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CQ WW DX Phone Contest
. . . page 13
Plus 1987 Rules . . . p. 49
THE RADIO AMATEUR'S JOURNAL
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220: FM for All!







Kenwood brings you a wide range of 220 MHz gear designed for every need. Choose from two types of mobile and two types of HT. The TH-315A is a full-featured HT covering 220–225 MHz. Ten memory channels and 2.5 watts of power. (5 W with PB-1 or 12 V DC.) Uses the same accessories as the TH-215A for 2 meters or TH-415A 440 MHz. For truly "pocket portability," choose the TH-31BT, a thumb-wheel programmable, 1 watt unit. For mobile use, select the TM-321A or TM-3530A.

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TM-321A
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New

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New

TM-3530A
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A complete line of accessories is available for all models.

Complete service manuals are available for all Kenwood transceivers and most accessories. Specifications and prices are subject to change without notice or obligation.

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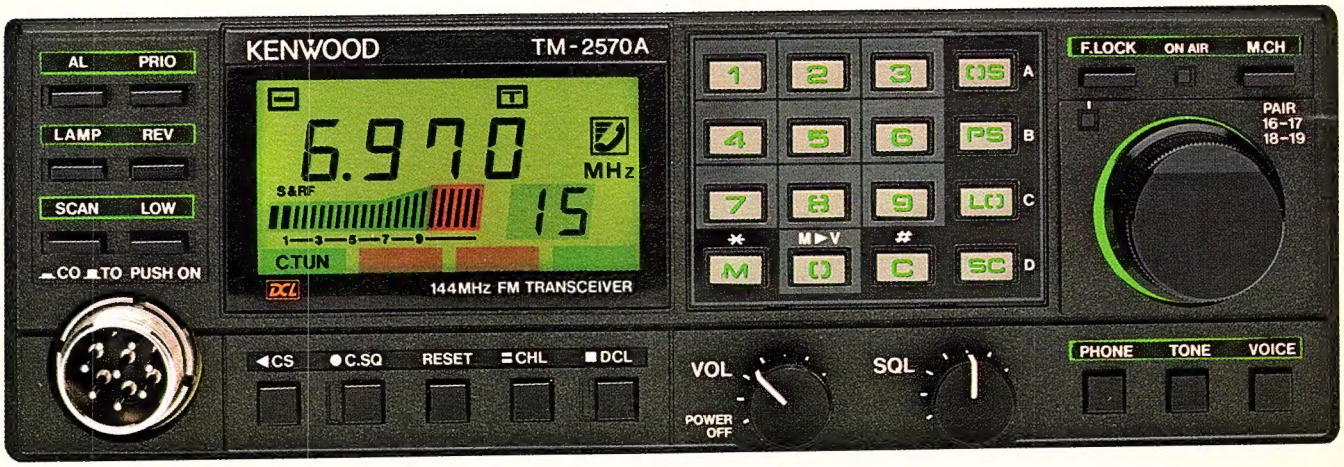


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Actual size front panel

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- **MU-1** DCL modem unit
- **VS-1** voice synthesizer
- **PG-2N** extra DC cable
- **PG-3B** DC line noise filter
- **MB-10** extra mobile bracket
- **CD-10** call sign display
- **PS-430** DC power supply for TM-2550A/2530A/3530A
- **PS-50** DC power supply for TM-2570A
- **MC-60A/MC-80/MC-85** desk mics.
- **MC-48B** extra DTMF mic. with UP/DWN switch
- **MC-43S** UP/DWN mic.
- **MC-55** (8-pin) mobile mic. with time-out timer
- **SP-40** compact mobile speaker
- **SP-50B** mobile speaker
- **SW-200A/SW-200B** SWR/power meters
- **SW-100A/SW-100B** compact SWR/power meters
- **SWT-1** 2m antenna tuner

Complete service manuals are available for all Kenwood transceivers and most accessories.
Specifications and prices are subject to change without notice or obligation.
Specifications guaranteed on Amateur bands only.

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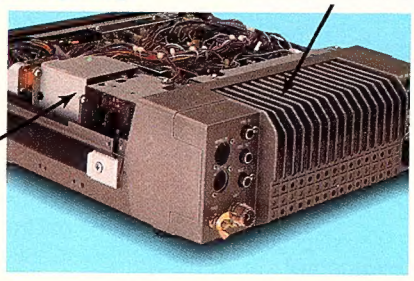
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"DX-citing!"

TS-440S Compact high performance HF transceiver with general coverage receiver

Kenwood's advanced digital know-how brings Amateurs world-wide "big-rig" performance in a compact package. We call it "Digital DX-citement"—that special feeling you get every time you turn the power on!

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  General coverage receiver tunes from 100 kHz—30 MHz. Easily modified for HF MARS operation.
- **Direct keyboard entry of frequency**
- **All modes built-in**
  USB, LSB, CW, AM, FM, and AFSK. Mode selection is verified in Morse Code.
- **Built-in automatic antenna tuner (optional)**
  Covers 80-10 meters.
- **VS-1 voice synthesizer (optional)**
- **Superior receiver dynamic range**
  Kenwood DynaMix™ high sensitivity direct mixing system ensures true 102 dB receiver dynamic range. (500 Hz bandwidth on 20 m)
- **100% duty cycle transmitter**
  Super efficient cooling permits continuous key-down for periods exceeding one hour. RF input power is rated at 200 W PEP on SSB, 200 W DC on CW, AFSK, FM, and 110 W DC AM. (The PS-50 power supply is needed for continuous duty.)





- **Adjustable dial torque**
- **100 memory channels**
  Frequency and mode may be stored in 10 groups of 10 channels each. Split frequencies may be stored in 10 channels for repeater operation.
- **TU-8 CTCSS unit (optional)**
  Subtone is memorized when TU-8 is installed.
- **Superb interference reduction**
  IF shift, tuneable notch filter, noise blanker, all-mode squelch, RF attenuator, RIT/XIT, and optional filters fight QRM.
- **MC-43S UP/DOWN mic. included**
- **Computer interface port**
- **5 IF filter functions**
- **Dual SSB IF filtering**
  A built-in SSB filter is standard. When an optional SSB filter (YK-88S or YK-88SN) is installed, **dual** filtering is provided.
- **VOX, full or semi break-in CW**
- **AMTOR compatible**



Optional accessories:

- AT-440 internal auto. antenna tuner (80 m—10 m)
- AT-250 external auto. tuner (160 m—10 m)
- AT-130 compact mobile antenna tuner (160 m—10 m)
- IF-232C/IC-10 level translator and modem IC kit
- PS-50 heavy duty power supply
- PS-430/PS-30 DC power supply
- SP-430 external speaker
- MB-430 mobile mounting bracket
- YK-88C/88CN 500 Hz/270 Hz CW filters
- YK-88S/88SN 2.4 kHz/1.8 kHz SSB filters
- MC-60A/80/85 desk microphones
- MC-55 (8P) mobile microphone
- HS-5/6/7 headphones
- SP-40/50B mobile speakers
- MA-5/VP-1 HF 5 band mobile helical antenna and bumper mount
- TL-922A 2 kw PEP linear amplifier
- SM-220 station monitor
- VS-1 voice synthesizer
- SW-100A/200A/2000 SWR/power meters
- TU-8 CTCSS tone unit
- PG-2S extra DC cable.

Kenwood takes you from HF to OSCAR!



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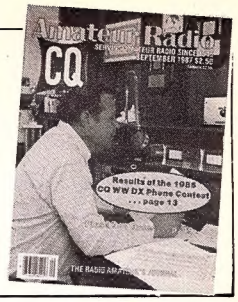
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CQ The Radio Amateur's Journal



ON THE COVER: Here's Ron Blake, N4KE, of Green Cove Springs, Florida warming up his contest muscles for this year's big one. Photo by Larry Mulvehill, WB2ZPI.

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Zero Bias AN EDITORIAL

September usually means that summer is drawing to a close and it's back to serious things like contesting. Judging by the log requests we've received so far, this upcoming *CQ* WW should be bigger than ever. This month we present the long-awaited results of last year's *CQ* WW DX Phone Contest and the rules for the 1987 series. I wouldn't be surprised by and I sort of anticipate a larger participation in this year's event by Novices exercising their new 10 meter privileges. If you're a Novice and would like to give the contest a try, there's still time to send for log sheets. It's a great way to perk up your DX country total or your WPX total in a short period of time.

Ideally you've spent the summer working on your antenna system, adding, tweeking, and rebuilding more efficient conduits of RF. You've read all the antenna articles, memorized all the available commercial antenna brochures, cracked a book or two, and climbed the hill to seek wisdom from the great DX sage. In reality, you may have gathered some hardware and a few assorted parts and spools of wire, placed them in a moldy carton salvaged from the dank, dark recesses of the garage, and thought about beginning to start thinking about the possibility of working on the old antenna farm. Most of us probably fell in the middle of that spectrum. However, you have to keep in mind that the thinking, dreaming, planning, and fantasizing about a new antenna system, or even a new piece of equipment, is all part of the enjoyment of the hobby.

In preparing for a contest the process is much the same. Most of us can envision a certificate on the wall or even the chance of a trophy (or two). The people who generally succeed at getting the certificates and trophies are the ones who not only think and dream, but also work at it very hard throughout the year and have diagrammed the entire contest period like a battle plan. From equipment to operating time, everything is geared to one thought only—to win. Some will get on, make a few contacts, and submit a checklog. They, too, are part of the contest and their help is appreciated when it comes to scoring some of the tricky entries. Again, most of us fall somewhere in the middle. Most of us get on, make contacts, and pick up a few new (or a lot of new) countries, prefixes, and other prerequisites for achievement awards. We help other people win, boost club scores, and by our very presence encourage others to get on and work us. In that sense everyone wins.

You already have the winning certificate; it's your amateur radio license. You should get that framed and hang it prominently on your wall. It's your "ticket" to enjoyment, giving you as much or as little as you want at the time.

New Name On Masthead

For those of you who are confirmed masthead readers (the same ones who read all of the credits at the end of a movie), you will notice a new name added this month. Peter O'Dell, KB1N, has joined the *CQ* staff as Associate Editor. Pete is no stranger to amateur radio publishing, and a lot of you will recognize his name from his earlier days in the Technical Department of the ARRL. In recent years Pete has been involved with various sales jobs and freelance writing, some of which has appeared in the pages of *CQ*. We were able to persuade Pete to get back into the wonderful world of amateur radio publishing and to move to Long Island. Pete and his wife Sally, KB1O, and their two children should be completely moved into their new home by the time you read this.

Also, by the time you read this, there should be a brand new addition at *CQ*'s other Associate Editor's home, namely a new brother or sister for Gail's son Brian. Brian waited to be born exactly one day after Gail put the finishing touches on an issue, but I'm not sure whether or not we're going to get the same cooperation this time. We'll keep you informed.

Travels With CQ

The intrepid *CQ* staff chalked up another hamfest this past month, this one in Atlanta. It was the ARRL National held at the Omni Center. I can't imagine any building complex bigger than this one. There were several other shows going on at the same time with no group getting in the way of the other. With all the walking involved, this one rates an A + for improving your cardiovascular system. The only horror stories I heard were about the adjoining Omni Hotel, a relatively new hotel beset with continual problems with service, water (or the lack thereof), and relative personal safety. In fact, one exhibitor told us that when he went back to his room on Friday evening after setting up his booth, he found that his entire floor was occupied by workmen and that his stuff had been moved because they were going to renovate the entire floor—now! We stayed at the Peachtree Plaza down the road (actually we were a little late in trying to get into the Omni), which was fine. In fact, most of the ARRL Board of Directors were there, too.

Joining Dick, his wife Cathy, Arnie, and I was Lew McCoy (who gave three talks that weekend). Also doing booth duty was Dave Ingram, K4TWJ, and Karl Thurber, W8FX. We saw some nifty new items which will show up in the pages of *CQ* over the next several months. Another *CQ* staffer, Fred Maia, W5YI, was there manning his own booth. The fleamarket was large and full of goodies, though nothing tempted me that weekend. Dick did come back with hookup wire, connectors, switches, and other good stuff. A quick food review gives the concession a triple yech. However, and this is a big one, there was a buffet area set up in the midst of the fleamarket with fresh sliced roast beef and assorted salads and cold drinks, and that was excellent. This one tops the list of hamfest food for the season so far.

There was a big meeting of VECs, and I expect Fred, W5YI, will report on it in his column. The ARRL Board voted on several items including the demise of the now fabled museum. Perhaps now we all can get our priorities in order.

In a few weeks we will be heading out to do the Huntsville Hamfest. This is a new one for us. All that we've heard seems to indicate good things for this one. They are claiming about 6,000 people show up for this annual event. I'll let you know all about it when we get back.

So far we plan to be in the Chicago area the end of this month for Radio-Expo, which is held at the Lake County Fairgrounds, near Mundelein. Mundelein, as you county hunters know, is the home of Dorothy Johnson, WB9RCY, our Awards Editor and USA-CA Director. This one usually has a great fleamarket with lots of "good stuff" to tempt the imagination of just about anyone.

I think that I've convinced at least a few of you to leave the shack for a bit and get out into the other world of amateur radio. I can tell who you are by your pallor when you enter the hamfest area and by your confused, puzzled look. "How long has this been going on?" you think to yourself. "Who are all these people?" "Where do I start?" "Prizes? What prizes?" It really doesn't take long to get the hang of having a good time. It also may be a little upsetting to check the call-letter badges and find out that one of your regular contacts is not at all as you pictured him in your mind, and in fact he is 30 years younger. By the end of one day you'll wonder why you haven't done this before.

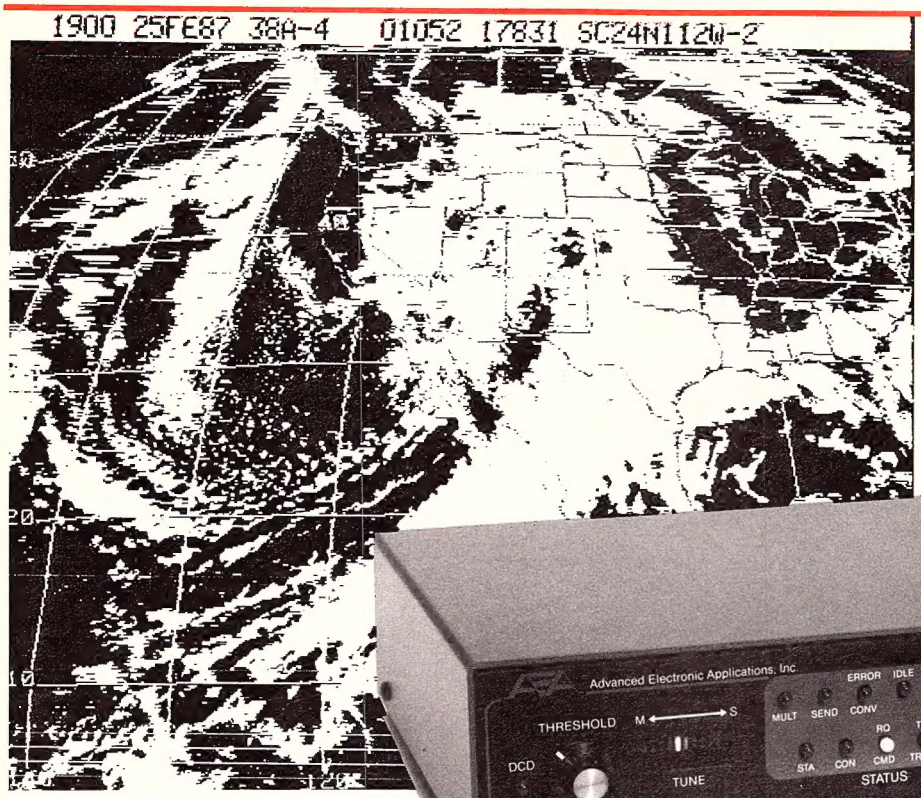
The rest of you don't need a specially engraved invitation to join in on the fun. Get out with the rest of us and sample one of amateur radio's greatest experiences—the hamfest. Eat a "mystery meat" hot dog or try some other stuff shaped like food. Gather brochures, check out the new gear, take in a forum or two, browse through the fleamarket, and meet all sorts of new people. You know, you'll probably want to come back next year.

73, Alan, K2EEK

Say You Saw It In CQ

New PK-232 Breakthrough

Six Digital Modes - Including Weather FAX



A new software enhancement makes the AEA PK-232 the only amateur data controller to offer six transmit/receive modes in a single unit.

* Morse Code
* Baudot (RTTY)
* ASCII
* AMTOR
* Packet
* Weather FAX



$319.95 AMATEUR NET
$379.95 AEA RETAIL

Your home computer (or even a simple terminal) can be used for radio data communication in six different modes. Any RS-232 compatible computer or terminal can be connected directly to the PK-232, which interfaces with your transceiver. The only program needed is a simple terminal program, like those used with telephone modems, allowing the computer to be used as a data terminal. All signal processing, protocol, and decoding software is in ROM in the PK-232.

The PK-232 also includes a no compromise VHF/HF/CW modem with an eight pole bandpass filter, four pole discriminator, and 5 pole post detection low pass filter. Experienced HF Packeteers are reporting the PK-232 to have the best Packet modem available.

Operation of the PK-232 is a breeze, with twenty-one front panel indicators for constant status and mode indication. The 240 page manual includes a "quick start" section for easy connection and complete documentation including schematics. Two identical back panel radio ports mean either your VHF or HF radio can be selected with a front panel switch. Other back panel connections include external modem disconnect, FSK and Scope Outputs, CW keying jacks, and RS-232 terminal interface.

The RS-232 connector is also used for attaching any Epson graphics compatible parallel printer for printing Weather Fax. Weather maps and satellite photos, like the one in this ad, can be printed in your shack.

Contact your local AEA dealer today for more information about the one unit that gives you six modes for one low price, the PK-232.

AEA Brings you the Breakthrough

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Lynnwood, WA 98036
(206) 775-7373

Announcing

• **Heston, Indiana**–The Porter County ARC will operate N9RD from 1300Z to 2300Z on Sept. 5–6 from the Heston Steam Museum for the annual Steam Show. Suggested frequencies: Phone—3.966, 14.266, 21.266, 28.466; CW on request. All contacts will receive a special QSL card. For further info, contact Jurgen, N9RD, or Tom, KB8AC, P.O. Box 1782, Valparaiso, IN 46383.

• **Waterford, Connecticut**–The Tri-City ARC will operate Special Events station KA1BB from the Waterford, CT I-95 weigh station to promote safe Labor Day travel and to commemorate Connecticut's historical role in the creation of the U.S. Constitution 200 years ago. Operation will be from 1700Z Sept. 5 through 2300Z Sept. 7 on 28.325, 14.295, 7.245, or 3.395 MHz phone or on 7.130, 7.075, or 14.145 MHz CW. Talk-in to coffee stop on FM-146.52 direct and CB channel 19. QSL with letter-size SASE via Tri-City ARC, P.O. Box 686, Groton, CT 06340.

• **WB9TXO From Schaumburg Septemberfest**–The Schaumburg ARC will operate WB9TXO from the Schaumburg Septemberfest on Sept. 6 from 1500–2000Z. Suggested frequencies: 7.250, 14.250, and 28.400 MHz. For a confirming certificate, send QSL to SARC, P.O. Box 68251, Schaumburg, IL 60168-0251.

• **Ledyard, Connecticut**–The Tri-City ARC will operate Special Events station K1FSC from the Ledyard Fair to commemorate the creation of the U.S. Constitution 200 years ago. Operation will be from 1400–2400Z Sept. 11 and 1800–2000Z Sept. 12 on 14.295 or 7.245 MHz phone or on 7.130 MHz CW. QSL with letter-size SASE via Tri-City ARC, P.O. Box 686, Groton, CT 06340.

• **Valparaiso, Indiana**–The Porter County ARC will operate N9RD from 1800Z to 2400Z on Sept. 12 from the annual Orval Redenbacher Popcorn Festival. Suggested frequencies: phone—3.966, 14.266, 21.266, 28.466; CW on request. For a special certificate QSL, send large 9″ × 12″ SASE to Porter County ARC, P.O. Box 1782, Valparaiso, IN 46383. For further info, contact Jurgen, N9RD, or Tom, KB8AC, at address above.

• **Milford, CT**–The Greater Bridgeport ARC will operate WA1RJI on Sept. 12 at the 16th annual Engine 260 Antique Fire Apparatus Show and Muster at Eisenhower Park, Milford, CT. Frequency: Phone 14.300, hours 1400–2200Z. For special certificate, send a 9″ × 12″ SASE (folded—business-size SASE) to GBARC, c/o Sterling House Community Center, 2283 Main St., Stratford, CT 06497.

• **W1FHP, The Hen House Gang**–On Sept. 12–13 the Hen House Gang ARC, W1FHP, will operate from the 63rd annual ARGI Fair, daylight hours on 40 and 20 meters SSB, some Novice and new 10 meter sections. Contact also counts for Worked Bethlehem Awards around the world. QSL with first-class stamp (no envelope) to Callbook or HHG, Hard Hill Rd., Bethlehem, CT 06751.

• **W1GB From Winsted, Connecticut**–The Quinnipiac Council, Boy Scouts of America will operate W1GB during the first annual Trader-O-Ree at Camp Sequassen, Winsted, CT on Sept. 11th from 2330–0400Z Sept. 12, and from Sept. 12 from 1200–0400Z Sept. 13. Suggested frequencies: Phone 3920, 7240, 14290, 21340, 28400; CW 3725, 7125, 21150. For special QSL, send QSL and SASE to Skip Paquette, KA1EAJ, 121 West Dayton Hill, Wallingford, CT 06492.

• **W9VT From Hazelcrest, Illinois**–On Sept. 12–13 the Tri-Town RAC will operate Special Event station W9VT from the grounds of the Hazelcrest, Illinois Hazelnut Festival. Operation will be from 1300 UTC Sept. 12 until 0300 UTC Sept. 13, and from 1300 UTC Sept. 13 until 2100 UTC Sept. 13. All bands 80–10 approximately 10–30 kHz up from the lower edges of the General portion of each band; 10 meter phone operation on 28.490 MHz in the Novice band and local 2 meter operation on 146.49 MHz are also planned. A certificate will be issued to all stations working W9VT that day. Send a SASE with one unit of first-class postage to the Tri-Town Radio Amateur Club. P.O. Box 302, Hazelcrest, IL 60429.

• **Wright-Patterson AFB, Ohio**–The Wright-Patterson Air Force Base MARS station, AGA1WP, and the Dayton ARA, W8BI, will operate two special event stations September 18–20, 1300–2100Z each day in honor of the celebration of the Air Force's 40th anniversary, "The Festival of Flight." AGA1WP will transmit on 3229.5, 7528.5, 14,528.5, and 20,874.5 kHz. Listening frequencies inside the amateur bands will be announced. Amateurs are cautioned in operating "split" to be sure they are transmitting on amateur frequencies. W8BI will be operating in the General class phone portions of the amateur bands and in the Novice/Technician 10 meter phone/CW band. A commemorative QSL is available for a QSL and an SASE. Send all QSL confirmations to W8BI, P.O. Box 44, Dayton, OH 45401. For more information, contact Paula DiGennaro, KA8HQJ, 7136 Pineview Drive, Huber Heights, OH 45424 (513-233-9018).

• **Norman, Oklahoma**–The South Canadian ARS will celebrate its decicentennial by operating a Special Event station, W5OU, from 1400–2400Z on Sept. 19. Operation will be on 7.237, 14.237, 21.337, and 28.337 SSB phone, 14.087 RTTY/AMTOR, 145.01 packet, 147.060 (±600) FM, and 439.25 ATV. For a certificate, send QSL and 9″ × 12″ SASE with 39 cents postage to SCARS c/o KD5IT, 2735 Poplar Lane, Norman, OK 73072.

• **WØVZG From Leavenworth, Kansas**–On Sept. 19 the Pilot Knob ARC will have a Special Event station celebrating the Buffalo Days in Leavenworth, Kansas. The call will be WØVZG. All bands will be used in the General portion, the Novice section on 10 meters, and 2 meters 147.00. To receive a certificate, send a QSL card with a long SASE to WBØIEL, Bill Meyer, 202 S. Main, Lansing, KS 66043.

• **Novice Ten Meter Celebration**–The Wellesley, Massa-

(continued on page 60)



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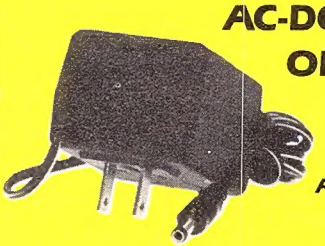
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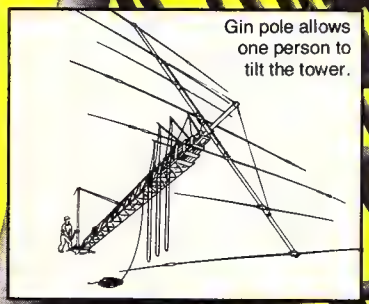
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Our Readers Say

KH6IJ Contest Hall of Fame

Editor, *CQ:*

One of the biggest surprises of my life was being presented the CQ Contest Hall of Fame No. 2 award at the April 1987 International DX Convention sponsored by the Northern and Southern California DX Clubs in Visalia, California.

There must be a number of amateurs who are equally qualified to be singled out for this award. I feel truly honored to have received this plaque. Thank you very much for honoring me with this distinctive award.

Katashi Nose, KH6IJ
Honolulu, HI

Seeking Laurelton Hams

Editor, *CQ:*

I wanted to share an interesting experience with you, and leave it to your editorial judgment whether to use it in *CQ*, and in which section.

I had finished a phone QSO with an Argentinian station and began tuning down the band (20 meters) when I felt compelled to listen to the tail end of a QSO by another California amateur and a South American station. The Californian ham's voice sounded familiar, but in some really long ago corner of my mind.

When the two hams had signed, I called the Californian, WB6FDR, and told him I had two questions. First, was he formerly a W2 (I was formerly K2UMU), and second, what was his call? He said, "Yes, I was WA2AED." And that is how I met up with my hometown friend, Mel, after more than 26 years.

I worked Mel on a Thursday evening, and the next day we were enjoying an eyeball QSO because I had to go to Los Angeles on business and looked him up afterward. To top it all off, on Saturday morning Mel, his brother Richard (formerly WA2BPK, now WA1NSJ), and I met on 14.250 for a 45 minute nostalgia session.

Mel, Richard, and I were only three of many hams, age 11 to 21 years, who grew up in a little suburb of New York City called Laurelton. On my street alone there were three hams, and the fellow who gave me my Novice test lived around the corner from me.

I can say unequivocally that none of this group now lives in Laurelton, and few if any still have the same calls they had then. It would really be great to schedule an "on-the-air" reunion of former Laurelton hams if I could somehow smoke them out after all these years.

I would like to get in touch with any hams who lived in Laurelton, New York from 1955 to 1970. I want to organize an on-the-air reunion. Please contact Rob, NS6V, 3881 Winkle Avenue, Santa Cruz, CA 95065.

Rob Brownstein, NS6V
Santa Cruz, CA

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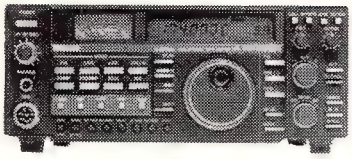
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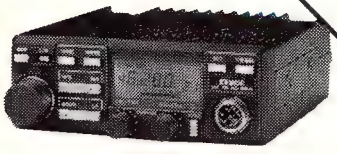


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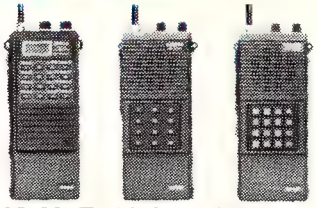
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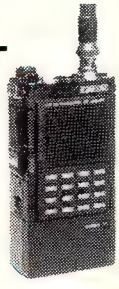
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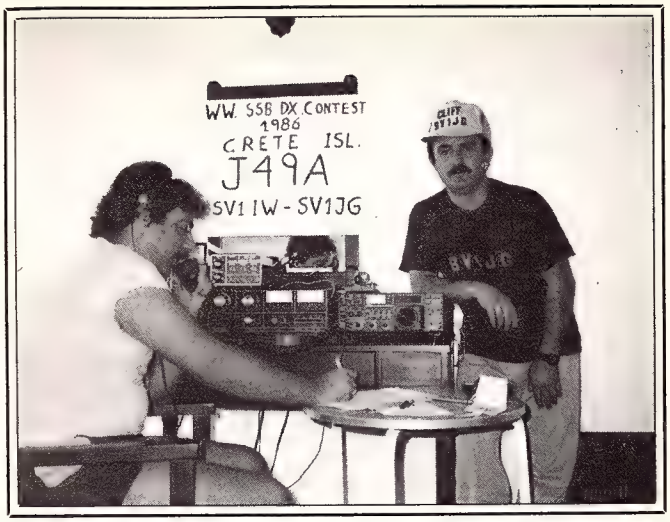
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Bahri, TA2BK, number one score in Asia.

1986 CQ World-Wide DX Contest Phone Results

BY BOB COX*, K3EST/6 AND LARRY BROCKMAN, N6AR/4**

A solar flux of 97 accompanied by little polar cap absorption after months of mediocre to poor conditions left everyone talking about the 1986 WW Phone Contest. The sun surely surprised anyone who turned on his radio. Ten meters was even alive, perhaps as a harbinger of a new sunspot cycle.

After all the talking died down, the honor of world high score goes to 8R1X, operated by Rick, NQ4I. Rick topped 8.9 million points and 5,400 QSOs. P40A, operated by Bill, N1GL, on the island of Aruba, takes second place, while 60 miles away on Curacao, PJ2FR, operated by K4JPD, took third place. In the U.S., K2TR made all the right moves to take the trophy. Fred had more QSOs than any other U.S. operator. In second place is found KT3M, Rob, an enthusiastic young operator using a tribander. He edged out fellow Frankford Radio Club member W3BGN.

High Bands

The action on the high bands reflected the surprisingly good conditions. Comments from all over the world indicated widespread band openings on 10 and 15 meters. Looking at the 10 meter top six shows that it was a battle within South

*3039 Campbell Place, Davis, CA 95616
**12041 Walker Pond Rd., Winter Garden, FL 32787



JA3YBF expedition to C21NI visiting KG6DX after test. L. to r. JG3LZG, KG6DX, JF3MOK, JN1DPL, JH9G.

America. The winner is LU1E, topping ZY5IW, while stateside K4JRB found 100 countries for the top slot. The *real* band openings occurred on 15 meters. There ZZ5EG operated by N5FA not only won the world top spot but set a new world record along the way. In second place was V22A operated by WB7RFA who set a new North American record. ZP5JCY was a very respectable third. In the U.S., Carl, K3RV/4 beat everyone hands down as he became the holder of the new 15 meter U.S. record. The 20 meter world winner, breaking the 3,000 QSO barrier, was OH8PF. His hard work brought him a new European record. Second place was hotly contested with VE3CDX edging out OH8SR and YW1A. Back in the U.S., K2EK was the top score on this highly competitive band, followed by KE7V, 3,000 miles west in Seattle.

Low Bands

On the low bands, ZY5EG led the way on 40 meters. He topped I4VEQ (who set a new European record) and JA8IXM (who set a new Asian record). In the U.S., K∅RF from Colorado led all comers followed closely by KM6B. Eighty meters saw three continental records fall. Pedro, NP4A, with the top score in the world set a new North American record, while second-place winner Danny, K7SS, created a new U.S. record. Third place goes to LX9BV (operated by DL6RAI), who set a new European record. Wally, LZ2CJ, once again takes top band (160 meters) world title, making over 1,000 QSOs. Wally says it helps to be able to speak Russian on 160, as there are lots of Novices. It will be interesting to see how the new U.S. Novice phone band on 10 meters affects strategies and scores. A long way from Russian novices, Yuri, VE3BMV, finished a very respectable second by setting a new North American record. In the U.S. Rick, K5UR, continues his winning ways by taking the number one position.

Low Power

The competition for low-power champion of the world was fierce. Angel, WP4G, led the field in the QRPp category. Second place goes to VE1CBF. The QRPp category has steadily grown since its creation several years ago. Many entrants commented in their logs how surprised they were that 5 watts input could do so much. Congratulations to all the QRPpers who persevered against the QRM.

Multi-Operator

In the ever-popular, competitive multi-operator, single-transmitter (M.O.S.T.) category, VP2EC had the high world score, edging out KP4BZ. Both of these teams are to be congratulated for their excellent, clean logs. The top European M.O.S.T. score was I5NPH, who had a tremendous signal on all bands. In the U.S. the top score was KX4S, followed by N2ME and his crew. The M.O.S.T. can be a great deal of fun. Get some friends together and set up two transceivers. Dedicate one of the transceivers as the QSO running station while the other transceiver is used as the multiplier station. Each station requires a different skill so that everyone is active in the station and fun is had by all (see the rules for all the details).

In the battle of the giants—i.e., the



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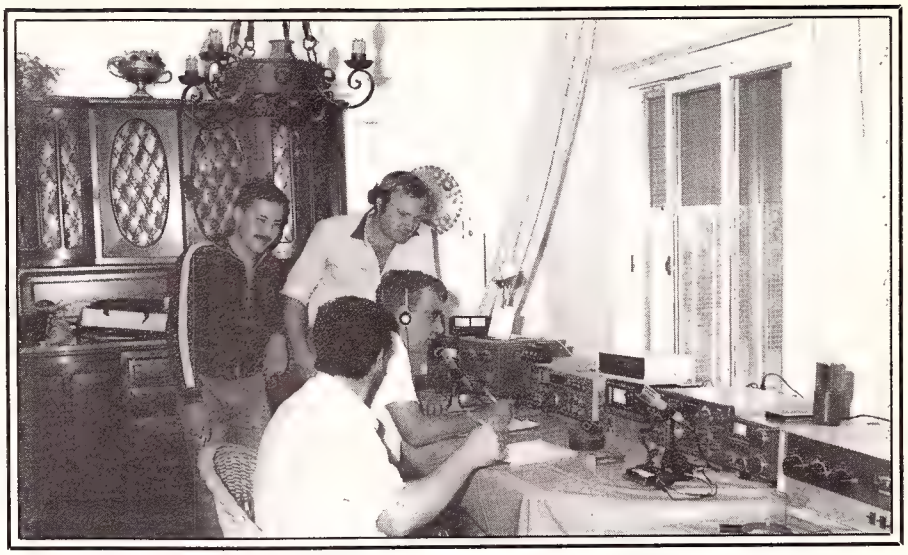
The brains of the operation: The FT-767GX. This intelligent HF/VHF/UHF base station includes four microprocessors for unparalleled flexibility and ease of operation.

Features include 160 to 10 meter transmit, including WARC bands. Optional plug-in modules for 6-meter, 2-meter and 70-cm operation. Receiver coverage from 100 kHz to 30 MHz. AM, FM, SSB, CW, AFSK modes built in. Ten memories that store frequency, mode, and CTCSS information (optional CTCSS unit for controlled-access repeaters). Memory check feature for checking memory status without affecting operating frequency. Dual VFOs with one-touch split frequency capability. VFO tracking for slaved VFO-A/VFO-B operation at a constant offset. Digital display in 10 Hz steps. Slow/fast main dial tuning. Synthesizer step programming at up to 99.99 kHz per step. Digital SWR meter. Digital RF power meter. Built-in RF preamplifier. Adjustable drive level from 0 to 100 watts. Blue fluorescent display. Built-in AC power supply.

Up to 30 minutes continuous transmit (100% duty cycle). Full CW break-in. Built-in CW electronic keyer. Audio peak filter for CW (Yaesu patent). CW and AM wide/narrow filters. Woodpecker noise blanker. RF clipping speech processor. IF shift for both receive and transmit (TX side allows you to adjust voice frequency response pattern). IF monitor. IF notch filter. Audio low-pass filter.

Built-in antenna tuner with memory of settings on each band. Separate antenna connectors for each VHF or UHF optional unit. Separate beverage antenna receive input on rear panel. Quick turnaround time from TX to RX for AMTOR, Packet, and QSK CW. AGC slow/medium/fast/off selection. Push-pull MRF422 transistors

multi-operator, multi-transmitter category—PJ1B showed what can be done at the sunspot minimum by racking up 25 million points from Bonaire. Their QTH was right on the Caribbean Sea (see photo). A quarter of a world away, JY7Z took second place. Not only did they do a great job, but they had the privilege of meeting JY1, who was enthusiastic about their efforts. In the U.S., mounting a great effort and blessed with superb conditions, N5AU triumphed over perennial winner N2AA. A great effort by the boys from Texas.



LU2FDR (M.O.S.T.): LU2FDR operating, helping LU9FDG and LU5FHM.

A Few Words

Checking the logs fairly and thoroughly is a massive undertaking and all of us would like to thank the many comments acknowledging our efforts. In this age of computers, it is becoming increasingly possible to check the logs in a manner which was impossible only a few years ago. However, as anyone who has ever used a computer knows, it still requires someone to type in all the entries. Those of you who either computer dupe your log or keep an online log can save us a *lot* of time, if in addition to your submitted hard-copy log, you also send a floppy disk containing your band-by-band QSOs to K2SS, Dave Donnelly, 8 Alder Street, Lincoln Park, NJ 07035. Dave will return your disk plus give you some blank *CQ* WW logs and a zone map. At this point it does not matter what type of format you are using. We will use your data to compile a master data bank of QSOs. This year we concentrated on 20 and 15 meters. A data bank of over 17,000 unique calls was generated on 15 meters. From this information it was determined that at least 199 countries were active on 15 and we can begin to determine what percentage of calls are unique to a single entrant. Such information will help us understand the dynamics of the contest in a way not possible before. When we assess the data more fully, we will then present our findings in a *CQ* article.

A question that always seems to arise from time to time is just how many of the log scores are changed by our log checking. A survey of all the scores indicated that about 30% are changed, reflecting both increases and decreases. The most common cause of increases in score is a



AND THE BRAWN.

(rated dissipation 290 watts each) operated at 24 volts for excellent intermodulation rejection in transmitter.

Enhanced C.A.T. system for external control of transceiver from personal computer. (Software for Apple IIe/MAC, Commodore C-64, and IBM-PC is available through your Yaesu dealer.) There's also data communication with the FL-7000 linear amplifier for hands-free amplifier operation.

The muscle to get you out: The FL-7000. This solid-state amplifier covers 160 to 15 meters, and includes a built-in power supply, automatic tuner and lots of powerful operating features.

There's fast turnaround time for break-in (QSK) CW, HF packet radio, and AMTOR. Only 70 watts excitation for full output, and 1200 watts PEP input power. Fully protected push-pull parallel wideband "no-tune" amplifier circuit powered by 47V, 25A DC power supply. Yaesu's exclusive "DVC" (Direct Vertical Cooling Heatsink System) with bottom-mounted fan. Automatic antenna matching sensor turns off amplifier and rematches tuner circuitry if SWR rises above 2:1. Hands-free automatic band change when used with FT-767GX, FT-757GX or FT-980. Lithium battery backup remembers antenna selection and tuner settings. Dual 2-speed fans with independent thermal sensors. Connection to up to four antennas, including automatic selection via optional unit. Eight front panel LED status indicators. And more.

Get the DX advantage. Just combine the FT-767GX's brains, the FL-7000's brawn, and your special operating knowledge. What an impact you'll make on the world!

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CIRCLE 166 ON READER SERVICE CARD

COMMITMENT

We continue our commitment to provide only the best Amateur Radio gear with the NEW Heathkit® SB-1000 and HK-232 kits.



SB-1000 Linear Amplifier



HK-232 PackKit Multi-Mode TNC

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The Heathkit SB-1000 Linear Amplifier Kit continues our commitment to produce the most popular linear amplifiers in the industry. Designed to operate at a full 1000 watts PEP output on SSB, 850 watts on CW or 500 watts for 30 minutes continuous on RTTY, this amp covers all bands from 160 to 15 meters including WARC bands. The SB-1000 uses a single 3-500Z tube in a high efficiency circuit for unparalleled performance at the price. Its high silicon E-I core transformer takes up less room and runs cooler. And it features a quiet computer-style fan, a stiff full-wave power supply with computer grade capaciters, adjustable ALC, and plate and load controls with smooth vernier tuning. And the SB-1000 is yours for only **$739.95.**

Consider the Heathkit HK-232 TNC. This versatile unit works on CW, RTTY, ASCII, AMTOR, both HF and VHF Packet, and now even WeFAX. You can work Packet in both HF (300 baud) and VHF (1200 baud or up to 9600 baud with external modem). Operate Morse from 5 WPM to speeds you never dreamed of, or print Weather Facsimile pictures on an Epson compatible printer. Connects to your computer through a standard RS-232 port. Connects to both your HF and VHF radios' PPT line, microphone input and speaker output. The same connections for Packet work on all other modes. Includes bar graph display to make HF tuning a breeze. Operates on 12 VDC at 750 mA with 10% ripple or less. The HK-232 is priced at only **$279.95.**

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CIRCLE 14 ON READER SERVICE CARD

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KB-101



F6BBJ (hands on pole) and F5MF erect antenna on salt water lake for FV6NDX.

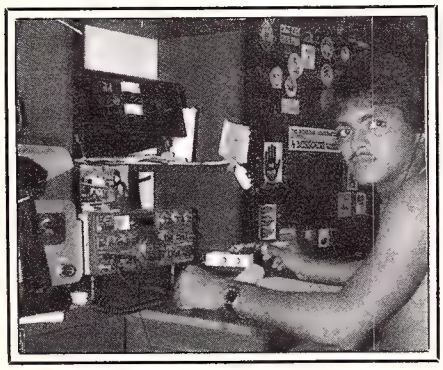
failure to count all the multipliers. Remember that the DXCC list plus UN (RA1N, UZ1N, UA1N), IT, GM (Shetland Islands), JW (Bear Island), and 4U1VIC from the WAE list count as multipliers. Score reductions are for more reasons, including duplicates, multiplier counted twice, and an impossible callsign.

A Special Thanks

A special thanks to all the contest managers of national radio associations around the world. We really appreciate your hard work in gathering your countries' logs together, and in disseminating information about the *CQ* WW Contest. In addition, we all owe our thanks to all the *CQ* contest committee members: Frank, W1WY; Dave, K2SS; John, K2VV; Doug, KR2Q; Gene, N2AA; Ed, N3ED; John, K1AR; Fred, AD6C; Glenn, K6NA; Jan, N6AW; Rick, N6ND; Jim, W7EJ; John, and KE7V. After many years of hard work John, K9DX, leaves the committee and in his place we welcome Mike, W9RE, a top-notch motivated contester. Finally, we would like to thank Dave, N3RD, for helping type computer entries.

Congratulations to all the winners! See you in '87.

Bob, K3EST/6 and Larry, N6AR/4



FB Phone/CW operator HK1HHX.

PHONE TROPHY WINNERS AND DONORS

SINGLE OPERATOR, ALL BAND
World
8R1X (Opr. Rick Dougherty, NQ4I)
Donor: Dave Rosen, K2GM—WA2RAU Memorial

WORLD QRPp
Angel N. Padilla, WP4G
Donor: Adrian Weiss, K8EEG/Ø

U.S.A.
Frederick E. Lass, K2TR
Donor: Potomac Valley Radio Club

Caribbean/Central America
V31CV (Opr. Mike Rosenfeld, KE5CV)
Donor: Alex M. Kasevich, VP2MM

Europe
YT3M (Opr. Joze Herman, YU3ZO)
Donor: Potomac Valley RC—W4BVV Memorial

Africa
Pilar Fernandez Sanchez, EA9AM
Donor: Gordon Marshall, W6RR

Asia
Bahri Kacan, TA2BK
Donor: Japan CQ Magazine

Japan
Eiichi Saito, JA1XAF
Donor: Japan Crazy Contester's Club

Oceania
Jim Smith, VK9NS
Donor: Northern California DX Club

South America
P4ØA (Opr. William Ovca, N1GL)
Donor: Special CQ Plaque

SINGLE OPERATOR, SINGLE BAND
World (21 MHz)
ZZ5EG (Opr. James A. Hoffman, N5FA)
Donor: North Jersey DX Assn., K2HLB Memorial

World—21 MHz
V22A (Opr. Craig M. Maxey, WB7RFA)
Donor: Lee Wical, KH6BZF

World—3.8 MHz
Pedro J. Piza, NP4A
Donor: Fred Capossela, K6SSS

U.S.A. (21 MHz)
Carl Kratzer, K3RV/4
Donor: West Jersey DX Group

U.S.A.—28 MHz
David Thompson, K4JRB
Donor: Donald Thomas, N6DT

U.S.A.—14 MHz
William V. Gioia, K2EK
Donor: Southern California DX Club

U.S.A.—3.8 MHz
Danny Eskenazi, K7SS
Donor: Arnold Tamchin, W2HCW

Canada (14 MHz)
Barry David Garratt, VE3CDX
Donor: Gene Krehbiel, VE7KB

Caribbean/Central America (14 MHz)
XF5L (Opr. Luis Chartarifsky, XE1L)
Donor: Pedro Piza, Jr., NP4A—KP4ES Memorial

Europe—28 MHz, Zone 14
Gabriel Sampol Duran, EA6VQ
Donor: A.G. Anderson, GM3BCL

Japan—21 MHz
Masanori Kawakami, JR1CBC
Donor: DX Family Foundation

MULTI-OPERATOR
SINGLE TRANSMITTER
World
VP2EC (Oprs. KC5EA, K5RX, N5AU, N5HGB)
Donor: Southern California DX Club—W6AM Memorial

U.S.A.
KX4S (Oprs. KX4S, KG4W, KB4DI, N4DCY, N4HB, N4MXT, NK4J, W4XR, W4MYA, WB4BVY, WK4Y, WU4G)
Donor: Carolina DX Association

Europe
I5NPH (Oprs. I5NPH, I5SDG, IK5BAF, I8MPO, I5MPN)
Donor: Bob Cox, K3EST/6

Canada
VE3BVD (Oprs. VE3OZB, VE3BVD)
Donor: Calgary Amateur Radio Association

MULTI-OPERATOR
MULTI-TRANSMITTER
World
PJ1B (Oprs. N7ZZ, N4RV, WA3LRO, K3EST, N3ED, PJ9EE)
Donor: Radio Club Venezolano

U.S.A.
N5AU (Oprs. K4VUD, K5MR, KM5X, KN6M, KY5N, N5CR, N5RZ, N5TR, WAØTKJ, WB5VZL, JL1BLW
Donor: DX Incorporated Club

Europe
UP9A (Oprs. UP2BAW, UP2BCO, UP2BCT, UP2BCV, UP2BCW, UP2BIG, UP2BIL, UP2BOC, UP2BN,UP2PAJ)
Donor: OH-DX-RING—OH2AM

CONTEST EXPEDITIONS
World—Single Operator
TA2BK (Opr. Bahri Kacan, DJØUJ)
Donor: Stuart Meyer, W2GHK

World—Multi-Operator
JY7Z (Opr. JY3ZH, JY4MB, JY4YJ, N6AA, N6TJ, N6VI, N6ZZ, W6MKB, W6NV)
Donor: The German CDXG & SDXG (DJ3NG & DJ4EI Memorial

**See rules.*

U.S.A. QRM

VS6DO long path, 10 meters QRP! . . . *KZ5Q.* Working KH6XX on 160 meters using the beverage antenna . . . *K1NG.* Field Day style operation from the basement of unoccupied new home . . . *W3LPL.* Working 15 meter long path into Europe; great propagation . . . *N6RO.* Best condx for W5 in years . . . *NR5M.* Finally got them . . . *N5AU.* Old Man Sol really does read the contest calendar! . . . *W3UM.* Looks like 2 is my lucky number! . . . *K3FNW.* First DX Contest since upgrade . . . *KC3ZG.* Who said 10 meters is dead? . . . *W3KHQ.* Installed A-3 Thursday. Great chance to break it in . . . *W3FGS.* Thrill: HS0A. Disappointment: Missing VK9NS . . . *K3ZPG.* Activity seemed slow on 75. Later found out how great the upper bands were! . . . *KQ3V.* A thrill to work BY, VS6, 9V1, 9M2, JT all within a short period of time . . . *W3BGN.* Sleeping through Sunday runs doesn't make for a great score . . . *KM3T.* Working JA's with 2 watts on 20M . . . *KA1SR.*

Unbelievable conditions on 10 meters both days, wasn't expecting 18 Zones! . . . *KQ1V.* My first CQ WW. Enjoyed it! . . . *W1QK.* Worked two BY's! . . . *W1LQQ.* Biggest thrill: breaking through 7Q7LW pile-up! . . . *KA1GQW.* Great fun working places I never heard of! . . . *KA1ONQ.* The propagation experts were wrong. Condx were fantastic! . . . *W1BIH.* Patience is definitely a virtue on 40M! . . . *ND1X.* First time I have entered. Exceeded my wildest expectations. Landed 61 countries, 21 of them new! . . . *KZ1D.* This is some sunspot minimum! . . . *K0EJ (Opr. W1ZM).* Congrats to N5AU for winning M/M . . . *K5ZD/1.* A thrill to finally snag a BY! . . . *W2GD.* What a difference a beam makes! . . . *NA2Q.* Extra inning World Series game cost 4 hours! . . . *KK2B.* Propagation as good as the high MUF days! . . . *K2MFY.* Never heard so many JA's with 20 over 9 signals . . . *KA2CHX.*

Had a great time. My first SSB contest . . . *KA2YMZ.* Working WAZ single band in 48 hours . . . *K2HFX.* Twenty meters sure is different from 15! . . . *K2EK.* First 19 minutes on 10 meters Sunday netted 56 contacts! . . . *N2RM.* Who would have thought 15 would open to Japan one hour before their sunrise? . . . *K2TR.* Thanks to K7NW for providing the entertainment! . . . *N2AA.* Great contest. My first of many! Gotta get a bigger amplifier . . . *N2DTL.* First two QSOs were BY1PK and VS6DO . . . *KG1D.* 4-1000 blew up after the contest . . . *W1BK.* Biggest thrill: looking up where P36P was after working him . . . *KT1O.* Real happy to be answered by ZC4IT on my CQ . . . *KQ2O.* Tremendous condx on 15 and 20. The flux was with us . . . *K3TUP.* Frustrating trying to hear mults while sharing one ant . . . *K3WW.* Shack got hot with 6 single band amps idling . . . *AA1K.* First time I ever had all zones on one band . . . *N4ZC.* Loudest sig on 20M was generated by computer monitor . . . *N4KZR.* First time. Glad the sun was "up" for the test . . . *KD4OM.* Next year we plan a huge sacrifice to the QRM gods . . . *W5JDV.*

My first single-op effort in 20 years; not too shabby for a 69-year-old goat . . . *W7RM.* Wow, HS0A called me during a JA run! . . . *NC7K.* Discovered some VCR RFI this year . . . *KA7EQS.* Worked great DX with just a vertical antenna on the chimney . . . *N7HWB.* Thanks, Gordie . . . *K7SS.* Still a lot of unethical operation re the 75M window . . . *WA7KPH.* Contesting since 1932; this is my first phone entry! . . . *N8BC.* I had a great time in my first contest (age 13) . . . *KA8ZPA.* Still enjoy the CQ WW after 61 years of hamming . . . *W8YGR.* I had to work, I had to sleep, the amplifier blew. I love the WW; don't change it! . . . *K9UWA.* Had to switch between my rig and the TV football game . . . *W9LNQ.*

DX QRM

Operated all bands to give out Zone 21 . . . *UF6FFF.* Nice to meet many old friends in USA . . . *UC2AA.* The pyramid antenna works great on long and short distance . . . *RR2RN.* Evolution of propagation on 28 MHz was same as last contest, but on Saturday opening to USA was more stable and possible to work USA 4 area stations . . . *UA6LQ.* Conditions were unexpected. Thank you for the fine contest . . . *UP2NK.* 73 for contest committee . . . *RP2BU.* Worked on 3.8 for first time ever and enjoyed this contest much more . . . *UB5LCV.* Ten meter dipole sounded like our 5 over 5 at sunspot maximum . . . *UZ9AYA.* Two good surprises: (1.) Nice to see sun come active again, and (2.) the real bomb—VE8DX from Zone 2 on 160! . . . *UR1RWX.* Put big antennas up as 5-el Yagi on 7 MHz, 6 + 6 on 28 and 21, and soon 7 + 7 on 14 MHz. Fantastic propagation on all bands . . . *RL8PYL.*

Nice to hear pile-ups on 10M again . . . *GM3BCL.* Great fun, first ever contest entry, the reward was in taking part . . . *GM3MOR.* Fine conditions, but "Murphy" struck with a 4 hour power out during peak conditions on Sunday . . . *GW4RHW.* I was accused of falling in love with 3.799 MHz . . . *GW4VEQ.* Fell from chair two hours before sunrise on Sunday and slept for 8 hours during the best time. Still broke European record, Hi . . . *LX9BV/DL6RAI.* CQ WW is still the best one; my first CQ WW was back in 1952. I will be there again too next year . . . *OZ7HT.* Nice to work old friends again . . . *PA2TMS.*

We are Novice opr, barefoot power but have 1KW spirits amp . . . *YB0ZDC.* Set up the whole station (including raising the tower) in 5 days . . . *P36P.* Five hrs no power during "prime time" Saturday . . . *VP2MU.* Best conditions ever for sunspot minimum . . . *VE7ZZZ.* Unbelievable condx on 15M, and unbelievable low score on 40M . . . *JA1YWX.* Just

BAND-BY-BAND BREAKDOWN—TOP ALL BAND SCORES

Number groups indicate: QSO's/Zones/Countries on each band.

WORLD TOP SINGLE OPERATOR—ALL BAND

Station	160	80	40	20	15	10
8R1X	180/12/25	325/17/44	859/28/81	1071/33/112	1980/33/98	1008/24/63
P40A	239/10/27	237/17/56	790/22/74	735/34/95	1429/34/93	1705/29/64
PJ2FR	199/11/25	195/19/39	335/22/52	1152/35/89	1552/29/79	1478/26/54
FY5YE	14/5/9	133/14/40	344/24/63	1790/31/97	1878/24/93	615/20/53
VK9NS	61/9/10	169/16/23	627/28/62	1149/33/97	1102/25/40	1067/18/36
VE60U/3	181/6/5	314/14/48	533/28/93	1054/35/102	1083/30/102	148/17/37
V31CV	136/13/22	353/16/39	469/23/50	790/22/71	1400/32/87	871/23/45
TA2BK	115/8/29	213/10/44	294/15/55	865/25/74	1107/27/79	641/17/60
WR6R/KH6	2/1/2	191/13/20	946/28/47	586/26/62	1708/34/51	396/18/32
ZF2FL	120/8/10	273/13/34	612/18/50	1159/33/89	1351/27/76	348/17/24

WORLD TOP MULTI-OPERATOR SINGLE TRANSMITTER

VP2EC	204/13/36	770/25/99	978/29/112	954/37/124	2632/34/128	946/25/54
KP4BZ	112/8/25	324/20/63	1272/30/105	1831/33/115	2839/34/121	621/27/63
CV1D	30/18/28	76/25/51	606/31/85	1506/36/117	1575/33/107	1498/29/90
I5NPH	52/11/49	715/18/76	687/31/107	1320/37/116	2142/36/112	293/31/78
LZ7A	59/10/37	362/20/73	704/33/101	976/37/112	2433/36/109	497/28/77
Y34K	84/11/43	319/14/54	711/29/93	1456/34/94	2312/32/98	112/21/47

WORLD TOP MULTI-OPERATOR MULTI-TRANSMITTER

PJ1B	336/14/33	792/20/67	1241/29/95	3492/37/152	3442/37/113	2914/31/77
JY7Z	81/8/30	722/20/74	1068/28/88	2204/39/131	2435/39/117	1093/29/101
VP2MU	319/16/61	768/22/85	1051/27/94	2922/37/116	2481/29/89	1337/17/27
KH6XX	209/13/15	376/23/44	1252/33/66	2008/35/111	3129/33/79	1052/26/59
UP9A	1053/13/58	888/16/64	1498/35/107	3049/37/122	1849/37/111	327/19/53
N5AU	107/15/41	347/24/81	423/28/90	1442/38/141	2291/35/148	606/29/81

USA TOP SINGLE OPERATOR—ALL BAND

Station	160	80	40	20	15	10
K2TR	33/10/19	56/11/33	91/21/55	835/37/116	1118/31/111	61/15/32
KT3M	30/8/14	100/15/51	76/19/46	1031/36/117	723/27/91	83/19/51
W3BGN	42/12/27	133/15/56	101/19/54	904/36/109	572/27/83	171/20/55
K1ZM	49/12/19	161/18/60	131/24/64	1040/37/113	362/27/92	91/18/42
K5ZD/1	32/10/22	130/16/59	109/21/59	803/35/109	687/30/99	75/17/41
W7EJ	17/11/11	89/19/41	137/25/63	614/34/82	956/32/81	158/18/39
W9RE	32/10/20	91/16/51	109/25/60	654/34/105	295/32/100	108/16/41
K1DG	25/11/15	130/18/59	101/25/65	850/35/108	575/28/93	63/16/36
K1CC	27/8/17	107/17/157	81/22/57	814/35/99	639/29/99	86/17/43
N2FB/3	26/6/15	82/14/45	111/21/59	692/36/103	829/31/98	70/16/32

USA TOP MULTI-OPERATOR SINGLE TRANSMITTER

KX4S	30/11/25	149/20/69	119/22/71	1050/40/128	901/35/129	105/23/76
N2ME	19/8/17	133/18/70	169/26/80	915/40/130	726/30/126	184/24/77
N3RS	19/9/18	91/18/65	149/24/79	895/38/123	1003/36/137	85/21/60
N4WW	33/13/29	124/24/76	134/24/77	576/35/110	1093/34/121	84/25/63
N4ZC	19/8/16	150/16/63	161/26/83	555/40/126	920/34/122	163/25/80
K1AR	17/8/13	122/18/72	127/25/81	1212/37/127	485/32/117	76/19/47

USA TOP MULTI-OPERATOR MULTI-TRANSMITTER

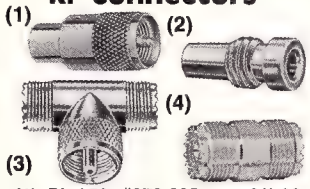
N5AU	107/15/41	347/24/81	423/28/90	1442/38/141	2291/35/148	606/29/81
N2AA	202/16/60	578/22/90	373/27/92	1943/39/146	1617/32/134	318/24/79
W3LPL	134/14/45	387/22/79	224/27/86	1135/36/131	1421/36/131	499/23/80
N6RO	75/11/17	266/23/50	463/27/68	1251/37/119	1739/34/125	589/23/59
NR5M	55/12/27	181/23/63	332/27/78	1032/38/130	1399/33/126	451/26/63
AD8P	126/14/37	267/29/65	209/26/76	1309/39/125	1151/33/123	358/24/72

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(3) M-358 "T" Adapter. Useful for phasing lines. #278-198 . . . . **2.99**

(4) PL-258 Coupler. Joins two PL-259 plugs. #278-1369 . . . . . **1.49**

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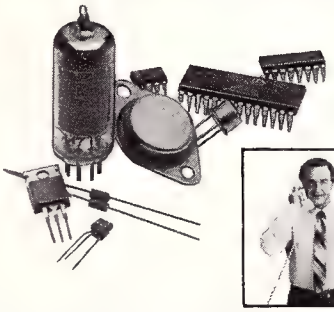
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Type	Cat. No.	Per Foot
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RG8/M	278-1328	.21
RG58/U	278-1326	.16
RG59/U	278-1327	.16

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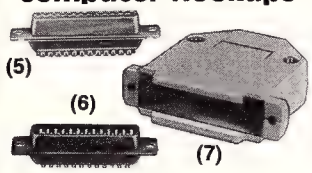
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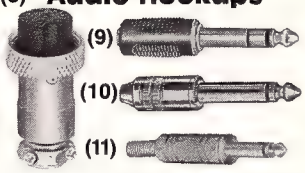
Computer Hookups



9 and 25-Position Subminis

Fig.	Type	Cat. No.	Each
5	D-Sub 25 Male	276-1547	1.99
6	D-Sub 25 Female	276-1548	2.99
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(8) Audio Hookups



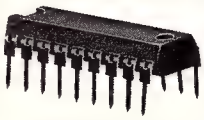
(8) 8-Pin Mike Plug. Fits popular transceivers. #274-025 . . . . . **2.19**

(9) Headphone Adapter. 1/8" stereo plug to 1/4" mono jack. #274-348 . . . . . **1.89**

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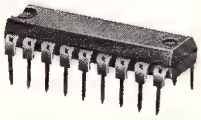
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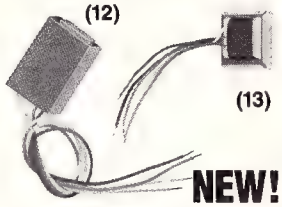


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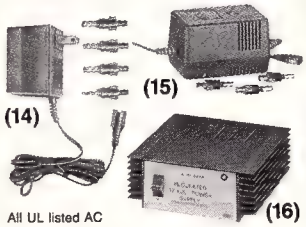


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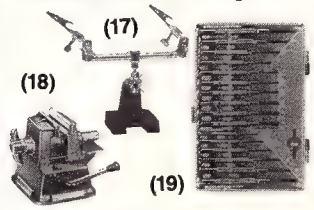
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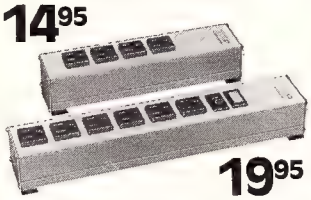
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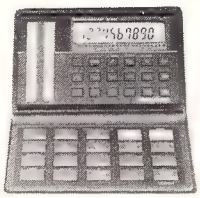
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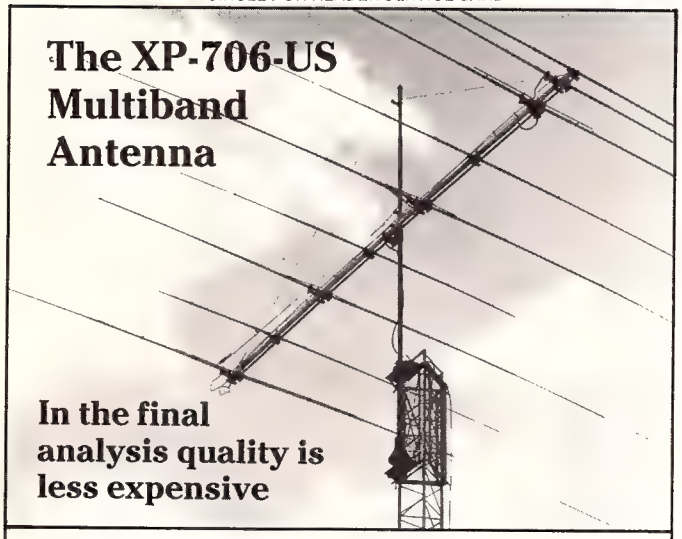
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can't continue the string of W/VE on 10 and 15. The voice went off! . . . *WP4G.* This old man fell asleep Sunday morning—only 23 years old! . . . *AH6EK.* Can't believe how well my 5 watts gets into Africa . . . *HK7IMB.* Quality is done with a few watts! . . . *PA2REH.* My third year QRP on 21 MHz, but still trying to work Zones 1 and 40 . . . *ZS6PT.* Very happy first Zone 40! . . . *JR8OGB.* I enjoyed it very much this time in all bands. Next I will be there again! . . . *CT1CLR.* Hope CS8 was a new prefix for everybody . . . *CS8NH(CT4NH).* My first contest. I will return next year. Now I have to sleep because 48H is so much time. Thanks . . . *CT1BOP.* We, in my location, have many troubles with the TVI. Impossible to work radio during de TV emission . . . *CT1CIR.* Noise—big time! . . . *CT4AT (Don Riebhoff).* Couldn't take part in 1985 due to studies, final exams, and was much longing for this year's turn—48 hours fun and pleasure . . . *DK8AX.*

Good condx, good score for a simple LW ant! . . . *DJ4AX* (1,058,661). Very good conditions on 15 and 10 meters by this sunspot down . . . *DL3NBL.* Amplifier blew in first half hour of contest, but the bands were great anyway . . . *DA1DX.* Finally worked HS0A 5 minutes before the end of the contest! . . . *DK9IP.* It is a very good contest, for work interesting countries with a little antenna . . . *DK8FD.* Considering my 100 watts and wire antennas, I worked a lot of DX and W's this year . . . *EI4DW.* BY1PK—What a pile-up! . . . *EI1DH.* I hope it will be last year with bad antennas and not too high—next year new QTH . . . *EA6GP.* An incredible good propagation on 10M. The band was open during the whole daytime . . . *EA6VQ.* My first WW DX Contest, VY GUD experience, looking forward next one . . . *EA6WV.* Very nice and difficult . . . *EA5FYJ.* Surprised to have a couple of QSO's with USA on 28 MHz . . . *G3SJX.* Called by ZD9BV off the back of the beam . . . *G3SNN.* If I was S9 to everyone, how come I made so few contacts? Miss some of the old calls like W3AU and W6AM . . . *G3JKY.* This is my first entry for a CQ contest after being licensed for 33 years—so it is about time! . . . *GI3KDR.*

I did not intend to go single band on 10M but the band opened and kept open . . . *VK6HD.* Able to operate only 24 hours because of a local radio station, BCI, BCI! . . . *OH1RY (Opr. of T2ARY).* Old Sol has to be a contester!! . . . *VE7EIK.* Wish that wife, kids, house, work, etc., would leave me alone on this weekend . . . *VE7AVU.* Had great fun working JA pile-ups on 15M . . . *VE7HMS.* Worked 16 new countries at bottom of sunspot cycle . . . *VE6AXB.* Nice to be called by HS, XU, and BY . . . *VE3CDX.* Wasn't 10 meters a pleasant surprise? . . . *VE2AEJ/3.* I thanked UA1CK for his UA1CK/JT1 QSL rcvd many years ago and he was delighted to hear this . . . *VE3XN.* Thought 10 would be slow and let me do some work around the house . . . *VE3OXT.* Participated in many of the contests from my previous QTH as ZS6BNZ . . . *VE3NTW.*

First JA phone contact . . . *VE3OMU.* 10M stayed open until about 3AM local . . . *VQ9GB.* Propagation on 10 was unreal . . . *ZS6P.* Enjoyed working phone bands for the first time . . . *VU2UR.* You've never heard JA's till you've heard them from this side . . . *K5IID (Opr. of BY1QH).* My 3rd contest, 1st on SSB—age 17 yrs . . . *VO2AC.* Amazing, VU and YC breaking through EU pileup on 15M . . . *VO1SA.* If this is the bottom of the cycle, may God let me see the top of the next one . . . *VE1BNN.* Back on the air after 3 year absence . . . *VE1TG.* By taking part in 1986 CQ WW, celebrated being TA2BK for 25 years . . . *TA2BK/DJ0UJ.* 10 meters open hour after hour copying down to S0 . . . *VK9NS.*

Wish some of those northern hemisphere stations would spend more on their receivers and less on their linears . . . *ZL1BOQ.* My first serious commitment . . . *YC0EJG.* No power outage, no lightning storms, but no big JA runs . . . *YB0ARA.* Perhaps next contest will be putting out a new prefix for AP2 . . . *AP2ZA.* I do hope I have helped OM's in giving my reports from Zone 20 . . . *OD5RF.* Good conditions and the *CQ* WW Phone seem to be synonymous. How do you guys do it? . . . *VE6OU/3.* Very hard to stay 48 hours operating this first time . . . *EA9AM.* Great conditions on long path . . . *NY6M/KH2.* Very easy to tell the stations using Yagis on 75 . . . *KG6DX.*

My first contest in 20 years. Great challenge! . . . *AL7IJ.* Only was on for 30 hours because of infection in my feet. Next time I'll keep my boots on! . . . *V31CV.* Just 10 months as a ham, and such an exciting experience . . . *TI2MEN!* Finished with a lot of things broken (computer, linear, rotor) but a very good experience . . . *WP4U.* Fun taking part for 1st time; maybe I'll get a 160M antenna for next year . . . *J87CD.* Bad propagation to Europe and local QRM . . . *ZY5IW.* Very interesting experience 4 single op. on 4 bands at the same QTH . . . *PY5EG (Multi-Multi next year? . . . ed.)* Tongue accident. More than 11 hours out of test. Vy good propagation all the time . . . *LU4MEE.* No conditions with Australia and New Zealand, very few QSOs with Europe . . . *HC5EA.* Mosquito bite rate: 1 per QSO . . . *N3JT/HK0.* Why do we contest? For mike for America . . . *4M4A.* Great propagation on 15 meters! All continents at the same time . . . *UT4UXW.*

Computers are great for logging until the bus gets jammed with RF and dumps all 1272 contacts . . . *HL9OS*. We need a directional antenna . . . *HP8BPM*. Best score yet. Hope to improve CW score and work 160 meters . . . *HS0A*. If this weekend was low sunspot activity, we can't imagine high sunspot future . . . *KP4BZ*. Unbelievable and unexpected conditions—a fascinating contest once again! . . . *VE3BVD*. Midnight mission—stringing the 160 meter antenna around the neighbor's house . . . *VE5GF*. The station was equipped with a new antenna system one week prior to the contest . . . *VE6CIZ*. Contesting is a great way to find new RFI problems—5 new cases the first day! . . . *WL7K*. Rain, thunder, and lightning came just in time to join the EU pile-up . . . *YE0X*.

Fantastic condx on 15 and 10. Thanks for the good contest . . . *LZ7A*. Glad to find 15 meters so nicely open for the supposed bottom of the sunspot cycle . . . *F6BEE*. You can always tell when the band will be good—listen for N2AA and in one hour you can run USA . . . *YZ9E*. KX6OI called us on 20 and 15. Thank you! . . . *I2UIY*. Nice to be back multi-single . . . *EI1AA*. The guest in the next room disturbed Manos at 2 in the morning informing him that he was disturbing the entire hotel . . . *J49A*. Our highest score in the *CQ* WW test so far. Glad to give out the multiplier . . . *4U1VIC*. We had to put in a lot of effort, but it was well worthwhile. All the club members pulled their weight . . . *GM0BRS*. The old gang says thanks for a wonderful test! It keeps us young, especially in October . . . *SM5AZU (age 78), SM0ATN (age 75), SM5BGM*.

Station Operators
Multi-Operator Single Transmitter

AA1K & AD3V, W3NX, N8NA. **AG6D** & N1EE, W7XA. **AI6V/KH6** & K6GSS, N6HR. **AL7FQ** & AL7IF, KL7XO. **BY4AA:** Xuru, Xie Lhiua, Chen Rong, Kautz, Yan Wenjie. **BY4SZ:** Wu Zhi Yuan, Zhao Ju Ren, Wue Qiang. **C21NI:** C21KH, C21RK, JF3MOK, JH9GRM, JN1PDL, N6LYB. **C31LDL:** C31LK, C31ON, OH2NP, OH3TQ, OH3TY, OH6CT, OH6CH, OH6LP, OH6XY, OH6RM, C31LFM, Kalle Bert, Jussi Jaakhola. **CE2AA:** CE2BEN, CE2BMU, CE2BXN, CE2ZEO, CE2ENJ, CE2EPB, CE2FTF, CE2GS, CE2LCV, CE2LCP, CE2MH, CE2WO. **CE4TA:** CE4AET, CE4BQO, CE4BXN, CE4EBJ, CE4EBL, CE4EM, CE4ETZ, CE4EUV, CE4EVR, CE4IEX, CE4IFA, CE4KX, CE4MLN. **CE6OS:** CE6AFK, CE6GEY, CE6MBQ. **CR1REP:** CT1AHU, CT1COX, CT1DJE, CT1DRC. **CV1D:** CX1BBL, CX2CL, CX2CS, CX3AN, CX4CC, CX4CR, CX5AO, CX7AL, CX8AC, CX8BZ, CX8CF, CX8CG, CX9CB, Julio. **DF8BV:** DL1MAJ, DJ0ND, DL6MAO, LX1II. **DK1QH** & DL1YAW, DF8XC, DL8AU, DL3YBM, DK4QT. **DL8JK:** DL2ZBP, DF2ZO, DL3ZBA, DL4ZBK, DL2ZBN, DL5ZBG, DL2ZBR, DK1KU, SWL's Achim and Dieter.

DL8JU: DL7ALM, DL7ANR, DL7AKC. **DL8TP:** DJ9UN & Club. **DL8UM:** DK7ZT, DL8DAS, DL5ZBA, DL5ZBP. **DL8WH:** DF6IH, DF7IT, DK8IT, DL5UL. **DL3MAA** & DJ10U, DL5MAE, DL7MAE, DL7MAT. **DX1A:** DU1AU, DU1TW, DU1AHS, DU1TDY. **DX9HT:** DU9AA, DU6AF/9, DU9CC, DU9KN/9, DU9BZ. **EA1BCF** & EA1EMI. **EA3CCN** & EA3CUQ, EA3DJL, EA3EBN, EA3EZD. **EA5FCM:** Martinez, Enguish, Moran. **EA8LS** & EA8BW, EA8TH, EA8YV. **ED3QD:** EA3BOW, EA3BOX, EA3CVA, EA3DDU, EA3DGQ, EA3EJO. **ED7BB:** EA7EL, EA7CEC, EA7TH, EA7IL, EA7FFA, EA7ALG, EA7CFW, Jose, Angel. **EI1AA:** EI2BB, EI3CP, EI6CW, EI7H. **F6BEE** & F6ARC, F6CTT, F9IE. **F6IFR/p:** F6IFR, F6CWN, F6GWV. **FR/W6QL** & W6KG. **G3NAS** & G3NLY. **GM0BRS:** G3KMR, G3YOG, G0AVU, G0ESQ, GM1JFF, GM4VJV, GM4ZXJ, GM0BPO, GM8BDX, GM8IIO, GM8YIK, G8TFL. **HA2KMR.** Jozsef, Attila, Gobor, Csaba, Robert Zoltan. **HA2KPA:** HA2PI, HA2VD, HA2EOI. **HA3KNA:** HA3OV, HA3OU, HA3NS, HA3NU. **HA5KAG:** HA5AEX, HA5ABC, HA5CE. **HA5KDB:** Club. **HA5KFL:** Gabor, Pal, Laszlo, Zoltan, Gyorgy, Jozsef. **HA5KKC:** HA5LV, HA5MA, HA5OG, HA5WU, HA5MD, HA5MO. **HA6KNX:** HA6OD, HA6NW. **HA8KWG:** Pol, Istvon, Janos, Csaba, Antal. **HA8KZC:** Lajos, Sandor, Gyorgy.

