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Gary Hext, WB4FLB, Bowling Green, KY

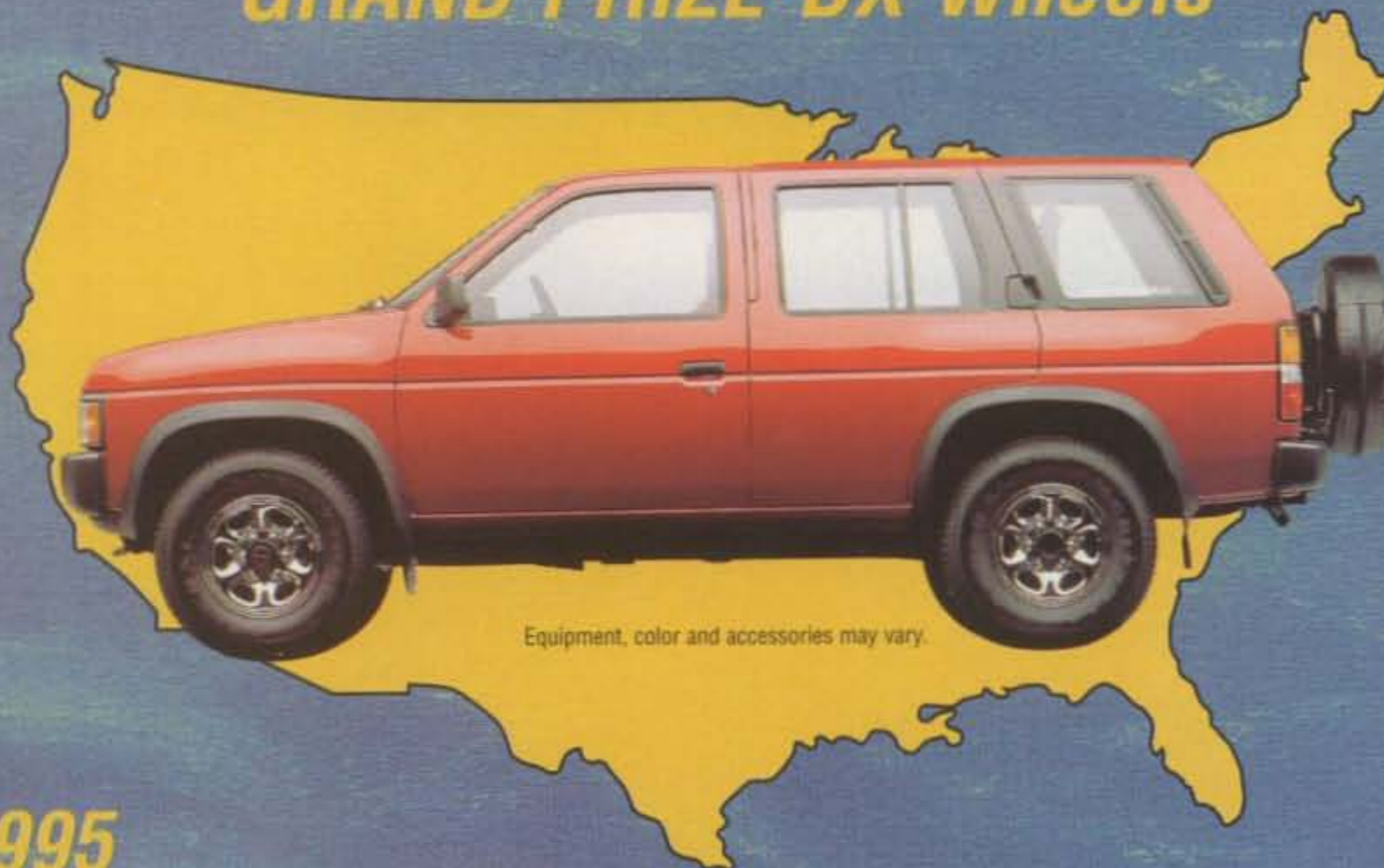
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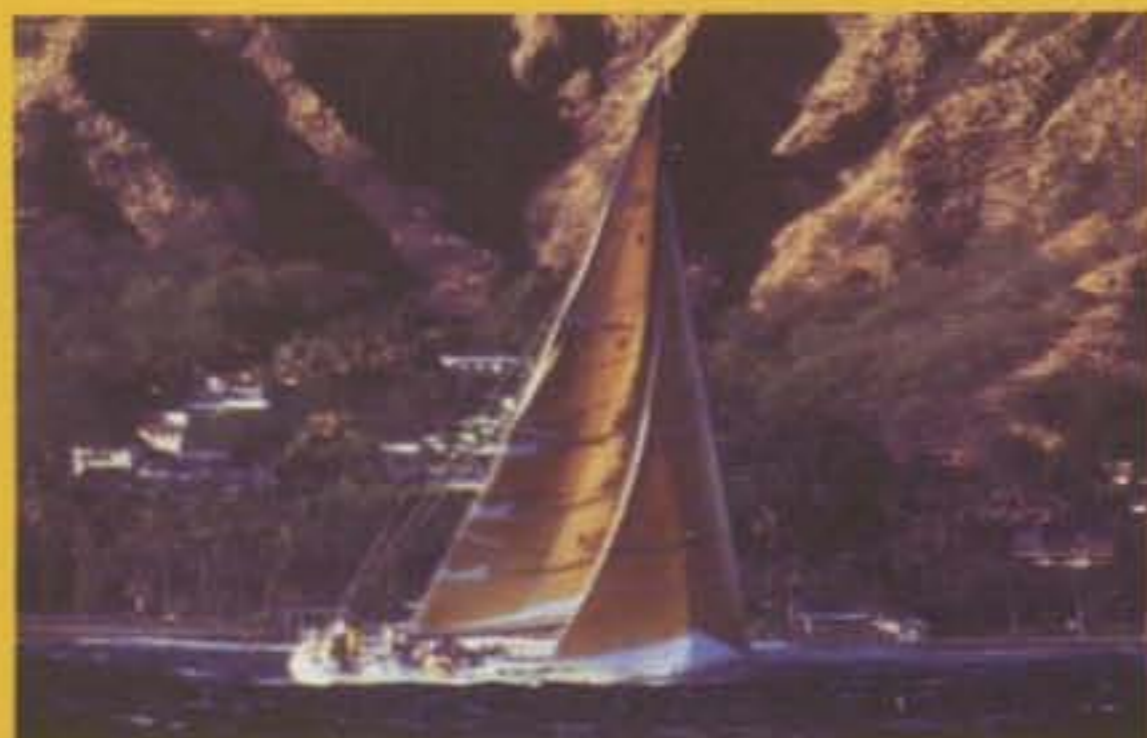
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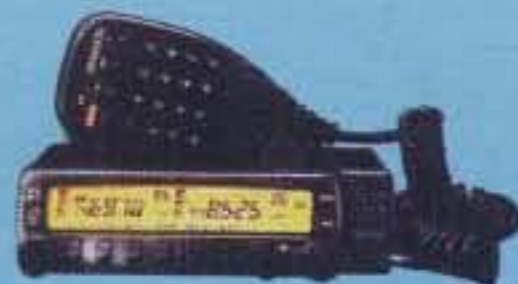
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The Radio Amateur's Journal



ON THE COVER: When you think of enthusiastic hams, Gary Hext, WB4FLB, certainly fits the bill. More often than not, you'll find him (and kitty!) on the bands operating from his fine station in Bowling Green, Kentucky. (Photo by Larry Mulvehill, WB2ZPI.)

JULY 1995

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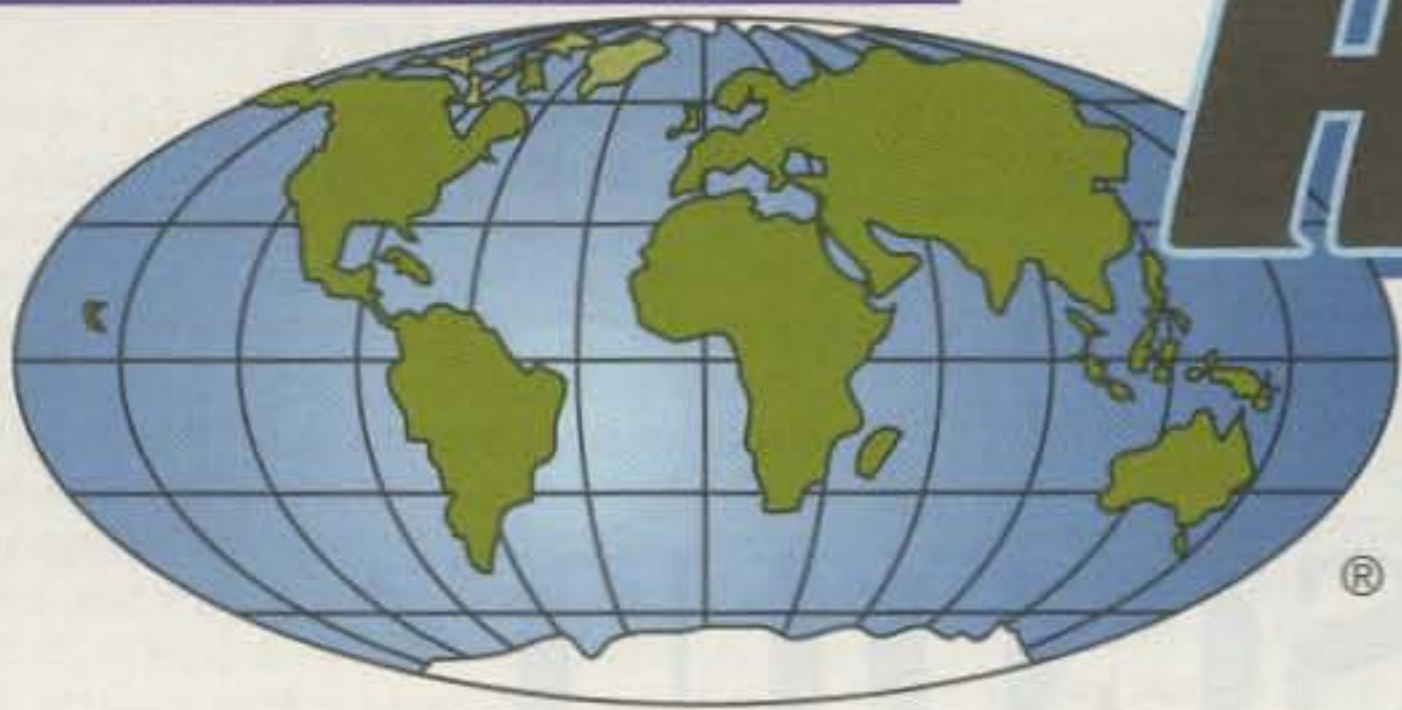


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DUAL-BAND HANDHELDS

Most of the time it's not easy to put a new country on the air or return an old friend back to the fold of amateur radio. VK9NS fills us in on his progress toward activating A51.

A51—The Kingdom of Bhutan

BY JIM SMITH*, VK9NS

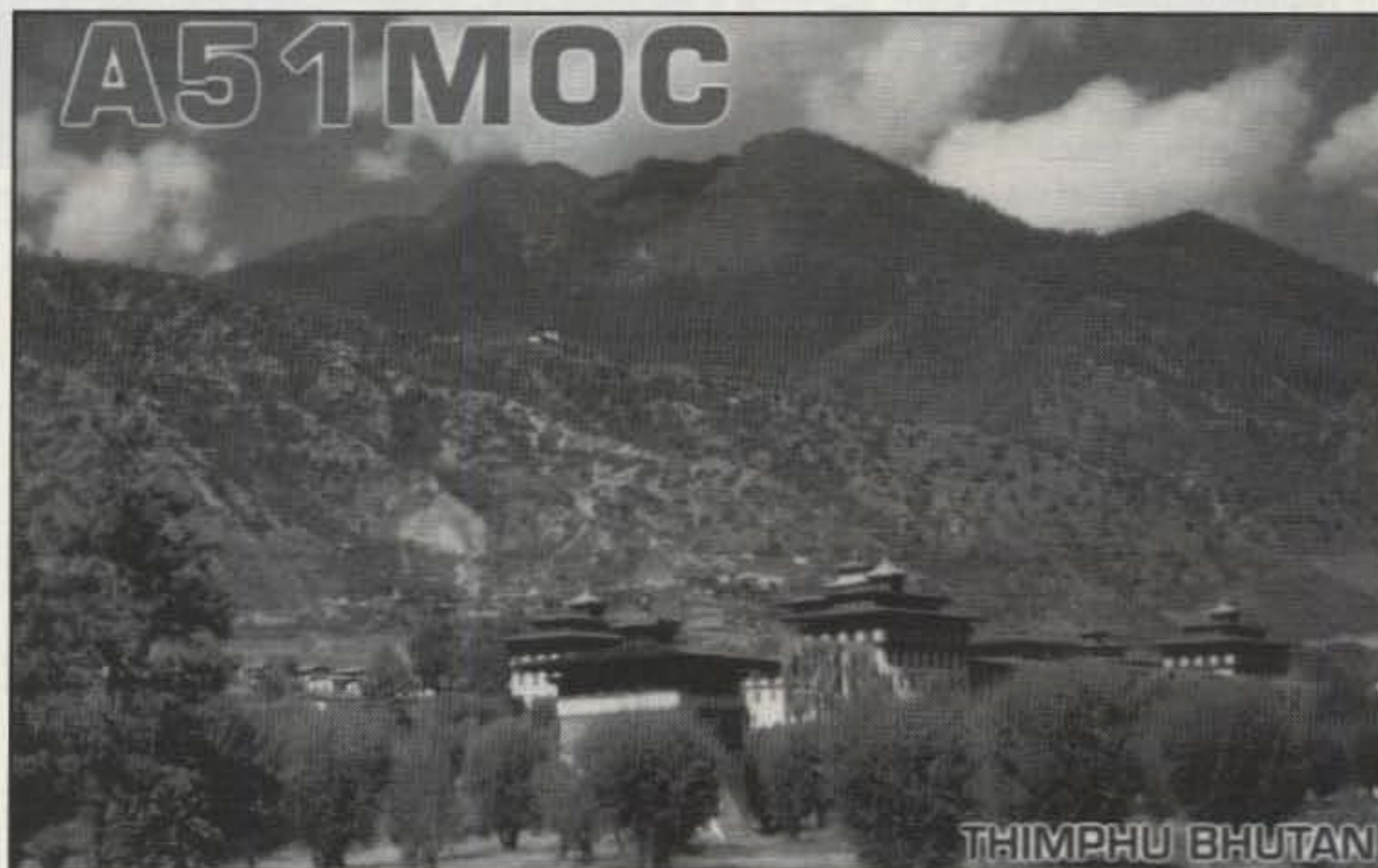
Back in late 1988, when I first contacted the Ministry of Communications in Thimphu regarding amateur radio, it was never envisioned that more than six years later I would be traveling to the country for the third time. After my activities as A51JS in 1990, several magazines carried my brief story "Amateur Radio in the Kingdom of Bhutan." In 1990 I was convinced that the amateur radio service would be in place a few short months after I left. We, the DXer and radio amateur, now know that this was not the case. Some five years later, however, it appears that things are really on the move.

In December 1993 the then current Minister of Communications, Dr. T. Tobgyel, was promoted to the post of Ambassador to Bangladesh. A few short days later his next in line, Dasho Nado Rinchen, was promoted not to the post of Minister of Communications, but as Ambassador to India. In the time span of a couple of days my two main contact points with the Ministry of Communications had evaporated. I still knew other government officials, but many were in other departments.

Over the years I had developed a warm and friendly relationship with both Dr. T. Tobgyel and Dasho Rinchen. Dr. Tobgyel was of particular interest, as he knew of Gus Browning, the days of T. Yonten, and so on—all so many years ago, a different world in fact. The day after he left the Ministry and prior to his departure for Bangladesh we had a long telephone conversation. He was "in limbo" in a way, and I felt that a number of areas could be discussed without prejudice.

A couple of weeks later, in mid-January 1994, I submitted a further amended proposal to the M.O.C. I felt the changes made might make things easier for the Ministry—limiting frequencies of operation (short term) to make any monitoring (if required) easier. Many other areas were addressed, and several other amendments were made to material previously submitted. It was to be mid-April before a Deputy Minister was in place. However, in the ensuing months it appeared that things were moving quite quickly. This point had been approved, that had been okayed, and so on.

As a suggestion to take away any "personality issue," the idea of A51MOC was proposed back in 1991. Any such callsign was neutral and no one individual tag was involved. It was the idea of only Bhutan, and this plan was well received. As the months of 1994 moved along, it was felt that I could gradually release comments about amateur radio in Bhutan. In con-



The QSL of A51MOC.

gratulating the M.O.C. for their apparent progress, I also suggested that they deserved a pat on the back from us all.

Things finally came to a head in late September as it was indicated to me that all would be okay for an A51MOC operation. Training of

Bhutanese operators and other plans were mentioned. These all were part of the various proposals which had been submitted over the years. I then started to make definite plans to return to Thimphu, and after further discussion with M.O.C., it was agreed that Kan Mizoguchi,



The Ministry of Communications building in Thimphu with the R5 vertical in place.

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



Wangdo on the air at A51MOC.



Jim, VK9NS, Wangdo, Phub, and Kan, JA1BK, at the A51MOC station.

This was confirmed later in the Director's office. Later I prepared an official letter of thanks to the office of the Deputy Minister. Progress in Thimphu these days made possible access to a computer with a well-known word processor installed.

It seemed that Kan and I now had problems in the sense that nothing was to be achieved. Thanks to the advice of Kan, however, my original release to the DX publications had been changed. In short, the actual release promised nothing but the fact that we would do our best. (The original in the wastepaper basket at home had been much more positive.)

In searching for a solution Kan and I submitted a letter to the Ministry requesting permission to demonstrate amateur radio. This letter was delivered to the office of the Deputy Minister. In the meantime I telephoned Dr. T. Tobgyel at the Royal Embassy of Bhutan in Dhaka and explained that I was considering changing my original plans and returning directly to Norfolk Island. I had planned to visit him in Dhaka on my return trip. I also had a surprise for him. His son was standing by my side, and he was delighted when I put Chhimmy on the line.

A few hours later on Wednesday afternoon we received word that the Minister had approved our request for an official demonstra-

tion. He had agreed to the use of A51MOC, and needless to say we were both delighted. It now seemed that the situation had swung back slightly in our favor, and something had been salvaged from the visit. That pendulum swung back again: a one hour operation was okayed and contacts had to be with JA stations, as Japan was celebrating its National Day. Kan alerted a few key stations in Japan and told them to just listen on this frequency at such and such a time, and so on. We both wanted a couple of strong stations for a good demonstration. I alerted Kirsti on Norfolk Island, keeping things very general.

In getting ready for the 10 AM start the next morning the FL2100Z, which HIDXA had donated in 1991, was released for our use. Kan, Chhimmy, Phub, Wangdo, and myself began to get the station ready. Kan, with some assistance, very quickly had his Cushcraft R5 vertical ready. Gradually, the A51MOC station began to take shape. The office allocated to us in the Ministry building was adequate with a large desk, power outlets, etc. Kan soon had his TS-690S connected, with keyer, microphone, and headset all ready to go. A pre-test showed a fault in the antenna system, and high

SWR an all bands. A few minutes later Phub and myself, with the aid of a meter, located a faulty section of coaxial cable, and on replacement we were in business.

Initial tuning around the bands was not very hopeful, and it soon became apparent that band conditions were terrible. At 10 AM, with a few minutes to spare, we were ready to start. It was planned that Phub Tshering and Wangdo Dorji would do the main operating, with Kan and myself supervising. We would both also make a couple of token contacts. The following hour was hard, frustrating work, but it was very exciting with a total of 27 QSOs being made. Despite the pre-warning to several JA stations, no S9 plus both way QSOs took place, as propagation was lousy.

Some 20 minutes after the A51MOC demonstration started, the Minister and the Director paid us a courtesy visit. Photographs were taken, questions were asked, and so on. Some 40 minutes later it was all over, with smiles all around. Phub and Wangdo had operated under difficult conditions, but we both knew that given a bit of time they would be fine. They had had their brief moments of amateur radio activity, and I am sure they enjoyed themselves. Eventually we started to dismantle everything; things come apart quickly, as we all know.

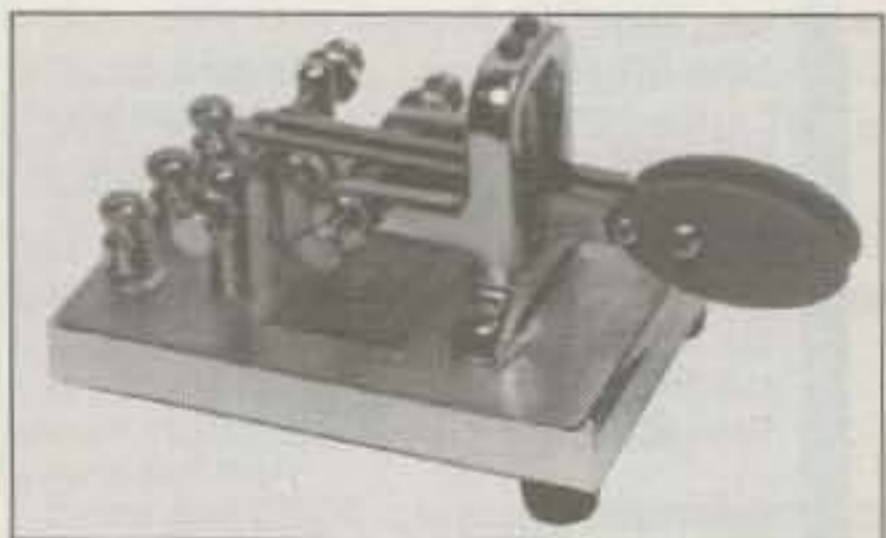
An official letter of thanks was prepared later in the day and submitted to the Minister the next day. It had been generous of him to permit this demonstration under the circumstances. I have great confidence in this man and feel that he will draw together into an organized file the material submitted over the years. He has a tremendous task ahead of him in his planned reorganization of the M.O.C. When that is done, legislation will be passed permitting the amateur radio service to start properly and blossom. This has happened in many other countries; and will happen in Bhutan.

Thanks is due to many: the members of HIDXA, and especially to Kan Mizoguchi, JA1BK, one of our Life Members; the Deputy Minister of M.O.C., Dasho Leki Dorji; the Director of Planning, Ugyen Nmgnyi; Phub Tshering; Wangdo Dorji; and my old friends of the Wireless Division. To the many Bhutanese who said hello to me and asked about Kirsti in remembrance of our previous meetings, my thanks.

Thanks especially to my fellow DXers. We all know that patience is a virtue. (So why is it so hard to bear?) ■

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CQ REVIEWS:

Jade Products KR01 Curtis Keyer Kit

BY PAUL CARR*, N4PC

During the early days of my amateur radio career, the only equipment that I had in my hamshack was either homebrewed or built from kits. Unfortunately, many of the kit manufacturers have gone the way of the steam locomotive. I am happy to announce that all good kits have not become extinct, however. Equipment is still available in kit form, and I have found a good one.

The Curtis Keyer Chip

The Curtis keyer chip has been around for many years, and it has made an appearance in many homebrewed keyers. This is a very versatile chip, and I am happy to say this kit takes full advantage of its potential.

The particular version of the Curtis chip used in this kit is the 8044ABM. This chip features iambic "A" and "B" modes. There are provisions for weight control, sidetone, manual keying, and a speed meter function. There are ample "bells and whistles" for those who want full versatility.

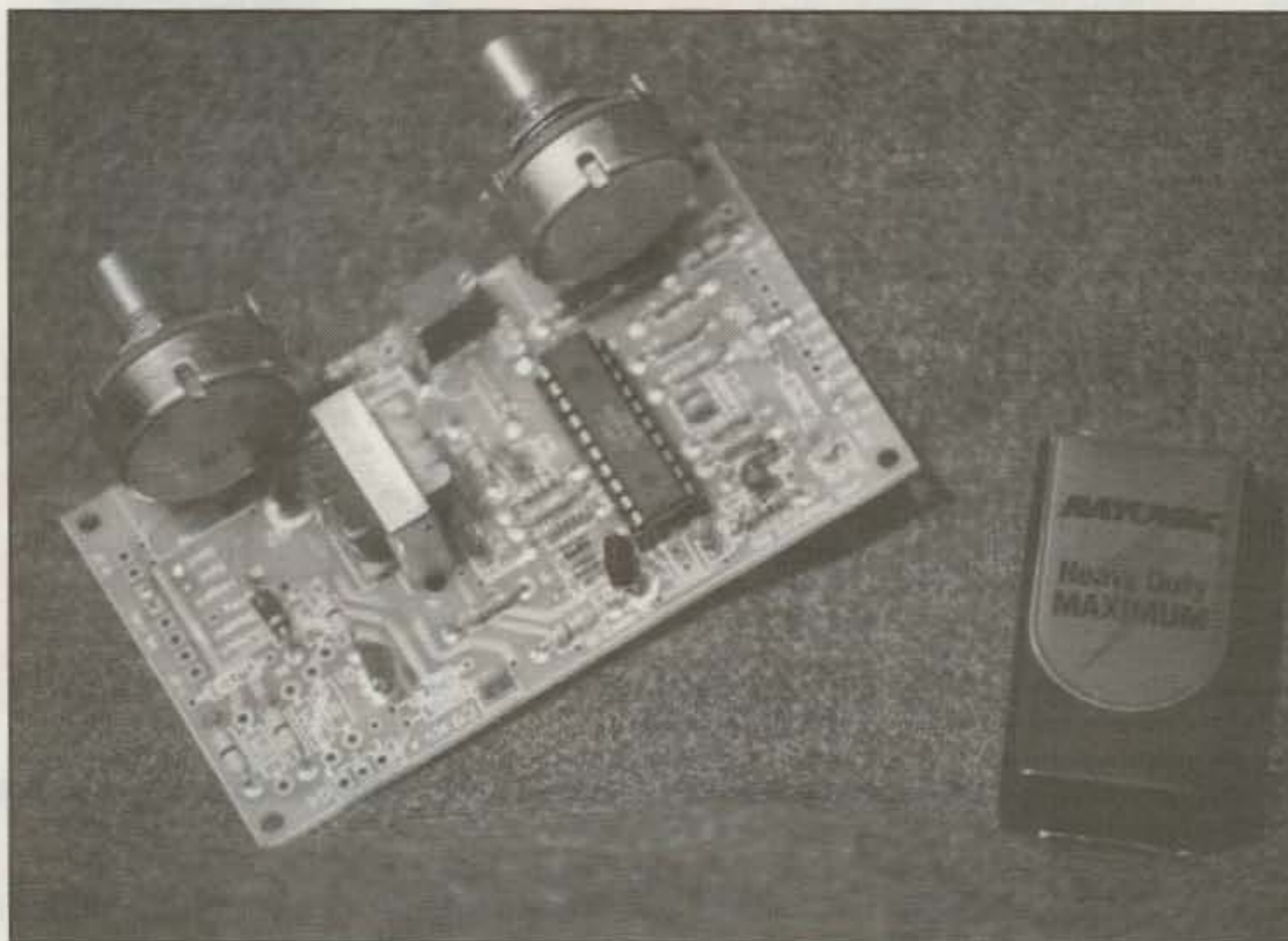
Before You Begin

One of the most important parts of the kit is the instruction manual. The manual is very well written, and you should make plans to spend sufficient time with it before construction actually begins. There are many pictorials in the manual. They clearly illustrate parts placement and construction techniques. There is a list of tools necessary for construction. Pay careful attention to the component descriptions. There may be some parts with which you are not familiar. Remember, the time you spend initially studying the manual is not time wasted; it is insurance for successful kit completion.

Construction

Choose a clean, well-lit area for the kit construction. Follow the manual exactly during construction. When you complete a construction step, visually inspect the results of your work. When you are satisfied the component is installed properly, check the box provided in the manual. Remember, your eyes are invaluable during the construction phase. Work slowly, and if something seems wrong, stop and resolve the issue immediately before potential mistakes accumulate. If mistakes occur, the earlier they are corrected, the greater the chance for ultimate success. Actual construction and preliminary testing required about three hours for me.

*97 West Point Road, Jacksonville, AL 36265



The completed keyer. As you can see, the finished unit is about the size of two standard 9 volt batteries. A single battery is shown for size comparison.

Testing The Keyer

After you complete the kit, follow the test procedure to ensure the keyer is wired properly. A digital volt-ohm meter is recommended for tests. A complete list of expected test readings is included in the manual. There is an excellent trouble-shooting guide also provided, but hopefully you will not need this section of the book. Wire the keying paddle according to the diagram provided and you're ready for CW fun.

Operating The Keyer

I tested the keyer on several transmitters in my shack to assure myself the unit was working properly. The unit keyed all the QRP rigs at my disposal without any problems. I further tested the keyer on two commercial transceivers in my shack, and the results were flawless.

Some older type transmitters require a keyer that will key a large positive voltage (for example, cathode keyed 6146A tubes). There is a section in the instruction manual that explains the necessary modifications for this application. Both positive and negative keying options can be keyed with this unit.

The sidetone circuit in the Curtis keyer is basically an RC oscillator. There are complete instructions provided in the manual to allow

customizing the sidetone volume and frequency of this circuit.

Back in the days when many operators used "Bug" type semi-automatic keyers, the weights on the vibrating arm were very carefully adjusted by the operator. This provided a very distinctive sound to the code generated by the device. This keyer has provisions for adjusting the "weight" to suit the individual's preference.

There are also provisions to connect a straight key to allow additional flexibility to the keying function.

Everything that you look for in a good keyer is provided in this unit.

Custom Mounting

The unit is small enough so that it can be mounted in many of the rigs that are currently on the market. This keyer is a natural for inclusion as a part of a home-brewed transceiver. If you choose to mount the circuit in a separate cabinet, you must provide the housing.

Availability

This kit is available from Jade Products, Inc., P.O. Box 368, E. Hampstead, New Hampshire 03826. The basic kit is priced at \$39.95 plus shipping and handling. ■

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More is less. QRP is the exciting world where you can prove how much more you can do with far less power. The big guns here run really low power.

A Low-Power (QRP) Primer Part II—How To Make It Work For You

BY RICH ARLAND*, K7YHA

It's now time to change gears and start making some contacts. As you gain experience using 5 watts or less, you soon will reach the conclusion "What's the big deal? QRP really works!" At that point, watch out! You have been fatally infected by the QRP virus and now run the very real risk of becoming a "milliwatter."

The milliwatt facet of the low-power hobby is populated by what I call "hard-core QRPers." Anything over 1 watt is too much RF! What these low-power communicators accomplish using milliwatt and microwatt power output levels is truly amazing. To date, the documented all-time galactic record for miles per watt is held by Bob Moody, K7IRK (in Texas) and Bill Brown, WB8ELK (in New Hampshire). In 1991 Bob and Bill completed a QSO between Texas and New Hampshire (a path in excess of 1500 miles) using .720 microwatts! This works out to over two billion miles per watt! Now that's quite an accomplishment.

If you, like most of us, are a gadget freak, you probably want to procure a *real* QRP rig. The original Ten-Tec Argonaut series (models 505, 509, 515) are the workhorse QRP transceivers. These little 80–10 meter SSB/CW rigs feature outstanding QSK (full break-in keying), small size, light weight, excellent performance, and high reliability. They do not cover the WARC bands (30, 17, and 12 meters), but they do lend themselves well to fixed and portable station use on HF. Prices depend upon condition (electronic and cosmetic) and can range from as low as \$150 for a model 505 to over \$500 for a model 515. Unfortunately, the latest trend in QRP is nostalgia based, and this has forced the prices of used Ten-Tec QRP rigs right through the ceiling. Factory support is still available for these rigs directly from Ten-Tec in Sevierville, Tennessee.

Almost every hamfest fleamarket has at least one Heathkit HW-8 QRP rig for sale. This was the mainstay of Heath's QRP line from the mid 1970s through the mid 1980s. This little rig has had more modi-



The Vicar of St. Aidan's, the Reverend George Dobbs, G3RJV, is one of the most well-known QRPers in the world. A prolific builder and author, George is also the man behind the very successful G-QRP Club. Shown here in his inner sanctum, George turns out some very interesting QRP gear. (Many a morning I've awakened on George's front lawn, but that's another story! (Photo by Practical Wireless))

fications written up for it than any other transceiver in existence. The HW-8 is the best of the lot as far as Heathkit QRP rigs are concerned. Its predecessor, the HW-7, suffered horribly from poor receiver performance. The successor, the HW-9, was overpriced and suffered from a group of maladies, including instability, reduced power output on 15 and 10 meters, and poor receiver sensitivity and selectivity, just to name a few. Heath Company no longer supports any of these radios, so if you pick one up, start look-

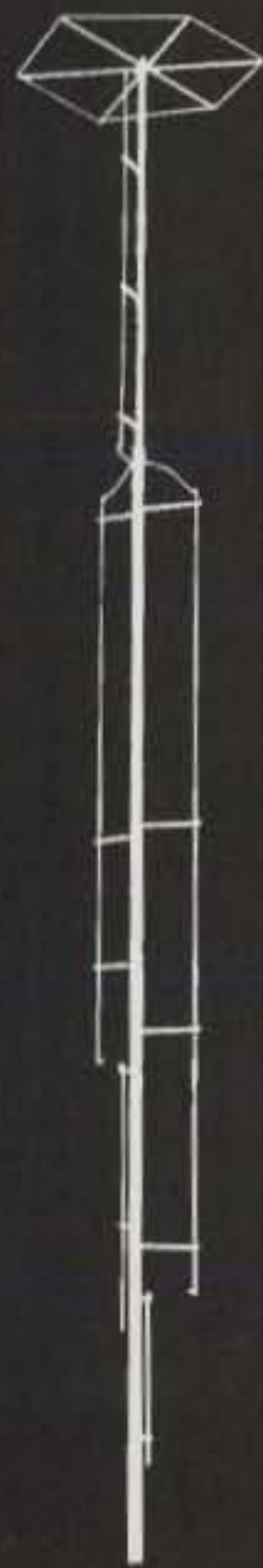
ing for another one to use for parts. Prices on used Heathkit QRP rigs run from \$25 for a HW-7 to \$250 for the HW-9.

The absolute "king of the hill" for used commercially manufactured QRP transceivers is the Kenwood TS-130V. A 10 watt radio covering 80–10 meters (including WARC bands), this low-power version of their popular TS-130S offered the same receiver and transmitter sections without the 100 watt power module. Even by today's standards, this transceiver is still an outstanding performer on the HF

*P.O. Box 1782, Shavertown, PA 18708

GAP: THE PERFECT ANTENNA

We at GAP realize there isn't a perfect antenna. No singular antenna will scream DX on 80 and be the best for local nets on 10. If anyone tells you there is, beware! The perfect antenna does not exist, but the right one for you may. If you want something to bust the pile on the low bands, then consider the Voyager. Just starting out in ham radio and need a great general coverage antenna, the Challenger is easy to assemble and for little effort will yield superior performance, especially on DX. Maybe you knowingly or unknowingly moved into one of those "restricted areas" where the Eagle's limited visibility, but unlimited ability is desired.



Voyager DX



Challenger DX



Eagle DX

This chart helps you select the right GAP antenna. When comparing GAPs, bandwidth is not a concern. With few exceptions, a GAP yields continuous coverage under 2:1 for the **ENTIRE BAND**.

All antennas utilize a GAP elevated asymmetric feed. A major benefit is the virtual elimination of the earth loss, so more RF radiates into the air instead of the ground. This feed is why a GAP requires **NO RADIALS**. Just as elevating a GAP offers no significant improvement to its performance, adding radials won't either, making set up a breeze.

A GAP antenna has no traps, coils or transformers. This is important. The greatest sources of failure in multiband antennas are these devices. Perhaps you heard someone discuss a trap that had melted, arced or became full of water. Improvements to these inherent problems are the focus of the antenna manufacturer, while the basic design of the antenna remains unchanged. **GAP improved the trap by eliminating it!** Removing these devices means they don't have to be tuned and, more importantly, won't be detuned by the first ice or rain. The absence of these devices improves antenna reliability, stability and increases bandwidth.

Another major advantage to a GAP antenna is its NO tune feature. Screws are simply inserted into predrilled holes with a supplied nutdriver.

The secret is out and people in the know say:

CQ—"The GAP consistently outperformed base-fed antennas...and was quieter."

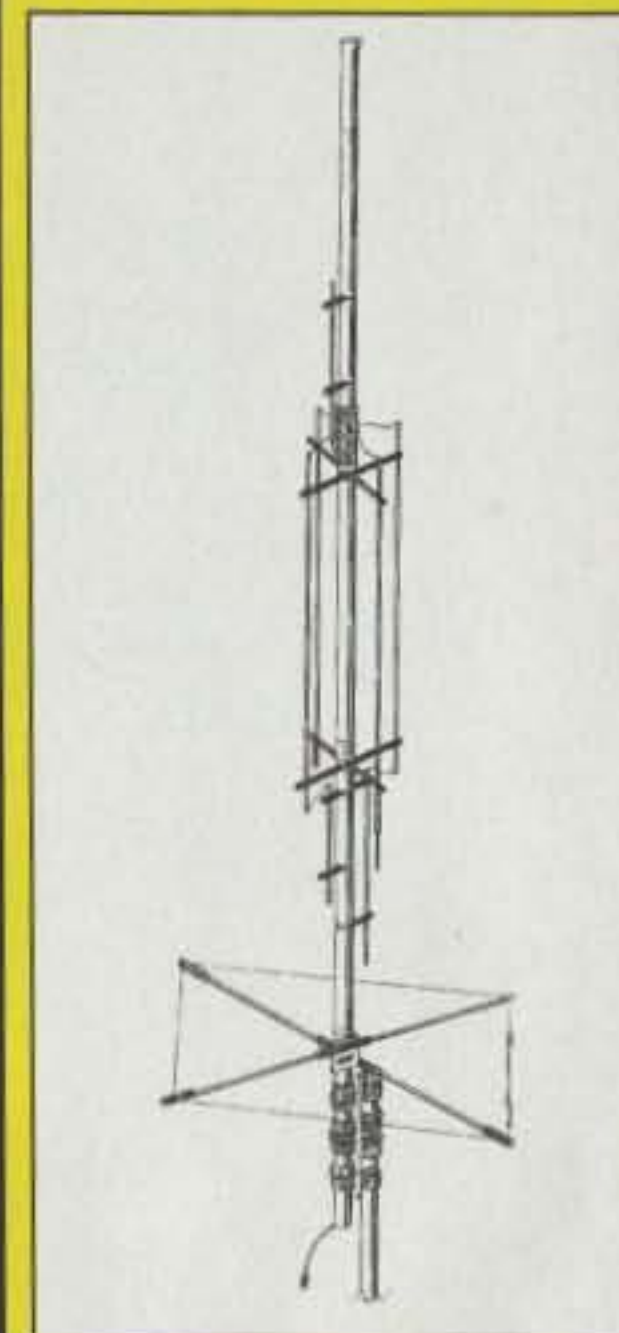
73—"This is a real DX antenna, much quieter than other verticals."

RF—"To say this antenna is effective would be a real understatement. Switching back and forth on 40m between another multiband HF vertical and the GAP, there was no comparison. Signals were always stronger on the GAP, sometimes by 5 units, not just DB's."

Worldradio—"These guys have solved the problem associated with verticals. That is, an awful lot of RF is wallowing around and dropping into the dirt instead of going outward bound. A half-wave vertical does need radials if it is end fed (at the bottom). But the same half-wave vertical does not (as much, hardly at all) if it is fed in the center."

IEEE—"Near field and power density analyses show another advantage of this antenna (asymmetric vertical dipole): it decreases the power density close to the ground, and so avoids power dissipation in the soil below it. The input impedance is very stable and almost independent of ground conductivity. This antenna can operate with high radiation efficiency in the MF AM standard broadcast band, without the classical buried ground plane, so as to yield easier installation and maintenance."

New Release: **TITAN DX**



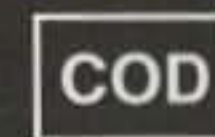
This all purpose antenna is designed to operate 10m-80m, WARC bands included. It sits on a 1-1/4" pipe and can be mounted close to the ground or up on a roof. Its bandwidth and no tune feature make it an ideal antenna for the limited space environment as well as a terrific addition to the antenna farm.

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Eagle DX			■	■	■	■	■		■			21.5'	19 lbs	1-1/4" pipe	80" Rigid	\$269
Titan DX			■	■	■	■	■	■	■	■		25'	25 lbs	1-1/4" pipe	80" Rigid	\$289
Voyager DX							■		■	■	■	45'	39 lbs	Hinged Base	3 Wires @ 57'	\$399

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Jim Cates, WA6GER, coordinator of the Northern California (NorCal) QRP Club, at his shack in Sacramento, California. If you joined NorCal, you've talked to Jim. Notice the extensive collection of QRP rigs, and they all work! (Photo by WA6GER)

bands. They are rare, so be prepared to pay premium prices for the rig and any accessories. All the TS-130S accessories (tuner, VFO, speaker, etc.) will work with the 130V, making it a very flexible radio system. Parts and support are still available from Kenwood USA. Prices for a used TS-130V start at \$450 and go up from there, depending on condition. Accessories can still be found, if you are willing to scrounge and look hard.

Yaesu also offered their FT-301S (the low-power version of their popular FT-301 HF rig) for several years. This is the same radio sans the 100 watt RF deck. Frequency coverage included 160 meters as well as the regular HF bands. The FT-301 accessories all work with the "S" version, which makes this rig a very flexible radio. In addition, the FT-301S came in both digital and analog readout models. Prices range from \$300 and up, depending on condition.

In 1992 Ten-Tec brought out their new QRP rig, the Argonaut-II model 535. This is essentially a Delta-II without the 100 watt RF deck. The Argo-II is a full-featured radio that has a general-coverage receiver, complete HF amateur band coverage, outstanding IF filtration with the continuously variable Jones filter, digital readout, and computer control

port. The downside is price. The Argo-II might tend to be an expensive 5 watt radio. Used prices for the Argo-II start at \$700.

Ten-Tec also markets their 50 watt Scout model 565 which can function as a QRP rig by turning down the RF power via an internal adjustment. This is a very small, highly portable HF rig that offers SSB and CW modes, and Jones filter in the IF strip, and provides band changing via unique band modules. You can purchase the Scout with your choice of band modules, greatly reducing the cost. The RF output is adjustable down to 5 watts via an internal control. Ten-Tec has released a QRP-only version of the Scout (model 556) that is identical to its big brother except for the lack of a 50 watt RF deck. Prices for both models of the Scout are available direct from Ten-Tec.

An outstanding example of technical ingenuity and fair price comes from Index Labs and their QRP Plus transceiver. I first viewed this QRP rig at Dayton '94 and I was impressed. These rigs are hand built by Index Labs one at a time, as orders come into the factory. The QRP Plus is fully microprocessor controlled and features SCAF filtration in the AGC loop, LCD digital display, multiple tuning rates, general-coverage receiver, and

QRO vs. QRP POWER LEVELS

S-Units:	S-9	S-8	S-7	S-6	S-5	S-4	S-3	S-2	S-1
Power (watts):	1000	250	63	16	3.9	.97	.24	.06	.02

(Note: Power levels have been rounded to the nearest watt or decimal equivalent.)

Table I- QRO versus QRP power levels.

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 CTCSS Encode /Decode standard.
 Frequency steps, 5, 10, 12.5, 15, 20, 25, 50 and 100 Khz.
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 Frequency steps, 5, 10, 12.5, 15, 20, 25, 50 and 100 Khz.
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 DTMF autopatch dialing, 10 memories, 15 digits.
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Paul Stroud, AA4XX, sits at the controls of K7YHA and uses a NorCal-40 to work the Michigan QRP Club QSO Party, January 9, 1995. Other station equipment: left to right, bottom shelf, a complete Kenwood TS-130V station and a Ten-Tec Century-22; top shelf, rotor control box, wattmeter, and a Ten-Tec Argonaut 509 with audio filter. Antennas consist of full-size dipoles for 80, 40, 30, and 20 meters and a TH7DX at 52 feet. (Photo by K7YHA)

full amateur band coverage. Power is controllable from 5 watts down to milliwatts. Size is very compact, making this little rig a natural for the QRPer on the go. Performance is excellent. Prices and more information are available from Index Labs, 9318 Randall Drive NW, Gig Harbor, WA 98332.

The preceding list of commercially available QRP rigs is by no means com-

plete. Various manufacturers have provided the QRP fraternity with a selection of low-power transceivers over the years. What I have chosen to highlight are the more popular rigs that can be readily obtained on the new and/or used market.

The frugal QRPer can opt to build some or all of his station. There are many fine kit-type radios available ranging from transceivers with simple direct-conver-



Here are some of the Wyoming Valley QRP Commandos: (left to right) Jim Martin, N3DCG; Paul Dula, KA3JZS; Fran Slavinski, KA3WTF; Paul Stroud, AA4XX; Lew Hilenski, KA3ICD; Joe Hilenski, WA3WMI; and Alice Rodgers, KA3KMH. This bunch (along with several others not in this picture) regularly get together for contests and Field Day. (Photo by K7YHA) (Also, in Part I of this article, in the March issue of CQ, we featured a photo of AA4XX [on the right] and KA3WTF [on the left] on page 56.)



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QRP CLUBS

NATIONAL/INTERNATIONAL

CW Operators QRP Club. Kevin Zietz, VK5AKZ, 41 Tobruk Ave., St. Marys SA 5042, Australia. Stateside contact: Bill Kesley, N8ET, 3521 Spring Lake Dr., Findlay, OH 45840. A \$14 fee for annual US membership.

G-QRP Club. Stateside contact: Mike Kilgore, KG5F, 2046 Ash Hill Rd., Carrollton, TX 75007. Fee: \$12 for new membership and annual renewal.

OK QRP Club. c/o OK1CZ, Petr Doudera, U 1.baterie 1, 162 00 Praha 6, Czech Republic. Fee 15 IRCs or \$10 for an annual subscription. The newsletter has English translations for most of the text.

QRP Amateur Radio Club International (QRP ARCI). c/o Mike Bryce, 2225 Mayflower NW, Massillon, OH 44647. Fee \$12 for new membership, \$10 for renewal.

LOCAL/REGIONAL

Cleveland QRP ARC. Bruce A. Wright, N8NWL, P.O. Box 14052, 410 Superior Ave., Cleveland, OH 44114-9998. No dues or membership fees.

Central Pennsylvania QRP Society. Cameron Bailey, KT3A, P.O. Box 173, Mount Wolfe, PA 17347-0173. No dues or membership fees.

Colorado QRP Club. Rich High, W0HEP, 14261 E. 4th Ave. #161, Aurora, CO 80011-8711. No dues or membership fees.

Illinois QRP Group. Vikki Welch, WV9K, 1307H N. Richmond Rd., McHenry, IL 60050-1461. No dues or membership fees.

Maryland Milliwatt Club. Address 3052 Fairland Rd., Silver Spring, MD 20904. No dues. Membership by invitation only.

MFJ90's Radio Club. Joseph Falcone, AA8HV, 3000 Town Center, Suite 2370, Southfield, MI 48075. No dues or membership fees.

Michigan QRP Club. Membership Chairperson, Michigan QRP Club, 654 Georgia, Marysville, MI 48040. Fee \$7 for new membership, \$5 annual renewal.

NorCal (Northern California) QRP Club. Jim Cates, WA6GER, 3241 Eastwood Rd., Sacramento, CA 95821. Fee \$5 for new membership and annual renewal.

NorthWest QRP Club. Bill Todd, N7MFB, 2418 55th Ave. SW, Seattle, WA 98116. Fee \$10 for new membership, no annual dues.

NorthEastern Illinois QRP Society. Don Kozlovsky, KE9GG, 28 W. 256 Purnell Rd., West Chicago, IL 60185. No dues or membership fees.

Oklahoma QRP Group. Don Kelly, KA5UOS, 703 West 8th St., Edmond, OK 73034. No dues or membership fees.

QRP Club Of New England. Jack Frake NG1G, P.O. Box 1153, Barnard, VT 05031. Fee \$10 for new membership, \$7 annual renewal.

St. Louis QRP Society. Keith Arns, KC0PP, 2832 Penbrooke Ln., St. Charles, MO 63301-0344. Fee \$12 annual dues. Membership restricted to QRPers in the Greater St. Louis Area.

WI QRP Club. P.O. Box 111, Brandon, WI 53919-0111. Dues voluntary, \$5-\$10 suggested.

Wyoming Valley QRP Commandos. Rich Arland, K7YHA, 25 Amherst Ave., Wilkes-Barre, PA 18702. No dues or membership fees. Contest oriented with emphasis on homebrew gear. Membership restricted to Greater Scranton/Wilkes-Barre Area only.

MISCELLANEOUS

Note: The following QRP clubs are furnished for information purposes only. No membership or dues information is available, and their newsletters are not in English.

U-QRP Club. P.O. Box 100, Saransk - 31, Russia 430031. The newsletter is in Russian.

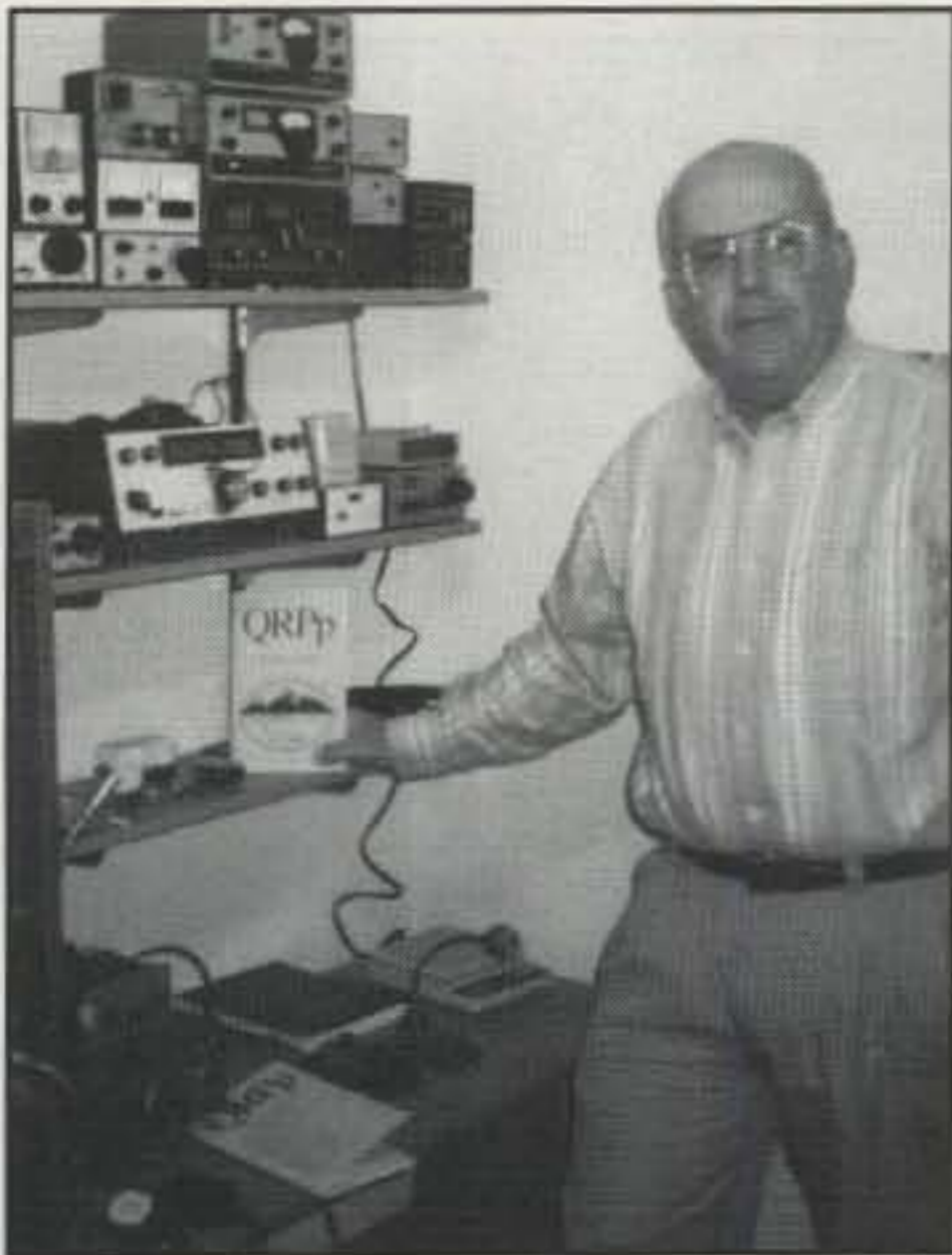
EA QRP Club. c/o Sr. Miguel Molina, Avenia Rio de Janeiro 123 2-1, 08016 Barcelona, Spain. The newsletter is in Spanish.

Table II - National and international QRP organizations.

sion (DC) receiving sections to ones featuring single-signal superhet designs and digital readout. Kits are fun to assemble, and the QRPer who chooses this route gains valuable electronics and construction experience. Many QRPers feel that homebrewing some or all of your station equipment makes you a "real radio amateur." In homebrewing, the theoretical and practical aspects of our hobby meet. The thrill of making contacts (especially DX contacts) using homebuilt equipment is nothing short of euphoric! Check the ads in various amateur radio magazines for manufacturers such as S&S Engineering, Tejas RF Technologies, A&A Engineering, Ramsey Elec-

tronics, and others who offer a selection of kit radios and useful accessories for the QRP home constructor. Building your own station equipment and accessories is one more way to find enjoyment in the radio hobby.

Antennas need not be big or fancy. What you currently use on HF will do nicely. However, if you have the money, time, real estate, and desire, by all means erect the biggest, tallest, most efficient antenna system you can. It will make life in the QRP arena much easier. Unfortunately, there is a small group of QRP purists who insist that using any type of large, rotatable gain antenna is not in the spirit of QRP. These same folks enjoy root canals



Doug Hendricks, KI6DS, at the controls of his shack in Dos Palos, California. Doug is the "firebrand" behind the NorCal QRP Club. He edits the quarterly NorCal journal, "QRPP." (Photo by KI6DS)

and IRS audits! Going back to Kruse and the New American Amateur theme, every low-power communicator should strive to erect the most efficient antenna system possible. It just makes sense.

To end our QRP Primer, we need to take a brief look at clubs dedicated to low-power operating. As mentioned earlier, the QRP Amateur Radio Club International is the oldest and largest club of its kind in the world. Originally started in the

early 1960s to promote the use of lower RF power on the HF bands, the QRP ARCI is the national QRP organization for the United States. Its quarterly newsletter, "The QRP Quarterly" ("QQ"), is filled to overflowing with technical and operational information of value to the low-power communicator. The QRP ARCI offers a great awards program and also sponsors QRP contests throughout the year. The annual membership fee is \$12 for new members and \$10 for renewal. Contact the Membership Chairman, Mike Bryce, WB8VGE, 2225 Mayflower NW, Massilon, OH 44647 for further details.

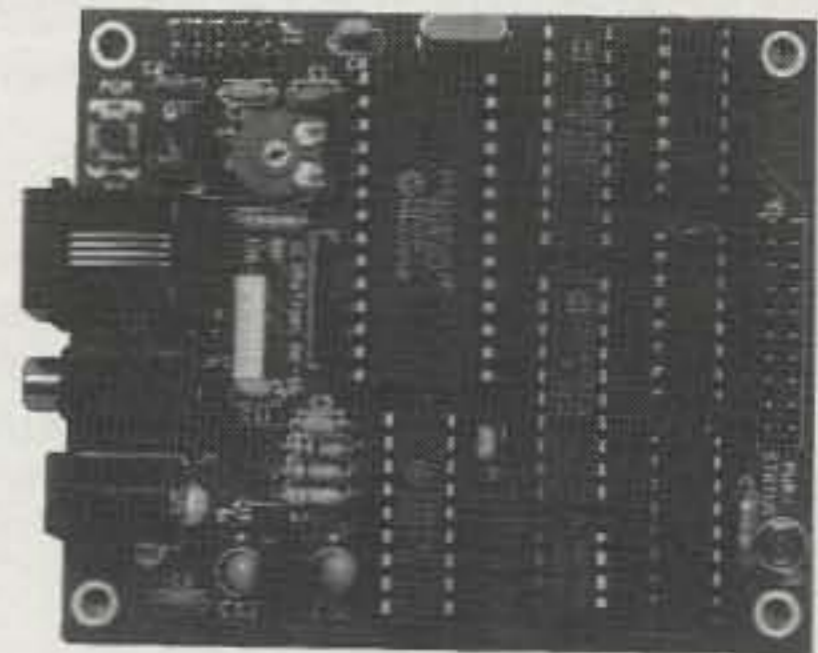
Founded in 1974, the G-QRP-Club, under the direction of the Rev. George Dobbs, G3RJV, is a dynamic organization that has an international following. Their newsletter "SPRAT" ("Small Powered Radio Amateur Transmissions"), which is published quarterly, presents a wealth of technical and operational information. Be forewarned: The G-QRP-Club is primarily for those who enjoy the technical end of the hobby. Each issue of "SPRAT" is full of construction projects to whet your technical appetite. Their outstanding awards program offers some really unique operating and technical excellence awards for their members. The G-QRP-C encourages stateside radio amateurs to join and has set up a stateside membership manager: Mike Kilgore, KQ5F, 2046 Ash Hill Road, Carrollton, TX 75007. Write to Mike for the latest membership information. Be sure to include a large SASE.

A recent phenomenon has been the sudden upsurge of regional/local



"Radio Free Larksville," aka Joe Hilenski, WA3WMI, sits in front of his AM rig (a rack of four R-390 receivers and a Hallicrafters HT-37 transmitter, modified to fit in a 19 inch rack panel). Joe is holding his homebrew 40 meter QRP rig. Joe and his son, Lou, KA3ICD, share an immaculate shack that features many rigs from the 1950s and '60s, not to mention several homebrew QRP creations. (Photo by K7YHA)

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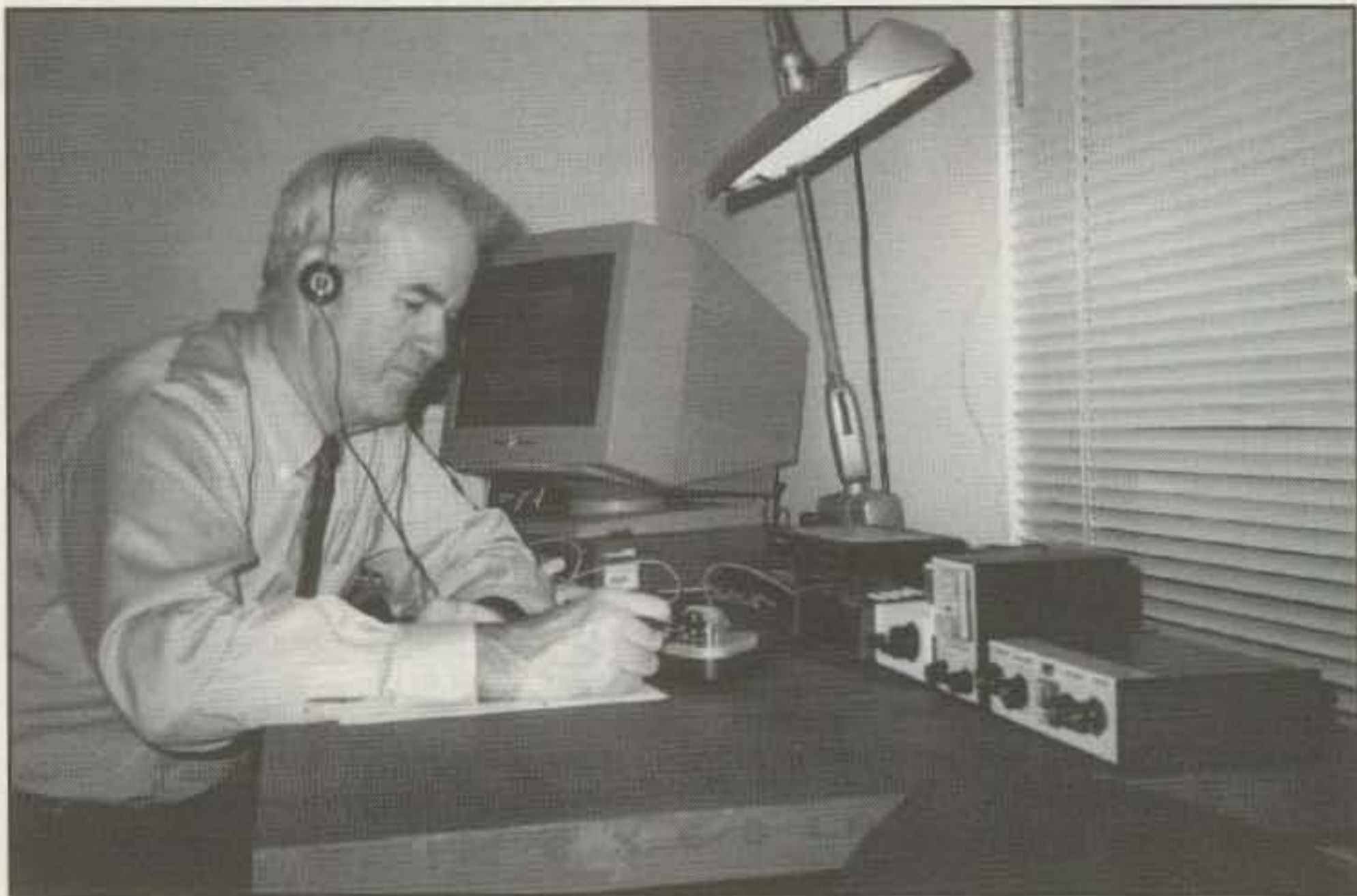
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QRP clubs. The oldest of these is the Michigan QRP Club. Then there is the QRP Club of New England, along with the Northern California (NorCal) QRP Club, to name just three. The NorCal club formed slightly over one year ago and now has over 800 members! Talk about explosive growth! All these clubs cater to local/regional interest in low power communications. Most offer regular meetings where members gather for a meal (breakfast or dinner) and bring their latest projects for a technical "show and tell."

The New England and NorCal clubs also offer club-designed transceiver kits that are outstanding performers at exceptionally low cost. In particular, the NorCal's NC-40 forty meter CW transceiver is an absolute work of electronic art. This kit has taken the QRP homebrew crowd by storm and for good reason. Designed by Wayne Burdick, N6KR, the NorCal-40 is a no-nonsense 2-3 watt transceiver featuring a very sensitive superhet receiver, RIT, crystal IF filter, and very low parts count—all in a box about 4.5 inches square and slightly over 1.5 inches tall! Performance is unbelievable, considering the simplicity of design.

NorCal's current club kit project is their Sierra multi-band CW transceiver. The Sierra is a quantum leap up from the NC-40 in both design and performance. This rig is only slightly larger than the NC-40, and band changing is performed by swapping out band modules. Rumor has it that Wayne added a small circuit board to one of the prototypes, and now that Sierra has become an SSB transceiver!



"Deep in the Heart of Texas" is where you'll find Chuck Adams, K5FO. Chuck is the awards chairman for the QRP ARCI. He is also an outstanding CW operator, and you can find him on the CW portion of most of the HF bands. A prolific homebrewer, Chuck takes his QRP seriously. His rig in this photo is a NorCal 40-A. (Photo by K5FO)

If you are not excited about the local/regional clubs, you should be. This is the direction in which low-power communications is heading as we enter the 21st century. The major emphasis is centered on providing a forum and idea exchange in a given locale. Most of these groups offer open membership to anyone, regardless of their locale. Judging from the tremendous growth of both the NorCal

and QRP NE clubs (along with others in various sections of the country), QRP will be well represented on all levels.

QRP is not for everyone. If you are going to pursue this facet of the radio hobby, you must be open-minded and be ready to modify your operating habits in order to be successful in the low-power arena. You might also take some heat from the local high-power operators who just don't get it.

Be of good cheer, though, as the QRP cause is just. True, you will suffer a power disparity of somewhere between 13 and 20 dB, but you can and will prevail. QRP works well in emergency situations where through the use of solar power, you can stay on the air indefinitely in an affected area, providing needed communication links for rescue and relief operations. Homebrewing your own equipment opens another fascinating area of low-power amateur radio. If you like contesting, most major contests offer a QRP class in which you will only compete against other QRPers. The ARRL's annual Field Day exercise is *the* contest for the QRPer. Each year more and more clubs are taking up the QRP challenge. In short, QRP can become a way of life which is not only challenging, but is rewarding and fun, too!

In closing this brief look at low-power communications, I'd like to leave all of you with a quote from Howard Pyle, W7OE, noted author, QRP operator, and founder of the Pacific Amateur Radio Guild: "Power is no substitute for skill." To sum up the low-power phenomenon, it is wits, not watts, that makes the difference in amateur radio.

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CQ REVIEWS:

The Farr Technologies 450 MHz Corner Reflector

BY LEW McCOY*, W1ICP

One of the finest antennas ever made is the corner-reflector type beam. This antenna is normally a very-high-gain antenna with narrow beamwidth and exceptional front-to-back ratio. Not too many companies manufacture corner reflectors for the amateur market. At the Dayton Hamvention last year I stopped at the Farr Technologies booth, where I saw their corner reflectors on display. Aaron Farr, the owner, and I struck up a conversation about antennas, and I quickly convinced him I should do a review of one of his beams. The antenna I chose was a 450 MHz corner reflector.

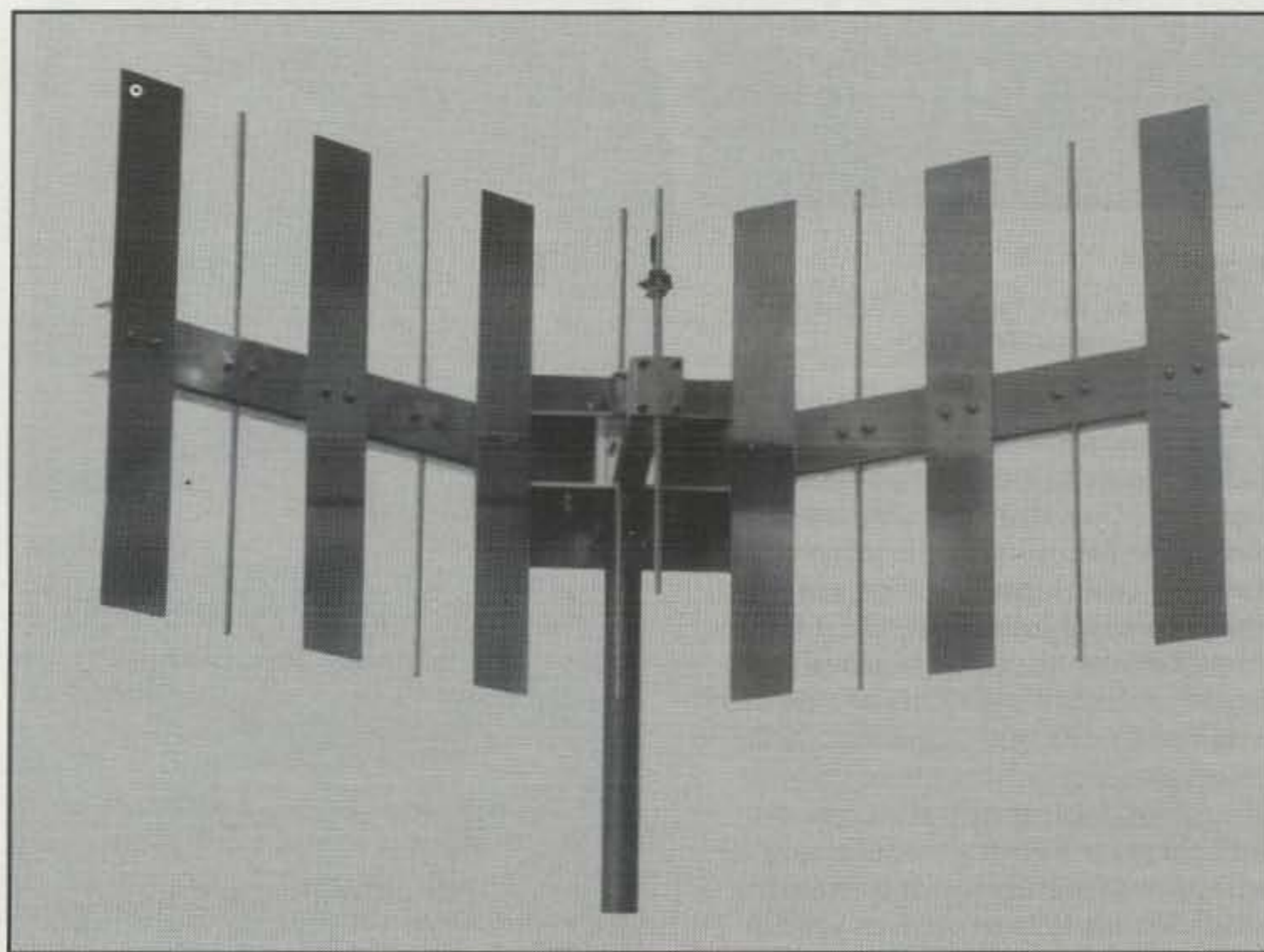
We have a couple of problems with paths over long distances, and ordinary Yagis (even long-boom models) have not solved the problem. In addition, a good friend of mine had a serious problem with intermodulation on a mountaintop installation. A high-power UHF TV station was messing up a 40 mile path. We tried the Farr Technologies Corner Reflector—no more problem. Still another problem was a path of slightly over 100 miles for a packet link. Several antennas had been tried—stacked verticals, long-boom Yagis, and so on. The corner reflector ate their lunch, so to speak.

The antenna we tested for 450 MHz measures 16 inches in length on each of the reflector legs. The width of the antenna reflector is 21 inches. An N-type connector is used for the dipole feed.

Normally none of us who do product reviews for CQ have any methods for measuring antenna gain. In this case, the manufacturer states the antenna has +12 dB gain over a dipole. I used the formulas for corner-reflector gain from the *ITT Handbook* and found that with the dimensions given for the Farr antenna, the results were slightly over 12 dBd. I am going to quote from a letter written by Aaron Farr, W7HJK, one of the owners of Farr Technologies.

"Our gain measurements are made by using several tests over different paths and averaging the results. The reference is a dipole also manufactured by us. It is constructed in a manner that would make it as efficient as we can. We do both near field (less than 10 wavelengths) and far field (greater than 20 wavelengths). These tests are made at different power levels and at several heights as well."

Keep in mind that this antenna can be used with either vertical or horizontal radiation simply by orienting the antenna properly. The SWR bandwidth is 1.5 to 1 or better. Also, we men-



This is the Farr Technologies 450 MHz Corner Reflector. The angle is 90 degrees on the reflectors. Note the dipole at the center front.

tioned forward gain; the front to back on this antenna is on the order of 50 dB!

As to construction and materials, the photo practically speaks for itself. It is made entirely from sturdy aluminum. The hardware is all stainless steel. Total weight of the antenna is 5 pounds. Mounting is simple, as U-bolts are used to secure the antenna to a mast in either a vertical or horizontal position.

If you are in a location where it is quite a distance to the repeater, or a point-to-point reliable path is desired, then this is an antenna well worth considering.

I mentioned the intermodulation problem earlier. This project hasn't been described in amateur publications before. Bill Neely is an amateur who lives here in Silver City, New Mexico. He has a 19 inch telescope in an area we call The Mimbres, about 40 airline miles away. Bill has his observatory at the Mimbres, but he actually spends his time during the week divided between the two locations. A great deal of programming, mechanical work, etc.,

went into building the observatory, and more important, controlling it from Silver City via a 450 MHz link. Using CCD techniques on the telescope, he can control the viewing, aiming, recording, and so on from here in Silver City. A serious problem developed when one of the local TV translators went to UHF and high power—at the same location as Bill's Silver City link. Several antenna orientation tricks tried by the UHF station still caused severe interference. When the Farr corner reflector was installed, just about all of the problems vanished. Obviously, the sharpness of the beam pattern, the semi-shielding of the dipole, the tremendous front-to-back, all got into the act. As you can see, I am very convinced about the antenna's performance.

The price of the 450 MHz Corner Reflector is \$114.48. I also should add that the company makes a dual bander for 144/440 MHz, a 2 meter version, and a 220 model. The antenna is manufactured by Farr Technologies, 64 East 300 South, Logan, UT 84321 (1-801-752-7063).

*Technical Editor, CQ, 1500 West Idaho St., Silver City, NM 88061

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YAESU FT-51R Dual-Band Handheld

Q Why does "windows" best describe this radio?

A As the radio is used, each operating function of the FT-51R menu is shown in the lower part of the radio display in a User Help menu. Operating information for a particular function automatically scrolls across the display in a continuous sentence string much like it does on a computer, thus the term "windows" seemed analogous to the familiar computer term. The User Help message displays the setting, name, a brief description and exit instructions. It's a big help if you get lost. Just hold in the VFO key while turning the radio on and the FT-51R will revert to the automatic User Help menu, then you can start over. The User Help menu is automatic, but you can turn it off. No competitor radio has these helpful functions!

Q What's the benefit of the Alpha-Numeric labeling capability in the FT-51R memory system?

A The FT-51R allows you to label your memories with identifying names, like "WX-1" or "SIMPLEX." It's a creative way to personalize and identify a memory channel, and makes the FT-51R uniquely yours. No other HT has 8-character alpha-numeric labeling.



Q Why is there no Volume Control knob?

A Actually there are two ways to control Volume and Squelch on the FT-51R. Since many customers prefer the simplicity of Up and Down Push Button volume/squelch control to avoid confusion with the top panel, you'll find them just above the upper left hand corner of the display. They're illuminated at night, too, along with the keypad. However, you can program volume and squelch to the main tuning dial on top of the transceiver. Just another way to demonstrate the versatile operation of the FT-51R.

Q How does the new Spectrum Scope help in daily operation?

A Spectrum Scope visually identifies activity on the band near your current operating frequency, and displays relative signal strength on three channels below, and on four channels above. The total frequency spread depends on what channel steps – 5 kHz, 10 kHz, etc. – have been selected. In the Memory mode, Spectrum Scope shows activity on the current memory channel plus the three memories below and four memories above, in numerical order. And, it doesn't matter if you're working V/V, U/U or V&U. The flexible Spectrum Scope can be used manually or automatically. Find new frequencies faster with Yaesu's exclusive Spectrum Scope.

Q Is the FT-51R really the smartest dual-band radio with the largest keypad?

A Yes! The keypad on the FT-51R was designed for fast, accurate operation, with special care given to the size of the keys and keypad spacing. Operation of the FT-51R is easy and unerring because the keys were shaped precisely for optimum fingerpad contact, and spaced to prevent accidental depression of adjacent keys. The FT-51R is fourth generation in both dual band HT technology, and electronic miniaturization. Since Yaesu pioneered these engineering areas, they were able to even further reduce the radio size, permitting expansion of the critical keypad area.

Q Do I have to modify the FT-51R to get expanded receive?

A No! Expanded receive is accessible right out of the box from the front panel of the FT-51R. No need to open the radio and tinker with "mods." 110-180 MHz, 420-470 MHz; "AM" Aircraft, Public Service, Marine, Weather; the FT-51R operates just like a scanner. Further, since the FT-51R has an "Auto Mute" feature, which gives the "Main" channel priority, you can monitor the weather channel on VHF without missing a call on UHF.

These are just some of the most commonly asked questions Yaesu has received since the introduction of the unique FT-51R. For more information, a complete "Question & Answer" Guide is yours for the asking. Just write, FT-51R "Q&A," Yaesu U.S.A., 17210 Edwards Rd., Cerritos, CA 90703, or call (310) 404-2700 Ext. 228.

DUCT Q&A

Q Does the FT-51R display current battery voltage?

A Actual battery voltage can be monitored at any time in the bottom half of the FT-51R display "window".



