ICD 08241

Amateur Radio

CQ

SERVING AMATEUR RADIO SINCE 1945

FEBRUARY 1993 $2.95

CANADA $3.95

In This Issue:

CQ Reviews:
The Tejas Backpacker QRP Transceiver,
The Logikey K-1 Keyer

DXpedition to the Saltee Islands

CQWW VHF Contest . . . 1992 Results

CQWW WPX Contest Rules

On the cover: Greg Cronin, W1KM, Fairhaven, Mass.

02
74820 08241

THE RADIO AMATEUR'S JOURNAL

KENWOOD

...pacesetter in Amateur Radio

Stretch

Expanded horizons in HF communications

Equipped with the latest advance in communications technology, Kenwood's TS-850S is a competition-class HF transceiver with platinum credentials.

- AIP (Advanced Intercept Point) system
- Internal automatic antenna tuner or external antenna tuner (both optional)
- Ultra-fine (1Hz) tuning
- Tunable IF notch filter
- IF slope tuning
- Optional DSP (digital signal processor)
- General coverage receiver

- **100W power output**
  RF output is 100W (40W in AM mode).
- **Wideband general coverage receiver**
  The TS-850S covers all Amateur bands from 160 to 10 meters.
- **100 memory channels with multi-scan functions**
  Of the 100 memory channels, 90 are available for independent storage of TX and RX parameters. This is especially useful for FM repeater use. In addition to programmable memory channel lock-out, there is group scan, programmable band scan, and variable scan speed
- **Kenwood's AIP system for clearer reception**
  AIP (Advanced Intercept Point) is an exclusive circuit design that increases dynamic range to 108dB.
- **Automatic antenna tuner**
  The TS-850S features an antenna tuner (built-in or optional) that automatically searches for minimum SWR on all bands. The AT-300 external tuner is also available
- **Ultra-fine (1Hz) tuning**
  The Direct Digital Synthesizer (DDS) and digital PLL system can control the frequency in 1Hz steps.
- **Tunable IF notch filter**
  Provides highly selective filtering with about 40dB of attenuation (for all modes except FM).
- **Optional DSP**
  The DSP-100 can be installed to provide greater signal quality, improved CW operation, and many other benefi You can actually tailor your CW wave form, and "highlight" your SSB signal.
- **Choice of accessories**
  Two matching power supplies, the PS-52 and PS-31, ar available, as well as a complete line of optional accessories. Contact your authorized Kenwood Amateur Radio dealer for details.

TS-850S

HF Transceiver

KENWOOD U.S.A. CORPORATION
COMMUNICATIONS & TEST EQUIPMENT GROUP
P.O. BOX 22745, 2201 E. Dominguez Street, Long Beach, CA 90801-5745
KENWOOD ELECTRONICS CANADA INC.
6070 Kestrel Road, Mississauga, Ontario, Canada L5T 1S8

KENWOOD

...pacesetter in Amateur Radio

NEW!

Split Decisions

Introducing the TM-742A and TM-942A—high-performance mobile transceivers with innovative 3-way convenience

Deciding on where to mount a transceiver can be a tough call. But with Kenwood's new TM-742A (144MHz/440MHz) and TM-942A (144MHz/440MHz/1200MHz) FM multi-banders, you get to enjoy real freedom of choice, because controls and display can be installed separately (requires optional kit). With their top-flight features and turbo-charged performance, these transceivers bring stylish sophistication to the world of mobile communications.

●High output—50 watts (144MHz), 35 watts (440MHz), 10 watts (1200MHz) ●100 memory channels+1 call channel and memory bank system ●8 scan modes per band, plus CO and TO scan stop modes ●Independent SQL and VOL controls for each band ●Automatic band change (A.B.C.) ●S meter squelch, noise squelch & auto squelch ●Tone alert with elapsed time indicator ●Date & time display, stopwatch, alarm, on/off timer ●Direct frequency entry with supplied microphone ●Cross-band repeater, dual-in repeater, fixed-band repeater

TM-742A/942A
Mobile Transceivers

●New & improved detachable front panel
Total 3-way convenience. For example, the main unit can be installed in the trunk, while the display and controls are mounted either side of the steering wheel (with DFK-3, 4, 7).

●Tri-band receive/display
The TM-942A can receive three bands simultaneously, with all three frequencies displayed on the LCD panel. The TM-742A can be upgraded to tri-band status with one of four optional band units (28MHz, 50MHz, 220MHz, and 1200MHz).

●Built-in DTSS with pager function
DTSS allows DTMF access to the transceiver: the squelch is opened only when a specific 3-digit code is received. Also, a pager alerts the operator to an incoming call.

KENWOOD U.S.A. CORPORATION
COMMUNICATIONS & TEST EQUIPMENT GROUP
P.O. BOX 22745, 2201 E. Dominguez Street, Long Beach, CA 90801-5745
KENWOOD ELECTRONICS CANADA INC.
6070 Kestrel Road, Mississauga, Ontario, Canada L5T 1S8

REMOTE CONTROL JUST GOT EASIER

DR-600T *New*

We invented the remote control transceiver in 1990, and we are redefining it today. Hams have been asking for a high-power remote-control rig that is more flexible, more powerful, and less complicated: This is it.

Standard features include FULL remote control with or without a security code. The user can exercise control over both bands from one control channel. This means that a single band HT is all that is required to take full advantage of this feature. The DTMF decoder board that makes all this possible is now factory installed as standard equipment. Also included is DSQ for private paging, autodialer channels, direct frequency input from microphone, CTCSS encode, and odd splits on every memory channel.

This rig features state of the art sensitivity and selectivity, including Airband reception capability with a simple modification. For security and convenience, the head can be mounted separately from the main unit with the optional separation kit.

Check out the affordable technology of the 90's.
Check out ALINCO.

Alinco New Warranty program
One Full Year, Parts and Labor Factory Warranty from Alinco Electronics.
Extended Coverage Plan (ECP) available.
See your Authorized Alinco Dealer for details.

ALINCO ELECTRONICS INC.

ALINCO ELECTRONICS INC.
438 Amapola Avenue, Unit 130, Torrance, CA 90501
Tel.(310)618-8616 Fax(310)618-8758

Specifications and features are subject to change without notice or obligation.

CIRCLE 15 ON READER SERVICE CARD

MASTHEAD

EDITORIAL STAFF
Alan M. Dorhoffer, K2EEK, Editor
Gail M. Schieber, Managing Editor
Lew McCoy, W1ICP, Technical Representative
Peter O'Dell, WB2D, Special Projects Editor

CONTRIBUTING STAFF
John Dorr, K1AR, Contest Calendar
Chod Harris, VP2ML, DX
Dave Ingram, K4TWJ, Special Interests
George Jacobs, W3ASK, Propagation
Dorothy H. Johnson, WB9RCY, Awards & USA-CA
Joe Lynch, N6CL, VHF
Frederick O. Maia, W5YI, FCC Correspondent
Irwin Math, WA2NDM, Math's Notes
Bill Orr, W6SAI, Radio Fundamentals
Buck Rogers, K4ABT, Packet Radio Editor
Karl T. Thurber, Jr., W8FX, Antennas & Software
Bill Welsh, W6DDB, Novice

AWARD MANAGEMENT
Jim Dionne, K1MEM, WAZ Award
Dorothy H. Johnson, WB9RCY, USA-CA Award
Norman Koch, K6ZDL, WPX Award
Billy Williams, N4UF, CQ DX Award

CONTEST MANAGEMENT
Steve Bolia, N8BJQ, WPX Contest Director
Larry Brockman, N6AR, WW DX Contest Director
Robert Cox, K3EST, WW DX Contest Director
John Dorr, K1AR, WW DX Trophies & Certificates
Roy Gould, KT1N, RTTY Contest Director
David L. Thompson, K4JRB, 160M Contest Director

BUSINESS STAFF
Richard A. Ross, K2MGA, Publisher
Dorothy Kehrwieder, General Manager
Arnie Sposato, N2IQO, Advertising Manager
Tracy A. Walsh, Sales Assistant
Frank V. Fuzia, Controller
Catherine Ross, Circulation Manager
Melissa Kehrwieder, Data Processing Manager
Carol Licata, Data Processing
Denise Pyne, Customer Service

PRODUCTION STAFF
Elizabeth Ryan, Art Director
Barbara Terzo, Assistant Art Director
Susan Reale, Artist
Edmond Pesonen, Electronic Composition Manager
Dorothy Kehrwieder, Production Manager
Tracy A. Walsh, Production
Pat Le Blanc, Phototypographer
Hal Keith, Illustrator
Larry Mulvehill, WB2ZPI/VK5AAY, Photographer

A publication of

CQ Communications, Inc.
76 North Broadway
Hicksville, NY 11801-USA.

Offices: 76 North Broadway, Hicksville, NY 11801. Telephone: 516 681-2922. FAX (516) 681-2926. CQ (ISSN 0007-893X) is published monthly by CQ Communications Inc. Second Class postage paid at Hicksville, NY and additional offices. Subscription prices: Domestic—one year $22.95, two years $43.00, three years $63.00; Canada/Mexico—one year $25.00, two years $47.00, three years $69.00; Foreign—one year $27.00, two years $51.00, three years $75.00; Foreign Air Mail—one year $80.00, two years $157.00, three years $234.00.
U.S. Government Agencies: Subscriptions to CQ are available to agencies of the United States government, including military services, only on a cash with order basis. Requests for quotations, bids, contracts, etc. will be refused and will not be returned or processed.

Allow six weeks for change of address. Printed in the United States of America.
Postmaster: Please send change of address to CQ Magazine, 76 North Broadway, Hicksville, NY 11801.

The Radio Amateur's Journal

ON THE COVER: Greg Cronin, W1KM, of Fairhaven, Mass. lets his fingers do the talking. Greg's antenna farm grows a variety of "silver trees" from his own personal salt marsh. Hmmm, we wonder what his priorities were when he went house hunting? (Photo by Larry Mulvehill, WB2ZPI)

FEBRUARY 1993 **VOL. 49, NO. 2**

FEATURES

DEPARTMENTS

ZERO BIAS

EDITORIAL

This past weekend we here on Long Island experienced what was termed a "100 year storm," or a storm that is bound to happen at least once in 100 years. It was extraordinary in the amount of damage it caused throughout the metropolitan area. The damage was in no way comparable to that caused by the hurricane in Florida, for example, but for this area the effect was the same. People not only lost all of their possessions, they also watched as their homes literally disintegrated and went out to sea, never to be seen again.

Local television showed a RACES group aiding a community in providing communications for emergency evacuation. It spoke well of amateur radio and once again proved the worth of our service. It also gave some of that community's residents something to think about when next they want to enact new antenna zoning ordinances. Both Nassau and Suffolk counties here on Long Island have some of the most restrictive zoning ordinances in the country. This unnamed storm provided a number of people with first-hand experience of amateur radio's value and gave television viewers a positive image of what we can do in an emergency. This time it was close to home and not an abstract image half a world away.

Storms and disasters also have a nasty way of pointing out how ill-equipped most municipalities are in caring for people-to-people needs and basic necessities. Most municipalities think in terms of global systems in large air-conditioned vans costing hundreds of thousands if not millions of dollars. Anything less couldn't possibly work nor be funded by federal dollars and grants. I think as amateurs we know first hand that it can be done far cheaper and easier.

If you look at the role amateurs play in these situations, you will also realize the great truth none of these municipalities wants to admit to or talk about. The reason why we are so important and needed is that in most municipalities there is no means or method for inter-agency communications. On Long Island, for example, there are numerous county and local police departments, fire departments, marine bureaus, and even air units. During emergencies it is virtually impossible for these units to communicate with each other in the field. Each of these agencies is also very territorial and protective of what it deems its role to be. We as amateurs transcend the bureaucracies and simply do what is really needed. No one seems to ask, "If the amateur can do it on a moment's notice, why can't my local government?"

I'll share something that will illustrate this point beautifully. A few years ago I worked for a local municipality as one of their Harbormasters. It came time to update the radio equipment on the boat, and being an amateur, the captain put me in charge of selecting replacement gear for the police radio. The police radio at that time was an old and very tired Motorola HT with only one channel. I found the local distributor who had the contract to supply equipment to the entire county police. In checking their catalogs and asking questions, I found a model that had 12 programmable channels and was about the size of a typical, small 2 meter transceiver. One could also program a separate PL for each channel. My municipality could buy this rig from the same general contract as the county, thereby saving a lot of money.

I then wrote a letter of intent to the Police Commissioner of Nassau County and the head of each agency involved with law enforcement and rescue. I explained that since time was a precious commodity, I wanted our unit to be able to respond to any situation and be able to communicate with anyone who could supply help. Initial responses were quite paranoid in that these agencies were somewhat reluctant to give permission to use "their" frequencies. After a lot of phone calls, they all sent a letter of permission (which was required by the distributor). The entire cost for this equipment, installed, ready for use on a boat or car, was $1100. The money was in the budget and everything looked good.

At this time our captain passed away suddenly, and he was replaced by a political appointee who thought $1100 was too much for one radio that sounded too complicated. I explained about a disaster situation and what would be needed. In his wisdom he opted to use that money for two 2-channel radios (both channels on the same frequency).

Three or four months later we had the terrible Avianca Airlines crash in the area, and the big problem was that rescue efforts were hampered by the lack of inter-agency communication. Once again amateurs came to the rescue and provided emergency communication. After things settled down, I again broached the subject of comprehensive communications and what we could have done with the right equipment. I was told not to worry. The Avianca thing was an anomoly and wouldn't happen again, so we didn't need it. Case closed.

We as amateurs manage to communicate with relative ease during any trying situation and also manage to organize as we go along. It is no longer amazing that we do it time after time. We know we can. What is amazing after all of this time is that no governmental agency, with all of their resources, can do it once.

1992 CQ World-Wide Logs

The valiant if not harried *CQ* Contest Committee has as of this writing (mid-December) received, sorted, and shipped out 34 cartons of CQ WW logs, for a total of just under 1,000 pounds. This year most of the SSB entries were clearly marked as to mode and contest. About one half of the CW logs received so far are not marked with anything other than *CQ* and our address. I don't know if that indicates that CW operators are a more rebellious lot or that they are steadfast non-conformists. One entrant just sent in a summary sheet (no logs or anything else), and another checked off every box on the summary sheet, meaning that he did everything in every conceivable combination on every band.

Sometimes when I see a log from someone I've worked in past contests and from whom I've never received a QSL, I fantasize that somehow his new log either slips gently behind a desk or rests peacefully upon a strong magnet for a week or two before being sent on. So far it's just a fantasy, but the thought of it does keep me chuckling.

1993 CQ WW 160 Meter SSB Contest

Ooops! Somehow we've publicized two dates for this annual event. The correct date, as per tradition, is the last full weekend in February, February 27 and 28 this year. If you're ever in doubt, just think the last full weekend and you can't go wrong. Yes, there is one and only one exception: our CQ VHF WPX Contest. The date for this one had to be different because of a conflict with another activity (which came before us).

Port Washington Chainsaw Massacre

Not too long ago the local power company (LILCO) decided on some preventive maintenance and went on a tree-pruning program, thinning out trees near the power lines. As luck would have it, the end of my inverted-V was attached to one of those trees. Of course it was in a clear spot, with bright blue trap and insulator, but that proved to be an attraction rather than something to be wary of. In their zeal, they chainsawed everything in sight, leaving a shower of blue plastic bits and pieces along with shards of antenna wire all over my front yard. They even left most of the stuff they trimmed from the tree. So until it gets really, really cold and miserable out there (genuine antenna weather), I am experiencing the joys of an inverted unipole. I guess by the end of this month it should be primo antenna weather.

1993 Hamfest Season

Besides being just about optimum antenna weather, February starts our hamfest season for the new year. We'll be at the Miami Hamfest, The Tropical Hamboree, on February 6 and 7. Every year I urge you to come on out to these events and check out real life. Hamfests are a wonderful way to see all the latest gear, meet a lot of old friends, make new friends, and be totally immersed in our hobby. It really is as great as we say it is.

73, Alan, K2EEK

INTRODUCING THE PK-900... NEW FROM THE INSIDE OUT!

IT'S THE NEXT GENERATION IN MULTI-MODE CONTROLLERS.

Now, there's a new standard of excellence in multi-mode digital controllers...the new PK-900 from AEA. It incorporates all of the features which made the PK-232 the most popular multi-mode controller in the industry. But that's just the start. AEA's new PK-900 also features dual port HF or VHF on either port; low cost 9600 baud plug-in option; memory ARQ and VHF DCD state machine circuit; powerful triple processor system; zero crossing detector for the sharpest Gray Scale FAX you've ever seen; and many other new software selectable features.

Inside and out, the new PK-900 from AEA is what other multi-mode controllers will now be measured against.

- Processors used: Zilog 64180, Motorola 68HC05C4, Motorola 68HC05B4
- Data rates: 45 to 1200 baud standard, up to 19.2K baud with external modems
- Dimensions: 11.75" (29.84cm) x 11.75" (29.84cm) x 3.5" (8.89cm) Weight: 4.6 lbs. (2.08 kg)
- Power requirements: 12 VDC at 1.1 amps

Connect with us for what's new in multi-mode controllers.
Call our liturature request line at 1-800-432-8873.

Advanced Electronic Applications, Inc.
PO Box C2160, 2006 - 196th St. SW, Lynnwood, WA 98036

Connect with us

ANNOUNCEMENTS

•**Dayton ARA 1993 Scholarships** – The Dayton Amateur Radio Assn. is once again offering scholarships to FCC licensed amateur radio operators graduating from high school in 1993. There are eight scholarships in the amount of $2000 each. There are no restrictions on the source of study planned, nor must the applicant be planning on a four-year baccalaureate degree. However, schools awarding associate degrees or any technical institution selected must be accredited. The awards will be based on a combination of financial need, scholastic achievement, contributions to amateur radio, and community involvement. For an application, write to DARA Scholarship Committee, 45 Cinnamon Court, Springboro, OH 45066-1000. (Applications must be postmarked no later than May 15, 1993.)

•**Utah 160 Meter Challenge** – Sponsored by the Utah DX Assn., this event will take place 0100–0700Z February 13 (Friday evening). CW first three hours; phone last three hours. Utah stations exchange RS(T) and county; others exchange RS(T) and state/province/DXCC country. Multipliers are one per state/province/country and four for each Utah county (max. 29). Score is QSOs × multipliers; multiply QSO points by 1.5 if power *output* is less than 200 watts. Awards available. Send logs postmarked by March 15 to Ron Johnson, WE7H, 68 South 300 West, Brigham City, UT 84302.

•**The following special events will take place during February:**

K1BKE, from grand opening of K1BKE club station at Christa McAuliffe Planetarium, Concord, New Hampshire, during New Hampshire QSO Party; Contoocook Valley Radio Club; Feb. 13–14 *(no times given)*; 80–10 meters. For QSL send No. 10 SASE to Contoocook Valley Radio Club, P.O. Box 88, Henniker, NH 03242.

KC4TDK, from Choose Catholic Schools Special Event, St. Bridget's School, Richmond, Virginia; 1300–2100Z Feb. 15 and other times during the week; 10–80 meter General phone portions, AMTOR and RTTY, and 10 meter Novice phone section. For certificate send QSL with contact number and 9 × 12 SASE (58 cents postage) to Fr. David V. McGuire, St. Bridget's School, 6011 York Rd., Richmond, VA 23226.

WA5SAM, from celebration of General Sam Houston's 200th birthday; Sam Houston State University, Huntsville, Texas; Huntsville ARS; 0000–2400Z Feb. 28 – Mar. 2; lower portion of HF General phone subbands and Novice 10 meter phone subband, propagation permitting. For a three-color certificate send QSL and 9 × 12 SASE to HARS Special Event, P.O. Box 7516, Huntsville, TX 77342-7516.

N5SMH, from Charro Days Festival, Brownsville, Texas; Faulk Intermediate School ARC; 1400–2200Z Feb. 25–28; General portion of 40, 20, 15, and Novice portion of 10 meters. For 8½ × 11 certificate send QSL and SASE to Faulk Intermediate ARC, 2200 Roosevelt, Brownsville, TX 78521.

N8GBA, from UP 200 Sled Dog Championship, Marquette, Michigan; Hiawatha ARA; 1700Z Feb. 19 to 1700Z Feb. 21; lower end of 10, 15, 20, and 40 meters phone. For certificate send a large SASE (two stamps for unfolded) to Richard Schwenke, N8GBA, 21 Smith Lane, Marquette, MI 49855.

North Central Wisconsin, a group of hams operating from 1993 Badger State Winter Games; Feb. 6–7 *(no times given)*; on 28.360, 21.360, 7.260, 38.860. For certificate send QSL and large SASE to Mike, KA9VFP, 1104 E. Lieg Ave., Shawano, WI 54166.

The following hamfests, etc., are slated for February:

Jan. 30, **Ward Melville High School ARC Hamfest**, Ward Melville High School, Setauket, Long Island, New York. Contact Michael Franzino, 516-751-7375. (Exams.)

Feb. 6, **Niagara Peninsula ARC 15th Annual Hamfest & Dinner/Dance**, C.A.W. Hall, St. Catharines, Ontario, Canada. Contact NPARC Inc., P.O. Box 692, St. Catharines, Ontario, Canada L2R 6Y3 (416-934-3231) or VE3KLM @ VE3SNP. (Dinner/dance tickets must be bought in advance.)

Feb. 6, **Dutch Country Computer and Communications Show**, Lancaster Host Golf Resort and Conference Center, Lancaster, Pennsylvania. Contact Columbia Area ARC, P.O. Box 574, Columbia, PA 17512 (717-627-1597).

Feb. 6, **Kerbela Hamfest**, Kerbela Temple, Knoxville, Tennessee. Contact Paul Baird, KY4A, 1500 Coulter Shoals Circle, Lenoir City, TN 37771 (615-986-9562). (Exams, preregistration until 9:30; code tests begin at 10, written at 11. Contact Ray Adams, N4BAQ, 615-688-7771.)

Feb. 13, **Orange County ARC Computer Fair & Winter Hamfest**, John S. Burke Catholic High School, Goshen, New York. Contact Jim Capicotto, 914-564-2707.

Feb. 13, **Midwinter Madness**, National Sports Center, Blaine, Minnesota. Contact Midwinter Madness, Robbinsdale ARC, P.O. Box 22613, Robbinsdale, MN 55422. (Exams Friday evening, preregister only with Dave 612-459-8678.)

Feb. 13, **Midwest Digital Conference**, West River Point Business Center, Minneapolis, Minnesota. Contact Paul Ramey, WG0G, 16266 Finland Ave., Rosemont, MN 55068 (612-432-1640).

Feb. 14, **Mansfield Mid*Winter Hamfest/Computer Show**, Richland County Fairgrounds, Mansfield, Ohio. Contact Dean Wrasse, KB8MG, 1094 Beal Rd., Mansfield, OH 44905 (419-589-2415 after 4 PM EST).

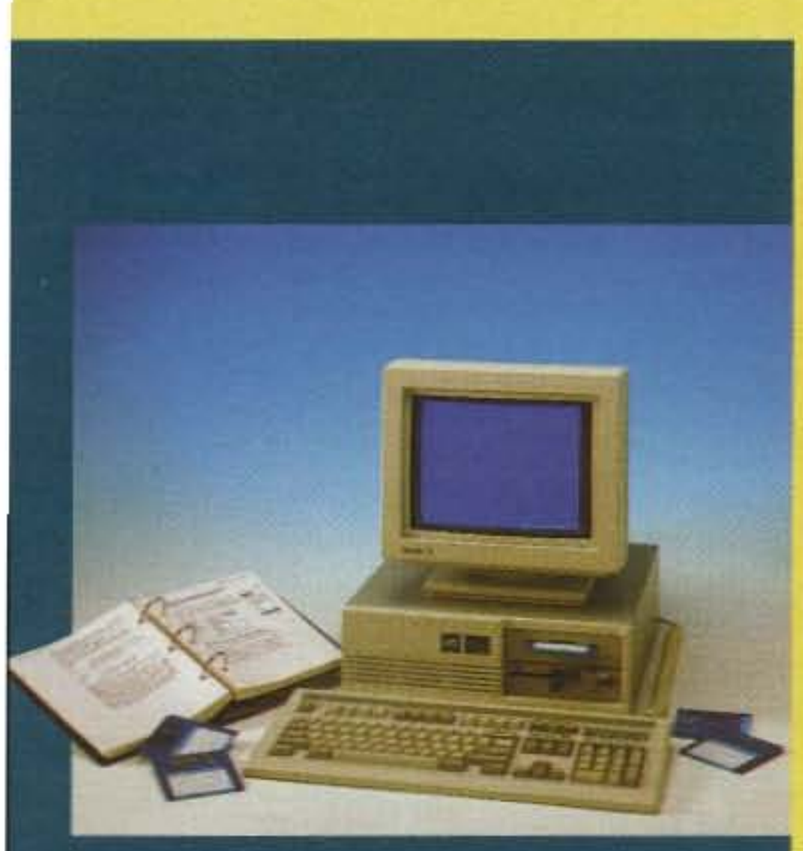
Feb. 19–20, **Sarasota Hamfest & Computer Show**, Sarasota County Fairgrounds, Sarasota, Florida. Contact Sarasota Hamfest, Inc., P.O. Box 3182, Sarasota, FL 34230 (813-388-2688). (Exams 9:30 AM Saturday.)

Feb. 20, **Charleston Hamfest**, Geodesic Dome, Charlestowne Landing, Charleston, South Carolina. Contact Jenny Myers, 803-747-2324. (Exams at Trident Technical College, walk-in only, 11 AM; more info 803-871-4368 or 803-572-1164.)

Feb. 20, **Cherryland ARC Hamfest**, Immaculate Conception School, Traverse City, Michigan. Contact Ken Musson, W8QKP, 9680 Peninsula Dr., Traverse City, MI 49684 (616-947-1372).

(continued on p. 143)

Examiner!



- create exams for all written and Morse code exams with ARRL computer software.
- use the multiple-choice Morse code exam format, at your VE team's option.

To become an ARRL VE, please complete and return the VE Application shown.

Give us the opportunity to provide you with first-class service.

YOU DESERVE IT!

ARRL VEC

American Radio Relay League - VEC
225 Main Street
Newington, CT 06111

ARRL/VEC
VOLUNTEER EXAMINER APPLICATION FORM

PLEASE TYPE OR PRINT CLEARLY IN INK

CONTROL NUMBER:
[ARRL/VEC will assign]

CALL: _____ ☐ ADVANCED ☐ EXTRA

LICENSE EXPIRATION DATE: _____

NAME: _____
(first, MI, last)

MAILING ADDRESS: _____

CITY: _____ STATE: _____ ZIP: _____

DAY PHONE: (___) _____ NIGHT PHONE: (___) _____

WAS YOUR LICENSE EVER SUSPENDED OR REVOKED? ☐ YES ☐ NO

HAVE YOU EVER BEEN DISACCREDITED BY ANOTHER VEC? ☐ YES ☐ NO

If yes, which VEC(s) and when?

DO YOU HAVE A CALL SIGN CHANGE PENDING WITH THE FCC? ☐ YES ☐ NO

DO YOU HAVE ANY KIND OF FORM 610 PENDING ACTION WITH THE FCC? ☐ YES ☐ NO

PERSON TO CONTACT IF YOU CANNOT BE REACHED? _____ (name) _____ (phone)

MAILING ADDRESS WHERE UPS OR DAYTIME DELIVERY IS RELIABLY POSSIBLE:

_____ (name) _____ (street address)

_____ (city) _____ (state) _____ (ZIP)

FOR INSTANT ACCREDITATION, HAVE YOU PARTICIPATED AS A VE IN ANOTHER VEC PROGRAM, AND IS YOUR ACCREDITATION IN THAT PROGRAM CURRENT? ☐ YES ☐ NO

(OPTIONAL) IF YES, WHICH VEC? _____

CERTIFICATION

By signing this Application Form, I certify that to the best of my knowledge the above information AND the following statements are true:

1) I am at least 18 years of age.
2) I agree to comply with the FCC Rules (see especially Subpart F—Section 97.515 [b]).
3) I agree to comply with the examination procedures established by the ARRL as Volunteer Examiner Coordinator.
4) I understand that violation of the FCC Rules or willful noncompliance with the VEC will result in the loss of my VE accreditation, and could result in loss of my Amateur Radio operator and/or station licenses, or both.
5) I understand that even though I may be accredited as a VE, if I am not able or competent to perform certain VE functions required for any particular examination, I should not administer that examination (Section 97.525[a] [3]).

_____ (signature) _____ (call sign) _____ (date)

[Please attach a photocopy of your Amateur Radio license, and if applicable a photocopy of any other VEC accreditation held, to this application.]

CIRCLE 159 ON READER SERVICE CARD

Our Readers Say

Alligators!

Editor, *CQ*:

I have just recovered from the CQ WW DX SSB Contest October 1992, and I must say conditions were excellent here in VK6. However, I am now partly bald due to ripping hair out in sheer frustration at failing to get my callsign between the millisecond breaks between calls by some stations in the USA.

It was *impossible* to give my full call during these breaks in TX! Some of the stations were S9+ in my shack.

This raises some questions:

1. Were the operators asleep and forgot to turn off the digital voice keyer?
2. Do they have deaf receivers?
3. Are they only interested in contacts with Zone 22 or somewhere?
4. Do they really think I can talk at 200 mph?

I heard a VK7 call one of these alligators, and he could not even get "VK" out before the USA station started calling again!

Anyway, it was a good contest. See you next year—if I can get my call out quick enough!

Graham Rogers, VK6RO
Ferndale, West Australia

An Intrusion or A Right?

Editor, *CQ*:

The other day I signed on to a local repeater on 2 meters with several other operators I knew casually on the air. By the time the conversation had gotten to the third operator, he informed me of the correct spelling of my name, my address, and my age—all gotten from his computer on a disk-listing program sold by a company. I phoned this company and they informed me that this was "public domain" information and they had the right to use it without my permission. In the age of computers and "hackers," all somebody needs is a scanner, a disk, a computer, and a few unprotected data files to get access to more secure data files such as S.S. number, VISA or MC numbers, credit history, as well as a host of other information, not to mention a "junk mail" address listing. The company in question will delete the information if I write a letter to them and enclose a copy of my license as proof of origin. I never asked them to use any data on myself for their profit in the first place! After checking with another ham, I was informed there may be as many as ten data bases with the same type data on it, none of which I have knowledge of.

Please ask your readers if this is a "right" or an intrusion by these companies on the radio amateur operator. After all, I never asked for this service, and now I must spend time, letters, and postage to correct the situation.

Leo F. Waelchli, KA3KUP
Zelienople, PA

0 TO 100 IN A FLASH.

0 to 100 COUNTRIES that is. DXCC has never been easier with the help of OMNI-VI's superior receiver performance. You don't have to chase DX or contest to appreciate what OMNI-VI's crystal mixing can do. Phase noise is essentially eliminated to hear the weakest signals under the worst band conditions.

100 dB DYNAMIC RANGE plus the ability to eliminate interference from even the closest signals. This superior selectivity is achieved by cascading optional filters from both the 9 MHz and 6.3 MHz I-Fs providing 20 - 24 poles of filtering!

100 MILLISECONDS or less is all it takes the DSP Automatic Notch Filter to eliminate interfering carriers. No matter how many, it gets them all. It's a SSB operators dream! Our DSP also provides an adjustable CW filter and programmable CW transmit offset.

100 MEMORIES and scratch pad; High Speed PC Interface runs up to 19,200 baud; Oven stabilized time base; Dual VFOs; +/-10 KHz offset, receive and transmit; Full or adjustable Semi QSK; Iambic keyer and much more...

FACTORY DIRECT $2285*

- Buy Direct and Get the Factory Price
- No-Risk 30 Day Money-Back Guarantee**
- Expert Advice
- Legendary Service

*Plus shipping and handling.
** Customer pays shipping both ways

ORDER FACTORY DIRECT HOTLINE
CALL 1-800-833-7373

Telephone Hours: 9:00 AM -5:30 PM Eastern

Now taking trades on used TEN-TEC gear.

America's Best

TEN-TEC

1185 Dolly Parton Parkway
Sevierville, TN 37862, U.S.A.
Office: (615) 453-7172
Fax: (615) 428-4483
Repair Dept.: 615-428-0364

VISA, MASTERCARD, DISCOVER

UNDER GSA CONTRACT
Government / Commercial
Inquiries invited

MADE IN USA

NEW
DUAL BAND RINGO

cushcraft

AR-270 (2m/70cm)

The engineering hams at Cushcraft bring to you an all new computer aided design.

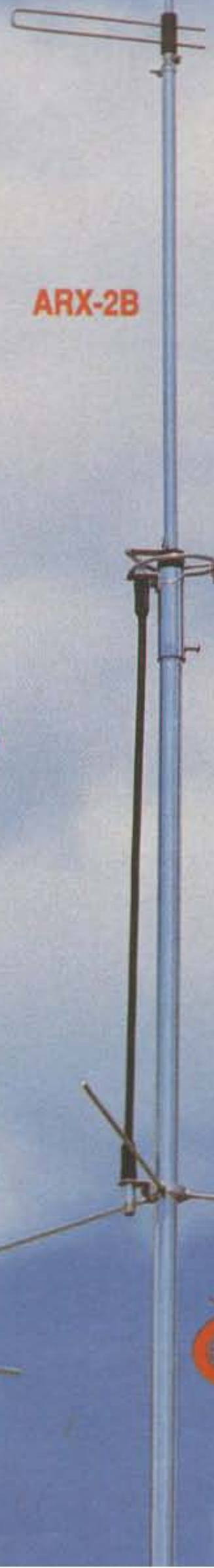
AR-270 uses the latest technology to give excellent gain and low angle radiation in a durable all aluminum antenna. It is a perfect choice for FM simplex, repeater or packet radio. Enjoy the full performance of your dual band radio with this exciting new antenna.

- **Excellent gain**
- **Broadband, minimum VSWR**
- **All aluminum - reduces static build-up**
- **No painted surface to chip peel or crack**
- **UV stabilized insulators**
- **Precision wound coils won't detune**
- **SO-239 connector**
- **Less than 4 feet high**
- **DC ground for lightning protection**
- **Mounting flexibility**
- **Rust free stainless steel hardware**
- **RF de-coupling eliminates TVI**
- **Amazing performance**

AR-270	144-148 MHz 435-450 MHz

ARX-450B

AR-270



ARX-2B

AVAILABLE THROUGH
DEALERS WORLDWIDE

RINGO RANGERS

The world's most popular 2 meter, 1 1/4 meter and 70 cm antennas.

They stand tall to give you more performance and wider area coverage. Ringo Rangers are your best single band antenna choice for FM repeaters, simplex or packet radio. There are many imitations, but none equal the value of a Ringo Ranger.

- **Excellent gain and bandwidth**
- **Optimum low angle radiation**
- **Broadband with low VSWR**
- **Highest power rating**
- **Built in lightning arrester**
- **RF de-coupling radials**
- **All weather performance**
- **SO-239 connector**
- **Rust free stainless steel hardware**
- **Slim profile for better appearance**
- **Durable static free aluminum**
- **Traditional Cushcraft value**

ARX-2B	135-160 MHz
ARX-220B	220-225 MHz
ARX-450B	435-450 MHz
ARX-450BN*	435-450 MHz

* N connector

cushcraft
CORPORATION

P.O. BOX 4680 • 48 PERIMETER ROAD
MANCHESTER, NH 03108 USA
TEL: 603-627-7877 • FAX: 603-627-1764

CIRCLE 69 ON READER SERVICE CARD

OUR BEST KEPT SECRET IS OUT!

We're best known for our HF transceivers and amplifiers. We also offer a complete line of high quality accessories for the shack. We just couldn't keep it to ourselves any longer.

AUTOMATIC ANTENNA COUPLER, RATED FULL LEGAL LIMIT, MODEL 253. Apply power, press tune, within seconds your antenna is matched! Handles up to 10:1 SWR, 1.8 - 30 MHz. 4 position antenna switch, built-in balun. $995*

ANTENNA TUNER, RATED FULL POWER, MODEL 238. Modified, reversible "L" network matches broad range of impedances with no false resonances. Handles 2 KW max, built-in lighted meter (external 12V required) monitors forward power on 200 or 2000 watt scales and SWR. 4 position antenna switch for coax, single wire or balanced line using built-in balun. $379*

ANTENNA TUNER, RATED 200 WATTS, Model 254 Versatile, compact "T" network uses our unique TEN-TEC 47 position tapped inductor. 1.8 - 30 MHz. Built-in lighted meter (external 12V required) shows 0 - 20 or 0 - 200 watts and SWR. 4 position antenna switch and built-in balun. $189*

ANTENNA TUNER, PORTABLE/MOBILE, Model 291 RATED 200 WATTS Same "T" network as Model 254 in a more compact size, without meter. $89*

BROADBAND DUMMY LOAD, MODEL 239. No shack is complete without this economical dummy load. 160 thru 2 meters @ 1:1 SWR, thru 70 cm below 2:1 SWR. 300 watts intermittent duty. $27.95*

KW DRY DUMMY LOAD, MODEL 240KW. Forced air cooled, handles 1500 watts "key down" for up to 2 minutes. 160 thru 10 meters @ 1.2:1 SWR, 1.5:1 @ 2 meters. Requires 12V. Signal sample output, over-temperature alarm. $259*

LOW PASS FILTER, MODEL 5061. You get what you pay for! No competitor's filter is as effective or well built. 9th order Chebyshev circuit. Unlimited operation at 1500 watts at up to 2:1 SWR. $79*

HIGH PASS TV/FM FILTER, MODEL 5060. 40 dB attenuation below 30 MHz. Insertion loss 2 dB or less. Extruded aluminum with type F connectors. $16*

MOBILE ANTENNAS. Linear loaded design is best compromise between efficiency and mechanical strength. Barely noticeable on vehicle. Precision wound on PVC, protected with heat shrink jacket. Handles 200 watts, stands 78" with minimum wind load. Fittings chromed, stainless whip. 3/8" x 24 thread.

9 models available:
Models 4080, 4075 $39 each*
Models 4040, 4030 $37 each*
Models 4020, 4017, 4015, 4012, 4010 $34 each*
Mobile Matcher, Model 3001 $18*

America's Best

TEN-TEC

1185 Dolly Parton Parkway
Sevierville, TN 37862 U.S.A.
Office: (615) 453-7172
Fax: (615) 428-4483
Repair Dept.: (615) 428-0364

- Buy Direct and Get the Factory Price
- No-Risk 30 Day Money-Back Guarantee**
- Expert Advice
- Legendary Service

*Plus shipping and handling
**Customer pays shipping both ways

VISA, MASTERCARD, DISCOVER

UNDER GSA CONTRACT
Government / Commercial
Inquiries Invited

ORDER FACTORY DIRECT HOTLINE
CALL 1-800-833-7373
Telephone Hours: 9:00 AM -5:30 PM Eastern

Now taking trades on used TEN-TEC gear.
Reconditioned used gear for sale.

MADE IN USA

- FEBRUARY IS ICOM MONTH -

HAM RADIO OUTLET®

WORLDWIDE DISTRIBUTION

FEBRUARY IS ICOM MONTH AT HAM RADIO OUTLET! SPECIAL PRICES APPLY EVERY DAY

> SPECIAL PRICING
on most ICOM products exclusive only at Ham Radio Outlet. $10. off any HT, $20 off on mobiles, $50. HF (This from our already low prices) Pricing good in store and telephone orders.

> FREE WEEKLY DRAWING
Each saturday at every store win an IC-2iA handheld.
(11 lucky winners each week)
(Need not be present to win)

> FREE DAILY DRAWING
Every store win a monogrammed ICOM jacket. (Winner will receive jacket direct from ICOM)(Need not be present to win)

> AUTOMATIC ENTRY
with any ICOM purchase at one of our 11 locations

> NO PURCHASE NECESSARY
to qualify. Just send your mailing label or QSL card (include telephone #) to the store nearest you. Void where prohibited by law.

> FREE ICOM HATS
on any purchase over $200 for the first 1,000 customers.

> SEE THE NEW
IC-737, IC-W21AT, IC-2iA, IC-Delta 1A at any of our 11 locations

ICOM

IC-737

HF Transceiver

$50. coupon good in Feb.!

Announcing the ICOM 737!

ICOM

IC-2iA

$10. coupon good in Feb.!

Introducing the ICOM 2iA!

NEW!

FREE weekly drawing at each store

ICOM

IC-W21AT

$10. coupon good in Feb.!

Now offering the all new ICOM W21AT!

NEW!

ICOM

IC-229H

2 Meter Mobile

$20. coupon good in Feb.!

50 W • 20 Memories • Small Size
Extended RX Coverage, 118-174 MHz

GREAT PRICE

COAST TO COAST

FREE SHIPMENT
UPS - Most items over $100

RAPID DELIVERIES FROM THE STORE NEAREST TO YOU!

ANAHEIM, CA 92801
933 N. Euclid St.
(714) 533-7373
(800) 854-6046
Jim Rafferty, N6RJ, V.P.
Near Disneyland

OAKLAND, CA 94606
2210 Livingston St.
(510) 534-5757
(800) 854-6046
Rich, WA9WYB, Mgr.
I-880 at 23rd Ave. ramp

SAN DIEGO, CA 92123
5375 Kearny Villa Rd.
(619) 560-4900
(800) 854-6046
Tom, KM6K, Mgr.
Hwy. 163 &
Claremont Mesa

SUNNYVALE, CA 94086
510 Lawrence Expwy. #102
(408) 736-9496
(800) 854-6046
Tom, KB6LUC, Mgr.
Lawrence Expwy.
So. from Hwy. 101

VAN NUYS, CA 91411
6265 Sepulveda Blvd.
(818) 988-2212
(800) 854-6046
Jon, KB6ZBI, Mgr.
San Diego Fwy.
at Victory Blvd.

Bob Ferrero W6RJ
President/Owner

Jim Rafferty N6RJ
Vice President

PORTLAND, OR 97223
11705 S.W. Pacific Hwy.
(503) 598-0555
(800) 854-6046
Earl, KE7OA, Mgr.
Tigard-99W exit
from Hwy. 5 & 217

DENVER, CO 80231
8400 E. Iliff Ave., #9
(303) 745-7373
(800) 444-9476
George, KD0RW, Mgr.

PHOENIX, AZ 85015
1702 W. Camelback Rd.
(602) 242-3515
(800) 444-9476
Gary, WB7SLY, Mgr.
East of Highway 17

ATLANTA, GA 30340
6071 Buford Highway
(404) 263-0700
(800) 444-7927
Mark, KJ4VO, Mgr.
Doraville, 1 mi.
no. of I-285

WOODBRIDGE, VA 22191
Washington D.C. area
14803 Build America Dr.
(703) 643-1063
(800) 444-4799
Curtis, WB4KZL, Mgr.
Exit 54, I-95, South to US 1

SALEM, NH 03079
Boston MA area
224 N. Broadway
(603) 898-3750
(800) 444-0047
Jim, K3QIO, Mgr.
Exit 1, I-93;
28 mi. No. of Boston

AZ, CA, CO, GA, VA residents add sales tax.
*Prices, specifications, descriptions, subject to change without notice.

DXing and DXpeditions don't always involve exotic countries; they sometimes involve exotic islands. Many amateurs avidly chase and collect exotic islands for the IOTA Award, and the pile-ups can be just as deep.

DXpedition To The Saltee Islands (EU-103)

BY DECLAN CRAIG*, EI6FR

According to legend, as St. Patrick chased the Devil out of Ireland, the Devil in a fit of temper took a bite out of the Galtee Mountains. As he fled across the sea, a piece of the mountain fell from his mouth. A mile farther out to sea and three miles from shore he spat the remainder into the water. The islands thus formed are the Saltees, and today they are perhaps the finest seabird sanctuaries in Europe.

The islands in the past have been home to monks seeking solitude, and to a long since departed fishing and farming community. Since 1954 The Saltees have belonged to the Neale family, and the head of that family is known as the Prince of The Saltees. The control of The Saltees and the surrounding sea area is the right of the Prince and his heirs, or in the event of no member of the family living, the island's government will be turned over to "The Absent Twelve," who can come from any country on Earth but all must be fishermen.

Visitors to The Saltees are welcome, and all that is asked is that they leave the islands as they found them for future generations to enjoy. Visitors are taken to the islands by Willy Bates, who for over the course of fifty years has ferried thousands to these beautiful islands. During the course of our operation we were amazed at the number of operators who had visited The Saltees and who asked about Willy and his boat. To all of you Willy sends his regards and hopes one day you will visit again.

In 1990 The Islandhoppers DX Group activated The Saltees for a couple of days. In 1991 the group was active from the Blasket Islands (EU-007). The group felt that there were still many island hunters, particularly stateside, who needed The Saltees, so we decided to return to EU-103 and try to provide the opportunity for as many as possible.

The intrepid EJ0SI team. The back row: Conor, EI5HF; Tony, EI2GX; and Declan, EI6FR. The front row, left to right: Liam, EI7DSB; Tony, EI3HA; and Emmet, EI7HF. Alan, the SWL, took the picture.

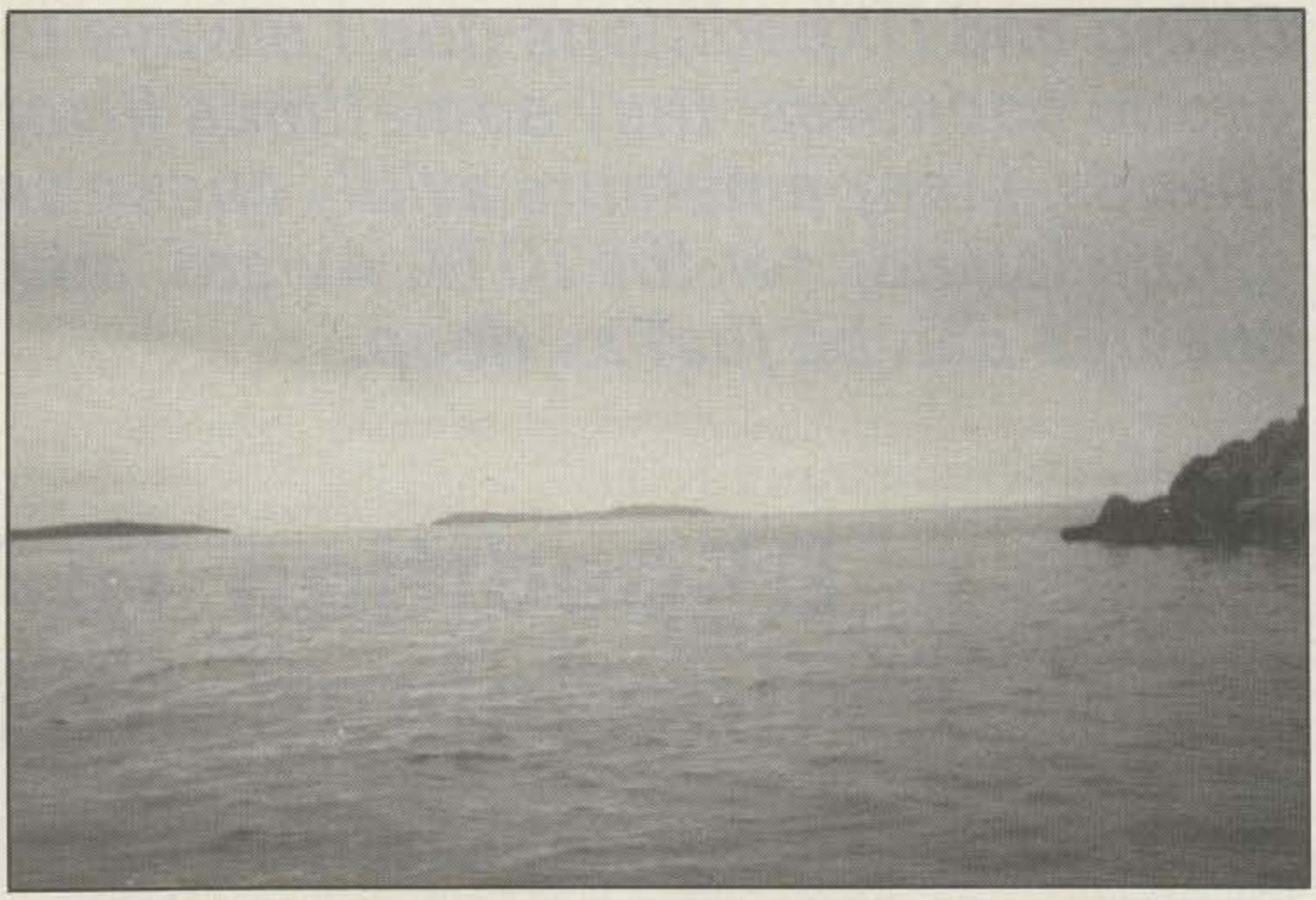
After discussion we decided to operate from the island for four to five days in July. It was planned to operate on both CW and SSB with a particular effort on the WARC bands. We were very pleased when the Department of Communications issued us the special call EJ0SI for our operation. With the help of Peter, EI8GM, the Prince of the Saltees, Michael the First, gave permission for our extended stay on the islands. After some changes in the line-up, the final team was decided: Tony, EI2GX; Tony, EI3HA; Conor, EI5HF, Declan, EI6FR; Emmet, EI7HF; Liam, EI7DSB; and SWL (and generator doctor) Alan. The dates for the operation were set for July 9th to the 14th. The IARU HF Championships were set for this weekend, but we decided not to take part in the contest but instead to concentrate our time on working island hunters. Advance publicity of the operation was distributed with special thanks to Brendan at *DX News-Sheet*; Johnny, I1HYW; Joe, EA6MR; and the *International DX Bulletin*

*167 St. James's Rd., Greenhill's, Dublin 12, Rep. of Ireland

for their efforts on our behalf.

One of the difficulties encountered in an operation from The Saltees is that of getting the equipment on to the islands. The equipment and supplies must first be loaded onto a fishing boat, which makes the 45 minute trip to the islands. This boat anchors about 300 feet from shore, and all the equipment for the operation is offloaded into a small open boat which makes the trip to shore. Because no jetty exists and the boat can't quite make the beach, the DXpeditioner must get his feet wet and carry his gear to shore.

We had decided that the minimum requirement for the operation was two complete HF stations. In the end we were able to bring from Kenwood a TS440S, a TS140S, and a TS130S, and from Yaesu an FT747GX. Antennas brought to the island included a Mosley Classic Tribander; a Hy-Gain 18VS vertical; dipoles for 80, 40, 30 and 17 meters; and a half-wave grounded Delta Loop for 40. With all the gear, plus generator, tents, food, and clothing piled on the dock, the boat began to look decidedly smaller.



This is what it looks like as you approach The Saltee Islands, IOTA (EU-103).

We were in luck with the weather. The threatened rain held off, and after 45 minutes we anchored off the islands. The task of getting the equipment ashore began. The first boat load of gear went ashore, and as the tidal conditions were perfect, the team completed the transfer without any loss or damage. The ops, however, at this stage had gotten their feet very wet and had picked up a bruise or two from the struggle over seaweed-covered rocks.

After a short inspection of the island we decided to set up the stations on one of the island's high points. Our sleeping quarters were to be in the loft of a small building kept open on the island for visitors in the event of inclement weather. This was located close to the shore and well away from the operating site. A well beside this building provided our drinking water.

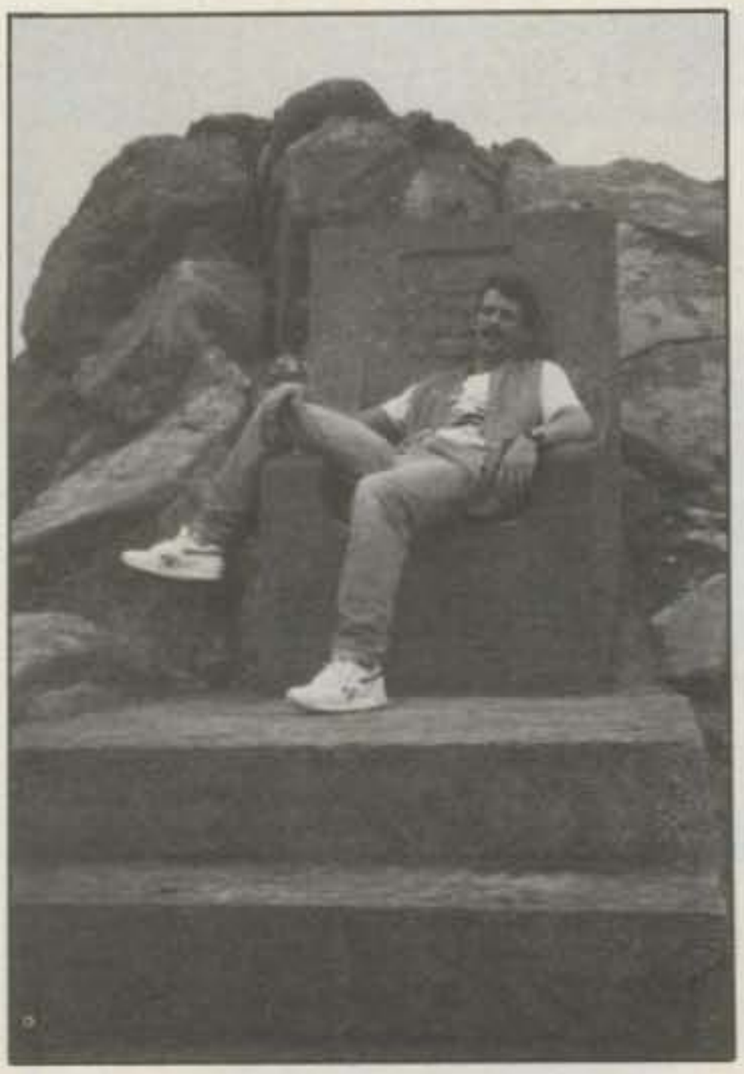
Inside the building we discovered a racing pigeon who had made it and the island its home. Percy, as we named him, quickly became the team mascot and joined us for meals. Each evening he made his bed in our quarters. If anybody has lost a rather fat and lazy racing pigeon with a poor sense of direction and the tag number GB 91 B31730, we can report he's alive and living well on the Great Saltee island.

At the island's summit and set into an outcrop of rock is the throne of the Prince of The Saltees. To the front of this is an open, grassy area with a large flag pole, a convenient antenna support. We established our operating site at this location. The generator was positioned behind the rock outcrop so that on this occasion the "power behind the throne" was a 3 kVA generator.

The team split into two working parties. One set up the operating tent and field kitchen, while the other put the antennas in place. First up was the Hy-Gain 18VS vertical. Next the flag pole was climbed and the inverted Vees for 80, 40, and 30 meters were put in place. A 20 foot aluminum ladder was set upright and the Mosley tribander affixed to it. This arrangement worked very well. Rotation of the beam was achieved by the Armstrong method. Team members temporarily unclipped the stays and moved the ladder and beam before re-staying.

After several hour's work in brilliant sunshine, and after a couple of beers to cool off, EJØSI was ready to go on the air. Initial operation was on 14.260, and the first station in the log was EA6ABN at 1600Z. At 1603 W3KH became the first of many stateside QSOs. Our second station was up and running on 40 meters at 1800Z with EI8GM in the log. Shortly thereafter G3XYP gave us our first QSO with our friends in G-land. Meanwhile, on 20 meters the vertical continued to perform well with 5Z4BP reporting a good signal in Africa. This was confirmed a short time later when TL8NG appeared in the log. CW operation began

The operating site of EJØSI.



Tony, EI2GX, takes a break on the official Throne of the Prince of The Saltees.

The kitchen of the "Saltee Catering Corp." showing head chef, Tony, EI3HA.

Declan, EI6FR, operates CW while Emmet, EI7HF, operates phone.

at 1630Z with the first 5NN going to HA5DA.

We took a break for the first of many fine meals prepared by the DXpedition's chef, Tony, EI3HA. Shortly afterwards we resumed operation, and with two stations on the air, it was a pleasure to see the logs filling with the calls of many old and new friends. It was great to hear from Johnny, I1HYW, at 1725Z, and during the hours that followed F9RM, VE7IG, N7BZI, CT4NH, and many more of the IOTA gang. Operation was mainly concentrated around the IOTA frequencies, but a couple of DX nets were also visited, and a special thanks to the guys on 14.256, and to Selim, OE6EEG, and the European DX Net for the warm welcome they gave our station.

The WARC bands received special attention, and we were happy to provide a first QSO with EI for many stations on these bands. Thirty meters in particular was an eye-opener. It produced very loud signals from stateside in the evenings and our 100W and our vertical got many fine reports. It gave a few surprises, with VQ9 being worked in the midst of EUs and VK6HD beating out the stateside pile-up to make the log. One of the few disappointments of the trip was the lack of significant openings to Japan. However, 18 MHz did produce a short opening to this part of Asia, with JF3ASY being the first of our JA friends into the log. We all resolved to pay more attention to the WARC bands from our home stations in the future.

On Sunday morning Tony, EI2GX, opened up the station and was concerned to find that the auto-tuner in the TS440S refused to tune the Yagi. Was it water in the coax? No, it hadn't rained. Was it a badly fitted PL259? "Certainly not," cried Emmet. "I fitted it." Moments later, from out of the rig crawled a small orange and black caterpillar, who had, it seemed, found the innards of an HF transceiver a cozy place to spend the night. The caterpillar having vacated his temporary lodgings, the rig once more tuned and operated perfectly. This is not the sort of bug (HI) we are used to discovering in our equipment. Perhaps manufacturers should introduce the creepy-crawly soak test in their routines.

We were to leave the island at approximately 11 AM on Monday morning, so in the early hours of Monday we made our last QSOs from Great Saltee. Declan, EI6FR, closed down the CW operation at 0200Z local time, with KQ3F on 40 meters being his last QSO. Emmet, EI7HF, kept the SSB station on the air for a couple more hours, until at 0400Z local time VO1JCC went into the log as the last QSO of Saltees '92.

The morning brought heavy rain, which continued throughout the day, making the job of removing our gear to the beach uncomfortable. However, the prospect of a hot meal and a cool beer waiting at Kilmore Quay made the work a lot easier. A couple of hours later, the equipment and seven very wet DXpeditioners were aboard the boat heading for home. At Kilmore Quay the gear was quickly off-loaded, and there was an anxious moment when one of the tents which had been borrowed from a scout troop teetered on the pier edge before being hauled to safety.

In the local hostelry, after a change of clothes and with dinner ordered, we reviewed the operation. We had kept two transceivers on the air at all times for 70 hours and had over 3000 contacts in the SSB log, with a further 546 having been made by Declan, EI6FR, on CW. All continents had been worked, and some fine DX contacts made, including QSOs with ZL and KH6 in the Pacific, TF and JW in the north, TL8 and 5Z4 in Africa, and some rare islands such as PY0T. We were also very pleased to have worked a number of other IOTA expeditioners, and hope they enjoyed their operation as much as we did ours. Plans were laid for our next operation, and we hope to meet many of our friends again from another island.

Emmet, EI7HF, and Tony, EI2GX, concentrate on giving out EJ0SI contacts.

All QSOs will be confirmed via the bureau, but for those who wish to QSL direct, Declan, EI6FR, will act as QSL manager.

Many thanks to all the stations who took the time to work us. See you from the next island! CQ

— 11 STORE BUYING POWER —

HAM RADIO OUTLET

WORLDWIDE DISTRIBUTION

ALINCO
DR-1200T
(Packet Only)

NEW!

2M Packet Only
Transceiver, 25W
REG. $319.
SPECIAL $249.95

ALINCO
SR-4 / SR-4D
Simplex Duplex

NEW!

12V, Microprocessor Based Remote Controller
Use with any transceiver • Digital voice storage configuration
Voice mail, Great for Ham Clubs! • DTMF remotely controlled commands
SR-4 (Simplex) requires only 1 frequency for complete simplex repeater operation
SR-4D (Duplex) requires 2 frequencies for duplex repeater operation

CALL FOR SPECIAL PRICING

ALINCO
DR-119T

2M 45W Mobile
Backlit LCD, Wide Range RX

CALL FOR SPECIAL PRICE!

ALINCO
DJ-F1T/DJ-F1T-HP

NEW!

2w 2 meter compact HT
8 scan modes • 40 memories
Now 5W Version Available, Too!

CALL FOR SPECIAL PRICE

ALINCO
DR-600T
2M/440 FM Transceiver

NEW!

45W/35W + Airband RX
Detachable/Remotable Head
Keyboard freq. entry from microphone!

CALL FOR SPECIAL PRICE

ALINCO
DJ-180T

NEW!

2M 2W HT
10 Mem. Standard
upgradable to 200 Mem.
PL Encode/Decode built in
DTMF Pad Included
no keyboard entry of frequency
Scanning

CALL FOR SPECIAL PRICING

ALINCO
DJ-580T
2M/440 Dual Band

40 Mem Channels
DSQ, Dual Display
CTCSS Enc/Dec Built-in
Cross Band Full Duplex

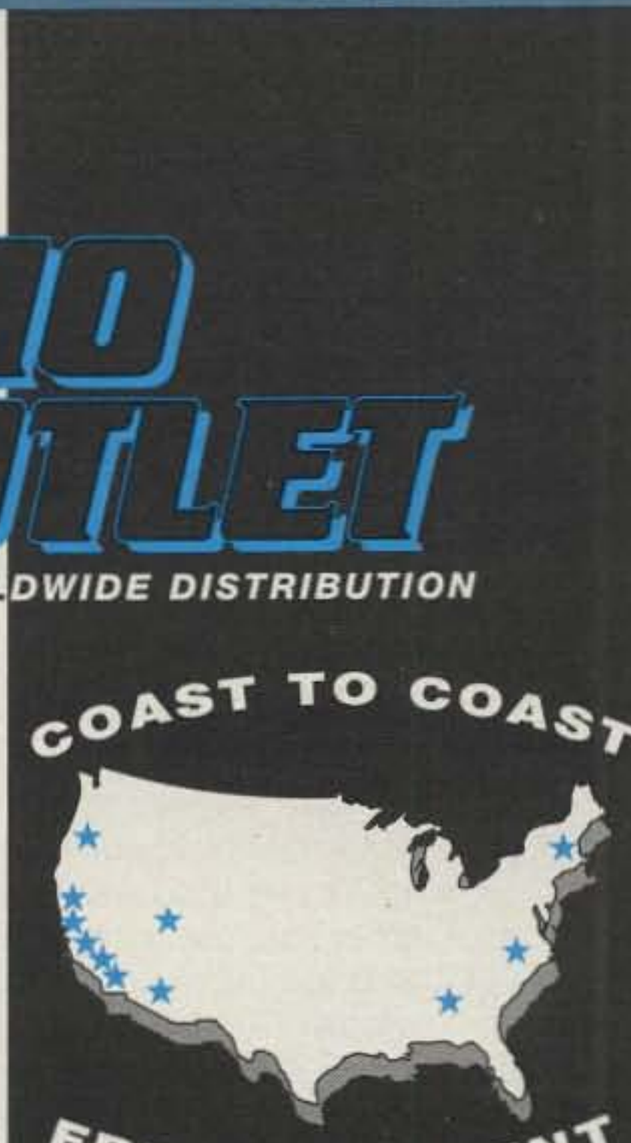
CALL FOR SPECIAL LOW PRICE

NEW!

ALINCO
DJ-560 TA
2M/440

SPECIAL! $299.95

Dual RX
40 Mem. Channels
Built-in DSQ
PL Enc./Decode Built-in
Call Now!



FREE SHIPMENT
UPS - Most items over $100

RAPID DELIVERIES FROM
THE STORE NEAREST TO YOU!

ANAHEIM, CA 92801
933 N. Euclid St.
(714) 533-7373
(800) 854-6046
Jim Rafferty, N6RJ, V.P.
Near Disneyland

OAKLAND, CA 94606
2210 Livingston St.
(510) 534-5757
(800) 854-6046
Rich, WA9WYB, Mgr.
I-880 at 23rd Ave. ramp

SAN DIEGO, CA 92123
5375 Kearny Villa Rd.
(619) 560-4900
(800) 854-6046
Tom, KM6K, Mgr.
Hwy 163 &
Claremont Mesa

SUNNYVALE, CA 94086
510 Lawrence Expwy. #102
(408) 736-9496
(800) 854-6046
Tom, KB6LUC, Mgr.
Lawrence Expwy.
So. from Hwy. 101

VAN NUYS, CA 91411
6265 Sepulveda Blvd.
(818) 988-2212
(800) 854-6046
Jon, KB6ZBI, Mgr.
San Diego Fwy.
at Victory Blvd.

Bob Ferrero W6RJ
President/Owner

Jim Rafferty N6RJ
Vice President

PORTLAND, OR 97223
11705 S.W. Pacific Hwy.
(503) 598-0555
(800) 854-6046
Earl, KE7OA, Mgr.
Tigard-99W exit
from Hwy. 5 & 217

DENVER, CO 80231
8400 E. Iliff Ave., #9
(303) 745-7373
(800) 444-9476
George, KDØRW, Mgr.

PHOENIX, AZ 85015
1702 W. Camelback Rd.
(602) 242-3515
(800) 444-9476
Gary, WB7SLY, Mgr.
East of Highway 17

ATLANTA, GA 30340
6071 Buford Highway
(404) 263-0700
(800) 444-7927
Mark, KJ4VO, Mgr.
Doraville, 1 mi.
no. of I-285

WOODBRIDGE, VA 22191
Washington D.C. area
14803 Build America Dr.
(703) 643-1063
(800) 444-4799
Curtis, WB4KZL, Mgr.
Exit 54, I-95, South to US 1

SALEM, NH 03079
Boston, MA area
224 N. Broadway
(603) 898-3750
(800) 444-0047
Jim, K3QIO, Mgr.
Exit 1, I-93;
28 mi. No. of Boston

AZ, CA, CO, GA, VA residents add sales tax.
Prices, specifications, descriptions, subject to change without notice.

CQ REVIEWS:

The Tejas Backpacker I QRP Transceiver

BY DAVE INGRAM*, K4TWJ

If you have ever listened below the normal level of strong signals on our HF bands, you know QRP is presently booming in popularity. In addition to stand-alone QRPers braving DX pile-ups (and proving the operator rather than the rig makes the difference), there are informal QRP nets open to all low-power enthusiasts every Wednesday at 0100 GMT on 7.030 kHz and each Sunday afternoon at 2300 GMT on 14.060 kHz. There are also informal QRP QSO parties each month, and several major QRP contests during various weekends throughout the year. Many QRPers enjoy building and using their own equipment, so there is also a special category in many QRP contests for operators using home-assembled gear.

Communicating with a small, battery-powered rig is fun and exhilarating. The rig is easy to set up almost anywhere, and the results are quite impressive when you use a good QRP transceiver such as the Backpacker I featured in this review. This little gem is a 2.5 watt output CW transceiver small enough to carry anywhere, and 2.5 watts is plenty of power for good QSOs when connected to a dipole (or better) antenna. This fact is particularly true on the 200 watt-limited and CW-only band of 30 meters. In fact, my first contact while using the Backpacker I on 10.1 MHz was 3B8CF on Mauritius Island in the Indian Ocean. He answered me on the first call, and a rather sizable pile-up formed immediately thereafter.

If you really want to enjoy the world of QRP in high style after getting your own Backpacker I, incidentally, I heartily recommend joining two or three QRP clubs. Their quarterly newsletters will keep you well informed on happenings in this area. The most popular clubs are QRP ARCI (c/o KG5F, 2045 Ash Hill Road, Carrollton, TX 76007), Michigan QRP Club (P.O. Box 80804, Lansing, MI 48908-0804), and the U.S. Division of the G-QRP Club (c/o W5HKA, 2852 Oak Forest, Grapevine, TX 76051). Be sure to include an SASE for details. Now on with the review!

The Backpacker I QRP CW transceiver. The unit is available in kit or preassembled form for operation on any single band from 80–10 meters, including the WARC bands.

Overview

The Backpacker I CW transceiver is produced in kit or assembled form by Tejas RF Technology Company. It measures 2½ "H × 6½ "W × 5½ "D, and is enclosed in a scratch-resistant, anodized aluminum case with silk-screened labels on front and back panels. The transceiver can be assembled for operation on any single band from 80 through 10 meters, including WARCs. Due to its unique design, changing bands only involves swapping one crystal and 10 other fixed components. That's right: No modifications to the VFO are necessary when changing bands, and dial calibration also remains intact.

The Backpacker I is an updated and expanded version of the popular W7EL transceiver described a few years ago in *QST*. It has one of the best direct conversion receivers I have seen, three degrees of selectivity, RIT with center detent, spot switch for perfectly zero beating other signals, vernier-drive tuning, and full break-in with no relays. The transmitter loafs along at 2.5 watts output; it has timed sequence differential keying that sounds great, high SWR protection, and adjustable CW sidetone that tracks with the front-panel volume control. Transmitter output is also adjustable down to almost zero for milliwatting, and this ultra-low-power pursuit is really hot in QRP today. In fact, many QRPers are working the world while using less than 50 mw of power—a most commendable achievement from any point of view!

The Backpacker I requires a 12 volt DC power source capable of supplying 300 ma. To power the Backpacker I, I used one of the new Quantum "Ham Batteries" designed for all-day operation with an FM handheld, and it worked great. The setup is so portable, I can even operate on my back deck or on a beach. If you decide to "roll your own" battery pack, there is sufficient room inside the Backpacker I's case to squeeze it in and have a completely self-contained rig. Add a miniature key and

*4941 Scenic View Drive, Birmingham, AL 35210

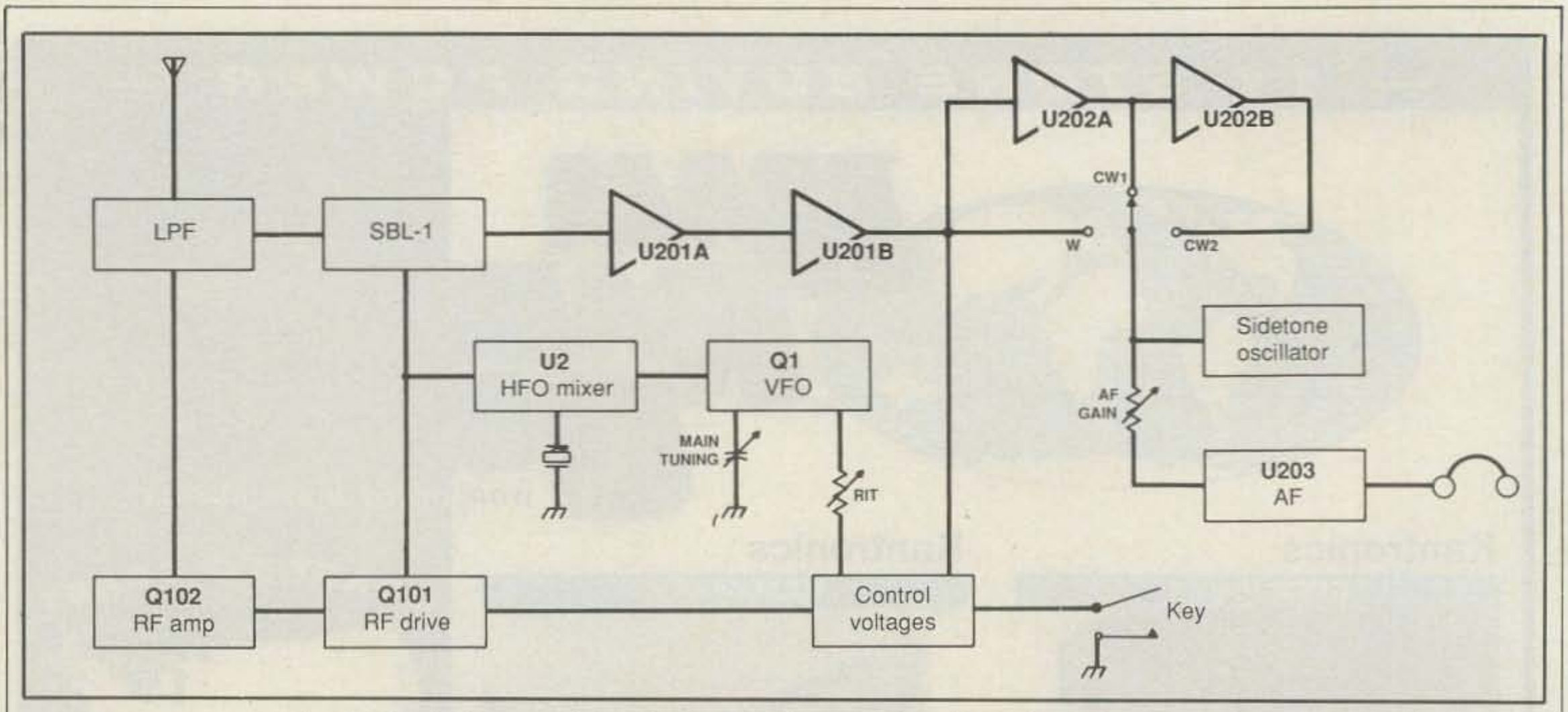


Fig. 1- Block diagram of the Backpacker I transceiver. (See discussion in text.)

a roll-up antenna, slip the whole works into a small camping bag, and you have a complete station ready for traveling or IOTA expeditioning!

Inside Views

The Backpacker I is assembled on three well-designed PC boards that make assembly easy and testing a snap. One board contains the direct-conversion receiver, another board supports the two-transistor transmitter, and the third board contains the VFO system. The front-panel-mounted 6:1 gear reduction vernier drive is mounted so you can install it one way and later reverse it exactly 180 degrees in changing to differently tuned bands. You can also set the VFO range for 100 or 50 kHz, as desired. Tejas did not cut any corners in this transceiver. Another example is the rear coaxial socket-type DC power connector that is fully insulated from the metal cabinet so you can add dual RF chokes, etc., if desired.

Now let's briefly look at the Backpacker I's block diagram shown in fig. 1. Incoming signals go through a low-pass filter and diode T/R switch to a mini-circuits SBL-1 doubly balanced diode ring mixer (a superb chip for receivers). They proceed through two audio amplifier ICs (the latter U2O2 serving as a very effective narrow-band CW audio filter) and continue through another IC to the earphones. Closing the key activates the time sequence differential keying system that mutes the receiver, shifts the transmit frequency, and activates the transmitter (in that order). The VFO's output is then amplified by Q101 and boosted to full output by RF amplifier Q102—a rugged 2SC799 SWR-protected by a 36 volt zener diode. The VFO, incidentally, operates on 6.0–6.2 MHz and requires calibration only once. Afterwards, band changes are narrowed to changing a mixer crystal and receiver input/transmitter output components.

The above description was not intended to make the Backpacker I seem complex for home assembly. Indeed, it is quite easy to construct if you have some previous experience. The rig and its well-detailed manual are exceptionally good, but they are not Heathkit style (such as connect a green wire of 2 inches between point A and point B, etc.). I compare it more to a kit complete right down to the last screw, nut, and miniature component for a magazine article. If you feel hesitant about self-assembly, the Backpacker I is also available in wired and tested form. One good point about self-assembly, however: It qualifies for the "homebrew" category of various QRP contests.

On The Air

The Backpacker I is a barrel of fun to operate, and the little rig works great. Since the transceiver does not represent an arm and a leg investment, I feel more comfortable switching it on/off for a quick band check or QSO than I do with my "big rig." That consideration, combined with the fact my Backpacker I is set up for 30 meters, results in an approximate 85 percent returns ratio on calls. In strictly spare time I have already worked all continents except Africa with the little pup, and only this morning I received a reply to my first CQ from a W8 in Ohio. Two watts connected to a good dipole or Delta Loop gets out great on 30 meters!

Overall, the Backpacker I works as smooth as any "big rig," although it lacks digital readout, memories, etc. The receiver is as hot as Texas chili, the VFO is smooth and stable, and the solid-state QSK is exceptionally quiet without pops or cracks. I especially like combining the rig's variable levels of selectivity and center detent RIT control, as they make cutting out interference easy, and going back to "zero beat" is no problem. I carried the rig with me on a recent IOTA expedition to St. George Island and made contacts throughout the United States plus Japan and Australia while using a small 12 volt battery pack and simple dipole 15 feet above the ground. That's good results from any point of view!

Conclusion

Tejas RF Technology seems to really have its act together with this new Backpacker I transceiver, and it is a great way to get rolling with QRP at economical cost. The kit makes a terrific home project I think you will enjoy building, and having all the parts in one box makes assembly nice. There is also confidence in knowing you can change bands to accommodate future interests.

I understand Tejas will be producing additional amateur radio projects in kit form in the future, and judging by the quality of their Backpacker I transceiver, additional goodies from this company should be most impressive.

The Backpacker I is priced at $159.95 for the kit and $199.95 assembled and tested. For more information on the Backpacker I, contact Tejas RF Technology, 17 South Briar Hollow, Suite 101, Houston, TX 77027 (telephone 713-840-8600, or FAX 713-840-8608). CQ

Magnetic Attraction

Tired of paying higher and higher prices for V.H.F. magnetic mount antennas? Hustler has the solution. Two new series of antennas at surprisingly affordable prices. Built with the same quality and performance you expect from a Hustler product. Designed to offer you years of trouble-free operation. Priced to **save you money.**

FX SERIES (pictured mounted)

- 3.4 db gain | 5/8 wave
- 200 watt rating
- 15 foot coax
  PL-259 connector installed
- Magnetic mount holds to
  100 mph

Model FX-2—2 Meter, black & chrome
Model FX-220—220 MHz, black & chrome

33.95 ea.

Also Available in Black
Model FX-2B, 2 Meter
Model FX-220B, 220 MHz.....**38.95** ea.

RX SERIES (pictured lying down)

- 3.4 db gain | 5/8 wave
- 100 watt rating
- 15 foot coax
  PL-259 connector installed
- Magnetic mount holds to 75 mph

Model RX-2, 2 meter black & chrome
Model RX-220, 220 MHz, black & chrome

24.95 ea.

Model FX-2
(Also Available in Black)

Model RX-2
(Also Available in Black)

CIRCLE 170 ON READER SERVICE CARD

HUSTLER®

One Newtronics Place
Mineral Wells, Texas 76067
(817) 325-1386

Here's a project you can easily build that will satisfy most of your QRP (and then some) needs.

How To Design And Build A Simple QRP Dummy Load

BY ED STILES*, WA7P

Since I operate QRP almost exclusively, my dummy loads have consisted mostly of a couple of 2 watt, 100 ohm resistors soldered in parallel to an RCA plug. But when I started experimenting with MOSFET power amps recently, I needed something bigger—a dummy load that would handle about 20 watts. Sure, I could have bought one, but my motto has always been "Why buy when you can build?" Besides, by using resistors from the surplus bin at a local electronics store, along with parts from my junk box, I could roll my own for a lot less and have the fun of building, too.

The power-handling capabilities and design were dictated largely by the resistors I found in the parts bin. These were 1000 ohm, 2 watt, noninductive types. (Wirewound resistors won't work because they introduce unwanted inductance into the load.) All I had to do was figure how many I would need to connect in parallel to make a 50 ohm load, and then determine if that load would be hefty enough to survive the power levels I had in mind.

The number of resistors I needed was determined by plugging the value of a single resistor (**R**) into the following formula:

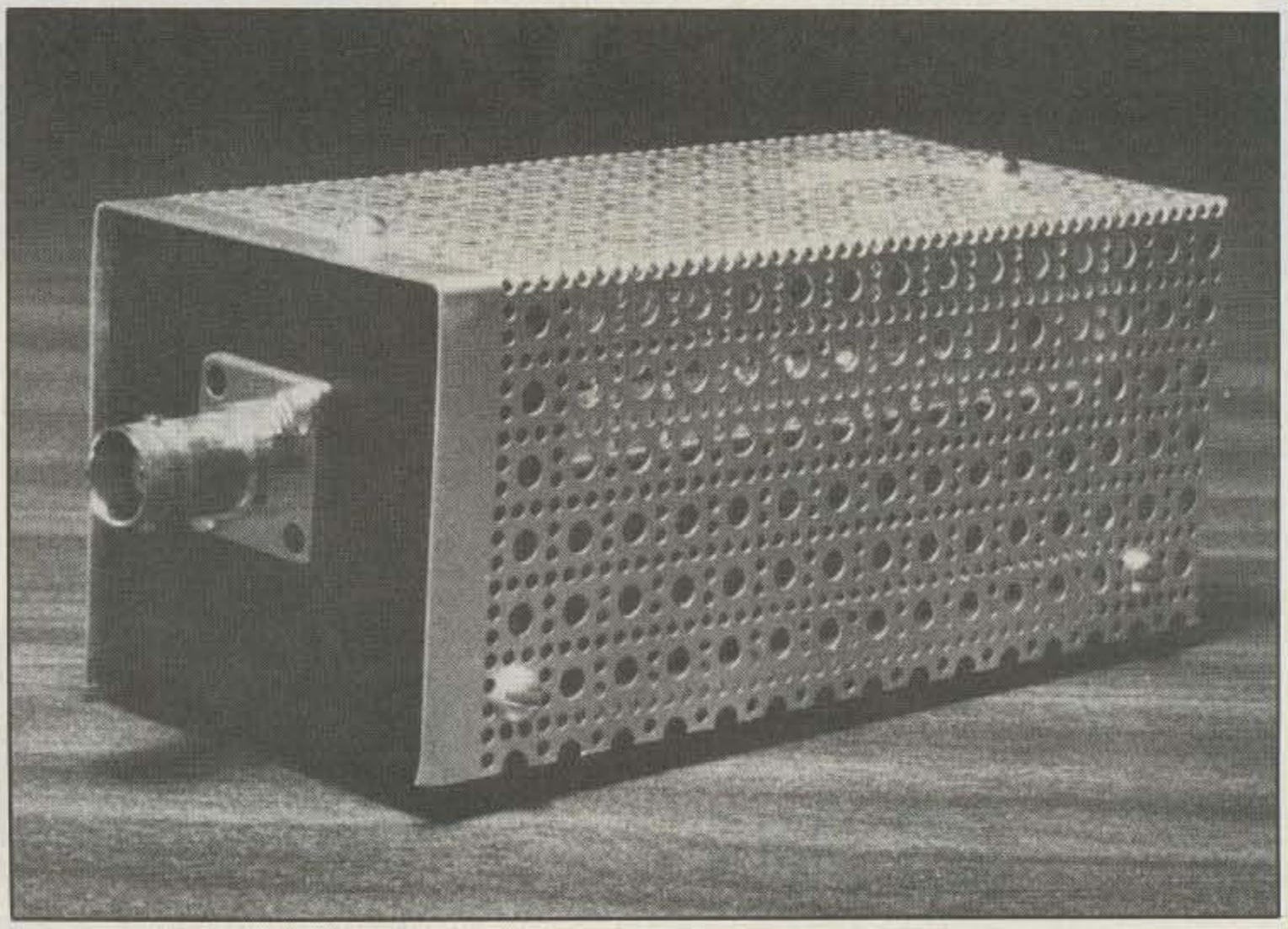
$$N = R/50$$

That would be 20 resistors in this case. Since I could buy packs of 5 resistors for a dollar, the total cash outlay for the project would be $4.00. All the other parts could be found in my junk box.

Only the question of power remained: Would the 20 resistors handle 20 watts? That can be determined easily by plugging the wattage rating of a single resistor and number of resistors connected in parallel into this formula:

$$P = WN$$

where **P** is the maximum power the load can handle, **W** is the power-handling capability of one resistor, and **N** is the number of resistors connected in parallel. This formula shows that the dummy load would handle 40 watts maximum, which gave me a comfortable safety factor for the 20 watt final amp I was planning to build.



The completed dummy load is a very compact unit.

Construction

The resistors were sandwiched between two pieces of single-sided PC board measuring 1 inch by 4.5 inches. Holes for the leads were drilled at ⅜ inch intervals on centers that were ⅛ inch from the edge of the board. This allowed a space around each resistor for air cooling.

I drilled all the holes, tinned the resistor leads and holes in the PC board, and then soldered the sandwich together, with the pieces of circuit board butting up directly against the resistors. This keeps all the leads as short as possible and prevents adding unwanted inductance into what should be a purely resistive load.

Along a center line on the bottom piece of circuit board material I drilled two holes 3 inches apart and soldered two 4-40 nuts to the board. The resistor sandwich was mounted to the enclosure by means of bolts through these nuts. This piece of PC board was attached to the ground side of a BNC connector at the input, and the other PC board on the resistor sandwich was soldered to the center pin.

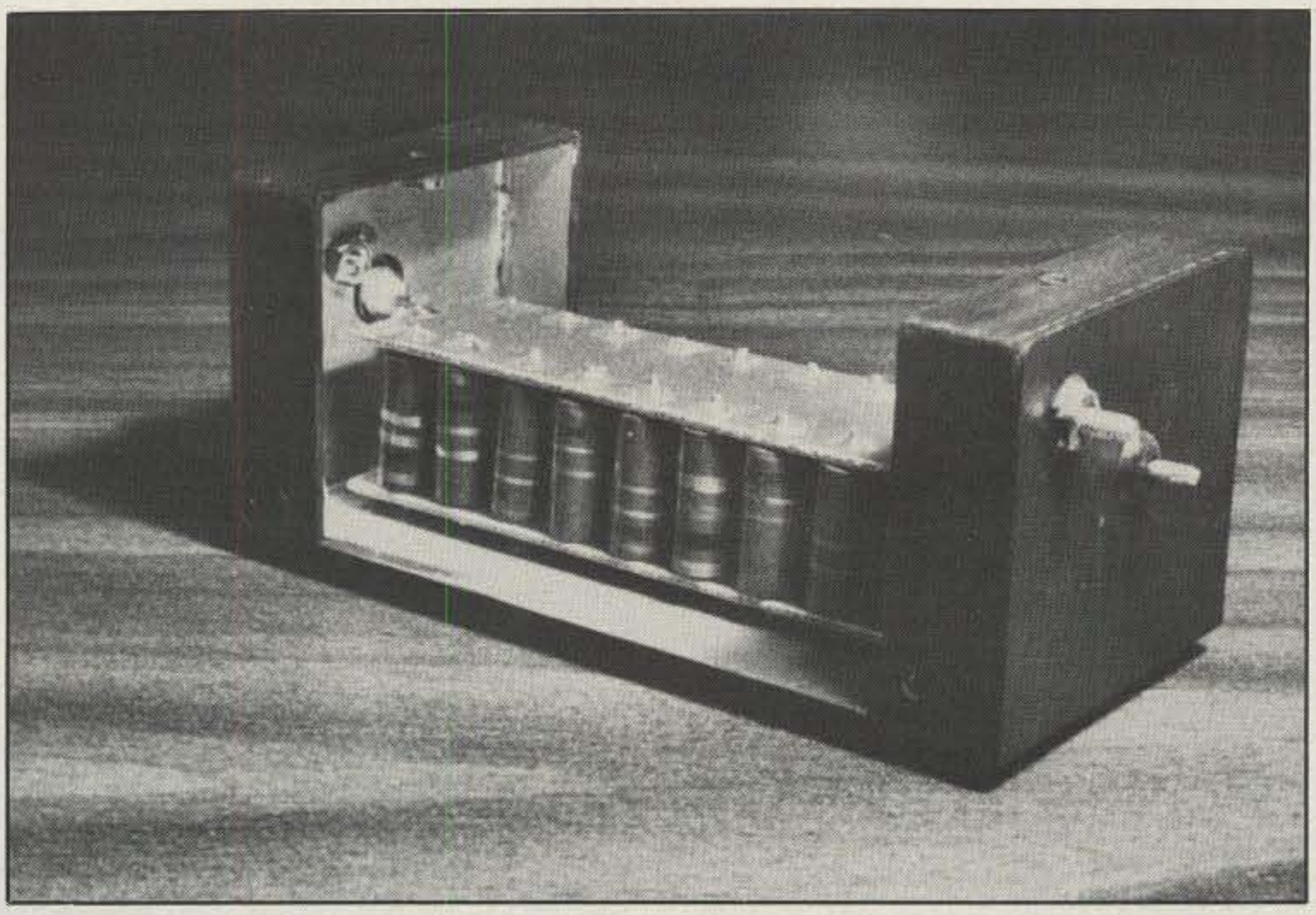
I made a box for the dummy load by soldering together several pieces of double-sided PC board. Some leftover screen material from the hardware store was bent in a U shape to make a top for the enclosure. Six 4-40 nuts were soldered over holes along the edges of the enclosure to

*3324 E. First St., Tucson, AZ 85716

hold the screen cover in place. A custom-made box was used instead of a commercial enclosure because I wanted to keep all leads as short as possible.

A BNC connector was mounted on one end of the box with its center pin soldered directly to the resistor sandwich. On the other end of the enclosure a piece of No. 14 solid wire was soldered to the sandwich. It runs out of the box through a grommet to prevent it from shorting to the case. I added this lead for my oscilloscope probe so that I can check the output waveform and power output of the various transmitters I build. The ground clip for the scope probe goes to a 4-40 screw and nut that have been soldered to the case.

After the enclosure was soldered together and the holes drilled, but before the resistor sandwich and other parts were soldered in place, the box was painted flat black. I did this in several thin coats with a brush because I don't like using spray cans.



An inside view of the dummy load. Note the very short leads on the resistors and the BNC jack. Test points for attaching an oscilloscope probe are on the rear of the unit.

Testing

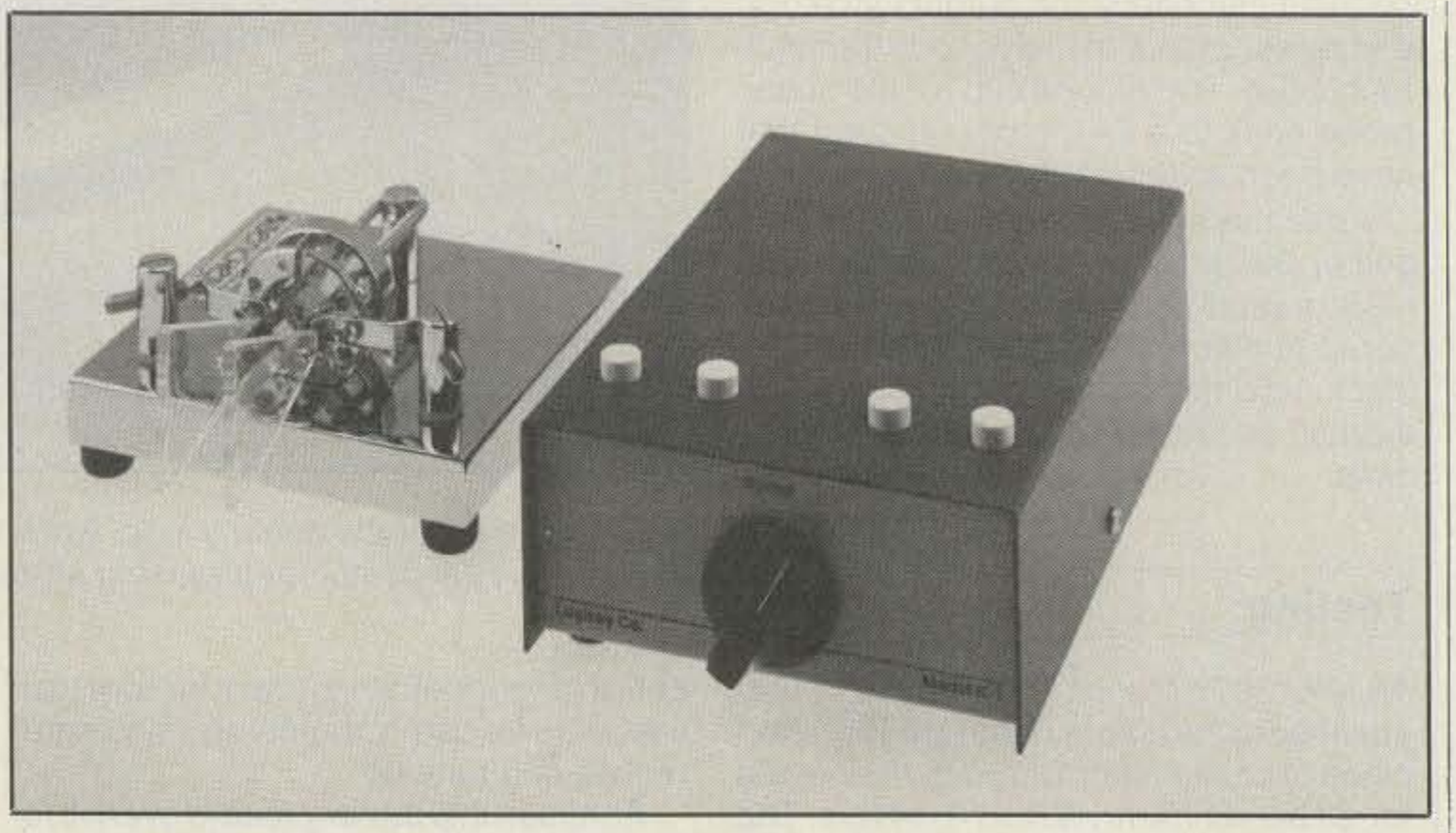
An MFJ 207 antenna SWR indicator was attached to the dummy load by a very short piece of coax and run through the ranges for all bands from 160 to 10 meters. The load showed a flat 1:1 reading across the entire range, indicating that it is more than adequate for use in homebrew transmitter testing and tune up.

Although this dummy load is overkill for transmitters in the 5-watts-or-less category, I use it now whenever I'm testing a new QRP homebrew transmitter, because the ability to easily attach a scope probe to the unit is an added plus when testing my latest creation. CQ

CQ REVIEWS:

The Logikey K-1 Keyer

BY JOHN DORR*, K1AR



The Logikey K-1 electronic keyer.

Most of the time when thinking about electronic keyers it is hard to remember why one is better than the next. For the most part, the keyers I have used over the years needed only a couple of features—some memory and a convenient way to change the speed setting. After using the Logikey K-1 keyer, I can report that this product has broken new ground for the serious CW enthusiast.

I must admit when I first saw the unit I was fooled by its simplistic look. After all, the product comes with a speed control on the front and four large buttons on the top. This seemed hardly to represent the beginnings of a CW revolution. After a brief scan of the manual and my first few QSOs, however, I was pleasantly surprised.

The Logikey K-1 keyer was designed by Jeff Russell, KCØQ, and Bud Southard, NØII. Scott is also the designer of the Super CMOS Keyer from the *Radio Amateur's Handbook*, the Kansas City Keyer, and the Super CMOS Keyer II found in November 1990 *QST*. The Logikey K-1 is in fact the commercial version of this latter design and is exclusively licensed to Logikey for distribution.

The first thing that struck me about the keyer is the obvious need to read the manual. If you are like me, you are the type who loathes the thought of reading through pages of boring information when learning how to use a product. Like most people, I prefer simply to dig in and figure it out. This is one product that does not afford that luxury and is one of the few negative aspects that I could find. You will find, however, that the manual is easy to read and will let you be well on your way to advanced use in less than an hour. Logikey did an excellent job of dividing the manual into sections so that you can work your way up to more complicated functions. I found that I was able to get started using the unit as a simple memory keyer in just five minutes. After reading the manual, you will discover that the keyer offers remarkable power and functionality.

Although very few people will ever use all of its functions, there are a number of features that you won't want to live without. In essence, the list of capabilities is like a buffet; take what you want.

I found that the unit has one of the most generous timing tolerances of any keyer I have ever used. The feel was instantly comfortable to my sending hand. The proof to me was when I lined up several keyers side by side and set their sending speeds to 45 wpm. The Logikey K-1 was the only unit I could consistently use to send with few mistakes time after time.

I was struck by the conspicuous absence of an ON/OFF switch on the unit. In fact, the keyer draws such a small amount of current (literally in microamps) when idle that this requirement is not necessary. An inexpensive 9 volt battery suffices for months of worry-free operation. Naturally, if you use the speaker monitor extensively, this time frame will drop dramatically.

The most interesting attribute of this keyer is the way you communicate with it and program commands. Unlike most conventional keyers using keyboard-oriented function pads, the Logikey K-1 is programmed by sending CW input from the paddle itself. What better way for the CW enthusiast to utilize a keyer!

The list of commands and features available through this mechanism is seemingly endless. For example, to obtain the keyer's speed setting, you press the right two buttons, activating the **Inquiry** function. When in this operating mode you have the ability to determine the current state of the keyer. After entering the inquiry mode, the keyer will automatically send a "?" through the built-in monitor speaker. By sending the letter "S" with your paddle, a response will occur providing the precise speed setting in perfect Morse and returning you automatically to the normal mode of operation. After a few days of use, this mode of programming becomes intuitive and fun.

The other major form of operation is the **Function** mode. Activated by pressing the left two buttons, you now have the ability to modify the keyer's current parameters, such as autospacing, speed, weighting, serial number, etc.

Perhaps the most powerful feature of the Logikey K-1 is the availability of embedded commands. An embedded command allows the user to insert keyer functions into programmed messages. This allows for pauses or breaks within messages, calling one message from another, contest serial numbers, or speed changes within messages, etc. While varieties of this design exist with other keyers on the market, Logikey has developed a very creative implementation indeed.

One final functional note has to do with multi-button functions. By depressing combinations of the 4-function buttons, you have the capability to invoke serial number decrements, tune, keying speed reset (20 wpm), hand key mode, etc. In any mode of operation the keyer will always provide an erroneous input "buzz" when

*c/o CQ magazine

Linear speed control (6–60 wpm)
Weighting control (25–75%)
Four 48-character message memories
Fully iambic, dot and dash memories
Messages containing embedded functions
Message loop capability
Input queuing for multiple memory calls
Multi-format serial numbers to 9999
Instant serial number decrements
Selectable auto spacing
Memory allowance for paddle insertion
Correctable transmitter keying characteristics
Built-in monitor and speaker
Tune function
Provision for remote switches
Positive or negative keying
Built-in battery backup (12 VDC)

Table I– Main features of the Logikey K-1.

you have incorrectly entered a command into the keyer.