HB9/HB9BHA: DJ2EH, DL8NBH, DL9NAP, DH9NAP, DK7NM, DL5NP, DL4NAC, DL4NN, DL8NBJ, HB9BHA. **HB9AUS** & HB9CIP, HB9SDF, HE9ASD, HE9EEX. **HB9BOU** & HB9ACA, HB9ADD, HB9BQP, HB9CHR, HB9CJG. **HB9CXZ** & HB9AGC, HB9ALM, HB9AIB, I2KMG. **HB9GT:** HB9BTI, HB9CMX, HB9COH, HB9DIC. **HC8DX:** HC1BI, HC1EA, HC1HC, HC1OT. **HG1S:** Gyula, Laszlo, Tibor, Zoltan, Pal, Kanoly. **HG5A:** HA5WE, HA5GF, HA5UA, HA5LN, HA7SU, HA7RY, HA5MK, HA5OM, HA8RG, HA5FM, HA5ML. **HG6N:** HA6ND, HA6NY, HA6ON, HA6NQ, HA6OQ, HA6NF, HA6NN, Toth, Geza. **HG7B:** HA5WA, HA5PP, HA7UO, HA7UG, HA8IE, ex-2E0D, HA7UL, HA0DU, HA5ND, HA5DW. **HG9R:** HA9RX, HA9PP, HA9OA, HA9RU, HA9RP, HA9SU. **HK3MAE** & HK3IXJ, HK3KME. **HL9OS:** HL9BR, HL9DM, HL9HH, HL9OB, HL9YG, C. Amos, Womack. **HP8BPM** & HP8BSZ. **HS0A:** DF2RG, DK8UJ, HS1ANT, HS1AOK, HS1AOO, HS1DS, K2BA, K3TW, N9TG, W4PJG, WL7AME, WB9SCO. **I1MQP** & I2VXJ, IK2BHX, IK2EGL. **I2UIY** & IK2DUU. **I5NPH** & I5MPN, I5SDG, IK5BAF, I8MPO. **IK2ASH** & I2OKW, IK2CFR. **IK6CGO:** IK6ATS, IK6COX, IK6FWJ. **IT9CHU** & IT9NJE, IT9OSF, IT9EQO, IT9ZXX. **J49A:** SV1IW, SV1JG.

JA1YAO: JH5GHM, JH5MXM, JH9AMJ, JN1AWY, JP1DMX, JS1IAQ. **JA1YFG:** JI3BKF, JN1IZK, JO1RUR, JP1OGL. **JA1YYE:** JH5NXK, JL1IVG, JJ1SLW, JO1QGK, JR0BAD. **JA2YDC:** JE2EZO, JF2AIB, JF2TZG, JG2XYV, JI2KAN, JI2RIQ, JK2ALA. **JA2YEF:** JI2QVF, JJ2LYF, JJ2VFE, T. Yamamoto, K. Asada, K. Hirai. **JA3YDS:** JE4MHL, JG3QBJ, JI3GAB, JI3XZA, Kami, Usui. **JA3YQP:** JA3PIA, JA5XPD, JE3KAM, JI3QPN, JJ3EFM, JL3UIX, JL3WLS, JR3BOT. **JA4YPE:** JF4MUY, JI3VQH, Kodama. **JA6YAI:** JA6PPI, JA6MQW, JF6AEC, JF6DEA, JF6EOZ, JF6CIC, JF6KIV, JF6PPQ, JG6CVO, JG6FEJ, JG6OZC, JH5GLL, J. Nilla, T. Higasi, Y. Moriyama, T. Nagasaki. **JA8YBY:** JE8BRO, JE8MXB, JH8GFB, JH8KJW, JH8PNE, JO1DFG. **JA8YCX:** JE8KEU, JH8LND. **JE2YRD:** JA2EZD, JH1DHI, JI2KVW, JK1JQQ, JL1KYF, JL1MWI, JM1APN, JM1HJG, JQ1ITD, JR2SQU. **JH6ZHH:** JA6CSY, JA6GDP, JA6HKV, JA6NAA, JE6JLP, JE6JRY, JF6HLQ, JF6JAC, JF6JAE, JF6OJS, JG6FQR, JH6NTL, JI6CQT, JI6KOV. **JH7YJF:** JA7DWU, JA7RHJ, JF7IQA, JH7LRS, JH7VEP, JH7XWT, JR7QKR, JR7XYW. **JR1ZTI:** JA1CAJ, JA1QXY, JA6KBK, JA7MOL, JA9JBZ, JE1TSD. **JR7YCM:** JE7WQR, JH7NPF, JR7WEC.

K1AR & KC1F. **K1RQ** & KB1KE, KB1W, WA1ZAM, WB1EYL. **K1TO** & K1XA. **K1YR** & K1RU. **KG1D** & KA1JNR, KA1VC. **KM1C** & WB8BTH. **KQ1F** & K1XM. **KD2EU** & K1SA, KB1U, KY1K, NG1W, W1OO. **KQ2O** & K2BK. **KU2C** & K2NJ, KB2HZ, KY2O, NB2P, NR2H. **K3TUP** & K3LR, KJ3L, N3BJ, AI8S, KB8IZ. **K3WW** & KQ3F. **K4VX** & AH2U, AC9C, K9BGL, KM9P, NS0Z, WB0IUN. **KJ4KS** & KF4PN, N4MJY. **KP4BZ** & K1RX, NP4CC, NP4Z, WP4K. **KX4S** & KG4W, KB4DI, N4DCY, N4HB, N4MXT, NK4J, W4XR, W4MYA, WB4BVY, WK4Y, WU4G. **K5RVK** & N5EA, W5ASP, WD5L, WA9VLI. **KC5DX** & NN5E, NT5V. **K6XO** & N6AUV. **KA6V** & AA6BB, WA7GCR. **KE6WL** & AC0P, KD6NT, WA6HAN. **KG6AO** & KI6CK. **K7ABV** & K7LGV. **K7LXC** & K7HBN, K7WA, KT7G, W7NG. **KC7MM** & KE7PN, KE8DN. **KC7V** & K7JVR, K7SP, KE7TY, KY7M, N7BG, N7GBM, N7GBN, N7US, NG7K. **KL7HFA** & NL7FU, NL7GE, NL7GP, NL7P, WL7AVK. **KE8FX** & K8AQM, KA8JJF, KA8POW, NI8L. **KD9ST** & KA9SQR, KA9SQJ, KA9SQT. **KQ9L** & K9RX, N9FLH. **KS9K** & N9TZ, K9CJK, K9GS, KS9J, N9AW, N9FLZ, NO9F, WB9OJE. **KB0KK** & KA0DQI, WD0FPY. **KF0H** & K20C. **KR0B** & AF9T, KA0JZV, KD0KF, N0BKL, N0BKY, N0GFA.

LA1K: LA1BEA, LA3JAA, LA7VV, LA5YFA, LA5EFA, LA2RY. **LA2AB:** LA4DCA, LA8SDA, LA9SEA. **LU1HPW:** LU1HDA, LU2HHO, LU2HJA, LU2HNP. **LU1VZ:** LU1VJR, LU1UK, LU1VPK, LU9VAB, W3DXL, W7VCA. **LU2FDR:** LU1FKR, LU1FT, LU2FDR, LU5FHM, LU9FDG. **LU7DEE** & LU1DJU, LU1NCO, LU3EZA, LU7ENP, LU8EWD. **LZ1KEZ:** Iwan, Encho, Planen. **LZ1KGB:** Club. **LZ1KNP:** Ilia, Dimitar. **LZ1KSN:** Iliev, Matev, Ganersky. **LZ1KVZ:** Nick, Victor, LZ1ZF. **LZ7A:** LZ2PO, LZ2HE, LZ2DF, LZ2CC. **NB1H** & K1FWE, WA1WMB. **N2ME** & KB2XZ, WA2HGU. **N3BB** & WN4KKN. **N3EC** & KA3NED. **N3RS** & N3AD, N3RD. **N4SF/VP9** & AA4V. **N4ZC** & KS2D, AA4S, HB9DCQ, K4MQG, KF4HK, N9CC, WA4UNZ, WD4BTF. **N4KZ** & AA4NG, WB8HDD. **N4RJ** & KX4R, N4NX, N4PN, W8ZF. **N4WW** & K0LUZ, KA4VXT, NX4N, WA4SVO. **N6ND** & NI6W, N6YA, N7CW. **N6ADI** & AC6T, N6HK, N6VR, NS6X, WB6TNB, AI7J. **N6CCL** & N6IYI. **N6MB** & W2KVA. **NB6L** & AK6T, K4UVT, K6ZM, KJ6EZ. **N7RO** & KC7GX, W7EKM, WA7ZWG, WB7CLU. **NF7T** & WG5N. **N8CXX** & K8JM, KA8MVV, KD8LM, N8BTU, NE8T. **NB9C** & K9BIL, N9ADN, N9CPW, N9EJL, N9FVV, NF9S, WB9NOV. **NO9H** & K9JS, KA9ULH, KE9T, N9FGO, N9FSJ, WB9YBI. **N0DPS** & KA0POK, WB0YJT. **N0GA** & WA0QMU. **ND0E** & K9MWM, KI0G, KV0K, N0ZV, W0KEA, W0CSA, W0RSG, WB0ITG.

OE5VBL & OE3GEA. **OH6AT:** OH6LF, OH6NGE, OH6QG, OH6YF. **OH7AI:** OH7BY, OH7EU, OH7HK, OH7HM, OH7KR, OH7SQ. **OH9AR:** OH9KK, Club. **OK1ORA:** OK1DHP, OK1AYD, OK1-21662. **OK2KJU:** OK2BCV, OK2-32248. **OK2KNC:** Club. **OK2KNP:** OK2BSA, OK2BRB, OK2BEF. **OK2KPS:** Club. **OK2RAB:** OK2PDK, OK2HBY, OK2PEM. **OK3KAG:** OK3CDX, OK3ZFM, OK3CIR. **OK3KII:** OK3CEI, OK3WM, OK3CDV, OK3CTM, OK3CQW, OK3CSW, OK3CZA, OL9CPG, OK3CWZ. **OK3KLM:** Club. **ON6MH:** ON5AV, ON5IQ, ON4GO, ON7ZV, ON6AH. **OZ1KWC** & OZ1BQA. **PA0KHS** & PA0ERA, PA3ADJ, PA3DQW, PE1LBX. **RZ6AWP:** Club. **SK6AW:** SM6CVE, SM6DED, SM6EHY, SM6HCX, SM6AWA. **SK6RR:** SM6CVT, SM6LRR. **SM5AZU** & SM0ATN, SM5BGM. **SP1PBW:** Club. **SP2KFV:** Club. **SP5PBE:** SP5ANJ, SP5ELA, SP5FKW, SP5GIQ, SP5JTF, SP5LCT. **SP5PKN:** Club. **SP5ZIM:** SP5GKN, SP5IUK, SP5GRU. **SP6PBQ:** SP6ECF, SP6AYP, SP6RLA. **SP9KOU:** SP90JB, Danek. **SP9PDF:** Club. **SP9PDJ/9:** Club.

UB3QZZ: RB5QCT, RB5QCV, UB5-064-1683. **UB4CWW:** RB5CB, RB5CW, UB5CCN, UB5-080-070. **UB4MWA:** UB5MDA, UB5MDD, UB5MMR. **UB4MYP:** RB5MOO, RB5MUQ, UB5MAQ, UB5MRB, UB5MRZ. **UB4MZU:** RB5MST, UB4ME, UB5MPD. **UB4SWM:** Club. **UB4WZA:** UB5WCX, UB5-068-453. **UC1AWU:** Club. **UC1AWZ:** UC2-188-40, UC2-188-42, UC2-188-123. **UC1WWY:** Club. **UL8CWW:** Victor, Victor. **UL8FWT:** UL7FCI, UL7-027-507, UL7-027-535. **UP1BYK:** UP2BJV, UP2BOT, UP2-038-1350, UP2-038-1360, UP2-038-1361. **UQ1GWE:** Club. **UQ1GWT:** UQ2GFB, UQ2GQQ, UQ2-037-379. **UQ1GWW:** UQ2GAG, UQ2GLK, UQ2OC, UQ2OI, UQ2-037-83, UQ2-037-116, UQ2-037-221. **UQ1GXY:** UQ2LL, UQ2-037-374. **UR1RXL:** UR2ED, UR2RLK, UR2-083-1046. **UR1RYY:** UR2RE, UR2RMR, UR2-083-914. **UT4UWE:** UT5UCU, Serge. **UT4UXW:** UB5XCM, UY5JW. **UZ1NWO:** Club. **UZ10WZ:** Club. **UZ3AXH:** Alex, Slava. **UZ3DXF:** RA3DJA, RA3DLA, UA3-142-242.

UZ3DXW: UA3DDB, UA3DFO, UA3-142-1751, UA3-142-1918, UA3-142-1924. **UZ3QWX:** UA1TCO, UA3QSC, UW0LEL, UA3-121-59. **UZ3WWW:** Club. **UZ4AWB:** Club. **UZ4LWA:** UA4LFC, UA4LFN, UL7-031-15/UA3. **UZ4NWM:** Serge, Andrey, Andrey. **UZ4YWW:** UA4YBN, UA4YDZ, UA4-097-33, UA4-097-403. **UZ6HXK:** UA6-108-1665, UA6-108-1740, UA6-108-1838. **UZ6YWB:** UA6YAJ, UA6YHR, UA6YY. **UZ9CWQ:** Vlad, Rom. **UZ9CWX:** Vladimir, Valery. **UZ9XWH:** UA9XBV, UA9XFY, UA9-090-964, UA9-090-966, UA9-090-967. **UZ9XWM:** Club. **UZ8JWA:** RA0JJ, UA0JAB, UA0JB. **VE1CIT** & VE1BIG, VE1BII, VE1GB, VE1UA. **VE3BVD** & VE3OZB. **VE3HUM:** VE3OOZ, VE3PKN. **VE4ALO** & VE4VV. **VE4UM:** VE4AMC, VE4GV. **VE5GF** & VE5AEO, VE5ELJ, VE5FX, VE5GHC, VE5RC. **VE6CIZ** & VE6CSE. **VP2EC:** K5RX, KC5EA, N5AU, N5HGB.

W1BK & K1TXH, WA1UAR. **W1YK** & AA2S, KM1P, WA1NUS. **W2RR** & KA2VYW, KA2WIK, W2KKZ, WA2AOG, WA2MBM, WB2CJL. **W2UI** & N3KR. **W2VJW** & K2BMI, N2BA. **WB2LVC** & WB2LVE, KC2ZA. **WB2ULI** & N2BOW. **WA3EUL** & WB3EKV. **WA3SPJ** & KS3F. **W4XJ** & AA4VG, K4RJG, KB4FHE, W4UWC, WA4IUM, WA4ZBC. **WA4QQV** & N4AOC, WA4QMQ, WD4MDY. **WB4PRX** & WA4CTA. **WI4R** & KB4KZY, KB4IUB. **W5JDV** & K5AJ, K5EUX, K5JNZ, KA5IPF, KA5PMA, KA5ROJ, KA5TBK, KA5TIL, KD5QN, N5BKM, N5FZR, N5IWA, WB5E, WD5EEH, WD5HDU. **W5WMU** & K5GA, K5LZO, KZ5D, W5XZ, N6TR. **WC5Y** & KD5IA, W4YID, KA5RSR, N5ADS, N5IMO, N5IZY, NU5P, W5VGX, WB5UDX, WD5JDA, K0MSK. **W6JTI** & KB6IFS, WD6AOJ. **W6KCB** & N6LYX, NU6L. **W6TMD** & AB6R, KB6UF, NC6U, NN6U, NW6S. **WC6H** & AA6Z, WC6I, KG6GF, KN6K, W6REC. **W6BIP** & WA6AUE. **WV6N** & W6UQF. **W7ZR** & N7AKQ, N7BSB, W7GJS, Vlad. **WL7K** & KL7R, KL7TG, N6IV. **W8CZN** & N8DCJ, W8JGU, WA8DXG, WA8RCN, WD8BIL. **W8QQQ** & KA0DYE, N0GUQ. **W8XK** & K0MAT. **WB8HCH** & KD8OZ. **WB8NAA/YN1** & K3ZO.

Y22TF & Y34SF. **Y22YD** & Y24YH. **Y34K:** Y23EK, Y24UK, Y21YK. **Y49ZF:** Y49MF, Y49PF, Y49RF, Y2-11249/F49. **Y54ZL:** Y43EO, Y54TO, Y54NL, Y54QL. **YE0K:** Dil, Dodi, Dudi, Endi, Fadjar, Mar, Ron, Rudy, Sib, Yoni. **YO6K8M:** Maris, Val, Yosddf, Gasnas, Val, YO6AHP. **YT2R:** YU2MM, YU2OH, YU2DQ, YU2MY, YT2AA, YU2JL, YU2AN, YU2HO, YU2OG. **YU3AI** & YU3BM, YU3EO, YU3MM. **YU4BAB:** Mario, Zdravko, Semir, Muki, Jana, Stipo. **3G1B:** CE1ADQ, CE1BEQ, VE2AQS/W6. **4C2C:** XE2ABA, XE2GDD, XE2JFR, XE2PPT, XE2PQ. **4N2M:** YU2WM, YU2RO, Eco, Tonci. **4U1ITU:** F6BLK, F6HRN, F6HLH, F6EXV. **4U1VIC:** K7AWD, NK4N, HS1ANV, DK6NP, DF4RD.

Station Operators
Multi-Operator, Multi-Transmitter

4N1C: YU1CF, YU1EQ, YU1EW, YU1SA, YU1DW, YU1KX, YU1OYW, YU1MAT, YU1ZZ, YU3IW, YU6AD. **AD8P** & K3JT, KS8S, KU8E, N9AG, NZ4K, W9FN, WD8IXE. **CQ9MI:** CT3BD, CT3BM, CT3CR, CT3DL, CT3DZ. **DF3QG** & DF1FC, DK1HV, DK8QA, DL2NB. **GB6AA:** G3GAF, G4PWA, G4TNB. **HB9AON:** DF1JC, DJ2YE, DK5EZ, DK8EY, DL3EBX, DL8EAQ. **HI6GRCD:** HI3AMF, HI3ARQ. **JA1YAC:** JH0SPE, JH0WGN, JO1MBO, JP1NWZ, JQ1CDB, JQ1DPP, JQ1XDO, JR0IRZ. **JA1YWX:** JF2IWL, JH5DXO, JH7PKU, JI1QQI, JI2GUT, JI2UWO, JJ1HJR, JJ2DIM, JM1CAX, JM1MCF, JN3PYQ, JO1BMV, JR4NIV. **JA1YXP:** JH0RRR, JH9CAU, JI2DLF, JN1OTG, JN1SBT, JO1BKL, JO1JOZ, JR0ALC, JR0GUM, JR4HCV. **JA2YEC:** JG2RNB, JI2XDP, JK2IDE, JR2RJI. **JA2YKA:** JE2JCV, JE2SRB, JE2VYM, JF2DQJ, JF2UTL, JG2AGD, JG2BVO, JG2MTC, JG2VTD, JI2JXR, JI2UHH, JI2WYI, JJ2FAU, JJ2NJF, JK2AYR, JK2CZL, JG3OPE, JR7OMD, JA9SSY, JA9XXS. **JA3YBF:** JA9UXW, JE6BXJ, JR4AGT, JJ2ICA, JO1IPS, JF4BME, JH9JFH, JR4IZK, JJ3KGS, JE3MCC, JF3PGA, JN3HDH, JH5BIT, JI3KWZ, JR8DHE, Shimobayasi, Hara, Sakon, Matsuda. **JA3YCT:** JJ3WAM, JJ3WYT, JK3FXN, JK3JTJ, JL3CLB. **JA3YKC:** JG3CPF, JG3HJG, JG3HLV, JG3MRT, JG6VTM, JH4RHF, JI3ERV, JJ3SRU, JK3GRR, JK3HYA, JL3TLC, JR4IMK, JR4PMX, JR5AHO, JR5WLA, JR6WHN. **JA4ZQA:** JA3ERG, JA4CUU, JA4CVJ, JA4FXL, JA4KLO.

JA7YFJ: JE7HMC, JE7JWU, JE7RCC, JE7WQH, JE7XTQ, JF7BJB, JF7SWJ, JG2XUR, JO1HBF, JR7EFI, JR7MPT. **JA7YRR:** JA7FDY, JA7JUD, JA7LBY, JA7MQM, JA7MQQ, JA7OZW, JA7RQE, JA7WSC, JH7MEX, JH7VHZ. **JA9YBA:** JA9LNJ, JA9NFO, JA9PPC, JA9UBX, JA9VBW, JA9VDA, JH9GAT, JH9KIF, JH9VSF, JH0CAZ, JH7UJR, JJ3URK, JA9-10148. **JH1YTX:** JE1BST, JM1JHQ, JS1WZZ. **JH8YCT:** JE8BFO, JE8RJK, JH8WAH, JR8GPT, JR8WLI. **JR1ZTT:** JP1MWR, JP1NIR, JI3RKJ, JR4WKV. **JY7Z:** JY3ZH, JY4MB, JY4YJ, N6AA, N6TJ, N6VI, N6ZZ, W6MKB, W6NV. **K1NG** & K1IG, WA1TFF. **K3II** & KY3N, NA3K. **K3ZZ** & KC3EK, N3AOE, N3EKQ, WA3EKL. **KH6XX** & 4X4AI, N5CT, KH6BZF, KH6ND, KH6LW. **LA7Q:** LA1AFA, LA1EE, LA1UI, LA2AD, LA2BH, LA2BFA, LA2TO, LA3WAA, LA5YJ, LA6OT, LA7JO, LA9IY, LA9GV. **LX/DF6QC:** DF1BZ, DF5BM, DF6QC. **N1AU** & KA1NWE, NC1M, W1FJ. **N2AA** & K2GL, K2GM, K2NG, K2SS, K2TT, K2TW, K5NA, KC2X, KR2J, KR2Q, KU2M, KY2P, W2RQ, WA2BFW, WB2MAE, NT2X. **N5AU:** JL1BLW, K4VUD, K5MR, KM5X, KN6M, KR0Y, KY5N, N5CR, N5RZ, N5TR, WA0TKJ, WB5VZL. **N6RO:** N6BV, N6KT, NU6S, K6TMB, NV6Z, WA6VEF, W6XX. **NF2L** & AG2S, K3JLT, WB2YOF. **NR5M** & HK4FER, K2TNO, K5GN, KD5SP, KE5IV, KG5U, KN5H, N5DU, NM5M, NT5D, NZ5I.

ON6NL & ON1ANK, ON1BCS, ON4AEK, ON6EB, ON6JZ, ON6MP, ONL620, ONL4867, PA0MPM, PA2NJC. **OZ4HAM:** OZ1BJF, OZ1FYW, OZ1DGP, OZ2JZ, OZ8IE. **P36P:** 4X6TT, 5B4LP, 5B4MF. **PI4DEC:** PA0LEG, PA0TUK, PA3AWW, PA3CJF, PA3CZW, PA3DJL, PA3EFZ. **PJ1B:** K3EST, N3ED, N4RV, N7ZZ, PJ9EE, WA3LRO. **SK2QG:** SM3RLO, SM20DB. **TI2OY** & TI2OZ. **UB3IWA:** UB5IFZ, RB5ID, UB5IOK, UB5IML, RB5II, RB5IM. **UP9A:** UP2BAW, UP2BCO, UP2BCT, UP2BCV, UP2BCW, UP2BIG, UP2BIL, UP2BOC, UP2BN, UP2PAJ. **VE7ZZZ:** VE6EZ, VE6UX, VE7AV, VE7DLM, VE7DSM, VE7ENS, VE7EOC, VE7EPN, VE7FZ, VE7IG, VE7RK, VE7SK. **VP2MU:** KD2SX, K8GG, K8GL, W7MAP, WD8RIN, VP2MAI, VP2MIX. **VP2MW:** K3OO, K3NZ, K3ZUF, NB3L. **W3GM** & KA3FXX, K3CY, K3GM, K3IPK, K3LZ, K3ND, K3OA, W3GU, WA3IJZ. **W3LPL** & AI3M, F6IIR, K1DQV, K3DI, K3RT, KC8C, KX3Q, N3GB, N8II, W3EKT, WA3VUQ, WB3JRU, WD4AXM, WP4J. **W6XJ:** K6JYO, K6SVL, WB0QPO, WB6OKK, WK6V. **YB0ZDC:** YC0EHN, YC0HRO, YD0IUO, YD0MFP, YD0TBG.

WORLD TOP 10 QRPp
(5w input)
All Band

1. WP4G	678,056	6. EA3FUM	116,640
2. VE1CBF	550,316	7. YO2AQB	113,826
3. K3WS	291,846	8. AH6EK	88,683
4. 4X6IF	263,313	9. KZ5Q	71,604
5. N1AFC	235,125	10. W6YVK	65,312

Number groups after call letters denote following: Band (A = all), Final Score, Number of QSO's, Zones, and Countries. Certificate winners are listed in Bold Face.

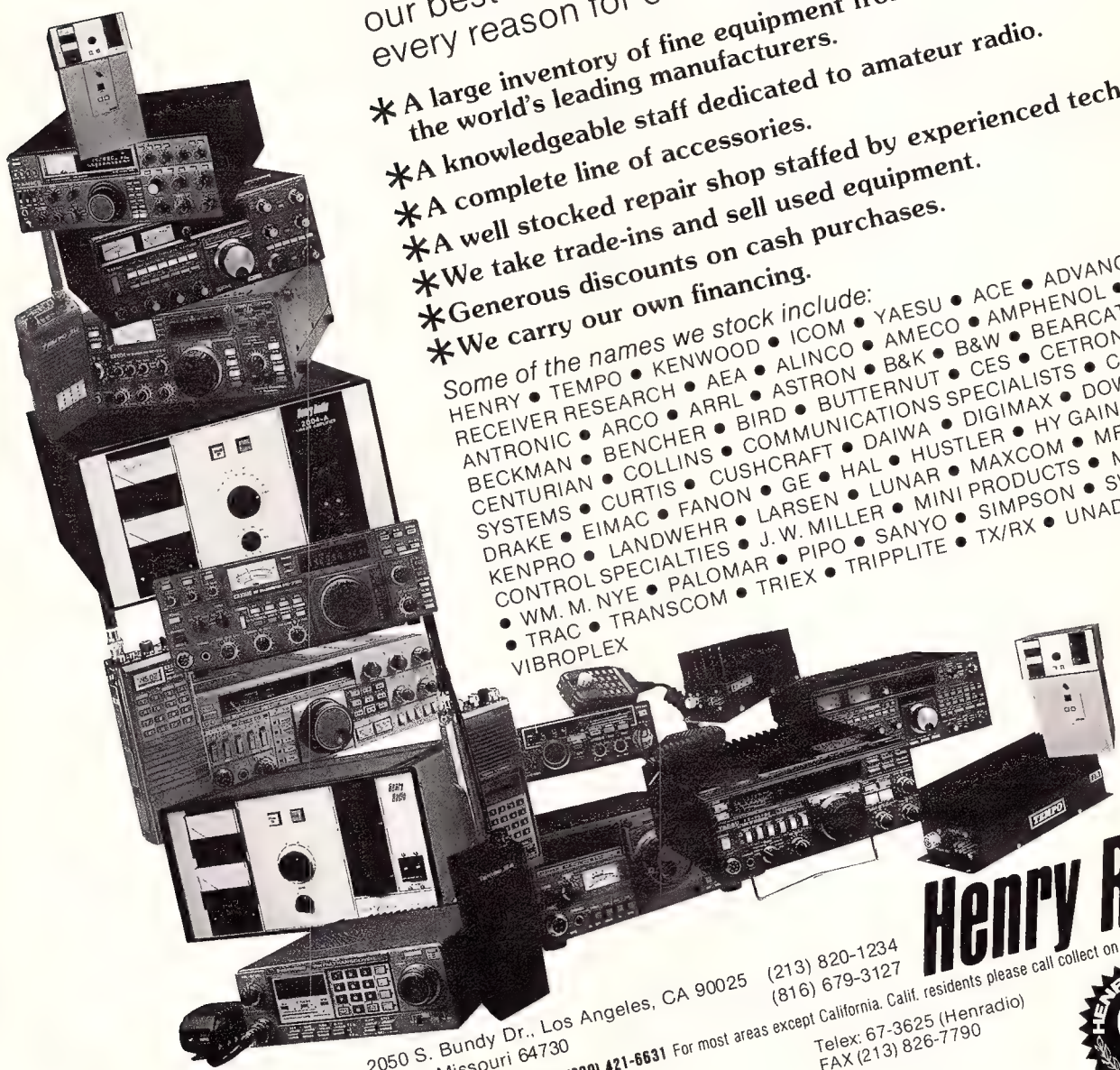
PHONE RESULTS
SINGLE OPERATOR
NORTH AMERICA
UNITED STATES

K1ZM	**A**	**2,747,824**	**1834**	**136**	**390**
K5ZD/1	"	**2,738,148**	**1836**	**129**	**389**
K1DG	"	**2,546,527**	**1744**	**133**	**376**
K1CC	"	2,529,578	1754	132	372
K1EA	"	2,331,924	1715	123	353
AK1A	"	2,136,792	1573	120	354
K1VR	"	1,650,660	1282	115	336
K1IU	"	1,091,872	846	114	344
KY1H	"	1,049,784	1033	104	268
W1WEF	"	909,536	935	99	245
W1GG	"	610,390	710	85	225
K8HVT/1	"	597,600	728	80	220
W1BIH	"	523,962	622	88	225
ND1X	"	429,867	638	75	168
KA1DWX	"	286,599	420	72	177
KA1CI	"	128,454	300	52	158
AI3E/1	"	115,200	225	53	127
KZ1D	"	80,422	198	50	108
KE1E	"	51,858	143	46	88
KD2EN/1	"	44,016	178	34	78
W1DO	"	40,612	100	43	100
KB1WR	"	24,534	98	34	60
W1FV	"	13,680	85	17	43
KB1XD	"	13,419	78	19	44
K2MN/1	"	9,792	58	25	39
K1SA	"	2,970	37	8	19
K1UO	**28**	**75,936**	**290**	**22**	**74**
KQ1V	"	18,126	120	18	39
W1ZM	**21**	**428,904**	**999**	**32**	**116**
					(Opr. K8EJ)
W1QK	"	190,820	590	26	90
K1EFI	"	155,820	401	31	109
KA1GQW	"	109,996	361	24	83
K1VSJ	"	14,421	82	21	48
NB1B	"	10,500	75	18	42
AA2Z/1	"	3,750	51	5	20
K1KJT	**14**	**169,680**	**571**	**26**	**75**
W1LQQ	"	37,224	141	29	65
KA1ONQ	"	14,384	89	16	42
KR1G	**3.7**	**52,548**	**270**	**18**	**69**
K1MEM	"	**45,125**	**177**	**19**	**76**
AB1A	**1.8**	**8,320**	**65**	**15**	**37**
N1ACH	"	**5,200**	**52**	**13**	**27**
K2TR	**A**	**3,109,503**	**2195**	**125**	**366**
N2LT	"	**2,283,630**	**1698**	**122**	**345**
N2RM	"	**2,105,780**	**1760**	**109**	**313**
N2MM	"	2,073,220	1558	115	345
W2GD	"	963,700	848	112	307
K2VV	"	906,362	1277	67	176
KY2J	"	814,908	839	99	255
W1GD/2	"	778,224	762	98	274
K2FL	"	482,562	570	86	220
KS9Z/2	"	464,202	501	94	239
K2LS	"	429,520	529	77	203
K2JLA	"	397,854	517	74	205
NA2G	"	367,745	515	65	180
KB2WN	"	256,278	374	74	168
N2VW	"	207,137	334	72	161
W2NS	"	192,146	352	51	140
KD2TT	"	168,912	317	54	130
ND2P	"	141,504	287	51	125
NA2Q	"	139,986	265	61	141
W2PHW	"	139,008	281	58	123
W2KHQ	"	100,532	226	50	114
N2AIF	"	98,735	228	46	109
KK2B	"	79,285	190	57	100
W2DW	"	58,520	169	40	93
N2MR	"	45,234	137	53	73
W2PHT	"	42,660	137	30	78
KA2OOG	"	41,409	119	48	81
W2SDO	"	39,128	111	49	85
W2JGR	"	39,058	122	39	79
W2FUI	"	36,119	119	38	67
KT2D	"	29,526	111	39	72
N2GDW	"	21,850	97	35	60
KS2M	"	16,926	80	32	46
KV2Y	"	12,390	62	24	46
W2GKZ	"	5,814	44	36	51
N2KA	"	3,560	32	16	24
K2OLG	**28**	**21,886**	**130**	**18**	**44**
W2KZE	"	5,310	52	16	29
KE2N	"	4,089	54	10	19
WA2QNW	**21**	**334,560**	**827**	**29**	**107**
KC2KU	"	147,436	452	28	96
K2MFY	"	94,864	301	25	87
W2IQL	"	24,563	115	19	58
W2TE	"	24,153	97	33	64
K2KTT	"	15,544	90	17	50
K2EK	**14**	**781,052**	**1547**	**38**	**134**
K2HFX	"	524,560	1077	40	126
K2WK	"	374,327	905	35	104
K2QF	"	182,372	497	31	96
K2IBW	"	166,223	508	32	81
KB2NU	"	118,701	339	32	89
KA2CHX	"	96,432	297	21	91
N2DTL	"	57,205	233	25	60
N2DTW	"	51,379	210	21	66
N2GOI	"	21,666	107	19	50
KA2YMZ	"	5,060	56	15	29
NJ2L	"	4,290	42	14	25
AC2P	"	4,180	40	8	27
W2HZ	**7**	**17,404**	**84**	**19**	**57**
NO2I	**3.7**	**37,022**	**218**	**17**	**59**
W2FCR	**1.8**	**7,425**	**71**	**13**	**32**
NA2M	"	3,080	62	11	17
KT3M	**A**	**2,884,466**	**2043**	**124**	**370**
W3BGN	"	**2,844,072**	**1923**	**129**	**384**
N2FB/3	"	**2,496,620**	**1810**	**124**	**352**
KM3T	"	1,880,529	1540	116	331
K3NA	"	1,754,740	1458	116	326
W3XU	"	1,729,890	1561	97	290
W3MR	"	638,483	736	87	224
W3UM	"	547,200	730	76	209
WB3CIW	"	348,740	479	77	188
N3RW	"	311,150	443	75	179
AD3Z	"	296,907	330	87	244
N3HW	"	293,898	488	64	155
W3ARK	"	237,200	433	50	150
W3DHM	"	235,440	382	63	155
K3FNW	"	222,222	352	71	160
K3WJV	"	219,163	338	71	168
W3OV	"	204,345	325	76	163
W3EVW	"	203,634	311	78	165
K4JLD/3	"	192,720	338	75	144
W3KV	"	182,483	340	61	138
KD8WX/3	"	114,400	245	58	118
K3IPK	"	85,540	237	38	92
W3YFV	"	78,732	187	50	112
WA3YOB	"	53,708	160	30	84
W3HVM	"	46,625	141	42	83
W3EAN	"	29,596	117	27	71
AD8J/3	"	20,574	90	33	48
N3RC	"	9,782	55	25	42
WA3VPL	"	3,266	30	26	20
KC3ZG	"	3,120	33	19	21
WA3JYA	"	1,914	26	14	19
KN3T	"	28	7	7	7
W3KHQ	**28**	**44,184**	**197**	**22**	**62**
WA3CGE	"	23,760	134	18	48
N3BNA	"	23,115	148	21	48
N3CZB	"	360	13	8	7
K3VW	**21**	**290,178**	**684**	**30**	**117**
N3II	"	190,704	512	30	107
K3NS	"	7,980	54	18	39
W3FGS	**14**	**46,563**	**201**	**22**	**61**
K3ZPG	"	20,090	103	16	54
KA3PZH	"	12,712	79	14	41
N3ARK	"	2,480	30	13	18
N5EYT/3	"	1,600	35	7	13
KQ3V	**3.7**	**21,696**	**153**	**14**	**50**
WX4G	**A**	**2,376,192**	**1647**	**132**	**380**
K4ISV	"	**2,318,853**	**1686**	**140**	**359**
N6AR/4	"	**1,665,830**	**1257**	**127**	**351**
WZ4F	"	1,431,808	1204	125	323
KE9A/4	"	1,334,838	1234	101	278
K4LTA	"	790,656	766	106	278
W3HHG/4	"	759,470	787	97	249
W3VT/4	"	698,629	678	102	271
WB4MAI	"	526,820	517	110	261
WA4VDE	"	468,272	583	90	206
K4BAI	"	431,186	575	71	195
W3YY/4	"	417,196	544	84	200
KU4V	"	411,433	461	96	235
K3KG/4	"	404,320	553	77	189
WI4K	"	360,912	492	99	210
N4TG	"	340,856	467	83	191
AA4LE	"	335,160	380	87	193
AA4VB	"	326,692	416	84	184
WD4KXB	"	290,705	402	81	184
N4BS	"	288,320	403	79	186
K4EZ	"	276,354	438	61	173
N4AXT	"	266,409	324	98	201
W4WKQ	"	260,960	430	76	157
N4UH	"	235,488	371	80	184
KN5X/4	"	228,480	388	72	168
W1UA/4	"	208,445	334	75	160
AB4H	"	207,090	325	72	162
K4PR	"	201,592	365	71	155
KD4RH	"	187,066	308	75	167
KA4C	"	177,662	305	59	152
W4UNP	"	158,974	299	59	143
W4UYC	"	141,120	304	45	123
KC4BX	"	138,866	288	52	130
WA4IUM	"	118,340	246	65	129
AA4MN	"	114,165	255	71	144
W8ZF/4	"	113,620	211	74	116
KZ2E/4	"	106,352	215	56	128
W60KX/4	"	104,030	206	67	135
K4GKV	"	100,724	222	51	118
K4DLI	"	91,665	216	70	119
WK4F	"	87,532	201	47	111
W4BTZ	"	86,688	209	51	117
W4WMQ	"	80,400	218	43	91
KE4VU	"	79,344	154	61	113
KF4CI	"	71,029	200	41	98
W4WXZ	"	70,200	212	36	84
N4ONI	"	64,224	180	50	94
AA4MJ	"	56,712	151	44	92
KB4I	"	53,376	157	42	86
K4OD	"	50,112	152	37	79
N4BSN	"	48,514	138	47	80
KB4RME	"	46,920	154	32	83
KJ4TE	"	45,279	149	38	79
N4BYO	"	44,577	149	42	75
WB4OSN	"	43,665	131	43	80
W4KMS	"	43,648	144	54	74
W4BFR	"	36,166	123	34	73
NN4K	"	31,979	115	43	70
WA4VCC	"	29,744	119	28	76
K4YFH	"	29,430	127	29	61
K4FPF	"	24,273	98	27	60
KO4J	"	22,936	94	29	65
KB4EUZ	"	22,413	90	32	61
KJ4TI	"	19,885	85	37	60
K4XO	"	19,244	100	22	46
W5DZF/4	"	18,450	75	34	56
W9LT/4	"	17,679	97	21	50
KJ4WH	"	15,980	79	33	52
W4UW	"	14,507	67	35	54
N4KVF	"	13,629	139	21	38
WG4P	"	10,248	64	23	38
K4RD	"	6,678	44	17	36
K4HGG	"	3,330	28	15	30
N4EUK	"	2,450	31	16	19
K4JRB	**28**	**179,530**	**522**	**30**	**100**
WC4E	"	99,081	350	25	76
N4MM	"	47,040	204	21	63
K4MF	"	34,496	161	24	53
KB4RDH	"	4,446	57	12	26
K3RV/4	**21**	**925,031**	**1821**	**35**	**138**
W4NL	"	415,740	945	33	123
N4VZ	"	354,732	749	31	133
N6BFM/4	"	324,819	747	34	119
K4UTE	"	274,240	624	36	124
KC4HN	"	92,196	285	25	92
N4ZG	"	47,000	183	24	70
W4WJJ	"	38,528	165	23	63
KC4GR	"	26,133	107	24	69
WD4FIP	"	18,815	97	22	49
KK8X/4	"	18,009	98	18	51
K4DGJ	"	7,268	57	16	30
K3ZJ/4	**14**	**539,770**	**1197**	**38**	**118**
N4MO	"	344,862	801	35	118
KV4P	"	298,851	909	31	102
KI4SV	"	72,318	273	25	77
N4DKW	"	16,038	81	19	47
W4JAT	"	8,946	73	9	33
HK3EZB /W4	"	5,538	152	10	29
K4MZW	**7**	**19,776**	**113**	**20**	**44**
W4PZV	**3.7**	**14,625**	**96**	**15**	**50**
W4DR	**1.8**	**11,648**	**89**	**15**	**41**
AA4MM	"	3,852	49	10	26
K4TEA	"	1,890	32	9	18
KA2CDJ/4	"	1,232	29	7	15
WS4Q/5	**A**	**1,573,830**	**1360**	**119**	**316**
KA5W	"	**1,227,919**	**1079**	**112**	**295**
WB5BIR	"	731,082	760	107	256
NI5M	"	626,606	660	98	248
K5FUV	"	433,849	533	84	215
W5AC	"	369,032	475	88	195
WM5K	"	302,877	495	62	157
KJ5W	"	272,814	426	77	169
N5JB	"	246,862	392	72	157
N5EPA	"	219,480	341	84	152
W5LMG	"	219,462	344	79	158
N5AW	"	209,911	332	73	168
N5RM	"	169,533	301	71	136
W5AE	"	165,945	301	53	142
W5KCR	"	126,198	263	50	121
KS5M	"	122,816	229	65	137
N5ACP	"	107,500	228	59	113
WA5IYX	"	86,460	309	39	71
W5OB	"	80,784	194	49	104
W5GVP	"	43,923	140	43	78
KE5LQ	"	40,500	127	52	83
KV5E	"	35,404	122	33	73
W5EIJ	"	30,564	114	39	69
N5GGO	"	30,498	114	40	62
K5LP	"	29,760	112	32	61
N5GPP	"	27,636	104	37	61
WB5SSD	"	26,796	118	29	55
K5KR	"	24,240	122	33	68
N5UA	"	7,497	51	18	33
WB5TDD	"	3,666	38	15	24
KE5FI	**28**	**147,870**	**566**	**27**	**66**
K5MK	"	18,252	120	18	36
K5BDX	"	4,080	44	14	20
K9MK/5	**21**	**64,260**	**218**	**29**	**76**
WE5P	"	20,306	112	20	51
WK5I	"	18,450	93	22	53
W5BOS	"	5,170	41	17	30
N5IQD	"	3,640	37	11	17
K5TSQ	**14**	**264,099**	**612**	**35**	**116**
KI3L/5	"	162,450	539	31	83
WF5E	"	133,515	383	34	95
K7CW/5	3.7	4760	53	11	29
K5UR	**1.8**	**19,044**	**147**	**19**	**50**
W5EHY	"	448	15	7	7
K6NA	**A**	**2,253,951**	**1798**	**134**	**307**
W6MKB	"	**1,221,380**	**1222**	**117**	**229**
W7CB/6	"	559,980	827	85	159
W6FSJ	"	455,148	608	90	179
K6EID	"	406,751	575	87	166
N6AW	"	327,472	540	71	140
WU6I	"	300,645	420	88	167
W8AKS/6	"	258,856	389	84	163
KB6GV	"	257,625	424	80	145
WA6TKT	"	215,202	422	67	119
WE6G	"	197,575	408	66	109
K6SIK	"	184,884	316	72	141
NE6I	"	179,400	287	81	149
N6IC	"	172,376	332	69	123
K6HIH	"	167,055	333	77	108
N6OU	"	132,540	272	70	118
W6ABW	"	125,598	268	69	104
W6FCF	"	122,892	297	59	88
N6EK	"	111,450	282	59	91
K6DR	"	110,850	270	63	87
K2ITG/6	"	94,094	237	47	96
WR6O	"	64,106	185	49	84
WB6CEC	"	48,768	182	50	77
N6GG	"	48,465	127	47	88
N6LL	"	46,168	150	46	70
N6JM	"	39,690	134	39	59
K6JG	"	34,840	95	47	83
K6UO	"	34,580	141	33	58
W6BYH	"	32,960	117	42	61
K6CSL	"	27,324	116	44	48
NK6A	"	19,672	84	29	53
N6OM	"	18,414	73	18	44
W6OES	"	16,448	95	26	38
N6NF	"	14,620	78	25	43
KJ6Z	"	12,540	73	29	37
AA6EE	"	11,932	67	35	41
WI6Y	"	9,858	74	29	33
WA6LOD	"	6,954	42	25	36
WA6EBD	"	3,492	40	16	20
WA6FGV	**28**	**19,152**	**130**	**17**	**40**
WB6JMS	"	14,208	111	16	32
KM6K	"	11,577	85	17	34
AJ6V	"	1,650	28	10	12
K6KM	"	690	16	7	8
WB9LDD /6	**21**	**127,761**	**395**	**30**	**81**
KK1A/6	"	124,200	541	28	62
W6BSY	"	117,342	417	29	77
K9RN/6	"	37,716	177	26	58
AI6Z	"	31,176	157	22	50
K4KIU/6	"	30,515	125	24	61
W6QHS	**14**	**510,510**	**1088**	**39**	**126**
W6PU	"	193,732	558	33	86
KI6CG	"	164,263	531	28	81
K6KLY	"	160,312	525	32	84
W6HXW	"	102,600	336	30	78
W5CWQ/6	"	65,835	216	28	77
W6FRZ	"	64,020	225	26	71
W6OK	"	62,000	268	23	57
NM6L	"	26,452	141	20	48
K6LRN	"	3,422	40	14	15
KM6B	**7**	**136,800**	**477**	**29**	**71**
W6RJ	**3.7**	**103,425**	**404**	**28**	**77**
W7EJ	**A**	**2,602,392**	**1971**	**139**	**317**
AI7B	"	**2,029,494**	**1784**	**123**	**271**
NN7L	"	**1,226,163**	**1310**	**113**	**226**
W7RM	"	**1,222,385**	**1229**	**118**	**247**
NC7K	"	506,012	708	91	172
W7KJJ	"	383,544	552	88	164
NW7Q	"	344,946	509	90	168
K7IDX	"	310,868	553	72	146
W7TSQ	"	259,128	508	73	110
W7KKR	"	201,334	372	65	132
KS7T	"	199,056	426	64	112
N7CTY	"	167,994	335	69	114
WA7HHX	"	158,112	348	59	103
W7ZI	"	105,792	202	73	119
W7GUR	"	100,595	235	55	100
W7QN	"	70,740	191	46	89
KA7RMV	"	67,210	193	43	87
W7LR	"	52,402	169	49	84
KL7BB/7	"	49,840	352	33	37
KA7EQS	"	48,840	132	48	84
WB0WNH /7	"	38,380	166	40	55
W7IIT	"	32,625	130	35	52
NB7N	"	26,481	105	30	61
N7HJM	"	20,805	101	29	44
W7QK	"	17,072	73	32	56
W7CMO	"	15,594	79	23	46
W7TVL	"	15,314	88	26	36
K7RIE	"	14,076	77	25	43
N7ENE	"	13,986	86	28	35
N7HWB	"	13,680	109	17	28
N7GLT	"	9,845	73	25	30
WA7BAY	"	9,834	56	25	41
W7AWA	"	6,000	51	26	24
K7RS	"	3,136	36	15	17
KD7EJ	"	2,880	27	20	20
WA7EKK	"	1,728	25	11	13
K7QQ	**28**	**103,716**	**591**	**20**	**47**
KE7C	"	94,032	475	19	53
					(Opr. WB7OJV)
WB7FDQ	"	72,625	325	22	61
WA7KLK	"	19,941	150	18	33
W7AYY	"	8,370	69	15	30
K7GEX	**21**	**188,846**	**686**	**28**	**66**
W7KSA	"	66,744	222	28	75
KX7J	"	58,976	216	27	70
W7LVI	"	55,335	214	29	64
W7KEU	"	34,160	160	26	54
KC7UP	"	18,954	128	18	36
KA7FEF	"	10,701	95	18	23
KE7V	**14**	**604,640**	**1345**	**37**	**123**
N7TT	"	547,500	1332	36	114
WA7GVM	"	243,846	623	35	103
W7FP	"	225,806	645	33	94
NI7T	"	129,924	473	29	79
W7KT	"	14,560	84	23	42
KD7XO	"	12,495	88	12	39
KN7K	"	2,929	34	9	20
W7VIH	"	1,148	29	7	7
K7SS	**3.7**	**217,038**	**828**	**31**	**91**
WA7KPH	"	12,155	94	18	37
K9JF/7	"	9,222	73	20	33
W6WBY/7	1.8	1,755	31	11	16
W8IMZ	**A**	**965,340**	**942**	**104**	**268**
					(Opr. N8BJQ)
WA8BIN	"	**437,294**	**559**	**80**	**198**
N8ATR	"	316,092	411	82	202
N8ESB	"	258,300	421	67	158
WA8YTM	"	186,428	323	59	150
KC8KE	"	179,304	346	59	127
W8UPH	"	177,008	355	55	129
W8TN	"	156,492	287	67	140
KF8K	"	120,600	246	52	128
K8CV	"	113,832	254	52	101
K8OT	"	108,290	238	59	111
N8CQA	"	106,355	205	60	179
K8EF	"	98,115	172	57	154
KB8FJ	"	80,465	221	40	93
N8BC	"	79,952	195	51	101
NI8Y	"	67,620	174	42	98
KA8ZPA	"	39,960	113	42	66
KB8TT	"	39,098	128	38	75
W7IJ/8	"	38,676	120	44	88
NK8Q	"	30,028	128	35	75
W8YGR	"	7,232	42	24	40
KC8PQ	28	4,160	44	11	21
N8GON	"	1,675	33	10	15
W8UA	**21**	**437,900**	**1001**	**32**	**119**
N8FEH	"	65,145	232	24	77
KE8AZ	"	43,130	164	23	72
WD9INF /8	"	28,028	138	22	55
W8TWA	**14**	**311,353**	**819**	**32**	**101**
WA8NDE	"	32,060	174	19	51
K8KUH	"	29,295	160	17	46
AD8C	**7**	**43,758**	**162**	**25**	**77**
W8UVZ	**3.7**	**30,000**	**178**	**17**	**58**
K8NW	**1.8**	**4,012**	**54**	**11**	**23**
W9RE	**A**	**2,580,600**	**1787**	**133**	**377**
K9SD	"	**485,352**	**552**	**101**	**223**
K9FD	"	**480,636**	**522**	**101**	**215**
K9CAN	"	404,040	473	90	222
W9NNE	"	403,683	475	107	222
K9UWA	"	350,557	462	86	203
KM9L	"	349,250	467	81	194
W9OP	"	324,648	523	61	182
WB9QCY	"	276,259	439	73	154
W9GIL	"	258,720	413	62	162
W9NA	"	239,899	447	53	140
NG9L	"	174,399	350	54	129
KC9EW	"	169,548	315	62	137
NE9I	"	161,568	293	59	145
NE9O	"	107,888	246	56	120
K9BQL	"	99,900	247	58	92

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W89HRO	"	61,000	174	42	83
W9TNZ	"	47,502	148	41	85
KK9A	"	41,403	135	36	75
NJ9Z	"	30,996	108	39	69
AG9E	"	26,829	100	33	66
W9LNQ	"	24,024	94	29	75
K9JNB	"	6,405	62	16	19
N9DHG	"	6,157	50	19	28
W9REC	"	5,320	46	20	36
N9DMG	"	4,797	48	18	23
NB9K	"	228	7	5	7
WD9AHJ	**28**	**32,884**	**164**	**24**	**57**
W8AIH/9	**21**	**208,740**	**513**	**32**	**110**
			(Opr. N8BSH)		
W9XT	"	189,791	524	29	104
KV9S	"	167,076	484	30	96
KS9U	"	146,089	393	33	106
W9OF	"	78,720	236	29	91
KA9GRA	"	49,780	191	23	72
W9SC	"	27,018	131	24	55
W9MP	"	20,700	100	20	55
WB9HAD	**14**	**470,041**	**1125**	**36**	**107**
K9CLO	"	160,290	508	28	89
K9LJN	"	86,688	314	25	71
K9YNF	"	39,200	175	22	58
KD9BG	"	32,800	144	24	56
K9AB	"	29,319	117	26	61
KS9O	**7**	**39,105**	**144**	**25**	**74**
N9BUS	"	18,788	94	22	55
W9RN	**3.7**	**41,040**	**253**	**19**	**57**
WØJLC	**A**	**1,723,176**	**1146**	**150**	**376**
KØUK	"	**1,697,868**	**1482**	**126**	**272**
WØEJ	"	**718,178**	**793**	**96**	**230**
WØHBH	"	486,972	573	96	238
KCØFJ	"	266,256	397	95	163
WØRXL	"	210,678	357	74	145
KØGT	"	168,693	302	68	135
NSØB	"	165,184	275	74	158
WBØISW	"	153,924	300	73	129
KØTLM	"	148,122	256	68	143
KØIYF	"	144,324	293	55	116
KAØGGI	"	132,762	229	65	153
WØFI	"	125,550	201	75	150
WAØDCB	"	97,614	275	51	102
KCØLX	"	97,486	233	52	106
KAØTMW	"	90,872	237	51	97
AKØM	"	79,050	194	55	100
KØUKO	"	75,145	202	46	87
NIØG	"	72,576	184	56	112
KEØHY	"	53,504	153	49	79
WBØIEL	"	51,865	165	41	74
NGØW	"	51,060	167	47	68
WØPPF	"	39,160	145	39	71
NBØH	"	36,850	129	34	76
KEØY	"	29,760	95	45	75
KSØT	"	22,352	91	29	59
KCØZW	"	20,976	84	35	57
NTØW	"	18,249	85	26	51
WØWUU	"	17,666	89	27	46
W4NIM/Ø	"	14,472	82	27	40
ABØX	"	11,607	66	27	46
KA9IMX	"	11,205	66	28	37
AKØW	"	10,048	57	26	38
WØNGB	"	9,734	54	23	39
WØJM	"	7,888	51	21	37
KEØCI	"	1,855	21	17	18
KØJVZ	"	270	10	8	7
N2IC/Ø	**21**	**637,515**	**1408**	**33**	**122**
KØGAS	"	74,250	270	29	70
KBØU	"	67,390	207	30	85
KDØS	"	41,490	164	29	61
KØDD	**14**	**240,919**	**658**	**33**	**94**
			(Opr. NSØN)		
KØSCM	"	193,736	566	30	92
W9RXJ/Ø	"	77,900	275	28	72
WØCAQ	"	5,985	59	7	28
KØRF	**7**	**148,629**	**440**	**32**	**87**
KØVVV	"	**85,734**	**308**	**28**	**71**
			(Opr. NØEKK)		
KVØQ	"	**84,930**	**314**	**27**	**68**
KJØG	"	8,550	66	20	30
KØCS	3.7	1,728	37	9	15

ALASKA

AL7CQ	**A**	**1,266,765**	**2269**	**87**	**150**
AL7IJ	**14**	**357,610**	**1381**	**32**	**78**
NL7DU	"	22,983	159	15	32
KL7U	**1.8**	**5,962**	**144**	**10**	**12**

ANTIGUA

V22A	**21**	**1,789,470**	**4075**	**37**	**140**
			(Opr. WB7RFA)		

BAHAMAS

W8KKF /C6A	**A**	**1,057,485**	**2566**	**62**	**133**
C6AER	"	18,473	85	42	49

BELIZE

V31CV	**A**	**4,165,972**	**4019**	**129**	**314**
			(Opr. KE5CV)		

BERMUDA

W3MA /VP9	**A**	**3,472,816**	**4074**	**101**	**267**
DL6FBL /VP9	"	3,084,208	3225	103	288

BRITISH VIRGIN ISLANDS

KQ2M /VP2V	**A**	**3,320,208**	**3693**	**106**	**264**

CANADA

VE1DH	**A**	**630,230**	**1515**	**57**	**133**
VO1AW	"	26,970	117	27	60
VE1BNN	**28**	**188,940**	**943**	**19**	**75**
VE1XN	"	15,207	186	13	24
VO1SA	**21**	**1,024,155**	**2416**	**33**	**132**
VE1TG	"	439,166	1279	27	106
VE1TE	"	105,698	495	21	61
VO1QF	**14**	**766,051**	**1896**	**34**	**109**
VO1QU	"	145,320	511	25	80
VE1CGV	"	92,400	443	26	62
VE1AGZ	"	67,120	300	21	59
VE2AYU	**A**	**799,800**	**1038**	**78**	**222**
VO2AC	"	449,628	1115	54	124
VE2XY	"	71,361	396	24	57
VE2PJ	**14**	**567,042**	**1425**	**36**	**102**
VE2FJH	"	118,260	461	23	67
VE2MR	"	56,364	265	22	61
VE6OU/3	**A**	**4,497,972**	**3311**	**130**	**386**
VE3XN	"	2,336,180	2028	119	332
VE3JGC	"	338,550	469	90	215
VE3CWE	"	64,380	160	55	93
VE3OMU	"	8,268	71	22	30
VE3FWQ	**28**	**92,976**	**498**	**21**	**57**
VE3OXT	"	33,360	353	14	34
VE2AEJ/3	"	15,300	129	14	37
VE3MVV	"	5,760	52	12	28
VE3NBE	**21**	**39,864**	**168**	**23**	**65**
VE3CDX	**14**	**1,075,148**	**2381**	**38**	**125**
VE3AT	"	427,704	1155	34	108
VE3NTW	"	168,000	548	27	93
VE3BMV	**1.8**	**52,240**	**662**	**14**	**26**
VE3PN	"	14,050	309	9	16
VE4RP	**A**	**194,265**	**540**	**47**	**86**
VE6AXB	**A**	**180,960**	**451**	**53**	**92**
VE6DZ	"	95,256	302	49	77
VE6AHS	**21**	**139,332**	**874**	**24**	**44**
VE6XS	**14**	**49,980**	**221**	**25**	**60**
VE7HMS	**A**	**264,180**	**583**	**67**	**103**
VE7DYX	"	120,930	342	56	89
VE7FTC	"	93,903	285	36	77
VE7AO	"	61,472	182	54	82
VE7GAK	28	230	11	5	5
VE7FJE	**21**	**71,344**	**566**	**20**	**32**
VE7EIK	**14**	**492,000**	**1554**	**32**	**88**
VE7EIQ	"	154,077	827	24	53
VE7AVU	"	93,300	691	17	43
VE7GDM	**1.8**	**1,800**	**97**	**6**	**4**
VE8CM	**A**	**57,421**	**311**	**48**	**43**
VE8DX	**1.8**	**3,749**	**68**	**7**	**16**

CAYMAN ISLANDS

ZF2FL	**A**	**3,736,635**	**3863**	**116**	**283**
			(Opr. N6RJ)		
ZF2JI	"	1,163,448	2253	74	160
			(Opr. K4IIF)		

COSTA RICA

TI2MEN	**A**	**541,680**	**1381**	**63**	**122**
TI2ANL	"	528,612	1297	67	136
TI2TEB	**28**	**54,180**	**595**	**16**	**27**

CUBA

CO2CB	**A**	**205,288**	**797**	**56**	**78**
CO2GB	"	40,180	229	33	49

DOMINICAN REPUBLIC

HI8JR	**A**	**1,471,860**	**2560**	**76**	**179**
			(Opr. HI3JEI)		
HI8DLA	"	65,516	718	15	29

FRENCH SAINT MARTIN

FG/WA4TLI /FS	**A**	**1,051,389**	**2230**	**64**	**133**
FG/AA4VK /FS	**28**	**83,735**	**924**	**17**	**32**

GREENLAND

OX3KM	**A**	**243,334**	**551**	**48**	**134**
OX3SG	"	66,734	233	34	88

MEXICO

XE1VIC	**A**	**1,405,560**	**2542**	**93**	**167**
XE2MX	"	151,385	451	52	85
XF5L	**14**	**526,008**	**1436**	**37**	**131**
			(Opr. XE1L)		
XE2NNZ	1.8	4,316	166	7	6

PANAMA

HP8AHF	A	21,868	119	31	40
HP2BPI	21	9,792	144	13	23

PUERTO RICO

KP4CZ	A	27,999	273	24	27
WP4U	**21**	**290,931**	**1160**	**23**	**88**
NP4A	**3.7**	**343,170**	**1098**	**28**	**107**

ST. MAARTEN

PJ1CU	A	19,710	91	33	57
			(Opr. K7CU)		

ST. VINCENT

J87CD	**A**	**144,196**	**374**	**59**	**99**

AFRICA

CANARY ISLANDS

EA8ACH	**A**	**2,821,398**	**2232**	**117**	**309**
EA8BDH	"	24,120	91	29	61
EA8AXN	"	18,300	74	16	34
EA8ANV	"	990	15	9	13
EA8VV	**28**	**318,516**	**856**	**28**	**99**
EA8AMT	"	120,540	435	25	73
EA8AKN	"	46,110	185	23	64
EA8BFU	**21**	**132,405**	**488**	**21**	**70**
EA8BED	"	90,610	364	25	60
EA8ABG	"	28,860	131	19	55
EA8BCJ	14	23,256	111	17	57
EA8BGO	"	2,432	30	15	23

CEUTA & MELILLA

EA9AM	**A**	**2,948,946**	**2311**	**109**	**320**
EA9NN	"	44,149	148	38	89
EC9IR	**21**	**165,915**	**424**	**35**	**100**

CHAGOS

VQ9GB	**A**	**1,387,008**	**1362**	**101**	**243**

GABON

TR8JLD	**A**	**2,725,002**	**2456**	**95**	**283**
TR8LD	**21**	**407,162**	**1111**	**32**	**95**
TR8SA	"	226,422	617	30	96

KENYA

5Z4DU	**21**	**723,940**	**1741**	**32**	**108**

LESOTHO

7P8DP	**A**	**336,364**	**704**	**58**	**106**

LIBERIA

EL7J	**14**	**59,203**	**276**	**26**	**47**

MADEIRA ISLANDS

CT3ET	**21**	**89,713**	**302**	**25**	**78**

NAMIBIA

ZS3HL	**A**	**2,309,710**	**2403**	**88**	**238**
ZS3BI	"	422,706	805	51	127
ZS4NS /ZS3	"	154,845	352	53	102

NIGERIA

JG1FVZ /5N26	**A**	**1,065,678**	**1306**	**72**	**210**

REPUBLIC OF SOUTH AFRICA

ZS6P	**28**	**317,520**	**1017**	**23**	**82**
ZS6G	**7**	**89,056**	**326**	**29**	**63**

ZIMBABWE

Z23JO	**28**	**26,572**	**177**	**15**	**37**

ASIA

BAHRAIN

A92BE	**14**	**340,750**	**1003**	**35**	**110**

INDIA

VU2LBW	A	36,408	127	47	76
VU2UR	"	27,874	137	23	54
VU2VVC	"	13,731	78	29	40
VU2Z	**21**	**400,062**	**1084**	**35**	**103**
			(Opr. VU2ZAP)		
VU2RJA	"	4,257	51	13	103
VU2N	14	23,712	129	26	52
			(Opr. VU2NTA)		

ISRAEL

4X6KX	A	24,528	114	31	53

JAPAN

JA1XAF	**A**	**2,102,895**	**1753**	**141**	**280**
JF1SEK	"	**1,201,068**	**1411**	**104**	**193**
JO1CRA	"	477,568	606	89	198
JE1AER	"	222,592	434	68	120
JM1WZP	"	82,038	238	50	71
JA1BNW	"	63,280	161	56	84
JA1AAT	"	26,726	119	38	45
JA1YWG	"	24,852	115	32	44
			(Opr. JJ1VRO)		
JP1SRG	"	23,904	122	32	40
JA6TIT/1	"	22,878	88	39	54

TOP SCORES

WORLD Single Op All Band		USA Single Op All Band	
8R1X	8,940,450	K2TR	3,109,503
P40A	8,172,930	KT3M	2,884,466
PJ2FR	6,925,920	W3BGN	2,844,072
FY5YE	6,484,830	K1ZM	2,747,824
VK9NS	4,766,779	K5ZD/1	2,738,148
VE6OU/3	4,497,972	W7EJ	2,602,392
V31CV	4,165,972	W9RE	2,580,600
TA2BK	3,973,710	K1DG	2,546,527
WR6R/KH6	3,937,192	K1CC	2,529,578
ZF2FL	3,736,635	N2FB/3	2,496,620
28 MHz		**28 MHz**	
LU1E	754,490	K4JRB	179,530
ZY5IW	728,280	KE5FI	147,870
4M7A	604,608	K7QQ	103,716
LU2E	514,180	WC4E	99,081
LU2FEC	452,985	KE7C	94,032
HC5EA	379,850	K1UO	75,936
21 MHz		**21 MHz**	
ZZ5EG	2,184,570	K3RV/4	925,031
V22A	1,789,470	N2IC/Ø	637,515
ZP5JCY	1,707,888	W1ZM	428,904
9Y4AT	1,106,145	W8UA	437,900
VO1SA	1,025,155	W4NL	415,740
CE6EZ	1,008,484	N4VZ	354,732
14 MHz		**14 MHz**	
OH8PF	1,259,503	K2EK	781,052
VE3CDX	1,075,148	KE7V	604,640
OH8SR	1,027,368	N7TT	547,500
YW1A	1,002,592	K3ZJ/4	539,770
PY5EG	899,085	K2HFX	524,560
IO6FLD	832,590	W6QHS	510,510
7 MHz		**7 MHz**	
ZY5EG	473,634	KØRF	148,629
I4VEQ	425,799	KM6B	136,600
JA8IXM	316,382	KØVVV	85,734
OH3UU	303,800	KVØQ	84,930
JA5BJC	298,384	AD8C	43,758
HA9RE	247,680	KS9O	39,105
3.7 MHz		**3.7 MHz**	
NP4A	343,170	K7SS	217,038
K7SS	217,038	W6RJ	103,425
LX9BV	185,280	KR1G	52,548
PA2TMS	151,065	K1MEM	45,125
IO3MAU	137,907	W9RN	41,040
GW4VEQ	123,070	NO2I	37,022
1.8 MHz		**1.8 MHz**	
LZ2CJ	89,244	K5UR	19,044
VE3BMV	52,240	W4DR	11,648
KH6CC	45,828	AB1A	8,320
DL1YD	36,864	W2FCR	7,425
UA9AKO	29,680	N1ACH	5,200
UG6GAW	23,712	K8NW	4,012
Multi-Op Single Transmitter		**Multi-Op Single Transmitter**	
VP2EC	11,547,536	KX4S	4,335,969
KP4BZ	10,596,868	N2ME	3,973,546
CV1D	9,636,250	N3RS	3,929,396
I5NPH	9,368,892	N4WW	3,623,833
LZ7A	7,711,234	N4ZC	3,587,985
Y34K	7,012,140	K1AR	3,511,632
Multi-Op Multi-Transmitter		**Multi-Op Multi-Transmitter**	
PJ1B	25,366,605	N5AU	11,116,064
JY7Z	14,341,888	N2AA	10,646,094
VP2MU	12,870,580	W3LPL	7,531,680
KH6XX	12,500,823	N6RO	6,858,638
UP9A	11,807,040	NR5M	6,217,750
N5AU	11,116,064	AD8P	6,066,450

SINGLE OP ZONE WINNERS

Zone	Call	Score		Call	Score
1	AL7CQ	1,266,765	21	UF6FFF	3,087,357
2	VO2AC	449,628	22	VU2Z	400,062
3	W7EJ	2,602,392	23	JT5AA	56,320
4	VE6OU/3	4,497,972	24	BY1QH	115,515
5	W3MA/VP9	3,472,816	25	JA1XAF	2,102,895
6	XE1VIC	1,405,560	26	No Entry	
7	V31CV	4,165,972	27	K4YT/4D9	3,086,770
8	ZF2FL	3,736,635	28	YB0ARA	2,374,560
9	8R1X	8,940,450	29	VK6HD	269,973
10	OA4ZV	1,907,765	30	VK2KL	1,816,920
11	ZZ5EG	2,184,570	31	WR6R/KH6	3,937,192
12	CE3FIP	3,643,269	32	VK9NS	4,766,779
13	CX9CO	1,731,184	33	EA9AM	2,948,946
14	DJ4PT	2,537,766	34	No Entry	
15	YT3M	2,898,336	35	JG1FVZ/5N26	1,065,678
16	UA4RZ	2,437,050	36	TR8JLD	2,725,002
17	RM8MA	546,260	37	5Z4DU	723,940
18	UA9MR	241,379	38	ZS3HL	2,309,710
19	UW0MF	505,050	39	VQ9GB	1,387,008
20	TA2BK	3,973,710	40	TF1PS	451,173

JA1JGP	"	20,440	100	32	41
JH1MTR	"	17,593	92	35	38
JH1NHY	"	8,499	91	33	34
JH1HER	"	6,414	110	31	30
JR1UTS	"	3,367	33	17	20
JO1MCC	"	1,350	20	11	14
JH1AJT	**28**	**269,940**	**722**	**31**	**101**
JH1LBR	"	78,854	308	29	60
JR1IJV	"	53,130	261	25	45
JA1MYW	"	16,936	103	22	36
JH1IED	"	13,632	80	22	42
JA1MVK	"	7,339	59	18	25
JA1FO	"	1,113	19	9	12
JR1OYL	"	390	10	6	7
JR1CBC	**21**	**529,740**	**1367**	**35**	**100**
JR1WHW	**"**	**428,895**	**1120**	**36**	**99**
JH1CMW	"	193,557	737	29	62
JO1RDV	"	180,380	557	35	81
JH1MQC	"	137,875	408	35	90
JE1DXC	"	109,272	346	33	83
JP1FZA	"	103,680	305	36	84
JS1UMQ	"	58,400	288	26	47
JA1QXC	"	49,764	228	29	49
JE1UMK	"	40,158	213	25	44
JH1UUT	"	36,225	213	23	40
JM1CMA	"	18,228	126	20	29
JM1AQU	"	12,642	110	19	23
JL1EJO	"	6,435	55	19	26
JH1AFH	"	5,580	69	14	17
JO1AIA	"	2,332	32	15	18
JS1MRM	"	1,650	36	14	11
JL1VNC	"	442	14	7	6
JK1XUL	"	54	3	3	3
JK1MAZ	**14**	**744,876**	**1587**	**39**	**123**
JA1JXU	**"**	**436,450**	**1115**	**37**	**108**
JK1KRS	"	121,336	369	33	83
JA1GO	"	27,232	109	31	61
JA1VBW	"	25,308	122	27	47
JA1BUN	"	15,370	106	22	31
JA1ASO	"	4,727	57	15	14
JH7AJD/1	"	2,175	27	11	18
JH1YDT	**7**	**133,416**	**447**	**33**	**76**
			(Opr. JH4UTP)		
JA1QOP	"	13,359	72	29	44
JA1NYV	"	714	18	9	8
JA2ODS	**A**	**198,283**	**301**	**99**	**134**
JH2FFR	"	167,365	322	82	105
JF2UOP	"	125,850	302	56	94
JA2UOT	"	77,592	265	48	58
JR2RAV	**28**	**95,616**	**351**	**29**	**67**
JH2KTA	**21**	**105,144**	**352**	**31**	**73**
JE2QYZ	"	32,256	162	26	46
JJ2IOX	"	11,950	87	20	30
JJ2LGS	"	5,217	51	18	19
JI2LCE	"	4,114	66	12	10
JI2MBQ	"	2,640	37	14	16
JK2CKB	"	99	5	4	5
JA2THS	**14**	**405,296**	**965**	**37**	**109**
JA2BNN	"	94,500	331	32	68
JF2PTA	"	13,583	105	22	25
JR2AGL	"	4,134	30	12	14
JA2WZ	"	2,470	35	11	15
JA2BAY	**7**	**163,170**	**522**	**33**	**78**
JA2BEY	"	130	8	5	8
JF3CCN	**A**	**360,864**	**580**	**81**	**143**
JH3DEJ	"	41,104	133	46	66
JA3UWB	"	34,749	135	42	57
JG3NKP	"	19,327	87	30	47
JR3XEX	"	7,650	57	19	31
JA3XOG	**28**	**23,703**	**112**	**26**	**47**
JA3AYX	"	14,418	94	21	33
JA3RBC	"	76	7	2	2
JR3NZC	**21**	**295,780**	**905**	**35**	**80**
JK3GAD	21	59,422	291	24	49
JI3MJK	"	31,892	179	22	45
JR3KAH	"	2,210	35	13	13
JR3CVJ	"	1,064	20	8	11
JE3ZFS	**14**	**249,174**	**690**	**36**	**91**
			(Opr. JI3JGJ)		
JA4XHF/3	"	6,232	58	15	23
JA3QHR	**7**	**74,048**	**276**	**33**	**71**
JE4VVM	**A**	**704,778**	**832**	**103**	**200**
JH4DIT	**"**	**676,668**	**769**	**118**	**203**
JR4IVR	"	461,241	569	102	195
JA4ESR	"	282,150	451	89	136
JA4AQA	"	36,386	122	46	67
JR4VGD	"	32,928	135	44	54
JA4GXS	"	29,450	113	44	51
JJ3LJU/4	"	6,084	59	15	21
JA4RWN	"	2,730	30	17	18
JE4RBR	21	8,398	85	16	22
JR4ISK	"	1,606	25	10	12
JA4FWM	**14**	**366,765**	**845**	**37**	**110**
JH4UYB	"	123,768	403	34	74
JE4MYY	"	10,854	73	22	32
JA4ATV	"	7,476	62	16	26
JA4PA	"	4,125	55	14	11
JR4TAP	"	2,673	35	12	15
JA4EE	"	864	18	8	8
JH4AAG	**7**	**54,390**	**190**	**33**	**78**
JR5JAQ	**21**	**75,768**	**333**	**26**	**58**
JE4WSA					
/5	"	46,248	181	28	66
JA5PDS	"	13,145	101	21	34
JA5EO	"	11,180	81	19	33
JA5YTD	"	3,312	43	15	21
			(Opr. JR5PDX)		
JA5AF	14	4,114	48	13	21
JA5BJC	**7**	**298,384**	**800**	**36**	**100**
JA6LDD	**A**	**1,296,324**	**1387**	**112**	**212**
JA6EZE	**"**	**1,220,518**	**1280**	**112**	**226**
JH6TYD	"	88,000	293	42	68
JA6EFT	"	66,480	213	49	71
JA6YFL	"	65,322	206	48	66
			(Opr. JR4WYU)		
JA6AKV	"	48,450	159	46	68
JH6IOM	"	22,977	118	25	44
JF6JQM	"	15,210	73	37	41
JE6IXH	"	10,800	82	16	34
JA6EGU	"	7,515	57	19	26
JI6ESQ	"	7,332	53	18	34
JF6KAC	"	2,160	26	16	14
JH6WHN	28	13,915	93	21	34
JA6WJL	"	84	4	3	4
JF6CBA	**21**	**126,720**	**414**	**35**	**75**
JF6CWS	"	98,490	386	31	74
JA6QVZ	"	33,525	167	28	47
JI6HTJ	"	2,618	63	17	17
JE6NXH	"	2,580	37	13	17
JE6DML	"	2,340	28	11	19
JG6LGE	"	2,028	28	13	13
JA6QDU	"	1,596	27	9	12
JE6GGE	"	1,127	19	11	12
JA6BWH	"	784	20	6	8
JR6IIB	"	29,988	166	26	42
JR6PGB	**7**	**83,616**	**313**	**32**	**72**
JA6GGD	3.7	1,647	29	13	14
JE7GAA	**A**	**232,872**	**446**	**70**	**116**
JA7JH	"	121,953	247	70	107
JA7AXP	"	6,273	45	24	27
JR7CDL	**28**	**14,208**	**101**	**20**	**28**
JH7WKQ	**21**	**363,204**	**1111**	**33**	**81**
JA7QVI	**"**	**162,800**	**507**	**32**	**78**
JA7QFU	"	109,830	381	32	73
JA2QQC/7	"	95,060	353	29	68
JH7KTI	"	15,300	74	26	49
JH7BMF	"	7,548	77	19	18
JH7HJF	"	760	20	9	10
JH7QXJ	"	141,790	450	34	76
JA7YCQ	"	129,492	457	32	67
			(Opr. JE7OWF)		
JA7DSL	"	79,092	358	27	51
JA7DOT	"	71,246	255	32	66
JA7SSB	"	47,215	180	33	62
JA7AKT	"	37,248	198	26	38
JA7RXU	"	35,728	219	24	34
JH7XGN	"	8,550	68	18	27
JA7HMZ	"	149,388	452	36	82
JA8RUZ	**A**	**375,336**	**560**	**94**	**140**
JA8SW	"	105,327	278	53	88
JA8UBV	"	57,105	154	50	85
JE8TRU	28	72	8	2	1
JA8RWU	**21**	**183,339**	**549**	**34**	**83**
JA8UJY	"	52,836	273	23	45
JR8GFA	"	49,802	252	26	48
JA8IUB	"	19,890	110	24	41
JA8QBY	"	5,740	50	19	22
JH8JWF	**14**	**653,184**	**1349**	**39**	**129**
JR8SGE	"	11,904	92	17	31
JA8IXM	**7**	**316,382**	**794**	**37**	**109**
JA9RPU	**A**	**1,178,886**	**1150**	**123**	**243**
JA9JFO	"	524,116	669	101	182
JA9CWJ	28	512	12	6	10
JH9KVF	**21**	**163,721**	**574**	**32**	**69**
JH9TOW	"	3,842	49	14	20
JH9JJD	"	275	9	5	6
JA9BEK	**14**	**105,450**	**339**	**34**	**77**
JA0JHA	**A**	**1,861,098**	**2068**	**113**	**200**
JA0VHI	"	43,524	149	52	65
JA0GZ	"	1,860	24	14	16
JR0BQT	28	8,476	60	22	30
JH0OTM	"	4,420	46	15	19
JH0EPI	**21**	**99,890**	**480**	**23**	**47**
JH0MXV	"	77,532	317	29	62
JH0HON	"	19,610	97	25	49
JH0SGG	"	13,035	86	23	32
JH0OBD	**14**	**45,408**	**247**	**24**	**42**
JH0NZN	"	31,185	175	23	40
JA0AD	"	28,365	168	27	34
JA0UMV	**7**	**36,736**	**169**	**28**	**54**
JA0RFF	"	30	3	2	3