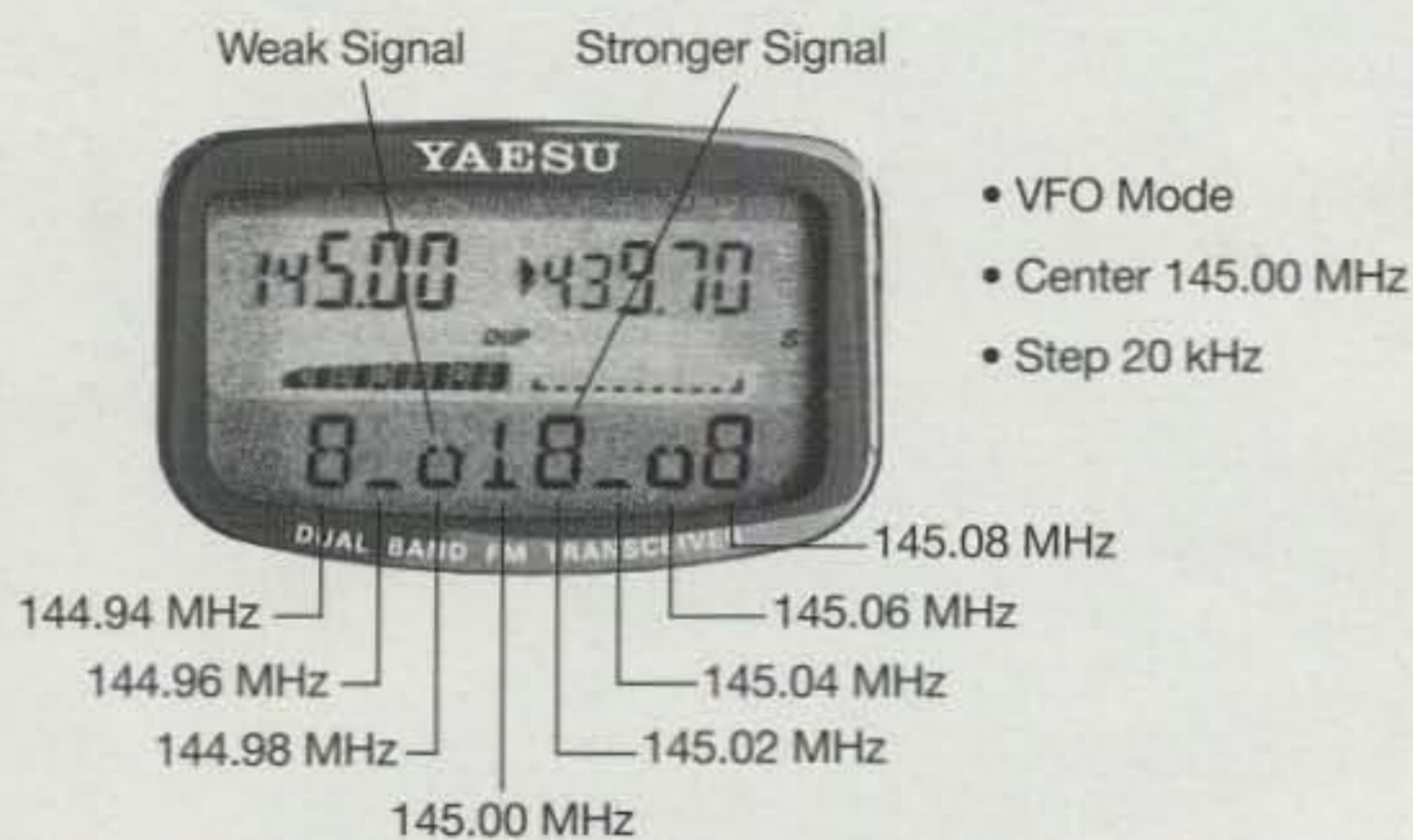
alerting you to any necessary re-charge requirement. This is a great feature, and not one found on any other radio. For example, when using the FNB-31 battery the display will show "4.8" as your current battery voltage.

Q What are my choices to power-up the FT-51R during mobile operation?

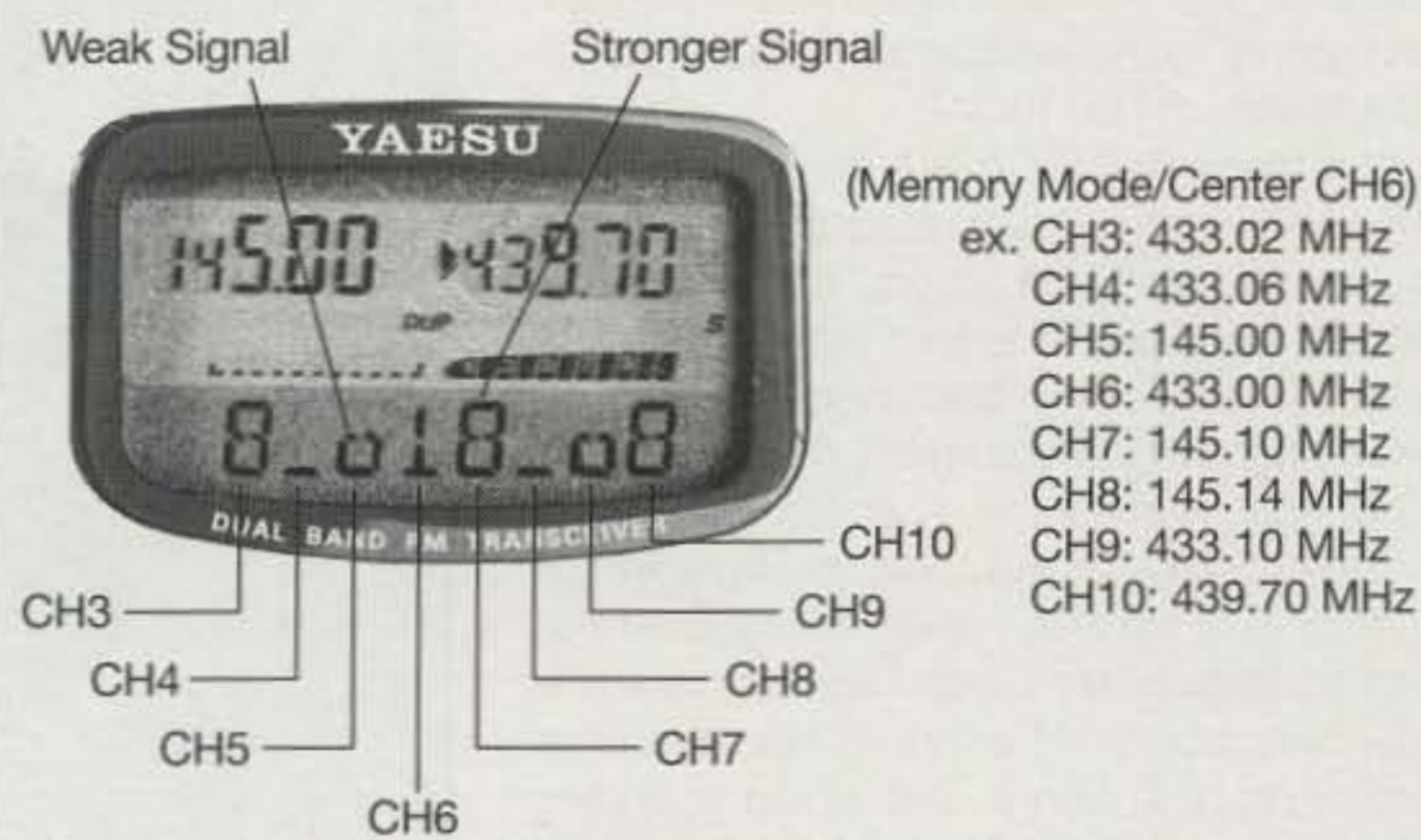
A Yaesu gives you three adapter options including the new E-DC-12 Mobile DC Adapter which slides on the bottom of the HT. The E-DC-12 provides direct DC power, and trickle charges the battery simultaneously.



Spectrum Scope Display Indication 1



Spectrum Scope Display Indication 2



Q Is the FT-51R the first PC programmable dual-band HT?

A Yes, the FT-51R is programmable with the optional Advanced Data Management System (ADMS-1) for Windows™ software. Specifically, you can program (or clone) all information including frequencies, alpha-numeric names, etc. in about 3 seconds. The FT-51R is the only HT which permits you to access your pre-programmed files of repeaters in any city where you may travel.



Options

Rechargeable Battery Packs

- FNB-31 Ni-Cd 4.8V, 600 mAh (1.5 Watt)
- FNB-33 Ni-Cd 4.8V, 1200 mAh (1.5 Watt)
- FNB-38 Ni-Cd 9.6V, 600 mAh (5 Watt)

Dry Cell Battery Case

- FBA-14 4 x AA Size (1.5 Watt)

Mobile Rapid Charger

- CD-2 (for charging use only)

DC Power Adapters

- E-DC-12 Mobile DC Power Adapter (w/ Trickle Charge)

- PA-10A Drop-in Mobile DC Power Adapter (w/Trickle Charge)

Desktop Rapid Chargers

- NC-50 Dual Sequential (requires CA-10 Charger Adapter)
- CA-10 Charger Adapter (Includes set of 2)

VOX Headset

- VC-22

Soft Vinyl Cases

- CSC-66 for FBA-14 or FNB-33/38

- CSC-67 for FNB-31

Microphones

- MH-12A2B Speaker/Mic
- MH-19A2B Mini Earpiece Mic
- MH-29A2B Display Speaker/Mic
- MH-32A2B Mini Speaker/Mic

- CT-51 Cloning Cable

PC Software

- ADMS-1 Windows™ Programmable Software



CQ REVIEWS:

The Standard C5718DA Twin-Band Transceiver

BY JOSEPH SCHROEDER*, W9JUV

Mobile rigs keep getting smaller while hordes of new features are being added. Cars are getting smaller while their dashes become less and less amateur radio friendly. Car break-ins have become such a problem in some areas that even if you could find a convenient place to mount a mobile rig, there's a serious question as to whether it still would be there the next time you leave your car parked in a downtown area!

With all these problems, shouldn't we consider giving up mobile operation? Not if you've got a Standard C5718DA!

Standard's C5718DA is a dual-band 2 meter/440 MHz transceiver rated at 50 watts out on 2 and 40 watts on 70 cm. It has so many features that after several months of use I still haven't found—much less used—all of them. Everything used to operate it, display as well as controls, is in the handy speaker mic!

As you can see in the photo, the rig itself has no display or controls, while the speaker mic boasts a large, easy-to-read liquid-crystal display that shows not only the operating frequency on both bands, but all the operating parameters as well. The diagram of fig. 1 shows the full array of displayed information. The 16 pushbuttons on the front, backlit for night operation, control most of the operating and programming functions; the five more on the top of the mic take care of the rest.

With everything you need to operate located on the mic itself, the compact ($1\frac{5}{8}''\text{H} \times 5\frac{3}{8}''\text{D} \times 5\frac{1}{2}''\text{W}$) case of the C5718DA can mount just about anywhere, since you'll never need to get at it again once it's installed. With the radio itself tucked away under the seat, behind the dash, in the glove compartment, or even in the trunk, the security problem as well as the operational problem are solved, since there's no longer that expensive-looking box with all the fancy controls visible to attract the unwanted attention of larcenous passersby.

Furthermore, there's an important safety bonus with the C5718DA. No longer will you have to take your eyes off the road to check frequency or band, or grope around under the dash looking for rig controls while trying to maintain control of your car. Just hold up the mic and you'll have everything you need at eye



Everything needed to operate the very compact C5718DA, display as well as controls, is on the speaker mic.

level, amateur radio wise, while keeping one eye on the road.

The C5718DA programs 100–200 and 250–500 MHz receive on the nominal 2 meter band (more on that "nominal" later), and 100–200, 250–500, plus 800–1000 MHz (with cellular frequencies locked out, of course) on the high band. It works well on those frequencies, too; sensitivity where I had the instrumentation to check it was in the bottom tenth of a microvolt area across most of the spectrum, and of course in the amateur bands, it even included 902–928 MHz! Worst-case FM sensitivity was still better than a microvolt. AM detection is programmed for 100–142 MHz and 250–327.5 MHz, covering both the commercial and military aircraft bands, a valuable bonus for those of us who fly airplanes for fun or profit.

In addition, there's a transmit flexibility that I didn't find mentioned in either the ads or the manual. Either "band" can be programmed for full operation on both 2 meters and 70 cm! This means that if you're like me (more active on 2

than 440), you'll fill the supplied 20 memories of the "low" band with all 2 meter frequencies, and then put additional 2 meter channels, NOAA weather, local airport tower and ATIS, police and fire (VHF or UHF), plus all the 440 MHz machines I operate on the nominal "high" band.

In other words, as the C5718DA comes out of the box you've got 40 channels that you can program with any mix of VHF and UHF frequencies that suit your particular needs. If 40 channels aren't enough, there's an optional memory chip available that increases memory capacity to 100 channels per band—200 memories in all.

The C5718DA is simple to use working the Space Shuttle or MIR! Just set up the Shuttle downlink frequency of 145.550 MHz on one band, and then put the uplink frequencies (144.910, 144.930, etc.) in the memory of the other band. Using the mic's up and down buttons, you can then toggle your calls between the various uplink frequencies while your re-

*2120 Fir, Glenview, IL 60025

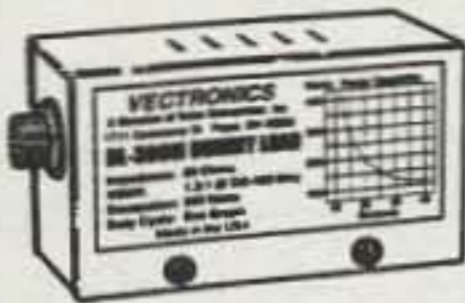
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WORLD CLASS QUALITY!

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VC300M 300W Mobile Tuner

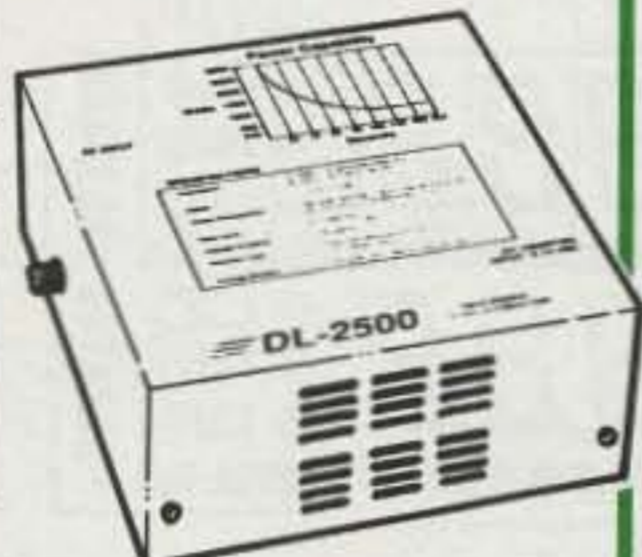


DL300M
300 Watt,
150 MHz, Dry
Dummy Load

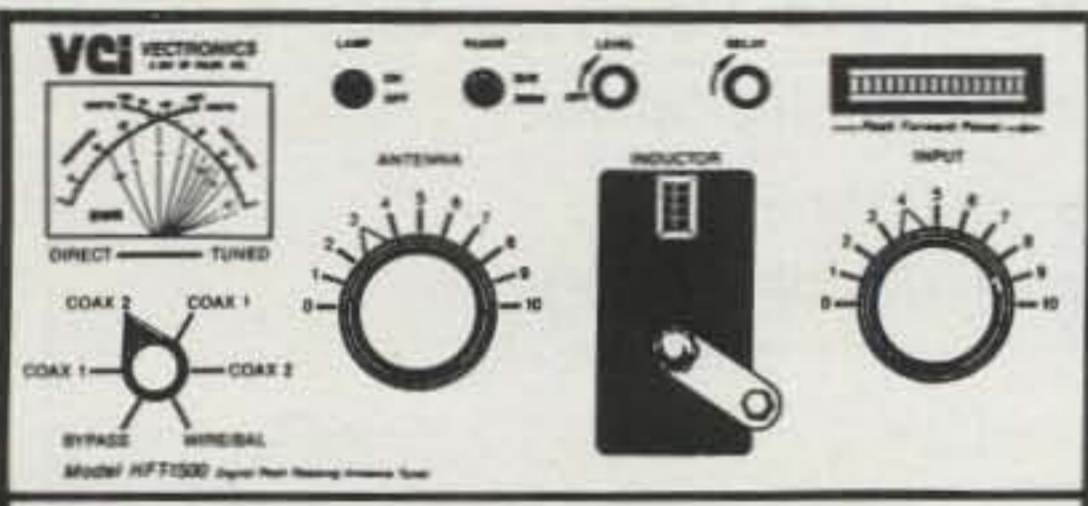


VC300DLP 300W Antenna Tuner

DL2500
2500 Watt, 150 MHz,
Dry Dummy Load



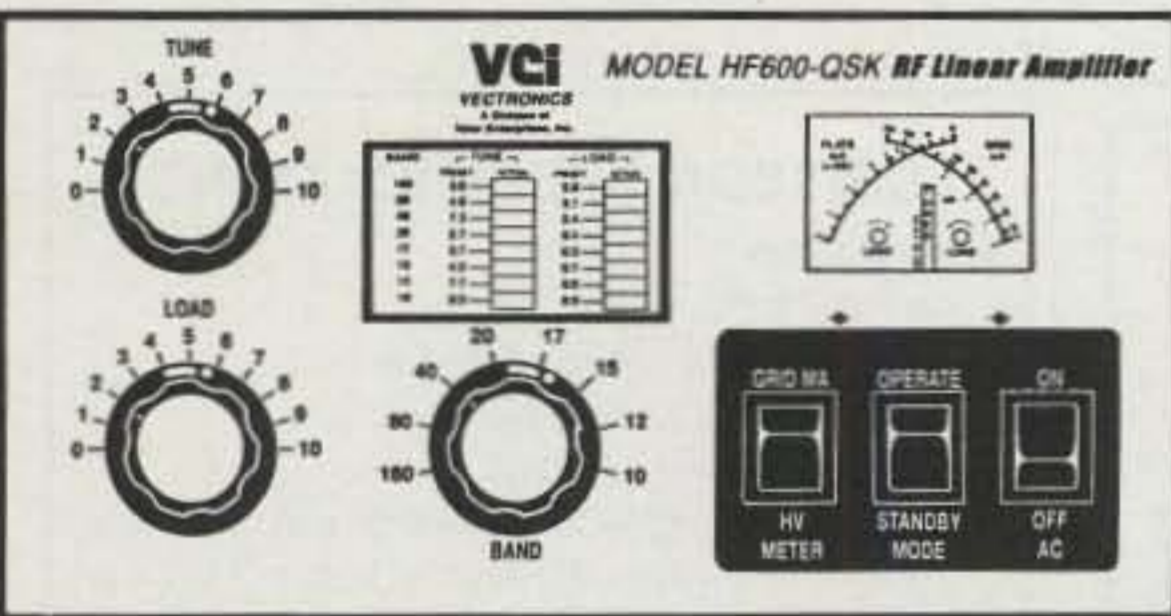
VC300D 300W Digital Antenna Tuner



HFT1500 1500W Antenna Tuner



DL650M
1500 Watt,
650 MHz, Dry
Dummy Load



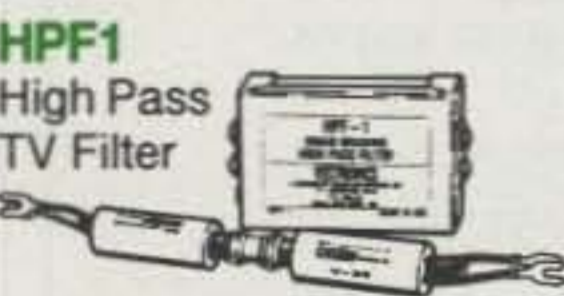
HF600QSK
1kW HF RF
Linear Amplifier with built-in QSK. (Also available: **VECTOR 500** 1000W PEP Linear Ampl.)



CK200 Deluxe CW Keyer



LP30
1500W Low Pass TVI Filter
(Also available: **LP2500**;
2500W Low Pass TVI Filter)



HPF1
High Pass
TV Filter



PM30UV
30W/300W Wattmeter



AT100
Mobile Active
Antenna/Tuner



PM30
300W/3kW Wattmeter



We also have 13.8Vdc Power Supplies



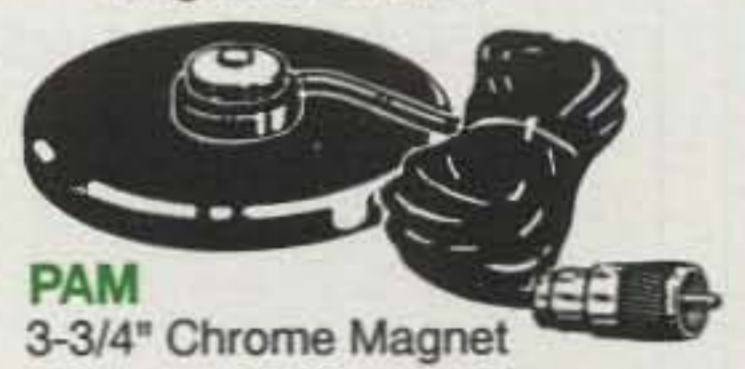
3401
Max Magnet
Mount Kit.
(Black: 3401B)



401
5" Chrome Magnet
Mount Kit. (Black: 401B)



401BSO
SO-239 Black 5"
Magnet Mount Kit.



PAM
3-3/4" Chrome Magnet
Mount Kit. (Black: PAMB)

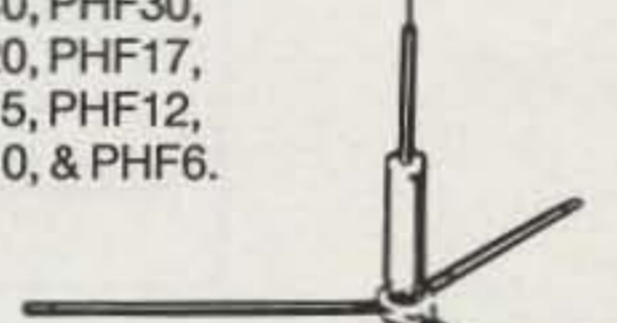
PAM2
3-1/4" Chrome Magnet
Mount Kit. (Black: PAM2B)

PAM4
5" Chrome Magnet Mount
Kit. (Black: PAM4B)

PHF Series Monoband Antennas...

Consist of a 4' fiberglass lower section and an adjustable stainless steel whip on top.

Available models: PHF160, PHF75, PHF40, PHF30, PHF20, PHF17, PHF15, PHF12, PHF10, & PHF6.



AB5
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HF Mobile Antenna System w/
resonators for
10, 15, 20, 40,
and 75 meters.

450BNC
1/4 Wave 6-1/2"
"Rubber Duck"
430-470 MHz.
(Also available:
77BNC: 12"
Dual Band
"Rubber Duck"
for 2 meter and
UHF.

144BNC: 12"
"Rubber Duck"
144-148 MHz.
220BNC: 10"
"Rubber Duck"
220-225 MHz.

MM450B
MICRO-MAG®
Mobile Antenna.
440-450 MHz.

MM3B
The MICRO-MAG®
Portable Scanner/Tri-
Band Antenna transmits at 144-148 MHz (2m), 440-450 MHz (UHF), and 824-896 MHz (Cellular), and receives in the range of 100-1200 MHz.

GM270
Dual Band
Glass Mount
Antenna.
144-148 and
440-450 MHz.

(Also available:
GM144
Glass Mount
Antenna for
144-148 MHz.)

PM144-440
Dual Band
Mag Mount
Antenna Kit
with RG58
Coax and
PL-259.

MM270B
MICRO-MAG®
Dual Band
Antenna.
144-148 and
440-450 MHz.

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Display Section of the CMP843A Full Remote Controller/Microphone

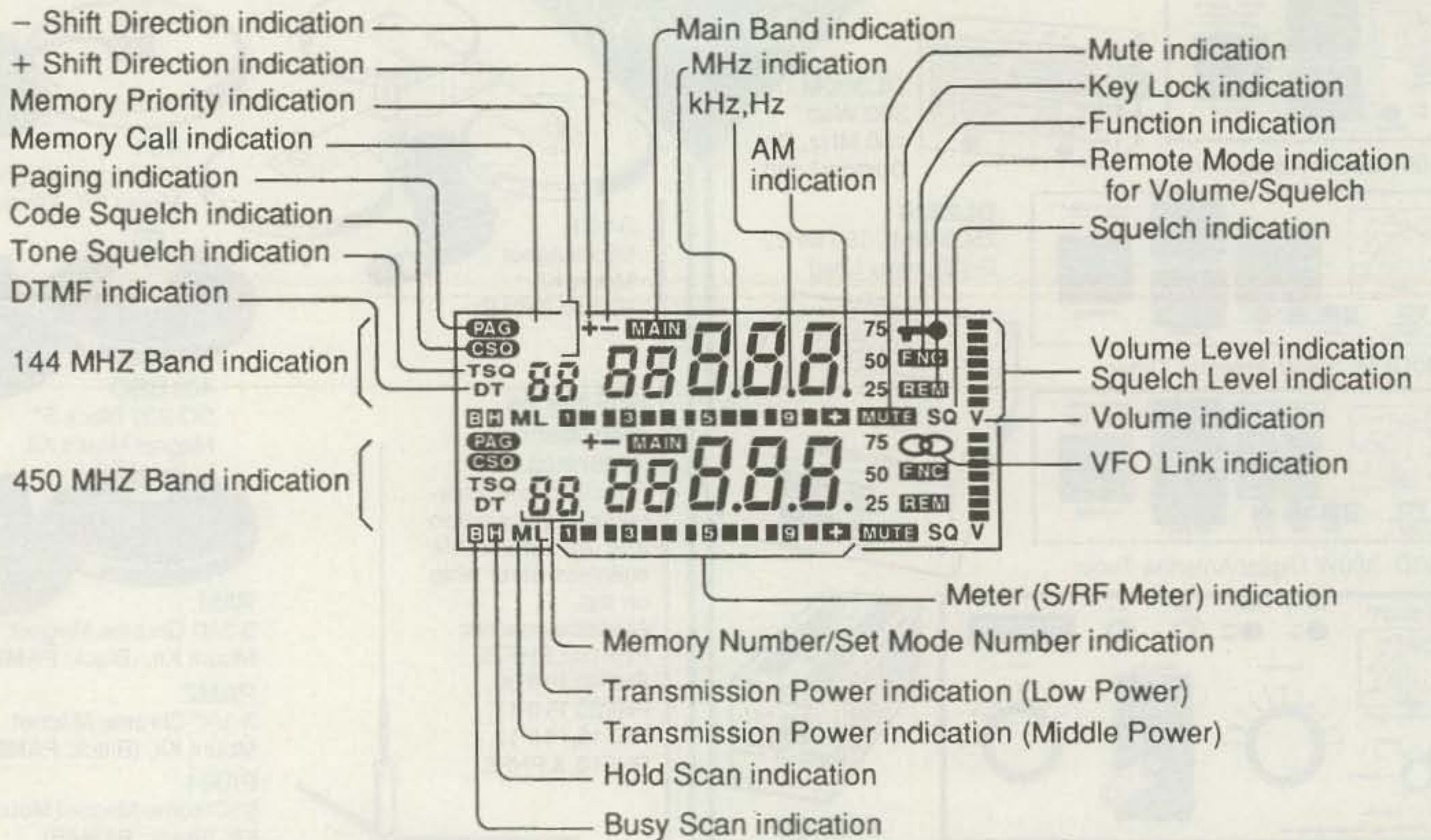


Fig. 1- Diagram shows the amount of information incorporated in the speaker mic display.

SGC
Complete Line
Available... Call!
Best Service
And Price

1-800-244-4567

"Better than a hamfest!"

Latching Vacuum Relay 8kv 30 amps

Jennings RF4B SPST

26v (16-30v) coil
light weight, only 3/4" x 2"
long. Mounts anywhere, on the
antenna, mast, boom, etc. Just
pulse the coil & it switches. You don't
have to keep voltage on it. Switch in traps, coils or
caps. Used/removed.



RF5B \$69

Deluxe Turns Counter

Finally, an affordable high quality turns counter suitable for many applications. 1/4" shaft coupling at rear. Counts to 9999.9 for precise control of variable inductors. Unit measures 2-1/4" x 3-1/2". Requires 1" x 3" hole in equipment for mechanics.



P/N SHW-TCY \$79.95 ea
(3-9) \$75 ea • (10+) \$69 ea



FERRITE Split Beads

Suppresses Radio Interference, EMI Surges &
Protects Against Lightning Surges On
Communication coax, data & telephone cables.

Save Big Bucks. Prices cut up to 50%

#SS28B2031+ .23" I.D. \$2.50/set (6-24) \$2.25 (25-99) \$2 (100-249) \$1.70
#264-3164351+ .375" I.D. \$2.95/set (6-24) \$2.50 (25-99) \$2.25 (100-249) \$2
#264-3164151+ .5" I.D. \$4.50/set (6-24) \$4.25 (25-99) \$4 (100-249) \$3.75



Air Variable Headquarters

All with 1/4" shaft, grounded
rotor, insulated stator.

#CAV-14-15	8-100 pF @ 4kv (.125")	\$45	(3-12) \$42
#CAV-12-53	36-249 pF @ 4kv (.12")	\$65	(3-12) \$62
#CAV-75-37	23-259 pF @ 2.5kv (.075")	\$52	(3-12) \$49
#CAV-75-74	Dual 23-259 pF @ 2.5kv (.075")	\$95	(3-12) \$90
#CAV-154-3-1	25-500 pF @ 2kv (.045")	\$55	(3-12) \$52
#CAV-154-30-13	45-1000 pF @ 1kv (.025")	\$74	(3-12) \$70

High Voltage

20uF @ 450vdc	\$ 7	(6-24) \$6.50
30uF @ 450vdc	\$ 7	(6-24) \$6.50
100uF @ 450vdc	\$ 8	(6-24) \$7.50
150uF @ 450vdc	\$14	(6-24) \$13
200uF @ 450vdc	\$14	(6-24) \$13
1500uF @ 450vdc	\$12	(6-24) \$19

Electrolytic Capacitors

Time to replace the caps in your amp or
Collins / Drake transceiver supply.

FERRITE Toroid

(ICH) FT-240-43
2.4" O.D., 1.4" I.D. Impedance @ 25MHz =
58Ω, 100MHz = 108Ω. 43 mix. Use
for communications projects DC-200
MHz or trap unwanted TVI signals by
wrapping speaker or coax cable
through core many times. \$12 ea

National R-154 1.1 mH 1 amp

Yowsa! NCL-2000 Plate
Choke now
available for
your amplifier.
Deluxe 5-Pi
design. ICH-R154
\$25 3/\$69

C5718DA SPECIFICATIONS

Transmitter

Transmit frequency range:
VHF: 144-147.995 MHz (note 1)
UHF: 420-449.995 MHz
Transmit Power Output:
VHF: 50 W (high), 10 W (medium), 3 W (low)
UHF: 40 W (high), 10 W (medium), 3 W (low)
Spurious radiation (VHF and UHF): -60 dB

Receiver

Receiver frequency coverage:
VHF: 100-199.995 and 250-499.995 MHz
(note 2)
UHF: 100-199.995, 250-499.95, and 800-
999.995 MHz (note 3)
Receiver sensitivity (VHF and UHF):
12 dB SINAD: 0.2 μV
Open squelch: 0.14 μV

Audio output: 3 W (10% distortion)

Power Requirements (at 13.8 V):

Receive: 0.9 A
Transmit (high power): 11.0 A
(medium power): 6.0 A
(low power): 4.5 A

Note 1: Transmit frequency range may be
extended for CAP or MARS.

Note 2: On the VHF (upper) band only, the
phase lock loop sometimes became unsta-
ble above 182 MHz.

Note 3: Cellular frequencies are locked out
on the 800 MHz band.

Table 1- The specifications of the Standard
C5718DA twin-band transceiver.

to order call 1-800-244-4567
1502 Jones St. • Omaha, NE 68102
Technical/Customer Service call or fax
402-346-4750 • fax: 402-346-2939

CATALOG 7BII included with your order. Please add adequate shipping. In
U.S.-48 figure 30¢ per lb. to 70 lbs. (MINIMUM CHARGE: 1st - 3lbs add
\$.5). Others please call, fax or write for exact shipping total. We accept Visa,
MC, Amexco, checks, Cash On Delivery (UPS only, add \$5) or wire transfer.

Surplus Sales of Nebraska

Display Section of the Control Head (optional)

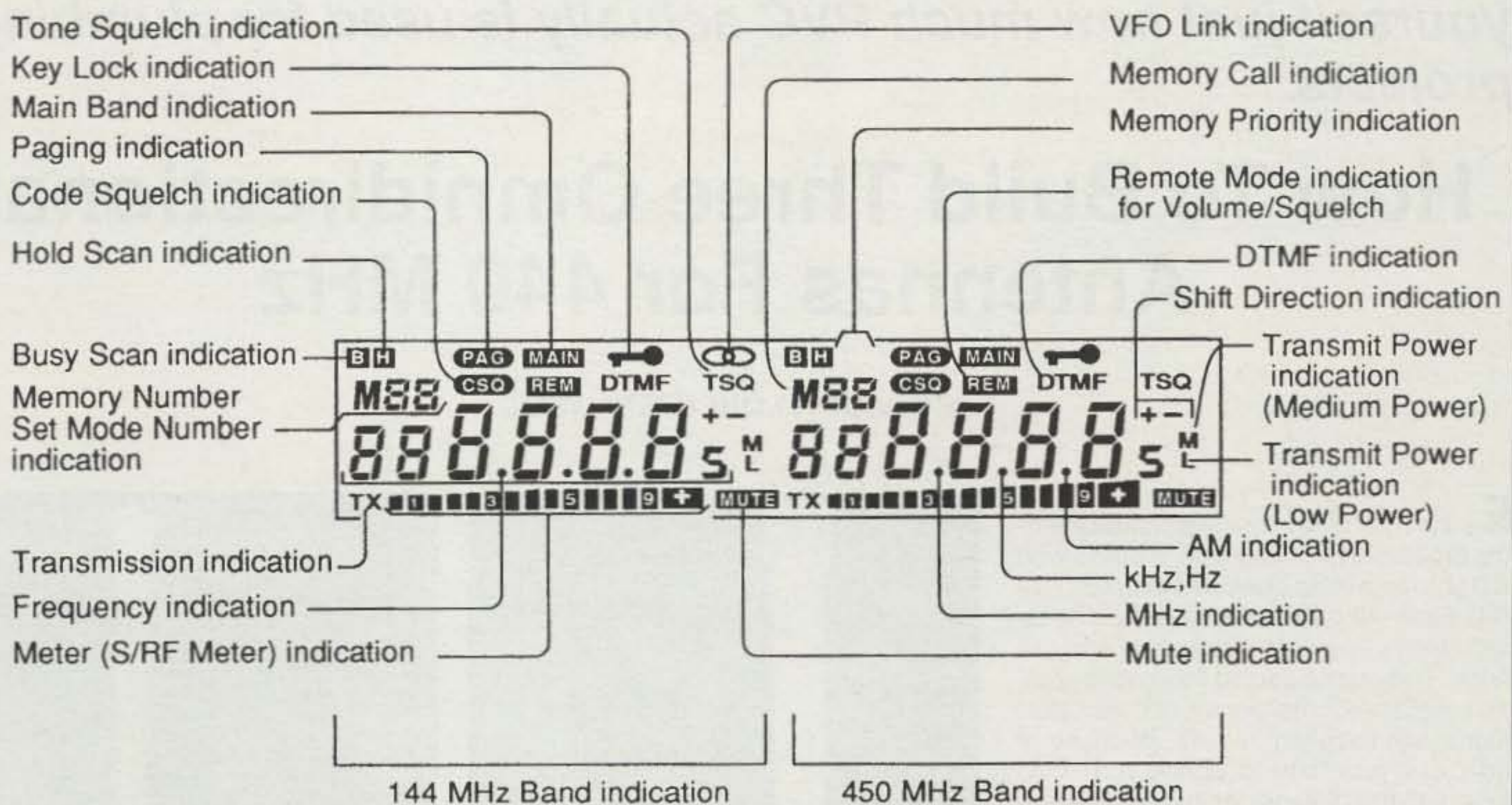


Fig. 2—For those who prefer it, there's an optional control/display panel that mounts on the transceiver module. This diagram shows the information it can display.

ceiver stays on the Shuttle's transmissions!

But how about general operation? Just how easy is it to operate a radio that has everything on the mic? After just a little bit of getting used to, I've found the C5718DA an easy radio to use. The most important buttons are in the corners of the 16-button array, with the CALL channel selection in the upper left (pad number 1), the BAND selection lower right (pad D), VOLUME/SQUELCH adjust selection upper right (pad A), and direct frequency ENTRY at the lower left (pad *).

DOWN and UP are the top center buttons (pads 2 and 3). They toggle memory channels when in memory mode, frequency in steps programmable from 5 to 100 kHz in VFO mode, or audio or squelch levels after the VO/SQ button is pushed. The pad B button mutes the band not in active use (termed the "sub" band in the manual) in user programmable steps of -6, -12, or -18 dB—a real necessity when someone comes up suddenly on the sub-frequency while you're working someone else on the main-band frequency.

The other pad buttons you're likely to want to memorize for use by touch are the # button, which switches between VFO and Memory, and pad buttons 7 and 8, which control memory scan (MS) and VFO scan (SCAN), respectively. The remaining button functions are most often used for programming, so they needn't be memorized.

Literally everything about the C5718DA is

programmable. For example, it has 22 Set Mode functions, from setting the beep tone level to even enabling cross-band repeat! It has selective calling and paging, and tone squelch receive. You can turn off the unused band if you wish, or link both band's VFOs so they track together with the UP-DOWN keys. There are six different scan modes with three different scan methods, and they can be programmed individually for each memory slot! For example, Memory 1 can be programmed for Scan and Hold, while Memory 2 is programmed for Busy, and so on.

There's much more. The manual has 84 pages of detailed instructions and includes a first-class table of contents and index. In addition, the radio is fully packet compatible for up to 9600 baud, and has a built-in speaker plus external speaker jack. There's plenty of audio, which you can program to come out of the mic's speaker, or the speaker built into the transceiver module (or a plugged-in external speaker), or both.

For the long-winded there's a tiny thermostatically operated, extra-quiet cooling fan mounted in the rear cooling fins. Don't forget to leave some clearance around the transceiver module for air circulation, of course. And finally, unlike many other dual-band rigs, the C5718DA doesn't require an external duplexer. RF in/out for both bands is through a single coax.

For those who require it, the C5718DA is also

CAP/MARS compatible; the modification is simple but not easy to get at. Detailed instructions are available when a copy of the appropriate license is supplied to Standard. For those who prefer it, there is an optional control head that mounts on the front of the radio.

Other options include the previously mentioned memory expansion module and a variety of speaker mic extension cables. One of these is even a "Y" cable, ideal for applications such as a camper where you'd like to be able to operate from either the driver's seat or the living area with a speaker mic in both locations.

As a repeater trustee, it's simply great to have one rig with which I can monitor W9AP/R on 147.09 while working the CAP net on 148.15, listening for hot DX tips on the NIDXA 147.36 repeater, or checking weather on 162.55. And unlike other UHF FM rigs, the C5718DA comes out of the box with full 420-450 MHz transmit, so I can also exercise repeater control on W9AP's 420 MHz link. Before this reaches print, I may even have a Space Shuttle or MIR contact with it thanks to the operating tip supplied above.

My biggest problem with the C5718DA? Not being able to afford two of them—one for mobile and one for base!

The C5718DA is priced at \$849.00 and is distributed by Standard Amateur Radio Products, Inc., P.O. Box 48480, Niles, IL 60714 (312-763-0081). ■

A quick trip to your local home-improvement store and you'll be ready to tackle these antenna projects, and ask yourself just how much PVC actually is used for plumbing projects.

How To Build Three Omnidirectional Antennas For 440 MHz

BY IVAN T. LORENZEN*, W4JC

Each of the three omnidirectional antennas discussed in this article is made with 300 ohm twin-lead enclosed in protective PVC pipe. All three antennas have wide bandwidth, low SWR, and are easy to make. They can be used for mobile, portable, field day, emergency, or base operations with excellent results. Because of the close proximity to plastic and PVC dielectric the dimensions are significantly shorter than for antennas in open air. The formulas and velocity factors given in texts and handbooks were used as a point from which to start pruning and trimming toward the final dimensions.

The first antenna is a J-pole, a half-wave radiating element end fed by a quarter-wave matching section. As the antenna books say, it gets its gain over a quarter-wave antenna by compressing the directive pattern in the vertical plane, providing an increase in field strength of about 1.7 dB toward the horizon.

The second antenna is a two-element, end-fed collinear. A collinear antenna is inherently broadband, and the books claim 1.9 dB for a two-element collinear over a half-wave dipole. A phasing stub is used between the two radiating elements in order to bring the currents in the two elements in phase.

The third antenna is a four-element collinear fed between the two center elements by means of a quarter-wave matching section. The antenna books give it credit for a 4.3 dB gain over a half-wave dipole.

Using a Radio Shack HTX-404 transceiver, with an RS#19-320 SWR meter mounted directly on it by a BNC/SO-239 adapter, and a 10 ft. length of RG8/M (mini-foam) coax to the antenna, the SWR readings for each of the three antennas were under 1.5:1 from 430 to 450 MHz. All transmitting tests were made outdoors

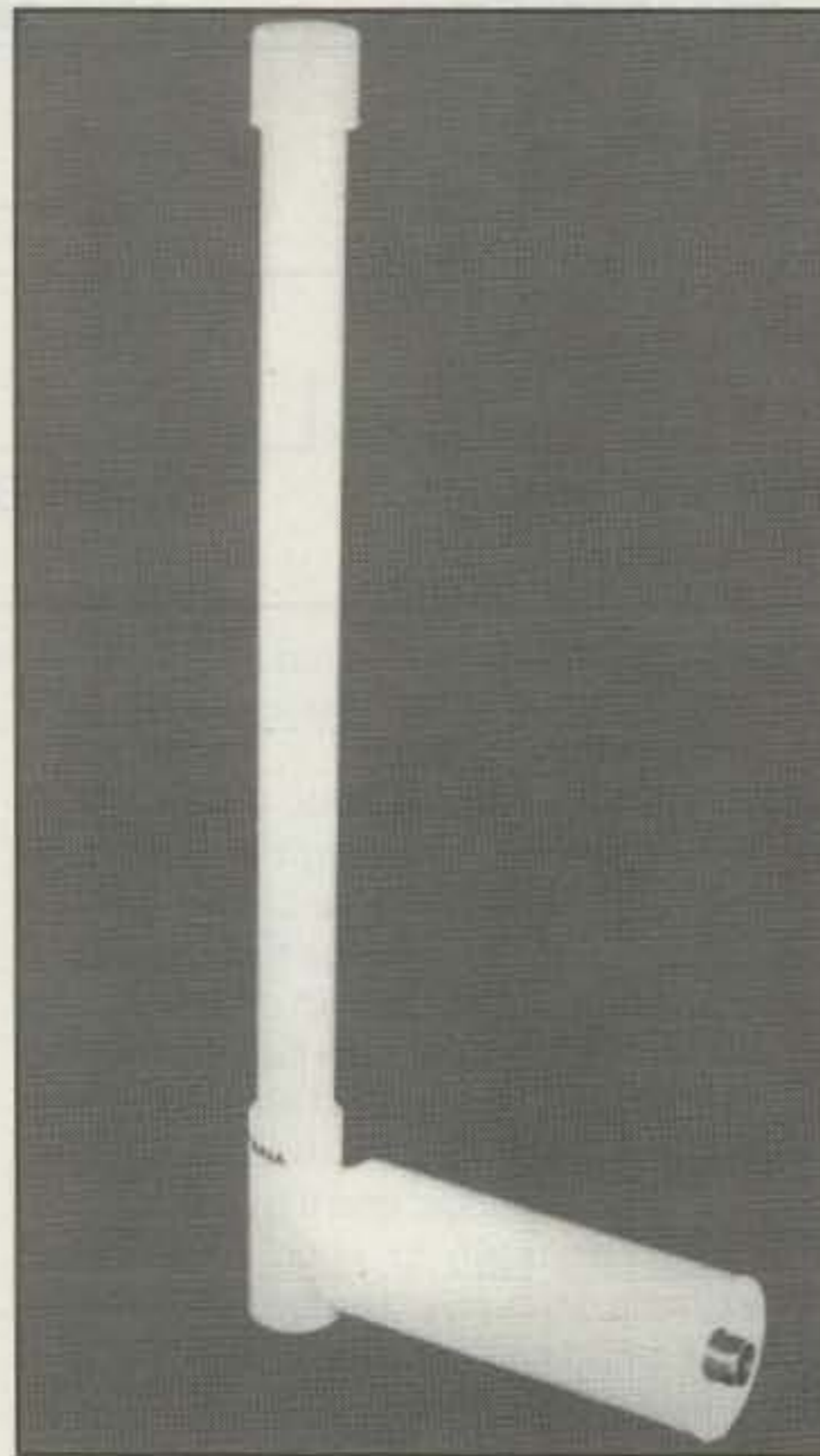


Photo A— The "J" antenna, full-length view.

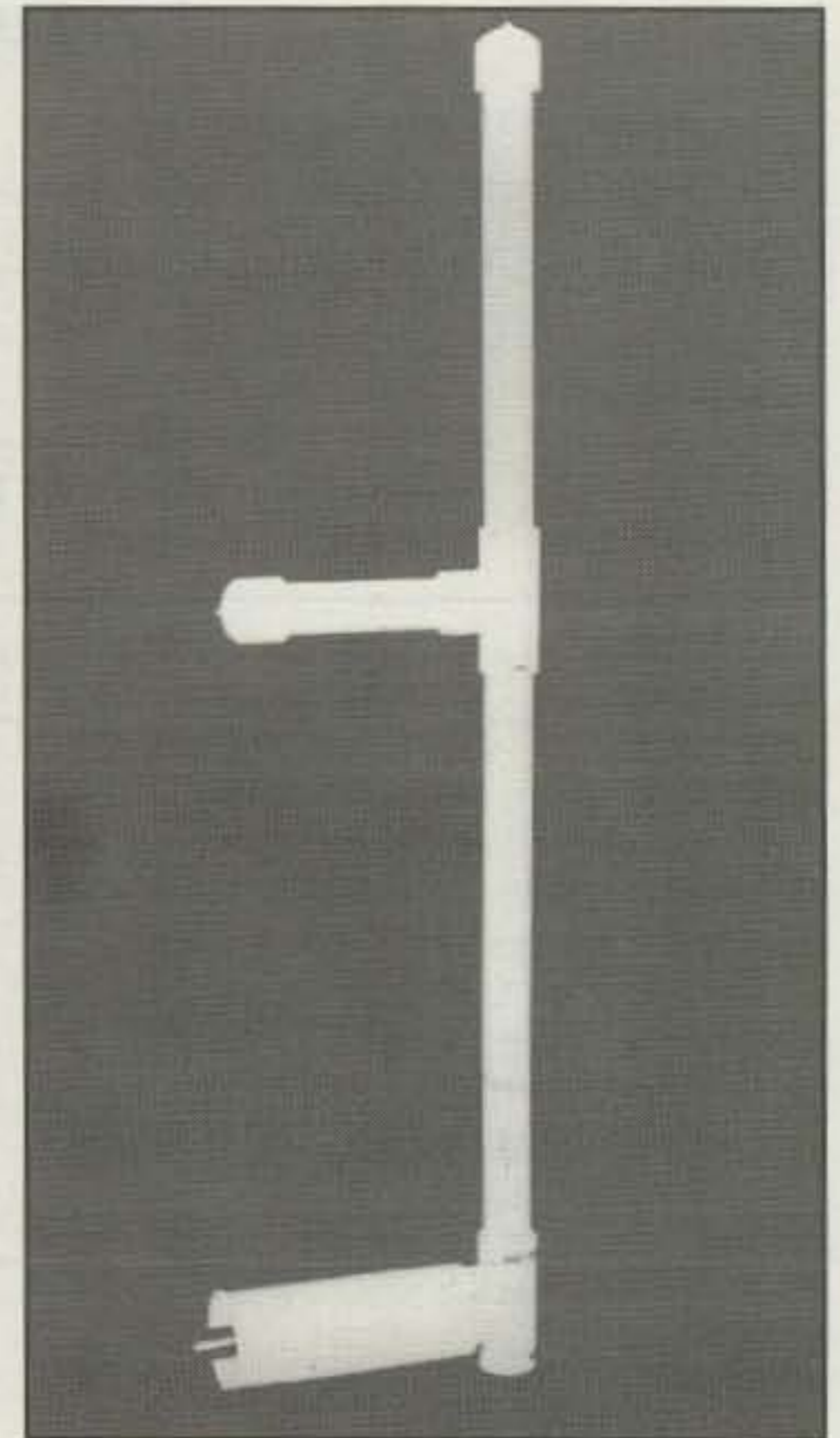


Photo B— Full-length view of the two-element collinear.

well in the clear, away from extraneous objects.

As for results, even the single-half-wave "J" connected through a 10 ft. length of RG8/M coax to a 1½ watt handheld transceiver raises repeaters 25 miles away with full quieting and S7 to S9 on the "S" bar graph.

Construction of The "J" Antenna

Dimensions for the "J" antenna are shown in fig. 1. The plastic on the twin-lead can be melted away with a soldering gun or stripped away with a knife. Dimensions

are rather critical at this frequency of operation, so press the twin-lead flat and straight when measuring. It will be easier to measure the feed-point connection and the stub length if the closed end of the stub is made flat, as shown, instead of a rounded loop. A rounded loop is made at the top of the antenna for the quarter-inch plastic rod which is inserted into the quarter-inch holes at the top of the PVC pipe to provide support. Cut through one side of the twin lead exactly 5⅜ inch from the bottom of the antenna. This dimension is the most critical of all. Bend the exposed wire over and solder it to the uncut wire.

*343 N. Tropical Trail #A205, Merritt Island, FL 32953



CH-32
 Miracle Baby
 146/446MHz
 HT Antenna
 Gain: 0dB
 Length: 1.75'
 Conn: BNC



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 Gain & Wave: 146MHz 4.5dBi 6/8 wave • 446MHz 7.2dBi 5/8 wave x 3 • Length: 58" • Conn: SB-7 PL-259/SB-7NMO NMO • Max Pwr: 70W



SB-5/SB-5NMO • Dual-band 146/446MHz w/fold-over
 Gain & Wave: 146MHz 2.5dBi 1/2 wave • 446MHz 5.5dBi 5/8 wave x 3 • Length: 39" • Conn: SB-5 PL-259/SB-5NMO NMO • Max Pwr: 70W



CX-224/CX-224NMO • Tri-band 146/220/446MHz w/fold-over
 Gain & Wave: 146MHz 2.15dBi 1/2 wave • 220MHz 3.5dBi 5/8 wave • 446MHz 6.0dBi 5/8 wave x 2 • Length: 36" • Conn: CX-224 PL-259, CX-224NMO NMO • Max Pwr: 100W



B-20/B-20NMO • Dual-band 146/446MHz w/fold-over
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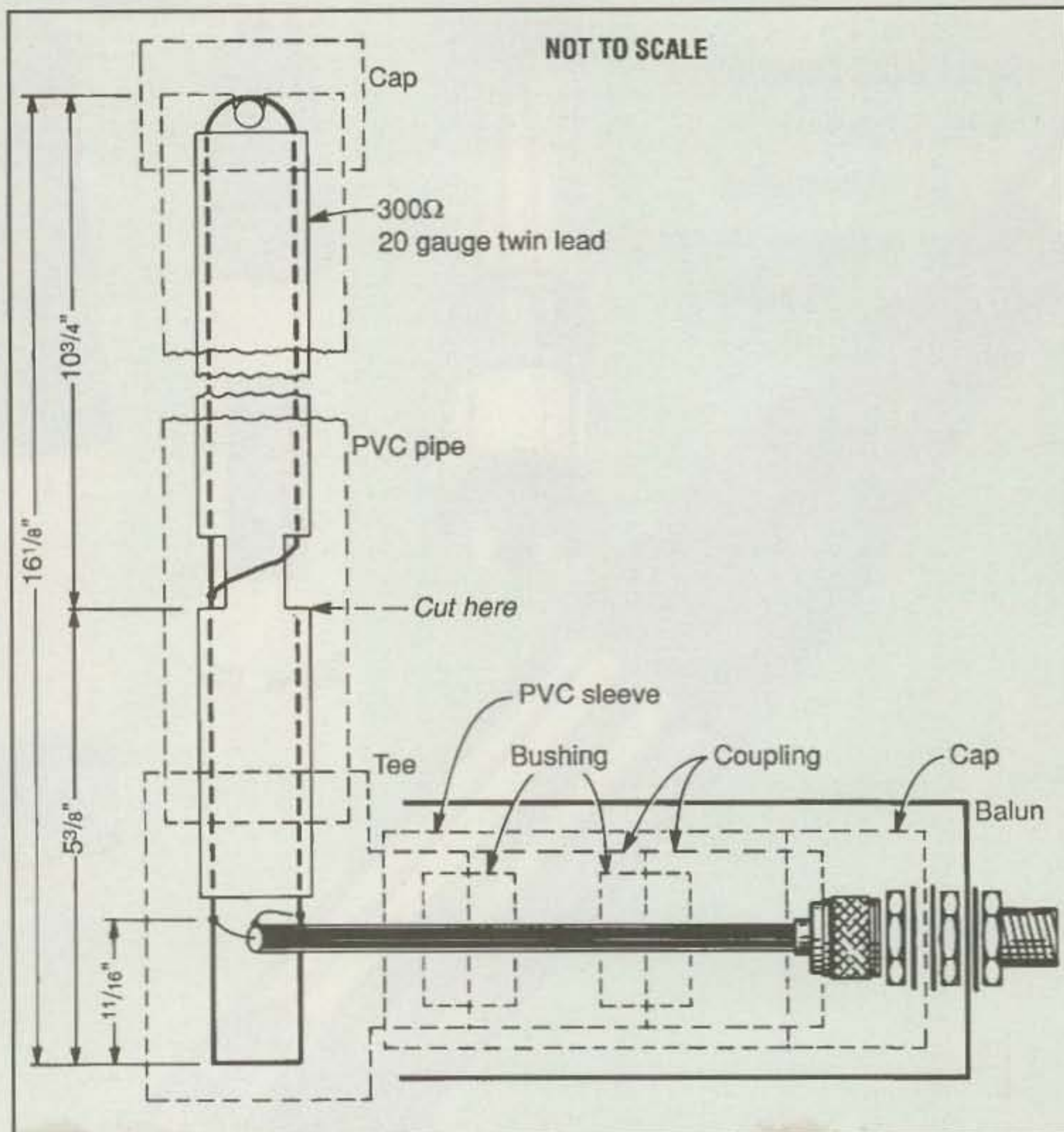


Fig. 1- Dimensions for the 440 MHz "J" antenna.

To minimize antenna currents on the transmission line which can distort the radiation pattern, a linear balun (also known as a bazooka) can be fabricated from an empty, evacuated 7 oz. air-freshener spray can 2 inches in diameter. Drill and file a $\frac{5}{8}$ inch hole well centered in the bottom of the can.

The top can be removed by a fine-tooth hacksaw, holding the can against a back-stop and sawing around and around. It takes only a few minutes. The cans I have are $5\frac{1}{2}$ inches long after the top is removed. Considering that the balun encloses quite a bit of PVC, as shown in the drawing, it should be close enough to an electrical quarter-wave to provide effective choking against antenna currents flowing onto the outer shield surface of the transmission line. It would be better if the hole in the closed end of the can were soldered directly to the coax braid without using a PL-259 and socket; however, as a compromise to keep things physically rugged, I did it this way. Handbooks show other methods to accomplish this if the antenna is to be used indoors or if weatherproofing is not a problem.

The PVC pipe is $\frac{3}{4}$ inch thick-wall type, called Schedule 40. The bushings are cut

from pipe and are $1\frac{1}{4}$ inches long. The tee and couplings are $\frac{3}{4}$ inch size. The coax cap is 1 inch size, and the top cap is $\frac{3}{4}$ inch. The sleeve, approximately $4\frac{1}{8}$ inches long cut from $1\frac{1}{4}$ inch pipe, adds extra rigidity to the assembly. Your PVC fittings may or may not be the same as mine, since not all PVC is created equal. If you don't already have a 1 inch size PVC pipe cutter, it is worth the cost to get one. Then only the $1\frac{1}{4}$ pipe sleeve will have to be sawed.

Drill and file or holesaw a $\frac{5}{8}$ inch hole in the center of the cap. The easiest way I could find to securely assemble the coax, cap, and SO-239 socket was to use a $1\frac{3}{4}$ inch bulkhead-type double SO-239 and cut off a short piece from one end of a 10 ft. length of RG8/M coax with PL-259 connectors already attached (Radio Shack #278-979). Screw the PL-259 very tightly onto one end of the bulkhead connector, and then run a nut up against the PL-259, also very tightly, and add an interior-tooth lock washer before inserting the socket into the cap. Add another interior-tooth washer and nut and tighten the assembly with a wrench and pliers. Just don't strip the threads.

Add the two bushings, two couplings,

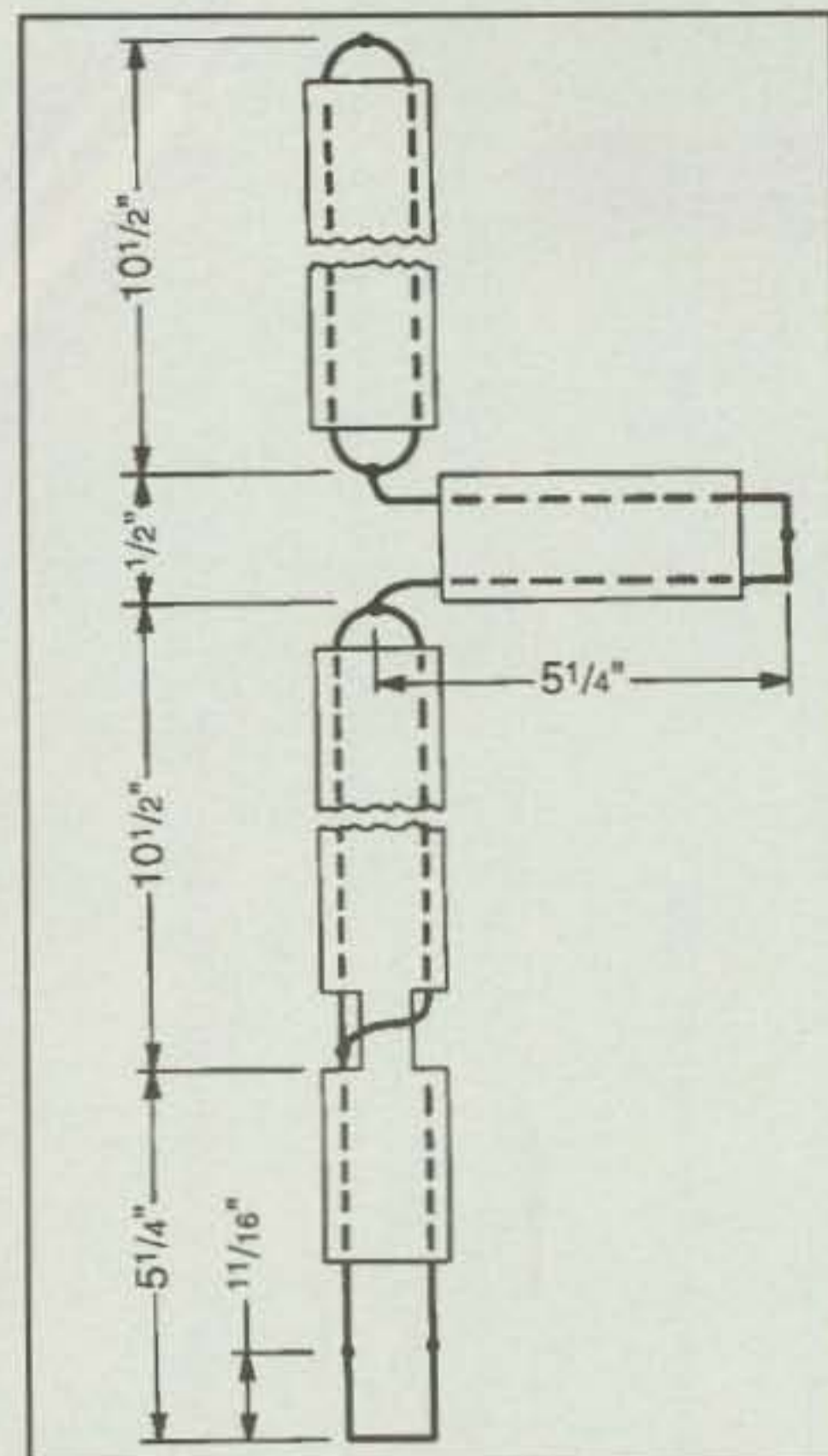


Fig. 2- Basic layout for the two-element collinear.

and the $1\frac{1}{4}$ inch PVC sleeve as shown in fig. 1. The linear balun can wait until the very last. Cut and dress the open end of the coax so it will reach the center of the tee. Solder the coax to the twin-lead as shown. It will be easier to make a neat braid connection if a No. 18 jumper wire is used to connect the braid to the twin-lead wire. Place the twin-lead across supports and hang the coax so it comes away at a right angle.

To assemble, feed the top of the antenna into the side opening and out through the top of the tee. Slide the tee down onto the twin-lead toward the coax. Bend the bottom of the stub down and back on itself, if necessary, to feed it into the tee. It can be straightened out after it is inside the tee. Push the PVC assembly containing the coax onto the side of the tee, and secure everything together with No. $6 \times \frac{3}{8}$ stainless steel flat-head or oval-head self-tapping screws. A $\frac{5}{64}$ inch drill bit is about the right size for pilot holes. Complete the assembly as shown in fig. 1.

Finally, the balun is slipped over the PVC cap and onto the protruding SO-239 socket. Secure it with another interior-tooth lock washer and nut. Apply silicone caulk around the open end of the balun to seal out rain and bugs.

The only source my supply of the $1\frac{3}{4}$ inch double SO-239 with three lock washers and three nuts is RF Products, 1930-D Murrell Road, Rockledge, FL 32955. The cost is \$5.25 postpaid.

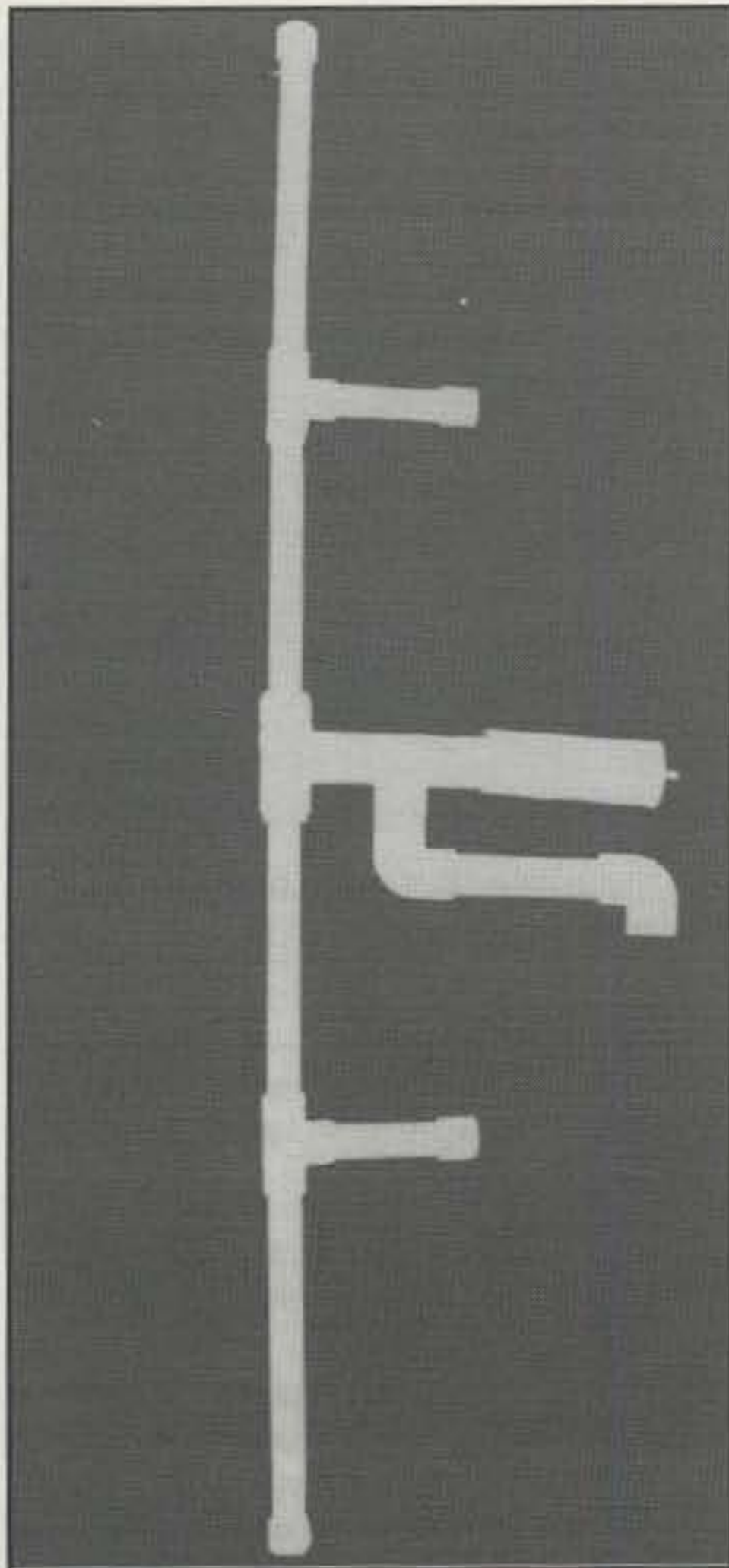


Photo C— Full-length view of the four-element collinear with its mounting arm.

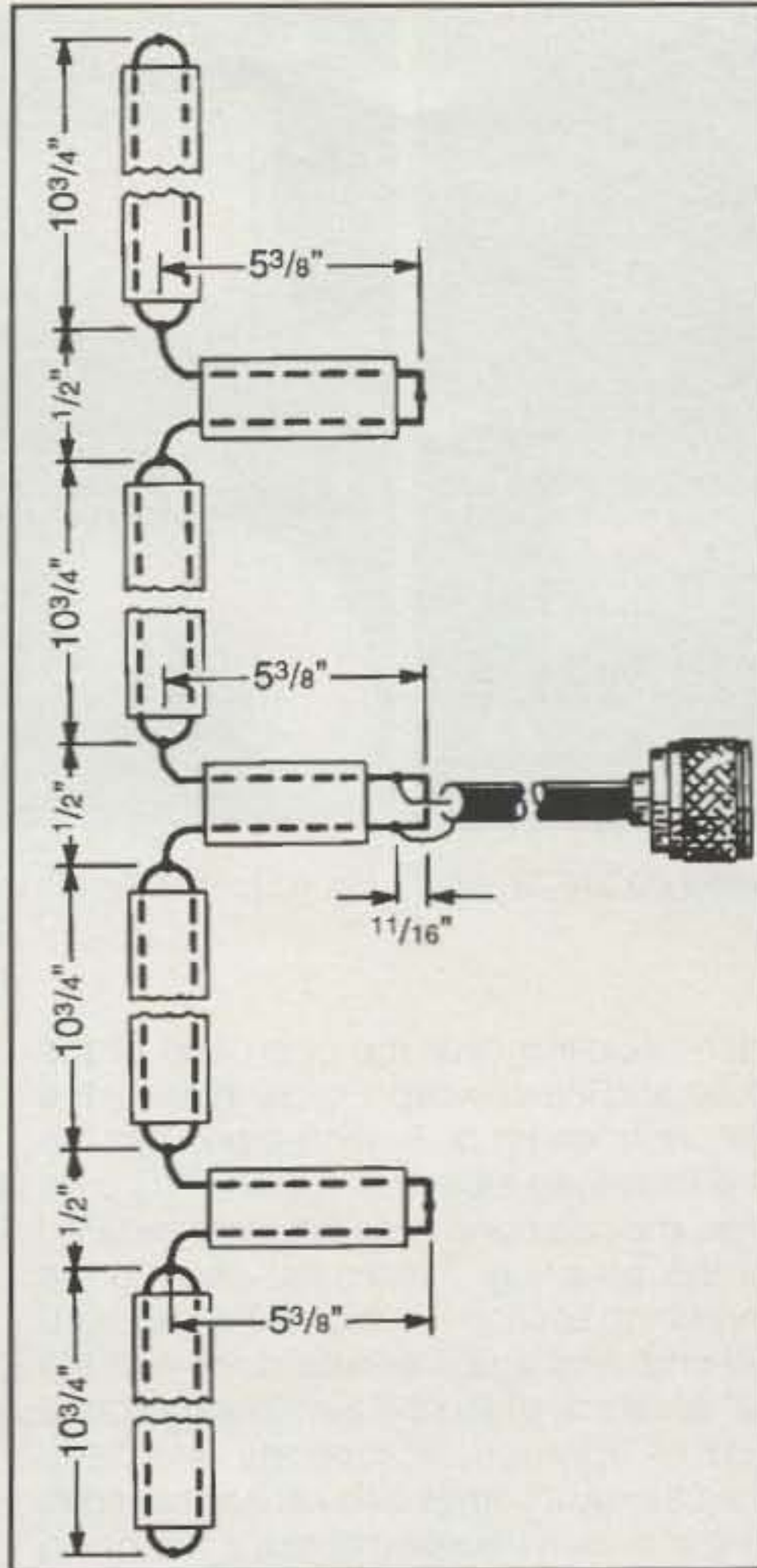


Fig. 3— Basic layout for the four-element collinear.

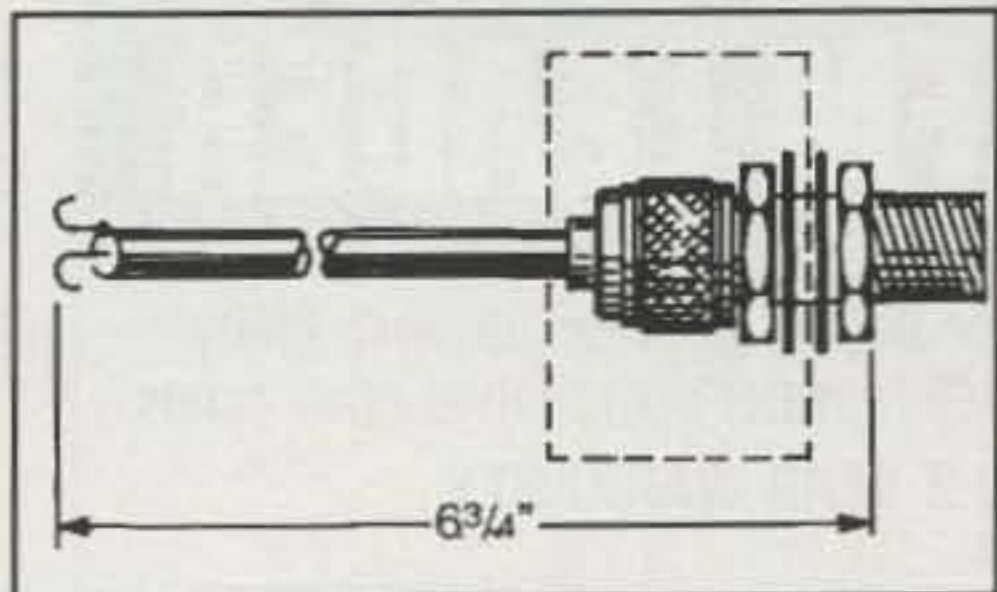


Fig. 4— Construction details of the bulkhead connector, 1 inch cap, and coax for the four-element collinear.

For field day, emergency, or other portable use just slip a PVC pipe mast over a stake tapped into the ground 12 inches or so. A stake can easily be made by flattening one end of a 4 ft. length of metal thin-wall conduit.

Construction of The End-Fed Two-Element Collinear

The two-element collinear uses a "J" at the bottom with an additional half-wave radiating element and a phasing stub on top of it. Construction is similar to the "J" with the addition of appropriate PVC housings for the stub and added radiator. The extra PVC pieces needed are: one tee, one cap, 3/4 inch PVC pipe about 4 5/8 inches long, and 3/4 inch PVC pipe about 10 inches long. The basic layout is shown in fig. 2.

It will be noted that both of the radiating elements and the quarter-wave matching section have been shortened slightly. When the same dimensions as those in the "J" were used, the SWR was a little over 1.6:1 at 450 MHz. The dimensions shown in fig. 2 brought the SWR down to 1.2:1. The coax/balun assembly

for the two-element collinear is the same as for the "J." Refer to fig. 1.

Construction of The Four-Element Collinear

The physical assembly of this antenna is similar to that of the "J" and the two-element collinear (see fig. 5). Start with the vertical twin-lead portion and the two phasing stubs as shown in fig. 3. Also make up the matching section, but set it aside until later. Next, make the coax, cap, and bulkhead connector assembly shown

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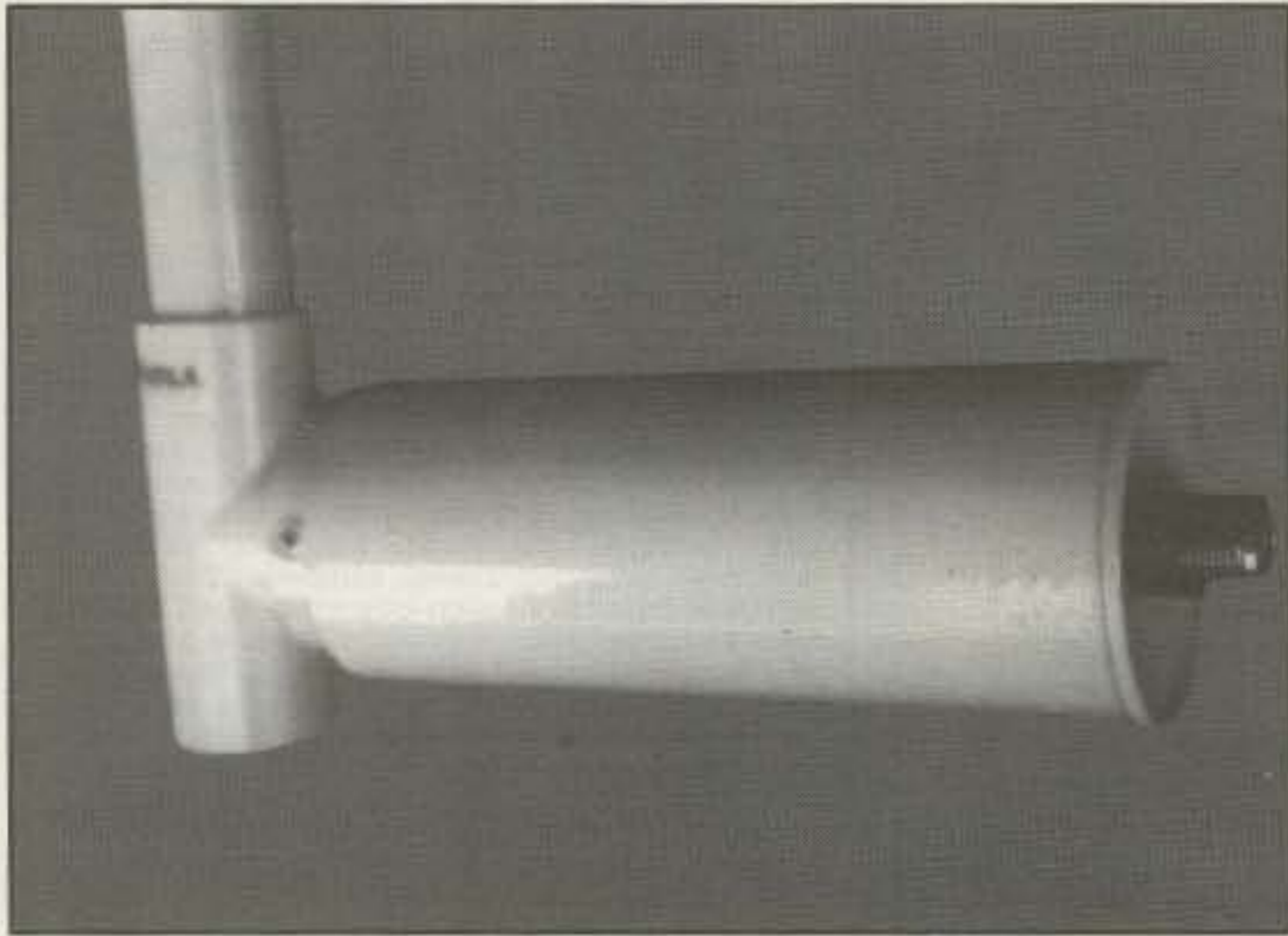


Photo D- Close-up view of the balun as installed on the "J" and the two-element antennas.

