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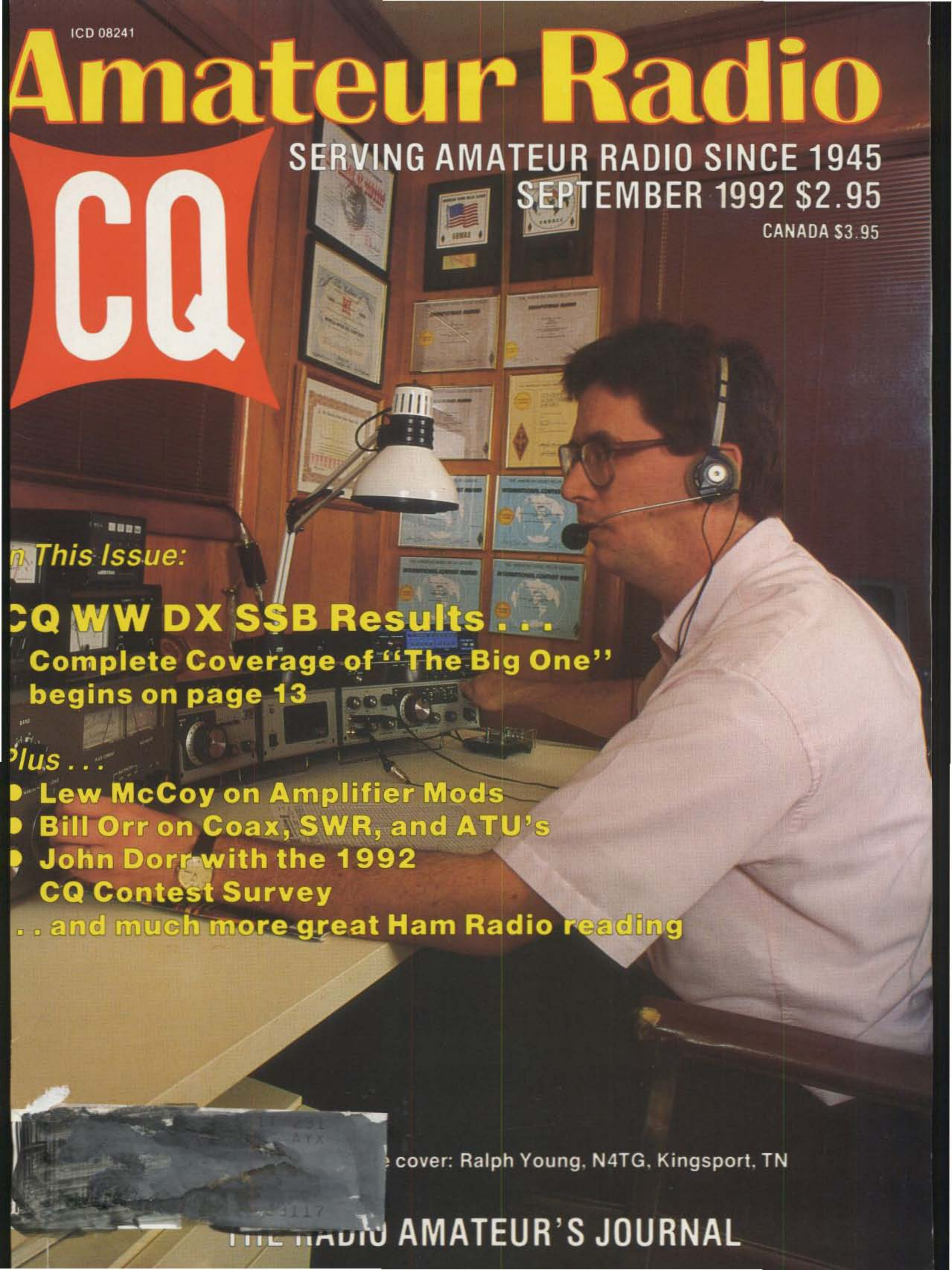
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- . . . and much more great Ham Radio reading**



cover: Ralph Young, N4TG, Kingsport, TN

THE RADIO AMATEUR'S JOURNAL

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The Radio Amateur's Journal



ON THE COVER: In beautiful downtown Kingsport, Tennessee, Ralph Young, N4TG, uses this unique rig to tend to his contesting chores. What's so unique about the rig? Look carefully at the setup, and let us know if you spot it. (Photo by Larry Mulvehill, WB2ZPI)

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EDITORIAL

Were it ever so simple. A reasonable person might turn on his or her AM/FM radio and tune to a particular frequency with the relative assurance of finding NBC, CBS, or some other discrete station. Holding that thought, one could extrapolate to TV and pretty reliably expect to find Channel 2 programming on Channel 2, and so on. After all, these stations and their parent companies have a considerable investment in equipment and licensing that assures them of that particular RF address. While the FCC might hold the ultimate mortgage, the lessee holds the right and claim to that distinct QTH under the provisions of his or her license.

Amateur radio operators, on the other hand, have sort of a nomad licensing structure. Depending on our license class, we have bits and pieces of a considerable amount of spectrum. Some of us use this to our advantage by "hunting and gathering," thereby foraging for contacts where we find them. Some of the more agrarian of us take root in one spot and try to defend it. Amateur radio's Industrial (technological) Revolution has allowed some of us to seemingly be all over the place at the same time, thereby ticking off the agrarians and the hunters and gatherers.

The very design of the amateur radio spectrum allows and encourages a multiplicity of uses. Unlike our commercial brethren, we have the ability to change mode and frequency at our whim. We can choose to be as active as we want or conversely stay inactive for long periods of time and yet still consider ourselves "good hams." I don't think NBC has that luxury. In addition, *CQ*, *QST*, and *73* are not facsimiles of *TV Guide*, whereby you can look up and "tune in," expecting with 100% certainty to find exactly the "programming" you expect or desire.

In a sense, we as amateurs have considerable leeway and a great deal of freedom attached to our licenses. Therein lies the problem. Since we as individuals have no inherent right to any unique "spot on the dial," we are obligated to share and compromise, egregious terms to some of us. Some of our rugged individualists feel that this "freedom" extends solely to them. Any activity other than what they envisioned when they awoke is grounds for protest. We (the inclusive we, and I mean all of us) take these things quite personally. None of us dare to ponder the thought of one morning down the road where every licensed amateur in the world decides as though by inspiration to go on 20 meters at the same time. On the contrary, most of us narrow our focus down to what "we" want to do at any given moment or on any specific day. What is singularly important is "our" quest for a simple QSO, a new county or prefix, another state or country, and yes even a contest score. What is important is what we (not you) want to do with our license today.

There are those other times, though, almost magical times, which transform a dead band or humdrum day into a glorious experience. It's that moment when you get caught up in the activity of a QSO Party, a special event station, a net activity, a DXpedition, or a contest. It doesn't matter what the activity is at that moment; it just charges the atmosphere with life. While it may also bring out the best and worst in people, for the most part it is a short-lived exhilaration and a wonderful celebration.

For the single-minded amateur who feels threatened and frustrated by this inrush of activity, especially contests, try to understand what's going on. First, it's not a purposeful plot to deprive you of your Saturday morning ragchew. Second, it's the closest you're going to get to having every licensed amateur in the world on the same band at the same time. To a great number of us this is indeed a celebration of life; to a few it's their worst nightmare. It's how you choose to look at it.

There is one thing, though, that we all characteristically believe in—namely, that amateur radio is without a doubt the best hobby in the world. Primarily it is a people hobby and an affirming hobby, giving us a sense of accomplishment and worth. Granted, there are the few who stand out for their despicable and repugnant behavior, choice of language, and views on society. I guess if we looked and listened, we'd probably find like-minded people shopping next to us in our local supermarkets, too. There are generally only a few, but the rest of us make them important by our reaction to them.

By and large, the apparently huge surge in activity brought about by contests, special events, DXpeditions, or whatever points out how friable our notion of "owning" frequency is. We can't be displaced from what we don't own. A band full of activity, regardless of what that activity is, leaves little or no room for added use. The measure of this activity or what all of these people are doing is called *fun*. All of these contacts, all of these purposes and aims represent an affirming celebration that says "the more the merrier." Throughout every disaster situation, political upheaval, and conflict, amateurs continuously have come to the aid of people in trouble in the same manner of affirmation. It's what we do.

I do realize that some of you look upon these operating activities as insipid and without substance, depriving you of your right to ragchew. I have to say, though, that I've managed to hear people ragchewing during just about every contest I've taken part in, and some of the conversations work better than warm milk and cookies before bedtime.

I think the politically correct term these days is "green space," and I think that some of you are truly looking for that quiet respite. While I

can only speak for *CQ* contests, they have been growing in popularity for what seems like forever. Each year more and more amateurs seem to like and enter them. I see no reason to discourage the practice. However, despite many suggestions and requests, we have not opened them up to include the WARC bands. If you're looking for green space, try the WARC bands. There's a lot out there to work and a lot of new friends to meet. Who knows? You might find something there that you like.

Try to think back to those first few months and years after you were licensed. Everything was new and exciting, and there were wonderful things to learn about and do. It was all fun. For me there is still the same thrill after all these years of checking the mail box for QSL cards when I get home. Operating events, whatever they are, bring out that joy in hundreds of thousands of amateurs who take part in them whether for a handful or thousands of contacts. If some of you can't understand it, then as the song says, "You've lost that loving feeling."

Contest Notes

As you will note when reading the results of the 1991 *CQ* World-Wide DX SSB Contest this month, the countries are listed as they were during that contest period. That is the way conditions and geography were at the time and so they are classified as such. Subsequent events held after changes will be categorized accordingly.

Since we base part of our countries list on the WAE list, the starting date for the four (so far) Yugoslavian countries is May 15, 1992. Before we get too wrapped up in or focused on amateur radio considerations, let's keep in mind that these new countries come with a high price tag in human life. This battle or war is still going on at this writing, and more people die each day. *The New York Times* recently ran a front-page story on how Yugoslavian amateurs were using amateur radio to let people know what was going on. Perhaps *Yugoslavian* is the wrong term these days, but it's still hard to figure out who's who.

It is also apparent that Czechoslovakia will be dividing into two countries. I hope that this change can be done peacefully and without bloodshed.

This month we are also publishing the rules for the next BIG ONE. Please read them carefully. The in-house Contest Committee (Gail and I) would really appreciate it if you would mark the outside of the envelope either SSB or CW. It does make our presort easier, takes far less time to distribute, and keeps us from passing your discs under a very (very) strong magnet.

I'll see you in the contest. Try to have a good time, and don't take yourself too seriously.

73, Alan, K2EEK

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ANNOUNCEMENTS

• **500 Years of American Discovery Award** - IARU Region II and the Venezuelan Radio Club are sponsoring this contest/award, the object of which is to make contact with 23 American countries (North, Central, South, and Caribbean area) from 0000Z January 1 to 2359Z October 12, 1992 on all bands between 1.8 and 30 MHz (excluding 10 MHz) on phone, CW, RTTY, Mixed. Logs must contain station, band, mode, date, time, and report sent and received. For certificate send log and 5 IRCs before March 31, 1993 to: Radio Club Venezolano, Comision de Concursos, P.O. Box 2285, Caracas 1010-A, Venezuela.

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

WF1N & NT1I, from Appledore Island part of Isles of Shoals (NA-148, Mass. N./N.H. Group); Sept. 11-14 (no times given); SSB on or near usual IOTA frequen-

cies. QSL to WF1N direct or via the bureau.

K2BR, from Miss America Pageant, Atlantic City, New Jersey; Southern Counties ARA; from 10 AM EST Sept. 14-19; phone 25 kHz inside lower General band edge, CW 65 kHz inside lower General band edge, Novice 28.100-28.500 kHz. QSL with #10 SASE to SCARA, P.O. Box 121, Linwood, NJ 08221.

W2GLN, from New York State Fair, Syracuse, New York; Liverpool ARC; 1300-2400Z Aug. 21-31; bottom 25 kHz of General phone and CW portions of 80-10 meters, RTTY on 14.085 and 21.085 MHz. SASE for certificate to LARC, P.O. Box 103, N. Syracuse, NY 13212.

KI3R, from 100th anniversary of Port Vue Borough, Pennsylvania; daylight and evening hours Sept. 18-20; 40, 20, 10 meters. QSL with SASE to 1008 Monroe Ave., Port Vue, PA 15133.

NX3Y, from Wyoming County Fair, Tunkhannock,

Pennsylvania; Sept. 2-7 (no times given); General 80-10 meter phone bands. For certificate send 9 x 12 SASE to KB3QW, 600 Constitution Ave., Duryea, PA 18642.

N3LBC, from Coal Miner Festival, Lansford, Pennsylvania; Schuylkill ARA; 0000-2400Z Sept. 19; lower portion of General bands and Novice 10 meters. For certificate send 9 x 12 SASE to J.F. Nihen, N3LBC, 222 East Bertsch St., Lansford, PA 18232-2105.

KD3XN, from Fort Delaware, Pea Patch Island, Delaware; Quad County IRC; 1400-2100Z Sept. 25-27; General and Novice portions of 10, 12, 15, 17, 20, 40 meters. For QSL send QSL and SASE to op worked.

WD4DAT, from Bear Bryant Special Event, Tuscaloosa, Alabama; West Alabama ARS; 1300-2300Z Sept. 26; bottom 25 kHz of General phone 40-10 meters, packet via TCL5 digipeater on 145.670 MHz, VHF/UHF 2 and 440 repeaters. For 8 1/2 x 11 certificate send QSL and SASE to WAARS Special Event, P.O. Box 1741, Tuscaloosa, AL 35403-1741.

4-land, from James Madison Days, Madisonville, Kentucky; Hopkins County ARA; 1700-2400Z Sept. 27; 40 and 20 meter General subbands and Novice 10 meter SSB subband. For certificate send SASE to Dwight Orten, KM4FO, 4785 Nebo Rd., Madisonville, KY 42431.

4-land, from "Prince of Mines," Gold Hill, North Carolina; 1300-2200Z Sept. 26; on 28.350, 7260, 14250 (plus or minus). Send SASE and QSL to Walt Bastow, N4KVF, 3045 Highrock Rd., Gold Hill, NC 28071.

KA5ACT, from 50th anniversary of Fort Hood, Texas; Sept. 15 to Dec. 30; 10, 15, 20 meters in General bands. For certificate send large SASE to CSM(Ret) Theron (John) L. Johnson, 1212 Bonnie Drive, Killeen, TX 76542-1226.

N5UHW, from Bogue Creek Festival, Duck Hill, Mississippi; Grenada Lake ARC; 0000-2400Z Sept. 12, 1992; 3.875, 7.250, 14.250, 21.350 and/or 28.350 (plus or minus), packet ROSE system 601453 N5UHW-1 (145.07). Send QSL and SASE to Bogue Creek Festival, Special Event Station N5UHW, P.O. Box 292, Duck Hill, MS 38925-0292 (indicate worked op's name on QSL and lower left of envelope).

W5QX, from Miles Cotton Festival, Miles, Texas; 1700Z Sept. 11 to 2200Z Sept. 12; 40, 20, 15 meter General bands and 28.400 if 10 meters is open. For certificate send 9 x 12 SASE and QSL to Don Goff, 1210 Ardmore, San Angelo, TX 76905.

KM6II, from 10th anniversary of City of Agoura Hills, California; 1600-2400Z Sept. 12; lower portion of General phone bands. For 8 1/2 x 11 certificate send QSL and SASE to Jeff Reinhardt, KM6II, c/o Agoura Hills City Hall, 30101 Agoura Court, Suite 102, Agoura Hills, CA 91301.

WA7LAZ, from Andy Devine Days, Kingman, Arizona; Hualapai ARC; 1500-1700Z 28.325 MHz, 1700-1900Z 21.325 MHz, 1900-2100Z 14.325 MHz, 2100-2300Z 28.325 MHz, 2300-0100Z 21.325 MHz, 0100-0300Z 14.325 MHz, 0300-0500Z 28.325 MHz. For certificate send QSL with contact number and 9 x 12 SASE (2 units postage) to WA7LAZ, P.O. Box 4364, Kingman, AZ 86401 (or \$1.00 with QSL and they will furnish envelope and postage).

W7AIA, from commemoration of exploration of Columbia River Basin, Vancouver, Washington; Clark County ARC; 1600-2300Z Sept. 19 and 1700-2200Z Sept. 20; lower portion of General phone bands, 40 and 20 meters, and 10 meter Novice/Tech band. For certificate send SASE to CCARC, P.O. Box 1424, Vancouver, WA 98668.

KG7VM, from Tulelake Fair, Tulelake, California; Keno ARC; 1600-0000Z Sept. 12-13; 10-80 meters: SSB on lower 20 kHz of General and Novice portion, CW lower 20 kHz of Novice, and RTTY applicable part of General subbands. For certificate send QSL and business-size SASE to Keno ARC, P.O. Box 653, Keno, OR 97627.

WZ8C, from Heritage Harvest Days, 7 Ponds Nature Center, Lapeer, Michigan; Lapeer County ARA; 1600Z Sept. 12 to 2100Z Sept. 13; CW in lower portion of 40 and 80 meter Novice subbands, and lower por-

(continued on p. 140)

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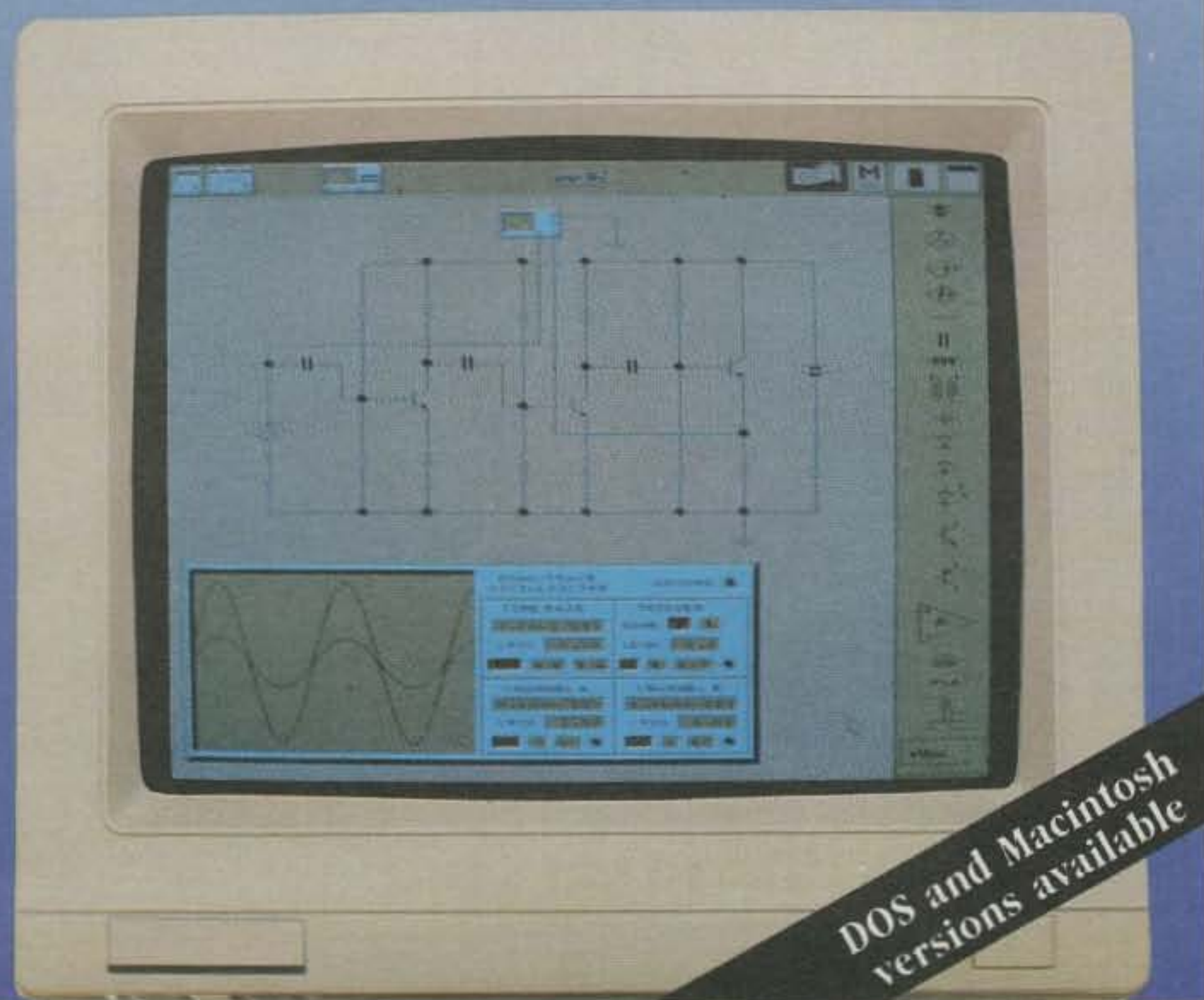
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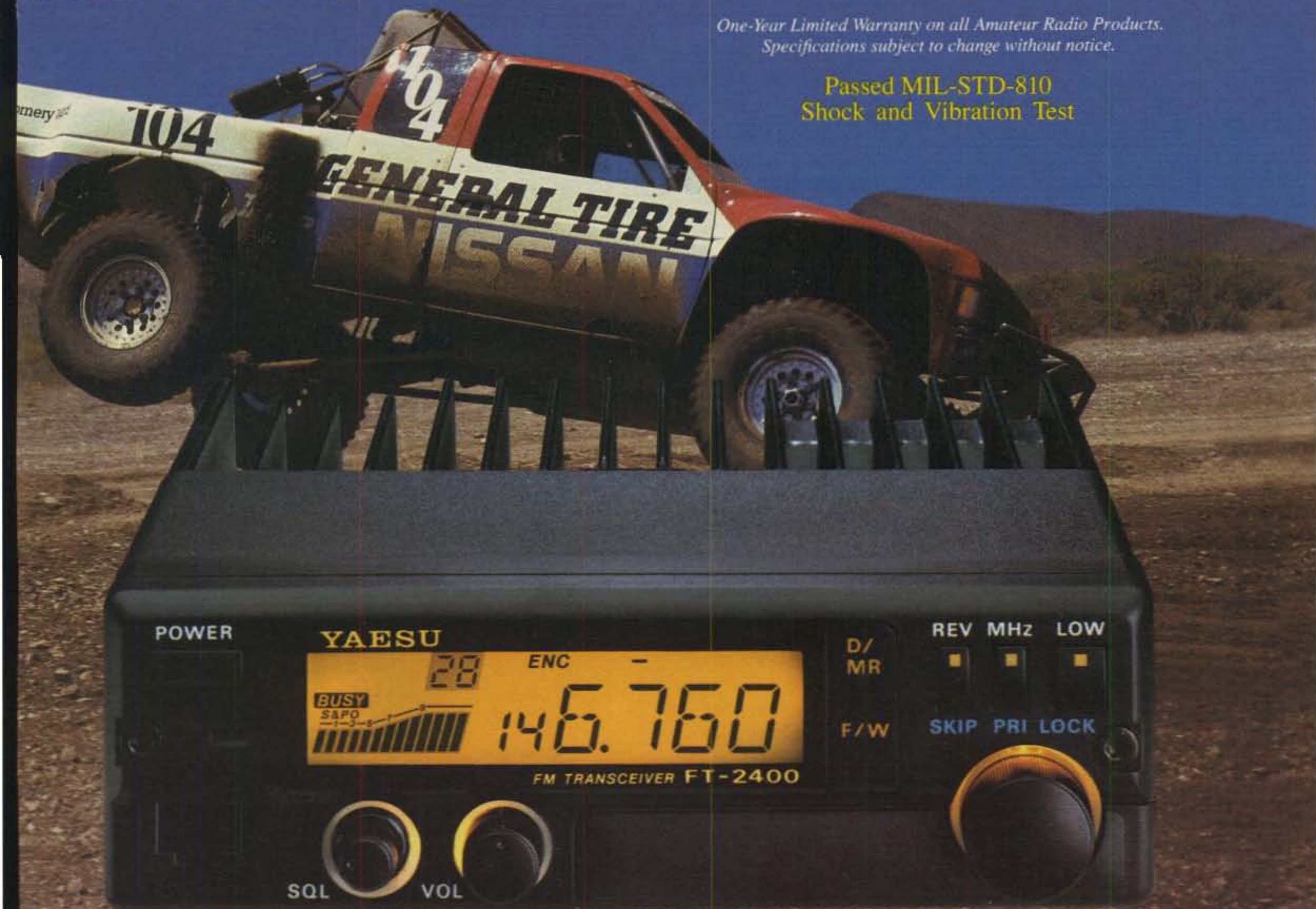


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OUR READERS SAY

Keep Up The Keys!

Editor, CQ:

As a long-time subscriber to CQ I'd like to express my appreciation for the many fine articles you manage to gather for each issue. I have particularly enjoyed the pieces written by Dave Ingram, K4TWJ, on the subject of keys of all varieties. His writing originally sparked my interest in collecting keys, and thanks to the various articles, I have learned a great deal about the subject which otherwise I would never have known.

I hope you will continue to present more information on this fascinating subject which reaches back into the heritage of amateur radio. Without the lowly telegraph key in the early days there would have been no radio communication.

Alby Allen, WB4NNC
Franklin, NC

Amateur Radio Joins Walk For Alzheimers

Editor, CQ:

Enclosed is a photo of the Amateur Radio Club of Augusta, Georgia Group, who participated in the Alzheimers Memory Walk. Again this year Shelley Fabares was the National Honorary Chairperson. Ms. Fabares enjoyed operating

amateur radio (2 meters). We had a tough time keeping her off the air! She talked on the air three different times during the walk in which she participated. One operator noted that when she approached the mobile station, before the operator could ask her if she wanted to talk, she reached for the mike and began thanking the hams involved.

Larry H. Lyda, WA4PJP
Hephzibah, GA



Pictured here are members of the Amateur Radio Club of Augusta, Georgia, who participated along with Shelley Fabares in the Alzheimers Memory Walk. (Photo by Judy Griffin)

Just The Right People

Editor, CQ:

Recently I received a confirmation slip from Bill Williams, N4UF, for the CQ DX Award, 320 on SSB. On the bottom he typed in "Conratulations on 320, Charlie!" I wanted you to know that made me feel real good! You have just the right people doing the right jobs for you. I also like Steve, N8BJQ, and Bob Cox, K3EST, among others. Just felt you should know my thoughts on this. Sure enjoy CQ magazine and CQ contests and the great staff making it all possible. 73, DX.

Charlie Clayton, W7FP
Hood River, OR

Can We Keep Up?

Editor, CQ:

I have just finished reading your "Zero Bias" editorial in the July 1992 issue of CQ. Yes, I agree with you. Speed and high tech are okay, but I just wonder if we can keep up with all of this. Sure, I would like to get the latest Mac or IBM, but money is a most important factor, speed or not. Perhaps when the finances are a bit better, I can get that new computer. For now, I'll have to contend with letter writing—oops, I mean "word processing"—with my aging but functional Apple IIC. Bear with me for being so behind!

Ben Alabastro, WA2PXR/3
Pittsburgh, PA



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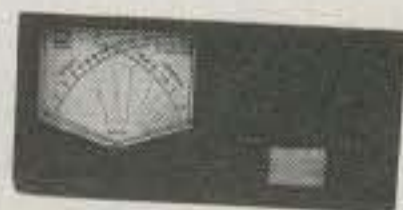


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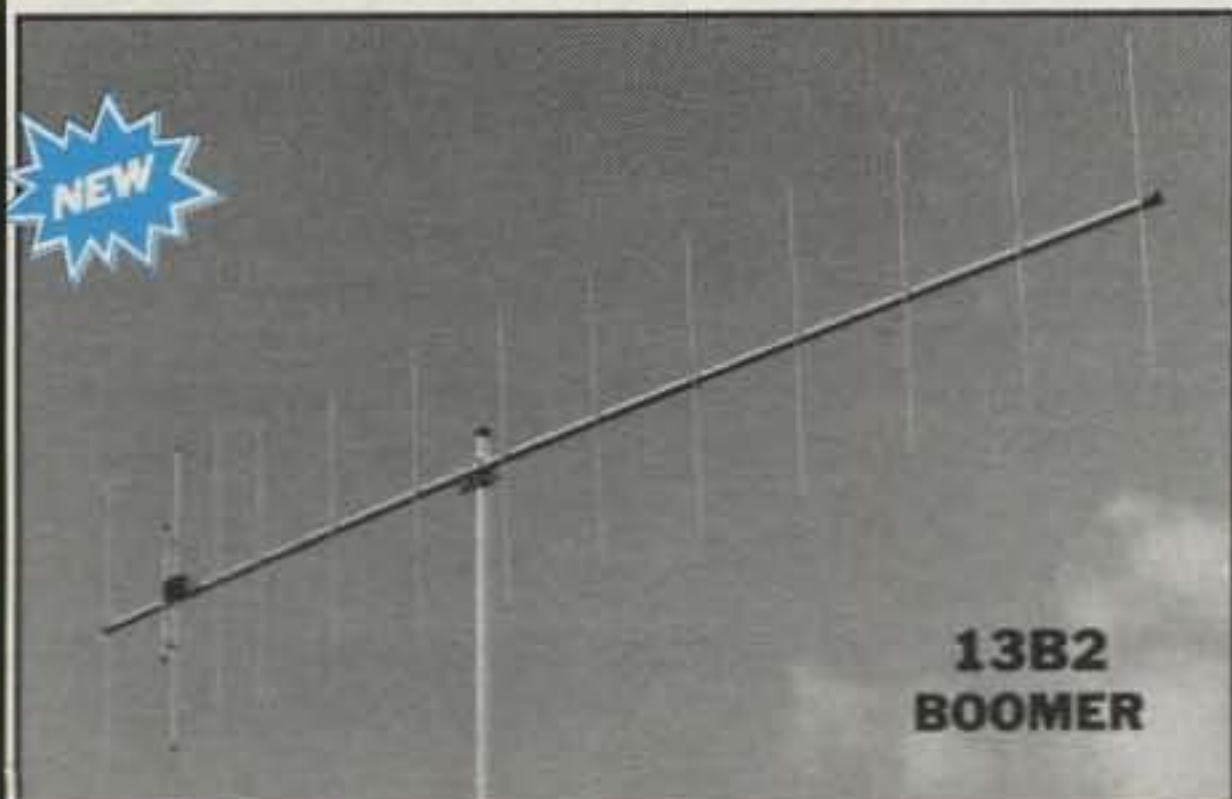


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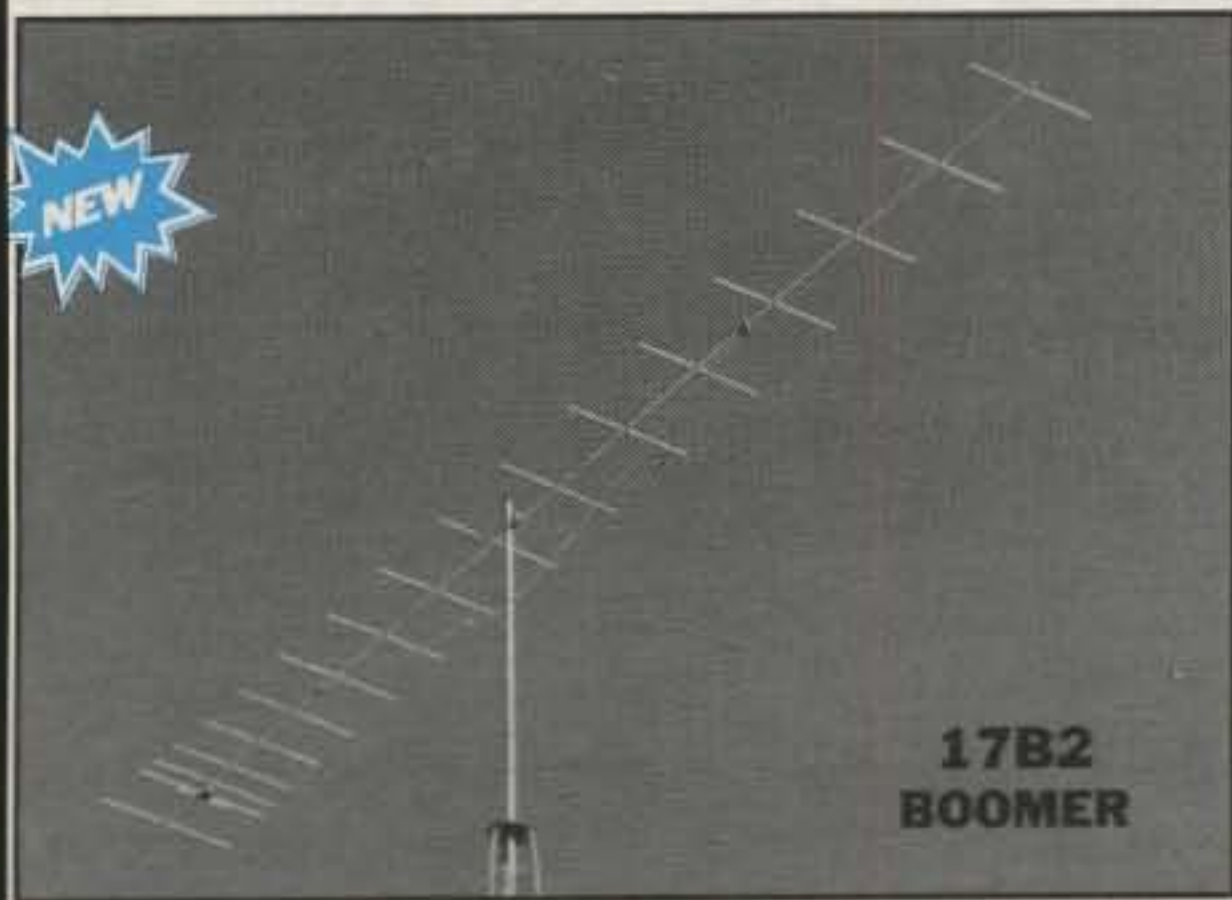
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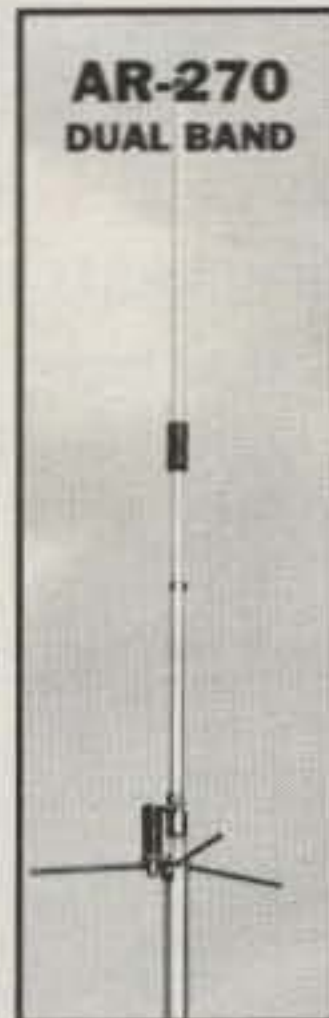
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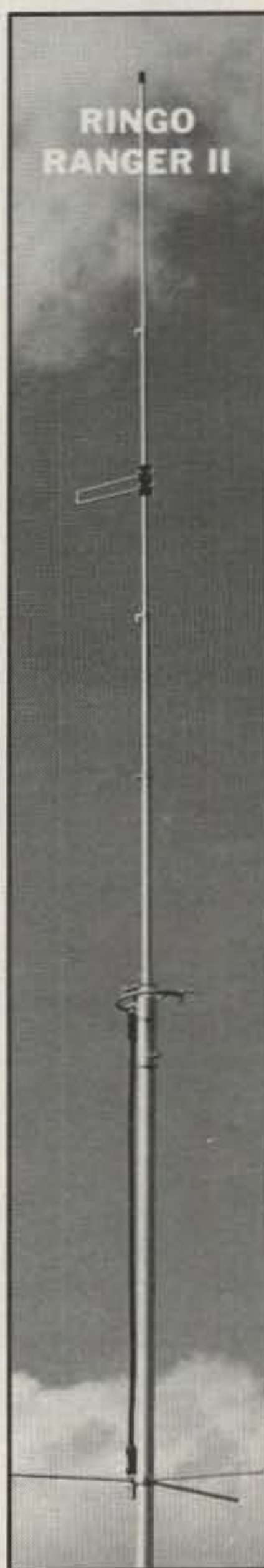
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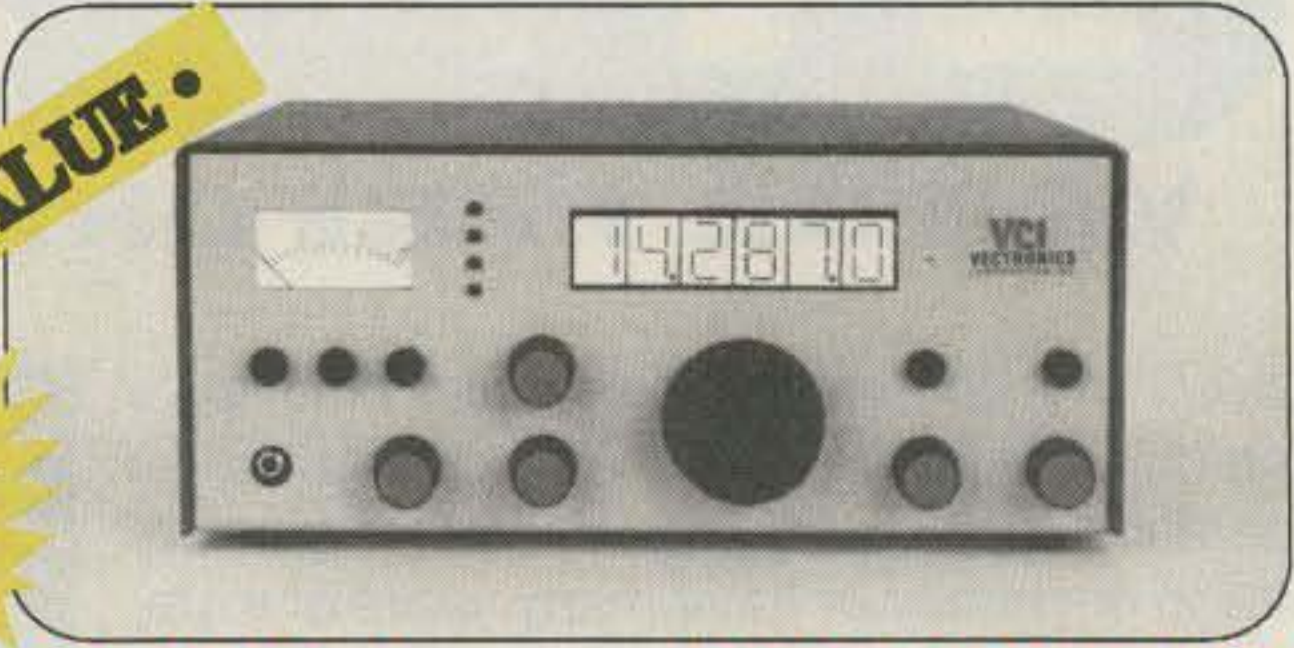


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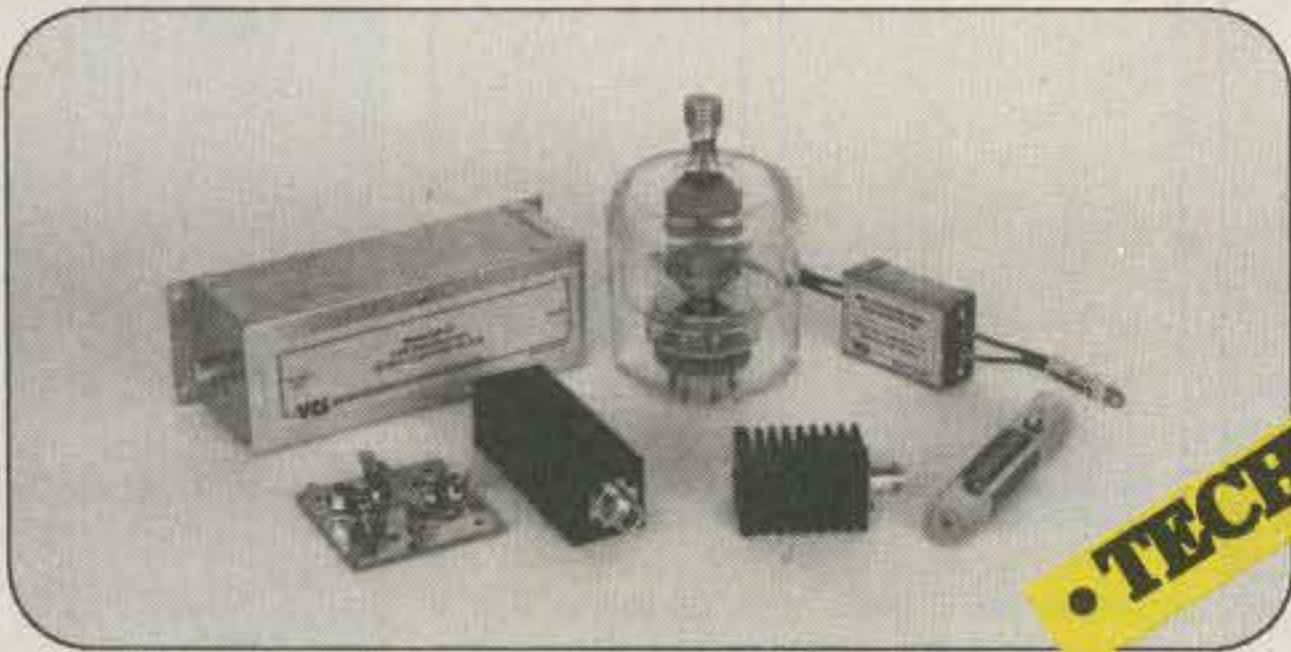
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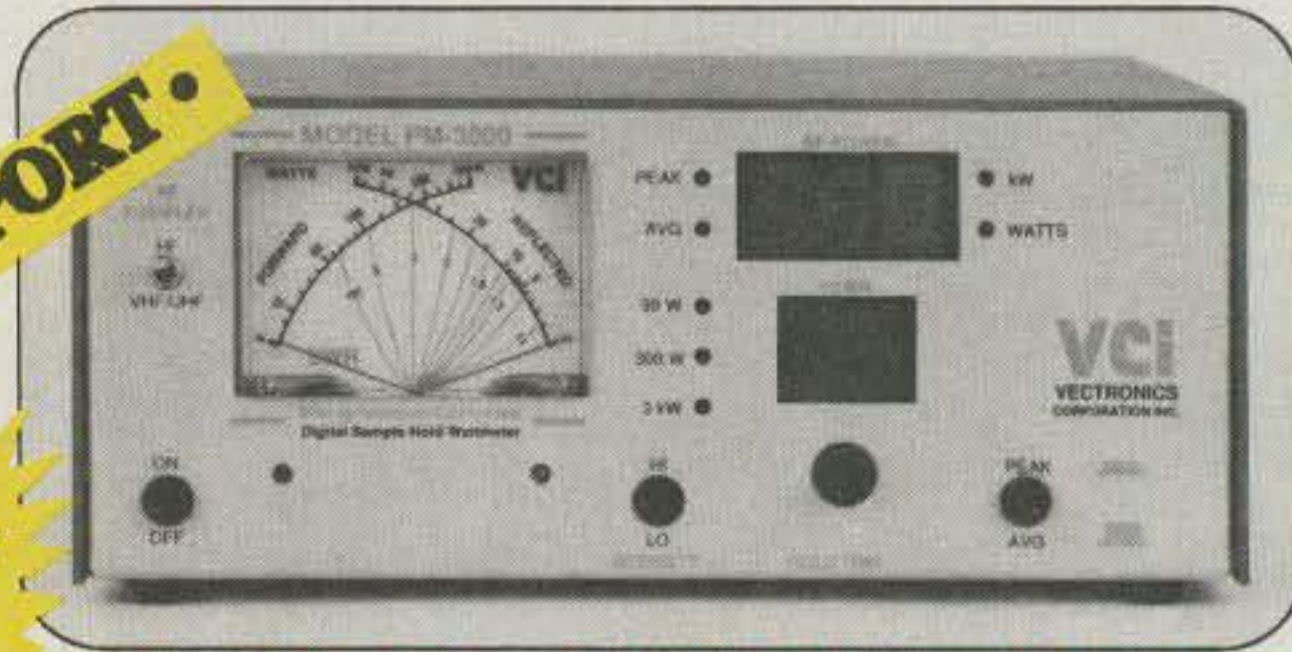


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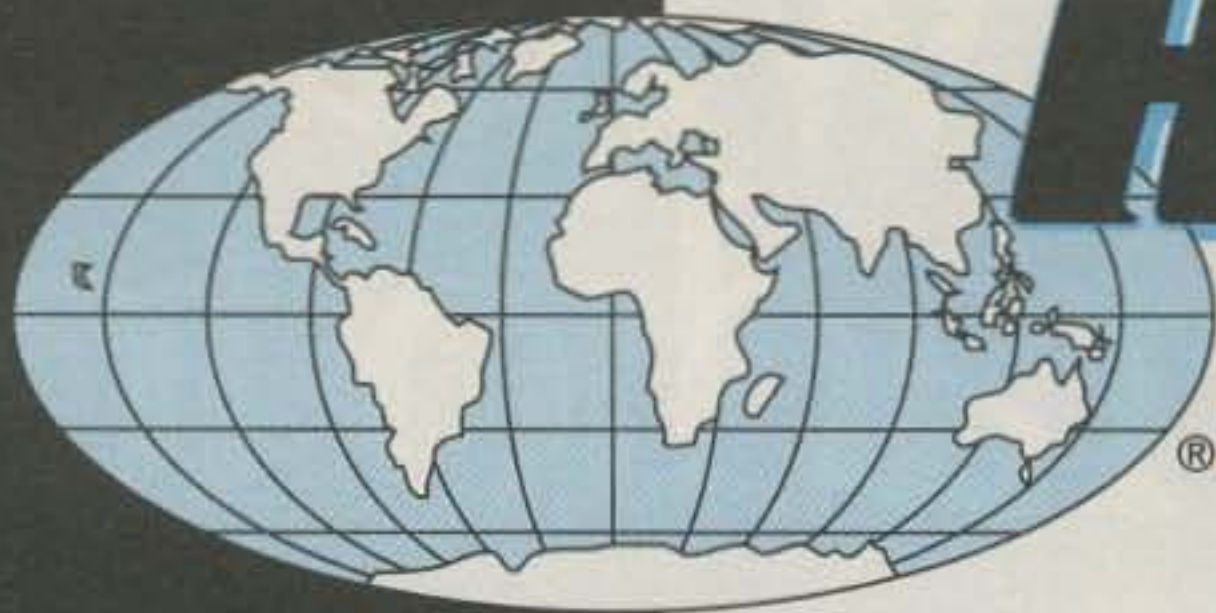
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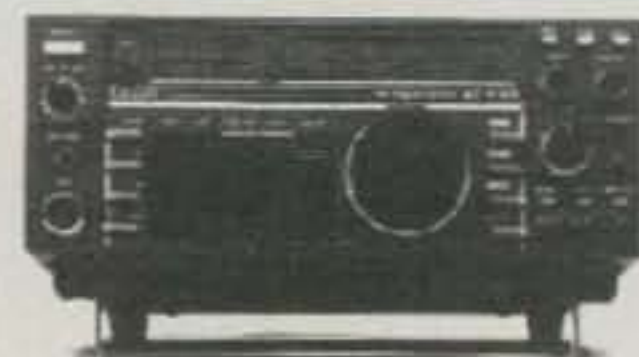
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Results of the 1991 CQ World-Wide DX SSB Contest

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

The sun was shining brightly on that fine Friday in late October. "Yep, those are sunspots up there, no doubt about it," remarks Horace as he shades his eyes from the sun. Another good sign for this year's CQ WW! With the propagation numbers all going out of sight, Horace feels this is the year for the all-out effort on 10 meters. No more sleepless nights and all band efforts. Our hero has the right idea—break the all-time record on 28 MHz at the peak of the cycle.