The Logikey K-1 truly differentiates itself when you consider its most advanced features. These functions may seem small by themselves, but when viewed collectively they offer undisputed versatility. Here are just a few examples. The K-1 allows the user to program the letters "N" or "T" in place of 9 and 0 in serial number/contest exchanges. Memories are soft sectored, allowing you to program one or two larger messages into available memory. During programming the keyer will automatically tell you when less than 40 bytes of message memory are remaining. Advanced timing is also available to allow the K-1 to "mimic" the timing patterns of other keyers you may have become accustomed to using over the years (e.g., Accukeyer, Curtis, W9TO). You can terminate message replays by tapping the key or hitting two of the message buttons, eliminating that extra "dit" that always is sent when the paddle is touched. And finally, the resume feature allows the sender to stop recorded message replay at any point, insert hand-keyed text, and continue memory playback. This is nice when deployed with the KB-1 paddle/button bracket accessory to implement a complete contest exchange and CQ or QRZ in one message.

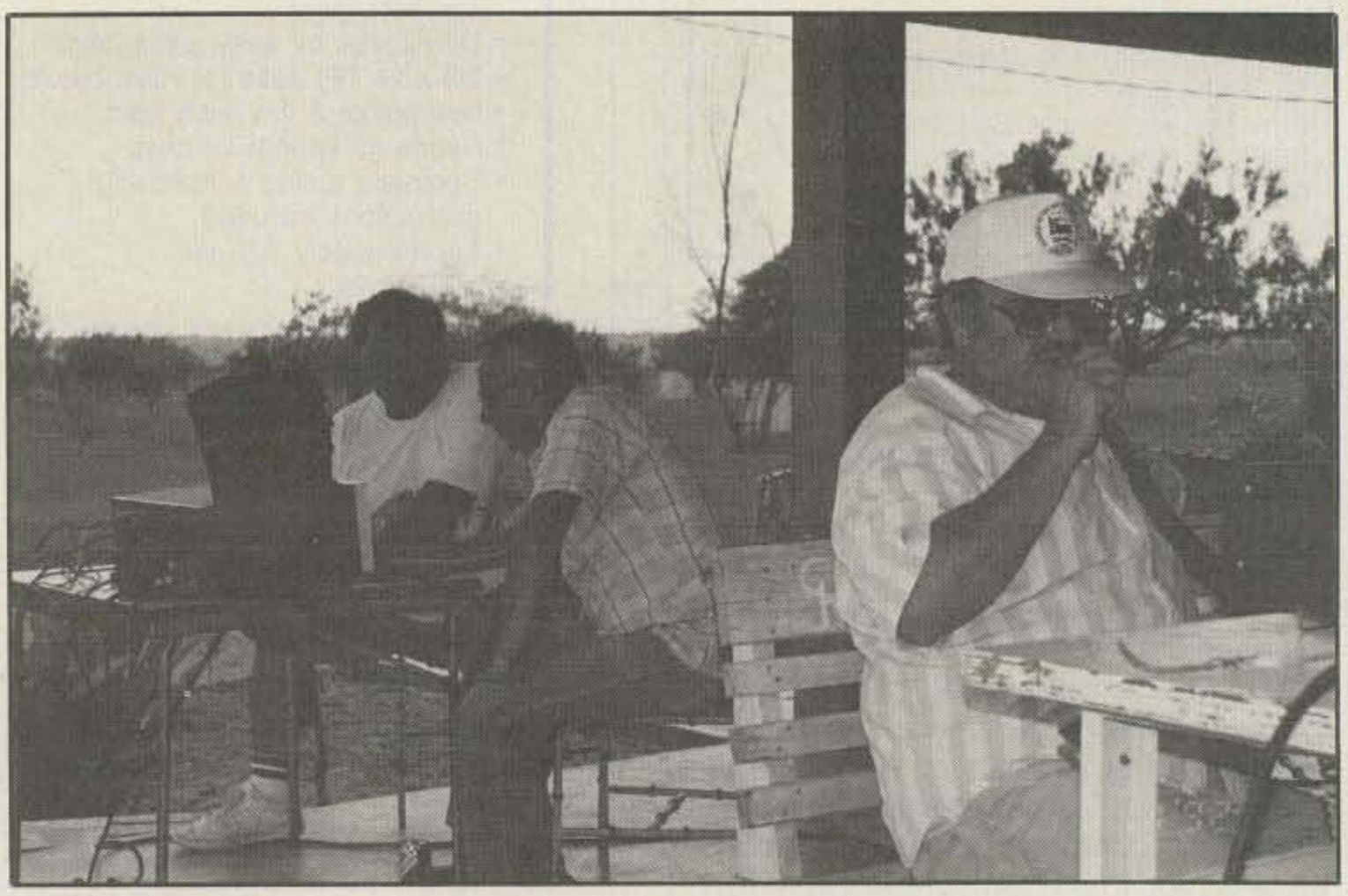
One final note is the flexibility of upgrading the unit. Logikey continues to increase the unit's functionality and provide these new capabilities through a low-cost CMOS chip upgrade that takes about 2 or 3 minutes to install.

The Logikey K-1 Keter is a fine addition to the shack of the serious CW enthusiast or even the budding newcomer. It is available from amateur radio dealers or direct from Logikey Company, P.O. Box 583, Deerfield, IL 60015 (708-945-3980). Suggested list price is $119.95. Other options include the Logikey HK-1 Hookup Kit ($3.95) and the Logikey KB-1 Push Button Bracket for all Bencher Paddles ($29.95).

Results of the 1992 CQ World-Wide VHF WPX Contest

BY JOE LYNCH*, N6CL

The "new" CQ WW VHF WPX Contest was met with renewed enthusiasm. The new rules were tried out and were liked by a vast majority of participants. The total logs received were just shy of 100. This is an excellent number considering the contest was not held in 1991 and this one is a rebuilding effort. On-the-air interest showed there was no lack of participation, at least in the United States.



Mexico was represented by a special prefix, XA5T. Operators: Rosendo, N5YBG; Enriqaue, XE2FU; and Mario, KF5RM. (Photo courtesy KF5RM)

Conditions

Conditions ranged from good to lousy. Sporadic-E was evident in the log entries on both days of the contest. Tropo enhanced conditions were also evident for those who operated on the higher frequencies.

DX

Thanks to publicity by our sister publication *CQ Espanol*, a fair share of log entries were received from Spain. Their (then) recent acquisition of 6 meter privileges shows up in the use of the EH prefixes. When used, the EH prefix is indicated in the callsign listings. In the single operator category DL1ZC was the European winner. Operating on 144, 432, and 1296 MHz, he amassed over 65k points. EA3 /EH3ADW, a multi-operator station operating on 50, 144, and 432 MHz, had a respectable showing by collecting over 31k points. YV25ARV, operating on 50, 144, and 432 MHz, and taking advantage of some multiple-hop sporadic-E into the States, was able to score in excess of 16k points.

North America

Entries were received from across the country, with many reporting fair to good conditions. The highest score obtained in the contest was earned by N6NB, a portable, single operator station, with over 95k points. N7AVK, a fixed station multi-operator category entrant, scored in excess of 85k. AJ0E, the top rover station, scored in excess of 73k points while traveling through nine grids. The multi-op N7AVK gang—which included WA7TDZ, N0XX, and AA7NH—scored tops with over 85k.

*P.O. Box 73, Oklahoma City, OK 73101

Other Stuff

Because the rules are new and there is no history for this contest, none of the software programs support this contest. However, some of you made valiant efforts to try to make one or another work. Perhaps in a couple of years one of the majors will include this program in one of their packages. Nevertheless, we really appreciated all logs, whether hand written or computer generated.

Scoring seemed to be somewhat of a problem. Apparently, the summary sheet led some of you astray. I re-scored every single log and if warranted corrected your score up or down.

A number of entrants took advantage of the CW multipliers and expressed an appreciation for them. They will continue to be a part of future contests.

A few entrants requested a QRP category in future contests. Accordingly, for the forthcoming contest there will be a QRP category, with the only restriction of no more than 25 watts. This means that you can be at home or portable. Just do not run more than 25 watts. We will try it this year and see how it works.

The 1992 contest is scheduled for July 10-11, 1993. I look forward to seeing you in this year's contest.

73, Joe, N6CL

Random Comments

Contest site was on top of 9500 foot volcano. Thank goodness the "big opening" didn't occur! C U next year . . . *WA7JTM (N7AMA)*. Where, oh where is the software to score this test?! . . . *N7AVK*. Only ran 2 meters and a small station but we enjoyed it nonetheless . . . *KM0L*. Very little participation . . . *N4HB*. W2VC's 2 watt rain scatter signal peaked S-9 at 16 degrees east of direct bearing. . . . It was interesting that, at times, the distant 3 cm signals were actually stronger than 2 meter signals over the same path . . . *AF1T*. The last QSO was made on CW. It was my first CW QSO on VHF! I am 100% CW on HF. SSB is for VHF . . . used to be for VHF, hi! . . . *FD1PBL*.

A contest is the best way to get people on and stir up activity. Many thanks . . . *WA2HFI*. It was a great contest, but I couldn't find even one station to work on 902 MHz in the entire state of California! . . . *N6NB*. Drove up to DN56 and almost got stuck in gumbo during a rain storm. Didn't work anybody except a few locals . . .

AES®/ KENWOOD • *Closeouts & Specials of the Month . . .*

KENWOOD TH-78A Dual Band FM HT
One of the Smallest, but Loaded!
Microprocessor controlled, covers 144 and 440 MHz; 144-148 tx, 118-174MHz rx and 438-450MHz tx/rx. 50 multi-function memory channels + 2 call channels. Dual receive, alphanumeric memory, double band scan, DTSS, pager, alphanumeric message paging, optional batteries. 2.5W output, 5W with 12V source. 1.95"w x 5.28"h x 1.61"d, .88 lbs.

✆ Call for our Sale Price

Miscellaneous Closeouts

BC-6 • 2-pack quick chgr for PB-21/21H	$49.95
BC-15 (not A) • Rapid charger; PB-13/14	49.95
DC-21 • DC adapter; TH-A/B	29.95
EB-3 • Battery case; 2600A/3600A	9.95
HMC-1 • VOX headset; 2600A/3600A/TH-A/B	39.95
LH-3 • Leather case; 2600A	19.95
MS-1 • Mobile stand/charger/ps; 2600A	49.95
PB-9 • 600ma 7.2v Battery w/built-in chgr	29.95
PB-10 • 600ma 7.2v Battery	9.95
SC-9 • Soft Case for TR-2600A	9.95
SC-22 • Soft case; TH-75A w/PB-6	9.95
SC-26 • Case; PB-7/8/9 w/26AT	9.95
TU-4C • Encoder; TW-4000A	19.95
TU-6 • Encoder; 21/31/41AT	9.95

TS-450S or TS-450S/AT HF Transceivers

✆ Call for our Sale Price

TS-850SD HF Transceiver

✆ Call for our Sale Price

TS-950SD HF Transceiver
$2699.00

CD-10 Call Sign Display Closeout
$49.95

Limited quantities on Closeouts and Specials. All prices and availability subject to change without notice. Please check with Salesperson when ordering.

TH-27A TH-47A CLOSEOUT

√ Check the features:

KENWOOD TH-27A 2m HT
144-148MHz with 118-165MHz receive. Keypad or tuning knob entry, with step selection and lock. 2.5W (3 levels); prog. VFO; 40 multi-function memories plus call channel; DTMF pager and squelch; 21 scan modes; (10) 15-digit autodial memories; tone alert with time indicator. Auto memory initiate, repeater offset, power off and battery saver. Monitor, rptr offset and reverse switches. Clock and timer functions. Battery and other options. 5¾" x 2¼"w x 1⅝"d, 0.8 lb. List $419.95
CLOSEOUT $299.95

KENWOOD TH-47A 440MHz HT
Features, options and specs same as TH-27A except 1.5W and 438-450MHz. List $419.95
CLOSEOUT $269.95

AES® stocks the entire KENWOOD Amateur Radio Line.
Please call us Today ✆ Toll Free for our Everyday Low Prices.

Order Toll Free: 1-800-558-0411 ***FAX: (414) 358-3337***

AMATEUR ELECTRONIC SUPPLY® Inc.

5710 W. Good Hope Road; Milwaukee, WI 53223 • Phone (414) 358-0333

AES® BRANCH STORES

WICKLIFFE, Ohio 44092
28940 Euclid Avenue
Phone (216) 585-7388
1-800-321-3594

ORLANDO, Fla. 32803
621 Commonwealth Ave.
Phone (407) 894-3238
1-800-327-1917

CLEARWATER, Fla. 34625
1898 Drew Street
Phone (813) 461-4267
No Toll Free Line

LAS VEGAS, Nev. 89106
1072 N. Rancho Drive
Phone (702) 647-3114
1-800-634-6227

Watch for Future AES® Branch Store Openings!

Contact AES® for all of your KENWOOD needs!

★ Low Prices ★ Large Stocks ★ Fast Service
★ Top Trades ★ Toll Free Ordering Lines
★ **AES®** ships to all 50 states

Over 36 Years in Amateur Radio

MasterCard VISA DISCOVER **Use your CREDIT CARD** AMERICAN EXPRESS

HOURS • Monday thru Friday 9-5:30; Saturday 9-3:00

Clip out this handy Coupon and Mail Today!

TO: AMATEUR ELECTRONIC SUPPLY®
5710 W. Good Hope Road
Milwaukee, WI 53223

I am interested in the following New Amateur Gear

_____

_____

I have the following to TRADE (What's your DEAL?)

_____

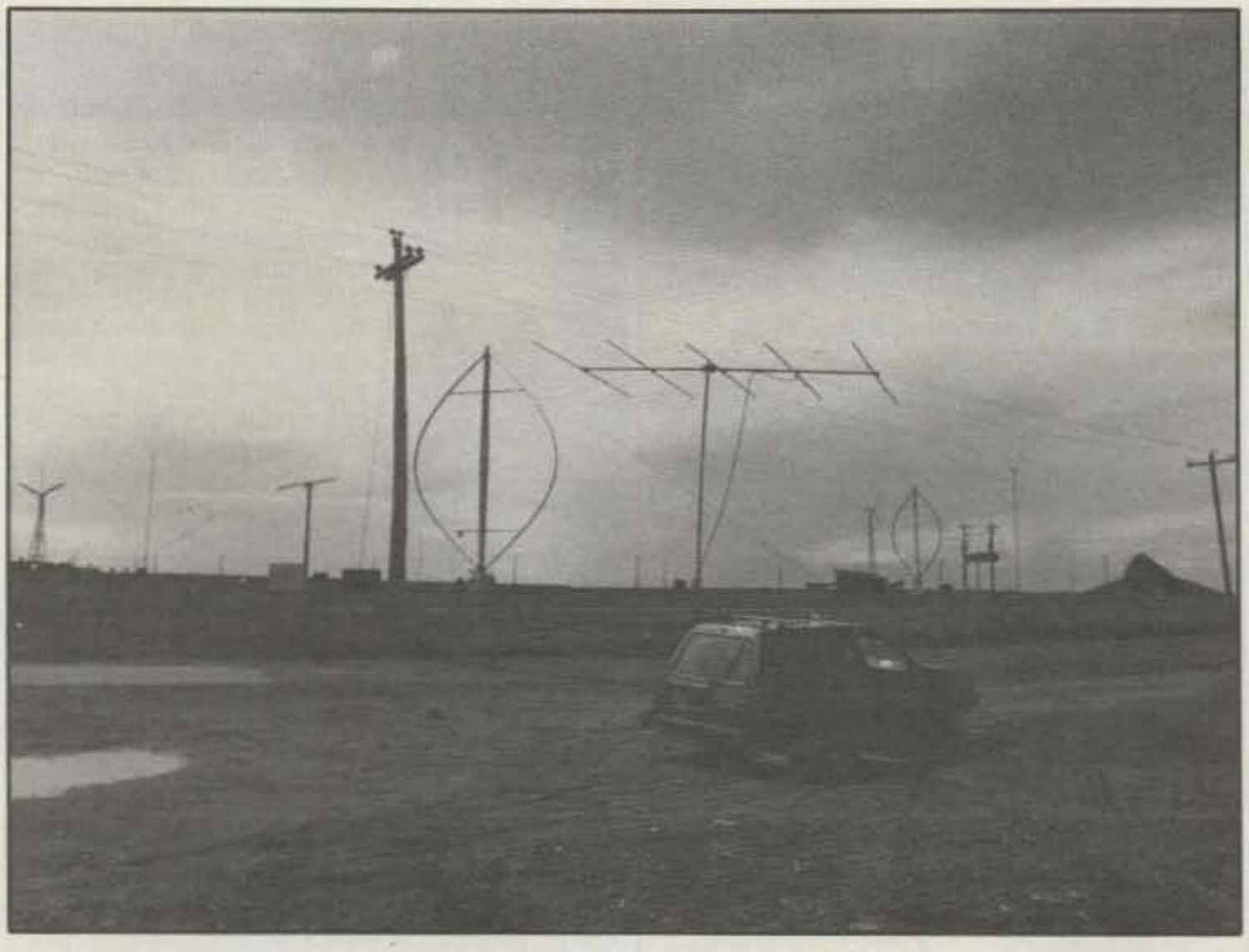
_____

Rush me your Quote • I understand that I am under no obligation.

Name _____

Address _____

City & State _____ Zip _____



Chip Taylor, W1AIM, operated as from his van as VY2QST on a narrow ½ by 2 mile strip of land in grid square FN87. (Photo courtesy W1AIM)

TROPHY WINNERS

FIXED STATION SINGLE OPERATOR
KY5N (65,340)
Sponsored by PY5CC

FIXED STATION MULTI-OPERATOR CLASS II
N7AVK (85,905)
Sponsored by N6CW

PORTABLE STATION SINGLE OPERATOR
N6NB (94,500)
Sponsored by N5JHV

PORTABLE STATION MULTI-OPERATOR CLASS I
NW7O (26,474)
Sponsored by N6CL

PORTABLE STATION MULTI-OPERATOR CLASS II
N7AMA (44,943)
Sponsored by Oklahoma Comm Center

ROVER STATION
AJ0E (73,377)
Sponsored by Rochester VHF Group

WB7Q. Relatively poor participation and the propagation was not good. I am glad for the new rules for the contest . . . *EA3TJ*. Giving CW contacts an extra point was a small brilliancy. CW work is far more efficient than SSB (I figure close to 3 dB), and its use should be encouraged . . . *WB9GKA*.

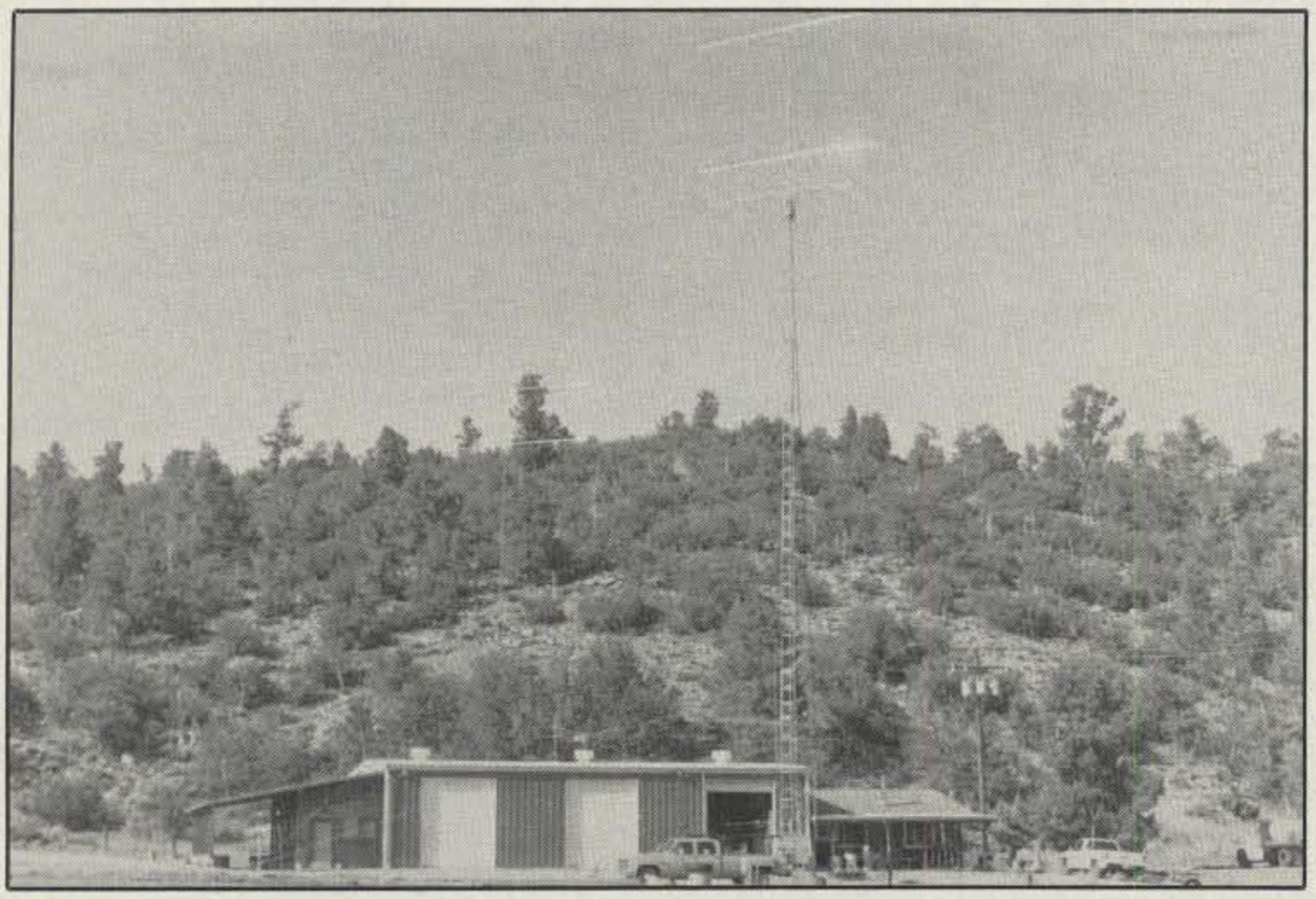
Good contest, but would like to see more activity. A lot of us are burned out after June ARRL test. Need to get activity on higher bands here; turned out to be 6 meter test . . . *WB8YFE*. A few days before the contest I hooked up my new SSB Electronics 6 meter transverter. What a difference! . . . Hopefully, next year someone (K1EA or K8CC) will write a contest logging program for this contest . . . *AA6TT*. Enjoyed the contest. Hope it grows over the years to rival the ARRL June VHF contest . . . *WB0CQO*. Where were all the 2 meter U.S. ops? Thanks to W1AIM (VE2QST) for FN87 from PEI . . . *VE1MQ (CJ1MQ)*. Missed part of the 6 meter opening because of a paint brush. Hope to spend more time next year . . . *KM0A*.

I operated only two hours in the contest . . . *EA6YY (AN6YY)*. We operated from Linden in the southeast of the Netherlands (JO21wr). We made our shack on a boat and we put up two masts with antennas on the land beside the boat, one for 50 MHz and one for 144 MHz . . . *PA3BIX (PE0WGA and PA6VHF)*. Rotator went QRT about 6 hours into the contest . . . Operated from Meda Mountain, about 450 meters high, in IN52ss . . . *EA1FDI (EA1RCI)*. Worked my 50th state on 6 meters when Harry, KA3B, operating from AC3T, answered my CQ! . . . *N6CL*. The bands were dead for the first 17 hours. Then all hell broke loose around 1100Z Sunday. The day was very hot, approximately 102 degrees. So we broke up early. Otherwise we could have accumulated more points . . . *KF5RM (XA5T)*.

This was a FUN contest! I drove 14 hours straight Saturday, traversing five grids and ending up back in DM09 for the evening opening. Next morning I went south to DM08, then north to CN90, and finished in DN00. N6NB was audible almost everywhere I went, even on my dipole! Love the new format for this contest! I will be back! . . . *NC7K*. We were plagued by rain and storm activity the whole contest, but it was fun, nonetheless! . . . *AJ0E*. 721 miles of pure fun!! Wish someone was along to hear some of the long-haul mobile QSOs. My homebrew antenna really works!! . . . *K6AAW*. There needs to be some incentive to get some microwave activity. Maybe a micro-only category . . . *KB3PW*.

Conditions were sub par on 6 meters. However, best catch was VY2QST on PEI . . . *KA3B (AC3T)*. Conditions very bad in the 10,000 foot "hole" I live in! My score is a joke, hi! *(Not at all—ed.)* . . . *W7US*. There is a ½ by 2 mile strip

Sporadic-E propagation gave a number of stateside stations an unexpected contact with YW5N. Operators: (back row) YV5LIX, YV5GE, YV5LDL, and YV4BHJ; (front row) YV5NN, YV5NFX, and YV5JCB. (Photo courtesy YW5N)



Ron Hammel, KC6WLC, stayed home for a change and worked the contest from there. With that QTH, Ron, why do you ever leave home? (Photo courtesy KC6WLC)

of land in grid square FN87. I set up across from the Atlantic Wind Turbine Test Site. Incidentally, PEI has six grids, all within easy reach, plus lots of nice scenery. It is a great place for anyone into grid square DXpeditions . . . *W1AIM (VY2QST)*. Glad to see "E" skip on 6. Otherwise there would have been very little activity here. Was fun even with light activity . . . *WD5EWD*. The DX made this contest interesting. Hope to do it again next year . . . *KY5N*.

Enjoyed hearing AA6TT with his big antenna array . . . *AD4F*. A lot of operators from the Antelope Valley Amateur Radio Club, K6OX, came by to give support, including Dale, KØBGL, Curtis, KD6CUI, Tom, KM6WO, and Henry, KD6LFB . . . *KC6WLC*. Fun contest but not many stations on 2 meters. Guess everyone was on 6 meters. I like the idea of the CW incentive points, but as a mobile/rover, couldn't take advantage of them . . . *NK4Q*. My biggest thrill was working HH7PV and several rover stations . . . *WB7QBC*. Not much activity, also too close to June VHF contest—maybe April contest halfway between the January and June contest would be better . . . *WY2H*.

How about club competition? . . . *WR3E*. Lots of fun, but not too many were on. Managed just one new grid square on 6 meters. Where was N6CL? *(At least part of the time in DM94—ed.)* . . . *WB4DBB*. Two east Texas 6 meter contacts —only opening to the east—Salt Lake a surprise . . . *W6PFE*. Worked XA5T and W7s on double hop with only 5 watts! . . . *N8AXA*. W2UC is the Union College Club call; first VHF contest in years for the club; just a start . . . *N2KVN (W2UC)*. The bands were dead . . . *VE1SLM*. Where was everyone? Most common comment, "What contest?" . . . *N1FUS*. Worked a new grid on 222 MHz, WB9CKA, in EN58 . . . *WØJRP*.

After years of service, my 2 meter rig went south a few hours into the contest, limiting me to 6 meters . . . *N7BUP*. Fun contest with good band conditions. Just need more participants . . . *KC4YO*. Worked my first FM simplex contest contact . . . *W1ENZ*. Where were all the operators? . . . *KBØCY*. Not many people on, but first time on 2 meter SSB. Boy, is it better than FM for distance! . . . *KB2FTX*. Lots of fun for Hal (KC4YO) and me . . . *KM4XW*. Nice to see you are running VHF contests again . . . *WA2BAH*. My biggest thrill was working HH7PV. I also enjoyed making a few CW QSOs. Keep the incentive there . . . *KN4QS*.

Nice to have the contest back. Maybe conditions will be better next year! . . . *W7ABX*. Finally snagged YV4AB for country number 78 . . . *K4SC*. The limited activity on 144 MHz was disappointing. Was this because people being on holiday or too close to the ARRL June VHF contest? . . . *W6AXX*. Heard N6NB all morning on scatter with no contact. Then the band opened up with sporadic-E and he was 60 over S-9! . . . *N3EG*. Good contest in spite of band conditions. Had a good time. Will plan to be back next year . . . *WA8QNR*.

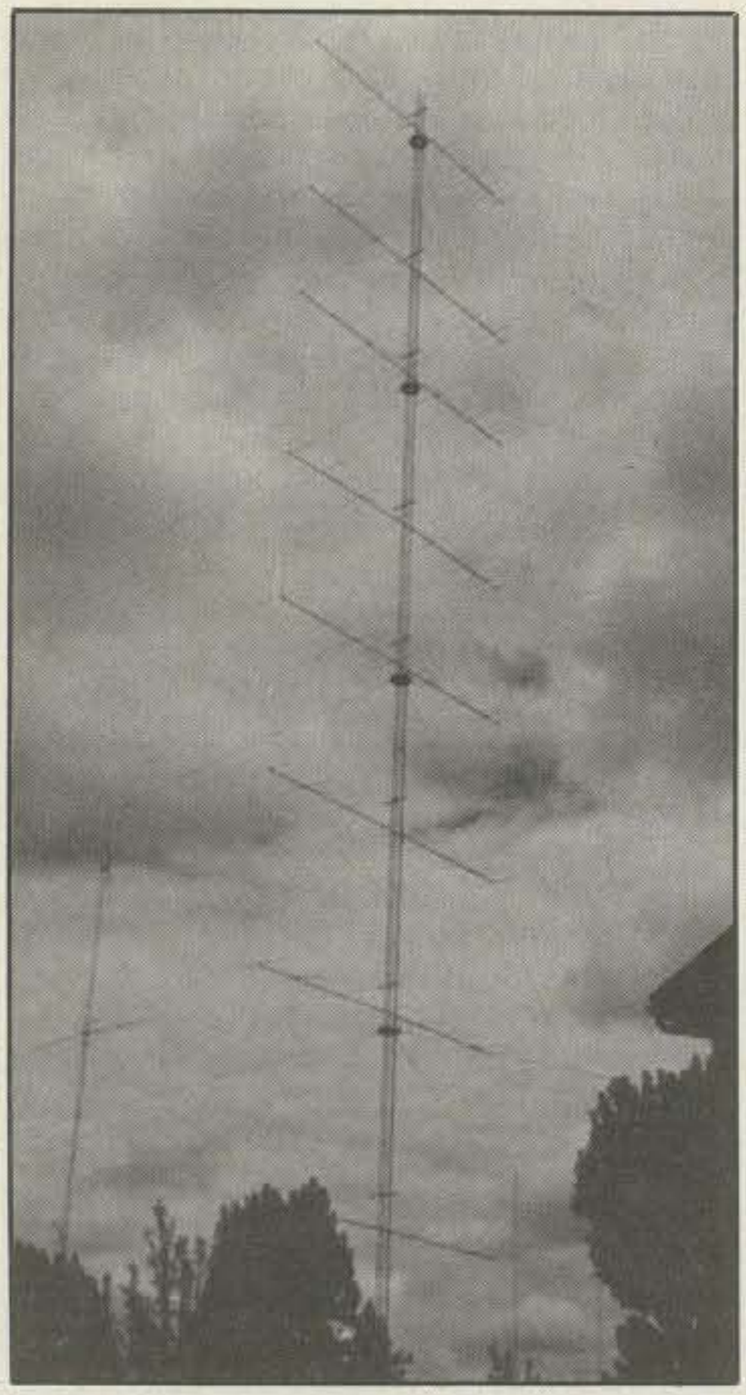
Multi-Operator Station Ops

Fixed Station Multi-Operator Class II. N4KWX & N4YKD. **N7AVK** & WA7TDZ, NØXX, AA7NH. **KMØL** & NØLBN. **EA3/EH3ADW** & EA3's FVZ, ADW. **EA3CQQ** & EA3's AYR, DRS, DJL, DSJ, ATK, BVT. **YZ3TTI** & YT3's CI, OK.

Portable Multi-Operator Class I. NW7O & W7TVF, KB7's ICF and GYS, N7ZHT.

Portable Multi-Operator Class II. AF1T & N1EKV. **KA1LMR** & KB1PL. **N5MHZ** & AB5DF. **N7AMA** & WA7JTM. **XA5T** & XE2's KB and FU, KF5RM, N5's YBG, LNU, XTP. **YW5N** & YV4BHJ, YV5's GE, EED, LOL, LIX. **AM1/EH1DVY/P** & EA1's AZC, BQR, EYL. **EA1RCI**: EA1FDI, EB1DYF. **ON4ALF/P** & ON1's AEN, ALJ, BLY. **PA6VHF/PEØWGA**: PAØNZH, PA3's BIX, DCO, EQS, FXW, GBR, PE1's AAP, FOD, JDX, LAU, LWT. **YU3R**: YT3IC, YU3XZ, YZ3CRX.

Rover Station. AJØE & KØTLM.



Did you hear that big signal from Bill Hein, AA6TT? This picture explains why. Bill uses eight (count them from top to bottom) DX Engineering 10-element 40 foot long antennas on a rotating tower. (Photo courtesy AA6TT)

Number groups after call letters denote following: Final score, number of QSOs (including multipliers for band and CW contacts), combined total of prefixes and grid squares, (in the case of Rovers) number of grid squares activated, and bands operated (A = 50, 7 = 70, B = 144, C = 222, D = 432, 9 = 902, E = 1296, F = 2304, G = 3456, H = 5670, I = 10G, J = 24G, L = Light). Certificate winners are listed in boldface.

FIXED STATION SINGLE OPERATOR

NORTH AMERICA

UNITED STATES

N1FUS	**104**	**8**	**13**	**B**
W1ENZ	70	7	10	B
WA2TEO	**31,506**	**177**	**178**	**ABCD9E**
KA2MCU	10,640	133	80	ABCDE
KB2FTX	5,986	82	73	AB
WY2H	3,600	80	45	BD
WA2BAH	1,650	50	33	ABCDE
W3ZZ	**40,512**	**211**	**192**	**ABCDE**
KB3PW	4,998	147	34	D9EFFGH
AC3T	4,661	59	79	A (Opr. KA3B)
WR3E	650	26	25	B
WB4DBB	**55,944**	**259**	**216**	**ABCD9EI**
KC4YO	27,370	161	170	ABCD
KM4XW	8,829	81	109	ABD
N4HB	6,984	97	72	ABCD9E
KN4QS	6,966	81	86	ABD
K4SC	1,326	51	26	A
AD4F	1,260	28	45	A
KY5N	**65,340**	**270**	**242**	**A**
WD5EWD	**42,218**	**209**	**202**	**ABD**
WB5IGF	16,896	128	132	ABCD9E
KC6WLC	**7,326**	**99**	**74**	**ABC**
W6PFE	1,974	42	47	AB
W6RCW	920	23	40	B
W6AXX	750	25	30	B
KE7CX	**31,856**	**181**	**176**	**ABCD9**
W7HAH	17,526	127	138	ABD
W7US	2,448	48	51	ABD
WB7QBC	2,322	43	54	A
N7BUP	2,166	38	57	AB
N3EG/7	1,656	36	46	ABD
W7ABX	510	17	30	A
KE8FD	**36,652**	**196**	**187**	**ABCDE**
WZ8D	18864	131	144	ABCD
WA8QNR	**11,716**	**101**	**116**	**AB**
N8AXA	6,240	78	80	ABCD
K2UOP/8	1,365	35	39	ABCDE
WB9GKA	**4,180**	**55**	**76**	**ABCD**
WB8YFE/9	1,288	28	46	AB
N0LL	**27,885**	**165**	**169**	**ABCDE**
AA6TT/0	25,428	156	163	AB
WQ0P	23,408	154	152	ABCDE
WB0CQO	11,484	99	116	ABD
NT0V	3,468	51	68	ABD
W0JRP	2,970	45	66	ABCD
N0DQS	1,088	32	34	B
KM0A	242	11	22	AB

CANADA

CJ1MQ	**2,491**	**47**	**53**	**ABD (Opr. VE1MQ)**

EUROPE

GERMANY

DL1ZC	**62,560**	**340**	**184**	**BDE**

SPAIN

EB5IJS	**2,279**	**53**	**43**	**B**
EH3DZG	1,560	39	40	A
EB2CSB	288	16	18	B
EB1EJB	121	11	11	BD

BALERIC ISLAND

EA6SA	**2,214**	**54**	**41**	**B**
AN6YY	120	10	12	B
AN6ZG	70	10	7	D

FRANCE

FD1PBL	**380**	**19**	**19**	**B**

ITALY

IV3VFP	**288**	**16**	**18**	**A**

BELGIUM

ON4KIP	**14,155**	**149**	**95**	**B**

ASIA

JAPAN

JE1HXZ	**1,584**	**48**	**33**	**ABD**

FIXED STATION MULTI-OPERATOR CLASS I

No entries received for this category.

FIXED STATION MULTI-OPERATOR CLASS II

NORTH AMERICA

UNITED STATES

N4KWX	**6,461**	**71**	**91**	**ABD**
N7AVK	**85,905**	**345**	**249**	**ABCD**
KM0L	**840**	**28**	**30**	**B**

EUROPE

SPAIN

EA3/EH3ADW	**31,161**	**221**	**141**	**ABD**
EA3CQQ	3,096	72	43	BDE

SLOVENIA

YZ3TTI	**18,908**	**163**	**116**	**B**

PORTABLE STATION SINGLE OPERATOR

NORTH AMERICA

UNITED STATES

WA2HFI	**3,186**	**54**	**59**	**AB**
N6NB	**94,500**	**350**	**270**	**ABCDE**
WB7Q	**15**	**3**	**5**	**B**

CANADA

VY2QST	**1,218**	**29**	**42**	**A (Opr. W1AIM)**

EUROPE

SPAIN

EA1FBF/P	**2,420**	**55**	**44**	**B**
EA3TJ/P	2,360	59	40	BD
EA1FES	486	27	18	B
EA1FCW/P	315	21	15	B
EA1BFZ/P	234	13	18	B

SLOVENIA

YU3GO	**4,544**	**71**	**64**	**A**

PORTABLE STATION MULTI-OPERATOR CLASS I

NORTH AMERICA

UNITED STATES

NW7O	**26,474**	**217**	**122**	**ABCDE**

PORTABLE STATION MULTI-OPERATOR CLASS II

NORTH AMERICA

UNITED STATES

AF1T	**1,809**	**67**	**27**	**B9EFGI**
KA1LMR	315	21	15	BCD
N5MHZ	**9,990**	**111**	**90**	**A**
N7AMA	**44,943**	**213**	**211**	**AB**

MEXICO

XA5T	**6,885**	**81**	**85**	**ABD**

SOUTH AMERICA

VENEZUELA

YV25ARV	**16,380**	**210**	**78**	**ABD**
YW5N	12,804	194	66	ABD

EUROPE

SPAIN

AM1/EH1DVY /P	**15,246**	**126**	**121**	**AB**
EA1RCI	425	25	17	B

BELGIUM

ON4ALF/P	**21,888**	**192**	**114**	**B**

THE NETHERLANDS

PA6VHF /PE0WGA	**21,762**	**186**	**117**	**AB**

SLOVENIA

YU3R	**5,360**	**80**	**67**	**B**

ROVER STATIONS

NORTH AMERICA

UNITED STATES

W2UC	**1,404**	**52**	**27**	**R**	**2**	**BD (Opr. N2KUN)**
NK4Q	**2,419**	**41**	**59**	**R**	**5**	**B**
WB9AJZ/6	**12,880**	**112**	**115**	**R**	**4**	**ABD**
K6AAW	**6,305**	**65**	**97**	**R**	**7**	**BD**
NC7K	**9,284**	**91**	**102**	**R**	**8**	**ABD**
AJ0E	**73,377**	**263**	**279**	**R**	**9**	**ABCDE**
KB0CY	**273**	**13**	**21**	**R**	**2**	**AB**

CANADA

VE1SLM	**493**	**17**	**29**	**R**	**4**	**AB**

YAESU

FT-747

FT-890

FT-5200

FT-415

FRG-8800 Receiver

FT-1000 D

FT-2400

FT-23R

FT-530

Oklahoma Comm Center

HUSTLER rfconcepts PC Electronics STARTEK

ICOM Ramsey Kits ALINCO Larsen Antennas Ameco

Outbacker Antennas cushcraft CORPORATION W5YI MFJ DIAMOND ANTENNA

Nye-Viking Kantronics M² ENTERPRISES ARRL

TELEX hy-gain Bug Catcher COMET ALPHA DELTA

SPECIAL SPECIAL

CALL

For This Month's Special-Buy
Some Quantities Are Limited

Orders & Price Quotes 1-800-70K-HAMS
1-800-765-4267

Local & Information (405) 359-9554

Oklahoma Comm Center

FREE SHIPPING UPS SURFACE On Purchases of $50 or More
(except Power Supplies and Antennas)

3900 S. Broadway, Suite 6
Edmond, Oklahoma 73013
FAX (405) 359-9556

Showroom Open Tues. thru Sat.
Hours M-F 10-6 Sat 10-2

VISA COD MasterCard

Oklahoma owned and operated. Not affiliated with any other store.

W1ICP concludes this two-part series by debunking old myths and showing us how easy it is to work with open-wire line.

Let's Talk About Wire—Part II

Getting Open-Wire Feeders Into The Shack

BY LEW McCOY*, W1ICP

Whenever a feed line is resonant on the same band as the antenna in use, it is well nigh impossible to keep the feed line from coupling energy from the antenna and reradiating it. But is this important? The answer is yes and no. If you have a beam and desire a given pattern, then you certainly don't want the feed line radiating and giving you something other than the desired pattern. On the other hand, let's assume you are using a multiband dipole fed with open-wire line. The antenna is going to provide all kinds of patterns, depending on its length, height, band, etc. Feedline radiation in this case *is not lost power*, and it is going to go somewhere and maybe work someone for you. Therefore, such radiation from a multiband dipole feed line just isn't that important.

As I have already stated, I bring my open-wire line directly into the shack. I use a plastic pipe through my wall to bring the open-wire line to my Transmatch. Some amateurs don't want to do this, however. They want coax coming inside. I know of two rather simple methods of meeting this requirement, and they both will work well. In one case a transformer/balun is used to get from the coax to open-wire line. In the other a section of dual coaxial line is used.

A word or two about coax is in order here. A coaxial feed line is supposed to be a two-conductor line. The inner conductor is one lead and the outer braid is the other. Unfortunately, the outer braid can be looked at as two conductors—the *inside* and *outside* of the braid. When you physically attach the outer braid to one side of the antenna, you of course have physically attached both the inside and outside of the braid to the antenna. If the outside of the braid happens to be of a certain impedance value (determined by its electrical length), then you will have a difficult time keeping RF from flowing back down the outside of line, causing parallel standing waves and feeder radiation.

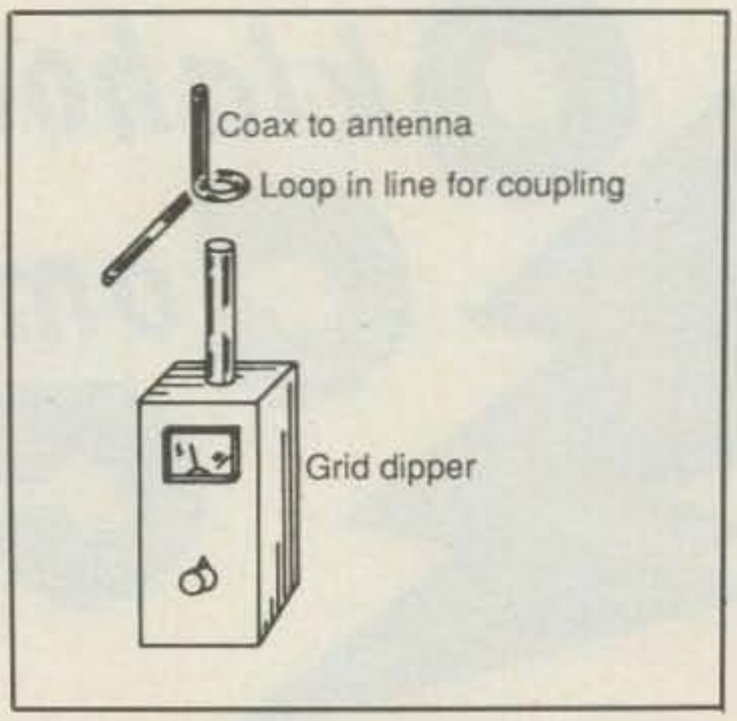


Fig. 1– This shows how I couple the grid dip meter to a loop in the coax. Just laying the grid dip coil alongside the coax does not provide a tight enough coupling. As described in the text, if you find a dip in one of the amateur bands, change the coax length to move the dip out of the band.

You may read or be warned by many "experts" that feed-line radiation can cause TVI or other interference because such radiation is vertically polarized. If they are careful "experts" they will say "can cause" to cover themselves, because quite simply, they could say all vertical antennas "can" cause TVI. In really plain, simple, easy-to-understand language, *any* antenna radiation, horizontal and/or vertical, "can" cause interference. These experts should realize that a TV installation has no respect for vertical *or* horizontal polarization. The real answer to the problem is that any decent television set should have built-in protection or a high-pass filter added to stop *any* amateur RF overload.

The reason I emphasize the above is that recently there has been a flood of praise for what are called "current" choke baluns, which are supposed to stop or prevent feeder radiation. I say "supposed to stop," because in many cases they will do a good job, but they are not a cure-all. *No balun is*. Most of these have been described for use with powers up to 150 watts. I made some tests using coaxial line with the shields resonant, via the grid dip meter method, to a 20 meter dipole. I used a good grade of heavy-duty coax (for high power), and I tried different amounts of large ferrite beads installed over the coax line at the feed point of the antenna. In all cases, running 1500 watts test, key down, the beads got too hot to handle, and in several cases they actually shattered. Please understand, this is a worst-case condition with the coax line braid being resonant at the operating frequency.

I might add that if you grid dip your coax, make a small loop of the coax to fit over the coil of your dipper (see fig. 1). This will provide the necessary coupling. Also, *and most important*, the actual electrical length of the line cannot be measured with a measuring tape. The electrical length is the length from the feed point of the antenna, down to your station, through your equipment, and to the point where the line is returned to real earth ground (and we don't know where that is, but the grid dipper will show the resonance). To move the resonance point, I recommend adding coax or changing the length to ground by using a longer ground lead. (Don't, for gosh sakes, prune your coax; it costs too much!) If your beam is multiband be sure to check the other bands, because it may take several changes in length to get the resonance out of each band. You don't have to move the resonance far, as long as it is out of the band.

*Technical Editor, CQ, 200 Idaho St., Silver City, NM 88061

MFJ *halfwave vertical* Antenna

6 bands: 40, 20, 15, 10, 6, 2 Meters . . . No radials or ground needed!

Operate 40, 20, 15, 10, 6, 2 Meters with this MFJ-1796 *ground independent halfwave* vertical antenna -- no radials or ground ever needed!

It's only 12 feet high and has a tiny 24 inch footprint! You can mount it anywhere from ground level to the top of a tower -- on apartments, condos, small lots, even on a motorhome. You can take it anywhere -- vacations, field day, DX-pedition, camping, nearly anywhere you go.

Frequency selection is fully automatic -- there are no moving parts, nothing to adjust -- all you do is transmit. It handles up to 1500 watts PEP. You'll work your share of DX because its *low angle of radiation* really reachs out and brings in DX.

During a contest, you'll love being able to *quickly* work one station after another from all directions because of its omni directional pattern.

It's so easy to put together that you can have it on the air in an afternoon.

How does MFJ achieve maximum efficiency in such a compact multiband antenna?

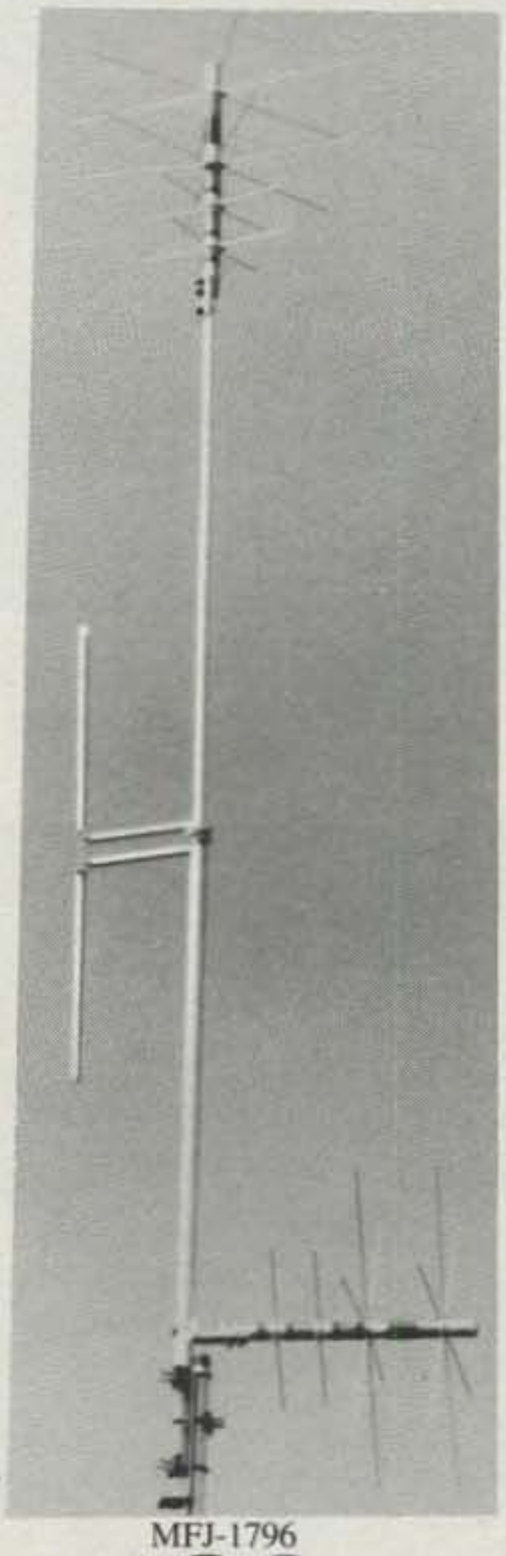
The key is *end loading* -- the most efficient form of loading known. The *entire length* of the antenna is always radiating power. There are no lossy traps to reduce effective length.

End loading provides multibanding and full electrical half wavelength on each HF band. An *optimum* combination of capacitive hat and inductive end loading delivers a close 50 ohm match without a lossy impedance matching network.

Efficient high-Q loading coils are wound on low loss *ceramic* forms. Large 1-inch diameter aluminum radiators are used to keep losses to a minimum.

No Radials or Ground *ever* Needed!

The MFJ-1796 is balanced and center fed to totally eliminate the need for radials, counterpoises or a groundplane -- you don't have the kind of ground losses that's common with a quarter wave vertical.



MFJ-1796

$189.95

No Feedline Radiation

There is no feedline radiation that causes pattern distortion and wastes power. The 50 ohm Teflon® coax feedline exits through the bottom radiator from a low impedance point -- the loading unit is mounted at right angles to decouple the feedline and to provide a low impedance point.

The feedline is further decoupled and isolated from the antenna with a highly efficient *air-wound* choke balun. This decoupling attentuates RF on the outside of the coax and minimizes feedline radiation that waste useful power.

Easy to Adjust

It's very easy to optimize the MFJ-1796 for your favorite part of the band. Frequency adjustments are nearly independent -- adjusting one band has minimum effect on the resonant frequency of the other bands -- unlike most other multiband antennas.

Built to Last

You get an antenna built with heavy duty, extra thick wall aluminum radiators, machined aluminum parts and stainless steel hardware.

The coils are wound on tough *low loss* ceramic forms using durable *Teflon®* covered wire that's highly weather resistant.

Full halfwave on 2 and 6 Meters

On 2 Meters and 6 Meters, MFJ's unique stub decoupling and efficient full size halfwave elements really get you out with low angle radiation for lots of DX.

The *most* for your Money

For $189.95, the MFJ-1796 gives you the most for your money -- no other multiband, automatic band-switching, ground independent DX antenna even comes close.

No Matter What™ Guarantee

You get MFJ's famous one year *No Matter What*™ *unconditional* guarantee. That means we will repair or replace (at our option) your MFJ-1796 *halfwave vertical* antenna *no matter what* for a full year.

Continuing Service

MFJ Customer Service Technicians will help you keep your *MFJ halfwave vertical* performing flawlessly -- no matter how long you own it. Just call our toll-free help line 800-647-TECH (8324) -- *an MFJ exclusive.*

Made in USA

MFJ halfwave verticals are made in the USA. Help our fellow Americans by keeping our money here -- buy Made in USA.

Call Your Dealer for Your *Best* Price Today

Enjoy DXing and ragchewing on six bands from your apartment, condo or anywhere. Call your favorite dealer for your best price and order your MFJ *halfwave vertical* today!

Shortwave *Regenerative* Receiver *Kit*

MFJ-8100K

$59.95

Remember hunching over your regenerative receiver for hours with a pair of phones pressing uncomfortably against your ears?

You could hear just about anything that fancy superhets could hear. Sure, you had to play around with the regeneration control just right and have a steady hand to tune but you could hear'em.

Don't you wish you could relive some of this fun and excitement of your youth — share some of it with your kids and grandkids?

Well, you can – with the MFJ-8100 *World Band* Shortwave Radio *Kit*.

Spend a fun evening with your child or grandchild and help him put this simple kit together. When you two finish, watch him glow with excitement as he tunes the world bands – just like you did – and remember for life.

This baby performs. It has an RF stage to really pick up the weak ones and it goes into regeneration smoothly without pops or dead spots. Stations all over the world will come in loud and clear with just a 10 foot wire antenna.

Listen to international shortwave broadcasts, hams on SSB and CW, WWV, RTTY, packet and much more. Covers all or part of 75/80, 49, 40, 30, 31, 20, 25, 22, 19, 17, 16, 15, 13 Meters in five bands.

It has vernier reduction drive, bandswitch, volume and RF gain controls, uses a 9 volt battery and is built into a rugged aluminum cabinet.

Two earphone jacks let you and your child or grandchild listen together with your Walkman style earphones or plug-in speakers. 7x6x2½ inches.

Order one as a gift for your child or grandchild . . . or for yourself.

MFJ-8100K, $59.95 kit; MFJ-8100W, $79.95 wired and tested.

Teflon® is a registered trademark of Dupont.

300 KHz-200 MHz Active Antenna

MFJ-1022

$39.95

Wish you could hear everything your expensive general coverage transceiver or receiver is capable of receiving?

Your ham band only antenna does great in the ham bands . . . but plug this new MFJ all band *active* antenna into your general coverage transceiver or receiver and you'll hear strong clear signals from all over the world from 300 KHz to 200 MHz–including low, medium, shortwave and VHF bands.

You'll enjoy up-to-the minute international shortwave newscast, ship-to-shore, airline, commercial RTTY and even military traffic. Use your data controller to receive FAX news photos, weather maps, Navtex and more.

Take it on trips and use it with your mobile or QRP rig to listen.

Also improves weak noisy scanner radio reception from low band to high band VHF — hear signals you couldn't hear before.

A J-310 FET handles strong signals and a new *noiseless feedback* circuit gives you excellent low noise reception. A 4.5 GHz MRF-901 transistor lets you receive weak signals well into VHF.

Detachable 20 inch telescoping antenna. Uses 9 volt battery or 110 VAC with MFJ-1312B, $12.95. 3⅓x1¼x4 inches.

Nearest Dealer/Orders: 800-647-1800
Technical Help: 800-647-TECH(8324)

• 1 year unconditional guarantee • 30 day money back guarantee (less s/h) on orders from MFJ • Free catalog

MFJ ENTERPRISES, INC.
Box 494, Miss. State, MS 39762
(601)323-5869; 8-4:30 CST, Mon.-Fri.
FAX: (601) 323-6551; Add s/h.

MFJ . . . making quality affordable

Prices and specifications subject to change © 1992 MFJ Enterprises, Inc.

CIRCLE 3 ON READER SERVICE CARD

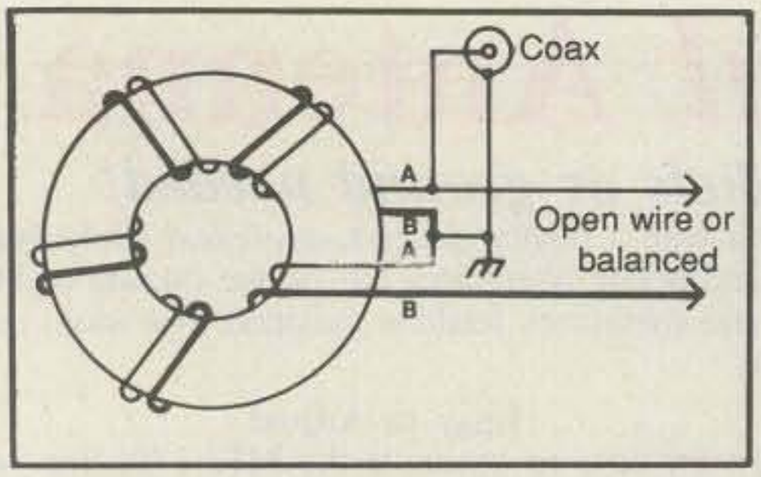
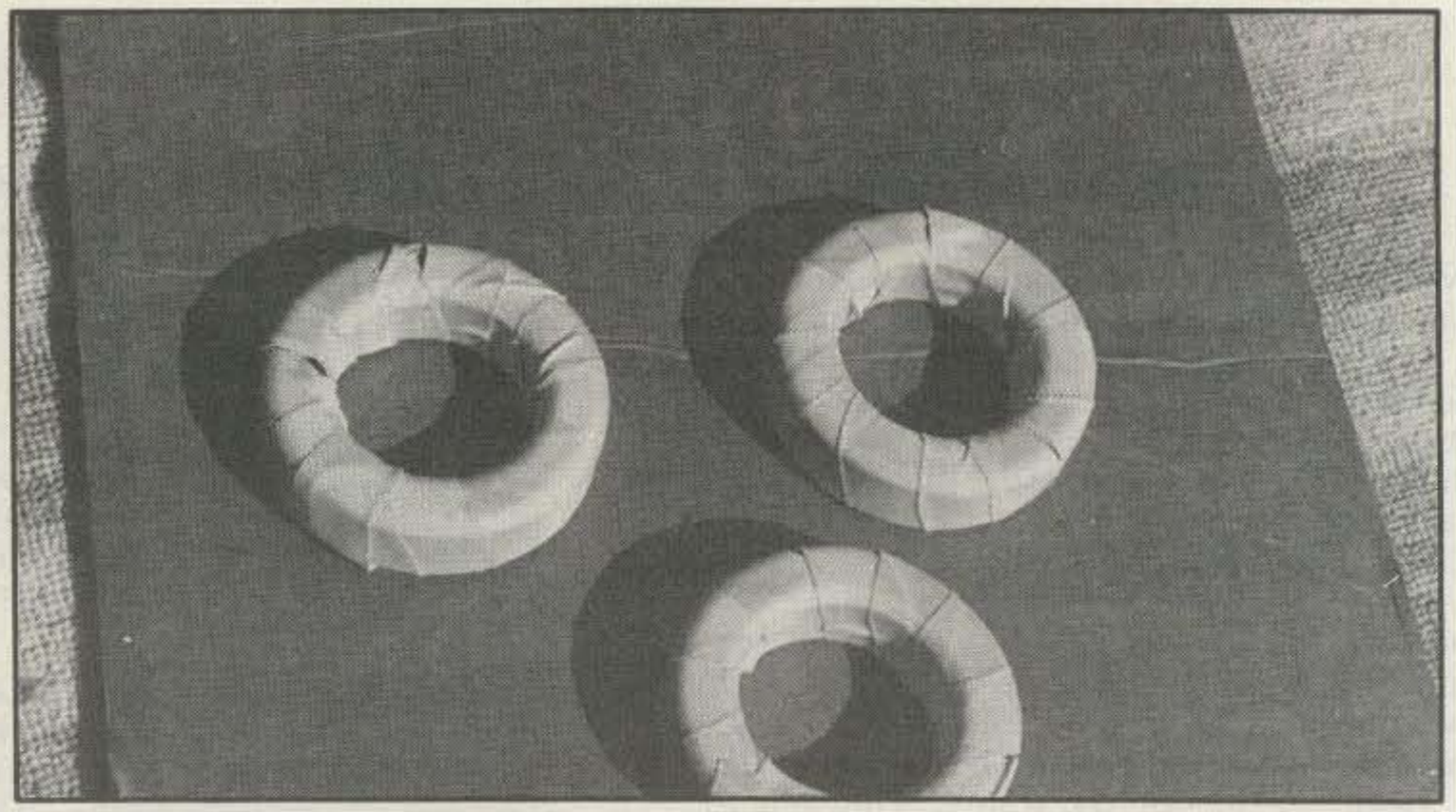
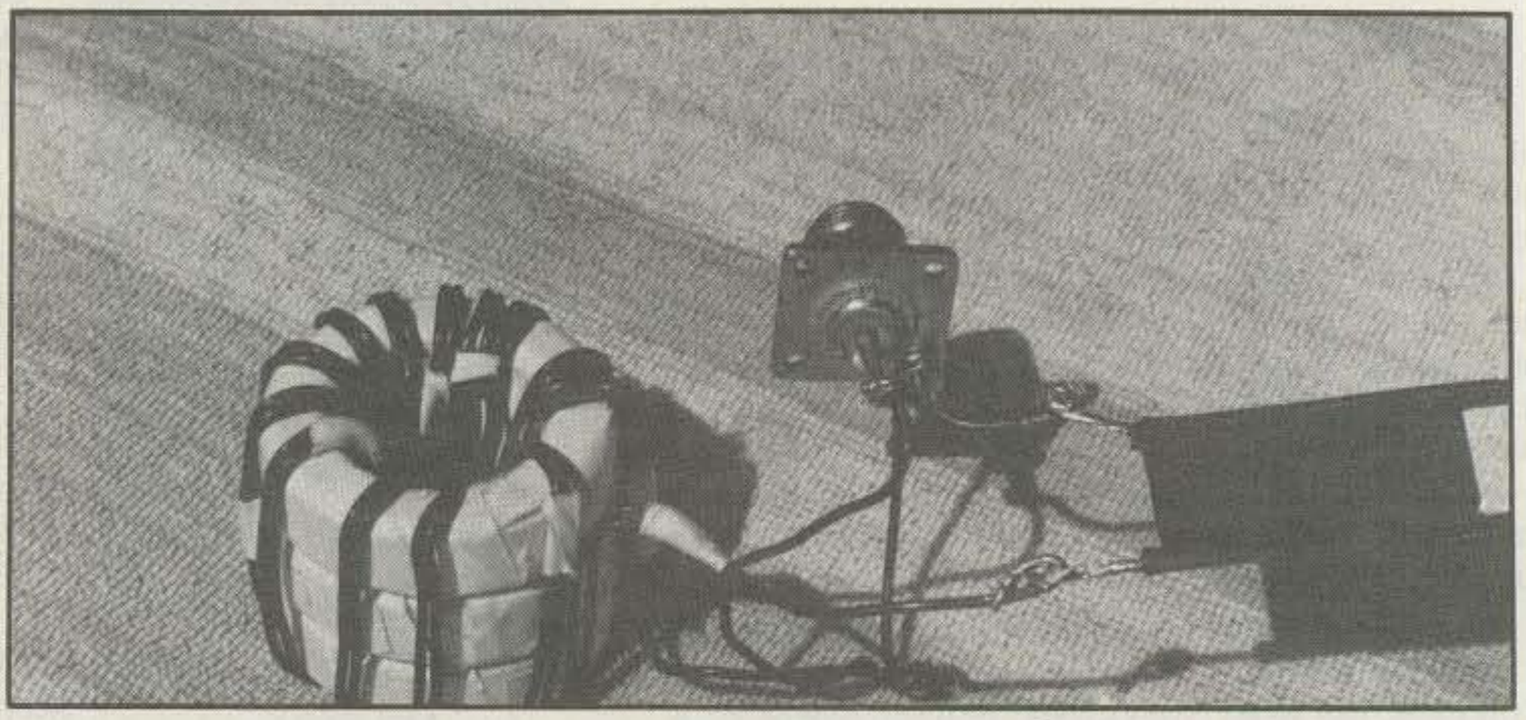


Fig. 2– The 4 to 1 transformer/balun.



In Part I we showed the basic kit available from The Wireman. Here are the three powdered iron cores wound with the 3M insulating tape.



I have deliberately left this "open" type construction to show the bifilar windings and the connections to the coax fitting (SO-239 type) and the other two leads connected to the open-wire line. While electrically this would work well, in actual practice the transformer needs to be mounted in a box or case that is weatherproof.

There are a couple of other points that should be covered before getting down to coax to open-wire feeder connections. Years ago when I first described the Ultimate Transmatch, I had the problem of going from a circuit that was basically single ended, to a balanced output or line (open-wire or twin-lead feeders). The answer boiled down to using a voltage type of balancing transformer. This is important because over the years arguments have erupted about the ratios, standing-wave matching, and other things. Keep in mind this simple fact: All I wanted was a transformer to go from unbalanced to balanced line. SWR had nothing to do with the design for a very good reason. If you take the composite antenna system load, the antenna plus feeders, the load presented at the Transmatch can be almost any value, *as we are not matching that load with the balancing transformer.* We are converting this balanced unknown load through the Transmatch to get the load to convert to the unbalanced 50 ohms, the design type of the transmitter or transceiver. The SWR at the balancing transformer is not important. What is important is that the transformer should be able to handle the mismatched currents or voltages. That is point 1.

One other aside here: I mentioned the heating of the current type of balun. The 4 to 1 voltage balun mentioned above, when properly built as described here, just does not "saturate" or overheat, as some people have said. I first made this type of balun in 1957 and have never had problems, and I run the legal limit. It is true that this balun may not be "flat" from 160 through 10 meters, but *we are not using it as a matching transformer.* Our aim is to get from coax to open-wire line and get as balanced a condition as possible. The cores I used are T-200 type material, and they are not as critical as ferrite, which I would not recommend for this application. Again, I would refer you to Jerry Sevick's excellent book for complete details on these materials and transformers.

Point 2 is how efficient is this type of balancing transformer in providing balanced output to open-wire line? I know I am being redundant here, but the argument that has erupted over current versus voltage baluns leaves one wondering if the whole thing is a tempest in a teapot. In the first place, and I am speaking now about open-wire feed to a multiband antenna, it is well nigh impossible *not* to have some feeder radiation regardless of the type of transformer used. However, it is important to keep in mind that such radiation is not *lost power.* It is going to go somewhere and probably will work someone for you. (Obviously, with the current balun tests I mentioned above, there is power lost as heat.) As long as pattern distortion is not a problem, and it rarely is with wire multiband antennas, then there should be no concern if there is some feeder radiation.

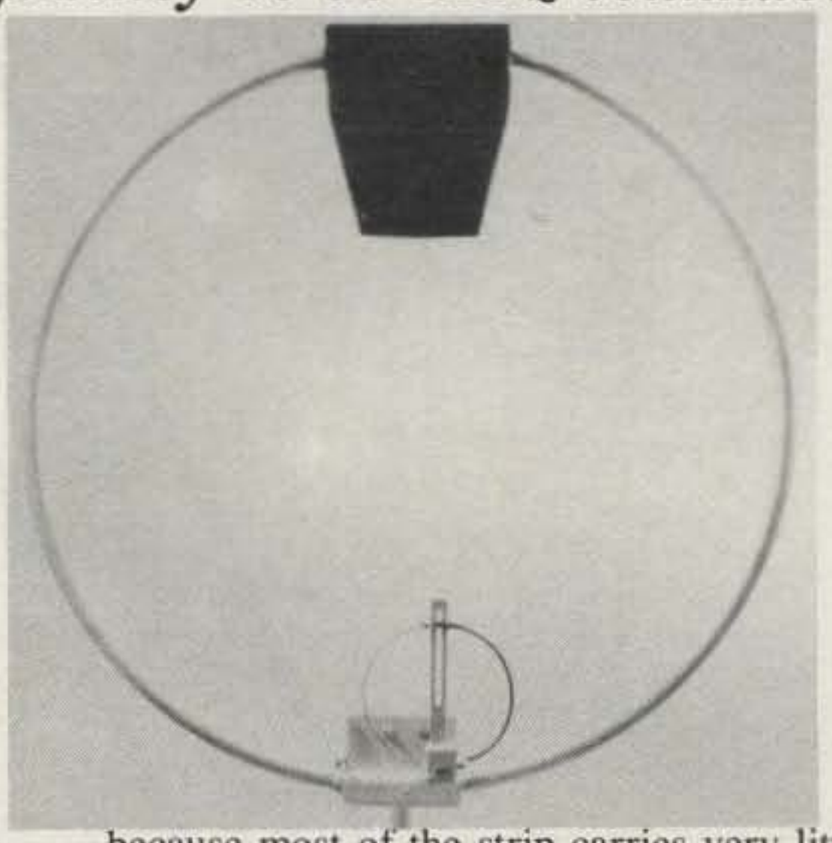
Since the inception of the Ultimate Transmatch some 30 years ago, manufacturers have used the balun/transformer

MFJ Super Hi-Q Loop™ Antenna

. . . 36 inch diameter -- it's the smallest, high efficiency 10-30 MHz continuous coverage antenna ever made for ham radio . . .

- *Only 36'' diameter but covers 10-30 MHz*
- *Round conductor more efficient than flat strip*
- *No control cable needed*
- *All welded construction*
- *Welded butterfly capacitor, no rotating contacts*
- *Automatic Band Selection™, SWR/Wattmeter*

MFJ-1784
$199.95



When was the last time you saw a *fully assembled* multiband HF antenna that fits in the back of a tiny Toyota?

Only 36 inches in diameter, the portable *MFJ Super Hi-Q Loop*™ is the smallest high efficiency 10 to 30 MHz continuous coverage antenna ever manufactured for ham radio.

You can take it with you and have it up and operating in minutes from nearly anywhere -- on trips, vacations, from hotels, DX-peditions, camping, even from a motorhome.

Its rugged all welded aluminum construction with built-in mounting bracket makes it ideal for home installations where space is limited -- apartments, condos, small lots, attics, closets -- it's so small it'll hardly be noticed.

The excellent performance of a high efficiency small loop antenna is well known and well proven by users all over the world.

It's almost as efficient as a dipole but gives you much better DX performance -- especially when mounted vertically near ground level.

Vertical mounting gives you both low angle radiation for DX and high angle radiation for close-in local contacts -- it's like having a vertical and a dipole combined into one. By rotating it you can null out QRM. Horizontal mounting gives you omni directional coverage.

The *MFJ Super Hi-Q Loop*™ antenna is a remotely tuned high-Q antenna with a narrow bandwidth that reduces transmitter harmonics, receiver overloading and out-of-band interference. It does not need a ground, radials or counterpoise. It covers 10-30 MHz continuously including the WARC bands with low SWR and handles a nominal 150 watts. No external antenna tuner is needed.

It's also a very quiet receiving antenna because it responds to magnetic fields and not electric fields -- you'll hardly notice static crashes during a storm.

10 reasons why the *MFJ Super Hi-Q Loop*™ beats the competition

Reason 1. The *MFJ Super Hi-Q Loop*™ has a more efficient radiator -- its large round conductor has less RF loss resistance than a thin flat strip conductor. You radiate more power.

Reason 2. It's built like a tank -- .050 inch diameter, thick wall aluminum radiator, all welded construction, no mechanical joints, welded butterfly capacitor with no rotating contacts.

Reason 3. You don't need a separate control cable -- the coax feedline carries *both* RF power and tuning control signals. The feedline is decoupled and isolated by a balanced to unbalanced transformer (balun) so the feedline does not radiate.

Reason 4. MFJ's exclusive *Automatic Band Selection™* auto-tunes to your desired band and lets you know with a beep.

Reason 5. Dual Fast and Slow tune push buttons make the remote control much simpler to use.

Reason 6. A Cross-needle SWR/Wattmeter with two ranges is built into the remote control.

Reason 7. The remote control is completely self-contained because it uses internal AA batteries (not included). You can also use isolated 12 VDC or 110 VAC with MFJ-1312B. $12.95

Reason 8. It's an incredibly low $199.95 -- that's 40% less than the nearest competition.

Reason 9. You're protected by MFJ's famous *No Matter What™* one year *Unconditional* Guarantee.

Reason 10. If you ever need help with your *MFJ Super Hi-Q Loop*™, you can call MFJ's exclusive *toll-free* technical help line 800-647-TECH(8324) and get expert help from a friendly MFJ Customer Service Technician.

Round conductor has less RF resistance than flat conductor

The following is quoted from *Electronic and Radio Engineering* by Frederick Terman, 4th edition, page 22: '' . . . with a conductor consisting of a thin flat strip, . . . the current flows primarily along the edges, . . . the true or effective resistance will be high because most of the strip carries very little current . . . it is not the amount of conductor surface that determines the resistance to alternating current, but rather the way in which the conductor material is arranged.''

Fact: A large round conductor has much less RF resistance than a thin flat strip.

Because the *MFJ Super Hi-Q Loop*™ uses a large 1.050 inch diameter *round* conductor for its radiator -- not a thin flat strip -- it's more efficient. You radiate more precious power and waste less as heat.

Remote Control (included) makes *MFJ Super Hi-Q Loop*™ easy-to-tune and *extra* portable

Super Loop™ Remote Control

MFJ's exclusive *Automatic Band Selection™* feature auto-tunes to your desired band and lets you know with a beep.

It's *extra* portable because . . .

. . . **you** don't need a separate control cable -- the coax feedline carries *both* RF power and tuning control signals.

. . . **you** don't need a separate SWR meter -- a two range Cross-Needle SWR/Wattmeter is built-in.

. . . **you** don't need a separate power cord because it's battery powered -- you can also use isolated 12VDC or 110 VDC with optional MFJ-1312B, $12.95. 3¼x6x2½ inches.

How can MFJ make the *Super Hi-Q Loop*™ so affordable?

By setting up an entire operation to build the *MFJ Super Hi-Q Loop*™ in volume, MFJ can reduce production and material cost and improve quality.

A production machine was custom built to automatically form thick wall aluminum tubing into precise loop antenna radiators.

MFJ builds the variable capacitor, does the welding, punching and forming and builds the electronics.

By doing as much as possible in-house MFJ reduces cost and brings you a better quality product -- it's *Made in USA* at its best.

No Matter What™ Guarantee

You get MFJ's famous one year *No Matter What™ unconditional* guarantee. That means we will repair or replace your *MFJ Super Hi-Q Loop™* (at our option) *no matter what* for a full year.

Call your dealer for your *best* price

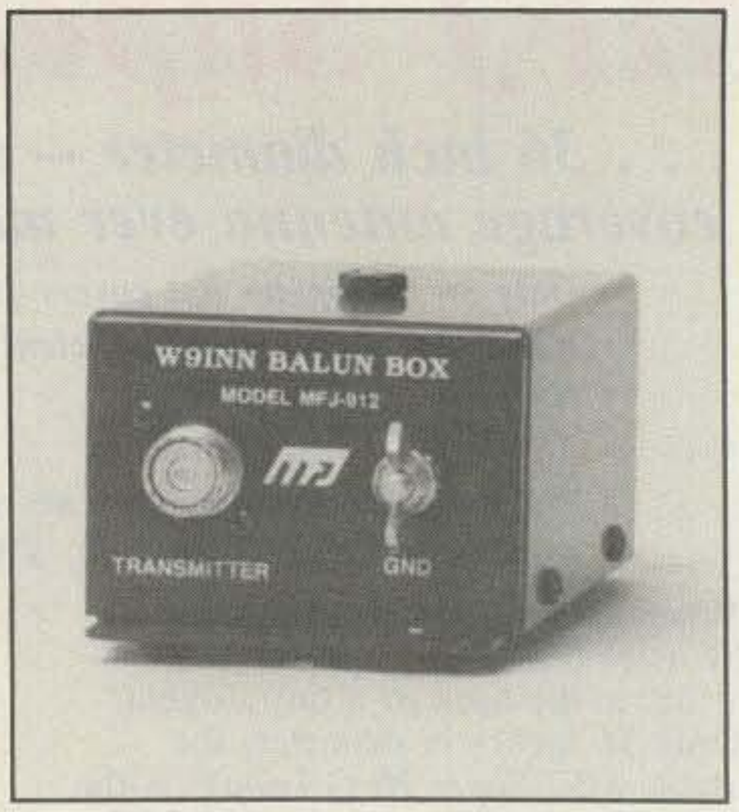
Take this *portable* multiband HF antenna with you and enjoy ham radio wherever you go. Call your dealer for your best price and get your *MFJ Super Hi-Q Loop™* today.

Nearest Dealer/Orders: 800-647-1800
Technical Help: 800-647-TECH(8324)
• **1 year unconditional guarantee** • 30 day money back guarantee (less s/h) on orders from MFJ • Free catalog

MFJ ENTERPRISES, INC.
Box 494, Miss. State, MS 39762
(601)323-5869; 8-4:30 CST, Mon.-Fri.
FAX: (601) 323-6551; Add $12 s/h.

MFJ . . . making quality affordable

CIRCLE 5 ON READER SERVICE CARD



This is the MFJ-912 four to one open-wire to coax transformer. This is a rugged unit designed to handle big mismatches.

method I described back then in their Transmatch/antenna tuners, and I might add with good success. So since this has worked so well for so many years, I am not about to suggest a change. I am always guilty of using cliches so I have tried to avoid them, but believe me, the old cliche that goes "If it ain't broke, don't fix it" certainly applies here! Fig. 2 is the circuit of this 4 to 1 transformer, and the accompanying photos provide details for constructing the transformer.

The first method of using coax to get outside the shack to open wire consists of using such a balancing transformer. We must come out of the transmitter/transceiver using coax to a Transmatch, then additional coax out to the balancing transformer which converts the system from coaxial line to open-wire line. One important point here: The commonly available built-in antenna tuner used in nearly all modern transceivers *will not* do the job. They simply do not have enough matching range to handle the mismatches encountered with a multiband tuned system. For that matter, in many cases they will not handle an 80 meter trap dipole. A Transmatch that has a wide matching range is needed. If you want to build your own, the handbooks are full of them.

I do not recommend using long runs of coax from the Transmatch out to the transformer. Try to keep the coax length under 25 feet, and by all means use an RG 8/U type, not RG 8X or RG 58, even with just 100 watts output. If you run high power, some very high voltages and currents can be developed and the coax must be able to handle them. Therefore, use a good, high-power type of coax.

There are commercial coax to open-wire line transformers available. The MFJ type is one (see photo). This is an excellent transformer and will easily handle 10 to 1 or higher SWR mismatches. However, for

No other Multi-Mode gives you all these features -- *not one!*

. . . only the easy-to-use MFJ-1278 Multi-Mode and MultiCom™ software gives you all these features plus 9 digital modes . . . Color SSTV, 16 Gray Level FAX, Packet, AMTOR, RTTY, ASCII, Navtex, CW, Memory Keyer

MFJ-1278 Multi-Mode
$279.95

MFJ-1289 MultiCom™
$59.95

Real Time Color SSTV

- Transmit and Receive Color SSTV
- Robot Color: 72, 36 Seconds
- Robot B/W: 8, 12, 24, 36 Seconds
- Scotty Color: 1 and 2
- Martin Color: 1 and 2

16 Gray Levels FAX/SSTV Modem

- 16 Gray Levels Weather FAX
- 16 Gray Levels AP Wire FAX
- 16 Gray Levels B/W SSTV

Real-Time Packet Pictures

- SVGA, VGA, EGA, CGA Color Packet Pictures

New *Enhanced* Mailbox

- Expandable 32K, 128K or 512K
- Separate callsign for mailbox
- Mailbox ON during packet connects
- Auto/Manual mail forwarding
- Auto/Manual reverse mail forwarding
- Remote Sysop access, Sysop paging
- Chat mode, mailbox C-text
- "Has mail" LED indicator

High Speed Modems

- 2400 baud Modem
- 9600 baud G3RUH Modem, $109.95
- Plugs inside MFJ-1278
- Selectable from keyboard
- MFJ-1278 Turbo, $359.95 with 2400 baud modem

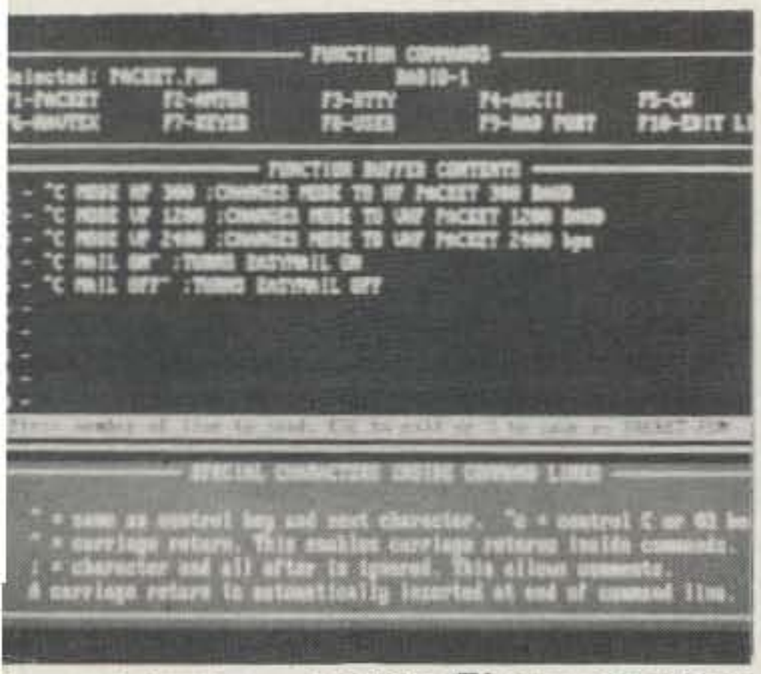
More MFJ *Exclusive* Features

- Automatic Signal Analysis™ for HF Packet and AMTOR as well as RTTY and ASCII
- Automatic Digipeater Routing™
- QSO *and* transfer files simultaneously
- Dedicated MARS mode
- Built-in printer port, sidetone amplifier
- *Individual* radio port level control
- *Stored* parameters for each mode
- CW iambic paddle input
- Call Alert Beeper™
- Built-in packet connect bell
- IC sockets used throughout
- One year *unconditional* guarantee

***Full* Color SSTV picture actually received on** 14.230 MHz, using Robot 72 second format. Transmit and receive color and black and white SSTV pictures.

16 Gray Levels WeFax map actually received on 16.410 MHz. Only MFJ-1278 and MultiCom™ gives you a 16 gray level modem for transmitting and receiving WEFAX, FAX and Color SSTV.

256 Color VGA Packet Picture actually received on packet. Join the fun of packet picture passing. See brilliant full color pictures paint across your screen as they are being received.



Easy and simple . . . MultiCom™ Operation Menu lets you select each mode by pressing a *single* key. Each mode has 10 user programmable buffers.

New MultiCom™ Terminal Program

MFJ MultiCom™ Starter Pack complete with computer interface cable and instruction. Order MFJ-1289, $59.95 IBM compatibles, MFJ-1282B, $39.95 C64/128, MFJ-1290, $49.95, Amiga MFJ-1287B, 59.95 Macintosh.

Pre-wired Cables and TNC/Mic Switch

Solves your wiring headache with the MFJ pre-wired TNC-to-radio cables, $14.95. TNC/Mic switch allows you to switch between Microphone and MFJ-1278 without disconnecting cables. MFJ-1272B, $34.95.

16 Gray Levels AP Wire Photo FAX actually received on 20.738 MHz. See tomorrow's news today before it appear in your newspaper.

Memory Expansion Board with firmware

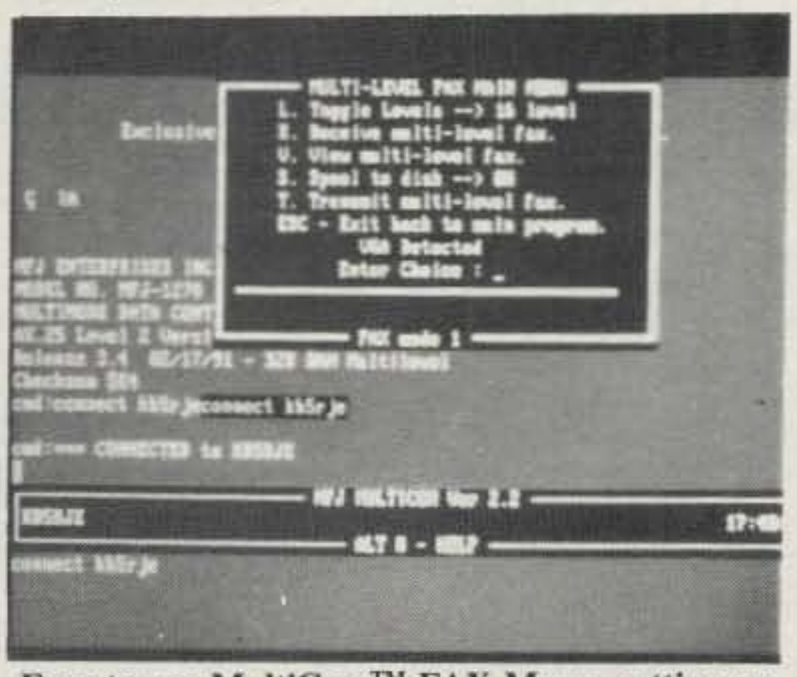
MFJ-46A, $49.95, 32K RAM; MFJ-46B, $69.95, 128K RAM or MFJ-46C, $239. 95, 512K RAM.

MFJ-1278 Real Time Clock

MFJ-43, $29.95. Ends frustration of setting TNC clock everytime you turn it on. Plugs into RAM socket. Works with MFJ-1278, MFJ TNCs and TAPR TNC clones.

Firmware 3.6 and MultiCom™ Upgrade 2.2

New firmware 3.6 upgrade, MFJ-48, $24.95. MultiCom™ 2.2 upgrade, MFJ-49B, $24.95, available.



Easy to use MultiCom™ FAX Menu--getting on FAX and SSTV is as simple as pressing one or two keys . . . it couldn't be easier!

Picture Perfect Video Digitizer

MFJ-1292, $199.95. Creates SSTV, FAX, packet picture.

Nearest Dealer/Orders: 800-647-1800
Technical Help: 800-647-TECH(8324)

• **1 year unconditional guarantee** • 30 day money back guarantee (less s/h) on orders from MFJ • Free catalog

MFJ ENTERPRISES, INC.
Box 494, Miss. State, MS 39762
(601)323-5869; 8-4:30 CST, Mon.-Fri.
FAX: (601) 323-6551; Add $6 s/h.

MFJ . . . making quality affordable

Prices and specifications subject to change © 1992 MFJ Enterprises, Inc.

Features in this ad uses MFJ-1278 Firware 3.6, MultiCom™ 2.2 and VGA graphic. Features may vary with other MFJ-1278 firmware, terminal program or other graphics system.

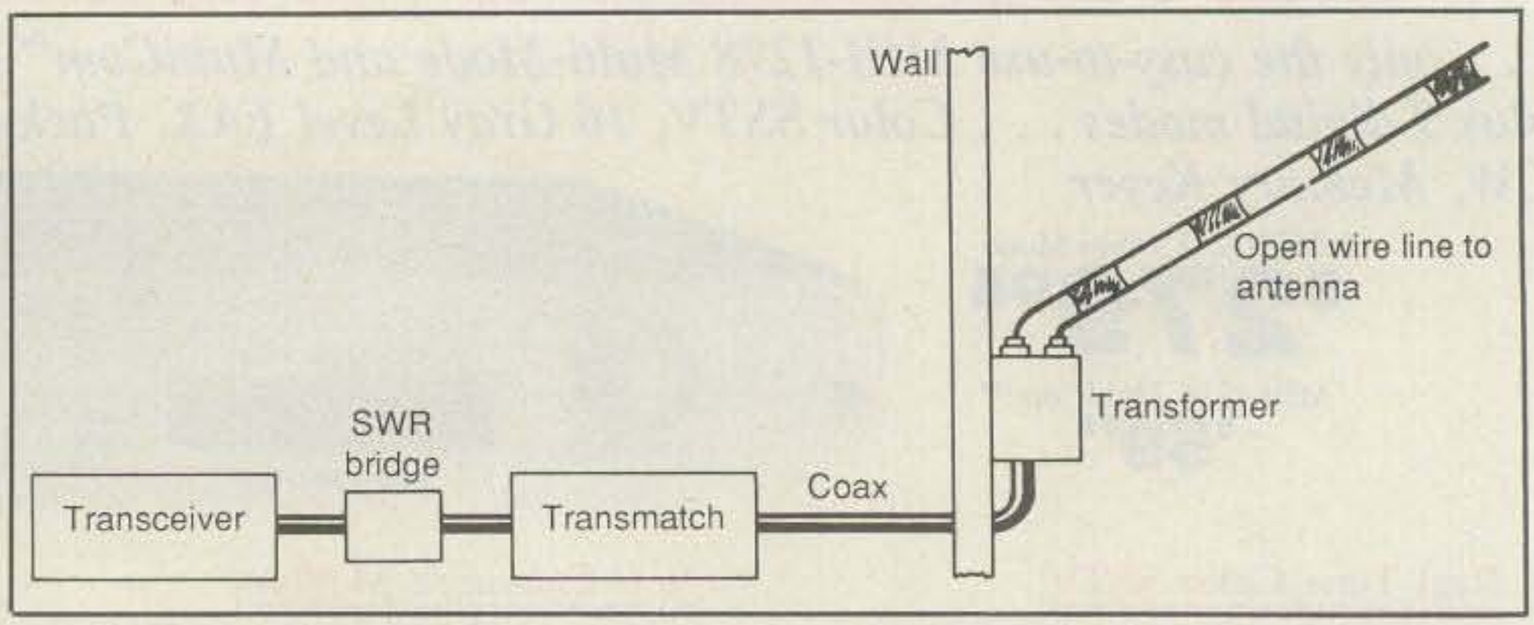


Fig. 3– This shows our goal: to bring the coax through the shack wall (or whatever) out to a transformer and then to the low-loss open-wire line.

those of you who want to roll your own I have shown how to make one in the photos. That way if something goes wrong and you have to blame someone, that someone will be me. The Wireman (see ads in *CQ*) sells a kit of parts for making the transformers. As I said earlier, don't be concerned about the 4 to 1 ratio, as we are not concerned with SWR here—at least not in the sense most amateurs think of SWR, because this is not a matching transformer. The thing to keep in mind is that we have a transmitter or transceiver that must work into a *50 ohm load,* and we must provide this load from an unknown antenna system load. The antenna system load may be very low or very high impedance with lots of reactance, and truly, the balun/transformer is only there to get from an unbalanced to balanced condition; that is all, nothing more. The Transmatch itself will convert the unknown antenna load to 50 ohms.

In fig. 2 a single T-200 core can be used, with Teflon-covered wire for powers up to a couple of hundred watts. For 1500 watts, key down continuous duty, three stacked cores should be used.

Construction of the transformer is relatively simple. The T-200 core/cores are first wrapped with a layer of the special insulating tape. If you are using the three cores, after each one is taped use a couple of strips of tape to tie the three cores together. Next put the two free ends of the Teflon wire in a vise and draw the two wires taut. I would suggest using some strips of the tape to tape the two conductors together, making a two-conductor wire. Next insert this wire "ribbon" through the cores or core and wind until you have at least 10

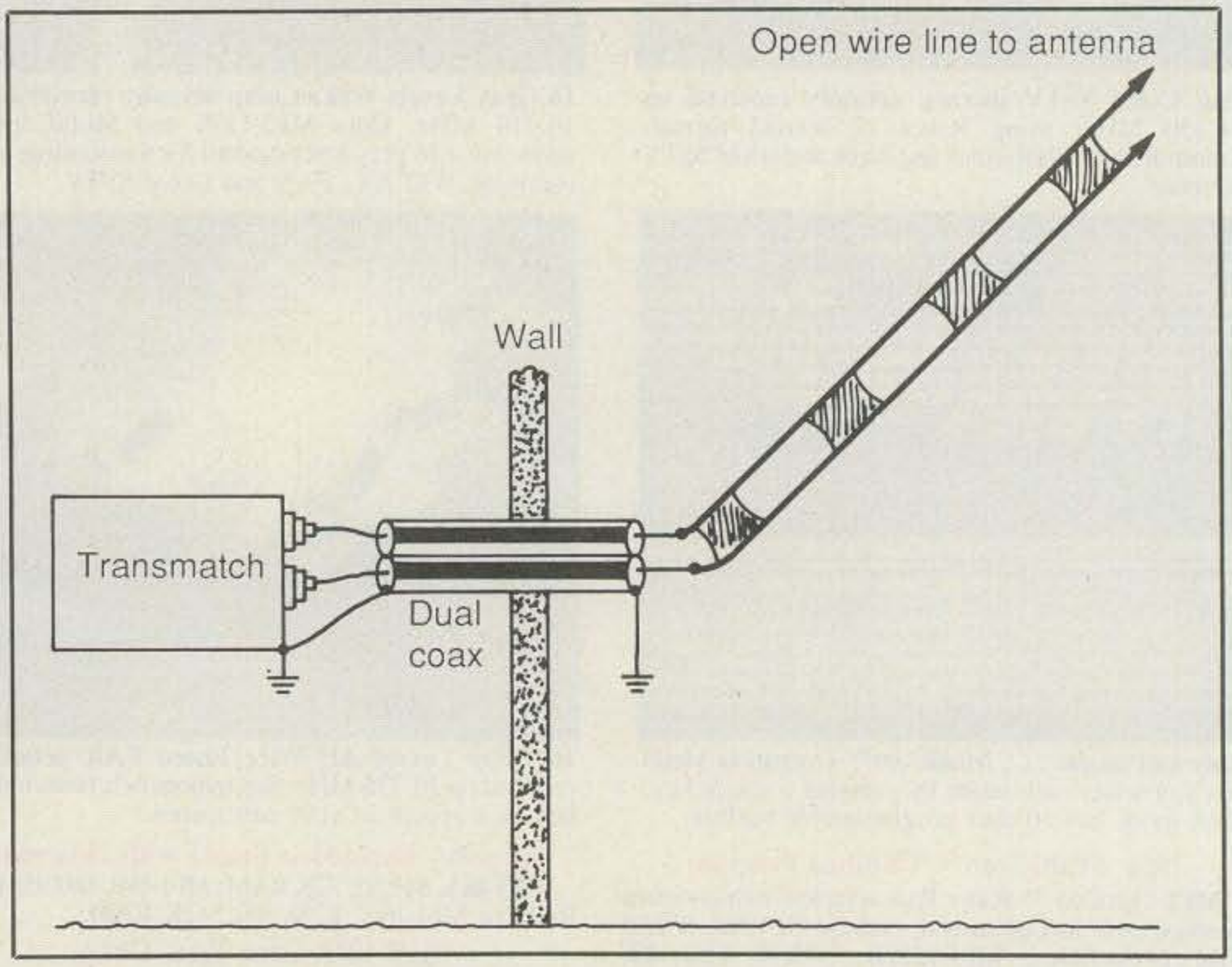


Fig. 4– Here is the second method of using short lengths of coax to get outside the shack. The dual lengths of parallel coax are brought from the balanced output of the Transmatch, out through the wall. At that point, we convert to open-wire line.

BEST OF MFJ

MFJ, Bencher and Curtis team up to bring you America's most popular keyer in a compact package for smooth easy CW

MFJ-422B **$134.95**

The best of all CW world's -- a deluxe MFJ Keyer using a Curtis 8044ABM chip in a compact package that fits right on the Bencher iambic paddle!

This MFJ Keyer is small in size but big in features. **You** get iambic keying, adjustable weight and tone and front panel volume and speed controls (8-50 WPM), dot-dash memories, speaker, sidetone and push button selection of automatic or semi-automatic/ tune modes. It's also totally RF proof and has ultra-reliable solid state outputs that key both tube and solid state rigs. Use 9 volt battery or 110 VAC with MFJ-1305, $12.95.

The keyer mounts on a Bencher paddle to form a small (4-1/8 x 2-5/8 x 5½ inches) attractive combination that is a pleasure to look at and use.

The Bencher paddle has adjustable gold plated silver contacts, lucite paddles, chrome plated brass and a heavy steel base with non-skid feet.

You can buy just the keyer assembly, MFJ-422BX, for only $79.95 to mount on **your** Bencher paddle.

Deluxe 300 W Tuner

MFJ-949D **$149.95**

MFJ-949D is the world's most popular 300 watt PEP tuner. It covers 1.8-30 MHz, gives you a new peak and average reading Cross-Needle SWR/Wattmeter, built-in dummy load, 6 position antenna switch and 4:1 balun -- in a compact 10 x 3 x 7 inch cabinet. Meter lamp uses 12 VDC or 110 VAC with MFJ-1312, $12.95.

Antenna Bridge

MFJ-204B **$79.95**

Now you can quickly optimize your antenna for peak performance with this portable, totally self-contained antenna bridge.

No other equipment needed -- take it to your antenna site. Determine if your antenna is too long or too short, measure its resonate frequency and antenna resistance to 500 ohms. It's the easiest, most convenient way to determine antenna performance. Built-in resistance bridge, null meter, tunable oscillator-driver (1.8-30 MHz). Use 9 V battery or 110 VAC with AC adapter, $12.95.

Super Active Antenna

"World Radio TV Handbook" says MFJ-1024 is a "first rate easy-to-operate active antenna ... quiet ... excellent dynamic range ... good gain ... very low noise ... broad frequency coverage ... excellent choice."

Mount it outdoors away from electrical noise for maximum signal, minimum noise. Covers 50 KHz to 30 MHz.

Receives strong, clear signals from all over the world. 20 dB attenuator, gain control, ON LED. Switch two receivers and aux. or active antenna.6x3x5 in. Remote unit has 54 inch whip, 50 ft. coax and connector. 3x2x4 in. Use 12 VDC or 110 VAC with MFJ-1312, $12.95.

