

# Amateur Radio

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SEPTEMBER 1998

ICD 08241  
OSCAR SATELLITE COMMUNICATIONS ACHIEVEMENT RECOGNITION  
VUCC  
W7ID

# CQ

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- Both Temotu Province DXpeditions—One New Country, Two New IOTA Numbers  
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U.S.



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Jeff Bishop, W7ID, of Boise, Idaho

THE RADIO AMATEUR'S JOURNAL

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"The new ICOM IC-706MKII certainly offers a substantial level of improvement in a product that already had a great deal to offer. Not only has ICOM managed to make its best little radio even better, it kept the price the same!" - QST, January 1998

### Compact Size

Extremely small and compact, this radio packs all of the features of a top class HF rig in a mobile-sized unit.

- Dimensions: 167(w) x 58(h) x 200(d)mm (6-9/16 x 2-9/32 x 7-7/8 inches)
- 2.5 kg (5.5 lbs)

### HF+6M+2M

Cover all modes (SSB, CW, RTTY, AM and FM) from HF to 6 meters AND 2 meters. A powerful 100 watts of output power on HF and 6 meters with 20 watts on 2 meters.

### Easy Operation

Switch bands with the touch of a button! The individual band change keys provide quick and easy QSY - the SUB DIAL for easy second VFO operation and RIT adjustment control. Each band stores pre-amp/attenuator and tuner ON/OFF settings.



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- Enhanced 0.03-200 MHz broadband all mode receive
- Slots for 2 optional crystal filters
- Quiet Thermally Controlled Cooling Fan
- Crossband Split Operation
- Superior Transmit Audio Characteristics
- Large Speaker
- Tone Squelch (option UT-86 required)
- New 350 Hz RTTY Filter (opt. FL-232)

- Detachable Front Panel (Option OPC-581 required)
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- Optional PS-85 DC Power Supply
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10, 15, 20 Meters  
9 Elements on a 28 ft (8.6m) Boom  
Optional 40 Meter Kit

# BIG THUNDER SERIES

X<sub>9</sub>



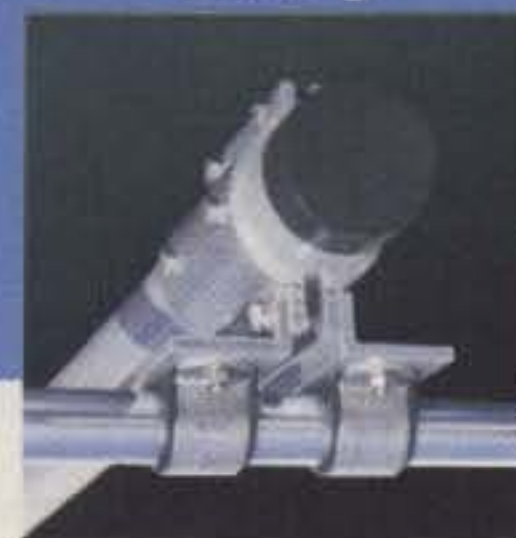
X<sub>7</sub>

10, 15, 20 Meters  
7 Elements on an 18 ft (5.5m) Boom  
Optional 40 Meter Kit

Boom to Mast Clamp



Element to Boom Mounting



## The Performance Tribander for the DX Years Just Ahead

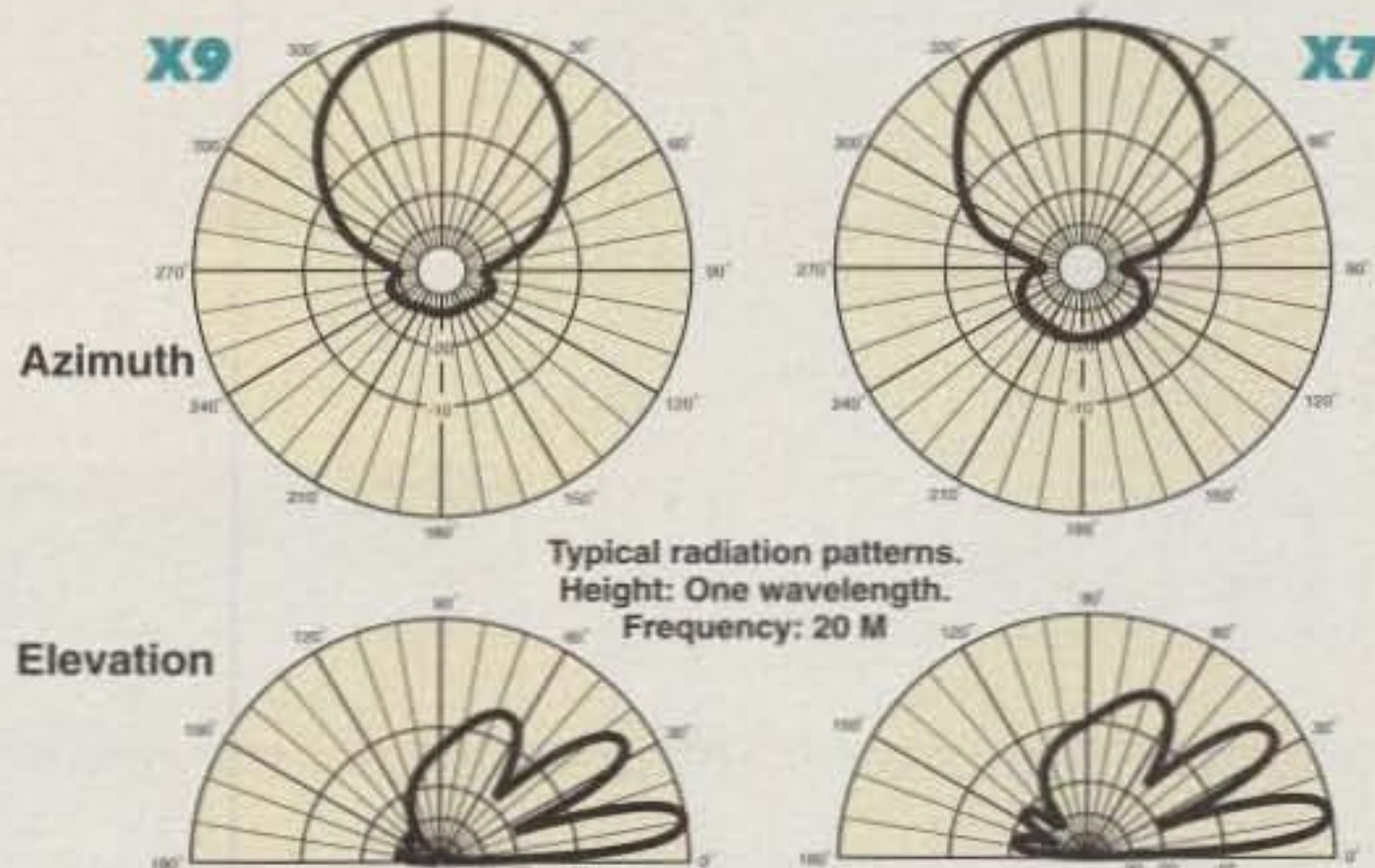
- ▶ New High Efficiency Computer Optimized Design for Maximum Gain and Ultra Clean Radiating Pattern
- ▶ 100+ MPH Construction for Best Reliability and Long Life
- ▶ NEW 4L Log Cell Driven Elements for better VSWR Bandwidth
- ▶ Trapless Driven Elements and Reflectors for Reliable Power Handling
- ▶ Interleaved Element Design for Mono-Band Performance
- ▶ Add-on kits available for 40 Meters

The new X9 and X7 Triband Yagis are geared to set new standards in both radiating performance and mechanical reliability. Cushcraft's product development team has employed the latest computer modeling technology

to achieve a superior electrical design as well as elegant new mechanical hardware and assembly techniques.

Each mechanical component was designed to 100+ MPH wind survival with a 1.25 safety factor. Traps were eliminated from the high current driven elements and reflectors using the new 4L Log Cell design, which yields virtual monoband performance and maximum power handling capability. Traps are employed only in the lower current directors for increased gain and sharper pattern. The result is a truly high performance antenna family which will easily handle the legal limit.

SPECIFICATIONS	X9	X7
Frequency Coverage (Meters)	10, 15, 20	10, 15, 20
Total number of Elements	9	7
Maximum Gain (dB)	20M 13.0 @ 14 deg	12.5 @ 14 deg
@ One Wavelength	15M 13.9 @ 12 deg	13.0 @ 12 deg
	10M 14.0 @ 15 deg	12.9 @ 14 deg
Maximum Front to Back Ratio (dB)	30	30
Number of Elements per Band	4	3
VSWR Minimum	1.1:1	1.1:1
VSWR 1.5:1 Bandwidth (KHz)	20M 350	600
	15M 450	750
	10M 1500	1700
Longest Element, ft (m)	36.5 (11.12)	37.2 (11.33)
Turning Radius, ft (m)	21.7 (6.61)	20.0 (6.09)
Boom Length, ft (m)	28 (8.53)	18 (5.49)
Boom Diameter, in (cm)	2-1/2 (6.35)	2-1/2 (6.35)
Maximum Mast Diameter OD, in (cm)	2-1/2 (6.35)	2-1/2 (6.35)
Maximum Wind Survival, mph (kph)	>100 (>161)	>100 (>161)
Maximum Wind Surface Area, ft <sup>2</sup> (m <sup>2</sup> )	9.9 (.92)	7.9 (.73)
Windload @ 80 mph, lb (kg)	255 (116)	202 (92)
Maximum Power Handling (KW)	2	2
Weight, lb. (kg)	85 (38.5)	60 (27.2)
List Price	\$995	\$675



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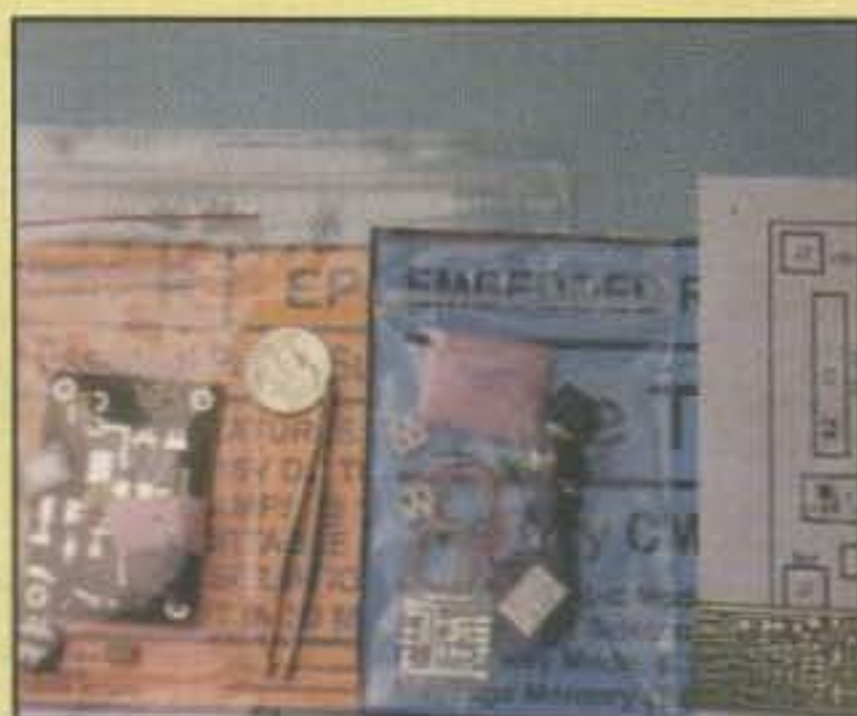
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**ON THE COVER:** When Jeff Bishop, W7ID, of Boise, Idaho wants to get away for a while and relive the golden days of yesteryear, he heads for his vintage operating position. (He also has a modern gear setup.) He has some prime examples of Collins, National, E.F. Johnson, and Hallicrafters gear from which to chose. (Photo by Larry Mulvehill, WB2ZPI)

# Shoot for the Stars

Kenwood's TS-570D/S(G) HF Transceiver incorporates an Advanced Technology Upgrade that propels your operating experience beyond the galaxy.

**NEW!**  
Sky Command Operating System  
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Kenwood has not been standing still since the introduction of the TS-570D/S HF Transceiver last year. Now you can command even more of Kenwood's advanced DSP technology with the G model.

The **DSP** filters and extracts signals with digital technology that is unmatched with standard analog circuits. It provides **CD-class transmit and receive audio quality** that can be shaped to your needs, and two powerful noise reduction systems: **Line Enhancer Method** for SSB/AM modes, and **Speech Processing by Auto Correlation (SPAC)** for CW mode. DSP also enables the **CW-Auto Tune** feature that automatically zero-beats CW signals.

The **Extensive Memory Functions** provide a bank of 100 memory positions split into 90 standard channels for general operation and 10 for programmable VFO, programmable scan and long-term memory. Memory contents can be scrolled, copied or locked out. In addition there are **5 quick memories** for storing frequencies and modes on the fly, perfect for the busy DX contest.

The powerful **Menu System** incorporates **46 menu features** and an **on-line guide** for instant reference. The **large amber backlight LCD display** provides 4 light levels for clear readability under any lighting conditions.

The TS-570D/S has no shortcomings in the construction and performance area. The **continuous-duty 100 watt transmitter** incorporates a large

heavy-duty heat sink with integrated cooling fan for non-stop operation even under extreme environmental conditions. The **wide-band receiver** is rock-stable from 500 kHz through 30 MHz with **dual pre-amps** and **dual bandpass filters** for exceptional selectivity and sensitivity.

With the features and performance of a high-end radio integrated into an affordable mobile-size package, the TS-570D/S is the perfect choice for the field or to build a full station around at home.

- ▶ Beat cancel
- ▶ 2 position antenna switch
- ▶ CW auto tune adjust (a world's first)
- ▶ Channel scan, program band scan, memory scan with channel lock-out and group channel scan, all with TO (time operated) or CO (carrier operated) resume modes
- ▶ Compact 10-5/8 inch by 3-3/4 inch front panel size for any travel or installation requirement
- ▶ Preset auto antenna tuner with 18 sub-bands
- ▶ Variable electronic keyer (0 and 100 wpm)
- ▶ Packet and FSK features
- ▶ RCP-2 software for PC-based display and memory configurations available via the Internet
- ▶ Full functionality on 6M (TS-570S) including DSP, 100 watts output and preset Auto Antenna Tuner
- ▶ QRP output adjustable from 5 to 100 watts

### TS-570D/S (G) new features

- ▶ TX sound quality monitor with 9-step monitor volume for absolute control over voice quality
- ▶ NR1 (SSB) is operator controllable in 9-step increments, or automatically tracks input signal strength
- ▶ New CW DSP Filters (80 Hz, 150 Hz and 500 Hz) give you a total of 11 user-selectable filters
- ▶ NR1 and NR2 settings can now re-configure automatically when changing mode groups (SSB/AM/FM to CW/FSK)
- ▶ Manual weight feature (with built-in electronic keyer) for adjusting the relative length of dots and dashes in 16 steps between 1:2.5 and 1:4.0
- ▶ Equalize receive signals, and use different settings for both TX and RX
- ▶ "One-touch" DSP filter wide mode allows 'resurfacing' to check the band conditions when operating in narrow mode
- ▶ Dual selectable Beat Cancel (BC) works against intermittent beat interference (except in CW mode)
- ▶ CW auto tune mode links only with the RIT frequency without changing the transmit frequency.

Advance Technology Upgrade is available in new production models and for pre-existing TS-570D/S; contact your dealer for details.

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# ZERO BIAS

## AN EDITORIAL

Logs to the right of me. Logs to the left of me. Logs all over the place. Paper logs, electronic logs, amended logs, and even lost logs from previous years. It's September, and the results of sifting, sorting, tabulating, and checking all of the CQ WW DX SSB logs are published in this issue. If anyone needs a benchmark or a magic moment to let him know that the whole world is out there once again, just check the results. The number of people who entered the WW contest in 1997 year zoomed up in comparison to the previous year. I'll bet that the number of individual calls used for credit also skyrocketed to an all-time high.

So what does all of this activity provide, promise, and portend for amateur radio? First it proves that you can work some great DX on most bands and in significant numbers. Second, it proves that the best of Cycle 23 is yet to come (and it will). Third, with everyone talking about the restructuring of our licensing system, we have the distinct possibility of having very large numbers of amateurs now eligible to operate in contests or work DX on many other HF bands. What it means on one level is that somewhere down the line in the not too distant future we may have a turnout for the CW WW increase by several orders of magnitude.

On an emotional level and an amateur radio level the above paragraph couldn't be better news. It's the kind of amateur radio that a lot of us dream about. So what's the problem? One major problem that we live with and will continue to live with in the foreseeable future is our amateur radio economy. It's not great. It's not booming, and we're going through some pretty rough times. It's no shock or surprise to see the dearth of dealers in amateur radio gear. Most of us simply accept it as the way things are. When Mr. Greenspan or Mr. Rubin speaks about the economy on TV, a lot of us find that our eyes glaze over just as we change channels and find something either happier or more understandable. However, what they may have to say does impact our hobby.

Maybe it's so obvious that we simply take it for granted. For those who have to see it in black and white in order for it to have meaning, let me state an obvious truth. Most of our equipment (you know, the great stuff we want, have, or covet) and most of the components that go into making up that gear, as well as the rest of the consumer and amateur gear we enjoy, is manufactured in Asia. When the various Asian countries have serious economic problems, sooner or later the problems filter down to amateur radio. Whether it's the value of the currency, the import/export exchange rate, their cost of doing business, or what have you, it comes down to whether or not our market is viable, big enough, and most important, profitable.

I guess that you could define *viable* as significant units of equipment being sold and an increasing dealer network. Well, nobody, outside of each individual company, knows exactly how many units are sold. Some may want to venture a guess, but the only outward indicator that the demand is great would be an increased distribution and dealer network. That's something we all can see, if it's there. Is the market big enough? If we look strictly at total numbers and growth potential, we would have to say yes. However, there's always that viable question. The big question to answer is, are we a profitable market overall?

Before we go into a quick review of Economics 101, let's take a quick look at how, for the most part, we really are. Years ago, when we were a much smaller group, we tended to be technocrats, building a lot of our own gear simply because we couldn't buy it. Most of this homebrew gear was a replication of a design featured in a magazine or handbook. Some of us still do that. However, as equipment became more and more complicated and certainly more sophisticated, companies sprang up to supply us with "store-bought" gear. It simply provided, at an economy of scale, things we suddenly wanted that we could no longer provide for ourselves. We slowly moved over from technocrat to technophile. As rigs became increasingly complex, we satisfied that "technocrat" need by becoming facile and adept at mastering 83 controls on a transceiver, rather than trying to design and build one. On one level we feel good technically without having to worry about what goes on behind the front panel.

We've evolved into a group who can pass a test based on abstract concepts (the things that go on behind the front panel) that we couldn't point out or, if need be, repair. It's enough that we can master the 83 controls (well, maybe most of them) and use them at will. We are basically consumers of finished goods. It's not bad or good; it's just the way things are. The one basic truth, though, is that as a group we're not going back to "the good old days" when we built all of our own gear from scratch.

The quandary comes these days with the concept of profit. Let's assume for a moment that you're a Japanese manufacturer, Mr. X, who puts out a great little rig, the "X-15 Zoomer." The unit is priced to sell for 100,000 yen and Mr. X (you) contracts to provide 5,000 units for the U.S. market. Things look great. The yen to dollar exchange is 100 to 1, and so the X-15 Zoomer produces \$1,000 per unit. There's a reasonable profit on each unit sold, and by virtue of 5,000 units, the X Company should do well. Well, things change in the economy, and now the exchange ratio is about 140 yen to the dollar. Your accountant comes to you, Mr. X, and tells you that "we" have a problem. Instead of receiving the

equivalent of \$1,000 for each X-15 Zoomer, we're now receiving \$714.29, leaving us \$285.71 in the hole for each unit. Not only are we not making a small profit, we're losing money. Well, we have two basic problems to face. The first is that we have a contract and simply can't change the price because we want to. Second, even if we could change the price in the U.S. market, increasing it by \$285.71 per unit so we could stay even and in the same place, the increase would cause sales to plummet. Either way, you, Mr. X, lose. The only decision you are forced to make is how long you are willing and the company is able to subsidize sales of the X-15 Zoomer.

Generally, we as amateurs tend to think that most things attached to amateur radio are too high-priced as it is, and so we would have very little sympathy for Mr. X, his company, and his financial problem. The fact that our local, regional, or national dealer is also caught up in Mr. X's problem doesn't seem to matter as long as we can still get something from someone, and get it at the lowest possible price.

The economic problems facing Mr. X in some ways are similar to the economic problems of those trying to put on a successful hamfest. A number of people resent the price of admission and/or parking fee for the event. Most of us who attend or exhibit at hamfests don't really concern ourselves with renting the facility, utilities, insurance, custodian services, etc. We tend to "see" a lot of people who volunteer their time and services usually on behalf of a club or group. We do see, and expect to win, raffles and prizes for great stuff that magically appears on some table or dais. We also expect to see and hear noted speakers—experts in various areas of amateur radio—and never think about how these people traveled to the event, where they are staying, and where they are eating. No, these people by and large do not spend their own money to do all these things just to make us happy. We really tend to expect an awful lot for the price of a movie, popcorn, and a soft drink (which gives you about two hours of entertainment and no prizes). For the same money, usually you can get two days of entertainment, plus the chance to take home a great prize. If that makes you unhappy and feeling ripped-off, then go to the movies.

The bottom line, as they say, is that it's probably the best time to invest in some new gear, as the prices will have to go up or some of the gear will become unavailable. Try to remember that it has nothing to do with you personally, or the amateur radio hobby. It's simply world economics and arbitrage. What is up to you are hamfests. If they became unprofitable and money losers, they too will slip into amateur radio history and lore. We have a very rich history of things that aren't around anymore. 73, Alan, K2EEK

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# ANNOUNCEMENTS

**YLRL Howdy Days**, 1400Z Sept. 18 to 0200Z Sept. 20. YLs only (send member or nonmember). Two points per QSO with member, 1 point per QSO with nonmember. Use max 750W CW, 1500W SSB. RTTY contacts allowed. Frequencies 3.550, 3.950, 7.050, 7.250, 14.050, 14.276, 21.133, 21.388, 28.176, 28.376. Awards. Send logs postmarked within 30 days to Cleo Bracket, K0JFO, 810 Towne Square Dr., Fremont, NE 68025-7000. Work only 24 hours.

\*The following special events are scheduled for September:

**ND1U**, from 100th anniversary of the First North American Wireless Transmission, Notre Dame, IN; 1600-2359Z Sept. 5; SSB 7.250, 14.250; CW 7.035, 14.035. For commemorative QSL send QSL and SASE to Notre Dame Amateur Radio Club, 226 COBA, University of Notre Dame, Notre Dame, IN 46556.

**K2BR**, from Miss America Pageant, Atlantic City, NJ (Absecon Island, IOTA: NA111); 1400Z Sept. 14 to 0300Z Sept. 20; phone 28.325, 21.325, 14.250, 7.250, and CW 28.065, 21.090, 14.090, 7.090. For QSL send QSL and #10 SASE to SCARA, P.O. Box 121, Linwood, NJ 08221.

**W2OW**, from 150th anniversary of Starucca Railroad Viaduct, Binghamton, NY; Binghamton ARA; 1300Z Sept. 12 to 2100Z Sept. 13; on 14.250, 28.450, 7.250, 21.350. For certificate send QSL to W2OW, P.O. Box 853, Binghamton, NY 13902.

**W2UXC**, to commemorate the Battle of Plattsburgh during the War of 1812; CVARC of Morrisonville, NY; 1300-1800Z Sept. 12-13 on 7.260 and 14.260 MHz. For QSL, send SASE to CVARC, P.O. Box 313, Morrisonville, NY 12962.

**WA2VJA**, from "CQ Labor Day," Nutley, NJ; Robert D. Grant United Labor ARA; 2200Z Sept. 4 to 2200Z Sept. 7; on 28.420, 52.525. For certificate send name, address and QSL to: R.D.G.U.L.A.R.A., P.O. Box 716, Nutley, NJ 07110-0716.

**K3TU**, 40th anniversary of Temple University ARC, Philadelphia, PA; 1600-2100Z Sept. 12; within 20 kHz of 7.250, 14.250, 28.350 MHz. For QSL send QSL to Dennis Silage, K3DS, 3312 Saw Mill Rd., Newton Square, PA 19073.

**W3PIE**, from 60th anniversary of Uniontown ARC, Uniontown, PA; Sept. 5; 0000-0300Z on 147.045-3.95 and 1200-1800Z on 147.045-7.25-14.3. For certificate send QSL and SASE to: UARC Inc., 465B Old Pittsburgh Rd., Uniontown, PA 15401.

**W4V**, from Virginia Beach, VA, to celebrate VA Beach Hamfest, 1600Z Sept. 12 to 1600Z Sept. 21; on 3.947, 7.280, 14.296. For more information, QSL Ed Williams, KN4KL, 3881 Windsor Gate Rd., VA Beach, VA 23462.

**KS4DC**, from Dickenson County, VA Pioneer Days; 1600-0400Z Sept. 19; General portion of 10-160 meters. QSL information will be given at time of contact (SASE).

**KB8UUZ**, from National POW/MIA Awareness Week, Freedom Township, OH; 2100Z Sept. 16 to 0300Z Sept. 21; 80, 40, 20 meters lower General, 10 and 6 meters. For 8 x 10 certificate send large SASE to Tom Parkinson, KB8UUZ, 9992 State Route 700, Mantua, OH 44255.

**W9BPT**, to celebrate Thomson Melon Days, Thomson, IL; Palisades ARC and 90 West DX Assn.; 1700-2100Z Sept. 6; lower portion of General 40 and 20 meter bands. For certificate, send QSL and 9 x 12 inch SASE to Bob Plumley, K9IEG, 1123 West Main St., Thomson, IL 61285.

**VE3MIS**, Halton County Radial Railway, Mississauga, Ontario, Canada; 1430-2000Z Sept. 26-27; SSB 3.930, 7.230, 14.240, 18.130, 21.330, 24.940, 28.340 MHz,  $\pm$ QRM. For QSL send SASE

to MARC, c/o Michael Brickell, VE3TKI, 2801 Bucklepost Crescent, Mississauga, ONT L5N 1X6, Canada. (Note: US stamps cannot be used to send mail from Canada to the US.)

\*The following hamfests are scheduled for September:

Sept. 5, **The Uniontown Amateur Radio Club's 49th Annual Gabfest**, club grounds, Uniontown, PA. Contact Carl, WA3HQK, or Joyce, KA3CUT, Chuprinko, Rt. 6 Box 231-CC, Morgantown, WV 26505 (304-594-3779).

Sept. 5, **Ottawa ARC's 2nd Annual Hamfest**, Carp Agricultural Fair Grounds, Carp, ONT Canada. Call Jim Cummings, VE3XJ, 613-446-1225, or e-mail: <fleamarket@oarc.net>; web: <http://oarc.net/fleamarket>.

Sept. 5, **Queen Wilhelmina Hamfest**, Queen Wilhelmina State Park, De Queen, AR. Contact QW Hamfest Assn., 415 Crosstrails Road, De Queen, AR 71832; e-mail: <blee@alltel.net>.

Sept. 12, **46th Annual W9DXCC Convention and Banquet**, Holiday Inn, Rolling Meadows, IL. Contact Bill Smith, W9VA, 847-945-1564; e-mail: <w9va@aol.com>; <http://www.qth.com/w9dxcc>.

Sept. 12, **TSARC 21st Annual Hamfest & Computer Show**, Wheeling Park, Wheeling, WV. Contact TSARC 2011 St., Hwy 250, Adena, OH 43901, (740-546-3920; fax 740-546-3685), or e-mail: <k8an@aol.com>.

Sept. 12, **Saratoga County R.A.C.E.S. Hamfest '98**, Saratoga County Fairgrounds, Ballston Spa, NY. Contact Darlene Lake, N2XQG, 84 Wilton Mobile Park, Saratoga Springs, NY 12866 (518-587-2384), packet: <n2qg@wa2umx>; e-mail: <lake@capital.net>. (Exams)

Sept. 12-21, **Virginia Beach Hamfest**, Virginia Beach, VA. Call W1WTG, Charlie Chapman, 207-655-2104 or 757-340-8812.

Sept. 13, **1998 ARRL Hudson Division Convention**, Briarcliffe College, Bethpage, Long Island, NY. Contact Diane Ortiz, K2DO, <hamyl@aol.com> or 516-286-7562, or visit the Hudson Div. website: <http://arrl-hudson.org>. (Exams)

Sept. 19, **Lake of the Woods Repeater Assn. Hamfest & Banquet**, Warroad Area Community Center, Warroad, MN. Contact David Landby, KB0HAP, Rt. 3, Box 10, Warroad, MN 56763 (218-386-1092).

Sept. 19, **South Jersey Radio Assn. Hamfest**, Mt. Holly Armory, Route 38, Mt. Holly, NJ. For more information and map on the Internet: <www.sjra.org>; or call N2XYZ, 609-268-2135, or <N2XYZ@juno.com>.

Sept. 19, **Rhode Island FM Repeater Service '76 Auction & Fleamarket**, VFW Post 6342, Forestdale (No. Smithfield), RI. Contact Rick Fairweather, K1KYI, 106 Chaplin St., Pawtucket, RI 02861, <k1kyi@juno.com> or call 401-725-7507 (7-8 PM only).

Sept. 19, **Sonoma County Radio Amateurs Swapmeet**, Holy Ghost Hall, Sebastopol, CA. Contact Colleen Dean, KF6DHA, 5324 Huckleberry Way, Santa Rosa, CA 95403 (707-578-4098; e-mail: <KF6DHA@cdsl.net>; <http://www.cdsl.net/scra>. (Exams)

Sept. 19, **Greater Louisville Hamfest/ARRL KY State Convention**, Kentucky Fair & Exposition Center, Louisville, KY. Call 812-282-7007, or 812-948-0037; web <http://www.thepoint.net/~GLHA>.

Sept. 19-20, **ARRL Alaska State Convention**, Anchorage, AK. Contact KL7AA, Anchorage ARC, P.O. Box 101987, Anchorage, AK 99510-1987.

Sept. 19-20, **The 43rd Weinheim, Germany VHF Convention**, Weinheim, Germany. Lecture topics include new modules and aeriels, types of modulation and conduct on the air. The exhibition

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Sept. 20, **Garden State Hamfest '98**, Veteran's Park, Hazlet, NJ. Contact GSARA, P.O. Box 34, Fair Haven, NJ 07704; web: <http://www.monmouth.com/~gsara>. (Exams)

Sept. 20, **Tailgate Electronics, Computer & Amateur Radio Fleamarket**, Albany and Main St., Cambridge, MA. Call 617-253-3776.

Sept. 20, **Adrian ARC's 26th Annual Hamfest & Computer Show**, Lenawee County Fairgrounds, Adrian, MI. Contact Brian J. Sarkisian, KG8CO, 517-265-1537, or <kg8co@lni.net>; ARC web: <http://www.LNI.net/w8tqe>. (Exams)

Sept. 20, **Western Connecticut Hamfest**, Edmond Town Hall, Newton, CT. Contact Ken KD1DD, Box 3441, Danbury, CT 06813-3441, or call 203-743-9181.

Sept. 20, **42nd Annual York, PA Hamfest & Computer Show**, York County Area Vocational Technical School, York, PA. Contact York Hamfest, P.O. Box 351, Dover, PA 17315; <http://www.yorkhamfest.org>; <w3sst@juno.com>. (Exams)

Sept. 20, **Communications Expo '98**, Cincinnati, OH. Contact Jim Weaver, K8JE, 513-825-2868, web <http://w3.one.net/~rkuns/expo98/>. (Exams)

Sept. 20, **L'Anse Creuse ARC Swap 'n Shop**, L'Anse Creuse High School, Mt. Clemens, MI. Contact Richard Dzick, N8MQU, Box 180072, Utica, MI 48318-0072 (810-268-4671; e-mail <n8mqu@aol.com>). (Exams 9 AM, contact Don Olszewski, WA8IZV, 810-294-1567.)

Sept. 25-26, **Pacific Northwest VHF Conference**, Bend, OR. Contact Don Krug, K7HSI, 1126 NE Burnside, Bend, OR 97701, <ghcdk@teleport.com>; 541-382-7561. Program includes 2 meter DSP, aurora, 10 GHz systems, and roving.

Sept. 25-27, **Moose Swappers Hamfest & Computer Fleamarket**, Lancaster Fairgrounds, Lancaster, NH. Contact Russ, N1YZE, 603-922-5514; e-mail <cusvt@together.net>. Moose Swappers Hamfest, P.O. Box 614, Berlin, NH 03570. (Exams)

Sept. 26, **Amateur Electronics Swapfest**, Women's Building, State Fairgrounds, Huron, SD. Contact Lloyd Timperley, WB0ULX, P.O. Box 205, Huron, SD 57350; 605-352-7896 eves, or e-mail: <wb0ulx@santel.net>. (Exams)

Sept. 26, **23rd International Hamfest/Computerfest**, Chemung County Fairgrounds, Horseheads, NY. Contact Elmira Hamfest, c/o Dave Lewis, 465, CR 13, Van Etten, NY 14889 (SASE), or call 607-589-7495. (Exams)

Sept. 26, **Fall Fest '98 Hamfest**, Tall Cedars of Lebanon Picnic Grove, Hamilton Twp., NJ. Call 609-882-2240; web <www.slac.com/w2zq>; or write to Hamcomp '98, DVRA, P.O. Box 7024, West Trenton, NJ 08628.

Sept. 26, **The Daytona Beach Hamfest & Computer Show**, Embry Riddle Aeronautical University campus, Daytona Beach, FL. Contact John Munsey, KB3GK, 19 China Moon Dr., Ormond Beach, FL 32174 <munseyj@worldnet.att.net>; or call 904-677-8179. (Exams)

Sept. 26-27, **W7DP Hamfest**, Community Building, Milton-Freewater, OR. Contact Denise Hebel, KC7ORO, 509-527-0411, or e-mail: <dhebel@bmi.net>.

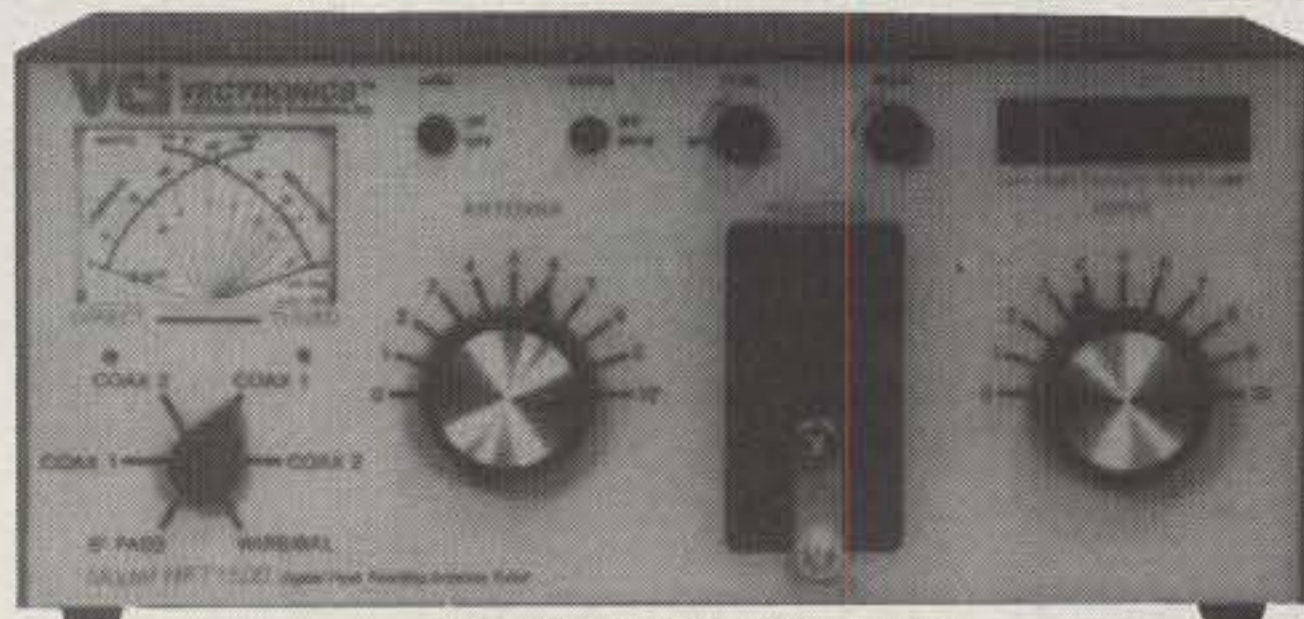
Sept. 27, **Giant Electronic Flea Market**, Lincoln H.S., Yonkers, NY. Contact Otto Supliski, WB2SLQ, 53 Hayward St., Yonkers, NY 10704 (914-969-1053). (Exams)

Sept. 27, **Eighth Annual Hamfest & Computer Show**, New Port Richey Recreation Center, New Port Richey, FL. Call Chuck, KU4EV, 813-937-2540; or e-mail: <cfowler995@aol.com>.

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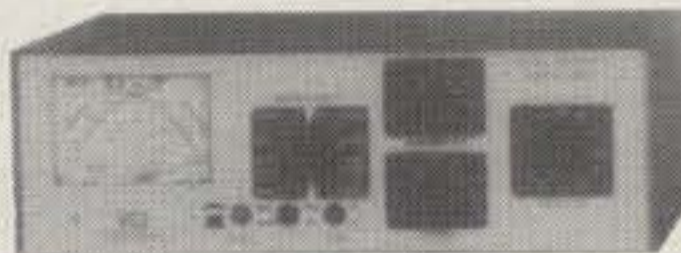
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# Results of the 1997 CQ WW DX SSB Contest

BY BOB COX\*, K3EST

Whether you are a first-time contestant or a veteran, each entrant in the CQ WW will be caught up in the Fall "contest fever." Contest fever can be defined as a single-minded concentration on improving your station, learning about propagation, and spending endless hours talking to friends about strategy and band openings over the phone or over a beer. The fun of catching a few new ones, testing out a new antenna system, and competing on all levels brings into focus what contesting is all about: fun, improvement, competition, and knowledge.

The 1997 WW SSB Contest yielded about 3500 logs when everything was finally tabulated, a number which reflects an 8% increase over 1996. With the Internet playing a big role in the submission process, about 1750 logs were received electronically. With conditions continuing to improve, the 1998 contest season should prove to be fantastic.

## Single Operator High Power

What can be said about the competition for the world top score? It started off as a battle between many stations and ended up a hard-fought duel between two members of the CQ Contest Hall of Fame! ZD8Z operated by Jim, N6TJ, took the long trip back to ZD8, while Martti, OH2BH, put EA8BH into the race. These two multiple winners of the CQ WW SSB (OH2BH three times, N6TJ four times) brought with them their considerable experience and skill. After all the log checking was finished, both ended up with A+ logs. Out of a total of almost 28 million points between their scores, only 80+K made the difference for ZD8Z, who took the world trophy. Martti finished second, while P40W operated by John, W2GD, armed with a new alarm clock, took third. Africa was well represented in the top ten box, taking five spots.

The top USA position went to Tom, W2SC, operating at K5ZD/1. It was Tom first win. Congratulations! Second place went to Dean, N6BV/1, whose stacked tribanders sure did the job. Dean will soon be N6BV/6. A race took place for the top W9 place between Mike, W9RE, and Jerry, WB9Z. Mike took 7th place USA and Jerry 8th. And a far west zone 4 station broke the top ten barrier. Steve, N2IC/Ø, talked his way to 9th in the US.

4N9BW(YU7BW) was sure in the right spot. Operating in eastern Yugoslavia, he took the top spot in Europe. The real battle was for second place. Five stations were within 200,000 points of one another. Steve, GW4BLE, emerged to take second place in Europe.

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Kell, SMØATN, part of the SMØBGM Multi-Single team, is 86 years young.

The top Oceania score was V8EA (JO1RUR). Hajime's callsign keeps getting smaller. Second place went to Al, NH7A. There are quite a few miles between those two.

The top Asia score was Hamad, 9K2HN, whose booming signal put zone 21 in a lot of logs. He was followed by the Bavarian Contest Club station of JY9QJ, while JH4UYB took time off from his dental clinic to take the top honors in Japan.

## Single Operator Low Power

This category of operation continues to be very popular, with big scores distributed worldwide. This year the scoring was dominated by Carlos, TI2CF, piloting his mega-antenna farm at TI1C to a new world record. In smashing the old record, the more southerly location, bigger antenna systems, and thirty years of experience paid off, as Carlos amassed a terrific multiplier to go with his big QSO total. Second-high in the world and North America was VP9ID (AJ2U) from beautiful Bermuda, with a more modest station and notably accurate log. OD5NJ in Asia took third place world with a nice effort from a rare country. LU2NI steered LQØN to fourth place and top South America, followed by EA7WA and TR8IG with winning efforts from Europe and Africa, respectively. Perhaps surprising-

ly, no Caribbean station was in the upper echelons of scoring, as no entry from there broke one million points.

In the Single Op, All Band, Low Power USA category things really got a good shake-up this year. The final order of finish looks substantially different than the claimed scores. For the first time ever in the CQ WW, a YL has earned the first-place slot in a major category (and, I might mention, the category with the largest number of entrants, too!). A hearty congratulations to Ann, WA1S, for winning the category and for being the only score to stay over the 1 million point mark after the log checkers had finished their work. Her score certainly will be noticed in the Yankee Clipper's final tally. And another big congrats to WD5K for taking second place, from zone 4 no less! This is really exciting and should provide lots of encouragement to everyone else in zone 4 to give it their all; it *can* happen, so give it try! The third place finisher was John, K2AZ, from northern New Jersey. He contributed 974k to the FRC's bottom line. And from the West Coast, in 10th position, was WA7BNM who seems to make the top 10 annually. A great job, indeed.

In Europe, EA7WA outdistanced second-place finisher LY3BA by over half a megapoint. TM6A operated by F5UFX took third place. The difference between 5th and 10th place was only 83k! Congratulations to all for a job well done!

## QRP

QRP is always a fun category (after the contest is over), but requires lots of stamina, hard work, and perseverance during the contest. The top three spots this time were spread out among Europe, Oceania, and North America. Number one in the world for QRP went to YU1KN with an honest 370k score. The battle for second place was very tight, with KH6/NØKE edging out KD2TT by just six tenths of one percent! Their scores were 301k and 299k, respectively. As the sunspots pick up, those QRP scores will again topple the one meg barrier. Two QRP records did fall this time: NC6M (Op. W6REC) for 75 meters North America and KR2Q for 40 meters North America.

## Assisted

The Single-Operator Unlimited class was topped by two European stations this time. TM2V, operated by F6GYT, outdistanced the pack handily with a fantastic QSO total. Roland, DK3GI, at club station DLØWW, was a comfortable second thanks to his excellent multiplier. Third in Europe and fifth overall was Z38G from Macedonia, the first entry in Single-Op Unlimited from that country.

## TROPHY WINNERS AND DONORS

- SINGLE OPERATOR**  
**World All Band**  
**ZD8Z (Opr. Jim Neiger, N6TJ)**  
 Donor: Dave Rosen, K2GM  
 WA2RAU Memorial
- World Low Power**  
**TI1C (Opr. Carlos M Fonseca, TI2CF)**  
 Donor: Slovenian Contest Club
- World QRP**  
**Sasa Djokic, YU1KN**  
 Donor: Doc Sayre, W7EW
- World Assisted**  
**TM2V (Opr. Andre Ginguene, F6GYT)**  
 Donor: Snake River Contest Club
- U.S.A.**  
**K5ZD (Opr. Thomas Georgens, W2SC)**  
 Donor: Potomac Valley R.C.  
 KC8C Memorial
- U.S.A Low Power**  
**Ann M. Santos, WA1S**  
 Donor: North Coast Contesters
- U.S.A. Zone 3**  
**W7AT (Opr. Lew Sayre, W7EW)**  
 Donor: Bill Fisher, KM9P/4
- U.S.A. Zone 4**  
**Mike Wetzel, W9RE**  
 Donor: Dennis O'Connor, K8DO
- Canada**  
**VE3EJ (Opr. Jeff Steinman, N5TJ)**  
 Donor: Niagara Frontier Int'l DX Assn.  
 VE3WT Memorial
- Caribbean/C.A.**  
**FG5BG (Opr. Ryuichi Nakano, JF2DQJ)**  
 Donor: Alex M. Kasevich, VP2MM
- Europe**  
**4N9BW (Opr. Robert Homolja, YU7BW)**  
 Donor: Potomac Valley R.C.  
 W4BVV Memorial
- Europe Low Power**  
**Angel Martinez Claus, EA7WA**  
 Donor: Scott Jones, N3RA & Tim Duffy, K3LR
- Africa**  
**EA8BH (Opr. Martti Laine, OH2BH)**  
 Donor: Gordon Marshall, W6RR
- Asia**  
**Hamad J Al Nusif, 9K2HN**  
 Donor: 2 AM Dayton Pizza Gang
- Japan**  
**Masaki Okano, JH4UYB**  
 Donor: Japan Crazy Contesters Club
- Oceania**  
**V8EA (Opr. Hajime Kato, JO1RUR)**  
 Donor: Northern California DX Club
- South America**  
**P40W (Opr. John Crovelli, W2GD)**  
 Donor: Yankee Clipper Contest Club
- South America—Mainland**  
**HC5C (Opr. Robert Woods, W5AJ)**  
 Donor: Jose L. Bachmann, ZP6CC  
 & Cesar Ivaldi, ZP5K
- SINGLE OPERATOR, SINGLE BAND**  
**World—28 MHz**  
**Arturo J Gargarella, LU6ETB)**  
 Donor: Joel Chalmers, KG6DX
- World—21 MHz**  
**ZX5J (Opr. Sergio Lima de Almeida, PP5JR)**  
 Donor: Robert Naumann, N5NJ
- World—14 MHz**  
**George Beasley, 5B4AGC**  
 Donor: North Jersey DX Assn.  
 K2HLB Memorial
- World—7 MHz**  
**IG9GSF (Opr. Fabio Grisafi, IT9GSF)**  
 Donor: Fred Laun, K3ZO  
 K7ZZ Memorial
- World—3.7 MHz**  
**Jerzy Smoczyk, SP3GEM**  
 Donor: Fred Capossela, K6SSS
- World—1.8 MHz**  
**Yuri Blanarovich, VX3BMV/1**  
 Donor: Robert Wruble, W7GG
- USA—28 MHz**  
**Chuck Dietz, KZ5MM**  
 Donor: Donald Thomas, N6DT
- USA—21 MHz**  
**Russell S. Rinn, N5LT**  
 Donor: Bill Gioia, K2EK
- USA—14 MHz**  
**Scott Detloff, K8DX**  
 Donor: Southern California DX Club
- USA—7 MHz**  
**Larry Pace, N7DD**  
 Donor: Stanley Cohen, WD8QDQ
- USA—3.7 MHz**  
**Robert Ferrero, W6RJ**  
 Donor: Arnold Tamchin, W2HCW
- USA—1.8 MHz**  
**K8MK (Opr. Pat Collins, K8LR)**  
 Donor: CQ Magazine
- Carib./C.A. (21 MHz)**  
**V47NS (Opr. Michael Treister, W9NY)**  
 Donor: Snake River Contest Club
- Europe—28 MHz**  
**9H0A (Opr. G. Morris, 9H1EL)**  
 Donor: Chod Harris, VP2ML
- Europe—21 MHz**  
**4O6A (Opr. Ranko Boca, YT6A)**  
 Donor: Tine Brajnik, S50A
- Europe—14 MHz**  
**IR4T (Opr. Fabio Ern Schettino, I4UFH)**  
 Donor: A.G. Anderson, GM3BCL
- Europe—7MHz**  
**Jiri Sanda, OK1RI**  
 Donor: Roger Burt, N4ZC
- Europe—3.8 MHz**  
**IR4T (Opr. Maurizio Panicara, I4JMY)**  
 Donor: Marconi Contest Club  
 I3MAU Memorial
- Europe—1.8 MHz**  
**Ceho Dusan, YU1EA**  
 Donor: Robert Kasca, S53R
- Japan—21 MHz**  
**Ooshika Tarou, JI2UNR**  
 Donor: DX Family Foundation
- Japan—14 MHz**  
**Tom A. Tatomi, JA5OVU**  
 Donor: Take Yokoyama, JL1BLW
- MULTI-OPERATOR**  
**SINGLE TRANSMITTER**  
**World**  
**ZX0F (Oprs: N6KT, N5FA, ZP5JCY)**  
 Donor: Southern California DX Club  
 W6AM Memorial
- U.S.A.**  
**W2A (Oprs: W2XX, N2TX, KE2NL, K2UU)**  
 Donor: Carolina DX Association
- Calib./C.A.**  
**8P9Z (Oprs: K3KG, K3ZR, K4FJ)**  
 Donor: Eric Scace, K3NA
- Asia**  
**P3A (Oprs: RA9JX, RA9JR, RA8AM, RV8AR, UN7FZ, UA9MA, UA8ANW, UA8AGI, RZ3TX, UA3TT, UA9YAB)**  
 Donor: Edward L. Campbell, AH2BE
- Europe**  
**IQ4A (Oprs: I4VEQ, I4TJE, I4EAT, I4AVG, I4IKW, I4IND, I4YRW, IK4DCT, IK4MGP, IK4QJH, IK4EWK, IK4XQH, IK4CZF, IK2NCJ, IK2JUB, IK2MRZ, IW4ANU)**  
 Donor: Bob Cox, K3EST
- Oceania**  
**NH2C (Oprs: JG3RPL, JR3RVO, JI3ERV, JR7OMD, JK3GAD, JH7QXJ)**  
 Donor: Junichi Tanaka, JH4RHF
- South America**  
**HC8N (Oprs: N5KO, AG9A, HC1OT, VE3EJ)**  
 Donor: Jerry Boyd, K6BZ
- South America—Mainland**  
**ZW5B (Oprs: PY5EG, PY5CC, PY5GU, PY1KN, PY2BW)**  
 Donor: Tomas Zappini, ZP5AZL,  
 & Renato Bellucci, ZP5XF
- MULTI-OPERATOR**  
**MULTI-TRANSMITTER**  
**World**  
**PJ9B (Ops: WA3LRO, N3ED, K1DG, K3EST, KB2XZ, N4RV, N3BB, N7ZZ, K2SB, W3UM)**  
 Donor: W6NL and K6BL
- U.S.A.**  
**N2RM (Ops: N2RM, N2NT, N2AA, N7BG, N2NC, W2RQ, N2NL, KQ2M, K2BM)**  
 Donor: Paul Hellenberg, W9JA
- Europe**  
**TK5NN (Ops: TK5NN, TK5EP, TK5MH, TK1BI, DL4RDJ, DJ1OJ, DL4GBA, DL4MDO, DK6WL, DK4VW, DK8FD, DL4MCF, DL1MAJ, DL6RAI, DL3MAA)**  
 Donor: Finnish Amateur Radio League
- Japan**  
**JH5ZJS (Ops: JA5BJC, JA5FDJ, JA5JCC, JA5THU, JH5RXS, JR5JAO, JR5PDX, JR5VHU)**  
 Donor: Ryoza Goto, JH3JYS
- CONTEST EXPEDITIONS**  
**World Single Operator**  
**V8EA (Opr. Hajime Kato, JO1RUR)**  
 Donor: National Capital DX Assn.  
 Stuart Meyer, W2GHK Memorial
- World Multi-Single**  
**IH9/OL5Y (Oprs: OK1FUA, OK1MM, OK2ZW, OK1JR, OK2XTE, IT9HBT)**  
 Donor: The German CDXG & SDXG  
 DJ3NG & DJ4EI Memorial
- World Multi-Operator**  
**P29AS (Ops: P29AS, AB6BH, N6AA, N6TW, N6ZZ, W6XD)**  
 Donor: Tachio Yuasa, JA9VDA
- SPECIAL SINGLE OPERATOR AWARDS**  
**World—All Band Under 21 Years Old**  
**RK9CWW (Opr. Andy Chepurnoy, RA9CKQ)**  
 Donor: Gene Zimmerman, W3ZZ
- World All Band High YL**  
**Emily Thiel, P43E**  
 Donor: Yutaka Tanaka, JH3DPB

## TOP SCORES IN VERY ACTIVE ZONES

### ZONE 3

W7AT	1,965,258
K6NA	1,827,118
K6GX	1,518,066
W7VJ	1,456,618
W6NL	1,335,176
N7TT	1,227,096
N6RV	802,256
*WA7BNM/6	655,308
W7OM	654,720
W7SE	579,576

### ZONE 4

VE3EJ	8,240,550
W9RE	2,941,546
WB9Z	2,426,580
N2IC/Ø	2,418,327
K4AB	2,320,886
VX3AT	1,853,816
K8LN	1,216,626
K9GD	1,138,860
NN5ZZ	1,066,965
K9BGL	1,047,489

### ZONE 5

K5ZD/1	5,494,655
N6BV/1	4,057,986
W4AN	3,492,160
K3ZO	3,466,918
VO1MP	3,456,300
K4ZW	3,205,420
W3BGN	3,130,400
W1WEF	2,415,943
K2DM	2,138,030
VE1JX	2,137,448

### ZONE 14

GW4BLE	3,656,088
DL6FBL	3,630,750
EA3NY	3,503,424
EA4KD	3,255,828
DL2NBU	3,118,432

DJ4PT	3,023,258
*EA7WA	2,118,914
EA7BA	1,606,452
DJ6QT	1,515,220
F5RZJ	1,435,760

### ZONE 15

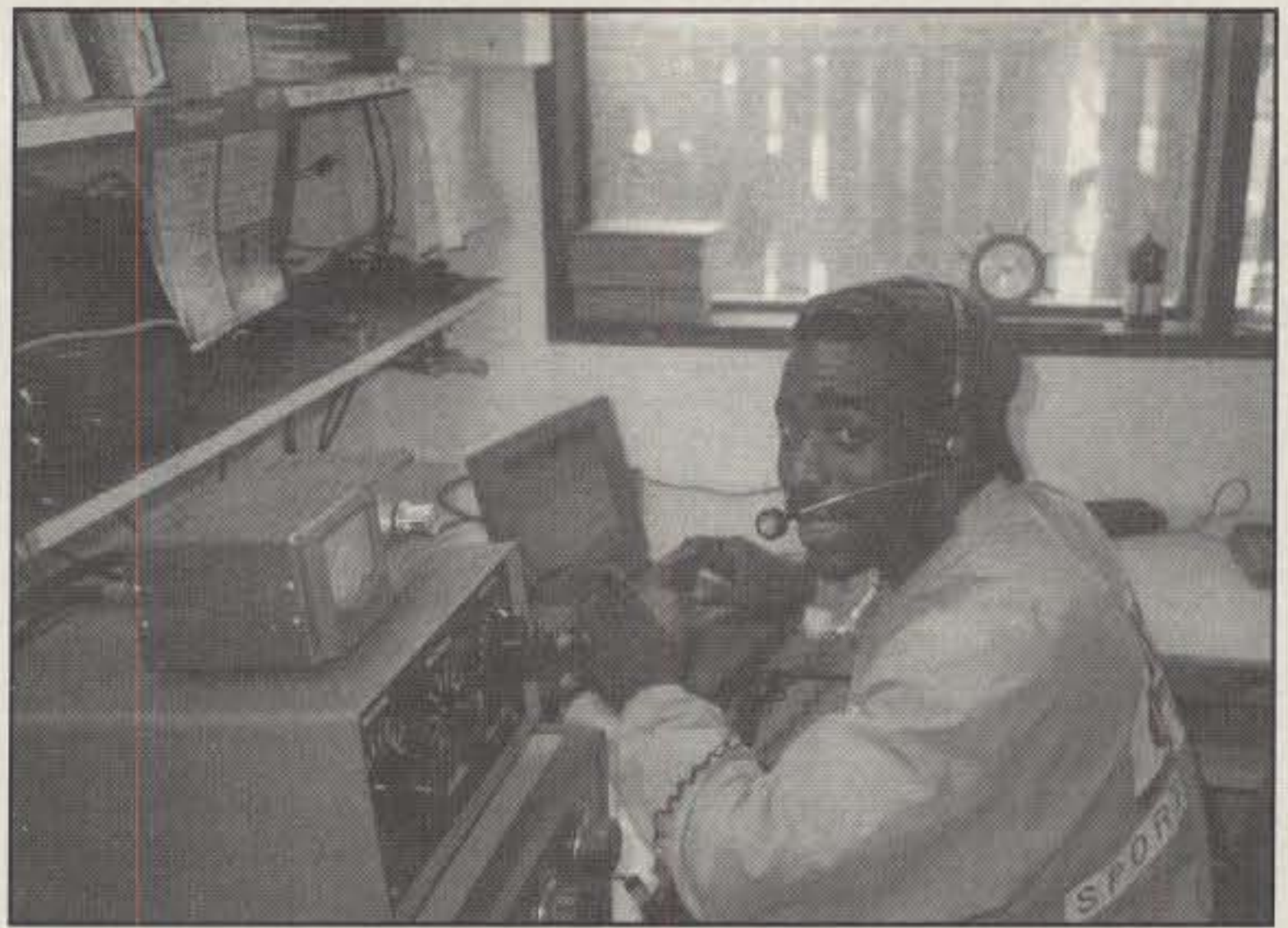
4N9BW	4,985,601
S59ZA	3,529,260
YT1AD	3,466,420
YT1BB	3,402,686
OF1MM	2,221,450
OHØTA	2,142,855
4O6A	1,980,046
HA6NF	1,912,448
IK4ADE	1,560,320
*LY3BA	1,465,440

### ZONE 16

UT4UZ	3,012,455
RN6BY	2,972,270
UTØD	2,472,666
UA6LU	1,448,568
UT3UZ	953,130
*RA3WA	753,543
*ER5DX	733,912
RX3APM	721,544
*UT5UAG	700,344
EO6F	640,003

### ZONE 25

JH4UYB	3,146,862
JAØQNJ	3,044,100
JA8RWU	1,735,536
JS3CTQ	1,361,600
JH7XGN	1,173,496
JA7BEW	1,102,635
JA5OVU	816,860
JA2BNN	797,130
JF1OPL	793,557
JH4ADK	706,318



Anthony, NP2Q, was a Low Power leader.



Part of the CS6S Multi-Single team: CT1ERK (left) and CT1ETE.

In the U.S., KS1L piled up the QSOs to compensate for N3AD's higher multiplier and topped the field. N3AD, in turn, outran fellow FRCer and multiplier leader K3WW. We note that VK5GN entered this category from Down Under, the largest ever VK entry.

Our log-checking found several instances where Single-Op Unlimited stations lost points because QSOs were logged on the wrong band. Apparently, some two-radio users lost track of their band changes at times. Others lost QSOs (and often multipliers) by grabbing packet announcements and logging the announced callsign without listening to verify the call. Some of the packet announcements are not accurate, so it is the operator's responsibility to find out who he is really working!

## Multi-Single

It was the battle of the equator: ZXØF and HC8N. Both were manned by superb operators. Both had visits from Murphy. Between them they worked 17,100+ stations! Not bad for only two run stations. Multipliers made the difference, with ZXØF taking the crown. The third South American score was ZW5B operating from their new QTH.

Using their special event call for all it was

worth, W2A of the YCCC beat out the experienced crew of the FRC, N2NU. I'd bet they had to say "Only W2A" many times! Farther west two zone 4 crews made the top six box. That is quite an accomplishment. W9JA (ex-KS9K) located near the center of the black hole in WI took the #4 slot, while the fine crew of K4ISV made KY proud.

Europe is a very competitive place when it comes to the MS category. Repeating as the number 1 score in Europe, the Monte Capra team of IQ4A used their fabulous location to best advantage. If you ever get a chance to visit Bologna, make sure you visit this fine crew. Second place went to the fine crew at TM2Y located at F6BEE's QTH.

Cyprus is proving to be a very popular destination for contest DXpeditions. A Russian and Kazakstani crew set up shop at P3A and finished third in the world and first in Asia. Second place in Asia went to the famous RZ9AZA, Chelyabinsk station.

Africa had three big Dxpeditons: The winner was EA8ZS, a mostly Spanish crew, followed by CT3BX, a German team operating with CT3BX, and the Czech DXpedition to IH9/OL5Y.

Taking time off from busy work schedules in Japan, a JA team powered NH2C to top hon-

ors in Oceania. Second place went to FO8DX, a SCDXC team who left just before Hurricane Martin destroyed the QTH of FO5IW, where they had operated. We hope that Stan gets going again soon.

## Multi-Multi

After the tower crew (two guys) had drunk 200 beers in 10 days, enough energy was developed to power PJ9B to the world top MM position. PJ9B is located on the beautiful island of Bonaire, about 10 miles from the nearest commercial power. Second place went to the FRC effort of V26B. Each year this group of guys gets together for the "big one." Only 158 QSOs behind PJ9B was the joint BCC and Corsican effort of TK5NN. This crew took top honors in Europe. A joint FRC and YCCC trip to Canada put C19DH into world fifth place. Rounding out the top six was the crew from the SCCC. They decided to go to P29AS this time. They didn't count on dangerous situations. Walking to the antenna after dark was a risky business.

In the heavyweight class, the crew at N2RM showed up at Bob's summer cottage to return to their winning ways. There must be something about their QTH. Being on sandy soil and close to the ocean doesn't hurt. Getting closer

# TOP SCORES

## WORLD

### SINGLE OPERATOR HIGH POWER All Band

ZD8Z	13,971,308
EA8BH	13,885,330
P40W	12,894,570
3V8BB	8,314,695
VE3EJ	8,240,550
FG5BG	7,195,161
V8EA	6,941,985
P40E	6,673,944
5N0T	6,216,212
FR5DX	5,876,154

### 28 MHz

LU6ETB	1,340,880
AY7D	1,307,576
9X0A	1,290,753
5X4F	1,164,728
PP5UB	929,183
5B4MF	801,261

### 21 MHz

ZX5J	3,181,696
4O6A	1,980,046
5X1T	1,780,200
P43A	1,534,995
ZP5XF	1,492,452
II3T	1,375,429

### 14 MHz

5B4AGC	2,140,790
8R1K	1,844,468
9M8R	1,339,743
IR4T	1,272,200
M7Z	1,225,810
YW1A	1,168,252

### 7 MHz

IG9GSF	1,249,236
OK1RI	769,602
9Y4VU	583,737
HA3O	580,620
HA9RE	391,926
IR1A	373,293

### 3.7 MHz

SP3GEM	244,325
IG9EQO	228,047
IR4T	213,576
VX3BY	208,872
OM2TW	156,456
G3WGN	143,840

### 1.8 MHz

VX3BMV/1	132,890
YU1EA	68,886
SV8CS	63,140
UA2FJ	62,352
SM6DOI	55,420
S50C	52,487

### LOW POWER

#### All Band

TI1C	7,379,253
HC5C	4,401,621
VP9ID	3,201,342
OD5NJ	2,851,836
LQ0N	2,453,047
EA7WA	2,118,914
TR8IG	1,960,452
LY3BA	1,465,440
4M5E	1,354,314
TM6A	1,276,290

### 28 MHz

LU3HYS	665,611
LU3MDO	621,034
PU2RUX	608,328
LU4DX	602,924
AZ9W	564,696
LU7HTJ	492,026

### 21 MHz

UA4LCQ	573,363
CN8NK	590,070
9G1BJ	504,575
UA4POL	463,298
LU7FJD	443,065
UN5PR	415,982

### 14 MHz

IT9STX	659,175
HA5BSW	577,643
ES2RJ	466,830
YO4GAO	465,408
LS9F	449,352
IQ7A	431,346

### 7 MHz

XM7A	289,556
CT1AOZ	176,001
YY5OHI	154,117
U5WF	79,123
UR7TZ	63,452
S54A	62,318

### 3.7 MHz

4L5O	79,205
Z39Z	67,451
S51TA	62,926
9A4RU	54,666
S50Q	46,512
IQ5Q	37,268

### 1.8 MHz

HA8BE	27,128
S54E	28,458
ES6MO	18,288
UU4JMG	17,785
PA2SWL	14,158
YU1RA	8,379

### QRP

#### All Band

YU1KN	370,590
KH6/NOKE	301,266
KD2TT	299,460
YU1LM	178,401
S59D	154,365
N7VY	126,198
W6YJ	102,340
N9SXT	96,425
N8XA	95,025
SM3CCT	91,674

### ASSISTED

#### All Band

TM2V	4,389,455
DL0WW	3,150,340
KS1L	3,024,912
N3AD	2,717,220
Z38G	2,553,040
K3WW	2,530,380
K3NZ	2,351,050
IK0HBN	2,026,296
N2MM	2,005,640
AA3B	1,973,412

### MULTI-OPERATOR

#### SINGLE

#### TRANSMITTER

ZX0F	19,653,570
HC8N	18,251,755
P3A	16,143,795
EA8ZS	13,864,862
8P9Z	13,695,719
FS5PL	13,359,136

### MULTI-OPERATOR

#### MULTI-TRANSMITTER

PJ9B	36,656,640
V26B	27,797,193
TK5NN	22,787,820
9A1A	18,156,595
C19DH	16,832,893
P29AS	15,379,068

## USA

### SINGLE OPERATOR HIGH POWER All Band

K5ZD/1	5,494,655
N6BV/1	4,057,986
W4AN	3,492,160
K3ZO	3,466,918
K4ZW	3,205,420
W3BGN	3,130,400
W9RE	2,941,546
WB9Z	2,426,580
N2IC/0	2,418,327
W1WEF	2,415,943

### 28 MHz

KZ5MM	208,102
W6AX	111,161
N4BP	106,288
W6YA	98,900
K4VUD	70,224
KF6JFG	44,616

### 21 MHz

N5LT	741,597
N4UK	582,552
WC4E	552,670
W5WMU	471,580
KC2X/4	469,560
K3ZJ/8	462,880

### 14 MHz

K8DX	698,828
K9JF/7	487,722
N3HBX	482,416
K0KX	430,760
W9IW	383,239
W0UN	315,392

### 7 MHz

N7DD	302,085
N3RS	185,020
KV0Q	136,686
NJ6D/7	129,136
KD9ST	70,180
K2WE	64,698

### 3.7 MHz

W6RJ	121,068
N2KK/6	96,253
W4DC	32,532
N6AR/4	27,887
W8UVZ	19,544
W2LU	17,181

### 1.8 MHz

K8MK	20,605
K1VW	7,497
W2VO	6,783
KN2T	3,772
AA4MM	2,905
AD4Z	1,652

### LOW POWER

#### All Band

WA1S	1,017,978
WD5K	986,850
K2AZ	976,740
KC5WCO	957,229
KQ3V	807,500
WO4O	791,895
N4DL	785,997
WS1A	696,850
N9VVV	656,370
WA7BNM/6	655,308

### 28 MHz

KC3PZ	90,735
AI2C/4	73,872
WB2BZR/3	49,484
WB4HFL	35,250
K7CK	35,108
W3EP/1	35,062

### 21 MHz

K4SN	143,112
KB8IBS	108,585
WA1FCN	99,015
KF8K	96,158
K6RO	95,849
K1VSJ	84,700

### 14 MHz

N4MO	187,172
K1VUT	161,280
K2MFY	150,525
AA7UN	119,125
W7FP	113,152
WD4CNZ	88,068

### 7 MHz

KW4T	42,016
W0AH	26,640
WA4QDM	10,790

### 3.7 MHz

W1MK	3,485
KD5BXQ	1,860

### QRP

#### All Band

KD2TT	299,460
N7VY	126,198
W6YJ	102,340
N9SXT	96,425
N8XA	95,025
WA8AGH	45,188
W3ECU	18,252

### ASSISTED

#### All Band

KS1L	3,024,912
N3AD	2,717,220
K3WW	2,530,380
K3NZ	2,351,050
N2MM	2,005,640
AA3B	1,973,412
W2RE	1,915,461
K1MY	1,817,376
W1GD	1,744,284
K3ND	1,730,746

### MULTI-OPERATOR

#### SINGLE

#### TRANSMITTER

W2A	5,960,728
N2NU	5,715,060
K1NG	4,965,840
W9JA	4,674,914
K2TR	4,332,042
K4ISV	4,179,770

### MULTI-OPERATOR

#### MULTI-TRANSMITTER

N2RM	14,581,824
K3LR	13,866,204
KC1XX	13,311,886
W3LPL	12,525,218
K1KI	11,720,112
W1FJ	6,707,920

## EUROPE

### SINGLE OPERATOR HIGH POWER All Band

4N9BW	4,985,601
GW4BLE	3,656,088
DL6FBL	3,630,750
S59ZA	3,529,260
EA3NY	3,503,424
YT1AD	3,466,420
YT1BB	3,402,686
EA4KD	3,255,828
DL2NBU	3,118,432
DJ4PT	3,023,258

### 28 MHz

9H0A	713,258
CT4NH	363,987
IO4LCK	323,736
YT1R	314,704
S53X	272,745
I8KPV	268,736

### 21 MHz

4O6A	1,980,046
II3T	1,375,429
EA2BP	111,1592
S53R	1,042,665
9A4D	992,413
YU9A	815,774

### 14 MHz

IR4T	1,272,200
M7Z	1,225,810
S50K	1,117,123
OM5DX	1,107,351
HA3UU	986,522
OM5M	983,992

### 7 MHz

OK1RI	769,602
HA3O	580,620
HA9RE	391,926
IR1A	373,293
OY3JE	321,198
RW4AA	309,863

### 3.7 MHz

SP3GEM	244,325
IR4T	213,576
OM2TW	156,456
G3WGN	143,840
S50Y	134,472
ON5LL	118,772

### 1.8 MHz

YU1EA	68,886
SV8CS	63,140
UA2FJ	62,352
SM6DOI	55,420
S50C	52,487
S54DL	50,832

### LOW POWER

#### All Band

EA7WA	2,118,914
LY3BA	1,465,440
TM6A	1,276,290
S57DX	1,137,600
LX1KC	1,025,838
OE2S	979,615
S52ZW	955,040
HA1CW	949,970
S59AA	949,630
EA3BKI	943,493

### 28 MHz

SP9W	169,164
EA7HBP	153,270
YU1CV	144,251
EA7FUN	1



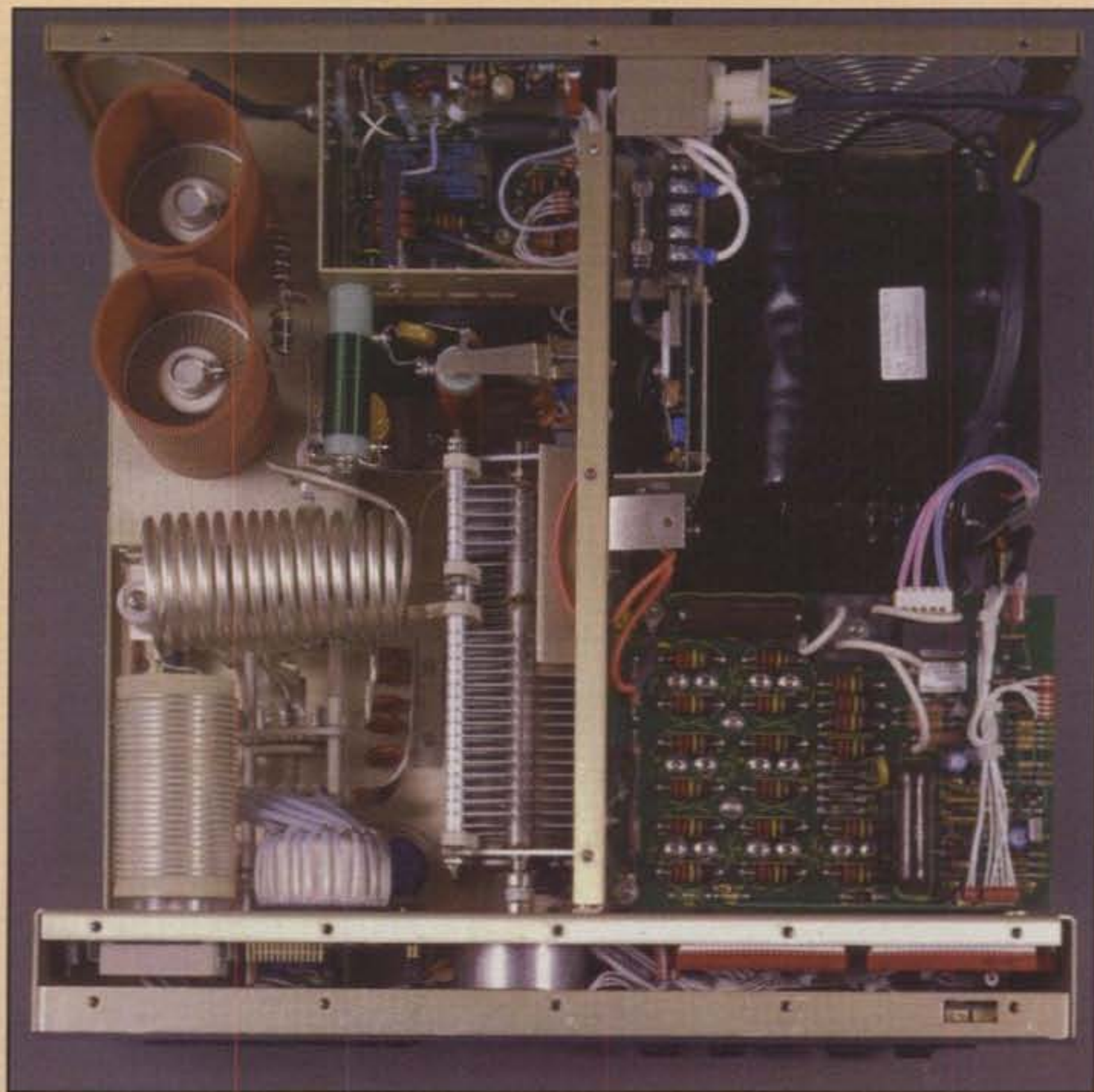
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  - 30 day money-back guarantee (US/Can)
  - Factory & overseas authorized service
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8. *Three decades of innovation and excellence in amateur and professional rf power*
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# BAND-BY BAND BREAKDOWN—TOP ALL BAND SCORES

Number groups indicate: QSOs/Zones/Countries on each band

## WORLD TOP SINGLE OPERATOR, ALL BAND

Station	160	80	40	20	15	10
ZD8Z	33/9/11	96/19/49	394/30/80	1631/34/133	1956/34/140	2602/31/146
EA8BH	138/14/42	521/22/76	486/23/75	1372/37/133	2462/37/123	1539/32/116
P4QW	139/11/27	416/19/73	684/22/79	1065/31/110	2303/33/115	2469/26/96
3V8BB	143/6/45	412/15/60	570/26/87	982/35/112	1563/33/103	1041/29/94
VE3EJ	211/12/20	649/20/75	835/26/106	1260/35/137	1661/34/135	232/20/65
FG5BG	111/11/26	381/16/62	1084/26/94	1467/32/88	1602/30/97	844/23/68
V8EA	3/3/3	216/22/48	909/30/66	999/33/77	1961/30/79	1021/23/51
P4QE	56/10/22	348/19/59	645/23/74	1472/32/95	1492/28/89	480/18/47
5N0T	1/1/1	25/10/18	617/23/68	1593/33/125	1110/30/106	862/24/85
FR5DX	3/3/3	89/14/15	172/25/39	1153/35/121	1237/30/96	1334/30/111

## USA TOP SINGLE OPERATOR, ALL BAND

Station	160	80	40	20	15	10
K5ZD/1	66/10/33	328/18/75	335/21/91	1299/37/136	1009/30/113	100/18/53
N6BV/1	30/8/20	218/16/64	199/21/75	1138/32/126	811/28/107	188/20/56
W4AN	18/8/13	95/14/49	227/24/72	961/33/120	845/31/132	147/18/46
K3ZO	17/5/13	137/12/52	229/22/84	672/33/105	1059/31/123	176/19/60
K4ZW	24/10/17	283/19/71	139/23/72	784/33/112	588/29/115	179/22/63
W3BGN	41/11/24	190/14/60	157/21/73	773/34/104	681/29/104	229/22/64
W9RE	23/9/15	96/15/45	168/24/77	729/37/129	680/32/119	206/20/55
WB9Z	36/12/22	215/22/60	151/24/73	429/29/91	653/29/111	211/18/58
N2IC/Ø	14/8/12	75/20/45	313/24/55	679/33/105	512/30/95	173/19/55
W1WEF	20/5/14	80/11/34	149/20/72	619/32/112	720/31/110	165/23/65

## WORLD MULTI-OPERATOR SINGLE TRANSMITTER

ZXØF	47/14/35	264/21/75	850/31/109	2440/39/151	3013/36/158	1540/30/130
HC8N	19/9/17	287/21/65	1342/28/100	1647/37/145	3334/33/145	1885/29/117
P3A	125/9/55	359/23/79	1260/31/115	2063/38/145	2372/35/138	1195/30/115
EA8ZS	65/11/40	499/17/76	1175/36/124	1130/37/155	2229/32/141	687/27/123
8P9Z	81/11/25	233/16/68	1375/29/107	1695/34/131	3194/33/135	1274/28/126
FS5PL	60/8/22	479/18/69	699/23/100	2114/37/152	2649/36/135	1947/28/108

## USA MULTI-OPERATOR SINGLE TRANSMITTER

W2A	17/10/25	325/20/813	269/28/110	1215/39/149	895/34/150	140/23/88
N2NU	36/10/37	334/23/84	207/30/107	1027/38/147	891/35/149	114/24/97
K1NG	22/11/30	218/20/77	239/28/110	877/37/144	769/34/152	198/23/94
W9JA	52/14/32	133/25/73	244/31/106	834/37/149	789/33/137	245/23/84
K2TR	33/12/32	225/22/82	147/27/102	1079/35/135	503/32/140	155/23/86
K4ISV	19/11/20	98/21/64	317/30/103	1097/38/145	535/31/139	200/24/85

## WORLD MULTI-OPERATOR MULTI-TRANSMITTER

PJ9B	360/15/38	1397/24/108	2034/32/124	4265/38/171	4697/37/159	2173/29/113
V26B	471/17/52	890/20/87	2384/30/118	4319/39/165	3843/35/157	1941/26/127
TK5NN	794/10/67	1691/24/104	3268/34/138	3947/39/160	3024/37/165	2044/31/126
9A1A	783/11/64	1235/22/94	2331/37/139	3367/39/166	2494/36/166	1423/32/135
C19DH	516/12/35	903/20/80	1262/27/105	3211/40/163	2889/33/146	895/21/99
P29AS	1/1/1	179/18/27	1358/35/87	2162/38/118	4044/36/118	1342/33/94

## USA MULTI-OPERATOR MULTI-TRANSMITTER

N2RM	105/15/42	907/25/96	833/29/124	1996/39/171	2119/36/168	536/25/108
K3LR	199/17/44	1042/27/93	718/33/122	2187/39/177	1556/36/157	596/24/107
KC1XX	215/15/54	770/26/98	732/29/120	2027/39/173	1667/35/167	535/22/111
W3LPL	265/18/47	682/26/96	543/32/120	1892/38/172	1668/33/164	743/26/121
K1KI	148/14/45	638/25/99	482/31/116	2411/38/171	1116/32/154	454/24/103
W1FJ	69/12/39	501/22/89	307/25/107	1430/38/149	802/33/135	345/24/91

and closer was Tim, K3LR's team. The flagship station of the North Coast Contesters turns a lot of heads on Interstate 80. Third place went to the ever-growing station of Matt, KC1XX. They say you can see EI on a clear day from his highest tower (Hi!).

## Team Contesting

Each year sees increasing interest in this fun category. This year 22 teams competed for top honors. A long supporter of this category, N6TJ went on the contest reflector and signed up enough members to form five teams! Neiger's Tigers #4 took top honors, averaging 11.1 million points each. This team really took the ball and ran to the goal. Once again the real battle was for second place. When all the scores were tabulated, Neiger's Tigers #2 edged out Team Nippon.

If this category gets much bigger, there could be various categories of teams: All Band, Single Band, Low Power. There are already such teams in this year's listings. All teams are to be congratulated.

## New Records, Special Mention

**World:** 7 MHz IG9GSF (IT9GSF), LA TI1C (TI2CF), Q14 RW9AB, A7 DL4NAC, A3.7 DL8OH; **Africa:** 7 IG9GSF (IT9GSF); **Asia:** 14 5B4AGC, L3.7 4L5O, Q14 RW9AB, MS P3A; **Europe:** 21 4O6A (YT6A); **N. America:** 1.8 VX3BMV/1, LA TI1C (TI2CF), Q7 KR2Q, Q3.7 NC6M (W6REC), A1.8 W4DR; **USA:** Q7 KR2Q, Q3.7 NC6M (W6REC), A1.8 W4DR; **Oceania:** 14 9M8R (W7EJ), L7 YC8UYB, QA KH6/NØKE, Q7 KH6/W8QZA; **S. America:** 21 ZX5J (PP5JR), LA HC5C (W5AJ), L28 LU3HYS, A21 LW1ECO.



Sh. Gankhuyag (left) watches JT1BV dig out a weak one.

Take a look at the entries from Aruba. It looks like these enthusiastic contesters are making a name for themselves. One of their group, Emily, P43E, was the world high YL score. The entry of 5A1A is a welcome sign. The CQ WW hopes for his and other 5As entries in the future. When was the last time you worked three 5X stations in a single weekend? The UN crew of SM7PKK (5X1Z) and ON6TT (5X1T) were joined by Paul, 5X4F, to make zone 37 a lot easier to work.