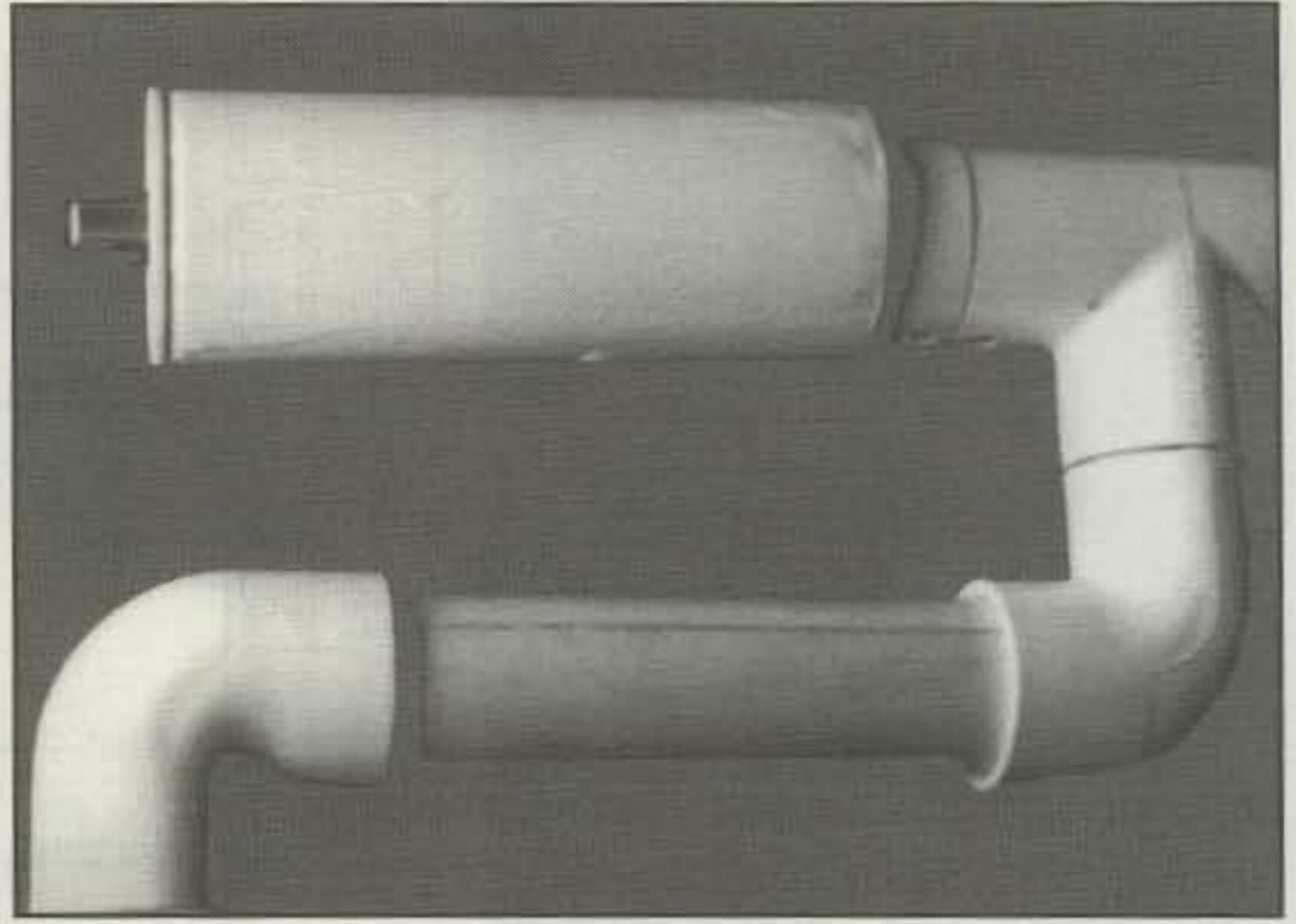


Photo E- Close-up view of the balun and mounting arm on the four-element collinear.

in fig. 4. I didn't have any low-loss coax readily available, and considering the low loss in this short length of coax, I used a piece of RG8/Minifoam with a PL-259 plug already attached. Don't forget the interior-tooth lock washers on both sides of the cap, and be sure the nuts are tight. Note that the overall length dimension is to the outside surface of the nut securing the connector to the cap. This is where the inside surface of the balun rests.

Next, in the following order slip a 3/4

inch coupling over the open end of the coax and into the cap. Follow this with the 3 1/2 inch length of 3/4 inch pipe. Slip the 4 1/2 inch long sleeve of 1 inch PVC pipe over the coax and onto the exposed end of the coupling. Solder the coax to the matching section 1 1/16 inch from the shorted end, and again as was done with the "J" antenna, place the twin-lead across a pair of appropriate supports and hang the coax so it comes away at a right angle. Slip a 3/4 inch coupling onto the matching

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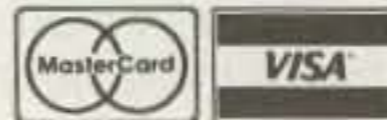
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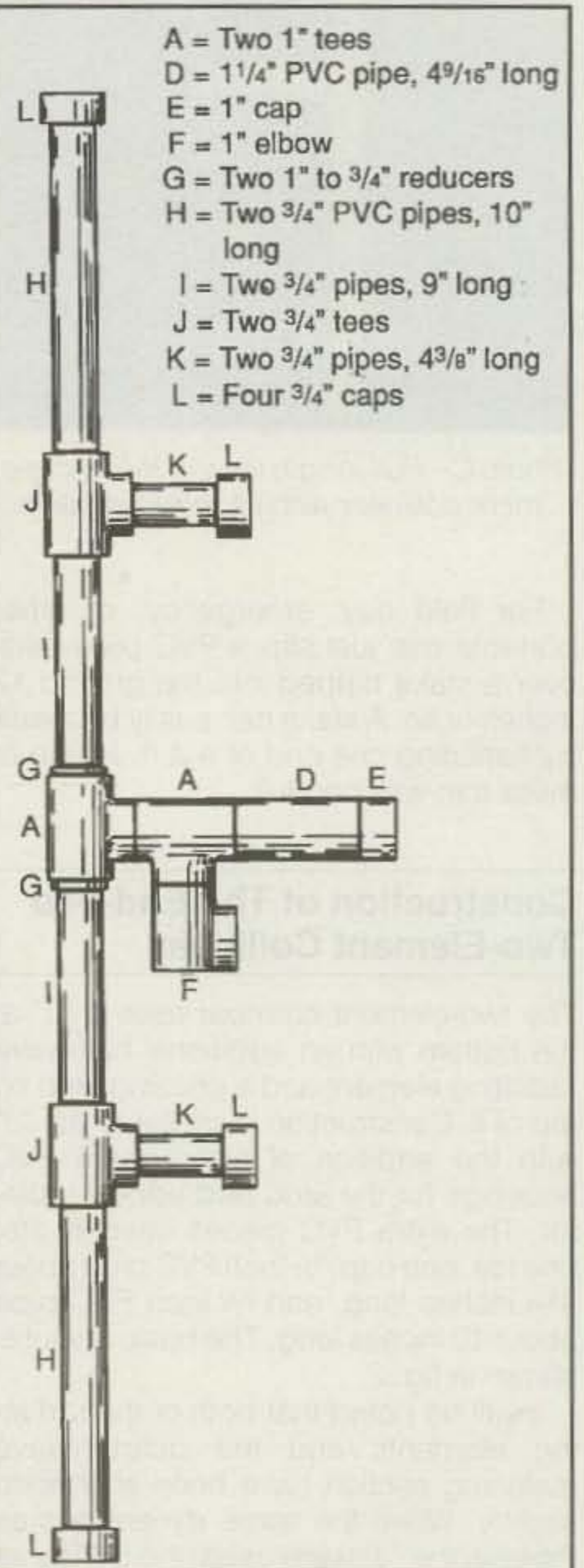


Fig. 5- PVC parts list and layout for the four-element collinear enclosure. See fig. 6 for details on parts A through G.

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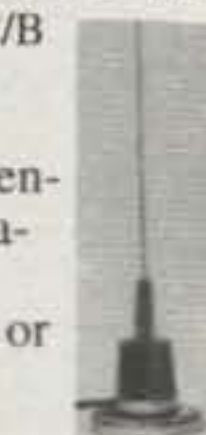
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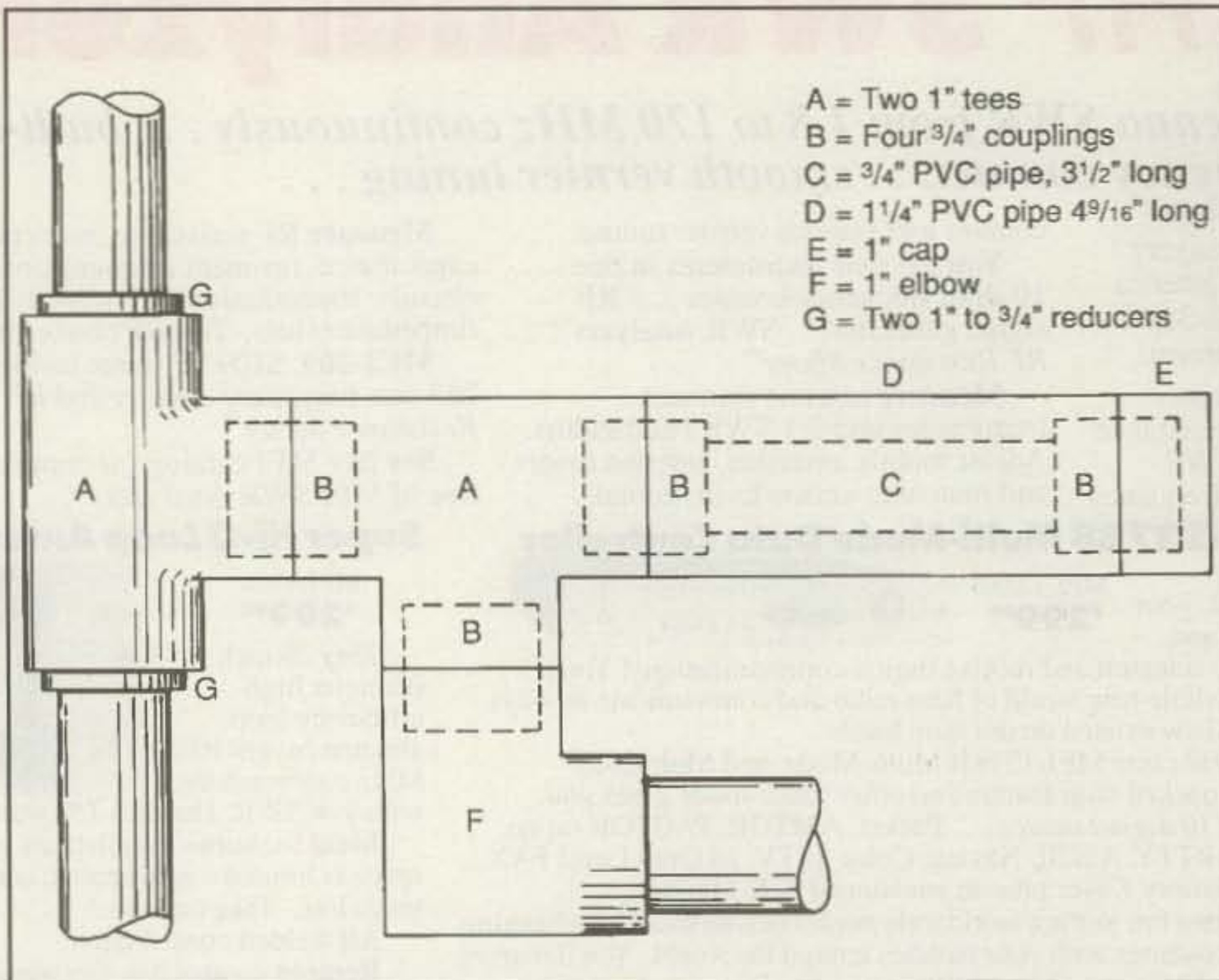


Fig. 6- Details of the PVC assembly for the balun and matching section enclosure for the four-element enclosure. The elbow fits into the 1 inch mounting arm.

- A = Two 1" tees
- B = Four 3/4" couplings
- C = 3/4" PVC pipe, 3 1/2" long
- D = 1 1/4" PVC pipe 4 9/16" long
- E = 1" cap
- F = 1" elbow
- G = Two 1" to 3/4" reducers



Photo F- Close-up view of the top of an antenna showing the 1/4 inch plastic rod supporting the twin-lead.

section and onto the 3 1/2 inch pipe inside the outer sleeve. As you insert the coax/matching section connection into the PVC, bend the stub toward the coax only enough to get it inside, so that the coax will not lay against the stub. Feed a 1 inch tee onto the matching section and push it against the sleeve as shown in fig. 6. Slip a 3/4 inch coupling over the matching section and into the tee. The open end of the matching section will protrude from the coupling about an inch. The 1 inch elbow and its bushing can wait until last, along with the balun.

Next solder the matching section to the radiating elements as shown in fig. 3. Carefully feed both ends of the radiating section into the side opening of a 1 inch tee, bringing one end out through the top and the other end out through the bottom. Gently work the tee toward the radiating elements as the tee passes over them. Push the tee onto the coupling protruding from the mounting-arm tee. Straighten the twin-lead that is now inside the tee to eliminate any twists. Slip a 1 inch to 3/4 inch reducer over each end of the radiating elements and work them down into the center tee. Install the stub tees as described above and complete the assembly. Again, straighten the twin-lead inside the tees.

No. 6x3/8" stainless steel self-tapping screws can be used to secure the various PVC pieces together. I used oval-head screws on the balun assembly, counter-sinking the pilot holes. Pan-head screws were used in the other places.

As happened with the two-element collinear, the SWR rises at the high end of the band. Since the SWR is under 1.5:1 at 450 MHz, I left it as is. It appears likely that shortening the element and stub lengths to the same dimensions as those for the two-element antenna, or adjusting the feed-point tap, would bring the SWR down lower, but the practical improvement obviously would be slight.

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100FT RQ213/U MIL-SPEC DIRECT BURIAL JKT 1.5dB @ 50MHz	\$45.00/EA
50FT RQ213/U MIL-SPEC DIRECT BURIAL JKT 1.5dB @ 50MHz	\$25.00/EA
100FT RQ8/U FOAM 95% BRD UV RESISTANT JKT 1.2dB @ 50MHz	\$40.00/EA
50FT RQ8/U FOAM 95% BRD UV RESISTANT JKT 1.2dB @ 50MHz	\$22.50/EA

ROTOR CABLE

5971 8/COND (2/18 6/22) for runs upto: 125ft BLK UV RES JKT	22/FT	20/FT
4090 8/COND (2/16 5/20) for runs upto: 200ft BLK UV RES JKT	38/FT	36/FT
1416 8/COND (2/14 6/18) for runs upto: 300ft BLK UV RES JKT	50/FT	48/FT
18GA TINNED COPPER 4/C GRAY PVC JACKET	20/FT	18/FT
18GA TINNED COPPER 5/C GRAY PVC JACKET	22/FT	20/FT
18GA TINNED COPPER 7/C GRAY PVC JACKET	26/FT	24/FT

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14GA 168 STR "SUPERFLEX" UNINSULATED	16/FT	14/FT
14GA 7/22 "HARD DRAWN" BC UNINSULATED	10/FT	08/FT
14GA SOLID "COPPERWELD" UNINSULATED	09/FT	07/FT
14GA SOLID "BARE COPPER" UNINSULATED	09/FT	07/FT
12GA 19/25 "BARE COPPER" UNINSULATED	15/FT	13/FT
16GA 26/30 "BARE COPPER" PVC INSULATED	09/FT	07/FT
14GA 41/30 "BARE COPPER" PVC INSULATED	11/FT	09/FT
12GA 65/30 "BARE COPPER" PVC INSULATED	17/FT	15/FT
DACRON ROPE DBL BRD 3/16" 770# TEST	12/FT	10/FT

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W2DU 1:1 1.8-30MHz CURRT TYPE DIPOLE OR BEAM	\$23.00/EA
W2DU 1:1 1.8-30MHz "IN LINE" CURRENT BALUN	\$26.00/EA
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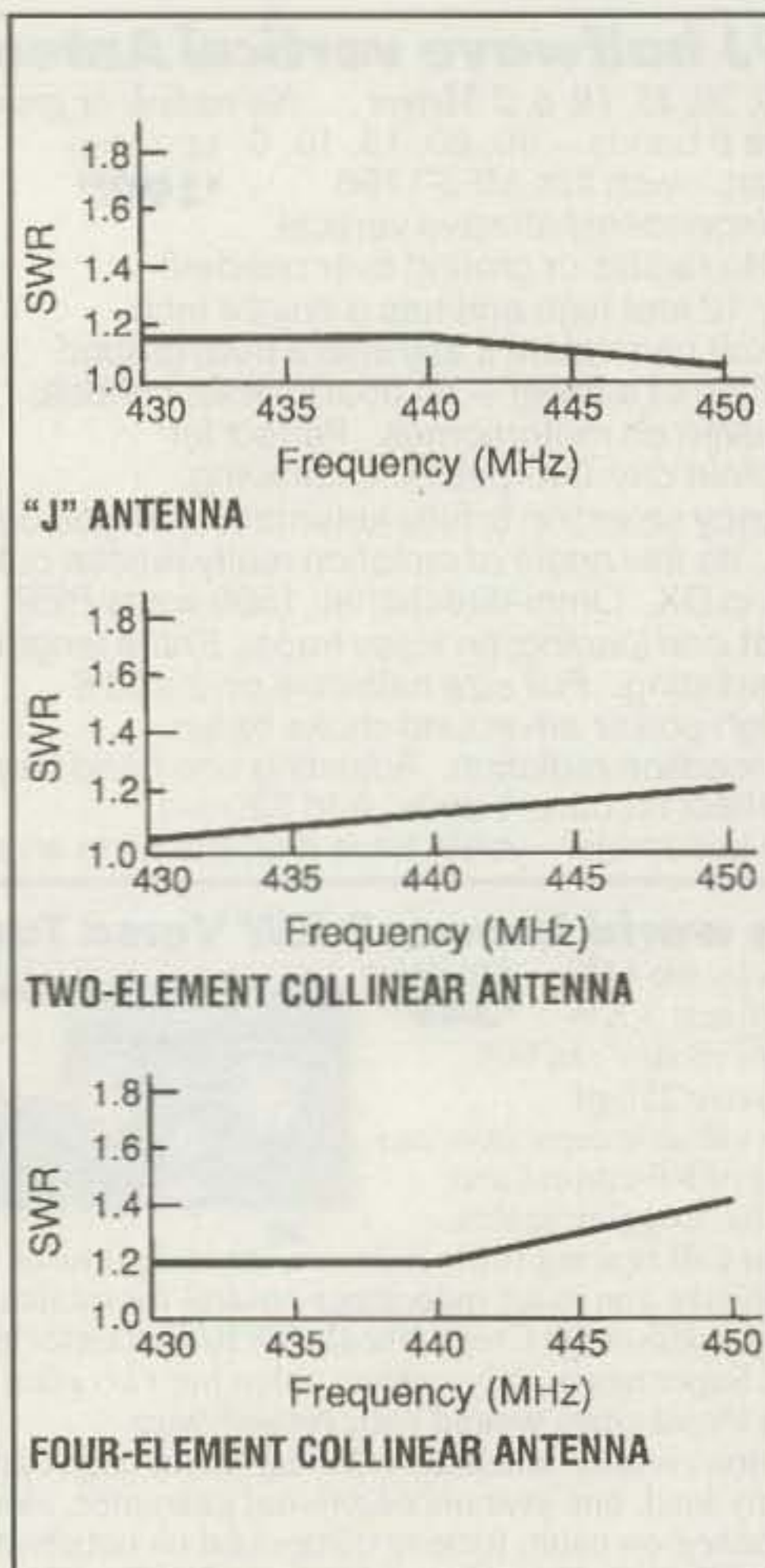


Fig. 7- SWR charts for the three 440 MHz antennas.

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MFJ-1270C 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 commercial applications working 24 hours a day -- many work for years without a single failure . . .

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MFJ-1270C **\$119⁹⁵**

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MFJ 9600 Baud TurboPlus™ TNC

MFJ-1270CQ
\$229⁹⁵



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TNC ACCESSORIES

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MFJ-2400, \$89.95, operates 300, 1200 and 2400 baud packet and works with any radio. MFJ-9600, \$109.95, G3RUH compatible 9600 baud modem. Not all radios compatible with 9600 baud. Both plug into MFJ TNCs for easy installation.

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For MFJ-1270C/1276. Plugs into RAM socket for extra mailbox memory. MFJ-45A (32K), \$14.95, MFJ-45B (128K), \$34.95, MFJ-45C (512K), \$219.95.

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MFJ-52, \$29.95, plug this board into your TNC configured as TheNet X-1J Node and users can check their transceiver packet FM deviation. Requires X-1J or later nodeware. See *CQ Magazine*, Nov. 1993.

Firmware Upgrade 1.2.9

For older MFJ TNCs. MFJ-40C, \$19.95, gives you enhanced mailbox and supports mailbox up to 512K.

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

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

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The enhanced Easy Mail™ personal mailbox lets you use a dedicated call-sign for your mailbox. Your mailbox can stay on while you operate packet. It will also auto forward or reverse forward mail to and from other BBSs. A *check 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. The mailbox memory is expandable to 32K, 128K and 512K.

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Switch between your TNC or Mic by pushing a button!

Switch between your microphone and TNC by pushing a button! MFJ-1272B/M **\$34⁹⁵**



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 these pre-wired cables into your rig's microphone connector and into your TNC and

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Works with HF, VHF and UHF radios with 8 pin mic connectors -- including Kenwood, ICOM, Yaesu, Alinco and others. For radios with 8-pin RJ-45 modular telephone jack, select the new "M" models.

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MFJ-1272BX/1272MX, \$39.95, for PK-232.

MFJ-1272BYV/1272MYV, \$39.95, for KAM VHF/KPC3.

MFJ-1272BYH/1272MYH, \$39.95, for KAM HF Port.

Pre-wired Radio-to-TNC cables . . . \$14⁹⁵

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Yaesu 8 pin radios	MFJ-5080	MFJ-5080X	MFJ-5080Z	MFJ-5080YV MFJ-5080YH
³ Icom 8 pin radios	MFJ-5084	MFJ-5084X	MFJ-5084Z	MFJ-5084YV MFJ-5084YH
Kenwood/Alinco 8 pin radios	MFJ-5086	MFJ-5086X	MFJ-5086Z	MFJ-5086YV MFJ-5086YH

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CQ REVIEWS:

The Radio Works Line Isolators

BY DOUG DeMAW*, W1FB

Keeping unwanted RF currents off the coaxial feedline and out of the station equipment presents a difficult challenge in a variety of situations. Furthermore, beam-antenna patterns can be affected adversely if the feed line is allowed to radiate RF energy. Various methods exist for RF-isolating amateur-station components from one another, and The Radio Works, Inc. of Portsmouth, Virginia offers two products that can be used to solve the foregoing problems. The Terminator-3 and 4KRF-LI "line isolators" are designed for use in any 50 ohm, unbalanced coaxial feed line. They are designed for operation from 160 through 10 meters. The maximum power rating is 3 KW PEP.

The function of the line isolators can be compared to the familiar coils of RG-8 coax that we amateurs use at the feed points of triband Yagis to prevent line radiation. In effect, such a device is nothing more than an RF choke that works on the shield braid, but not on the coax center conductor. Chokes of this kind are sometimes referred to as "baluns," even though they do not convert unbalanced feeders to a balanced feed point. It's true that they are connected to balanced antenna terminals, depending upon the antenna design, but that does not qualify them as baluns.

Isolator Characteristics

Radio Works has enclosed its chokes in 2 inch OD PVC pipe, and the two end caps are cemented to the tubing. Therefore, I was unable to inspect the interiors of the devices without sawing them open. I presume that the isolators contain a length of coaxial cable that is loaded (to increase the inductance of the outer conductor) with ferrite sleeves of various permeabilities, along the lines of the W2OBJ choke described in *The ARRL Antenna Compendium*, 2nd ed., p. 172. Roehm used sleeves of different permeabilities to make his choke effective over a wide range of frequencies.

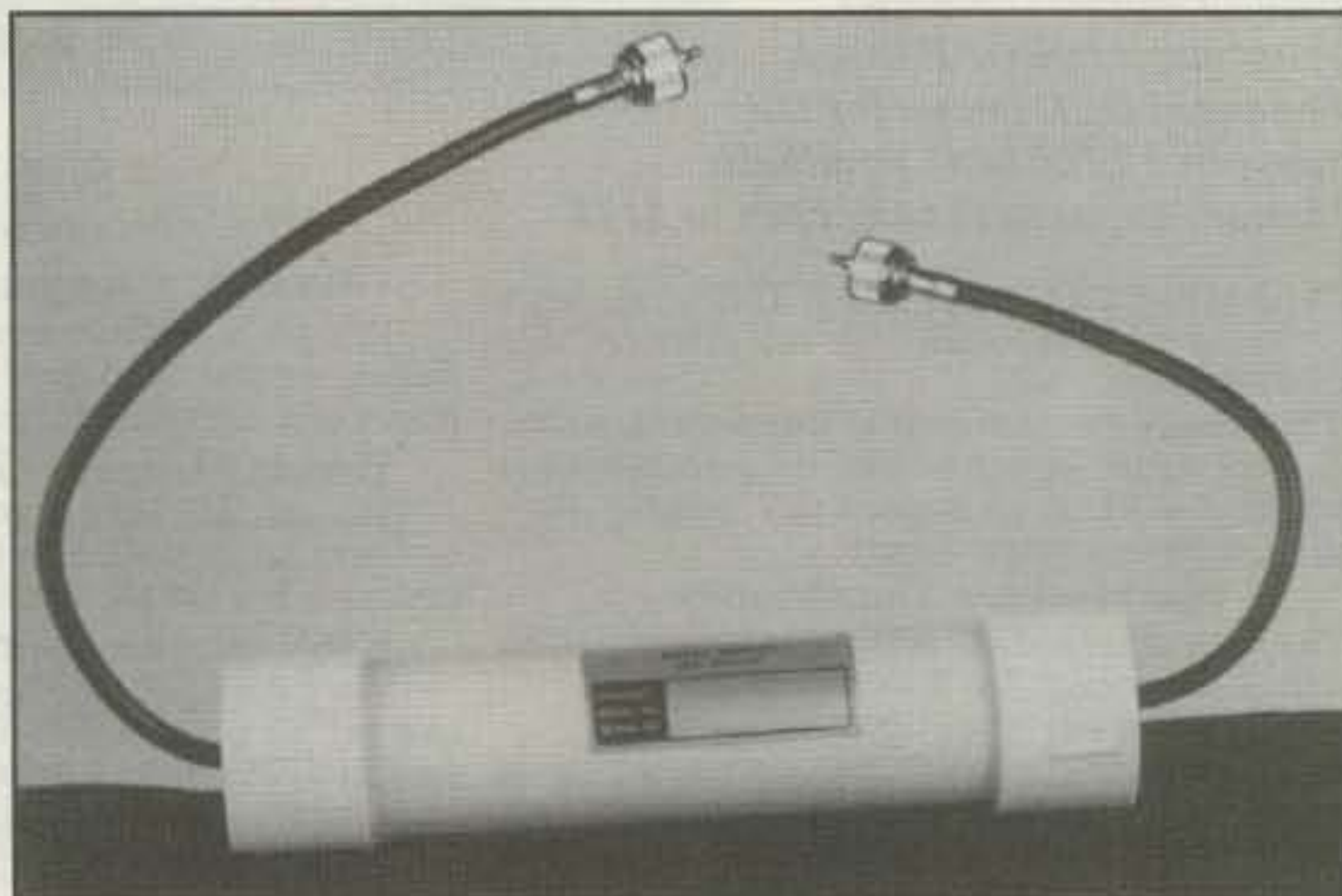
The 4KRF-LI has a 10 inch length of 50 ohm Teflon coax (with PL-259 connector) at one end. The opposite end is fitted with an SO-239 female receptacle. The Terminator-3 isolator has 10 inch Teflon coax pigtailed with PL-259s at each end. The isolators are supplied with Coax Seal® putty that may be used to protect them during outdoor use. Each of these units is 9 inches long, minus the pigtailed.

There is no impedance transformation with the line isolators. Therefore, they are 1:1 devices. Radio Works rates these products for use in SWR environments up to 2:1. Ideally, an SWR of 1 should be maintained to prevent damage to the chokes at high power levels. These units are bidirectional. The Terminator-3 is recommended especially for use between a Transmatch and the remainder of the station equipment.

Practical Applications

The Radio Works line isolators have many useful applications. I use the Terminator-3 between my Transmatch and the station gear. This enables me to use my single-ended tuner as a balanced network when feeding my multiband dipole with 450 ohm balanced feeders. The isolator "floats" the tuner at RF (no earth ground attached to the tuner) so that one side of the feeder can be connected to the end-fed wire terminal with the remaining feed-line conductor attached to the Transmatch chassis, as described by W2OBJ in the earlier reference. This method eliminates the need for having a balun transformer at the tuner output port. It also solves the problems related to balun use in that type of system. Both of these line isolators are suitable for this and the other applications discussed here. They differ essentially in their physical characteristics.

I was able to cure a sticky RF-feedback problem that occurred when I operated my Kenwood TS-140S and TS-450S transceivers from my camp trailer. I use the 12 volt system in my truck to power the transceivers, and neither the truck nor the camper are connected to an earth ground. RF current flowed on the shield braid of the antenna feeder, entered the transceivers, and disabled them (feedback) at power lev-



The Radio Works Terminator-3 line isolator.

els greater than 40-50 watts. By installing the Terminator-3 at the transceiver antenna jack I was able to cure the malady. The RF problem took place when I tried to operate a short, loaded vertical antenna with the camper body as the ground plane.

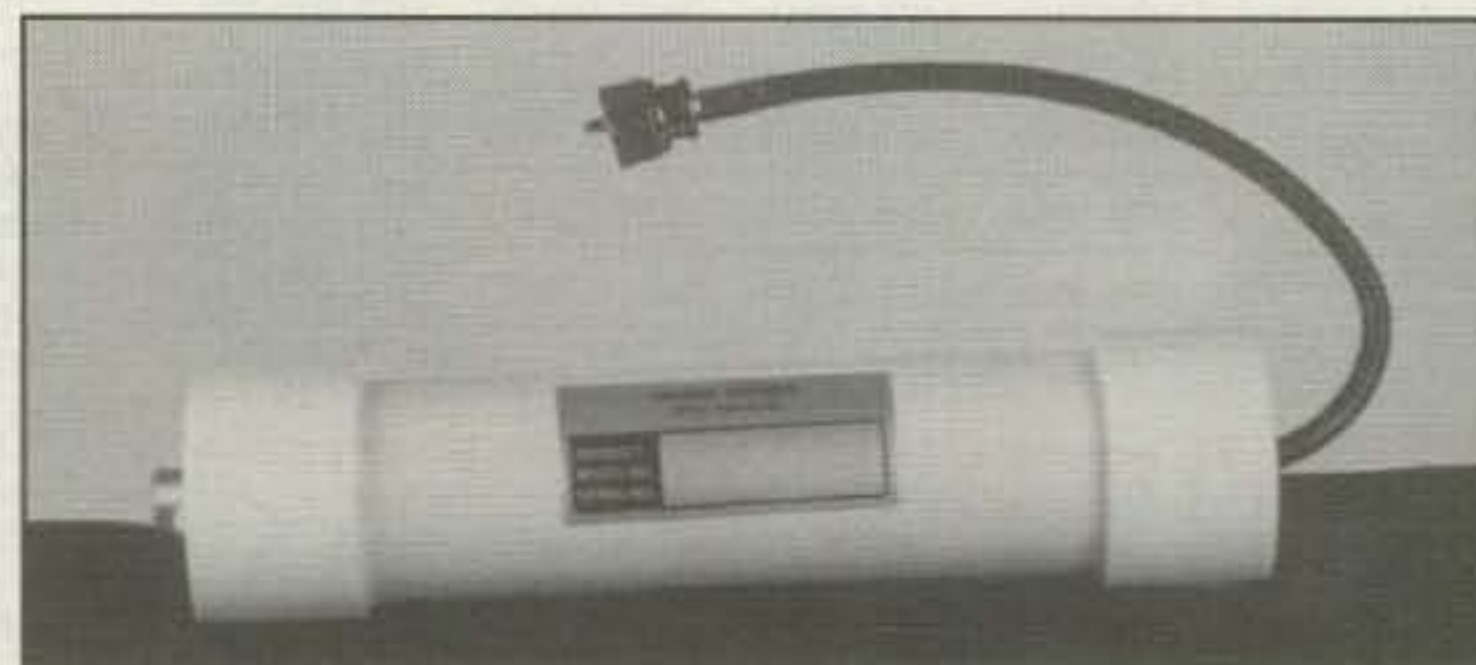
The Radio Works isolators may be used in place of the coiled RG-8 coax chokes that are required at the feed terminals of some triband Yagis, etc. Certainly, they are far less cumbersome to install than those hard-to-wind chokes!

These chokes are useful for isolating a transceiver from a linear amplifier, should there be a ground loop that causes troublesome feedback to the transceiver during transmit. The choke can help prevent the operator from being "tingled" when he or she touches the microphone, key, or transceiver chassis. RF feedback into the transceiver audio circuit often can be eliminated by isolating the transceiver from the amplifier.

At no time while using my Ameritron AL-80A linear amplifier at maximum power from 160 through 10 meters could I discern any heating of either line isolator. This condition prevailed despite the strange impedances reflected to the tuner from the multiband dipole. These tests were conducted while using the isolators between my Transmatch and the AL-80A.

In Summary

Certainly there are many other practical uses for the Terminator-3 and 4KRF-LI line isolators. They are compact enough for use in nearly any system where they are needed. The Terminator-3 sells for \$27.95 and the price tag on the 4KRF-LI is \$25.95. These products are available from Jim Thompson, W4THU, at The Radio Works, Box 6159, Portsmouth, VA 23703. Catalogs and parts may be ordered by calling 1-800-280-8327. FAX line is 804-483-1873. ■



The Radio Works 4KRF-LI line isolator.

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condition, or (3) invest in a SCOUT at \$549 with a one year factory warranty and our legendary TEN-TEC support.

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Operators with years of experience and a shack full of expensive HF gear also buy the SCOUT. It's refreshing to many who say "It takes 5 minutes to learn and without all the complicated features, there is only one thing to do with a SCOUT, work someone!" Experienced hams call us constantly to report "I can't believe this receiver, it outperforms my \$1400 synthesized rig".

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The SCOUT has a little brother, the ARGO 556. It is identical to the SCOUT without the 50 watt final. adjustable 1-5 watts output. TX-2 Amps, RX-.6 Amps.
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travel bag to include the 5 lb SCOUT, wire or whip antenna and lightweight power supply like our Model 938 switcher (its only 3 lbs!). It is surprising how many hikers and cyclists take along their SCOUT using some clever battery arrangement.

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The SCOUT is the most economical way to get started in ham radio. Consider the choice a new ham must make just to test his interest in HF: (1) Spend nearly \$1000 or more on a new rig, (2) buy a used radio and take a chance on its



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- "SYNCHRO-LOCK" software keeps VFO virtually drift free regardless of temperature variation.
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\$549* Includes one band module of your choice

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700C	Hand Mike	\$39.95
607	Weighed Key Paddle	\$39.00
291	Antenna Tuner	\$89.00

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CQ SHOWCASE

June Showcase Correction

Last month on page 44 in CQ Showcase we included information on "VHF-DX" VHF/UHF contest logging software from VHF Products of Chagrin Falls, Ohio. We printed their phone number incorrectly. The correct phone number is 216-543-2748.

Radio Telegraph Courses From Gordon West

Gordon West Radio School provides both amateur radio and commercial radio courses. Now offered are high-fidelity, long-play code cassettes "commercial rated" to pass



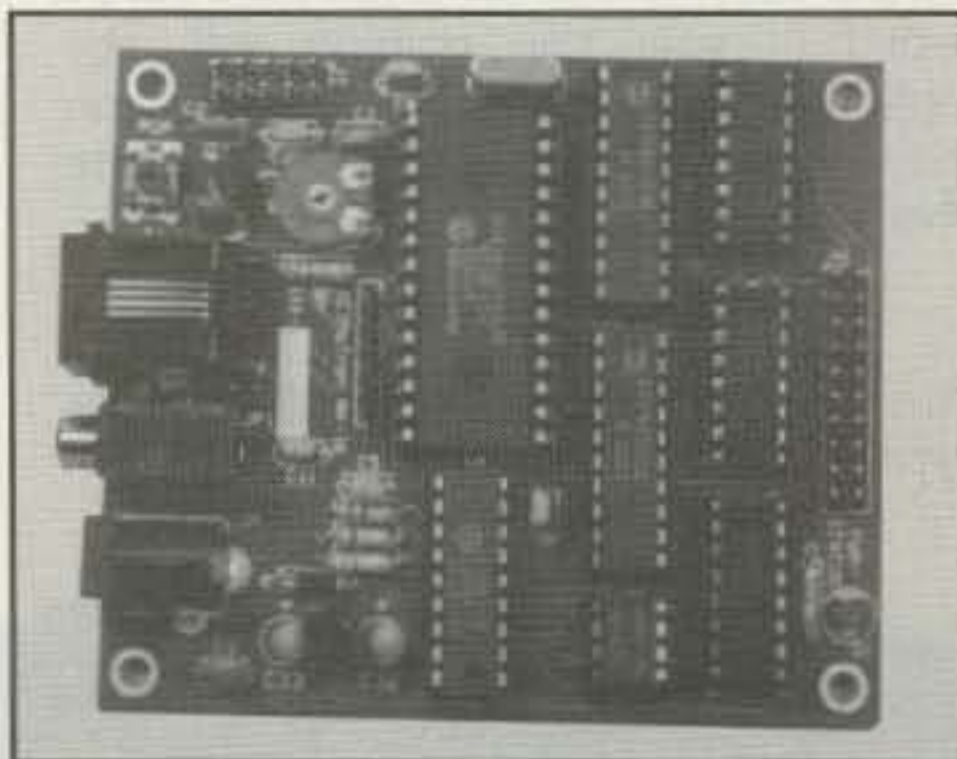
the commercial first-class, second-class, and third-class radiotelegraph licenses, as well as any level of amateur radio examination.

Learning the code, radiotelegraph 6-cassette course #1, accelerates code character recognition with 5 wpm word rates using 16-20 wpm character rates. The CW speed-building 6-cassette course #2 is for anyone who knows the code but plans to build code speed up to 16 wpm for either the commercial radiotelegraph random code group test, or an amateur radio General class code test. The 6-tape radiotelegraph course #3 prepares applicants to pass the radiotelegraph second and first class exams, with room to spare for the Extra class exam.

Each code course contains six long-play cassettes narrated by Gordon West and packaged in sturdy plastic cassette holders. Each course is \$29.95, plus \$5.00 postage and handling, and can be obtained from leading amateur radio and commercial dealers, or direct from Gordon West Radio School, 2414 College Drive, Costa Mesa, CA 92626; or for more information, circle number 101 on the reader service card.

MoTron Auto-Kall AK-16

The Auto-Kall AK-16 is the newest member of the MoTron Auto-Kall product line. It is a DTMF controller with 16 relay driver outputs, DTMF to X-10 home control, CW ID, and Morse



response tones. A relay board with screw terminal blocks, sold separately, can be directly mated to the AK-16 for easy set-up.

All 256 X-10 house/unit codes can be addressed, allowing the user to control lights, appliances, gates, etc., with the DTMF keypad on a hand-held or mobile radio. The House code can be changed "on the fly." Outputs can be configured for several different modes of operation. One mode makes it possible to control the pan/tilt focus/zoom functions of a remote video camera and also provides latching outputs for controlling transmitters, lights, etc. The AK-16 can be configured with a Morse response after each output is turned on, off, or triggered momentarily. This assures the user that the command was received and executed. An output can also be polled to see if it is on or off. The 0-12 digit security code and 32-character CW ID are programmed by using a DTMF keypad. The AK-16 also has a serial output that converts incoming DTMF to ASCII for input into your computer.

The AK-16 is sold as a fully assembled circuit board. Price is \$99.00 and it is available from MoTron Electronics, P.O. Box 2748, Eugene, OR 97402 (phone 800-338-9058; fax 503-687-2492). For more information, circle number 102 on the reader service card.

DSP Noise Reduction Products From JPS Communications

JPS Communications, Inc. has announced a new DSP noise reduction and filter unit available to amateurs and SWLs. The NIR-12 Noise & Interference Reducer and Filter Unit is an audio signal processor designed to provide the user the ability to reduce or eliminate most types of interference from received voice, CW, and data transmissions. The NIR-12 uses dual DSPs to provide simultaneous bandpass operation, noise reduction, and multiple tone removal. The spectral notch filter eliminates multiple tone interference from "tune-ups," foreign broadcast carriers, CW, RTTY, etc. A multi-



layer printed circuit board provides shielding to virtually eliminate radiation from the DSP data bus, maker says. Two methods of noise reduction are provided—Improved Spectral Subtraction (NIR[®]) and Improved Dynamic Peaking.

The unit may be used in all data modes, including ARQ modes popular with AMTOR and PACTOR. The unit gets its audio input from the receiver speaker output, line output or headphone jack, then provides volume-adjustable processed audio from its own built-in amplifier to power an external speaker of 3 to 8 ohm impedance. A line output, unaffected by the volume control, is provided for modem or phone patch.

The NIR-12 requires 12 VDC at 1A peak. Power adapters are available from JPS. Mating connectors are supplied with each unit. The NIR-12 has a one year factory warranty and is fully upgradable. For more information, contact JPS Communications, Inc., P.O. Box 97757, Raleigh, NC 27624, or circle number 103 on the reader service card.

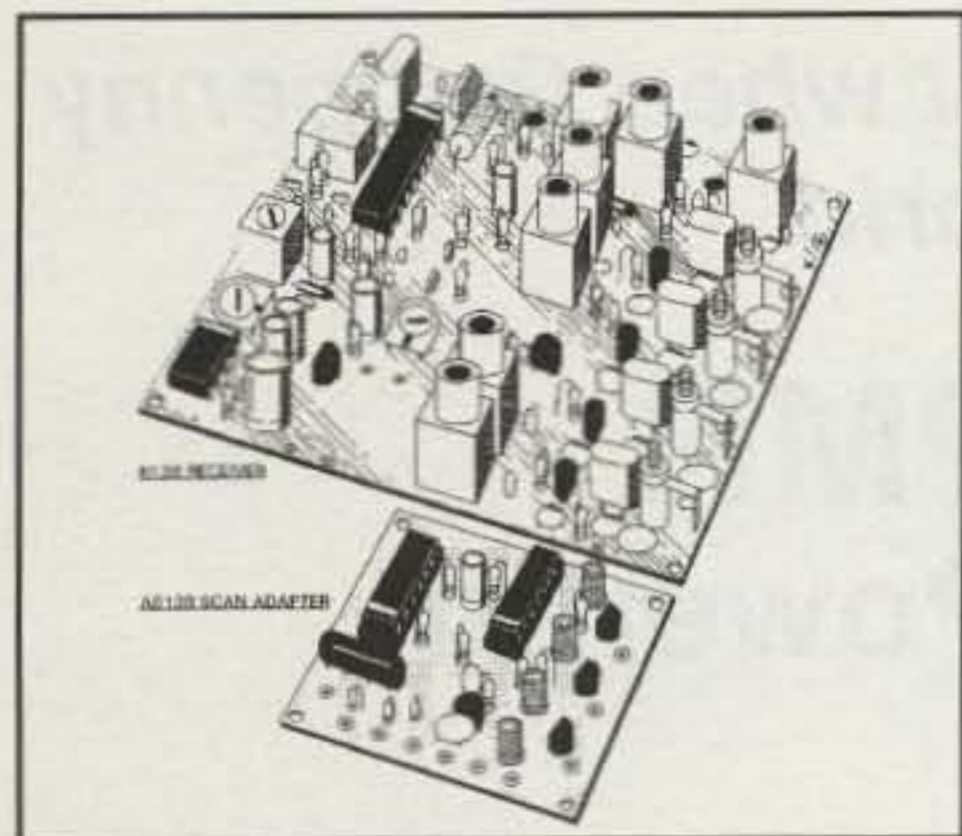
Tools/Test Equipment Catalog From Jensen Tools

Jensen Tools, Inc. offers a "Spring 1995 Catalog Supplement D." This catalog presents 72 pages of service products for the support of telecom/broadband communications equipment and systems. New products include Chesilvale Electronics' DSTS2 Dual Standard Test Set, the Fluke 860 Series Graphical Multimeters with combination digital/graphical display, and several new Jensen brand tool kits. Many other instruments from Fluke, Chesilvale, Tektronix, Wavetek, Harris Dracon, Microtest, and other leading test manufacturers are also offered. Included too are Jensen's ratchet-style crimp tool frame and dies their JTK-44 Telecom Installer's kit, and the JTK-4400 Deluxe Telecom Kit. Other major sections of the catalog offer wire/cable, connectors and connector kits, PC diagnostics, soldering equipment, benches and bench accessories, cleaning supplies, cases, shipping containers, and more.

For a free copy of "Spring Supplement D," call 800-426-1194. For more information, write to Jensen Tools, Inc., 7815 S. 46th St., Phoenix, AZ 85044, or circle number 104 on the reader service card.

Scan Adapter For Hamtronics R138

The Hamtronics R138 Weather Satellite Re-



ceiver now has a companion accessory, the AS138 Scan Adapter Module. The R138 is crystal controlled and has four channel oscillators which allow the user to select a particular satellite by grounding the desired control line with an external switch. Crystals are available for all the common satellites, and they install by plugging into sockets on the board.

The new AS138 Scan Adapter allows operators to be away from the shack and still monitor the various weather satellites. It consists of a small PC board which continually monitors the receiver, scanning the four channels, looking for an active satellite overhead. If it hears one, the scanner stops on that channel and turns on a relay. The relay can be used to activate a tape recorder, allowing operators to play back the tape into the demodulator unit whenever there's time to reproduce the satellite images on a computer.

The R138 Receiver is available as a kit for \$129, or wired and tested for \$189. The AS138 Scan Adapter Module is \$39 in kit form or \$69 wired and tested. Channel crystals are \$12 each. For more information, contact Hamtronics, Inc., 65-F Moul Rd., Hilton, NY 14468-9535 (telephone 716-392-9430; fax 716-392-9420), or circle number 106 on the reader service card.

Yaesu FT-8500 Dual-Band Transceiver

The FT-8500 is a compact FM mobile transceiver for both 2 m and 70 cm amateur band operation. Two unique features, the FS-10 Smart Controller Microphone and the Spectra-Analyzer, have been added to the



FT-8500. The FS-10 Smart Controller Microphone permits total transceiver control from the palm of your hand. All radio functions are housed in the microphone. The Spectra-Analyzer allows the user to view channel occupancy above and below the current operating frequency. The Spectra-Analyzer can also be used to watch activity within the memory banks.

The FT-8500 features programmable transceiver status display; menu program-

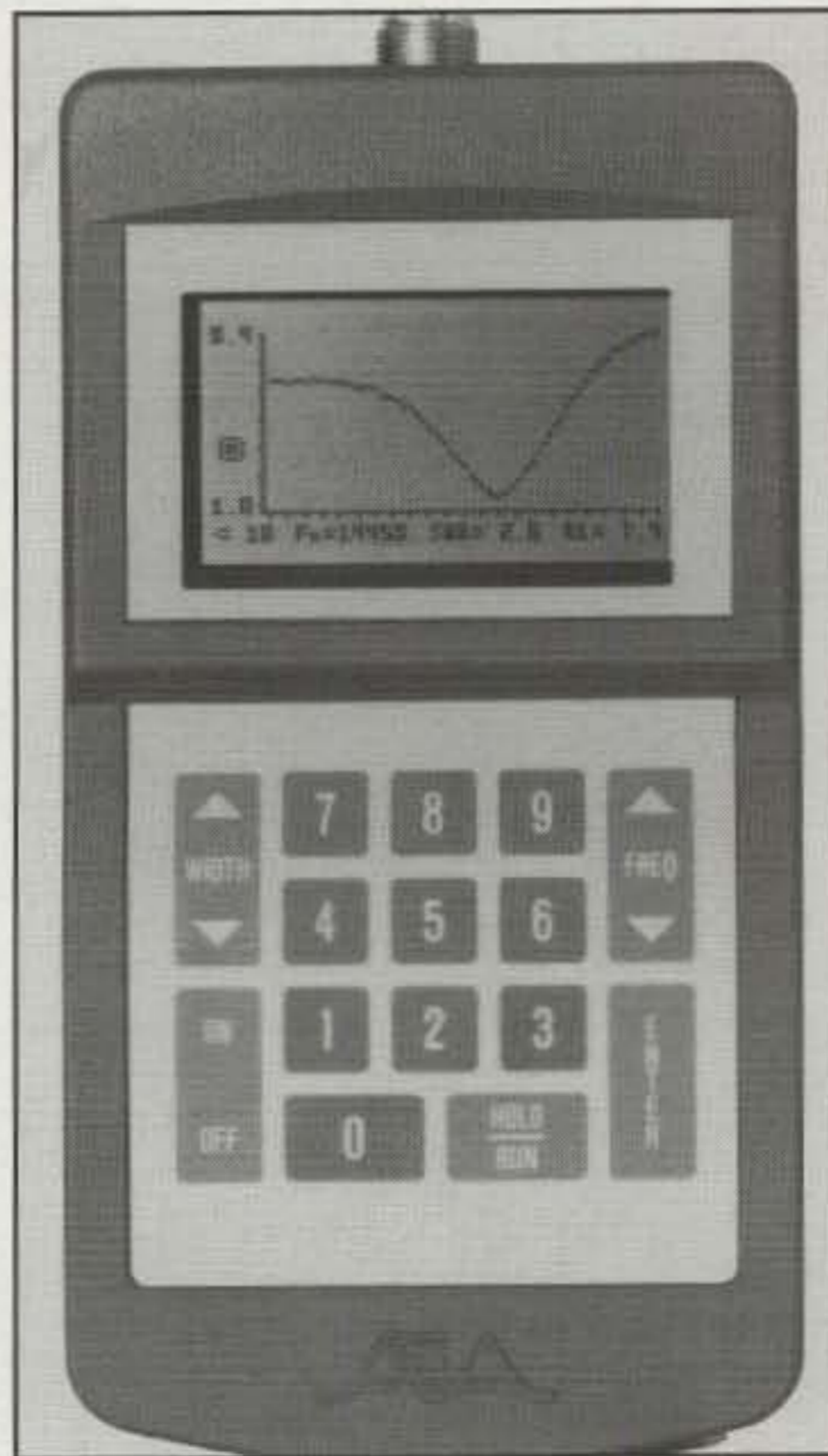
ming/custom settings; menu-selectable packet baud rate; built-in CTCSS Encode, which provides 39 subaudible tones for repeater access; CTCSS paging, or silent monitoring of busy channels with optional FTS-22 Dual CTCSS Decode Unit; DTMF paging with alerting systems including a ringer, alert melody, or CW playback of the calling stations callsign and/or message; automatic power off timer; 110 memory channels in 5 memory banks with 5 special-purpose memories for each band, including one for a "home" channel; a cloning feature to enable quick transfer of radio setup and configuration data from one FT-8500 to another; and more.

For more information, write to Yaesu USA, 17210 Edwards Road, Cerritos, CA 90703; or circle number 105 on the reader service card.

AEA 30-137 Antenna Analyst

Advanced Electronic Applications has added the 30-137 to their hand-held Antenna Analyst line. The 30-137 Antenna Analyst (30-137 MHz continuous coverage) provides antenna performance information in a graphic format for commercial, government, and military applications. It is designed to fit the needs of aircraft maintenance personnel.

The 30-137 graphically displays antennas' SWR vs. frequency plots on an LCD screen over an SWR range of 1:1 to 10:1. The LCD readout displays the SWR curve over the entire frequency range, as well as at single frequencies. The 30-137 also measures return loss in dB. The keypad allows users to select the center frequency, frequency range, step size, and other parameters. The unit is equipped with a serial interface to allow computer control. Users can store SWR plots obtained by the Analyst in a PC for later reference, comparison, or printing by using AACOM optional software.



The 30-137 Antenna Analyst measures 4.30"W x 2.25"H x 8.50"L and weighs 1lb. 10 oz. The Analyst is battery powered with a built-in battery saver and can also be powered with an external 12-16 VDC source. For more information, contact Advanced Electronic Applications, Inc. (AEA), P.O. Box C2160, Lynnwood, WA 98036 (800-432-8873), or circle number 107 on the reader service card.

Optoelectronics CX12AR Computer Control Interface

The CX12AR is a Computer Control Interface for AOR (AR8000, AR3000, and AR2700) and CI-V (ICOM R7000, R7100, and R9000) receivers. The CX12AR has two operating modes, switch selectable between Full Duplex and CI-V. The CX12AR also has Dedicated Squelch Status input for the AR8000 and the R7000 with no need for additional connections. The interface converts TTL serial interface signal levels to RS232 levels compatible with most personal computers, while allowing up to four different Optoelectronics devices equipped with serial ports to be connected to one computer port in a star network configuration. It can be used to download memory from the Scout



to files in a computer or check against the FCC spectrum CD ROM database. Switched in RS232 mode, the CX12AR is used as a data-logging device for the M1 frequency counter. The CX12AR also has software controlled tape recorder output.

All cables, adaptors and demonstration software included. For more information, contact Optoelectronics, Inc., 5821 NE 14th Ave., Ft. Lauderdale, FL 33334 (305-771-2050, fax 305-771-2052), or circle 108 on the reader service card.

Eimac 4CM1000KB Superpower Broadcast Tube

Varian Associates, Inc. has introduced a new Eimac Superpower Broadcast Tube. This Eimac product is a multiphase cooled tetrode with pyrolytic graphite grids. The 4CM1000KB is intended for use in transmitters in the 500 kHz to 30 MHz frequency range. The tube is capable of generating output power of up to 800,000 watts.

For additional information or literature, contact Varian Power Grid Tube Products, 301 Industrial Way, San Carlos, CA 94070 (phone 415-594-4000; fax 415-592-9988; internet address powergrid@pgtp.varian.com or circle number 109 on the reader service card.

A penny for your thoughts isn't much, but when that penny is a mountain, you've got a whole new world.

The Story of VE7PMR Penny Mountain's Solar-Powered Packet Repeater

BY DENNIS M. WILSHER*, VE7EMS

The Penny Mountain Packet Repeater is located at 6400 feet above sea level in the Rocky Mountain Trench in Northern British Columbia, Canada. It came into operation on September 3, 1993, and was designed to operate in lightning storms, in up to 120 mph winds, at -54 F temperatures, and in up to 15 foot snowfalls—all without missing a beat.

Background

I was raised in that area in my childhood and was more than familiar with the extreme conditions old Mother Nature could play on anything man might attempt to put together or try to keep running. Then there are the grizzly bears, porcupines, and wolverines that like to chew up snowmobile seats or just roll things over to see what's under them.

Early in 1993 I sat down with Frank, VE7ENX, in McBride, and the discussion came around to a link to Prince George from McBride whether on VHF voice or packet. I bounced around the idea about putting a packet node on Penny Mountain, where the Rocky Mountain Trench does a 45 degree bend to complete the 150 mile distance to Prince George and the nearest BBS. Frank was pretty enthusiastic about the idea.

Researching

Gaining access to the mountain was via an old forestry road cut in the early 1960s, but as the game (grizzlies) used the road as a trail quite regularly, it was well worn. Also, about one-half mile below the summit there was a private cabin completely outfitted so a person could safely stay in it. What a bonus!

In June 1993 I bought a small DT50 motor bike to get up the mountain to do a path check. My first attempt had me leaving Prince George at 4 AM and getting to the bottom of the mountain via a new logging road. I took along two 2 gallon gas jugs and a car battery strapped to the front of the bike, a dualband antenna, a laptop, a Kenwood 741A, and a Pk88. My newly purchased DT50 powered out halfway up the mountain. I tried pushing the bike, but because I was a smoker, I had to lie down and almost had a heart attack right there. Then it started to hail!

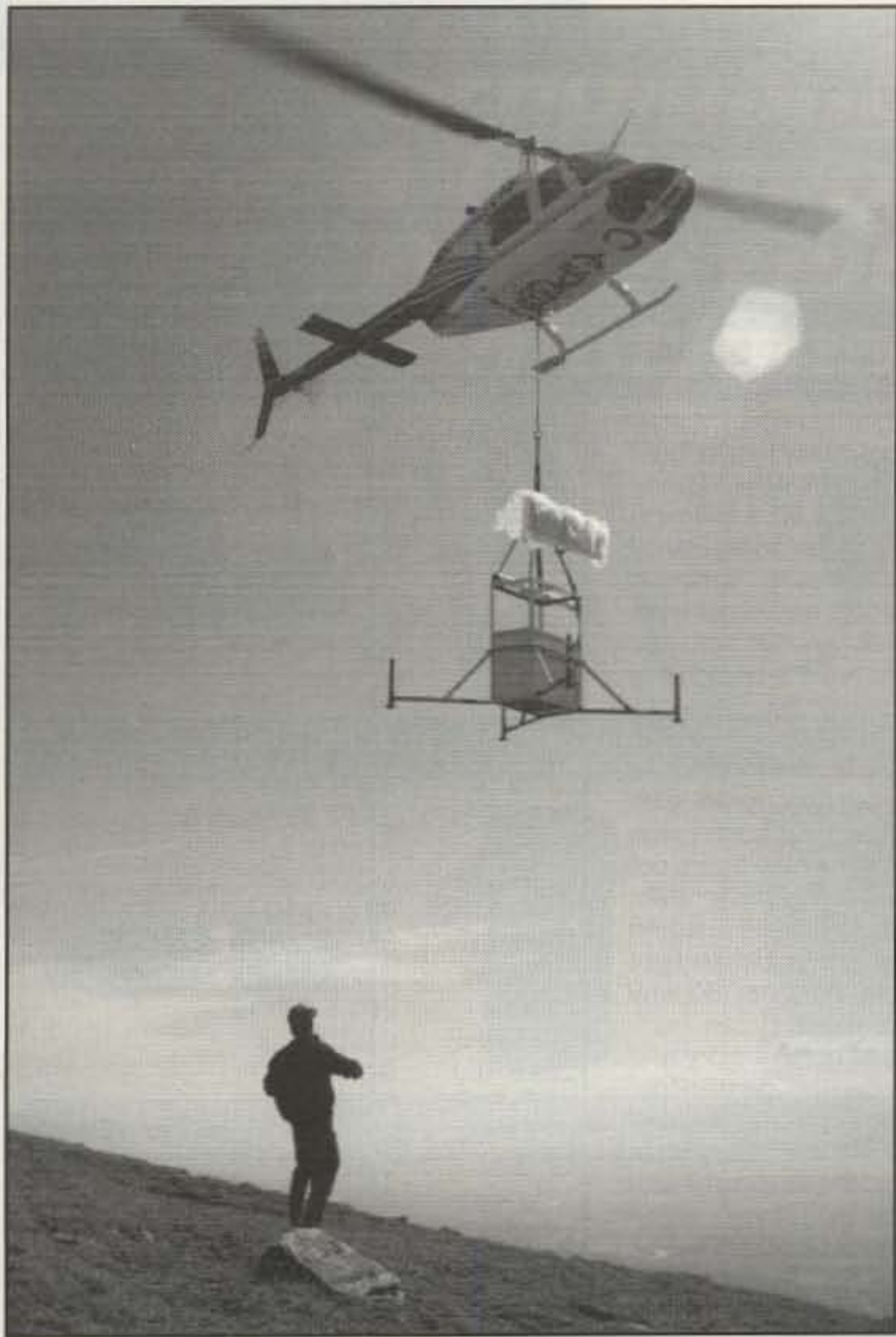
*4177 First Ave., Prince George, B.C.
Canada V2M 1C5
VE7EMS@VE7FG.#NBC.BC.CAN.NOAM



The basic VE7PMR packet node: an HT, a TNC, and some control boxes. These components plus three heavy-duty solar-powered batteries keep it operating flawlessly.



About a year later, in October 1994, the crew returned to make upgrades to the system. Here VE7EMS is shown during a snowstorm adjusting a set of temporary antennas.



In September 1993 the "lunar module" type repeater was airlifted to the mountaintop. The author is seen guiding the pilot to the exact spot.



Taking advantage of the nice weather in September 1993, VE7HRC and VE7EMS quickly secure the module to the mountain and set up the antennas.

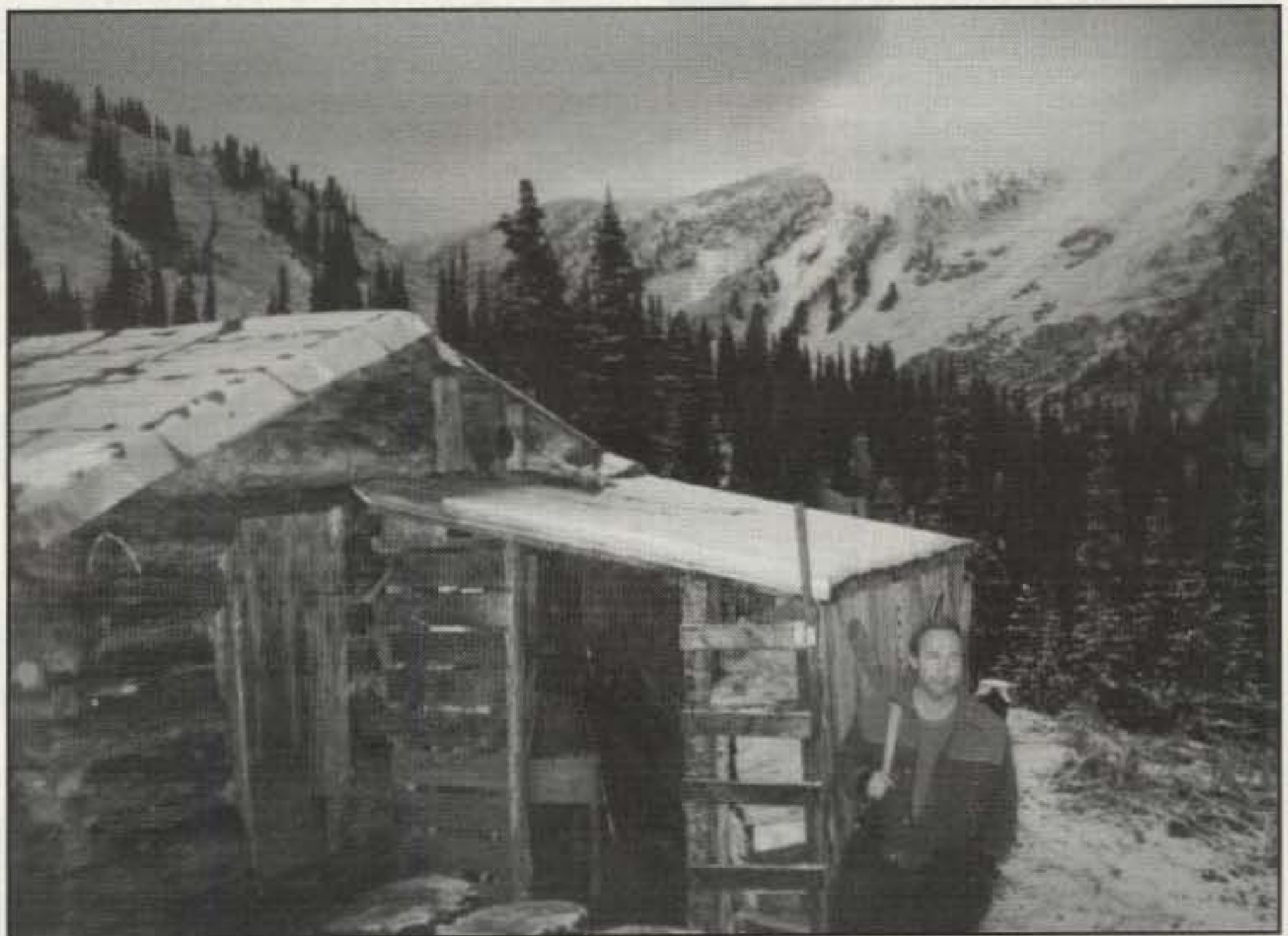
At this point I almost gave up on the whole idea, but I figured I might as well see if a packet contact to Prince George was possible. With a garbage bag protecting the radio equipment sitting on the motorcycle seat I could connect to YXS 50 miles away with 5 watts. Great! I then turned around and went back to civilization to regroup, tired, wet, and exhausted.

Stan, VE7SSS, and I went to the local library and studied topographical maps to check the path from his BBS, VE7FG, to Penny Mountain. We concluded it would be close, but we would clear Tabor Mountain by 300 feet HAAT (height above average terrain) in theory.

I then sold the DT50, moved up to a TY250 trial bike, and left again in July 1993 with the same equipment (and extra jets to rejet the carb at higher elevation). I made it to within 200 feet of the top before I chickened out, as it became too steep for my limited bike experience to go any farther. Walking around with my handheld at 2 1/2 watts, there wasn't a repeater around for 120 miles that I couldn't get into.

I set up the packet station and connected to Prince George and to McBride with no problem at 4 watts with a mag-mount antenna sitting on a rock.

A wicked-looking storm was coming in from the east, and my time there was limited. I moved down the slope to the south about 200 feet to try another path site. The idea was to



The next morning VE7DPG emerges from the cabin just below the summit, proving to one and all that he didn't freeze to death.

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back across the input of the front end. There was no noticeable reduction in sensitivity.

Installation

After contacting several helicopter companies while I was building the unit, I lucked into Northwood Pulp & Timber Ltd. They not only trans-

ported the unit to the mountaintop, they took three of us up and brought us back for free.

The night before we set out on our journey, with the help of seven amateurs we loaded the node in my pickup truck and tied it down. We left the next morning and arrived at the bank of the Fraser River, 7 miles from the site, on time to meet the helicopter. Shorty, VE7HRC, Randy, VE7AMS, and myself were transported

up the mountain. While the helicopter went back to get the unit, we looked for the spray-painted spot. It was gone! (I had used environmentally safe spray paint. Oh, oh.)

As the helicopter had the unit by now and would be back to the site in 4 minutes, we had to think fast. I looked around and made an educated guess as to where I had made the path check in July, and stood on the spot just as the helicopter came over the ridge with the unit.

A successful landing! The weather was beautiful, about 70 degrees F with just a slight breeze. We leveled the unit with the adjustable legs, unwrapped the protected solar panels, and mounted the initial $5/8$ -wave, PVC protected antenna.

We drove five lightning rods 3 feet down into the overburden, and connected one rod to each leg of the structure; all components inside were grounded to a separate fifth one. A sixth ground rod was driven in at the peak to hopefully attract a nearby strike to it, and not the node.

I then proceeded to paint the structure with rust-proof paint. Our two hours were now up, and the helicopter was on its way back to get us. I fired up the node at 2:30 on September 3, 1993, and Frank, VE7ENX, in McBride was happily packeting to Prince George's BBS—VE7FG. We all jumped in the helicopter and left the site, a successful mission completed.

Improvements

In October 1994, after Wayne, VE7DUC, had redesigned an 18 foot 6 dB commercial fiberglass antenna for this operation and after we

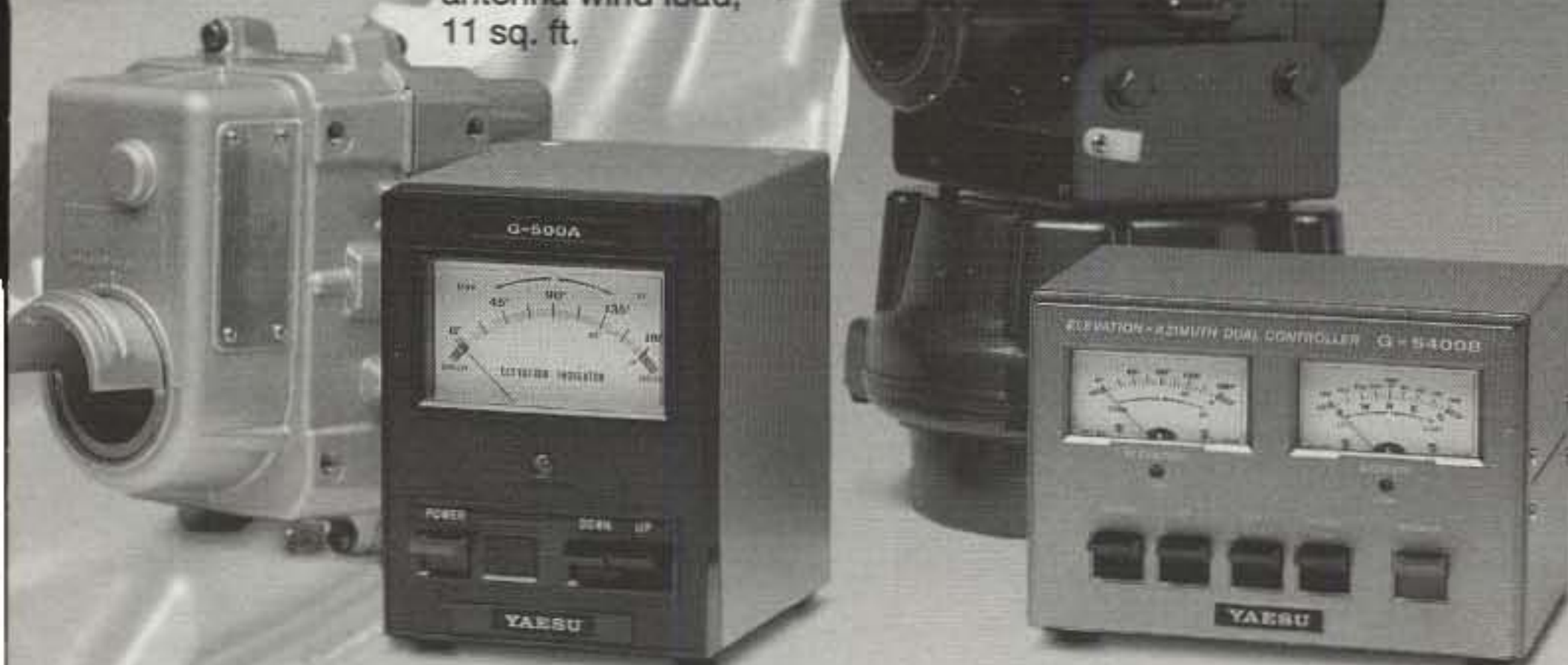


Flying over Penny Mountain in March of this year, the repeater is barely a spec in the snow.

Turn your head!

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had acquired two additional 1000 amp batteries, we had these items air-lifted to the site. Myself and Warren, VE7DPG, hiked up the mountain to install the X1J2 upgrade, deviation, temperature, and voltage meters, and open a squelch mode on the line before the snow hit. Otherwise I would have had to wait until late June 1995 before the snow melted again to get back to the site.

The antenna and battery upgrade were necessary so I could drop the wattage to 3 watts

and still get the same ERP. The Penny Mountain Repeater also needed the additional capacity to support the new BBS that was now in McBride and all the forwarding it created.

We left the cabin wearing two pairs of long johns, rain coats, mitts, and snowpacks. We were ready, or so we thought! Unfortunately, as we neared the summit the first snowfall of the year hit us with a vengeance. We were now in a full-blown snow blizzard with 40 mph howling winds, no place to hide, and only 30 foot

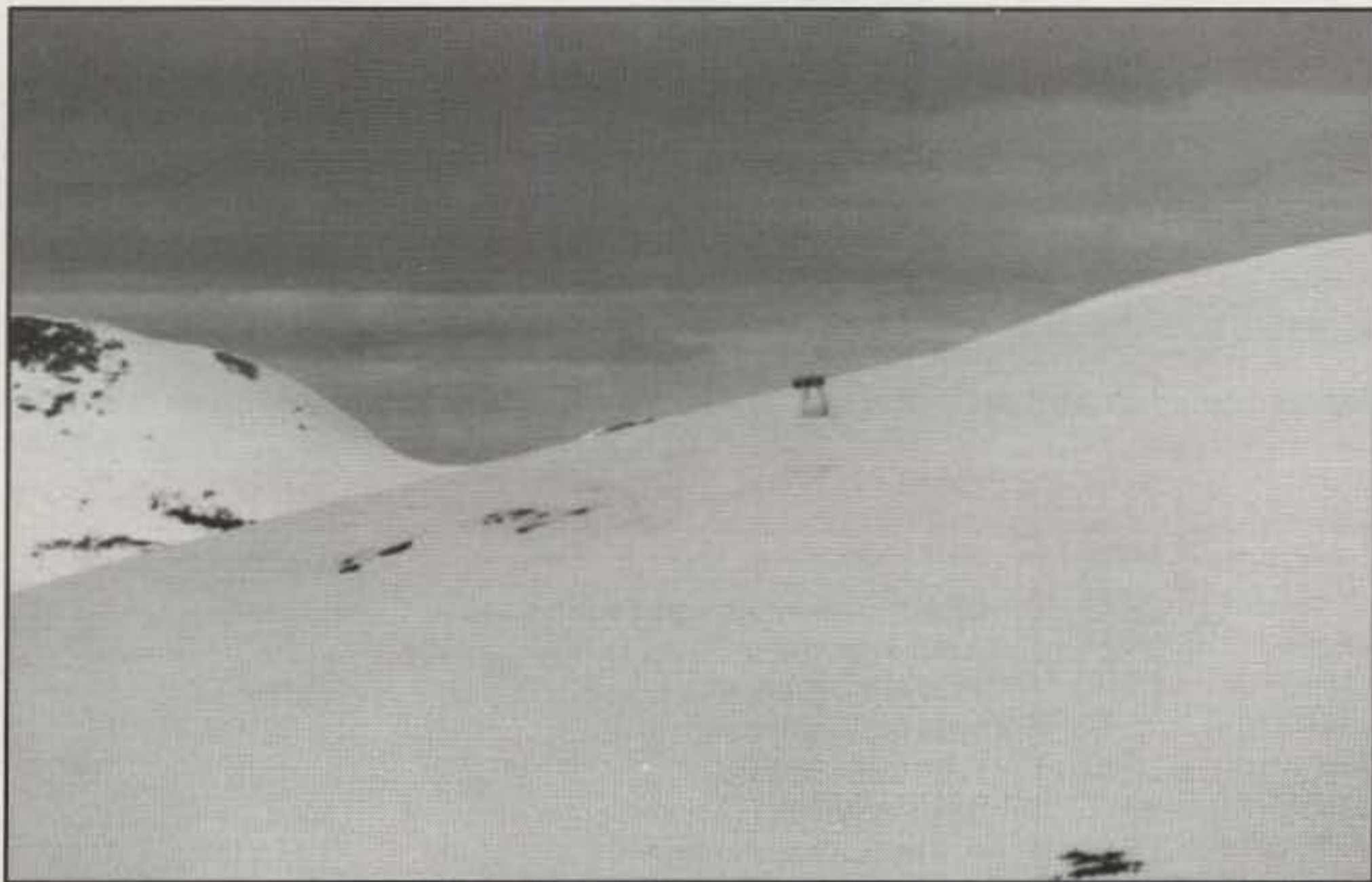
visibility. We persevered and mounted the antenna, hooked up and topped off the water levels in the batteries, and installed the upgrades. The cordless drill died on us, as nickel-cadmiums don't like cold. The butane soldering iron also died, as the butane wouldn't turn into gas. We worked around it, though, closed the lid, and left without taking a picture. We just wanted to get out of there!

We slipped and slid our way down the slope to the cabin through the now 2 inches of snow, our bodies shaking and fingers numb, snow stinging our eyes as it came at us at a 90-degree angle. Was hypothermia setting in? This hobby is no fun in those conditions, and I don't think Warren wants to go back to the site anytime soon. I'll stick to August visits myself from now on!

Operation of the repeater since October 1994 has been monitored remotely from the site. The lowest voltage recorded was 12.3 volts and -10 degrees C inside the freezer when the valley temperature was -34 degrees C. The node has been running for over 5000 hours on X1J2 software and has never been off the air!

I thank all the amateurs who helped in this project in various ways, including Shorty, VE7HRC, and Randy, VE7AMS, who were part of the initial installation team putting the unit on the mountain on September 3, 1993. I would also like to thank Warren, VE7DPG, who almost froze to death with me, and anyone else I might have forgotten to mention.

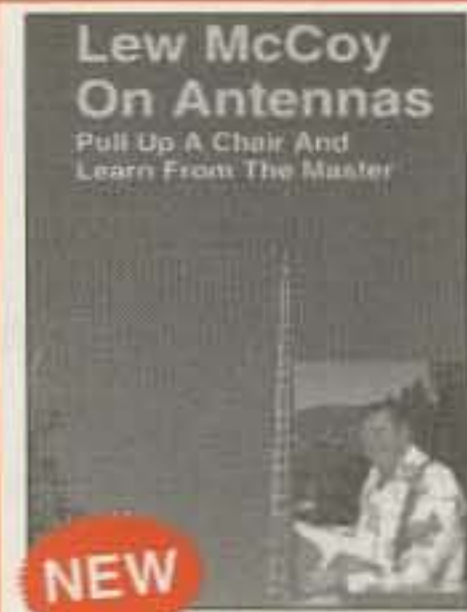
I believe this project shows that if all amateurs work together, anything is possible. If anyone says to you something can't be done, remember there is no such thing as "can't."



You have to fly quite a bit closer before the shape of the module stands out from the snow.



CQ BOOK &



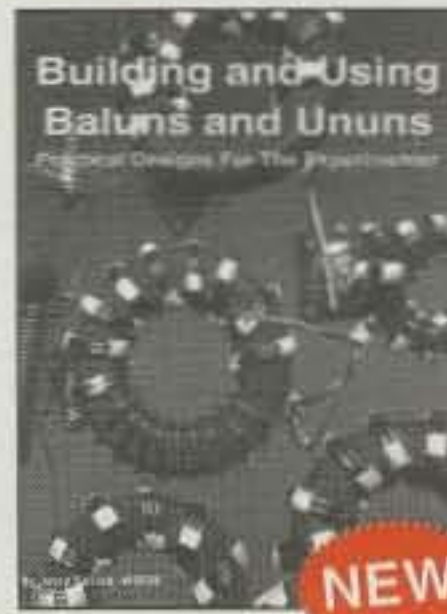
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Everyone remembers his or her first car and first rig, and all the fun that went with them. As we grow older, some of us want to recreate those feelings by acquiring the same things. With some of us, though, this leads to a passion for collecting—something to which many amateurs can relate.

C³

Collections, Collectors, and Collecting

BY JOE VERAS*, N4QB

Imagine going to a hamfest every weekend of the year. Then suppose at each of these hamfests you find one nice piece of vintage gear in the fleamarket. If you continued to visit a hamfest a week and took home one fleamarket gem each time, in ten or fifteen years your equipment collection would rival some I've encountered in my travels for *CQ*.

For the past couple of years I have been photographing amateur radio equipment to illustrate *CQ*'s "Radio Classics" calendars and recently for a book I am working on about the American amateur radio gear industry. Along the way I've seen collections as interesting and varied as the people who assembled them.