KOREA

HL1LW	**A**	**224,154**	**649**	**74**	**115**
HL9CW	**21**	**413,406**	**1271**	**32**	**87**
HL4HAQ	**"**	**135,450**	**741**	**28**	**62**
HL1ABR	**"**	**7,520**	**118**	**14**	**18**
HL1IE	**14**	**104,004**	**500**	**32**	**75**

KUWAIT

9K2YA	A	44,034	197	18	44

LEBANON

OD5RF	A	38,473	168	24	55

MONGOLIA

JT5AA	**A**	**56,320**	**434**	**33**	**55**
JT1BQ	**21**	**26,199**	**453**	**11**	**30**

PAKISTAN

AP2ZA	**14**	**364,603**	**1011**	**37**	**112**

PEOPLE'S REPUBLIC OF CHINA

BY1QH	**A**	**115,515**	**788**	**26**	**59**
				(Opr. K5IID)	

SAUDI ARABIA

HZ1HZ	**A**	**863,360**	**1072**	**83**	**201**

TURKEY

TA2BK	**A**	**3,973,710**	**3235**	**102**	**341**

U.S.S.R. (ASIATIC)

ARMENIA

UG6IJ	**A**	**374,360**	**687**	**50**	**146**
UG6LQ	**14**	**545,020**	**1458**	**35**	**105**
UG6GAW	**1.8**	**23,712**	**182**	**9**	**39**

ASIATIC RUSSIA

UA9MR	**A**	**241,379**	**361**	**95**	**186**
UV9WR	"	42,834	152	39	82
UA9XAB	"	38,446	187	29	65
UA9XDG	"	726	15	9	13
RA9YM	**21**	**121,425**	**1038**	**21**	**54**
RA9JX	"	113,568	501	26	65
UV9WN	"	83,970	375	22	68
UA9SMO	"	43,529	201	22	57
UA9XSJ	"	35,535	215	18	51
UA9HFC	"	8,424	216	12	27
UW9UP	**14**	**182,274**	**719**	**29**	**73**
UW9QA	"	147,210	500	29	76
UA9QA	**7**	**46,080**	**250**	**20**	**52**
UW9SW	"	31,008	198	11	46
UV9FM	**3.5**	**52,094**	**316**	**14**	**47**
UA9AKO	**1.8**	**29,680**	**191**	**15**	**41**
UA9UR	"	10,998	165	10	29
UW0MF	**A**	**505,050**	**756**	**96**	**163**
UW0LT	"	356,880	572	81	159
UA0LCZ	"	237,006	508	81	128
UW0CF	"	35,867	155	42	47
UW0CM	"	1,216	29	8	11
UZ0AB	28	1,054	24	6	11
UA0QF	**21**	**191,592**	**803**	**32**	**76**
UA0SMM	"	111,168	556	28	68
UW0LO	"	47,061	238	28	55
UA0FF	"	41,154	246	22	35
UA0SG	"	33,810	223	21	49
UA0UN	"	24,400	272	15	35
UA0UDC	"	13,776	204	13	28
UA0TO	**7**	**181,608**	**1028**	**26**	**68**
UA0SR	"	26,460	307	17	37
UA0FDX	**3.7**	**20,466**	**276**	**20**	**34**

AZERBAIJAN

UD6DCF	**7**	**16,454**	**150**	**8**	**30**

GEORGIA

UF6FFF	**A**	**3,087,357**	**2449**	**106**	**303**
UF6VAW	**3.5**	**91,093**	**475**	**17**	**54**

KAZAKH

UL7LEG	**A**	**61,060**	**247**	**19**	**67**
UL7ACI	**28**	**175,050**	**718**	**26**	**64**
RL7GE	21	2,987	57	10	19
UL7DA	**14**	**230,336**	**837**	**31**	**87**
RL7ABK	7	9,766	98	9	29
RL7AC	**3.7**	**16,905**	**180**	**7**	**28**
UL7CEP	"	176	18	4	4

KIRGHIZ

RM8MA	**A**	**546,260**	**809**	**78**	**182**
UM8MTF	"	76,428	326	32	67
UM8MIG	**28**	**68,055**	**476**	**20**	**53**
UM8MCW	**21**	**73,720**	**372**	**28**	**67**
UM8DX	**14**	**194,930**	**713**	**29**	**72**
UM8MAN	"	61,110	268	28	62
UM8MIZ	7	4,896	92	11	21
UM8MO	**3.7**	**23,650**	**220**	**13**	**42**

TURKOMAN

RH8AD	**A**	**1,269**	**20**	**12**	**15**

UZBEK

UI8ZAA	**A**	**343,959**	**582**	**58**	**173**
UI8IAJ	"	62,205	167	47	96
UI8BAA	28	1,564	26	8	15
RI8BQ	**21**	**105,675**	**573**	**22**	**53**

EUROPE

ANDORRA

C31LFD	A	0	5	5	5

AUSTRIA

OE1WWL	**A**	**18,640**	**89**	**30**	**50**
OE1TKW	**28**	**1,224**	**26**	**9**	**15**

AZORES ISLANDS

CT1DIZ /CU3	**21**	**105,570**	**611**	**21**	**81**

BALEARIC ISLANDS

EA6GP	**A**	**85,635**	**370**	**40**	**125**
EA6MQ	"	71,070	328	34	81
EA6VQ	**28**	**121,284**	**705**	**26**	**82**
G6ZY/EA6	**21**	**360,360**	**1390**	**31**	**89**
EA6OA	"	110,313	688	26	77
EA6WX	"	6,762	109	12	30
EA6WY	"	2,943	43	10	17
EA6WV	**14**	**220,564**	**880**	**35**	**99**
EA6TC	7	3,168	90	5	28
EC6LS	3.7	391	23	3	14

BELGIUM

ON4KST	**21**	**262,691**	**810**	**35**	**86**
ON5KY	**14**	**285,840**	**946**	**35**	**109**
ON4XG	"	39,060	293	17	53
ON5WL	"	20,723	172	15	38

BULGARIA

LZ6KST	**A**	**589,280**	**1262**	**81**	**209**
LZ1HP	"	155,056	476	55	161
LZ2RM	"	64,938	133	46	112
LZ1BJ	"	22,295	169	24	67
LZ2JE	"	20,705	125	29	72
LZ1KDP	**28**	**99,600**	**616**	**27**	**73**
LZ2ZA	"	20,636	151	20	47
LZ6DV	"	15,792	134	19	37
LZ1KOZ	**21**	**197,125**	**849**	**34**	**91**
LZ1NS	"	1,242	21	12	11
LZ2DU	**3.7**	**7,749**	**215**	**6**	**35**
LZ1VA	"	5,455	148	4	31
LZ6FJ	"	432	23	5	11
LZ2CJ	**1.8**	**89,244**	**1077**	**13**	**61**

CZECHOSLOVAKIA

OK3CSC	**A**	**2,122,515**	**2078**	**125**	**342**
OK1IMP	**"**	**1,261,239**	**1634**	**105**	**294**
OK2JS	**"**	**918,012**	**1180**	**98**	**241**
OK2RU	"	538,650	965	64	202
OK3CMZ	"	333,659	578	84	195
OK1EP	"	226,320	449	63	142
OK1KZ	"	196,811	748	47	152
OK3YCA	"	177,210	427	53	145
OK2ABU	"	117,603	416	50	129
OK2QX	"	81,243	240	50	127
OK3YK	"	78,183	391	35	118
OK2BWH	"	72,774	317	33	84
OK3FON	"	57,949	165	43	124
OK1BB	"	47,152	365	23	112
OK3MB	"	42,375	158	38	75
OK3CTX	"	33,363	300	20	79
OK1DVK	"	30,051	129	41	118
OK1KAY/P	"	9,744	221	9	33
OK1DZJ	"	8,950	126	16	34
OK1KCF	"	6,780	78	17	43
OK1AOU	"	5,760	81	18	46
OK1KUZ	"	5,203	101	9	34
OK2TH	"	4,028	68	11	27
OK1DZL	"	2,725	34	15	17
OK2KVI	"	1,014	40	10	16
OK1KCP	"	147	7	3	4
OK3CFA	**28**	**81,216**	**414**	**27**	**69**
OK3LZ	"	61,750	338	27	68
OK2BBI	"	15,057	131	21	42
OK2CDP	"	432	21	7	9
OK1AZI	"	264	16	5	7
OK2BJR	**21**	**46,694**	**228**	**25**	**49**
OK3CAP	"	37,400	179	25	60
OK2BHQ	"	28,899	198	20	37
OK1PN	"	14,204	94	19	34
OK1AJN	**14**	**113,658**	**575**	**28**	**86**
OK2PAY	"	111,755	620	24	79
OK2AWQ	"	52,208	250	25	79
OK3UG	"	31,608	439	18	54
OK2BQL	"	18,392	107	21	55
OK2PCL	"	16,393	106	21	38
OK1DHJ	"	15,300	198	15	45
OK1MIZ	"	2,304	72	8	16
OK2BNX	"	1,296	28	9	18
OK2HI	**3.7**	**25,960**	**457**	**9**	**46**
OK3YCL	**"**	**20,600**	**405**	**7**	**43**
OK1AYE	"	9,062	199	8	38
OK1MNV	"	7,913	191	6	35
OK2PCF	"	7,683	198	5	34
OK1MKU	"	4,620	143	4	29
OK1DXW	"	2,320	84	4	25
OK3CTT	"	2,196	62	4	32
OK1DXS	**1.8**	**15,677**	**243**	**9**	**52**
OK3CQR	**"**	**10,206**	**185**	**11**	**43**
OK3CWQ	"	8,507	175	6	41
OK1JDX	"	6,956	131	10	37
OK1DWC	"	1,914	66	6	27
OK3CSQ	"	528	20	5	19

DENMARK

OZ7HT	**A**	**1,041,708**	**1672**	**77**	**205**
OZ1DPW	"	81,840	225	51	114
OZ1FAO	"	51,600	165	39	90
OZ1ZE/A	"	21,160	96	37	78
OZ1ACB	"	17,940	89	33	59
OZ1LTB	"	11,532	90	21	41
OZ2BM	"	9,360	61	26	34
OZ1LRT	"	3,192	38	17	25
OZ7NB	"	1,235	30	7	12
OZ1CFV	"	1,800	33	11	19
OZ5EV	**21**	**139,150**	**463**	**33**	**88**
OZ8CT	**14**	**66,516**	**379**	**25**	**67**
OZ1DTF	"	64,242	347	22	64
OZ1CVI	"	33,600	245	18	50
OZ1AXG	"	5,548	105	8	11
OZ8T	"	2,139	49	11	12
OZ4NA	"	1,452	28	9	24
OZ5JR	"	792	24	5	6
OZ1APA	7	2,829	60	7	34
OZ4CG	"	2,112	58	6	26
OZ3KE	"	1,350	53	3	24
OZ4MD	**3.7**	**89,870**	**792**	**17**	**69**

ENGLAND

G3SJX	**A**	**669,908**	**1004**	**80**	**236**
GB6AR	**"**	**296,100**	**522**	**63**	**172**
				(Opr. G4XKR)	

G3SNN	"	217,588	405	76	190
G4IUF	"	208,803	471	58	105
G4UDU	"	184,110	525	41	149
G3ICG	"	85,120	414	29	83
G6QQ	"	64,827	249	39	108
G4BWP	"	52,731	205	37	56
G4GIR	"	13,230	74	30	40
G6NK	"	13,164	109	15	48
G4JQL	"	2,395	23	12	23
GØAEV	**28**	**19,158**	**171**	**16**	**46**
G4RKK	**21**	**166,026**	**559**	**34**	**84**
G3RTE	"	137,706	510	31	87
G4PCI/P	"	40,950	259	22	53
GB2RIP	14	8,668	81	13	31
			Opr. GØCLY)		
G3JKY	"	8,442	123	13	29
G4CNY	**7**	**80,200**	**447**	**21**	**79**
G3XTT	**1.8**	**10,974**	**142**	**10**	**52**
G3XWZ	"	8,272	94	8	36

FED. REP. OF GERMANY

DJ4PT	**A**	**2,537,766**	**2269**	**122**	**340**
DL8PC	"	**1,565,832**	**1780**	**109**	**315**
DK8AX	"	**1,304,758**	**1281**	**105**	**364**
DJ2YA	"	**1,167,886**	**1108**	**115**	**367**
DJ4AX	"	**1,058,661**	**1197**	**120**	**333**
DJ3HJ	"	959,524	1191	93	295
DJ9ZB	"	944,118	1180	107	274
DJ6QT	"	776,282	990	88	321
DL3LU	"	623,004	762	103	283
DK2OY	"	576,944	820	88	249
DL3NBL	"	570,008	940	100	244
DJ8RR	"	556,829	1091	49	154
DF1SD	"	501,334	789	85	249
DL3YCJ	"	357,178	635	63	208
DF2UQ	"	307,850	566	62	173
DJ4ZR	"	276,150	406	72	191
DK5WQ	"	252,720	412	65	195
DK5DS	"	233,445	524	50	147
DL5RBW	"	193,998	416	75	141
DL7YS	"	138,060	286	60	135
DJ4PI	"	114,471	274	66	141
DL6YAO/P	"	102,265	565	48	133
DK1IT	"	101,061	335	42	129
DL6EH	"	82,593	316	47	86
DF9RD	"	72,437	258	48	101
DK8NG	"	66,240	184	60	147
DK1ZN	"	43,375	160	39	86
DL3FBY	"	42,920	158	43	73
DK6QW	"	39,585	147	36	69
DL1XAS	"	34,875	148	20	73
DF2HL	"	26,390	129	24	67
DL3IV	"	22,011	126	26	61
DL9OT	"	21,631	118	38	59
DJØKE	"	21,200	128	36	64
DJØCP	"	17,391	77	31	62
DL6RBZ	"	16,200	92	29	46
DA1DX	"	14,720	92	25	39
DL6QW	"	12,141	77	26	31
DJØVZ	"	7,424	80	20	38
DL8RBR	"	6,608	80	11	17
DJ5AV	"	6,583	56	19	38
DF3QN	"	3,726	41	15	31
DL8AK	"	3,283	50	12	37
DL8RBU	"	1,128	17	12	12
DL3RDF	"	646	12	9	10
DJ1ZU	**28**	**67,609**	**299**	**25**	**72**
DL3ME	"	2,730	42	11	15
DHØFAV	"	720	19	5	11
DK8FS	**21**	**73,680**	**255**	**33**	**87**
DL9SN	"	70,087	261	32	77
DL1RB	"	37,786	169	26	63
DJ6TK	"	21,252	121	26	51
DL3NAA	"	14,790	151	15	36
DJ4YV	"	11,232	78	20	34
DL8NU	**14**	**802,102**	**1973**	**37**	**124**
DK9IP	"	**697,655**	**1764**	**37**	**118**
DFØAT	"	**668,834**	**2119**	**33**	**104**
			(Opr. DL9NC)		
DL6LAU	"	170,898	1117	25	66
DK3GI	"	70,070	220	34	96
DL2RBK	"	43,500	300	20	55
DJØBX/P	"	7,896	124	10	32
DL1JC	"	3,390	47	13	17
DK8FD	"	1,794	28	10	16
DK4OO	**3.7**	**32,234**	**399**	**13**	**58**
DJ5JH	"	3,570	65	8	34
DL1YD	**1.8**	**36,864**	**421**	**15**	**57**

FINLAND

OH6JW	**A**	**2,327,236**	**2340**	**118**	**321**
OH2PM	"	**1,242,248**	**1573**	**101**	**291**
OH1VR	"	**1,062,152**	**1421**	**99**	**265**
OH2YF	"	841,976	1232	79	223
OH6GZ	"	144,375	385	51	124
OH7NW	"	66,424	307	37	115
OH2BJG	"	61,446	238	46	101
OH1BV	"	49,703	522	60	148
OH5TE	"	48,006	200	38	78
OH7TO	"	25,662	207	26	68
OH6SC	"	17,372	144	22	79
OH6SQ	"	14,592	74	32	44
OH1PY	"	7,956	64	10	41
OH3MC	"	7,089	102	22	36
OH9UW	"	6,399	58	25	56
OH2BPW	"	4,848	35	12	29
OH9SV	"	1,830	40	16	14
OH3RO	"	1,127	37	7	20
OH1ZAA	**28**	**19,527**	**167**	**19**	**50**
OH5OD	"	1,890	43	8	22
OH5BN	**21**	**685,296**	**1894**	**37**	**107**
OH1AD	"	402,555	1174	36	105
OH6AC	"	399,024	1200	35	101
			(Opr. OH6CS)		
OH1PE	"	61,700	252	27	73
OH5RZ	"	10,580	104	15	31
OH1TD	"	9,063	88	18	35
OH8PF	**14**	**1,259,503**	**3054**	**38**	**123**
OH8SR	"	**1,027,368**	**2890**	**36**	**116**
OH2WI	"	509,102	1472	34	112
OH8LQ	"	423,120	1589	34	89
OH2BUU	"	93,156	576	22	62
OH2CK	"	90,840	321	30	90
OH6NEQ	"	30,558	244	16	50
OH5JD	"	17,344	131	21	43
OH9PN	"	9,639	103	13	38
OH3MP	"	2,240	46	10	25
OH5MX	"	874	30	5	18
OH3UU	**7**	**303,800**	**1061**	**33**	**107**
OH6ZH	"	29,133	222	19	64
OH7UE	**3.7**	**120,980**	**784**	**28**	**87**

FRANCE

F3VX	**A**	**114,162**	**423**	**38**	**121**
FD1HWB	"	**112,520**	**372**	**40**	**105**
F6IUI	"	75,972	249	49	107
F6ENV	"	53,868	277	24	110
FE6FNA	"	35,919	180	34	83
F6CXL	"	28,700	244	17	24
FE6DRP	"	22,344	165	20	37
F2RO	"	17,664	125	23	41
F3AT	"	14,504	90	30	44
F6FIO	**28**	**68,796**	**376**	**28**	**63**
F6BVB	"	1,975	64	6	19
F9JS	**21**	**107,160**	**347**	**32**	**88**
F6CLM	"	9,560	94	11	29
F6CQU	**14**	**461,038**	**1616**	**30**	**92**
FV6NDX	**7**	**122,778**	**658**	**24**	**90**
			(Opr. F6BBJ)		
F6AOJ	"	78,818	518	20	74

GERMAN DEMOCRATIC REP.

Y56YF	**A**	**764,750**	**1225**	**86**	**264**
Y22JJ	"	**607,104**	**1209**	**74**	**214**
Y38YK/P	"	**251,873**	**730**	**51**	**182**
Y28AL	"	**218,502**	**815**	**45**	**138**
Y36UE	"	**217,626**	**602**	**63**	**186**
Y33QJ/P	"	191,226	595	56	147
Y47PN	"	146,718	550	44	127
Y24NG	"	134,504	340	53	131
Y33UJ/P	"	112,175	375	47	128
Y23DG	"	107,055	365	43	92
Y22WD	"	84,056	299	40	112
Y53VN	"	74,980	279	50	113
Y53FD	"	73,688	218	46	105
Y43XE	"	72,160	230	46	118
Y53DD	"	71,232	202	62	106
Y48ZA	"	65,107	303	36	95
Y41NK	"	61,740	225	41	85
Y23RJ/A	"	59,353	351	32	107
Y64OI	"	55,195	208	39	94
Y58ZA /Y56WG	"	54,831	159	48	99
Y39TF	"	52,560	255	29	61
Y54TA	"	51,508	143	48	110
Y21HB	"	47,946	229	35	96
Y51XO	"	44,034	164	41	82
Y43GO	"	43,575	264	31	74
Y43XL	"	40,176	216	35	89
Y51WI	"	39,648	189	37	81
Y22WF	"	36,844	171	37	85
Y49YC	"	36,047	189	33	80
Y22HF	"	35,750	167	38	92
Y67UL	"	34,551	252	28	57
Y47WJ/P	"	34,320	181	28	82
Y23LG	"	30,750	161	22	53
Y39SH	"	28,320	240	23	57
Y22VI	"	26,712	215	23	83
Y82ML	"	23,100	136	27	48
Y27AO/A	"	22,464	120	36	68
Y24XJ	"	18,630	112	29	52
Y44TN	"	17,850	94	27	48
Y44TI	"	17,476	106	23	45
Y36YM	"	16,082	120	25	61
Y79XN	"	15,987	115	26	47
Y32DN	"	15,936	169	17	66
Y25IF	"	14,792	133	20	66
Y36SG	"	13,992	74	23	43
Y58ZA /Y31SC	"	12,629	63	25	48
Y25BE	"	11,968	161	15	53
Y54TI	"	11,736	65	27	45
Y25ML	"	11,400	107	22	54
Y25MG/A	"	10,450	73	22	33
Y31RB	"	10,128	101	17	31
Y66YF	"	9,943	107	16	45
Y47YM	"	9,360	74	25	47
Y42HA	"	8,468	90	16	42
Y54VA	"	7,488	43	29	35
Y22GC	"	6,882	47	26	36
Y26WM	"	6,440	46	25	45
Y55LA	"	5,229	52	19	44
Y55VJ	"	5,100	41	20	30
Y25JA/A	"	4,785	60	17	38
Y26BM/A	"	4,455	56	15	40
Y25TA/A	"	4,429	49	17	26
Y55TJ	"	3,700	42	17	33
Y22UB	"	3,276	44	14	25
Y27BN	"	2,622	40	13	25
Y48ZF	"	2,576	41	15	31
Y33TB/P	"	2,565	62	8	37
Y51PG	"	2,376	30	12	24
Y23XF	"	2,244	67	6	28
Y34XF	"	2,175	31	12	17
Y33UB/P	"	2,142	55	7	35
Y32ZF	"	1,519	48	7	24
Y39TH	"	1,472	24	11	12
Y47PM	"	1,377	29	10	17
Y44WA	"	1,334	45	7	22
Y38WE	"	1,232	44	9	19
Y27ML	"	1,230	40	6	9
Y26IM	"	1,012	16	5	17
Y36RG	"	882	16	7	14
Y45VJ	"	756	12	10	11
Y33VL	28	1,500	38	8	12
Y24SG	**21**	**86,022**	**282**	**31**	**87**
Y22EK	"	**74,766**	**276**	**27**	**75**
Y37ZE	"	67,210	300	29	65
Y38ZB	"	8,037	83	16	31
Y46ZC	"	7,770	99	13	29
Y26DM/A	"	6,795	59	17	28
Y23VB	"	1,276	20	6	16
Y24GB/A	"	1,058	18	9	14
Y37RB	"	814	19	10	12
Y51TG	"	392	10	6	8
Y32KE	**14**	**174,608**	**223**	**27**	**85**
Y78XL	"	17,732	154	17	35
Y57VJ	"	11,078	76	20	38
Y25FF/A	"	9,000	102	14	36
Y48YN	"	4,880	57	15	25
Y41OH	"	4,160	70	10	22
Y21IC	"	3,276	43	13	23
Y23CJ	"	1,755	37	9	18
Y24HB	"	1,560	35	10	14
Y21UL	"	1,532	35	9	20
Y63VN	"	542	25	6	12
Y21WI	"	192	16	2	2
Y25DF/A	7	2,448	70	6	28
Y32FE	**3.7**	**15,936**	**324**	**9**	**39**
Y44UI	"	5,740	138	5	36
Y24RK	"	3,540	124	4	26
Y24FB	"	1,326	58	3	23

GREECE

SV1RP /SV7	7	12,050	241	9	41
J48CS	**1.8**	**20,160**	**273**	**13**	**47**

HUNGARY

HA4YO	**A**	**134,028**	**472**	**45**	**108**
HA8KVB	"	25,195	107	37	68
			(Opr. HA8RJ)		
HA9RG	"	**298,072**	**1151**	**34**	**118**
HA5HH	"	32,214	259	17	61
HA9RE	**7**	**247,680**	**1271**	**32**	**97**
HA4KYN	**3.7**	**109,368**	**973**	**20**	**73**
			(Opr. HA4XH)		
HA7UI	"	40,672	608	10	52
HA4KXR	"	10,693	324	5	32
			(Opr. HA8LKK)		
HA5MY	"	1,675	73	4	21

ICELAND

TF1PS	**A**	**451,173**	**1195**	**44**	**133**

IRELAND

EI9FN	**A**	**195,286**	**653**	**41**	**141**
EI4DW	"	189,415	514	49	166
EI1DH	**21**	**95,256**	**520**	**24**	**73**

ISLE OF MAN

GD4GWQ	**A**	**41,008**	**261**	**26**	**62**

ITALY

I5MXX	**A**	**2,368,330**	**2081**	**123**	**347**
IV3PRK	"	**2,026,634**	**1872**	**121**	**345**
IV3YYK	"	756,576	1052	96	312
IK2DZM	"	383,205	567	77	223
I2KYM	"	304,416	577	68	184
IKØDWN	"	234,320	495	62	170
I4CSP	"	158,193	420	56	161
IK1BBC	"	103,782	318	40	107
IK2DZN	"	96,538	313	50	108
IK6CNM	"	95,795	310	51	110
IK4CBM	"	55,342	277	26	92
IN3XUG	"	26,622	209	23	61
I8BYG	**28**	**76,110**	**564**	**26**	**60**
IØAMU	"	34,650	249	20	57
IK1HVN	"	10,716	130	13	44
I6YEF	"	5,796	68	14	22
I4LEC	**21**	**596,025**	**1620**	**36**	**99**
IK4AUY	"	444,150	1196	34	107
I5OYY	"	168,622	615	33	85
IO6FLD	**14**	**832,590**	**2141**	**38**	**136**
I1ZEU	"	496,860	1659	35	105
IK8ETA	"	229,770	917	29	106
IO8KPV	"	183,855	981	29	90
IV3BMV	"	41,184	318	18	54
I4VEQ	**7**	**425,799**	**1435**	**35**	**118**
IO3MAU	**3.7**	**137,907**	**1031**	**22**	**77**
IO3QBR	"	56,064	706	12	61
IK4FNC	"	55,130	588	14	60



Expedition of F6EXU (rear) and F6HRN to 4U1ITU.

LUXEMBOURG

LX1EA	**A**	**262,570**	**641**	**55**	**187**
LX1GQ	"	204,624	692	37	159
LX2QR	**14**	**64,484**	**419**	**24**	**70**
LXØRL	**7**	**206,763**	**1284**	**25**	**98**
			(Opr. DF7RX)		
LX9BV	**3.7**	**185,280**	**1527**	**19**	**77**
			(Opr. DL6RAI)		

MONACO

3A6F	**A**	**107,950**	**448**	**46**	**124**
			(Opr. 3A2LF)		

THE NETHERLANDS

PAØAGA	**A**	**1,160,712**	**1528**	**92**	**251**
PAØXPQ	"	**693,945**	**1224**	**73**	**161**
PA2SWL	"	195,936	646	68	140
PA3AIR	"	102,762	236	48	125
PAØOX	"	32,565	206	25	40
PA3BZV	"	26,190	163	28	62
PAØKDM	"	74,148	387	36	112
PAØYN	"	11,856	65	24	52
PA3BVM	"	5,684	89	12	46
PA3BNH	"	1,656	35	12	24
PAØZH	**28**	**18,546**	**153**	**19**	**47**
PAØDUO	"	15,600	99	18	35
PA3CZP	"	4,788	66	12	26
PA3CEF	**21**	**40,426**	**214**	**28**	**54**
PA2TMS	**3.7**	**151,065**	**1615**	**15**	**66**
PAØIJM	"	41,528	620	11	47

NORTHERN IRELAND

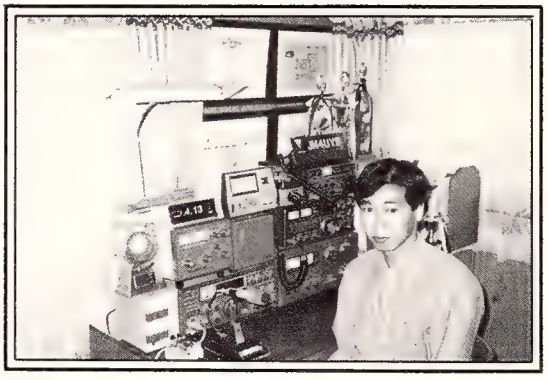
GI4MWA	28	817	21	8	11
GI3KDR	**14**	**45,375**	**321**	**22**	**53**
GI4BBY	**7**	**22,357**	**180**	**17**	**62**

NORWAY

LA4NL	**A**	**53,932**	**216**	**39**	**100**
LA6VFA	"	35,730	198	31	59
LA7SI	"	28,254	181	40	62
LA1KQ	"	11,200	157	28	36
LA4YW	"	7,215	91	20	45
LA9PEA	"	6,649	85	19	42
LA6ZFA	"	2,565	45	13	32
LA5UF	**21**	**322,420**	**959**	**32**	**103**
LA9ZV	"	101,184	333	35	89
LA1XDA	"	18,880	176	15	49
LA5XFA	"	8,526	87	13	36
LA2IZ	"	4,070	51	14	23
LA1MFA	**14**	**369,820**	**1249**	**31**	**79**
LA7MFA	"	121,500	654	25	83
LA8DY	"	64,372	470	19	57
LA2IE	"	16,383	150	14	29
LA9HW	**7**	**35,571**	**456**	**12**	**59**
LA9DI	"	12,900	159	13	47

POLAND

SP9HWN	**A**	**386,070**	**926**	**58**	**197**
SP6DVP	"	**243,552**	**619**	**67**	**191**
SP9DWT	"	**189,538**	**544**	**53**	**141**
SP9IGY	"	153,850	561	42	139
SP9AKD	"	119,952	408	52	144
SP9BLF	"	96,444	426	35	106
SP5LM	"	75,240	300	45	107
SP3DAH	"	66,030	310	39	103
SP9MAT	"	58,053	205	40	71
SP9MQH	"	51,626	217	34	49
SP3HBF	"	51,240	248	38	84
SP9EES	"	51,125	258	33	92
SP1DTG	"	39,312	233	32	93
SP7DZA	"	37,968	211	35	78
SP6JZG	"	36,519	237	25	86
SP3BYZ	"	27,948	160	22	68
SP9BRP	"	24,511	152	35	94
SP3IOE	"	22,947	260	44	129
SP6CIK	"	19,437	143	20	37
SP9ENV	"	18,605	173	17	44
SP3PJC	"	17,608	200	17	54
SP9DAE	"	13,608	86	28	53
SP5BNB	"	10,923	126	28	73
SP9GKO	"	9,240	136	13	43
SP3CDR	"	8,624	114	17	39
SP3CDQ	"	7,800	55	18	22
SP7GAQ	"	6,552	52	24	48
SP3KPN	"	3,634	68	15	31
SP3DIK	"	3,600	100	9	27
SP7GSM	"	3,555	155	9	28
SP7FQI	"	2,205	51	9	26
SP6KYA	"	2,040	97	10	30
SP3HC	"	1,696	39	12	20
SP3LPP	"	1,312	58	6	24
SP9LEM	"	1,026	31	7	20
SP6BFK	**28**	**7,830**	**97**	**14**	**31**
SP7NJX	**21**	**56,160**	**220**	**29**	**67**
SP7FWJ	"	55,328	244	27	64
SP5DIR	"	49,590	221	27	63
SP9KAR	"	36,260	221	24	46
SP9FTJ	"	29,520	138	24	56
SP9IWO	"	8,325	88	18	27
SP2GUB	"	7,266	53	16	26
SP5XD	"	7,182	73	16	26
SP3GRQ	"	5,428	46	13	23
SP9CAY	"	5,282	59	14	24
SP5ANJ	"	2,730	44	10	11
SP2ZFJ	**14**	**281,120**	**959**	**33**	**107**
SP4DGN	"	**259,776**	**768**	**36**	**108**
SP9KMM	"	140,070	630	31	84
			(Opr. SP7MTH)		
SP2AYC	"	103,452	555	25	86



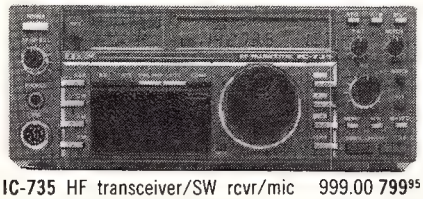
JH4UYB, always with a good signal.



HF Equipment	Regular	SALE
IC-761 HF xcvr/SW rcvr/ps/AT	2499.00	**2149**
SP-20 Ext. speaker w/audio filter	149.00	**134.95**
FL-101 250 Hz CW filter	69.95	
FL-102 6 kHz AM filter	56.00	
CI-V Computer interface adapter	TBA	
EX-310 Voice synthesizer	46.00	



IC-751A 9-band xcvr/.1-30 MHz rcvr	1649.00	**1399**
PS-35 Internal power supply	199.00	**179.95**
FL-32 500 Hz CW filter (1st IF)	66.50	
FL-63 250 Hz CW filter (1st IF)	54.50	
FL-52A 500 Hz CW filter (2nd IF)	108.00	**99.95**
FL-53A 250 Hz CW filter (2nd IF)	108.00	**99.95**
FL-33 AM filter	35.25	
FL-70 2.8 kHz wide SSB filter	52.00	
RC-10 External frequency controller	39.25	
IC-745 9-band xcvr w/.1-30 MHz rcvr	1049.00	**899.95**
PS-35 Internal power supply	199.00	**179.95**
EX-241 Marker unit	22.50	
EX-242 FM unit	44.00	
EX-243 Electronic keyer unit	56.00	
FL-45 500 Hz CW filter (1st IF)	66.50	
FL-54 270 Hz CW filter (1st IF)	53.00	
FL-52A 500 Hz CW filter (2nd IF)	108.00	**99.95**
FL-53A 250 Hz CW filter (2nd IF)	108.00	**99.95**
FL-44A SSB filter (2nd IF)	178.00	**159.95**

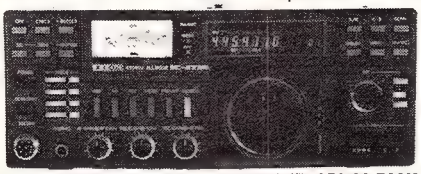


IC-735 HF transceiver/SW rcvr/mic	999.00	**799.95**
PS-55 External power supply	199.00	**179.95**
AT-150 Automatic antenna tuner	445.00	**349.95**
FL-32 500 Hz CW filter	66.50	
EX-243 Electronic keyer unit	56.00	
UT-30 Tone encoder	17.50	

Other Accessories	Regular	SALE
IC-2KL 160-15m solid state amp w/ps	1999.00	**1699**
PS-15 20A external power supply	169.00	**154.95**
PS-30 Systems p/s w/cord, 6-pin plug	299.00	**269.95**
MB Mobile mount, 735/745/751A	24.50	
SP-3 External speaker	61.00	
SP-7 Small external speaker	49.00	
CR-64 High stab. ref. xtal (745/751)	63.00	
PP-1 Speaker/patch	159.25	**149.95**
SM-6 Desk microphone	44.95	
SM-8 Desk mic - two cables, Scan	78.50	
SM-10 Compressor/graph EQ, 8 pin mic	136.25	**124.95**
AT-100 100W 8-band auto. antenna tuner	445.00	**389.95**
AT-500 500W 9-band auto. antenna tuner	559.00	**489.95**
AH-2 8-band tuner w/mount & whip	625.00	**549.95**
AH-2A Antenna tuner system, only	495.00	**429.95**

ICOM

Other Accessories - continued:	Regular	SALE
GC-5 World clock	91.95	**89.95**
VHF/UHF base multi-modes	Regular	SALE
IC-271A* 25W 2 meters ... **CLOSEOUT**	859.00	**699.95**
AG-20* Internal preamplifier	64.00	
IC-271H 100W 2m FM/SSB/CW	1099.00	**969.95**
AG-25 Mast mounted preamplifier	95.00	
IC-275A 25W 2m FM/SSB/CW w/ps	1199.00	**1049**
IC-275H 100W 2m FM/SSB/CW	1389.00	**1229**
IC-475A 25W 440 FM/SSB/CW w/ps	1399.00	**1249**



IC-471A* 25W 430-450.... **CLOSEOUT**	979.00	**769.95**
AG-1* Mast mounted preamplifier	99.50	
IC-471H* 75W 430-450 ... **CLOSEOUT**	1399.00	**999.95**
AG-35* Mast mounted preamplifier	95.00	

***Preamp $9.95 with 271A/471A/471H Purchase**

Accessories common to 271A/H and 471A/H		
PS-25 Internal power supply for (A)	115.00	**104.95**
PS-35 Internal power supply for (H)	199.00	**179.95**
SM-6 Desk microphone	44.95	
EX-310 Voice synthesizer	46.00	
TS-32 CommSpec encode/decoder	59.95	
UT-15 Encoder/decoder interface	14.00	
UT-15S UT-15S w/TS-32 installed	92.00	
VHF/UHF mobile multi-modes	Regular	SALE
IC-290H 25W 2m SSB/FM **CLOSEOUT**	639.00	**569.95**
IC-490A 10W 430-440 **CLOSEOUT**	699.00	**499.95**
VHF/UHF/1.2 GHz FM	Regular	SALE
IC-27A Compact 25W 2m FM w/TTP mic	429.00	**369.95**
IC-27H Compact 45W 2m FM w/TTP mic	459.00	**399.95**
IC-37A Compact 25W 220 FM, TTP mic	499.00	**439.95**
IC-47A Compact 25W 440 FM, TTP mic	549.00	**479.95**
PS-45 Compact 8A power supply	139.00	**129.95**
UT-16/EX-388 Voice synthesizer	34.99	
SP-10 Slim-line external speaker	35.99	
IC-28A 25W 2m FM, TTP mic	459.00	**399.95**
IC-28H 45W 2m FM, TTP mic	489.00	**429.95**
IC-38A 25W 220 FM, TTP mic	489.00	**429.95**
IC-48A 25W 440-450 FM, TTP mic	489.00	**429.95**
HM-14 TTP microphone	55.50	
UT-28 Digital code squelch	37.50	
UT-29 Tone squelch decoder	43.00	
HM-16 Speaker/microphone	34.00	
IC-900 Transceiver controller	589.00	**529.95**
UT-29A 2m 25W unit	295.00	**269.95**
IC-3200A 25W 2m/440 FM w/TTP	599.00	**529.95**
UT-23 Voice synthesizer	34.99	
AH-32 2m/440 Dual Band antenna	37.00	
AHB-32 Trunk-lip mount	34.00	
Larsen PO-K Roof mount	20.00	
Larsen PO-TLM Trunk-lip mount	20.18	
Larsen PO-MM Magnetic mount	19.63	
RP-3010 440 MHz, 10W FM, xtal cont.	1229.00	**1089**
IC-1200A 10W 1.2 GHz FM Mobile	699.00	**629.95**
IC-1271A 10W 1.2 GHz SSB/CW Base	1229.00	**1069**
AG-1200 Mast mounted preamplifier	105.00	
PS-25 Internal power supply	115.00	**104.95**
EX-310 Voice synthesizer	46.00	
TV-1200 ATV interface unit	129.00	**119.95**
UT-15S CTCSS encoder/decoder	92.00	
RP-1210 1.2 GHz, 10W FM, 99 ch. synth	1479.00	**1289**



MasterCard VISA

Hand-helds	Regular	SALE
IC-2A 2-meters	279.00	**249.95**
IC-2AT with TTP	299.00	**259.95**
IC-3AT 220 MHz, TTP	339.00	**299.95**
IC-4AT 440 MHz, TTP	339.00	**299.95**
IC-02AT 2-meters	365.00	**299.95**
IC-02AT/High Power	399.00	**339.95**
IC-03AT for 220 MHz	449.00	**399.95**
IC-04AT for 440 MHz	449.00	**389.95**
IC-u2A 2-meters	299.00	**269.95**
IC-u2AT with TTP	329.00	**289.95**
IC-u4AT 440 MHz, TTP	369.00	**329.95**

Accessories for micros - CALL $

IC-12AT 1W 1.2GHz FM HT/batt/cgr/TTP	459.00	**399.95**
A-2 5W PEP synth. aircraft HT	499.00	**449.95**
Accessories for all except micros		Regular
BP-7 425mah/13.2V Nicad Pak - use BC-35		74.25
BP-8 800mah/8.4V Nicad Pak - use BC-35		74.25
BC-35 Drop in desk charger for all batteries		74.50
BC-16U Wall charger for BP7/BP8		20.25
LC-11 Vinyl case for Dlx using BP-3		20.50
LC-14 Vinyl case for Dlx using BP-7/8		20.50
LC-02AT Leather case for Dlx models w/BP-7/8		54.50
Accessories for IC and IC-O series		Regular
BP-2 425mah/7.2V Nicad Pak - use BC35		47.00
BP-3 Extra Std. 250 mah/8.4V Nicad Pak		37.50
BP-4 Alkaline battery case		15.25
BP-5 425mah/10.8V Nicad Pak - use BC35		58.50
CA-5 5/8-wave telescoping 2m antenna		18.95
FA-2 Extra 2m flexible antenna		11.50
CP-1 Cig. lighter plug/cord for BP3 or Dlx		13.00
CP-10 Battery separation cable w/clip		22.50
DC-1 DC operation pak for standard models		23.25
MB-16D Mobile mtg. bkt for all HTs		24.50
LC-2AT Leather case for standard models		54.50
RB-1 Vinyl waterproof radio bag		34.95
HH-SS Handheld shoulder strap		16.95
HM-9 Speaker microphone		47.00
HS-10 Boom microphone/headset		23.25
HS-10SA Vox unit for HS-10 & Deluxe only		23.25
HS-10SB PTT unit for HS-10		23.25
ML-1 2m 2.3w in/10w out amplifier	**SALE**	**99.95**
SS-32M Commspec 32-tone encoder		29.95

Receivers	Regular	SALE
R-71A 100 kHz-30 MHz, 117V AC	$949.00	**799.95**
RC-11 Infrared remote controller	67.25	
FL-32 500 Hz CW filter	66.50	
FL-63 250 Hz CW filter (1st IF)	54.50	
FL-44A SSB filter (2nd IF)	178.00	**159.95**
EX-257 FM unit	42.50	
EX-310 Voice synthesizer	46.00	
CR-64 High stability oscillator xtal	63.00	
SP-3 External speaker	61.00	
CK-70 (EX-299) 12V DC option	12.25	
MB-12 Mobile mount	24.50	
R-7000 25 MHz-2 GHz rcvr .. **SPECIAL**	1099.00	**899.95**
RC-12 Infrared remote controller	67.25	
EX-310 Voice synthesizer	46.00	
TV-R7000 ATV unit	131.95	**119.95**
AH-7000 Radiating antenna	89.95	**(3)**

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SP6DNS	"	23,324	154	17	51
SP9AVZ	"	19,020	221	13	47
SP4HKN	"	16,182	167	15	43
SP9PRH	"	9,450	97	11	34
SP9ZD	"	6,560	97	12	28
SP3LPR	"	6,360	105	11	29
SP6JMV	"	4,738	68	11	35
SP9MQD	"	4,680	71	12	33
SP7EWX	"	2,886	55	9	17
SP90JZ	"	2,848	43	7	25
SP3IBS	**7**	**114,588**	**681**	**28**	**80**
SP6IXF	"	28,500	232	13	63
SP6AGD	"	9,342	146	9	45
SP5GKI	"	4,998	83	9	40
SP2BKZ	"	3,276	89	6	30
SP6IHE	**3.7**	**82,705**	**825**	**17**	**68**
SP9AHB	"	**28,448**	**511**	**8**	**48**
SP90DY	"	14,448	298	7	41
SP3NYC	"	7,680	190	5	35
SP9BMQ	"	6,878	171	6	32
SP5BLI	"	6,480	161	6	34
SP9KJM	"	3,915	149	4	23
SP6AUI	"	3,168	95	5	27
SP3BVI	"	2,368	80	5	27
SP3DF8	"	2,288	88	8	18
SP9MZP	"	2,072	77	4	24
SP9LAQ	"	1,675	70	4	21
SP9LAM	"	1,482	60	4	22
SP3BQD	**1.8**	**21,056**	**270**	**12**	**52**
SP5INQ	"	13,944	228	11	45
SP9GDB	"	3,264	105	4	28

PORTUGAL

CT1CLR	**A**	**592,200**	**885**	**71**	**229**
CR2UA	"	**570,174**	**1427**	**49**	**114**
CT1AUW	"	**541,926**	**1288**	**59**	**179**
CS7TM	"	115,800	276	61	139
CT1COU	"	80,030	299	41	110
CT1BFN	"	76,560	236	48	117
CT1BOD	"	13,524	97	26	58
CT1BBJ	"	10,430	91	21	49
CT1AYE	"	5,974	87	18	40
CT1BMQ	**28**	**27,521**	**219**	**19**	**54**
CS4NH	**21**	**755,988**	**2158**	**35**	**111**
CT4KQ	"	278,132	1053	30	94
CT1AZS	"	17,040	117	21	50
CT1UO	"	4,444	61	13	31
CT1BOP	**14**	**111,000**	**509**	**26**	**74**
CR6BY	"	36,103	457	22	57
CT1DJN	"	14,518	168	11	50
CT1AEO	"	7,182	79	13	25
CT1CHU	"	7,080	89	11	29
CT1CIR	"	224	14	4	12
CT1AOZ	**7**	**122,720**	**519**	**24**	**80**
CT1DJK	"	1,225	46	4	21
CT1DRC	"	30	5	1	5
CT4AT	**1.8**	**17,350**	**171**	**11**	**39**

ROMANIA

YO9DIA	**A**	**180,320**	**588**	**47**	**149**
YO2ARV	"	45,598	318	13	105
YO4US	"	24,360	255	17	70
YO2AOB	"	23,265	129	31	68
YO9BVG	"	21,306	148	27	79
YO5BRZ	"	16,530	83	39	56
YO3HL	"	7,336	114	16	40
YO6VZ	**21**	**25,767**	**188**	**19**	**44**
YO2CMI	"	5,070	49	15	24
YO3DCO	"	4,500	39	17	22
YO6EZ	"	1,536	44	5	7
YO4JQ	**14**	**30,720**	**146**	**30**	**66**
YO6BQT	"	7,480	119	10	34
YO4AEQ	"	1,586	53	7	19
YO3JF	**7**	**80,127**	**607**	**20**	**67**
YO6BZL	"	25,012	281	13	61
YO8CAQ	"	1,944	57	7	20
YO2CJX	**3.7**	**6,006**	**155**	**9**	**30**

SARDINIA

IS0UWS	**A**	**31,037**	**99**	**30**	**147**

SCOTLAND

GM3BCL	**A**	**276,740**	**602**	**53**	**149**
GM4WEW	"	**233,120**	**625**	**42**	**146**
GM8SQ	"	1,122	24	9	8
GM4CHX	28	1,300	29	8	17
GM0AXY	21	4,756	66	11	18
GM3MOR	"	1,104	24	10	14
GM4JFS	**14**	**27,786**	**252**	**15**	**51**

SHETLAND ISLANDS

GM4GPN	**A**	**319,676**	**778**	**59**	**174**

SPAIN

ED1CI	**A**	**660,660**	**1079**	**74**	**211**
			(Opr. EA1CIM)		
EA3DZB	"	**431,256**	**962**	**57**	**147**
EA5CGU	"	**341,922**	**605**	**78**	**216**
EA5CIX	"	272,223	455	70	191
EA1BGT	"	244,316	586	58	148
EA7BHO	"	209,385	407	68	167
EA5FEX	"	194,812	411	62	164
EA5JC	"	182,784	464	66	168
EA1AW	"	166,336	412	60	166
EA7EHE	"	136,290	345	53	157
EA3DXD	"	135,400	403	47	153
EA5FCO	"	115,380	314	45	135
EA5AP	"	108,108	304	47	109
EA3EGI	"	102,600	318	51	129
EA5CXL	"	58,245	155	58	107
EA5CHT	"	51,750	224	39	86
EA7PS	"	50,690	182	48	89
EA1CVZ	"	49,969	244	36	71
EA7GCS	"	46,000	197	33	67
EA2BMA	"	40,608	148	37	69
EA5AEN	"	39,220	140	48	100
EA7DHP	"	37,206	135	38	79
EA5EFV	"	26,329	128	35	78
EA7DXR	"	24,459	137	29	64
EA2CR	"	22,357	158	18	61
EA3ESZ	"	19,404	124	30	54
EA5FMS	"	18,564	101	30	54
EA4EDI	"	17,388	119	29	55
EA1BMM	"	17,226	105	27	60
EA7ARK	"	16,564	105	30	71
EA7BYM	"	15,089	87	27	52
EA5DWQ	"	12,928	104	24	77
EA4DAN	"	12,782	63	31	46
EA5DNO	"	12,351	116	26	43
EA1BZI	"	11,972	82	25	57
EA5FYJ	"	8,385	65	31	34
EA7EBL	"	8,370	67	20	34
EA7FZY	"	7,181	109	13	30
EA4BJD	"	6,519	66	15	38
EA5DIJ	"	6,405	98	21	40
EA1AXF	"	6,390	81	12	33
EA7AZA	"	4,730	41	20	35
EA7FUN	"	3,969	37	22	27
EA7FQI	"	2,848	33	15	17
EA7CZR	"	2,772	84	10	23
EA1DHB	"	1,102	58	8	11
EA7CBE	"	144	6	3	6
EA3DBO	"	42	3	3	3
EA4EAP	**28**	**45,090**	**267**	**22**	**68**
EA1CON	"	19,398	143	19	42
EA5FHE	"	14,520	135	19	41
EA3DZZ	"	14,364	219	15	39
EA5DIT	"	13,664	91	19	42
EA3ERT	"	9,381	156	12	41
EA3FHT	"	7,525	103	13	30
EA7FDW	"	5,110	64	14	21
EA3PE	"	4,720	80	11	29
EA5FNE	"	4,320	51	13	19
EA5BZS	"	2,884	68	7	21
EA4CMF	"	2,850	35	14	24
EA3FWO	"	2,706	52	11	22
EA4AXI	"	1,000	20	9	16
EA3FIM	"	285	13	6	9
EA1BIM	**21**	**62,640**	**239**	**30**	**78**
EA3FWE	"	**61,200**	**299**	**28**	**74**
EA3ELM	"	53,392	246	25	69
EA7AVU	"	48,910	375	19	48
EC4CPK	"	35,908	244	25	69
EA5DCL	"	33,117	161	22	61
EA5CTZ	"	20,220	190	17	43
EA1ECB	"	12,411	83	21	42
EA1CNO	"	12,408	80	20	46
EC4CNA	"	11,102	89	16	45
EC3CJN	"	9,576	105	15	41
EA3CZM	"	4,992	48	17	31
EC5CCG	"	4,452	68	14	28
EA7FLU	"	144	6	3	5
EA3AAY	**14**	**213,282**	**948**	**31**	**92**
EA3FJM	"	**62,040**	**401**	**21**	**67**
EA3DEE	"	33,228	234	21	57
EA1DFH	"	23,606	213	18	56
EA3FKC	"	20,724	173	16	50
EA3DVJ	"	9,760	149	12	28
EA3EXW	"	5,848	76	11	32
EA1BDB	**7**	**41,760**	**292**	**16**	**64**
EA1SQ	3.7	6,625	102	10	43

SWEDEN

SM5AOE	**A**	**811,156**	**1128**	**86**	**212**
SM3BIZ	"	**578,534**	**963**	**69**	**213**
SM7WT	"	**469,898**	**604**	**89**	**252**
SM6BJI	"	365,523	672	70	197
SM6LIF	"	211,142	404	61	132
SM0DJZ	"	133,730	298	57	158
SM7DXQ	"	103,785	275	49	116
SM0BDS	"	37,350	173	32	58
SM7FHJ	"	29,832	203	31	57
SM3RAB	"	28,800	191	33	54
SM5DAC	"	13,770	115	32	120
SM6CNX	"	11,760	75	27	53
SM7BEX	"	6,048	65	16	40
SM7BGF	"	1,008	18	12	12
SM0JOQ	28	3,060	43	9	25
SM5DYC	"	2,400	37	10	20
SM7MXP	"	1,320	30	8	16
SM4CMG	"	1,224	26	9	15
SM4POB	"	594	13	10	12
SM0JXA	"	28	3	2	2
SM5FUG	21	9,072	76	15	27
SM5CSS	"	5,612	38	22	33
SM6IJF	"	5,040	93	10	23
SM7CNA	"	3,762	40	20	37
SM4GNU	**14**	**652,188**	**1895**	**34**	**105**
SK0UX	"	**598,476**	**1596**	**37**	**122**
				(Opr. G4JVG)	
SK4EA	"	336,819	1256	29	100
				(Opr. SM0GQ)	
SK2KW	"	144,700	597	28	72
				(Opr. SM2KWQ)	
SK0LM	"	115,453	722	21	62
				(Opr. SM0DRD)	
SK3AH	"	28,186	295	13	21
				(Opr. SM3COL)	
SM7TV	"	22,555	210	16	49
SM0TW	"	9,682	86	17	30
SM3LIV	"	8,272	105	14	33
SM6CDN	"	1,675	34	9	16
SM6JY	"	400	15	6	10
SM5AQD	**7**	**199,332**	**946**	**32**	**94**
SM6FJY	"	5,535	105	11	30
SM2EKM	**3.7**	**89,965**	**431**	**27**	**68**
SM7CRW	"	45,824	417	12	52
SM6BGG	"	17,141	125	15	46
SM7ITZ	"	9,812	215	7	37

SWITZERLAND

HB9AAA	**A**	**119,464**	**332**	**46**	**91**
HB9DFY	"	113,307	358	34	145
HB9DDZ	"	68,544	218	44	124
HB9AYZ	"	19,292	119	29	62
HB9DCZ	**21**	**62,560**	**209**	**31**	**84**
HB9DX	"	25,016	87	34	84

WALES

GW4RHW	**14**	**155,958**	**798**	**25**	**77**
GW4VEQ	**3.7**	**123,670**	**906**	**17**	**63**

YUGOSLAVIA

YT3M	**A**	**2,898,336**	**2895**	**105**	**294**
			(Opr. YU3ZO)		
YU3EF	"	**829,512**	**1134**	**88**	**281**
YU7BW	"	761,876	1196	79	237
YU3QI	"	492,704	832	84	262
YU2OB	"	376,380	626	72	198
YU7MGU	"	177,192	506	53	161
YU7SF	"	104,210	404	40	130
YU1ATA	"	10,080	97	23	49
YU1PQI	"	7,049	58	22	31
YT3EW	**28**	**82,719**	**407**	**27**	**64**
YU1HA	"	47,763	333	20	67
YU2LRU	"	23,115	172	21	46
YU2LLL	"	2,888	53	11	19
4N3E	**21**	**759,437**	**1876**	**39**	**122**
4N4C	"	**547,755**	**1315**	**36**	**123**
YU1DX	"	**515,520**	**1446**	**38**	**106**
YU2NA	"	379,550	1183	32	103
YU4YA	"	256,040	798	35	113
YU2OM	"	128,161	536	27	66
YU3CK	**14**	**121,932**	**663**	**24**	**84**
YU1PJ	"	540	20	5	7
YU4ELS	**7**	**135,432**	**721**	**23**	**85**
			(Opr. YU4VQT)		
YU4EZS	"	9,720	177	9	45
YU3BQ	**3.7**	**72,072**	**856**	**13**	**59**
YU2QU	"	**72,064**	**549**	**10**	**54**
4N4A	"	60,345	629	16	65
YU2BST	"	20,484	351	8	48
YU2TW	**1.8**	**22,302**	**225**	**12**	**51**

U.S.S.R. EUROPEAN

BYELO-RUSSIA

UC2IDC	**A**	**181,251**	**734**	**48**	**141**
UC2ACZ	"	37,632	176	33	65
RC2AB	"	18,676	119	30	62
UC2AFA	**21**	**64,080**	**344**	**28**	**62**
UC2WO	"	40,480	207	27	61
UC2AA	**14**	**698,400**	**2034**	**36**	**124**
RC2CC	"	38,592	246	20	52
UC2ACT	**3.7**	**16,464**	**293**	**6**	**43**
UC2LB	**1.8**	**5,904**	**134**	**7**	**34**

ESTONIA

UR2RER	**A**	**274,214**	**451**	**87**	**253**
UR2RNG	"	16,740	129	22	71
UR2DL	"	8,056	76	16	22
UR2RZ	**14**	**82,650**	**452**	**22**	**73**
RR2RT	"	7,728	90	13	33
RR2RN	**3.7**	**48,093**	**590**	**15**	**54**

EUROPEAN RUSSIA

UA4RZ	**A**	**2,437,050**	**2419**	**120**	**342**
UA3RAR	"	**1,038,445**	**1595**	**83**	**240**
UA4NC	"	**656,200**	**870**	**109**	**316**
RA3RR	"	393,216	821	74	182
UA6ADC	"	324,972	1066	51	126
RW3DW	"	256,564	619	62	176
RA3QW	"	199,683	519	63	155
UW3RR	"	171,228	541	53	175
RW3DR	"	147,960	397	56	146
UV6AY	"	145,187	525	40	113
UA3PP	"	132,076	505	44	134
UA6LHU	"	100,650	386	46	119
UW1BM	"	89,700	361	38	118
UA3VFS	"	79,993	402	45	122
RA1AA	"	58,079	252	36	87
UA4CO	"	52,360	198	46	90
UA3XBB	"	47,168	192	40	94
UV3MM	"	45,360	217	33	87
RA3RN	"	36,120	154	30	80
UA3ASL	"	34,944	208	25	59
UA1OMW	"	26,244	152	25	83
UA6LIG	"	24,682	270	19	63
UA3ATV	"	22,881	132	24	63
UA3ALX	"	18,696	144	19	57
UA4ANZ	"	11,532	127	17	45
UV3NB	"	9,880	115	15	50
UA1ANA	"	9,656	110	19	49
RA3DAD	"	9,072	81	20	36
UA3ARI	"	5,130	69	16	41
UA3TGO	"	1,053	32	7	20
UA6LQ	**28**	**189,306**	**945**	**31**	**86**
UA6BPM	"	4,641	99	10	29
RA3QOC	"	2,800	86	6	22
RA3DAV	"	2,640	60	7	26
RA3DQP	"	1200	38	7	17
UA4HNP	**21**	**194,224**	**770**	**30**	**92**
UZ6HR	"	144,780	613	30	84
UW3EQ	"	129,739	459	35	102
UA6HRZ	"	121,990	527	32	78
UW3UO	"	54,275	383	17	48
UW1AE	"	48,692	235	25	69
UA3XDS	"	38,947	184	23	56
RV6AA	"	28,560	262	19	60
RA3VA	"	27,384	181	19	65
RA3DNC	"	17,886	166	20	46
UA3TG	"	18,998	220	15	44
UA1ZD	"	17,732	243	21	31
RW4CA	"	10,348	137	16	36
UA3TAM	"	9,840	205	7	41
UA3THQ	"	8,228	119	11	33
UA6LTA	"	6,536	112	11	32
RA3RC	"	4,727	57	12	17
UA3MBE	"	2,346	50	7	10
UA4LCH	**14**	**294,140**	**1188**	**35**	**105**
UA4CED	"	69,870	407	29	73
UV3TE	"	55,811	444	34	33
UA1MU	"	21,384	297	21	51
UA4AO	"	1,855	32	14	21
UA4WA	**7**	**126,651**	**613**	**29**	**82**
UA3XDM	"	94,320	461	29	91
UA3TEP	"	19,520	212	14	47
UA1QQ	"	12,896	210	11	41
UA3DRB	**3.7**	**28,776**	**332**	**12**	**54**
UA4PMI	"	27,300	353	12	53
UA3AHM	"	22,428	200	13	50

FRANZ JOSEF LAND

UV100	**A**	**207,350**	**775**	**42**	**88**

KALININGRAD

UA2EC	**A**	**150,894**	**423**	**50**	**152**

KARELIA

RA1NA	**A**	**279,888**	**797**	**59**	**179**

LATVIA

UQ2GIP	A	3,636	39	16	20
UQ2GLW	**21**	**57,900**	**343**	**30**	**70**
UQ2GCP	"	44,548	233	26	60
UQ2GW	"	3,478	36	14	23

LITHUANIA

UP3BH	**A**	**889,252**	**1316**	**88**	**261**
UP2BR	"	**358,614**	**593**	**70**	**191**
UP3BU	"	325,628	897	63	191
UP3BP	"	321,310	808	63	167
UP3BA	"	262,430	857	52	178
UP2BBF	"	244,883	675	59	174
UP2BW	"	237,120	630	47	105
UP2BNC	"	62,992	388	26	98
UP2DM	"	57,088	173	47	81
UP2BBD	"	26,037	203	31	68
UP2BDO	"	16,490	126	28	69
UP2BB	"	11,169	117	17	56
UP2NK	**28**	**73,538**	**434**	**22**	**61**
UP3BI	**21**	**197,076**	**713**	**31**	**101**
UP2BNE	"	16,983	121	18	33
UP2AV	"	14,520	115	20	40
UP2ND	"	6,424	70	15	29
UP2PCI	**14**	**328,848**	**1368**	**33**	**103**
UP2OI	"	**210,672**	**974**	**29**	**97**
UP3BX	"	83,460	475	26	81
UP2BLQ	"	9,456	133	13	35
UP2BLE	**7**	**13,237**	**153**	**12**	**49**
UP2BOQ	1.8	416	33	3	10
RP2BID	"	78	7	2	6

MOLDAVIA

UO5OV	A	33,792	148	39	93
UO50AK	14	17,820	150	15	40
UO5GR	**3.7**	**12,760**	**171**	**11**	**44**

UKRAINE

RB5MF	**A**	**1,566,873**	**2003**	**102**	**297**
RB5DX	"	**1,506,720**	**1946**	**103**	**327**
UT4UX	"	532,608	1025	82	226
RB5IJ	"	461,266	849	78	236
RB5WW	"	251,968	504	66	182
UT5RY	"	248,084	731	50	168
UB5KN	"	202,477	537	66	167
UY5TE	"	199,500	579	53	175
RB5IA	"	176,440	490	56	164
RB5NT	"	98,258	356	42	104
UB5JB	"	95,865	375	41	124
UB5ML	"	68,880	277	32	91
UB4MF	"	48,260	309	27	90
UB5ENI	"	19,440	140	25	56
UB5IPN	"	6,178	99	11	30
UB5FCE	"	5,115	91	23	32
UT5HP	"	513	15	6	13
RB4JF	**28**	**61,152**	**467**	**23**	**61**
UB5CDF	"	45,045	298	21	56
RB5TW	"	37,525	225	23	56
RB5CCO	"	18,410	140	22	48
RT5UO	"	8,424	98	16	36
UB5VCK	"	5,590	78	11	32
RB5UCY	"	2,291	48	8	21
UB5ITW	**21**	**261,876**	**802**	**36**	**103**
UT4UO	"	155,325	570	32	77
UB5IAL	"	113,088	546	32	61
UB5TCS	"	85,078	357	28	75
UB5EJB	"	24,704	202	17	46
UB5FDM	"	19,712	178	17	47
UB5JDM	"	14,350	117	19	51
RB5VZ	"	1872	30	12	14
RB5EG	**14**	**84,094**	**505**	**26**	**72**
RB5JX	"	26,673	315	16	34
UB5CN	"	23,958	214	15	51
UB5VAA	"	20,878	179	19	54
RB5MR	**7**	**178,717**	**812**	**30**	**91**
RB4IQZ	"	85,975	636	22	73
UB5QMA	"	27,968	253	18	58
RB5IQ	"	12,566	143	12	49
RB5VA	**3.7**	**54,150**	**618**	**14**	**61**
UB5IKB	"	**30,459**	**348**	**16**	**55**
UB5LCV	"	24,510	359	9	48
UT4UR	"	14,352	290	7	39
UB5MX	"	11,234	196	7	34
RB5SA	"	8,865	187	8	37
UB5MLP	"	5,616	119	7	32
UB5EEP	"	2,117	64	7	22
UB5SDX	1.8	4,400	81	10	34
RB5QCJ	"	360	11	4	9

OCEANIA

AUSTRALIA

VK2KL	**A**	**1,816,920**	**2147**	**104**	**190**
VK4BJD	"	231,957	398	78	135
VK3PU	"	120,582	235	68	106
VK2AYK	"	88,572	265	48	73
VK5ZN	"	59,605	250	34	57
VK8OB	"	10,738	70	18	34
VK6HD	**28**	**269,973**	**933**	**21**	**78**
VK4KWO	**21**	**69,747**	**368**	**24**	**43**
VK2APK	**14**	**242,176**	**677**	**33**	**95**
VK3SM	"	52,528	187	29	69
VK5QX	"	651	31	4	3
VK2EKY	**7**	**103,230**	**381**	**29**	**64**
VK3BEE	1.8	1,575	16	5	7

FRENCH POLYNESIA

FO5GW	**28**	**67,782**	**689**	**14**	**19**

GUAM

NY6M					
/KH2	**14**	**196,588**	**591**	**33**	**86**
KG6DX	**3.7**	**41,768**	**245**	**24**	**39**

HAWAII

WR6R					
/KH6	**A**	**3,937,192**	**3829**	**120**	**214**
AH6FL	**21**	**143,864**	**869**	**20**	**36**
KH6CC	**1.8**	**45,828**	**402**	**14**	**24**

INDONESIA

YB0ARA	**A**	**2,374,560**	**2258**	**110**	**250**
YB4FW	"	528,115	940	69	122
YB5QZ	"	314,754	534	77	132
YB5NOF	"	272,182	496	61	133
YB8VM	"	54,528	152	48	80
YB3EP	"	1,404	21	16	23
YC0EJG	**21**	**509,888**	**1395**	**32**	**92**
YC2CTW	"	**402,498**	**1160**	**30**	**88**
YC4GAP	"	249,240	713	33	87
YC3HCM	"	246,471	964	30	57
YC3BXK/8	"	47,136	174	33	63
YC0LWA	"	27,403	135	22	45
YC1IOI	"	27,132	125	27	49
YC2GHE	"	22,243	131	19	40
YC0KVG	"	22,040	190	10	30
YC2OK	"	1,300	20	10	16

MINAMI TORISHIMA

7J1ACH	**A**	**970,324**	**1590**	**87**	**125**
				(Opr. NJ7D)	

NEW ZEALAND

ZL1BZC	**A**	**195,156**	**572**	**45**	**72**
ZL1IM	"	84,778	309	51	46
ZL4BO	**3.7**	**49,324**	**236**	**23**	**53**
ZL1BOQ	"	7,392	57	21	27

NORFOLK ISLAND

VK9NS	**A**	**4,766,779**	**4170**	**129**	**268**

PHILIPPINES

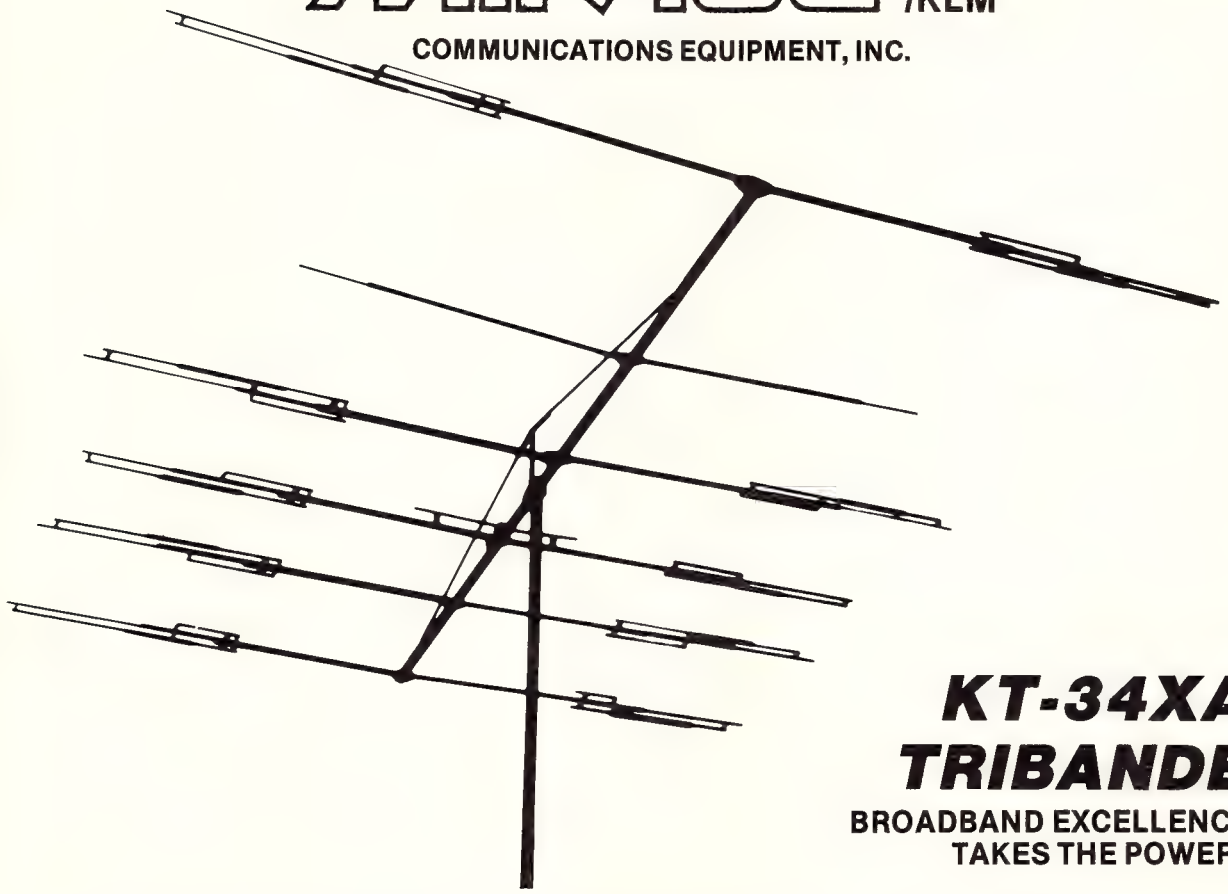
K4YT/4D9	**A**	**3,086,770**	**2575**	**129**	**286**
K1BAZ					
/DV1	"	278,307	912	59	107
DU1TV	**14**	**42,744**	**195**	**25**	**53**

TUVALU

T2ARY	**A**	**1,831,886**	**2678**	**88**	**150**
				(Opr. OH1RY)	

MIRAGE /KLM

COMMUNICATIONS EQUIPMENT, INC.