MFJ-1024 **$129.95**

VHF SWR/Wattmeter

MFJ-812B **$29.95**

Covers 2 Meters and 220 MHz. 30 or 300 Watt scales. Also reads relative field strength 1-170 MHz and SWR above 14 MHz. 4½x2¼x3 in.

MFJ Coax Antenna Switches

MFJ-1701 **$34.95**

MFJ-1702B **$21.95**

MFJ-1704 **$59.95**

Select any of several antennas from your operating desk with these MFJ Coax Switches. They feature mounting holes and automatic grounding of unused terminals. They come with MFJ's one year **unconditional** guarantee.

MFJ-1701, $34.95. 6 pos. 2 KW PEP, 1 KW CW. 1.8-30 MHz. 10x3x1½ in.

MFJ-1702B, $21.95. 2 positions plus new Center Ground. 2.5 KW PEP, 1 KW CW. Insertion loss below .2 dB. 50 dB isolation at 450 MHz. 50 ohm. 3x2x2 in.

MFJ-1704, $59.95. 4 position cavity switch with lightening/surge protection device. Center ground. 2.5 KW PEP, 1 KW CW. Low SWR. Isolation better than 50 dB at 500 MHz. Negligible loss. 50 ohm. 6¼x4¼x1¼ in.

"Dry" Dummy Loads for HF/VHF/UHF

MFJ-260B **$28.95**

MFJ-264 **$59.95**

MFJ-264N **$69.95**

MFJ has a full line of dummy loads to suit your needs. Use a dummy load for tuning to reduce needless (and illegal) QRM and save your finals.

MFJ-260B, $28.95. VHF/HF. Air cooled, non-inductive 50 ohm resistor. SO-239 connector. Handles 300 Watts. Run full load for 30 seconds, derating curve to 5 minutes. SWR less than 1.3:1 to 30 MHz, 1.5:1 to 150 MHz. 2½x2½x7 in.

MFJ-264, $59.95. Versatile UHF/VHF/HF 1.5 KW load. Low SWR to 650 MHz. Run 100 watts for 10 minutes, 1500 watts for 10 seconds. SWR is 1.1:1 to 30 MHz, below 1.3:1 to 650 MHz. 3x3x7 inches. **MFJ-264N: "N" connector.**

HF or VHF SWR Analyzer™

MFJ-207 **$99.95** MFJ-208 **$89.95**

MFJ's revolutionary new SWR Analyzers give you a complete picture of your antenna SWR over an entire band -- without a transmitter, SWR meter or **any** other equipment. Just plug your antenna into the coax connector, set your SWR Analyzer™ to the frequency and read SWR off the meter. You can find your antennas true resonant frequency right at your feedline -- something a noise bridge can't do. Battery operated and handheld sized -- makes it **soooo easy** to work on antennas. MFJ-207,1.8-30 MHz; MFJ-208,142-156 MHz.9V battery or 110 'VAC with MFJ-1312, $12.95.

MFJ Speaker Mics

MFJ-283, 284, 285, 285L, 286, 287 or 287L **$24.95** *each*

MFJ's compact Speaker/Mics let you carry your HT on your belt and never have to remove it to monitor calls or talk. You get a wide range speaker and first-rate electret mic element for superb audio on transmit and receive. Earphone jack, lapel clip, PTT. MFJ-284 fits ICOM, Yaesu, Alinco. MFJ-286 fits Kenwood.

MINIATURE SPEAKER MICS: 2" x 1¼" x ¼". MFJ-285 and MFJ-285L (with "L" connector) fit Icom, Yaesu or Alinco; MFJ-287 or MFJ-287L fit Kenwood; MFJ-283: Split jack Alinco. All features of compact models. One year guarantee.

MFJ-1278 Multi-Mode Data Controller

MFJ-1278 **$279.95**

Use computer to transmit/ receive in **all 9** digital modes: Packet, AMTOR, ASCII, CW, RTTY, FAX, SSTV, Contest Memory Keyer and Navtex receive. Automatic Signal Analysis™ (ASA™), Easy-Mail™, printer port, 20 LED tuning indicator, AC supply, Host, Multi-gray level modem, CW key paddle jack and tons more. Options include 2400 baud modem (MFJ-2400, $69.95) and software with cables for IBM compatible, Commodore 64/128, Macintosh and VIC-20.

MFJ-1278T, $359.95. MFJ-1278 with 2400 modem built in.

12/24 Hour LCD Clocks

$19.95 MFJ-108B **$9.95** MFJ-107B

Huge 5/8 inch bold LCD digits let you see the time from anywhere in your shack. Choose from the dual clock that has separate UTC/local time display or the single 24 hour ham clock.

Mounted in a brushed aluminum frame. Easy to set. The world's most popular ham clocks for accurate logs. MFJ-108B 4½x1x2;MFJ-107B 2¼x1x2 in.

Cross-Needle SWR Meter

MFJ-815B **$69.95**

MFJ Cross-Needle SWR/ Wattmeter has a new **peak** reading function! It shows you SWR, forward and reflected power in 2000/500 and 200/50 watt ranges. Covers 1.8-30 MHz.

Mechanical zero adjusts for movement. SO-239 connectors. Lamp uses 12 VDC or 110 VAC with MFJ-1312, $12.95.

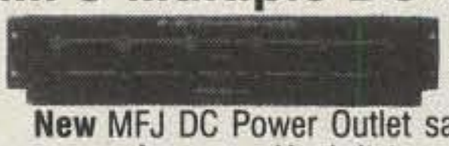
Deluxe Code Practice Oscillator

MFJ-557 **$24.95**

MFJ-557 Deluxe Code Practice Oscillator has a Morse key and oscillator unit mounted together on a heavy steel base so it stays put on your table. Portable because it runs on a 9-volt battery (not included) or an AC adapter ($12.95) that plugs into a jack on the side.

Earphone jack for private practice, Tone and Volume controls for a wide range of sound. Speaker. Key has adjustable contacts and can be hooked to your transmitter. Sturdy. 8½x2¼x3¾ in.

MFJ Multiple DC Outlet



MFJ-1112 **$29.95**

New MFJ DC Power Outlet saves you space **and** money. Hook it to your 12 VDC power supply and get 6 DC outlets for connecting your accessories. RF bypassing keeps RF out of power supply from DC line outlet. 13½x2¾x2½ in.

Nearest Dealer/Orders: 800-647-1800

MFJ ENTERPRISES, INC.
Box 494, Miss. State, MS 39762
(601) 323-5869; **FAX:** (601) 323-6551
TELEX: 53 4590 MFJ STKV

• One year **unconditional** guarantee • 30 day **money back** guarantee (less s/h) on orders from MFJ • Add $6.00 each s/h • **FREE** catalog

MFJ . . . making quality affordable

Prices and specifications subject to change without notice or obligation.

CIRCLE 166 ON READER SERVICE CARD

turns (10 to 12 turns are okay). You now have your transformer. It can be mounted on a metal plate or U, with a coax fitting on one side and two terminals on the other side (for the open-wire line). The entire unit can then be mounted on an outside wall, post, or whatever (see fig. 3). When mounted outside, cover the assembly with a plastic freezer box to keep out the rain and snow. The Wireman tells me that they can supply two different kits—high or low power.

As I noted earlier, there are a couple of commercial units sold in which the transformer is already mounted in a case. One in particular is the MFJ-912 W9INN remote transformer, which is identical in circuit to the transformer I described above. This unit uses two cores, but they are larger than the three I specified in the home-built version. They will handle at least 2 kilowatts with mismatches that are very high —10 to 1 or greater. This unit is already in a weatherproof box with mounting screws and terminals.

Remember, it is important that the coax from the Transmatch in the shack out to the transformer be a high-quality line, RG-8/U type, that will handle 4000 to 5000 RF volts. To repeat: The reason for caution here is that a high SWR can exist on this line between the transformer and Transmatch. A high SWR can cause high voltage or high current to be present, which could cause damage to the coax line. For this reason it is best to keep this coax line as short as possible.

I realize I didn't use a specific number here, but short as possible means just that. I know of some amateurs who have used as much as 50 feet of coax, but I think this is begging for trouble. Keep in mind that a high SWR is likely to exist on this coax into the Transmatch. For example, an 80 meter dipole, 130 feet long, center fed with open-wire line, is likely to have an SWR of 10 to 1 or higher appearing on the line. This mismatch also appears across the transformer and then goes on to the 50 ohm coax. The Transmatch in the station converts the mismatch to a pure 50 ohm match, but there still can be high voltages and currents on this coax, so keep it as short as possible.

Tune up is simple. With the system all connected and an SWR indicator in the line between the transmitter and Transmatch, apply enough power to obtain a reflected reading on the SWR bridge. Next adjust the Transmatch for a null or match as indicated by the SWR bridge. You can then bring up your power to the desired level.

The second system does not require an external balun/transformer at all. Use the one that is built into the Transmatch. Use two equal lengths of coax to get from the balanced line output of the Transmatch, to a point outside the house, to the open-wire line (see fig. 4). The coax is run together and the two inner conductors will be your section of feed line. The coax shield is connected together at each end (soldered). The coax feeders at the Transmatch end are connected to the balanced output terminals on the Transmatch. (In this case, the balun/transformer is already built into your Transmatch; just about all commercial units have them.) The coax leads at the outside point are connected (soldered) to the open-wire conductors, and the shields are connected to earth ground.

Wait! I know what you are going to say. What about the impedance of the open-wire feeders (450 ohms) being connected to the parallel coaxial feeders (100 ohms)? Isn't this a bad mismatch? It is a mismatch, but *it is of no importance in this case.* The coaxial section is a balanced line, and there can be no radiation from it (not only that, it is shielded). The difference in line impedance does not matter, because we are matching or adjusting a *complete* and complex antenna system load via the Transmatch.

We could, if we wanted to, make a transmission line of combination impedances —say, 300 ohm line, 450 ohm line, 600 ohm line, etc.—as long as both conductors in each line are perfectly equal in length. In theory, the radiation from one conductor cancels the radiation from the other, so the line doesn't radiate. If that is true, our only problem is one of matching this completely unknown load back to 50 ohms at the transmitter—and that is what we do. We adjust the Transmatch as described earlier. Remember, though, as I mentioned earlier, to keep the dual coax lines as short as possible. The same or similar high voltages/currents we mentioned earlier can exist here.

While I have written this article telling you what you can do, it is not what I do. I don't care if the open-wire line comes into the shack. Although I have thoroughly tested both methods, as I stated at the outset, I bring my open-wire line in along with several coax lines through a section of PVC pipe and then up to the Transmatch. Sometimes, however, amateurs like the idea of bringing coax all the way in (also it may keep their wives happy), so be my guest!

MFJ TNCs for VHF/HF Packet

MFJ-1270B *super* TAPR TNC clone has a world wide reputation as *the most reliable packet TNC in the world!* Thousands used as digipeaters, nodes, BBS and in all kinds of commerical applications working 24 hours a day — many work for years without a single failure . . .

NEW *ENHANCED* MAILBOX

- *Expandable 32K, 128K or 512K*
- *Separate callsign for mailbox*
- *Mailbox stays on during packet connects*
- *Auto forwarding and reverse mail forwarding*
- *Remote Sysop access, Sysop paging*
- *Chat mode, mailbox C-text*
- *"Has mail" LED indicator*

NEW LOWER PRICES!

MFJ-1270B
$119.95

MFJ-1274, with HF tuning indicator
$139.95

The MFJ-1270B super TAPR TNC clone has a world wide reputation as *the most reliable TNC in the world!*

Thousands are dedicated as digipeaters, nodes, BBS and used in all kinds of commerical applications working 24 hours a day — many work for years without a *single* failure.

The Most for Your Money

The widely acclaimed MFJ-1270B may not be the cheapest TNC, but it gives you the most for your money. You get features that others just don't have. See for yourself . . .

Fully TAPR TNC-2 Compatible

You get full TAPR TNC-2 compatibility — all software and hardware designed for the TAPR TNC-2 standard works without modification.

You get Net Rom compatibility that turns your MFJ-1270B into a Layer Three and Four networking node and Rose Switch compatibility that gives you another networking option.

VHF *and* HF operation

You get high performance VHF and HF modems as standard equipment — lets you double your fun on packet.

You get a true DCD circuit that dramatically reduces sensitivity to noise and dramatically increases completed QSOs.

FREE AC Power Supply

You get a *free* 110 VAC power suppy at no extra cost. With other brands, the AC power suppy could cost you an extra $20.95.

New *enhanced* Personal Mailbox

The *enhanced* Easy Mail™ personal mailbox lets you use a dedicated call-sign for your mailbox. Now your mailbox can stay on while you operate packet. This *new* mailbox will also auto forward or reverse forward mail to and from other BBS. Plus, the "has mail" LED blinks when you have mail. More features: remote Sysop access, sysop paging, mailbox C-text, chat mode and many other features not available in other TNCs or multimodes. The MFJ TNC mailbox memory is expandable to 32K, 128K, 512K.

WeFAX gives you Weather Maps

You get a WeFAX mode that lets you print full fledged weather maps from your HF radio to screen or printer or save to disk using an MFJ Starter Pack.

2400 or 9600 Baud Modem simply plugs in

You can add MFJ's optional *internal* 2400 baud or 9600 baud modem just by *plugging it in* and making a few simple connections.

KISS interface and MFJ Host Mode

You get a KISS interface that lets you run TCP/IP and MYSYS and MFJ's Host Mode that makes it eaxy to write efficent application programs.

MFJ Anti-Collision™ Technology

You get MFJ's Anti-Collision™ technology (Prioritized Acknowledgement) that prevents packet collisions to improve performance on busy channels.

Plus more . . .

You also get 32K RAM, IC sockets for easy service, true DCD for HF, 256K ROM, speaker jack, lithium battery backup, RS-232 and TTL serial ports, radio cable (you have to add a connector for your particular radio), Fast-Start™ Manual plus much more. Use 12 VDC or 110 VAC. 9½x1½x7½ inches.

One Year *Unconditional* Guarantee

You get MFJ's famous *No Matter What*™ one year *unconditional* guarantee.

Enjoy Packet for a long, long time

If you want a packet TNC that'll work 24 hours a day without failure — one that has more features than any other — get the ultra reliable MFJ-1270B today and enjoy packet for a long, long time.

TNC with built-in HF Tuning Indicator

MFJ-1274, $139.95. Same TNC as MFJ-1270B but has precision tuning indicator for HF packet — makes operating HF a pleasure. Just tune your radio to center single LED and you're precisely tuned in to within 10 Hz — and it shows you which way to tune!

New 2400 baud Turbo TNCs

MFJ-1270BT, $209.95 and MFJ-1274T, **$229.95** have built-in fast 2400 baud modem. Lets you operate 300, 1200 and 2400 baud packet.

ACCESSORIES for TNCs

MFJ Starter Packs

An MFJ Starter Pack, $24.95, gets you on the air instantly. You get interface cable, software on disk and instructions -- just plug it all in and start enjoying packet. Order MFJ-1284 for IBM or compatibles, MFJ-1282 for Commodore 64/128 or MFJ-1287 for Macintosh. For VIC-20 or C64/128 with tape drive use MFJ-1283, $24.95.

Mailbox Memory Expansion Board

For all MFJ TNCs. MFJ-47A, $49.95, 32K RAM; MFJ-47B, $69.95, 128K RAM; MFJ-47C, $239.95, 512K RAM. Complete with Firmware.

MFJ TNC Real Time Clock

MFJ-43, $29.95. Ends frustration of setting TNC clock everytime you turn it on. Maintains correct time even when TNC is turned off. Plugs into RAM socket. Works with MFJ TNCs and TAPR TNC clones.

MFJ TNC Firmware Upgrade Release 1.2.9

New firmware features enhanced mailbox and supports expandable mailbox up to 512K. MFJ-40C, $24.95.

MFJ 2400 and 9600 Baud Modems

MFJ-2400, $89.95. Operates 300, 1200 and 2400 baud packet. Works with any radio. **MFJ-9600,** $109.95. G3RUH compatible 9600 baud modem. Not all radios compatible with 9600 baud. Both plug in MFJ TNCs and MFJ-1278 for easy installation.

MFJ's new TNC/Mic Switch . . . lets you switch between your TNC or microphone by pushing a button!

MFJ-1272B
$34.95

The MFJ-1272B is the most popular TNC/multimode accessory in ham radio! **Why?** Because you can switch between your microphone and packet TNC or multimode by pushing a button.

You won't have to unplug your microphone and plug in your TNC *everytime* you want to work packet or other digital modes.

Just plug the pre-wired cables into your rig's microphone connector and into your TNC and you're ready to go -- no more hunting for hard-to-find connectors and wiring up complicated cables.

Works with HF, VHF and UHF radios with 8 pin mic connectors—including Kenwood, ICOM, Yaesu, Alinco and others.

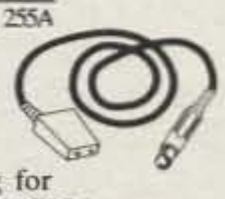
Plug-in jumpers let you quickly set-up for virtually any radio. Factory set for Kenwood and Alinco. Includes easy to follow instructions. Has audio-in and speaker jacks. 3-¼ x 1-¼ x 4 inches.

MFJ-1272B, $34.95, for MFJ TNC/multimodes and TAPR TNC-2 clones.
MFJ-1272BX, $39.95, wired with connector for PK-232.
MFJ-1272BYV, $39.95, wired with connector for KAM, VHF Port.
MFJ-1272BYH, $39.95, wired with connector for KAM, HF Port.
MFJ-1272BZ, $39.95, wired with connector for PK-88.

Pre-wired Radio-to-TNC cables . . . $14.95

	All MFJ	PK-232™	PK-88™	KAM™
[1]Icom/Yaesu HTs	MFJ-5024	MFJ-5024X	MFJ-5024Z	MFJ-5024YV
[2]Kenwood HTs	MFJ-5026	MFJ-5026X	MFJ-5026Z	MFJ-5026YV
Yaesu 8 pin radios	MFJ-5080	MFJ-5080X	MFJ-5080Z	MFJ-5080YV[4] MFJ-5080YH[4]
[3]Icom 8 pin radios	MFJ-5084	MFJ-5084X	MFJ-5084Z	MFJ-5084YV[4] MFJ-5084YH[4]
Kenwood/Alinco 8 pin radios	MFJ-5086	MFJ-5086X	MFJ-5086Z	MFJ-5086YV[4] MFJ-5086YH[4]

1 does not include IC-W2A 2 does not include 2500 3 does not include 25A & 255A
4 YV models connect VHF port of KAM. YH models connect HF port of KAM



MFJ-5082, $9.95, open end cable with 8-pin microphone connector
MFJ-5224, $9.95, open end cable for Icom/Yaesu handhelds
MFJ-5226, $9.95, open end cable for Kenwood handhelds
MFJ-5268, $7.95, open end cable with 8-pin modular telephone plug for Yaesu FT-2400H, Kenwood TM641A, TM714A, TM732A

MFJ-1271 turns your Commodore 64/128 into full featured packet TNC!

Just plug in this MFJ-1271 modem and boot up the public domain Digicom/64 software (not included) to enjoy VHF or HF packet at 1200 and 300 bauds.

You get a high performance modem featuring true DCD circuit with adjustable threshold. DCD detect LED tells you when you're receiving a good signal. Plugs into cassette port and uses 12 VDC or 110 VAC with MFJ-1312, $12.95.

MFJ-1271
$49.95

Nearest Dealer/Orders: 800-647-1800
Technical Help: 800-647-TECH(8324)

• **1 year unconditional guarantee** • 30 day money back guarantee (less s/h) on orders from MFJ • Free catalog

MFJ ENTERPRISES, INC.
Box 494, Miss. State, MS 39762
(601)323-5869; 8-4:30 CST, Mon.-Fri.
FAX: (601) 323-6551; Add $6 s/h.

MFJ . . . making quality affordable

CIRCLE 6 ON READER SERVICE CARD

The 36th Annual CQ World-Wide WPX Contest

SSB: March 27–28, 1993
CW: May 29–30, 1993

Starts: 0000 GMT Saturday
Ends: 2400 GMT Sunday

I. Contest Period: Only 36 hours of the 48 hour contest period permitted for Single Operator stations. **Off periods must be a minimum of 60 minutes in length and clearly marked in the log.** Multi-operator stations may operate the full 48 hours.

II. Objective: Object of the contest is for amateurs around the world to contact as many amateurs in other parts of the world as possible during the contest period.

III. Bands: The 1.8, 3.5, 7, 14, 21, and 28 MHz bands may be used. No WARC bands.

IV. Type of Competition:

1. Single Operator (Single band and All Band)

(a) Single operator stations are those at which one person performs all of the operating, logging, and spotting functions. **Only one signal is allowed at any one time. The use of DX spotting nets or any other form of DX alerting assistance places the station in the multi-single category.**

(b) **Low Power:** Same as 1(a) except that **output power shall not exceed 100 watts.** Stations in this category will compete with other low-power stations only.

(c) **QRP/p:** Same as 1(a) except that **output power shall not exceed 5 watts.** Stations in this category will compete with other QRP/p stations only.

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).

(b) **Multi-Transmitter:** No limit to transmitters, but only one signal and running station allowed per band. NOTE: All transmitters must be located within a 500 meter diameter or within property limits of the station licensee's address, whichever is greater. All antennas must be physically connected by wires to the transmitters and receivers.

V. Exchange: RS(T) report plus a progressive three-digit contact number starting with 001 for the first contact. (Continue to four digits if past 1000.) Multi-transmitter stations use separate numbers for each band.

VI. Points:

A. Contacts between stations on different continents are worth three (3) points on 28, 21, and 14 MHz and six (6) points on 7, 3.5, and 1.8 MHz.

B. Contacts between stations on the same continent but different countries are worth one (1) point on 28, 21, and 14 MHz, and two (2) points on 7, 3.5, and 1.8 MHz. **Exception: For North American stations only—contacts between stations within the North American boundries count as two (2) points on 28, 21, and 14 MHz and four (4) points on 7, 3.5, and 1.8 MHz.**

C. Contacts between stations in the same country are permitted for multiplier credit but have zero (0) point value.

VII. Multiplier: The multiplier is the number of different prefixes worked. A "PREFIX" is counted only once regardless of the number of times the same prefix is worked.

A. The letter/numeral combinations which form the first part of the amateur call will be considered the prefix. Examples: N8, W8, Y22, Y23, WD8, HG1, HG19, WB2, WB200, KC2, KC200, OE2, OE25, U3, GB75, ZS66, NG84, etc. Any difference in the numbering, lettering, or order of same shall constitute a separate prefix. A station operating from a DXCC country different from that indicated by its callsign is required to sign portable. The portable prefix must be an authorized prefix of the country or call area of operation. In cases of portable operation, the portable designator would then become the prefix. Example: N8BJQ operating from Wake Is. would sign N8BJQ/KH9 or KH9/N8BJQ, and KH6XXX operating from Ohio would not sign /KH8 which is normally assigned to American Samoa, but could sign /W8, /N8, /K8, etc., or any other prefix authorized for use in the US 8th district. Portable designators without numbers will be assigned a zero (Ø) after the second letter of the designator to form the prefix. Example: N8BJQ/PA would become PAØ. All calls without numbers will be assigned a zero (Ø) after the first two letters to form the prefix. Example: XEFTJW would count as XEØ, RAEM would count as RAØ, etc. Maritime mobile, mobile, /A, /E, /J, /P, or interim license class identifiers do not count as prefixes.

B. Special event, commemorative, and other unique prefix stations are encouraged to participate.

VIII. Scoring: 1. Single Operator (a) All Band score, total QSO points from all bands multiplied by the number of different Prefixes worked. (b) Single Band score, QSO points on the band multiplied by the number of different Prefixes worked. See VII.

2. Multi-Operated stations. Scoring in both these categories is the same as the All Band scoring for Single Operator.

3. A station may be worked once on each band for QSO point credit. However, **prefix credit can be taken only once** regardless of the number of different bands on which the same station and/or prefix has been worked during the entire contest.

IX. QRPp Section: (Single Operator Only). Output power must not exceed 5 watts. **You must denote QRPp on the summary sheet and state the actual maximum output power used for all claimed contacts.** Results will be listed in a separate QRPp section and certificates will be awarded to each top scoring QRPp station in the order indicated in Section XI. These certificates will be marked QRPp and will show your power output. QRPp stations will be competing only with other QRPp stations for awards. All other information contained in these rules is applicable to this section.

X. Low Power Section (Single Operator Only): Output power must not exceed 100

watts. **You must state the actual output power used for all claimed contacts on the summary sheet.**

XI. Awards: Certificates will be awarded to the highest scoring station in each category listed under Section IV.

1. In every participating country.

2. In each call area of the United States, Canada, Australia, and Asiatic USSR.

All scores will be published. However, to be eligible for an award, a Single Operator station must show a minimum of 12 hours of operation. Multi-operator stations must show a minimum of 24 hours.

A single band log is eligible for a single award **only**. If a log contains more than one band, it will be judged as an all band entry, unless specified otherwise. However, a 12 hour minimum is required on the single band.

In countries or sections where the returns justify, 2nd and 3rd place awards will be made.

XII. Trophies, Plaques and Donors:

SSB

Single Operator, All Band

WORLD - Stanley Cohen, WD8QDQ
U.S.A. - Atilano de Oms, PY5EG
EUROPE - Jim Hoffman, N5FA
SO. AMERICA - Ron Moorefield, W8ILC
OCEANIA - Phillip Fraizer, K6ZM Memorial
AFRICA - Peter Sprengel, PY5CC
*JAPAN - The DX Family Foundation
WORLD QRPp - Dayton A.R.A.
USA QRPp - Doug Zwiebel, KR2Q

Single Operator, Single Band

WORLD - John N. Reichert, N4RV
WORLD 7 MHz - William D. Johnson, KV0Q
EUROPE - Myron E. Crofoot, WB4VQO
OCEANIA - D. Craig Boyer, AH9B
U.S.A. 3.7 MHz - Lance Johnson Engineering
U.S.A. 7 MHz - Lewis W. Sayre, N7AVK
U.S.A. 21 MHz - Bernie Welch, W8IMZ Memorial
U.S.A. 28 MHz - Novice/Tech. only - Jon Engelhardt, KA0ZFX

Multi-Operator, Single Xmtr.

U.S.A. - Oklahoma Comm Center

Multi-Operator, Multi-Xmtr.

WORLD - Prince Georges Zulu Radio Club
NORTH AMERICA - James Dixon, NL7HI (Burt Curwen, KL7IRT Memorial)
U.S.A. - Glenn Tracey, KC3EK

Contest Expedition

WORLD - Kansas City DX Club

• • •

CW

Single Operator, All Band

WORLD - Terry Baxter, N6CW
U.S.A. - Steve Bolia, N8BJQ
OCEANIA - Tom Morton, KT6V
CANADA - Canadian Amateur Radio Federation (C.A.R.F.)
*JAPAN - The DX Family Foundation

Single Operator, Single Band

WORLD - Pedro Piza, Jr., NP4A (Pedro Piza, Sr., KP4ES Memorial)
WORLD 7 MHz - William D. Johnson, KV0Q
WORLD 3.5 MHz - Lance Johnson Eng.
OCEANIA - D. Craig Boyer, AH9B
U.S.A. - Kansas City DX Club
U.S.A. 28 MHz - Walt Smith, K1DWQ (Bernie Welch, W8IMZ Memorial)
U.S.A. 21 MHz - Wayne Carroll, W4MPY
U.S.A. 14 MHz - Gene Walsh, N2AA

Multi-Operator, Single Xmtr.

WORLD - Ron Blake, N4KE
U.S.A. - Austin Regal, N4WW

Multi-Operator, Multi-Xmtr.

WORLD - Roger Burt, N4ZC

Contest Expedition

WORLD - Ed Roller, K4IA

• • •

Combined SSB/CW

WORLD - SINGLE OP, ALL BAND - Al Slater, G3FXB Memorial
EUROPE - SINGLE OP, ALL BAND - Les Nouvelles DX Group
U.S.A. - SINGLE OP, ALL BAND - Oklahoma Comm Center

Club (SSB & CW)

WORLD - CQ Magazine
U.S.A. - Oklahoma DX Assn.

**Donor is responsible for this trophy.*

A station winning a World Trophy will not be considered for a sub-area award. That Trophy will be awarded to the runner-up for that area if the returns justify the award.

XII. Club Competition: A trophy will be awarded each year to the club or group that has the highest aggregate score from logs submitted by members. The club must be a local group and not a national organization. Participation is limited to members operating within a local geographical area. **(Exception: DXpeditions especially organized for operation in the contest and manned by members.)** Indicate your club affiliation. To be eligible for an award, a minimum of three logs must be received from a club.

XIII. Log Instructions: 1. All times must be in GMT. All breaks must be clearly marked. Single operator and multi-single logs must be submitted in chronological order. Multi-multi logs must be submitted chronologically by band.

2. Prefix multipliers should be entered only the FIRST TIME they are contacted.

3. Logs must be checked for duplicate contacts, correct points, and prefix multipliers. Duplicate contacts must be clearly shown. Computerized logs must be checked for typing accuracy. Original logs may be requested if further cross-checking is required.

4. An alpha/numeric check list of claimed PREFIX multipliers must be submitted with your log.

5. Each entry must be accompanied by a Summary Sheet listing all scoring information, the category of competition, and the contestant's name and mailing address in BLOCK LETTERS.

Also submit a signed declaration that all contest rules and regulations for amateur radio in the country of the contestant have been observed.

6. Official log and sample summary sheets are available from *CQ*. A large self-addressed envelope with sufficient postage or IRCs must accompany your request.

If official forms are not available, you can make your own.

7. Contest logs may be submitted on disk. Logs submitted on disk must contain all required information (Time, Band, Call, RST & NR Sent, RST & NR Rcvd, Multiplier, and QSO Points). Files must be in ASCII format and in chronological order for single operator and multi-single entrants. Multi-multi entrants should submit logs chronologically by band. Other file formats (.bin, .res, .dbf, .wks) are acceptable. A sorted multiplier file is also required. Only MS-DOS compatible disks will be accepted (either 5¼ or 3½ inch). A written summary sheet must accompany the disk, showing all required scoring information, the category of competition, off times, and the normal signed declaration, as well as your name, address, and a phone or FAX number where you can be reached. The original log may be requested for cross-checking.

XIV. 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 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 WPX Contest Committee to contain a large number of errors may be disqualified as a participant operator or station for a period of one year. If within a 5 year period the operator is disqualified a second time, he will be declared ineligible for any *CQ* contest awards for a 3 year period. The use of non-amateur means to solicit contacts during the contest period is considered unsportsmanlike and will result in disqualification of the entry. Actions and decisions of the CQ WPX Contest Committee are official and final.

XV. Deadline: All entries must be postmarked no later than **May 10, 1993** for the SSB section and **July 10, 1993** for the CW section. **Indicate SSB or CW on the envelope. One extension of up to 30 days, for legitimate reasons, may be granted if requested from the contest director. Logs postmarked after the deadline or extension deadline, if granted, may be listed in the results, but will be ineligible for any awards.**

All logs go to: CQ Magazine, WPX Contest, 76 N. Broadway, Hicksville, NY 11801 U.S.A.

Questions pertaining to the WPX Contest can be sent to: WPX Contest Director, Steve Bolia, N8BJQ, 4121 Gardenview Dr., Beavercreek, OH 45431 U.S.A., or via packet to the following: N8BJQ @W8BI.OH.USA.NA.

Please remember to send in early for the WPX Contest Logs and Summary Sheets.

ASTRON CORPORATION
9 Autry
Irvine, CA 92718
(714) 458-7277 • FAX (714) 458-0826

ASTRON POWER SUPPLIES

• HEAVY DUTY • HIGH QUALITY • RUGGED • RELIABLE •

MODEL VS-50M

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, RS-4L, RS-5L
- MAINTAIN REGULATION & LOW RIPPLE at low line input Voltage
- HEAVY DUTY HEAT SINK • CHASSIS MOUNT FUSE
- THREE CONDUCTOR POWER CORD except for RS-3A
- 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)
- All units available in 220 VAC input voltage (except for SL-11A)

SL SERIES

- LOW PROFILE POWER SUPPLY

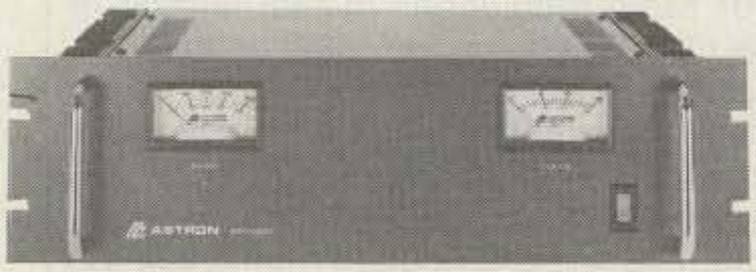
MODEL	Colors Gray	Colors Black	Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H × W × D	Shipping Wt. (lbs.)
SL-11A	•	•	7	11	2⅝ × 7⅝ × 9¾	12
SL-11R	•	•	7	11	2⅝ × 7 × 9¾	12
SL-11S	•	•	7	11	2⅝ × 7⅝ × 9¾	12
SL-11R-RA		•	7	11	4¾ × 7 × 9¾	13

RS-L SERIES

- POWER SUPPLIES WITH BUILT IN CIGARETTE LIGHTER RECEPTACLE

MODEL	Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H × W × D	Shipping Wt. (lbs.)
RS-4L	3	4	3½ × 6⅛ × 7¼	6
RS-5L	4	5	3½ × 6⅛ × 7¼	7

RM SERIES



MODEL RM-35M

- 19" 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
RM-60A	50	55	7 × 19 × 12½	60
• 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
RM-60M	50	55	7 × 19 × 12½	60

RS-A SERIES

MODEL RS-7A

MODEL	Colors Gray	Colors Black	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	Colors Gray	Colors Black	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
SL-11S	•	•	7	11	2¾ x 7⅝ x 9¾	12

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

OPTOELECTRONICS

ALL OF OUR PRODUCTS ARE MADE IN THE U.S.A.

Handi-Counter® 3000

The world's finest hand held multifunction counter – incorporates many unique functions usually found only in very expensive bench models. Designed for virtually every measurement application from near DC through Microwave including measuring RF transmission frequencies at the maximum possible distance. The 3000 is also the world's first HandiCounter® with Period, Time Interval and Ratio measurement capability. **$259.**

Bench/Portable Multifunction Counter Model 8030

10Hz - 3GHz extremely High Sensitivity, High Resolution and Accuracy, includes a Bargraph, ± 1PPM TCX0, Two Inputs, Adjustable Trigger Level, Trigger Variable and Hold Button **$579.**

Optional ± .1 TXCO: $135.

HandiCounter® Model 2810

Our full range counter with bargraph 10Hz to 3GHz. Ultra-high sensitivity, 4 fast gate times, outstanding quality–low, low price. **$199.**

Handi Counter® Model 2300

The Original Pocket Sized Counter. 1MHz to 2.4GHz – 8 digit LED. Maximized Sensitivity, ± 1ppm TCXO. Includes Hold Switch, NiCads and Charger/ Adapter! **$99.**

R10 FM Communications Interceptor™

ALL NEW TECHNOLOGY!!

The Interceptor follows & locks on even when frequency changes and intercepts ALL FM Two-Way Transmissions without gaps in coverage. It does not have to tune through RF Spectrum to capture signals. FCC Classified as Communication Test Instrument – Increase your RF Security!! **$359.**

APS104

Our Active Preselector allows you to pick-up transmissions or frequencies at 10 times the distance. Use with our HandiCounter® or R-10 Interceptor™ 10MHz - 1GHz Tunable over 5 octaves **$995.**

ACCESSORIES

Vinyl Carry Case

CC12 - Padded Black Vinyl carrying case for 2300 size LED Counters ..... $ 12

CC30 - Padded Black Vinyl carrying case for 3000 size LCD counters. ..... $ 15

Antennas

TA100S Telescoping Whip Antenna ..... $ 12

Antenna Packs:

Ant-Pak 1 (includes RD27, RD800, TA100S – Save $11) ..... $ 65

Ant-Pak 2 (includes five assorted rubber ducks, 27-1000MHz – Save $32.) ..... $ 99

Probes

P30 - Counter/Oscilloscope probe - for direct coupling to signal sources or circuit test points. 1x/10x, switchable ..... $ 35

P101- Low-Pass probe attenuates RF noise from Audio frequencies. Has two stage low pass filter. ..... $ 20

R20 AM Interceptor™

NEW! The R20 is both a sensitive RF signal strength meter (for ALL RF signals) and a near field AM receiver. The 10 segment LED bargraph responds with nominal 3dB increments to RF signal level received through the built in antenna. **$119.**

Tone Counter Model TC200

NEW! Ideal companion for use with the R10 FM Communications Interceptor™ to measure sub audible signalling tones off the air. The TC200 can also be used with scanners and communications receiver to monitor sub audible tones. **$179.**

OPTOELECTRONICS

Factory Direct ORDER LINE **1-800-327-5912**

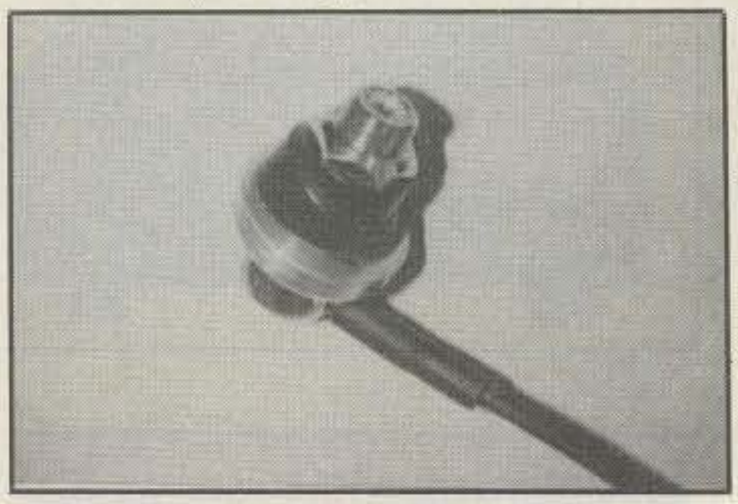
305-771-2050 • FAX 305-771-2052
5821 NE 14th Ave, Ft. Lauderdale, FL 33334

5% Ship/Handling (Max $10) U.S. & Canada.
15% outside continental U.S.
Visa, Master Card, C.O.D., Cash or Money Order only.

CQ SHOWCASE

EUR-AM Electronics Adjustable Antenna Mount

An up to 25 degrees adjustable mount for PL or N type connector antennas is being imported from WiMo (Germany). The mount comes with

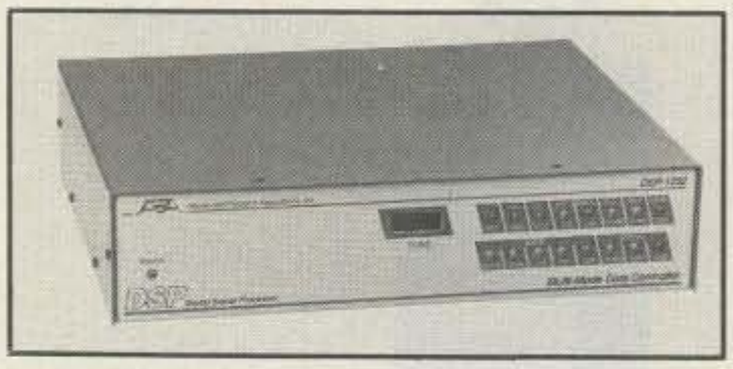


12 feet of RG-58 coax permanently connected in either vertical (fenders) or horizontal (roof) fashion. The N-type sells for $36 and the PL for $33.

For more information, contact EUR-AM Electronics, P.O. Box 990, Meredith, NH 03253-0990, or circle number 101 on the reader service card.

AEA Single-Port DSP Multi-Mode Controller

The DSP-1232, a single port version of the DSP-2232, features digital signal processing and includes the following: packet, AMTOR, Baudot, ASCII, Morse code, NAVTEX, WEFAX, and more; all satellite digital modes; 9600 bps K9NG/G3RUH; 2400 bps; automatic identification of most types of digital signals; software DSP modems; and more. The controller elimi-

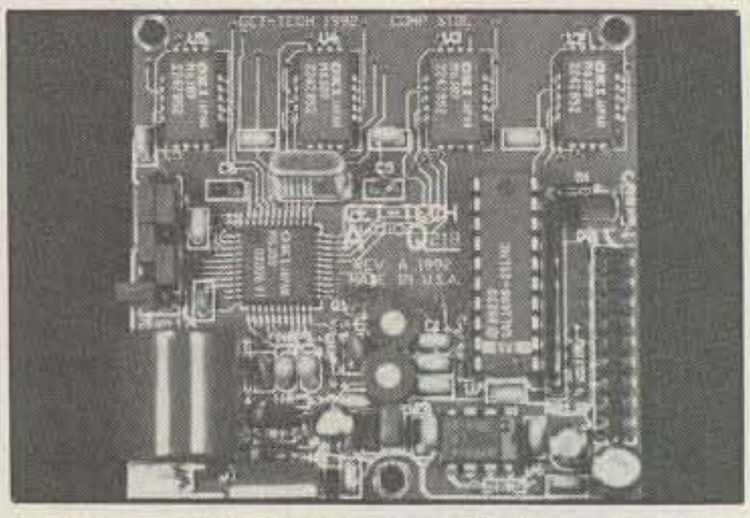


nates the need for external modems for satellite work or high-speed data, as all the modems exist in software.

Suggested list price is $799. For a product data sheet and list of authorized dealers call AEA's Literature Request Line at 800-432-8873, or contact Advanced Electronic Applications, Inc., P.O. Box C2160, 2006 196th St. SW, Lynnwood, WA 98036.

GET-TECH Audio Q-218

GET-TECH has introduced its Digital Voice Recorder, Audio Q-218. The unit will record up



to 218 seconds of speech. With four selectible sample rates, up to eight different variable-length messages may be stored. Two separately adjustable audio outputs are provided. One high-level output will drive a speaker to 400 MW, while the other may be used for output to an external amplifier or transmitter. An on-board regulator allows use from 8 to 15 VDC. Also included is an open collector output for keying a transmitter or external device during playback.

The unit comes fully assembled and tested, including battery back-up, 4 meg RAM, and measures 2½" × 2½". The Audio Q-218 is priced at $149 plus shipping and handling. For more information, contact GET-TECH, 201 Riley Road, New Windsor, NY 12553 (914-564-5347), or circle number 102 on the reader service card.

Azimuth 24 Hour Clock With Large Digits

The Azimuth Grand 24 Hour Clock (Model GC-24) features a large liquid-crystal digital dis-

play with 24 hour notation used in Universal Time. The new "see-thru" LCD is 3⅛"W × 2¼"H with large floating digits over 1¾ inches high. It has a brushed black metal stand and is battery operated (included).

The Model GC-24 is priced at $29.95 plus $2.95 shipping and handling. For more information, contact Azimuth, 3612 Alta Vista Ave., Santa Rosa, CA 95409 (707-577-8007), or circle number 106 on the reader service card.

THE PARTS PLACE SM

Pocket LCD-digital multimeter value

Take it along! This UL listed, autoranging multimeter folds up, with its probes, to easily fit a shirt pocket. Continuity buzzer, diode-check mode. Measures to 400 volts AC or DC and 2 megohms resistance. #22-171 . . . . . **24.99**

TECHLINE™ Tools—The new standard in strength and precision!

- ***Precision-crafted with top-quality materials***
- ***Designed for long life and ease of use***
- ***Backed by Radio Shack's 1-Year Limited Warranty***

New TECHLINE tools represent Radio Shack's uncompromising dedication to quality. Each is precision-crafted of long-lasting, hard-working materials and employs the latest design innovations for comfort and ease of use. And, each is backed by our full 1-year limited warranty.

Portable Power Inverter. For camping, fishing, emergencies. Converts car/boat 12VDC to 115VAC for powering a TV, VCR, light or tool. Compact and efficient. Rated 140W continuous. #22-132 . . . . . **99.99**

TECHLINE Swiss Army Knife. Tool kit for your pocket! You'll be prepared with a large blade, Phillips and slot screwdrivers, wire stripper, cutter, pliers, opener, tweezers and toothpick. #64-2001 . . . . . **29.95**

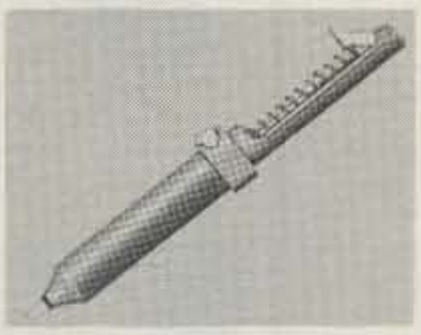
TECHLINE 9-in-1 Screwdriver. With eight steel tips in the most needed sizes—Phillips, slot and special purpose. Tips store in handle and shank doubles as ¼" nutdriver. #64-1967 . . . . . **9.99**

Hi-Current Car DC Adapter. Plugs into vehicle lighter socket. Provides 6, 9 or 12VDC. With four Adaptaplugs. #270-1562 . . . . . **15.95**

12VDC Brushless Micro Fan. Use to cool hum-sensitive circuits and small car stereo amps. Provides 3.5 CFM. #273-0244 . . . . . **17.95**

Anti-Static Spray. By STATX® brands. New high-tech cleaner and protector repels dust—cleans without scratching. #64-3310 . . . **3.99**

Mini Audio Amp With Built-in Speaker. Many uses—test amp, signal tracer, phone amp and amplified PC speaker. #277-1008 . . . . . **11.95**



Desoldering Helper. Handy solder remover is easy to use. Your nearby Radio Shack has everything in soldering needs. #64-2120 . . . . . **5.99**

Speedy service and low prices on thousands of parts and accessories!

- ***FREE delivery to Radio Shack on orders $5 and up***
- ***Semiconductors and ICs ■ Hard-to-find batteries***
- ***CB and scanner crystals ■ Long-life vacuum tubes***
- ***Phono cartridges/styli ■ SAMS® service books***

Why pay more for mail-order? Your Radio Shack stocks 1000 electronic components, and another 15,000 are available *fast* from our special-order warehouse. Ordering is easy! Bring in the exact part number (or old part). We'll check availability and order by phone. Delivery time to your nearby Radio Shack for most items is a week.

Prices apply at participating stores and dealers.

Radio Shack® SINCE 1921
AMERICA'S TECHNOLOGY STORE℠

CIRCLE 4 ON READER SERVICE CARD

Tucker Sav

Time & Money! Call for a FR

Tucker Computer

Tucker 486DX 50

- 120 MB IDE HD
- 4 MB RAM, Exp. to 64
- 1.44 FD &1.2 FD
- SVGA Color Monitor, 28 MM Dot Pitch
- 101 Keyboard
- DOS 5.0 & Windows 3.1
- 1 Year Warranty

Only $1995

Tucker 286-12

- 1 MB RAM
- 1.44 or 1.2 MB FD
- 20 MB Hard Drive
- Mono Monitor (Reconditio
- Keyboard
- DOS 3.3
- DeskTop or Mini Tower
- 1 Year Warranty

Only $449

Tucker 386DX - 40 MHz

- 4 MB RAM
- 64K Cache
- 1.2, 1.44 MB FD's
- 105 MB IDE HD
- SVGA Color Monitor
- 101 Keyboard
- DOS 5.0
- Windows 3.1
- 1 Year Warranty

Only $1395

AEA PCB-88

HF/VHF Packet Controller Board

The PCB-88 is designed for hams who want the best packet controller available but don't have a lot of room in the ham shack. It plugs into an 8 or 16 bit expansion slot on your IBM PC or compatible computer which leaves room for your other equipment. It has a true DCD circuit built in as well as a standard modem disconnect header to allow easy hook up of external modems. The PCB-88 also comes with the PC-Packratt-88 host mode program for easy control of the packet device and the AC-1 12VDC adapter.

Only $179

AEA isoLoop

Compact HF Attenna

ALL AEA IN STOCK

The IsoLoop model 10-30 is round, measuring 43 inches in diameter and weighing only 14 pounds. And because it comes fully assembled, it is ideal for Field Day, DXpeditioning, etc. Includes AC-1 power supply (U.S. model only).

Only $314.95

Alinco Radios Full Line In Stock

MFJ-1214PC

Multimode IBM Controller

- Covers FAX, WeFax, RTTY, ASCII and CW
- Lets you use your computer and radio to receive, display and transmit brilliant full color news photos and incredible WeFAX weather maps with all 16 gray levels
- Easy-to-use menu driven software, cables, ps, comprehensive manual & Jump-Start guide
- FAX- Full color capability with 4096 colors supported
- RTTY- sync and QRM features give you greatly improved copy under poor conditions
- ASCII-transmit and receive all 7 bit ASCII files
- CW-automatic speed tracking, on-screen tuning and easy sending
- This is ham radio's most value-packed multimode

ALL MFJ IN STOCK

Only $144.95

MFJ-127

Multi-mode Data Controll

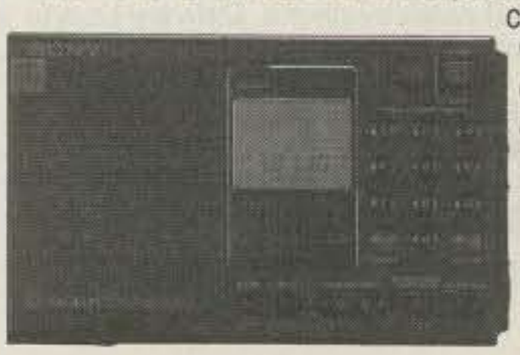
TX/RX on color SSTV, Packet, AMTOR, RTTY, ASCII, CW, I
too many features to describe. We carry a full-line of MFJ p
ucts at low, low prices. Call for de

Only $247

Sony ICF-SW7600

World Band Radio

Explorers and travelers will love the versatile ICF-SW7600 World Band Radio Receiver with stereo FM reception and convenient instant access to all channels and bands. The built-in clock timer with sleep and stand by functions come in handy on camping trips or expeditions. Complete frequency coverage and dual conversion superheterodyne circuitry cover all short-wave bands as well as FM stereo. Includes compact antenna, stereo headphones and worldwide AC adapter.



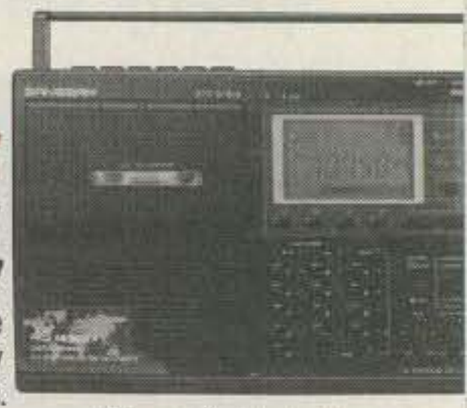
Only $239.95

SONY Full Line In Stock

Sangean ATS-818CS

Combines the VCR With World Band Radio!

- Imagine recording your favorite shortwave programs while you are away at work,school,etc.



- 16 band digital shortwave recei w/programmable cassette recor
- BFO for SSB reception, AM/FM stereo,45 pres
- Dual time display, sleep timer & tone control, and m
- AC adapter inclu

Only $249

s You More!

Copy of our Latest Catalog!

Phone Numbers and Address Listed at Bottom of This Page.

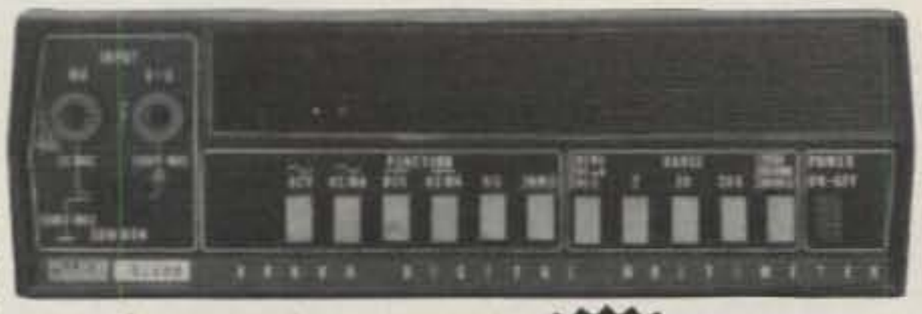
TEST EQUIPMENT MANUALS FOR SALE

Bird 694
1000 Watt Termaline® RF Absorption Wattmeter

This Termaline®RF absorption wattmeter has a frequency range of 2 to 30 MHz with a single range of 1000 W. Other specifications include: 5% meter reading accuracy, N(f) input connector, oil filled air cooled 50 Ω load, weight of 27 pounds, 6" wide, 8 3/4" high, 21" long, retractable top handle, meter protection cover.

Only $250

TUCKER 25th Anniversary 1967-1992



Fluke 8000A
Digital Voltmeter

Most popular DVM ever made. Offers 26 ranges of AC/DC voltage, current and resistance coverage. Basic accuracy is 0.1%. Many accessories for this unit are available to make it even more versatile.

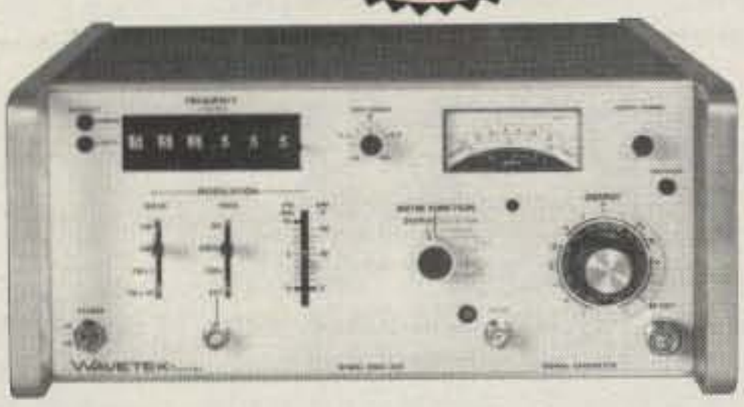
Only $175

IN-HOUSE PROCESSING 25 TECHNICIANS ON STAFF

HP 606A
HF Signal Generator

- 50 kHz - 65 MHz in six bands
- ±1% frequency accuracy
- Harmonic output < 3%
- 0.1 mV - 3 V output ± 1 dB
- +23 dBm to -120 dBm
- 0 - 95% AM modulation
- Internal AM frequency of 400 & 1000 Hz, ± 5%
- External AM frequency of DC to 20 kHz maximum
- 50 lbs; (WxHxD): 19 1/8 x 10 1/2 x 13 1/4 in

Only $250



Wavetek 3000-200
Signal Generator/Deviation Meter

Our best offer ever on the highly versatile Wavetek 3000-200. This unit incorporates a complete 1-520 MHz FM, M, and CW signal generator and an FM deviation meter in one compact package. Ideal for testing FM transmitters and receivers. Frequency Coverage: 1-520 MHz in 1 kHz eps with 6-digit lever/indicator switches: 1 kHz resolution. Accuracy: 0.001% all modes; stability of 0.2 ppm/hr. RF output level: +13 to -137 dBm continuously adjustable. AM modulation: internal 400 Hz and 1 kHz; external DC-20 kHz. FM modulation: internal 400 Hz and 1 kHz; external DC-25 kHz. FM deviation meter: 30-500 MHz frequency range, 10 mV to 5 Vrms. FM deviation ranges of 0-5 kHz and 0-50 kHz

Only $995

General Radio 1606B
RF Impedance Bridge

Operating range is from 400 kHz to 60 MHz. Direct reading 0 to 00 Ω. Can be adapted for use with coaxial lines.

Only $995

HP 5255A
Counter Plug-in

- Allows a HP 5245 series counter to cover from 3 GHz to 12.4 GHz
- Sensitivity of -7 dBm to +13 dBm
- Auxiliary input of 1 MHz to 200 MHz(5 mV sensitivity)
- Auxiliary output of 1 MHz to 200 MHz
- Original selling price of over $2200.00
- This is a heterodyne type of converter
- The cheapest way to count to X band

Only $299

We Gladly Accept

VISA MasterCard DISCOVER

National: 800-527-4642
In Texas: 800-749-4642
Local: 214-348-8800
Fax: 214-348-0367

TUCKER
ELECTRONICS & COMPUTERS

1717 Reserve Street - Garland, TX 75042

ANTENNAS & ACCESSORIES

A LOOK AT THE SHACK FROM BOTH ENDS OF THE COAX

BY KARL T. THURBER, JR., W8FX

Special Delivery

Antenna Potpourri de KJ6GR. We received two letters from Bill Shanney, KJ6GR. Bill's first letter highly recommended a British compendium, *HF Antenna Collection*, edited by Erwin David, G4LQI, and published by the Radio Society of Great Britain (RSGB). The book, which contains articles reprinted from the RSGB's *Radio Communication*, covers single- and multi-element horizontal and vertical antennas, very small transmitting and receiving antennas, feeders, antenna tuners, and more. To Bill, "the book's material is classic British ingenuity applied to wire antennas with many great ideas being presented." It is carried in the ARRL publications catalog (225 Main St., Newington, CT 06111) as #3770, price $18.

Bill also wrote that he has made some progress in obtaining reasonably good hamshack RF grounding and TVI suppression, frustrating problems of operating HF using limited space antennas in an apartment or condo environment. Bill addressed some of the problems of RF grounding mentioned by Ken Gilcrest, KA8FFL/7, which we cited in last August's column. Ken, we should recall, said that he had read countless articles about small antennas for apartment conditions. The big problem, he felt, was to obtain a good, solid RF ground. He wondered what to do about it, and we offered a variety of suggestions on RF grounding.

At that time we offered Ken some suggestions to minimize "RF in the hamshack" problems, including running several different ground leads in parallel, experimenting with insulated counterpoises on troublesome bands (where the hamshack is "hot with RF"), using an antenna tuner, keeping power levels low, and avoiding the use of voltage-fed antennas with the feedpoint in or near the hamshack.

We noted that a *counterpoise*, a type of capacitive ground, can be useful when an extensive buried ground system, or even a cold-water-pipe ground, isn't available. To work best, the counterpoise should be large enough to have a considerable capacitance to ground, covering as much area as possible. The shape can be anything that's convenient. Often, large-area counterpoises are up to a half-wavelength in radius, but the actual length of individual wires which make it up isn't critical. Too, large counterpoises aren't always realistic. For the simple, insulated-wire counterpoise you might install in a small apartment, you may get away with an insulated wire no more than one-quarter wavelength at the operating frequency. The counterpoise's height isn't important, but it should be routed so as not to be easily tripped over. If outdoors, it should be installed 7–10 feet above ground.

Possible "solutions" to RF grounding problems also may include the use of a device such as the MFJ-931 Artificial Ground. The MFJ unit helps create a usable RF ground, especially when using random-length antennas. The unit effectively places your rig near actual earth ground potential even if located on the second or higher floor, with no direct earth ground possible. The device reduces the electrical length of the ground connection wire to almost zero by tuning out its reactance.

Possible solutions to apartment RF grounding problems include RF counterpoises and even devices such as the MFJ-931 Artificial Ground unit, to help create a usable RF ground. The unit effectively places your rig near actual earth ground potential even if located on the second or higher floor, with no direct earth ground possible. The unit reduces the electrical length of the ground connection to almost zero by tuning out its reactance. The device also can tune a counterpoise, used as an artificial ground when a "real" RF ground isn't available. Doing so essentially resonates the random-length "ground wire" you may have strung along your apartment floor. (Photo courtesy MFJ Enterprises, Inc.)

Bill, KJ6GR, noted that he's had good success in using coax as a counterpoise. He prefers RG-59 or RG-213, coiling the coax to minimize undesirable radiation. He uses electrical quarter-wavelength sections of the coax (taking into account the cable's velocity factor), at the near end connecting only the center conductor and leaving the far end open circuited. He suggests connecting all hamshack equipment grounds (transceiver, linear amplifier, lowpass filter, antenna tuner, antenna switch, etc.) together and using two sets of counterpoise wires made of coax cable. One set is connected to the antenna tuner's ground lug and the other is connected to the common station ground point. Each set is made up of individually cut counterpoises for each band. Fig. 1 illustrates this grounding arrangement.

Bill also stresses the importance of good station grounding and RF filtering from a harmonic-suppression standpoint. He fits Cho-Sorb beads around all his coax cables to help prevent feedline radiation of TVI-generating harmonics. He also uses two or three of the beads on each chassis ground lead to absorb RF at fundamental and harmonic frequencies. He also places three beads on the chassis end of the counterpoise wires and five beads on all interconnecting cables, including coax. Bill also uses toroids on his rotor and DC control cables. (The Cho-Sorb beads are available from Radiokit, P.O. Box 973, Pelham, NH 03076.)

A tip of the hat to Bill Shanney, KJ6GR, for his nicely worded suggestions. We're sorry we didn't have room to print his complete RF grounding writeup, and one he sent us on above-ground mounted HF verticals.

Feedback on the UA1DZ Broadband Vertical. In the March 1992 column we ran a short note about an article in a (former?) Soviet radio publication, *RADIO*, that described the "UA1DZ broadband vertical radiator." It consisted of eight phased vertical radiators designed by the late Georgi A. Rumyantsev, UA1DZ. Reportedly using 100 ohm coaxial cable, SWR is said to not exceed 1.2:1 over the range 10 to 30 MHz, and the antenna presents a suitably low angle of radiation for DX work, in common with most other verticals. The original Russian text and an English translation were sent to us by Bill Mollenhauer, N2FZ.

In response to our request to readers for more information on the UA1DZ vertical, Edward T. Tanton, N4XY, wrote that he had been interested in the antenna ever since he saw a reprint of the English language translation in the Prometheus Amateur Radio Association's newsletter. Here are excerpts from Ed's letter:

"I have been working toward building one since. I have found that several of the stackable aluminum antenna mast sections from Fair Radio should be perfect for the antenna. I have gotten 300 feet of 'Flex-weave' wire being advertised by Davis RF, to use. . . . I also would like to upscale the antenna into a suitable 40 meter dimension if possible. We shall see about that: if you allow a low frequency value of 10 MHz and scale the dimensions proportionally to 7 MHz, the total height becomes about 53 feet, a bit high, probably necessitating guying.

"The feedpoint is specified as 200 ohms in the article, and UA1DZ uses the simple coaxial coil to 'balance' the output. I plan to try a 4:1 current balun and see what happens. Again, this will require 'trying-and-seeing' as far as performance is concerned. I also plan to run the coax up the inside of the lower mast. I expect that the balun version will work somewhat better than the coil version, but do not expect significant differences."

Ed went on to explain some of the mechanical problems involved in the design, such as the required insulation between mast sections and the mechanics of the wire spreader rods. He plans to construct the antenna in the near future and promises to let us know how it performs and possibly even how it models using W7EL's

317 Poplar Drive, Millbrook, AL 36054

ELNEC antenna analysis program. Ed intends to publish the results after he has built, tested, and operated the antenna, making on-the-air comparisons with his nearby Cushcraft. We'll be looking forward to seeing Ed's results.

MacMININEC: Who's on First? In last June's column we printed some information on MacMININEC. We noted that Chris Smolinski, N3JLY, had developed what he believed to be the only implementation of the MININEC algorithm for the Mac. His MacMININEC V4.4 is an NEC-based antenna analysis program that analyzes antennas, calculating the feedpoint impedance and current distribution, and producing plots of the resulting radiation patterns. Chris, N3JLY, offers MacMININEC for $35 postpaid from him at 40 South Lake Way, Reisterstown, MD 21136.

This brought a note from Christopher Smith, NXØE, who says that MacMININEC isn't the first implementation of MININEC for the Mac. Christopher asserts: "I have followed the MININEC series since 1984, when I ran across MININEC 2. When MININECC3 became available, a colleague of mine, Don Metzger, and I obtained a copy through ACES, the Applied Computational Electromagnetics Society. Don translated it into Pascal and C [programming languages]. The Mac version came from the C translation, and it does not make use of special Mac features as I am sure MacMININEC does. I distributed it to almost 50 ACES members, so one might find it on a BBS occasionally. Since I no longer have access to a Mac, I no longer distribute that version."

NXØE adds "I also have PC versions of MININECC3, rev. 13, as received through ACES, in BASIC and FORTRAN versions. I will send these out to those who send an SASE and a formatted disk (3.5 or 5.25 inch, DD or HD). These [programs] are *without* documentation, and readers will have to get documents through DTIC or Artech House. I also have a PC version of NEC2, the 'grandfather' of all the MININEC versions, which I will send out *sans* documentation." Christopher Smith, NXØE's address is 12455 Donovan Lane, Colorado Springs, CO 80908.

According to Christopher, "These codes and more are available *with* documents from ACES. Information on the various code packages offered by ACES is available from Prof. Richard Adler, Naval Postgraduate School, Code 62AB, Monterey, CA 93943." Chris adds that amateurs who are serious about antenna investigation should consider joining ACES; their journal and newsletter contain much valuable information on all aspects of electromagnetic modeling.

Scarce Sources of Commodore Software. A few months back we brought up the problem of obtaining current hamshack and other software for Commodore 8-bit computers such as the Commodore Vic-20, C-64, and C-128. I moved over to an IBM PC compatible in 1986 and haven't closely tracked the Commodore software market since then. It seems at first glance to have almost dried up, and today there seems to be little development of new commercial software for 8-bit Commodores. But I still receive many letters inquiring about amateur radio software for such machines. Most of the letters, like one from Rodney Riley, VE3BLB, asked for good logging software. Peter Fournia, WA2BPQ, on the other hand, wrote with some specific suggestions, especially regarding the C-128:

"I have been using the C-128 for about 5 years and thought I'd share with you and your readers

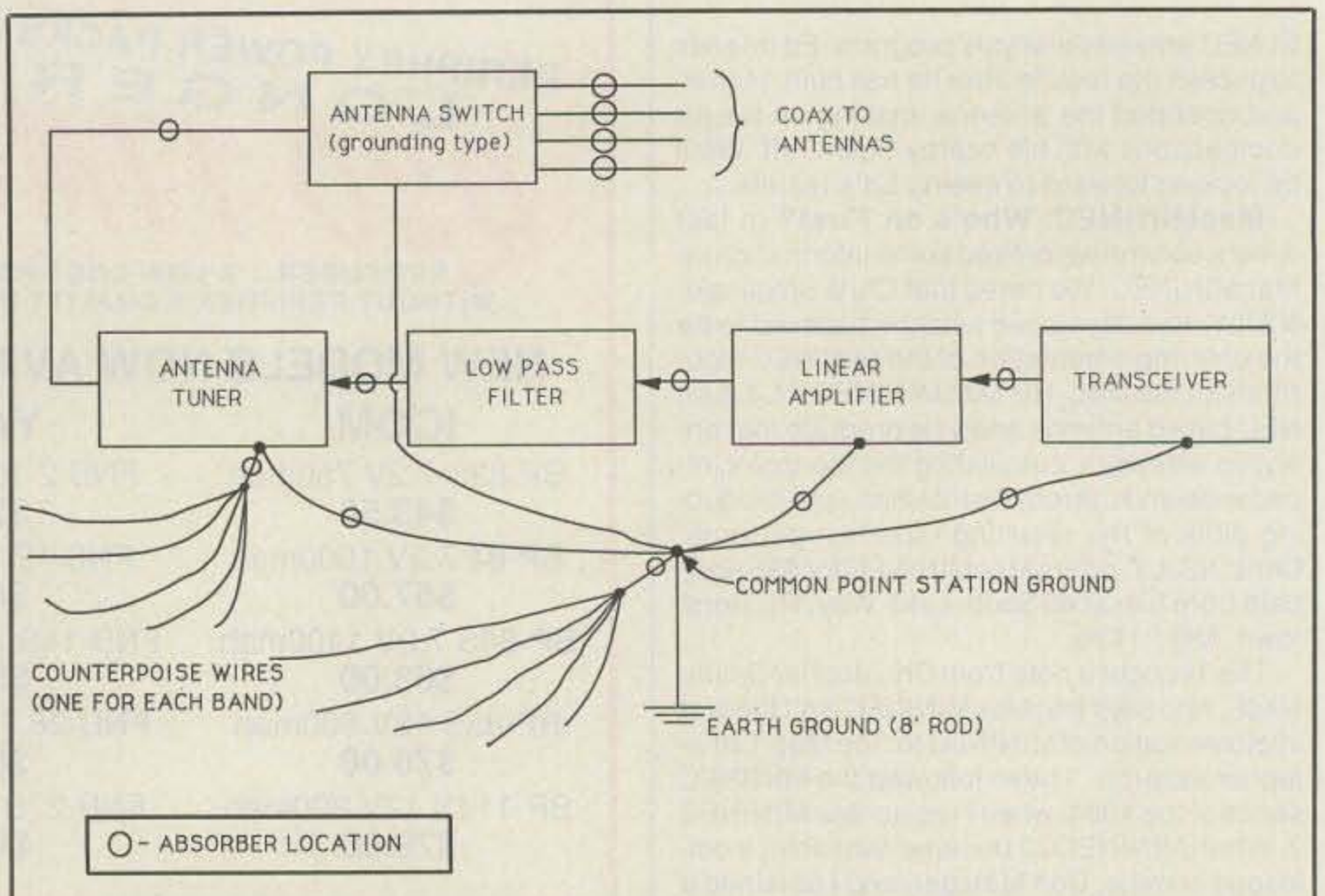


Fig. 1– Shown here is a simplified diagram of Bill Shanney, KJ6GR's hamshack equipment and the locations of the various ground interconnections, counterpoise wires, and RF-absorbing beads he uses. See the text for a discussion of his approach to achieving a good RF ground in an apartment or condo environment and minimizing RFI/TVI. (Sketch courtesy Bill Shanney, KJ6GR)

a couple of my favorite programs designed specifically for the C-128. Programs that use the full features of the C-128 are not easy to find. Most programs are for the C-64. So when a good C-128 specific program comes along, it's worth a little language."

Peter notes: "An excellent program written specifically for the January VHF Sweepstakes is CONTEST LOGGER-128 written by Harry Hoffman, KA2ENE, in Rochester, New York. Harry has placed his last version (V4.0) of April 1990 into public domain. The program uses the 2 MHz, 80-column screen and the memory capabilities of the C-128. It supports numerous printers and has a customizable printer driver program .... It supports up to 999 QSOs.

"Another favorite C-128 program is ULTRATERM III, written by Steve Boerner, also of Rochester. The program is shareware ($25) written in June 1988. It also uses the C-128 advantages in speed, 80-column screen, and memory .... ULTRATERM III is fully featured and comparable to most of the present-day commercial programs. Editing is available in the 60-KByte buffer .... The program is organized with eight pull-down menus."

Peter highly recommends these C-128 programs and notes that they are accessible free of charge from the Commodore Users Group of Rochester BBS at (716) 621-5908. He adds, however, that he's still looking for a good C-128 satellite tracking program.

We also received a letter from Keith Wyatt, N6JPA, who has assembled a collection of six packet-related Digicom terminal programs, plus some utilities, for the C-64. He is making the public-domain programs available as a package, which includes two program disks and all disk-based documentation. He requests you send an SASE disk mailer with two blank disks and a $3 shipping and handling fee. Contact Keith Wyatt, N6JPA, Wyatt Industries, P.O. Box 1305, Arroyo Grande, CA 93421-1305.

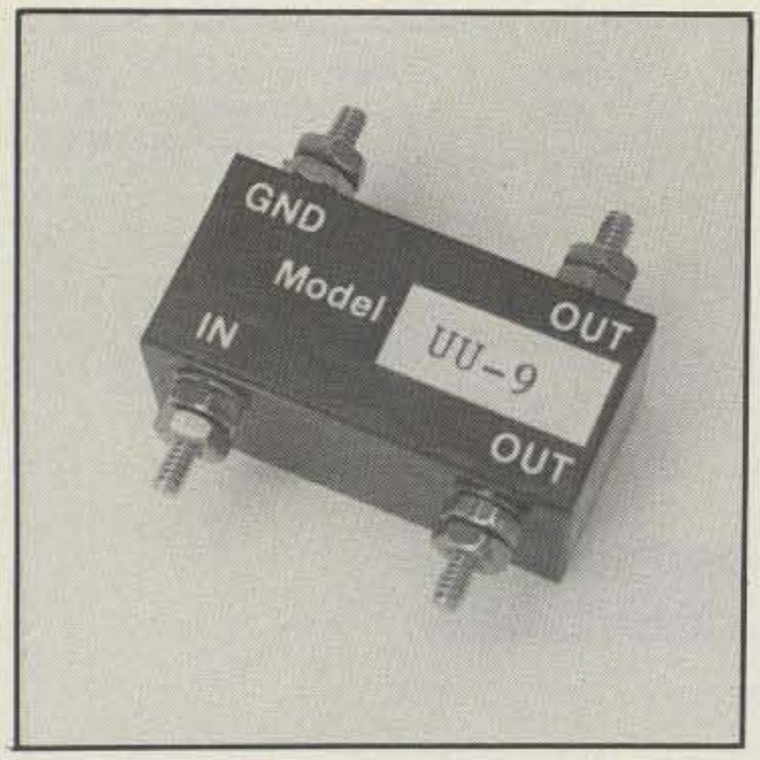
Despite the relative scarcity of Commodore shareware and public-domain software distributors, there still are a few of them around. One is HomeSpun Software, P.O. Box 1064, Estero, FL 33928. They specialize in C-64 amateur radio programs and utilities, and boast that they have, at last count, at least 42 amateur disk sides for the C-64 containing hundreds of programs. These are priced from $2 to $5 per disk side, depending on quantities ordered. The firm offers an introductory package of 8 disk sides containing over 200 amateur programs for $16.95. A catalog is available from HomeSpun Software for a 29-cent stamp.

Antenna Notes

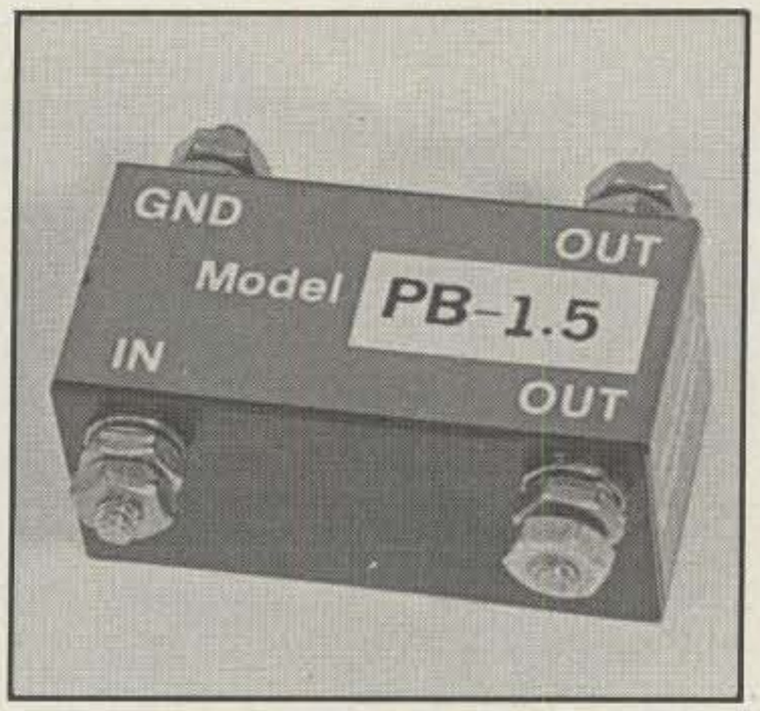
Free Antenna Pubs de ICE. You may recall that in the March 1991 column we mentioned the Industrial Communication Engineers, Ltd. free catalog, which shows a wide range of low-cost antenna accessory products for amateur, commercial, and government applications. As we noted then, the catalog shows various RFI filters, VHF/UHF receiving preamps, signal splitters, RF-tight enclosures, coax lightning and EMP suppressors, coax grounding blocks, ground rod mounts, tower leg mounting fixture kits, rotor cable voltage suppressors, guy wire grounding kits, coax cable assemblies, and other accessories.

Now ICE engineers have prepared a set of (at last count) 17, one-page technical publications for customer reference. The reports are single sheet, 8½" × 11" size, and they cover a variety of subjects related to the use of ICE products, station design and construction, lightning protection, and product comparisons with competitors' goods. The pubs are written in easy-to-understand language for the nontechnical user, and they contain capsulized information not easily found elsewhere.

Current publication topic areas are: conducting noise audits (#10); Beverage antennas (#11); lightning protection (#30, 30A, and 30B); ground-



The Palomar Engineers UU series "Ununs" (unbalanced to unbalanced) transformers are designed to match 50 ohm coax to unbalanced loads such as Beverages. The Ununs are available in 11 different load matches from 50 to 800 ohms. They handle 350 watts PEP. (Photo courtesy Palomar Engineers)



Close cousins to the Ununs are the PB series impedance matching balun transformers used to match coax to balanced load impedances. The PBs are also are available in the same 11 impedance ratios from 1:1 to 16:1. Both series units are epoxy encapsulated and weigh about 40 grams (1.5 oz.). (Photo courtesy Palomar Engineers)

ing techniques (#31 and 31A); cold-water-pipe grounds (#32); coax lightning arrestors (#33, 33A, and 33B); grounding coax cable shields (#36); lowpass filters (#42); highpass filters (#43); solving telephone RFI (#46); using anti-oxidants for good interconnections (#60); and DC grounded antennas (#80).

For a detailed listing of the free publications (or to order one of the pubs or a catalog), contact Industrial Communications Engineers, Ltd., P.O. Box 18495, Indianapolis, IN 46218-0495.

Palomar Unun Transformers. These little transformers are an economical answer to many RF matching problems. They are small and lightweight, and they have enough power-handling capability for most modern transceivers and transmitters. Eleven impedance ratios are available from 1:1 to 16:1, matching 50 ohms to 50, 75, 100, 150, 200, 250, 300, 375, 450, 600, or 800 ohms, over the range 1.8 to 30 MHz. The units handle 350 watts PEP or 100 watts CW. Typical applications involve matching Beverages and other unbalanced antennas.

The new UU series Ununs (unbalanced-to-unbalanced) are close cousins of the PB series impedance matching balun (balanced-to-unbalanced) transformers we've discussed previously, and in fact grew out of their popularity. The PBs are also are available in the same impedance ratios from 1:1 to 16:1. Both series units are epoxy encapsulated.

Jack Althouse, K6NY, Palomar Engineers' proprietor, notes that one should not try to use the PB baluns as Unun transformers, as some amateurs have tried to do. Why? If you try to use a PB balun as a UU (Unun) transformer by grounding one output lead, you effectively short out half of the output winding. Use a Unun for matching coax to other unbalanced loads.

Both series devices are $26.95 from Palomar Engineers, P.O. Box 462222, Escondido, CA 92046.

Soft Topix

MINIPROP PLUS™. In several columns we've observed the steady progress of MINIPROP, a comprehensive propagation prediction program by Shel Shallon, W6EL. Shel recently sent us his latest, MINIPROP PLUS, which like previous versions provides detailed information about the strength of received signals in addition to maximum usable frequency (MUF) predictions.

The program uses a unique method for searching through the several ionospheric modes to find the right combination of signal "hops" that yield the strongest received signal, at each half hour of the day, on each of seven user-selected frequencies. For the strongest mode, MINIPROP PLUS reports predicted signal strength, the radiation or takeoff angle for the mode, the mode configuration, and the predicted mode availability (the percentage probability that the predicted mode actually exists).

The program gives you beam headings from both ends of the selected path, path length, sunrise and sunset times for the path terminals, grayline data, and more. Information for both short and long path is displayed on the PC's screen, or you can print it out. A new feature in MINIPROP PLUS is a world map graphics display that shows the day-night terminator (gray line) and the Great Circle path between any two station locations. All screens are in full color on suitably equipped computers. There's also a handy "DX Compass" feature that helps you determine what bands are open in twelve directions from your QTH at any time of day.

You can store your own QTH in a disk file, and the program includes an on-disk atlas of latitudes and longitudes of some 360 locations and all DXCC countries. The program includes utilities that let you add, modify, or delete atlas entries and print a customized table of beam headings to all locations in the atlas.

The program supports Intel math coprocessors, which are recommended but not required. The program runs on IBM PCs and compatibles with at least 512K RAM. A professionally printed manual is included. Price is $49.95 postpaid from Sheldon C. Shallon, W6EL Software, 11058 Queensland St., Los Angeles, CA 90034-3029. Fig. 2 shows a MINIPROP PLUS quick-look prediction, while fig. 3 shows the DX Compass feature.

More 10-10 Stuff from Hardy Data Systems. Turning to the July 1991 column, we described the K4HAV Contest Logging Program ("1010"), a specialized contesting and recordkeeping program by James D. Hardy, K4HAV. It's for handling 10 meter awards and contests sponsored by the 10-10 International organization—you know, the guys who exchange their 10-10 numbers. As we reported then, two 1010 program features are unique. The first of these is the ability to convert stations worked in the first contest to a database available for subsequent 10-10 contests. The second distinctive feature lets you access a built-in master list of all assigned 10-10 numbers while on the air, to know a station's 10-10 number as soon as you enter the callsign.

Jim still offers 1010 for $25. However, he has greatly expanded his software offerings to include the 1010CH County Hunter program ($25) for records tracking of the new 10-10 Worked All Counties Award. The new program also provides recordkeeping functions on many other 10-10 awards, prints the various applications, and generally simplifies keeping track of 10-10 numbers. The 1010CH program has all 3076 counties in a text file; counties worked, needed, or all counties can be displayed in a pop-up window for a given state. You also can display a list of new counties worked and, if over 100, you can print out a 10-10 County BAR application. The 1010CH program makes use of various 1010 program features, including the master list of all assigned 10-10 numbers, and a file conver-

```
MINIPROP PLUS SHORT-PATH PREDICTIONS 08-10-1992 (Polar) Path Length: 15361 km
SSN: 98.2 Flux: 140.0  Radiation Angle: 5 deg for Minimum No. of F Hops: 5
TERMINAL A: 32.50 N   86.30 W  Millbrook AL          Bearing to B:  20.0 deg
TERMINAL B:  7.40 N   80.40 E  Sri Lanka            Bearing to A: 343.1 deg
Terminal A Sunrise/Set: 1110/0031 UTC    Terminal B Sunrise/Set: 0035/1252 UTC

          ---------- QUICK-LOOK SIGNAL LEVELS in dB ABOVE 0.5 uV ----------
UTC   MUF   3.6 MHz   7.1 MHz   14.1 MHz   21.2 MHz   28.3 MHz
0000  16.7            11 a       19 A       18 D
0200  20.4            -7 a       13 a       16 C
0400  19.0                        5 a        11 D
0600  17.1                       -2 a         8 D
0800  14.6                       -6 b
1000  16.7                       -6 a         6 D
1200  17.6                       -5 a         7 D
1400  19.1                        0 a         9 D
1600  20.2                        3 a        11 C
1800  20.9                        6 a        12 C
2000  21.2                       10 a        14 C
2200  18.7            -2 a       15 a        16 D

Signal levels suppressed if below -10 dB or if predicted availability is zero.
Availabilities  A: 75 - 100%  B: 50 - 75%  C: 25 - 50%  D: 1 - 25%
a, b, c, d: Same as A-D, with high probability of reduced signal levels.
 nfo  mAp  oom  raphs  rint  ew  ong path
```

Fig. 2– On any path you specify, MINIPROP PLUS mode-searching predictions compute the received signal levels at every half hour of the day on each of seven user-specified frequencies between 3 and 30 MHz. Also MUFs, radiation angles, beam headings, path lengths, sunrise/sunset times, and other useful information is reported. The quick-look report, depicted here, gives faster predictions, but gives somewhat less accuracy and reports less detailed information than do the intensive mode-searching predictions the program is capable of generating.

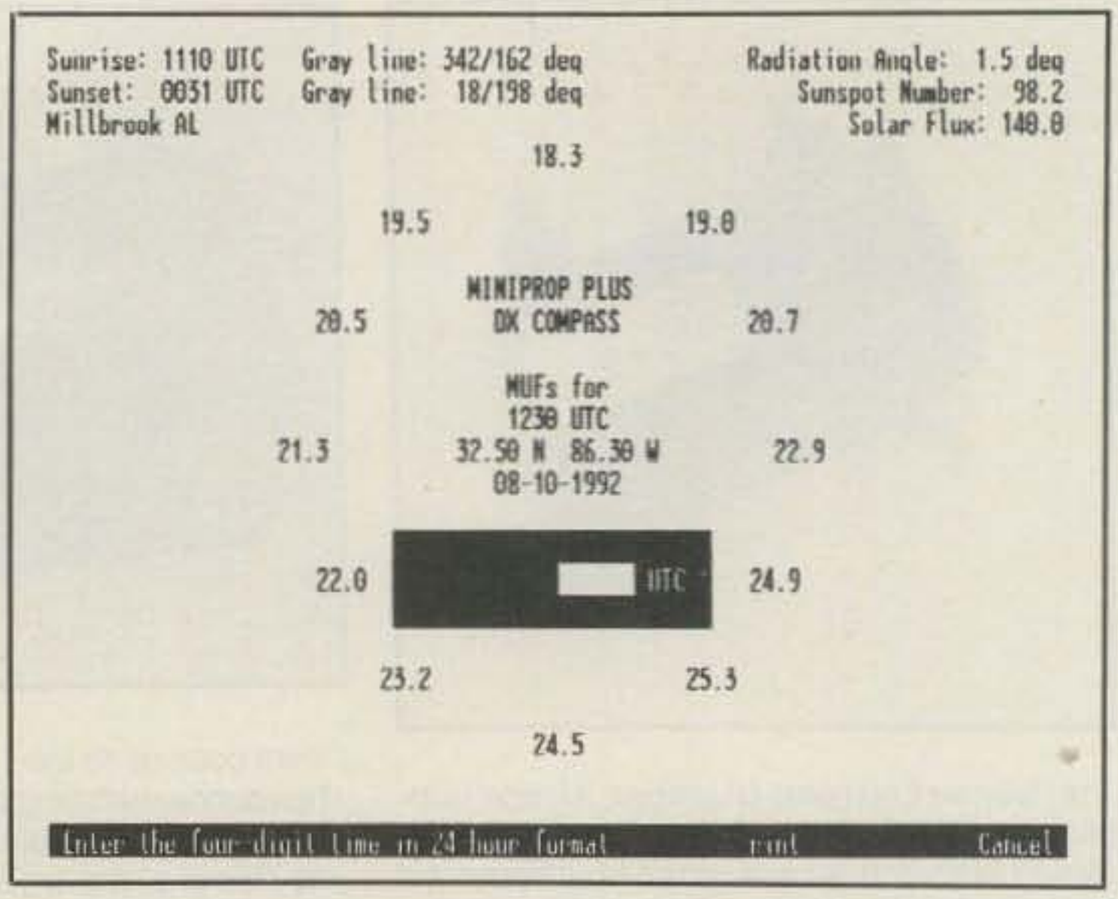


Fig. 3– One of the niftiest features of MINIPROP PLUS is the handy DX Compass feature that helps you determine what bands are open in 12 directions from your QTH at any time of day. The DX Compass screen display shows the highest MUF you can expect on 12 bearings separated at intervals of 30 degrees from a specified location at a specified time. The feature is useful for planning operations during DX contests.

sion program takes logs from the 1010 program.

That's not all Jim's been up to. He's introduced 10ZIP, the ZIP/County Index Program, an add-in package ($25) also designed for the county hunter, that works closely with the 1010 and 1010CH programs. The add-in package lets you input a ZIPcode and display the city, state, and county, and it offers various search options. Also included with it are a QSL program that displays your contest log and tags the contacts for which you want to print a QSL label, as well as the K4HAV address database of U.S. 10-10 members to give you the county and full name and address of the other station. Using this feature you can print address labels. What more could a 10-10'er want?

Finally, Jim offers another version of 10ZIP that's designed for the *CQ*-type USA-CA county hunter program; it's $20. For more details contact Hardy Data Systems, P.O. Box 7304, Tifton, GA 31793-7304.

Millie does it! Your columnist's XYL, Millie, is now a new Tech licensee, callsign KD4SHM, thanks to the FCC's no-code Tech, some diligent book study, and the VIS study materials (flash cards). Shown in the photo are Carolyn Van Iderstine, N5MUU, of VIS, standing at left, and a very happy XYL, Millie Thurber, KD4SHM, at right. (W4ADU photo)

Propagation Path Update. Last June we briefly profiled the *Propagation Path Collection*, a series of calculation and analysis routines for the IBM PC, sent to me by Jim Mills, N5IKJ, and offered by Valle Verde de Rio Grande (VVDRG) Electro. Jim recently forwarded Version 3 which is easier to use since it now is menu-driven.

The toolkit is a collection of propagation tools to improve users' understanding of how to obtain the best possible estimate of HF ionospheric propagation paths in point-to-point communications, especially those which use the E, F1, and F2 layers. Several programs are included which compute Great Circle distances and bearings, determine optimum signal launch angle, calculate the time of high noon for antenna orientation purposes, and estimate signal path attenuation. Various measurement conversion utilities are included, and the user can customize some program defaults. Price is still $9.50 from VVDRG Electro, 1724 Regal Ridge, Las Cruces, NM 88001.

Short Bursts

HAM-SOFT: Still Going Strong. We've received so much mail on this one that it bears repeating. In last May's column we ran a short blurb on HAM-SOFT, which offers a thick 60-page catalog of amateur radio public domain and shareware software that includes hundreds of programs for the IBM PC and compatible computers. The catalog includes about four pages of Macintosh and once plentiful but now hard to find Commodore 64 software.

Unfortunately, and unknown to us, proprietor Ray McKnight, WB3ABN, moved HAM-SOFT from Louisiana to Texas, and mail forwarding ran afoul of the post office. As a result, *CQ*'s editorial offices and I received many inquiries as to what happened to the firm, since readers' mail inquiries were returned by the post office. We were at a loss until Ray dropped us a note explaining the postal problem and giving us his new address. For the record, HAM-SOFT now is at P.O. Box 443, Galena Park, TX 77547. The catalog is still $1. Also, for the record, the entire HAM-SOFT catalog is contained in the *Amateur Radio Mail Order Catalog and Resource Directory*, described below.

Millie Does It! Saving the very best for last, I'm proud to announce that my XYL, Millie, finally obtained her amateur radio license. Although I've been an amateur all the way through our 27-year marriage, Morse always was the stumbling block for her to get serious about obtaining her ham ticket. Sound familiar?

With the scratching of the Morse requirement for the Technician class license, she successfully passed the Tech exam at last July's Atlanta HamFestival and is now KD4SHM. The technical material for the exam was still a stumbling block, but she found one of the books that we reviewed in the column last month (*All About Amateur Radio*, by Harry Helms, AA6FW, published by HightText Publications, Inc., 7128 Miramar Road, Suite 15, San Diego, CA 92121) was a real help to her in understanding the technical and operating side of the hobby. The final stretch of memorization and nuts-and-bolts preparation for the exam was aided immeasurably by the Technician theory study cards sold by VIS Study Guides (119 Comanche Drive, P.O. Box 16646, Hattiesburg, MS 39404).

Wrap-Up

That's all for this month. Next time more Antennas and Accessories topics of current interest. See you then.

Overheard: Most often, a computer program does what you *tell* it to do, not what you *want* it to do.

73, Karl, W8FX

YAESU

FT-1000D / FT-1000
200W HF XCVR with dual RX, with automatic antenna tuner, power supply, and more! Deluxe and standard models available. An excellent performer ..... **Call**

FT-990 / FT-990DC
100W HF XCVR with automatic antenna tuner, digital peak filter, and more! The DC model comes without power supply and CW filter. A great performer ..... **Call**

FT-890AT
100W HF XCVR with CW keyer and 160-10m automatic antenna tuner. Many other features make this radio an excellent mobile performer ..... **Call**

FT-767GX
100W HF XCVR with automatic tuner, power supply, and more! Three optional slots for 6m, 2m, and 70cm ..... **Call**

FT-736R
50W VHF/UHF XCVR with power supply and more! Two optional slots for 6m, 220MHz, 1.2GHz. A great radio ..... **Call**

FT-747GX
100W HF XCVR. Optional AM/FM and remote mounting unit. This is the smallest HF mobile rig on the market ..... **Call**

FT-5200
45W mobile 2m/70cm XCVR. Optional remote mounting kit for tight spots. A great dual band mobile radio ..... **Call**

FT-2400
45W mobile 2m XCVR, built to military-spec. Tuned front end eliminates intermod. An excellent 2m radio ..... **Call**

FRG-8800	SWL receiver	**Call**
FT-290	2m all mode	**Call**
FT-470	dual band HT	**Call**
FT-411	2m HT	**Call**
FT-415	2m HT	**Call**
FT-650	12-6m XCVR	**Call**
FT-690	6m all mode	**Call**

Please call for other Yaesu items.

KENWOOD

TS-950SDX
150W HF XCVR with dual in-band RX, all mode digital signal processor, automatic antenna tuner, CW keyer, and much more! A great HF performer ..... **Call**

TS-850SAT / TS-850
100W HF XCVR. Optional all mode digital signal processor. The AT model includes an automatic antenna tuner. A great DC powered HF performer ..... **Call**

TS-450SAT / TS-450S
100W HF XCVR. Optional all mode digital signal processor. The AT model includes an automatic antenna tuner. A great mobile HF performer ..... **Call**

TM-741A
50W 2m/70cm FM XCVR. One optional band unit can be added for 10m, 6m, 220MHz, or 1.2GHz ..... **Call**

TM-241A
45W FM XCVR with extended receive (118-174MHz) and super compact size. A great 2m mobile performer ..... **Call**

HW-3	Ham Windows	**Call**
R-5000	HF receiver	**Call**
TH-28	2m tiny HT	**Call**
TH-78	2m/70cm tiny HT	**Call**
TH-225	2m 5W HT	**Call**
TM-732	2m/70cm mobile	**Call**
TR-751	2m all mode mobile	**Call**
TS-140	HF mobile	**Call**
TS-690	HF and 6m mobile	**Call**
TS-790	2m/70cm base	**Call**

ICOM

IC-765
100W HF XCVR with automatic antenna tuner, CW filter, power supply, CW keyer, and more. A great performer ..... **Call**

IC-751A
100W HF XCVR. A compact, high performance HF radio with DC input. A great mobile performer ..... **Call**

IC-2SAT/IC-2SAT/IC-P2AT	**Call**
IC-24AT/IC-W2AT	**Call**
IC-229H/IC-275H	**Call**
IC-726/IC-729	**Call**
IC-728/IC-735	**Call**
IC-R1/IC-R100	**Call**
IC-R7000/IC-R7100	**Call**
IC-R71A/IC-R72A	**Call**
IC-2KL/IC-4KL	**Call**

AEA

Isoloop	HF loop antenna	**329.00**
PK-232	all mode TNC	**320.00**
PK-88	2m packet TNC	**139.00**

AMERITRON

AL-1500	1500W linear amp	**2150.00**
AL-1200	1500W linear amp	**1695.00**
AL-82	1500W linear amp	**1645.00**
AL-80B	1000W linear amp	**1025.00**
AL-811	600W linear amp	**585.00**
AL-811H	750W linear amp	**695.00**

ASTRON

MODEL	AMPS	ICS	PRICE
RS-12A	9	12	**73.00**
RS-20A	16	20	**90.00**
RS-20M	16	20	**112.00**
RS-35A	27	35	**144.00**
RS-35M	27	35	**162.00**
VS-35M	27	35	**179.00**
RS-50A	35	50	**219.00**
RS-50M	35	50	**239.00**
VS-50M	35	50	**249.00**

A=Plain M=meters V=variable DC

BUTTERNUT

HF-2V	80/40 vertical	**149.95**
HF-5B	5 band beam	**259.95**
HF-6V	80-10 vertical	**159.95**

DIAMOND

F22A/F23A/F718A	**90/132/189**
SG-2000/SG-7200	**75/79**
SG-7500/SG-7900	**75/99**
X-50/X-200/X-300	**95/119/139**
X-500HNA/X-510MA	**200/159**

Please call for other Diamond items.

MFJ

203/204/205/206	**89/79/79/79**
207/208/249/346	**99/89/179/169**
401/407/422/451	**49/69/119/79**
486/490/492/493	**179/149/89/129**
815/816/817/901B	**79/29/89/59**
921/945D/941E	**69/89/99**
948/949E/962C	**119/139/209**
971/986/989C	**79/259/299**
1224/1278/1270	**89/249/119**
1268/1284/1289	**49/25/59**
1728/1784/1796	**24/179/155**

KANTRONICS

KAM	all mode TNC	**289.95**
KPC-3	tiny packet TNC	**119.95**

Please call for more Kantronics items.