That was the way Horace entered the competition. And what a beginning it was, too—all those JA's and YB's, and even four or five BY's and BZ's. What a start! The band conked out about 06Z, rather late for the East Coast, but just one more sign of the good time to be had in the thick of the European opening in the morning.

After a refreshing 4 hour nap, Horace is up and about at 10Z for the crest of the mind-boggling opening to the east. Indeed, there are already some ZS boys in there and a few Europeans, too. Wow! As the morning unfolds, so does Horace. He melts into that microphone as he racks up 2 or 3 hours of incredible rates. Why, Horace has peaked over 250 an hour, and it's not even 3 hours into the opening.

And then it happened. That slow, sure, low-pitched hiss began to make its way into Horace's senses through his receiver. All of a sudden the guys have stopped calling him. Could it be? Horace peeks at his packet screen. Horace knows how to play that game, too; just turn the packet on, but don't type the connect command! What's this, a talk message from John. "Gotcha, Horace. Listening on packet, eh." Why that dirty rat. But there are more important concerns now—the WWV report. A solar flare at 1503! Oh no, not now. But for sure, there's a solar flare. In just a few short minutes the band is DEAD—really DEAD. The band stayed dead, too, right up into Sunday afternoon. What a pity.

In 1991 the above "Nightmare on Elm Street" did not occur. The propagation held up throughout the weekend. Alas, just the day after the contest ended, there was a flare. We have all been fortunate that our contest has been spared such a horrible fate. This year, 1992, has been marked with frequent flares. We'd like to urge you all to plan ahead. Think carefully about your choice of category this year; maybe a bit more low-band activity would be wise.

The All Band Results

While conditions were down from last year, Old Sol nevertheless provided the basis for another

*12041 Walker Pond Road, Winter Garden, FL 34787

**1816 Poplar Lane, Davis, CA 95616



Ville, OH2MM, is shown here at the operating position of this year's all band Single Operator winning station, CR3A, with the cool 12.9 million!

outstanding series of all band entries in the World competition. Ville, OH2MM, came out on top with a fantastic 12.9M, not enough to break Martti Laine's 1990 record, but within fighting distance of it. John Crovelli, W2GD, came in second with a fine 10.8M from P40W, followed by HC5R, operated by Jim, W7EJ; Dave, 9L1US, at 9.2M; V29W at 9.2M, operated by Bruce, KD6WW; and P40V at 8.9M, operated by Carl, AI6V. Ville had 200 contacts more than John, but the real secret to his success was the 90 extra multipliers. Jorma, ZB2X, managed another European high effort, good enough to eke out a new Continental record, besting YT90A's 1990 mark by just a few thousand points. GW4BLE finished second at 4.4M, pointing out that the 10 meter conditions were quite a bit down from last year in the Northern Latitudes. Stateside honors went to John Dorr, K1AR. There must be a secret somewhere in all that analysis on the CQ contest that John reports about in his column! KM1H, manned by Bob, KQ2M, was second with 4.5M; followed closely by Bill, K4XS, at 4.4M, and WM5G with 4.2M, operated by Jeff, KR0Y. Finally, some balance across the land with the northeast, south, and Texas represented in the top 10.

In the fledgling Low Power Category, ZC4BS topped the field with 5.2M worldwide, with K7RI taking the top honors in the USA at 1.2M, and LY3BX besting the European entries with 2 + M. Note that an asterisk (*) is used in the results to designate Low Power (defined from now on as 100 watts output or less). All of the High Power entries in a country or call area are grouped together, followed by all of the Low Power entries. This new category was very popular considering the notice we were able to give. We noticed an increase in participation in Japan, India, and several other places where licensees are limited to low power or low power privileges predominate. Please be sure to label your logs "LP" if you plan to enter this category next year. It makes it a lot easier for CQ to make sure your log gets entered in the right category.



The second-place Multi-Multi crew at KH0AM participated in K1EA CT primer classes all day Friday, just before the contest.

The Single Operator Assisted category likewise grew this year, particularly with all the packet generated pileups. Note that there are no power categories for Single Operator Assisted, nor are there power categories for the two Multi-Op categories. This year's Assisted winner for both the World and the U.S. is Hugh Valentine, N4RJ, with a fine 4.0M. IR8A led the growing Assisted contingent in Europe with 2.7M. A special word of thanks to the Assisted entrants for their honesty.

High-Band Results

Ten meters continued to dominate the Single Band categories this year, with Oms, PY5EG, taking the top spot worldwide from ZV5A with 2.9M, besting ZP0Y's 1990 World and South American record by a few thousand points. Jim Neiger, visiting his ZD8Z location, finished second after beginning as an All Band entrant. Jim's fine 2.3M captured a new African record. The World High Low Power Single Band effort was done by Z21HQ, with an amazing 1.2M points and just 100 watts! USA honors went to NR5M (478K) for the second straight year; European accolades go to CQ4A, operated by Joao, CT1BOP, with 1.2M.

Fifteen meters was also hot this year, with another Brazilian taking the top spot. Peter, PY5CC, used the special ZX9A prefix to advantage, as he edged out arch rival ZP0Y with a fine 2.5M. Gil, FM6A, finished third with a new North American record at 1.8M, wiping out V22A's old 1986 mark. An Asian record was set on 15 by 7L1GVE, whose 1.2M just nudged out 7L1GVV/8's '90 mark. K3RV/4 piled up a comfortable lead on 21 MHz in the States and posted a fine 850K. European honors went to OK1RI with 805K. LU1ICX's 461K bested the low power boys on 15. These great scores on 10 and 15 come at a time when many stations in the midwestern and western portions of the USA, and the north-

ern and eastern parts of Europe, complained of terrible conditions (see the QRM section for the specifics).

Twenty meters, always the most reliable band for propagation, provided its share of fun this year. Italo, YW1A, snagged the prize with a great 1.3M score, followed closely by another Brazilian, ZY5EG. LZ5W's 169 countries helped him to finish third, tops in Europe. KS1L demolished the competition in the States with 515K. One of the benefits of the addition of the Low Power category was the heightened interest on the sub-continent, as VU2PTT racked up a fine 272K on 20 meters for worldwide top dog. Boy, 100 watts is tough on 20!

Low-Band Results

This was a tough year on the Low Bands, as 160 and 80 meters dramatically illustrate. In fact, no records of any kind were set on those two bands. On 40 meters Jim Rafferty, ZF2JR, fought hard to best his '90 winning performance. Although Jim managed a first place slot worldwide with 632K, he fell shy of his record. KC7EM topped the US field with a fantastic 263K, good enough for 6th place worldwide. His was one of only two USA entrants to make the worldwide top scores in any of the Single Op unassisted categories this year. It was also the only new US record set this year. G3NLY took the European top slot with over 400K. We would be remiss if we didn't mention HA9BVK's fine Low Power 139K winning score on 40 meters. What a signal on 40 SSB here in the States for 100 watts!

By the way, 40 SSB provides a lot more promise than most of you guys give it credit for. Lots of stations were heard here in the States who never "listen up." We heard UM8, UI8, and other deep Asian calls very well at sunset here in the States, but few seemed to listen in the US band. In fact, 40 provides much better propagation to most places than 80. Yet some of the top all band and multi-op entry contact totals seem to be way down on 40. As we start swinging down the sunspot cycle, why not give 40 more attention in 1992?

We couldn't help but be struck by enthusiastic comments from the participants about "firsts" on 80. P29DX, who led All Band Oceania contestants, remarked that he worked his first European ever on 80 during the contest (see the QRM). Indeed, the band provided GW4OFQ 183K worth of propagation, for a fine pacesetter World High. The Europeans took the top four slots on 80, with Y21CW, DL3LAB, and ES5RY rounding out the field. K1UO was fifth in the World and tops in the USA. Low Power aficionados LZ1DM and YO3RU battled it out for tops in the World at 47K and 41K, respectively.

The Top Band conditions were enough to drain anyone's patience. IV3PRK managed an unbelievable 28.8K for worldwide lead; but OZ3SK's 19.2K for the top Low Power entry was a mind-boggling accomplishment. Uncle Sam participants were held under 5K, with AB4RU leading a field of southerners. (Special note to second place finisher, AA4MM: We didn't lose your log this year, Leo!!)

Multi-Op Categories

The only category sporting a World record effort this year was Multi-Single. In a hot competition from the southern Caribbean, the predominantly FRC team at PJ1B took high honors with a fantastic 21.2M, edging the Southeast DX Club



Peter Sprengel, PY5CC, took World High 21 MHz honors as ZX9A.

team at P40T with their 19M. Both teams beat the old World and South American 18.5M standard set by P40V in 1989. The 40 meter contact and multiplier edge made the difference! By the way, we saw some slides of the P40T setup, which went up at the last minute on the rooftop of the hotel. These guys in the Multi-Op Expedition categories do a tremendous job setting up in short order. We also saw the slides of the beach and pool! Great off-work duty in anybody's book.

Other Continental records were set by 8P9Z and KH2S. Third place went to the 8P9Z team, who set a new North American mark of 15.9M, besting 8P9X's '89 effort. Sixth place finisher KH2S just murdered the old AH0B '88 record of 8M for Oceania with a fantastic 11.1M. The European top entry was the team at IQ4A, with 12.4M. The interesting thing about the IQ4A entry was the apparent strategy they followed—multipliers at the expense of contacts. The IQ4 boys had 931 multipliers, higher than the highest Multi-Multi, yet they were almost 4000 contacts below the PJ1B contact total! The Stateside top MS entry was Tim Duffy's K3LR crew, with 5.5M.

The Multi-Multi entrants were down quite a bit this year. VP9AD's crew led the pack with a substantial 28.0M, followed by KH0AM (25.0M). The first ever contest winner from Albania, the Hungarian crew at ZA0RS, finished first in Europe with 18.9M, and led all Multi-Multi entrants in the multiplier count with 916. They were also the only station in the contest this year to hit the 40 zone jackpot (on 15 meters). The ZA0RS drew more commentary in the QRM section than any entrant we can ever remember in the history of the contest. Congratulations on a job well done. The FRC guys at N2RM pulled ahead of the USA competition for the second



The KH2S "All Stars," shown here, demolished the old Oceania Multi-Single record. Left to right are JA8RUZ, JA8RWU, JG8IGL, JR4DUW, JH4RHF, JH0USD, JH8PNE, and JR0BQD.

year in a row, with a fine 12.9M, beating the arch-rival PVRC contingent at W3LPL with their 12.4M.

QRP Results

Smarting from last year's loss to Doug, KR2Q, 4M1G stuck it out again in the QRP category, and managed the World High with a fine 1.98M. He was hard pressed by ZX5A's second place 1.87M. These two top scores were almost a million points higher than Doug's winning effort in 1990, but considerably under the PJ2FR record. The rest of the competitors were over one million down from the top in points, with WA2UUK leading the USA contingent with 316K. G4BUE gave a super trial of his new Ten-Tec Argonaut, but finished third in Europe behind UA3DQH and TO1W.

Hurrahs

A giant hurrah to the FRC Team for the great 27M team contest effort. Come on, guys, let's give them some competition next year.

A special thanks to the guys who put some of the toughest zones on the air this year. We were particularly blessed with fine efforts from HS0E and HS1ZEB from zone 26; FR5DX in zone 39; CE3FIP in zone 12; AP2SQ in zone 21; the team at JT1J in zone 23; and the teams at VE2UMS and WD4KXB/VE2 in zone 2. Do it again, guys!

Comments

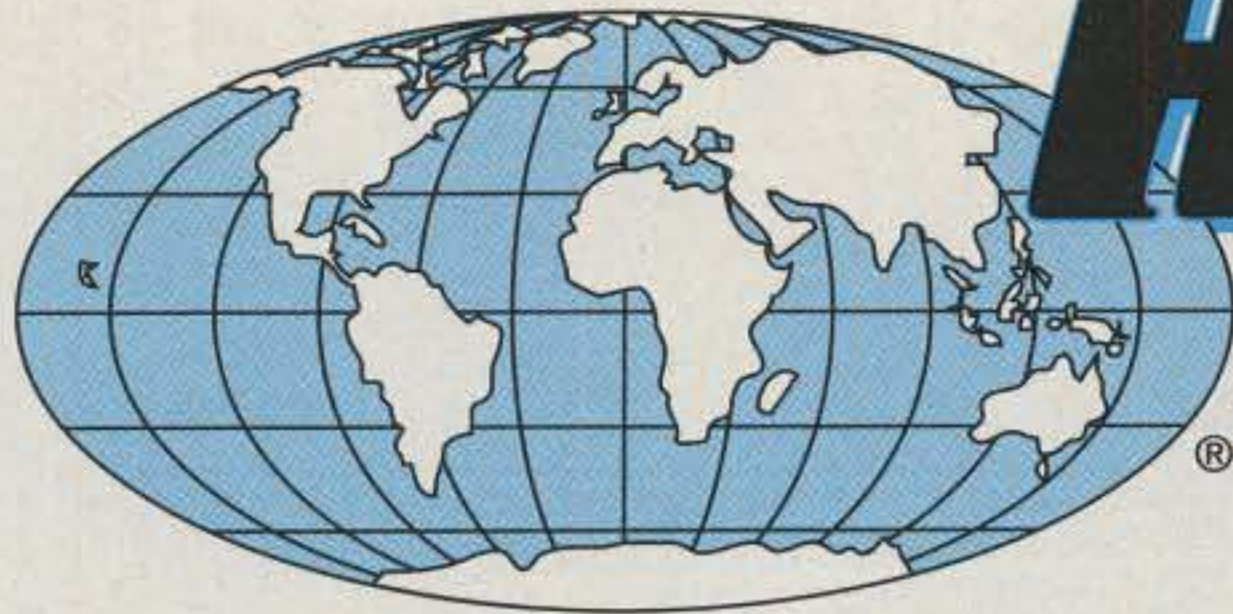
When you scan the rules for this year, pay particular attention to the following changes:

1. The requirement for a station to sign portable if he is in a different zone from the one indicated by his call has been deleted.
2. The rule that allows an extension in the log submittal date has been tightened (see section XIII, number 2).
3. The committee can require a disk for possible top scores on request, provided that the paper log or dupe checking material as originally submitted was a computer printout.
4. Format requirements for the data supplied on disks are clarified (see section XI, number 5).
5. The special consideration given on penalties for those submitting computer disks has been deleted due to the change in rule XI, number 5.

Although not part of the rules, K1AR has a request. If at all possible, he would like each of you to staple a self-addressed mailing label to your summary sheets when you send in your logs. This would greatly facilitate certificate processing.

A few years ago we received many questions after the contest about whether East Germany was a multiplier or not in the twilight of Unification of the two Germanies. We have anticipated this same kind of question for 1992 on the split up of Yugoslavia and Czechoslovakia. As we write these words, we were apprised of the ARRL DX Advisory Committee scheduled vote on the Yugoslavian issue in August 1992. Thus, be advised that the ARRL will speak on Yugoslavia *et al* before the contest is held! This will occur after these words go to print. However, our rules also state that for European countries, the WAE country list applies. Note that the DARC has already announced the addition of Croatia (old YU2/YT2/4N2 and now 9A1-9A0), Slovenia (YU3/YT3/4N3 and soon to be S5), and Bosnia/Herzegovina (YU4/YT4/4N4) to the WAE list.

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These three countries are therefore separate from Yugoslavia for the CQ contest. The ARRL may also rule on Macedonia, which will be admitted to the United Nations when a dispute over the name of the country is settled. To my knowledge, other possible splits from Yugoslavia and the split up of Czechoslovakia into Bohemia/Moravia and Slovakia are not scheduled for consideration by either organization before the WW Contest. However, CQ will abide by a decision by either of these two organizations made effective before the contest.

You will also note the retention of the term "USSR" in the results of the 1991 contest. As always, the results reflect the political status in the world as it was *at the time of the contest*. The results of the upcoming 1992 contest will reflect the political changes that have occurred in the time since last year's contest.

This year we ran some extensive computer analysis of our Multi-Multi and Single Operator winners. Some of you avail yourselves of services where you submit your log to another source asking for data on how you stack up in

terms of accuracy as measured by uniques, etc. To give you an "official" reading from CQ, we will cite a couple of examples from our checking. The top USA entrants in the All Band category had an *average* unique rate of just 3.7% on 80 and 40 meters, and an average of 5.4% on 20, 15, and 10 meters. Amazingly, the 40 and 80 meter averages were the same, and so were the 20, 15, and 10 results. If you fall significantly above these unique rates, you may have an accuracy problem.

For the stateside Multi-Multi's, the unique

TROPHY WINNERS AND DONORS

SINGLE OPERATOR, ALL BAND World

CR3A (Opr. Vilho Hillesmaa, OH2MM)
Donor: David Rosen, K2GM
WA2RAU Memorial

**World—Single Operator Assisted
N4RJ** (Opr. Bill Fisher, KM9P)
Donor: Richard Newell, AK1A

World, QRPp
4M1G (Opr. George A. Padron Vera, YV1CLM)
Donor: CQ Magazine

U.S.A.
John Dorr, K1AR
Donor: Potomac Valley Radio Club
KC8C Memorial

Caribbean/Central America
V29W (Opr. Bruce D. Lee, KD6WW)
Donor: Alex M. Kasevich, VP2MM

Europe
Jorma Saloranta, ZB2X
Donor: Potomac Valley Radio Club
W4BVV Memorial

Africa
9L1US (Opr. David E. Heil, K8MN)
Donor: Gordon Marshall, W6RR

Asia
RL20 (Opr. L. D. Welikinov)
Donor: Japan CQ Publishing Co. Ltd.

Japan
Fumishige Takeyama, JE4VVM
Donor: Japan Crazy Contesters

Oceania
Steve Lowe, P29DX
Donor: Northern California DX Club

South America
P40W (Opr. John Crovelli, W2GD)
Donor: David Novoa, KP4AM/W4

**SINGLE OPERATOR, SINGLE BAND
World—28 MHz**
ZV5A (Opr. Atilano De Oms Sobrinho, PY5EG)
Donor: Joel Chalmers, KG6DX

World—21 MHz
ZX9A (Opr. Peter Sprengel, PY5CC)
Donor: CQ Magazine

World—14 MHz
YW1A (Opr. Italo Stradiotto, YV1AVO)
Donor: North Jersey DX Association
K2HLB Memorial

World—7 MHz
ZF2JR (Opr. Jim Rafferty, N6RJ)
Donor: Fred Laun, K3ZO
K7ZZ Memorial

World—3.8 MHz
Roger Hunt, GW40FQ
Donor: Fred Capossela, K6SSS

World—1.8 MHz
Pierluigi Mansutti, IV3PRK
Donor: CQ Magazine

U.S.A.—28 MHz
George De Montrond III, NR5M
Donor: Donald Thomas, N6DT

U.S.A.—21 MHz
Carl Kratzer, K3RV/4
Donor: Bill Gioia, K2EK

U.S.A.—14 MHz
Lou Maglione, KS1L
Donor: Southern California DX Club

U.S.A.—7 MHz
Steve Kelley, KC7EM
Donor: Stanley Cohen, WD8QDQ

U.S.A.—3.8 MHz
Larry Emery, K1UO
Donor: Arnold Tamchin, W2HCW

Caribbean/Central America (21 MHz)
FM6A (Opr. Gildas Le Cloitre, F6HMQ)
Donor: Pedro Piza, Jr., NP4A
KP4ES Memorial

Europe—28 MHz
CQ4A (Opr. Joao Almeida, CT1BOP)
Donor: Chod Harris, VP2ML

Europe—21 MHz
Jiri Sanda, OK1RI
Donor: Robert Starling, N4GVF

Europe—14 MHz
LZ5W (Opr. Aleko Iglev, LZ3ZZ)
Donor: A. G. Anderson, GM3BCL

Europe—7 MHz
Roger Smethers, G3NLY
Donor: Roger Burt, N4ZC

Japan—28 MHz
Tsutomu Saiki, JA5EXW
Donor: Take Yokoyama, JL1BLW

Japan—21 MHz
Hiro Shiozawa, 7L1GVE
Donor: DX Family Foundation

**MULTI-OPERATOR, SINGLE TRANSMITTER
World**
PJ1B (Oprs. N3ED, W3UM, KB2XZ, K2SS, N7ZZ, K2SB, PJ9EE, WA3LRO)
Donor: Southern California DX Club
W6AM Memorial

U.S.A.
K3LR (Oprs. K3LR, N3BJ, WR3G, K5ZD)
Donor: Carolina DX Association

Europe
IQ4A (Oprs. I4VEQ, I4LCK, I4TJE, I4EAT, I4LEC, I4IKW, I4IND, I4AVG, I4EWH, I4FGG, I4JEE, I4YRW, IK4EWK, IK4DCT, IK4JSI, IK4DKO, IK4AUY, IK4CZF, IK4NPD, IK4QJH, IW4ANU)
Donor: Bob Cox, K3EST

Caribbean/Central America
8P9Z (Oprs. K3KG, K3ZR, K4FJ)
Donor: K3NA and KN3T

**MULTI-OPERATOR, MULTI-TRANSMITTER
World**
VP9AD (Oprs. VP9AD, W3MA, G4CNY, N3AD, N3RD, N8ET)
Donor: W6QHS and KK6QM

U.S.A.
N2RM (Oprs. N2RM, WM2H, N2NT, K3UA, KR2J, KZ2S, N4HY, N2AA, K2TW, W2RQ, KA2AEV)
Donor: K4VX and Operators

Europe
ZA0RS (Oprs. HA1TJ, HA5NG, HA5OV, HA5PP, HA7JAO, HA8VK, HA0DU, HA0MK, HA0MM, HA0NAR, HA0NNN)
Donor: Finnish Amateur Radio League

Japan
JE2YRD (Oprs. JH0GHR, JA9SSY, JA9-10148, JK3GAD, JI2KVV, JA2KVD, JF2EOC)
Donor: Nippon Television Network Corp.

**CONTEST EXPEDITIONS
World—Single Operator**
J82A (Opr. Richard M. Neuman, K3IPK)
Donor: Stuart Meyer, W2GHK

World—Multi-Operator
KH0AM (Oprs. AH0K, JH1EAQ, JK1GXU, JM1CAX, JA2VUP, JE2JCV, JF2NKS, JG2BVO, JI3ERV, JR7OMD, JE8XRF, JA9VDA, JA0QNJ, N2BA)
Donor: The German CDXG and SDXG
(DJ3NG and DJ4EI Memorial)

BAND-BY-BAND BREAKDOWN—TOP ALL BAND SCORES

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

WORLD TOP SINGLE OPERATOR, ALL BAND

Station	160	80	40	20	15	10
CR3A	48/8/32	412/18/65	720/26/92	1787/33/102	1856/34/110	1748/33/110
P40W	49/7/13	114/11/36	564/19/66	1254/30/104	1572/33/115	2836/31/106
HC5R	53/8/14	171/14/40	527/28/80	1002/32/108	1218/35/122	2285/32/113
9L1US	10/6/9	45/12/28	357/24/50	1090/28/88	2185/32/114	2125/31/114
V29W	6/2/6	261/15/44	555/23/82	1378/29/97	2215/31/111	2289/30/98
P40V	94/7/18	246/14/41	489/22/53	836/27/73	1175/31/81	3302/30/89
OH1RY/EA8	16/4/12	250/15/55	491/23/68	1609/31/93	1519/30/94	1539/32/106
KP2A	88/9/23	425/15/56	696/19/78	1468/28/93	1089/32/77	2146/32/92
ZB2X	92/9/36	329/15/61	621/23/87	1610/33/112	1208/29/108	1196/28/106
J82A	35/8/15	252/13/38	627/19/62	1592/28/103	1165/30/97	2262/28/83

WORLD TOP MULTI-OPERATOR, SINGLE TRANSMITTER

PJ1B	20/8/18	144/15/50	740/27/92	2020/27/150	2796/37/147	3698/36/139
P40T	17/8/16	150/12/32	485/25/77	2387/35/133	2863/36/141	3570/33/127
BP9Z	15/4/14	144/13/52	675/22/96	2440/37/129	2552/37/147	2886/36/144
PJ7A	15/4/14	232/12/41	143/12/48	3118/37/126	2964/38/148	2239/32/123
IQ4A	57/10/57	271/22/86	825/33/128	1837/38/166	1947/39/166	751/36/150
KH2S	3/2/3	43/9/16	312/25/50	1555/37/108	2632/37/111	2515/35/102

WORLD TOP MULTI-OPERATOR MULTI-TRANSMITTER

VP9AD	559/12/31	972/17/63	1732/28/97	4067/38/154	3734/38/157	3981/33/149
KH0AM	7/4/5	534/24/39	1705/32/77	3203/38/133	2754/36/116	3602/37/126
ZA0RS	157/11/51	1069/26/92	2206/28/125	4110/38/161	3463/40/165	1255/36/133
LU4FM	24/6/9	187/19/34	232/28/75	2303/37/126	2574/36/235	4090/36/137
IZ3A	371/9/55	1226/23/90	1816/32/124	2391/38/158	2253/37/149	1292/36/147
HG73DX	425/11/55	1270/24/96	2290/33/115	3017/39/157	1714/38/139	775/32/127

USA TOP SINGLE OPERATOR, ALL BAND

Station	160	80	40	20	15	10
K1AR	17/6/13	134/18/59	86/22/60	1011/38/142	950/37/135	542/32/116
KM1H	17/8/14	151/15/56	125/23/64	613/39/126	1081/36/136	509/29/113
K4XS	13/7/12	81/14/46	127/19/68	914/36/121	743/34/121	549/33/125
WM5G	14/7/12	52/14/38	190/26/69	508/37/128	743/36/121	802/35/126
K300	33/6/16	136/15/57	103/20/58	797/38/131	700/36/127	365/30/110
K3Z0	18/6/13	188/19/54	129/17/53	588/33/95	837/29/105	474/30/98
N6BV/1	17/6/8	100/14/48	89/21/54	825/35/116	646/30/112	341/30/92
W3BGN	28/10/20	110/18/53	85/17/44	531/32/106	609/34/108	365/28/102
W9RE	21/7/14	61/16/42	94/23/60	534/35/126	489/31/118	448/32/104
W1PH	14/5/11	49/14/38	102/22/58	531/37/123	413/33/116	373/30/109

USA TOP MULTI-OPERATOR, SINGLE TRANSMITTER

K3LR	18/7/17	106/20/64	131/30/89	1060/39/153	965/37/152	318/33/126
K1YR	14/5/12	64/17/61	105/25/79	981/37/156	871/37/147	371/32/139
NF2L	33/9/20	198/20/77	191/24/82	699/38/147	711/34/135	450/32/138
N3RS	29/10/23	89/21/73	148/25/81	690/39/151	864/35/143	327/32/134
W6QHS	8/7/7	58/15/33	394/30/74	514/38/128	1077/35/121	510/30/84
AA6TT	14/9/11	103/20/38	319/27/59	218/34/108	1325/38/123	614/32/93

USA TOP MULTI-OPERATOR, MULTI-TRANSMITTER

N2RM	58/10/21	530/25/86	375/26/93	1489/39/161	1889/39/169	1124/34/162
W3LPL	74/14/29	320/24/81	485/31/107	1415/39/165	1822/39/164	838/34/157
K1ST	52/11/19	343/20/70	354/25/80	1836/39/166	1363/39/149	897/35/147
W7XR	147/12/14	365/28/58	695/34/95	1020/38/146	1618/38/136	1090/33/103
K2TR	103/18/36	406/23/76	260/28/85	1523/39/171	1176/39/161	497/33/142
N5AU	20/7/12	1056/18/51	221/30/80	932/39/141	1754/38/153	1152/34/140



This gentleman, Bill Nesbitt, provided us all those very welcome zone 37 multipliers from 5Z4BI. Bill says his spirits were undaunted by that blackout on Sunday morning.

rates were somewhat higher, with the averages ranging from 8% to 13% depending on the band, and averaging 9% over all bands. The World High Multi-Multi's had average unique rates from 10% to 15%, averaging 12% over all bands. Again, if unique rates are substantially higher than this, there may be a problem. Our experience with cross-checking shows that about half of the uniques are busted calls. This data is general, and of course, every station's particular situation will affect the results. For example, we had one particular low band single band entrant who worked a great deal of Caribbean uniques by virtue of his diligence in checking into daytime nets. Such tactics will skew the statistics!

The Master Data Base generated for the SSB

contest this year was used to do the above analysis and gave us some very interesting insight into other workings of the contest. About 50 logs, most of them top logs in all the categories, were compiled together to form the data base. A total of 230,000 contacts were included, representing over 43,000 unique calls. Since we received under 3000 logs this year, that means that there are over ten participants in the contest for every person who submits a log! Last year we remarked that such a massive simultaneous participation might be some kind of record. That is, the CQ WW DX contest might represent a unique event that gathered more simultaneous participants together worldwide than any other competition of any kind.

Bill, W9VA, wrote us a nice note spoiling our fun. It seems that there is a Bridge Tournament that boasts 60,000 simultaneous participants from all over the world! We are confident that the amateur radio world will rise to the occasion and challenge the bridge players. Certainly, the collective hundreds of thousands of hams could muster an effort with over 60,000 contributors so we could legitimately submit an application to the *Guinness Book of World Records!*

Credits

Once again we would like to thank KB3MM for revising some of our software as required to read files from version 7 of K1EA's CT program. (One of your Directors had a mild heart attack this year, possibly from the shock of finding out the old software didn't work.) Then, of course, there are the hardworking committee members who poured over many logs, dupe sheets, com-

puter listings, and disk files to police the expanding contest populace. This time the committee included Mike, W9RE; Pat, WA8YVR; Glenn, K6NA; Doug, KR2Q; Randy, K5ZD; Jim, W7EJ; Jeff, KR0Y; Bill, K4XS; Doug, K1DG; Jan, N6AW; Bill, W2RQ; and Ed, N3ED. Again, a round of applause to John Dorr, K1AR, for doing the trophies and certificates.

See you all in this year's test. Remember, work lots of YUs!

73, Larry, N6AR/4, and Bob, K3EST/6



WD4KXBVE2: that was the zone 2 call that gave so many of us this rare North American zone.

ASTRON POWER SUPPLIES

• HEAVY DUTY • HIGH QUALITY • RUGGED • RELIABLE •



MODEL VS-50M

SPECIAL FEATURES

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

PERFORMANCE SPECIFICATIONS

- INPUT VOLTAGE: 105-125 VAC
- OUTPUT VOLTAGE: 13.8 VDC ± 0.05 volts (Internally Adjustable: 11-15 VDC)
- RIPPLE Less than 5mv peak to peak (full load & low line)
- All units available in 220 VAC input voltage (except for SL-11A)

SL SERIES

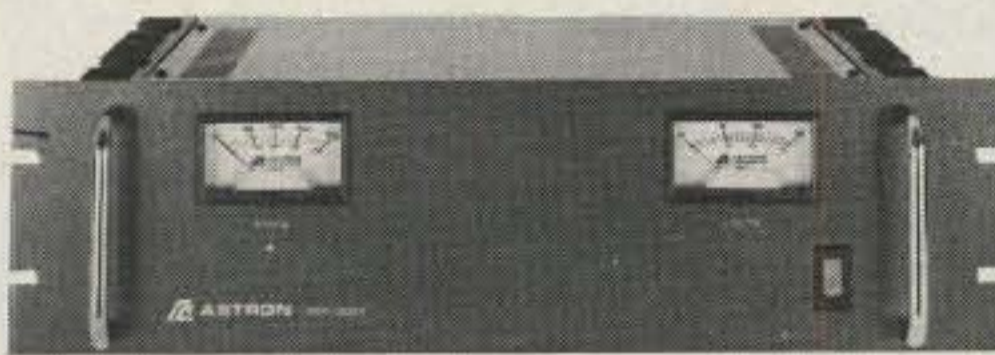


MODEL	Colors		Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H x W x D	Shipping Wt. (lbs.)
	Gray	Black				
• LOW PROFILE POWER SUPPLY						
SL-11A	•	•	7	11	2 3/4 x 7 5/8 x 9 3/4	11

RS-L SERIES



MODEL	Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H x W x D	Shipping Wt. (lbs.)
• POWER SUPPLIES WITH BUILT IN CIGARETTE LIGHTER RECEPTACLE				
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

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-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

VS-M AND VRM-M SERIES



MODEL VS-35M

MODEL	Continuous Duty (Amps)			ICS* (Amps) @13.8V	Size (IN) H x W x D	Shipping Wt. (lbs.)
	@13.8VDC	@10VDC	@5VDC			
• Separate Volt and Amp Meters • Output Voltage adjustable from 2-15 volts • Current limit adjustable from 1.5 amps to Full Load						
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

MODEL	Colors		Continuous Duty (Amps)	ICS* Amps	Size (IN) H x W x D	Shipping Wt. (lbs.)
	Gray	Black				
• Built in speaker						
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

TOP SCORES

WORLD

<p>SINGLE OPERATOR HIGH POWER</p> <p>All Band</p> <p>CR3A 12,974,910 P40W 10,779,338 HC5R 9,630,000 9L1US 9,263,688 V29W 9,196,488 P40V 8,852,976 OH1RY/EA8 8,726,500 KP2A 7,609,190 ZB2X 7,128,646 J82A 7,037,844</p>	<p>FM6A 1,934,659 KG6DX 1,861,358 CT3M 1,855,722 9Y4VU 1,493,220</p> <p>14 MHz</p> <p>YW1A 1,326,318 ZY5EG 1,232,769 LZ5W 994,240 SM2EKM 948,117 TF3CW 822,300 YW5N 743,808</p> <p>7 MHz</p> <p>ZF2JR 630,498 FG8Y 531,375 LU1IV 399,600 G3NLY 393,908 JA8IXM 264,960 KC7EM 263,048</p> <p>3.8 MHz</p> <p>GW4OFQ 183,590 Y21CW 162,450 DL3LAB 122,194</p>	<p>ES5RY 116,958 K1UO 105,609 VE3VN 102,305</p> <p>1.8 MHz</p> <p>IV3PRK 28,864 EA3ALD 18,961 RY7D 17,500 OK1JDX 13,230 VE1ZZ 12,948 UC2IEF 10,948</p> <p>LOW POWER</p> <p>All Band</p> <p>ZC4BS 5,244,877 9M6RO 2,924,380 ZK1XC 2,215,343 LY3BX 2,107,140 JF1SEK 1,966,968 NH6T 1,934,998 PX1Z 1,810,710 P29KH 1,345,986 K7RI 1,286,946 EA8BVH 1,230,876</p>	<p>28 MHz</p> <p>Z21HQ 1,118,611 V47TV 857,934 Z21BL 844,074 J43A 444,288 LU2NI 435,666 ZY5IO 420,243</p> <p>21 MHz</p> <p>LU1ICX 461,590 IT9RYJ 448,392 VU2BIX 424,074 KC1SJ 398,025 I5NSR 390,136 JQ1QET/JD1 373,255</p> <p>14 MHz</p> <p>VU2PTT 272,251 EA6AAX 267,910 EA3GFT 195,534 JH0OBD 140,239 5N0RJM 127,335 JE2UFF 121,155</p>	<p>7 MHz</p> <p>HA9BVK 139,664 N1XZ 27,455 JA0UMV 23,680 JA1LZR 21,488 OK1PFJ 13,780 JJ6DGP 7,889</p> <p>3.8 MHz</p> <p>LZ1DM 47,872 YO3RU 41,160 OK3YCL 24,300 HJ6RXI 22,608 F6BVB 16,610 OK2HI 11,750</p> <p>1.8 MHz</p> <p>OZ3SK 19,198 OK3IQ 15,660 CT1AOZ 10,816 Y21XC 5,600 RV9WG 4,784 PA0ZH 3,626</p>	<p>ASSISTED</p> <p>N4RJ 4,005,762 K1ZM 3,978,942 IR8A 2,738,757 K3WW 2,610,960 KC1XX 2,555,944 N4WW 2,507,618</p> <p>MULTI-OPERATOR SINGLE TRANSMITTER</p> <p>PJ1B 21,214,809 P40T 18,997,200 8P9Z 15,929,221 PJ7A 13,368,655 IQ4A 12,424,195 KH2S 11,095,392</p> <p>MULTI-OPERATOR MULTI-TRANSMITTER</p> <p>VP9AD 28,086,030 KH0AM 25,084,536 ZA0RS 18,877,416 LU4FM 18,747,378 IZ3A 17,660,068 HG73DX 15,959,514</p>
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USA