In 1973 Herman Cone, WB4DBB, set out to re-create the station he used when he was first licensed in 1966. He accomplished that in short order, but didn't stop there. From the vast collection he has today, it should be possible to create *anybody's* first station. In the basement of his Goode, Virginia home, Cone has an amateur radio station that is active on most modes from 1.8 through 1300 MHz, with some notable achievements across the whole spectrum. He recently received his 5-Band WAZ, CWAZ, and is on the DXCC Honor Roll. Other shack wallpaper includes VUCC on 50, 144, 220, and 432 MHz.

The real story in the basement, though, is his collection of several hundred pieces of vintage amateur gear. Stacks of receivers and transmitters form canyons which lead into a maze of transceivers, power supplies, and amplifiers. Antenna tuners, HTs, keyers, and other accessories are everywhere. Cone initially concentrated on Swan, Drake, and Heath, but today most manufacturers active since the World War II are represented.

We can add to the impressive scope of this collection the equally astonishing fact that most of it works. If you QSO WB4DBB, be sure to ask Herman what rig he's using. Many pieces from his collection continue to see service on the air long after they've reached normal retirement age.

A consulting electrical engineer by profession, Cone worked nine years for G.E.'s mobile radio division. He also spent a couple of years at Aerotron, a company connected with names from amateur radio's past, including Gonset, Ameco, and Waters. Restoring and maintain-



WB4DBB helps prepare a Hallicrafters SX-115 from his collection for photography.



Even a wide-angle lens takes in only a small part of the WB4DBB collection.

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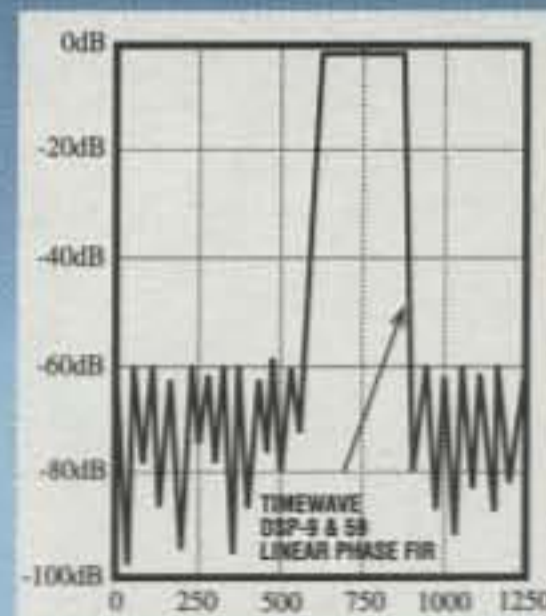
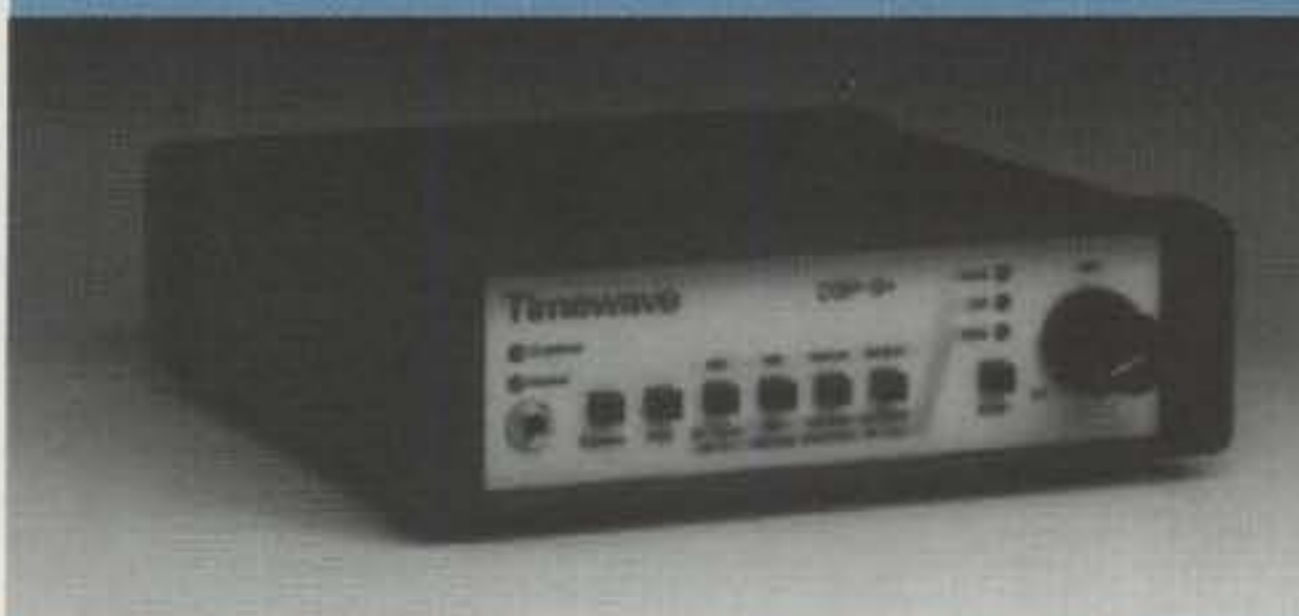
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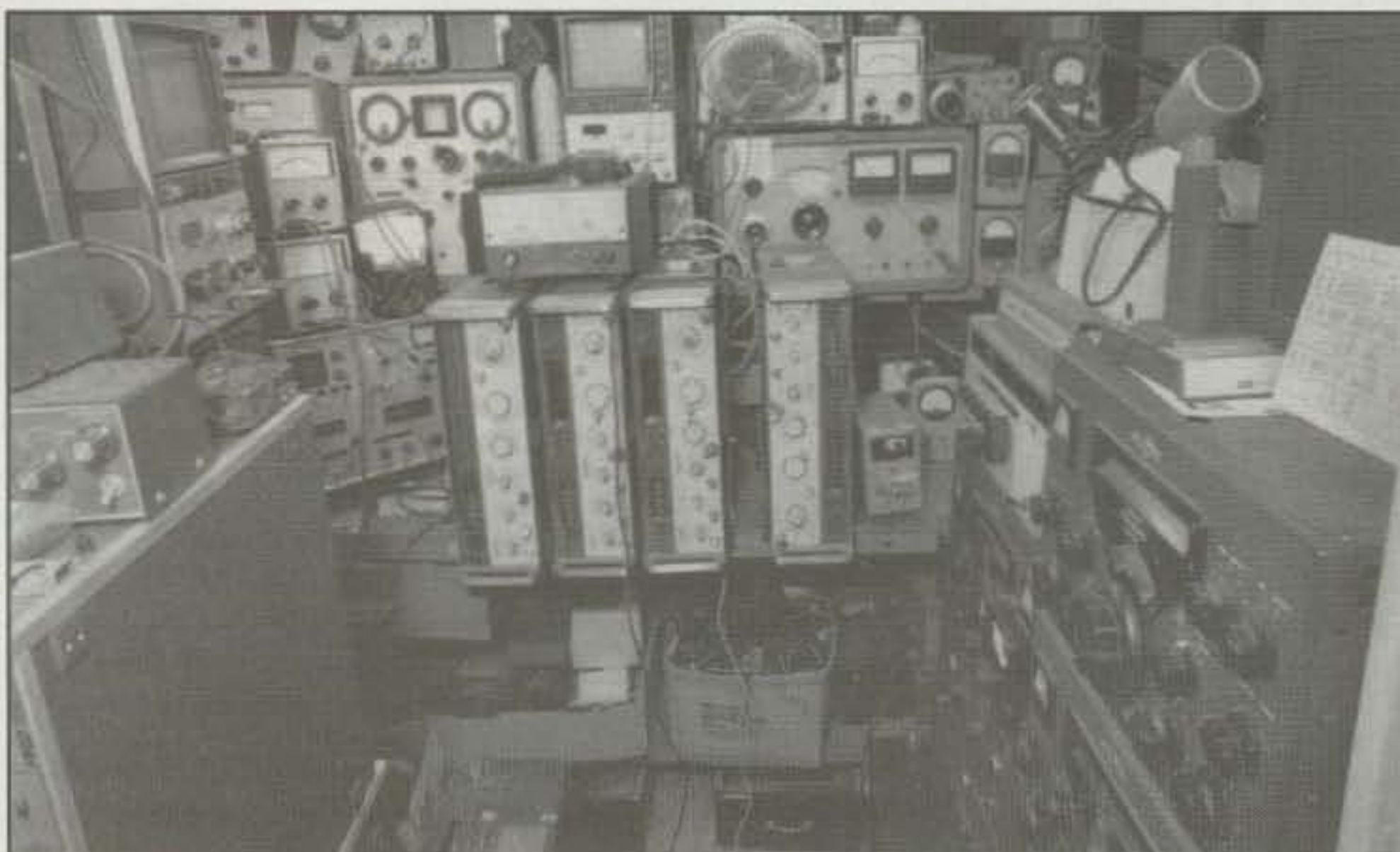
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Which microphone or key goes with which rig? The WB4DBB operating position.



K6DPZ amid some of Land-Air Communications' inventory. I believe the 75S-3C in the upper left-hand corner was acquired from some K2 in Northport.



Some of Hal Guretsky's diagnostic tools.



An amateur can't have too many 75A-4's. Hal Guretsky, K6DPZ, admires a stack of the classic Collins receivers.

ing his collection has given him a thorough knowledge of the way vintage gear works. His shop includes all the tools and test gear needed to keep it in top form. A complete library of manuals and periodicals provides an in-house source of technical and historical information. With all this equipment, it is not surprising to find more than one amateur in the Cone family. Herman's wife, Donna, is N4RXL.

Herman likes American-made gear, and these days he is interested in things that are unique, rare, or complement something he already has. Collectors of anything are haunted by the one that got away, but Cone's big regret is having built the Johnson Ranger II that he found in kit form at a hamfest. His favorite piece of gear? "The Collins 75A-4 and KWS-1 combination," he says, and then quickly adds, "The Drake 1-A, Central Electronics 200V, and Hallcrafters FPM-200 are all at the top, too."

An equally astonishing collection is located just east of New York City, not far from CQ headquarters. Hal Guretsky, K6DPZ, has what must be the greatest concentration of vintage amateur radio gear per cubic foot I've ever seen. It is as if the inventory from all the amateur radio stores of days gone by has been compressed and deposited into a building behind Guretsky's house. The densely populated rows of floor-to-ceiling metal shelving contain the equipment end of Guretsky's business—*Land-Air Communications*.

Guretsky's regular job is maintaining communications equipment for the New York City police department. In his time away from those duties he runs the business he started while in California and brought east with him when he came to New York in 1978. His West Coast company dealt primarily with land-mobile business communications, but amateur radio gear became predominant when he moved to New York.

Although he stresses that he has wide-rang-

ing interests, radio and electronics have figured largely in Guretzky's life. Licensed at age 12, by his 16th birthday he had passed the FCC's First Class Radiotelephone exam. His work experience includes having taught electronics at a Brooklyn high school and several trade schools. Guretzky holds 5 U.S. patents dealing with antennas and positioning devices.

Hal remembers drooling over the amateur gear in the Allied Radio and other catalogs—equipment beyond the means of a youngster in the mid-1950s. Now he has that 75A-4 and Johnson Desk Kilowatt—those two pieces and 2500 to 3000 more. The inventory at Land-Air Communications changes constantly. For that reason, he has no published list, but a quick phone call or fax will determine whether or not he can fill a customer's need for a particular piece of equipment.

In addition to maintaining the equipment he sells, Guretzky does a large repair business, for which his facility is well-equipped. Two complete test benches and a bake-in bench are furnished with all the test gear necessary to service anything from DC to microwave. Even though his personal philosophy is "Anything man builds, man can repair," he doesn't feel that restoring a piece to working order is always advisable. He says, "If the cost of repair approaches half the replacement cost, you might think twice about doing the repair."

Sentiment drives many amateurs to collect and restore vintage gear. The distinguishing factor in doing a repair is economics for Hal. "As far as equipment goes, I cannot get emotionally involved," he says. "It's a way of making money doing something I really like." Yet there must be something quite satisfying about having turned the stuff of all those long-ago dreams into reality.

Lack of sentiment or attachment doesn't imply a lack of appreciation, however. Guretzky feels that American-made amateur gear from 1950-65 displays a quality of workmanship unlike any found today. Pressed for a personal favorite, he answers, "The Collins KWM-380. It was years ahead of its time. If it were developed and marketed today, it would probably cost \$20-25,000."

Although he is not a collector in the conventional sense of the word, Guretzky's showroom presents the history of amateur radio equipment in a tableau that is, in places, several layers deep and extends from the floor to the ceiling. At times I felt as if I were an archaeologist peering into the tomb of some ancient amateur radio king. My favorite find was an 8 foot high stack of Collins 75A-4's.

Here and there around his shop radios were in the process of being crated for shipment, some of them to distant points on the globe. Collecting, like amateur radio itself, is a hobby with a worldwide following. Many of the radios Guretzky ships overseas are bound for Japan, swimming upstream against the flood of amateur products that have landed on our shores since the 1970s.

CQ magazine was only three months old when I was born. I grew up around my dad's ham gear and received my own license in an era still ruled by vacuum tubes. I have a great appreciation for today's technology. It reduces an entire desk-full of 1950s equipment to a package small enough to slip into a coat pocket. Advances in the state of the art make modes of communication undreamed of 40 or 50 years ago commonplace today. I am, however, sen-



K6DPZ at one of his service benches sleuthing out a problem.

timental. Intellectually, I know that most of today's amateur gear is light-years ahead of the equipment I dreamed of in my Novice days, but it is the old stuff which tugs at my heart. Emotionally, I am vulnerable to the warm glow of a pilot lamp behind a yellow-with-age celluloid dial.

I'm glad people such as Herman Cone and Hal Guretzky exist. They put us in touch with our past. Amateur radio has an abundance of traditions. Sharpening one's sense of history develops a keener appreciation of this great hobby. Knowing where we've been is the most accurate way to measure how far we've come.

The author is still in search of vintage radio gear to photograph for CQ's Radio Classics Calendar and an up-coming book, as well as information on the companies that produced equipment during the 1930-1980 period. He may be reached at P.O. Box 1041, Birmingham, Alabama 35201; through e-mail at his Compuserve address 72752,756; or via telephone 205-328-2661 days, 205-967-0639 evenings and weekends.

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CIRCLE 91 ON READER SERVICE CARD

Sometimes, without expecting it, we get more than we bargained for. If you happen to own one of the popular antenna analyzers available, WCØY explains what else they're capable of telling.

How To Get More Information From Your Antenna Analyzer

BY WARD HALL*, WCØY

Advances in technology have brought us new instruments to help us build homebrew antennas and understand their performance. Antenna analyzers are available that provide readouts of standing wave ratio (SWR) and impedance (Z). These instruments are simple to use, are portable, and provide great insight into how well an antenna is operating. What I have discovered is that these instruments actually provide more information than many realize! If you would like to get more performance from your SWR analyzer, read on.

The techniques discussed in this article pertain to antenna analyzers that give measurements of SWR and impedance. This includes the RF ANALYST™ RF-1 sold by Autek Research, and SWR Analyzer™ with RF Resistance Meter™ models sold by MFJ Enterprises, Inc. I own the RF-1 and have found it extremely useful in my antenna work.

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While working with it, I felt that more information must be available from it than the instructions said. A check of equations available in *The ARRL Antenna Book*, and a call to Autek Research, revealed that this is true, and that an antenna's input resistance (R) and the magnitude of its reactance (X) can be determined from measurements of SWR and impedance (Z). This is possible even at frequencies away from the antenna's resonance.

Knowing the antenna's R and X values is extremely useful in determining how to change the antenna or design a matching network to lower SWR.

An antenna's impedance is purely resistive only at its resonance frequencies. Away from resonance and without readjustment, the antenna's impedance will contain a reactive component in addition to the resistive part. This reactive component does not contribute to radiation, and in fact, it increases the antenna's SWR. The equations that relate resistance and

reactance to SWR and impedance are as follows (Ref. 1):

$$SWR = \frac{(A + B)}{(A - B)} \quad (\text{Eq 1})$$

where:

$$A = \sqrt{(R + Z_0)^2 + X^2} \quad (\text{Eq 2})$$

$$B = \sqrt{(R - Z_0)^2 + X^2} \quad (\text{Eq 3})$$

R = resistive component, ohms
X = reactive component, ohms
Z₀ = characteristic impedance of the feed line (ohms)

The antenna analyzers provide measurements of SWR and Z. However, R and X are related to Z as follows:

$$Z^2 = R^2 + X^2 \quad (\text{Eq 4})$$

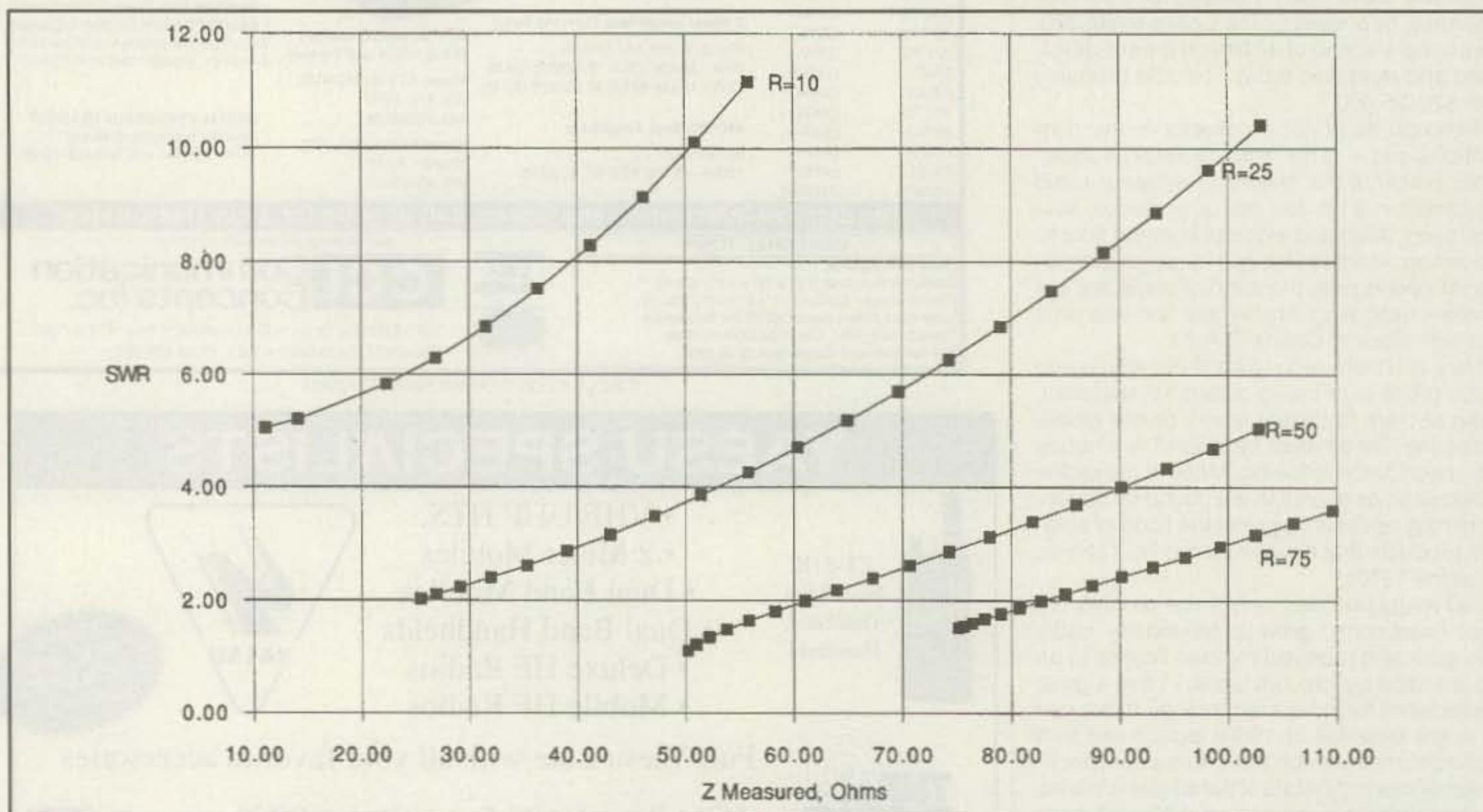


Fig. 1—The relationship among VSWR, Z, and R.

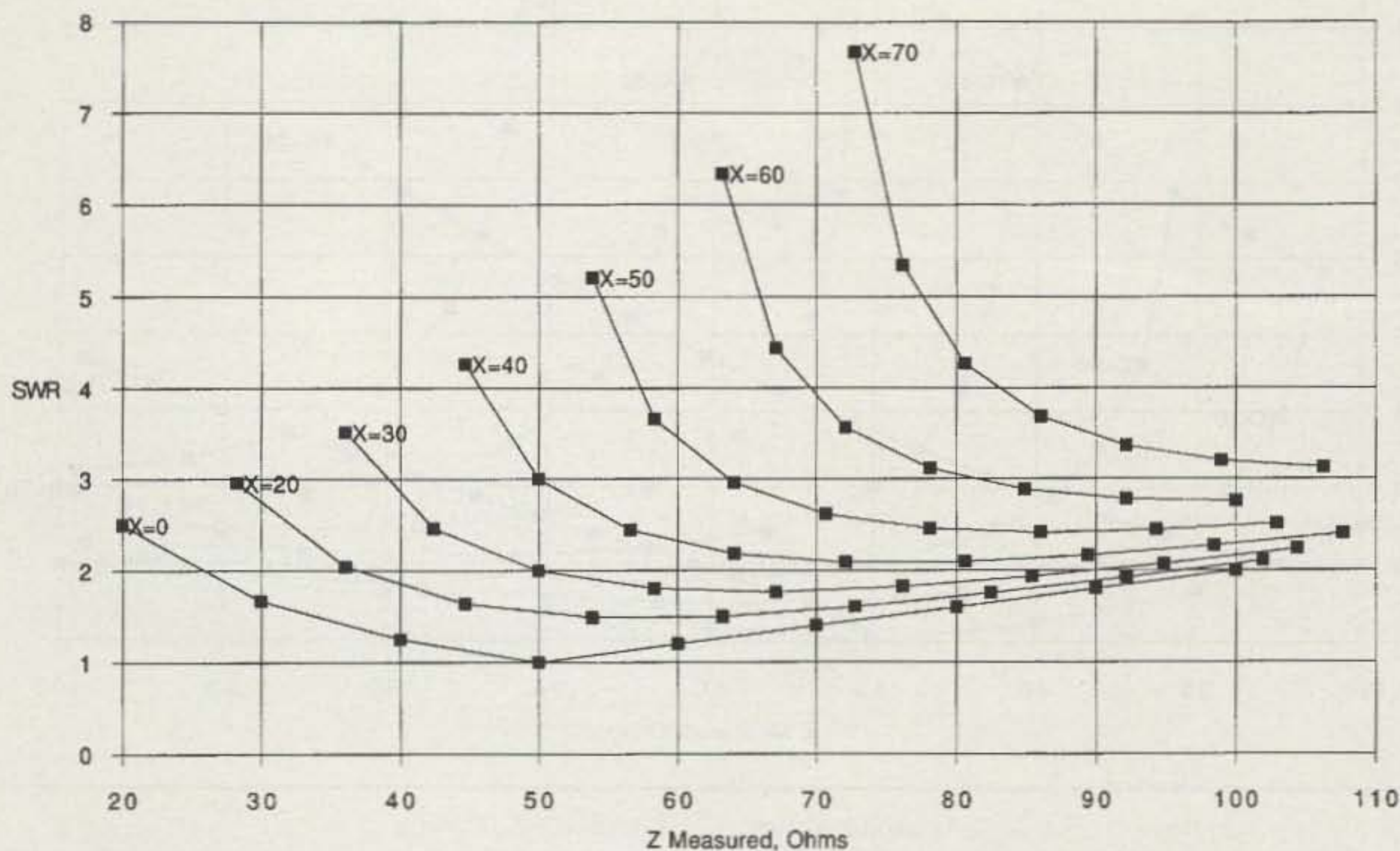
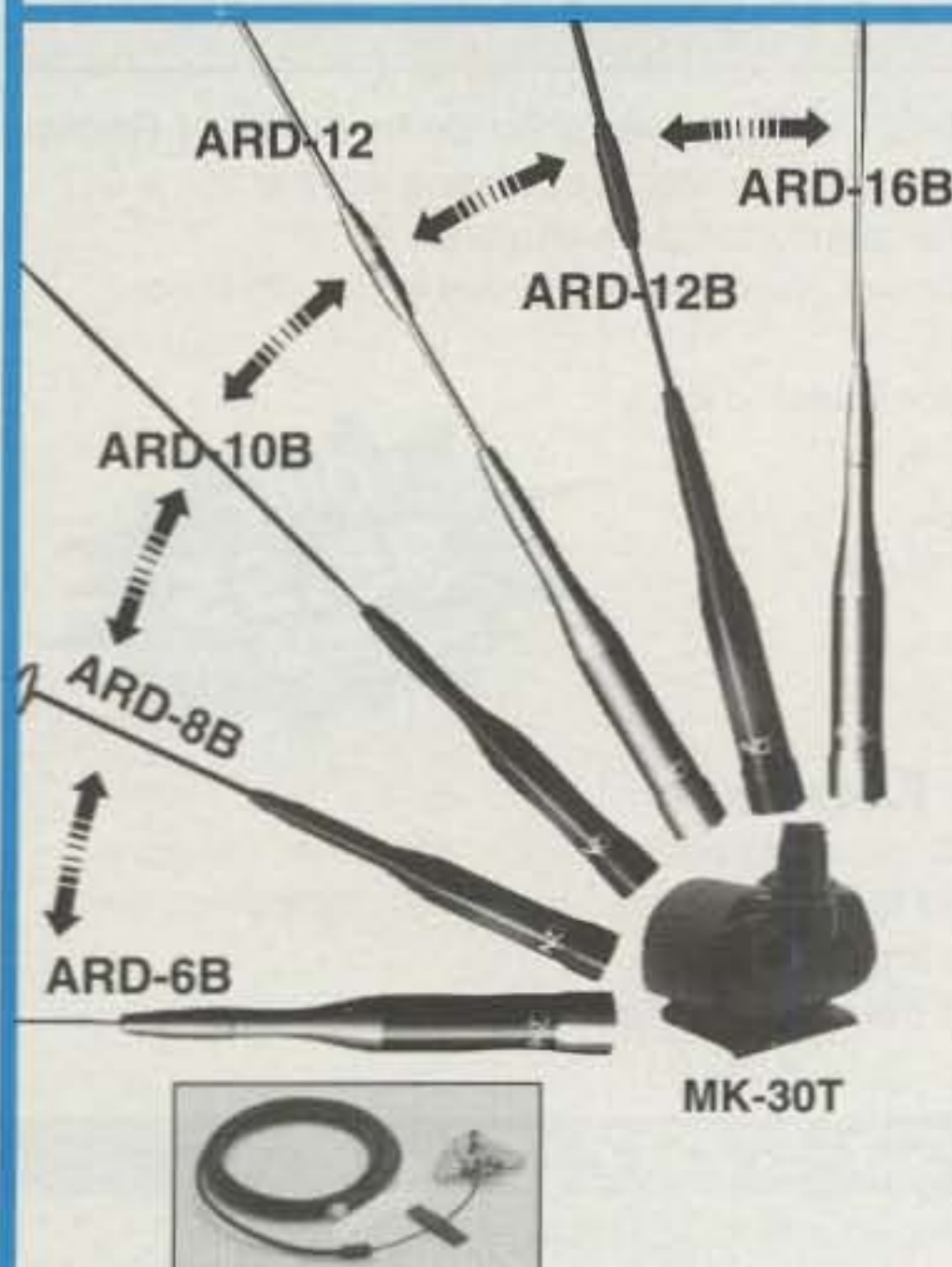


Fig. 2- The relationship among VSWR, Z, and X.

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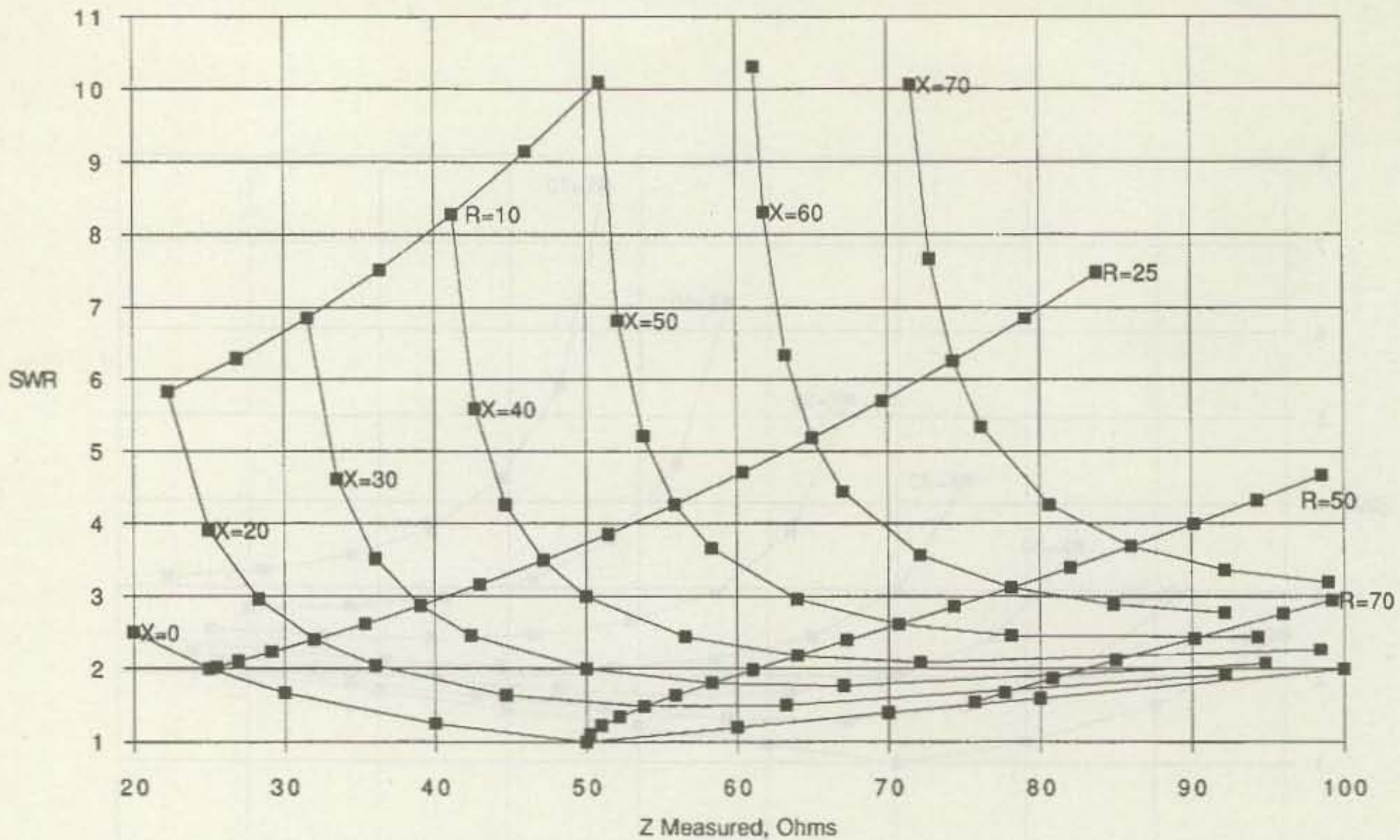


Fig. 3—Comparing the relationships of VSWR, Z, R, and X.

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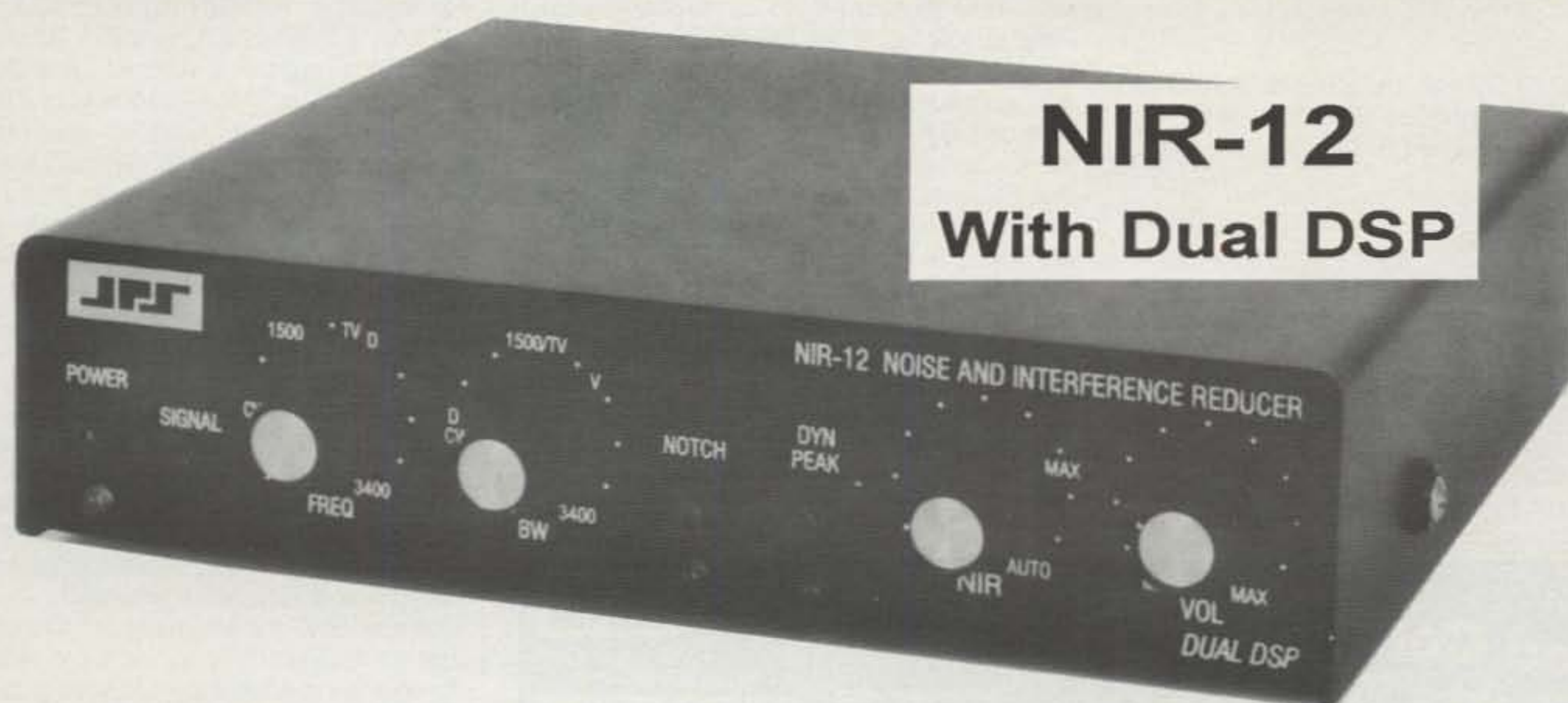
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We can combine these expressions to solve for R from measurements of SWR and Z (Ref. 2).

$$R = \frac{(2500 + Z^2) \times \text{SWR}}{50 \times (\text{SWR}^2 + 1)} \quad (\text{Eq 5})$$

Resistance (R) can therefore be solved for, and then the magnitude of reactance (X) can be solved for using Eq 6.

$$X = \sqrt{Z^2 - R^2} \quad (\text{Eq 6})$$

Figs. 1 and 2 were generated using these equations. Fig. 1 is a reference chart to look up resistance values (R) for measured values of SWR and impedance (Z). Fig. 2 provides the magnitude of reactance (X), also for measured values of SWR and impedance (Z).

For example, suppose you used an antenna analyzer to check the performance of a

dipole antenna and measured an SWR of 4:1 and impedance value (Z) of 90 ohms. In fig. 1 lines drawn from 4.00 on the SWR (vertical) axis and 90.00 on the Z (lower) axis intersect on the curve labeled R = 50 ohms. That might sound like a nice match to a 50 ohm coaxial line, but remember that the SWR was measured as 4:1. Next check fig. 2 for the reactive value (X). Lines drawn from 4.00 on the SWR (vertical) axis and 90.00 on the Z (lower) axis intersect outside the X = 70 ohm curve at about 75 ohms, the cause of the high SWR. A matching circuit that cancels the 75 ohm reactive component would create a good match condition to a 50 ohm coaxial transmission line.

Now for the cautions and disclaimers for using these look-up charts. As mentioned, this method only gives you the magnitude of the reactance, not whether it is positive (inductive) or negative (capacitive) reactance. There are methods of determining this by experiment that will be discussed later. Also, caution must be used for certain combinations of SWR and Z,

because measurement inaccuracies may lead to inaccurate values of R and X.

The effects of instrument errors can be seen in fig. 2. The lines of constant reactance become close together for values of Z greater than 70 ohms and SWRs around 2:1 and less. For instance, an SWR measurement error of ± 0.1 for a SWR of 2:1, and Z = 90 ohms can result in a reactance error of up to 20 ohms. Likewise, errors in measurement of Z will compound the problem. The good news is that verticals, dipoles, Yagis, etc., typically have resistive and reactive components in the region where the results are not sensitive to measurement errors. As a rule of thumb, you should be cautious of results when they are derived from measurements of large Z at low SWR.

Fig. 3 is provided as a single look-up chart that contains curves for R and X. It covers an SWR and Z range that includes most antennas.

Whether the derived reactance is capacitive or inductive is not directly available through this method, but usually can easily be determined through knowledge of antenna behavior or with a little experimentation. We know that reactance is zero at an antenna's resonance, where an SWR minimum occurs. We also know that as frequency is varied from resonance, these antennas typically will have a capacitive (negative) reactance below resonance, and an inductive (positive) reactance above resonance. By experiment, a small-value capacitor will decrease an inductive reactance and a small-value inductor will decrease a capacitive reactance. Care must be taken not to swamp the reactance you are trying to determine with the reactance of the added component. The following equations will assist you in determining the correct value to use:

$$C = \frac{1}{6.28 \times f \times |X_C|}$$

$$L = 6.28 \times f \times |X_L|$$

where:

- C = capacitor value
- L = inductor value
- f = frequency of measurement
- $|X_C|$ = magnitude of capacitive reactance from the look-up charts
- $|X_L|$ = magnitude of inductive reactance from the look-up charts

Since you will not know ahead of time whether it is an inductive or capacitive reactance, try one or the other and see if it increases or decreases the measured reactance.

Conclusion

Antenna analyzers are popular test instruments that can provide much useful information for improving antenna performance. With a little effort, these devices can provide information similar to an impedance bridge instrument at a fraction of the cost.

References

1. *The ARRL Antenna Book*, 16th ed., p. 24-9.
2. Instructions, RF Analyst™ Model RF-1, Autek Research, April 1994, and private communications.

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- **Very Compact** -- 6 x 9 1/2 x 12 inch amplifier takes up less desktop space than your transceiver and weighs about the same -- only 12 1/2 pounds
- **Illuminated Cross-Needle SWR/Wattmeter** -- lets you read SWR, forward and reflected *peak* power simultaneously
- **Operate/Standby Switch** -- lets you run "barefoot", but you can instantly switch to full power if you need it
- **Front Panel ALC Control** -- exclusive Ameritron feature -- convenient front panel control lets you adjust your output power
- **Transmit, ALC, SWR LED indicators** -- keeps you informed
- **12 VDC output jack** -- lets you power low current accessories
- **Separate ALS-600PS power supply** (included) can be placed conveniently out of the way and plugged into your nearest 120 VAC outlet -- no special wiring needed
- **Made in USA**
- **Enjoy 600 Watts of *no tune* solid state power.** Call your favorite dealer for your best price and order your ALS-600 with power supply today

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 Suggested Retail
 (Includes AC
 Power Supply)



ALS-600PS Heavy Duty Power Supply

ALS-600PS power supply included with ALS-600 amplifier



- **Massive choke input filter** greatly improves voltage regulation and reduces peak AC line current
- **Ameritron's exclusive Multi-Voltage Power Transformer** lets you compensate for stressful high line voltage and performance robbing low line voltage
- **Step-Start Inrush Protection™**

stops damaging inrush currents and extends life of power supply components

- **Illuminated Cross-Needle Meter** monitors voltage and current of 50 VDC line
- **Extremely quiet fan**
- **Very compact** 6 x 9 1/2 x 12 inches -- can be placed conveniently out-of-way
- **Wired for 120 VAC**, supplies 50 VDC at 25 amps to ALS-600 amplifier
- **Also use on 100-130 VAC and 220-250 VAC, 50/60 Hz**
- **Draws** less than 12 amps at 100 VAC and less than 6 amps at 230 VAC
- **Includes prewired cable** to plug into ALS-600 amplifier
- **Made in USA**

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Ideal mobile amplifier -- uses 13.8 VDC mobile electrical system, very compact 3 1/2 x 9 x 15 inches, extremely quiet, 500 Watts output, continuous 1.5-22 MHz coverage, instant bandswitching, no tuning, no warm up, SWR protected

ALS-500M
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 Suggested Retail



- **Mobile *no tune* Solid State Amplifier** -- uses four rugged 2SC2879 high power linear RF power transistors
- **Instant bandswitching, no tuning, no warm up** -- just turn on and operate -- makes mobile QSOs safer
- **Very Compact** -- just 3 1/2 x 9 x 15 inches -- fits in nearly any mobile installation; weighs only 7 pounds, that's less than some mobile HF transceivers
- **Extremely quiet** -- quiet low speed, low volume fan stays off and silent until temperature rises
- **Output Power** -- 500 Watts PEP, 400 Watts CW
- **Continuous Coverage** -- 1.5 to 22 MHz; 10/12 Meters with easy-to-install optional kit, \$29.95 plus s/h
- **Load Fault Protection** -- disables and bypasses amplifier if antenna has excessively high reflected power or if bandswitch is set lower than exciter frequency -- virtually eliminates damage because of operating error; has Load Fault LED indicator
- **Thermal Overload Protection** -- disables and bypasses

Exact power output of amplifiers may vary on each band.

amplifier if temperature is excessively high; automatically resets when temperature drops to safe level; has Thermal Overload LED indicator

- **Excellent harmonic suppression** -- multiple section output network and push-pull output circuit gives excellent harmonic suppression
- **DC current meter** lets you monitor collector current
- **ON/OFF Switch** -- bypasses amplifier for "barefoot" operation without having to disconnect high current power supply cables
- **Remote ON/OFF Control** -- lets you remotely control ON/OFF function for out-of-the-way mounting of amplifier
- **Exciter Drive** -- less than 100 watts input gives full output
- **Power Supply Requirements** -- requires 13.8 VDC at 80 amperes peak current for PA transistors and separate line for 12-15 VDC at 4 amperes for control and bias circuits
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CIRCLE 14 ON READER SERVICE CARD

A LOOK AT THE WORLD AROUND US

On The Road Again—Part II

News of more unique mobiles and special goodies began arriving almost immediately after I had completed writing last month's column. I thus modified the opening paragraph of Part I to make it into this two-part series and share more views while mobiling season is in full swing. This way you will have a maximum number of ideas to pursue and visions of new gear to check out while hamfesting or vacationing. Get going and let's hear about your DX adventures on wheels!

DX? Is Dave trying to sway you toward working HF rather than 2 meters and 70 cm while in the car? No, I am saying work both so you can enjoy every possible aspect of amateur radio! Working 2 meters around hamfests and chatting with the locals is a blast, yet highway travel time is perfect for chasing a few new countries on SSB or working CW on the WARC bands. That's right, and your XYL can thrill to driving with the Indy 500 crowd while you dink with the radar detector zapper and ham it up—fun for all! On the other hand, maybe you are ready for a different style of mobiling. Okay, let's begin with some unusual setups to pique your interest. We are going to roll through featured topics at a fast clip to get everything in, so hang on and let's go!

High-Power Bike

First in the spotlight is an inspiration generator for cyclists presently using only a belt-clipped talkie and mag-mount mini-antenna for mobile operations (photos 1 and 2). This customized Gold Wing Honda and trailer setup belongs to Bob Curry, KC3VO, and it is loaded for bear! A new remote-controlled Yaesu FT-900AT driving a 2 KW amplifier is used for global DXing, and a Yaesu FT-530 dualband handheld driving an 80 watt amplifier handles local area communications. Additional rigs on the motorcycle include 6 meter, 2 meter, and 70 cm multimode transceivers, a tape recorder for easy logging, and triple batteries for backup power. The 2 KW amplifier and a supporting 3.5 KW generator for powering it are fitted into the trailer. A combination of blowers and side louvers duct air through the trailer for cooling. Amplifier on/off switching and push-to-talk operation of rigs is controlled from the handlebars. Describing this setup as "elaborate" is putting it mildly!

Now focusing on less obvious features, the FT-900's remote head sits in a custom-made center console that also snaps off for access to other motorcycle items, and a boom mic is mounted inside the driver's helmet. Earphones are not logical nor are they legal in many states, so a console-mounted speaker that can be switched between rigs is used. (A Gold Wing is exceptionally quiet, so Bob can hear the speaker perfectly.) The motorcycle's saddlebags and fairing are lined with copper foil to

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Photo 1—Bob Curry, KC3VO, at the stern of his multiband, multimode 2 KW motorcycle mobile setup. A high-power amplifier and its required generator are in the forced-air-cooled trailer. The Outbacker antenna on the trailer is new 160-20 meter version. Bob obviously plans to do some serious low-band DXing this fall.

provide additional ground surface area for the rigs and antennas, and to ensure top signal radiation. Finally, Bob can leave the 2 KW trailer at home and enjoy multiband mobiling with barefoot rigs. Notice the Outbacker antenna on the trailer; it is a new, tall 160 through 20 meter version rated at 800 watts that KC3VO is beta testing. Bob says he is pumping 1200 watts SSB into it with no problems, and he is "getting out" like a champ. Quite a setup!

Outbackin' Road Train

Imagine taking a roadside break in the Australian bush country around dusk when suddenly the trees are illuminated with incredible light while the earth trembles with thunder. Birds fly wildly and small animals scurry. (Headlights appear, a huge engine roars, and above it all, someone seems to be screaming "CQ DX stand by for a call." Is it the end of the world? Not quite. It is a genuine road train, one of the three-trailer "Super Trucks" carrying goods across Australia. Railways are not practical on this the largest island in the world, so overland haulers handle mass cargo shipping.

The super-power truck shown in photo 3 is one of the Road Transport Australia fleet. It is approximately 170 feet long when pulling three trailers and has 34 tires on the ground. You can visualize that as two 75 foot long mobile homes end-to-end and a massive Mack truck in front. The truck's front bar assembly protects the grill (like a cowcatcher on old locomotives) and supports the Terlin (Outbacker) multiband mobile antenna (you did hear a CQ DX!). Almost all vehicles "down under" have HF rigs and grill protectors Aussies refer to as "roo bars." The latter minimize damage from stray kangaroo encounters and make ideal Outbacker antenna mounts. Any less substantial antenna would not last a day in bush country. The chap with

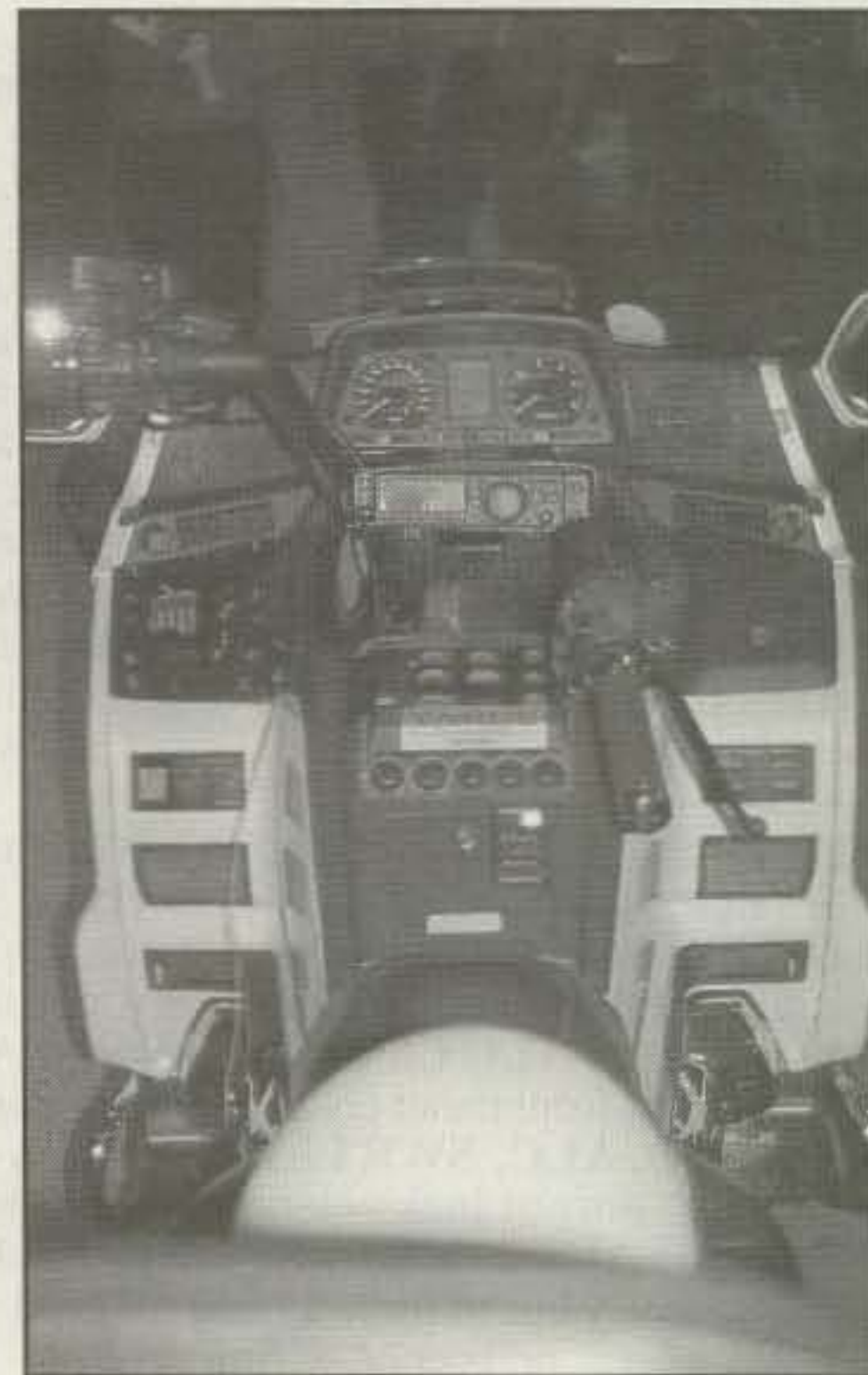


Photo 2—Driver's-seat view of KC3VO's motorcycle showing the main location of rig controls, etc. It looks like an airplane cockpit!

the hat and beard in photo 3 is Terry Clinch. He and XYL Lin spearhead the Terlin Antenna Company, Australia's premier mobile antenna manufacturer.

Work-It-All Mobile

Okay, friends, our next view is your call. Is the antenna-laden vehicle in photo 4 a rolling communications center for the outback, an escort for a road train, or a gung-ho mobile heading for Dayton? Seriously, however, WD4FSY spotted this delight while visiting Australia, and it attracted him like a magnet. People living and/or traveling in the bush country rely heavily on shortwave for staying in touch with others, and this vehicle really drives home that fact.

The vehicle is a Toyota Land Rover with gear and antennas for everything from microwaves and cell phones through HF and 160 meters. Note the extensive front roo bar supporting a bevy of high-intensity lights (two million candlepower worth!) and a classic 6 foot Terlin Outbacker antenna. Look closely at the front tag (under KCP-252); it reads "Outback Australia." Now this is the way to go vacationing!

Let's now shift from views of unusual mobiles and spotlight some new ideas and gear for greater traveling enjoyment. Take a deep breath and change altitudes—err, attitudes—



Photo 3- Terry Clinch (right), owner of Terlin Antennas in Australia and member of the Road Transport Australia crew, poses with a couple of Outbackers used on massive Road Trains. (See story in text.)



Photo 4- Globetrotting and outbacking Don Arnold, WD4FSY, spotted this rolling communications center somewhere in Australia's bush country. What a setup!

as we move into this second part. It is a real eye opener!

GPS and APRS: A Hot Mobile Combo

If you pursue mobiling, boating, backpacking, or IOTA expeditioning to any reasonable degree (better known as occasionally getting lost!), now is the time to start to check out GPS.

Possibly you have already heard that buzzword used around marine stores but assumed it was not amateur radio related. Surprise! A GPS (Global Positioning System) receiver can pinpoint your location (anywhere in the world), store coordinates for originating or retracing a route without physical markers, indicate directions, and more. Further, portable GPS receivers such as ICOM's GP-22 shown in photo 5 fit in a coat pocket and display your current latitude/longitude while moving. Outbacking

Don Arnold, WD4FSY, even used one propped on a car's dashboard during a recent trip to Bolivia, and reported it was a neat pathfinder. So how does this new technology work and how is it related to amateur radio? Read on!

A group of 24 GPS satellites transmitting telemetry 24 hours a day on 1575.42 MHz are positioned in orbits around the world. A GPS receiver copies time-share data from three or four in-range satellites, measures signal time differences, and processes data via a built-in

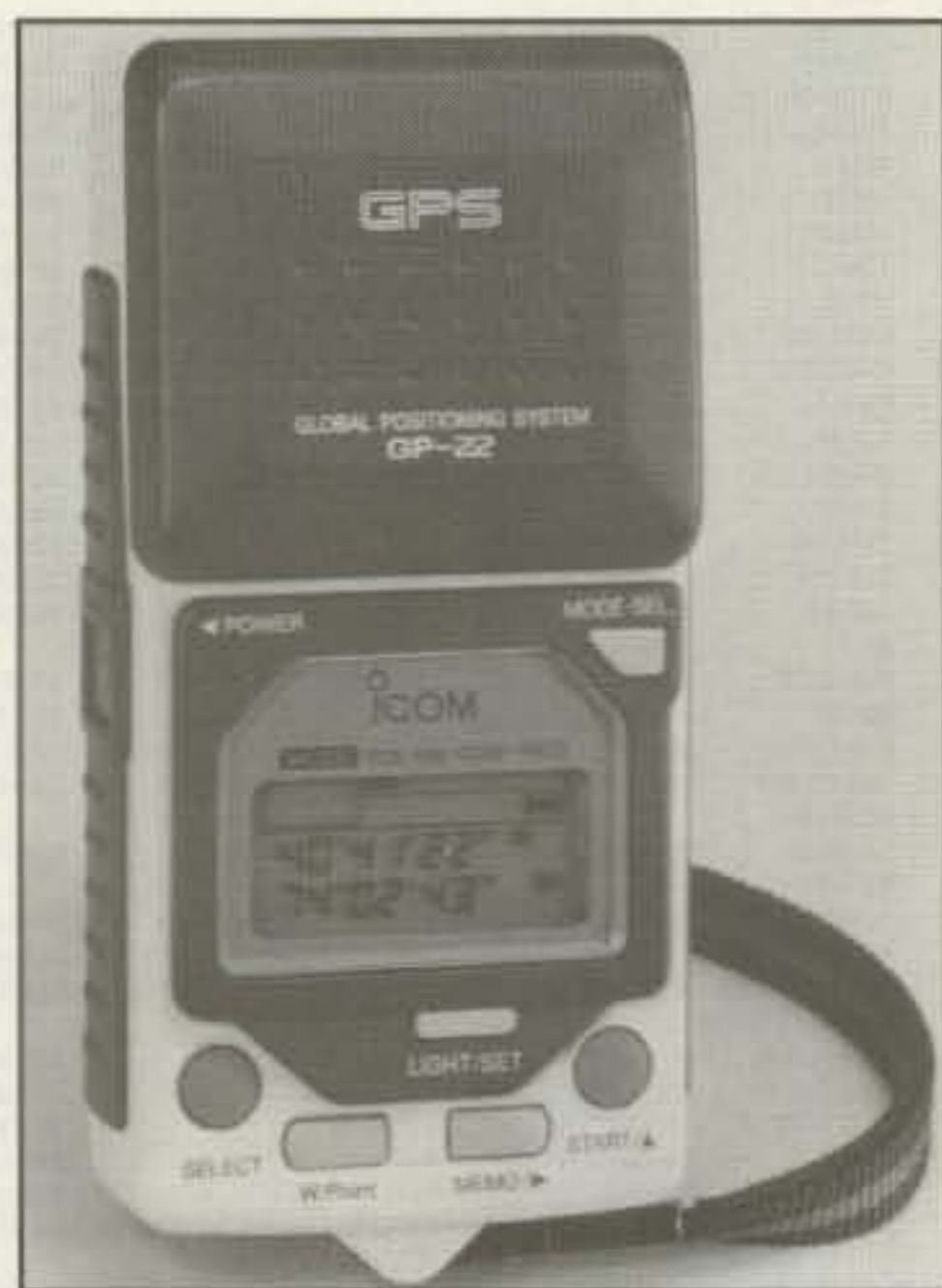


Photo 5- The ICOM GP-22 Global Position receiver. The palm-size unit references on data from GPS satellites, and displays your latitude, longitude, and other route-plotting information in real time.



Photo 6- A full Global Positioning System capable of determining your location, plotting it on a related map, and automatically reporting it to others via packet radio. Units in the photo are a lap top computer, GPS receiver, and new AEA PK-12 packet controller with built-in APRS software.

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- All units available in 220 VAC input voltage (except for SL-11A)

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MODEL	Colors		Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H x W x D	Shipping Wt. (lbs.)
	Gray	Black				
SL-11A	•	•	7	11	2 5/8 x 7 5/8 x 9 3/4	12
SL-11R	•	•	7	11	2 5/8 x 7 x 9 3/4	12
SL-11S	•	•	7	11	2 5/8 x 7 5/8 x 9 3/4	12
SL-11R-RA	•	•	7	11	4 3/4 x 7 x 9 3/4	13

RS-L SERIES



• POWER SUPPLIES WITH BUILT IN CIGARETTE LIGHTER RECEPTACLE

MODEL	Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H x W x D	Shipping Wt. (lbs.)
RS-4L	3	4	3 1/2 x 6 1/8 x 7 1/4	6
RS-5L	4	5	3 1/2 x 6 1/8 x 7 1/4	7

RM SERIES



MODEL RM-35M

• 19" RACK MOUNT POWER SUPPLIES

MODEL	Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H x W x D	Shipping Wt. (lbs.)
RM-12A	9	12	5 1/4 x 19 x 8 1/4	16
RM-35A	25	35	5 1/4 x 19 x 12 1/2	38
RM-50A	37	50	5 1/4 x 19 x 12 1/2	50
RM-60A	50	55	7 x 19 x 12 1/2	60
• Separate Volt and Amp Meters				
RM-12M	9	12	5 1/4 x 19 x 8 1/4	16
RM-35M	25	35	5 1/4 x 19 x 12 1/2	38
RM-50M	37	50	5 1/4 x 19 x 12 1/2	50
RM-60M	50	55	7 x 19 x 12 1/2	60

RS-A SERIES



MODEL RS-7A

MODEL	Colors		Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H x W x D	Shipping Wt. (lbs.)
	Gray	Black				
RS-3A		•	2.5	3	3 x 4 3/4 x 5 3/4	4
RS-4A	•	•	3	4	3 3/4 x 6 1/2 x 9	5
RS-5A		•	4	5	3 1/2 x 6 1/8 x 7 1/4	7
RS-7A	•	•	5	7	3 3/4 x 6 1/2 x 9	9
RS-7B	•	•	5	7	4 x 7 1/2 x 10 3/4	10
RS-10A	•	•	7.5	10	4 x 7 1/2 x 10 3/4	11
RS-12A	•	•	9	12	4 1/2 x 8 x 9	13
RS-12B	•	•	9	12	4 x 7 1/2 x 10 3/4	13
RS-20A	•	•	16	20	5 x 9 x 10 1/2	18
RS-35A	•	•	25	35	5 x 11 x 11	27
RS-50A	•	•	37	50	6 x 13 3/4 x 11	46
RS-70A	•	•	57	70	6 x 13 3/4 x 12 1/2	48

RS-M SERIES



MODEL RS-35M

MODEL	Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H x W x D	Shipping Wt. (lbs.)
• Switchable volt and Amp meter				
RS-12M	9	12	4 1/2 x 8 x 9	13
• Separate volt and Amp meters				
RS-20M	16	20	5 x 9 x 10 1/2	18
RS-35M	25	35	5 x 11 x 11	27
RS-50M	37	50	6 x 13 3/4 x 11	46
RS-70M	57	70	6 x 13 3/4 x 12 1/2	48

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)			ICS* (Amps) @13.8V	Size (IN) H x W x D	Shipping Wt. (lbs.)
	@13.8VDC	@10VDC	@5VDC			
VS-12M	9	5	2	12	4 1/2 x 8 x 9	13
VS-20M	16	9	4	20	5 x 9 x 10 1/2	20
VS-35M	25	15	7	35	5 x 11 x 11	29
VS-50M	37	22	10	50	6 x 13 3/4 x 11	46
• Variable rack mount power supplies						
VRM-35M	25	15	7	35	5 1/4 x 19 x 12 1/2	38
VRM-50M	37	22	10	50	5 1/4 x 19 x 12 1/2	50

RS-S SERIES



MODEL RS-12S

• Built in speaker

MODEL	Colors		Continuous Duty (Amps)	ICS* Amps	Size (IN) H x W x D	Shipping Wt. (lbs.)
	Gray	Black				
RS-7S	•	•	5	7	4 x 7 1/2 x 10 3/4	10
RS-10S	•	•	7.5	10	4 x 7 1/2 x 10 3/4	12
RS-12S	•	•	9	12	4 1/2 x 8 x 9	13
RS-20S	•	•	16	20	5 x 9 x 10 1/2	18
SL-11S	•	•	7	11	2 3/4 x 7 5/8 x 9 3/4	12

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ELNEC is a MININEC-based program with nearly all the features of EZNEC except transmission line models, and is limited to about 127 segments (6-8 total wavelengths of wire). Not recommended for quads, long Yagis, or antennas with horizontal wires lower than 0.2 wavelength; excellent results with other types. Runs on any PC-compatible computer with 640k RAM, CGA/EGA/VGA/Hercules graphics. Specify coprocessor or non-coprocessor type.

Both programs support Epson-compatible dot-matrix, and HP-compatible laser and ink jet printers.

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CIRCLE 69 ON READER SERVICE CARD



Photo 7- Alinco's new DR-150T. This 2 meter FM rig's Channel Scope is perfect for overviewing activities on seven favorite repeaters simultaneously. (Details in text.)

microcomputer. It then displays latitude and longitude (right down to feet and inches) plus altitude on its front LCD panel. You can then relate that info to a topo map and pinpoint your location on the spot. Assuming the GPS receiver has a clear-sky view of the satellites (obviously necessary at this ultra-high frequency), typical time to receive, process, and display position information is less than a minute. That sort of blows away the classic compass and sexton concept, eh?

Now assume you are traveling with a cross-state group (like last month's Ride Around Wyoming), helping during an emergency, or embarking on a DX venture and need to report your precise location to others. Most GPS receivers include a NMEA-0183 data output socket for interfacing with a computer or modem, and AEA's new PK-12 portable packet controller is set up to use that interface. It also has APRS (Automatic Packet Reporting System) software included in its package and special GPS commands built into the PK-12 itself. Interconnect the GPS receiver, PK-12, and a 2 meter transceiver (photo 6 less the laptop computer), and your GPS-referenced position can be reported to others from almost anywhere via packet. Lights probably are flashing and bells are ringing at this point, so I will attempt to anticipate your first wave of questions.

First, you must be in range of another packeteer (or a digipeater) or work through a packet-relaying OSCAR satellite for others to spot/track you remotely. Second, any number of remote stations can spot/track you, provided they are running APRS software in their (packet system's) computer. Third, you can substitute a laptop computer for your (previously mentioned) topo maps with your mobile GPS

setup and spot/track yourself and other GPSers automatically as you go. Finally, APRS data is different from regular packet bursts, so permission to send it over long paths should be secured to keep everyone happy. Confusing? I will clarify some elusive points.

Any TNC and computer setup running APRS software (the related data processing program with tracking maps) can do tracking and show maps. Since that software is included in the PK-12, however, it works with or without an interconnected computer. The computer screen is only necessary when you want to see your location or track yourself on the spot. Hmmm... I can already envision amateurs planning their own "video bag mapping package" for use in rental cars.

APRS software was developed by Bob Bruninga, WB4APR, and it is available from several BBSes and Internet FTP sites. The basic program is also included in AEA's PK-12 and PK-96. The software includes detailed maps of the whole world, and can be scaled up/down from .5 mile to 2000 miles as desired. Grid squares are also included, plus several APRS stations can be mapped/tracked simultaneously. Symbols such as cars, boats, airplanes, and houses can also be assigned to reporting stations. The more I explain, the more there is that needs explaining! This topic could turn into a major subject.

What's your opinion? Would you like to read more about GPS and APRS in a future column, or would you prefer we stick with mobile setups and new gear/antennas as usual? In fact, let's expand that inquiry into a "something for everyone" poll and bring in everything. What do you like best and want to see covered more in this column—mobiling, keys, classic rigs, QRP, satellites, understanding new gear? You tell

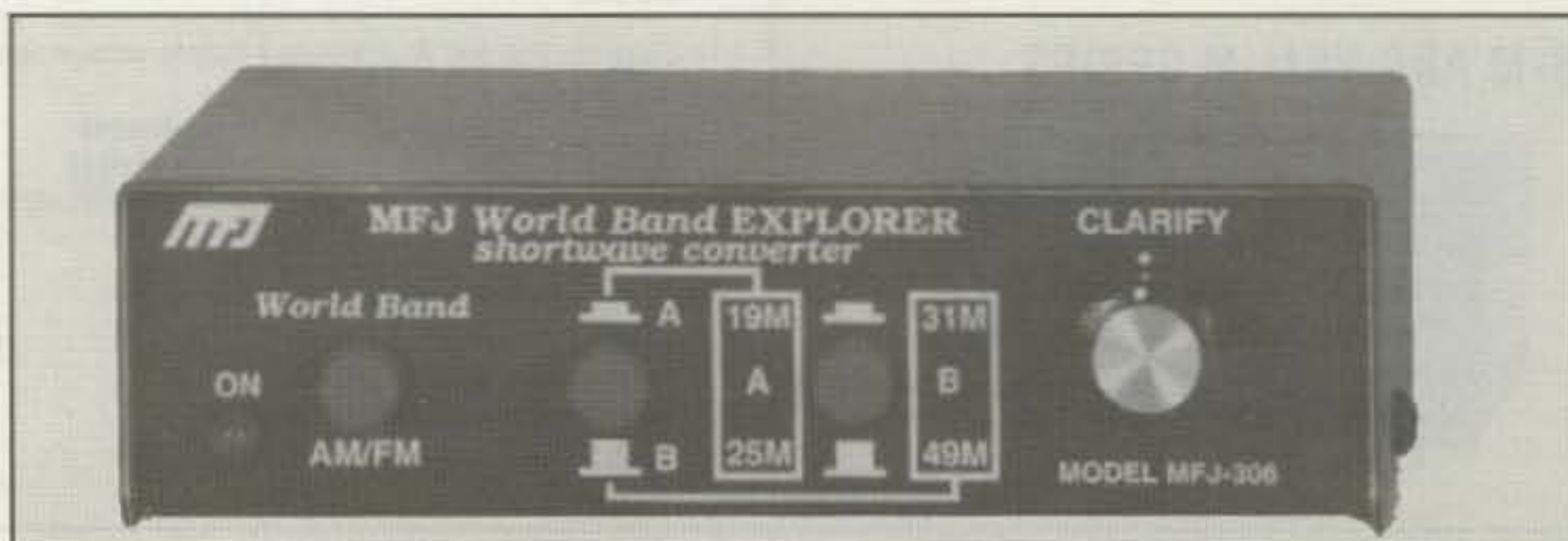


Photo 8- If working HF and 2 meters simultaneously while mobile is not enough excitement for you, top off the setup with this new MFJ-306 World Band shortwave converter. It connects to your car's radio and provides coverage of all popular international broadcast bands.

me! Drop me a postcard (or SASE if you want a quick reply) and I will take it from there. Fair enough?

Flash! The May issue of *CQ* arrived right before this completed column went in the mail to *CQ*, and Buck Rogers' packet column tells about GPS and APRS from the packet user's angle. Check it out! Combined, our two columns really give you insight into GPS/APRS!

New "View All" Mobile Rig

Want a hot new 2 meter radio to go with GPS/APRS or combine with your car's HF setup (like I mentioned at the beginning of this column)? Check out Alinco's new DR-150T 50 FM transceiver shown in photo 7. It will fit anywhere (1.5"H x 5.5"W x 6"D), has 100 memories, has emergency DTMF paging ("LITZ" function), and includes 70 cm receive that can be extended to 512 MHz with a simple mod. It also has a new programmable "pause between access and dial" function in its autodialer that simplifies autopatching while mobile in motion. Just press the mic's PTT and DOWN button to "bring up the patch" and make a call, then press the PTT and UP button to shut off the patch after use.

The DR-150T's most impressive feature has to be its "Channel Scope," which lets you view activity and signal levels on seven favorite channels/repeaters in a single glance. Yes, and you can even use the Channel Scope while QSOing on a repeater or working HF with the DR-150T's volume turned down. How's that? Seven vertical bar graphs in the display indicate S levels on three memories or frequency steps either side of the (center graphed) tuned/operating frequency. It is like seven receivers in one. When scanning, signal levels parade across the vertical graphs to show you which frequencies are hot and which are not. It is a treat! I could continue on, but space is short, so I will just say check out Alinco's DR-150T yourself or contact Alinco directly for more details. You'll be glad you did.

Conclusion

As I wrapped up this month's column, details of yet another new goodie for mobiling arrived. We naturally want to keep you informed, so MFJ's new model 306 World Band Explorer mobile shortwave converter is shown in photo 8. This fit-anywhere gem measures 11 1/2" x 5" x 3 1/2" and converts the International Shortwave bands of 19, 25, 31, and 49 meters to your car's AM (550 to 1675 kHz) band. Installation involves simply unplugging the car radio antenna, plugging it into the MFJ-306, plugging the '306's cable into the radio's (then vacant) antenna socket, and connecting 12 volts to the 306. Neat! Yes, and guest riders will really be blown out of their seats when you tune in South American rebel stations, Russian talk shows, or music direct from the tropics. Check out the new MFJ-306 soon.

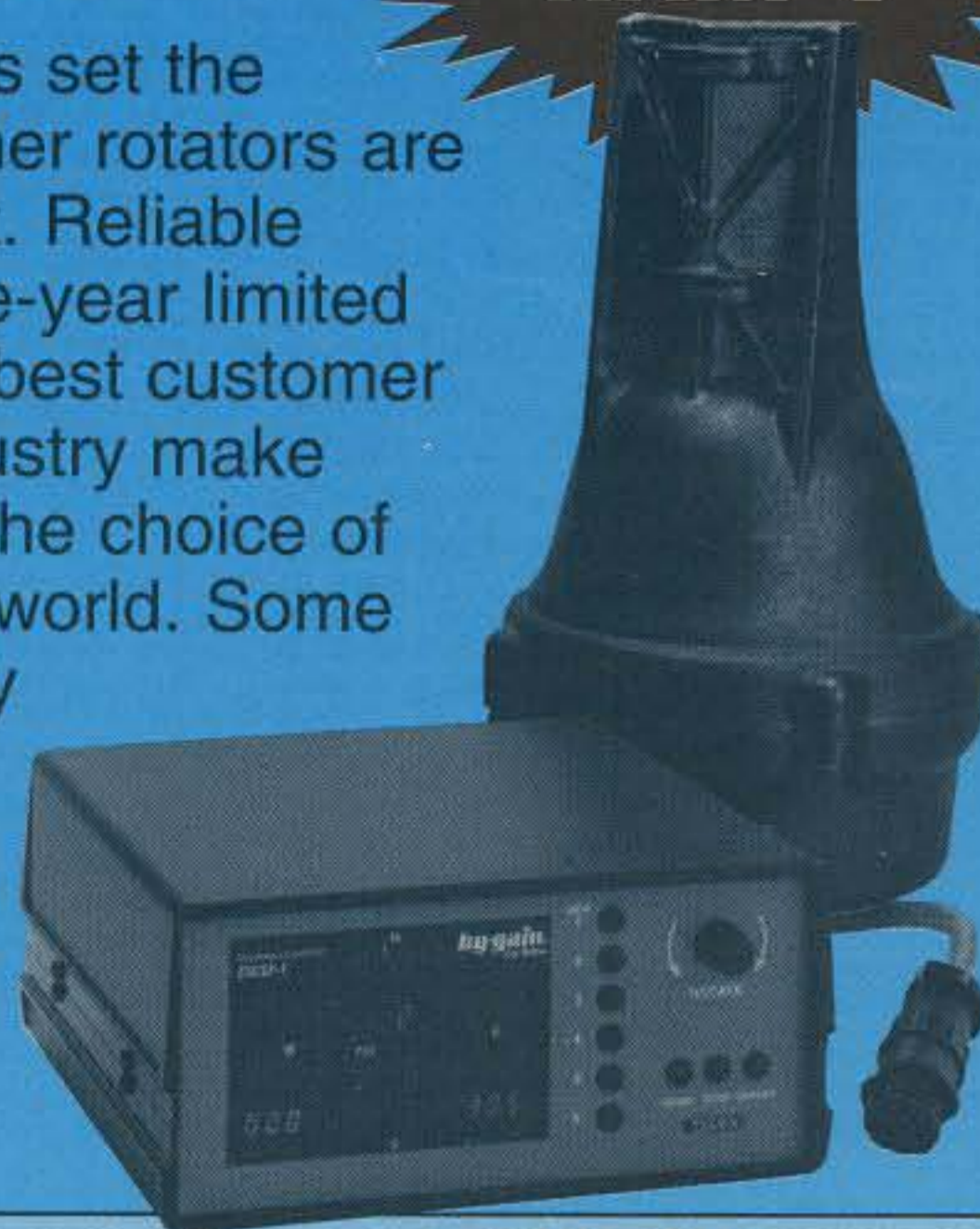
We are out of space again, but more super-exciting columns are lined up for upcoming months. Our Pandora's box is bulging with notes on more exciting columns on QRP, classic rigs, RFI, etc. Stay tuned. Meanwhile, I still look forward to talking with you on 14.180-14.225 MHz Sundays from 2200-2300 GMT or on 30 meters weeknights. See you there!

73, Dave, K4TWJ

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CONSTRUCTION PROJECTS, TECHNIQUES, AND THEORYs

Cut Costs With LC IF Filters

Letters from amateurs who build simple superheterodyne receivers often contain comments about the prohibitive cost of commercial IF filters. A quality AM, CW, or SSB filter may cost \$75 or more if it is new. Even the flea-market prices for used filters can exceed the cost of the other parts needed to build a receiver. This is a dilemma we face when we sit down at the drawing board to design a receiver with a price tag that won't seriously erode our special-projects budget.

I am not a traditionalist, but I want to discuss some old techniques that were used in the '30s and '40s to obtain relatively narrow IF bandwidths. At the same time I am not overlooking the practicality of using low-cost surplus computer crystals for building ladder types of IF filters. Some good articles on this subject were published in *QST* by W. Hayward, W7ZOI.¹ His articles were published later in W1FB's *Design Notebook* (ARRL).

This article concerns the application of inexpensive L and C components for constructing low-frequency IF filters with toroids. Some of you will recall the thrill of obtaining improved receiver selectivity with the WW II BC-453 Command receivers that were called "Q5ers." They were tuned to 455 kHz and connected to the main receiver mixer of first-IF output so that their narrow IFs (85 kHz) could be used to obtain CW and SSB selectivity. Since theory is timeless, the concept remains viable and is waiting to be recognized by the newer amateurs who like to build receivers.

LC Filters Explained

The bandwidth of a resonant circuit (-3 dB points on the response curve) is a function of frequency and Q (quality factor). For a circuit with a specified Q there will be a particular bandwidth, as indicated by the 3 dB points above and below center frequency. Most commercial CW filters have bandwidths of 250, 500, or 600 Hz, whereas SSB filters usually come with bandwidths of 1.8, 2.2, or 2.4 kHz. These bandwidths are sometimes based on the -6 dB points on the response curve. AM filters generally come with 6 kHz or greater bandwidths.