KT-34XA TRIBANDER

BROADBAND EXCELLENCE THAT TAKES THE POWER

KLM's KT-34XA TRIBANDER is the 2nd generation of a unique new series of antennas designed to provide superior **broadband** coverage on 20, 15, and 10 meters. The combination of lossless linear loading and hi-Q air capacitors enables the KT-34XA to outperform **all** commercial available tribanders and meet or exceed the performance of a conventional stacked monoband system. The lower weight and windload of a single antenna mean reduced tower and rotator requirements. Thus, overall system costs can be kept to a minimum while enjoying the best of monobander-type performance.

KLM's field proven KT-34A is the heart of the "XA" model. The boom length of the "XA", however, has been doubled, and one tri-resonant and one full size 10 meter element have been added. These changes increase the gain to **11-11.3 dBd** on 10M, **9-9.5 dBd** on 15M, and **8.5-9 dBd** on 20M. Two driven elements are used to make the KT-34XA unusually broadbanded (a concept applied to many KLM antennas). Gain is virtually flat across each band except for 10 meters which has been optimized for the DX'er, 28-29 MHz. The chart shows the remarkable performance qualities of the KT-34XA.

The KT-34XA's design represents the first major advancement in tribander technology in over 20 years! The conventional traps, coils, and capacitors have been discarded in favor of integral linear loading and hi-Q air capacitors, all composed of aluminum tubing. These give the KT-34XA a conservative power handling capability of 4 KW PEP and an unusually high level of operating **efficiency**. Linear loading also makes full ¼-wave elements possible on 15 and 10 meters, and brings 20 meters much closer to the desirable ¼-wave than any conventional tribander.

BANDWIDTHS:	14.0-14.350 MHz 21.0-21.50 MHz 28-29 MHz	**GAIN:**	8.5-9dB 9-9.5dB 11-11.3dB
VSWR:	1.5:1	**BOOM LENGTH:**	32 ft. × 3″ O.D.
FB/FS:	20dB/40dB	**TURN RADIUS:**	21.5 ft.
FEED IMP.:	50 ohms w/balun	**WINDLOAD:**	9 sq. ft.
BALUN:	3-60-4:1 5KW PEP	**WT. (LBS.):**	75 lbs.
ELEMENT LENGTH:	24 ft.	**MAST:**	2″ O.D. (standard)

Mechanically, the KT-34XA has been built to survive the toughest weather conditions. All aluminum, including the boom, is strong 6063-T832 alloy. All electrical hardware is stainless steel. Virtually indestructible "Lexan" insulators, just like those on KLM's 40 meter "Big Sticker," are used for mounting the elements and insulating them from the boom. KLM's 3-60 MHz 4:1 balun is supplied for direct connection to any 50 ohm feedline.

Turn your KT-34A into an XA.
Call your local dealer for price.
W. Scott

MIRAGE /KLM

COMMUNICATIONS EQUIPMENT, INC.

P.O. Box 1000 • Morgan Hill, CA 95037
(408) 779-7363

CIRCLE 159 ON READER SERVICE CARD

SOUTH AMERICA

ANTARCTICA

DPØGVN	14	113,085	360	29	76

ARGENTINA

LU4LAV	**A**	**1,329,042**	**2399**	**96**	**190**
AZ1ARU	"	271,740	668	54	86
			(Opr. LU2DX)		
LU9DBK	"	134,442	462	40	59
LU1E	**28**	**754,490**	**2329**	**26**	**84**
			(Opr. LU3AJW)		
LU2E	"	**514,180**	**1858**	**25**	**69**
LU6FEC	"	**452,985**	**1521**	**26**	**75**
L4H	"	252,639	1073	22	59
LU8AJK	"	220,890	1037	23	51
LU6EJP	"	153,525	750	23	46
LU2DGZ	"	8,256	75	14	29
KØTO/LU	"	5,590	147	7	6
LU3MDO	**21**	**946,974**	**2188**	**35**	**112**
VP2ML/LU	"	6,208	69	9	23
LU8AE	"	2,457	43	13	14
LU4MEE	**14**	**573,300**	**1426**	**39**	**101**
LU1YU	"	17,766	140	19	28
LU5UL	**7**	**214,228**	**768**	**30**	**68**

BRAZIL

PY7ZZ	**A**	**1,094,808**	**1422**	**78**	**186**
PY4OY	"	**931,224**	**1171**	**76**	**200**
PT7CB	"	235,458	398	71	135
PT2TD	"	148,029	423	52	81
ZV2BW	"	126,224	281	65	119
PY4BA	"	90,334	343	32	62
PY1ZT	"	19,307	161	43	43
PY6YZ	"	13,644	131	21	20
PY1TIA	"	3,234	39	21	21
PY3CM	"	54	3	3	3
ZY5IW	**28**	**728,280**	**1982**	**30**	**96**
PY1LI	"	85,125	408	26	49
PT7CB	"	74,451	308	24	59
PY1ADE	"	64,350	315	28	47
PY2ZM	"	34,584	202	25	41
ZZ5EG	**21**	**2,184,570**	**4236**	**36**	**138**
			(Opr. N5FA)		
ZV7BZ	"	119,988	411	28	73
PT2ALD	"	8,056	79	15	23
PY5NF	"	5,069	47	13	24
PY5EG	**14**	**899,085**	**1856**	**37**	**128**
			(Opr. PY5ALP)		
PY1BKA	"	8,030	63	22	33
ZY5EG	**7**	**473,634**	**1182**	**36**	**111**

CHILE

CE3FIP	**A**	**3,643,269**	**3155**	**122**	**275**
CE3BFZ	"	**1,420,540**	**1989**	**83**	**159**
CE5CNT	"	112,096	320	53	71
CE3BYL	"	83,633	245	63	114
3G3Z	**28**	**304,080**	**1233**	**23**	**61**
			(Opr. CE3ZI)		
CE6DAQ	"	83,391	506	18	39
CE3GWO	"	5,420	92	8	9
CE6EZ	**21**	**1,008,484**	**2409**	**30**	**112**
CE4FXY	"	**885,354**	**2552**	**30**	**88**
3G3N	**14**	**472,386**	**1293**	**31**	**100**
			(Opr. CE3NR)		
CE5BSS	"	11,712	76	26	35

COLOMBIA

HK3BED	**A**	**1,405,396**	**1657**	**96**	**196**
HK2LSC	"	60,669	215	39	68
HK6BER	"	42,375	172	42	83
HK1LDG	**21**	**166,497**	**811**	**20**	**49**
HK6HFY	"	57,120	265	19	61
HK3JJH	"	36,160	202	17	47
HK1KYR	"	23,034	123	20	46
HK1HHX	**7**	**244,500**	**869**	**24**	**76**

EASTER ISLAND

CEØZIJ	**14**	**371,246**	**1077**	**33**	**89**

ECUADOR

HC5EA	**28**	**379,850**	**1211**	**30**	**77**
HC1TQ	"	15,317	126	18	35
HC1HV	**3.7**	**34,465**	**208**	**18**	**43**

FRENCH GUYANA

FY5YE	**A**	**6,484,830**	**4764**	**118**	**355**
			(Opr. OHØXX)		

GUYANA

8R1X	**A**	**8,940,450**	**5423**	**147**	**423**
			(Opr. NQ4I)		

NETHERLANDS ANTILLES

P4ØA	**A**	**8,172,930**	**4984**	**146**	**409**
			(Opr. N1GL)		
PJ2FR	"	**6,925,920**	**4911**	**142**	**338**
			(Opr. K4JPD)		

PARAGUAY

ZP5JCY	**21**	**1,707,888**	**3715**	**33**	**123**

PERU

OA4ZV	**A**	**1,907,765**	**2270**	**97**	**198**
OA4ED	"	59,094	309	44	90

SAN ANDRES ISLAND

N3JT					
/HKØ	**A**	**2,756,520**	**4711**	**73**	**187**

TRINIDAD-TOBAGO

9Y4AT	**21**	**1,106,145**	**2683**	**35**	**106**

URUGUAY

CX9CO	**A**	**1,731,184**	**1648**	**104**	**260**
CX2AAL	**28**	**342,054**	**1250**	**25**	**68**

VENEZUELA

4M4A	**A**	**1,831,467**	**2487**	**88**	**165**
			(Opr. K3UOC)		
YU5IAL	"	505,230	1038	53	112
OA4BOF					
/YV4	"	25,194	96	46	68
YV5EF	"	1,325	19	9	16
4M7A	**28**	**604,608**	**2152**	**27**	**69**
			(Opr. YV7QP)		
YV6PM	"	320,705	1433	26	51
YY1C	**21**	**93,227**	**589**	**17**	**36**
			(Opr. YV1CP)		
YW1A	**14**	**1,002,592**	**2190**	**33**	**119**
			(Opr. YV1AVO)		
YV3BKC	"	176,734	622	28	69
YY1DOB	"	22,072	140	13	49
YV6BTF	**7**	**230,724**	**780**	**27**	**105**
YW5D	"	**141,900**	**444**	**25**	**85**
YV5CMI	**1.8**	**3,010**	**72**	**5**	**9**

MULTI-OPERATOR SINGLE-TRANSMITTER NORTH AMERICA UNITED STATES

K1AR	**3,511,632**	**2039**	**139**	**457**
K1YR	**2,750,368**	**1978**	**122**	**366**
K1RQ	2,436,902	1752	123	371
NB1H	2,165,792	1735	109	315
K1TO	1,570,752	1359	100	304
KM1C	1,234,240	1112	109	297
KG1D	913,653	933	95	256
K1ST	524,628	568	93	249
W1YK	487,046	663	81	185
W1RR	441,530	489	91	244
KD2EU/1	341,000	487	68	182
W1BK	215,800	333	77	183
KT1O	177,156	298	65	157
K1KI	25,192	106	35	59
K1TR	15,664	78	34	55
KQ1F	15,323	76	27	50
N2ME	**3,973,546**	**2146**	**146**	**500**
WB2ULI	**2,655,537**	**1743**	**135**	**386**
KU2C	2,349,027	1608	129	384
W2VJN	1,651,260	1326	114	321
KQ2O	906,535	1083	78	217
W2RR	496,671	522	97	256
W2UI	367,715	512	69	182
K2TD	122,400	229	61	139
WB2LVC	67,068	324	58	149
N2FHK	15,194	214	26	45
N3RS	**3,929,396**	**2742**	**146**	**482**
K3TUP	2,356,415	1732	114	357
K3WW	2,063,936	1357	136	408
AA1K/3	1,946,148	1402	130	378
WA3SPJ	1,311,240	1149	117	303
W3AP	1,186,146	1022	125	286
WA3EUL	873,948	788	105	297
N3EC	746,746	710	95	278
K3UEI	140,767	270	60	131
W3NX	82,720	196	54	106
KX4S	**4,335,969**	**2354**	**151**	**498**
N4WW	**3,623,833**	**2044**	**155**	**476**
N4ZC	**3,587,985**	**1968**	**149**	**490**
N4RJ	2,771,400	1782	141	455
W4XJ	1,553,418	1260	118	328
WI4R	1,088,610	1016	112	281
WB4PRX	888,384	754	119	329
WA4QQV	878,490	858	106	281
K8UNP/4	578,646	597	101	265
KB4IT	245,872	380	75	167
N4KZR	204,594	445	57	126
KJ4KS	204,010	327	68	162
N4HOH	166,254	258	71	158
N4TL	130,112	238	75	139
WS4E	126,202	255	59	119
KD4OM	121,747	215	68	143
WA4YLD	120,581	257	58	115
K4ZCQ	120,546	250	52	129
WB4GNT	54,180	150	43	97
W400	41,409	139	38	69
W4OWJ	33,855	128	46	65
W4WJ	31,416	113	30	72
WA4CTC	14,484	74	20	51
KB4FO	3,403	39	16	25
W5WMU	**3,239,474**	**2076**	**137**	**416**
N3BB/5	**2,034,894**	**1562**	**129**	**329**
KC5DX	832,714	981	104	245
WC5Y	687,258	838	93	204
W5JDV	477,996	795	81	163
NF7T/5	464,653	636	95	192
K5RVK	460,795	1291	123	124
K5BDA	8,528	71	11	41
N6ND	**3,180,950**	**1995**	**153**	**410**
W6TMD	**1,958,503**	**1563**	**130**	**313**
WC6H	1,474,780	1368	116	264
W6GO	1,125,396	1066	121	266
NB6L	1,019,919	1023	110	249
W6BIP	840,140	845	110	243
N6ADI	783,300	828	119	212
WX6M	582,435	743	102	199
K6XO	550,563	791	91	156
KE6WL	341,550	454	96	174
W6KCB	308,654	560	61	133
AG6D	288,648	470	84	144
N6MB	245,575	415	74	135
N6CCL	200,128	354	82	130
WV6N	183,111	338	72	129
KG6AO	148,005	332	65	100
W6JTI	140,238	319	69	90
KC7V	**2,149,780**	**1656**	**134**	**336**
W7ZR	1,723,524	1701	122	241
K7LXC	1,538,988	1360	120	273
N7RO	1,276,464	1166	126	267
KA6V/7	337,322	553	87	140
K7ABV	315,900	689	52	110
KC7MM	309,092	608	70	126
W8CZN	**2,509,501**	**1794**	**135**	**356**
N8CXX	2,005,602	1481	121	361
KE8FX	748,713	765	103	250
KS9K	**3,236,112**	**1904**	**147**	**447**
KQ9L	825,588	908	104	238
N89C	624,351	835	74	199
KD9ST	299,472	706	56	148
K4VX/Ø	**3,490,576**	**2033**	**154**	**472**
NDØE	**1,638,934**	**1306**	**137**	**314**
KFØH	1,217,370	1122	111	274
WØXK	768,496	810	102	242
KRØB	733,488	761	103	251
NØGA	449,616	546	89	215
NØDPS	286,101	411	81	168
WBØHCH	251,040	404	75	165
KBØKK	70,064	178	58	93
WØQQQ	40,061	150	30	67

ALASKA

KL7HFA	**1,315,008**	**2490**	**79**	**137**
AL7FQ	**1,191,632**	**2457**	**74**	**134**
WL7K	440,394	1031	64	110

ANGUILLA

VP2EC	**11,547,536**	**6484**	**163**	**558**

BERMUDA

N4SF/VP9	**3,680,532**	**4951**	**91**	**227**

CANADA

VE3BVD	**6,131,169**	**4307**	**141**	**420**
VE4ALO	**1,644,104**	**2427**	**96**	**212**
VE1MUF	**598,104**	**1097**	**63**	**153**
VE5GF	**512,082**	**1102**	**79**	**139**
VE4UM	430,440	1104	59	111
VE1CIT	366,068	998	38	135
VE3HUM	101,016	420	25	67
VE6CIZ	62,488	239	39	59

MEXICO

4C2C	**1,234,539**	**2614**	**81**	**148**

NICARAGUA

WBØNAA/Y-				
N1	**1,148,160**	**2446**	**71**	**137**

PANAMA

HP8BBM	**20,448**	**111**	**30**	**42**

PUERTO RICO

KP4BZ	**10,596,868**	**7009**	**152**	**492**

ST. MAARTIN

PJØJ	**3,300,254**	**4230**	**93**	**241**

AFRICA

CANARY ISLANDS

EA8LS	**2,479,542**	**2148**	**99**	**294**

REUNION ISLAND

FR/W6QL	**513,820**	**842**	**71**	**160**

ASIA

HONG KONG

VS6DO	**2,458,932**	**3444**	**136**	**265**

JAPAN

JA1YYE	**2,759,525**	**2278**	**144**	**281**
JA1YAD	1,041,806	1096	118	228
JR1ZTI	583,120	703	108	188
JA1YFG	268,048	546	64	112
JE2YRD	**2,681,560**	**2015**	**147**	**341**
JA2YEF	354,564	656	77	119
JA2YDC	229,500	514	72	98
JA3YQP	**586,117**	**979**	**78**	**139**
JA3YDS	45,684	198	28	53
JA4YPE	108,698	306	54	85
JA6YAI	**2,350,358**	**1839**	**134**	**320**
JH6ZHH	107,865	310	47	88
JH7YJF	**2,709,977**	**2237**	**133**	**288**
JA7YAB	308,250	504	81	144
JR7YCM	66,646	252	38	56
JA8YBY	**529,419**	**730**	**84**	**79**
JA8YCX	20,068	136	22	36
JA8YAK	**2,171,988**	**1733**	**143**	**299**

KOREA

HL9OS	**585,600**	**1272**	**68**	**124**

PEOPLES REPUBLIC OF CHINA

BY1PK	**1,182,104**	**2475**	**93**	**173**
BY4AA	**919,056**	**2059**	**94**	**152**
BY5QA	257,621	1350	61	88
BY4SZ	75,276	808	41	37

THAILAND

HSØA	**2,350,892**	**2985**	**116**	**272**

TURKEY

TA2KB	**68,956**	**760**	**40**	**107**

U.S.S.R. ASIA

ARMENIA

UG7GWB	**313,257**	**732**	**38**	**109**

ASIATIC RUSSIA

UZ9AYA	**3,396,858**	**2439**	**125**	**373**
UZ9WWS	1,227,657	1505	82	227
UZ9XXM	437,525	904	47	138
UV9UWW	405,260	950	81	149
UZ9CYP	374,808	747	45	149
UZ9XWV	193,402	495	46	103
UZ9XWH	156,780	465	38	96
UZ9CWX	59,592	239	28	76
UZ9CWQ	22,600	200	10	13

KAZAKH

RL8PYL	**6,839,676**	**4640**	**153**	**473**
UL8FWT	219,716	659	41	92
UL8LWA	196,416	615	40	87
UL8CWW	152,823	474	31	90

EUROPE

ANDORRA

C31LDL	**3,619,928**	**3637**	**121**	**361**

AUSTRIA

OE5VBL	**133,980**	**625**	**46**	**128**

BELGIUM

ON6MH	**983,390**	**1355**	**82**	**208**

BULGARIA

LZ7A	**7,711,234**	**5031**	**164**	**509**
LZ1KSN	1,244,864	2156	96	271
LZ1KVZ	565,914	1485	68	189
LZ1KGB	279,522	1186	32	74
LZ1KEZ	248,472	564	65	167
LZ1KNP	159,225	463	47	146

CRETE

J49A	**1,752,408**	**3137**	**93**	**306**

CZECHOSLOVAKIA

OK3KII	**2,274,209**	**2144**	**124**	**369**
OK3KCM	1,683,738	2098	105	414
OK3KAG	1,450,990	2103	95	314
OK2RAB	900,320	1428	89	251
OK1ORA	210,210	679	44	138
OK2KNP	25,608	272	21	67
OK2KJU	13,804	110	24	34
OK2KNC	8,370	69	21	33
OK2KPS	1,400	46	5	20

DENMARK

OZ1KWC	**435,784**	**889**	**66**	**178**

ENGLAND

G3NAS	**2,775,216**	**2585**	**107**	**349**

FINLAND

OH7AI	**722,850**	**1055**	**90**	**276**
OH9AR	400,288	1016	51	173
OH6AT	378	19	3	4

FRANCE

F6BEE	**6,022,130**	**4211**	**139**	**451**
F6IFR/p	517,712	993	66	181

GERMANY (FRG)

DK1QH	**1,764,536**	**2306**	**95**	**272**
DFØBV	**1,473,636**	**1506**	**113**	**331**
DL3MAA	1,048,332	1219	104	335
DLØJK	949,864	1312	80	216
DLØWH	875,524	1126	82	216
DLØJU	857,485	1046	90	227
DLØUM	472,578	809	65	172
DLØTP	225,750	557	72	143

GERMANY (GDR)

Y34K	7,012,140	4994	141	429
Y22YD	883,449	1494	93	240
Y54ZL	247,544	652	59	173
Y49ZF	180,184	638	51	151
Y22TF	1,904	63	9	25

HUNGARY

HG5A	**6,633,882**	**4768**	**144**	**462**
HG6N	**6,123,610**	**4434**	**137**	**453**
HG9R	**5,962,537**	**4350**	**150**	**493**
HG7B	5,395,550	4167	144	446
HA5KKC	2,187,588	2598	95	284
HG1S	1,379,116	2361	74	218
HA2KMR	1,242,826	1963	85	253
HA8KWG	1,072,497	1616	101	292
HA5KDB	996,012	1942	79	213
HA3KNA	983,003	1646	97	264
HA5KFL	492,507	1008	69	192
HA5KAG	381,990	860	42	198
HA8KZC	201,435	593	53	142
HA6KNX	87,381	436	38	95
HA2KPA	16,188	209	17	54

IRELAND

EI1AA	**2,085,594**	**2399**	**86**	**271**

ITALY

I5NPH	**9,368,892**	**5209**	**164**	**538**
I2UIY	2,448,290	2049	121	388
IK6CGO	1,819,121	1991	83	290
I2MQP	1,689,473	2070	105	316
IK2ASH	365,310	605	70	200

LIECHTENSTEIN

HBØ/HB9BH-				
A	**2,161,352**	**2291**	**100**	**312**

NETHERLANDS

PAØKHS	**730,728**	**1212**	**86**	**220**

NORWAY

LA2AB	**2,061,242**	**2372**	**108**	**290**
LA1K	561,870	1257	62	208

POLAND

SP5PBE	**1,235,464**	**1561**	**102**	**287**
SP9PDF	368,352	716	86	202
SP9KOU	303,688	724	59	173
SP1PBW	236,643	673	56	157
SP5ZIM	141,404	519	53	159
SP2KFV	80,631	353	45	108
SP9PDJ/9	32,046	244	23	86
SP6PBQ	10,207	92	21	38
SP5PKN	5,042	130	27	68

PORTUGAL

CR1REP	24,128	137	33	71

ROMANIA

YO6KBM	89,125	397	63	92

SCOTLAND

GMØBRS	**1,390,095**	**2020**	**73**	**242**

SICILY

IT9CHU	**696,486**	**1309**	**75**	**234**

SPAIN

ED7BB	**4,486,446**	**3415**	**126**	**436**
EA3CCN	2,426,135	2346	116	363
ED3QD	871,008	1861	67	191
EA1BCF	163,944	425	54	130
EA5FCM	28,116	154	34	65

SWEDEN

SK6RR	**2,441,368**	**2753**	**96**	**280**
SK6AW	981,749	1413	81	236
SM5AZU	61,880	218	37	103

SWITZERLAND

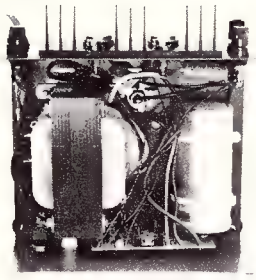
HB9BOU	**2,585,460**	**2225**	**129**	**363**
HB9AUS	1,198,920	1535	113	299
HB9CXZ	971,520	1277	93	291
HB9GT	424,340	913	68	177

Say You Saw It In CQ

ASTRON CORPORATION
9 Autry
Irvine, CA 92718
(714) 458-7277

ASTRON POWER SUPPLIES

• HEAVY DUTY • HIGH QUALITY • RUGGED • RELIABLE •



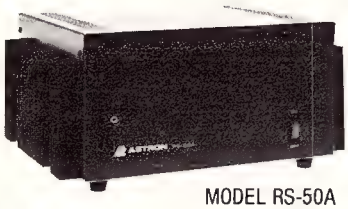
INSIDE VIEW — RS-12A

SPECIAL FEATURES

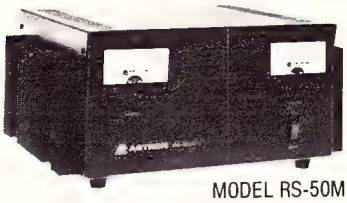
- SOLID STATE ELECTRONICALLY REGULATED
- FOLD-BACK CURRENT LIMITING Protects Power Supply from excessive current & continuous shorted output
- CROWBAR OVER VOLTAGE PROTECTION on all Models **except RS-3A, RS-4A, RS-5A.**
- MAINTAIN REGULATION & LOW RIPPLE at low line input Voltage
- HEAVY DUTY HEAT SINK • CHASSIS MOUNT FUSE
- THREE CONDUCTOR POWER CORD
- ONE YEAR WARRANTY • MADE IN U.S.A.

PERFORMANCE SPECIFICATIONS

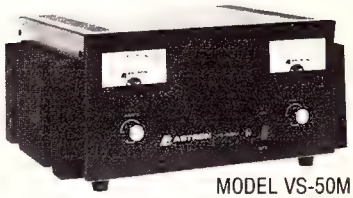
- INPUT VOLTAGE: 105-125 VAC
- OUTPUT VOLTAGE: 13.8 VDC ± 0.05 volts (Internally Adjustable: 11-15 VDC)
- RIPPLE Less than 5mv peak to peak (full load & low line)
- **Also available with 220 VAC input voltage**



MODEL RS-50A



MODEL RS-50M



MODEL VS-50M

RM SERIES



MODEL RM-35M

19″ × 5¼ RACK MOUNT POWER SUPPLIES

MODEL	Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H × W × D	Shipping Wt. (lbs.)
RM-12A	9	12	5¼ × 19 × 8¼	16
RM-35A	25	35	5¼ × 19 × 12½	38
RM-50A	37	50	5¼ × 19 × 12½	50
• Separate Volt and Amp Meters				
RM-12M	9	12	5¼ × 19 × 8¼	16
RM-35M	25	35	5¼ × 19 × 12½	38
RM-50M	37	50	5¼ × 19 × 12½	50

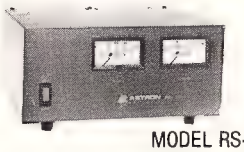
RS-A SERIES



MODEL RS-7A

MODEL	Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H × W × D	Shipping Wt. (lbs.)
RS-3A	2.5	3	3 × 4¾ × 5¾	4
RS-4A	3	4	3¾ × 6½ × 9	5
RS-5A	4	5	3½ × 6⅛ × 7¼	7
RS-7A	5	7	3¾ × 6½ × 9	9
RS-7B	5	7	4 × 7½ × 10¾	10
RS-10A	7.5	10	4 × 7½ × 10¾	11
RS-12A	9	12	4½ × 8 × 9	13
RS-12B	9	12	4 × 7½ × 10¾	13
RS-20A	16	20	5 × 9 × 10½	18
RS-35A	25	35	5 × 11 × 11	27
RS-50A	37	50	6 × 13¾ × 11	46

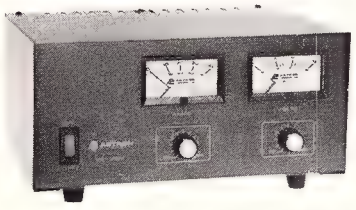
RS-M SERIES



MODEL RS-35M

MODEL	Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H × W × D	Shipping Wt. (lbs.)
• Switchable volt and Amp meter				
RS-12M	9	12	4½ × 8 × 9	13
• Separate volt and Amp meters				
RS-20M	16	20	5 × 9 × 10½	18
RS-35M	25	35	5 × 11 × 11	27
RS-50M	37	50	6 × 13¾ × 11	46

VS-M AND VRM-M SERIES



MODEL VS-35M

• Separate Volt and Amp Meters • Output Voltage adjustable from 2-15 volts • Current limit adjustable from 1.5 amps to Full Load

MODEL	Continuous Duty (Amps) @13.8VDC	@10VDC	@5VDC	ICS* (Amps) @13.8V	Size (IN) H × W × D	Shipping Wt. (lbs.)
VS-12M	9	5	2	12	4½ × 8 × 9	13
VS-20M	16	9	4	20	5 × 9 × 10½	20
VS-35M	25	15	7	35	5 × 11 × 11	29
VS-50M	37	22	10	50	6 × 13¾ × 11	46
• Variable rack mount power supplies						
VRM-35M	25	15	7	35	5¼ × 19 × 12½	38
VRM-50M	37	22	10	50	5¼ × 19 × 12½	50

RS-S SERIES



MODEL RS-12S

• Built in speaker

MODEL	Continuous Duty (Amps)	ICS* Amps	Size (IN) H × W × D	Shipping Wt. (lbs.)
RS-7S	5	7	4 × 7½ × 10¾	10
RS-10S	7.5	10	4 × 7½ × 10¾	12
RS-12S	9	12	4½ × 8 × 9	13
RS-20S	16	20	5 × 9 × 10½	18

*ICS—Intermittent Communication Service (50% Duty Cycle 5min. on 5 min. off)

CIRCLE 81 ON READER SERVICE CARD

UN GENEVA

4U1ITU	1,349,898	2219	84	255

UN VIENNA

4U1VIC	1,854,142	2222	105	356

YUGOSLAVIA

YT2R	3,526,152	2888	141	415
YU3AI	2,339,904	2770	85	251
4N2M	219,735	423	82	175
YU4BAB	131,313	523	40	129

U.S.S.R. EUROPEAN

BYELO-RUSSIA

UC1AWC	1,461,250	2239	85	265
UC1AWZ	18,144	191	23	58
UC1WWY	5,625	81	19	26
UC1AWU	1,368	49	10	14
UC1WWC	1,280	34	11	21

ESTONIA

UR1RWX	4,573,730	3415	149	437
UR1RWW	934,912	1424	90	242
UR1RYY	740,868	1451	73	248
UR1RXL	78,840	403	31	104

EUROPEAN RUSSIA

UZ6LWZ	2,610,216	2610	130	374
UZ4WWB	816,136	1557	74	215
UZ3QWX	799,744	1393	82	270
UZ3DXW	787,150	1462	80	245
UZ4WWG	602,330	1008	84	206
UZ3AWH	582,329	940	79	238
UZ3WWW	487,032	1182	70	203
UZ4LWA	425,810	813	62	183
UZ4AWT	413,364	854	74	220
UZ1OWZ	360,258	974	51	143
UZ4AWB	269,724	570	74	173
UZ4YWW	212,619	770	67	120
UZ6XWC	171,912	611	40	134
UZ6YWB	115,425	831	29	56
UZ6HXK	95,670	787	21	45
UZ3AYR	72,990	333	27	63
UZ4NWM	22,785	199	29	76
UZ3DXF	16,146	135	28	50
UZ3AXH	9,860	60	27	41
RZ6AWP	7,992	112	17	37

KALININGRAD

UZ2FWA	4,020,003	3900	123	384

KARELIA

UZ1NWO	209,945	670	52	159

LATVIA

UQ1GWW	5,771,841	4418	135	414
UQ1GZW	3,879,600	3408	131	399
UQ1GWT	38,883	466	41	80
UQ1GXW	37,976	286	23	78
UQ1GWE	32,558	335	44	107
UQ1GXY	31,210	449	27	104

LITHUANIA

UP1BWW	3,730,145	3218	122	393
UP1BZA	2,820,304	2590	115	376
UP1BZO	1,104,048	1593	96	278
UP1BWG	777,915	1452	70	225
UP1BYK	273,542	644	63	170
UP1BYC	171,414	664	37	141

UKRAINE

UB4MWA	1,764,192	2376	97	279
UB4CWW	1,154,016	2590	73	215
UB4WZA	1,117,584	1304	112	320
UT4UXW	806,124	1547	88	253
UB4MZL	762,522	1475	81	253
UB4MZU	688,818	1192	86	232
UB4MYP	592,410	1161	79	231
RT0U	491,470	1299	66	179
UB3QZZ	216,450	727	47	148
UB4QXU	109,190	542	34	88
UB4SWM	54,984	415	29	87
UB4MWU	47,520	268	29	81
UT4UWE	16,199	301	23	72

OCEANIA

HAWAII

AI6V/KH6	3,731,134	3497	121	241

INDONESIA

YE0X	3,455,412	2934	116	288

NAURU

C21NI	2,510,890	3404	95	162

PHILIPPINES

DX1A	2,662,506	3728	86	152
4D0P	867,040	1821	56	104
DX9HT	575,712	1397	53	91

SOUTH AMERICA

ARGENTINA

LU2FDR	4,348,252	3715	109	295
LU1VZ	2,559,426	2683	102	224
LU7DEE	1,475,346	1833	92	186
LU1HPW	1,200	60	8	11

CHILE

CE6OS	3,245,216	2937	110	267
CE4TA	2,500,360	2538	101	239
CE2AA	2,433,560	2534	104	238
3G1B	1,683,012	2081	85	193

COLOMBIA

HK3MAE	811,300	1089	77	189

GALAPAGOS ISLANDS

HC8DX	6,564,480	4710	132	348

URUGUAY

CV1D	9,636,250	5291	172	478

MULTI-OPERATOR MULTI-TRANSMITTER NORTH AMERICA

UNITED STATES

N5AU	11,116,064	5216	169	583
N2AA	10,646,094	5031	160	601
W3LPL	7,531,680	3800	158	552
N6RO	6,858,638	4383	155	438
NR5M	6,217,750	3450	159	487
AD8P	6,066,450	3420	165	498
NF2L	3,897,649	2409	142	421
K1NG	3,318,091	2046	143	438
W3GM	2,402,887	1660	139	430
K3ZZ	2,287,890	1704	121	374
W6XJ	1,517,120	1300	126	314
K3II	1,142,472	1052	92	270
N1AU	956,736	966	93	259

CANADA

VE7ZZZ	5,442,267	5666	134	283

COSTA RICA

TI2OY	2,037,210	3463	89	178

DOMINICAN REPUBLIC

HI6BRCD	413,664	1294	56	83

MONSERRAT

VP2MU	12,870,580	8878	148	472
VP2MW	8,994,390	8222	118	352

AFRICA

MADEIRA ISLAND

CQ9MI	1,719,893	2100	84	193

ASIA

CYPRUS

P36P	7,045,916	4991	114	373

JAPAN

JA9YBA	6,535,354	4110	159	394
JA2YKA	6,292,141	3922	154	393
JA1YWX	4,810,680	3342	151	353
JA3YKC	4,180,164	2726	153	374
JA7YRR	3,568,266	2716	146	313
JA7YFJ	2,513,706	2570	115	223
JA4ZQA	2,136,024	2013	124	272
JA3YBF	2,131,824	2141	122	246
JH8YCT	635,688	1027	81	137
JA1YAC	609,062	962	92	141
JA1YXP	222,712	491	54	110
JA2YEC	87,330	265	57	66
JA3YCT	39,846	201	47	40
JH1YTX	20,764	134	29	29
JR1ZTT	15,525	74	34	41

JORDAN

JY7Z	14,341,888	7603	163	541

EUROPE

BELGIUM

ON6NL	1,775,741	2372	98	309

DENMARK

OZ4HAM	129,600	594	41	121

ENGLAND

GB6AA	997,150	1396	93	277

GERMANY (FRG)

DF3OG	1,564,584	1569	120	349

LIECHTENSTEIN

HB0AON	3,815,175	3871	110	415

LITHUANIA

UP9A	11,807,040	8664	157	515

LUXEMBOURG

LX/DF6OC	199,155	637	49	164

NETHERLANDS

PI4DEC	500,688	1220	58	170

NORWAY

LA7O	5,403,606	4687	134	373

SWEDEN

SK2OG	329,745	686	49	218

UKRAINE

UB3IWA	8,899,100	6452	171	529

YUGOSLAVIA

4N1C	4,572,774	5225	117	369

OCEANIA

HAWAII

KH6XX	12,500,823	8026	163	374

INDONESIA

YB0ZDC	366,828	819	54	100

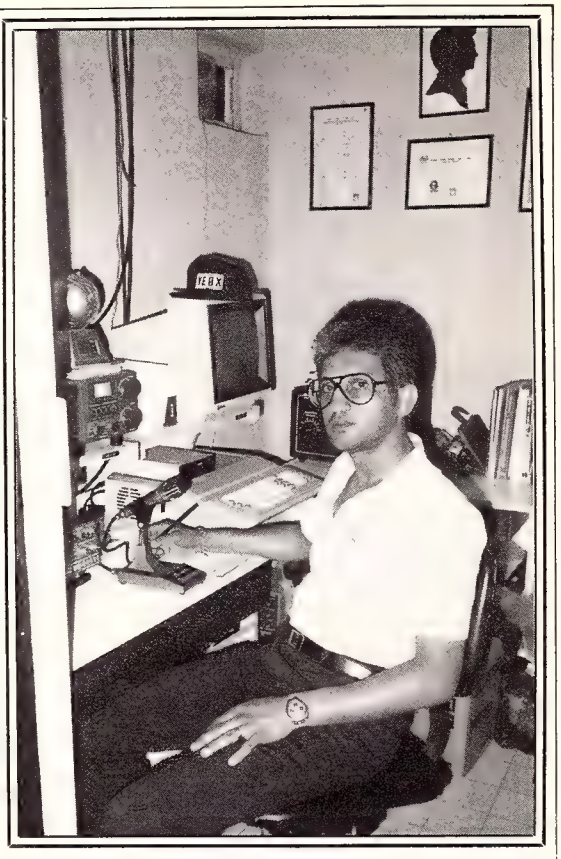
SOUTH AMERICA

BONAIRE

PJ1B	25,366,605	12217	168	537

QRPp

WP4G	A	678,056	1191	82	180
VE1CBF	"	550,316	893	60	187
K3WS	"	291,846	423	77	177
4X6IF	"	263,313	613	42	111
N1AFC	"	235,125	400	55	154
EA3FUM	"	116,640	383	50	130
YO2AQB	"	113,826	468	44	139
AH6EK	"	88,683	307	48	55
KZ5Q	"	71,604	186	53	109
W6YVK	"	65,312	230	43	61
OH5NHI	"	63,020	237	43	94
HK7IMB	"	49,088	193	40	64
WA8AGH	"	43,218	116	41	85
G4MTC	"	41,195	271	26	81
G3KDB	"	35,640	160	31	77
ON8WN	"	32,330	152	29	81
JH3TXP	"	18,663	101	24	47
KH6CP/1	"	12,012	70	30	47
PA2REH	"	11,336	93	21	83
FD1BEG	"	10,664	96	22	40
WA7TUX	"	9,983	81	33	34
KA1SR	"	9,154	103	38	73
RB5IIU	"	8,832	66	14	32
UY5VA	"	8,476	103	18	34
EA3DNC	"	7,770	94	15	55
SP5NHV	"	6,552	129	9	43
SP2BMX	"	6,431	51	24	35
DF7MV	"	5,336	82	14	44
Y21XC	"	703	15	8	11
Y25CF	"	600	29	5	20
EA4DQD	28	40,236	245	21	63
EA4CFN	"	26,880	159	19	61
EA5FCJ	"	25,200	181	19	51
JR3RWB	"	23,680	135	25	39
EA7DZL	"	11,760	104	17	39
JH9HXF/1	"	9,360	65	18	34
EA3FHC	"	8,695	133	13	34
WA0VBW	"	5,904	56	13	28
EA4CHI	"	4,329	61	10	29
VE7EKS	"	153	7	4	5
JE1BQE	"	81	4	3	3
LZ2EW	21	87,010	350	29	81
ZS6PT	"	30,340	143	29	45
JR8OGB	"	26,314	163	25	34
JR0AMD	"	14,344	125	25	43
JO1SVX	"	13,800	99	20	30
UB5RCA	"	13,750	152	14	36
JL3AMK	"	9,900	79	19	31
JE7DOT	"	5,910	73	13	17
JR4LTZ	"	1,564	27	11	12
Y24XA	"	860	24	6	14
OK1HBT	"	182	10	6	7
JA1JSF	14	54,351	236	25	56
JA2VKD	"	38,313	170	28	53
LZ1DB	"	36,450	345	18	57
GM4ELV	"	32,560	320	16	64
ZL1BIL	"	31,584	133	26	58
W6CN	"	19,430	122	21	37
EA1CJJ	"	18,850	210	13	52
IK0GPS	"	16,815	268	10	47
RB5QD	"	14,465	170	14	41
UB5WAB	"	10,123	96	15	38
PA0NRD	"	5,330	106	7	34
SP2RIB	"	3,772	38	15	31
SM5ODQ	"	108	9	2	2
SP6CZ	7	7,488	123	9	43
NZ5A	"	4,680	65	13	26
JH7ZZO	"	4,142	46	17	21
HK3LBU	"	1,664	23	3	14
Y24MB	"	425	25	3	14
UB5IRN	3.7	11,184	206	8	40
OK1AIJ	"	3,078	115	4	23
Y22AN	"	2,808	105	4	23
Y24SB	"	2,511	82	4	27
SP4GFG	"	1,728	65	4	23
OK2SLL	"	902	43	4	18
Y49RF	"	792	40	3	19
SP9FMP	"	329	23	3	11
Y49OF	"	225	15	3	12
Y26EH	"	204	19	2	10
JA1KFX	"	96	7	4	4
OK1MP	1.8	3,744	87	5	34
RB5IOV	"	1,296	38	7	17
OK3IAG	"	998	36	4	23
UB5WEQ	"	352	26	4	12



DI1IP, YC0EJG number one on 21 MHz in Oceania.

CHECK LOGS

Our thanks go to the following stations who sent in check logs: CE2CQZ, CE6DFY, CT1CLU, CT1DIZ/CU3, DL1AM/A, DL9HP, EA1AUS, EA1CBY, EA1DQB, EA1DXS, EA2BEJ, EA2CAC, EA2CDG, EA2QU, EA3FSU, EA3FWE, EA4DPK, EA5BVR, EA5EZS, EA5FFQ, EA5FVY, EA7BCT, EA7CDD, EA7DHF, EA7DHK, EA7DOH, EA7DUD, EA7EL, EA7FLU, EA7FTR, EA7ZR, EA7GBD, EA7GEZ, EA7OLA, EA8AKQ, EA8AMX, EA8AXT, EA8AVV, F11CDP, GJ0/DK2ZO, HA4XX, HK1LDG, HK3BFU, HK3DDD, K9AY, LA1FW, LA1TCA, LA3WBA, LA4TG, LA5EBA, LA5QK, LA5XAA, LA6PBA, LA7ZN, LA8CJ, LA9OI, LU1HGN, LZ1KAU, LZ1KAZ, LZ1KSD, LZ2KKZ, LZ2RS, N7BD, OH2BKF, OH2KI, OH5PT, OK1AYU, OK1MHI, OK2PLH, OK2-31-325, OK3CGT, OK3IA/UA3, ON5CZ, ON5FV, OZ1EBD, OZ1FNX, OZ1KZL, OZ2TH, OZ4ZT, OZ8AE, OZ8WD, PA3AAN, PA3EMN, PA0BDO, PA0RWS, PA0TV, PU3ESB, PY10L, PY2LV, PY3EM, PY4KB, RA0JB, RA1AE, RA1QAZ, RA1QE, RA3AR, RA3AUP, RA3EA, RA3VR, RA4NAI, RA6LR, RA9FA, RA9JB, RB5AE, RT4UA, RV6AB, RV6AF, RV9UV, RZ1OWA, RZ3AM, RZ3DM, SK6TW, SM3CBR, SM3QJ, SM4AWC, SM4JUW, SM5AOZ, SM5DQC, SM5CVC, SM5LI, SM5UF, SM6AVM, SM6KMD, SM6LJP, SM6ODI, SM6PVB, SM7ASN, SM0BFJ, SM0CSX, SP1CGP, SP1DMD, SP1EUS, SP2BKI, SP2DKI, SP2GWH, SP2HGG, SP2JVT, SP2UUU, SP3IUM, SP3NUT, SP4AS, SP4DC, SP5CWQ, SP5EAQ, SP5ENA/7, SP5GMK, SP5ILO, SP5SS, SP6ECF, SP6FER, SP6HFI, SP6JZB, SP8AG, SP8DIP, SP8EMO, SP8GZB, SP8HJC, SP8RJ, SP8SIP, SP9HZF, SP9JRO, SP9LDI, SP9MDY, SP9MRO, SP9ODE, UA0AAB, UA1AUA, UA1CK UA1QD, UA3ACJ, UA3AGW, UA3AHA, UA3AIF, UA3DAO, UA3DLD, UA3DMY, UA3DPH, UA3PB, UA3PDW, UA3QMK, UA3QUK, UA3RDG, UA3RFZ, UA3RMW, UA4CGP, UA4UBC, UA6ALT, UA6LDX, UA6LMT, UA6VY, UA9AKF, UA9CB, UA9CHM, UA9FZ, UA9MDV, UA9TS, UA9ZAC, UB5IBM, UB5JOO, UB5JQS, UB5UCH, UB5UIC, UF6VB, UL7BW, UL7ECH, UL7NR, UL8JWR, UM8MD, UM8MGO, UO1GXJ, UQ2GLQ, UQ2GMR, UR2RCU, UR2RMC, UT4UH, UT4UW, UT5UCH, UT5UDG, UT5UH, UV3DN, UV3FD, UV6HP, UW1BI, UW3AA, UW3HY, UW4NN, UW6AA, UW6HS, UW9CL, UW0CW, UZ3AZG, UZ3QWM, UZ3SWW, UZ3TWT, UZ4HWD, UZ4HWZ, UZ4SWF, UZ9QWM, UZ9YXO, UY5GG, VE3NXQ, W2HAX, W2NRD, XE2PMG, YZ1BG, Y21RO/A, Y21UD, Y22YJ, Y23CO, Y23NL, Y24CE/A, Y24EG, Y24LN/A, Y24WJ, Y24XD, Y25BL, Y25SM, Y26GN, Y26JD, Y26SO, Y26ZI/A, Y27GL/A, Y28UN, Y32KI, Y33ON, Y33TB, Y35VG, Y38YE, Y39ZC, Y41SM, Y43VF, Y48YB, Y52NE,Y53PN, Y53UL, Y53VL, Y53YN, Y54NL, Y54TO, Y54ZL/Y43EO, Y55UG, Y55YA, Y56SG, Y56VF, Y58YM, Y62SM, Y66QL, Y67RI, Y73XH, Y75YL, Y78XL, YV5IVI, YY1C, ZL2BDC.

Disqualification: K3TUP 15 meter log—unverifiable contacts.

Say You Saw It In CQ

NEW! CB Radios & Scanners

Communications Electronics,™ the world's largest distributor of radio scanners, introduces new models of CB & marine radios and scanners.

NEW! Regency® TS2-RA

Allow 30-90 days for delivery after receipt of order due to the high demand for this product.

List price $499.95/**CE price $339.95**

12-Band, 75 Channel • Crystalless • AC/DC

Frequency range: 29-54, 118-175, 406-512, 806-950 MHz.

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List price $299.95/**CE price $148.95/SPECIAL**

8-Band, 60 Channel • No-crystal scanner

Bands: 30-50, 88-108, 118-136, 144-174, 440-512 MHz.

The *Regency* Z60 covers all the public service bands plus aircraft and FM music for a total of eight bands. The Z60 also features an alarm clock and priority control as well as AC/DC operation. Order today.

Regency® Z45-RA

List price $259.95/**CE price $139.95/SPECIAL**

7-Band, 45 Channel • No-crystal scanner

Bands: 30-50, 118-136, 144-174, 440-512 MHz.

The *Regency* Z45 is very similar to the Z60 model listed above however it does not have the commercial FM broadcast band. The Z45, now at a special price from Communications Electronics.

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16 Channel • 25 Watt Transceiver • Priority

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Bearcat® 50XL-RA

List price $199.95/**CE price $114.95/SPECIAL**

10-Band, 10 Channel • Handheld scanner

Bands: 29.7-54, 136-174, 406-512 MHz.

The *Uniden Bearcat* 50XL is an economical, handheld scanner with 10 channels covering ten frequency bands. It features a keyboard lock switch to prevent accidental entry and more. Also order the new double-long life rechargeable battery pack part # **BP55** for $29.95, a plug-in wall charger, part # **AD100** for $14.95, a carrying case part # **VC001** for $14.95 and also order optional cigarette lighter cable part # **PS001** for $14.95.



PC 22

NEW! Scanner Frequency Listings

The new Fox scanner frequency directories will help you find all the action your scanner can listen to. These new listings include police, fire, ambulances & rescue squads, local government, private police agencies, hospitals, emergency medical channels, news media, forestry radio service, railroads, weather stations, radio common carriers, AT&T mobile telephone, utility companies, general mobile radio service, marine radio service, taxi cab companies, tow truck companies, trucking companies, business repeaters, business radio (simplex) federal government, funeral directors, veterinarians, buses, aircraft, space satellites, amateur radio, broadcasters and more. Fox frequency listings feature call letter cross reference as well as alphabetical listing by licensee name, police codes and signals. All Fox directories are $14.95 each plus $3.00 shipping. State of Alaska–**RL019-1**; Baltimore, MD/Washington, DC–**RL024-1**; Chicago, IL–**RL014-1**; Cleveland, OH–**RL017-1**; Columbus, OH–**RL003-2**; Dallas/Ft. Worth, TX–**RL013-1**; Denver/Colorado Springs, CO–**RL027-1**; Detroit, MI/ Windsor, ON–**RL008-2**; Fort Wayne, IN /Lima, OH– **RL001-1**; Houston, TX–**RL023-1**; Indianapolis, IN–**RL022-1**; Kansas City, MO/ KS–**RL011-2**; Los Angeles, CA–**RL016-1**; Louisville/Lexington, KY–**RL007-1**; Milwaukee, WI/Waukegan, IL–**RL021-1**; Minneapolis/St. Paul, MN–**RL010-2**; Nevada/E. Central CA–**RL028-1**; Oklahoma City/Lawton, OK–**RL005-2**; Pittsburgh, PA/Wheeling, WV–**RL029-1**; Rochester/ Syracuse, NY–**RL020-1**; Tampa/St. Petersburg, FL–**RL004-2**; Toledo, OH–**RL002-3**. A regional directory which covers police, fire ambulance & rescue squads, local government, forestry, marine radio, mobile phone, aircraft and NOAA weather is available for $19.95 each. **RD001-1** covers AL, AR, FL, GA, LA, MS, NC, PR, SC, TN & VI. For an area not shown above call Fox at 800-543-7892 or in Ohio 800-621-2513.

Regency® Informant™ Scanners

Frequency coverage: 35-54, 136-174 406-512 MHz.

The new *Regency* Informant scanners cover virtually all the standard police, fire, emergency and weather frequencies. These special scanners are preprogrammed by state in the units memory. Just pick a state and a category. The Informant does the rest. All Informant radios have a feature called *Turbo Scan*™ to scan up to 40 channels per second. The **INF1-RA** is ideal for truckers and is only $249.95. The new **INF2-RA** is a deluxe model and has ham radio, a weather alert and other exciting features built in for only $324.95. For base station use, the **INF5-RA** is only $199.95 and for those who can afford the best, the **INF3-RA** at $249.95, is a state-of-the-art, receiver that spells out what service you're listining to such as Military, Airphone, Paging, State Police, Coast Guard or Press.

Regency® HX1500-RA

List price $369.95/**CE price $218.95**

11-Band, 55 Channel • Handheld/Portable Search • Lockout • Priority • Bank Select Sidelit liquid crystal display • EAROM Memory Direct Channel Access Feature • Scan delay

Bands: 29-54, 118-136, 144-174, 406-420, 440-512 MHz.

The new handheld *Regency* HX1500 scanner is fully keyboard programmable for the ultimate in versatility. You can scan up to 55 channels at the same time including the AM aircraft band. The LCD display is even sidelit for night use. Includes belt clip, flexible antenna and earphone. Operates on 8 1.2 Volt rechargeable Ni-cad batteries (not included). Be sure to order batteries and battery charger from the accessory list in this ad.

Bearcat® 100XL-RA

List price $349.95/**CE price $178.95/SPECIAL**

9-Band, 16 Channel • Priority • Scan Delay Search • Limit • Hold • Lockout • AC/DC

Frequency range: 30-50, 118-174, 406-512 MHz.

Included in our low CE price is a sturdy carrying case, earphone, battery charger/AC adapter, six AA ni-cad batteries and flexible antenna. Order your scanner now.

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★★★ Uniden Marine Radios ★★★

Now the finest marine electronics are available through CEI. The *Unimetrics* **SH66-RA** has 50 transmit and 60 receive frequencies with 25 or 1 watt power output. Only $169.95. The *Unimetrics* **SH 88-RA** is a deluxe full function marine radiotelephone featuring 55 transmit and 90 receive channels and scanning capability for only $259.95. The *Unimetrics* **SH3000-RA** is an excellent digital depth sounder, good for 300 feet. It has an LCD continuously backlit with red light display and a 5 ft. or 10 ft. alarm. Only $189.95. Order today.

Bearcat® 800XLT-RA

List price $499.95/**CE price $289.95/SPECIAL**

12-Band, 40 Channel • No-crystal scanner Priority control • Search/Scan • AC/DC

Bands: 29-54, 118-174, 406-512, 806-912 MHz.

The Uniden 800XLT receives 40 channels in two banks. Scans 15 channels per second. Size 9¼" x 4½" x 12½."

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Add $3.00 shipping for all *accessories* ordered at the same time.
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Add $7.00 shipping per radio and $3.00 per antenna.

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KI6DR presents a situation familiar to a lot of us. It makes use of that wonderous commodity lurking in the recesses of our minds, the imagination.

"Scoot over, Mitzi"

BY LEW DECKER*, KI6DR

There is an enduring charm about life in a small town in the south, but for the seven years my family lived in one, it always seemed that we were misplaced a little and that I was just some towheaded Yankee kid passing through. At first the people of the town welcomed us with gifts and invitations, but after our novelty wore off, life seemed to shift into slow motion, and we spent the next few years trying to scrape together a modest living surrounded by the azalea blossoms and crinolines of a minimum-wage south.

I went to work at the local theater for $10.00 a week and free admission, so I sold popcorn each summer and got to see every Randolph Scott western and John Wayne war movie that came to town. While my classmates tried out for the high-school football team and played hanky-panky with the girls down at the Rexall, my brother and I bought .22 rifles and shot up the countryside. Fortunately, that phase of our lives didn't last long, and we never shot people, but the war movies played on. I even fell in love with Mitzi Gaynor when *South Pacific* opened at the theater, so I sat through the movie 18 times and became fascinated by shortwave radio in the process.

Not long after, in school I met an amateur radio operator whose call sign was scribbled on the blackboard in Mrs. Ferguson's algebra class. K4 "Young Dumb Operator" became my friend and mentor, and a hero of sorts since he was a junior "A" student and I was a freshman misfit. He had a Navy surplus Collins TCS-12 receiver and a modified Globe Scout transmitter set up in a room off his parents' garage, and when I visited him that first time I thought Emile De Becque's voice would come crackling over the loudspeaker.

With my parents' permission I used some popcorn money to buy a TCS-12 ($24.95 from Arrow Radio in Chicago). K4YDO helped me put together a power supply out of one of my mother's aluminum bread pans. Our creation looked lethal, and probably was, but the TCS-12 sparked to life, and I spent hours searching the airwaves lost in a *South Pacific* fantasy.

I remember once lugging that big receiver to work with me, power supply and all, so that I could tune in to the military weather frequencies for the updates on an approaching hurricane. The only patrons we had in the theater that day were a handful of crusty winos who had stumbled in to escape the wind and rain, so I assembled the radio in the lobby and turned up the volume. One by one those old winos came out of the theater and sat by the receiver, eyes focused and ears straining, listening through the static as the hurricane hunters radioed their reports. Outside the wind rattled the doors and blew the letters off the marquee, but inside the theater a few surplus old men and a boy sat huddled over a radio that had been granted a second life, and for a few hours that day none of the winos needed anything to drink.

My mother took me to a small town not far away to visit a distant relative of ours who was also an amateur radio operator. I don't remember his name or his call, but I remember his rig—the way it looked in the shed behind his house, how it was 4 or 5 feet tall and painted army-tank green, and that it "ran 400 watts" because he told me it did. And I remember thinking then how powerful 400 watts would be and what a 1,000 watt station must look like because the antenna feedlines for this monster were held away from the side of the shed by standoff insulators bigger than softballs. I also remember a fading little man who smiled at the world from behind a three-day stubble. I knew he liked me a lot because my eyes were as big as those standoff insulators, and when he spoke to me it seemed like he could have been my grandfather. But when you are young and confused, you leave old men like that without saying thank you, and I never saw him again. I listened for him on my radio, and I thought his green monster would come booming into my bedroom and that I would answer him back one day, but it never happened. I still don't know who he was.

Eventually I took my Novice exam (from another hero, W4HZI, who owned a huge DX-100) and became KN4INW operating on 80 meters with a Heathkit DX-40. I was proud of my license, and I was proud of that transmitter as well. It stacked perfectly on top of the TCS-12 and made my shack look professional, like the pictures in the radio magazines, but I was so shy no one at school ever knew about my hobby.

I enjoyed those first few months of operating because the fascination of radio hadn't diminished. It still seemed like magic to me, and so I stayed in my World War II command post and talked with amateurs all over the southeast. I never could bring myself to fight the QRM at night when 80 meters was open, though, so most of my operating was done after school and on Saturday afternoons when the band was quiet. DX was for the other guys, it seemed. But someone told me to try the predawn darkness, so now and again I'd set the alarm for 5 o'clock and drag myself out of bed to hit the airwaves in a fruitless chase for a station more than 500 miles away.

But out of the blue one morning came a call from a K5 something or other in Tyler, Texas, and for 30 minutes we chatted until I realized that he was my farthest contact, and that the band had finally come alive. When I ended our conversation and listened for further contacts, I copied a pair of WØs from somewhere out west. The signals weren't exactly weak, just distant, and they drifted into my bedroom wavering like the winds that send ripples across the Kansas wheat fields. I imagined an unpainted farmhouse and a split-rail fence and a sky that stretched beyond dreams, and an overalled farmer at his radio set pounding out a CQ in the early morning quiet. I called repeatedly, but to no avail, and in a short time the band closed up again. Disappointed, I dressed and trudged off to school. Like Texas and Kansas though, everything seemed so far away, and I felt trapped in the classroom like the flies that exhausted their lives buzzing against the screens that never opened.

Things change as you grow, though. When I finally understood enough theory to pass the exam for my General license, the radio in my bedroom had lost its magic. There was no mystery anymore, only a machine that spit static and another that spit radio waves that disappeared into more static, and that's all there was. The end came when I let my license expire without ever trying to upgrade even though my code speed was in the mid-twenties. I knew just enough theory to destroy my interest in radio.

*4260 Narragansett Ave., San Diego, CA 92107

A year later my rig was still intact in my room, but a move to California was imminent so I put the gear up for sale. A buddy at the theater bought my beautiful receiver, and I threw in the bread-pan power supply with instructions on how to build a safer one. My DX-40, along with a never-used VFO and microphone and a Heathkit VOM I had built, went to a Canadian amateur who happened to be passing through on vacation. To this day I'm mad at myself for letting that guy get away with my stuff for $40.00, but I was intimidated by a man I didn't know who kept telling me he didn't think my stuff worked anymore. He won, and I'm still not any good at business. But that was that. Mitzi Gaynor faded from my dreams, and my command post drifted away like the winos who disappeared after the hurricane.

That little town in South Carolina was a long time ago, and now I'm 41, but a good mid-life crisis can put distance between you and your past like nothing else. When it happens we scramble around a bit and do dumb things trying to recapture those earlier times, and we eventually get over the crisis, but in the process we accumulate a few toys and learn something about the kid who lingers in us all. I just built an Italian racing bicycle from scratch because I could never afford one when I was young and riding every day. I still can't afford one, but it seems I want it even more now than I did then. It leans against a small table in my room next to the wonderful Drake "C" line I bought a few months ago.

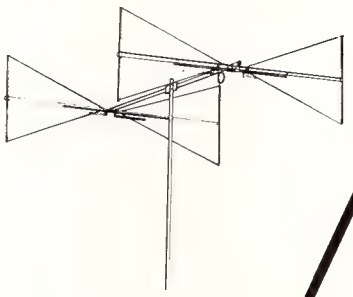
Are these toys just one man's monuments to a lost youth? Probably so, but I loved that old TCS-12, and the local ham radio store doesn't sell them. They have all kinds of digital shoe boxes that can squawk and pop in a dozen different languages, but whatever happened to strength and character . . . and charisma . . . and, for that matter, Mitzi Gaynor? They are all there, I think, just beyond the knobs and meters of my "C" line.

Now whenever I emerge from an air-conditioned theater and blink into the summer sun, I shift gears for an instant, and life seems as motionless as the Spanish moss hanging from the oaks that sagged beneath the weight of a long-ago southern heat. When the recycled R-4C is warmed up, an outside world comes to life again, and I'm back to a time of hiss and static and old radios that no one wants anymore.

One of these days I'll no doubt sell the Drake equipment and move on to something more modern and complex, but for now I'm enjoying that command-post mentality I lost so long ago. If you hear a lid butchering a CQ on 20 or 40 meters, it's probably just me sneaking around behind enemy lines trying to recapture a little youth. Have patience, and if you will excuse me now I'd like to crawl back into my foxhole. Scoot over, Mitzi. CQ

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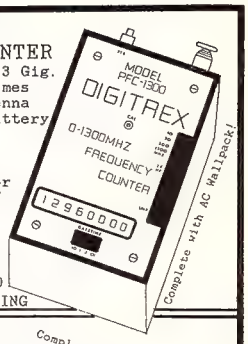
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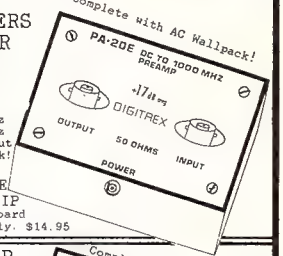
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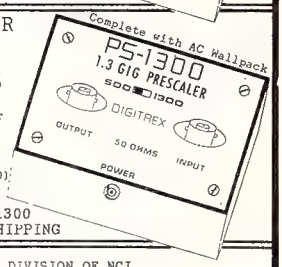
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CIRCLE 41 ON READER SERVICE CARD

Now that the official antenna season has started, here's a simple project that will make tuning your antenna easier.

How To Build A Simple SWR Bridge

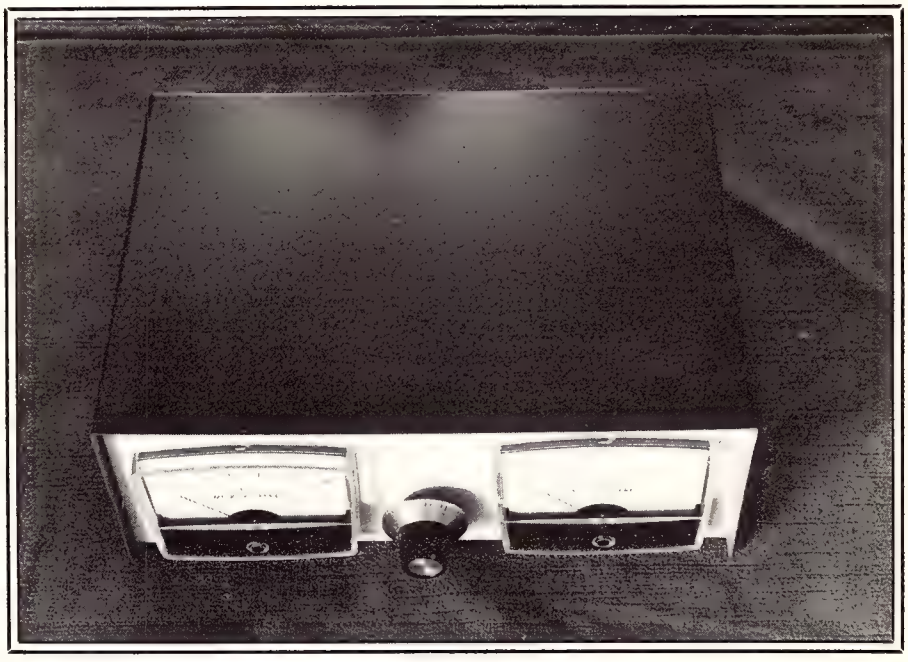
BY JOHN J. GRAY*, VE3AEH

Here's a simple weekend project that you can build inexpensively with readily available parts from Radio Shack. The only parts you might have to hunt around for are the two 0–50 uA meters. Radio Shack does list 0–15 VDC meters, and these may be converted to read full scale with appropriate shunt resistors. Check most radio handbooks for details of selecting shunt resistors. You can also use meters reading 100 to 200 uA for this purpose.

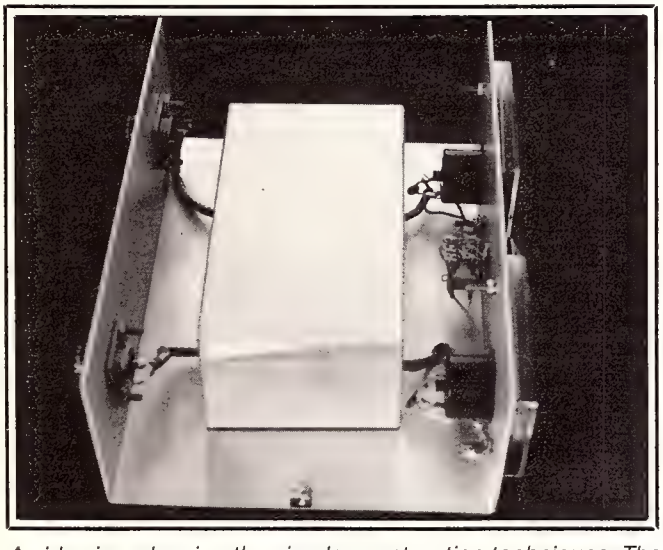
L1, L2, and L3 are made from #12 copper wire, 4½ inches long, spaced ¼ inch apart. They are mounted on the perf board as shown in the photographs. The perf board is mounted in a separate aluminum box within the main cabinet. R3 and R4 are a dual stereo control (sensitivity).

The shielded cable is made from ordinary hook-up wire and the shield braid of a short piece of coax. Some care should

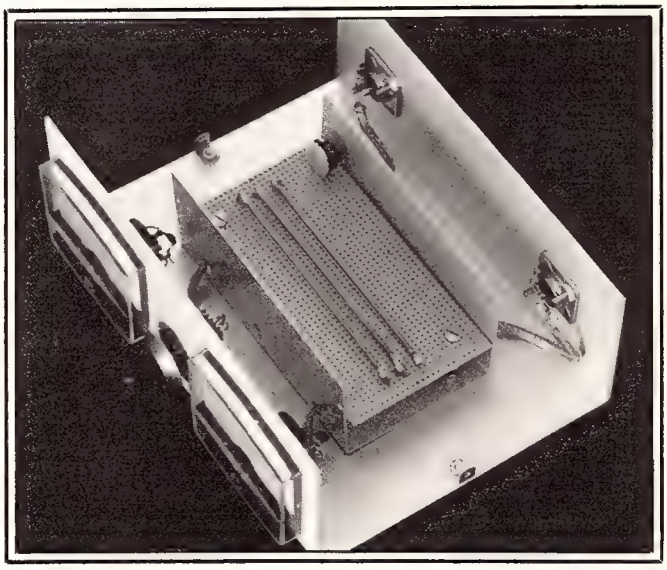
5166 Lakeshore, Burlington, Ontario, Canada L7L 1C3



Looking down at the completed SWR bridge. It looks sleek and professional.



A side view showing the simple construction techniques. The small chassis box (RS 270-238) encloses the perf board strip lines as seen in the other photograph.



Interior view shows the perf board, strip lines, and R2. Shielded cables enter near the bottom through small drilled holes.

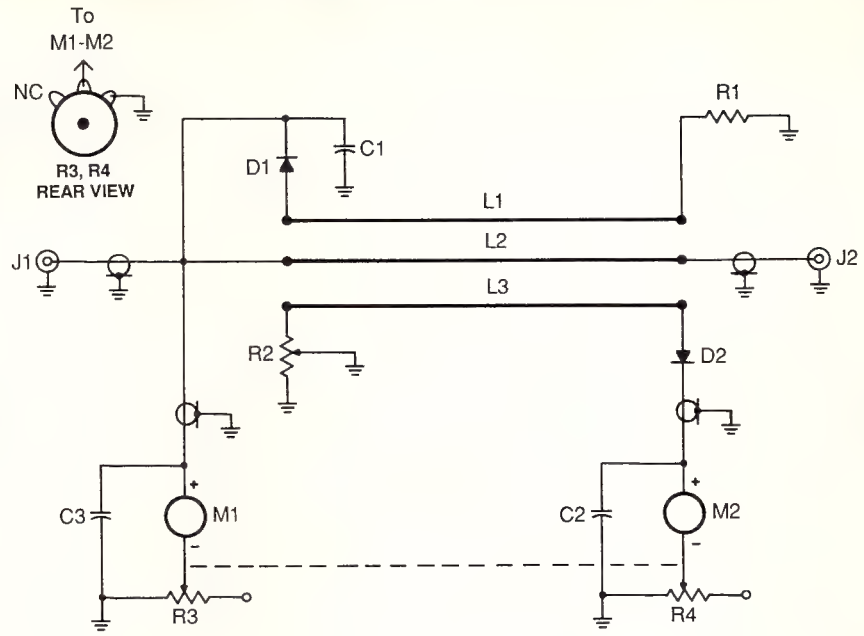
Say You Saw It In CQ

be taken with wiring of the two diodes D1 and D2. First measure the forward resistance. The reading obtained is academic, but both diodes should read the same. Next check the backward resistance; this should read almost zero. Now wire in the diodes using a pair of long-nosed pliers. Recheck the forward and backward resistance. The pliers act as a heatsink and should be held in place for a few seconds. The black bands of D1 and D2 will go to C1 and M1, and C2 and M2, respectively.

The two metal standoffs (RS 276-195) are used to secure the shield box to the main chassis, as support for the perf board, and to provide a handy terminal for C1, R2 and R1, C2 to ground. D1 and D2 are wired to the other lugs of a terminal strip (RS 274-688).

To balance the bridge simply hook up a dummy load to J2 and then apply up to 200 watts of power to J1. In the key-down mode, adjust the sensitivity control R3, R4, for a full-scale reading at M1. A smaller reading will be seen at M2 (reflected power). Now adjust R2, the balance control, for a null at M2. While adjusting R2, keep your fingers away from the pickup loops or you might experience a nasty RF burn.

That's really all there is. The photographs show how the unit goes together. The parts list indicates the Radio Shack parts numbers. However, you can fill in from your own junk box. CQ



Parts List

D1,D2: IN914 (RS 276-1123)
C1,C2,C3,C4: .001 (RS 272-126)
R1: 68 ohms (RS 271-8010)
R2: 500 ohms (RS 271-226)
R3,R4: 100K (RS 271-1732)
M1,M2: 0-50 μA
Metal Standoffs (RS 276-195)
Chassis box (RS 270-238)
Enclosure (RS 270-276)
Terminal strips (RS 274-688)

Fig. 1– Schematic diagram of the simple SWR bridge.

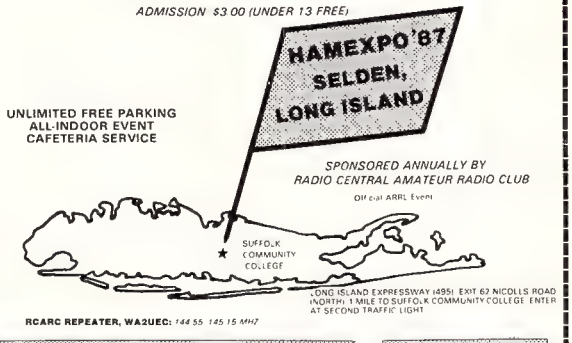
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CIRCLE 25 ON READER SERVICE CARD

Things being what they are, this article should provide some helpful tips when you plan your next vacation, DXpedition, or when you just want to safeguard your valuables.

A Ham Hideaway For Your Valuables

The author of this article, a long-time midwestern amateur, understandably wants to preserve his anonymity. There is no point in taking these precautions and then announcing in a major publication what you've done. Hence there is no byline, no call or QTH, and no photographs of his actual installation. —K2EEK

It is one of the realities of urban (and suburban and probably rural) living that someone out there would like to get what you have. It is also one of the realities that "someone" is quite willing to go to some lengths to find out when you're not home, and then break in to take your goodies. Ask your own police chief for the local statistics.

Amateurs are in a special position to protect themselves against this kind of loss. The suggestions below deal with your highly portable possessions—jewelry, credit cards, cash, small heirlooms—the kind of stuff that a burglar can sweep into a plastic bag as he goes through your bureau drawers.

There is no substitute, of course, for a safe deposit box in the bank downtown. Still, there are some things that you want to keep on hand in the house. Others won't fit into the safe deposit box for those odd times when you will be away from home for a while and want to keep your valuables secure.

I propose that you *hide these things in the house.* Now, I am assuming that you take all of the published precautions, such as stopping newspaper and milk deliveries, having someone mow the lawn regularly, putting timers on your lamps, and all the rest. I must warn you at the outset that this idea is no safeguard against fire. I do suggest that expensive items can be hidden from a thief and yet can be, in fact, right under his nose.

As an amateur you probably have a location which provides at least one or more hiding places—your ham shack. The idea is to find a spot which is readily accessible to you and your family, secure, but not obvious to a stranger or even to a friendly visitor.

Let me use my own "hideaway" as an example. My basement shack features an operating console which houses the transceiver, antenna tuner and SWR meter, standby receiver, and assorted accessories. When I built it I was proud of its professional appearance, especially the enclosed lower deck which holds the power supplies. This section has a drop front panel with concealed hinges; I did it that way only to be neat, but one would never know, looking at it, that it can be opened.

A couple of years ago we were planning an extended trip out west and my wife asked for ideas about storing her jewelry. The safe desposit box was already jammed (I'd told her that she saves too many old documents) and she didn't know where to put the stuff. Safe hiding spots in the house are not a new idea, and I immediately thought of the operating console. The power-supply compartment seemed the most logical place. I showed her how the tricky front panel opened; she seemed doubtful but was willing to use the space. We put her jewelry, our credit cards, and some other assorted junk in a shoe box and shoved it in next to the power supplies. All I had to do was to remember to take it out before I switched the power on when we returned.