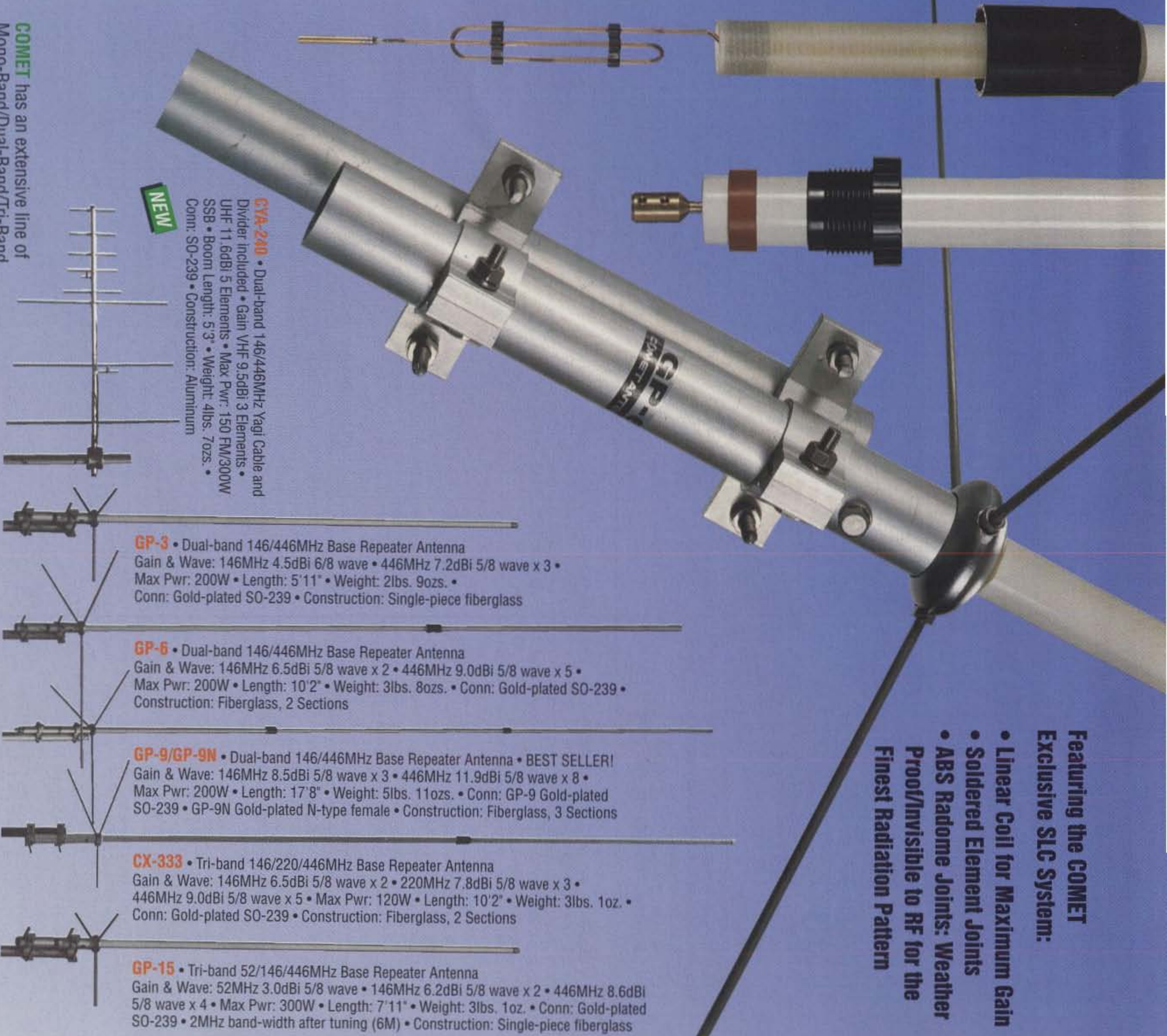
## Comments

**A. Big Numbers:** The 1997 CQ WW Contests were big ones in every sense. Over 6700 total

logs were received! That number is the largest in CQ WW history, setting submission records on both modes. About 3400 entrants submitted logs electronic in nature. Electronic submissions are what we want and they make the post-contest process easier for you. The easiest way for you to submit a log is via e-mail. Please send SSB logs to <ssb@cqww.com>. You will receive a robotic response and a personalized access code. Keep a record of your code so that you can view your log and its analysis. For complete details on how to submit your log electronically, look at the rules in this issue or our WWW site at <cqww.com>.

**B. Log Analysis:** Besides the number of

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Max Pwr: 200W • Length: 5'11" • Weight: 2lbs. 9ozs. •  
Conn: Gold-plated SO-239 • Construction: Single-piece fiberglass

**GP-6** • Dual-band 146/446MHz Base Repeater Antenna  
Gain & Wave: 146MHz 6.5dBi 5/8 wave x 2 • 446MHz 9.0dBi 5/8 wave x 5 •  
Max Pwr: 200W • Length: 10'2" • Weight: 3lbs. 8ozs. • Conn: Gold-plated SO-239 •  
Construction: Fiberglass, 2 Sections

**GP-9/GP-9N** • Dual-band 146/446MHz Base Repeater Antenna • BEST SELLER!  
Gain & Wave: 146MHz 8.5dBi 5/8 wave x 3 • 446MHz 11.9dBi 5/8 wave x 8 •  
Max Pwr: 200W • Length: 17'8" • Weight: 5lbs. 11ozs. • Conn: GP-9 Gold-plated  
SO-239 • GP-9N Gold-plated N-type female • Construction: Fiberglass, 3 Sections

**CX-333** • Tri-band 146/220/446MHz Base Repeater Antenna  
Gain & Wave: 146MHz 6.5dBi 5/8 wave x 2 • 220MHz 7.8dBi 5/8 wave x 3 •  
446MHz 9.0dBi 5/8 wave x 5 • Max Pwr: 120W • Length: 10'2" • Weight: 3lbs. 1oz. •  
Conn: Gold-plated SO-239 • Construction: Fiberglass, 2 Sections

**GP-15** • Tri-band 52/146/446MHz Base Repeater Antenna  
Gain & Wave: 52MHz 3.0dBi 5/8 wave • 146MHz 6.2dBi 5/8 wave x 2 • 446MHz 8.6dBi  
5/8 wave x 4 • Max Pwr: 300W • Length: 7'11" • Weight: 3lbs. 1oz. • Conn: Gold-plated  
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## TEAM CONTESTING

1. **Neiger's Tigers #4:** 55,665,702. By EA8BH (OH2BH), P40E (CT1BOH), P40W (W2GD), VE3EJ (N5TJ), ZD8Z (N6TJ).
2. **Neiger's Tigers #2:** 19,502,270. By GW4BLE, HC5C (W5AJ), YB1AQS, 5X1Z (SM7PKK), UT4UZ.
3. **Team Nippon:** 19,234,163. By 3DA5A (JM1CAX), 6Y6A (JE3MAS), FG5BG (JF2DQJ), JA0QNJ, V8EA (JO1RUR).
4. **Yugoslavian Team #1:** 15,777,018. By YT1AD, YT1BB, 3V8BB, V29NR (YU1NR).
5. **Team Aruba:** 9,749,256. By P43W, P43A, P43T, P43E, P40E (CT1BOH).
6. **Neiger's Tigers #1:** 8,683,774. By W7WHY, N6BV/1, K6NA, N7NG, W6XR/2.
7. **Neiger's Tigers #5:** 7,501,732. By W6RJ, 8R1K (N5ZO), WB9Z, V47KP (W2OX).
8. **Team Canada #1:** 4,931,978. By VE5MX, VE3FU, VE2QRZ (WB2K).
9. **Contest Club Finland:** 4,757,935. By BY1QH (OH2PM), CP6AA (OH0XX), OF1MM, OH0TA (OH2TA).
10. **Neiger's Tigers #3:** 4,743,222. By W1WEF, CT1ELP, 8P6CV, 5X1T (ON6TT).
11. **Yugoslavian "Single Band" Team:** 2,419,654. By 4N7B, YU1ZZ, YZ1AU, YU1JW.
12. **Great White North DX eh?:** 1,494,336. By VE2ZP, VX5FX, VE6BMX, VD3MG.
13. **Hanging Judge Contest Team:** 1,156,417. By AB5SE, K5OY, K5YRZ, KG5NE, KK5NO.
14. **Team Tennessee LP:** 1,071,686. By AE4ZZ, KE4KMG, KE4YBS, NY4T, WO4O.
15. **West Island DX Group:** 874,037. By VE2OL, VE2AYU, VE2TBH.
16. **Tupy DX Group #1:** 851,376. By PU2MHB, PY2NY, PY2XW.
17. **Team No. 13:** 698,329. By EA1FAK, EA1BLI, EA1OT, EA1JE, EA1MK.
18. **Tupy DX Group #2:** 586,349. By PY2APQ, PY2DUN, PU2VJJ, PY2IQ, PT2AW.
19. **Team Canada Single Banders:** 575,437. By VX6JY, VX3BMV/1, VE1JF, VE4VV.
20. **Team Tennessee HP:** 508,454. By K4AMC, N4ZZ, W4PA, WD4K, W9WI.
21. **Yugoslavian "Low Band" Team:** 77,265. By YU1EA, YU1RA.
22. **Catalonian Team:** 59,521. By EA3AML, EA3AVP.

logs received, the 1997 tests brought a long-time CQ WW Committee dream to fruition. The WWW allowed us to archive all the electronic logs and their analyses. Using an access code, each entrant could privately view their log and "UBN" report. Although the report shows more than UBN (acronym for "Unique, Bad, Not in log"), it serves as a simple way for each entrant to locate areas for contesting improvement. The report is especially useful to multi-operator stations. If they keep track of when their operators log on, they can help inexperienced operators improve. Fun and improvement is what it is all about.

The UBNS were devised years ago to help the CQ WW get a handle on the reliability of top-scoring logs. If a top log had a UBN% much higher than the average for its category, it acted as a flag for further research on that log. The research required laborious human intervention. The log-checking process has progressed remarkably since those early days. Now a computer can rescore all electronic logs using the same .CTY file. Following strict rules of what can be removed from a log, the computer provides a conservative analysis that you see in your WWW file.

In 1997 it became feasible for the first time to incorporate all electronic scored logs into the final results. What this means is about 50% of the results that you see on these pages were evaluated, a process considered impossible just a few years ago.

Many of the top scorers in the CQ WW Contests have long known about the UBN report, and their reports have been supplied to them on request since the early 1990s. This process is now very visible to all levels of contesters. So what should you make of the report that you receive? In a rough sense, you can view your score retention as a "grade," just like when you were in school. That 90-100 was an "A," 80-89 was a "B," etc. You can use the data provided to see if there are any patterns. I found that at PJ9B I would make copying errors on SSB with K and KA stations. So now I always say the prefix phonetically to avoid an error.

The strong words we have received from contesters everywhere are "Thanks for this service. I can see how to improve." And that, after all, is the whole idea—to improve your skill.

**C. Packet:** The use of packet is perfectly okay for those who claim Assisted or Multi-Operator. Any use of packet in any other category is wrong. If you are going to enter the HP, LP, or QRP categories, you cannot receive any packet help. If you want to try to work some new DX countries, packet is an easy way to do it. Just claim Assisted. A serious problem occurs when nine of the top scores in a category play by the rules and one decides to cheat. It is not fair or right that the entrant be entered into the same category as the others.

**D. QTH Rule:** It has come to the attention of the CQ WW Committee that several MS and MM stations are violating rule III, which states, "Transmitters and receivers must be located within a 500 meter diameter circle or within the station licensee's address, whichever is greater." This means that you cannot run 20 meters 30 km away from 40 meters. The whole station must be within the limits of rule III. Of course, it is easier to avoid interference by placing 30 km between your stations. You might even be tempted to run two signals on the same band. Interference is a technical problem everyone must try to solve. Many stations have figured out QRM reduction methods within the rules.

## Thanks

Thanks to the CQ WW log checkers who validated the winners and provided insight into many contesting topics. The 1998 crew includes: K1DG, K3UA, K3ZO, K6NA, KR2Q, N2AA, N2NC, N3ED, N3RA, N5NJ, N5TJ, N6ZZ, N8BJQ, N9RV, W2RQ, W3ZZ, and W7EJ. Our DX advisors were very helpful in offering advice, providing information, and sorting out potential problems. They are CT1BOH, DL6RAI, EA3DU, F6BEE, G3SXW, HS0/G4UAV, I2UIY, JE1CKA, OH2KI, OH2MM, OK2FD, ON6TT, PY5EG, S50A, SM3SGP, UA9BA, and VE3EJ.

A special thanks to Dick, N6AA, who again spent countless hours to make the CQ WW database the best in contesting. The CQ WW uses the software developed by Tree, N6TR, to create the database. John, K2MM, created the entire WWW log entry information. His robot worked smoothly in acknowledging receipt of a log. He also created the search engines utilized by Committee members to aid in log checking. Tack, JE1CKA, has created the appearance and non-log data on <cqww.com>. Translations of the rules into Spanish, Japanese, German, and French were done by EA3DU, JE1CKA, DL6RAI, and F6BEE. Larry, N6TW, was invaluable in retrieving and processing data from e-mail submissions. Thanks to John, VE3EJ, and his wife, Hazel, for proofreading the tables shown in these results. John, W0UN's help has allowed the CQ WW to modernize its certificate program. Thanks to John, K1AR, for his advice and hard work to make the CQ WW so successful.

Congratulations to all the winners! Try to get a fellow tester on for a local, friendly competition. To participate is what contesting is all about! CU in '98!

73, Bob, K3EST


## DX QRM

I operated from the top of a mountain which was about 950 meters above the sea! . . . JH6RFT/1. Zat Zat two Zat QRZat . . . I really need a DVP . . . ZZ2Z (PY2YP). My first international DX contest. Will be back next year . . . YC2ERL. I operated from my driving seat 1 mile from house in a disused airfield to avoid QRM and TVI . . . G3TVU/m. I developed my own contest software and it works great! I'm very happy to enter the contest. It was cool! . . . XE1NAD. My 49th CQWW and still enjoying it! . . . GM3BCL. My first CQWW was in 1956. We worked from the club station UA1KBB using AM! Old timers remember the 1958-59 years with SF# up to 200! I was UW1BM for 30 years . . . U1BA. My first CQ WW! It was fantastic . . . PY8MD. Great! My second child was born during the contest—a boy! . . . YB2BRW. I'm glad to listen in the contest. I'm glad to read CQ Contest magazine! . . . RV3BR.

First day 3316 QSOs. The record was in my hands. Second day bad propagation and the record returns to ZD8Z's hands . . . ZX5J (PP5JR). Was out of country on business. Only 7 hours operating time . . . S50A. The CQ WW is still the most exciting operating activity to work the world. After 32 years as a radio amateur, I'm still thrilled by the enthusiasm it brings to me personally and to thousands of others, too . . . VX3XN. Great fun after many years of QRT . . . IT9WPO. It was exiting for me that I could contact more than 60 stations with my bare-foot radio system . . . JA9SCB. First time to operate from two DXCC countries in a contest (3DA5A and ZS6) . . . ZS6CAX (JM1CAX). Conditions unacceptable! No way to get 12 hrs operating time with no sigs . . . KH6CC. I am a beginner at WWDX Contest. I specialize in domestic contests only . . . JF2FIU. This was my first time to be shown "300/hr" on the last 10 min rate of CT . . . JR4PMX/1. After a short 10m opening into the US and SA nearly all was dead by 9AM Sat . . . YB1AQS.

Nice to hear bands start to open. Even 28 was boiling from time to time . . . SM0AJV. Almost as good as a full course meal with high power! Condx much better on the high bands. The EU crowd has gotten mighty unruly and many times the "last two" syndrome was overwhelming . . . VP9ID (AJ2U). First time in any HF contest. Next will be on top. Hi . . . S53AJL. We had a lot of fun during the time in the contest. Our plane left about 7 hours before the end. Too bad. But after all, what matters is that we enjoyed our stay in Cozumel Island . . . XF3/EA3BT. It was my first SSB on 40m. It was very hard work. I had a lot of fun! . . . SP4EEZ. First time low power. Quite a different job! Great contest . . . S53ZO. Very good propagation the first night on 160. Very bad the next day—only 9 stations all night . . . YV2IF. Wow! Great experience, bad antenna, big fun! . . . IT9ZYT. Last time I did this contest was 1962 as 5B4AB. What a difference! . . . G3LQJ.

Nevezukha (Russian equivalent of Mr. Murphy) came again. There was an electric power failure the first 4 hours of the contest, then after 1.5 hours my new



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## ZONE LEADERS SINGLE OPERATOR

Zone	Call	Score	Zone	Call	Score
1	KL7AC	339,850	21	9K2HN	4,459,463
2	VE2QRZ	3,180,810	22	AT0MB	1,085,352
3	W7AT	1,961,874	23	JT1CO	333,108
4	VE3EJ	8,240,550	24	BD4DW	153,450
5	K5ZD/1	5,494,655	25	JH4UYB	3,146,862
6	XE1NAD	561,484	26	HS0GBI	17,091
7	TI1C	7,379,253	27	WH0AAV	906,660
8	FG5BG	7,195,161	28	V8EA	6,941,985
9	P40W	12,894,570	29	VK6WJH	49,217
10	HC5C	4,401,621	30	VK2ARJ	969,465
11	ZX5J	3,181,696	31	NH7A	4,477,494
12	CE8T	5,653,488	32	ZL4AS	462,000
13	LQ0N	2,453,047	33	EA8BH	13,885,330
14	GW4BLE	3,656,088	34	5A1A	253,162
15	4N9BW	4,985,601	35	5N0T	6,216,212
16	UT4UZ	3,012,455	36	ZD8Z	13,971,308
17	RK9CWW	1,997,504	37	5X1Z	4,900,518
18	UA0WY	936,180	38	ZS6BXN	1,067,566
19	RA0FW	2,237,634	39	FR5DX	5,876,154
20	JY9QJ	3,147,376	40	TF/OZ5IPA	39,786



FK8GM (left to right): Alain, FK8FI, Franck, FK8HC, and Eric, FK8GM.

PA blew up. So I lost about 12 hours... UA1OMS. Our first challenge for the CQ WW using our old callsign. We enjoyed so much and will be back next year with many friendship... JA6ZPR. We lost the best DX band—21 MHz—due to failure of our transceiver... SP9KRT. Due to an important meeting on Monday I had to QRT at 14Z Sunday. But sure enjoyed the new sunspot beginnings... JA8RWU. Not a single JA or North American station worked. Incredible!... 9G1YR. No, my call is not VE2; it's VE2QRZ! And yes, it's snowing... VE2QRZ (WB2K). It was a real big fun! "Serious" contesting is fun. Even though you ain't gonna be the winner (Willy Umanets, UA9BA)... TA2KB. Unbelievable what you can work with only 100w... OE2S (OE2GEN). My ant does work for EU but not for DX... OE9MON. Best contest ever for these new kids on the block... V26B. The worst propagation in Finland in years. It was painful to see other comments about FB condx... OF1AF. When the VK2 told me after 2 hours they had 170 Qs on 10m, I felt really bad. However, when the going gets tough, the tough get going, and I just kept plugging away. I pulled back their lead with good runs on 15m... VK5GN.

Was nice having PJ9B call me for a change!... VR97BG. First time MM in CQ WW. Thanks to our special guest star Dan, LY1DS... OH2HE. First time on 40m SSB single band... OK1RI. Gee, I wish I had checked my amp before the test. If I had known I had one dead tube, I would have officially declared low power... VE2ZP. Very nice to compete again! A perfect contest... P43A. After a few of our antennas were stolen, we had to improvise a bit. The best contest we had for years in terms of contest spirit... PI4COM. The CQ WW provides two days with plenty of emotion where I could work new countries... PY2DJ. This was my 439th contest!... VK2APK. It was very difficult to get zones 8 and 9... JE2LUN. Ban all Europeans... except GM... GM4CUX. Last time I submitted an entry was as ZC4AK in 1960. That was a Royal Air Force Club Station operated by myself, ZC4AB, and Steve, G3MBS. Next time I tried was as ZC4AB in 1962. However, I was also getting ready to return to England and the logs were accidentally stowed in my deep-sea baggage. My next attempt was from Ghana as 9G1FB in 1964. The result was so pitiful I just did not have the heart to submit the logs. All the rigs were "Home Brew" then, and, in Ghana, I was a little restricted! I was crystal controlled and only had two crystals to shift frequency if I thought I was getting popular. Ah! Halcyon Days. This attempt comes after being 20 yrs QRT!... G3LOJ. 10m finally came alive!... VA3SK.

Once again the air was alive with the sound of heavenly music—wall to wall propagation! A Great Contest!... VK2ARJ. Nice to operate from FP during the contest. Would like to thank the local ham radio group from FP with our travels concerning our DXpedition... FP/KG8CO. Condx on 10 and 15 were FB! First time in CQ WW was in 1972—25 years!... OZ6PI. We had big problems with the coax cables. This contest was the first one for most of the operators... TX8KAB. I was working the contest from the mountain, Rogla (1550m ASL) on the lonely TV tower... S51TA.

To work a Hanoi station in the SWedish embassy... KH6BZF. The combination of difficult band conditions, meager antennas, and being in old England instead of New England made this contest a real slog! I still had a great time... G0UHK. This was my first CQWW and I worked some difficult zones and new countries. The conditions were very good to JA... PY3RK. Mni new band countries for me; it is a very long month to the CQWW CW. Hi!... OK1DWC. The CQ WW is the biggest contest in the amateur radio world... PY1ZT. My first contest entry. I hope for better results in the next contest... Z31RB.

We had a lot of fun but were tired at the end. Need more operators next time... VK4DZ. I would like to express my thanks to the 13 North American stations who showed great patience in making a QSO with my low power station on 80 meters. As a show of thanks I have now bought an amplifier and will use it in the next contest... OZ2ZZZ. Sometimes we have to resign ourselves to fate, QRP... Let's have some fun!... JA5GPJ. It was my second CQWW. I enjoyed it very much... 7K4XVK. Very good conditions to the south on 10... UA0SR. I had more dupes than multipliers! But I enjoyed the contest; aloha & mahalo to all... KH6FKG. 5A1A called me on 20!... ZF2AH. Was a wonderful contest. I worked 33 zones with my 4-el... RZ6HX. It was a pleasure to take part in this contest for the first time... TA2IJ. JA2RL/2 is the JARL HQ station that was briefly on the air at Mie prefectural local meeting demonstrating the CQ WW Contest to beginners... JA2RL/2. My first participation in the CQ WW with my new 40m 3-el beam. Much fun!... OE3WMW. This was my first contest (my license is brand new) and I enjoyed it very much... XE2AUB. This is my first DX contest. I felt that the world was small, speaking with various countries and operators... 7M1QYH.

High bands is vy FB. Low power and whip makes a good job!... JA1SKY. It was a thrill to have someone answer a CQ on 40m QRP, but that's what can happen with a better prefix... KH6/W8QZA. Great competition as always. Thanks to the new sunspot cycle I beat my personal best score... IK4QJM. My target was to try to win the CQWW on 10 meters by working from the central part of a 7 million inhabitant city. Tks to LU8AQE for the use of his fine station... AY7D (LU7DW). After many years we finally started and finished the contest with the runner station on 20m instead of 40m... IQ4A. Our first DX contest MS class outside of Japan... YN6WW. We are all high school students no more than 17 years old. We are the first time to take part in the CQWW contest... BY5QN. They don't call it the big one for nothing—it is the best contest of all... CT1ELP. While having power shortages we had to switch off all not needed devices to continue operating. We have to thank our host CT3BX, Hern... CT3BX. Quite a difference between 708!1960 and DL in 1997, so CU in 1998 from OE or... DJ0FX (OE2VEL). I like contests... JH0FWV. Excellent contest. Many new countries for me. Wish HC8, S50 turned their antennas south!... VK4MOJ. This was my first international DX contest ever! Very pleasant... CX9BAG.

It was great to work several YL operators—refresh-

ing to see their increased participation... VE3HX. Due to a QRP alarm clock I gained some extra hours of sleep... DL2NBU. We calling in, all Ws only give their callsign, nobody calls like "DL6FBL this K1XXX." That technique would be very useful on 40m split... DL6FBL. A lot of fun, many QSOs, low multipliers with our minimal two op DXpedition... EA8/DL6MHW. This was my first serious attempt and I chose 10 meters. Sat was great condx but Sun was a washout as the wind blew and the QRN reached S5... 3DA0CA. Power supply blown by thunder storm just before the contest. Worked only JH7PKU with a car battery... 3DA5A (JM1CAX). Always a thrill to work DX on 10 meters. Thanks for giving a chance to compete against the best... 4Z5JA. My first CQWW since 3 years surely reminded me how much it brings out the best on the bands... 5X1T (ON6TT). Wow! What an activity on all bands... DL8ZAW. I managed 25 new band countries!... G0KRL. The CQ WW SSB contest is the only time the microphone is taken out its box... G3TXF.

First CQ WW from home QTH for nine years... G4BUO. Our first attempt at an international contest... GM0NTL. We will continue without a break our 3\$\$ year participation... HB9H. This was the third attempt to beat the world 40m record. I needed the 3-el to break it... IG9GSF (IT9GSF). First experience on African Italy. I need a better antenna for 20. I broke my leg taking down antennas... IG9STG (IT9STG). My first DX contest DXpedition alone! Many thanks to LU8ERR and his family for their support... LW8EXF (YL). Condx far better than last year. we set fire to the shack on Sunday morning!... M7P. Used KH6SQ for QRP. Never worked one European!... KH6/N0KE. Never recovered from the main generator and amp going out of service at the beginning of the contest... NH7A. Conditions on 10 and 15 were good. JAs were scarce this go around... KH7R. Big thanks to the Z30M team for the possibility to use their contest station... Z38G (OH3MIG). Never worked so many stations on 10m in one single weekend. Thank you CQ WW!... YO3JF. I enjoyed the best and biggest contest with a tiny antenna... 7N2UTO.

## USA QRM

The CQ Contest Gods did it again. Great propagation. What is it going to be like at the solar flux maximum?... KS1L. Ten was open! N. Pole aurora stopped me from working Europeans on 20... KM7TM. First time entry! Indicator stopped, had to look where I was pointed... N4MXT. Ten minutes before the contest my G5RV blew down. It's a tradition!... KM6XX. Ten inches of rain, 5 times I had to completely disconnect everything, and 95% of the weekend was spent on the low antenna of the stacks due to rain static. This was not my weekend... W4AN. I am a quadriplegic. I use a VOX and computer logging with a Macintosh and Headmaster Plus "mouse"... K17LS. First CQ WW. Used this experience as a training ground... NT4L.

Would have done much better had it not been for problems with the rig that forced us to run most of the contest with 20W out! We were delighted to have ET3AA and FP5AC call us and answer our 20W signal

# MIRAGE... 160 Watts on 2 Meters!

Turn your mobile, base or handheld into 160 Watt powerhouses and talk further, longer, clearer... All modes: FM, SSB, CW... Superb GaAsFET preamp... Overdrive, high SWR, Over-temperature protection... Remote controllable...

B-5016-G  
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**MIRAGE RUGGED!**

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

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

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

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

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

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

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

- 45 Watts on 2 Meters/35W on 440 MHz
- Auto Band Selection
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## 100 Watts for 2 Meter HTs

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

Watts Out	25	50	75	95	100	100+	100+
Watts In	1/4	1/2	1	2	4	6	8

- 100 Watts out with all handhelds up to 8 watts
- All modes: FM, SSB, CW
- Great for ICOM IC-706
- 15 dB low noise GaAsFET preamp
- Reverse polarity protection/SWR Protection
- FREE mobile bracket
- Auto T/R switch
- FREE handheld BNC to B-310-G cable
- Ultra-compact 4 3/4 x 1 3/4 x 7 3/4 inches, 2 1/2 pounds
- One year MIRAGE warranty

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

## 6 Meter Amplifier

FCC Type Accepted The A-1015-G, \$389, is the world's most popular all mode FM/SSB/CW 6 Meter amplifier. 150 watts out for 10 in. For 1 to 15 watt transceivers.

## 70cm Amplifiers (420-450 MHz)

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

## Amateur TV Amps

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

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## 35 Watts for 2 Meter HTs

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

Watts Out	18	30	33	35+	35+	35+	35+	35+
Watts In	1	2	3	4	5	6	7	8

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

35 watts, FM only... \$69.95

B-34, \$69.95. 35 watts out for 2 watts in. Like B-34-G, FM only, less preamp, mobile bracket. 3 1/8 x 1 3/4 x 4 1/4 inches.



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11 models -- continuous duty all mode FM/SSB/CW repeater amps for 6, 2, 1 1/4 Meters, 70cm, 450 MHz ATV.

## Low noise GaAsFET preamps

High gain ultra low noise GaAsFET preamps for receiving weak signals. Selectable gain prevents receiver intermod. 15 to 22 dB gain. Less than 0.8 dB noise figure. Automatic RF switching up to 160 Watts. Choose In-Shack model or Mast-Mount (includes remote control) model to reduce loss. Rugged die-cast enclosure.

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50-54	KP-1/6M	KP-2/6M
144-148	KP-1/2M	KP-2/2M
220-225	KP-1/220	KP-2/220
430-450	KP-1/440	KP-2/440

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CIRCLE 135 ON READER SERVICE CARD

... KV4T. Put a 80m 4-square up the month before the test. Elevated radials. It didn't work as well as I had hoped ... KQ3V. What a nice surprise—10m had early openings both mornings, just great, even though every QSO was S&P ... A12C/4. 10 meter mobiling in downstate Illinois with 25 watts I worked into FO and 9X (a new one) ... KB9CRY. Midwest snow storm forced us to use beverages on 20m due to precip noise. Also forced to battery power and still could not operate the last hour due to power outage ... N0MA. Biggest thrill was working ZD8Z 1st call on top band ... K6SE. The blizzard came. The main coax went. Reduced to a single band. But STILL fun! ... K0ZA. Only my second CQ WW SSB. I doubled my QSOs and tripled my points from last year ... N4BTO.

Fastest voice exchange ever heard award goes to HH2PK. Wow! ... N4CW. It's great to still feel the rush generated by the contest weekend ... N4KW. The European opening on 10 was a great surprise. It was the first time I had worked Europeans till 5PM! ... KC3PZ. Best outing ever! Nice to see 10m back ... K2CS. I was operating mobile using an ICOM 706 and Perth Outbacker. I feel pretty good about the results ... AE7C/5. First contest by myself since 1983 when I was CN8CO. It sure was alot easier being DX ... W3EMH/4. Nice to see such wonderful condx. It has been a long time! ... WA2ASQ. Are the bands back or what?? QRP works! ... N7VY. This contest broke my 1995 record by 100 QSOs. We ended the contest with 148 QSOs which may not seem like much, but it was a big deal for me. I like to improve in contests and I achieved my goal ... N9YXA at WG9L.

Very enjoyable contest. My first serious contest in many years. CQ WW is my favorite ... W8LRL. Played around a few hours. Nice to see the bands getting back in shape ... AE2T. Lots of fun. The first time I made a real effort to get on. Now is the time for improvements ... AJ4Y. This is my second CQWW and it could not have been greater ... KS4YX. The best DX contest there is ... K2FR. Operated from a 40 acre spread 30 miles from my home QTH. I've been licensed 5 years and until this weekend never heard a ZS. Not only worked two but one called me! ... K5OY. Nothing broke. Working IH9/OL5Y on 15m! ... K6GT. First time DX contest effort for most of the crew. It was great fun to have JR1HAA and JJ1BMB visit for the weekend ... K8CC. Interesting that almost all the top scoring stations ID themselves after every QSO ... KA2CDJ. This was my second time working the contest and it was an absolute blast! ... KB4OGM. There was a huge pile-up for 5X1T that I couldn't crack so I went up the band and heard 5X1Z begging and I got him first call ... KC6X. I qualified for the worked all Argentina award ... KJ9C. Congrats to the "Old" Gang at K6IDX. Now we know who was beating us in pileups. We're not exactly spring chickens either except for KX7M ... KO6N (N6RO). My first CQ WW. I loved it! ... WB8STO.

All in all, this was a most excellent journey around the world in a weekend ... WO4O. I thought that nobody would hear my little station. Although I didn't make a huge score, I was very pleased at the contacts that I made ... KO6QW. First time low power in 17 years of contesting! ... N1TM. My first contest as a General after 29 years as a Tech. Heard 52 countries that I could not work. Will be back with bigger ants and higher class ticket ... N3GPU. Multiplier operator fell off the chair when KG4QD refused to work us and then announced "Full calls only" to the pile-up!! Had great fun with the call ... W2A. 15m was astounding! ... W4NC. It was very nice to work 5N0T on 40m without a gain antenna ... W6RCL. The highlight was when I worked a station in the Caribbean and he signed by saying "good luck on w/the swap meet today" ... W6TRW. Am I the only one using a Macintosh for contest logging? ... W7BX. First contest I've done in 35 years of hamming. 95 countries on a dipole!! ... W2SSB.

Ignoring TZ6SI. And then realizing I needed him for a new country! ... W4UW. This was the first time I tried single band. It turned out to be as hard as I've ever worked in any contest. Tks! ... KQ6ES. Propagation was good on the first day. 21 MHz was fantastic! ... WB6NFO. The bands were much better this year. 15 and 10 were virtual pipelines to South America and the Caribbean from my QTH ... KN7T. A great contest but a vertical and 100 watts makes for lots of calls and few returns ... W4ZYV. I enjoyed the contest from a portable location this year with only a couple hours operating time ... AA8UP. Good 15m opening to JA land the last hour of the contest! 3A/LX2AA and 9U5CW called—Tnx for the surprise! ... N4CT. Great contest in spite of the early winter storm that dumped 4 inches of wet snow on leaf laden trees causing numerous power outages. Low bands were quite noisy, but 10m was looking good ... NR0X. It was really great to make so many phone QSOs in a couple of hours. Glad 15m is back

... KE9EX. QRP makes one humble ... NC6M (W6REC). My big thrill was working ZL1AA longpath on 15m and then 40 minutes later working him shortpath on 10m ... KR4QI. First time out in DX test with new call ... K3CV (ex-NX9T). Lost the amp about 2/3 of the way through the contest. I had lots of fun; hope to find time to do it again next year ... KA1EKR. Mother Nature shut down 80 and 160m again this year, but 10 and 15m came to life ... W5CWQ. What a joy to find 15m wide open ... N4UH. In the past, I've made a contest QSO here and there, but after 29 years as a ham, this was the first time I've actually spent the better part of a weekend on a contest. I had a blast. Worked a couple of new ones and look forward to doing it again. How do I get the callsigns to quit playing in my head? ... K5IQ.

## Station Operators Multi-Op Single Transmitter

**4G2X:** 4F2IR, DU2BFG, 4F2MD, DU2BRL, DY2PTO, DU2RK. **6D2X:** K5TSD, W5VX, N5RZ, N5NYK, K5TR, XE2YNE, XE2YNS. **7J1YAA/1:** 7J1ABD/WA6URY, JJ1JYO, JF1NIW, JA1FTC, 7J1AKH. **8P9Z:** K3KG, K3ZF, K4FJ. **9A5D:** 9A2FK, 9A3GA, 9A3NY, 9A3VM, 9A4KS, 9A4NC, 9A4SG, 9A4VN, 9A5AQ, 9A5DU, 9A6KK. **9A7A:** 9A7V, 9A8A, 9A2ME, 9A3OS, 9A3TR, 9A4PA, 9A4RX. **9A9D:** 9A4KK, 9A4DD, 9A4UU, 9A2QU, 9A5YA, 9A6KOS, 9A7GIH. **9K9K:** 9K2RR, 9K2SS, 9K2RO, 9K2SD, 9K2QA, 9K2OK, 9K2HR. **A47RS:** A41MC, A41LI, A41KW, A45ZN, G0MRF, G0ONA. **AA10N & W1RH.** **AA5NT & NO0T.** K05ENQ, AD4PU, KE4RHU, KB8UTR. **AC6LK & N7FF.** **BY1BY:** BZ1LL, BZ1DG, BZ1LHD, BZ1WY, BZ1YC. **BY4RSA:** BA4RC, BD4RX, BD4RF, BD4RD, BD4RE, BG4RAD. **BY5QN:** Heng, San, Chen Xiang, Suming, Yanfang, Jipeng.

**C6AJT:** W4WX, KM4WE, W4USN, K4GZ, W4CJ, C6BT: C6BABF, C6SFG, C6BCDV, C6BFSG, C6BGLD. **CS6S:** CT1ERK, CT1ETE, CT2FUR & CT1DSJ, CT1EGF, CT3BX & DK1BT, DK7YY, DL20BF, DL3DXX, DL7BY. **DF0AT:** Club. **DF0DX:** DK5QN, DL1YAW, DF8AE, DL1YDI, DF8XC. **DF0HT:** DF7ATW, DK1SAM, DL3SBI, DK7TL, DL5NAH. **DF3IAG/P & DF2IAX, DF4IAO.** **DK0ANO:** DL3WV, DL2FDP. **DK0ER:** DL4NT, DL4NN. **DK4QT & DK1QH, DJ7YP, DL1YFF, DL4YAJ, DL8YFC, DF9VI.** **DL0CA:** Club. **DL0GK:** DF8QB, DF6VP, DH3YMR, DL1QW, DL8YBW, DL9YAJ. **DL0MBG:** Club. **DL0TD:** DG2FEF, DH5IAE, DK1BN, DK5FJ, DK7WJ, DL1FDT, DL1FDV, DL2FDK, DL2FZN, DL2SEK, DL2ZBN, DL3NEK, DL4VBP, DL8AAU. **DL0TU0:** DL6DVU, DL1DDY, DH5FS. **DL0UM:** DF5BM, DK7ZT, DL1EFD, DL1FO, DL4FDT, DL4MFM, DL6BCF. **DL1MFL & DF3CB, D5JK, DL3NED, DL4MEH.** **DL1Q0 & DL5KUT, DK2OY.** **DL5NAM & DL3NCI.**

**DX1E:** 4F1EJD, DU1KQG, DY1RAN, DY1FDD, DY1RSM, DY1FYU, DY1OTJ, DU1MQA, DU100P, Richie, Eric. **DX1CW:** Club. **DX1S:** DU1KT, DU1GW. **EA1B0I & EA1CBX, EA1BXI.** **EA1COZ & EA1EAG, EA1AS.** **EA1EEY & EA1CUB, EA1CS, EA1BXW, EC1/Diplomado n'ba 63514.** **EA1FEF & EA1ACP, EA1BFZ, EA1CMN, EA1FEL.** **EA1RCT:** EA4AZU, EA1AOD, EB1BAY. **EA3GW & Others.** **EA3KA & EC3AJU, EC3ALS, EC3AD.** **EA3RKG:** EA3BOW, EA3BOX, EA3DGO, EA3EIO. **EA5BY & EA5BXT, EA5DG, EA5EU, EA5FD, EA5GRV, EA5IK, EA5KW, EA5RS.** **EA5KB & EA5CY.** **EA7BJV & EA7ESH, EC7AJL.** **EAB/DL6MHW & DL3ABL.** **EA8ZS & EA1AK, EA3DU, EA3KU, EA4DX, EA4KR, EA5GRV, EA5AJE, K2SS, Alexis.** **ED1II:** Others. **ED2WV:** EA1HO, EA3MQ, EA2ATU, EA2CCG. **ED3TR:** EA3BW, EA3CT, EA3KG, EA3WC, EA3AJW, EA3GEP, EA3GGO, EC3CTR, EC3CVD, Julio, Santi. **ED5WWC:** EA5KQ, EA5CIO, EA5XN. **ES5Q:** ES5MC, ES5MG, ES5QX, ES5RN, ES5RP, ES5RW, ES5RY.

**EW4XA:** EU4EU, EU4AE, EU4004. **EX9A:** EX2M, EX0M, EX8W, EX8M, EX8F, EX8MIN. **F5KDC:** FB1NAN, F5OKD, F5PAL, F8BGV. **F5SUL & F50GG.** **F6KWP:** F5RKL, F-11734. **F6KZD:** F5HN, F6FYX, F6EPN, F6ITD, F8AOF, F6IHY, F2NH, F5IJT. **F8KFC:** F6FNL, F6BNH, F6BGC, F5IQA, F5DJL, F6IFY, F5AVK, FB1CM, F5UAM, F6A1TF, F1ADG, F5BNI. **F8KOH:** F5UTN, F6JSP, F1IGJ. **FM/K2PF & KU9C.** **F08DX:** W6RW, W6KK, N6RT, N6VO, N7CQQ, W8AEF. **FP5AC/P & FP5BU, FP5BZ, FP5CJ.** **FR/IK2RXV & FR5DN.** **G3TBK & G0GDU, 2E1F0G, 2E1F0R.** **G4UJS & G4XUM, G3VAO, G4VUO, G6ABU, G0FYA.** **G7B:** G4L0D, G0BWW, G8ATD, G1GSN, G4VXT, M08IK, M1ACI, G4YRF, G3E0S, G4OXD, G7NBI, G6RHL, G0WIZ, M0AJF, G4LWA. **GM0NTL & MM1BGI, GM0CLN, GM4UYZ, GM4IKU, MM1BJO, MM1AVA.** **GW8GT:** GW3NWS, GW3KYA, GW4JBQ, GW5NF, GW0MAW, W0AIIH. **HB9H:** HB9CIP, HB9BLO, HB9CAT, HB9CXZ, HB9FBD, HB9FBO, HB9FBG, HB9AUS, HB9YC, HB9FAP.

**HB9OK:** HB9FAQ, HB9FMB, HB9FBS, HB9OAB, HB9FBL, HB9ODO, HB9ODD. **HC8N:** N5KO, AG9A, HC1OT, VE3EJ. **HG1S:** HA1TJ, HA1DAE, HA1AH, HA1DAC, HA1BN, HG1DAI. **HG5C:** HA5LZ, HA5LV, HA5MA, HA5WE, dj David. **HL00:** Kyungpook National University Students. **HS2YM & HS2PF, HS2JFW.** **IC8JAH & IC88NK, IC8SDI, IC8FAX, IC8CQF, ISQLS, ISFWT, IC8WIB, IC8WIC, IC8HWN.** **IH9/OL5Y:** OK1FUA, OK1MM, OK2ZW, OK1JR, OK2XTE, IT9HBT. **IJ2Y:** IK2OWX, IK2PTR, IK2WBN, IK2PIH, I2ZZZ, IK2DUU, I2PHN, I2MWZ. **IK2UCK & IK2BUF, IK2YU, IK8PGM/2, I2K2SGF.** **IK4BWC:** IK4NPI, IK4RQE, IK4HLP, IK4GND. **IQ2A:** IK2RZP, IK2GHF, IK2CIO, IK2ANI, I2IFT, IK2XRW. **IQ2L:** I2OKW, I2ZACZ, I2ZAAJ, IK2PFL, IK2YXP, IK2YYE, IK2HAJ, IK2FSG, IK2HPI. **IQ2X:** IK2GZU, IK2GSN, IK2WAD, I2CQZ, IK2SAU, IK2PUZ, IK2ZJP, IW2LLH.

**IQ4A:** I4VEQ, I4TJE, I4EAT, I4AVG, I4IKW, I4IND, I4YRW. **IK4DCT, IK4MGP, IK4QJH, IK4EWK, IK4XQH, IK4CZF, IK2NCJ, IK2JUB, IK2MRZ, IW4ANU.** **IR2W:** I2EOW, I2VXJ, IK2OHG, IK2PZC, IK2QEI, IK4MTF. **IR3PN:** IV3JUJ, IV3XNF, IV3SCR, IV3NVB, IV3NUR, IV3ORB, IV3BTF. **IR7S:** IK7YUA, IK7UXW. **IT9KWF & IT9EWG.** **IJ2M:** IK2SGC, IK2SFZ. **I28Z:** IK8HCG, IK8UND. **J41DKL:** SV1DKL, SV1COT. **JABYAK:** JF0ESV, J00ETP, JM7SGO, J17TDR, J10TAG, J17UPJ, Tanako. **JA1ELY & JA1IDY.** **JA1YKX:** JQ1VNM, JH4OWG, JO1VVT, JH9JFH, JQ1PCT, JK1QHK, Suginome. **JA2RL/2:** JF2VAX, JG2JCA, JJ2TKX, JK2RKE, JK2TDW, JK2VOC, JO2AXB, JP2XYT. **JA6ZLI:** JG6POJ, JJ6WYS, Toyo. **JA7YAA:** 7M1JAS, JG7PSJ, JH0NAN, JF1SXL, Nakagawa. **JA9YAA:** JH9KVF, JG2KKG, JN2QCV, JM2FCJ, J00ADV, J060LV, JR9KZR, 7L2DEG, JJ0BLW. **JA9YBA:** JR9EJZ, JR0BAK, Nads, JR0ELG, JR9ONJ, JF0EGG.



Andy, 9X0A, got into a lot of logs.

**JE6ZIH:** JR6GKT, JH6QFJ, JL6MPR, JI6BRB, JH7AFR & JA7WME, J77ABV, JH7PKU & JA9SSY, JH7FQK, JH7DXZ, JO1BMV. **J12ZEY:** JA2BIV, JA2BHJ, JA2BIL, JQ2BBC, JN12DF: JE8XRF/1, JE8KX/1. **JR12TT:** JK1JHU, 7L1XCM, JK2FGD, JF4JYE, JM4HHH, 7M4AZB, JR80FE, JI7OHM, JE0IUZ, JR0UUU, Megumi, Furuta, Furukawa. **JT1T:** JT1BL, JT1BV. **JW5E:** JW5NM, JW7FD. **JY8Y & JY5SK.** **K0RF & W0UA, W1XE, N0AH, W00GAZ.** **K1EU & W1DEO.** **K1NG & K1IG, K1SD, AA1AA, W1B.** **K2TR & K20NP, N1F, NA2NA, KE1EO.** **K3IE & W4EAE, K4WG.** **K4FCC:** AE4SW, K4LO, W4JAM, W4OX, W0MAN. **K4ISV & K4CN, N4AT, K4CM, K4CMS.** **K4K:** N8PR, W4SO, N4QV, K4VP, K4ACW, YV5DTA/4. **K4RC:** W3MGL, KA4VGF, KU4FP, K4MU. **K5DM:** W0NSA, K5KDM. **K5KG/2 & W6TER, N7UN.**

**K5RAC:** Club. **K6A:** K6BEW, KF6HIN, K6PU, **K6IDX & KF6FSM, A16V, W7TO, K5RC, K7BV, W6AT0, K6KR, K6KM & N6BT, K2KW. K6MDX:** AC1D, K6BG, K6BQKX, K6FDD, K6JYJ, K6JYQ, K6ZNB, K06IWA, K06VIU, K06VIV, K06IKN, K06IKX, K06LBT, K06GB, K06GK, N6VVY, N6VVZ, N6WVO, W6PMV, W6LOS, WJ1P, W6WCP. **K6SG & K6GH.** **K6ZM:** K6WG, W66MZQ, K06RNM, K2KW, KF6NIA. **K8AZ & K8BL, K8NZ, N8TR, NW7Q, W1MD, W8KIC, WT8C. K8CC & JJ1BMB, JR1HAA, K8GT, K8OW, W88HBJ, W08S.** **K9MK/5 & N5HRG.** **KA1DWX & W10HM.** **KB1SO & K1ZR.** **KB3A & KB3B.** **KC7V & K7SP, N7MB, N7ZE (JR6ZE).** **KG4QD & KG4BV, KG4WB, KG4AU, KG4WD, KG4PK, KG4PT, KG4BA.** **KG8ZD & W8AXW, K08ABF.** **KH0A:** JA1WSX, JE2PCY, JP1JFG, JF1MIA. **KH8/N5OLS & N5JA.** **KJ3V/4 & Others.** **KL7/NO7F & WL7COJ.** **KP2/K3MD & N3PUR, N3NWM.**

**L20H:** LU3HIP, LU9HS, LU1HM, LU3HWE, LU5HF, LU5HD. **L40H:** LU7YS, LU8VCC, LU7VCH, LW1EXU, LU1H00, LU3HU, LU4HMF, LU9HOA, LU3HNE, LU2HAM, LU3HAK, LU4HTW, LU6HBK, LU9HPN, LU9HXQ, LW1HBV, LW5HBR, LW9HBU. **L50V:** LU1VK, LU9VET, LU7SP. **LABW:** LA4DCA, LA8SDA, LA9EEA, LA9SEA, L71F: LU5FHM, LU3FZW, LU1FKR. **LT5V:** LU3VMS, LU3VED, LU9VI. **LU1HPW:** Club. **LU1NF:** LU1NDC, LU1NAF, LU4NAD, Eduardo, Otto. **LU6FBI & LU1HF, LU2FFD, LU6FAZ, LU6FUD.** **LU80ZE:** LU6DH, LW1DBA, LW4DYU, LW6DQ, LW7EIG, LW9ETY. **LY3AV:** LY1CX, LY1CQ, LY3BP, LY1DA. **LZ5Z:** LZ1KDP, LZ1JY, LZ1HST, LZ3FR, LZ3DJ, LZ3SM, LZ3FN, LZ4AX, LZ9A: LZ1UK, LZ2CC, LZ2DF, LZ2HE, LZ2JE, LZ2PO, LZ2TX, LZ2UU, Goshu. **M7C:** G3KKQ, G3NTM. **M7G:** G0UCS, G0UZF, G0WTD, G0WTM, G1AHM, G3ZRE, G4TZR, G4WJR, G7SUR, G7VOO, M1ADC.

**M7P:** G3GAF, G3UHU, G4PWA, G4TNB. **N0MA:** N0LNO, K0HWE, W0DYFL, K0VM, K09K, K00IES, N6WLY, K0VAR, W00F. **N0ZA & K0CL, K0UK, K0DU, K06IZT.** **N1KWF & K1ZO, WA1ZYX, WK1P, N1MD & K21M, N1TLN, KB1VM, K1ZE, K1ZLN.** **N2A1Z & W2AYL.** **N2LBR & WA1KKM.** **N2NU & W2REH, W2Y2, K2WI.** **N2SS & N2MT, N3DL & AA3JT.** **N4USA:** K1GG, US7CQ, UC7CW. **N5HV & K0EJ.** **N6ED & N06X, W6UC, KE6YI2, K6REX.** **N6KI & KE6WEO, W6MD.** **N6KP:** W6BSY, K6BJOX. **N7MO:** WM7R, NY7T, W5TV, KH6CJJ. **N7SG & K7FD.** **N7TX & KK7JS.** **N8NR & N8BJQ, N9AG.** **N9LYE & N1ZRD.** **N90X & KE9I, WD9GGY.** **NE3F & K3ATO, K3F, NT3V, K3FP.** **NF4L & N04J, K4UTE, KN4UB, WA4B, KC4FWS.** **NH2C:** JG3RPL, JR3RVO, JJ3ERV, JR70MD, JK3GAD, JH7QXJ. **NJ5S & KA7GLA, N1UOC.** **NK7U & K7ZO, K7MK, W7ZRC, N7BZ.** **NM3K & Others.**

**NO4I & AA4LR, K4BAI, K4JNY, N4CM, N9HZQ, W14R.** **NT4L:** K1KY, W4KH, KC4OFR, K06ID. **NXBI & KM0L, N08IV, K0VB, K0BU, K0BDVT, K00US, K00UT.** **OE5T:** OE3GEA, OE5VVL, OE5JBL, OE5K0U, OE5MKM, OE5CMN, OE5BWN, OE5ERN, OE5OHO. **OF1AF:** OH1EB, OH1MDR, OH1NOA, OH1HS, OH1XT, OH1HEV. **OH5BM & OH5UQ, OH4JLV, OH5LZY.** **OH6AW:** OH6EME, OH6UV, OH6MSZ, OH6MW, OH6KSR. **OH6NIO & OH6CS, OH6KZP, OH6RX.** **OH7AAC:** OH4LYX, OH6LNI, OH7LTK, OH7MHL, OH7KD, OH7WV. **OK1KCF:** Club. **OK1KUO:** OK1UG, OK1FFC, OK1UO. **OK2KJU:** Club. **OK2K0D:** OK2BDI, OK2WAZ, OK2BNX, OK2BJ. **OK5W:** OK1AEZ, OK1CF, OK1WF, OK1WT, OK1JKT, OK1TN, OK1TA, OK1FKD, OK1DDO. **OL2A:** OK2PDK, OK2HBY,

(Continued on page 94)



# WHO SAYS YOU CAN'T IMPROVE A MASTERPIECE

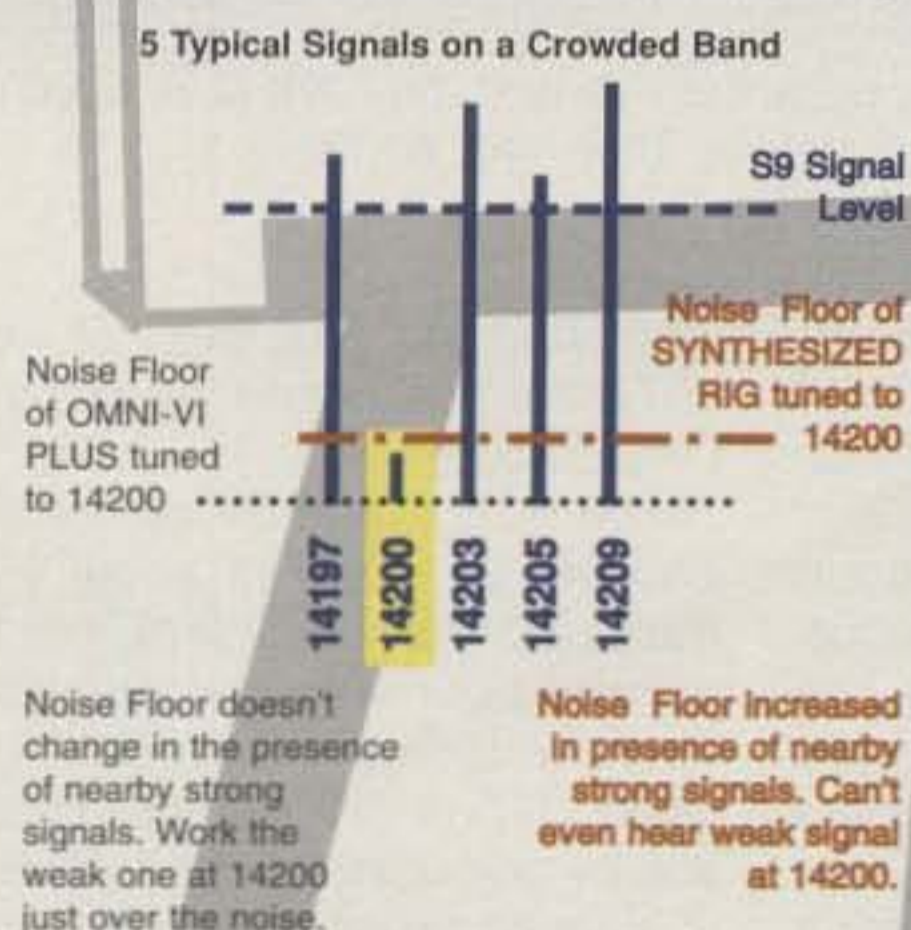
Like a great artist who steps back, reflects, then adds a final brush stroke, we hams at TEN-TEC could not resist a few subtle but powerful refinements to our treasured OMNI-VI. Take a look at this new "OMNI-VI PLUS", and judge for yourself how we improved a masterpiece....

## JUST THE RIGHT AMOUNT OF DSP...

...to forget about those add-on DSP boxes. New, single button NOISE REDUCTION improves signal-to-noise on the weakest signals - makes SSB and CW leap out of the noise. DSP LOW PASS is now available in all modes providing 5 choices to cut the highs "just the way you want" to reduce listening fatigue. Rig even remembers your separate choices for SSB and CW. The DSP processor adds two more subtle features to the canvas. Built-in AUTO NOTCH instantly eliminates interfering carriers - now work 40 meters day or night. Finally, CW transmit offset is adjustable 400 - 990 Hz with auto tracking sidetone.

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## SUPERB SELECTIVITY

The artist is never quite satisfied... We've added one more optional filter position. Provides up to 4 choices of bandwidth in the 6.3 MHz I-F and now 3 choices in the 9 MHz I-F. Two of the 7 filters are standard; add only the options that fit your "view" of the bands. In the OMNI tradition, all filters remain independent of mode.

## ATTENTION TO THE DETAILS

Rigorous computer controlled tests now exercise every OMNI. Made possible by the rig's high speed PC Interface coupled to automatic test equipment. Our own custom software orchestrates the entire process. There's also an overnight burn-in. OMNI's transmit into dummy loads cycling between RX and TX every few seconds changing bands along the way. One final performance check finishes things up. A reliable masterpiece out of the box and for years to come.

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*New country? Maybe. Great catch for IOTA hunters? Definitely. VK9NS heads off to operate from Temotu Province in the Solomon Islands' Santa Cruz Group (OC-065).*

## H40AB

# DXpedition to Pigeon Island

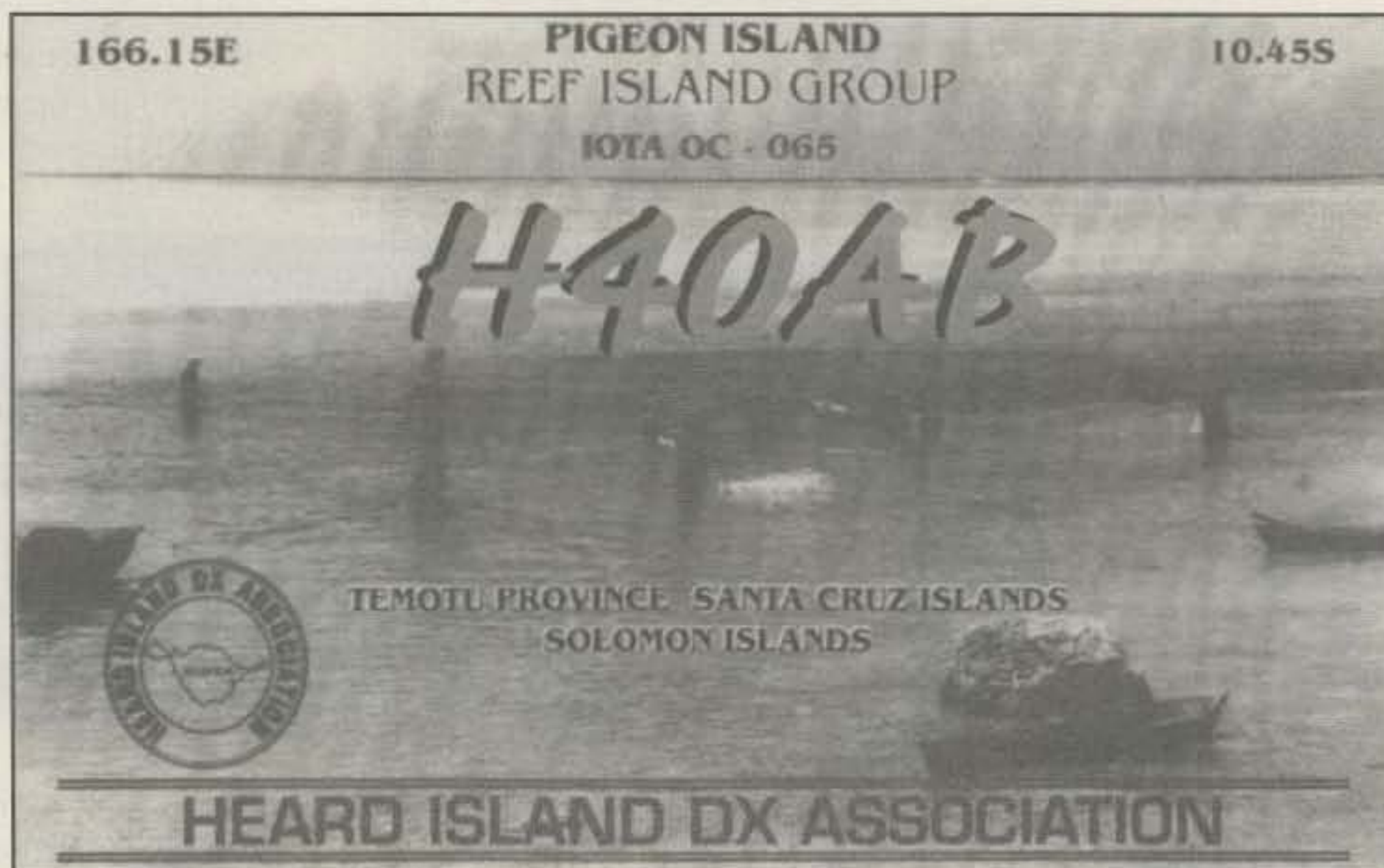
BY JIM SMITH\*, VK9NS

Changes to the ARRL DXCC Rules for country criteria, etc., were released by the ARRL in early 1998. These changes were to become effective April 1, 1998 and were of immediate interest to all DXers. Although many of the changes were "cosmetic," three important parts were of great consequence. One was the definition of the size of an island for DXCC purposes, which after the events of Scarborough Reef was a major policy decision. Another was the idea of political entities, which helped make a couple of French Polynesia groups possibilities for DXCC status. Yet another was the change in the unit of measurement used to determine the "separation by water" between two areas. The unit was changed from the mile to the kilometer, and in the conversion 225 miles became 350 kilometers (instead of 362 km). This had the effect of reducing the old distance requirement by a small factor.

It was this last factor that raised the possibility of the Santa Cruz Group of the Solomon Islands becoming a new DXCC country. The group had failed the distance test by a very narrow margin many years ago. In those days (P29JS) I worked in the region and was in fact licensed first with the call VR4BJ; then on Independence this was changed to H44BJ. I used to visit the Solomon Islands on a regular basis.

The Santa Cruz Group is over 350 km from Guadalcanal, and it seems that, as I write this, it is scheduled to qualify as a new DXCC country. The largest island is Nendo, which is also the nearest point to the parent country. The capital is Lata, and there is a small grass air strip in the immediate area which is served by air from Honiara (Guadalcanal) two or three

\*P.O. Box 90, Norfolk Island, Australia 2899



*The H40AB QSL card states acknowledgement where they are due. QSLing started just a couple of weeks after I got home.*

times a week. The arrival and departure of the Twin Otter plane is always well attended, since in such a small community most people know each other.

DXer Martti Laine, OH2BH, and a group of other well-known DXers chose to operate from Lata with the callsign H40AA. The Santa Cruz Group is known better locally these days as the Temotu Province. It has its own provincial government, etc.

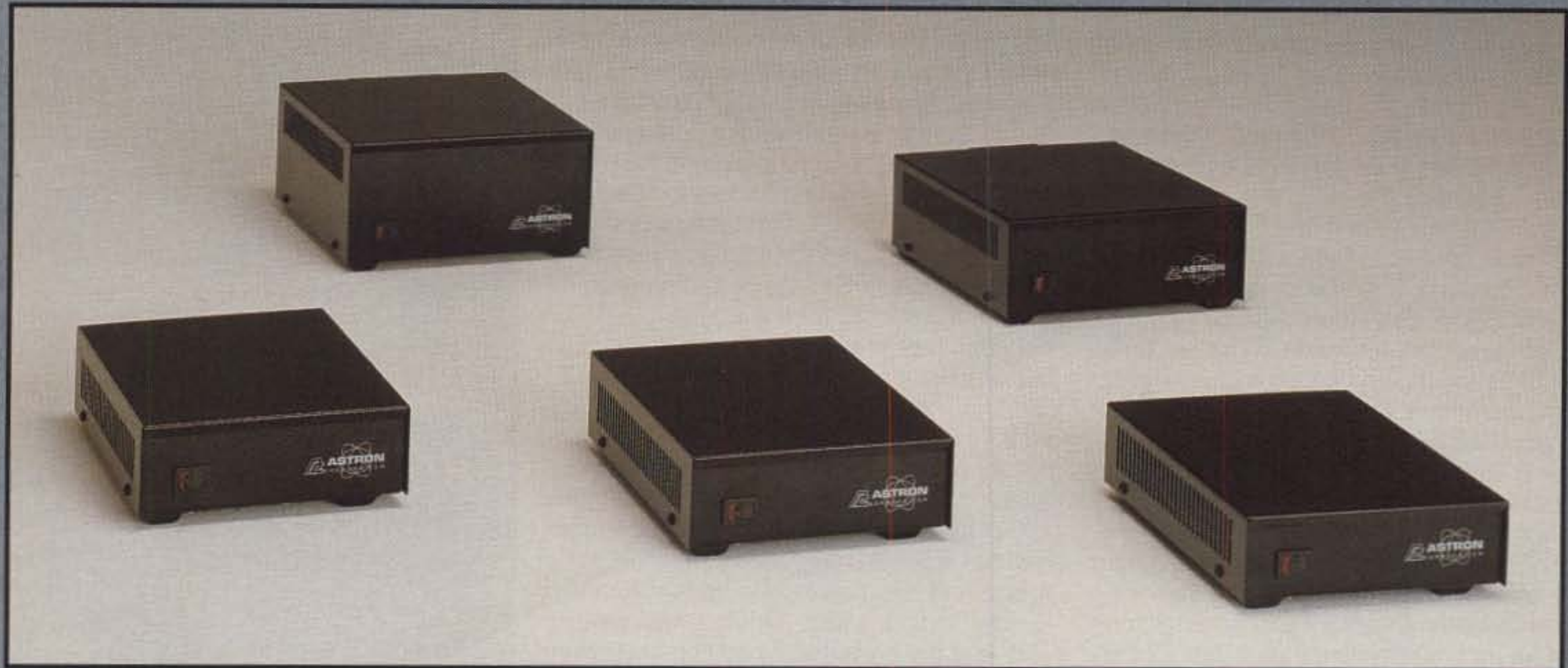
The reason for my choosing Pigeon Island, Temotu Province, was fairly straightforward, as I knew quite a lot about the area and it made no sense for two groups to operate from Lata. In IOTA terms Pigeon Island is part of the Reef Group and numbered OC-065 which I needed. The IOTA rules allow me to claim OC-065 if I activated it. Nendo Island by the way is IOTA OC-100 so the radio ama-

teurs had the possibility of working two IOTA numbers and perhaps one new DXCC country.

The Reef Island Group consists of several islands and lies about 75 km NNE from Lata (Nendo Island). The trip means a three hour small boat journey across open water and the canoes used are ribbed 6.5 m (20 ft.) fiberglass hulls driven by an outboard motor. The canoe trip is quite an experience and may not be for the weak or squeamish. The trip over to Pigeon Island was fine, but the trip back a couple of weeks later was a memorable one, as it took over four hours in fairly rough seas.

My arrival on Pigeon Island was just at dusk a couple of days before the important April 1st date when the H40 callsign would come into effect. By the time I had

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SS-30	25	30	3 <sup>3</sup> / <sub>4</sub> x 7 x 9 <sup>5</sup> / <sub>8</sub>	5
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unloaded my 85 kg (188 lbs.) of baggage and radio equipment and settled in, it was already dark with no hope of erecting my antenna. The generator was running, giving me lights and power in my accommodations, and I unpacked my TS-690S rig, ICOM 706 MKII, and power supply unit and took the lid off the antenna box, etc. I quickly switched the rig on to check that it was working okay. The TS-690S, keyer, etc., all seemed okay and none the worse for the trip from Norfolk Island. I then unpacked the linear amplifier, fitted the 572B tubes, and put the lid back on. Then I called it quits for the night.

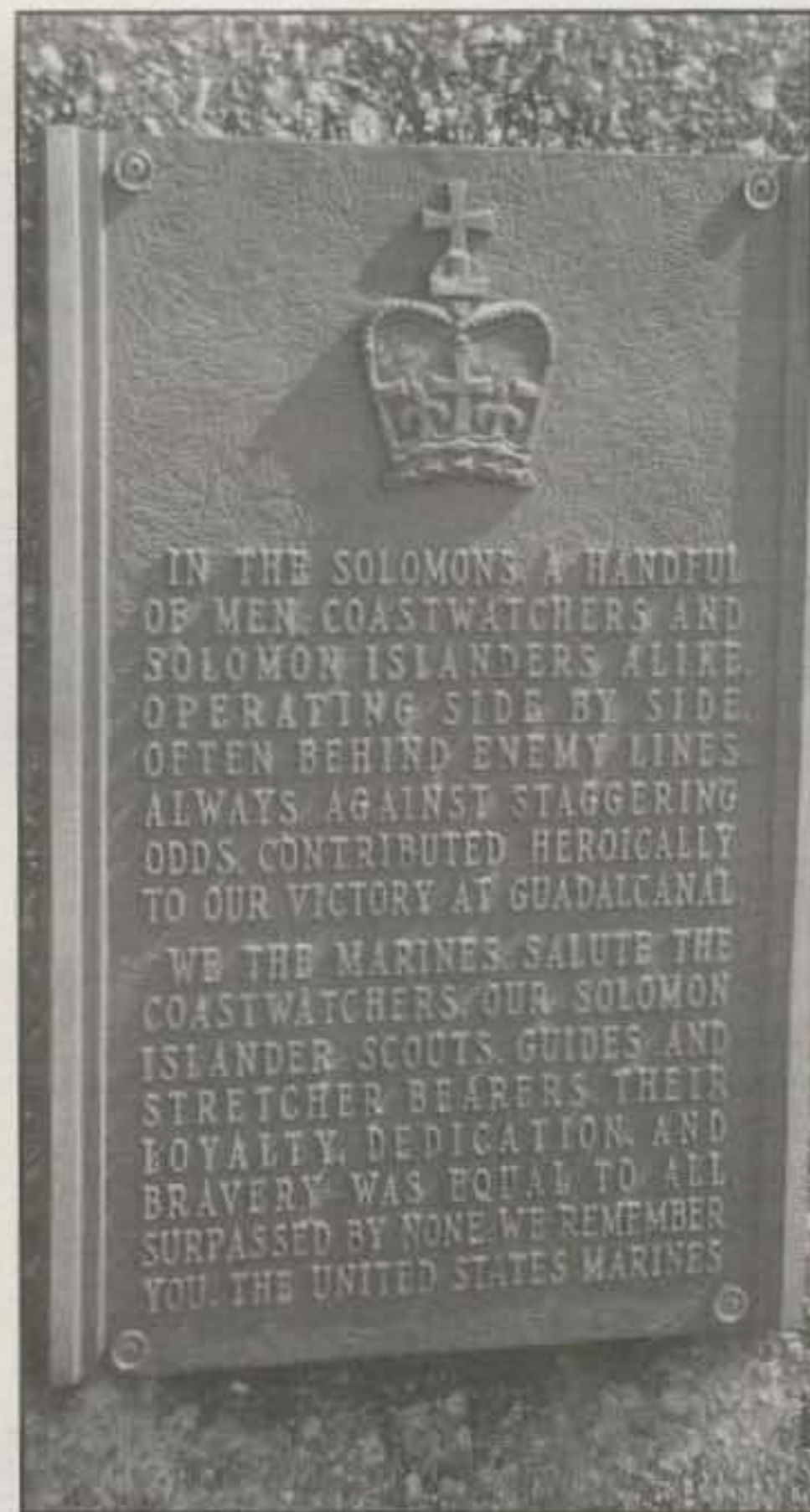
It must be explained that my TS-690S is powered via a home-built unit with an ICOM PS35 Switched Mode PU and ICOM keyer board inside. While in India as VU2JBS, the PU often had an erratic start up. However, I had purchased a backup PS35 ICOM PU in Brisbane on my way through, so I was happy. If the unit decided to quit, then I had a fix, merely having to change over the PU units.

The next morning I proceeded to set up the station properly. The generator had been moved nearer to the operating position for easier refuelling. My trusty Butter-nut HF6V multiband vertical antenna was soon erected, and I was more or less

*A dedication plaque at Honiara Airport, Guadalcanal. (All photos in this article were taken by VK9NS) →*

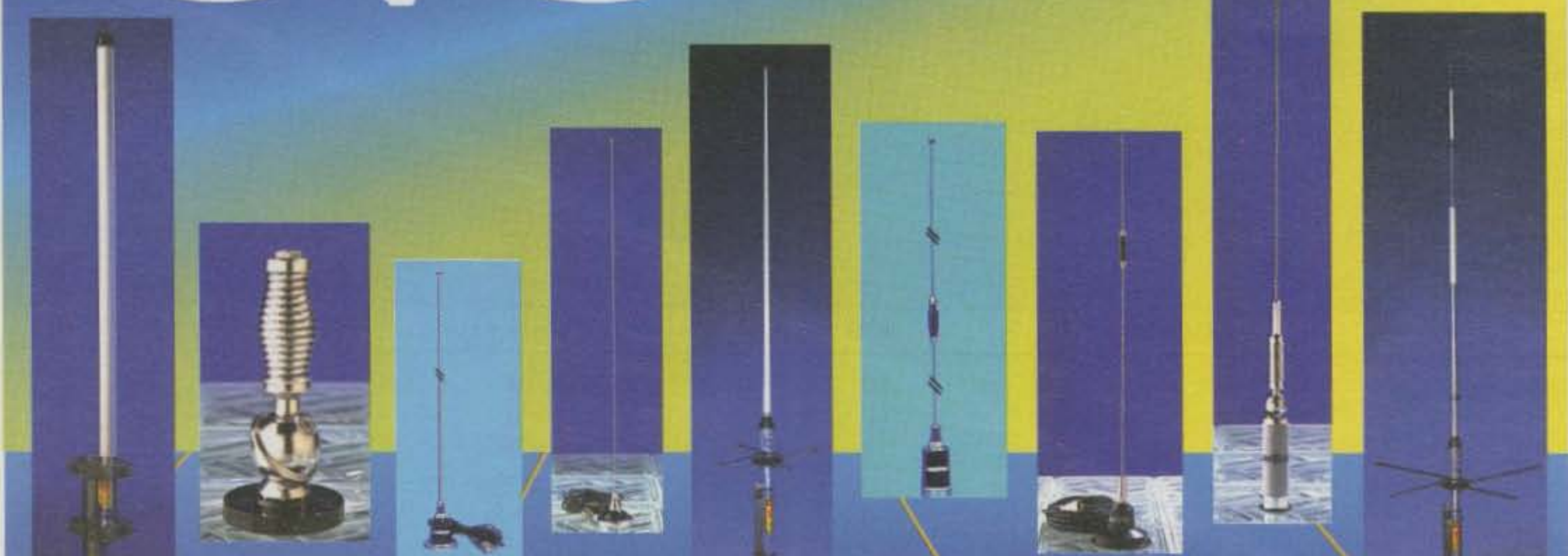
ready to go. H44/VK9NS would soon be active and the FL 2100Z would be put in line in due course. However, on switching on, there was a sharp crack from the power supply unit and then nothing! I had that sinking feeling and diagnosed (incorrectly) that finally the cause of the intermittent starting had come to light! No problem. I went to work and had soon fitted the replacement PU unit. This time, on switching on there was a much bigger bang and again silence. Now I really had a problem with no 13.8 VDC for the rig(s)!

I won't bother you with the grisly details, but on checking the output of the generator, I found it was pushing out 320 volts! I simply did not believe the meter, but it proved to be correct. The previous evening the output had come via at least 100 m (300 ft.) of wire and the voltage drop had saved me! It happened that the generator had been serviced and made ready for my arrival. Later, when I had time, I checked the carburetor position and reset it, as the link was in the wrong slot. The AC output was now around 240 volts, but



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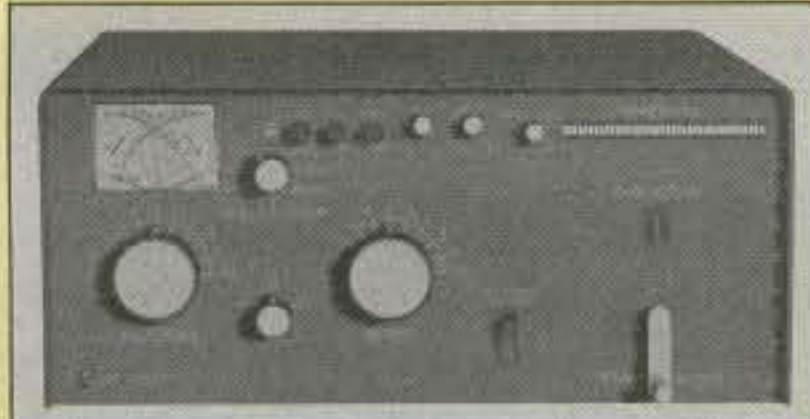
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*The radio gear and baggage at Lata Airport.*

regulation was very poor. This generator also had a 12 V battery charging output.

Of course, this was jumping the gun. I had no immediate fix and felt very much down in the dumps. There seemed to be no solution. I went to the owner of the island and spelled out my predicament, and she suggested that I borrow one of their 12V batteries. "What batteries?!" I thought. There, in a cupboard under the island's radio equipment desk, were two 150 AH, 12V batteries connected in parallel. They used solar panels with an occasional full charge from the generator to keep things in shape. In any case, the batteries looked brand new, and one soon found its way down to my "shack." It was a lucky break. It restarted my brain and

gave me time to think and take steps for a future permanent fix. This involved flying in a new power supply from Australia.

Meanwhile, the battery, the generator with its 12 V (20 amp) charging outlet, and a couple of solar panels (one had to be fixed first) helped me to float charge the battery. The rig worked very well, and signing H44/VK9NS, I started to get QSOs in my log. However, the bad news was that this generator was only a couple of feet away from me! It is understandable that my signal became distinctive on SSB with a loudish background noise! One station was quite excited as he told me how lousy my signal sounded. Then on CW, which I tended to use more and more, it was said that my signal had a distinctive chirp. Well,



*A typical local fishing scene on Pigeon Island.*

why not? In a few cases, reports of 575, 598, etc., were received. It didn't worry me a bit, although in the old days we used to give 559c and left it at that.

The Yaesu FL-21002 linear was soon in service using a second generator which was fairly new with excellent regulation. I ran it at very modest power, but it allowed me to back off the TS-690S output, thus conserving battery power. I ran all day with the battery and charger generator, and then just before dark I had to relinquish it to the islanders. I then continued with the other generator (no charger) for the linear and lights until the battery was too flat to carry on. Meanwhile, the DXpedition routine soon set in, and despite the various challenges, my QSO total really started to build up. However, that steadily failing battery power at night was a big limitation.

In the meantime, I arranged for my heavy-duty Kenwood transformer 13.8 VDC supply to be sent to me. This became a copybook transaction: Brisbane to Honiara; Honiara to Lata; rushed through customs with a large MUST GO label (bless you, Solomon Island Airlines!). Then followed the six hour round trip from Pigeon to Lata and return by canoe to pick it up for me. I'll long remember the smile of Dawoo as he waded through the water carrying my precious power supply. Come to think of it, I felt pretty happy myself!



Temporary power: a battery, generator charging output, and solar panels.

From then on I was in business, and most of all, the lack of that charger generator noise was a major plus. I had often felt as though my brain was coming apart, and I'm not joking.

There is not much to be said about the

usual DXpedition routine: operate, eat, sleep, and at one time refueling both generators, etc. The H40AB station was set up outside under my covered veranda with super air conditioning, but it was a pity about the mosquitoes at night. The

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The H40AB station: TS-690S, IC-706 MKII, FL-2100Z, MFJ keyer, etc.

station had to be moved inside the last couple of days due to a big change in the weather conditions. This weather change was still apparent on the morning of my departure for Lata. I had a good but restricted view of the water and soon got used to recognizing daily events such as local fishing, seabirds catching their

breakfast, various other wading birds, and so on. Pigeon Island does have pigeons, by the way, and two or three varieties of lizards, a species of small parrot, and a humming bird. A land crab and coconut crab also inhabit the island. There are, of course, fish, fish, and more fish.

Pigeon Island is not very large, but I got

around quite a bit and took lots of photographs and quite a bit of video. I joined the family for the evening meal at around 6:30 PM with light from "that" generator. The accommodations and food were excellent, but of course I was eating rice twice a day and a variety of vegetables and fish. Plenty of water laced with lime became a daily requirement, and there was even a kerosene refrigerator running for my use. There is a trading store, a small school, several outbuildings, and a few residential buildings. I purchased from the store all the petrol, which was hand-pumped into a plastic container.

These days the possibility of higher QSO totals for DXpeditions is the result of the improved band conditions. It is a great feeling to be able to work 10 meters during the day once again. On both 10 and 12 meters I had some tremendous openings that helped increase available operating slots.

I also had the opportunity to use the ICOM 706 MK II, which I brought as backup. It is a great rig, and several stations commented on the excellent audio quality on SSB. Just how did ICOM manage to get so much into such a small package? The function programming is fairly easy to use once you get used to it. I did not use the rig to drive the linear, as to be honest, I was not sure if it was a good idea to do so without a proper relay interface to key the linear. I also tried 6 meters a couple of times, as the band was reported to be open by several JA stations, but I did not have any success. This was almost certainly due to antenna problems. Never did I get on 160 meters, but frankly, my activities on 80 and 40 meters gave me little time. Perhaps my next visit!

My rough log total count shows that almost 15,800 QSOs were made from H40AB. This will decrease, however, at such time that it is computerized with dupe QSOs, etc., removed. All in all, though, I felt this was a very satisfactory QSO total, with another 800-plus QSOs signing H44/VK9NS. Murphy, despite his cardinal effort against all DXpeditions, had failed.

The HIDXA H40AB DXpedition has been dedicated to Ken Stevens, VK5QW, who recently became a Silent Key. Ken was a staunch supporter of the HIDXA, and I have the feeling that he would have been happy with the results of this H40AB operation.

Let us hope that the Santa Cruz Islands (Temotu Province) become a new DXCC country. For the IOTA hunters who made the QSO with H44/VK9NS or with H40AB, they now have OC-065 (Reef Islands) in their log.

A thank you is due to many, and especially to HIDXA members and Kirsti, VK9NL. Kirsti should have been with me, but she fell a couple of days before my departure and badly bruised her knee. ■

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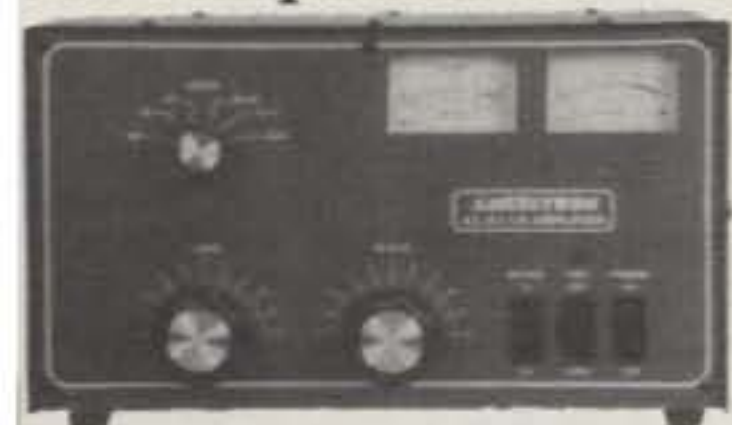
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Ameritron AL-811H gives you four 811A tubes, 800 watts, superior quality -- for less money -- than the competitor's 3 tube 600 watt unit . . . Why settle for less power, less quality and pay more money?



AL-811H  
**\$795**  
Suggested Retail

Only the Ameritron AL-811H gives you four fully neutralized 811A transmitting tubes. You get absolute stability and superb performance on higher bands that can't be matched by un-neutralized tubes.

AL-811  
**\$649**  
Suggested Retail

Ameritron mounts the 811A tubes vertically -- not horizontally -- to prevent hot tube elements from sagging and shorting out. Others, using potentially damaging horizontal mounting, require special 811A tubes to retard sagging and shorting.

A quiet, powerful computer grade blower draws in

plenty of cool air. It pressurizes the cabinet and efficiently cools your 811A tubes. Our air flow is so quiet, you'll hardly know it's there -- unlike noisy, poorly chosen blowers.

You also get efficient full size heavy duty tank coils, full height computer grade capacitors, heavy duty high silicon core power transformer, slug tuned input coils, operate/standby switch, transmit LED, ALC, dual meters, QSK compatibility with QSK-5 plus much more.

AL-811 has three 811A tubes and gives 600 Watts output for only \$649.

## Kilowatt Amplifier



AL-80B  
**\$1249**  
Suggested Retail

Full kilowatt PEP output from a whisper quiet compact desktop linear Only 8 1/2x14x15 1/2 inches. Plugs into nearest 120 VAC outlet. All bands 160-15 Meters, 1000 watts out on SSB, 850 watts out on CW, genuine Amperex 3-500ZG tube has graphie plate, nearly 70% efficiency, inrush current protection, multi-voltage transformer.

## NearLegalLimit™ Amp



AL-572  
**\$1395**  
Suggested Retail

New class of Near Legal Limit™ amplifier gives you 1300 Watt PEP SSB power output for 65% of price of full legal limit amps! Four rugged Svetlana Russian 572B tubes. Instant 3-second warm-up. Plugs into 120 VAC. Compact 8 1/2Hx15 1/2Dx14 1/2W. 160-15 Meters. 1000 Watt CW output. Tuned input, instantaneous RF Bias, dynamic ALC, parasitic killer, inrush protection, two lighted Cross-Needle meters, multi-voltage transformer.