LARSEN

KG-144	2m on glass	**49.95**
KG-270	2m/70cm on glass	**69.95**
KG-440	70cm on glass	**44.95**
LM-150	5/8 wave mag	**51.85**
NMO-150	5/8 wave mag	**62.95**
PO-2/70	2m/70cm mag	**70.85**

ROTATORS

Alliance HD-73 (10 Sq. Ft.)	**159.95**
Orion OR-2300 (35 Sq. Ft.)	**945.00**
Telex HAMIV (15 Sq. Ft.)	**Call**
Telex Tailtwister (20 Sq. Ft.)	**Call**
Telex HDR300 (25 Sq. Ft.)	**Call**
Yaesu G400RC (11 Sq. Ft.)	**219.95**
Yaesu G500A (elevation)	**229.95**
Yaesu G800SDX (21 Sq. Ft.)	**349.95**
Yaesu G1000SDX (23 Sq. Ft.)	**399.95**
Yaesu G2700SDX (34 Sq. Ft.)	**839.00**
Yaesu G5400 (az./el.)	**429.95**

U.S. TOWERS

- All steel construction
- Hot dip galvanized
- Towers all self-support
- CA residents add 6% tax
- Drop shipped directly from the factory to save you money
- Highest quality, best selling crankups available

MODEL	MIN.	MAX.	WINDLOAD	PRICE
MA-40	22'6"	40 FT	10 SQ. FT	629
MA-550	22'1"	55 FT	10 SQ. FT	999
MA-770	23'10"	71 FT	10 SQ. FT	2249
MA-850	24'6"	85 FT	10 SQ. FT	3489
TX-438	22'6"	38 FT	18 SQ. FT	919
TX-455	21'0"	55 FT	18 SQ. FT	1385
TX-472	23'8"	72 FT	18 SQ. FT	2279
TX-489	24'4"	89 FT	18 SQ. FT	3959
HDX-538	22'6"	38 FT	30 SQ. FT	1179
HDX-555	22'0"	55 FT	30 SQ. FT	2079
HDX-572	23'8"	72 FT	30 SQ. FT	3559
HDX-589M	24'8"	89 FT	30 SQ. FT	7119

ROHN TOWER

ROHN GUYED TOWER PACKAGES

HEIGHT	25G	45G	55G
50'	849	1229	1549
60'	939	1389	1939
70'	999	1719	2159
80'	1199	1869	2369
90'	1289	2039	2579
100'	1369	2199	2989
110'	1449	2459	3209
120'	1669	2619	3429

These complete tower packages come with base section, top section, guy wire, guy hardware, and anchors. Please call for a shipping estimate.

25G	medium duty 12"	**65.50**
45G	heavy duty 18"	**153.50**
55G	extra heavy 18"	**197.50**
AS25G	25G rotor shelf	**29.85**
AS455G	44/55G rotor shelf	**74.25**
EF2545	25/45/55G ginpole	**375.00**
EFBX	HBX ginpole	**399.00**
HBX40	tower (40'-10Sq. Ft.)	**349.00**
HBX48	tower (48'-10Sq Ft.)	**469.00**
HBX56	tower (56'-10Sq. Ft.)	**589.00**
HDBX40	tower (40'-18Sq Ft.)	**429.00**
HDBX48	tower (48'-18Sq. Ft.)	**579.00**
TB3	2" thrust bearing	**75.00**
TB4	3" thrust bearing	**90.40**

CUSHCRAFT

13B2/17B2/26B2	**Call**
10-3CD/10-4CD/12-4CD	**Call**
15-3CD/15-4CD	**Call**
20-3CD/20-4CD	**Call**
40-2CD/TEN-3	**Call**
A3S/A3WS/A4S	**Call**
A449-6/A449-11	**Call**
AR-2/AR-6/AR-10	**Call**
AR270/ARX-270	**Call**
ARX-2B/ARX-220B/ARX-450B	**Call**
CS-28M/CS-147M/CS-220M	**Call**
CS-270M/CS-450M	**Call**
D3W/D40	**Call**
R5/R7/AP-8A/AV-5	**Call**

Please call for Cushcraft prices!

TELEX / HYGAIN

TH11DXS/TH7DXS/TH5MK2S	**Call**
TH3JRS/Explorer 14/DX-88	**Call**

Please call for Hygain crankup prices.

ALUMINUM

6063-T832 DRAWN TUBING

O.D.	WALL	I.D.	COST
.375"	.035"	.305"	**.30/Ft.**
.500"	.049"	.402"	**.40/Ft.**
.500"	.058"	.384"	**.43/Ft.**
.625"	.058"	.509"	**.50/Ft.**
.750"	.058"	.634"	**.57/Ft.**
.875"	.058"	.759"	**.65/Ft.**
1.000"	.058"	.884"	**.70/Ft.**
1.125"	.058"	1.009"	**.80/Ft.**
1.250"	.058"	1.134"	**.90/Ft.**
1.375"	.058"	1.259"	**1.05/Ft.**
1.500"	.058"	1.384"	**1.25/Ft.**
1.625"	.058"	1.509"	**1.45/Ft.**
1.750"	.058"	1.634"	**1.60/Ft.**
1.875"	.058"	1.759"	**1.70/Ft.**
2.000"	.058"	1.884"	**1.75/Ft.**
2.125"	.058"	2.009"	**1.85/Ft.**

Available in 6 and 12 foot lengths, 6' ship by UPS, 12' ship by truck/air.

6061-T6 EXTRUDED TUBING

.188"	Solid	—	**.15/Ft.**
1.125"	.058"	1.009"	**.65/Ft.**
1.250"	.058"	1.134"	**.70/Ft.**
2.000"	.120	1.760"	**2.35/Ft.**
2.000"	.250"	1.500"	**3.75/Ft.**
2.500"	.120"	2.260"	**2.95/Ft.**
3.000"	.065"	2.870"	**1.95/Ft.**
3.000"	.120"	2.760"	**3.50/Ft.**

Available in 6, 12, and 24 foot lengths, 6' ship by UPS, 12' and 24' ship by truck/air.

COAX & CABLE

ANDREW HELIAX®

1/2" ..... **2.29/ft.** 7/8" ..... **5.69/ft.**
connectors: 1/2"....**29.00** 7/8"....**74.00**

COAX

9086 (9913 equivalent)	**.49/ft.**
RG-213/U (8267 equivalent)	**.39/ft.**
RG-8X (mini RG-8/U)	**.25/ft.**
RG-58C/U	**.19/ft.**

COPPER WIRE

14 gauge stranded	**.10/ft.**
14 gauge flex-weave	**.15/ft.**

ROTOR CABLE

8 conductor (2-#18, 6-#22)	**.25/ft.**
heavy duty (2-#16, 6-#18)	**.45/ft.**

PHILLYSTRAN

NON-CONDUCTING GUY CABLE

HPTG1200I (1200#)	**.32/ft.**
HPTG2100I (2100#)	**.39/ft.**
HPTG4000I (4000#)	**.64/ft.**
HPTG6700I (6700#)	**.84/ft.**
end kits 2100/4000/6700	**4/5/6**

GUY HARDWARE

3/16EHS guywire	**.15/ft.**
1/4EHS guywire	**.18/ft.**
3/16CCM cable clamp	**.45**
1/4CCM cable clamp	**.55**
1/4TH thimble	**.45**
3/8EE turnbuckle	**7.95**
3/8EJ turnbuckle	**9.95**
1/2X9EE turnbuckle	**11.95**
1/2X9EJ turnbuckle	**12.95**
1/2X12EE turnbuckle	**13.95**
1/2X12EJ turnbuckle	**14.95**
3/16 preformed big grips	**2.49**
1/4 preformed big grips	**2.99**
GAS604 screw anchor	**19.95**
500D guy insulator	**2.29**
502 guy insulator	**4.49**
5/8X8' copper ground rod	**12.95**
Klein safety belts (S M L XL)	**69.95**

CARBON STEEL MASTS

WALL	5'	10'	15'	20'
.12	29	55	82	99
.18	49	95	139	179
.25	—	129	—	249

Don't be fooled by aluminum masts! The typical yield strength of our 2" O.D. galvanized steel masts is 87,000 psi.

DUE TO MARKET CONDITIONS PRICES, SPECIFICATIONS, AND STOCK QUANTITIES ARE SUBJECT TO CHANGE WITHOUT NOTICE. PRICES LISTED DO NOT INCLUDE SHIPPING COSTS.

ORDER TOLL FREE: 1 (800) 272-3467

LOCAL AND TECHNICAL HELP : 1 (214) 422-7306 FAX: 1 (214) 881-0776

TEXAS TOWERS

C.O.D.
MC / VISA

M-F: 9AM-5PM
SAT.: 9AM-1PM

A Division of Texas RF Distributors, Inc., 1108 Summit Ave. Suite #4, Plano, TX 75074

MATH'S NOTES

BY IRWIN MATH, WA2NDM

WHAT'S NEW AND HOW TO USE IT

Charging A Battery The Simple Way

This month we will cover a topic that a number of readers have requested—a simple method for charging a battery. We all are familiar with the wide variety of rechargeable batteries that are available today and have probably read about some of the various "pet" ways that experimenters have found to recharge them. Our approach, however, will be rather straightforward and may be dull, but it will work and will not "break the bank."

First let's consider a couple of facts about chargeable and non-chargeable batteries in general. Both of them have a rated open-circuit voltage when they are new, and a minimum voltage, as they age, below which they will not properly operate the circuit or device in which they are being used. In addition, there is a maximum current that can be drawn from them and a useful life that is a function of the current drawn and minimum desirable voltage. These parameters are most often summed up in the "watt-hour" rating of the battery. A 12 volt battery with a watt-hour rating of 6 ampere hours, for example, will provide 6 amperes to a load for 1 hour, 3 amperes for 2 hours, or 0.6 amperes for 10 hours before the battery voltage drops too low. When this occurs with conventional dry batteries, replacement is the only thing you can do. In the case of "rechargeables," however, you actually can reverse the chemical process within the device and restore the battery to practically new condition a number of times.

Reversing the chemical reaction in a battery requires that you force current to flow through it in the reverse direction from normal discharge current. The amount of reverse current determines how fast the chemical process will reverse, and as a result, how fast the battery will recharge. Too much current will cause the battery to overheat, however, so battery chargers usually are limited to a value that starts out at roughly the full load current and then tapers off to about 5 to 10% of that value.

Fig. 1 is a schematic of an ultra-simple battery charger that will demonstrate the principles of battery charging. The value of R1 is chosen so that with a fully charged battery, one tenth of the maximum load current (often called the "trickle" current) will flow into the battery from the charging supply. This means that the current flow will increase as the voltage across the battery decreases. In the example shown, a 12 volt 6 ampere/hour lead acid or "gel-cell" battery is to be charged from a 15 volt power supply. Since the fully charged open-circuit voltage of such a battery is 13.8 volts and one tenth of the rated maximum current is 600 ma, the resistor is calculated as follows:

$$(V_{in} - V_{batt})/\text{Trickle Current} = R$$
$$\text{or } (15 - 13.8)/0.6 = 2 \text{ ohms}$$

The result is that a fully charged battery will be "trickle charged" at about 600 ma, while a discharged battery—at 10 volts, for example—will initially start charging at 2.5 amperes. Since a discharged battery will draw 2.5 amperes of charging current through the resistor, a high-wattage unit will be required. The power through this resistor will drop as the battery charges, but the large power rating required (12.5 watts in this example) can make this approach somewhat unwieldy. In fact, if the battery voltage at discharge is lower than 10 volts, the current will be even higher.

Fig. 2 is a practical battery charger that can be built by the experimenter at reason-

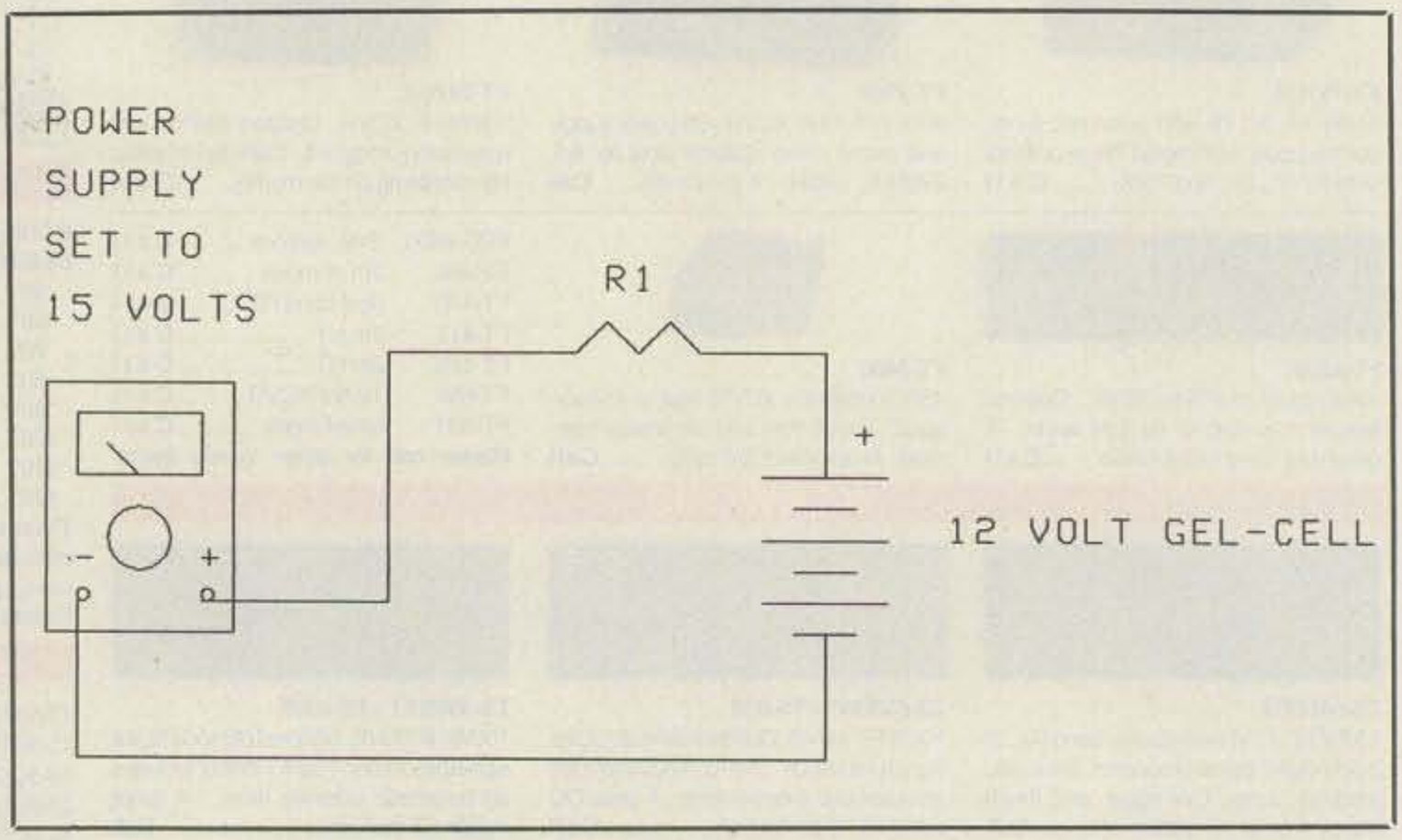


Fig. 1– Simple "battery charger."

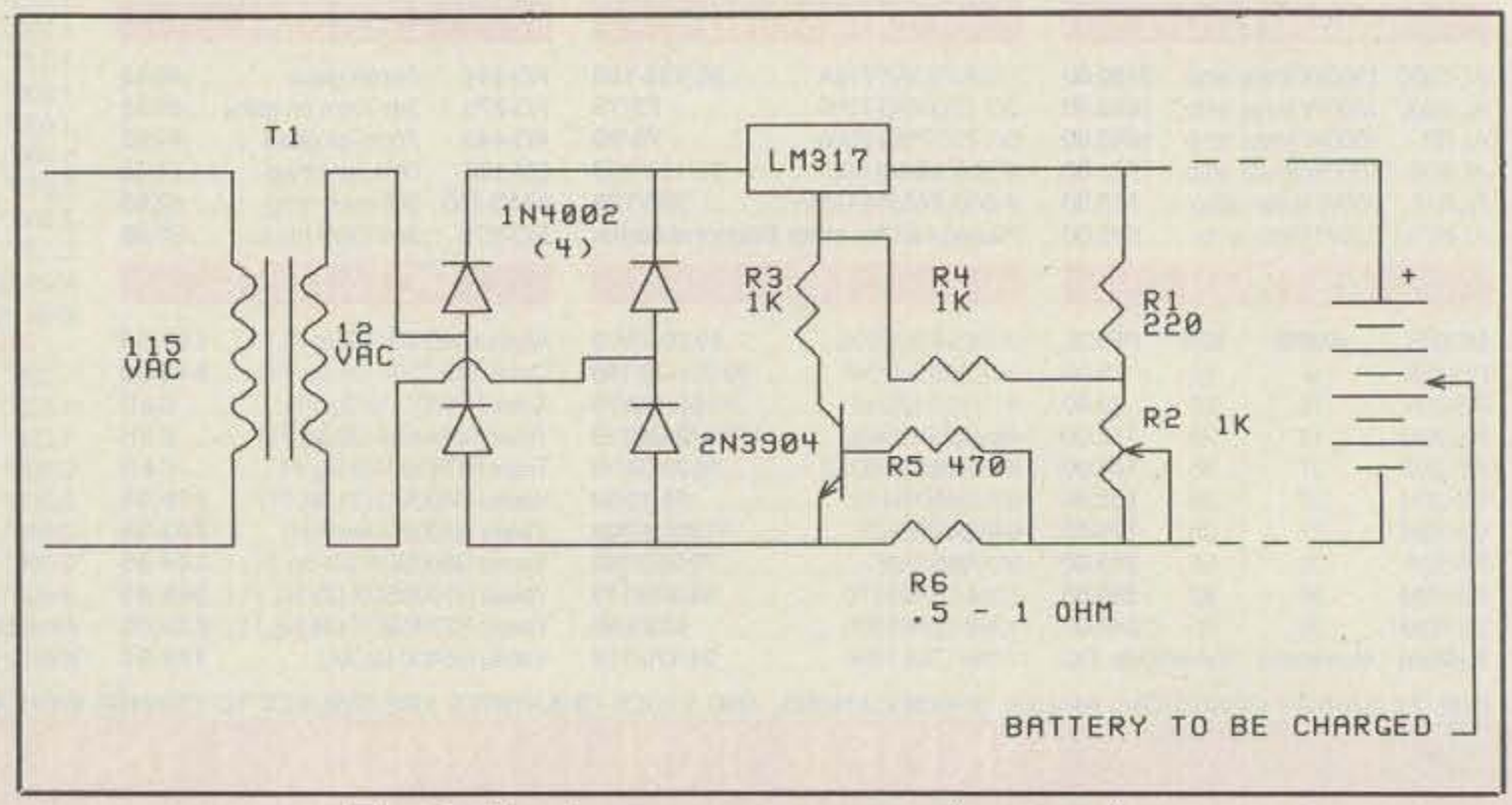


Fig. 2– Simple, easy to construct battery charger.

c/o CQ magazine

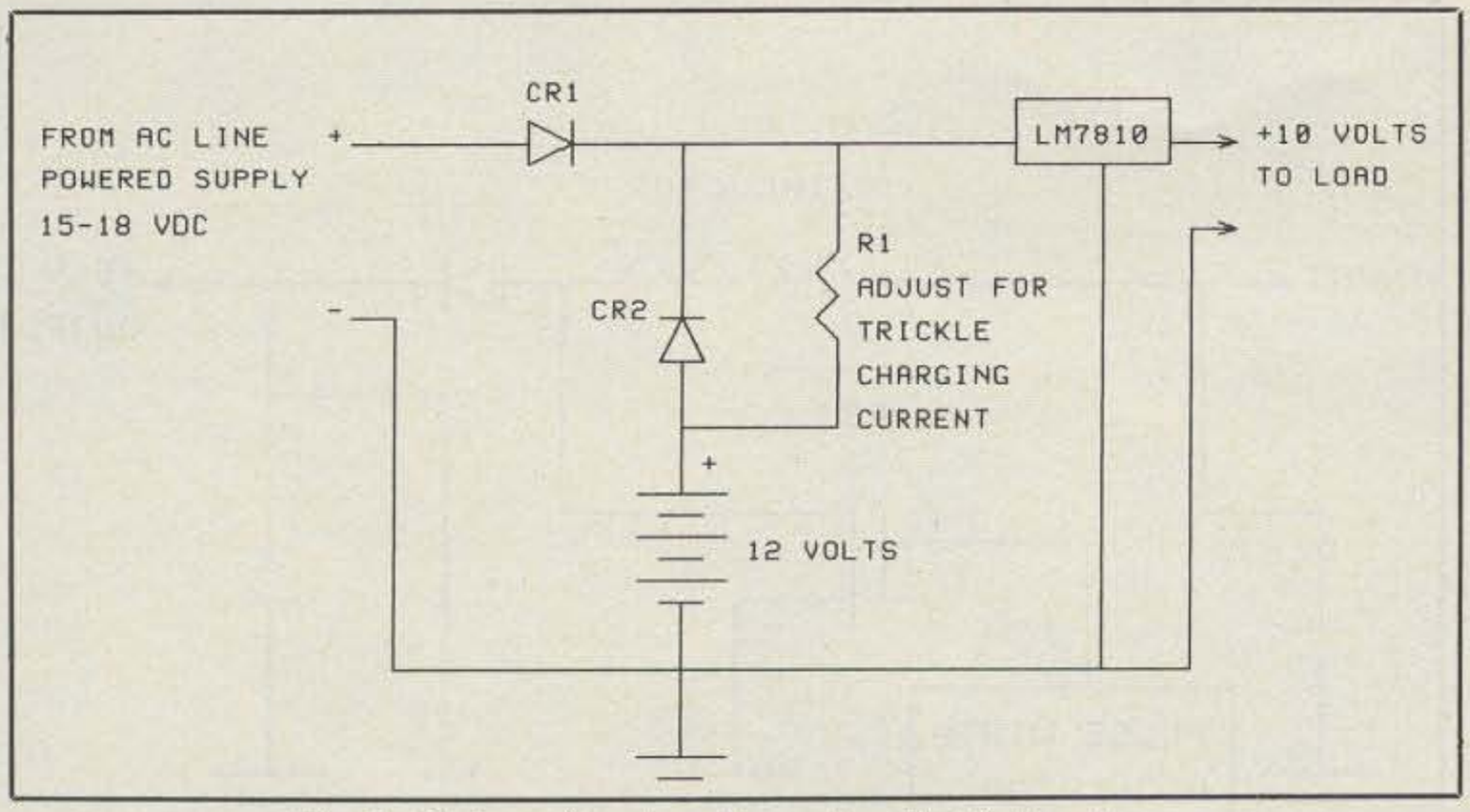


Fig. 3– Battery "back-up" supply with trickle charger.

able cost without the need for a huge dropping resistor. This circuit uses the LM317 adjustable regulator and a few common junk-box parts and will equal the performance of many commercial units. Construction is not at all critical, and the charger can be built in an aluminum mini-box with excellent results. The LM317 will require a heat sink, however, so one of the insulating kits available for that purpose will have to be obtained, as the regulator case must not make electrical contact with the housing.

In operation the bridge rectifier converts the AC from T1 to pulsating DC. The LM317 senses the output voltage by means of the divider composed of R1 and R2 and maintains this output at the value set by R2. Normally, this value will be slightly less than the open-circuit voltage of the battery. As long as too much current is not drawn, the circuit operates much like the resistor in fig. 1. As the battery charges and its terminal voltage approaches the value set by R2, the charging current will slowly drop to the point where it equals the pre-set "trickle charge" value.

R6 serves as a current limit. Notice that

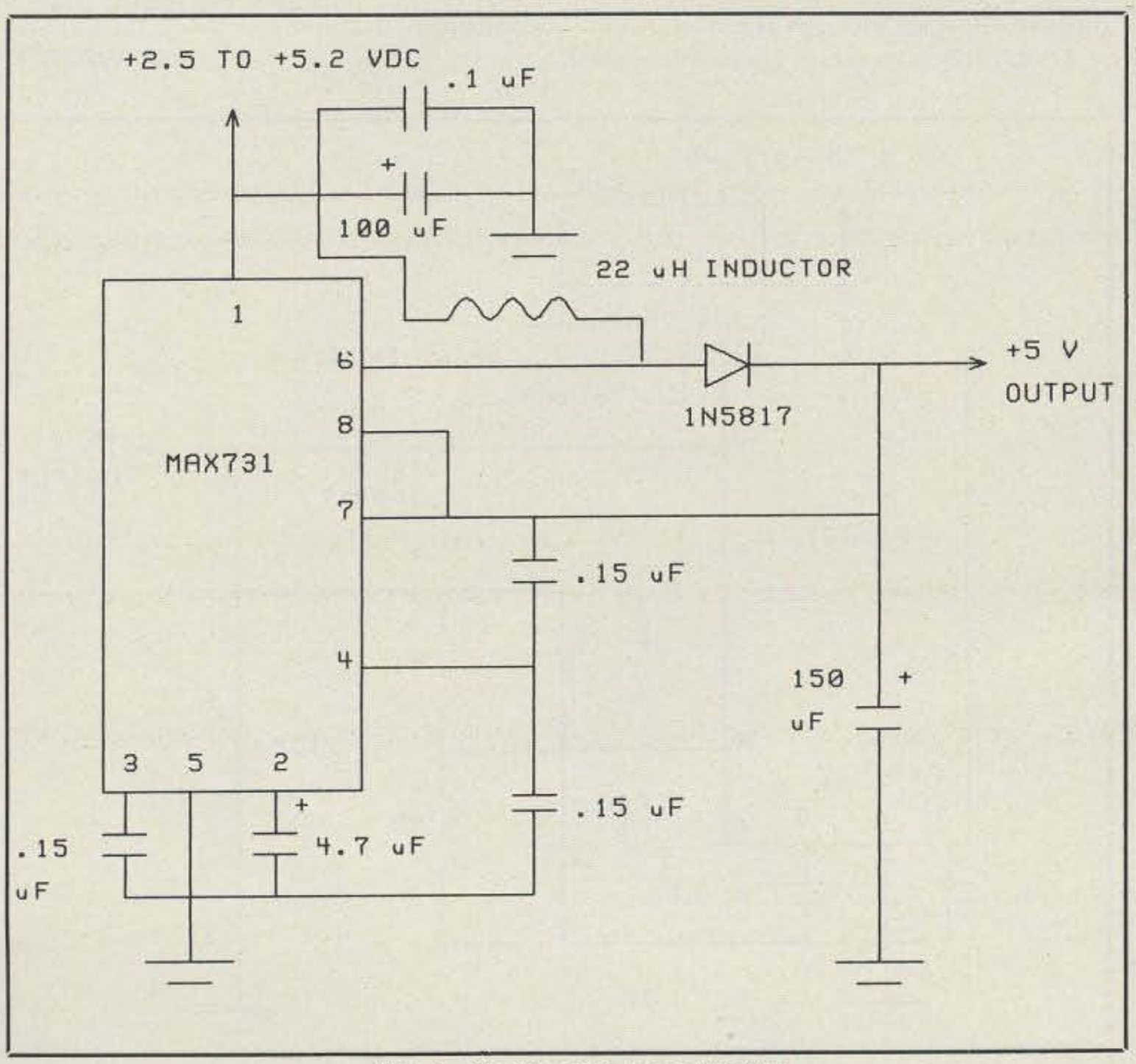


Fig. 4– Basic step-up regulator.

the current path to and from the bridge rectifier is through R6. With a low level of current, the voltage across R6 is not high enough to turn on Q1 and the regulator operates normally. If the current through R6 becomes too high, such as when a shorted battery is connected to the circuit, the voltage produced will cause Q1 to turn on. When this happens, the regulator output will be lowered to the point where the current again falls below the maximum limit. The value of R6 is chosen so that the maximum output current of the circuit will produce about 0.6 volts across it. A 1 ohm resistor, for example, will limit the current to 0.6 amperes, a ½ ohm resistor to 1.2 amperes, and so on.

To set up the circuit, first apply power with no battery connected. Adjust R2 for an output voltage equal to the final open-circuit voltage of the battery. Now connect a fully charged battery, in series with a milliammeter, to the circuit and slightly readjust R2 for the correct value of "trickle charge" current.

Occasionally it would be nice to have a battery "take over" when the AC power line fails. Fig. 3 is a way to do this while having the battery remain at full charge. The DC power supply operates from the AC line and produces enough voltage to forward bias CR1 and reverse bias CR2. This voltage is present at the input of the regulator and provides operating voltage to the circuit. In addition, "trickle current" is provided via R1 to keep the battery at full charge. If the AC line fails, CR1 becomes reverse biased by the battery, while CR2 becomes forward biased and drives the regulator. The load never even knows anything at all has happened. When the AC line power is restored, the circuit reverts back to its original mode of operation and the battery charges through R1.

I hope the above has given interested readers an idea of how to charge a battery. Remember, these circuits are only designed for use with rechargeable batteries. Non-rechargeable ones, such as common carbon zinc or alkaline types, will not work in them and may get so hot they leak and may even explode. Therefore, be very careful you only use the proper type of battery.

73, Irwin, WA2NDM

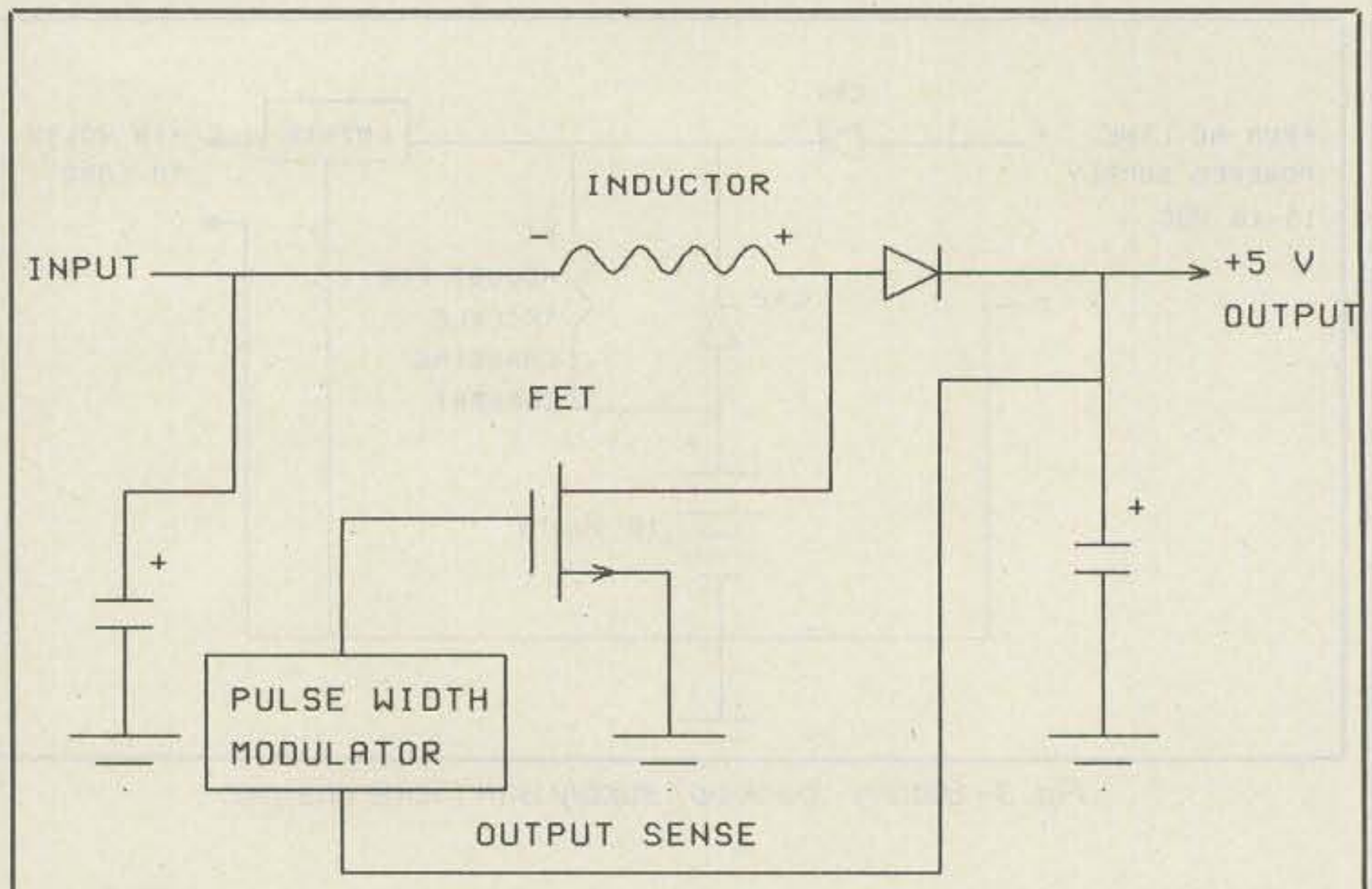


Fig. 5– Basic operation of step-up regulator. As the PW modulator turns the FET on and off, the voltage developed across the inductor is connected in series with the incoming voltage, thereby producing the higher output voltage.

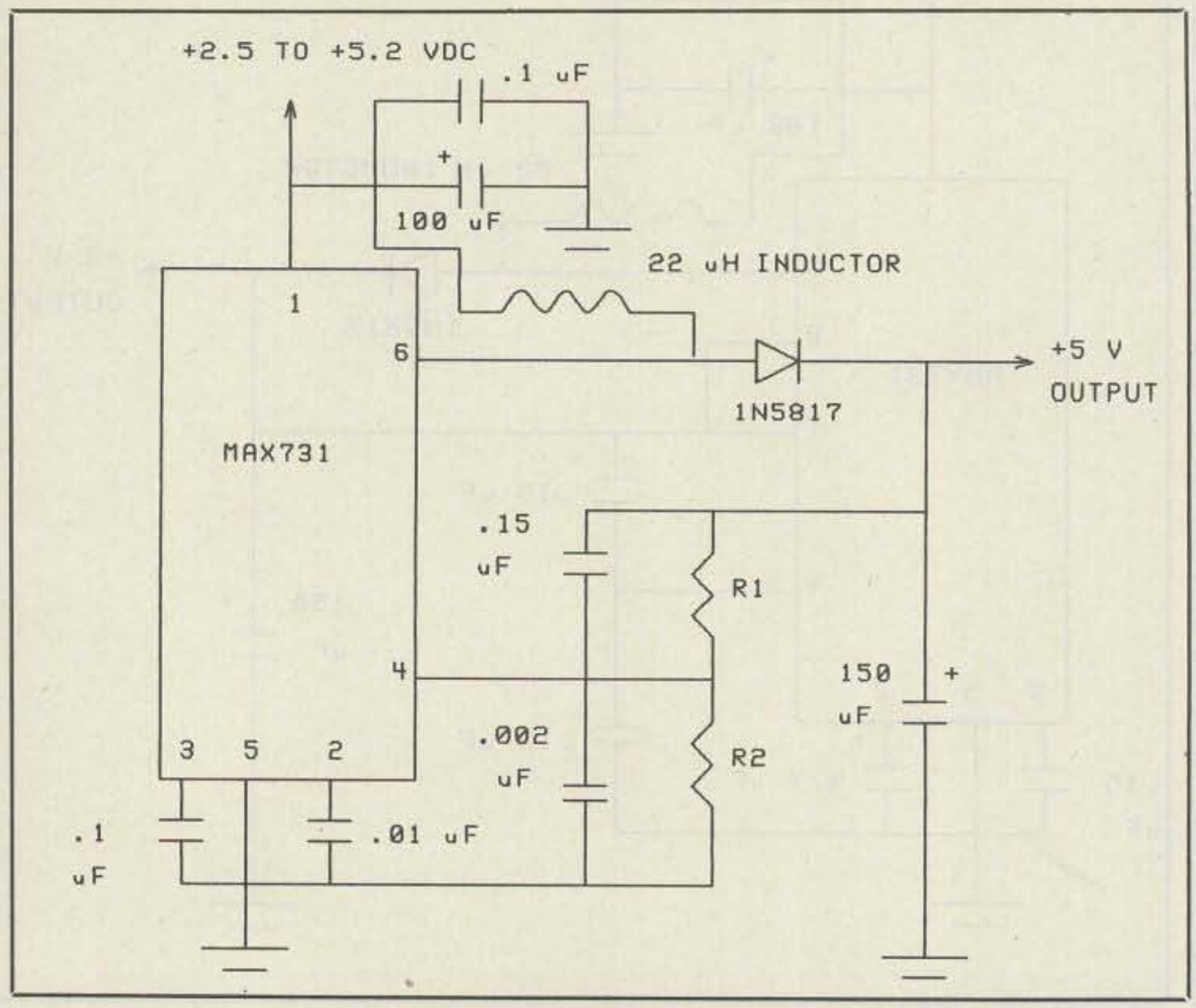


Fig. 6– Adjustable step-up regulator.

PACKET USER'S NOTEBOOK

BY BUCK ROGERS, K4ABT

CONNECTING YOU AND PACKET RADIO IN THE REAL WORLD

Portable Packet

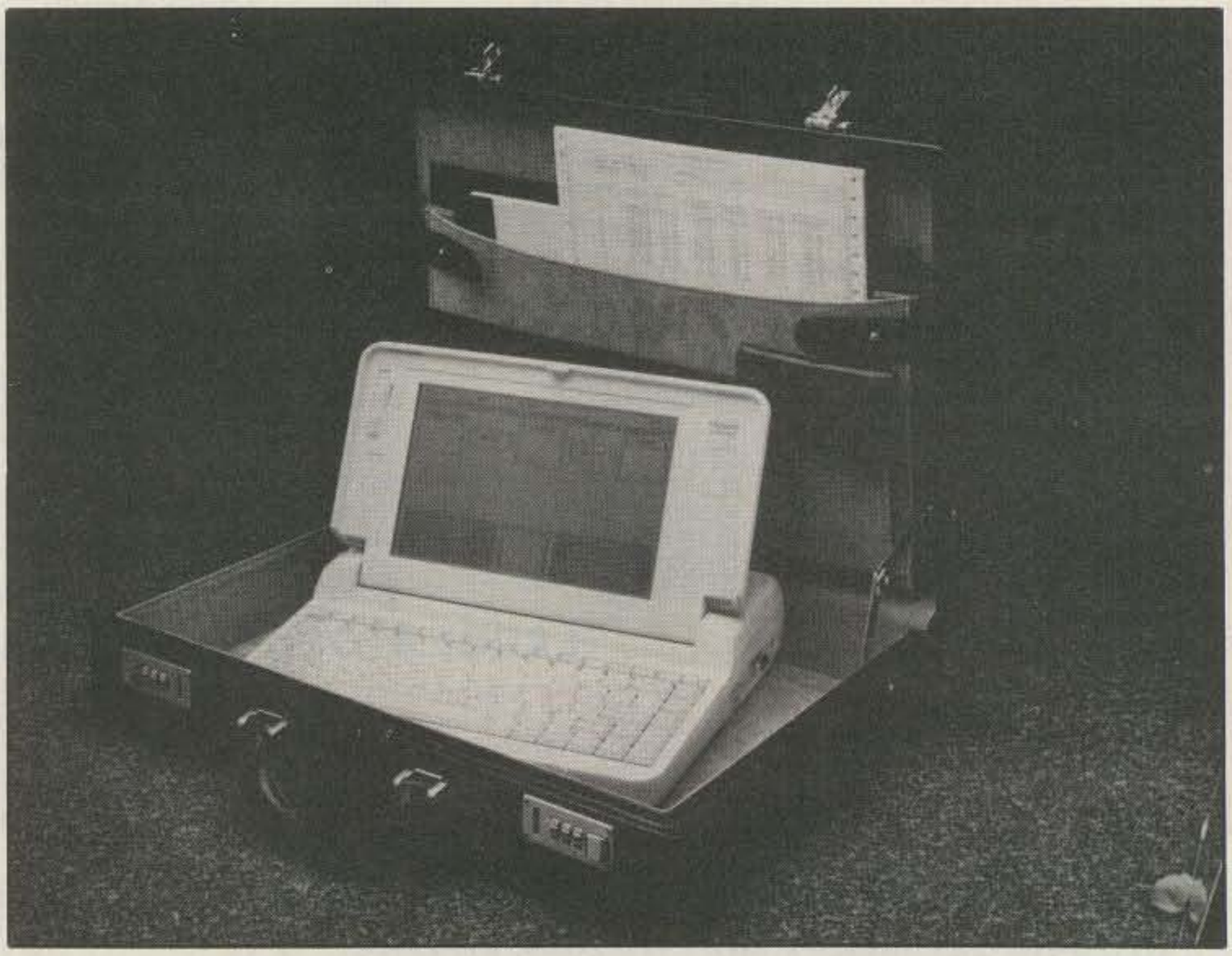
While on one of my travels around the country I stayed over in one of the beautiful cities located in the Blue Ridge Mountains of Virginia. I set up my portable packet station and sent a couple of broadcast messages announcing my arrival. It wasn't long before I was in QSO with some local packeteers.

One of the packeteers with whom I connected asked, "How are you doing, Buck?" I answered, "Oh, I'm sitting up taking nourishment." The next response from Jon was "Aren't you feeling well?" That did it. I need to either explain some of my one-liners or stop using them. I had to explain that I was doing great, and that it was only an expression. I also use another one: "I'm touching the high places."

In recent months I've moved into another profession, one that is really made to order for my specialization. In doing so, I've had an opportunity to fly (commute) throughout the United States. Some areas I visited are places I have not visited in some time.

I keep the portable packet station in one of my briefcases so I can set it up and be on the air in short order. This lets me connect with many packeteers from my *former* Tennessee QTH with whom I would not normally be able to connect. The use of a laptop in my business is almost mandatory, and since there are times when I'm either on an airplane or spending some weekend time in a motel room, this way I can catch up on my packeting or writing this column.

211 Leunburg Drive, Evington, VA 24550



The Tandy 1110 HD fits perfectly in my briefcase with room to spare.

My new Notebook Computer is a Tandy 1110 HD. It is a laptop that is both portable and affordable. The 1110 HD sells for under a thousand dollars and has all the features that I need while "on the fly." It is completely portable (battery lasts about 4 hours between charges), and it can be operated battery or AC. It is PC compatible and comes with DeskMate™ and MS/DOS 5.0 installed on the hard drive. It has built-in 20 megabyte hard drive, and a 720K floppy disk drive. The high-speed CPU runs at 10 MHz and is supported by 640K of RAM. There is a printer port, a serial com-port, and a compartment for the optional 1200/2400 bps internal modem. DeskMate

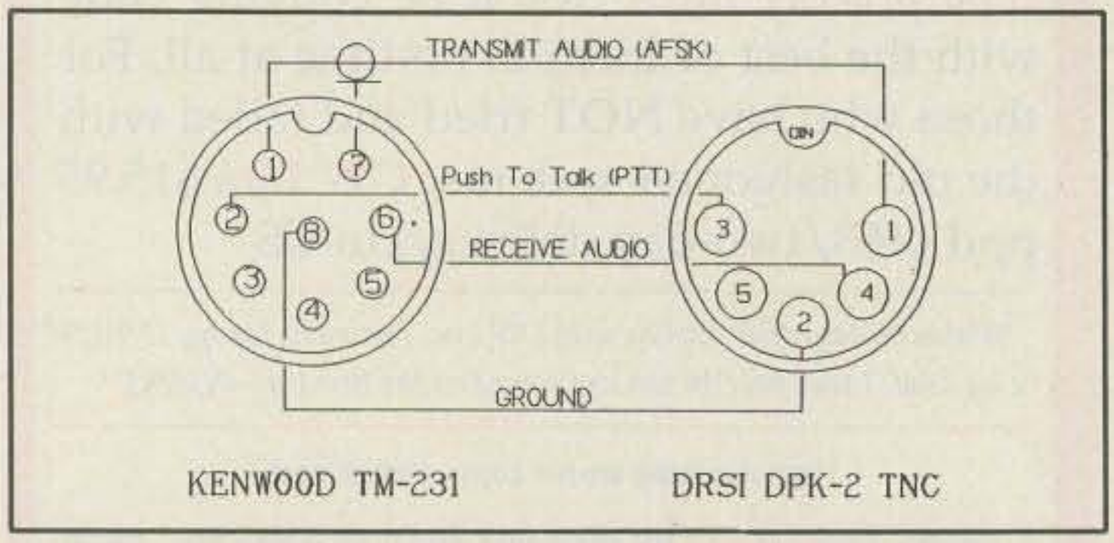


Fig. 1– The TM-231 has receive audio at pin 6 of the microphone connector. The same interface works well with the Alinco DR-1200 DataRadio.

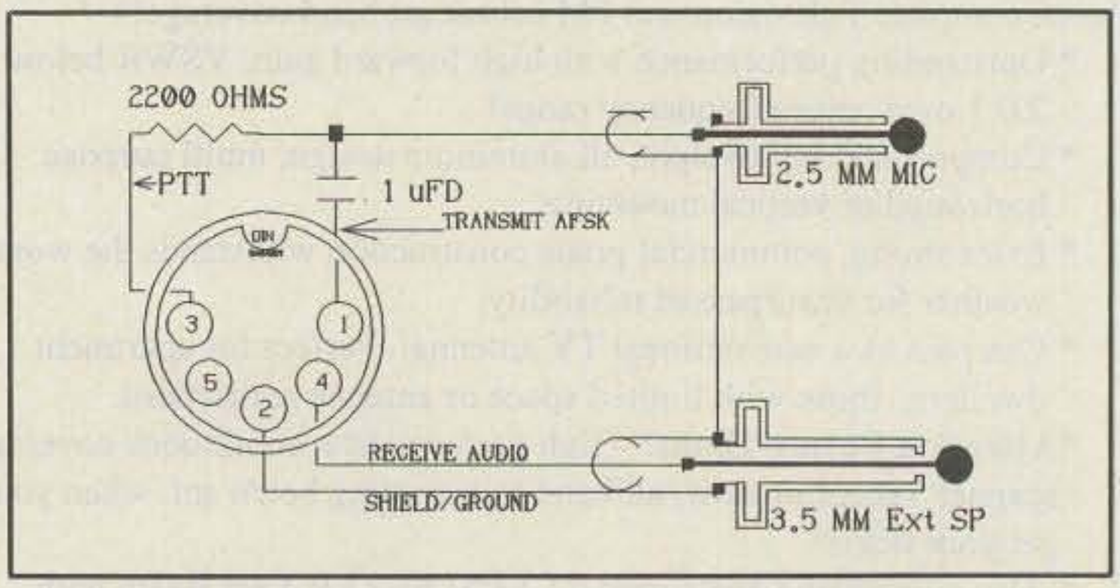
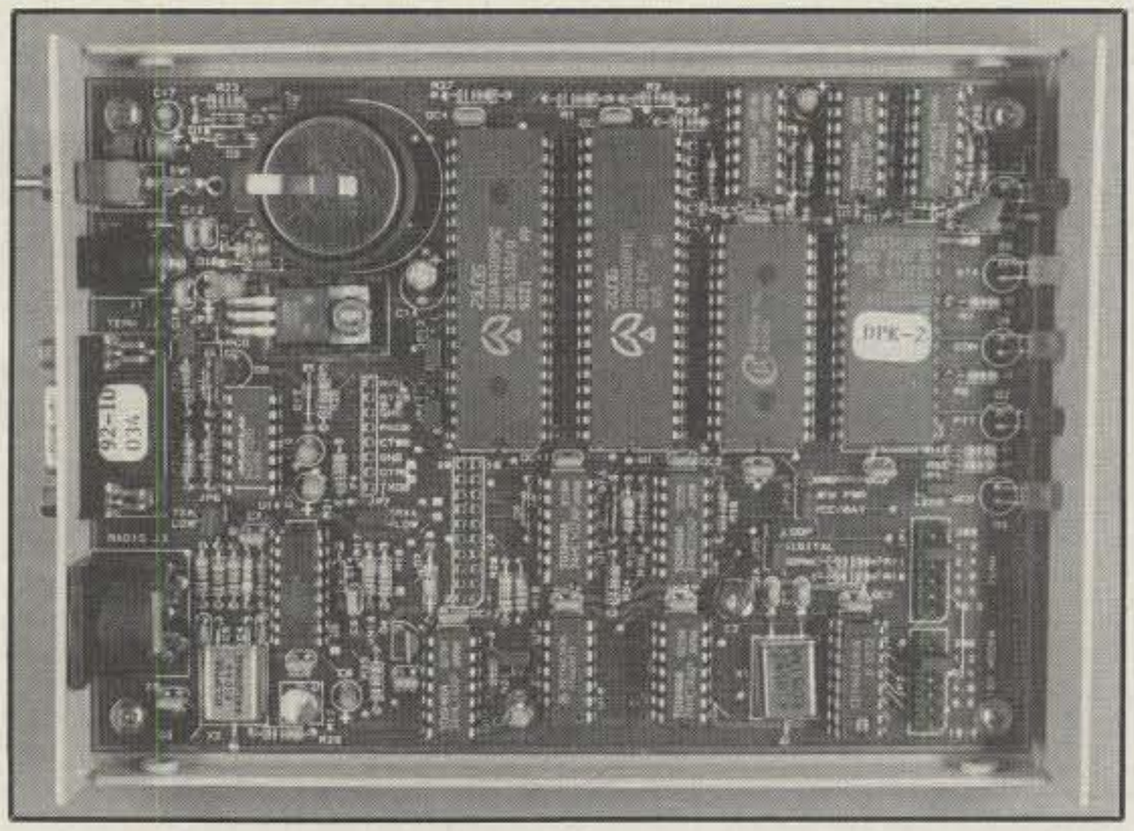


Fig. 2– DRSI DPK-2 TNC to HT interface. The component values shown here are used with the Alinco DJ-F1 and the DJ-580 HTs.

(Top) Front view of the DRSI DPK-2 TNC, which isn't a drain on the pocketbook or the power supply. (Bottom) Rear view of the DPK-2 showing the on/off switch and power supply, RS-232, and transceiver connections.



View of the DPK-2 with top cover removed. The DRSI PC boards are among the highest quality PCBs I've seen, and there is no skimping when it comes to the quality of the components attached to the board.

has a terminal program already resident, so all I needed was the radio (transceiver) and the TNC.

Introducing The New DPK-2 From DRSI

As with all the Digital Radio Systems Inc. (DRSI) products, Andy DeMartini has once again produced another quality TNC. Of all the TNCs I use, the DRSI PC boards are among the highest quality PCB's I've seen. In addition, there is no skimping when it comes to quality components attached to the board.

As I write this column on one of my trips, I am using a new TNC that has just been introduced by DRSI—the DPK-2. The DPK-2 offers users and SYSOPs alike an inexpensive TNC that is not a drain on the packet pocketbook or the power supply. The DPK-2 consumes less than 50 ma, and with the LED's disconnect header removed, the current drain is even less. The latter is most often removed when the TNC is installed at a remote switch or node site where the LEDs are not necessary.

The DPK-2 is TheNET and ROSE compatible. It is similar in some ways to the TAPR TNC-2 clones, where firmware is involved. I've already found some differences, and to my enjoyment, the differences are positive. There are no modification problems in this little powerhouse, as you see in the interface drawings that accompany this month's "Packet User's Notebook."

Shown in fig. 1 is the manner in which I attach the transceiver to the DPK-2, and in fig. 2 is how I attach the DPK-2 to my DJ-F1 HT.

Sporty Little Speedster

The RS-232 port uses the "MAXIM," a new and different kind of RS-232 driver. For my needs the new unit seems to drive the data/terminal speed at a better rate. If you're not sure what I mean, the next time you have your packet station on and you are in the CMD: mode, try holding the Enter key down for a short duration. At the moment you release the key, see if any of the CMD prompts that appear on the screen are out of line, or if there is a horizontal string at the end of the carriage return. With this TNC I have not been able to out run the CMD prompts, so to speak.

No More Mail-Snail

With one TNC we've used we often try a connect only to get the response "NOT WHILE MAIL SERVER IS ON"! Of course we have to go back a step and set the mailbox to OFF and then try the connect again.

With the DPK-2 Personal Mail Server (PMS) set to OFF, the command prompt is displayed as the usual CMD:. When the PMS is set to ON the prompt becomes PMS:. Thus, the operator is advised ahead of a connect attempt that the mail server is ON.

Standard TAPR TNC2 commands are supported in the firmware, and most features are covered. There are other enhancements within the firmware that make this an ideal component in the portable packet environment.

For The ROSE and Node SYSOPs

Since I've already mentioned that the DPK-2 is ROSE and TheNET EPROM compatible, I've included some serial port interface(s) in fig. 3 to illustrate how easy it is to use the DPK-2's in a gateway configuration. Add to this the new 9600 baud modem that will soon be available for the DPK-2, and we are assured of a smooth transition between LAN and backbone because of the new faster drivers and components. Andy says the new 9600 baud modem is different from the others that are around, but the DRSI *will be* fully compatible with the current 9600 baud format.

Even at the user level, the DRSI 9600 baud modem can be plugged into the TAPR standard header inside the TNC. The modem (radio port "HBAUD") baud rate can be set for 300, 1200, 2400, 4800, and 9600 bps by JP2. The terminal (ABAUD) baud rate can be set at 300, 1200, 2400, 4800, 9600, or 19,200 baud at JP1. As shipped, the DPK-2 is set for radio port speed of 1200 baud and terminal speed of 9600 baud.

TTL Interfacing—A Lost Art

For the TTL user, TTL connections are made at P4 inside the DPK-2. Pin 1 of P4 is nearest to JP7, and although it may be labeled TXDB, the definition of the connection is actually RxD, or the point where the "receive data" connection is made. The same applies to point number 5 of the P4 connector. Here the PC board might be labeled RXDB, but we attach the "transmit data" (TxD) connection here.

The only other label of P4 that could mislead the TTL user is pin 2. Point number 2 is where we would attach a DCD line if it were used.

Since most terminal programs for the

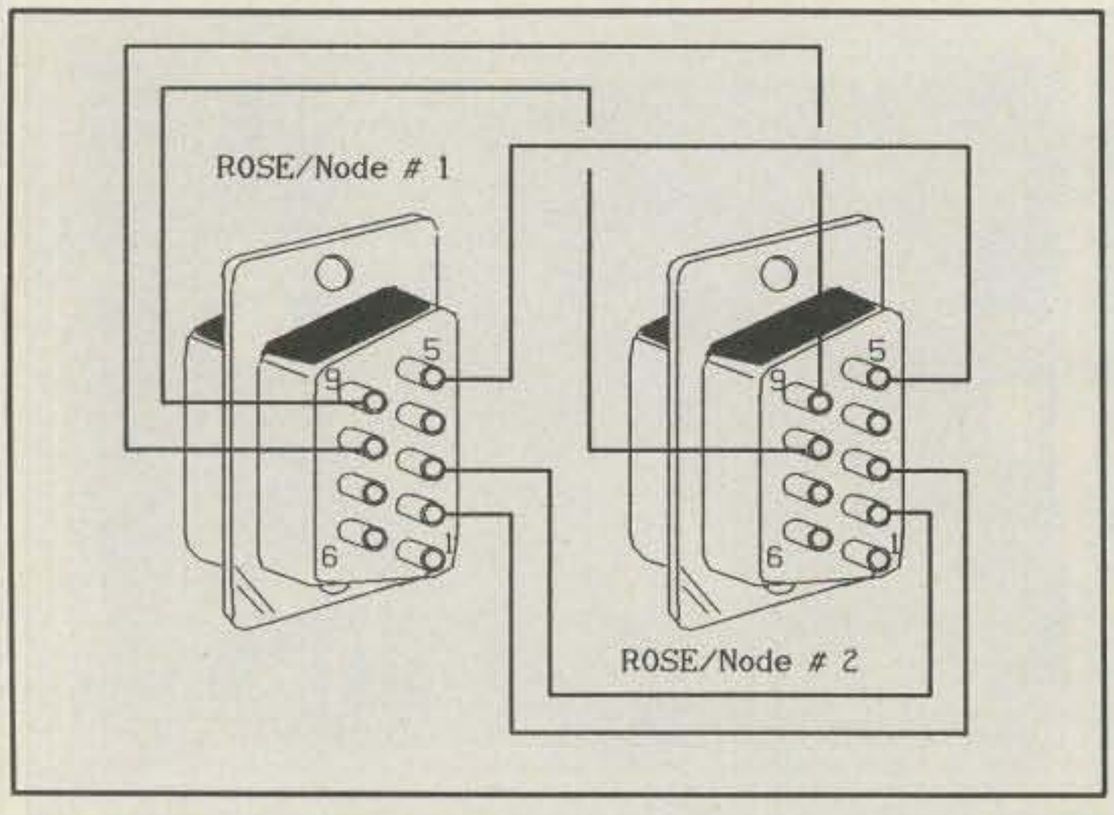


Fig. 3– Interface cable illustrating how the DRSI DPK-2 is used in a gateway application. The terminal speed at JP1 should be set to the same baud rate inside both units. The async port speed can be operating at a higher baud rate (9600) and into a different radio operating on another frequency.

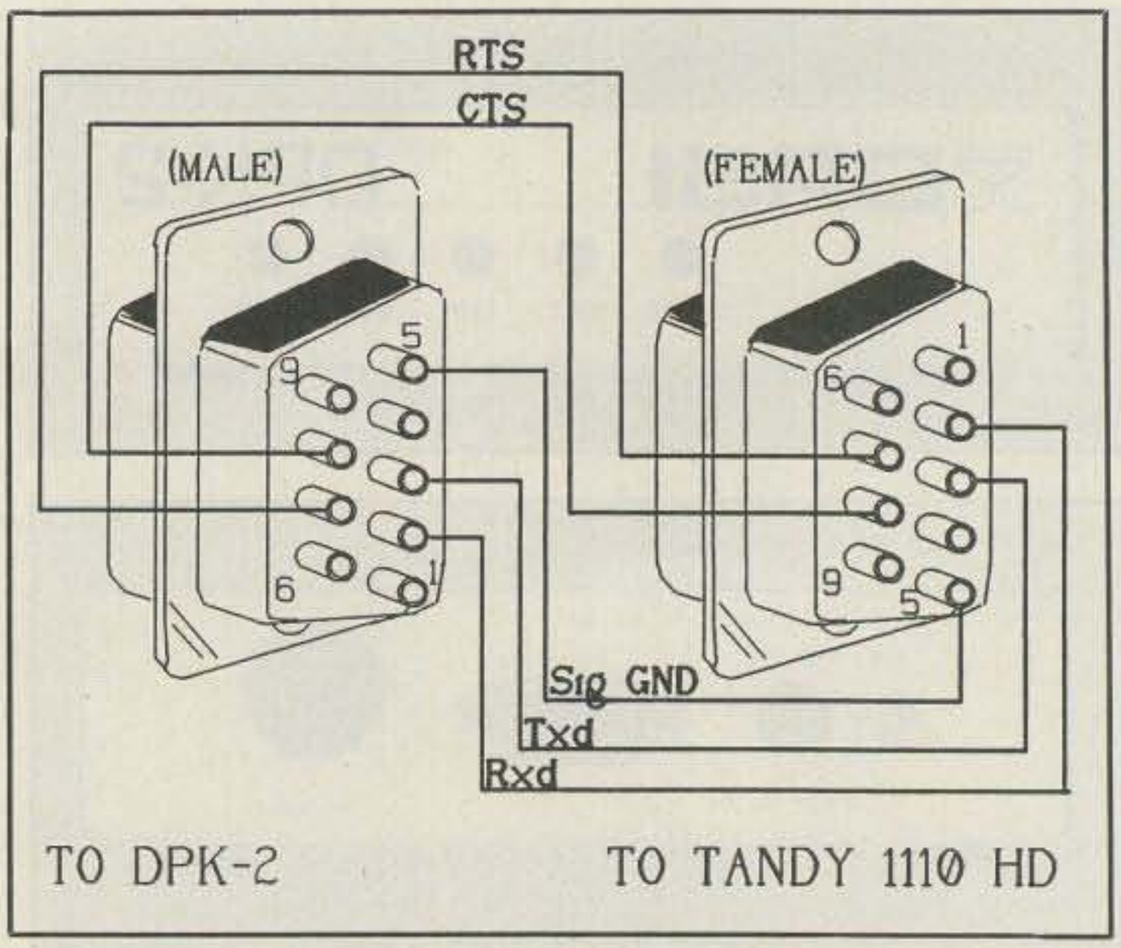


Fig. 4– The Digital Radio Systems DPK-2 connector is "male" and the connector at the Tandy 1110 HD is "female." This wiring configuration supports hardware handshaking.

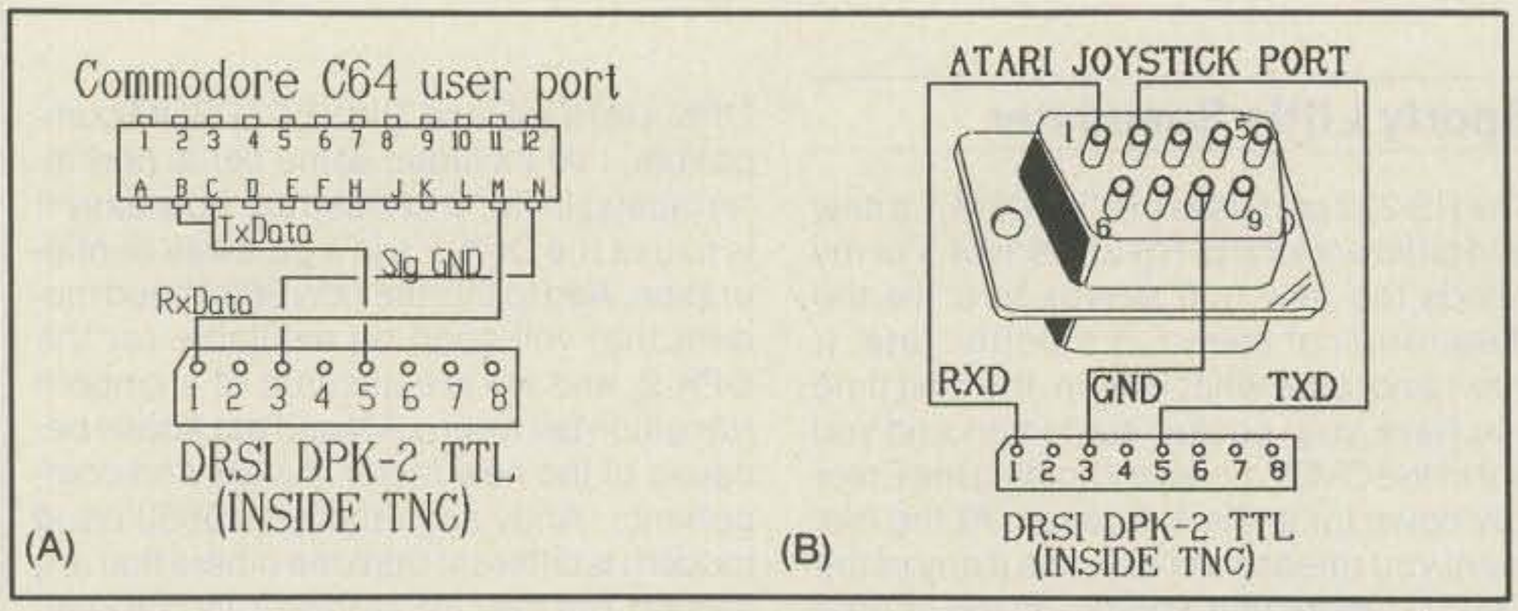


Fig. 5– (A) The TTL port (P4) of the DPK-4 interfaced to a Commodore 64/VIC-20. (B)The DPK-2 connected to the Atari joystick port.

Commodore 64 and Vic 20's enable software handshaking, only the Receive Data (pin 1) and Transmit Data (pin 5) are used (see fig. 5). Signal ground is made at pin 3 or 6 of P4 inside the DPK-2. Another interface to the early Atari is shown in fig. 5B. For the PC and compatible users I've included the interface shown in fig. 4. Note the DB9 connectors on both PC and DPK-2.

A lithium battery maintains the command memory and the mailbox contents when the DPK-2 is turned OFF. The front panel has no buttons or switches, and there are only five LEDs that identify the DCD, PTT, Connect, Status, and power conditions.

Transmit audio (AFSK) level is controlled by the placement of strapping option JP6. Included in the DPK-2 is a means to control the receive audio level, a feature not often seen (or used) in a TNC. Receive AF can be set HI or LO with strapping option JP7.

A five-pin DIN connector for the radio port and a power (barrel) connector are included with the TNC. The ON/OFF switch on the rear panel is a very positive miniature toggle (ball-bat) switch. Documentation and schematics are large enough for the user to really read and define the parts.

There are no vacant sockets inside the DPK-2, and the layout is packaged so as to conserve space and reduce EMI. This allows the size of the DPK-2 to be compressed into 6½ " × 5 " × 1¼ ". With this compact size I'm able to place the Tandy 1110/HD Notebook computer, the DJ-F1 HT, and the DPK-2 easily into my briefcase. There is enough room leftover for my printed material and a small 12 volt, 1.7 amp nickel-cadmium battery which operates the TNC longer than the charge on the battery in the computer.

There is enough room for everyone to have some fun, at home or on the road. More and more packeteers are finding that portable packeting is fun and affordable. If you are like many other packeteers who would like to have a packet station on the fly or be ready in an emergency, look into this or similar systems for portable operating.

For more information about the Tandy 1110 HD (PN 25-3531), see your local Radio Shack store or dealer.

The DPK-2 lists for $114.95. See your DRSI dealer for more information or contact Digital Radio Systems Inc., 2065 Range Road, Clearwater, FL 34625 (813-461-0204; FAX 813-447-4369).

Happy Packeting!

73, de BucK4ABT
K4ABT @ WD4ELJ.VA.USA.NA

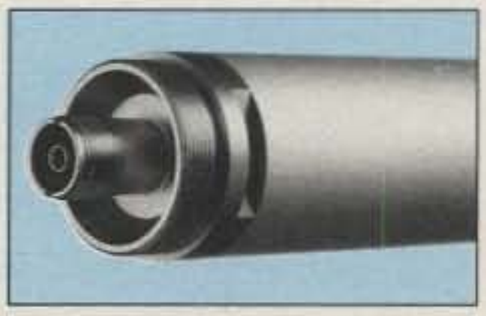
DIAMOND ANTENNAS –
THE STANDARD BY WHICH ALL OTHERS ARE JUDGED

DIAMOND ANTENNA

ACCLAIMED AS THE TECHNOLOGICAL LEADER IN SINGLE & MULTIBAND ANTENNAS
●WIDE-BAND PERFORMANCE ●FACTORY ADJUSTED/NO TUNING REQUIRED
●HIGHEST GAIN ●UPS SHIPPABLE ●HIGH WIND RATING ●FIBERGLASS RADOME
●DC GROUNDED ●STAINLESS HARDWARE

X-500HNA

RUGGEDIZED BASE/
REPEATER ANTENNA



COAX CONNECTION
AT BASE END

HEAVY DUTY BASE/
RADIAL ASSEMBLY

STRONG JOINT COUPLINGS

Xseries

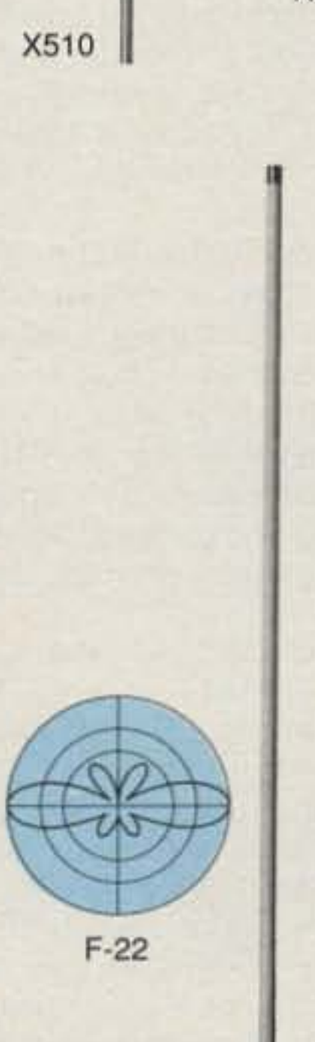
MODEL	BAND(MHz)	GAIN(dBd.)	WATTS	CONN.	HT. Ft.	RATED WIND/ MPH
X-50A	144/440	4.5/7.2	200	UHF	5.6	135
X-200A	144/440	6.0/8.0	200	UHF	8.3	112
X-300A	144/440	6.5/9.0	200	UHF	10.2	112
X-510NA	144/440	8.3/11.7	200	N	17.2	90
X-510MA	144/440	8.3/11.7	200	UHF	17.0	90
X-500HNA	144/440	8.3/11.7	200	N	17.8	90+
X-700HA	144/440	9.3/13.0	200	UHF	24.0	90
X-2200A	144/222	6.0/7.8	150	UHF	11.5	112
X-3200A	144/222/440	6.0/7.8/8:0	100/200	N	10.5	112
X-6000A	144/440/1240	6.5/9.0/10.0	100/100/60	N	10.5	112

BAND: 144=144 - 148MHz. 222=222 - 225MHz. 420=420 - 430MHz.
430=430 - 440MHz. 440=440 - 450MHz. 1240=1240 - 1300MHz.
* X510NJ :144 - 147 / 430 -440MHz

147MHz

445MHz

RADIATION PATTERNS FOR
X-500HNA/X-500MA/X-510NA

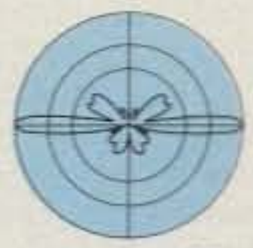


X510

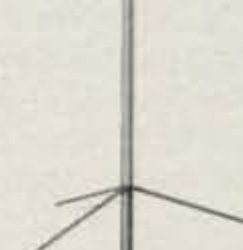
GH/F/U&V series

MODEL	BAND(MHz)	GAIN(dBd.)	WATTS	CON N.	HT. Ft.	RATED WIND/ MPH
DP-GH62	50	6.0	200	UHF	21.0	78
F-22A	144	6.7	200	UHF	10.5	112
F-23A	144	7.8	200	UHF	15.0	90
F-142A	222	5.5	200	UHF	6.0	110
F-718A*	440	11.5	250	N	15.0	110
F-1230A	1240	13.5	100	N	10.5	90
U-200A	440/1240	8.3/11.7	100	N	5.9	135
U-300A	440/1240	8.6/13.2	100	N	8.3	110
U-5000A	144/440/1240	4.5/8.3/11.7	100	N	5.9	135
V-2000A	50/144/440	2.1/6.2/8.4	150	UHF	8.3	110

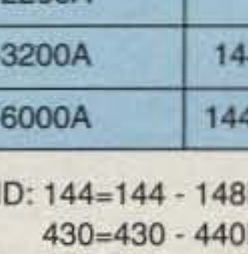
*F-718A:440 - 450MHz, F-718J:430 - 440MHz, F-718L:420 - 430MHz



U-300A 440MHz



F-22



U-300A 1200MHz

VHF PLUS

BY JOE LYNCH, N6CL

ALL ABOUT THE WORLD ABOVE HF

FCC Issues NPRM Concerning VHF+ Frequencies

On 4 December 1992 the FCC issued a press release announcing that the Commission was proposing rules changes to the Amateur Service that would essentially combine three petitions (two ARRL, RM-7868 and RM-7869, and one by Dr. Michael C. Trahos) into one proposal. The substance of the proposal is three issues. First, the FCC proposes that repeater operation be prohibited from 222.000–222.150 MHz. Second, the FCC proposes that the Novice class licensee be granted full frequency access to the 222 MHz band. Third, the FCC proposes that Novice privileges would include authorization to be control operators of repeaters in this band and the Novice subband of 1270–1295 MHz in the 1240–1300 MHz amateur radio band. Comment and reply dates were not available as of the writing of this column. However, by the time you read this, that information will have been publicized in other media.

With this NPRM the FCC has stated that they agree that a designated "weak signal" portion of the 222 MHz band seems warranted. It also appears that the FCC is recognizing that volunteer cooperation is not working in all parts of the country. In some of the areas of the country, such as in Texas, repeater coordinating organizations, such as the Texas VHF-FM Society, have gone out of their way to cooperate with the weak-signal community to establish a band plan that accommodates the weak-signal activity within their territories. However, in southern California it is a different matter. Under the leadership of Mark Gilmore, WB6RHQ, in September 1992 the Spectrum Management Association, the southern California repeater coordinating organization, agreed to declare the spectrum of 222.000–222.110 as "weak signal" and thus free from repeaters. However, according to Wayne Overbeck, N6NB, and Chip Angle, N6CA, reports of malicious interference from FM operators to weak-signal operators continue come to their attention. Wayne stated that more than two months after the voluntary band plan was to be effective, weak-signal operators are being subject to deliberate interference from stations operating on FM, with the latter claiming that weak-signal operators are "not allowed" on that portion of the band.

From these examples it is evident that voluntary cooperation has worked for some areas of the country, but it clearly has not worked in southern California.

The repeater operators have stated that southern California has problems unique to its locale. However, many feel that the problems seem to be principally caused by the rationale that states that everyone wants to own his or own repeater.

Another reason given for a regulated portion of the band has to do with uncoordinated repeaters. With the growing desire to place repeaters on the air and the lack of available spectrum to handle the requests for these repeaters, the temptation exists to establish uncoordinated repeaters. If an uncoordinated repeater were to show up in a portion of the band that clearly prohibits that type of operation, there would be the force of law behind the efforts to silence the offending repeater.

The argument is made, however, that this effort to silence the trespassing repeater is the responsibility of coordinating organizations. When an uncoordinated repeater shows up, all the organization has to do is go to the FCC and force the uncoordinated repeater off the air. Regardless, this action usually only takes place when such a repeater is interfering with a properly coordinated repeater. Unfortunately, rarely is relief via this route available to another type of user of the spectrum. These situations cause Wayne to conclude that an FCC regulated portion of the band is necessary.

Why should there be a weak-signal segment at all? Wayne wrote an interesting paper that he presented to the 1992 West Coast VHF conference (a copy of it is in the *Proceedings* for that conference). In it he gave a history of activity on the band that dates back to 1934. However, the most significant aspects of the paper were the citing of the post World War II accomplishments.

Wayne first reports on the successful contacts that Fred Tuckerman, W3LZD, made with W8DX and W8BFQ via aurora in 1954. The next distance record to fall would be via propagation caused by tropospheric enhancement. Wayne indicated that the extension of the distance record for this mode of propagation was accomplished on this band in 1959 by John Chambers, W6NLZ, and Ralph "Tommy" Thomas, KH6UK. He pointed out that 2 years after Chambers and Thomas made their historic contact on 2 meters, they tried it again on 1.25 meters. By comparison, their contact on 1.25 meters was far easier to accomplish than their contact on 2 meters, having taken only 5 days of schedules on 1.25 meters as compared to 9 months on 2 meters. Wayne recounted that after this contact on 1.25 meters, the federal government, particularly the defense department, took a keen interest in propagation via tropospheric enhancement. As a result of their investigations they concluded that, among other things, it was conceivable that signals previously thought not receivable on higher VHF frequencies were indeed copyable under the right circumstances.

Following the successful 2 meter meteor-scatter contact in 1954 between Paul Wilson, W4HHK, and Tommy Thomas, W2UK (yes, the same Tommy, only under a different callsign), efforts were made to see if it was possible to make a meteor contact on 222 MHz. Wayne reports that on 9 August during the 1968 Perseids shower another Californian, Mel Baer, W6WSQ, and Don Hilliard, W0EYE (then living in Colorado and now W0PW and living in Missouri), made the first meteor-scatter contact, over an 825 mile path. Surprisingly, that record lasted only two days before being broken by John Perchalsky, K4IXC, in Florida, and Jud Snyder, K2CBA, in New York, when they made a contact over a 1090 mile path. Wayne goes on to report that Mel and Don completed a second contact on 12 August.

Wayne continues by stating that only two years following these firsts on meteor scatter Jud was at it again, this time trying EME communications. At the same time Louis Anciaux, WB6NMT (now KG6UH and HL9UH, in Korea) was working with Lucky Whitaker, W7CNK, in Oklahoma to make a successful EME contact. On 15 March 1970 Lou and Lucky succeeded. The next day Lou completed a second contact, this time with Jud.

Wayne goes on to discuss two other forms of propagation discovered to exist on 222 MHz *after* repeater operation populated the band. In his first example he states that on 9 March 1983 KP4EOR, near San Juan, Puerto Rico, and LU7DJZ, near Buenos Aires, made a successful CW QSO using sky-wave propagation. In his second example he cites the contact between K5UGM, near Dallas, and W5HUQ/4, near Jacksonville, Florida, via sporadic-E as an example of yet another form of propagation existing on this band.

Clearly, this band has a fascinating menu of propagation forms available to its users. Unfortunately, the cloud of uncertainty has hung over

P.O. Box 73, Oklahoma City, OK 73101

VHF Plus Calendar

Jan. 23–25	ARRL VHF Sweepstakes. (See text for details.)
Jan. 26	Approximate beginning of KH1 operation. (See text for details.)
Jan. 31	First quarter moon.
Feb. 7	Full moon and Perigee. Excellent EME conditions.
Feb. 13	Aurora '93. Contact Paul Husby, W0UC, 612-642-1559.
Feb. 14	Moderate EME conditions.
Feb. 15	Last quarter moon.
Feb. 16	Noisy EME conditions. Sagittarius A.
Feb. 22	New moon and Apogee. Poor EME conditions.
Feb. 28	Moderate EME conditions.
Mar. 1	First quarter moon.

ALINCO VHF & UHF Mobiles • Handhelds • Packet

You can afford the Low AES® Prices . . you'll Love the ALINCO Quality!

ALINCO DR-112T 2m Mobile • 144-148MHz transmit, and receive 130-170MHz/335-410MHz receive with MARS/CAP mod. 45/5W output. 14 multi-function memory channels, 4 scanning modes. LCD display, 16 button DTMF microphone with up/down buttons for frequency and memories. Built-in DTMF encode. 12V DC @ 9.5A 5½"w x 2"h x 6¾"d, 2½ lbs **$329.95**

50 watts!

DR-119T High Power 2M Mobile • **Plenty of output!** 144-148MHz tx, modifiable for 130-174MHz, 335-410 & 800MHz receive. LCD display, built-in CTCSS encode and decode. 14 memories, 4 scan modes, 6 channels spacing steps. DTMF microphone. Easy-to-read LCD 5½" x 2"h x 6¾"d, 2.4 lbs..... **$349.95**

DR-570T 2m/70cm Twin Band Mobile • 2m/440MHz tx. Broadband rx 130-170, 340-470 and 870-890MHz with MARS/CAP modification. 45/5W (2m), 35/5W (70cm). Cross band repeat and full duplex functions, Dual LCD displays, volume, squelch and tuning controls. 20 memories, 4 scan modes, priority. CTCSS encode/decode, Internal duplexer, 16-key DTMF microphone. 5⅞"w x 2"h x 6⅛"d, 3¾ lbs **$549.95**

DR-1200T 2m Data Radio • **Perfect for Packet!** True FM, 25W - fully compatible packet radio functions. 2400 baud rate standard (modifiable to 9600 baud). LCD display. Voice transmission with included microphone. Also Includes DC cord and TNC interface cable. 5½ "w x 2"h x 6¾"d, 2.2 lbs..... **$249.95**

NEW! . . .
Replaces the DR-599T

ALINCO DR-600T 2m/70cm Twin band FM Mobile Remotable. 45W VHF-35W UHF. 144/440MHz tx, 138-174MHz & 420-470MHz rx, mod. for aircraft band rx and MARS/CAP tx. 28 memories. Detachable control head (optional kit). Remote controls from any DTMF capable 2m or 70cm xcvr (decoder required). Separate VHF/UHF outputs. Full duplex cross band repeat function, simultaneous receive on both bands. Dual LCD and separate volume/squelch controls. CTCSS and DTMF encoder. 5⅞"w x 2"h x 7"d, 3¾ lbs **$629.95**

SAVE on these ALINCO CLOSEOUTS

ALINCO DJ-560T/A 2m/70cm Twin Band HT • 144-148/440-449 MHz tx and 130-174/400-520MHz rx. 2.5W; 5W with optional battery. Dial up, keypad or step up-step down frequency entry. Full duplex, 40 memories (20 each band) ; 21 scan modes, autodialer and DTMF encode (16 buttons). With flexible antenna, Ni-Cd battery, AC wall charger, hand strap and belt clip. 6⅛"h x 2¼"w x 1¼"d, 0.82 lbs..... **CLOSEOUT $329.95**

ALINCO DJ-120T 2m HT • Covers 144-148MHz transmit/receive. 2.5W; 6.5W with opt. battery. LCD display, 10 memories, call channel, S-meter, function indicator, battery saver feature, built-in tone encoder. 6½"h x 2⅜"w x 1 3/16"d, 0.97 lbs ..... **CLOSEOUT $199.95**

MasterCard VISA DISCOVER Use your CREDIT CARD AMERICAN EXPRESS

★ Low Prices ★ Large Stocks ★ Fast Service
★ Top Trades ★ Toll Free Ordering Lines
★ **AES® ships to all 50 states**

Over 36 Years in Amateur Radio

HOURS • Monday thru Friday 9-5:30; Saturday 9-3:00

All Prices and Specifications are subject to change without notice.

Wide Coverage
Simple Operation
Low Cost!

NEW! . . .

ALINCO DJ-180T 2m FM HT
Superior receive audio and tough construction. Offering simple intuitive operation. The command keys are laid out so you won't have to spend hours studying the manual. Covers 144-148MHz transmit and 130-174 MHz receive. Power: 2.0W, 5W with optional 12V battery. Illuminated LCD display, 16 digit DTMF pad, 10 memories with upgrades available for 50 or 200. 5.2"h x 2.3"w x 1.3"d **$219.95**

ALINCO DJ-580T 2m/70cm Twin Band HT
A Great Value! 2m/440MHz tx, rx 130-174 and 410-470MHz. Mod.for MARS/CAP tx, + 118-136MHz & 800MHz rx. 40 memories, CTCSS encode/decode, DTMF encode, DSQ. Full duplex cross band repeat, 8 scan modes, autodialer, back-lit keypad. Simultaneous receive on both bands with separate squelch and volume controls. **Super Audio!** 2.5W; 5W w/12V or opt. 6½"h x 2¼"w x 1¼"d, 0.97 lbs .. **$389.95**

ALINCO DJ-162T 2m FM HT • 130-174 MHz rx (modifiable for 118-136MHz aircraft rx and MARS/CAP tx). 2.5W out; 5W with opt. battery or 12V. Keypad, 20 memories, autodialer, CTCSS, DTMF encode, DSQ paging. 5⅜" x 2¼" x 1¼", ¾ lb **$249.95**

ALINCO DJ-162TD 2m FM HT • Same as 162T but no nicad or charger - includes AA battery case..**$229.95**

ALINCO DJ-F1T 2m Mini HT • **Small!** 130-174MHz rx, mod.for 118-136MHz rx and MARS/CAP tx. 8 scan modes, autodialer, back lit keypad, 40 memories, call channel. CTCSS, DTMF encode and DSQ paging. 2.5W; 5W optional. 4 5/16"h x 2⅛"w x 1½"d, 14 oz **$289.95**

DJ-F1T/HP • Same as DJ-1FT but 5W with 12V 600mah nicad battery, standard **$299.95**

Due to space limitations, the Optional Accessories for the products shown in this ad are not listed. For information, call us Toll Free or see the latest AES® Catalog. You may also call . . .

ALINCO Customer Service
Phone (310) 618-8616

Order Toll Free: 1-800-558-0411 *FAX: (414) 358-3337*

AMATEUR ELECTRONIC SUPPLY® Inc.

5710 W. Good Hope Road; Milwaukee, WI 53223 • Phone (414) 358-0333

AES® BRANCH STORES

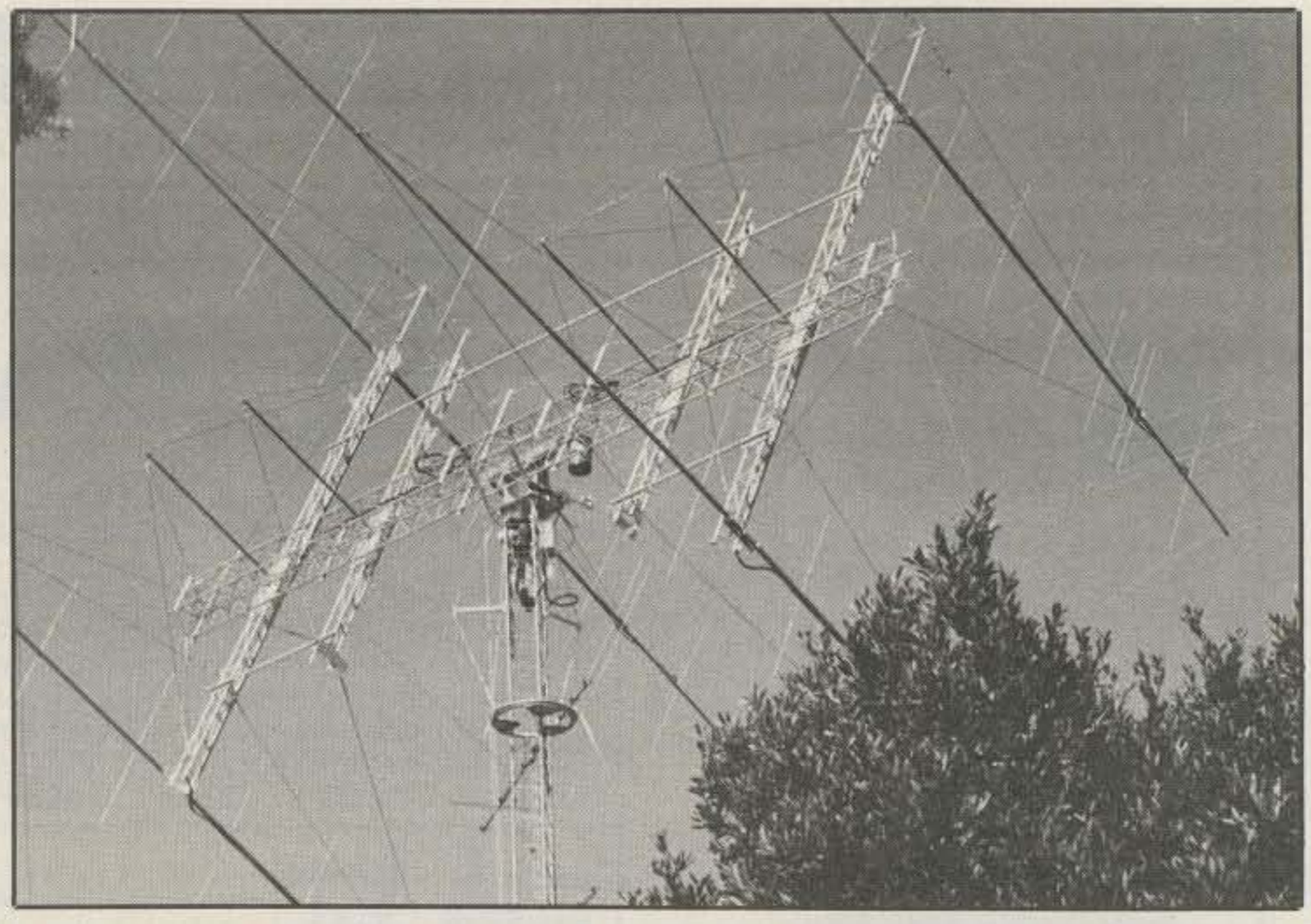
WICKLIFFE, Ohio 44092
28940 Euclid Avenue
Phone (216) 585-7388
1-800-321-3594

ORLANDO, Fla. 32803
621 Commonwealth Ave.
Phone (407) 894-3238
1-800-327-1917

CLEARWATER, Fla. 34625
1898 Drew Street
Phone (813) 461-4267
No Toll Free Line

LAS VEGAS, Nev. 89106
1072 N. Rancho Drive
Phone (702) 647-3114
1-800-634-6227

Watch for Future AES® Branch Store Openings!



Bob Magnani, K6QXY, and Al Ferrera, WA6MXA, engineered, designed, and built this beautiful 6 meter EME array. (Photo courtesy K6QXY)

the band far too long. Exploration of its potential has not happened with the necessity required to make even more new discoveries. To the weak-signal community the FCC NPRM is a two-edged sword. If it passes, then we have the protected spectrum. However, it is up to us to use it and make it work for us.

Joel Paladino, N6AMG, Silent Key

On 6 December 1992 Joel F. Paladino, N6AMG, lost his battle with Hodgkin's Disease and the VHF+ community lost a valuable friend and contributor. Joel got his most enjoyment in amateur radio by being on DXpeditions. He gave many of us new countries on 6 meters terrestrial and 2 meters EME. Joel wrote of his last DXpedition to Morocco and the Azores in an article entitled "VHF DXpeditioning," which was published in April 1992 *DX Magazine*.

Joel was also a brilliant technician. He worked for Motorola for a number of years as a field site engineer before leaving to start his own consulting business. His last technical work, "An Experimental Solid-State Kilowatt Linear Amplifier for 2 to 54 MHz," appeared in September 1992 *QST*.

Joel made many unselfish contributions to the VHF+ community. For example, he loaned almost his entire 6 meter station (including the amplifier described in the *QST* article) to the guys who went to FO0CI, Clipperton, last year. If you worked that DXpedition on 6 meters, you had Joel to thank. Joel also gave unselfishly to others through his labors. In Bob Magnani, K6QXY's photo album showing the progress of his 6 meter EME array is a picture of Bob and Joel on top of the world (on the cross boom of the array).

Joel's last attendance of CSVHF conferences was the 1991 gathering in Cedar Rapids, Iowa. There he presented a paper entitled "A Rapid Deployment Prototype Solid State Kilowatt Linear Amplifier for 2 to 50 MHz Using MRF-154s." (This paper was a precursor to the above *QST* article and was published in the 1991 *Proceedings*). Because of failing health he was unable to attend the 1992 conference in Kerrville, Texas. Nevertheless, thanks in large part to the efforts of Bill Tynan, W3XO, he was honored at the SMIRK (Six Meters International Radio Klub) breakfast Sunday morning by being awarded SMIRK's Award of Merit for Technical Achievement. (Those in attendance at the conference were able to sign a huge banner that expressed good wishes to Joel).

Mike Staal, K6MYC, a long-time friend, remembers Joel as an enthusiastic amateur who enjoyed working contests from Mike's QTH. He also remembers Joel's enthusiasm toward the hobby in general. Bob Magnani, K6QXY, remembers Joel as one who was always ready to give assistance to his fellow ham. He described Joel as a person driven to do things right and thoroughly.

Perhaps Joel's biggest accomplishment was the establishment of an extensive VHF-microwave repeater system that covers most of California. Bob remembers times when Joel would call up from Australia and control aspects of the repeater system over the phone while away on a trip.

My fiancee, Carol King, K5CPZ, and I last saw Joel when we paid him a visit at the hospital following our trip to Jimmy Treybig's barbecue. Joel's strong love for animals was clearly demonstrated when he insisted on meeting Carol's guide dog, Echo, during our hospital visit.

Joel's loss has been felt worldwide by his friends in the VHF+ community. He will be missed by many who knew him and many who benefitted from his contributions. Knowing Joel, though, I think he is trying to plan a DXpedition to some distant part of the universe. We on this planet, though, will miss you very much, Joel.

EME, 6 Meter Style

Bob Magnani, K6QXY. In the December issue I mentioned seeing pictures of Bob Magnani,

Unique Performing Antennas... From SAGANT ANTENNA

Zepp Type Wire Antennas

ZA-21K (15M)
Easy to Install
No Tuner Required
No Radials
Low Angle Pattern for DX
1000W PEP

Zepp type antennas are known for their ease of installation and excellent performance. All of our Zepp's use stranded copper wire that is coated with clear vinyl. Shape of the antenna may be horizontal, sloping, or bent. ZA series come complete with matching transformer, pre-measured wire, insulators, and rope. Just connect your 50 ohm coax cable to the antenna and you're ready to operate.

Model	**ZA-3.5FK**	**ZA-7K**	**ZA-14K**	**ZA-21K**	**ZA-50K**
Band	3.5MHz	7MHz	14MHz	21MHz	50MHz
Length	131'	65'	32'	21'	9'

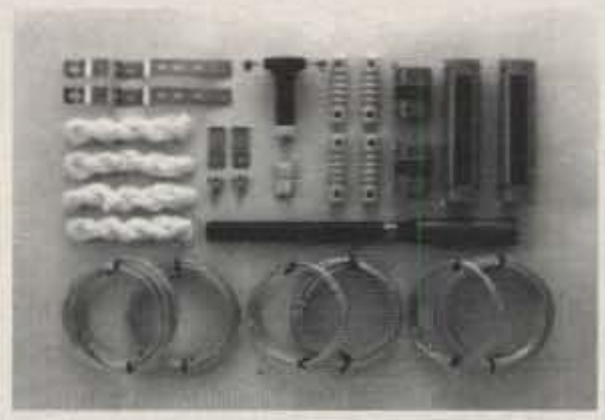
(Power Rating IKW PEP)

ZA-721
7/21 MHz Dual Band Zepp

This popular antenna is only 39 feet long. Highly flexible stranded copper wire is coated with clear vinyl for excellent corrosion resistance. Power is 600W PEP.

Inverted V Wire Antennas

MT-240XK (5 Bands)
3.5-7-14-21-28 MHz
Efficient Loading Coils
Overall Length 72 Feet
1000W PEP



Inverted V wire antennas include our unique offset matching balun support which prevents interaction with the mounting mast. All V's use loading coils which are more efficient and last longer than traps. Wire is 7 stranded, annealed copper, coated with clear vinyl for flexibility and durability.

Model	*Bands*	*Length*
MT-240XK	3.5-7-14-21-28	72'
EL-40XK	3.5-7	85'
EL-140XK	7-21	42'

(Power rating IKW PEP)

AW- 3.5 Antenna Wire

7 Strand Annealed Copper Wire
Coated with Clear Vinyl
Excellent Corrosion Resistance
Flexible
Rugged Enough for Marine Use
30 Meter Rolls (98')

Wt. 2.2 lb.
Outer Dia. .14"
Copper Wire Dia. .09"

FAMOUS *Arrow Line Antenna* SERIES

AL-207F
Base
2M/70CM
Slim Design
Easy to Install
Low Radiation Angle
Power 250W FM
Glass Fiber Mast
Lightweight .77 lbs.
Length 51.1"

AL-144F
Base
2M
Compact
Easy to Install
Low Radiation Angle
Power 250W FM
Glass Fiber Mast
Weight .66 lbs.
Length 43.3"

AL-207FM
Mobile
2M/70CM
High Performance
Low Radiation Angle
Power 250W FM
PL-259 Base
Lightweight 1.2 lbs.
Length 53.1"

AL-144FL
Mobile
2M
Great Performance
Collapsible
Low Radiation Angle
Power 250W FM
PL-259 Base
Lightweight 1.1 lbs.
Length 55.9"

HUMAN POWER STATIONS
Revolutionary hand operated generator. Rotation of the hand crank produces up to 15 watts of power. Never worry about dead batteries with the compact Human Power Stations. Great for portable, emergency, charging, and numerous other applications.

HPS-55

HPS-55X

TA-144VW
2 Meter Mobile
1/2 wave
No Radials
Ceramic Insulator
Large High Q Coil
17-7Ph Stainless Rod
200W FM
PL-259 Base
Weight l0 oz.
Length 39"

CM-144W
HF Mobile
2M/6M/10M/15M
Roof Mount
Glass Fiber Rod
Lightweight 12 oz.
200W PEP
No Tuner Needed
PL-259 Base

Add-on Coils for Other Bands Available

S-600MR
Super wide-band antenna receives on 25-1000 MHz. Transmits on 50/144/430 and 900 MHz.
Weight 1.31 lbs.
Length 4 ft.

MG-DW
Magnet Mount

T-13M
Trunk Lip

Phone Sagant for a Dealer Near You

SAGANT USA

Sagant U.S.A. P.O. Box 14000 Pinedale, CA 93650

Tel. 209-261-1400
Fax. 209-261-0662

K6QXY's well-engineered 6 meter EME array. Within this column you can also see a picture of it. Bob and Al Ferrera, WA6MXA, engineered, designed, and built this beautiful array.

The array is installed on top of 50 feet of Tri-Ex T-20 tower that is rotated at the base by a number 100 chain drive linked to a one-quarter horsepower 1750 RPM reversible motor that is coupled to a 3600:1 gear box. Elevation is accomplished using a 24 inch throw, 1 inch recirculating ball nut, "acme" screw, 28 VDC linear actuator. Elevation readout is performed by using a weighted pendulum on a synchro-generator. The antenna can be elevated from −2 to +90 degrees.

The "H" frame consists of two parallel 40 foot sections of Rohn 45G tower. The vertical towers are Aluma towers with 10 inch faces. The antennas are four specially designed 11-element 2.5-wavelength M2 antennas that are stacked 30 feet apart horizontally and 28 feet apart vertically. The antennas are fed with 1⅝ inch heliax type cable to the tower and ⅞ inch heliax type cable to the relay box. The rotator and elevation loops use RG-213 type cable.

Bob reports that he plans to install four 20-element 6-wavelength 144 MHz Yagis and a receive-only polarization switch box. When installed, this box will enable vertical and horizontal elements to be combined and delayed accordingly to produce vertical (90°), horizontal (0°), 45°, and 135° polarization.

To date Bob has worked OH2BC, W5FF, K5FF, and W7HAH, and had partial contacts with WA4NJP and KN5S.

Fred and Lee Fish, W5FF and K5FF. The Fishes have built a 6 meter array on a much smaller scale. Their array consists of four 7-element antennas on 24 foot booms. These antennas are similar to the ones Bob Sanders, WW4T, is using on Maude (see last February's column for more information on his array). He feeds the array with ⅞ inch heliax-type cable and uses RG-214 type coax for the feed lines between the antennas.

Fred reports that in spite of the lack of size, during good conditions he can hear his own echoes, even with the antenna pointed straight up. To date he reports working OH2BC, W7HAH, K6QXY, W6JKV, K6MYC, and WA4NJP. Lee has worked OH2BC, K6QXY, and WA4NJP.

Bob and Fred represent a growing number of amateurs interested in 6 meter EME. With the sunspot cycle making its inevitable slide, F2 propagation is becoming increasingly scarce. The serious DXer feels that the only way to work more countries on this band is via the moon.

Is getting on the moon that difficult? Not as hard as one might imagine. It is necessary to have a linear capable of running nearly 1 kw. The minimum antenna would be one that has around 16 dBi gain. Shep Shepard, W7HAH, uses just such a setup, running 1 kw into an M2 2.5-wavelength 11-element beam (the same antenna Bob uses, only a stock version).