We used the console hideaway regularly after that when we went on trips. Now it works for us all the time as a safe. I found a metal box about the size of the shoe box and fastened it to the panel (no screw heads showing from the front!) away from the power supplies.

"OK," you say, "but I haven't got a fancy operating position with a secret power supply deck." Well, what do you use as an operating desk? Somewhere in that desk there is a place that will do a job for you. Do not use a drawer, of course, or even try to rig a secret section in a drawer. If anyone entered your shack with larceny in his mind, the drawers would be his first target. How about *behind* a drawer . . . a second drawer concealed by the normal one? In a deep desk the drawers frequently do not extend all the way back and you might make a second drawer to go behind the first.

Do not get clever with a junked transceiver or receiver set boldly on top of the table, empty of electronics and full of valuables. If I were ripping off your shack the first thing I'd pick up, especially if I knew nothing about radio, would be any loose gear lying around. If it were nailed down I might get extra suspicious and figure that it was something special and worth prying off.

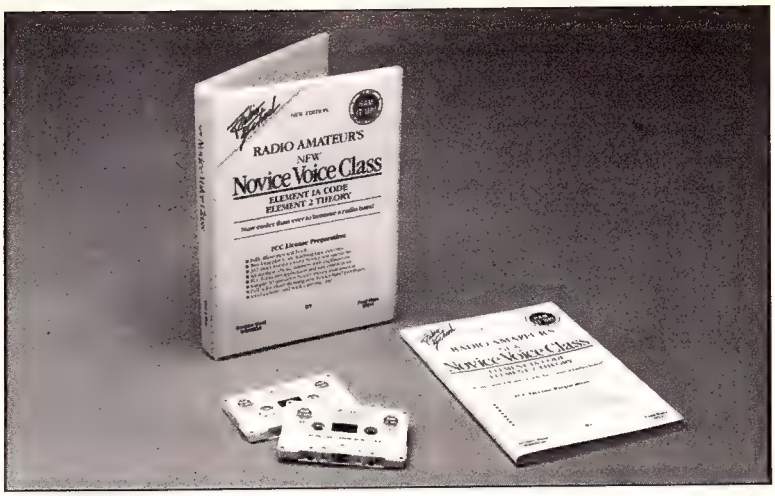
If you are an antique collector and your equipment is in an enclosed rack, you have ready-made security. A blank panel on the rack is too much to hope for, but some of you may have one. Arrange a not-too-obvious hinge arrangement so you do not have to remove four, six, or eight screws every time you want to get into the safe. If you have no unused panel on the rack, there may be one with small, non-heat-producing equipment and some extra room behind it.

A circuit-breaker cabinet such as is found in any basement is so common as to attract no attention and can be used to conceal small objects. I used ours until I needed more space and went to the operating console. If you want to go first class, hang up an empty box near the operating position; you'll have *lots* of room in it after you've torn out the excess metal work. They come in several sizes. And if you just need a tiny place for that $15,000

wrist watch, how about a galvanized "utility" box (complete with outlets) fastened right on the face of your operating position. In any event, don't neglect to include some electrical conduit leading to and from the box to make it look real.

Look at your workbench. It must have numerous useful nooks and crannies. Again, be subtle; your hiding-place can be out in the open or concealed behind something, but it must not look like what it is. The back legs of my bench (2″ × 4″ lumber) extend 3 feet above the work surface and support a sheet of peg board on which I hang my tools. The bench stands about 10″ away from the basement wall. Thus, I have a space a bit less than 3 by 4 feet where a thin box with all kinds of valuables can be hung away. The work surface itself is braced underneath by a 10″ deep wooden "skirt" across the front and on both ends. This leaves a fairly deep area under the bench which is not visible unless one gets on the floor and looks up. A box could easily be hidden there.

You begin to get the idea. Tailor your own safe place to your needs and the space available. Put a note describing the location in your safe deposit box, in case of a serious disaster. Then forget it. You and your immediate family members should know about it, and no one else. This is not the kind of project that you brag about to the local ham gang, and even your best friends need not know about it.



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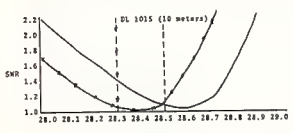
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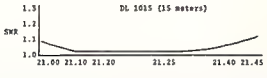


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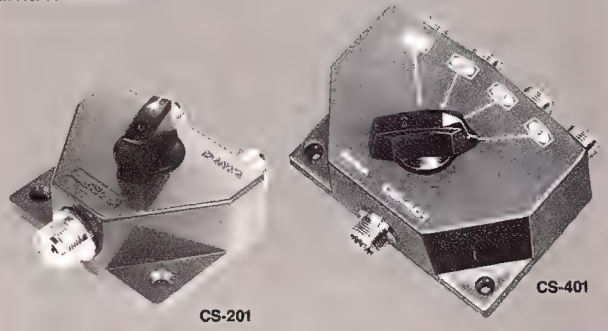




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CIRCLE 72 ON READER SERVICE CARD

Sometimes we forget that amateur radio is a learned process. We learn by instruction or example. KA2VXM goes over some points for newcomers and perhaps gives a useful refresher for the rest of us.

Repeater Etiquette

BY ALAN GLASSER*, KA2VXM

Often a new amateur (or even an old amateur) may develop bad habits and bad operating procedures only because of a lack of knowledge of proper procedures. This guide to repeater etiquette gives the conscientious repeater user some basic guidelines.

Before You Key The Mike

When first turning on your radio, listen to the frequency for at least 15–30 seconds before you transmit.

Speak into your microphone at a normal voice level. Don't mumble, ramble, slur, chew food, or burp while talking.

Key your microphone before you speak, and unkey it after you finish speaking.

If A Conversation Is In Progress

Don't break into the *middle* of the conversation if you have to make a call to another station or want to join the conversation. Wait (at least) until the thought in progress is completed and then announce your call sign. Do so by allowing the talking station to unkey the mike and then make a quick call before the repeater "Beeps."

Identifying a station with "Call please," "Quickie," "Comment," or any other such words is not an acceptable form of identification, and those stations should not be acknowledged. However, "I have a comment, KX2ABC" is acceptable.

You don't have to identify after each transmission—just once every 10 minutes or at the end of the communication before you go off the air. If you think a new station coming on frequency doesn't know who you are, as a courtesy you can give your name and call.

The station that is to get the frequency next is the *only* station that should acknowledge the breaking station. The reason for this is that the next station to get the frequency was supposed to talk next anyway, so why not let that station handle the breaking station?

Even if the breaking station is your best friend, if it's not your turn, don't say "Hello Seymour. How are you?" Wait until it's *your* turn.

Stations hearing another station calling have two choices: acknowledge that you heard the calling station ("KX2ABC recognized") and give the frequency to the station at the end of your conversation, or if you have nothing important to say, give the frequency immediately to the calling station.

A station that is given the frequency after identifying can join the conversation in progress, and then give it back to the station that gave it to him, or give it to the next station in a group discussion if he knows who gets it next. It is poor operating practice to throw the frequency up in the air for grabs.

If a breaking station is given the frequency to make a call, and if the call is not acknowledged, the breaking station should give it back to the station that gave it to him.

If a breaking station is given the frequency to make a call and the called station is contacted, either the conversation should be brief or both stations should move to an unused frequency, unless the station(s) originally talking on the frequency say it's okay to stay.

If you are in the middle of a long recitation and have to unkey the microphone in order not to time out the repeater, leave some room in case a breaking station has to make a transmission. Remember, the repeater is a very valuable asset to mobile stations who might have emergency traffic.

Leave some room after the squelch tail has dropped to allow another station to break in if necessary.

Do not make comments or remarks during someone else's discussion.

Do not try to transmit over another station. First of all it's illegal, and second of all nobody wins, since neither station can be understood.

If you think you are possibly doubling with another station, unkey your mike a second and listen.

If the repeater is being controlled by one station, such as the weekly check-in net or a technical net, stations given a chance to talk should always give the frequency back to the control station unless otherwise instructed by the control station.

If you are reporting an accident or other emergency traffic, the police department wants at least the following information: nature of emergency—i.e., vehicle on fire; location including cross streets (especially on a highway)—i.e., "Belt Parkway eastbound, 100 yards past West Street exit"; description of vehicle(s)—i.e., white station wagon in the left lane; any injuries.

If *you* are passing emergency traffic (such as a mobile accident) to another station, make sure you stay on frequency in case the station handling the traffic has to furnish the responding agency (police, fire, etc.) with additional information.

If you are a base station reporting emergency traffic, let the emergency telephone operator know up front that you are an *amateur radio operator* in communication with a mobile station.

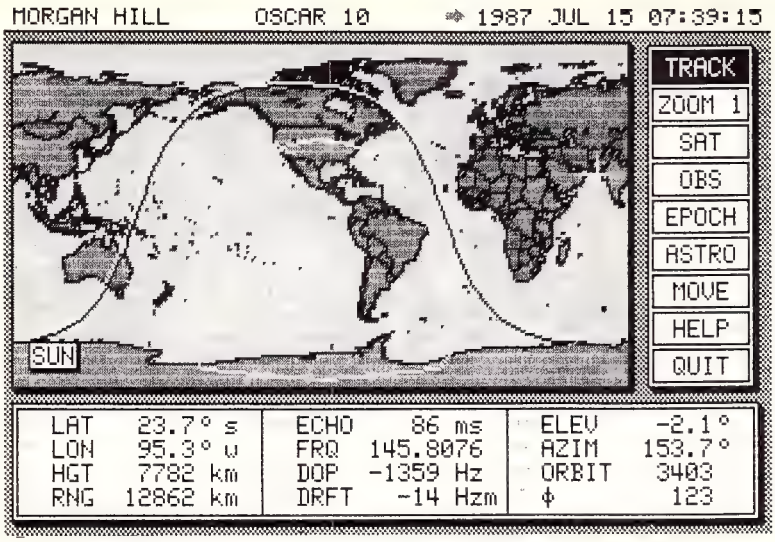
Use amateur radio "slang" on amateur radio. Don't use 11 meter ("10-4 good buddy," "The handle here is Rattle Snake," "The first personal is Barry," etc.), military, police ("K"), or other terms not indigenous to the amateur bands.

The word(s) **BREAK** *(not to be confused with a breaking station)*, **BREAK BREAK**, or **BREAK BREAK BREAK** are strictly reserved for emergency traffic. Any station in communication on frequency hearing the word BREAK should give the frequency to the breaking station. BREAK should **not** be used for breaking into a conversation just so you can get a turn to talk.

Remember: amateur radio is a hobby! You can have fun on the repeater! You can joke around! But keep it sensible! CQ

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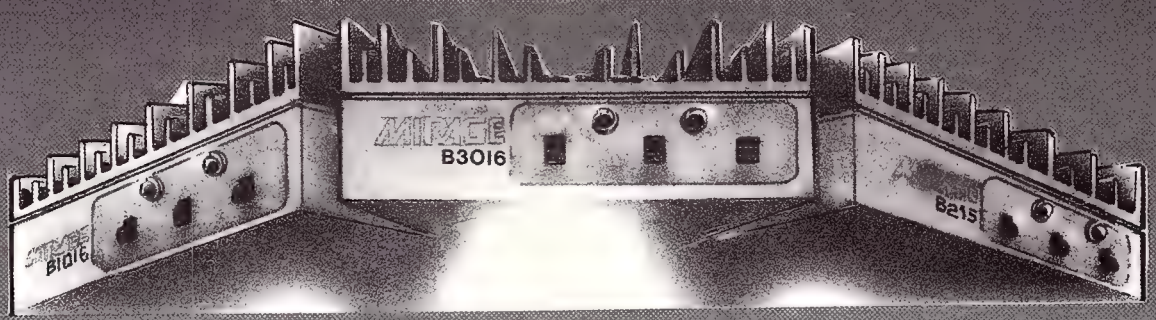
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CIRCLE 31 ON READER SERVICE CARD

With deference to Hy-Gain, N5RM once again comes up with another interesting antenna project. This time he reconfigures a 402-BA into a 2 element 30 meter beam.

The 302-BA(X)
A 2-Element 30 Meter Beam

BY R.H. MITCHELL*, N5RM

My experiences on 30 meters had not been too favorable. Like many other amateurs, I had been using a makeshift antenna on that band. It was a quarter-wave sloper coming from the 47 foot level on a 48 foot tower that supported a tribander. The sloper did work slightly better than a multiband vertical, which had coils for 10.1 MHz. I experienced a lot of fading. Signals were not on a par with those on 7 and 14 MHz. Of course, on those bands I had beams.

I knew I needed a beam, but I hated to go to the expense and effort of putting up one for a "casual" band. Then an idea penetrated the QRM layer surrounding my brain. I had a moderately good Hy-Gain 402-BA sitting in my barn. A few of the outer tips were somewhat bent from several moves, and the driven-element insulators had suffered permanent ruptures when I tried to run 1500 watts of CW to the beam. I had gotten spare insulators, but, since I had erected my homebrew 7 MHz beam at our new QTH, the 402-BA was not needed. The 402-BA had done a grand job for me. Back in the 60s I had worked over 200 countries on 7 MHz and had earned the 7 MHz portion of my first 5-Band DXCC using it. However, the shorter element appeared to be about the right length for a 10.1 MHz driven element, and the longer element appeared to be nearly the correct length for a 10.1 MHz reflector. So, some pencil whipping and modifications were in order.

Each half of the shorter element was 20 feet, 2 inches long. Each half of the longer element was 22 feet, 6 inches long. The boom, which was 16 feet long, also looked about right for a 2-element Yagi with a driven element/reflector design. After moving the elements in about 4 inches from each end of the boom, element spacing was about .15 wavelength. Obviously, the elements had to be lengthened. The elements could not be lengthened mechanically without going beyond what I considered to be the boundaries of safety, so, the lengthening had to be done electrically. Years ago I had calculated the proper lengths for the elements of a 2 element Yagi to be 490/F for the reflector, and 462/F for the driven element.[1] These formulas indicated that desired half lengths would be 22 feet, 9¾ inches for the driven element, and 24 feet, 2⅜ inches for the reflector. That would mean adding 20⅜ inches to each

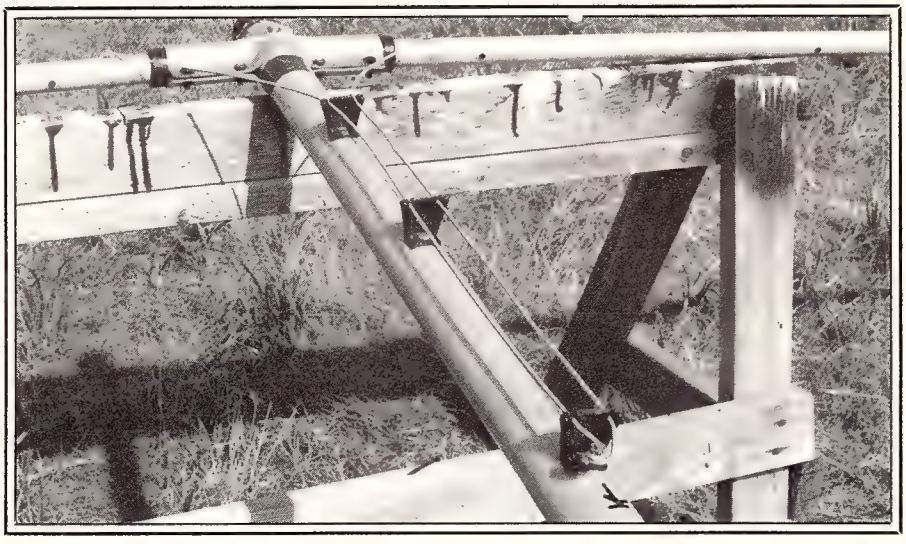


Fig. 1– The reflector loading stub.

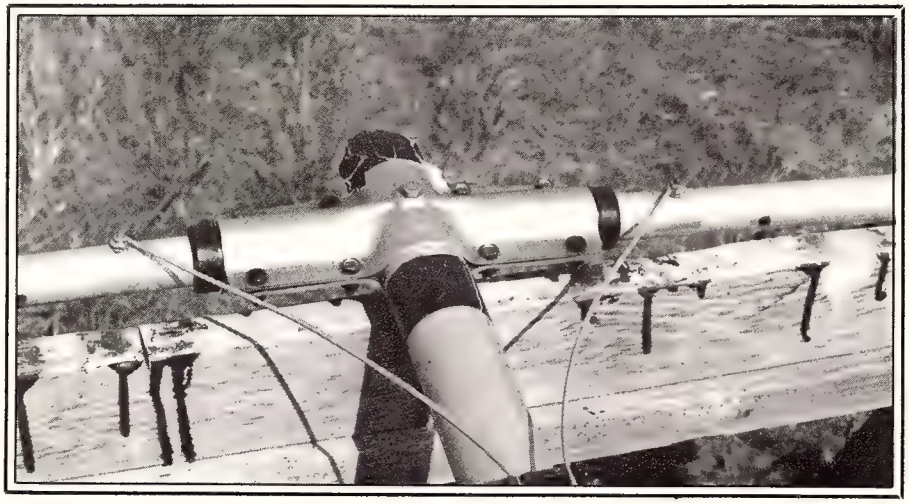


Fig. 2– Attachment of the loading stub to the reflector.

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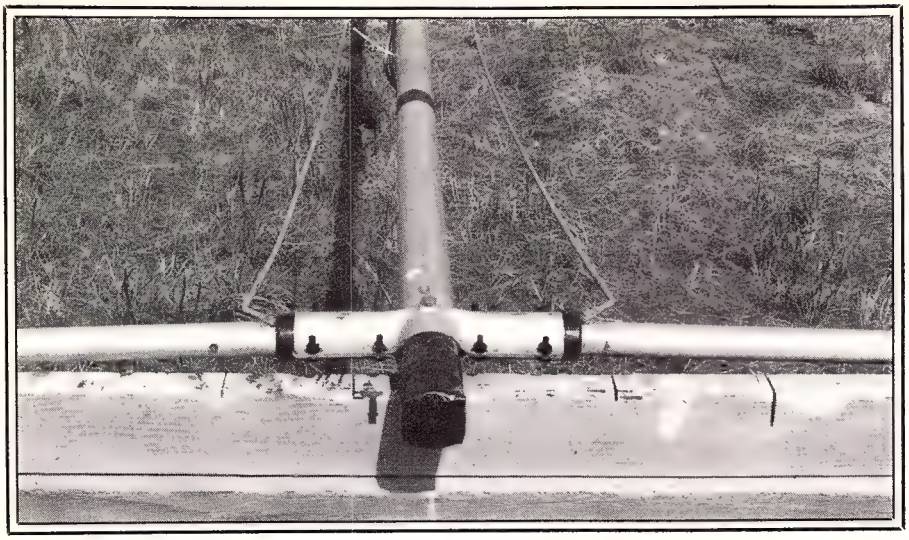


Fig. 3– Attachment of the beta match to the driven element.

reflector half and 31¾ inches to each driven-element half.

In order to load the reflector, one of the "linear loading lines" from the original reflector was used as a loading stub. Three of the "Beta Insulators" from that line were attached to the boom with self-tapping screws. The loading stub was supported on the boom, as shown in fig. 1. The outer ends of the loading stub were attached to the reflector with 2 inch 8/32 machine screws which went through the reflector at the points where Hy-Gain had fastened their loading line with #8 sheet metal screws. (The sheet metal screws caused intermittent connections after they loosened, and we had to go off the air in one DX contest because of the TVI caused by a loose sheet metal screw.) This is shown in more detail in fig. 2. By the second attempt, the correct length for each half of the reflector loading stub was found to be 35¾ inches. In addition, two ¾ inch circles were formed in each end of each half of the loading stub. The two halves were joined at the inner end with a 1 inch 10/32 stainless steel machine screw, lockwashers, and nuts. (Correct length was determined by grid-dipping the reflector at a height of 25 feet off the ground, and adjusting the length of the stub until the reflector resonated at 9625 kHz when the driven element was tuned and matched. Minor interaction resulted in the need for two or three adjustments to each element.)

In order to load the driven element, the original "Beta Match" rods were utilized. This also gave a convenient matching system. Each of the rods for the Beta

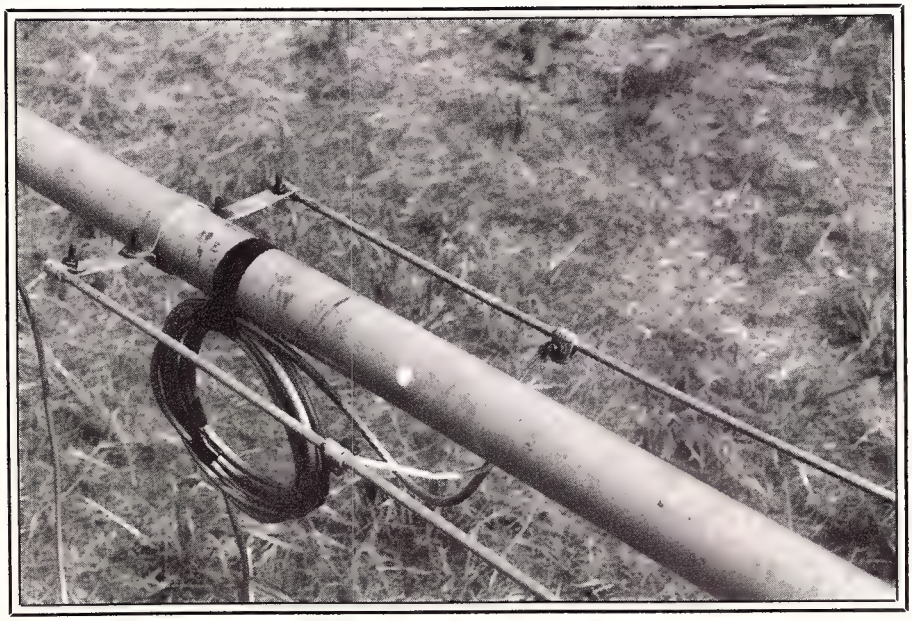
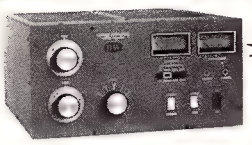


Fig. 4– Shorting bar and feedline attachment to beta match.

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Fig. 5– The 302-BA(X) at 25 feet.

Match was 50 inches long. The rods were fastened to the driven element with machine screws, nuts, and lockwashers. The rods were flared out from the boom and turned back in to the driven elements in order to provide better spacing, as shown in fig. 3. The inner ends of the Beta Match rods are attached to the boom with the Beta Match shorting clamp from the 402-BA, as shown in fig. 4. To my surprise, the clamp had to be fastened on the very ends of the rods to provide resonance at 10.1 MHz, with the antenna at a height of 25 feet. It was expected that the antenna would resonate higher in frequency after it was raised to its operating position. The antenna was fed through a choke consisting of 12 turns of RG-8X cable, 6 inches in diameter. The choke was fastened under the boom with plastic tape, and the ends of the cable were attached to the two feed clamps on the Beta Match at a point 9¾ inches in from the shorting strap. Resonance was at 10.1 MHz, as indicated earlier, and the VSWR measured under 2 to 1 from 10 to 10.3 MHz. From 10.1 to 10.15 MHz, the VSWR measured between 1 to 1 and 1.15 to 1.

The antenna was to be installed on my rotating tower.[2] I removed the original boom-to-mast clamp. That had held the boom halves together. A 1 foot long piece of 1⅞ inch diameter, .058 inch wall aluminum tubing was used as a plug. Six inches of the plug was inserted in each half of the boom, the two halves pushed together, and a 3 inch long, quarter inch diameter bolt was used to pin through each boom half and plug. Two 4″ × 8″ × ¼″thick aluminum plates were secured. These were drilled to take 2 inch clamps to secure the boom, and two 1¼ inch clamps to grasp the vertical legs of the Rohn 45 tower. Fig. 5 shows the test installation at 25 feet.

The antenna worked very well at 25 feet. However, I took it down and taped all the connections and all the screws that might come loose. Then I disassembled the beam. I intended to position it at about 80 feet high on the rotating tower. As there were four TH7DX beams at various heights on the tower, it did not appear to be feasible to raise the beam intact. So, I made several trips up and down the tower, carrying an element or the boom each time. Then I had to make the trip to assemble the antennas in place on the tower. That was simple until the wasps started flying about. That necessitated another trip down the tower to get the wasp spray. The wasps had built nests in the boom during the couple of days it was on the tower but disassembled. Finally, I attached the feedline and went down to test the antenna. In brief, it works great. Minimum VSWR did shift up to about 10.19 Mhz, but it is still less than 1.2 to 1 across the amateur band. The beam had a front-to-back ratio of about 12 to 20 dB. It is mounted about 8 feet above the nearest TH7DX. Thanks to earlier experience,[3] I did not expect any problems either way with interaction between the tribander or the 10.1 MHz beam. None has developed. The beam appears to have a 2 to 4 S-unit improvement in signal strength, as compared with my sloper. It is vastly quieter, and thanks to the 302-BA(X), the 10.1 MHz band is no longer a "casual" band. With the numbers of old 2-element 40 meter beams around, we should expect to hear some better signals on 10.1 MHz once the idea gets around.

Footnotes

"Three-Band Interlaced Beams," *CQ*, November 1958, p. 102.

"The TH28DX," *CQ*, August 1986, p. 11.

"Design Notes on a Four-Band Rotary," *QST*, December 1955, p. 19. CQ

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CIRCLE 75 ON READER SERVICE CARD

The 1987 CQ World-Wide DX Contest

Phone: October 24-25 & C.W.: November 28-29
Starts 0000 GMT Saturday 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:

1. Single Operator (single band and all band). Single operator stations are those at which one person performs all of the operating, logging, and spotting functions. The use of DX spotting nets or any other form of DX alerting assistance places the station in the Multi-Operator category.

2. Multi-Operator (all band operation only).

a. Single Transmitter, only one transmitter and one band permitted during the same time period (defined as 10 minutes). *Exception: One—and only one—other band may be used during the same time period if—and only if—the station worked is a new multiplier. Logs found in violation of the ten-minute rule will be automatically reclassified as multi-multi to reflect their actual status.*

b. Multi-Transmitter (no limit to transmitters but only one signal per band permitted).

c. *All transmitters must be located within a 500 meter diameter or within the property limits of the station licensee's address, whichever is greater. The antennas must be physically connected by wires to the transmitter.*

3. QRPp (single operator only). Power must not exceed 5 watts output. Stations in this category will be competing only with other QRPp stations for awards.

4. 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. A team **must operate** from two continents. 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. S.S.B. and C.W. teams are totally separate. That is, a member of an S.S.B. team can be on a totally different C.W. team. A list of a team's members must be received by October 15 for S.S.B. and November 15 for C.W. Send the list to *CQ*, Att: Team Contest, 76 North Broadway, Hicksville, NY 11801 U.S.A. Awards will be given to the top teams on each mode. A list of a team's members' scores plus the total team score must be submitted to *CQ* by the normal contest log deadlines.

IV. NUMBER EXCHANGE: Phone: RS report plus zone (i.e., 5705). C.W.: RST report plus zone (i.e., 57905).

A station in a zone or country different than that indicated by its call sign is required to sign portable.

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.

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, Asiatic USSR, 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 and 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—QRPp—Milliwatt Books
U.S.A.—Potomac Valley Radio Club
Carib./C.A.—Alex M. Kasevich, VP2MM
Europe—Potomac Valley R.C.—W4BVV Memorial
Africa—Gordon Marshall, W6RR
*Asia—Japan CQ Magazine
*Japan—Japan Crazy Contesters Club
Oceania—Northern California DX Club
South America—David Novoa, KP4AM

Single Operator, Single Band
World—28 MHz—Joel Chalmers, KG6DX
*World—21 MHz —Lee Wical, KH6BZF
World—14 MHz—North Jersey DX Assn.—K2HLB Memorial
World—3.8 MHz —Fred Capossela, K6SSS
U.S.A.—28 MHz —Donald Thomas, N6DT
U.S.A.—21 MHz—West Jersey DX Group
U.S.A.—14 MHz—Southern California DX Club
U.S.A.—7 MHz—Stanley Cohen, W8QDQ
U.S.A.—3.8 MHz—Arnold Tamchin, W2HCW
*Canada—Gene Krehbiel, VE7KB

Carib./C.A.—Pedro Piza, Jr., NP4A—KP4ES Memorial
*Europe—28 MHz Zone 14—A. G. Anderson, GM3BCL
*Japan—21 MHz—DX Family Foundation

Multi-Operator, Single Transmitter
World—So. Calif. DX Club—W6AM Memorial
U.S.A.—Carolina DX Association
Europe—Box Cox, K3EST/6
*Canada—Calgary Amateur Radio Assn.

Multi-Operator, Multi-Transmitter
World—Radio Club Venezolano
U.S.A.—DX Incorporated Club
Europe—OH-DX-RING—OH2AM

Contest Expeditions
World—Single Opr.—Stuart Meyer, W2GHK
World—Multi-Opr.—The German CDXG & SDXG (DJ3NG & DJ4EI Memorial)

CW

Single Operator, All Band
World—Albert Kahn, K4FW—W2AB Memorial
World—QRPp—Gene Walsh, N2AA
U.S.A.—Frankford Radio Club
*Canada—Canadian DX Association
Carib./C.A.—Peter Munroe, WB1DQC
Europe—Edward Bissell, W3AU
Africa—Gordon Marshall, W6RR
*Asia—Japan CQ Magazine
*Japan—Japan Crazy Contesters Club
Oceania—Maui Amateur Radio Club
*So. Amer.—Venezuela DX Club—YV5AAZ Memorial

Single Operator, Single Band
World—28 MHz—Joel Chalmers, KG6DX
World—21 MHz—South Jersey DX Assn.—N2CW Memorial
World—14 MHz—North Jersey DX Assn.—W2JT Memorial
World—3.5 MHz—Fred Capossela, K6SSS
World—1.8 MHz—Chip Margelli, K7JA—KP4ES Memorial
U.S.A.—14 MHz—Northern Illinois DX Association
*Canada—Canadian Amateur Radio Federation
Carib./C.A.—DX Club of Puerto Rico
Europe—Southern New England DX Club
Australia—14 MHz—Jay Carr, W6FAY
*Japan—21 MHz—DX Family Foundation

Multi-Operator, Single Transmitter
World—Anthony Susen, W3AOH
U.S.A.—Douglas Zwiebel, KR2Q
Europe—Friends of K3AO—K3AO Memorial

Multi-Operator, Multi-Transmitter
World—Hazard Reeves, K2GL Memorial
U.S.A.—James Rafferty, N6RJ
Europe—OH-DX-RING—OH2AM

Contest Expeditions
World—Single-Opr.—Yankee Clipper Contest Club
World—Multi-Opr.—Bill Schneider, K2TT

Special—Single Operator Awards
World—All Band—SSB/CW—John Knight, W6YY
World—Single Band SSB/CW—Yuri Blanarovich, VE3BMV
World—All Band—CW—Most QSOs—KV4AA Memorial (From the 14270 kHz Group)

Club
World—SSB/CW —CQ Magazine
Non-USA—SSB/CW—No. Calif. Contest Club—N6AUV Memorial

**Trophy supplied by Donor.*

Trophy winners may win the same trophy only once in a two-year period. In the event that the same station wins the World Award in the same category in two consecutive years, a special *CQ* Magazine Championship plaque will be awarded the second year. The sponsored trophy in that category will then be awarded to the second-place finisher in that category if the returns justify the award.

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.

The Canadian and Carib./C.A. awards are for residents *only.* A resident is defined as one living in that country with an established Post Office address.

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 opera tion in the contest).

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 c.w.

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. The *original* log may be requested by the Contest Committee if further cross-checking of the log is necessary.

5. Use a separate sheet for each band.

6. 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.

7. Sample log and summary sheets and zone maps are available from *CQ.* A *large* self-addressed envelope with sufficient postage or IRC's must accompany your request.

If official forms are not available, make up your own 80 contacts to the page on 8½″ × 11″ paper.

8. All entrants are required to submit cross-check sheets for each band on which 200 or more QSO's were made. All other entrants are encouraged to submit cross-check sheets.

9. Duplicate contact penalty: up to 1%—three (3) additional contacts removed; 1% to 3%—ten (10) additional contacts removed; over 3% is grounds for possible disqualification.

10. QRPp 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 QSO's; 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.

Actions and decisions of the *CQ* Contest Committee are official and final.

XIII. DEADLINE: All entries must be postmarked NO LATER than December 1, 1987 for the Phone section and January 15, 1988 for the C.W. section. An extension may be given if requested. Indicate phone or c.w. on envelope.

Both phone and C.W. logs should be sent to *CQ* Magazine, 76 North Broadway, Hicksville, NY 11801.

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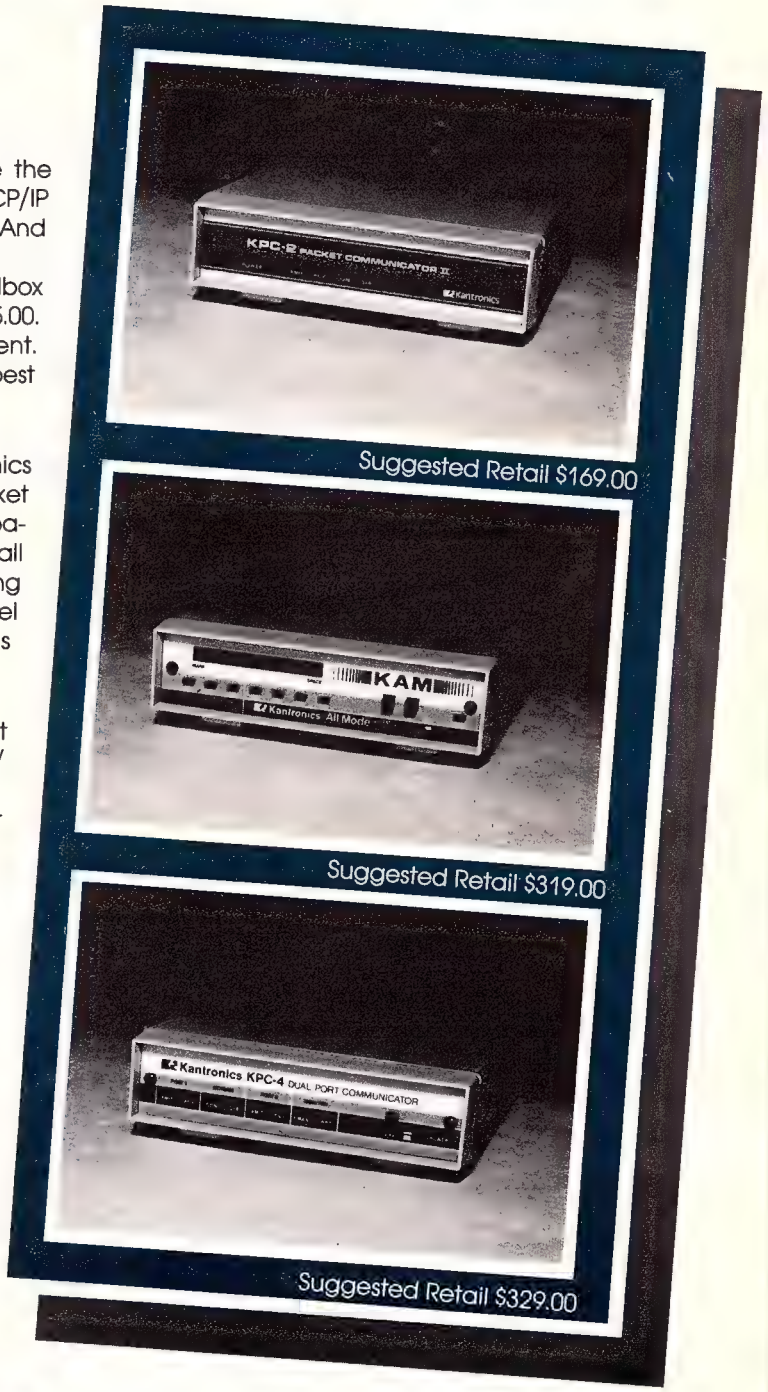
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** KPC-1 (Packet Communicator), KPC-2, KPC-4, KPC-2400

Here's a useful adapter that will let you use a multitude of earphones with your amateur receiver.

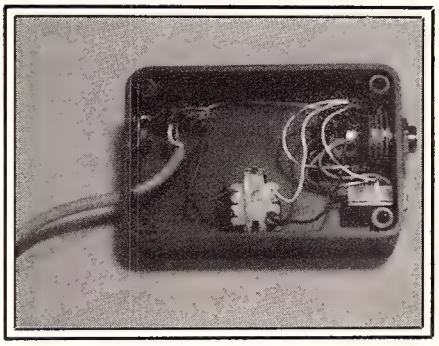
How To Use Stereo Earphones With Your Amateur Receiver

BY GEORGE S. PEACOCK*, W4WYV

If your house is like mine, you probably have more than one pair of stereo headphones lying around, especially if there are young people living there. Frequently, I would see one of these headsets and think about the possibilities of trying it out on my receiver. Well, I finally tried plugging a pair of stereo phones into my receiver, and you can guess how disappointing that was.

If you are lucky enough to have stereo headphones with the traditional ¼ inch diameter phone plug, at least they can be plugged-in to your receiver. The problem, of course, is that sound will only come from one side. This can easily be remedied by using a stereo-to-monaural adapter such as the Radio Shack #274-360 which ties both sides of stereo phones in parallel and connects them to a standard ¼ inch monaural plug. You can also pull the same trick with stereo phones that have a ⅛ inch diameter plug by using the Radio Shack #274-348 adapter. Now if you have plenty of volume with either of these adapters, you are in business.

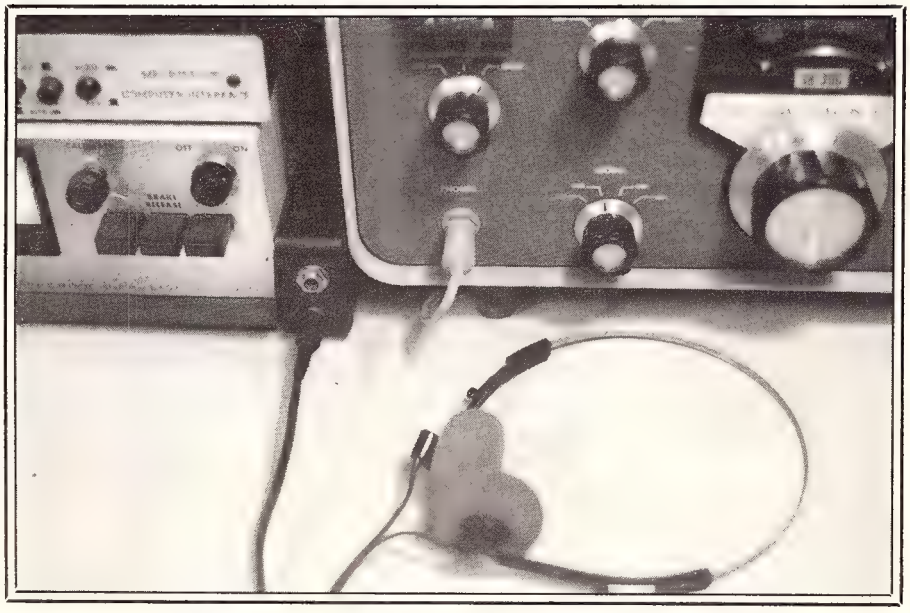
My problem was that some of the phones would work with some of my equipment and some would not. For instance, when using the above adapters, all of my stereo phones worked great with my old Hammarlund HQ-129X, but none of them worked properly with my Heath SB-300. The reason is that the headphone jack on the HQ-129 is wired directly into the 8 ohm speaker circuit and the SB-300 has a separate high-impedance connection for headphones. There was such a mismatch with the SB-300 that the receiver audio output stage would go into distortion before the volume could be turned up high enough to copy anything. The audio output stage on my little Heath HW-7 is specified at 1,000 ohms, but it works fine with some of the stereo phones I have tried and not with others. I suspect that the real source impedance of the HW-7 audio output is much less than 1,000 ohms, plus I have definitely determined that some of the phones have impedances higher than 8 ohms. This accounts for the usable results in the face of such a stated mismatch.



An internal view of the stereo earphone adapter.

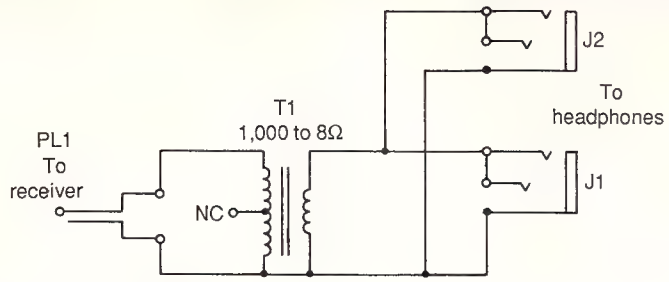
Of course, the problem boils down to impedance matching so that maximum power transfer takes place from the radio to the headphones. For practical results it is not necessary to match ohm for ohm, but it *is* necessary to get in the ballpark. The desire to use any stereo phones with my amateur receivers has led to the design of the simple converter box shown in the accompanying diagram. This box plus the Radio Shack adapter plugs mentioned earlier should allow you to use practically any stereo headphone set with any amateur receiver.

The box contains nothing more than a 1,000 to 8 ohm audio transformer and the proper plug and jacks to convert from stereo to monaural. While the transformer will not perfectly match all receivers, it will get you into the ballpark and allow you to use most stereo phones. This is definitely a "one-evening" project, and layout is totally noncritical. Raid your junk box and you will probably find most of the parts there. I got the input cord complete with ¼ inch phone plug, the terminal strip, and the ¼ inch stereo phone jack from my junk box. The only parts I bought were the transformer, box, and ⅛ inch jack. Actually, J-2 is not needed if you buy the ⅛ inch



The finished adapter nestles between two pieces of equipment.

*6604 Johnsdale Rd., Raleigh, NC 27615



Parts List

1—Box (RS 270-230)
1—¼ inch diameter phone plug (RS 274-1536)
1—¼ inch diameter stereo jack (RS 274-312)
1—Audio transformer 1,000 to 8 ohms (RS 273-1380)
1—two-position terminal strip

Fig. 1– The simple circuit for impedance matching earphones.

to ¼ inch adapter plug. So in the interest of further simplifying the converter, you can leave J-2 out. I decided to install J-2 just for convenience. You can also make do without the terminal strip if you don't mind flying lead connections. I prefer to tie down mine, plus the terminal strip also provides mechanical strain relief. A dab of RTV will hold the transformer in place, and although not shown, a glob around the input cable will also serve as a cable strain relief.

One other thing: The transformer shown can most likely be substituted by any audio output transformer with a primary impedance of 1,000 to 10,000 ohms. If you have an audio output transformer from an old radio or TV set, try it. It will probably work just fine. Don't be afraid to experiment.

I have found this little box to be a handy addition to the operating table. I have mine jammed in between my main receiver and adjacent piece of equipment. It is convenient there and can be plugged in at any time. I thought that I would never find a better headset for amateur use than my old WW-II HS-23, but now that I can use them, the new light-weight stereo phones have them beat. Anyway, build the box and you will have fun with stereo phones, too.

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- **Improves radiation pattern distorted by poor RF ground**

Don't we all sometimes have problems getting a good RF ground?

Unpleasant problems. Problems like RF "hot spots" that "bite" our lips or fingers when we transmit; like RF feedback that causes our rigs to quit working on certain bands; like excessive RF coupling to AC lines that causes everything to quit working; like our neighbors screaming about TVI and RFI; like our computers computing jiberish; or like being unable to talk across town because of extreme ground losses or radiation pattern distortion.

"Hey, my rig is on the second floor. There's no way I can get a good ground," you're thinking, or "I already have an excellent ground but the long ground connection wire causes reactance and acts like a high impedance circuit, isolating my rig from true RF ground."

What to do

Use the new MFJ-931 to create an artificial RF ground! It resonates a random length of wire thrown along the floor and produces a tuned counterpoise. This artificial ground effectively places your rig near actual earth ground potential even if your rig is on the second floor or higher with no earth ground possible.

Also, the MFJ-931 electrically places a far away RF ground directly at your rig -- no matter how far away it is. The MFJ-931 reduces the electrical length of the ground connection wire to virtually zero by tuning out its reactance.

How it works

The MFJ-931 connects between the ground connection of your transmitter or antenna tuner and a random length of wire thrown along the floor. Two knobs are adjusted for maximum RF ground current using its built-in RF ammeter. This resonates the random wire, converts it into a tuned counterpoise and presents an effective low impedance near ground potential to your rig, thus creating an artificial RF ground.

To electrically place a far away ground directly at your radio equipment simply connect the MFJ-931 between your rig and the connecting ground wire and adjust its two knobs for maximum RF current using its RF ammeter. This tunes out the reactance of the connecting wire, reduces the electrical ground lead length to virtually zero and electrically places your far away ground directly at your rig.

Get an effective RF ground

Get an effective RF ground. Eliminate "RF bites". RF feedback TVI, RFI and many other annoying problems due to inadequate RF ground, *and* -- at the same time --improve your radiation and radiation pattern for more DX.

The MFJ-931 covers 1.8 to 30 MHz and has a built-in RF ammeter for indicating RF ground current. It's ruggedly built in an all aluminum cabinet with a brushed aluminum front panel and measures 7½x3½x7 inches. It comes with a one year unconditional guarantee.

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Ticket Talk

a monthly feature by
FREDERICK O. MAIA, W5YI

INFO ON AMATEUR RADIO LICENSING

Novice Enhancement Attracting New Blood To Ham Radio

We have just received the FCC licensing statistics for the month of May 1987. You are all aware that effective March 21, 1987, beginners in the Amateur Radio Service are no longer restricted to just Morse code operation. Novices can now operate in the voice mode in the 10 meter (28.3–28.5 MHz) HF ham band, and also through VHF (222.1–223.91 MHz) and UHF (1270–1295 MHz) repeaters.

The information that the Commission released *clearly* shows that there is indeed much interest among newcomers in a voice-class amateur ticket. The government operates on a fiscal year that starts October 1st. Table I shows the number of new FCC Form 610 applications received by month for the last three years. Table II indicates the total number of Form 610s that the FCC processed through their licensing facility in Gettysburg, Pennsylvania during the month of May for the last six years.

As you can see, the number of applications seeking to enter amateur radio has *skyrocketed* to 10,314 for the 60-day period ending May 31, 1987. By comparison, this figure was 3,418 for the same period in 1985, and 4,893 in 1986. Table II shows that the FCC processed a record number of applications this past May. More important, the current downtrend in Form 610 applications has been dramatically reversed! Ninety-three percent (6,567) of new applicant Form 610 applications processed during May 1987 entered amateur radio at the Novice level.

The only conclusion you can come to is that (1) the public wants to communicate with one another and (2) the FCC's Novice Enhancement proceeding is doing what was intended, that being to interest newcomers in pursuing the ham radio hobby. Ten years from now we should have a fine new crop of electronic engineers—engineers that were influenced toward their profession by initial interest in amateur radio. Owen Garriott, W5LFL, the first amateur in space, acknowledges that he pursued electronics after first being introduced to amateur radio. We might even regain the supremacy in this area lost to off-shore nations.

National Volunteer Examiner Coordinator, P.O. Box 10101, Dallas, TX 75207

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Total
1984–5	992	1,310	1,597	1,380	1,278	2,051	2,100	2,200	1,218	1,479	1,335	908	17,848
1985–6	1,413	1,074	2,579	1,501	1,889	1,676	2,826	1,017	2,067	2,899	1,406	1,619	21,956
1986–7	929	1,465	1,862	2,299	1,978	934	3,249	7,065					*19,781

*(*Through May)*

Table I–Applications for new amateur licenses received by month by FCC. (Source: FCC, Gettysburg, Pennsylvania)

Radio Shack Enters Amateur Radio

The Tandy Corporation—headquartered in Fort Worth, just a few miles from where we live—also has been watching the progress of the FCC's Novice Enhancement proceeding. They operate some 8,500 Radio Shack stores worldwide. Many Radio Shack employees are ham radio operators, but Tandy did not consider the amateur radio market large enough for them with only an average of 1,500 new applicants joining the ham ranks monthly.

Last September we received a note from their Vice President of Consumer Products Merchandising, Robert B. Miller. He had seen our advertisement in this *(CQ)* magazine and ordered one of our Novice Packages. Bob wrote us "After 30 years of watching Amateur Radio, I have finally decided to take the plunge." We sent him our package that contained various manuals, code key, oscillator, etc., plus two of Gordon West's (WB6NOA) Morse code learning tapes. Bob obtained his Novice ticket shortly thereafter and was assigned KB5BXW. The Technician and General license (and call sign N5KLR) followed. Bob now holds an Advanced Class license and, as of this writing, is awaiting a 2-by-2 format amateur call sign.

Once it became apparent that the Commission would be approving Novice Enhancement, Bob arranged (through his book buyer, Leon R. Lutz, and Master Publishing, Inc., a publisher that does many of Radio Shack's books) for Gordon and I to produce a Novice package for the Radio Shack chain. We collaborated on the package which has now been completed. By the time you read this, it should be available nationwide at Radio Shack (Item No. 62-2402, $19.95 retail). It will immediately be the widest distributed amateur radio training manual of all time.

Gordo and I also arranged for us to have our own version of the package with our own book cover and binder which will be made available to amateur radio aspirants through mail order ($19.95 plus $2.00 shipping charge from W5YI-VEC, P.O. Box 10101, Dallas, TX 75207). Amateur radio dealers and classroom instructors can purchase multiple copies at a trade discount.

The self-study package is unlike any on the market today. The 300-page typewritten manuscript has been reduced to a fully illustrated 112-page textbook covering the background of the Novice class from the early days through Novice Enhancement. An overview of the Amateur Radio Service is included. It is fully accurate and updated through the new 1987 Novice rules, questions, and privileges.

Unlike most Novice license preparation manuals, the Novice Voice Class explains how testing has changed over the

	1982	1983	1984	1985	1986	1987
April	11,257	16,207	15,037	10,409	13,567	15,230
May	15,537	17,050	12,102	12,090	6,579	19,249
Total	26,794	33,257	27,139	22,499	20,146	34,479
Percent Increase:		+24.1%	−18.4%	−17.1%	−10.55%	+71.1%

Table II–Total applications processed by FCC during April/May by year. Includes all new, modified, and renewed Form 610 applications. (Source: FCC, Gettysburg, Pennsylvania)

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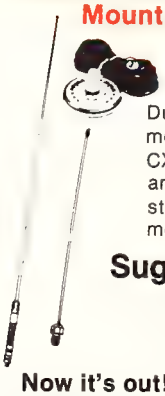
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CIRCLE 15 ON READER SERVICE CARD

years and how it is conducted today—even where to find volunteer examiners to conduct the needed 5 words-per-minute code examination and 30-question Element 2 theory exam. In addition to two included audio cassette tapes that teach the fun method of learning Morse code from ground zero, a chapter in the textbook coaches the correct way to learn the code.

Chapter 4, "Getting Ready for the Written Examination," prepares the applicant for the 30-question multiple-choice examination. All 302 possible questions, their multiple choices with the correct answer identified, follow. After each question is a short explanation as to why the answer is correct. There is no long text to tediously search through to find the answer references.

Realizing that some General class (and higher level) amateurs might not know how to administer the Novice examination, Chapter 5 "Taking the Novice Examination" advises both the applicant and VE alike on the proper procedure. A correctly completed FCC Form 610 Amateur Station/Operator application is pictured and a blank application enclosed with the package. The textbook can even be used by the VEs to administer the theory examination, since the number of questions required from each subtopic is indicated. A glossary of common CW abbreviations and amateur radio terms completes the textbook. The entire package is contained in a colorful shrink-wrapped cassette binder.

Radio Shack plans to advertise the amateur Novice Voice Class package in a fall 1987 circular in full color. Some 15 million will be circulated. In addition, the Novice Voice class package will be promoted in their big 1988 (40 million printed) Radio Shack catalog. It is mind-boggling to anticipate what this could do for amateur radio and the number of new Novices! We will just have to wait and see. It has been fun working on this project with Gordon West. His West Radio School, Inc., continues to develop more new Novice operators than any other in the country.

From the Mailbag

We welcome reader questions concerning amateur radio testing and licensing. Those of general interest will be covered in this column. Here is one from Mick McDaniel, W6FGE, of San Diego.

Is it a published regulation or a carryover from the FCC custom that a VE cannot or will not identify missed test questions to an applicant? I can understand why the FCC examiners refused. I cannot understand why the VEs will not. Grading of all amateur radio operator examinations, both written and code tests, is the complete responsibility of the Volunteer Examiner, Part 97.29(a). The answer format and acceptance of an applicant's answer as correct is also a VE function. While every VEC (and VE) must use test questions verbatim from the various pools, they need not accept the answer and its format from the VEC. We know of none that don't, however. The multiple choices used by nearly every VEC have become the de facto standard.

Part 97.28(d) requires that VEs ". . . inform the candidate by providing the percentage of questions answered correctly." This rule goes back to the early days (1984) of the VE program when the FCC advised VECs which questions to use on their written examinations. VECs were provided with three different test designs (Schedule A, B, and C) for each written test element. Since not all questions in the pool were used for testing purposes, the FCC asked that applicants only be advised of their score rather than identify exact questions which might identify specific test designs in force.

Eventually the VEC got to choose the exam questions. Today the questions that appear on all Technician through Extra class examinations can be selected by either the VEC or the administering volunteer examiners. The VE team must follow the formula supplied by the VEC if they elect to choose the questions. While there probably is no longer a reason for not identifying the exact questions missed by an applicant (since all questions are usually used) the Part 97.28(d) rule remains in force.

Is it my imagination, or is the new VEC program being merged into the older Novice VE program? We can understand why you might think that since the new Technician through Extra class VE/VEC examining program has been *deregulated* several times. The VEC, and especially the VE team, has taken on increased responsibility in recent years as the government continues to withdraw from the amateur radio testing function. Regimented testing with prior FCC notification of each session is now a thing of the past.

Except for FCC oversight, the VECs now administer the examination program. The FCC no longer creates the question pools. Even the test program syllabus and the VEC instructions, previous FCC functions, are now developed by agreement among the various VECs. Basic differences remain, however, between the Novice and VE/VEC testing programs.

It takes three VEs accredited by a VEC to conduct amateur examinations *above the Novice level*. The Form 610 applications are sent to the VEC for administrative handling before being forwarded to the FCC in Gettysburg, PA. Two VEs administering Novice tests need not be accredited and can forward successful applications directly to the FCC. No test fees—actually expense reimbursement—are allowed for Novice examinations.

The balance of the testing procedures for both VE programs *can* be pretty much

Say You Saw It In CQ

the same—that is, if the VEC and the VE team want it to be. VE teams can now design the written as well as the code examinations. Both of these examinations can be obtained (even purchased) from an outside supplier as long as the supplier meets the *preparing VE* criteria and the examination contents are not divulged. A preparing VE must hold a higher class license, if one exists, than the examination being prepared.

Your VE teams retain the written and code examinations for later testing use. Aren't you concerned that these will become compromised and public knowledge? We have basically two testing programs. One program is for VE teams that want to conduct a single examination session. A team participating in ADP (Automatic Distribution Program) conducts tests on a repetitive periodic basis without prior notification to the VEC. They are sent a package containing all instructions, forms, and many different designs of each examination. These examinations are used by the VE team in any order, and the VEC does not know which test design will be used. We send enough designs so they can be constantly changed since no applicant can be administered the same written or Morse code examination again. (Part 97.27[c])

We have dozens of different, computer-generated written examination designs, and we keep generating more all of the time. FCC Part 97.27(d) rules require volunteer examiners to hold all examination designs in strict confidence. A VE who violates this could lose his amateur radio license. (Part 97.33)

Even if one—or all—of these test designs should happen to fall into the wrong hands, there is no way for anyone to know which test design will be administered at a session. We have not had a problem in this regard, since all test questions and their answers are a known factor. It is easier for applicants to simply study the various license preparation manuals that are available in the marketplace.

Our code examinations consist of three different cassette tapes—one each at 5, 13, and 20 words per minute. Each has ten different five-minute properly constructed QSO-type examinations on them. (*Each* code test must now contain all alphabet letters, numerals, and certain punctuation and operating signals.) The VE team selects which test they want to administer and then designs the Morse code examination. This can be in any form including fill-in-the-blank, ten questions (seven of which must be answered correctly) multiple choice, even true/false. Again, the VEC does now know how the code exam will be constructed. This is a VE function. As an additional security measure, we also recommend that the VE team generate their own code tapes, since this can easily be done with a personal computer. More than half our VE teams (and we have over 250) make up their own code test tapes.

While knowledge of amateur radio operator questions was a problem when the FCC ran the testing program, it isn't under the present system, since there are so many test design possibilities and all questions/answers are public information. The FCC had three different designs. VE teams—especially those which elect to design their own—have an infinite number.

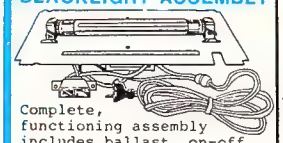
I want to administer a Novice test to a friend. Where do I get the materials? Actually VEs are supposed to develop their own. We do, however, have a *Novice Testing Kit* available especially for this purpose (cost is $5.95 plus $1.00 postage from W5YI). It contains properly constructed, assorted cassette-tape Morse code and written test designs. A supply of the new version Form 610 applications and a manual containing all 302 test questions and their answers is included for applicant use.

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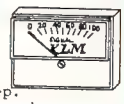
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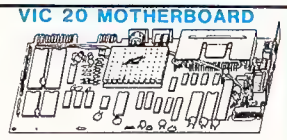
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9086	50	.4	.64	1.7	3.1
½" Alum	50	3	.5	1.2	2.2
½" Heliax	50	.2	.4	.9	1.6
⅞" Heliax	50	.1	.2	.5	.9

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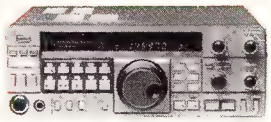
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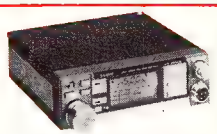
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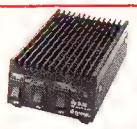
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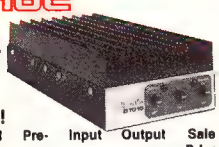


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B3016	2M	Yes	30W	160W	$229
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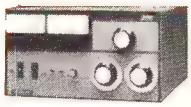
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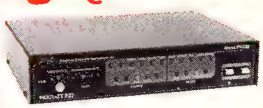
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Announcing *(from page 6)*

chusetts ARS will operate W1TKZ to celebrate the new Novice 10 meter privileges on Sept. 19 from 1300Z to Sept. 20 at 0100Z. Operation will be USB at 28.350 MHz. All amateurs are welcome, especially Novices and Technicians. For a special QSL card, send a completed QSL and SASE to the Wellesley ARS, 211 Washington St., Wellesley, MA 02181.

• **Wellesley, Massachusetts ARS FCC Exam Session**–The Wellesley, Massachusetts ARS will sponsor an FCC exam session on Sept. 19 at 10 am at the Wellesley Red Cross building at 211 Washington Street in Wellesley, MA. All classes of exam will be administered. Contact Dan Brevik, KZ1D, at 617-460-9059 by September 15.

• **Detroit, Michigan**–Members of the Southeastern Michigan DX Association will operate Special Event station K8JP commemorating the visit of Pope John Paul II to the Detroit area, Sept. 19 0001–2400Z. Operation will be 10–80 meters, phone and CW. For special commemorative QSL, send QSL and SASE to Larry Zabkowski, K8NLD, 18082 Gaylord, Fraser, MI 48026.

• **Fairmount, Indiana**–The GC ARC will operate W9EBN on Sept. 26 and 27 from 1700Z Saturday until 1700Z Sunday to celebrate Museum Days in the hometown of actor James Dean. Operation will be 10 kHz from the lower end of the General phone bands on 20, 40, 80 meters, also on 28,350 Novice band phone. For certificate send QSL and SASE to KA9TBM or N9FBB at Callbook address.

• **Lumberton, North Carolina**–The Carolina Amateur Radio League will operate KS4S from the Lumberton Municipal Airport, Lumberton, North Carolina from 1300–2100 UTC on Sept. 26 and 27 in celebration of the 200th anniversary of Robeson County, North Carolina. Operating frequencies will be 3.870, 7.240, 14.290 kHz and will be on 28.400 kHz on the half hour. For a certificate send your QSL to CARL, P.O. Box 2208, Lumberton, NC 28359.

• **WA1JHV Special Event**–The North Providence, Rhode Island ARC will operate WA1JHV on Sept. 27 from 8 a.m. to 6 p.m. EST on 14.300, 7.225, 3.900, 28.400 for the celebration of the bicentennial of the United States Constitution. A special "We the People" QSL card will be sent to all SASE contacts. Send to NPARC, 41 Brookside Ave., N. Providence, RI 02911.

• **The following hamfests, etc., are slated for Sept.:**

Sept. 12, **W9DXCC DX Convention,** Holiday Inn, Glen Ellyn, IL. Contact Howie Huntington, K9KM, 65 South Burr Oak Dr., Lake Zurich, IL 60047.

Sept. 12, **Ham-O-Rama '87 & Computerfest,** Niagara Falls Convention and Civic Center, Niagara Falls, NY. Contact AE2T, 92 Saxton St., Lockport, NY 14094-4346 (716-433-3396).

Sept. 12, **RACES Hamfest,** Saratoga County Fairgrounds, Ballston Spa, NY. Contact Dave Atwell, N2FEP, Box D15 RD #5, Ballston Spa, NY 12020.

Sept. 12, **Windsor Hamfest,** Southern Kennebec Agricultural Society Fairgrounds, Windsor, ME. Contact W1JTH and W1TGY, 47 Longwood Ave., Augusta, ME 04330 (207-622-1385).

Sept. 12, **W3PIE Gabfest,** Uniontown, PA. Contact John T. Cermak, WB3DOD, P.O. Box 433, Republic, PA 15475 (412-246-2870).

Sept. 12–13, **Louisville Hamfest,** Kentucky Fair and Exposition Center, Louisville, KY. Contact Greater Louisville Hamfest Assn., P.O. Box 34444, Louisville, KY 40232.

Sept. 12–13, **Hospitality Hamfest,** Texas Street Recreation Center, Mobile, AL. Contact N4MFQ at 205-471-4717.

Sept. 13, **Findlay Hamfest,** Hancock County Fairgrounds, Findlay, OH. Contct FRC Hamfest, P.O. Box 587, Findlay, OH 45839-0587 (SASE).

Sept. 13, **Ozarks Club Congress & Swapfest,** City Park, Monett, MO. Contact KY0B.

Sept. 13, **LaPorte Summer Hamfest,** LaPorte County Fairgrounds, LaPorte, IN. Contact LaPorte ARC, P.O. Box 30, LaPorte, IN 46350.

Sept. 13, **Butler Hamfest,** Butler Farm Show Grounds, Butler, PA. Contact John Varljen, K3HJH, 174 Oak Hill Heights, Butler, PA 16001 (412-283-9403).

Sept. 13, **Indian Foothills ARC Hamfest,** Marshall Senior Citizens Bldg., Marshall, MO. Contact Randy Ebers, KE0MV, 125 Lakeview, Marshall, MO 65340 (SASE).

Sept. 13, **Candlewood ARA Hamfest,** Elk's Lodge, Danbury, CT. Contact Gene Marino, W1IDH, 31 Valley View Rd., Newtown, CT 06470 (203-426-8852).

Sept. 19, **Sonoma County RA Fleamarket,** Sebastopol Community Center, Sebastopol, CA. Contact SCRA, Box 116, Santa Rosa, CA 95402.

Sept. 19, **Ham Hangover Hamfest & Electronics Show,** Ponca City National Guard Armory, Ponca City, OK. Contact Lin Jackson, KA5ZJM, 350 S. Birch St., Ponca City, OK 74603 (405-762-7299).

Sept. 19, **Packet Radio Symposium,** Georgian College, Barrie, Ontario, Canada. Contact Hex-9 Group, Box 254, Barrie, Ontario, Canada L4M 4T2.

Sept. 19–20, **Peoria Area ARC Superfest '87,** Peoria, IL. Contact Superfest '87, PAARC, P.O. Box 3461, Peoria, IL 61614 (309-674-5656).

Sept. 19–20, **Wichita ARS Hamfest,** Wichita Falls Activity Center, Wichita Falls, TX. Contact WARS Hamfest, P.O. Box 4363, Wichita Falls, TX 76308.

Sept. 20, **Adrian, MI Hamfest,** Lenawee Fairgrounds, Adrian, MI. Contact Adrian ARC, P.O. Box 26, Adrian, MI 49221.

Sept. 20, **Augusta ARC Hamfest,** Lake Olmstead Park, Augusta, GA. Contact N4JA 1-404-790-7802.

Sept. 20, **LIMARC ARRL Long Island Hamfair,** NY Institute of Technology, Old Westbury, LI, NY. Call Hank Wener, WB2ALW, 516-484-4322 evenings.

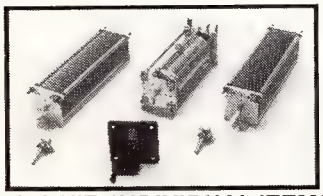
Sept. 20, **Open House—World of Amateur Radio,** North Park Village, Chicago, IL. Contact Chicago ARC 545-3622.

Sept. 20, **Grand Rapids ARA Swap & Shop,** West Catholic High School, Grand Rapids, MI. Contact Dan Hazelswart, KA8BCI, at 616-363-0649.

Sept. 20, **South Jersey RA Hamfest,** Pennsauken Senior High School, Pennsauken, NJ. Contact Fred Holler, W2EKB, 348 Bortons Mill Rd., Cherry Hill, NJ 08034 (609-795-0577).

(continued on page 62)

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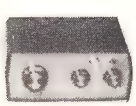
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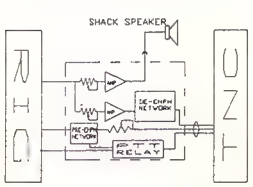
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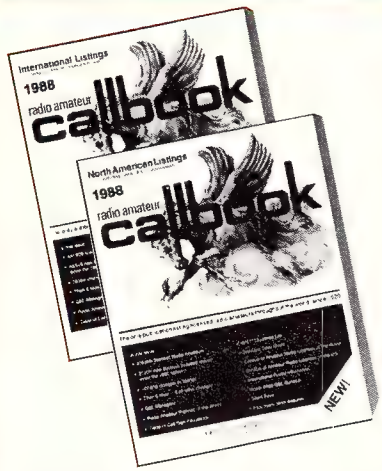
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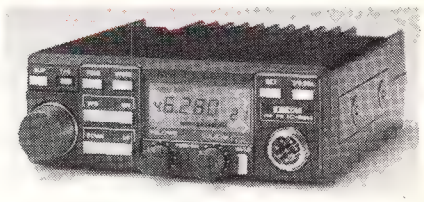
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82-202-1006 N Male for 9913	4.50
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3/16" Guy Cable. 3700 #7 × 7 strand, import	15c/ft.
3/8" × 6 E&J Turnbuckle	7.95
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1/4" wire clips	50
1/4 Thimbles	45
Porcelain 500D Guy Insulator (3/16)	1.99
Porcelain 502 Guy Insulators (1/4)	3.39

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Announcing (from page 60)

Sept. 26, **Viking ARS Swapfest,** Waseca High School, Waseca, MN. Contact VARS, P.O. Box 3, Waseca, MN 56093.

Sept. 26, **Orange County ARC Hamfest & Computer Fair,** John S. Burke Catholic High School, Goshen, NY. Contact Barbara Christopher, N2AWI, Box 447 RD2, Wallkill, NY 12589 (914-564-0688).

Sept. 26, **Elmira International Hamfest,** Chemung County Fairgrounds, Elmira, NY. Contact Steve Zolkosky, 118 East 8th St., Elmira Heights, NY 14903.

Sept. 26–27, **York Hamfest,** York, PA. Contact York Hamfest, Box W, Dover, PA 17315.

Sept. 26–27, **Radio Expo,** Lake County Fairgrounds, Rt. 120 & 45, between Chicago and Milwaukee. Contact Radio Expo, Box 1532, Evanston, IL 60204.

Sept. 26–27, **Northern New Mexico ARC Hamfest,** Camp Stoney, east of Santa Fe, NM. Contact Bob Norton, N5EPA, Rt. 3, Box 95-15, Santa Fe, NM 87505 (SASE).

Sept. 27, **SVRC Hamfest/Computer Swap,** New Berlin, IL. Contact SVRC, P.O. Box 8252, Springfield, IL 62791.

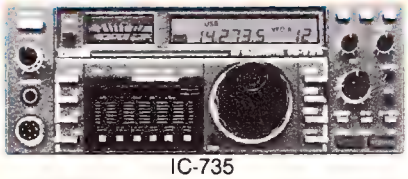
Sept. 27, **BARCFEST** Swap Meet, National Guard Armory, Boulder, CO. Contact Dale Scott, KA0QPV, 303-665-2364.

Sept. 27, **SPARC September Swapfest,** Golden Triangle Park, St. Peters, MO. Contact Jason Zwyers, KA0INR, 1084 Crestwood Lane, O'Fallon, MO 63366.

Sept. 27, **Natchaug ARA Fleamarket,** Elks Home, Willimantic, CT. Contact Ed Sadeski, KA1HR, 203-456-7029 (after 4 pm).

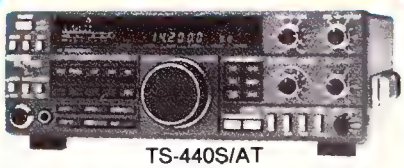
Sept. 27, **Cleveland Hamfest Assn. Hamfest & Computer Show,** Cuyahoga County Fairgrounds, Berea, OH. Contact CHA, P.O. Box 81252. Cleveland, OH 44181-0252.

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IC-735 Gen. Cvg Xcvr	999.00	Call $
IC-745 Gen. Cvg Xcvr	1049.00	Call $
IC-751A Gen. Cvg. Xcvr	1649.00	Call $
Receivers		
IC-R7000 25-1300 + MHz Rcvr	1099.00	Call $
IC-R71A 100 kHz-30 MHz Rcvr	949.00	Call $
VHF		
IC-275A All Mode Base w/PS	1199.00	Call $
IC-275H All Mode Base 100w	TBA	Call $
IC-271A All Mode Base 25w	859.00	Call $
IC-27A FM Mobile 25w	429.00	Call $
IC-27H FM Mobile 45w	459.00	Call $
IC-28A FM Mobile 25w	429.00	Call $
IC-28H FM Mobile 45w	459.00	Call $
IC-38A FM Mobile 25w	459.00	Call $
IC-2AT FM HT	299.00	Call $
IC-02AT FM HT	399.00	Call $
IC-μ2AT Micro HT	329.00	Call $
UHF		
IC-475A All Mode 25w	TBA	Call $
IC-471A All Mode Base 25w	979.00	Call $
IC-47A FM Mobile 25w	549.00	Call $
IC-48A FM Mobile 25w	459.00	Call $
IC-4AT FM HT	339.00	Call $
IC-04AT FM HT	449.00	Call $
IC-μ4AT 440 FM HT	TBA	Call $
IC-3200A FM 2m/70cm 25w	599.00	Call $
220 MHZ		
IC-375A All-Mode, 25w, Base Sta.	TBA	Call $
IC-38A 25w FM Xcvr	459.00	Call $
IC-37A FM Mobile 25w	499.00	Call $
IC-3AT FM HT	339.00	Call $
IC-03AT Deluxe HT	449.00	Call $
1.2 GHz		
IC-1271A All Mode 10w	1229.00	Call $
IC-120 1w, FM, Xcvr	579.00	Call $
IC-12AT Deluxe 1w HT	459.00	Call $



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TS-930S/AT Gen. Cvg Xcvr	1849.95	Call $
TS-830S Xcvr	1099.95	Call $
TS-430S Gen. Cvg Xcvr	859.95	Call $
TS-440S/AT Gen. Cvg Xcvr	1199.95	Call $
TS-440S Gen. Cvg Xcvr	999.95	Call $
TL-922A HF Amp	1499.95	Call $
Receivers		
R-5000 100 kHz-30 MHz	899.95	Call $
R-2000 150 kHz-30 MHz	649.95	Call $
VHF		
TS-711A All Mode Base 25w	899.95	Call $
TR-751A All Mode Mobile 25w	599.95	Call $
TM-221A Compact FM 45w	399.95	Call $
TM-2530A FM Mobile 25w	429.95	Call $
TM-2550A FM Mobile 45w	469.95	Call $
TM-2570A FM Mobile 70w	559.95	Call $
TH21-BT FM, HT	259.95	Call $
TH-205 AT, NEW 2m HT	259.95	Call $
TH-215A, 2m HT Has It All	349.95	Call $
UHF		
TS-811A All Mode Base 25w	1049.95	Call $
TR-851A 25w SSB/FM	699.95	Call $
TR-9500 10w All Mode	649.95	Call $
TM-421A Compact FM 35w	419.95	Call $
TM-411A FM Mobile 25w	449.95	Call $
TH-415A 2.5w 440 HT	359.95	Call $
TH-41BT FM, HT	269.95	Call $
TW-4100A, 2m/70cm FM	649.00	Call $
TR-50 1w 1.2GHz FM	549.95	Call $
220 MHZ		
TM-3530A FM 220 MHz 25w	449.95	Call $
TH-31BT FM, 220 MHz HT	269.95	Call $



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HF Equipment	List	Juns
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FT-980 9 Band Xcvr	1795.00	Call $
FT-757 GX II Gen. Cvg. Xcvr	1079.95	Call $
FT-767 4 Band New	1895.00	Call $
Receivers		
FRG-8800 150 kHz - 30 MHz	599.95	Call $
FRG-9600 60-905 MHz	679.95	Call $
VHF		
FT-211RH FM Mobile 45w	459.95	Call $
FT-270RH FM Mobile 45w	439.95	Call $
FT-290R All Mode Portable	579.95	Call $
FT-23 R/TT Mini HT	299.95	Call $
FT-209RH FM Handheld 5w	359.95	Call $
UHF		
FT-711RH FM Mobile 35w	TBA	Call $
FT-730R 10w 440 FM	399.95	Call $
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FT-73 R/TT Mini HT	314.95	Call $
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FT-690R MKII, 6m, All Mode, port.	569.95	Call $
Dual Bander		
FT-2700RH FM 2m/70 cm 25w	599.95	Call $
FT-727R 2m/70 cm HT	479.95	Call $
220 MHZ		
FT-109 RH New HT	379.95	Call $
Repeaters		
FTR-2410 2m Repeaters	1249.95	Call $
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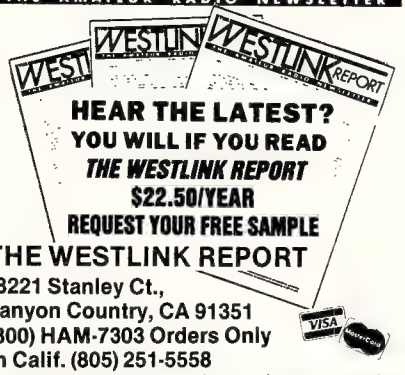


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CQ REVIEWS:

The Alpha-Delta, Delta-4 Coax Switch

BY LEW McCOY*, W1ICP

A recent new product from Alpha-Delta Communications is their four-position RF coaxial switch with built-in lightning surge protection. The switch is called the Delta-4. The Delta-4 has several features that set it apart from most coaxial switches.