## AMERITRON offers the best selection of legal limit amplifiers

AMERITRON's legal limit amplifiers use Peter Dahl super heavy duty Hypersil® power transformer capable of 2500 watts! Ameritron's most powerful Amplifier with Eimac® 8877 ceramic tube

AL-1500  
**\$2795**  
Suggested Retail

Ameritron's most powerful amplifier uses the herculean Eimac® 8877 ceramic tube. It's so powerful that 65 watts drive gives you the full legal output -- and it's just loafing because the power supply is capable of 2500 Watts PEP.



Ameritron's toughest legal limit Amp

AL-1200  
**\$2295**  
Suggested Retail

Get ham radio's toughest tube with the Ameritron AL-1200 -- the Eimac 3CX1200A7. It has a 50 watt control grid dissipation. What makes the Ameritron AL-1200 stand out from other legal limit amplifiers? The answer: A super heavy duty power supply that loafs at full legal power -- it can deliver the power of more than 2500 watts PEP two tone output for a half hour.



Ameritron's Classic legal limit linear amp with a pair of graphite plate

AL-82  
**\$2195**  
Suggested Retail

Get full legal output using a pair of durable 3-500ZGs. Most competing linears using 3-500s can't give you 1500 watts because their light-weight power supplies can't use these tubes to their full potential. AL-82 is ham radio's only super 3-500 amp!



ARB-700/702 amp-to-radio interface . . . \$39.95



Protects your costly transceiver from damage by keying line transients, steady state current and excessive voltages.

QSK-5 Pin Diode T/R Switch . . . \$349



Self-contained, connects externally to most HF amps. Handles 2.5 KW PEP, 2 KW CW. Six times faster than vacuum relay. 6x4x9 1/2 in.

## AMERITRON HF Linear Amps with Eimac™ 3CX800A7



AL-800H  
**\$2295**  
Two tubes  
1500 Watts plus

Suggested Retail  
Call your dealer for your best price!

AL-800  
**\$1595**  
Single tube  
1250 Watts

AMERITRON's new AL-800/H amps cover 160-15 Meters including WARC bands. The AL-800 has a single Eimac™ 3CX800A7 tube and produces 1250 Watts PEP. The AL-800H has two 3CX800A7s giving 1500 Watts plus. Both amps have an adjustable slug tuned

input circuit, grid protection, ALC control that is front panel adjustable, vernier reduction drives, heavy duty 32 pound grain oriented silicone steel core transformers and high capacitance computer grade filter capacitors.

These amplifiers have multi-voltage operation (14 user selectable AC line voltage from 90-140; 200-250 VAC), quiet pressurized ventilation systems, dual illuminated Cross-Needle meters that read peak forward and reflected power, SWR, high voltage, grid current and plate current.

Vernier reduction drives make tuning adjustments smooth and easy Ameritron's exclusive Step-Start Inrush Protection™ stops damage to your amplifier from inrush current. Ameritron amps feature an attractive Lexan front panel decal and superior, all metal construction -- it's built to last! Ultra compact desktop size is perfect for your operating station. 8 1/2x16 1/2x14 1/4".

## AMERITRON no tune Solid State Amplifiers

Ameritron ALS-500M Mobile no tune Solid State Amp has 500W out, covers 1.5-22 MHz



ALS-500M  
**\$799**  
Suggested Retail

Ideal Mobile amplifier -- uses

13.8 Vdc mobile electrical system, very compact 3 1/2x9x15 in., extremely quiet, 500W output, 1.5-22 MHz coverage, instant bandswitching, no tuning, no warm up, no tubes, SWR protected.

Ameritron ALS-600 no tune Solid State FET amp includes heavy duty power supply, 600 Watts out



ALS-600  
**\$1299**  
Suggested Retail

No tuning, no fuss, no worries -- just turn it on and operate. Includes AC

power supply, 600 W output, continuous 1.5-22 MHz coverage, instant bandswitching, fully SWR protected, extremely quiet, very compact. Amp is 6x9 1/2x12 inches.

## AMERITRON brings you the finest high power accessories!

RCS-8V Remote Coax Switch . . . \$149

Replace 5 coax feedlines with a single coax. 1.2 SWR at 250 MHz. Adjustable to 450 MHz. 1kW at 50 MHz. RCS-4, \$139. 4 position remote HF switch.

ADL-1500 Dummy Load with oil . . . \$59.95



Oil cooled 50 ohm dummy load handles 1500 W for 5 minutes. SWR under 1.2 up to 30 MHz. Low SWR to 400 MHz.

ICP-120/240 Inrush Current Protector . . . \$79

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Designed for legal limit amplifiers! Covers 1.8-30 MHz, peak reading SWR/Wattmeter, 6 pos. antenna switch, 1:1 or 4:1 balun.

ARB-700/702 amp-to-radio interface . . . \$39.95



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QSK-5 Pin Diode T/R Switch . . . \$349



Self-contained, connects externally to most HF amps. Handles 2.5 KW PEP, 2 KW CW. Six times faster than vacuum relay. 6x4x9 1/2 in.

TP-100 Tuning Pulser lets you safely tune your amplifier . . . \$49.95

Pulse tuning lets you safely tune up your amplifier for full power output and best linearity. Keeps average power to low safe level to prevent overheating, tube damage, power supply stress and premature component failure.

ADL-2500 fan cooled 2500 Watt dry dummy load . . . \$199.95



Whisper quiet fan. Handles any legal limit amplifier -- 2500 Watts average power for 1 minute on, ten off. 300 Watts continuous. SWR below 1.25 to 30 MHz and SWR below 1.4 to 60 MHz.

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# MATH'S NOTES

WHAT'S NEW AND HOW TO USE IT

## Semiconductor Update

Well, it finally happened. Someone at last has introduced a line of logic chips with *less than four gates or six inverters* in a package. No longer will we have to build a circuit that needs just one more inverter or gate and get locked into another 14-pin DIP package with five unused inverters or three unused gates, not to mention the extra PC board space "floating around." We can now buy a single inverter or a single gate all by itself. The "someone" is none other than Fairchild Semiconductor, and their new "Tiny-Logic" chips are the God-send I am talking about.

There are 15 single-gate functions currently available, and these are the usual: an inverter, a single two-input NAND or AND gate, a NOR gate, and a few open-drain (collector equivalent) elements as well. All are designed to operate from 1.8 to 5.5 volt rails so that TTL as well as the 3.3 volt logic families can be accommodated. All are also supplied in SC70 or SOT23 surface-mount packages, so the extra space needed is minimal. All have propagation delays on the order of 2 to 6 nanoseconds, so speed is not a factor in most designs. For further information, contact Fairchild Semiconductor on the web at [www.fairchildsemi.com/offers](http://www.fairchildsemi.com/offers).

For those of you who are familiar with the Mini-Circuits MAR wide-band amplifier product line, there is now a new, similar ERA Amplifier series. Like the MARs, the new ERAs are small four-lead "dots," but these devices cover the range from DC to 8 GHz, thereby allowing easy entry into the microwave region. Some typical specifications for these devices are DC-8000 MHz, gain 11.7 dB, noise figure 5.3 dB (ERA-1); DC-6000 MHz, gain 12.8 dB, noise figure 4.7 dB (ERA-2); and DC-3000 MHz, gain 12.1 dB, noise figure 3.8 dB (ERA-3). Cost ranges from \$1.80 (ERA-1) to \$2.10 (ERA-3) in lots of 10 pieces. As in the case of the MARs, a "designer's kit" with 10 devices is available for prices ranging from \$49.95 to \$99.95 depending on the selection of devices in the particular kit. Fig. 1 is a typical hookup for an ERA amplifier. You will note that it is quite similar to the MAR hookup. Obviously, microwave construction techniques are necessary to achieve optimum results.

For further information on specifications and design criteria you should con-

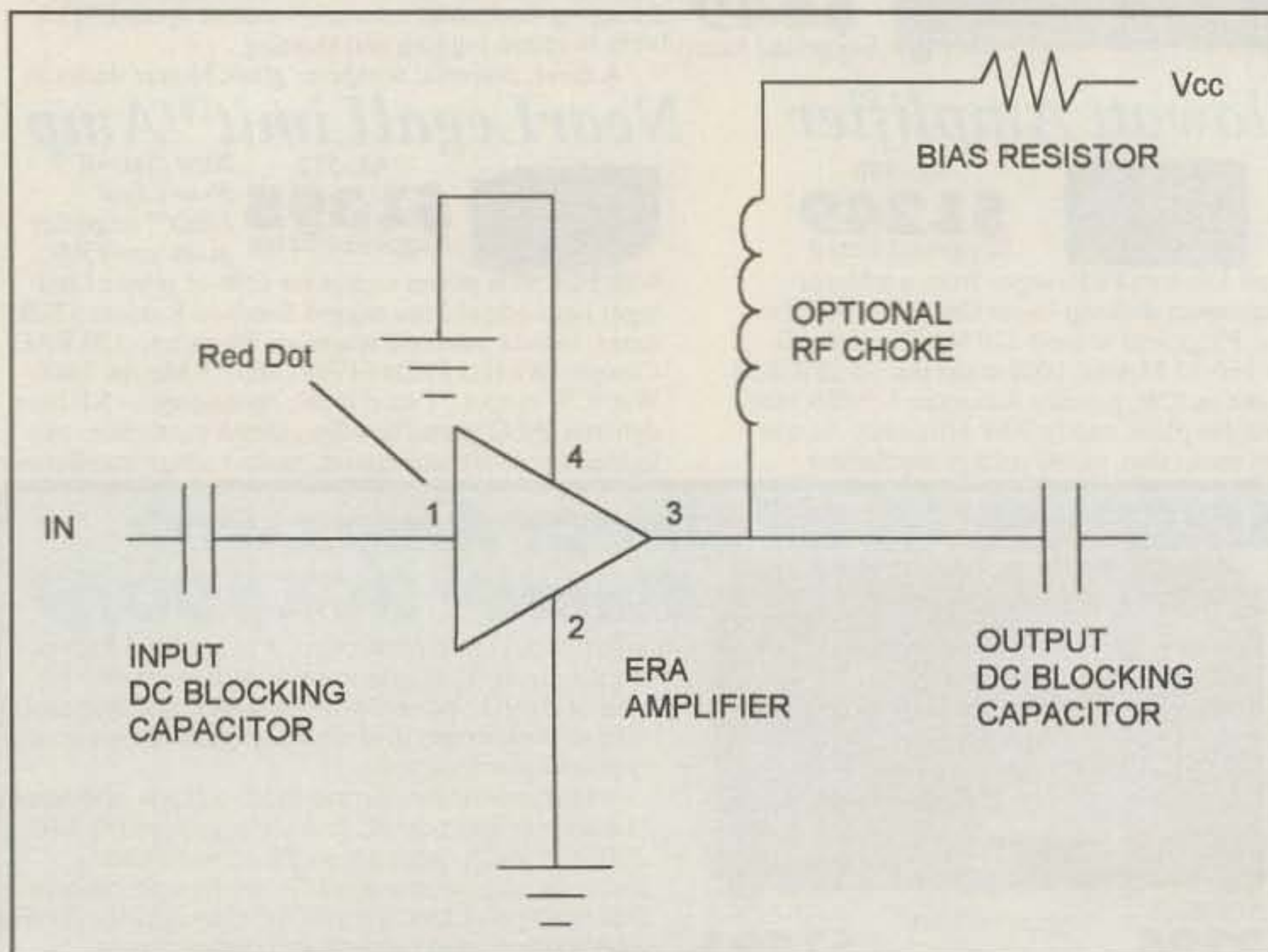


Fig. 1— Typical circuit configuration for ERA amplifier.

tact Mini-Circuits on the Internet at: <http://www.minicircuits.com>.

For our next offering we jump to the Burr-Brown Corporation. They have been advertising what is deemed to be the "world's smallest op-amps." Their OPA336, 340, 237, and 337 are a series that come in SOT-23 8-pin packages which are one tenth the area of a common 8-pin mini-dip. The leads are only 0.025 inch wide, so you can imagine how small the device really is. These devices are available in single, dual, and quad configurations and boast speeds of up to 5.5 MHz. All are rail-to-rail (within 1 millivolt), CMOS devices with input bias currents of 10 pico-amperes and quiescent current drains of 0.5 milliampere. All operate from supplies as low as 2.5, making them ideal for battery-operated devices. Costs are typically less than 50 cents each in 1000 quantity. Details are available from Burr-Brown at: <http://www.burr-brown.com>.

UHF experimenters will appreciate the MAXIM Integrated Circuits MAX2430, an 800 to 1000 MHz power amplifier. Designed for the cellular marketplace, this 16-pin SO packaged device will provide up to 125 milliwatts of output (into 50 ohms) from a single 3.6 volt supply and

offers a gain of 30 dB. The chip also contains a control voltage input that allows you to vary the power output as a function of a 0 to 2 volt input. It seems that if you apply audio to this input, you might come up with a simple AM transmitter, but that is left to the experimenter. MAXIM has further details on their web site at: <http://www.maxim-ic.com>.

While every "died in the wool" experimenter is familiar with the common +5 to -5 volt charge pump inverter, what if you need higher voltages? Seiko Instruments has the answer with their S-8438AF inverting switching regulator chip. This operates with +2 to +10 volts input, but will produce up to -18 volts output at loads of up to 100 ma. Packaged in tiny SOT-89 packages, the S-8438AF chip draws only 10 microamperes (no load), operates from -40 to +85C, and costs \$1.05 in lots of 1000 pieces. If this chip interests you, contact Seiko at: <http://www.seiko-usa-eed.com>.

For our last offering this month, we would like to present an abstract of an application idea from the February 1998 issue of *Linear Technology Magazine*, an in-house engineering and applications oriented journal published by the semicon-

c/o CQ magazine

***RT Systems Amateur Radio Supply***  
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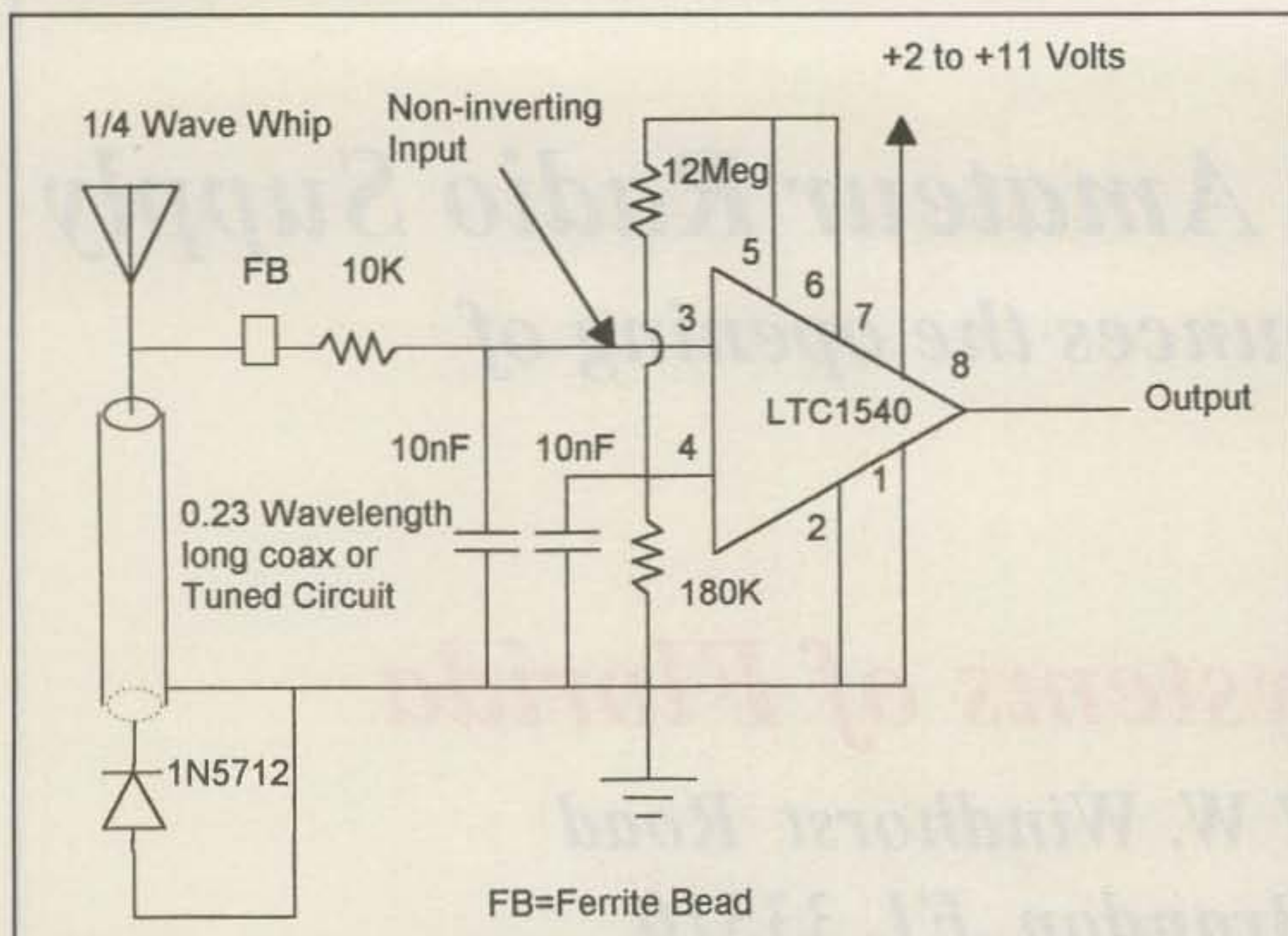


Fig. 2— Simple field-strength meter/receiver.

ductor manufacturer. The application, written by Mitchell Lee, relates to a very low power consumption detector for an RF ID tag, but could easily be applied to amateur applications. As shown in fig. 2, a high-frequency 1N5712 diode is used to detect RF from a 1/4-wave tuned circuit (at 445 MHz)

and applied to a low-power comparator/reference chip, the LTC1540, manufactured by the company. The LTC1540 is internally biased so that any rectified input voltage above 18 millivolts triggers the output. In normal operation the output is applied to external alarm circuitry. For amateur appli-

cations, the LTC1540 could be used either as a loss of signal monitor (at a repeater, for example) or replaced by a high-gain op-amp. The result would be a low-power, low-cost "field strength meter" or even a simple receiver.

The circuit is unique in that the high impedances used result in the detector diode not being loaded so that the ultimate in sensitivity is achieved from a circuit that is, in many ways, identical to an early "crystal set." Sensitivity, by the way, was such that a 200 milliwatt signal from a dipole triggered the device at 100 feet and battery drain was less than 0.5 milliamperes. If you do build the circuit, remember to keep the impedances high and to use a CMOS op-amp. For further details see Linear Technology's web site at: <<http://www.linear-tech.com>>.

You will notice that we have begun to give Internet web page addresses for the various manufacturers whose products we describe. This allows almost instant retrieval of data by our readers without making a pest of ourselves to the various manufacturers. Since most manufacturers, understandably, are interested in volume users, the occasional experimenter is often a bother. Contacting an automatic web site, on the other hand, rather than calling an 800 number satisfies our curiosity and assures that we will get a very timely answer to inquiries.

73, Irwin, WA2NDM

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TELETEC DXP Linear Amplifiers

Clearly the best all-mode amplifiers around.

"Well constructed" "Designed to be installed and forgotten" QST October 1996



DXR Model shown with meter option installed.

Model #	Freq.	Pwr Rating (In/Out)	Sugg. Retail	Model #	Freq.	Pwr Rating (In/Out)	Sugg. Retail
DXP-L180	6 meter	15W/180W	\$379.00	DXR-L180_	6 meter	15W/180W	\$639.00
DXP-V175	2 meter	50W/175W	\$329.00	DXR-V175_	2 meter	50W/175W	\$629.00
DXP-V220	220 MHz	20W/150W	\$369.00	DXR-V220_	220 MHz	20W/150W	\$659.00
DXP-U150	70 cm	30W/150W	\$429.00	DXR-U150_	70 cm	30W/150W	\$789.00

\* Output Power level is determined by the input power level. Units will operate with input power level as low as 1 watt.

TELETEC's DXP Series Linear Amplifiers clearly outperform the competition. The die cast aluminum heat sink provides an attractive low profile, but powerful package. These amplifiers operate in all modes: FM, SSB, CW, and AM. Transmit/Receive Switching is automatic - RF sensed. Over/Reverse Voltage, Over-Temp, and VSWR protection are provided. Available Options include: ATV tuning, Repeater tuning, Preamp disable and keying wire kit. "N" connectors are also available (std on DXP-U150).

TELETEC's DXR Series Linear Amplifiers are 100% continuous duty packages available in Rack Mount or Desktop versions. Super quiet fans are used to keep the heatsink and internal components extremely cool. DXR series amplifiers provide the same operational features as the DXP series. "N" connectors standard on all DXR models.

"We meet or exceed all published specifications, - We GUARANTEE IT"

Contact your dealer for your best pricing !

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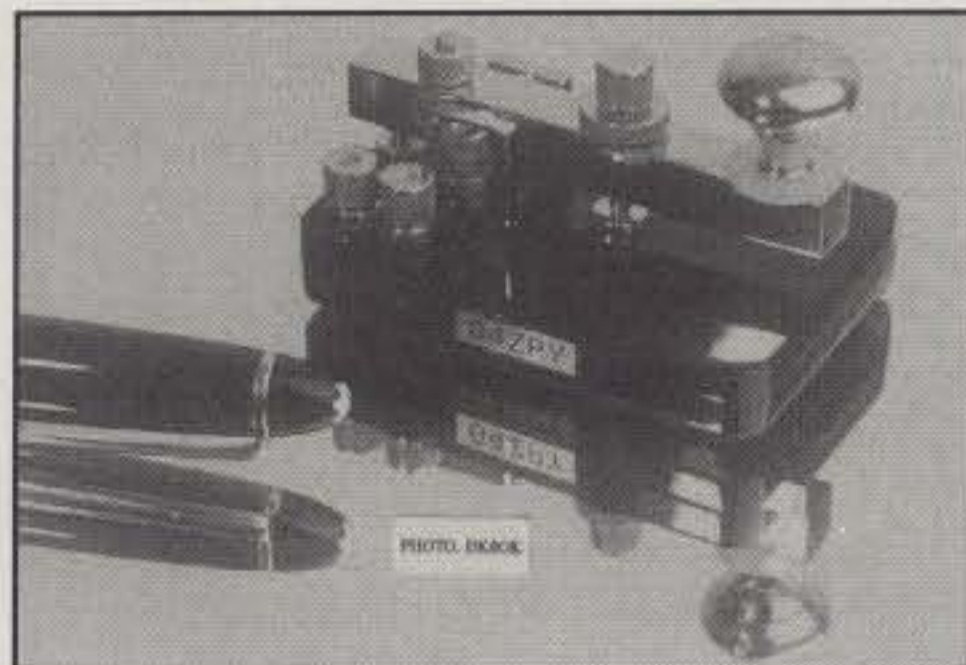
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# CQ SHOWCASE

## G4ZPY "Baby" Straight Key

The "Baby" half-size straight key has been added to G4ZPY's line. It was designed for portable use and weighs 165g. The base is made from two layers of 75 x 50 x 6 mm black plastic. The working components are highly polished brass, and the key arm is made from 75mm long x 10mm square material and is pivoted in a "white metal" bush-type bearing. The forward stop is preset to give optimum balance. The adjustable contact, tipped with silver, has a fine thread and can be locked in position with the thumb wheel. Although the knob is made of metal, it is insulated from the key arm.



Price is £40 for highly polished brass finish and £45 for the nickel-plated finish. Post and packing for each to the US is £5. (Only pounds sterling payment is accepted, and payment may be made by Visa or MasterCard. Do not send checks payable to an American bank.) For more information, contact G4ZPY Paddle Keys International, 41 Mill Dam Lane, Burscough, Ormskirk, Lancs., England L40 7TG (telephone/fax 0044 1704 894299; e-mail <g4zpy@lineone.net>), or circle number 101 on the reader service card.

## Dynamic Electronics DP-9 & DP-9S Multiband HF Antennas

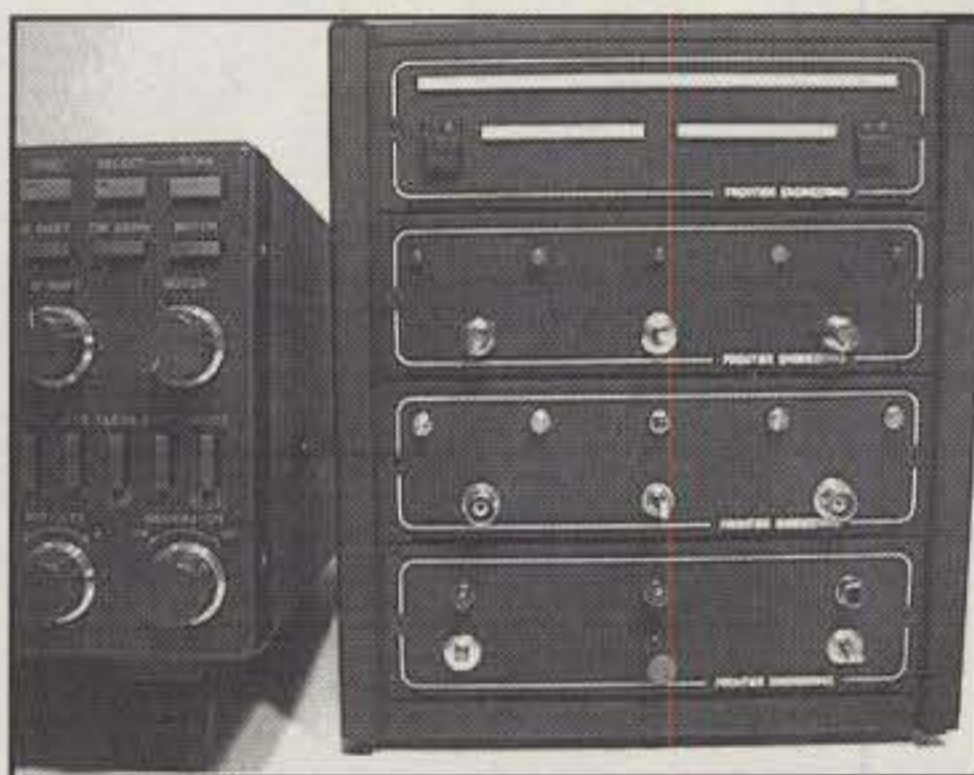
The DP-9 multiband antenna consists of nine full-size dipole antennas separated about two inches with PVC spacers for 160, 80-75, 40, 30, 20, 17, 15, 12, and 10 meters. The bandwidth is approximately the same as a single dipole on each band. The SWR is less than 2:1 on each band. Each antenna can be individually adjusted for resonance at any frequency within its band. There are no traps to fail, allowing the antennas to handle maximum power. A No. 12 stranded insulated wire is used for the 160 meter band and No. 14 stranded insulated wires are used for the other bands. Only one cable with a PL-259 connector is required to connect to the SO-239 socket. An inverted Vee type installation is recommended with supports at the center and ends. The DP-9 is 240 ft. long. The DP-9S is the same as the DP-9 except the 160 meter antenna has coils placed in the center of each side. The DP-9S is 140 ft. long and has a 2:1 SWR bandwidth of approx. 30 kHz on 160 and full bandwidth on the other bands.

The DP-9 is priced at \$189 and the DP-9S is \$210, plus \$10 shipping to USA locations. For more info, contact Dynamic Electronics Inc., P.O. Box 896, Hartselle, AL 35640 (256-

773-2758; fax 256-773-7295; e-mail <dei@whnt19.com>; <http://www.hsv.tis.net/~dei/>, or circle number 102 on the reader service card.

## Frontier Engineering C3 Communications Control Console

Frontier Engineering's C3 Control Console is designed to fit neatly beside the average rig and allows the user to repackage some of the small items that clutter the shack. Each box is made up of four trays. The bottom one contains an adjustable power supply which can be used to supply internal and external devices. The remaining trays can be ordered as blanks, allowing the user to build his own circuits into each one. Or individual products such as pre-amplifiers, QRP rigs, filters, keyers, etc., can be ordered from an options menu and configured at the factory. A test equipment version is also available.



Finished in black, the units measure approximately 10"D x 9"H x 8"W. The basic unit, which is made of one power tray and three blank trays, is priced at \$235. For more information, contact Frontier Engineering, P.O. Box 837, Platteville, CO 80651 (telephone/fax 970-785-2897; e-mail <frontier@lanminds.net>; on web <www.amplifier.net>), or circle number 104 on the reader service card.

## HI-RES Communications Hammarlund SP-600-JX Video

HI-RES has added the Hammarlund SP-600-JX Video to their existing video reference library, which previously was devoted to Collins equipment. Produced for the vintage radio enthusiast, Chuck Rippel, WA4HHG, covers the tools, equipment, and techniques required to work on this receiver. He takes the viewer step by step through the proper operation, modification, restoration, and alignment of this classic radio. In addition, the viewer is shown how to replace every one of the old outdated capacitors which are found in most SP-600-JX receivers, including the capacitors in the turret and RF strip.

The video is four hours long and is priced at \$89.95 (plus shipping). For more information, contact HI-RES Communications, Inc., 8232 Woodview Drive, Clarkston, MI 48348-4058 (phone/fax 248-391-6660; e-mail <hires@rust.net>; web <<http://www.rust.net/~hires/>>), or circle 103 on the reader service card.

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# THE DIGITAL DIPOLE

FROM SOFTWARE THROUGH ANTENNAS FOR THE SHACK

## September Soirée

The dictionary says that the French call a party or social gathering a *soirée*, and I guess our column is, indeed, a special type of social gathering. In any case, this month we'll socialize with readers by keeping the column on track with our tried-and-true formula of antenna, software, and book notes. As is our usual custom, we'll begin with antennas.

### Antenna Notes

**New Goodies and Website News from The Radio Works.** For more years than I care to count, your columnist has noted the steady growth of Jim Thompson, W4THU's firm, The Radio Works, the motto of which is "where ham radio is a contact sport." Jim sells a variety of antennas and antenna accessories, being especially committed to the "high performance" wire antenna market.

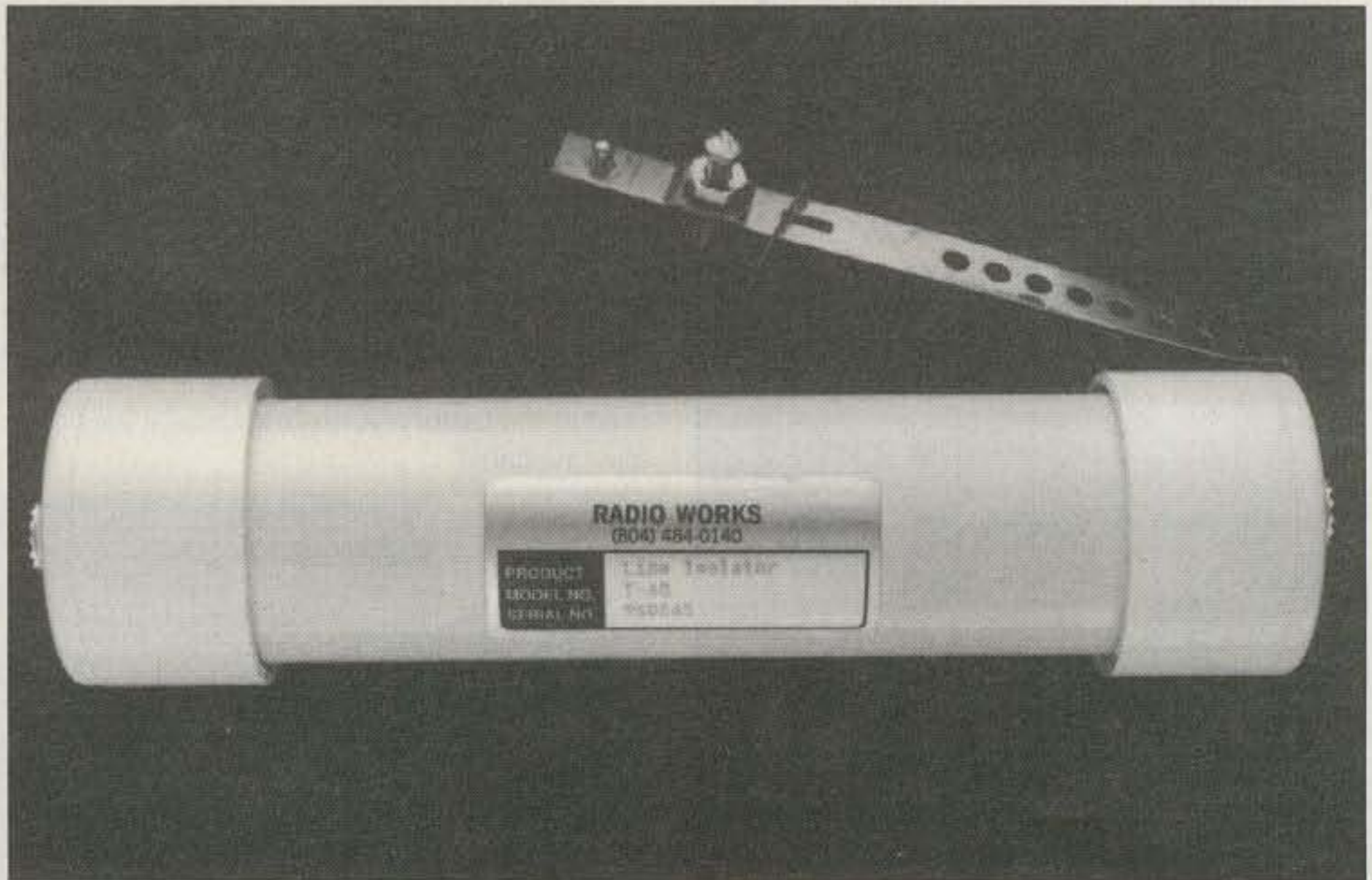
Recently, Jim proudly advised us that the demand for his baluns and Line Isolators™ is ever-increasing. His 1998 catalog reflects several new accessory products, among them new 6 meter baluns, 6 meter wire antennas, and Line Isolators (see photo). Also new is the Carolina Windom 20, which covers 20 through 10 meters, and the SuperLoop 40, which covers 40–10 meters and is only 56 ft. long.

Jim also advises that he recently completed work on the new Radio Works Website. Admirably, over 70 percent of the site's content is dedicated to the non-commercial side of The Radio Works business. Of special note, he's included on the site a variety of reference materials and information useful to anyone installing antennas or solving antenna and grounding problems. New information is added regularly, and the General Catalog and company price list also are available online.

The paper version of the General Catalog is free upon request from The Radio Works, P.O. Box 6159, Portsmouth, VA 23703 (1-800-280-8327; e-mail: <jim@radioworks.com>; Website: <http://www.radioworks.com>.

**Goodies and Catalogs from Glen Martin Engineering.** This Missouri firm, in business for over 50 years, is well-known as a manufacturer of high-quality aluminum and steel towers, self-supporting towers, and various accessories

289 Poplar Drive, Millbrook, AL 36054-1674



According to The Radio Works proprietor Jim Thompson, W4THU, the market for baluns, Line Isolators™, and other wire antenna accessories is growing. To meet this demand, he recently added the T-4G, a grounded Line Isolator™, to his product line. Shown here, it's an unbalanced, current-type device that's effective in reducing stray RF on a coax shield, without having any effect on the signal carried by the coax. The device achieves a high degree of isolation by providing a direct path to ground for stray RF traveling along the outer surface of the shield. The new device is \$33.95. (Photo courtesy The Radio Works)

for them. Indeed, if a new tower is on the horizon for you, check out Glen Martin.

Their main "Your Guide to Amateur Radio Towers & Accessories" catalog describes their line of seven Martin satin anodized aluminum tower packages. The catalog also encompasses a variety of tower accessories, including turnbuckles, thrust bearings, wall brackets, bases and footings, masts, side arms, turnbuckles and other hardware, and the like.

The same catalog also describes the Martin Hazers, unique "elevator systems" for towers, accessories that facilitate the raising and lowering of tower-mounted antennas. The Hazers were designed as alternatives to tower climbing, and they're attractive to those who are "too old, too scared, or too tired" to climb their towers. The catalog includes an explanation of how the Martin Hazers, which are available in several different models and configurations, work with a variety of Rohn and Martin towers.

Also available is a new "1998 Hazer

Accessories" catalog. It features a plethora of Hazer-related accessories and replacement parts, including the new HR-6040 Bearing Block Set (\$44) for the Hazer 5 and 6 models, designed to impart extra "glide-down" smoothness to configurations involving a Martin M-13 or M-18 tower. Also new in the catalog is the HR-2040 Roller Bearing Set (\$59.95) for Hazer Models 2, 3, and 4; the accessory roller set improves the smooth contact of the Hazer with the tower. The bearings easily roll over tower joints or other rough spots, eliminating any previous play or sideward movement on a Hazer.

For copies of the two free catalogs, contact Glen Martin Engineering, 13620 Old Highway 40, Boonville, MO 65233 (phone 660-882-2734; e-mail: <info@glenmartin.com>; Website: <http://www.glenmartin.com>.

Incidentally, the searchable Glen Martin Website features complete online amateur radio and industrial catalogs, new product profiles, a photo gallery, links to



related amateur radio sites, contact information, an events calendar, and a catalog request form. Check it out.

**News from Alpha Delta Communications.** In the January column, we took note of a new Aussie import, the 12 ft. tall, portable Outbacker® Outreach™ Antenna. To recall our profile, the \$399, 150 watt antenna is designed to be installed anywhere from patios to mountaintops, and it covers all HF bands 160 through 10 meters. A companion matching network, the Outpost™, is a \$199 tripod antenna coupler and ground mount system which matches the base impedance of all Outbacker antennas for portable and fixed station operation.

Now Alpha Delta has added the Outreach 500. This is a 500 watt CW/600 watt PEP version of the Outreach we described in January; mechanical specifications are the same as for the standard Outreach. However, the new high-power version doesn't cover 160 meters, but instead covers 6 meters in addition to all other HF bands. The antenna also adds a band tap for 80 meters, in addition to the band tap for 75 meters, thus allowing coverage of the entire 3.5-4.0 MHz range.

Also, Alpha Delta has added a new Outbacker Outrunner™ HF Mobile Antenna to its line of slim, efficient, single-whip multiband mobile antennas. Like its other antennas, no extra resonators, "porcupine" extenders, or large coils are required. The new mobile whip is designed to perform well over all HF amateur bands, 160 through 10 meters, including the WARC bands. The antenna is 9 ft. in overall length, consisting of a 6 foot shaft with a 3 foot collapsible "stinger." The \$349 antenna handles 150 watts PEP and terminates in standard 3/8-24 threads.

Other news from the firm relates to their line of equipment protectors, notably the popular Transi-Trap® surge protectors that use the fast-acting, field-replaceable gas tube Arc-Plug® cartridges to isolate electronic equipment from transients coming through coaxial cable transmission lines. These protective devices, which are available from Alpha Delta in several versions including ones incorporated in surge-protected coaxial switches, now are fully tested and UL (Underwriters Laboratories, Inc.) Listed under Standard 497B, which relates to protection for communications circuit applications.

The move to achieve UL listing is a good step for Alpha Delta to have taken. The firm's Jim Burns advises that although UL listing isn't a requirement of the amateur and SWL market, having a product listed helps give some assurance as to the safety of your equipment. The stringent testing and listing process isn't simple, and it takes months of testing with significant expense to the applicant.

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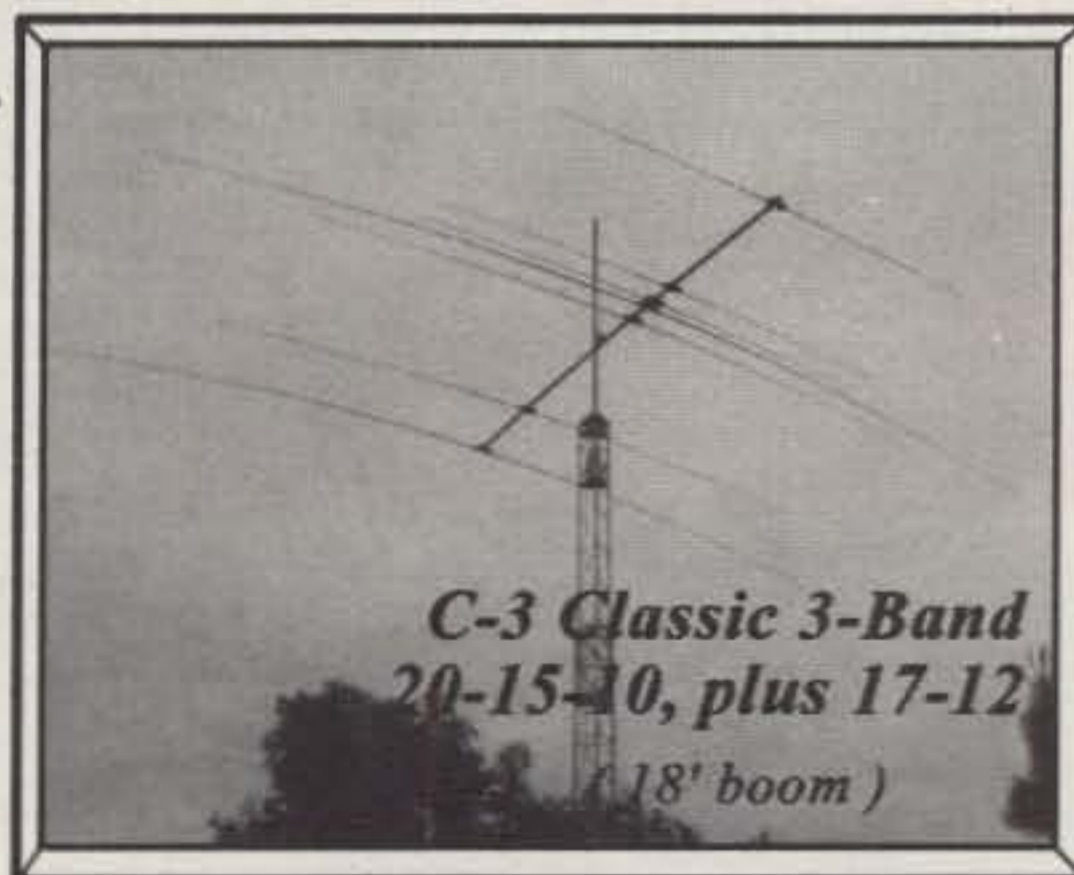
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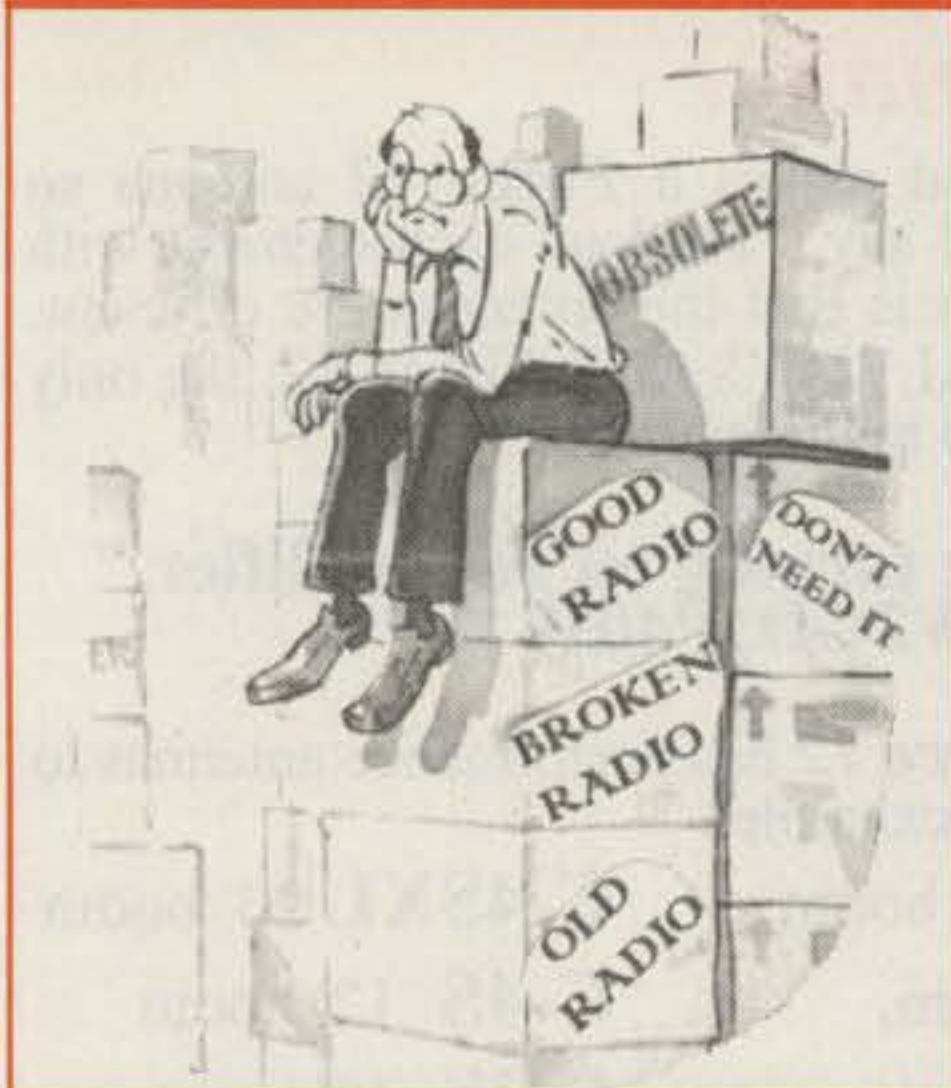
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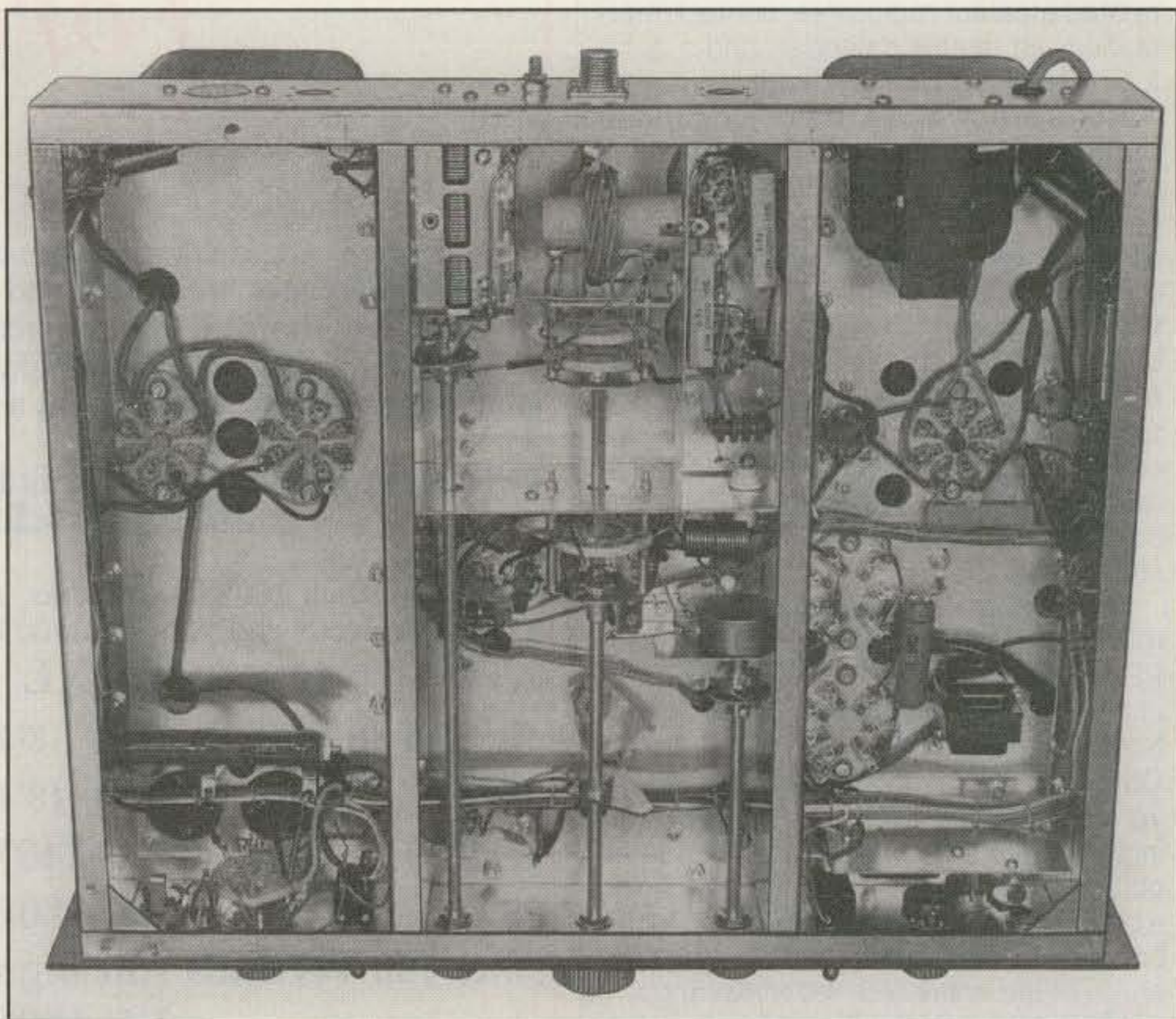
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Check out that letter-perfect, squared-off, 1950s-style classic wiring job! In the 1950s do-it-yourself (DITY) electronic kits were all the rage, and The Heath Company of Benton Harbor, Michigan, or "Heathkit ®" was the world's largest manufacturer of electronic kits. One of their most popular amateur radio kits—one that graced my ham-shack for several great years—was the hefty 180 watt DX-100 (and later DX-100B) AM/CW transmitter. A bottom-chassis view of an assembled kit's wiring is shown in this photo. (Heath photo courtesy Terry Perdue, K8TP)

breakdown voltage, impulse voltage, pressure/temperature cycling, dielectric testing, water spraying, and corrosion. Alpha Delta notes that the Transi-Traps came through the tests with flying colors, with no design changes being required by UL for full listing.

For a free product information flyer and spec sheets, contact Alpha Delta Communications, Inc., P.O. Box 620, Manchester, KY 40962 (1-888-302-8777).

#### Soft Stuff

**Computer Aided Technologies Takes to the Web.** In October 1992 and January 1995 we noted several innovative software products developed by Computer Aided Technologies of Shreveport, Louisiana. Since 1989 the firm has offered a variety of software programs and products to enhance your scanning and shortwave listening pursuits. Some products offered by Computer Aided Technologies include the comprehensive Scancat-Gold for Windows and Scancat-Gold for DOS, PC-based CAT-5000 spectrum analysis software, Info MAGIC and COPYCAT-PRO utility programs, and various other software and digital related products.

The firm now has a new and highly versatile Website up and running. The elaborate site gives complete information on all their wares, including new products. It also offers a variety of useful software downloads, including program demos, frequency files, maps, and support files and utilities. Also, if you want to be kept posted on new program versions and updates, you can register for automatic e-mail "product update notification" announcements to be e-mailed to you. Links to support groups and hints and tips also are featured on the site.

Check out the firm's highly informative Website at <<http://www.scancat.com>>, or contact Computer Aided Technologies, P.O. Box 18285, Shreveport, LA 71138 (telephone 1-888-722-6228; e-mail: <[scancat@scancat.com](mailto:scancat@scancat.com)>).

**Mom 'N' Pop's Software Update.** Last December we profiled Mom 'N' Pop's Software, a small, two-person firm whose principals report that they have personally checked out all the programs in their library. As we noted then, their extensive software offerings run the proverbial gamut, and include database, spreadsheet, education, finance, graphics, hobby, pro-

gramming, health, cooking, engineering and science, and other types of Windows and DOS programs. A wide range of amateur radio software and freeware also is offered. Disks are \$2.75 each.

A free catalog diskette is available; it lists the firm's offerings and includes numerous additional amateur listings outside the regular catalog. Of special note, they've recently enhanced the on-disk "special" ham catalog.

According to the firm's Ron Cohen, KF4GHG, there now are some 16 different amateur-related subject areas in the ham catalog, to make finding suitable programs easier than previously. Classifications include antennas, contesting, controls, CW, DX/HF/VHF, electronics/design, logging, maps, shortwave radio, Modem/fax/packet/TNC, modifications, printing/graphics/QSL, references/education, satellites, miscellaneous, and "just added" programs.

For a free on-disk catalog, contact Mom 'N' Pop's Software, P.O. Box 15003, Spring Hill, FL 34609 (352-688-9108; e-mail: <momnpop@gate.net>.

## From the Bookshelf

**CQ Equipment Buyer's Guide.** Once again, I can't claim a hand in its production, but I find that the new *CQ Amateur Radio Equipment Buyer's Guide* is a real winner. The new 144-page *Guide*, once more capably edited by Edith Lennon, N2ZRW, is jam-packed with solid information including features, specs, photos, and prices on over 2100 amateur radio products and 1000 accessory items, neatly organized into some 20 directory classifications.

The new *Guide*, which completely updates and replaces the previous 1996 *Guide*, is designed to be a reliable and unbiased source for detailed information on most every piece of currently offered amateur radio equipment and accessory. These range from the biggest, baddest HF transceiver and linear amplifier to amateur radio computer software and the smallest accessories.

The *Guide* also includes a very comprehensive directory of some 475 amateur radio product manufacturers and dealers, which is complete with their phone and fax numbers, Websites, and e-mail addresses. Dealer and manufacturer listings include the major products manufactured, as well as service and repair policies, where applicable.

The *CQ Equipment Buyer's Guide* is priced at \$15.95 plus \$4 s/h from CQ Communications, Inc., 25 Newbridge Rd., Hicksville, NY 11801 (1-800-853-9797).

**Heath Nostalgia: New Printing.** Have you ever assembled an electronic kit, particularly a Heathkit? Whether or not you actually have built one, most ama-

teurs probably felt that a bit of ham radio disappeared when Heath left the business several years ago. As most readers know, the Heath Company of Benton Harbor, Michigan was the world's largest manufacturer of electronic kits.

Indeed, countless people around the world for many years have enjoyed assembling electronic products with their

own hands, and in doing so they learned something useful in the process (see photo). However, for a variety of reasons, interest in kit building has declined over the past few decades, and mainstay Heath left the kit business (although it remains a functional company, but one pursuing other activities).

Fortunately, some of the essence of kit-

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building has been preserved in books written about Heath. In the August 1993 and July 1994 columns we mentioned *Heath Nostalgia*, by Terry Perdue, K8TP. As we noted then, Terry, a former Heath employee, assembled the 124-page brief history and scrapbook that covers Heath's half-century of building Heathkits.

Terry's book was divided into three sections—"Heath History," "Picture Potpourri," and "Memory Miscellany." The latter section contained stories and anecdotes submitted by contributors, many of whom were former Heath employees. While the book wasn't designed to be a definitive Heath history, readers would likely enjoy renewing their kitbuilding memories by perusing this book. I certainly know I did.

Be that as it may, interest in radio nostalgia, especially "things Heath," never seems to wane. Thus, Terry's stock of the book diminished over the years, which recently led him to reprint it. So if you're interested in recapturing a bit of amateur radio history, *Heath Nostalgia* is again available for \$15 postpaid from Terry Perdue, K8TP, 18617 - 65th Court NE, Seattle, WA 98155. Terry ships the day after he receives the order.

**Two Books from Macmillan.** One good thing about being a magazine columnist is that your mailbox often fills up with new and interesting books, magazines, catalogs, and CD-ROMs—even ones you didn't request. Recently, Macmillan Publishing USA sent me two new Que®-imprint computer books that I'll share with readers of the column.

The first of these two new books is *Special Edition Using Windows® 95 with Internet Explorer™ 4*, by Ed Bott, Ron Person, and others. The massive, 1066-page book/CD-ROM combo actually is something of a precursor to the new Windows 98 operating system, which should be available by the time this column appears in print. The book attempts to put together and simplify all the hoopla surrounding the in-process "marriage" of Windows 95 and Internet Explorer 4 (IE 4) that will cumulate in the release of Windows 98. The book goes far in helping you master all of the functionality that IE 4 brings to the Windows 95 environment.

The \$39.99 book is an advanced reference that tackles many of the tough issues that serious users need to know. Its non-nonsense approach to learning, in-depth studies, and practical examples are designed to get you working up to speed immediately. The authors do this by guiding you through the fundamentals and moving onto the more advanced levels for IE 4.

Using the book's guidance, you can browse the Web with IE 4, search and save favorite sites, download files, keep up to date with e-mail and newsgroups, use Websites more efficiently with the

Active Channel™ technology, and more. Most important, you learn the "backbone" of the new Windows 98 features and functionality. Thus, the book is a good bet if you haven't yet upgraded to Windows 98 but are considering it, or if you want to know what it will offer.

The second of the two books we'd like to share with you is the *10 Minute Guide to PC Upgrades*, by Galen Grimes—a slim but authoritative book that could be very useful to you if you're considering upgrading your present PC rather than replacing it. A much smaller, less intense book than the one we just profiled (at just 197 pages), it's one of the roughly 4 million copies sold so far in the popular "10 Minute Guide" series of Que books.

The \$14.99 Que book offers simple, practical help for busy people who need fast results. Through goal-oriented, 10-minute lessons in some 24 chapters, it shows you how to perform popular PC upgrades and also to obtain better performance and results from your PC.

Some of the "how to" information provided includes giving your PC a diagnostics test; adding memory; replacing the motherboard or microprocessor; replacing floppy disk drives, keyboards, and mice; upgrading a modem; adding a sound card or speakers; migrating to a newer, more powerful operating system; adding a fast CD-ROM drive; and installing other PC add-ons such as a scanner, digital camera, and color printer.

Check out these two books in your local bookstore, or contact Macmillan Computer Publishing USA, 201 West 103rd St., Indianapolis, IN 46290 (1-800-858-7674) for a free computer books catalog. E-mail: <info@mcp.com>. Or go online and check out the Macmillan Computer Publishing Website; you'll find it at <<http://www.mcp.com>>.

Incidentally, you'll find Macmillan's massive but readily searchable and easily navigable Website, which aggressively bills itself as "The Authoritative Encyclopedia of Computing," to be replete with a variety of useful materials. The Macmillan Website offers online computer resource centers, industry information, software downloads, special offers, and online education and training capabilities, that nicely supplement Macmillan's extensive line of computer books (which include the Que, New Riders, and Sams imprints).

## Wrap-Up

That's all for this time, gang. Next time more Digital Dipole topics of current interest. See you then.

*Overheard:* Do you often feel overloaded? Remember that "no" is one of the most powerful words in your vocabulary. Use it when you must!

73, Karl, W8FX

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**MFJ No Matter What™ Warranty**

MightyLites™ are covered by MFJ's famous No Matter What™ one year limited warranty. MFJ will repair or replace (at our option) your power supply for one full year.

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It's highly regulated with load regulation better than 1%. Ripple voltage is less than 30 mV. No RF hash -- it's super clean!

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You get front panel adjustable voltage from 1 to 14 VDC with a convenient detent set at 13.8 VDC. A pair of front-panel meters

let you monitor voltage and current.

Three sets of output terminals include a pair of heavy duty five-way binding posts for HF/VHF radios, two pairs of quick-connects for shack accessories and a covered cigarette lighter socket for mobile accessories.

A front-panel fuse holder makes fuse replacement easy. Whisper quiet fan speed increases as load current increases -- keeps components cool. 9 1/2 W x 6 H x 9 3/4 inches.

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# WORLD OF IDEAS

A LOOK AT THE WORLD AROUND US

## Homebrewing Surface-Mount Style: Three Neat Kits

**A**s we move toward a new millennium, some very exciting concepts and paths of development in equipment design, homebrewing, and modes of voice communication are appearing on the horizon. This month's column looks at one of those rapidly rising areas with three hot, new homebrew projects.

We often hear that change is the only true constant in our ever-expanding world, and that fact is particularly true in the area of amateur radio. Early equipment, for example, was assembled open-air style using a pocket knife and screws to mount parts on a breadboard. (Yes, and some beautiful classics from that golden age will be featured in upcoming columns. Stay tuned!) Then electronics moved into the big tube and metal chassis era, with large soldering irons, hand drills, and Greenlee punches gracing almost every home workshop. Next, transistors came on the scene, size of components shrunk, and



Photo 1— The three unique surface-mount kits highlighted this month are (left to right) a universal DC-to-DC converter, a deluxe-feature electronic keyer, and an ultra-small Pixie transceiver. Each kit, in progression, uses smaller size components.

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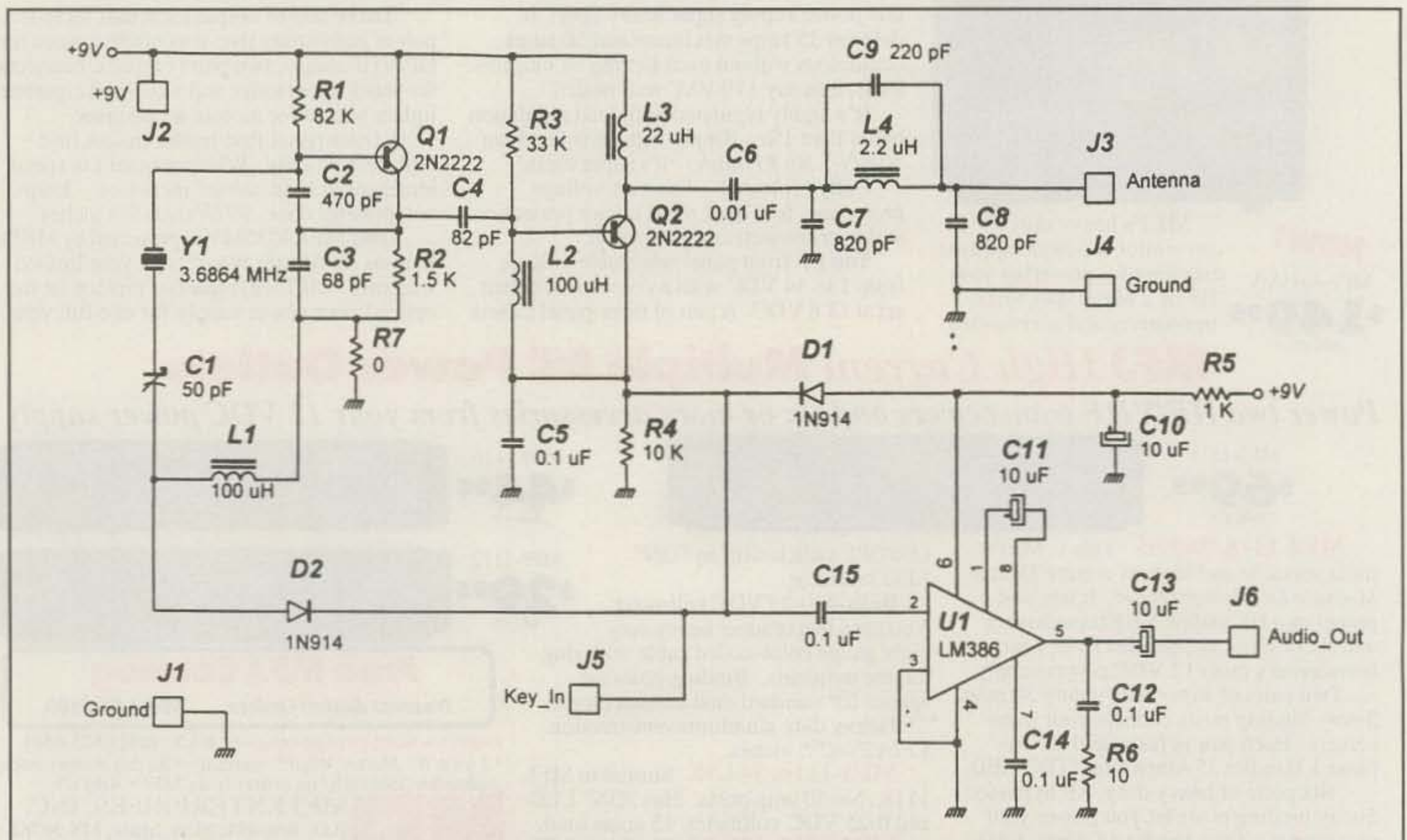


Fig. 1— Circuit diagram of the KnightSMiTe Pixie transceiver. (Discussion in text.)

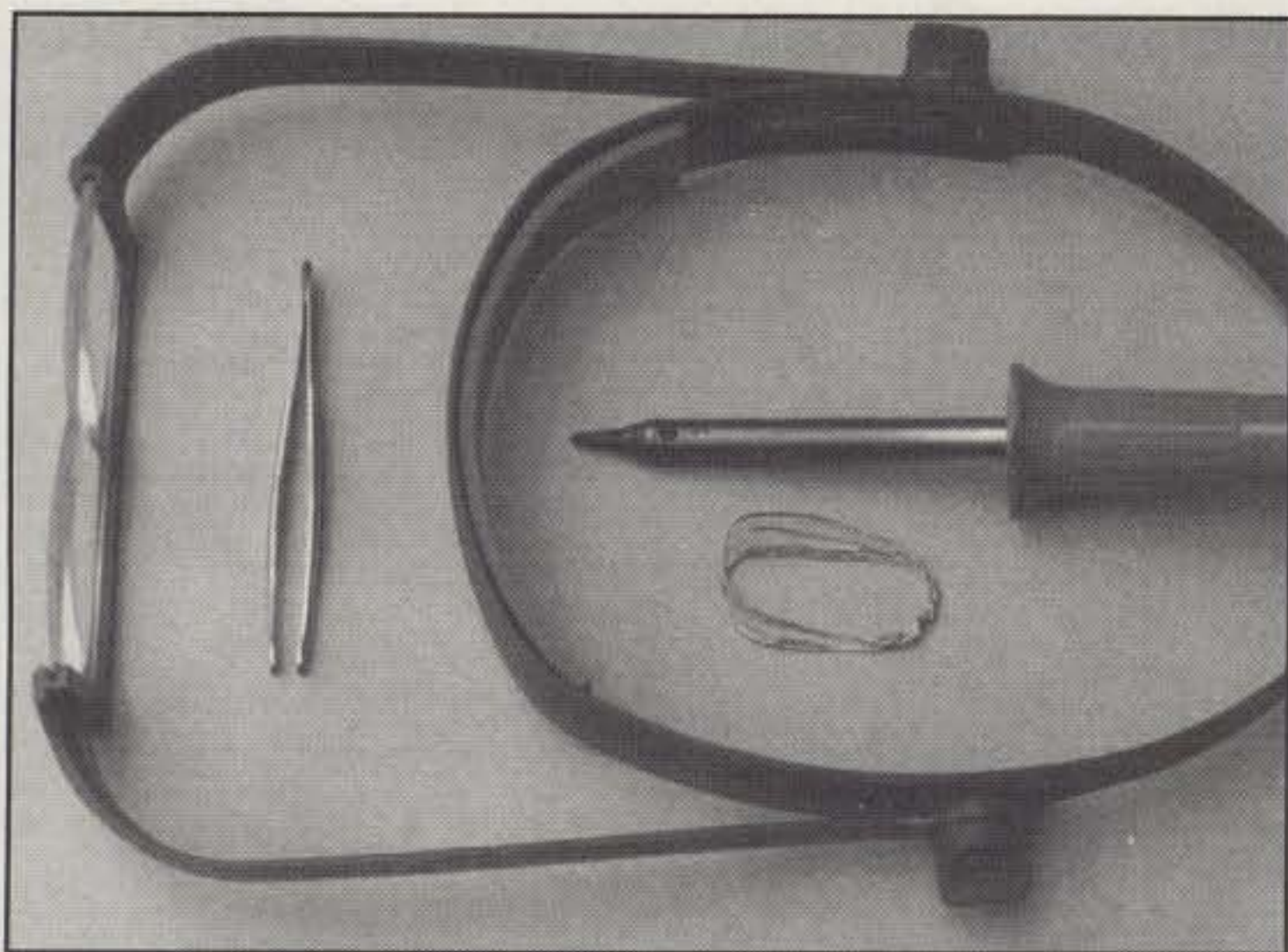


Photo 2— Basic tools for surface-mount work include a high-power magnifier, accurately mating eyebrow tweezers, pinpoint-tip soldering iron and ohmmeter test leads, ultra-fine 2% silver solder, and some thin solder wick for desoldering if/when required. (Discussion in text.)

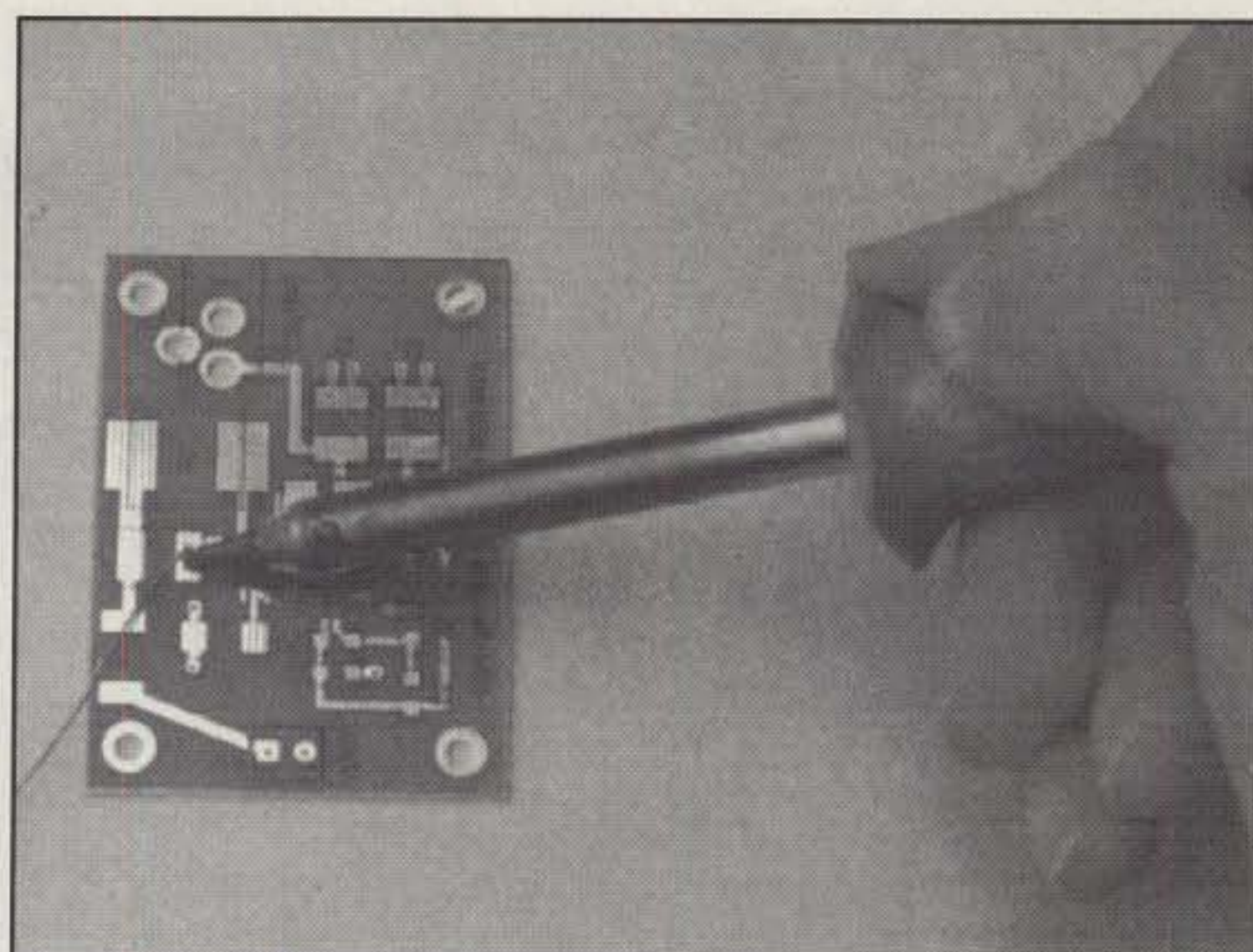


Photo 3— Extra large components in the Embedded Research EPS-1 kit make it an ideal first project, and aid in explaining the assembly process. Here I am "wetting" a pad with a tiny touch of solder.

construction techniques shifted into the PC board era.

Today we are on the brink of yet another evolution: homebrewing surface-mount style with microminiature chip components. Commercially produced gear is already going this route. Modifying a new-style FM transceiver for extended fre-

quency reception or just looking inside a new HF rig quickly confirms that fact. Rather than cutting a wire, you now remove a zero ohm microchip resistor from a PC board. Modern "tools of the trade," so to speak, are high-power magnifiers, eyebrow tweezers, tee-tiny soldering irons, and ultra-thin solder. Are we up to the chal-

lenge of working with these small components and unusual—err—implements? Sure! Many XYLs have been using a head-band-type magnifier and thin tongs to do fine needlework for years. We just adapt some of their crafting ideas to electronics.

I might also point out that regular "lead components" are beginning to rise in

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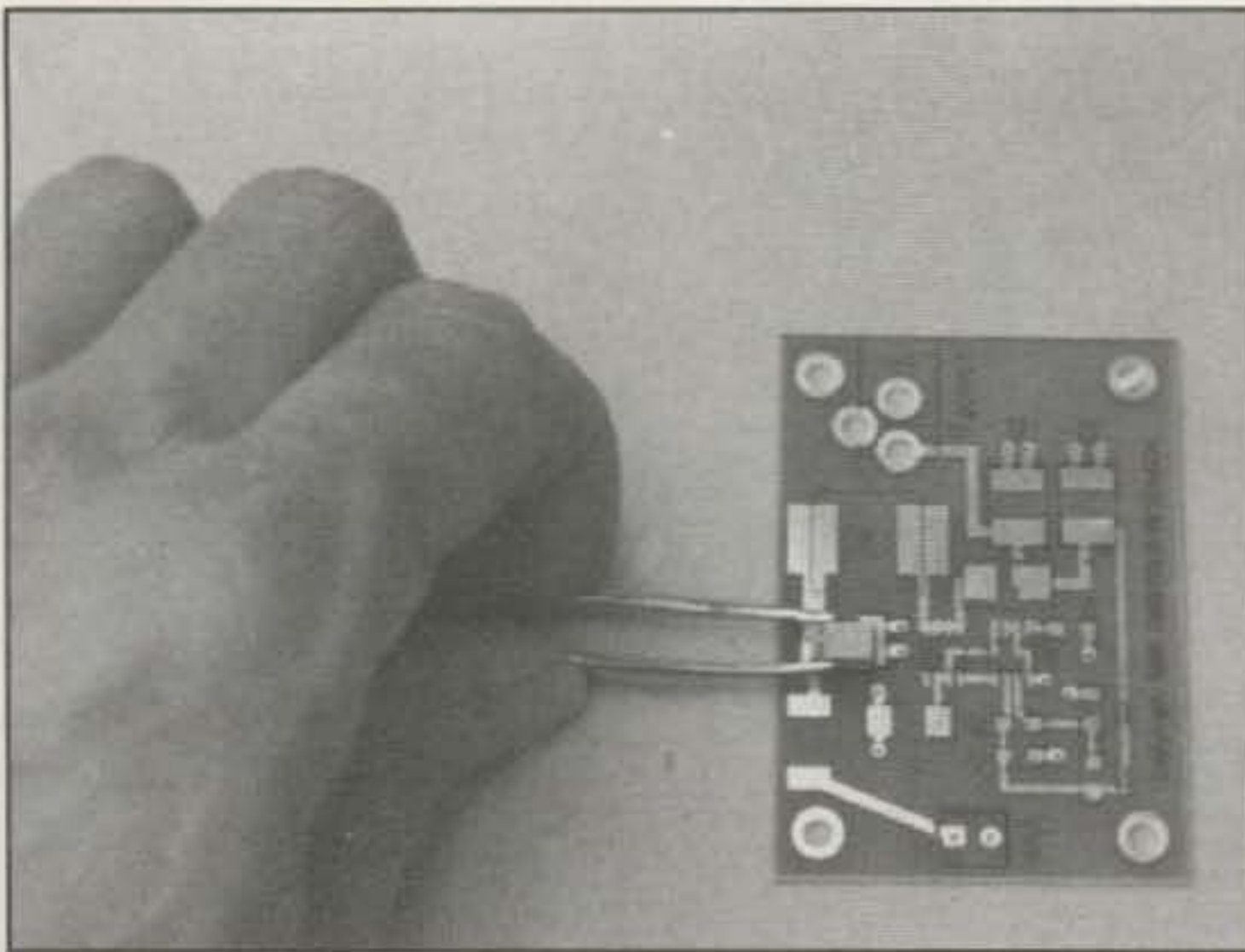


Photo 4— Using tweezers to hold the component in position, I will reheat the solder on the pad of photo 3. Instantly, it will flow onto one end terminal of the component. After it cools, I will solder the other end terminal to its related pad and then check my work with pinpoint-tip ohmmeter test leads.



Photo 5— The Embedded Research Tick Keyer ready for assembly. Notice the PC board is barely larger than a pushbutton or paddle socket. The component in the wrapper on the left is the Tick IC. (Double capacitors, resistors, and transistors (above PC board) are included for soldering practice or as quick replacements if one is dropped and lost. (Discussion in text.)

cost and decrease in availability, while the cost of surface-mount components is dropping quite noticeably. One need not be a wizard to read the writing on the wall here. This month's column thus features a "show and tell" description of surface-mount homebrewing, plus introduces three new and impressive surface-mount kits (photo 1). Some interesting technical notes are also included: a "3 in 1 special!" We must move fast to get in as much information as possible, so read both text and captions carefully!

### New-Era Tools

Whether modifying, repairing, or homebrewing new-era gear, a few unique tools are vital for success (photo 2). Particularly important to avoid botched work and/or solder-bridged PC board pads is a high-level magnifier. I use a pair of low-cost "Mag Eyes" from Nancy's Notions (1-800-833-0690). These headband magnifiers/goggles work with or without eyeglasses (photo 2). Alternate ideas include a jeweler's loupe or an illuminated desk magnifier. A fresnel lens from an overhead projector also works well when positioned above a workspace with a stack of books or magazines (CQs!).

Next, a perfectly mating pair of tweezers is necessary for handling components and holding them in position when soldering. The types with curved ends are neat, as they allow you to see components easily when soldering.

An ultra-small and temperature-controlled pencil soldering iron with a pinpoint tip is most desirable for surface-mount work. I improvise with a very small (and cheap!) Radio Shack 20 watt iron and file its tip to a needle point. If component size

is not super small, I find Radio Shack's Silver Bearing Solder (62% tin, 36% lead, 2% silver) .022 diameter also works well.

Finally, a small roll of thin solder wick is vital when you need to remove a component that is in the wrong place or accidentally bridge adjacent solder pads. I heartily recommend "Pro Wick" of .030 width from Mouser Electronics (1-800-346-6873).

That's enough tool talk. Now let's continue on track by looking at some sharp, new surface-mount kits!

### Embedded's New Universal DC-to-DC Converter

Have you ever looked at a handful of large flashlight batteries, 9 volt batteries, a 6 volt dry cell, or a large DC wall adapter and

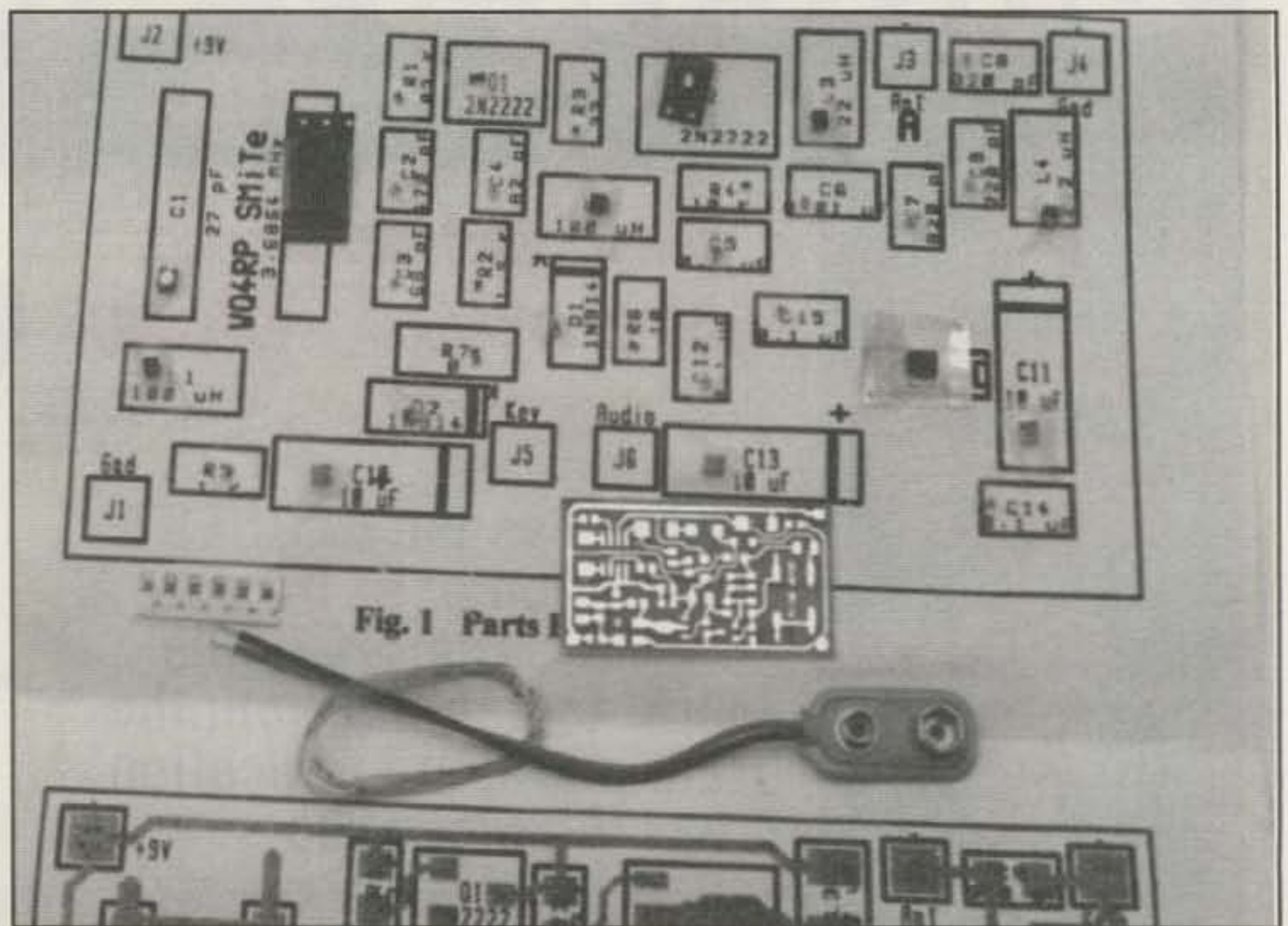


Photo 6— Each component in this KnightSMiTe Pixie transceiver kit is taped to its board-overlay location to ensure the right parts are mounted in the right places. Using tweezers, you lift each component and install it on the PC board one at a time. Notice the six capacitors on the white strip below "J1" and "Figure 1—Parts" in photo. They are extras included with the kit for soldering practice before beginning assembly. Notice also the complete transceiver PC board is barely larger than a standard 9 volt battery clip!