Mike Staal, K6MYC, who, through his antenna building expertise and companies, has probably built more antennas that are being used on the moon than anyone else in the world, makes some comparisons between 6 and 2 meters. He reports that ground gain is better because broken terrain has less effect on this band. He says that libation fading is less of a factor on this band and that even though sky noise is more, the path loss is less.

Ray Rector, WA4NJP, who has more contacts than anyone else (40 QSOs, 18 initials, 4 continents, and the only North American to work FG/W6JKV during Jimmy's stay) reports that it requires a bit of patience to complete a contact. He says that for him the sky noise is very hard to contend with. He made a comparison between the sky noise on this band and 70 cm. He says that he can connect a dummy load to his radio, and the noise from the dummy load is nothing compared with the sky noise on 6 meters. By contrast, the same dummy load is noisier than the sky noise on 70 cm. Presently, Ray is using four 36 foot long W1JR designed Yagis mounted 80 feet high. He says that he is building an array that will consist of nine of these antennas. It will be ground mounted and used to complete his (and hopefully the first) WAC on 6 meters "off the moon." Ray reports that many Europeans, using only 6-element beams, have heard him.

As a way of encouragement to the DXer, Bob suggests that DX stations could also consider building arrays that would be fixed at a position in the sky. Operators who want to work these stations would set skeds that would occur during their common window. Bob suggests that several of the bigger stations that are well-equipped are already capable of operating "on the moon," albeit on their horizon.

Bob and the other operators who are actively on the moon on this band are hoping that others will also take the challenge. To that extent several stations are planning a day early this year that they will be transmitting, hoping to be heard by DX stations. Announcements of the exact date will be made on the EME net, and hopefully operators who have heard these stations will send SWL reports to them. Incidentally, if you are looking to set up a sked with Bob, you can contact him at 707-538-3801, or FAX 707-538-1343.

Another Big Gun On The Moon

After about a nine-year absence, Gerald Williamson, K5GW, has returned to 2 meters EME. Gerald, not known for doing anything halfway, has built a 480-element array. It consists of 48 ten-element 2.5-wavelength boom Yagis that are stacked six high and eight wide. The array produces an incredible 29 dBi of gain. The antennas were designed using the K4VX YAGIMAX 3.23 software, and an individual antenna was range tested to verify the accuracy of the computer program. The 52 by 75 foot antenna array is fed with 575 feet of ⅞ inch heliax type of hardline and over 650 feet of RG-213 type of coax. The tower folds over at the base for ease of maintenance, although once down it requires the assistance of a John Deer tractor to raise it back up.

The array is completely computer controlled, using software that Gerald designed and an industrial A/D converter board that converts the data streams to the necessary 28 volts.

During the first weekend of the operation Gerald kept blowing preamps because of a switching problem. Therefore, his 135 QSOs with 35 multipliers were made using the IC-275 without a preamp. During the second weekend a power divider opened up, thereby shutting down half of the array. Nevertheless, Gerald was able to complete an additional 75 QSOs with an additional 16 multipliers.

Gerald, who owns Texas Towers, reported that because of all the aluminum he used in constructing the array, he has, by default, gone into the aluminum tubing business (have you seen

one of their ads lately? Excellent prices!).

If you are looking for a sked with Gerald, you can reach him "at the office" at Texas Towers (214-422-7306) almost any week day.

VE3ONT Loses Power Just Before Contest

What was hoped to be the biggest signal on the band during the second weekend of the EME contest turned out to be the biggest disappointment for all concerned.

Mike Owen, W9IP, reported that in anticipation of the big event, the team traveled to Pembrook on Thursday, where they spent the night. During the night a violent snow storm came up and resulting winds in excess of 60 mph buffeted the area. The next day they made it to the site, having to use four-wheel drive to get around all the downed trees. Upon arrival they discovered that not only trees were down, but power lines some distance from the site were also down, causing loss of power to the site. The only power available was from a generator that provided enough power to keep warm and test the equipment (during their tests they did hear signals, presumably from one of the side lobes of the dish). During the day the optimistic hams went ahead with the equipment installation. In the wind and blowing snow, Mike, his guardian angel, and other members of the team (and presumably their guardian angels, too) braved trips up the 90 foot extension of the cherry picker to install the equipment in the feedpoint room (well, it is almost as big as a room).

The next day they talked to the power company representative and were told that power would not be restored before Sunday night. Painfully disappointed, they spent the better part of the day taking the equipment back down and packing up for the trip.

While discouraged, they were given assurances that they could return another day. Mike states that they intend to be back sometime this spring and that they will mount a three-band effort (144, 432, and 1296 MHz) during this year's ARRL EME contest.

More EME Reports

Chuck Smallhouse, WA6MGZ. Chuck reports that he worked 154 stations with 50 multipliers. Among his totals were 4 new countries and 43 initials, raising his totals to 69 countries and 451 initials. He observed that the conditions were up and down. He said that they may have been better than usual. However, for one period lasting six hours he had no echoes. Additionally, he lost AC power for 4 hours. Chuck runs the maximum power into eight 28 foot 15-element homebrew antennas that are optimized using the DL6WU computer program. Chuck reports that he worked Terry, N6CW, while Terry was at KP2A during the contest. He again worked Terry as VP2ECW after the contest.

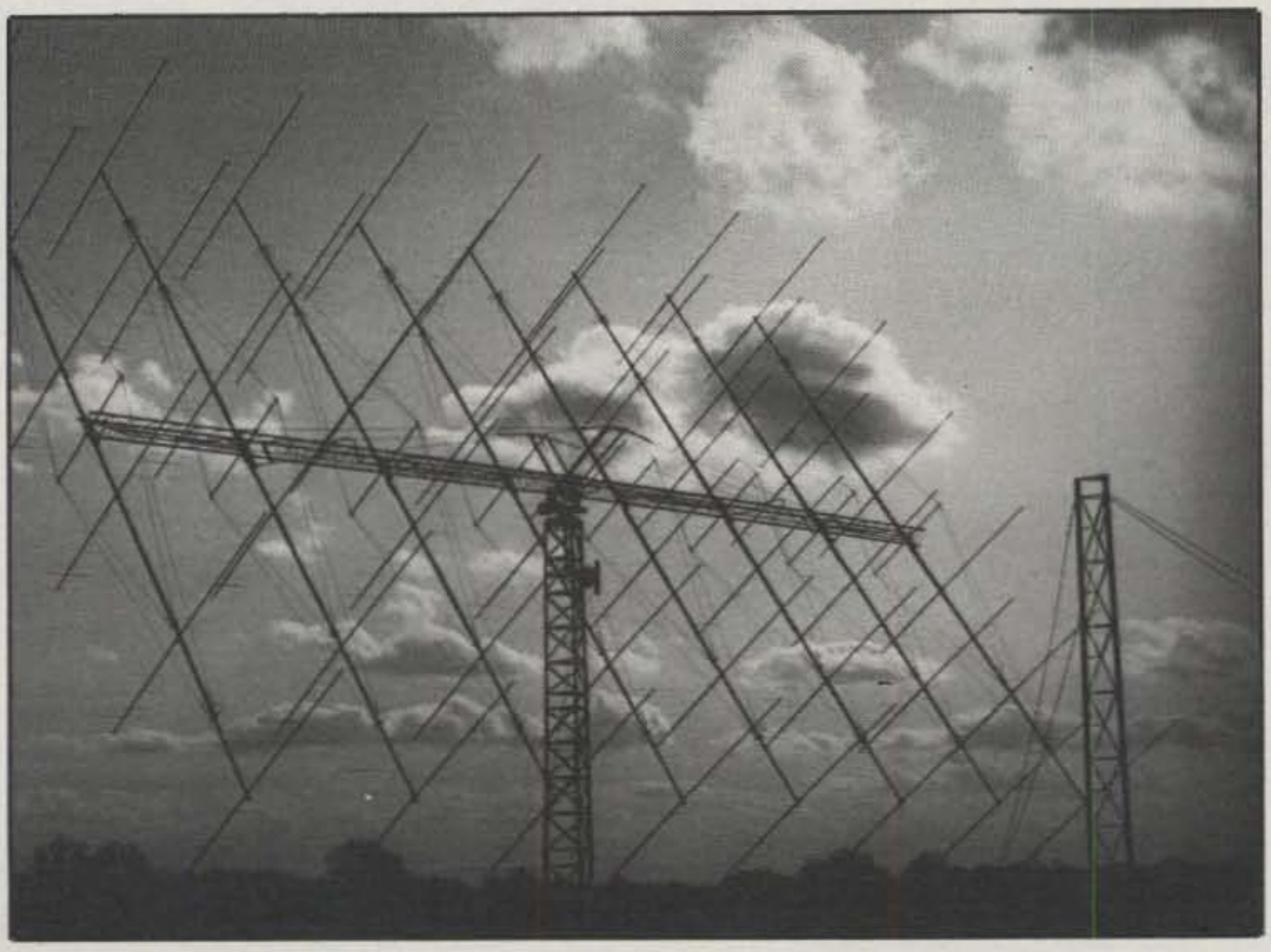
Gary Crabtree, KB8RQ. Gary reported that he worked 237 stations, 56 multipliers. Gary was surprised to work Terry, N6CW, operating at KP2A, for another new country. Gary now proudly displays his DXCC number two for 2 meters. He states that it took him eleven years to work the required number of countries. His first contact was with Lionel Edwards, VE7BQH.

Lionel Edwards, VE7BQH. Speaking of Lionel, he worked 140 stations during the contest with approximately ten initial contacts.

Tobbe Kihlgren, SM5FRH. Tobbe reported 254 contacts with 56 multipliers.

Terry Baxter, N6CW. During the second weekend Terry was at John Ackley, KP2A's QTH. While there he used John's station to make eight contacts during the contest and an additional ten contacts after the weekend.

Joel Harrison, WB5IGF. Joel, operating on 2 meters, worked 46 stations, with 24 multipliers. Among his initials were JL1ZCG, HG1W, LAØBY, RB5PA, and LZ2US. He reports that both weekends were very good for him, with the exception



Gerald Williamson, K5GW, has returned to 2 meters EME in a big way with this 480-element array. Look for him on your moon rise (or set) around 144.009 MHz. (Photo courtesy WA5VJB)

ICOM's *new* IC-737 desired features at a

Bright and large LCD shows modes, receive and transmit frequencies.

Push ANT to select antenna (two antenna connections available).

Push FULL to activate full break-in (QSK) function.

Push TUNE/TUNER to instantly activate the internal 160-10m automatic antenna tuner and match your rig to the selected antenna.

Push ATT or PRE AMP to reduce interference or improve weak signal reception.

Push COMP to activate the built-in speech compressor increasing average talk power.

Push NB to reduce pulse type noise interference.

DDS (Direct Digital Synthesis) provides crystal clear reception and transmission.

Adjust KEY SPEED to vary the speed of the internal electronic keyer.

Press SSB, CW/N, AM, or FM to select desired operating mode.

Press MP-R to recall memo pad memories for immediate use.

With features like these, no wonder ham

Now that we've pushed all *your* buttons, push ours.
To get more information about the IC-737, or any ICOM product, contact your dealer or call our I-COM LINE

gives you the most most desirable price.

Hold SPLIT down for one second to start the split mode function and initiate QUICK SPLIT feature, equalizing both VFOs to the same frequency.

Rotate MEMORY CHANNEL SELECTOR to select a channel from 101 available memories (memories store frequency, mode, antenna selection and tuner on/off condition).

Adjust PBT to reduce interference.

Push RIT and/or ΔTX to change the transmit or receive frequency +/- 2.5 KHz or +/- 1.25 KHz (selectable).

Press NOTCH and adjust to eliminate annoying beat signals.

Press MP-W to automatically write the present operating frequency and mode to memo pad memory.

Using the KEYPAD, select a desired band or directly enter frequencies.

Retain your last selected frequency and modes with DBSR (double band stacking registers — two frequencies per band), use one for the CW end of the band and one for SSB.

are raving about ICOM's *new* IC-737!

1-800-999-9877

ICOM America, Inc. 2380 – 116th Ave NE,
Bellevue, WA 98004
Customer Service Hotline (206) 454-8155

ICOM
Experience the Quality.

of Friday night of the second weekend. Joel is using 1.5 kw into four Cushcraft 17B2s. Incidentally, Joel has WAS number 123 (for 2 meters) now hanging on the wall.

Tommy Henderson, WD5AGO. Tommy operated on 2 meters and 70 and 23 cm during both weekends. Tommy uses a 16 foot home-built dish on 70 and 23 cm. He used a 4 by 13 element array on 2 meters, which he has since sold to K5ZXE. He made a total of 98 contacts and 55 multipliers. Among the other operators present during the weekends were Gary Gerber, KB0HH; Carol King, K5CPZ; John Locke, KF0M; and your editor. During a good period on 1296 MHz, Tommy sat Carol down at the station. Carol then made her first EME contact (or, for that matter, her first ever contact on that band) by working F1AQC. While this contact of Carol's represented a contest QSO for Tommy, it was also a new initial on that band for him.

Unfortunately, Murphy was also present at the station. A coax connector on the 2 meter array blew up and a diode chain in the power supply for the 1296 MHz linear also blew up. Even though there were problems, the fun and fellowship made up for the disappointments caused by the difficulties. Incidentally, Tommy is now running a beacon at 1296.193 MHz. It is a 1 watt transmitter fed into a coffee-can antenna pointed east.

Steve Powlishen, K1FO. Murphy also visited Steve the second weekend in a rather peculiar way. After falling asleep at 12:30 AM local time, Steve was awakened by the sound of his door bell ringing. When he finally made it to the front door, he found no one. However, left in their wake on his porch was a Comodore 64 computer, complete with joy sticks.

After puzzling over this event, Steve went back to bed, only to be awakened again at 4:30 AM, this time by the sound of the phone ringing. Now realizing that he had forgotten to unplug it, he got up and disconnected the phone in the bedroom. In his dazed state he forgot to unplug the other phones. Sure enough, the phone rang again at 5:00 AM, this time the one down the hall. Steve did not get up. Obligingly, the phone rang again at 5:30 and again at 6:00, each time three rings. Finally, he got up and disconnected every phone in the house.

Now it was the cat's turn. The cat, being used to a feeding time of 6:30 AM, was not to be denied. One who has ever had a pet cat can know the persistency of its howl and scratching. The battle was won by the cat and the sleep was lost by Steve. In spite of the predicaments, Steve did manage to work 153 stations with 36 multipliers, including fellow Oklahoman, Larry Hazelwood, W5NZS.

Allen Katz, K2UYH. Al also was visited by Murphy, when for the first time in over 20 years he was struck by lightning a week before the contest. Allen reports that most of the damage was done to his 10 GHz equipment and the digital readouts for the dish.

Murphy was not through. Al goes on to report that about an hour after the end of the first night's activities a transformer in the dish control caught fire, starting a small secondary fire. Fortunately, his fire alarm system went off, enabling him to extinguish the fire before much damage was done. Then, near the end of the contest his 1296 MHz brick blew up. Nevertheless, he was able to put in a respectable score of 148 contacts and 51 multipliers between 70 and 23 cm.

Tim Marek, NC7K. Tim made his first contact on the moon when he worked Dave, W5UN, during the second weekend. Tim is using a 170 watt amplifier. He is using pressurized ⅞ inch heliax type cable to feed a single M2 2M5WL.

Emil Pocock, W3EP. Emil also worked his first contacts on the moon: W5UN, K5GW, and KB8RQ.

Herman Cone, WB4DBB. Herman also reported his first contact on the moon, also with Dave, W5UN.

Mike Abbot, KM4ID. Mike also made his first contacts on the moon. His was with Gary, KB8RQ.

Other Rumored Scores. Thanks to Paul Kelley, N1BUG, your editor has a few of the rumored scores for 2 meters. The results following the callsign are the total QSOs followed by the number of multipliers. W5UN/332/55; SM5FRH/254/56; KB8RQ/234/56; DL8DAT/224/53; SM7BAE/156/54; LA8YB/156/44; WA6MGZ/151/48; AF9Y/132/40; SM5MIX/131/44 (a four Yagi station); LZ2US/115/36; DL5MAE/113; SM2CEW/107/42; F1JTA/100/38; N1BUG/98/36 (for only one half of the contest); OE5JFL/98/37; F1GHP/98; F6IRF/94/38; SM2CKR/78/33; N8AM/72/33; RA6HHT/66/31; VE1BVL/63/32; G4SWX/63/32; GM4YXI/49/26 (running only four 9-element Yagis and 600 watts); W7VXW/43/23; SM4RNA/43; EA2AVY/42; DK9ZY/40/22; UA9FAD/38/23; PA0JMV/38/24 (two Yagi); EA3DXU/36/22 (a two Yagi station); DK1KO

/35/22; DJ9CZ/33/20; VE6TA/33/22; RB5AO/31/17; WD5AGO/31; PA2CHR/28/17; RB5PA/26/17; G3IMV/25; EA6VQ/25/17; K9BCT/23/15; PAØCIS/21/14; K2LME/20/15; DL7AKA/18/12; EA3ADW/17; RB5AL/17/9 (a one Yagi station and only 500 watts); VE1KG/12/8; and KP2A/8/5 (Terry Baxter, N6CW, the operator used a Henry 2002 linear and the M2 54 foot boom antenna).

Thanks to Allen Katz, K2UYH, your editor has a few of the rumored scores for the microwave bands: SM4IVE/174/38; DL9KR/163/38; K1FO/153/36; OH2PO/150/34; OE5JFL/98/37 (on 2 meters), 141/36 (on 70 cm), 48/25 (on 23 cm), for a total of 287/98; K4QIF/105/31 (on 70 cm), 13/8 (on 23 cm); K2UYH/107/29 (on 70 cm) and 41/22 (on 23 cm); N2IQU/83/27 (on 70 cm) and 30/15 (on 23 cm); KØRZ/82/30; F1ELL/80/31 (on 70 cm) and 35/18 (on 23 cm); UT5DL/73/29; SM2CEW/66/26 (on 70 cm) and 30/15 (on 23 cm); DL9NDD/65/28; DL3BWW/50/20; OE9ERC/49/24 (on 23 cm); and OE9XXI/49/23 (on 23 cm).

Roger Webb, WB4WTC. During the contest Roger made 68 contacts with 29 multipliers. He topped off the second weekend by receiving a call from ZL1BVU for a new country. Roger is using eight 17-element M2 2.5-wavelength antennas and one kilowatt. He is looking for EME skeds and meteor skeds to be able to complete his WAS. He is in North Carolina (EM95) and his phone number is 704-827-6246.

Manford Kubat, DL8DAT. Manford now has the cards for DXCC. He has worked (as of this writing) 101 countries. It is rumored that a couple of SM stations are also very close to the magic number, with a number of others, including Lionel, VE7BQH, over 90 countries. The ARRL DX desk better be prepared for the inrush in the next 12 to 18 months.

EME and other VHF Nets. Both the microwave and the 2 meter EME nets are on Saturday on 14.345 MHz. The microwave EME net begins following the relinquishing of the frequency by the Veterinarian Net, somewhere around 1500–1600 UTC. The 2 meter EME net begins right after the end of the microwave net, somewhere around 1715–1730 UTC. There is also a Russian language net that meets on 7.095 MHz on Saturday and Sunday at 1200 UTC. The midwest VHF net meets on 3.843 MHz at 0200 UTC Tuesdays (Monday nights). Check-ins from the west coast are recognized around 0400 UTC. An informal net from the west coast meets every night on 3.818 MHz around 0300–0400 UTC. A Maritime VHF net meets at 0100 UTC Thursdays (Wednesday nights) on 3.765 MHz.

Dave Meier, N4MW. Dave was among the hopefuls who were looking for VE3ONT. The first night of the second weekend he was in Monroe, Louisiana. With the help of Charlie Chennault, WA5YOU, and another local amateur he set up a single Cushcraft 424B on a camera tripod. He used an ICOM 475H and an ICOM mast-mounted preamp. Both the antenna and rig were loaned to him by N4HKS. He heard signals from six different stations, including DL9KR calling CQ. On the second night he was back home in his backyard. There he heard SM4IVE. He tried to get a QRZ from Lars, but with no luck. Even though Dave made no contacts, he did feel his efforts were a success. He says that he will be looking again for VE3ONT.

EME Conditions. Excellent EME conditions are predicted for the weekend of 6–7 February. The moon will be close to perigee and in a quieter portion of the sky. Use the above-mentioned nets to set up schedules. Remember, even if you are a "low power" station, there are plenty of operators willing to help you get your feet wet.

Some 6 Meter Notes

ZP6CW Now QRT, ZP5AA (Maybe) QRV. Doug Woolley, ex-ZP6CW, is now back in the U.S. after working 103 countries on 6 meters. He reports that he left his equipment behind for use by the Radio Club of Paraguay. Hopefully, ZP5AA will take up the slack left by Doug's absence. It is anticipated that the ZP5AA beacon on 50.025 MHz will remain active. If you still need a QSL card for his operations, you may send to Doug Woolley, N4PW, P.O. Box 688, Culpeper, VA 22702.

Frank Brooker, 9Y4VU. Frank now has an IC 551D and is active on SSB. He had a brief opening into the states, working around eight stations in the midwest on 24 November. QSL Frank direct or via his manager, W3EVW.

Jim Langdon, J37AE. On the same day that Frank had his brief opening, Jim also worked over 60 stations in the U.S. Jim will be on Grenada until April, when he will once again return to Arkansas. QSL Jim direct via his *Callbook* address.

Terry Baxter, N6CW. During Terry's stay on Anguilla he signed the callsign VP2ECW. Between 23–24 November Terry worked over 60 stations in North America. Additionally, Terry worked five stations on 2 meters EME. QSL via his home call.

OD5SIX Beacon on the Air. According to Ted Collins, G4UPS, the OD5SIX beacon went on the air in early December. It is located in Tripoli (KM75), runs 10 watts, and transmits on 50.078 MHz into an omni-directional antenna. Additionally, a 150 watt brick has been donated to Samir, OD5SK, thereby boosting his signal.

TU2VHF Beacon on the Air. Again, according to Ted, the TU2VHF beacon is now on from the Ivory Coast. The beacon operates on 50.094 MHz and its grid locator is EJ76am.

Antarctica on the Air. VKØAQ, operating from Casey Basin, came on the air on 28 November for one year. They are using an IC-505 and a 3-element beam. QSL via VK3OT.

Other DX stations Activated. VQ9QM is back on the air. UL7GCC is active. XUØDX may be active by the time this is published.

6 Meter Propagation. While F2 propagation was scarce in the states, I have received reports from other parts of the world. On 1 November, between 0830 and 0910 UTC, VK6PA worked 9H1BT, 9H5ET, 9H1PA, 9H1ET, and 9H1AZ. Also, on 1 November PY5CC worked FG/W6JKV. On 5 November PY5CC worked BV2DP. On 6 November JA1VOK worked KH6IAA. On 7 November JA1VOK worked VK9NS. On 11 November VK3OT worked PE1JKW. On 15 November JA1VOK worked 9M6HF. On 21 November JA1VOK worked ZL2KT and ZL2TPY and heard four other ZLs. On 23 November JA1VOK worked T30JH and heard four ZLs and the ZL2MHF beacon. Hatsuo has now worked 135 countries.

Meanwhile, here in the U.S. sporadic-E was the mode of propagation. Tom Moore, K5ZXE, reported sporadic-E openings on 22, 23, 24, 27, 29, and 30 November. That one on 30 November was a big one, with double hop reported by many in the bay area of California and the mid-Atlantic to Florida portion of the east coast. Among the participants were KM4ID, KD4S, WB5KYK, WA5UUD, WB7REL, W7RV, N9MSS, W7/DL1UF (who was put out on packet without the W7/), NØJRN, WØJRP, WAØX, N4MW, KØRI, N5UYI, KF5IU, WW7B, K5HC, KB5DRD, N5WJB, N4TWX, KQ4CG, KD4BWQ, KC4YO,

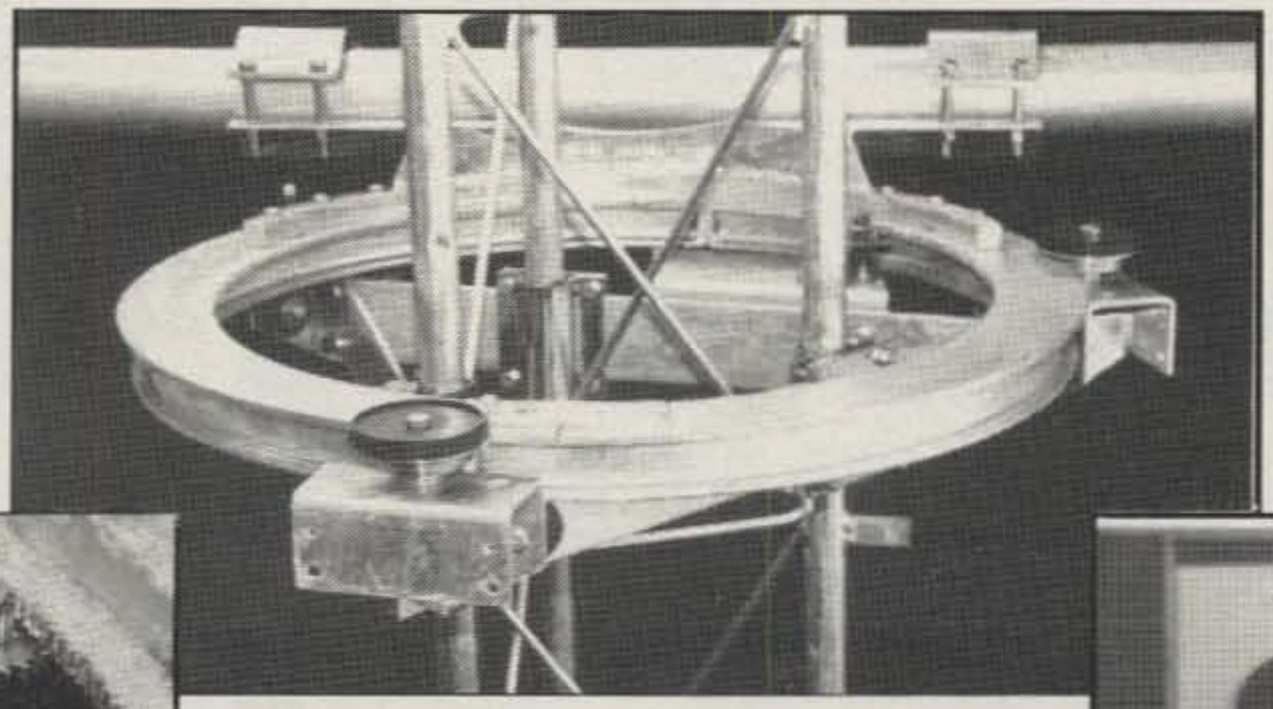
NEW PRODUCT ANNOUNCEMENT

TIC RING
RINGROTOR

DESIGNED FOR HAM RADIO

TIC RING MODEL 1022

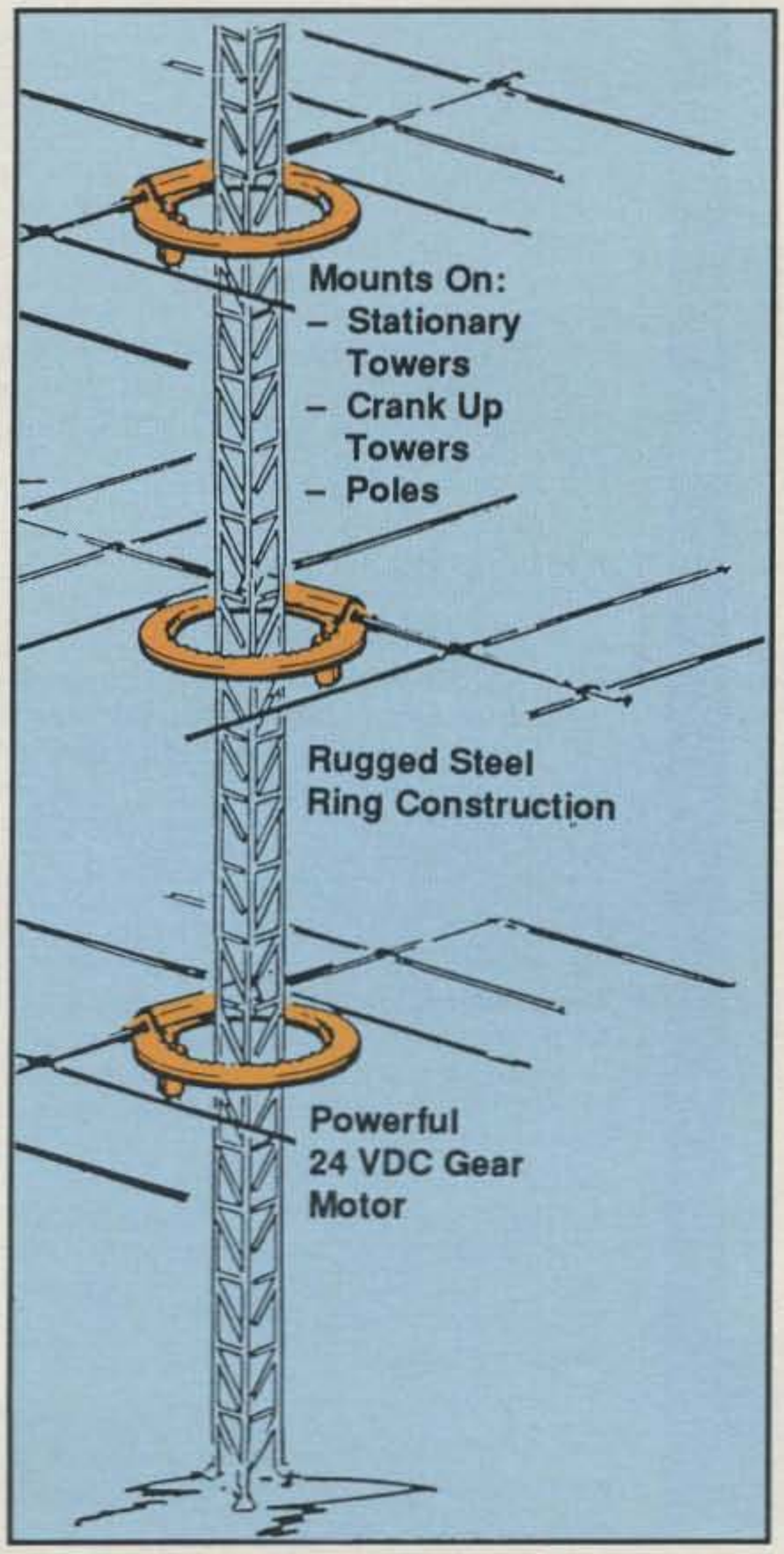
Multiple rotating antennas on a single tower – now possible with the powerful TIC Ring!



Great for phased arrays or individual rotation!
YOUR CHOICE!

Steel Gears

New preset analog controller



Contesters, DX'ers and all Ham Radio operators. Rotate your HF, VHF and UHF antennas at any safe mounting location on your tower! (360° Rotation)

- ★ Up to 18 1/2" Tower Face.
- ★ New Preset Controller.
- ★ Optional Top Mast Adapter.
- ★ Optional Truss Assembly.

TIC Ring Model 1022
(Incl. Controller)

$649.00
(Plus Shipping and Handling)

ORDER YOUR TIC RING NOW!
FACTORY DIRECT PRICING
(OPTIONS ARE EXTRA)

TO ORDER OR FOR MORE INFORMATION CALL TODD AT

1-800-TIC-RING

(Toll Free U.S.A.)

TIC General, Inc.

P. O. Box 1, 302 Third Street East
Thief River Falls, MN 56701
1-800-842-7464 or (218) 681-1119; Fax: (218) 681-8509

Mfg. under PRI U.S. and foreign patents present and/or pending.
Stated prices are in U.S. currency. Price and specifications are subject to change without notice.

CIRCLE 161 ON READER SERVICE CARD

KG6I, KC4RDP, W5FF, KF7NP, WA6BYA, AJ6T, NC7K, WB9GKA, N6RMJ, WA8WZG, WB4JEM, W6EMD, and N8DEF, all of this activity taking place between 0300 and 0500 UTC, with some beacons still being reported as being received as late as 0530 UTC at NC7K's QTH. Yet another report of sporadic-E came to your editor's attention, this one occurring on 8 December around 1700 UTC. Among the participants in this one were W5FF, KC4UVM, WA5UUD, and N6RMJ.

Some Microwave Reports

Dave Meier, N4MW. Dave reports receiving VUCC #32 for 3456 MHz. He says that he has Al Ward, WB5LUA, to thank for motivating him. His first contact was with Al parked across the street. His second contact was again with Al, this time 420 miles away at his home. He then assembled a rover station and talked John Coons, KC4BQX, into operating it. John gave both Dave and his wife, Joyce, N4ZRW, a contact from EM45. Jim Butler, KB4LJV, operating from the 135 foot tall Dover Elevator test tower EM44 gave Dave another grid and the first Tennessee to Mississippi 3456 QSO. Finally, WI3B gave Dave a contact from EM54 to complete the required five QSOs.

Dave also reports that he purchased two 5760 MHz no-tune boards at the Microwave Update conference. He is using one to drive his TWT to 5 watts. He reports that Paul Wilson, W4HHK, has located a source for 6.5 GHz elliptical waveguide. He says that it is made by Cablewave Systems and is marked 16733-810261-WE65-260. He wants to know if it is usable on 5760 MHz. Finally, he reports that N4HKS, WAØWQI, and he are on 23 cm ATV. He hopes to use it to support public-service events and to spur others to be interested in ATV on this band.

Dave Felgar, NJ7A. Dave reports on the activities from Utah. He says that 10 GHz activity is being revitalized. He reports that Paul Larson, WA7PXD (DN30), and Clint Turner, KA7OEI (DN40), worked each other over a 65 mile path last June using Gunn oscillators and feeding 2 foot dishes. Dave also reports that Buzz Miklos, WA4GPM (DN40), completed a 1296 MHz contact with Jeff Bishop, W7ID (DN13), at 1447 UTC on 21 November. He says that Buzz is running 200 watts into four 31-element loopers and Jeff is running 75 watts into two 45-element loopers. Dave goes on to report that Utah is represented on all bands from 50 MHz to 10 GHz, with the exception of 222 MHz. The grid squares covered are DN30, DN31, DN40, DN41, DM38, and DM49. Dave does work meteors. So if you need Utah, or DN30, give Dave a call at 801-966-0150.

Results 1992 SMIRK Contest

Thanks to Ray Clark, K5ZMS, the following are the results of the 1992 SMIRK contest. Ray reports that he received 13 logs. However, he noted that there were approximately 322 participants, of which 137 were SMIRK members. The top score was WØKEA with 25,192 points. Second place was W5OZI with 5,292 points. The section leaders were as follows: Arizona, WB7OHF, 384; Colorado, WØKEA, 25,192; Florida, KC4SUS, 128; Kansas, NØLL, 3,330; Eastern Massachusetts, K1DAT, 288; Nebraska, KØUS, 1170; Ohio, N8AXA, 756; South Texas, W5OZI, 5292; Utah, WB7QBC, 2960; Maritime (New Brunswick) VE1SLM, 396; and British Columbia, VE7FEI, 3120.

KH1 To Be Activated

A group to include Arie, PA3DUU, will activate KH1 on all bands from late January to early February. Arie plans to man the VHF/satellite station. Look for liaison activities on 28.885 MHz.

And Finally

January. The dates listed in last month's column for the ARRL VHF Sweepstakes are incorrect. The correct dates are 23–25 January. Spurred on in part by some rivalry between the Rochester VHF Group and the North Texas Microwave Society, which was evident at the Microwave Update conference, the NTMS is planning an all-out assault on the records. It is not certain where this rivalry got its beginning. However, sources close to your editor say it has something to do with Dave Hallidy, KD5RO, a few years back, switching his loyalty from NTMS to RVHFG. Watch out, Dave.

I want to thank the RVHFG, the Packrats, K2UYH, WB4WTC, G4UPS, W3EP, and G8ROU for input to this column.

73, Joe, N6CL

JRC NRD-535D

"Best Communications Receiver"
World Radio TV Handbook 1992

Special Offer!
FREE ST-3 HEADPHONES
With purchase of NRD-535D receiver from participating JRC dealers!
A $77 value. Offer valid through 3/31/93

"Unsurpassed DX Performance"
Passport to World Band Radio 1992

Setting the industry standard once again for shortwave receivers, the NRD-535D is the most advanced HF communications receiver ever designed for the serious DXer and shortwave listener. Its unparalleled performance in all modes makes it the ultimate receiver for diversified monitoring applications.

Designed for DXers by DXers! The NRD-535D (shown above with optional NVA-319 speaker) strikes the perfect balance between form and function with its professional-grade design and critically acclaimed ergonomics. The NRD-535D is the recipient of the prestigious World Radio TV Handbook Industry Award for "Best Communications Receiver."

- Phase-lock ECSS system for selectable-sideband AM reception.
- Maximum IF bandwidth flexibility! The Variable Bandwidth Control (BWC) adjusts the wide and intermediate IF filter bandwidths from 5.5 to 2.0 kHz and 2.0 to 0.5 kHz—continuously.
- Stock fixed-width IF filters include a 5.5 kHz (wide), a 2.0 kHz (intermediate), and a 1.0 kHz (narrow). Optional JRC filters include 2.4 kHz, 300 Hz, and 500 Hz crystal type.
- All mode 100 kHz – 30 MHz coverage. Tuning accuracy to 1 Hz, using JRC's advanced Direct Digital Synthesis (DDS) PLL system and a high-precision magnetic rotary encoder. The tuning is so smooth you will swear it's analog! An optional high-stability crystal oscillator kit is also available for ±0.5 ppm stability.
- A superior front-end variable double tuning circuit is continuously controlled by the CPU to vary with the receive frequency automatically. The result: Outstanding 106 dB Dynamic Range and +20 dBm Third-Order Intercept Point.
- Memory capacity of 200 channels, each storing frequency, mode, filter, AGC and ATT settings. Scan and sweep functions built in. All memory channels are tunable, making "MEM to VFO" switching unnecessary.
- A state-of-the-art RS-232C computer interface is built into every NRD-535D receiver.
- Fully modular design, featuring plug-in circuit boards and high-quality surface-mount components. No other manufacturer can offer such professional-quality design and construction at so affordable a price.

JRC *Japan Radio Co., Ltd.*

Japan Radio Company, Ltd., New York Branch Office – 430 Park Avenue (2nd Floor), New York, NY 10022, USA Tel: (212) 355-1180 / Fax: (212) 319-5227

Japan Radio Company, Ltd. – Akasaka Twin Tower (Main), 17-22, Akasaka 2-chome, Minato-ku, Tokyo 107, JAPAN Tel: (03) 3584-8836 / Fax: (03) 3584-8878

CIRCLE 78 ON READER SERVICE CARD

AWARDS

BY DOROTHY JOHNSON, WB9RCY

NEWS OF CERTIFICATE AND AWARD COLLECTING

The Story of the Month for February is:

James J. Curtis, N8HAM
USA-CA All Counties #682
All SSB Mobile, 11-6-90

"My interest in radio probably started about 1958 while watching my father put together an EICO kit for the then emerging CB radio hobby. When I started the extensive traveling that I do, this interest in radio reawakened, but I soon became disillusioned with CB and dropped that altogether.

"In 1980 I took initial steps to become licensed in amateur radio, figuring that this was a better method of radio communication. Not knowing any other amateurs at the time, and having some difficulty with the code, I let this effort lapse. In 1985 I again took up the crusade and received my license in December of that year.

In the intervening time I met only one other amateur, and that was just a few days before I took my test. Terry, KA8UZD, turned out to be a member of my softball team and invited me into his shack. This redoubled my desire to pass the test.

"I started out only on 2 meters, working parades, marathons, and other public-service events. After a short while I bought the HF gear that I presently have.

"The day I built my shack and installed my antenna was the day that I found 14.336 MHz—October 9, 1987, with a contact with K5KZL. My initial reaction was that I had found a good place to work all states, but this soon expanded into working all counties.

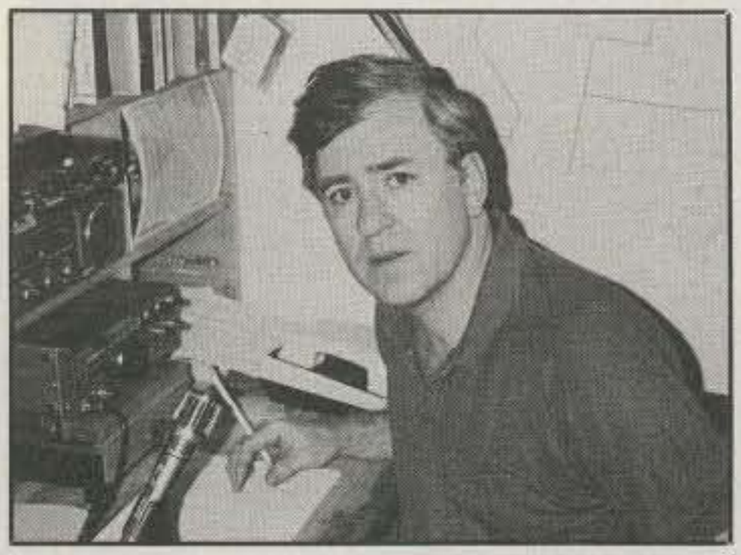
"With the amount of traveling I do, it soon became apparent that working all counties would be a lot easier if I could work mobile and have the pleasure of putting out the counties at the same time. I started going mobile about five months later. I have enjoyed putting out the counties, even putting together a mobile station to take with me on airplanes and to be installed in rental cars.

"The people I have met either on the radio or in person at conventions, at Dayton, or in eyeball QSOs have been very enjoyable and have become good friends.

"I want to thank all the other mobile stations and net control operators who have assisted me in finishing and in qualifying for USA-CA All Counties #682. I worked the last county just about three years to the day after I started when I worked George, KD8HA, in Crawford County, Ohio. Along the way, my family put up with quite a bit when I wouldn't answer the dinner call because I wanted to work one more mobile, or stayed up late because someone was going to be in a county I needed.

"I do plan to continue working the counties and hope to be able to put out all of Michigan, Ohio, and Indiana soon.

"To those of you who haven't asked but have thought about it, the call was just the luck of the draw, and I do plan to take it to the grave with me!—73, Jim, N8HAM"



Jim Curtis, N8HAM, USA-Ca All Counties #682, poised for action.

333 South Lincoln Ave., Mundelein, IL 60060

Awards Issued

Gary R. Long, KD2Q, filed his completely filled and certified Record Book and qualified for USA-CA All Counties #785, USA-CA 3000 #810, USA-CA 2500 #889, USA-CA 2000 #964, USA-CA 1500 #1053, USA-CA 1000 #1253, and USA-CA 500 #2636, All SSB, dated 10-13-92.

Harlan F. Jones, KM8U, did it all in one giant leap, claiming USA-CA All Counties #786, USA-CA 3000 #811, USA-CA 2500 #890, USA-CA 2000 #965, USA-CA 1500 #1054, USA-CA 1000 #1254, and USA-CA 500 #2638, Mixed, dated 10-19-92.

Jack D. Cale, N8FEB, completed all of his paperwork and received USA-CA All Counties #787, and USA-CA 3000 #812, All SSB, dated 10-19-92.

Michael Moss, AA9CW, made a clean sweep and was awarded USA-CA All Counties #788, USA-CA 3000 #813, USA-CA 2500 #891, USA-CA 2000 #966, USA-CA 1500 #1055, USA-CA 1000 #1253, and USA-CA 500 #2639, All SSB, dated 10-24-92.

Carol I. Morkrid, NØLDT, filed her good application for USA-CA 3000 #814, USA-CA 2500 #892, USA-CA 2000 #967, USA-CA 1500 #1056, USA-CA 1000 #1256, and USA-CA 500 #2640, All 20M SSB Mobile, dated 10-26-92.

USA-CA 500 certificates went to:

Hiroshi Hidaka, JA1JTR, USA-CA 500 #2633, Mixed, 9-21-92.

Bobo Koch, DL8AK, USA-CA 500 #2634, Mixed, 9-21-92.

Jim Watkins, VO1SF, USA-CA 500 #2635, Mixed, 10-1-92.

Gary R. Long, KD2Q, USA-CA 5000 #2636, All SSB, 10-13-92.

Larry Cahoon, WD3P, USA-CA 500 #2637, All CW, 10-14-92.

Harlan F. Jones, KM8U, USA-CA 500 #2638, Mixed, 10-19-92.

Michael Moss, AA9CW, USA-CA 500 #2639, All SSB, 10-24-92.

Carol I. Morkrid, NØLDT, USA-CA 500 #2640, All 20M SSB Mobile, 10-26-92.

Awards Available

Worked EUCW Award. The Worked EUCW Award is offered by the European CW Association. The award is available to all licensed radio amateurs and shortwave listeners anywhere in the world. Only contacts made on or after 27 April 1991 (the 200th anniversary of the birth of Samuel F.B. Morse) are valid for this award.

Applicants should submit a list of contacts made (or SWLs, stations heard) for which QSL cards have been received. The list must be certified by a licensed amateur who is a member of an EUCW Club, who should state the name of his/her club and membership number. The list must include date of contact, callsign of station worked or heard, band, name of operator, QTH, EUCW Club, and club membership number.

USA-CA Special Honor Roll

Gary R. Long, KD2Q
USA-CA All Counties #785
All SSB, 10-13-92

Harlan F. Jones, KM8U
USA-CA All Counties #786
Mixed, 10-19-92

Jack D. Cale, N8FEB
USA-CA All Counties #787
All SSB, 10-19-92

Michael Moss, AA9CW
USA-CA All Counties #788
All SSB, 10-24-92

USA-CA Honor Roll

3000		1500	
KD2Q	810	KD2Q	1053
KM8U	811	KM8U	1054
N8FEB	812	AA9CW	1055
AA9CW	813	N0LDT	1056
N0LDT	814		
		1000	
2500		KD2Q	1253
KD2Q	889	KM8U	1254
KM8U	890	AA9CW	1255
AA9CW	891	N0LDT	1256
N0LDT	892		
		500	
		JA1JTR	2633
2000		DL8AK	2634
KD2Q	964	VO1SF	2635
KM8U	965	KD2Q	2636
AA9CW	966	WD3P	2637
N0LDT	967	KM8U	2638
		AA9CW	2639
		N0LDT	2640

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 nonsubscribers it is $10.00. Initial application must be submitted in the USA-CA Record Book, which may be obtained from CQ Communications, 76 North Broadway, Hicksville, NY 11801 USA for $2.00. 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 June 15, 1991. A complete copy of the rules may be obtained by sending an SASE to Norm Van Raay, WA3RTY, USA-CA Custodian, Star Rt. 40, Box 76, Pleasant Mount, PA 18453-0076 USA. DX stations must include extra postage for airmail reply.

Europe at the time of Samuel F.B. Morse

European C. W. Association

THIS IS TO CERTIFY that ..... has communicated with, or heard, 100 members of EUCW-Clubs by means of Morse telegraphy via Amateur Radio in accordance with the rules of the EUCW-Award.

Class of Award

EUCW Award's Manager

Certificate Nr.

Date

SAMPLE ONLY

Classes of Award - QRP, up to 5 watts output; Standard, any legal power; SWL, stations heard using any power.

Worked EUCW Award sponsored by the European CW Association.

EUCW clubs are AGCW-DL (Germany), BQRP (Benelux QRP), BTC (Belgium), FISTS (UK), FOC (First Class CW Operators' Club), G-QRP (UK), HCC (Spain), HSC (High Speed Club), INORC (Italy), SCAG (Scandinavia), SHSC (Super High Speed Club), UFT (France), and VHSF (Very High Speed Club).

Separate certificates will be issued for each class of award. The fee for the award is DM10, or US$8, or 12 IRCs. Applications for the award should be sent to the EUCW Award Manager, Gunther Nierbauer, DJ2XP, Illinger Strasse 74, D-6682 Ottweiler/Saar, Germany. The award manager's decision is final on all applications.

Requirements for the Award: Confirmed CW-only contacts (SWLs, CW stations heard) with 100 different stations who are members of EUCW clubs, over 3 different amateur bands with a minimum of 20 stations worked or heard in each band. The total of 100 stations worked or heard over 3 bands must include at least 3 members of 6 different EUCW clubs. To encourage activity on the 200th anniversary of the birth of Samuel F. B. Morse, up to 40 stations worked or heard on 27 April 1991 will count as double contacts. All other requirements remain unchanged.

Classes of Award: Standard award—100 two-way contacts made using any authorized transmission power; QRP award—100 two-way contacts made with the applicant using not more than 5 watts RF output transmission power; SWL award—100 stations heard using any power.

PZK Awards Program. Awards are available to licensed amateurs and SWLs. All contacts, any band CW, phone, or mixed, are valid for these awards. QSLs need not be sent. However, the GCR list must be certified by the awards manager of your society, or by a radio club, or by two licensed amateurs. The fee is 10 IRCs each. Send applications to PZk Awards Manager, Monika Wasowicz, SP5NOW, P.O. Box 320, 00-950 Warszawa, Poland.

AC-15-Z Award (All Countries of the 15th Zone). This award is issued for contacts with at least 23 countries or call areas located in CQ Zone 15: OH0, ZA, OE (2 call areas), TK, OK, UR, OH (3 call areas), HA, I, UA2, UQ, UP, 9H, OJ0, SP (4 call areas), T7, IS, IT, HV, and YU (3 call areas). Contacts with 4 call areas of Poland are obligatory. All contacts are valid from 1 January 1955.

W-21-M Award (Worked with 21st Meridian). This award is issued for contacts with at least 16 countries situated on the meridian 21 degrees east: OH0, D2, A2, TL8, TT8, OK, UR, UQ, UP, UA2, OH, SV, HA, ZS3, LA, SP, ZS, YO, JW, SM, YU, 5A, 9Q. Contacts with Poland are obligatory. All contacts are valid from 1 January 1955.

Polska Award. This award is available in three classes: Class 1—for contacts with 49 (all) provinces of Poland; Class 2—for contacts with 35 provinces of Poland; Class 3—for contacts with 20 provinces of Poland. All contacts are valid from 1 June 1975. When applying for a higher class, supply the number of your lower class diploma and a list of your additional contacts.

Abbreviations denoting WOJEWODZTWOs/provinces of Poland are shown in Table I. The applicants are asked to give the abbreviations denoting Polish provinces in alphabetical order.

Notes: The Polska Award can be received if special application is added to the contest log. Only QSOs made within one SP DX contest year are valid for award credit.

DARC (Deutscher Amateur Radio Club) Awards. The following information about awards offered by the DARC is courtesy of Ralph M. Hirsch, K1HR. Ralph is the North American check point for all of these awards. Anyone desiring further information and the mandatory forms should enclose a business-size SASE and $1.00 to help cover costs. Ralph's address is 172 Newton Road, Woodbridge, CT 06525. The following general requirements are applicable.

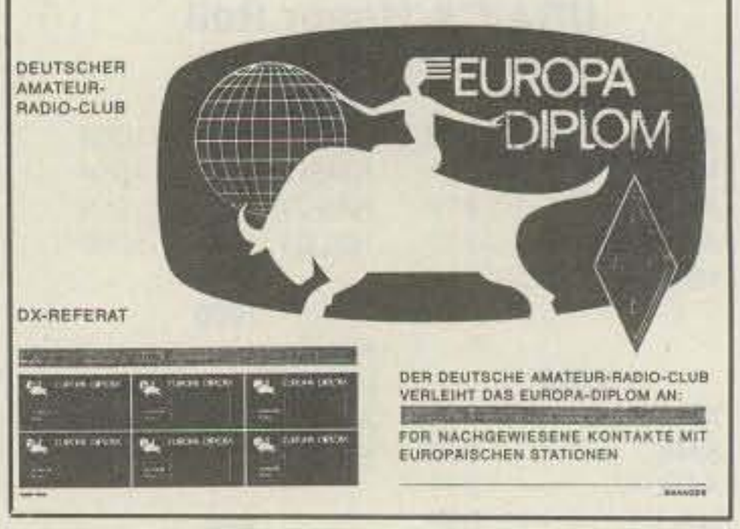
Processing: Original application fee

BB	Bielsko Biala	SP9	OP	Opole	SP6
BK	Bialystok	SP2	OS	Ostroteka	SP5
BP	Biata Podlaska	SP8	PI	Pila	SP3
BY	Bydgoszcz	SP2	PL	Plock	SP5
CH	Chelm	SP8	PO	Poznan	SP3
CI	Ciechanow	SP5	PR	Przemysl	SP8
CZ	Czestochowa	SP9	PT	Piotrkow Tryb.	SP7
EL	Elblag	SP2	RA	Radom	SP7
GD	Gdansk	SP2	RZ	Rzeszow	SP8
GO	Gorzow Wlkp.	SP3	SE	Siedlce	SP5
JG	Jelenia Gora	SP6	SI	Sieradz	SP7
KA	Katowice	SP9	SK	Sierniewice	SP7
KI	Kielce	SP7	SL	Slupsk	SP1
KL	Kalisz	SP3	SU	Suwalki	SP4
KN	Konin	SP3	SZ	Szczecin	SP1
KO	Koszalin	SP1	TA	Tarnow	SP9
KR	Krakow	SP9	TG	Tarnobrzeg	SP7
KS	Krosno	SP8	TO	Torun	SP2
LD	Lodz	SP7	WA	Warszawa	SP5
LE	Leszno	SP3	WB	Walbrzych	SP6
LG	Legnica	SP6	WL	Wloclawek	SP2
LO	Lomza	SP4	WR	Wroclaw	SP6
LU	Lublin	SP8	ZA	Zamosc	SP8
NS	Nowy Sacz	SP9	ZG	Zielona Gora	SP3
OL	Olsztyn	SP4			

Table I– Abbreviations denoting WOJEWODZTWOs/provinces of Poland.

Worked All Europe, Class I, Telegraphie (Telefonie), a DARC award.

Europa-DX Diplom available annually from the Deutscher Amateur Radio Club.



Europa Diplom offered by the DARC for specified cumulative annual Europa-DX scores.

$6.00; endorsement $4.00. These processing charges include airmail return of awards from DL3RK, except for the EU-DX-D 1000 Point Plaque, which costs an additional $10.00.

Postage: Actual cost. If first-class mail, 29 cents for the first ounce and 23 cents for each additional ounce. Figure return postage at what it costs to send the card to the check point.

Fees: For registered mail, add $4.85 per package. For certified mail, the cost is only 85 cents per package and this is recommended.

General: You may use any of the following bands authorized in your country: 1.8, 3.5, 7, 10, 14, 18, 21, 24, and 28 MHz. The same cards may be used for any of the awards.

Country List: The following countries may be used for the DARC awards: C31, CT1, CT2, DL, EA, EA6, EI, F, G, GO, GI, GJ, GM, GM (Shetland), GU, GW, HA, HB, HB0, HV, I, IS, IT, JW (Bear), JW (Spitzbergen), JX, LA, LX, LZ, OE, OH, OH0, OJ0, OK, ON, OY, OZ, PA, SM, SP, SV, SV5 (Rhodes), SV9 (Crete), SV (Athos), T77, TA (European), TF, TK, UA1346, UA2, UA(FJL), UB, UV, UN/UK1N, UO, UP, UQ, UR, Y22–99, YO, YU, ZA, ZB2, 1A0, 3A, 4U1 (Geneva), 4U1 (Vienna), 9H1.

The awards may be obtained by licensed radio amateurs and SWLs in the USA, Canada, and Mexico. All contacts must be made from the same country.

WAE (Worked All Europe) Award: The WAE is a certificate awarded to amateur radio stations for contacts with European countries on different bands. It is issued in two divisions—Telegraphy (2 × CW) and Telephony. Each European country counts one point on each band. For USA, Canadian, and Mexican stations, contacts on 80 and 160 meters count two points. A maximum of five bands per country may be used.

Classes are: WAE III—at least 40 countries and 100 points; WAE II—at least 50 countries and 150 points; WAE I—at least 55 countries and 175 points.

Holders of WAE I get a special WAE Badge.

EU-DX-D (Europa-DX Diplom): The EU-DX-D is an award that may be claimed annually. The EU-DX-D is issued in the following classes: Telegraphy, SSB, or Mixed modes. For Mixed class, at least 30% of the contacts must be made in a different mode.

A minimum of 50 points is required for the EU-DX-D per year. Twenty points must be obtained by contacts with European countries, and 30 points by contacts with countries outside Europe. All bands can be used, but each country can be used only once per year on just one band, which counts for one point, unless claimed on 80 or 160 meters, when two points are given. Stickers are available for each additional block of four European and six non-European points within the same calendar year.

The EU-DX-D may be claimed anew every year. Each year's score may be added to obtain the EU-DX-D 500 Badge and the EU-DX-D 1000 Trophy. There is no limit to the number of years.

Europa Diplom: The Europa Diplom is awarded for working (or hearing) amateurs in European countries. Applicants must prove a total score of at least 100 points.

Annual score: Each confirmed European country counts one point per year on each amateur band.

Total score: The sum of the annual scores for the year of application and the five preceding years.

Europa 300 Trophy: Owners of the Europa Diplom may obtain the Europa 300 Trophy. Applicants have to prove 300 country points when counting each country on each band only once in all the years. The service charge is $10.00 for the trophy when applied for together with the Europa Diplom.

73, Dorothy, WB9RCY

You Failed CW?

Held back because you *can't* do code? Why? Mental blocks about CW are easy to overcome with **CW Mental Block Buster**. This tape and booklet program uses hypnosis, affirmations and mental movies (visualization) to EXPLODE your mental blocks. You've never heard a code tape like this before. Why waste time banging your head against the wall with a *mere practice tape*—**You can explode the wall with CW Mental Block Buster!** Requires 30 minutes per day for 30 consecutive days to begin to see improvement. You can learn code! **You can move up!** $25.95 ppd (+$3/two-day delivery) in US

Thank you for your CW Mental Block Buster tape. It really works. I have tried to learn CW for a period of 31 years. The best I could do was 3 wpm. . . . I passed my Novice and then the 13 wpm General— KB2HTB

Hypnosis tapes are not copy-practice tapes.

Order today! NY residents add 8.5% sales tax
Phone: 516-584-8164 Fax: 516-584-9409
MC/VISA mail/fax orders include signature

PASS Publishing, Dept. AC, Box 570, Stony Brook, NY 11790

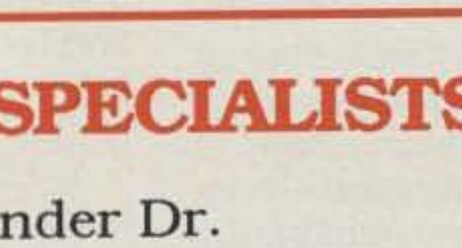
ELECTRONIC SPECIALISTS

3830 Oleander Dr.
Wilmington, NC 28403
service & technical (919) 791-8885
Hours Tues-Fri 10-5:30; Sat 10-3 EST
FREE CALL FOR ORDERS & QUOTES

1-800-688-0073

YAESU

FT-890AT



FT-5100

call for prices on your favorite equipment

- *free call for orders & quotes
- *Visa-MasterCard-Discover
- *friendly sales people
- *customer satisfaction
- *full staff including two full time service technicians
- *authorized in-store service for all YAESU products
- *trades for clean late model amateur equipment
- *orders shipped UPS ground
- *faster shipping available

Software for Hams!

Still having trouble with Morse Code?

Then get the PC-based Morse trainer that offers more!

Sale Priced!

Morseman+ version 4.0 offers the ham and prospective ham the best way to learn the code or improve skills. Morseman+ lets **you** choose the method to improve your skills, not someone else. Choose any speed from 5 to 99 wpm, fully Farnsworth configurable, CPU independent timing, random character generation, random word generation, improved code teacher (for the newcomer), true random callsign generator, true random QSO generator (with realistic, world-wide QSO's), practice only (practice only the characters that you want), send and compose ASCII text files, FCC/VE tests, built in text editor, interactive modes (type in what you just heard), generate FCC/VE tests without sending them and much, more! Morseman+ 4.0 now even features Adlib/Soundblaster audio card support for a more realistic sound! Some modes even have background static as an option! Morseman+ can even be used to key an external transmitter or other device through the serial port!! With all of these features and **thousands** of users, why would you use anything else? Until January 31, 1993, you can get Morseman+ for $29.95 (plus s/h), instead of the regular $34.95 price! Call 1-800-525-7235 (or fax 205-757-8664) and use your Visa or Mastercard, or send your order (plus $4 s/h North America, $9 elsewhere) to the address below!!

Morseman+ 4.0 requires an IBM-PC or compatible with a hard drive (can use 720k or better floppy system) and 640k RAM. Optionally uses a mouse, but not required. Will also use an Adlib or Soundblaster audio card for greatly enhanced sound, but not required. Can also make use of a serial port device for keying.

Software Paks Sale!!!

HamPak 1 - A knockout collection of software for the radio amateur. Includes our disks 1082-1150 and 1801-1823. Includes programs for logging, packet, antennas satellite tracking, rig control, contesting, SSTV, CW decoding and much, much more. Also includes our popular Morseman+ 4.0 Morse Code trainer, which has helped thousands of radio amateurs upgrade. A total value of $184.95, regularly priced $119.95, **now only $89.95!** Makes a great gift! **Offer expires January 31, 1993**. (for 3.5" disks, add $30)

HamPak Plus - Includes all disks in HamPak 1, plus all disks in our ham radio group 2 collection (1801-1899). A total value of $247.95, regularly priced $159.95, **now only $119.95!** (for 3.5" disks, add $50). **Offer expires January 31, 1993.**

Windows Pak - A high quality collection of programs for Windows 3.0 and Windows 3.1. (Our disks 1401 to 1499). Includes all sorts of utilities, app runners, file managers, menuing, icons, personal organizers and much, much more. A total value of $207, regularly priced $139.95, **now only $99.95!** A great addition to any Windows user's library. (for 3.5" disks, add $40). **Offer expires January 31, 1993.**

TrueType Font Pak - A high quality collection of more than 200 public domain TrueType fonts. Great for the Windows 3.1 user. Includes all types of typefaces, from traditional to the bizarre! A 22 disk collection, a total value of $66, regularly priced $49.95, **now only $29.95!** (for 3.5" disks, add $15). Here's your chance to add a lot of great typefaces to your collection at a very low price! **Offer expires January 31, 1993**.

A hot new selection of shareware for the PC!

Disks $3.50 ea/ $3.00 ea for 10 or more - (add $1 each for 3.5")

127,128	Envision Publisher (2 disks) - Finally, a full featured desktop publishing system in shareware! Rivals most commercial systems. Has scalable fonts, full text manipulation, drawing, picture import, Postscript quality printing and much more! (hard drive req'd)
164	Odyssey - A nice, new telecommunications program for the modem/packet user. Built in MNP support, Zmodem, scripting, text editor and much more! (modem or TNC req'd)
964	Comcob 3D -A fantastic 3D air combat game, WW2 vintage. Fly various missions. One of the best flight simulators around! (hard drive and VGA req'd)
1075	FONE800 - A large collection of toll-free 800 numbers, including everything from government, business and much more. Even dials the number if a modem is available! Fully editable.
1238,1239	Map It! (2 disks) - A great, user-extensible world map system. Allows creation of individualized maps and attaching of any type of data to it. Excellent graphics. A high quality system. (mouse, hd, EGA req'd)
1474,1475	Take Note (2 disks) - A great information manager for Windows. A combo card file, PIM and database. Create database templates, password protection and much more. (requires MS Windows)
2005	Job Search - A nice system for the person looking for a job. Helps the user locate a job in less time, with less hassle. A nice search manager system!

Terms of Sale: All items shipped FOB, Killen, Alabama. North America, please add $4.00 s/h per order, overseas $9.00 s/h per order. To order, call 1-800-525-7235 (or 205-757-5928), or fax to 205-757-8664 and use Visa or Mastercard, or send your order to the address below. COD's accepted **only** in the U.S. (**minimum COD order is $30**)

renaissance
software & development
killen plaza - box 640 - killen - alabama 35645

CIRCLE 71 ON READER SERVICE CARD

BILL'S BASICS

BY BILL WELSH, W6DDB

"HOW TO" FOR THE NEWCOMER TO AMATEUR RADIO

Help Wanted

I receive many letters from people who read this column. New and prospective amateurs usually include comments telling me how much trouble they had/have getting started in amateur radio. They say that they have a difficult time determining where and when local amateur radio clubs meet. When they finally succeed in attending a club meeting, their reception is seldom a glad one. Established, long-time amateurs must know that the newcomers are seeking help, but such assistance is rarely offered. These troubling comments are common in most of the letters I receive from new and prospective amateurs.

About one half of our American amateurs are Novices or Technicians. Many of these amateurs have been operating almost exclusively in the 10 meter Novice voice segment. Ten meters had poor operating conditions during this past summer, and it will become even less useful next summer. These amateurs need your help in switching over to code operation prior to the time when 10 meters is completely dead. They are unlikely to continue operating without your help. If they do not operate, there is little chance that they will upgrade. In fact, it is very likely that many of today's Novices and Technicians will have given up on amateur radio by the time 10 meters peaks again. There are no "they" who will keep these people in amateur radio; there are only you and me to get this job completed successfully.

The prospective amateur is even worse off than the Novices and Technicians. Those people who are already licensed probably know where and when licensing examinations are held. If these licensed amateurs are lucky, they may also know where and when licensing courses are conducted, and other amateurs may have given them some information about station accessories and equipment. The prospective amateur has the necessary desire to become licensed, but she/he has very little real assistance in getting started in our hobby.

Your help is essential to the future growth and vitality of our Amateur Radio Service. Your help is needed right now. It is time to get involved with new amateurs instead of just *thinking* about doing this essential work.

45527 Third Street East, Lancaster, CA 93535-1802

Seven-year-old Casey Haley, KB5UEO, of South Houston, Texas shares a radio shack with his father (Marty, AB5GU) and his mother (Wende, KB5TNU). Their station includes a Kenwood TS-940S transceiver with a dipole antenna. Casey's uncle (Barry, KI5WE) gave him a 10 meter Yagi-Uda beam antenna, and his dad gave him a 50 foot tower to hold it. His mom received a Kenwood TH-27A transceiver as a birthday present. Casey averages about two contacts per day, including many in other states and foreign countries. Casey is a straight A student in the third grade. He is a Cub Scout, a Little League baseball player, and a rodeo rider. He collects baseball cards, football cards, gems, minerals, and Spiderman comic books, and enjoys swimming and bicycling. He is active in his church.

I offer an extensive assortment of article reprints which instructors are welcome to distribute to their students as-is, or they may be revised as desired prior to duplication and distribution. That offer is frequently included in this column. Individual students are also welcome to get a set of reprints for their own use. This set of printed aids includes a lot of highly useful operating information that is essential to new operators.

I have a set of 15 code training cassettes which have been used successfully by several thousands of my ex-students. They take the student from no knowledge of the International Morse Code to a receiving speed of about 13 words per minute. Instructors are welcome to copy these tapes for distribution to their students. These tapes allow a student to progress at her/his own rate. Many students do not have computers, but most of them do have a cassette player available for their use. If you want information regarding these tapes, send your self-addressed, stamped envelope to my California address, as it is shown on the first page of this article.

I work more than 1000 contacts every year in the Novice bands, and I understand Novice band problems quite well. I am the recipient of an Edison Award and a deForest Award. My licensing course efforts were the main reason I received these awards. I have helped license more amateurs (since 1948) than most amateurs have ever contacted on the air. However, amateur radio cannot reach new heights with just the efforts of a few fanatics such as myself. We need the active participation of every willing and able amateur to upgrade the thousands of existing Novices and Technicians, and to license additional thousands of prospective amateurs. Your help is desperately needed now.

My September 1992 column provides a good review of current band conditions, and it includes suggestions regarding some of the things individuals and groups can do to help upgrade our Novices and Technicians. If you are just now getting interested in helping these operators, I advise you to read that article.

If you are not associated with an amateur radio club, do everything possible to let people know that you are an amateur radio operator. Have your callsign on T-shirts, sweatshirts, caps, jackets, license plates, and other items. When people ask you what the callsign is, tell them about our Amateur Radio Service. Invite them to your shack to see and hear your station in operation. Do not dazzle visitors with highly sophisticated operation. Keep your demonstrations simple and easy to understand. Invite prospective and new amateurs to your shack. Let them see and hear you operate, and put them on the air at your station. Offer to help new amateurs select the accessories and equipment they need to set up initial stations, and help them get their stations ready to operate. There are thousands of amateurs who are not on the air because they need the help of an experienced amateur. Won't you please help them?!

Here are (left to right) Al Folsom, KY3T, and Doc Murein, KA3RAU, of the Warminster Amateur Radio Club. They are shown operating WA3DFU as a special-event station at the Union League Building in Philadelphia. The Union League was created in 1862 to support the policies of Abe Lincoln during the Civil War. More than 350 contacts were made 27–28 March last year. A special certificate is available to all stations contacted. Send contact data and an SASE to WA3DFU, P.O. Box 113, Warminster, PA 18974.

If you are a member of an organization which could conduct amateur radio licensing courses, please urge the group to provide such training on a regular basis. The following paragraphs contain information that should be helpful to amateurs who want to initiate or upgrade licensing courses. Individual amateurs are urged to bring the following information to the attention of local club officials.

Objective. It is our job to pass knowledge to people who are interested in amateur radio. They may persevere and become operators, or they may decide that the time and effort involved in becoming an amateur is to much to suit them. All we should do is provide the required information to those people who are willing to do the work that is required to become licensed operators. Amateur radio is not for everyone, and a course should not be degraded to retain students who are unwilling to study. Make it clear to prospective amateurs (and license upgrade candidates) that they are expected to do their part in the licensing effort.

Instruction should be tailored to emphasize operating. Amateur radio has too many licensees who seldom (if ever) get on the air. License holders are of very little benefit to our amateur radio service. What we need are license *users* (operators). Stress good operating procedures. Give examples of both good and bad operating procedures, with explanations of why each one is good or bad. The quality of amateurs is more important than the quantity.

Instructor Qualifications. The single most important feature of an instructor is her/his desire to help people get a good start in amateur radio. You do not have to

Here is Henry Kotowski, SM0JHF (left), operating portable from Provence, France. His son, Gabriel (right), expects to become an amateur soon now that Sweden's minimum amateur radio licensing age has been reduced from 14 to 10. Their home QTH is Kista, Sweden.

be an expert in all facets of amateur radio to be an effective instructor. The most effective way to learn a subject is to teach it to others. I have run licensing courses for 44 years (about 200 courses), and each one has given me additional knowledge. Instructors must serve as a means of imparting information to students. It is counterproductive to do (or say) anything intended to impress students. I believe that a single instructor is more effective than a team of instructors, because she/he knows what has been covered and what material still needs to be covered. Continuity and uniformity enhance the student's learning experience. Keep explanations simple and easy to understand. The least effective co-instructor I ever worked with knows more about electronics than I will ever know. However, he made everything seem more complicated than it was, and he confused the students.

Recruitment. Local newspapers have helped me recruit thousands of students. I have used radio announcements, but they are less effective than newspaper articles. Course notices can also be posted at local radio stores, schools, and businesses. I have run several courses for youngsters, and they are effective for certain age groups. Basically, one has to attract boys and girls before they become acutely aware that each other exists. Senior citizens are better prospects than youngsters, but they usually have more trouble acquiring the required knowledge and code proficiency; they may also be limited in their ability to purchase gear. My best prospect has always been the middle-aged person who has established a family, job, and lifestyle. Such people are willing to expend the time, effort, and money needed to become active amateurs. Keep recruitment material simple; excessive sophistication and complexity turn away prospective amateurs.

Course Location. Access is important. Try to obtain a location with plenty of parking and nearby public transportation. Heating, cooling, and lighting should be good. Student comfort is very important. Tables, chairs, and space should be adequate. A large chalkboard (or similar) is essential. If they are available, it is useful to have projectors, a screen, a VCR, and similar aids. It is helpful to have storage facilities for printed aids, tests, and other course materials. Recruitment becomes almost unnecessary after courses have been conducted several years at the same location. Other amateurs, clubs, and radio stores will direct prospective amateurs to your courses. The single best possible feature of a course setting is to have it include a station. It has been highly effective for me to use club stations to get new (and prospective) amateurs on the air. If you have enough room to do so, establish a reference library for use by your students.

Class Size. I have found that the most effective class size is 20 to 40 people. When I had classes with more than 200 students, they felt inhibited and would not ask questions. When I started courses with less than 20 people, a few dropouts depressed the remaining students. A course fee provides some additional motivation for students to complete courses, and the income can be used to purchase supplies needed to enhance the course. I believe in doing things first class, and that takes money.

Course Materials. I have recorded a series of cassette tapes that can take

someone from no knowledge of the International Morse Code to a receiving proficiency of about 13 wpm. It is advisable to have such material available to students on a loan basis. I use about 250 pages of printed handouts which allow students to supplement in-person class instruction with individual home study. Much of this printed material is also useful for reference purposes, when students subsequently start operating. Each printed aid should be discussed at the time it is distributed. New instructors should follow prepared course outlines and lesson plans, such as the ones that are issued by the League. As you become experienced in conducting courses, it is normal to alter material to do the job more to your liking.

Testing. Let your students know when and where FCC amateur radio licensing tests are conducted. If possible, give students information regarding several local test sites. Provide your students with complete information regarding what they should expect to encounter at a test site. Make sure that your students know what they should bring with them to a test session, such as identification, writing instruments, and a license copy (if already licensed). If you have the material available, it is a good idea to conduct a realistic sample test session as the concluding class of the licensing course.

Students' Stations. The most important thing an instructor can do is to help a student (or ex-student) get on the air. Discuss station equipment and accessories briefly during course sessions, but restrict detailed discussions to one-on-one talks with individuals. Encourage them to obtain the best station they can afford. Experienced operators can achieve remarkable results with junk equipment, but inexperienced operators are likely to remain active on the air only if they start with good gear that provides good communication results. It is unwise to advise newcomers to build kits or homebrew equipment for their initial station. Those activities are better suited to experienced amateurs. I ran homebrew gear for many years. However, I know that homebrewing is almost dead. The sophistication of modern components and tools has just about killed homebrewing.

If you have a suitable location, it is advisable to check students' equipment there using known antenna and ground systems. I have found that doing this provides me with an excellent opportunity to teach the student the function of each control under actual operating conditions. I usually have the student work a couple of contacts with her/his new gear at the conclusion of the check session. This increases the student's confidence in the equipment and him- or herself. I often check the new amateur's initial station installation. This allows me to make suggestions which she/he is welcome to implement or ignore. A station installation check

Arshad H. Quadri, leader of a group of about 60 potential amateurs in the Sindh province of Pakistan, advises that help is needed in the form of training material and/or equipment (see text).

provides another opportunity to get the new amateur on the air. Stress the importance of a good ground system and antenna system for each station, with special emphasis on safety. Encourage new amateurs to become active in local amateur radio clubs; they need exposure to other amateurs.

Amateur Radio Home-Study Courses Needed

Donald Ashdown, 6Y5DA, knows several prospective amateurs in Jamaica. Poor transportation and long distances between students make in-person instruction relatively ineffective in Jamaica. If you have a homestudy amateur radio course that you no longer need, please consider mailing it to the Mandeville Chapter of the Jamaica Amateur Radio Association. The mailing address is 18 Villa Road, Mandeville, Jamaica, West Indies.

Pakistan Group Seeks Help

Arshad H. Quadri is the leader of a group of about 60 potential amateurs in the Sindh province of Pakistan. He advises that most of Pakistan's amateurs live in the Punjab province, which is inhabited by richer people than those who live in the Sindh province. The International Amateur Radio Union (IARU) sent some books to this group, but Arshad advises that a lot more help is needed. This would be a very worthwhile project for some Canadian or American amateur radio club.

If you are interested in supplying training material and/or equipment, please contact Arshad c/o the Larkana Shortwave Technical Library, 1989/A-1 Shaikh Street, Karma Bagh, Larkana 77150, Sindh Province, Pakistan.

Help Request From The Philippines

Rainier R. Bautista, DY9CKQ, advises that the OSCAR-MARBEL organization needs training material to be used with a group of potential amateurs. In addition to printed training data, they need books, club newsletters, code practice tapes, magazines, pictures, posters, and video tapes. If you have any item(s) of interest to this group, please contact them directly. Their address is the Organization of South Cotabato Amateur Radio (OSCAR), Marbel Peterpan, Koronadal, 9506 South Cotabato, Philippines.

Printed Aids

My previous columns contain information that is useful to new and aspiring amateurs. Many of these items have been reprinted for distribution to students of licensing courses I instruct. For ease of use, these printed aids have been separated into six categories. These categories are introduction, code, theory, station, operating, and miscellaneous. Outdated items are continually replaced with newer material. Fifteen dollars brings a complete set of current printed aids, including shipping costs. A list of these printed aids will be sent to anyone who requests it and sends a business-size (#10) self-addressed and stamped envelope to my California address. Licensing course instructors are welcome to revise and/or duplicate these items to suit their requirements.

73, Bill, W6DDB

WORLD OF IDEAS

BY DAVE INGRAM, K4TWJ

A LOOK AT THE WORLD AROUND US

More QRP Notes, Rig Views, and Projects!

Heads up, gang. This month's column features another return visit to the always popular area of low-power communications, and we have some good notes, philosophy, and circuit ideas to share with you. We will discuss DXing with QRP and milliwatting, briefly look at the Argonaut II and new Backpacker I transceivers, plus highlight some very interesting British endeavors in QRP. Hold on to your key and soldering iron as we once again move at our usual fast pace. There is always so much to say and so little time, so let's get started!

Reviewing the mailbag, newer amateurs continue to visualize QRP as an ultra-low budget way to get started in HF operating and ask my opinion on a particular rig or circuit that can be assemlbled quickly. I must thus re-emphasize that any interest you pursue on a shoestring budget yields only shoestring results, and stand-alone QRP is not an ideal introduction to the fascinating world of low-band action. Newcomers need to start out by experiencing the real thrill and "glitz" of working faraway lands with a good 100 watt output transceiver before delving into the challenge of using low power. Until operating expertise is perfected, reaching DX with even a "big rig" and fine-tuned antenna can be difficult. Pursuing that goal with 5 watts and a dipole is definitely not easier!

Understand I am not advocating you bypass QRP activity completely, but consider it a special-interest expansion to enjoy on a just-for-fun basis. If you are presently operating 10 meter SSB with a 25 watt transceiver and dipole or ground-mounted vertical antenna, you are almost experiencing QRP action (and challenges!) as-is. By analogy, a 2.5 or 5 watt CW rig on 40 meters will probably give you the same results or success ratio as you realize with the 25 watt transceiver on 10 meters during weekends, especially during contests.

Let's now assume you have worked and confirmed 100 or more countries and you are interested in new challenges such as DXing with QRP. Jolly good show! You have probably acquired a self-taught DXing technique that works well for you, so let's discuss some additional ideas to increase your success. First, move away from packet-cluster DXing assistance. Such wide-area listings of "who is on what frequency" are fine if you are using a high-power rig and enjoy wading through pileups, but why be a follower when you can be a leader (even with QRP)! Your contacts-per-call ratio will be higher by diligently tuning a band right as it opens (or right before it closes) and spotting/working DX stations before their presence is revealed to everyone via packet clusters.

Second is the ability to copy through heavy on-frequency QRM. Thinking like the DX station you are trying to contact, and mentally placing yourself behind his/her rig will make the big difference. You must time your call precisely when the DX operator is listening. Only last night, for example, I heard three stations miss their reply and contact with a rare DX station because they could not copy through other (long winded!) callers. As a result, they called again (generating more QRM) while the DX operator was "QRZing" for the next station, and the scenario repeated. Tisk, tisk. One well-timed QRP call snagged a QSO right from the jaws of sharks. As I have said before, the operator rather than the rig makes the difference, especially when using QRP. If you wish to hear more (plus study QRP rigs and homebrew circuits), however, check out my new book *How To Get Started In QRP* (fig. 1) available from N.A.R.A. (1-800-GOT-2-HAM) or from amateur dealers nationwide.

One of the most recent trends in QRP is milliwatting, and this area of using less than 1 watt of power really brings out the sharp operators. I thought my own accomplishment of contacting western Australia while running only 250 mw was quite a feat,

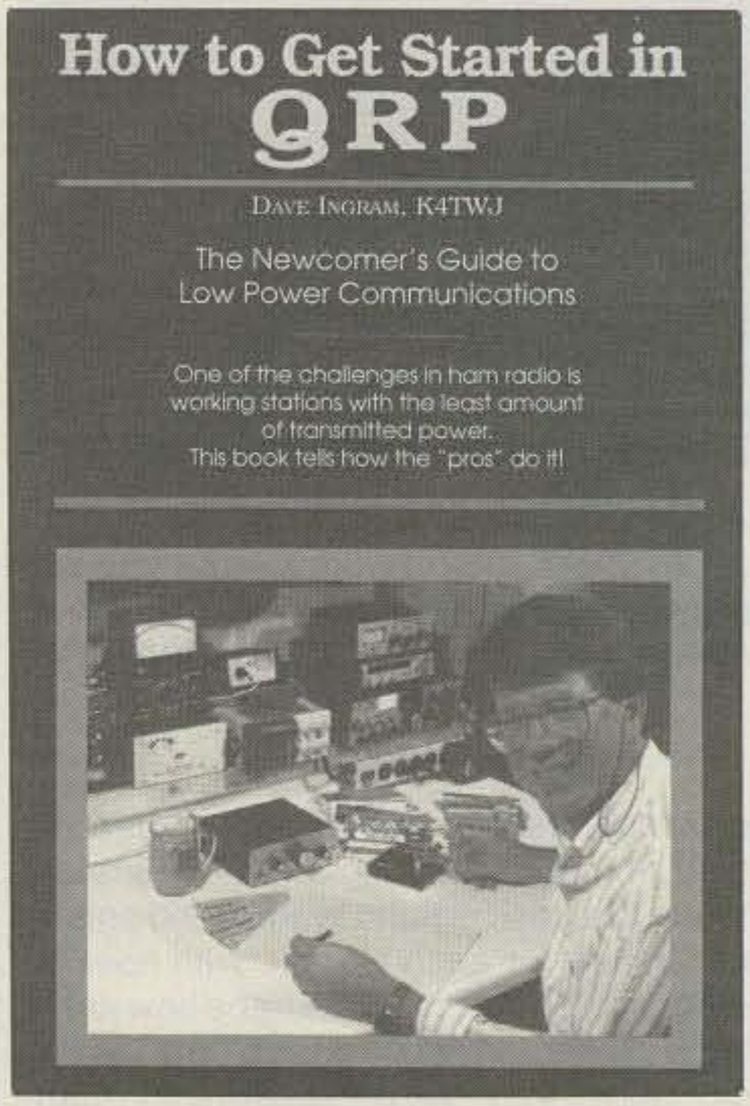


Fig. 1– More good information on QRP has just been released. K4TWJ's new book How To Get Started In QRP *is now available from amateur dealers nationwide. Do not be tricked by the title, as it is loaded with circuits and ideas everyone can use!*

Fig. 2– Continuing the QRP legend is Ten-Tec's Argonaut II. This photo was shot while we were on our IOTA DXpedition to St. George Island (NA-85).

4941 Scenic View Drive, Birmingham, AL 35210

Fig. 3– The recently introduced Backpacker I monoband QRP transceiver. This little rig is a hot performer!

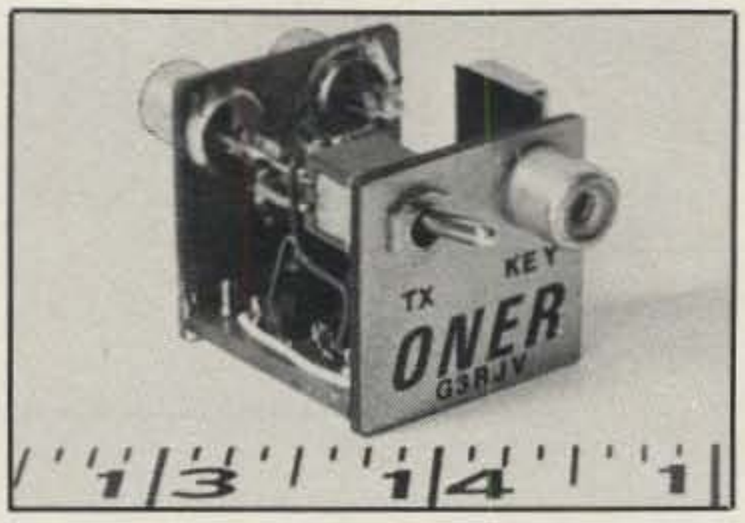


Fig. 4– The famous little "Oner" transmitter built by G3RJV. Complete rig is 1 inch square and produces 1 watt output.

but it does not hold a candle to contacts logged by some of the pros. Michael, WA8MCQ, in Maryland, for example, worked Colorado on 10 meters while using only 24 mw, Puerto Rico while running 12 mw and an attic dipole, and Maine on 40 meters while using only 5 mw. During the 1992 Michigan QRP Contest, WA8MCQ ran between 29 mw and 480 *microwatts* and made 20 contacts on 40, 20, and 15 meters. As an encore, Michael wrangled 22 QSOs with 10 states plus France while running between 2 and 37 mw during the last 10 meter contest. He also pointed out his milliwatting efforts are not final "words" and have been superseded by others. Big-time QRP for sure!

Hot Rigs For Serious QRPers

As mentioned in our Fall column featuring HF mobiling, we recently embarked on a long overdue break and IOTA expedition to St. George Island (NA-85). We carried several rigs and antennas, including a new Ten-Tec Argonaut II and a Tejas Backpacker I transceiver (watch for the full expedition story in a future column). I used the Argo II with a Cushcraft R5 vertical, and it worked like a little champ on all five upper HF bands (fig. 2). In fact, operating this top-of-the-line QRP transceiver with its totally silent QSK, super-sensitive receiver, and continuously adjustable bandwidth control was absolutely marvelous. Did the Argo II's 5 watt signal reach out? You bet! We worked stations on all continents the first day! I honestly felt like I was using a 100 watt rig. If you are looking for a super-elaborate, all-band transceiver that no one can question as being total QRP, the Argonaut II cannot be beat!

The recently introduced Backpacker I single-band QRP transceiver (fig. 3) also proved terrific on our expedition. My particular model worked 30 meters, and its 2.5 watt signal got out like a champ. I have described how good 30 meters is for QRP in past columns, so I will not repeat those statements again here. Too many alligators can fill a pond and make fishing difficult. The little Backpacker I has some impressive features for CW operating such as solid state and mouse-quiet QSK, RIT, and three levels of front-panel selectivity. I used battery power with the Backpacker I so I could operate it outdoors, and although subjected to varying temperatures plus instant switch-on-and-go conditions, the transceiver was stable and a barrel of fun to use. If you really take QRP and/or milliwatting seriously, take a close look at the Argonaut II or Backpacker I. They are real gems!

British-Style QRP

A creditable number of our amateur friends in England are true QRP devotees, and nearly every issue of the G-QRP Club's magazine *SPRAT* features advertisements or modifications for their favorite little transmitter known as the "Oner." This little delight is a 1 watt output transmitter built on a 1 inch square PC board. The Oner is available as a complete kit from Kanga Products in England or via Kanga's U.S. liaison, Bill Kelsey, N8ET, for $10 (3521 Spring Lake Drive, Findlay, OH 45840). You add a crystal and output filter circuit for a band of choice, install the completed kit in a tiny enclosure, and bingo: a genuine postage-stamp-size QRP transmitter!

Rev. George Dobbs, G3RJV, the guru of QRP in Europe, assembled his Oner as a cube (fig. 4), and the little critter has received worldwide recognition. Look closely at the photo and you will see the Oner's circuit board on the cube's bottom. The crystal is mounted on the right side, and rear phono sockets are used for antenna and receiver connections. The cube, incidentally, is made of PC board material. Now this is a real QRP showpiece!

The Oner's schematic, shown in fig. 5, is now commonplace yet quite interesting and worthy of discussion. TR1 is an oscillator/buffer, TR3 is a VMOS power amplifier, and TR2 is the keying transistor. The oscillator section varies from typical U.S. designs by using a single resistor for for-

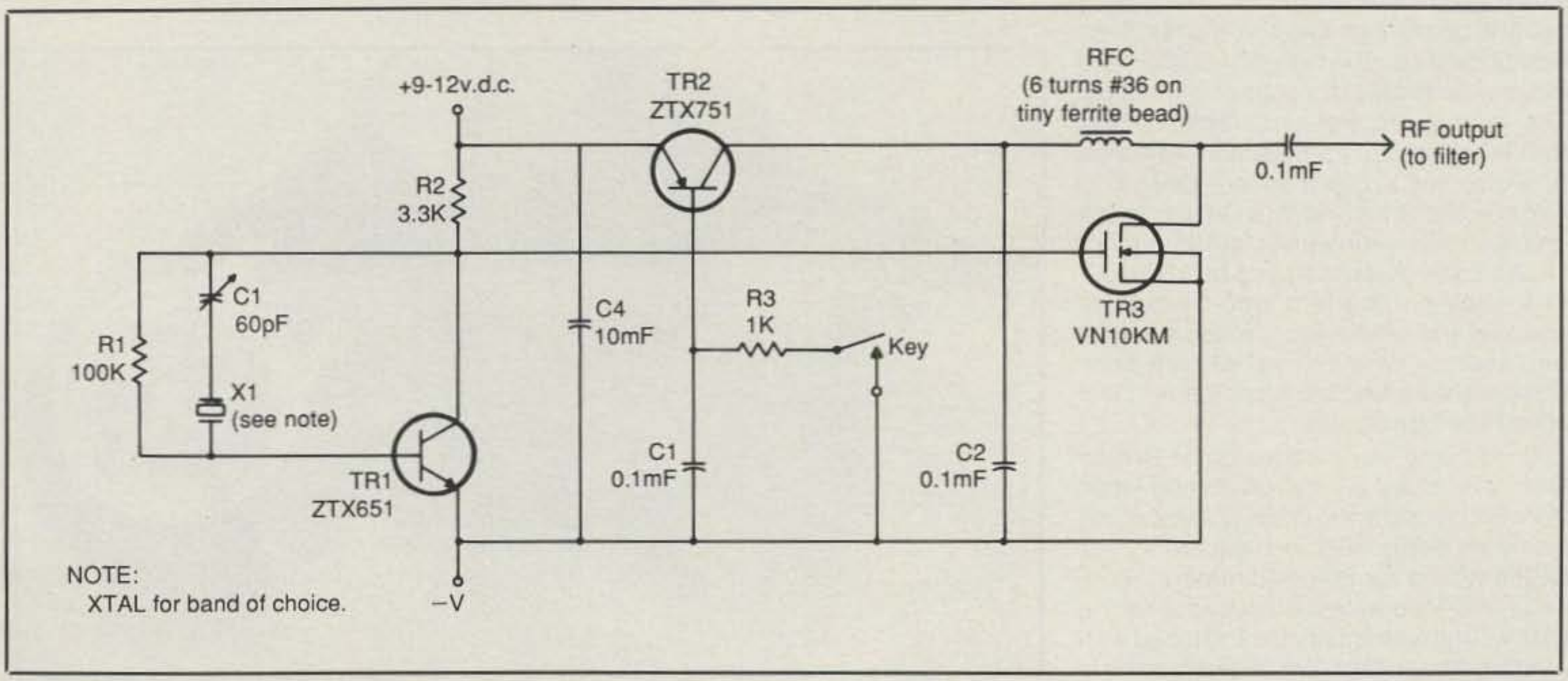


Fig. 5– Circuit diagram of popular "Oner" transmitter. (See discussion in text.)

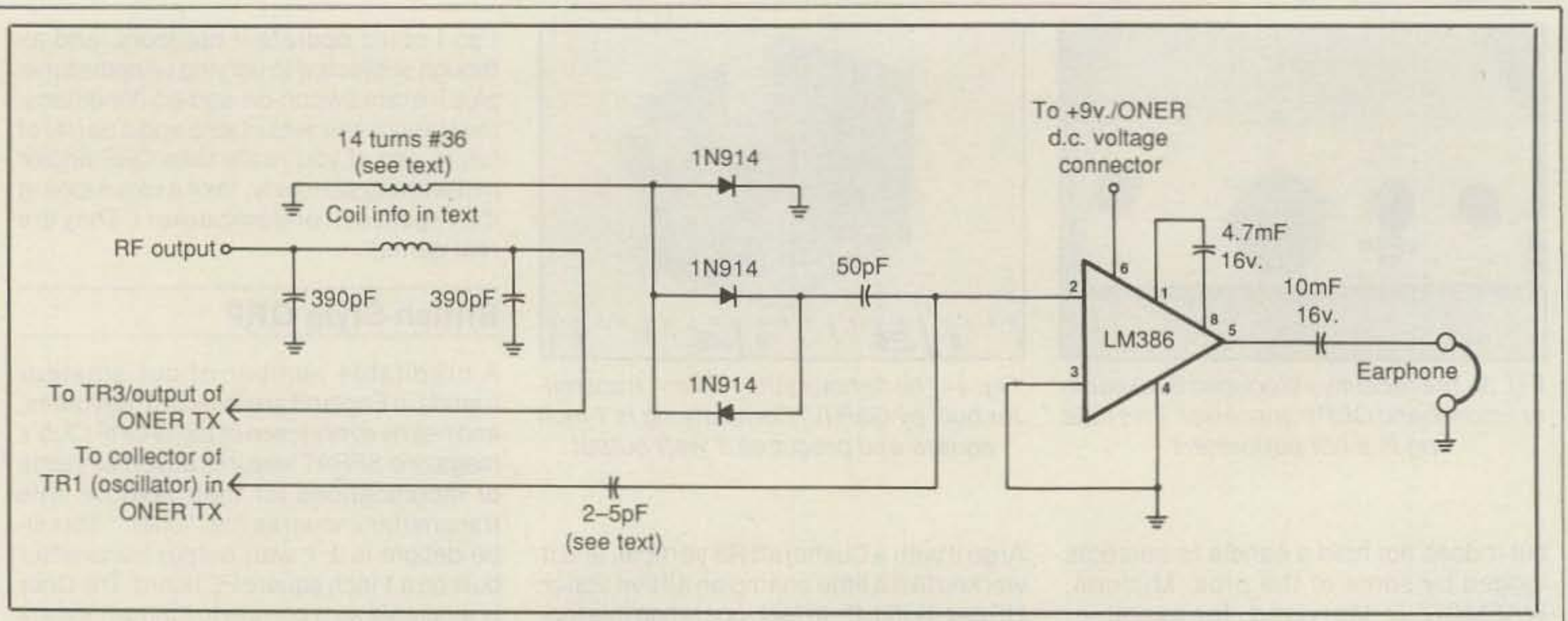


Fig. 6– Circuit diagram of Sweet Nuttin' 30 meter pocket transceiver.

ward bias. A small trimmer capacitor in series with the crystal is used for frequency warping, whereas U.S. circuits usually employ a combination coil and capacitor. TR3 is a VN10KM, a plastic-cased device that resembles a 2N2222 with a small heatsink on the top. Although the heatsink is quite small, it keeps the transistor cool at an even 1.5 watts output.

I assembled my own Oner transmitter approximately a year ago using super-thin solder and a 10 watt pencil iron, and working under a large magnifying glass. It proved to be one of the neatest little QRP rigs I have played with in many moons. After making several good contacts with the Oner on 30 meters, I decided to homebrew a mating 1 inch receiver. After working out details of that design so it would squeeze into a 2″ × 1″ × ½″ plastic box, N8ET informed us that Kanga also offers a complementing Oner Receiver that features a sharp five-transistor circuit on a 1 inch square board just like the transmitter. Component count is high, so resistors are mounted vertically for space conservation. The receiver requires an external oscillator/VFO for frequency selection, so Kanga now also has a 1 inch square Oner VFO and a similar 1 inch square Oner antenna changeover switch with sidetone monitor kit available. Assuming you build all four kits, they can be laid side-by-side or stacked and will fit into a wide variety of enclosures. Who knows? Maybe soon someone will assemble a four-stack "Oner High Rise" transceiver!

Continuing our discussion of British QRP, I received a very interesting letter from Richard Marris, G2BZQ, describing his newly designed 9 inch square indoor QRP antenna for 80 or 40 meters. Richard's milli-loop antenna uses four ferrite rods wound with small wire and tuned with a variable capacitor. We understand he is now perfecting a "Mark II" version, and details will be released in the future. Can you imagine an HF antenna small enough to sit on top of your rig? Yes, and G2BZQ reports he has made some good contacts using it with a 5 watt transmitter. Gusto QRP indeed! Full details are not available at this time, but Richard says they will be coming in the future.

Sweet Nuttin'

Since assembling the previously mentioned pocket transceiver, several homebrew enthusiasts have asked me to share information on its circuit design. I must emphasize this is strictly a tinkerer's project, but you will probably overload my mailbox with requests for the circuit if I do not include it herein (SASEs please!), so the diagram is shown in fig. 6.

One brief glance explains why I dubbed the project "Sweet Nuttin'." It is ridiculously simple! First, a separate winding on the Oner Transmitter's output coil couples incoming signals to a dual diode detector, and resultant audio is amplified by a single LM386 IC. Second, a 2–5 pFd capacitor connected between the collector of oscillator transistor TR1 in the Oner Transmitter and Pin 2 of the LM386 is used for BFO injection. Finally, a single 1N914 diode is connected between the receive pickup coil and ground to prevent burn-out of the back-to-back-connected 1N914 diodes in the detector. Incoming signals thus coupled to the pickup coil undergo detection and mixing to produce an audio output which is amplified by the IC and applied to an earphone. The complete transmitter and receiver are then powered via a regular 9 volt battery to reduce IC gain below the self-oscillation point and to drop the Oner Transmitter output to approximately .5 watts, thus avoiding cremating the receiver.