Antennas, in a like manner, are resonant circuits that exhibit a specific bandwidth in accordance with antenna Q. If the Q of an antenna, filter, or other resonant circuit is kept constant and the frequency is changed, the bandwidth will double at each octave higher. Thus, if a 40 meter dipole with a particular Q has a 2:1 SWR bandwidth of 100 kHz, a 20 meter dipole with the same Q will exhibit a bandwidth of 200 kHz, and so on. Since the same rule applies to the tuned circuits in LC filters, we can use it to

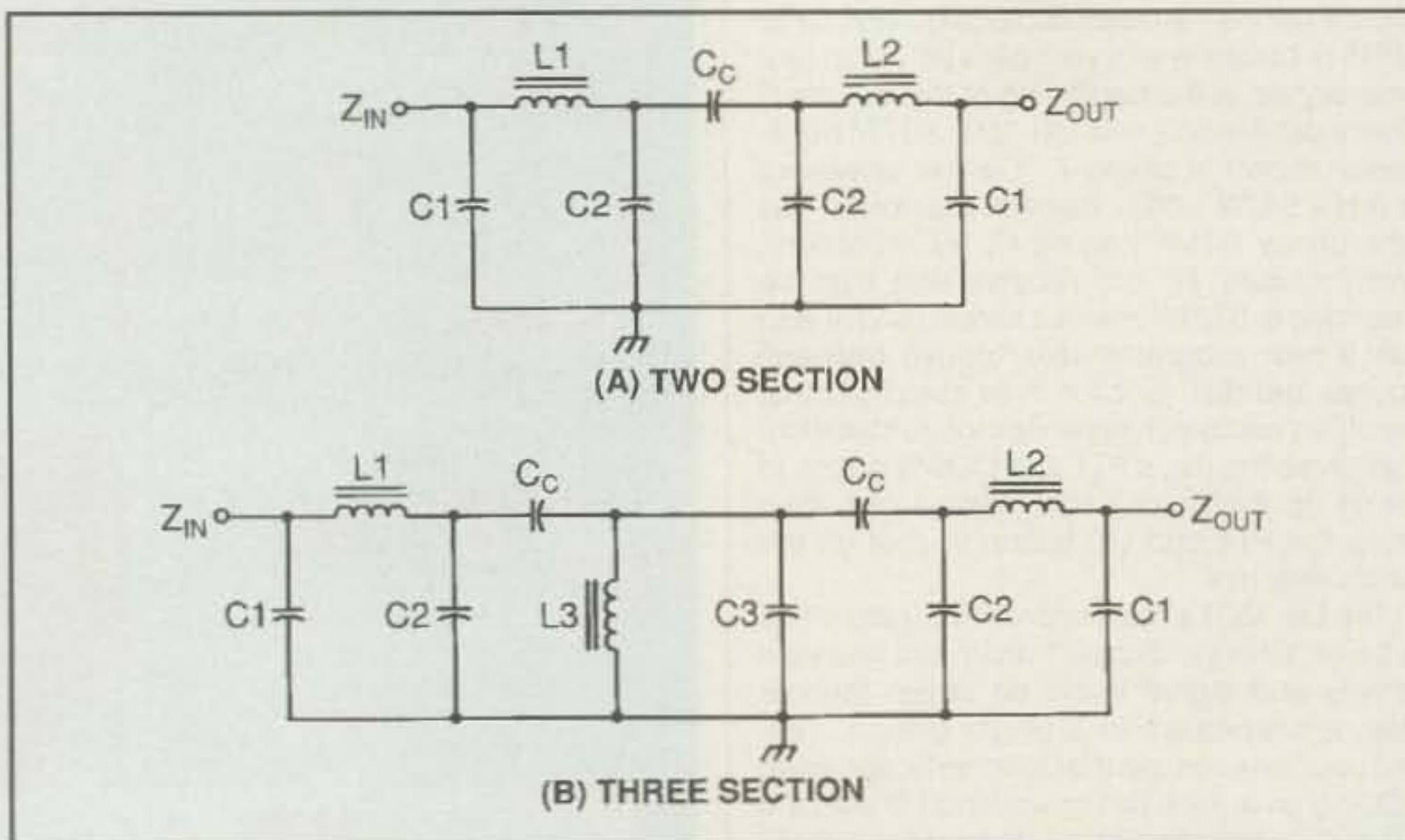


Fig. 1—Circuits for (A) two-section and (B) three-section LC IF filters. The inductors are wound on 0.5 inch OD ferrite toroids. High-Q capacitors are required.

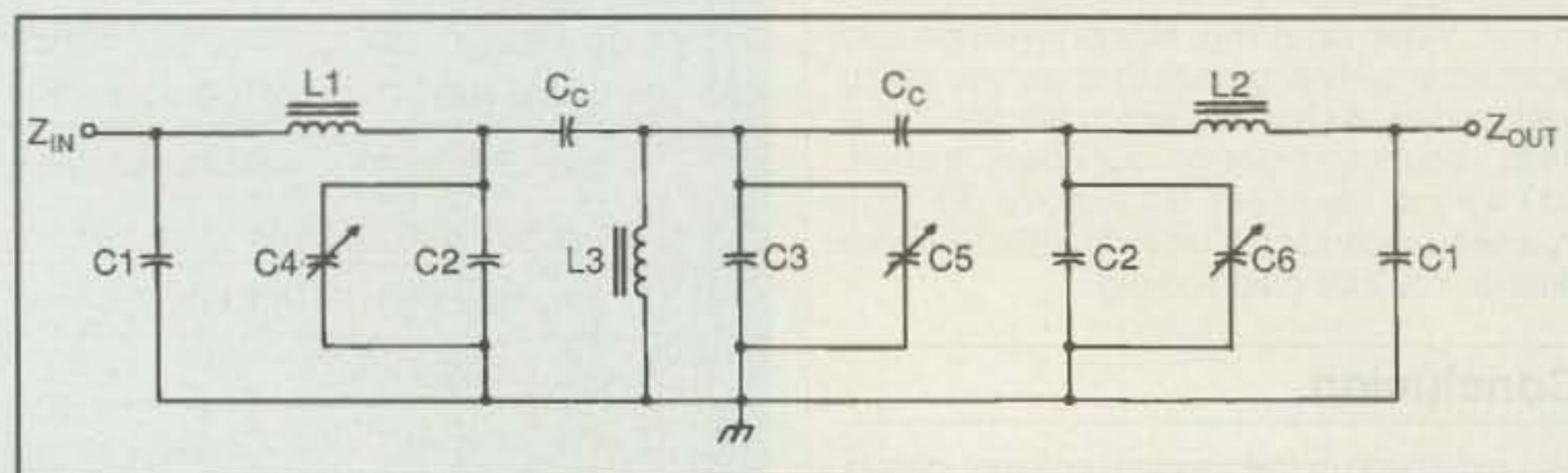


Fig. 2—Tweaking the LC filters to their center frequencies is accomplished by using fixed-value capacitors (C2 and C3) that have less C than specified in Table I. Trimmer capacitors (C4, C5, and C6) are used in parallel with these modified values to allow frequency adjustment. Arco/Elmenco mica compression trimmers are available in large capacitance amounts for use in the LF circuits described in this article.

advantage in a 50 or 100 kHz receiver IF system. An ideal receiver would have an IF response that was essentially rectangular (the shape factor) rather than having what is called a "nose" (top) and sloping "skirts" (sides). The skirts can be made steeper by adding filter poles (resonator sections), but as the number of sections is increased, the insertion loss (IL) in dB increases. Because of these factors we must strike a compromise between filter loss and shape factor. It is not unusual to have an IL as great as 10 dB through a 8-pole crystal-lattice CW filter with a 250 Hz bandwidth.

LC Filter Components

Fig. 1 contains the circuits for two- and three-section LC filters for use in the IF systems of

homemade receivers. The inductors are wound on high-permeability ferrite toroid cores. The capacitors and inductors must have high Q in order to ensure the required selectivity and minimum IL. Polystyrene or silver-mica capacitors in combination to provide the exact values listed in Table I are suitable.

Some of the capacitor values can be obtained by paralleling two or more standard-value units. On-the-nose center-frequency adjustment can be accomplished by using slightly less capacitance than listed for C2 and C3 of fig. 1, then using mica compression trimmers in parallel at those circuit points. This is shown in fig. 2. This method is recommended because the net value of toroidal inductance is unlikely to be exact unless the builder increases or narrows the gap between the ends of the toroid windings to peak the filters at their

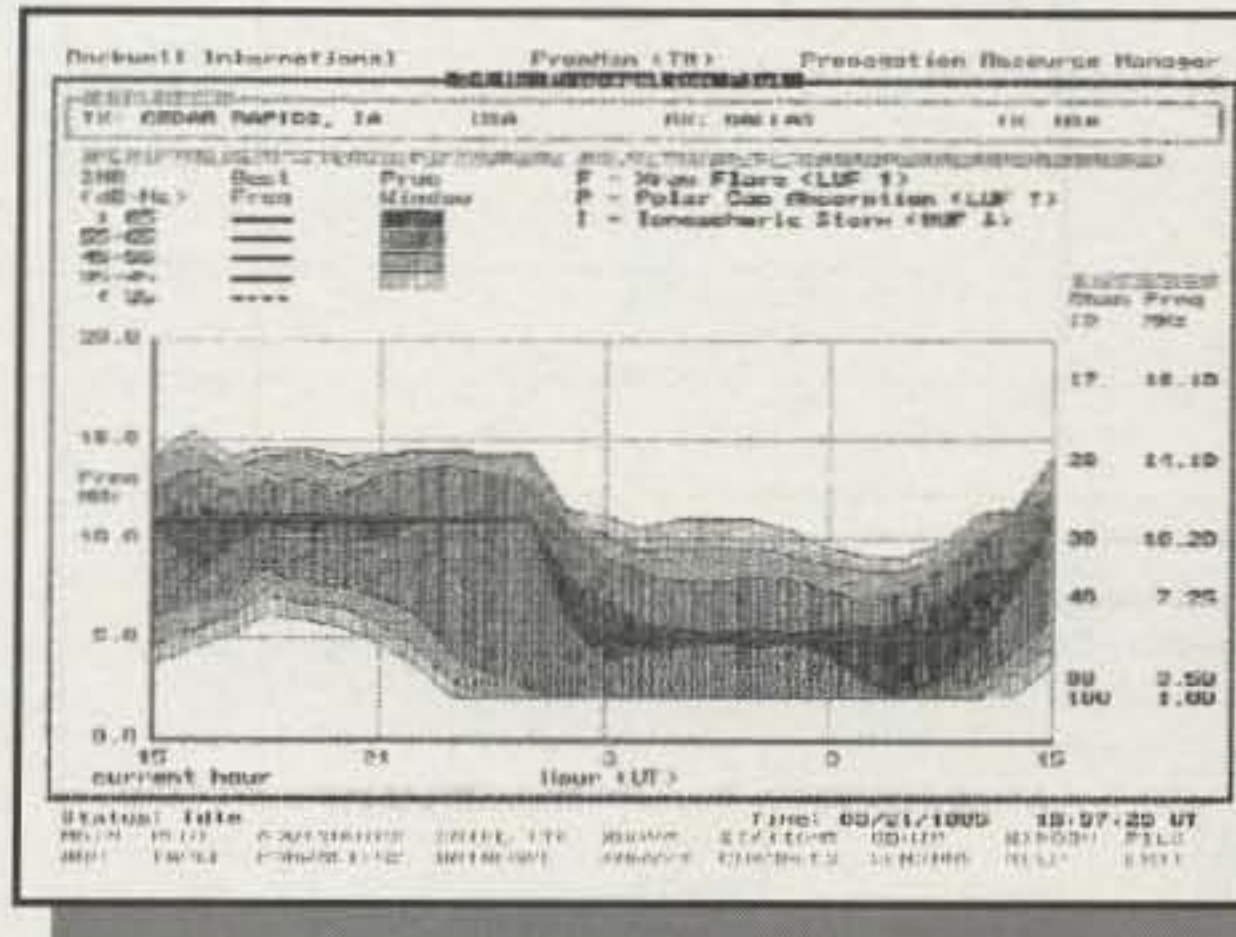
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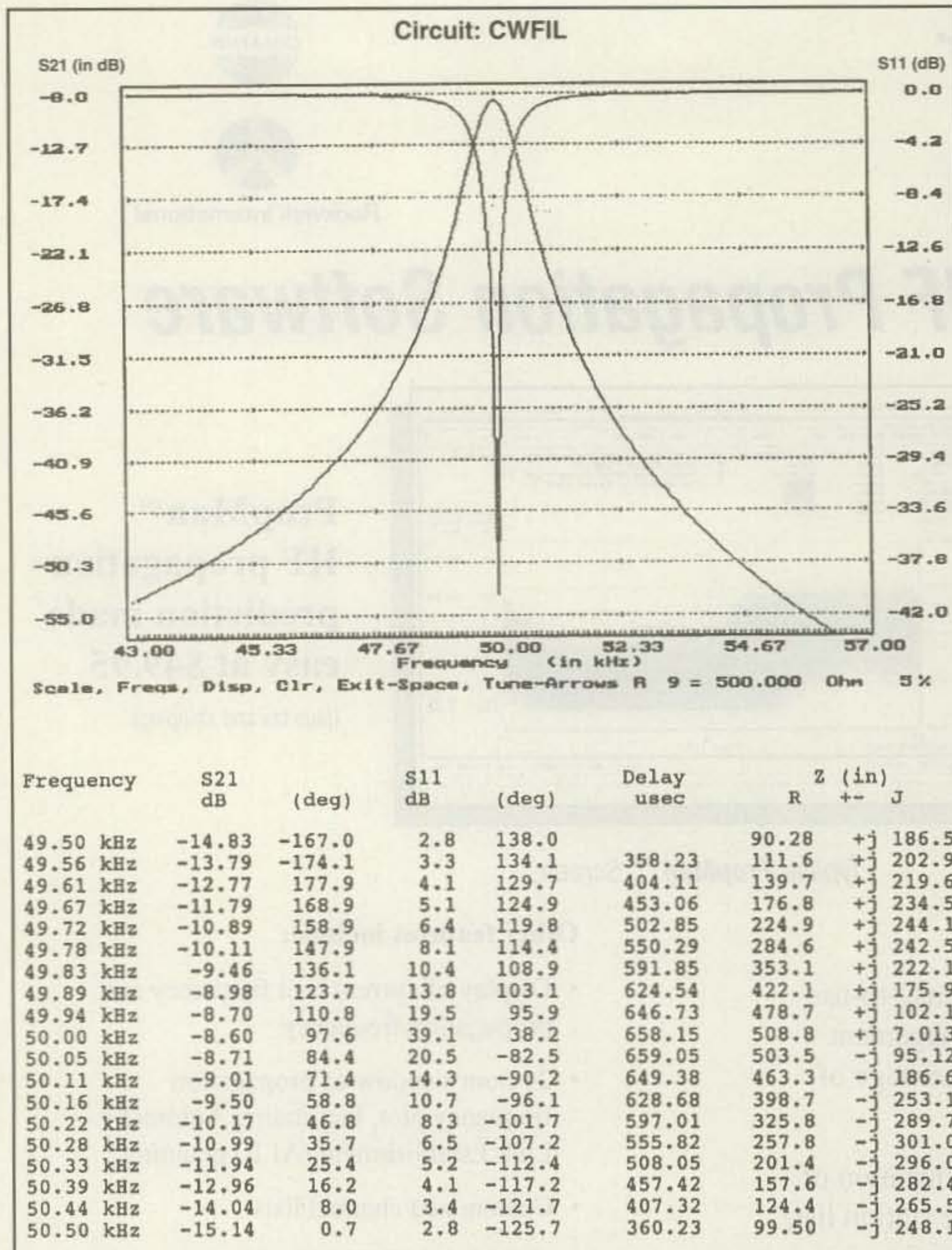


Fig. 3— Response curve and AC analysis for the two-section 50 kHz IF filter that has a CW bandwidth of 500 Hz. The IL is 8.1 dB and the terminal Z is 500 ohms.

center frequencies. If the toroids are tweaked to obtain resonance (in lieu of trimmers), lay a strip of epoxy glue across the winding to prevent the coil turns from shifting on the core later.

50 and 100 kHz Filters

It is a simple matter to design AM and SSB filters for a center frequency of 100 kHz, but it is not practical to develop a 250 or 500 Hz CW filter for that frequency. The problem is one of tremendous IL (greater than 20 dB). The resonator Q at 100 kHz is too low for such narrow bandwidths unless many poles are used. However, suitable filters of this kind are practical at 2.0, 2.4, or 6 kHz with as few as two sections.

The filters listed in Table I are for terminal impedances of 50 or 100 ohms. They have bandwidths of 500 Hz, 1 kHz, 2.0 kHz, and 6 kHz. No. 43 and 61 Amidon Associates (Fair-Rite Corp.) toroid cores are specified for the filters in this article.

Broadband transformers, L networks, or RC-coupled transistor amplifiers can be used for matching the filters to their associated circuits. I prefer the RC-coupled amplifier approach (fig. 4) because the gain can be used to compensate for the filter loss.

Fig. 3 shows the response curve and AC analysis (via NOVA software) for a two-section CW filter. This and the other filters in Table I are based on the Butterworth criterion. Each of the filters is slightly asymmetrical, but this will not impair the performance. It can be seen in fig. 3 that the CW filter IL is 8.1 dB and the terminal impedance is very close to the desired 500 ohms.

If the RC-coupled amplifier circuit in fig. 4 is used for matching, you can lower the gain to suit your receiver by making C1 smaller in value, or by inserting a 1k ohm trimmer pot between the Q2 emitter resistor and ground.

BFO Considerations

The BFO operating frequency should be offset 700 Hz above or below the filter center frequency for CW reception. For SSB reception you may place the BFO frequency at a point about 20 dB down on the upper or lower skirt of the filter (USB or LSB). Generally, this will be between 1 and 2 kHz above or below center

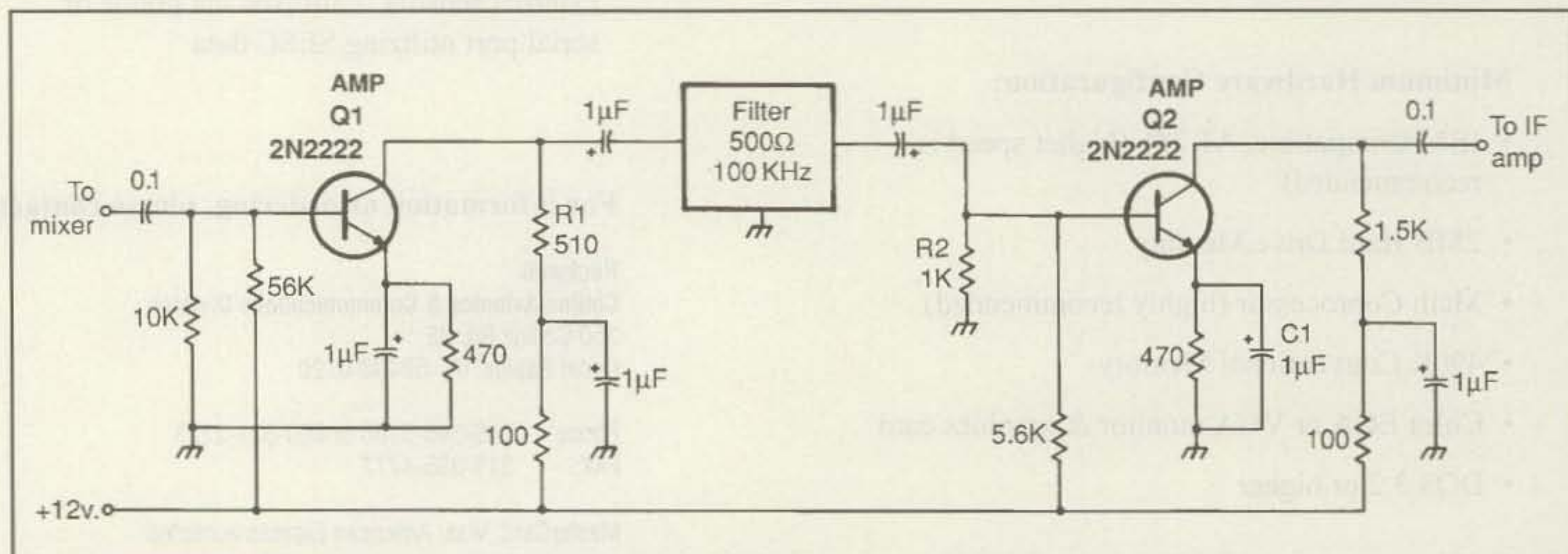


Fig. 4— A method for recovering the filter insertion loss while providing an impedance match. R1, in parallel with the Q2 input resistance, provides a filter termination of approximately 500 ohms. (See text.)

LC IF FILTER COMPONENT VALUES

3 dB (BW)	Z (ohms)	IL (dB)	CF (kHz)	C1 (uF)	C2 (uF)	C3 (uF)	C _c (pF)	L1, L2 (μH)	L3 (μH)
500 Hz*	500	8	50	0.0105	0.02	—	150	599 (34t No. 28, on an FT-50-43)	—
500 Hz*	50	9	50	0.6	0.041	—	270	262 (42t No. 28, on an FT-50B-61)	—
1.0 kHz	500	100	100	0.05	0.0075	0.0062	47	386 (51t No. 30 on an FT-50B-61)	402 (52t No. 30 on an FT-50B-61)
2.0 kHz*	500	2.7	50	0.1	0.054	—	0.002	282 (64t No. 30 on an FT-50-61)	—
2.0 kHz	500	6.6	100	0.0473	0.0165	0.012	200	204 (55t No. 30 on an FT-50-61)	Same as L1
2.0 kHz	50	6.0	100	0.1	0.0082	0.0075	120	332 (47t No. 30 on an FT-50B-61)	330 (66t No. 30 on an FT-50A-61)
6.0 kHz	500	3.3	100	0.035	0.015	0.01	470	236 (40t No. 30 on an FT-50B-61)	Same as L1

Table 1—LC IF filters for various bandwidths and terminal impedances. The columns that contain an asterisk indicate a two-section filter (see fig. 1[A]). All others are three-section filters. Standard-value capacitors are used in parallel to obtain the specified values of C. The inductances are critical within a few μH, and capacitances are critical within 100 pF to ensure the center frequencies, minimum IL, and the specified terminal impedances.

frequency. Set the BFO for the best SSB voice quality that is consistent with rejection of the unwanted sideband. The carrier-frequency placement follows the same rule if the filter is used in an SSB generator.

BFO frequency stability at 50 or 100 kHz should be excellent if polystyrene or silvermica capacitors are used. The LC type of BFO is easily adjustable and eliminates the high

cost of crystals. Fig. 5 shows a practical circuit for an LC BFO. It allows a frequency variation of plus or minus 3 kHz.

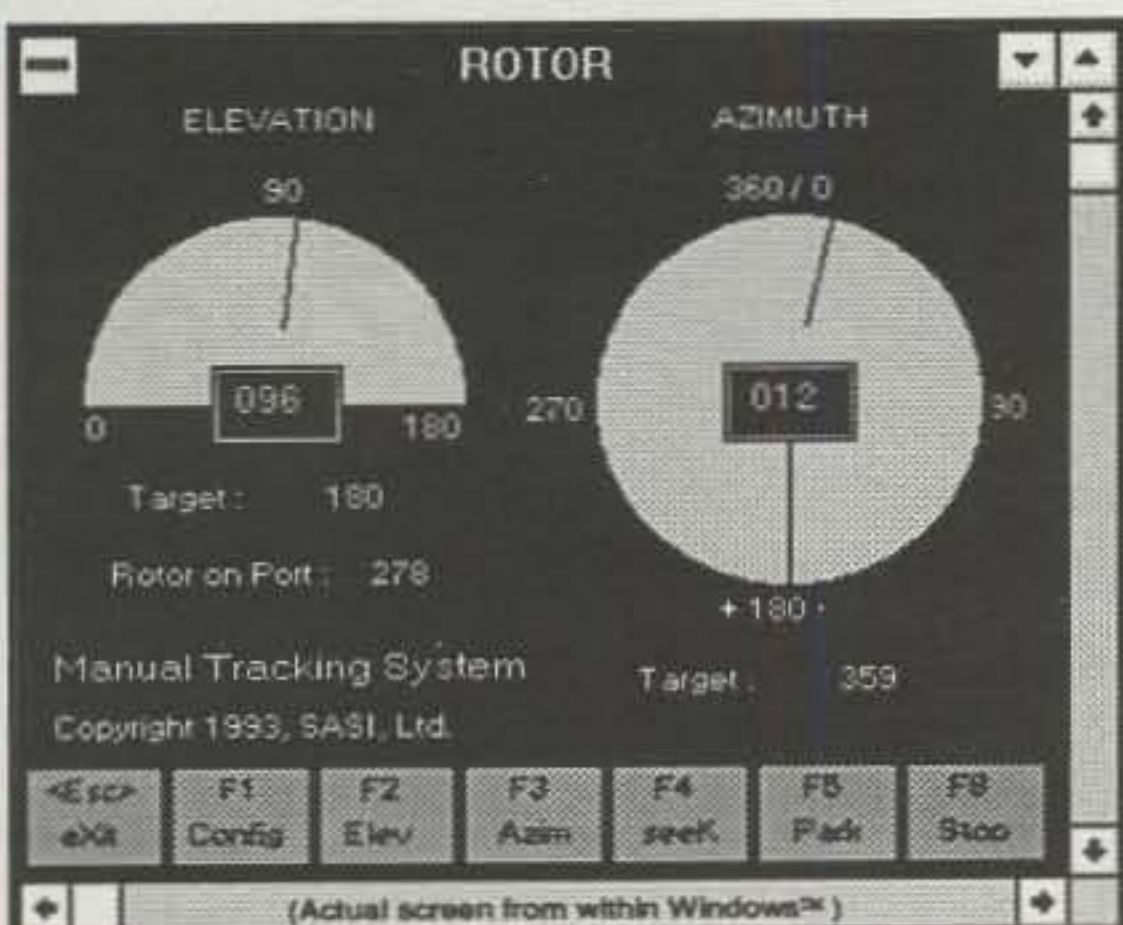
Tunable IF Receiver

There are two ways to develop an amateur-band receiver when using a tunable IF system. One

involves using a crystal-controlled amateur-band converter ahead of a receiver that tunes from, say, 300 to 500 kHz (ala the BC-453 mentioned earlier). As an alternative, we may opt for a tunable amateur-band converter ahead of a fixed-tuned receiver set at a particular frequency, such as 400 or 600 kHz. A tunable IF receiver would cover a range that matched the amateur-band frequency spread of interest,

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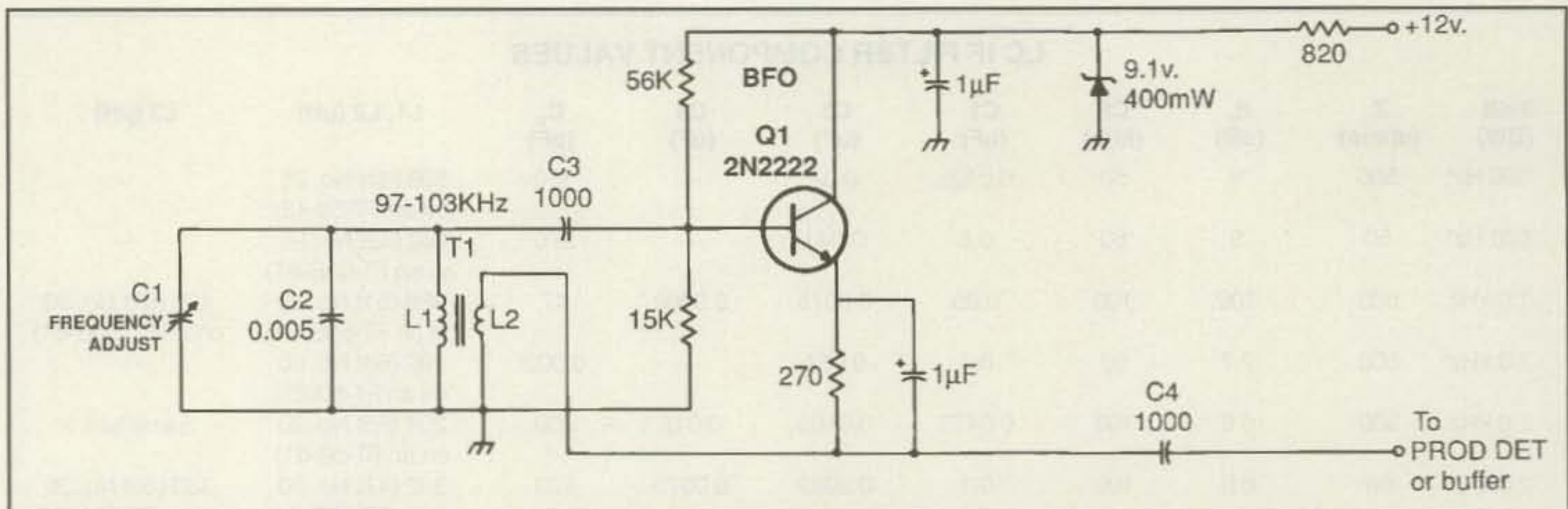


Fig. 5- Schematic diagram of a practical 50 or 100 kHz BFO. C1 is a 1000 pF trimmer (Arco 307M or equivalent) for 100 kHz and is a 3000 pF unit (Arco 313M or equivalent) for 50 kHz. The 1 µF capacitors are chip ceramic or tantalum types. L1, for 100 kHz, has a primary inductance of 450 µH. Use 29 turns of No. 26 enameled wire on an Amidon FT-50-43 toroid. L2 has 7 turns of No. 26 enameled wire. For 50 kHz operation use a 0.05 µF capacitor at C2. L1 (495 µH) has 31 turns of No. 26 enameled wire on an FT-50-43 toroid. L2 has 7 turns of No. 26 enameled wire. C3 may need to be increased in value to obtain oscillation at 50 kHz. For either frequency use the least amount of C3 capacitance that will ensure reliable oscillation. The BFO should be enclosed in a shield box to minimize stray radiation that could cause 50 or 100 kHz markers to appear in the tuning range of the receiver.

such as 3800 to 4000 kHz. A tunable-IF receiver range of 300 to 500 kHz, for example, would be suitable. The block diagram in fig. 6 illustrates this principle. Excluded are the usual frills, such as AGC, an S-meter, and digital frequency display included in the circuits of commercial receivers. The simple approach seen in fig. 6 is entirely adequate for most amateur communications. Design information for developing receiver circuits is presented in *Solid*

State Design for the Radio Amateur, *W1FB's QRP Notebook*, and *W1FB's Design Notebook* (ARRL publications).

Filter Adjustment

You may adjust your LC BFO to the center frequency of the filter by observing its output with a frequency counter. This will enable you to

use the BFO as a signal generator when aligning the filter. The filter under test should be terminated by resistors that match the filter impedance (51 or 510 ohms). Output from the filter can be observed with a scope, and adjustments should be made to display maximum waveform amplitude. A post filter RF amplifier may be required in order to obtain sufficient waveform height. Another alignment method calls for using a general-coverage receiver



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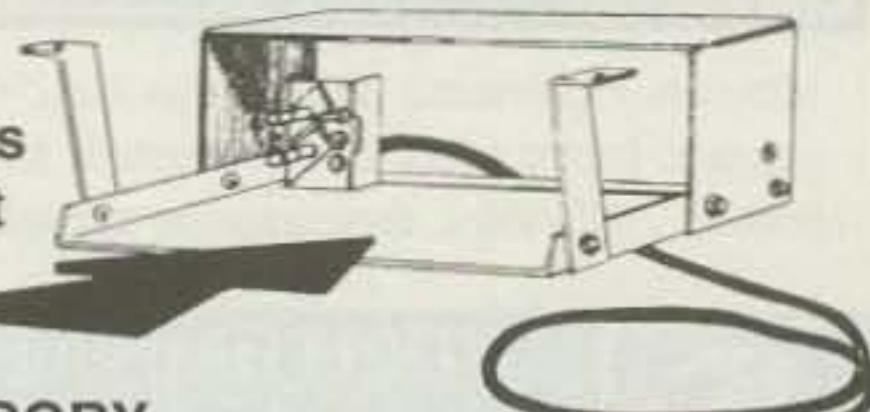
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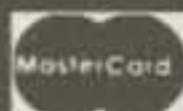
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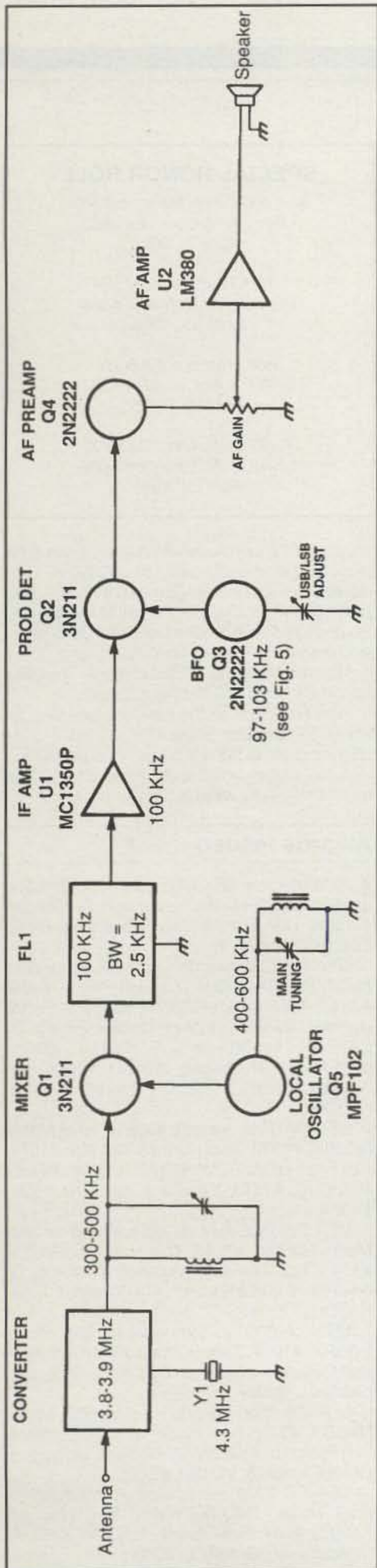


Fig. 6—Block diagram of a suggested circuit for a crystal-controlled converter and a tunable-IF receiver that covers a 300–500 kHz range. A doubly-balanced mixer would provide superior performance at Q1. This circuit represents a bare-bones approach to SSB receiver design. The arrows indicate the signal direction.

that can be tuned to 50 or 100 kHz. Adjust the filter for maximum S-meter deflection at the filter center frequency. A third method calls for using a post-filter amplifier, a tone-modulated signal generator, a diode detector, and headphones. Adjust the filter for maximum audio level in the phones.

Construction Tips

Input-output isolation (to reduce signal leakage) is important if good performance is to result. This is a critical consideration for HF filters, but at 50 and 100 kHz it is not as serious a matter, because stray capacitive coupling versus frequency is less significant. The toroids are inherently self-shielding, and this makes unwanted mutual coupling virtually impossible. However, it is prudent to use shield partitions between the filter sections to minimize leakage. The completed filter should be housed in a metal or PC-board box to prevent the intrusion of noise and the BFO signal.

Keep the component leads as short and direct as practicable. If you don't have polystyrene or silver-mica capacitors, you may use Sprague-type COG monolithic ceramic capacitors or Sprague 192P units.

Summary

Table I lists combinations of standard-value capacitors. I juggled the computed values of the L and C components in order to use standard-value units of C, consistent with minimum IL and the desired terminal impedances.

The converter and tunable-IF receiver front-end circuits need to have high Q in order to minimize image responses. This can be a problem when using low-frequency IFs.

If you can find pot cores (a.k.a. cup cores) that are adjustable (some have movable ferrite slugs), you may use them in place of the toroids listed in Table I. Tunable pot cores would allow easy on-the-nose filter adjustment. Pot cores without tuning slugs would also be excellent in these filters.

This article was written to inspire experimenters toward the use of LC filters. The revival of this old technique can save many dollars while providing practical IF filters. There is no reason why LC filters can't be used also in high-performance receiver circuits.

Footnotes

1. W. Hayward, W7ZOI, "A Unified Approach to the Design of Crystal Ladder Filters," *QST*, May 1982, p. 21; and W. Hayward, W7ZOI, "Designing and Building Simple Crystal Filters," *QST*, July 1987, p. 24. Also see, D. De Maw, W1FB, "A Tester for Crystal F, Q and R," *QST*, January 1990, p. 21.

73, Doug, W1FB

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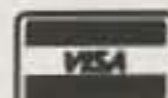
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NEWS OF CERTIFICATE AND AWARD COLLECTING

This month K1DFO tells the story of his quest for USA-CA All Counties.

Walt Ordway, K1DFO USA-CA #851

"In 1958, when I was 14 years old and a sophomore at Bishop Bradley High School in Manchester, New Hampshire, a few of us got our Novice licenses. It didn't take long for us to complete the requirements for WAS (Worked All States). It seemed too easy, so we looked for something that would be more challenging and hold our interest a bit longer. It was to work all counties! The strategy was to enter all of the state QSO parties, and eventually we'd have them all. We knew that there was no award at the time, but maybe by the time we finished there would be one.



Walt, K1DFO, USA-CA #851, and XYL, Jo.

"That was a great goal while we were in high school, but when we got into college our priorities changed, and amateur radio was not high on the list. After college my ham activities were close to zero, until I turned 40 in 1982, at which time I got back into the hobby with both feet. Long forgotten was the thought of working all counties. In fact, even though I had a new subscription to *CQ*, I had always managed to bypass the "Awards" column and thereby had not discovered the USA-CA Award.

"In August 1984 I was twisting the dial on 20 meters while at home nursing a case of pneumonia. As I tuned past 14.336 MHz, I heard the word "county"—a word from my past. I quickly tuned back and listened for a while. Incredible! These folks were actually trying to work all counties. It all seemed organized—the net control, the 10-minute runs, and all of those mobiles traveling through counties that nor-

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mally would be too difficult to work at random. I didn't know who sponsored the award, but I knew that I probably was behind, so I jumped in and started. My first net contact was KCØJG, mobile in Shannon, Missouri, 26 August 1984.

"Two years later the XYL and I decided to have the QTH remodeled. I couldn't imagine putting the IC-730 in the box for 6 months, so I started a new phase of my amateur experience—mobile operation. It made sense—35 minutes on the way home. Of course you get another 60 minutes at lunch, plus time on the weekends while you're traveling to and from the hardware store. You get a special bonus when you go on vacation. This was absolutely incredible!

"When the remodeling was finished, I bought another IC-730 for the shack. By then I was hooked on mobile operation. In the meantime, I found a great logger—my XYL, Jo (Joanne).

"For years you wonder if you'll ever make it to the finish line. Well, as the net closed down on the evening of 7 December 1994, I told Dave, N7BKW, that I was down to Breckenridge, Kentucky for 'the whole ball of wax.' A station in Kentucky came on and said he'd get it for me that weekend. But as I turned on the radio the next morning around 1430Z, I immediately heard N7BKW say, "K1DFO, up 3." He explained that Bill, N7OTR, and Jerry, KJ7FJ, were about 100 miles from Breckenridge. I then got a land line from NT9V, with the same

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USA-CA All Counties #867
April 29, 1995

A. G. Anderson, GM3BCL
USA-CA All Counties #868
April 29, 1995

message. I confirmed that I'd delay leaving for work to get the contact. At 1736Z N7OTR called back into the net and said that Jerry had never given out a 'last for the whole ball of wax.' So at 1736Z on 8 December 1994 Jerry and I exchanged 59's at my finish line.

"There are too many folks to thank. The most important is my XYL for her support.

"Will I be back on the net? You bet! I've got about 52 to go for all mobile to mobile, 20M SSB, and about 200 for bingo! And something tells me I'll get hooked on going around one more time."—73, Walt K1DFO

Awards Issued

A. G. Anderson, GM3BCL, has the distinction of becoming the first amateur from Scotland to achieve USA-CA All Counties status. Bravo Zulu (well done).

USA-CA 500 awards were issued to: Shel Mann, NØDRX, #2846; Tom Hughes, KM4ES, #2847; Rolf Franzke, KK6QW, #2848; A. G. Anderson, GM3BCL, #2849; Dalibor Sebestiok, OK2BVX, #2850; Jerry F. Pierce, KI7SN, #2851; John P. Stewart, W5LLU, #2852; Kari Ahokas, OH1HD, #2853; Donald J. Falls, KA3OGL.

USA-CA 1000 awards went to: Shel Mann, NØDRX, #1370; Tom Hughes, KM4ES, #1071; Rolf Franzke, KK6QW, #1372; A. G. Anderson, GM3BCL, #1373; Donald J. Falls, KA3OGL, #1374.

USA-CA 1500 awards were issued to: Shel Mann, NØDRX, #1144; Tom Hughes, KM4ES, #1145; Rolf Franzke, KK6QW, #1146; A. G. Anderson, GM3BCL, #1147; Donald J. Falls, KA3OGL, #1148.

USA-CA 2000 awards went to: Shel Mann, NØDRX, #1051; Tom Hughes, KM4ES, #1052; Rolf Franzke, KK6QW, #1053; A. G. Anderson, GM3BCL, #1054.

USA-CA 2500 awards went to: Shel Mann, NØDRX, #973; Tom Hughes, KM4ES, #974; Rolf Franzke, KK6QW, #975; A. G. Anderson, GM3BCL, #976; VO1SF, #977.

USA-CA 3000 certificates were issued to: Shel Mann, NØDRX, #886; Tom Hughes, KM4ES, #887; Rolf Franzke, KK6QW, #888; A. G. Anderson, GM3BCL, #889.

Awards Available

WARC 500 Award. The WARC 500 Award is sponsored by James E. Mackey, K3FN. It is available to all amateurs who have made valid two-way QSOs with 500 or more countries on the WARC bands (30, 17, 12 meters). The basic award is for QSOs with 500 countries (no distinction as to mode). The award is endorsable in 100 country levels after the 500 level has been attained.

The award is an etched plaque which will be a welcome addition to any operating position. Endorsement plates are attached to the basic award. The fee is US\$50.00 for basic award plus endorsements, or 100 IRCs. For award application and convenient country check list, send US\$2.00 or 4 IRCs to: James E. Mackey, K3FN, P.O. Box 270569, West Hartford, CT 06127-0569. Those who have already received the WARC 500 Award are listed in Table I. We commend Jim for sponsoring this award and encouraging the use of the WARC bands. Award seekers should seriously consider working toward it.



Certificate of the Guglielmo Marconi Award, sponsored by the Italian ARI.

Guglielmo Marconi Award. This award is available to radio amateurs who contact Italian stations between May 1, 1995 and April 30, 1996. All bands may be used, but no repeater contacts.

Contacts must be made with Italian stations, located in different provinces and regions, and with special stations commemorating the discovery of the radio. Italian amateurs must contact at least 50 different provinces, all 10 call areas, and 4 out of 5 special regions (IX, IN, IV, IS, and IT). Contacts also must be made with at least 5 special stations commemorating the discovery of radio with the IY prefix.

Amateurs located outside of Italy must contact all the 10 Italian call areas and 3 special stations with the IY prefix.

To apply for the award send request with 5000 lira, or US\$.00, or 10 IRCs. List your contacts with full details with a complete, clear address and send to: GMA Award Manager, c/o ARI, Via Scarlatti 31, 20124 Milano, Italy. Deadline is December 31, 1997.

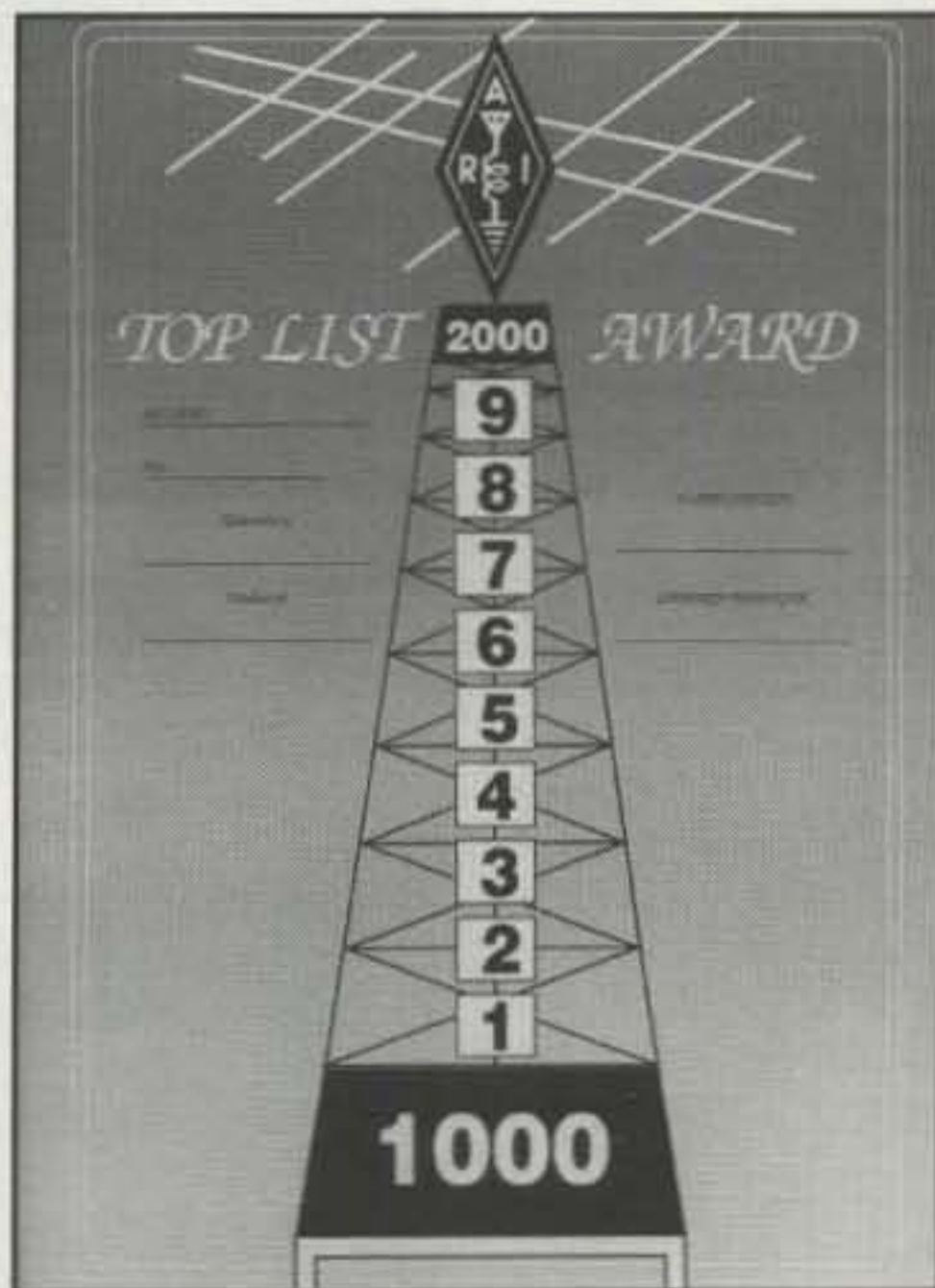
TOP List Award. The Italian Amateur Club also offers the TOP List Award to DXers who can prove having achieved excellence in the DX activity.

It is required to contact 1000 countries using all available bands between 10 and 160 meters (WARC bands included). Endorsements are given for each additional 100 countries confirmed, up to 2000 countries. The level of 2100 countries will be confirmed with a plaque. Only

WARC 500 AWARD RECIPIENTS TO DATE

Award	Call	Recipient	Endorsement
#1	K3FN	James E. Mackey	800
#2	K2FL	Jack Heisey	800
#3	W4MBD	Robert H. McNeill	500
#4	N4VZ	Robert D. Peterson	900
#5	WB4DBB	Herman Cone III	700
#6	K3UA	Phil Koch	700
#7	K6VX	Ray Balch	500
#8	KD6PY	Steven R. Buerg	700
#9	AA2U	Randy Rand	600 (QRP)
#10	VE1UK	Paul M. Dunphy	500
#11	DK7NP	Rudolf Heim	500
#12	DL5ARX	Michael Adaszewski	700
#13	VE3NSZ	Ernest W. Poole	500
#14	DL5DQZ	Frank Mueller	700
#15	ON4AGX	De Vlaminck Mathieu	800
#16	4Z4DX	Dov Gavish	700
#17	HB9ALO	Mauro Mombelli	600
#18	K4II	William G. Baird	600
#19	DF3CB	Bernd Koch	700
#20	DL3BUN	Willy Fassi	700
#21	ON4VT	Danny Van Tricht	700
#22	IK2BLA	Giuseppe Feretti	500
#23	KK4XL	Jim Young	500
#24	K8JJC	Paul H. Geerdes	500
#25	N1IR	Chip Cohen	500
#26	VE3XN	Garry V. Hammond	700

Table I—Recipients of the WARC 500 Award, sponsored by K3FN.



The TOP List Award certificate. This award program is sponsored by the Italian ARI.

DXCC countries may be used, and delete excluded.

It is only necessary to send the total number of countries confirmed on each band, with no details of each single country contact. You must declare that all the corresponding cards have been received, and the award manager may ask to check each card. The award costs lira 5000, or US\$5.00, or 10 IRCs. If you qualify for the award between 30 June and 1 September the award will be free of charge and will be sent to you before the end of September. Amateurs outside Italy will get it free if the request is made before the end of September.

Endorsement stickers will be sent on request and cost lire 1000, or US\$1.00, or 2 IRCs.

The plaque will be sent when 2100 points is reached. It will be free for the first three Italian stations. It will then cost lira 30,000 plus lira 10,000 for shipping. For non-Italian amateurs cost of the plaque will be US\$30.00 or 45 IRCs.

Applications should be sent to: TOP Award Manager, c/o ARI, Via Scarlatti 31, 20124 Milano, Italy.

73, Norm, WA3RTY



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The ARRL DXCC Countries List is available for \$2.00 from the American Radio Relay League, 225 Main Street, Newington, CT 06111-1494. This ARRL list shows the countries which provide credit towards the DXCC award. A list of deleted countries shows countries that can provide DXCC credit if they were contacted during the required dates. A "was" and "is" list enables one to quickly associate previous to current callsign prefixes. It also includes a list showing the allocation of international callsign series, such as AAA-ALZ being assigned to the United States of America.

The list in this article does not include every callsign that amateurs can use; it includes the callsigns one is most likely to hear on the air. Insignificant additional letters and numbers are not included in this list. However, significant additional letters and numbers (such as FM7 to indicate Martinique) are included.

A listing such as AA-AL means every prefix from AA through AL. The listing TE/ TI means only callsign prefixes TE and TI, excluding TF through TH prefixes.

The numeral zero (0) is treated as if it is a figure ten (10), just as it is used in domestic and foreign callbooks. Notice that the zero is in the callsign prefixes of many rare DX locations. More than 20 of these zero prefixes are included in the list which follows these introductory comments. I advise you to contact "zero prefix" stations whenever you hear them. If a particular callsign prefix is used by most of the amateurs in a country, that prefix is shown following the name of the associated country. As an example, the prefix block CA-CE is shown belonging to Chile, and CE is included after the name of the country because it is the prefix that is used by most Chilean amateur radio operators.

Morse Code Decision

The International Amateur Radio Union (IARU) established a three-person committee to recommend deletion or retention of the existing requirement that people applying for amateur radio licenses which authorize operation below 30 MHz must prove their ability to receive Morse Code by ear and to send it by hand. International Radio Regulation 2735 details these requirements and it has been quoted previously in this column. Our FCC, however, has dropped code sending tests. In addition, Japan issues code-free licenses which authorize 10 watt (maximum) operation below 30 MHz.

The IARU ad hoc committee consisted of one member from each of the three International Telecommunications Union (ITU) regions. They recommend retaining regulation 2735 in its present form.

The author of this column prefers to use Morse Code. I work 3000 to 4000 contacts per year, with no voice (or other mode) contacts made during most of my 47 years on the air. Despite my personal preference for code operation, I do not agree with the concept that every amateur should have to prove Morse Code proficiency to qualify for a license entailing operating privileges below 30 MHz. I believe applicants should be licensed in accordance with the modes they intend to use on the air. I have submitted this suggestion to the FCC in past proposals, but without support or acceptance by other amateurs or amateur groups.

Wire Antennas Catalog

The Radio Works Catalog 951 has a cover price of \$4.00, but Jim Thompson, W4THU, president of the company, will send it free to readers who request one. This 80-page catalog covers wire antenna sys-

45527 Third Street East, Lancaster, CA 93535-1802



Nine-year-old Jennifer Ruggieri, KE6KJV, who lives in Catoosa, Oklahoma, recently upgraded to a Technician-Plus. Her mom is N6SKI and her dad is N6EU. The family station includes a Yaesu FT-990 transceiver and a Cushcraft R7 vertical antenna. Jennifer prefers operating in the 40 meter band. She also plays the piano in competition.

tems in detail, including the Big Sig Loop, Carolina Beam, G5RV-Plus, inverted-L, and many more. Also offered are related accessories, such as insulators, antenna wire, filters, coaxial cables, etc.

The company's 128-page Reference Catalog, a useful tool for those new to wire antennas, sells for \$4.00. It provides easy-to-understand explanations, and is one of my primary reference books.

73, Bill, W6DDB



Chris Dimitrakopoulos, SV2CWY, of Thessaloniki, Greece considers CQ magazine to be his "right hand." According to Chris, CQ has helped him work more than 150 countries during his first year on the air.

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Current (cont.)	9.2	12	24	32	4.2
Ripple(max.)	3mV	3mV	3mV	3mV	3mV
Regulation	1%	1%	1%	1%	2%
Cooling Fan	NO	NO	NO	YES	NO
Size(inch.)	5x4x9	5x4x9	7x6x9	11x5.5x9	6x3x9
Weight (ilbs.)	11	11	18	22	6
Meter	YES	NO	YES	YES	YES

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A3	Tonga (A35)
A4	Oman (A41/A45/A47)
A5	Bhutan (A51)
A6	United Arab Emirates (A61)
A7	Qatar (A71)
A9	Bahrain (A92)
BT/BY	China (BY)
BV	Taiwan
CA-CE	Chile (CE)
CE9	Chilean Antarctica
CE9	South Shetland Islands
CEØ	Easter Island
CEØ	Juan Fernandez Islands
CEØ	San Felix and San Abrosio
CM/CO	Cuba
CN	Morocco (CN8)
CP	Bolivia
CT	Portugal
CT3	Madeira Islands
CU	Azores
CV-CX	Uruguay (CX)
CY9	St. Paul Islands
CYØ	Sable Islands
C2	Nauru (C21)
C3	Andorra (C31/C32)
C5	The Gambia (C53)
C6	Bahamas (C6A)
C8-C9	Mozambique (C9)
DA-DL/Y2-Y9	Germany
DPØ	Antarctica, German
DU-DZ	Philippines
D2-D3	Angola (D2)
D4	Cape Verde (D44)
D6	State of Comoros (D68)
EA-EH	Spain (EA)
EA6-EH6	Balearic Islands
EA8-EH8	Canary Islands
EA9-EH9	Ceuta & Melilla
EI-EJ	Ireland
EJ	Aran Island
EK	Armenia—C.I.S.
EL	Liberia
EM-EO/UR-UZ	Ukraine—C.I.S.
EP-EQ	Iran (EP2)
ER	Moldova—C.I.S.
ES	Estonia
ET	Ethiopia
EU-EW	Belarus—C.I.S.
EX	Kirghizistan
EY	Tadjikistan—C.I.S.
EZ	Turkmenistan—C.I.S.
E3	Eritrea
F/FA-FF	France
FG	Guadeloupe
FH	Mayotte
FJ/FS	St. Martin
FK	New Caledonia
FM	Martinique
FO	Clipperton Island
FO2-FO8	French Polynesia Residents
FOØ	French Polynesia Visitors
FP	St. Pierre & Miquelon Islands
FR	Reunion Islands
FR/FG	Glorioso Islands
FR/FJ	Juan de Nova/Europa
FR/FT	Tromelin

FS/FJ	St. Maartin
FT8W	Crozet
FT8X	Kerguelen Island
FT8Y	Antarctica
FT8Z	Amsterdam & St. Paul Islands
FW	Wallis & Futuna Islands
FY	French Guiana

G/GX	England, United Kingdom
GB	Special United Kingdom Stations
GD/GT	Isle of Man (GD)
GI/GN	Northern Ireland (GI)
GJ/GH	Jersey (GJ)
GM/GS	Scotland (GM)
GU/GP	Guernsey (GU)
GW/GC	Wales (GW)

HA/HG	Hungary
HB	Switzerland (HB9)
HB0	Liechtenstein
HC-HD	Ecuador (HC)
HG8-HD8	Galapagos Islands (HG8)
HF0	South Shetland Islands
HH	Haiti
HI	Dominican Republic
HJ-HK	Colombia (HK)
HK0	Malpelo Islands
HK0	San Andres & Providencia Islands
HL	South Korea
HL9	U.S.A. Personnel in South Korea
HO-HP	Panama (HP)
HQ-HR	Honduras (HR)
HS	Thailand
HU	El Salvador (YS)
HV	Vatican
HZ	Saudi Arabia
H4	Solomon Islands (H44)

I-IZ	Italy
IA5	Tuscan Archipelago
IC8	Capri & Ischia Islands
IM0-IS0	Sardinia (IS0)
IT9	Sicily

JA-JS	Japan
JD1	Minami-Torishima
JD1	Ogasawara
JT-JV	Mongolia (JT)
JW	Svalbard Island
JX	Jan Mayen Islands
JY	Jordan
J2	Djibouti (J28)
J3	Grenada (J37/J39)
J5	Guinea-Bissau
J6	St. Lucia
J7	Dominica (J73)
J8	St. Vincent & Dependencies (J88)

K/KA-KZ	U.S.A., plus U.S.A. protectorates, etc. (also A/NW)
KC4	Antarctica (special callsigns)
KC6	Belau, West Caroline Islands
KG4	Guantanamo Bay, Cuba
KH1	Baker & Howland Islands
KH2	Guam
KH3	Johnston Island
KH4	Midway Island
KH5	Palmyra & Jarvis Islands
KH5K	Kingman Reef
KH6	Hawaii
KH7	Kure Island
KH8	American Samoa
KH9	Wake Island
KH0	Mariana Islands
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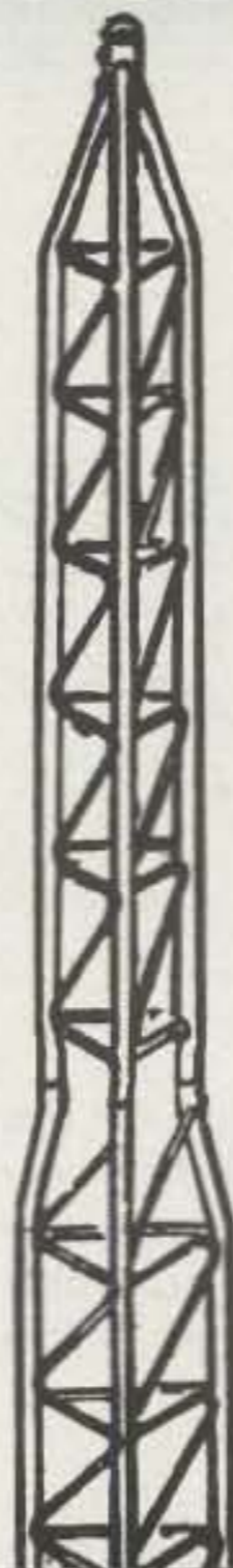
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KP5	Desecheo Island
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LB	Norwegian Novice Stations
LJ	Norwegian School Stations
LO-LW	Argentina (LU)
LU	Antartctica (see VP8)
LX	Luxembourg
LY/UP	Lithuania
LZ	Bulgaria
N/NA-NZ	U.S.A., plus U.S.A. protectorates, etc. (also A/K/W) (see KC4-KP5)
OA-OC	Peru (OA)
OD	Lebanon (OD5)
OE	Austria
OF-OI	Finland (OH)
OH0	Aland Islands
OJ0	Market Reef
OK-OL	Czechoslovak Republic (OK)
OM3	Slovak Republic
ON-OT	Belgium (ON)
OR4	Antarctica
OX	Greenland (OX3)
OY	Faroes
OZ	Denmark
PA-PI	Netherlands
PJ2/PJ9	Curaçao
PJ4/PJ9	Bonaire
PJ5/PJ8	Sint Eustatius
PJ6	Saba
PJ7/PJ8	St. Maarten
PP-PY	Brazil (PY)
PP0-PY0	Fernando de Noronha Island (PY0)
PP0-PY0	St. Peter & St. Paul Rocks (PY0)
PP0-PY0	Trinidad & Martin Vaz Islands (PY0)
PZ	Suriname
P2	Papua New Guinea (P29)
P4	Aruba (P43)
RA-RZ/UA-UI	C.I.S., Russian Federation
SA-SM	Sweden (SM)
SN-SR	Poland (SP)
SP0	Special Polish Stations
ST	Sudan (ST2)
ST0	Southern Sudan
SU	Egypt
SV-SZ	Greece (SV)
SV/A	Mount Athos
SV5	Dodecanese Islands
SV9	Crete
S2	Bangladesh (S21)
S5/YU3	Slovenia
S7	Seychelles (S79)
S8	Transkei
S9	Sao Tome & Principe
S0	Western Sahara
TA-TC	Turkey (TA)
TD/TG	Guatemala (TG)
TE/TI	Costa Rica (TI)
TF	Iceland
TI9	Cocos Islands
TJ	Cameroon (TJ1)
TK	Corsica
TL	Central African Republic (TL8)
TN	Congo
TP	Council of Europe
TR	Gabon (TR8)
TT	Chad (TT8)
TU	Ivory Coast (TU2)
TV-TX	France (F)
TY	Benin

TZ Mali
 T2 Tuvalu
 T3Ø West Kiribati/Gilbert Islands
 T31 Central Kiribati/British Phoenix Islands
 T32 East Kiribati/Line Islands
 T33 Banaba Islands/Ocean Islands
 T5 Somalia Republic (T53)
 T7 San Marino (T72/T77)
 T9YU4/4N4/4O4 Bosnia-Herzegovina

UA-UI1/3/4/6 & RA-RZ Russian Federation
 UA1/4K2R1FJ Franz Josef Land
 UA2 Kaliningrad
 UA-UI8/9/Ø & RA-RZ Asiatic Russia
 UJ-UM Uzbekistan
 UN-UQ Kazakhstan
 UR-UZ/EM-EØ Ukraine

VE/VO/VY Canada
 VK Australia
 VK9C Cocos-Keeling Islands
 VK9L Lord Howe Island
 VK9M Mellish Reef
 VK9N Norfolk Island
 VK9W Willis Island
 VK9X Christmas Island
 VKØ Heard Island
 VKØ Macquarie Island
 VO1 Newfoundland
 VO2 Labrador
 VP2E Anguilla
 VP2M Montserrat
 VP2V British Virgin Islands
 VP5 Turks & Caicos Islands
 VP8 Antarctica
 VP8 Falkland Islands
 VP8/LU South Georgia Island
 VP8/LU South Orkney Islands
 VP8/LU South Sandwich Islands
 VP8/LU South Shetland Islands
 VP9 Bermuda
 VQ9 Chagos Archipelago
 VR6 Pitcairn Island
 VS6/VR2 Hong Kong (VS6)
 VU India (VU2/VU3)
 VU Andaman & Nicobar Islands
 VU Laccadive Islands
 VY1/VY5 Yukon Territory (VY1)
 VY2 Prince Edward Islands
 VY9 Canada (VE)
 V2 Antigua & Barbuda Islands
 V3 Belize (V31)
 V4 St. Kitts & Nevis Islands (V44/V47)
 V5 Namibia (V51)
 V6 Micronesia (V63) (East Caroline Islands)
 V7 Marshall Islands (V73)
 V8 Brunei (V85)

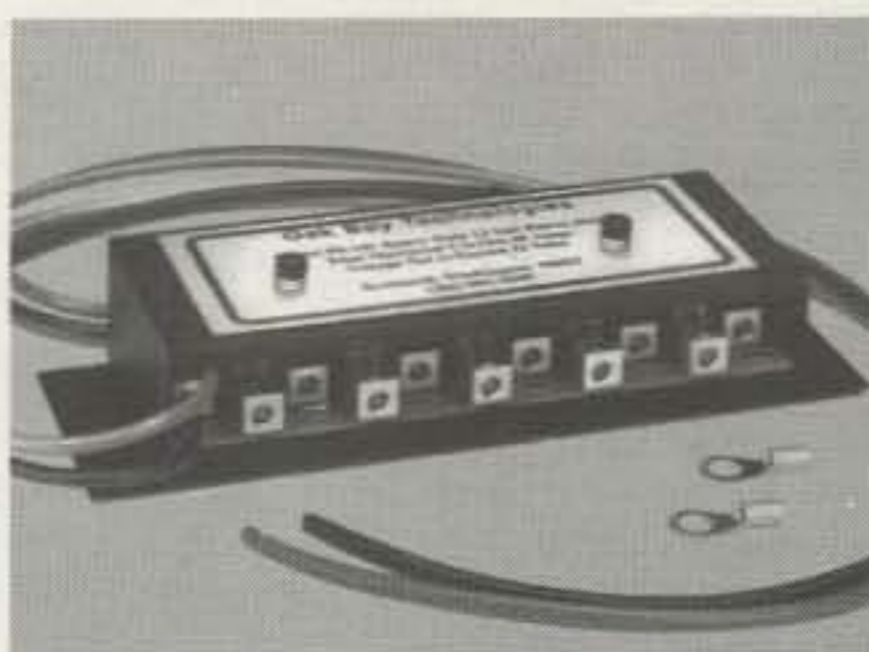
W/WA-WZ U.S.A., plus U.S.A. protectorates, etc.
 (also A/K/N) (see KC4-KP5)

XA-XI Mexico (XE)
 XA4-XI4 Revilla Gigedo (XF4)
 XP Greenland
 XQ Chile (CE)
 XT Burkina-Faso (XT2)
 XU Cambodia (XU1)
 XV Vietnam (XV2)
 XW Laos (XW8)
 XX Macao (XX9)
 XY-XZ Myanmar (XZ)

YA Afghanistan
 YB-YH Indonesia
 YI Iraq (YI1)
 YJ Vanuatu (YJ8)
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model	height	max. wind base width	max. vert. load ft.2	load lbs.	weight
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CR30	9'10"	39"	27@90mph	1,322	33
CR45	14'9"	39"	23@90mph	881	57



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Y2-Y9	Germany (see DA-DL)
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ZK1	South Cook Islands
ZK2	Niue
ZK3	Tokelau Islands
ZL-ZM	New Zealand (ZL)
ZL5	Antarctica
ZL7	Chatham Island
ZL8	Kermadec Island
ZL9	Auckland & Campbell Islands
ZP	Paraguay
ZR-ZU	Republic of South Africa (ZR/ZS)
ZS1	Antarctica
ZS8	Prince Edward & Marion Islands
ZX-ZY	Brazil (PY)
ZXØ	Antarctica
Z2	Zimbabwe (Z21)

Z3/4N5/YU5	Macedonia
1AØ	Sovereign Military Order of Malta
1S	Spratly Islands
2A-2Z	England (G)
3A	Monaco (3A1/3A2)
3B6	Agalagea Island
3B7	St. Brandon Island
3B8	Mauritius Island
3B9	Rodriguez Island
3C1	Equatorial Guinea
3CØ	Annobon Island
3DA	Swaziland
3D2	Fiji Islands
3D2	Conway Reef
3D2	Rotuma Island
3V8	Tunisia
3W8/XV	Vietnam (XV)
3X	Guinea (3XØ)
3Y	Bouvet
3Y	Peter I Island
3Y	Antarctica
3Z	Poland (SP)
4F	Philippines (DU)
4J-4K	Azerbaijan—C.I.S.
4J1/R1MV	Malyj Vysotskij Island—C.I.S.
4K1	Antarctica—C.I.S.
4K1	South Shetland Islands—C.I.S.
4K2/UA1/R1FJ	Franz Josef Land—C.I.S.
4L	Georgia—C.I.S.
4M	Venezuela (YV)
4N4-4O4/T9/YU4	Bosnia-Herzegovina (T9)
4N5/YU5Z3	Macedonia
4P-4S	Sri Lanka (4S)
4U1	ITU Headquarters (Europe)
4U1	U.N. Headquarters (U.S.A.)
4X/4Z	Israel
5A	Libya
5B	Cyprus (5B4)
5H-5I	Tanzania (5H3)
5J-5K	Colombia (HK)
5N-5O	Nigeria (5N)
5R-5S	Madagascar (5R)
5T	Mauritania (5T5)
5U	Niger (5U7)
5V	Togo (5V7)
5W	Western Samoa (5W1)
5X	Uganda (5X5)
5Y-5Z	Kenya (5Z)
6V-6W	Senegal (6W)
6Y	Jamaica (6Y5)
7J-7N	Japan (JA, etc.)
7O	Yemen
7P	Lesotho (7P8)
7Q	Malawi (7Q7)
7T-7Y	Algeria (7X2)
7Z	Saudi Arabia (HZ)
8J-8N	Special Japanese Stations (JA, etc.)
8J1	Japanese Antarctica
8P	Barbados (8P6)
8Q	Maldives (8Q7)
8R	Guyana (8R1)
9A/YU2	Croatia (9A)
9G	Ghana (9G1)
9H	Malta
9I-9J	Zambia (9J2)
9K	Kuwait (9K2)
9L	Sierra Leone
9M2/9M4	West Malaysia (9M2)
9M6	Sabah, East Malaysia
9M8	Sarawak, East Malaysia
9N	Nepal
9Q-9T	Zaire (9Q5)
9U	Burundi (9U5)
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9Y-9Z	Trinidad & Tobago (9Y)

AMATEUR TELEVISION



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Many ATV repeaters and individuals are retransmitting Space Shuttle Video & Audio from their TVRO's tuned to Spacenet 2 transponder 9 or weather radar during significant storms, as well as home camcorder video. If it's being done in your area on 420 - check page 538 in the 95-96 ARRL Repeater Directory or call us, ATV repeaters are springing up all over - all you need is one of the TVC-4G ATV 420-450 MHz downconverters, add any TV set to ch 2, 3 or 4 and a 70 CM antenna (you can use your 435 Oscar antenna). We also have ATV downconverters, antennas, transmitters and amplifiers for the 400, 900 and 1200 MHz bands. In fact we are your one stop for all your ATV needs and info. We ship most items within 24 hours after you call. **Hams, call for our complete 10 page ATV catalogue.**

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Weather Stations/Scanners/CB

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Bearcat 860XLT-R base	\$154.95
Bearcat 760XLT-R base/mobile	\$189.95
Bearcat 700A-R info mobile	\$148.95
Bearcat 560XLA-R base/mobile	\$76.95
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Bearcat 80XLT-R handheld	\$159.95
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Weather Stations

Now you can be your own weather reporter with the Davis Weather Monitor II. Our top-of-the-line weather station combines the most advanced weather monitoring technologies available 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. Push a button, and read indoor and outdoor temperature, wind chill, humidity and barometric pressure. Our package deal includes the new ultra high resolution 1/100 inch rain collector part #7852-R, and the external temperature/humidity sensor, part #7859-R. The package deal is order #DAVI-R for \$479.95 plus \$15.00 shipping. If you have a personal computer, when you order the optional Weatherlink computer software for \$139.95, you'll have a powerful computerized weather station at an incredible price. For the IBM PC or equivalent order part #7862-R. Apple Mac Plus or higher including PowerBook, order part number 7866-R.

The Weather Monitor II (7440) comes complete with anemometer with 40 feet of cable, external temperature sensor with 25 feet of cable, junction box with 8 feet of cable, AC power adapter, detailed instruction booklet and one year limited factory warranty.



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8-Conductor 100' (30.5 m) junction box cable 7882-R	\$44.95
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Indoor-Outdoor Thermometer/Barometer & Hygrometer by OSI BA213-R	\$79.95
Thermometer with transparent calendar & clock display by OSI TC188-R	\$19.95
Thermometer with AM/FM clock radio by Oregon Scientific CR388-R	\$39.95
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Bearcat® 9000XLT-R Radio Scanner

Mfg. suggested list price \$769.95/CE Special \$374.95
500 Channels • 20 banks • Alpha numeric display
Turbo Scan • VFO Control • 10 Priority channels
Auto Store • Auto Recording • Reception counter
Frequency step resolution 5, 12.5 & 25 KHz.
Size: 10-1/2" Wide x 7-1/2" Deep x 3-3/8" High

Frequency Coverage:
25.000-549.995 MHz., 760.000-823.995 MHz.,
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The new Bearcat 9000XLT gives you pure scanning satisfaction with amazing features like TurboSearch™ to search VHF channels at 300 steps per second. This base and mobile scanner is ideal for surveillance professionals because it has a selectable attenuator to help eliminate annoying intermodulation from adjacent frequencies in highly populated areas and selectable AM, Wide FM and Narrow FM modes that allow you to change the default receiving mode of the BC9000XLT. Other features include **Auto Store** - Automatically stores all active frequencies within the specified bank(s). **Auto Recording** - This feature lets you record channel activity from the scanner onto a tape recorder. **Hi-Cut filter** to help eliminate unwanted static noise. You can even get an optional **CTCSS Tone Board** (Continuous Tone Control Squelch System) which allows the squelch to be broken during scanning only when a correct CTCSS tone is received. For maximum scanning enjoyment, order the following optional accessories: **PS001** Cigarette lighter power cord for temporary operation from your vehicle's cigarette lighter \$14.95; **PS002** DC power cord - enables permanent operation from your vehicle's fuse box \$14.95; **MB001** Mobile mounting bracket \$14.95; **BC005** CTCSS Tone Board \$54.95; **EX711** External speaker with mounting bracket & 10 feet of cable with plug attached \$19.95. The BC9000XLT comes with AC adapter, telescopic antenna, owner's manual and one year limited warranty from Uniden.

CB/GMRS Radios



The new Maxon GMRS 210+3 transceiver is a PLL synthesized 10 channel radio on General Mobile Radio Service frequencies. Two repeater channels are programmable and one channel (462.675 MHz) is set aside for emergency and safety communications. The seven remaining

interstitial frequencies 462.5625, 462.5875, 462.6125, 462.6375, 462.6625, 462.6875 & 462.7125 MHz are all-Rurpose GMRS radio channels. 2 watts of RF power for exceptional transmitting range. Up to 5 watts when used with the supplied 12 volt vehicular DC power cord. CTCSS built-in. Includes 450mAh Ni-cad rechargeable battery pack, AC/DC wall battery charger, owner's manual, FCC license application, belt clip, antenna. Order today.

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Cobra HH40-R CB 40 ch. Handheld	\$99.95
Ranger RCI2950-R 25 watt 10 meter	\$239.95
Uniden GMR100-R GMRS Handheld	\$144.95
Uniden WASHINGTON-R SSB CB Base ...	\$199.95
Uniden GRANTXL-R SSB CB Mobile	\$139.95
Uniden PRO538W-R CB & Weather	\$59.95



Digital Barometer



The Oregon Scientific BA888-R forecasting barometer displays rising, falling and constant barometric trends. Other features include 6-line advanced liquid crystal display, weather forecast shows sunny, cloudy, slightly cloudy or rainy, °C or °F selectable, indoor relative humidity, indoor temperature, barometric pressure bar graph shows trend for past 24 hours, clock/calendar/alarm.

Special \$99.95

VHF Transceiver

RELM® WHS150-R Transceiver/SPECIAL

Mfg. suggested list price \$481.67/CE price \$299.95
Severe weather spotters depend on the RELM WHS150 transceiver for direct two-way communications with their police or fire department, civil defense agency or ham radio repeater. The WHS150 is our most popular programmable five watt, 16 channel handheld transceiver that has built-in CTCSS, which may be programmed for any 39 standard EIA tones. Frequency range 148.000 to 174.000 MHz. Will also work 144.000-148.000 with slightly reduced performance. The full function, DTMF compatible keypad also allows for DTMF Encode/Decode and programmable ANI. Weighing only 15.5 oz., it features dealer programmable synthesized frequencies either simplex or half duplex in both 5.0 and 6.25 KHz. increments. Other features include scan list, priority channel, selectable scan delay, selectable 5 watt/1 watt power levels, liquid crystal display, time-out timer and much more. When you order the WHS150 from Communications Electronics Inc., you'll get a complete package deal including antenna, battery, belt clip and user operating instructions. Other accessories are available. A leather carrying case with swivel belt loop part #LCWHS is \$49.95; rapid charge battery charger, part #BCWHS is \$69.95; speaker/microphone, part #SMWHS is \$54.95; extra Ni-cad battery pack, part #BP007 is \$59.95. The radio technician maintaining your radio system must order programming instructions part #PI150 for \$18.00 to activate this radio. FCC license required for United States operation.

Other neat stuff

Soundtronic AC101-R digital portable shortwave receiver - 20 memory	\$39.95
Grundig Satellit700-R digital portable shortwave receiver with 512 memory	\$459.95
Grundig Yacht Boy 400-R digital portable shortwave receiver - 40 memory presets	\$179.95
Grundig Yacht Boy 230-R portable shortwave receiver	\$109.95
Sangean AT5800-R portable 20 memory shortwave receiver	\$69.95
Sangean AT5805A-R portable shortwave w/AC adapter - 9 memory presets	\$129.95
Sangean AT5808-R portable 45 memory shortwave receiver	\$149.95
Uniden EXP9200-R 900 MHz, 1 or 2 line spread spectrum cordless telephone	\$289.95
Uniden EXP9100-R 900 MHz, 1 line cordless spread spectrum telephone	\$229.95
Bogen FR3110-R Digital FAX Friday Fax-on-Demand system & answering machine	\$399.95
Bogen FR3020-R memory expansion module for Fax Friday/up to 36 minutes	\$99.95
Bogen FR2000-R Digital two-line advanced voice mail system & answering machine	\$279.95
Bogen FR0018-R memory expansion module, doubles recording time to 36 minutes	\$139.95
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WX70-R weather radio with National Weather Service storm alert	\$39.95
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WHAT'S NEW AND HOW TO USE IT

A Simple Way To Achieve Battery Backup

In the summer one naturally thinks of batteries due to the great amount of time spent outdoors with all sorts of portable gear. There is another use for our "portable power packs" however, and that is to provide emergency power in the event of a loss of AC-line power. This function is vital in many critical applications ranging from security equipment to hospital life-support systems. In the computer world, UPS devices (uninterruptible power supplies) are common to prevent loss of data from sudden power outages, and we all are familiar with the battery-operated emergency lighting systems used in

many public places. As a result of these "battery intensive applications" we will investigate a couple of ways in which experimenters can implement simple battery backup schemes for their own special needs.