<p>SINGLE OPERATOR HIGH POWER</p> <p>All Band</p> <p>K1AR 5,345,352 KM1H 4,371,147 K4XS 4,319,712 WM5G 4,136,726 K3OO 3,760,306 K3ZO 3,271,950 N6BV/1 3,091,624 W3BGN 2,785,068 W9RE 2,758,161 W1PH 2,481,744</p> <p>28 MHz</p> <p>NR5M 473,796 W0UN 450,282 K1NG 415,472 KT4W 378,840 KE5FI 356,372 K5MR 332,210</p>	<p>21 MHz</p> <p>K3RV/4 844,482 KW8N 548,973 WB9Z 541,818 WC6H 499,212 NX1P 457,864 KK9A 443,220</p> <p>14 MHz</p> <p>KS1L 515,406 KV4P 371,169 KC2X/4 314,560 W8TWA 185,440 W5FO 181,712 K9CAN 175,380</p> <p>7 MHz</p> <p>KC7EM 263,048 KV0Q 194,327 N4ZC 108,250</p>	<p>KZ2I 40,326 KD9Q/0 36,864 K5NU 34,356</p> <p>3.8 MHz</p> <p>K1UO 105,609 K8PO/1 90,944 K7EG 80,800 W0CD/8 37,037 KQ3V 29,200 K4JEX 18,407</p> <p>1.8 MHz</p> <p>AB4RU 4,725 AA4MM 2,700 W2FCR 1,600 KC4YM 432 K4TEA 420 KM5R 182</p> <p>LOW POWER</p> <p>All Band</p> <p>K7RI 1,286,946</p>	<p>K5RX 993,806 KX5Z 842,898 KG1D 769,880 W3UJ 603,630 K6XV 591,426 W3KXR 504,839 KD5GD 487,602 KB3TS 432,398 WM2D 422,712</p> <p>28 MHz</p> <p>W0LSD 161,868 K2MFY 139,997 WB5CRG 111,875 KC4TIR 88,288 WB6MBF 83,754 W6EUF 81,290</p> <p>21 MHz</p> <p>KC1SJ 398,025 NI5M 132,928 N7RO 119,952 KE2JO/4 105,564</p>	<p>WA4APM 104,520 KA1GTR 101,598</p> <p>14 MHz</p> <p>N4IJ 71,424 WB8ORV 28,428 N3FTI 7,301</p> <p>7 MHz</p> <p>N1XZ 27,455 WA6WPG 5,220 W6YVK 2,392</p> <p>3.8 MHz</p> <p>N7RM 1,265 WB0YWO 160</p> <p>1.8 MHz</p> <p>KR9G 390</p> <p>ASSISTED</p> <p>N4RJ 4,005,762 K1ZM 3,978,942</p>	<p>K3WW 2,610,960 KC1XX 2,555,944 N4WW 2,507,618 W1RR 2,432,073</p> <p>MULTI-OPERATOR SINGLE TRANSMITTER</p> <p>K3LR 5,512,429 K1YR 4,792,752 N3RS 4,572,087 W6QHS 4,239,284 AA6TT/0 4,111,440 K5NA/2 4,062,062</p> <p>MULTI-OPERATOR MULTI-TRANSMITTER</p> <p>N2RM 12,888,500 W3LPL 12,409,592 K1ST 10,204,000 W7XR 9,818,865 K2TR 8,606,163 N5AU 8,042,232</p>
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EUROPE

<p>SINGLE OPERATOR HIGH POWER</p> <p>All Band</p> <p>ZB2X 7,128,646 GW4BLE 4,446,585 IR6L 3,167,322 YT1BB 3,436,884 EA7BA 2,419,533 DJ4PT 2,281,644 F6HLC 2,114,820 OH8LQ 1,814,540 GM0ECO 1,775,520 UT4UX 1,760,150</p> <p>28 MHz</p> <p>CQ4A 1,203,924 IT9A 801,220 YZ9A 493,812 IT9S 457,424 UB5IJG 426,387 RB5VK 408,946</p>	<p>TM1K 663,217 OH5TS 636,976 EA6FO 599,454 YU7AV 586,710</p> <p>14 MHz</p> <p>LZ5W 994,240 SM2EKM 948,117 TF3CW 822,300 HA4XX 713,241 YT3E 658,068 UA6LQ 542,325</p> <p>7 MHz</p> <p>G3NLY 393,908 OH2AQ 219,312 IN3ZNR 192,076 4N4A 153,640 RB5ISP 131,098 OZ1FTE 125,424</p> <p>3.8 MHz</p> <p>GW4OFQ 183,590 Y21CW 162,450 DL3LAB 122,194</p>	<p>ES5RY 116,958 YU3XU 97,020 OH6RM 86,390</p> <p>1.8 MHz</p> <p>IV3PRK 28,864 EA3ALD 18,961 RY7D 17,500 OK1JDX 13,230 UC2IEF 10,948 F6AML 10,350</p> <p>LOW POWER</p> <p>All Band</p> <p>LY3BX 2,107,140 EA3BKI 1,121,324 EA3CWK 990,318 EA7FTR 745,032 Y48PJ 712,194 EA3GBU 605,440 EA3GCJ 586,845 HA3RD 574,560 SM3SGP 570,372 G4XKR 516,975</p>	<p>28 MHz</p> <p>J43A 440,700 EA7ARK 204,074 IT9HBT 196,647 UA3ZIU 137,888 SL5AB 131,313 UA6BPM 120,879</p> <p>21 MHz</p> <p>IT9RYJ 448,392 I5NSR 390,136 YT3SW 316,233 EA4DX 205,280 EA1EVQ 90,200 UA3DJY 68,700</p> <p>14 MHz</p> <p>EA6AAX 267,910 EA3GFT 195,534 EA3AAY 110,288 EA3GCT 95,920 LX1SG 83,646 RB5EG 83,210</p>	<p>7 MHz</p> <p>HA9BVK 139,664 OK1PFJ 13,780 Y67RL 3,440 UA3D/UB3LB 2,856</p> <p>3.8 MHz</p> <p>LZ1DM 47,872 OK3YCL 24,300 F6BVB 16,610 YO3RU 13,008 OK2HI 11,750 EA3EGB 8,160</p> <p>1.8 MHz</p> <p>OZ3SK 19,198 OK3IQ 15,660 CT1AOZ 10,816 UW3AT 2,489 G3BDQ 2,128 SP3GUG 1,392</p> <p>ASSISTED</p> <p>IR8A 2,719,656</p>	<p>UT2L 1,768,947 ON4UN 1,512,252 DJ2YA 1,478,556 F6AOJ 1,320,170 DF3CB 1,254,396</p> <p>MULTI-OPERATOR SINGLE TRANSMITTER</p> <p>IQ4A 12,424,195 RY1U 9,987,465 LZ9A 8,864,650 FV7A 7,564,217 TO7C 7,076,538 GW8GT 6,564,178</p> <p>MULTI-OPERATOR MULTI-TRANSMITTER</p> <p>ZA0RS 18,877,416 IZ3A 17,660,068 HG73DX 15,959,514 UR5M 12,567,996 G0KPW 12,139,792 R6L 10,660,857</p>
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HF Equipment
IC-781 Xcwr/ps/tuner/scope..... Regular SALE
 ● \$6395.00 4899



IC-765 Xcwr/ps/keयर/tuner..... ● \$2800.00 2239



IC-751A 9-band xcvr/SW rx..... ● \$1440.00 1159

- PS-35 Internal power supply..... 228.00 209⁹⁵
 FL-63A 250 Hz CW filter (1st IF)..... 59.00
 FL-52A 500 Hz CW filter (2nd IF)..... 115.00 109⁹⁵
 FL-53A 250 Hz CW filter (2nd IF)..... 115.00 109⁹⁵
 FL-70 2.8 kHz wide SSB filter..... 59.00
IC-735 HF xcvr/SW rcvr/mic..... ● 1064.00 859⁹⁵
 PS-55 External power supply..... 228.00 209⁹⁵
 AT-150 Automatic antenna tuner..... 446.67 389⁹⁵
 FL-32A 500 Hz CW filter..... 69.00
 EX-243 Electronic keyer unit..... 64.67
 UT-30 Tone encoder..... 18.67



IC-725 HF xcvr/SW rcvr/mic.....D ● \$893.00 719⁹⁵

AH-3 Automatic antenna tuner..... 488.33 429⁹⁵

IC-726 10-band xcvr w/6m.....D ● 1283.00 1058

HF Accessories: Regular SALE

- IC-2KL HF solid state amp w/ps**..... ● \$2079.00 1679
IC-4KL HF 1 kw amp w/ps..... ● 7275.00 5599
 EX-627 Automatic antenna selector..... 314.67 279⁹⁵
 PS-15 20A external power supply..... 183.00 169⁹⁵
 PS-30 Systems p/s w/cord, 6 pin plug..... 363.00 299⁹⁵
 SP-3 External speaker..... 65.00
 SP-7 Small external speaker..... 52.00
 CR-64 High stab. ref. xtal; 751A, etc..... 79.00
 SM-6 Desk microphone..... 47.93
 SM-8 Desk mic; two cables, scan..... 89.00
 AT-500 500w 9 band auto ant tuner..... 589.00 529⁹⁵
 AH-2 8-band tuner w/mount & whip..... 780.00 689⁹⁵

Accessories for IC-781/765/765/726/725 • **CALL**



ICOM OLD PRICES +
 Bonuses Extended!
 ● Indicates
 Special Prices for
 a Limited Time.



VHF/UHF Base Transceivers Regular SALE

- IC-275H 100w 2m FM/SSB/CW**..... ● \$1455.00 1179
IC-475H 100w 440 FM/SSB/CW..... ● 1665.00 1359
IC-575A 25w 6/10m xcvr/ps.....D ● 1455.00 1158
IC-575H 25w 100w 6/10m xcvr..... ● 1564.00 1289
IC-1275A 10w 1.2GHz FM/SSB/CW... ● 1923.00 1559



VHF/UHF FM Transceivers Regular SALE

- IC-229A 25w 2m FM/TTP mic**..... ● \$392.00 319⁹⁵
IC-229H 50w 2m FM/TTP mic..... ● 425.00 349⁹⁵
IC-38A 25w 220 MHz FM xcvr..... ● 409.00 339⁹⁵
IC-449A 35w 440FM xcvr/TTP..... ● 473.00 389⁹⁵
IC-1201 10w 1.2GHz FM/SSB/CW..... ● 831.00 709⁹⁵

Dual band FM Transceivers Regular SALE

- IC-2410A 25w 2m/440 FM/TTP mic**..... ● \$889.00 729⁹⁵
IC-2410H 45w 2m/35w 440 FM/TTP... ● 932.00 769⁹⁵
IC-3220A 25w 2m/440 FM/TTP mic...D ● 685.00 569⁹⁵
IC-3220H 45w 2m/ 35w 440 FM/TTPD ● 727.00 589⁹⁵
IC-2500A 35w 440/10w 1.2GHz FMD ● 1039.00 829⁹⁵

Multi-band FM Transceiver Regular SALE

- IC-901 50w 2m/35w 440 FM xcvr**... ● \$1039.00 829⁹⁵
 UX-R91A Broad band receiver unit..... 405.00 349⁹⁵
 UX-19A 10w 10m unit..... 311.00 269⁹⁵
 UX-59A 10w 6m unit..... 363.00 329⁹⁵
 UX-S92A 2m SSB/CW module..... 623.00 549⁹⁵
 UX-39A 25w 220MHz unit..... 363.00 329⁹⁵
 UX-129A 10w 1.2GHz unit..... 571.00 499⁹⁵
 UX-49A 440MHz module for IC-900..... 363.00 319⁹⁵
IC-970A 25w 2m/430MHz xcvr/ps..... ● 2409.00 1939
IC-970H 45w 2m/430 MHz xcvr..... ● 2567.00 2099
 UX-R96 50-905 MHz receive unit..... 405.00 349⁹⁵
 UX-97 1.2GHz band unit..... 1039.00 869⁹⁵

VHF/UHF Mobile Antenna Regular SALE

- AH-32 2m/440 Dual Band mobile ant**..... \$39.33
 Larsen PO-K Roof mount..... 23.00
 Larsen PO-MM Magnetic mount..... 28.75

VHF/UHF Repeaters Regular SALE

- RP-1520 2m 25w repeater**..... ● \$2319.00 1909
RP-2210 220MHz 25w repeater..... ● 1715.00 1409
RP-4020 440MHz 25w repeater..... ● 2392.00 1959
RP-4020/50W 440MHz 50w repeater... ● 2599.00 2149
RP-1220 1.2GHz 10w repeater..... ● 2703.00 2229

We stock the entire ICOM line, but due to space limitations some items are not listed in this ad.

Handhelds Regular SALE

IC-P2AT NEW! 2m HT..... \$421.00 349⁹⁵
IC-P3AT NEW! 220MHz HT..... 421.00 349⁹⁵
IC-P4AT NEW! 440 MHz HT..... 467.00 389⁹⁵
IC-2A 1.5w 2m HT • **Closeout**..... 199⁹⁵
IC-2AT 1.5w 2m HT/TTP..... 247.00 219⁹⁵
IC-02AT/High Power 2m ● 333.00 279⁹⁵
IC-03AT 2.5w 220 HT/TTP ● 319.00 259⁹⁵
IC-2SA 2m HT..... D ● 345.00 279⁹⁵
IC-2SAT 2m/TTP..... ● 372.00 309⁹⁵
IC-2SRA 2m/25-905 rx..... 572.00 479⁹⁵
IC-24AT 2m/440MHz/TTP..... 456.00 379⁹⁵
IC-3SAT 220MHz HT/TTP ● 351.00 289⁹⁵
IC-4SAT 440MHz HT/TTP ● 351.00 289⁹⁵
IC-4SRA 440/25-905 rx..... 579.00 489⁹⁵
IC-2GAT 2m HT/TTP..... ● 372.00 309⁹⁵
IC-4GAT 440MHz/TTP..... ● 372.00 309⁹⁵
IC-12GAT 1.2GHz/TTP..... ● 381.00 319⁹⁵
IC-W2A 2m/440 HT..... 588.00 499⁹⁵

Aircraft band handhelds Regular SALE

- A-2 5W PEP synth aircraft HT**..... \$525.00 429⁹⁵
A-20 aircraft HT w/VOR..... 625.00 469⁹⁵
A-21 Navicom Plus Aircraft HT..... 660.00 499⁹⁵



Shortwave Receivers Regular SALE

- R-1 100kHz-1.3GHz AM/FM pocket** ● \$533.00 449⁹⁵
R-71A 100kHz-30MHz rcvr..... ● 1019.00 829⁹⁵
 RC-11 Infrared remote controller..... 71.00
 FL-32A 500 Hz CW filter..... 69.00
 FL-44A SSB filter (2nd IF)..... 178.00 169⁹⁵
 EX-257 FM unit..... 49.00
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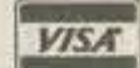
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DX QRM

It's nice to be a rare multiplier... 5B4BCC. J3 should count as South America. It's farther south than P4 and PJ, and we can watch YV-land TV with rabbit ears in the hotel room—our score would have been 34% higher... J37H. No "run station"; we had only one transceiver. That makes it impossible to compete, but we had a great time... C6AFQ. Kept being told how loud I was in Europe, but they still did not call me... WR6R/KH6. This is my first QRP experience and I found it quite thrilling... JA1MYW. I got a zone 40!... JP1RMK. My rare stations were KH2, KL7, etc... IK8COG. It was my first DXpedition and the contest enabled me to enjoy it... JP1AVZ/JD1. Saturday was fine; Sunday was horrible... DA2UI. Contesting from Europe is just no fun anymore; just too much QRM... DF2RG. More QRM every year... DL7MAE. Rain the whole contest, thunder crashes, 30-40 dB most of the time. Had great fun though... VE3CXK. I had a niece visiting and she slept all morning in the nearby room; TVI all over; had friends for dinner; went to music hall!... IK2AIT.

It is a big problem to find the results for our country... YO3AIL. I've never seen such traffic and competition... CT0BWN. So many prefixes, just like the WPX contest... YB0TR. I am new to Amateur Radio and have never operated a contest before; also, I can't speak English very well... JM6DYM. I flew from Yuma, Arizona to Wrangel Island, Alaska just to work the contest... NL7QT. First time in the contest; good experience, but not much of a score... NH6ZW. Extremely poor conditions on the second day blocked a new OE record; just worked 20 stations on 10 meters on Sunday... OE2VEL. Things are getting bad when you have to get on a list to work a station... VE3EJ. Thanks, CQ magazine, for giving us a chance to compete with ourselves. It's great, great fun working the existing contest... XE2BEU. Poor propagation up here on 10 meters most of the contest plus local power-line noise... NL7TB. I worked my first South American on 160 meters—PP0F!... OZ3SK. Happy to give so many stations zone 29. Look forward to next year... VK6OD.

Had big problem with the SB200 on 40 meters. It just wouldn't work properly... LA9DFA. Never thought I would hear a ZA calling CQ contest and getting no answer... VE3ITA. Without a special callsign, it's impossible to compete... DL8PC. Murphy was here the last 6 hours on Saturday—rebuilding one prop pitch rotor. Sure isn't any fun working on the tower in 20 degrees F temperature... JL6IPK. The conditions were bad on 15... HA8CQ. Many thanks to my XYL for her understanding... TK5MH. Contacting Albania is the highlight of the contest for me... ZS6HO. PJ9W again had the biggest signal on the bands... YU4XA. It was my best score in the CQ WW so far in spite of very little activity from Africa and Oceania... CE6EZ. My only duplicate was ZA. My, how times change... G3JKY. Very tired, but too much fun. Thanks to everybody... UT2L. Spent so much time with company (relatives) taking them shopping, didn't get too many stations... YB2HTD. We need more luck next year... GW0JR. Sunday evening, good signals, no QRM, but all dupes... IN3QBR.

Too many technical problems in the MM category... 4N3IA. Propagation to Europe on 10 was terrible; still lots of fun... VK2ARJ. And the aurora—what a thrill... PA3DWD. I couldn't believe my good luck when ZA0RS called me; thanks to RB5AA for alerting me... VK2KS. Worked BY1PK on 80!... GW4OFQ. This is my first entry from Niger; I caught many pileups, very exciting... 5U7M/JH4NMT. Very poor conditions on 28 MHz. I did not have any QSOs from the Western Hemisphere... OH5PA. Conditions on 28 MHz were very poor; glad I did not go to Shetland Islands this year... GM4CHX. The WW DX and WPX SSB and CW—these are the nicest weekends of amateur radio... IK2BLA. Rig blew out second day, but had a great time... VE3WSM. Conditions could have been much better... ON7UN. In spite of the Ironman volunteer party, Halloween party, and a bad cold, I still had 19.5 hours to operate the contest... AH6JR. On Sunday, ZA0RS answered my CQ, but it was a dupe... I1POR. It was wonderful—my first participation in a contest... CT1EDJ.

My first serious attempt for #1 QRP Canada. Even worked a few "new ones"... VE6GK. Compared to last year, this was purgatory. GW4BLE's 1000+ QSOs on 10 meters made my 100 QSOs look sick. What a difference 400 miles will make when solar flares are about... GM0ECO. Contacted laryngitis 8 hours before the contest. Better luck next year... VE3LRL. Conditions could only have been worse if I had returned to zone 2... VE2ZP. Heard V31DX and T14CF the last hour of the contest, but was too exhausted to break through the radio wall... BV2AR. It was difficult to work stations over the Pacific ocean with only 50 watts... JJ7XAY. Finally worked BV, but in the craziest conditions... AL7EN. Band conditions not too hot here in the north; very few Europeans heard until Sunday noon... VE3CWE. Enjoyed contest immensely... 3D2DD. The CQ WW DX Contest is the MECCA of contests... VE7ETY. Conditions were good, but getting too old to cut the mustard... VE4RP. I slept more than 10 hours during bad conditions... JA8GYQ. Climbing the tower to turn the antenna made me tired—no rotor here... PY2NY.

It's a very good change to add the low power category to the contest, as I have no license for high power... JA0UHI. Worked the whole contest without a rotator; my beam was fixed on Europe and parts of Asia only... DU1CHD/6. Special thanks to our group president, PY2NY, who notified everybody... PY2EX. Worked Albania, and the operator said he had been trying for a half hour! Revenge is sweet... NP2N. Conditions were down from last year, but still had a good time... ZF2JR/N6RJ. My first CQ WW was great; will make sure I am in the contest next year... PY1CAS. Weak propagation, strong U.S. operators... CQ4A. Super conditions helped make me feel like a big gun... VU2PTT. My best DX was OH6RM on 28 MHz—my first and only European on 3.8 MHz from P29... P29DX. Worked USSR long path!... IT9HBT. Lost time the first day listening to a discussion on the future of packet radio... ZS6BRZ. The government shut the power off twice with load shedding; the sun shut the band off twice with sunspots... KG6DX. Solar flares and power failures—we lost 10 M points... KH2S.

Biggest thrill was working the contest in the middle of Hurricane Grace...

VP9AD. I had a great time and got 8 new countries ... P29KH. Bad conditions to the USA on 10 meters both days—what a pity ... HE7H. Absolutely nothing went wrong on this trip to KG4 ... KG4QQ. The conditions to the east coast were very bad ... JA1AUD. Next year I hope to work this excellent contest MM ... CT1CLR. Wonderful! This is the first time I had more than 1000 Qs ... EA4CQT. CQ WW is always very interesting ... UA2EC. We did not work the full 48 hours due to lack of operators ... 5B4ES. Thanks for the fine unforgettable test ... YL2TW. If a British Knighthood is good enough for Stormin' Norman, I propose K1EA for king! ... G4PKP. Very strange conditions. First day, a few JAs and no Ws; second day no JAs and a few Ws ... OZ5EV. Many problems with TVI and traffic noise on 10 meters with only 80 watts ... F6DZD. And longing for a 75 meter Yagi at 110 feet to dig out the calls ... XE3EB. I proved that a good location is more important than an antenna ... G3XSV/P.

Fatal aurora killed my effort ... SP5DDJ. Aloha and mahalo to all ... KH6FKG. Great to work DXCC in one weekend, but very frustrating using state of the art receiver with only 100 watts and having to leave 5U7, KC6, HS0, FR7, etc. ... G4XKR. How come everybody gave me 59, but some had to ask me for my call 2 or 3 times ... VE2NAM. (So that's your call!—ed). Because I'm tired of contesting alone around here, I've been preaching to all the locals about the joys of the contest. I hope some of them beat me ... VE3ZD. Despite the bad conditions, it was a good opportunity to try out my new Ten-Tec Argonaut II which I had purchased just 2 weeks before the contest ... G4BUE. Ole Sol was sure playing up; this part of Europe was in a black hole for most of the contest weekend ... GW4BLE. The first MS organized by Luxembourg amateurs ... LX6A. Power department truck arrived to make pole to house hookup just a few hours before the contest started! ... J80D. Our ham radio life is DX contests. I think the CQ WW is the best ... JA1DCO. Absolutely the best contest ... IT9NTT.

I have lived long enough to be called by ZA! ... VK2DXI/9M2. Very hard to get multipliers with no propagation to Europe ... VO1SF. I got my brand new 3-element 40 meter Yagi ready only a few hours before the test and it was really worth it since the upper bands were really bad ... OH3OJ. This is the last time GU3HFN will be activated from the present shack; new one under construction (look out!) ... GU3HFN. The pileup of JAs to the Caribbean was too heavy ... JR5HCU. Too many crocodiles on the air with jaws bigger than their ears ... YL2DX. My wife grumbled about me getting to bed at 0100 local hours for 2 days in a row! ... ZL1IM. My fourth contest—I just love contests ... TG9AJR. Heard Dave, 9L1US, working stations that I couldn't hear at all ... 9L1SL. Interesting and many rare DX stations, but tough with 100 watts ... DJ2HH. Unfortunately we don't yet have power for all 24 hours in Beirut; that is the reason I couldn't operate my station longer ... OD5PL. Too much QRM ... G3XWZ.

A lot of QRM, QRN, rain, and lightning ... EA3ALD. Worst low band conditions experienced in any WW ... KL7Y. Only got in 10 hours operating time before I came down with terminal TVI ... DA1DG/K3WOW. Wanted! Contest operators ... JA3YBF. Europe is closer, stronger, and worth more points! ... AP/WA2WYR.

USA QRM

Thunderstorms and heavy precipitation static all night both nights and less than stellar propagation caused my 100 watt score to be less than my QRP 1.1 Meg score from last year ... K5RX. Working ZA (Albania) for the first time! ... K9YNF. Big pileups, lots of fun. Had to work Saturday and it cut my score down ... K9IKP. This is the greatest contest; don't change it ... K3OO. Great to see all the activity under so-so conditions ... WA8DXB. Where were all the Europeans? Last year it seemed that all I worked was zones 14 and 15; this year everybody but zones 14 and 15 ... WJ3N. Working HS0E QRP is always a thrill! ... AK5E. We will be better next time ... W9HOQ. I do hope that the U.S. station that spent most of the contest squarely on 14.150 will be disqualified ... W9LYN. I've only been a ham for 3 months and I already have 35 countries! ... KC6ZWB. My first contest and I learned a lot. I will be back next year ... N0OST. Forty meter phone could be a good DX band, but too much QRM from foreign broadcast ... W2OAE. My biggest thrill was working South America again ... N2JZK.

Strange conditions; few runs ... K3ND. Never imagined being called consecutively by two ZAs. Wow! ... N2MM. When W3LPL told a neophyte ZD7 to go by call areas, the ZD7 confused that with zones! Guys in one-land would answer him and he said he wouldn't work them because they were giving zone 5! ... NK3U. Had to work this weekend; 18 hour shift Saturday ... N2MR. Conditions poor; too many people bugging me for less important chores ... K7ABV. The flu! ... N7LOX. Working 9J2BO on the LP with just 5 watts on Sunday AM only seconds before the "Big Boys" found him ... WB5ASP. Getting harder to stay up two nights but still enjoy it ... W8UVZ. It was a pleasure to work BT7JS from Hainan Island, China, on 20 meters without a pileup ... KU6T. Very few European stations heard/worked this year ... KC5AC. G5RV got out lousy. Could hear OK but no one heard me. Spent most of the contest trying to install GAP vertical ... K8LA. Thrill in working KH0AM on 40 SSB; conditions on 40 meters were baaaad! ... K15GF. Beat my last year score even though conditions were difficult ... N9IHW.

First contest. Tough to compete with a small station ... KA8WQL. This is the first time I ever tried to do any contesting. What fun I had ... N8HTT. A case of laryngitis 7 days before the contest kept my score from being high ... WJ8E. Score improvement—used hunt and pounce method only. Still couldn't get through some pileups ... K1JBS. Worked my 100 stations and was able to have lots of sleep ... W6BIP. Was only having fun this time—hunted and pounced ... N7KA. Three new countries, including XT2, when 10 meters should have been dead to Africa ... WA5SOG. Tried new equipment. Worked great! ... W8ILC. I am 15 years old and this is my first WW. Looking forward to many more in the future ... KB9BIB. Frustrating when DX stations won't listen in our portion of the band ... N4HOH. I only hollered CQ about 10 times during the entire contest and had a ZD9 answer!

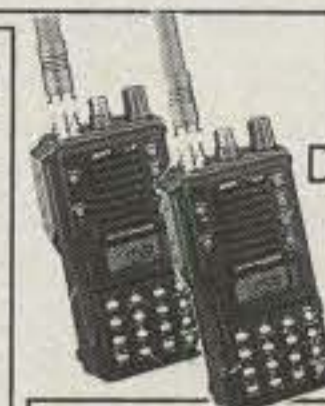
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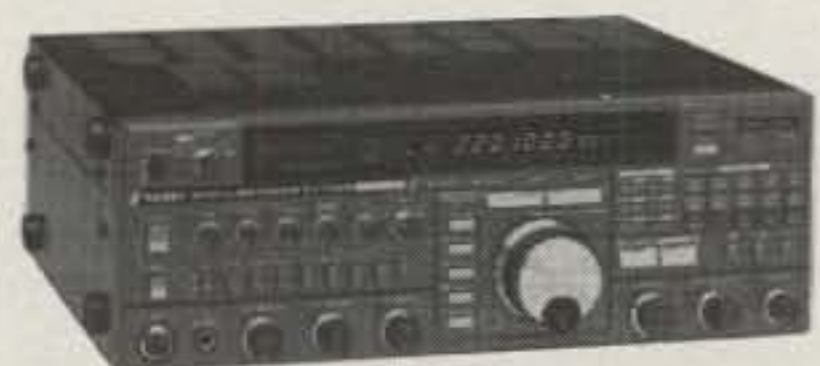


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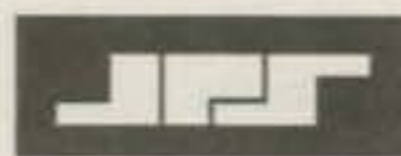


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N4PC comes through with another interesting antenna design based on some fascinating history. As the song says, everything old is new again.

A Two-Band (12 and 17 Meter) Half-Square Antenna With Coaxial Feed

BY PAUL CARR*, N4PC

“What is a half-square antenna?” you may ask. That’s an honest reaction, so let me introduce you to the antenna. A half-square antenna consists of two quarter-wave vertical elements spaced one-half length with a horizontal wire connecting the tops of the quarter-wave elements. That sounds like two-thirds of a bobtail curtain, doesn’t it? Yes, you are right. It is a simple, economical DX antenna that works great, and its history is almost as interesting as the performance of the antenna. Read on.

A Brief History of The Half-Square Antenna

Chapter 1. The half-square antenna was designed, modified, an article published, and then discovered. That sounds unlikely, but it’s true. The antenna was designed by Woody Smith, W6BCH, shortly after WW II. Woody had experimented with an inverted ground plane prior to the war, and his thought was of extending the concept to two or more elements. The antenna consisted of a full-wave wire bent at a quarter wave from each end in an “upside down U” configuration. (We know this as a half-square antenna configuration.)

A problem arose. Before Woody could build the antenna, he had to move. He tried to interest some of his friends in building and testing the antenna. The reaction was universal: Nothing that simple could be any good. If it were any good, someone else would be using it!

Facing rejection, Woody tried a more elegant version—three vertical radiators instead of two. This was the birth of the bobtail curtain. Reports began coming

back—great DX performance on 40 meter DX, especially beyond 2500 miles.

The original article “Bet My Money on a Bobtail Beam” appeared in the April 1948 issue of *CQ*. Reader response was great. Some readers reported great results although they had only enough room for two vertical elements. I’m sure Woody smiled.

Chapter II. Ben Vester, K3BC, had built an 80 meter version of the bobtail curtain in the early seventies. He found it to be an excellent DX antenna, but Mother Nature played a trick on him. During a storm the horizontal phasing line was broken near the center vertical radiator. Ben, without knowing, had Woody’s original antenna design—two vertical radiators connected by a horizontal phasing line. Ben concluded the antenna’s great performance was primarily due to the low angle of radiation instead of the additional gain of the third element. He named his discovery “The Half-Square Antenna” and reported his results in March 1974 *QST*.

Chapter III. Enter Jim Stevens, KK7C. While Jim was living in an apartment in Europe, he began to search for an antenna to use on the path from Europe to the United States. Ben Vester’s article caught his eye. The design had good points and bad points. On the plus side, it was a low-angle radiator, small size (only one-half wavelength horizontally), easy to install, and economical. The bad point: How to feed the antenna and make it ground independent. Jim concluded that one-quarter wavelength from the end of the radiator there was a low-voltage, high-current point. The impedance at this point should have been about 50–75 ohms, and furthermore, this was a convenient point to attach a coaxial feeder. He tried the arrangement, and it exceeded his expectations. Jim had a winner.

Chapter IV. How do I fit into this history?

Well, I built a 40 meter half-square antenna to use as a companion antenna during the test of “The N4PC Loop Antenna.” I fed the antenna at the junction of the vertical element and the horizontal phasing line as Jim had done, but I used a balanced feeder instead of coax. I matched the system at my station using a transmatch. The antenna proved to be an excellent performer, but after the tests were concluded, the half-square was removed to make room for other experiments.

The half-square would not stay down. Gus Hansen, KBØYH, and I began to experiment with a 17 meter version of the antenna. We had both built versions and compared notes during our many QSOs. I built two antennas—one fed with coax and a second fed with balanced line. These antennas were placed perpendicular to each other, so by switching antennas in the shack, the patterns could be verified. The antenna fed with balanced line could be matched on other bands to determine the feasibility of a multiband half-square. This gave rise to another question: Could this antenna be made to work effectively on 12 and 17 meters with a single coaxial feed? I ran patterns and impedance tests on the 17 meter antenna using an antenna analysis program. The results were used as an input to a computerized Smith chart. The Smith chart showed that if I placed a half-wave stub of 300 ohm balanced line at the feed point, at the transmitter end of the stub there would be a close match to 50 ohms—on both bands. Guess what? It works.

Predicted Results

A glance at the predicted patterns might be in order.

17 Meters (see fig. 1). The horizontal pattern is very similar to that of a half-wave dipole. The pattern is comprised of both

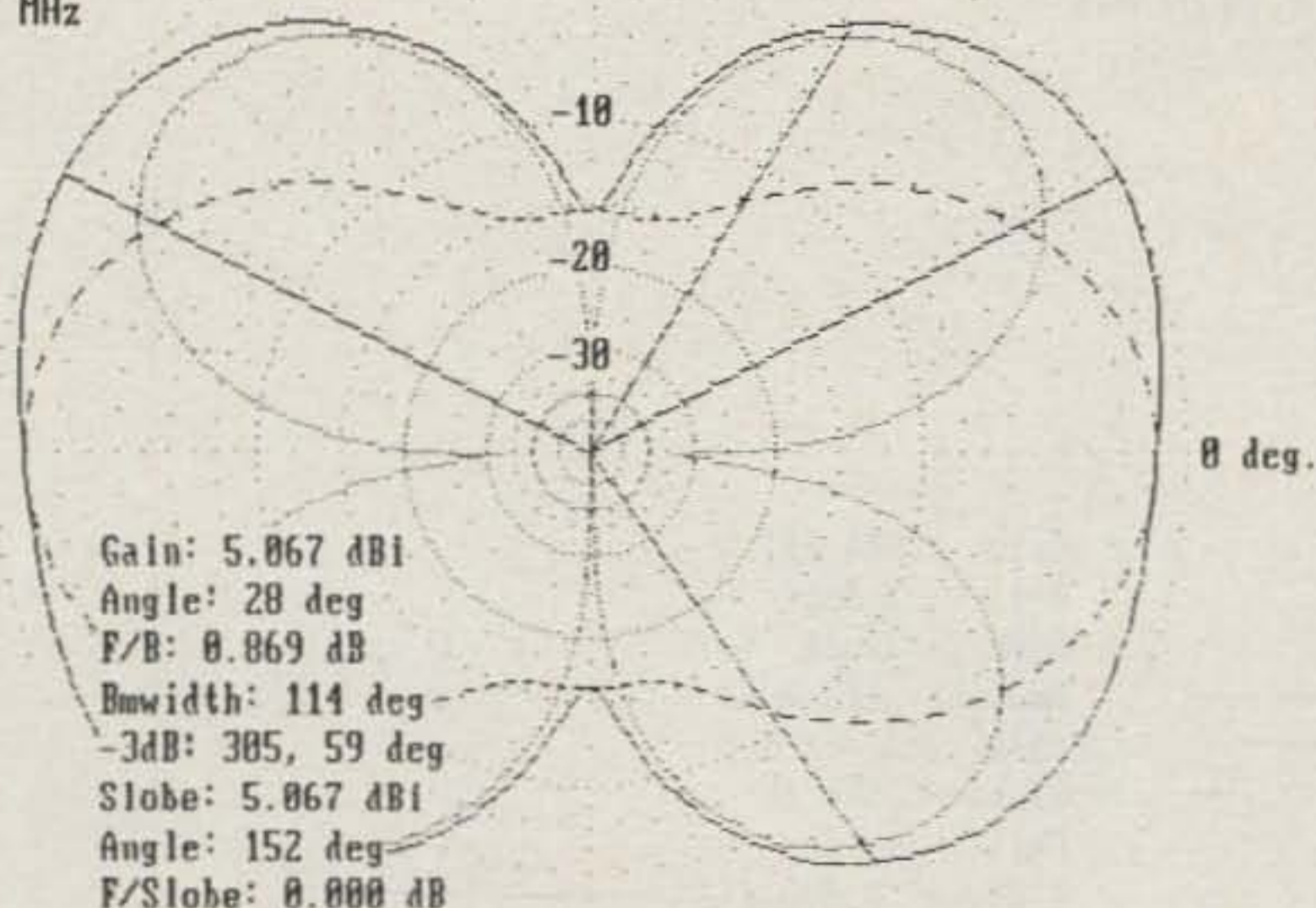
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(A)

0 dB

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ELNEC 2.23
(c) 1991

03-30-1992 08:28:35
Freq = 18.1 MHz



Tot ———
H ———
V ·····

Outer Ring = 5.067 dBi
Max. Gain = 5.067 dBi

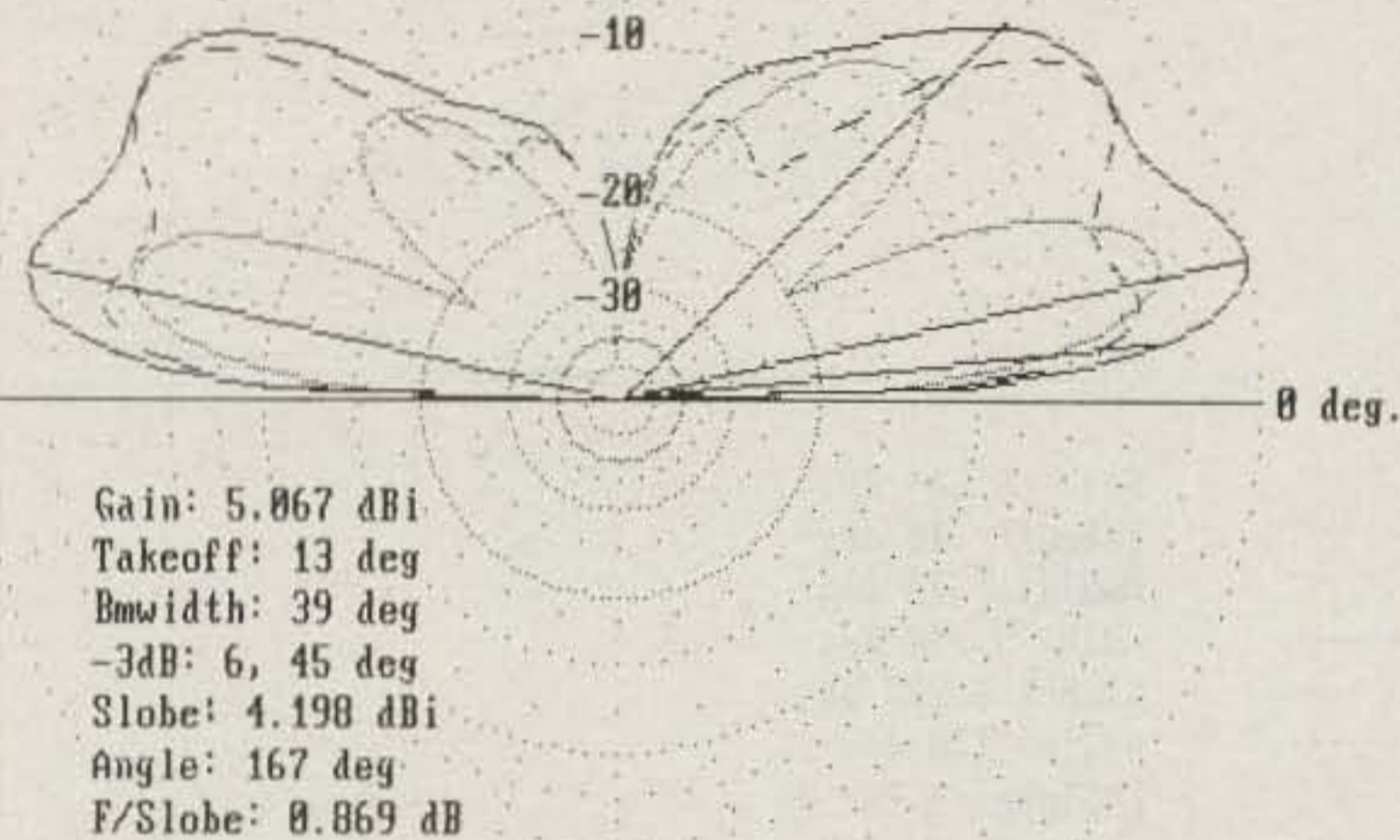
Azimuth Plot
Elevation Angle = 13.0 deg.

(B)

0 dB

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(c) 1991

03-30-1992 08:25:34
Freq = 18.1 MHz



Tot ———
H ———
V ·····

Outer Ring = 5.065 dBi
Max. Gain = 5.067 dBi

Elevation Plot
Azimuth Angle = 28.0 Deg.

Fig. 1- (A) Azimuth plot for 17 meters. (B) Elevation plot for 17 meters.

vertical and horizontal components, and it is slightly skewed due to the feed point being at the junction of a vertical element and the horizontal phasing line. It also has a broad horizontal beamwidth. The vertical pattern also shows the vertical and horizontal components.

12 Meters (see fig. 2). The horizontal pattern has become less like that of a dipole and is approaching omnidirectional. If you double the predicted beamwidth (the pattern is symmetrical about the phasing line) there are 244 degrees between the 3 dB points. This occurs because the sepa-

ration between the vertical elements is about 0.7 wavelength.

The vertical pattern shows more contribution from the horizontal component, which indicates there is more radiation from the phasing lines. The predicted angle of maximum radiation is one degree less than a dipole at the same height as the phasing line.

Construction and Tuning

Perhaps a short word picture of what we're about to build is in order (see fig. 3). Pic-

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Freq = 24.94 MHz

W7EL
ELNEC 2.23
(c) 1991

Tot ———
H ———
V ·····

Gain: 6.504 dBi
Angle: 31 deg
F/B: 2.282 dB
Bmwidth: 122 deg
-3dB: 302, 64 deg
Slope: 6.504 dBi
Angle: 149 deg
F/Slope: 0.000 dB

Outer Ring = 6.503 dBi
Max. Gain = 6.504 dBi

Azimuth Plot
Elevation Angle = 10.0 deg.