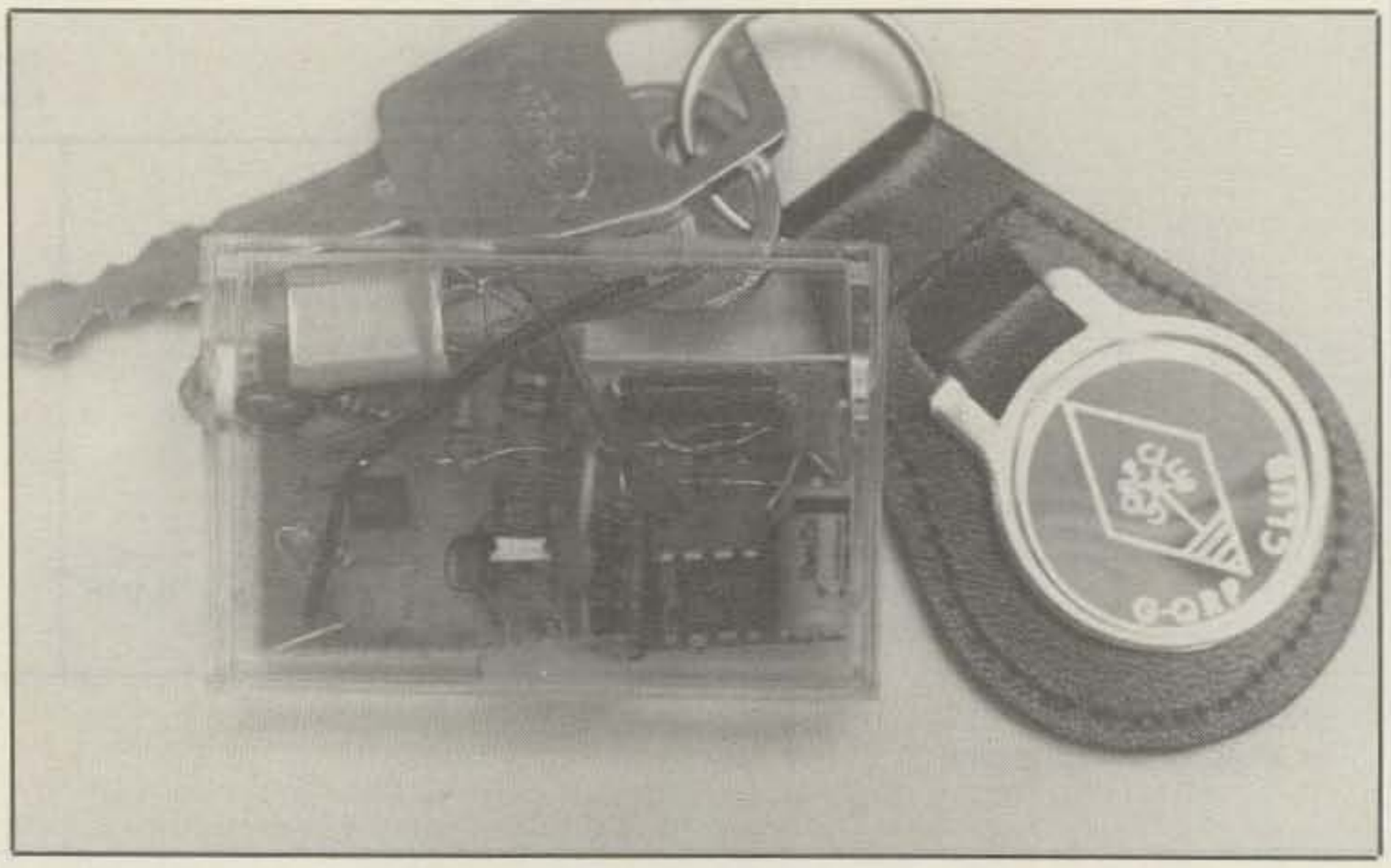


Fig. 7– Photo of Sweet Nuttin' transceiver. Compare size with keyfob.

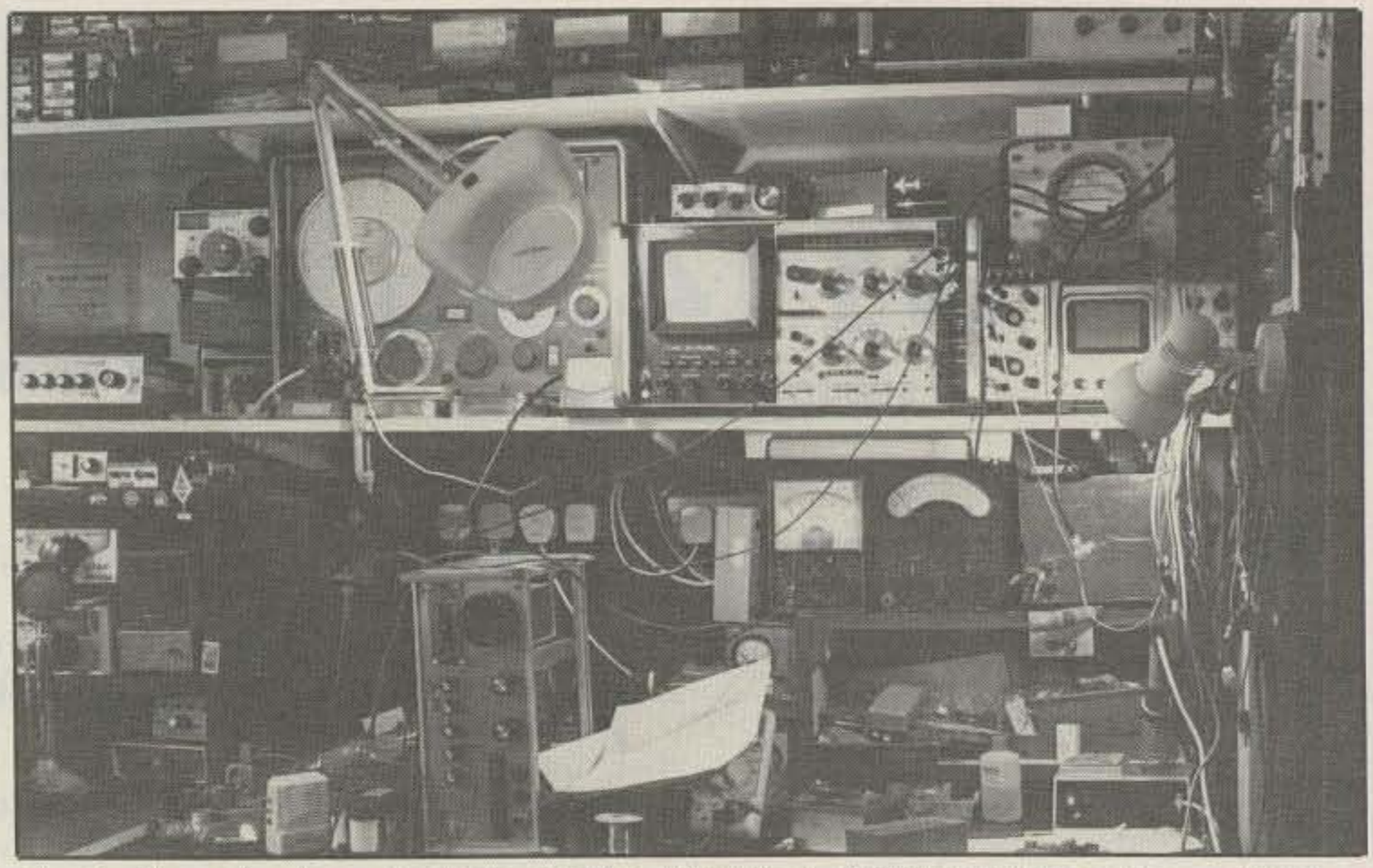


Fig. 8– Home is where the ham gear is! Workshop of QRP guru Rev. George Dobbs, G3RJV, reveals plenty of test equipment for checking out circuits.

My Sweet Nuttin' is built for 30 meters, so the Oner's output filter consists of two 390 pFd capacitors separated by a very small coil obtained from Radio Shack. I am not sure if the number is 273-101 or 273-102, but the coil is approximately ½ inch long by 1/16 inch diameter with 30 or 40 turns of fine wire. My pickup coil (wound directly over the top) is ultra-fine wire (#36) and has approximately 14 turns. Substitution of other super-small coils should work fine.

Just "dink" with capacitor values and number of turns until output is clean and above 100 mw. Room permitting, I also suggest dual RF protection diodes rather than the single diode shown in my schematic. Acquiring the proper level of oscillator injection is tricky. Experiment with the coupling capacitor value of 2–5 pFd, and consider twisting a couple of small wires together if oscillation is a problem. If the size is not a major consideration, substituting a Oner Receiver is heartily encouraged! My receiver circuit is not sensitive to weak signals, and selectivity strictly depends on gray matter between the earphones!

A photo of Sweet Nuttin' is shown in fig. 7. This picture was taken after I installed the rig in a micro cassette box. I later installed sockets in the right top area for key, power, earphone, and antenna. I used miniature three-conductor jacks, so the power and antenna leads were connected to one socket and the earphone and key connections routed through the second socket. Needless to say, there is no room to spare! Sweet Nuttin' makes a nice keyfob, and it actually works!

Fig. 9– A recent product of G3RJV's workshop: a compact 80 meter transceiver that works great.

The Wizard's Den

Many QRPers have read articles written by G3RJV or listened to his fascinating discussions at hamfest forums, so I invited Rev. Dobbs to share his picture and views of natural home habitat with us. Rev. Dobbs was a mite camera shy, so he sent a picture of his shack and workshop (fig. 8). I am guessing, but it looks as if the camera moved (actual shack must be to left) and focused on the workbench. Ah, but there are some unique items buried in all those cables, and many neat projects evolve from that table. As an example, check out G3RJV's neat 80 meter transceiver shown in fig. 9. I understand this transceiver (and several other projects) is now also available from Kanga U.S. Our G-friends definitely know how to enjoy QRP in high style!

Summary

That wraps up the column for this month, gang, and we look forward to seeing you on 20 or 30 meters QRP-style in the near future. In conclusion, I remind you the real secrets of QRP success are sharp operating techniques and a big outdoor antenna.

73, Dave, K4TWJ

Radio FUNdamentals

BY BILL ORR, W6SAI

THINGS TO LEARN, PROJECTS TO BUILD, AND GEAR TO USE

Multiband Wire Antennas

My last few columns discussed popular multiband wire antennas: the G5RV /ZS6BKW design and the off-center-fed (OCF) dipole. These simple skywires, aided by an antenna tuning unit (ATU), permit the user to skip from band to band and enjoy the waning days of the present sunspot cycle.

Of course, one of the most versatile multiband antennas is the center-fed "Zepp," a pre-WWII favorite (fig. 1). This simple antenna can be used on any frequency between 1.8 and 30 MHz, provided a suitable balanced antenna tuner is used with it. Alas, the days of the balanced tuner seem to be gone. I've described one[1] and there is one shown in the *ARRL Antenna Book*.[2] Unfortunately, modern store-bought ATUs are single-ended devices and use a balun to convert to a balanced line. This approach is okay, provided the balanced line has a low value of SWR on it. This is usually not the case in a multiband antenna, and the ferrite balun just won't do the job. I hope one of these days a manufacturer will bring out a link-coupled, balanced ATU that will do the job as it should be done! That will open the door for more interesting multiband antenna designs.

Build a balanced ATU yourself? If you can find the components and have the time, go to it! You'll be glad you did.

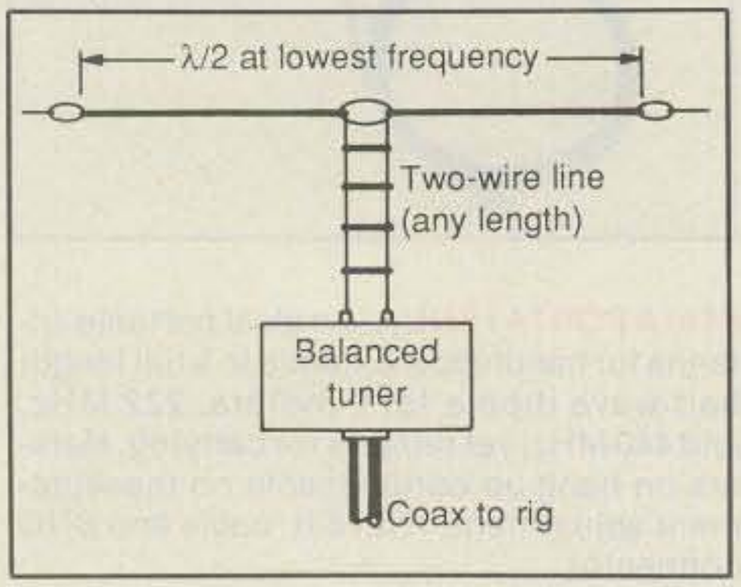


Fig. 1– Most versatile multiband antenna is the center-fed "Zepp." For 80–10 meter service the recommended antenna length is 136 feet.

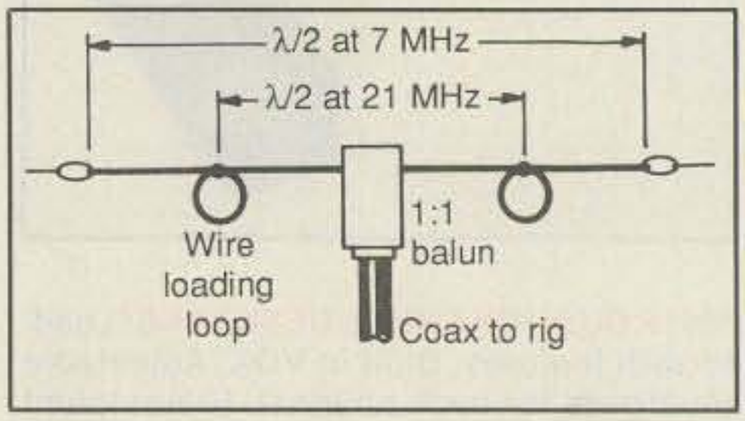


Fig. 2– Loading loop placed at 21 MHz end points lowers third harmonic resonant frequency.

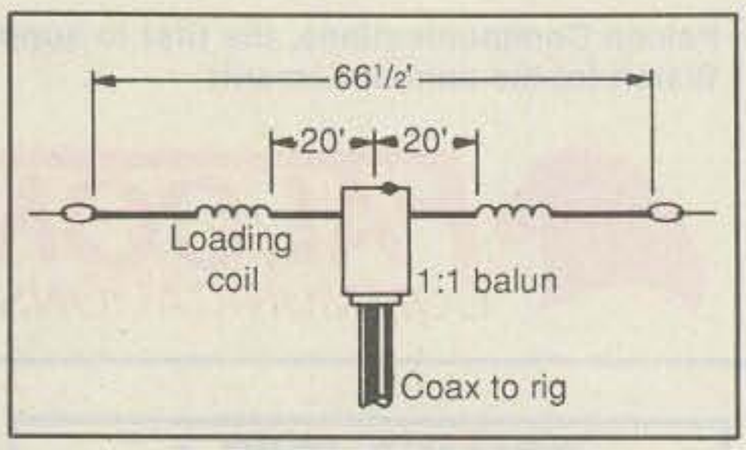


Fig. 3– The WA3T dual-band antenna places loading coils at points of maximum current for 21 MHz. Coils are 0.5 uH.

A 7 and 21 MHz Dipole Antenna

A center-fed half-wave antenna will work on odd harmonics of the fundamental frequency. That is, a 7 MHz dipole will operate on 21 and 35 MHz, the third and fifth harmonics of 7 MHz. However, the physical length of a harmonically operated antenna is not the same as the electrical length, and therein lies the problem. The approximate resonant frequency of a harmonic antenna in free space can be determined by the following formula:

$$f\ (MHz) = \frac{492\ (N - 0.05)}{L}$$

where L is length in feet and N is the number of half-waves on the antenna.

Let's examine a dipole cut for 7 MHz and see what the third harmonic relation is. By formula (468/f), a dipole cut for 7.000 MHz is 66.857 feet long. Plugging this number into the harmonic equation, we find that third harmonic resonance falls at 21.709 MHz. That's a long, long way from the 21 MHz band!

The problem is to lower the third harmonic resonant frequency into the 15 meter band without disturbing the fundamental frequency resonance point. This has been attempted by the addition of loading loops, placed at 21 MHz high potential points on the antenna (fig. 2). Unfortunately, loading loops are large and unwieldy and must be adjusted by cut and try.

The WA3T Inductively Loaded Antenna

In the September 1992 issue of *Radio Communication*, Robin Moseley, WA3T, approaches harmonic resonance in a different manner. He says, "Another solution is to use a small amount of inductive loading, positioned approximately at the center of each of the 'outside' half-waves of the 21 MHz, 1.5 wave dipole (fig. 3). The inductors should be positioned near the maximum-current points in the 21 MHz dipole. When operating on 7 MHz they carry only half the maximum current. Taking this and the frequency difference into account, the inductors present about six times more loading effect on 21 MHz than they do on 7 MHz. Thus, they increase the electrical length correspondingly more on 21 MHz.

"In a practical antenna, the two design and adjustment variables are the inductance of the loading coils, and the overall length of the dipole. Rather than worry too much about putting the inductors at the exact maximum-current points for 21 MHz, I suggest they be positioned 20 feet from the center, and the final length adjustment be made in the outer section without changing the position of the inductors.

"A good value for the inductors is 0.5 uH, corresponding to four turns on a 1.5 inch plastic tube, spaced about 1.3 inch. A good starting point for the overall length is 66.5 feet.

"For an antenna height of 30 feet, MINI-NEC predicts a 21 MHz resonant impedance of 82 ohms, giving an SWR of 1.65 on a 50 ohm line . . . .

"Note that these inductors are not 'traps,' merely slight loading to adjust the electrical length. The bandwidth of the antenna is not significantly affected by their presence."

Building a 7-21 MHz Dipole

Well! There was nothing to do but to try out this simple antenna. Being a contrarian, my antenna is slightly different from the WA3T design. It has an overall length of 65 feet and instead of using inductors, hairpins made out of #12 wire were used (fig. 4). It is suspended in an inverted-V con-

48 Campbell Lane, Menlo Park, CA 94025

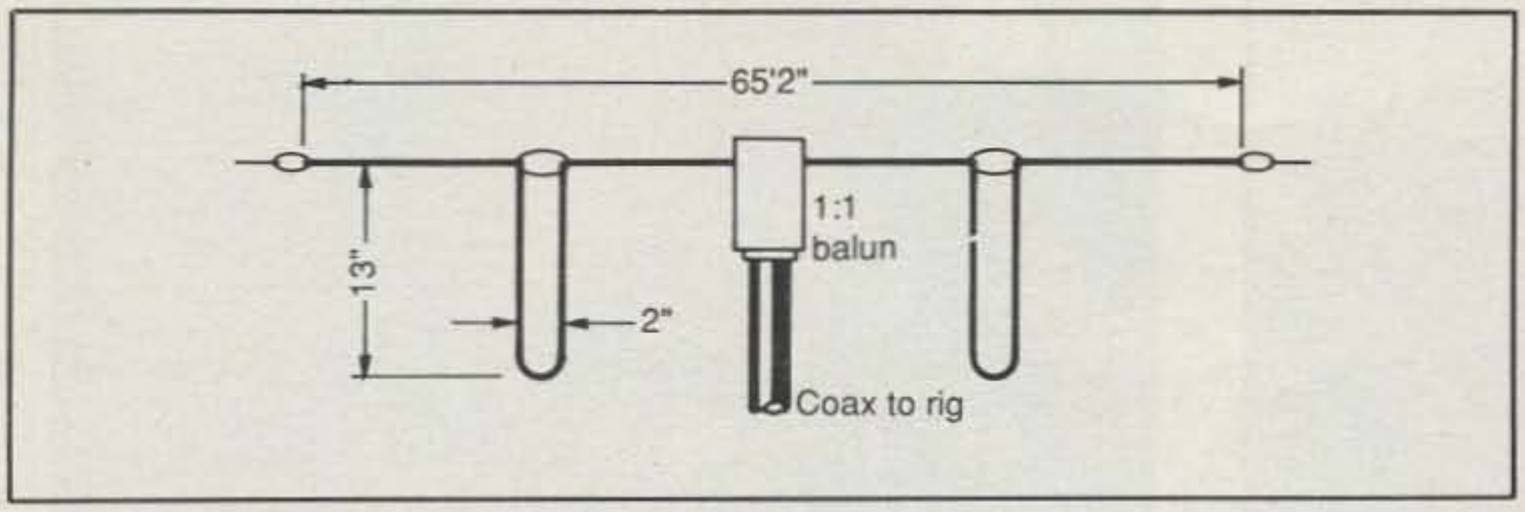


Fig. 4– Hairpin inductors are made of #12 wire spaced 2 inches, 12 to 14 inches long.

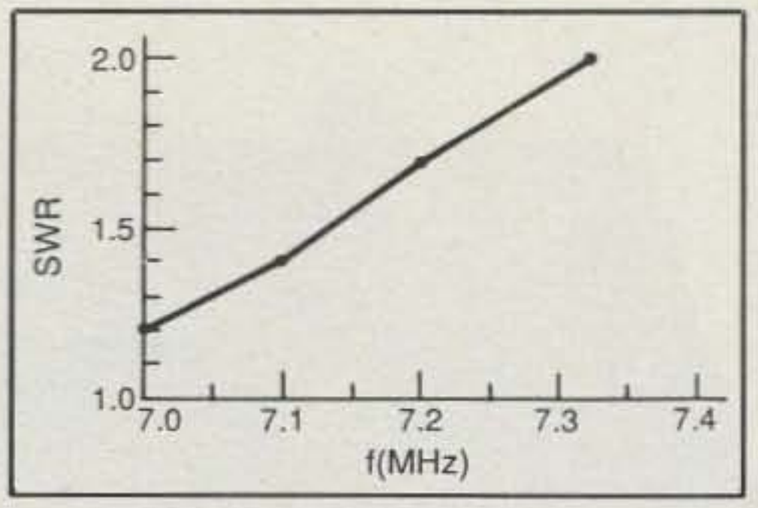


Fig. 5– SWR curve for antenna cut to resonate at 7.0 MHz.

figuration, with the apex at 40 feet and the ends at 21 feet. And it worked right off the bat!

As with any antenna, the resonant feedpoint impedance varies with height above ground. In my case it turns out to be about 62 ohms on 40 meters and about 80 ohms on 21 MHz. The corresponding SWR curves are shown in figs. 5 and 6.

It is possible to move the 7 MHz SWR curve higher in the band by trimming the antenna tips, but this seems unnecessary, as the ATU drops the SWR to unity at any point in the band.

All in all, it is a nifty antenna for today's low sunspot propagation. Fifteen meters is still open for good DX, and 40 meters is great for rag-chewing within the U.S. I recommend this simple skywire for easy, two-band operation.

The WA2YYI Trap Design

Lots of amateurs like the trap-dipole configuration for multiband operation. John, WA2YYI, is one of these amateurs, and he's designed a nifty trap assembly for a compact 160–80 meter dipole (fig. 7).

Building a tuned trap is always a messy business, and waterproofing it is a pain. John's approach sheds a new light on this problem. This arrangement places the coil in a vertical position and uses a short length of RG-8/U coax inside it for the capacitor. The trap coil is wound on a section of 1 inch white PVC water pipe (actually 1 ¼ inch outside diameter), 4 inches long. The coil consists of 66 turns #21 enamel wire, close-wound to 2⅛ inch long. This works out to about 75 uH, and in conjunction with a 9⅛ inch length of coax, resonates at approximately 3.7 MHz.

Both ends of the coax can be protected from the weather by dipping them in black plastic sealant used to coat the handles of tools (pliers, screwdrivers, etc.) and obtainable at a hardware store. The trap is adjusted to frequency with the aid of a dip oscillator in the time-proven manner.

The coil is given a heavy spray of acrylic to protect it. When wet, the water runs off the coil and the whole assembly seems waterproof. It will be interesting to see what this design does in a heavy snowstorm! Time will tell.

Jerry's Place

Old timers living in the New York area pre-WWII fondly remember "Jerry's Place," otherwise known as Gross Radio. Located at 51 Vesey Street in the heart of "Radio Row," it was a popular hangout for enthusiastic amateurs.

You could buy a 6 foot relay rack complete with all panels for $16.95, 866 rectifier tubes for 99 cents, a genuine carbon plate 203A tube for only $8.75, and a kilowatt plate transformer for $11.70! Meters were $3.35, and a good "bug" key was $6.00. In a word, it was "ham heaven" for the lean purse.

Jerry Gross, W3AAE, was one of the first distributors to bring out a low-cost transmitter kit. The CB-25, a 30 watt transmitter for 80-40-20 meters, sold for $13.95. A lot were sold, but very few of these antiques can be found today.

John Rollins, W1FPZ, has a unique hobby: he locates these old rigs and refurbishes them into working models. His CB-25 is shown in fig. 8. It has the original coils, wound with green, silk-covered wire and is ready to go on the air!

John also built up another look-alike Gross transmitter which uses a pair of Taylor T-20s (similar to a 210) in the final stage (fig. 9). A pair of 816 mercury vapor rectifiers supply high voltage for this 100 watt rock crusher.

These two transmitters bring back fond memories of Jerry's place and other inhabitants of radio row: Leeds, Wholesale Radio Service Company, Blan, the Radio Man. . . . Oh boy, I could go on for hours. John helps to keep these happy memories alive with his meticulous recreation of some of amateur radio's glorious past.

The Amateur Radio Library

Every once in a while a book comes along that I wish I had read a lot earlier in my life. Unfortunately, this book wasn't around when I really needed it! I refer to *The Art of Science* by Joe Carr, K4IPV. Joe has written over 80 books in the scientific field and was well-known as a contributing author to *Ham Radio* magazine.

This book covers the "nuts and bolts" of real-world scientific inquiry. It covers

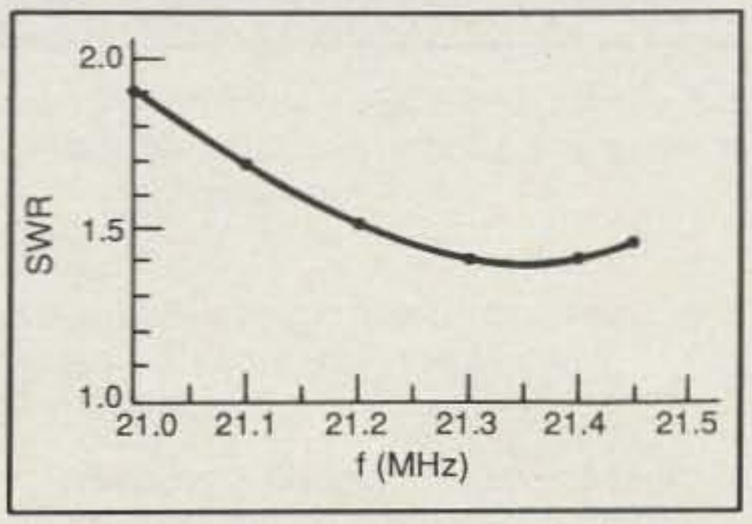


Fig. 6– SWR curve for 21 MHz band.

logical thinking and is a bible for any young student thinking of going into the modern world of computer science or business administration. In my case it is a helpful companion for an older person to help codify his thoughts and establish an analytical thinking technique that benefits all walks of life.

The book was especially helpful in the last presidential election in which the politics of counterfeit and deception reached new heights. The book lists and explains 26 arguments used in everyday politics that delude the voter into reaching conclu-

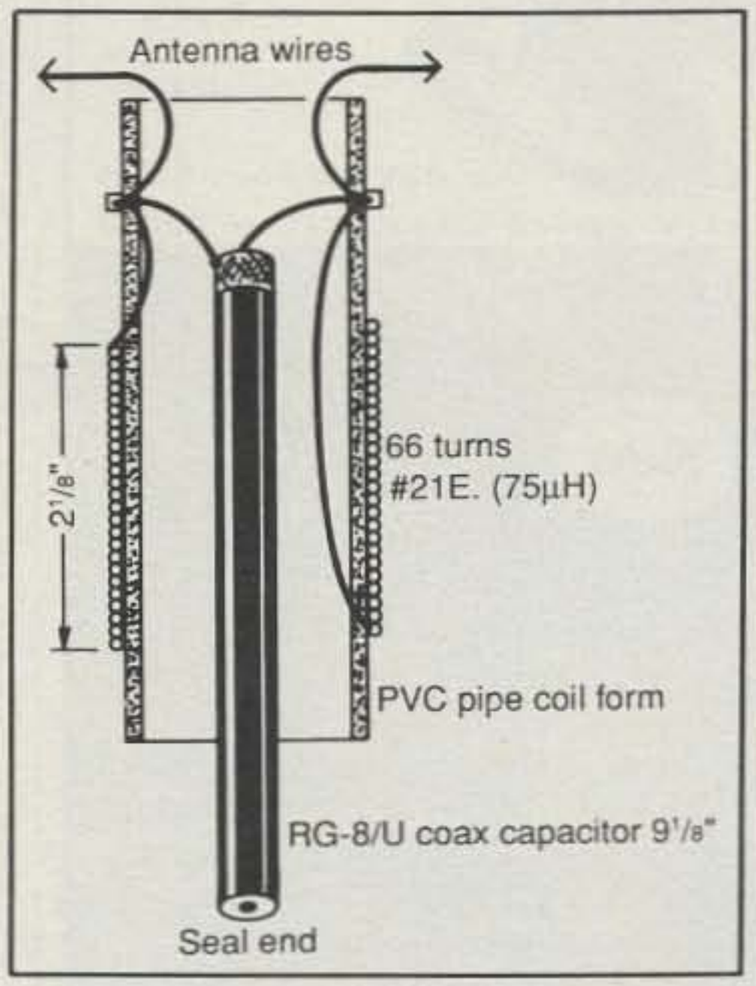


Fig. 7– Cutaway view of compact 80 meter trap. Capacity of coax is about 22.5 pF.

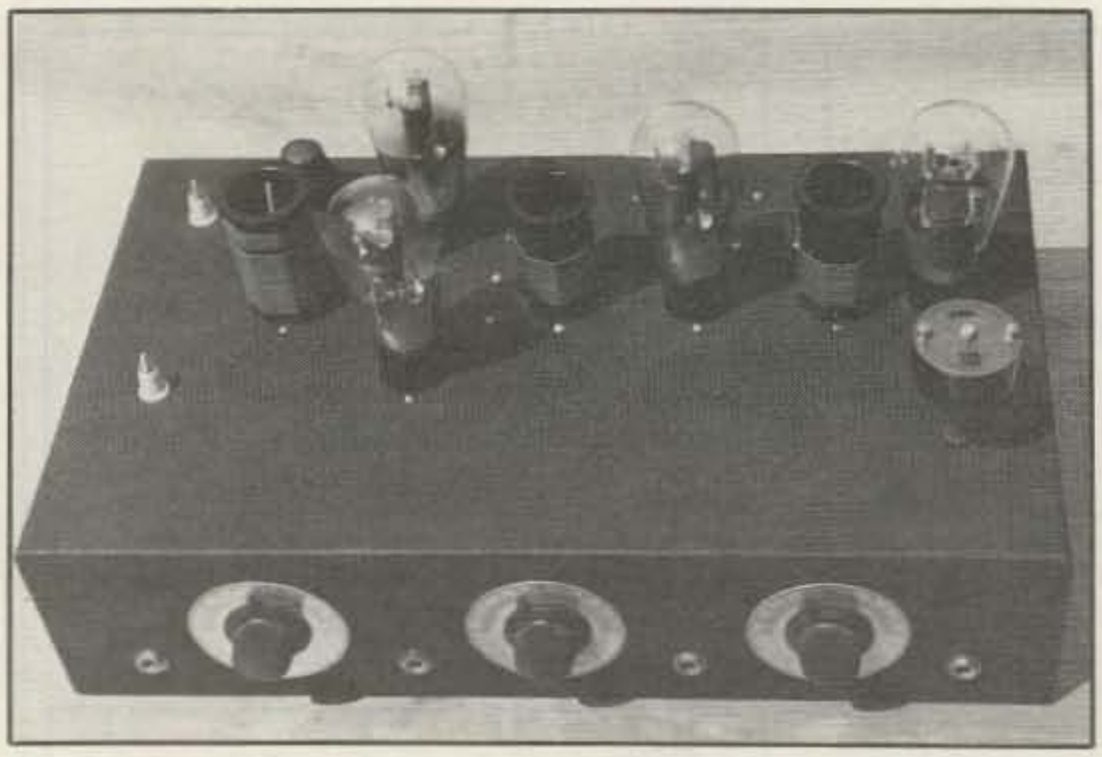


Fig. 8– Refurbished CB-25 transmitter of John Rollins, W1FPZ. The line-up is 47 crystal oscillator, 46 buffer, and two 46's in the final amplifier.

Fig. 9– One-hundred watt Gross transmitter built by W1FPZ uses two Taylor T-20 tubes in final amplifier.

sions that are false or biased. It was very helpful during the various TV debates. The XYL and I listened to them with book in hand. "Aha! He's using Argument by Oversimplification!," or "He's using an Incomplete Comparison argument!" I must say it was very satisfying to catch the rascals right in the act!

Political obfuscation extends into science and engineering and even into amateur radio. While this book doesn't deal with amateur radio *per se*, it deals with everyday life. Reading it helps to overcome and understand some of the maddening and confusing events that continually surround us.

In a nutshell, the book is a practical guide to experiments, observations, and handling data of all types. Fifteen chapters cover theory, records, measurements, probability, sampling data, and other subjects important in today's competitive world of business, science, and industry. It is a fascinating discourse on the world around us. I recommend this book, *The Art of Science*, by Joseph Carr, High Text Publications, 7128 Miramar Rd., Suite 15, San Diego, CA 92121.

The Dead Band Quiz

My recent remarks on retarded technology, or technology in reverse, drew cogent comments from W2FZ and W8YFB, who had noted the same phenomena. The quiz about the voltmeter, which read zero volts, and the little poem about the "Scarlet Pimpernel," brought correct replies from SM5GW, W2DFZ, OH2DT, N2EBG, N7VZB, VE7IIT, K1RD, KI6IS, W3ZLK, N3EID, WA4DTE, ex-K2UKT, KF9HG, W4HYY, N4OFV, VE7BS, and KA1ADF.

Also thanks for the comments about the demise of Heathkit and other personal thoughts from WA0KKC, K9AY, K5BDZ, KH6GI, VE4AKM, W2YYI, W5QJM, W6PYK, K9BXG, WA3EOQ, WA8MCQ, W8JI, W8UOF, W1PXL, KJ6GR, and W8ARM. I wish I had time to reply individually to each one of you! Thank you for your comments and suggestions.

A New Dead Band Quiz

The writer of this story was Eric Blair. Born in India in 1903, he became a famous political writer. What is his "pen name" and from which of his books comes this quotation?

"It was a bright cold day in April, and the clocks were striking thirteen."

Footnotes

1. Orr and Cowan, *Simple, Low-cost Wire Antennas for Radio Amateurs*, published by Radio Amateur Callbook, Box 2013, Lakewood, NJ 08701 (1-900-905-2961).

2. *The ARRL Antenna Book*, published by the ARRL, Newington, CT 06111.

Correction

In fig. 1B (page 74), November 1992 issue, the correct length of the 300 ohm feedline is 29 feet 6 inches, not 26 feet 9 inches.

CONTEST CALENDAR

BY JOHN DORR, K1AR

NEWS/VIEWS OF ON-THE-AIR COMPETITION

Strategies for QRP Contesting

In keeping with the theme of low-power contesting, which we have been discussing over the past few contest columns, I am concluding this month with the topic of QRP operating. I've always admired the QRP contester as a person drawn from a special breed. As you can tell from the comments to follow, there is no lack of enthusiasm in the successful QRPer's attitude about contesting. I suspect that like myself, you will be left with the feeling that a dose of QRP contesting just might give us a new outlook on our operating styles and tactics. It can become too easy to develop poor operating techniques which tend to be obscured behind our KW amplifiers. In my book, successful QRP contesting brings out some of the best operating around! And now to the experts.

Contesting with QRP

By Christopher J. Page, G4BUE

In many ways QRP contesting is the same as contesting with high power, but by other measurements things are very different indeed. I will be concentrating on those areas of contesting that in my experience (since the late '70s), I have found to be either unique to QRP or very much more important than when using high power.

I have found that setting goals and objectives for this mode of operation is very much a personal thing, depending on how ambitious you are feeling at the time! Trying to beat the score of last year's winner or an existing record is no different from QRO goals and objectives, but trying to see how close you can come to the QRO guy in the same class as you is unique to QRP. An example was my goal in our National Field Day this year. A new QRP Class (5 watts output) was introduced for 1992, but in all other aspects the rules were identical to the existing 100 watts Restricted Class. Although the results have yet to be announced, the claimed scores were quite encouraging. The leader of the Restricted Section claimed 5121 points from 1042 QSOs and I claimed 2801 points from 571 QSOs!

The majority of the major contests now include a QRP class. The rules are identical to the regular class(es) except for the power limitation, which is usually 5 watts output, the QRP standard agreed by QRP clubs worldwide. Nothing is more rewarding than to see your callsign listed in the QRP class with a higher score than a station listed in the corresponding QRO class. Believe it or not this is easier to achieve than you might think.

Many QRP contesters are also DX-chasers. They not only go for DXCC, WAZ, WAS, and the other major DX operating awards, but for the more difficult ones such as 5BDXCC, 5BWAS, etc. Contests are an excellent method of increasing your band/country/mode scores, and therefore another goal could be to work 10 new countries on 40 meters and/or 20 new countries on 20 meters. Obviously, your operating strategy for this type of goal would be quite different from that, if you were trying to achieve a big contest score.

Needless to say, your operating strategy will depend on your goals. The difficult decision of whether to try and "run" stations or "search and pounce" is dealt with separately, but there are several strategies that apply whatever your goal may be. These also apply to QRO contesting, but come under the heading of being more important in QRP contesting.

Accuracy is absolutely essential. When your signal is several S points down from others and perhaps the victim of deep QSB, you cannot afford to make mistakes. On CW this not only means sending accurate code, but well-spaced code. Every QRPer knows Murphy's Rule #1: If you send your callsign three times making only one mistake, and the other station only copies your call once, it will be the one when you made the mistake!

Because you are a QRP station, don't make the mistake that some QRPers do and send very slow CW to make up for your low power. Listen to a QRO contest station "running" QSOs (that is, working one station after the other in quick succession on the same frequency). He is working to a rhythm and stations are calling him with the same CW speed that he is using. If you use a slower speed, then you break his rhythm, and in addition to making it more difficult for him to copy you, you slow down his rate and will not be popular with him—something to remember if you want his QSL card later!

Accuracy on SSB is also important. Use clear phonetics that cannot be confused with other words or letters. Remember that phonetics which sound clear to English-speaking amateurs may not be so clear to those whose natural language is other than English.

A good strategy, as with QRO contests, is to work the highest band that is open. But I have also found that when working DX on the HF bands with QRP, you can obtain some enhancement in signal strength from being on the appropriate band that the MUF is rising or falling through. This phenomena appears to be more distinctive when the MUF is falling. It probably occurs when using QRO but seems much more noticeable when using QRP. In the CQ WW and ARRL contests when 10 and 15 meters are beginning to close to the west, I have often been able to "run" USA stations at 2 or 3 a minute for 20 or 30 minutes just before the band finally dies completely.

Can I please make a big plea for a strategy that you should never adopt? That is appending /QRP to your call. The callsign G4BUE/QRP or your own call /QRP can never legally exist, so why use it? In addition to being more letters for the other station to copy, it can be construed that you think you should be given some sort of favor or special treatment because you are a QRP station. I know several top-class QRO contesters who interpret the use of /QRP that way and refuse to answer (unless they are really desperate for the QSO!). Apart from those contests where you are obliged to give your power, nothing about your operating should indicate that you are using QRP.

One of the most-asked questions in QRP operating is whether to "run" stations or "search and pounce." Naturally this depends on many things, but mostly hinges again on your goals and objectives for the contest. If you are trying to build up band/mode/country scores, then searching and pouncing is your best tactic. However, if you are trying to achieve a "big" score, then you have the same dilemma as the QRO

c/o CQ magazine

Calendar of Events

Jan.	**29-31**	**CQ WW 160M CW Contest**
Jan.	29-30	U.B.A. SSB Contest
Jan.	30-31	REF French CW Contest
Jn. 30	- Feb.7	ARRL Novice Roundup
Feb.	6	North American CW Sprint
Feb.	6	Vermont QSO Party
Feb.	6-7	QCWA CW QSO Party
Feb.	6-7	YL-ISSB CW QSO Party
Feb.	7-8	1993 Classic Radio Exchange
Feb.	13	North American SSB Sprint
Feb.	13	Utah 160 Meter Challenge
Feb.	13-14	New Hampshire QSO Party
Feb.	13-14	YLRL YL-OM CW Contest
Feb.	13-14	Dutch PACC Contest
Feb.	13-14	EA RTTY Contest
Feb.	20-21	ARRL DX CW Contest
Feb.	**26-28**	**CQ WW 160M SSB Contest**
Feb.	27-28	RSGB 7 MHz CW Contest
Feb.	27-28	REF French SSB Contest
Feb.	27-28	U.B.A. CW Contest
Feb.	27-28	YLRL YL-OM SSB Contest
Feb.	27-28	North Dakota QSO Party
Mar.	6-7	ARRL DX SSB Contest
Mar.	13-14	QCWA SSB QSO Party
Mar.	13-14	YL-ISSB SSB QSO Party
Mar.	14-15	Wisconsin QSO Party
Mar.	20-21	Bermuda Contest
Mar.	20-21	B.A.R.T.G. Spring RTTY Contest
Mar.	**27-28**	**CQ WW WPX SSB Contest**
Apr.	10-11	JA Int'l CW Contest (High Bands)
May	**29-30**	**CQ WW WPX CW Contest**

February's Contest Tip

Even though there seems to be a focus on the "band edges," don't be afraid to use the high end of the bands as well. In one hour during a run in the 1992 CQ WW SSB Contest, I had HS, 8Q7, 4S7, TL8, and 9K call me while operating on 14318 kHz!

contesters. Decisions are usually influenced by the scoring system for the contest, band conditions, the QSO rate when running stations, the number of multipliers worked, how far through the contest you are, and how tired you are.

When using QRP you have to be realistic. That means you don't start the CQ WW CW Contest on 14025 calling "CQ Contest." Generally speaking, I have found the best tactic in the major 48 hour contests is to search and pounce at least for the first 24 hours and usually for the first 36. During the last 12 hours the majority of the "big guns" have worked each other and the pile-ups on the DX stations have slowed to a trickle or even dried up altogether. This is the time when some of the big guns and even some of the DX stations themselves are often searching and pouncing. They are listening for the weak stations calling "CQ Contest," as chances are they have already worked the louder ones. This is when the QRPer can run stations, perhaps not as quickly as the QROers, but with QSOs going in the log that he would probably not otherwise have made.

I have discovered several useful techniques when searching and pouncing with QRP. It virtually goes without saying that you must be able to zero beat accurately. QRPers don't have big signals to draw the station to them. They must therefore ensure they transmit exactly on the frequency the other station is listening on. If the first call or two are unsuccessful, I have often found that moving the transmitter VFO 10 Hz or so at a time can eventually get you through. It can mean the difference between your QRP signal being in the clear and being heard and being swamped by a much louder one.

How long do you spend calling a particular station? This question could be debated amongst contesters almost as long as the running vs. search and pounce question. Contest scores are composed of QSOs being entered into the log. Obviously, time spent unsuccessfully calling a station does not contribute to the score. Some form of self-discipline has to be introduced. This can depend on several factors, the most influential of which is whether the station is a multiplier (or a double multiplier—zone and country, as in the *CQ* Contests) and if so, the likelihood of working the multiplier again.

In any case don't just tune away from a station after unsuccessfully calling it. Make a note of the call and frequency (e.g., use those 100 memories you have in our new transceivers!) and come back half an hour or so later. In many instances conditions will have changed, the size of the pile-up may have grown smaller, or the station may have altered the direction of his antenna. Any of these changes can make a big difference when running QRP—the difference between getting through and not getting through. I have often called a station unsuccessfully for longer than I should, tuned away in frustration, and then gone back a short while later and raised him on the first call! My scratch pad is usually full of callsigns and frequencies when searching and pouncing in ernest.

After spending considerable time searching and pouncing with QRP in several major contests, you begin to learn the art of calling in pile-ups and realize that one of the reasons you are getting through against the kilowatt boys is due to the way you call. Almost without realizing it, you begin to adopt a different calling technique. It cannot be described in words, but any QRPer will tell you it happens. If you use full break-in (QSK), then you will learn the technique that much quicker, as it will enable you to hear the state of the pile-up while you are calling. I have

always used Ten-Tec Argonauts for QRP contesting (initially the 509, then the 515, and currently the 535, Argonaut II). In my opinion, Ten-Tec has the best QSK in the world, and the thought of searching and pouncing in contests with QRP without full break-in makes me shudder! The other reason I use Argonauts is that they are a "proper" QRP rig. You will never be tempted to turn up the gain and give people the opportunity to accuse you of cheating.

After a couple of years of regular QRP contesting I found I was able to assess the size of a pile-up and, combining this with the propagation conditions, was able to accurately forecast how long it would take me to get through. This "seasoning" has enabled me to save a lot of otherwise wasted time in unsuccessful calling. This, of course, comes with experience and cannot be learned overnight. It also depends on a good knowledge of propagation, which is another aspect that is more important to the QRP contester.

A critical secret of successful QRPing is the antenna, and in contesting this can help make up for some of the disadvantage you have with regard to the QROers. Obviously, a full-size, multi-element, monoband Yagi on top of a 200 foot tower would help, but most of us have to be more realistic! What is more important than the type of antenna you are using is how well it is working.

QRPers can never be content with their antenna just working. It has to be working the very best way possible. For any antenna to work properly requires sound construction, good-quality low-loss coax and connectors, efficient and well-constructed antenna tuner (if used), and perfect adjustment to ensure the maximum amount of RF is being radiated in the desired direction. Once this has been achieved, all unnecessary accessories should be removed from the line between the transmitter and the antenna. Every antenna switch, SWR bridge, etc., has some attenuation. Individually it isn't much, but when added together it can mount up to a dB or two. When you are only starting with 5 watts from your transmitter, you cannot afford to waste any RF on its way to the antenna!

The quality of your transmission is more important with QRP. Your CW note must be T9 with no hint of a chirp or click. Use a good-quality microphone on SSB and ensure your audio is as clear as possible. Although speech processors can do wonders for an SSB QRP signal, they can be more destructive to a QRP signal when overdriven.

In addition to those skills you need for general contesting, you need to have extra reserves of patience and perseverance when using QRP. In return you stand to receive more satisfaction, fun, and sense of achievement. Breaking a big pile-up when running 5 watts cannot really be described. You have to do it to discover the sense of achievement. One of the things I enjoy about the ARRL contest is giving my power on CW. I used to give "005" and then receive the inevitable "not nr but pwr pse." The sense of pride you have when you then send "5W 5W" again cannot be described in words. Sometimes you have to repeat it and add the letters "QRP" before the other station eventually realizes you are only running 5 watts!

An aspect of QRP contesting that has given me a lot of fun is "milliwatting," and more recently "microwatting." Milliwatting is using mw power levels instead of watts. Output RF power levels can be accurately adjusted using a simple stepped attenuator. Ten-Tec make the model 290 for the Argonaut, which reduces 5 watts in steps down to just 10 mw. If you are not trying to achieve a big score, it can be real fun trying to see how far you can work with the lowest power or how many US states you can work in the ARRL contest with 500 mw or so.

Milliwatting is a very good method of "testing" the antennas and operating skill of the big DX contest stations, as well as your own antenna. As any European knows, during the late afternoon of a major contest the HF bands are usually full of USA stations, evenly spaced all running stations on their own frequency. Most of them are very similar in signal strength, but which of them are achieving their big signal through good antennas and which through high power? Milliwatting can tell you, as antennas work two-way and high power only works one way!

I usually start by calling at the 10 mw level and gradually increase power until the station copies me, logging the power. I generally find that those stations who copied me with the lowest power levels on, say, 20 meters are the same stations who copied me with the lowest power on 15 and 10 meters. If further confirmation was needed, after repeating this in several contests I usually find it is the same stations who continually copy me with the lowest power levels, thus reducing any differences in conditions, etc. (What am I bid for my list of USA stations who never hear me until I have increased my power quite considerably?!)

More recently I have taken milliwatting one step further into microwatting. By adjusting the output of the Argonaut to 50 mw output, the attenuator allows me to use power levels down to 100 microwatts! These power levels really test the operating skill and antennas of contest stations. In the 1992 Radio Sport Contest I was able to work two YU stations when only running 100 uw and an HA station with 500 uw. I had to increase power to 2.5 mw to achieve my best USA contact with WZ3Q and then 5 mw to work WJ9B. This season I shall be looking to beat this and make my first ever USA contact with microwatts. Will you be ready in case I call you? See you in the next contest!

QRP Contesting

By Tom Russell, N4KG

After years of QRP DXing, I stumbled into QRP contesting in the ARRL SSB DX contest of 1982 when my multi-single partner failed to show for the contest. Dismayed, I began calling some new band countries QRP only to discover that I could actually break pile-ups and work people with just 5 watts output in a contest situation. What a revelation! I was off and running. EA9, TF, and 5Z4 in the first 5 minutes. This was FUN! Twenty-eight hours and approximately 500 contacts later, my lady friend arrived with dinner. Yearning for a respite, I succumbed to awake just after sunrise. After 35 hours of operation, I finished with 617 contacts in 202 band countries using only 10, 15, and 20 meters; good enough for third place behind KA1VQ and KN8P. Just think, another 3 or 4 hours and . . . Skip the desert!

It never ceases to amaze me to have stations from all around the world answering my CQ calls while the needle of my wattmeter is just barely coming off its resting position. But perhaps that shouldn't be such a big surprise. We know that 100 watts will work the world, and that's only 2 S-units (12 dB) below the 1500 watt legal limit. Well, 5 watts is only 13 dB, or another 2 S-units, below the 100 watt level. If you are S9 with your 1500 watt amplifier, lowering your power to 100

watts should produce an S7 signal, and 5 watts will still be a respectable S5. On a quiet band, with typical receiver sensitivity, it should be possible to hear a 5 watt signal when KW signals are only S5 or 6!

By now you're probably thinking, "That's fine for you to say; you probably have giant antennas. What about the little guy with a tri-bander on a 50 foot tower?"

Well, it's time to debunk a few popular myths about antennas.

First, higher is NOT always better. As a matter of fact, on the high bands while the sun is up, my LOW antennas (35 to 45 feet) outperform my high antennas by as much as 20 dB! They are almost always better than the high antennas to Europe and Africa. To the Caribbean, the low antennas perform well in midday but the high antennas are better in late afternoon and early evening as the MUF drops and those of us in the Southeast must make it in one (low angle) hop. High antennas DO enjoy an advantage under marginal conditions and during the hours of darkness.

Second, big antennas are not all that much better than small antennas. Without going into the analysis, it can easily be verified with any of the popular computerized antenna analysis programs that a good 5-element Yagi is only 2 dB better than a good 3-element wide-spaced Yagi and that stacking in typical configurations only provides an additional 2 dB gain over a single antenna. Yes, these small gains can make big differences under marginal conditions and in big pile-ups, but as a QRPer, these situations are not productive places to spend your time.

Third, even the badly maligned dipole is actually a very efficient antenna when installed at the proper height to match the wave angles that are propagating. The free-space gain of a wide-spaced 3-element Yagi is only 6 dB over a dipole. Over ground, the dipole may show somewhat more or less than this 6 dB difference, depending on height. Tribanders and short-boom Yagis will have less than 6 dB gain over a dipole. On the higher bands (10–20 meters), a horizontally polarized dipole is 6 to 12 dB stronger than a vertically polarized signal, when installed in the 35 to 50 foot height range.

So, now that you are beginning to suspect that competing with low power and modest antennas just might be a real possibility, you might be wondering, "What can I do to optimize MY performance?"

Versatility is the key. *A high and low tribander is a much better combination than any single beam at any single height.* Multiple antennas can give you not only height and wave-angle diversity, but directional diversity, saving that all-important element, TIME, by allowing you to change direction with the flick of a switch instead of waiting for a rotor to come around (and back!). If you can't put up a second tower, stick two beams on a tall (70 foot or higher) tower, or put a simple trap dipole (driven element from an old tri-bander) parallel to the boom of your tribander. This way you will always have an antenna at plus/minus 90 degrees from your beam. That makes picking up a KP4 or KL7 a snap when your beam is on Europe.

No-tune radios with multiple VFOs are a real plus. So is computerized logging. Send away for logging programs such as K1EA's CT. I guarantee that you'll never go back to paper logs again!

"Search and Pounce" is the name of the game for the QRPer—at least for those of us more than two saltwater hops away from Europe. I know, I said you could be heard all over the world with 5 watts and a dipole, but holding

Tom Russell, N4KG, standing in front of his impressive antenna farm.

a frequency and running DX stations is another matter. There are a couple of reasons for this. Obviously, the big guns will walk all over you, so a clear frequency is necessary. ("On 20 meters? Are you kidding?" Now you're beginning to see the light.) Many, if not most, of the DX stations with good antennas are going to be calling CQ themselves. These are the guys with the best chance of pulling your signal through. So even though you may be able to get an occasional answer to a CQ, I find it more productive to run around calling stations. Rates of 40 and even 50 contacts per hour into Europe have been reported by QRPers during peak times. Steady rates of 20 to 30 contacts per hour can be maintained with good activity.

"So, if I can't CQ, how am I ever going to crack these pile-ups?" On SSB timing is everything. Wait for that pregnant pause in the pile-up and dump your FULL callsign in there. Watch the S-meter for dips and listen for quiet gaps in the pile-up. Sometimes you'll just be lucky and the skip will be with you. In one SSB DX contest HZ1AB was holding forth on 10 meters with a gargantuan pile-up. On a lark I called anyway. You can't imagine the exhilaration I felt as he came right back to me. Propagation can be a great equalizer. When you have it, you can work anything. When you don't, you'll be the first to know! Then change bands.

Generally, the highest band that is open will

Search and Pounce

Practice good timing in pile-ups
Try tailending the better operators
Speak clearly
Don't stay long in pile-ups
Leapfrog pile-ups with 2 VFOs
Follow propagation
Change bands when going gets slow
Have multiple antennas for each band
Use computer logging

Table I– Tom Russell, N4KG's top ten QRP operating tips.

1991 ARRL SSB DX CONTEST

Band	QSOs	Countries	Score
160	1	1	
80	4	3	
40	38	27	
20	193	60	
15	235	75	
10	397	79	
Total	**868**	**245**	**633,570**

1991 ARRL CW DX CONTEST

Band	QSOs	Countries	Score
160	3	3	
80	47	30	
40	97	46	
20	194	62	
15	231	65	
10	291	61	
Total	**863**	**267**	**690,462**

1990 CQ WW CW DX CONTEST

Band	QSOs	Zones	Countries	Score
160	10	6	5	
80	23	10	16	
40	68	20	44	
20	137	25	63	
15	204	27	73	
10	249	26	75	
Total	**691**	**114**	**276**	**748,410**

1990 CQ WW SSB DX CONTEST
(Single Band 10 Meters)

Band	QSOs	Zones	Countries	Score
10	481	31	113	197,424

Table II– Recent N4KG QRP DX contests high scores.

have the least path loss, but it is often productive to drop down one band for a quick sweep to pick up a few contacts on what may be a less crowded band.

Also, be sure to enunciate clearly. Don't mumble and don't speak too fast. Project your voice and use readily understood phonetics. And give your full callsign! I can't emphasize this enough. How would YOU like to have to backup your computer to enter the prefix and take an extra transmission to complete the exchange for every contact?

On CW timing is also very important, but there are a few additional tricks you can utilize to make yourself heard among the throng. Listen carefully to the stations the DX station is answering. Are they exactly on frequency or are they a little higher or lower? What speed does he seem to prefer? Is the DX operator a top-notch operator? The good operators will pull you through. Skip over the guys who have difficulty managing their pile-ups. Note their frequency or put them in memory and check on them later.

Most of the time I send my call twice. It drives my "Have Key, Will Travel" friends from California nuts, but the average operators seem to need the second shot to verify my call to themselves. With guys like ZD8Z, I crank up the keying speed to 40 WPM and let it rip, once, between calls of the big guns. Jim always pulls me through. I don't know if he actually copies my call or just knows that crazy guy going like a bat with such a puny signal must be N4KG running QRP!

Same story with Trey, WN4KKN. Last year when he first fired up on 15 meters from ZP0Y, the pile-up was totally out of control. No way was I going to break through that with 5 watts. So I listened to the stations he worked, and just as they sent their zone number I reached for the memory button. BANG! N4KG at 40 wpm right in the pause at the end of the report. Another multiplier in the log. Thanks, Trey. Good ears.

To keep the rate up, I leapfrog two VFOs through the band, always working two pile-ups at a time. If I can't break a pile-up after a few calls, I load the frequency into a memory and move on. Multipliers usually come quickly except for the terrible pile-ups on Sunday afternoon when new Africans seem to always show up and create havoc. The best way to boost your multiplier is to work as many easy ones on as many bands as possible. This means heading for the low bands after dark.

Yes, the low bands! With good antennas you can accumulate a sizable multiplier on 40 meters and there are always some easy ones on 80 and even 160. With my two-element delta loop at 120 feet, I have been able to work lots of Europeans on 40 CW and even twenty or so split frequency on 40 SSB! It blew my mind. But not as much as the 80 meter conditions during the 1991 ARRL CW DX Contest when I was able to work 30 countries on that band, including 29 Europeans in 15 countries. That may not impress the Northeast contest machines, but I live in Alabama, less than 100 miles from W5-land, and Europe is a long way away on 80 meters. Special thanks to UZ2FWA for pulling me through that long haul over such a considerable land mass!

If you can't put up high antennas for the low bands, a vertical with lots of radials or a simple elevated ground plane will amaze you. For Europe I use a high dipole on 80 meters, but my simple elevated ground plane does wonders into the Caribbean and Pacific, including even an occasional JA. Sound like fun? You bet it is!

The all-band QRP contester can hope for 500 to 1000 contacts in 200 to 280 band-countries with 30 to 40 hours of operating time. I try to get 3 hours sleep the first night, just before sunrise, and I try to limit myself to 5 or 6 hours the second night! I confess, I'm a low-band addict and whenever conditions are really hot it's difficult to pry myself from the radio the first night. This sometimes makes the second sleep goal very difficult to achieve (which accounts for so many second-place finishes to my younger competitor, AA2U!). Like me, many of the single operator DX operators can't make it through the second night either, which creates something of a dilemma for the QRP contester, namely, which night to emphasize. Friday night has much more activity but more competition. By Saturday night many of the DX stations are begging for contacts, but many more are working the pillow!

If all-day and all-night contesting is not your forte, a single-band entry can provide lots of action with a chance for a little rest to boot. In the SSB contests, the highest band that is open is always a fun way to go. Ten meter single band can easily yield over 500 contacts and DXCC in a fun-filled weekend. QRP contesting is not for the feeble hearted. However, it can be one of the most exhilarating operating classes that contesting can offer. Above all remember to have fun and see you in the pile-ups!

(N4KG won the 1990 ARRL SSB DX Contest QRP category and has several second-place QRP finishes in the ARRL and CQ WW DX contests on both modes. Tom has been an active QRP DXer and contester since 1981 and has achieved 311 DXCC countries and 8 Band DXCC [80 through 10 meters, including WARC bands] with 5 watts output. Stressing versatility, he has 20 antennas to select from including 4 tribanders and at least 2 monobanders per band. He rarely touches a rotor control, as six directions are available at the flick of a coax switch on each of the high bands! Tom emphasizes the importance of low [35 to 45 foot] antennas for daytime operation on 10, 15, and even 20 meters.—ed.)

Final Comments

I hope you have enjoyed the excellent input we have received about low power and QRP contesting over the past few months. While you may not have the advanced station layout of some of our contributing authors, most of their operating tips and strategies can apply to even the smallest of stations.

I want to thank those of you who replied to my 1992 Contest Survey. Next month I'll reveal the results, which will prove to be very enlightening.

By now many of you have learned that I have taken a full-time position here at *CQ* headquarters. In the future, please submit your Contest Calendar information directly to our offices in Hicksville. As always, please remember that the deadline for the June issue is April 1st.

73, John, K1AR

Vermont QSO Party

0000–2359Z Sat., Feb. 6

This is the 30th annual Vermont QSO Party and a great opportunity to work this rare one on several bands. Participation is open to all licensed radio amateurs worldwide on 160–10 meters.

Classes: Single or multi-operator all bands.
Exchange: Vermont stations send RS(T) and

STARTEK INTERNATIONAL INC

ATH™ - BAR GRAPH FREQUENCY COUNTERS

Check out the ALL NEW ATH-15 . . . it's FAST !

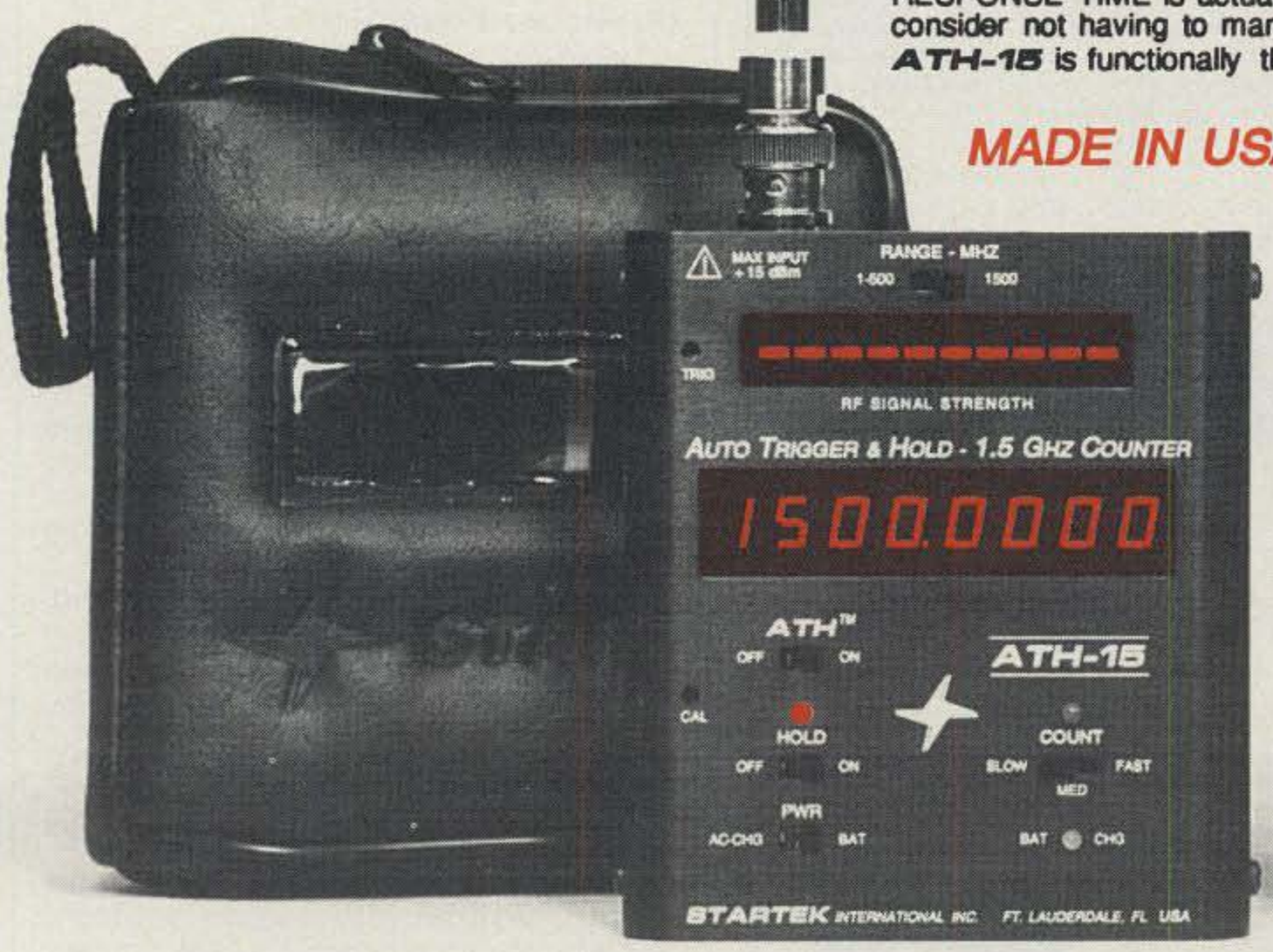
The *ATH-15* can ACCURATELY READ an input signal, DISPLAY the frequency and AUTOMATICALLY switch to HOLD status, in less than 8% of a second !!

- ***ATH™ - AUTO TRIGGER & HOLD***
- ONE-SHOT *ATH™* OPTION
- AUTOMATIC CLEAN DROPOUT
- *800%* FASTER RESPONSE TIME
- *ULTRA BRIGHT* LED DIGITS
- MAXIMIZED SENSITIVITY < 1mV typ
- 3 to 5 HOUR NI-CADs STANDARD
- *BATTERY CHARGE* INDICATOR
- 4 GHZ - 2 INCH LED BAR GRAPH
- 2 RANGES - 6 *FAST* GATE TIMES
- 1 PPM TCXO STANDARD
- HIGH STAB 0.2PPM TCXO OPTION
- MANUAL HOLD FUNCTION
- BLANK DISPLAY FUNCTION
- 9-12V *AUTO-POLARITY* PWR JACK
- ***StarCab™*** ALUMINUM CABINET
- 1 YEAR LIMITED WARRANTY

ATH™ refers to our exclusive new *AUTOMATIC TRIGGER & HOLD* circuit with *AUTOMATIC CLEAN DROPOUT*. With ***ATH™*** you can say good-bye to almost all of that annoying random counting and the false readings we have become accustomed to when using portable counters. The model ***ATH-15*** is an *ULTRA HIGH SENSITIVITY*, 1 MHz to 1500 MHz frequency counter with an INTEGRATED BAR GRAPH circuit which ***instantly*** displays the signal strength of an input signal from <1 MHz to over 4 GHz. When the ***ATH™*** feature is used, the counter displays the last readable signal received. It automatically triggers on a readable signal and automatically switches to the "hold" status when the signal dissapears. Because of *AUTO TRIGGERING*, the first reading is correct. If the signal stops in the middle of a sample or gate time, the last complete accurate reading will be displayed and the unit switched back to "HOLD" status, hence the *AUTOMATIC CLEAN DROPOUT* prevents the display of erroneous data, all this is done automatically, with hands free operation - and it works great !!!

We are further responding to user requests by offering a *ONE-SHOT* ***ATH™*** option. This consists of a *ONE-SHOT* select switch, a push button *RESET* switch and two LED indicators all located on the top of the counter (not shown). When this function is used, the first readable signal that triggers the counter will be held on the display until manually reset. One push of the reset button will reset the display to zeros and enable the one-shot circuit again. The display can be blanked or turned off pending the auto triggering from an input signal, which also saves power under battery operation.

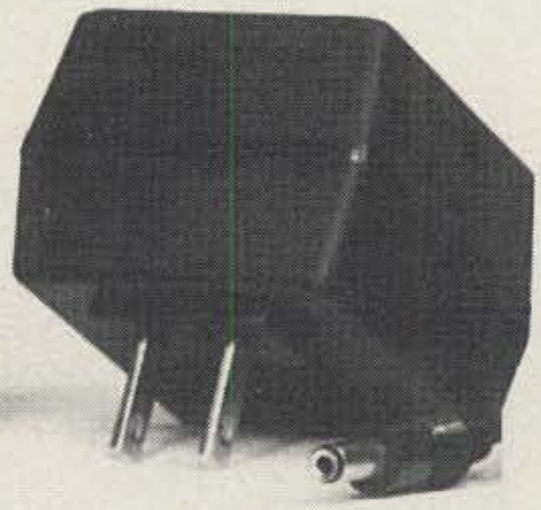
RESPONSE TIME, defined as the time from the beginning of the input signal to a stable, accurate, readable display, has been dramatically speeded up. The RESPONSE TIME is actually 800% faster than previous models and if you consider not having to manually throw the hold switch, at just the right time, the ***ATH-15*** is functionally the fastest counter you can buy !!



MADE IN USA

SAY *GOOD-BYE* TO RANDOM COUNTING & FALSE READINGS

ATH-15



SIZE: 4"H x 3.5"W x 1"D

#ATH-15	FREQUENCY COUNTER WITH NI-CADs & 110VAC ADP	$235.
FACTORY INSTALLED OPTIONS:		
#O/S-ATH-15	ONE-SHOT ATH™	40.
#HSTB-15	HIGH STAB TCXO 0.2ppm	100.
ACCESSORIES:		
#CC-90	BLACK VINYL ZIPPER CASE	12.
#TA-90	TELESCOPING BNC ANTENNA	12.
#P-110	PROBE, 200 MHZ, 1X-10X	39.
#M207IC	CABLE FOR MFJ-207/208	10.

CHECK IT OUT. . . BEFORE YOU BUY A COUNTER
Does Bar Graph give *INSTANT* readings or 3 gate times delayed?
Does Bar Graph work on every range? Over 2 GHz? With HOLD on?
Does HOLD switch *CHANGE* the GATE selection when turned off?
Does unit *SELF-OSCILLATE* - random count with no input signal?
How many switches needed to select range? Gate times per range?
How long does unit operate with batteries? One hour?
NO PROBLEM with a ***STARTEK*** *POCKET COUNTER™ !!*

ALL MODELS IN STOCK WE SHIP SAME DAY !

Orders & Information
305-561-2211
Orders only
800-638-8050
FAX 305-561-9133

MasterCard VISA DISCOVER

TERMS: Shipping-handling charges for Florida add $4 + tax, US & Canada add 5% ($4 min - $10 max), others add 15% of total. COD fee $4. VISA, MC or DISCOVER accepted. Prices & specifications subject to change without notice or obligation.

STARTEK INTERNATIONAL INC
398 NE 38th St., Ft. Lauderdale, FL 33334

county (14 total). Others send RS(T) and state/province/DXCC country.

Frequencies: Phone—first 25 kHz up from the beginning of the General band and Novice 10 meter band. CW—40 kHz up from the bottom edge of the bands and 20 kHz up from the bottom of Novice portions.

Scoring: Credit 1 point per phone QSO and 2 points for CW, Digital, ATV, etc. Non-Vermont stations multiply total QSO points by the number of VT counties and special-event QSOs with W1BD and/or W1KOO. Vermont stations follow similar format with the addition of states/provinces/DXCC country multipliers. Stations may be worked twice per band (SSB and one other mode).

Awards: Vermont stations submitting a log will receive a Special 30th Anniversary QSO Party Certificate. Plaques will be awarded to the three highest scoring Vermont stations. Special certificates will also be awarded for the highest scoring station in each state, province, and DXCC country. The Worked All Vermont award is provided to stations working at least 13 of the 14 Vermont counties in the contest.

Send your postmarked entries no later than March 1, 1993 to: Bob DeForge, K1HKI, RR1, Box 271, Brookfield, VT 05036. Be sure to include an SASE for final results.

North American "Sprint"

CW: Feb. 6 SSB: Feb. 13
Sunday 0000Z to 0400Z (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—3850, 7225, 14250. (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 North American 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. Pre-contest registration is required for each team before the start of the contest—with WN4KKN 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 WN4KKN or K7GM if you do not have a copy of the *National Contest Journal*.

Entries must be received no later than 30 days after the end of each "Sprint."

The CW go to: Trey Garlough, WN4KKN, P.O. Box 563, Santa Cruz, CA 95061.

SSB go to: Rick Niswander, K7GM, Box 2857, College Stn., TX 77841.

YL ISSB QSO Party

CW: Feb. 6–7 SSB: Mar. 13–14
0001Z Saturday to 2359Z Sunday

The party is open to all, but the emphasis is on membership participation. Rules and logging format are much too lengthy and complicated to list here. I strongly suggest you send a large SASE to KØETA for more details.

Categories: Single operator, DX-US Partners, and YL-OM Teams.

Exchange: Call, name, QTH (state, province, territory, district or country), name, ISSB number, YL-OM teammate, DX-US partner.

Points: One point for non-member contacts, 3 points for member contacts on the same continent, and 6 points if in a different continent.

Multiplier: Only contacts with member stations count as a multiplier. In addition, credit one multiplier for working both DX-W/K partners, each YL/OM team, US state, VE province, DXCC country, and each VK, ZL call area. Use multiplier of 5 for low power (less than 200 W).

Frequencies: The General portions of the CW and phone bands, 10 through 80 meters. Avoid 14332 used by ISSB Net. Check 40 and 80 hourly.

Awards: Category and QTH area winners. Special certificate to the top combined CW and Phone score.

Logs: Should be set up as outlined in the exchange and should indicate at least two 6-hour rest periods. A summary sheet showing the scoring and other essential information would be helpful.

Mailing for all entries is April 30th, and they go to: Fred Kujawa, KØETA, RR 4 Box 213-6, Stockton, MO 65785.

QCWA QSO Party

CW: 0001Z Sat. to 2400Z Sun., Feb. 6–7
SSB: 0001Z Sat. to 2400Z Sun., Mar. 13–14

This is the 36th annual edition of QCWA's fun and traditional QSO Party, which is open to QCWA members worldwide. Please note that CW QSOs are only valid in the CW section and visa versa for SSB.

Classes: Single operator, all bands.

Exchange: QSO number, operator's first name, chapter identification (members not belonging to a chapter should send "AL"), and state or DXCC country.

Scoring: Final score equals the total number of stations worked times the multiplier. Multipliers are the number of QCWA chapters worked during the contest (credit a chapter multiplier only once). Frequencies: CW: 3530–3560, 7025–7055, 14030–14060, 21040–21070, 28040–28070. SSB: 3900–3930, 7230–7260, 14260–14300, 21350–21380, 28530–28560. No QSOs on WARC bands. Check 160 meters at 0400–0500Z and 1200–1300Z.

Awards: Plaques will be awarded to the top scorer worldwide on each mode.

Separate logs and scores must be submitted for both modes. All logs must be received by April 16, 1993 and sent to: Bill Bergan, NU4X, 1308 East 8th St., Stuart, FL 34996-3221.

EA RTTY Contest

1600Z Sat. to 1600Z Sun., Feb. 13–14

This is the 1993 edition of the Spanish RTTY Contest sponsored by U.R.A.D. It is open to participants worldwide on 80–10 meters.

Classes: Single operator, all bands and single band, multi-single, and SWL.

Exchange: Signal report and Spanish Province (for EA stations). All others use *CQ* zone.

Scoring: For non-EA stations: On 10–20 meters credit 1 point for contacts in your continent, 2 points for QSOs outside your continent. On 40 and 80 meters triple your QSO points (e.g., 3 within your continent). QSOs between stations in the same country are only valid for multiplier credit and have no QSO point value.

Multipliers: Non-EA stations count each DXCC country and EA province (maximum 52) per band. Spanish stations use *CQ* zones and DXCC countries per band.

Final Score: Multiply total QSO points times multiplier.

Awards: Trophies to the top entries in each class. Certificates will be awarded to winners in each class for every DXCC country and EA district (50 QSOs minimum).

Send your entries to: EA RTTY Contest, c/o EA1MV, Antonio Alcolado, P.O. Box 240, 09400 Aranda de Duero (Burgos), Spain. The mailing deadline for entries is April 10, 1993.

Dutch "PACC" Contest

1200Z Sat. to 1200Z Sun., Feb. 13–14

It's the world working The Netherlands on all six bands, 1.8 through 29.7 MHz, in the band sections recommended for contest operation by the IARU. The same station may be worked on each band, but on one mode only, phone or CW, for QSO and multiplier credit. Note that SSB QSOs are not allowed on 160 meters.

Categories: Single operator, multi-operator, and SWL.

Exchange: RS(T) plus a QSO number starting with 001. Dutch stations will add two letters to identify their province. There are 12 provinces: DR, FR, GD, GR, LB, NB, NH, OV, UT, FL, ZH, and ZL.

Scoring: Each QSO with a PA/PB/PI station counts one point. DX stations determine their multiplier by the number of provinces worked on each band (maximum of 72).

Final Score: Total number of QSOs times the number of provinces worked on each band.

Awards: Certificates to the top scoring station in each category in each country and call areas of JA, LU, PY, UA9/0, VE/VO, VK, W/K, ZL, and ZS. Also second-and third-place awards if returns justify.

SWL's must log the call of the Dutch station as well as the station being worked and both serial numbers. Scoring same as above. Indicate the multiplier in a separate column in your log only the first time it is worked on each band. Include a summary sheet showing the scoring, your name and address in block letters, and the usual signed declaration.

Mailing deadline is March 31st to: PACC Contest, Att: F. Th. Oosthoek, PA0INA, P.O. Box 499, 4600 AL Bergen op Zoom, The Netherlands.

New Hampshire QSO Party

1900Z Sat. to 0700Z Sun., Feb. 13–14
1400Z Sun. to 0200Z Mon., Feb. 14–15

This year's party is again sponsored by the NH Amateur Radio Association. It is New Hampshire stations working all others. As with most QSO Parties, the same station may be worked once on each band mode.

Exchange: RS(T) and QTH. County for NH

stations; state, province, or country for others.

Scoring: All stations credit 1 point/SSB QSO and 2 points digital QSO. (RTTY, CW, Packet). NH stations multiply QSO points by number of NH counties, states, provinces, and DXCC countries. Others simply use counties. Twenty (20) bonus points/QSO may be added to your final score for working NHARA members: WB1CAG, NY1Z, W1GUA, W1WQM, WW1G, N0CUH, K1RD, WB1ASL, WK1P, N1LT, K1BKE, W1OC, W1ET, N1ICK, KC1OX, and NE1K.

Final Score: Final score is calculated by multiplying QSO points times total multiplier and adding bonus points.

Frequencies: CW—1810, 3535, 7035, 14035, 21035, 28035; SSB—1875, 3935, 7235, 14280, 21380, 28320, 50115, 144205.

Logs must be received by March 31st, 1993. Be sure to include an SASE for final results. Send logs and comments to: Conrad Ekstrom, WB1GXM, P.O. Box 1076, Claremont, NH 03746-1076.

ARRL International DX Contest

CW: Feb. 20–21 Phone: March 6–7
0000Z Saturday to 2400Z Sunday

This is a great DX contest that you should not miss. I strongly recommend that you study the announcement in the December issue of *QST* for more details. Also send a large SASE (2 IRCs for DX) for sample log and entry forms.

All bands may be used, 1.8 through 28 MHz, but not 10, 18, or 24 MHz. Aeronautical or maritime mobile stations cannot be worked for contest credit. Following is a brief outline.

Categories: Single operator, both single and all band, and single operator assisted. Multi-operator, one transmitter and two transmitters. Also multi-operator, multi-transmitter. Also QRP, all band only (5 watts or less output). Multi-transmitter stations must remain on a band at least 10 minutes once a contact is made.

Exchange: RS(T) and state or province for W/VE; RS(T) and power input for DX stations (three-digit number).

QSO points: W/VE stations earn three points for each DX contact. DX get three points for each W/VE contact.

Multiplier: Each DXCC country worked on each band for W/VEs. DX stations use US states (48), District of Columbia (DC), and VE provinces (13) for their multiplier. (Maximum multiplier of 63 per band.)

Final Score: Total QSO points times the sum of the multiplier from each band. Entries with 500 or more QSOs must include a QSO check sheet.

Awards: Certificates given in each category, in each country, and in each ARRL section, plus a wide selection of plaques. Also certificates to DX stations making over 500 QSOs.

Log entries are accepted on 5¼" MS-DOS formatted diskettes. Submit an ASCII file along with a signed summary sheet. No paper logs are required with this method.

Disqualification regulations will be strictly enforced and are listed in the official rules. Mailing deadline for all entries is April 7th, and they go to: ARRL DX Contest, 225 Main Street, Newington, CT 06111.

CQ WW 160 Meter SSB Contest

2200Z Fri. to 1600Z Sun., Feb. 26–28

Just a reminder that the SSB section of our 160 Meter Contest will be coming up the last full weekend of this month.

Extensive coverage has been given to this event, with complete rules in the November issue. They are the same rules that have been used these past many years and are well known worldwide.

Mailing deadline for your entry in last month's CW contest is February 28th, and March 31st for this month's SSB section.

They can be sent directly to the 160 Contest Director, David L. Thompson, K4JRB, 4166 Mill Stone Court, Norcross, GA 30092. And, of course, they can always be sent to the *CQ* office. *CQ* 160 Meter Contest, 76 North Broadway, Hicksville, NY 11801. **(Be sure to indicate CW or SSB on the envelope.)**

North Dakota QSO Party

0000–0800Z & 1600–2400Z Sat., Feb. 27
0800Z–1600Z Sun., Feb. 28

This is a great opportunity to work another rare U.S. state in the North Dakota QSO Party sponsored by the Red River Radio Amateurs.

Classes: Single- and multi-operator all bands.

Exchange: Signal report and QTH (county for ND stations, state/province/DXCC country for others).

Frequencies: Phone—1875, 3935, 7235, 14280, 21380, 28380. CW—1810 and 35 kHz up from band edges. Novices operate 35 kHz above their band edges.

Scoring: Credit 1 point per phone QSO and 2 points for CW/RTTY. ND stations multiply their total QSO points by states/provinces/DXCC countries worked. Others use the total number of ND counties worked (53 maximum). Stations may be worked once per band and mode.

Awards: Awards will be provided to the top scores for CW, Phone, and mixed mode. ND stations will receive separate awards.

Multi-operator stations must list all operators and their callsigns. The postmark deadline for log entries is March 28th. Logs should be sent to: Mike Olsen, KIØE, 305 27th Ave. North, Fargo, ND 58102.

RSGB 7 MHz CW Contest

1500Z Sat., Feb. 27 to 0900Z Sun., Feb. 28

Like the 21 MHz CW Contest, the activity in this one is between the British Isles and the rest of the world. Competition is limited to single operator stations only. There is a separate QRP section in which power input must not exceed 10 watts, and there is also an SWL section.

The following rules are for areas other than the British Isles.

Exchange: RST report plus a progressive QSO number starting with 001. U.K. stations also send their county codes.

Scoring: Each contact with a B.I. station is worth 5 points (Europe), 15 points (NA, SA, AF, AS), and/or 30 points (OC). Multiply total QSO points by the number of U.K. counties worked.

Unmarked duplicate contacts for which credit has been taken will be penalized ten times the points claimed. Logs containing more than five unmarked duplicates will be disqualified.

Only British Isles stations are to be logged by overseas SWLs. The same call may be reported only once in every three contacts, unless the logged station is a new multiplier. Scoring is the same as above.

Frequencies: 7000–7030 kHz, CW only.

Awards: Certificates to the sectional leaders and highest multi-op, and at the discretion of the committee, to the leading station in each country.

Include a summary sheet with a list of multipliers worked, station description, the usual signed declaration, and your name and address in block letters.

Logs must be received by April 19, 1993 and go to: RSGB Contest Committee, c/o G3UFY, 77 Bensham Manor Road, Thornton Heath, Surrey, CR7 7AF, England.

Scanners/Shortwave/CB/Radar

COMMUNICATIONS ELECTRONICS INC.

Emergency Operations Center

We're introducing new Uniden *Bearcat* scanners that are just what you've been searching for. Order your *Bearcat* scanner today.

Radio Scanners

NEW! Bearcat® 8500XLT-D

List price $669.95/CE price $369.95/SPECIAL

Continuous Coverage · 500 Channels · 20 banks

Auxiliary Tape Output · Reception Counter · VFO

Frequency range: 29.0000 MHz.–1,300.000 MHz. Continuous Coverage. Excludes 823.9875–849.0125 and 868.9875–894.0125 MHz.. Due to the high demand for this product, allow 120–180 days for delivery A.R.O.

Signal intelligence experts, public safety agencies and *CQ Magazine* readers have asked us for a world class scanner that can intercept just about any radio transmission. The new Bearcat 8500XLT gives you a revolutionary breakthrough in scanners because it has *continuous* band coverage from 29 MHz. through 1,300 MHz. This feature packed scanner also has 500 channels in 20 banks, VFO knob, turbo scan, weather alert, reception counter, dot matrix – alpha numeric illuminated display, 20 priority channels, automatic frequency storage, instant weather button, auxiliary tape recorder output, selectable delay, frequency step select and more. If you want a very similar model with frequency coverage from 29 MHz. through 956 MHz. and 200 channels in 10 banks with 10 priority channels, then order the lower cost Bearcat **890XLT-D** for only $259.95. Both scanners have the profile of the popular Bearcat 760XLT and operate from 12 Volts DC. An AC adapter is included for base station use. A magnetic mount antenna with a BNC connector part number **USAMMBNC-D** is $39.95. Order your new Bearcat scanner from CEI today.

For more information on Bearcat radio scanners or to join the Bearcat Radio Club, call Mr. Scanner at 1-800-423-1331. To order any Bearcat radio product from Communications Electronics Inc. call 1-800-USA-SCAN.

Great Deals on Great Scanners

NEW! Bearcat 8500XLT-D base/mobile	$369.95
NEW! Bearcat 890XLT-D base/mobile	$259.95
NEW! Bearcat 2500XLT-D handheld	$349.95
NEW! Bearcat BCT2-D info mobile	$149.95
NEW! Bearcat 350A-D info mobile	$119.95
NEW! Bearcat 700A-D info mobile	$209.95
NEW! Bearcat 148XLT-D base	$99.95
Bearcat 800XLT-D base/SUPER SPECIAL	$199.95
Bearcat 760XLT-D base/mobile	$239.95
Bearcat 560XLA-D base/mobile	$89.95
Bearcat 200XLT-D handheld/SPECIAL	$208.95
Bearcat 100XLT-D handheld	$149.95
Bearcat 70XLT-D handheld	$129.95
Bearcat 65XLT-D handheld/SPECIAL	$109.95
Bearcat 855XLT-D base	$159.95
Bearcat 210XLT-D base	$129.95
Bearcat 172XL-D base	$109.95
Bearcat 147XL-D base	$83.95

NEW! Bearcat® 2500XLT-D

List price $649.95/CE price $349.95/SPECIAL

Continuous Coverage · 400 Channels · 20 banks

VFO Knob · Auto Store · 20 Priority Channels · Reception Counter

Frequency range: 29.0000 MHz.–1,300 MHz. Continuous Coverage. Excludes 823.9875–849.0125 and 868.9875–894.0125 MHz. Due to the high demand for this product, allow 120-180 days for delivery A.R.O.

The Bearcat 2500XLT-D gives you pure scanning pleasure with continuous band coverage to 1,300 MHz. in a handheld scanner. The Bearcat 2500XLT scanner has 400 programmable channels with 20 scanning banks, 20 priority channels, automatic frequency storage, VFO knob, instant weather, speedy turbo scan, illuminated LCD display, reception counter, step select, and much more. Includes antenna, carrying case with belt loop, ni-cad battery pack, AC adapter and earphone. Order your Bearcat 2500XLT today.

Shortwave

Grundig Satellite 500-D portable	$359.95
Grundig Cosmopolit-D with tape recorder	$179.95
Grundig Yacht Boy 230-D portable	$139.95
Grundig Traveller 2-D portable	$79.95
ICOM R1-D handheld	$429.95
ICOM R100-D mobile	$579.95
ICOM R71A-D base	$989.95
ICOM R72A-D base	$899.95
ICOM R7000-D base	$1,149.95
ICOM R7100-D base	$1,189.95
ICOM R9000-D base	$4,679.95
Sangean ATS800-D portable	$79.95
Sangean ATS803-D portable	$159.95
Sangean ATS818CS-D with tape recorder	$209.95

CB Radios

NEW! Uniden GMR100-D UHF GMRS Handheld	$169.95
NEW! Uniden GRANTXL-D SSB CB Mobile	$149.95
NEW! Uniden PC76XL-D CB Mobile	$99.95
NEW! PRO320XL-D CB Handheld/Mobile	$69.95
Uniden PRO310E-D CB Handheld/Mobile	$64.95
Uniden PRO330E-D CB Remote	$99.95
Uniden PRO810E-D SSB CB Base	$158.95
Uniden PC122-D SSB CB Mobile	$107.95
Uniden PC66A-D CB Mobile	$78.95
Uniden PRO510XL-D CB Mobile	$36.95
Uniden PRO520XL-D CB Mobile	$49.95
Uniden PRO538W-D CB & Weather	$69.95

Radar Detectors

Uniden LRD9000W-D X, K, Ka, Stalker, Pulse, Laser	$159.95
Uniden RD6000W-D X, K, Ka, Stalker, Pulse	$119.95
Uniden RD5000W-D X, K, Ka, Stalker, Pulse	$99.95
Uniden RD1600S-D X, K, Ka & Stalker	$69.95
Uniden PR110-D X & K Band	$49.95

Amateur Radio

NEW! Ranger RCI 2970-D

List price $559.95/CE price $389.95/SPECIAL

Enjoy ham radio fun and communicate worldwide with a powerful Ranger Communications Inc. RCI2970-D 100 Watt 10 Meter Mobile Amateur Radio Transceiver. With continuous coverage from 28.0000 through 29.6999 MHz., this compact mobile radio has controls for frequency selector, RF power, RF gain, noise blanker, on/off/volume, squelch, clarifier, repeater splits, manual mode, display dimming, memory, enter, frequency lock, frequency up and down selector and more. If you only need 25 watts of power, order the Ranger **RCI2950-D** for only $244.95 each. F.C.C. amateur radio license is required for United States operation. For technical information call Ranger Communications Inc. at 619-259-0287. Order your 100 Watt Ranger radio today.

CIRCLE 144 ON READER SERVICE CARD

Publications

During our 24th anniversary special, all books are only $12.95 each.

MOA-D Monitor America – 2nd edition by Richard Barnett
SMHV1-D Scanner Modification Book, Volume 1 by Bill Cheek
SMHV2-D Scanner Modification Book, Volume 2 by Bill Cheek
PWB-D Passport to Worldband Radio by Intl. Broadcasting Serv.
LIN-D Latest Intelligence by James Tunnell
NPD-D Uniden National Police Directory by Norm Schrein
FBE-D Uniden Eastern Frequency Directory by Norm Schrein
FBW-D Uniden Western Frequency Directory by Norm Schrein
ASD-D Air Scan Directory by Tom Kneitel K2AES
TSG-D Top Secret Registry of U.S. Government Frequencies
TTC-D Tune in to Telephone Calls by Tom Kneitel K2AES
CBH-D Big CB Handbook/AM/FM/Freeband
CBR-D CB Radio Hacker's Guide
TIC-D Techniques for Intercepting Communications
EEC-D Embassy & Espionage Communications by Tom Kneitel
CIE-D Covert Intelligence, Electronic Eavesdropping

Two-way Transceivers

RELM RH256NB-D

List price $599.95/CE price $289.95/SPECIAL

16 Channel · 25 Watt Transceiver · Priority Time-out timer · Off Hook Priority Channel

The RELM RH256NB is the updated version of the popular RELM RH256B 150-162 MHz. VHF sixteen-channel land mobile transceiver. RELM is the choice of many public safety agencies because this radio has built-in CTCSS tone and scanning capabilities as well as a priority function. The radio technician maintaining your radio system should also order programming instructions, part number PI256N for $10.00.

Weather Stations

Public safety agencies responding to hazardous materials incidents must have accurate, up-to-date weather information. The Davis Weather Monitor II is our top-of-the-line weather station which combines essential weather monitoring functions into one incredible package. Glance at the display, and see wind direction and wind speed on the compass rose. Check the barometric trend arrow to see if the pressure is rising or falling. Our package deal includes the part **#7851-D** Rain Collector, and the external temperature/humidity sensor, part **#7858-D**. The package deal is order **#DAV1-D** for $449.95 plus $15.00 shipping. If you have an IBM PC or equivalent, when you order the optional Weatherlink computer software part **#7862-D** for $149.95, you'll have the world's most powerful computer weather station at an incredible price.

Buy with confidence

It's easy to order from CEI. **Mail orders to**: Communications Electronics Inc., Emergency Operations Center, P.O. Box 1045, Ann Arbor, Michigan 48106 U.S.A. Add $15.00 per radio for U.P.S. ground shipping and handling in the continental U.S.A. Add $6.00 shipping for all accessories ordered at the same time. Add $6.00 per antenna for shipping. Michigan residents add 4% sales tax. No COD's. 10% surcharge for P.O. billing to qualified accounts. All sales are subject to availability, acceptance and verification. Prices, terms and specifications are subject to change without notice. For Canada, Puerto Rico, Hawaii, Alaska, or APO/FPO delivery, shipping charges are two times continental U.S. rates. No surcharge on credit cards. We welcome your Discover, Visa, American Express or MasterCard. Order toll-free by calling 1-800-USA-SCAN. For information or if outside the U.S.A. call 313-996-8888. FAX anytime, dial 313-663-8888. Order your radio from CEI today.

For credit card orders call

1-800-USA-SCAN

Communications Electronics Inc.
Emergency Operations Center
P.O. Box 1045, Ann Arbor, Michigan 48106-1045 U.S.A.
For orders call 313-996-8888 or FAX 313-663-8888

DX

BY CHOD HARRIS, VP2ML

NEWS OF COMMUNICATION AROUND THE WORLD

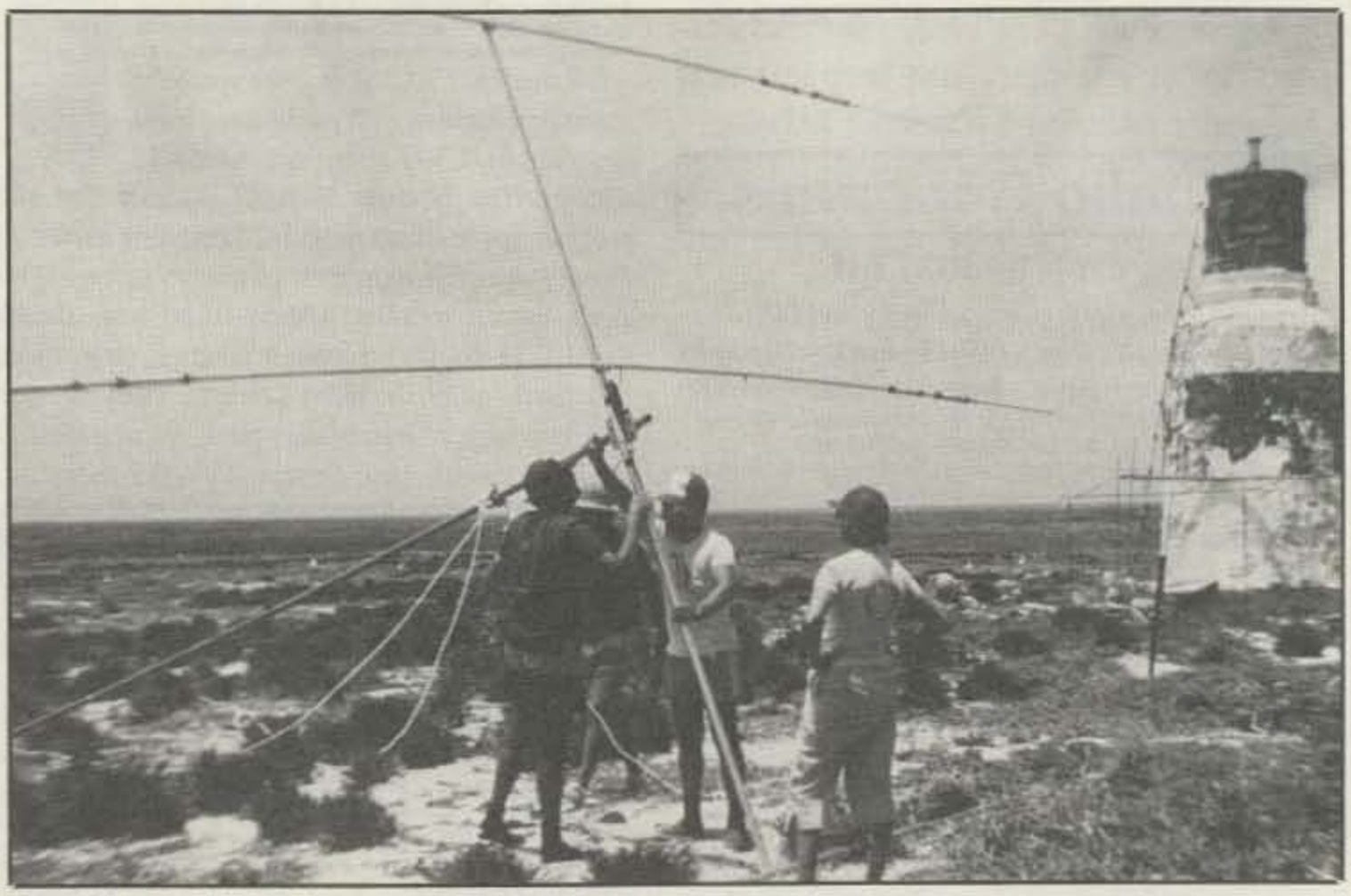
Howland Island KH1

A multi-national team is set to operate from tiny Howland Island KH1 for about seven days, beginning around January 26. The team includes several DXpedition veterans, and other experienced operators, under the leadership of Mike McGirr, K9AJ. Mike organized the successful Kingman Reef KH5K and Palmyra Island KH5 operations in 1988. Other planned operators include WRLX, F6EXV, W9IXX, K4UEE, G4LJF, WCP, KEU, PA3DUU, and ON6TT. They will have four HF stations, and one satellite/VHF station on the air.