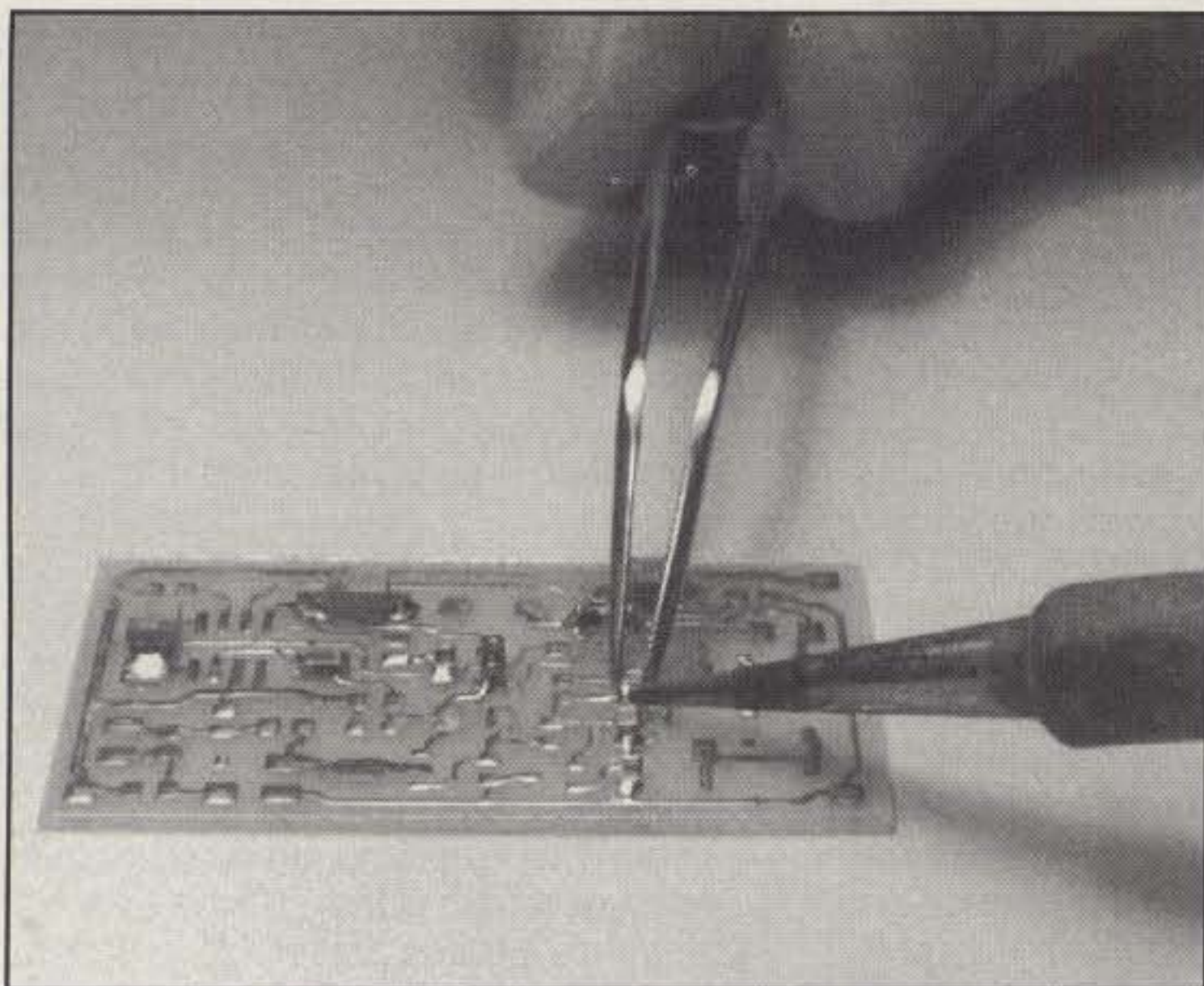


Photo 7— Here Bob, AE4IC, is using fine-tip tweezers to hold a resistor in position while reheating one of its PC board pads "prewet" with a bare touch of solder.

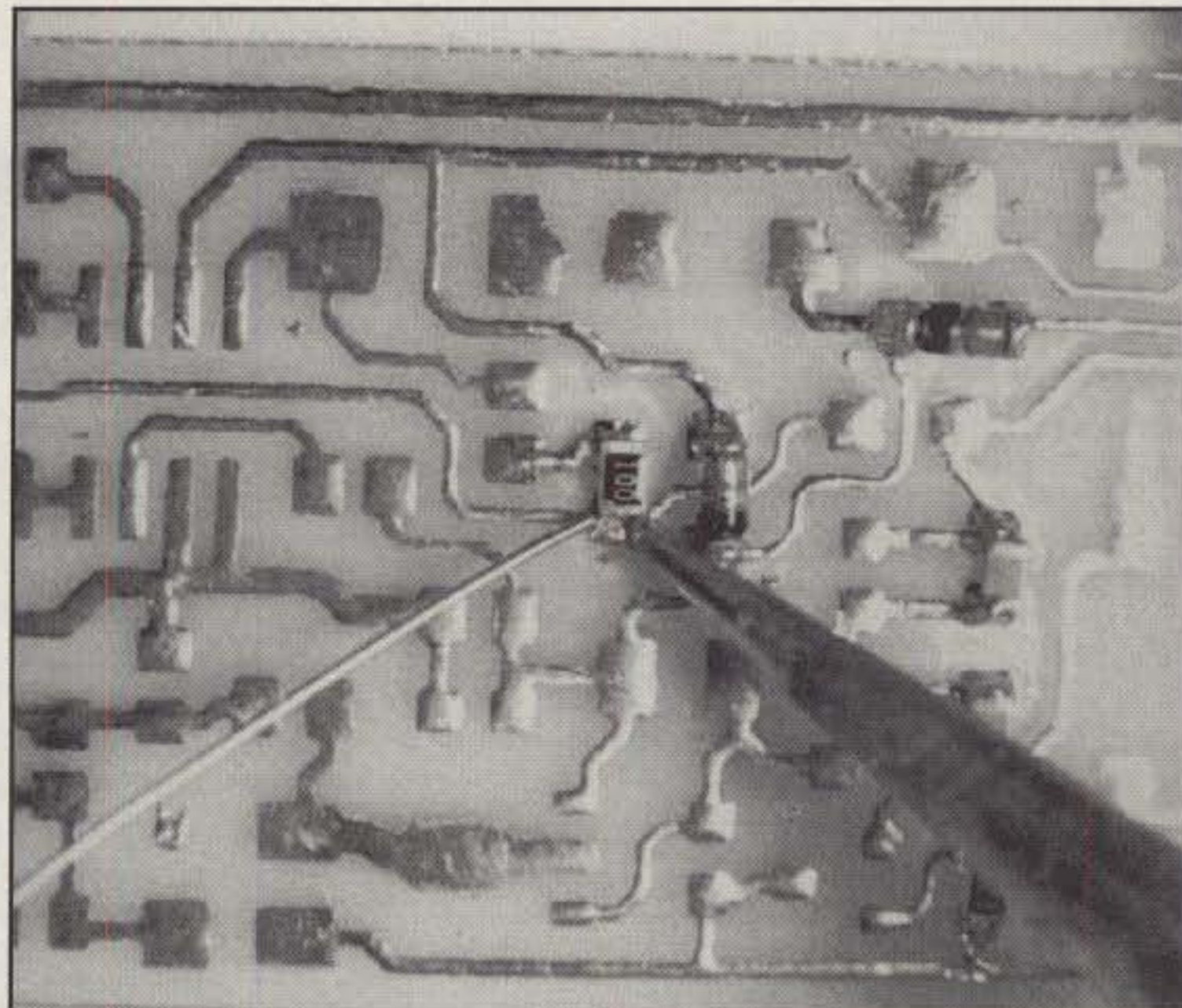


Photo 8— Now Bob is quickly soldering the resistor's other end terminal and PC board pad with a pinpoint-tip iron. Surface-mount components readily accept solder, so only an accurate "in and out" touch is required. Otherwise, excess solder will cover the resistor.

wished you could use it to emergency-power a small receiver, QRP rig, or FM handheld? Would you like to quickly assemble a small device that would fit inside such a low-power radio and allow it to operate without fumbles from a 4 to 16 VDC

source? Well, friends, Embedded Research has the answer with their new EPS-1 DC converter kit. You connect a 4 to 16 volt source to its input and get 12 volts at up to .5 amp (maximum) from its output. With respect to emergency pre-

paredness or impromptu field operations, this gem is hard to beat!

The EPS-1 kit consists of approximately 12 parts, and typical assembly time is less than an hour. Most of the parts are also quite large for surface-mount tech-



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nology, so this is an ideal "starter project" for new-era homebrewing. Photos of a component being mounted in this kit (photos 3 and 4) illustrate that fact. Understand the EPS-1 is not a miracle worker, so do not expect the impossible.

As an example, let's suppose you wish to power an FM handheld or QRP transceiver that requires 12 volts at .4 to .5 amp (5 or 6 watts input) for 2 or 3 watts output. A single and fully charged 9 volt battery can deliver only .1 amp (.9 watts) and is insufficient for converting to 5 watts. Parallel-connect ten 9 volt batteries, however, and you are set (9 V x 1.0 A = 9 watts).

Here's another idea. Suppose you have a 12 or 13 volt/6 amp gel cell. Using the EPS-1, your 12 volt/.5 amp (maximum) rig can be operated until the battery discharges all the way down to 3 or 4 volts. Nice idea!

The EPS-1 is available for \$35 from Embedded Research, P.O. Box 92492, Rochester, NY 14692. Check it out and start homebrewing surface-mount style the easy "big components way"!

### New Surface-Mount Tick Keyer

Next in our spotlight and also available from Embedded Research is the deluxe-feature electronic keyer kit shown in photo 5. This little marvel is only .75 by .75 inches in size, small enough to fit on or under a paddle's base or mount inside the cab-

inet of even the smallest transceiver. If mounted in a rig, a seldom-used push-button-like frequency lock could be rewired for accessing the Tick's functions.

Assembly of this kit is easy, as there are only four surface-mount components on its PC board. An extra resistor, capacitor, and transistor are also included for soldering practice or instant replacements if you lose one. Off-board connections/components include TV (3 to 5 VDC), ground, paddle input, keyer output, sidetone output, and pushbutton input.

Perchance you are unfamiliar with Ticks. They are a modern "keyer on a chip" with all functions such as speed adjust, tune mode, sidetone on/off, iambic A or B operation, right/left paddle select, etc., accessed by a single pushbutton. Additional details on full-size Ticks were presented in last month's column. This one differs only in its use of surface-mount components and smaller overall size, both of which are smaller than Embedded's previously highlighted EPS-1 kit. I would thus classify this surface-mount kit as a "level 2 project." The kit is \$16 for a standard Tick, or \$23 for a Tick-2 which includes a 25-character memory in its repertoire. Order one (or two!) from Embedded Research. You will love it!

### The 'SMiTe Micro Transceiver

Our final surface-mount kit is the world's

smallest Pixie transceiver. It is called the KnightSMiTe, and it is presently available from Bob Kellogg, AE4IC, of the Knight-Lites QRP Club at the unheard of price of only \$10 plus postage & handling (\$3 U.S.). A limited number of these kits are available (probably only a two-month supply, unless Bob finds an additional source of low, low cost components), so act fast if you are seriously interested in this bargain kit.

I call the KnightSMiTe a "level 3 project," as it utilizes the really small components (some folks call them "fly specks"). You will need a pinpoint-tip iron for assembly (some super-thin solder is included in the kit).


Thanks to Bob and an assistant, we have some terrific close-up "how to do surface mount" photos applicable to both the KnightSMiTe and Tick kits (photos 6-12). Explanations are included in each photo's caption, so I will only add a couple of additional short notes.

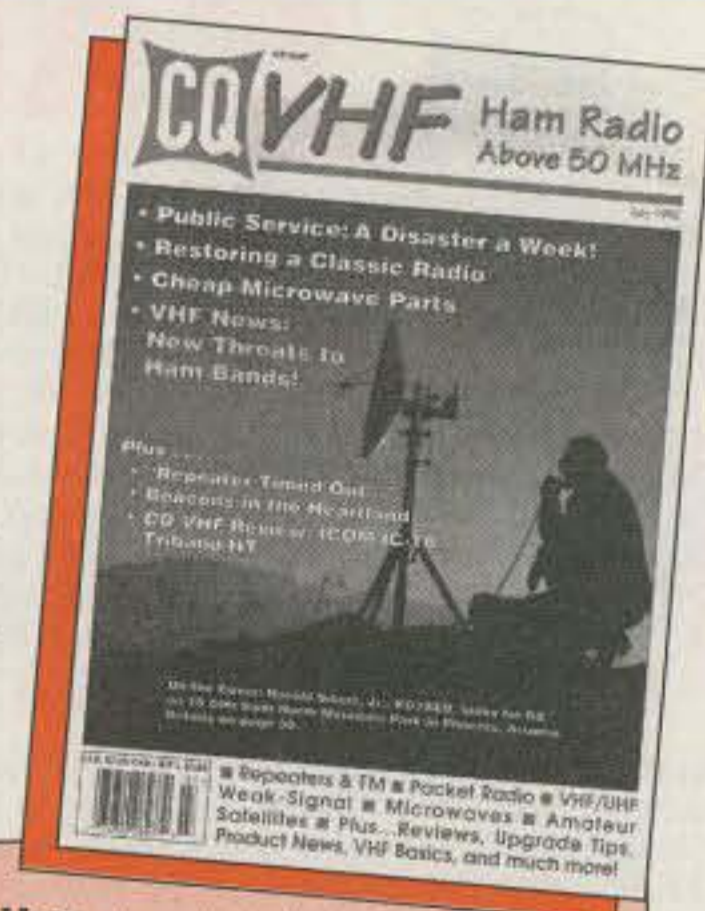
First, the process goes as follows:

1. Prewet a pad with a tiny bit of solder.
2. Using tweezers to hold a component in position between its board pads, briefly reheat the pad so solder flows onto one end of the component.
3. Again using a brief touch, solder the component's other end and its board pad.
4. Check your work with an ohmmeter.
5. Repeat the sequence to install the next component.

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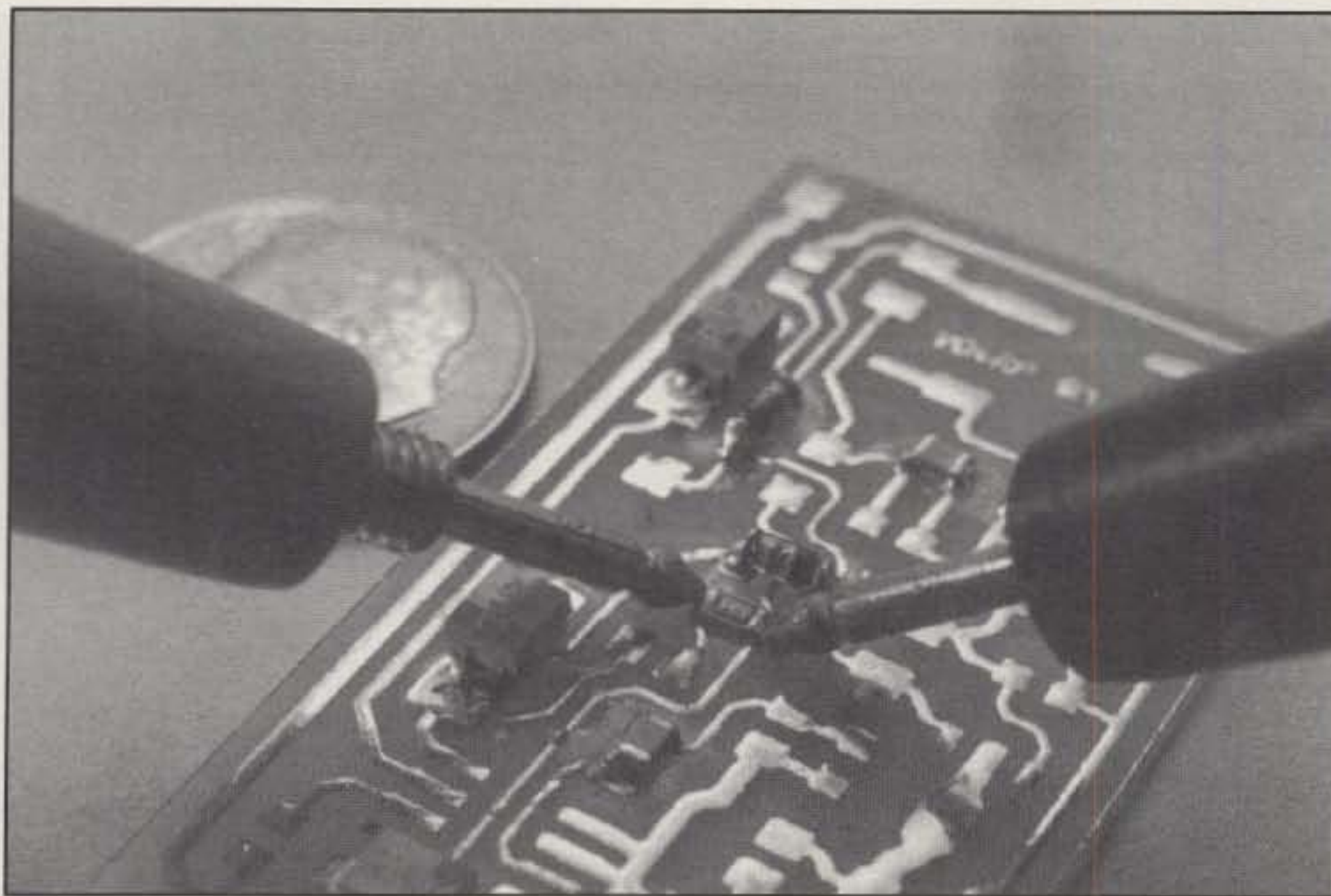


Photo 9— Now Bob is using a very sharp-tip ohmmeter test lead to check his soldering work. After this step, he will move leads to the prewetted pad and trace below the resistor to double check his work and the resistor value.

Take a close look at photos 8 and 10, and you will notice surface-mount resistors are marked with three numbers instead of color bands. A resistor marked 100 is thus 1, zero, and "zero zeros" for its multiplier band, or 10 ohms. Likewise, a mark of 823 is 8, 2, and 3 zeros, or 82K ohms. Manufacturers do not mark values on small capacitors, so you, personally, must keep track of them and ensure the right one is installed in the right place.

That explains why KnightSMite components were taped to the overlay sheet in photo 6.

### Tech Notes

Last month I mentioned a few more notes on Tixies and Pixies would be included this month. We are overflowing column space, however, so the notes must be very brief.

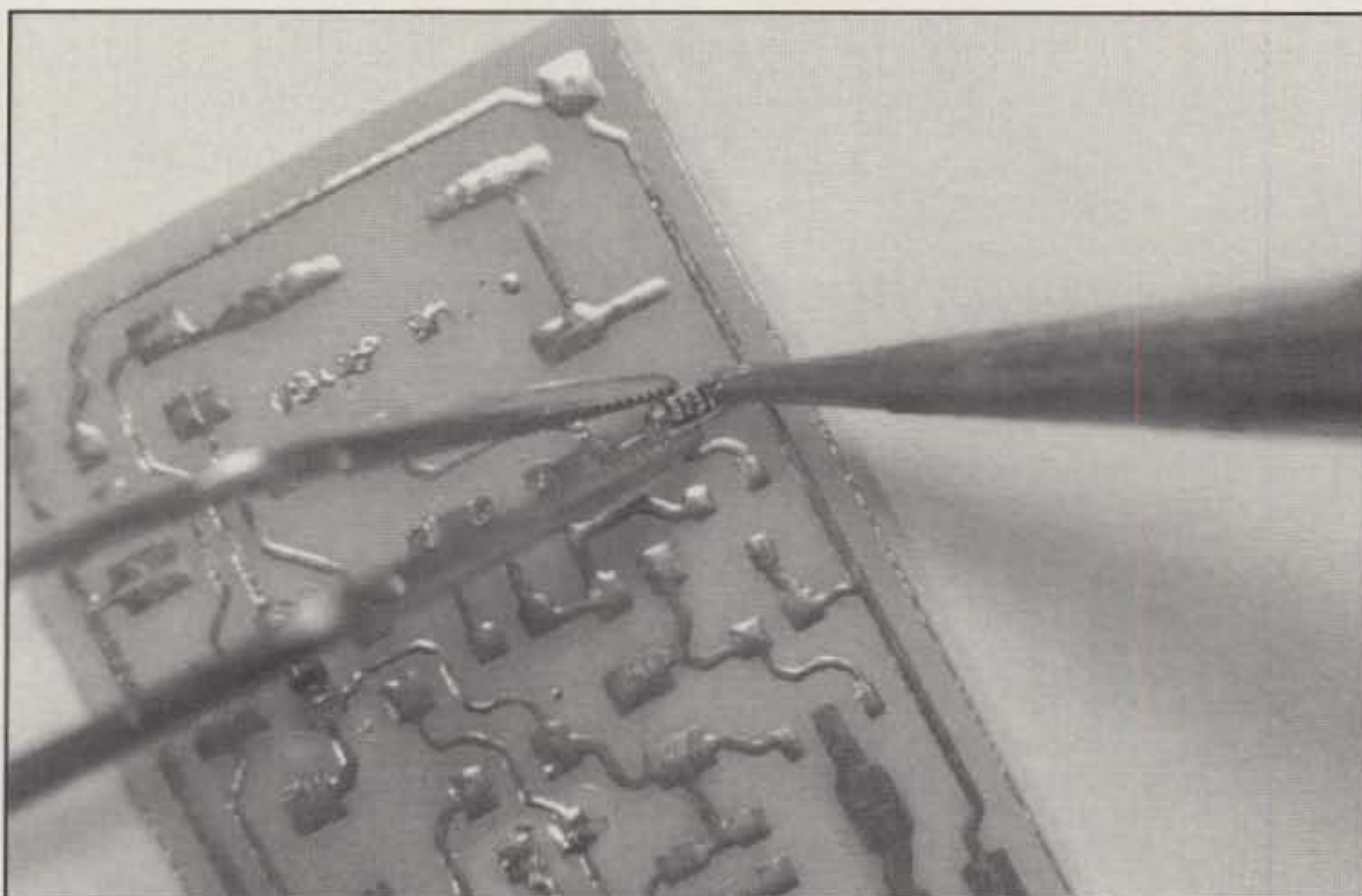


Photo 10— After solder-wetting another pad, Bob is holding another resistor (823, or 82 K ohms) in position while reheating a pad. Only a quick touch of the iron does it! After cooling, the other pad will be touch soldered. Then work will be checked with an ohmmeter as illustrated in photo 9.

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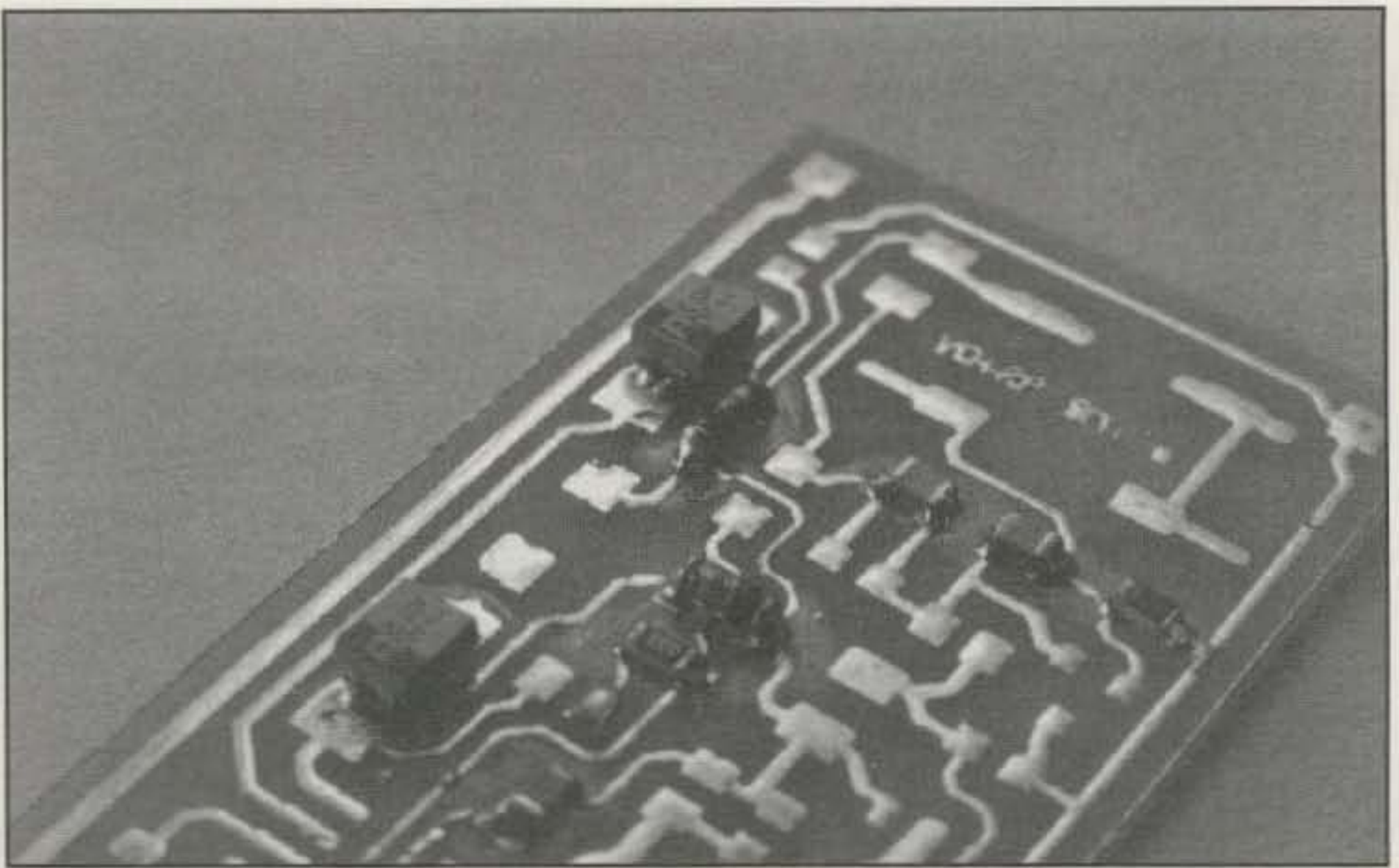


Photo 11- Use your magnifier to study this photo, and you can see how various components look after installation. Only a speck of solder is visible at each component end/pad. Look closely and you will also notice resistors are stamped with value, while small capacitors are unmarked.

Place last month's Tixie diagram beside this month's Pixie diagram (fig. 1) and read carefully while thinking along with me as we proceed. The basic circuit designs of the Embedded Research Tixie and the KnightSMiTe Pixie are similar, but there are some easily overlooked performance-influencing variations that are interchangeable between the two and some expansions/modifications that can be applied to either one. In both circuits, Q1 functions as a frequency-adjustable oscillator, while Q2 serves as an active mixer/

detector on receive and a class C RF power amplifier on transmit. Incoming and detected signals are developed across Q2's 10K emitter resistor and capacitor-coupled into U1 on receive. A key shorts that 10K resistor on transmit, changing the bias on Q2 so it can deliver full RF output. Notice C4 in the Tixie is .05  $\mu$ Fd and C5 in the Pixie is .1  $\mu$ Fd. Using a .1  $\mu$ Fd increases selectivity by rolling off lower audio frequencies while peaking audio response around 1000Hz.

Next notice C10 in the Tixie and C11 in

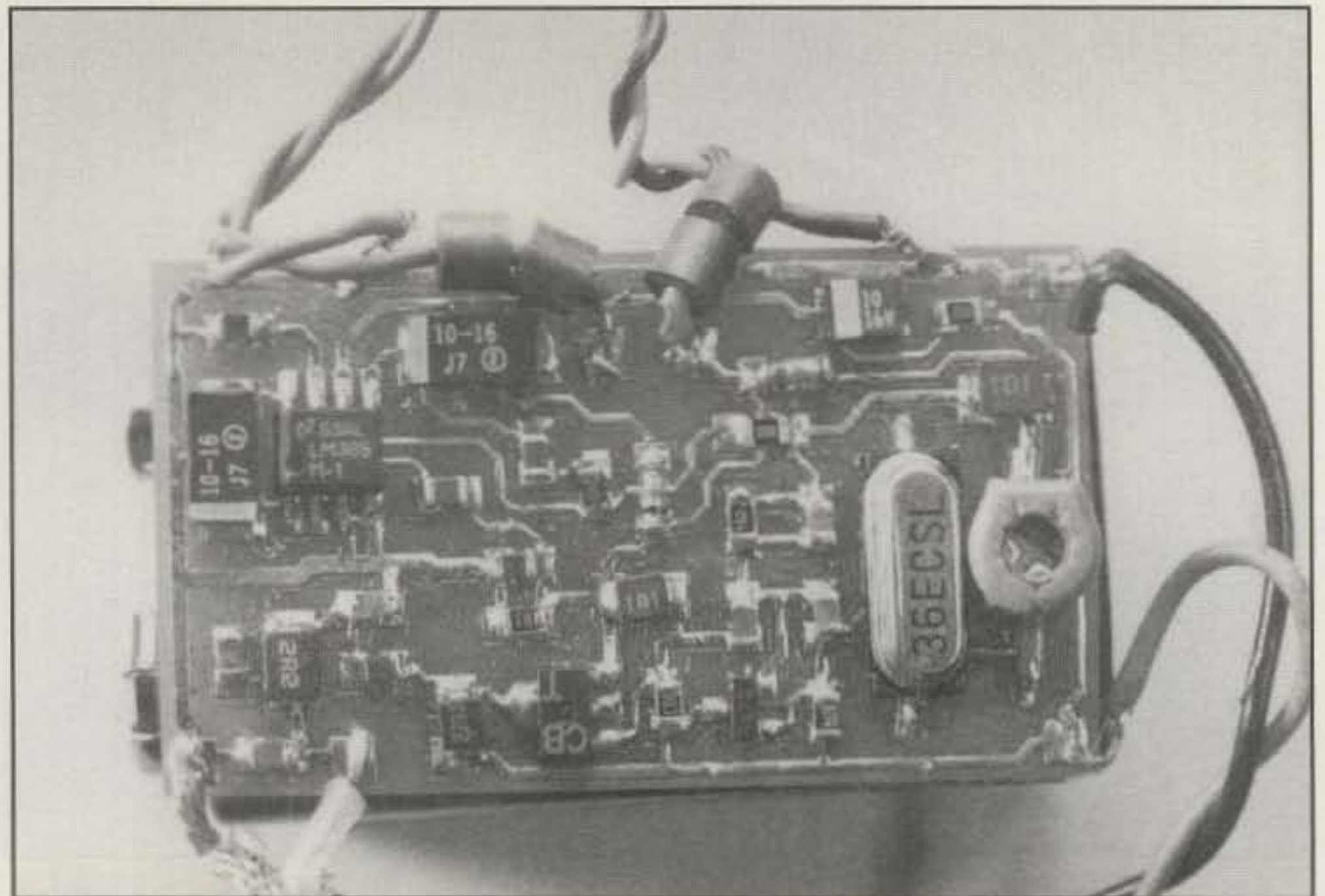


Photo 12- Completed KnightSMiTe Pixie transceiver ready for on-the-air QRPing. Even with super-fine tools, perfectly aligning every component is nigh impossible. They are just too tiny! That is why we checked each one after installation.

the Pixie are 10  $\mu$ Fd. Changing their value to 4.7  $\mu$ Fd further emphasizes the 1000 Hz peak and low-frequency roll-off. Actually, various other amplifier chips/circuits (such as a TL082) could be used in lieu of U1. We could even add dual sections/stages and selectable SCAF filtering as included in a QRP Plus to make a killer Pixie or Tixie, if desired. We simply "rework" part of the PC board, couple audio in through C15 of the Pixie or C8 of the Tixie, and extract audio out from the "Pin 5" connection of U1 (and apply voltage, naturally) for expanding the little rig. Want more output power? Just "tack on" an IRF-510 amplifier stage to the antenna terminal of a Tixie or Pixie. The IRF-510 is "transparent" (you can hear right through it), so no T/R switching is required. Where is a good circuit to use? Just check a QRP Plus or 38 Special's schematic diagram.

Now look at the crystal's frequency-shifting circuit on either diagram's left side. A 50 pFd variable capacitor is shorted out during transmit by Q3 in the Tixie, thus adjusting its receive offset. A 100  $\mu$ Hy inductor is added in series with the 50 pFd capacitor in the Pixie for slightly more tuning range. Since it is not shorted out, it works on both transmit and receive. How is T/R offset accomplished? Closing the key changes the bias on D2, thus changing its capacitance. "Dink enthusiasts" could have fun here, as changing to a varicap circuit with a bar-display IC reading tune voltage could add slide-rule tuning to a Tixie or Pixie.

Last month's notes on changing a Tixie's output/tank circuit for 40, 30, or 20 meter operation can also be adapted to a Pixie, but chip inductors are obviously used in lieu of toroid coils. KE6RIE said he changed L4 from 2.2 to 1.0  $\mu$ Hy for 40 meters. Although not mentioned, I assume he also removed C9 and changed C7 and C8 to 470 pFd. Scaling further, 1.0  $\mu$ Hy and 330 pFd capacitors should be fine for 30 meters, and .5  $\mu$ Hy and 270 pFd capacitors should work for 20 meters. Change the crystal and the Pixie's "warp coil" (L1) to 18  $\mu$ Hy for 40 or 30 meters or 5.6  $\mu$ Hy for 20 meters, maybe scale L2 (either rig) accordingly, decrease Q1's emitter resistor to not less than 100 ohms for more output power, and have fun.

Homebrewing is alive and thriving in QRP! Yes, and we are now totally out of space for another month. Stay tuned! Barring unforeseen circumstances, a double feature on beautiful and easy-to-homebrew classic rigs is coming during the next two months. Meanwhile, let's QSO on 14.200 MHz ( $\pm 10$  kHz) one Saturday or Sunday around 2200 GMT or 10.110 MHz ( $\pm 10$  kHz) one weeknight around 0130 GMT.

73, Dave, K4TWJ

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# PACKET USER'S NOTEBOOK

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## Making A Difference

**W**hile other packet radio pseudo gurus are talking about packet operations in some far off land, I'm getting pelted with tons of mail about packet radio here in the USA. Don't get me wrong; I love the new-found interest in packet radio that is emerging.

When I say "tons," I mean it literally. If I committed the e-mails to hardcopy, I might get a surprise. Lately, I'm receiving more US snail and e-mail than I could have ever dreamed of.

Something is making a difference. I haven't put my finger on exactly what it is yet, though. It seems the world of packet radio is being discovered. I know: The word should be *re-discovered*. After you read this month's column, however, you'll understand why I say *discovered*.

### Packet Radio and Citizen's Band Radio

I can guess at where some of the interest is being cultivated. I do know that several Citizen's Band frequencies are now operating packet. Some of the e-mail I'm receiving is from CBers who want to know how to interface brand X TNC to brand X transceiver.

As a matter of interest, I just received an e-mail this morning from an amateur in Illinois who wants to add 2400 bps to a friend's packet station. Later in this column, I'll address the addition of a 2400 bps modem to some of the well-known TNCs in use today.

It seems some of the CBers are going to 2400 bps as a means of achieving faster throughput of their data. One CB pPacket user e-mailed me about how fast he could display a color picture using packet CB and the old DOS version of MFJ Multicom version 2.2.

I suppose that after the novelty of voice CB subsided, a new interest in data/digital CB grew. I'm not fostering the idea. The notion has already reached its stride on the 27 MHz (11 meter) band.

After getting the e-mails, I asked some of the senders where on the citizen band this packet was being used. Overwhelmingly, the reply was "listen on Channels 32, 37, and 21." I think I opened a box of worms I didn't expect, as there was a contingent of CBers who use whatever channel is available.

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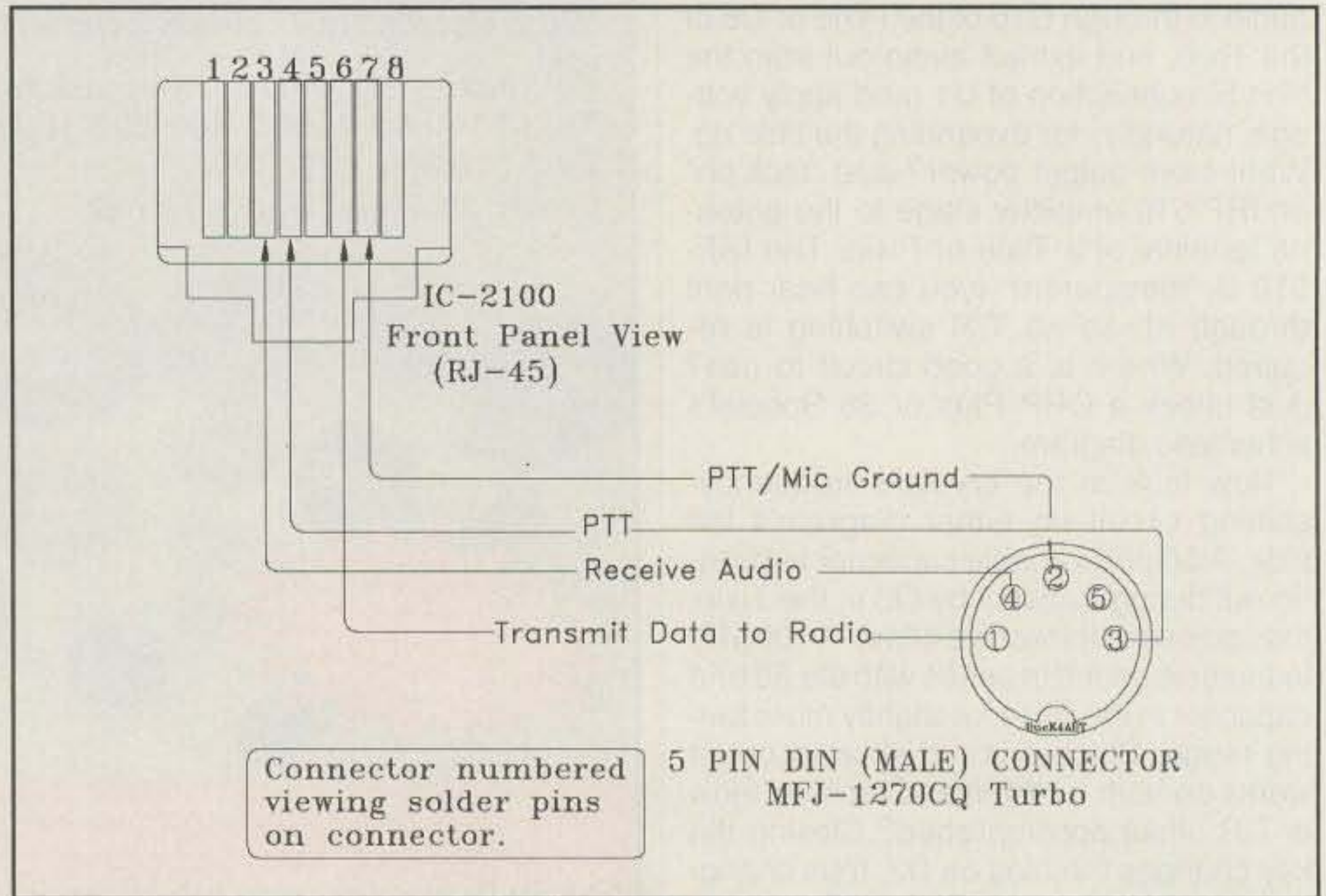


Fig. 1— Interfacing the IC-2100 packet I/O and the mic port which uses the RJ-45 connector. For most applications with this interface the TNC will be a 1200 baud type.

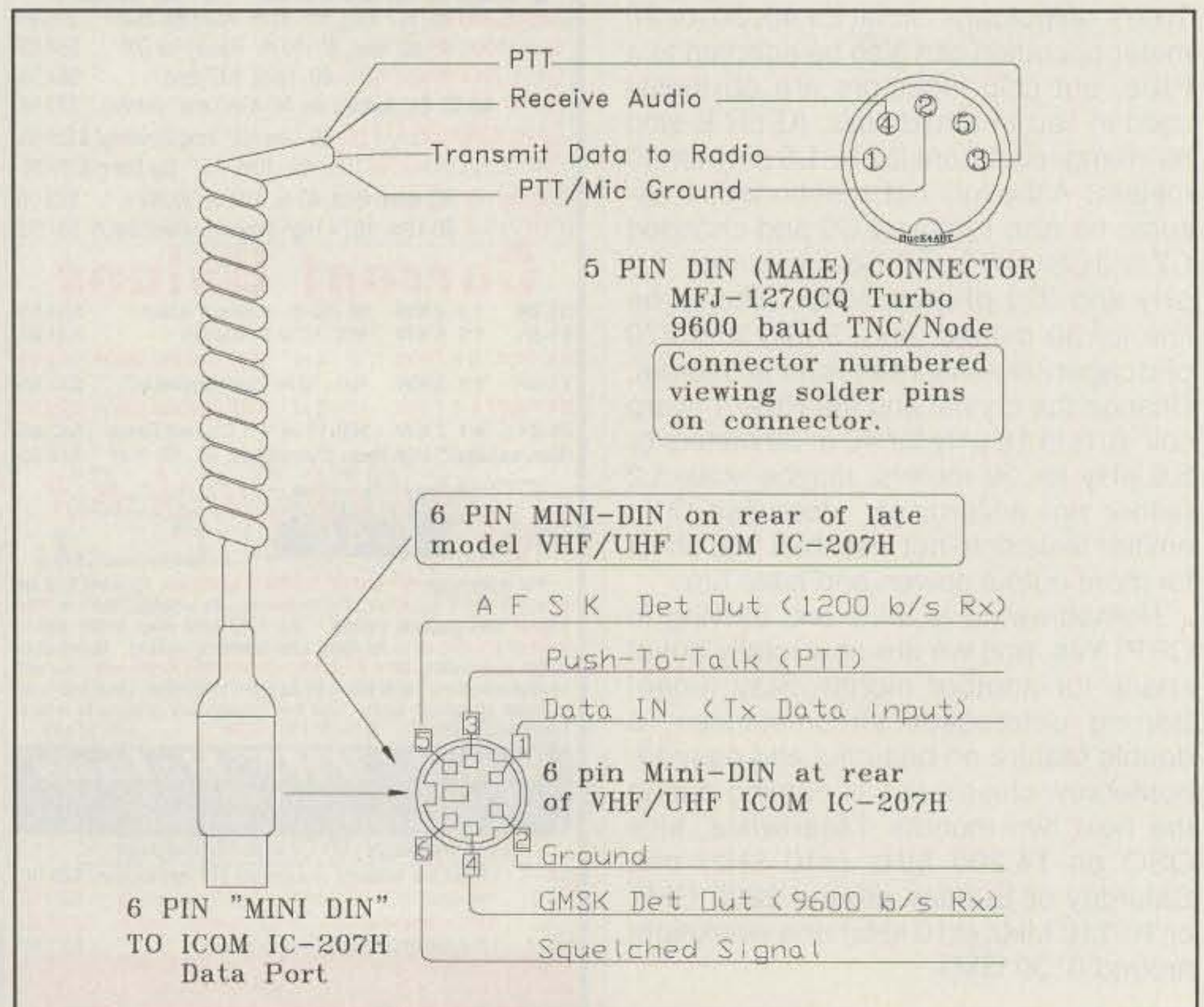


Fig. 2— The ICOM IC-207H configured for use at 9600 baud.

Not only are the CB ops using the usual station connect, they are also using each other to "digipeat" via.

### New Interest in and Applications for Packet

So many of the mail messages refer to a newfound interest in packet radio. Some of the new operators are telling me about how they have heard of packet radio, but have yet to try it. Now they are "taking the plunge," as Gary Donner, WB8NLL (yes, Gary, I remember meeting you and Dave at Dayton), of Hamersville, OH and Jeff Ewy, Ft. Wadsworth S.I., NY put it. Gary noted that he has been an amateur radio operator for about 26 years, and is slow at getting into newer modes. He uses RTTY now, via sound blaster. Gary proclaims that it is much quieter than the old Model 19 ASR that he used on RTTY about 20 years ago.

Gary is taking the "packet plunge." Watch it, Gary. Packet radio is FUN—so much fun that it's addictive. Gary plans to implement packet as an adjunct to the ARES and other emergency services.

### Packet Radio Should Be Outlawed!

Recently at a nearby hamfest I was conducting a packet radio forum when a lady in the audience raised her hand to ask a question. I gave her the floor and she exclaimed, "Packet radio should be outlawed!" Her statement startled me. After regaining my composure, I asked, "Why do you feel that packet radio should be outlawed?" Although I expected to get a real jolting retort, she smiled and said, "Well, packet is so much fun and so enjoyable that it seems almost sinful." I certainly breathed a sigh of relief!

In the e-mail, the U S mail, and at the packet forums I get lots of questions about which, what, when, how, where packet etc. For instance:

- Which TNC should I buy?
- What is the best TNC?
- Which TNC will work with my computer?
- How can I connect a TNC to my (generic) transceiver?
- Which TNC will last the longest?
- Which TNC will be compatible with most packet radio systems?

I have to assume a happy medium here and ask each person in which application he or she wishes to use the TNC and where? HF, VHF, or UHF? Will it be used as a node, as a fixed station, or in portable operations? I then explain the different applications and also explain the features contained in each TNC and KPC.

### We Found the Bauds

I suppose at this point I should turn to a more aggressive aspect and focus the dis-

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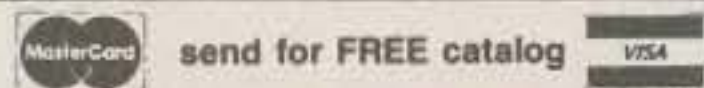
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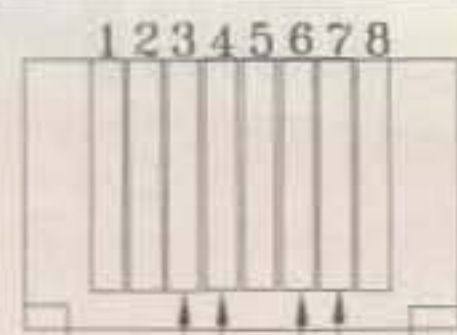
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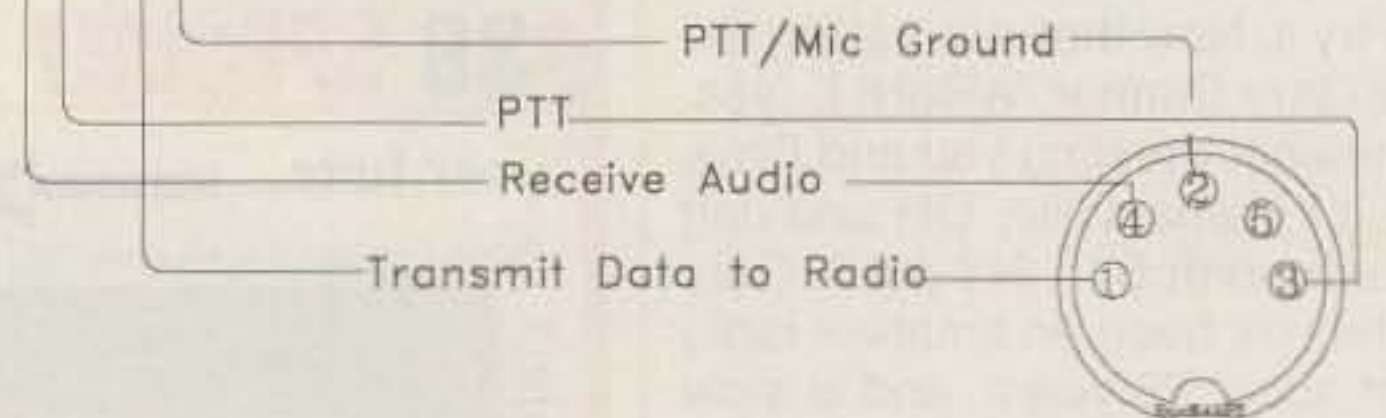
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CIRCLE 75 ON READER SERVICE CARD



IC-706 MKII  
Rear Panel View  
(RJ-45)



Connector numbered viewing solder pins on connector.

5 PIN DIN (MALE) CONNECTOR  
MFJ-1270CQ Turbo

Fig. 3— A retake of fig. 1, except this time it's the IC-706.

cussion on baud rates that are faster than 1200, since in most cases the prospective TNC purchaser is looking at moving above the old 1200 baud handicap.

Let's make sure the TNC we buy is a multi-speed TNC, *not 1200 baud only!* The trend in radios and packet radio in particular is to move away from 1200 baud. Let's face it: When the Citizen's Band operators are trying to go to 2400 bps, the least we amateurs can do is get on with it at 9600 baud.

### New Radio Interfaces

Many new transceivers are being introduced in the amateur market. With the release of these new models comes transceivers that have additional ports for higher speed packet radio I/O. In the drawings that accompany this month's column, I'm providing you with both sets. The interface at fig. 1 is of an ICOM IC-2100 packet I/O and the mic port which uses the now familiar RJ-45 connector. For most applications with this interface, the TNC will be a 1200 baud type.

At fig. 2 the ICOM IC-207H is configured for use at 9600 baud. Notice the 9k6 port is a 6-pin mini DIN. The 9k6 port is

located at the rear of the IC-207H.

To make the interface an "all-in-one" I/O, ICOM utilized all the pins of the mini DIN and included I/O for 1200 baud as well.

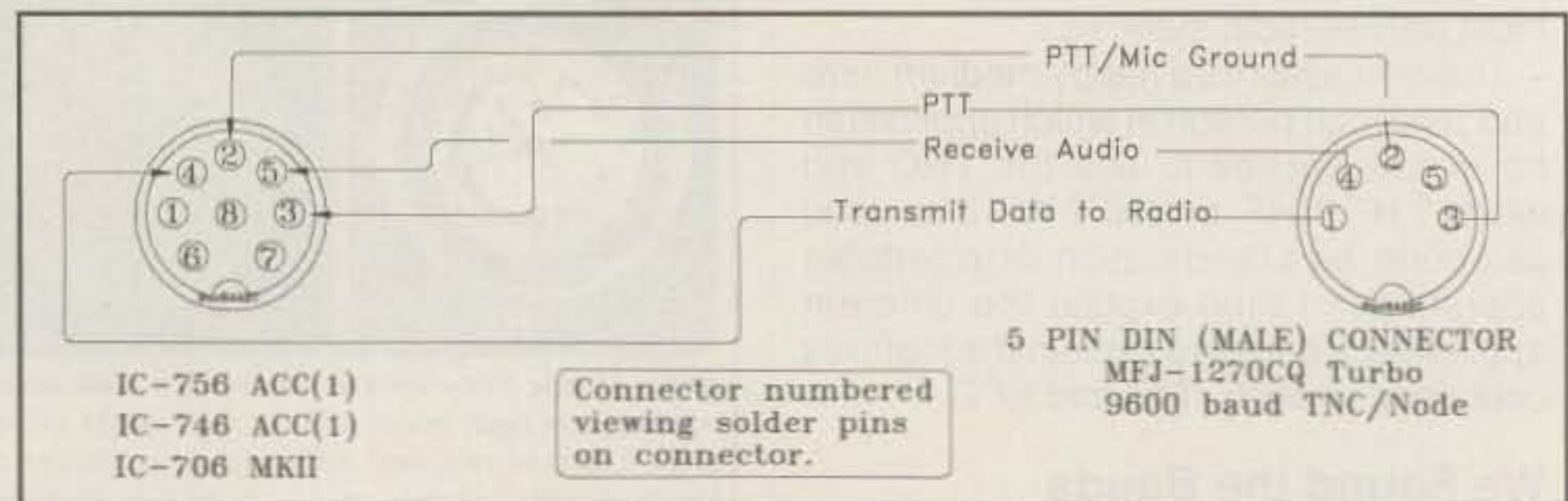
Fig. 3 could be a retake of fig. 1, except that fig. 3 is an ICOM IC-706. This is a multiband radio, as you will see when you view fig. 4.

Fig. 4 shows the accessory port being interfaced for use at HF. The use of the ACC1 I/O enables the operator to use a multimode TNC (KAM, MFJ-1278B, DSP-900, etc.) on AMTOR, packet, PACTOR, RTTY, CW, SITOR via ACC1 port.

### Building a 1200 Baud TNC

As promised earlier in this column, here are the instructions to install the MFJ 2400 B/S modem (Model MFJ-2400) into the MFJ-1278 multimode TNC. If you order the MFJ-2400 from MFJ, a complete set of installation instructions is included.

This is the same installation that was included in an earlier "Packet User's Notebook" a few years ago. The installation was performed by Glynn, WB4RHO, and the instructions were written by him. Yes, the name is the same, and I'm proud



IC-756 ACC(1)  
IC-746 ACC(1)  
IC-706 MKII

Connector numbered viewing solder pins on connector.

5 PIN DIN (MALE) CONNECTOR  
MFJ-1270CQ Turbo  
9600 baud TNC/Node

Fig. 4— The accessory port interfaced for use at HF.



to say this graduate EE Magna Cum Laude is my son. Here in his words is how to build the MFJ into a 2400 baud TNC.

**Modification to add a 2400 BPS modem to the MFJ-1278 and include 2400 bps packet operation. Installation of the TNC-2400 modem into the MFJ-1278 Multi-Mode and the MFJ-1274.**

Up front, I'm not responsible for mistakes, omissions, or damages.

Glynn E. Rogers, Jr., WB4RHO  
<grogers@ala.net>

**Step 1:** First remove the 4 screws from the cover, then remove the cover. Remove the 2 screws that hold the face plate in place. Locate the 5 screws holding the printed circuit board in place, and remove the screws. Watch out for the screw that holds the 5 volt regulator tab!

**Step 2:** Now that the circuit board is removed, locate J4 on the component side of the PC board. Now turn the solder side of the PC board up with the front facing you. Now locate J4 from the bottom side.

**Step 3:** With an X-acto knife, carefully cut the traces between pins 11-12, 13-14, and 17-18, as indicated in figure five. Note: You should have made 3 cuts to the header traces on the bottom of the PC board.

**Step 4:** You must remove all the solder from the holes in J4 to install a 20-pin header (2 rows of 10 pins). After removing the excess solder from J4, install the 20-pin header into the PC board, pressing the short ends of the header through the board. When all pins are properly seated, solder all 20 of the pins.

**Step 5:** Prepare the 5 pieces of conductor cable assembly for installation by cutting the wires to the following lengths:

- red wire—4 inches
- orange wire—full length
- yellow wire—3 inches
- white wire—8 inches
- black wire—8 inches

**Step 6:** With the PC board component side up, and front facing toward you, attach the 5-conductor cable in the following locations:

A. Solder the orange wire to pin 4 of RAD 1 (Radio port 1).

B. Locate R56 near the rear of the unit solder the red wire to the end of R56 nearest the rear of the PC board.

C. Locate C10 near the right center of the PC board. Solder the yellow wire to the pad at the end of the P. trace extending outward toward the rear from C10.

D. Locate R11 near the right front of the PC board. Solder the black wire to the lead of R11 which is nearest the outer edge of the PC board.

E. Solder the white wire to the other end of R11 toward the inside of the PC board.

**Step 7:** Because the modem was designed for the TNC-2 (MFJ-1270) and clones, the tuning indicator brackets of the

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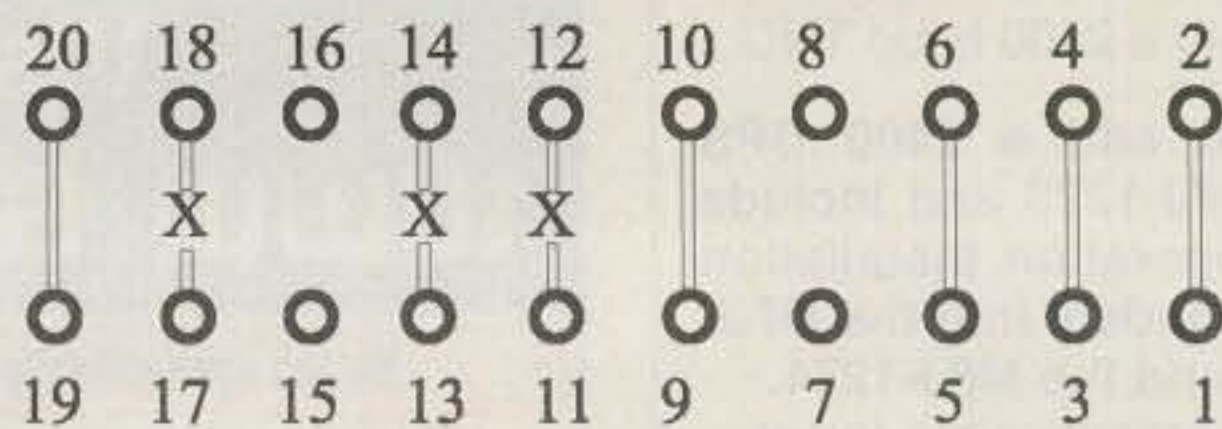
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CIRCLE 47 ON READER SERVICE CARD

## MoDem disconnect header.



Bottom view (solder side) of TNC

X = Cut Trace

|| = Connected

Fig. 5—Connecting the modem to the TNC (see text).

MFJ-1274 and MFJ-1278 weren't taken into account.

You will have to modify the modem board and the right mounting bracket of the modem indicator. Next, let's turn the TNC with the solder side up. Locate the indicator bracket, which will be to the left now that you are looking at the bottom of the unit.

Remove the solder that holds the bracket to the PC board. Now turn the unit back over, and with a pair of needle-nose pliers, twist the prongs that go through the tuning indicator straight so the bracket can be removed. When you have removed the bracket, with a pair of tin snips, or a large pair of diagonal cutters, snip the bracket at the middle. Reinstall the bottom half of the bracket into the indicator. This should leave the top hole of the indicator PC board empty. Install the bottom prongs back into the main PC board, and resolder.

To modify the modem circuit board, you should place the front of the modem circuit board up against the tuning indicator. As you soon notice, it won't quite fit. Use a pencil to mark the edge of the modem PC board where the edge of the tuning indicator board meets (right side). Next, you mark the modem board and set the TNC aside. With a flat file, carefully remove the edge of the modem PC board from the pencil mark to the left side of the board. The removed portion should be about one sixteenth of an inch ( $1/16$  inch). **Be extra careful: Do not** file off all the foil traces on top and bottom of the PC board. You may remove a portion (cut) of some of the foil on the modem board, but continuity must be preserved.

Now that you have modified the modem board, take a piece of electrical tape and place it along the front of the modem board where it was filed.

To install the modem onto the 20-pin header (J4), first place the filed edge of the modem board up against the tuning indicator between the legs of the 16-pin chip of the tuning indicator board. Lower the rear of the modem and carefully install

the modem onto the 20-pin header. (Note that it still may be a snug fit, so apply pressure carefully.)

**Step 8:** Attach the 5-pin cable assembly to the connector provided on the 2400 TNC PC board. Observe that the orientation of this plug is with the **green dot down**. Do not force the connector into place. It is designed to fit only one way.

**Step 9:** Locate jumpers K2 through K5 on the 2400 TNC PC board. Place the jumpers in the position marked 2.

**Step 10:** After double checking all your installation, reassemble the unit into the case. Reinstall face plate; then connect all cables. Now you are ready to power up the unit.

Verify normal operation of the unit first. Next let's activate the 2400 bps modem. This is done on the 1278 with the MODE command.

At the command prompt type the following:

cmd: **MODE VP 9600** <enter>

At this point the RED LED located on the left side of the modem PC board should illuminate. This indicates that the 2400 QPSK modem is activated.

Another mod you may wish to make to the unit is to remove the RED LED from the modem board and place it on the face plate of the MFJ-1278 (some later models have an LED already in place labeled TURBO).

Remove the LED from the modem board and install two wires in the modem PC board where you removed the LED, and connect them to the LED that you install on the face plate. *Note:* Be careful to notice the polarity of the LED that you remove from the modem PC board. Rewire it the same way when you move it from the sub-assembly to the front faceplate. That's it, and it works great for me.

de Glynn WB4RHO

We are having fun with packet. Visit the Packet Radio Networking pages at: <<http://www.packetradio.com>>. Until next month . . .

73 de Buck4ABT

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CIRCLE 134 ON READER SERVICE CARD

# VHF PLUS

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## Phase 3D Launch Date Becomes Indefinite

About the time last month's column was being completed, officials of the Amateur Satellite Corporation (AMSAT) were confirming that they would be bumped from the Ariane 5 series rocket launches—at least for the foreseeable future. This development represents a major setback to the Phase 3D satellite program. A series of press releases attempt to tell the story of what has happened leading up to this development. In this column, I will use information from AMSAT's June 24, 1998 press release to tell their story:

AMSAT's new Phase 3D satellite will not be launched on the third test flight of Ariane 5. The bad news reached Karl Meinzer, DJ4ZC, Phase 3D Project Leader and AMSAT-DL President, on Monday, June 15th. He immediately informed the P3D Project workers of the unfortunate news.

AMSAT-NA President Bill Tynan, W3XO, had the following explanation for the decision: "It is important to point out that the decision was actually made by Arianespace, not ESA. As everyone should know by now, ESA is the European Space Agency. It is similar to NASA in the United States except that it is multinational. Arianespace is the organization set up to market Ariane launches. So, naturally, its prime interest is money. Because of the failure of the first Ariane 5 test, A-501, in June of 1996, and the less-than-expected performance of the second flight, A-502, last October, all concerned have been understandably anxious to complete a fully successful test as soon as possible. Arianespace cannot begin to sell Ariane 5 launches until a successful test actually takes place."

Tynan went on to state that, "The failure of '501 and the lower-than-expected performance of '502 have caused an extension of the program and hence have increased the cost of the development phase. ESA has been anxious to recoup some of these additional costs. As a result, they asked Arianespace to try very hard to find a paying customer for A-503. A figure of somewhere around \$35,000,000 was mentioned. This is about half of the amount usually paid to launch a present-day commercial satellite on an operational launcher. The lessor amount is indicative of the fact that Ariane 5 is not yet fully operational. ESA even signaled a willingness to delay the flight until a suitable customer could be found. This shows how serious they were in wanting to recoup some of the financial losses they have suffered as a result of the delays and problems that have befallen the Ariane 5 program."

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### VHF Plus Calendar

Sept. 6	Full Moon. Good EME conditions.
Sept. 9	Moon perigee.
Sept. 12	Last quarter Moon.
Sept. 12-14	ARRL VHF QSO Party.
Sept. 13	Poor EME conditions.
Sept. 14	Highest Moon declination.
Sept. 20	New Moon. Moderate EME conditions.
Sept. 20-21	ARRL 10 GHz Contest.
Sept. 24	Moon apogee.
Sept. 26	Northwest VHF Conference. (See text for details.)
Sept. 27	Very poor EME conditions.
Sept. 28	First quarter Moon.
Sept. 29	Lowest Moon declination.

\*EME conditions courtesy W5LUU.

"Arianespace, apparently in order to get the A-503 flight off as soon as possible, and so that they could begin to sell future Ariane 5 launches, agreed to pay ESA some \$40,000,000 in order to control the payloads on the mission and get A-503 launched as soon as possible. It is not known at this time what Arianespace will choose to put on the '503 flight; it may even be a dummy satellite of some sort. The bottom line is that Phase 3D will not ride on Ariane 503," Tynan said.

"While we are disappointed," Tynan continued, "crying and gnashing of teeth never accomplishes anything." He emphasized that "AMSAT is taking steps to complete the testing of Phase 3D and have it ready for any launch that we might be able to obtain," adding, "naturally, ESA and Arianespace are still prime candidates for our presentations."

Tynan emphasized that Phase 3D was designed and built "with the then very real prospect of a launch on an Ariane 5 vehicle." It was later determined that with an appropriate adapter, it could also be accommodated by an Ariane 4 launch vehicle. "But, because it was built to go on an Ariane, it just can't be put on any rocket that's going up," said Tynan. Continuing, he noted that Phase 3D is a "rather large spacecraft and also quite massive, on the order of 600 kilograms or about 1000 pounds when fully fueled. As such, it requires a launcher with a large volume under the shroud and a launch vehicle with substantial performance."

"The orbit that the launcher puts us into is also very important," Tynan continued. "Generally a Geostationary Transfer Orbit (GTO) is what we need. A launch into a circular low Earth orbit (LEO) would be much less than optimum. Many launches, including the Space Shuttle, go to such LEO orbits. There are, of course, other launchers that go to GTO besides Ariane, and we will be looking at them. However, nothing can be promised at this time," Tynan concluded.

Tynan also said that he hopes that AMSAT-NA members, and all who have contributed to the Phase 3D project to such a great extent, will keep the faith and continue their support while efforts to secure a launch for Phase 3D continue. He also made it clear that AMSAT is beginning to embark on other projects as Phase 3D is being completed. These include assisting with a number of university satellite projects, some of which are to include amateur transponders. Effort is also getting underway in connection with developing amateur radio equipment for the International Space Station. "In addition, I'd like everyone to remember that there are several satellites preparing for launch which will carry amateur transponders," said Tynan.

The AMSAT-NA president wrapped up his statement with, "There's lots to keep all satellite enthusiasts occupied while waiting for the launch of Phase 3D, which will come in time. Even though Phase 3D apparently will not be launched this year, AMSAT is very much alive and kicking."

The following message was posted to the AMSAT-BB mailing list on June 16 by AMSAT-NA President Bill Tynan, W3XO, and subsequently posted to the AMSAT home page <<http://www.amsat.org>>:

To: All AMSAT-NA members and everyone interested in Amateur Radio satellites worldwide; from: Bill Tynan W3XO President AMSAT-NA; subject: Bad News on Phase 3D Launch:

By now many of you have heard the bad news that Phase 3D will not fly on Ariane 503. This is, obviously, very disappointing news. We must, however, persevere and continue our present course to get the satellite tested and ready for a launch. And we pledge to do so.

I think the situation is best summarized by the words sent this morning by Dr. Karl Meinzer, DJ4ZC, the Phase 3D Project Leader. But first, a few words of explanation may be in order.

(1) Arianespace is a commercial company set up to sell Ariane launches. (2) ESA is the European Space Agency, much like the U.S. NASA, but a multinational organization. (3) W1 is a commercial satellite built in Europe, which was damaged in a fire a few months ago. Reports have said that it has been refurbished and made ready for flight. (4) Although not mentioned in Karl's note, previous information has referred to CNES. CNES is the French equivalent of NASA. They have been designated by ESA as the technical agency in charge of developing the Ariane 5 launch vehicle.

73, Bill Tynan, W3XO

DJ4ZC's statement:

First I would like to thank all of you who sent me notes of sympathy and encouragement following the recent news from ESA.

Since that information was released, I have spoken with many people and the situation has become a bit clearer. First let me give a short rundown of events to put things into perspective.

1. Before the launch of AR 502, ESA terminated our launch-contract based on the fact that we "were not ready in time for the launch." This of course was due to the specification change which was imposed on us shortly before the launch following the AR 501 failure. We always maintained that the termination of the contract was on somewhat shaky legal grounds because of the unacceptable short notice we were given for the spec-change. ESA maintained that this was a risk we had to accept because the flight was a test-flight.

2. As a consequence of the AR 501 failure, a third test-flight (AR 503) had become necessary. Because there was an uncovered hole of about \$US 40,000,000 in the AR 5 development budget, ESA turned to Arianespace to find a paying customer for this flight and partly delegated the responsibility for the payloads to Arianespace. For the case that such a customer could not be found, the countries developing Ariane 5 would have had to pay this missing sum.

3. In January we accepted the termination of the contract and with acceptable financial provisions without further squabbles after ESA agreed to: (a) Carry us as a backup on AR 503 if no paying customer could be identified; (b) ESA would use "best efforts" to place us elsewhere if a flight on AR 503 did not become available due to a paying customer.

4. While we always maintained that it would be unlikely that Arianespace would find a paying customer (and in fact we were proved right by the events) and thus we would be flying on AR 503, ESA always assumed that Arianespace would come up with a paying customer. Thus ESA unfortunately did not pursue the provisions of 3(a) in an active way. In particular they failed to perform the necessary studies to include us on AR 503 if the option 3a) would have to be exercised rather late in the game.

5. In the ESA Programme Board meeting last week, Arianespace surprised everybody by stating that they (the company Arianespace) would cover the missing US\$40,000,000 in return for having the freedom to decide the composition of the lower payload. So in fact, Arianespace had become the "paying customer" for this slot, and we were off.

Initially it was not clear why Arianespace would take this step. But after having spoken with many people, eventually the following picture emerged:

First of all, it is clearly in the interest of Arianespace to get AR 503 as quickly into orbit as possible. Assuming that ultimately they want to launch one AR 5 per month, each month of delay will cost them on the order of \$200,000,000 of lost revenue. This is all the more true since recently there has been some discussion about the performance of the AR 5 with regard to the market demands for launchers. So Arianespace may have some fears that they may lose the competitive edge if the AR 5 is further delayed and their customers may wander off to other launch-suppliers.

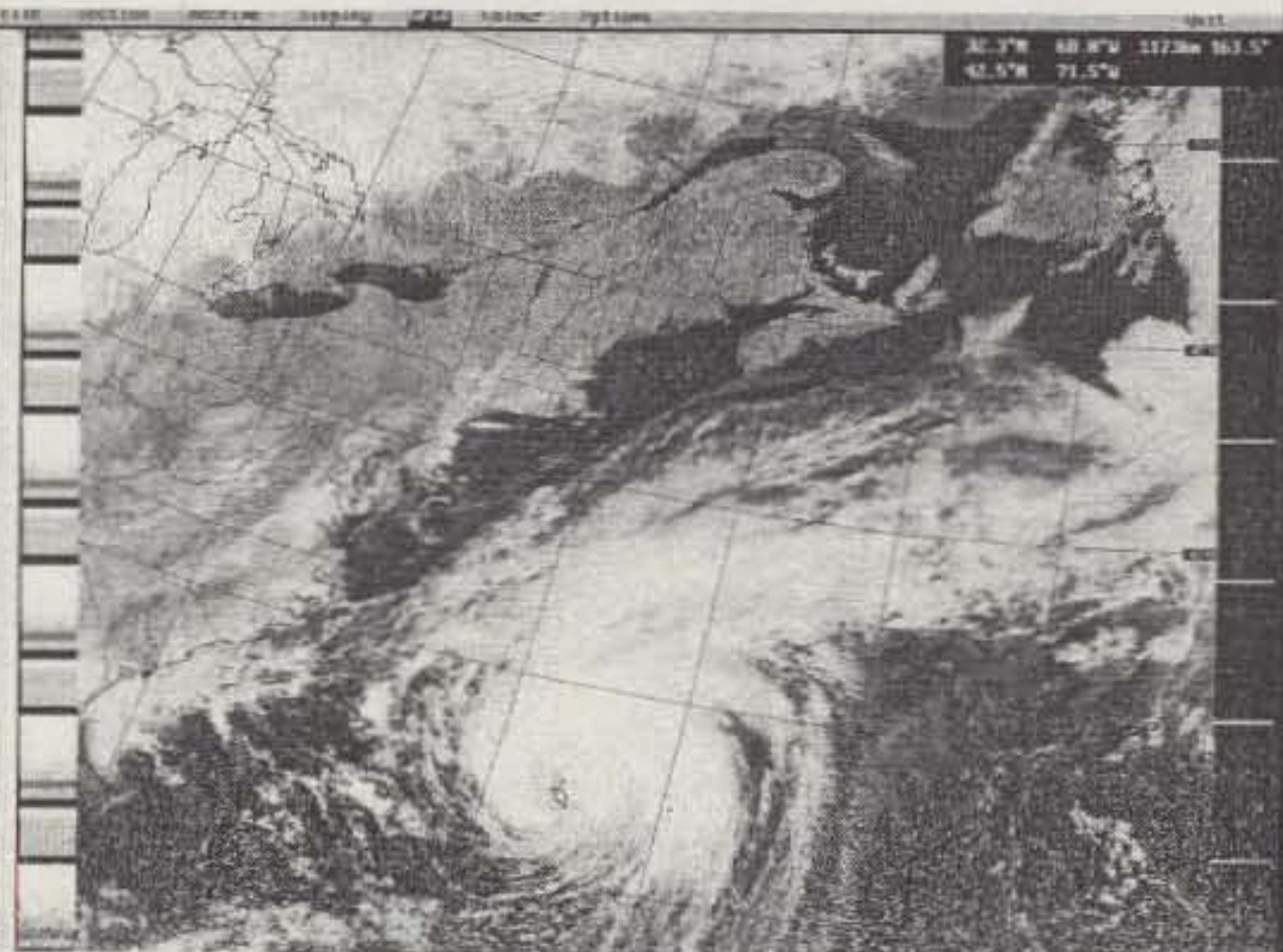
But also with AR 503 itself Arianespace looked into optimizing the cost/profit ratio. To this end Arianespace has been negotiating with the insurance about the damaged W1. If the W1 can be refurbished in time for the AR 503 launch, they will launch it and then sell the communication services themselves. I had earlier indications of this, but I did not take it very seriously because I assumed that Arianespace would stay away from this option in view of the resulting conflict of interest with their customers; it turned out that I misjudged this. So in a way we have become the first victim of this conflict of interest. But in the light of this gamble, it is now doubtful that Arianespace would have considered us as backup even if ESA had done their homework. Clearly, they want to retain the option of switching the refurbished W1 against the W1-dummy to the last second before the launch. We simply could not compete with this by our offer of \$1,000,000 and some moral justification of not flying ballast. So we wept some, and that being done, let us now look forward:

1. For ESA the launcher development has come to an end, and this phasing out is also reflected in the size of their staff and their commitments. So frankly, I do not expect very much from them in the future in spite of the above commitment 3(b).

2. With Arianespace we have to start to deal seriously for a launch. In an initial contact they stated that they would launch us for \$10,000,000. Clearly for us this is out of reach, but I hope that once Arianespace has a better understanding of our environment and the constraints we work under, there will be room for negotiation.

3. I expect that we will get some significant help from our government

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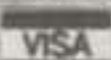
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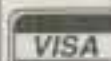
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[German] given that they saved quite some money, and that this savings occurred essentially at our expense.

Also all players agree that we have to finish the work on the spacecraft including the tests as soon as possible to be ready once the opportunity arises for a launch. It is clear that it will not be this year, but I think that the chances are not bad that we will find something next year on AR 5. This is all the more true given the mismatch of payloads with AR 5 performance.

But also in parallel we should and will pursue other launch options.

Although in the short term we have a problem, in the medium term I am reasonably optimistic. So keep your fingers crossed. I will inform you by this path on the progress we make in securing a launch.

73 de Dr. Karl Meinzer, DJ4ZC

There you have it, a candid but optimistic look at the present and potential future of the Phase 3D satellite program.

## SAREX Program Cancelled

The following is from the AMSAT News Service (ANS) June 28, 1998:

The Space Amateur Radio Experiment (SAREX) payload originally scheduled to fly on Shuttle Mission STS-95 this October has been removed, along with nine other payloads from the flight manifest due to tight constraints on the crew's payload activity timeline.

Flight managers, after reviewing all of the planned STS-95 activities, concluded there was a need to reduce the overall manifest and took the action of removing SAREX and some other secondary payloads. This action was done to ensure sufficient time to accomplish the major objectives of the flight and ensure the overall success of the busy mission.

NASA expressed regret at having to take this unfortunate action, in particular, having to delete educational activities from STS-95. NASA, SAREX, ARRL, and AMSAT were in the throes of planning the activities for STS-95 when the official word came concerning the mission. Four US schools that had been selected for SAREX QSO's will now be first in line for consideration on future missions, such as STS-93 and the International Space Station.

All future shuttle missions are heavily loaded with activities that revolve around building the International Space Station. But SAREX has an imminent place in NASA's future plans for the few shuttle missions that will support it, such as January's STS-93. The SAREX Working Group is looking at another mission for 1999 that may be suitable, too. SAREX also continues to have a big place within NASA's International Space Station plans, which involve a temporary and a permanent Amateur Radio station onboard.

(ANS thanks Frank Bauer, KA3HDO and the SAREX Working Group for this information.)

## Current Band Threats

The following two ARRL bulletins report on recent threats to our VHF plus bands:

**ARLB051 League reiterates stance on LMCC petition:** The ARRL has called upon the Land Mobile Communications Council (LMCC) to withdraw its request for reallocation of segments of the 420 to 450 MHz band to the Private

Mobile Radio Service. Such a move would permit the FCC to focus its attention on portions of the LMCC petition that "might have more merit," the ARRL said. The League's suggestion is contained in reply comments filed July 16 with the FCC in response to the LMCC's petition for rulemaking, RM-9267, filed earlier this year. Amateur Radio shares the 70 cm band on a secondary basis with the federal government. The LMCC seeks immediate reallocation of the segments 420 to 430 and 440 to 450 MHz from the federal government to the PMRS.

Alternatively, the League asked that the FCC dismiss those portions of the LMCC petition dealing with the 420 to 450 MHz band as "plainly not deserving of further consideration."

The League said that comments from Amateur Radio operators—the vast majority of those filed in response to the LMCC petition—establish that the LMCC proposal for a PMRS allocation in the 70 cm band "was ill-conceived." Hams told the FCC that the band is heavily used and vital to amateur public service activities. The League noted among other commenters "a complete absence of support" for the 420 to 450 MHz proposal in particular. Some commenters were altogether silent on the 420 to 450 MHz reallocation issue, while one LMCC member, the Association of Public Safety Communications Officials-International (APCO), opposed any reallocation in the band.

The League urged the FCC to pay close heed to the comments of the National Telecommunications and Information Administration. The NTIA said national security and other federal interests would preclude sharing on the band. Those comments, the League noted, were "clearly protective of its own use of the 420-450 MHz band, and that of the Amateur Service as well."

The League said the LMCC has failed to justify a 420 to 450 MHz reallocation. Comments filed so far, the ARRL said, disprove both the LMCC's "rank speculation" about possible federal reductions in the use of 420 to 450 MHz as well as its representations about amateur use of the band. "The record that has been developed shows that there is no compatibility between incumbent Federal and amateur facilities and new PMRS facilities," the League said. But the ARRL said it has no quarrel with the LMCC to the extent that it seeks to open discussion on the general issue of PMRS allocation needs.

A complete copy of the League's reply comments is available on the ARRL Web page at <<http://www.arrl.org/news/bandthreat/RM-9267/arrl-reply.pdf>>.

**ARLB046 FCC amends rules for U-NII devices on 5 GHz:** The FCC has amended its rules for Unlicensed National Information Infrastructure (U-NII) devices operating in the 5 GHz range under Part 15 of the Commission's rules. In 1997, the FCC made 5.15 to 5.35 and 5.725 to 5.825 GHz available to U-NII devices under Part 15 of its rules. Amateur Radio shares part of the spectrum involved, from 5.650 to 5.925 GHz. U-NII devices would provide short-range, high-speed wireless digital communication.

In response to industry petitions for reconsideration and clarification, the FCC has amended Part 15 to permit fixed, point-to-point U-NII devices in the 5.725 to 5.825 GHz band to operate with up to 1W maximum transmitter output power and directional antennas of up to 23 dBi gain. The Commission will specify trans-

mit power limits as a function of the channel bandwidth. A logarithmic equation would determine the power permitted. "This action will not increase the maximum power permitted by U-NII devices, but merely scale permissible maximum power to the bandwidth used," the FCC said.

The FCC said it will consider higher gain antennas for U-NII devices for longer-range community networking. In its comments, the NTIA expressed concerns that high-power government radar systems could interfere with the unlicensed devices, but otherwise supported the use of higher-gain antennas for fixed, point-to-point U-NII devices in that band.

The ARRL has argued that longer-range links will interfere with amateur operations and are a significant departure from Part 15, which requires that interference potential of unlicensed devices be subject to "reasonable regulation" so as to not interfere with licensed services. One industry petitioner, Apple Computer, said the ARRL has not demonstrated that U-NII devices present any real threat of interference to ham operation.

The FCC said it would maintain the power spectral density limits adopted in the original order and order.

The FCC also revised its rules to express U-NII out-of-band and spurious emission limits in terms of absolute radiated power levels, regardless of antenna gain.

The FCC advised manufacturers "to consider the proximity and the high power of non-government licensed radio stations," including amateur stations, when choosing operating frequencies during the design of their equipment.

The complete text of the FCC Memorandum Opinion and Order, released June 24, is available on the FCC Web page at <<http://www.fcc.gov/Bureaus/EngineeringTechnology/Orders/1998/fcc98121.txt>>.

## Current Conferences

The Northwest VHF Conference is scheduled for Saturday, September 26, in Bend, Oregon. More detailed information and notices should have been mailed to last year's participants by now.

According to Ed, KI7WB, they hope to include noise figure testing as part of the conference and are looking for the test equipment. The plan would be to conduct the testing at the Bend Environmental Center on Friday evening, the 25th. For more information on the conference, contact Ed, KI7WB, at <[ki7wb@teleport.com](mailto:ki7wb@teleport.com)> or Don, K7HSJ, at <[ghcdk@teleport.com](mailto:ghcdk@teleport.com)>.

## Current Contests

**The ARRL September VHF QSO Party:** This contest is scheduled between 1800 UTC, Saturday, September 12, and 0300 UTC, Monday, September 14. Complete rules can be found in August *QST*.

**The ARRL 10 GHz and Above Contest:** The second weekend of this modified contest is 19-20 September, from 8 AM to 8 PM, local time. More information on the rules changes can be found in last month's column and June *QST*.

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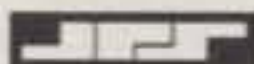


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Both of these contests' rules and log sheets can also be found on the League's home page

If you have not yet sent in your logs for the CQWW VHF contest, please do so by 31 August. Preliminary reports indicate that participation, while restricted by propagation, was up during this year's contest.

### Current Meteor Showers

Two minor showers, the *Piscids* (two peaks, 8 and 21 September) and the *Aurigids* (30 September) can be seen this month. However, their activity has not been much above what is considered sporadic activity.

### Beacon News

The following is from Jack Henry, N6XQ:

**XE1KK/B world's highest beacon?** Ra-

mon, XE1KK, was not satisfied with having a beacon at a mere 3000 meters, so yesterday he installed his beacon at the 4000 meter level of the Popocatepetl active volcano east of Mexico City. Ramon reported thick smoke spewing from the volcano as he was installing the beacon. The exact elevation reported by Ramon is 13,123 feet. Is this the world's highest beacon?

The beacon is on 50.023 with 20 watts into a Ringo Ranger. The grid square is EK09qc. I am hearing the beacon weakly into San Diego as I type this (in late June). Thanks to Ramon for providing the great propagation indicator in central Mexico.