As can be seen from the rear-view photograph with the cover removed, ribbon rather than wire leads are used. These provide a very low-inductance lead and reduce any mismatch that might occur through the switch. The leads are silver-plated copper material. The efficiency of the switch is excellent. The insertion loss at 30 MHz is less than 0.1 dB (VSWR 1.1:1), less than 0.15 dB up to 150 MHz (VSWR less than 1.5:1), and 0.5 dB at 450 MHz with VSWR of less than 1.4:1. Notice also in the rear view the depth of the casting which provides better than 50 dB of isolation between contacts (through 450 MHz).

Another feature is the lack of customary rotating switch contacts. The switch drive is a steel ball-bearing unit that has a Teflon material "lifting" unit on the drive. When the drive is rotated, the unit lifts the contact from a grounding ring making contact to the desired antenna SO-239 antenna fitting. All remaining contacts are grounded out.

The Delta-4 also has a lightning surge protection device built in. This is the Model D-4 ceramic gas-tube ARC-plug. The theory here is that if a severe lightning hit occurs, the cartridge pill will short to ground, protecting your equipment from the lightning stroke. The cartridge will remain shorted until replaced (or removed). Replacement is simple in that one need only remove the back of the switch, snap out the shorted cartridge, and snap in a new one.

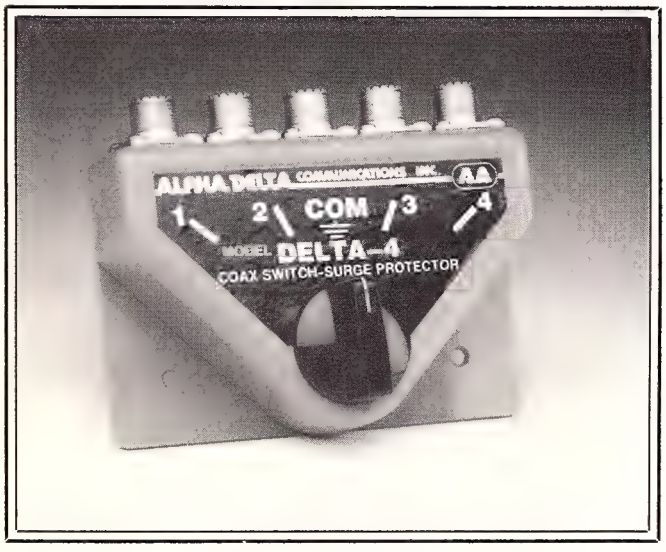
It is difficult to predict the life of one of the lightning cartridges simply because it will depend on the size and severity of the lightning stroke. I found in testing that my wire antenna would build up strong static charges when storms were as much as 20 miles away. The Transmatch I use would actually arc to ground from these built-up charges. When I installed the Delta-4 this no longer happened, and I checked to make sure I was still getting these charges when the Delta-4 was out of the circuit. I would definitely recommend the surge protection, particularly in these days of solid-state circuitry that cannot stand much over-voltage. Of course, it is important to install a good earth ground with a solid electrical connection to the Delta-4 (and to all your equipment).

I don't want to mislead the reader into thinking that the Delta-4 will protect against *any and all* lightning hits. How to protect against lightning is probably the most-asked question by amateurs. There is no 100 percent protection aside from possibly disconnecting all external leads, including power leads, from the equipment. What is important in this review is that the Delta-4 will protect against many lightning hits that *could* ruin your equipment.

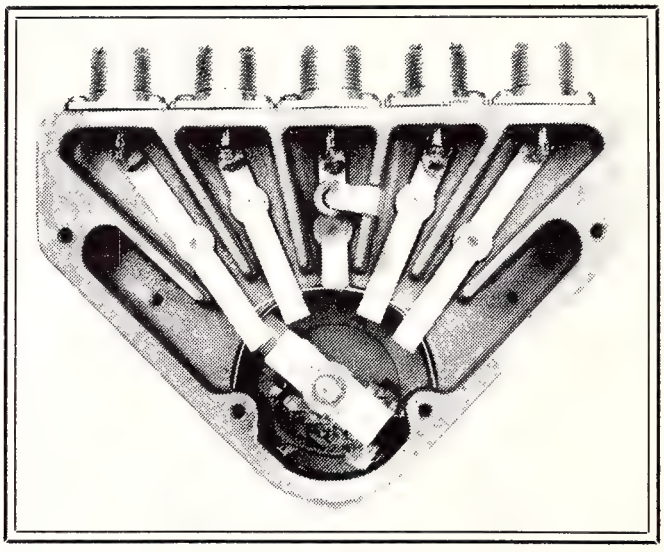
The Delta-4 is extremely rugged as can be seen from the back-view photograph. I would certainly rate the unit very highly.

The switch lists for $69.95 and is manufactured by Alpha Delta Communications, P.O. Box 571, Centerville, OH 45459 (513-435-4772). CQ

*Technical Editor, CQ, 200 Idaho Street, Silver City, NM 88061



The Delta-4 coax switch.



Interior view of the Delta-4 coax switch.



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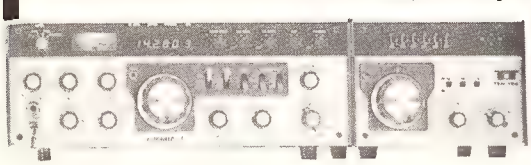
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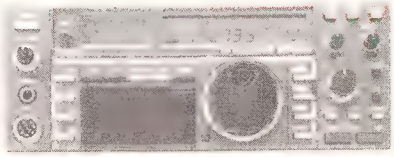
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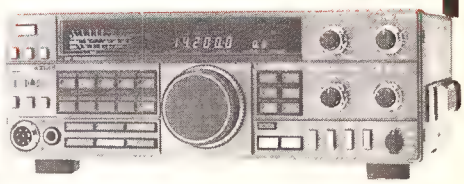
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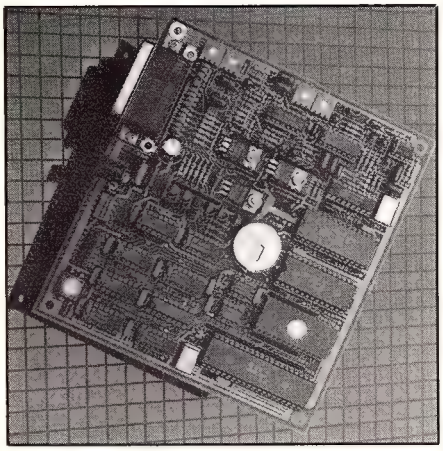






CIRCLE 140 ON READER SERVICE CARD

CQ Showcase



S-COM "5K" Repeater Controller

The S-COM "5K" is a low-cost, compact addition to S-COM's line of repeater controllers. The state-of-the-art CMOS microprocessor design supports both a repeater and a control receiver, and requires 60 ma at 12 VDC. Applications include control of main site repeaters, remote receiver links, portable repeaters, and emergency repeaters. Operating parameters, such as ID callsigns, courtesy message, timeout timer, pre- and post-timeout messages, CW pitch, and CW speed are remotely programmable via DTMF commands, eliminating trips to the repeater site to make programming changes. Data is retained in non-volatile memory. Three logic inputs and three logic outputs are provided for site control and monitoring purposes. Among the other features included are CW shaping, a watchdog monitor, flexible repeater interfacing, a CW clock and calendar, DTMF muting, security passwords, a "polite" identifier, transient protection, power MOSFET outputs, and G1OFR glass epoxy PC board.

The board measures 5.5″ × 6.0″ with the tallest component only 0.05 inches above the board. Options include full IC socketing, 1¾″ × 19″ inch rackmount cabinet, wall-mount power supply, and audio delay module. The S-COM "5K" comes with a 1-year warranty. The assembled and tested board, with all connectors and manual, is priced at $179. For more information, contact S-COM industries, P.O. Box 8921, Fort Collins, CO 80525, or circle number 101 on the reader service card.



Heathkit Linear Amplifier Kit

The Heathkit SB-1000 Linear Amplifier provides a full 1000 watts PEP output on SSB or 850 watts output on CW. It provides full HF coverage from 160–15 meters including 80% of rated output on the three WARC bands. The SB-1000 uses a single 3-500Z tube and has a hypersil steel E-I core transformer. It also features a quiet computer-style fan, a full-wave power supply with computer-grade capacitors, adjustable ALC, and plate and load controls with vernier tuning.

For more information about the SB-1000 Linear Amplifier kit and Heathkit's line of amateur radio equipment, send for the free Heathkit catalog. Write to Heath Company, Dept. 150-955, Benton Harbor, MI 49022. In Canada, write to Heath Company, 1020 Islington Ave., Dept. 3100, Toronto, Ontario, M8Z 5Z3.

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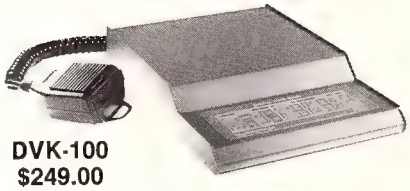


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CIRCLE 65 ON READER SERVICE CARD

HOW WE MADE *TUNE IN THE WORLD WITH HAM RADIO* EVEN BETTER!

The **BIG NEWS** about the League's beginner's package is that we have replaced the 60-minute cassette with two 90-minute cassettes in order to give almost three time the Morse Code instruction. Production of these tapes was a team effort. First, selected ARRL registered instructors were asked to review prototype tapes. ARRL staff incorporated the suggested improvements on the master tape. A special keying interface was designed in the ARRL lab.

The result is vastly superior to the code practice material contained in the previous editions. The popular Farnsworth method is used: the letters are sent at 18 WPM with appropriate spacing so that the actual speed is 5 WPM. The code is recorded on both stereo channels, but the voice-over is recorded only on one. Students with a stereo tape player can learn the code as the text is described on the tape, and then switch to the "code only" channel to test themselves as they go along.

The first tape is devoted to teaching the letters of the alphabet, prosigns, and numbers; the knowledge of each is required on the code portion of the Novice exam. Each new letter (or character) is sent several times, then words are sent containing previously learned letters and the new letter before going on the the next. The audio channel explains what is being sent. The first side of the second tape consists of 9 practice sessions; which are described on the tape and in greater detail in Chapter 3 of the *Tune In The World* text. The other side of the second tape consists of six sample Amateur Radio contacts for use as final practice by the student. Sample 10-question tests covering each of the QSOs are also presented in the text in order to give the student a feel for what the code portion of the exam will cover. The new tapes should made learning the code a fun experience.

We've improved the text too! Material has been added to the text to cover what the prospective Novice needs to know in order to pass the new 30-question Novice exam.

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Besides improving the text, we've added almost three times the code practice material to the package in the form of two C-90 tape cassettes. One tape teaches the code, the other provides practice. They are recorded in stereo so you can switch off the voice portion for even more practice. These new tapes make learning the code a snap!



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CIRCLE 125 ON READER SERVICE CARD

A LOOK AT THE SHACK FROM BOTH ENDS OF THE COAX

More on Software—Part III

Author Thurber continues with his timely examination and discussion of some excellent computer software for the amateur hamshack. If you missed the two previous installments, check them out if you can.

—K2EEK

Last time we got together we continued with the second installment of our three-part series on high-potential software for the hamshack. We discussed several engineering-oriented software products from BV Engineering. We also looked at K2LAF's MULTIFAX facsimile program for the IBM. We examined two code instruction programs, one by LARESCO and the other by Archway Data. We also highlighted Spec-Com's COCORADIO, a unique, no-interface-required multimode operating program for the Radio Shack CoCo. Not forgetting our equally important interest in antennas, we also described the Bugcatcher HF mobile antenna and the ready-made G5RV antennas fabricated by Amp Supply Co.

This month our plan is to start on the software track. While we will not review any one product in detail this time, we'll catch up on some mail regarding computer topics. We'll also address some of the problems associated with hamshack AC lines, look at several new antenna products, and pull down a few books, catalogs, and booklets from the bookshelf.

Before getting into anything else, let's first take a look at the software correspondence we've received in recent months.

From the Software Mailbox

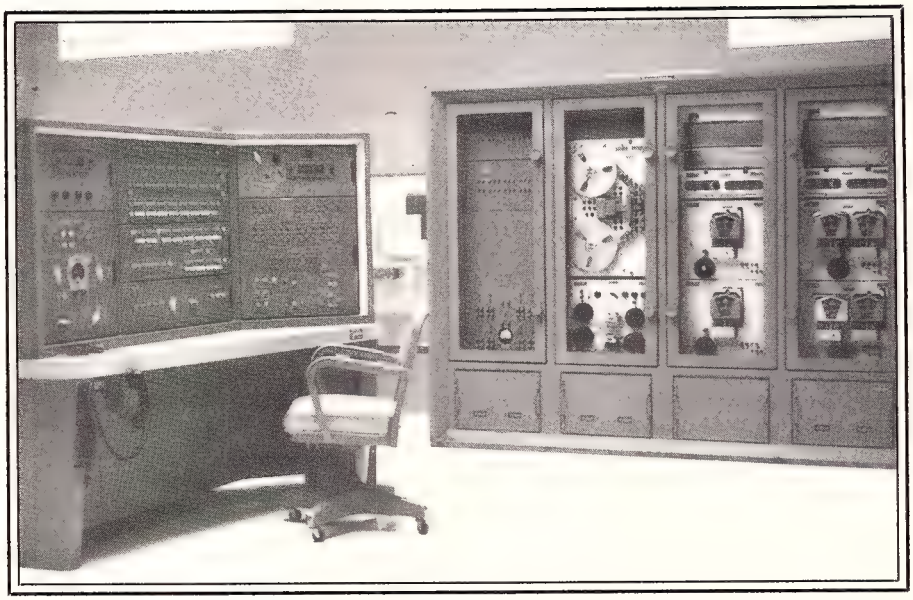
Commodore 64 Inquiry. Dennis G. Eksten, W9SS, wrote to us about some concerns that many C-64 owners share. Writes Dennis:

"I've been a ham for more than 30 years. Two years ago I got the computer bug, motivated by [the need for] a simple way to get into RTTY and also send good CW. I use my C-64 primarily, but also have a Vic-20 in the shack.

"I am writing to you because I read with great interest your Computer Care article in the November 1986 issue. I have been troubled by the great lack of information on repair in C-64 magazines such as *Run* and *Compute!'s Gazette*. I wish you would in a future issue expand on your current writing in the following two areas:

"1. Diagnostic Programs. I have a friend who is a service technician for RCA [which is factory-authorized to repair Commodores]. He says that they have a diagnostic program cartridge that plugs into the game port on the C-64. It checks all the computer's internal components and then gives a printout of any problems, right down to the level of which IC or major part is defective. Do you know where I can purchase this program?

317 Poplar Drive, Millbrook, AL 36054



Computers have changed a great deal since 1956, when this early Burroughs guidance computer (which nearly filled a room) was the first operational unit to use transistors rather than tubes. This monster was known as the Atlas Guidance Computer, Mod. I. As computers became more and more accessible and useful to hams, we changed the emphasis of CQ's Antennas column to reflect coverage of antennas, accessories, and computers . . . "a look at the shack from both ends of the coax" . . . in the May 1985 issue.

"2. Parts. I've been trying to find a reasonably priced 6526 CIA chip that is used in the C-64. In scanning the catalogs and magazines such as *Radio-Electronics*, I can only find Jameco that even sells it ($14.95 each with a minimum order of $20 plus shipping and handling). Can you publish a list of Commodore chip IC sources that sell reasonably to hams on a small order basis?"

We responded to Dennis with some general suggestions, but could offer nothing specific on either problem. And, while we were aware of the Commodore diagnostic cartridge, we doubted that it was available for sale. If anyone has some specific experience with C-64 diagnostic software, or has come up with some reliable and reasonably priced sources of specialized computer chips for the C-64, please give Dennis a hand—and share your information with us for other readers' benefit. (Contact Dennis G. Eksten, W9SS, 5006 N. Second St., Loves Park, IL 61111-5809).

Winner's Edge Notes. Pete Smith, N4ZR, who operates Winner's Edge Software, wrote to thank us for the description of his contesting software in the February column. Pete advises that in the future, he'll make the decision whether to port his Commodore software over to the IBM-PC. As all of us know, the price of the "clones" is coming down so fast that they may replace the Commodore 128 as the logical next step for Commodore 64 owners. Perhaps by the time this appears in print, the computer market will have stabilized and Pete will have made his decision!

Pete enclosed a flyer on his latest product, Version 3.1 of the Contester II integrated contest software. The new Commodore 64/128 software is optimized for use in SSB contests, or for CW contests with a separate keyer. As with the original Contester II, the new version provides considerable contest operating automation. The program both logs and dupes, and it may be customized for any contest. Running score, band-by-band QSO and multiplier totals, and other useful contest stats are maintained automatically. Also, automated multiplier tracking, scoring, and other contest-specific functions are provided by the ARRL DX, CQWW, Sweepstakes, and WPX modules. (Contact Pete at Winner's Edge Software, 2003 Sarazen Place, Reston, VA 22091.)

Incidentally, we've heard some rumors regarding future major decisions to be made at Commodore regarding their product mix. Seems that the C-64C, a cosmetically (but attractively) repackaged Commodore 64, has been selling like the proverbial hotcakes, and that the 128 is having fair but not-as-strong sales; too, software for the 128 has been painfully slow in coming. One rumor has it that C-128 production will be deemphasized to free up production lines for the surprisingly popular C-64C and also to make working capital available to import Commodore's new line of IBM-PC clones.

While the Commodore 64 lives on via the repackaged C-64C, it appears that in the future, non-gameplaying first-time purchasers may find themselves buying a low-cost IBM-PC



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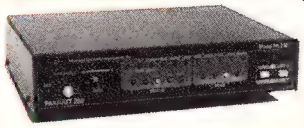
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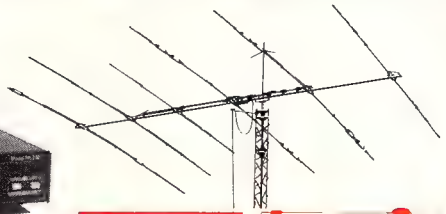
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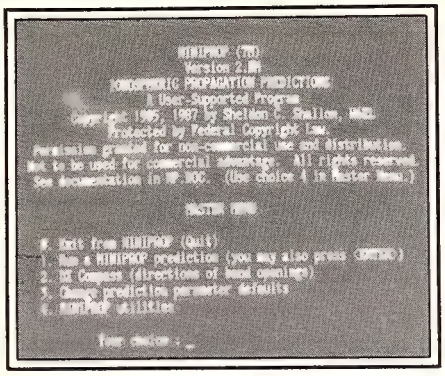
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We plan to look next month at the shareware concept of software distribution—sometimes known as user-supported software—and we will use as an example MINIPROP 2.0, an outstanding propagation prediction program for the IBM-PC and compatibles. Shown here is the program's master menu.

clone, already in the same ballpark pricewise, with "home" computers such as the Commodore 128, Atari 130XE, Apple IIc/IIe, and the like—with serious game players and graphics enthusiasts going for Atari STs and Amigas. So stay tuned for more turbulence in the computer hardware and software business and maybe another "shakeout"!

Etron Notes. John Simmons, W6MDI, who operates Etron RF Enterprises and whose technical software we've mentioned a couple of times in the column, wrote to update us on what his firm is up to.

Etron had a price adjustment late last year, as the economics of the old pricing scheme didn't seem to make sense anymore, particularly in the Commodore market. So John has vacated the Commodore 64 market. *Ham Radio Magazine's* bookstore has acquired all of their C-64 Notes Version 1.0 inventory and presumably is offering some good sale prices on them until the stock is exhausted. Old customers who have the IBM products (such as the RF Notes series) can obtain free software updates simply by returning their old IBM disks to Etron; they will receive fresh versions by return mail.

John also advises that he's in the process of introducing several new products, one of which is RF Notes, Volume 3, a highly specialized and expensive ($220) program for the professional and used to design Chebyshev response filters. This is the fifth in the series of programs for addressing problems frequently encountered in RF design activities. The programs outputs are in schematic diagram form, with circuit constants printed out on the schematic. You can even plot the predicted response of your design by depressing a single key.

For more information on the RF Notes line, contact John Simmons, W6MDI, at Etron RF Enterprises, P.O. Box 4042, Diamond Bar, CA 91765.

Gardner Electronics Follow-Up. We've mentioned the line of Commodore 64 hamshack software offered by Glen Gardner, AA8C, several times in the column, most recently in last November's issue. Glen makes a series of CW transmit/receive and code practice programs available, his major products being MR-64, a Morse receive/transmit program, and CW Champ, a send-only Morse keyboard program. He writes with this update on his activities:

"Thanks for the writeup in November *CQ*. Enclosed you will find the latest version of MR-64 and CW Champ; these are the latest additions to my product line. MR-64 is a very special program. It truly does ignore up to 50% of all natural atmospheric QRN. Try this program, say on 40 meters in the evening when the static crashes have caused your favorite CW software to go belly-up." In Glen's opinion, "MR-64 really does do a better job copying in the real world than does any other CW program."

Glen adds that he previously offered a kit of parts for the interface required for MR-64, but he dropped the parts kit from his product line in view of the sluggish demand for the kit; apparently, users are simply homebrewing their own. He also advises that ". . . I have also changed my pricing. Most of the products have (sadly) gone up in price, reflecting increased costs. However, the programs on Ham-Pac 5 [a collection of C-64 Morse code, logging, utility, and graphics programs] are available separately at [low] prices."

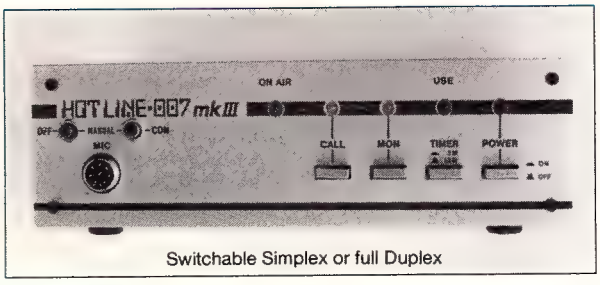
For a listing of his C-64/C-128 products, contact Glen E. Gardner, Jr., AA8C, Gardner Electronics, P.O. Box 387, Chillicothe, OH 45601.

AC Line Voltage Woes

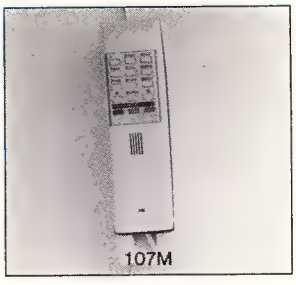
Amateur radio equipment and computers are very sensitive to AC line-voltage variations and, particularly, to spikes or transient surges, which have the potential for destructive damage to equipment. But how many of us give more than passing consideration to the line voltage "problem"?

Have you ever checked out your line voltage? If you have, you may be surprised, as I was, to find that the line voltage varies over a restricted range over the course of a day. Most

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of the time I find that it's pegged at about 120 volts, but it's not unusual for it to drop to as low as 110 volts during periods of heavy demand and to surge into the "high one-twenties" during off-peak hours. This variation is annoying though not too serious, provided that the line voltage doesn't go outside the range of, roughly, 110 to 130 volts.

The big problem, of course, is with transient voltages. Short-duration voltage "spikes" of 750–1000 volts or more may appear even on normally tame residential lines, often generated by virtue of induction devices (such as motors) cycling on and off, or from electrical discharges. Typical local spike sources include your own or neighbors' heating systems, air conditioners, heavy power tools, refrigerators, and the like. These nasty spikes can wreak havoc with your gear, especially with computers.

While most hamshacks have access to adequate electrical power sources, these should be more than just any old AC outlets. Computers, in particular, require conditioned or "clean" AC power, both for smooth operation and for their own protection from spikes or transients. Preferably, a computer should be on its own set of outlets, separate from the ham rig's AC line.

I highly recommend use of power-line conditioners with amateur and computer equipment. A sufficient measure of protection is usually afforded through use of a multiple-outlet power strip which contains surge suppressors on the outlets, its own master on-off switch, and a circuit breaker for the whole system. While such commercial protectors can be very expensive, $75 or more in some cases, perfectly satisfactory devices can be obtained for under $20, and you can also add your own surge suppressors to ordinary multiple outlet boxes for just a few dollars.

These suppressors will not protect your equipment from a direct lightning strike on nearby power lines, but for most anything short of such a catastrophe, they should do the trick. One problem, though, is that you'll never know if your surge suppressors are doing their job unless one day you find that your gear has been "taken out" by a line transient, and then it's too late. Therefore, it's not a bad idea to take a "belt and suspenders" approach in which you physically unplug the most voltage-sensitive equipment, such as your computer, when it's not actually in use. It's also wise not to operate sensitive equipment just prior to, during, and after passage of a severe electrical storm, if for no other reason than the strong likelihood that damaging line transients will be present.

I like to keep tabs on AC line voltage with a voltmeter on the hamshack line at all times. This doesn't give a useful indication of transients, however. If you've experienced an inordinate share of transient-induced equipment failures, you may want to consider purchase of a commercial line disturbance or spike monitor. While these little gems aren't cheap (costing between about $100 and $200), if you have a good deal of sensitive and expensive equipment on-line, they may be worth the investment.

As an example, Testware (4425 Canoga Ave., Woodland Hills, CA 91364) offers a series of line monitoring devices. They provide a means for evaluating and troubleshooting electronic systems, such as computers and amateur gear, which are sensitive to a variety of AC line woes—voltage sags, surges, dropouts, transients, and noise. The units even provide an internal audible alarm that can alert you to unsafe line conditions, and which can even shut down equipment. One of the firm's monitors detects, stores, and displays the worst-case peak voltage of AC line spikes and noise, using an LED bar graph, over the range of 100 volts to 2.5 kv, with a response time as little as 250 nanoseconds. Interestingly, the Testware monitors themselves are heavily protected against transients, and their power suppliers are designed to allow the equipment to operate properly over a range of 55 to 160 volts AC.

Antenna Products of Note

Big Horn Delta Loops. We've discussed the considerable advantages of the Delta Loop in previous columns. However, we've been aware of few, if any, commercial versions of this good-performing antenna. Robert J. Hobert, KA1UJ, has changed all that with his launching of the Big Horn series of Delta Loops. According to Bob, to the best of his knowledge he's the first to commercially produce this type of antenna.

It's no secret that the Delta Loop is one of the more effective DX antennas in the book. As Bob points out in his product literature, the Delta Loop is similar to the better-known quad; both are based on the full-wave loop. Both antennas are characterized by excellent DX performance, and often feature "first one in, last one out" performance. Both are similar in terms of electrical properties, although they differ in their physical construction. The Delta Loop is essentially of "plumber's delight" construction, while the quad makes use of insulating support members. Both types of antennas' performance can be enhanced in

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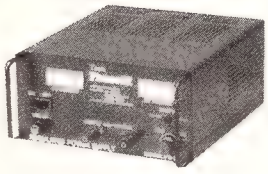
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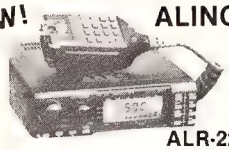
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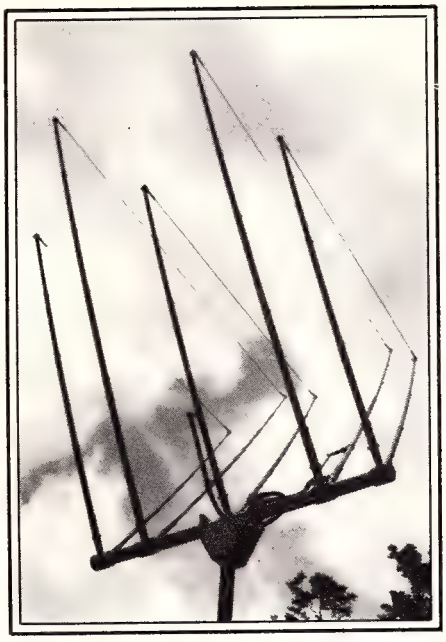


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CIRCLE 137 ON READER SERVICE CARD



Looking good here is one of the "Big Horn" Delta Loops, this one a duobander covering 10 and 15 meters. Several other models are available with two or three elements for individual band coverage of 10, 12, 15, and 20 meters. (KA1UJ photo)

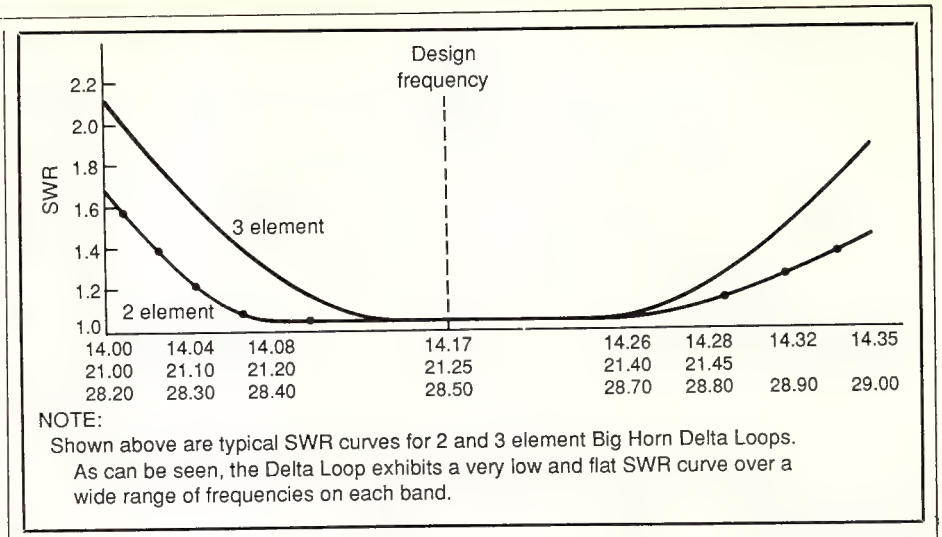


Fig. 1–Typical "Big Horn" Delta Loop SWR curves. Shown above are typical SWR curves for two- and three-element Big Horn Delta Loops. As can be seen, the Delta Loop exhibits a very low and flat SWR curve over a wide range of frequencies on each band.

terms of gain and directivity if additional elements are added.

The short boom length of the Delta loop, when compared with the conventional Yagi, offers easier installation. And, since the Delta Loop elements are mounted above the boom in a V shape, the increased effective array height aids in slightly lowering the antenna's angle of radiation. As a result, good performance may be obtained from Delta Loops at somewhat lower heights above ground than comparable Yagis.

The Delta Loop may, of course, be mounted above an existing Yagi beam or alone on a tower. Delta Loop antennas typically exhibit a very low, flat SWR curve over a wide band of frequencies around the design frequency. Gain can be excellent: generally accepted gain figures indicate that, at the design frequency, a two-element, full-wave loop antenna yields a 7.2 dBd gain (referencing a standard half-wave dipole), while a three-element model typically shows a gain of about 9.3 dBd. Front-to-back (F/B) ratios are on the order of 20–25 dB. These figures tend to echo the comparison of the quad and Yagi: a two-element, full-wave Delta Loop performance approaches that of a three-element Yagi, while the performance of a three-element Delta Loop exceeds that of a Yagi by about 1.2 dB. Fig. 1 shows typical SWR curves for the "Big Horn" Delta Loops.

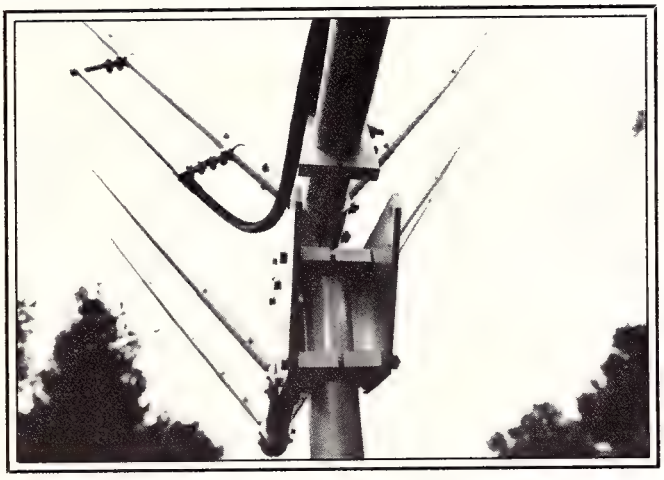
Bob offers several two- and three-element models for 10, 12, 15, and 20 meter operation. They are shipped partially assembled and are constructed of heavy-duty 6061-T6 aluminum tubing and stainless-steel parts. They feature a unique swingover mounting of the 2 inch diameter boom to the mast. All of the antennas are designed for 2 kw operation, with 50 ohm coax feed using a Gamma match. Turning radius favors space-constrained locations: as little as 8 feet is required for a 3-element, 10 meter model. Regular prices run from under $300 to about $600 for a 10/15 meter duobander or 3-element for 20.

For more detailed specs, contact Bob at Delta Loop Antennas, 44 Old State Road/Unit #18, New Milford, CT 06776.

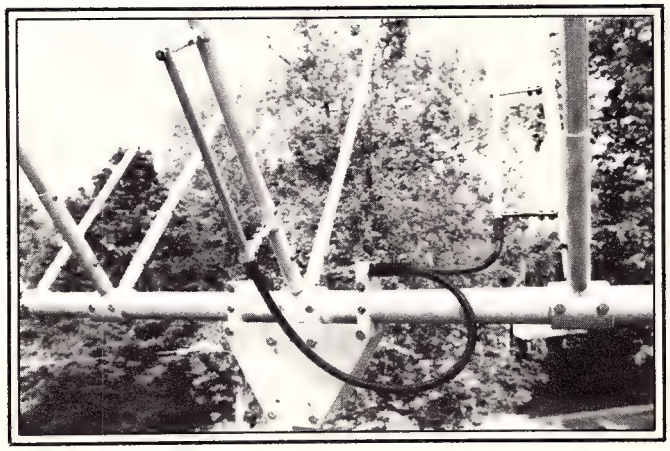
Austin Custom Antenna. We've noted a considerable expansion of Austin's product line in the most recent catalog we received from them.

Austin offers a number of amateur and general-purpose HF/VHF/UHF antennas. Included are the "Superlite" series of Yagis (140 to 500 MHz); multiband (50/144/220/450 MHz) verticals; the "Omni" HF mobile vertical; single- and dual-band mobile VHF/UHF antennas (100 MHz to 2 GHz); various base-station VHF/UHF antennas in both extended double Zepp and collinear configurations for the 100 MHz to 1200 MHz range; and several marine antennas, including a VHF model designed for amateur use.

They also offer several rather unusual antenna products. One of these is the MP-500 Multipurpose Antenna, a portable VHF antenna designed for use with amateur, marine, and commercial handi-talkies (HTs) to 220 MHz. It is an end-fed, trap decoupled model, essentially equivalent to a half-wave dipole, for which they claim practical performance equal to or exceeding that obtained from a ⅝-wave anten-



Apex of the "V" which defines the Delta Loop's physical configuration is shown in this photo of one of KA1UJ's "Big Horns." The gamma match can be seen at the left. (Photo courtesy KA1UJ)



Separate gamma matches, which are factory preset, are used to feed the "Big Horn" DL 1015 Delta Loop, a duobander for 10 and 15 meters. The antenna has a boom length of 9 feet with a 9 foot turning radius; weight is but 47 lbs. (Photo courtesy KA1UJ)

na. The antenna may be mounted directly on the handi-talkie, or hung near a window and coupled to the HT using a short length of coaxial cable.

Austin takes pride in the care it takes with proper antenna/feedline decoupling methods, bandswitching techniques, and multiple band isolation in all their VHF and UHF antennas. With the exception of some beam antennas, all of their products come pretuned, with the only installation required being the selection of a suitable mounting location and the routing of the coaxial cable to the antenna.

For a catalog, contact Austin Custom Antenna, P.O. Box 357, Tenney Road, Sandown, NH 03873.

From the Bookshelf

Yagi Antenna Design Book. Amateur radio, and especially the field of antenna design, lost a staunch supporter and topnotch engineer when Dr. James L. Lawson, W2PV, passed away just a few short years ago. Jim was especially well-known for his definitive work on HF beam antennas, particularly Yagis.

This ARRL hardcover book is based primarily on articles he wrote for *Ham Radio* magazine, and stands to become a classic that's surely a candidate for the technically oriented amateur's library. The book includes over 200 pages of detailed information on Yagi design, and includes chapters on performance calculations, simple Yagis, Yagi performance optimization, loop antennas, ground effects, stacking, and practical HF designs.

Edited by Bill Myers, K1GQ, Clarke Greene, K1JX, and Mark Wilson, AA2Z, the book is $15 (plus $2.50 postage). It's available from the American Radio Relay League, 225 Main St., Newington, CT 06111.

Universal Shortwave Radio Catalog. Fred Osterman has come up with what is probably his largest catalog to date, a 70-pager that describes his unique mix of wares—communications receivers, portable shortwave radios, antennas and supplies, radioteletype and facsimile (FAX) equipment, communications books, and various parts and accessories.

Communications equipment is Fred's primary business, but he also takes an interest in promoting what might be termed "knowledgeable listening and operating," with a focus on the shortwave and monitor enthusiast. Thus, Fred offers a number of books, pamphlets, and other publications that, he asserts, make for a far more informed listener, one who is more productive than any "super equipped neophyte."

These include standards such as the *World Radio TV Handbook, Radio Data-Base International, The SWL's Antenna Handbook, Shortwave Listening with the Experts*, and the *Shortwave Frequency Directory*. They also include specialized and seemingly esoteric books such as the *Guide to Utility Stations, Worldwide Air Traffic Frequency Directory, U.S. Military Radio Communications, Worldwide RTTY Callsign List, World Press Services Frequency List and Manual*, and many others. Fred also offers several package book deals in such areas as RTTY and military listening, shortwave monitoring, facsimilie, satellite monitoring, and the like.

I also note that Fred has added a new SWL Sloper Antenna which covers the mediumwave and major shortwave bands, including the 90 and 120 meter bands, which are often overlooked by SWL antenna manufacturers. The sloper's overall length is 60 feet, and it is designed to be fed with 50 ohm coaxial cable. The antenna is constructed with heavy-duty components and stainless-steel hardware and uses broadband low-Q RF choke resonators for multiband frequency selection. The antenna, which is priced at $69.95, is furnished fully assembled and requires no adjustment or trimming.

The sloper is, of course, a very popular antenna among both SWLs and amateurs. It's well-known for its DX performance because of its considerable low-angle radiation component. The sloper can be a half-wavelength or quarter-wavelength long, or even an odd length; it is neither vertically nor horizontally polarized, but is actually a combination of both. Another plus is that unlike the ordinary dipole, the sloper requires but one main support and somewhat less real estate for installation.

The new catalog is available for $1.00 or three IRCs (refundable) from Universal Shortwave Radio, 1280 Aida Drive, Reynoldsburg, OH 43068.

GEARVAKf Bulletin: Going Strong. Is there really such a publication, with a name like that? Yes indeed, and the name, as we've spelled it, is no typo.

We first reported on the *Bulletin* in our September 1985 column; receipt of a recent issue brought it back into focus. To reiterate, it's been around since about 1958, either in its present newsletter format or in the earlier form of private letter exchanges between several amateurs who attended college together in the 1950s. The newsletter, a recent issue of which shows it's into Volume 26, is published by Joe Ventolo, K8DMZ, 356 Coronado Trail, Enon, OH 45323, as a labor of love. It's also a well-known Dayton Hamfest feature.

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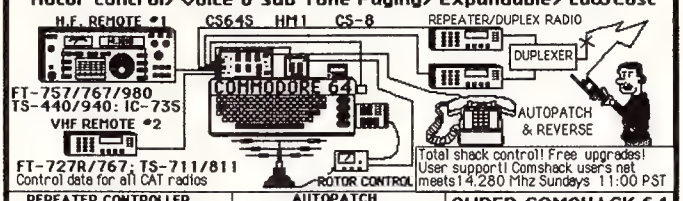
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H.F. REMOTE #1
•10 Memories/auto mode sel.
•Scan up/down sel. rate or 100Hz
•Voice ack. all control commands

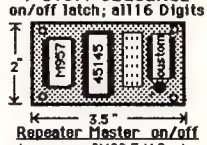
AUTOPATCH
•300 Auto/quick dial recall
•300 calls paged/32 sub tone
•50 enable/disable tel.#'s
•Hi/Lo priority access codes
•Directed/general/rev. page
•Full or Half duplex operation
•Secure mode/ TT repeat on/off
•Store MCI/Sprint tel. #'s
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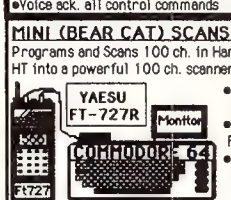
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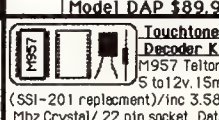


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GEARVAKf —BULLETIN—

SPRING 1987 NEWSLETTER OF GEARVAKf VOL. 27 NO. 1

GEARVAKf BULLETIN SPECIAL ISSUE

We are publishing this special spring issue of The GEARVAKf Bulletin to inform our half-vast array of members of those events which have altered and illuminated our times since we published the last issue in the winter of 1986. For those of you who are not GEARVAKf members, we should mention that this newsletter is one of the least appreciated benefits of GEARVAKf membership. As in the past, a membership application blank has been attached to the page following the last page of the Bulletin. DO NOT USE THIS APPLICATION BLANK TO APPLY FOR GEARVAKf MEMBERSHIP! Members are selected by invitation only, at the whim of the GEARVAKf Trusteeship Council, totally without regard to merit. All life memberships are good for one year. No full memberships will be granted. Allow 76 weeks for processing. For information on how to get on our mailing list, see the SPECIAL "SUBSCRIPTION" INFORMATION" item elsewhere in this issue.

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ARE BIRDS SOURCE OF DANGEROUS MICROWAVE RADIATION?

Dr. T. Ree Nestor, GEARVAKf Director of Dangerous Stuff, has just completed work on a major project for the National Fund for Science. The $250,000 federally financed project, taking more than 18 months to complete, was to determine whether birds emit high levels of microwave (23-50 ghz) radiation in amounts that may be harmful to humans or other animal life. "For months we measured around trees and bushes with our 'Bird' wattmeters," said Dr. Nestor, "and we found absolutely no evidence that birds gave off anything other than bird doo-doo, which was not radioactive." The National Fund for Science was so pleased by the research that it granted GEARVAKf $1,350,000 more to study some other stuff. —N8JR

GEARVAKf OFFICIAL SUPERVISES ALL VECs

The government's Radio Commission has named GEARVAKf Official Officiator, Elliot P. Dermashtuffer, as supervisor of all VECs (Various Electrical Cords). "I consider the VEC Program to be very important to the future of amateur radio," exclaimed Dermashtuffer, "for without various cords, our radios won't play right." Following Mr. Dermashtuffer's appointment to the post, GEARVAKf Trustees voted to permit him to attend the annual convention of the American Zip Cord Association to be held at Lytle, Ohio, next October, and authorized travel and lodging expenses not to exceed $12.00. —N8JR

Fig. 2– Typical GEARVAKf Bulletin masthead page.

It's difficult to accurately describe the newsletter. But I would characterize it as a spirited vehicle for amateurs to make fun of themselves and, in a good natured way, other amateurs, hamfests, the ARRL, all amateur radio magazines, the FCC, and anything else that comes to mind. Parody plays a strong part in the newsletter whose initials, I should mention, stand for a somewhat mystical organization known tongue-in-cheek as "The Greater Enon AmateurRadioVention and Kitefly" (in that Joe and his close friends are also enthusiastic backyard kite-flyers).

The best way to learn about the *GEARVAKf Bulletin* is to read it. Joe asks for a $1.00 donation per issue, although the newsletter is a hobby with him and definitely not a money-making adventure. As he says, "It isn't worth it, so don't send any more money than you can afford to lose!"

Joe's approach to the newsletter is typified by his appeal for articles. If you'd like to write for the newsletter, he asks that you keep your material ("stuff") in typical *GEARVAKf* style, and under 200 words (way under, if possible). He advises that he'll try to print any suitable submissions, but doesn't pay anybody anything. He gives credit by callsign, or by first name if you're not a ham! For more details, contact Joe, K8DMZ, at the address we listed above.

I'm sure that Joe won't object to our showing a typical masthead page of his wacky, way-out newsletter. It's fig. 2.

Free Government Catalogs. We recently received a copy of the new *U.S. Government Books* catalog describing hundreds of publications for sale by the Government Printing Office. It's an even fatter catalog of books published by the Federal government than when we mentioned it some time ago in the column. It's also free.

The catalog serves a broad range of "consumer interests," including computers, science, and technology. The catalog lists and describes books in diverse areas such as business and industry, education, energy, the environment and weather, government, hobbies, military matters, space exploration, and even vacation and travel.

For a free copy of the *U.S. Government Books* catalog, write to the Superintendent of Documents, Washington, DC 20402.

We should also mention another government publication that's worth sending for while you're at it. This is the *Consumer Information Catalog*. It's also free, and it's filled with descriptions of more than 200 government booklets that can answer many questions American consumers have. These include booklets on subjects such as starting a business and getting an education, buying a house, fixing a car, money management, federal benefits, and more. Nothing specifically on amateur radio, mind you, but quite worthwhile.

You can obtain the *Consumer Information Catalog* by requesting a copy from Department 87, Consumer Information Center, Pueblo, CO 81009.

Tying On the Ribbons

That's all we have room for this time, gang. To review, we've looked at another batch of hamshack software, discussed some troublesome AC line problems, looked at some new antenna products, and highlighted a number of items for the well-equipped bookshelf. Next time we'll examine several other topics of timely interest. See you then. 73, Karl, W8FX

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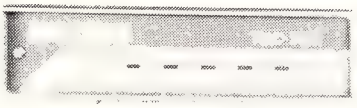
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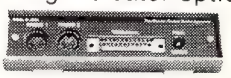


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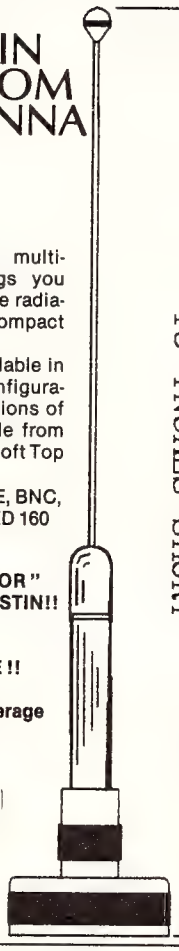
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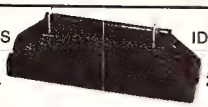
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Awards

a monthly feature by
DOROTHY JOHNSON, WB9RCY

NEWS OF CERTIFICATE AND AWARD COLLECTING

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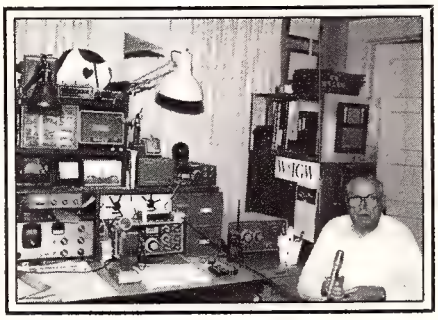
Ed Holmes, W4IGW
USA-CA All Counties #525
Mixed, 11-14-86

Ed Holmes, W4IGW, was awarded USA-CA All Counties #525 on November 14, 1986. Ed waited until he had worked them all before submitting an application for the 1000, 1500, 2000, 2500, and 3000 classes. Ed's counties were worked on mixed bands and mixed modes. Some of the contacts dated back to his Novice days in 1954 and 1955.

Ed, who resides in Humboldt, Gibson County, Tennessee, was first licensed as a Novice in 1954. His first goal was the usual one of working all states, which was almost accomplished during his stint as a Novice and was completed soon after getting his higher class license. Ed pursued several aspects of ham radio for several years, including DX if it came along, but probably enjoyed traffic nets most of all. When Incentive Licensing came along, Ed proceeded all the way to the Extra class license. For a time he held the secondary call of N4EH, but when the ruling was made that a person could have only one call, he decided to stick with his original call of W4IGW. He is now on two Volunteer Examiner teams.

Ed first learned about County Hunting when he stumbled across a 40 meter mobile net as the group of county hunters were going home from their first county hunters convention in Mountain Home, Arkansas. He attended the next convention in Knoxville the following year. Incidentally, he won first prize at that convention—a portable tape recorder which still serves as a training aid for radio classes that he teaches.

After having been exposed to some of the county hunting nets, Ed wondered if he really wanted to get involved in that activity. His XYL, Betty, suggested that they go through his accumulated QSL cards and determine the counties of the places he had worked. After searching for county names in POD #26, they found that Ed's past QSL cards represented about 250 different counties already worked. With that start he began to accumulate others as time permitted. However, a full-time daytime job and numerous other commitments made county hunting a sporadic activity. In early 1986 Ed realized that many of the county hunters of his vintage had not only completed working all counties one time, but many of them had worked them all two and three times. He decided to concentrate on working the 50 odd that he lacked for the first time around. Retirement, after 35 years at Milan Army Ammunition Plant, provided more time at the radio, so the list began to dwindle more rapidly.



Ed Holmes, W4IGW, at home in his well-equipped shack in Humboldt, Tennessee.

Prior scheduled commitments kept Ed and Betty from attending the mini-convention in Manchester, Tennessee in November 1986. However, the "advertising" for the last few needed counties paid off. Several of the last few were worked from mobiles going to and from Manchester. KC3X was kind enough to wait several hours for Ed to get back to the rig and get Craig County, Virginia for next to last in the USA. The last one, Perry, Indiana, was available the next day, but Ed wasn't. Then the remarkable KB7QO interrupted his planned Indiana run and drove two hours to give Ed the last one—Perry, Indiana. Ed's first mobile contact for the second time around was also with KB7QO in Iowa the day before Ken's great accomplishment of having given out all counties in the USA.

Ed's XYL, Betty, is the librarian at Humboldt High School. She is very supportive of Ed's radio activities. (She even lets him buy new equipment from time to time!) They have attended several national conventions and regional conventions sponsored by the Mobile Amateur Radio Awards club, the most recent being the national convention in Denver, Colorado in July. Ed is secretary of the Humboldt Amateur Radio Club and also secretary of the Humboldt Lions Club. He is quite active in Lions Club activities and expects to hold district offices for the next two years. He is an active member of the First Presbyterian Church of Humboldt, where he serves as an Elder.

Ed's other hobbies include photography, gardening, traveling, and computer work. He has two computers and has recently become somewhat involved with packet operations.

Ed operates mobile on the county hunting nets as time permits. He says that as soon as he catches up on his many "honey-do" jobs, he expects to be mobile more often, so he can help others who are trying to work all counties.

333 South Lincoln Ave., Mundelein, IL 60060

USA-CA Special Honor Roll

Margaret S. Donaldson, WØGOQ
All Counties #542, Mixed, 5-4-87

USA-CA Honor Roll

3000		1000	
WØGOQ	574	WØGOQ	970
		OH6JW	971
2500			
WØGOQ	644	**500**	
		KA6SFX	2178
2000		WØGOQ	2179
WØGOQ	709	HB9BYZ	2180
WA1UDH	710	I1EZU	2181
		OH6JW	2182
1500		N1ETC	2183
WØGOQ	794		

The total number of counties for credit for the United States of America County Award is 3076. The basic award fee for subscribers to CQ is $4.00. For non-subscribers, it is $10.00. Initial application must be submitted in the USA-CA record book which may be obtained from CQ Publishing Company, 76 North Broadway, Hicksville, NY 11801, U.S.A. for $1.25. To qualify for the special subscriber rate please send a recent CQ mailing label with your application. To be eligible for the USA-CA, applicants must comply with the rules of the program as set forth in the revised USA-CA Rules and Program dated April 2, 1985 A complete copy of the rules may be obtained by sending a SASE to the USA-CA Custodian, 333 South Lincoln Avenue, Mundelein, IL 60060, U.S.A. DX stations must include extra postage for air mail reply.

Awards Issued

Margaret S. Donaldson, WØGOQ, finished all her paperwork and qualified for All Counties #542, Mixed, dated 5-4-87. She also received USA-CA 3000 #574, USA-CA 2500 #644, USA-CA 2000 #709, USA-CA 1500 #794, USA-CA 1000 #970, and USA-CA 500 #2179, All SSB, dated 5-4-87.

Stephen E. Press, WA1UDH, filed his application and received USA-CA 2000 #710, Mixed, dated 5-7-87.

Antti Kiviluoma, OH6JW, claimed USA-CA 1000 #971, Mixed, dated 5-23-87.

USA-CA 500 certificates went to:

Paul Hoff, KA6SFX, USA-CA 500 #2178, Mixed, 5-2-87.

Margaret S. Donaldson, WØGOQ, USA-CA 500#2179, All SSB, 5-4-87.

Peter Zbinden, HB9BYZ, USA-CA 500 #2180, Mixed, 5-15-87.

Andriano Gugliucci, I1EZU, USA-CA 500 #2181, Mixed, 5-21-87.

Antti Kiviluoma, OH6JW, USA-CA 500 #2182, Mixed, 5-23-87.

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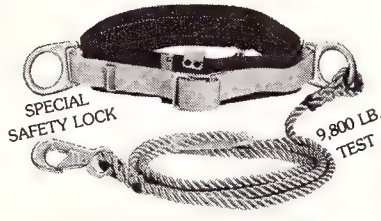
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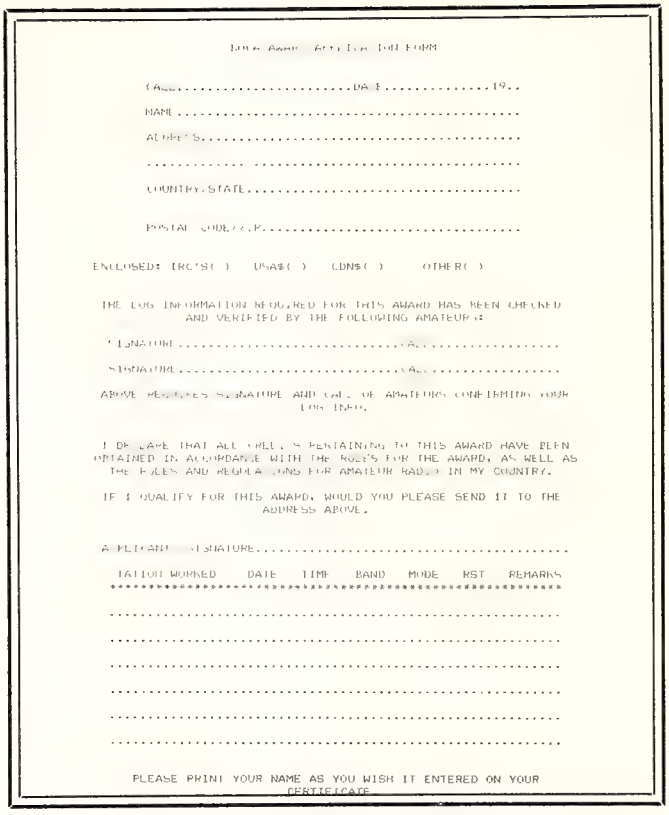


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Birthplace of Canada Award offered by the Wiltshire DX Association, Charlottetown, Prince Edward Island.



Sample application for the BOCA Award.

Richard R. Brodeur, N1ETC, USA-CA 500 #2183, All CW, 5-28-87.

Awards Available

Birthplace of Canada Award. This award (BOCA) is sponsored by the Wiltshire DX Association, P.O. Box 2494, Charlottetown, Prince Edward Island, Canada C1A 8C2.

Prince Edward Island is located on Canada's east coast, in the Gulf of Saint Lawrence, at 45° 15′ north latitude and 63° 10′ west longitude. It is separated from the "Mainland" by the Northumberland Strait, the closest point being approximately 9 miles. The strait is traversed daily by several of the largest passenger- and automobile-carrying vessels in North America. The 45-minute crossing is enjoyed by thousands of vacationing families during the "peak" summer months, from June through September.

The capital city of Prince Edward Island is Charlottetown, and therefore it alone is called "The Birthplace of Canada." This is where the founding fathers assembled to join the individual provinces and territories in this country under one flag and thereby united this grand country of "Canada." In 1949 the province of Newfoundland (VO1 and VO2), under the leadership of Premier Joseph Smallwood, signed the required documents to become Canada's 10th province, thereby uniting the country from Atlantic to Pacific.

Rules: VE1 and VO1/VO2 stations must confirm 6 contacts with amateur stations located in Charlottetown, "The Capital City." All other VEs, and USA amateurs, must confirm a contact with three stations in Charlottetown. All DX amateurs (stations outside North America, including Hawaii and Alaska for this award) must confirm a contact with any two stations located in the city of Charlottetown.

The QSL cards confirming the required contacts must be in your possession when you apply for the award. Do not send your cards. Send a copy of your log sheet, verified by two licensed amateurs, along with $3.00 or 6 IRCs, to the address above. The association is proud of this award and hopes that you will be, too.

All contacts made after January 1, 1967 will count for this award. Contacts must have been made on any of the HF bands used for amateur radio.

Noorderkempen (NOK) Award. The NOK Award is available to licensed amateurs and SWLs operating/listening on HF.

All contacts made/heard after January 1, 1986 are valid. There are no mode or band limitations.

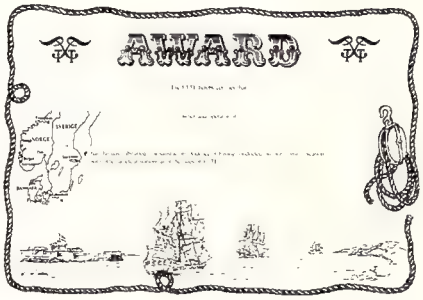
To qualify for the NOK award Belgian stations need 50 points; EU stations need 40 points; DX stations need 30 points. Each contact (SWL card) with a member of the section NOK is worth 10 points. Contacts (SWL cards) with other Belgian stations are each worth 1 point.

To apply for the award send GCR list and fee of 5 IRCs or $4.00 to Verbist Cyriel, Helhoekweg 6, 2310 Rijkevorsel, Belgium.

FTTF Award. The FTTF Award is offered



Noorderkempen Award available from Section NOK, Belgium.



FTTF Award offered by the Union of Hams of Denmark.

by a special Union of Hams in Denmark, specifically, the south of Jylland and the island of Fyn. The award is available to all licensed amateur radio operators and SWLs. Contacts since January 1, 1980 which meet the conditions set forth in the following rules are valid.

VHF: Sixty points are required. Every county in Denmark is worth 10 points. Contact with a member of FTTF is worth 20 points.

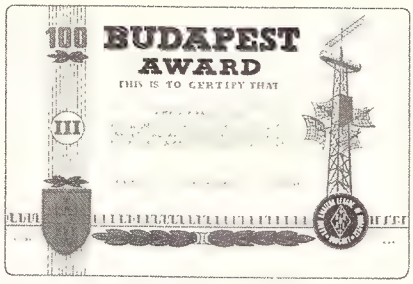
HF: For Class 1, one hundred points are required; Class 2 requires 50 points. Every contact with an OZ station is worth 2 points. Contact with a member of FTTF is worth 20 points. Membership in FTTF will be shown on the QSL card.

Contacts via repeater and crossmode contacts are not valid. Awards will be numbered beginning with number 001.

Fee is 10 IRCs, or $5 US, or 25 d. kr. To apply for the FTTF Award, send list of QSOs confirmed by two licensed amateur radio operators, along with the required fee, to Grethe Heiberg, OZ1DXX, P.O. Box 3025, 6710 Esbjerg V., Denmark.

Budapest Award. The Budapest Award, sponsored by the Hungarian Radioamateur Society, is available to licensed amateurs and SWLs. All contacts after January 1, 1976 are valid. There are no band or mode limitations.

To qualify for this award European stations need confirmed contact with 75 different HA5 or HG5 stations; DX stations need confirmed contact with 25 different HA5 or HG5 stations; and VHF stations need confirmed contact with 50 HA5 or HG5 stations.



Budapest Award by the Hungarian Radioamateur Society.

A list of contacts, certified by the award manager of a national society, must be submitted. The fee is 10 IRCs.

Send the certified list of contacts and fee to the Hungarian Radioamateur Society, P.O. Box 2, H-15153 Budapest, Hungary.

Notes

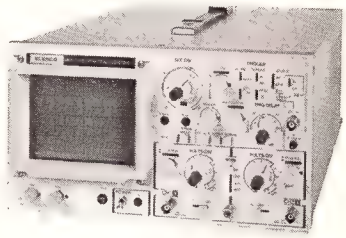
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73, Dorothy, WB9RCY

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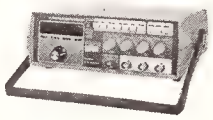
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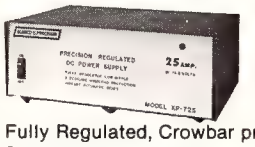


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Contest Calendar

a monthly feature by
FRANK ANZALONE, W1WY

NEWS/VIEWS OF ON-THE-AIR COMPETITION

Here's another contest expedition for the coming WW DX Phone Contest next month. Craig Maxey, WB7RFA, expects to be on from Tunisia where there has been little or no activity lately. His call will be 3V8RFA or possibly TS8RFA, which he has requested for the contest. He has received permission to operate 3.5–28 MHz but no 160. Some CW activity can be expected a few days before and after the contest period. QSLs go to his home stateside QTH. A "green stamp" with your SASE would help defray some of the expenses.

I have already called attention to and given my opinion about the overcrowding of contest events during the months of September and October. Any additional comments would serve little purpose.

As I mentioned before, the picture is not as grim as it appears. The use of opposite modes on the overlapping dates on four of the major events—the SAC and CAN-AM in September, and the VK/ZL/O and IRSA Championship in October—avoided any serious QRM problems except for a short period on Sunday, October 11.

Some of the state QSO parties scheduled during that period have managed to stay out of each other's hair by avoiding other state activities in the same call area and by using a different choice of operating frequencies. This is a good example for club managers to keep in mind when planning future activities. Checking the Calendar of Events of the previous year in this column would be a good starting point.

The many YLRL activities present no problem since they are mostly scheduled on weekdays for obvious reasons.

I have made no mention of some of the smaller domestic and overseas events. They usually follow their own pattern and are not concerned about world competition. However, a little planning on their part would improve their participation, even though they are considered "small potatoes" by the average contester.

We try to maintain an informative calendar, but the lack of communication, especially from many of the overseas organizations, makes it very difficult. You get the information to me on time, and I'll make sure it gets the proper coverage.

Deadline for the December issue is September 15th, and October 15th for the January issue. Send material to my home address, please.

73 for this time, Frank, W1WY

14 Sherwood Road, Stamford, CT 06905

Calendar of Events

*	Sept. 5 & 6	National CW & SSB Champ.
*	Sept. 9-11	YLRL "Howdy Days"
*	Sept. 12-13	European Phone Contest
	Sept. 12-14	Wash. State QSO Party
	Sept. 12-14	ARRL VHF QSO Party
	Sept. 13	North American CW Sprint
	Sept. 19-20	Fernand Raoult F9AA Cup
	Sept. 20	North American SSB Sprint
	Sept. 19-20	Scandinavian CW Contest
	Sept. 19-20	CRRL CAN-AM SSB Contest
	Sept. 26-27	Scandinavian SSB Contest
	Sept. 26-27	CRRL CAN-AM CW Contest
	Sept. 26-27	Italian YLRC Contest
	Sept. 26-27	**CQ WW RTTY DX Contest**
	Sept. 27-28	Classic Radio Exchange
	Oct. 3-4	California QSO Party
	Oct. 3-4	Middle of the World Contest
	Oct. 3-4	VK/ZL/Oceania SSB
	Oct. 10-11	VK/ZL/Oceania CW Contest
	Oct.. 10-11	IRSA SSB & CW Champion
	Oct. 10-12	Pennsylvania QSO Party
	Oct. 11	RSGB 21/28 MHz SSB
	Oct. 11-12	Illinois QSO Party
	Oct. 14-16	YLRL Anniv. CW QSO Party
	Oct. 17-18	Boy Scout Jamboree
	Oct. 17-19	Rhode Island QSO Party
	Oct. 18	RSGB 21 MHz CW Contest
	Oct. 24-25	**CQ WW DX Phone Contest**
	Oct. 28-30	YLRL Anniv. SSB QSO Party
	Ot.30 -Nv.1	Maryland/DC QSO Party
	Nov. 7-9	ARRL CW Sweepstakes
	Nov. 14	ALARA YL-OM Contest
	Nov. 14-15	European RTTY Contest
	Nov. 21-23	ARRL SSB Sweepstakes
	Nov. 28-29	**CQ WW DX CW Contest**

** Covered last month.*

Wash. State QSO Party

0100Z to 0100Z Mon., Sept. 12–14

This is the 22nd annual party sponsored by the Boeing Employees ARS, K7NWS (BEARS). The same station can be worked on each band and mode, and Wash. mobiles in each county change. Wash. stations may work other in-state stations for QSO credit.

Exchange: QSO no.; RS(T), and QTH; county for Wash.; state, province, or country for others.

Scoring: Phone contacts are worth 2 points, CW contacts 3 points, mobile 5 points.

Wash. stations multiply total by sum of states, provinces, countries, and Wash. counties worked. Others use Wash. counties worked for their multiplier (maximum of 39).

Frequencies: CW—60 kHz up from bottom of each band. Phone—3925, 7260, 14280, 21380, 28580. Novice—3725, 7125, 21150, 28160.

Awards: Certificates to top scorers in each U.S. state, VE province, DX country, and Wash. county.

Mail log, summary sheet, and SASE (for results) by October 15th to: BEARS, Att: David Long, N7FNG, 2117 No. 52nd Street, Seattle, WA 98103.

ARRL VHF QSO Party

1800Z Sat. to 0300Z Mon., Sept. 12–14

All bands 50 MHz and up can be used for this one. The August issue of *QST* should have had all the details.

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.

Fernand Raoult, F9AA Cup

1200Z Sat. to 1200Z Sun., Sept. 19–20

This contest was started in 1986 in memory of Fernand Raoult, founder of the French Club Group. The theme is Radio Clubs against the World, with a rather unusual format. The way I interpret the rules, the objective is to contact clubs, but contacts between individual stations are permitted.

Exchange: RS(T) and QSO number. Club stations will also include RC for identity.

Classes: Single operator (OM) and club stations (RC). They may be single or multi-operator, and SWL.

Modes: CW and SSB, 12 hours on each mode.

Bands: All HF bands according to IARU rules.

Points: Same continent QSOs, OM 1 point, RC 5 points. Other continents OM 3 points, RC 10 points.

SWLs earn 10 points for RC heard in the French zone; 15 points if 2 are heard. An RC/FF6ERC or OM/FF6URC is worth 50 points.

Multiplier: Each different RC and DX country worked or heard, counted only once.

Final Score: Total QSO points from all bands times the RC + country multiplier.

Awards: Special awards to the 10 top single operators (OM), and the winning club station and SWL out of France will receive the F9AA Cup Award.

Mailing deadline for logs is four weeks after the end of the contest to: Union des Radio Clubs, Coupe Fernand Raoult, B. P. 73-08, 75362 Paris Cedex 08, France.

Say You Saw It In CQ

North American "Sprint"

CW: Sept. 13 SSB: Sept. 20
Sunday 0000Z to 0395Z (Sat. night)

This is the spring edition of the "Sprint" run by the National Contest Journal. As the name implies, it's a shorty, only four hours long.

North Americans will be contacting other North American stations as well as stations in other countries, single operator only. North American boundaries are as defined by the rules used in the *CQ* WW DX Contest.

Exchange: Call, QSO no., name, and QTH (state, Canadian area, or country).

Scoring: Multiply total QSOs by the sum of states, Canadian areas, and other North American countries worked for your final score. (U.S. and VE not countries; KH6 not a state.) There are eight Canadian multipliers: VE1/VO1/VO2, VE2–VE7, VY1/VE8. Non-North American countries do not count as a multiplier.

Frequencies: Three bands only: 80, 40, and 20 meters. CW—3540, 7040, 14040. SSB—3900, 7225, 14280. (Plus or minus QRM.)

Awards: A trophy to the highest scoring entrant. Certificates to the top scorer in each U. S. call area, Canada, and other country. Also to the ten top scores, to each member of the winning team, and the highest scoring entrant on each team.

Team competition is limited to a maximum of 10 operators as a single unit. Precontest registration is required for each team before the start of the contest—with W6OAT for the CW and K7GM for the SSB.

There are other detailed rules, a special QSY rule, disqualifying penalties, etc. I suggest you write to W6OAT or K7GM if you do not have a copy of the *Contest Journal*.

Entries must be received no later than 30 days after the end of each "Sprint." The CW go to: Rusty Epps, W6OAT, 948-H Kiely Blvd., Santa Clara, CA 95051. The SSB go to: Rick Niswander, K7GM, 4520 N. Central, Suite 500, Phoenix, AZ 85012.

Scandinavian Activity Contest

C.W.: Sept. 19-20 Phone: Sept. 26-27
1500Z Saturday to 1800Z Sunday

It's the world working the Scandinavians in this the 29th 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); OH0 (Aland Is.); OH0M (Market Reef); OX (Greenland); OY (Faroe Is.); OZ (Denmark); SJ, SK, SL, SM (Sweden); TF (Iceland).

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.

Classes: Single operator and multi-operator single transmitter, all band only. Multi-operator must remain on the same band for at least 10 minutes. Also QRP single operator (maximum of 10 watts output) and SWL (only SAC stations may be logged).

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

Points: European stations score 1 point for each SAC contact. Non-Europeans score 1 point on 14, 21, and 28 MHz, and 3 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 multiplier from each band. Scoring for SWL's 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 to the top-scoring station in each continent.

The usual disqualification criteria will be observed. Include a summary sheet and a dupe sheet for logs with more than 200 QSOs, and a signed declaration. Mailing deadline is October 30th. This year's logs go to: SRAL Contest Manager, Erkki J. Korhonen, OH4NRC/OH8RC, P.O. Box 44, SF 00441 Helsinki, Finland.

CRRL CAN-AM Contest

Phone: Sept. 19–20 CW: Sept. 26–27
1800Z Sat.to 1800Z Sun.

This contest is sponsored by the International Radiosport Assn. and the Canadian Radio Relay League to increase friendship between American and Canadian amateurs. Use all 6 bands, 1.8–28 MHz, in the U.S. General portion of each band.

Categories: Single operator, single and all band, and QRP (maximum of 10 watts input). Multi-operator, single transmitter (or single operator other than the licensee or a club station).

Exchange: RS(T) plus a progressive QSO number, and state or province. Use two-letter abbreviations. For Caribbean use CN, and PC for US possessions in the Pacific and Antarctica.

Points: U.S. to U.S. and VE to VE QSOs, 1 point on phone, 2 points on CW. U.S. to VE and VE to US, 2 points on phone, 3 points on CW. The same station can be worked on each band for QSO credit.

Multiplier: 50 U.S. states, 2 U.S. possessions (CN and PC), 10 VE provinces, 2 territories (VE8 and VY1), 1 island (Sable/St. Paul). Total of 65 possible on each band.

Final Score: Total QSO points from all bands times the sum of the multiplier from each band (maximum of 390 possible). Phone and CW are separate contests. However, combined scores from each band will be used for overall competition by the committee.

Awards: Certificates to single operator winners in each class in each multiplier area. And to the top five multi-operator stations in each country for combined phone and CW scores. There are four trophies, American and Canadian champion, combined scores, single and multi-operator categories.

Log Instructions: Do *not* use separate logs for each band. Indicate multiplier only first time it is worked on each band. A summary sheet showing the scoring and the usual signed declaration is a must.

Official log forms and a more detailed rules sheet are available by sending a large SASE to the address below.

The usual disqualification rules are in effect. Taking credit for duplicate contacts in excess of 2% could mean disqualification.

Mailing deadline is 30 days from end of each contest to: CRRL CAN-AM Contest, VE3BMV/W2, P.O. Box 282, Pine Brook, NJ 07058.

Italian YLRC Contest

1300Z Sat. to 1300Z Sun., Sept. 26–27

This is a new one organized by the Italian YL Radio Club. It's the Italian YLs working other YLs and OMs worldwide. Contacts between other YLs and between OMs are also permitted.

Categories: Single operator, YL and OM, and SWL.

Bands: All six bands, 1.8–28 MHz on the YL contest frequencies.

Exchange: RS(T) and a progressive QSO number. Members of YL clubs will also add RC.

Points: One point for contacts with stations in same country, 3 points if in other countries. Each station may be worked on each band and mode for QSO and multiplier credit.

Multiplier: (A) One point for each DXCC country and call areas in the U.S., VE, JA, and VK worked on each band. (B) Five points for each member of the Italian YLRC worked. (Not valid for QSOs between YLs of radio clubs.) SWLs score 1 point for each YL heard on each band.

Final Score: Total QSO points from all bands times the sum of the multiplier A and B on each band.