As of press time the organizers were actively seeking financial assistance to help with this expensive undertaking. The boat charter from Christmas Island T32 alone is over $37,000. Each operator has already committed $6000 each, and several equipment and antenna manufacturers are helping, but more funds are needed. While it is probably too late to send donations before they get on the air, a little something extra in with the QSL request would be greatly appreciated. The exact callsign, operating frequencies, and QSL route will be announced closer to departure. See the DX newsletters, computer BBSs, and W1AW's DX report for the latest information.

Howland Island is a low-lying, windswept coral island about one mile long and a half-mile wide. It sits just north of the equator about midway between Hawaii and Australia. The only landmark is the battered Earhart Light, a lighthouse erected in 1937 in honor of Amelia Earhart (see below). Two runways constructed in the 1930s are unusable for any aircraft, so any landing must be by ship through the narrow fringing reef.

For such a tiny Pacific island, Howland has a long and fascinating radio history, from the early days of radio in the mid-1930s until the last amateur operation from Howland in 1988.



The Earhart Light will help anchor antennas in the 1993 Howland Island operation, as it did in 1988. (Thanks to VK9NS for photo.)

History of Howland

Howland Island fell under US jurisdiction in 1856 under the Guano Island Act, along with nearby Baker, Jarvis Island, and Navassa, in the Caribbean. (This act said that the US asserted rights to mine guano from these islands, and was a major factor in future US claims.) Howland Island saw little activity other than limited guano mining until the early 1930s.

At that time, to counter, or at least keep an eye on, the Japanese imperialistic expansion in the region, the US sought an excuse for increasing our presence in the area. The famed Pan American Airlines China Clippers provided the perfect justification to establish semi-permanent observation stations from Hawaii to China. Howland Island was selected as one of the Clipper stops, and a small base was set up there. Then in 1937 Howland Island became the center of the world's attention. Amelia Earhart disappeared on one of the last legs of her around-the-world flight, while aiming for Howland.

Amelia Earhart

Amelia Earhart, or AE as she preferred to be called, was one of the most accomplished aviatrixes of the era. She gained fame as the first woman to cross the Atlantic in a airplane in 1928, while she was only a student pilot. (She was not allowed to touch the controls.) Future husband George Putnam set AE onto a long-lasting and very successful publicity run, pushing her flying and her books. She soon learned to fly for real, and matured into a daring, if not particularly talented pilot. She was the first person to fly solo over any part of the Pacific, flying from Hawaii to California in 1934. She chose that direction be-

Ian Shepherd, G4LJF, will take two months off from his job as an airline pilot to join the Howland Island DXpedition.

P.O. Box 50, Fulton, CA 95439

The WPX Program

Mixed

1582	F5ZI	1587	WT3B
1583	WD8O	1588	JI1LAI
1584	HP2CWB	1589	KC7V
1585	RB5MT	1590	VE6OA
1586	Y33VL		

SSB

2345	I0FDH	2347	WB2ABD
2346	N4LGX	2348	KC7V

CW

2761	EA2CIN	2763	WB2ABD
2762	N1IR	2764	KC7V

Endorsements

Mixed: 450 F5ZI, HP2CWB, Y33VL, JA1-20762/BV, RB5MT, WT3W, KC7V, VE6OA. 500 F5ZI, HP2CWB, JA1-20762/BV, RB5MT, Y33VL, WT3W, KC7V. 550 F5ZI, HP2CWB, JA1-20762/BV, CT1EEB, Y33VL, WT3W, KC7V. 600 F5ZI, HP2CWB, WJ7H, CT1EEB, G5MN, Y33VL, WT3W, KC7V. 650 F5ZI, HP2CWB, WJ7H, CT1EEB, Y33VL, WT3W, KC7V. 700 F5ZI, HP2CWB, WJ7H, CT1EEB, Y33VL, WT3W, WM2U, KC7V. 750 F5ZI, HP2CWB, WJ7H, JE1RRK, CT1EEB, Y33VL, WT3W, WM2U, KC7V. 800 F5ZI, HP2CWB, WJ7H, JE1RRK, Y33VL, WT3W, WM2U, KC7V. 850 F5ZI, Y33VL, HP2CWB, KC7V. 900 F5ZI, HB9BHY, Y33VL, KC7V. 950 F5ZI, HB9BHY, Y33VL, KC7V. 1000 OZ1ACB, F5ZI, HB9BHY, Y33VL, KC7V. 1050 OZ1ACB, Y33VL, KC7V. 1100 Y33VL, KC7V. 1150 K9BQL, Y33VL, KC6X, KC7V. 1200 Y33VL, KC7V. 1250 Y33VL, KC7V. 1300 Y33VL, KI3L, KC7V. 1350 Y33VL, I2EAY, WB2ABD. 1400 Y33VL, WB2ABD. 1450 Y33VL, WB2ABD. 1500 Y33VL. 1550 Y33VL. 1600 Y33VL. 1650 Y33VL. 1700 W9IL, Y33VL. 1750 Y33VL. 1800 Y33VL. 2200 HA0HW. 2400 I8RFD. 2450 I8RFD. 2800 W2FXA.

SSB: 350 I0FDH, N4LGX, WB2ABD, KC7V. 400 I0FDH, DL2KDW, WB2ABD, KC7V. 450 I0FDH, DL2KDW, WB2ABD, KC7V. 500 I0FDH, WB2ABD, KC7V. 550 I0FDH, CT1EEB, WB2ABD, KC7V. 600 I0FDH, CT1EEB, WB2ABD, KC7V. 650 I0FDH, CT1EEB, KC7V. 700 I0FDH, CT1EEB, KC7V. 750 I0FDH, KA9MOM, CT1EEB, KC7V. 800 I0FDH, KA9MOM, HP2CWB, KC7V. 850 I0FDH, HP2CWB, KC6X, KC7V. 900 KC6X, KC7V. 950 KC7V. 1000 K9BQL, KC7V. 1050 I3UBL, K9BQL. 1100 OE6CLD, I3UBL. 1150 OE6CLD. 1200 OE6CLD, W5ILR. 1250 OE6CLD, K0REF. 1300 K0REF. 1350 K0REF. 1900 W4UW. 2050 I8RFD.

CW: 350 EA2CIN, N1IR, WB2ABD, KC7V. 400 EA2CIN, N1IR, EA2CKP, WB2ABD, KC7V. 450 EA2CIN, N1IR, WB2ABD, KC7V. 500 EA2CIN, K9BQL, N1IR, WB2ABD, KC7V. 550 ZS6NT, WJ7H, EA2CIN, N1IR, WB2ABD, KC7V. 600 WJ7H, EA2CIN, N1IR, WB2ABD, KC7V. 650 WJ7H, EA2CIN, WB2ABD, KC7V. 700 EA2CIN, KC6X, WB2ABD, KC7V. 750 EA2CIN, KC6X, KC7V. 800 KC7V. 850 KC7V. 900 KC7V. 1000 K2PK. 1050 K2PK. 1150 I2EAY. 1300 I8RFD.

10 Meters: OZ4ZT, I2VRF, Y33VL, WB2ABD, N6IBP, KC7V

15 Meters: OZ1ACB, Y33VL, WT3W, WB2ABD, N6IBP, KC7V

20 Meters: I2VRF, Y33VL, WT3W, WB2ABD, N6IBP, KC7V

40 Meters: I2VRF, Y33VL, KC6X, WT3W, N6IBP, KC7V

80 Meters: OE6CLD, Y33VL, WT3W, KC7V

160 Meters: Y33VL, N6IBP, KC7V

Asia: WJ7H, DL2KDW, I2VRF, Y33VL, HB9BHY, WB2ABD, N6IBP, KC7V

Africa: KF7RU, Y33VL, WB2ABD, KC7V

No. Amer.: HB9BHY, Y33VL, WT3W, WB2ABD, N6IBP, KC7V

So. Amer.: OE6CLD, Y33VL, WB2ABD, N6IBP, KC7V

Europe: HB9BHY, WJ7H, I2VFR, G5MN, Y33VL, WT3W, WB2ABD, N6IBP, KC7V

Oceania: Y33VL, WB2ABD, N6IBP, KC7V

Award of Excellence Plaque Holders: 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, UR2QD, AB9O, FM5WD, I2DMK, W4BQY, I0JX, SM6CST, VE1NG, I1JQJ, WA1JMP, PY2DBU, HI8LC, KA5W, K0JN, W4VQ, KF2O, K3UA, HA8XX, HA8UB, W8CNL, K7LJ, W1JR, F9RM, W5UR, WB8ZRL, SM3EVR, CT1FL, K2SHZ, UP1BZZ, W8RSW, WA4OMQ, EA7OH, K2POF, DJ4XA, IT9TQH, W8ILC, K2POA, N6JV, W2HG, ONL-4003, VE7DP, K9BG, W5AWT, KB0G, HB9CSA, F6BVB, W1BWS, YU7SF, G4BUE, N3ED, DF1SD, K7CU, I1POR, LU3YL/W4, NN4Q, KA3A, YB0TK, VE7WJ, VE7IG, K9QRF, YU2NA, N2AC, W4UW, NX0I, W9NUF, N4NX, SM0DJZ, DK5AD, WB4RUA, DK5AD, WD9IIC, W3ARK, I6DQE, LA7JO, VK4SS, K6JG, I1EEW, I8RFD, I3CRW, VE3FXR, N4MM, KC7EM, ZS6BCR, CT1YH, IV3PVD, KA5RNH, ZP5JCY, F1HWB, KC8PG, NE4F, VE3MS, K9LJN.

Award of Excellence Plaque Holders with 160 Meter Endorsement: FM5WD, SM0DJZ, DK5AD, SM6CST, I1JQJ, PY2DBU, W3ARK, HI8LC, KA5W, UR2QD, VE3XN, K6XP, LA7JO, W4VQ, K6JG, K3UA, HA8UB, W4CRW, N4MM, K7LJ, SM0AJU, KF2O, SM3EVR, K5UR, UP1BZZ, OK1MP, N5TV, K2POF, W8CNL, DJ4XA, IT9TQH, DL9RK, N6JV, ONL-4003, W1JR, W6OUL, W5AWT, KB0G, F6BVB, W4BQY, YU7SF, W5UR, N4NO, DF1SD, K7CU, I1POR, W8RSW, N4KE, I2UIY, YB0TK, W8ILC, W1BWS, VE7WJ, K9QFR, NN4Q, W4UW, K9QFR, NX0I, G4BUE, LU3YL/W4, I4EAT, WB4RUA, VE7WJ, N4NX, DE0DXM, VE7IG, K9BG, I1EEW, AB9O, CT1YH, IV3PVD, KA5RNH, ZP5JCV.

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," 880, CR13, Clovis, NM 88101-9511 USA.

Eric, SM0AGD, and his lovely wife, Eva, SM0OTG, recently operated from Easter Island CE0Y, the site of Eric's first-ever DXpedition, 20 years ago. Eric operated from Canton Island, alternately signing T31AF and SM0AGD/KH1. (DK7PE photo)

cause "It's easier to hit a continent than an island." These words proved to be an ill omen for her more hazardous around-the-world flight.

By 1937 AE felt comfortable enough with a dual-engine aircraft (a Lockheed Electra) to attempt a flight completely around the world, at the equator. This flight was to be AE's last major flight before settling down. She never completed the trip.

AE's flight got off to a very poor start. In March 1937 AE and her navigators flew from Oakland, California to Hawaii on the first leg of a west-to-east trip. The next day AE ground-looped the big Electra while attempting to take off from Luke Field for the trip to Howland. The plane had to be taken apart and sent back to the mainland for repairs.

As far as the United States government was concerned, however, the flight was already a success. The US used the AE flight as reason to construct two long runways on Howland and to station a Coast Guard cutter off shore to aid in navigation. (Of course, the real reason the US went to the expense of improving Howland and committing a Coast Guard cutter to the area was to monitor Japanese activity and to "raise the flag" in the area. The US was unlikely to go to that much trouble for a private publicity stunt unless it had other irons in the fire.) The delay in the flight meant that the cutter and land-based personnel could continue their monitoring. Incidentally, K6GNW was among the group on Howland, and his was probably the very first amateur radio operation from the island.

AE tried again in May, and in one month had made it 20,000 miles of her 27,000 mile journey. This time AE flew west-to-east, to avoid crossing the Atlantic at the peak of the hurricane season. Her flight path took her to Miami, San Juan KP4, Venezuela YV, Dutch Guinea (now Suriname PZ), Brazil PY, and across the Atlantic to Senegal 6W.

This first long oceanic leg of the trip revealed AE's unfamiliarity with radios, her navigator's unreliability, and AE's lack of faith in her navigator. First, AE complained that the direction-finding (DF) radio didn't work. The problem was a blown fuse. (Shouldn't someone attempting to fly around the world be able to replace a fuse in flight?) Then AE arrived at the Senegal coast a bit north of Dakar, her target. But instead of following her navigator's advice and turning south, she turned north on a hunch, and had to put down for the night at a tiny, remote airstrip. AE even turned down an offer from Pan-Am to use their extensive radio network for support communications and DFing. She didn't want to sacrifice any of the limited crystal positions in her rig. (Or maybe she was saving a "secret" frequency for communications with US military near Howland, as part of the "secret mission" many feel AE was on at the time of her disappearance.)

AE had no navigational problems over the next legs of the trip, across Africa. The most risky leg was an all-water route from Assab in Eritrea to Karachi, Pakistan, the first time that flight had ever been attempted. However, AE had an entire continent to run into in both her Atlantic and her Indian Ocean crossings; she didn't have that luxury on the leg to Howland.

At 0000Z on July 2 AE and navigator Fred Noonan eased the Electra into the air from Lae, New Guinea, for the 18 hour, 2500 mile flight to Howland. Considering that this was the first time AE had ever flown toward a tiny island landing site with neither broadcast stations nor alternate landing sites, she seemed to have little concern about the radio communications

5 Band WAZ

As of October 31, 1992, 347 stations have attained the 200 zone level.

New recipients of 5 Band WAZ Award with all 200 zones confirmed:

None

The top contenders for 5 Band WAZ are:

N4WW, 199	K6EID, 199
SP9PT, 199	IK8CNT, 199
K6YRA, 199	W1JR, 199
PY7ZZ, 199	W8SEY, 199
DL9WW, 199	N7RT, 199
K0CS, 199	VE7AHA, 199
KB0G, 199	W1FZ, 199
AA4KT, 199	IK2GNW, 199
K7UR, 199	I8IGS, 198
K9EL, 199	SM6AHS, 198
NA0Y, 199	K1ST, 198
VE7DX, 199	4X4DK, 198
W0PGI, 199	UA3AGW, 198
W2YY, 199	KL7Y, 198
W9WAQ, 199	VO1FB, 198

The following have qualified for the basic 5 Band WAZ Award:
IK2GNW, 199 Zones
WA8SXM, 179 Zones

802 Stations have attained the 150 zone level as of October 31, 1992.

Applications and reprints of the latest rules may be obtained by sending a self-addressed stamped envelope (75 cents) size 4½ × 9½ to the WAZ Manager, Jim Dionne, K1MEM, 31 De Marco Rd., Sudbury, MA 01776. 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. Please make all checks payable to the Awards Manager. In order to qualify for the subscriber rate, please enclose your latest *CQ* mailing label with your application. Send any questions to K1MEM by mail and include an SASE (please do not telephone).

The WAZ Program

Single Band WAZ

10 Meter SSB

444 ..... WA6APQ

15 Meter SSB

433 ..... WA4APM

20 Meter SSB

905 ..... WA4APM

20 Meter CW

427 ..... ND6G

160 Meters

71 ..... WB9Z (36 zones)

WNZ

51—10M SSB N8JOA

All CW

18 ..... WD4JHY 19 ..... NW8F

RTTY

77—Mixed WA4MCZ

All Band WAZ

SSB

4008	ND6G	4011	OE7XMH
4009	YV5DEH	4012	JH1AFD
4010	IK2CFH	4013	IK7CSA

CW/Phone

7285	SM0KRN (CW)	7291	OK1FPG (CW)
7286	OE2BZL	7292	SP2DX
7287	DJ7BP	7293	JA1AVV/QRP
7288	IK2MRZ (CW)	7294	PT2NP
7289	CT4AH (CW)	7295	KN4UB
7290	PA3CJS	7296	N1IR

Applications and reprints of the latest rules may be obtained by sending a self-addressed stamped envelope (75 cents) size 4½ × 9½ to the WAZ Manager, Jim Dionne, K1MEM, 31 DeMarco Rd., Sudbury, MA 01776. 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 *CQ* awards is $4.00 for subscribers and $10 for non-subscribers. Please make all checks payable to the Awards Manager. In order to qualify for the subscriber rate, please enclose your latest *CQ* mailing label with your application. Send any questions to K1MEM by mail and include an SASE (please do not telephone).

and DF of her aircraft. She had the long, trailing-wire antenna ripped out earlier to save weight. An even more serious mistake was when AE had the lone telegraph key pulled from the airplane. Neither AE nor her navigator had any proficiency with Morse code, but she could have used the key to send a series of dashes that would permit radio location.

In any case, AE called in on schedule for the first few hours of the flight on her "day" frequency of 6210 kHz. She passed her last daylight landfall on time and noted the bright lights of the round-the-clock guano mining on Nauru C2. Nauru reported hearing the plane and AE's radio carrier, but could not copy her words. (If she had known CW, she probably could have communicated with Nauru at the time.) Also, against the advice of her land-based radio operator, she QSYed at sunset to her "night" frequency—3105 kHz. Her announcement that she was changing frequency was the last two-way communication anyone had with the ill-fated flight.

Exactly what happened to AE after that point is the subject of much speculation and numerous books and articles. Vincent Loomis firmly believes that AE backtracked to Mili Atoll in the Marshall Islands, some 700 miles back to the west. Richard Gillespie says Nikumaroro Island in the Phoenix chain was the site of AE's final landing. Whatever the actual fate of AE on the way to Howland, DXers can regret that AE didn't spend a few minutes brushing up on her CW, and a few more learning a bit about radio propagation in the tropics. She might well have made it safely to Howland, with the help of radio.

An interesting sidelight of AE's last flight is to look at the radio propagation between New Guinea and Howland. Thanks to historical solar records and MiniPropPlus, a propagation prediction program from W6EL, we can say that AE should not have QSYed to 3105 at her sunset.

July 1937 was very near the peak of sunspot Cycle 17, with a 13-month smoothed sunspot count of about 120 (compared to a Cycle 22 peak of almost 160 in June 1989). MiniPropPlus says that

600 WATTS OUT . . . $649

Ameritron's new . . .

AL-811 linear amplifier gives you plenty of power to bust thru QRM.

You get a quiet desktop linear that's so compact it'll slide right into your operating position -- you'll hardly know it's there . . . until QRM sets in. And you can conveniently plug it into your nearest 120 VAC outlet -- no special wiring needed.

You get three tough 811A transmitting tubes, extra heavy duty power supply, all HF band coverage, pressurized ventilation, tuned input, dual illuminated meters, adjustable ALC and much more . . . for an incredible $649 . . .

The first 600 watts makes the most difference

The AL-811 gives you 600 watts PEP output — that's nearly 2 full S-units over your barefoot rig.

That could mean the difference between hearing, "You're Q-5 armchair copy" and, "Sorry can't copy you, too much QRM."

Now you won't have to stand aside while the "big guns" steal your DX. You'll be able to log some of those stations first.

Going from 600 watts to the full legal limit gives you less than one S-unit increase. But is that fraction of an S-unit worth the 3 to 4 times more money it'll cost you?

The AL-811 gives you a powerful punch at a price that's easy on your wallet.

All band, all mode coverage

The AL-811 covers all HF bands (10/12 meters with easy user mod). There's no compromise on WARC and most MARS bands — you get a 100% rated output.

You can operate the AL-811 on all modes. You get 600 watts output PEP SSB and 500 watts output CW. You even get 400 watts on demanding continuous carrier modes like RTTY, SSTV, FM and AM.

How the low cost 811A tube resists premature failure - even when your amplifier is mistuned

811A tubes resist premature failure in two ways.

First, they're constructed with widely spaced elements that minimize the chance of elements touching and causing a short — even if the plate gets hot enough to melt.

Second, they use a directly heated thoriated tungsten filament cathode that prevents the electron emitting layer from instantly stripping off — even if mistuning causes a sudden, severe current overload.

Indirectly heated oxide cathode tubes (like the $400 3CX800A7) can be rendered instantly useless if their electron emitting layer is stripped off because of a severe current overload due to mistuning.

The Ameritron AL-811 is excellent for the newcomer because it's tough enough to withstand momentary mistuning. And the tubes are so inexpensive that you can replace one for mere pocket change.

The Ameritron advantage: extra heavy duty power supply that gives you peak performance year after year

The heart of the AL-811 power supply is its heavy duty power transformer with a high silicon steel core weighing a hefty 17 pounds.

A full wave bridge using 52.5 ufd of total capacitance (four 210 ufd, 470 volt capacitors) produces 1500 volts under full load and 1700 volts no load. That's excellent high voltage regulation!

Full height computer grade filter capacitors with screw terminals are used — not short stubby, light duty soldered-in "high technology" capacitors that can't dissipate the heat generated by high current.

The rectifier diodes are rated for a massive surge current of 200 amps. They won't blow even if you accidentally short the high voltage supply.

Wire wound, 7 watt, 50 K ohm equalizing resistors safely protect each filter capacitor — not 2 watt, 100 K ohm carbon composition resistors that can open and cause your filter capacitors to explode or fail.

The Ameritron AL-811 power supply is built tough so you get peak performance year after year.

Tuned input provides excellent load for any rig

A Pi-Network *tuned input* provides a 50 ohm load for your rig. Even fussy solid state rigs can deliver their full drive to AL-811.

Low loss slug tuned coils — tunable from the rear panel — let you optimize performance. High quality low drift silver mica capacitors maintain proper tuning.

800 WATTS OUT . . . $795

from *FOUR* fully neutralized 811A tubes

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

NEW

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

A powerful 20 CFM computer grade blower — not an open frame phonograph motor — draws in cool air to pressurized the cabinet and efficiently cool your 811A tubes for extra long life.

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

Output tank: optimum Q on each band

The low loss pi-network output tank of the AL-811 has been carefully designed for optimum Q on each band and built with quality RF components.

The result is peak performance over each band, wide impedance matching range and exceptionally smooth tuning with efficiencies close to 70%. Even a 3:1 SWR load won't damage the tubes or tank components.

A ball bearing vernier reduction drive makes plate tuning precise and easy.

Quiet pressurized ventilation keeps your tubes safely cooled

A quiet fan pressurizes the cabinet with over 20 cubic feet per minute of cool air.

This large volume of air flow keeps the 811A tube temperature safely below the tube manufacturer's rating — even with a key down carrier at 500 watts output.

Two illuminated meters

Two illuminated meters give you a clear picture of your AL-811 operating conditions so you can tell right away if something is wrong.

The Grid Current meter continuously checks for improper loading. The other meter switches between high voltage and plate current to warn of abnormal conditions.

Ameritron exclusive Adapt-A-Volt™ power transformer

Too high line voltage stresses components and causes them to wear out and fail. Too low line voltage causes a "soft-tube" effect — low output and signal distortion.

Ameritron's exclusive Adapt-A-Volt™ power transformer has a special buck-boost winding that lets you compensate for stressful high line voltage and performance robbing low line voltage.

This makes your components last longer and gives you peak performance — regardless of your line voltage.

Plus more . . .

An Operate/Standby switch lets you run barefoot, but you can instantly switch to full power if you need it.

A transmit LED tells you when your rig is keying your AL-811.

A 12 VDC keying relay makes it compatible with all solid state and tube rigs. A built-in back-pulse cancelling diode protects your rig's keying circuit.

Shielded RF compartment. One year limited warranty. Compact 16" D x 13¾" W X 8" H. 30 pounds. UPS shippable. Shipped with transformer installed and wired for 120 VAC. Draws 8 amps at 120 VAC. Export model Al-811X wired for 240 VAC and includes 10 and 12 meters.

Made in USA

Made in USA. You're keeping your money here at home and helping fellow Americans. If you buy a foreign made product, how do you get service? Are you willing to pay expensive freight and duties to a foreign country for service?

Call your dealer for your best price

Get 600 watts of real power and the most for your money. Call your favorite dealer for your best price and order your AL-811 today.

AMERITRON

CIRCLE 171 ON READER SERVICE CARD

. . . the high power specialist

921 Louisville Rd. • Starkville, MS 39759

(601) 323-8211 • **FAX:** (601) 323-6551

Free Catalog/Nearest Dealer: **800-647-1800**

8 a.m. - 4:30 p.m. CST, Monday - Friday

Prices and specifications subject to change. © *1992 Ameritron*

THE WPX HONOR ROLL

The WPX Honor Roll is based on the current confirmed prefixes which are submitted by separate application in strict conformance with CQ master prefix list. Scores are based on the current prefix total regardless of an operator's all-time count. Honor Roll must be up-dated annually by addition to, or confirmation of, present total. If no up-date, file will be made inactive. Lifetime Honor Roll fee is $4.00 (U.S.) for each mode, with no fee for additions.

MIXED

4377	9N2AA	2733	I2UIY	2295	HA8XX	1945	N6JM	1629	DF6EX	1342	KA5TQF	1094	KØIFL
3991	K2VV	2722	PA@SNG	2274	SM6DHU	1905	DK5AD	1628	WB8ZRL	1335	AI6Z	1089	W@IZV
3397	EA2IA	2709	W2FXA	2205	SM@AJU	1861	WB2YQH	1626	SM6CST	1332	YU3PG	1032	I1ZQD
3275	K6JG	2707	IT9TQH	2163	K2POF	1855	W8UMR	1589	K5DB	1325	KC7V	1025	NH6T
3231	VE3XN	2704	W1BWS	2148	HA@HW	1835	WE2L	1572	NV9S	1323	YU1PJ	920	WB2PCF
3175	K6XP	2694	I1EEW	2141	YU4EXA	1829	K9AGB	1553	VE1RJ	1300	CT1QF	915	W4USW
3101	N4NO	2667	KA5W	2133	3A2LF	1812	K2OLG	1549	W3KH	1298	KI3L	913	HP2CWB
3056	N6JV	2659	IN3ANE	2132	N4UU	1797	VE3MS	1548	LA7JO	1282	LU8DY	904	WK@B
2996	N9AF	2637	YU7SF	2132	K9QFR	1793	YT7WW	1524	WB2ABD	1266	I2EAY	813	WT3W
2983	W4BQY	2628	9A2NA	2106	K5UR	1789	YU7RU	1499	IK2ILH	1241	TF1MM	778	VE3OMM
2965	PY1APS	2546	YU7BCD	2075	I2EOW	1788	YU1GR	1497	W7CB	1229	KS@Z	755	CT1EEB
2904	I2PJA	2530	HA@DU	2062	4N7ZZ	1776	W6OUL	1485	YB@TK	1165	K9BQL	750	JN3SAC
2876	N4MM	2508	N2AC	2052	KL7AF	1768	HA5NK	1483	PY2DBU	1164	W9IAL	720	EA3CWK
2845	WA8YTM	2499	YT7DX	2040	W@SFU	1709	G4OBK	1417	I@AOF	1164	CT3CU	714	VE6BMX
2840	SM3EVR	2498	SM7TV	2023	W4UW	1668	W9IL	1405	CT1YH	1149	NJ1T	670	WK3Z
2817	YU1AB	2470	K9BG	1970	HA@IT	1662	WB4RUA	1405	DF4ZL	1146	N7JXS	640	JR3TOE
2801	K@BLT	2339	UA3FT	1956	K8LJG	1648	KB@G	1375	WB3DNA	1132	N6IBP	635	JA4DUD
2797	ZP5JCY	2301	KF2O	1956	YU1GR								

SSB

3780	I@ZV	2362	I1EEW	1869	W4UW	1471	YU7SF	1258	I8WYD	1050	KB2DE	855	HP2CWB
3339	ZL3NS	2350	I2UIY	1858	I2EOW	1401	KF7RU	1252	K2EEK	1044	WB6SRK	831	NH6T
3303	K2VV	2337	I4CSP	1850	K5RPC	1393	KA@ZFX	1239	DK5WQ	1038	WB6GFJ	831	IT9JPK
3170	VE1YX	2303	EA9AKN	1811	KD9OT	1392	KE6KT	1227	KB@C	1036	K9BQL	814	KE7UH
2980	K6JG	2282	W4BQY	1797	K5UR	1391	HA@IT	1206	W5ILR	1035	IT9SVJ	806	I6KYL
2889	I2PJA	2250	WA8YTM	1758	4X6DK	1367	LA7JO	1200	ZS6AOO	1034	HA5NK	791	KA9MOM
2815	WD8MGQ	2213	KA5W	1747	SM@AJU	1367	N2AC	1199	K3IXD	1019	KC7V	787	CT1YH
2810	K6XP	2159	I5ZJK	1742	CT1AHU	1360	K8LJG	1162	HP6AYV	1016	5Z4BP	764	WT3W
2676	ZP5JCY	2089	HA8XX	1703	WE2L	1350	LU8DY	1152	W5AWT	1003	DF4ZL	755	CT1EEB
2612	IT9TQH	2046	9A2NA	1689	CT1BY	1345	IT9JKY	1151	G4OBK	998	IK2AEO	751	EA3EQT
2608	CT4NH	2041	WA4QMQ	1686	SM6DHU	1335	EA1AK	1135	OE2EGL	990	NG9L	750	NM5Y
2563	N4MM	1994	YU7BCD	1654	IK5ACO	1315	CT1UE	1117	FE6FNA	976	I8IYW	736	EA1IF
2494	EA2IA	1971	K9QFR	1645	IK8GCS	1305	WN5MBS	1116	CT1BWW	962	VE3MS	728	YU1PJ
2481	I6ZJC	1969	KF2O	1600	KL7AF	1290	LU7HJM	1112	WA2FKF	958	IK2DUW	728	CT1ZW
2466	I@AMU	1944	EA3AQC	1581	IN3QCI	1288	WB8ZRL	1097	W6OUL	951	KB@G	693	CE5FSB
2460	OZ5EV	1920	I8KCI	1580	CX6BZ	1286	IK7DBB	1092	KA5TQF	951	KB4HU	664	SM6CST
2421	N4NO	1897	W3ARK	1545	N6FX	1285	EA3FHT	1091	TF1MM	917	KK5P	643	JR3TOE
2409	W@YDB	1892	LU8ESU	1536	K2POF	1278	IK2DUU	1090	I3ZSX	899	AI6Z	632	IK5DNE
2403	I8YZP	1885	CT4UW	1534	EA2AOM	1274	OE6CLD	1063	IK@EIM	885	EA3BOX	612	JA4DUD
2395	PA@SNG	1883	HR1KAS	1508	I2TZK	1267	G4MVA	1054	K8MDU	869	DK7NP	610	KI6PG
2371	NJ@C	1871	PY4OY	1480	N4UU								

CW

3349	K2VV	2128	LZ1XL	1673	K5UR	1476	G3VQO	1306	LA9XG	1059	AI6Z	807	W4UW
3244	WA2HZR	2042	YU7BCD	1656	G4UOL	1468	IK@ADY	1305	W5AWT	1036	KA1CLV	794	LA7JO
3034	N6JV	1948	KA5W	1623	G4SSH	1461	ZS6EZ	1304	VE3MS	1019	IK2ECP	760	EA2CIN
2674	N4NO	1938	N4MM	1618	K2POF	1442	K8LJG	1293	I1EEW	1013	WB8ZRL	758	4X6DK
2666	IT9TQH	1802	N4UU	1608	N6FX	1428	I7PXV	1280	IK3GER	1010	YU1PJ	754	KA5TQF
2491	W3ARK	1801	I2UIY	1599	KL7AF	1408	HA5NK	1244	DL2HBX	988	AH6JF	749	W8LRY
2473	EA2IA	1745	9A2NA	1556	SM@AJU	1405	CT1YH	1187	YU3PG	954	W9IAL	700	EA1MV
2464	K6JG	1744	KA7T	1555	W9PWM	1398	VS6UW	1151	ZP5JCY	949	IS@FIC	700	VE3OMM
2407	YU7LS	1715	W8IQ	1536	KF2O	1362	I2IWM	1141	LU2YA	923	DF4ZL	699	JN3SAC
2381	YU7SF	1710	N4YB	1526	HA@IT	1359	HA8XX	1138	I2EAY	908	KC7V	659	TF1MM
2373	K6XP	1692	IT9VDQ	1525	VE1RJ	1330	KB@G	1133	JA9CWJ	900	3A2LF	617	DK7NP
2340	W4BQY	1686	EA7AZA	1517	SM6CST	1327	DJ1YH	1085	NJ1T	883	K9QFR	606	I5OOV
2275	N2AC	1681	SM6DHU	1511	W1WAI	1319	W6OUL	1063	KS4S	862	EA6AAK	601	N5GFX
2147	WA8YTM	1678	TI4SU	1490	OZ5UR	1310	G4OBK						

the east-west 2500 mile path between P29 and KH1, at a solar flux of about 160, would have a maximum usable frequency (MUF) above 30 MHz during the day, dipping to a low of 10 MHz at 1800Z, sunrise at Howland. AE really should have used an even higher frequency during the day. (The closer one transmits to the MUF, the stronger the signals. Also, the signal strength of the 6210 kHz was weakest during the day. The New Guinea based radio operator may have noticed the increasing signal strength when he tried to prevent AE from QSYing to the lower frequency. In fact, 6210 kHz would have been an excellent frequency to use that particular night.

After AE

The US maintained a presence in the area long after the search for AE had ended unsuccessfully. However, the Navy decided it needed a more suitable base for their operations and moved to nearby Canton Island in 1935. Except for the erection of the Earhart Light in 1937, Howland seems to have been forgotten.

Other events in the region, however, produced a unique event in amateur radio: a location that could count for two different DXCC countries! From the start of post-WWII DXCC until 1985, an operation from Baker, Howland, or any of the Phoenix Islands (including Canton) could count for either American Phoenix Islands KB6 (later KH1) or British Phoenix Islands VR1 (later T31). For example, Eric Sjolund, SM@AGD, operated from Canton using the callsign SM@AGD/KH1 one UTC day, and T31AF the next. Both operations were from the identical radio shack! How did this strange situation come to be?

Beginning near the end of the nineteenth century Great Britain asserted sovereignty over most of the individual islands comprising the groups known as the Phoenix Islands and the Line Islands. In 1937 Britain extended the boundaries of its Gilbert and Ellis Islands colony to formally en-

HF Equipment

	Regular	SALE
IC-781 Xcvr/ps/tuner/scope	$6659.00	**5399**

IC-765 Xcvr/ps/keyer/tuner **Special!**	$2919.00	**2348**

IC-751A 9-band xcvr/SW rx **Special!**	$1659.00	**1299**
PS-35 Internal power supply	239.00	**219.95**
FL-63A 250 Hz CW filter (Ist IF)	64.00	
FL-52A 500 Hz CW filter (2nd IF)	124.00	**114.95**
FL-53A 250 Hz CW filter (2nd IF)	124.00	**114.95**
FL-70 2.8 kHz wide SSB filter	64.00	
IC-735 HF xcvr/SW rcvr/mic	1169.00	**979.95**
PS-55 External power supply	239.00	**219.95**
AT-150 Automatic antenna tuner	479.00	**409.95**
FL-32A 500 Hz CW filter	75.00	
EX-243 Electronic keyer unit	69.00	
UT-30 tone encoder	21.00	

IC-725 HF xcvr/SW rcvr/mic	$919.00	**769.95**
AH-3 Automatic antenna tuner	523.00	**449.95**

IC-728 HF xcvr/SW rcvr/mic	1119.00	**939.95**
IC-729 HF xcvr/SW rcvr w/6m	1449.00	**1199**
AT-160 Antenna tuner **Special!**	423.00	**349.95**

HF Accessories:

	Regular	SALE
IC-2KL HF solid state amp **Special!**	$2159.00	**1768**
IC-4KL HF 1 kw amp w/ps	7609.00	**6199**
SP-3 External speaker	71.00	
SP-7 Small external speaker	56.00	
SM-6 Desk microphone	52.00	
SM-8 Desk mic; two cables, scan	96.00	
AT-500 500w 9 band auto ant tuner	631.00	**529.95**
AH-2 8-band tuner w/mt and whip	836.00	**709.95**
AH-2A Antenna tuner system, only	623.00	**529.95**

ICOM

All Prices are subject to change without notice. Please confirm with salesperson when ordering.

VHF/UHF Base Transceiver

	Regular	SALE
IC-275H 100w 2m FM/SSB/CW	$1619.00	**1359**
IC-475H 100w 440 FM/SSB **Special!**	1849.00	**1498**
IC-575A 25w 6/10m xcvr/ps **Close-out!**	1455.00	**1158**
IC-575H 100w 6/10m xcvr **Special!**	1739.00	**1398**

VHF/UHF FM Transceiver

	Regular	SALE
IC-28H 45w 2m FM/TTP mic	$399.00	**339.95**
IC-228H 45w 2m FM/TTP mic	439.00	**369.95**
IC-229A 25w 2m FM/TTP mic **Special!**	449.00	**369.95**
IC-229H 50w 2m FM/TTP mic **Special!**	449.00	**369.95**
IC-38A 25w 220 MHz FM xcvr	449.00	**379.95**
IC-449A 35w 440FM xcvr/TTP	539.00	**449.95**
IC-2330A 2m/25w/220 25w FM xcvr	839.00	**699.95**
IC-1201 10w 1.2GHz FM xcvr **Special!**	869.00	**699.95**

Dual band FM Transceivers

	Regular	SALE
IC-2410A 25w 2m/440 **Close-out!**	$889.00	**699.95**
IC-2410H 45w 2m/35w 440 FM/TTP	949.00	**799.95**
IC-3230A 25w 2m/440 FM/TTP mic	759.00	**639.95**
IC-3230H 45w 2m/ 35w 440 FM/TTP	859.00	**719.95**

Multi-band FM Transceivers

	Regular	SALE
IC-901 50w 2m/35w 440 FM xcvr	$1089.00	**899.95**
UX-R91A Broad band receiver unit	549.00	**459.95**
UX-19A 10w 10m unit	329.00	**279.95**
UX-59A 10w 6m unit.	379.00	**319.95**
UX-S92A 2m SSB/CW mod. **Special!**	649.00	**499.95**
UX-39A 25w 220MHz unit	489.00	**409.95**
UX-129A 10w 1.2GHz unit	599.00	**499.95**
UX-49A 440MHz module for IC-900	379.00	**319.95**
IC-970A 25w 2m/430MHz xcvr/ps	2899.00	**2399**
IC-970H 45w 2m/430 MHz xcvr/ps	3139.00	**2599**
UX-R96 50-905 MHz receive unit	429.00	**359.95**
UX-97 1.2GHz band unit	1079.00	**899.95**

VHF/UHF Mobile Antenna

	Regular
AH-32 2m/440 Dual Band mobile ant	$ 43.00

VHF/UHF Repeaters

	Regular	SALE
RP-1520 2m 25w repeater	$2419.00	**1999**
RP-2210 220MHz 25w repeater	2049.00	**1699**
RP-4020 440MHz 25w repeater.	2489.00	**2069**
RP-4020/50W 440 50w repeater	2709.00	**2249**

We stock the entire ICOM line, but due to space limitations in this ad some items, especially accessories, are not listed. For information, please call Toll Free or see the latest AES Catalog.

Handhelds

	Regular	SALE
IC-P2AT 2m HT **Special!**	$429.00	**349.95**
IC-P3AT 220 HT **Special!**	429.00	**359.95**
IC-P4AT 440 HT **Special!**	479.00	**389.95**
IC-2AT 2m HT **Special!**	279.00	**199.95**
IC-02AT/High Power 2m	359.00	**299.95**
IC-03AT 2.5w 220 HT/TTP	339.00	**279.95**
IC-2SAT 2m/TTP **Special!**	389.00	**309.95**
IC-2SRA 2m/25-905 rx	589.00	**489.95**
IC-24AT 2m/440MHz/TTP	469.00	**389.95**
IC-3SAT 220MHz HT/TTP	369.00	**309.95**
IC-4SAT 440 HT **Special!**	409.00	**329.95**
IC-4SRA 440/rx **Special!**	589.00	**489.95**
IC-2GAT 2m HT/TTP	409.00	**339.95**
IC-4GAT 440MHz/TTP	409.00	**339.95**
IC-12GAT 1.2 HT **Special!**	529.00	**429.95**
IC-W2A 2m/440 HT	599.00	**509.95**
IC-X2A 440/1.2 HT **Special!**	759.00	**629.95**
PS-70 2A power supply for HT's	80.00	**69.95**

Aircraft band handhelds

	Regular	SALE
A-2 5W PEP synth aircraft HT	575.00	**449.95**
A-21 Navicom Plus Aircraft HT	680.00	**529.95**

Shortwave Receivers

	Regular	SALE
R-1 100kHz-1.3GHz AM/FM pocket	$549.00	**469.95**
R-71A 100kHz-30MHz rcvr	1229.00	**1029**
RC-11 Infrared remote controller	77.00	
FL-32A 500 Hz CW filter	75.00	
FL-44A SSB filter (2nd IF)	191.00	**174.95**
EX-257 FM unit	53.00	
EX-310 Voice synthesizer	64.00	
CR-64 High stablity oscillator xtal	85.00	
R-72 30kHz-30MHz SW rcvr	1129.00	**949.95**
R-100 100kHz-1.856GHz AM/FM	739.00	**619.95**
R-7000 25MHz-2GHz receiver	1459.00	**1229**
RC-12 Infrared remote controller	77.00	
EX-310 Voice synthesizer	64.00	
TV-R7000 ATV unit	188.00	**169.95**
SP-3 External speaker	71.00	
CK-70 (EX-299) 12V DC option	15.00	
R-7100 25MHz-2GHz receiver	1509.00	**1269**
R-9000 100kHz-2GHz all mode rec	5969.00	**4929**

Look! New Lower Prices on Selected Models . . .

	Regular	SALE
IC-751A 9-band xcvr/SW rx	$1659.00	**$1299**
IC-1201 10w 1.2GHz FM xcvr	869.00	**699.95**
IC-2410A 25w 2m/440 FM xcvr.	889.00	**699.95**
IC-2AT 1.5w 2m HT/TTP	279.00	**199.95**

Order Now! . . . Toll Free

MasterCard VISA DISCOVER AMERICAN EXPRESS

Order Toll Free: 1-800-558-0411 ***FAX: (414) 358-3337***

AMATEUR ELECTRONIC SUPPLY® Inc.

5710 W. Good Hope Road; Milwaukee, WI 53223 • Phone (414) 358-0333

AES® BRANCH STORES

WICKLIFFE, Ohio 44092
28940 Euclid Avenue
Phone (216) 585-7388
1-800-321-3594

ORLANDO, Fla. 32803
621 Commonwealth Ave.
Phone (407) 894-3238
1-800-327-1917

CLEARWATER, Fla. 34625
1898 Drew Street
Phone (813) 461-4267
No Toll Free Line

LAS VEGAS, Nev. 89106
1072 N. Rancho Drive
Phone (702) 647-3114
1-800-634-6227

Watch for Future AES® Branch Store Openings!

compass the Phoenix and Line Island territories, including Baker and Howland.

In 1939 the United States asserted its own sovereignty over eight of the islands claimed by Britain in the Phoenix group. These islands were Canton, Enderbury, Hull, Birnie, Gardner, Phoenix, Sydney, and McKean. The US claim to these islands initially was based upon a claim of discovery and the issuance of United States guano mining bonds in the nineteenth century. Additionally, US personnel were posted on Canton from 1937 until mid-1979.

To resolve the diplomatic dispute between the United States and the United Kingdom over conflicting claims to Canton and Enderbury Islands, the two governments signed an agreement on April 6, 1939 providing for joint administration without prejudice to the claim of either party. In 1970 the US Air Force became the sole administrator of Canton, Enderbury, and Hull Islands under a second agreement with the British, but in recognition of the continuing British interest in the islands, the US agreed to compensate the United Kingdom for ten years.

On July 12, 1979 the Republic of Kiribati was created upon the independence of the Gilbert and Ellis Islands Colony. The new republic encompassed the Gilbert Islands, the British Phoenix Islands, and the Line Islands. Only the names were changed in the DXCC country list, with the former DXCC country of British Phoenix becoming Central Kiribati (T31). The conflicting territorial claims between the US and the UK thus became conflicting claims between the US and the Republic of Kiribati.

In the Treaty of Friendship between the US and Kiribati, signed at Tarawa on September 20, 1979, the US renounced, among other things, all claims to the eight islands in the Phoenix group. The treaty was forwarded to the US Senate on January 24, 1980 by President Carter with a recommendation for its ratification. The treaty was finally ratified by the Senate on June 21, 1983.

Note that Baker and Howland Islands are not affected by this treaty. Baker and Howland are now wildlife refuges, currently administered by an agency within the US Department of the Interior.

In 1984 a group of Northern California DXers petitioned the DX Advisory Committee (DXAC) to delete the old DXCC country of Baker, Howland, and the American Phoenix Islands, and start a new DXCC country of Baker and Howland alone. They reasoned that the removal of 90% of the land area and 100% of the population of the DXCC country constituted such a major change that the DXCC status of the country should also be changed. The group planned to stage the first-ever operation from the new DXCC country, and even obtained the callsign AH1A for same. (Go ahead; look it up in the *Callbook*!)

As it turned out, the DXAC decided

QSL Information

3C1EA to EA4CJA
3X0HNU to F6FNU
4J1FM to OH2LVG
4J4GAT to DL1VJ
4K2MAL to UA4RC
4K2OLP to RA1OA
4L0FWW to UF6FFF
4L9DZ to UF6DZ
4N5GB to YU5GBC
4N5JA to YU5XTC
4T7IA to OA4ED
4U47UN to W8CZN
5B5E to 5B4ES
5J0J to IK2HTW
5R8DF to JH8JWF
5R8GW to F6FNU
5Z4BI to W4FRU
6W6/WB2P to WB2P
7Q7CM to N2AVR
7Q7TA to JH1OGC
7Q7XX to JH3RRA
9A2TW to YU2TW
9A3ST to YT2ST
9A7A to YU2HDE
9ER1TA to N4NX
9ER1TB to K4PHE
9K2RC to OK1FTW
9K2ZR to K8EFS
9M2ER to AB4MD
9M2NA to VE3CHZ
9Y4H to K6NA
A22MN to WA8JOC
A71/DF6UQ to DF6UQ
AM25DWX to EA3DWX
AM9UA to EA9UA
C9RDM to W8GIO
C9REI to HB9BEI
C9RJJ to W8GIO
CE0Y/N6ZZ to N6ZZ
CT3CU to W2ZZ
CY0NSM to VE1CBK
D2EL to EA7EL
EA9UK to EA9LZ
ED6DXX to EA5CZ
EU0O to DL1GWS
EU8O to DL1GWS
EV1S to F6AML
FG5FZ to F6FNU
FM5BH to W3HNK
FS4PL to FG5BG
GB10TA to G3PMR
HA92ITU to HA5NK
HF0POL to SP9DWT
HR2IQC to JF1NZW
HV3JK to I5GJK
IG9/IK7RWE to IK7IJP
J37V to K8CV
J68AP to K0IYF
J68ZR to W7ZR
JU83ØC to JT1KAA
JW0F to SP2GOW
JX7DFA to LA7DFA
KD4PNW/U to DK1RV
LU8XPA to LU6XPA
OD5/SP7LSE to SP7EJS
OH0W to OH2BH
OT2C to ON7LR
OT2L to ON6NL
P29DK to N4EOF
PR0R to PP5JR
PR5T to PY5EG
PT4A to PY4BHB
PT5W to PY5LY
PU0F to PP1CZ
PX0F to PY2KP
PY0F/PP1CZ to PP1CZ
PY0TSN to PY3ASN
PZ5EL to FY5KL
R60Z to UA1ZX
RT9I to RB5IM
RY0Q to RB5QW
RY1O to NA3O
RY7O to RB5DX
S21A to W4FRU
S51GE to YU3DBC
S52AA to YT3AA
S52AN to YT3RU
S55AA to YU3AI
S57AM to YU3EW
S57AV to YU3TG
S57DX to YU3BQ
S57EK to YU3ROA
S58AB to YU3PV
S58AL to YU3EF
S58DX to YU3CR
S59AM to YT3ET
S59AR to YU3AR
S59DBC to YU3DBC
S59UN to YU3ZV
S79ELY to JA1ELY
S79IDY to JH1ELY
S79KMB to KN2N
T32LN to VK4CRR
T49AB to CO5DD
TA1ZA to WA6JCD
TA9/KU0J to KU0J
TI9JJP to TI2AOC
TJ1GG to I2EOW
TL8BG to WA1ECA
TL8GR to F5XX
TR8JH to W3HCW
TR8YA to F6FNU
UI8GA to DL1GWS
UO5OLW to SP7LZD
US1U to PA3BUD
US50BS to UB5BAZ
UT2L to UB5LCV
V2/JL1MUT to JR0AMD
V31VB to KI6IM
V31ZZ to N6YRU
V47KP to K2DOX
VD325E to VE3XN
VG3W to VE3ZM
VP5ØCC to W3HNK
VP5P to WN5A
VP8GAV to GM0LVI
VQ9AC to WN8O
VR2/WX3N to AA0CR
VU7CVP to VU2CVP
VY2SS to VE7ARS
WX3N/VR2 to AA0CR
XT2BW to WB2YQH
XU2UN to SP5AAS
YJ0C to SM4DHF
Z2/W7LN to ZS6WLN
ZA1J to HB9BGN
ZC4ST to G4SGD
ZD8GW to GW8VHI
ZK1HJ to G3MCN
ZK2XX to ON4QM
ZP5ØØY to ZP5JCY
ZP92M to ZP5XHM
ZS9A to ZS1IS
ZW8DX to PS8DX
ZW8ET to I0WDX
5H3TY to Tak, P.O. Box 972, Kilimanjoro, Tanzania
A71BV to P.O. Box 2260, Doha, Qatar
CE0YAA to P.O. Box 7, Easter Island, via Chile
EL2PP to P.O. Box 2274, Monrovia, Liberia
J28FO to P.O. Box 2419, Djibouti
J28GG to P.O. Box 1076, Djibouti
S51VQ to P.O. Box 146, Celje, Slovenia
SV9BAI to P.O. Box 92, Chania 73100, Greece
ZA1Z to P.O. Box 569, Tirana, Albania
ZD8G to P.O. Box 2, Ascension Island, South Atlantic

against deleting the previous country and starting a New One. Instead, they simple redefined the boundaries of KH1 to exclude the Phoenix Islands, now solely central Kiribati T31. This made KH1 a much more difficult country to work. Freighters call regularly at Canton Island, and there is even a usable airstrip. When an operation from Canton counted for either T31 or KH1, Canton was the natural focus of all KH1 DXpeditions.

Once KH1 was limited to Baker and Howland islands, it began to move quickly up the Most Wanted list, up to 39th in 1987. Finally in 1988 five DXpeditioners operated as NO1Z/KH1 and VK9NL/KH1. The operators—7J3AAB, TR8JLD, NO1Z, VK9NL, and VK9NS—made some 27,000 QSOs, including the first RTTY, 160 meter, YL, and 6 meter contacts from Howland. Since that operation there have been several T31 operations, but no KH1. Baker, Howland has moved up to 18th in the 1992 Most Wanted survey. If all goes according to plan, that will change this month, thanks to K9AJ and company.

DXers in the western half of the US should have no trouble making a Howland QSO. Even with very low solar flux levels, the path between California and Howland should be open on 17, 15, and probably 12 meters during the day: 1900–0100Z. There is a good chance of a 10 meter opening near 2100Z. The low bands should be open most of the night.

Stations on the east coast will find a much shorter "window" of time to work Howland. The sun rises at Howland about 1800Z, and it sets in Philadelphia about 2215Z. The higher bands should be open for at least part of that time, especially 20 and 17 meters at 1830–2100Z. Should solar flux increase significantly during the operation, look for openings on 15 and 12 meters near 1900Z. (Even a dramatic increase in solar flux doesn't make a great deal of difference in openings, contrary to popular belief; we'll explore the relationship between band openings and solar flux in a future column.)

For those DXers planning the *next* Howland Island trip, here are some helpful facts. Howland is under the jurisdiction of the Fish and Wildlife Service of the US Department of the Interior. As it is a national wildlife refuge, access to the island is limited. Visitors must obtain a permit from the Fish and Wildlife Service, and take a naturalist from the Service with them. This makes an operation by an individual amateur impractical.

For larger groups, carrying an additional non-operator is a small price to pay for the privilege of operating from Howland. By the way, this writer stopped by the Fish and Wildlife Service office in Honolulu to investigate operations from the French Frigate Shoals. I discussed the logistics of operating from some of the islands under their control, including Howland. I started to

R&L ELECTRONICS

1315 Maple Avenue
Hamilton, OH 45011

Orders & Price Quotes
800-221-7735
Local & Technical: (513) 868-6399
FAX: 513-868-6574
Hours: 10-6 M-F, 10-3 Sat.

NEW STORE

8524 E. Washington Street
Indianapolis, IN 46219

Orders & Price Quotes
800-524-4889
Local & Technical: (317) 897-7362
FAX: 317-898-3027
Hours: 10-6 M-F, 10-3 Sat.

Call Or Write For Our FREE Catalog

YAESU
HF

FT-747

FT-990

FT-1000

FT-890AT

Receiver

FRG-8800

YAESU
HT's

FT-23

FT-33

FT-411

FT-415

FT-911E

FT-815

FT-530
Dual Band

FT-470
Dual Band

YAESU
Mobile

FT-5200

FT-2400

FT-212RH

FT-290

Satellite

FT-736

COD'S **WE TAKE TRADE-INS**

CIRCLE 176 ON READER SERVICE CARD

CQ DX Awards Program

SSB

1981	WA1DHM	1983	IK2DUW
1982	VU2JJQ		

CW

860	G4BWP

SSB Endorsements

320	VK4LC/323	300	WA1DHM/304
320	N5FW/323	300	IØSGF/300
320	KF7SH/322	275	KD5ZD/281
320	G4ADD/322	275	K2AJY/280
320	PY4OY/322	275	VE7HAM/276
310	W2FGY/319	250	K2EEK/274
310	W6MFC/316	250	IK2DUW/253
310	K1VHS/314	200	VU2JJQ/203
300	KB8O/308	28 MHz	K2AJY

CW Endorsements

320	K2OWE/323	300	N4AH/309
320	K6JG/323	300	K1VHS/305
320	K3UA/322	300	WB5MTV/303
320	W9WAQ/320	275	KA7T/298
310	W1WAI/319	250	KL7AF/256
310	N5FW/318	200	KB8O/219
310	EA2IA/317	200	KE5PO/211
310	G4BWP/317	28 MHz	G4BWP
310	W7CNL/316	3.5/7 MHz	G4BWP
310	N7MC/316	1.8 MHz	G4BWP

Total number of active countries is 323. The basic award fee for subscribers to CQ is $4. For non-subscribers, it is $10. In order to qualify for the reduced subscriber rate, please enclose your latest CQ mailing label with your application. Endorsement stickers are $1.00. Updates not involving the issuance of a sticker are made free when an SASE. is enclosed for confirmation of total. Rules and application forms for the CQ DX Awards Program may be obtained by sending a business size, No. 10 envelope, self-addressed and stamped, to CQ DX Awards Manager, Billy Williams, N4UF, Box 9673, Jacksonville, FL 32208 U.S.A. DX stations must include extra postage for air-mail reply. Please make all checks payable to the awards manager.

launch into a long explanation of amateur radio, DX, DXCC, etc., when the naturalist laughingly stopped me and pulled out the Howland file. In it were 22 inquiries about landing on Howland, every single one from an amateur radio operator! I recognized about 20 of the callsigns. "It seems that you hams and the booby birds are the only ones who care about Howland," the naturalist chuckled.

There are no special licensing requirements for Baker, Howland; anyone with a stateside license may operate /KH1. The nearest jumping-off spot for Howland is Canton, but that is almost as difficult to get to as Howland. The K9AJ team will sail from Christmas Island T32, about 1300 miles to the east. The trip will take about six days each way, plus about seven days on the island. Add in the weekly flights between Christmas and Honolulu, and getting to and from Honolulu, and you will find the DXpeditioners must take at least a month off from work for the trip. Airline pilot Ian Shepherd G4LJF must take two months off to join the crew! Once there, the DXpeditioners will put up with equatorial heat and high winds, the stench of bird guano, boobies ruining antennas, and probably DX policemen. It should be an interesting trip! And don't forget the donations to help pay for the trip!

[Special thanks to W6CF, the Northern California DX Foundation, *Amelia Earhart —The Final Story* by Vincent Loomis, Mini-PropPlus by W6EL, The "DX Bulletin" Special Report March 1988, and VK9NS.]

Other February Operations

The Howland Island DXpedition is not the only one scheduled for this month. Veterans (survivors?) of the last Clipperton FOCI and South Sandwich VP8SSI operations will be on from Kingman Reef KH5K for 8 to 9 days beginning in late February. They'll also send an operating team to Palmyra KH5 for a few days. The multi-national crew includes NAFW, N9NS, W7KNT, AH9B, V73CT, and some others, with up to 12 ops in all. They are especially interested in raising funds for this expensive undertaking; contact Pete Myers, NAFW, for details. Interestingly, the last operation from Kingman Reef was by Mike McGirr, K9AJ, in 1988, and the 1993 Kingman group will use the same boat the Howland gang is chartering. It's a small world out there!

A little closer to home, Silvano Amenta, KB5GL, will operate SSB and RTTY HKØ/ from San Andres Island February 27 to March 7. Don, AA5AU, will accompany Silvano on CW and RTTY. They'll be on the higher bands, including the new bands. QSL to KA6V.

A couple of Islands On The Air operations are also set for this month. Art Phillips, NN7A/V31JZ, and Mike Sharp, NG7S/V31RL, will operate February 22–24 from Southwater Cay in the Belize Caribbean Sea Coast South group, a New One for IOTA. Before the island trip they'll be active from the Belize mainland in the ARRL CW test. QSL V31JZ via NN7A and V31RL via NG7S. Also, Bob Schmieder, KK6EK, who put the Farallon Islands on the air for the first time ever earlier this year, is planning a return to **Rocas Alijos XF** in mid-February. This is another New One for IOTA. He has asked for a special XF call.

DX News

Al Slater, G3FXT, passed away on November 11 at age 65. Al was elected to the CQ Contest Hall of Fame in 1988. Al was a world-class CW operator, and held several offices in the First Class Operator Club (FOC). He was a regular winner in *CQ* and RSGB Commonwealth contests. Al hosted hundreds of radio visitors at his Sussex shack, and nurtured dozens of budding amateurs and DXers. Our condolences to Al's wife, Maud, and his family.

The ARRL Awards Committee voted unanimously to accept the DXAC recommendations to add **Croatia 9A, Slovenia S5,** and **Bosnia-Hercegovina 4N4** to the DXCC Countries list. Croatia and Slovenia are added for contacts made June 26, 1991 or later, and Bosnia-Hercegovina for contacts made October 15, 1991 or later. The DXCC Desk will accept cards from these three countries *after January 1, 1993*. The Awards Committee did not vote on, nor even schedule a vote on, adding **Macedonia 4N5** to the DXCC Countries list, as the DXAC also recommended. DXCC Specialist Bill Kennamer, K5FUV, says the following operations have been accepted for DXCC credit: 7Q7CW, C9RAA, D2/F6BLQ, D2CW, D2FGC, ET3BC/YL, JT1/K7HDK, KP5/NTG, PYTSN, S21ZC, S79CW, TA/DK7PE, AHG/TF/P, TU4EF, VS6/DK7PE, ZB2/IKFVC, ZS9/DK9PE, 9DØRR, and cards from Iranian contacts made on or after August 20, 1988. Previously rejected Iranian cards may be returned for DXCC credit. Cards for these operations may be submitted for DXCC credit.

QSL Notes

QSL **VP2MR, VP2MBM,** and **VP2MCX** via N5DXD. QSL **VP2MCX** via Robert Giese, N5KXN, P.O. Box 7681, Houston TX 77270-7681.

QSL **SV5BOP** direct to Tharenos (Ross) Tharenou, P.O. Box 22, Lardos 85109, Rhodes Island, Dodecanese, Greece.

AM3DU/AM6/p operated from the Baleric Islands in September; QSL to EA3DU or EA3DXD.

The Oklahoma DX Association (OKDXA) is the QSL route for **AH9B/VO2, V7MHZ,** and **V73SG**, all active in CQWW SSB. Address is Box 88, Wellston, OK 74881.

Some Cayman Island QSL routes: **ZF2JI** via KG6AR; **ZF2TB** via KJ6HO, and **ZF2SZ** via WB6OKK.

QSL **3D2ZC** from Fiji via operator Martin Bayes, G4DZC, at his stateside address: Box 620674, Newton, MA 02162, or via the UK RSGB bureau. (His *Callbook* addresses are wrong.)

PZ1DY reports that the third postage increase in six months in Suriname has pushed the cost of airmail return to the US to US$1.50. One "green stamp" isn't presently enough; send US$2, or add an IRC.

Direct QSL routes for some Slovenia stations: **S59WA, S59AB,** and **S51HB** via Box 1, 65282 Cerkno, Slovenia; **S52CD** via Tone Crv, Bukovo 3, 65282 Cerkno, Slovenia; **S54DL** via Darko Laharnar, Trg 31. Divizijeg, 65282 Cerkno, Slovenia; and **S51XE** via Boris Tusek, Jerebova 9, 65282 Cerkno, Slovenia.

QSL **JU830C** via the headquarters station of the Mongolian Radio Sport Federation JT1KAA, P.O. Box 639, Ulaanbaatar-13, Mongolia. QSL **JT1T** and **JU1T** via the same address.

JX7DFA is on Jan Mayen until April; QSL via the Norway bureau to home call LA7DFA, or direct to Box 300, 1202 Oslo, Norway.

QSL the October **V63SM** Micronesia operation via Manami Shimazaki, JQ1EEL, P.O. Box 88, Moriguchi, Osaka 570, Japan.

QSL the **OK1DTG/P5** North Korean operation via Josef Zabavik, Ohradni 1361, 140 00 Praha 4, Czechoslovakia. (This op-

eration does not presently count for DXCC.)

DXers still needing a **YI1BGD** confirmation may try Christian Steger, OE6CRD, Haus Nr. 104, A-8132 Pernegg, Austria. Christian has YI1BGD and **YI1RJ** logs from 1989.

QSL **TL8DF** via FE1LBM, P.O. Box 265, F-67504 Haguenau, France (not in the *Callbook*.)

QSL **RI1OA** via Jack Staats, KB8RJ. However, please be patient; Jack hasn't received any logs yet.

QSL the 1992 operation of **PW2A** and **PW2N** via Vitor Luis Aidar Dos Santos, PY2NY, P.O. Boz 145, 18001-970 Sorocaba SP, Brasil. (QSL the **1989** operation of PW2A via operator PT2BW.)

QSL **R0H** via the European DX Foundation, P.O. Box 620260, 5000 Koln 60, Germany.

S79KMB's QSL manager, Anita Keighley, KN2N, has moved. Her new address is VA Medical Center, Building 21, Martinsburg, WV 25401.

Not Managers

HP2CWB and special-event call **H92A** should be confirmed via Jose N. G. Lee, N4YWY, FIT Box 6758, Melbourne, FL 32901. (Not via W6JOX.)

TU2BC was a slim; don't QSL via DL7BC.

3L1A does not QSL via LA1K.

QSL Manager Volunteers

Arnold Pedersen, KK4VN, Route 3, Box 221, Cumberland, VA 23040.

David Tucker, NU4N, 1500 Massac Church Road, Paducah, KY 42001.

Luc Glarey, I1YRL, via S. Martino 11, 10091 Alpignano, offers QSL managing services to a CW operator from the Pacific or Africa.

And Teddy Barczyk, DL4DBR, Pappelstr. 34, D-W-5800 Hagen-1, Germany, offers his services.

QSL Help Wanted

WA9CDY worked **S79QZ** in 1991, who said to QSL via DJ0QZ. Letters to DJ0QZ's 1992 *Callbook* address are returned marked: "unbekannt verzogen." Any help?

VE3XO seeks help getting a QSL from **RW9USA** for a 75 meter QSO. Several direct, registered letters to the *Callbook* haven't worked. Any suggestions?

Bill Sullivan, N5AFH, is trying to locate a current QSL route for **9G1WS** from 1979. Operator Will Stilley said he was an engineer for Kaiser Aluminum, and said to QSL via the 1979 *DX Callbook* address. Any ideas?

W9EVI wants to find logs for **VQ1ERR** from January 1959. VQ4ERR was operator, and W4IYC was then QSL manager. "His widow, now in England, does not have the logs," Mac reports.

KA1NCN seeks to confirm an ARRL DX test contact with **KG6DV/KH6** on 75 meters. Return receipt, SASE, and ready-made QSL weren't enough to get a confirmation. Ideas? KA1NCN also needs QSL info for **LT4U** and **RB4IZ**.

WB5LLM needs a QSL route for **FO0N** on CW in May of 1990.

KM9J seeks any info on **CE0ZJF** and **3A2NU**. (The 3A rings a faint bell as a possible pirate.)

K5KDG lost some old QSLs in a fire. He's trying to replace confirmations from **KH6BCB/KS4** from 1966, and **KZ5ZWN** from 1963. Any help?

KA8OUT seeks a QSL route for **LW4LN**.

N1HKH seeks QSL routes for **JZ3WW** and **JT1BS**.

KA3NIL wants help with **F0SSB, VU1PH**, and **VR4SF**.

N4UU says a card to **G3MTL**, QSL manager for RO200T, was returned marked "Gone Away." Anyone have a better address?

KF4TA worked 7J4LK on Ogasawara, but a QSL card to *Callbook* address of **JA3ABD** was returned marked insufficient address. Any help?

AB4WB seeks help with **I74XO**. Broken call?

K4QVK needs QSL routes for **3D2GT** (July 1983) and **ZC4AB** (May 1985).

Ex-USSR QSL Information

UC2LR has a new QSL manager: Dick Corp, K2POF, who has a new address: 10 Cary Road, Mechanicville, NY 12118.

UW6HS can help with QSL cards to Russia. He is manager for numerous ex-USSR stations and DXpeditions. He asks for registered mail to Vasil Kasyananko, P.O. Box 20, Georgievsk, Stavropolskogo KR 357800, Russia.

QSL the August operation of UL1I /UW9AM, UL2I/UA9AT, RL3I/RA9ABK, and UL4I/UZ9AWD via Igor Finogenov, Box 49, Magnitogorsk 455044, Russia.

QSL the RTTY contest call of RO0Q via UO5OLW, Box 112, Kishinev, Moldova 277012, Europe.

Stephen Licht, WF2S, has been QSL manager for UF6VBZ/UF6VM since 1990. He has logs until October 27, 1991, but nothing after that date. He can't confirm the 1000+ outstanding QSL requests until he gets Vladimir's logs; please be patient.

QSL Help Provided

9Y4H cards will (eventually) be out, according to Glenn, K6NA.

And Marv, K2VHW, QSL manager for 5B4ADA and YU2OO/5B4, says that the QSL delays were "caused by several circumstances of which one was the special QSLs Ivo requested. The cards are on the way out, about 100 per week as I catch up."

73, Chod, VP2ML

WASHINGTON READOUT

BY FREDERICK O. MAIA, W5YI

REGULATORY HAPPENINGS FROM THE WORLD OF AMATEUR RADIO

Everything You Ever Wanted To Know About Morse Code, But Were Afraid To Ask!

There can be no doubt that the subject of Morse Code is the single most prevalent topic on which we get mail. Readers are for it or against it, and want to know why telegraphy knowledge is necessary, how the tests are administered, how to study, and what they can do if they just can't learn it. This month let's talk about "the code." We have saved up a stack of your letters and will try to address all of your concerns.

International Amateur Radio Law

The Amateur Service is an internationally recognized radio communications hobby. In the United States amateur radio exists for purposes such as providing a means by which radio enthusiasts may provide voluntary communications for themselves and others, especially public-service and emergency communications. Ham operators also learn about and contribute to electronics technology and make up a very important pool of trained operators in the event of a national emergency.

Since radio waves know no boundaries, the various nations of the world periodically agree on the broad guidelines for accessing the radio spectrum. This is primarily accomplished at meetings called World Administrative Radio Conferences (WARCs), which are scheduled by the Geneva-based International Telecommunication Union. The ITU, a specialized agency of the United Nations, consists of delegations representing more than 150 different countries.

The ITU got its start in Europe in 1865 as the International Telegraph Union to expedite message handling across national borders. They primarily address radio frequency bands and the guidelines for accessing them. Once ratified by Congress, these international agreements have the force of law and provide the framework under which our Federal Communications Commission must operate.

National Volunteer Examiner Coordinator, P.O. Box 565101, Dallas, TX 75356-5101 (817-461-6443)

There are not many international laws which apply to amateur radio. From a technical standpoint, all nations must verify that their amateur operators are qualified to operate their equipment and that they can manually send and receive Morse code if the operation takes place below 30 MHz. There also must be a relationship between privileges (such as power levels, frequencies, and so forth) and operator proficiency. These rules exist primarily to reduce unwanted interference to other services.

Current international amateur service communications are limited to technical or unimportant personal matters. And the amateur bands must not be used to transmit international third-party messages unless agreed to by the countries involved. The International Radio Regulations also state that amateur stations shall transmit their callsigns at short intervals. There are no other international limitations.

International regulations requiring telegraphy proficiency in the amateur service have existed from at least 1938. Article 8, Section 197 (Cairo WARC 1938) required " . . . any person operating amateur and private experimental station apparatus, either on his own account or for another, must have proved his ability to transmit passages in the Morse Code and to read in telegraphy reception by ear, passages thus transmitted. He may be replaced only by authorized persons possessing the same qualifications."

In 1947 (Atlantic City WARC) the regulations (Article 42, Section 1003.3) included for the first time a frequency limit above which a test in Morse code may be waived and set this limit at 1000 mc/s. In 1959 (Geneva WARC) this frequency limit was dropped to 144 MHz and in 1979 (another Geneva WARC) to its current 30 MHz.

This cut-off point has been lowered at every general WARC since 1947, and it is wondered what will happen at the next general WARC, which should take place around the end of the century. Many believe that the amateur radio Morse code requirement will be totally eliminated.

While code-free amateur radio operation isn't supposed to take place on the shortwave HF bands under 30 MHz, Japan allows it by creatively interpreting the rules. They maintain that any radio operation is legally permitted under the International Radio Regulations provided it does not cause interference to others. No country has complained to the ITU about the code-free operation of the Japanese "voice-class" license. Japan has over one million "voice class" amateurs using 10 watts on the HF amateur bands *without Morse code proficiency.*

Morse Code Standards

There are no international Morse code speed standards. Theoretically, just recognizing the Morse sounds and being able to hand send the characters meets all international requirements. It is our FCC that provides for the three different levels of telegraphy proficiency—5, 13, and 20 words-per-minute. All FCC rules are made in accordance with the Administrative Procedures Act, which requires the public to be involved in the rule-making process. Actually the amateur radio telegraphy regulations exist the way they are because that is the way we as amateurs want them.

Back on June 22, 1982 the FCC published a Public Notice detailing the specifications used by the FCC for amateur radio Morse code test tapes. This has more or less become the defacto standard used in Morse code testing. Here is the text of that FCC Bulletin:

The international standards for the relative duration of elements and spacing employed in the Morse code are defined in CCITT Recommendation R.140 as adopted by the VIIth Plenary Assembly in November 1980. The 13 and 20 word-per-minute amateur radio test tapes conform to these standards.

The 5 word per minute amateur radio test tapes are constructed using Morse letters sent at 13 words per minute, but with additional spacing between characters and words to provide an effective rate of 5 words-per-minute. This method [commonly referred to as the Farnsworth system] is favored for slow telegraph speeds because it is believed to facilitate the attainment of higher speed.

Specifications:

For the 5 words per minute tapes, the modulation rate and duration of unit interval are calculated using 13 words per minute as the desired code speed.

WE SHIP WORLDWIDE

Barry Electronics Corp.

WORLD WIDE AMATEUR RADIO SINCE 1950

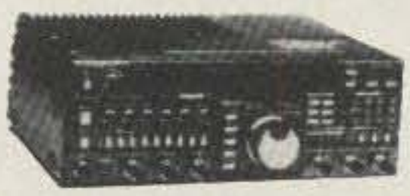
Your one source for all Radio Equipment!

For the best buys in town call:
212-925-7000
Los Precios Mas Bajos en Nueva York
WE SHIP WORLDWIDE!
Export orders expedited.

IC-R71A,751AM 781M 229GM R-7000, IC-765, IC-726, IC-323, 3230H, 729 & 728, IC-901, R-7100, IC-2410A/2500A, R-1, R-72, R-100, P2/P4AT

Wherever I go, I take my radio.
Specialist in RADIOS;
Business marine aviation,
ham radios and scanners.

KITTY SAYS: WE ARE NOW OPEN 7 DAYS A WEEK.
Saturday 10-5pm/Sunday 11-2pm
Monday-Friday 9 to 6:00 PM
Come to Barry's for the best buys in town



CONTACT US FOR THE LATEST IN BUSINESS AND HAM RADIOS, SHORTWAVE RECEIVERS & SCANNERS. MOTOROLA, YAESU, ICOM, KENWOOD, MAXON, SONY, ETC.

ICOM

YAESU

FT-767GX, FT-890, FT-747GX, FT-990, FRG-8800, FT-736R, FT-1000D, FT-415/815, FT-530, FT-5200, FT-2400, FT-470, FT-411E

YAESU	ICOM
FT-23R/26/76	IC2/3/4SAT
FT411E-811-911	IC02AT/2SRA
FTH-2008/7008	IC2/4GAT/24AT
	IC-A21/U16

Landmobile HT's
ICOM: U16, H16, V100, U400
MAXON, MOTOROLA,
YAESU: FTH 2008/7008
UNIDEN, REGENCY, KING,
MARINE ICOM: M7, M56, M700
AVIATION ICOM: A21 A200 H.T., TAD

IC-W2A

IC-H16/U16

MOTOROLA RADIUS COMMERCIAL RADIOS

TH-78A

FT-530

KENWOOD

ANTENNAS
A-S, AES, Cushcraft, Hy-Gain, Hustler, KLM, METZ, Urban, MODUBLOX, TONNA, Butternut, Multi-Band

TS450S/AT, R-5000, TS-850S, TM 241/A/ 441A, TR-751A, Kenwood Service Repair, TS140S, TS690S, RZ-1, TS-790A, TS950SD, TH-78A, TH28/48A, TM-941A, TM-741A, TM-732A, TM-641A

SCANNERS:
AOR, 1000, 3000, 900, ICOM, Bearcat.

MARINE RADIOS
ICOM M7, M11, M56, M700TY, M800
AVIATION PORTABLE ICOM A-21
MOTOROLA MARINE KING KX 99

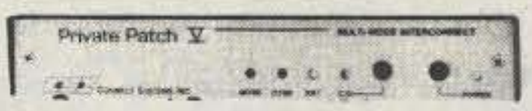
Budwig ANT. Products
FLUKE 77, 83, 85, 87 Multimeters

Linear Amplitier:
Ameritron, Icom, Kenwood, Yaesu

Telephone Autopatch

Patches telephone calls from your radio to phone line. Great for making and receiving phone calls where there are no phone lines. Simple to use. Write or fax for inquires.

Models: SD1-50, Private Patch V, CES, CSI, etc.



MFJ-989C
8L8H, AT300, etc.

Covercraft/Coaxseal Stocked

SHORTWAVE RECEIVERS STOCKED

Satellite telephone in suitcase for worldwide use, also for use in car and wireless telephone (for export). Motorola cellular phone stocked.

Computer Interfaces Stocked: MFJ-1270B, MFJ-1274, MFJ-1224, AEA PK-88, MFJ-1278T, PK-232 MBX W/FAX, DRSI PRODUCTS DSP 2232

Antenna Tuners:
Ameritron, Nye, Kenwood, MFJ, AEA, etc.

COMMERCIAL & HAM REPEATERS STOCKED. WRITE FOR QUOTES

MOTOROLA

Kantronics
KAM, KPC II,
KPC IV, Data Engine,
DVR 2.2 ,KPC-3

MOTOROLA AUTHORIZED DEALER
KACHINA COMMUNICATIONS DEALER

Radios for Business, Gov't, 2-way, etc. Stocked & Serviced,

Call for Great Prices!

Panasonic

Shortwave Radios/Marine

Wide selection of SW & Amateur Publications

AUTHORIZED DEALER
SONY
Shortwave Radios Stocked
DIGITAL FREQUENCY COUNTERS

AMPLIFIERS STOCKED:
RF Concepts
Mirage
TE Systems

Telephone scramblers for cellular and regular phones. $299.00 each

CAR Stereo with Shortwave Phillips DC-777 @ $499.95 in stock

BIRD Wattmeters & Elements In Stock

COMET ANTENNAS STOCKED

HEIL EQUIPMENT IN STOCK

ANTENNAS:
AEA, AlphaDelta, ANLI, Antenna Specialist, Barker & Williamson, Comet, Cushcraft, Diamond, GAP, Hy-Gain, Hustler, Larsen, Etc.

(144, 220, 440 MHz), Isoloop.

EIMAC
3-500Z
572B, 6JS6C
12BY7A &
6146B

BIRD Wattmeters & Elements In Stock

Long-range Wireless Telephone for export in stock

BENCHER PADDLES.
BALUNS. LOW PASS FILTERS
IN STOCK

MIRAGE AMPLIFIERS
ASTRON POWER SUPPLIES
Belden Wire & Cable, Int'l Wire
OPTO KEYERS STOCKED

OPTOELECTRONICS model 1300 H/A, 0-1300MHz 2300, 2210 H, 0-2200 MHz, 2600H, UTC-3000, 2810

STANDARD.

JRC Short-wave radios
JST135, NRD-535D

Hy-Gain Towers will be shipped direct to you FREE of shipping cost.

Ameritron Amplifiers
AMERITRON®

MAIL ALL ORDERS TO: BARRY ELECTRONICS CORP., 512 BROADWAY, NEW YORK CITY, NY 10012 (FOUR BLOCKS NORTH OF CANAL ST., BETWEEN SPRING AND BROOME ST.)

New York City's LARGEST STOCKING HAM DEALER
COMPLETE REPAIR LAB ON PREMISES

"Aqui Se Habla Espanol"
BARRY INTERNATIONAL
FAX 212-925-7001 Phone 212-925-7000

Monday-Friday 9 A.M to 6:00 P.M.
Saturday 10- 5pm /Sunday 11- 2pm

IRT/LEX-"Spring St. Station". **Subways:** BMT-"Prince St. Station". IND-"F" Train-Bwy Station"
Bus: Broadway #6 to Spring St. Path-9th St./6th Ave. Station.

COMMERCIAL RADIOS STOCKED: ICOM, Motorola, MAXON, Standard, Yaesu. We serve municipalities, businesses, Civil Defense, etc. Portables, mobiles, bases, repeaters...

We stock: AEA, Alinco, Ameco, Ameritron, Antenna Specialist, ARRL, Astatic, Astron, B&K, Belden, Bencher, Bird, Butternut, CES, Cushcraft, Daiwa, Elmac, Henry, Heil, Hustler, Hy-Gain, Icom, KLM, Kantronics, Kenwood, Larsen, Maxon, MFJ, Mirage, Motorola, Nye, Palomar, RF Products, Shure, Standard, TUBES, Uniden, Yaesu, Vibroflex, Duplexers, Repeaters, Scanners, Radio Publications

WE NOW STOCK COMMERCIAL COMMUNICATIONS SYSTEMS
HAM DEALER INQUIRES INVITED PHONE IN YOUR ORDER & BE REIMBURSED
COMMERCIAL RADIOS stocked & serviced on premises.
Amateur Radio Courses Given On Our Premises, Call
Export Orders Shipped Immediately.

ALL SALES FINAL

Technical help offered upon purchase

FAX: 212-925-7001

Duration of code elements
Dot—1 unit interval
Dash—3 unit intervals

Duration of spacing for 13 and 20 words per minute
Space between elements—1 unit interval
Space between characters—3 unit intervals
Space between words—7 unit intervals

Duration of spacing for 5 words per minute
Space between elements—1 unit interval
Space between characters—15 unit intervals
Space between words—39 unit intervals

Accuracy

Notwithstanding accuracy implied by the above formulas, the timing accuracy of actual test tapes may vary +/−2%.

Audio frequency range (pitch of CW note)

The audio frequency used is no lower than 700 Hertz and no higher than 1000 Hertz.

Message duration

All tapes run for at least 5 minutes but no longer than 6 minutes.

Message content

The test messages transmitted simulate one side of a typical amateur radio conversation using code (CW QSO). Common telegraphy abbreviations, Q-signals, and amateur conventions (such as RST signal reporting system) are used.

The average word in the English language has been determined to be 50 units long. Since the word PARIS contains exactly 50 units, code speed can be accurately calculated by sending that word a specified number of times. Since numerals, prosigns, and punctuation marks contain more character elements, they count as two characters (see Part 97.507e). Dot spacing should normally be about 10 per second.

Taking The Morse Code Test

All W5YI-VEC prepared telegraphy examinations match these FCC standards. The American Radio Relay League telegraphy examinations are slightly different. While their 20 wpm examination conforms to the FCC standard, the ARRL's 5 and 13 words-per-minute Morse code examinations are transmitted at 18 wpm character speed with the spaces between the characters and words spaced out to yield 5 and 13.

It is a matter of opinion as to which Farnsworth spacing is best. The ARRL uses 18 wpm because they believe it makes it easier to attain the 20 wpm Extra Class level if you learn at a faster character speed to begin with. Volunteer examiners are allowed to prepare their own telegraphy examinations. In actual practice, any spacing may be used as long as the overall speed conforms to the telegraphy element standards specified in §97.503. Some VEs who use a computer to generate the code test will even let you decide which Farnsworth spacing you want.

The rules require knowledge of 43 different characters: all letters of the alphabet, numerals 0–9, four punctuation marks (period, comma, question mark, and slant bar) and prosigns $\overline{AR}$, $\overline{BT}$, and $\overline{SK}$. A prosign is a special operating character made up of sending two characters together. $\overline{AR}$ means "End of Transmission," $\overline{BT}$ "Break" (or hyphen), and $\overline{SK}$ for "End of Contact."

A telegraphy examination must consist of a message sent at no less than the prescribed speed for a minimum of five minutes. Every examination message must contain at least one of the 43 required characters, and no message known to the examinee may be administered in a telegraphy examination. Neither may the same telegraphy examination be readministered to an examinee.

The VECs, at their annual conferences, have consistently declined to adopt a code test transmission and answer standard, instead leaving it up to the individual VEC and VE team to use whatever standard they feel appropriate. Any answer format may be used, including one minute solid copy, fill in the blanks, multiple choice, answering seven out of ten questions about the examination text . . . even true/false.

The rules simply state that an applicant must prove to the examiners that he or she is able to copy the International Morse code *by ear*. Some VEs give the applicant two chances to pass the code test by asking questions about the text if the applicant fails to copy 25 characters in a row.

Morse code tests may be taken in reverse order if desired—that is, 20 wpm before 13 wpm. If the 20 wpm is failed, then the applicant may try the 13 wpm. As a general rule, Morse hand sending examinations are not administered, since the FCC has taken the position "Passing a telegraphy receiving examination is adequate proof of an examinee's ability to both send and receive telegraphy." See §97.509(d). The administering VEs, however, may also include a sending segment if they feel it important.

Is The Morse Code Necessary?

Technology has progressed to the point where the reasons for retaining the code as a prerequisite for amateur radio operation are becoming outdated. Newer digital communications modes now can do what code traffic handled by humans cannot—that is, assure accurate delivery of important traffic.

Automatic message correction through electronic "handshaking" circuitry has made the last stronghold of hand sent/received telegraphy, the Maritime Radio Service, unnecessary. Large ocean-going vessels are in the process of being tied into digital networks relayed by satellites. Simply stated, ship-to-shore shortwave communication is fast becoming part of the romantic past history of ships at sea.

In 1988 the International Maritime Organization made a decision to end Morse code on the high seas. The IMO is the United Nations agency dedicated to the

safety of ocean shipping. They represent some 97 percent of the world's ocean-going vessels. This ruling basically signals the demise of radio operators and manual telegraphy aboard ocean-going vessels.

Maritime radio first used Morse code to enhance the safety of life at sea. Now a new, automated satellite-based Global Maritime Distress and Safety System will allow the crew to send a distress signal simply by pushing a button. Ships will also carry a radio beacon which would give the ship's position via GMDSS if it were to sink suddenly. Morse code, which had been the foundation of maritime distress and safety messages since the turn of the century, now becomes obsolete. Ship owners are expected to phase out radio operators when the new equipment is installed in ships starting this year.

Telegraphy can, however, be an interesting and fun way to communicate. It allows more amateurs to use the bands at one time due to its efficient use of spectrum. CW is also an international language understood by most amateurs of the world.

What Is The Best Way To Learn Morse Code?

To many people the Morse code requirement is simply a barrier to HF privileges. It need not be. It merely requires the discipline to practice code for a few minutes every day to be able to learn enough Morse to pass the 5 wpm and faster code exams. Today most amateurs are learning the code after first passing the (No-Code) Technician requirements.

There are several good Morse code courses on cassette tapes available in the license preparation marketplace. I personally believe the best way, however, to learn Morse code is with a personal computer. We distribute a program called Morse Academy, which does everything from teaching the characters to building up speed past the Extra Class level. (Cost is $9.95; VISA/MasterCard order toll-free 1-800-669-9594.)

Morse Academy is a Computer Aided Instruction (CAI) based program that teaches Morse code through various games and sessions. The Learning Session introduces characters from the keyboard and through a flashcard mechanism that communicates the sounds and images of the characters. The Receiving Game provides immediate feedback for characters sent and copied. The Endurance Session helps the student extend his skills by playing against the computer in an attempt to build the length of time he can copy correctly. The Proficiency Session allows longer sessions copying text either on the computer keyboard or with paper and pencil. Actual telegraphy tests generated by Morse Academy can be used for practice, and the program can be configured to match any speed, tone, and spacing.

Morse Academy supports sound output from the PC's sound chip, the Disney Sound Source, or an ADLIB/Sound Blaster compatible music card.

Listening to W1AW, the ARRL headquarters station, or other code-practice stations, or listening to other amateurs, is also a good way to learn CW operating procedures. Practice at least 30 minutes a day sending and receiving. Once you learn the code, try copying a station sending much faster than you can actually copy—and try copying behind. That is, don't write down a letter until the next letter has been transmitted. One of the best ways to become proficient at Morse code is to simply get on the air once you pass 5 wpm. Don't be concerned that you don't know enough to carry on a conversation. There will be many others in the same situation.

Code Exemptions For The Handicapped

Not only has the FCC dropped the code requirement to enter amateur radio, they also have relaxed the code requirement for handicapped amateurs. Disabled amateurs who have passed at least the 5 wpm code requirement can now be exempted from having to pass a higher speed in order to upgrade their license.

It is up to the applicant to prove that he or she has passed the 5 wpm code requirement. This is usually accomplished by presenting a Certificate of Successful Completion of Examination (CSCE) showing Element 1(A) telegraphy credit received during the past year or a current operator license of any class except the Codeless Technician.

Administering VEs are required by the rules (97.509h) to accommodate all applicants whose physical disabilities require a special examination procedure. Any special needed equipment must be supplied by the examinee. Volunteer examiners may not eliminate the 5 wpm test requirement because of a disability. If the disability is not clearly evident, they may require a physician's certification indicating the nature of the handicap before determining which, if any, special procedures are to be used.

You will find that VE teams will go to great lengths to accommodate any legitimately disabled person. The examination may be administered at a place convenient and comfortable to the examinee, even bedside. For a deaf person, the dots and dashes may be sent to a vibrating surface or a flashing light. Examiners may read the questions to blind persons or write for the examinee where the examinee is unable to do so.

Where warranted, the examiners are even authorized to pause the telegraphy test tape after each sentence, each phrase, each word, or even each character to allow the applicant additional time to absorb and interpret what was sent. Also, a sending test may be substituted for a receiving test where the examinee's particular handicap precludes a telegraphy receiving examination.

Once the 5 wpm code exam is passed in some manner, a 13 and 20 wpm telegraphy exemption is available to the severely disabled. The Physician's Certification of Disability and Patient's Medical Information Release on the back of the FCC application Form 610 must be completed to obtain credit for the 20 wpm code exam. The certifying physician must be a medical doctor or a doctor of osteopathy. This code credit is valid for a period of one year—enough time for applicants to pass any needed written examinations.

Volunteer examiners are not permitted to question the medical judgment of the certifying physician. However, if the VE team has substantial evidence that the 20 wpm telegraphy exemption is being granted improperly, they may attach a signed letter to the Form 610. The application is then referred to the FCC's Personal Radio Branch for further investigation.

No handicapped person is required to apply for an exemption from the higher speed telegraphy examination, nor is anyone denied the opportunity to take the telegraphy examination.

73, Fred, W5YI

HAM RADIO Bookstore

Radio Amateur Callbooks

North Amercian Edition

The latest edition of the Amateur's best source of names, callsigns and addresses. Up-to-date with all the latest information from every country in North America. Includes handy aids such as QSL bureaus, time charts and much more. Buy today and get a full years use! ©1992

❑CB-NA93 Softbound $29.95

International Edition

Countries are changing overnight. DXCC lists are out-of-date as soon as they are published. Get a new International Callbook and have the latest information on hand. Includes all countries outside of North America. Handy aids make easy work of getting QSLs. Bureaus are listed with current addresses. Get your new Callbook today! ©1992

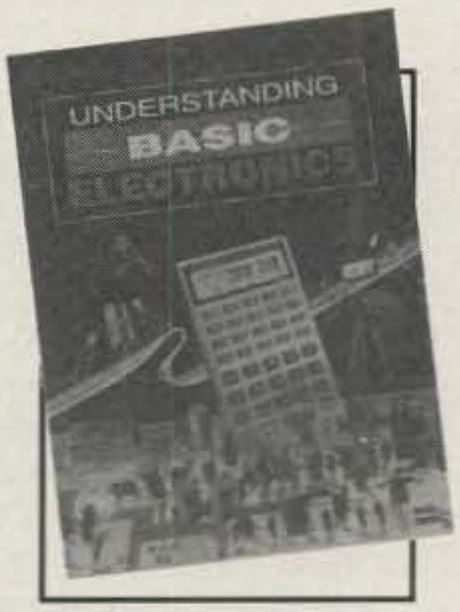
❑CB-I93 Softbound $29.95

Buy'em both Save $4.95Just $54.95
Regular price $59.90

Understanding Basic Electronics

by Larry Wolfgang, WR1B

You **DO NOT** have to be an engineer or a math wiz to enjoy electronics! This book will teach you all the basic electronics you need to know to start enjoying the fascinating world of today's Amateur Radio. Text uses a modular approach so that no one subject or study area becomes too complex. WR1B's light-hearted writing style plus pictures, illustrations and diagrams make for fun reading. This book is one I would not hesitate to recommend. ©1992 314 pages First Edition



❑ AR-UBE Softbound $16.95

1993 Radio Amateur's Handbook

by ARRL

The new 1993 edition of this classic has been revised and updated. In addition to theory and practical application ideas, hints, tips and suggestions, the Handbook includes many projects for you to build. From amplifiers to zener diode power supplies, you'll find it in the 1993 Radio Amateur's Handbook ©1992 over 1000 pages

❑ AR-HB93 Hardbound $24.95

Two New How-To-Get Started Books

From NARA and Dave Ingram, K4TWJ

These two books were written with the beginner in mind.Questions get full answers in simple easy-to-understand terms. No technical gobbledygook! *Packet Radio* tells you how to set up and operate a packet station using the latest equipment.. QRP delves into the "secrets" of low power and explains antennas, equipment and accessories you need.

❑DS-QRP Softbound ©1992 $9.95
❑DS-PKT Softbound ©1992 $9.95

Ham Radio Contesting

by Bob Halprin, K1XA

Here's a great book for both the beginner and expert alike. Insights on how to build and operate a contest station from one of the best. You'll learn strategies for sleeping, eating and operating - often overlooked but very important to winning. Includes band descriptions and using your computer to log and control your radio. Plus much more! ©1992 70 pages 1st edition

❑TP-C Softbound $14.95

1993 CD ROM Call Directory *from Buckmaster*

US and International Calls ***Mac &IBM***

Use the latest way to get names and addresses for 550,000 US and 250,000 International hams. Also has new to old call cross reference for 100,000 calls! 6,000 PC public domain programs and data files of amateur related programs and make this an unbelievable value for $49.95. US files include name address license calss and date of birth. International files came from an extensive survey of foreign licensing authorities. Information included is the most up-to-date available in CD-ROM format. You can even do searches to find long lost friends or other hams in your neighborhood. Great way to use the latest in computer technology! ©1992

❑CD-ROM $49.95

Call or write for Free 16 page catalog

Shipping , Handling & Ordering tips

Every attempt will be made to ship your order the same day it is received. For fastest delivery, we recommend UPS. UPS Brown ships by ground and is $5.00 per order. UPS Second Day and Overnight are available. Call for details. Orders also ship via US Mail Book rate for $4 per order. International orders ship via US Mail surface unless otherwise specified. International shipping charges calculated by weight plus $3 handling charge. Contact us directly for Air and other methods of shipment. Sorry, no COD shipments. No retail or walk in sales. Prices subject to change without notice.

Ham Radio Bookstore
PO Box 209
Rindge, NH 03461-0209
(603) 899-6957

(800)457-7373

24 hour FAX line (603) 899-6826
Phones answered 8-5 EST

CIRCLE 7 ON READER SERVICE CARD

PROPAGATION

BY GEORGE JACOBS, W3ASK

THE SCIENCE OF PREDICTING RADIO CONDITIONS

Flash !

Mother Nature cooperated with amateur radio during the CQ World-Wide DX Contest CW weekend of November 28 and 29. In fact, conditions on the HF bands were somewhat better than expected. While my forecast called for normal conditions ranging between Low Normal and High Normal, early results from the contest weekend indicate conditions were mainly High Normal, and may have even climbed into the Above Normal range at times. A 10.7 cm solar flux level of 149 was reported for November 28th, dropping slightly to a level of 140 on the 29th. This corresponds to approximate sunspot numbers of 107 and 90, respectively. The world-wide index for geomagnetic activity (A_p) was reported as 5 on November 28th and 4 on the 29th. These indicate an exceptionally quiet and stable ionosphere. All in all, the 1992 CQ World-Wide DX Contest periods, both phone and CW, enjoyed relatively good propagation conditions, despite the decline in the solar cycle.

Sunspot Cycle 22 Progress

The Royal Observatory of Belgium, the world's official keeper of sunspot records, reports a monthly mean sunspot number of 88 for October 1992. This results in a smoothed running sunspot number of 103 centered on April 1992. The present sunspot cycle is continuing to decline at a relatively rapid rate. A smoothed index of approximately 73 is forecast for February 1993.

Canada's Dominion Radio Astrophysical Observatory in Penticton, B.C. reports a corresponding mean 10.7 cm solar flux level of 132 for October 1992. This results in a smoothed level of 163 centered on April 1992 and a predicted level of approximately 140 for February 1993.

February Conditions

In the Northern Hemisphere during February, expect a seasonal decrease in the range of frequencies that will propagate long distances during the daylight hours (i.e., 10 and 12 meter bands) and an increase during the hours of darkness (i.e., 30 and 40 meter bands).

11307 Clara Street, Silver Spring, MD 20902

LAST MINUTE FORECAST

Day-to-Day Conditions Expected for February 1993

	Expected Signal Quality			
Propagation Index	**(4)**	**(3)**	**(2)**	**(1)**
Above Normal: 7-8, 17, 19	**A**	**A**	**B**	**C**
High Normal: 4, 6, 9-10, 16, 18, 24-25	**A**	**B**	**C**	**C-D**
Low Normal: 2-3, 5, 11, 14-15, 22-23, 27	**B**	**C**	**D**	**D-E**
Below Normal: 1, 12, 20, 28	**C**	**C-D**	**D-E**	**E**
Disturbed: 13, 21, 26	**C-D**	**D**	**E**	**E**

Where expected signal quality is: **A—Excellent opening, exceptionally strong, steady signals greater than S9.**

B—Good opening, moderately strong signals varying between S6 and S9, with little fading 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.
3 dB per S-unit.

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 fair-to-poor (C-D) on February 1st, fair (C) on the 2nd and 3rd, good (B) on the 4th, fair (C) on the 5th, etc.

Towards the end of February and continuing through March and early April, an *equinoctial* effect should be noticeable on the HF bands. This usually means an improvement in conditions for openings between the Northern and Southern Hemispheres—for example, between the United States and South America, southern Africa, Australasia and Oceania, and the southern areas of Asia. Equinoctial propagation occurs during the spring and fall months, when the sun is most directly overhead at the equator. This results in similar ionospheric characteristics over large areas of the world. It tends to maximize during sunrise and sunset periods and over both short and long paths.

While fewer *10* and *12* meter DX openings are expected during February, some very good ones should be possible to many areas of the word during the daytime hours. The *15* meter band is forecast to be the best band for world-wide DX propagation conditions during the daylight hours. Excellent openings are predicted to most areas of the world, with generally strong signals and little fading or noise. The band should open towards the east shortly after sunrise, peak towards the north and south during the early afternoon hours, and towards the west during the late afternoon and early evening. Good openings world wide are also forecast for the *17* and *20* meter bands from shortly after sunrise through the early evening hours. The *20* meter band is expected to remain open well into the hours of darkness for paths towards the south and west.