**XE2UZL beacon back on the air.** Thanks to everyone who sent kind words regarding the revival of the XE2UZL beacon. For those not familiar with the beacon it is on 50.028 and puts out 25 watts in bright sunlight and 15-20 watts in the evening with varying duty cycle. The message is the call and grid sent over and over with a longer dash every 35 seconds which is followed by a 2 character telemetry message indi-

cating the battery voltage. The location is DM10 on a 700 foot high cinder cone which overlooks the Pacific Ocean and the San Quintin Valley. The antennas are stacked dipoles that are oriented for maximum propagation E/W. According to the K6STI computer antenna model, the gain is 5.4 dB over a single dipole when stacked .6 wavelength. The sloping terrain should yield up to an additional 6 dB ground gain at low angles in some directions.

The anticipation is that the beacon will be a great indicator for transpacific propagation when we get into F2. The beacon is approximately 150 miles south of San Diego and should be a good indicator for openings to Southern California. Locals should also be able to hear the backscatter for alerts to openings. On 14 July, the first day of operation with the new antennas, KH6CC reported the beacon to be S9 double hop E into Hawaii.

I would like to thank Peter, W9DHK, Elpidio, XE2ERD, and Paul, N6ZSY(SK) who have helped greatly in the beacon installation. As soon as I repair the EPROM burner, the call XE2ERD will replace XE2UZL on the beacon.

73 de Jack N6XQ.

The following is from VE8HL:

**VE8BY Beacon QRV:** VE8BY/b is QRV as of 0001 03 Jul 98. Frequency is 144.292 FSK, power is 23 watts, and antenna is 8 element folded dipole (SRL-235-2) Grid is FP53rs. Please QSL via the VHF reflector.

### Hawaii To Mainland Activity On The Rise

During the months of late June and early to mid July there were considerable postings on the VHF reflector concerning QSOs between Hawaii and the Mainland. Over several days in mid July there were reception reports of the KH6HME beacon on 2 meters across the West Coast. Additionally, several stations on the West Coast and the western part of the U.S. reported contacts with Hawaiian stations on 6 meters—indicating both sporadic-E and F2 propagation. For more information about the KH6HME beacon, the URL is: <<http://hiloweb.com/kh6hme/index.html>>.

### Fred Link, ex-W2ALU, SK

The following is from ARRL bulletin ARLX005:

Two-way radio pioneer Fred M. Link, ex-W2ALU, of Pittstown, New Jersey, died June 18. He was 93. Link was best known for his role as a maker of two-way radio gear used extensively by police departments and public service agencies and by the armed forces during World War II. He founded the Fred M. Link Company (later Link Radio Corporation) in 1931 and became a fixture in the industry. Beyond that, he was a man of wide-ranging interests, from running a horse farm to being involved in local government, once serving as mayor of Westwood, New Jersey.

Link served as president of the Radio Club of America from 1968 until 1992. Among other honors, the club awarded him its Sarnoff Citation in 1976 and its President's Award in

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1996. Link was a fellow of the IEEE and a founding member of its Vehicular Technology Society. He had served as a member of its board of governors since 1975. The IEEE honored Link with its Centennial Medal in 1984. Early in his career, Link worked for the De Forest Radio Company as assistant chief engineer for the manufacture of transmitting tubes.

Link has said that his early experiences with ham radio helped him to become the leading manufacturer of police radio gear in the 1930s and 40s. He learned Morse code for a Boy Scout merit badge and, during World War I, worked as a relief railroad Morse operator while only 14. He was first licensed as 3BVA and later became 2ALU and finally W2ALU. As 2ALU, he and his friend Johnny Knight, 4DX, were in contact with the Byrd expedition to the South Pole and helped to relay news of the expedition. The pair also shared other ham radio adventures, including a notorious episode where they managed to get themselves evicted from a New York YMCA while operating a station from there for the 1927 ARRL DX Contest because they were interfering with local radio reception.

Link's wife, Mildred, and a daughter, are among his survivors. Contributions to the Fred M. Link Scholarship Fund are welcome to The Radio Club of America, 3 Caro Ct, Red Bank, NJ 07701. (Our thanks to Don Bishop, W0WO, for this information.)

## And Finally

There is a certain level of disappointment in not knowing that the Phase 3D satellite will not be launched any time soon. This

column is being completed the week before the Central States VHF conference, where Bill Tynan, W3XO, is anticipated to be in attendance. Hopefully, there will be some update or more background given out at that conference. Your editor will report on this next month.

Both Bill and Dr. Karl Meinzer, DJ4ZC, AMSAT-DL President and Phase 3-D Project Leader, have contributed countless hours to making the P3D project happen. It is unfortunate that the project has reached this logjam. However, it is important that the leadership of AMSAT proceed with caution, which they are doing, in attempting to get through these launch-related problems. Indicative of the amateur radio community's interest in the success of the launch is the following: AMSAT recently received a note of thanks from Karl. The note reads as follows:

After the announcement about our launch situation, I received a little under 400 letters until now. I wish to express my appreciation for the support and suggestions that were mailed to me, and I find it impossible to answer all these letters individually. All letters I received were very encouraging and not a single real complaint was voiced.

This really taught me two things. The amateur community, and in particular the AMSAT community, is looking forward to the launch of P3-D as a real enrichment to our service and they understand the difficulties in securing a

launch of a 600 kg spacecraft in a highly competitive environment. Second, the people waiting and wanting this spacecraft are a formidable bunch!

I take real encouragement from these letters and it once more has taught me why I am doing all this. So, I want to say thanks for all the expressed support and all the suggestions. I am proud to serve the AMSAT community.

To Karl's above words of appreciation, AMSAT-NA President Bill Tynan, W3XO, and Vice-President Keith Baker, KB1SF, added their thanks for the very strong outpouring of support shown by AMSAT members and others in recent days. "Your comments, helpful suggestions, as well as messages of understanding and support have been most helpful to us as we continue our search to find a safe and affordable launch for Phase 3-D," said KB1SF. "With such strong support within the Amateur Radio community, we can, and will, make it happen!"

If the news about the launch delay is news to you and/or you have not dropped a note of appreciation to either Bill or Karl, you might want to do so. They can be reached by e-mail via their AMSAT addresses: <w3xo@amsat.org> and <dj4zc@amsat.org>, respectively. I am sure that they would very much appreciate hearing from you.

Until next month . . .

73 de Joe, N6CL

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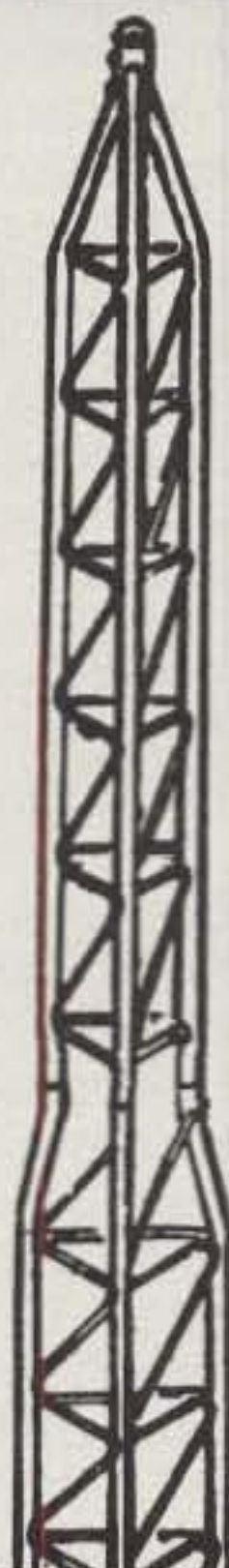
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# CONTEST CALENDAR

NEWS/VIEWS OF ON-THE-AIR COMPETITION

## Debating The Role of Guest Operating

### September's Contest Tip

This month's tip is focused on safety. Most contesters finally get serious about their antenna work around this time of year as the contest season approaches. Often tower work is major part of the task list. If you haven't climbed your tower lately, take a few minutes to inspect your guy wires. There's nothing more frightening than climbing a tower to discover a large tree limb is hanging on one of the guys, or worse, discovering a major problem at one of the guy anchors—while you're on the tower. An extra ten minutes work may mean thousands more QSOs in the future. Be careful this fall!

**A**s you'll read in this month's CQ WW SSB Contest results, many contesters place a high value on operating from their own stations—stations that have been designed, built, and maintained by one person. My experience in this area benefits from seeing both sides of the coin.

In the mid-1980s, I used to operate nearly all the time from my own station in Billerica, Massachusetts. It was a simple station by today's standards—one tower with monobanders and a few wires hanging off the top. Fortunately, it was also a magic location (in a valley, believe it or not), and I was able to win a few contests from there.

In recent years, and especially since my move back to New Hampshire, it has not been practical to construct a large contest station. My current situation is not unlike many other contesters' circumstances. Let's face it: Not all amateurs have the time and resources to build the next contest superstation (at least I have the land!).

If your goal is to operate competitively, what are you to do? Herein lies the topic for this month's discussion.

In talking to many people over the years, I've found there are wide-ranging opinions on this topic. The hardliners feel that you should always operate from your own station and that use of someone else's sweat and toil is inappropriate. There may be some truth to that. You, at the very least, have to ask whether or not it's completely fair for someone to enjoy the same accolades by driving to a "turn-key" station on Friday afternoon versus

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e-mail: K1AR@contesting.com

### Calendar of Events

Aug. 29-30	Hawaii QSO Party
Sept. 5-6	All Asian SSB Contest
Sept. 5-6	LZ DX Contest
Sept. 6	NA CW Sprint
Sept. 6	Panama Anniversary Contest
Sept. 9-11	YLRL Howdy Days Contest
Sept. 12-13	WAE SSB Contest
Sept. 13	NA SSB Sprint
Sept. 19-20	SAC CW Contest
Sept. 19-20	Air Force Anniversary QSO Party
Sept. 19-20	Washington State Salmon Run
Sept. 19-20	QCWA QSO Party
<b>Sept. 26-27</b>	<b>CQ WW RTTY DX Contest</b>
Sept. 26-27	SAC SSB Contest
Oct. 3-4	VK/ZL Oceania SSB DX Contest
Oct. 3-4	California QSO Party
Oct. 4	RSGB 21/28 MHz SSB Contest
Oct. 7-9	YLRL Anniversary Party
Oct. 10-11	VK/ZL Oceania CW DX Contest
Oct. 10-11	Pennsylvania QSO Party
Oct. 17-18	Worked All Germany Contest
Oct. 18	RSGB 21/28 MHz CW Contest
Oct. 18-19	Illinois QSO Party
<b>Oct. 24-25</b>	<b>CQ WW SSB DX Contest</b>
Nov. 7-9	ARRL CW Sweepstakes
Nov. 21-23	ARRL SSB Sweepstakes
<b>Nov. 28-29</b>	<b>CQ WW CW DX Contest</b>

someone who has been climbing towers for five summers in a row in a concerted effort towards personal achievement.

There are other considerations. The most obvious gray area is when the station malfunctions during a single operator contest effort. Is it fair to make the guest operator figure out the design and intricacies of the host's station on little or no sleep? Conversely, is it equitable for the host to busily repair a problem while the guest continues to operate? When operating from your own station and a problem develops, there is no one, short of a very cooperative spouse, who is going to help. At the very least, you stand to lose unrecoverable operating time. I think the answer is obvious: It's not really fair.

Fortunately, over the years I've been very lucky to not have any catastrophic situations occur as described above while I've been guest operating. But this scenario makes you think. What if you lose a contest by 15 QSOs to a "guest operating competitor" and those contacts were lost because you were at 90 feet on a tower Sunday afternoon fixing a sticky relay on your 20 meter stacks?

Even if contest adjudicators (I've always wanted to use that word.) included language in the rules that prevented host

operator intervention for station malfunctions, it would be very difficult to enforce. Even more disconcerting would be a rule preventing someone from operating at another contesters' station. This is a complicated subject indeed. The contest world certainly does not need another operating category. Imagine the burden of figuring out the winner of the Single Operator, CW, QRP, Assisted, 20 meter single band, guest operator category?

We all can agree that it's not a perfect world, and the scenarios that can come out of this topic should be something to be discussed and considered. I personally feel that the fairest solution resides with the operator—period! It actually begins well before the contest. If practical (and as a host operator, I would expect it), the guest should be involved in the development and maintenance of the station. In other words, the guest should have a vested interest in the performance of the hardware, too! However, it becomes more complicated during the heat of battle. I suggest, as a guideline, that guest operators at the very minimum should have responsibility for fixing problems that are understood and practical.

A little common sense applies here. For example, it should be the job of the guest operator to retrieve a replacement amplifier from the trunk of his car and install it rather than the host giving you the luxury of continuous operating time by doing the dirty work. I believe the same applies to outside work—especially if you have been involved in the construction of the station. The sticky relay problem should be solved by the guest, not the host. Put in general terms, host operators are not there to maintain continuous operating time for the guest. They are there to provide an operating venue and a little alternating current for the equipment.

Now I know you're thinking about the many other advantages that come from operating at someone else's station. Who should cook the food? Is it fair for the host to make sure you are awake at 1000Z on Sunday morning? Does the very presence of a "cheerleader" in the shack give you a motivational advantage? The bottom line on this topic is to be extremely cognizant as a guest operator of any advantage given to you by the presence of your host. The solution, although not perfect, is to try to operate under the same circumstances that you would encounter at home. Wake-up calls by your wife or a gracious host

are probably the same thing in my book. A good hot meal cooked by your girlfriend or host is also similar. In contrast, asking your host to climb his tower to manually move the Tailwister rotator off the south limit switch or drive around the neighborhood looking for line noise is another matter. Do you have opinions on this complex topic? I'd like to hear from you!

### Final Comments

That's it for this month. I'm out of space and time. Remember to send your contest calendar submissions to me for the December issue no later than October 1st.  
73, John, K1AR

### Panama Anniversary Contest

0001Z to 2400Z Sunday, Sept. 6

The Panama Radio Club invites all radio amateurs of the world to participate in the XXVII Anniversary Contest.

**Class:** Single Operator, All Band, SSB only, 40, 20, and 15 meters.

**Exchange:** RS and serial number (e.g., 59001).

**Scoring:** HP club members are 2 points; all other stations are 1 point. The multiplier is the total number of DXCC countries worked on all bands. Final score is total QSO points times multiplier.

**Awards:** Certificate of participation will be sent to all amateurs that work 5 or more HP stations. HP stations must operate for at least 6 hours to be eligible for awards. A plaque will be awarded to the station with the high score from each continent.

Logs must be postmarked by December 1st and sent to: Radio Club Panama, Anniversary Contest, P.O. Box 10745, Panama 4, Panama.

### Bulgarian DX Contest

0000Z Sat., to 2400Z Sun., Sept. 5-6

The Bulgarian Federation of Radio Amateurs holds this activity the first weekend in September each year. It's on CW only, all five bands, 10-80 meters, using the IARU Region 1 band plan.

**Classes:** "A"—Single Operator, All Band; "B"—Single Operator, Single Band; "C"—Multi-Operator, All Band, Single Transmitter; "D"—SWL.

**Exchange:** RST and ITU Zone.

**Points:** QSOs with LZ stations, 6 points. QSOs with other stations in the same continent, 1 point; in other continents, 3 points. SWLs must show calls of both stations heard. Score 3 points if both exchange numbers are copied; 1 point if only one is copied.

**Multiplier:** Total ITU Zones worked on each band.

**Final Score:** Total QSO points from all bands times the sum of the multiplier from each band.

**Awards:** Classes "A" and "C"—Cups and medals to the three top world scorers and medals to the three continental leaders in each continent. Class "B"—Medals to the top three scorers on each band in the world. Class "D"—Medals to top three. A special plaque will go to the first of the top ten list in categories "A" and "C."

**Logs:** Use a separate sheet for each band, a summary sheet showing the scoring, and the usual signed declaration.

Mailing deadline is 30 days after the end of the contest: Central Radio Club, P.O. Box 830, 1000 Sofia, Bulgaria. Logs may also include applications for the many

BFRA awards: NRB, W-100-LZ, 5 Bands LZ, W-28-Z, Black Sea, and Sofia awards.

### YLRL Howdy Days Contest

1400Z Wed., Sept. 9 to 0200Z Fri., Sept. 11

This annual event is sponsored by the Young Ladies Radio League (YLRL) and is open to all licensed women operators around the world. All amateur bands may be used. Any type of emission may be used (SSB, CW, etc.). A station may be worked only once on each band for contact points. No crossband, net, or repeater contacts are allowed. Maximum allowable

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**Scoring:** Score two points for each YLRL member contacted. Score one point for each non-YLRL member contacted. For each duplicate contact that is removed by the YLRL vice-president, a penalty of three additional and equal contacts will be exacted. There are no multipliers.

**Awards:** Top-scoring YLRL member will receive her choice of YLRL pin, charm, or stationery. In addition, the top-scoring non-YLRL member will receive a one-year YLRL membership certificate.

All log entries should be sent to: Nancy Hall, KC4IYD, P.O. Box 775, N. Olmsted, OH 44070-0775. Logs must be post-marked no later than 30 days after the end of the contest.

### ARRL VHF QSO Party

1800Z Sat., to 0300Z Mon., Sept. 12–14

All bands, 50 MHz and up, can be used for this one. Details can be found on the ARRL Web site at <[www.arrl.org](http://www.arrl.org)>. It is recommended that you send for official summary and log sheets. A large SASE will get you a supply. Address your request to the ARRL VHF Party, 225 Main St., Newington, CT 06111.

### Scandinavian Activity Contest

CW: Sept. 19–20 Phone: Sept. 26–27  
 1500Z Saturday to 1800Z Sunday

It's the world working in this 40th Scandinavian Activity Contest (SAC). The same station may be worked on each band for QSO and multiplier credit. The prefixes used in Scandinavia are: LA, LB, LG, LJ (Norway); JW (Svalbard & Bear Is); JX (Jan Mayen); OF, OG, OH, OI (Finland), OF0, OG0, OH0 (Åland Is.); OJ0 (Market Reef); OX (Greenland); OY (Faroe Is.); OZ (Denmark); SJ, SK, SL, SM, 7S, 8S (Sweden); and TF (Iceland).

**Classes:** Single Operator and Multi-Operator Single Transmitter, All Band only. Multi-Operator must remain on the same band for at least 10 minutes (Exception: A station may be worked on another band if it is a new multiplier, only). Also, QRP Single Operator (maximum of 10 watts output) and SWL (only SAC stations may be logged).

**Bands:** 3.5, 7, 14, 21, 28 MHz according to IARU band plans; 3560–3600, 3650–3700, 14060–14125, and 14300–14350 kHz should be kept free of contest activity.

**Exchange:** RS(T) plus a QSO number starting with 001.

**Scoring:** European stations score one point for each SAC contact. Non-Europeans score one point on 14, 21, and 28 MHz, and three points on 3.5 and 7 MHz.

**Multiplier:** Each call area in the above list of SAC countries worked on each band (call areas, not prefixes).

**Final Score:** The sum of QSO points from all bands times the sum of the multipliers worked on each band. Scoring for SWLs same as above.

**Awards:** Certificates to the winning station in each class, both CW and phone, in each country and each U.S.A. call area. QRP stations will be listed in one common list. The non-SAC SWL winner will be awarded. Plaques will be awarded to the top-scoring station in each continent. Depending on the number of participants, the Contest Committee may consider additional awards.

The usual disqualification criteria will be observed. Include a summary sheet and a dupe for logs with more than 200 QSOs, and a signed declaration. Logs may also be submitted on MS-DOS diskettes in either ASCII format or the accepted ARRL contest log standard. If you send your log on disk, paper logs are not required. Summary sheet must always be on paper. All disks must be clearly labeled with call, contest name, class, and date of the contest. CW and SSB portion can be on same disk. A SASE is needed if you want your disk returned.

Mailing deadline for all logs is no later than October 31st. Send all entries to: SAC Contest Manager, Jorgen Romming, OZ1JSH, Gammelgards Allé 1 st. tv., DK-2665 Vallensbaek Strand, Denmark. E-mail logs go to: <[sac@contesting.com](mailto:sac@contesting.com)>.

### Air Force Anniversary QSO Party

0001Z Sat., Sept. 19 to 2359Z Sun.,  
 Sept. 20

The purpose of this annual event is to create an on-the-air gathering of as many active and former members of the Air Force as possible for a weekend of fellowship and in remembrance of all those who served. Operation is permitted on all bands and modes.

**Scoring:** Score contacts by "point identifier." Stations with licensees with no Air Force affiliation have a point identifier of 1, are worth one point, and would identify with the suffix "Air Force One" on phone or "/AF1" on CW or digital modes. If the licensee is a U.S. Air Force veteran, member, or retiree (of any component, active, Air National Guard, or AF Reserve), point

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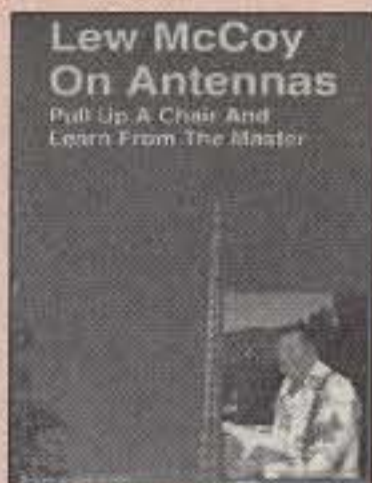
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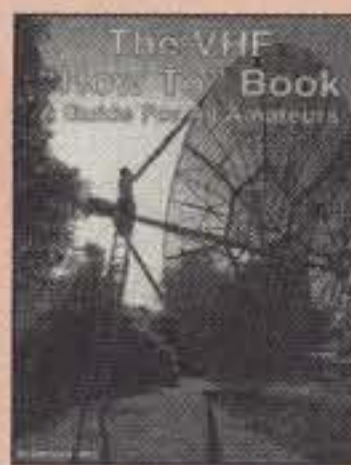


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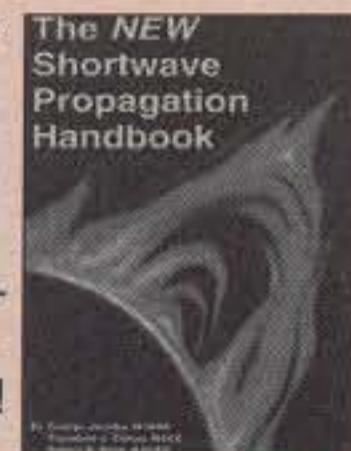
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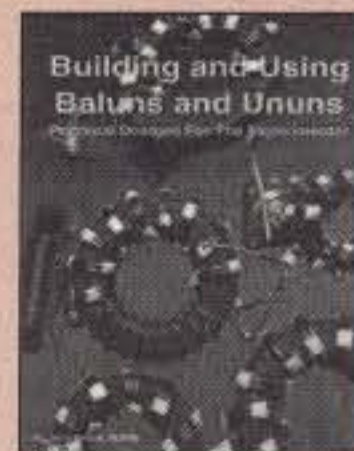
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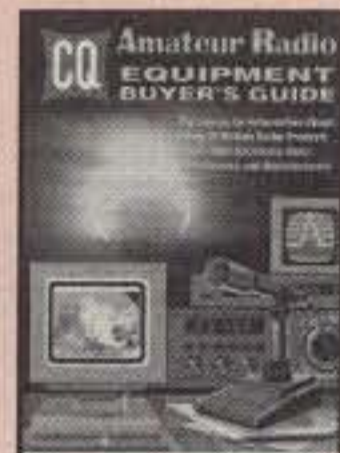


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identifier is determined by subtracting the year the licensee entered the Air Force from 1998. For example, if he or she entered the Air Force in 1947, the point identifier is 50 (1998-1948 = 50), and they would ID "AF/50." If he or she entered in 1963, the point identifier is 34 (1998-1964 = 34), and they would identify "AF/34." Note that the duration of Air Force service is insignificant; the point identifier value is determined solely by the year the member entered the Air Force. Obviously, the most sought after stations will be those brave men and women who entered the Air Force in 1947, whose point identifiers will be "50" and whose contacts are worth 50 points. Add total point identifiers for all qualifying contacts.

This year a multiplier is being added. Multipliers are determined by counting the number of different point identifiers worked and multiplying your score by that multiplier. For example, if you work four stations with point identifiers of "AF8," "AF22," "AF8," and "AF4," you would determine your final score by first adding together all of the point identifiers (8+22+ 8+4B) and then multiplying that number by three (since you worked three different point identifiers: AF8, AF22, and AF4), for a final total of 126 (42 x 3 = 126). (Note that you can count each identifier only once for the multiplier. So in this example, you can count "AF8" only once as a multiplier, even though you worked two "AF8" stations.)

This new scoring scheme should encourage more "hunting" for even the smaller point identifiers, since it will be in the best interest of participants to work as many of the 51 different point identifiers (AF1 through AF51) as possible.

Stations may be worked multiple times on the same band if the contacts are on different modes, but only once on each band if on the same mode. Stations may be worked and scored on multiple bands.

**Bonus Stations:** New point bonuses are available for working stations operating from the premises of Air Force installations worldwide. All stations (club or individual) operating within the boundaries of an Air Force base will identify the name of the base they are on. For example, K5TYP (the Mississippi winner for 1997) will identify "K5TYP, Air Force 51, Keesler Air Force Base." The Razorback Radio Club station located on Hickam Air Force Base will identify "K5HOG, Air Force 24, Hickam Air Force Base." For each of those stations you work (even if more than one are on the same base), you may count their usual point identifiers (and use them to compute the multiplier above) and also earn a bonus of 100 points per station to be added to your final score. If you work four stations located on AF bases, you may add 400 points to your score.

**Final Score:** To summarize how 1998 final scores will be computed, you will:

*Step 1:* Add the total of all point identifiers of all stations worked; *Step 2:* Count the number of different point identifiers worked, and multiply your score in Step 1 by that number (maximum multiplier will be 51); *Step 3:* Count the number of stations worked which were operating from Air Force installations, and add 100 points for each of those stations to determine your final score. A scoring worksheet is available for download on The Razorback Radio Club Web site: <<http://ourworld.compuserve.com/homepages/k5xs>>.

**Awards:** A trophy (plaque) with Air Force 50th Anniversary logo signed by the Headquarters, United States Air Force Director of Communications and Information (Lt General William Donahue) will be awarded to the overall winner. Certificates (signed and with AF 50th logo) will be sent to the top three finishers in each state and country.

Logs are to be postmarked by 15 October 1998 and sent to: K5HOG, Razorback Radio Club, 604 Julian Avenue, Honolulu, HI 96818. Logs must have station worked, date, time, mode, band, and point identifiers for each contact. **Points must be totalled on each page to be accepted.** Neither accepted nor rejected log sheets will be returned unless accompanied by a suitable SASE. Direct all questions to: Bernie Skoch, K5XS, Colonel, US Air Force Director of Communications and Information, Headquarters Pacific Air Forces, 604 Julian Avenue, Hickam Air Force Base, Honolulu, HI 96818. Electronic logs may be submitted (ASCII-only) to: <[k5hog@aol.com](mailto:k5hog@aol.com)>.

### CQ/RJ WW RTTY Contest

0000Z Sat. to 2400Z Sun., Sept. 26-27

This is the annual running of the CQ/RJ WW RTTY Contest, and from the response to last year's contest, it has become one of the major RTTY competitions.

**Bands:** All five bands, 10 through 80 meters.

**Classes:** Single Operator, Single and All Band, and Single-Op Assisted All Band only. Multi-Operator, Single Transmitter, All Band only. Keep in mind that competitors in all categories may operate the entire 48-hour contest period.

**Exchange:** RST, state or VE area, and CQ zone for stations within the 48 continental U.S. states and 13 Canadian areas. All others send RST and CQ zone.

**Points:** One for contacts within own country. Two for contacts outside own country but same continent. Three for contacts outside own continent.

**Multiplier:** One for each state (48) and VE area (13). One for each DX country (ARRL and WAE list). One for each CQ zone (40). All of the above on each band.

**Final Score:** Total QSO points from all

bands times the sum of the multiplier from each band.

**Awards:** Plaques to the first-place winners in each operator classes. Certificates to second and third place. Certificates to first-place finisher in each DX country.

Complete rules were published in the July issue of *CQ*. The standard *CQ* log and summary sheets are recommended. Sample forms are available from *CQ*. Include an SASE (or IRC) with your request. All entries must be postmarked no later than December 1st. An extension may be given upon a written request. Low power logs go to: *CQ* RTTY Contest, Roy Gould, K1RY, P. O. Box DX, Stow, MA 01775 USA. High power logs should be sent to: Ron Stailey, K5DJ, 504 Dove Haven Drive, Round Rock, TX 78664-5926, USA. Requests for log forms, only, go directly to *CQ*.

### Washington State Salmon Run

1600Z Sat., to 0700Z Sun., Sept. 20-21  
1600Z to 2400Z Sun., Sept. 21

This popular state QSO party is sponsored by the Western Washington DX Club and is open to amateurs worldwide on SSB and CW.

**Classes:** Single or Multi-Operator, Single Transmitter. Also, entrants may operate QRP, low power (200 watts or less), or in the open category on SSB, CW, or mixed modes. There will be a special competition among Washington State Clubs in the Multi-Single category.

**Exchange:** RS(T) and QTH (state/province/DXCC country or Washington state county).

**Scoring:** Count 2 points for SSB and 3 points for CW. QSOs with CW Novice/Technicians are worth 6 points. The multipliers are Washington counties (maximum 39) or state/provinces/DXCC countries for Washington state stations. Credit multipliers only once per mode on multiple bands. Final score is total QSO points times multiplier. Low-power stations multiply score by 2 and QRP by 3.

**Frequencies:** CW—1805, 3530, 7030, 14050, 21050, and 28050. SSB—1815, 3925, 7260, 14280, 21380, and 28380. Novices—3700, 7125, 21150, and 28160.

**Awards:** The highest scorers in each DX country and US call area will receive a package of Pacific Northwest smoked salmon. Certificates will be available for other category winners. A participation certificate will be awarded to each log submitted (50 QSOs [US], 25 QSOs [DX], 100 QSOs [Washington state] minimum). A special award will be given to the highest Washington club score.

The mailing deadline for logs is October 31st. Logs can be sent to: W7FR, Western Washington DX Club, P.O. Box 395, Mercer Island, WA 98040.

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# AWARDS

## NEWS OF CERTIFICATE AND AWARD COLLECTING

This month we continue on with the tradition of featuring the background of one of the recipients of CQ's prestigious USA-CA All Counties Award. Here is the story of:

### Thomas Horton, K5IID, USA-CA #661

I guess there is something to be said for working all the counties as rapidly as possible, but in taking over 30 years to do so, I think I am luckier than those who have done it so quickly. Too many just work them all and go away. Some do hang around, but many just leave. I, on the other hand, have been around to work Cliff Corne all the way up to today. Just think of all the fantastic people who have been a part of county hunting since its inception. I have known or at least worked nearly all of them. How lucky can you get?

My county hunting began before I knew there was such a thing. In fact, it may well have been before there really was such a thing. It was certainly before there was any organized county hunting.

If we go back to 1958 or so, 15 meters was a pipeline from north Texas to the northeastern part of the US in the afternoons and evening. K5IHD and I used to get on AM and work "new" counties to try to receive the awards that were then issued for working all the counties in New England, New York, New Jersey, and Pennsylvania. Donn and I played this game throughout high school and never quite finished our goal. After high school, there was work, college, and the military obligation. Ham radio took its first back seat in my life, and so did county hunting. After all, the USA-CA Award had not even been instituted by CQ magazine and Cliff Evans yet. Besides, how could you possibly work every county in the US. Why, some of them didn't even have amateur radio operators in them.

When I returned from Vietnam in the mid-sixties, I found out about the CHC (Certificate Hunter's Club) net on 80 meters, and being a CHC certificate holder, I decided to stop by and see what was going on. To my surprise, they were chasing counties—all counties, not just New England. This is where I belonged.

I began checking in nightly and often took net control in the late evening and early morning hours. That was probably the cause of my being late for work at times—too many times.

65 Glebe Road, Spofford, NH 03462-4411  
e-mail: k1bv@top.monad.net

### USA-CA Special Honor Roll

Kermit Gay, K4XI  
USA-CA All Counties #948  
June 8, 1998

Rufus Burdet, KD4HXM  
USA-CA All Counties #949  
June 23, 1998

Several of these operators went ahead to get their numbers and some still show up on the net sometimes. It's always good to hear from them.

After a couple of years, I moved to an apartment and got married, too. Well, this was back seat number two, and I was off the air for a few years. Finally, we moved to a rental house where the landlord (my wife's uncle) was sympathetic and allowed me to erect some simple antennas. I restarted my quest for the then ultimate certificate of them all.

By this time several amateurs had in fact worked all the counties, and I then realized it could be done. Soon the 20 meter Independent County Hunters Net began, and you could work mobiles all day long, not just at night on 80. I belonged there, too.

Soon after the net really got rolling, Dave, W6CCM, started the Mobile QSL Bureau and came up with an affordable means to get the confirmations. It was a wonderful thing, because now I was a college student again, with little to spend on postage. The net, however, was probably the reason for my missing classes or being late for class at times—too many times.

I started a new job, and we moved to west Texas, where I really got active on the net again. I did quite a bit of mobiling around west Texas and the eastern part of New Mexico and was able to give out a lot of last counties. However, I still hadn't worked them all.

Several years later we transferred back to Ft. Worth, and I began a job that was going to take me to China for a few years. I, of course, took a receiver with me, and hoped to be able to operate one of the club stations from there. In fact, I was able to operate from BY1QH any time I was in Beijing. I was the first ex-pat to operate a whole contest from China without them looking over my shoulder. One of my first contacts in preparation for the 1986 CQ WW SSB Contest was none other than K2NJ, another old county hunter buddy. But that's another story (see *CQ Contest* magazine, January 1998 issue). I tried many times to hear the net from China,

### USA-CA Honor Roll

500		2000	
KD9ZP.....	3024	KJ8F.....	1129
DL5MC.....	3025	K4XI.....	1130
K4XI.....	3026	KD4HXM.....	1131
KD4HXM.....	3027		
1000		2500	
K4XI.....	1476	K4XI.....	1057
KD4HXM.....	1477	KD4HXM.....	1058
1500		3000	
DJ4GJ.....	1228	K4XI.....	966
K4XI.....	1229	KD4HXM.....	967
KD4HXM.....	1230		

The total number of counties for credit for the United States of America Counties Award is 3076. The basic award fee for subscribers is \$4.00. For nonsubscribers it is \$10.00. To qualify for the special subscriber rate, please send a recent CQ mailing label with your application. Initial application may be submitted in the USA-CA Record Book, which may be obtained from CQ Magazine, 25 Newbridge Road, Hicksville, NY 11801 USA for \$2.50, or by a PC-printed computer listing which is in alphabetical order by state and county within the state. To be eligible for the USA-CA Award, applicants must comply with the rules of the program as set forth in the revised USA-CA Rules and Program dated March 1, 1997. A complete copy of the rules may be obtained by sending an SASE to Ted Melinosky, K1BV, 65 Glebe Road, Spofford, NH 03462-4411 USA. DX stations must include extra postage for airmail reply.

but the sunspot cycle was at a minimum and it was impossible.

After the China job was over, we moved again, this time to Denver, where I was on the road constantly throughout Colorado, New Mexico, Texas, Wyoming, and Utah, with forays at times into the states bordering them. I didn't have a "real" mobile radio, just the old Omni that I had been using for quite a while by then. I just put the radio on the front seat of the company Suburban, plugged in the Texas Bug-catcher, and took off. The radio and the net kept me company on nearly all of my trips. Carl, W9OO (ex-WA9PQY and KF9FU), was a nocturnal creature as was I, and if I was mobile late at night, he was usually there to keep me company and maybe he got a few new counties along the way.

After about a year my company merged with another and my job in Denver was dissolved. I was transferred to Farmington, New Mexico. Not long after I had erected some antennas there, I ran into a familiar call on 20 meter CW. It was Quint, K5TVC. Although Quint didn't remember me, I recognized his call as being the one I had counted for San Juan county. We became friends, and I guess I started him down the road of county hunting. He became quite active on the net for a while and got his USA-CA All Counties, too.

I finally finished All Counties while I was in New Mexico and received #661. I decid-



ed to do it again, but this time a bit differently. I am currently working for All Counties, All CW, All QRP, and also 5-Band USA-CA. Obviously, you can't work 5-Band USA-CA by staying on 20 meters, so I spend a lot of what time I have on the other bands. I operate a lot of contests and find that a very good way to work counties on different modes and bands.

Before the advent of the computer data bases, I used to go through the contest logs, look up the call in the call book, write down the city for each contact, refer to my atlas, determine the county, check the USA-CA Record Book, and if it was a new one, send out a card along with an MRC and hope for the confirmation. I have found that if you send an MRC and an SASE to casual or contest QSOs, the return rate is pretty good. It can get to be expensive, however.

USA-CA is not the only award that interests me, I am on the WPX Honor Roll, and have 5-Band DXCC, WAZ, and many more. I am active in DXing as well as in contesting.

I have been transferred three times since New Mexico, and now live in West Virginia—at least when I am not working. I work in Algeria and travel back to the Mountain State. I work 28 days on and 28 days off. I am trying to get a license over there and maybe someday that will happen, but it's not easy. If I do get a ticket, you can be assured that I will be on the net. I can hear it from here occasionally. While I am home, I try to stop by the net from time to time to say hello to the many friends that I have met over the years. There are very few county hunters who have been around as long and been as fortunate as I have to meet so many good people, and a few old soreheads, too. Hi!

One of the highlights of my radio career was at Dayton a few years ago. In one weekend I got to meet personally KF9FU (now W9OO), I6FLD, N4ANV, and AL7EL (ex-K4TSJ, now K8XP, one of the stalwarts from the old 20 meter net in the early 70s). I was able to meet many other county hunters that weekend, but these were fellows who had been "on-the-air friends" for many years and whom I had never met in person. It was quite a weekend for me.

Obviously, I could not have been involved in all the radio activities throughout the years without the understanding of my wife of 28 years, Candy, and my two daughters, Deedee and Parrish. I thank them for their support and help. Candy even used to log for me while mobile, whenever she was along.

County hunting has been a part of my life for over 40 years, and I expect and hope that it will be for many years to come.

73, Tom, K5IID

*(Tom e-mailed me from his overseas job in Algeria (7X2) and is energetic*

*enough to now be working on USA-CA via all CW, all QRP, and on 5 Bands.—ed.)*

### New County Logging Program

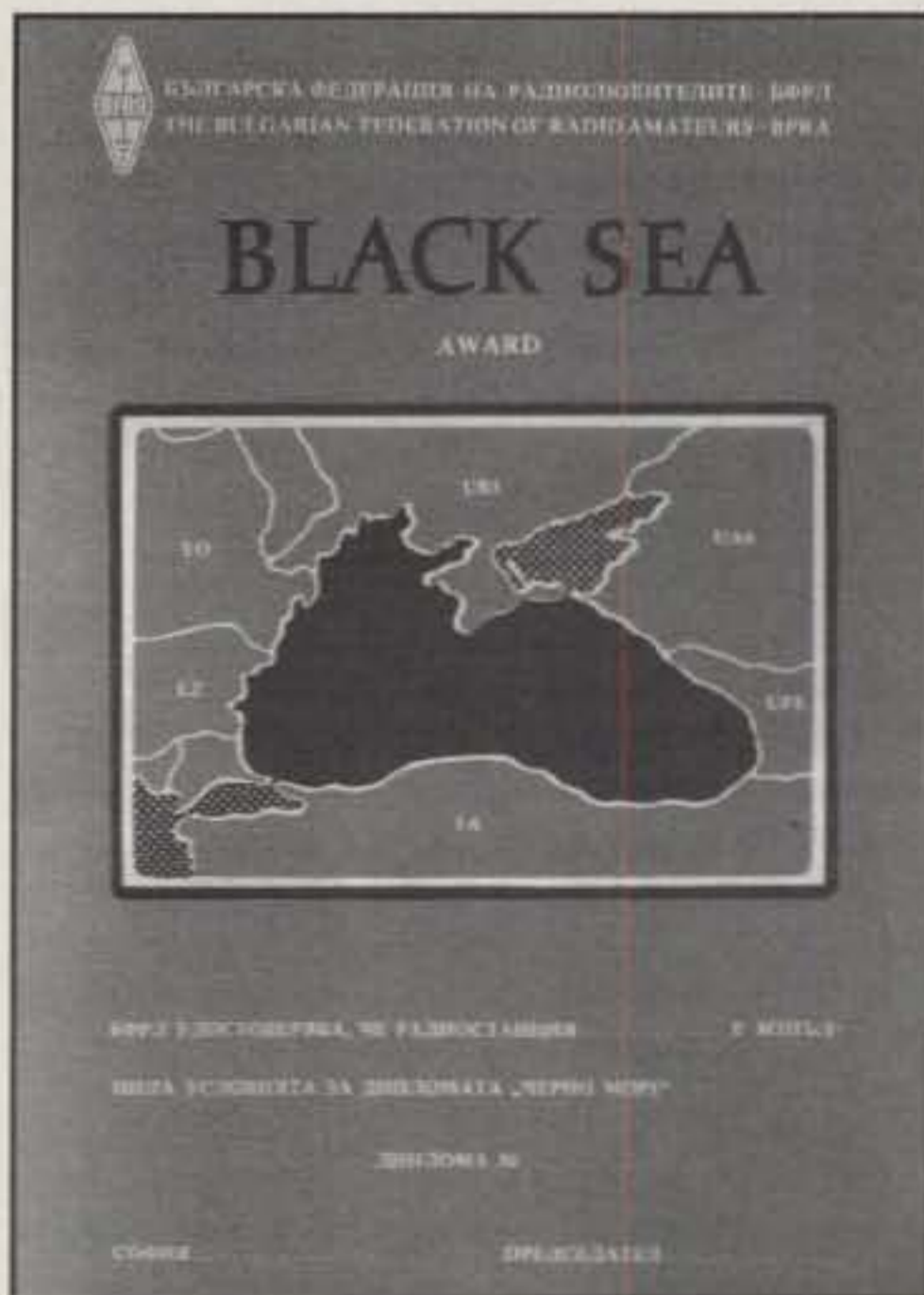
CQ's USA-CA rules have been changed to allow any and all submissions to be made via a computer-printed list. The operator and witness certification are still needed in any reasonable format that provides all the data listed in various editions of the county record books.

Here is a new logging program which might be of interest. Gene Olig, KD9ZP, is a retired programmer and active county hunter who has developed a Windows 95® County Hunters Logging Program which he offers free of charge. It requires that your PC have the Microsoft database program "ACCESS" installed, since it is used for the database and printing of reports and MRC cards. Write to Gene for further details, and certainly offer to send diskettes for the code: Gene Olig, KD9ZP, W4325 Fourth St. Road, Fond du Lac, WI 54935.

### BFRA Awards Program

This month features the complete awards series of BFRA, the Bulgarian Federation of Radio Amateurs. The awards are well designed, reasonably priced, and are attention getters for your shack with their bold Cyrillic lettering. Bulgaria has long been a hotbed of DX contest activity, which makes earning some of the awards fairly easy to accomplish. I've always found the BFRA to be very good about responding to inquiries.

**General requirements.** The awards are available for two-way contacts or SWL on CW, SSB/AM, or mixed modes. GCR lists are accepted. Fee for each award is 10 IRCs. Apply to: BFRA, P.O. Box 830, Sofia 1000, Bulgaria.



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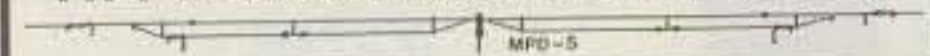
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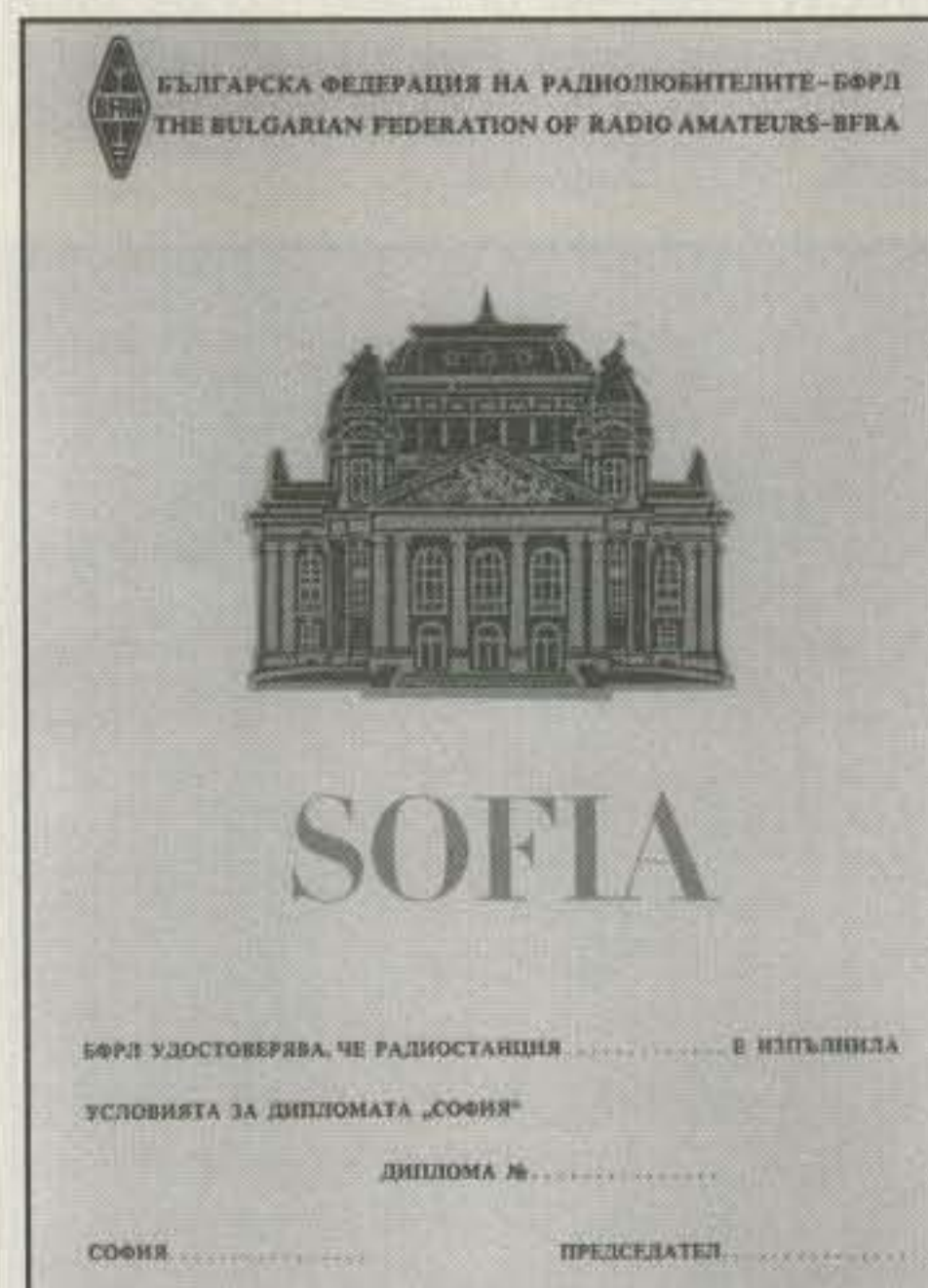


CIRCLE 77 ON READER SERVICE CARD

**Black Sea Award.** Make 60 contacts with different amateur stations located in countries bordering the Black Sea. A minimum of one QSO is required with each of the following countries: LZ, TA, YO, Ukraine, UF/4L Georgia, UA6A/UA6L. Contacts must have been made after 1 January 1979.



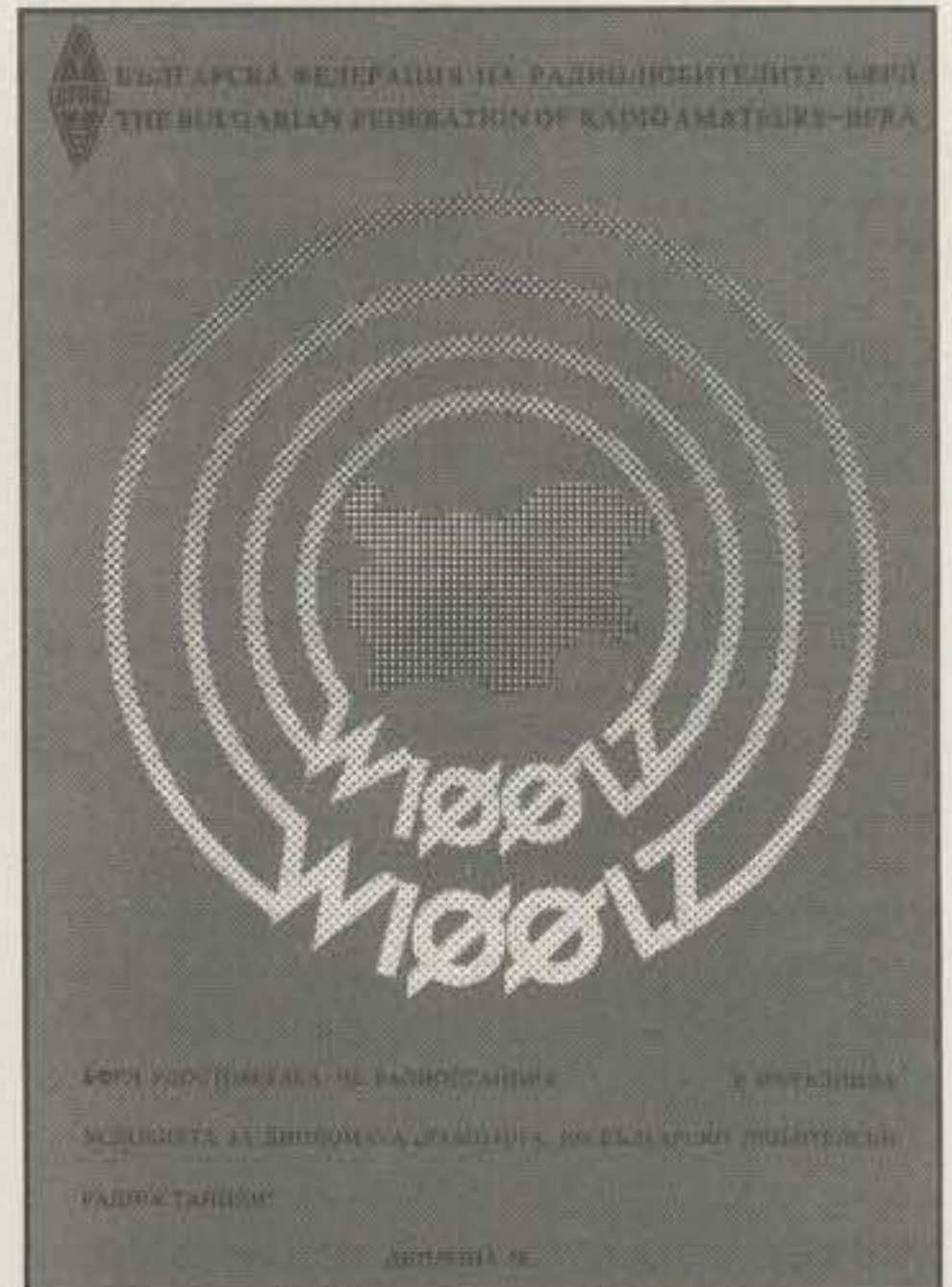
**Republic of Bulgaria Award.** Work Bulgarian stations since 1 January 1965. Europeans need 5 contacts with LZ1/LZ3 stations and 5 contacts with LZ2/LZ4 stations on the 80 and 40 meter bands; total of 20 contacts. All others need 10 contacts with LZ1/LZ3/LZ5 and 10 with LZ2/LZ4/LZ6 with no band restrictions; total of 20 contacts.



**Sofia Award.** Earn 100 points for contacts with stations located in Sofia, the capital of Bulgaria, after 1 January 1979. Points earned are calculated as follows:

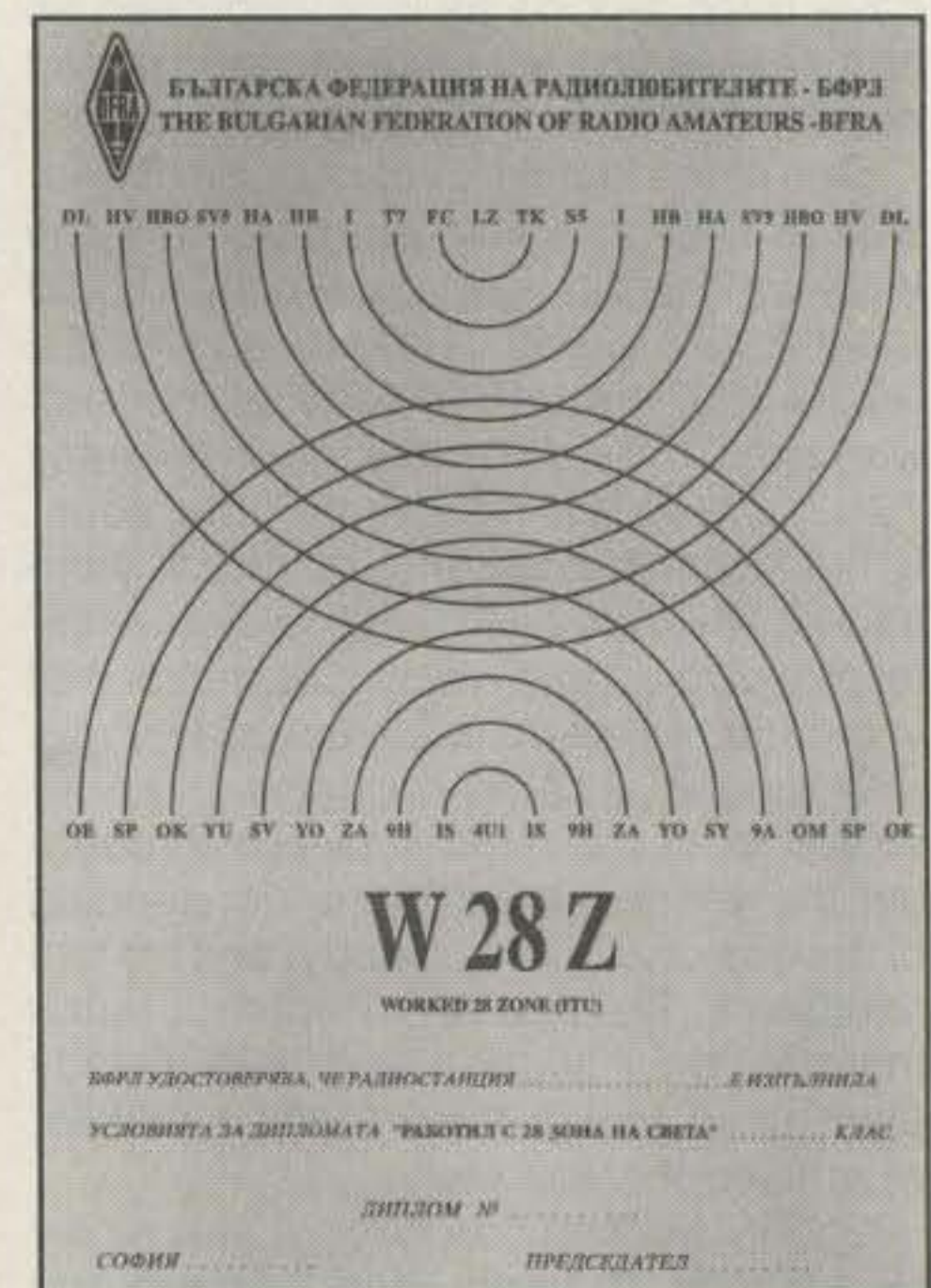
<b>Band</b>	<b>3.5</b>	<b>7</b>	<b>14</b>	<b>21</b>	<b>28</b>
EU applicants	2	2	1	2	2
All others	15	5	1	2	3

Report with same station only once per band regardless of mode.



**W 100 LZ Award.** Make 100 contacts with different LZ's during one calendar year, after 1 January 1979.

**W 28 Z ITU Award.** Contact the following countries of ITU Zone 28 after 1 January 1979: DL, DL7/W.Berlin, TK, HA, HB9, HB0, HV, I, IS, LZ, M1/T77, OE, OK, OM, S5, SP, SV, SV5, SV9, SY, YO, YU, ZA, 1A0, 4N4, 4U (Vienna), 9H, and 4U1ITU (Geneva)

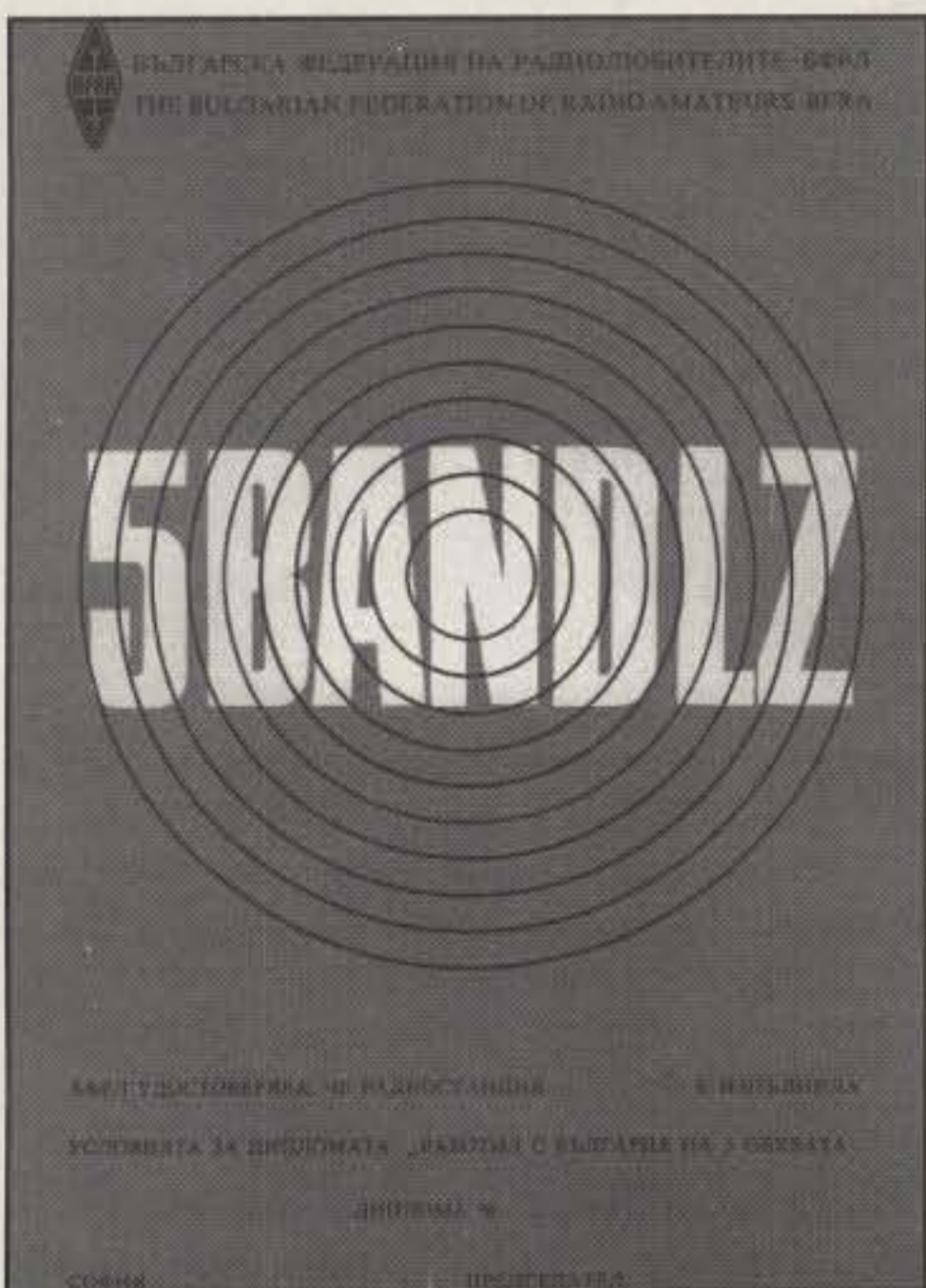


The award is issued in three classes:  
**Class 1:** 28 different stations in 20 above-listed countries.  
**Class 2:** 28 different stations in 16 above-listed countries.

Class 3: 28 different stations in 10 above-listed countries.

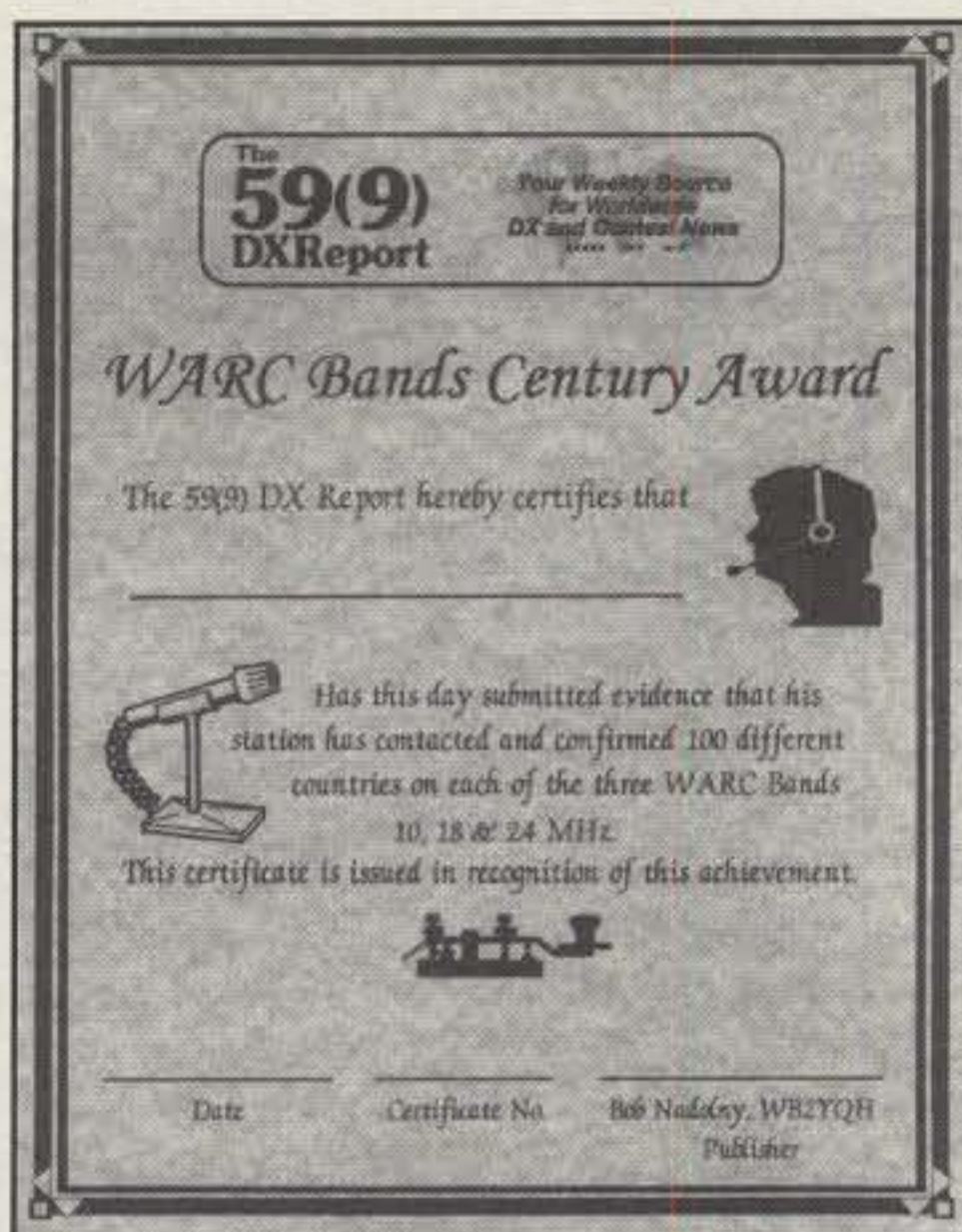
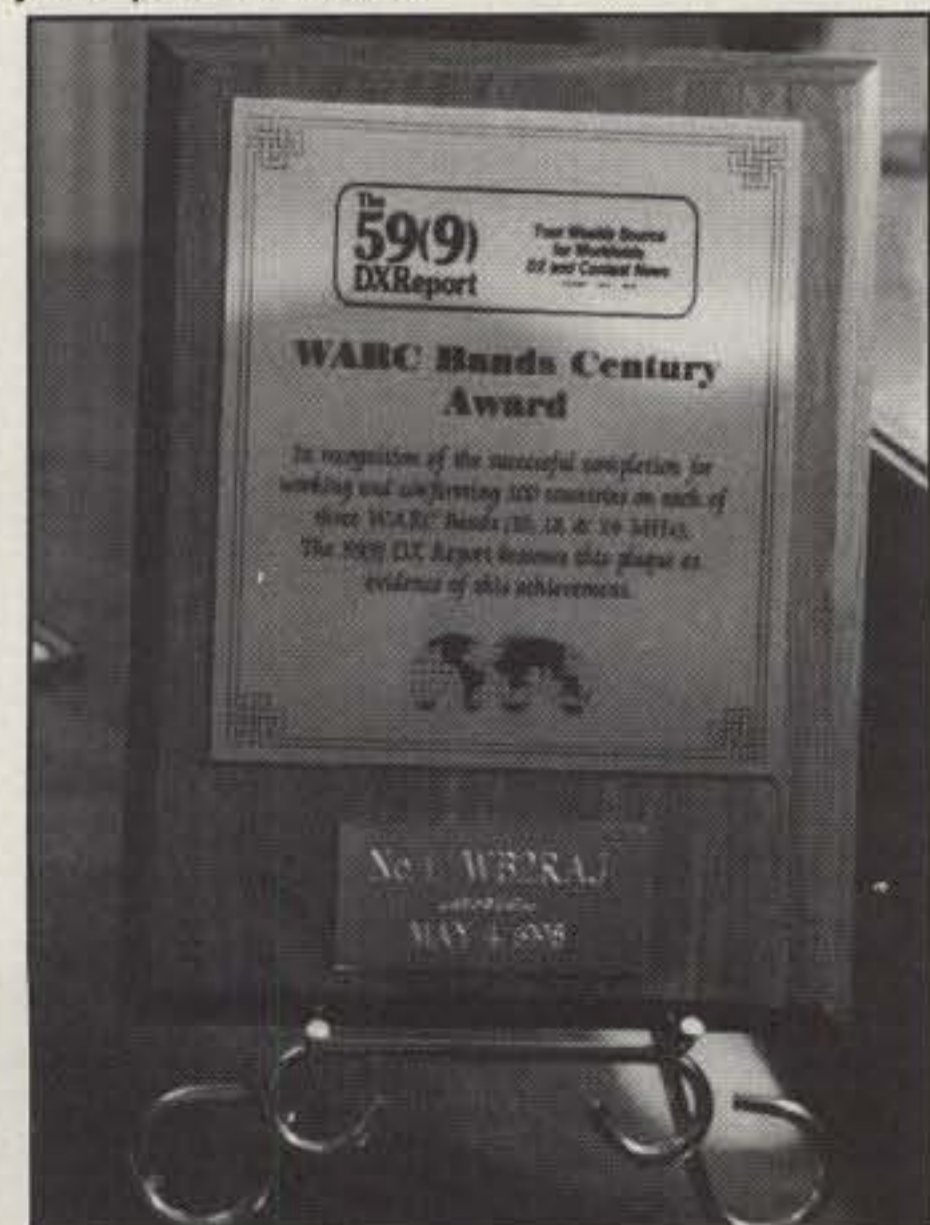
In addition, 5 QSOs are needed with different LZ stations.

**5 Band LZ Award.** Contact one LZ1 and LZ2 on each of the bands 3.5, 7, 14, 21, and 28 MHz for a total of 10 contacts. QSOs since 1 January 1979.



## USA WARC Bands Century Award

Bob Nadolny, WB2YQH, the well-known editor of the "59(9) DX Report" newsletter has just begun to sponsor this award in the form of a plaque or paper certificate. The requirements are that you contact at least 100 DXCC countries on each of the WARC bands of 10, 18, and 24 MHz for a total of 300 countries. QSOs must be made within the acceptable dates used by the ARRL DXCC program. Deleted countries do not qualify. No QSLs are needed; just submit a GCR list signed by two other amateurs verifying that the cards are in your possession.



The plaque is a 9 x 12 inch hard-wood base with a brushed gold plate inscribed with the award details. Each plaque will carry an engraved gold plate with the sequential number, callsign, and date of issue.

As an alternative, you may opt to receive the WARC bands paper certificate. This is a multi-colored document printed on heavy parchment stock. A special application and instructions are available from Bob for an SASE. The fee for the plaque is \$50, which includes shipping to USA addresses. Ask for cost if you are out of this country. The cost for the certificate is \$5. Apply to: WARC Bands Century Award, The 59(9) DX Report, P.O. Box 73, Spring Brook, NY 14140.

## Internet Site of the Month

The Brazilian CWSP series is found at <<http://www.qsl.net/cwsp/awards.htm>>. The Grupo de CW de Sao Paulo sponsors a fairly easy award for contacting 5 of their members (CW only, of course), a more difficult award for contacting the many states and territories of Brazil, and one for contacting just 3 Brazilian YL stations. It's a little harder to know if you've worked a YL on CW.

## Notes

I am anxiously looking forward to attending the 30th Annual Mobile Amateur Radio Awards Club convention scheduled for July 1-4 in San Antonio, Texas. The tentative list of attendees is loaded with those who have earned all possible levels of CQ's USA-CA and some who have earned MARAC-sponsored awards for the second, third, and even more times around.

Please continue to send rules and samples of your organization's or group's awards programs. Sending them directly to me at the address at the beginning of this column is the best route.

73, Ted, K1BV

# SOFTWARE

**DSP Blaster 2.0** uses your PC and sound card to provide tunable highpass, lowpass, and bandpass filters, autotracking CW peaking filter, automatic notch filter, coherent phase-locked CW processor with stereo output, adaptive noise reduction, and AGC. **DSP Blaster** graphs the audio waveform, envelope, spectrum, and CW phase. It can run in the background. \$125. **RITTY 2.0** is a high-performance DSP modem for RTTY and PACTOR. The limiterless front-end, sharp BPF, autotuned optimal filters, ATC, numerical flywheel, packet repair, and memory-ARQ recover signals other modems can't. **RITTY** features an FFT spectral tuning indicator, waveform displays, adjustable frequencies, precision AFSK, and FSK & PTT outputs. \$150. 486DX, VGA, and 16-bit Creative Labs sound card required (no "compatibles").

**AO 6.5** automatically optimizes antenna designs for best gain, pattern, impedance, SWR, and resonance. **AO** features 3-D pattern and geometry displays, 2-D polar and rectangular plots with overlays, automatic wire segmentation, automatic frequency sweep, skin-effect modeling, symbolic dimensions and expressions, current sources, and polarization and near-field analysis. **NEC/Wires 2.0** models true earth losses, surface waves, and huge arrays with the Numerical Electromagnetics Code. Best for elevated radials, Beverages, wire beams, giant quads, delta loops, and LPDAs. **TA 1.0** plots elevation patterns for HF antennas over irregular terrain. **TA** accounts for hills, valleys, slopes, focusing, shadowing, reflection, diffraction, and ground constants. Use **TA** to optimize antenna height and siting for your particular QTH. **YO 6.5** automatically optimizes monoband Yagi designs for maximum forward gain, best pattern, minimum SWR, and impedance. **YO** models stacked Yagis, dual driven elements, tapered elements, mounting brackets, matching networks, skin effect, ground reflection, and construction tolerances. **YO** runs hundreds of times faster than NEC or MININEC. **NEC/Yagis 2.5** provides reference-accuracy modeling of individual Yagis and large arrays. Best for EME arrays. One antenna program, \$70; three, \$120; five, \$200. 386 + 387 and VGA required.

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# WASHINGTON READOUT

REGULATORY NEWS IN THE WORLD OF AMATEUR RADIO

## *FCC Reduces Cost of Vanity Callsigns*

**T**he vanity callsign regulatory fee will drop to its lowest cost ever effective September 14, 1998. A vanity callsign is an amateur station callsign selected by the FCC from a list of up to 25 callsigns requested by the licensee.

According to Terry Johnson, N4ECF, in the FCC's Office of Managing Director, the new fee will be \$13, which will be payable in advance for the ten-year term of the license. The current vanity callsign application fee is \$50. This represents a reduction of nearly 75%!

Earlier this year, the FCC had proposed dropping the fee to \$12.90, but the actual fee was "rounded up" to the nearest whole dollar.

*Important!* The FCC says that it has no plans to refund the difference between the current fee and the new fee for applicants who submit applications before the new fee schedule goes into effect in September.

### **Vanity Callsign Background**

The history of "vanity" callsigns in the amateur service goes back to June 1990 when Jim Wills, N5HCT, a retired Extra Class amateur from Tyler, Texas, wanted to reclaim his long-expired WA5EHQ callsign. In the spring of 1990, Jim filed a Petition for Rule Making requesting that amateurs be allowed to specify three callsign choices in order of preference and attach a \$30 check made out to the FCC to cover the administrative cost. That petition was denied because of the statutory exemption of amateur service applications from fees.

In 1991 Jim contacted his Congressman, who shared the idea with the staff of the House Telecommunications Subcommittee, who were already working on a way to make the FCC at least partially self-supporting. The goal was for the FCC to collect enough "regulatory" (user) fees to help pay for itself.

Congress agreed to add amateur vanity callsigns to the list of other regulatory fees they were considering. The fee would recover the total cost associated with the amateur callsign program. This action

also gave the FCC permission for the first time to collect fees associated with amateur radio. The ARRL had no idea the program was coming, since Jim Wills had worked directly with Congress, who dealt directly with the Commission.

On December 13, 1993 the FCC issued a Notice of Proposed Rulemaking looking toward implementing vanity callsigns. They approved the final rules almost exactly a year later (on December 23, 1994).

While the ARRL played no part in getting the vanity callsign program through Congress and enacted into law, they were very active in developing the guidelines under which amateurs would be able to obtain a callsign of their choice. In the end, the FCC basically followed their suggestions.

Under the new system, which got underway on May 31, 1996, "vanity" amateur station callsigns:

1. would be phased in by the opening of different starting gates.
2. may only be requested from your (or a lower) callsign group.
3. would cost \$30 (\$50 effective September 15, 1997) for a ten year term and are renewable indefinitely.
4. must be ordered using a new paper or electronic (interactive) FCC Form 610-V application form.
5. are assigned from your list of 25 choices in order of preference.
6. cannot be assigned unless an operator already has a callsign.
7. all licensed amateurs qualify for this new program.

For fiscal year 1997, the FCC estimated that 10,000 amateur vanity callsigns would be issued at a cost of \$50 per callsign for the ten-year license term.

By the way, Jim Wills, N5HCT, who got the vanity callsign program off and running, never did get his old WA5EHQ callsign back. He requested and received W5JIM!

### **Vanity Callsigns for Fiscal Year 1998**

Section 9(a) of the Communications Act of 1934, as amended, authorizes the Commission to assess and collect annual regulatory fees to recover the costs, as specified each year by Congress, that it incurs in carrying out enforcement, policy and rulemaking, and international and user information activities.

The FCC released its revised schedule of regulatory fees for all radio services for fiscal year 1998 on June 16, 1998. The Commission is being required by Congress to collect almost \$163 million during FY 1998 to help cover its operating budget. (FY-1998 actually started on October 1, 1997.) This amount is \$10,000,000, or nearly 7% more than the amount that Congress designated for recovery through regulatory fees for FY 1997. Thus, as a general rule, the regulatory fees increased somewhat. But not for the Amateur Service.

The FCC again calculated the new fee based on an expected 10,000 vanity callsign applicants during FY 1998. However, due to more efficient automated "vanity" callsign processing, the cost was reduced to \$1.29 a year, or \$13 for the full ten year license term (rounded up to the nearest dollar amount).

The Commission said that the new \$13 Regulatory Fee for Vanity callsigns in the Amateur Service will be effective with all callsigns issued on or after September 14, 1998.

### **Obtaining a Vanity Station Callsign**

To obtain a vanity callsign, you must file your request on one FCC Form 610-V using either, but not both, the interactive electronically-filed Form 610-V or the paper document Form 610-V. To facilitate the processing of requests for vanity callsigns each work day, electronically-filed Forms 610-V for which the filing fee has been received will be processed first, followed by document Forms 610-V.

The fee effective September 14, 1998 is \$13. The fee is \$50 until then. Payment may be made by check (payable to "FCC"), bank draft, money order, or credit card. Do not send cash.

### **Using the Interactive Electronically-Filed 610-V**

The interactive electronically-filed Form 610-V is available via the FCC Internet homepage at: <<http://www.fcc.gov/wtb/amateur/>>. To access the instructions, click your mouse button with the pointer on the highlighted portion of the item for which you need assistance. Press your <enter> key to submit your application.

If you have provided the required infor-

National Volunteer Examiner Coordinator,  
P.O. Box 565101, Dallas, TX 75356-5101  
(telephone 817-461-6443  
e-mail <[fmaia@internetMCI.com](mailto:fmaia@internetMCI.com)>)

mation, the screen will prompt you with a Fee Remittance Advice, FCC Form 159, that you must complete, print, and mail together with the fee to Federal Communications Commission, P.O. Box 358994, Pittsburgh, PA 15251-5994. The Form 159 and the fee must be received within ten days of submitting your application or the application will be dismissed. A section "Frequently Asked Questions" about the Vanity callsign system is also available on the web site.

### Using Document Form 610-V

The document Form 610-V is available for downloading at <http://www.fcc.gov/formpage.html>, from the fax-on-demand system by calling 202-418-0177 from the handset of a facsimile machine, or from the FCC's forms contractor by calling 800-418-FORM (3676).

Mail your application package, including your completed Form 610-V with a copy of your license attached, Form 159 (Remittance Advice) and the fee to Federal Communications Commission, Amateur Vanity Callsign Request, P.O. Box 358924, Pittsburgh, PA 15251-5924. (Important: Note this address is not the same as that for the interactive electronically-filed Form 610-V.)

Legibility is critical. If the information on your application is not legible, you could

experience a delay in processing, lose the opportunity to obtain a requested callsign, or even obtain a callsign different from the one you want.

You must hold an unexpired amateur operator/primary station license grant of the proper operator class, as described below, to request a vanity callsign for your primary station. To request a vanity callsign for a club station, you must also hold an unexpired club station license grant listing you as the license trustee. Your name and mailing address as shown on your current license grant must be correct.

If your license grant has expired, or if your name or address has changed, you must first request modification of your license grant to show the correct information by filing FCC Form 610, or in the case of a club station, FCC Form 610-B. Refer to the licensee database to verify that the callsign you are requesting is not already assigned.

The license grant of the former holder now deceased must be deleted from the licensee database. This is accomplished by submitting a signed request for license grant cancellation accompanied by a copy of an obituary or death certificate to the FCC, 1270 Fairfield Road, Gettysburg, PA 17325-7245 prior to filing the application for a vanity callsign. Even where a callsign does not appear on the database, it may not be available for assignment.

For additional information on the assignment status of callsigns, contact the FCC's copy contractor, International Transcription Services (1-717-337-1433). You may also contact the FCC's National Call Center (1-888-225-5322). It will provide information free of charge, with a limit of five callsigns.

A callsign is normally assignable two years following license expiration, surrender, revocation, set aside, cancellation, void ab initio, or death of the grantee. See Fact Sheet PR5000 No. 206-V Amateur Station Vanity Callsign System.

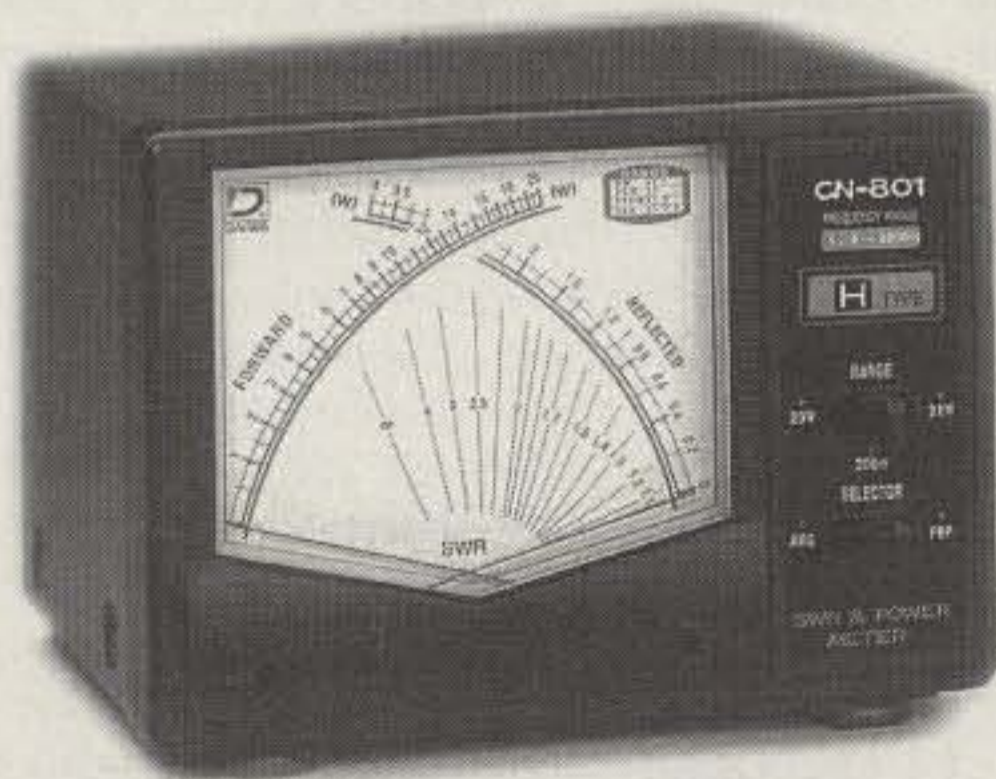
Where a vanity callsign for which the most recent recipient was ineligible, is surrendered, canceled, revoked or voided, the two year requirement does not apply. For explanations of Groups A, B, C, and D and the geographic regions, see Fact Sheet PR5000 No. 206-S, Amateur Station Sequential Callsign System. (All of the Fact Sheets are available on the FCC web site.)

### Request Categories

**By list (primary or club station).** Most amateurs will be submitting a list of desired station callsigns. This is done by completing the back of the FCC Form 610-V to provide a list of up to 25 callsigns in the order of your preference. The first assignable callsign on your list will be as-

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signed to your station. When so requesting for your primary or club station:

- The callsign must have been unassigned for at least two years.

- If you are an amateur Extra Class operator, each callsign must be in Group A, B, C, or D. (Gate opened September 23, 1996.)

- If you are an Advanced Class operator, each callsign must be in Group B, C, or D. (Opened August 6, 1997.)

- If you are a General, Technician Plus, or Technician Class operator, each callsign must be in Group C or D (1-by-3 and 2-by-3 format). (Opened December 2, 1997)

- If you are a Novice Class operator, each callsign must be in Group D (2-by-3 format). (Opened December 2, 1997.)