(B)

83-38-1992 08:34:42
Freq = 24.94 MHz

W7EL
ELNEC 2.23
(c) 1991

Tot ———
H ———
V ·····

Gain: 6.504 dBi
Takeoff: 10 deg
Bmwidth: 13 deg
-3dB: 5, 10 deg
Slope: 4.222 dBi
Angle: 170 deg
F/Slope: 2.282 dB

Outer Ring = 6.504 dBi
Max. Gain = 6.504 dBi

Elevation Plot
Azimuth Angle = 31.0 Deg.

Fig. 2- (A) Azimuth plot for 12 meters. (B) Elevation plot for 12 meters.

ture this: an inverted "U" with two vertical elements one-quarter wavelength long and the horizontal phase (line at the top) at one-half wavelength. The antenna is supported by halyards attached to insulators in the corners. The system is fed in one corner where the vertical element meets the horizontal phase line. The feed line is routed along the halyard for about one-quarter wavelength. Specifically, this is how you build it.

Start by spreading two insulators to support the pattern. Next cut a piece of wire about 41 feet long. Measure 13 feet 6 inches from one end and fold the wire back

on itself. Push the folded wire through one hole of the insulator far enough to allow the insulator to pass through the wire loop. Pull the slack out of the wire, forming a cinch knot on the insulator. Secure this cinch knot with a nylon cable tie. Trim off the surplus cable tie.

Now measure 27 feet 9 inches from the insulator. Allow enough wire to pass through one hole in the second insulator. If you are using insulated wire, remove enough insulation to allow for subsequent soldering to the feed line. Cut another wire 13 feet 9 inches and pass this wire (insulation removed if necessary) through the

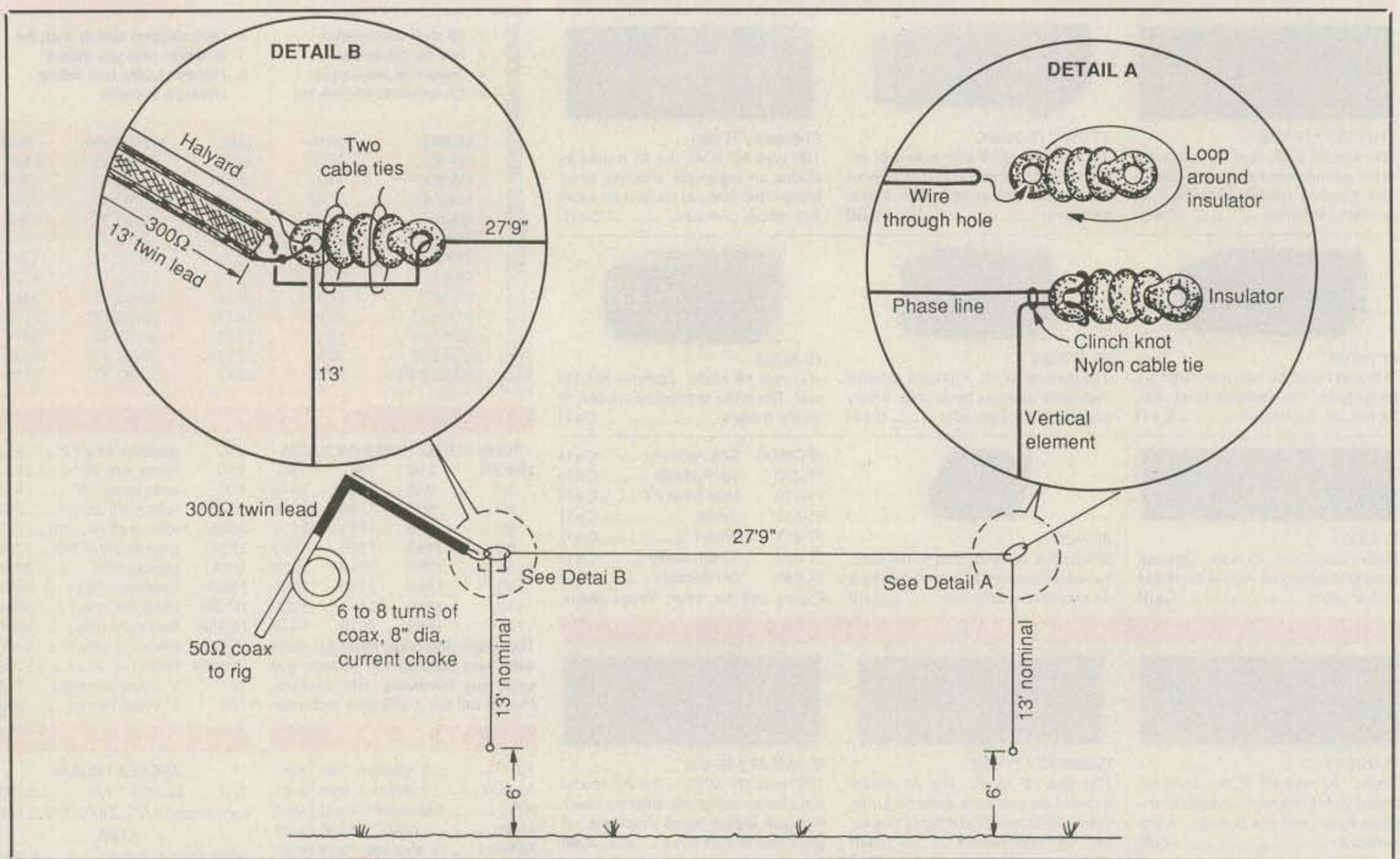


Fig. 3— Details for two-band half-square wire antenna.

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second hole of the insulator. The halyard will also connect through this hole. Temporarily connect a 50 ohm coax to this junction with the center connector to the phase line and the braid to the vertical wire. Attach halyards to the insulators and route the coax out its halyard about 13 feet. Make a loop in the halyard and attach the coax. This will keep the coax out of the antenna pattern. Hoist the antenna high enough into the air so the ends of the vertical elements will be about 6 feet off the ground. Route the coax to your rig and supply enough power to get an SWR reading. Trim the vertical elements by removing equal lengths from the vertical elements to get a resonant condition at 18.1 MHz. The SWR should be very close to 1:1. Lower the antenna and remove the coax.

We now construct the matching stub. Cut 23 feet 6 inches of good-quality 300 ohm TV twin lead. I used TV lead with a velocity of 0.82 (Belder 8230). If the twin lead you use has a different velocity factor, compensate accordingly. Attach the twin lead at the point where the coax was attached and solder the connections. Secure the twin lead to the insulator with nylon cable ties. Route the twin out the halyard and attach it as you did with the coax. Make a current choke by placing about six to eight turns of coax into a loop

about 8 inches in diameter. Try to keep the first and last turns of the coil separated. Use electrical tape to secure the coax to the twin lead by twisting the conductors together. Be sure that the center conductor of the coax attaches to the side of the twin lead that goes to the phase line.

Again, hoist the antenna into the air. Tune your rig to 24,930 MHz and check the SWR. Trim the twin lead for the best match on 12 and 17 meters. With careful tuning of the phase line and vertical elements, you should be able to obtain an SWR of 1.5:1 or better on both bands. After you have assured yourself that you have achieved the best SWR on both bands, solder the coax to the twin lead and waterproof the connection. I suspended 1 ounce fishing weights to the vertical elements with nylon twine to remove any curl in the wire. Hoist the antenna into the air and that's it.

On-The-Air Results

The results have been very gratifying. It seems strange for me to hear signals from New England and Europe at the same signal strength. I have had many long rag-chew QSOs on both bands while running QRP. A standard comment seems to be "I can't believe you're running only 5 watts

output to a pair of phased verticals." I smile.

Afterthoughts

The two computer programs used during the design phase were ELNEC by Roy Lewallen, W7EL, and MicroSmith by Wes Hayward, W7ZOI. I used ELNEC for the antenna analysis and MicroSmith to solve the matching stub problem. These are two excellent design tools for the modern ham shack.

Acknowledgements

I would like to thank Lew McCoy, W1ICP, my technical editor, who has always tried to keep me headed in the right direction. Gus Hansen, KBØYH, and Jim Stevens, KK7C, were quick to supply encouragement and in Jim's case, a field trial. I owe a special debt of gratitude to Hal Stahlhut for supplying historical data without which I could not have written about Woody Smith's early efforts. And thanks to Woody Smith, W6BCX, for a great antenna.

As with previous articles, I will try to answer all letters (SASE please).

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JOE: N6YYO

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Here's something you can accomplish in one or two evenings in plenty of time before the next contest.

Save-A-Buck Modifications For Heathkit Power Amplifiers

BY DEAN BATTISHILL*, W5LAJ, AND LEW McCOY, W1ICP**

The Heath Company for many years produced a series of 1 to 1.5 KW amplifiers using 3-500Z grounded-grid tubes. As many users have found, there are a few critical areas where breakdowns can occur. I (W1ICP) have a Model 2200 amplifier that had some of these problems. My friend and cohort, Dean, W5LAJ, who is an experienced amplifier designer, suggested that he go over my unit and make repairs and simple improvements. Of course, I suggested that I write this article about the changes because others may want to do the same thing. So Dean did the mods, and I did the writing.

First of all, I found that my 2200 was running excessive resting plate current, and Dean surmised that I had a blown zener diode—one that fixes the resting plate current. He told me that this was a common problem because Heath had not used a rugged enough diode. It is easy to check to see if your diode has blown. Simply observe the plate current without any drive being applied. The resting plate current for a pair of 3-500Zs should be 120 ma or .12 amp on the plate meter or within 30 or 40 ma of that figure. If it is much higher than this, then your diode has gone south.

It is very difficult to find an exact replacement diode, and the prices of such are really out of this world. One amplifier manufacturer gets \$36 for a 10 volt, high-power zener! The one described here using junk box parts shouldn't cost you more than a few dollars (and it is much more rugged). Therefore, the simple answer is to "roll your own."

A low-cost 6.5 volt, 0.5 watt zener is the basic voltage regulator which controls either a PNP or NPN, germanium or silicon transistor. The transistor must be a device that is rated at 40 watts or more and has an HFE of about 30 or so. See fig. 1 for the circuit, using either a PNP or NPN tran-

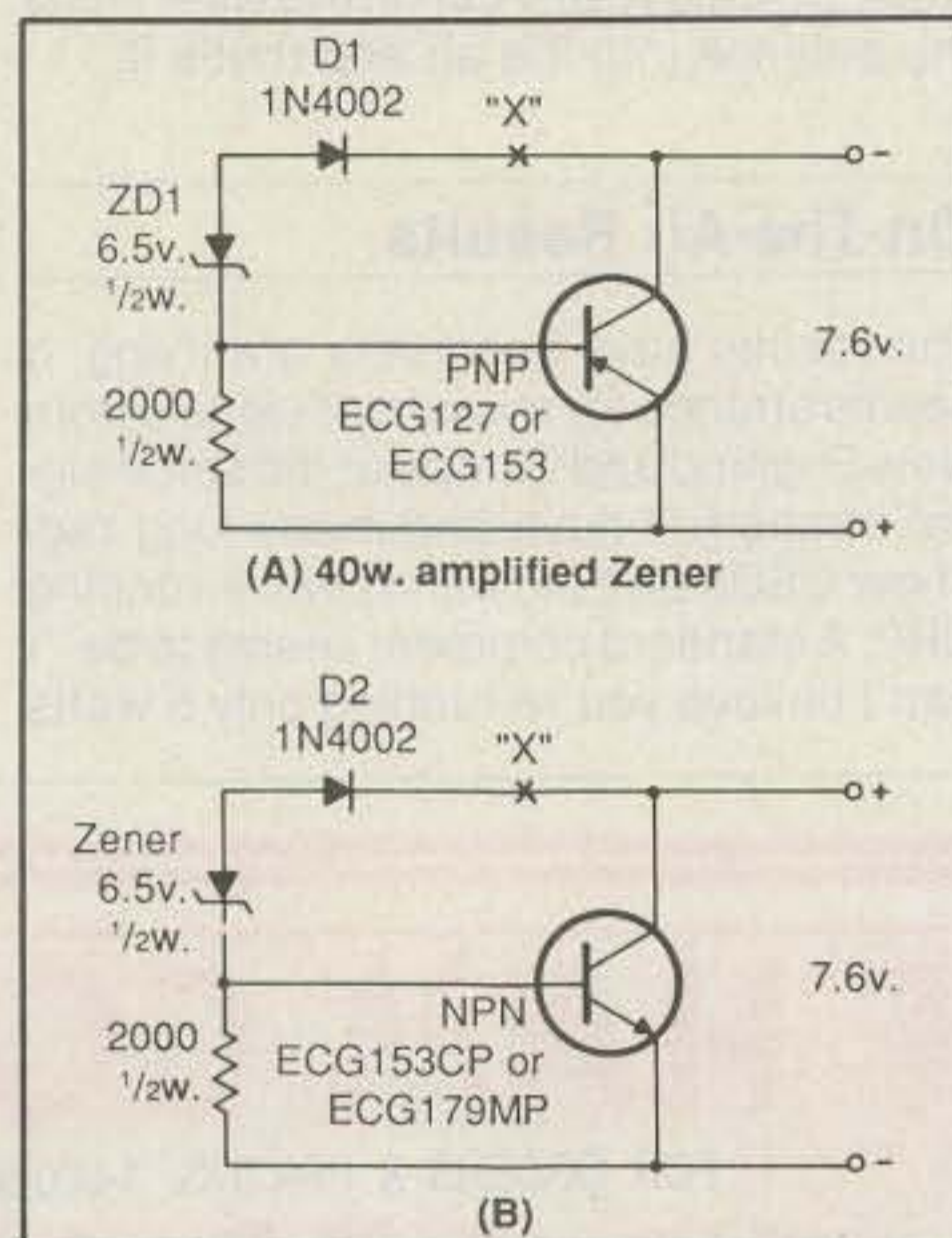


Fig. 1—Circuit diagram of the amplified zener diode. At A is the circuit using a PNP and at B, an NPN. The point X is where an additional diode can be inserted to add to the voltage.

sistor with a type TO-3 base. What we have here is an "amplified zener." The photograph shows the simple mounting of the circuit. This is mounted on a small piece of angle aluminum which in turn is mounted to the amplifier chassis.

When you test your unit, and the resting plate current is over the 120 ma level in the **CW/Test** position (about 150 ma in the **SSB** position), it is simple to make a change to get the current into the ballpark. D1 has a rating of 0.7 volts. This added to ZD1 (6.5 volts) and the voltage in the transistor provides 7.6 volts regulated output. Adding another diode the same as D1 in series with D1 (at point X on the diagram) will add 0.7 volts, providing stiffer regulations and lower resting current. The 3-500Z tubes have different characteristics as they age, so this may become necessary.

The zener is installed as follows. Lift the wire from terminal No. 6 on the antenna

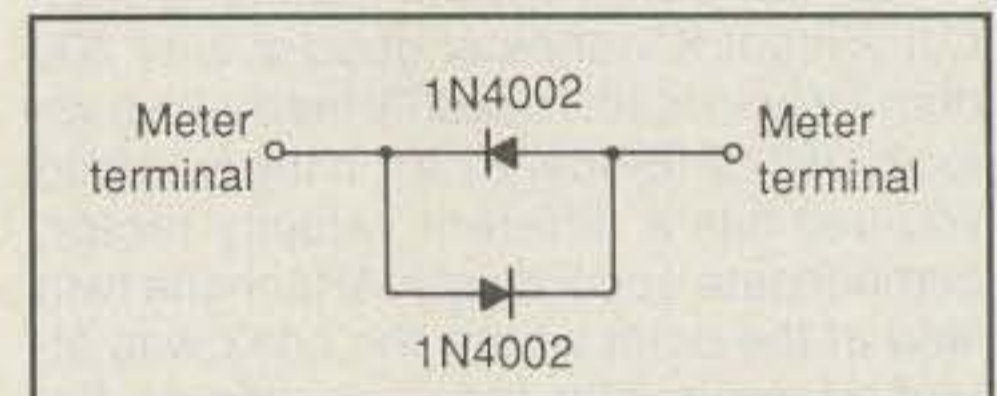


Fig. 2—Simple diode addition for meter protection.

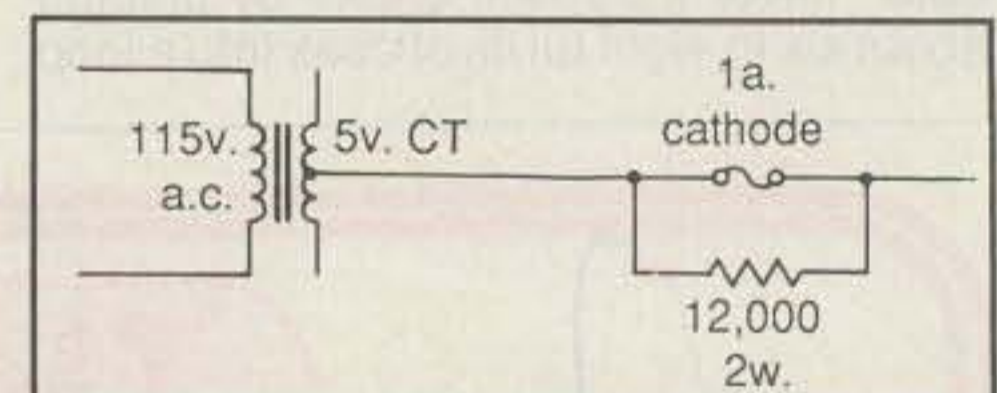


Fig. 3—This detail shows the fuse for protecting the tubes in the event of flashover.

changeover relay. Connect the end of this wire to the anode, or negative lead, of the device. Solder a new wire (insulated) on terminal No. 6 and connect this wire to the cathode, or plus lead, of the device. Be sure to jumper the original ZD1 so it will not be in the circuit.

No doubt some amateurs will want to know if they can use the popular 2N3055 or 2N2955 transistors in this new circuit. The answer is yes, but the reference diode value will have to be a 1 watt device to take care of the lower current gain of the transistor. The output voltage will be about 0.5 volt higher because of the additional junction drop of the silicon device. Transistor mounting on the aluminum elbow heatsink is conventional using a mica washer for insulation.

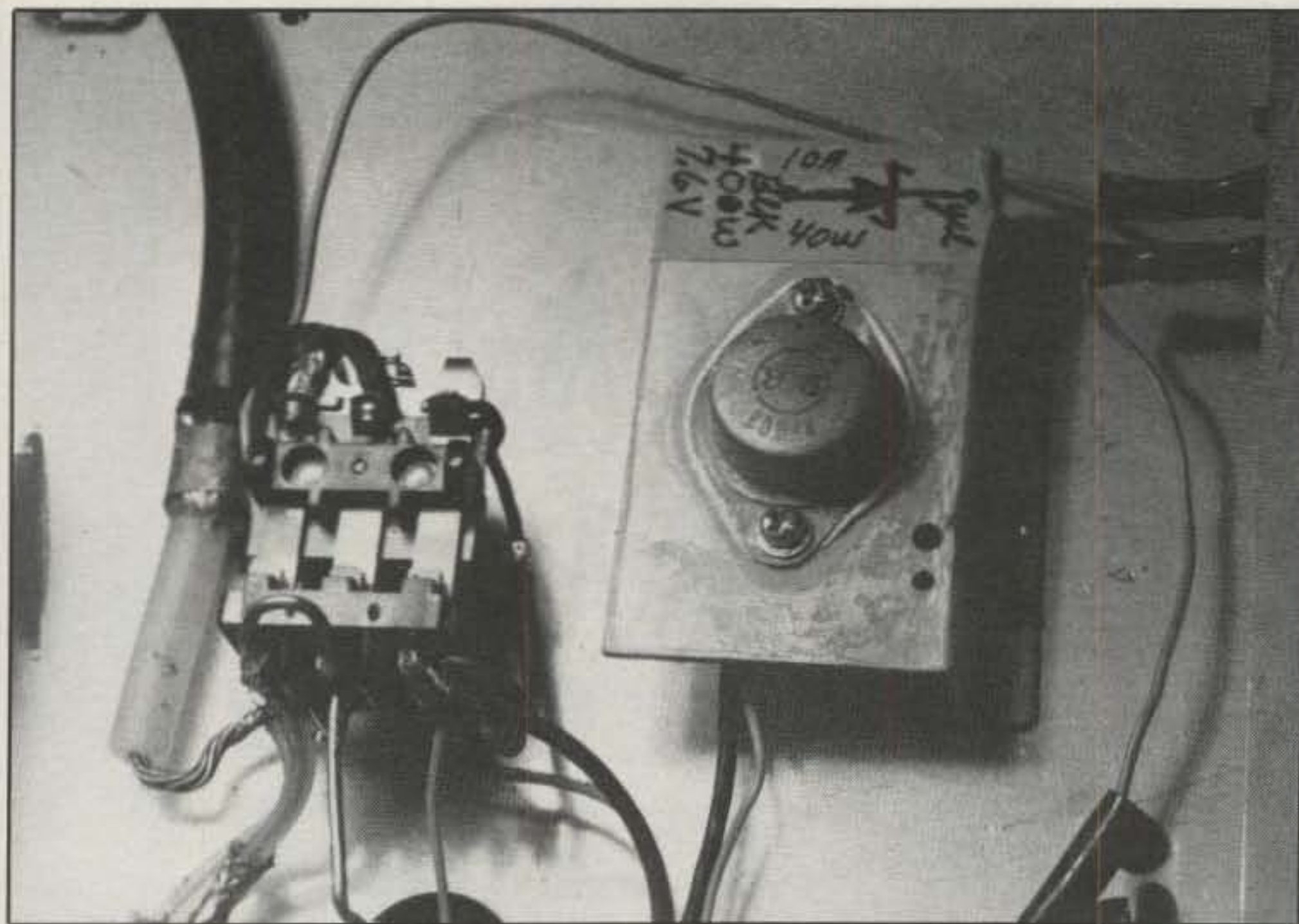
In my amplifier, with 7.6 volts of bias, I had about 100 ma of resting current in the **CW/Tune** position and 150 ma in the **SSB** position. These are very satisfactory numbers.

Meter Protection Modification

For some reason, probably to keep cost

*7 Crestway, Silver City, NM 88061

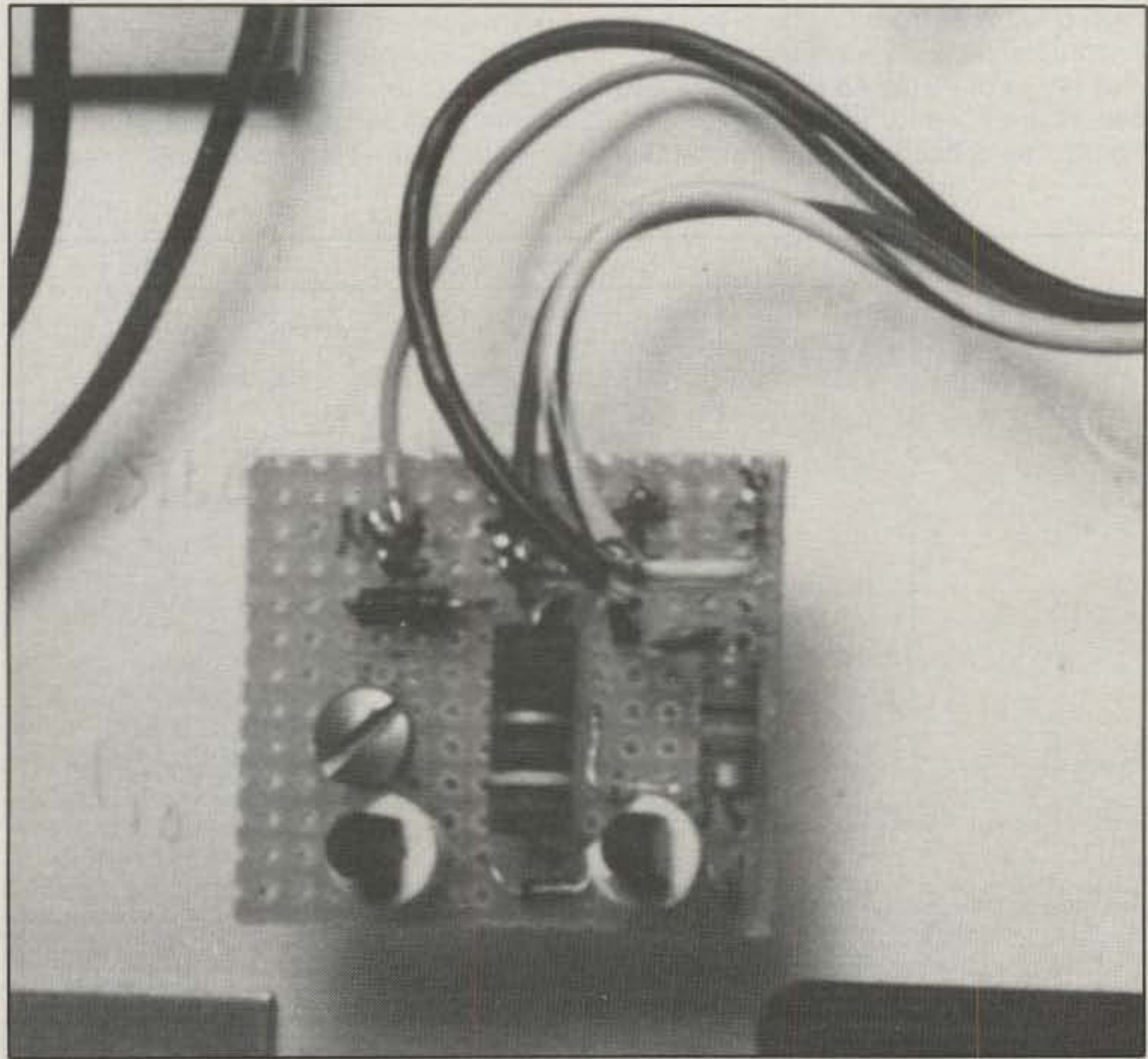
**Technical Editor, CQ, 200 Idaho St., Silver City, NM 88061



This shows the zener unit, mounted near the antenna relay. The unit is built on a small aluminum bracket that also serves as a heat sink.

down, Heath didn't provide meter protection in case of flashovers, etc. Meters can be very expensive, and exact copies would be hard to replace. Heath replacements, if they still have them, are about \$40 a copy.

A simple solution for protection is to install diodes, back to back, as shown in fig. 2, across the meter terminals. Dean prefers 3 amp diodes because they offer greater protection than one amp units. Also, once your amplifier is tuned up, place



Here is the "saturated" antenna switching unit. Note it is built on a small piece of perf board and mounted just above the chassis.



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the meter switch in the **Rel. Output** or **Ep** position to further protect the meter in the event of flashover.

Flashover Tube Protector

Heath did not design any tube protection in the event of flashover of the tube. This can be cured by installing a 1 amp fuse in the cathode circuit of the tubes. Then if a flashover occurs, the fuse will blow out rather than the tubes.

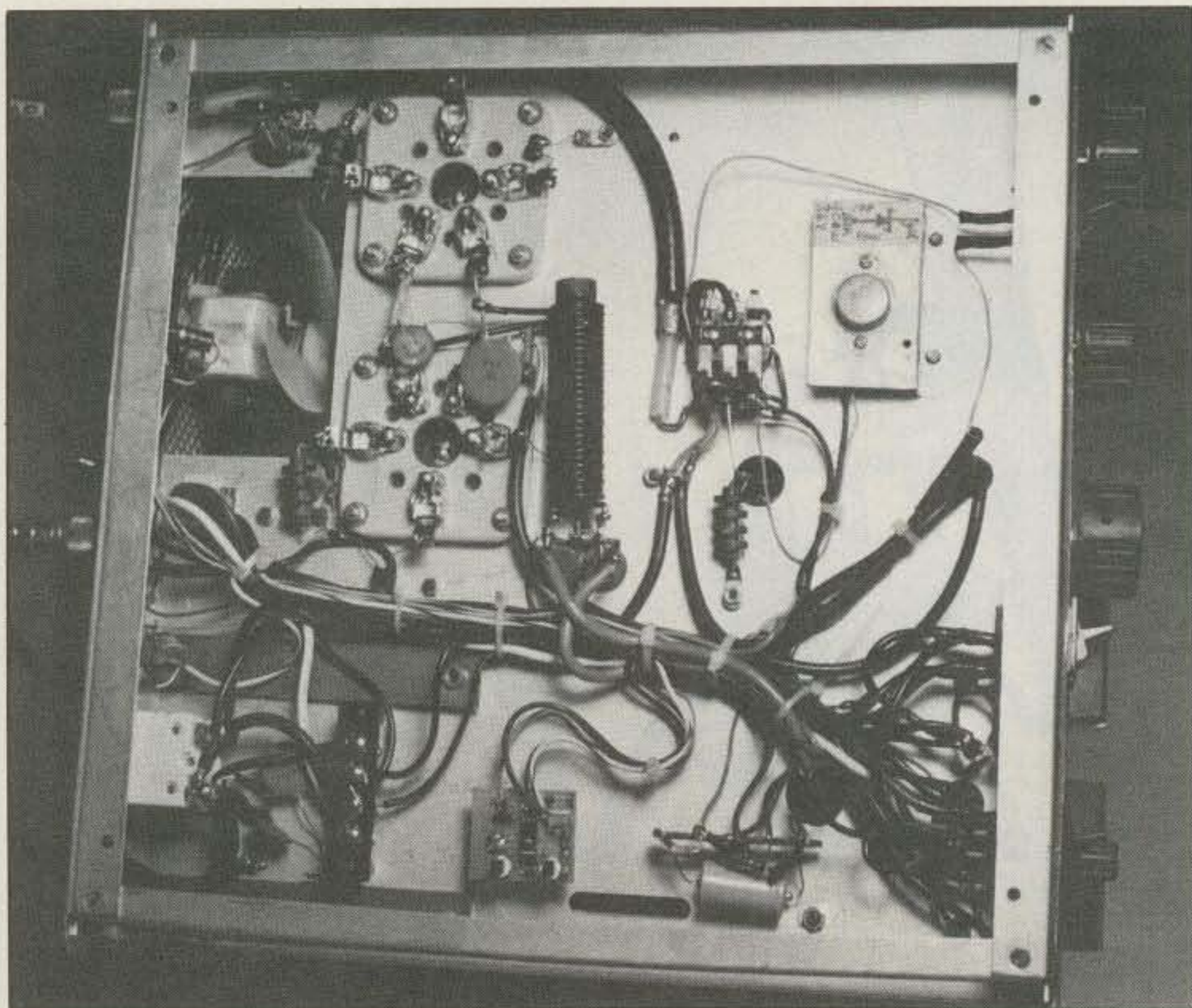
This installation is very simple. Fig. 3 shows the circuit modification. Be sure to study your construction manual before starting the installation. We have included (fig. 5) the pictorial 4-12 from our manual to assist you. This drawing also shows the relay contacts.

Install a fuse holder on the rear wall of the chassis, next to the exciter input coax fitting. The green-yellow wire is lifted from terminal No. 9 on the antenna changeover relay and a piece of insulated wire is spliced to the green-yellow wire, the added wire being long enough to reach the fuse holder. Another insulated wire is connected to terminal No. 9 on the relay, and this wire is run in parallel with the green-yellow wire back to the remaining terminal on the fuse holder. The fuse used should be a 1 amp AGC1 fast blow type (and of course the fuse holder should be the type to hold this kind of fuse.)

Saturated Transistor Antenna Switch

Now we come to a big problem with Heath amplifiers. Just about all modern transceivers use very low voltage controls (solid state) for switching antenna changeover relays in amplifiers—or, to put it another way, to turn the amplifier on and off. The big problem with Heath amplifiers is that K1, the changeover relay, is switched by 120 volts DC through the relay. This voltage is fed to and through the coil, and the relay and amplifier are switched when the coil lead is returned to ground. Many newcomers, who don't understand, see a connector on their exciter that says "Amplifier Switch" or something similar and conclude that all they need do is connect from the Heath amplifier switch to this connection. The result is usually a disaster.

Fig. 4 is a circuit diagram of the "saturated" transistor antenna switch. When the PTT line is grounded via a low-voltage transistor, or switching device in the exciter, Q1 amplifies this action and feeds the information to the base of Q2, the collector of which is connected to the Heath relay coil. This connection replaces the "normal" grounding of the relay. The relay



This is an overall view of the amplifier bottom showing the modifications. An already fine amplifier is made into a much better unit as far as protection is concerned.

is then returned to ground via the emitter of Q2.

As you can see from the photo, the components for this switch are mounted on a small piece of insulated perf board, and sockets are used for the transistors, Q1 and Q2. The connections are simple. Dis-

connect the blue wire from the J1, the antenna relay jack on the rear chassis apron. Connect this lead to the collector of Q2. Connect a wire to terminal number 11 of the antenna relay (Heath relay) and connect this wire to the B+ 126 volt line from the saturated switch. Connect a

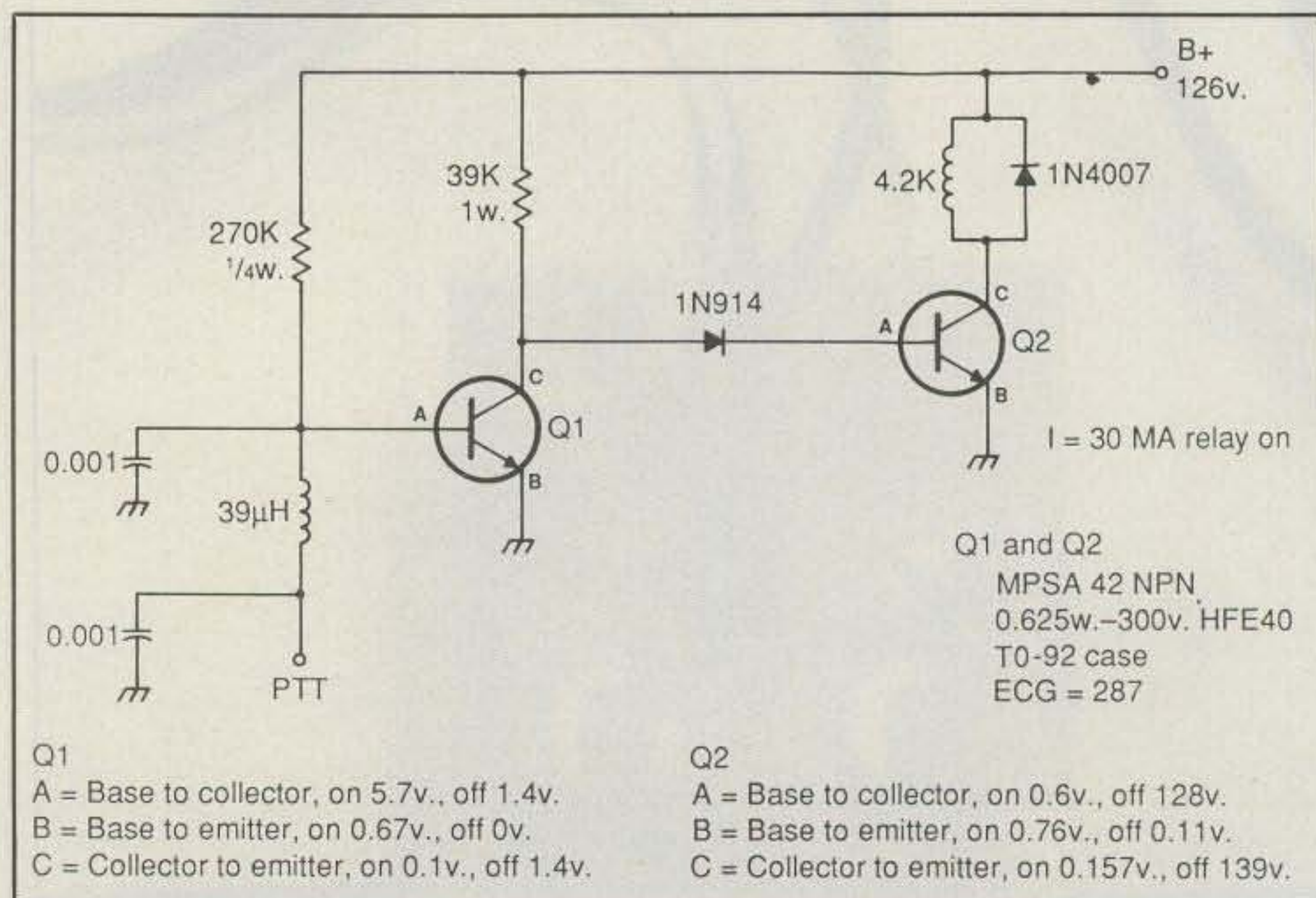


Fig. 4—Circuit diagram of the saturated switch for the antenna changeover relay. A1 and A2 are the voltage from base to collector. B1 and B2 are base to emitter voltage; C1 and C2 are collector to emitter voltages. Circuit was designed by Richard Lanari, W0YXM.

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Dear Bill,

I'm writing to thank you for the excellent help and hardware I've received from DX Engineering.

A few years ago I ran an average station with an average tri-bander and obtained average results in dxing and contesting. I enjoyed radio so much that I decided to upgrade my situation. After researching what was available, I cautiously purchased the 3 element full size 40M monobander.

Wow!! I had to record qsos with the dx to convince friends that the dx was really there.

This prompted me to put up 2 5 element 20's, 2 6 element 15's, and 2 6 element 10's on a rotating tower. The installation went up quickly, made easy from the help of DX Engineering with regard to the phase & switch boxes, spacing and actual antenna construction.

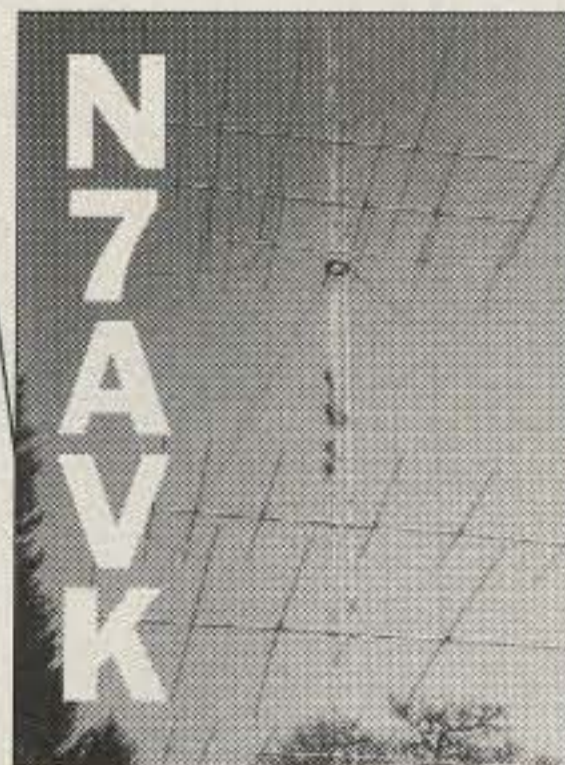
These antennae and systems work great! Dx pileups are cracked with 1 or 2 calls. My contest scores have soared. In short, your hardware has performed like my research indicated it would.

I've put the log periodic up now and am constructing the 3 element full size 80M monobander. By the start of this contest season I expect the 80 to be up performing like gangbusters like all of my DX Engineering hardware does.

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shielded lead from the PTT terminal of the transistor switch and run this shielded lead to the antenna changeover jack on the rear apron. Also, connect a ground wire on the transistor antenna switch to the nearest ground lug on the Heath amplifier. Be sure the diode across the coil of the Heath relay is a good high-voltage device, a 1N4007 or equivalent.

The Heath relay still runs at 30 ma and 126 volts, but what is changed is that while the relay is now controlled by our saturated transistor switch, the relay jack for switch-over now operates with about 0.6 volts and less than 1 ma. Any exciter should be able to handle this. Note that Q1 and Q2 must be 300 volt devices—no 2N222 transistors! The switch can be bench checked

by putting a 4200 ohm, 5 watt resistor in place of the relay and feeding 130 volts DC to it. The current is about 4 ma with the PTT line open, and 34 ma with it keyed to ground.

Needless to say, these modifications could save you a lot of money, plus they are very worthwhile in making a good amplifier even better. MI

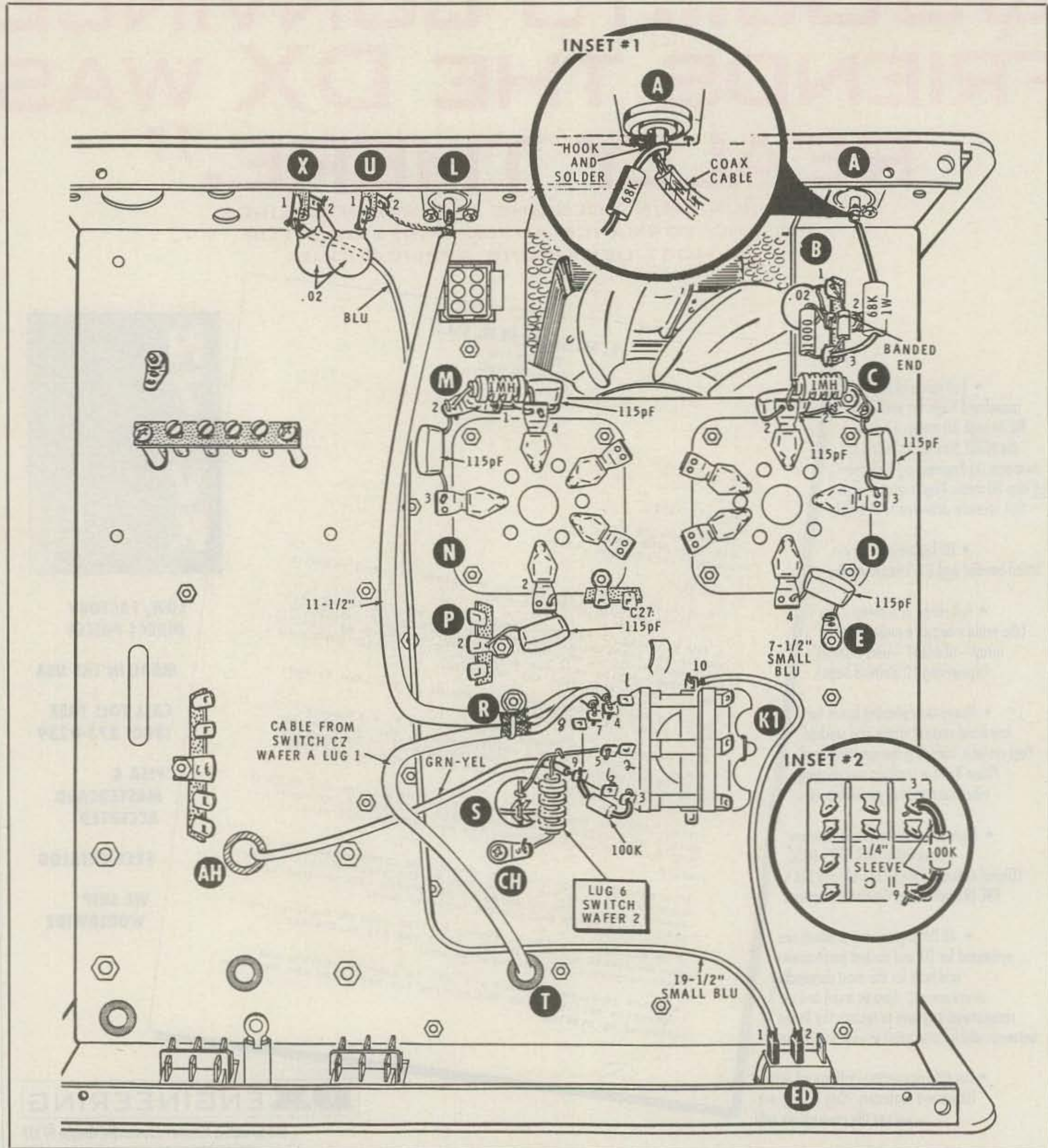


Fig. 5— This is the pictorial taken from the Heath manual showing some of the wiring we are concerned with for the modifications. The green/yellow lead we refer to is the one going through AH.