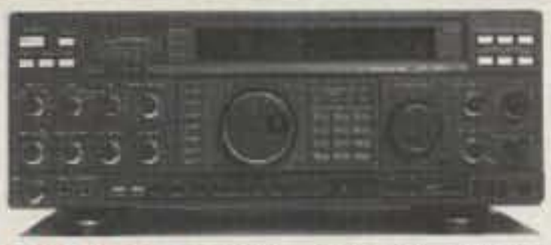
Fairly good DX propagation conditions are expected on the *30* and *40* meter bands from late afternoon and continuing through the hours of darkness until shortly after local sunrise. Fairly high signal levels are expected during many DX openings. A seasonal increase in static levels is expected to result in somewhat poorer DX propagation conditions on *80* meters. Despite weaker signals and higher static levels, some fairly good DX openings are forecast to many areas of the world during the hours of darkness. Some DX openings may also be possible on the *160* meter band during the hours of darkness and the sunrise period.

For short-skip openings less than 250 miles, *80* meters should be best during the daylight hours, followed by *40* meters, while *160* meters is expected to be optimum during the hours of darkness, with *80* meters as a follow-up. For distances between 250 and 750 miles, try *30* and *40* meters during the day and *80* meters at night. The best band for openings between 750 and 1300 miles during the daytime hours of February should be *20* meters, with *30* and *40* meters optimum from sundown to midnight and *80* meters recommended from midnight to sunrise. For short-skip openings between 1300 miles and the one-hop limit of 2300 miles, check and *15*, *17*, and *20* meters during the day and *30*, *40*, and *80* meters at night. Good short-skip openings between approximately 1000 and 2300 miles are expected on *10* and *12* meters throughout much of the daytime period.

VHF Ionospheric Propagation

Auroral displays tend to occur somewhat more frequently during February than dur-

Call AES® Toll Free for Discount Prices on YAESU Equipment



YAESU FT-1000 • 200W - 9-band, all-mode HF transceiver with 100kHz-30MHz receive, 99 memories, built-in antenna tuner with memories. Built-in AC ps. 6"h x 16"w x 15"d, 58 lbs..... **LIST $3499.00**
YAESU FT-1000D • Deluxe version with dual bandpass filter for crossband receive, temperature compensated crystal oscillator, 2.4kHz/2KHz SSB filters and 500Hz CW xtal filter ..... **LIST $4499.00**

YAESU FT-990 • 100W – all mode 160-10M HF transceiver with 100kHz-30MHz receiver, 99 memories. Built-in antenna tuner and AC power supply. 12¾"w x 4½"h x 11½"d, 30 lbs..... **LIST $2399.00**
FT-990DC • No AC ps or CW filter..... **LIST $1999.00**

YAESU FT-767GX • All-mode, 160-10M transceiver with 100kHz-30MHz receiver. Opt. modules for 6M, 2M & 70cm 100W out to 30MHz, 10W above. Built-in AC ps. 5⅛"h x 14½"w x 11½"d, 30 lbs.. **LIST $2068.00**

YAESU FT-890 • 100W 160-10m all mode transceiver with 100kHz-30MHz receiver. Optional internal automatic antenna tuner. 13.5VDC @ 20A. 9⁵⁄₁₆"w x 3⅜" x 9½"d, 12.3 lbs..... **LIST $1339.00**
YAESU FT-890/AT • w/ant tuner..... **LIST $1529.00**

YAESU FT-747GX (left) • 100W, 160-10M SSB/CW base or mobile transceiver with 100kHz-30MHz receiver, and optional FM transmit7 receive. 12V DC @ 20A. 3¾"h x 9½"w x 9½"d, 7 lbs ..... **LIST $899.00**
YAESU FT-650 (right) • 100W ,6, 10 & 12M all mode with 24.5–56.0 MHz receive. 105 memories: 99 for channels, 4 programmable scan memories and 2 priority channels. Built-in AC supply or 12V DC.@ 18A. 5¼"h x 11½"w x 11¼"d, 18 lbs..... **LIST $1599.00**

YAESU FL-7000 • Solid-state, 160-12M. linear with built-in automatic antenna tuner and power supply. 70W drive for 600W output. Full break-in for CW, HF Packet and AMTOR. Auto. selection of 4 antennas with opt. unit. 5"h x 15"w x 15"d, 66 lbs..... **LIST $2279.00**

FMP-1
AQS Message Display for FT-736R
CLOSEOUT
$89.95

YAESU FT-736R • All-mode, 2M/430 multi-band VHF/UHF. Optional. modules for 50MHz, 220MHz, and 1.2GHz. 10W on 50MHz and 1.2GHz, 25W.on 2m and 440 MHz. Built-in AC ps, or 12V DC w/optional power cord. 5⅛"h x 14½"w x 11½"d, 19.8 lbs... **LIST $1999.00**

MK II's 2½w, FM, SSB/CW portable. Requires 12V DC @ 1.1A, or opt. battery case with 9 (C) cells or nicads. DTMF mic with up-down control, dual VFOs, 10 memories with scan. Offset tuning, LCD display. 2⅛"h 6¼"w x 7½"d, 2.6 lbs.

FT-290R MK II • 2 meters, 25W..... **LIST $659.00**
FT-690R Mk II • 6m, 50-54MHz, 10W.. **LIST $799.00**
FT-790R Mk II • 430-450MHz, 25W .... **LIST $759.00**

YAESU FT-5200 (top) • 2m/440MHz FM Mobile. Covers 140-150 (tx), 140-174 (rx) & 430-450MHz.32 memories, CTCSS encoder. (2m) 50/5W, (70cm) 35/5W. Cross band full duplex. DTMF mic., detachable front panel for remote. 5½"w x 1⅝"h x 6"d, 2 lbs. ..... **LIST $769.00**
FT-5100 • Like 5200 w/o remote cap. ... **LIST $695.00**
FT-6200 • 35/10w, 440MHz/1.2GHz ..... **LIST $799.00**
YAESU FT-212RH/C8 (right) • 2m FM mobile. 140-150MHz transmit, 138-174MHz receive. 45/5W. 12V DC @ 10A. 1⅝"h 5½"w x 6"d, 2.8 lbs ..... **LIST $405.00**
FT-712RHT/C8 • same as 212 but covers 430-450MHz, 35/3W, 12V DC @ 10A..... **LIST $497.00**
FT-912RH • 1.2GHz, 10W, 12VDC @ 4A..**LIST $581.00**
YAESU FT-2400H (left) • Rugged 2m FM mobile. 50W/25W/5W. Receives 140-174MHz (140-150MHz tx). 31 memories, CTCSS encoder, 5 scan functions. Programmable call channel, auto. offset. backlit DTMF mic. 6"w x 1⅞"h x 7"d, 1½ lbs ..... **LIST $439.00**

A B C D E

YAESU FT-411E (C) • 2m, 140-150MHz (tx), 140-174MHz (rx). 2½w FM HT. LCD, keypad and rotary-dial freq entry. 5½"h 2¼"w x 1½"d, .85 lb. ..... **LIST $358.00**
YAESU FT-811 (A) • 2w, 430-450MHz..... **LIST 394.00**
YAESU FT-911 (A) • 1w, 1.2GHz..... **LIST 489.00**
YAESU FT-470 (B) • 2m/440MHz, 2.3w, FM handheld. Similar to FT-411 and 811 above. Simultaneous receive on both bands, 21 memories for each band. 6½"h x 2¼"w x 1½"d, .88 lbs..... **LIST $499.00**
YAESU FT-415 (D) • Compact 2m FM HT. 2w, 130-174MHz/rx (140-150MHz tx). Dual VFOs, 41 tunable memories. 2⅛"w x 5¼ "h x 1⅜"d, 12½ oz..... **$409.00**
FT-815 • Similar to FT-415 but 70cm, 2W, 430-450MHz receive and transmit ..... **LIST $439.00**
These are similar to FT-415/815 but without TTP
FT-26/25 • 2-meters, 2W, 130-174MHz receive and 140-150MHz transmit..... **LIST $299.00**
FT-26/27 • 2-meters, 5W, 130-174MHz receive and 140-150MHz transmit..... **LIST $329.00**
FT-76/25 • 70cm, 2W, 430/450 MHz/tx-rx **$329.00**
YAESU FT-23R-17 (E) • 2m FM HT 2.5w ouput, rotary dial frequency entry, LCD display, 10 memories, scanning, priority. Rugged and weatherproofed. 4⅛"h 2¼" x 1⅜"d, 1 lb ..... **LIST $290.00**
FT-23R-12 • as above but 2m, 5w..... **LIST 309.00**
FT-33R • 220 MHz FM, 5w ..... **LIST 329.00**

FRG-8800 (rt) • Shortwave receiver...**LIST $784.00**

ANTENNA ROTORS	LIST
G-250 • Light duty, 4 sq. ft. rotor.....	$111.00
G-400RC • Light/medium duty, 11 sq. ft.	242.00
G-500A • Elevation rotor, 12 sq. ft.....	249.00
G-800S • Med/hvy duty, 21 sq. ft., 450° rot.	322.00
G-800SDX • Med/hvy duty, 21 sq. ft, presets	389.00
G-1000SDX • HD, 21 sq. ft, 450° rot/presets	466.00
G-2700SDX • HD, 34 sq. ft, 450° rot/presets	999.00
G-5400B • Light/med, 11 sq. ft. az/el combo	497.00

IMPORTANT! • All prices in this ad are LIST. Please call Toll Free for our latest DISCOUNT PRICES.
Accessories for major items are not shown in this ad. For information, call Toll Free or see the latest AES Catalog.
All Prices subject to change without notice.

MasterCard VISA DISCOVER AMERICAN EXPRESS

Order Toll Free: 1-800-558-0411 *FAX: (414) 358-3337*

AMATEUR ELECTRONIC SUPPLY® Inc.

5710 W. Good Hope Road; Milwaukee, WI 53223 • Phone (414) 358-0333

AES® BRANCH STORES

WICKLIFFE, Ohio 44092
28940 Euclid Avenue
Phone (216) 585-7388
1-800-321-3594

ORLANDO, Fla. 32803
621 Commonwealth Ave.
Phone (407) 894-3238
1-800-327-1917

CLEARWATER, Fla. 34625
1898 Drew Street
Phone (813) 461-4267
No Toll Free Line

LAS VEGAS, Nev. 89106
1072 N. Rancho Drive
Phone (702) 647-3114
1-800-634-6227

Watch for Future AES® Branch Store Openings!

HOW TO USE THE DX PROPAGATION CHARTS

1. Use Chart approprate to your transmitter location. The Eastern USA Chart can be used in the 1, 2, 3, 4, 8 KP4, KG4 and KV4 areas in the USA and adjacent call areas in Canada; the Central USA Chart in the 5, 9 and 0 areas; the Western USA Chart in the 6 and 7 areas, and with somewhat less accuracy in the KH6 and KL7 areas.

2. The predicted times of openings are found under the appropriate meter band column (10 through 80 Meters) for a particular DX region as shown in the left-hand column of the Charts. An * indicates the best time to listen for 160 meter openings.

3. The *propagation index* is the number that appears in ( ) after the time of each predicted opening. The index indicates the number of *days* during the month on which the opening is expected to take place as follows:

(4) Opening should occur on more than 22 days
(3) Opening should occur between 14 and 22 days
(2) Opening should occur between 7 and 13 days
(1) Opening should occur on less than 7 days

Refer to the "Last Minute Forecast" at the beginning of this column for the actual *dates* on which an opening with a specific *propagation index* is likely to occur, and the signal quality that can be expected.

4. Times shown in the Charts are in the 24-hour system, where 00 is midnight, 12 is noon, 01 is 1 A.M., 13 is 1 P.M., etc. Appropriate *standard* time is used, *not* GMT. To convert to GMT, add to the times shown in the appropriate chart 8 hours in PST Zone, 7 hours in MST Zone, 6 hours in CST Zone, and 5 hours in EST Zone. For example, 13 hours in Washington, D.C. is 18 GMT. When it is 20 hours in Los Angeles, it is 04 GMT, etc.

5. The charts are based upon a transmitted 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-wavelength above ground on 40 and 20 meters, and a wavelength above ground on 15 and 10 meters. For each 10 dB gain above these reference levels, the *propagation index* will increase by one level for each 10 dB loss, it will lower by one level.

6. Propagation data contained in the Charts has been prepared from basic data published by the Institute for Telecommunication Sciences of the U.S. Dept of Commerce, Boulder, Colorado, 80302.

February 15 - April 15, 1993
Time Zone: EST (24-Hour Time)
EASTERN USA To:

Reception Area	*10 Meters*	*15 Meters*	*20 Meters*	*40/80 Meters*
Western & Central Europe & North Africa	09-11 (1) 11-13 (2) 13-14 (1)	07-08 (1) 08-09 (3) 09-12 (4) 12-13 (3) 13-15 (2) 15-16 (1)	04-07 (1) 07-09 (4) 09-12 (3) 12-15 (4) 15-17 (3) 17-19 (2) 19-21 (1)	17-19 (1) 19-20 (2) 20-01 (3) 01-02 (2) 02-03 (1) 19-21 (1)* 21-22 (2)* 22-23 (3)* 23-00 (2)* 00-01 (1)*
Northern Europe & European USSR	08-12 (1)	07-08 (1) 08-11 (2) 11-14 (1)	05-07 (1) 07-09 (3) 09-11 (2) 11-13 (3) 13-14 (2) 14-18 (1)	18-20 (1) 20-22 (2) 22-02 (1) 20-00 (1)*
Eastern Mediter-ranean	09-13 (1)	08-09 (1) 09-11 (3) 11-13 (2) 13-15 (1)	07-09 (2) 09-12 (1) 12-14 (2) 14-16 (1) 16-18 (3) 18-22 (2) 22-23 (1) 04-07 (1)	19-20 (1) 20-22 (2) 22-23 (1) 20-22 (1)*
East Africa	10-13 (1) 13-15 (2) 15-16 (1)	07-08 (1) 08-13 (2) 13-16 (3) 16-17 (2) 17-18 (1)	06-07 (1) 07-09 (2) 09-13 (1) 13-18 (2) 18-21 (3) 21-23 (2) 23-01 (1)	19-00 (1) 21-23 (1)*
West & Central Africa	11-14 (1) 14-16 (2) 16-17 (1)	07-08 (1) 08-09 (2) 09-11 (3) 11-14 (4) 14-16 (3) 16-17 (2) 17-19 (1)	07-09 (2) 09-12 (1) 12-13 (2) 13-15 (3) 15-18 (4) 18-19 (3) 19-22 (2) 22-07 (1)	18-20 (1) 20-22 (2) 22-01 (1) 21-23 (1)*
South Africa	10-11 (1) 11-12 (2) 12-14 (1)	07-09 (1) 09-13 (2) 13-15 (3) 15-17 (2) 17-18 (1)	05-14 (1) 14-16 (2) 16-18 (3) 18-20 (2) 20-23 (1) 23-01 (2) 01-03 (1)	21-23 (1) 23-00 (2) 00-01 (1) 23-01 (1)*
Central & South Asia	*Nil*	07-09 (1) 18-20 (1)	07-10 (1) 19-22 (1)	05-07 (1) 19-21 (1)
Southeast Asia	*Nil*	07-09 (1) 18-20 (1)	06-07 (1) 07-09 (2) 09-10 (1) 19-21 (1)	06-08 (1) 17-20 (1)
Far East	17-19 (1)	07-09 (1) 16-17 (1) 17-19 (2) 19-21 (1)	06-07 (1) 07-09 (2) 09-11 (1) 17-20 (1) 20-22 (2) 22-00 (1)	05-08 (1) 06-07 (1)*
Guam & Pacific Islands	13-15 (1) 15-17 (2) 17-18 (1)	12-15 (1) 15-17 (2) 17-19 (3) 19-20 (2) 20-21 (1)	01-07 (1) 07-10 (2) 10-19 (1) 19-01 (2)	00-02 (1) 02-06 (3) 06-07 (2) 07-08 (1) 02-03 (1)* 03-05 (2)* 05-06 (1)*
Australia & New Zealand	16-18 (1)	08-12 (1) 15-17 (1) 17-20 (2) 20-22 (1)	00-03 (2) 03-07 (1) 07-09 (3) 09-10 (2) 10-13 (1) 13-15 (2) 15-19 (1) 19-22 (2) 22-00 (3)	03-05 (1) 05-07 (2) 07-09 (1) 04-05 (1)* 05-06 (2)* 06-07 (1)*
Northern & Central South America	08-10 (1) 10-12 (2) 12-15 (3) 15-16 (2) 16-18 (1)	07-08 (1) 08-11 (3) 11-14 (2) 14-15 (3) 15-17 (4) 17-19 (3) 19-20 (2) 20-21 (1)	00-03 (2) 03-06 (1) 06-07 (2) 07-09 (4) 09-11 (3) 11-15 (2) 15-17 (3) 17-22 (4) 22-00 (3)	18-19 (1) 19-20 (2) 20-03 (3) 03-05 (2) 05-07 (1) 19-21 (1)* 21-02 (2)* 02-06 (1)*
Southern Brazil, Argentina, Chile & Uruguay	09-11 (1) 11-13 (2) 13-15 (3) 15-16 (2) 16-18 (1)	07-08 (1) 08-10 (3) 10-15 (2) 15-17 (4) 17-18 (3) 18-19 (2) 19-20 (1)	04-06 (1) 06-08 (2) 08-15 (1) 15-16 (2) 16-17 (3) 17-19 (4) 19-01 (3) 01-04 (2)	19-21 (1) 21-03 (2) 03-07 (1) 21-06 (1)*
McMurdo Sound, Antarctica	11-13 (1) 13-16 (2) 16-18 (1)	08-10 (1) 15-17 (1) 17-19 (2) 19-21 (1)	04-07 (1) 07-09 (2) 09-12 (1) 15-18 (1) 18-21 (2) 21-00 (3) 00-04 (2)	23-05 (1)

Time Zones: CST & MST
(24-Hour Time)
CENTRAL USA To:

Reception Area	*10 Meters*	*15 Meters*	*20 Meters*	*40/80 Meters*
Western & Central Europe & North Africa	09-12 (1)	07-08 (1) 08-09 (2) 09-12 (3) 12-14 (2) 14-15 (1)	05-07 (1) 07-09 (3) 09-11 (2) 11-14 (3) 14-17 (2) 17-20 (1)	17-19 (1) 19-22 (2) 22-02 (1) 20-21 (1)* 21-22 (2)* 22-00 (1)*
Northern Europe & European USSR	08-11 (1)	07-09 (1) 09-11 (2) 11-13 (1)	06-07 (1) 07-09 (2) 09-11 (1) 11-13 (2) 13-17 (1)	19-01 (1) 20-23 (1)*
Eastern Mediter-ranean	09-12 (1)	07-09 (1) 09-12 (2) 12-14 (1)	23-02 (1) 07-12 (1) 12-17 (2) 17-22 (1)	19-23 (1) 20-22 (1)*
East Africa	10-15 (1)	07-10 (1) 10-15 (2) 15-17 (1)	06-12 (1) 12-17 (2) 17-20 (3) 20-21 (2) 21-23 (1)	19-21 (1) 20-22 (1)*
West & Central Africa	11-13 (1) 13-15 (2) 15-16 (1)	07-08 (1) 08-10 (2) 10-12 (3) 12-14 (4) 14-15 (3) 15-16 (2) 16-18 (1)	07-12 (1) 12-13 (2) 13-15 (3) 15-17 (4) 17-20 (2) 20-00 (1)	18-19 (1) 19-21 (2) 21-00 (1) 20-22 (1)*
South Africa	10-13 (1)	07-09 (1) 09-13 (2) 13-14 (3) 14-16 (2) 16-17 (1)	05-14 (1) 14-16 (2) 16-18 (3) 18-19 (2) 19-21 (1) 00-02 (1)	23-00 (1) 23-00 (1)*
Central & South Asia	17-19 (1)	07-10 (1) 18-20 (1)	06-07 (1) 07-09 (2) 09-11 (1) 19-22 (1)	06-08 (1) 19-21 (1)
Southeast Asia	09-11 (1) 16-19 (1)	08-11 (1) 16-17 (1) 17-19 (2) 19-20 (1)	06-07 (1) 07-09 (2) 09-12 (1) 17-18 (1) 18-10 (2) 20-22 (1)	06-08 (1) 17-19 (1)
Far East	15-18 (1)	07-09 (1) 14-16 (1) 16-19 (2) 19-21 (1)	07-09 (2) 09-11 (1) 17-20 (1) 20-00 (2) 00-07 (1)	02-05 (1) 05-07 (2) 07-09 (1) 05-07 (1)*
Guam & Pacific Islands	12-15 (1) 15-17 (2) 17-19 (1)	10-13 (1) 13-16 (2) 16-19 (3) 19-20 (2) 20-21 (1)	06-07 (2) 07-09 (3) 09-11 (2) 11-18 (1) 18-20 (2) 20-22 (3) 22-00 (2) 00-06 (1)	22-01 (1) 01-06 (3) 06-07 (2) 07-09 (1) 00-03 (1)* 03-06 (2)* 06-07 (1)*
Australia & New Zealand	15-17 (1)	09-12 (1) 12-17 (2) 17-19 (3) 19-20 (2) 20-22 (1)	07-09 (2) 09-17 (1) 17-20 (2) 20-00 (3) 00-03 (2) 03-07 (1)	02-04 (1) 04-07 (2) 07-09 (1) 04-05 (1)* 05-07 (2)* 07-08 (1)*
Northern & Central South America	09-11 (1) 11-13 (2) 13-14 (3) 14-15 (2) 15-17 (1)	06-07 (1) 07-08 (2) 08-14 (3) 14-16 (4) 16-18 (3) 18-19 (2) 19-20 (1)	06-07 (2) 07-11 (3) 11-14 (2) 14-16 (3) 16-20 (4) 20-22 (3) 22-02 (2) 02-06 (1)	18-19 (1) 19-20 (2) 20-02 (3) 02-04 (2) 04-06 (1) 20-21 (1)* 21-02 (2)* 02-06 (1)*
Southern Brazil, Argentina, Chile & Uruguay	08-11 (1) 11-13 (2) 13-15 (3) 15-16 (2) 16-18 (1)	07-08 (1) 08-13 (2) 13-15 (3) 15-17 (4) 17-18 (3) 18-19 (2) 19-20 (1)	06-08 (2) 08-15 (1) 15-16 (2) 16-18 (4) 18-22 (3) 22-04 (2) 04-06 (1)	19-22 (1) 21-03 (2) 03-06 (1) 21-05 (1)*
McMurdo Sound, Antarctica	11-13 (1) 13-15 (2) 15-18 (1)	13-16 (1) 16-18 (2) 18-20 (1)	07-09 (2) 09-12 (1) 15-18 (1) 18-20 (2) 20-23 (3) 23-03 (2) 03-07 (1)	00-06 (1)

Time Zone: PST (24-Hour Time)
WESTERN USA To:

Reception Area	*10 Meters*	*15 Meters*	*20 Meters*	*40/80 Meters*
Western & Central Europe & North Africa	09-11 (1)	08-10 (1) 10-12 (2) 12-15 (1)	23-01 (1) 06-08 (1) 08-12 (2) 12-14 (3) 14-16 (2) 16-20 (1)	18-00 (1) 20-22 (1)*
Northern Europe & European USSR	*Nil*	08-12 (1)	23-01 (1) 06-07 (1) 07-09 (2) 09-13 (1)	19-23 (1) 20-22 (1)*
Eastern Mediter-ranean & East Africa	*Nil*	07-11 (1)	06-09 (1) 09-11 (2) 11-15 (1) 18-21 (1)	18-21 (1)
West & Central Africa	11-16 (1)	06-08 (1) 08-15 (2) 15-17 (3) 17-18 (2) 18-19 (1)	05-10 (1) 10-15 (2) 15-18 (3) 18-20 (2) 20-22 (1)	18-22 (1) 19-21 (1)*
South Africa	10-13 (1)	08-10 (1) 10-14 (2) 14-16 (1)	05-14 (1) 14-16 (2) 16-18 (3) 18-20 (1) 00-02 (1)	19-22 (1) 20-21 (1)*
Central Asia	17-19 (1)	07-09 (1) 16-17 (1) 17-19 (2) 19-21 (1)	06-07 (1) 07-09 (2) 09-11 (1) 17-19 (1) 19-20 (2) 20-22 (1)	05-08 (1)
Southeast Asia	16-19 (1) 09-11 (1)	08-09 (1) 09-10 (2) 10-14 (1) 14-17 (2) 17-18 (3) 18-19 (2) 19-21 (1)	07-08 (1) 08-10 (3) 10-11 (2) 11-21 (1) 21-00 (2) 00-02 (1)	00-02 (1) 02-06 (2) 06-08 (1) 02-06 (1)*

Far East	14-15 (1) 15-16 (2) 16-18 (1)	12-14 (1) 14-18 (2) 18-20 (3) 20-22 (1)	08-10 (2) 10-20 (1) 20-22 (2) 22-00 (3) 00-04 (2) 04-08 (1)	00-02 (1) 02-06 (2) 06-08 (1) 02-08 (1)*
Guam & Pacific Islands	12-15 (1) 15-17 (2) 17-19 (1)	08-12 (1) 12-16 (2) 16-17 (3) 17-18 (4) 18-20 (3) 20-21 (1)	09-10 (2) 10-12 (4) 12-16 (3) 16-19 (4) 19-20 (3) 20-00 (2) 00-09 (1)	19-20 (1) 20-22 (2) 22-06 (4) 06-08 (2) 08-09 (1) 21-23 (1)* 23-06 (2)* 06-07 (1)*
Australia & New Zealand	11-15 (1) 15-17 (2) 17-18 (1)	10-12 (1) 12-17 (2) 17-19 (3) 19-20 (2) 20-21 (1)	07-08 (1) 08-10 (3) 10-12 (2) 12-17 (1) 17-18 (2) 18-20 (3) 20-22 (4) 22-00 (3) 00-02 (2) 02-04 (1)	00-03 (1) 03-05 (3) 05-07 (2) 07-08 (1) 02-03 (1) 03-05 (2) 05-07 (1)
Northern & Central South America	10-12 (1) 12-14 (2) 14-16 (1)	06-07 (1) 07-08 (2) 08-14 (3) 14-16 (4) 16-17 (3) 17-18 (2) 18-19 (1)	06-07 (2) 07-09 (3) 09-10 (2) 10-14 (1) 14-16 (2) 16-18 (4) 18-22 (3) 22-00 (2) 00-06 (1)	18-20 (1) 20-00 (3) 00-03 (2) 03-05 (1) 20-21 (1)* 21-01 (2)* 01-04 (1)*
Southern Brazil, Argentina, Chile & Uruguay	08-12 (1) 12-13 (2) 13-15 (3) 15-16 (2) 16-18 (1)	00-02 (1) 07-11 (1) 11-13 (2) 13-15 (3) 15-16 (4) 16-17 (3) 17-18 (2) 18-19 (1)	20-05 (2) 05-15 (1) 15-16 (2) 16-18 (4) 18-20 (3)	18-19 (1) 19-23 (2) 23-03 (1) 20-02 (1)*
McMurdo Sound, Antarctica	11-13 (1) 13-15 (2) 15-17 (1)	12-15 (1) 15-18 (2) 18-20 (1)	05-06 (1) 06-08 (2) 08-11 (1) 16-19 (1) 19-20 (2) 20-23 (3) 23-02 (2) 02-05 (1)	00-06 (1)

*Indicates best times to listen for 80 meter openings. Openings on 160 meters are also likely to occur during those times when 80 meter openings are shown with a propagation index of (2) or higher.
For 12 meter openings interpolate between 10 and 15 meter openings.
For 17 meter openings interpolate between 15 and 20 meter openings.
For 30 meter openings interpolate between 40 and 20 meter openings.

ing the earlier winter months. Unusual short-skip conditions often occur on the VHF bands during such displays as a result of the ionization associated with auroras. Openings over distances of several hundred miles and up to as much as 1300 miles may take place by means of reflection from such regions. Auroral-type openings are characterized by flutter fading and multi-path echoes. To take maximum advantage of such openings, antennas should be pointed towards the auroral display, if it is visible, or in a generally northerly direction.

The sun's energy, which causes auroral displays in the earth's atmosphere, often is also responsible for producing large areas of sporadic-*E* ionization. Reflection of VHF signals from such regions can make possible short-skip openings between distances of approximately 750 and 1300 miles. Unlike auroral-type propagation, signals reflected by sporadic-*E* ionization are often strong and stable.

Auroral activity usually takes place during periods of radio storminess. Check the Last Minute Forecast at the beginning of this column for those times during February which are likely to experience radio storminess.

No significant meteor showers are expected during February, but there should be an improvement in trans-equatorial, or TE, VHF openings. The best chances for such openings are between the southern tier states and South America on paths approximately at right angles to the equator. They are more likely to occur on *6* meters, but an occasional *2* meter opening also may be possible. The best time to check for TE openings is between 7 and 10 PM local time. TE openings are characterized by very weak signals with considerable flutter fading.

This month's propagation charts contain band-opening predictions for major DX paths for the period February 15 through April 15, 1993. A short-skip propagation forecast for February appeared in last month's column.

73, George, W3ASK

HAM SHOP

FREE TO CQ SUBSCRIBERS

Advertising Rates: Non-commercial ads are 20 cents per word including abbreviations and addresses. Commercial and organization ads are 60 cents per word. Boldface words are $1.20 each (specify which words). Minimum charge $2.00. No ad (non-subscriber) will be printed unless accompanied by full remittance. Non-commercial ads free to CQ subscribers, as space permits, maximum 3 lines each. All ads must be typewritten double spaced. Recent CQ mailing label must accompany ad.

Closing Date: The 10th day in the third month preceding date of publication. Because the advertisers and equipment contained in Ham Shop have not been investigated, the Publisher of *CQ* cannot vouch for the merchandise listed therein. The publisher reserves the right to reject any paid or nonpaid advertisement. Direct all correspondence and ad copy to: CQ Ham Shop, 76 N. Broadway, Hicksville, NY 11801.

QSLs & RUBBER STAMPS—Top Quality! Card Samples and Stamp Information $1.00 (refundable with order). Ebbert Graphics D-2, Box 70, Westerville, OH 43081.

IMRA-International Mission Radio Assn. helps missioners—equipment loaned; weekday net, 14.280 MHz, 1:00–3:00 PM Eastern. Sr. Noreen Perelli, KE2LT, Fletcher Street, Goshen, NY 10924.

KNOW FIRST! Ham radio fanatics—you need THE W5YI REPORT, a twice-monthly award-winning Hot Insider Newsletter. Acclaimed best! Confidential facts, ideas, insights, nationwide news, technology, predictions, alerts. Quoted coast-to-coast! We print what you don't get elsewhere! $21.00 annually w/money-back guarantee! FREE SAMPLE for S.A.S.E. (two stamps). W5YI, Box 10101-C, Dallas, Texas 75207.

FOR SALE. CQ/Ham Radio/QST/73 magazines @ 75¢ (thru 1975) and $1.00 (1976-up) each, including shipping. $3.00 minimum order. W6DDB, 45527 Third Street East, Lancaster, CA 93535-1802.

CERTIFICATE for proven contacts with all ten American districts. SASE to W6DDB, 45527 Third Street East, Lancaster, CA 93535-1802.

CLANDESTINE CONFIDENTIAL NEWSLETTER: Latest info on secret broadcasters. Six issues $10 US, $13 foreign, US funds. RR4 Box 110, Lake Geneva, WI 53147.

HALLICRAFTERS Service Manuals. Amateur and SWL. Write for prices. Specify Model Numbers desired. Ardco Electronics, P.O. Box 95, Dept. C, Berwyn, IL 60402.

WANTED: Older model bugs, unusual bugs, and miniature hand keys. State price, condition. Dave Ingram, K4TWJ, 4941 Scenic View Drive, Birmingham, AL 35210.

KENWOODS FOR SALE: TS940SAT $1395, TS930SAT $995, TS850SAT $1495, TS440SAT $995, TS830S w/VFO230, SP230, $895. All equipment excellent, mint. Buyer pays UPS shipping. John, WW1R, 802-775-6732 home, 802-775-6726 work.

LOW POWER COMMUNICATIONS, Vol. 1—Basic QRP, by Rich Arland, K7YHA. A great A to Z how-to guide! Contesting, digital, computers, antennas, solar power, milliwatting, etc. $14.95 + $2 s/h ($3 foreign) from Tiare Publications, P.O. Box 493, Lake Geneva, WI 53147. Visa/Mastercard welcome. US $ only.

HAM TRADER YELLOW SHEETS. In our 31st year of publication. Buy, sell, trade ham radio gear. Published twice a month so ads quickly circulate. No long wait for results. **Mailed first class.** For sample copy send #10 SASE (2 stamps). ONE YEAR SUBSCRIPTION (24 issues) $16.50. P.O.B. 2057, Glen Ellyn, IL 60138-2057, or P.O.B. 15142, Seattle, WA 98115.

COMMODORE 64 HAM PROGRAMS: 8 disk sides, over 200 Ham programs, $16.95. 29¢ stamp gets unusual software catalog of Utilities, Games, Adult and British Disks. HomeSpun Software, Box 1064-AR, Estero, FL 33928.

Morse code got you down? Why let a mental block stand between you and upgrading? Use PASS Publishing's **CW Mental-Block Buster** to **blast through those barriers.** Just follow the instructions for 30 days! Based on 40 years of research, the **CW Mental-Block Buster** uses guided meditation, dynamic visualizations, and powerful affirmations to blast through mental blocks. **You can do code!** That means new bands, more contacts, more fun! (This is not a CW practice tape.) The **CW Mental-Block Buster** audio cassette and practice booklet are only $25.95 ppd. in the US (NY residents add $2.21 sales tax). VISA, MC, COD: 516-584-8164; FAX: 516-584-9409. PASS Publishing, P.O. Box 570, Stony Brook, NY 11790.

THE DX BULLETIN is your premier weekly source of all DX information: DXpeditions, propagation, QSL routes, and much more. SASE or call for samples. Box 50-C, Fulton, CA 95439 (707-523-1001).

CHASSIS, CABINET KITS: SASE. K3IWK, 5120 Harmony Grove Road, Dover, PA 17315.

CW Lite is the **easiest** Morse code training method in the world, bar none! And it is the **fastest**, too. Just close your eyes and relax. This powerful **hypnosis cassette tape** does the rest. **Subliminals** speed you along! Only $15.95 ppd in US (NY residents add $1.36 tax). Order today! VISA, MC, COD: 516-584-8164; FAX: 516-584-9409. **PASS Publishing**, Box 570, Stony Brook, NY 11790.

FREE Ham Gospel Tracts, SASE. N3FTT, 5133 Gramercy, Clifton Heights, PA 19018.

QSL SALE! 200/$11, 300/$14, 500/$20, 1000/$33, 2000/$58. Many Designs! Free shipping! Phone or write today for samples or ordering. Shell Printing, KD9KW, Box 50, Rockton, IL 61072 (815-629-2193 anytime).

Contest Code is your ticket to CW Contesting and DXing! This powerful series of **hypnosis cassette tapes** teaches you to copy the essentials for working DX and contests. Code recognition is conditioned at 30/40 WPM on the **High Speed** cassette and at 50/60 WPM on the **Ultra High Speed** cassette. In no time at all, you will be slugging it out with the best of them! **Subliminals** boost your speed. Only $15.95 each ppd. in US (specify which program you want) (NY residents add 8.5% sales tax) VISA, MC, COD: 516-584-8164; FAX: 516-584-9409. **PASS Publishing**, Box 570, Stony Brook, NY 11790.

HAM RADIO REPAIR! Maximum labor charge per unit $80.00, all makes! TELO TECHNOLOGY, 1302 S. Uplands Dr., Camano Island, WA 98292 (Dan Rupe). Phone 206-387-3558.

HAMS: USE AIRMAIL POSTAGE for successful QSLing! Many countries, monthly bargains, plus **EUROPEAN AIRMAIL ENVELOPES!** Samples, prices: William Plum, 12 Glenn Road, Flemington, NJ 08822. FAX 908-782-2612.

VHF WEAK SIGNAL NEWSLETTER: Large SASE. Box 685, Holbrook, AZ 86025.

HAVE AM CAPABILITY? Join SPAM (Society for the Promotion of AM). For information and membership, send $1 and SASE to SPAM, WB6TRQ, Box 62, Potrero, CA 92063.

CB-TO-10M CONVERSIONS: FM kits, frequency modification hardware, books, plans, high-performance CB accessories. Catalog $2. CBCI, Box 31500CQ, Phoenix, AZ 85046.

THE DX MAGAZINE is your monthly DX reference: DXpedition reports, equipment and software reviews, six meters, awards, QSL information, and more. Sample only $1.00. Box 50-C, Fulton, CA 95439 (707-523-1001).

MAUI, HAWAII: B&B with a Ham, KH6SQ. For brochure send 75 cents for postage to P.O. Box 351, Pukalani, HI 96788.

RADIO TRANSCRIPTION DISCS WANTED: W7FIZ, Box 724, Redmond, WA 98073-0724.

FREE HAM BBS: 317-742-1868.

AA1A SIDEKICK ANTENNAS 617-837-2880.

PSE QSL! An Expert's Guide to Amateur Radio QSL'ing. By *CQ*'s Bill Welsh, W6DDB. Every imaginable facet from designing to ordering to filling them out to filing them. Card sources, postage usage, bureaus, much much more. $9.95 + $2 s/h ($3 foreign) from Tiare Publications, P.O. Box 493, Lake Geneva, WI 53147. Visa/Mastercard welcome. US $ only.

R-390-A SQUELCH MODIFICATION: Small external add-on module, super sensitive, works great on AM and SSB, 15 minute installation, instructions included. $25.00. Call 419-726-2249.

QSL CARDS. Fast quality service. Samples $1.00 (refundable with order). WordWise Services, 16 Kent Drive, Foxmeadow, Hockessin, DE 19707.

Ready to explore VHF/UHF operating? Get W3FQJ's **BASIC GUIDE TO VHF/UHF HAM RADIO.** Propagation, equipment, antennas, operating techniques, contests, repeaters, awards, and more. $6.95 plus $2 s/h ($3 foreign) from Tiare Publications, P.O. Box 493, Lake Geneva WI 53147. Visa/Mastercard welcome. US $ only.

DISPLAY YOUR CALL on T-Shirts, Caps, Bumperstickers, more. Free information. NOVEL-TEES by KA5CXP, Dept. Q, Box 10, Ozone, AR 72854-0010.

P40V's ARUBA COTTAGE with BIG Antennas, 2bdr & Radio room. $550 per week. Brochure from AI6V.

QSL CARDS—Look good with top quality printing. Choose standard designs or fully customized cards. Request free brochure, samples, (stamps appreciated) from CHESTER QSL's, 310 Commercial, Dept. C, Emporia, KS 66801. FAX 316/342-4705.

FOR SALE New, Unused, in original cartons: Radio Shack DMP 130A dot matrix printer, PTC-64, C-64 printer controller. $160.00. K2EEK, CQ Magazine, 76 N. Broadway, Hicksville, NY 11801.

MORSE CODE COMPUTER INTERFACES with Software for IBM ($49.95) or COCO ($39.95). Ham License Study Programs $14.95. Free Shareware and Ham Catalog for IBM or COCO. Dynamic Electronics, Box 896, Hartselle, AL 35640 (205-773-2758; FAX 773-7295).

HAM RADIO CONTESTING, by Robert J. Halprin, K1XA is a thorough, how-to treatment on the art of contesting from a ham who's been at it for more than 20 years! If you're new to the game or feel you could do better you need this book. $14.95 + $2 s/h ($3 foreign) from Tiare Publications, P.O. Box 493, Lake Geneva, WI 53147. Visa/Mastercard welcome. US $ only.

"PERMANENT MAGNET MATERIALS SHORT COURSE." Complete history, materials listing, glossary, specifications, applications, design criteria, sources. Details $2.50, order refundable. SJL PUBLISHING, Dept. A004CQ, P. O. Box 152, Hanna, IN 46340-0152.

WANTED: Clean and reasonably priced Millen 90711 VFO, 90801 exciter; ARC-5 XMTR (40 or 80); Lakeshore Bandhopper VFO; Bud, Millen, and B&W plug-in coils (MEL type for various bands); 455 kHz surplus xtals; FT-243 ham band (CW) xtals, Millen 10035 or 10039 dial; National ACN, ICN, MCN, or R dial; VFO adjustment tool for 75A3; 455 kHz IF XMFRs; photocopies of Ranger I and SX-100 manuals; Johnson, Hallicrafters, Heath, Knight, or Ten-Tec VFO; Heath SB-102 or HW-101 w/ps. Dave Heil, A22MN (K8MN), Gaborone/Dept. of State, Wash. D.C. 20521-2170. Indicate lowest price in first letter.

WANTED: SWAN P.S./ SP. for 700 or 500. Call Many, 1-510-535-2017, or P.O. Box 421723, S.F., CA 94101.

VIDEOCIPHER II: Surveillance, Satellite, Scanner, Cable, Amateur, Cellular; Repair Manuals, Modification Books & Software. Catalog $3.00. **TELECODE**, P.O. Box 6426-CQ, Yuma, AZ 85366-6426.

SAMS for HAMs: Photofacts of vintage HAM gear. Buy & Sell. A.G. Tannenbaum, WA2BTB, P.O. Box 110, E. Rockaway, NY 11518. Call 516-887-0057.

WANTED: FM board for IC-551D multi-mode 6 meter part no. ICEX 106. Call Ralph, N2OHX, at 212-289-1261 after 4:30 PM.

EMBROIDERED EMBLEMS, Enameled Pins, Your Design. Free booklet. A.T. Patch Co., Dept. 67, P.O. Box 682, Littleton, NH 03561; 603-444-3423 (FAX 603-444-2371).

CELLULAR HACKERS BIBLE. Theory, Hacks, Modifications, $53.95. Cellular Programmers Bible, $84.45. **TELECODE**, P.O. Box 6426-CQ, Yuma, AZ 85366-6426.

YOU MUST USE AMCO USA screwdriving bits. Free pricelist. DSC/cq, Box 24042, Dayton, OH 45424-0042.

2 MTR 75 to 50 OHM CATV HARDLINE CONNECTORS Low Loss $35/pr, $5 shipping cont. US. SASE for brochure. REYNOLDS ELECTRONICS, 72 S. 23rd, Newark, OH 43055. Call 614-344-5357, 7–10 PM EST, KB8JVH.

10 METER RF LINEAR AMPLIFIERS, 100–500 watts, base or mobiles. Flyers/catalog $3.00. LWC, P.O.B. 030128CQFH, Brooklyn, NY 11203-0001.

THERMOGRAPHED CARDS! Raised-print QSLs at flat printing prices. Samples: Phone 817-461-6443 or write: W5YI Group, Box 565101, Dallas, TX 75356.

RCI-2950 OWNERS: New modification manual including Power increase, Clarifier modification, Modulation increase, Operating hints, and more. Parts Included. Only $20.00 ppd in U.S. (Missouri residents add $1.15 tax). Scott, P.O. Box 510408, St., Louis, MO 63151-0408 (314-846-0252). Money Orders or C.O.D.

CLUBS OR CLUB MEMBERS BUY WHOLESALE!! Wire antenna parts, **JPS DSP AUDIO** and **NOTCH FILTERS,** dacron rope, **"FLEX-WEAVE™"** hybrid wire rope, coax **ALL B&W, VIBROPLEX,** etc., **DISCOUNTED.** Chartered clubs or two or more members qualify. **DAVIS RF CO.**, 1-800-484-4002, code 1356.

BLACK DACRON® POLYESTER ANTENNA ROPE

- UV-PROTECTED
- HIGH ABRASION RESISTANCE
- REQUIRES NO EXPENSIVE POTTING HEADS
- EASY TO TIE & UNTIE KNOTS
- EASY TO CUT WITH OUR HOT KNIFE
- SIZES: 3/32" 3/16" 5/16"
- SATISFIED CUSTOMERS DECLARE EXCELLENCE THROUGHOUT U.S.A.

LET US INTRODUCE OUR DACRON® ROPE TO YOU • SEND YOUR NAME AND ADDRESS AND WE'LL SEND YOU FREE SAMPLES OF EACH SIZE AND COMPLETE ORDERING INFORMATION.

MANUFACTURED BY synthetic textiles,inc. 2472 EASTMAN AVE., BUILDING 21 VENTURA, CALIFORNIA 93003 (805) 658-7903

DACRON® IS A DUPONT REGISTERED TRADEMARK

CIRCLE 72 ON READER SERVICE CARD

1992 U.S. CALL DIRECTORY
(on microfiche)

Call Directory - by callsign $10
Name Index - by last name $10
Geographic Index - by state/city $10
All three - $25
$3 shipping per order

BUCKMASTER PUBLISHING
Route 4, Box 1630
Mineral, Virginia 23117
703: 894-5777 visa/mc 800: 282-5628

CABLE TV CONVERTERS
Why Pay A High Monthly Fee? Save $100's A Year

- All Jerrold, Oak, Hamlin, Zenith, Scientific Atlanta, and more.
- Visa/MC and C.O.D.
- 60 Day Money Back Guarantee
- Shipment within 24 hours

WE WILL BEAT ANYONE'S PRICE
No Illinois Orders Accepted

Purchaser agrees to comply with all state and federal laws regarding private ownership of cable TV equipment. Consult local cable operator.

Electronic Engineering
P.O. Box 337, Barrington, IL 60011
Orders only ***1-800-542-9425*** *Information* ***1-708-540-1106***

THIS MONTH'S GOODIE FROM THE CANDY STORE

RDC

TELEX-HY-GAIN
CD-45 II
$222.00

Similar Savings On Yaesu, Astron, Icom, Hy-Gain, Alinco, Etc. All L.T.O.

MFJ 815B $52.00

Over 9039 Ham Items in Stock, all Prices, Cash FOB Preston. More Specials in HAM-ADS. Looking for Something not Listed?

Call Today (208) 852-0830
ROSS DISTRIBUTING COMPANY
78 S. State Street, Preston, Id. 83263
Hours Tue.-Fri. 9-6 - 9-2 Mondays. Closed Sat. & Sun.

ROBERT HALL ELECTRONICS
AMATEUR RADIO REPAIR
1660 MCKEE RD.
SUITE A
SAN JOSE, CA 95116
(408) 729-8200

Where's the Fun?

The 10 meter test had started, and I expected the band to open about the time I arrived at the motel. Rig and gel cell were in the trunk. Maxi-J was right beside, rolled up inside the launcher pail. Room with a view. Maxi takes off from the balcony sloping down to a tree. His tail slips under the door. And I'm 59 in Japan.

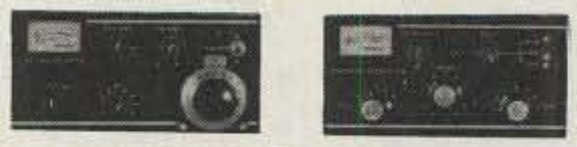
J-10	J-15	J-17	J-20	J-30	J-40	Info Pack
$39	$42	$47	$49	$59	$69	$1

Add $6 Post & Handling USA & Canada $14 others

AntennasWest Box 50062-C, Provo UT 84605 **Order Hotline: 800-926-7373**

CIRCLE 11 ON READER SERVICE CARD

Townsend Electronics, Inc.
presents
C.M. Howes Kits
for
H.F. Amateur Equipment



"RIG SAVER"
H.T. and Mobile Mounts

THE WORLD'S BEST
in ham radio books and publications
Send $1.00 For Catalog
Townsend Electronics, Inc.
Box 415C
Pierceton, IN 46562
(219) 594-3661

CIRCLE 54 ON READER SERVICE CARD

---

5 BAND QUADS

$289 2 Element Complete
UPS Shippable

4 Elements Available, HF, V/UHF, Delta Loops Also.
Quality Construction And Years Of Experience.
Lightning Bolt Antennas
RD #2, RT 19, Dept. Q, Volant, PA 16156
412-530-7396
APO/FPO Shippable

HANDIE-BASE

PATENT MAILED
Finally! An accessory for your Handie Talkie or Hand held scanner: Functional, Efficient, Economical, Attractive Walnut Base. Send check/money order for $14.95 plus $3.50 shipping to: **Handie-Base and More Inc., P.O. Box 2504 Dept. B-1, Broken Arrow, OK 74013-2504**

TOKYO HY-POWER

VHF UHF Dual Band Amplifiers

Transverters Preamplifiers

Orion Business International, Inc.
360 W. Bedford Ave. Suite 111 Fresno, CA 93711
Tel: **209-432-4155** Fax: **209-261-0662**

---

2 METER 9 DB GAIN

BASE ANTENNA W/MOUNT
DOUBLE 5/8 OVER 1/4 ASSEMBLED 10'5"
"MULTI-WAVE" #9209
$32.43 + $4.00 S&H U.P.S.
A.S.A. 1-800-722-2681
P.O. Box 3461, Myrtle Beach, SC 29578

CB-TO-10 METERS

We specialize in CB radio modification plans and hardware. Frequency and FM conversion kits, repair books, plans, high-performance accessories. Thousands of satisfied customers since 1976! Catalog $2.

CBC INTERNATIONAL
LOU FRANKLIN/K6NH - Owner
P.O. BOX 31500CQ, PHOENIX, AZ 85046

WEATHER RADIO—The Complete Guide to Receiving NOAA, Volmet, Weatherfax, Weather Satellite and Other Weather Information Sources, by A.R. "Tony" Curtis, K3RXK. Everything from TIS stations to Russian fishing fleet and ham emergency weather nets. $14.95 plus $2 s/h ($3 foreign) from Tiare Publications, P.O. Box 493, Lake Geneva, WI 53147. US $ only. Visa/Mastercard.

MACINTOSH SOFTWARE! Marathon contesting software $59.95. Demo with manual $8.00. Kantronics Hostmaster for the Macintosh, $64.95. Write for further information. Kevin Krueger, 1780 Ruth Street, Saint Paul, Minnesota 55109.

TEN-TEC, New Factory Boxed, Latest 1993 Production Models, USA Made, 535 Argonaut, 536 Delta, 563 Omni 6, 585 Paragon Transceivers, 420 Hercules, 422 Centurion, 425 Titan Linear Amplifiers, 238, 253, 254 Antenna Tuners, 239, 240 Dummy Loads, Mobile HF Antennas, Cabinets, Filters, Keyers, VISA/MC or Check. For best mail-order deal, write/phone Bill Slep 704-524-7519, Slep Electronics Company, Box 100, Otto, NC 28763.

SOFTWARE: Try **SMART RIG** version 2.10 for **Windows 3.X,** the best program for control of your **KENWOOD TS** or **R-5000** radio. For free information send name + address to: Agate Software, P.O. Box 1237, Brea, CA 92622, or phone 714-777-0855.

9½ INCH UTC Wall Clock $26.50 ppd. Gabay Tool Co., Box 68, Necedah, WI 54646.

SALE: NEW NATIONAL HRO-500 in factory-sealed box. 88 lbs. wood crate or 58 lbs. box $1100 plus shipping. Brown, P.O. Box 3514, Lancaster, CA 93586 (805-943-2027 8 AM to noon).

ENGLAND/Wales as it was 200 years ago. Copies from original Victorian Ordnance maps. See it as it was before your kin emigrated. Looks great framed, unusual gift. Specify Town and County. Sent to you Air Mail. Send $30 to: G4VZR, Lukes Orchard, Coaley, Glos. GL11 5EL, ENGLAND.

STRUGGLING Filipino amateur radio club seeks assistance with operating and Morse code training materials, video tapes, old radio magazines and books, club newsletters, and assistance in radio club management. If you can help, contact Rainier R. Bautista, DY9CKQ, Organization of South Cotabato Amateur Radio (OSCAR-MARBEL), c/o Marbel Peterpan, Koronadal, 9506 South Cotabato, Philippines.

RTTY JOURNAL published ten times per year for those interested in the Digital modes. Timely information on RTTY, AMTOR, PACKET, PACTOR, CLOVER, MSOs, Contesting, Hardware/Software for the digital modes, plus technical articles. This is a Digital operators magazine. $16 per year (foreign higher). RTTY JOURNAL, 1904 Carolton Lane, Fallbrook, CA 92028-4614.

FOR SALE: "Sparks" (lone radio officer on ships) is fading away with the 20th century. Book *QTC (I have a message for you)* is a nostalgic salute to him. His SOS's saved a million lives. Fellow-Sparks enthusiastically applaud: "Outstanding" Kemp Richter/K7UQH. "Complaint—can't put book down" Ken Johnson/W6NKE. "Best book ever written about marine operator" Doug Stivison/NR1A . . . Reviewers too: "Nostalgic spirit surrounds tales told" *Popular Electronics.* "Fascinating book" *Radio Bygones, U.K.* "You just have to see QTC" *Amateur Radio Action,* Australia . . . **SORRY, HARDCOVERS ALL SOLD! BUT 80 PAPERBACKS STILL AVAILABLE, NOVEMBER 1.** $11.00 postpaid. Write SEQUOIA/KA5HCX, 2502 W. Cockburn, Austin, TX 78745 or call 512-442-1311. Hams—want a personal inscription? Give your callsign!

HAM HOME For Sale: 80 × 30 brick rancher, Tower, TA33, GAP and Ringo Verticals. Barn, gazebo, solar panels. 3.2 acres, beautiful hilltop view. Thirty miles NE of Baltimore in Harford County. Adjoining two acre lot available. John Norman, KA3VIY, 3241 Ady Rd., Street, MD 21154 (410-836-1460).

PERSONALIZED DXCC COUNTRY/BEARING list laser printed in protective covering, $3.00 ppd. Send call, lat/long to M & S, 6 Edna Drive, Hyde Park, NY 12538.

WANTED: Remote speaker SP-120 to match Yaesu FT-301, also matching phone patch LL-301. Gary Zimmerman, WB8RTR, 878 Jeanne Drive, Hinckley, OH 44233 (216-278-4794).

DACRON ROPE, ETC.: WHY RISK FAILURES with aerial supports? Strong, high UV resistant, non-stretch braided Dacron, Mil type. **LOWEST U.S. PRICES.** 3/32" $.045/ft. (260 lb. test); 3/16" $.095/ft. (770 lbs.); 5/16*inch* $.145/ft. (1775 lbs.). Fifty foot increments. Add $4.95 shipping/handling (cont. U.S.; Canada $7.95). **NOTE:** Add $1.50 if spooled. Counterweights, B&W Al-5 polymer (1000 lb.) 4" insulators **DISCOUNTED**: $2.49 each. **CLUBS OR CLUB MEMBERS BUY WHOLESALE!** coax, ladder line, **ALL B&W, JPS, VIBROPLEX, etc., DISCOUNTED.** Catalog. **DAVIS RF CO.**, P.O. Box 230-CJ, Carlisle, MA 01741 (24 hours 1-800-484-4002, code 1356).

Tune in the space shuttle! **MONITORING NASA COMMUNICATIONS** by A.R. "Tony" Curtis, K3RXK, tells you how to tune in NASA on shortwave, VHF, UHF, and Satellites. Includes data on ham radio retransmissions and master list of NASA frequencies. $14.95 plus $2 s/h ($3 foreign) from Tiare Publications, P.O. Box 493, Lake Geneva, WI 53147. US $ only. Visa/Mastercard.

INEXPENSIVE HAM EQUIPMENT. Send stamp for list. WA4DSO, 3037 Audrey Dr., Gastonia, NC 28054.

AZDEN repairs by former Chief Engineer of the American Distributor of Azden Transceivers. Integrity guaranteed or you don't pay!! N4NFA, 3300 Salem Road, Farmington, GA 30638 (706-769-0840).

HEATHKIT SB-640 Remote VFO wanted. Shane, WB2WPM (716) 675-5797.

LAMBDA AMATEUR RADIO CLUB international for gay and lesbian hams. Box 24810, Philadelphia, PA 19130 (215-978-LARC).

RADIO RUBBER STAMPS free brochure. Reid Associates, 6680 Mellow Wood, West Bloomfield, MI 48322.

MICROMETALS FERRITE CORP CORE KIT: 5 each of T68-2, T68-6, T50-2, T50-6, T37-2, T37-6, FT37-43, FT37-61, FT50-61, FT50-43. Price $12.50 postpaid. Ferrite bead and balun kit 1 doz. FB43-101, 1 doz. FB43-801, 1 doz. FB43-301, 5 BLN-43-2402, 5 BLN-43-302, 5 BLN-43-202. Price is $8.50 postpaid. CH/MO to KA7QJY, Components, Box 3893, Logan, Utah 84323. Catalog large SASE or included with order.

HEATHKIT AMATEUR RADIO REPAIR by RTO Electronics, 4166 Maple Street, Berrien Springs, MI 49103. Phone 616-473-3201.

**** I BUY ELECTRON TUBES **** Magnetrons, Klystrons, Planar Triodes, etc. Jeremy Madvin at the Vacuum Tube Exchange, (800) 995-TUBE or FAX at (800) 995-6851.

FINALLY HEAR THOSE UNREADABLE SIGNALS buried in noise, heterodynes, tuner-uppers. The REVOLUTIONARY JPS Audio Filter, NIR-10, Digital Signal Processing. DEEP DISCOUNTED: $329.95 DELIVERED continental U.S.! (elsewhere $350). Also, NF-60 DSP Notch Filter ELIMINATES MULTIPLE NOISE TONES, discounted at $139.50 delivered! (see 3/92 73 mag). DON'T SETTLE FOR JPS CLONES! REVOLUTIONARY WIRE, "FLEX-WEAVE"™ 168 strand #14 hybrid wire rope, $36.95 for 275 feet min. DELIVERED cont US. Coax, B&W, VIBROPLEX, ETC. ALL DISCOUNTED! CLUBS OR CLUB MEMBERS BUY WHOLESALE! Catalog. Authorized dealer: DAVIS RF Co., POB 230-QF, Carlisle, MA 01741. 24 HOUR ORDERS: 1-800-484-4002, CODE: 1356. FAX: 508-369-1738.

COAX, GROUND RADIAL WIRE, OPEN WIRE LINE, DACRON ROPE, PULLEYS. TOP QUALITY, Catalog: $1. DAVIS RF Co., POB 230-CR, Carlisle, MA 01741. 24 HOUR ORDERS ONLY: 1-800-484-4002, CODE 1356. FAX: 508-369-1738.

CLUBS or INDIVIDUAL MEMBERS: BUY WHOLESALE WIRE ANTENNA PARTS, coax, ladder line, JPS DSP AUDIO and NOTCH FILTERS, Dacron rope, "FLEX-WEAVE"™ hybrid wire rope. Chartered clubs OR two or more members qualify. DAVIS RF Co., 1-800-484-4002, CODE 1356.

SELLING OUT: Mint Kenwood TS-940 (late serial number), $1300; mint SP-940, $75; mint SM-220 with BSR-8 pan adapter, $350; Ameritron AL-80A, $600; MFJ 3KW tuner, $150; Kenwood TH-25, $175; 50′ Rohn 25 with all accessories, $500 (pick up only LI NY); Hy-Gain TH7, $400 (pick up only LI NY); factory rebuilt Ham-M series rotator, $190; HK-232 (Heath version of PK-232) with mailbox, $150; Yaesu FT-4700 mobile, $350; 60W 220 amp, $70; Heath remote antenna switch, $50. Peter O'Dell, WB2D; days, 516-681-2922; evenings, 516-862-9025.

SPR4 NOISE BLANKER $75, Gonset amp 3211CD new in box $175, IBM PC Jr. and color mon $280, Kaypro computer $135. List $1 and SASE. Joe Bedlovies, POB 139, Stratford, CT 06497.

WANTED: Collector of Vibroplex Keys (bugs) wants your old semi-automatic keys. All types, especially Blue Racer (2.5″ wide base) and Zephyr (3″ wide base), also hand keys. K8LJQ, 2023 Lannen Rd. Howell, MI 48843.

WANTED: DFC-230, with 10 foot connecting cable, for TS-120. Larry, WD6EJN, P.O. Box 1716, La Jolla, CA 92038.

FOR SALE: Communications Specialists Community Repeater Tone Panel, Model TP-38 with DTMF Module, like new condition, $450. Motorola Model C74MSY UHF Repeater, good condition, $550. Two Meter Duplexer, Wacom Model WP-641, new, $650. You ship. Gordon Ichikawa, N6IN/2, 1-607-687-1207, 7 PM to 10 PM Eastern.

WANTED: Old AM Broadcast Receivers, in particular cathedrals, plastics, bakelites, and old transistor sets. Gerald Skloot, 2923 Mandalay Beach Road, Wantagh, NY 11793 (516-221-3535).

SELL: Ten-Tec Paragon, P.S., all filters, FM, and Giehl enhancement, $1300. R-3 vertical, $75. AA2EO, 212-877-0980.

WANTED FOR HRO 500. Preselector type LF10. Also Drake 4310 Commercial Transceiver. Alan Morriss, G4GEN, Pippingford Park, Nutley, Sussex TN22 3HW, ENGLAND.

PLEASE HELP. Junior High School radio program needs your unwanted parts, equipment, books, and magazines. Please contact G. Skloot, Rockaway Beach Junior High School, 320 B. 104 Street, Rockaway Park, NY 11694. Thank you.

CRYSTALS: SASE for my list. K8LJQ, 2023 Lannen Rd., Howell, MI 48843.

WANTED: Screw-base flashbulbs #22, 50 etc. T.N. Colbert, WA8MLV, General Delivery, Burton, OH 44021.

CLEANING SHACK: Must go, Drake TR7, TR3, MN-2000; Kenwood TS-711A, TR-2500 w/base stand charger; Microlog ATR-6800 w/monitor, others. Bill, 904-282-9925.

FOR SALE: DJ-160 2 mtr HT covers 130–173, has not had mod done to it. Comes with RD, standard battery and 2 HD batteries, and manual, one extra antenna, $300.00. More info. Send SASE to P.O. Box 518, Whitehouse, FL 32220.

FOR SALE with manuals, clean and working, $50 each you pay shipping. Heath: DX-60B, HR-10B, HG-10B VFO, VHF-1 Seneca RME-45 Com. Rec, RCA 3" scope. $10. each you pay shipping. RCA VOM, CQ Mag. 1990, 91, 92, boxes of various tubes (250 in each box). WA2MCF, Charlie, 718-445-0558 after 6 PM.

ART-13B. Who has technical information about plug-in Crystal Oscillator Unit CDA-T? Fred Gunther, K7FG, 1307 Shaw St., Moses Lake, WA 98837-3133 (509-762-9294).

HEATH ETW-1000 analog/digital circuit design trainer. New, factory wired. $100. Schultz, 302 Glasgow Lane, Greenville, NC 27858.

WANTED: Manual/schematic for Palomar Electronics Corporation 10–40 meter 115V Amplifier. KB4VLO, 6799 Incachee Rd., Wood Bine, GA 31569.

NATIONAL HRO-60 FOR SALE. Excellent with 12 coils (only "J" missing), 100 KC calibrator. FM unit, and original manual. Matching speaker included. Offers? Write KD4AJ, 1968 Huntington Hall Court, Atlanta, GA 30338, or call Charlie, KD4AJ, 404-396-0276 in the evenings for more information.

CRYSTALS: SASE for my list. K8LJQ, 2023 Lannen Rd., Howell, MI 48843.

IC2AT/4AT, HW-99, HW-16, tiny HF CW xcvr wanted. Trade for 6A 14V PS, SBE-34, LED's, IC's, etc. KC8HF, 5354 Foxridge, W. Bloomfield, MI 48322.

SELL: CQ/HR/QST/73 Magazines. Send SASE for list. KA1VY, E. Guimares, 401 Bedford St., Lakeville, MA 02347.

SWAN 700CX TRANSCEIVER W/SPKR PS, VFO/600R RCVR, PHN PATCH, D104 mike, 800 watts PEP, excl. condx., $475. Prefer local deal. Call Al at 201-445-8034 (K2DNF).

FOR SALE: Kenwood TS-930S with antenna tuner, excellent condx, basic unit, $1,000. Kenwood SM-220 station monitor scope (NO PAN), $300. Yaesu FT-7 transceiver, 10–80 meters, 20 watts, $275. Contact: Tony Musero, K3UKW, 1609 S. Iseminger Street, Philadelphia, PA 19148-1010 (215-271-8898).

DRAKE R4/T4X $475, R4B/T4XB $500, R4C/T4XC $600, TR4 $295, TR4C $350, Cabinets $55, 1525EM $35, SPR4 $450, NB $79, CAL $45. List $1/SASE. J. Bedlovies, P.O. Box 139, Stratford, CT 06497.

IBM COMPATIBLE KEYBOARD, BTC 39/69 series, PC/XT/AT compatible, 102 keys. $15.00. Walt Grosch, KZ9F, 1735 Stoneway Ct., Richfield, WI 53076.

WANTED: OLD RECEIVERS. I am looking for the older "ham" type receivers manufactured in the 50's thru 70's. Also am searching for a good 6 meter transceiver. If you have any of the above equipment and would like to sell it, you can call me at 404-396-0276 or write me at 1968 Huntington Hall Ct., Atlanta, GA 30338. Charlie, KD4AJ.

ICOM RIG: Air time less than 6 hours, mint as-new condition in original boxes, 751A, PS30, AT500, SP3, SM8, $1650. Will consider selling pieces separately. Bill, K3CRC, 717-222-9390.

WANTED: DFC-230 Kenwood digital frequency controller, radio in trunk, no room in car. WD6EJN, P.O. Box 1716, La Jolla, CA 92038.

WANTED: TS-520S CW filter, ARRL VHF Manual, ARRL Mobile Manual. Q.R. Galbraith, 4303 Kingsway, Farmington, NM 87402.

FOR SALE: SBE-34. Excellent condition. With original mike, manual, and power cord. $110, OBO. Ken Lowrey, KF8BC, 7716 Oceola Lane, West Chester, OH 45069.

WANTED: FT-101E, FL-2100B, FB-101B, FTV-250, FTV-650B, YC-601, YP-150, FT-221R, or TS-700S, TS-711A. Gyongyosi, 1044 Riverton St., No. Brunswick, NJ 08902.

FOR SALE: Alinco DJ-160 2 meter HT covers 130–173.995, comes with standard battery and two heavy-duty batteries, comes with manual, RD and one extra ant. Price $300. More info send SASE to P.O. Box 518, Whitehouse, FL 32220, or FAX for more info to 1-904-777-5936 Monday thru Friday until 5 PM.

WANTED: Ham Key Paddles, anything Brown Brothers, WRL SS-3 Q-multiplier (1965), MFJ-40 QRP VFO, Kantronics Rock-Hound, Philmore CR-5, Ameco R5A. Gary, K3OMI, 11124 Oak Hollow Rd., Knoxville, TN 37932 (615-690-4217 days).

Announcements

(from p. 6)

Feb. 20, **1993 Ham Fair**, Polk County Fairgrounds, Salem, Oregon. Contact Salem Repeater Assn., P.O. Box 784, Salem, OR 97308.

Feb. 21, **Livonia ARC Swap 'n Shop**, Dearborn Civic Center, Dearborn, Michigan. Contact Neil Coffin, WA8GWL, Livonia ARC, P.O. Box 2111, Livonia, MI 48151 (SASE), phone 313-427-3905. (Exams.)

Feb. 21, **LIMARC Hamfest & VHF Tune-up Clinic**, Nassau County Police Activity League, New Hyde Park, New York. Contact Neil Hartman, WE2V, 516-462-5549.

Feb. 21, **Burnaby ARC Fleamarket**, Westminster Armories, New Westminster, BC, Canada. Contact Burnaby ARC, P.O. Box 80083, Postal Station South, Burnaby, BC V5H 3X1 Canada, or the club net Monday nights 8 PM local time.

Feb. 22, **Davenport, Iowa ARC Hamfest**, QCCA Expo Center, Rock Island, Illinois. Contact Kent Williams, K9UQI, 4245 Tenth St., East Moline, IL 61244. (Exams, info contact Al Broendel, N9OK, 2712 38th St., Rock Island, IL 61201; exam talk-in on W0BXR 146.04/.64 repeater.)

Feb. 27, **Northern Vermont/New York Winter Hamfest**, Milton High School, Milton, Vermont. Contact Mitch Stern, WB2JSJ, 802-879-6589. (Exams at 9 AM and 2 PM.)

Feb. 27, **Orange Fest '93**, VFW Hall, Hwy 87, Orange, Texas. Contact Paul Tullier, N5QGO, 409-769-1231. (Exams, walk-ins welcome.)

Feb. 27, **Appalachian AR Group Hamfest & Computer Show**, Lebanon Area Fairgrounds, south of Lebanon, Pennsylvania. Contact Ron, WB3HNX, 717-345-8667. (Exams 8:30 AM, preregistration required by Feb. 12, contact Wilson Hein, WJ3G, 717-273-6334.)

Feb. 27, **LaPorte, Indiana ARC Hamfest**, LaPorte Civic Auditorium, LaPorte, Indiana. Contact LPARC, P.O. Box 30, LaPorte, IN 46350 (SASE).

Feb. 27–28, **ARRL 1993 Great Lakes Division Convention**, Cincinnati Gardens Exhibition Center, Cincinnati, Ohio. Contact Stan Cohen, WD8QDQ, 513-531-1011. (Exams.)

Feb. 28, **Mattapoiset, Massachusetts Amateur Radio Fleamarket**, Rt. 6 Knights of Columbus Hall, Mattapoiset, Massachusetts. Contact Kenneth Rapoza, K1NSX, 19 Golf St., Fairhaven, MA 02719 (508-993-3993).

THE CHOICE IS SIMPLE

Pick a band. . .pick a power level. . .pick a price! Picking the right brand is simple

Henry Radio is the power amplifier specialist. Every one of our 14 models offer superb value, experienced engineering (30 years!) and top quality components.

Since we offer the broadest selection of power amplifiers of any manufacturer, we feel that you should find exactly what you need in the following list:

3K ULTRA console with remote desk top control panel. 1500 W PEP output, 1.8 to 30 MHz coverage.

2K CLASSIC X console. 2000 W PEP output, 80 to 15 meters, 1.8 to 30 MHz.

2KD classic desk top. 2000 W PEP, 80 to 15 meters, 3.5 to 30 MHz.

3K CLASSIC Mk II console. 2000 W PEP, 80 to 15 meters, 3.5 to 30 MHz.

3K PREMIER console. 2000 W PEP, 160 to 15 meters, 1.8 to 30 MHz.

3KD PREMIER desk top. 2000 W PEP, 160 to 15 meters, 1.8 to 30 MHz.

3KD CLASSIC desk top. 1500 W PEP, 80 to 15 meters, 3.5 to 30 MHz. (10 meters available on export models).

2002-A desk top. 1200 W SSB, 400 W continuous operation, 144 to 148 MHz. (100 to 300 MHz available on commercial models).

2002-A desk top. 1200 W SSB, 400W continuous operation, 220 to 225 MHz.

2006-A desk top. 1200 W SSB, 400 W continuous operation, 50 to 54 MHz. (30 to 100 MHz available on commercial models).

3002-A console. 2000 W SSB, 1000 W continuous operation, 144 to 148 MHz.

3004-A console. 2000 W SSB, 1000 W continuous operation, 430 to 450 MHz.

3KD CLASSIC

1500 W PEP nominal output SSB and CW. 1000 Watts ICAS, RTTY, and FM, covering the 3.5 to 30.0 MHz frequency range. Nominal gain: 15 to 20 times input drive. Tube complement consists of one remarkable new Eimac 3CX-1200D7 ceramic triode. It uses a Pi-L plate circuit with a silver plated tank coil for maximum efficiency and attenuation of unwanted harmonics.

3006-A console. 2000 W SSB, 1000 W continuous operation, 50 to 54 MHz. (30 to 100 MHz available on commercial models).

2004-A desk top. 1200 W SSB, 600 continuous operation, 430 to 450 MHz.

Amplifiers for amateur radio is only part of the picture. We also design and manufacture amplifiers for commercial, MARS, military, short wave broadcast, VHF link, domestic, foreign. . . Henry amplifiers go everywhere for diverse services. HF point-to-point, SSB, AM, FM, RTTY, packet, meteor burst, digital, marine shore station. If you need a special purpose vacuum tube amplifier for a specific frequency from 2 MHz to 500 MHz at power levels up to 10,000 watts, we invite your inquiry.

But communications is only the beginning. Think about plasma generation, sputtering and etching, thin film deposition, laser excitation, nuclear magnetic resonance (NMR), photo-emissions and mass spectrometry, scientific research, industrial production. . .Henry equipment is used in all of these applications. We have always been customer driven and still are.

Commercial users, remember the superb new 8K ULTRA is now in full production and drawing unbridled praise from users.

Henry Radio

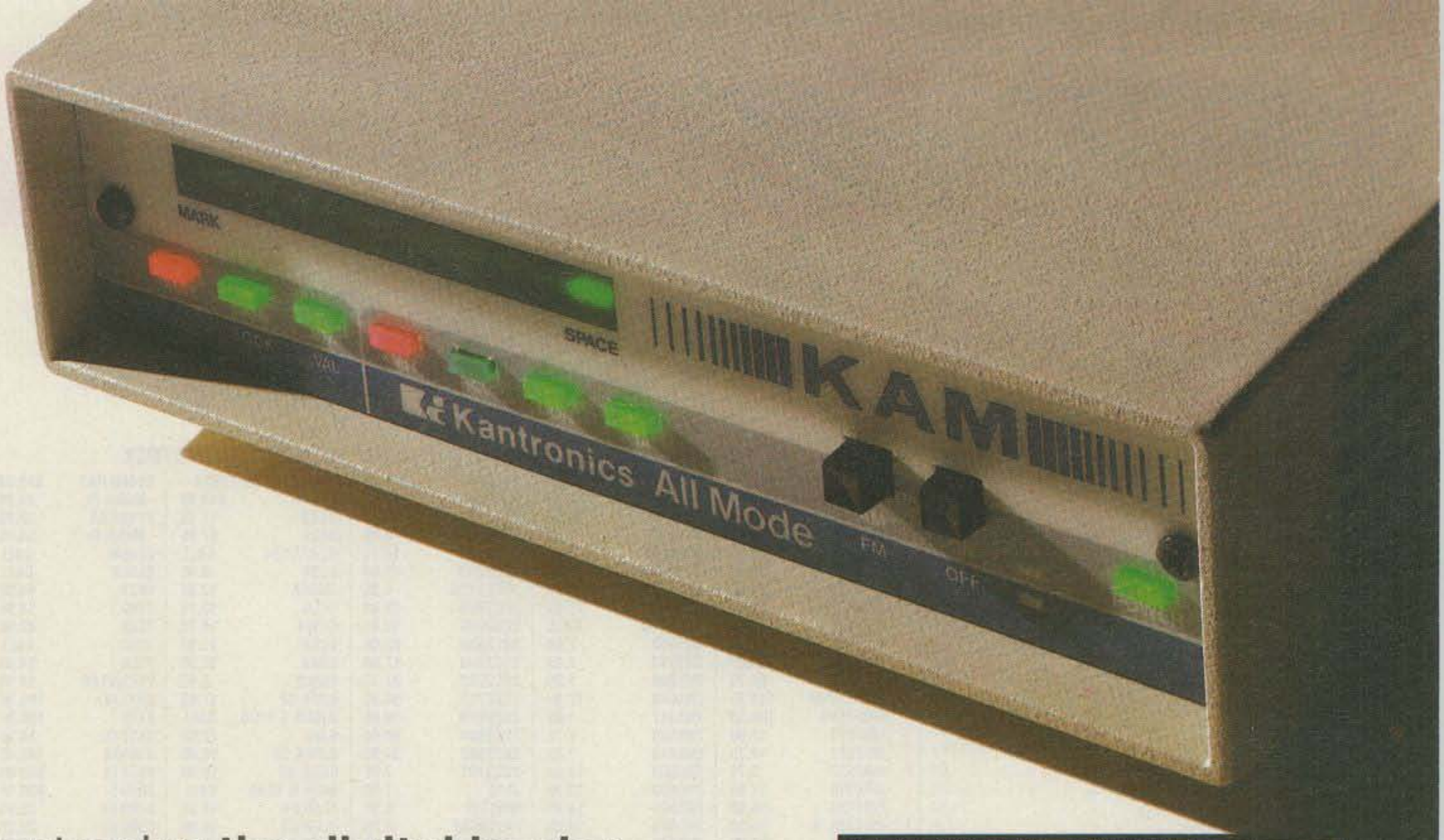
2050 S. BUNDY DR. • LOS ANGELES, CA 90025 • (310) 820-1234

Toll free order number: (800) 877-7979 FAX (310) 826-7790

CIRCLE 168 ON READER SERVICE CARD

Advertiser's Index

(continued on page 147)



Kantronics **the digital leader**

announces the availability of **Pactor** for the KAM (Kantronics All Mode). Maintaining its "state-of-the-art" status, Kantronics, in cooperation with the German developers of **Pactor**, has made the newest digital mode available as an option for KAM owners.

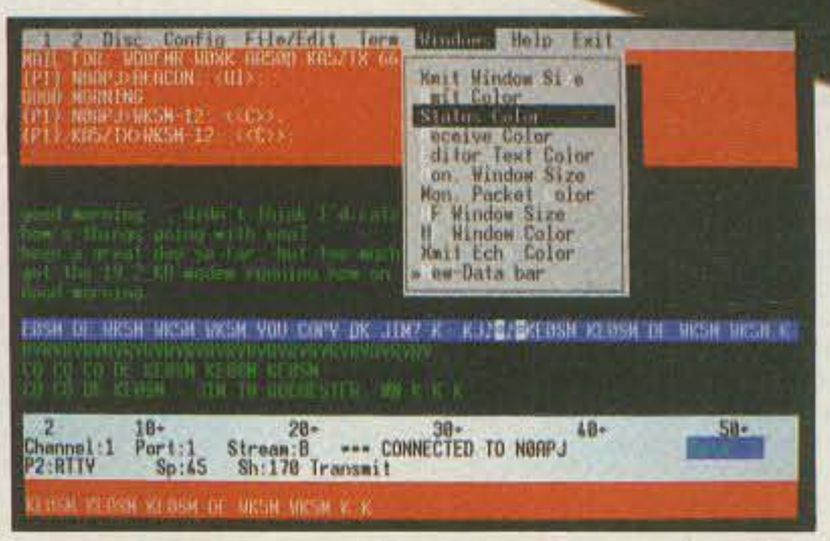
Pactor combines the best features of packet radio and AMTOR to provide robust digital communication for HF data transfer. Like packet, **Pactor** uses a 16-bit code (CRC) to insure error-free data transfer between stations. Features unique to **Pactor** include:

- automatic baud rate selection at initiation of link, 200 or 100 baud, depending upon band conditions, with automatic speed adjustment to compensate for changing link conditions.
- Memory-ARQ and optional Huffman data compression for increased throughput.
- optional long path contacts using extended timing

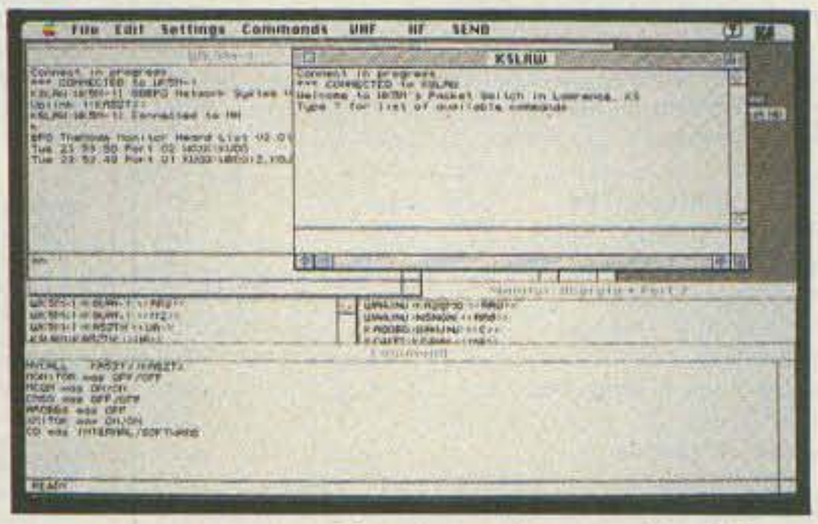
With the Kantronics KAM, **Pactor**, HostMaster software and just a few keystrokes, the operator can do Pactor, CW, RTTY, ASCII or any other HF mode while operating UHF/VHF packet at the same time! HostMaster is now available in versions for PC-compatibles, the Commodore 64 and Macintosh.

The standard KAM is version 5.0. The new **Pactor** option (version 6.0) is available now for all KAMs, with or without version 5.0 firmware. Contact your favorite dealer or Kantronics today and join users world-wide who are enjoying **Pactor**.

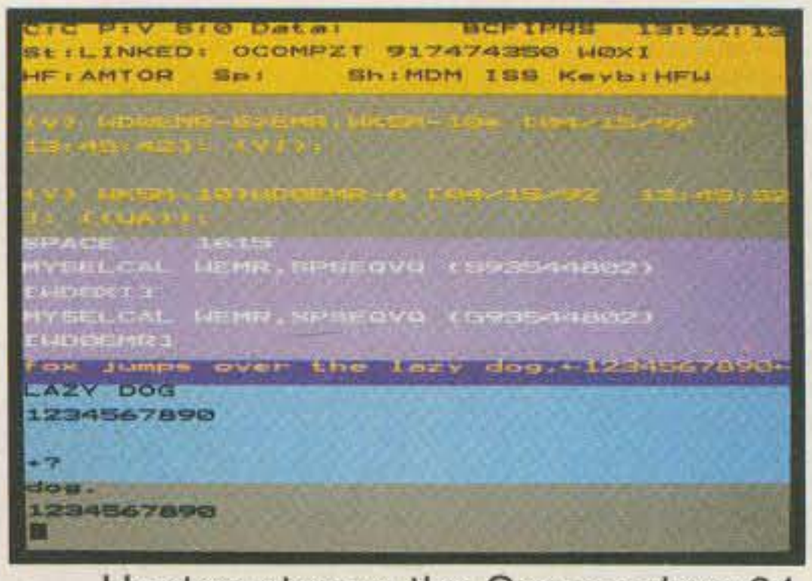
Kantronics KAM . . . the leader in all-mode digital communications.



Hostmaster on the PC



Hostmaster on the Mac



Hostmaster on the Commodore 64

Kantronics 1202 E. 23rd St, Lawrence, KS 66046 913.842.7745 TELCO BBS 013.842.4678 FAX 913.842.2021

Advertiser's Index (cont'd)

We'd like to see your company listed here too. Contact Arnie Sposato, N2IQO, at 516-681-2922 or FAX 516-681-2926 to work out an advertising program tailored to suit your needs.

VISA MasterCard DISCOVER COD

RADIO CENTER USA

EAST/MIDWEST TOLL FREE
1-800-821-7323

Kansas City, MO 64150
102 N.W. Business Park Lane
(816) 741-8118 • M-F 8-5, Sat 9-2

WEST TOLL FREE
1-800-345-5686

Sparks, NV 89431
12 Glen Carran Circle
(702) 331-7373 • M-F 8-5, Sat 9-1

AEA • ALINCO • ALLIANCE • ASTRON • ALPHA-DELTA • AMERITRON • BENCHER • BUTTERNUT • CUSHCRAFT • DIAMOND • HUSTLER • HYGAIN • ICOM

ALINCO

DR-600T
VHF/UHF Twinband Mobile
- Full Remote Control Using Your HT
- Detachable Front Panel
- 45W-2M, 35W-440 MHz
- Direct Freq. Input

CALL TODAY!

ICOM IC-728

HF ALL BAND TRANSCEIVER
- General Coverage Receiver
- Direct Digital Synthesis
- Triple Conversion Plus Noise Blanker
- Compact Size and Compact Price

CALL FOR DETAILS!

ALINCO

DR-112
COMPACT FULL FEATURED 2M MOBILE
- 45 Watts Of "True FM"
- Multiple Scanning Modes
- 14 Memory Channels
- DTMF Encoder Built-In

SPECIAL DISCOUNTS APPLY!

ICOM

IC-229H
STATE OF THE ART MOBILE
- Ultra-Compact 2 Meter Operation
- 20 Memory Channels
- Big 50 Watts Output
- Auto Dialing For Autopatching And Repeater Control

DON'T DELAY—CALL!

ALINCO

DJ-580T
TWIN BAND HANDHELD

- Rx 130-173.995 MHz 400-519.995 MHz
- Up to 5 Watt Output
- Multiple Scanning Modes
- Direct Freq. Selection
- 40 Memory Channels
- Cross Band Full Duplex

CALL TODAY!

KENWOOD

TM 741A
FULL FEATURED, FM, MULTIBAND
- 144 & 440 MHz Operation with Expansion to Include 28,50,220 or 1200 MHz
- Detachable Front Panel
- Up to 50 Watts Output

CALL TODAY

ALINCO

DJ-180
2 Meter HT

- 2 Watts w/5W Optional
- Simple Operation
- 10 Memory Channels Expandable to 50 or 200
- Built-in PLL Encode/Decode
- RX 138-174 MHz

CALL TODAY!

KENWOOD

TH-28A VHF HANDHELD
- Transmit-2 Meter Receive-2 Meter & 440MHz
- 40 Memory Channels
- Message Paging

TH-78A
V/UHF HANDHELD
- RX 118-173.995 MHz TX 144-147.995 MHz UHF 438-449.995 MHz
- Dual Band Receive
- Message Paging
- 50 Memory Channels

HOLIDAY SALE!

YAESU

You're a competitor.

You want optimum receiver performance and you want muscle on transmit.

Try the FT-1000.

You'll hear signals you've never heard before, and its first with 200 Watts.

When you want the best, and top of the line radio equipment is your choice the only name you need to know is–

RADIO CENTER USA

YAESU

QUALITY SERVICE WITH "LOW" RADIO CENTER PRICES

CASH FOR QUALITY USED GEAR—SEND SASE FOR USED LIST

INNOVATION is In!
"OVER" is Out!

1-800-999-9877 and the W21AT

ICOM's 1993 product line is going to be one innovation after another. To keep up with the breakthroughs, you'll need the ***I-COM LINE:*** your hotline for new radio info. Use it *now* for the latest on the W21AT, featuring dazzling duplex operation!

The NEW! *I-COM LINE*

Telephone Based Information!

Our I-COM LINE is free, it's fun, and it's the best way ever of making intelligent radio buying decisions.

Here's all you do:

1. Dial **1-800-999-9877**

2. Leave your name, address, and the name of the product you're interested in – in this case, the W21AT.

Within 24 hours, we'll send you REAL info about the W21AT: how and why it was designed, spec sheets, field tests, reviews – everything you need to decide if this is the radio for you.

Give it a try! See how easy it is to communicate with the world leader in amateur radio communications.

I-COM LINE: *uniquely* ICOM!

The NEW! *IC-W21AT*

Telephone Style Innovation!

Full-duplex operation has always been possible, but not very practical.

ICOM's changed all that. The W21AT is the *first and only* handheld to give you full duplex that works like a telephone.

"Over" is over!

We added a second microphone, unique electronics, and wrapped it in the sleekest body ever. The W21AT *looks* as good as it performs.

We added Single Band Dual Receive (receive 2 signals on the same band simultaneously), and Cross Band Repeat (receive a signal on one band, retransmit it on another).

And "smart" memory for easy recall of preset functions.

And automatic sensing that matches output power to incoming signal strength to extend your on-air time. And more!

How much more? Call the I-COM LINE!

The IC-W21AT: *uniquely* ICOM!

(also available: the IC-W21A, without the DTMF pad).

ICOM's HT Family – also available on the ICOM-LINE!

P Series
P2AT - 2M
P3AT - 220MHz
P4AT - 440MHz

SRA Series
2SRA - 2M/WideBand Receiver.
4SRA - 440MHz/WideBand Receiver

SAT Series
2SAT - 2M
3SAT - 220MHz
4SAT - 440MHz

GAT Series
2GAT - 144MHz
4GAT - 440MHz
12GAT - 1.2GHz

0AT Series
02AT - 2M
03AT - 220MHz

Dual Band
W2A - 2M/440MHz
W21 - 2M/440MHz
X2A - 440MHz/1.2GHz
24AT - 2M/440MHz

AT Series
2AT - 144MHz

ICOM Experience the Quality©

"The magazines judged the FT-1000 world's best in it's class. That's leadership!"

K. Karamanos
National Sales Manager
WD6DIH

"Leadership means innovation, and since we're hams too, we understand what you want."

C. Margelli
Customer Service Manager
K7JA

"We keep our HF leadership position by constantly improving our products."

M. Maruya
Executive Vice President
WA6F

FT-1000 Best of the Best

Unmatched performance, the ultimate DX and Contest radio. Unlimited simultaneous crossband dual receive, 200 watts power output, with heavy duty power supply. World's best receiver performance utilizing quadruple conversion, Yaesu's exclusive DDS, IF notch, IF shift, IF variable bandwidth, CW APF, independent mode and IF filter selection. Also, CW spot and built-in high speed antenna tuner with memories. Proven performance: The choice of the world's top DX'ers.

You may not think you
but you

All of Yaesu's quality HF radios come available with a wide selection of accessories. Specifications subject to change without notice. Specifications guaranteed only within amateur bands.
Some accessories and/or options are standard in certain areas. Check with your local Yaesu dealer for specific details.

FT-990 High-Tech Innovation

The advanced RF front end design similar to the FT-1000 allows for superior receiving performance. In addition to CW spot, IF notch, IF shift, independent mode and IF filter selection and Yaesu's exclusive DDS, the FT-990 features the industry's only dual digital SCF high performance filters providing unsurpassed receiver selectivity as never before obtained. And the CPU controlled RF FSP gives you that extra pile-up punch when you need it most. A high speed antenna tuner with memories and built-in switching power supply are included.

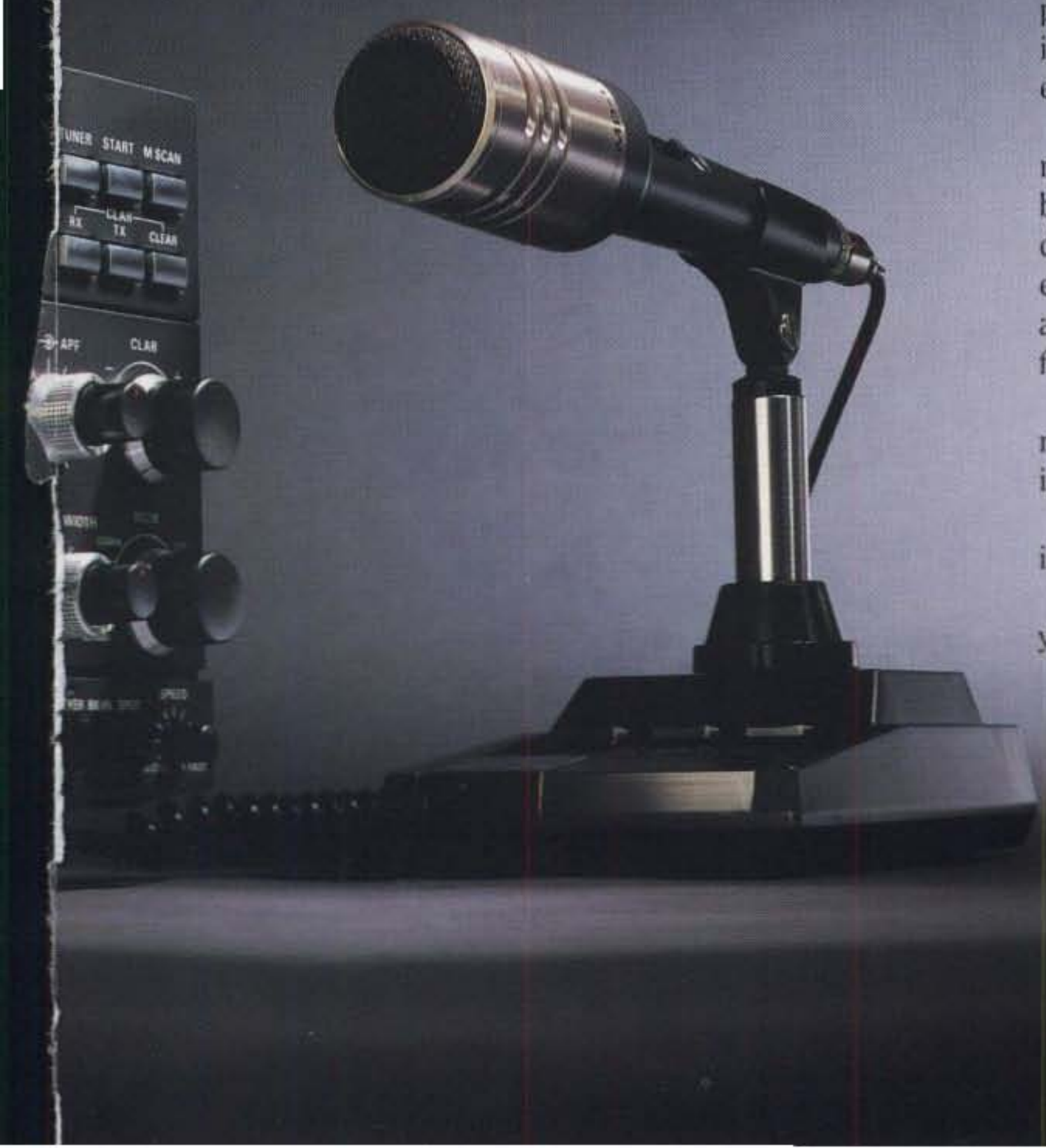
FT-890 Light Years Ahead

World's smallest premium high-performance mobile includes Yaesu's exclusive DDS, IF notch, IF shift, built-in iambic keyer, general coverage receiver and built-in high-speed antenna tuner with memories. Outstanding receiver front end with IPO (Intercept Point Optimization), selectable AGC and all-mode squelch. DFCS (Duct Flow Cooling System) for 100% duty cycle at 100 watts output for up to 30 minutes. A great Field Day or DX-pedition rig!

FT-747GX Small Wonder

Features include ultra-lightweight design, multiple scan functions, selectable noise blanker, 20 memories, all-mode squelch, separate drive and mic gain controls. The simplest full-featured 100 watt HF radio, with general coverage receiver at an affordable price.

know a world leader, know us.



Keeping our world leadership position in HF radio products means knowing what you need to make DX'ing more fun and challenging, then interpreting those needs into technical improvements and innovative features. We're hams too, so we know how exciting advanced engineering can be.

Being a world leader in HF technology doesn't mean anything to us though, unless there are real benefits to you. Like peak performance and unfailing durability – the very qualities that keep our HF equipment on top; the best benefits you can have – and our design goals since 1956 the year Yaesu was formed.

This lineup of radios exemplifies the achievement of those goals and over 35 years of manufacturing "the best of the best" amateur radio equipment.

You see, you do know a world leader – but more importantly, we know you.

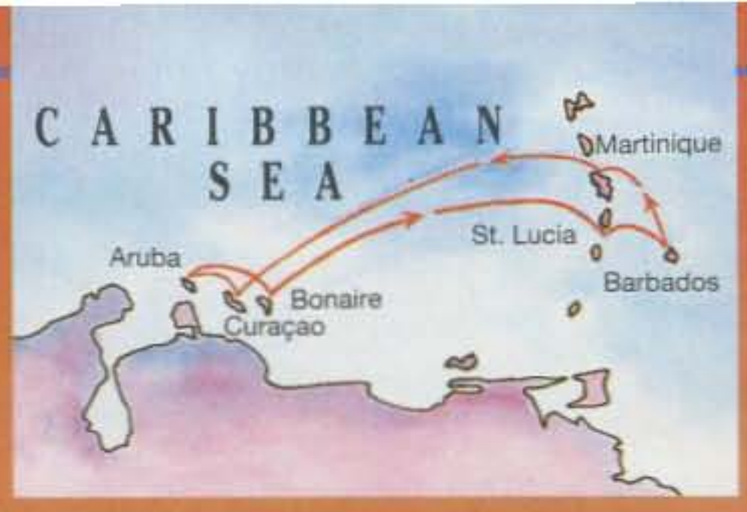
Experience the best of the best today! Contact your nearest Yaesu dealer.

YAESU

Performance without compromise.℠

The Dream Vacation of a Lifetime.

Join the DXpedition event of the year with Yaesu and cruise the Caribbean for a week-long exciting adventure. ♦ Work stations from the intimate S.S. Oceanbreeze, latest addition in the Dolphin Cruise Line, and from 6 Caribbean islands along the way. ♦ Get souvenir licenses from tranquil Aruba, coral-reefed Bonaire, lush St. Lucia, Barbados with its British charm, Gaugin's paradise, Martinique and exotic Curaçao. ♦ Participate in discussions with notable DX-ers and attend technical seminars conducted by the experts at Yaesu. Enter contests for "most contacts," "work all stations," CW at sea and "ASCII" sending with valuable Yaesu products and commemorative QSL Cards as rewards! ♦ And, if "cruising" is



all you want, round the clock non-DX activities will tempt you every day. Work up an appetite at the fitness center, or just laze by the pool. Shop colorful island markets, and relax with

FREE YAESU HT
SIGN UP BY FEB. 28, 1993

friends for dinner then test Lady Luck in the glittering casino. ♦ A DXpedition with a casual cruise ambience, attentive service, sumptuous dining, exhilarating days and sensational nightlife. It's an 8-day event you'll never forget. ♦ Join Yaesu and friends from all over the world this May for DX-Caribe Cruise '93℠ – the Dream Vacation of a lifetime. ♦ Bookings are "first come" basis, so hurry, space is limited. For a FREE DX-Caribe Cruise '93℠ Package Brochure with all the details call:

DX-CARIBE CRUISE
YAESU
Performance without compromise.℠
MAY 16-24 1993

Landry & Kling, Inc.

800-223-2026

DX the Caribbean with Yaesu.

MAY 16-24, 1993