Fig. 1 is a schematic of the simplest type of battery backup that you can use. While simplicity in itself, the circuit relies on constant load requirements to prevent premature discharging of the battery. If the load requires more current than the rectified AC line can deliver, the battery discharges. If the load requires less current, the battery runs the risk of being overcharged and eventually destroyed.

A simple variation of the above is shown in fig. 2. In this circuit, as long as incom-

ing AC power is present a relay is kept pulled in. When AC power is lost, the relay drops out and the battery takes over. Although this circuit obviously works, it produces a momentary "glitch" when the relay switches. A large capacitor on the rectified DC line attempts to correct this, but in critical applications the interruption may not be desirable. Nevertheless, the circuit is very inexpensive, can be implemented with a single component that almost everyone has in his or her junk box, is virtually foolproof, and will not destroy the battery. Other means can also be added, if desired, to keep the battery charged.

Fig. 3 is a better scheme for accomplishing both battery backup and charg-

c/o CQ magazine

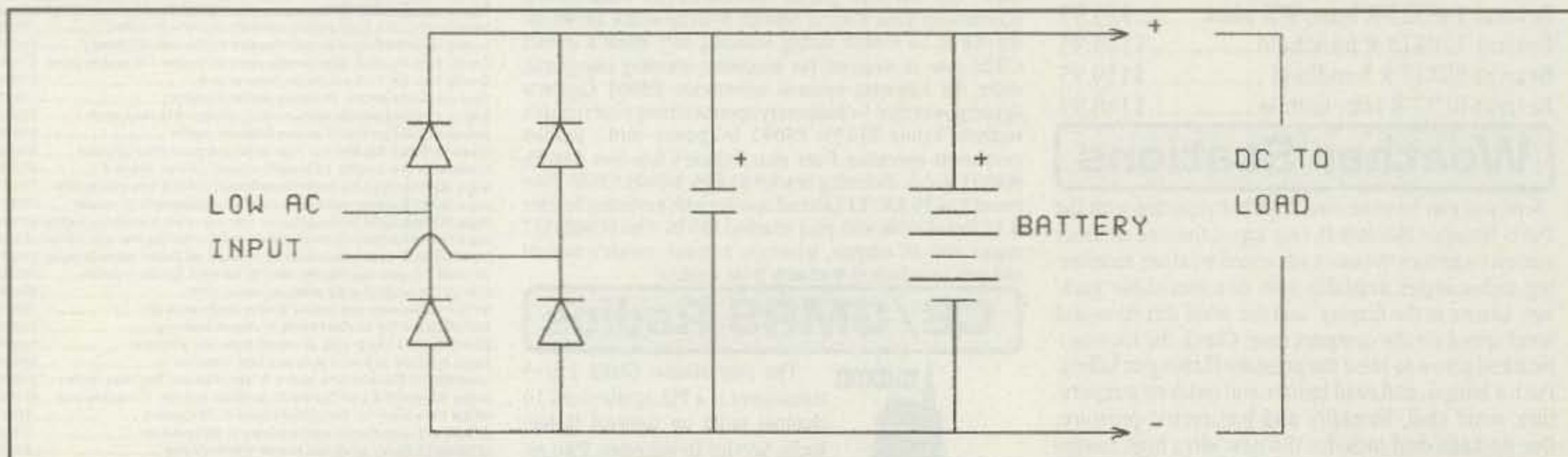


Fig. 1- The simplest battery backup circuit. Be sure to read text for proper precautions when attempting to use this circuit.

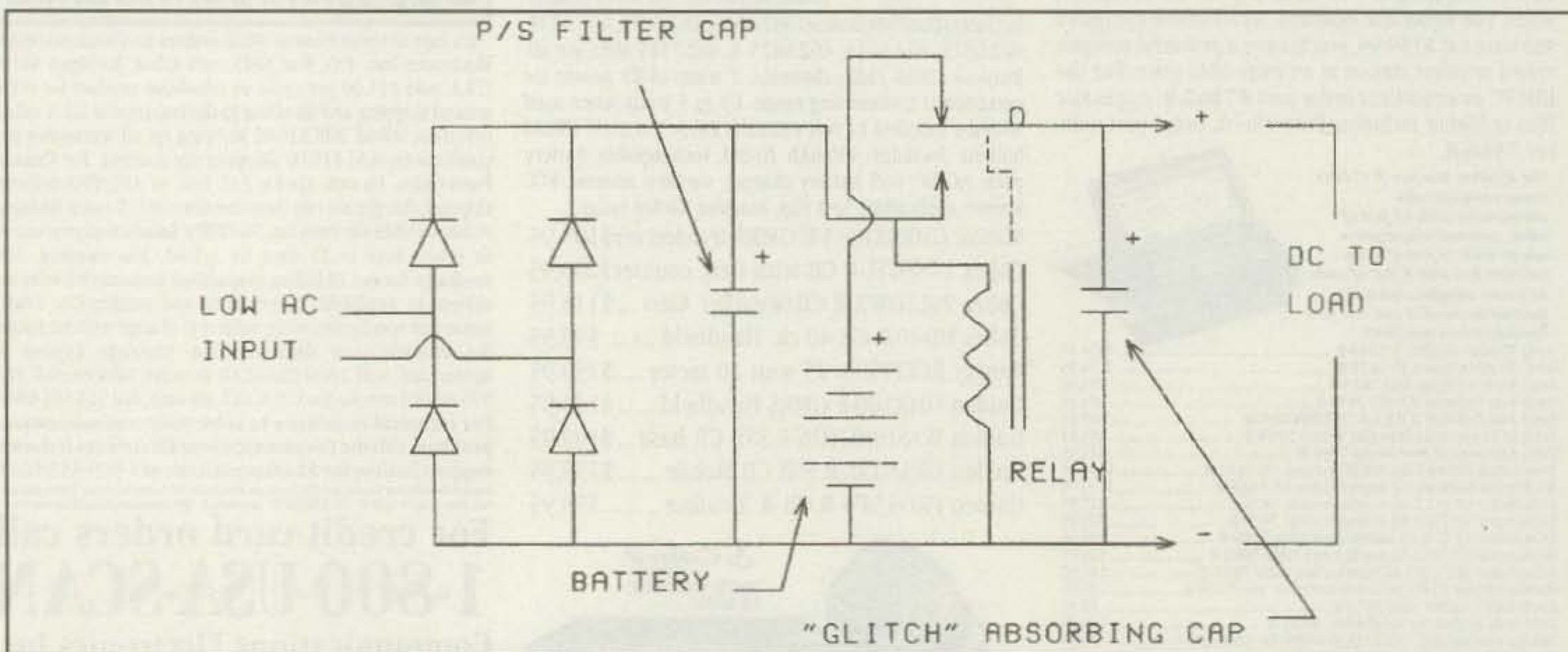


Fig. 2- A one-relay, one-cap battery backup.

Expand your Horizon

The C-4: 40-20-15-10

Plus 17 & 12

Ham Radio Outlet
Sunnyvale, CA
(bird not included)

Our customers tell us that the C-3, and now the the C-4, outperforms every commercially made, trapped tribander, regardless of boomlength. And, the C-3 is the easiest to assemble and put up, plus coverage on 17 and 12 mtrs. The forward gain is superior to high-claimed marketing numbers from trapped antennas.

That's why these antennas really "work."
Isn't it time for a change?!!

C-3 Classic 3-Band
20-15-10, plus 17-12

C-3 @ 87'
MAGNUM 2 / 2 @ 74'
(2el 80/75 & 2el 40, 38' radius)
80/75, 40 fun even w/ low power
C-3 @ 53'
(N6BT, city lot)

C-3 = No Traps = More QSO's + More 59&599's + 40 mtrs = C-4

You will be amazed at the improvement between the C-3 and trapped antennas. The receiver will sparkle. Running barefoot will be fun. And now, the fantastic C-3 performance has been extended to 40 meters. The C-4 incorporates a re-designed EF-140S 40 mtr element on the standard C-3 boom for more than 100 kHz 2:1 VSWR coverage on 40 mtrs. If you are presently enjoying the great performance of a C-3, upgrade to a C-4!

- ◆ The C-3 : 7 elements: riveted and tapered for a low profile, pleasing look; 18' boom, 5.6 sqft, 32 pounds, Easy-On™ mount.
- ◆ The C-3 has deep side nulls and a fine pattern; F/B 14-18 dB; fed with a single 50 ohm coax; 19.8' turning radius.
- ◆ The element-to-boom brackets are pre-aligned on the boom, so every element is straight and will not move.
- ◆ The C-4 maintains the same turning radius, weighs about 40 pounds, with separate feedline so that the C-3 remains intact.
- ◆ Force 12 has more than 60 HF antennas from 3 el 80/75 mtr yagis to 6 mtr beams. The **MAGNUM 2 / 2** shown above is a 2el 80/75 and 2el 40 mtr on a single boom with two feedlines. The **MAGNUM 2 / 2** uses EF-180B (66.5') elements on 80/75 and EF-140 (44.5') elements on 40. At about 14 sqft, the **MAGNUM 2 / 2** is the answer to gain on both bands. Other 80/40 available.
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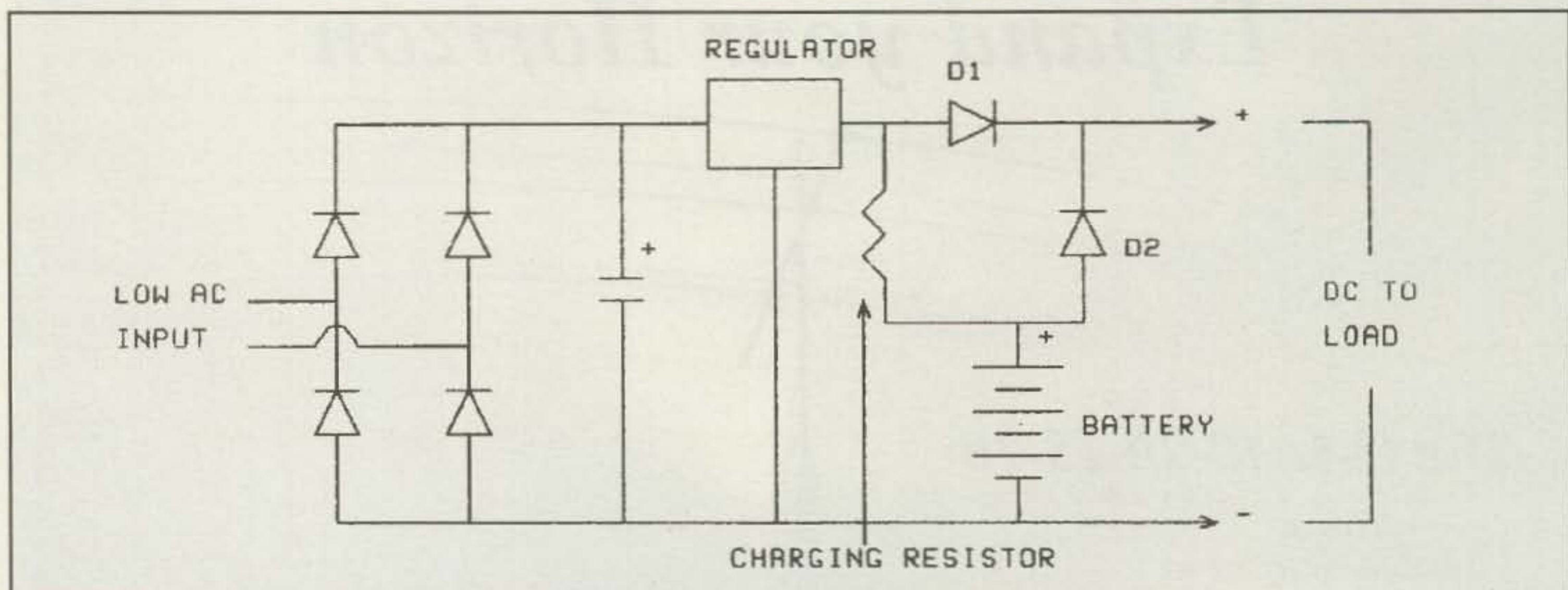


Fig. 3—Using diodes to switch and charge a battery. See fig. 4 for a practical example of this circuit.

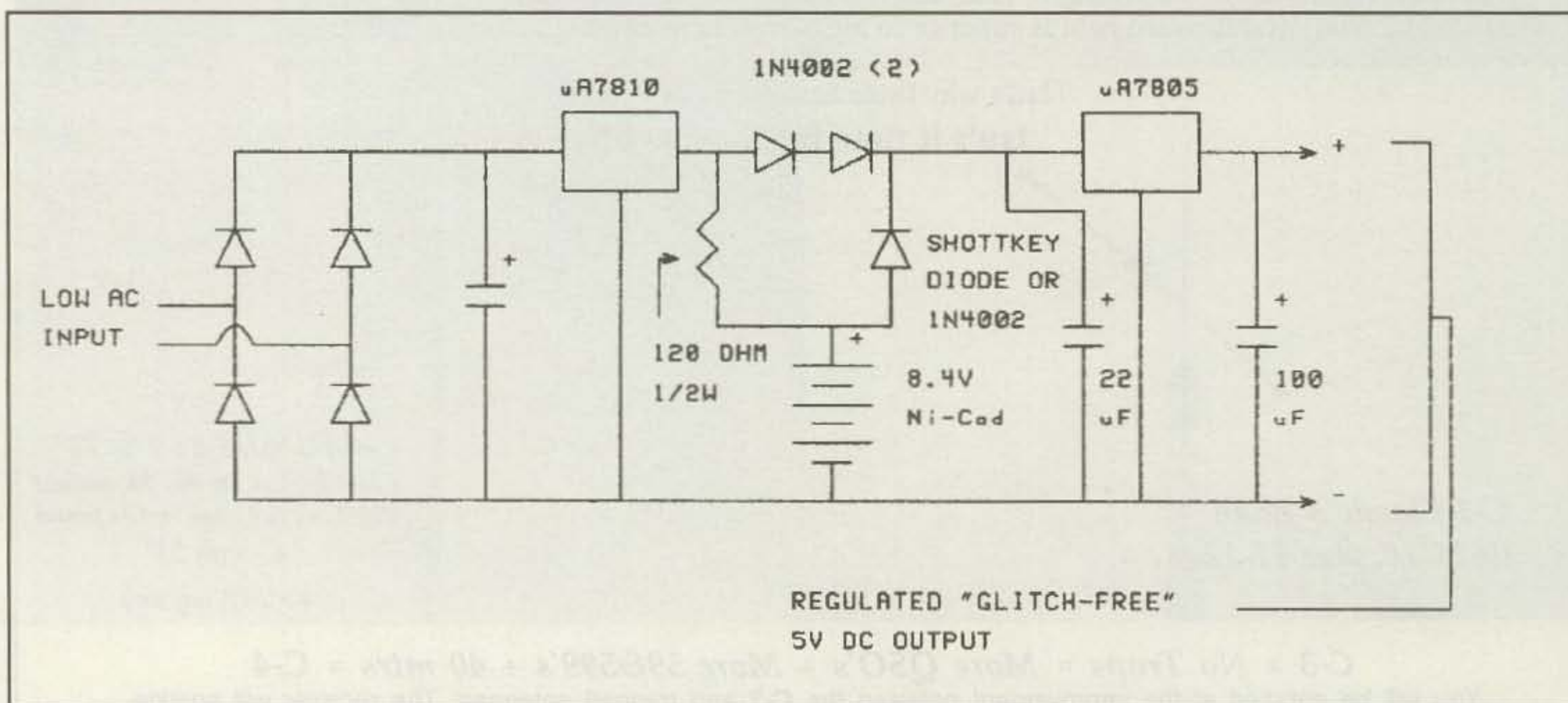


Fig. 4—Complete circuit for regulated battery backup supply.

ing the battery. You will notice that diodes are used in this circuit to achieve the switch-over. When AC power is present, rectified DC is present at the anode of D1 and it conducts. This reverse biases diode D2, effectively disconnecting the battery from the load. When AC power is lost, the incoming DC drops to zero. Now diode D1 is reverse biased and diode D2 conducts, connecting the battery. Since there is no relay here, and the diodes switch within a few microseconds (or at least a millisecond or two), the glitch produced by the scheme of fig. 1 is not present and the switch-over transition is nice and smooth.

In addition to a smooth switch-over, resistor R1 is used to charge the battery when it is not delivering power to the load. It is used to trickle charge (or "float") the battery and keep it at peak readiness until

required. The value of R1 can be approximated by the following:

$$R1 = (V_{ps} - V_{bat}) / I_t$$

V_{ps} is the input DC less 0.7 volts for the drop in D1, V_{bat} is the battery voltage at full charge, and I_t is the trickle charge current of the battery, usually 10 to 15% of the normal recommended charge current. While this circuit will keep a battery at full charge, it will not quickly charge a discharged battery. In fact, the charging current of a fully discharged battery will only be V_{ps} less 0.7 volts divided by the value of R1. At such a level, with nickel-cadmium batteries, charging can take anywhere from 12 to 16 hours or even more. Where quick charging is a must, additional circuitry must be used.

The only other consideration of the cir-

cuit of fig. 3 is that the fully charged battery voltage must be slightly lower than the DC input voltage in order to keep D2 reverse biased. This means that there will be a slight drop in output when the battery takes over. The use of a slightly higher voltage than needed, applied to a simple regulator, will take care of this. The final version, a 5 volt regulated power supply for use with logic circuitry, is shown in fig. 4. In this circuit the microprocessor output load will never know that any change-over has taken place.

While there undoubtedly are numerous schemes for implementing battery backup circuits, the above two must rank among the simplest. If there is enough continued interest, we will be pleased to present more elaborate circuits for using batteries or publish your favorites.

73, Irwin, WA2NDM

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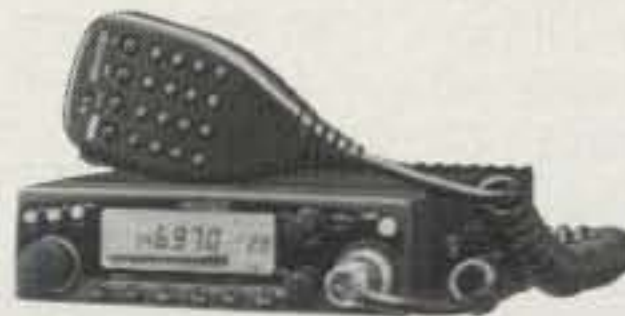
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PACKET USER'S NOTEBOOK

CONNECTING YOU AND PACKET RADIO IN THE REAL WORLD

BY BUCK ROGERS, K4ABT

For That Quantum Leap—The Alinco DR-150T TNC

Packet radio has propelled amateur radio into the era of computers with a quantum leap. Because of this rapid move into the world of digital communications, there are many new amateurs entering the hobby for the purpose of using the digital modes that make use of the computer and associated software.

With the quantum leap comes the need for faster data rates. This need in turn drives the requirement for broader receiver IF and faster switching (transmit push-to-talk to full power output) transceivers. As a result of these requirements, many packeteers are looking into transceivers that will provide both voice operation and high-speed packet use.

If you are looking for a transceiver to access the local voice repeater and one which will handle the large variety of packet applications that exist—including keyboard-to-keyboard networks, switches, nodes, DX spotting nets, BBSes, conference clusters—you can find that happy balance in the Alinco DR-150T.

With some of the packet applications I've just mentioned the user can connect to distant stations in other cities, states, and countries using a medium-power transceiver. There is no need for super-power transceivers that run hundreds of watts. The power level of the Alinco DR-150T allows the user to select the power needed to make the connect or contact ranging from 10 to 50 watts output. This Alinco transceiver was designed with the packeteer in mind.

The Best Is Yet To Come

The DR-150T is engineered to provide optimum audio characteristics for the Mark and Space tones of 1200 and 2200 Hz (1200 baud). In addition, the DR-150T has been engineered to transmit and receive 9600 baud. Thus, it can be used with both 1200 and 9600 baud TNCs.

Although it is not a requirement, one of the desired features in a data radio is the time period between when the TNC activates PTT and the level at which the transmitter reaches full output power. This is called TXDelay. Ideally, a 50 watt, 9600 baud transceiver should have a TXDelay of 20 or less. A TXDelay of 20 equates to 200 milliseconds, or one fifth of a second from the time the Push-To-Talk (PTT) is activated until the transceiver reaches the full 50 watts of output power. At full output (or the TXD setting) the TNC applies the data stream to the transmit FSK or AFSK line (transceiver data input).

As a matter of interest, I've found that the DR-150T performs as well in 9600 baud packet operation as it does with voice applications. To give you a better understanding of what you



The Alinco DR-150T TNC.

can expect from the Alinco DR-150T, I've included the specifications in Table I.

Interfacing Your TNC To The Alinco DR-150T

Twelve-hundred baud mic pin connections for the Alinco DR-150T I/O are shown in Table II (also see fig. 1).

Interfacing the DR-150T to a 9600 baud TNC is somewhat different from the way in which we connect the DR-150T to a 1200 baud TNC. In fig. 2 I've illustrated the back panel of the DR-

150T to provide a detailed look at the two jacks. Notice the 9600 baud data jack is a 2.5 millimeter "stereo" jack, while the external speaker jack is a 3.5 millimeter mono jack. The 3.5 mm jacks are often called a "1/8 inch" jack (or plug). The 3.5 mm plugs are easy to locate at any Radio Shack store. You may soon discover the 2.5 mm "stereo" plug is a different story.

To circumvent this problem I made up the interface cable using a 3.5 mm stereo plug on the Tx/Rx connection. I purchased a 3.5 mm to 2.5 mm adapter to complete the connection to the DR-150T 9600 baud data jack. The adapter is available from Radio Shack as part

SPECIFICATIONS OF THE ALINCO DR-150T

GENERAL

Frequency coverage	Tx = 144.000–147.995 MHz Rx = 108.000–173.995 MHz Rx = 440.000–449.995 MHz
Antenna Impedance	50 ohms unbalanced
Power requirements	13.8 volts DC
Receive current	0.6 ampere (approx.)
Transmit current	10 ampere (approx.)
Dimensions	(not defined in US standard)
Weight	(not defined in US standard)

TRANSMITTER

Output Power	High = 50, Medium = 25, Low = 10
Emission Mode	16F3
Modulation Type	Reactance (true FM)
Maximum Frequency Deviation	±5 kHz
Spurious Emission	Not more than -60 dB

RECEIVER

Receiver Type	Dual Conversion, Super Het.
Modulation Acceptance	16F3, F2, F3
Intermediate Frequency	45.1 MHz and 455 kHz
Sensitivity (12 dB SINAD)	2 m band better than 0.16 uV
Sensitivity (12 dB SINAD)	70 cm band better than 0.10 uV
Selectivity	12 kHz => @ -6 dB; =<28 kHz @ -60 dB
Audio Frequency Output	1.5 watts into 8 ohm speaker

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Table I—Specifications of the Alinco DR-150T dataradio.

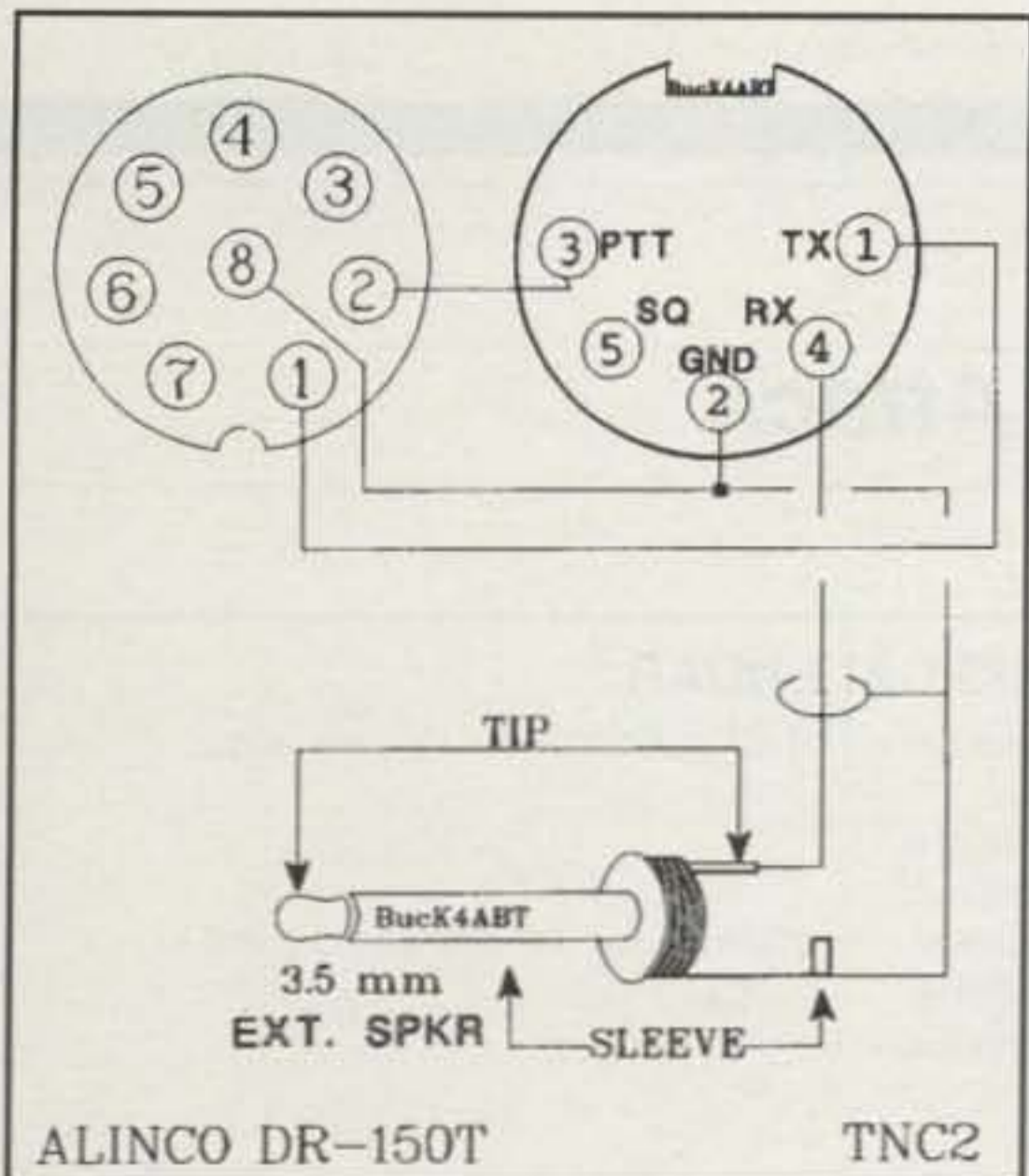
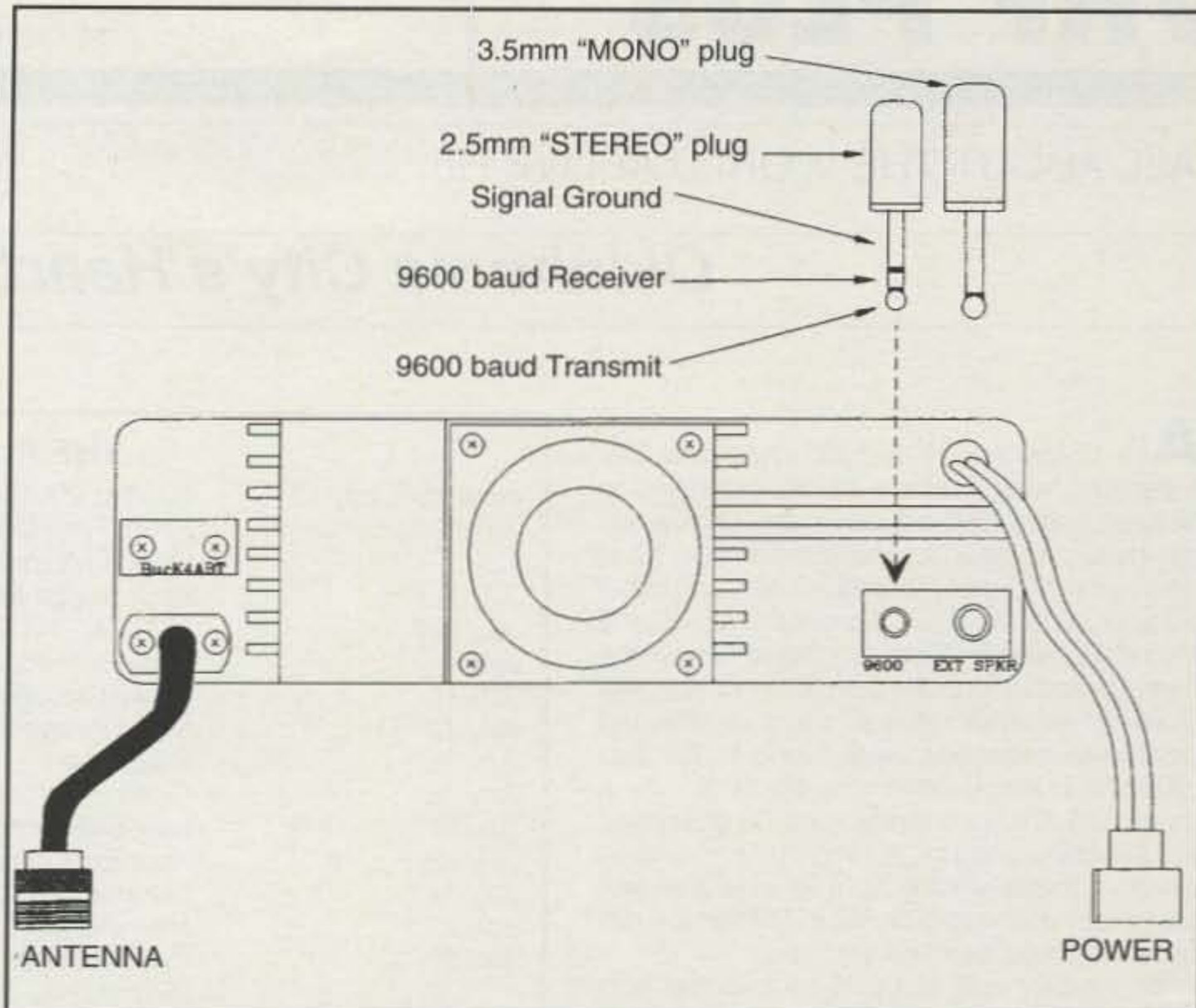


Fig. 1— Interfacing the Alinco DR-150T transceiver to a TNC-2. (See also Table II.)

Fig. 2— The 2.5 mm stereo plug is used as the input/output for 9600 baud. The 3.5 mm plug is used to extract receive audio for 1200 baud only.



number 274-373. The description on the Radio Shack blister pack is "Headphone Adapter"—adapts 3.5 mm (1/8 inch) to 2.5 mm (3/32 inch) jacks.

Before beginning the interface and setup procedures which we will discuss in the next portion of this month's column, I recommend that you read page 63 of the DR-150T manual. Reading the complete manual will allow you to familiarize yourself with the transceiver and will provide information for the 9600 baud configuration. The DR-150T manual is a virtual storehouse of information that applies to your new DR-150T voice and data radio. Best of all, you will discover hundreds of wonderful features that are programmed into the micro-processor of the DR-150T.

Transmitting Packet

To operate a packet station you should have a current amateur radio license that allows operating privileges within the spectrum to which your DR-150T is tuned.

If the interface cables are properly wired and connected, then you are ready to establish contact with another packet station. It is wise to solicit help of another person who is already operating in the packet modes, especially when operating at 9600 baud. In this way you will have someone who can listen for your signal and direct you to the operating frequencies that are set aside for 9600 and/or 1200 baud packet.

Although the DR-150T is engineered to make use of limiting circuits that are designed to prevent over-modulation (deviation), there are some TNCs which may drive the transmit audio circuitry too hard. An indication that a problem such as this is present would be noticed when a connect is tried to a nearby packet station with no results. Often too much transmit deviation can cause the same problem as not enough transmit audio. I've found

1200 BAUD MIC PIN CONNECTIONS

PIN (mic connector)	TNC FUNCTION
1	AFSK Output
2	PTT Control
6	RECEIVE Audio
7	Shield/Ground
8	PTT Ground

Table II— Microphone pin connections for the Alinco DR-150T I/O, 1200 baud (also see fig. 1). Note: If hum or noise is experienced on the transmitted packet signal, disconnect the shield connection at the TNC end of the cable. The gray wire at pin 8 will provide ground return for the PTT line; therefore no additional ground wires are necessary.

the best transmit audio level setting for either 1200 or 9600 baud is in the range of 3.0 to 3.5 kHz (swing). Without exception, all TNCs have provisions within their circuitry that enable users to increase or decrease the level(s) when necessary. It is advisable to know which component inside or outside the TNC controls the TNC audio output. It may be necessary to make an adjustment to the associated level control(s). Remember: This is the exception, not the rule, with 1200 baud. However, the level setting for 9600 baud transmit audio is less forgiving. Until you experience packet at 9600 baud, you don't know what you are missing. Once you have achieved the proper setting for 9600 baud, the rest is pure pleasure.

For more information concerning the Alinco DR-150T, contact Alinco Electronics Inc., 438 Amapola Ave., Unit 130, Torrance, CA 90501 (phone 310-618-8616; FAX 310-618-8758).

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Oklahoma City's Heart Attack

At 9:02 AM on April 19, 1995, Oklahoma City suffered a heart attack. A bomb, estimated to be in excess of 4500 pounds in explosive energy, burst the heart of downtown. The blast killed over 165 people and injured an untold number of others. The target of the attack, the Murrah Federal Building, sustained most of the damage and most of the casualties were in that building. However, at least three deaths and dozens of casualties were found in the surrounding buildings near the epicenter. Also, more than 270 buildings across the downtown area sustained damage ranging from broken windows to total destruction. So awesome was the blast that it could be felt in Bethany, a city about 10 miles from the explosion.

Your editor was stopped for a signal light change about 3 1/2 miles away. I felt the blast slightly rock my conversion van. Wondering what it was, I looked to the sky. I saw no clouds and immediately ruled out thunder. Because the blast was of such short duration, I thought that a nearby house had blown up.

Driving on my way to my 9:00 AM appointment (I was running 10 minutes behind), I kept looking for a plume of smoke. Spotting it much farther away than anticipated, and in the direction of downtown, I began to surmise that it was going to be something major. About that time I started to hear sirens in the distance.

Arriving at the office of my appointment, I noticed that a crowd had gathered around a TV set. Local TV Channel 9 had focused its long-range camera, which is usually used for weather observations, on the A. M. Murrah Federal Office Building. Looking at the TV picture, I began to have this surreal feeling that what I was watching couldn't possibly have happened. The whole north side of the building was blown away. In addition, a part of the interior of the building was now missing. It was as if someone had used a giant ice-cream scoop to carve a concave hole in the north side of the building.

For me, it began to sink in as to how close I could have been to the blast. The Murrah building traverses 5th Avenue between Harvey and Robinson. The Centre City Post Office is across the street and on the opposite corner to the northwest of the Murrah building. Almost every day I go downtown to pick up my mail at Box 73. I exit the post office parking lot onto 5th Avenue. I proceed east to the corner of Harvey and 5th. I make a left turn onto Harvey and proceed north back to my home. Sometimes I drive straight ahead, passing in front of the Murrah building as I go toward the I-235 on-ramp located about a mile away on 5th Avenue. Almost every day I am in this part of the downtown area—that is, except on this day.

The secretary jolted me back to reality. She said that at the first sound of the blast the per-

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July 27–30

July 30

VHF PLUS CALENDAR

50 MHz DX Marathon. (See last month's column for rules.)
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CQ WW VHF Contest. (See May issue for complete rules.)
Poor EME conditions.
Lowest Moon declination
Moon Perigee.
Full Moon.
Good EME conditions.
Last quarter Moon.
Poor EME conditions.
Moon apogee and highest declination.
New Moon.
Central States VHF Conference, Colorado Springs, CO.
(See text for details.)
Good EME conditions.

EME conditions days provided by W5LUU.

son I was to see had taken off to downtown because his reporter's instincts (he is the director of communications for the Oklahoma United Methodist Conference) told him that he needed to check to see if it had been one of the Methodist properties (this was before the TV picture came on). She added that she doubted he would be back the rest of the day. I agreed and said I would reset the appointment for some other time.

At about this time my sense of responsibility as the Oklahoma Section Manager for the American Radio Relay League (ARRL) kicked in. Leaving the office, I rushed home. I stopped long enough to call Carol King, K5CPZ, my Assistant Section Manager. I advised her of the situation and told her that I had no idea when I would be back to my apartment and that she would have to arrange other transportation home from work.

I have my Kenwood TM-742 connected to a cigarette-lighter plug, thereby making it easy to connect to power in the van. I grabbed it and the mag mount and quickly installed everything in the van. I headed downtown and joined up with Don, KC5BRO, Keith, K15XA, and Glenn, N5WNL, who were parked at a corner several blocks away from the Murrah building. By this time our Amateur Radio Emergency Service (ARES) net had already been activated by John, KC5DRI, on the Oklahoma City Autopatch Association's 146.82 MHz repeater (it was actually on the air less than 15 minutes after the blast).

As they have been trained to do in response to tornados, ARES members checked in and were assigned to local hospitals. One amateur on the scene, Earl Claus, KB2LWS, was assigned to the police mobile command post. With his FT-280 and car battery he set up operations inside the mobile command post. It was

quickly determined that he needed an outside antenna. I headed for the mobile command post intending to loan my mag mount.

Locating the mobile command post, I arrived just as the police were in the process of relocating it. Driving in behind it, I followed it to its new location. When I finally was able to get inside, I was surprised and relieved to find Police Lt. Stan Van Nort, N5JFQ, operating one of the police radios. Stan and I are good friends and members of the same church. It was to be the first of so many "coincidental" run-ins that I would have over the course of the next week.

While the ARES members had practiced operating from the mobile command post (actually, practice often entailed sending an operator to a specific location and that operator would pretend that he or she was really inside the mobile command post), this was the first time that an amateur operator was working in the mobile command post in a real emergency. Any mistrust by the police of the amateurs doing their jobs was quickly dissolved by the seemingly "ironic chance" placement of Stan and me together.

After a short while we were able to get permission from the mobile command post driver to install my mag mount on top of the roof of the van. Following that, Earl and I quickly settled into a routine of relaying information to the police of placement of items such as Salvation Army canteens, Red Cross personnel, and the mobile field hospital. Additionally, because the media had given out the cellular telephone number of the command post as the information phone number about casualties, we two amateurs found ourselves answering the police phones in order to help reduce that duty for the police.

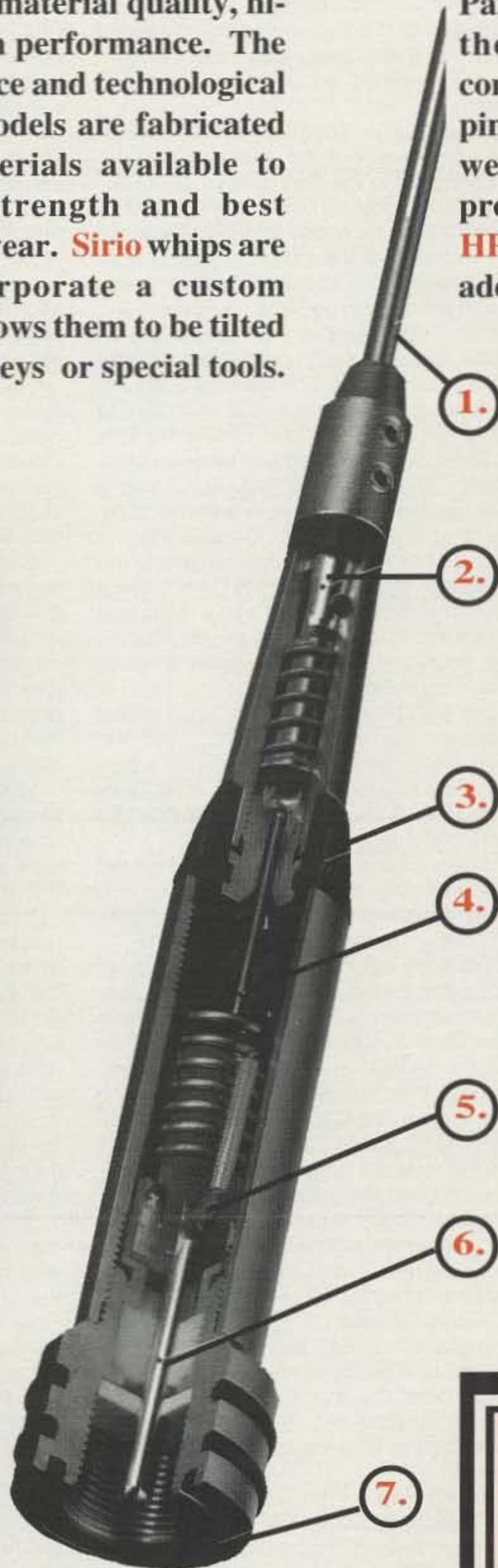
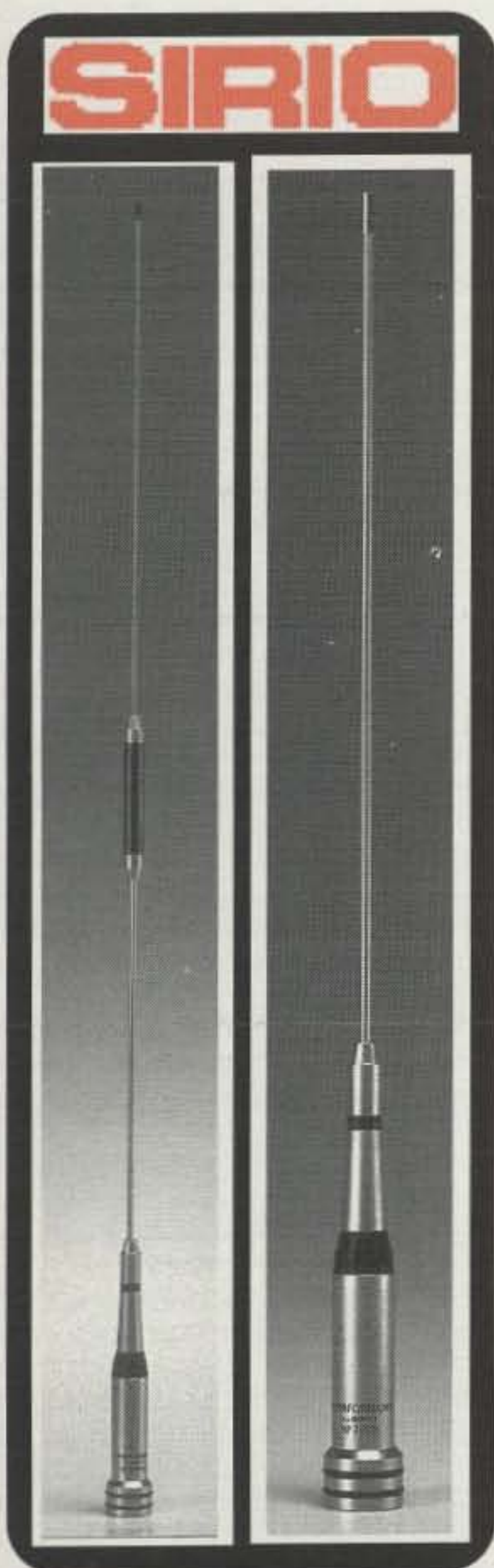
About three hours into the operation I happened to look out the window, and I noticed

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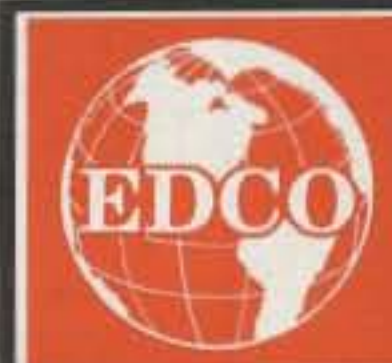
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my friend Rev. Linda Brinkworth serving food at the Feed the Children temporary station. Going outside to greet her, I found three other ministers from my church also working out of that location.

After awhile the command post was once again relocated, this time to its location for the duration of the operation. Earl and I operated from there until around 5:30 PM, when I determined that the usefulness of that part of the operation was over. After requesting permission from net control, I secured the station and Earl and I went to my van to await reassignment.

We didn't have to wait long. The amateurs manning one of the Salvation Army canteens had to leave. Being assigned to that location, we quickly obtained police passes and proceeded to it.

Our location was in front of the YMCA building, which was across the street and on the opposite corner to the northeast of the building. We parked my van and spent the night providing communications for the canteen.

The next day Earl had to go to work. I contacted Carol, K5CPZ, to advise her of my situation, and she asked me if she could be of any assistance. I told her that if she could get off work, she was welcome to come down and be a relief operator for me. She was easily able to secure permission to leave. It is important to note that her employer, the Oklahoma City Public Schools, as well as many other employers across the city granted volunteers liberal leave or administrative leave in order for them to be available to work at the disaster site.

I arranged for net control to divert one of the operators arriving into the area to Carol's place of work and pick her up. By this time the police were becoming more stringent on issuing passes, so it took her and the other amateur two hours to process through.

After finally obtaining her pass, Carol joined me in the van. We traded off operating until the evening, when Earl returned from work. I borrowed his car and took Carol home. I also went home and took a shower and then stopped by the Net Control location.

Returning to the site two hours later, I stayed until the morning, trading off operating with Earl. In the morning I went and picked up Carol. After our return to the site, Earl went home.

On Saturday afternoon a representative of the FCC came by the van and introduced himself. I advised him of our operations and what frequencies we were using. He told me that one of the federal agencies was receiving interference from an unknown transmitter and that they were trying to track it down. I advised him that I felt it would possibly be necessary to have the repeater frequency declared a voluntary emergency frequency for the operation, and he gave me a phone number to contact in order to initiate that procedure. As with all who were working the disaster site, he was most cooperative and helpful to me.

Carol and I traded off operating until Saturday night. When Earl again showed up to relieve us, we went by the Net Control operation to visit with the amateurs there. Later we went to our respective homes, took showers, and went to bed thinking that we would have Sunday off.

While listening to the net on my way to church Sunday morning, I found out that we were again having trouble getting people issued their FBI badges (security was especially tight because of President Clinton's im-

pending visit to the city and possible visit to the site). I told Carol that we might have to work Sunday afternoon. We prepared to be ready to work the night. When we were again assigned to our old canteen, our "night" turned into another full day and night. At 7 AM Tuesday we were relieved by Jerry Havill, KG5AA.

Because I had to go to the Dayton Hamvention for several reasons, I had to take Wednesday off to get caught up on my personal business. I did, however, visit the Area Command center and the Net Control center to keep apprised of the activities of the operators.

On one of my trips to the Net Control center I looked over the list of operators who had worked the disaster to that date. I saw dozens of calls of new amateurs. I had known that there were new amateurs involved because I had heard their calls on the net. Aside from the sheer number of them who volunteered, what impressed me most about these new amateurs was their dedication and professionalism despite their recent arrival to the hobby.

Dedication and professionalism were what I saw in all the amateurs involved. As the operation matured, our responsibilities evolved into providing communications for the Salvation Army canteens located throughout the perimeter. However, our amateurs went way beyond that responsibility. They volunteered their own personal vehicles and became delivery people as well as operators. Amateurs worldwide can be very, very proud of the brothers and sisters in our hobby who gave sacrificially of their time and resources during the operation.

Carol and I, because of our leadership positions within the Oklahoma Section, chose to pull long shifts. However, we were not alone in working many hours. Some amateurs stayed on duty 12 to 14 hours and longer because they were needed or because of the security problem that kept us from getting replacements. Several other amateurs worked shifts every day for the entire two-plus weeks.

Whenever I called for volunteers from clubs throughout the state, I received instant responses. The answers from these amateurs were always in the form of questions, such as "What can we do?" or "How can we help?"

It is difficult for me to write my impressions now because the experience is still so very real to me. I am overwhelmed with sadness about the event, but I am also overwhelmed with pride in being a part of the operation. Many times I had to fight back tears when one of the rescue workers came by to grab something to eat from the canteen and then took a moment to say "thanks for being there" with food and refreshments. It was we who were thanking them for putting themselves on the line, yet they deeply appreciated us.

You who regularly read my writings know that I am deeply religious. As with anyone else who has to try to explain why something so tragic has to happen, I am at a loss for words. However, I am also at a loss for words to explain the outpouring of care and love that has happened in this city except to say, "Where evil abounds, good does more abound."

Insofar as trying to say something spiritual about the tragedy, there is one phrase that sticks in my mind from the service at my church on the Sunday following the blast. Rev. Maggy Ball, one of the ministers, related a quote that she had heard while working at the site as one of the chaplains. She said that when the blast occurred, God was the first to weep.

What you have read here are my observations and impressions. A forthcoming article for QST is being prepared by my appointees who were so heavily involved in the disaster work. I urge you to read that article to get a more comprehensive perspective of the involvement of amateur radio operators in this most tragic and significant story.

Current Contests

The new, revised CQ World-Wide VHF Contest is planned for the weekend of 8-9 July. Complete rules for the contest can be found in the May issue. Please check the rules, as there have been significant changes. Rules and log sheets are also available from CQ. I am looking forward to working you during the contest.

Dana Shtun, VE3DSS, published the entire rules in his column, "6 Metres and Down," in the May issue of *The Canadian Amateur*. My thanks go to Dana for his kind courtesy to me.

Current Conferences

Central States VHF Society: The following was supplied by the Central States VHF Society.

The annual conference of the Central States VHF Society will be held at the Sheraton Colorado Springs Hotel in Colorado Springs, Colorado on July 28-29, 1995. Colorado Springs is a popular summer vacation location with a wide variety of offerings and local attractions, in addition to the conference program. The summer weather tends to be cool and dry, so you can come prepared to have a great vacation in Colorado Springs, as well as to enjoy the VHF Conference.

The conference includes two solid days of technical and operating talks for the beginner as well as experienced amateurs. A sample of what's in store is the following tentative list of speakers: Rick, KK7B, on homebrewing portable VHF equipment; Kent, WA5VJB, on the future of VHF, UHF, and microwave operating; Paul, N6TX, on the Search for Extraterrestrial Intelligence; Russ, N7ART, on VHF amplifier tubes and amplifiers; Jack, AA0P, on Edge of Space Sciences balloon launches, balloon telemetry and command; Randy, N0LRJ, on building and using portable VHF antennas; Ray, WA4NJP, on large dish antenna mounts; Tom, W3IWI, on weak-signal digital signal processing; Doug, W2CRS, on predicting VHF and UHF openings; Joe, N6CL, on the Oklahoma City Bombing and the role of amateur radio; Emil, W3EP, on Field Aligned Irregularities; Chuck, W8MQW, on EME signal processing; Bill, K5MAT, on 222 MHz transverters; Tommy, WD5AGO, on 23 cm preamps; Chuck, AF8Z, on local oscillator design; and Dave, W6OAL, on VHF and UHF little wheel antennas. There will be additional program features, including a special "Young People's" VHF program for those under 21.

Bring your antennas for the antenna measuring contest, bring your preamps and converters for the gain and noise figure contest, and bring your excess gear for our Friday evening swap and sale.

On the Thursday night before the conference there will be an optional trip to the "Flying W Ranch" for a western beef barbecue meal and western music entertainment (a great family event). The conference will end with the traditional Saturday night banquet and prize

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Y1-5K	1:1	5 KW	160-10m	The YagiBalun™	\$29.95
B4-1.5K	4:1	1.5KW	80-10m	General Purpose	\$22.95
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4KRF-LI 4 KW 160-10m PL-259 in, SO-239 out \$25.95

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PL-259	Gold-Teflon, USA	\$1.49 or \$30/25
N/9913	For 9913, 9086, Flexi, etc.	\$3.25
N/9913S	As above but silver & Teflon	\$4.25
N-200	Silver-Teflon, install like PL-259	\$3.25
CQ-8X	95% shield, Type IIA non-contaminating	23¢
CQ-8XMM	Solid dielectric, tinned, 95%, Type IIA	27¢
CQ-1003	RG-8X, loss like RG-312, double shield	32¢
CQ-213	Enhanced RG-213, 96%++ braid	40¢

RG-8X 95%, Premium 16¢
RG-213 95%, Mil-type 35¢
CQ-Flexi Flexible, 9913-type 59¢

R1 Rotator	8 conductor (2 x #16, 6 x #24)	20¢
R2 Rotator	8 conductor (2 x #16, 6 x #18)	37¢
R4 Rotator	8 conductor (2 x #14, 6 x #18)	48¢
#14 HD	Stranded, 7 x 22 hard-drawn	8¢
#14 CW19	19-strand, copper-clad, tinned	10¢
#13 CW	19-strand, copper-clad, insulated	16¢
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drawing. The keynote speaker will be Arnie Coro, CO2KK, with a talk on VHF operating in Cuba and a taste of Cuban culture. This talk should appeal to amateurs and non-amateurs alike. A slate of activities for wives and children is also being planned. SMIRK will sponsor a Sunday morning breakfast get-together after the conference.

The prize committee has a great selection of prizes for the drawings. (They already have nearly \$5,000 worth of high-power amplifier tubes and sockets promised.)

Registration packets were to have been mailed out in mid to late May. The mailing list for these packets will mostly be drawn from the Central States membership list and registration records from the last three conferences. Let them know if you don't get a registration packet and would like one.

Colorado Springs has an excellent airport with direct connections to many of the major cities in the United States. The hotel has an airport shuttle bus. Make arrangements for use of the shuttle when you make hotel reservations. The Central States VHF Conference has a large block of rooms reserved for the conference; take advantage of that, **early**, because it will be difficult to find rooms otherwise.

If you have any questions or suggestions, contact Lauren Libby, KX0O, President, Central States VHF Society, 719-593-9861, or Hal Bergeson, W0MXY, Vice-Pres., 719-471-0238.

Current Meteor Showers

This month there are a number of minor showers. The most intense, the *Delta-Aquarids*, is a southern latitude shower. It has produced in excess of 20 meteors per hour in the past. Its predicted peak is around 29 July at 0613 UTC.

The other southern latitude showers are all named *Capricornids* and all produce around five meteors per hour, which is right at the sporadic rate of meteors for an average sky.

The only northern latitude shower is the *Alpha Cygnids*. It should peak around 20 July, but with a rate of only five meteors per hour.

Beginning around 17 July and lasting until approximately 14 August, you will see activity tied to the *Perseids* meteor shower. Its predicted peak is around 12 August. I will have more extensive coverage of this shower next month.

More on the Internet

After last month's column was put to bed, information on another VHF reflector came to my attention. It's another European, e-mail address vfh-dx-discuss@insite.parasoft.co.uk. Also, if you have Mosaic, Netscape, or Chameleon (available on Windows type computer), you might be interested in a worldwide web server. Geoff, GJ4ICD, publishes a Home Page on

<http://www.business.co.uk/equinox>.

Home pages are becoming increasingly popular. Jun-ichi Nishihara, JR3HED, lists two Japanese 6 meter Home Pages to be found at <http://apricot.cradle.titech.ac.jp/~mike> and <http://www.st.rim.or.jp:80/~ja6qjg/>. The first one covers nets, expeditions, and photos. The second one covers JA6 six meter information. For more information, you can send JR3HED an e-mail to nishi@otsuka-shokai.co.jp. My thanks go to "The 50 MHz DX Bulletin" for the above Internet information.

Finally, Ron Klimas, WZ1V, has announced that he also has joined cyber space by starting his Home Page. It can be accessed at <http://www.ultranet.com/~bellvill/news.html>.

SMIRK News

A board meeting of SMIRK, the Six Meter International Radio Klub, was held at the home of Bill Tynan, W3XO, on 9 April. During that meeting founding Secretary Ray Clark, K5ZMS, submitted his resignation and Pat Rose, W5OZI, was appointed to succeed him. Pat has been performing the duties for the past two years on an unofficial basis.

The idea of reviving a newsletter was discussed but tabled because of the lack of finances. An offer by Vic Frank, K6FV, to publish monthly SMIRK news in the "50 MHz DX Bulletin" was accepted.

Other ideas for reviving SMIRK activities were also discussed but with no resolution. There are plans to hold a least an informal SMIRK meeting at the CSVHF conference at the end of this month. Perhaps at that meeting some solid plans will be developed.

And Finally

Those you who do page counts of my column will realize that this one is a bit shorter than usual. You will see why as you read below. Next month I will get caught up on news that I didn't get into this one. Thank you for continuing to send me your material, and please continue to do so at the address shown at the beginning of this column or via my Internet address, 72124,2734@compuserve.com. You can also call me at 405-528-6625 or fax me at 405-528-0746.

It is early morning in San Diego, where I am finishing this column. In a few hours I, along with my family, will say a final goodbye to my brother Bill. Bill lost his battle to cancer on Friday evening, 12 May. He peacefully went to sleep early in the day only to wake up on the other side of eternity a few hours later. I will say goodbye to my best friend. He was a fun-loving guy, and I will miss him. We always had a joke going between us. Often we would call each other for the lamest of excuses, just to stay close to one another.

It has been a sad time for me lately; both the Oklahoma City bombing and my brother's passing have made for some tough times internally. However, it is the outpouring of love that I have seen following the bombing and from you to me that has sustained me. I hope that we as fellow human beings can capture the essence of this love and keep it going, for in so doing, we will make our world a bit better place in which to live.

73, Joe, N6CL

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PL259TS PL259 teflon ins/silver plated	1.59
PL258AM Amphenol female-female (barrel)	1.65
UG175/UG176 reducer for RG58/59 (specify)	.22
UG21D N plug for RG8,213,214	3.35
UG83B N jack to PL259 adapter, teflon	6.50
UG146A SO239 to N plug adapter, teflon	6.50
UG255 SO239 to BNC plug adapter	4.75
SO239AM UHF chassis mt receptacle, Amphenol	1.10
UG88C BNC plug RG58,223,142	1.55

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ANTENNAS & ACCESSORIES

A LOOK AT THE SHACK FROM BOTH ENDS OF THE COAX

BY KARL T. THURBER, JR., W8FX

Random Reflections—Part V

This month we'll update Antennas and Accessories topics we covered in previous columns. We'll also cover a great deal of new territory. Ready? Let's begin with antennas.

Antenna Notes

Revex Power Checker. Bob Levine, KD1GG's firm, Radio Devices, is the sole importer of the Japanese-made Revex PC705 Power Checker. This handy little gadget (see fig. 1) is a compact and convenient RF measurement device. It lets you estimate the RF power output of low-power transmitters—such as amateur handie-talkies (HTs) and QRP rigs up to 5 watts in the 20–1300 MHz range. It's also suitable for checking RF power for police, fire, and marine units which typically have no way of indicating power output. The power checker illuminates up to seven LEDs, based on power applied through the BNC connector. The unit requires no external power, as power comes from transmitted RF.

To use the Power Checker, which I recently had the pleasure of playing with, you simply attach the unit to any HT or QRP rig and immediately read the power output and evaluate the status of the rig or its batteries. The unit also can be used as an antenna of sorts for very short-range communications. It's \$39.95.

Radio Devices also is a distributor for Walnut Creek CD-ROMs, offered at a discount, including the popular *QRZ! Ham Radio* CD-ROM at \$14.99 plus \$2 postage. They also carry the Buckmaster *HamCall™* CD-ROM, and distribute Antennas West, Anli, Ramsey Electronics, and Oak Hills Research products. Bob says he expects to expand the business considerably in 1995.

For more information on the Revex Power Checker or a Walnut Creek CD-ROM catalog, contact Radio Devices, 32 Queens View Road, Marlboro, MA 01752 (508-480-0502).

RF Products OMNI-J. The OMNI-J is a sturdy J-pole for 144–148 or 220–225 MHz operation, an omnidirectional, half-wavelength vertical for base-station use (see fig. 2). One model is for 144–148 MHz (2 meters) and can be modified for 148–174 MHz and 216–225 MHz use; modification for a higher frequency is accomplished by drilling two additional holes and cutting the radiator. A second is for the 220–225 MHz (1 $\frac{1}{4}$ meter) band.

The antenna's mechanical design reflects setup simplicity and high-quality materials. The antenna is shipped in the collapsed configuration and can be deployed for use in minimal time and with minimum effort. The antenna RF input is DC grounded for maximum lightning protection. The OMNI-J handles 200 watts and has a feedpoint impedance of 50 ohms; it boasts an SWR of less than 1.5:1. Claimed operating bandwidth is 4.5 MHz on 2 meters and 6 MHz on 1 $\frac{1}{4}$ meters.

289 Poplar Drive, Millbrook, AL 36054

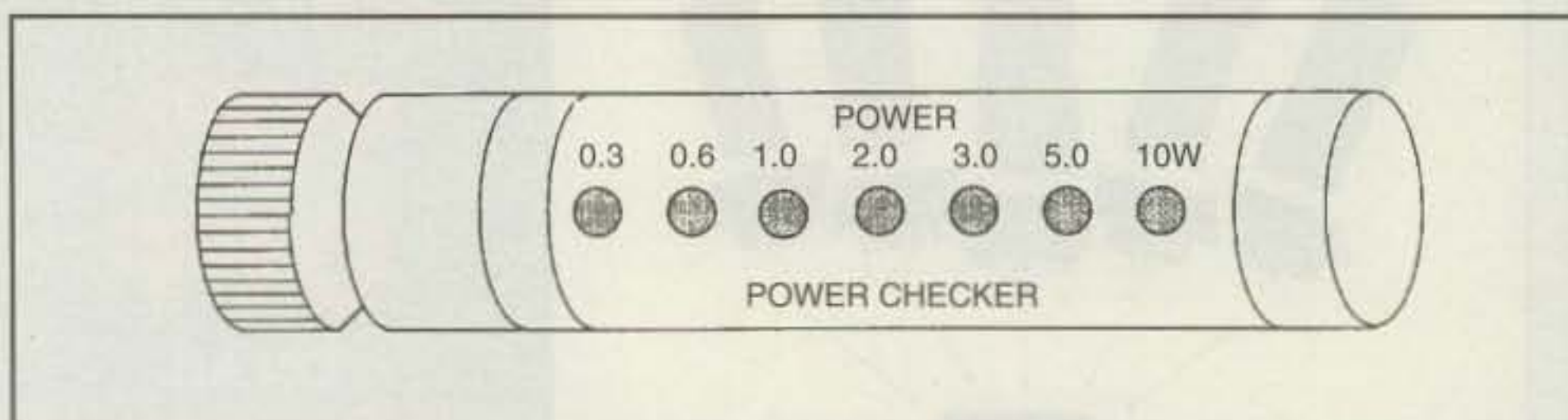


Fig. 1—The Revex PC705 Power Checker is a compact and convenient RF measurement device that depicts the RF power output of low-power transmitters such as HTs and QRP rigs running up to 5 watts in the 20–1300 MHz range. The checker illuminates up to seven LEDs, based on the power applied through the BNC connector.

For more details and pricing, contact RF Products, 1930-D Murrell Road, Rockledge, FL 32955 (407-631-0775).

US Tower Corporation. According to information from Mike Feryan, KA6JKN, US Towers offers a variety of free-standing crank-up tubular towers, heavy-duty free-standing crank-ups, and accessories for both.

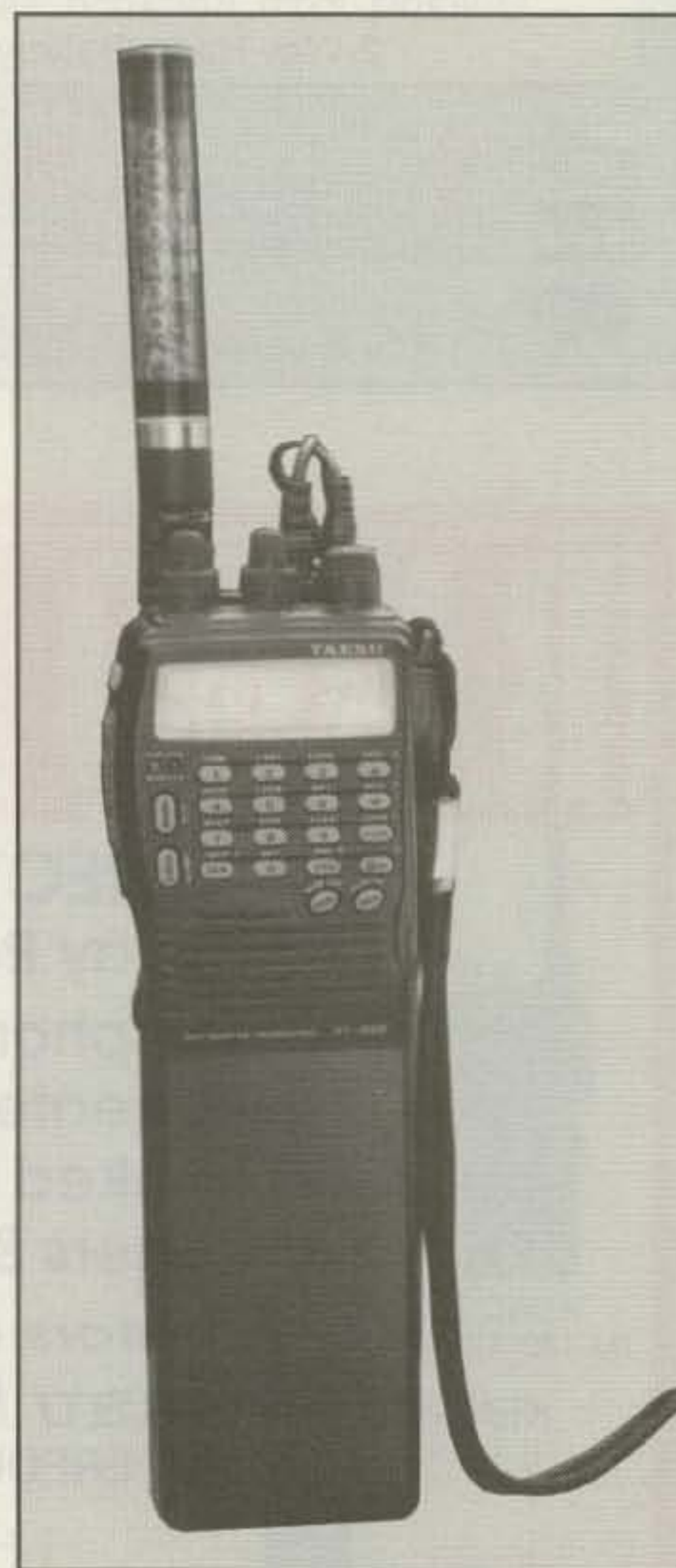
The firm's flagship product is the MA series crank-up tubular tower, designed to be "both safe and neighbor friendly." The slim design offers a flagpole-like appearance while allowing antennas up to 10 sq. ft. in 50 MPH winds per EIA specifications.

The MA series towers are available in heights from 40 to 85 ft., and they range in weight from 242 to 1128 lbs. The towers are completely self-supporting if used with US Tower's accessory bases. The MARB series rotor base allows the entire tower and antenna to be rotated from the base. This feature provides for easy rotor maintenance plus emergency hand rotation of the entire tower and antenna. (You supply the rotor.)

US Towers also offers three series of self-supporting crank-ups. Perhaps the most popular is the compact TMM series for amateurs living in restricted areas. TMM series towers have a minimum retracted height of 11 ft., 4 in. and a maximum height of 41 ft. without mast. The towers allow up to 24 sq. ft. of antenna in 50 MPH winds, depending on model. At the retracted height, visual impact is reduced to a minimum and antenna servicing is facilitated. Typically, the tower and antenna are *below* the roof line of your home when the tower is fully retracted.

The free-standing TX series are midrange towers. They offer high strength using 21 ft. sections with 4 ft. overlaps to help prevent binding while lowering the tower in wind. These towers, rated at 18 sq. ft., are furnished complete with rotor plate and base hardware. TX towers are available in maximum heights from 38 to 89 ft. The towers have a large enough top section (12 $\frac{1}{2}$ inches) to allow installation of most rotors inside the section for high strength, while allowing the section to fully retract.

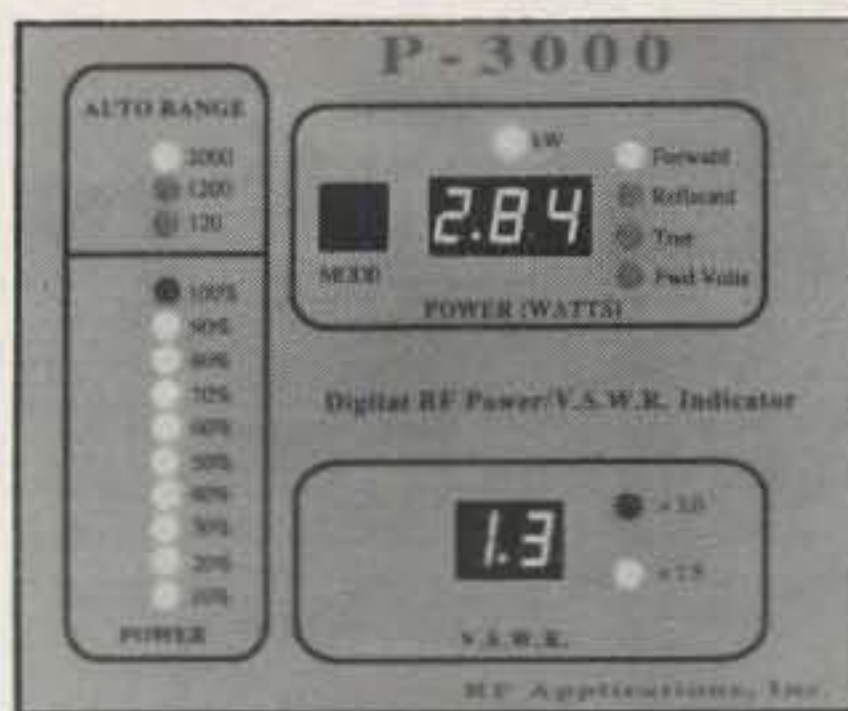
At the top of the line are the HDX series towers. These are heavy-duty crank-up towers with a high wind loading capacity of 30 sq. feet,



The Radio Devices Revex PC705 Power Checker displays the RF power output of low-power transmitters up to 5 watts in the 20–1300 MHz range. To use it, you simply attach the power checker to any HT or QRP rig to immediately estimate the power output and evaluate the radio or its batteries. (Photo courtesy Bob Levine, KD1GG)

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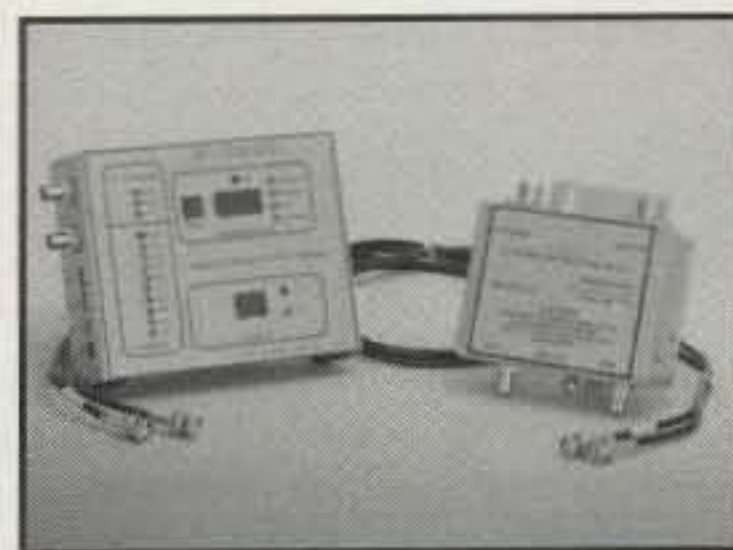
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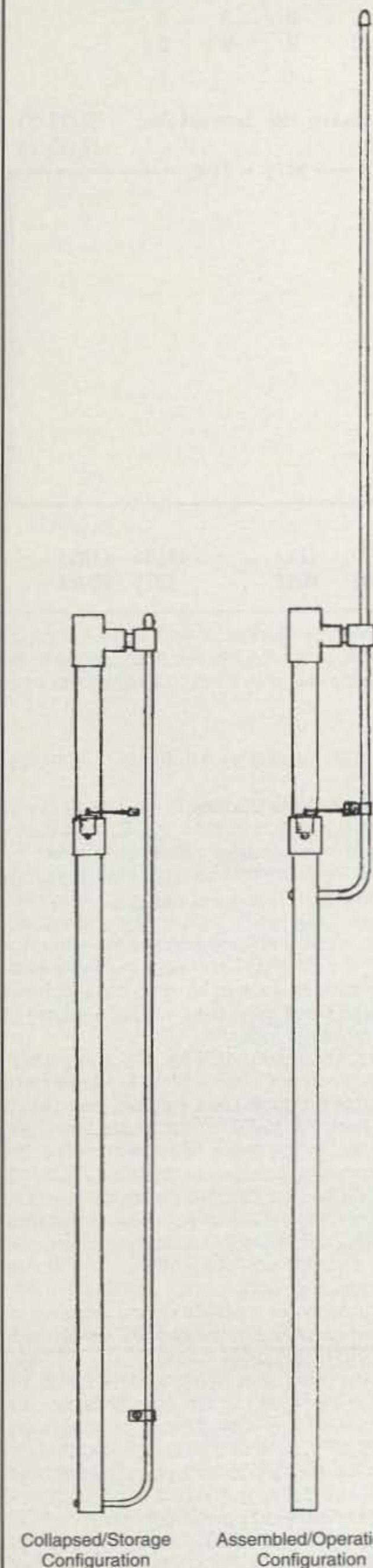


Fig. 2- The OMNI-J by RF Products is a sturdy J-pole design available in two versions, for 144-148 or 220-225 MHz operation. The antenna is an omnidirectional, half-wavelength vertical designed for base station use.

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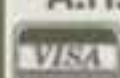
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TOTAL SCORE: 1

Printer: Inactive

TOTAL QSOs: 1

Contest: ARRL January VHF Sweepstakes 01/23/95
17:13:25

BAND = MODE = CALL-SIGN = GRID = DATE = TIME
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MENU 50 144 222 432 982 1296 SHF MODE EDIT ROVER

Fig. 3- Here's the main logging screen of VHF-DX, offered by Mark Hoersten, N8VEA, through his VHF Products. The program's operation is simple: to log a contact in real time, just enter the callsign of the station and the station's grid locator. See the text of this month's column for more details.

which allows for large stacked arrays. HDX towers are available in the same height range as the TX series, and they come with rotor plate, anchor bolts, and heavy-duty base.

Various accessories also are available. These include raising fixtures, remote controls, motor drives, rotor bases, rotor adapters, service platforms, coaxial standoff arms, thrust bearings, and masts.

For a catalog, contact US Tower Corporation, 1220 Marcin Street, Visalia, CA 93291 (209-733-2438).

Heights Tower Systems. Heights Tower Systems offers a variety of free-standing aluminum tapered and telescoping towers to design a system tailored to your own needs. A full line of easy to assemble and erect towers is offered; the towers are self-supporting up to 144 ft. Drake Dimitry, Jr., the company's president, asserts that Heights Towers' benefits accrue along four lines: high strength, long life, ease of installation and maintenance, and overall versatility and beauty.

The Heights towers are constructed of high tensile strength aluminum, and they are engineered and tested to withstand a 20 lb. per sq. ft. or 80 MPH windload pressure; higher values are achievable. Although guys are not required, they may be used; if installed, greater windloads and heights can be attained.

The firm's self-supporting, tapered towers feature high tensile strength, lightweight materials, and good structural efficiency. The 8 ft., triangular latticework truss sections can be assembled on the ground. Foldover kits and other accessories (hinged bases and mounts, rotor shelves, bearings, aluminum masts and top sections, replacement parts, etc.) are available. Heights Tower also offers some 40-plus variations of telescoping crank-up towers with extended heights to 116 ft. and maximum antenna wind loads to 40 sq. ft.

For a catalog and tower specs, contact Heights Tower Systems, Ltd., 9505 Groh Rd.,

Bldg. 70E, Grosse Ile, MI 48138 (1-800-745-1780).

Cable X-Perts Update. In the July 1993 column we described RG8 Mini(X) Coax, a clear-jacketed mini coaxial cable as offered by Cable X-Perts. As we indicated then, the product has a soft, highly flexible, and ultraviolet-resistant clear PVC jacket. The clear coax blends nicely into practically any surroundings. The cable has essentially the same electrical characteristics as other 95 percent braid coverage black coax but is priced a couple of cents more per foot.

Marc Abramson, KC9VW, the firm's president, recently advised me of his expanded wire and cable products lines. Besides coax, Marc also offers 72-450 ohm balanced feedlines, ladderline, rotor cable, wire, automotive zip cord, tinned copper grounding braid, Dacron® rope, 50 ohm low-loss microwave cable, coaxial connectors and adapters, quick-disconnect cable kits, dipole center and end insulators, and W2AU-style baluns. Also offered are mobile antennas and accessories, a 10-80 meter G5RV antenna kit, mobile mounts, cable waterproofing products, regulated DC power supplies, and other accessories.

Marc's product information sheets also are useful in that they contain coaxial cable connector assembly instructions for most connectors sold. Also included is a comprehensive coax attenuation and power rating chart as well as detailed guidelines and recommendations on burying coaxial cables.