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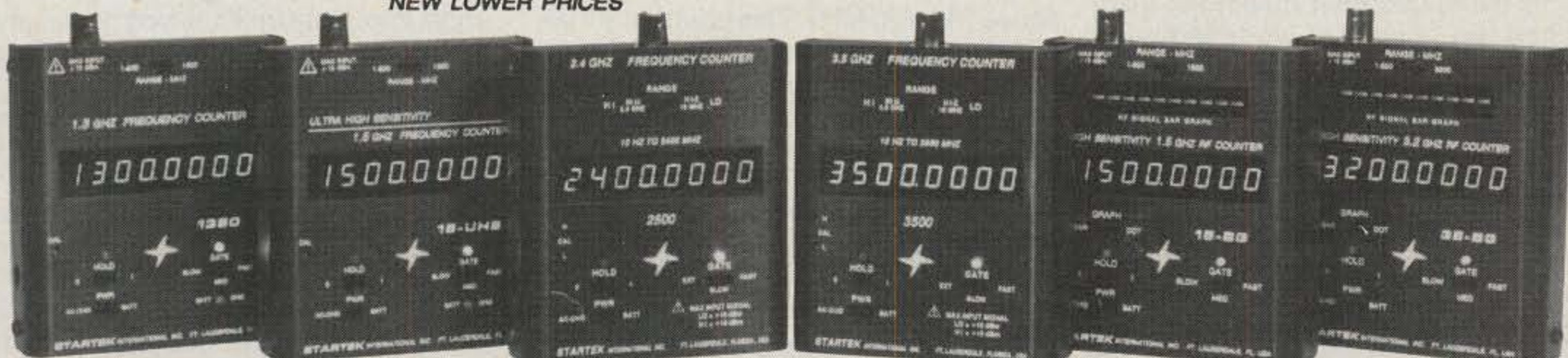
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CQ REVIEWS:

The Cushcraft 17B2 2 Meter (Long Boom) Beam

BY JOE LYNCH*, N6CL

With the introduction of the 17B2, the 17-element, long-boom, 2 meter antenna (and its little brother, the shorter 13-element 13B2), Cushcraft has embarked on an entirely new class of Yagi design. This antenna has been "enhanced" using the latest computer-modeling techniques. In this review I will concentrate on the 17B2 antenna.

Long-boom antennas are designed with high gain as a compelling motive. Generally speaking, the longer the boom length, the greater the gain. However, there are optimum boom lengths and numbers of elements that yield good gain as well as a clean pattern with a good front-to-back ratio. It is up to the designer to find these optimum lengths and patterns.

The use of computer modeling allows for almost instantaneous observance of antenna design changes in gain, pattern, impedance, and front-to-back ratio, without cutting a piece of aluminum. With a modern PC and the proper software (Cushcraft uses the Mininec program), the designer can change or move a single element length or spacing and in seconds see what variations will occur. If the results improve, another "tweak" can be tested. This can go on as long as the designer can see worthwhile improvements.

After Cushcraft completed computer modeling the 17B2 antenna, they constructed it, tested it on the antenna range (they have two 50 foot towers located 500 feet apart), and adjusted the element lengths to compensate for boom mounting, as well as computer-modeling offsets. The end result was a radiation pattern that not only exceeded their goals, but also matched the computer modeling very closely. Fig. 1 shows the resultant azimuth and elevation patterns (according to the Mininec program).

The new Cushcraft 17B2 boomer has many special features and improvements over its predecessor, the 4218XL. Some of them are:

- All elements are tapered in spacings and lengths to yield the greatest possible

Antenna Gain Measurement Test Results				
Dayton Dayton Hamvention				
Call	Antenna Description	Boom Length		Measured
		feet	(λ)	
W8ULC	19-ele. homebrew modified K1FO	35.0	(5.12)	14.3
W1JR	17-ele. Cushcraft 17B2 W1JR design	31.0	(4.53)	14.15
WA8OGS	6-ele. Chen-Chang design	11.6	(1.69)	11.3
WA8OGS	6-ele. W2PV design	5.1	(0.75)	8.8
KA0VFF	4-ele. homebrew	4.0	(0.58)	6.1
WB4IZR	3-ele. dual-band 144/432 Yagi	3.7	(0.54)	5.7
WB4IZR	3-ele. monoband Yagi	3.7	(0.54)	5.7
W8CBR	2-ele. homebrew quad	1.75	(0.25)	5.05
WB8IFM	2-ele. commercial HB9CV design	0.84	(0.12)	4.5

Cedar Rapids Central States VHF Society				
Call	Antenna Description	Boom Length		Measured
		feet	(λ)	
AF9Y	22-ele. homebrew optimized YO/MN/NEC	42.0	(6.14)	14.9
W1JR	17-ele. Cushcraft 17B2 W1JR design	31.0	(4.53)	14.1
W1JR	13-ele. Cushcraft 13B2 W1JR design	15.0	(2.19)	12.9
N0CIH	14-ele. homebrew (modified Cushcraft 214WB)	15.0	(2.19)	12.2
WB0TEM	8-ele. homebrew Yagi	—	—	10.0
AJ0E	5-ele. homebrew Yagi K0IWA design	—	—	9.7
WQ0P	single halo, Cushcraft	—	—	0.2

Table 1—Results of two antenna gain measurement contests.

gain, bandwidth, clean pattern, and low noise temperature for EME.

- Careful attention has been given to director lengths. Because of this care, the gain, SWR, and pattern will not shift drastically when rain, ice, or snow collect on the elements.

- The antenna is rated and shown to have a low VSWR over two MHz, centered above 144.200 MHz. This is important because when the antenna is loaded with snow or ice, the resultant frequency shift will not force the antenna's bandwidth out of the band.

- The highest possible gain versus clean pattern (known as the figure of merit) was found to be the 31 foot, 4.5 wavelength boom length of this antenna.

- The antenna uses a single low-profile reflector—no more trigons.

- The best possible balanced feed system, the tried and proven T-match, is used. It is fed with a weatherproofed, built-in balun (the black box). This balun (called the

UltraMatch™) is made with a coil of low-loss, high-power, Cushcraft UltraLink™ cable (specially designed teflon dielectric coaxial cable, similar to RG 303) and a special piece of ferrite on the cable to dampen any possible extraneous radiation on the line.

- An N-connector is built into the balun for ease in connecting your feed line and (most important) maintaining continuity of the 50 ohm impedance of the balun and transmission line.

- Specially designed swagged booms, reinforced at the ends, are used for the high strength and low wind load.

- The boom uses new, enhanced boom supports that are stronger and easier to mount.

- The strong aluminum alloy, 6063-T832, is used for the tubing and the 3/16 inch solid directors and reflector elements.

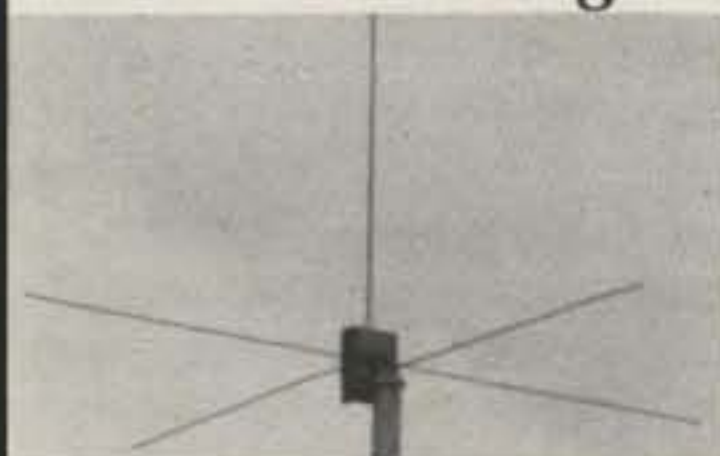
- One-hundred percent stainless-steel hardware is used throughout.

- This antenna is excellent for entry-

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

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possible SWR . . . strong lightweight aluminum construction that's protected by MFJ's Permanent Molecular Bonding Technology™ . . . low loss ceramic antenna insulator for maximum radiated power . . . MFJ's Fast Tune Radiator™ for quick accurate tuning . . . super easy installation to any 1" to 1 1/2" inch mast with single U-bolt (included) . . . and it's Made in USA.

Also available for 220 MHz, MFJ-1752, \$19.95.

MFJ Pocket Roll-Up™

2 Meter Halfwave J antenna

MFJ-1730

\$14⁹⁵

Roll up this half-wave 2 Meter J-antenna and stick it in your pocket!

This new MFJ Pocket Roll-Up™ is the perfect gain antenna for traveling.

Get home station performance on the go. Just hang your Pocket Roll-Up in the clear, plug the handy BNC connector into your handheld and enjoy some great QSOs.

It's omni-directional and has significant gain over a 1/4 wave. It doesn't need a cumbersome ground plane so it's convenient for indoors and works great with handhelds.

1/4 Wave Ground Plane

MFJ-1740

\$12⁹⁵

The MFJ-1740 is the most inexpensive way to put out a potent FM signal on 2 Meters. It'll bring up repeaters as well or better than any 1/4 wave ground plane — even if it cost twice as much.

The improved MFJ-1740 1/4 wave ground plane minimizes feedline radiation for more useful radiated power, reduced TVI and noise pickup by the coax shield.

It's made of strong lightweight aluminum parts protected from corrosion by MFJ's Permanent Molecular Bonding Technology™.

You get MFJ's Rapid-Tune-Radiator™ for easy tuning and low loss ceramic antenna insulator for maximum radiated power. Single included U-bolt mounting for 1 to 1 1/2 inch mast. Cutting chart included for 220/440 MHz. Made in USA.

"Shorty" Duck for HTs

MFJ-1718

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Add this strong, flexible "Shorty" 1/4 inch rubber duck to your 2 Meter handheld and enjoy an outstanding signal! Its super efficient, high-Q helical wound radiator is specially impedance matched to handhelds for maximum gain.

No Matter What Guarantee

Your MFJ antenna comes with MFJ's famous No Matter What™ One Year Unconditional Guarantee. That means we will repair or replace your MFJ antenna (at our option) no matter what for a full year.

MFJ Permanent Molecular Bonding Technology™

MFJ's exclusive Permanent Molecular Bonding Technology™ protects aluminum. This super durable finish actually bonds itself to aluminum molecules — it won't come off unless metal comes off!

5/8 Wave 2 Meter Mobile Antenna

MFJ-1728 For maximum range while mobile, use MFJ's Maximum Gain™ 5/8 Wave 2 Meter Mobile Antenna. You'll get the maximum possible theoretical gain of any single element mobile antenna!

Competitive 5/8 wave mobile antennas can't work any better — no matter how much more they cost.

You get low SWR so your rig can safely deliver maximum power into your antenna. It's rated at 300 watts PEP so you can use any mobile rig plus a mobile amplifier.

You get a heavy-duty magnet mount that holds your antenna tight at highway speed and a chrome plated magnet base that keeps it looking good for years.

You get has a stainless steel radiator that'll endure years of harsh mobile use and 12 feet of coax cable with connector.

You get MFJ's famous one full year No Matter What™ Unconditional Guarantee.

The MFJ-1728 Maximum Gain™ 5/8 Wave Mobile Antenna gives you maximum mobile range and the most for your money. Get yours today.

MFJ Dual 5/8 Wave Super Gain™ 2-Meter Antenna . . . direct feed gives you irrefutable real gain.

MFJ-1764 This new MFJ Super Gain™ 2-Meter antenna directly feeds two full size 5/8 wave radiators and makes both elements strongly radiate. You get irrefutable real gain.

Plus, you get additional gain for FM and Packet because your mast doubles as a reflector. There's plenty of antenna gain to work stations off the sides and back — your signal is just stronger in the direction the MFJ-1764 faces.

The result? You get more range to reach distant repeaters and much better local coverage on direct channels and Packet.

You get an extremely wide 10 MHz 2:1 SWR bandwidth . . . excellent ferrite choke balun feedline decoupling to eliminate wasted power due to field pattern distortion . . . shunt choke for bleeding off unwanted static . . . strong lightweight aluminum construction protected by MFJ's Permanent Molecular Bonding Technology™.

It's fully assembled — simply attach radiators — no tuning required. Mounts vertically for FM and Packet or horizontally for SSB. Easy-to-install with single U-bolt (supplied) on any 1 to 1 1/2 inch mast or tower leg. Weighs 1 1/2 pounds, two 47 inch radiators, 23 inch boom. Made in U.S.A. One year Unconditional Guarantee.

Double your Gain with direct feed!

You can double the gain of one MFJ-1764 5/8 Wave Super Gain™ 2-Meter Antenna by mounting two MFJ-1764s one above the other on the same mast and directly feeding both. Order MFJ-1766, \$89.95, includes 2 MFJ-1764 Super Gain™ 2-Meter Antennas and a Direct Feed Power Splitter/Cable Harness.

If you already have two MFJ-1764s, order MFJ-1765, \$29.95, Direct Feed Power Splitter/Cable Harness to feed your two MFJ-1764s.

Portable 3 element Yagi for 2 M

MFJ-1763 You can set up or take down MFJ's new portable 3 element 2 Meter Yagi in seconds! Elements simply screw into the boom.

You can take it with you wherever you go and have the "oomph" and directivity of a beam.

It's easy to store and sturdy enough to use as your home station antenna.

You can mount it vertically for FM or horizontally for SSB. You can easily center mount it on a mast or end mount it on a tower leg with a single U-bolt (included). It's great for packet and PacketCluster™.

Its compact 2 3/4 foot boom gives you a calculated gain within 1 dB of a four element Yagi with a boom nearly twice as long.

Extra thick elements maintain high gain and directivity over virtually the whole 2 Meter band. A ferrite choke balun gives you excellent feedline decoupling. Coax coupling is further reduced by mounting the SO-239 connector behind the reflector.

Elements and boom are made from strong lightweight aluminum and protected by MFJ's Permanent Molecular Bonding Technology™.

Weighs just 2 pounds. Boom is 30 1/2 inches. Made in USA.



Dual Band Mobile

Mobile Antenna for 144/440 MHz

MFJ-1724B

\$14⁹⁵

For \$14.95, you get an MFJ dual band magnet mount mobile antenna

for 2 Meters and 440 MHz! Plus, it's covered by MFJ's famous One Year unconditional No Matter What™ Guarantee.

The MFJ-1724B is a 1/4 wave on 2 Meters and a gain antenna on 440 MHz — it's perfect for dual band radios.

Low SWR across both bands lets your rig safely deliver full power into your antenna.

The stainless steel radiator will withstand the toughest mobile service. It's only 19 inches tall so you can park in your garage without knocking over your antenna.

The MFJ-1724B handles 300 watts PEP, has 15 feet of coax and has an extra powerful magnet to hold it steady — even at highway speeds.

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2 Meter Halfwave.

MFJ-1714, \$16.95.

For really long range this MFJ ended halfwave is hard to beat. It outperforms a

5/8 wave on a handheld because the A. B. C.

5/8 wave needs a ground plane. The MFJ halfwave doesn't. It's shorter, lighter, has more gain and places less stress on your antenna connector than a 5/8 wave antenna.

When collapsed, it performs like a rubber duck. 40" extended, 10 1/2" collapsed.

B. The Dual Bander™ for 2

Meters and 440 MHz. MFJ-1712,

\$14.95. Got a new dual band

handheld or separate units? One

antenna fits all. It's a 1/4 wave for

2 Meters and a 5/8 wave with gain

for 440 MHz.

7 1/4" collapsed, 19" extended.

C. The Pocket Linear™

3/8 Wave, 2 Meters. MFJ-1710,

\$9.95. Carry this pen size antenna

in your pocket like a ballpoint pen.

When you're using your rubber

duck, on the fringe and noisy, put

on The Pocket Linear™, extend it to

24 1/2" and carry on your QSO.

Has pocket clip. 5 1/4" collapsed.

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Maximum Sidelobe 18.28 dB down at 38° Azimuth
Azimuth Beamwidth 29°
Maximum Sidelobe 15.64 dB down at 38° Elevation
Elevation Beamwidth 30°

G	Gain, F/B, Impedance	V	View Geometry	F	Change Frequency
P	Plot Directive Pattern	E	Edit Antenna File	S	Change Sources
D	Save Directive Pattern	A	New Antenna File	C	Change Colors
N	Save Near Fields	R	Examine RUN File	Q	Quit to DOS

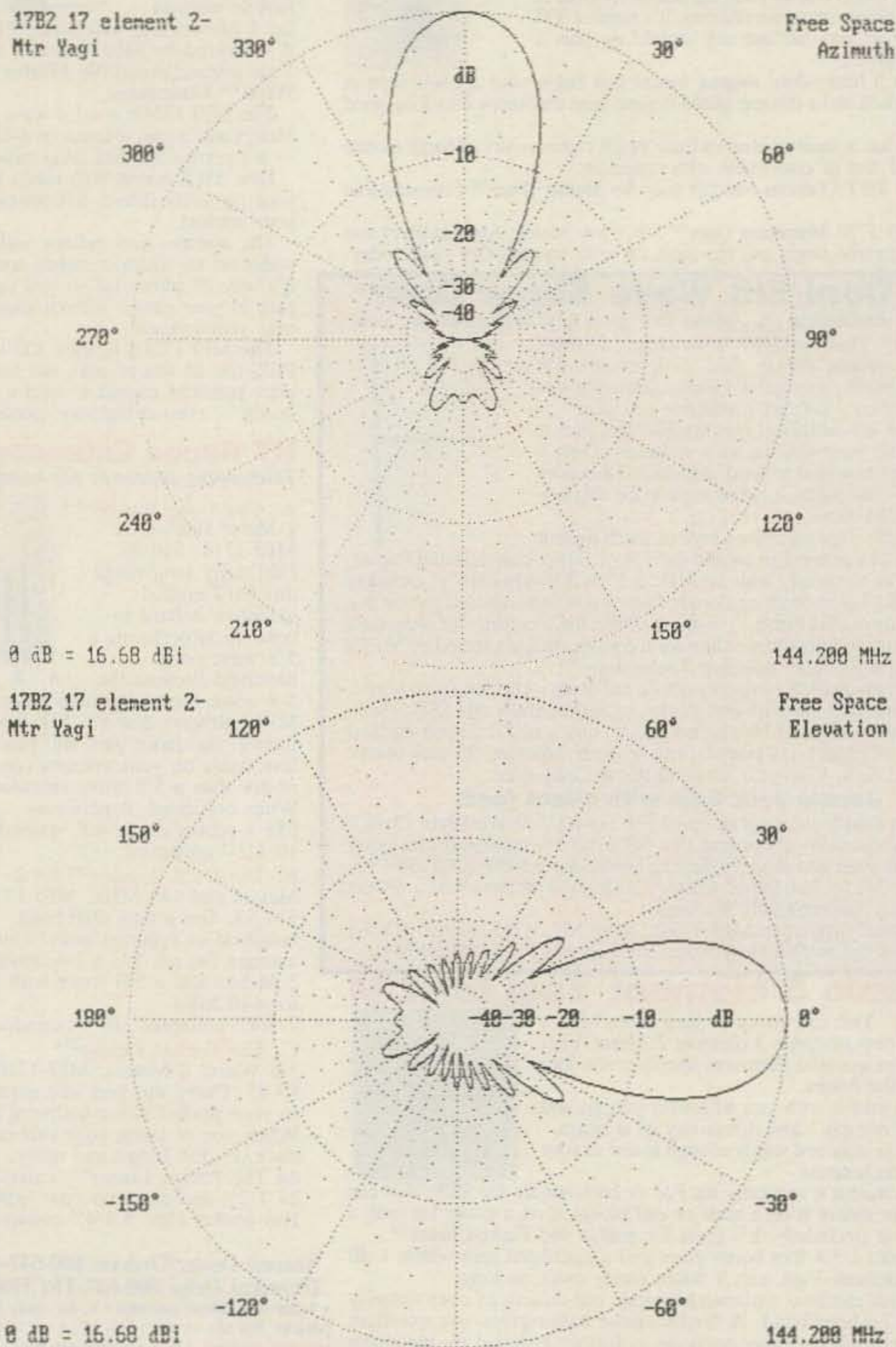


Fig. 1—Azimuth and elevation plots for the Cushcraft 17B2 two meter beam.

level 2 meter EME work, or it can be a big gun as part of an array of four in a 12 by 11 + foot stack.

Now, let's get down to reviewing the antenna. To begin, this antenna did more traveling than it ever expected in its early life. Joe Reisert, W1JR, brought it with him when he attended the Central States VHF Conference last July at Cedar Rapids, Iowa. While there, he entered the antenna in the VHF/UHF antenna gain measuring contest. The results of the CSVHF (and Dayton) measurement tests appear in Table I. I must say that in the two places this model competed (Dayton and Central States), it did very well.

After the CSVHF conference was over, Joe made arrangements with Larry Hazelwood, W5NZF, to have the antenna transported to me. Joe had mostly disassembled the antenna, but he kept the hardware attached to the boom and elements, thereby saving me the trouble of finding all those screws, washers, half washers, brackets, and nuts used to assemble the antenna. He also saved me the trouble of assembling the T-match by not disassembling it before sending it to me. However, I did get the benefit of the major part of the experience of (re)assembling it.

Although I put this antenna together and raised it by myself, I would recommend that you have help. Long boom antennas, for the uninitiated, are a tremendous amount of work. In fact, the boom length (over 31 feet, or 4.5 wavelengths, at the operating frequency) is almost as long as my mast, for my HF quad is high. Nevertheless, I did get it together "all by myself."

I found the instruction book to be simple and straightforward, complete with appropriate cautions about assembling the antenna and working around power lines. However, I *always* recommend that before you begin your antenna installation you read or review the chapters on antenna installation (and shack) safety found in the ARRL *Antenna Handbook* very carefully.

As always, before you assemble an antenna, you should lay out all of the parts in your work area and check them against the inventory supplied with the manual. Cushcraft's inventory control system is to weigh each antenna box before it leaves the factory. Therefore, you are reasonably assured the box doesn't leave the factory if it doesn't weigh right. (Yes, the scale is sensitive enough to detect missing small parts). In the unlikely event you find you are missing a part, you will be asked to refer to your weight label when you contact them about the missing part.

In assembling the antenna I used my usual work area—the hood of my car. Notice from the photo how that the work area is so neat and orderly. Especially

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You can instantly find your antenna's true resonant frequency right at your feedline — that's something a noise bridge just can't do.

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Create your perfect multi-band antenna

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Mobile Antennas made easy

You'll find the perfect adjustment for your mobile whip in seconds by actually seeing the SWR as you pull the whip in and out without transmitting.

You can easily find the ideal place on the car for your mobile antenna by checking different spots with the SWR Analyzer™.

All kinds of uses

You can see how the SWR varies over your entire band and quickly find your usable 2:1 SWR bandwidth.

You can see your SWR change as you drive under an overpass and see how mobile whip flutter affects SWR.

You can see what happens as you swing your beam toward the power line or away from your tower.

You can see how rain or snow affects your beam.

You can tune up your antenna tuner without transmitting.

You can check the SWR of the input to your linear amplifier.

You'll find all kinds of uses for this totally

MFJ-247 SWR Analyzer™ with LCD frequency counter

MFJ's newest SWR Analyzer™ has built-in 10 digit LCD frequency counter — makes reading SWR easier than ever.

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You can use the new MFJ-247 as an SWR Analyzer™, as a sensitive high accuracy 150 MHz frequency counter and as a signal generator.

It has high contrast LCD digits that don't wash out in bright



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self-contained handheld unit that'll revolutionize how SWR is measured.

Super Value: Several Instruments in One

You get a super value because several instruments are combined into a single portable handheld unit.

It has a low distortion RF generator that covers 10-160 meters, an SWR bridge that gives forward and reflected components and a computing circuit that automatically computes the SWR and displays it on the meter.

Everything is automatic. All you do is set

sunlight like LEDs do — they're actually easier to read the brighter the light.

Reading SWR is automatic. All you do is plug in your antenna, set your MFJ SWR Analyzer™ to the frequency you want and read your SWR — it couldn't be easier!

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You can monitor how SWR changes as you adjust your beam or vertical — you'll know right away which way to adjust it.

You can shorten or lengthen your dipole and see the effect immediately.

the frequency and read SWR. It also has a frequency counter output so you can connect a frequency counter for precise digital readout.

Use 9 volt battery or 110 VAC with MFJ-1312, \$12.95. 7½" x 2½" x 2¼".

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MFJ VHF SWR Analyzer™

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If you operate 2 meters this MFJ-208 VHF SWR

Analyzer™ helps get your antennas in tip-top shape. Just plug in the coax to find the SWR of any antenna from 142-156 MHz. Use 9 volt battery or 110 VAC with MFJ-1312, \$12.95.



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MFJ 600 MHz 10 Digit LCD Frequency Counter

A perfect companion for MFJ's SWR Analyzer™

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New!

Add this handy MFJ-346 frequency counter to your station and get high accuracy frequency measurements to 600 MHz with 10 digit precision. It's also

compatible with the MFJ SWR Analyzers and Antenna Bridge. Large quarter-inch LCD digits make reading easy. These high contrast LCD digits don't wash out in bright sunlight like LEDs do — they're actually easier to read the brighter the light.

Four gate times let you select the resolution you need — selecting a 1 second gate time gives you 1 Hz resolution. Has high accuracy 1 ppm 10 MHz crystal time base with adjustable calibration.

Uses high speed ASIC and custom LCD technology. 3-7/8 x 1-3/8 x 5-1/4 inches. Uses 9 volt battery or 110 VAC with optional MFJ-1312B, \$12.95.

You'll find all kinds of uses for this totally self-contained handheld unit that has revolutionized how SWR is measured.

Has separate BNC input connector for use as high accuracy frequency counter. Counter has 1 ppm 10 MHz crystal time base; .01, .1, 1, 10 second gate times; .1 Hz resolution. Uses 6 AA cells or 110 VAC with MFJ-1312, \$12.95. 4 x 1¾ x 7½ inches.

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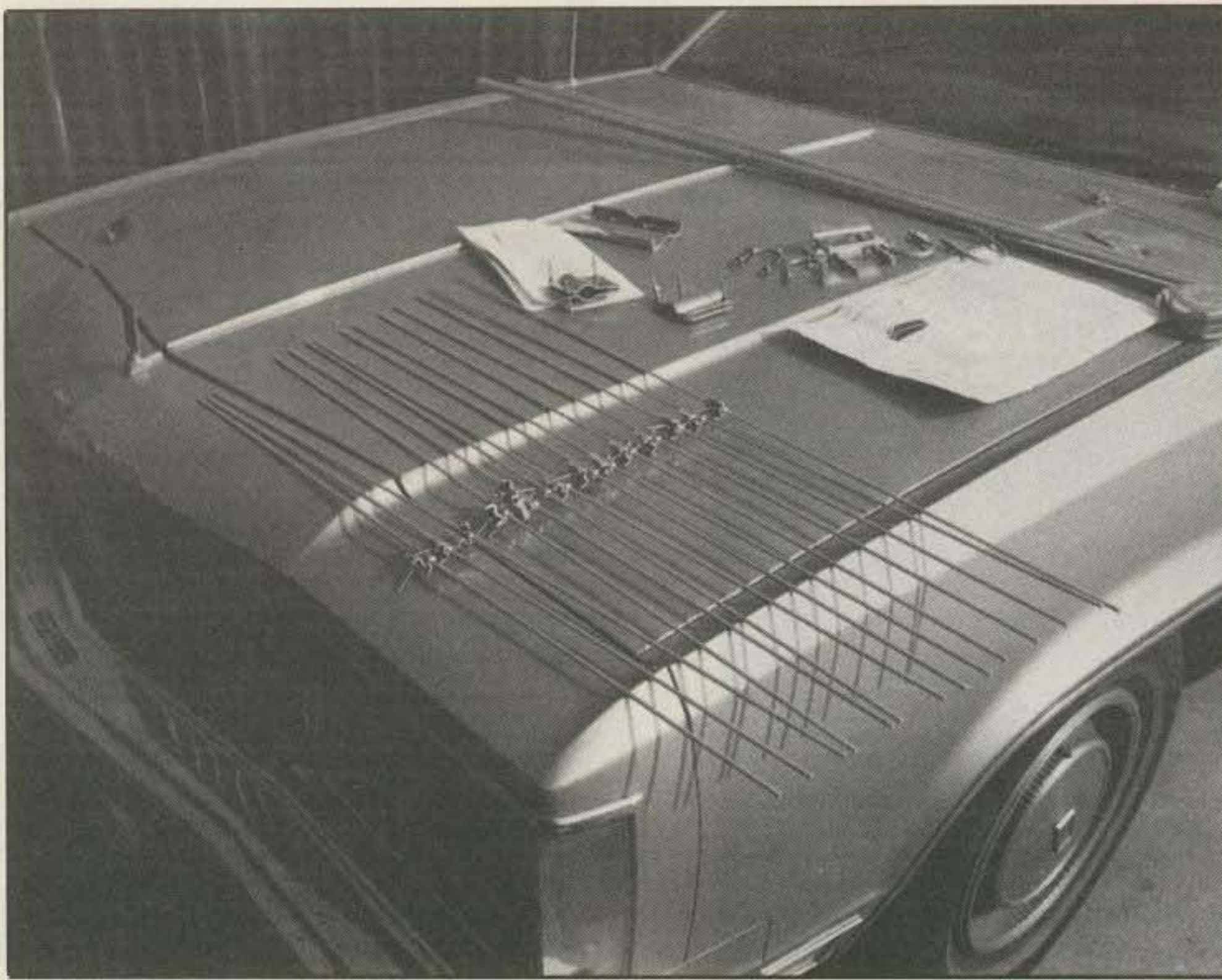
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My neat and well-organized work area before I began the assembly of the 17B2.

notice how each element is laid out, from the longest (right) to the shortest (left), in its tapered order. This tapered order will be useful when you get ready to install the

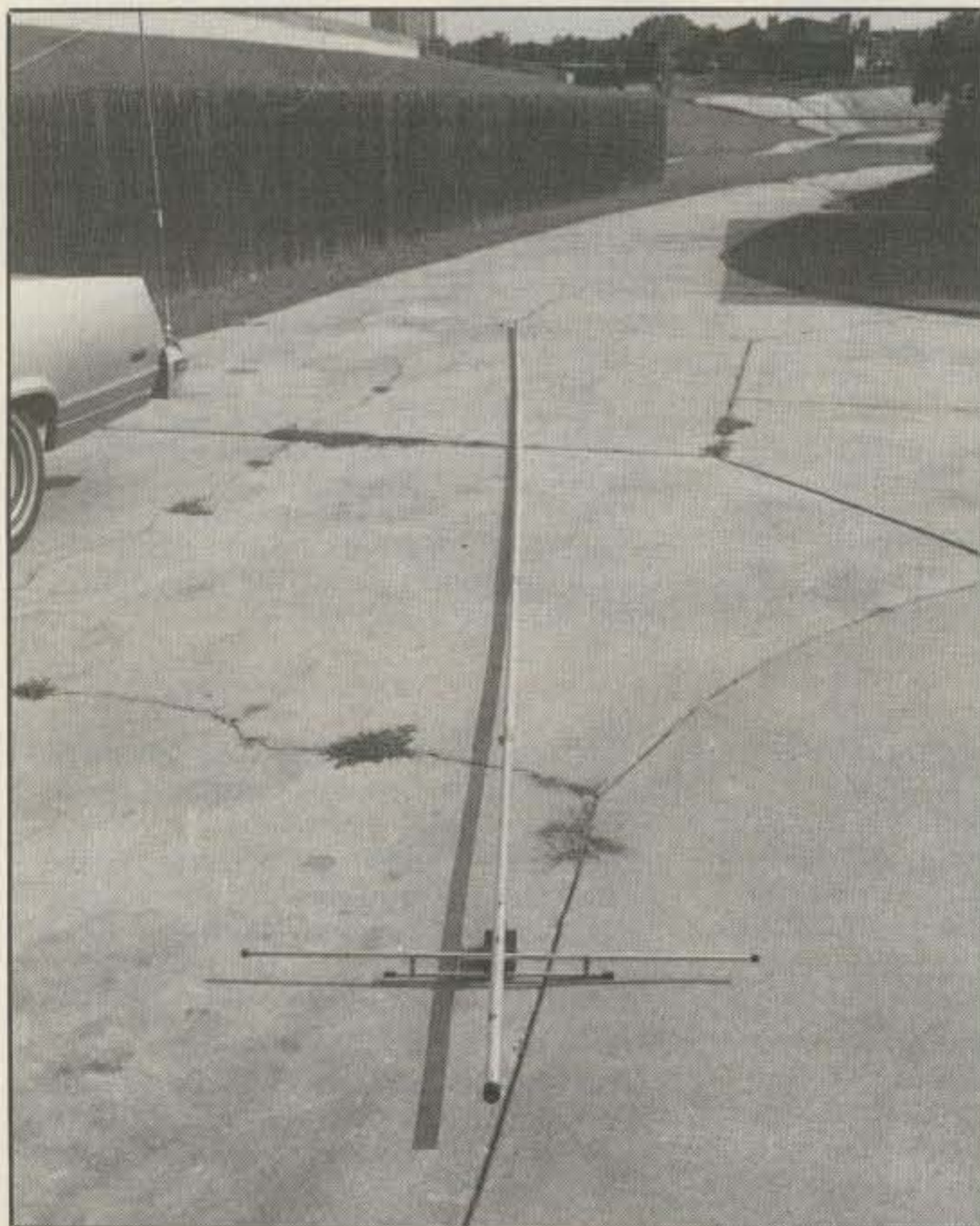
element onto the boom, as you will see later in this review.

The antenna is packaged so that it is UPS shippable. Therefore, the boom is

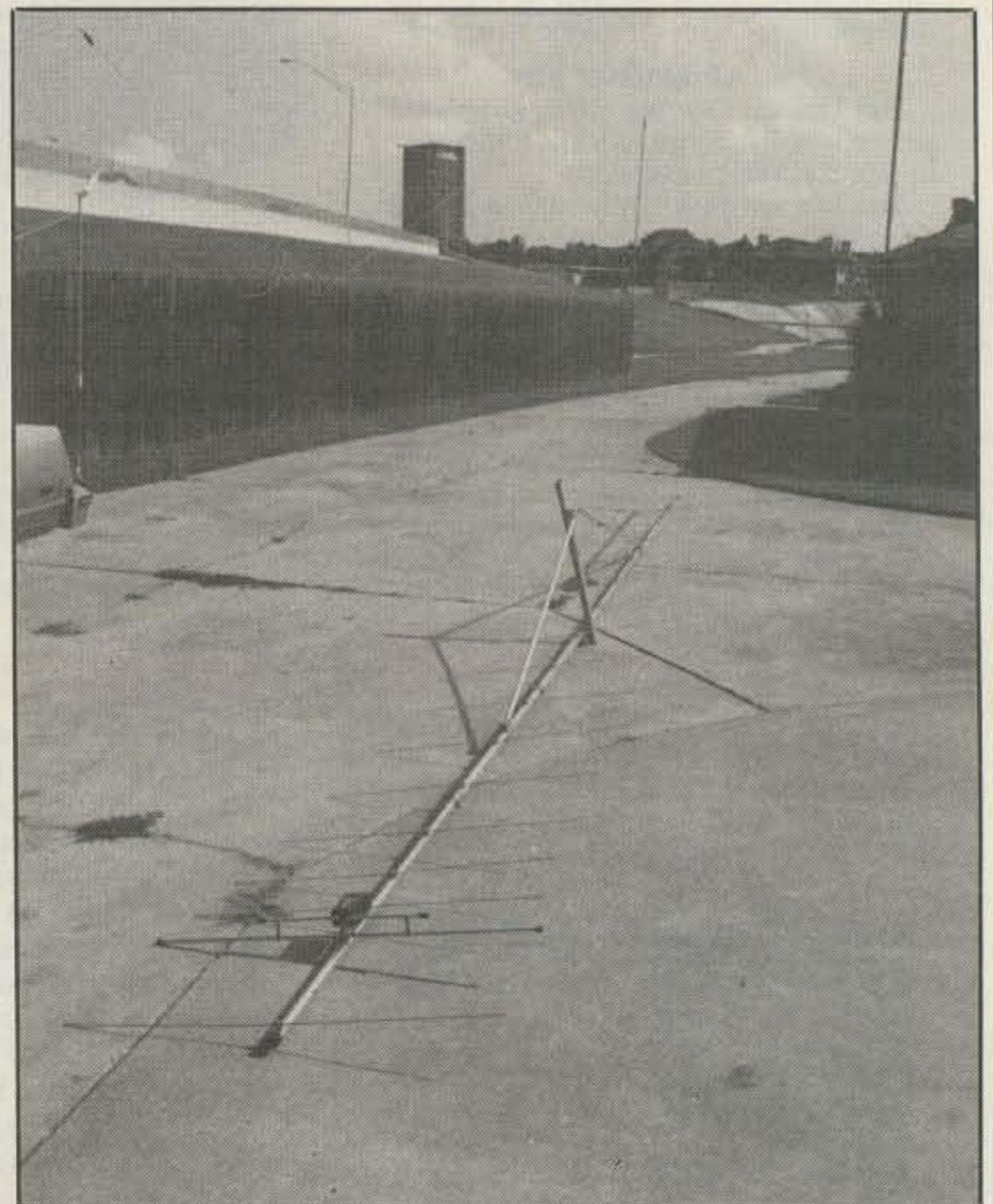
broken down into six sections (I told you it was long). Each section of the boom is illustrated in the instruction book and measurements are made (and illustrated) to reference holes on the boom sections so that you can distinguish each section. I found it helpful to mark each section temporarily with a felt-tip marker to aid me as I laid them out on the ground. (I used the water-based markers so that when the first good rain came, all the marks were washed away). The procedures of locating the hardware and assembling the boom were made a bit easier by Joe's previous assembly. However, it still took a bit of time to do the work. Since you will be starting from scratch, get some help, as it goes faster.

After I got the boom assembled, I located the T-match. While it is not hard to assemble (the drawing in the instruction book is explicit), once again Joe's preassembly made things easier for me. I just had to bolt it onto the boom, locate the UltraMatch™ balun (that black box) and bolt it to the T-match and the boom. The photo shows the assembled boom with the attached balun. (How many car lengths long is it? About one and a half of mine.)

The element assembly is easy. Each element is successively shorter than the next, with the reflector (obviously) being the longest. Remember that neat row of elements on the hood of my car? Well, now it was time to pick up one element at a time



The 17B2 boom with the driven element, T-match, and Ultra-Match™ balun attached to it.



The assembled 17B2 upside down, ready to be mounted on the rotator.



The 17B2 mounted on the push-up TV mast, almost ready to be raised.

from its laid out order and attach it to the boom. In no time at all each element was in its proper place and secured to the boom.

Assembling the boom to mast plate was no big deal. However, once again I used my felt-tip marker to locate on the boom where I would attach the mast plate.

Because this antenna is so long, it needs braces. There are two braces, one on each side of the boom, which attach to the mast as it extends down toward the rotator. The braces are in two sections each. The diagrams in the instruction manual give you visual illustrations as to the assembly of the braces and their ultimate attachment to the mast. One aspect of the braces I really appreciated was the reinforcement in the ends of the braces that join (or bolt) to the mast. When heavy winds are whipping

around the antenna, there is a tremendous amount of torque applied to those joints. This reinforcement helps sustain the braces from the back and forth motion caused by the wind. In the case of this antenna, before the ends of the braces are pressed together and drilled, a piece of aluminum is placed inside the brace. Then the ends are pressed and drilled, thereby completing the reinforcement of the ends.

Once I had the braces attached to the boom, I attached the braces to a section of mast. I mounted the antenna on a short mast that was installed into the rotator. The photo shows the completed antenna upside down. The antenna was now ready for installation. Once again, if you are a novice (at antenna installations), or if you are the least bit intimidated by the length of this antenna, get some help. The antenna can

get away from you very quickly, especially on a (even slightly) windy day.

I chose to mount the antenna on a short, heavy-duty, TV push-up mast. The antenna is light enough (about 16 pounds, according to the bathroom scales), to be able pull up the mast and antenna while raising the antenna in place. Notice in one of the photos how long it is compared to the length of the front of the house.

The balun has an installed N-connector. I appreciate that change in design (from the 4218XL) because an N-connector maintains the continuity of the 50 ohm impedance between the transmission line and the balun. I used International Wire and Cable brand 9086 (which is very similar to 9913) coaxial cable. It is double shielded and has a solid center conductor, making it low loss on VHF.