Awards: Plaques and medals to winners in each category and mode for YLs, OMs, and SWLs. Diplomas to the first, second, and third place winners in each category.

Use a separate log for phone and CW and indicate the multiplier only the first time it is worked on each band. A summary sheet showing the scoring, etc.,

and the usual signed declaration is also requested.

Mailing deadline for logs is November 30th to: Italian YL Radio Club, Att: Ornella Torri, ISØTUE, P.O. Box 22, 09012 Capoterra, (CA) Italy.

Contacts made during the contest with YLRC stations are valid for the "Gioconda" award. Europeans must work 8 YLRC members; others work 6 members. Send application with your log and 20 IRCs or $10.00.

CQ World-Wide RTTY Contest

0000Z Sat. to 2400Z Sun., Sept. 26–27

This is the first annual RTTY Contest organized by *CQ* in conjunction with the *RTTY Journal*. A lot of time and effort has gone into the planning of this our first RTTY Contest. Rules are basically the same as those used in our World-Wide Phone and CW DX Contests and should be easy to follow. Complete details were published back in the April issue of *CQ* but will be reviewed here briefly.

Categories: Single operator, both single and all band. Multi-operator, single transmitter, all band only.

Multi-operator stations can operate the full 48-hour contest period, but single operators are limited to 30 hours. The 18 hours *off* time may be taken any time but in periods of not less than 3 hours, and must be clearly indicated in your log.

Bands & Modes: All six bands, 160–10 meters, using Baudot, AMTOR (FEC/ARQ), ASCII, and AX 25. (No digipeated QSOs allowed.) A given station may be worked only once per band regardless of mode.

Exchange: Stations within the 48 Continental U.S. states and 13 Canadian areas—RST, U.S. state or VE area, and *CQ* zone number. All others—RST and *CQ* zone.

QSO Points: One point for contacts within own country, 2 points outside own country but within own continent, 3 points outside own continent.

Multiplier: One for each U.S. state (48) and VE area (13) worked on each band. One for each DX country worked on each band (ARRL and WAE lists). One for each CQ zone worked on each band (40).

(**Note:** VE areas—VO1, VO2, VE1 NB, VE1 NS, VE1 PEI, VE2, VE3, VE4, VE5, VE6, VE7, VE8 NWT, VY Yukon.)

Final Score: Total QSO points times the sum of U.S. states, VE areas, DX countries, and *CQ* zones worked on each band.

Disqualification: Duplicate contacts exceeding score by more than 2%, unsportsmanlike conduct, and violation of rules and regulations are considered grounds for disqualification.

Awards: Plaques to first-place winners in each class, certificates to second and third place. Certificates to first-place winners in each U.S. and VE call area, and each DX country. All inaugural entries will also receive certificates.

Use a separate log sheet, dupe sheet, multiplier check list for each band, and a summary sheet. Standard *CQ* forms are available from *CQ*. (A business-size SASE will get you a sample.)

Mailing deadline for all entries is December 1st to: CQ RTTY Contest, 76 N. Broadway, Hicksville, NY 11801 USA.

Classic Radio Exchange

2000Z Sun. to 0300Z Mon., Sept. 27–28

This is the fall edition of this unusual event. The format is still the same as it has been for the past years. Object is to restore and operate older equipment with like-minded hams, not required in the exchange, but a distinct advantage in the scoring.

A classic radio is any equipment at least 10 years old *(25 years would be more realistic—ed.)*

The same station may be worked on each band and each mode, and with different equipment combinations. Noncontesters may be worked for credit also.

Exchange: Name, RS(T), QTH, receiver and transmitter type, and other interesting conversation.

Scoring: Multiply total QSOs by total number of receivers, transmitters, state/provinces/countries worked on each

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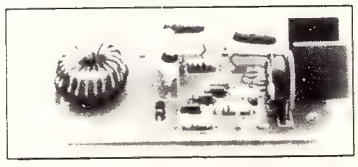
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band and mode. Multiply that total by your Classic Multiplier, the total age of all receivers and transmitters used. Three QSOs minimum per unit. Multiply age by two if gear is a transceiver. If equipment is homebrew, count it as a minimum of 25 years old, unless its actual construction date is older.

Frequencies: CW—60 kHz up from low edge of band. Phone—3880, 7290, 14280, 21380, 28580. Novice/Tech.—3720, 7120, 21120, 28120, 28320.

Awards: Certificates and appropriate memorabilia are awarded for highest scores, longest DX, exotic equipment, best excuses, and other unusual achievements.

Send logs, comments, anecdotes, pictures to Jim Hanlon, W8KGI, 5560 Linworth Road, Worthington, OH 43085. Include a large SASE for copy of newsletter with results.

Middle of The World Contest

0000Z Sat to 2359Z Sun., Oct. 3–4

Organized by the Guayaquil Radio Club of Equador, it's the world working the Equadorians on 7 MHz and 14 MHz SSB only.

There will be four "Middle of the World" stations on the Equator line active during the contest: HD1GRC, Equator Line; HD0GRC, Cayambe Volcano; HD7GRC, Equadorian Amazon; and HD8GRC, Galapagos Island. These are worth 20 points per QSO.

Classes: Single operator on 7 MHz or 14 MHz or both bands. Multi-operator, both bands.

Exchange: RS plus a 3-digit QSO number starting with 001.

Scoring: For non-Equadorian stations.

Points: Contacts with HC stations, 10 points; with HD stations, 20 points.

Multiplier: Is rather unusual. It's described as "the sum of the numeral of HC zones worked, only once per band." There are 8 call areas in Equador, HC1–HC8. Therefore, HC1 would be one multiplier and HC8 would count as 8 multiplier points. A possible 36 per band.

Final Score: Total QSO points on each band times the multiplier from that band.

Awards: A trophy and diploma for first- and second-place winners on 7 MHz, 14 MHz, and both bands for single operators. And first- and second-place on both bands for multi-operator winners. There is a special award for stations making 30 or more HC contacts, and a minimum of 3 HD contacts. Work at least 5 HC zones and you will be awarded the "WHC" certificate.

Use a separate log for each band and include a summary sheet and a signed declaration with your entry. Include 5 IRCs to cover cost of any award.

Logs must be received by December 31st and go to: Middle of the World Contest, Guayaquil Radio Club, P.O. Box 5757, Guayaquil, Ecuador.

California QSO Party

1600Z Sat. to 2200Z Sun., Oct. 3–4

This year's party is again being sponsored by the Northern California Contest Club. All efforts are being made to activate all CA counties and make this the most successful of all state parties.

Operating time is limited to 24 out of the 30-hour contest period for single operator stations. Multi-operators may use the full 30 hours. Off times must be at least 15 minutes and clearly indicated in the log.

The same station may be worked on each band and mode, and CA stations may contact other in-state stations for QSO and multiplier credit. CA mobiles may be worked in each county change.

Exchange: QSO no. and QTH. County for CA stations; state, province, or DX country for others.

Scoring: Two points for phone contacts; 3 points on CW.

Multiplier: CA stations use states (50) and VE call areas (8). VO/VE1–7 and VY1/VE8. Out-of-state use CA counties (maximum of 58).

Final Score: Total QSO points times the sum of the multiplier.

Frequencies: 160 meters through 2 meters, except 30 and 12 meter bands. CW—1805 and 50 kHz up from band edge. Phone—1815, 3850, 7230, 14250, 21300, 28500. Novice–10 kHz up from edge of Novice bands and 28490.

Try CW on the half hours, 10 meters on the hour 1700–2000Z, 147.54 at 2000, 0000, 0400Z, 160 at 0500Z, and 80 at 0700Z.

Awards: Certificates to the highest scoring single operator in each state, province, and country. Also each CA county and stations scoring 100 or more QSOs.

Trophies galore. Single operator, top three out-of-state, and CA top three. Also CA county expedition, and the WA6VEF special award for the CA station making the most CW QSOs. Multi-single and multi-multi winners in CA and county expedition. And the CA mobile team making the most QSOs. A Special Award of a refreshing local product goes to the top 20 single operators in CA and 20 out of state.

Include a summary sheet showing the scoring, etc., a dupe sheet if you make more than 200 QSOs, and a large SASE for a copy of the results.

Mailing deadline is November 15th and entries go to: NCCC c/o Gary Caldwell, WA6VEF, 1830 Polk Street, Concord, CA 94521.

A contest paperwork packet containing log, summary sheet, contest records, county abbreviations, and Special Awards List is available by sending a large SASE to WA6VEF.

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DX

This month by
JOHN A. ATTAWAY, K4IIF

NEWS OF COMMUNICATION AROUND THE WORLD

"A public not to be bribed, not to be entreated, and not to be overawed, decides upon every man's title to fame."
—Ralph Waldo Emerson

The Editors of *CQ* are pleased to announce the election of Dr. John Allaway, G3FKM, to the DX Hall of Fame. Presentation of the Hall of Fame plaque to Dr. Allaway was made on behalf of *CQ* by Mr. Richard Baldwin, W1RU, President of the International Amateur Radio Union (IARU), on the occasion of the IARU Region One Conference in Noordwijkerhout, Holland on April 15, 1987. Dr. Allaway is Secretary of the IARU.

The DX Hall of Fame came into being some 20 years ago when the *CQ* editors perceived the need for a special award to honor those relatively few amateurs who had made major contributions to the hobby of amateur radio DXing. They did not envision an operating award for DXers who had amassed large numbers of certificates and topped the various honor rolls. The award would be solely to provide recognition for those who had made unselfish contributions to the benefit of their fellow DXers, particularly those who had devoted major time and resources to their efforts.

Since the first DX Hall of Fame award was confirmed on Gus Browning, W4BPD, in 1967, in recognition of his major worldwide DXpeditions, DXers have been honored from various categories including QSL managers and DX writers as well as those who organize and conduct major DXpeditions. In each case the recipient was active in his or her field of endeavor for many years and had made contributions far beyond anything which might be perceived as the call of duty.

Today in honoring G3FKM we recognize another great DX writer in the mold of Rod Newkirk, W9BRD, long-time DX Editor of *QST*, who was elected to the DX Hall of Fame in 1984. John Allaway has compiled and written DX news for *Radio Communication*, the monthly publication of the Radio Society of Great Britain (RSGB), for over 20 years. Like Rod Newkirk, he never missed a deadline, a truly remarkable accomplishment for a man who carries on a medical practice and serves the RSGB, the IARU, and amateur radio in general in many capacities, including two terms as President of RSGB and many years as Region I Secretary for IARU.

I first became acquainted with John Allaway in the mid-1960s when we edited and published a monthly paper called the *Florida DX Report*. G3FKM then wrote his column in the *RSGB Bulletin* which later became *Radio Communication*. In addition to writing a column every month, G3FKM has been a contributor to the *RSGB Radio Communications Handbook* since 1966 and has also contributed to the Society's *Radio Operating Manual* and *Amateur Radio Awards*.

P.O. Box 205, Winter Haven, FL 33882



Left to right are Dr. John Allaway, G3FKM, and Mr. Richard Baldwin, W1RU, holding the DX Hall of Fame plaque presented to Dr. Allaway by Mr. Baldwin on behalf of CQ magazine. The presentation took place at the IARU Region I Conference in Holland on April 15, 1987. G3FKM is the second UK DXer to be elected to the DX Hall of Fame.

Dr. John Allaway joined the RSGB in 1948 and became a licensed amateur in 1949. He became an RSGB Council Member in 1970 and served on the Council until 1983. He was President of the RSGB in 1976 and again in 1982. From 1977 to 1981 he was chairman of the Finance and Staff Committees and has been HF Manager since 1978.

G3FKM has represented the RSGB at many IARU conferences, including the 1975 Region I Conference in Warsaw, the 1978 Region I Miskole Tapolca Conference, the 1981 Region I Conference in Brighton, the Region II Conference in Miami in 1976, and the Region III Conference in Manila in 1982, and attended the Region III Conference in Auckland, New Zealand. He served as Chairman of the IARU Region I High Frequency Working Group from 1981 to 1984 and presently serves as IARU Region I Secretary. In that capacity he maintains liaison with ITU headquarters in Geneva on matters of policy affecting amateur radio.

In addition, G3FKM is an outstanding DXer and has occupied a slot near the top of the DXCC Honor Roll for 20 years.

Congratulations to Dr. John Allaway, G3FKM, DX Hall of Fame.

De Extra

Aruba Is A Country—Why The Recognition Problem? This editorial feature was written by John Crovelli, W2GD/P4OGD, and first appeared in the *National Contest Journal* edited by Dave Pruett, K8CC.

"Aruba, West Indies. Notice I haven't written Aruba, Netherlands Antilles. On Jan. 1, 1986 the 55,000 inhabitants of this beautiful island celebrated their official separation from the Netherlands Antilles, having been granted complete domestic autonomy. Under 'status aparte,' Aruba is an *equal* member of the Kingdom of the Netherlands, enjoying the same political standing of the Netherlands Antilles and the Netherlands. In ten years, Aruba will have the option of deciding whether to sever its remaining ties, such as defense, to the Kingdom of the Netherlands.



Katashi Nose, KH6IJ, was inducted into the CQ Contest Hall of Fame at the Visalia DX Convention in April. (Photo via N6AW)

"Aruba's independence is similar to Surinam's separation from the Netherlands in the 1960s. You will recall that PZ was recognized as an autonomous, self-governed political entity immediately upon achieving 'status aparte.' DXCC country status was also immediate. Why hasn't similar action been taken in the case of Aruba? If you aren't aware, the DXAC rejected DXCC country status for Aruba by an 8-to-8 tie vote last fall.

"It is clear upon arrival on Aruba that you have entered a separate country. Your passport is stamped Aruba and posted custom regulations differ from those of the Netherlands Antilles. Aruba has its own currency, flag, and

News Flash!

HB9AMO Confirms 40 Zones on 160

At press time W4KA reports that Switzerland's Pierre Petry, HB9AMO, has submitted QSLs confirming the first, full WAZ award on the 160 meter band. This remarkable achievement was accomplished only 14 months after announcement of 160 Meter WAZ as a new award in the February 1986 issue of *CQ*.

Immediately behind HB9AMO, in almost a dead heat for first place, was Jerry Fiore, N4JF. Jerry will be remembered as the first DXer to qualify for the 50th Anniversary WAZ Award.

The *CQ* editors are impressed by the skill of these top-band DXers. We had expected a wait of several years before all zones could be worked and confirmed on 160 meters. Congratulations Pierre and Jerry!

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2447	DF5TS		

Endorsements

Mixed: 450 K5IID, W9SU, YU3DTN, I4IKW. 500 K5IID, W9SU, YU3DTN, I4IKW. 550 K5IID, W9SU, YU3DTN, I4IKW, JJ1EEA. 600 K5IID, W9SU, YU3DTN, I4IKW, JJ1EEA. 650 KS3F, K5IID, AA4LB, YU3DTN, I4IKW, JJ1EEA. 700 K5IID, YU3DTN, I4IKW, JJ1EEA, KS3F. 750 K5IID, YU3DTN, F8BO, I4IKW. 800 VE7EIK, YU3DTN, F8BO, I4IKW. 850 YU3DTN, I4IKW. 900 DK4SY, YU3DTN, I4IKW. 950 DK4SY, YU3DTN, I4IKW, AB9O. 1000 DK4SY, N2CIC, YU3DTN, I4IKW, AB9O. 1050 DK4SY, I4IKW, AB9O. 1100 DK4SY, AB9O. 1150 DK4SY. 1200 DK4SY, HA8UB. 1250 DK4SY, HA8UB. 1300 DK4SY. 1350 DK4SY. 1400 DK4SY. 1450 DK4SY. 2100 N2AC.

S.S.B.: 350 K5IID, DK4SY, OZ1GLN. 400 K5IID, DK4SY, K3ZPG. 450 DK4SY, DJ0AF. 500 DK4SY, DJ0AF. 550 DK4SY, FE6FNA. 600 DK4SY, FE6FNA, N4DRC. 650 FE6FNA. 700 FE6FNA. 750 I8IGS, K8ZZU. 800 I8IGS. 850 I8IGS. 900 I8IGS, N2CIC. 950 I8IGS. 1000 I8IGS. 1050 I8IGS. 1250 W2NC. 1350 W3ARK. 1400 W3ARK. 1850 WD8MGQ. 1900 WD8MGQ. 2400 ZL3NS. 2450 ZL3NS.

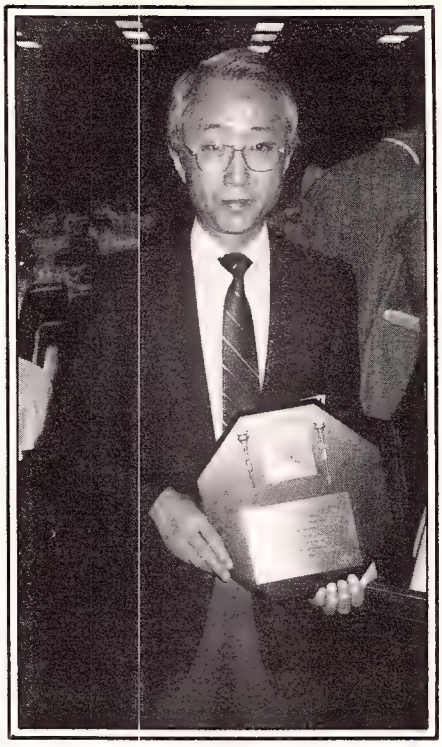
CW: 350 I0ZUT, K5IID, DK4SY, DF1OF, KB2OR, AB9O. 400 I0ZUT, DK4SY, DF1OF, AB9O, KB2OR. 500 I0ZUT, DK4SY, DF1OF, WA2EYA, AB9O. 550 I0ZUT, DK4SY, DF1OF, WA2EYA, AB9O. 600 I0ZUT, DK4SY, AB9O. 650 I0ZUT, G3VQO, NF5Z. 700 I0ZUT, PT2CW. 750 I0ZUT, PT2CW. 800 I0ZUT, PT2CW, HI8LC. 900 LA9XG. 1000 AK9Z. 1350 IS0FPH. 1400 IS0FPH. 1450 IS0FPH. 1500 IS0FPH. 2200 N6JV.

10 Meters:	I8IGS, ONL-4003, DK4SY, AB9O, N4OM
15 Meters:	I8IGS, ONL-4003, AB9O
20 Meters:	ONL-4003, G3VQO, KD9OT, AA4LB, W9IAL, AK9Z, LU8DPM
40 Meters:	I8IGS, DK4SY, ONL-4003
80 Meters:	I8IGS, ONL-4003
160 Meters:	HA8UB
Asia:	K5IID
Africa:	I8IGS, PY2DBU, ONL-4003, DK4SY, AB9O, HA8UB
No. America:	I8IGS, K5IID, KB2OR, IK4FDQ
So. America:	I8IGS, DK4SY
Europe:	N2CIC, K5IID
Oceania:	I8IGS, K5IID, DK4SY, I1WXY

Award of Excellence Plaque Holders: W4BQY, I0JX, WA1JMP, K0JN, W4VQ, KF2O, W8CNL, W1JR, F9RM, W5UR, CT1FL, W8RSW, WA4QMQ, W8ILC, VE7DP, K9BG, W1BWS, G4BUE, N3ED, LU3YL/W4, NN4Q, KA3A, VE7WJ, VE7IG, N2AC, W9NUF, N4NX, SM0DJZ, DK5AD, WD9IIC, W3ARK, LA7JO, VK4SS, K6JG, N4MM, I8YRK, W4CRW, SM0AJU, K5UR, K6XP, N5TV, K2VV, VE3XN, W6OUL, DL1MD, DJ7CX, DL3RK, WB4SIJ, SM6DHU, N4KE, I2UIY, DL7AA, ON4QX, WA8YTM, YU2DX, OK3EA, I4EAT, OK1MP, N4NO, ZL3GQ, VK9NS, DE0DXM, DK4SY.

Award of Excellence Plaque Holders with 160 Meter Endorsement: SM0DJZ, DK5AD, W3ARK, LA7JO, W4VQ, K6JG, W4CRW, N4MM, SM0AJU, KF20, K5UR, OK1MP, N5TV, W8CNL, W1JR, W6OUL, W4BQY, W5UR, N4NO, W8RSW, N4KE, I2UIY, W8ILC, W1BUS, NN4Q, G4BUE, LU37L/W4, I4EAT, VE7WJ, W9NUF, N4NX, VK9NS, DE0DXM, UR2.

Complete rules and application forms may be obtained by sending a business-size, self-addressed, stamped envelope (foreign stations send extra postage if air-mail desired) to CQ WPX Awards, P.O. Box 1351, Torrance, CA 90505-0351 U.S.A.



Kan Mizoguchi, JA1BK, was inducted into the CQ DX Hall of Fame at Visalia in April. (Photo via N6AW)

postage stamps, and amateur radio licensing is administered by the Aruban government, which collects the licensing fee.

"The Aruban Amateur Radio Society is applying for IARU membership retroactive to Jan. 1, 1986, and, according to the Society's President, P43GR, the Netherlands Antilles Radio Society—VERONA—supports separate IARU membership for Aruba.

"In light of these facts, it is difficult to understand why eight members of the DXAC voted against recognition. Did the committee members not understand the meaning of status aparte, and was much pertinent information overlooked?

"N1GL/P4OA, N4PN/P4ON, K4UEE/P4OR, P43GR, and myself have requested the DXAC immediately review and reverse its decision on country status for Aruba. We hope you will support us with a letter to the DXAC and your ARRL Director."

Special Callsigns and Rare Prefixes for WPX

FJ5: Beginning Feb. 26, 1987 all resident stations on St. Barthelemy were authorized to use the FJ5 prefix instead of FG5. However, the island still counts as FS-St. Martin for country award purposes.

FV6FIT: Callsign of a special station at the International Fair in Toulouse from April 24 through May 7.

FV6PAX: This station was active from Normandy from May 24 to June 30 to celebrate the 43rd anniversary of D-Day. QSL to F8BO.

JV1M: This call was used by a special event station celebrating May Day in Mongolia.

LY7L: Commemorated Lenin's birthday with an operation from European Russia. QSL to P.O. Box 88, Moscow, USSR, attention UA4LCQ.



Andrew Morrison, KZ1L, of Stoneham, Massachusetts was declared winner of an all-expense-paid trip to Bermuda's Elbow Beach Hotel at the first annual Ham Radio Contest, "Hamfest," recently sponsored by the deluxe hotel, Fresh Pond Travel of Natick, Massachusetts and the Bermuda Radio Society. From the left are VP9KG and VP9HK, both past presidents of the Bermuda Radio Society; WA1ERZ; WA1SCH; and KZ1L.

P4: P45AR was on the air from April 24 to May 2 from the Aruba Road Race.

PA6IARU: Special callsign from the IARU Region I Conference from April 9 through April 20, 1987.

TV7GLC: Was QRV from Rouen from May 1 to June 30 to mark the 900th anniversary of the death of William the Conqueror. The operation was carried out by the Radio Club Normandie. Special QSLs are available from F6DLM.

The WAZ Program

10 Meter Phone

314	G4BWP

20 Meter Phone

607	CT1TM	608	KE4VU

15 Meter CW

120	SM6CST

20 Meter CW

261	K5MC	262	SM6CST

40 Meter CW

63	SM6CST	64	JA2BL

80 Meter CW

10	JH3BGG	11	JA2AAQ

All Band WAZ

SSB

3114	KD7PS	3118	KO8HX
3115	VE3IMO	3119	F6EXQ
3116	KE4VU	3120	I2WNO
3117	G4BWP		

Phone and CW

6098	JA5DQH	6104	OK1MHI
6099	DL8YCN	6105	JA3PG
6100	K1KOB	6106	JH2IJU
6101	KI4EW	6107	JH7CFX
6102	W3PLI	6108	PT2VE
6103	G4BWP	6109	EA4BWN

Applications and reprints of the latest rules may be obtained by sending a self-addressed stamped envelope (39 cents) size 4½ × 9½ to the W A Z Manager, Leo Haijsman, W4KA, 1044 S.E. 43 Street, Cape Coral, Florida 33904. Applicants forwarding QSL cards either direct to the WAZ manager or to a check point should include sufficient postage for safe return of their QSL cards. The processing fee for all C.Q. awards is $4.00 for subscribers and $10 for non-subscribers. In order to qualify for the subscriber rate, please enclose your latest *CQ* mailing label with your application.

YB19AR: Celebrated the 19th anniversary of ORARI, the Indonesian national amateur radio society.

YB42RI: Operated from Aug. 16–18, 1987 to commemorate Indonesia's 42nd year of independence.

YW1: YW1D was a special callsign used by YV1AVO during the CQ WPX Test.

ZZ8ADV & ZZ8VMC: Operated June 29 to July 5 in conjunction with Brazil's Fire Prevention Week. QSL to PW8DP, Box 84, Porto Velho, RO 78900 Brazil.

3FD1LR: Operated by HP1XJZ to mark Panama's Field Day. QSL to P.S.C., Box 3004, APO Miami, FL 34002.

4X5000: Commemorated the 5,000th anniversary of Akko, one of the oldest harbors in the Mediterranean. QSL to 4X6DK.

4X39ID: Independence Day station from Tel Aviv, Israel, May 3–4, 1987. QSL to 4X4HQ.

4U2: The callsign 4U2ITU was used at the ITU in Geneva during the month of May to celebrate Telecommunications Month.

9N5: Three Japanese operators activated 9N5ITU in May to celebrate Telecommunications Month. QSL to JH8RUZ.

29L: This unusual prefix was used by stations in Sierra Leone to celebrate 29 years of independence. 29L1IS was 9L1IS, etc.

Stations, groups, or clubs wishing to publicize special event stations or special callsigns are asked to send info to K4IIF, P.O. Box 205, Winter Haven, FL 33882 as far in advance as possible.

Useful Publications for the DXer

DX Beam Headings Around the World ($10.00 plus $3.00 for airmail postage) and **DX Net Lists Around the World-6/87** ($3.00) are available from Dieter Konrad, OE2DYL, Bessarabierstrasse 39, A-5020, Salzburg, Austria.

Worldwide Ham Net Directory lists 300 special-interest amateur radio networks including all worldwide DX nets. For further information contact Tiare Publications, P.O. Box 493, Lake Geneva, WI 53147 USA.

DXCC Summary Lists have been reprinted by the Yankee Clipper Contest Club with the permission of the ARRL and will be provided free to DXers who send an SASE to the club secretary/treasurer, Charlotte Richardson, KQ1F, 11 Michigan Drive, Hudson, MA 01749. Complete DXCC rules are available only from the ARRL.

5 Band WAZ Competition Fierce in Japan

Competition for the honor of being the first JA station to achieve a full 200-zone 5-Band WAZ was as intense as any in memory. In December 1986 at least 4 stations had 199 zones confirmed, each lacking only Zone 2 on 80 meters. Then a succession of QSOs were made with Martin Benoit, VE2EDK, as follows:

12/27/86—JA3EMU at 2142 GMT
12/28/86—JA3CSZ at 2106 GMT
12/28/86—JA0CWZ at 2115 GMT
12/28/86—JA1BWA at 2117 GMT

Based on Martin Benoit's log, JA3EMU was the first Japanese amateur to achieve 5-Band WAZ, followed by JA3CSZ, JA0CWZ, and JA1BWA.

JH3BGG was actually the first to work VE2EDK, logging his QSO at 2122 GMT on 12/27/86. However, his application was for 80 meter, single-band WAZ, and he has the honor of being the first JA station to work all 40 zones on 80 meter CW.

To date, no JA station has made application for single-band WAZ on 80 meter SSB, so that achievement is still in the future.

Other JA stations to achieve 5-Band WAZ to date include JA3FYC, JA5DQH, JA2AAQ, and JA1ELY. *(Thanks Leo, W4KA)*

DXpedition To Trinidade Island—PY0T

In October 1986 a DXpedition was made to rare and very difficult to reach Trinidade Island by PY1DFF and PY2RRG. This is their story.

Trinidade Island is located at 20 deg., 30 min. S, 29 deg. 20 min. W, or about 765 miles northeast of Rio de Janeiro, Brazil. It was first discovered in 1501 by Portuguese navigator Joao de Nova. It is a volcanic island with a total area of 8.2 square kilometers. Its highest point is Desejado Peak at 600 meters above sea level. The island's sole inhabitants are the crew of a weather station maintained by the Brazilian Navy.

Trinidade Island is a three to five day trip from the Brazilian mainland depending on weather conditions. It is necessary to request permission for a trip to the island at least two months in advance, but confirmation is only given two or three days before departure. Therefore, it is difficult to make an announcement in advance without the risk of cancellation or postponement.



The approach to Trinidade Island as seen by PY1DFF and PY2RRG on their PY0T DXpedition in October 1986.

The supply ship sails to the island every two months, and the men at the weather station put in four month shifts. Ham radio operations can be made during the time it takes to unload the supplies, usually from 12 to 72 hours, and consequently DXpeditions are usually very short, as the only alternative is to stay two months and return on the next supply ship. The Petropolis Amateur Radio Club (CWP), after making its first expedition to the island in December 1985, decided to plan a new operation for October 1986. Preparations began in July 1986, and Claudio, PY1DFF, and Fran, PY2RRG, were chosen to carry out the DXpedition.

The ship sailed from Rio de Janeiro on Oct. 6, 1986 and arrived at the island on the morning of Oct. 10. The antennas and equipment were unloaded by helicopter, and at 1411 GMT PY1DFF called the first CQ from PY0T on 15 meter SSB. The rigs used included a Yaesu 101F with VFO, a Yaesu FT-101ZD, a Kenwood TS130S, and a Brazilian-made linear. The antennas were monoband verticals for 10, 15, and 20 meters; an Electril multiband vertical for 40, 20, 15, and 10 meters; plus dipoles for 40 and 80 meters.

Things went smoothly until 2100 GMT when



Left to right are Fran, PY2RRG, and Claudio, PY1DFF, on Trinidade Island for their PY0T operation in October 1986. See story in text.

a malfunction in the generator caused a voltage surge which damaged the rigs. For a time it appeared that the expedition was over, but we were finally able to return to the air with the Kenwood TS-130S powered by a battery. The operation then concentrated on 40 meter CW where conditions were favorable. Total effective operating time was 9 hours, during which we made 820 QSOs. We feel our mission was accomplished and hope to return to the island and operate for a longer time.

We would like to express our thanks to the Brazilian Navy, to the crew of the ship "Almirante Graca Aranha" for their hospitality; to the First Squadron of General Use Helicopters for transportation from ship to shore; to "Antennas Electril" for the donation of a DXV-4 antenna; to PU1YOC, PY1AVZ, PY1HBS, PY1LUC, PY1OTO, PY1QQ, PY1RF, PY1ROB, and PY2LQB for their assistance in preparing

5 Band WAZ

Standings as of June 1, 1987

New recipients of 5 Band WAZ with all 200 zones worked:

140. JA3EMU
141. JA3CSZ
142. JA0CWZ
143. JA1BWA
144. JA3FYC
145. JA5DQH
146. JA2AAQ
147. JA1ELY

The top 10 contenders for 5 Band WAZ are:

1. N4WW, 199
2. K6YRA, 199
3. W8UVZ, 199
4. K9CEB, 199
5. DJ9ZB, 199
6. SP6JCY, 199
7. W2YY, 198
8. K7UR, 198
9. K9GX, 198
10. G4BWP, 198

418 Stations have met the 150 Zone level.

Applications and reprints of the latest rules may be obtained by sending a self-addressed stamped envelope (39 cents) size 4½ × 9½ to the W A Z Manager, Leo Haijsman, W4KA, 1044 S.E. 43 Street, Cape Coral, Florida 33904. Applicants should include sufficient postage for safe return of their QSL cards. The processing fee for all CQ awards is $4.00 for subscribers and $10 for non-subscribers. In order to qualify for the subscriber rate, please enclose your latest *CQ* mailing label with your application.

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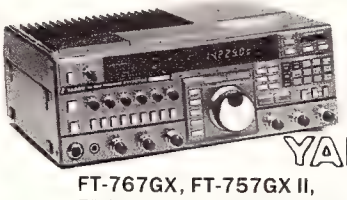
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ICOM IC2AT/12AT ICO2AT IC-03/04AT IC-A2/U16

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SMART PATCH

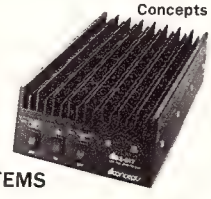
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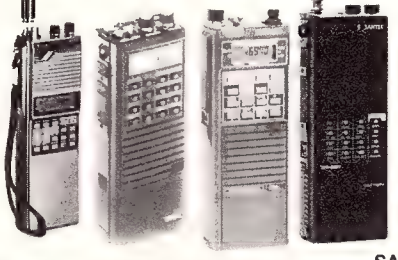
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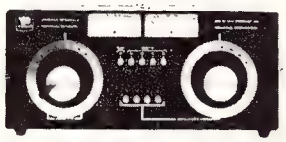
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CW

K4CEB	317	W6ID	311	K8PYD	305	N5FW	294	I8WY	281
W9DWQ	316	K4XO	311	N4KG	305	K8LJG	292	K2OWE	281
W6PT	316	N6AR	311	AB4H	304	N5DX	291	N4AH	281
ON4QX	316	DL3RK	310	W0IZ	303	W0HZ	291	K7ZR	280
N4JF	316	SM6CST	310	WA8DXA	302	WA4JTI	290	I5XIM	280
K9MM	315	AA6AA	309	YU2TW	301	W1WLW	289	W2LZX	280
N4PN	315	DL8CM	309	I3OBO	301	W4BV	289	W9NUF	280
DL7AA	315	W9BW	309	W6SN	300	N8MC	288	HB9AFI	279
N6AV	315	N4MM	308	WB4RUA	300	WD9IIC	288	IT9QDS	279
W3GRS	314	DL1PM	308	W0SR	300	WA2HZR	286	WA4DAN	278
W8KPL	314	K1MEM	308	W7CNL	299	NN4Q	286	DL1QT	277
K6LEB	314	OK1MP	308	K3FN	298	YU1HA	286	W9SC	277
K6JG	314	W9RY	308	K3UA	298	K4CXY	284	KA3R	276
N6CW	313	W4OEL	307	K9IW	298	W6YQ	283	W1WAI	276
K9AB	313	SM3EVR	307	EA2IA	298	G2GM	282	K4SE	275
K6EC	312	W1NG	306	DJ7CX	297	JH1VRQ	282	KQ9W	275
W4BQY	312	K9QVB	306	WD9IIX	296	K1VHS	281	K9BWQ	275
W2FXA	312								

SSB

K2FL	317	K5OVC	313	WA0DCQ	306	WZ4I	300	VE3DLR	290
W4EEE	316	YU1AB	313	VE3MRS	306	WB5TED	300	JA5PUL	289
K6WR	316	VE7WJ	313	KB5FU	306	I2ZGC	300	W9TA	289
W4UG	316	N4MM	313	K8CMO	306	K2JLA	300	K8ZZU	289
W6EUF	316	K4XO	313	XE1OX	306	WA2MID	300	KE4HX	288
VE3MR	316	F2MO	312	EA1QF	305	NW5K	300	OK1AWZ	288
DL9OH	316	K8PYD	312	NA5W	305	WB6GFJ	300	I8KCI	288
N4JF	316	W0SD	312	KZ8Y	305	JH1VRQ	300	KI3L	287
I0ZV	316	K9RF	312	NS7Z	305	KC8EU	300	EA3KW	287
KD8VM	316	K4MQG	312	K3UA	305	WA0TKJ	299	AB9E	287
I0AMU	316	I8ACB	312	I8KCI	305	I6PLN	299	W5LLU	287
F9RM	316	W9SS	312	K8VFV	305	KA8T	299	G3XTT	287
TI2HP	316	N2SS	312	W6SN	305	DJ7CX	298	XE1MDX	287
KS2I	316	LA7JO	312	W8IMZ	304	K9SM	298	N8BJQ	286
YV1KZ	316	OE2EGL	312	XE1J	304	I8LEL	298	N3ARK	286
I8AA	316	LU3YL	312	VE7HP	304	JH4PRU	298	K9MNT	285
DJ9ZB	316	DL6KG	312	W4UNP	304	K8ZZU	298	KB5RF	285
ZL1AGO	316	K6EC	311	W6NLG	304	EA9IE	298	KD8V	284
W9JT	316	W4SSU	311	NY5L	304	XE1NI	298	WB3HAZ	283
VE3GMT	316	I4LCK	311	CT1UA	304	K5DUT	297	VE3MV	283
4Z4DX	316	W0SR	311	I4EAT	304	HP1JC	297	IN3ANE	283
W4DPS	316	K9BWQ	311	VE7DX	304	YU7KV	297	K4JLD	283
W9DWQ	315	K6XP	311	XE1KS	303	K3LUE	297	PY2DBU	283
VE2WY	315	K9AB	311	W2LZX	303	XE1OW	297	AE5B	282
K6YRA	315	W1LQQ	311	WB3DNA	303	WB3GPR	296	G4GED	282
W3AZD	315	W7FP	311	KB0U	303	KQ9W	296	KC8YM	282
XE1AE	315	N6OC	311	K0GT	303	KB3KV	296	AI9R	282
W3GRS	315	DL6KG	311	K1MEM	302	W4BQY	296	TG9EP	282
W0YDB	315	IV3YRN	310	N5FG	302	I0SGF	296	N1ALR	282
ZL1AGO	315	DK2BL	310	W6FET	302	K7LAY	295	K9TI	280
ZL3NS	315	AA6AA	310	W2FGY	302	W0IYR	295	ZL1BOQ	280
I8YRK	315	W8JXM	310	K9HQM	302	KK0C	295	G4FAM	280
N6AR	315	WA4JTI	310	WA4DAN	302	W6MFC	295	KU9Z	280
VE1YX	315	9H4G	310	I3OBO	302	KA9ABC	295	VE6PW	280
W4NKI	315	AB9O	310	K9UAA	302	VE3XO	295	KS0Z	280
I4ZSQ	315	N4PN	309	NJ2C	302	I8ZTE	294	KB5DN	279
OK1MP	315	K1UO	309	KP4EQF	302	WD0BNC	294	EA6DE	279
ZS6LW	315	W6DN	309	AI8M	302	I5BDE	294	JH8NYK	279
I8KDB	315	W7OM	309	WB4UBD	302	WD8PUG	294	KX5V	279
W9BW	315	ZL1BIL	309	N5FW	302	WB3CQN	294	K4BYK	278
K9LKA	315	WD9IIX	309	I5EFO	302	K4SE	293	I5EFO	278
N4WF	315	SM4CTT	309	W6BCQ	302	KC8JH	293	N2CIC	278
OZ3SK	314	VK4VC	308	I2MQP	302	AI5I	293	VE3IUE	278
K9MM	314	YV5AIP	308	WB4NDX	301	K4LR	293	KB8O	278
YV5DFI	314	N6AV	308	WA3HUP	301	W9NUF	293	KG9N	278
K6JG	314	W2CC	308	VE3FJE	301	AG9S	293	G4ADD	278
CT1FL	314	AI8S	308	W8ILC/QRPp	301	KD5ZM	293	WB6OKK	278
OZ5EV	314	N4KG	308	K4CXY	301	WA4LOF	292	WB0UFL	277
W2SUA	314	K8NA	308	W9OKL	301	AC0A	292	W4PTT	277
W0SFU	314	WA4WTG	308	YU2TW	301	VE3FEA	292	KB0SY	277
OE3WWB	314	W1NG	308	N4CRU	301	VP9CP	292	I8XTX	277
VE3XN	314	G4CHP	308	KZ0C	301	W8LKG	292	N0AMI	276
YS1RRD	314	W9RY	308	N8BKF	301	K1VHS	292	N7ASL	276
N7RO	314	KU9I	308	KZ2P	301	W0ULU	292	WA6DTG	276
K8LJG	314	K9HDZ	308	KE3A	301	W4UW	292	WA4OPW	276
W3GG	314	VE4SK	307	WT4T	301	SV1JG	292	AI9U	276
I2LLD	314	WB1DQC	307	NN4Q	301	WA2FKF	292	KC2RS	276
K9AB	314	I0MBX	307	YV1AJ	301	VE3IPR	291	WA9IVU	276
ON5KL	313	KV2S	307	W4OHZ	300	N5AWS	291	K0HQW	276
PY1APS	313	WD8MGQ	307	I5EFO	300	K2JF	291	I8INW	275
EA2IA	313	KB9OC	307	K9QVB	300	W4JFE	291	WB1EAZ	275
W8ILC	313	KB8DB	307	I1POR	300	K2JLA	291	VE7BSM	275
EA4LH	313	VK3JF	307	KB9KD	300	DU9RG	291	K8NWD	275
OZ8BZ	313	K9IW	306	KB3OQ	300	VE3CKP	290	VE5FX	275
N6AW	313	KR90	306	VE4AT	300	KB2HK	290	KC2FC	275
W8PCA	313	N4KE	306	G4CHP	300				

the equipment; and to PT7WA, PY1OL, PY1VOY, PY1ZAE, and PY4OD for announcing the DXpedition by radio and through bulletins. *(PY1DFF & PY2RRG)*

Johnston Atoll, KH3

Johnston Atoll originally consisted of a coral reef and two small islets located in the Pacific Ocean about 717 nautical miles west southwest of Honolulu, near 16 degrees, 45 minutes north, and 169 degrees, 31 minutes west.

The two islets, in their natural state, were 46 acres and 10 acres in size, but during the second World War they were enlarged and connected to a total area of 210 acres including a 6100 foot runway. By the end of the war, none of the original vegetation or shoreline remained.

Construction on the atoll continued during the 1950s and 1960s until the island was enlarged to 570 acres and the runway lengthened to 9000 feet. It has since been described as the largest land-based aircraft carrier in the world.

The discovery and naming of Johnston Atoll is credited to Captain Charles James Johnston of the British ship *HMS Cornwallis* in 1807. However, it had actually been discovered 11 years earlier in 1796 when two ships, the American brig *Sally* and the British Schooner *Prince William Henry* both ran aground on the island. The atoll was first occupied by American guano diggers around 1858, who made a claim based on the U.S. Guano Act of 1856. For at least 50 years control alternated between American business interests and the Kingdom of Hawaii, except for an unsuccessful attempt by Great Britain to claim Johnston for a cable station in 1892. In 1909 the then Territory of Hawaii leased the island to a private citizen for a period of 15 years.

Strict control of Johnston by the United States government began in 1926 when it be-

CQ DX Awards Program

SSB

1539	XE1ND	1542	K3EQN
1540	PY1APS	1543	K9GBN
1541	K2OQA		

CW

699	DF1OF

SSB Endorsements

310	K2FL/317	300	W9OKL/301
310	4Z4DX/316	300	KB3OQ/300
310	N4WF/315	300	I1POR/300
310	W0YDB/315	250	JK1MOC/253
310	PY1APS/313	28 MHz	K2OQA
310	DL6KG/312	QRPp	K2OQA
300	G4CHP/309	3.5/7 MHz	JK1MOC

CW Endorsements

310	K4CEB/317	275	W6YQ/283
275	K4CXY/284	275	N4AH/281

Total number of active countries is 317. 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 s.a.s.e. 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 air-mail reply. Please make all checks payable to the awards manager.

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came a bird refuge and was placed under the control of the U.S. Department of Agriculture. In 1935 the island came under military control by the U.S. Navy and then alternatively the Navy and the Air Force until the 1950s when a joint task force of the military and the Atomic Energy Commission assumed control. Beginning in 1958, it was the site of various nuclear tests, and in 1973 operational control was placed under the Defense Nuclear Agency.

In addition to being an air base during World War II, Johnston was also an important refueling station for submarines. By the end of the war it had become one of the busiest air transport terminals in the Pacific. Johnston again became militarily important during the Korean War and as a storage area during the Vietnam War. *(Thanks Bob Winn, W5KNE, in QRZ DX.)*

WPX—The DX Award For All Seasons

Is there a DX award for all seasons—and all sunspot cycles? The answer is yes—*CQ's* Worked Prefixes (WPX) Award!

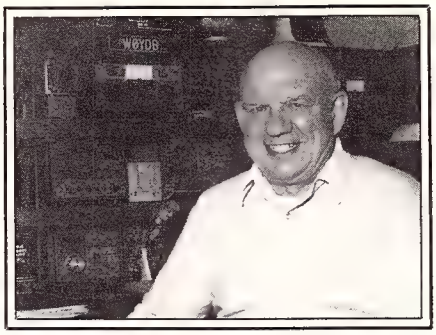
When the sunspot cycle is reaching for a bottom and band openings range from weak to nonexistent, it becomes almost impossible to work a new country. This is particularly true if you have already confirmed all the easy ones, and it is easy to succomb to the temptation to cover up the rig and spend some time on the stamp collection. Don't despair. When you become a prefix chaser "new ones" will abound again just as they did when you first entered the country chase. *CQ's* WPX Program offers enough to keep you busy until the next sunspot peak rolls around, and for a time thereafter.

The WPX Certificate. If code is your mode, there is a WPX certificate to be earned by working 300 prefixes on two-way CW , but if voice is your choice, 300 prefixes earned by two-way SSB also nets a certificate. If you are a versatile DXer with operating capability using both key and mike, a third certificate is awarded for mixed mode which requires 400 prefixes, and this is just the beginning.

The Endorsement Stickers. The WPX Program offers colorful endorsement stickers for continents, bands, and for each additional 50 prefixes beyond the required minimums. Band endorsements may be earned by working 50 prefixes on 160 meters, 175 prefixes on 80 meters, 250 prefixes on 40 meters, 300 prefixes on 20 meters, 300 prefixes on 15 meters, and 300 prefixes on 10 meters. The 10 and 15 meter endorsements will be very tough during the sunspot trough, but once you become a prefix chaser you will want to save something for the next sunspot peak.

To qualify for continental endorsements, 160 prefixes are required for North America (a snap with all the newer U.S. prefixes), 95 prefixes for South America, 160 prefixes for Europe, 90 prefixes for Africa, 75 prefixes for Asia, and 60 prefixes for Oceania.

WPX Honor Rolls. And it isn't over yet. There is more to come. The truly successful DXer is also eligible for the WPX Honor Rolls and the WPX Award of Excellence. There are three separate Honor Rolls—mixed mode, SSB, and CW. A place on either Honor Roll requires 600 current confirmed prefixes. However, to reach the top you will need a number approaching 3,000. For example, the Honor Rolls in the June 1986 issue, page 79, show YU2DX at the top of mixed mode with 2,903 prefixes confirmed, F9RM at the top for SSB with 2,788 prefixes, and W2NC the world's premier CW operator with 2,346 prefixes. It is interesting to note that while WPX applications from overseas frequently outnumber applications from North American DXers, the top 10 spaces on the CW WPX Honor Roll are all held by US DXers.



Bill Higgins, W0YDB, is past president of the Twin Cities DX Association (TCDXA) and is at the 315 country level on the CQ SSB DX Honor Roll. (Photo courtesy N4UF)

WPX Award of Excellence. The WPX Award of Excellence, mentioned above, is considered by many DXers to be the ultimate DX operating award as it requires proficiency on both CW and SSB. The requirements are 1,000 prefixes mixed mode, 600 prefixes on SSB, and 600 prefixes on CW, all continental endorsements and 5 band endorsements for 80–10 meters. A special 160 meter endorsement bar is also available.

Novices and Shortwave Listeners. If you are a beginning DXer with a Novice license, the WPX program also has something for you, the WPNX Award. This award can be earned by US Novices who work 100 different prefixes prior to receiving a higher class license. Prefixes earned as a Novice may be used after you upgrade to General class license or higher as a credit toward the WPX Award.

If you are a shortwave listener (SWL), you may earn the VPX Award certificate by submitting QSL cards confirming the reception of at least 300 different amateur prefixes. Applications must be submitted to the WPX Award Manager in accordance with WPX rules.

Application Blanks. For application blanks and complete information on the WPX Program, send a self-addressed, stamped, business-size envelope to the WPX Manager, Norm Koch, K6ZDL, P.O. Box 1351, Torrance, CA 90505.

Acknowledgements

Acknowledgement is made to the following sources of DX information which are very helpful to this column. The list is alphabetical.

Balanced Modulator (N4UF and W4PTT)
Carolina DX Association Bulletin (W4WMQ)
DX'ers Magazine (W4BPD)
DX Bulletin (VP2ML)
DX-NL (DL3RK)
DXPRESS (PA3CXC)
Heard Island DX Newsletter (VK9NS)
Long Island DX Bulletin (W2IYX)
Long Skip (VE3IPR)
Lynx DX Bulletin (EA2JG in Spanish)
Northern Calif. DX Foundation Newsletter (W6SZN)
Northern Calif. DX Club's DXer (W6CF)
National Contest Journal (K5ZD)
QRZ DX (W5KNE)
Southern Calif. DX Bulletin (NK6A)
Totem Tabloid (K7ZR)
Worldradio—DX World (N6JM)

73, John, K4IIF

QSL Information

A22BW to P O. Box 217, Etsha, Botswanna
A61AB to WA3HUP
AP2SQ to W3HNK
BV0AE to JA1UT
BY8NC to P.O Box 1033, Nanchang, P.R.C.
C21A to Ed de Jong, P.O. Box 17, Nauru, South Pacific
C30BAX, C30BBB, C30CSA & C30DCA to DL4BAH
CP8XA to DL3NAZ
CY0SAB to VE1BCK
D68QL to YASME, Box 2025, Castro Valley, CA 94546
FP/K1RH & FP/W1CCN to K1RH
FY5YE to W5JLU
HL9YG to N4GNR
HS0B to P.O. Box 2008, Bangkok, Thailand
HV2V0 to I0AOF
H44RO to W6CNA
J88AQ to W2MIG
J88BK to WN5K, 41607 Highway 931, Gonzales, LA 70737
K1ST/6W1 to K1MM
K5KG/VS6 to K5TU
KC6MX & KC6IF to KQ1F
KG6SL to WA6AHF
KH0AC to K7ZA
KX6AZ to Annabel Lyman, Box 1768, APO San Francisco, CA 96555
LT1E to LU4EGE
LZ9E to LZ2KTS
LZ0L to LZ1KCP
PJ2/W1BIH to W1AX
PT2ZDR to W2PD
P29FG to WA0GUD
S79KG to YASME
SM2DWH/BT0 to SK4NI
SU1ER to Box 78, Heliopolis, Cairo, Egypt
T50DX to C.P. 35, 20089 Rozzano (MI), Italy
TE2Y to TI2LCR
TI2T to K8LJG
TJ1CH to F6FNU
TL8DN to N2AU
TL8JM to N4NW (1987 Callbook)
TR8SA/P to F6FNU
TU2QZ to WS5O
TZ6VV to N0BLD
VK0DA to VK9NS
VK9XP to Box 59, Christmas Island, Indian Ocean (via Australia)
VK0GC to VK9NS
VK9LM to OE1ZL
V02AC to KA8SOF, 512 West 8th St., Traverse City, MI 49684 (*not* 1987 callbook).
VP5DG to WN5K
VP8BNO to G3LZQ
VR6TC to W6HS
VU4NRO to VU2APR
WB3IXC/KH2 to KA3T
YJ8JG to Box 548, Port Vila, Efate Island, Vanuatu
ZD8MAC to G3IFB
ZD8RP to G3IFB
ZF2KI to K1AR
ZK1XV to VK2BCH
ZL7AA to ZL1AMO
ZY1CRP to PY1AJK
3C1MB to EA7KF
3G1X to CE1ANF
4K1F to UQ2OC
5A0A to SP6BZ
5H3ZO to K0LST
5T5NU to F6FNU
5Z4KG to YASME
7J1ACH to NG7X
7P8DP to W8MPW
8Q7CH to SM5DQC
8Q7QL to YASME
9K2KW to Box 13296, Kuwait City, 71953 Kuwait
9L1GG to N4DW
9L1IS to KB9N
9N1MM to N7EB
9Q5DA to KC4NC
9Q5KI to YU3KI

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2- "	- 80, 40M	85 ft. "	$ 55 "
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	Kit	H-D		Kit	H-D
2-M	None	$ 49.96	12-M	$175.67	$279.35
6-M	$ 75.33	$118.73	15-M	$209.39	$328.09
10-M	$154.09	$261.45			

Above models in stock; ask for prices on other frequencies.

DX Hidden Asset, broadbanded, gain equal to a dipole. Bi-directional horizontal or omni vertical. Designed for indoor mount; space required 0.1λ in direction of polarization, 0.125λ at 90° (See *73*, Feb. 1984).

2-M	$39.95	12-M	$63.95
6-M	$47.95	15-M	$67.95
10-M	$54.95	Plans only	$12.50

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Novice

a monthly feature by
BILL WELSH, W6DDB

"HOW TO" FOR THE NEWCOMER TO AMATEUR RADIO

Getting Started—Conclusion

This is the conclusion of an eight-part article that has been written to help new amateurs get on the air. Each part of this article is useful by itself; however, maximum benefit can be derived from reading the entire article. Previous issues of *CQ* can usually be purchased at $2.50 each by writing to *CQ*, 76 N. Broadway, Hicksville, NY 11801.

Interference

Sources and Sufferers. You may become aware of interference problems when you start operating. Contrary to what you may be thinking, it is much more likely that you will be bothered by interference than that your station operation will cause interference. Past experience in a major city's interference (elimination) committee taught me that any electric or electronic device can cause interference. It is common to trace interference to commonplace things such as flourescent lights, light dimmers, neon signs, hair dryers, refrigerators, freezers, electric motors, electric drills, TV sets, electric blankets, heating controls, air conditioners, electric fans, computers, and just about anything else one can name. Interference enters the receiver through the AC power line or the antenna input. It takes patience and effort to isolate and eliminate each source of interference.

Power-Line Interference. It is usually effective to eliminate or minimize power-line interference by installing a low-pass filter between the house power electric outlet and the electric power input to the station equipment. If a power-line filter is being installed to reduce interference to the receiver, the filter configuration should be as shown in part (A) of fig. 1. If you have a particularly troublesome source of interference in your home, it is advisable to install a low-pass filter between this unit and its electric power input. The configuration of this type of filter should be as shown in part (B) of fig. 1. If a station is causing interference through the electric power wiring, the filter configuration shown in part (B) of fig. 1 should be used to eliminate this problem.

Radiated Interference. If your station causes interference due to radiated energy, it can be reduced or eliminated, but this is not always easily accomplished. A good low-pass filter in the transmitter RF output line can help eliminate radiated interference, particularly in a case of television interference (TVI). The low-pass filter is built into the transmitter output section of modern transceivers. Adding a high-pass filter between the TV antenna and the TV set can further minimize TVI, but the filter should be mounted directly on the TV tuner (channel selector) to be most effective. Do not install filters or other interference reduction devices on anyone's home entertainment units because you make yourself liable for their future equipment repairs, even though the later problems may be completely unrelated to the changes you made. Be cooperative, friendly, and helpful in assisting neighbors resolve any interference problems, but do not touch their equipment.

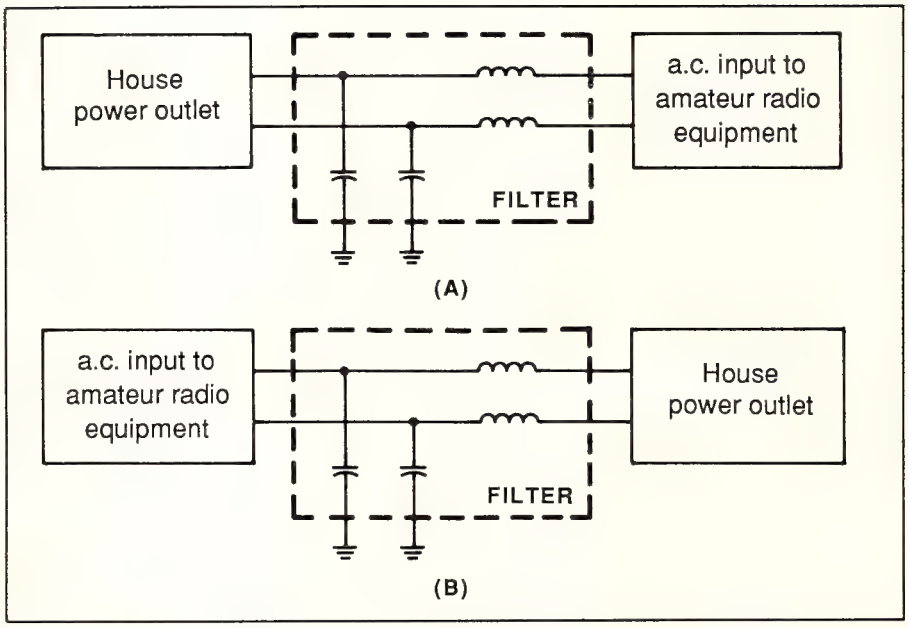


Fig. 1–Power-line low-pass filter connection. (A) Configuration used to keep household electrical interference out of amateur equipment. (B) Configuration used to keep amateur station interference out of house power line.

Helpful Attitude. Very few interference complaints against amateur radio stations are found to actually be the fault of amateur stations. Nevertheless, it is very important to go out of your way to cooperate with any neighbor who reports interference. Very few people are experts on interference, and the extent of their knowledge is usually that they have no problem except when you operate your station. Frankly, there is no reason to expect your neighbors to know what causes interference or how to eliminate this problem. Patience and understanding can help the two of you resolve any difficulty, can keep you on good terms with your neighbors, and can help keep your station on the air without interruption. Amateur radio has long enjoyed a very favorable image with the general public, and it is worth the effort to maintain this situation.

Precautions. The possibility of your station causing interference can be minimized by using properly designed equipment, establishing an excellent station ground, using properly matched monoband antennas, and taking care to operate the transmitter correctly. Interference possibilities increase with higher RF output power, and it is often possible to minimize or eliminate a critical interference problem by reducing transmitter RF output power until the difficulty has been remedied. In any case, it is best to operate the rig at less than its maximum rated RF output power.

Cable Television Interference. The March and April 1984 Novice columns cover cable television interference thoroughly. This article does not include that detailed coverage. However, it is important for you to know that cable TV is required by law to be a closed system, which means it must not be susceptible to RF interfer-

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ence, and it must not cause interference to other radio/TV services. Simply stated, it is up to the cable TV outfit to eliminate any interference problem that occurs.

Perspective. Don't let an interference problem of any type cause you to panic and stop operating. Most problems are easily resolved. There are excellent books and magazine articles that can help you solve any problem. Stores have very effective low-pass (power-line and RF types) and high-pass filters for sale at reasonable prices. There are also many experienced amateurs who can discuss interference problems with you, and they should be able to suggest ways to isolate and eliminate interference. However, if you have an interference problem, you are the person with the most interest in finding an effective solution.

Broadcast interference (BCI), television interference (TVI), and telephone interference are usually much easier to eliminate than interference to unshielded high-gain audio amplifiers and other electronic home-entertainment equipment.

Frequent contacts with active licensed amateurs have shown that less than one third of them have received a report that their operation has caused any interference. Most of the problems that do occur concern equipment in the amateur's own home. Almost all interference cases involving neighbors are quickly and easily eliminated. Interference is mentioned in this article because it can occur, and you may have to take steps to eliminate it. Although very few amateur stations cause interference, almost all of them are bothered by interference. Even dirty insulators on electric power utility poles can ruin reception at one's station.

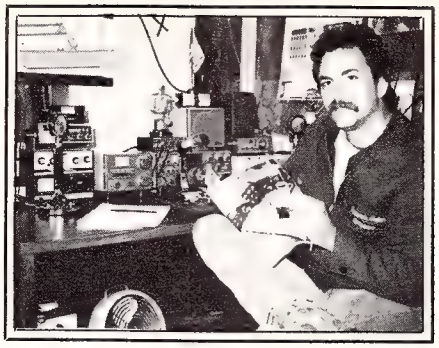
Station Location

Decide the best location for your amateur station. You will be almost completely motionless for long periods of time as you operate, which makes it very important to select an area that is warmed in the winter and is cooled in the summer. Do not set up your station in a garage, cellar, or attic. If you can possibly avoid it, don't locate your station in someone else's room, because this would limit your operating opportunities.

Try to select a comfortable and readily accessible area in your home as your station location. Your operating position must be as close as possible to where your RF ground will be established and it should be reasonably close to where your antenna transmission lines will enter your home.

Operating

Calling and Listening. Learn to keep each CQ call (general call to all stations) brief and to listen very carefully for answers before you start sending another CQ call. A good operator expects replies to his calls and he listens for them, rather than to immediately start making another call. After making a CQ call, tune slowly above and below your own transmitting frequency and listen for an answer. Most replies are spotted within a few kiloHertz of the sending frequency, so don't tune too far or too fast. Don't shortwave listen after you send a CQ call; if the station you hear sends even one character that isn't part of your call sign, tune past him and listen to the next guy. Slowly tune above and below your transmitting frequency a couple of times as you listen for a reply. If you don't hear a response within 60 to 90 seconds, repeat your CQ call again and repeat the tuning procedure. A series of short CQ calls is far more effective than one long CQ call. It's easier to send from written material until you become experienced enough to send out of your head. You have enough troubles as a new operator without worrying about what to send. You can use the following typical transmissions to help you out until you get some experience. Just substitute your own call in place of KB6ADP in these examples.



Ken Nelson, KA1OXQ, of Oakham, Massachusetts was just getting started on the air when this photograph was taken. Ken helps local amateurs erect their antennas, which I am sure they appreciate. He plans to erect several excellent antennas, and a couple are already being built.

Initial Call

CQ CQ CQ CQ CQ DE KB6ADP
CQ CQ CQ CQ DE KB6ADP KB6ADP
CQ CQ CQ DE KB6ADP KB6ADP KB6ADP K

Typical Answer

KB6ADP KB6ADP KB6ADP DE W6DDB W6DDB W6DDB K

Typical Opening Comments

W6DDB DE KB6ADP BT TNX FER DE CALL BT UR RST 579 ? 579 HR IN CAMBRIDGE, MASS ? CAMBRIDGE, MASS ES NAME IS BOB ? BOB BT HW? W6DDB DE KB6ADP

The typical opening comments effectively say, "Thanks for the call. Your signal is perfectly readable, moderately strong, and has good tone here in Cambridge, Massachusetts, and my name is Bob. How do you copy? Usually these opening comments are kept brief because you don't know how well the other station is hearing you. When the other operator responds, he'll give you the same type of information and he should then open up the conversation to any subject that comes to mind. You are welcome to discuss anything you find interesting in subsequent transmissions.

That First Contact. When a new ham makes his first contact on the air, he usually is very nervous and makes mistakes. I've seen guys get so panic-stricken by the first answer that they've turned off their gear. There have been other cases in which they didn't wait to turn off anything before they ran out of the shack. Just do your best and keep contacts short until you become more experienced and relaxed enough to enjoy chatting with other hams on the air. The Novice bands were established for beginners, so don't be concerned if you sound like a beginner when you first start to use these bands.

Operating Schedule. Set a reasonable operating schedule and stick with it. You should operate (not just listen) at least 7 hours each week while you are a Novice. An hour per day every day is more beneficial than a couple of long operating sessions a couple of days per week. You don't need a ham license to be a shortwave listener; if you have a license, use it. The American Novice has come a long way in the past 35 years. Many improvements have been made and others are still possible. You should truly appreciate this excellent opportunity. Operate courteously, legally, and frequently. Be an asset to your community, club, country, and the Amateur Radio Service. Continue the long-established practice of welcoming and helping a fellow amateur whenever and wherever you meet one. Modern technology is opening doors to fantastic communication breakthroughs. The best is yet to come.

Theory Advancement

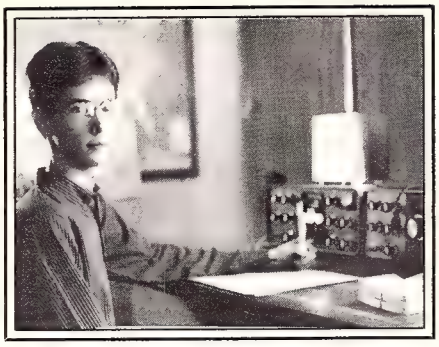
Self-Study. It is more difficult to get ready to pass the theory part of the General exam if you have to teach yourself. Nevertheless, many hams have done this, and you can also make the grade. Don't spend a lot of money on textbooks. Local libraries have electronics and communications books which you can borrow for backup reference. All you really need is a license manual and a reference manual of your own. My personal recommendation to someone teaching himself is to get an up-to-date ARRL License Manual and a dictionary of electronic terms, which provides simple but thorough explanations of all common electronic terms.

Classes. The best way to obtain the theory knowledge needed to pass a General exam is to attend a local licensing course. Most of these courses are advertised, and they are known to local amateurs and electronics distributors. These courses help the prospective amateur,

and they can also help a sponsoring club because many of the resultant new amateurs may join the club as active new members.

Examination Scope. Today's theory exams are more comprehensive than those used in the past. Long-licensed hams may have become expert due to commendable efforts, but they passed much simpler theory tests than you'll have to pass. Modern exams cover many facets of electronics which were not known (or used) just 10 to 20 years ago. Don't assume that every ham is technically able to help you, but don't be afraid to at least ask for help if you have a problem. Learn your material well and you won't care how the questions and answers are written in the FCC theory exams.

Upgrading. Passing FCC exams is not a matter of luck. It's a simple matter of having sufficient knowledge of required subjects. There's a great difference between the General and Advanced theory tests. However, since both have the same 13 WPM code test, you should apply for the Advanced license. If you pass the code test and the General theory exam, you'll get your General ticket, even if you should fail to pass the Advanced theory test. Some of our students move right up to the Advanced ticket from the Novice license. However, the General class license provides one with the use of 87% of all the high-frequency spectrum that is available to Extra class licensees. Upgrading to the Advanced class ticket increases this percentage to 95%.



Seventeen-year-old Stuart Hale, KB4PPT, of Bowling Green, Kentucky is an honor student and a member of the physics club at Warren Central High School. He shares a station with his father, Richard, WA4RZP. Their station includes Heath HW-100 and SB-101 equipment. Stuart operates the 40 meter Novice band. He has contacted other amateurs in nine states, plus one in the Bahamas (C6ACI). Two teachers at his high school are amateurs, and two students are preparing to become licensed amateurs. They expect to start an amateur radio club at their school. Stuart's brother is also preparing to pass the FCC licensing exam.

Printed Aids

This article includes several references to articles that have been printed in previous Novice columns. I hope you will obtain and read the referenced material. The August 1986 Novice column lists a wide variety of printed aids that are available. Past Novice columns contain a lot of information that is particularly helpful to new amateurs. The following alphabetical list provides an indication of the range of subjects which have been covered in previous Novice columns, and includes the month and year of the issue containing the indicated information.

Amateur Radio Station Call Signs, Apr.–May 1979
Emission Designations, Dec. 1983
FCC General/Technician Examinations, Feb. 1986
Getting on the Air, Feb. 1985
Getting Started, Mar. 1986
International Reply Coupons, Feb. 1986
Military Affiliate Radio System, Apr.–May 1986
Novice Band Code Nets, Dec. 1982
Novice Band QRP Net, Jan. 1982
Novice Licensing Data, July 1985 to Jan. 1986
Operating Etiquette, Dec. 1982
Operating Privileges, Oct. 1984
Operating Tips, Aug.–Nov. 1981
Phillips Code, Nov.–Dec. 1979
QRP QSL Cards, Jan. 1982
Q-Signals for Amateur Use, Feb. 1980
Shortwave Listening, May-Oct. 1982
SWL Club List, Apr. 1983
Temperature Conversion, Feb. 1984
Terms and Abbreviations, June 1984
UTC Conversion, Feb. 1984
Volunteer Examinations, Apr.–May 1985
What to Do When You Hear a Radio Call for Help, Nov. 1982
Zero Beat, Nov. 1984

My wife (Marie, W6JEP) and I continually update the set of printed aids we distribute to students in the licensing courses we instruct. Outdated material is discarded and new items are added. A list of typical printed aids will be sent to anyone who requests one and provides the usual SASE. This list gets out of date quickly as changes are made, but it does indicate the variety of available items. A complete set of current printed aids is available to anyone at $15, which includes shipping costs. Instructors are welcome to duplicate material for use in their courses. The idea is to help new amateurs be active operators. They need all the help they can get.

Summary

The information in this associated series of Novice columns is intended to help new amateurs set up original stations or to improve existing stations. Please bring this information to the attention of people you know who are just getting started as amateurs. Installation of a good station is a big step toward regular activity on the air, which leads to continued interest in amateur radio and license upgrade. I have helped many Novices set up their first stations, and this article is intended to help new amateurs avoid the most common mistakes. This material has been prepared to serve as a guideline, and each subject requires a lot of study to be fully understood. I hope your knowledge has been increased to where you will be a better student and a more active operator.

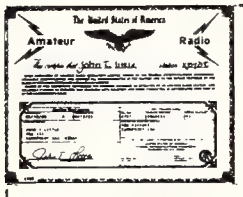
Photographs Wanted

Photographs of Novices in their shacks provide introductions to a few of the newer amateurs. Photograph size is unimportant, but good definition, contrast, and subject matter are important. Color pictures can be used, but black-and-white photographs are preferred. Operating activities and achievements, plus a self-introduction, are needed with each picture. Send SASE if a picture must be returned. A free one-year *CQ* subscription (or renewal) is awarded to the one amateur whose picture I select as the winner for the month. If you are a subscriber, please enclose the mailing label (or copy) from your latest *CQ* issue. One award is made each month, no matter how many photographs are printed. DX amateurs, who frequently work the American Novice bands, are also urged to submit photographs. I have not received a picture from a Novice in Hawaii or Vermont.

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CIRCLE 165 ON READER SERVICE CARD

Propagation

a monthly feature by
GEORGE JACOBS, W3ASK

THE SCIENCE OF PREDICTING RADIO CONDITIONS

New Cycle Climbing!

Flash!

Record-breaking intensive and widespread sporadic-E ionization occurred during early June. This resulted in numerous trans-Atlantic openings on the 10 and 6 meter bands. More complete information in a later column.

It looks almost certain now that a new sunspot cycle, Cycle 22, began during September 1986 with a smoothed sunspot count of 12.

The Royal Observatory in Belgium reports a monthly mean sunspot number of 31 for May 1987. Daily values ranged between a low of 10 on May 31st and a high of 62 on the 19th. This results in a smoothed sunspot number of 15 centered on November 1986. This is an increase of three units since the beginning of the new cycle. A smoothed sunspot number of approximately 30 is forecast for this month.

Although an unbroken string of sunspot records is available for the past 230 years, a more precise measure of solar activity was devised about 40 years ago. This is the measurement with very accurately calibrated radio receivers of radio frequency radiation emitted from the sun. While the source of these radio emissions, called *solar noise* or *solar flux*, and the physical process which produces them are not yet fully understood, they appear to be very closely related to sunspot activity. Fig. 1 shows the close linear relationship which exists between daily levels of solar flux (SF) and the daily sunspot count (R).

Solar flux measurements can be more accurately calibrated and standardized on a worldwide basis than can measurements made with solar telescopes. Measurements can be made daily and are unaffected by cloud coverage or adverse weather.

Solar flux measurements are presently made on a worldwide basis on selective frequencies between 245 and 15,400 MHz (not kHz!). The standard most used is the measurements made at 2695 MHz, or 10.7 cm, wavelength. These are usually referred to as 2800 MHz measurements.

The 2695 MHz solar flux level is measured simultaneously at several observatories throughout the world at precisely 1700 UTC daily. The values are coordinated internationally by the Algonquin Radio Observatory at Ottawa, Canada. The Algonquin Observatory reports a 10.7 cm solar flux median level of 87.8 for May 1987. This corresponds to the increase in sunspot count reported earlier.

11307 Clara Street, Silver Spring, MD 20902

LAST MINUTE FORECAST

Day-to-Day Conditions Expected for September 1987

	Expected Signal Quality			
Propagation Index.....	(4)	(3)	(2)	(1)
Above Normal: 5, 8, 23	A	A	B	C
High Normal: 3-4, 7, 9, 19, 26, 29-30	A	B	C	C-D
Low Normal: 1-2, 6, 10, 13-14, 17-18, 20-22, 25, 27-28	A-B	B-C	C-D	D-E
Below Normal: 11, 15, 24	B-C	C-D	D-E	E
Disturbed: 12, 16	C-E	D-E	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 or noise.

C—Fair opening, signals between moderately strong and weak, varying between S3 and S6, with some fading and noise.

D—Poor opening, with weak signals varying between S1 and S3, and with considerable fading and noise.

E—No opening expected.

HOW TO USE THIS FORECAST

1. Find *propagation index* associated with particular band opening from 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 band opening for any day of the month. For example, an opening shown in the charts with a *propagation index* of 3 will be good-to-fair (B-C) on September 1st and 2nd, good (B) on the 3rd and 4th, excellent (A) on the 5th, good-to-fair (B-C) on the 6th, etc.

September Propagation

During most of September and early October expect variable propagation conditions on the HF bands. On some days conditions should continue to be much the same as they were earlier in the summer, but on other days the first signs of wintertime conditions should be noticeable. 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 an increase in *10 meter* DX possibilities. While the sunspot cycle is still too low to expect worldwide openings on this band, look for some fairly good openings to the Caribbean and Central and South America, particularly during the afternoon hours. When conditions are High Normal or better, some openings may also be possible to the South Pacific and Africa.

A seasonal improvement is expected for DX conditions on *15 meters*, and with increased solar activity a greater number of DX openings should occur this year compared to the past several years. The best time for DX openings should be from a few hours before noon through the afternoon hours. Expect good openings towards the Caribbean and Central and South America, with openings often possible to Africa, the South Pacific, and Europe as well.

During September and early October *20 meters* should continue to be the best band for worldwide DX propagation. The band should open in almost all directions for a few hours after sunrise, and remain open to many areas of the world throughout most of the day and into the early evening, with peak conditions expected during the afternoon. At times signals will be noticeably stronger than they were during July and August, but the band will close an hour or two earlier because of the shorter period of daylight.

Look for an improvement in nighttime DX conditions on *40, 80*, and *160 meters*, which should result from the increasing hours of darkness and a seasonal decline in the static level. *Forty* should be best for worldwide DX from sunset through the sunrise period. Check *80* and *160* meters during the hours of darkness, and particularly for an hour or so before local sunrise.