For product information sheets send a No. 10 business-size SASE to Cable X-Perts, Inc., 113 McHenry Rd., Suite 240, Buffalo Grove, IL 60089-1797 (1-800-828-3340).

Computer and Software Notes

VHF-DX Contest Logger. Mark Hoersten,



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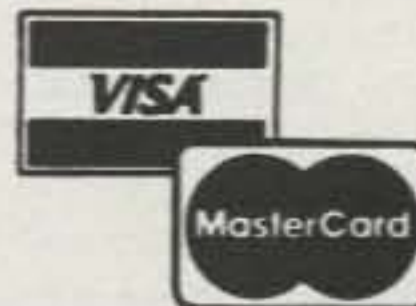
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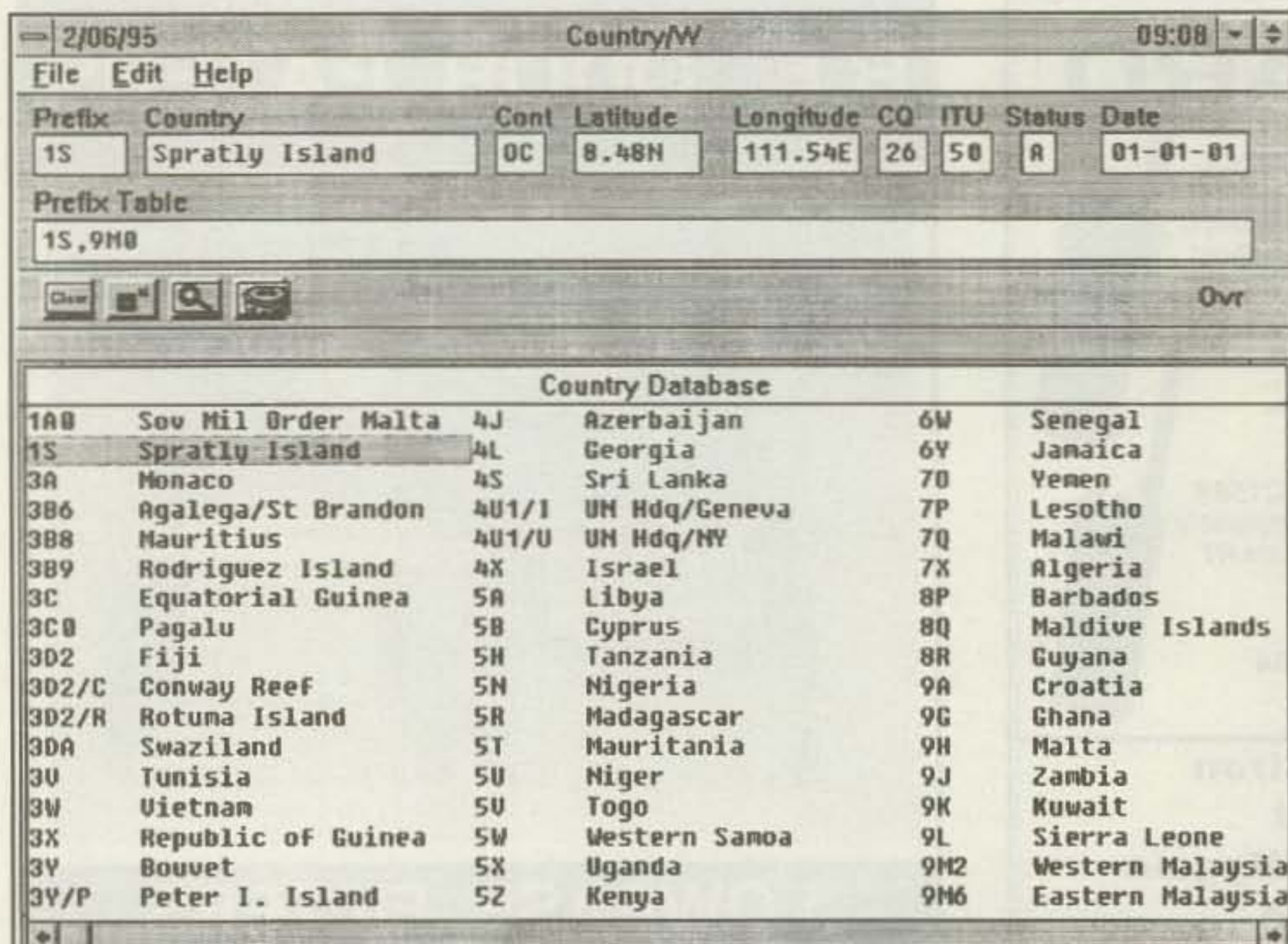
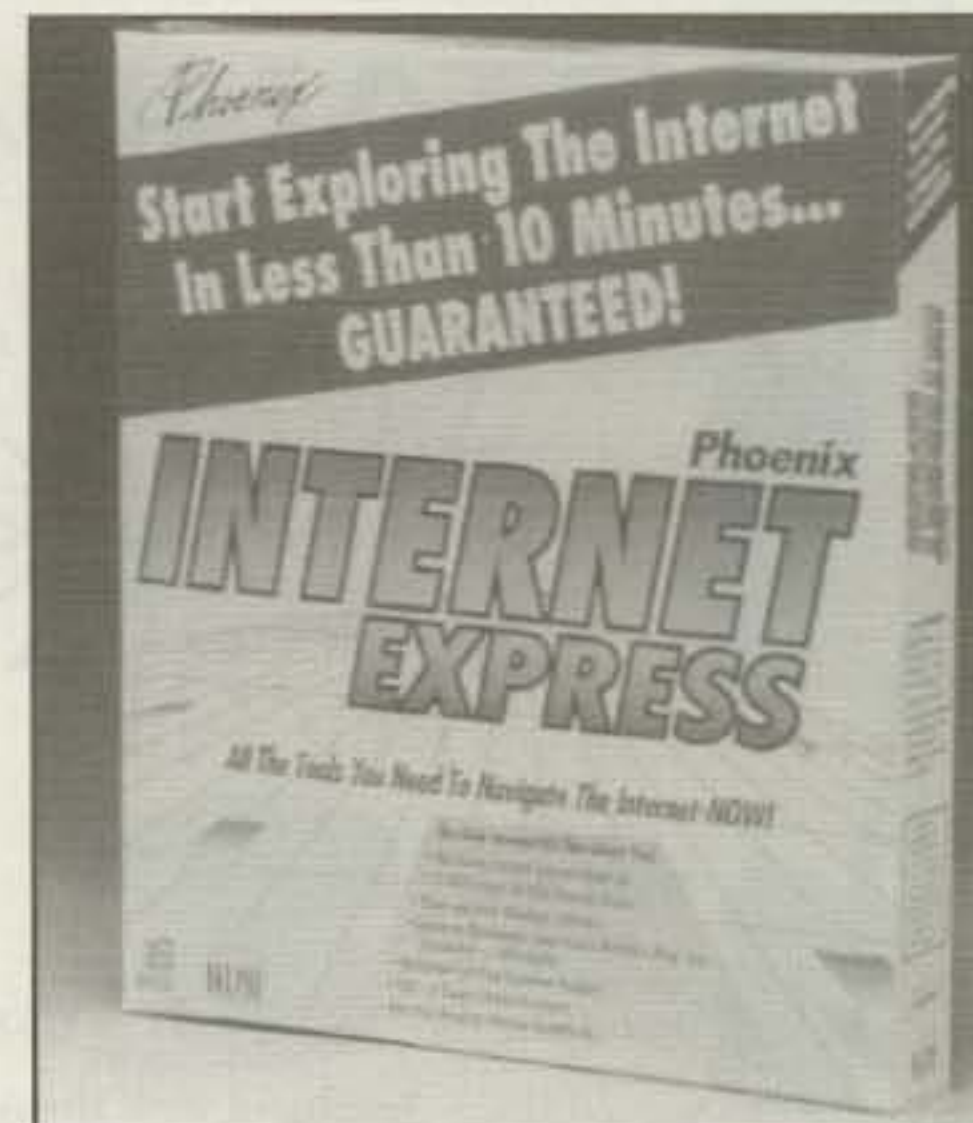


Fig. 4—AEA's Log Windows 2.0 includes a country database maintenance program, Country/W. With it, you can maintain the country database yourself, to add a new country, prefix, DXpedition, or special event callsign; or change the award status of a country. The program uses a multi-part screen that's split into three areas: prefix fields, a toolbar, and a prefix table.



Phoenix Technologies, Ltd. has introduced a new software and book package, the Phoenix Internet. It provides Windows users with what they need to navigate the Internet quickly and easily. Besides offering users ten free hours of full Delphi Internet access, the package also includes the InterNav™ Windows software. (Photo via Phoenix Technologies, Ltd.)

N8VEA, recently sent me his VHF-DX amateur radio logging software for IBM PCs and compatibles. The DOS-based package is designed for VHF/UHF contesting, VHF/UHF Century Club (VUCC) award tracking, DXing, and OSCAR satellite operation on the bands 50 MHz to 10 GHz. The program handles four- or six-character grid locators and keeps track of both worked and confirmed QSO and grid count by band.

VHF-DX is designed for the unique requirements of VHF and higher operation and logging. VHF-DX supports at least five ARRL VHF/UHF contests, including the popular Spring Sprints, and it also tracks grid squares. The program is optimized for both your contest and non-contest logging requirements.

The program generates the ARRL Standard File Format for easy contest entry. It also correctly logs rover contacts; works in a real-time mode, with contest score being updated after each QSO; displays QSO and grid totals by band; and performs "new grid" and duplicate contact checking.

VHF-DX also lists previous QSOs; displays confirmed grid count by band for VUCC tracking; correctly logs OSCAR contacts along with terrestrial contacts, adding the satellite name and transponder mode to the log; logs simplex, SSB, and CW contacts; and more. The program is easy to use and includes on-screen prompts; it can handle up to 7000 QSOs.

VHF-DX is regular commercial (not shareware or public domain) software. It's \$16.95 postpaid and includes a nicely printed, 32-page instruction manual; specify disk media. For more details, contact VHF Products, P.O. Box 23391, Chagrin Falls, OH 44023-0391 (216-543-2748). (See fig. 3.)

Note that we received Version 1.5 of VHF-DX for review. As we were preparing the issue for publication, we received Version 2. It is sim-

ilar but has at least ten new or enhanced features. These include tracking of states worked and confirmed by band, manual entry mode, several new reports and forms, and much more. Contact the publisher for more details.

Pasokon Color SSTV. The number of amateurs getting on slow-scan TV (SSTV) has been growing at a high rate over the past few years due to the availability of inexpensive PC-based scan converters. About five years ago, in June 1990, we noted a low-cost color SSTV program for the Atari ST developed by John W. Langner, WB2OSZ, that he wrote up in December 1989 and January 1990 *73 Amateur Radio Today*. John now offers Pasokon TV™, a full-featured, low-cost alternative for SSTV using 80386 or higher IBM PCs and compatibles, and the receive-only SSTV Explorer. These are offered through Absolute Value Systems.

The plug-in Pasokon TV adapter and the accompanying graphics software offer many features that you can use to both send and receive color images over HF, VHF, or UHF. Some of the unit's key features include the ability to use all popular SSTV formats; display of color pictures in real time; automatic fine tuning (up to ±100 Hz); import and export of GIF, TGA, PCX, and other graphics files; test patterns and image manipulation; and more. The interface board fits AT-type slots on your PC and does not use the serial or parallel ports. It's \$239.95.

If you just want to receive color images, John offers SSTV Explorer. This low-cost (\$59.95) but powerful PC serial port adapter and associated graphics software allows you to receive most popular SSTV modes. It plugs into your computer's serial port and comes with the same graphical user interface software as furnished with the Pasokon TV adapter.

For more information, contact Absolute Value Systems, 115 Stedman St., Chelmsford, MA 01824-1823 (508-256-6907). (I should mention

that both units, along with Digital Vision's ComputerEyes/RT system for real-time image capture and the new JPS SSTV-1 DSP audio filter, are prominently featured in the Radioware catalog. For a copy, contact Radioware Corporation, P.O. Box 1478, Westford, MA 01886 [1-800-950-9273].)

Phoenix Internet. If you haven't already heard, what is the Internet? It's a loosely spun web linking well over 15,000 computer networks in more than 50 countries, from mainframes to desktops. With 25+ million users worldwide (no one knows the real number), it's the fastest growing online resource.

Designed originally for research by the government and educational institutions, it's not very user-friendly. However, that's changing as more users seek access. You may be able to hook up through work or school, online communications utility services, bulletin-board systems (BBSes), and Internet access providers that connect you for a fee. Today anyone with a personal computer and a modem can benefit from the resources of the Internet, including communication throughout the world, tapping into robust databases, and downloading articles from online archives.

Sometimes, though, it's not so easy to hook up with the Internet, especially if you're doing it strictly on your own. Lots of software and book publishers have jumped in to fill that void. One of them is Phoenix Technologies, Ltd.

Recently they developed a software and book package called the Phoenix Internet. It provides Windows users with all the tools they need to navigate the Internet quickly and easily. Besides offering users 10 free hours of full Internet access, the package includes the InterNav™ Windows software for point-and-click access. The package also contains "The Official Delphi Internet Guide" and the "What to do on the Internet" tour guide. The pack-

age lets you begin exploring the Internet in less than 10 minutes through the Delphi Internet online service.

The *Phoenix Internet* is \$39.95. For more information contact Phoenix Technologies, Ltd., Eclipse Division, Three First National Plaza, Suite 1616, Chicago, IL 60602 (312-541-0260).

Walnut Creek CD-ROM Update. We have mentioned Walnut Creek CD-ROM before in the column, and have seen their catalog grow from a couple of pages describing eight discs of inexpensive archives of public-domain and shareware programs to a colorful, slick 16-page catalog describing more than 50 carefully chosen titles.

Included in these titles is the Walnut Creek CD-ROM sampler, which contains something from every one of their products; it includes the index files and file descriptions from each disc. This lets you see what you'll get with the real product. The sampler also includes choice bits from each of the actual CD-ROMs and comes with a \$5 credit. The sampler is free except for shipping (\$5 in the U.S. and Canada).

Some of the more interesting discs include a "CD-ROM of CD-ROMs," which covers 5300 different discs; the *QRZ! Ham Radio* CD-ROM, which covers over 750,000 callsigns; and lots of specialized discs supporting Macintosh, CP/M, UNIX, and Atari operating systems and PCs. New titles and updates include the two-disc *CICA Windows* shareware set, *Teacher 2000* (with over 2000 educational programs), and the comprehensive *Music Workshop* collection.

For a free catalog, contact Walnut Creek CD-ROM, 4041 Pike Lane, Suite D-893, Concord, CA 94520 (1-800-786-9907). (Walnut

Creek also distributes its discs through dealers such as Radio Devices, which we mentioned previously in this month's column.)

CT-9 Contest Software Update. Since 1985 one of the "standards" against which IBM PC contesting programs are judged has been CT™. With a reputation as a comprehensive and sophisticated real-time contest program, CT is used by many top-scoring contenders. Key features and functions include logging, scoring, PacketCluster® interfacing, networking, QSL label generation, multiplier lists, rate information, log statistics, and radio support for most popular transceivers.

In October 1992 we highlighted CT Version 7 and its many features, which we won't repeat here. We would like to note, however, that Version 9, available now, offers a host of new features. These include a 50-line display mode, a color-coded band map, window position and color control, mouse support, sunrise/sunset tables, bandswitch support, variable CW spacing, increased CW speed range, beam headings, and rotor control for the Yaesu G-1000 SDX rotor. CT now has a "DXpedition mode" and supports 15 contests, including the CQ WW DX, CQ WPX, and CQ 160 Meter contests, plus the big ARRL contests and others.

CT Version 9 is for 80386 and higher PCs; it's \$79.95. Version 8 is available and supports XT, AT, 386, and 486 PCs; it's \$69.95. An upgrade from CT 8 to CT 9 is \$44.95. Shipping is \$4 in the U.S. For more information, contact K1EA Software, 5 Mount Royal Ave., Marlborough, MA 01752-1935 (508-779-5054).

FlexPac Update. In January 1994 we highlighted *FlexPac*, developed for the IBM PC by Bob Seidel, ND2O, and Rich Thorne, WB5M. *FlexPac* boasts that it's a "real" packet/TNC

(terminal node controller) program, not just a glorified terminal or logger. Features include PacketCluster® interfacing, multiple windows and sessions, ability to send "DX spots" to a printer, pull-down menus, automatic log-ons, a full script language, a connect alarm, and simultaneous input and output.

Recently, Version 5 was released. Besides squashing a few program "bugs," the new version significantly improves several functions, particularly the logger, which is more flexible and easier to use. New fields have been added, such as QSL manager and state, and more functions have been automated: setting the STATE field automatically updates the ZONE field. You now can search on more fields, and wild-card searches are allowed in the CALL-SIGN field. The log windows also have been reorganized.

Perhaps the most important new feature is rig control. If you have a Kenwood radio (and some others) that allows computer control with a COM port interface, *FlexPac* will let you set your rig's frequency and mode to that of a DX spot. Also, if you are entering a new log entry, you can read the rig's frequency.

New registrations are \$35 and upgrades from version 4.x are \$15; add \$3 shipping and handling. Contact Rich Thorne, WB5M, 133 Light Falls Drive, Wake Forest, NC 27587. Include your callsign when ordering and specify disk media.

AEA Log Windows™ Update. In a recent column we featured AEA's Log Windows. To recall, it's a Windows package that combines logging, rig control, and DX spot monitoring with award tracking and reporting. It allows you to perform day-to-day logging and awards tracking for various DXCC, WAS, VUCC, and

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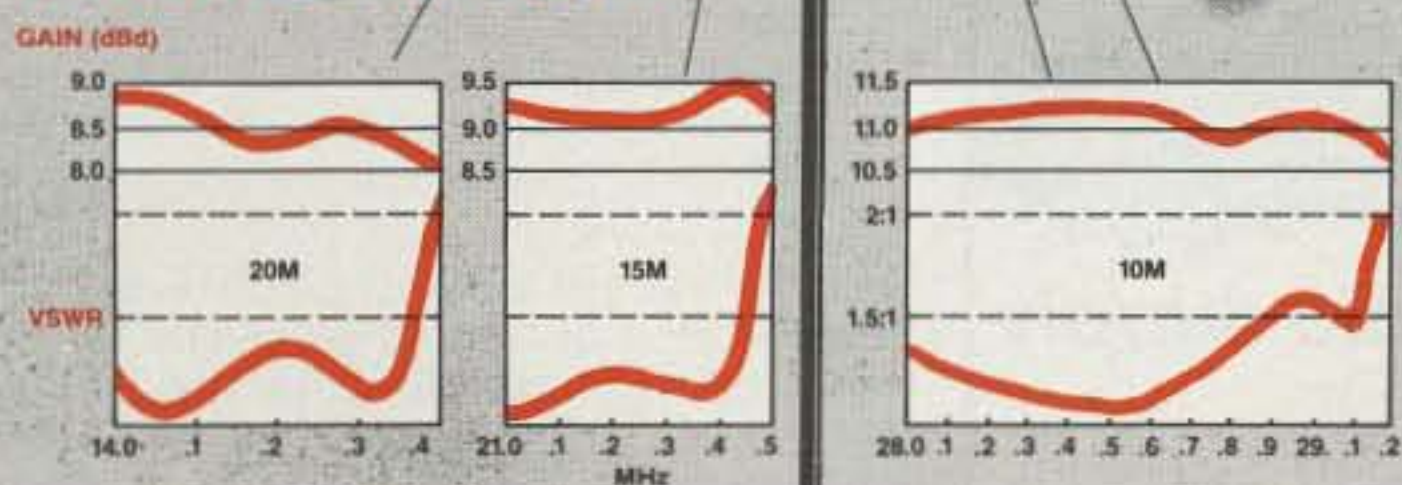
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CQ awards. It also provides a PacketCluster® interface for identifying stations that appear on your local DX cluster, changing frequency and mode to the indicated station, logging the contact, or posting a DX contact to the DX cluster.

Just after putting the earlier column to bed, we found that AEA had released Log Windows 2.0 with many new features and enhancements—enough to merit our revisiting the program. These features include computerized rotor support, database browsing, a log import function, user buttons that may contain file specifications for sending files, access to external QSL manager databases, support for the United States County Award (US-CA), and voice announcements of DX spots.

Other impressive features include a "quiet mode" to disable sounds from the TNC window; export of logbook records to a dBASE™ format database; connectivity with AEA's PC

Packratt for Windows; support for additional ICOM, Kenwood, and Ten-Tec radios; and the ability to turn off the searching of callsigns via an online callbook. Also included is Country/W, a country database maintenance program that lets you maintain the database yourself (see fig. 4). The program doesn't require an AEA TNC.

For a catalog, spec sheets, and pricing, contact Advanced Electronic Applications, Inc., P.O. Box C2160, Lynnwood, WA 98036 (1-800-432-8873). Updates from earlier versions are \$35.50.

Books and Catalogs For The Shack

Lew McCoy on Antennas. Happily, *CQ* is steadily building its repertoire of both operating and technical publications. Recently I had

the pleasure of reading a new book by my colleague, Lew McCoy, W1ICP. This is a superb new *CQ*-published antenna book, *Lew McCoy on Antennas*. Surely you know Lew (or "Mac," as he is also known), who held several posts at the ARRL during his 30-plus years there, including Technical Editor. Later Lew became Technical Editor of *CQ*, a position he presently holds. (Lew has been ministering unto the amateur radio world for quite some time. When my first antenna article was published by *QST* in June 1956 as 14-year-old K2IKZ, Lew was already on the *QST* masthead as a Technical Assistant!)

When you read his book, you'll understand why he has for so long been a standing-room-only speaker at hamfests and amateur radio conventions. Reading Lew is like having a conversation with him in your hamshack, or asking him a question from the front row of that hamfest seminar. Unlike what you find in some antenna books, Lew presents his information—both technical and nontechnical—in a casual, comfortable, non-intimidating way.

Some of the broad topics in the 112-page book's 12 chapters are basic facts about antennas; antenna matching; standing-wave ratio (SWR); decibels; transmatches and antenna tuning; feedline radiation; wire antennas; rotary dipoles, beams, and quads; VHF antennas; and multiband mobile antennas. Included are examples, illustrations, and photos that supplement the text nicely.

Lew McCoy on Antennas is \$15.95 from *CQ* Communications, Inc., 76 N. Broadway, Hicksville, NY 11801 (1-800-853-9797).

Fine Tuning's Proceedings. In the May 1991 column we reviewed Fine Tuning's *Proceedings 1990*. *Proceedings* was, and still is, a cut above most SWL or amateur compendiums we've seen. It's modeled after the collections of scholarly articles published by professional societies; careful attention is paid to article selection and technical accuracy by a formal review panel. Each article is thoroughly edited for clarity of expression and good understandability.

Fine Tuning (FT) is a nonprofit organization that supports shortwave broadcast DXing; they've published a weekly newsletter of DX loggings since 1976. In 1986 FT set out to publish a number of hobby aids and DXing handbooks, such as *Proceedings*. The compendium fills the need for in-depth articles that neither radio club bulletins nor the commercial hobby press offers. Each *Proceedings* article is designed to provide a forum for "cutting edge" ideas that may well advance the radio state of the art.

Fine Tuning's John Bryant recently sent me their newest, *Proceedings 1994-95*. This edition has nearly 200 pages of articles, reviews, and features. There are several excellent antenna articles that provide solid information on multiple Beverage antennas, ferrite loops, specialty antennas for the tropical band, and impedance matching devices; a review of the Carolina Beam from The Radio Works; and an examination of the popular Kiwa Electronics medium-wave loop antenna.

Two of the 23 major articles challenge your understanding of HF propagation: "A Brief History of Ionospheric Studies" by Dr. Bob Brown, NM7M, and "Tropical Band Propagation from Asia," by David Clark and Tony Ward, VE3NO. General-interest articles include reviews of the current crop of "dream receivers"; comparisons between the Drake R8 and the Japan Radio NRD-535D receivers; and nostalgic dis-

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cussions of several classic shortwave radios, including the Hammarlund SP-600, the Hallcrafters SX-42 and SX-62, and two top Zenith Trans-Oceanic sets.

The 1994-95 edition is \$20.50. Previous editions (1988, 1989, 1990, 1991, and 1992-93) are the same price. The books are from Fine Tuning Special Publications, c/o John Bryant, RRT #5, Box 14, Stillwater, OK 74074. Checks should be payable to Fine Tuning Special Publications; include \$4 postage for each book.

Postscript: Professors John H. Bryant and Harold N. Cones recently authored a definitive book on the Zenith radio classics. It's *The Zenith Trans-Oceanic: The Royalty of Radios* (published at \$24.95 by The Radio Professors, P.O. Box 592, Stillwater, OK 74076). We plan to review it soon, so stay tuned.

Using Computer Bulletin Boards, Third Edition. This 1995 book by John Hedtke, KD7WS, introduces beginners to BBSes and telecommunications, and it helps more advanced users to more effectively use BBSes. The book covers basic concepts, required equipment, telephone networks, online communications utility services, setting up a BBS, and more.

The book starts by discussing basic telecommunications concepts and shows you what equipment to use. It tells you how to log on to a BBS, read and enter messages, send and receive files, chat with other users, and even play online games. It continues by giving valuable information on BBS networks, offline mail readers, and BBSing via amateur radio. The book also introduces you to the Internet and popular online information services.

Appendices provide sources for hobby, commercial, and government BBS phone numbers, communications software, and BBS software. The book also has an extensive glossary, bibliography, and index, and it includes a disk with the popular DOS-based Qmodem 4.6 TestDrive communications package. The book/disk combo is \$29.95. The MIS:Press book is from Henry Holt and Company, Inc., 115 W. 18th St., New York, NY 10011 (1-800-488-5233).

Surplus Software Catalog. Are you looking for some *real* bargains on software? Surplus Software looks like the place to go. It's a clearinghouse for publishers and distributors with overstocked, overproduced, or distressed inventories. The firm offers many current version, previous version, and promotional packages that offer good value (previous versions give the option of trying software inexpensively and upgrading to current releases).

All products are unused, although some items are packaged in promotional bundling, saving you the cost of retail packaging. All products come from overstocked, distressed, or bankrupt companies, or from overrun inventories that the firm buys. However, all products are offered in limited quantities, and once sold, may not be available again. Returns are okay, provided the merchandise is unopened and in original factory condition.

For a tabloid-size, newspaper-style catalog that typically runs to about 40 pages, contact Surplus Software International, Inc., 489 N. 8th St., Hood River, OR 97031 (1-800-753-7877).

Looking Back Five

Five Years Ago in "Antennas and Accessories." Now you know what the column looks like in July 1995. What did it feature in July 1990? "From the Notebook, Part VI" was the title.

Then, we highlighted the Procomm/Digitrex

Supercone, an unusual combo HF through microwave discone and vertical antenna; the Multi-Rotating "Original Ringrotor" Antennas by TIC General; CUBEX quads; rotatable 12/17 meter trap dipoles from SV Products; and DX Engineering's heavy-duty HF Yagis. We also presented some antenna tuner "do's and don'ts."

We looked at *IONSOUND*, an HF ionospheric propagation prediction software; *Satellite Pro*, a satellite tracking program for the Macintosh; and *Shortwave Navigator*, a program schedule database for the Macintosh. We also peeked at *PopDrop Plus*, a RAM resident program manager from BlocPublishing, and *Ctrl-Alt*, a sophisticated shareware RAM-switching package from Biologic.

If you find a topic we covered in this or a pre-

vious column of interest, please obtain the back issue directly from *CQ's* New York office, rather than requesting the article from us. Most back issues are available from *CQ* for \$3.50 postpaid. (*CQ* also offers various "back issues specials" to complete your collection. Check their ad in this issue, or call them at 1-800-853-9797 to order back issues.)

Wrap-Up

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

Overheard: The first place you should look for something is the very *last* place you would expect to find it!

73, Karl, W8FX

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**Starts 0000 UTC Saturday
Ends 2400 UTC Sunday
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I. **Announcing:** The seventh annual CQ WW RTTY DX Contest, co-sponsored by *The Digital Journal*.

II. **Objective:** For amateurs around the world to contact other amateurs in as many CQ Zones and countries as possible using the digital modes.

III. **Contest Period:** 0000 UTC September 23 to 2400 UTC September 24, 1995.

Note: The total contest period is 48 hours. **All stations and operator classes** may operate the entire 48-hour period; there are **no required off time periods** for any entries.

Note the following operator classes.

IV. **Operator Classes:** There is a **High Power** category (greater than 150 watts) and a **Low Power** category (less than 150 watts). **Only** Single Operator **All Band** and **Multi-Op** Single Transmitter entries are eligible to enter the **High** or **Low Power** category. Enter one or the other, and so note on your log. Single Band entries, Single Operator Assisted, and Multi-Multi entries are **not** eligible to enter the High or Low Power category.

1. **Single Operator, All Band and Single Band.** One person performs all operating and logging functions. Use of spotting nets, DX Alert Packet systems, telephone, etc., is *not* permitted.

2. **Single Operator Assisted, All Band Only.** One person performs all operating and logging functions. However, the use of DX spotting nets or any other form of DX alerting assistance **is** allowed. The operator can change bands at any time. Single operator stations are allowed only one transmitted signal at any given time.

3. **Multi-Operator, Single Transmitter.** All band entry only. More than one person operates, logs, checks for duplicates, use of a spotting net, etc.

(a) Only one (1) transmitter and one (1) band permitted during the same time period (defined as ten [10] minutes). Once the station has begun operation on a given band, it *must* stay on that band for 10 minutes; listening time counts as operating time.

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

4. **Multi-Operator, Multi-Transmitter.** All band entry only. No limit to the number of transmitters, but only one (1) signal per band permitted.

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

V. **Entry Categories:** Single Operators may enter as (a) All Band High Power or Low Power; (b) Single Band; or (c) Single Operator Assisted All Band.

Multi-Operators may enter as (a) Multi-Op Single Transmitter, High Power or Low Power, All Band; or (b) Multi-Op Multi-Transmitter, All Band.

VI. **Modes:** Contacts may be made using Baudot, ASCII, AMTOR (FEC & ARQ), Packet. (Unattended operation or contacts through gateways or digipeaters are not permitted.)

VII. **Bands:** 80, 40, 20, 15, and 10 meters.

VIII. **Valid Contacts:** A given station may be contacted only **once** per band regardless of the digital *mode* employed. Additional contacts are allowed with the same station on each of the other bands as well.

IX. **Exchange:** Stations within the 48 continental United States and the 13 Canadian areas must transmit RST, State or VE area, and CQ Zone number. All other stations must transmit RST and CQ Zone number.

X. **Countries:** The ARRL and WAE country lists will be used.

Note: The USA and Canada count as country multipliers. Example: The first US State and Canadian area you work not only count as a multiplier for the state or area, but also count as a country multiplier for each band.

XI. **QSO Points:** One (1) QSO point for contacts within your own country. Two (2) QSO points for contacts outside your own country but within your own continent. Three (3) QSO points for contacts outside your own continent.

XII. **Multiplier Points:** One (1) multiplier point for each US state (48) and each Canadian area (13) on each band. One (1) multiplier point for each DX country in the ARRL and/or WAE lists on each band. *Note:* KL7 and KH6 are country multipliers only and not state multipliers. One (1) multiplier point for each CQ Zone worked on each band. Maximum of 40 Zones per band.

Note: Canadian areas are VO1, VO2, VE1 NB, VE1 NS, VE1 PEI, VE2, VE3, VE4, VE5, VE6, VE7, VE8 NWT, and VY Yukon.

XIII. **Final Score:** Total QSO points times the total multipliers equals the total claimed score.

XIV. **Contest entries and logging instructions:** CQ WW RTTY DX logs and forms should be used to facilitate scoring and checking. **Please do not** roll the US States and Canadian Provinces together on the Summary Sheet as Country Multipliers; break them out separately.

All logs **must** show:

1. Times in UTC.
2. All sent and received exchanges are to be logged (call-sign, RST, Zone, country, State/VE, points claimed).
3. Indicate State/VE area, Zone, and Country Multiplier only the *first* time they are worked on *each* band.
4. Use a separate log sheet for each band.
5. A check list of duplicate contacts for each band (dupe sheet).
6. A *multiplier* check sheet for each band.
7. An overall *summary sheet* showing total QSOs, Points, Zones, Countries and States/VE areas worked.

8. Each entry must be accompanied by a signed declaration that all contest rules and regulations for amateur radio in the country of operation have been observed.

Contest forms are available from *CQ*, *The Digital Journal*, and the Contest Director. Please include a large SASE with two units of US first class postage or IRCs.

XV. Disqualifications: Operating in an unsportsmanlike manner, manipulating scores or times to achieve a score advantage, or failure to omit duplicate contacts which would reduce the overall score more than 2% are grounds for disqualification. The use of non-amateur means such as telephones, telegrams, etc., to elicit contacts or multipliers during the contest is unsportsmanlike, and the entry is subject to disqualification. Actions and decisions of the Contest Committee are official and final.

XVI. Awards: Plaques will be awarded to the first-place finishers in each of the operator classes. Certificates will be awarded to second and third places. Certificates will be awarded to the first-place finishers in each DXCC country. To be eligible for awards, a Single Operator must operate a minimum of 12 hours, and a Multi-Operator entry must operate a minimum of 18 hours.

XVII. Deadline: All entries must be postmarked **no later** than December 1, 1995. An extension may be given if requested. Logs should be mailed to: Roy Gould, KT1N, CQ WW RTTY DX Contest Director, P.O. Box DX, Stow, MA 01775 USA.

XVIII. Plaques (Donors): Single Operator and Multi-Operator All Band plaques are awarded to the high scorer, either High Power or Low Power, whichever is highest.

North America, Low Power—American Digital Radio Society
 South America—The Contest Committee
 Europe—HAL Communications Corp.
 Oceania—*The Digital Journal*
 Asia—N5JJ Memorial
 Africa—The Contest Committee
 United States—RTTY by WF1B
 United States, Low Power—Geoff Malta, N2HOQ

Single Operator, Single Band

3.5 MHz—Reggie Corey, KA1UQU
 7.0 MHz—Open
 14 MHz—Kunihiko Fujii, JH1QDB
 21 MHz—Denis WD4KXB & Mike KA4RRU
 28 MHz—The Contest Committee

Single Operator Assisted

World—*CQ* magazine
 North America—Terri Bouvier, N1DTG
 Continents—Open

Multi-Operator, Single Transmitter

World—AEA, Advanced Electronic Applications, Inc.
 World, Low Power—HAL Communication Corp.
 North America—GØAZT Award
 Continents—Open

Multi-Operator, Multi-Transmitter

World—*CQ* magazine
 Continents—Open

There are many plaques looking for sponsors: High Power, Low Power, Single Band, a specific country, Multi-Op by continent, etc. If you are interested, contact the Contest Director.

Single Operator, All Band

World—AEA, Advanced Electronic Applications, Inc.
 World, Low Power—Eastern Washington Amateur Radio Group
 North America—TG9VT Memorial



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NEWS/VIEWS OF ON-THE-AIR COMPETITION

Calling "CQ Contest"

It's 2359Z and the anticipation of another exciting CQ WW DX Contest is at its peak. You may not have the biggest station in the world, but you've at least done as much preparation as possible. For once you've actually tested your computer software ahead of time. Even your automated "voice" hardware is working! After careful consideration, you've decided to enter the Single Operator, Assisted category. Packet messages are flying across your screen. The coffee is brewing along with a steaming crockpot full of beef stew. This is contesting as we know it.

Suddenly the clock turns over to 0000Z; the contest has begun. As a smaller station, you choose a strategy that begins by searching and pouncing up the band. This is probably the approach taken by most participants in a major contest, and it can be quite effective. Careful tuning combined with judicious use of packet spots can really maximize your start in any contest—especially from a smaller station.

What I have described so far is missing one key element. Starting at 14150.2 and moving up as much as 150 kHz is more often than not filled with station after station calling CQ. Some of them are DX stations in South America or the Caribbean working guys at incredible rates. Others are North American operators endlessly calling CQ with only an occasional answer. This issue of CQing is my topic of discussion this month.

Unless I've missed something, there are no contest rules that disallow discretionary CQing. If you want to park your VFO on 28995 kHz for the entire 48 hours of a DX contest, calling CQ the entire time, it is your prerogative. Lately, however, there seems to be more debate about excessive CQing in contests, so let's unpack the topic a little more.

Who are the predominant CQers these days? Well, it used to be an exclusive club that included mostly the large multi-multi and multi-single stations from around the world. However, over the past five years or so something has changed dramatically. It seems that more and more operators have become increasingly aggressive with their use of the CQing operating tool. Why is that? Well, for starters there simply are more stations to work. From a USA perspective (especially the East Coast), the number of European participants in a contest such as the CQ WW is at an all-time high. I'd be a rich man if I had 25 cents for every time I've commented about the "bottomless pit" of G, DL, I, EA, and other countries that call me during a European opening. So from this perspective, aggressively calling CQ is usually a sensible operating strategy.

Second, while the top tier of stations has maintained its leadership in antenna hardware, the second tier has been hard at work,

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Calendar of Events

June	24-25	ARRL Field Day
June	24-25	RSGB Summer 1.8 MHz Contest
June	24-25	SP-QRP International Contest
July	1	RAC Canada Day Contest
July	1-2	Venezuela SSB DX Contest
July	8-9	CQ WW VHF Contest
July	8-9	IARU HF World Championship
July	9	QRP ARCI Summer Homebrew Sprint
July	22-23	SEANET '95 CW Contest
July	29-30	RSGB IOTA Contest
July	29-30	Venezuela CW DX Contest
Aug.	5-6	YO DX Contest
Aug.	5-6	ARRL UHF Contest
Aug.	12-13	Maryland-DC QSO Party
Aug.	12-13	Great New Mexico Chile Chase
Aug.	19-20	SEANET '95 SSB Contest
Aug.	19-21	New Jersey QSO Party
Sept.	2-3	All Asian SSB DX Contest
Sept.	2-3	Bulgarian DX Contest
Sept.	3	Panama XXIV Anniversary Contest
Sept.	9-11	ARRL September VHF Contest
Oct.	14-15	Pennsylvania QSO Party
Oct.	28-29	CQ WW DX SSB Contest

too. It used to be that only the very elite had use of stacked high-band beams. Now while it's hardly everyone, it's simply not that uncommon to run into station after station—especially in the U.S.—using this kind of antenna hardware. The point is that while station "X" may still be 15 dB weaker than W3LPL or KC1XX, it is still transmitting a dominant signal that can take good advantage of a CQing operating strategy.

The third contributor to this proliferation of CQers in contests is the advent of the second radio by single operators. In the "old days" you had to make some tough decisions about band choices as a single operator with only one radio. For example, "Should I call CQ on 20 meters with the intent of establishing a good, clear frequency at the beginning of an opening to Europe/Japan?" Or, "Should I stay on the low bands for another 20 minutes and pick up some of those juicy 5W, VK6, FK8, CE, UAØ multipliers on 40 and 80 meters?" Now with the use of a second radio, as I've described in the past, you can have the best of both worlds. After all, as a single operator you don't have the 10-minute rule limitation with which multi-single operations have to contend. You can CQ to your heart's content on 20 meters working stations at 20 to 30 QSOs per hour, for example, while mounting a determined multiplier search on the second radio. The result is maximized scoring with yet another tier of CQers on the band.

Last (and I'm sure there are even more examples), competitors outside of North America have jumped on the CQing bandwagon as well. For at least the past 25 years the bands

July's Contest Tip

In keeping with this month's theme of CQing, try varying your CQing style. Remember the most important information another station needs is your callsign, not the letters "CQ." You may want to "call CQ" occasionally by just signing your callsign 2 or 3 times, especially on CW. Calling CQ with less information, apart from your call, is always better than more!



One of contesting's operating giants, Dick Norton, N6AA (left), received his CQ Contest Hall of Fame award from CQ WW Contest Director Bob Cox, K3EST (right), at the Dayton Hamvention this year. (All photos courtesy Joe Pearlstein, NU3Y.)

have always been filled with the louder overseas stations running Ws at a feverish clip. In recent years they have been joined by a new second-level of stations who have found CQing to be an effective operating strategy by virtue of: (1) improved station hardware, (2) increased contesting experience, and (3) rising participation by North Americans. This is especially noticeable with the JAs and some European areas.

So what is the point of all of this rhetoric? I think a fair question to consider is: Is there too much CQing in today's world of contesting and is there anything we should do about it? While thinking about this topic, my first reaction was to put much of the blame on the level of sunspot activity. It's only natural that this topic becomes an issue of contention with some when everyone is crammed into a 300+ kHz bandspace on 20 meters. But if you think about it, we were dealing with this issue even at the last sunspot

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Yours truly, K1AR (right), had the honor of presenting CQ Contest Hall of Fame plaque #17 to Ken Wolff, K1EA (left), at Dayton.

cycle peak. I can still vividly recall operating on 10 meters above 28850—not because I wanted to be there, but because the band was so crowded that it was simply the first usable spot I could find. The issue of CQing is not simply limited to SSB either. A little introspective thought will yield similar comparisons on CW.

Well, just to set your mind at ease (if it even needed to be), I'm not suggesting that we need to change contest rules to put a governor on the use of CQing in contests. Now if we did something like that, excluding perhaps K1AR and perhaps your callsign, then we might have something, but I won't hold my breath on that one. What I am suggesting this month is the need to continue to keep this topic at the forefront of our minds and think about it in a little more depth as we operate. Remember, excessive CQing has implications beyond the contest community. A non-contester listening to a station calling CQ ineffectually can build a pretty strong case for spectrum misuse if you look at it from the non-contester's perspective.



Frankford Radio Club President Wayne Kline, KY3N (right), accepted the 1993 CQ WW World Club Competition plaque on behalf of the club at the contesters' banquet in Dayton.

We need to continually be sensitive, as contesters, to that point.

Let me illustrate some scenarios that may fit into the excessive CQing category:

- Situating yourself on the lower end of a band 30 to 60 minutes before the band opens to Europe/USA/Japan in an attempt to establish a clear running frequency. An obvious moral violation (if not an outright breaking of the rules) is to do this with a different callsign so as to not use valuable on-time during non-48-hour events.

- Allowing yourself to go beyond what is reasonable and sensible and continuing to call CQ, even when rates fall below 10 to 15 QSOs/hour.

- Being overly inflexible and continuing to call CQ when the frequency you are using clearly is not yours (i.e., nets, ragchewers, other modes, etc.). Another variation on this is the typical "frequency battles" where two stations may choose to "duke it out" for upwards of 15 to 30 minutes, both calling endless CQs and neither working anyone.

- Transmitting with an endless CQ loop while you leave the station temporarily (i.e., "potty break") in order to hold a run frequency.

I'm sure you can think of a myriad of other examples along these lines. Let's face it: CQing as an operating strategy has been with us for decades and will be an element of contesting for a very long time into the future. I'm personally opposed to putting artificial limits on the practice through rule changes. This unfortunately smacks of the old days of QSO quotas by country, which hopefully will never see the light of day again. Some suggestions I've heard to deal with this issue include taking advantage of the computerization of logs—especially in the area of frequency reporting. You obviously can determine by looking at the reported frequencies in a log when someone is CQing versus searching. By giving increased point credit to the "searched QSOs," you may encourage less CQing and more searching on the bands. While this idea may have some merit, the idea needs somehow to be developed to accommodate the "non-computerized" operator before it can go further. There's plenty of opportunity to develop ideas in this area. Send me your thoughts!

**Dayton Hamvention
1995 Update**

There's so much that can be reported about any Dayton Hamvention. I just want to highlight two brief points this year.

As has become CQ's tradition recently, the Dayton Contest Banquet is the venue for announcing the latest inductees into CQ's Contest Hall of Fame. As I described last month, this year's class includes: N6AA, N6TJ, K1EA, and S52AA/S50A. It's an incredible honor for me to even write about these guys (refer to last month's column). So many of them were champion operators while I was just beginning to use my old TS-520 on training wheels!

Another aspect of Dayton—and I've never been let down on this one—is the opportunity to meet new friends. This year I met a number of "former USSR" hams, making this type of encounter almost commonplace at Dayton compared to just a few years ago. I also had the pleasure of meeting I6FLD for the first time. Standing near this long-time friend reminded

me of my early days in contesting when I6FLD was my only Italian multiplier from my tri-band-based 100 watt contest station in the '70s. If you can possibly go next year, make the effort. Every year I return to New York completely exhausted (yes, I have to work, too!), but counting the days until the next one.

Closing Comments

That's it for another month. Have you been digging those tower base holes, fixing element tips, putting up that "killer" 80 meter array so far this summer? If so, you're not alone. I'm amazed at the resiliency of contesting and its participants' level of enthusiasm even during the doldrums of a solar minimum. Keep up the good work!

As usual, please submit your contest announcements to me no later than August 1st for inclusion in the October issue of CQ.

73, John, K1AR

Canada Day Contest

0000-2359Z, Sat., July 1

Each year on July 1st, the anniversary of Canada's confederation, the radio amateurs of Canada sponsor the Canada Day Contest. Amateurs from around the world are invited to Canada's birthday party on the air.

Classes: Single Operator All Band (high power and QRP) and Single Band, and Multi-Operator.

Exchange: Canadians send RS(T) and province/territory. Foreign entries send RS(T) and serial number beginning with 001.

Points: Any station may work any other station for credit. A QSO with a Canadian station is worth 10 points. Canadian stations with an RAC, VCA, or QST suffix are worth 20 points. Stations outside of Canada are worth 2 points.

Multipliers: Credit 1 multiplier per band and mode worked for Canadian provinces and territories (12 maximum). Final score is total QSO points times your multiplier.

Entrants must submit a summary sheet showing score calculation as well as a dupe sheet, multiplier checklist, and logs. Send entries to: RAC, 614 Norris Court, Unit 6, Kingston, Ontario, K7P 2R9, Canada by July 31st. Results will be published in the Canadian *TCA Journal* (contact RAC for further information) and will be sent to all certificate winners.

Venezuelan Contest

SSB: July 1-2 CW: July 29-30
0000Z Sat. to 2400Z Sun.

This is the 34th annual contest celebrating Venezuela's independence. It's a worldwide-type contest, so do not confine your activity to working YVs only. Working other DX is encouraged. Use all bands, 80-10 meters (no WARC bands).

Classes: Single operator, Single and All Band, and Multi-Operator, Single and Multi-Transmitter. (No limit to transmitters, but only one signal per band).

Exchange: RS(T) and QSO number (e.g., 59001).

Points: Contacts between stations in the same country count as 1 point. QSOs between stations in different countries but the same

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continent are 3 points. QSOs between stations on different continents are 5 points.

Multiplier: One for each YV call area, and one for each different country worked on each band (including your own).

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

Awards: A plaque will be awarded to the highest scorer in each operating class. Certificates will be distributed to stations making more than 20% of the next highest score.

Use a separate log sheet for each band. Each YV call area (9) and each country (DXCC list) should be indicated in a separate column 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 that all contest rules and regulations for amateur radio in the country of the contestant have been observed.

Mailing deadline is September 30th for SSB entries and October 31st for CW. They go to: Radio Club Venezolano, Concurso Independencia, P.O. Box 2285, Caracas, 1010-A, Venezuela.

CQ WW VHF Contest

1800Z Sat. to 2100Z Sun., July 8-9

The popularity of this contest continues to grow. Be sure to review the full set of rules in the May issue of CQ. Mail your logs directly to the Contest Director: Joe Lynch, N6CL, CQ VHF Contest Chairman, P.O. Box 73, Oklahoma City, OK 73101. Please be sure to mark VHF Contest Logs on the envelope.

IARU HF Championship

1200Z Sat. to 1200Z Sun., July 8-9

This is the tenth annual IARU World HF Championship. All six bands, 10 through 160 meters, and the full 24 hours may be used by both single and multiple-operator stations. (No WARC bands.)

Categories: Single Operator, CW only, phone only, and mixed modes. Multi-Operator, Single Transmitter, mixed modes only. Stations must remain on a band for at least 10 minutes (exception: Only IARU member-society HQ stations may operate simultaneously on more than one band with one transmitter on each band/mode.)

Exchange: RS(T) and ITU zone. HQ stations: RS(T) and official society abbreviation.

Points: Contacts within own zone or with an HQ station count as 1 point. Contacts within own continent but different zone are 3 points, and 5 points with different continents.

Multiplier: Total number of ITU zones plus IARU HQ stations worked on each band.

Final Score: Total QSO points from all bands times the total multiplier.

Awards: Certificates will be awarded to the top scorer in each category, state, ITU zone, and DXCC country. In addition, achievement awards will be issued to those making at least 250 QSOs or those having a multiplier of 50 or more.

Entrants with more than 500 QSOs are required to include a dupe sheet with their log. A three-QSO reduction will be assessed for each duplicate QSO for which credit has been

taken. Disqualification may occur if the overall score is reduced by 2% or more.

It is recommended that you check QST (April 1995 issue) for more detailed information. A large SASE with 2 IRCs (or equivalent) will get you official forms and an ITU zone/prefix/continent map. Mailing deadline for entries is August 9th to: IARU HQ, Box 310905, Newington, CT 06131-0905.

QRP QRCI Summer Homebrew Sprint

2000-2400Z Sat., July 9

Sponsored by the QRP ARC International, this one is a real shorty on CW only. The goal is to encourage QRP operation with home-made equipment.

Classes: Single Operator All Band, Single Band, High Band (20, 15, 10, 6) and Low Band (160, 80, 40).

Exchange: Signal report and QTH (state, province, country) and QRP ARCI number, if appropriate, or power output if non-member.

Frequencies: Use 1860, 3560, 3710, 7040, 7110, 14060, 21060, 21110, 28060, 28110, and 50060 kHz.

Scoring: Credit 5 QSO points for QSOs with any ARCI member, 2 points for non-members (4 points outside of your continent). Bonus points should be applied to your score for using homebrew equipment. Credit 2000 points for a homebrew transmitter, 3000 points for a receiver, and 5000 points for a homemade transceiver. Final score is the total QSO points times the sum of all states, provinces, and countries worked times an output power multiplier (>5W=1, <5W=7, <1W=10, <250MW=15), plus bonus points.

Logs should be postmarked no later than August 9th and sent to: QRP ARCI Contest Manager, Cam Hartford, N6GA, 1959 Bridgeport Ave., Claremont, CA 91711.

SEANET Contest

CW: 0000Z Sat. to 2400Z Sun., July 22-23
SSB: 0000Z Sat. to 2400Z Sun., Aug. 19-20

This is an annual event sponsored this year by The Radio Amateur Society of Thailand (RAST) under the theme of "Worldwide Friendship of Amateur Radio." The objective is for amateurs worldwide to work stations in Southeast Asia.

Bands: 160-10 meters (no WARC bands).

Classes: Single Operator (Single Band and All Bands) and Multi-Single.

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

Multiplier: Multipliers are SEANET country prefixes: A4, A5, A6, A7, A9, AP, BV, BY/BZ, DU/DV/DX, EP, HL, HS, JA, JD1, JY, KH2, P29, S79, VK1-9, VQ9, VS6, VU, V85, XU, XV, XW, XX9, YB/YC/YE, ZK, ZL, ZM1-4, ZL6/ZM6, ZL9, 3B6/3B7, 3B8, 3B9, 4S7, 4X/4Z, 8Q7, 9K2, 9M2, 9M6/9M8, 9N1, 9V. Multipliers are calculated by total number of SEANET countries times three.

Scoring: QSOs count for one point. QSOs in your own SEANET country only count for country credit. Final score is total multiplier times QSO points.

Entries must be received by October 31st and sent to: SEANET '95, Eshee Razak,

9M2FK, P.O. Box 13, 10700 Penang, Malaysia. Include three IRCs for a copy of the final results.

RSGB Islands On The Air Contest

1200-1200Z Sat.-Sun., July 29-30

Following the great success of last year's contest, this event is a fantastic opportunity to work IOTA contacts around the world.

Classes: Single Operator (CW, SSB, or mixed modes), Single Operator Limited (only 12 hours of operation), Multi-Single, and SWL.

Exchange: RS(T) and serial number (e.g., 599001) plus IOTA if applicable.

Frequencies: Contest operation is on 80-10 meters (no WARC activity). Avoid operation

in the high portions of band segments (e.g., 14300-14350 kHz).

Scoring: Each contact with an IOTA island counts 15 points. Other contacts count 5 points except those within your own country, which are worth 2 points. Multipliers are the total of different IOTA references contacted on each band per mode. The final score is the total of QSO points on all bands added together times the total of multipliers.

Awards: There are a number of trophies and certificates available for this one. If you're looking to add to your shack's wallpaper, this one is for you.

Entries must be postmarked by August 26th and mailed to: RSGB IOTA Contest, c/o S. Knowles, G3UFY, 77 Bensham Manor Road, Thornton Heath, Surrey, CR7 7AF, England. ■

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NEWS OF COMMUNICATION AROUND THE WORLD

Minimum Country Size

In mid-April the ARRL Awards Committee voted 5 to 2 to accept a modified ARRL DX Advisory Committee (DXAC) recommendation to add a minimum-size rule to Point 2 (separation by water) of the Countries List Criteria in the DXCC rules. This change adds the following paragraphs to the existing rules under point 2:

(c) An island is defined as a naturally formed area of land surrounded by water, the surface of which is above water at high tide. Rocks which cannot sustain human habitation shall not be considered for DXCC country status.

(d) An island must meet or exceed size standards. To be eligible for consideration, the island must be visible, and named, on a chart with a scale of not less than 1:1,000,000. Charts used must be from recognized national mapping agencies. The island must consist of a single unbroken piece of land not less than 10,000 square feet in area, which is above water at high tide. The area requirements shall be demonstrated by the chart.

No effective date on this change in the DXCC countries criteria was mentioned.

This rule change immediately ignited a fierce controversy, especially at the DX forum of the International DX Convention in Visalia, California, a week after the announcement. To understand this controversy, let's review the chronology of the minimum-size discussion.

In December of 1993 Hans Hannappel, DK9KX, petitioned the DXAC to add Scarborough Reef to the DXCC countries list. (DK9KX is an experienced map junkie who identified the now-deleted Penguin Islands off the coast of Namibia as a potential DXCC country.) DK9KX argued that Huangyan Dao (as the Chinese call the reef) is an island, is a possession of China, is not claimed by the nearby Philippines, is not claimed by the Republic of China (the official name of Taiwan), and lies more than 225 miles from the nearest part of the People's Republic of China, and that nothing lies above water between China and Scarborough Reef. By this argument, Scarborough Reef appears to meet the then-existing DXCC requirements for a new country, under country criterion 2(a)—separation by water.

The problem with Scarborough Reef is that it is composed of numerous small rocks scattered along a 30 mile extent. It is not a single island, but numerous islands, each one of which is very small, only a few feet in any direction. DXers harkened back to the 7J1RL Okino Tori-Shima 1976 DXpedition, when Japanese DXers "brought along their own island" to activate that controversial country for the first time. The Japanese DXers set up their station on a scaffold-supported platform on a part of Okino Tori-Shima that was under several feet of water



Mike, K5KWG/ZA1MH (sitting), and Vlado, Z32KV, in Mike's Tirana shack. Vlado is a frequent guest operator in Tirana.

at high tide. See the December 1994 DX column for a further discussion of 7J1RL.

DXers, especially East Coast DXers, did not want to see another Okino Tori-Shima. There was considerable sentiment that an island had to be large enough to permit an amateur radio operation from dry land to count as a DXCC country. Accordingly, then-DXAC chairman Bob Beatty, W4VQ, introduced an internal

DXAC agenda item to add a minimum-size rule to the island criteria in the DXCC rules. (An internal DXAC agenda item is considered solely within the DXAC, without soliciting comments from the DX community. As such, it is usually reserved for amendments to the DXAC's internal workings. The DXAC usually asks DXers for their comments on major events such as changing the DXCC country criteria.)



Albert, XX9AS, operates from this neat shack in Macao. His antenna farm includes a multi-band quad on the roof. (Thanks to W8PHZ for the photo.)

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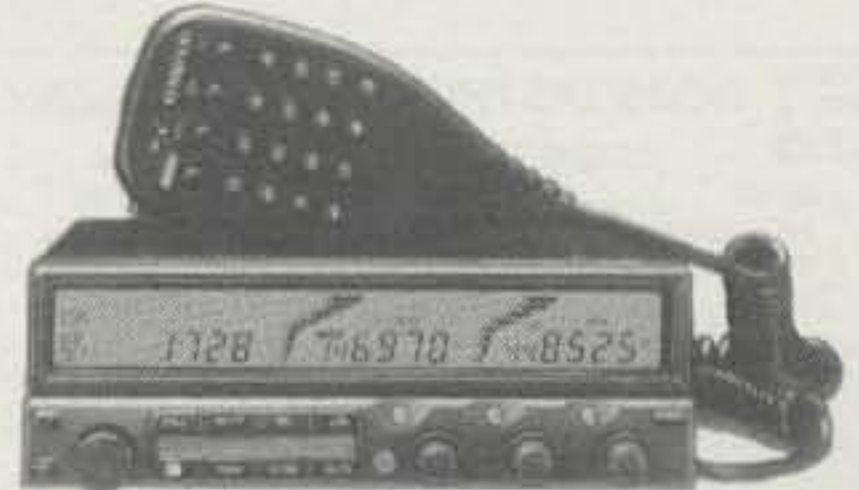
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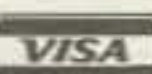
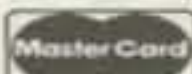


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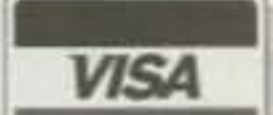
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Not long after W4VQ initiated the minimum-size discussion, Martti Laine, OH2BH, chartered a plane to fly over Scarborough Reef, scouting possible operating sites. His photographs of the numerous rocks that composed Scarborough Reef were shared with members of the DXAC at the 1994 Dayton Hamvention. OH2BH started planning a DXpedition to Scarborough Reef, and invited DK9KX along. Hans not only declined the invitation to join Martti's group, but he also immediately asked the DXAC to cease consideration of his application to make Scarborough Reef a DXCC country, and to return the maps he submitted to document his claims.

OH2BH and others went ahead with their planned DXpedition, and operated as **BS7H** from a scaffold erected adjacent to one of Scarborough's rocks for a few hours in late June 1994. (The complete BS7H story is in the first two issues of the 1995 *The DX Magazine*.) This operation was accepted for Islands On The Air credit, and Scarborough Reef became AS-116 in the IOTA program. Note that this operation took place after DK9KX withdrew his application for separate country status for Scarborough Reef.

A few days after the first BS7H DXpedition, BZ1WX of the Chinese Radio Sports Association (the Chinese IARU society) petitioned the DXAC to add Scarborough Reef to the



Luis, CT1ESO, prepares to swim (that's right, swim) to Pessegueiro Island EY-167. He lost the 20 meter vertical on the way back when the small boat holding his gear overturned.

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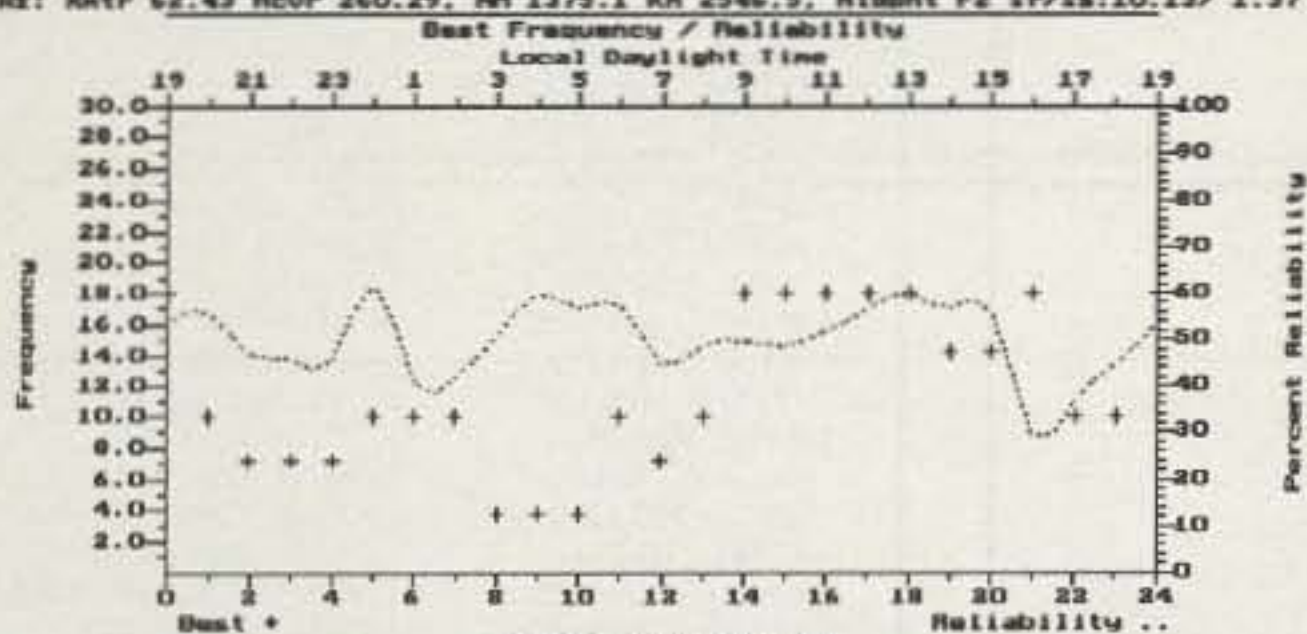
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countries list. As of the writing of this column, that application is still under consideration by the DXAC.

In August 1994 the DXAC voted 11 to 4 to set a minimum size for new DXCC countries. The DXAC recommendation read: "A DXCC country shall be a natural land mass of a size adequate to support a reasonable Amateur Radio operation. In the case of islands, the surface shall be dry at all times during high tide, and the physical characteristics may not be changed or modified. This includes the use of man-made operating structures. Each case will be judged on its own merits. Implicit in the recommendation is that the operation from an island must take place from the surface of that island." This recommendation clearly reads as an anti-Okino Tori-Shima manifesto. Had the rule been in effect prior to the first BS7H operation, it would have prevented that operation from counting for DXCC credit. (The BS7H DXpeditioners never sought DXCC credit for that first operation.)

This recommendation, however, was *not* accepted by the ARRL Awards Committee, composed of HF-active amateurs at ARRL Headquarters in Newington. The Awards Committee voted 5 to 2 against accepting the DXAC recommendation for a minimum country size, stating that they felt such a rule was not needed. In the rare cases of disagreement between the DXAC and the Awards Committee, the chair-

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IK2GNW, 199 (1)	G3KDB, 198 (1, 12)
W9CH, 199 (26)	DK2GZ, 198 (1, 24)
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IK8BQE, 199 (31)	N5FG, 198 (22, 34 on 40)
JA2IVK, 199(34, 40m)	KG9N, 198 (18, 22)
KA5W, 199 (26)	KM2P, 198 (22, 26)

The following have qualified for the basic 5 Band WAZ Award:

EA4KD, 192 Zones	DK6WL, 200 Zones
F6ELE, 155 Zones	KD5ZM, 180 Zones
G3LNS, 200 Zones	

Endorsements:

I2EOW, 200 Zones	W2UE/7, 200 Zones
KL7Y, 199 Zones	K7RLS, 180 Zones
SP5GRM, 200 Zones	

956 Stations have attained the 150 Zone level as of March 31, 1995.

Rules and applications for the WAZ program may be obtained by sending a large SAE with two units of postage or an address label and \$1.00 to: WAZ Manager, Jim Dionne, K1MEM, 31 DeMarco Road, Sudbury, MA 01776. The processing fee for all CQ awards is \$4.00 for subscribers (please include your most recent CQ mailing label or a copy) and \$10.00 for nonsubscribers. Please make all checks payable to the Award Manager. Applicants sending QSL cards to a CQ checkpoint or the Award Manager must include return postage. Questions regarding the WAZ Award may be sent to K1MEM with an SASE.

men of the two committees work on a compromise to be again considered by the Awards Committee. The DXAC as a whole does not necessarily get involved in this discussion. Upon hearing of the Awards Committee vote, then-DXAC chair W4VQ declared a moratorium on new DXCC country petitions that might be affected by a minimum-size rule, pending resolution of the disagreement between the two committees.

Garth Hamilton, VE3HO, assumed the chairmanship of the DXAC in 1995. Working with Awards Committee chair Chuck Hutchinson, W8CH, VE3HO came up with the wording at the top of this column. The Awards Committee subsequently reversed its earlier vote, and accepted the revised wording. The timing of the announcement couldn't have been worse, as six DXpeditioners had just operated from the surface of one of Scarborough's rocks the week previously, putting BS7H into the logs of thousands of DXers. Two members of the BS7H team—Tim Totten, KJ4VH, and BZ1HAM of the Chinese Radio Sport Association—were on their way to Visalia and Dayton to present their Scarborough Reef story. The DXpeditioners is-



JST-245

160-10 Meters PLUS 6 Meter Transceiver



Fifteen reasons why your next HF transceiver should be a JST-245...

- 1** All-Mode Operation (SSB, CW, AM, AFSK, FM) on all HF amateur bands and 6 meters. JST-145, same as JST-245 but without 6 meters and built-in antenna tuner.
- 2** MOSFET POWER AMPLIFIER • Final PA utilizes RF MOSFETs to achieve low distortion and high durability. Rated output is 10 to 150 watts on all bands including 6 meters.
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- 4** MULTIPLE ANTENNA SELECTION • Three antenna connections are user selectable from front panel. Antenna selection can be stored in memory.
- 5** GENERAL COVERAGE RECEIVER • 100 kHz-30 MHz, plus 48-54 MHz receiver. Electronically tuned front-end filtering, quad-FET mixer and quadruple conversion system (triple conversion for FM) results in excellent dynamic range (>100dB) and 3rd order ICP of +20dBm.
- 6** IF BANDWIDTH FLEXIBILITY • Standard 2.4 kHz filter can be narrowed continuously to 800 Hz with variable Bandwidth Control (BWC). Narrow SSB and CW filters for 2nd and 3rd IF optional.
- 7** QRM SUPPRESSION • Other interference rejection features include Passband Shift (PBS), dual noise blanker, 3-step RF attenuation, IF notch filter, selectable AGC and all-mode squelch.
- 8** NOTCH TRACKING • Once tuned, the IF notch filter will track the offending heterodyne (± 10 KHz) if the VFO frequency is changed.
- 9** DDS PHASE LOCK LOOP SYSTEM • A single-crystal Direct Digital Synthesis system is utilized for very low phase noise.
- 10** CW FEATURES • Full break-in operation, variable CW pitch. built in electronic keyer up to 60 wpm.
- 11** DUAL VFOs • Two separate VFOs for split-frequency operation. Memory registers store most recent VFO frequency, mode, bandwidth and other important parameters for each band.
- 12** 200 MEMORIES • Memory capacity of 200 channels, each of which store frequency, mode, AGC and bandwidth.
- 13** COMPUTER INTERFACE • Built-in RS-232C interface for advanced computer applications.
- 14** ERGONOMIC LAYOUT • Front panel features easy to read color LCD display and thoughtful placement of controls for ease of operation.
- 15** HEAVY-DUTY POWER SUPPLY • Built-in switching power supply and "silent" cooling system designed for continuous transmission at maximum output.



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FT-1000D Deluxe • dual bandpass filter • temp. compensated xtal osc. • 2.4kHz & 2kHz SSB filters, 500Hz CW crystal filter.



FT-990 HF Transceiver • tx: 160 to 10m Amateur Bands • rx: 100kHz to 30MHz • 90 memory channels • SCAF • FSP • DDS • high speed antenna tuner w/memories • AC power supply. 12 1/2" x 4 1/2" x 11 1/2" d, 30 lbs
FT-990DC • DC version w/o built-in AC ps.



FT-840 HF Transceiver • rx: 160 to 10m Amateur Bands • rx: 100kHz to 30MHz • 200 memories (independent tx/rx per memory) • Twin band stacking VFOs • optional FM • automatic 10M repeater offset with selectable CTCSS encode • 100W • 13.5V @ 20A • 9 1/2" w x 3 1/2" x 9 1/2" d, 18 lbs.

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FT-736R Multi-Mode U/V Full Duplex Base
2 meters: 144-148MHz; 70cm: 430-450MHz • opt. modules for 50, 220MHz and 1.2 GHz • 100 memories • full duplex crossband with inverted tracking • 25w (144, 220 & 440MHz) 10w (50 & 1.2GHz) • built-in AC supply or 13.5 VDC • 5 1/2" h x 14 1/2" w x 11 1/2" d, 19.8 lbs.



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32 memories • CTCSS encode • dual receive • built-in duplexer • cross band repeat • remote capability • 5 1/2" w x 1 1/2" h x 6" d, 2 lbs.
FT-5200 • 2M/440MHz (50/35w).
FT-6200 • 440MHz/1.2GHz (35/10w)
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FT-2200 • 2m with 110-180MHz rx (50w).
FT-7200 • 440MHz (35w)



FT-7400H Mobile (left) • 440MHz (35w) • 31 memories • alpha display • track tuning • CTCSS encode • backlit DTMF microphone • 6 1/2" w x 1 1/4" h x 7" d, 3.3 lbs.

FT-2500M 2m Mobile (top) • 50w • 31 memories • CTCSS encode • scan • backlit DTMF mic • 6" w x 1 1/4" h x 7" d, 1 1/2 lbs.

FT-912RH Mobile (right) • 1.2GHz



VHF/UHF Multi-Purpose Mobiles/Portables

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• strap • 2 1/2" h 6 1/4" w x 7 1/2" d, 2.6 lbs.
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FT-51R/HP • 5w 2m/440 FM HT
FT-411E • 2.5w 2 meter FM HT
FT-911 • 1w, 1.2GHz HT
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FT-816 • 440 MHz HT..... **CLOSEOUT** \$299⁰⁰
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FT-530 • 2m/440 FM HT w/TTP
FT-11R • 1.5w 2 meter FM HT
FT-11R/HP • 5w 2 meter FM HT
FT-41R • 440MHz FM HT



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	FT-900, FT-900/AT... \$50 Off	FT-51R, FT-51R/HP.. \$20 Off
	FT-840..... \$50 Off	FT-530..... \$50 Off
	Mobiles	Rotators
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	FT-5100..... \$30 Off	G-800S..... \$25 Off

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DR-150T 2m Mobile 50W • 144-148MHz tx, 174MHz (AM, FM) + 440-450MHz (FM) rx • two VFOs • direct frequency entry from microphone • 100 memories • channel scope • 3 scan modes • 9600bps ready • tone encoder • DTMF encoder • auto dialer • cloning • DSQ • 5 1/2" w x 2" h x 7" d, 3 lbs.



DR-600TB 2m/440MHz Twin Band Mobile 45/35W • rx 118-174MHz (incl. AM) + 410-470 MHz • 40 memories • scan • full duplex cross band • remote from any DTMF capable 2m or 70cm unit • separate VHF/UHF outputs • separate controls for each band • CTCSS and DTMF encode • 5 1/2" w x 2" h x 7" d, 3 lbs.



DR-610T 2m/440MHz Dual Band Mobile New! 50/35W • 144-148MHz tx, 108-174MHz (AM, FM) rx; 420-470 MHz tx, 438-450 MHz rx • 2 VFOs • 120 memories • channel scope • 4 scan modes • 9600 bps ready • CTCSS encoder • built-in duplexer • Bell Priority • DSQ • 5 1/2" w x 1 5/8" h x 6 1/2" d, 2 1/2 lbs.



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DR-1200TH2 • The 9600 baud version.



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DJ-180T 2m HT • E-Z to operate! • receives 130-174 MHz • 2.0W, 5W with optional battery. Illuminated LCD display • 16 digit DTMF • 10 memories • 5 1/2" h x 2 1/2" w x 1 1/2" d.
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DJ-580T 2m/440MHz Twin Band HT • 2.5W • 130-174 & 410-470MHz rx. • Modifies for MARS/CAP tx, + 118-136MHz+ • 40 memories • CTCSS encode/decode • DTMF encode • DSQ. • full duplex cross band repeat • scan • autodialer • back-lit keypad • simult. rx on both bands-separate controls • 6 1/2" h x 2 1/2" w x 1 1/2" d, 0.97 lbs. **COUPON!** – See List
DJ-F1T 2m Mini HT • 2.5W • 130-174MHz & 118-136MHz rx • scanning • autodialer • back lit keypad, 40 memories • call channel • CTCSS • DTMF encode • DSQ page • 4 1/2" h x 2 1/2" w x 1 1/2" d, 14 oz.**CLOSEOUT** \$254⁹⁵
DJ-F1T/HP • Same as DJ-1FT but 5W • 12V 600mah nicad battery....**CLOSEOUT** \$269⁹⁵
DJ-G1T 2m HT • 2m tx/rx + 440MHz and AM aircraft rx • Channel Scope • 80 memories - 5 for autodialer • Crossband semi-duplex operation • DSQ paging • Scan • 4 1/2" h x 1 1/2" w x 1 1/2" d, 12.6 oz. **COUPON!** – See List

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CW

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YV1KZ.....326	K9BWQ.....326	K8CSG.....325	WB4PUD.....322	KB5FU.....318	EA2AOM.....313	WB2NQT.....303	EA5GKE.....289	WZ3E.....276
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W9OKL.....326	OZ3SK.....326	N4KEL/M.....324	ZS6A00.....322	W6NLG.....318	I8INW.....312	N6RJY.....302	TI5RLI.....287	F5NDX.....275
9A2AA.....326	W4EEE.....326	IK8BQE.....324	K1HDO.....322	IK8GCS.....318	K8CMO.....311	WA9BDX.....302	OK1AWZ.....287	
KD8V.....326	KE4VU.....326	W3GG.....324	N2VW.....322	W6MFC.....318	K8NWD.....311	KD5ZD.....302	4X6DK.....287	
DL6KG.....326	AG9S.....326	IT9TQH.....324	LU7HJM.....322	N5ORT.....318	ZS6BBY.....311	WA8MEM.....302	KG6LF.....287	

RTTY

K2ENT.....312	WB4UBD.....291	K3UA.....267	NI4H.....250	W4EEU.....250	KE5PO.....248
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sued hundreds of BS7H QSL cards to those fortunate enough work this second operation.

Thus, the stage was set for considerable fireworks at the DX forum in Visalia. On the one side were the BS7H DXpeditioners who had just spent \$13,000 and a tremendous amount of effort erecting, operating, and traveling to give Deserving DXers a potential New One, siding with the many hundreds of convention goers who were holding their still-warm BS7H QSL cards. On the other side sat Bill Kenamer, K5FUV, DXCC coordinator. The DXers expressed anger not only at the rule itself, but also at the way it was approved without significant input from the DX community. A straw vote on the new rule showed exactly two

attending DXers approved of the rule as written, while hundreds opposed any minimum-size rule. (Five were in favor of some minimum size rule, but not the wording of the new rule.)

Shel Shallon, W6EL, pointed out that the new rule has two technical flaws. First, map scales work in inverse fashion—i.e., the larger the scale, the smaller a given island will appear. Thus, the rule should read: "a scale not larger than 1:1,000,000." Second, the rule specifies that the 10,000-square-foot minimum area must be readable from that map. At a scale of 1:1,000,000, the minimum size 100 x 100 ft. would be only 0.0012 x 0.0012 in.—essentially invisible!

There was also considerable disagreement

with the requirement that the island "sustain human habitation." This wording is vague and subject to considerable interpretation, which makes it very difficult for potential DXpeditioners to determine ahead of time whether a given entity might qualify. This phrase also adds to the long list of current DXCC countries that don't meet the existing DXCC rules for separate country status. In addition to the 60-odd such countries now on the list, this rule would appear to say that Conway 3D, Bouvet 3Y, Peter I 3Y, Malpelo HK, Kingman KH5, St. Peter and St. Paul Rocks PY, Mellish Reef VK, and Aves YV shouldn't be DXCC countries.