I got the antenna up and in the air in time for the September VHF QSO Party and what a difference! I had been using the old 215WB (Cushcraft has now replaced that model with the 13B2). I didn't know what I was missing! My friend Sam, K5SW, who lives about 120 miles from me, asked me if I had added a linear. The guys in Dallas were consistently giving me 20 over 9 reports, and the best DX was Larry, N0LL, on the Kansas-Nebraska border, almost 450 miles from my QTH! All these reports were given during a weekend with average tropo conditions.

Summary

Cushcraft has designed a very nice long-boom antenna. Table II gives the manufacturer's specifications for it. The materials are top notch and the construction is designed with the lowest possible profile—a necessity for keeping wind and precipitation load resistance to a minimum. Although big, this antenna is practical for the guy who wants to go beyond the short-boom antenna. The forward gain and the clean, narrow, pattern open a whole new world of DX on 2 meters. Using horizon gain, one can run with a super station on EME and have a very good possibility of a successful QSO. When enhanced tropo conditions exist, DX contacts will be made with ease.

I mounted my antenna at the lowest possible practical height, yet I was impressed by its performance. Obviously, mounting it higher will only enhance its performance. Nevertheless, I have already increased my grid square totals with it at its present height.

I fully expect to see more and more QSL cards indicating use of this fine antenna. Maybe one of those QSL cards will be from you. I hope so!

For more information, contact Cushcraft Corporation, 48 Perimeter Road, Manchester, NH 03108 (telephone 603-627-7877 or FAX 603-627-1764). The suggested retail price is \$220.



Manufacturer's Specifications

Frequency	144-145 MHz
Number of Elements	17
Forward Gain	18.0 dBd
Front-to-Back Ratio	26 dB
SWR at Minimum	1.2:1
Typical 2:1 Bandwidth	>2 MHz
Power Rating	2000 watts PEP
3 dB (half power)	
Beamwidth (degrees)	
E Plane	2 × 14.5
H Plane	2 × 15.0
Side Lobe Attenuation, E plane	>60 dB
Electrical Wavelength	4.5λ
Boom Length	31 ft. (9.45 m)
Longest Element	40.75 in. (103.5 cm)
Turning Radius	17.25 ft. (5.26 m)
Mast Size Range	1.5-2 in. (3.8-5.1 cm)
Wind Load	3.9 ft. ² (.36 m ²)
Weight	15.75 lb. (7.14 kg)

Table II- Manufacturer's specifications for the 17B2.

"HOW TO" FOR THE NEWCOMER TO AMATEUR RADIO

Upgrade Time

Novice and Technician-Plus amateurs who did most of their operating on 10 meter SSB (voice) need to upgrade to at least a General class license to have worthwhile operating privileges. It is true that many modes remain available to these amateurs on several bands, but the current degraded condition of the 10 meter band presents a major problem to most of them. There is a simple way to overcome this difficulty and to enjoy amateur radio more than ever; you simply need to get a General (or higher) class license, which is an achievement that is relatively easy to accomplish.

The No-Code Technician class of license went into effect 14 February 1991. These amateurs share all operating privileges available to Amateur Extra class licensees above the 10 meter band. The poor operating condition of the 6 meter band makes it almost useless, which leaves these licensees with mainly 2 meter and 1.25 meter band activity. The No-Code Technicians are worse off than the Novice and Technician-Plus amateurs. I continue to be pleasantly surprised by the strong interest No-Code Technicians have in upgrading.

Conditions

Long-distance communications are almost nonexistent on the 6 and 10 meter bands during the summer. The 15 meter band is a little better than 6 and 10, but it is seriously degraded. These unfavorable band conditions will continue to worsen as we slowly approach the lowest point in the current 11-year sunspot cycle. The existing situation makes it advisable to upgrade to at least a General ticket.

Now that the bad news has been mentioned, it is time to cover the good news. During the present downturn of the sunspot cycle, the optimum transmission frequency (FOT) is lower, which results in the 80 and 40 meter bands frequently being excellent for long-distance (DX) contacts. Smart amateurs will take advantage of this condition, rather than fret about the eventual decline of the 10 meter band.

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Charlie Newell, K2GNZ, and Wayne Cunningham, KD4HEK, are shown here proudly displaying the blue ribbon that was awarded to the Palm Beach Amateur Radio Council's booth at the 1992 South Florida Fair and Expositions event. Ten blue ribbons were distributed among more than 300 exhibitors. The council consists of 17 clubs. ARRL provided booklets and posters and ICOM furnished equipment for use in the booth. More than 100 local amateurs manned the booth, providing attendees with exposure to on-the-air amateur radio activity. A special South Florida Fair QSL card was used to confirm these contacts. Wayne (right) served as the booth chairman.

What Novice and Technician-Plus Amateurs Can Do To Upgrade

About half of the American amateurs are Novice or Technician-Plus licensees. Technician licensees have the 2 meter band, which provides a lot of local activity in most areas, but many Technicians are likely to want to have other bands to use.

Novice and Technician-Plus amateurs should operate in the so-called Novice code segments of the 15, 40, and 80 meter bands, which is not news to such amateurs. The most enjoyable way to increase your code speed is to get on the air working code contacts. In addition to being fun, such operation is the best way to quickly increase code proficiency.

The 15 meter band is less useful as we approach the null in the sunspot cycle, but it continues to be good for coast-to-coast and DX (long distance) contacts. This band usually opens up soon after sunrise, and it closes rather abruptly soon after sun-

down. The 15 meter band is good for daytime usage.

The 40 meter band is most useful during the night hours. The maximum communication range is minimum (local contacts) at about noon, and it often becomes worldwide at night. However, the 40 meter band is just 7000-7100 kiloHertz in most of the world. Amateurs in ITU Regions I and III are not allowed to operate above 7100 kHz, which means you won't hear them in the 40 meter Novice code segment. Only North American, Central American, and South American amateurs can be worked on this Novice band. A major problem related to this band is interference from powerful international broadcasts every 5 kHz throughout the band. When DX (long distance) communication conditions are good, such interference is maximum, of course. These stations are heard on 7105, 7110, 7115, 7120, 7125, 7130, 7135, 7140, and 7145 kHz in the Novice 40 meter segment. I have had good luck operating midway between the frequencies used by ad-

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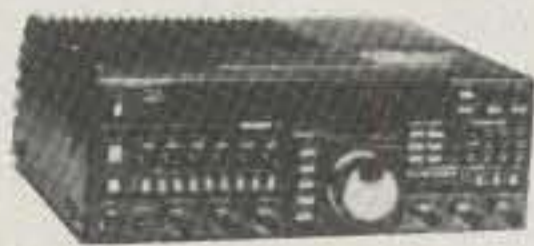
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This is 70-year-old Werner Bopp, HB9KC, of Guemligen, Switzerland. He is one of the many DX amateurs who frequently operate in the American Novice bands to help increase the interest of new amateurs. Werner has been an amateur since 1949. His wife is Lydia; they have two married sons, plus four grandchildren. His station includes an ICOM IC-735, Yaesu FT-One, Yaesu FT-470, and Yaesu FT-208 transceivers. His antenna system consists of a 2-element 10/15/20 meter quad, a 6-band Hustler ground plane, and a longwire. His location is about 17 miles east of Berne and about 1600 feet above sea level. When you work a DX (foreign) amateur in a Novice band, it is wise to keep the contact short. Such amateurs work the Novice bands to give new amateurs DX contacts, and they usually want to contact as many amateurs as possible. You should not waste time telling the DX amateur you want one of her/his QSL cards, because she/he probably assumes that you want a QSL. Do not waste time giving your mailing address and requesting direct mailing of the DX card. It is too expensive and time consuming for a DX operator to mail her/his cards directly to others. Make use of the ARRL Incoming DX QSL Bureau, which is frequently described in amateur radio publications. If you need a data sheet about the ARRL Incoming DX QSL Bureau, you can send your request to my (W6DDB) California address with the usual business-size (#10) self-addressed, stamped envelope. Please do not drive DX operators off our Novice bands; they help make Novice band operation more fun.

adjacent pairs of international broadcast stations. As an example, 7127.5 kHz is dead center between the 7125 and 7130 kHz frequencies that are used by international broadcasting. This type of operation requires a good (narrow) code filter of 250 (preferably) or 500 Hertz. If you use a transceiver which only has a standard SSB filter, interference could ruin many contacts. Good contacts are possible even when broadcast interference is at its worst. The early evening hours are optimum on this Novice band (7100-7150 kHz).

The 80 meter Novice segment has been shifted from 3700-3750 to 3675-3725 kHz. This change eliminates the voice in-



Here are Patricia Lovarco, KD4ABZ's amateur radio students at the Nova Middle School in Davie, Florida. Shown are (back row, left to right) Derek Duda, Omer Ozkul, Jesse Itzkowitz (callsign pending), Joe Schreiber (KD4LDB), Ed Smith (callsign pending), Dan Alonso (KD4IXG), and Alex Hochberger (KD4LDE). The front row (left to right) shows Cheryl Soverns, Aimee Bedell, Mike Eber (callsign pending), Aaron Kall (KD4LAW), Jason Ash (callsign pending), and Casey Soloff (callsign pending).

terference that existed at the top half of the original 80 meter Novice band. Like 40 meters, the 80 meter band has an extremely limited communications range around midday and its range often becomes worldwide at night. Unlike the 40 meter Novice segment, the 80 meter segment is not subject to international broadcast interference, and it is available to amateurs in all parts of the world. The major problem related to operating on this band is usually the length of the required antenna, but this can be overcome partially by using a shorter antenna such as a coil-loaded vertical or a Marconi (quarter-wave) antenna. This is a very good band for long contacts with minimum possibility of interference. When the 10 and 15 meter Novice bands are dead, I usually shift to the 80 meter Novice segment. This Novice segment should be used by many more Novice and Technician-Plus amateurs than are now using it.

In addition to increasing code proficiency, it is essential to prepare yourself to pass the written portion of associated upgrade examinations. If a course is available in your area, it is advisable to participate in it with good attendance and excellent attention to all instruction.

Equipment

Many Novice and Tech-Plus amateurs have 10 meter only transceivers. It is wise to keep such gear for future use or for sale. There are plenty of good new and used all-band high-frequency transceivers available. It is advisable to purchase the best equipment you can afford to buy. Basic-

ly, we get what we pay for, and good gear is not cheap. The hybrid (combination solid state and tube) rigs provide the most capability at the lowest cost. No matter which rig you obtain, be sure you purchase a good code filter to use in it. Very few rigs are sold new with a suitable code filter already installed in them, but 250 and 500 Hertz code filters are commonly available as accessories. There is no sense in listening to noise and interference that could exist over about 2500 Hz when you can cut out all but 250 Hz of such unwanted signals. Atmospheric noise (QRN) is fairly evenly distributed over adjacent frequencies; it makes sense to eliminate about 90 percent of such noise.

Antennas

A simple quarter-wave (Marconi) antenna with a random-wire tuner can prove adequate for 15, 40 and 80 meter operation. Coil-loaded verticals function reasonably well. There are many electrically shortened antennas available, and they are advertised in amateur radio publications. You should expend the effort that is required to select the optimum antenna system for your station. A good transceiver deserves a good antenna if it is expected to provide good communications capability.

Opportunity

Groups and individual amateurs now have an excellent opportunity to help thousands of Novices and Technicians upgrade. If we

do not take advantage of this opportunity, we will probably lose most of these amateurs. By the time the 10 meter band drops out entirely or returns to its peak, many Novices and Technicians will have given up on amateur radio. Renewable licenses and longer license terms will mask our losses, but such losses are sure to occur.

What Individuals Can Do. In many areas there are no nearby amateur radio licensing courses that are conducted on a regular basis. In some areas there are no nearby licensing courses at all. In such areas it is up to individual amateurs to help upgrade existing lower classes of licensees to General (or higher) class tickets. We must actively seek out such amateurs at local amateur radio clubs, electronics stores, and conventions. If you are active on the air, it is very beneficial to have such amateurs see your station in operation. Give them tastes of bands and modes they do not operate. Novice and Technician-Plus amateurs should be good bets to become interested in 40 and 80 meter code operation. I have found it to be effective to let such amateurs use my station to work code contacts. Several previous guest operators have upgraded thanks (in part) to increased code proficiencies. This is basically a one-on-one effort which requires participation by the majority of General, Advanced, and Amateur Extra class licensees. There is no "they" who can accomplish this task; it is up to you and me.

What Groups Can Do. Amateur radio clubs, and other groups who conduct amateur radio licensing courses, are in the key position to help Novice, No-Code Technician, and Technician-Plus amateurs who want to upgrade. Encourage your General (or higher) class licensees to personally invite such amateurs to see their stations in operation. If they can do it, such host operators should have guest operators get on the air during their visits. Encourage guest operators to use several modes and bands. Do everything possible to increase the interest of each guest operator in upgrading. The efforts of such host amateurs should be supplemented by improved and increased licensing courses held by amateur radio clubs and other groups. The upgrading effort should be a continuing major program in every active group. This is our opportunity to upgrade many amateurs.

Summary

Incentive licensing resulted in thousands of amateurs who only operated 10 meter voice (SSB). The No-Code Technician license has nearly killed Novice licensing, further reducing the likelihood that new amateurs will upgrade to General licensees. All of these amateurs need our help. We need to help them with both the written (theory) preparation and their code proficiency. It is reasonable to assume that code presents a more formidable chal-

lenge to these amateurs, which is why this article emphasizes code. This is a good chance for many General (and higher) class licensees, who usually use other modes, to brush up on code operation.

Printed Aids

My previous columns contain information that is useful to new and aspiring amateurs. Many of these items have been reprinted for distribution to students of licensing courses I instruct. For ease of use, these printed aids have been separated into six categories. These categories are introduction, code, theory, station, operating, and miscellaneous. Outdated items are continually replaced with newer ma-

terial. Fifteen dollars brings a complete set of current printed aids, including shipping costs. A list of these printed aids will be sent to anyone who requests it and sends a business-size (#10) self-addressed and stamped envelope to my California address. Any single item is available at no charge to anyone who supplies a self-addressed and stamped envelope. When a single item is being requested, it is advisable to supply a large (at least 9 by 12 inch) envelope and to include a couple of extra stamps (loose in your envelope) in case extra postage is required. Some items are long. Licensing course instructors are welcome to revise and/or duplicate these items to suit their requirements.

73, Bill, W6DDB

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A LOOK AT THE WORLD AROUND US

Mailbag Notes and HF Mobiling Revisited

We're back! Pardon this column's eclectic appearance during the last few months, gang, but old Father Time continues short-changing our side of the tracks. Time is also like money: it only goes so far (bless those with an ample supply of both!). Someone out there must be enjoying 26 hour days, because ours are only 22 hours long! I can usually juggle working 10 hours a day, writing several pages on a new QRP book (publication scheduled for early '93), writing this column, and getting on the air a few minutes a day. Columns featuring keys and QRP, however, favorably change that routine. Our mailbag overflows with encouraging (and welcomed!) letters, and writing replies zaps time for future columns. You can help (!) by remembering to include an SASE and leaving room in your letter for my replies or by initially okaying your comments and photos for publication, then watching for them to appear in a future column. Details on some fantastic keys and pocket QRP rigs are already standing by for upcoming columns. Watch for them!

After discussing QRP rigs and the low-power-favoring band of 30 meters in February and March CQ, I received a most informative report from George Morgan, Jr., W3MWY, aboard the gigantic tanker ship *LNG Gemini* in the South China Sea. George says 30 meters is really hot and jumping with DX in that area of the world ("JAs swarm like locusts between 10.120 and 10.130 MHz and QSL everyone they work 100 percent"). George also reports other stations like ZA1PAC, FK8FS, HL9JK, VS6BG, 3B8CF, and 9M2AX are often heard in the lower 10 kHz of 30 meters running long strings of QSOs. U.S. stations roll into that area around 1000 GMT and may not be aware of all the juicy DX calling them. If you are an early riser and like successful QRPing, snap on the earphones and check out 30 meters.

A brief sampling of W3MWY's loggings from the South China Sea during the week of March 7-14 is shown in Table I. Is your call in there? After returning to the U.S. George says he now understands my reference to 30 meters as a great QRP band. Our special thanks to W3MWY for his

report. Now let's change subjects and take a look at what the well-equipped mobileer is sporting for 1992 and 1993.

Mobile What!

Squeezing in time for amateur radio fun rather than pursuing foolish home chores recently captured my interest, and thus inspired photo 1—"K4TWJ/RM" (riding mower mobile). Don't laugh, as next month we may hit 30 CW as "K4TWJ/BY" (Back Yard).

Now this is outbacking in style! The transceiver sits on a thick foam cushion atop the mower and is held down by a bungee cord. My Outbacker antenna is mounted on the rear fender and grounded to the mower's frame with a heavy copper strap. Power is tapped off the mower's battery, and I use a single in-ear 'phone for copying rare DX. Crocodile Dundee hat with alligator teeth adds 3 dB in signal strength.

The photo was shot during one of the rare times I operate SSB rather than CW mobile. If you think my neighbor's yard looks bad, you should see his car!

Mobile Where?

A year-old yet very interesting report from Dudley Taylor, G4ZAU, tells us how our British friends go HF mobile despite ultra-compact cars, right-side steering, and left-hand keying.



Photo 1—Alabama's big-time mobileer! I usually run CW mobile, but those backyard ruts challenge even a good "fist."

Dudley's car is a Nissan Micra GLX, and his rig is a Kenwood TS-440 connected to a NAVY Special Triband mobile antenna like we featured in a previous mobile column. Dudley removed the package shelf on the car's passenger side and installed

Time in GMT	Calls	Time in GMT	Calls	Time in GMT	Calls
1500	AD6T/QRP	1518	K6UA	1520	WA2TM/7
1531	K6WS	1031	KC6YLB	1034	VE2FRE
1209	W6TUR	1308	WA0CML	1324	K6YN
1450	K6YK	1459	W6MVW	1415	W4DDV
1430	W7AM	1435	W7LNG	1445	N6FX
1410	W5AAC	1105	W7RJ	1135	KH2FT
1154	K8OQL	1218	W3PA	1205	K2POL
1207	W1MTS	1210	W1WAS	1212	NJ4N
1012	WF5T	1015	W4BW	1018	NS7E
1035	KP2J	1050	W1MK		
			DX Stations Heard		
1518	YB0USJ	1725	UF5GG	1729	G3HAL
1510	9V1YS	1514	FR5GG	2257	PZ1DV
1210	FO0PT	1430	3B8CF	2221	UL7DX
1000	VK9NS	1000	FK8FS	1350	HL9JK

4941 Scenic View Drive, Birmingham, AL 35210

Table I—Stations heard on 30 meters by W3MWY in the South China Sea during the week of March 7-14, 1992.

Arrow Line Antenna

The Arrow Line is so lightweight and easy to handle. It will increase the range of communication. This is due to its low radiation angle and its improved power transfer. Even with 0 S-meter reading, reception is clear. The Arrow Line is superior even to the double extended whip antenna. The Arrow Line can reach places where Yagi's sometimes fail.

FOR BASE STATION

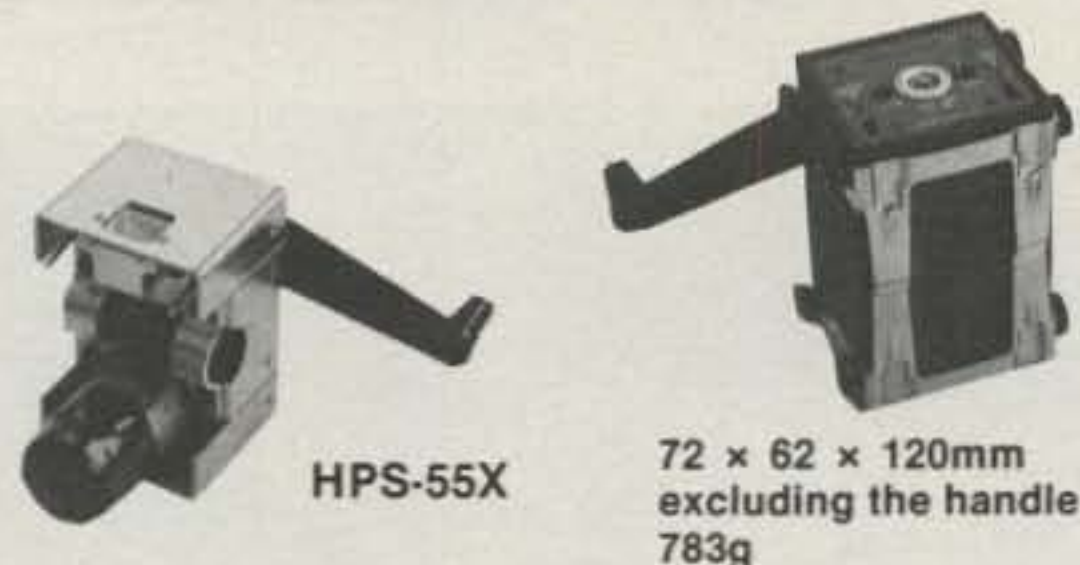
AL-144F	AL-432FII	AL-207FH
2m	70cm	2m & 70cm
1/2 wave	5/8 x 2 wave	1/2 wave 5/8 x 2 wave
1m	1.2m	1.3m
150g	150g	360g

HF ARROW LINE

AL-21F	21 MHz
AL-28F	28 MHz
AL-50F	50 MHz

Length 2.5m Weight 500g

A Final Breakthrough - A Hand-Generated Battery
Human Power Station™
 (Portable Hand Generator) Max. Output 15W
 Power Generating and Charging
 for Hand-Held Transceivers, 8mm Video Cameras, Etc.



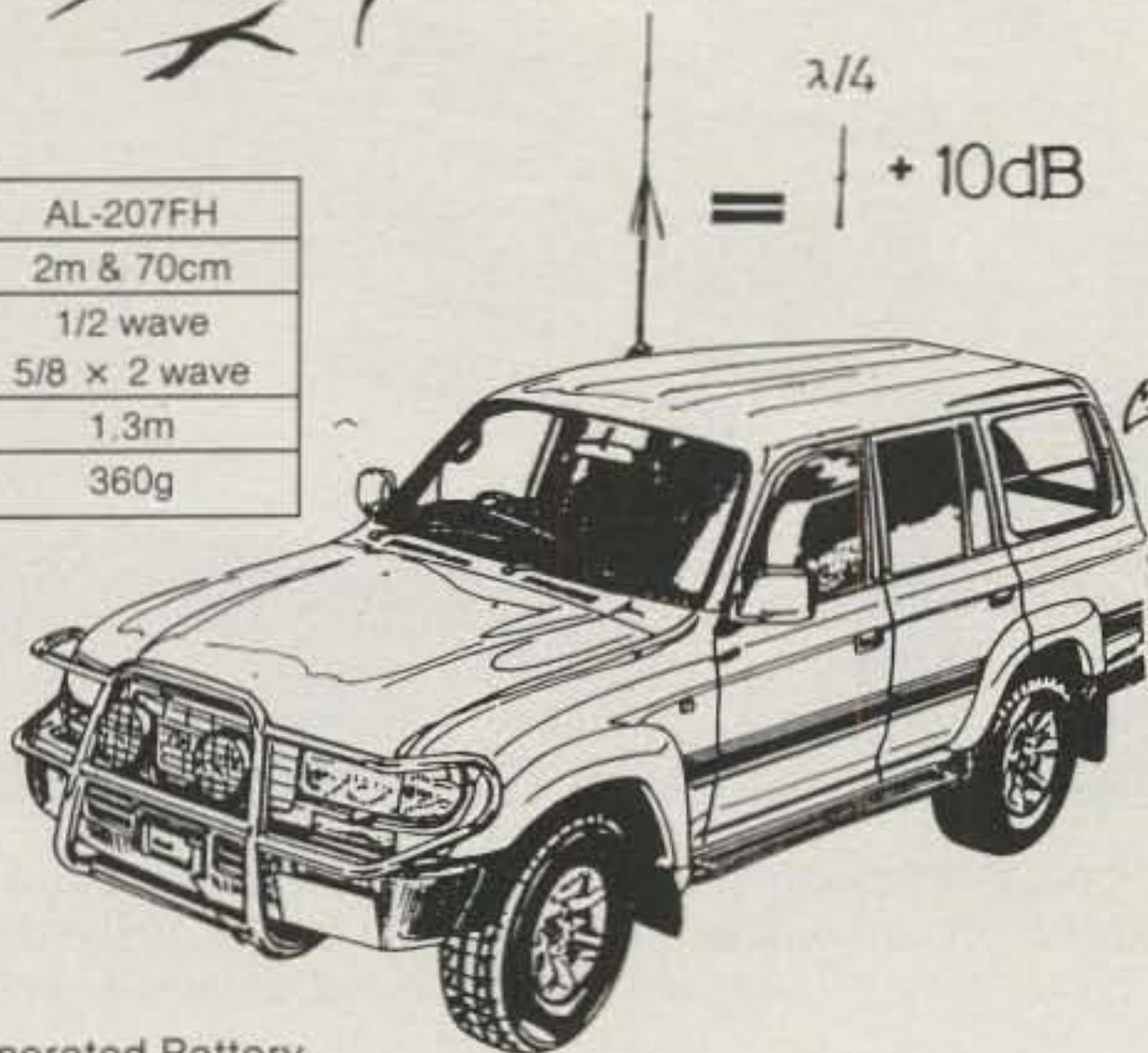
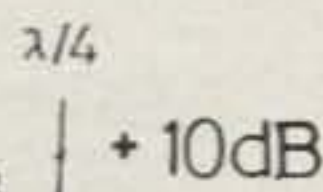
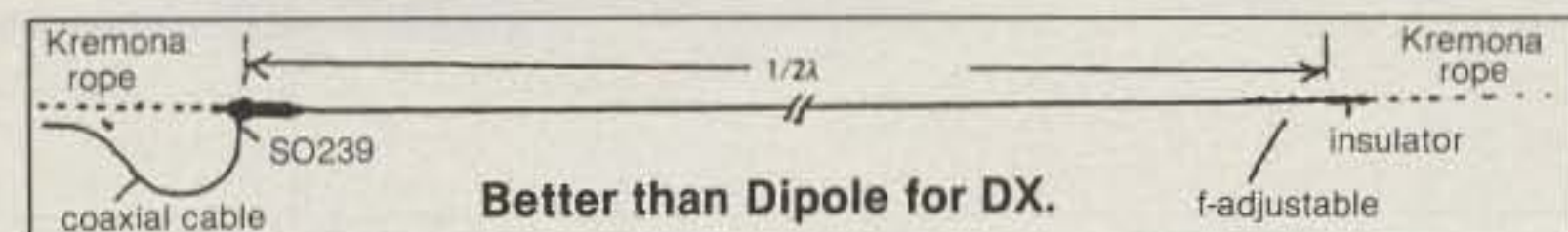
Zepp Type Wire Antenna

Easy to install and adjust. Convenient for portable use.



Model	Band	Length
ZA-3.5K	3.5 MHz	40m
ZA-7K	7 MHz	20m
ZA-21K	21 MHz	6.5m
ZA-14K	14 MHz	10m
ZA-50K	50 MHz	2.8m

Power Rating 1 KW SSB



FOR MOBILE STATION

AL-144F	AL-432FII	AL-207FLH
2m	70cm	2m & 70cm
1/2 wave	5/8 x 2 wave	1/2 wave 5/8 x 2 wave
10dB	10dB	6dB & 10dB
1.42m	1.6m	1.4m

Gain: 1/4 wave whip antenna ratio
Weight 400g

HF (3.5 - 24 MHz) + 50/144 MHz BAND ANTENNA ONE OF OUR MOST POPULAR PRODUCTS

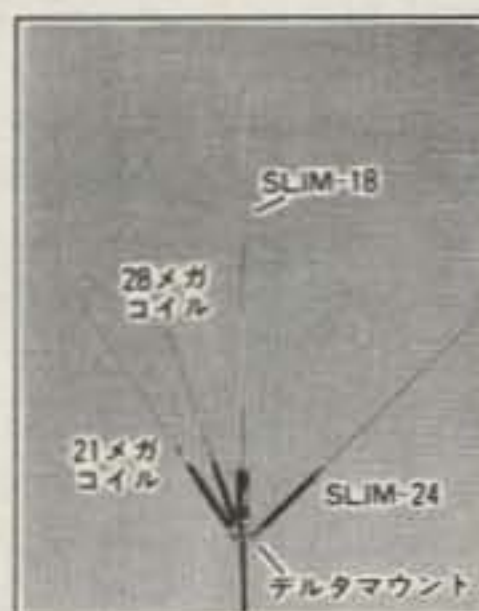
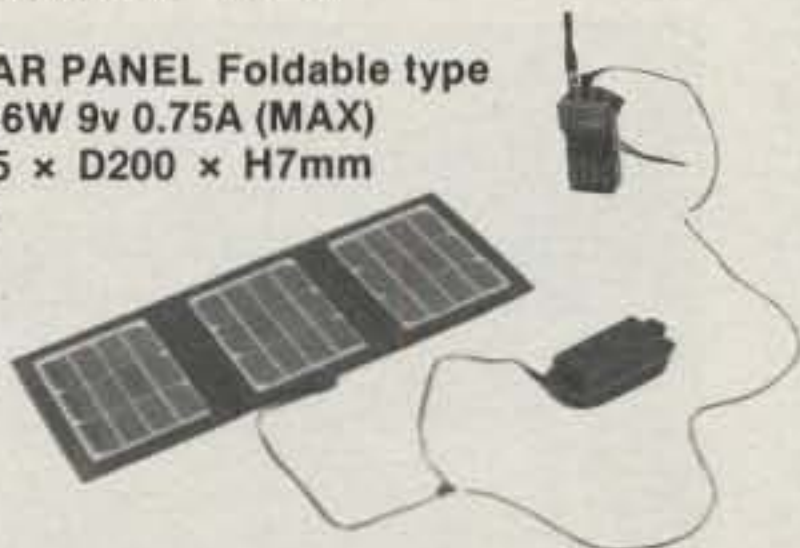
CM-144W is an antenna of unique design for 15 and 10 meter bands top coils attached to a 6 and 2 meters bands main element.

OPTIONAL COILS

Model	Frequency	Length
SLIM-3.5	3.5 MHz	135cm
SLIM-7	7 MHz	70cm
SLIM-14	14 MHz	57cm

Coated with glass-reinforced epoxy resin. Power rating: 200W SSB

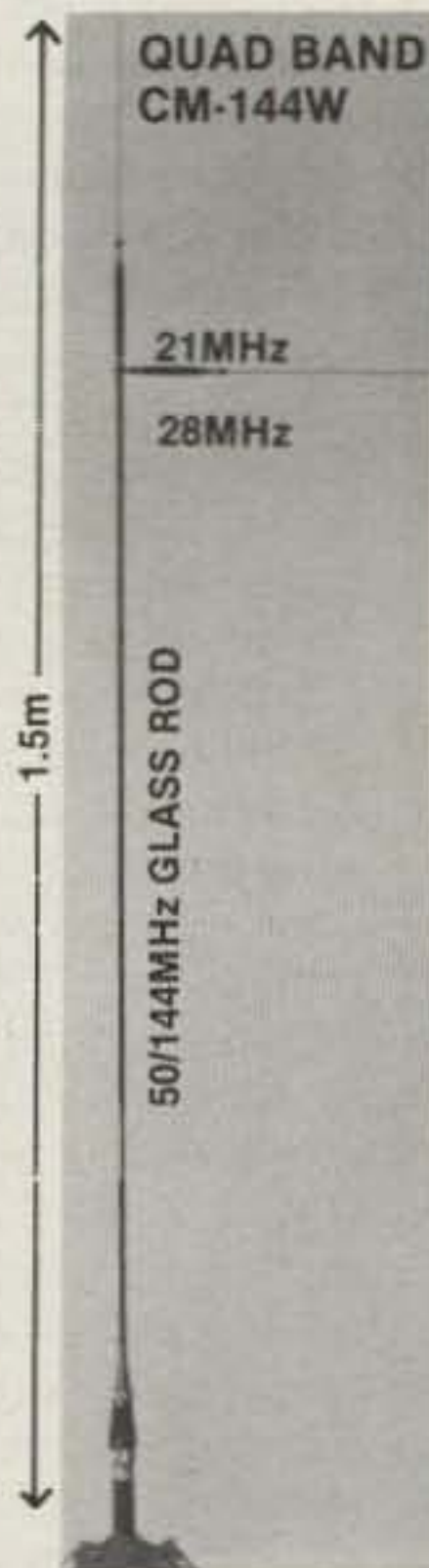
SOLAR PANEL Foldable type
HPS-6W 9v 0.75A (MAX)
 W445 x D200 x H7mm
 570g



Delta mount
7-14-21-28 MHz



Fleming adaptor
7-14-21 MHz



INVERTED V Wire Antenna

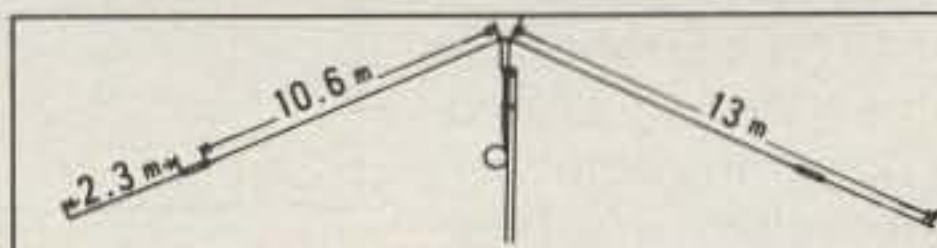


MT-240XK
3.5-7-14-21-28 MHz
7m - 22m 2.2kg

MT-40XEK
3.5-7-21-28 MHz
5m - 22m 2.5kg

EL-40XK
3.5-7 MHz
26m 1.9kg

EL-140XK
7-21 MHz
13m 1.2kg
Power Rating 1KW SSB



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CIRCLE 177 ON READER SERVICE CARD

a mounting bracket for the rig (see photo 2). Rather than tapping off the car's battery for power and worrying about chaos with the vehicle's computer, he installed a heavy-duty 90 aH marine battery in the rear luggage compartment as shown in photo 3. The transceiver's power cable was then routed under floor mats to the battery. The NAVY Special antennas (one for 40, 30, and 20 meters, and the other for 17, 15, and 12 meters) were installed on magnetic mounts atop the car's roof. A heavy ground strap was connected between the antenna's mag mount and transceiver's cabinet for grounding.

Dudley says he can switch from a "no-ham auto" to a full HF mobile system in five minutes by snapping the rig into the mount, plopping an antenna on the roof, and fitting his iambic keyer onto the ashtray. Since changing bands with the NAVY Special antenna involves pushing or pulling the large chrome section above its base coil to one of three click stops, and the antenna is within arm's length of the driver's seat, he can change bands while moving.

If you would like more information on these NAVY Special antennas, incidentally, they are available from Tony Allen, 73 Crogen, Chirk, Clwyd, LL 14 SBJ United Kingdom. Dudley says his favorite mode is CW, but he did not explain how he keys with his left hand while driving with the right hand. Now that's challenging! CW mobile is obviously much easier in the U.S.!

Dudley says the battery lasts long enough for a day's operation between home recharges, and he has worked all continents with the setup. Jolly good show, old chap!

While writing this column I received a letter from G4ZOW/M, who is apparently a big-time mobileer in the U.K. This hearty chap runs 2 KW mobile with an amplifier that draws 175 (!) amps. He is now looking at antennas that can be phased on 2 meters and will handle 1200 watts output (whew!). Phil also made one of the first U.K.-U.S. EME contacts while mobile in motion. He used a 1 KW 2 meter amplifier driving a 9-element beam hung out the car's window (watch out for those left-handed CW mobileers in the oncoming lane, Phil!). Might this be where the expression "Mad dogs and Englishmen" evolved?

Neat Mobile

Clyde Keiser, N4XLL, of Trenton, Florida passed along some interesting pictures of his big-time mobile setup. A Kenwood TS-430 drives a solid-state and no-tune amplifier mounted in the trunk (photo 4). A high current marine battery charged from a heavy-duty alternator in the engine compartment is used to power the amplifier. Clyde uses a high-power version 6 foot Outbacker antenna for all-band coverage (see photo 5). It is mounted on a heavy steel



Photo 2- Mobile installation of G4ZAU in his Nissan Micra. When studying this neat installation, remember the steering column is on the right-hand side so Dudley must key with his left hand while also shifting gears.

strip emerging from beneath the bumper (photo 6), and a large circular area at the antenna's base helps match impedance. This is a clever idea worth remembering if you use a bumper mount, because there is not sufficient metal below the antenna's space to simulate a good ground plane. The more metal you have below an antenna's base, the better it will radiate. Roof mounting atop a fan is ideal, but it is heck on low tree limbs and overpasses. Nice setup, Clyde.

Bicycle Mobile

If you have listened in to the BMHA (Bicycle Mobile Hams of America) net on 14.253 MHz around 2330 GMT on the first or third Sunday of a month, you will surely agree this group is having a ball hamming on the open road. Bicycle mobileers typically start out with a 2 meter handheld clipped to their belt and a boom mike headset affixed to a hat, but an increasing number are moving into HF mobile. Elliot, WA4YDK, for



Photo 3- During inactive times G4ZAU stores his mobiling gear behind the car's rear seat. Shown here are his earphones, 90 amp battery, and 6-band NAVY antennas.



Photo 4- In-trunk view of N4XLL's kilowatt mobile amplifier and high-current marine battery. Large-diameter cables connect these items to front engine compartment. (Discussion in text.)

example, runs a 100 watt transceiver powered from a motorcycle battery and connected to a Hustler antenna affixed to the rear frame of his bike. He has worked over 100 countries and all 50 states right from the bicycle seat.

Some BMHA members mainly bicycle around their neighborhood; others really get into long-distance trips. Russell, KB8U, for example, recently soloed from Ann Arbor, Michigan to Lynden, Washington. He carried a 2 meter handheld and 10 meter/

20 meter CW QRP transceiver, and made a number of good contacts on each band along the way.

BMHA has a very impressive quarterly newsletter, and it is always filled with clever bicycle mobiling ideas and antenna designs plus stories of members' bicycling successes (like Kenny, K6OPG, working ZK1CD from his two wheeler). Editor NAA ensures the newsletters are always filled with great information on both bicycles and rigs. Burned out on traveling congested freeways in encapsulated vehicles? Bicycle mobiling may be that long deserved change of pace. Membership in BMHA (Box 49, Boulder, CO 80306) is \$10 a year, and includes a subscription to their BMHA newsletter. Check it out!

Mobile Kaputt . . . Putt

John, W8JBH, of Tavares, Florida recently passed along some rather alarming mobile information that we trust does not mark the path of future trends. John purchased a 1992 Toyota Camry and, like any true-blooded amateur, installed his 45 watt 2 meter rig in the vehicle. During his third transmission the car's on-board computer croaked. The ensuing story (no pun intended) is quite long, but here are the bottom-line details. Toyota, and several other automotive manufacturers, presently do not warranty their vehicle's computer when any two-way radio running more than



Photo 5- Clyde, N4XLL, beside his high-power mobile. Underdash mounted TS-430 connects to amplifier in trunk and high-power version Outbacker antenna.



Photo 6- Close-up view of base mount for N4XLL's antenna. Large, circular disk helps impedance matching.



Photo 7- ARE's new "Silencer" speaker with DTMF decoder is perfect for silently monitoring FM repeaters while running HF mobile.

10 watts is installed in the car. Makes sense. The computers are not shielded or bypassed and are "sitting ducks" for both RFI and wipeout by nearby lightning strikes (the latter case was well known in the Deep South a few years ago).

Where will such blind use of modern technology lead? Who knows? Maybe new-car test drives will become mobile test operations with an alligator-clipped rig and mag-mount antenna, or QRP mobiling may increase in popularity. Don't knock it: N4QB, N4DKD, and I have been running 30 meters CW mobile with low power for over a year, and we are having a ball. Join us. Maybe we can start a new trend.

Before winding down this month's column, three new items with appeal to mo-



Photo 8- The new MFJ-247 stand-alone antenna bridge and SWR meter. This unit makes quick-tuning mobile antennas a breeze.

bileers warrant mention. First is the "Silencer" external speaker (as shown in photo 7) and DTMF decoder from Amateur Radio Engineers, Inc., P.O. Box 169, Redmond, WA 98073. This unit is ideal for silently monitoring any busy VHF/UHF repeater with your 2 meter or 70 cm rig while running HF mobile. You just plug it into your FM rig's speaker socket, connect it to 12 volts, and program it for any desired two- to four-digit DTMF code (and tell your friends or amateur family members the code), then the setup sits quietly until someone calls you. The speaker then activates, plus its front LED latches on until reset by the front switch to alert you to missed calls. Nice!

Another super handy item for quick-

tuning mobile whips and designing your own antenna is the MFJ-247 shown in photo 8. Just plug your antenna's coax into the MFJ-247's top socket, tune the dial until its meter reads lowest SWR, then read the frequency on its digital counter. You do not even need the transceiver in the car for these checks. I used the MFJ-247 when quick-assembling a 6 foot homebrewed antenna for 30 meters, and tapping the loading coil plus adjusting the base impedance matching coil and top stinger took only 5 minutes. This is one handy item!

Finally, H.C. Van Valzah Company has a new Motorola-type VMO-B hole mount for VHF/UHF antennas that is all-brass and defies rust or corrosion (see photo 9). If you have experienced the traditional corrosion or poor continuity problem with these popular mounts on your 2 meter/70 cm antenna, replacing it with Van Valzah's mount will eliminate that entanglement permanently. You can order this gem by calling 1-800-426-0073.

Whoa! We are out of room before we are out of views! I've also yet to tell you about my upcoming plans for a Heart-of-Dixie mobiling expedition while enroute to activate a new IOTA island around the time this column is printed. I will be giving away more Mobile Marauder Dixie Bandannas (great rig covers and riot starters) and Wild Woody WARC Keys (you will remember them from previous Keys Special columns), so keep an ear tuned for us on 20 or 15 SSB and 30 CW. Watch for the blow-out second part of this "Mobiling Special" next month.

73, Dave, K4TWJ

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Photo 9- H.C. Van Valzah's new Motorola-type hole mount for VHF/UHF antennas. Unit is all-brass and defies corrosion.