- Certain prefixes (AL, KL, NL, WL, KP, NP, WP, AH, KH, NH, and WH) are reserved for stations whose mailing address is located outside of the continental U.S.

**Request by former callsign holder (primary station).** This gate opened May 31, 1996. For your primary station, you may request a callsign that was previously assigned to your primary, secondary, repeater, auxiliary link, control, or space station. When so requesting for your primary station:

- You may request your former callsign even though it has been unassigned for less than two years. The two year requirement does not apply to an otherwise eligible primary station if the callsign was previously assigned to a station of the requester.

- You do not have to hold a class of operator license required for the Group (A, B, C, or D) for the callsign requested. A callsign request by a former holder may be from any Group in the sequential system.

- Your mailing address does not have to be in the region designated in the sequential system for the callsign requested. A callsign requested by a former call-

sign holder may be in any region.

**Request by close relative of former holder now deceased (primary station).** Opened May 31, 1996. For your primary station, you may request a callsign that was previously assigned to the primary, secondary, repeater, auxiliary link, control, or space station of your now-deceased spouse, child, grandchild, stepchild, parent, grandparent, stepparent, brother, sister, stepbrother, stepsister, aunt, uncle, niece, nephew, or in-law. When so requesting for your primary station:

- You may request the former callsign of a close relative now deceased even though it has been unassigned for less than two years.

- Upon the death of the holder, a callsign is assignable immediately to an otherwise eligible primary station of a close relative.

- You must be an amateur Extra Class operator to request a Group A callsign.

- You must be an amateur Extra or Advanced Class operator to request a Group B callsign.

- You must be an amateur Extra, Advanced, General, Technician Plus, or Technician Class operator to request a Group C callsign.

- You must be an amateur Extra, Advanced, General, Technician Plus, Technician or Novice class operator to request a Group D callsign.

- Your mailing address does not have to be in the region designated in the sequential system for the callsign requested. A callsign requested by a close relative of a former holder now deceased may be in any region.

- You must show your relationship to the deceased person exactly as listed in the instruction—i.e., child, niece or in-law.

**Request by former holder (club station).** Opened May 31, 1996. For the club station for which you are the license trustee, you may request a callsign that was previously assigned to that station.

When so requesting for a club station:

- You may request your club station's former callsign even though it has been unassigned for less than two years. The two year requirement does not apply to an otherwise eligible club station if the callsign was previously assigned to the club station for which the requester is the license trustee.

- You do not have to hold a class of operator license required for the Group (A, B, C, or D) for the callsign requested. A callsign request by former holder may be from any group in the sequential system.

- Your mailing address does not have to be in the region designated in the sequential system for the callsign requested. A callsign requested by a former holder may be in any region.

**Request "In Memoriam" (club station).** Opened July 22, 1996. If you are the license trustee for your club station, you may request in memoriam for your club station the callsign previously shown on the primary, secondary, repeater, auxiliary link, control, or space station license of a deceased person who was a member of the club. When so requesting in memoriam for your club station:

- You may request the callsign even though it has been less than two years following death of the club member. Upon the death of the holder, the callsign is assignable immediately to an otherwise eligible club station.

- You must have in your station records a written statement (do not send to the FCC unless requested) from a spouse, child, grandchild, stepchild, parent, grandparent, stepparent, brother, sister, stepbrother, stepsister, aunt, uncle, niece, nephew, or in-law of the deceased confirming the deceased person's association with the club and showing consent of the relative to your request.

- You must be an amateur Extra Class operator to request a Group A callsign.

- You must be an amateur Extra or Advanced Class operator to request a Group B callsign.

- You must be an amateur Extra, Advanced, General, Technician Plus, or Technician Class operator to request a Group C or D callsign.

- Your mailing address does not have to be in the region designated in the sequential system for the callsign requested. A callsign requested in memoriam may be in any region.

- You must enter the relationship to the deceased person giving consent exactly as listed in the instruction—i.e., child, niece, or in-law.

If you need further information about the vanity callsign system, visit the Internet site <<http://www.fcc.gov/wtb/amateur/>> or contact the FCC's National Call Center at 1-888-225-5322 (CALLFCC).

73, Fred, W5YI

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## NEWS OF COMMUNICATION AROUND THE WORLD

*H40AA: Pushing the DXpeditioning Envelope*

While I have already briefly discussed the April H40AA DXpedition to the Temotu Islands in the Solomon chain, there were several unique aspects to that operation that deserve more attention. Some of the strategies in selecting operators, choosing band plans to give all DXers a good shot at this potential New One, and making a social commitment as well as a radio one make the H40AA operation stand out among recent trips. I'll let Martti Laine, OH2BH, tell more of the H40AA story in his own words:

[Following a description of how the H40AA team determined that the Temotu island were a potential New Entity for DXCC, Martti continues:] The team began to take shape and identify the strategy elements. A quick call to Wayne, N7NG, confirmed his interest in another DX outing, and we soon had a case on our drawing boards. Some of the recent developments bothered us greatly. Wayne had just seen another missile launch cut short the operation at Scarborough, BS7H.

Jammers would build up on any DXpedition frequency and every expedition was cash hungry, selling coffee mugs at street corners. We agreed to go ahead, but it had to be a clear-cut policy and some new horizons were to be explored in an effort to improve the current code of conduct.

A decision was made not to seek any individual contributions, but to have the DXpedition participants cover their expenses. Only two major DX outlets and one corporate sponsor were involved in terms of providing the expedition with specific transportation facilities, while selected equipment manufacturers were given a choice to participate in building up the H40AA sites to high standards of technical excellence.

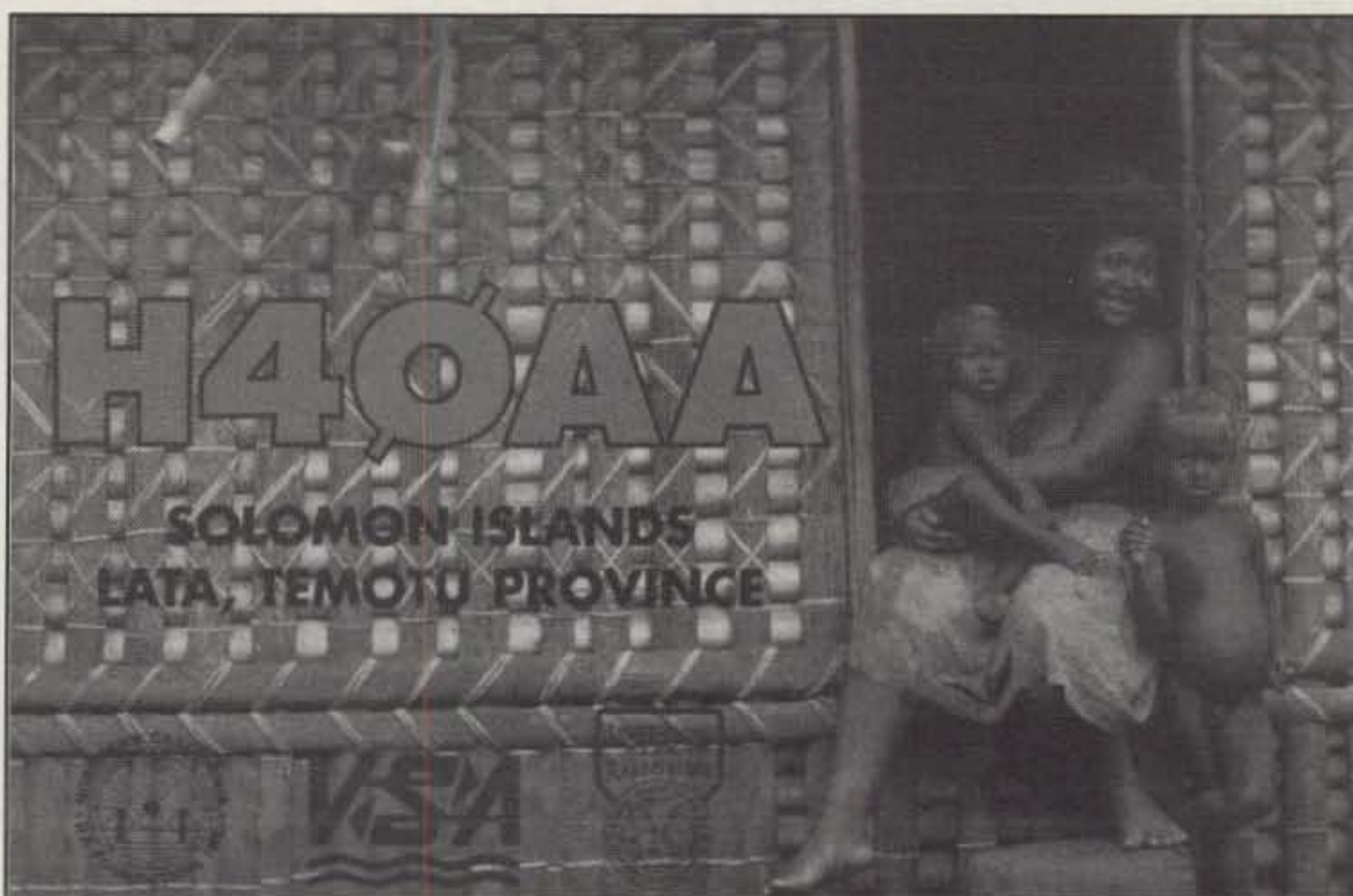
Wayne, incumbent DXAC Chairman, made his participation conditional, aiming at harmony between the past and the future, trying to test the newly drafted rules in practice, a concept which was to guide us through at H40AA in many ways. The operation was to make enough QSOs to please the audience, but our ultimate sights were set far beyond the traditional QSO tallies.

The target set for this write-up was simply to bring into focus these strategy elements in the hope of giving the DX community renewed inspiration in the current age of DXpeditioning and to be well received by the DX audience, called the thundering multitudes.

Our sincere hope was to make H40AA more than just a DXpedition, one which would not just provide a lot of QSOs and folded QSL cards. The day had to come for us personally and for the DX community at large to measure up the performance and make a judgment.

**A Multinational Team with Multiple Types**

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The H40AA QSL card, direct from Temotu Island.

**of Knowledge and Complementary Skills.**

The month of February was set aside for lining up the team and the logistics. Going public by mid-March was the plan, since we felt that late publicity would see less competition show up in our destination on the day of our grand opening—a kind of reasonable assumption from those of us who had discovered the entity but who were not intent on protecting our discovery in any other way.

While basic confidentiality was maintained, several people with a good track record were contacted to make the team highly efficient with multiple skills and to round up personalities that would fit.

The final lineup was N4GN, N7NG, and W6OSP from the U.S.; OH1RY, OH2TA, and OH2BH from Europe; OH0XX/LU from South America; plus 9V1YC from Southeast Asia. Obviously one operator from Japan was needed, as we had planned. The latter presented an ultimate challenge because of heavy DX politics in Japan. We had to stand very firm and honor proven performance found outside the inner circles of the Japanese DX community. Aki, JA5DQH, was invited, coming with an excellent track record and multifaceted skills. The team was complete.

It was quite evident that commanding such a broad range of knowledge was to be one of the key elements ensuring the future success of H40AA. A lot of effort was required to put the team together in this manner and to facilitate the flow of information and communication, but it was ultimately worth the trouble.

Given the logistical challenges, a limited number of slots were available on the operating team. We looked for people with a wide

range of important talents, rather than selling seats at a high price for those who might have deep pockets but less to offer at the actual DXpedition site.

**Three Phases and Tight Operating Strategy.** It was decided that the operation would be organized in three phases with different operators and a different focus for each phase. With this concept, we expected to throw fresh operating power into the battlefield and make maximum use of the available time for each desired operator. It was also known that the facilities at the final destination could not accommodate a large group of people all at once. We knew that we would be going right to the basics of life. No luxury hotels were to be found in Temotu, as their typical housing is crafted from the leaves of palm trees.

OH1RY and N7NG volunteered to stay in Temotu for the entire operation, thus securing the maintenance of our efforts as well as keeping up with the original strategy elements. As a matter of fact, OH1RY arrived in the Solomons two weeks prior to the actual H40AA operation and ran the CQ WPX Contest from the Temotu expedition site using the then still current Solomon prefix H44RY.

The first phase was to run a few selected bands hour after hour for five days and give a first QSO to each DXer in a record time, allowing the thundering multitudes to go back to their daily routines without the pileups calling day in and day out.

The 15 meter band was selected, and both CW and SSB were operated simultaneously to maximize worldwide coverage. As this phase included one full weekend, success was rather obvious. It was surprising that in five days, the



Martti Laine, OH2BH, organized the H40AA operation.

basic pileups were largely worked down and the number of different callsigns reached 17,892 (61%) out of a total of 40,836 QSOs at that point. We had worked all Europeans at least once with no hassle, and we still had another eight days to go!

The second stage embraced the weekday phase with another set of operators now launching several other bands and sub-activities such as 160 meters and RTTY. It was time for those who were willing to get a multitude of bands to be given a break for their investment in time during the week.

The observation was that reasonable pileups were there, but pileup discipline was not the only aspect of Japanese on-the-air behavior. Workplace discipline was remarkably tangible in Japan, and consequently few JA QSOs were made during the propagation hours correlating with Japanese working hours. Still, a total of 15,107 JAs were logged with 4525 different callsigns.

The third stage encompassed our second weekend phase. The H40AA stations returned to the original productive bands while also establishing another massive weekend presence on the WARC bands and 17 meters, which probably represented an optimum mix of both 20 and 15 meters. Those who for whatever reason missed the opening weekend had another fair chance. Following the initial five-day phase, we were able to log another 26,268 QSOs, but they only represented 5248 new individuals. The second part, according to our strategy, was a clear fiesta for multiple QSOs. As the dust settled, we had 67,104 QSOs in our books, representing 2.9 QSOs per each station worked, the most active stations having 20 QSOs under their belts.

With these three phases or stages, it was felt that there should be no one in any of the three

## The WPX Program

**SSB**

2675 ..... JH7GZF 2676 ..... JH3OHO

**CW**

2986 ..... IK8VRP 2988 ..... IK4UPX  
2987 ..... DL6UAA

**Mixed**

1815 ..... KF4ZR

**CW:** 350 IK8VRP, DL6UAA, IK4UPX. 400 IK8VRP, IK4UPX. 450 IK8VRP. 500 IK8VRP. 550 IK8VRP. 600 IK8VRP. 650 IK8VRP. 800 JK1AJX. 850 JK1AJX. 1350 WA2EYA.

**SSB:** 300 JH3OHO. 600 KE4SCY. 750 WD8ANZ. 800 WD8ANZ. 900 CP1FF. 950 CP1FF. 1000 CP1FF. 1050 CP1FF.

**Mixed:** 450 KF4ZR. 500 KF4ZR. 550 KF4ZR. 750 WD8ANZ. 3450 F2YT. 3500 F2YT. 4300 W2FXA.

**No. America:** JH5OXF

**Award of Excellence Plaque Holders:** K6JG, N4MM, W4CRW, K5UR, VE3XN, DL3RK, OK1MP, N4NO, W4BQY, W4VQ, KF2O, W8CNL, W1JR, W5UR, W8RSW, W8ILC, K9BG, W1BWS, G4BUE, LU3YL/W4, NN4Q, VE7WJ, VE7IG, W9NUF, N4NX, SM0D-JZ, DK5AD, W3ARK, LA7JO, SM0AJU, N5TV, W6OUL, N4KE, I2UIY, I4EAT, VK9NS, DE0DXM, UR2QD, AB9O, FM5WD, SM6CST, I1JQJ, PY2DBU, H18LC, KA5W, K3UA, I8YRK, SM0AJU, N5TV, W6OUL, WB8ZRL, WA8YTM, SM6DHU, N4KE, I2UIY, I4EAT, VK9NS, DE0DXM, DK4SY, UR2QD, AB9O, FM5WD, I2DMK, SM6CST, VE1NG, I1JQJ, PY2DBU, H18LC, KA5W, K3UA, HA8XX, K7LJ, SM3EVR, K2SHZ, UP1BZZ, EA7OH, K2POF, DJ4XA, IT9TQH, K2POA, N6JV, W2HG, ONL-4003, W5AWT, KB0G, HB9CSA, F6BVB, YU7SF, DF1SD, K7CU, I1POR, K9LJN, YB0TK, K9QFR, YU2NA, W4UW, NX0I, WB4RUA, I6DQE, I1EEW, I8RFD, I3CRW, VE3MS, NE4F, KC8PG, F1HWP, ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, KC7EM, YU1AB, IK2ILH, DE0DAQ, I1WXY, LU1DOW, N1IR, IV4GME, VE9RJ, WX3N, HB9AUT, KC6X, N6IBP, W5ODD, I0RIZ, I2MQP, F6HMJ, HB9DDZ, W0ULU, K9XR, JA0SU, I5ZJK, I2EOW, IK2MRZ, KS4S, KA1CLV, WZ1R, CT4UW, K0IFL, WT3W, IN3NJB, S50A, IK1GPG, AA6WJ, W3AP, OE1EMN, W9IL, S53EO, DF7GK, S57J, EA8BM, DL1EY, KU0A, K0DEQ, VR2UW, 9A9R, UA0FZ, DJ3JSW, OE6CLD, HB9BIN, I7PXV.

**Award of Excellence Plaque Holders with 160 Meter Endorsement:** K6JG, N4MM, W4CRW, K5UR, VE3XN, DL3RK, OK1MP, N4NO, W4BQY, W4VQ, KF2O, W8CNL, W1JR, W5UR, W8RSW, W8ILC, K9BG, W1BWS, G4BUE, LU3YL/W4, NN4Q, VE7WJ, VE7IG, W9NUF, N4NX, SM0D-JZ, DK5AD, W3ARK, LA7JO, SM0AJU, N5TV, W6OUL, N4KE, I2UIY, I4EAT, VK9NS, DE0DXM, UR2QD, AB9O, FM5WD, SM6CST, I1JQJ, PY2DBU, H18LC, KA5W, K3UA, K7LJ, SM3EVR, UP1BZZ, K2POF, IT9TQH, N6JV, ONL-4003, W5AWT, KB0G, F6BVB, YU7SF, DF1SD, K7CU, I1POR, YB0TK, K9QFR, W4UW, NX0I, WB4RUA, I1EEW, ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, YU1AB, IK4GME, WX3N, W5ODD, I0RIZ, I2MQP, F6HMJ, HB9DDZ, K9XR, JA0SU, I5ZJK, I2EOW, KS4S, KA1CLV, K0IFL, WT3W, IN3NJB, S50A, IK1GPG, AA6WJ, W3AP, S53EO, S57J, DL1EY, K0DEQ, VR2UW, DJ3JSW, OE6CLD, HB9BIN.

Complete rules and application forms may be obtained by sending a business-size, self-addressed, stamped envelope (foreign stations send extra postage if airmail desired) to "CQ WPX Awards," P.O. Box 593, Clovis, NM 88101-9511 USA.

population centers still lacking a Temotu QSO. H40AA was to claim 23,140 different people worked during one DXpedition—still far behind the 32,000+ number once achieved at ZA1A, something that can be cited as the ultimate success factor for any DXpedition. This represented an approach where quality took precedence over quantity, both no doubt being inter-related—a distinct three-phase strategy.

**Local Amateur Population and Arrangements In Honiara.** Any DXpedition has two options: go independently and ignore the local amateur population, or go together with the locals and secure their support.

We opted for the latter approach and made contact with the Solomon Islands Radio Society, with the SIRS President, Greg, H44GP, and Secretary, Graham, H44GR. They turned out to be a group of jolly good fellows and amateurs who assisted us and participated in a multitude of local H40AA arrangements.

Such were the dealings with the licensing authorities that we obtained a license for Honiara (H44DX) and a first-ever H40 callsign, now representing a dedicated block for this new DXCC entity, a major goodwill gesture from the telecom administration. Customs arrangements were also greatly assisted by the locals, who also helped us negotiate a charter deal with their national carrier, Solomon Airlines, to fly two charters to Temotu. The distance was that magic 350+ kilometers, resulting in a three-hour flight from Honiara.

We wanted to honor the fact that Solomon Islands, as another ITU member country, represented equal voting power along with countries such as the United States in matters pertaining to amateur radio. Thus we assisted and reinforced the efforts of the local amateur community with regard to their local telecom administration. Those efforts would often require a

boost from the visiting delegation. Also, many of the group members had a professional profile which was complementary to these efforts.

We were pleased with the attitude of the local community as well as with the telecom and various other governmental agencies with whom we were dealing directly or through the local amateurs. The story of H40AA was featured in a Solomon Airlines in-flight magazine to further promote amateur radio and its potential for those traveling with the national carrier.

**Experiencing Hard Facts of Life in Temotu Province.** If life is tough in the capital Honiara, the outer islands adrift in time certainly stand out as a place where a traveler goes back in time by decades. Only some 30 percent of the island population receives any sort of schooling. People still live in their original huts hand-crafted from tree leaves, with kerosene lights allowing them to walk around during the darkness. They eat fish caught from the ocean and pick up an assortment of juicy fruits that Mother Nature has kindly made available for those she loves.

It is no wonder that the Solomons only receive some 11,000 tourists annually. The limiting factor is that malaria and other diseases have effected some 40 percent of the population in recent years. The U.S. Center for Disease Control classified all parts of the Solomons as a high risk area for malaria throughout the year.

The situation is primitive, but for us life went on in Temotu every day with our normal routines. We got acquainted with two Temotu volunteers from New Zealand, Ashley and Lynn, who worked hard with their limited resources to raise the level of education, to build a healthy society, and to create some commerce that could help people pursue meaningful activities and achieve success. Dr. Ashley Wilson imme-



## 5 Band WAZ

As of May 31, 1998, 482 stations have attained the 200 Zone level.

New recipients of 5 Band WAZ Award with all 200 Zones confirmed:

NØFW

The top contenders for 5 Band WAZ (zones needed, 80 meters):

N4WW, 199 (26)	KZ4V, 199 (26)
AA4KT, 199 (26)	W8DX, 199 (34)
K7UR, 199 (34)	N4CH, 199 (18 on 10)
WØPGI, 199 (26)	N6AW, 199 (34)
W2YY, 199 (26)	OE1ZL, 199 (1)
W9WAQ, 199 (26)	W6DN, 199 (17)
VE7AHA, 199 (34)	W3NO, 199 (26)
W9CH, 199 (26)	K4UTE, 199 (18)
IK8BQE, 199 (31)	K5RT, 199 (23)
JA2IVK, 199 (34 on 40)	UA3AGW, 198 (1, 12)
K1ST, 199 (26)	EA5BCK, 198 (27, 39)
ABØP, 199 (23)	K4PI, 198 (23, 26)
KL7Y, 199 (34)	G3KDB, 198 (1, 12)
UY5XE, 199 (27)	KG9N, 198 (18, 22)
NN7X, 199 (34)	KM2P, 198 (22, 26)
OE6MKG, 199 (31)	DKØEE, 198 (19, 31)
HABIB, 199 (2 on 15)	KØSR, 198 (22, 23)
IK1AOD, 199 (1)	K3NW, 198 (23, 26)
DF3CB, 199 (1)	UA4PO, 198 (1, 2)
F6CPO, 199 (1)	JA1DM, 198 (2, 40)
W6SR, 199 (37)	9A5I, 198 (1, 16)
W3UR, 199 (23)	K4ZW, 198 (18, 23)
KC7V, 199 (34)	DJ4GJ, 198 (1, 31)
GM3YOR, 199 (31)	OH2VZ, 198 (1, 31)
VO1FB, 199 (19)	W2YC, 198 (24, 26)

The following have qualified for the basic 5 Band WAZ Award:

W3NO, 199 zones      UT5UGR, 192 zones

Endorsements:

K4UTE, 199 zones      NØFW, 200 zones  
K5RT, 199 zones      N2TN, 194 zones

1080 Stations have attained the 150 Zone level as of May 31, 1998.

**\*\*PLEASE NOTE:** Due to supplier increases, effective September 1, 1998 cost of the 5 Band WAZ Plaque is now \$80 (\$100 if airmail shipping is requested).

Rules and applications for the WAZ program may be obtained by sending a large SAE with two units of postage or an address label and \$1.00 to: WAZ Manager, Jim Dionne, K1MEM, 31 DeMarco Road, Sudbury, MA 01776. The processing fee for all CQ awards is \$4.00 for subscribers (please include your most recent CQ mailing label or a copy) and \$10.00 for nonsubscribers. Please make all checks payable to the Award Manager. Applicants sending QSL cards to a CQ checkpoint or the Award Manager must include return postage. Questions regarding the WAZ Award may be sent to K1MEM with an SASE.

## The WAZ Program Single Band WAZ

### 15 Meter SSB

515 ..... WØVV

### 20 Meter SSB

1028 ..... K6FG      1030 ..... KFØQR  
1029 ..... LX1KC

### 20 Meter CW

488 ..... UT5UGR

### 40 Meter CW

201 ..... K4JLD

### All Band WAZ

#### SSB

4433 ..... LX1KC      4436 ..... IK8FLW  
4434 ..... KF4ZR      4437 ..... DL8AAV  
4435 ..... IK8UHA

#### CW/Phone

7809 ..... W2HCA (CW)      7811 ..... W4SD  
7810 ..... OH8US

#### All CW

118 ..... WAØGOZ      119 ..... KUØJ

Rules and applications for the WAZ program may be obtained by sending a large SAE with two units of postage or an address label and \$1.00 to: WAZ Manager, Jim Dionne, K1MEM, 31 DeMarco Road, Sudbury, MA 01776. The processing fee for all CQ awards is \$4.00 for subscribers (please include your most recent CQ mailing label or a copy) and \$10.00 for nonsubscribers. Please make all checks payable to the Award Manager. Applicants sending QSL cards to a CQ checkpoint or the Award Manager must include return postage. Questions regarding the WAZ Award may be sent to K1MEM with an SASE.

enteen barrels left on the day of our departure. Soon there would be none left, and total darkness could not be avoided! Would we, after all, be responsible world citizens or just a bunch of pileup machines?

### Temotu Development Fund Established.

Another idea entered the minds of those who visited the local villages and met with the people. We looked into their native settlements and realized that these people studied the Bible most seriously, although they could not yet read the text.

Ashley's recent successes included establishing a processing mill for coconut butter to make soap and seeing a man with his newly opened woodwork shop. The man had already produced wooden products worth US\$4,000 for shipment to Honiara and could certainly lay claim to being the first industrialist in Temotu—through his own hands, to say the least. But Ashley's worries were many. Only part of his soap factory's workforce showed up daily for work because of the serious malaria situation. He was right at the edge of his resources.

The H40AA team took great pride in stepping forth and suggesting that the DX community should participate and help the country that they were about to add to their collection and to the overall DXCC listing. The rationale was to help this new entrant be at least partially in line with the other entities on the DXCC countries list. It was instantly agreed that in addition to providing timely regular QSL services through OH2BN, we would establish a special fund through W6OSP, NCDXF Treasurer, and provide those supporting the development

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diately opened his private house and personally moved elsewhere to allow the H40AA CW station to move in and be located far enough from the main camp to have two signals on the same band with no mutual interference.

We passed no one on the streets who did not politely greet us. If the question was raised among the locals about the H40AA mission in Temotu, the question was fortunately raised among the DXpedition group as well: Had we come here merely to make QSOs and eat their limited food supply, or could we possibly be of more value and offer something in exchange for the hospitality and kindness extended to us by the people and the volunteers of Temotu? Was it unfair for an DXpedition only to get something but not leave anything valuable behind? The H40AA DXpedition ran the island's 60 KW generator for two weeks with one barrel of gasoline a day. There were sev-

## CQ DX Honor Roll

The CQ DX Honor Roll recognizes those DXers who have submitted proof of confirmation with 275 or more ACTIVE countries for the mode indicated. The ARRL DXCC Countries List is used as the country standard. Honor Roll listing is automatic when submitting application or endorsement for 275 or more countries. Deleted countries do not count and are dropped from listing as they occur. Currently there are 328 countries. To remain on the CQ DX Honor Roll, annual updates are required. Honor Roll updates may be made at any time, in any number. Updates indicating "no change" will be accepted to meet the annual requirement. All updates must be accompanied by an SASE for confirmation. The fee for endorsement involving the issuance of a sticker is \$1.00.

### CW

K2TQC.....328	K2OWE.....328	N7RO.....327	W7CNL.....326	WA4JTI.....323	K6CU.....319	K4JLD.....312	CT1YH.....305	G4MVA.....294
K1MEM.....328	K6LEB.....328	KZ4V.....327	N6AR.....325	KU0S.....323	K2JF.....319	W3II.....312	K7JS.....305	I2EOW.....294
K2FL.....328	K9MM.....328	9A2AA.....326	K8NA.....325	W1WAI.....323	HA5NK.....319	K1VHS.....311	W7IT.....305	W4UW.....294
K9BWQ.....328	F3AT.....328	OK1MP.....326	I1JQJ.....325	4N7ZZ.....323	N6AV.....318	WA8YTM.....311	KE5PO.....304	KB8O.....292
K2ENT.....328	PA0XPQ.....328	N4JF.....326	IT9VDQ.....325	AG9S.....322	VE7DX.....318	N6AW.....311	G2FFO.....303	F6HMJ.....292
DL8CM.....328	W6DN.....327	W9WAQ.....326	W8XD.....325	DL3DXX.....322	G3KMQ.....317	N5HB.....311	IK0ADY.....302	LU3DSI.....292
W0IZ.....328	K3UA.....327	AA4KT.....326	K8LJG.....325	KA5TQF.....322	N4CH.....317	LA7JO.....311	WA4DAN.....301	DJ1YH.....288
G4BWP.....328	N7FU.....327	K9IW.....326	K4CN.....325	AA5NK.....321	N6CW.....316	OH3NM.....310	WG5G/QRPP.....301	YU7FW.....286
K6JG.....328	N4MM.....327	YU1HA.....326	WB5MTV.....324	ON4QX.....321	W3BBL.....315	OZ5UR.....310	W6YQ.....301	KF5PE.....282
I4EAT.....328	IT9TQH.....327	I5XIM.....326	IT9QDS.....324	K9QVB.....321	N4AH.....315	K4CXU.....309	N4OT.....301	W7A.....282
SM6CST.....328	K4CEB.....327	WA8DXA.....326	W0JLC.....324	HA5DA.....321	N0FW.....315	VE9RJ.....309	YU1TR.....300	YC2OK.....280
W2UE.....328	WA4IUM.....327	N5FW.....326	N5FG.....324	KA7T.....321	AA2X.....314	9A2AJ.....309	YU2TW.....300	PY4WS.....276
W2FXA.....328	K4IQJ.....327	W7OM.....326	DJ2PJ.....324	IT9ZGY.....321	W5OG.....313	HB9DDZ.....307	KH6CF.....300	KF8UN.....276
N4KG.....328	F3TH.....327	W0HZ.....326	W4OEL.....324	K1HDO.....320	WB4UBD.....313	I2EOW.....307	YV5ANT.....299	
K8PV.....328	EA2IA.....327	IK2ILH.....326	W6SR.....324	VE7CNE.....320	N1HN.....313	HB9DDZ.....307	K0HQW.....299	
W4QB.....328	NC9T.....327	K2JLA.....326	W7ULC.....323	I4LCK.....320	K9DDO.....312	K8JJC.....306	YU1AB.....294	

### SSB

K4MZU.....328	IT9TGO.....328	YS1GMV.....326	WB3DNA.....326	VE2GHZ.....324	LU1JDL.....320	EA1JG.....317	W4WX.....310	KQ4WD.....292
K2TQC.....328	WD8MGQ.....328	KF7SH.....326	I2EOW.....326	N2VW.....324	KF8VW.....320	N5HSF.....316	EA5RJ.....309	LU3HBO.....292
K2FL.....328	I1EEW.....328	ZS6LW.....326	KE5PO.....326	OE7SEL.....324	I0AMU.....320	KB1HC.....316	CT1AHU.....309	K2EEK.....291
DJ9ZB.....328	I0ZV.....328	YV5AIP.....326	K4JLD.....326	K8YVI.....323	K4CXY.....320	K6RO.....316	CT1EEN.....309	W6WL.....291
EA2IA.....328	VE3MR.....328	K9IW.....326	W6SR.....326	K9HQM.....323	G4ADD.....320	W6NW.....315	EA5KY.....308	YB1RED.....291
K2ENT.....328	DL9OH.....328	WA4JTI.....326	N4CH.....326	KC5P.....323	I4WZK.....320	KV2S.....315	EA3CB.....308	DJ2UU.....291
OZ5EV.....328	ZL1AGO.....328	YV1AJ.....326	K1HDO.....326	WD0GML.....323	I4SAT.....320	WA9RCQ.....315	N6AV.....306	4X6DK.....291
VE1YX.....328	SV1ADG.....328	YV1KZ.....326	W7FP.....326	WW1N.....323	WE2L.....320	N3ARK.....315	TJ2TEB.....306	WA3KKO.....290
W6EUF.....328	LA7JO.....328	W9OKL.....326	K9PP.....326	K4SBH.....323	EA3EQT.....320	K6BZ.....315	VE3DLR.....306	OE7KWT.....290
K2JLA.....328	VE3XN.....328	9A2AA.....326	YV5IVB.....326	W2JZK.....323	WS9V.....320	K2AJY.....315	W3YEY.....306	N6CFQ.....290
N7RO.....328	K9MM.....328	DL6KG.....326	I8ACB.....325	CE7ZK.....323	K0FP.....320	K7TCL.....315	XE1MDX.....305	IK2PZG.....289
K6YRA.....328	K7LAY.....328	K0KG.....326	N6AR.....325	K2ARO.....323	KE3A.....320	I4CSP.....315	DK5WQ.....305	VK3IR.....289
W6BCQ.....328	VK4LC.....328	OK1MP.....326	K8NA.....325	LU7HJM.....323	N4CSF.....320	N6RJY.....315	EA5OL.....305	KF7VC.....288
K5OVC.....328	DL8CM.....328	WB3CQO.....326	A18M.....325	K5NP.....323	NI5D.....320	N0AMI.....314	G4NXG/M.....304	OK1AWZ.....287
KZ2P.....328	N0FW.....328	I2QMU.....326	W4UW.....325	KB8O.....323	W6SHY.....320	W5RUK.....314	VE3CKP.....304	IK2DUW.....287
VE7DX.....328	I8KCI.....328	N4JF.....326	VE2PJ.....325	VE2GHZ.....323	N4HK.....320	DL3DXX.....314	K6CF.....304	EA5GMB.....287
AA6BB.....328	XE1VIC.....328	KB4HU.....326	I8LEL.....325	KD8IW.....323	ON5KL.....319	WB8ZRV.....314	WB2NQT.....303	IK8BMV.....286
EA4DO.....328	PA0XPO.....328	KC4MJ.....326	IT9ZGY.....325	YV1JV.....323	WA4DAN.....319	OH5KL.....313	EA3CWK.....303	TU2QW.....286
ZL3NS.....328	KE4VU.....328	CX2CB.....326	K6LEB.....325	VE4ROY.....322	KI3L.....319	WD0DMN.....313	EA3BT.....303	WZ3E.....286
K6JG.....328	K3UA.....327	TJ2CC.....326	IK1GPG.....325	WN5IJZ.....322	VE3HO.....319	K9YY.....313	YC2OK.....303	NM5O.....285
K6GJ.....328	K9BWQ.....327	IK0IOL.....326	I1JQJ.....325	XE1CI.....322	XE1MD.....319	K1VHS.....313	WA9BDX.....302	EA1AYN.....285
SM6CST.....328	W0YDB.....327	ZL1HY.....326	I1WJ.....325	WB4PUD.....322	KB1JU.....319	W91L.....313	WA8MEM.....302	IK2HBX.....284
W3GG.....328	W4QB.....327	YU1HA.....326	A18S.....325	LZ1HA.....322	PY2DBU.....319	W1LQO.....313	KD4YT.....302	VE7HAM.....284
I4EAT.....328	VE3MRS.....327	W4NKI.....326	N5FG.....325	ZS6AOO.....322	I0SGF.....319	WA2FKF.....313	CT1YH.....302	KE6CF.....283
W4UNP.....328	OE2EGL.....327	KZ4V.....326	AC7DX.....325	WA5HWB.....322	KF8UN.....319	K4LR.....312	N5QDE.....302	KK4TR.....283
YU1AB.....328	K8CSG.....327	VE3GMT.....326	K0HQW.....325	TJ2JP.....322	K9QVB.....318	WA9IVU.....312	RA2YA.....301	YC3OSE.....282
F9RM.....328	K1UO.....327	W4EEE.....326	K2JF.....325	WD0BNC.....322	KB5FU.....318	KD5ZD.....312	W2LZX.....301	WN6J.....281
PY4OY.....328	WB4UBD.....327	KE4VU.....326	KC8EU.....324	W8AXI.....322	AA4AH.....318	WA2FKF.....312	XE2DU.....301	YU1TR.....280
OZ3SK.....328	W2FXA.....327	AG9S.....326	N4KEL/M.....324	W5XQ.....321	G4GED.....318	K4JJD.....312	WP4AFA.....300	KN4RI.....280
XE1L.....328	IK8CNT.....327	WA4WTG.....326	IK8BQE.....324	KA5TQF.....321	IK8GCS.....318	N5HB.....312	YU2TW.....300	WD9ACQ.....280
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efforts with a commemorative QSL card signed by Dr. Ashley Wilson and mailed from the Temotu Post Office. A special arrangement was made with Solomon Airlines to handle this one-off exercise courtesy of their flight to Temotu.

So the message was heard loud and clear the world over. Within a short period of time (just two weeks) the DX community demonstrated its awesome power, and almost 500 DXers stepped forward to donate more than US\$20,000 to be used exclusively in Temotu to further develop their society and commerce.

Hundreds of DXers gladly volunteered the requisite US\$25, and some felt moved to donate even more to this good cause. Lee Shaklee, W6BH, who long ago prowled the bands as W6PQW, presented the fund with a check for US\$10,000. Lee was one of the early

visitors to Temotu Province, patrolling the area in a PT boat and living with the native folks for the better part of 2 1/2 years during WWII. Lee remembers these times well and has always harbored a fondness of the people of the area. When Lee stood up and released this very substantial amount for the people of Temotu, it was unquestionably one of the happiest days for the participants of H40AA. We knew we were doing the right thing for the DX fraternity. We were not only proud of being DXers, but also realized that we were able to rejoice at someone else's potential success, a rarely experienced feeling in today's busy world.

**Logistics/Equipment.** Yaesu FT1000MPs were used for clean multiple operating in close proximity to one another with ICE filtering, and Alpha Power provided some heavy 91B power

together with airline-cabin-size amps from FinnFet Ltd. For a show of technical excellence, two stations were set up on 21195 and 21295 kHz to run segmented pileups on SSB simultaneously—a truly satisfying experience for all those involved.

All the equipment was hand-carried by the participants to avoid those long-running customs procedures and often complicated clearance formalities required for regular cargo operations. It all paid off nicely with full control of the situation throughout the exercise and minimum cost. Everyone had his own personal materials list, and as of then, we had not noticed anything was missing at any point during the operation.

OH1RY's FinnFet outlet had produced three beam antennas, two of which were left behind

## QSL INFORMATION

3D2CW to DK7PE  
 3DA0CW to DK7PE  
 4N7ZR to VE3EXY  
 4S7CQ to WA3HUP  
 4X/SM7PKK to SM6CAS  
 4X1FN to AA2KD  
 4X50FN to AA2KD  
 4Z5IQ to K2OVS  
 4Z5JQ to K2OVS  
 5K1WC to HK3SGP  
 5K3WC to HK3SGP  
 5W0XX to DK7PE  
 5X1DK to KD4UDU  
 5Z4SQ to DK7PE  
 7P8CW to DK7PE  
 7Q7CW to DK7PE  
 8P9DR to K8LJG  
 9F2CW to DK7PE  
 9F2CW/A to DK7PE  
 9H3HF to DK7PE  
 A35CW to DK7PE  
 A4AFX to AB4ET  
 AY1I to I0WDX  
 AY7D to LU7DW  
 BI4Q to BY4RSA  
 C6A/NE8Z to K8LJG  
 C9RAA to DK7PE  
 CF9ND to VE9AV  
 CN2BA to DK7PE  
 CU3T to CU3URA  
 D2CW to DK7PE  
 ED1SCR to EA1EAU  
 EG0MCP to EA7URM  
 EI1M to EI2WW  
 EI4VPW to DK7PE  
 EI4VVF to W0GLG  
 EK60VC to K6EID  
 EK6DO to K6EID  
 EK6LF to IK2QPR  
 ES2RW/3 to ES2RIQ  
 ET4A to DK7PE  
 FG0MH to K8LJG  
 FO0MAC to K8OU  
 FO0PAP to K8OU  
 FP0TD to K8LJG  
 FT5ZI to F5PFP  
 G3KQL to AB4ET  
 GS7UEG/P to G7DKX  
 HB9CL to HB9CXZ  
 HB9H to HB9CXZ  
 HB9RL to HB9CXZ  
 HC1MD to K8LJG  
 HC5EA to K8LJG  
 HC8EE to K8LJG  
 HC8GT to K8LJG  
 HC8MD to K8LJG  
 HD8CD to K8LJG  
 HD8EE to K8LJG  
 HU0A to K8LJG  
 HU2CEN to K8LJG  
 I0N to IK0AEH  
 IQ2X to IK2GZU  
 J69TV to N4TV  
 J79KV to W6JKV  
 JY8BY to DL5MBY  
 KH8/N5OLS to N5JA  
 NP2N to W0ANZ  
 NT4TT to AC7DX  
 OA7MP to K8LJG  
 OD5RAK to F6FLV  
 OF1AF to OH1AF  
 OF3KCB to OH3KCB

OF5M to OH5NQ  
 OH3A to KG6UH  
 OH7WW to OH3LQK  
 ON9CPE to DK7PE  
 OZ7MW to F5OIH  
 P29VCW to DK7PE  
 P38M to YL2KL  
 P4/NE8Z to K8LJG  
 P43E to P43AR  
 PA6HQ to PA3CAL  
 PR2P to PT2NP  
 PR2W to PT2NP  
 PY0FA to PY4KL  
 RA9AA to K0XQ  
 RA9AE to K0XQ  
 RK9AWN to K0XQ  
 S07WW to ON5NT  
 S21ZC to DK7PE  
 S79CW to DK7PE  
 SN6F to SP6IXF  
 SV/OH9MM to OH3LQK  
 SV5A to SV1AIH  
 TF2KJ to K8LJG  
 TI1T to K8LJG  
 TI2LAK to F6FNU  
 TL5A to PA3DMH  
 TN0CW to DK7PE  
 UA0DC to K1WY  
 UA0ZBK to K1WY  
 UA9AR to K0XQ  
 UA9JMM to K0XQ  
 UN9FD to K0XQ  
 US0Q to SP8BXQ  
 UT1Z to UT2IO  
 V31MZ to K1MZB  
 V73RL/P to NG7S  
 VK1QL to AB4ET  
 VK2FRG to DK7PE  
 VK5QL to AB4ET  
 VK8RH to VK4ARR  
 VK8SEA to VK8ZWM  
 VK9AE to K1EU  
 VK9LV to K1JB  
 VP2VHI to N0IJ  
 VP5VMA to W8AV  
 VP5Z to W5ASP  
 VP8CPL to K8LJG  
 VP8CZJ to G0HXL  
 XT2CW to DK7PE  
 XX9CW to DK7PE  
 YC8FI to IK0ZKK  
 YJ0AXX to DK7PE  
 YJ8PU to KF4VPU  
 YN0HSM to K8LJG  
 YS1CEN to K8LJG  
 ZA1ZPL to JK1OPL  
 ZC4ATC to 5B4YC  
 ZF1HQ to G0VHQ  
 ZF2NT to N2AU  
 ZK1EHH to K8VIR  
 ZK8RS to ZL1RS  
 ZM1A to ZL3CW  
 ZS80NRM to ZS6Y  
 ZY2HT to PY2HT

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 6Y5WJ to Josh Walker, Walker  
 James Associates, Frost  
 Building, Dudley Road West,  
 Tividale, Warley, West Midlands  
 B69 2PJ, England

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 Ridge, Christ Church, Barbados  
 8P6TD to Tony Davis, #7  
 Holborn Terrace, Wilcox, Christ  
 Church, Barbados  
 9M6CT to Philip J. Weaver, P.O.  
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 Fernandez, Coloong 1,  
 Valenzuela, MM 1445,  
 Philippines  
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 Route du Stade, F-97222 Case  
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 P40AV to Alan B. Caplan,  
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 4, TR-64100 Usak, Turkey  
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 Indonesia  
 YB1KOR to Yana Koryana, Jl.  
 Pencak Silat 14, Bandung  
 40293, Indonesia  
 YB9ZUK to Badung Club  
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 Bali 80361, Indonesia  
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 7642 JKPWB, Jakarta 10076,  
 Indonesia  
 YC0NDB to Warnyaty Wihardjo,  
 Jl. Muara Karang, Blok Y 7  
 Selatan No. 38, Jakarta 14450,  
 Indonesia  
 YC8BVG to Aminuddinsyah,  
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 YC8SBY to Achmad Hasni, Jl.  
 Letjen Soeprapto 141, Gorontalo  
 96111, Indonesia  
 YC9BU to Kadek Kariana Sp.,  
 P.O. Box 106, Singaraja 81100,  
 Indonesia  
 YC9ZAD to ORARI Stasiun  
 Induk Lokal Buleleng, P. O. Box  
 250, Singaraja 81100, Indonesia

The table of QSL managers is  
 courtesy of John Shelton K1XN,  
 editor of The GOLIST, P. O. Box  
 3071, Paris TN 38242; phone  
 901-641-0109; e-mail: <golist@  
 wk.net>

at Ashley's house for possible future operations from Temotu. A complete Yaesu station (courtesy of Yaesu MUSEN Co. Ltd.) with a tribander (courtesy of W6OSP) were donated to the Solomon Islands Radio Society for their future activities. Maybe one day local amateur radio

operators will hit the airwaves, so much so that Solomon DXpeditions could be considered a thing of the past.

**H40AA DXpedition Recap.** What was originally scheduled to be another DXpedition turned out to be a major charity event on sev-



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eral fronts. Our aim was to try to focus on these and other added values that could be considered part of any DXpedition to any remote society where amateur radio does not exist or could be further promoted.

Yet those 67,104 QSOs were made and a sense of satisfaction was very much in evidence among those who traveled to Temotu. Let me pull out a piece of e-mail from James, 9V1YC (AD1AD), to the entire H40AA project group which reflects the essence of our international H40AA three-phase multi-purpose DXpedition:

"Finally, I'd just like to say thanks to the entire team of support crew (G3ZAY, OH1MA, OH2BN, K4MQG, and K6GNX) and the ops for a super expedition. The pilots were there every day, and never missed a beat. Well done. And to the ops, you were probably the most highly skilled team of DXpeditioners assembled in the world. Excellent work all around. It was truly an honor and learning experience to be included with you all. Thank you, and let's do it again!"—James, 9V1YC.

The ultimate measure of success relies on you, the entire global audience of H40AA. Did you make your QSO? Did you make your first QSO quickly? If you were a small pistol in Poland, did you still make your only QSO? And with some extra effort down the line, hopefully

your multiband appetite was satisfied as well. Yours is the final word as the curtain falls after another performance on the DX stage!

The H40AA operation was supported by the Northern California DX Foundation, INDEXA, Mikrolog of Finland, Yaesu Musen Co. Ltd., Alpha Power, and Finnfet Ltd.

Welcome to the H40AA website at <<http://www.iglou.com/n4gn/h40aa/>>. You may surf deeper into Temotu through the website. While checking your QSOs using the website's log search facility, you can also see those in the Five Hundred Century Club—QSOs from 001 through 500! Or maybe you would like to play part of the soundtrack of an early H40AA pile-up, or just play back your own QSO as it sounded on site at Temotu. For the playback function, only the first five hours of contacts are available so that you can try out this new technology feature. We call it DXpedition magic!

[Thanks, Martti, for sharing your thoughts on this new approach to DXpeditioning. An expanded version of this article previously appeared in The DX Magazine.—Chod]

## IOTA Yearbook

The 1998/99 Islands on the Air Directory and Yearbook is now available from the Radio Society of Great Britain (RSGB). The directory list thousands of IOTA islands, including a list by prefix, a new feature this year. In addition to all the rules and forms needed to apply for IOTA awards, the yearbook includes many additional sections: lists of new and rare IOTA islands, the IOTA committee and checkpoints, the IOTA contest, most wanted islands, stories of recent island DXpeditions, and much more. The 112-page softbound book includes 40 color photos and maps. US island chasers should order their copy from Dewitt Jones, W4BAA, P.O. Box 8695, Lacey, WA 98509-8695. Cost is US\$16, postpaid in the US and Canada.

## DX Gatherings

The 46th annual W9DXCC Convention and Banquet is Saturday, September 12, at the Holiday Inn in Rolling Meadows, IL, which is about 10 miles from Chicago's O'Hare airport. The program includes Tim Totten, N4GN, on the H40AA Temotu Island operation; DXCC 2000 presentation by new DXCC Manager Bill Moore, NC1L; an ARRL forum with W9PRN, K9KM, and NC1L; and the W9 QSL bureau by K9BG. The banquet speaker is Fred Laun, K3ZO, LU5HFI, HS1ABD, etc., who always is entertaining and informative. The banquet also includes the presentation of the DX Hog of the Year award. Bill Moore will be checking cards for DXCC. There are hospitality suites both Friday and Saturday evenings. For more information, contact chairman Bill Smith, W9VA, at 847-945-1564, e-mail: <[w9va@aol.com](mailto:w9va@aol.com)>.



Baldur, DJ6SI, haggles for native art in Guinea.

## DX Operations

Three English DXers will operate from the club station of the Ethiopian Amateur Radio Society, ET3AA, in Addis Ababa Sept. 18–27. The three operators, Alan, G3XAQ, Steve, G3VMW, and Andy, G4ZVJ, will concentrate on CW with some SSB. At that time, sunrise in Ethiopia is about 0320Z and sunset is near 1520Z. Suggested frequencies are 1829, 3508, 7008, 10108, 14026, 18076, 21026, 24896, and 28026 kHz. DXers on the east coast should try 40 and 80 meters 22–0400Z, 30 meters 20–0400Z, 20 at 18–



Bob, KK6EK, and the VKØIR plaque left on Heard Island.

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	Fits UG-21 D/U & UG-21 B/U's	1.50
UG-21D/9913	N Male for RG-8 with 9913 Pin	4.00
UG-21B/9913	N Male for RG-8 with 9913 Pin	6.00
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### SSB

2252 ..... KO4YB    2254 ..... AE5DX  
2253 ..... W1TE

### CW

975 ..... W1TE    976 ..... HB9DAX

### RTTY

28 ..... W1TE

### SSB Endorsements

320 ..... YV5IVB/326	250 ..... EA3EJI/265
320 ..... VE4ACY/324	200 ..... KO4YB/209
320 ..... W8AXI/322	200 ..... EA7CD/233
320 ..... W5RUK/321	28 MHz ..... EA3CD
320 ..... NI5D/320	28 MHz ..... W5OXA
300 ..... N3RX/301	3.5/7 MHz ..... EA3CD
275 ..... YT1AT/294	

### CW Endorsements

320 ..... W6SR/324	150 ..... HB9DAX/151
320 ..... KA7T/321	QRPp ..... HB9DAX
250 ..... EA3EJI/260	3.5/7 MHz ..... W1TWW

### RTTY Endorsements

275 ..... W4QB/280    275 ..... W4EEU/276

Total number of active countries is 328. The basic award fee for subscribers to CQ is \$4. For non-subscribers, it is \$10. In order to qualify for the reduced subscriber rate, please enclose your latest CQ mailing label with your application. Endorsement stickers are \$1.00. Updates not involving the issuance of a sticker are made free when an SASE is enclosed for confirmation of total. Rules and application forms for the CQ DX Awards Program may be obtained by sending a business-size, No. 10 envelope, self-addressed and stamped, to CQ DX Awards Manager, Billy Williams, N4UF, Box 9673, Jacksonville, FL 32208 U.S.A. DX stations must include extra postage for airmail reply. Please make all checks payable to the awards manager.

0200Z, 17 at 16-0000Z, and 15 meters 16-2000Z. West coast DXers should try 40 and 80 around 0230Z; 30 at 0200Z; 20 around 1600, 22-0200Z, and 0400Z; 17 meters 18-0200Z; and 15 at 20-2400Z. This operation will include an effort to obtain personal callsigns for a two-week DXpedition next year. QSL this operation of ET3AA via Steve Wilson, G3VMW, 3 Crag Gardens, Bramham, Wetherby, West Yorkshire LS23 6RP, England. More info is available on Steve's web page: <<http://www.bramham.demon.co.uk>>.

Alex, PA3DZN, is operating from the Central African Republic as TL5A until the end of the year. He has been worked on 20 meter SSB, but hopes to be active on all bands eventually.

Ronald Stuy, PA3EWP, and Rob Snieder, PA3ERC, will operate from Jamaica Aug. 27-Sept 8 as 6Y5/PA3EWP and 6Y5/PA3ERC. They will be on all bands 160-6 meters on CW, SSB, and RTTY. They plan to concentrate on the new bands and the low bands for Europe. Following this operation, they move to Cayman Brac, where they will operate as ZF2WP and ZF2RC Sept. 8-20; same info as above. QSL all four calls to Rob Snieder, PA3ERC, Van Leeuwenstraat

137, 2273 VS Voorburg, The Netherlands.

Thanks to "The Daily DX" for the DX news. For more information on this electronic DX newsletter, contact <bernie.mcclenny@mail.wdn.com>.

Finally, the Southern Counties Amateur Radio Association (SCARA) will again this year operate the special event station of **K2BR** Sept. 14-19 from the Miss America Pageant from Atlantic City, New Jersey. Note that Atlantic City is on Absecon Island, NA-111 for IOTA. On SSB, try 7250, 14250, 21325, and 28325 kHz. On CW, try 7090, 14090, 21090, and 28065 kHz. QSL with business-size SASE to SCARA, P.O. Box 121, Linwood, NJ 08221.

### QSL Notes

The correct QSL address for special-event station **W7A** is via W7WK, 421 16th Street SW, Great Falls, MT 59404.

Burt W7IIT reports that his direct QSL from Serge, EK4JJ (ex-UG6JJ), included a note that the Armenia QSL bureau is no longer functioning. Cards sent to P.O. Box 22 will not be delivered.

Fred Laun, K3ZO, reports that he is getting cards for CU3URA. Fred is not the manager for that station; QSL direct via the RAC address. Also, Fred reports get-

ting some cards for 5H3TW. Cards for this station and Tom Warren's other calls of 5H0T, D68TW, J20TW, 5H1TW, K3TW/4S7, and VU2TJW should go via Tom's home call of K3TW or via his current call: DL8TWA.

Mike, W2GR, says that VU2FWW is the QSL manager for VU2JPT and S83KA.

Aki Minagawa, JA0JHA, asks for cards for his operations as **9J2AM** and **9J2A** to go to his home call, via the Japanese bureau.

Chuck, W4NXE, is now **DU3NXE**. He asks for cards direct to him at 222 Villa Leonor, Limay, Bataan, Philippines 2103.

Sigi Bill, HB9DLE, writes that **HB2CA** is the special contest callsign of the Letzi DX group in Switzerland. This is the first use of the HB2 prefix on the air. QSL HB2CA via HB9DLE, P.O. Box 34, Turgi CH-5300, Switzerland.

QSL **P40GH** via Gerald Harley, WA2TTI, 1219 Dorothy Avenue, Phoenixville, PA 19460.

QSL the May special event station of **J47LAF** via Nick Moraitis SV7CO, P.O. Box 46, Alexandroupoli 68100, Hellas-Greece.

QSL the WPX SSB callsign of **J42Z** via op Chris Dimitrakopoulos, SV2CWY, P.O. Box 40130, Thessaloniki 56000, Greece, or via the Greek bureau.

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# PROPAGATION

THE SCIENCE OF PREDICTING RADIO CONDITIONS

## Off to Salt the Ionosphere!

The Royal Observatory of Belgium reports a mean sunspot number of 56.9 for May. A high daily count of 82 was observed on May 14, with a low count of 21 recorded on May 22. This results in a 12-month running smoothed sunspot number of 35 centered on November 1997. The cycle has risen by a count of 3 since last month. The National Geophysical Data Center in Boulder, Colorado is predicting a smoothed sunspot number of 94 centered on September 1998.

The solar cycle is measured by the level of smoothed sunspot number, which is an average of the mean values for the previous 12 months. The Royal Observatory of Belgium is the world's official keeper of solar and sunspot records, which presently are based on daily observations made at 37 different observatories throughout the world.

As expected, there was a corresponding increase in 10.7 solar flux levels during May. According to daily observations made at Penticton, B.C. by the Dominion Radio Astrophysical Observatory, the mean monthly level of 10.7 cm solar flux was 110 units. This results in a smoothed level of 93 centered on November 1997. A smoothed level in the range of 120 is forecast for September 1998.

### CQ DX Contest Special 1998

The 1998 contest weekends will mark the 48th consecutive CQ WW DX Contest for which this column has contained special propagation forecasts. This year's contest weekends are:

October 24–25 SSB section  
November 28–29 CW section

In the tradition of the past 47 years, next month's column will contain a special, comprehensive forecast focusing on both sections of the 1998 contest. Besides worldwide propagation predictions, the column also will contain pointers for scoring as many points as possible and tips to make the most of the Internet.

### Salting the Ionosphere

While there may be no scientific grounds to explain it, my mythical "salting of the ionosphere" prior to the past seven CQ World-Wide DX Contest periods has produced favorable results. I have received several good suggestions for this year's

11307 Clara Street, Silver Spring, MD 20902  
e-mail: g.jacobs@ieee.org

### LAST-MINUTE FORECAST

Day-to-Day Conditions Expected for September 1998

Propagation Index.....	Expected Signal Quality			
	(4)	(3)	(2)	(1)
Above Normal: 2, 6, 18-19, 28	A	A	B	C
High Normal: 1, 7, 16-17, 24-25	A	B	C	C-D
Low Normal: 4-5, 9-12, 15, 20-23, 27, 30-31	B	C-B	C-D	D-E
Below Normal: 3, 8, 13, 26, 29	C	C-D	D-E	E
Disturbed: 14	C-D	D	E	E

Where expected signal quality is:

A—Excellent opening, exceptionally strong, steady signals greater than S9.

B—Good opening, moderately strong signals varying between S6 and S9+, with little fading and noise.

C—Fair opening, signals between moderately strong and weak, varying between S3 and S9, with some fading and noise.

D—Poor opening, with weak signals varying between S1 and S6, with considerable fading and noise.

E—No opening expected.

### HOW TO USE THIS FORECAST

1. Find the *propagation index* associated with the particular path opening from the Propagation Charts appearing on the following pages.
2. With the *propagation index*, use the above table to find the expected signal quality associated with the path opening for any given day of the month. For example, an opening shown in the Propagation Charts with a *propagation index* of (3) will be good (B) on September 1st, excellent (A) on the 2nd, fair-to-poor (C-D) on the 3rd, fair-to-good (C-B) on the 4th and 5th, etc.

salting pilgrimage. After much thought and consultation, it may be no surprise to readers of this column that I am packing my bags of "salt" and heading for Brussels, Belgium and the Royal Observatory of Belgium! This renown Institution is a world leader in a wide spectrum of scientific investigation, but its main association with the ionosphere and HF propagation is that it has been selected as the world's Sunspot Index Data Center (SIDC). More than three dozen of the world's largest observatories send daily records of their solar observations to the SIDC for correlation and for mathematically determining the official daily, monthly, smoothed, and yearly sunspot numbers. I do not believe that there is any other place in the world that is as associated with sunspots as the Royal Observatory of Belgium, and I will be there during the last week of August for my 1998 "salting" pilgrimage.

### September Propagation

Propagation conditions generally are quite variable on the HF bands during

September. This is usually a transitional month between typically summer and typically wintertime conditions. For this reason this month's column contains DX Propagation Charts for the one-month period September 15 to October 15, rather than the usual two-month span. This month's column also contains Short-Skip Propagation Charts for September and October.

During September and early October expect a noticeable increase in 10 and 12 meter DX openings during the daylight hours. A considerable improvement is also expected on 15 and 17 meters, with the bands opening for DX shortly after sunrise, and remaining open to one area of the world or another until past sunset. It probably will be a toss-up between the 15 and 20 meter bands for DX honors during the sunlight hours of September, with a slight edge in favor of 20 meters. Expect 20 meters to open for DX at sunrise and to remain open for a window of several hours, during which time it should be possible to work most areas of the world. Conditions should dip a bit during the high noon hours, with another peak in worldwide openings expected during the late afternoon and evening.

Once the sun has set, look for improved DX conditions on 30, 40, 80, and 160 meters. With increasing hours of darkness and decreasing static levels, openings should be more numerous on these bands, with stronger and quieter signals. Expect peak signals from a generally easterly direction at approximately midnight and from the west at sunrise. Signals from other directions generally will remain strong during much of the nighttime period. While 40 meters is expected to be the best band for worldwide DX during this period, be sure to check 20 and 30 meters for some good DX openings during the hours of darkness. Openings should be possible toward the south and equatorial areas, towards the South Pacific, and to other areas as well.

For short-skip propagation during September and October, use 80 meters during the day for openings shorter than 250 miles, and either 80 or 160 meters at night over this range. For openings between 250 and 750 miles, try 30 and 40 meters during the day and 80 meters at night. For distances between 750 and 1300 miles, the best bet should be 20 meters by day, 30 and 40 meters from sundown to midnight, and 80 meters from midnight to sunrise. For openings beyond 1300 miles, try

## HOW TO USE THE SHORT-SKIP CHARTS

1. In the Short-Skip Chart, the predicted times of openings can be found under the appropriate distance column of a particular meter band (10 through 160 meters) as shown in the left-hand column of the chart. For the Alaska and Hawaii Charts the predicted times of openings are found under the appropriate meter band column (15 through 80 meters) for a particular geographical region of the continental USA as shown in the left-hand column of the charts. An \* indicates the best time to listen for 160 meter openings. An \*\* indicates possible 10 meter openings.

2. The propagation index is the number that appears in ( ) after the time of each predicted opening. In the Short-Skip Chart, where two numerals are shown within a single set of parentheses, the first applies to the shorter distance for which the forecast is made, and the second to the greater distance. The index indicates the number of days during the month on which the opening is expected to take place, as follows:

- (4) Opening should occur on more than 22 days
- (3) Opening should occur between 14 and 22 days
- (2) Opening should occur between 7 and 13 days
- (1) Opening should occur on less than 7 days

Refer to the "Last-Minute Forecast" at the beginning of this column for the actual dates on which an opening with a specific propagation index is likely to occur, and the signal quality that can be expected.

3. Times shown in the charts are in the 24-hour system, where 00 is midnight; 12 is noon; 01 is 1 AM; 13 is 1 PM, etc. On the Short-Skip Chart appropriate daylight time is used at the path midpoint. For example on a circuit between Maine and Florida, the time shown would be EDT, on a circuit between New York and Texas, the time at the midpoint would be CDT, etc. Times shown in the Hawaii Chart are in HST. To convert to daylight time in other USA time zones add 3 hours in the PDT zone; 4 hours in the MDT zone; 5 hours in the CDT zone; and 6 hours in the EDT zone. Add 10 hours to convert from HST to GMT. For example, when it is 12 noon in Honolulu, it is 15 or 3 PM in Los Angeles; 18 or 6 PM in Washington, D.C.; and 22 GMT. Time shown in the Alaska Chart is given in GMT. To convert to daylight time in other areas of the USA subtract 7 hours in the PDT zone; 6 hours in the MDT zone; 5 hours in the CDT zone; and 4 hours in the EDT zone. For example, at 20 GMT it is 16 or 4 PM in New York City.

4. The Short-Skip Chart is based upon a transmitted power of 75 watts CW or 300 watts PEP on sideband; the Alaska and Hawaii Charts are based upon a transmitter power of 250 watts CW or 1 KW PEP on sideband. A dipole antenna a quarter-wavelength above ground is assumed for 160 and 80 meters, a half-wave above ground on 40 and 20 meters, and a wavelength above ground on 15 and 10 meters. For each 10 dB gain above these reference levels, the propagation index will increase by one level; for each 10 dB loss, it will lower by one level.

5. Propagation data contained in the charts has been prepared from basic data published by the Institute for Telecommunication Sciences of the U.S. Dept. of Commerce, Boulder, Colorado 80302.

## CQ Short-Skip Propagation Chart September & October 1998 Local Daylight Savings Time At Path Mid-Point (24-Hour Time)

Band (meters)	Distance Between Stations (miles)			
	50-250	250-750	750-1300	1300-2300
10	Nil	10-21 (0-1)	08-10 (1) 10-13 (1-2) 13-15 (1-3) 15-16 (1-2) 16-21 (0-1)	08-10 (1) 10-13 (2) 13-15 (3) 15-16 (2-3) 16-17 (1-2) 17-19 (1) 19-21 (1-0)
15	Nil	08-10 (0-1) 10-15 (0-2) 15-21 (0-1)	08-09 (1) 09-10 (1-2) 10-15 (2-4) 15-17 (1-4) 17-18 (1-3) 18-20 (1-2) 20-21 (1) 21-08 (0-1)	08-09 (1) 09-10 (2-3) 10-11 (4-3) 11-17 (4) 17-18 (3) 18-19 (2-3) 19-20 (2) 20-21 (1) 21-08 (1-0)
20	12-14 (0-1) 14-16 (0-2) 16-22 (0-1)	08-09 (0-1) 09-10 (0-2) 10-11 (0-3)	06-08 (1-2) 08-09 (1-3) 09-10 (2-4) 10-11 (3-4) 11-12 (4) 14-16 (1-4) 18-19 (3-4) 19-22 (2-3) 21-22 (3) 22-00 (1-2) 22-23 (2-3) 00-06 (1) 23-00 (2) 00-06 (1)	06-08 (2) 08-09 (3) 09-14 (4-2) 14-16 (4-3) 16-19 (4) 19-21 (3-4) 21-22 (3) 22-23 (2-3) 23-00 (2) 00-06 (1)

40	08-10 (1-3) 10-12 (2-4) 12-18 (3-4) 18-19 (2-3) 19-21 (1-2) 21-06 (0-1) 06-08 (0-2)	08-10 (3-4) 10-12 (4-3) 12-16 (4-2) 16-18 (4-3) 18-19 (3-4) 19-21 (2-4) 21-23 (1-4) 23-03 (1-3) 03-06 (1-2) 06-08 (2-3)	08-10 (4-2) 10-12 (3-1) 12-16 (2-1) 16-18 (3-2) 18-19 (4-2) 19-20 (4-3) 20-23 (4) 23-03 (3-4) 03-06 (2-3) 06-08 (3-4)	08-10 (2-1) 10-16 (1-0) 16-18 (2-1) 18-19 (2) 19-20 (3) 20-21 (4-3) 21-03 (4) 03-05 (3-4) 05-06 (3) 06-08 (4-3)
80	07-09 (3-4) 09-12 (4) 12-19 (4-3) 19-23 (4) 23-05 (3-4) 05-07 (2-3)	07-09 (4-2) 09-12 (4-1) 12-17 (3-1) 17-19 (3-2) 19-21 (4-3) 21-05 (4) 05-06 (3-4) 06-07 (3)	07-09 (2-1) 09-17 (1-0) 17-19 (2-1) 19-21 (3-2) 21-22 (4-3) 22-04 (4) 04-06 (4-3) 06-07 (3-2)	07-09 (1) 09-17 (0) 17-19 (1) 19-21 (2) 21-22 (3-2) 22-04 (4-3) 04-06 (3-2) 06-07 (2-1)
160	17-19 (1-0) 19-21 (2-1) 21-06 (4) 06-08 (3-2) 08-10 (2-1) 10-12 (1-0)	18-20 (1-0) 20-21 (1) 21-03 (4-3) 03-06 (3-2) 06-08 (2-1) 08-10 (1-0)	20-21 (1-0) 21-23 (3-1) 23-03 (3) 03-06 (2-1) 06-08 (1) 08-10 (1-0)	21-23 (1-0) 23-03 (3-2) 03-06 (1) 06-08 (1-0)

## ALASKA September & October 1998 Openings Given in GMT#

To:	10 Meters	15 Meters	20 Meters	40/80 Meters
Eastern USA	19-22 (1)	17-19 (1) 19-23 (2) 23-00 (1)	12-15 (1) 18-21 (1) 21-23 (2) 23-01 (3) 01-02 (2) 02-04 (1)	08-12 (1)
Central USA	20-00 (1)	17-19 (1) 19-21 (2) 21-23 (3) 23-01 (2) 01-02 (1)	13-22 (1) 22-00 (2) 00-03 (3) 03-04 (2) 04-06 (1)	08-11 (1) 11-13 (2) 13-14 (1) 11-13 (1)*
Western USA	20-22 (1) 22-01 (2) 01-02 (1)	18-21 (1) 21-22 (2) 22-00 (4) 00-01 (3) 01-02 (2) 02-03 (1)	16-18 (1) 18-20 (3) 20-00 (2) 00-02 (3) 02-03 (4) 03-04 (3) 04-05 (2) 05-07 (1)	08-11 (1) 11-14 (2) 14-16 (1) 11-14 (1)*

## HAWAII September & October 1998 Openings Given in Hawaiian Standard Time #

To:	10 Meters	15 Meters	20 Meters	40/80 Meters
Eastern USA	08-10 (1) 10-13 (2) 13-14 (1)	07-11 (1) 11-12 (2) 12-14 (3) 14-15 (2) 15-16 (1)	11-13 (1) 13-14 (2) 14-18 (3) 18-20 (2) 20-04 (1) 04-07 (2) 07-08 (1)	18-20 (1) 20-22 (2) 22-00 (3) 00-02 (2) 02-03 (1) 10-21 (1)* 21-00 (2)* 00-01 (1)*
Central USA	08-10 (1) 10-14 (2) 14-16 (1)	07-10 (1) 10-12 (2) 12-16 (3) 16-17 (2) 17-18 (1)	09-13 (1) 13-14 (2) 14-15 (3) 15-18 (4) 18-19 (3) 19-21 (2) 21-04 (1) 04-09 (2)	18-20 (1) 20-22 (2) 22-02 (3) 02-04 (2) 04-05 (1) 19-21 (1)* 21-00 (2)* 00-02 (1)*
Western USA	08-09 (1) 09-10 (2) 10-15 (3) 15-16 (2) 16-17 (1)	07-09 (1) 09-10 (2) 10-13 (3) 13-15 (4) 15-16 (3)	10-12 (2) 12-14 (3) 14-18 (4) 18-20 (3) 20-00 (2) 16-17 (2) 17-19 (1) 00-05 (1) 05-06 (2) 06-10 (3)	18-19 (1) 19-20 (2) 20-02 (4) 02-04 (3) 04-05 (2) 05-06 (1) 19-20 (1)* 20-22 (2)* 22-02 (3)* 02-04 (2)* 04-05 (1)*

\* Indicates best time to listen for 80 meter openings. Openings on 160 meters are also likely to occur during those times when 80 meter openings are shown with a propagation index of (2) or higher.

Note: The Alaska and Hawaii Propagation Charts are intended for distances greater than 1300 miles. For shorter distances use the preceding Short-Skip Chart.

#See explanation in "How To Use Short-Skip Charts" in this column.

15, 17, or 20 meters during the day, and 30 and 40 meters during the hours of darkness. Check 10 meters and 12 meters for some fairly good openings beyond 1300 miles during the afternoon hours, particularly when conditions are High Normal or better.

## Equinoctial Propagation

September 22 will mark the fall, or autumnal, equinox. On this day the sun will cross the plane of the Earth's equator as it appears to travel from northern to southern skies, and the hours of daylight and darkness will be equal in length throughout the world. Sunrise should take place at approximately 6 AM local time and sunset at about 6 PM local time, no matter where you are.

For a period of approximately two weeks before to about two weeks after the autumnal equinox, the characteristics of the ionosphere are similar over large areas of the world in comparison to the widely different characteristics that are observed during the summer and winter seasons. For this reason, the equinoctial periods (a similar period, called the spring equinox, occurs on March 21st) are generally considered to be the best times for DX openings between the temperate regions of the northern and southern hemispheres.

Gray-line DX conditions also peak during equinoctial periods. These are long openings that occur during the sunrise and sunset periods as signals appear to follow the day-night terminator. Over the pole, DX and long-path openings are expected to increase considerably during late September, and stations along the terminator should provide strong signal openings.

From mid-September through mid-October look for a considerable improvement in openings between the USA and South America, to the South Pacific area and Australasia, to southern Asia, and to southern Africa and Antarctica. The improvement should take place on all HF bands, but it will be most noticeable on 15, 17, and 20 meters during the day and 30 and 40 meters at night.

## VHF Ionospheric Openings

While sporadic-E propagation is expected to taper off considerably by September, some 6 meter openings should still be possible over distances of approximately 750 to 1300 miles. During periods of intense widespread sporadic-E ionization, two-hop openings may be possible considerably beyond this range. Check the 2 meter band for an occasional sporadic-E type opening between approximately 1200 to 1400 miles. While these types of short-skip openings can take

## HOW TO USE THE DX PROPAGATION CHARTS

1. Use chart appropriate to your transmitter location. The Eastern USA Chart can be used in the 1, 2, 3, 4, 8, KP4, KG4, and KV4 areas in the USA and adjacent call areas in Canada; the Central USA Chart in the 5, 9, and 0 areas; the Western USA Chart in the 6 and 7 areas; and with somewhat less accuracy in the KH6 and KL7 areas.

2. The predicted times of openings are found under the appropriate meter band column (10 through 80 meters) for a particular DX region, as shown in the left-hand column of the charts. An \* indicates the best time to listen for 160 meter openings.

3. The propagation index is the number that appears in ( ) after the time of each predicted opening. The index indicates the number of days during the month on which the opening is expected to take place as follows:

- (4) Opening should occur on more than 22 days
- (3) Opening should occur between 14 and 22 days
- (2) Opening should occur between 7 and 13 days
- (1) Opening should occur on less than 7 days

Refer to the "Last Minute Forecast" at the beginning of this column for the actual dates on which an opening with a specific propagation index is likely to occur, and the signal quality that can be expected.

4. Times shown in the charts are in the 24-hour system, where 00 is midnight; 12 is noon; 01 is 1 A.M.; 13 is 1 P.M., etc. Appropriate *daylight* time is used, not GMT. To convert to GMT, add to the times shown in the appropriate chart 7 hours in PDT Zone, 6 hours in MDT Zone, 5 hours in CDT Zone, and 4 hours in EDT Zone. For example, 14 hours in Washington, D.C. is 18 GMT. When it is 20 hours in Los Angeles, it is 03 GMT, etc.

5. The charts are based upon a transmitted power of 250 watts CW, or 1 kw, PEP on sideband, into a dipole antenna a quarter-wavelength above ground on 160 and 80 meters, and a half-wavelength above ground on 40 and 20 meters, and a wavelength above ground on 15 and 10 meters. For each 10 dB gain above these reference levels, the *propagation index* will increase by one level; for each 10 dB loss, it will lower by one level.

6. Propagation data contained in the charts has been prepared from basic data published by the Institute for Telecommunication Sciences of the U.S. Dept of Commerce, Boulder, Colorado 80302.