CQ DX Contest Special

This year's *CQ* World-Wide DX Contest will be held on the following dates:

October 24–25: Phone Section
November 28–29: CW Section

As for the past 37 years, next month's Propagation column will be devoted to a special, comprehensive forecast which will focus on both sections of the contest. With rising solar activity, conditions during the 1987 contest could be better than they have been for the past several years.

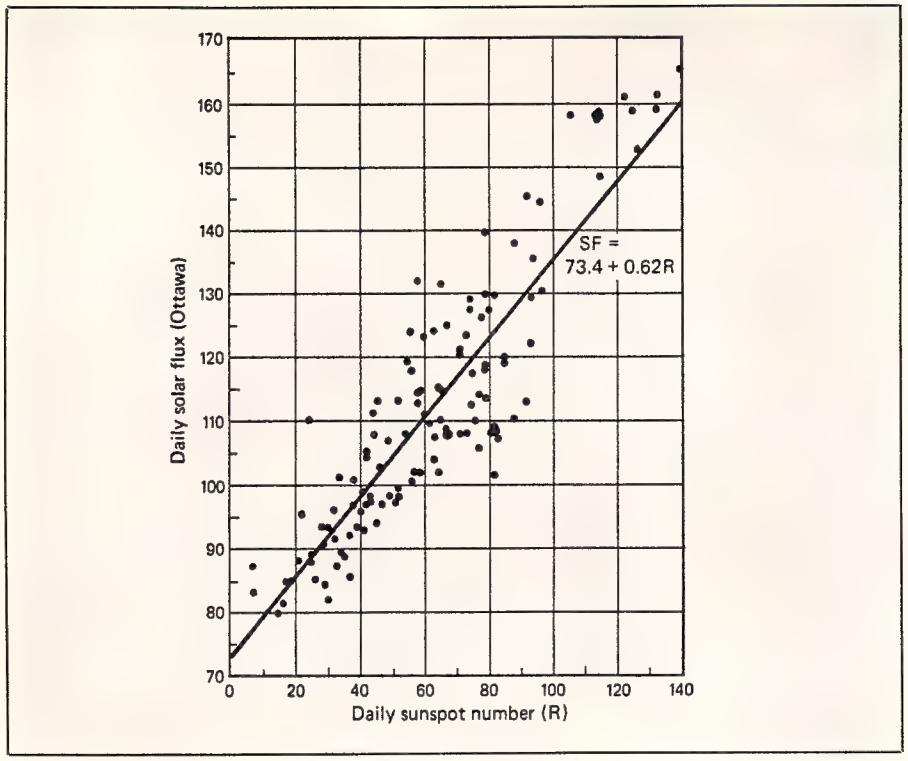


Fig. 1– Example of the linear relationship that exists between daily solar flux levels (SF) and daily sunspot numbers (R).

From mid-September through mid-October, for *short-skip* openings less than *250* miles, use *80* meters during the day and either *80* or *160* meters at night. For distances between *250* and *750* miles try *40* meters during the day and *80* at night. For openings between *750* and *1300* miles, best bet should be *20* meters during the day, *40* meters from sundown to midnight, and *80* meters from midnight to sunrise. For openings beyond *1300* miles, *20* meters should be most reliable during most of the daylight period, with *40* meters optimum during the hours of darkness. Check *15* meters for some good openings beyond *1300* miles during the afternoon hours.

Equinoctial Propagation

It's that time of year again when the sun is almost directly overhead at the equator. This happens twice a year, in the spring and fall, and is called an equinox.

The fall equinoctial period marks the time that the sun crosses the equator on its apparent travel into southern skies.

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 (10 through 40 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 80 meter openings.

2. The *propagation index* is the number that appears in ( ) after the time of each predicted opening. On the Short-Skip Chart, where two numerals are shown within a single set of parenthesis, 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) " " " between 14 and 22 days
(2) " " " between 7 and 13 days
(1) " " " 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 A.M.; 13 is 1 P.M., 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 N.Y. 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 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 P.M. in Los Angeles; 18 or 6 P.M. 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 P.M. in N.Y.C.

4. The Short-Skip Chart is based upon a transmitted power of 75 watts c.w. or 300 watts p.e.p. on sideband; the Alaska and Hawaii Charts are based upon a transmitter power of 250 watts c.w. or 1 kw p.e.p. 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 10db 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 1987
Local Daylight Savings Time
At Path Mid-Point

Meter Band	Distance Between Stations (Miles) 50-250	250-750	750-1300	1300-2300
10	Nil	10-21 (0-1)	08-10 (1) 10-15 (1-2) 15-22 (1)	08-10 (1-0) 10-14 (2-0) 14-18 (1) 18-22 1-0)
15	Nil	08-10 (0-1) 10-14 (0-2) 14-22 (0-1)	08-10 (1) 10-14 (2) 14-17 (1-3) 17-18 (1-2) 18-22 (1) 22-00 (0-1)	08-10 (1) 10-14 (2) 14-17 (3) 17-18 (2-1) 18-20 (1) 20-00 (1-0)
20	12-20 (0-1)	08-10 (0-1) 10-12 (0-2) 12-15 (1-4) 15-17 (1-3) 17-20 (1-2) 20-07 (0-1)	08-10 (1-2) 10-12 (2-4) 12-15 (4) 15-17 (3-4) 17-19 (2-4) 19-20 (2-3) 20-21 (1-3) 21-23 (1-2) 23-08 (1)	08-09 (2-1) 09-10 (2) 10-14 (4-2) 14-16 (4-3) 16-19 (4) 19-21 (3) 21-23 (2) 23-01 (1) 01-06 (1-0) 06-08 (1)
40	08-10 (0-2) 10-12 (2-4) 12-16 (3-4) 16-18 (2-3) 18-20 (1-2) 20-22 (0-1)	08-10 (2-3) 10-12 (4-3) 12-16 (4-2) 16-18 (3) 18-20 (2-4) 20-22 (1-4) 22-00 (0-3) 00-03 (0-2) 03-06 (0-1) 06-08 (0-2)	08-10 (3-2) 10-12 (3-1) 12-16 (2-1) 16-18 (3-2) 18-20 (4-3) 20-22 (4) 22-00 (3-4) 00-03 (2-3) 03-06 (1-2) 06-08 (2-4)	08-10 (2-1) 10-16 (1-0) 16-18 (2-1) 18-20 (3-2) 20-21 (4-3) 21-00 (4) 00-03 (3-4) 03-06 (2-3) 06-08 (4-2)
80	07-09 (3-4) 09-12 (4) 12-19 (4-3) 19-22 (4) 22-04 (3-4) 04-07 (2-3)	07-09 (4-2) 09-12 (4-1) 12-17 (3-1) 17-19 (3-2) 19-21 (4-3) 21-04 (4) 04-06 (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 (4-2) 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 (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)	21-23 (1-0) 23-03 (3-2) 03-06 (1) 06-08 (1-0)

ALASKA
September & October 1987
Openings Given in GMT

Reception Area	10 Meters	15 Meters	20 Meters	40/80* Meters
Eastern States	Nil	21-23 (1)	12-14 (1) 18-21 (1) 21-00 (2) 00-02 (1)	08-12 (1)
Central States	Nil	21-01 (1)	13-15 (1) 19-22 (1) 22-01 (2) 01-03 (1)	08-13 (1)
Western States	Nil	20-21 (1) 21-23 (2) 23-01 (1)	17-18 (1) 18-22 (2) 22-01 (3) 01-03 (2) 03-05 (1)	08-11 (1) 11-14 (2) 14-16 (1) 11-14 (1)*

#See explanation in "How To Use Short-Skip Charts" in box at the beginning of this column.
Note: The Alaska and Hawaii Propagation Charts are intended for distances *greater* than 1300 miles. For shorter distances, use the preceding Short-Skip Propagation Chart.
*Indicates best time to liste for 80 Meter openings. Openings on 160 Meters are also likely to occur during those times when 80 Meter openings are shown with a forecast rating of (2), or higher.

HAWAII
September & October 1987
Openings Given In
Hawaiian Standard Time

Reception Area	10 Meters	15 Meters	20 Meters	40/80* Meters
Eastern States	Nil	07-12 (1) 12-15 (2) 15-16 (1)	11-13 (1) 13-14 (2) 14-16 (3) 16-17 (2) 17-19 (1) 03-05 (1) 05-07 (2) 07-08 (1)	17-19 (1) 19-21 (2) 21-00 (3) 00-02 (2) 02-03 (1) 19-20 (1)* 20-23 (2)* 23-01 (1)*

Central States	09-13 (1)	07-11 (1) 11-12 (2) 12-14 (3) 14-15 (2) 15-17 (1)	05-06 (1) 06-09 (2) 09-13 (1) 13-15 (2) 15-17 (4) 17-18 (2) 18-20 (1)	17-19 (1) 19-21 (2) 21-02 (3) 02-04 (2) 04-05 (1) 19-20 (1)* 20-00 (2)* 00-02 (1)*
Western States	10-15 (1)	07-10 (1) 10-12 (2) 12-15 (3) 15-16 (2) 16-18 (1)	06-07 (1) 07-10 (3) 10-12 (2) 12-14 (3) 14-16 (4) 16-18 (3) 18-19 (2) 19-21 (1)	17-18 (1) 18-19 (2) 19-01 (4) 01-03 (3) 03-06 (2) 06-07 (1) 19-20 (1)* 20-22 (2)* 22-03 (3)* 03-04 (2)* 04-06 (1)*

September 15 - October 15, 1987
Time Zone: EDT (24-Hour Time System)
EASTERN USA TO:

Reception Area	*10 Meters*	*15 Meters*	*20 Meters*	*40/80* Meters*
Western & Central Europe & North Africa	Nil	10-11 (1) 11-15 (2) 15-16 (1)	07-08 (1) 08-10 (3) 10-12 (2) 12-14 (3) 14-16 (4) 16-17 (3) 17-18 (2) 18-19 (1)	18-19 (1) 19-21 (2) 21-23 (3) 23-02 (4) 02-03 (3) 03-04 (2) 04-05 (1) 20-22 (1)* 22-01 (2)* 01-04 (1)*
Northern Europe & European USSR	Nil	10-13 (1)	07-08 (1) 08-10 (3) 10-12 (2) 12-14 (1) 14-16 (2) 16-18 (1)	18-20 (1) 20-04 (2) 04-05 (1) 21-04 (1)*
Eastern Mediterranean & Middle East	Nil	10-11 (1) 11-13 (2) 13-15 (1)	07-08 (1) 08-09 (2) 09-14 (1) 14-16 (2) 16-17 (3) 17-18 (2) 18-19 (1) 22-00 (1)	19-21 (1) 21-00 (2) 00-01 (1) 22-00 (1)*
Western Africa	14-16 (1)	09-11 (1) 11-13 (2) 13-16)3) 16-17 (2) 17-18 (1)	08-10 (1) 13-15)1) 15-16 (2) 16-17 (3) 17-18 (4) 18-20 (3) 20-21 (2) 21-23 (1)	20-23 (1) 23-02 (2) 02-04 (1) 01-03 (1)*
Eastern & Central Africa	Nil	11-13 (1) 13-15 (2) 15-16 (1)	13-15 (1) 15-17 (2) 17-18 (3) 18-19 (2) 19-21 (1)	21-02 (1)
Southern Africa	11-14 (1)	09-11 (1) 11-13 (2) 13-15 (3) 15-16 (2) 16-17 (1)	08-10 (1) 13-15 (1) 15-18 (2) 18-19 (3) 19-20 (2) 20-21 (1) 23-01 (1)	19-22 (1) 22-00 (2) 00-02 (1) 23-01 (1)*
Central & South Asia	Nil	09-11 (1) 18-20 (1)	07-08 (1) 08-10 (2) 10-12 (1) 19-22 (1)	05-07 (1) 20-23 (1)
Southeast Asia	Nil	10-12 (1) 14-16 (1) 18-20 (1)	07-08 (1) 08-10 (2) 10-12 (1) 16-18 (1) 20-22 (1)	06-08 (1)
Far East	Nil	09-11 (1) 18-20 (1)	08-09 (1) 09-10 (2) 10-12 (1) 17-19 (1) 19-21 (2) 21-23 (1)	06-08 (1)
South Pacific & New Zealand	15-18 (1)	11-15 (1) 15-17 (2) 17-18 (3) 18-19 (2) 19-20 (1)	07-08 (1) 08-11 (2) 11-14 (1) 16-20 (1) 20-00 (2) 00-04 (1)	01-02 (1) 02-03 (2) 03-06 (3) 06-09 (2) 03-04 (1)* 04-06 (2)* 06-07 (1)*
Australasia	17-19 (1)	14-17 (1) 17-19 (2) 19-20 (1)	07-08 (1) 08-10 (2) 10-12 (1) 14-16 (1) 16-18 (2) 18-21 (1) 21-00 (2) 00-02 (1)	02-04 (1) 04-06 (2) 06-07 (3) 07-08 (2) 08-09 (1) 04-05 (1)* 05-06 (2)* 06-07 (1)*

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 (15 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 Propagation column for the actual *dates* on which an opening with specific propagation index is likely to occur, and the signal quality that can be expected.

4. Time 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 transmitter power of 250 watts c.w., or 1 kw, p.e.p. on sideband, into a dipole antenna a quarter-wavelength above ground on 160 and 80 meters, and 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.

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.

Caribbean, Central America & Northern Countries of South America	11-14 (1) 14-17 (2) 17-18 (1)	09-10 (1) 10-13 (2) 13-15 (3) 15-16 (4) 16-17 (3) 17-18 (2) 18-19 (1)	07-08 (1) 08-09 (3) 09-10 (4) 10-15 (2) 15-17 (3) 17-19 (4) 19-21 (3) 21-22 (2) 22-00 (1)	19-20 (1) 20-21 (2) 21-04 (4) 04-06 (3) 06-07 (2) 07-08 (1) 21-23 (1)* 23-04 (2)* 04-06 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina and Uruguay	14-15 (1) 15-17 (2) 17-18 (1)	09-10 (1) 10-11 (2) 11-14 (1) 14-16 (2) 16-18 (3) 18-19 (1)	07-08 (1) 08-10 (2) 10-11 (1) 14-16 (1) 16-18 (2) 18-19 (3) 19-20 (4) 20-21 (3) 21-23 (2) 23-00 (1)	21-00 (1) 00-05 (2) 05-07 (1) 01-06 (1)*
McMurdo Sound, Antarctica	Nil	16-18 (1)	18-20 (1) 20-23 (2) 23-01 (1) 08-09 (1)	00-03 (1) 03-05 (2) 05-07 (1) 04-06 (1)*

Time Zones: CDT and MDT
(24-Hour Time System)
CENTRAL USA TO:

Reception Area	*10 Meters*	*15 Meters*	*20 Meters*	*40/80* Meters*
Western & Central Europe & North Africa	Nil	10-14 (1)	07-08 (1) 08-10 (2) 10-13 (1) 13-14 (2) 14-16 (3) 16-17 (2) 17-18 (1)	18-20 (1) 20-23 (2) 23-01 (3) 01-02 (2) 02-03 (1) 21-23 (1)* 23-01 (2)* 01-02 (1)*
Northern Europe & European USSR	Nil	10-13 (1)	07-08 (1) 08-10 (2) 10-12 (1) 12-15 (2) 15-17 (1) 21-23 (1)	20-23 (1) 23-01 (2) 01-02 (1) 22-01 (1)*
Eastern Mediterranean & Middle East	Nil	10-13 (1)	07-08 (1) 08-09 (2) 09-15 (1) 15-17 (2) 17-18 (1) 21-23 (1)	20-23 (1) 21-23 (1)*
Western Africa	12-14 (1)	09-11 (1) 11-13 (2) 13-15 (3) 15-16 (2) 16-17 (1)	07-09 (1) 13-15 (1) 15-16 (2) 16-19 (3) 19-20 (2) 20-22 (1)	20-23 (1) 23-01 (2) 01-02 (1) 23-01 (1)*

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Eastern & Central Africa	Nil	12-16 (1)	07-09 (1) 13-16 (1) 16-19 (2) 19-20 (1)	21-00 (1)
Southern Africa	11-13 (1)	09-10 (1) 10-12 (2) 12-14 (3) 14-15 (2) 15-16 (1)	07-09 (1) 12-14 (1) 14-16 (2) 16-18 (3) 18-19 (2) 19-20 (1) 22-00 (1)	20-21 (1) 21-23 (2) 23-01 (1) 21-23 (1)*
Central & South Asia	Nil	18-21 (1)	07-08 (1) 08-10 (2) 10-12 (1) 18-21 (1)	06-08 (1) 19-21 (1)
Southeast Asia	Nil	17-19 (1)	07-08 (1) 08-10 (2) 10-13 (1) 18-22 (1)	05-08 (1)
Far East	Nil	15-17 (1) 17-19 (2) 19-20 (1)	07-08 (1) 08-10 (3) 10-11 (2) 11-13 (1) 17-19 (1) 19-22 (2) 22-00 (1)	03-05 (1) 05-07 (2) 07-09 (1) 06-08 (1)*
South Pacific & New Zealand	14-18 (1)	10-13 (1) 13-16 (2) 16-18 (3) 18-19 (2) 19-20 (1)	06-08 (1) 08-10 (3) 10-12 (2) 12-18 (1) 18-20 (2) 20-22 (3) 22-00 (2) 00-02 (1)	00-01 (1) 01-07 (3) 07-08 (2) 08-09 (1) 02-04 (1)* 04-07 (2)* 07-08 (1)*
Australasia	16-18 (1)	13-16 (1) 16-19 (2) 19-21 (1)	05-07 (1) 07-08 (2) 08-10 (3) 10-13 (2) 13-17 (1) 17-18 (2) 18-20 (1) 20-23 (2) 23-01 (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	11-13 (1) 13-16 (2) 16-18 (1)	09-10 (1) 10-11 (2) 11-13 (3) 13-16 (4) 16-17 (3) 17-18 (2) 18-19 (1)	06-07 (1) 07-08 (3) 08-10 (4) 10-12 (3) 12-15 (2) 15-17 (3) 17-19 (4) 19-21 (3) 21-22 (2) 22-00 (1)	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)*

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Peru, Bolivia, Paraguay, Brazil, Chile, Argentina, & Uruguay	14-15 (1) 15-17 (2) 17-18 (1)	09-10 (1) 10-11 (2) 11-13 (1) 13-15 (2) 15-17 (3) 17-18 (2) 18-19 (1)	07-08 (1) 08-09 (2) 09-11 (1) 13-16 (1) 16-18 (2) 18-19 (3) 19-20 (4) 20-22 (3) 22-23 (2) 23-00 (1)	21-00 (1) 00-04 (2) 04-06 (1) 01-05 (1)*
McMurdo Sound, Antarctica	Nil	16-18 (1)	17-20 (1) 20-23 (2) 23-01 (1) 08-10 (1)	00-03 (1) 03-05 (2) 05-07 (1) 04-06 (1)*

Time Zone: PDT (24-Hour Time System)
WESTERN USA TO:

Reception Area	*10 Meters*	*15 Meters*	*20 Meters*	*40/80* Meters*
Western Europe & North Africa	Nil	10-12 (1)	07-08 (1) 08-10 (2) 10-13 (1) 13-15 (2) 15-16 (1) 22-00 (1)	20-21 (1) 21-23 (2) 23-00 (1) 21-23 (1)*
Central & Northern Europe & European USSR	Nil	10-12 (1)	08-09 (1) 09-10 (2) 10-12 (1) 12-14 (2) 14-16 (1) 22-00 (1)	20-00 (1)
Eastern Mediterranean & Middle East	Nil	10-12 (1)	08-12 (1) 12-14 (2) 14-16 (1) 20-22 (1)	20-23 (1)
Western & Central Africa	12-14 (1)	10-13 (1) 13-15 (2) 15-16 (1)	07-08 (1) 08-09 (2) 09-14 (1) 14-15 (2) 15-17 (3) 17-18 (2) 18-19 (1)	21-00 (1)
Eastern Africa	Nil	13-15 (1)	07-09 (1) 13-15 (1) 15-17 (2) 17-19 (1) 21-23 (1)	20-22 (1)
Southern Africa	Nil	11-15 (1)	07-09 (1) 12-14 (1) 14-18 (2) 18-19 (1) 22-00 (1)	19-22 (1)
Central & South Asia	Nil	17-19 (1)	08-09 (1) 09-11 (2) 11-13 (1) 17-19 (1) 19-21 (2) 21-22 (1)	06-08 (1) 19-21 (1)
Southeast Asia	Nil	16-19 (1)	07-08 (1) 08-10 (3) 10-11 (2) 11-12 (1) 21-22 (1) 22-00 (2) 00-01 (1)	01-03 (1) 03-06 (2) 06-08 (1) 03-06 (1)*
Far East	Nil	14-16 (1) 16-19 (2) 19-20 (1)	07-08 (1) 08-10 (3) 10-13 (2) 13-20 (1) 20-21 (2) 21-22 (3) 22-23 (2) 23-01 (1)	01-03 (1) 03-08 (2) 08-09 (1) 03-07 (1)*
South Pacific & New Zealand	13-15 (1) 15-17 (2) 17-18 (1)	11-15 (1) 15-17 (2) 17-19 (3) 19-20 (2) 20-21 (1)	14-18 (2) 18-20 (3) 20-22 (4) 22-23 (3) 23-01 (2) 01-07 (1) 07-08 (2) 08-10 (3) 10-11 (2) 11-14 (1)	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	15-17 (1)	13-16 (1) 16-17 (2) 17-19 (3) 19-20 (2) 20-21 (1)	17-19 (1) 19-20 (2) 20-00 (3) 00-03 (2) 03-07 (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	11-13 (1) 13-15 (2) 15-17 (1)	08-09 (1) 09-12 (2) 12-14 (3) 14-15 (4) 15-16 (3) 16-17 (2) 17-18 (1)	07-08 (1) 08-09 (2) 09-10 (3) 10-15 (2) 15-17 (3) 17-19 (4) 19-21 (3) 21-23 (2) 23-00 (1)	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	13-14 (1) 14-16 (2) 16-17 (1)	09-10 (1) 10-11 (2) 11-13 (1) 13-15 (2) 15-17 (3) 17-18 (2) 18-19 (1)	08-10 (1) 13-15 (1) 15-17 (2) 17-20 (4) 20-21 (3) 21-22 (2) 22-00 (1)	21-23 (1) 23-02 (2) 02-04 (1) 00-03 (1)*
McMurdo Sound, Antarctica	Nil	16-19 (1)	07-10 (1) 17-19 (1) 19-20 (2) 20-22 (3) 22-00 (2) 00-01 (1)	01-03 (1) 03-05 (2) 05-07 (1) 03-06 (1)*

During this period the hours of daylight and darkness are just about equal in length throughout the world. Sunrise should take place at approximately 6 a.m. local time (7 a.m. daylight) and sunset at about 6 p.m. local time (7 p.m. daylight), no matter where you are in the world.

This results in an ionosphere of almost similar characteristics over large areas of the world, and is usually the best time of year for long DX openings between the temperate regions of the northern and southern hemispheres, on all HF bands. Expect considerably more frequent openings from mid-September through mid-October between the USA and South America, the South Pacific, South Asia, and southern Africa, particularly on *20* meters for a few hours after sunrise and again during the sunset period.

Long-path openings also improve considerably during the equinoctial period. In western states look for long-path openings to Europe and Africa on *20* meters shortly after sunrise and again during the early evening. Stations in eastern states can expect some long-path openings to the South Pacific during the late afternoon and early evening, and to parts of eastern Africa and Asia just after sunrise. Long-path openings should also be possible on *40* meters, and at times on *80* meters, for an hour or so *before* sunrise, and just *before* sunset.

VHF Ionospheric Openings

Although summertime sporadic-E ionization is expected to fall off considerably during September and early October, an occasional *6* meter short-skip opening may still be possible over distances ranging between approximately *1000* and *1300 miles*. Best time to check is before noon and during the early evening.

There is usually an *increase* in auroral activity during an equinoctial period, so look for some fairly frequent *6* and *2* meter auroral-type openings. The best times for such openings are when conditions on the HF bands are Below Normal or Disturbed. Check the Last Minute Forecast at the beginning of this column for those days likely to be in these categories during September.

No major meteor showers are expected during September, so few, if any, meteor-scatter-type openings are likely on the VHF bands this month.

73, George, W3ASK

a monthly feature by
STEVE KATZ, WB2WIK

PRINCIPLES, PRACTICES, AND PROJECTS FOR THE VHFER

June 1987—What a Month!

This was written towards the end of June, as all kinds of reports about record-breaking E-skip contacts were trickling in. Surely the weekend of the June VHF QSO Party gave many new opportunities to work exotic DX on the VHF bands. Solar conditions which prompted widespread thunderstorms also seemingly allowed for E-skip over distances, and on frequencies, previously uncovered.

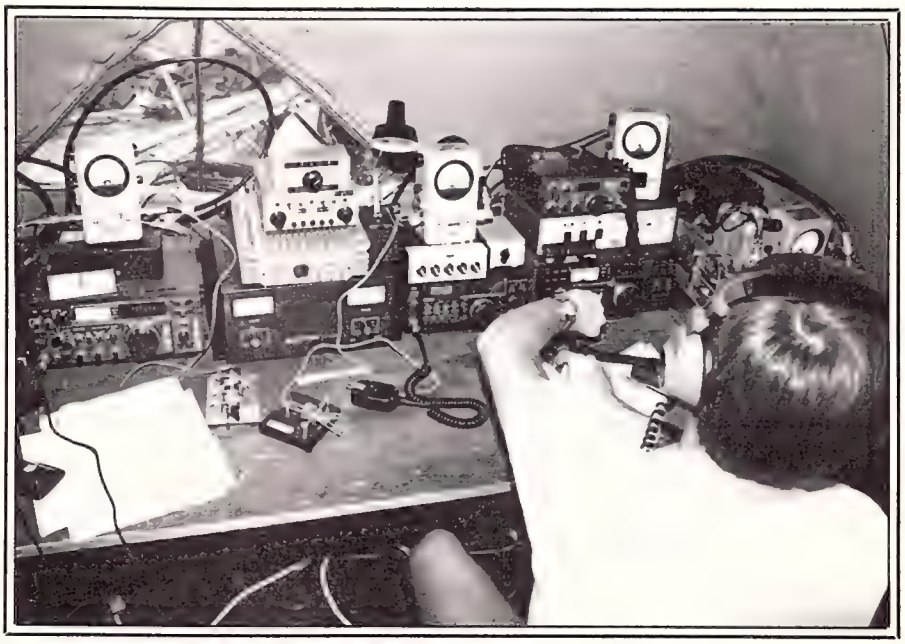
Unconfirmed reports of the first-ever E-skip QSO made on the 220 MHz amateur band, between stations in Florida and Texas, have arrived via various channels. I don't doubt the reports. Conditions over the weekend of June 13–14 were pretty crazy. I've also received unconfirmed reports of stations in the midwest working over 100 grids on 144 MHz during the contest period. By the time this is printed, these reports will be either confirmed or dismissed. Bill Tynan's VHF column in *QST* should have more details as logs for the VHF QSO Party roll in to League headquarters.

Personally, a few friends and I set up a rather small-scale multi-op station in rare grid FM27 (the eastern shore of VA) for the June contest. When we weren't running for shelter from very nearby lightning (and rain and wind) storms or being eaten alive by sand flies, we had a good time operating six bands 50–1296 MHz from a wildlife refuge on Chincoteague Island. Using modest power and antennas—200 watts PEP maximum on any band, lower power on most, to smallish Yagis all mounted on a single mast and rotor supported by a trailer-mounted 51 foot crankup tower—we did incredibly well, making 846 QSOs in 313 grids for a total score of 330,215 points.

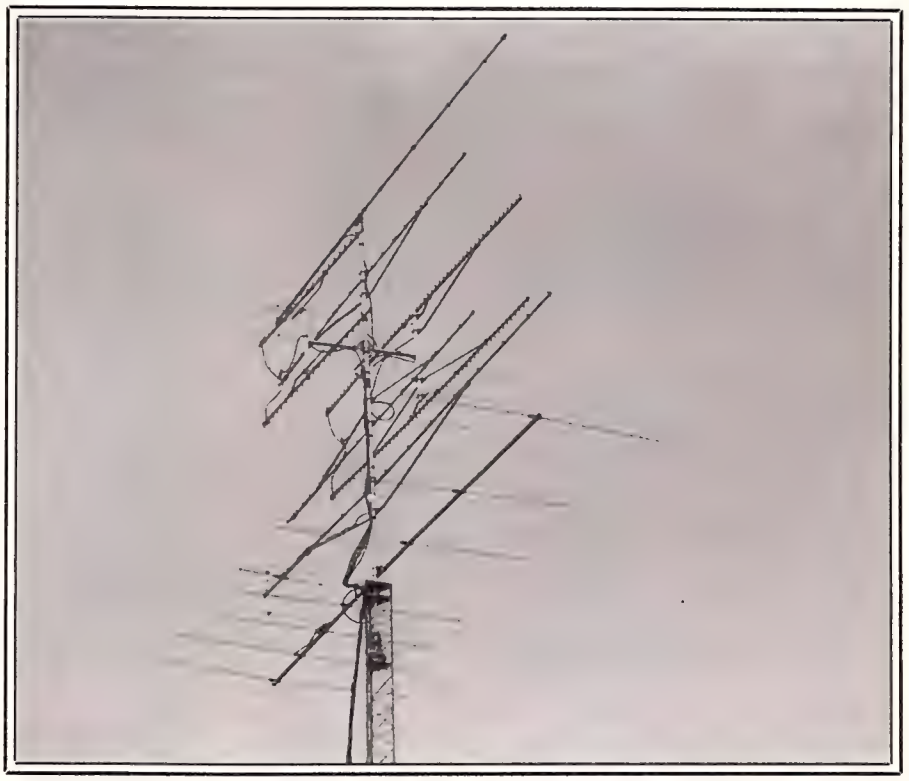
This is not a record-breaking score (although I'm certain it's the best anyone has ever done from FM27!), but we had a marvelous time despite having operated only 25 hours out of the 33-hour contest period, due to the terrible local weather Saturday evening. Our operation was severely handicapped by the use of a single rotator to control all antennas. Six meters was open 90% of the time, making our chief 6 meter operator, WB2OTK, very reluctant to yield the rotor control to anyone else. "Oh, man, I've got this big pileup going. How could you turn the antennas?" was an oft-heard cry from the operating tent at WB2WIK/4.

Six meters was in such good shape that even when we QRPed down to 10 watts output for an hour or so to repair an antenna relay on the 200 watt amplifier, we maintained pileups and continued working stations on the west coast. And while the band was producing meter-pinning signals from the west coast, signals of similar strength continued to arrive from the south, the midwest, and the Carribbean. I've been on 6 meters for 20 years and have never heard anything quite like it.

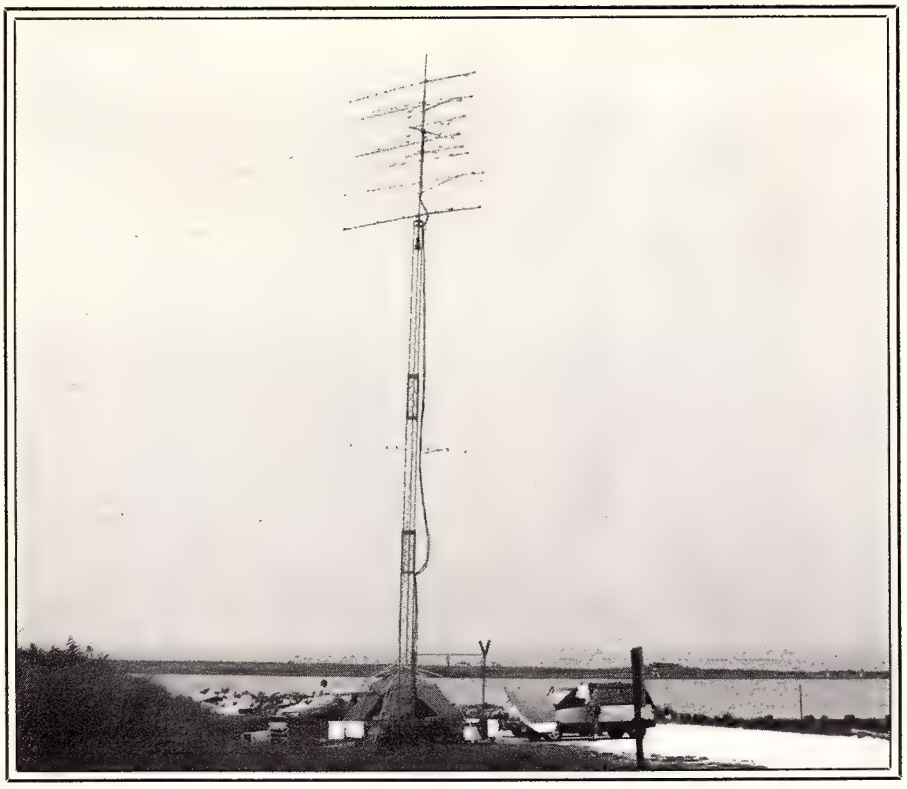
153 Rodman Court, Eatontown, NJ 07724



A bit of the UHF station (135, 70, 33, 23 cm) at WB2WIK/4, Chincoteague Island, VA. Here Pete, KT2B, snags a new one on 1296 MHz. Other operators included KC2PX and WB2OTK.



A close-up shot of the 239 elements for 6 bands assembled on the single 51 foot crank-up tower at WB2WIK/4. The uppermost antenna, a 17-element "Boomer" for 220, is at 70 feet above ground. It was unwise to mount all antennas on a single tower and rotor, as the text points out.



Here is a distant shot of the WB2WIK/4 operation at Chincoteague Island. We used three tents (operating, computer logging/duping plus sleeping, and sleeping) plus the tower trailer and set up at a secluded spot surrounded by water. About 5 miles across a channel we could see the large dish antennas at the NASA Wallops Island facility.

The *piece de resistance* was hearing KH6IAA coming through with a good, workable signal about one minute before the contest's official end. He was working stations in the midwest and by the time we could get through, the contest was over; we never did get the new grid in the log. Nuts! Propagation from W4 to KH6 was probably triple- or quadruple-hop E-skip. Students of meteorology will likely debate for years over what kind of unique conditions created this unusual situation. I'd worked KH6 on 6 meters before (lots of times, actually), but always via F2 during solar cycle peaks. This long-haul E-skip is pretty rare, especially in consideration of its widespread nature. Everybody seemed to be cashing in on the good conditions.

Despite our handicaps as described above, we managed to work 387 stations on the bands above 6 meters, including 28 stations in 13 grids on 23 cm. Because of our unique location just off Virginia's eastern shore and the very low population density of that area, our average contact was about 200 miles distant on any band. On both 903 and 1296 MHz we completed contacts stretching 400 miles into central New England under what seemed to be totally "flat" band conditions with no unusual tropospheric propagation. Considering our elevation above sea level (zero) limited our optical horizon to just several miles, this isn't bad. While activity isn't great on 903 MHz yet, about every station worked was in a new grid and thus became a multiplier.

Here in the northeast the typical front-runner multi-operator stations (W2SZ/1, K3YTL, W1TKZ, W3CCX/8, et al) were all present with good signals, and I understand they all did extremely well. But the stations farther to the south, including Florida, may have done better, at least on 50 and 144 MHz. After all, we worked 204 grids on 50 MHz from FM27 using what I'd call very modest equipment (200 watts to a 7-element beam at 51 feet). It will be interesting to see what kinds of records are broken by the top contenders in the June contest. If you heard or worked something unusual, even if you didn't enter the contest, please write to let me know.

In last month's column I mentioned that we intended to use ICOM's new "75 series" multimode transceivers for the June contest. We did use two of these feature-packed little rigs, the IC-275A on 144 and the IC-475A on 432 MHz (driving solid-state amplifiers on each band) and had very good results. Unfortunately, the IC-375A (220 MHz) and IC-575A (28/50 MHz) did not arrive from ICOM in time to make the trip to VA with us, so I can't report anything about these new radios. We used Microwave Modules transverters on 50 and 220 MHz and had outstanding results with them. The new MMT50/28, with an ARR GaAsFET preamp (P50VDG) installed, played wonderfully and never overloaded, even on the strongest signals. This transverter, with an IC-740 IF section, was a winning combination for 6 meters.

Speaking of unusual results, Tom Black, KJ4QJ, wrote to say he worked 25 grids on 2 meters during the contest weekend and the following few days while operating *mobile* with a Kenwood TR751A and Mirage B3016 amplifier feeding an Austin Omni antenna. Tom reports he worked a station in Dallas while he was driving along I-40 in Oklahoma City and enjoyed S9 signals over this 250 mile path. Great, Tom! I hope you gave out some rare grids as you were motoring along.

Amplifier Info

My construction article in the June issue, "An Easy-to-Build 8877 Legal-Limit Amplifier for Six Meters," brought in a lot of interesting mail. Most folks just wanted advice on where to get parts or whatever, but a very good letter was received from Bill Orr, W6SAI, of Eimac/Varian, who had some useful suggestions.

First, Orr scolded me for using a fuse in the B – line as shown in fig. 2. This could create a lot of flames and smoke, he said, if the fuse were to open and HV remain turned on. With the circuit as shown in fig. 2, I'd agree, but the circuit contains an error regarding the placement of the fuse. The 1.5 amp fuse in the HV return should actually be located *before* the grid meter, closer to the B – return jack. This way, if the fuse were to open, the tube would still have a ground return through the 100 mA grid meter.

W6SAI also recommends installing a 20 ohm, 50 watt resistor in the B + line between the plate choke RFC1 and the HV connector on the RF deck. This resistor could limit surge current during an ion arc in the 8877, protecting the tube and the grid and plate current meters. Although I didn't use such a resistor (and never have in any of my amplifiers), I agree it is a good idea and will add one at my first convenience. If you're building this amplifier, please take heed.

Bill's other comment related to my recommendation that the amplifier be run at 6 kV plate potential. This exceeds the ratings for the 8877 and could be hazardous, according to W6SAI and the manufacturer, Eimac. Well, I didn't really recommend running the tube at 6 kV. In fact, I warn against such use in the third paragraph of my article. We've been using the tube at 3 kV and it will run legal-limit output power at this level, although 4 kV is probably a more ideal plate voltage. Anyone who wishes to operate tubes beyond their ratings does so at his own risk, of course, and such operation may void the manufacturer's warranty. I don't recommend operation of the 8877 at 6 kV, even though my tests indicate the tube performs well at this potential.

One detail that nobody seemed to catch was a mistake that cropped up while the staff at *CQ* was redrawing my fig. 2 schematic diagram. Diode D9, shown as a rectifier wired in series with D7 and D8 in fig. 2, is actually a zener diode which should be reverse-polarized to D7 and D8. That is, the cathode of D9 should be connected to the cathode (not the anode) of D8, while the anode of D9 should be connected to one end of the 10K resistor. If one were to wire the amplifier as shown in fig. 2, it would draw excessive plate current immediately with the application of B + and a PTT signal, for improper bias would be applied to the tube. Please make this correction if you intend to build the amplifier.

In addition, there should be a 500 pF, 20 kV "doorknob" capacitor across the B + line, inside the RF deck, right at the HV connector (B + to chassis ground). This was indicated on my original schematic, but somehow was deleted in the final printing. The amplifier may work without this HV bypass, but stability may suffer.

Gene Sykes, W4OO, of West Palm Beach, FL wrote to ask about using a 4-1000A, powered by his Drake L4-B high voltage supply, on 6 meters. I don't recommend this for a few reasons. One, the 4-1000A is not terribly happy

with only 2.7 kV plate voltage. It is difficult to maintain a safe screen current level with such low plate potential on this tube. Two, the L4-B doesn't have the proper screen and grid bias voltages for a 4-1000A, creating the need to homebrew some of the power supply anyway. Three, the L4-B uses a voltage-doubling plate supply which cannot provide sufficient current for a 4-1000A running at the legal limit. As such, it would be not only possible but quite likely that the plate supply would fail after even casual operation powering a 4-1000A. I'd recommend anyone wishing to use a 4-1000A on 6 consult my construction article in the July 1985 issue of *73* magazine.

W4OO did have some interesting information regarding his 6 meter operations. Using a Swan 250 barefoot, Gene has been working into Europe from his Florida QTH. On June 7 he worked EI6AS followed by VP9GE, and just missed CT4KQ, who did complete with K1JRW. There are ever-increasing opportunities to work western Europe on 6 meters, especially with the recent rules changes in the U.K. allowing both Class A and B licensees 6 meter privileges.

AP2AP from Karachi, Pakistan also wrote a nice letter in response to the 6 meter amplifier article. This fellow, whose name I couldn't quite decipher (handwritten), was interested in modifying the 8877 design to cover 12 meter (?) CB. I'm not very aware of international rules regarding this stuff, but if 1500 watts is a legal power level for CB operation in Pakistan, I suppose such a modification wouldn't be out of the question. Both the input and output circuits would require a total redesign to cover a different band, and I don't have time to bench-test such a modification, so I'd have to go with calculated values for the components. So, friend, if you can write again to tell me exactly what operating frequency you intend to use, I can probably accommodate your request with at least a calculated set of values which ought to work. But frankly, there are so many American manufacturers of legal-limit amplifiers which tune the HF spectrum and are reasonably priced that I cannot imagine why anyone would undertake such a major project from scratch. Henry Radio, for one, will make an 8877 or 3CX1200A7 (another good tube) amplifier for any HF band on special order, and their prices are better than reasonable.

Letters

Stan Rutherford, W0EUG, wrote to tell of his recent acquisition: a slightly used IC-551D for 50 MHz. He was in the process of installing a 5-element beam for 6, and should be active by this printing. Stan liked the 8877 amplifier article in the June issue, but says 350 to 500 watts PEP might be a more realistic goal. Stan, good deals can be had on at least two different commercially manufactured amps in this power range. The old Gonset 913A or more recent Dentron Clipperton V each use a single 4CX250 type tube and are capable of 300 watts output power with about 5 watts drive on 6 meters. The Gonset is a bit better built, so although any surplus units available will be 20 years old, they are likely to work. Either amplifier should be available for about $250. Don't worry about having too much drive power from the IC-55ID. There are ways to reduce the transmitter output power easily and efficiently. Of course, 300 watts is only 6.3 dB more power than the IC-551D's barefoot 70 watt level. This makes a legal-limit amplifier a more attractive deal.

Bruce Kreutzer, N4OAS, of Ledbetter, KY would like it known that he has *not* been operating maritime mobile off the coast of Florida on 6 meters. Apparently, someone is bootlegging Kreutzer's call and making lots of 6 meter contacts, allegedly from rare grid EL93. Bruce has been inundated with QSL requests which he cannot fulfill. The cognizant FCC field office has been notified of all this, but unitl the bootlegger is caught, it is recommended we not bother working "N4OAS/mm." Kreutzer would greatly appreciate hearing from anyone who has further information on this operation.

I received a letter from Rick Haworth, WI6I, of Newport, RI stating he had just moved to this new QTH, erected beams for VHF, and was now operational from FN41. This came exactly one day before I had the chance to work Rick on 2 meters and hear the details on the air. WI6I would like to announce that FN41 can be had "for a song" on 50.096 MHz CW nearly every day. He goes on, "My only reservation about 6 is the lack of CW activity. I hear so many stations that can't quite make it on SSB, and lots of them don't even go for it on CW. Pity."

Rick's using a TS670 transceiver and was using an attic-mounted dipole back in June. With this simple lashup he had already worked FL, GA, IN, and MN. Using a tiny Mizuho 6 meter rig (this is like a handie-talkie) while operating mobile near Binghamton, NY, Rick worked stations in LA and AR. At the time his mobile antenna was a Radio Shack fibreglas CB whip "lovingly tuned with a hacksaw." I tell you, the

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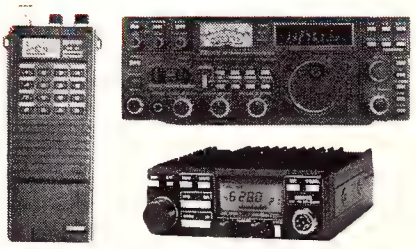
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band is amazing. Keep up the good work, Rick, and see you on the bands.

Walt Schivo, KB6BKN, of Novato, CA wrote to tell about his 6 meter operations. With a KLM661 (10 watt multimode) and a modified 3-element CB beam tuned to 50 MHz, he activated from CM88 on May 2nd and immediately worked 8 grids in 5 call areas. Walt followed this act on May 22nd by working 8 stations in 7 grids and 3 call areas, all on the east coast, during another sporadic-E session. Schivo also has a QTH in the mountains, at an elevation of 4000 feet in grid CM99, and has installed a 6-element Yagi at 8 feet above ground on a fence post. Using an IC-502 (2 watts PEP portable rig) and that antenna, KB6BKN says he worked KH6IAA in Hilo, HI at 2047 UTC on May 10. Good job, Walt!

Schivo included a sketch of his 3-element 6 meter beam, which uses a "trigon" (3-element) reflector spaced 51 inches behind the driven element and a single director spaced 90.5 inches ahead of the driven element. He says this gamma-matched Yagi offers both good performance and VSWR below 1.5:1 from 50.0 through 51.0 MHz. I'm sure Walt would be glad to send construction details to anyone who is interested enough to send an SASE to 560 Eldridge Ave., Novato, CA 94947.

Speaking of Yagi antennas, there was a good article "High Performance Long Yagis" by Ian F. White, G3SEK, in the April 1987 issue of *Radio Communication*, the monthly RSGB journal. Ian had good technical discussions of gain and boom length, radiation patterns, gain and beamwidth, optimized long Yagis, uniform and singly-optimized Yagis, and so forth. If your're interested in such matters, you'd do well to get hold of a copy of this issue. If you can't find it, let me know and I'll photocopy the article for you—large SASE with 39 cents postage, please.

I can't help but occasionally mention what an excellent job Roger and Gayle Cox, WB0DGF and KA0DWH, are doing on their "Midwest VHF Report," a monthly publication from Lincoln, NE. They continually amaze me with the newsworthiness, along with the friendly, informal style of their articles. If you're an active VHFer, especially in the midwest, and you don't subscribe to this journal, you're missing a good bet. Write to The Midwest VHF Report, 3451 Dudley St., Lincoln, NE 68503-2034.

Ron Roche, K0ALL, of Fargo, ND wrote to say he's a lifetime member of "HAGS" (Hams Against Grid Squares). Ron's letter, which was perhaps just a bit tongue-in-cheek, says, "I used to live from contest to contest, but since grid squares were crammed down our throats, I've gone fishing instead." He urges we eliminate grid squares as part of the required exchange in the *CQ* VHF WPX Contest and use instead "an exchange that is universally accepted."

Roche recommends states, Canadian provinces, JA districts, or almost anything other than grid squares. I'm not clear on his reasons for disliking grid squares so much—they're innocuous enough—but I agree that grids are not an equitable multiplier for contest use. Unfortunately, neither is anything else we've been able to come up with. At least in the *CQ* contest, grids are *not* the multiplier; they're simply the exchange. We did this in response to hundreds who wrote in favor of exchanging grids. Lots of VUCC members and prospective members are out there. K0ALL summarizes with this plea: "Let us HAGS have a contest and show there is LAGS (Life After Grid Squares)." He does have a sense of humor.

Coming Attractions

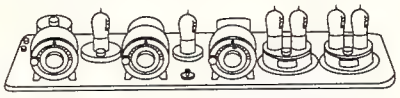
Being the proud owner of a new SSB Electronic LT33S transverter for 33 cm (902 MHz), I've used the little rig in the June contest and will be using it again in July and September. Running its barefoot 6 watts output to a single F9FT 23-element Yagi, I've been able to work stations about 250 miles distant under average conditions, but I'll admit activity is a bit disappointing thus far. We borrowed a 20 watt solid-state amplifier from Down East Microwave for the June contest and intend to review both the LT33S and the amplifier in a future column.

Our FM27 expedition found us using a pair of stacked 23-element F9FT arrays on 33 cm. We also had a pair of 55-element F9FT arrays on 23 cm, and used the 23 cm antennas to counterbalance the 33 cm units, which were mounted on the same "H" frame. The photographs tell the story. Antennas for 23 or 33 cm must be mounted above, below, or in front of metal supporting structures to avoid detuning effects. By using an asymmetrical "H" frame, we were able to stack pairs of antennas for each band without having the metal mast problem. This was my idea, and it worked very well. Thanks to WA2VUN for fabricating a custom stacking frame in time for the contest. The stacked antenna patterns were sharp and clean, and measured VSWR for each system was very low.

At home I intend to install a pair of the 23-element Yagis above my stacked 6 meter beams. Without offsetting the 33 cm mast (as with the "H" frame), I'll have no choice but to use nonconductive mast material for the 33 cm system. I've found 1⅝ inch fir closet poles and 2 inch schedule 40 PVC pipe both work well in this application. More on this and how it works in a future column.

Last minute news flash! Monday, June 29 produced incredible E-skip on 144 MHz with hundreds of stations happily pursuing new DX catches from nearly all over the U.S. In full accord with Murphy's Law, I was away from the shack for most of the prolonged opening, so I'll rely heavily on our reades for exciting reports of the happenings. Please write and let me know what you worked or heard.

73, Steve, WB2WIK



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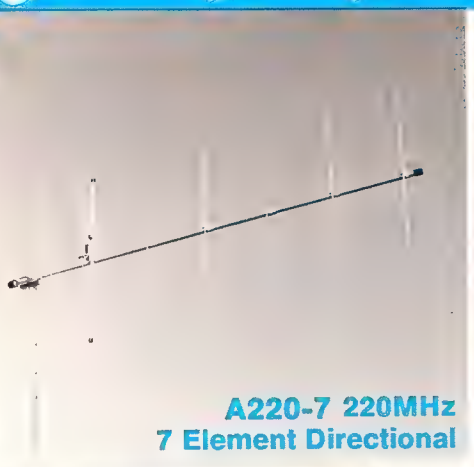
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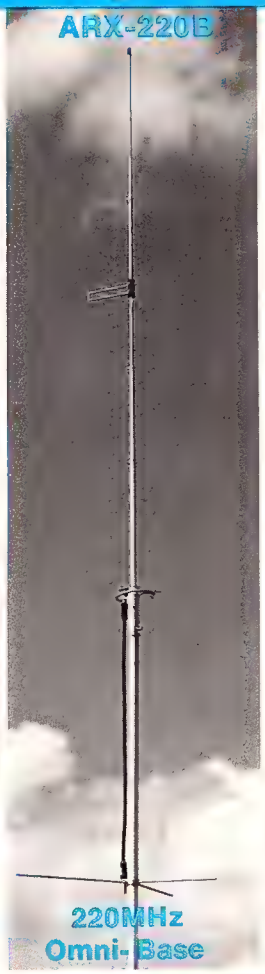


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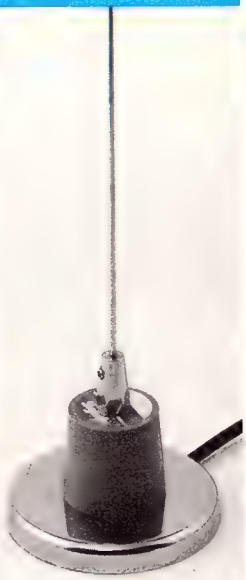


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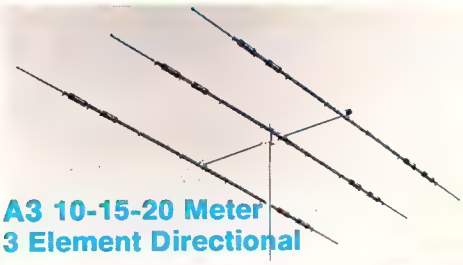
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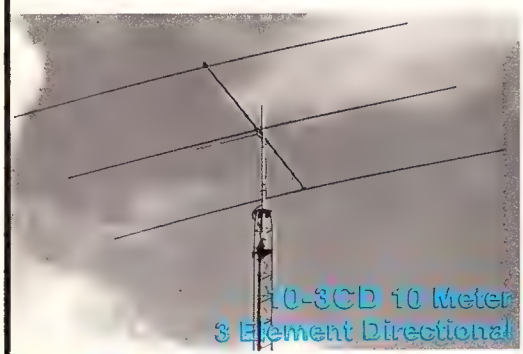
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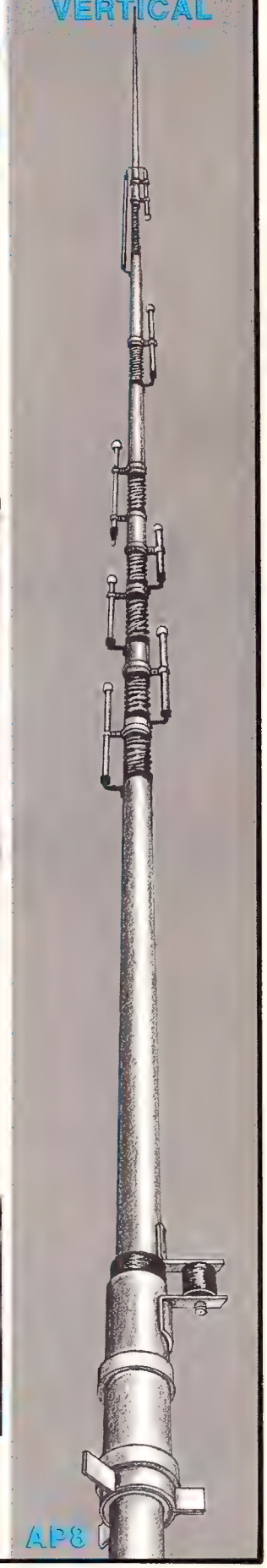


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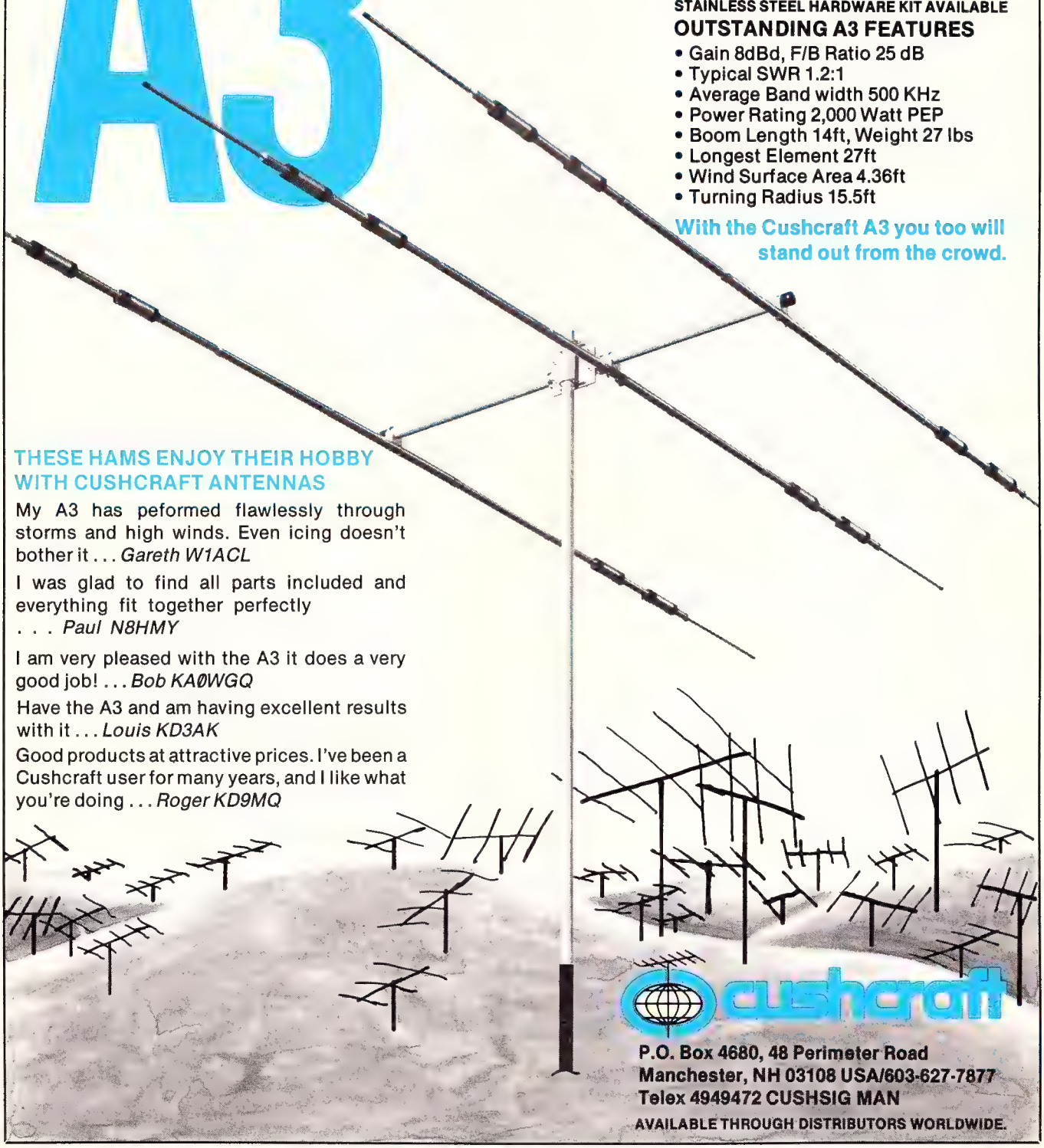
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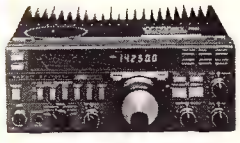
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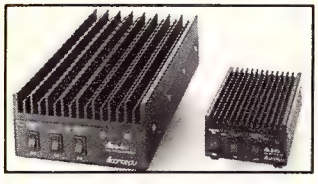
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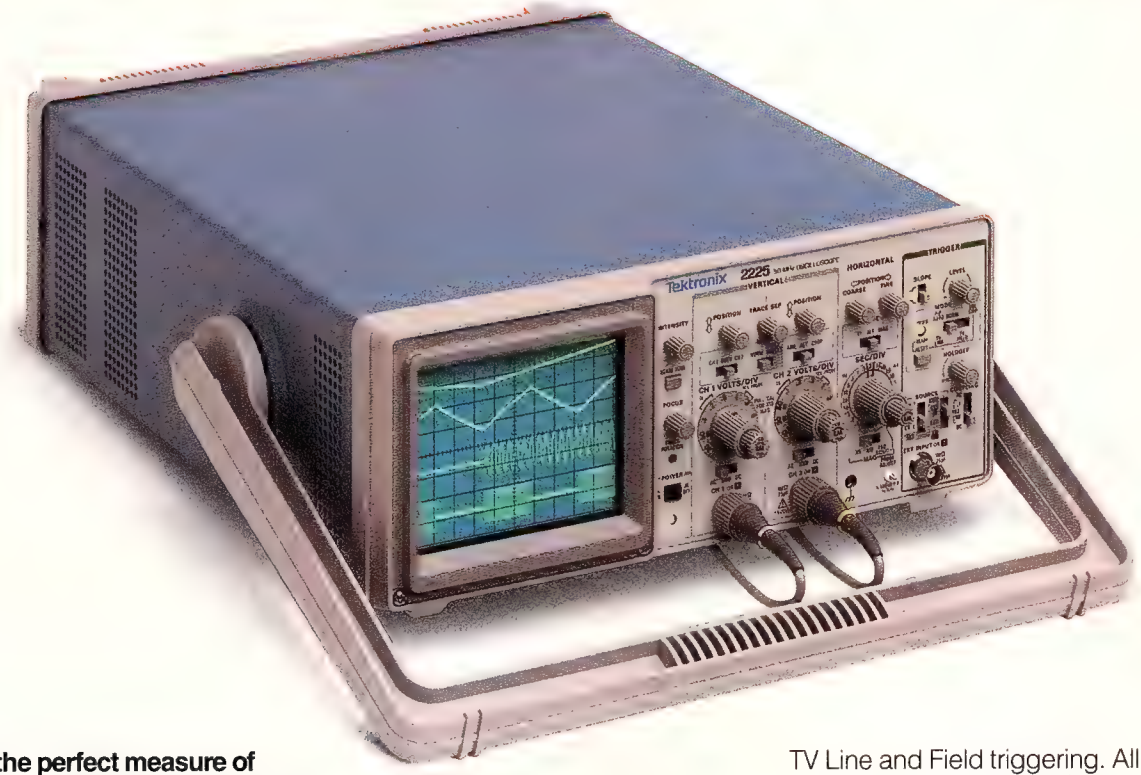
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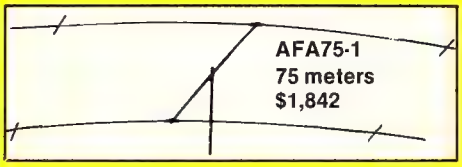
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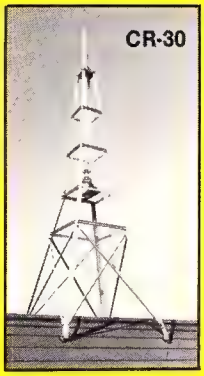


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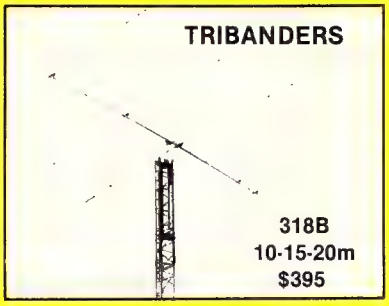
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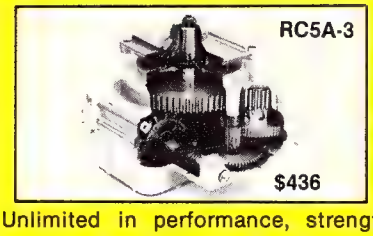
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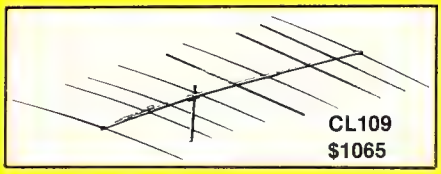
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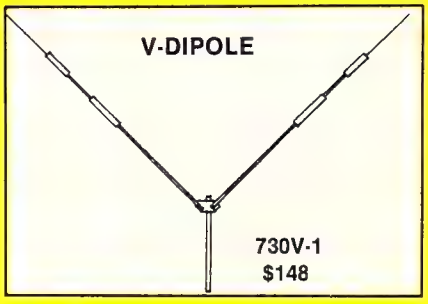
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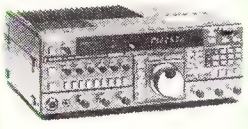
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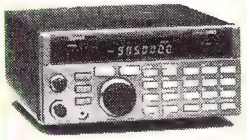
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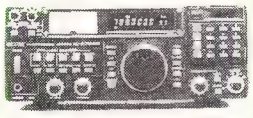
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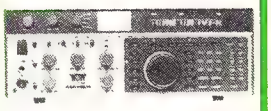
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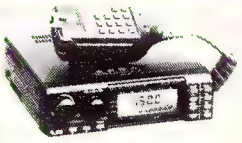


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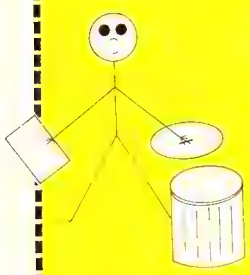
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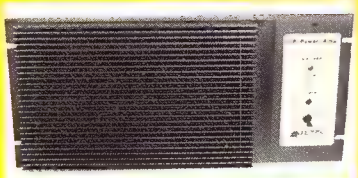
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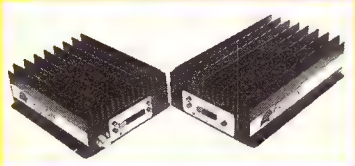
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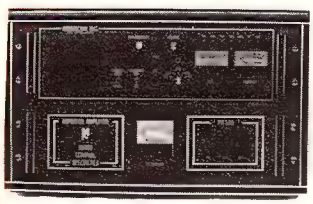
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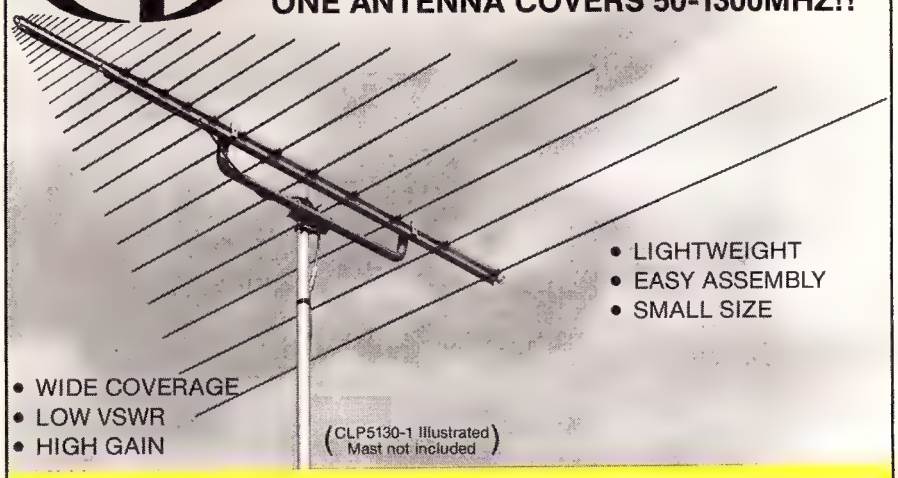
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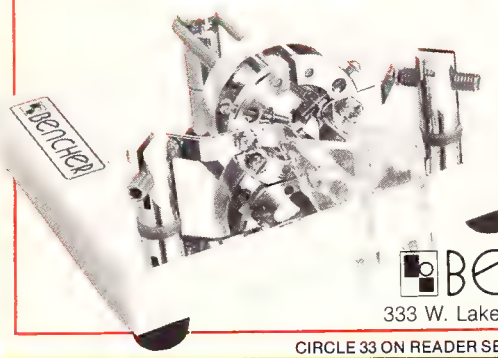
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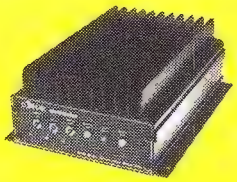
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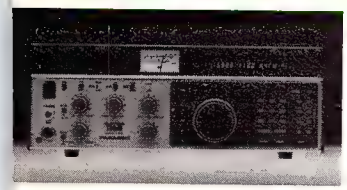
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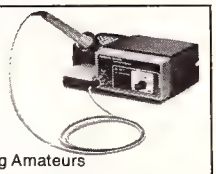
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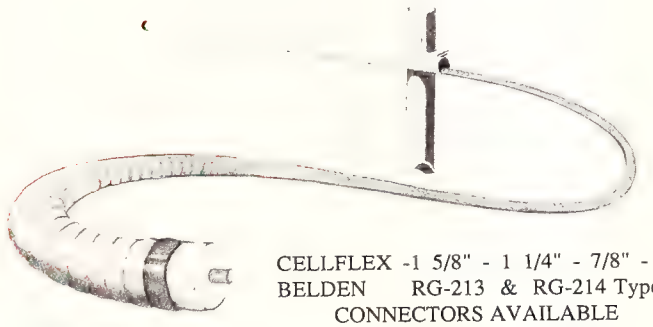
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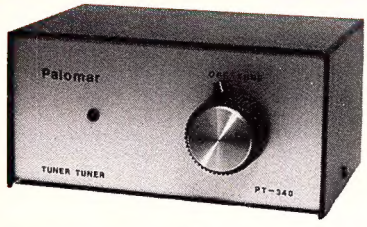
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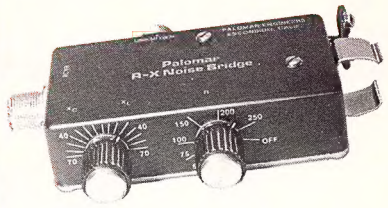
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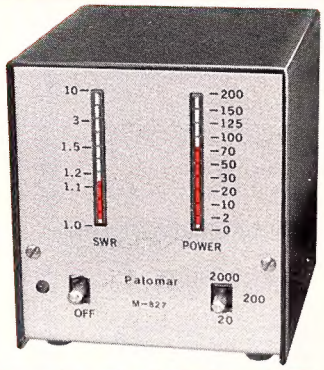


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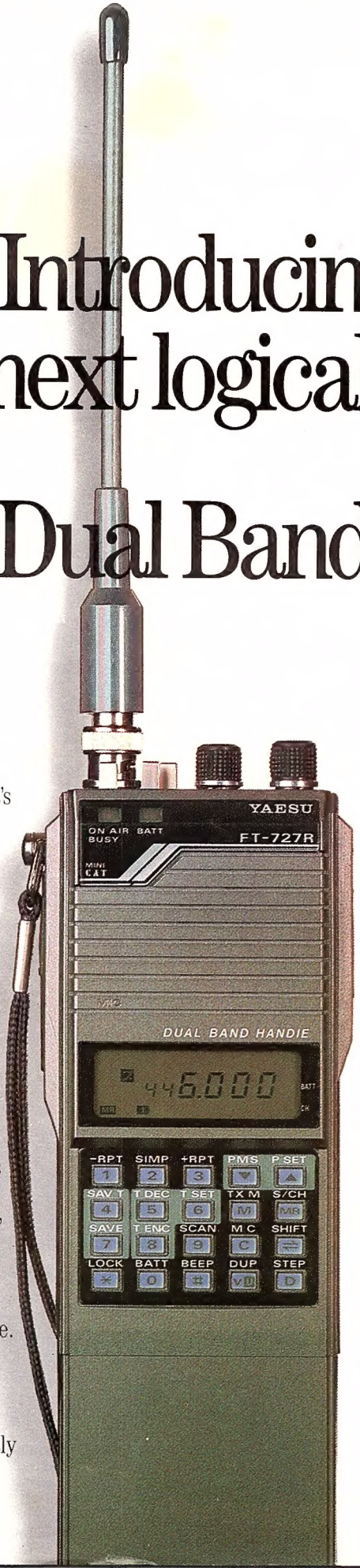
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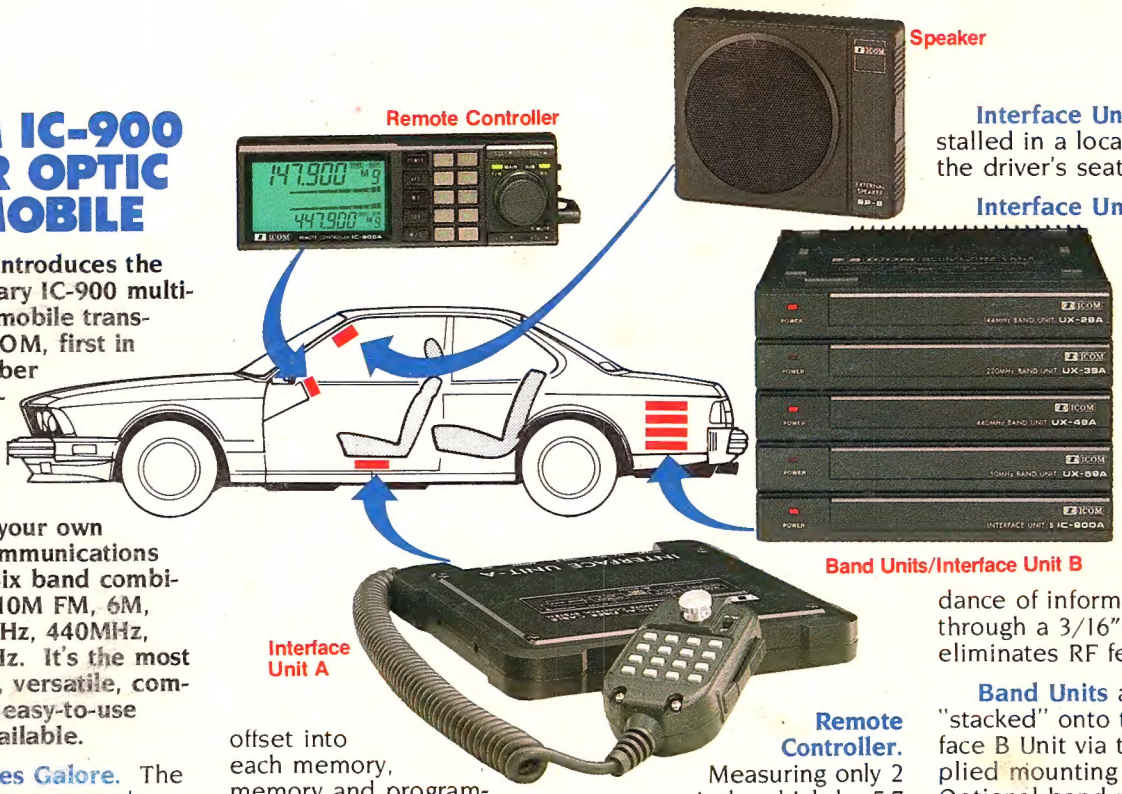
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The IC-900 includes an ultra compact remote controller, an Interface A unit, Interface B unit, SP-8 speaker, HM-14 up/down DTMF mic, **fiber optic** and controller cables.

Remote Controller. Measuring only 2 inches high by 5.7 inches wide by 1 inch deep, the remote controller can be installed on your car's dash or sun visor with the supplied velcro. And, if you want, take the controller with you when you leave your car. The controller features a super large, highly visible LCD.

Interface Unit A is installed in a location near the driver's seat.

Interface Unit B controls the six band units and can be installed in your car's trunk. A **fiber optic** cable runs from Interface A to Interface B, which transports an abundance of information through a 3/16" cable and eliminates RF feedback.

Band Units are "stacked" onto the Interface B Unit via the supplied mounting bracket. Optional band units available are:

Band Unit	Power Output	Frequency
UX-19A	10W/1W	28-30MHz
UX-29A	25W/5W	138-174MHz Rx; 140.1-150MHz Tx
UX-29H	45W/5W	138-174MHz Rx; 140.1-150MHz Tx
UX-39A	25W/5W	216-236MHz Rx; 220-225MHz Tx
UX-49A	25W/5W	440-450MHz
UX-59A	10W/1W	50-54MHz
UX-129A	10W/1W	1240-1300MHz

CIRCLE 78 ON READER SERVICE CARD



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