The 10,000-square-foot minimum size also came under attack. One DXer pointed out that

QSL INFORMATION

3B8GD to 3B8DB
 3D2CT to G4WFZ
 4N73N to YU7FIJ
 4S7DA to W3HNK
 5H/9Q5MRC to G3MRC
 5H3CK to I4LCK
 5K0/G0SHN to F6AJA
 5R8AL to WA4VDE
 5R8EH to DL5UF
 5U7AA to HH2HM
 5X1F to WA1ECA
 6D2X to K5TSQ
 6W6/K3IPK to home call
 7J1ATX to OH1TX
 8P6JQ to K9JJR
 9G1SD to WA0UOX
 9G5JL to K7GE
 9I30ZIN to IN3VZE
 9J2XX to JH3RRA
 9K2/N6BFM to W8CNL
 9M6BH to KU9C
 9M6LS to N5FTR
 9M8BT to N5FTR
 9M8FH to N5FTR
 9M8LL to N5FTR
 9M8RC to HL5AP
 A41KJ to N5FTR
 AA2JS/T19 to pirate
 AH0T/KH2 to JA6BSM
 BV2BI to W3HNK
 BZ5HAN to BY5HZ
 C31SD to CT1AMK
 C37UA to C31UA
 C91J to N5FTR
 CE0/W0JF to W0JF
 CO2HR to HI3JH
 CO2MA to HI3JH
 D2EGH to CT1EGH
 EG8BPR to EA8ADJ
 EN6Q to UA9AB
 EO50JS to LY1DS
 ER2GR to I8YGZ
 ET1WK to LX1UN
 ET3YU to YU1FW
 EU6MM to IK2QPR
 EW6WW to IK2QPR
 EX0M to DF8WS
 EY4AA to UA9AB
 FG/K5BDX to K5BDX
 FH5CQ to F6ITD
 FO0KUS to JA1ELY
 F050U to F6GQK
 FR5HG/E to F6FNU
 H5ANX/H5ABP to A22RS
 HK0/G0SHN to F6AJA

HK4/G0SHN to F6AJA
 HR2BDC to AA5ET
 HS/WQ5W to W5BJ
 IB4M to I4ABF
 II4M to I4MES
 IL7/IK7XIV to I7PXX
 J28JJ to F6HGO
 KC4AAA to NC6J
 KG4WH to KD4NKW
 KP2A to W3HNK
 LP3C to LU3CF
 LT5E to LU1EYW
 LX4A to LX1NO
 LX95VEC to LX1NO
 N6BFM/9K2 to W8CNL
 OH1NOA/OD5 to OH1MRR
 P49I to K4PI
 PJ7/K7CI to W7MAP
 PJ8AA to N4XO
 PZ5DX to K3BYV
 PZ5JR to K3BYV
 R1FJL to JA3AFR
 R3/W0YR to AA9DX
 RK2FWA to DK4VW
 RL00 to IK2QPR
 RW2F to DK4VW
 ST2AA to WB2RAJ
 TA4ZM to DK5WL
 TF/OH1KAG to OH3NE
 TG9IKN to KC5AGX
 TI4/AA7JM to WA5TUD
 TM0TRS to F6KEQ
 TN4U to DL7VRO
 TO2DX to F5VU
 UA0QJG/B to UA1AGC
 UA0UBG/UA8V to UA9AB
 UA1ZFO/1 to UA1ZX
 UA3YH/KC4 to UA3XBY
 UA9BA to UA9AB
 UA9BA/50 to UA9AB
 UD6DFF to UA9AB
 UD6DFT to UA9AB
 UD8F to UA9AB
 UG/UV3ZZ to UA9AB
 UJ8RA to UA9AB
 UK7R to UA9AB
 UK8AWX to UA9AB
 UK8AX to UA9AB
 UL00B to IK2QPR
 UL70B to IK2QPR
 UL7VV to UA9AB
 UN2L to UA9AB
 UN20 to IK2QPR
 UN7JID to UA9XFY
 UN7VV to UA9AB
 UR4WWT to WR3L
 UT7QF to UA9AB

UW9AR to UA9AB
 UX2HO to I2PJA
 V29TU to HB9TU
 V31DX to AA6BB
 V31TP to WC0W
 V31VW to W7WY
 V51E to K8EFS
 V63BM to JA6BSM
 VE3UWC/4U to KD4DIO
 VP2EN to AA4NC
 VP2ENR to YU1NR
 VP2ES to KC0ZC
 VP2MDE to K5GN
 VP2MEJ to W5ASP
 VP2MEM to W4MYA
 VP2MFM to WD4KXB
 VP2MFP to WD9DZV
 VP2MFT to KA4RRU
 VP2MGP to N5RP
 VP9DX to WB2YQH
 VP9IN to WB2YQH
 VP9MZ to WB2YQH
 VP9NC to WB2YQH
 VQ9QM to W4QM
 VQ9XX to WY8Q
 WR6R/KH6 to N2AU
 X5EBL to YU1FW
 XE1/AA6RX to XE1MD
 XF0C to XE1BEF
 XT2BW to WB2YQH
 XT2JB to W4HCB
 XU7VK to HA0HW
 XU95HA to HA0HW
 XW2A to JA2EZZ
 XX9TR to KU9C
 XX9TYD to K8PYD
 XX9TZ to KU9C
 XX9X to KU9C
 YL1XZ to IK2QPR
 YS1XS to WD4PDZ
 YZ50AA to YU1FD
 YZ7UN to YU7GMN
 Z21BA to N5FTR
 Z32XA to KM6ON
 ZA/Z32KV to Z32KV
 ZA1Z to HB9BGN
 ZD8Z to VE3HO
 ZF2CF to N6RPL
 ZF2DC to AA9D
 ZF2EW to W1XN
 ZF2PP to K9PW
 ZF2RB to KG6ZQ
 ZF2VZ to N1MFW
 ZK1DXP to DL7UVO
 ZK1VDX to DL3BUM
 ZL7FD to DK8FD

the average city lot size in California is only 6,000 square feet, and that includes a house, garage, swimming pool, tower, etc. Isn't that large enough to "sustain human habitation"?

Your DX columnist argued that we already have a valid and widely accepted definition of an island. The Law of the Sea says an island is a piece of land, surrounded by water, that rises above the mean high tide—no vague definition of possible human habitation, no arbitrary size, no map requirements.

CQ DX Hall of Famer JA1BK argued, only slightly tongue-in-cheek, that if we have a minimum-size rule, shouldn't we also have a *maximum* size rule as well? Any country larger than, say, Brazil should be deleted. Say goodbye to Canada, Russia, the US, etc. Frivolity aside, the DXers at the Visalia DX forum were clearly angered by the new rule.

The new rule seems to be written especially to apply to Scarborough Reef. The requirement that the land area be a "single unbroken piece" appears to focus exactly on the widely scattered nature of Scarborough. Changing the DXCC rules to specifically prevent adding a single new country seems to be overkill and ill-conceived.

This raises another important question:

Should the new rule apply to the pending Scarborough Reef application for separate country status? While there is little doubt that the first Scarborough Reef application triggered the minimum-size discussion, in fact no such rule existed at the time of that application. The Chinese Scarborough Reef application dates from July 1994, well before even the DXAC voted for the original wording in August. W4VQ's moratorium on new country applications that might fall under the new rule wasn't issued until October, many months after the Chinese application. Applying the new rule retroactively would not be fair, say the BS7H DXpeditioners, the Chinese Radio Sport Association, and thousands of satisfied DXers. However, at least one member of the DXAC apparently feels that the new rule should be used to evaluate the Scarborough Reef application. Gary Dixon, K4MQG, Roanoke DXAC member, says, "Since . . . Minimum Size Rules were being discussed for many months *before* the Chinese application was filed, the Chinese application will most likely hinge on the final outcome of the Minimum Size Rule."

As of early May 1995 the controversy continues. Will the ARRL Executive Director or Board of Directors overrule the Awards Com-

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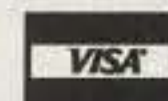
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mittee decision on minimum size? What will happen to the Scarborough Reef petition for separate DXCC country status? Will it be considered under the rules that existed at the time of application, in which case it should be added to the DXCC countries list, or will the minimum size rule be applied retroactively to Scarborough Reef? My personal view is that Scarborough Reef should be added to the DXCC countries list, and the new rule rewritten to clean up the technical errors and ambiguity. Stay tuned. . . .

An interesting footnote on the minimum-size discussion is a dramatic polarization across the United States. While most DX issues are

debated worldwide, there is a remarkable difference of opinion on minimum size between the West Coast and the East Coast. I call this the Okino Tori-Shima effect, as it appears to stem from that 1976 DXpedition, which very few East Coast DXers contacted. While the DXers at the DX forum in Visalia, California were nearly unanimous in rejecting any minimum-size rule, the DXers at the Dayton DX Dinner actually booed when the BS7H DXpeditioners showed slides of their second operation, from the surface of one of the many rocks that compose Scarborough Reef. I can't think of any issue that splits the DX community so dramatically along geographic lines as

does the issue of minimum country size!

In other DXAC news, the committee was considering the petition to add the Kingdom of Mustang to the countries list and reconsidering the question of separate DXCC country status for Pratas Island BV9. It became clear that many DXAC members voted against such status because of the possibility of intervening rocks between Pratas and Taiwan. It is now clear that there are no such rocks, and Pratas may well be added to the list soon. The DXAC is also considering petitions to delete Alaska and Hawaii (unlikely) and to delete Aruba. Aruba was separated from the Netherland Antilles in 1986, on a path to become an independent country in 1996. However, there are signs that Aruba might not continue with that process, in which case there would be little to differentiate Aruba from the neighboring islands of Bonaire and Curacao.

Upcoming DX Activities And Events

A very rare country is due to be activated July 6-9: **Mt Athos SV/A**. Peter Vekinis, KC1QF, and Andreas, SV1BKN, plan an operation as **SVØGV/3** from near the 1700 meter high peak of Mt. Athos. On CW try 3510, 7010, 14010, 21010, and 28010 kHz, listening up as directed. On SSB, watch 3780, 7075, 14225, 21355, and 28555 kHz, again listening up as the operator indicates. They will transmit special DXpedition updates on 7075 and 14265 kHz at 08, 12, 16, and 2000Z. Peter didn't provide a QSL route for this operation, but his home address is P.O. Box 1966, Arlington Heights, IL 60005-1966.

Ron, AA4VK; Murray, WA4DAN; Bob, KW2P; and Vance, W5IJU, will operate **IC9Y** from St Paul Island July 27 to August 2 on 160-6 meters on SSB, CW, and RTTY. QSL to Murray Adams, WA4DAN, 403 East 14th St., Greenville, NC 27858.

W1SO will commemorate the Special Olympic Games July 1-9 from New Haven, Connecticut. **5X1MW** is the Uganda callsign of Paul (ex-5Z4FO). Paul is a missionary with the Waycliffe Bible Translators, and will be active on all bands, CW and SSB. QSL to his son, KB4EKY.

In Islands On The Air news **NL7TB** is scheduled to be active July 3-6 from Ushagat Island, a New One for IOTA. Try 14250, 7250, and 3950 kHz. Operators include N6IV and KF6XC, in addition to NL7TB. QSL to their addresses in the 1995 *Callbook*. IK3GES plans to activate some of the Greek islands July 13 to August 3. He is especially looking at Thassos EU-049 and Lefka EU-052. QSL home call.

The 43rd Annual Pacific Northwest DX Convention is July 21-23 at the Renton Holiday Inn in Renton, Washington, and is sponsored by the Western Washington DX Club. Registration information is available from the club at P.O. Box 224, Mercer Island, WA 98040. Make your hotel reservations by calling the hotel at 206-226-7700. Chip Margelli, K7JA, is the keynote speaker Saturday night, and your favorite DX editor, VP2ML, is the breakfast speaker Sunday morning. I'll be talking about 25 reasons *not* to go on a DXpedition. See you there.

The 1995 New Orleans International DX Convention is August 25-26, at the Royal Sonesta Hotel, on Bourbon Street in the French

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CW

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320.....XE1L/326 275.....KF7VC/288
320.....YU1HA/326 275.....EA3BT/285
320.....K2ARO/323 275.....EA3CWK/283
310.....NØAMI/314 200.....KD4FAZ/200

CW Endorsements

320.....HA5DA/321 275.....KH6CF/284

Total number of active countries is 327. The basic award fee for subscribers to CQ is \$4. For non-subscribers, it is \$10. In order to qualify for the reduced subscriber rate, please enclose your latest CQ mailing label with your application. Endorsement stickers are \$1.00. Updates not involving the issuance of a sticker are made free when an SASE is enclosed for confirmation of total. Rules and application forms for the CQ DX Awards Program may be obtained by sending a business-size, No. 10 envelope, self-addressed and stamped, to CQ DX Awards Manager, Billy Williams, N4UF, Box 9673, Jacksonville, FL 32208 U.S.A. DX stations must include extra postage for airmail reply. Please make all checks payable to the awards manager.

Quarter of New Orleans. The program includes presentations on DXpeditions to Belize, Thailand, Ghana, Conway Reef, and South Georgia Islands, as well as many other antenna and DX-related topics. Registration prior to August 7 is \$50 (late registration is \$60). Send your registration to Michael Mayer, W5ZPA, 5836 Marcia Ave., New Orleans, LA 70124. Make your hotel reservations directly with the hotel by calling 504-586-0300. Mention the convention to get a special room rate. It is an excellent convention in a fine facility, and well worth attending.

The ARRL Letter reports that the FCC has gone along with a 1993 ARRL request to provide additional callsigns for amateurs in Alaska, Hawaii, and Puerto Rico. Alaskan amateurs will be able to get any AL, KL, NL, or WL call, not just those with the numeral 7. (KL9KAA-KL9KHZ are reserved for US personnel in Korea.) Hawaiian amateurs will get AH7, KH7, NH7, and WH7, with Kure Island being noted by a K in the first letter of the suffix. Puerto Rico amateurs gain use of KP3, NP3, and WP3 prefixes. No timetable has been announced for when these new prefixes will be available.

DX Publications Available

The Radio Society of Great Britain has recently published the *RSGB Prefix Guide*, building on the long-term efforts of Geoff Watts, who died last year. The 30-page, spiral-bound *Prefix Guide* includes DXCC listing by prefix, ITU prefix allocations, CQ and ITU zones, latitude and longitude, previous country names, deleted countries, a complete guide to the Russian and CIS countries, DXCC country changes since 1987, and much more. The *Prefix Guide* is available from the RSGB at Lambda House, Cranborne Road, Potters Bar, Hertfordshire,



Dave Bloomfield operates as VP8BKT from the Falklands. (Thanks to KDØJL for the photo.)

EN6 3JE, for 6.75 English pounds, including airmail postage outside of Europe.

The latest version of Dennis Peterson, N7CKD's list of the 160 meter allocations for every current ARRL country is now available from Dennis for US\$6.50 for stateside DXers, US\$7.50 for Canadians, and US\$8.50 for DX. US funds only, please. Contact Dennis at 4248 A St. SE, Auburn, WA 98002.

Correction: One of the 1S1A Spratly Island DXpeditioners was Chester, W4EVG, not K4EVG as printed in the May issue. Thanks to Fred Laun, K3ZO, for spotting the typo.

QSL Notes

QSL **UU8J** via Rusty Muhametzianov, UU2JQ, Mate Zalki 9-32, Simferopol, Ukraine.

QSL **EN5J**, a contest call from the Crimea, via LY1DS, direct only.

QSL the IOTA SA-026 operation of **ZV5LL**

via PP5LL, P.O. Box 08, 88 010-970, Florianopolis SC, Brazil.

QSL Ian W. B. Emslie, **ZS1QD**, direct to him a 5 Alleyne Yeld Crescent, Silverlea Fish Hoek, 7975 Republic of South Africa. IRCs are not useful in RSA.

QSL **ED8OR** (CQ WPX 1995), **DX1EA** (CQ WW 1994), **OHØXX/DU1** (CQ WW 1994), **8R1K** (1992-3), and **8R1RPN** to Olli Rissanen, OHØXX, P.O. Box 373, Ayala-Aalabang Village, 1799 Muntinlupa MM, Philippines. QSL **DX1EA** (1994 CQ WW CW), **OHØXX/DU1** (1994 CQ WW SSB), **8R1X** (1992, 1993), and **8R1RPN** via Olli Rissanen, OHØXX, P.O. Box 373, Ayala-Alabang Village, 1799 Muntinlupa, MM, Philippines.

QSL **PY1DHG** (and **PY4DHG**) direct to Carlos Silva, Rua General Artigas 440/102, 22450-010 Rio de Janeiro RJ, Brazil. (His *Callbook* address is wrong.)

73, Chod, VP2ML



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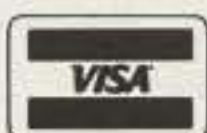
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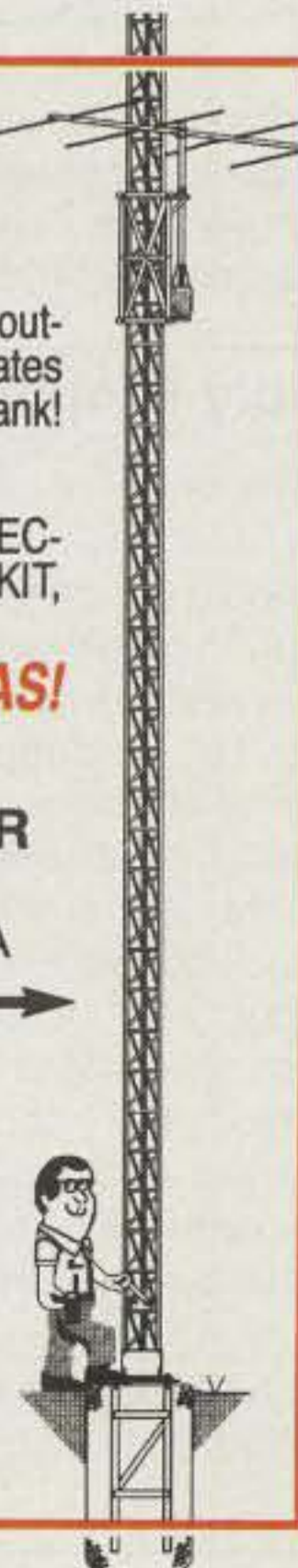
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THE SCIENCE OF PREDICTING RADIO CONDITIONS

Sunspot Cycle Progress

The present solar cycle, the 22nd observed since accurate records have been kept, continues its slow decline, much as expected.

Dr. Andre Koeckelenbergh, Director of the Royal Observatory of Belgium, reports a monthly mean sunspot number of 31 for March 1995. Daily values ranged between a high of 65 on March 4 and a low of 0 on the 10th. This results in a 12-month running smoothed sunspot number of 27 centered on September 1994. This is the same smoothed level as was observed the previous month. This very slow decline, with occasional plateaus, is typical of the final stage of a sunspot cycle.

There was a corresponding decrease in the 10.7 cm radio solar flux level, as observed at Canada's Dominion Radio Astrophysical Observatory located at Penticton, BC. A level of 85 was reported for March 1995. This results in a smoothed running number of 81 centered on September 1994.

A smoothed sunspot count of approximately 17 is forecast for July 1995 with a corresponding smoothed level of approximately 74 for the 10.7 cm solar flux.

This month's "Propagation" column contains detailed Short-Skip Propagation Charts based on a smoothed sunspot number of 17, as well as charts centered on Hawaii and Alaska, valid for July and August 1995. The Short-Skip Charts contain forecasts for band-by-band openings between distances of 50 and 2300 miles. For detailed DX forecasts over greater distances refer to the DX Propagation Charts for July, which appeared in last month's column. For an assessment of day-to-day conditions expected during the month, see the Last-Minute Forecast, which appears at the beginning of this column.

July Propagation

With longer hours of daylight and the sun high in the northern sky, HF propagation conditions should be considerably more stable during July than they were during the spring months.

Twenty meters should be the optimum band for DX propagation during the month. The band should remain open to one area of the world or another from sunrise through midnight, and at times almost around the clock. Peak conditions should take place for several hours after local sunrise, and again during the late afternoon and early evening hours. During these peak periods 20 meters may be open in almost all directions at the same time.

With declining solar activity and the doldrums of summertime propagation, not much

11307 Clara Street, Silver Spring, MD 20902

LAST-MINUTE FORECAST

Day-to-Day Conditions Expected for July 1995

Propagation Index.....	Expected Signal Quality			
	(4)	(3)	(2)	(1)
Above Normal: 4, 10, 19-20, 31	A	A	B	C
High Normal: 3, 5-7, 9, 11, 21-22, 30	A	B	C	C-D
Low Normal: 1-2, 8, 14-15, 17-18, 26-29	B	C	D	D-E
Below Normal: 12, 16, 23, 25	C	C-D	D-E	E
Disturbed: 13, 24	C	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 S9 and S6, with some fading and noise.

D—Poor opening, with weak signals varying between S1 and S3, and with considerable fading and noise.

E—No opening expected.

HOW TO USE THIS FORECAST

1. Find propagation index associated with particular band opening from Propagation Charts appearing on the following pages.
2. With the propagation index, use the above table to find the expected signal quality associated with the band opening for any date of the month. For example, an opening shown in the charts with a propagation index of 3 will be fair (C) on July 1st and 2nd, good (B) on the 3rd, excellent (A) on the 4th, good (B) from the 5th through the 7th, etc.

DX propagation is expected on 15 and 17 meters, and even less on 10 and 12 meters. Fifteen and 17 meters should still open fairly frequently towards the south. Short-skip openings into the Caribbean area and Central America may be possible as early as 10 AM. Longer skip openings should take place later in the day, between 3 and 6 PM local daylight time. The bands may occasionally open during the late afternoon to Africa, and during the early evening to the Pacific area and Australasia. On 10 and 12 meters the only DX looks like short-skip openings during the day towards the Caribbean and Central America and a very occasional longer skip opening towards South America during the afternoon.

During the hours of darkness, 30 and 40 meters should open to many areas of the world, but seasonally high static levels may often mar DX reception. High static levels are also expected to hinder DX conditions on 80 meters, although some good long-distance openings are forecast during the hours of darkness. Not many DX openings are expected on 160 meters during July because of seasonally high levels of static and solar absorption.

Peak Short-Skip Conditions

This month's column contains Short-Skip Propagation Charts for July and August, as well as charts centered on Hawaii and Alaska. The Short-Skip Chart contains propagation forecasts for distances between 50 and 2300 miles from your transmitting location.

Short-skip propagation conditions are expected to be optimum during July as a result of a seasonal peak in sporadic-E propagation. During the daylight hours considerable short-skip openings are forecast for 10, 12, 15, and 17 meters over distances ranging between approximately 500 and 1300 miles, with some openings extending out to beyond 2000 miles. Around-the-clock short-skip openings are expected on 20 meters between distances of 300 and about 2300 miles. Conditions on 20 meters should peak during the late afternoon and early evening.

Good daytime short-skip openings on 30 and 40 meters are forecast for distances between 100 and 750 miles, with good nighttime openings expected between 250 and 2300 miles. Conditions on 80 meters are also expected to be good during the daylight hours, with openings up to approximately 300 miles. During the hours of darkness good openings should be possible up to the one-hop limit of 2300 miles. While no short-skip openings are expected on 160 meters during the daylight hours, some good openings should be possible during the hours of darkness up to at least 1300 miles, and as long as 2300 miles.

For a more detailed discussion of sporadic-E propagation, and methods for predicting its occurrence, refer to the "Propagation" column in the June 1995 issue of CQ, or to the chapter entitled "Unusual HF and VHF Ionospheric Propagation," appearing in *The NEW Short-wave Propagation Handbook* now available from CQ Communications and discussed later in this column.

VHF Ionospheric Openings

The best bet for ionospheric openings on 6 and 2 meters during July should be during periods of very intense sporadic-E propagation. Fairly frequent 6 meter openings should be possible over distances ranging between approximately 600 and 1300 miles, with some openings extending out to about 2000 miles, and possibly beyond. Few 2 meter openings are expected, but some could take place between 1000 and 1300 miles as a result of sporadic-E ionization. While sporadic-E openings can take place at just about any time, statistics indicate that conditions for 6 and 2 meter open-

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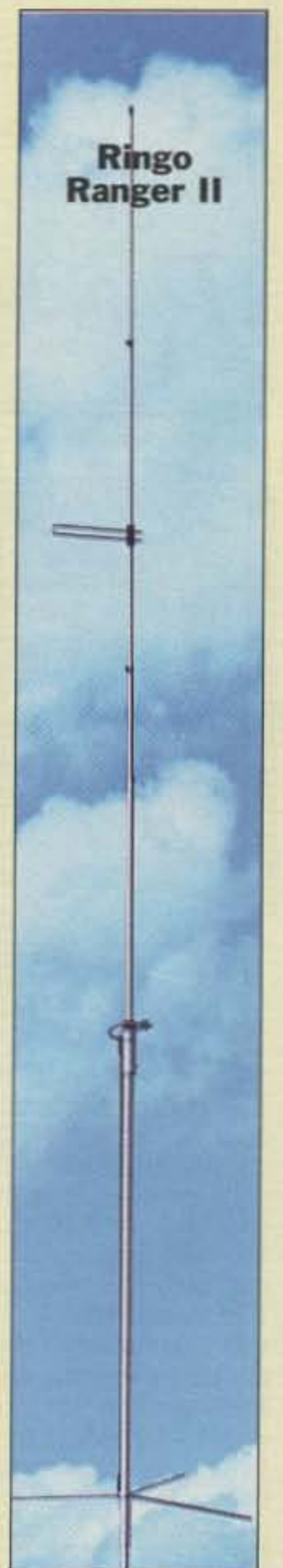
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HOW TO USE THE SHORT-SKIP CHARTS

1. In the Short-Skip Chart, the predicted times of openings can be found under the appropriate distance column of a particular meter band (10 through 160 meters) as shown in the left-hand column of the chart. For the Alaska and Hawaii Charts the predicted times of openings are found under the appropriate meter band column (15 through 80 meters) for a particular geographical region of the continental USA as shown in the left-hand column of the charts. An * indicates the best time to listen for 160 meter openings. An ** indicates possible 10 meter openings.

2. The *propagation index* is the number that appears in () after the time of each predicted opening. In the Short-Skip Chart, where two numerals are shown within a single set of parentheses, the first applies to the shorter distance for which the forecast is made, and the second to the greater distance. The index indicates the number of *days* during the month on which the opening is expected to take place, as follows:

- (4) Opening should occur on more than 22 days
- (3) Opening should occur between 14 and 22 days
- (2) Opening should occur between 7 and 13 days
- (1) Opening should occur on less than 7 days

Refer to the "Last-Minute Forecast" at the beginning of this column for the actual dates on which an opening with a specific *propagation index* is likely to occur, and the signal quality that can be expected.

3. Times shown in the charts are in the 24-hour system, where 00 is midnight; 12 is noon; 01 is 1 AM; 13 is 1 PM, etc. On the Short-Skip Chart appropriate *daylight* time is used at the path midpoint. For example on a circuit between Maine and Florida, the time shown would be EDT, on a circuit between New York and Texas, the time at the midpoint would be CDT, etc. Times shown in the Hawaii Chart are in HST. To convert to daylight time in other USA time zones add 3 hours in the PDT zone; 4 hours in the MDT zone; 5 hours in the CDT zone; and 6 hours in the EDT zone. Add 10 hours to convert from HST to GMT. For example, when it is 12 noon in Honolulu, it is 15 or 3 PM in Los Angeles; 18 or 6 PM in Washington, D.C.; and 22 GMT. Time shown in the Alaska Chart is given in GMT. To convert to *sdaylight* time in other areas of the USA subtract 7 hours in the PDT zone; 6 hours in the MDT zone; 5 hours in the CDT zone; and 4 hours in the EDT zone. For example, at 20 GMT it is 16 or 4 PM in New York City.

4. The Short-Skip Chart is based upon a transmitted power of 75 watts CW or 300 watts PEP on sideband; the Alaska and Hawaii Charts are based upon a transmitter power of 250 watts CW or 1 KW PEP on sideband. A dipole antenna a quarter-wavelength above ground is assumed for 160 and 80 meters, a half-wave above ground on 40 and 20 meters, and a wavelength above ground on 15 and 10 meters. For each 10 dB gain above these reference levels, the *propagation index* will increase by one level; for each 10 dB loss, it will lower by one level.

5. Propagation data contained in the charts has been prepared from basic data published by the Institute for Telecommunication Sciences of the U.S. Dept. of Commerce, Boulder, Colorado 80302.

40	08-12 (1-2) 12-16 (1-4) 16-20 (2-4) 20-23 (1-2) 23-08 (0-1)	08-10 (2-3) 10-12 (2) 12-16 (4-2) 16-18 (4-3) 18-20 (4) 20-23 (2-4) 23-08 (1-3)	08-10 (3-1) 10-16 (2-0) 16-18 (3-1) 18-21 (4-3) 21-23 (4) 23-06 (3-4) 06-08 (3)	08-10 (1-0) 10-16 (0) 16-18 (1-0) 18-21 (3-2) 21-06 (4) 06-08 (3-1)
80	07-12 (3-4) 12-17 (4-3) 17-22 (4) 22-05 (3-4) 05-07 (3)	08-10 (4-1) 10-12 (4-0) 12-17 (3-0) 17-19 (4-1) 19-21 (4-2) 21-23 (4-3) 23-05 (4) 05-07 (3) 07-08 (4-2)	08-10 (1-0) 10-17 (0) 17-19 (0-1) 19-21 (2-1) 21-23 (3-2) 23-05 (4) 05-07 (3) 07-08 (2-1)	08-19 (0) 19-21 (1-0) 21-23 (2-1) 23-04 (4-3) 04-05 (4-2) 05-06 (3-1) 06-07 (3-0) 07-08 (1-0)
160	18-19 (1-0) 19-20 (1) 20-22 (3-2) 22-00 (4-3) 00-06 (4) 06-08 (3-2) 08-09 (1) 09-10 (1-0)	19-20 (1-0) 20-21 (2-0) 21-22 (2-1) 22-00 (3-2) 00-04 (4-2) 04-06 (4-3) 06-08 (2-1) 08-09 (0-1)	21-22 (1) 22-01 (2-1) 01-04 (2) 04-06 (3-2) 06-07 (1) 07-08 (1-0)	21-23 (1-0) 23-01 (1) 01-06 (2-1) 06-07 (1-0)

**HAWAII
July & August 1995
Openings Given in Hawaiian
Standard Time #**

To:	15 Meters	20 Meters	40 Meters	80 Meters
Eastern USA	12-14 (1) 14-15 (2) 15-16 (1)	02-05 (1) 05-07 (2) 07-14 (1) 14-16 (2) 16-18 (3) 18-19 (2) 19-20 (1)	18-20 (1) 20-00 (2) 00-02 (1)	20-21 (1) 21-23 (2) 23-01 (1)
Central USA	09-13 (1) 13-17 (2) 17-19 (1)	04-05 (1) 05-07 (3) 07-09 (2) 09-13 (1) 13-16 (2) 16-18 (4) 18-19 (3) 19-20 (2) 20-22 (1)	18-21 (1) 21-22 (2) 22-01 (3) 01-02 (2) 02-03 (1)	20-22 (1) 22-01 (2) 01-02 (1) 21-02 (1)*
Western USA	08-09 (1) 09-11 (2) 11-13 (1) 13-15 (2) 15-17 (3) 17-18 (2) 18-19 (2) 14-16 (1)**	04-06 (1) 06-08 (2) 08-11 (3) 11-15 (2) 15-16 (3) 16-18 (4) 18-19 (3) 19-21 (2) 19-21 (2) 21-23 (1)	18-19 (1) 19-20 (2) 20-22 (3) 22-02 (4) 02-04 (3) 04-05 (2) 05-06 (1)	19-20 (1) 20-22 (2) 22-02 (3) 02-03 (2) 03-04 (1) 23-03 (1)*

**ALASKA
July & August 1995
Openings Given in GMT #**

To:	15 Meters	20 Meters	40 Meters	80 Meters
Eastern USA	Nil	12-15 (1) 22-01 (1) 01-03 (2) 03-05 (1)	07-10 (1)	Nil
Central USA	00-03 (1)	13-16 (1) 23-01 (1) 01-04 (2) 04-05 (1)	08-12 (1)	Nil
Western USA	02-05 (1)	14-16 (1) 16-18 (2) 18-00 (1) 00-02 (2) 02-05 (3) 05-06 (2) 06-08 (1)	07-09 (1) 09-13 (2) 13-15 (1)	10-13 (1)

*Indicates best time to listen for 160 meter openings.
**Indicates best time for 10 meter openings.
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.
Note: The Alaska and Hawaii Propagation Charts are intended for distances greater than 1300 miles. For shorter distances, use the preceding Short-Skip Propagation Chart.

**CQ Short-Skip Propagation Chart
July & August 1995
Local Daylight Savings Time
At Path Mid-Point**

Band (Meters)	Distance Between Stations (Miles)			
	50-250	250-750	750-1300	1300-2300
10	Nil	08-10 (0-1) 10-14 (0-3) 14-18 (0-1) 18-22 (0-2) 22-08 (0-1)	08-10 (1) 10-14 (3) 14-18 (1-2) 18-22 (2-3) 22-08 (1)	08-10 (1-0) 10-14 (3-0) 14-18 (2-0) 18-22 (3-0) 22-08 (1-0)
15	Nil	08-10 (0-2) 10-14 (0-3) 14-18 (0-2) 18-20 (0-3) 20-22 (0-2) 22-08 (0-1)	08-10 (2) 10-14 (3) 14-18 (2) 18-20 (3) 20-22 (2) 22-00 (1-2) 00-08 (1)	08-10 (2-0) 10-14 (3-0) 14-16 (2-0) 16-18 (2-1) 18-20 (3-1) 20-21 (2-1) 21-00 (2-0) 00-08 (1-0)
20	10-00 (0-1)	07-10 (0-2) 10-16 (1-4) 16-21 (1-3) 21-00 (1-2) 00-07 (0-1)	07-10 (2) 10-16 (4) 16-19 (3) 19-21 (3-4) 21-00 (2-3) 00-07 (1-2)	07-10 (2) 10-16 (4-2) 16-19 (3) 19-21 (4) 21-23 (3-2) 23-00 (3-1) 00-05 (2-0) 05-07 (2-1)

ings peak for a few hours before noon and again during the late afternoon and early evening. During July you can expect openings on 6 meters on three out of four days. Openings may last from a few minutes up to several hours. Considerably fewer openings are expected on 2 meters.

Some VHF meteor activity should take place during the *Delta Aquarids* shower. This is a major shower which should occur between July 28 and 30, peaking at 2 AM EDT on the 29th with a meteor count of about 20 an hour.

Some VHF openings are also likely to occur during auroral activity. Check the Last-Minute Forecast at the beginning of this column for periods that are expected to be Disturbed or Below Normal during July. These are the dates on which auroral-type short-skip openings are likely to occur on the VHF bands.

NEW Shortwave Propagation Handbook Now Available

The *NEW Shortwave Propagation Handbook*, co-authored by myself, W3ASK, Dr. Theodore Cohen, N4XX, and Bob Rose, K6GKU, made a successful debut at the 1995 Dayton Hamvention in April.

The book, in preparation for more than a year, revises and updates the previously very popular *Shortwave Propagation Handbook*, which is out of print. It contains nearly 200 pages in 8.5" x 11" format. It may well be the only book you will need on the subject of ionospheric propagation for the next ten years or more. The authors intend for it to be a "must read" for all users of the HF or shortwave radio spectrum, including radio amateurs, shortwave listeners, and professional communicators who need to make the most productive use of the HF radio spectrum, regardless of the time of day, the season of the year, or the state of the sunspot cycle. We hope that this will be one book that will become the reader's ever-present companion and will help in understanding and mastering the art of shortwave propagation.

The following listing of chapters in *The NEW Shortwave Propagation Handbook* illustrates the wide range and depth of subjects discussed and explained in the new book:

- Chap. 1. Principles of Ionospheric Propagation
- Chap. 2. Sunspots and The Sunspot Cycle
- Chap. 3. Sunspot Cycle Predictions
- Chap. 4. Do-It-Yourself Propagation Predictions and Master Propagation Charts
- Chap. 5. Ionospheric Forecasts
- Chap. 6. HF Propagation Prediction Computer Programs
- Chap. 7. Unusual HF and VHF Ionospheric Propagation

The new book also contains a comprehensive index which simplifies locating subjects of interest.

Copies of *The New Shortwave Propagation Handbook* are now available directly from CQ Communications by calling 1-800-853-9797. It retails for \$19.95 plus \$4.00 shipping/handling.
73, George, W3ASK

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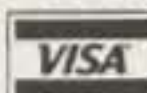
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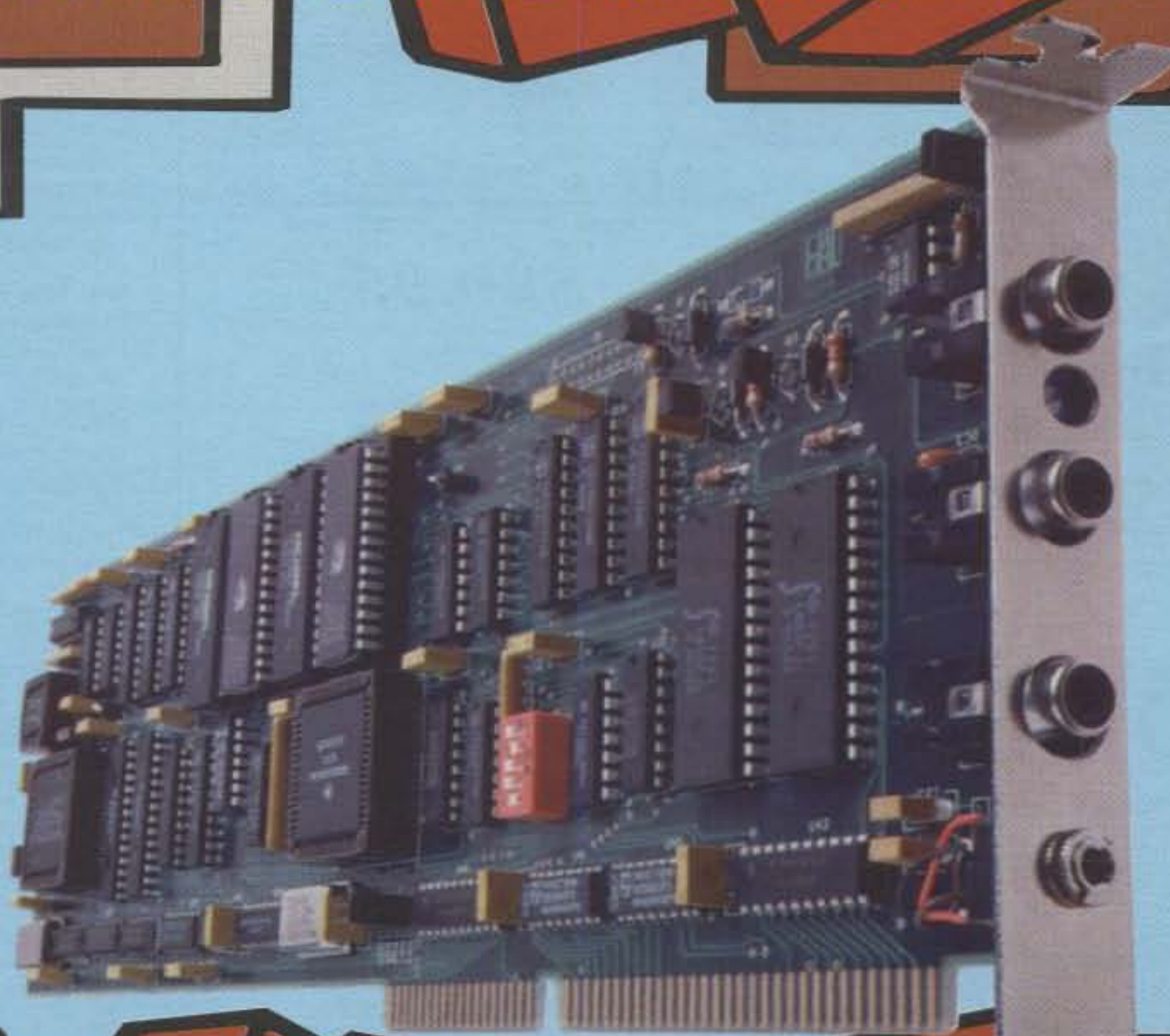
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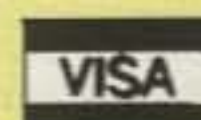
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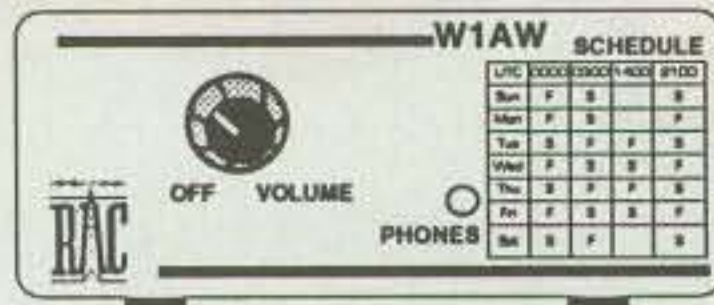
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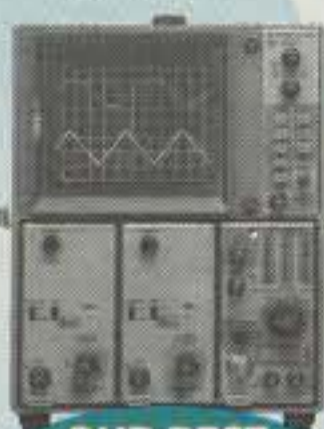
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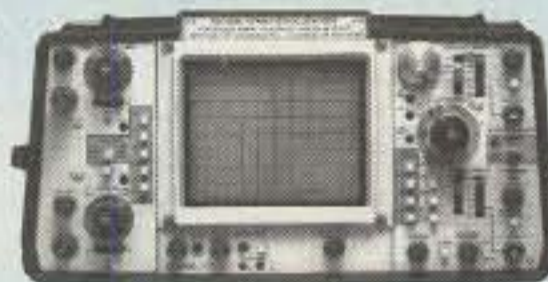
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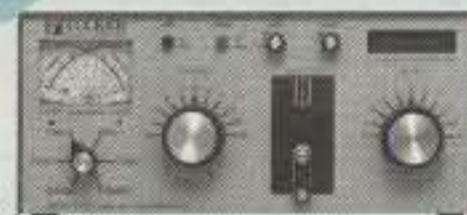
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WANTED: Artifacts, memorabilia, early keys, and/or any historical data, correspondence, or information relating to the Vibroplex Company. Please contact: Mitch Mitchell, WA4OSR, c/o The Vibroplex Company, 11 Midtown Park, E., Mobile, Alabama 36606-4141 (phone 1-800-840-8873 or FAX 1-334-476-0465).

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TS-850S 9-band xcvr	\$70 REBATE 1949.95	Call \$
TS-850S/AT 9-band xcvr	\$70 REBATE 2149.95	Call \$
TS-450S/AT 9-band xcvr	\$70 REBATE 1639.95	Call \$
TS-450S 9-band xcvr	\$70 REBATE 1439.95	Call \$
TS-690S 9-band xcvr w/6m/mic	1759.95	Call \$
TS-50S Super compact xcvr	\$70 REBATE 1279.95	Call \$
AT-50 External automatic tuner	354.95	Call \$
TS-60S Super Compact 6M xvr	1209.95	Call \$
TS-140S 9-band HF transceiver w/mic	1109.95	Call \$
ACCESSORIES		
TL-922A 2KW PEP HF linear (3-500Zs)	2099.95	Call \$
SM-230 Sta. monitor w/pan; 950/850	1099.95	Call \$
DSP-100 Digital signal proc. 450/850	669.95	Call \$
RECEIVERS		
R-5000 100 KHz-30 MHz receiver	1179.95	Call \$



TM-742



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TS-790A 45w 2m/40w 440 SSB/FM xcvr	2199.95	Call \$
TM-642 50w 2m/25w 220 FM xcvr/TTP	939.95	Call \$
TM241A 50w 2m FM xcvr	\$35 REBATE 459.95	Call \$
TM-733A 2M/70cm Mobile	\$35 REBATE 749.95	Call \$
TM-742A 50/35w/2m/440	\$70 REBATE 939.95	Call \$
DTU-2 Digital paging unit	29.95	Call \$
DFK-4 13' remote cable kit	51.95	Call \$
DFK-7 23' remote cable kit	84.95	Call \$
TSU-7 CTCSS decoder unit	55.95	Call \$
UT-28S 50w 10 meter unit	339.95	Call \$
UT-50S 50w 6 meter unit	339.95	Call \$
UT-220S 25w 220 MHz unit	339.95	Call \$
UT-1200 10w 1.2 GHz unit	439.95	Call \$
TM-942A 2m/440/1.2 FM Xcvt/TTP	1309.95	Call \$
TM-255A FM,SSB,CW,2M	\$70 REBATE 1109.95	Call \$
TM-455A 440MHz Mobile	\$70 REBATE 1279.95	Call \$
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TM-331A 25w 220 FM Xcvt w/TTP mic	539.95	Call \$
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TH-79A(D)



TH-48



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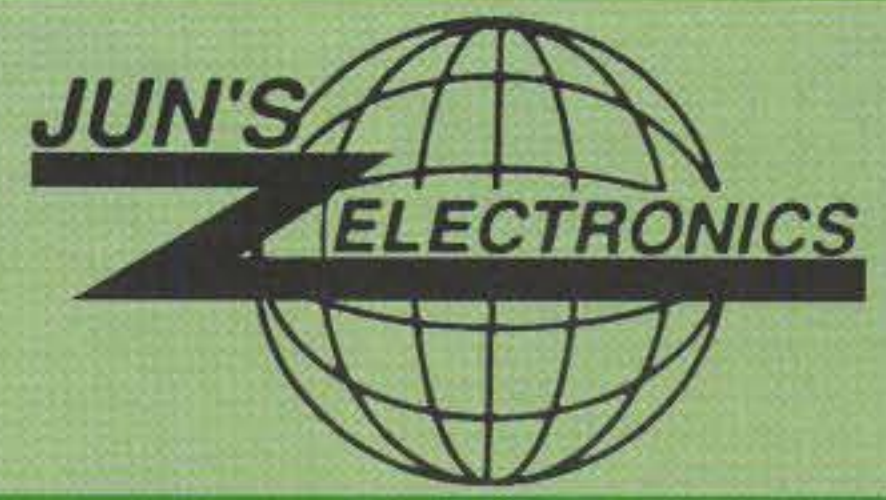
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FT-840 New Compact HF	\$50 OFF 1099.00	Call \$
FT-900 Mobile Or Base, Remv. Frt. Panel	1499.00	Call \$
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FRG-100B Mini Receiver	699.00	Call \$
VHF		
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FT-11RH 5 Watt Version of FT-11R	389.00	Call \$
FT-23 R/17 Mini HT	309/329	Call \$
FT-2200 50w, 2m Mobile	\$30 OFF 479.00	Call \$
FT-2500M Rugged 2M Mobile	\$30 OFF 449.00	Call \$
FT-290R/690R 6M, All Mode Portable	729/859	Call \$
UHF		
FT-41R, Worlds Smallest 440MHz HT	429.00	Call \$
FT-7200 35w, 440MHz Mobile	599.00	Call \$
FT-7400H New, Rugged 440MHz Mobile	589.00	Call \$
FT-790 R/II 70cm/25w Mobile	839.00	Call \$
VHF/UHF Full Duplex		
FT-736R, All Mode, 2m/70cm	2299.00	Call \$
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FT-530 2m/70cm HT	\$50 OFF 589.00	Call \$
FT-5100 Compact 2m/440 Mob.	\$30 OFF 779.00	Call \$
FT-5200 Compact 2m/440 Mob.	\$40 OFF 819.00	Call \$
FT-6200 Cpt 440/1.2 GHz Mob.	899.00	Call \$
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FT-911 Compact HT	549.00	Call \$
FT-912 10w Mobile	729.00	Call \$
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C188A Mini 2 Meter Dlx	489	Call \$
C288A 220MHz, HT	499	Call \$
C468A Mini 440 MHz	480	Call \$
C158A Affordable 2M	339	Call \$
C178 Mini 2 Meter	459	Call \$
C228A 2M/220MHz	695	Call \$
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C628A 440MHz/1.2 GHz	727	Call \$
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DJ-180TH 5W, 2M, HT	\$15 OFF List \$309	Call \$
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1995 CALLBOOKS. North American, \$24.95; International, \$24.95. Both, \$48.95. **CD-ROM: QRZ!** Ham Radio (Vol. 4), \$13.95. **ARRL:** Handbook, \$25.95; Antenna Book, \$25.95. ADD \$3/order shipping. Check/M.O. to AA6EE—Callbook Distributor, 16832 Whirlwind/C7, Ramona, CA 92065 (619-789-3674).

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WANTED: S Meter MT-066 for Clegg FM 28. WB4MLP, 901-668-0554.

FOR SALE: Drake Equipment —T4XC and R4C Speaker, Power Supply, and Manuals, \$600.00. WA7YNN, 503-686-8639.

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SERVICE MANUAL COPIES: Kenwood TS-820S/830S/940S @ \$14.00 ea; ICOM IC-751, \$19.00 Plus shipping. D. Heise, AA6EE, 16832 Whirlwind, Ramona, CA 92065 (619-789-3674).

MINT IC-W2A w/\$268 in options, \$450; rare IC-MT100 tuner, \$145; Kenwood PS-430, \$125; power & WARC modified Cushcraft R-3, \$100; unopened Lotus Smartsuite, \$100; 1/94 AmSoft callsign CD-ROM, \$20. F.O.B. Raleigh, NC. Lanny, K1LEC, 919-231-1626.

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ANNOUNCEMENTS

(from p. 6)

W6AK, from the Folsom Powerhouse Centennial, Folsom, California; the Sacramento ARC; July 13-15; 8 AM to 8 PM (PDT); on 10, 15, 20, 40, and 80 meters. A special centennial QSL card will be sent to stations worked who send an SASE to The Sacramento ARC, P.O. Box 161903, Sacramento, CA 95816-1903.

AA7BP, from the highest point on the first transcontinental highway, Laramie, Wyoming; the University ARC; 0000 UTC July 15 to 2400 UTC July 16; the General portion of the 80-15 meter phone bands and the Novice portion of the 10 meter phone band. For a QSL, send QSL with contact number and SASE to University ARC, P.O. Box 3625, Laramie, WY 82071.

W7SP, from "Days of '47" parade, Salt Lake City, Utah; Utah ARC; 1200-0200Z July 24; CW and SSB on 7047, 7147, 7247 kHz and 14.047 CW, 14.247 phone, and 146.54 simplex. For QSL send QSL and SASE to Ray Allen, N7TEI, 1774 Lincoln Lane #4, Salt Lake City, UT 84124.

K8EPV, from Port Huron to Macinac Island Yacht Race, Port Huron, Michigan; 1400Z July 22 to 0200Z July 23 and 1400Z July 23 to 0200Z July 24; CW 3.710, 7.110, 21.110; SSB 3.910, 7.272, 14.272, 21.312, 28.393. For certificate send QSL card a and 9 x 12 SASE to K8EPV, P.O. Box 611230, Port Huron, MI 48061-1230.

WN8F, from Ohio River Amateur Radio "River Days," aboard the Jewell City Sternwheeler, Lawrence County, Ohio; July 8; on 146.715 and 146.610 linked on 2 meters, 28.400 on 10 meters, 14.240 on 20 meters, and 7.240 on 40 meters. For info, contact Michael L. Love, WB8YKS, at 614-894-6340.

K9JSI, from susquecentennial of LaPorte County Fair, LaPorte, Indiana; LaPorte ARC; 1500-0400Z July 17-22; HF in General portion of 75, 40, 20, 15, 10 meters phone. For QSL send QSL and #10 SASE to LaPorte Radio Club, P.O. Box 30, LaPorte, IN 46350.

WD9GTW, from WW II commemoration, Mt. Carmel Airport Appreciation Days; Mt. Carmel, Illinois; Radio Amateur Downstate Illinois Organization (R.A.D.I.O.); 1200-2100Z July 1; General phone subbands 15, 20, and 40 meters, and 28490 on 10 and 146.940 Mt. Carmel, IL repeater. For certificate, send SASE with QSL to: R.A.D.I.O., 827 Broadmoor, Mt. Carmel, IL 62863. For information call 618-262-7111.

W9UDU, from the 21st anniversary of the largest Lake Michigan fishing contest, "The Big One," Salmon-A-Rama, Racine, Wisconsin; Racine Megacycle Club; July 15th and 22 from 1500Z to 1900Z; on the lower 25 kHz of the General 20 and 40 meter phone/CW bands and 28.400 MHz. For a certificate, send QSL and SASE to Racine Megacycle Club W9UDU, Box 3, Racine, WI 53401-0003.

WBZWY, from U.S.S. South Dakota BB57 (WW II Battleship) 50 Year National Reunion, Sioux Falls, South Dakota; Sioux Empire ARC; July 8; on CW and phone on 80-10 meters. For QSL certificate, send QSL and SASE to S.E.A.R.C., P.O. Box 91, Sioux Falls, SD 57101.

CG3V, from centennial of the City of Chatham, Ontario, Canada; Chatham Kent ARC, Inc.; month of July; lower portion of the US General subbands and Canadian bands; phone and CW on 10, 15, 20, 40, and 80 meters. For certificate, send QSL and 1 IRC to CG3V, c/o Chatham-Kent ARC, Inc., P.O. Box 284, Chatham, Ontario, Canada N7M 5K4.

GB5WF, from the Wolverley Festival; from the small village of Wolverley in the Midlands Area; July 15 and 16; on 20 and 12 meter bands. For more information, contact Graeme Coultas, 12 Ashley Rd., Kidderminster, Worcestershire, England DX10 2XD.

VA3MER, for enthusiasts of boating and amateur radio, Lake Ontario Marine Radio Rendezvous, Toronto, Ontario, Canada; Toronto Marine ARC; July 7-9; on 7.035/7.235 and 14.035/14.235 MHz; 9 AM to 3 PM Saturday and Sunday. For more information, call Tony Wright, VA3MER, at 416-763-3481; or Charles Leggatt, VE3CFL, at 416-486-6025.

VG30, from Ontario Games for the Physically Disabled, Ontario, Canada; Niagara Peninsula ARC; July 1-10; 80-10 meters. (Amateurs located in Niagara Falls, Ontario and St. Catharines, Ontario may

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(from p. 145)

use VG3 instead of VE3 or VB3 instead of VA3. QSL to Dave Digweed, VE3FOI, 2575 Rosedene Rd., St. Anns, ON, L0R 1Y0 Canada. All others QSL via RAC QSL bureau.

VE4IHF/Ø, from hamfest at International Peace Gardens, north of Dunseith, North Dakota; July 7 and 8. For more information, contact Steve Allar, NØELA, 1701 6th Ave. N.E., Beulah, ND 58523.

XJ1CWI, from Pictou Island, Northumberland Strait, between Nova Scotia and Prince Edward Island (45°49'N lat., 62°35'W long.; IOTA NA-154; Canadian Islands Award NS-05); West Island ARC; on or near (MHz) 1835, 3510, 3795, 7050, 7250, 10110, 14040, 14195, 18080, 18120, 21040, 221320; RS-12 Tx 21220, Rx 29420; RTTY 7090; 14090; VHF 144.3 MHz (SSB), 50.11 SSB. Helen, VE2YAK, will be especially looking for YLs. QSL to West Island ARC, P.O. Box 884, Pointe Claire/ Dorval, Quebec, H9R 4Z6 Canada.

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

July 4, **Harrisburg RAC Hamfest**, Bressler Picnic Grounds, Harrisburg, Pennsylvania. Contact Tom Hale, WU3X, Box 418, Halifax, PA 17032 (717-232-6087).

July 7-9, **North Dakota Hamfest**, International Peace Gardens, north of Dunseith, North Dakota. Contact Steve Allar, NØELA, 1701 6th Ave. N.E., Beulah, ND 58523.

July 8, **26th Annual SwapFest**, American Legion Post #434 Grounds, Milwaukee, Wisconsin. For more info, send SASE to South Milwaukee ARC, Inc., P.O. Box 102, South Milwaukee, WI 53172-0102. (Exams.)

July 8, **The Firecracker Hamfest**, Civic Center, Salisbury, North Carolina. For more information, send SASE to Walter Bastow, 3045 High Rock Rd., Gold Hill, NC 28071. (Exams.)

July 9, **Jackson Hamfest & Computer Show**, Jackson County Fairgrounds, Jackson, Michigan. Contact Terry, KD8B, 517-784-2398; leave message

on answering machine and include phone #; or 517-784-4734 (weekdays 5:30 PM to 10:00 PM).

July 9, **North Hills ARC 10th Annual Hamfest**, Northland Public Library, Pittsburgh, Pennsylvania. Contact Gregg Corsello, K3QK, 2021 Red Coach Road, Allison Park, PA 15101 (412-366-7006). (Handicapped accessible.)

July 9, **1995 Batavia Hamfest**, Alexander Firemen's Grounds, Batavia, New York. For information, send SASE to Knute Carlson, 26 Burke Drive, Batavia, New York 14020 (716-343-5580).

July 9, **Maryland Hamfest and ComputerFest**, Timonium Fairgrounds, Maryland. Contact BRATS, P.O. Box 591, Baltimore, MD 21208 (410-467-4634). (Handicapped accessible; exams.)

July 9, **DuPage ARC Hamfest & Computer Show '95**, Santa Fe Park, Hinsdale, Illinois. Contact Hamfest '95, 7511 Walnut Ave., Woodridge, IL 60517 (708-985-9256).

July 15, **Sugar River Amateur Radio Festival**, Town Common, Newport, New Hampshire. Contact Rob Boyd, N1CIR, 603-863-5383. (Exams.)

July 15-16, **Amateur Radio Emergency Preparedness Exposition & Hamfest**, Mission Municipal Recreational Complex, Mission, BC, Canada. Contact AREP Expo Hamfest, P.O. Box 20, District of Mission, Mission, BC, Canada V2V 4L9 (packet address VE7MIS@VE7KIT; voice mail 604-820-3788, Mission, BC, Canada).

July 16, **Van Wert ARC Hamfest '95**, Van Wert County Fairgrounds, Van Wert, Ohio. Call Bob, KA8IAF, at 419-795-5763 (before 5 PM); or Bob, WD8LPY, at 419-238-1877 (after 5 PM). For exam info, send SASE to or call Bob High, KA8IAF, 12838 Tomlinson Road, Rockford, OH 45882 (419-795-5763). (Exams.)

July 16, **MIT Flea Market**, Cambridge, Massachusetts. For information, call 617-253-3776.

July 16, **Sussex County ARC 17th Annual Hamfest**, Sussex County Fairgrounds, Augusta, New Jersey. Contact Daniel Carter, N2ERH, 8 Carter Lane, Branchville, NJ 07826 (201-948-6999).

July 16, **Zero-Beaters ARC 33rd Annual Ham-**

fest, Washington City Park, Washington, Missouri. Contact ZBARC, P.O. Box 24, Dutzow, MO 63342; or call Dave Randolph at 1-314-532-2477 (days), or 1-314-764-4999 (eves). (Exams.)

July 21-23, **ARCA Fort Tuthill Hamfest**, Cocino County Fairgrounds, Flagstaff, Arizona. Contact the Amateur Radio Council of Arizona at 602-440-2039. (Exams.)

July 23, **Hamfest '95**, the Marc Train Station, Frederick County, Maryland. Write to MADRA Hamfest '95, 230 N. Potomac St., Hagerstown, MD 21740. (Exams.)

July 23, **Indiana County ARC Summerfest**, at the Red Barn Sportsman Club, Homer City, Pennsylvania. Contact Tom Ringler, WA3W, at 412-349-8847; or Gary Robison, K3SJK, at 412-459-8941.

July 28-29, **Ham Holidays '95**, Oklahoma State Fair Park (Hobbies, Arts & Crafts Building), Oklahoma City, Oklahoma. Write to Ham Holidays '95, P.O. Box 851281, Yukon, OK 73085-1281; or CompuServe 75672.3475. (Exams.)

July 28-30, **ARRL New England Division Convention**, Center of New Hampshire Convention Center, Manchester, New Hampshire. Write to North East Convention Associates, Inc., P.O. Box 475, Goffstown, NH 03045. (Exams.)

July 29, **Macoupin County ARC Computer Fair/ Hamfest '95**, Macoupin County Fairgrounds, north of Carlinville, Illinois. To pre-register, or for information, call 217-854-8261. (Handicapped accessible; exams.)

July 29, **20th Annual Western Carolina Hamfest**, Haywood County Fairgrounds, near Waynesville, North Carolina. Contact Tommy Queen, K4BNP, 12 Lynwood Circle, Asheville, NC 28806 (704-258-2639).

July 30, **Ashtabula County Hamfest and Computer Show**, Nappi's Party Center, Ashtabula, Ohio. Contact Ken Stenback, A18S, 722 Lyndon Ave., Ashtabula, OH 44004 (216-964-7316 evenings and weekends before 9 PM).

July 30, **SWAP '95**, St. Clair County Community College Student Center, Port Huron, Michigan. For information, tables, or tickets, send SASE to Hank Kohl, K8DD, 1640 Henry St., Port Huron, MI 48060. (Exams.)

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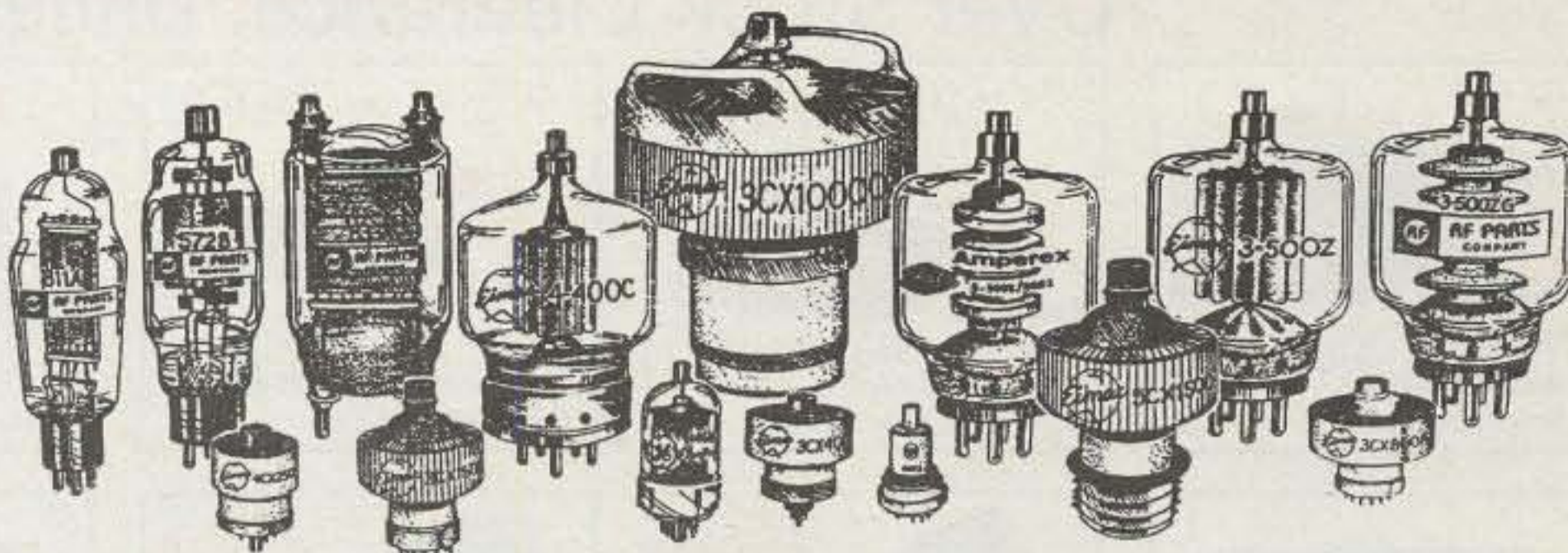
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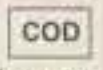


2 Meter/440MHz Dual Band Antenna NMO Mag Mount Super Priced For Mobile Fun
\$33.95

OUTBACKER



8 HF Bands On 1 Whip No Coils To Change, No Tuner HF Mobilizing Fun, Plug And Play
NEW LOW PRICES

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Lowest Prices On MFJ From Radio Center, USA

Complete MFJ Stock On Hand Call For Pricing!

NEW! Pull out signals
no one else can!



ICOM

IC-775 DSP

**UNSURPASSED SIGNAL QUALITY...
WITH REVOLUTIONARY DSP
TECHNOLOGY ON
TRANSMIT AND RECEIVE**

ICOM next generation technology for HF operators is now available! The IC-775DSP (also available without DSP as the IC-775, a version which can be modified at any time with the optional UI-100) is engineered from the ground up, using next generation design and components, offering a combination of features and performance you'll find nowhere else.

- **TRANSMIT DSP*** Precise control of transmit signals at the modulation stage produces a high quality SSB transmit signal that analog methods can't match.
- **RECEIVE DSP*** The digital signal processor separates the desired signal out from the noise before it enters the audio amplifier! Pull very weak signals right out of the noise!
- **ADVANCED INTERFERENCE REJECTION AND NOISE REDUCTION** Digital automatic notch, digital low/high pass filters*, digital ultra-narrow CW filter*, manual IF notch,

manual audio peak filter, CW reverse mode and a noise blander (with adjustable level and width) are next generation features providing incredibly clear signals.

- **DUAL WATCH** Dual watch with 2 independent tuning knobs enables monitoring of 2 frequencies...simultaneously.
- **TWIN PASS BAND TUNING** Allows you to zero in on and isolate a signal from both sides of the pass band. Ideal for contests, nets, etc...!
- **200 WATTS** Power MOS FETs in all stages of the PA unit provide excellent signal quality, good IMD characteristics and reliable full-duty cycle operation.
- **BUILT IN ANTENNA TUNER** A high speed tuner is built in and matches the connected antenna in all ham bands, including 160 m.
- **NEW DDS** The new Direct Digital Synthesizer system uses a new PLL which operates without a mixer and uses a single crystal which provides very high stability.
- **CW FEATURES** CW enthusiasts will love the electronic memory keyer, CW pitch control, CW reverse, full break-in (QSK) and two key jacks.

Features you've only dreamed of:

- ICOM DSP on Transmit and Receive
- Noise Reduction/Auto Notch*
- Twin Pass Band Tuning
- Dual Receive
- 200W MOS FET PA with built-in Power Supply
- Digital Noise Reduction*:
 - Digital Low and High Pass Filters
 - Digital Modulation/Demodulation
 - Digital Automatic Notch
 - Digital Ultra-Narrow CW Filter
 - Digital Automatic APF (Audio Peak Filter)
- Rx 100kHz-29.990 MHz
- New Single Crystal Control DDS
- RTTY/DATA Mode
- HF Packet Ready
- IF Notch
- APF (Audio Peak Filter)
- Quick-Split Function
- Memory CW Keyer
- CW Pitch Control & CW Reverse Mode
- Two CW Key Jacks
- 1Hz Tuning and Display
- Large LCD with new CFL Back Light
- Built-In Automatic Antenna Tuner
- Dual Antenna System
- Selectable Pre-Amp (2 Levels) and RF Attenuator (3 Levels)
- Triple Band Stacking Register
- Built-In Tone Encoder
- VOX
- 99 Memory Channels
- XFC
- Noise Blander with Adjustable Level and Width
- AGC with Adjustable Time Constant
- RF Speech Compressor
- Optional SSB filters
- Optional Speech Synthesizer

The new IC-775 DSP is the next generation rig you've been patiently waiting for. For more information about the IC-775DSP or the IC-775, visit your local ICOM dealer, contact ICOM Technical Support on the Hamnet forum on CompuServe® @ 75540.525, (Internet: 77540.525 @ compuserve.com) or call ICOM's brochure hotline for more information: (206) 450-6088.

ICOM
Experience the Quality

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CIRCLE 158 ON READER SERVICE CARD

NEW
DUAL BAND

Never before has Yaesu technology changed an industry so dramatically.

Rear-panel data jack for packet with 6-pin connections for Data Input, PTT, 9600 bps and 1200 bps Receive Data, Squelch Status, Ground.



"With the Smart Controller Mic, all the radio functions are in your hand."

"And, look, the digital voltage readout monitors my car battery voltage!"



"Spectra-Analyzer lets me check out channel activity in UHF, VHF, and keep track of my favorite repeaters, too."

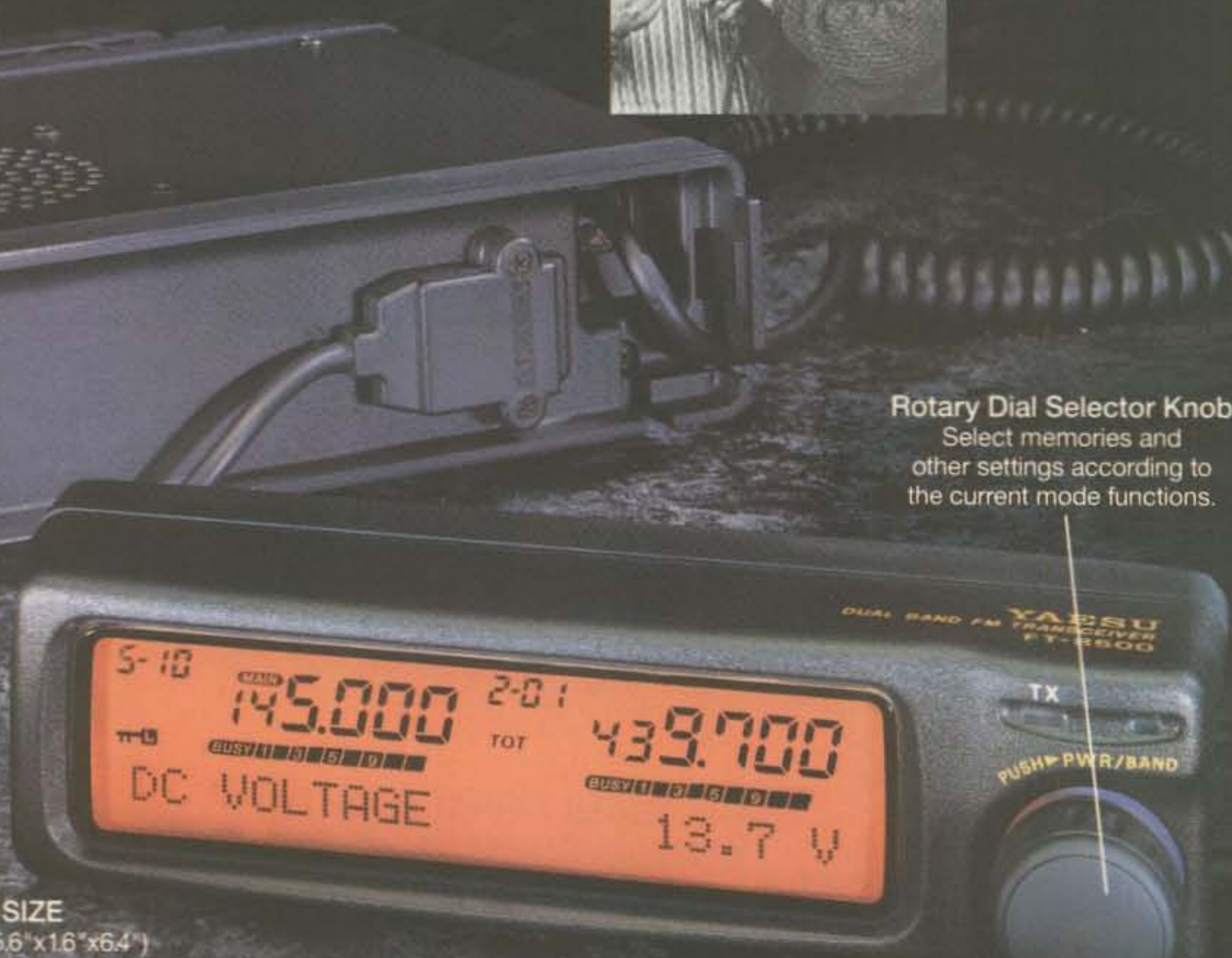
"Yaesu did it again!"

Rotary Dial Selector Knob

Select memories and other settings according to the current mode functions.

ACTUAL SIZE

140x40x160mm (5.6"x1.6"x6.4")



Omni-Glow™ LCD Dual-Band Display

VHF&VHF, UHF&UHF, VHF&UHF
Select three dual band configurations. Display settings are accessible from the Smart Controller™ Microphone "joystick"-type lever and keys, and the front panel Rotary Dial knob.

Unique Spectra-Analyzer™ displays station activity above and below the current operating channel in the Dial (VFO) mode. Use Spectra-Analyzer™ to search out signal activity, then QSY direct for a QSO.

Programmable XCVR Status Display
Another Yaesu exclusive, the built-in digital voltage display, monitors automobile battery voltage.



Menu Programming/Custom Settings
The menu loop contains 13 headings and a total of 53 entries encompassing most functions and settings. 6-character alpha-numeric display is located below the frequency window.

In Memory Recall (MR) mode, all programmed channels within a selected memory bank (up to ten channels) are displayed. In both Dial and MR, the display shows relative signal strength of all monitored stations.

Menu-Selectable Packet Baud Rate
Select 1200 or 9600 bps packet operation from the user menu. Move unique Smart Controller™ Microphone "joystick"-type lever left to right to select.

Dual Band Mobile FT-8500



Specifications

- **Frequency Coverage:**
2m RX: 110-174 MHz
TX: 144-148 MHz
70 cm RX: 420-500 MHz
TX: 430-450 MHz
- Spectra-Analyzer™ w/adjustable signal width, spacing & span markers
- 6-Character Alpha-Numeric Display
- 110 Memories (in 5 memory banks)
- Omni-Glow™ Display
- Digital voltage display
- Selectable 1200/9600 baud
- 3-Level Auto-Mute w/Mute Timer
- V+V, U+U, V+U Dual Receive
- 3 Power Output Levels
2 m 50/10/5 Watt
70 cm 35/10/5 Watt
- Built-in Auto Power Off (APO) and Time-out Timer (TOT)
- MIL-STD 810/C Rating
- 9 Memory DTMF Autodialer
- Handy Cloning Feature
- 3 Scanning Modes w/ Clear Scan
- Adjustable LCD Contrast/Brightness Control
- **Accessories:**
Consult your local Yaesu dealer.

Yaesu again demonstrates their world leadership position in 2-way radio communications with the introduction of the FT-8500 and Smart Controller™ Microphone. The deluxe, compact FT-8500 defines "high-tech" in mobile engineering. Just four simple flicks of the Smart Controller™ Microphone "joystick"-type lever, and you command frequencies, memories and every adjustment you need. Over 50 separate functions from the palm of your hand!

The Smart Controller™ Microphone isn't the only engineering advancement in the FT-8500. Watch the unique Spectra-Analyzer™ exhibit station activity above and below your current operating channel. Search out signal activity, then QSY direct for a QSO! See the digital voltage read-out monitor your car battery voltage big and bold in the Omni-Glow™ display. Work V+V, U+U or V+U frequencies and view custom alpha-numeric messages at the same time. There are other great features, too! Like handy cloning, selectable 1200/9600 baud, and a rear-panel data jack for packet! All of this and more in the ultimate deluxe, compact FT-8500 dual band mobile.

See the extraordinary FT-8500 Dual Band Mobile at your Yaesu dealer today, and find out how this dramatic change will affect mobile technology for you from this day forward.

FT-5100 Unbeatable Value!

Specifications: Frequency Coverage: 2 m-130-174 MHz RX, 144-148 MHz TX, 70 cm-430-450 MHz RX/TX • 94 Memories (47 per band) • Dual in-Band Receive, V+V, U+U, V+U • DTMF Paging & Coded Squelch • Packet Radio TNC Jack • CTCSS Encode built-in • Built-in Antenna Duplexer • Back-lit DTMF Mic • Automatic 8-Level Display Dimmer • RF Power: 2 m: 50/5 W (high/low), 70 cm: 35/5 W (high/low).
Accessories: See your authorized Yaesu dealer.



FT2500M/7400H
2 m or 70 cm
Rugged Mil Spec.

FT-2200/7200
2 m or 70 cm
Fits anyplace!



YAESU
Performance without compromise.™

FT-11R/41R 2m/70cm Handhelds

- **Frequency Coverage:**
Wide Receiver Coverage:
FT-11: 110-180 MHz RX,
144-148 MHz TX
FT-41: 430-450 MHz RX/TX
 - Selectable Alpha Numeric Display
 - New Compact Battery Design
4.8V produces 1.5 Watts
9.6V produces Full 5 Watts*
 - 150 Memory Channels
(75 when Alpha Numeric)
 - AM "Aircraft" Receive
(110-136 MHz)
 - Small Compact Size w/ Easy Operation (measures only:
4"H x 2 1/4"W x 1"D)
 - Rx/Tx Battery Savers
 - High-efficiency MOS FET Power Module
 - Large Back-Lit Keypad and Display
 - Up/Down Volume/Squelch Controls
 - Built-in DTMF Paging/Coded Squelch
 - Automatic Power Off (APO)
 - **Accessories:**
FNB-31 4.8V, 600 mAh Battery
FNB-33 4.8V, 1200 mAh Battery
FNB-38 9.6V, 600 mAh Battery
FBA-14 6 AA Size Battery Case
FTS-26 CTCSS Decode Unit
NC-50 Dual Slot 1-Hour Desk Charger
CA-10 Charge Adapter
(required w/ NC-50)
- *FT-11 Only.
FT-41, 3.5 Watts

"Look, alphanumeric display and a 4.8V battery. Terrific!"

"Small and thin – with a full sized keypad! How'd they do that?"

"Yaesu did it again!"



NEW Alphanumeric Display

First time for Yaesu HT Full function LCD combines letters and numbers.

NEW Up/Down Thumb Control

with Volume and Squelch Bar Graph. No other radio has this. Back lit, too!

NEW Compact Battery Design

4.8V gets you 1.5 Watts. A first for amateur radio.

\$20.00 OFF
SEE YOUR DEALER
FOR DETAILS
LIMITED TIME
OFFER.

Get a grip on this!

World's smallest size HT with a full sized keypad
Measures only: 4"H x 2 1/4"W x 1"D

"Small" is relative, isn't it? It could mean size – which in this case it does. And, it could mean "reduced", which it doesn't! Nothing missing from the hot new FT-11R HT from Yaesu except bulk! You're going to wonder just how all the features of this full-function radio fit in. Until you remember Yaesu pioneered 2-way radio micro technology.

To see what this really means to you,

check out all the new features. Like the alphanumeric display. This Yaesu HT first, lets you tag your favorite frequency by name, call sign or number. Or, the new "voltage stingy" battery. It's an industry first for amateur radio. Smaller and compact, the 4.8V battery gives you 1.5 watts on TX. And, if that's not enough, there's an optional drop in, dash mount battery charger.

You see it's not a small time performer. Just small sized. The FT-11R. Another small example of Yaesu superiority. See your dealer today!

YAESU

Performance without compromise.™