### September 15 - October 15, 1998 Time Zone: EDT (24-Hour Time) EASTERN USA TO:

To:	10 Meters	15 Meters	20 Meters	40/80 Meters
Western & Central	09-11 (1)	08-09 (1)	03-04 (1)	18-19 (1)
Europe & North Africa	12-14 (1)	11-14 (4)	06-10 (3)	21-23 (3)
		14-15 (3)	10-12 (2)	23-02 (4)
		15-16 (2)	12-15 (3)	02-03 (3)
		16-17 (1)	15-17 (4)	03-04 (2)
			17-19 (3)	04-05 (1)
			19-20 (2)	20-22 (1)*
			20-21 (1)	22-01 (2)*
				01-04 (1)*

Northern Europe & European CIS	09-12 (1)	08-09 (1)	03-06 (1)	18-20 (1)
		09-10 (2)	06-08 (2)	20-04 (2)
		10-12 (3)	08-11 (3)	04-06 (1)
		12-13 (2)	11-13 (2)	21-04 (1)*
		13-15 (1)	13-17 (3)	
			17-18 (2)	
			18-20 (1)	
Eastern Mediteranean & Middle East	10-13 (1)	08-09 (1)	07-09 (2)	19-21 (1)
		09-12 (2)	09-15 (1)	21-00 (2)
		12-14 (3)	15-17 (2)	00-01 (1)
		14-16 (2)	17-20 (3)	22-23 (1)*
		16-17 (1)	20-21 (2)	
			21-23 (1)	
			23-01 (2)	
			01-07 (1)	
Western Africa	11-13 (1)	07-09 (1)	05-08 (2)	20-23 (1)
		09-13 (2)	08-15 (1)	23-02 (2)
		14-16 (3)	13-15 (3)	02-04 (1)
		16-17 (2)	15-17 (4)	00-03 (1)*
		17-18 (1)	17-18 (3)	
			18-21 (4)	
			18-19 (2)	
			21-23 (3)	
			19-20 (1)	
			23-03 (2)	
			03-05 (1)	
Eastern & Central Africa	13-15 (1)	08-09 (1)	12-14 (1)	20-02 (1)
		09-13 (2)	14-17 (2)	00-01 (1)*
		13-15 (3)	17-21 (3)	
		15-17 (4)	21-01 (2)	
		17-18 (3)	01-02 (1)	
		18-19 (2)		
		19-20 (1)		
Southern Africa	09-11 (1)	08-11 (1)	14-16 (1)	19-22 (1)
		11-12 (2)	16-19 (2)	22-00 (2)
		13-14 (1)	12-13 (3)	00-02 (1)
			13-15 (4)	23-01 (1)*
			15-16 (3)	
			16-17 (2)	
			17-18 (1)	
Central & South Asia	09-11 (1)	09-10 (1)	07-08 (1)	05-07 (1)
		19-21 (1)	10-12 (2)	20-23 (1)
			12-13 (1)	10-12 (1)
			20-22 (1)	17-19 (1)
				19-22 (2)
				22-00 (1)
Southeast Asia	11-13 (1)	09-11 (1)	06-07 (1)	06-08 (1)
		18-20 (1)	14-16 (1)	07-10 (2)
			18-19 (1)	10-12 (1)
			19-20 (2)	15-18 (1)
			20-21 (1)	20-21 (1)
				21-23 (2)
				23-01 (1)
Far East	18-20 (1)	10-12 (1)	07-08 (1)	05-08 (1)
			16-18 (1)	08-10 (2)
			18-20 (2)	10-12 (1)
			20-21 (1)	17-20 (1)
				20-22 (2)
				22-00 (1)
				06-07 (1)*
South Pacific & New Zealand	09-15 (1)	09-14 (1)	08-10 (3)	01-02 (1)
		15-17 (2)	14-18 (2)	02-03 (2)
		17-19 (3)	18-20 (3)	12-20 (1)
			20-21 (2)	03-06 (3)
		19-20 (2)	20-21 (2)	20-23 (2)
		20-21 (1)	21-22 (1)	06-08 (2)
				23-03 (3)
				08-09 (1)
				03-07 (1)
				03-05 (1)*
				05-07 (2)*
				07-08 (1)*

Australasia	10-12 (1)	09-11 (1)	07-09 (2)	02-04 (1)
	16-17 (1)	14-17 (1)	09-11 (3)	04-06 (2)
	17-19 (2)	17-18 (2)	11-13 (2)	06-07 (3)
	19-20 (1)	18-20 (3)	13-16 (1)	07-08 (2)
		20-21 (2)	16-18 (2)	08-09 (1)
		21-22 (1)	18-21 (1)	04-05 (1)*
			21-23 (2)	05-06 (2)*
			23-01 (3)	06-07 (1)*
			01-03 (2)	
			03-07 (1)	
Caribbean, Central America & Northern Countries of South America	10-11 (1)	08-09 (1)	04-06 (1)	19-20 (1)
	11-14 (2)	09-10 (2)	06-07 (2)	20-21 (2)
	14-17 (4)	10-13 (3)	07-08 (3)	21-04 (4)
	17-18 (2)	13-18 (4)	08-10 (4)	04-06 (3)
	18-19 (1)	18-19 (3)	10-15 (2)	06-07 (2)
		19-20 (2)	15-17 (3)	07-08 (1)
		20-21 (1)	17-22 (4)	21-23 (1)*
			22-03 (3)	23-04 (2)*
			03-04 (2)	04-06 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	09-10 (1)	08-09 (1)	11-16 (1)	21-00 (1)
	10-12 (2)	09-11 (2)	16-17 (2)	00-05 (2)
	12-14 (1)	11-14 (1)	17-20 (3)	05-07 (1)
	14-15 (2)	14-16 (2)	20-01 (4)	01-06 (1)*
	15-17 (4)	16-17 (3)	01-03 (3)	
	17-18 (3)	17-19 (4)	03-04 (2)	
	18-19 (1)	19-20 (3)	04-07 (1)	
		20-21 (2)	07-08 (2)	
			21-22 (1)	08-10 (3)
				10-11 (2)
McMurdo Sound, Antarctica	16-18 (1)	12-15 (1)	16-18 (1)	23-01 (1)
		15-18 (2)	18-21 (2)	01-05 (2)
		18-19 (3)	21-23 (3)	04-06 (1)
		19-20 (2)	23-01 (2)	04-06 (1)*
		20-21 (1)	01-03 (1)	
			07-09 (1)	

### Time Zones: CDT & MDT (24-Hour Time) CENTRAL USA TO:

To:	10 Meters	15 Meters	20 Meters	40/80 Meters
Western & Central Europe & North Africa	09-12 (1)	08-10 (1)	06-07 (1)	18-20 (1)
		10-11 (2)	07-10 (2)	20-23 (2)
		11-13 (3)	10-13 (1)	23-01 (3)
		13-14 (2)	13-14 (2)	01-02 (2)
		14-16 (1)	14-16 (4)	02-03 (1)
			16-17 (3)	21-23 (1)*
			17-20 (2)	23-01 (2)*
			20-23 (1)	01-02 (1)*
Northern Europe & European CIS	09-11 (1)	08-10 (1)	06-07 (1)	20-23 (1)
		10-12 (2)	07-10 (2)	23-01 (2)
		12-14 (1)	10-12 (1)	01-02 (1)
			12-13 (2)	22-01 (1)*
			13-15 (3)	
			15-16 (2)	
			16-18 (1)	
			22-01 (1)	
Eastern Mediteranean & Middle East	10-12 (1)	08-10 (1)	06-07 (1)	20-23 (1)
		10-13 (2)	07-09 (2)	21-23 (1)*
		13-14 (1)	09-15 (1)	
			15-18 (2)	
			18-21 (1)	
			21-23 (2)	
			23-00 (1)	
Western Africa	11-13 (1)	07-10 (1)	05-06 (1)	20-23 (1)
		10-13 (2)	06-08 (2)	23-01 (2)
		15-17 (1)	13-15 (3)	08-15 (3)
			15-17 (4)	01-02 (1)
			17-18 (2)	23-01 (1)*
			17-18 (3)	
			18-19 (1)	
			18-19 (4)	
			19-22 (3)	
			22-00 (2)	
			00-01 (1)	
Eastern & Central Africa	12-15 (1)	09-11 (1)	13-15 (1)	21-00 (1)
		11-15 (2)	15-17 (2)	
		15-16 (3)	17-19 (3)	
		16-17 (2)	19-21 (2)	
		17-18 (1)	21-22 (1)	
Southern Africa	10-11 (1)	07-09 (1)	06-08 (2)	20-21 (1)
		09-12 (2)	08-14 (1)	21-23 (2)
		11-13 (2)	14-16 (2)	23-01 (1)
		13-14 (1)	16-19 (3)	21-23 (1)*
			14-15 (3)	
			15-16 (2)	
			16-17 (1)	
				23-01 (2)
				01-02 (1)
Central South Asia	09-11 (1)	09-11 (1)	07-08 (1)	06-08 (1)
	18-20 (1)	18-19 (1)	08-10 (2)	19-21 (1)
			19-21 (2)	

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	21-22 (1)	17-19 (1)		
		19-21 (2)		
		21-23 (1)		
Southeast Asia	10-12 (1) 18-20 (1)	09-11 (1) 14-17 (1) 17-19 (2) 19-21 (1)	06-08 (1) 08-10 (2) 10-13 (1) 16-21 (1) 21-00 (2) 00-02 (1)	05-09 (1)
Far East	17-18 (1) 18-19 (2) 19-20 (1)	10-16 (1) 16-18 (2) 18-20 (3) 20-21 (2) 21-22 (1)	07-08 (1) 08-10 (3) 10-12 (2) 17-21 (1) 21-00 (2) 00-02 (1)	03-05 (1) 05-08 (2) 08-09 (1) 06-08 (1)*
South Pacific & New Zealand	13-15 (1) 15-17 (2) 17-19 (3) 19-20 (2) 20-21 (1)	09-13 (1) 13-17 (2) 17-19 (4) 19-20 (3) 20-21 (2) 21-23 (1)	07-08 (2) 08-11 (3) 11-13 (2) 13-18 (1) 18-20 (2) 20-22 (3) 22-00 (4) 00-01 (3) 00-03 (2) 03-07 (1)	00-01 (1) 01-06 (3) 06-08 (4) 08-09 (2) 09-10 (1) 02-04 (1)* 04-07 (2)* 07-08 (1)*
Australasia	14-16 (1) 16-18 (2) 18-19 (3) 19-20 (2) 20-21 (1)	09-11 (1) 13-17 (1) 17-19 (2) 19-20 (3) 20-21 (2) 21-22 (1)	16-18 (2) 18-21 (1) 21-23 (2) 23-03 (3) 03-04 (2) 04-07 (1) 07-09 (2) 09-11 (3) 11-13 (2) 13-16 (1)	02-03 (1) 03-05 (2) 05-07 (3) 07-08 (2) 08-09 (1) 05-06 (1)* 06-07 (2)* 07-08 (1)*
Caribbean, Central America & Northern Countries of South America	09-10 (1) 10-11 (2) 11-13 (3) 13-16 (4) 16-18 (2) 18-19 (1)	07-08 (1) 08-10 (2) 10-13 (3) 13-17 (4) 17-18 (3) 18-20 (2) 20-21 (1)	07-10 (4) 10-12 (3) 12-15 (2) 15-17 (3) 17-22 (4) 22-01 (3) 01-03 (2) 03-05 (1) 05-07 (2)	19-20 (1) 20-21 (2) 21-01 (3) 01-05 (4) 05-06 (3) 06-07 (2) 07-08 (1) 20-23 (1)* 23-05 (2)* 05-06 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	09-10 (1) 10-13 (2) 13-15 (3) 15-17 (4) 17-18 (2) 18-19 (1)	07-08 (1) 08-11 (3) 11-15 (2) 15-16 (3) 16-19 (4) 19-20 (3) 20-21 (2) 21-22 (1)	04-08 (1) 08-10 (2) 10-16 (1) 16-18 (2) 18-20 (3) 20-23 (4) 23-02 (3) 02-04 (2)	21-00 (1) 00-04 (2) 04-06 (1) 01-05 (1)*
McMurdo Sound, Antarctica	15-18 (1)	11-16 (1) 16-18 (2) 18-19 (3) 19-20 (2) 20-21 (1)	08-09 (1) 17-19 (1) 19-20 (2) 20-23 (3) 23-00 (2) 00-03 (2)	00-03 (1) 03-05 (2) 05-07 (1) 04-06 (1)*

**Time Zone: PDT (24-Hour Time) WESTERN USA TO:**

To:	10 Meters	15 Meters	20 Meters	40/80 Meters
Western Europe & North Africa	09-11 (1)	08-09 (1) 09-12 (2) 12-14 (1)	06-07 (1) 07-10 (2) 10-13 (1) 13-14 (2) 14-16 (3) 16-17 (2) 17-19 (1)	20-21 (1) 21-23 (2) 23-00 (1) 21-23 (1)*
Central & Northern Europe & European USSR	Nil	08-09 (1) 09-11 (2) 11-13 (1)	06-07 (1) 07-09 (2) 09-12 (1) 12-14 (2) 14-16 (2) 21-23 (1)	20-00 (1) 20-22 (1)*
Eastern Mediteranean & Middle East	Nil	08-09 (1) 09-11 (2) 11-12 (1) 20-22 (1)	06-07 (1) 07-10 (2) 10-13 (1) 13-15 (2) 15-16 (1) 19-20 (1) 20-22 (2) 22-23 (1)	20-23 (1)
Western & Central Africa	11-12 (1) 12-14 (2) 14-15 (1)	08-10 (1) 10-13 (2) 13-16 (3) 16-17 (2) 17-18 (2)	06-07 (1) 07-09 (2) 09-14 (1) 14-15 (2) 15-16 (3) 16-18 (4)	21-00 (1)

			18-20 (3)	
			20-22 (2)	
			22-00 (1)	
Eastern Africa	11-14 (1)	10-13 (1) 13-16 (2) 16-17 (1)	07-09 (1) 12-15 (1) 15-19 (2) 19-21 (1)	20-22 (1)
Southern Africa	10-13 (1)	07-09 (1) 09-11 (2) 11-13 (3) 13-15 (2) 15-16 (1)	05-07 (1) 07-09 (2) 09-10 (1) 12-14 (1) 14-16 (2) 16-18 (3) 18-19 (2) 19-22 (1) 22-00 (2) 00-01 (1)	19-22 (1)
Central & South Asia	17-19 (1)	08-11 (1) 16-17 (1) 17-19 (2) 19-21 (1)	07-08 (1) 08-11 (2) 11-13 (1) 17-19 (1) 19-21 (2) 21-23 (1)	06-08 (1) 19-21 (1)
Southeast Asia	16-19 (1)	10-11 (1) 11-13 (2) 13-16 (1) 16-18 (2) 18-21 (1)	05-07 (1) 07-09 (3) 09-11 (2) 11-12 (1) 21-23 (1) 23-01 (2) 01-02 (1)	01-03 (1) 03-06 (2) 06-08 (1) 03-06 (1)*
Far East	16-17 (1) 17-18 (2) 18-19 (1)	14-15 (1) 15-17 (2) 17-19 (3) 19-20 (2) 20-21 (1)	07-08 (1) 08-09 (2) 09-10 (4) 10-13 (3) 13-15 (2) 15-20 (1) 20-22 (2) 22-00 (3) 00-01 (2) 01-03 (1)	01-03 (1) 03-07 (2) 07-08 (3) 08-09 (1) 03-05 (1)* 05-07 (2)* 07-08 (1)*
South Pacific & New Zealand	11-13 (1) 13-15 (2) 15-17 (3) 17-19 (2) 19-20 (1)	09-11 (1) 11-13 (3) 13-17 (2) 17-19 (3) 19-21 (4)	13-19 (1) 19-21 (2) 21-23 (3) 23-01 (4) 01-03 (3) 03-05 (2) 05-06 (1) 06-07 (2) 07-09 (3) 09-13 (2)	21-22 (1) 22-23 (2) 23-00 (3) 00-05 (4) 05-07 (3) 07-08 (2) 08-09 (1) 23-02 (1)* 02-06 (2)* 06-07 (1)*
Australasia	14-15 (1) 15-17 (2) 17-19 (3) 19-20 (2) 20-21 (1)	08-10 (1) 13-17 (1) 17-19 (2) 19-21 (3) 21-22 (2) 22-23 (1)	19-21 (1) 21-23 (2) 23-01 (4) 01-03 (3) 03-04 (2) 04-07 (1) 07-08 (2) 08-10 (3) 10-12 (2) 12-13 (1)	01-02 (1) 02-03 (2) 03-06 (3) 06-08 (2) 08-09 (1) 02-04 (1)* 04-06 (2)* 06-07 (1)*
Caribbean, Central America & Northern Countries of South America	09-10 (1) 10-11 (2) 11-13 (3) 13-15 (4) 15-16 (3) 16-17 (2) 17-18 (1)	07-08 (1) 08-10 (2) 10-12 (2) 12-15 (3) 15-17 (4) 17-18 (3) 18-19 (2) 19-20 (1)	06-08 (4) 08-10 (3) 10-15 (2) 15-17 (3) 17-23 (4) 23-01 (3) 01-03 (2) 03-05 (1) 05-06 (2)	19-21 (1) 21-02 (3) 02-04 (2) 04-07 (1) 20-22 (1)* 22-03 (2)* 03-05 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	09-10 (1) 10-12 (2) 12-14 (3) 14-16 (4) 16-17 (3) 17-18 (2)	07-08 (1) 08-09 (2) 09-13 (1) 13-15 (2) 15-16 (3) 16-19 (4) 19-20 (2) 20-21 (1)	06-15 (1) 15-17 (2) 17-19 (3) 19-23 (4) 23-01 (3) 01-06 (2)	21-23 (1) 23-02 (2) 02-04 (1) 00-03 (1)*
McMurdo Sound, Antarctica	14-18 (1)	11-15 (1) 15-17 (2) 17-19 (3) 19-20 (2) 20-21 (1)	08-10 (1) 17-19 (1) 19-20 (2) 20-23 (3) 23-00 (2) 01-03 (1)	01-03 (1) 03-05 (2) 05-07 (1) 03-06 (1)*

\* Indicates best time to listen for 80 meter openings. Openings on 160 meters are also likely to occur during those times when 80 meter openings are shown with a propagation index of (2) or higher.  
For 12 meter openings interpolate between 10 and 15 meter openings.  
For 17 meter openings interpolate between 15 and 20 meter openings.  
For 30 meter openings interpolate between 40 and 20 meter openings.

place at any time, as the name implies, during the late summer there is a tendency for it to peak between 8 AM and noon and again between 6 and 9 PM local daylight time.

Trans-equatorial (TE) openings on 6 meters should begin to improve during September and become fairly frequent by the end of the month. The best time for these openings is between 8 and 11 PM local daylight time. This type of propagation favors considerably openings from the southern tier states into deep South America, but an occasional opening should also be possible from more northern states.

Although no major meteor showers are expected during September, some minor ones may permit meteor-scatter-type openings on the VHF bands during the first two or three days of the month, and again for several days after September 20.

There is often a seasonal increase in auroral activity during the equinoctial periods, so expect some 6 and 2 meter auroral-type short-skip openings during the month. The best possibilities for such openings should coincide with periods of expected storminess on the HF bands. Check the Last-Minute Forecast at the beginning of this column for those days during September that are expected to be Below Normal or Disturbed.

73, George, W3ASK

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**Announcing:****The 1998 CQ WW DX Contest**

**Phone: October 24–25**  
**Starts 0000 GMT Saturday**

**CW: November 28–29**  
**Ends 2400 GMT Sunday**

**I. OBJECTIVE:** For amateurs around the world to contact other amateurs in as many zones and countries as possible.

**II. BANDS:** All bands, 1.8 through 28 MHz, except for WARC bands.

**III. TYPE OF COMPETITION** (choose only one):

**For all categories: All entrants must operate within the limits of their chosen category when performing any activity that could impact their submitted score.** Transmitters and receivers must be located within a 500 meter diameter circle or within the property limits of the station licensee's address, whichever is greater. All antennas used by the entrant must be physically connected by wires to the transmitters and receivers used by the entrant. Only the entrant's callsign can be used to aid the entrant's score.

**A. Single Operator Categories:** Single band or all band; only one signal allowed at any one time; the operator can change bands at any time.

1. Single Operator High: Those stations at which one person performs all of the operating, logging, and spotting functions. The use of DX alerting assistance of any kind places the station in the Single Operator Assisted category.

2. Single Operator Low: Same as III A 1 except that the output power shall not exceed 100 watts (see rule XI. 11).

3. QRPp: Same as III A 1, except that the power output must not exceed 5 watts (see rule XI.11).

**B. Single Operator Assisted:** Same as III A 1 except the passive (self-spotting not allowed) use of DX spotting nets is allowed.

**C. Multi-Operator** (all band operation only):

1. Single Transmitter: Only one transmitter and one band permitted during any 10-minute period, defined as starting with the first logged QSO on a band. Exception: One—and only one—other band may be used during any 10-minute period if—and only if—the station worked is a new multiplier. Logs found in violation of the 10-minute rule will be automatically reclassified as multi-multi.

2. Multi-Transmitter: No limit to transmitters, but only one signal and running station allowed per band.

**D. Team Contesting:** A team consists of any five radio amateurs operating in the single operator category. A person can be on only one team per mode. Competing on a team will not prevent any team member from submitting his personal score for a radio club. A team score will be the sum of all the team member scores. SSB and CW teams are totally separate. That is, a member of an SSB team can be on a totally different CW team. A list of a team's members must be received at CQ Headquarters by the time the contest begins. Mail or FAX the list to CQ, Att: Team Contest, 25 Newbridge Road, Hicksville, NY 11801 U.S.A.; FAX 516-681-2926. Awards will be given to the top teams on each mode.

**IV. NUMBER EXCHANGE:** Phone: RS report plus zone (i.e., 5705). CW: RST report plus zone (i.e., 57905).

**V. MULTIPLIER:** Two types of multiplier will be used.

1. A multiplier of one (1) for each different zone contacted on each band.

2. A multiplier of one (1) for each different country contacted on each band.

Stations are permitted to contact their own country and zone for multiplier credit. The CQ Zone Map, DXCC country list, WAE country list, and WAC boundaries are standards. Maritime mobile stations count only for a zone multiplier.

**VI. POINTS:** 1. Contacts between stations on different continents are worth three (3) points.

2. Contacts between stations on the same continent but different countries, one (1) point. *Exception:* For North American stations *only*, contacts between stations within the North American boundaries count two (2) points.

3. Contacts between stations in the same country are permitted for zone or country multiplier credit but have zero (0) point value.

**VII. SCORING:** All stations: the final score is the result of the total QSO points multiplied by the sum of your zone and country multiplier.

*Example:* 1000 QSO points × 100 multiplier (30 Zones + 70 Countries) = 100,000 (final score).

**VIII. AWARDS:** First-place certificates will be awarded in each category listed under Sec.III in every participating country and in each call area of the United States, Canada, European Russia, Spain, and Japan.

All scores will be published. To be eligible for an award, a Single Operator

station must show a minimum of 12 hours of operation. Multi-operator stations must operate a minimum of 24 hours. A single-band log is eligible for a single-band award *only*. If a log contains more than one band it will be judged as an all-band entry, unless specified otherwise.

In countries or sections where the returns justify, 2nd and 3rd place awards will be made.

All certificates/plaques will be issued to the licensee of the station used.

**IX. TROPHIES & PLAQUES (Donors)****PHONE****Single Operator, All Band**

World—Dave Rosen, K2GM (WA2RAU Memorial)

World—Low Power—Slovenia Contest Club

World—QRPp—Doc Sayre, W7EW

World—Single Operator Assisted—Snake River Contest Club

U.S.A.—Potomac Valley R.C. (KC8C Memorial)

U.S.A.—Low Power—North Coast Contesters

U.S.A.—Zone 4—Dennis O'Connor, K8DO

U.S.A.—Zone 3—Bill Fisher, W4AN

Canada—Niagara Frontier Int'l DX Association (VE3WT Memorial)

Carib./C.A.—Alex M. Kasevich, VP2MM

Europe—Potomac Valley R.C.—W4BVV Memorial

Europe—Low Power—Scott Jones, N3RA & Tim Duffy, K3LR

Africa—Gordon Marshall, W6RR

Asia—2 AM Dayton Pizza Gang

Japan—Japan Crazy Contesters Club

Oceania—Northern California DX Club

South America—Yankee Clipper Contest Club

South America, Mainland—Jose Bachmann, ZP6CC & Cesar Ivaldi, ZP5K

**Single Operator, Single Band**

World—28 MHz—Joel Chalmers, KG6DX

World—21 MHz—Robert Naumann, N5NJ

World—14 MHz—North Jersey DX Assn. (K2HLB Memorial)

World—7 MHz—Fred Laun, K3ZO (K7ZZ Memorial)

World—3.8 MHz—Fred Capossela, K6SSS

World—1.8 MHz—Bob Wruble, W7GG

U.S.A.—28 MHz—Donald Thomas, N6DT

U.S.A.—21 MHz—David Hueben, KB0ISS

U.S.A.—14 MHz—Southern California DX Club

U.S.A.—7 MHz—Stanley Cohen, WD8QDQ

U.S.A.—3.8 MHz—Arnold Tamchin, W2HCW

U.S.A.—1.8 MHz—CQ Magazine

Carib./C.A.—Snake River Contest Club

Europe—28 MHz—Chod Harris, VP2ML

Europe—21 MHz—Tine Brajnik, S50A

Europe—14 MHz—A.G. Anderson, GM3BCL

Europe—7 MHz—Roger Burt, N4ZC

Europe—3.8 MHz—Marconi Contest Club (I3MAU Memorial)

Europe—1.8 MHz—Robert Kasca, S53R

Japan—21 MHz—DX Family Foundation

Japan—14 MHz—Take Yokoyama, JL1BLW

**Multi-Operator, Single Transmitter**

World—Southern California DX Club (W6AM Memorial)

U.S.A.—Carolina DX Association

Europe—Bob Cox, K3EST

Carib./C.A.—Eric Scace, K3NA

Oceania—Junichi Tanaka, JH4RHF

Africa—CQ Magazine

South America—Victor Burns, KI6IM

South America, Mainland—T. Zappini, ZP5AZL & R. Bellucci, ZP5XF

Asia—Edward Campbell, AH2BE

**Multi-Operator, Multi-Transmitter**

World—Dave & Barbara Leeson, W6NL & K6BL

U.S.A.—Paul Hellenberg, W9JA

Europe—Finnish Amateur Radio League

Japan—Ryozo Goto, JH3JYS

#### Contest Expeditions

World—Single Opr.—National Capitol DX Association  
(Stuart Meyer, W2GHK Memorial)

World—Multi-Single—The German CDXG & SDXG  
(DJ3NG & DJ4EI Memorial)

World—Multi-Multi—Tachio Yuasa, JA9VDA

#### Special—Single Operator Award

World—All Band Under 21 years old—Gene Zimmerman, W3ZZ

World—All Band High YL—Yutaka Tanaka, JH3DPB (KA6V Memorial)

#### CW

#### Single Operator, All Band

World—Albert Kahn, K4FW (W9IOP Memorial)

World—Single Operator Assisted—Snake River Contest Club

World—Low Power—Slovenia Contest Club

World—QRPP—Gene Walsh, N2AA

U.S.A.—Frankford Radio Club

U.S.A.—Low Power—North Coast Contesters

U.S.A.—Zone 4—Dennis O'Connor, K8DO

U.S.A.—Zone 3—Bill Fisher, W4AN

Canada—Canadian DX Association

Carib./C.A.—Chuck Shinn, W7MAP

Europe—Edward Bissell, W3AU

Europe—Low Power—Scott Jones, N3RA & Tim Duffy, K3LR

Africa—Gordon Marshall, W6RR

Asia—Chuck Shinn, W7MAP

Japan—Japan Crazy Contesters Club

Oceania—Peahi Contest Club

South America—Venezuela DX Club

#### Single Operator, Single Band

World—28 MHz—Joel Chalmers, KG6DX

World—21 MHz—Don Busick, K5AAD (N5JJ Memorial)

World—14 MHz—North Jersey DX Assn. (W2JT Memorial)

World—7 MHz—Alex M. Kasevich, VP2MM/W4

World—3.5 MHz—Fred Capossela, K6SSS

World—1.8 MHz—Kenneth Byers, Jr., K4TEA

U.S.A.—28 MHz—CQ Magazine

U.S.A.—21 MHz—Wayne Carroll, W4MPY

U.S.A.—14 MHz—Northern Illinois DX Association

U.S.A.—7 MHz—Jan Perkins, N6AW (W6AM Memorial)

U.S.A.—3.5 MHz—Bill Feidt, NG3K

U.S.A.—1.8 MHz—CQ Magazine

Canada—Radio Amateurs of Canada

Carib./C.A.—Snake River Contest Club

Europe—28 MHz—John Pryor, K4OGG

Europe—21 MHz—Robert Naumann, N5NJ

Europe—14 MHz—Maud Slater (G3FXB Memorial)

Europe—7 MHz—Ivo Pezer, T93A

Europe—3.5 MHz—Frankford Radio Club (K3VW Memorial)

Europe—1.8 MHz—Pat Barkey, N9RV & Terry Zivney, N4TZ

Japan—21 MHz—DX Family Foundation

Japan—14 MHz—Mitsuhiro Nishimura, JA7WME

#### Multi-Operator, Single Transmitter

World—Anthony Susen, W3AOH

U.S.A.—Douglas Zwiebel, KR2Q

Canada—Eastern Canadian DX Assn.

Carib./C.A.—North Nevada DX Contest Club

Europe—Bob Cox, K3EST

Africa—CQ Magazine

Oceania—Junichi Tanaka, JH4RHF

South America—Tyler Stewart, K3MM

Asia—Steve Merchant, K6AW

#### Multi-Operator, Multi-Transmitter

World—Douglas Zwiebel, KR2Q (K2GL Memorial)

World—SSB/CW Combined—Alpha/Power, Inc.

U.S.A.—Bob Ferrero, W6RJ (N6RJ Memorial)

Europe—Finnish Amateur Radio League

Japan—Ryozo Goto, JH3JYS

#### Contest Expeditions

World—Single-Opr.—Yankee Clipper Contest Club

World—Multi-Single—CQ Magazine

World—Multi-Multi—Bill Schneider, K2TT

#### Special—Single Operator Award

World—SSB/CW Combined—Hrane Milosevic, YT1AD

World—All Band—Under 21 years old—Chuck Shinn, W7MAP

#### Club

World—SSB/CW—CQ Magazine (W1WY Memorial)

Non-USA—SSB/CW—No. Calif. Contest Club (N6AUV Memorial)

A station winning a World Trophy will not be considered for a sub-area award. That trophy will be awarded to the runner-up of that area.

#### X. CLUB COMPETITION:

1. The club must be a local group and not a national organization.
2. Participation is limited to members operating within a local geographic

area defined as within a 275 km radius from center of club area (except for DXpeditions especially organized for operation in the contest; club contributions of DXpedition scores are percentaged to the number of club members on the DXpedition).

3. To be listed, a minimum of 3 logs must be received from a club and an officer of the club must submit a list of participating members and their scores, both on phone and CW.

#### XI. LOG INSTRUCTIONS:

1. All times must be in GMT.
2. All sent and received exchanges are to be logged.
3. Indicate zone and country multiplier only the FIRST TIME it is worked on each band.

4. Logs must be checked for duplicate contacts, correct QSO points and multipliers. Submitted logs must have duplicate contacts clearly shown.

5. We prefer an electronic log. The Committee requires an electronic log for any possible high score. DISKS: If you use a computer, please send your IBM, MS-DOS compatible computer disk. A disk containing your files may be submitted in lieu of a paper log. All disks MUST be accompanied by a PAPER summary sheet satisfying all logging instructions. Label your disk clearly with YOUR CALL, files included, the mode (SSB or CW), and your category. The format we require for the most common logging programs is your CT.all file (e.g. HS0AC.all), N6TR.DAT, or NA.QDF files. Name your file correctly (for example, HS0AC.all).

E-MAIL Required Content: (1) A SUMMARY sheet in plain-text ASCII, and (2) your LOG in plain-text ASCII. These files may be sent in either one message or in separate messages. Be sure to put the STATION CALLSIGN and the MODE in the "Subject:" line of each message.

Your log should be sent in plain-text ASCII format. Every logging program has the option of producing an ASCII text log. Examples of the ASCII log file names of the three most common logging programs are the following: CT = YOURCALL.ALL, NA = YOURCALL.PRN, and TR = YOURCALL.DAT. Acceptable submissions can also include all other fixed-column ASCII formats. If you must send a binary file, it will have to be encoded. All popular encoding schemes are acceptable, including UUencode, Base64, and BinHex. Your software may automatically encode your log as an attachment.

Your e-mail log will automatically be acknowledged by the server. You will also receive a personal access code from the server. Use this code to view your log for completeness and later to retrieve your computer analysis. If we have trouble reading your file, we may ask you to send a disk. Submit your CQ WW SSB log to <ssb@cqww.com> and your CQ WW CW log to <cw@cqww.com>.

6. Use a separate sheet for each band.

7. Each entry must be accompanied by a summary sheet showing all scoring information, category of competition, contestant's name and address in BLOCK LETTERS, and a signed declaration that all contest rules and regulations for amateur radio in the country of operation have been observed.

8. Sample log and summary sheets and zone maps are available from CQ. A large self-addressed envelope with sufficient postage or IRCs must accompany your request. If official forms are not available, make up your own 80 contacts to the page on 8 1/2" x 11" paper.

9. All entrants are required to submit cross-check sheets (an alphabetical list of calls worked) for each band on which 200 or more QSOs were made. All other entrants are encouraged to submit cross-check sheets.

10. Duplicate contacts and broken QSOs penalty: three (3) additional contacts removed.

11. QRPP and low power stations must indicate same on their summary sheets and state the actual maximum power output used, with a signed declaration.

**XII. DISQUALIFICATION:** Violation of amateur radio regulations in the country of the contestant, or the rules of the contest; unsportsmanlike conduct; taking credit for excessive duplicate contacts; unverifiable QSOs; or unverifiable multipliers will be deemed sufficient cause for disqualification. Incorrectly logged calls will be counted as unverifiable contacts.

An entrant whose log is deemed by the Committee to contain a large number of discrepancies may be disqualified from eligibility for an award, both as a participant operator or station, for one year. If an operator is disqualified a second time within 5 years, he will be ineligible for any CQ contest awards for 3 years.

**The use by an entrant of any non-amateur means such as telephones, telegrams, internet, or the use of packet to SOLICIT contacts during the contest is unsportsmanlike and the entry is subject to disqualification.** Action and decisions of the CQ Contest Committee are official and final.

#### XIII. DEADLINE:

1. All entries must be postmarked NO LATER than December 1, 1998 for the SSB section and January 15, 1999 for the CW section. **Indicate SSB or CW on the envelope, disk, or e-mail.**

2. An extension of up to one month may be given if requested by letter or other means. The granted extension must be confirmed by letter sent to the contest director, must state a legitimate reason, and the request must be received before the log mailing deadline. Logs postmarked after the extension deadline may be listed in the results but will be declared ineligible for an award.

**Both Phone and CW logs should be sent to CQ Magazine, 25 Newbridge Road, Hicksville, NY 11801.**

OK2PEM, OK2JPR, DL50: OK1HRA, OK1FLC, DL5T: OK1KT, OK1VD, OK1NR, OK1TC, OK1DNR, OK1FHI, OK1HSC, OK1MUJ.

OM3A: OM3DX, OM7RU, OM7ZZ, OM8AM, OM8AW, OM0WR, OT7C: ON4ACA, ON4AJZ, ON4ALT, ON4AMI, ON6MR, ON7UN, OT7P: ON4GO, ON4LAM, ON4LCW, ON5PV, ON5OO, ON6AH, ON6QR, ON6MH, ON7PC, OT7T: DJ4AX, DL2CC, ON4WW, ON4AFZ, ON4MA, ON5UK, ON4UN, ON4JO, OZ5EDR: OZ1IVA, OZ5LH, OZ7AAQ, OZ5W: OZ1KRF, OZ1FTE, OZ1FTU, OZ7HAM: OZ1ETA, OZ1BIZ, OZ1JO, OZ9KY: OZ9AAR, OZ1EEZ, P3A: RA9JX, RA9JR, RA0AM, RV0AR, UN7FZ, UA9MA, UA0ANW, UA0AGI, RZ3TX, UA3TT, UA9YAB, PA/DL0PPP: DL8AAE, DL80BF, DL80BH, PA3DWD & PA3AAV, PA0COR, PA0JMH, PE1LAU, P14CC: PB0AIU, PA3BAG, PA3BSQ, P14TUE: PA3HCW, PA3GFE, PE1PRG, PE1PEB, P14WAL: PA0ABM, PE1RNT, PE1PTQ, PD1AEB, PA-9851, P14ZLD: PA3EOB, PA3GCU, NL8884, PJ9Q: W9QD, W7DLO, PX2U: PT2QX, PT2UP, PT2BAT, PT2ADM, PT2RY, PU2CAG, PU2ASF.

RK10WZ: RA10J, RW10N, RK3EWA: RZ3EM, RZ3EC, RA3EK, RK4HYT: Bakhaev, Tartarinceva, RK4WWA: UA4WA, RW4WA, UA4WAN, RK9SWF: RA9ST, UA9SFR, RN3R: UA3RAR, UA3SAQ, RA3SL, RU3SD, UA3RJ, RA3RFA, RU4WJ & RW4WM, RW4WR, RU6LWZ: UA6LO, UA6LV, UR8MA, UT2IW, RV6LNA, RV6LOB, RV6LRT, UT6IZ, RZ3Q: RW3QC, RW3QNZ, UA3QDX, UA4WIN/3, UA9XFY/3, RN3QO, RN3QY, RU3QW, RX3QP, RZ4PZL: Dmitrov, Tischenko, Kulinov, RZ9AZA: UA9BA, RA9AB, RA9ADT, RU9AN, RZ9AR, RZ9AZ, S52FO & S54AA, S53AJL: S57MKE, S57VMA, S97A: S92AT, CT1EAT, SK6NP: SM6BUV, SM6FKF, SM6FUD, SM6VUL, SM6VVF, SH6AAD, SH6ADG, SL3ZV: SM3JLA, SM3QJR, SM0BGM & SM0ATN, SM0MC, SM5FQQ & SM3OSM, SM3SGP, SM5ACQ, SM5CSS, SM5FUG, SM5IMO, SM5INC, SM5LNE, SN2B: PA3EYZ, SP2FAX, SP2UKB, SP2WKB, SP3RBI, SP3RBR, SP8NR, US5WDX, SN6Q: SP6NVK, SP6OPE.

SP3PLD: SP3HBF, SP3IBM, SP6HTQ & SP6CT, SP6KFA: SP6MLG, SP6-1010WR, SP6-1011WR, SP9KJU: SP9MOY, Michat, Damian, Kamil, Kukasz, SP9KRT: SP9ADU, SP9ZW, SP9QLW, SP9UXL, SP9PRO: SP9LJD, SP9PT, DJ0MCZ, SV1AFA: SV1CIB, SV1CIF, SV1DPJ, SV1CGG, SV1SN, SV3YY, SV1DPF, SV1DPP, SX2T: SV2AEL, SV2CWF, SV28FN, SV7CLI, T7BA: DF6QC, DL2MEH, DL4OCL, DL80BC, IK4TVP, T77WI, TA2KB: TA2BB, TA2YA, TA2BW, TA2NC, TA2FC, TF/AE4FY & KE4HTS, TM1C: F6FVY, F8AKS, F5ITK, F6GWV, F6HMQ, F6CTT, TM2T: F5NOD, F5SIH, F5PFP, F5ROP, F6JUX, F5RHT, F5JUJ, F1AEY, TM2Y: F6BEE, F6ARC, F6FGZ, F5SNJ, F5NLY, G4BAH, F5MUX, TM5V: F5ROX, F5MLJ, F5AEB, F5MFL, TM8A: F5RXL, F2VX, F5OZF, F5SSG, UA2AA & UA2FB, UA2FC, UA2FF, UA2FX, UA2FZ, RA2FA, RN2FA, UN8LW: UN9LW, UN7LAN, UN9LFW, UP0F: Others.

UR4MWU: UR5MB, UR5MT, UR5MFE, UR-M-56, UR4PWC: US-P-272, US-P-273, UT4PZ, UR4QWW: UR4QFE, UR5QN, US3I: US2IES, US2IMA, UR5IFB, UR5IBM, UT5IM, UR3IUS, UT4UWC: US-U-036, US-U-021, US-U-007, UT4UWT: UT5UPN, UT5UDG, US-U-093, US-U-094, US-U-095, UT7L: UR4LSB, UR4TLX, UR4LUG, US4LW, UU5J: UT5UGR, UU1JA, UU2JQ, UU2JZ, UU3JD, UU4JDX, UU0JX, UX0Z: UR5ZOS, UR7ZZ, UT1ZZ, V31DX: W2NA, K16IM, KM6K, VA3CRC: VE3XL, VA3KA, VA3SK & VA3MW, VA3PC, VA3JAK, VA3WTO, VA3RTW, VA3BDR, VE3XKB, VE2UMS: VE2FAB, VA2FRU, VE3HG: Others, VE3RM & VE3WIB, VE5SF & VE5CPU, VE5TP, VE6SV & VE6WQ, VE6VW, VE6NAP, VE7GAS, V01CV, VE7UBC: VE7MJI, VE7LTD, VE7OZE, VE7TTO, VE7WNA, VE7MDL, VE7CDL, VK4DZ & VK4CEJ, VK4KTS, VP5DX: AB4UF, N4KE, NU4Y, W1LR, W3KT, VK4MZ & VK4EMM, VK4EXA, VK4UW, VK4XY, VX7GFC & VE7GFS.

W2A: W2XX, N2TX, KE2NL, K2UU, W2AY/4 & W4YDD, W2XT & W2RD, KE2HG, KB5U, N2UYV, WA2F, NU2W, N2OP, K82VRO, W2YC & KG2MY, W3GNO & WR3Z, K3LP, W12T, K3SKE, W3MF & K3PH, W4NC & N4VHK, N0KTY, WB4KQN, K5PK, KE4TES, WA4IAM, WB4MSG, KD4RGB, KF4ILN, KF4PLQ, KU4BP, W4SMG & AE4CL, K4DXR, KE4ART, K04JN, N4XFT, WA4FOT, NW6S, W4ZR: W4FDA, WR4K, AB4XA, WB4KSP, N4JBK, W4USA, W5R0K: K1GD, K3NT, WA8ZBT, N5TIP, KC5MVE, KK5PB, W6TRW: KS4IS, AB6DU, WB6K, KN6OW, KD6WYO, KK6ZO, K0DI, W7IG & K7C0, N7TL, W7SIR, W7UB & K7CMXO, W8ZA & N8II, W03A, W9FX & W9RAS, W9JA & K9JY, K9PW, KA9FOX, W9QA, W9RM, WE9V, WA1RR: K1JN, N1RJF, N1HRA, KB1LN, KA1RL, KA1VMG, K1GOX, WB2KHO & N2LDV, WB4PHW & KD4LIF, WN90 & K9DAL, W01N & K1WD, WY3T & N3JRX, XE2DV & K7LXC, K7AR, KC7RN, K06PS, XF3/EA3BT & XF3/EA3AOK, YM3SV: TA3YJ, TA3J, YN6WW: JA6WFM, JM6EUB, JM6UAA.

YT0X: Ivan, Goran, YU1AAX: Club, YZ1V: YU1AAV Club Operators, ZL1AA: ZL1ANJ, ZL1/YU1UN, ZP0R: ZP5AZL, ZP5CGL, CX6VM, ZP5HMM, ZP5WBM, ZP5RPO, ZW5B: PY5EG, PY5CC, PY5GU, PY1KN, PY2BW, ZX0F: N6KT, N5FA, ZP5JCY, ZY2HT: PY2KC, PY2KJ, Tarikian.

### Station Operators Multi-Op Multi-Transmitter

9A1A: S56A, S550D, S51R, S51D, S57NW, 9A5W, 9A2DQ, 9A2B, 9A2EU, 9A2HW, 9A2R, 9A2TS, 9A3GW, 9A3NR, 9A3SC, 9A3ZA, 9A40M, 9A6W, 9A7DLA, 9A7R, 9A9A, 8P0A: BV2AD, BV2CI, BV2KI, BV/JH3GCN, BV/JP1RIW, C19DH: K2NJ, NR2H, VE1ASJ, VE9BM, VE9DH, VE9DX, VE9GJ, VE9JEF, VE9JW, VE9MY, VE9WH, W1VE, W2CG, W2EN, WA2VUY, CS0RCL: CT1ASU, CT2GFK, CT5GFJ, CW5R: CX5BW, CX8CP, DK5EZ & DG1EBL, DG3EX, DH4EA0, DK1WJ, DK4TP, DK8EY, DL1EHH, DL1EJ, DL3EBX, DL4EBA, DL4EBW, DL6EAQ, DL8EBW, DL9JT, E22AAA: HS1CHB, HS1CKC, E20HHK, E20ACU, HS0ZCO, HS0JR3XMB, E21EIC, HS9HQR/1, EA3AAY & EA3CCN, EA3CKX, EA3EJ, EA3ESJ, EA3EZD, EA4AHW & EA4ABW, EB4HAD, EA4RCT: Julian, Eduardo, Manolo, Luis, Esther, Jacobo, Paco, Isidro, Pilar, Jose, Angel.

EA4URE: EA1D0F, EA4AEB, EA4AJB, EA4BT, EA4BPJ, EA4CT, EA4ECF, EA4KA, EA5DY, EA5GR, EA7JB, EA4EKR, EA4AWF, EB4EPJ, EB4AKI, EA5EZM & EA5BM, EA5ANL, ED7VG: EA7HY, EA7ATX, EC7ADS, EC7AHN, FK8GM & FK8HC, FK8FI, FP/KG8CO: K8AEM, KG8CO, N8CC, W8MC, GM7V: GM3WQJ, GM4FDM, GM4YXI, VE7NS, JA6IDJ, GW0GEI, GM4BAP, GM4CXM, G4FAM, GM4TXX, GM0NAI, GM4AFF, GW7K: GW0BANA, GW0PUP, GW4BVJ, GW4GSH, GW4MAD, GW4MDG, GW4LFV, HB0/HB9AON: DF1JC, DL8DAW, DL8EAQ, HB9CRV, DJ2YE, HR3/DL7DF: DJ6TF, DL2RUM, DL7BO,



The oceanside QTH of CW5R.

DL7DF, DL8FR, J3A: N6LL, W6SR, NDAT, W8KKF, KC5AK, KC5DJI, NH7C, JA3ZOH: JH3PRR, JG3KIV, JI3OPA, JM3XKG, JH4IFF, JH4NMT, JR4ISF, JF4FUF, JG4CLV, JA6ZPR: JH6JSR, JH6SQI, JR6CKX, JR6BSC, JEG6LHM, JH6ETS, JA7YRR: JA7FDY, JA7JUD, JA7LBY, JA7MQM, JA7MSQ, JA7OZW, JH7VHZ, JR7LVA, JJ1XGF, JQ1NBV, JEBKKM, JH5ZJS: JA5BJC, JA5FDJ, JA5JCC, JA5THU, JH5RXS, JR5JAO, JR5PDX, JR5VHU.

JN1YUU: Keiko Yamada, Moe Iwakura, Tomoko Ouchi, Keiko Oogawara, Saeko Kawase, Saki Yokoyama, Minako Tabuse, Yumi Onaka, Saon Shizu, JO1YAO: JA1ATK, JA1PEJ, JA1QJK, JM1NKT, JF1FKX, K0UE & KE0MF, KB0NUY, K1GW & K1ART, K1KI & K1CC, K1PI, K1RM, KM1P, K2KQ, WA2GO, K1KP & N1RD, K1QA, K1EP, K1NU & K1TTT, KB1W, NT2X, AB2EC, KE1FO, NO2T, WA1ZAM, WR2I, K1RO & K1ZZ, KB1GW, K1RX & KF1V, K1EPJ, K1OZ, WA1T, AA1LN, K2KV & WM2V, N2GA, K2DO, N2JIX, K2NG & K2WK, N2BIM, KU2M, K2WB & KD2KS, K2WS & K2BU, K3ANS & WF3H, N3TU, N2KJM, K3YD, W3LR, W0RSJ/3, N3VJA, N3IYX, K3BSA: K3JLK, KA3LEK, N3NMP, K3LR & N3RA, K3UA, K8GL, K8CX, N9RV, KB3AFT, N3BJ, KA3JWJ, ND8L, W8JV, K3JT, K7FR & Others, K8WT & N8VCF, KV8S, N8UBH, N8YYS, K7CI, KC8AJH, KB8FHW, N8FMD, N8OKV, KC8BHR.

K80WY & N8NSV, KC1XX & KC1F, AD1C, N1RR, K1EA, K1LZ, KB1AWE, K1ZM, T93M, KM3T, K5ZD, KB1H & AA1CE, K1EBY, N1BU, NB1U, KH7R & WH6R, AH7R, KH6U, KH7U, WH6H, WH6T, KL7Y, KL2A, KH6ND, KH6TO, NH6XO, AH6LV, AH6OY, AH6OZ, KH6HKL, WH6XR, KH7BM, K06N: N6RO, K6AW, KX7M, NU6S, W6RGG, AE0M, KV1W & N6RFM, W1CSM, K1MBO, L70FM (LU4FM): LU1FA, LU1FAC, LU1FAK, LU1FOW, LU1FZR, LU2BRG, LU2FYU, LU4FIP, LU4FGV, LU4FPZ, LU5FYV, LU6FEC, LU6FUQ, LU8FPT, LU9AU, LU9FEC, LU9FDG, LU9FOT, LY7A: LY3NIT, LY2OC, LY4AA, LY2UF, LY2KZ, LYR-728, N2RM & N2NT, N2AA, N7BG, N2NC, W2RO, N2NL, K02M, K2BM, N3BNA & W3EEE, WB3CTD, N3NS & K3IPK, N3RU & N3ISH, KA3JOI, N4ZC & AA4ZZ, K4HA, K4MA, K4ZA, KU4V, W4WN, W4WNT, WA4UNZ, N5ZC, WD4BTF, 5B4AFM.

N6AW & W6BA, W6KP, W6UL, AD6DO, K6HMS, KF6HI, N6ER, OH2HE & OH1JT, OH2BTI, OH2BVI, OH2BZY, OH2IW, OH2JA, OH2JTE, OH2XX, OH6CT, OH6DD, OH7BX, OH7JR, OH8KXK, LY1DS, OK10KE: OK1DUT, OK1FUT, OK1VBA, OK1UTS, OK1FHL, OT7A: DL3EBM, DL3KDV, DL4XS, ON1AEI, ON1AFF, ON1AWB, ON1CIM, ON1DAL, ON1DEK, ON1DEL, ON1DJU, ON1DLA, ON1DLH, ON1GL, ON2BDD, ON4AID, ON4AIL, ON4AJW, ON4AJZ, ON4ALW, ON4AML, ON4ASB, ON4AUC, ON4AVO, ON4AWH, ON4AWU, ON4AWV, ON4BAG, ON4BAW, ON4BI, ON4CAS, ON4CAT, ON4CBP, ON4CCL, ON4COC, ON4CDE, ON4CFQ, ON4DB, ON4FG, ON4FI, ON4VT, ON5CD, ON5DH, ON5GO, ON5OT, ON5RW, ON5UM, ON6AA, ON6DN, ON6HZ, ON6PU, ON6RW, ON7AW, ON7DR, ON7GB, ON7HU, ON7NB, ON7NO, ON7VU, ONL6861, PA3EBT, PA3EZL, P29AS & AB6BH, N6AA, N6TW, N6ZZ, W6XD.

P14COM: PA38BP, PA3BWD, PA3CAL, PA3ERC, PA3EWP, PA3GBQ, DF8MQ/PA, DL5NEJ, DL2LSO, ON4BDS, PA3DMH, PJ9B: N1DG, K2SB, KB2XZ, N3BB, N3ED, K3EST, WA3LRO, W3UM, N4RV, N7ZZ, RK9AZZ: Club, RW6AWT: RN6BN, UA6LP, RN6MM, RA6AX, RV6YZ, RA6YY, UA6AAY, RV6YY, RX6BA, RW6YY, RU6AB, RZ6AU, UA6ADC, RW6ADA, SP5ZCC: SP5UAF, SP5STAT, SP5MBQ, SQ5BPT, SQ5BPM, SQ5EBL, SQ5EBJ, SQ5HAB, 3Z5AAN, SWL-Arthur, SWL-Bob, SP5ZIM: SP5IUK, SP5SSN, SP5VYI, TK5NN & TK5EP, TK5MH, TK1BI, DL4RDJ, DJ1OJ, DL4GBA, DL4MDO, DK6WL, DK4VW, DK8FD, DL4MCF, DL1MAJ, DL6RAI, DL3MAA, TM5S: F5ABL, F5OKL, F5CWU, F6CVM, F1RIQ, F1SXM, F-16675, Sylvain, Christophe, TX8KAB:



KP2/K3MD (left to right): Becky, N3NWM, N3PUR, and K3MD.

FK8HG, FK8AH, FK8FS, FK8FK, FK8GY, FK8VHM, FK8FU, FK1TV, FK1UL, FK1US, FK1UT, FK1UZ, V26B: AB2E, KA2AEV, N2TK, W2UDT, N2SR, W3FV, N5NJ, WT3Q, K3MM, N3OC, WX0B.

VE5RI: VE5FD, VE5FN, VE5WI, VE68BP, VE6EZ, VE6FW, VE6FI: VE6LB, VE6AQ, VE6PY, VE6BIC, VE6NA, VE6AQE, VP5T: N2VW, W2OF, WA2VYA, W0AII/9 & N9BU, N0KK, AA9D, AA0ZZ, K0HB, KB0VRV, K0TG, N9THC, KT0R, W0GJ & W0BO, K0ZV, KC0ZC, N0YPC, KB0NLC, W1FJ & N1BB, K1XM, K1CB, W1KM, NB1W, WT10, WA1GOC, W1OK & Others, W2AX & K2LE, VE1XT, VE1AL, K2SX, N2UN, N2FF, W2UD, W2UB & AA2FK, N2HKK, W3EA & WB3FZ, K2MW, WU3M, N3IDP, K2UT, W3LPL & K1HTV, K1RA, K1RZ, WM2H, ND3A, ND3F, N3GB, A13M, K3NA, K3RA, KT4W, K5GO, N5OKR, G4PIQ, OH2MM, ON7ZV, W3PP & NX3A, NW3Y, KW3Z, KE3ZR, N3WDL, W4MYA & AD4TS, WA4DAI, KD4JXY, N4EHJ, AD4TS, WU4G, KC4AUF, KS4RX, AC4OB, N4ZJ, KF4QOY, KF4SPT, Louise, W6EEN & K6XC, W6AQ, W6ORD, K17FX, W7MMQ & WT9U, K17YX.

WP2Z: W3CF, K3MQH, Murphy!, WS2U & NK2H, N2HR, AA2EQ, AA2MU, N2BC, N3YKF, N2FU, WE2K, WS4F & AE6E, K3TD, YB3ZBZ: YD3LYK, YD3LWN, YD3LOF, YD3LUN, YD3WHM, YB3UEM, YO9KPD: YO9BVF, YO9IF, ZM2K: ZL2DX, ZL2ARF, ZL1CN, ZL2AMI, ZL1AZE, ZL1AXG, ZL2MF, ZL2IQ, ZL2IR, ZL2BPL, ZL2BSJ, ZM7A: ZL2AL, ZL2ST, ZL2HU, ZL2TT, ZL2RR, ZL2GI, ZL2LF.

Number groups after call letters denote following: Band (A = all), Final Score, Number of QSOs, Zones, and Countries. An asterisk (\*) before a call indicates low power. Certificate winners are listed in boldface. (All country terminology reflects the DXCC list at the time of the contest.)

## SSB RESULTS SINGLE OPERATOR NORTH AMERICA

### UNITED STATES

K5ZD/1	A	5,494,655	3137	134	501
(Opr. W2SC)					
N6BV/1	"	4,057,986	2584	125	448
W1WFEF	"	2,415,943	1753	122	407
K5MA/1	"	1,492,164	1238	107	351
W1TE	"	1,012,239	917	94	329
KD1YN	"	985,214	865	109	337
K2TE/1	"	840,867	872	91	290
K1DWQ	"	815,022	797	91	296
W1KRS	"	810,681	775	90	289
AK1N	"	649,971	651	98	301
W1RY	"	643,264	642	89	279
K1CN	"	567,084	639	72	242
K1YT	"	544,806	571	96	258
W1OP	"	465,443	525	90	233
(Opr. K1PLX)					
K1LD	"	463,143	623	67	196
K1BV	"	343,125	544	53	172
N1API	"	338,599	510	55	196
KT1M	"	319,176	494	67	181
N1HOQ	"	289,278	399	79	218
K1KNQ	"	247,020	458	57	173
KK1DX	"	182,608	340	59	143
KA1EKR	"	134,532	256	60	162
N1DD	"	110,982	254	49	110
K1LU	"	92,796	282	42	106
W1FV	"	25,009	109	28	61
K1DX	"	7,072	64	25	43
WR1P	"	375	10	7	8
WA1MKS	14	39,168	186	26	70
K1VW	1.8	7,497	120	13	36
*WA1S	A	1,017,978	889	101	320
*WS1A	"	696,850	739	86	276
*K1HT	"	526,400	594	81	239
*N1TM	"	445,424	595	72	215
*AA1EY	"	329,896	440	80	221
*W1EQ	"	299,200	436	67	205
*WF1L	"	262,422	417	66	173
*W1ZZ	"	205,920	308	76	184
*W1XF	"	195,264	371	50	142
*K1TW	"	125,479	260	50	129
*N1SNB	"	94,484	242	43	115
*AA1QD	"	67,639	194	39	104
*N3KJ/1	"	59,292	178	34	88
*KQ1F	"	52,038	146	38	88
*N1XF	"	28,809	150	30	67
*KD1O	"	14,193	99	15	42
*K1MV	"	1,886	30	17	24
*W3EP/1	28	35,062	181	22	72
*WA1FCN	21	99,015	330	28	95
*K1VSJ	"	84,700	270	29	92
*K1VUT	14	161,280	458	26	102
*WB2QVA/1	"	85,470	306	23	88
*K1VR	"	60,282	211	23	79
*AB1U	"	16,744	107	13	43
*W1MK	3.7	3,485	45	13	28
K2DM	A	2,138,030	1677	105	365
W6XR/2	"	1,756,664	1440	128	380
KE2VB	"	1,056,780	1008	99	313
N2MR	"	977,976	886	94	314
N2LT	"	901,250	945	89	261
N2ED	"	889,326	846	88	295
WA2NHA	"	766,363	876	84	269
KG2BN	"	554,166	666	83	223
WB2YQH	"	545,580	627	75	240
K2FR	"	439,992	584	78	213
W2BE	"	379,472	565	73	223
W2HCA	"	377,300	531	68	207
K2CS	"	364,620	520	81	214
W2YK	"	270,072	419	69	195
N2PKN	"	245,765	466	55	192
K2MP	"	222,548	353	66	170
W2GDJ	"	221,216	395	62	161
WR2V	"	149,292	312	51	147
K2JLA	"	120,744	262	46	126
W2TZ	"	109,641	248	50	111
W2OMV	"	106,110	248	41	121
K2JF	"	74,480	229	55	135
N2CK	"	31,428	134	32	76
K2MGA	"	28,080	122	19	61
K2FF	"	26,728	99	32	72
KB2LIF	"	19,110	90	26	52
WA2CNV	"	17,370	74	32	58
K2ZP	"	15,840	102	34	62
KE2DX	"	12,782	79	29	48
W2OP	"	10,608	61	26	52
W2EZ	"	9,576	60	28	44
N2LEB	"	5,757	42	24	33
W2VU	"	1,215	19	12	15
NA2X	21	128,271	322	31	112

WB2OSM	14	121,920	461	25	95
KC2Q	"	56,358	206	24	77
N2PT	"	16,445	114	16	49
KB2FWP	"	5,175	42	13	32
K2WE	7	64,698	200	28	95
N2PP	"	62,928	249	25	89
K2WJ	"	45,100	178	22	78
WQ2M	"	27,090	330	27	102
W2LU	3.7	17,181	143	19	50
W2VO	1.8	6,783	85	14	37
KN2T	"	3,772	95	11	30
*K2AZ	A	976,740	855	99	347
*KA2CDJ	"	446,462	499	100	279
*WB2ZTH	"	394,368	467	83	229
*NA2Q	"	348,132	525	74	194
*K2UF	"	361,620	467	74	213
*KG2AU	"	234,112	389	63	185
*N2RMZ	"	181,068	312	50	179
*K2TZ	"	169,926	293	66	157
*K2SZ	"	166,057	288	53	158
*K1PY/2	"	114,589	278	44	119
*KB2NOW	"	109,620	223	53	136
*W2SSB	"	54,460	142	45	95
*W2MKW	"	41,268	137	39	75
*K2DE	"	39,984	130	40	96
*N2LQ	"	36,960	135	36	74
*W3EH/2	"	30,690	109	33	77
*AE2T	"	29,400	115	31	69
*KC2TA	"	23,067	88	32	67
*KF2YX	"	22,816	93	27	65
*K2DL	"	10,877	64	29	44
*NT2W	"	6,270	42	19	38
*W2UL	"	5,559	45	20	31
*KA2VVO	28	1,320	22	8	14
*WB2BWU	"	117	5	5	4
*KA2JEM	21	46,835	223	23	72
*K2MFY	14	150,525	432	27	108
*K2AW	"	78,546	291	24	82
*WA2ASQ	"	25,670	110	22	63
K3ZO	A	3,466,918	2290	122	437
W3BGN	"	3,130,400	2071	131	429
K4JLD/3	"	621,712	632	93	271
K3ZA	"	565,380	644	89	260
K3KFD	"	536,988	724	75	217
KB3TS	"	496,128	625	73	250
K3TEJ	"	456,660	644	58	200
K3SX	"	455,952	493	102	266
W3KN	"	455,022	565	84	222
N3JCL	"	444,220	631	81	253
W3AZ	"	223,250	445	62	188
AD3Z	"	221,650	205	78	197
AD8J/3	"	181,728	343	52	151
W3EKT	"	178,080	300	63	161
W8FJ/3	"	154,560	264	70	160
W3GG	"	132,675	264	44	139
KM3J	"	128,700	236	55	143
W3YD	"	128,576	258	57	139
W3IZ	"	125,600	254	60	140
K7SZ/3	"	83,390	200	40	115
W3BEN	"	76,194	215	43	123
N9GG/3	"	34,432	138	42	86
N3HTZ	"	30,478	116	30	68
N3YEA	"	10,320	69	21	39
W3CQH	"	1,800	46	18	32
WB3ICL	21	142,308	408	28	106
N3HBX	14	482,416	1140	35	141
AI3Q	"	134,316	379	26	100
NG3Q	"	40,320	160	23	67
WB4CVH/3	"	5,439	54	11	26
WA3YSW	"	640	14	5	11
N3RS	7	185,020	469	30	115
W3KHQ	"	35,904	139	23	73
K3SV	1.8	814	33	7	15
*KQ3V	A	807,500	804	96	284
*WW3S	"	654,984	637	97	299
*WA2C/3	"	438,672	603	78	218
*NI3I	"	277,380	377	53	150
*WA3HAE	"	158,991	307	58	143
*WA3RHW	"	107,743	251	45	118
*KD3RP	"	107,450	232	48	127
*KB3B	"	26,980	124	27	68
*W3DF	"	16,650	93	25	50
*K3LD	"	12,567	84	23	48
*NM3O	"	4,320	42	21	24
*KC3PZ	28	90,735	300	23	92
*WB2BZR/3	"	49,484	220	23	66
*N3ZAQ	"	17,952	109	18	43
*W3CP	21	20,590	108	19	52
*NY3C	14	48,594	197	20	71
*KB3A	"	26,574	119	22	64
W4AN	A	3,492,160	2293	128	432
K4ZW	"	3,205,420	1997	136	450
K4AB	"	2,320,896	1808	130	382
K3CV/4	"	1,266,320	1038	106	334
N4KW	"	1,112,929	1121	110	282
AA4S	"	1,034,930	944	100	319
N4UH	"	957,638	941	101	317
KA4RRU	"	820,821	745	105	314
WA4TH	"	800,520	750	105	315
K4PI	"	603,288	583	105	294
KN4T	"	580,636	610	92	264
NX4W	"	457,320	612	77	219
WA4JUK	"	449,306	588	71	215
KM4E	"	377,104	529	71	188
K4LM	"	357,903	454	87	212

AE4RG	"	319,308	495	58	188
N4CW	"	293,229	405	80	199
N4GN	"	262,508	356	84	208
W4NYY	"	254,774	419	63	176
W2YE/4	"	241,664	351		

*K7ED	"	43,582	220	23	54	*W9JOO	"	31,025	139	22	63	VE30TL	"	131,112	566	23	85	V44NK	3.7	26,352	353	11	25	5X4F	28	1,164,728	2455	33	131
*KJ7WY	"	16,443	105	23	40	*WD9FEN	"	9,360	117	21	59	VX3BY	3.7	208,872	1121	26	82	<b>U.S. VIRGIN ISLANDS</b>						5X1T	21	1,780,200	3389	35	145
*AA7UN	14	119,125	361	28	97	*W9IXX	"	4,816	44	14	29	*VE3FU	A	966,826	1093	94	277							<b>ZAMBIA</b>					
*W7FP	"	113,152	331	29	99	N2IC/Ø	A	2,418,327	1766	134	367	*VA3NR	"	222,687	462	64	163							9J2FR A 1,941,457 1963 88 249					
*KG7RZ	"	36,100	186	28	48	KGØZI	"	641,067	1068	80	187	*VE3BUC	"	153,220	417	49	139							<b>ZIMBABWE</b>					
*KC5AC/7	"	3,198	59	13	13	WØTM	"	526,854	662	96	221	*VE3STT	"	134,334	339	48	105							Z2/DF3XZ A 436,254 634 70 168					
K8LN	A	1,216,626	1098	100	322	KØMX	"	458,337	562	91	232	*VE3UZ	"	68,550	183	45	105							<b>ASIA</b>					
W9LT/8	"	1,189,850	1033	108	341	WØGG	"	446,072	622	92	204	*VE3TDG	"	27,500	388	23	27							<b>ARMENIA</b>					
W8KX	"	509,400	508	90	270	WØID	"	346,804	461	86	191	(Opr. VA3SYL)												EK8WW A 169,000 448 40 90					
KE8GG	"	469,456	605	70	226	WØMP	"	219,123	362	86	162	*VA3IX	"	24,072	151	16	52							*EK8WF A 392,964 631 57 172					
K2UOP/8	"	467,025	542	84	241	K9WIE/Ø	"	200,385	356	62	157	*VD3JFF	"	15,200	93	29	51							*EK4JJ 14 32,736 125 24 69					
W8JY	"	334,554	518	74	200	KØGAS	"	191,490	375	77	138	(Opr. VA3JFF)												<b>ASIATIC RUSSIA</b>					
W8UPH	"	256,360	439	55	166	WØTT	"	103,878	212	69	130	*VE3OIL	"	4,588	85	14	17							RK9CWW A 1,997,504 1638 1103624					
N8CN	"	215,550	389	61	164	WØMW	"	100,085	220	56	129	*VE3ST	"	2,960	28	15	25							(Opr. RA9CKO)					
AA8RK	"	144,695	278	64	151	WØGFV	"	90,610	202	49	121	*VE3XN	28	24,698	187	15	38							UA9CLB " 1,090,369 1202 94 277					
W8BD	"	143,584	281	66	158	WØPPF	"	67,048	188	39	97	*VE3HX	"	17,289	131	13	38							UA9OS " 25,984 104 44 68					
N8NX	"	123,832	250	58	126	WØYA	"	62,100	198	44	91	*VE3ZZ	14	84,376	321	21	85							RW9SG 28 4,600 52 16 30					
W88STO	"	85,800	243	39	111	WØJEL	"	58,520	161	43	97	VE4JB	A	23,370	122	36	50							RA9JP 21 157,584 814 30 82					
KC8KE	"	84,373	220	41	98	KØNL	"	30,488	114	42	61	VE4RP	"	18,408	100	38	40							RA9FF 14 78,648 269 28 88					
W88SDL	"	75,317	195	50	117	KKØSS	28	43,055	244	20	59	*VX4VV	14	52,839	467	17	40							RX9FG " 47,547 221 17 64					
W88P	"	69,960	238	31	101	N7DR/Ø	"	21,708	151	16	38	VE5MX	A	784,342	1154	93	218							UA9OC 3.7 41,662 215 19 55					
W8ILC/M	"	51,051	136	48	95	NØNR	21	287,573	765	31	112	VX5FX	"	547,370	1044	70	184							*UA9CAW A 625,280 808 86 234					
N8TC	"	7,564	55	19	43	KØKE	"	250,756	670	33	106	VE5CB	"	309,056	850	69	107							*RW9QA " 280,940 469 55 165					
WA8RSA	"	4,187	78	25	54	WØOSK	"	27,920	135	23	57	*VX6JY	14	312,018	782	36	125							*RA9AE " 183,540 357 57 153					
W8CO	28	14,322	101	19	43	KØKX	14	430,760	916	38	140	*VX6BF	A	50,435	171	52	79							*RA9JW " 73,476 214 51 105					
K3ZJ/8	21	462,880	1053	33	127	WØUN	"	315,392	905	35	119	*VE6BMX	28	8,207	131	12	17							*RW9RF " 35,328 153 27 65					
W8JGU	"	146,228	374	29	110	(Opr. K9AN)						VE7XO	A	164,268	400	61	108							*RU9UG " 23,908 140 28 58					
N8EXS	"	41,968	191	21	65	KØZA	1.8	780	16	8	12	VE7HA	"	11,960	96	26	26							*RN9XA " 18,408 94 38 66					
K8UC	"	18,800	141	22	58	WØRXL	"	240	12	6	6	VE7IN	14	473,837	1586	32	95							*UA9AJD 21 60,636 262 22 71					
K8DX	14	698,828	1546	37	141	*ACØW	A	560,058	677	93	254	*VX7TLK	A	292,176	980	57	87							*RZ9UC 14 1,259 480 33 81					
W8TWA	"	218,080	548	33	112	*KAØWWT	"	186,065	388	60	127	(Opr. VE7TLK)												*RX9UKF " 657 304 28 69					
W8UD	"	170,553	465	31	108	*KEØUI	"	150,981	317	50	127	*VE7ZEP	21	7,781	108	15	16							*UA9ACJ 3.7 11,960 90 8 38					
W8SJU	"	74,865	258	26	79	*KZØC	"	113,240	259	62	128	*VE7FJE	14	12,960	118	18	22							RAØFW A 2,237,634 2275 138 303					
W8UVZ	3.7	19,544	182	13	43	*WKØF	"	102,850	239	53	134	*XM7A	7	289,556	1437	27	73							UAØWY " 936,180 1384 83 232					
K8MK	1.8	20,605	378	17	48	*WB4RDV/Ø	"	75,047	193	55	96	(Opr. VE7SV)												UAØSE " 176,954 434 65 141					
*K8FLY	A	171,784	363	54	143	*WAØDCB	"	55,554	159	45	96	CAYMAN ISLANDS												RAØFU " 119,988 251 81 121					
*K8FC	"	53,392	153	44	98	*K2HT/Ø	"	41,004	128	46	88	ZF2AH	A	1,917,964	2596	93	239							UAØJDD " 6,862 108 20 27					
*AF8C	"	58,917	176	39	84	*KAØZPP	"	30,411	127	33	60	(Opr. W6VNR)												RUØSL " 4,100 38 17 24					
*N8AA	"	48,514	146	48	79	*WØAJ	"	16,799	103	44	63	COSTA RICA												UAØSR 28 45,474 439 23 55					
*K8VUS	"	21,600	96	33	57	*NØEID	"	7,100	70	16	34	T17DBS	21	208,265	724	27	88							RZØSR 21 299,022 1409 26 88					
*W8IDM	"	5,100	40	18	32	*AAØMQ	28	20,126	137	17	41	*T1C	A	7,379,253	5453	144	465							UAØLS " 8,064 50 22 42					
*N8FWA	28	21,762	164	14	40	*WØAH	7	26,640	135	26	64	(Opr. T12CF)												*UAØJB A 934,620 1722 123 247					
*K8NH	"	17,864	114	19	39	ALASKA						CUBA												*UAØSJ " 550,560 1239 90 197					
*K8ENM	"	3,955	51	12	23	KL7AC	A	339,850	818	64	111	CO2KG	14	22,445	175	17	50							*UAØYAY " 159,137 351 53 134					
*K8BIBS	21	108,585	320	27	99	KL7/KG5EG	"	30,456	169	30	42	DOMINICANA												*RAØFF " 156,330 356 74 119					
*K8FK	"	96,158	282	30	103	*KL7WP	A	15,275	137	22	25	H17/NO2R	A	1,273,488	2383	76	182							*RZØCQ " 119,081 291 70 123					
*K8KM	"	58,479	220	23	78	*KL7FAP	"	3,937	54	16	15	GRENADA												*RAØCL " 23,166 162 36 45					
*N8LIQ	"	35,574	213	22	55	*KL1R	14	1,638	35	10	11	*J3/												*UAØZBK 21 227,217 1230 33 78					
*K8ME	"	4,536	51	10	26	ANTIGUA						DL5MAE	A	971,115	1429	83	220							*UAØAPP " 17,836 174 15 37					
*AA8UP	14	3,478	37	9	25	V29NR	14	593,217	2021	37	136	GUADELOUPE												*RAØSA 3.7 5,148 67 15 24					
W9RE	A	2,941,546	1902	137	440	(Opr. YU1NR)						FG5BG	A	7,195,161	5489	138	435							*TA3BN A 468,050 854 35 150					
W89Z	"	2,426,580	1695	134	415	BARBADOS						*FG5GA	A	446,706	949	68	181							*TA8AH " 225,975 741 25 90					
K9GD	"	1,138,860	862	128	412	*8P6CV	A	766,208	1328	68	188	HAITI												*TA3EM " 37,324 136 17 69					
K9BGL	"	1,047,489	894	111	326	*8P6DX	28	16,940	110	18	37	HH2PK	A	3,790,600	3717	114	326							*TA2IJ 21 112,952 700 19 37					
WA9TPQ	"	526,467	652	91	248	BELIZE						JAMAICA												*4K9W 21 4,160 58 5 21					
KBØC/9	"	448,514	519	59	260	*V31MX	14	104,246	629	23	71	6Y6A	A	2,052,911	3264	86	225							*BD4DW A 153,450 698 57 98					
K9MWM	"	248,703	508	89	184	BERMUDA						(Opr. JE3MAS)												*BA4TB 28 4,953 75 17 22					
KJ9C	"	216,900	369	68	173	*VP9ID	A	3,201,342	3240	106	332	MARTINIQUE												*BY1QH 14 95,982 442 26 76					
W9BCV	"	214,361	371	80	191	(Opr. AJ2U)						FM5BH	A	4,406,170	4122	119	380							(Opr. OH2PM)					
N9CO	"	182,156	326	64	162	*VP9/						XE1NAD	A	561,484	1822	57	97							*4K9W 21 4,160 58 5 21					
K9HUH	"	153,024	292	59	133	W9LYN	A	2,523	40	11	18	XE3LMV	"	425,952	975	73	131							*TAØMB A 1,085,352 1537 90 238					
K9GSD	"	146,030	317	43	127	BRITISH VIRGIN ISLANDS						XE2MX	"	54,418	192	57	104							*4L1ZG A 54,020 260 14 59					
WA9KVE	"	137,313	258	61	148	*VP2VF	28	423,324	2014	27	72	XE2/												*4U/TF1MM " 46,104 176 28 74					
N9LCR	"	100,562	239	45	109	CANADA						WA7UQV	1.8	16,375	326	10	15							*4L50 3.7 79,205 509 10 54					
W9IL	"	97,173	200	53	124	VO1MP	A	3,456,300	2777	108	384	*4B1BEF	A	315,198	1383	50	67							*ATØMB A 1,085,352 1537 90 238					
K9LU	"	95,142	225	46	111	VE1JX	"	2,137,448	2380	99	298	(Opr. XE1BEF)												*4X1VF 28 493,167 1521 27 102					
K9NR	"	47,854	138	47																									

JM1XCW	"	486,152	639	93	175	*JA2BLJ	"	31,654	140	44	75	*JA7HQK	7	27,962	142	28	54	UK0A	A	1,972,740	1983	111	309	*9A3ZO	"	15,379	107	26	65
JR1LEV	"	144,632	288	64	115	*JA2GAL	"	22,420	113	31	45	*JL7GPO	"	3,604	43	18	16	*UK8IG	A	182,078	529	44	105	*9A4BT	"	9,720	129	24	66
JA1HP	"	134,640	313	56	109	*JH2IJC	"	7,645	61	23	32					<b>UZBEKSTAN</b>				*9A6ACV	"	8,190	120	25	44				
JA1QOW	"	88,440	250	54	80	*JJ2TKX	"	2,124	25	16	20					<b>WESTERN MALAYSIA</b>				*9A6KCL	"	4,675	85	12	43				
JH1CTV	"	22,695	110	15	27	*JA2BY	28	36,750	191	27	48					<b>*9M2TO</b>				*9A3MW	21	45,657	256	19	70				
JJ1VEZ	"	21,840	86	37	54	*JR2TRC	"	408	10	8	9					<b>A</b>				*9A2TX	"	23,892	198	19	47				
JJ1JRH	"	3,315	38	18	21	*JF2WXS	"	209	7	5	6					<b>714,714</b>				*9A1CDG	14	31,104	222	17	55				
JS1KQQ	28	1,204	23	11	12	*JS2LGN	21	326,886	937	35	94					<b>1722</b>				*9A4RU	3.7	54,666	726	12	64				
7J1ABD	21	2,200	35	10	17	*JF2PXB	"	7,602	80	16	26					<b>92</b>				*9A3QK	"	20,648	335	7	51				
(Opr. WA6URY)																<b>EUROPE</b>													
JH1RFM	7	50,388	248	31	71	*JA2IZA	"	6,908	71	18	26					<b>ALAND ISLANDS</b>				<b>CZECH REPUBLIC</b>									
JH1AEP	3.7	22,101	199	20	33	*JH2WHS	"	1,120	24	7	13					<b>OH0TA</b>				<b>A</b>									
*JE1LFX	A	603,450	807	95	175	*JM2BHI	"	667	14	10	13					<b>A</b>				<b>672,204</b>									
*JJ1VRO	"	501,500	654	105	190	*JR2LIS	14	136,468	454	32	77					<b>2,142,855</b>				<b>1448</b>									
*JS1OYN	"	333,074	567	93	166	*JM2RUV	7	1,512	24	13	11					<b>2675</b>				<b>88</b>									
*JQ1BVI	"	332,952	557	84	177					<b>91,790</b>				<b>123</b>				<b>432</b>											
*JF1SQC	"	272,699	455	87	152					<b>121,659</b>				<b>62</b>				<b>225</b>											
*7L4IOU	"	228,620	406	89	141					<b>20,605</b>				<b>22</b>				<b>43</b>											
*JH1UUT	"	192,236	379	66	121					<b>1,650</b>				<b>23</b>				<b>18</b>											
*JA1GYO	"	169,422	338	63	124					<b>64</b>				<b>4</b>				<b>4</b>											
*JE1UFF	"	127,673	314	56	105					<b>136,773</b>				<b>430</b>				<b>32</b>											
*JL7PVR/1	"	119,460	254	74	107					<b>5,868</b>				<b>65</b>				<b>15</b>											
*JG1TVK	"	110,815	229	64	121					<b>4,320</b>				<b>66</b>				<b>13</b>											
*JK1ASO	"	98,778	236	69	94					<b>340</b>				<b>14</b>				<b>6</b>											
*JR1MRG	"	97,674	277	55	91					<b>22,223</b>				<b>116</b>				<b>21</b>											
*JM1NOQ	"	88,480	200	63	95					<b>3,044,100</b>				<b>2573</b>				<b>133</b>											
*JA1HFX	"	86,112	219	64	92					<b>685,930</b>				<b>879</b>				<b>97</b>											
*JF1RMM	"	58,650	165	57	81					<b>341,649</b>				<b>479</b>				<b>89</b>											
*JH5CZY/1	"	57,031	223	41	66					<b>202,230</b>				<b>369</b>				<b>78</b>											
*JP1SRG	"	46,224	158	46	61					<b>131,300</b>				<b>273</b>				<b>72</b>											
*JE1HXZ	"	44,712	148	39	69					<b>130,922</b>				<b>210</b>				<b>93</b>											
*JH1RMH	"	17,301	96	28	45					<b>720</b>				<b>17</b>				<b>8</b>											
*JA1AB	"	15,911	159	41	53					<b>5,148</b>				<b>44</b>				<b>16</b>											
*JA1XPU	"	15,394	89	35	51					<b>393,071</b>				<b>603</b>				<b>88</b>											
*JA1MQS	"	15,326	72	33	46					<b>73,304</b>				<b>228</b>				<b>41</b>											
*JA1ANA	"	11,844	55	30	64					<b>35,052</b>				<b>104</b>				<b>53</b>											
*JA1STY	"	11,256	65	30	37					<b>4,600</b>				<b>41</b>				<b>19</b>											
*JG3NKP/1	"	11,036	58	22	40					<b>12,141</b>				<b>84</b>				<b>22</b>											
*JP1POD	"	9,882	60	31	30					<b>213,282</b>				<b>649</b>				<b>34</b>											
*JA1XUY	"	9,027	59	25	34					<b>86,268</b>				<b>389</b>				<b>26</b>											
*7K4XVK	"	7,696	60	23	29					<b>57,475</b>				<b>170</b>				<b>31</b>											
*JR3PZW/1	"	7,316	47	23	39					<b>37,599</b>				<b>159</b>				<b>25</b>											
*7M1QYH	"	5,000	50	18	22					<b>931</b>				<b>19</b>				<b>9</b>											
*JJ1NUJ	"	4,346	48	16	25					<b>JORDAN</b>																			
*JH1SWD	"	2,035	21	16	21					<b>JY9QJ</b>				<b>A</b>				<b>3,147,376</b>											
*7N2JFU	"	1,904	42	10	17					<b>3,147,376</b>				<b>2569</b>				<b>111</b>											
*7K2VPT	"	1,425	24	13	12					<b>KHIRGHIZSTAN</b>																			
*JA1EIS	"	1,368	15	9	8					<b>EX8MZ</b>				<b>28</b>				<b>363</b>											
*JA1MYW 28	"	25,674	158	25	41					<b>KOREA</b>																			
*JH1CML	"	24,254	154	26	41					<b>HL1CG</b>				<b>A</b>				<b>63,492</b>											
*JA1JCD	"	19,941	134	26	43					<b>KUWAIT</b>																			
*JA1QZC	"	18,150	106	26	40					<b>9K2HN</b>				<b>A</b>				<b>4,459,463</b>											
*JA1AAT	"	16,298	111	22	36					<b>KAZHAKSTAN</b>																			
*JA1BUJ	"	9,016	72	22	34					<b>UN8LA</b>				<b>A</b>				<b>1,554,474</b>											
*JS1UMQ	"	8,085	67	21	34					<b>UN9FD</b>				<b>A</b>				<b>42,716</b>											
*7N2UQC	"	7,155	69	17	28					<b>UN7LG</b>				<b>21</b>				<b>396,140</b>											
*JF1RWZ	"	3,960	62	13	17					<b>UN6T</b>				<b>"</b>				<b>146,520</b>											
*JA1AAV	"	3,193	35	13	18					<b>UN7CE</b>				<b>1.8</b>				<b>10,332</b>											
*7N2UTO	"	2,520	33	14	21					<b>*UN9PO</b>				<b>"</b>				<b>19,684</b>											
*JA1SKY	"	2,210	26	14	20					<b>*UN5PR</b>				<b>21</b>				<b>415,982</b>											
*JP1IXV	"	26	10	6	7					<b>*UN7JX</b>				<b>"</b>				<b>195,182</b>											
*JH6RFT/121	"	275,719	822	36	102					<b>*UN7D</b>				<b>14</b>				<b>147,480</b>											
*JF1LLT	"	165,211	581	34	89					<b>LEBANON</b>																			
*JE1BDC	"	161,211	627	31	78					<b>*OD5NJ</b>				<b>A</b>				<b>2,851,836</b>											
*7M2CAG	"	39,039	186	26	51					<b>MACAO</b>																			
*JA1BBA	"	27,403	154	24	43					<b>*XX9BB</b>				<b>A</b>				<b>20,916</b>											
*JL1MWI	"	22,470	281	30	60					<b>*XX9AU</b>				<b>21</b>				<b>48,888</b>											
*7K2GNK	"	15,447	111	19	38					<b>MONGOLIA</b>																			
*7K2GMJ	"	8,370	82	16	29					<b>JT1CO</b>				<b>14</b>				<b>333,108</b>											
*7K1EQG	"	7,824	71	18	30					<b>JT7AA</b>				<b>"</b>				<b>41,888</b>											
*JG1GCO	"	5,456	54	16	28					<b>JT1BG</b>				<b>3.7</b>				<b>4,351</b>											
*JN1ZHJ	"	4,823	21	7	13					<b>*JT1V</b>				<b>28</b>				<b>36</b>											
(Opr. JJ1JHI)																<b>(Opr. JT1-126)</b>													
*JQ1LPT	"	4,558	41	19	24					<b>*JT1BV</b>				<b>21</b>				<b>9,684</b>											
*7K4SKD	"	4,240	45	17	23					<b>OGASAWARA ISLANDS</b>																			
*JA2KQE/1	"	2,440	36	18	22					<b>*JD1BIA</b>				<b>21</b>				<b>7,250</b>											
*JK1BI	"	810	15	7	11					<b>PAKISTAN</b>																			
*JM3UAQ/1	"	398	32	12	14					<b>*AP2N</b>				<b>A</b>				<b>351,780</b>											
*7M1TCV	"	336	21	4	12					<b>*AP2TJ</b>				<b>A</b>				<b>336,532</b>											
*JR1BSV	"	240	10	3	5					<b>7Z500</b>				<b>A</b>				<b>308,560</b>											
*JR4PMX/114	"	262,305	669	36	109					<b>HZ1AB</b>				<b>14</b>				<b>56,337</b>											
*JE1GZB	"	24,640	131	23	47					<b>SAUDI ARABIA</b>																			
*JA1EEG	"	11,950	90	20	30					<b>7Z500</b>				<b>A</b>				<b>308,560</b>											
*JO1RGV	"	6,591	65	15	24					<b>OGASAWARA ISLANDS</b>																			
*JA7ICX/1	"	3,253	59	20	33					<b>*AP2N</b>				<b>A</b>				<b>351,780</b>											
*JK1LUY	"	360	10	5	10					<b>*AP2TJ</b>				<b>A</b>				<b>336,532</b>											
*JG1FGL	"	275	11	4	7					<b>7Z500</b>				<b>A</b>				<b>308,560</b>											
*JK1AFI	7	1,508	20	13	16					<b>HZ1AB</b>				<b>14</b>				<b>56,337</b>											
*JE1SPY	3.7	940	25	10	10					<b>SAUDI ARABIA</b>																			
(Opr. JJ1JHI)																<b>(Opr. K3UOC)</b>													
JA2BNN	A	797,130	964	104	202					<b>(Opr. SMOCXU)</b>																			
JA2AXB	"	381,131	557	89	168					<b>TAJIKISTAN</b>																			
JF2QNM	"	365,056	680	90	166					<b>EY8WW</b>				<b>A</b>				<b>263,476</b>											
JH2AQI	"	79,242	206	50	91					<b>THAILAND</b>																			
JA2VQF	"	49,502	187	43	63					<b>*HS0GBI</b>				<b>A</b>				<b>17,091</b>											
JJ2NYT	"	15,416	74	30	52					<b>TURKMENSTAN</b>																			
JF2FIU	"	12,489	75	27	42					<b>*EZ8CW</b>				<b>A</b>				<b>21,240</b>											
JJ2UNR	21	436,595	1080	36	109					<b>UZBEKSTAN</b>																			
JA2CWU	14	83,850	280	26	80					<b>UK0A</b>				<b>A</b>				<b>1,972,740</b>											
JE2LUN	"	55,632	175	34	60					<b>UK8IG</b>				<b>A</b>				<b>182,078</b>											
JM2CCL	"	4,107	41	15	22					<b>WESTERN MALAYSIA</b>																			
JA2DLM	3.7	12,744	91	22	32					<b>*9M2TO</b>				<b>A</b>				<b>714,714</b>											
*JA2DJ	A	77,859	225	48	75					<b>EUROPE</b>																			
*JA2BEY	"	50,864	162	55	81					<b>ALAND ISLANDS</b>																			
*JA2HBK	"	39,456	105	58	86					<b>OH0TA</b>				<b>A</b>				<b>2,142,855</b>											
*JA2GHP	"	38,416	160	36	62					<b>C31LJ</b>				<b>A</b>				<b>647,185</b>											
*JG2REJ	"	35,535	117	38	7																								