"They laughed when I sat down to take the code test..."

but they gazed in disbelief when I presented my answer sheet, with flawlessly copied text and every blank filled in with the correct answer. They just had to know my secret, because everyone knew I have always had trouble with the code. I told them, 'Morseman Plus - The ultimate Morse Code trainer for the PC.' But no one could believe that a computer program could do so much. I guess they had tried the other code programs that promised a lot and didn't deliver. I told them about the great features that Morseman Plus offered, such as simulated random tests, random characters, ASCII text transmission and realistically generated random QSO's that sound just like folks talking on the air. I mentioned just how easy it was to use and how good it sounded on my PC's speaker, and how it blew the house down when I used it with an Adlib or Soundblaster sound card - heck, it even had an option for background static! Talk about realistic!!! It just has so many features that they would have to see it to believe it, especially where it would key my little QRP rig through the serial port! I don't know where I'd have been without Morseman Plus, but I do know - I'm way ahead of the other folks who don't know about it!"

Morseman+ 4.0 is only **\$34.95** (plus \$4 s/h, \$9 overseas). Call **1-800-525-7235** and use your Visa or Mastercard, or fax to **(205)757-8664**, or send a check or money order to us at the address below.

(requires IBM-PC or compatible with 640k RAM and a hard drive is recommended (will run off of high density or 720k floppy drive). Optionally uses Adlib or Soundblaster sound card and mouse (not required).

Morseman+ 4.0 - the Ultimate Morse Code trainer for the PC!



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No surprises! All disks virus-free!

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882,883 - Goodbye Galaxy (2 disks) - Another classic, high resolution Nintendo-style game from the folks who brought you Commander Keen. Great, flowing graphics make this one tops! (EGA/VGA required)

891 - Crystal Caves - A great Nintendo-type adventure game for the PC. Great graphics, and an interesting plot. Hours of enjoyment. (EGA/VGA)

1096 - Radio Mods 1 - A very popular disk. Has text file listings of modifications to many popular HF rigs, HT's, scanners and much more!

1144 - LanLink 2.0 - The best shareware packet terminal program available for the PC! Loaded with great features and documentation. Works with most all TNC's. A great addition to any software library.

1150 - GeoClock - The latest version (4.42) of one of the classics in ham radio software. Has many features that the ham will appreciate. Shows high resolution EGA/VGA screens of the Earth, sun terminator line (moves real time) and much more. (EGA/VGA req'd)

1208,1209 - Interstate Traveler (2 disks) - A top notch travel planning program. Displays up to 40 city maps and a US map of interstates. Has zoom, figures total mileage, fuel consumption, cost and more. Even prints an itinerary. A great system! (req's HD, EGA or VGA)

1333 - Chart - A Smith Chart analysis program for engineers. Functions identically to the paper version, except faster! (EGA/VGA req'd)

1438 - WinGraph - A nice equation graphing system. Works in 2D or 3D modes, polar coordinates, Cartesian coordinates and more. Makes use of the Windows Clipboard. Very easy to use.

1456 - Earth Centered Universe - (req's Windows) A top notch astronomy/planetarium program for MS Windows.

1802 - 10-X Test Drive - a nice system for tracking and submitting 10-10 numbers for awards, endorsements and more. (req'd hard drive)

1823 - HyperLog - Probably the best shareware logger we've seen. Has packetcluster connect, spotting, DXCC database, rig interface, QSL labels and much, much more! Oh yes, it does have regular logging! (HD req'd)

1831-1835 - Russian Callbook(5 disks) - Direct from the Russian Republic comes this great system. Lists all Russian/CIS hams (nearly 30,000) by call. Includes address, Oblast and more. With retrieval prgm. (HD req'd)

1842,1843 - STS Shuttle & Orbit Tracker (2 disks) - A good, high resolution shuttle/satellite tracking system. Uses NASA/NORAD elements, or enter data manually. Includes MET, map zoom and extensive documentation.

1850 - HamCom - A good quality RTTY/CW converter for HF. Connects via a very simple interface (schematic included in program) that connects to the serial port. Even has a tuning indicator display.

1891 - R8 Tuner - A nice control program for the Drake R8 receiver. Has shortwave database library capability.

1896 - Radio Mods 2 - One of our best sellers! A set of text files describing modifications to Uniden, Icom, Alinco, Yaesu, Realistic and other radios.

1897 - RIG EQF - A great Kenwood HF rig control system from the author of LOG-EQF. Allows control of most Kenwood features from the PC.

1898 - IC7000 Rig Control - PC control for the Icom R7000 receiver. Includes logging functions.

2004 - Looking for Work - A great assistant in helping you get a job. Helps you make a job search plan, gives guidelines in searching out and approaching new firms and developing industry-specific resumes.

2501,2501 - TrueType Font Sampler (2 disks) - A collection of 18 fonts for Windows 3.1. Includes Garamond, Eurotype, Chancery, dingbats and many others. For a collection of nearly 200 typefaces, order our TrueType FontPak (listed below)!

Ordering Information

All disks are **\$3.50 each/\$3.00 each for 10 or more**
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To order, call **1-800-525-7235** (or 205-757-5928) anytime, and use your Visa or Mastercard, or fax to **205-757-8664**, or send a check or M/O to the address below.

HamPak 1

A great collection of **50** shareware and public domain disks (our 1082-1150,1801-1823) that include programs for logging, antenna design, maps, packet terminal programs, contest logging, SSTV, CW decoding and much more. It also includes Morseman+ 4.0 - the ultimate Morse Code trainer that has helped thousands of folks get and upgrade their ham ticket. This is a \$184.95 value for **only \$119.95** (add \$30 for 3.5" disks). **You save over \$65!** An excellent gift idea and a great addition to any software collection!

TrueType Font Pak for Windows

A collection of **nearly 200** TrueType fonts for use with Windows 3.1. All fonts from Times, Courier, Cairo, Arabian, Eras, Caslon and much more are included. Decorative caps, script typefaces of all types, serif and sans serif and much more. Over 22 disks loaded with fonts all for all occasions. That's a \$66 dollar value for only **\$49.95** (plus s/h) on 5.25" disks! (3.5" disks add \$15). That's a savings of \$16.05! Call to order yours today!

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ANTENNAS & ACCESSORIES

A LOOK AT THE SHACK FROM BOTH ENDS OF THE COAX

BY KARL T. THURBER, JR., W8FX

Antenna Update

Last month we printed some comments from Bill Drummond, WN6J, in which he described his GAP Challenger DX-VI antenna installation. In it he mentioned that he had very few problems with the GAP vertical. However, the one problem he *did* have (after the antenna came through two heavy storms with 50 mph plus winds) was that a metal screw worked loose. The fix was to put Loctite®, a thread locking compound available in most hardware and auto stores, on all the metal screws to stop the problem from recurring.

In a follow-up letter Bill advises us that Loctite is a liquid polymeric material that's a registered trademark of the Loctite Corporation's Automotive and Consumer Group, Cleveland, OH 44128. He also notes that Loctite comes in several grades, each of which makes it progressively harder to get the threaded joint apart. He finds that Loctite 271, which is the *weakest* grade, works well for his purposes.

To use the product, you just put a drop on the threads of a bolt or screw before making up the connection. After you tighten the connection, the small amount of polymer remaining on the threads hardens, preventing accidental loosening from vibration. The stuff works. To take the connection apart you have to heat the fastener; a small propane pencil torch works well.

Black Vertical C.T.W. Antenna Update. In the September 1991 column we briefly discussed an Australian advertisement for the Australian-patented Black Products C.T.W. (Coaxial Traveling Wave) 1.8–30 MHz HF antenna. Jerry L. Bartachek, KD0CA, had sent us a copy of the ad that Peter Barretto, VK6PB, forwarded to him.

Despite the unusual claims made in the Black Products ad (all-band continuous HF coverage, no antenna pruning or transmatch required, no traps, flat SWR, etc.), Jerry indicated that VK6PB has one of the antennas set up in the vertical mode and likes its performance, using it to good effect on the lower HF bands. Jerry maintains a weekly sked with Peter, who has tried the Black vertical over the path. Jerry says it's usually down only about two or three S-units from Peter's three-element tribander.

In response to our request for more information on the antenna in the September column, Trevor Boyd, VK4ARB, sent us a copy of his user report of the antenna that appeared in the Australian publication *Amateur Radio Action* (Vol. 11, No. 4). Trevor has a good-performing, 40 foot high C.T.W.-design vertical that uses the manufacturer's matching unit, although the company, Black Products Engineering, offers both inverted Vee and vertical formats. The former is supplied as a complete antenna, and the lat-

ter is furnished only with the critical components (you supply the aluminum tubing and miscellaneous parts). A 53 foot counterpoise and the manufacturer's special matching unit are part of the kit.

Trevor's implementation approximates the manufacturer's recommended vertical design, which is somewhat reminiscent of a folded dipole. Actual details of operation are protected by the manufacturer's Australian patent, although Trevor's article attempts to generally explain the operation of the coaxial traveling wave antenna as he sees it. He found performance to be very good, offering a good match directly to 50 ohm coax on all HF bands.

Either antenna is priced at about \$125 (Australian) plus tax and shipping. A vertical sloper version reportedly is in the works. For more details and possible overseas shipping information, write to Black Products Engineering, 92 Granite St., Geebung, Q. 4034, Australia.

ANT-Ventures Hard Line Connectors. Using CATV hardline has proven to be a low-cost source of very low-loss cable for amateur applications. This is because cable TV companies, in upgrading their systems, often have available surplus lengths of 75 ohm hardline, typically ½ inch or greater in diameter.

If you can afford the high cost of good-quality hardline, which can be several dollars or more per foot, well and good. For the rest of us, surplus cable TV hardline bears looking into, despite the fact that the cables usually have a 75 ohm impedance, rather than the familiar 50 ohms, and some mechanical connection problems are involved. The semi-rigid, aluminum shielded coax often can be obtained from your cable company at low or no cost.

In a recent column we took note of the linear quarterwave matching transformers (LMTs) offered by Paul H. Darwactor, W8ZD (ZD Engineering, 605 Balsley Avenue, Findlay, OH 45840), which make it fairly simple to use such cables by providing an accurate impedance match between the 75 ohm hardline and a 50 ohm load. Other dealers also offer LMTs and high-quality, low-cost connectors for connection to the coax.

ANT-Ventures is one such firm. It offers a series of easy-to-install LMTs that allow you to efficiently use your 50 ohm radios and antennas with 75 ohm hardline. The LMTs connect directly to the 75 ohm hardline and mate with standard UHF male connectors. The units are available to cover 144 to 450 MHz in four models that range in price from \$22.95 to \$24.95, depending on band.

Also offered by ANT-Ventures are hardline-compatible UHF male and female connectors (\$5.95) that feature easy, fast installation without the need for special tools. Also available is a 75 ohm hardline cable splice (\$6.95). All LMTs, connectors, and cable splices are furnished with installation instructions.

ANT-Ventures also has announced a "no-ground" 2 meter VHF mobile antenna. It is said to function efficiently without a ground plane and is especially suitable for vehicles with plastic or fiberglass bodies. The antenna also is recommended for portable or apartment use, as it can be mounted to wood or metal, or directly to the back of the radio. Two versions are offered: one mounts directly on a SO-239 connector, and another mounts to a standard ⅜ inch mount. Price is \$39.95.

For more information and an application note on hardline, contact ANT-Ventures, P.O. Box 776, McHenry, IL 60050-0776.

Solarcon A-99 Antenna. The Solarcon A-99 is earning a reputation as a good-performing, economical vertical for 10–17 meter work. Originally designed for citizens band (CB) use, the antenna is 17 feet 8 inches high, is furnished in three sections, and operates at DC ground. Since the antenna is a half-wave voltage fed design, radials are optional.

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For more information, contact Solarcon, 7134 Railroad St., P.O. Box 176, Holland, OH 43528.

Soft Topix

J•Com HamBase™. Remember the "old days" when the only practical way to find an amateur's address was to consult a directory the size of a telephone book? For many of us, that's the way we still look up callsigns. But with the advent of computers, online databases of all kinds have become practical. For example, Zipcodes and telephone area codes are commonly available for computer lookup, and advances such as CD-ROM technology allow you to look up not only Zips and area codes, but virtually every street address and telephone number in the country.

All this is starting to change the face of how we look up amateur callsigns and addresses, especially for QSL purposes. While the "last word" on callsign databases hasn't been written yet, one of the pioneers in this area is j•Com. Earlier this year, this California firm began offering HamBase™ 2.00, an update of the original 1991 HamBase for IBM PC-compatible and Macintosh computers. Given a callsign, HamBase instantly retrieves the name, address, license class, and birthdate of any of the roughly 570,000 licensees in the U.S. and Canada; results are displayed in a window on your computer monitor screen.

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"...do not, repeat, do not approach intake by boat since dock is damaged in..."

"...bright yellow, red trim Piper last reported lost and disoriented in fog near..."

"...conditions for trout in the deeper pools best before 6 am, they're taking..."

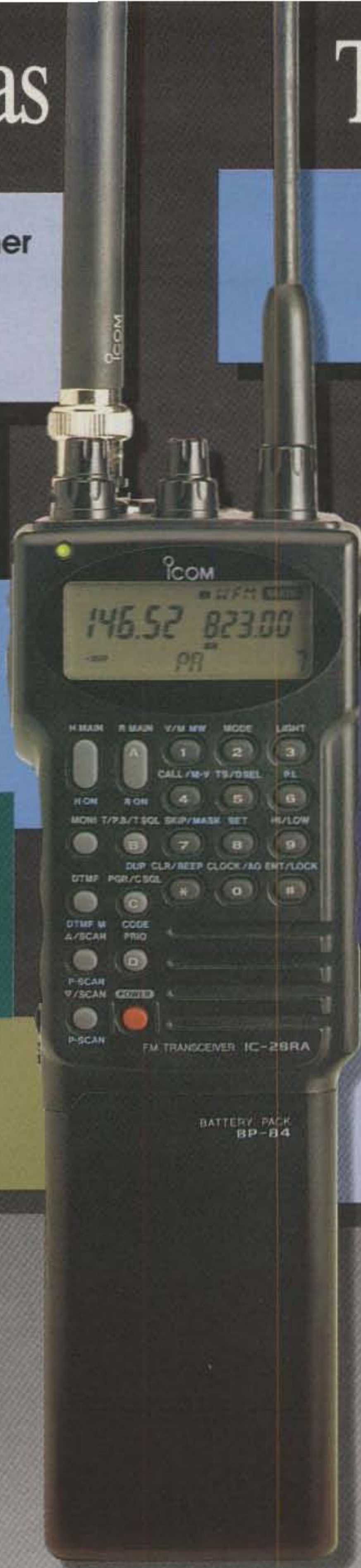
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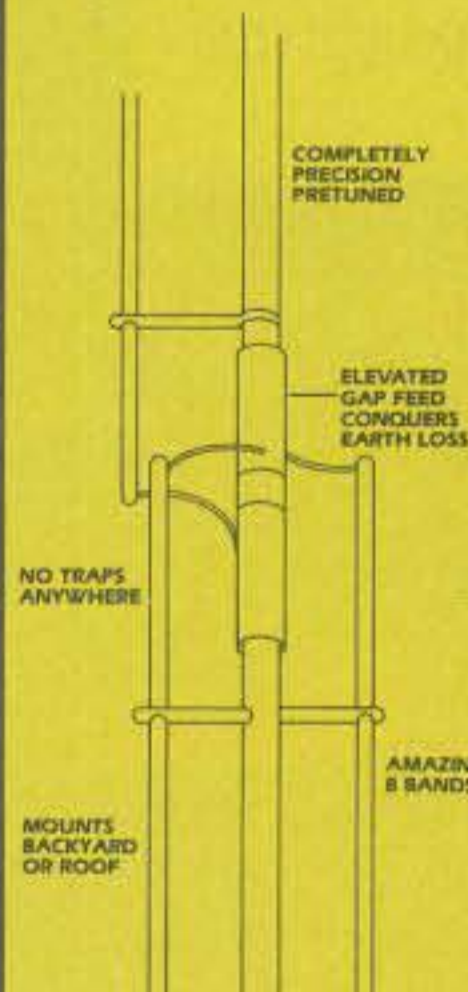
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[Esc] Exit to MAIN MENU

Tap the NUMBER of your selection

Fig. 1- The shareware program BEAMHEAD, by Jim Hammer, KO9T, the main menu of which is shown here, lets you enter almost any existing amateur radio prefix. In return it gives you accurate directions to point your beam for either the long or the short path. It also specifies the distance to that location. (See this month's column for details.)

printing address labels; the capacity to store and later merge corrections into the database; creation of a special category for DX stations with stateside QSL managers that links the DX call to the manager's mailing address; and the ability to make use of QSO data to produce a label to affix to the front of a QSL.

The basic IBM PC program covers the 540,000 U.S. callsigns and is available on 1.44 MB or 1.2 MB high-density diskettes, for \$59.95 at this writing; the Macintosh version is available either on 800K or 1.4 MB diskettes for \$69.95. The 30,000-callsign HamBase Canada is \$19.95. In addition, two optional programs, HBPopUp and WHamBase are also available. The former is a handy TSR (terminate-and-stay-resident) version of HamBase which you can pop up over another application using a user-defined hotkey combination. The latter is a fully functional Microsoft Windows application of HamBase.

I found HamBase to work quite well, and access time is considerably faster than working with a CD ROM. The downside is that the database requires a great deal of hard disk space — about 23 MB. However, you can keep the data on floppies or even run the whole package from floppies without too much slowdown; an index on the main disk tells you which data disk to insert for the callsign you're searching for.

The program presently doesn't let you search for anything except callsign. However, you can export the HamBase database to an ASCII file and then import it to your favorite database. This would let you index the file and sort it by name, Zipcode, state, or any other field, resulting in a sophisticated inquiry system. Hopefully, future versions will offer such features, and there already are competitors' callsign databases that offer at least some data management features.

The value of "callbook databases" such as HamBase is evident as logging programs pro-

vide bridges and interfaces for them. For example, the popular LOGic II multi-purpose logger supports it. By entering a callsign and pressing a function key combination, the data appears in the LOGic window. Another keypress lets you copy the information to the log screen and address field.

For more information, contact Susan Tracy, WA6OCV, at j•Com, Box 194, Ben Lomond, CA 95005. (HamBase can also be purchased from the LOGic II software's manufacturer, Personal Database Applications, 2616 Meadow Ridge Dr., Duluth, GA 30136-6037.)

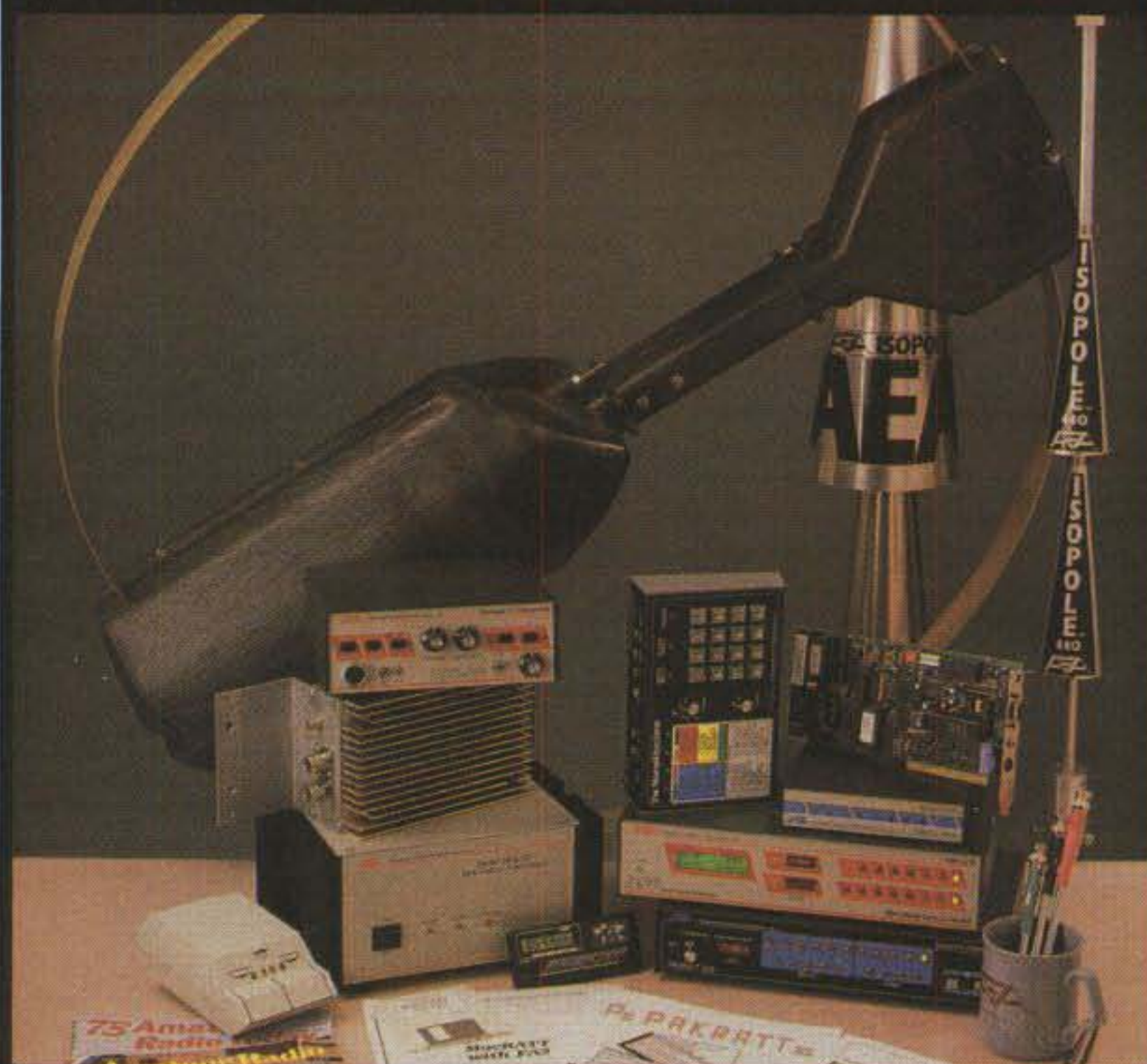
CWTUTOR and BEAMHEAD de KO9T. Jim Hammer, KO9T, sent us his IBM PC programs, CWTUTOR and BEAMHEAD. Both look like promising shareware offerings.

CWTUTOR is an outgrowth of Jim's 30-odd years as an amateur, his experience as a Morse code instructor for a local Boy Scout camp, and his three years of service with the Army Signal Corps. The program started out in 1988 as a means of learning how to program in the BASIC language on the Commodore C-64 computer. The IBM version is greatly enhanced; it helps you learn Morse code and improve your speed if you already know the code. You can send characters from the keyboard, practice receiving random characters, and take a simulated FCC-style test.

Jim originally wrote BEAMHEAD for his own use. Like CWTUTOR, it evolved from a C-64 program. Although he wrote it originally for his own use, he's had many requests for it and so has ported it to the IBM. The program lets you enter almost any amateur radio prefix and in return gives you accurate beam-pointing directions and distances for either the long or the short path.

Jim has released both programs as shareware, allowing users to freely copy the programs and pass them on. However, if you find the pro-

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grams to be of use, Jim suggests a monetary contribution (of no set amount).

If you can't find the programs locally or on your favorite amateur radio BBS, contact Jim Hammer, KO9T, at E. C. Software, 622 N. Illinois St., Monticello, IN 47960.

PacketCluster®. In last April's column we inadvertently referred to the PacketCluster® software in connection with another manufacturer's software, not realizing that the program name is actually a registered trademark of Dick Newell, AK1A's Pavillion Software. Apparently, the amateur radio press, myself included, has become accustomed to the terms "DX cluster" and "DX spotting networks," instead of referring to the actual trade name, PacketCluster. This tendency probably arises from the fact that the PacketCluster network is usually referred to as the "cluster," and that DX is often the primary function most users are concerned with. According to Dick, who wrote us to set the record straight, it's virtually the only software of its kind, and it's been installed at almost 400 sites worldwide.

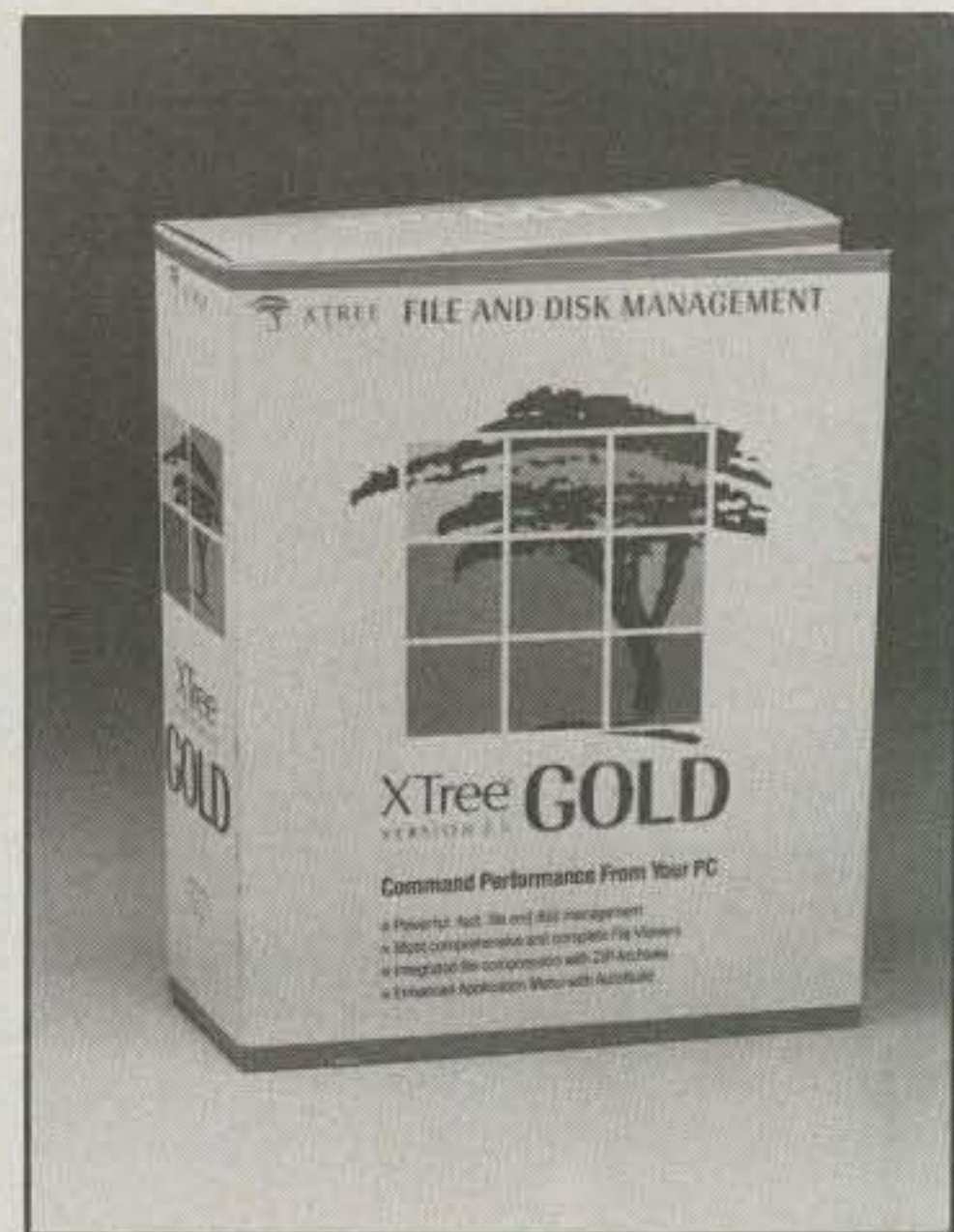
PacketCluster is a packet radio application that runs on IBM-compatible PCs and provides numerous features, including DX spotting and logging, real-time announcements, talk and mail functions, and database access and update capabilities. The application not only supports the special interests of contesting and DXing enthusiasts, but also provides a great deal of fun for the general packet radio community.

The software is designed to let multiple PacketCluster computers (nodes) connect to each other and form a network (cluster) of nodes. All connected users can communicate with each other, regardless of the node to which they actually are connected. The beauty of the system is that databases may reside on one node, but users throughout the network can access and update them. Multiple PacketCluster nodes can link together to form one large network, thereby connecting even hundreds of users into the system. In the Northeast, for example, the PacketCluster network often is comprised of over 50 nodes and several hundred users, from Maine to Ohio to Virginia.

At this writing PacketCluster is offered in Version 5. It is designed for use with the Kantronics KPC-2 or KPC-4 TNC, or the DRSI PC*Packet-Adapter (PCPA) board TNC, and an IBM PC compatible computer. The V5 software and manual are priced at \$219.95; a new product, PacketCluster Limited, has reduced functionality and is available for \$75. Another new product, SHOW/HAMCALL™, recently was jointly introduced by Dick's Pavillion Software and Electronics Enterprises (W6GO/K6HHD). Priced at about \$80 plus update fees, it is the FCC database of all amateur callsigns, derived from the CD-ROM based HamCall database licensed from Buckmaster Publishing, and integrated into PacketCluster to provide instant user database access.

For more information, contact Pavillion Software, P.O. Box 803, Hudson, MA 01749.

OH1AA Logging Program Update. In the November 1991 column we discussed an early version of a Finnish logger that was sent to us by Veikko "Vic" Nieminen, OH1MIE. The program was designed originally for the Finnish radio amateur club station OH1AA and was said to handle a maximum of 27,000 QSOs per log file. Although the program can be freely used, it was billed as "almost" public domain in that the club requests a donation of \$10 along with your call, which is programmed in the software.



XTree Gold Version 2.5 is the most recent incarnation of the popular file management software that did a great deal to pioneer hard disk management. The DOS-based program offers very advanced menuing, viewing, and file and disk management features. (Photo courtesy XTree Company)

At the time I originally received the program, only Finnish documentation was available, and so the several hundred users were mostly in Scandinavia. Now, however, as the program is more widely distributed in version 5.47 or higher, the English docs are contained in an on-disk "README" file that provides about nine pages of user documentation. Some "toolkit" file and QSL label management utility routines are provided in the package.

For more information on how to obtain the program, contact Radio Amateur Club OH1AA/Softline, P.O. Box 29, 20101 Turku, Finland. Again, I'd suggest including a greenstamp or a couple of IRCs.

XTree Gold File and Disk Manager. One of the better so-called "DOS shells" is XTreeGold. XTreeGold 2.5 is the most recent version of the popular file management software that did a great deal to pioneer sophisticated hard disk management. The new program offers advanced menuing, viewing, and file and disk management features. It contains the now-familiar outline-interface as well as drop-down menus that give you complete control over copying, deleting, renaming, and otherwise manipulating files and directories on your hard disk. It's fully compatible with DOS 5.0.

One of the biggest features of the program is the greatly expanded graphic file viewer support and various time-saving techniques and usability improvements. The new version adds 13 graphics viewers, allowing you to view on-screen a wide range of graphics formats.

While XTree and its various derivatives have always been known for their power, the new version has many other enhancements. These include a "speed search" ability to go directly to a directory by simply entering the first letter of the directory, eliminating the need to "scroll through" large drives; a new "AutoView" feature that lets you copy, delete, rename, or even launch an associated program while in the AutoView mode; new shortcut command line start-



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- MD-1CB Desk microphone..... 115.00
- MH-1B8 Extra hand microphone..... 29.00
- SP-767 Speaker w/audio filters..... 99.00
- TV-736 1.2 GHz ATV converter..... 163.00
- E-736 DC cable..... 10.00



Mark II • Shoulder-carried, FM/SSB/CW. Three models, same appearance and function. 2 1/2W out when operating from 12V DC @ 1.1A, or with optional snap-on battery case containing 9 (C) cells or nicads. DTMF microphone with up-down control, dual VFOs, 10 multi-function memories with scanning, programmable band scan. Offset tuning for satellites, LCD display. 2 1/2" h x 6 1/2" w x 7 1/2" d, 2.6 lbs.

- FT-290R MK II • 2 meters, 25W..... \$610.00
- FT-690R MK II • 6-meters, 50-54MHz, 10W.. 752.00
- FT-790R MK II • 430-450MHz, 25W..... 681.00
- FBA-8 Holder for C-cell Nicads..... 32.00
- NC-26B Wall Charger for FBA-8..... 10.00
- CSC-19 Soft case..... 16.00
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YAESU FT-5200 • 2m/440MHz FM Mobile. Covers 140-150 (tx), 140-174 (rx) & 430-450MHz. 32 tunable memories, 38-tone prog. CTCSS encoder and 7 DTMF memories. Output: (2m) 50/5W, (70cm) 35/5W. Cross band full duplex. Dual VFOs with DDS, superior SCF filter. Backlit DTMF mic, detachable front panel. 5 1/2" w x 1 3/4" h x 6" d, 2 lbs. **\$769.00**

- FT-6200 • 35/10w, 440MHz/1.2GHz..... 799.00
- DVS-3 Digital voice memory..... 129.00
- FRC-4 DTMF pager unit..... 34.00
- FTS-22 CTCSS decode unit..... 54.00
- MW-1 Wireless remote control mic..... 109.00
- SP-7 External speaker..... 34.00
- YSK-1L Separation kit w/18' cable..... 59.00



YAESU FT-212RH/C8 • 2m FM mobile. 140-150MHz transmit, 138-174MHz receive. 45/5W. Large multi-function LCD display. User-selectable tuning steps with main tuning knob and up/down frequency entry with supplied DTMF mic. Digital VFO, 20 full-function memories with scan/lockout, encoder standard. Programmable band scan and offset, priority and call channels. CAT System bus for PC control. 12V DC @ 10A. 1 1/2" h x 5 1/2" w x 6" d, 2.8 lbs. **\$405.00**

FT-712RHT/C8 • same as 212 but covers 430-450MHz, 35/3W, 12V DC @ 10A..... **\$497.00**

FT-912RH • 1.2GHz, 10W, 12V DC @ 4A..... **\$581.00**

DVS-1 Digital voice memory module..... 105.00

FTS-12 Decoder; 121/212RH/912RH..... 55.00

MH-15D8 Autodial TTP microphone..... 80.00



YAESU FT-2400H • 2m FM mobile. Rugged, built to take the abuse of off-road use. Three power levels: 50W/25W/5W. Wide band receive 140-174MHz (140-150MHz tx). 31 full function memories, CTCSS encoder, 5 scan functions: Band; Memory; Memory channel lockout with selectable stops; Priority. Programmable call channel, auto. rptr offset. backlit DTMF mic. 6" w x 1 1/4" h x 7" d, 1 1/2 lbs. **\$439.00**

- 2400 Mic Cable 2 ft. packet cable..... 8.00
- FRC-6 DTMF pager unit..... 34.00
- FTS-17A CTCSS decode unit..... 53.00
- SP-3 Small mobile speaker..... 17.00
- SP-4 Mobile speaker..... 22.00



YAESU FRG-8800 • Shortwave Receiver. Covers 150KHz-29.99MHz and 118-173.99MHz with optional VHF converter. Manual tuning and 21-button keyboard for direct entry and programming of 12 memories. LCD with 100 Hz resolution, bargraph S/SINPO indicator. Three scanning modes, dual 24-hour clock/timer, computer compatible with optional interface. 110/220V AC or 12V DC with optional. cord. 14" w x 6" h x 9" d, 13 lbs. **\$784.00**

DC-8800 DC kit for FRG-8800..... 4.00

FIF-232C Interface for RS-232..... 95.00

FM-W/8800 FM-wide kit for FRG-8800..... 21.00

FRA-7700 Indoor active receive antenna..... 58.00

FRT-7700 Antenna tuner..... 77.00

FRV-8800 118-174 MHz VHF converter..... 107.00

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YS-500 140-520 MHz 200w PEP wattmeter..... 99.00

YH-55 Lo-Z headphones..... 28.00

YH-77 Lightweight headphones..... 26.00

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YAESU FT-411E (right) • 2m, 140-150MHz (tx), 140-174MHz (rx). 2 1/2w FM HT. LCD, keypad and rotary-dial frequency entry. Dual VFOs, 49 memories. Busy channel band, sub-band and selective memory scanning, priority. DTMF autodialer with 10 telephone number memories. Encoder/decoder, battery saver and automatic power off. *Optional* batteries for 5W or extended operation. Flexible ant., Ni-Cd battery, wall charger. 5 1/2" h x 2 1/4" w x 1 1/2" d, .85 lb. **\$355.00**

YAESU FT-811 (left) • 2w, 430-450MHz..... **\$394.00**

YAESU FT-911 (left) • 1w, 1.2GHz..... **\$489.00**

YAESU FT-470 (center) • 2m/440MHz, 2.3w, FM handheld. Similar to FT-411/811 above. Simultaneous receive on both bands, 21 memories for each band. 6 1/2" h x 2 1/4" w x 1 1/2" d, .88 lbs. **\$499.00**

See the latest AES Catalog for Discount Prices and a complete listing of accessories for handhelds, etc.

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YAESU FT-415 (left) • Compact 2m FM HT. 2w, 130-174MHz/rx (140-150MHz tx). Dual VFOs, 41 tunable memories (odd splits on any channel), DTMF paging and coded squelch, 15 digit DTMF autodialer, CTCSS encode/decode, VOX. Direct DC (5.5-16V) jack to power the transceiver and charge the battery. Programmable 4 power levels, battery saver & auto power off. 2 1/2" w x 5 1/4" h x 1 1/2" d, 1 1/2 oz. **\$409.00.**

FT-815 • Similar to FT-415 but 70cm, 2W, 430-450MHz receive and transmit..... **\$439.00**

Similar to FT-415/815 but without TTP:

FT-26/25 • 2-meters, 2W, 130-174MHz receive and 140-150MHz transmit..... **\$299.00**

FT-26/27 • 2-meters, 5W, 130-174MHz receive and 140-150MHz transmit..... **\$329.00**

FT-76/25 • 70cm, 2W, 430/450 MHz/tx-rx.. **\$329.00**

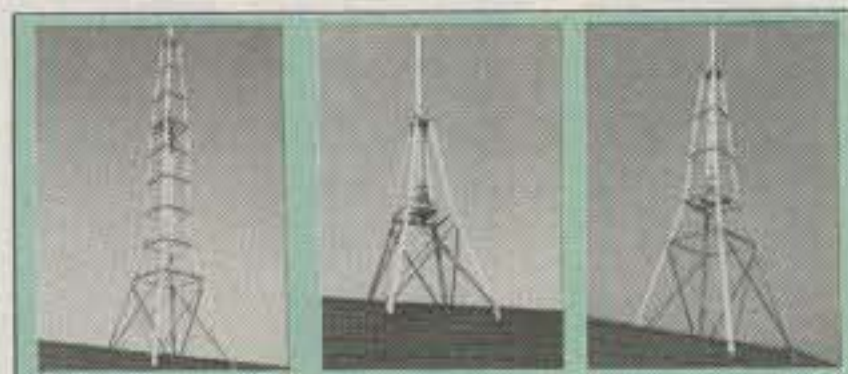
YAESU FT-23R-17 (right) • 2m FM HT 2.5w output, rotary dial frequency entry, LCD display, 10 full function memories, busy channel and memory scanning, priority channel monitoring. Rugged and weatherproofed. Flexible rubber antenna, nicad battery, wall charger. 4 1/4" h x 2 1/4" x 1 1/2" d, 1 lb. **\$290.00**

FT-23R-12 • as above but 2m, 5w..... **\$309.00**

FT-33R • 220 MHz FM, 5w..... **\$328.00**

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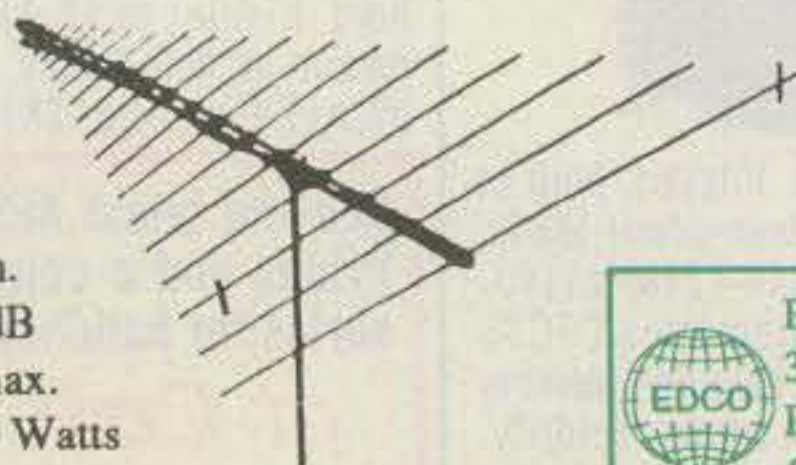


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fest was held. The turnout of packeteers was overwhelming. Fortunately, I had carried enough ROSE network maps, but alas not enough ROSE handbooks. Since then we've supplied a handbook to those who did not receive it at the forum.

I would like to express thanks to Rich ND4F, of the "Computer King" for the loan of two very efficient 386 PC compatibles for use in my demo at the Knoxville Packet Forum.

Show Us Your Handiwork

If you have a packet switch installation that you would like to share with the rest of the packet world, send clear, sharp photos (black and white or color) of your installation along with a description, names of supporter(s), and callsigns to me at 1584 Oxford Court, Gallatin, TN 37066. Your packet system may find itself in a future column.

Power-Packing Packet Switches

I continue to receive mail that talks about the use of sites that do not have utility power access. There are numerous locations that are ideal for a packet switch, but the prospective sysop is unable to connect, or in some cases unable to afford the utility power chargers to, a switch site.

Here is the "stock" answer for those sysops who are in need of switch power. In any case, you are going to need a power supply for the site. Many of our ROSE switch sites use a 50 to 75 amp battery with a charger comparable to the battery charging requirements.

A solar-powered packet switch is just as dependable, and in many ways it may require less maintenance than one being supplied with utility power.

At my home here on resort lake "Ole Hickory," I have a 200 amp solar-powered system. I power four 50 watt VHF transceivers, one dualband 45 watt VHF/UHF transceiver, and a Kenwood TS-450S 100 watt HF transceiver from this 200 amp battery bank (power levels are "output" power, and intermittent packet use).

Here's the kicker! This system has no had utility power applied to it for more than 9 months. My power source is exclusively solar. I use three 35 watt solar panels connected in parallel to provide plenty of power to keep the battery bank well charged. I maintain a 20 amp fuse between the solar panels and the battery bank. Oh, yes—clean them about once a month with warm soapy water, or if WB4EDZ has a bottle handy I "Windex" them.