*ES4BG 3.7	11,350	214	7	43	F5BBD	607,257	1080	74	283	DF0EE	263,264	884	34	118	*HA8XX	331,230	741	73	232	*IK5WVG	26,427	194	16	53
*ES6MO 1.8	18,288	352	46	400	F5RAB	368,244	739	71	247	(Opr. DL20BO)					*HA0HW	237,510	554	62	211	*IK4YNR	5,428	84	10	36
<b>EUROPEAN RUSSIA</b>					F2NH	207,378	352	68	178	DL3BWF	68,256	98	12	36	*HA3FT 28	17,460	162	16	44	*IQ7A 14	431,346	1645	37	137
RN6BY	A 2,972,270	3280	139	527	F2AR	157,586	465	55	192	DK0NK	65,780	324	28	82	*HA5BSW 14	577,643	1860	39	132	(Opr. IK7XIV)				
UA6LU	1,448,568	1546	122	436	F2RO	134,054	359	55	139	(Opr. DJ2IA)					*HA4FB	129,480	700	26	118	*IR2R	394,558	1373	38	138
RX3APM	721,544	1567	91	313	F5HWB	41,474	135	43	135	DL3MHS 3.7	78,528	668	20	76	*HA8BE 1.8	27,128	510	9	55	(Opr. IK2UZN)				
RZ6ACF	465,451	759	93	250	F5IHD	408	15	6	11	DL8DBW	52,129	589	17	60	<b>ICELAND</b>					*IV3RAV	84,680	453	27	89
UA10MS	439,824	813	82	254	F5TDK 28	129,408	516	25	103	DL7ALM	38,000	468	14	66	*TF/OZ5IPA A	39,786	274	27	87	*I4CSP	92,196	200	54	143
UA10MX	284,817	473	85	242	F6EZV 21	787,033	2021	33	136	DL7VMM	19,026	275	10	53	*I4PZP	64,400	267	28	87	*IK8AFN	21,056	326	12	52
UA6JY	269,690	400	86	212	F5NBX	689,885	1926	34	127	*DF7RX A	583,311	980	78	303	*IK2XSQ	63	8	2	7	*IQ5Q 3.7	37,268	475	11	66
UA4LY	180,194	457	58	153	F5FLN	520,536	1721	36	128	*DJ4JF	434,313	590	83	286	(Opr. I5VXG)									
RU3FF	180,063	495	57	190	F2EE	200,361	715	31	116	*DL2HX	398,670	665	88	323	<b>IRELAND</b>									
RA1AA	164,256	415	66	170	F2SI	97,970	492	27	74	*DK7ZH	396,670	741	62	249	EI8GS A	708,228	1255	70	239					
RUGLC	144,716	437	64	189	F5BOY	18,942	114	25	52	*DF3QG	392,424	609	82	250	EI8GP 14	48,282	300	14	64					
UA1DJ	91,584	430	37	122	F5PGP 14	717,162	2048	39	139	*DL7ANR	371,954	750	68	251	<b>ITALY</b>									
RV6LOB	7,200	55	29	43	F8AMV	14,476	84	23	54	*DL2DBH	246,960	520	68	226	IK4ADE A	1,560,320	2128	94	330					
RK6BZ	7,200	181	13	62	*TM6A A	1,276,290	1414	111	378	*DL8NBJ	193,440	567	61	187	IK8NWK	912,516	1913	80	261					
RU6MM 28	20,520	131	20	70	(Opr. F5UFX)					I11H	857,790	1389	91	314	(Opr. I1HJT)									
UA3LPF	368	26	5	11	*F5NZO	717,765	1036	100	339	*DK5DS	177,656	468	51	161	IU4U	650,880	1198	79	260					
UA3AB	124,410	409	33	110	*F5HNO	663,184	1013	83	279	*DL1TS	168,872	459	47	162	I7TAC	540,400	1334	82	268					
RA3QUA	91,200	391	27	93	*F5AMH	456,876	921	75	268	*DL6MDT	163,944	495	53	163	IK6JNH	179,208	540	59	203					
UA6LQ 14	394,065	1435	38	151	*F5POJ	220,472	559	53	195	*DK5MV	136,750	290	50	200	IK3UMT	134,285	296	65	186					
RU3AG	4,601	62	13	30	*F5AXP	182,706	486	50	172	*DJ4QO	119,988	360	46	152	IN3XUG	80,597	270	47	140					
UA3XBB	1,170	23	7	19	*F6FNA	176,046	495	54	168	*DL9US	115,987	405	45	161	IK0JMS	72,756	252	40	101					
RU4AA 7	309,863	1252	37	126	*F6IJG	173,420	550	45	185	*DF5AN	97,098	290	40	174	IK8TPJ	26,166	113	32	66					
RU4AA	248,301	963	30	111	*F5OIH	91,936	307	40	129	*DL8SDC	94,336	352	39	137	IK5YJK	25,491	150	26	61					
UA6EE	81,918	393	20	91	*F6HMX	88,480	301	41	117	*DL8ULO	86,275	410	38	137	IO4LCK 28	323,736	1227	34	130					
UA10MZ	33,128	303	18	64	*F6FTB	87,262	352	35	126	*DL3ARK	85,975	309	39	142	I8KPV	268,736	1261	30	106					
UA1OZ 3.7	25,842	260	14	59	*F5JBR	65,764	265	37	127	*DL1LSZ	84,456	396	38	146	I13T 21	1,375,429	2861	38	171					
RA3VV	14,649	235	8	49	*F5RPB	64,380	210	45	100	*DL2WF	83,790	418	41	169	(Opr. IV3TAN)									
RZ3OU 1.8	33,666	488	10	62	*F5PVJ	52,938	259	34	119	*DL1DCJ	82,668	276	43	123	IQ6F	805,000	2125	36	148					
RA4CC	9,384	168	6	40	*F5GEG	42,081	217	36	133	*DL2KK	78,581	317	41	138	IV3YYK	344,080	1045	36	148					
*RA3WA A	753,543	1144	99	344	*F6DZD	35,332	206	28	93	*DL2YAK	78,581	317	38	128	IR4T 14	1,272,200	3010	40	160					
*RV3BR	475,167	1121	94	269	*F5JBF	28,560	182	27	93	*DL3HWW	64,320	245	50	142	(Opr. I4UFH)									
*UA3BL	377,325	771	78	247	*F5JIW	13,200	60	27	57	*DF5ZV	64,116	266	37	100	IR1A 7	373,293	1770	34	137					
*RA3AF	316,344	701	71	223	*F8IN	10,584	105	19	53	*DL6JCB	63,705	290	35	120	(Opr. IK1GPG)									
*UA4LU	145,642	316	68	138	*F5JDG	9,394	134	13	48	*DL8UVG	63,674	281	48	110	IR4T 3.7	213,576	1119	26	106					
*RX3ARI	139,258	471	51	152	*F5OHH	8,494	107	15	47	*DL8NFU	61,902	305	43	128	(Opr. I4JMY)									
*RU4WE	124,017	440	50	151	*F5DXN	5,208	73	16	40	*DL0MFL	61,533	270	38	121	IK2DED 1.8	50,410	719	10	61					
*RV3AH	118,524	396	53	151	*F5PFA	3,074	60	8	21	(Opr. DL2JRM)					IK0YUT	17,984	303	8	56					
*RV1CC	63,954	285	43	128	*F6CAV	2,548	48	19	30	*DL3YEI	56,550	297	31	143	IV3FSG	16,512	374	7	41					
*RA3QOC	50,688	260	30	102	*F5TNI	2,028	158	46	110	*DJ3GE	52,245	53	35	100	IU2E	10,944	306	6	42					
*UA1QCP/1	49,141	238	36	121	*F5RMY 28	62,856	283	21	87	*DK2HD	46,632	247	28	96	(Opr. IK2VUE)									
*RW1QF	46,990	142	54	131	*F8AKC	22,968	166	17	55	*DL7UXG/P	44,088	267	31	101	*IV3UHL A	870,504	1085	96	360					
*UA6LHM	40,548	233	24	69	*FB1BJI	20,942	158	19	55	*DL5ST	40,098	184	38	125	*IR4R	861,445	1226	102	355					
*U1BA	34,625	217	28	97	*FB1PMO	8,610	94	10	31	*DJ9RP	39,368	182	37	96	(Opr. IK4ALM)									
*RA4AFP	3,700	228	53	130	*F8ASF	8,208	99	14	40	*DL5DSA	38,376	158	37	119	*IK3SSJ	591,316	1221	78	278					
*UA3LBE 28	630	41	5	13	*F5TVG	7,910	55	17	53	*DL5ANS	27,750	178	29	96	*I13B	434,656	759	72	217					
*UA4LCQ 21	573,363	1610	40	146	*F5SHQ 21	58,806	320	23	76	*DL3KDC	25,573	238	37	70	(Opr. IK3OII)									
*UA4POL	463,298	1498	35	123	*F6AXD	8,550	61	20	37	*DJ2OR	19,200	150	19	56	*IK3PQG	236,583	560	65	226					
*RZ6HX	332,165	1234	33	120	*F5BMK 14	65,088	484	21	75	*DL2KWA	23,400	165	25	95	*IU4F	201,213	439	55	182					
*RA6LW	251,688	999	33	114	*F6FUN	50,880	250	24	72	*DL7FEA	14,700	144	20	78	(Opr. IK4ZHH)									
*RU3DX	163,082	510	35	111	*F9DK	32,047	306	13	60	*DL6AG	14,700	63	24	48	*IK4WMG	193,984	416	58	166					
*RA3RCL	124,744	533	30	94	*F5AJG	15,529	192	12	41	*DL2MIH	11,481	82	29	60	*IQ0A	176,963	489	66	205					
*RA3DNC	95,520	460	28	92	*F6JSZ 7	616	24	6	16	*DL9XW	7,140	57	21	47	(Opr. IK0XBX)									
*RV6BW	71,368	398	28	60	*F6OYU 3.7	1,173	35	5	18	*DL9JW	6,696	13	10	44	*IO4I	161,916	491	50	156					
*UA3PP	17,485	197	14	51	<b>GERMANY</b>					*DL9LBI	5,963	68	24	43	*IK1TTD	158,976	518	50	16					
*RV3ACA 14	65,953	419	25	76	DL6FBL A	3,630,750	3118	124	494	*DL8NTC	5,580	62	16	46	*IK2RPE	156,403	417	52	175					
*RK3RT	64,470	433	28	77	DL2NBU	3,118,432	2685	126	482	*DL2KG	5,141	69	17	36	*IZ3AYU	148,612	500	46	166					
*UA3XIK	54,435	365	20	75	DJ4PT	3,023,258	2455	128	446	*DL1ET	2,808	43	16	38	*IK3SCB	140,030	418	42	148					
*RZ3FR	45,493	301	23	74	DJ6QT	1,515,220	1546	115	433	*DL7MAT	2,331	31	13	24	*I6NOA	137,475	403	58	167					
*UA3ACV	36,480	345	19	61	DF8WS	1,365,548	1328	107	380	*DL7VPO	2,178	96	10	12	*IK1RQJ	123,280	225	68	162					
*UA4LBK	34,290	264	22	68	DL2DX	1,048,905	1100	114	375	*DL3WB	1,888	55	7	25	*IK4QJM	116,688	470	36	120					
*RA3ATE	21,760	249	13	51	DF2RG	774,978	1031	97	357	*DL9CC	1,768	26	13	21	*IK7QHS	105,716	384	50	164					
*UA3QNL	10,920	86	20	58	DL8UCC	619,648	615	105	307	*DH1LAD 28	67,830	384	18	77	*IK7WPD	101,493	323	48	141					
*RA1QX	6,579	108	10	41	DK2XX	535,790	675	99	310	*DH2BRR	57,528	343	18	76	*IK1ZOF	94,976	234	59	165					
*RA6LVT 7	5,310	70	11	34	DJ8CR	401,310	907	73	270	*DL3ZAI	6,160	89	10	34	*IK7RVY	86,292	312	45	108					
<b>EUROPEAN TURKEY</b>					DL1JPL	349,770	754																	



\*PA0MIR 3.7 18,300 289 9 51  
\*PA2SWL 1.8 14,158 252 7 53

### NORTHERN IRELAND

\*GIB0UM A 32,482 202 25 84  
\*GI4MWA \* 8,250 80 20 35

### NORWAY

LA4BN A 40,300 200 35 95  
LA4EU \* 17,028 151 24 75  
LA6VDA \* 10,191 103 20 59  
LA2QJA \* 8,066 123 17 57  
LA2MJA 21 18,018 115 19 58  
LA2IR 14 62,370 301 20 79  
LA7AK 1.8 7,380 182 5 36  
LA5JX \* 240 17 2 14  
\*LA7CL A 68,892 260 39 128  
\*LA2EIA \* 67,080 340 31 125  
\*LA2HFA \* 19,030 146 31 79  
\*LA1KQ \* 12,834 136 23 70  
\*LA9IHA \* 10,624 104 23 60  
\*LA8ZJA \* 9,380 70 27 40  
\*LA8LA \* 5,162 57 20 38  
\*LA9CJA \* 3,128 54 13 33  
\*LA2XIA \* 195 13 4 9  
\*LA8WG 14 25,056 231 21 51  
\*LA7SI 1.8 528 25 3 19

### POLAND

SP8FHK A 601,783 1150 85 304  
SP2JMR \* 323,016 600 83 261  
SP6FBD \* 267,810 600 53 184  
SP2AQP \* 170,352 479 59 193  
SP3JHY \* 140,377 350 54 175  
SQ5HAR \* 97,595 410 34 115  
SP3BNC \* 90,090 335 37 117  
SP3CCT \* 75,582 224 51 120  
SP6CXH \* 39,809 255 27 94  
SP9KJM \* 35,941 244 28 99  
SP9LDI \* 32,630 228 32 98  
SP5CEQ \* 25,312 151 30 82  
SP9HQJ \* 24,684 173 28 74  
SP9VRY \* 12,788 115 23 69  
SP3FZN \* 9,125 71 15 59  
SP5ENA \* 378 17 6 12  
SP9W 28 231,132 1091 26 106  
(Opr. SP9HWN)

SP2QVI \* 53,802 374 21 77  
SP5DDJ \* 39,676 327 21 70  
SP5GRM 21 322,414 1237 34 129  
SP4HKB \* 221,852 858 30 118  
SP8NCJ \* 104,919 490 28 95  
SP5BB \* 46,305 254 24 82  
SP3CMA \* 3,690 59 11 30  
SP4EEZ 7 212,214 988 31 120  
SP9MOH \* 8,319 58 20 39  
SP3GEM 3.7 244,325 1448 33 112  
SP9MAV \* 33,984 473 12 52  
SP5XVY \* 14,632 394 10 52  
\*SP6CYX A 502,970 903 82 283  
\*SP6MLX \* 333,840 703 74 238  
\*SP7KYE \* 279,595 701 60 221  
\*SP2EWQ \* 245,280 683 52 240  
\*SP9HZF \* 167,960 531 51 196  
\*SP1MHV \* 151,524 290 69 207  
\*SP1EOI \* 135,552 350 47 148  
\*SP7LZD \* 117,667 343 52 157  
\*SP9NLK \* 116,064 359 52 156  
\*SP9LKS \* 102,114 384 43 140  
\*SP5NHI \* 99,530 456 36 149  
\*SQ2BNM \* 60,725 220 41 134  
\*SP6CDP \* 56,947 275 38 129  
\*SP9RPW \* 50,320 150 48 100  
\*SQ6ADP/9 \* 48,077 280 34 97  
\*SQ5AAS \* 46,171 320 59 99  
\*SP1AFU \* 36,716 250 34 100  
\*SQ2HEB \* 35,244 214 32 100  
\*SQ1EIX \* 30,100 163 35 105  
\*SP5DRE \* 29,900 197 24 68  
\*SQ5EXM \* 25,296 185 26 98  
\*SP9LDP \* 24,308 120 36 82  
\*SP1RWK \* 22,781 177 24 85  
\*SP7LHX \* 16,340 169 28 50  
\*SP9PKM \* 14,886 306 10 21  
\*SP4MPH \* 12,768 105 27 69  
\*SP6FJ \* 11,544 60 30 48  
\*SP9IKN \* 10,263 199 37 121  
\*SP3VAU \* 9,728 54 30 46  
\*SQ3BYH \* 8,496 84 19 53  
\*SP5OXJ \* 6,752 54 27 51  
\*SP9XUE \* 5,670 100 14 40  
\*SP9EH \* 5,382 106 16 30  
\*SP6OPE \* 5,100 44 20 40  
\*SP4KWQ \* 5,077 98 24 53  
(Opr. SQ4CIS)

\*SP2XDR \* 3,159 150 10 27  
\*SQ9DXN \* 1,978 40 12 31  
\*SP2FWC/P \* 1,150 30 18 28  
\*SP9W 28 169,164 1022 26 101  
(Opr. SP9HWN)  
\*SP5LCC \* 12,180 140 15 43  
\*SP9KGG \* 8,944 159 10 33  
(Opr. SQ9DDH)  
\*SQ8GBN \* 1,710 41 8 22  
\*SQ8DFR \* 1,568 22 11 17  
\*SP6EJY \* 420 15 5 7  
\*SP7DZA \* 396 18 6 12

\*SP3SLA 21 252,844 807 32 136  
\*SP60JJ \* 194,388 517 35 132  
\*SP5LKM \* 118,990 485 33 113  
\*SP9JCN \* 23,250 178 17 58  
\*SP9HQC \* 20,944 117 21 67  
\*SP9CAY \* 18,870 85 25 77  
\*SP6PCB \* 375 15 9 12  
(Opr. SQ6ANH)

\*SQ5FWS 14 93,708 484 26 88  
\*SP9OYK \* 37,392 303 18 64  
\*SP2GNB \* 33,453 256 20 61  
\*SP6PRT/P \* 15,176 194 10 46  
\*SP6IXU \* 12,006 72 19 50  
\*SP1EOM \* 10,070 144 11 42  
\*SP3GHK/P \* 7,175 140 9 32  
\*SP3BHI \* 5,628 74 8 34  
\*SQ8AMI \* 4,992 87 9 39  
\*SQ4CTM \* 4,032 82 10 26  
\*SP6AUJ \* 2,210 44 8 18  
\*SP9ABU 7 17,710 188 13 57  
\*SP7MUZ \* 8,850 159 15 55  
\*SP3GTS \* 6,480 101 7 47  
\*SP2EXN 1.8 7,250 50 5 29  
\*SP2QCH \* 5,904 143 6 35

### PORTUGAL

CT1AUO A 533,596 868 67 199  
CS1A \* 383,084 855 69 209  
CT1BXX \* 271,320 513 67 218  
CT1AHU \* 181,260 757 23 83  
CT4NH 28 363,987 1176 26 127  
CT1DIZ 21 803,938 2363 33 134  
CT1BNW 14 118,950 466 29 101  
CS1SL \* 80,352 412 23 85  
\*CS7BWW A 698,175 1024 86 235  
\*CQ8EIF \* 304,704 707 56 136  
\*CT1EGH \* 203,581 449 59 170  
\*CS5EWA \* 65,565 222 48 107  
\*CT1ESQ \* 41,307 258 35 112  
\*CT1FLD \* 34,860 249 48 92  
\*CT1FNT 28 21,899 157 13 48  
\*CT1EDJ \* 18,150 141 17 49  
\*CT1CLR \* 7,748 100 12 40  
\*CT1ELF \* 5,772 52 13 25  
\*CT1ELP 21 280,872 1139 29 112  
\*CT1AZS \* 9,730 65 17 48  
\*CT4NC 14 256 16 3 13  
\*CT1AOZ 7 176,001 756 23 96  
\*CT2GLT \* 4,264 73 7 45  
\*CT2FZZ \* 1,850 70 4 21  
\*CT2GPT \* 984 40 6 18

### ROMANIA

YO3APJ A 1,230,528 1900 100 364  
YO3FF 14 60,208 353 25 81  
YO4AYE \* 12,400 141 15 47  
YO2LII 7 4,116 137 12 20  
YP2C 3.7 50,176 768 10 54  
(Opr. YO2LIF)  
YO9GJY \* 11,592 248 3 43  
YO9KVV \* 2,900 24 5 15  
(Opr. YO9GDY)  
YO2LHD \* 864 37 5 19  
\*YO3FRI A 739,440 1242 93 297  
\*YO3GJC \* 652,176 1412 82 254  
\*YO4CIS \* 515,775 1012 82 263  
\*YO5CYG \* 343,608 946 78 200  
\*YO8FR \* 289,404 630 52 207  
\*YO4GDP \* 187,460 654 46 160  
\*YO7ARY \* 163,374 502 59 160  
\*YO3CTK \* 86,304 295 49 137  
\*YO3NL \* 51,300 321 25 125  
\*YO2BS \* 16,576 108 20 26  
\*YO8ROO \* 11,628 126 25 51  
\*YO8GF \* 4,380 123 30 30  
\*YO3JF 28 75,388 653 21 73  
\*YR7C \* 14,809 203 16 43  
(Opr. YO7VS)  
\*YO3AIL 21 53,707 185 31 88  
\*YO4GAD 14 465,408 2062 34 114  
\*YO5TP \* 57,000 400 23 72  
\*YO8BPK \* 33,858 283 20 61  
\*YO4ATW \* 24,180 200 18 60  
\*YP2R 3.7 31,265 510 10 55  
\*YO5PAP \* 22,684 422 7 46  
\*YO9IAB \* 9,648 181 8 40  
\*YO2BEH 1.8 2,550 74 9 25  
\*YO2BB \* 1,815 55 5 28

### SAN MARINO

T77V 14 673,679 2841 35 128  
(Opr. IV3TMV)

### SARDINIA

IS0HHA 21 34,977 288 20 69  
\*IS0WBT A 198,250 597 60 190  
\*IS0IGV \* 10,563 437 24 75  
\*IS0NHT 28 122,200 1047 22 82  
\*IS0GYW \* 120,539 800 19 84

### SCOTLAND

GM0FET A 582,612 1043 61 221  
GM3BCL \* 421,452 733 61 215  
GM0EGI \* 378,000 760 57 213  
\*GM4CUX A 39,646 195 28 58

### SICILY

IT9WPO A 894,704 1446 96 302  
IT9BLB 3.7 104,834 764 20 86  
IT9JOF A 228,921 385 72 159  
\*IT9ORA \* 13,144 100 32 74  
\*IT9ZYT 21 69,324 404 26 80  
\*IT9STX 14 659,175 2232 38 127  
\*IT9ICS \* 81,320 753 26 81

### SLOVAK REPUBLIC

OM7M 21 667,776 1822 38 150  
(Opr. OM5ZW)  
OM5DX 14 1,107,351 3000 39 151  
OM5M \* 983,992 2662 39 149  
(Opr. OM3BH)  
OM6KW \* 293,388 1216 32 106  
OM2TW 3.7 156,456 1341 19 87  
\*OM3IAG A 218,842 703 65 182  
\*OM3YK \* 202,335 607 65 170  
\*OM6TX \* 137,360 492 41 161  
\*OM7ARC \* 64,532 352 30 116  
\*OM2SM \* 25,956 225 19 84  
\*OM3CDZ \* 23,925 340 45 100  
\*OM3PQ \* 11,745 129 15 72  
\*OM5FA 28 114,384 620 27 98  
\*OM4KK 21 58,298 273 25 78  
\*OM0AMB \* 5,848 78 13 30  
\*OM4WW 14 26,475 222 17 58  
\*OM5KM 3.7 36,035 487 13 57  
\*OM7AB \* 27,848 451 7 52

### SLOVENIA

S59ZA A 3,529,260 3082 136 494  
S55A \* 1,212,100 1664 86 305  
S50A \* 607,152 1015 80 198  
S59L \* 379,962 919 55 154  
S53FO \* 286,141 635 67 210  
S53X 28 272,745 1019 31 140  
S50R \* 254,528 947 34 130  
S53O \* 173,328 833 26 112  
S52OT \* 170,982 828 31 107  
S53R 21 1,042,665 2260 38 157  
S50U \* 733,116 1757 39 160  
S50L \* 604,101 1779 37 140  
(Opr. S59W)  
S57O \* 484,891 1397 36 151  
S50K 14 1,117,123 3179 40 149  
S58AB \* 880,200 2394 38 142  
S53M \* 830,400 2370 38 135  
(Opr. S51ZO)  
S50O \* 438,570 1439 37 128  
S50Y 3.7 134,472 1124 21 83  
S58J \* 47,808 644 12 60  
S52GP \* 34,188 503 10 56  
S50C 1.8 52,487 719 10 63  
(Opr. S53CC)  
S54DL \* 50,832 706 10 62  
S57M \* 42,778 581 11 62  
\*S57DX A 1,137,600 1470 98 352  
\*S52ZW \* 955,040 1362 101 407  
\*S59AA \* 949,630 1183 106 379  
\*S51F \* 673,214 1102 87 322  
\*S58MC \* 481,327 816 78 251  
\*S59KW \* 368,520 758 100 232  
\*S51SK \* 178,524 476 50 178  
\*S52FB \* 133,476 374 58 169  
\*S58MU \* 56,090 256 39 119  
\*S53DX \* 41,418 292 30 88  
\*S57KM \* 40,377 282 28 101  
\*S51MA 28 86,880 464 25 95  
\*S57J 21 316,057 959 34 129  
\*S53ZO \* 263,526 759 32 135  
\*S57U 14 246,704 1044 29 107  
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\*S51TA 3.7 62,926 869 13 60  
\*S50Q \* 46,512 647 12 60  
\*S57CBS \* 22,980 416 10 50  
\*S57KAA \* 19,890 412 6 41  
\*S57IIO \* 17,914 350 7 46  
\*S57NPR \* 9,062 228 5 41  
\*S54E 1.8 28,458 466 8 54

### SPAIN

EA3NY A 3,503,424 3456 116 398  
EA4KD \* 3,255,828 3009 119 424  
EA7BA \* 1,606,452 1948 93 261  
EA5DFV \* 1,085,166 1729 83 278  
ED2WW \* 841,344 1446 76 237  
EA3GBU \* 819,678 1268 88 314  
EA3GHQ \* 686,232 1174 72 252  
EA3AHS \* 578,442 981 79 242  
EA3BCP \* 507,508 1311 63 221  
EA3ALV \* 465,500 929 75 275  
EA5OL \* 429,006 879 61 193  
EA3ASS \* 378,487 747 73 238  
EA5GRB \* 343,200 652 62 250  
EA1JO \* 331,792 695 53 180  
EA1FAK \* 186,846 498 49 160  
EA4BAS \* 181,450 444 54 136  
EA5AEN \* 100,232 242 70 148  
EA1GA \* 72,846 236 42 100  
EA4EIS \* 55,458 186 38 120  
EA5TD \* 23,862 92 45 78  
EA5DCL \* 23,560 119 33 91  
EA3TA \* 19,046 133 27 80  
EA1BJO \* 8,856 92 23 49

EA2GC \* 8,176 75 22 36  
EA4FW \* 7,176 50 33 45  
EA1EXY \* 3,634 46 16 30  
EA4MZ \* 1,190 33 10 25  
EA7BR 28 150,192 611 25 99  
EA3AML \* 43,741 396 18 65  
EA2BP 21 111,1592 502 28 95  
EA5GMB \* 46,812 298 22 72  
EA3ATM 14 401,636 1350 36 123  
EA3BHB \* 306,634 1384 33 106  
EA1DDO 3.7 26,994 340 9 57  
EA2CLU \* 22,610 298 12 58  
EA1CON \* 17,051 182 10 49  
EA3AVP \* 15,780 270 9 51  
\*EA7WA A 2,118,914 2285 112 381  
\*EA3BKJ \* 943,493 1534 84 263  
\*EA3ELZ \* 625,894 994 79 294  
\*EA3GEG \* 621,765 1035 74 263  
\*EA7RU \* 568,834 849 71 216  
\*EA5ARC \* 478,081 855 83 306  
\*EA1AYN \* 443,200 924 71 249  
\*EA3FUM \* 419,850 1165 65 246  
\*EA1FAD \* 287,670 662 61 197  
\*EA3BHK \* 253,332 355 94 278  
\*EA5WX \* 250,275 502 63 172  
\*EA4DXP \* 216,480 513 58 188  
\*EA7FTF \* 210,406 774 28 105  
\*EA5EOR \* 194,555 556 46 187  
\*EA5ASF \* 190,226 468 58 169  
\*EA3ASX \* 182,728 361 66 185  
\*EA1ANZ \* 182,042 245 16 66  
\*EA5PWW \* 169,694 494 48 169  
\*EA1BLI \* 165,270 576 52 158  
\*EA1JE \* 152,880 389 55 155  
\*EA7AKK \* 149,592 507 46 138  
\*EA1BAF \* 124,914 353 47 144  
\*EA5JC \* 123,096 323 53 170  
\*EA1AAW \* 119,786 345 52 150  
\*EA1ET \* 119,568 393 51 161  
\*EA5AFH \* 111,756 234 65 203  
\*EA3NA \* 105,076 242 73 145  
\*EA2ATV \* 104,196 223 62 166  
\*EA1APS \* 103,914 400 39 99  
\*EA1CJH \* 100,912 317 50 162  
\*EA1MK \* 98,783 393 45 128  
\*EA3AQQ \* 97,555 374 43 136  
\*EA1OT \* 94,550 439 34 121  
\*EA1FFC \* 91,584 329 46 146  
\*EA7IA \* 85,041 324 24 75  
\*EA3AM \* 76,825 281 43 132  
\*EA5GJT \* 76,440 282 41 89  
\*EA4BSC \* 75,425 221 46 129  
\*EA7EWX \* 75,006 300 39 123  
\*EA1JW \* 70,770 221 52 158  
\*EA4DAT \* 69,810 354 32 98  
\*EA1AUM \* 67,539 309 36 105  
\*EA1CJ \* 65,598 317 35 139  
\*EA1CP \* 65,569 285 30 89  
\*EA7BDL \* 62,729 290 35 114  
\*EA1CM \* 62,240 268 41 119  
\*EA1AEG \* 58,743 224 29 78  
\*ECSAKR \* 49,973 257 30 91  
\*EA2ADJ \* 49,010 165 45 124  
\*EA1BZP \* 47,892 289 34 122  
\*EA1AW \* 46,782 242 29 84  
\*EA3APS \* 43,940 178 37 93  
\*EA7CWV \* 41,168 148 28 86  
\*EA2AP \* 40,602 219 33 101  
\*EA3EU \* 34,950 158 41 109  
\*EA4AYB \* 31,744 114 42 86  
\*EC5CFD \* 30,847 149 26 83  
\*EA7CWA \* 25,602 105 36 86  
\*EC7DNE \* 24,288 167 24 68  
\*EA5CZL \* 23,108 142 29 77  
\*EA7ALO \* 21,400 77 41 66  
\*EA1FBJ \* 20,608 207 26 102  
\*EA5CMQ \* 18,924 126 22 61  
\*EA3EVR \* 18,920 117 25 30  
\*EA3EAN \* 18,810 117 26 64  
\*EA1BLX \* 17,014 105 25 69  
\*EA5FME \* 16,983 159 29 82  
\*EA1DFP \* 16,456 79 36 52  
\*EA4CKC \* 15,476 116 29 77  
\*EA5IL \* 13,923 78 27 64  
\*EA7AHA \* 13,530 59 35 47  
\*EA4CIE \* 13,524 75 27 71  
\*EA7TG \* 13,072 62 28 48  
\*EA5CGU \* 10,350 61 28 47  
\*EA5CRU \* 10,064 95 18 56  
\*EA7ATF \* 9,316 75 23 34  
\*EA2CR \* 8,643 103 11 56  
\*EA5FRP \* 7,739 47 28 43  
\*EA4SS \* 7,548 51 25 43  
\*EA1BAW \* 7,344 100 11 40  
\*EA3FAJ \* 7,280 39 27 38  
\*EA5EIL \* 6,820 46 23 39  
\*EA3ATO \* 5,307 54 22 39  
\*EA5AOP \* 4,720 46 17 34  
\*EA2CND \* 4,320 38 16 38  
\*ECSAGX \* 3,780 69 11 31  
\*EA1CGC \* 3,690 58 15 30  
\*EA1ND \* 3,298 43 12 22  
\*EA4ART \* 2,867 43 14 33  
\*EA7AFD \* 2,820 54 12 28  
\*EA1BPS \* 2,754 37 13 21  
\*EA5EI \* 1,380 16 14 16  
\*EA7HBP 28 153,270 708 26 105

\*EA7FUN \* 139,464 628 25 92  
\*EA7GTF \* 130,350 803 27 83  
\*EA3FCQ \* 106,090 649 21 82  
\*EA7ASZ \* 44,640 279 20 76  
\*EA4EER \* 41,192 302 18 58  
\*EA7AKJ \* 29,625 176 20 55  
\*EA7ALN \* 27,797 188 17 60  
\*EA2CAR \* 13,496 184 16 40  
\*EA4EJR \* 10,586 115 16 51  
\*EA3DNC \* 10,560 114 14 50  
\*EA7GGP \* 6,667 54 16 43  
\*EA5YJ \* 513 22 5 14  
\*EA2CJC 21 201,468 1010 23 80  
\*EA3OP \* 156,520 821 31 99  
\*EA7DPU \* 134,504 599 28 108  
\*EC5CPL \* 130,921 1077 15 93  
\*EA7ANM \* 63,800 480 18 48  
\*EA3BIM \* 57,783 429 21 82  
\*EA3KT \* 46,806 331 17 70  
\*EC3CJN \* 35,496 450 17 55  
\*EC7ACV \* 22,325 172 23 72  
\*EC3AJW \* 21,610 255 22 76  
\*EA7AKB \* 14,388 140 18 48  
\*EC5CWA \* 13,396 104 18 50  
\*EC3AJQ \* 9,180 65 19 49  
\*EC5AGD \* 6,912 68 17 47  
\*EC4AGJ \* 6,890 71 16 37  
\*ECTANH \* 4,488 42 13 31  
\*EC5CVR \* 4,223 80 13 28  
\*EC3CMT \* 3,640 50 11 29  
\*EC5AIL \* 3,330 38 11 26  
\*EC4DJY \* 144 8 4 8  
\*EA3GHZ 14 124,000 572 28 96  
\*EA1AJV \* 112,564 551 23 84  
\*EA4EOI \* 60,701 352 22 79  
\*EA3DVJ \* 25,275 193 15 60  
\*EA5TN \* 6,136 92 10 42  
\*EA2CHL \* 2,112 58 7 25  
\*EA1DST \* 1,540 37 7 15  
\*EA5DIT \* 472 19 13 19  
\*EC3ADZ 3.7 1,961 93 6 31  
\*EA4AV 1.8 6,528 115 7 44

### SVALBARD

JW0L A 3,160 50 12 28  
(Opr. G3WFT)

### SWEDEN

SM3PZG A 1,098,072 1739 83 321  
SM5AOE \* 1,091,800 1418 99 325  
SM5CEU \* 658,298 968 100 343  
SM3BIZ \* 300,124 642 81 278  
SM4AIO \* 202,805 617 47 188  
SM0AJV \* 15,400 139 20 68  
SM5OK \* 14,833 11

UT2QT	*	277,999	1011	33	124
UT7LA	*	171,201	598	34	115
UX0HA	*	56,661	410	21	80
US11	14	598,368	2259	38	146
UY5ZZ	*	526,240	1819	37	123
UX0KN	*	267,696	1219	33	111
UT6Q	*	251,255	1308	35	120
(Opr. UR6QA)					
UT7I	*	229,680	1130	36	109
(Opr. UT210)					
UR7M	*	149,296	798	25	99
UT7EF	*	73,554	320	30	93
UT7MD	*	3,362	48	10	31
UT5HP	*	608	12	10	9
UT1ZZ	*	231	7	4	7
UT21Y	3.7	85,488	727	22	83
UU0JM	*	60,974	707	16	70
UX1VT	*	20,270	340	9	46
UR4E	1.8	13,570	305	9	50
*UT5UAG	A	700,344	1013	98	328
*UT8U	*	462,308	999	77	231
*UT4UO	*	341,000	807	66	209
*UY5TE	*	138,736	559	35	208
*UR5U	*	114,425	440	46	153
(Opr. UR5UW)					
*UT6EE	*	68,400	313	37	115
*UT3IZZ	*	62,061	339	34	103
*UR6EX	*	19,992	164	24	60
*UX8I	28	106,000	771	24	82
*UR8LA	*	35,672	262	18	73
*UX3HX	*	22,196	258	15	47
*UU4JEE	*	3,200	56	11	29
*UT1YV	*	836	31	6	16
*UR7UL	14	61,270	365	27	83
*US5ESP	*	49,755	273	22	85
*UR6MW	*	41,586	321	18	69
*U5WF	7	79,123	495	24	86
*UR7TZ	*	63,452	548	18	82
*UR6EA	*	54,845	426	24	82
*UX3M	*	22,576	196	14	69
(Opr. UR3MP)					
*UT1WW	*	11,385	173	9	46
*UT5EGE	*	10,050	136	10	48
*UX2MF	3.7	29,376	395	9	55
*UX3MO	*	17,710	271	8	47
*UU4JMG	1.8	17,785	281	9	54
*UR4MRT	*	4,641	103	34	39

**WALES**

GW4BLE	A	3,656,888	3050	108	414
GW7J	1.8	19,272	284	9	57

**YUGOSLAVIA**

4N9BW	A	4,985,601	4189	146	535
(Opr. YU7BW)					
YT1AD	*	3,466,420	2923	141	479
(Opr. Z32ZM)					
YT1BB	*	3,402,686	4137	127	451
YT1R	28	314,704	1731	30	106
(Opr. YU1ZZ)					
YU1OL	*	12,624	172	14	34
406A	21	1,980,046	3280	37	145
(Opr. YT6A)					
YU9A	*	815,774	2297	37	141
(Opr. YU1FW)					
YZ1AU	*	535,830	1803	35	124
4N7B	14	979,080	3022	38	161
(Opr. YU7BJ)					
YU1JW	*	590,040	2335	33	116
406A	7	245,025	1294	28	93
(Opr. YT7AA)					
YU1EA	1.8	68,886	784	13	73
*YU7SF	A	18,216	121	27	72
*YU1CV	28	144,251	661	30	108
*4N1N	21	235,049	945	31	108
*YU7YZ	*	132,804	555	29	97
*4N8P	*	87,780	404	27	87
*YU7KM	*	40,984	175	23	71
*4N7TA	*	4,278	74	10	21
*YU1EL	14	140,283	828	32	111
*YU1RE	*	99,250	489	28	97
*YU1RA	1.8	8,379	197	7	50
*YU1AST	*	7,224	123	6	36
(Opr. YU1CZ)					
YT1T	*	1,333	49	4	27
(Opr. YU1AC)					

**OCEANIA**

**AMERICAN SAMOA**

AH8A	7	332,832	1219	31	65
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**ANTARCTICA**

*VK0ANARE	A	11,873	161	16	15
(Opr. VK1TS)					

**AUSTRALIA**

VK2ARJ	A	969,465	1384	81	164
VK3TZ	*	471,296	692	88	175
VK1MJ	*	153,080	358	66	112
VK2EKY	*	94,752	340	32	64
VK8AV	*	35,209	113	54	83
VK2XT	21	47,628	271	21	42
VK2APK	14	317,955	785	34	107
VK2CM	*	65,265	259	27	68
VK6WJH	*	49,217	197	24	65

*VK4EJ	A	74,600	580	58	96
*VK3NDS	21	97,744	366	25	63
*VK4MOJ	*	4,294	57	18	20
*VK5KMI	*	2,125	35	13	12
*VK1FF	*	672	21	6	6

**BRUNEI**

V8EA	A	6,941,985	5109	141	324
(Opr. J01RUR)					

**EASTERN MALAYSIA**

9M8R	14	1,339,743	2650	36	147
(Opr. W7EJ)					
*9M8YY	A	279,212	826	47	69
(Opr. J33WXA)					
*9M8DX	21	230,656	781	30	76
(Opr. VK3DXI)					

**GUAM**

KH2D	21	717,402	1929	35	98
*KH2JU	A	304,983	759	54	87

**HAWAII**

NH7A	A	4,477,494	4346	130	227
(Opr. UR5UW)					
KH6/AB7IT	*	506,560	1178	70	90
KH6/K6GSS	*	12,596	79	32	35
KH6BZF	21	228,750	1529	19	31
WH6CQH	14	661,080	2323	34	71
KH6FKG	7	171,300	988	21	39
KH6CC	1.8	6,432	140	8	8

**INDONESIA**

YB1AQS	A	3,531,588	3875	124	329
YB5QZ	*	1,023,611	1250	87	196
YB9CCB	*	291,844	872	65	131
YC0AN	*	85,905	260	39	67
YB0HD	*	31,106	107	34	69
YB0AI	3.7	5,576	64	14	20
*YC9WZJ	A	241,944	828	38	64
*YB6INU	*	130,562	242	70	124
*YB2CPO	*	103,194	286	55	92
*YB2BRW	*	97,360	475	21	59
*YB4JIM	*	18,700	88	31	54
*YC1KEN	*	9,412	73	17	35
*YC8NLF	*	2,940	86	8	13
*YC2ERL	21	33,553	162	26	63
*YC0FEF	*	22,320	109	24	48
*YC3VPE	*	3,392	41	14	18
*YC3LYP	*	1,620	24	12	15
*YC3RH	*	1,060	22	9	11
*YC8UYB	7	62,464	360	21	40
*YB2PBX	3.7	2,952	49	17	24
*YC0LOW	*	442	11	6	11

**NEW CALEDONIA**

*FK8VHN	A	329,043	811	58	85
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**NEW ZEALAND**

ZL4AS	A	462,000	899	68	108
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**NORTHERN MARIANAS**

WH0AAV	21	906,660	2301	37	101
KH0CE	14	239,200	903	30	70

**PHILIPPINES**

DU1SSR	A	300,560	684	62	108
4F3GDX	*	29,928	107	53	76
DU1FZB	28	22,824	341	12	12
4F4IX	21	619,579	1960	33	80
DU1SAN	14	239,269	867	32	71
*DU7/N7ET	A	116,788	271	69	103
*DU3HXH	*	1,485	20	15	18
*DU3RCM	21	202,240	876	29	51
*DU1JZZ	*	39,396	236	22	45

**SOUTH AMERICA**

**ARGENTINA**

L50V	A	2,014,500	2456	83	217
LU1BR	*	1,381,152	1742	84	191
LU1HLH	*	879,333	1239	79	194
LW2DFM	*	188,244	508	53	109
LU4DPO	*	72,846	202	46	96
LU3HBO	*	5,450	78	35	53
LU6ETB	28	1,340,880	3298	28	122
AY7D	*	1,307,576	3439	28	118
(Opr. LU7DW)					
LR2DW	*	653,976	1992	27	97
LU4VZ	*	419,040	1450	27	89
LW8EXF	*	324,185	1030	26	89
LU7EC	*	153,204	684	23	79
LW7DSR	*	90,288	550	20	52
LU9MBY	21	435,182	1416	29	102
LU2AH	*	297,648	980	27	81
(Opr. OH0XX)					
LU2HNP	*	5,140	132	5	15
LS0I	14	511,480	1283	37	115
(Opr. LU4IC)					
LU6MFD	7	324,954	978	35	91
*LQ0N	A	2,453,047	2100	126	330
(Opr. LU2NI)					
*LU8ADX	*	1,194,928	1375	90	239
*LU8HLI	*	1,105,272	1562	68	190
*LU3FMR	*	952,170	1394	74	181
*LU6AMD	*	541,162	920	64	142

*LU1AEE	*	60,102	195	49	77
*LU5EVK	*	54,756	261	28	53
*LU5ER	*	43,860	200	29	57
*LU3HYS	28	665,611	2205	33	98
*LU3MDO	*	621,034	2087	28	90
*LU4DX	*	602,924	1791	28	94
*AZ9W	*	564,696	1679	25	99
(Opr. LU5UL)					
*LU7HTJ	*	492,026	1670	26	83
*LW3HAD	*	446,689	1474	26	87
*LU4FCZ	*	372,780	1335	26	88
*LUBFXF	*	350,773	1225	22	79
*LUGFJZ	*	329,770	1161	26	72
*LU1VV	*	253,635	900	25	86
*LW2EOC	*	223,482	841	24	78
*LUSHCZ	*	220,116	832	24	78
*LU4DZ	*	204,375	892	24	85
*LU7FQT	*	166,937	709	22	75
*LU5WFT	*	160,797	737	21	70
*LU5HA	*	150,384	773	20	58
*LU3VAO	*	131,140	580	23	60
*LW7EGO	*	100,860	481	21	61
*LU2FDN	*	66,038	469	18	35
*AY9H	*	47,124	393	14	28
*LW6DYB	*	38,626	239	22	67
*LU8UBN	*	10,575	130	17	30
*LW4DHB	*	5,882	166	13	21
*LU7FJD	21	443,065	1427	28	91
*LU7H	*	216,982	695	29	77
(Opr. LU2HAO)					
*LU4HKL	*	17,688	142	17	27
*LU3MM	*	16,801	114	18	35
*LU3ES	*	13,416	145	18	34
*LS9F	14	449,352	1229	37	121
(Opr. LU5FCI)					
*LU1UD	*	197,901	768	26	73
(Opr. LU8UAR)					
*LU5MEC	*	49,955	260	27	76
*LU2ANN	7	24,934	147	26	65

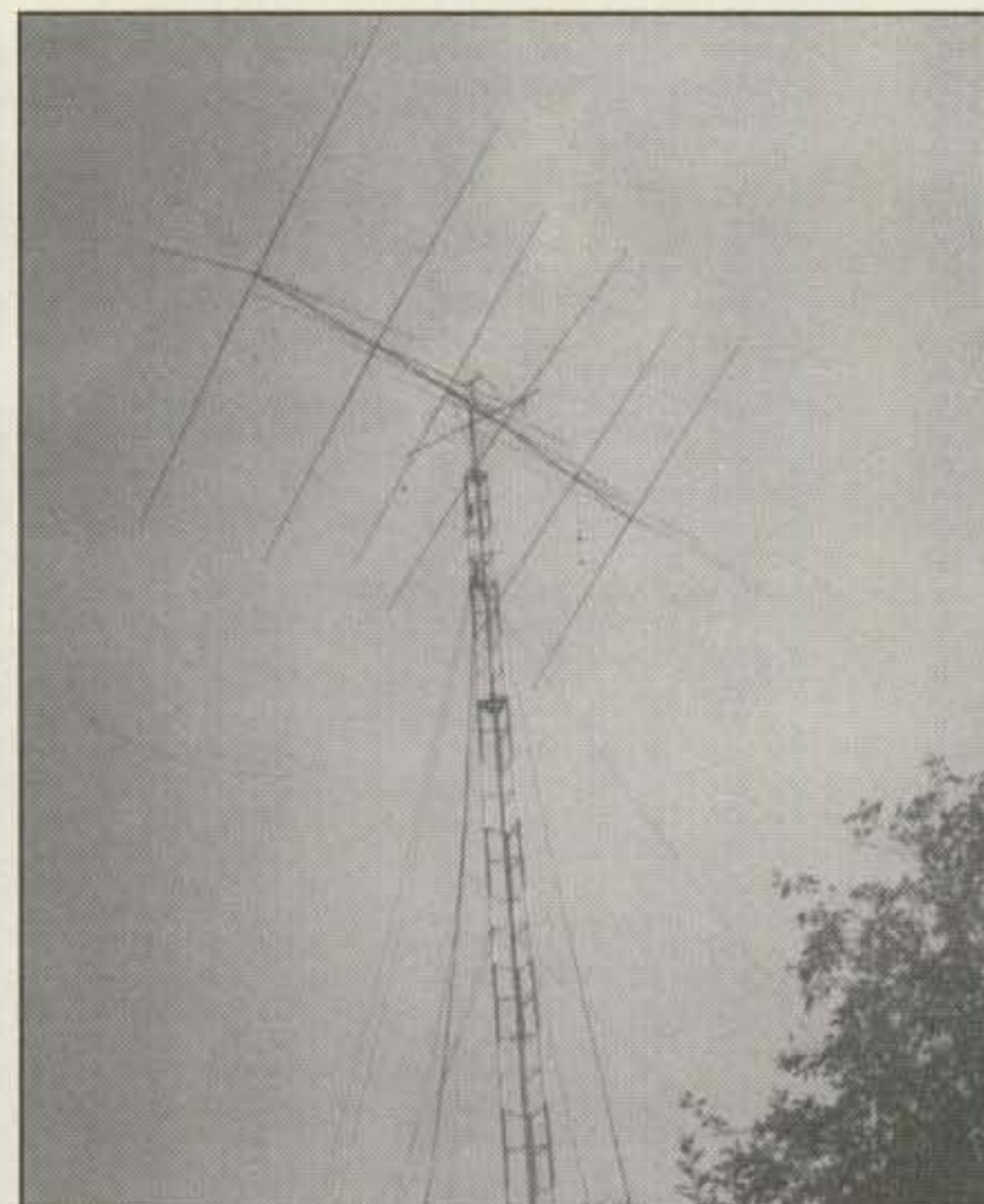
**ARUBA**

P40W	A	12,894,570	7076	142	500

W1RZF	1,182,864	1043	99	357
K1MO	1,040,908	853	101	350
AA1V	922,560	715	107	358
NQ1K	835,668	637	117	384
K1SM	801,000	772	93	282
W1NG	776,625	650	117	358
AA1BU	598,430	615	97	318
N1DG	566,354	569	97	301
N1SP	547,884	603	72	252
W1ZT	534,699	535	86	277
W1BIH	519,515	597	95	297
WV1M	493,290	526	93	285
K1GE	478,188	530	91	242
W1IG	462,870	704	84	249
K1LOM	411,502	519	80	243
N1EZC	394,719	501	90	259
NZ1Q	381,193	548	75	218
W1NR	377,365	395	85	270
N1AU	329,085	402	76	233
K1TH	297,024	417	68	205
K1AR	250,652	352	68	213
W1ZS	247,506	390	67	182
K1VV	246,807	362	68	209
N1MM	232,786	375	64	175
KD1KI	225,786	392	62	180
KA1CLX	149,640	284	54	154
KV1J	143,722	264	58	154
WW1E	130,200	312	44	131
KA1O	124,938	238	52	146
K1RV	106,168	225	61	132
K4XR/1	104,647	176	64	163
KD1NE	77,400	205	35	115
W1/KL7DN	30,532	158	45	90
N2MM	2,005,640	1278	128	452
W2RE	1,915,461	1262	123	426
K2TW	1,375,528	992	119	420
W2TV	1,118,376	852	109	395
W2NO	969,342	959	92	326
K2FU	903,890	743	114	328
W2YR	610,490	547	99	311
KF2O	509,105	459	108	329
K2BX	480,638	622	77	229
N2QLT	464,310	505	90	245
KG2P	269,433	417	66	194
K2OWE	269,056	455	82	205
K2QMF	263,344	411	65	195
N2UM	191,774	316	75	178
WK2H	182,965	394	47	138
N2KJM	180,923	317	70	169
W2LK	130,150	267	54	136
K2WK	120,336	243	51	133
KF2XK	104,650	277	54	122
K2EP	96,824	245	39	113
NA2U	86,840	203	45	122
K2ZT	81,016	201	43	109
W2UP	15,522	76	26	52
K2FL	4,550	39	16	34
WF2B	4,500	43	18	32
N2WK	2,145	21	18	21
WA2QNW	305,195	751	31	124
N3AD	2,717,220	1477	146	514
K3WW	2,530,380	1315	147	552
K3NZ	2,351,050	1318	138	512
AA3B	1,973,412	1258	124	449
K3ND	1,730,746	1202	120	418
N3MKZ	1,542,800	1085	123	437
K300	1,490,197	1163	111	356
AA3JU	1,353,696	1123	108	370
W3MM	1,348,355	921	125	422
N3II	1,226,420	872	117	413
NN3Q	1,177,605	917	111	384
K3AR	1,109,591	783	125	416
K3KY	1,073,610	824	107	367
K3DI	1,019,508	852	100	358
W2GG/3	966,380	812	106	352
WB3CIW	910,000	896	81	283
N3ZA	787,050	652	109	368
KU3X	743,967	781	81	262
W3AP	672,931	777	100	283
W3UJ	583,010	700	81	265
W3HVQ	545,699	612	90	283
W3OC	545,658	558	96	302
W3OV	519,317	618	78	259
WT3P	490,758	612	76	235
K3IXD	432,595	455	93	266
WT3W	336,908	413	96	245
W3KV	333,231	443	67	210
N3NT	309,920	433	75	223
KE3VN	236,941	401	75	238
WD3JB	220,311	298	83	190
W3DMC	208,865	384	43	142
K3CP	200,640	317	63	177
WF3T	171,784	315	52	145
W8FJ/3	162,400	268	47	132
N3KR	129,685	265	47	138
AA1K/3	104,496	232	50	118
AA3LX	66,007	177	53	96
N3GP	51,614	164	40	91
N3RD	836,676	1611	32	161
WR3L	197,920	436	31	129
W4WA	1,535,940	1222	113	370
K3SW/4	1,380,834	981	125	421
N4VZ	1,360,970	918	124	427
K4ZAM	1,340,847	1131	116	361

W4JVN	632,341	653	88	279
N4PQX	588,438	488	110	349
W4UM	359,640	439	83	213
K2SD/4	103,740	208	62	133
N4ZR	97,524	210	53	119
W4WNT	71,272	177	53	117
NT4D	54,683	148	48	101
N3QYE/4	32,592	128	40	72
N4XM	25,092	95	40	62
AA4GA	31,920	133	24	71
W4DR	10,788	73	17	45
K5NA	1,242,720	1024	128	352
N5JR	1,214,994	1041	110	339
K5LP	1,116,691	859	119	368
N5TW	421,038	506	103	236
W5DN	330,174	416	90	216
N5ASO	130,678	251	61	162
NA4M/5	79,636	178	65	107
N5NMY	138,741	669	28	75
W5ZO	59,514	269	25	66
W6TKF	812,175	957	102	223
N6CCL	435,445	450	107	258
KO6WQ	264,041	475	83	175
N6DA	216,504	326	76	172
K6UC	84,500	225	54	96
Ni6T	69,915	161	70	107
N6TNX	41,072	115	49	87
N6TNW	25,920	92	41	67
W6ISQ	16,450	71	39	55
KA6BIM	25,016	164	17	42
N6ND	335,478	857	32	111
WA6TLA	13,332	79	19	47
AK6L	54,742	263	29	72
KE6WAV	5,220	45	17	28
KA7ZUM	429,930	683	92	189
K7WP	150,960	272	77	145
N7MQ	100,104	251	70	124
W7BX	42,158	154	40	67
W7IL	198,240	522	31	109
N8RF	566,184	598	89	283
ND5S/8	509,820	490	108	327
KB3AUG/8	294,525	358	78	237
K8CV	108,940	260	42	113
AA8LL	13,662	78	18	48
W09Z	942,540	833	115	345
WE9R	576,240	627	85	251
W90P	550,225	626	82	243
N9UA	514,754	592	87	239
KB9BUM	345,030	428	82	236
W9GIG	271,414	332	89	249
AA9TK	206,234	328	78	190
K9OSH	6,384	47	21	36
W9XT	202,020	484	30	126
N9AU	51,051	169	30	89
NR0X	1,115,880	813	120	390
N5IN/0	391,680	536	93	213
K0INR	30,174	111	36	71
K0ZM	19,764	95	41	67
K0BX	50,221	148	41	82
ALASKA	160,380	515	60	72
WL7E	160,380	515	60	72
CANADA	1,785,465	1389	120	375
VD3DX	559,455	855	62	185
VE2SEI	219,128	965	26	72
VE7AV	219,128	965	26	72
MEXICO	85,125	288	48	77
XE1RGL	85,125	288	48	77
PUERTO RICO	189,540	657	46	130
WP4LNY	189,540	657	46	130
WP4KOE	3,388	71	12	10
U.S. VIRGIN ISLANDS	548,811	814	79	210
KP2BH	548,811	814	79	210
ASIA	1,128,220	1472	131	249
UA00C	1,128,220	1472	131	249
HONG KONG	1,551,600	2623	122	238
VR97BG	1,551,600	2623	122	238
JAPAN	1,047,935	1028	117	262
JE3HD	847,027	901	113	234
JF1SEK	369,656	502	103	184
JA9XBW	253,605	383	94	171
JK1GKG	149,408	278	68	135
JA3VXH	137,600	310	78	137
JJ3VPY	135,360	327	67	113
JK2VOC	159,237	558	34	83
JA7OWD	257,004	812	30	88
JA1YBK	257,004	812	30	88
JA0BMS/1	50,160	212	27	61
JE9LLO	39,375	202	24	51
JK1OXU	24,075	118	25	50

EUROPE	65,728	298	37	121
BELGIUM	65,728	298	37	121
ON4CAS	65,728	298	37	121
CROATIA	106,403	492	57	130
9A4KA	106,403	492	57	130
CZECH REPUBLIC	157,136	408	51	193
OK1PG	157,136	408	51	193
DENMARK	22,000	142	32	78
OZ9AG	22,000	142	32	78
ENGLAND	1,455,180	1725	84	311
G40JH	1,455,180	1725	84	311
G0UHK	299,904	664	78	274
G7W	34,612	365	13	55
(Opr. G4JVG)				
EUROPEAN RUSSIA	1,926,205	1703	469	
RA3AUU	1,926,205	1703	469	
FINLAND	462,210	1052	64	246
OF3NXW	462,210	1052	64	246
(Opr. OH3MMF)				
OH3BU	271,560	714	64	228
OH3LQK	83,160	350	40	149
OF3KCB	20,710	154	26	83
OF3JKV	528	15	8	14
OH1KF	91,834	330	30	116
FRANCE	4,389,455	3191	125	456
TM2V	4,389,455	3191	125	456
(Opr. F6GYT)				
F5ASD	421,702	818	69	245
F5PYI	6,270	50	26	31
GERMANY	3,150,340	2164	139	531
DL0WV	3,150,340	2164	139	531
(Opr. DK3GI)				
DJ2YA	1,596,048	1187	133	523
DK9DA	978,730	1076	105	380
DL5IC	902,520	1115	99	361
DK1FW	712,530	703	106	416
DK1FW	712,530	703	106	416
DF1IC	613,206	776	94	324
DL3AI	549,268	804	85	268
DL8AAM	321,342	832	55	239
DL4DXF	202,119	388	73	194
DK0PI	86,072	346	48	164
(Opr. DL3LBA)				
DJ9MH	69,628	232	53	153
DL9SEV	67,204	230	58	154
DL8ZAW	39,952	201	35	115
DL7RGO	33,220	272	32	119
DL/OK8KYP	24,307	187	27	82
DK2FR	4,819	65	19	42
DL4RCK	11,098	131	14	48
DF9ZP	531,260	1406	37	165
DL8UD	473,445	1433	35	132
DL5ABR	16,470	158	14	47
DL4NAC	583,280	1840	37	147
DL8OH	142,945	1060	21	94
IRELAND	203,312	769	27	104
EI6FR	203,312	769	27	104
EI2GX	204,276	1017	27	89
ITALY	2,026,296	1644	128	508
IK0HBN	2,026,296	1644	128	508
(Opr. IK0YVV)				
IN3ZNR	1,790,305	2058	107	366
IO4A	1,625,334	1922		



Always a FB signal, 4N7B (YU7BJ), with 5-el quad on 20, 6 on 15 and 10.

<b>GERMANY</b>	<b>POLAND</b>
DL1MFL 4,197,028 2903 143 581	SN2B 6,576,956 4423 162 650
DF0DX 3,403,740 2715 134 571	SP9PRO 944,118 1457 87 326
DL0UM 2,591,865 2192 127 530	SP3PLD 415,412 975 62 236
DL1QQ 2,255,442 2246 119 462	SP6HTQ 264,270 439 86 259
DL0TD 2,018,250 2060 119 466	SP9KRT 263,680 754 50 206
DF0AT 1,939,546 2078 112 462	SN6U 228,430 641 100 165
DL5NAM 1,575,840 1530 121 467	SP6KFA 46,056 283 32 120
DL0MBG 1,522,409 2073 119 434	SP9KJU 4,399 70 11 42
DK4QT 1,294,848 1550 112 450	
DL0GK 1,171,836 1395 105 411	<b>PORTUGAL</b>
DF0HTE 743,070 1139 97 373	CS6S 888,939 1289 80 307
DK0ER 457,040 729 89 305	CT2FUR 150,790 587 43 127
DF3IAG/P 331,674 1006 59 239	
DK6CQ 305,905 691 61 256	<b>SAN MARINO</b>
DL0TUD 189,720 605 58 190	T70A 3,728,151 4511 103 428
DL0CA 45,360 777 14 58	
DK0ANO 12,672 121 20 52	<b>SCOTLAND</b>
	GM0NTL 348,243 698 66 243
<b>GREECE</b>	<b>SICILY</b>
SX2T 1,880,025 2800 114 411	IT9KWF 380,337 760 64 227
SV1AFA 373,394 835 85 273	
<b>HUNGARY</b>	<b>SLOVAK REPUBLIC</b>
HG1S 8,692,072 5808 169 719	OM3A 3,101,324 3451 117 425
HG5C 1,858,742 2533 108 415	
<b>ICELAND</b>	<b>SLOVENIA</b>
TF/AE4FY 21,824 176 22 66	S50G 1,860,988 2486 109 417
	S52FO 252,317 805 36 133
	S53AJL 17,841 330 10 47
<b>ITALY</b>	<b>SPAIN</b>
IQ4A 11,664,525 5717 172 727	EA5BY 2,939,744 2904 120 492
IR2W 6,290,032 3952 163 621	ED3TR 2,384,760 3145 109 392
IQ2X 4,376,825 3361 144 581	ED1H 2,291,490 2655 90 320
IO2A 3,733,462 2995 143 579	EI263 1,263,000 2012 98 323
IU2M 3,148,110 2814 125 505	EI1EEY 1,120,752 1588 81 306
IO2L 1,787,928 1977 105 387	ED2WW 953,040 1500 76 228
IU2Y 1,706,677 1923 113 396	EA3GW 734,033 1599 61 202
IC8JAH 1,542,250 3130 88 310	ED5WWC 566,392 1066 75 257
I28Z 1,435,702 1820 110 376	EI1FEF 565,948 1020 70 232
IR7S 1,196,576 1882 104 384	EI1COZ 554,229 929 71 280
IR3PN 1,017,401 1287 108 403	EI1BOI 547,128 913 66 240
IK2UCK 797,544 1257 100 356	EA3KA 360,774 819 70 236
IK4BWC 6,527 91 17 44	EI1RCT 164,832 587 48 154
	EA7BJV 138,537 449 44 145
<b>KALININGRAD</b>	EA5KB 112,310 441 22 105
UA2AA 5,269,737 4323 152 607	
<b>LITHUANIA</b>	<b>SVALBARD</b>
LY3AV 1,239,270 1976 88 321	JW5E 613,319 842 89 198
<b>NETHERLANDS</b>	<b>SWEDEN</b>
PA3DWD 2,150,110 2484 127 508	SM5FQQ 2,202,872 2656 117 449
PI4TUE 1,580,293 1956 102 371	SL3ZV 455,430 1309 47 123
PA/DL0PPP 696,849 1071 80 301	SM0BGM 58,000 243 38 107
PI4ZLD 585,882 1254 79 284	
PI4CC 494,540 981 72 244	<b>SWITZERLAND</b>
PI4WAL 146,216 433 52 144	HB9H 4,335,155 3339 148 597
	HB9OK 591,976 1655 64 244
<b>NORWAY</b>	<b>UKRAINE</b>
LA8W 1,560,406 2499 106 352	UU5J 4,014,828 4153 139 548

<b>CANARY ISLANDS</b>	<b>KAZAKHSTAN</b>	OK1KUA 122,220 404 48 162
EA8ZS 13,864,862 6124 161 653	UN8LW 4,620,231 3410 130 401	OK1KUO 55,874 403 22 69
EA8/ DL6MHW 3,937,682 3362 88 334	UP0F 27,375 164 24 51	OK1KCF 37,638 177 37 116
<b>MADEIRA ISLANDS</b>	<b>KHIRGIZIA</b>	OL5Q 33,573 633 8 49
CT3BX 11,414,125 5733 144 575	EX9A 4,578,302 3722 125 423	<b>DENMARK</b>
<b>REUNION</b>	<b>KOREA</b>	OZ5W 4,256,845 3449 136 519
FR/IK2RXV 636,620 1061 61 168	HL00 234,832 738 74 134	OZ9KY 2,180,136 2525 115 417
<b>SAO TOME &amp; PRINCIPE</b>	<b>KUWAIT</b>	OZ7HAM 394,940 969 65 245
S97A 1,027,065 1542 57 172	9K9K 2,356,992 2503 95 301	OZ5EDR 146,118 507 44 169
<b>ASIA</b>	<b>MONGOLIA</b>	<b>ENGLAND</b>
<b>ASIATIC RUSSIA</b>	JT1T 1,306,010 2877 101 204	M7P 3,986,820 3162 133 557
RZ9AZA 6,335,166 3776 154 513	<b>OMAN</b>	G4UJS 3,415,707 3092 110 459
RK9SWF 760,095 1000 81 234	A47RS 2,216,907 2241 112 329	G3TBK 978,892 1304 92 312
<b>ASIATIC TURKEY</b>	HS2YM 254,800 952 76 132	G7B 654,480 1055 86 319
YM3SV 931,270 1476 43 187	<b>THAILAND</b>	M7G 579,282 1205 60 202
TA2KB 525,192 872 51 186	ES5Q 1,726,050 2288 116 439	M7C 10,385 96 20 47
<b>CHINA</b>	<b>EUROPEAN RUSSIA</b>	<b>ESTONIA</b>
BY4RSA 1,339,056 2208 106 200	RU6LWZ 5,323,787 4080 161 608	
BY1BY 61,478 362 42 76	RZ3Q 4,553,556 4558 150 568	
BY5QN 44,166 331 36 66	RN3R 3,437,280 3388 125 403	
<b>CYPRUS</b>	RU4WJ 2,236,509 2251 131 420	
P3A 16,143,795 8315 164 635	RK4WWA 1,336,632 1434 126 362	
<b>JAPAN</b>	RK4HYT 333,925 798 92 269	
JH7PKU 3,734,740 2718 157 372	RK3EWA 101,200 381 51 149	
JA1ELY 3,068,432 2267 156 337	RZ4PZL 30,772 165 34 64	
JA1YKX 2,264,068 1969 135 317	RK1OWZ 768 20 8 16	
JE6ZIH 2,242,209 2086 137 306	<b>FINLAND</b>	
JR1ZTT 2,022,543 1894 136 297	OH7AAC 3,373,458 2983 139 508	
JA7YAA 1,980,341 2045 144 307	OF1AF 3,300,347 3220 128 519	
JA9YAA 1,417,665 1253 135 300	OH6AW 1,738,516 2350 110 389	
JH7AFR 946,475 1271 104 185	OH5BM 1,697,952 1873 127 425	
JA0YAK 912,152 1035 104 219	OH6NIO 1,500,954 1577 119 427	
JA9YBA 706,515 916 107 228		
JA6ZLI 608,832 799 96 192	<b>FRANCE</b>	
JJ2ZEY 577,225 940 94 181	TM2Y 9,469,847 5163 159 658	
JN1ZDF 298,556 553 76 126	TM1C 6,796,752 4679 140 548	
7J1YAA/1 102,527 231 66 97	TM2T 4,542,390 3844 143 595	
JA2RL/2 5,280 64 21 27	F8KCF 2,688,196 2740 116 473	
<b>JORDAN</b>	TM8A 2,584,296 3179 108 394	
JY8XY 481,839 981 47 136	F6KZD 1,340,775 2003 109 396	
	F5KDC 260,576 1219 61 211	
	F8KOH 85,932 420 39 147	
	TM5V 81,087 395 43 136	
	F6KWP 78,900 400 50 100	
	F5SUL 58,824 275 35 117	
	<b>CZECH REPUBLIC</b>	
	DK5W 5,109,184 3408 151 625	
	OL5T 1,584,609 2203 111 422	
	OL2A 720,244 1400 88 318	
	OK2KOD 524,664 944 79 268	
	OK2KJU 502,435 1324 84 307	
	<b>BELGIUM</b>	
	OT7T 7,695,592 4007 160 684	
	OT7P 2,757,483 2582 119 458	
	OT7C 1,965,136 2252 114 353	
	<b>BULGARIA</b>	
	LZ9A 6,346,650 5201 152 573	
	LZ5Z 6,148,850 5409 163 612	
	<b>CROATIA</b>	
	9A7A 4,012,358 3878 137 482	
	9A5D 2,610,438 3388 78 101	
	9A9D 1,781,940 2373 91 363	

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UT7L	1,491,600	1684	118	410
US3I	1,316,529	1718	105	348
UT4UWC	312,998	767	58	225
UX0Z	170,177	580	34	170
UR4PWC	159,782	505	46	156
UT4UWT	129,042	547	45	169
UR4MWU	99,648	381	46	146
UR4QWW	11,400	80	20	55

<b>WALES</b>				
GW8GT	3,680,568	3635	119	463
<b>YUGOSLAVIA</b>				
YT0X	1,164,168	1639	98	358
YZ1V	227,962	637	59	205
YU1AAX	22,148	178	31	82

<b>OCEANIA</b>				
<b>AMERICAN SAMOA</b>				
KH8/N50LS	4,355,298	4048	138	249

<b>AUSTRALIA</b>				
VK4MZ	3,211,468	2858	118	291
VK4DZ	2,749,124	2874	100	229

<b>FRENCH OCEANIA</b>				
F08DX	5,667,884	4998	141	271

<b>GUAM</b>				
NH2C	8,567,056	5475	158	396

<b>NEW ZEALAND</b>				
ZL1AA	3,975,195	3660	122	271

<b>NORTHERN MARIANAS</b>				
KH0A	5,365,019	4414	142	297

<b>PHILIPPINES</b>				
DX1S	788,966	1798	76	150
4G2X	631,680	1342	65	103
DX1CW	393,828	1076	58	90
DX1E	57,768	314	33	54

<b>SOUTH AMERICA</b>				
<b>ARGENTINA</b>				
LT1F	5,126,648	4721	136	373
L40H	5,116,137	4219	125	382
LU6FBI	4,522,722	3425	144	438
L20H	3,509,406	2940	126	360
L50V	1,964,100	2442	83	217
LU1NF	1,653,913	1912	94	265
LU8DZE	909,250	1392	83	167
LT5V	453,765	1325	34	105
LU1HPW	218,450	855	55	115

<b>BRAZIL</b>				
ZW5B	12,204,017	6486	148	561
ZY2HT	2,145,780	3104	97	267
PX2U	411,551	677	71	156

<b>CHILE</b>				
CE8T	A 5,653,488	4679	115	341

<b>FERNANDO DE NORONHA</b>				
ZX0F	19,653,570	8563	169	661

<b>GALAPAGOS ISLANDS</b>				
HC8N	18,251,755	8670	156	589

<b>NETHERLAND ANTILLES</b>				
PJ9Q	2,315,685	2851	95	222

<b>PARAGUAY</b>				
ZP0R	4,327,245	3652	127	380

**MULTI-OPERATOR  
MULTI-TRANSMITTER  
NORTH AMERICA**

<b>UNITED STATES</b>				
N2RM	14,581,824	6496	169	709
K3LR	13,866,204	6298	176	700
KC1XX	13,311,886	5946	166	723
W3LPL	12,525,218	5793	173	720
K1KI	11,720,112	5250	164	688
W1FJ	6,707,920	3454	154	610
N4ZC	6,045,800	3332	159	581
K1RO	6,239,734	3127	149	585
K1NU	5,801,152	3499	151	585
NQ4I	5,363,280	3202	154	566
W2AX	4,974,312	3011	149	547
K1RX	4,644,721	2811	144	559
W4MYA	4,470,200	2691	153	568
W3EA	4,404,667	2866	148	535
N6AW	4,183,420	2940	141	404
K2NG	3,864,240	2126	151	569
W3PP	3,590,625	2395	137	488
KV1W	3,460,716	2144	140	511
K2WS	3,255,174	1875	147	555
K06N	3,120,078	2762	136	371

K3ANS	3,104,824	1992	140	512
K3II	3,103,659	1872	138	509
W0AIH/9	2,995,650	1983	148	486
W6EEN	2,444,946	1985	133	350
K8WT	2,229,624	1846	122	397
K1KP	2,222,880	1686	109	419
K2KV	1,880,463	1505	113	394
N3BNA	1,747,372	1137	132	472
N3NS	1,739,352	1192	117	431
W0GJ	1,666,614	1471	132	402
KB1H	1,483,802	1152	108	383
K80WY	1,046,112	999	107	301
K1GW	988,754	858	100	342
WS4F	922,296	804	111	352
WS2U	895,050	877	108	334
K7FR	849,376	1003	104	248
W7MMQ	645,840	853	107	244
K2WB	586,920	667	90	275
W10K	456,599	565	84	257
N3RU	366,450	495	86	263
K0U	312,312	518	81	183
K3BSA	236,096	375	55	183
W2UB	234,090	335	76	194

<b>ANTIGUA</b>				
V26B	27,797,193	13848	167	706

<b>CANADA</b>				
CI9DH	16,832,893	9676	153	628
VE6FI	2,318,400	3185	108	260
VE5RI	733,380	1447	82	173

<b>GRENADA</b>				
J3A	12,533,220	10283	140	469

<b>HONDURAS</b>				
HR3/DL7DF	5,672,766	6503	115	292

<b>ST. PIERRE &amp; MIQUELON</b>				
FP/KG8CO	4,263,754	4486	107	344
<b>TURKS &amp; CAICOS</b>				
VP5T	9,551,900	7534	129	446

<b>U.S. VIRGIN ISLANDS</b>				
WP2Z	4,392,293	5221	111	310

<b>ASIA</b>				
<b>ASIATIC RUSSIA</b>				
RK9AZZ	193,053	405	56	147

<b>JAPAN</b>				
JH5ZJS	9,065,943	5318	172	485
JA3ZOH	7,843,845	4395	165	480
JA7YRR	3,752,452	2791	154	330
JA6ZPR	2,981,328	2095	148	384
JO1YAO	2,028,136	1982	135	283
JN1YUU	1,400	28	9	11

<b>TAIWAN</b>				
BP0A	2,309,760	3089	99	221

<b>THAILAND</b>				
E22AAA	837,870	1587	101	229

<b>EUROPE</b>				
<b>BELGIUM</b>				
OT7A	12,724,446	8880	170	729

<b>CORSICA</b>				
TK5NN	22,787,820	14769	175	760

<b>CROATIA</b>				
9A1A	18,156,595	11633	177	764

<b>CZECH REPUBLIC</b>				
OK10KE	431,360	985	68	252

<b>EUROPEAN RUSSIA</b>				
RW6AWT	7,461,180	6131	161	659

<b>FINLAND</b>				
OH2HE	9,537,615	6964	167	670

<b>FRANCE</b>				
TM5S	254,024	900	47	179

<b>GERMANY</b>				
OK5EZ	2,441,215	2418	128	537

<b>GREECE</b>				
JA1DKL	604,604	1668	75	233

<b>LIECHTENSTEIN</b>				
H8B/ HB9AON	4,585,732	5599	106	460

<b>LITHUANIA</b>				
LY7A	3,801,189	4665	135	516

<b>NETHERLANDS</b>				
PI4COM	7,537,196	6025	153	649

<b>POLAND</b>				
SP5ZCC	690,690	1334	79	306
SP5ZIM	270,830	766	61	204

<b>PORTUGAL</b>				
CS0RCL	140,244	605	47	139

<b>ROMANIA</b>				
YO9KPD	110,664	467	43	131

<b>SCOTLAND</b>				
GM7V	8,372,049	6927	142	620

<b>SPAIN</b>				
EA4URE	6,399,100	5679	148	571
EA3AAY	3,981,474	3514	119	448
EA5EZM	859,320	1459	94	340
ED7VG	449,904	1265	68	241
EA4RCT	190,284	562	56	146
EA4AHW	92,225	457	44	173

<b>SWEDEN</b>				
SK6NP	300,200	940	63	253

<b>WALES</b>				
GW7K	1,056,178	1744	74	285

<b>OCEANIA</b>				
<b>CHATHAM ISLAND</b>				
ZM7A	3,593,216	3947	113	239

<b>HAWAII</b>				
KH7R	14,392,608	9656	171	373

<b>INDONESIA</b>				
YB3ZBZ	41,837	157	41	66

<b>NEW CALEDONIA</b>				
FK8GM	6,180,384	5735	135	273
TX8KAB	711,540	1052	83	153

<b>NEW ZEALAND</b>				
ZM2K	5,800,642	4923	125	318

<b>PAPUA NEW GUINEA</b>				
P29AS	15,379,068	9087	161	445

<b>SOUTH AMERICA</b>				
<b>ARGENTINA</b>				
L70FM	12,063,184	8233	148	444

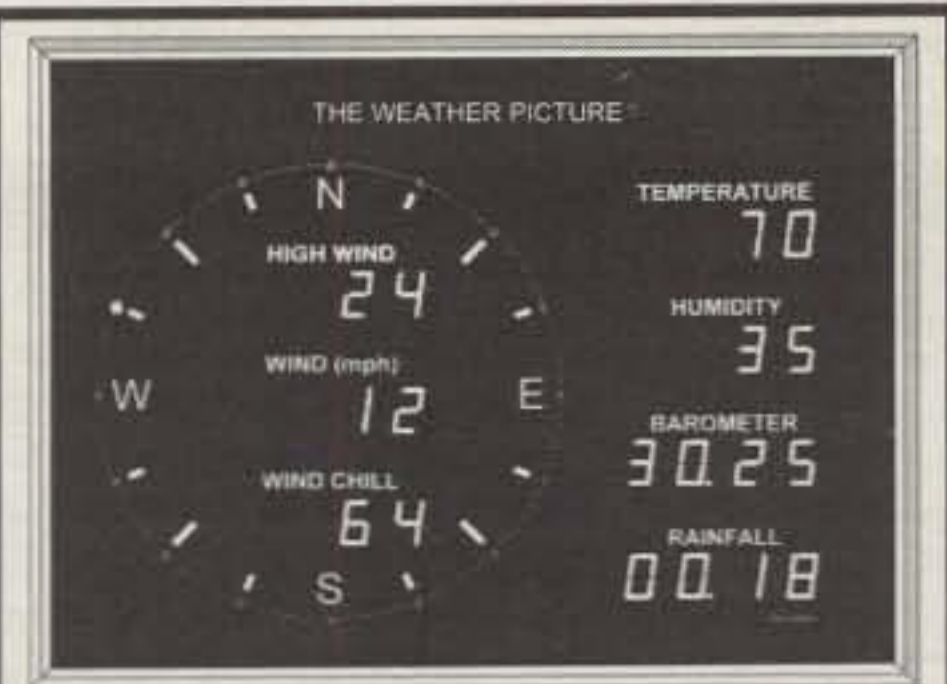
<b>NETHERLAND ANTILLES</b>				
PJ9B	36,656,640	14927	175	713

<b>URUGUAY</b>				
CW5R	6,268,372	4972	110	326

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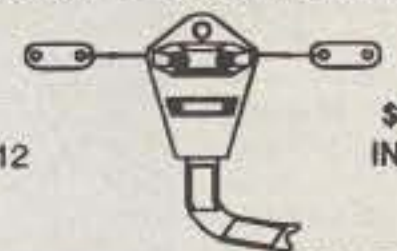
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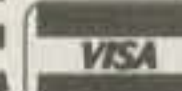
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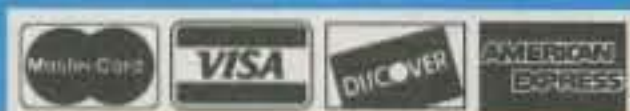
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**TRANSCEIVERS:** Kenwood TS-520S \$350, TS-820S \$450, TS-530S \$495, TS-830S \$575. ICOM IC-761 \$1095, IC-735 \$600. K1BW 413-538-7861.

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We at GAP realize there isn't a perfect antenna. No singular antenna will scream DX on 80 and be the best for local nets on 10. If anyone tells you there is, beware! The perfect antenna does not exist, but the right one for you may. If you want something to bust the pile on the low bands, then consider the Voyager. Just starting out in ham radio and need a great general coverage antenna, the Challenger is easy to assemble and for little effort will yield superior performance, especially on DX. Maybe you knowingly or unknowingly moved into one of those "restricted areas" where the Eagle's limited visibility, but unlimited ability is desired.



Voyager DX



Challenger DX



Eagle DX

This chart helps you select the right GAP antenna. When comparing GAPs, bandwidth is not a concern. With few exceptions, a GAP yields continuous coverage under 2:1 for the **ENTIRE BAND**.

All antennas utilize a GAP elevated asymmetric feed. A major benefit is the virtual elimination of the earth loss, so more RF radiates into the air instead of the ground. This feed is why a GAP requires **NO RADIALS**. Just as elevating a GAP offers no significant improvement to its performance, adding radials won't either, making set up a breeze.

**A GAP antenna has no traps, coils or transformers.** This is important. The greatest sources of failure in multiband antennas are these devices. Perhaps you heard someone discuss a trap that had melted, arced or became full of water. Improvements to these inherent problems are the focus of the antenna manufacturer, while the basic design of the antenna remains unchanged. **GAP improved the trap by eliminating it!** Removing these devices means they don't have to be tuned and, more importantly, won't be detuned by the first ice or rain. The absence of these devices improves antenna reliability, stability and increases bandwidth.

Another major advantage to a GAP antenna is its **NO TUNE** feature. Screws are simply inserted into predrilled holes with a supplied nutdriver.

The secret is out and people in the know say:

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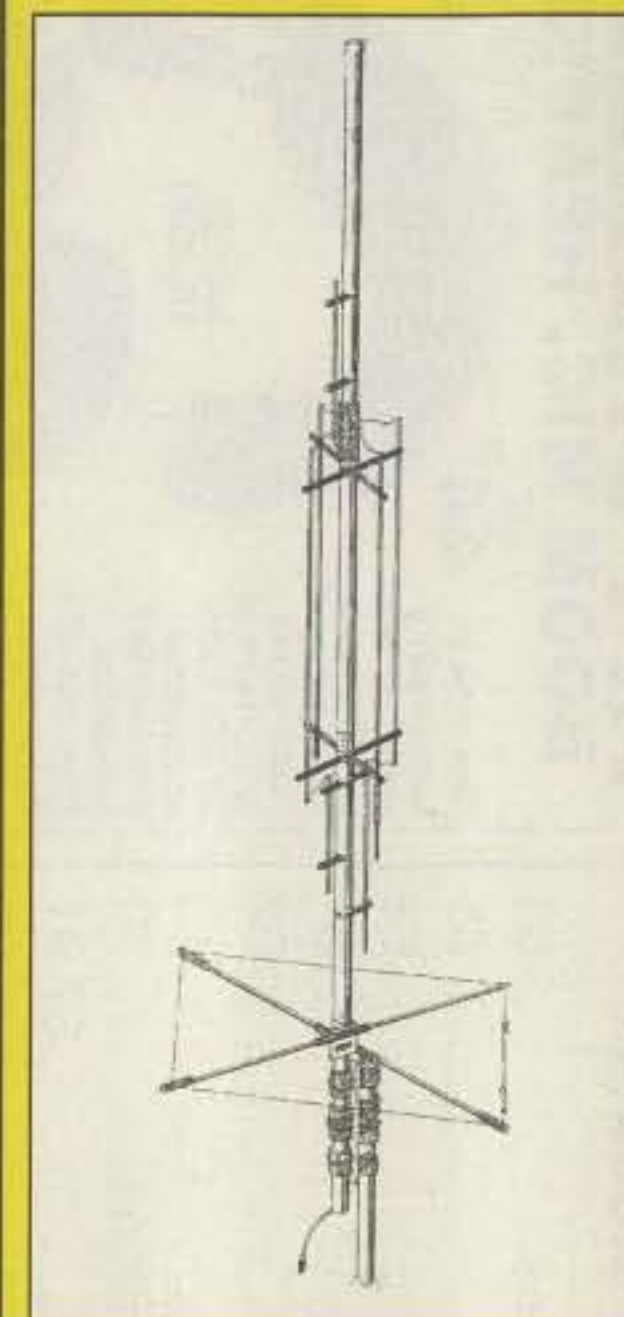
**73**—"This is a real DX antenna, much quieter than other verticals."

**RF**—"To say this antenna is effective would be a real understatement. Switching back and forth on 40m between another multiband HF vertical and the GAP, there was no comparison. Signals were always stronger on the GAP, sometimes by S units, not just DBs."

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Eagle DX			■	■	■	■	■		■			21.5'	19 lbs	1-1/4" pipe	80" Rigid	\$269
Titan DX			■	■	■	■	■	■	■	■		25'	25 lbs	1-1/4" pipe	80" Rigid	\$299
Voyager DX							■		■	■	■	45'	39 lbs	Hinged Base	3 Wires @ 57'	\$399

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