The system would normally produce between 7 to 10 amps to the batteries, but when the bank has been subjected to lots of use, the current flow from the panels to the batteries can reach as much as 12 or more amps at 16 volts. On very bright, sunny days the current may go even higher.



Photo 6- Shown here are KA4AZQ and the 147.195 controller.



Photo 7- AC4JF about to test the "fire" to the spark-plug of the generator. The big question is, will his eyes light up?

charge controller is recommended in addition to the fuse(s). A solar panel in-line disconnect switch should be placed in an accessible location near the solar panels.

How For The Good Stuff

I have discovered a source of solar panels that were removed from service, and every one I've purchased thus far performs like new. The price is about half that of new units. These are the same panels we use

at the packet switch sites. They are priced at \$150 each in lots of 1 to 3, and 4 to 7 are \$145 each. Shipping is about \$5 per panel. The solar panels I'm describing are ARCO model 16-2000, and they are available from Fowler Solar Electric Inc., 13 Bashan Hill Road, P.O. Box 435, Worthington, MA 01098 (413-238-5974 or 413-238-4275).

I won't go into all the other goodies that Fowler Solar Electric carries, but when you write to them or call them, ask for Steve. If you have a question about the use or ap-

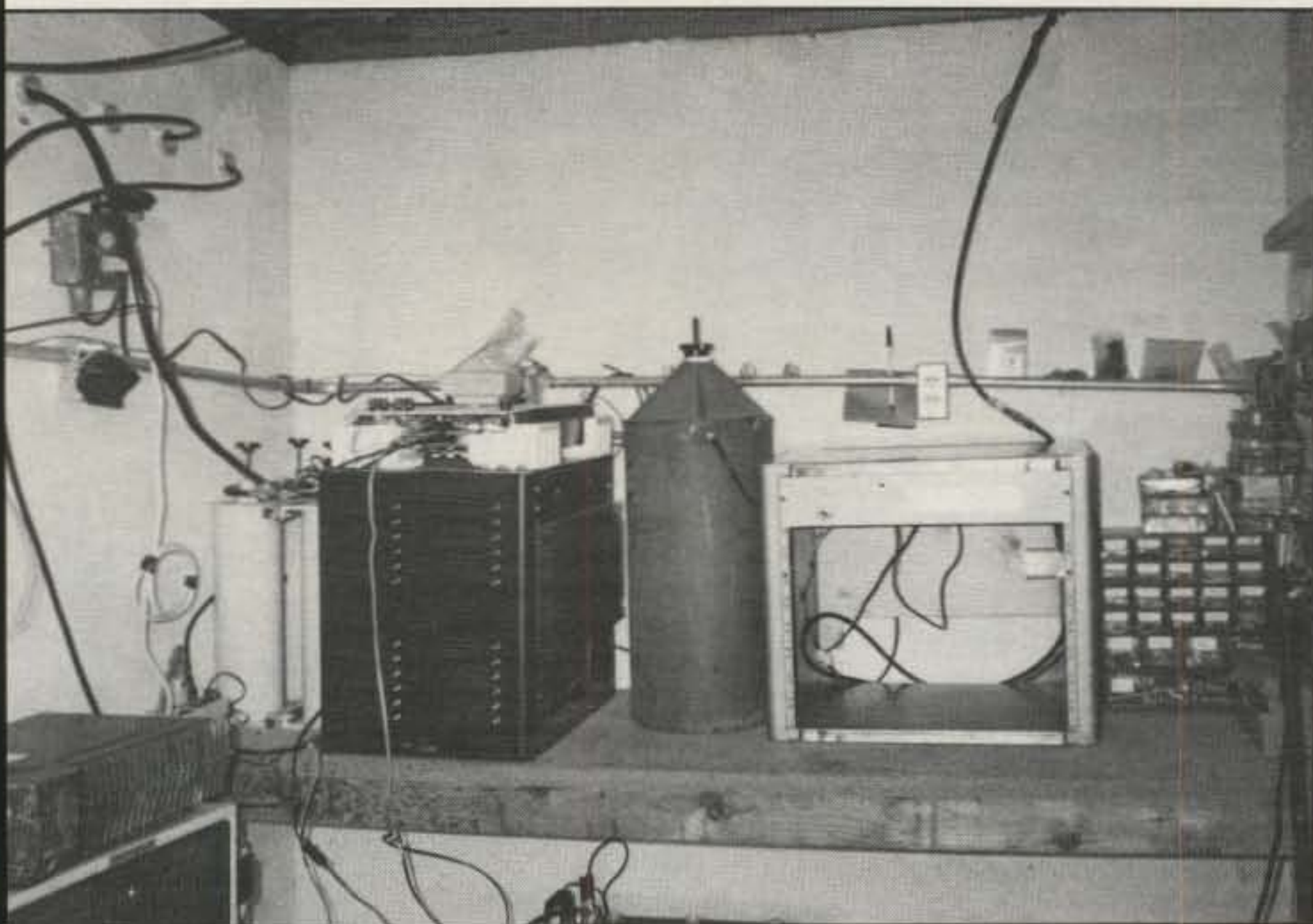


Photo 8- An interior shot of the building that houses the AC4JF-5 Knoxville, Tennessee ROSE switch.

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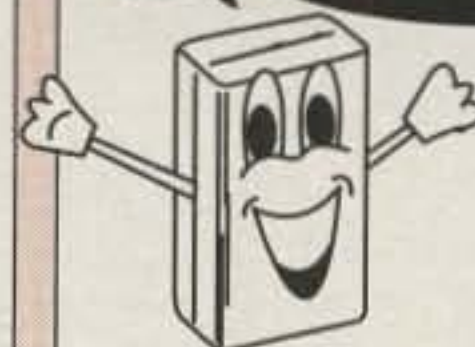
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DRZI 0092



Photo 9- This view from the mountain looks south across Knoxville and Chattanooga

plication of solar energy, you've reached the guru. Even their catalog resembles a handbook for solar power.

Having A Packet Meeting?

We received a letter from GARDS (Georgia Amateur Radio Digital Systems) asking us to remind readers in the central Georgia area of the GARDS meeting at 7:00 PM the first Tuesday of each month. The meeting place is the Christian Towers in Macon, Georgia.

RATS (Radio Amateur Telecommunications Society) meets the second Thursday of each month at 8:00 PM. Their meeting location is Howard Johnson's on Route 3 in Nutley. For more information, contact Gordon Beattie, N2DSY @ N2DSY.NJ.

Word from Lane Arbuthnot, KC6AST, is that the new TRW/San Diego Ham Club is now operating with callsign KK6G. The new wing of the TRW Amateur Radio Club at San Diego will serve as an emergency communication system, plus some plain, down-home packeting and hamming.

For The Notebook

In this month's illustrations for our "Packet User's Notebook" I have prepared a description of the interface cable that is included with the Alinco DataRadio, DR-1200 (fig. 1), and an interface cable which complements many Yaesu hand-helds (fig. 2).

Having fun with packet radio!
de Buck4ABT @ W4HHY.TN.USA.NA



Photo 10- A handshake for a job well done before departing for the trip back down.



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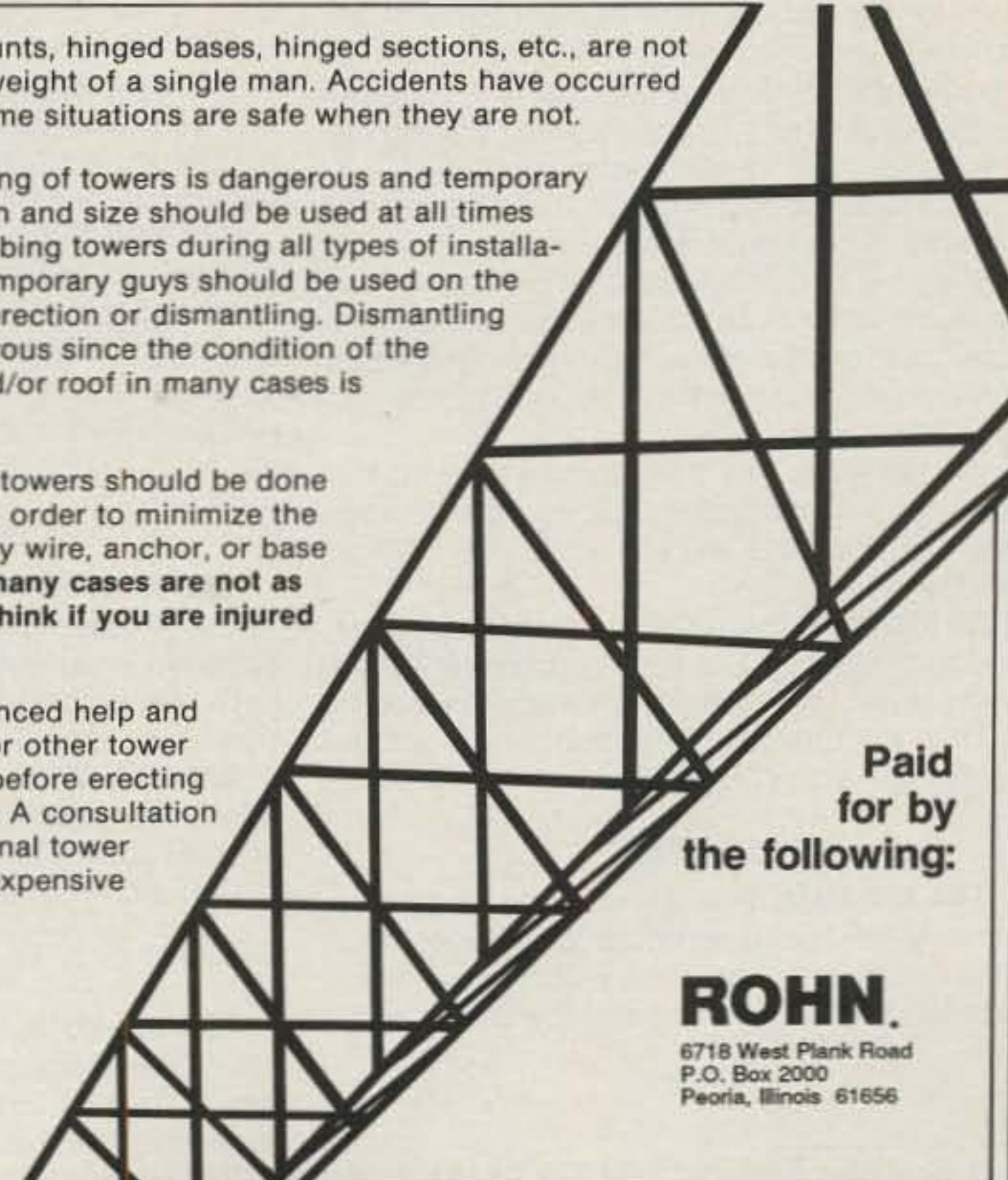
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ALL ABOUT THE WORLD ABOVE HF

What Is A "Calling Frequency?"

Many of you who read this column are new to VHF and above. Because activity is less frequent on the VHF and above frequencies than on the HF frequencies, certain calling frequencies have been set up and agreed to by a majority of operators of those amateur bands.

Whether you came from HF, or repeater operation, or you are a new ham, you may be familiar with FM calling frequencies. However, you may not be familiar with the weak signal calling frequencies. The purpose of the calling frequency is to establish a gathering point for operators to initiate contacts. Once a contact has begun, operators are urged to move off the frequency in order to keep that frequency clear for others to start contacts. Unfortunately, sometimes during band openings one station will stay on the calling frequency and dominate all contacts, unfairly reducing others' chances of making contacts. A list of calling frequencies for FM and weak signal work for each band appears below.

50 MHz

28.885 MHz: This frequency is used to report immediate propagation on 6 meters from locations around the world. QSOs are discouraged, especially during band openings on 6 meters. When a contact is established on this frequency, the operators are encouraged to QSY immediately to a vacant frequency, usually up or down 5, 10, or 15 kHz. This frequency is invaluable for the serious 6 meter DXer because so much current information is exchanged continuously. While there is no formal net control, peer pressure generally works very well to keep the frequency clear of idle chatter.

50.110 MHz: This is the DX to DX calling frequency. Intra country and intra continental QSOs (that is, QSOs within one's own country, or in the case of North America and Europe one's own continent) are highly discouraged on this frequency, as well as between 50.100 and 50.125 MHz.

50.125 MHz: This is the domestic calling frequency. Once contact is established on this frequency, operators are encouraged to QSY up the band.

52.525 MHz: This is the domestic simplex FM calling frequency. Once contact is established on this frequency, operators are encouraged to QSY to another simplex frequency, such as 52.490 MHz or 52.510 MHz.

144 MHz

144.200 MHz: This is the calling frequency for all weak signal contacts. Once contact is established on this frequency, operators are encouraged to QSY up or down the band.

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VHF PLUS CALENDAR

Sept. 3	First quarter moon
Sept. 5	Noisy moon, Sagittarius A
Sept. 6	Very poor EME conditions
Sept. 9	Apogee
Sept. 11	Full moon; VK5MC Europe: 1942 UTC
Sept. 12-14	ARRL VHF Contest; N4KWX grid expedition to FM24 (see text for details)
Sept. 13	Moderate EME conditions
Sept. 18	VK5MC NA: 1452 UTC, 144.012 (Call .010-)
Sept. 19	Last quarter moon; VK5MC NA: 1548 UTC
Sept. 19-20	ARRL 10 GHz Cumulative Contest (see August column for details)
Sept. 20	Poor EME conditions
Sept. 24	Perigee

(Courtesy W4ZD and others)

146.520 MHz: This is the domestic FM simplex calling frequency. Once contact is established on this frequency, operators are encouraged to QSY to another simplex frequency. Simplex frequencies are defined as starting on 146.415 MHz and are found every 15 kHz up the band to 146.595 MHz. Simplex frequencies also are found starting on 147.420 MHz and running every 15 kHz up the band to 147.585 MHz.

222 MHz

222.100 MHz: This is the calling frequency for all weak signal contacts. Because there is less activity on this band, it is not as necessary to QSY once contact has been established, except during a contest.

223.500 MHz: This is the domestic FM simplex calling frequency. Once contact is established on this frequency, operators are encouraged to QSY to another simplex frequency. Simplex frequencies are defined as starting on 223.420 MHz and are found every 20 kHz up the band to 223.900 MHz.

432 MHz

432.100 MHz: This is the calling frequency for all weak signal contacts. Here again, because there is less activity on this band, it is not as necessary to QSY once contact has been established, except during a contest.

446.000 MHz: This is the domestic FM simplex calling frequency. Because there is less simplex activity on this band, it is not necessary to QSY once contact has been established.

902 MHz

903.100 MHz: This is the calling frequency for all weak signal contacts. Once again, because there is so little activity on this band, it is not necessary to QSY once contact has been established, except during a contest.

906.500 MHz: This is the domestic FM simplex calling frequency. Again, because there is little simplex activity on this band, it is not necessary to QSY once contact has been established.

1240 MHz

1294.500 MHz: This is the domestic FM simplex calling frequency. Because there is less



Ted, WA4VCC, astride his roving van during the ARRL Contest. (Photo courtesy KB4CSE)



ave Bostedor, N8NQS, working Europe from EN97.

W4FF, again via tropo. Arnie's experience with sporadic-E caused him to keep an ear to the broadcast band indicators. When he started hearing extremely short skip on 6 meters, he started to get excited. (Sometimes extremely short skip on a lower frequency foretells an opening on a higher frequency.) When he began hearing a Texas FM station on 107.9 MHz louder than he had ever heard, he really got excited. Then the 2 meter magic happened. It began at 1824 UTC, Sunday. Arnie worked KA5ULI, in Louisiana (EM30). Following that, he made 11 additional QSOs in EM12, EM13, EM14, EM15, EM22, and EM25. The last station he worked was Sam, K5SW. Among the other lucky ones were Tom, K5ZXE, Floyd, WQ5S, Gary, KM5X, Buddy, WD5FEN, and Craig, N5OCP.

WB0DRL: Jon Jones, NO0Y, the 6 meter operator of this contest station, reported that they made 1008 contacts in 280 grids. Among the

highlights were: KL7IGR (BP43), VE8KM (DP89), and JR3HED (PM74).

WA7TDZ: Bill, N0XX, the 6 meter operator there, reported that they had a ten hour double hop opening to the east. Additionally, they had openings to JA, KL7, HH7, KP2, and 49 states (lacking Hawaii). He reported that they had over 530 QSOs in 220 grids. Bill said that their location was an alternate because their normal location at the 6000 foot level had 2 feet of snow!

K8MFO: Among the highlights for Don, K8MFO, was a 6 meter CW contact with 7Q7CM, via a very rare summertime apparent F2 propagation mode.

N5DDB: Mike, N5DDB, reported that he also was able to work VE8KM. With this contact, he has now completed working all Canadian districts on 6 meters.

WA4VCC/R: Ted, and his wife, Itice, KB4CSE, operating as WA4VCC/R, making 290

Complex activity on this band, it is not necessary to QSY once contact has been established.

1296.100 MHz: This is the calling frequency for all weak signal contacts. Again, because there is less activity on this band it is not as necessary to QSY once contact has been established, except during a contest.

10 GHz

10.368 GHz: This is the calling frequency for narrow band (CW, SSB) activity.

A final note on calling frequencies: Most contests, CQ's included, disallow contacts made on VHF calling frequencies below 148 MHz. Additionally, some contests disallow domestic contacts made within the 50 MHz DX window. My friend, Gordon West, WB6NOA, wrote a guest editorial that appeared in the July issue of the "West Coast VHFer" decrying the activities of the "big gun" contest station that "parked" on 144.200 MHz during most of the ARRL June VHF contest. Gordon's point was that it was a shame that many new amateurs' first experience with excellent propagation was marred by the inconsiderate nature of one organization's actions of monopolizing a "calling frequency." In the case of Gordon's example, the "big gun" could easily have been heard at 144.190 MHz or some other frequency close to the calling frequency. A calling frequency is just that—a place to meet and establish contact. Therefore, as a courtesy to our fellow VHF operator, once you establish contact on a VHF calling frequency, please QSY to a nearby clear frequency.

ARRL June VHF Contest

Some are calling the June ARRL VHF Contest the best since 1987. It appears that nearly 20 countries were active during the weekend, including 4U1UN, FGs, FM, 6Y5s, C6AFP, VP2MO, P2A, NP4NP, XEs, VP5, VP9, HHs, HIs, JAs, and KL7. Sporadic-E was dominant during the entire contest period on 6 meters. Parts of the country experienced outstanding sporadic-E propagation on 2 meters as well. A few of the reports that have come to my attention follow.

Arnie Coro, CO2KK: Arnie started out the contest on 6 meters, making many contacts on around 50.110 MHz. However, he kept one ear to 2 meters. Before the contest started he made a contact on that band with Rene, WB4MJE, via tropo enhancement. Therefore, he had reason to be optimistic. After the contest was underway he made a contact with Frank,

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contacts on 6 meters alone. The highlight of their roving expedition was the trip across the Chesapeake Bay bridge. During the trip they made 36 contacts in 26 grids, 14 states, and 3 countries. Ted reported that propagation was so intense that at one time they made successive contacts with Washington state, south Florida, and Nova Scotia. They used an FT-736 and respective bricks on 6 and 2 meters and 70 cm. On 6 meters they used a 25-year-old three-ring Saturn halo. As the photo shows, they used modest gain antennas for the other bands.

KG5UN: Ed, KG5UN, is putting EM02 back on the map with operations on 6 and 2 meters. During the contest he made 101 QSOs in 72 grids.

N6CL/R: Your editor made a huge circle around Oklahoma while operating mobile on 6 meters. Among the grids activated were EM05 (8 contacts), EM06 (4 contacts), EM15 (59 contacts), and EM16 (107 contacts). From my fiancée's parents' QTH, I was only 2 miles south of EM16. I operated from EM16 both Saturday night and Sunday morning. On Sunday morning propagation was so intense that I was working stations in all directions. At one point I got so excited that I forgot to start the car to recharge the battery. Well, the inevitable happened. I was on a dirt road off the highway with my dead battery and my only company was a lone cow and an oil pumper. After some huffing and puffing, I got the car pushed down to the highway. I got out my jumper cables, raised the hood, and held the jumper cables in the air. A few cars passed before one motorist got the hint. He was curious as to how I ran my battery down. I mumbled something about a contest and operating my amateur radio set. Fortunately, he didn't press me for any further explanation.

Current Contests

September ARRL VHF Contest: This contest is similar to the June VHF contest. The contest starts Saturday, September 12, at 1800 UTC and ends Monday, September 14, at 0300 UTC. Full rules can be found in August QST.

ARRL 10 GHz Cumulative Contest: The second weekend of this contest is September 19-20, from 8 AM local to 8 PM local. A summary of the rules is in last month's column.

Grid Square Expedition Reports

KA3B/VP5: Harry Schools, KA3B, operating as KA3B/VP5, between June 11 and June 16, completed 620 QSOs. During the contest he made 395 contacts in 113 grids. Among the highlights were contacts with stations in W1-5, W8-0, VE1, VE3, CO2KK, C6AFP, FG3FR, FG5BF, FM3AG, TI2NA, and VP2MO.

KB4CRT/6Y5: John, KB4CRT, operating from Jamaica, reported 250 QSOs from there. During the contest he made 107 contacts in 57 grids, with his best DX being Bob, VE1YX.

C6AFP: Steve, N4JQQ/C6AFP, and Owen, K6LEW, operated from Treasure Cay, Bahamas between June 10 and June 15. During their stay they made in excess of 1200 contacts. Their contest contacts included 596 QSOs in 167 grids. Among the DX they worked were CO2KK, XE3EB, HH2PK, NP4NP, 6Y5IC, KB4CRT/6Y5, KA3B/VP5, VP2MO, KP2A, 6Y5NW, and HH7PV. While there, they were able to work Bill, KM1E, at his home in Maine. Bill regularly operates as KM1E/C6A and was very appreciative of being able to work a country that he has previously activated. Steve and Owen's only regret was not


taking 2 meters and missing a possible contact with Arnie, CO2KK.

XE2-N6CW: During Terry's third annual trip to Mexico he operated from DL37, DL46, DM1, DM10, DM20, DL29, and DL38. He made a total of 420 contacts during the trip. Unfortunately he made very few contacts during the contest because most operators were not looking south and his 100 watts was not enough to overcome the big guns that were easily workable by the many contest participants. Incidentally, Terry and Bryan, K6STI, were not able to go to VP2 due to their inability to get a flight. They plan to try again this fall.












N8NQS/VE3: The idea for Dave Bostedo N8NQS's grid expedition was born in his mind in January. In planning for the trip he sent letters out to four different communities in the area of Canada that he wanted to put on the air. One of the responses was from a fellow ham, A VE3XAL. Al proved to be an excellent logistia and he and his wife, Peggy, VE3PGY, were wonderful hosts.


Dave was accompanied by his wife, Linda, who is not (yet) a ham. They decided to rent a cabin at a lodge in Gogama and work from there during their trip, as this was close to Al and Peggy. This trip was Dave's first ever grid expedition. He and Linda set up in EN97 on June 22, as their first location. From there they had a panoramic view of at least 50 miles. Immediately upon turning on the 6 meter radio they discovered that the band was open to Europe. Sixty contacts later, in five different countries (as far south as Italy), they shifted their attention stateside. Their evening was complete with a treat of an aurora. Their total for that grid was 116 QSOs, with all but a few on 6 meters.

From there they moved on to EN98. They se



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in a clearing of 200 acres that had been used by a forest fire a few years ago. Over the evening and the next day they completed 40 contacts.

Their next location was EN87. They found a mountaintop that had a clear view to the south. They set up there and logged 70 QSOs, again being favored with an aurora.

The next grid was EN88. The two hour drive to this grid prevented them from returning to their cabin that evening. Therefore, they pitched it at a hunting and fishing camp. Linda found roughing it a bit of a challenge, having to use two very well cleaned ash trays for contact log holders for the night. The QSO total count for this location was 40.

Next they made an hour and a half detour to EN99 for their friend, Don, WW8M, and anyone else they could work in a half hour. After finding a location to set up in a parking area, Dave made contacts with Don and four others.

After completing the detour, they headed back to Gogama. Upon arrival they were treated as Dave described "... fantastic roast beef dinner (prepared by Peggy)." Reluctantly, the next day, Saturday, they began their return trip home.

Dave's father, Dave, Sr., K8WKZ, reported that he was able to keep CW schedules with his son all the way up and most of the way back. He worked him in EN72-75 and all four grids of the expedition. For Dave, Sr., this trip represented not only pride in his son's accomplishment but deep appreciation, as well. As a result of his son's efforts, Dave, Sr. was able to fill in all the remaining grids for grid block EN. Dave, Sr. has now completed all grid squares in both the EN and EM blocks.



Dave, Jr., N8NQS, presents his father, Dave, Sr., K8WKZ, with the QSL cards necessary to complete grid block EN.

Dave and Linda were especially impressed with the warmth and friendliness of the people they met during their trip. They are very appreciative of all the help they received from people who made the trip possible, especially Al and Peggy and Dave's father (who loaned them most of the equipment). They made over 300 QSOs for the trip and are already planning another trip

for next year. However, Linda says that they need to purchase a travel trailer. Any leads?

W5OZI: Pat, W5OZI, Nick, W5FUA, and John, KB5IUA, spent June 25 to June 30 at the exact intersection of DM70, DM80, DL79, and DL89. They were able to determine the exact location by finding a surveyor's five-eighths inch rod in the ground in a farmer's field. At that location

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they set up camp to work a total of 75 contacts on both 6 and 2 meters, principally by random meteor scatter. However, with those guys, that is only half the story.

In the morning of the next day after set up they awoke in their "field of dreams" with visions of plenty of QSOs. As the day wore on they began to realize that sporadic-E was going to live up to its name. Not only did Mother Nature not cooperate with propagation, but it gave them a turn in the weather that was almost disastrous. They had been watching a weather front form all day long. Finally, around 4:30 PM the weather got real nasty. It began to rain and the wind began to blow (up to 45 miles per hour). Their tower began to twist and tilted to around a 30 degree angle.

In the wind and rain they attempted to stabilize the tower with barely successful results. In the process Pat suffered a rope burn when his hand momentarily got caught in one of the stabilizing ropes. They were finally able get everything secured whereupon Pat and John made a quick trip to the pickup for shelter. Meanwhile, Nick went to the tent to make sure it and its contents were secure. In the process he was hailed upon, suffering a welt on the back of his neck from hail they later measured to be over 1 1/2 inches in diameter. After finally verifying that everything was alright in the tent, Nick also retreated to the pickup.

They rode out the rest of the storm and the rest of the week eking out contacts mostly via meteor scatter. However, John reported that in spite of the storm they had a tremendous amount of fun.

Nevertheless, John did make a point in his report about the use of the calling frequency. They operated on 50.125 MHz, maintaining a keyer in order to let people know that they were there. However, they were prevented from making some contacts by the continuous ragchewing that took place on the calling frequency (another point for QSYing from the calling frequency once the contact has been established). Additionally, they observed that sometimes people who had just worked them would then call CQ on top of them. It was a bit disconcerting to them to have to put up with the elements to make the expedition possible and then to put up with

inconsiderate operating practices by a few miscreants.

In spite of the difficulties, they are already planning for another trip next year and are open to suggestions for a place to go.

WZ8D/VE3: I talked to a very tired John Walker, WZ8D, the night this column was being completed about the trip he, WA8R, and WA8NJR took to Canada in early July. John reported that they had around 550 contacts, with 45 of them on 2 meters meteor scatter. (Three of these were made while they were traveling down the highway!) A more detailed report will be in next month's column.

N4KWX to FM24: Ray, N4KWX, reports that he will be 22 miles off the coast of North Carolina in a 53 foot motor vessel, operating from FM24 during this month's ARRL VHF contest. He plans operation on 6 and 2 meters and 70 cm. Operation on 902 and 1296 MHz may also be possible.

Concluding Notes on Expeditions: All of these people who went on these trips went at significant expense to them. We who stayed home and worked them owe them a debt of gratitude and possibly some other form of contribution. When you drop them a QSL card for your contact, I am sure that they would not turn down a bit of extra "postage money." This practice has been in effect for HF DXpeditions for a long time. There is no difference between an HF group going out and setting up for a DXpedition and a VHF group going out and setting up for a grid expedition. At the very least, write them a few words of thanks for their efforts.

On The Air

While the ARRL Contest was probably the highlight for the month, there were other significant events. The most exciting for the Canadians in parts of VE1, VE2, and VE3 and some New England 6 meter operators was Monday, June 22. Bob, VE1YX, reported that beginning around 1200 UTC he had a 13 hour opening to Europe. He completed over 300 contacts in over 25 countries. He reported that VE1ZZ, K1TOL, and WZ1V also were in on the fun. Additionally, VE2TH reported contacts with 20 countries. (Remember, this is the day that Dave, N8NQS,

also had the European opening in the evening of his arrival to EN97). Bob stated that this opening was longer than any F2 opening he has previously experienced. Bob also stated that while he was experiencing his opening to Europe the Europeans were experiencing propagation to 9K2 and Africa. When I receive confirmation of these reports, I will include them in this column.

While Field Day was not spectacular for operators of 6 meters, operators of 2 meters fare much better. Hal, KC4YO, reported that he completed contacts in (the panhandle of) Florida, Louisiana, Texas, Oklahoma, Missouri, Kansas, Nebraska, Iowa, Wisconsin, Michigan, and Ohio, all on tropo. Additionally, Hal completed a contact with W5OZI on random meteor scatter on Sunday morning.

Apparently, tropo enhanced conditions were the order of the day for the following week. Reports from Florida and Texas indicate much tropo activity. Frank, W4FF, reported contact between several Florida stations and WP4KJ, KP4EIT, CO2KK, CO2VV, and a CO3. Also reported was that stations in the Caribbean were able to "key up" repeaters in Florida. Jordan, WB2QLP, reported that at one point he and Alnie, CO2KK, were so bored with the excellent conditions that they worked each other cross band from 6 to 2 meters twice, with 40 over reports both ways. He wonders if it is a first time work from the U.S. to Cuba on cross band and then for the operators to reverse the cross band and work again.

Conditions seemed to peak on Monday evening, July 6, as the tropo extended deep into Texas (as far northwest as EM12) and up to the Georgia line. The tropo was evident from 6 meters to 2 cm. At 0330 UTC John, KB5IUA, answered a CQ from WA4CHA on 1296.1 MHz. Later, on 2 meters John worked Bill, KC4HMI, who was running only 10 watts into a mag mount scanner antenna.

XJ3S: During the early days of July special event station XJ3S showed up on VHF. This operation was to commemorate the 200th anniversary of the landing of John Graves Simcoe at Niagara. QSLs for this operation go to VE3BGI or VE3VM.

And Finally

This month I talked a lot about calling frequencies. It is my purpose not to lecture, but to educate. I hope that I did not inadvertently step on anyone's toes. However, if your toes are sore and you know why, I hope they will soon feel better now that you understand a little better the importance of the proper use of calling frequencies. Things are a bit different on the VHF bands. Because there are fewer of us, we have a tendency to know each other much better and are a bit more like a family. It is alright for family members to disagree with each other sometimes. However, it is imperative that, as family, we strive to get along with each other as much as possible. Who knows? We may even set an example for our HF brethren.

This is all the room for the news this month! Please continue to let me know of your achievements on the VHF + bands. Feel free to call me at 405-528-6625 or write to me at the address shown at the beginning of the column. I really appreciate your kind words in your letters and during our QSOs. As you can tell, I really like writing this column. It is because of you and your excellent support that writing this column is so much fun. Until next month...

73, Joe, N6C

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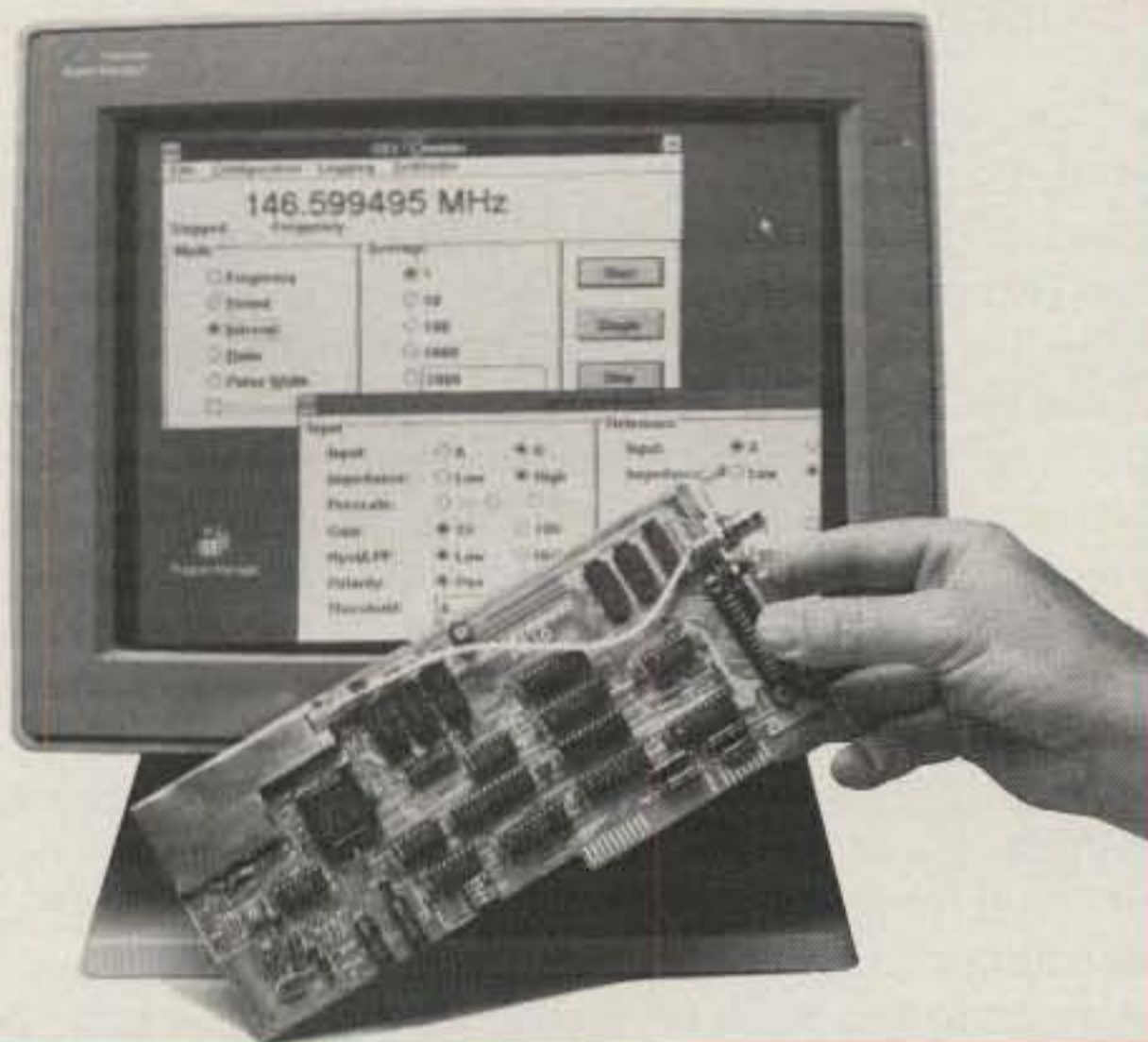
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NEWS OF CERTIFICATE AND AWARD COLLECTING

The Story of the Month for September is:

**Edward Palagyi, KN4Y
USA-CA All Counties #757
All A-1, 3-17-92**

"I was born in Conneaut, Ohio in 1932 and in 1954 received my degree in Chemical Engineering from Tri State University. I worked in the gypsum board industry in south Indiana until 1961, when I moved to Florida to work in a chemical plant. I got married in 1967 and settled down in Jacksonville, Florida for a normal run at life. My wife, Helen, is a true born Floridian, so I became a red neck by marriage. In 1975 my wife bought me a Ward 8-band FM/AM/CB radio and my existence changed dramatically.

"The CB band caught my ear, especially channel 10, the trucker's frequency at that time. I was intrigued with mobile to mobile operation. By coincidence, or divine intervention, the company bought two CB handhelds to use for trouble-shooting from top of the distillation tower to the control room. One night when on top of a tower I talked to a fellow across town, my first introduction to two-way radio communications. This good buddy told me where I could purchase a CB radio and soon I was on the air shooting skip.

"One night I was invited to attend an amateur radio Novice class downtown. I had heard about hams and decided to attend the class to see what hamming was all about. By this time I had become disillusioned with CB and was ready for a change.

"The code was the hardest element for me to learn, but my wife got me a Swan 700CX for Christmas and there was no quitting now. Finally in 1977 I received my Novice license, WB4QVK, and quit CB cold turkey. My call was too long to remember so I decided to upgrade to extra to get a shorter call. Having no background in electronics I enrolled in a basic electronics course at the University of North Florida to, hopefully, learn enough theory to pass the FCC exams. It was not as easy as I had hoped, but in 1970 I finally received my current call, KN4Y, and promptly forgot the theory. I tried SSB, but a hearing problem made this mode a chore, so I decided to stick with CW.

333 South Lincoln Ave., Mundelein, IL 60060



Edward Palagyi, KN4Y, USA-CA All Counties #757, shown here with Tiger, his 19 pound Maine coon.

"My Elmer, Billy, N4UF, gave a presentation about county hunting at a Jacksonville Amateur Radio Club meeting and I was hooked. I went through my QSL cards and on October 20, 1979 received my basic USA-CA 500 #1398 from CQ magazine. I began to work every contest and QSO party I could find in hopes of adding to my county totals, but it was slow.

"Then my job was eliminated when the company changed owners and radio activity took an hiatus. We moved to Tallahassee, Florida and I went to work with the Florida Department of Environmental Regulation in the air division and later was appointed State Asbestos coordinator, the position I currently enjoy.

"My radio shack was reconstructed and in 1982 I resumed county hunting. I came across county hunting mobile activity on 14.066 MHz and worked KA1HB/m in Eddy, New Mexico. This was the CW net and I spent every possible minute listening and working mobiles. The counties were coming faster and my wife was complaining louder and louder about my other responsibilities. Finally, I promised not to turn the rig on every fifth weekend. This was comparable to the time I quit drinking and smoking, which were the longest five minutes of my life.

"I heard about and became a member of the Mobile Amateur Radio Club and the world of county hunting suddenly expanded. Highlights are the county hunter conventions. We attended our first convention in 1987 in Denver, Colorado and have not missed one since. Meeting and sharing stories with other county hunters is a most enjoyable part of the total experience.

"I heard how exciting and enjoyable operating mobile could be and suggested to

USA-CA Special Honor Roll

Dick Elkins, N6OKX
USA-CA All Counties #765
All SSB, 5-1-92

Antonio Cardelli, I6FLD
USA-CA All Counties #766
All SSB, 5-21-92

Richard T. Marshall, WB4CCT
USA-CA All Counties #767
Mixed, 5-29-92

my wife that we purchase a new radio so I could go mobile like the big boys. My wife said I could get a new toy when it snowed in Tallahassee. The following winter we had two inches of snow and soon I was operating mobile on the CW net. Mother nature must be a county hunter.

"As part of my job I teach asbestos removal courses at the University of Florida, talk at seminars, assist in public service communication on 2 meters, fish, bowl in tournaments, and do work-related field inspections. These activities require a lot of traveling and I try to go mobile whenever possible and give out counties on the CW net. This is my way of saying thanks to all the county hunters who made it possible for me to receive USA-CA All Counties #757, and to help others to obtain the ultimate thrill of achievement. I am a charter ARRL accredited volunteer examiner which is my way of helping others enjoy amateur radio.

"I would like to thank the many many mobile county hunters who gave me county after county, especially Stu, WU4S, who made a special trip to Union County, NC to get my last county. Thanks to Ed, WA6VJP, who would let me know when a mobile was in one of my last few counties, and to my lovely wife Helen who threatened but never actually hit me, whose driving skills provide me the chance to run new counties, and who makes it possible for me to operate mobile in the county hunters CW contests.

"Every two months I write a CW column for the County Line Road Runner. Dorothy, WB9RCY, the USA-CA Custodian, asked that I prepare this article in a serious format and not like my articles in the road-runner. But Dorothy, my roots and forma-

USA-CA Honor Roll

3000		KA2ELH	1035
N6OKX	791	N1GCZ	1036
I6FLD	792	I6FLD	1037
WB4CCT	793	ZL2ASM	1038
		WB4CCT	1039
2500			
N6OKX	872	1000	
I6FLD	873	N6OKX	1235
WB4CCT	874	N1GCZ	1236
		I6FLD	1237
		ZL2ASM	1238
2000			
N6OKX	947		
OE5CA	948	500	
I6FLD	949	EA4CQT	2606
ZL2ASM	950	CE1YI	2607
WB4CCT	951	N1GCZ	2608
		IK0AZG	2609
		G3CWW	2610
1500		ZL2ASM	2611
N6OKX	1034		

The total number of counties for credit for the United States of America county award is 3076. The basic award fee for subscribers to CQ is \$4.00. For non-subscribers it is \$10.00. Initial application must be submitted in the USA-CA Record Book, which may be obtained from CQ Communications, 76 North Broadway, Hicksville, NY 11801 USA for \$2.00. To qualify for the special subscriber rate please send a recent CQ mailing label with your application. To be eligible for the USA-CA, applicants must comply with the rules of the program as set forth in the revised USA-CA Rules and Program dated June 15, 1991. A complete copy of the rules may be obtained by sending an SASE to Dorothy Johnson, WB9RCY, USA-CA Custodian, 333 South Lincoln Avenue, Mundelein, IL 60060 USA. DX stations must include extra postage for airmail reply.

ive years were not exactly compatible with the 'serious format' concept, and graduation from a school whose mascot was the penguin did not help. However, I tried. 73 o all, E. Palagyi, KN4Y."

Awards Issued

Dick Elkins, N6OKX, completed all of his paperwork and qualified for USA-CA All Counties #765, USA-CA 3000 #791, USA-CA 2500 #872, USA-CA 2000 #947, USA-CA 1500 #1034, and USA-CA 1000 #1235, All SSB, dated 5-1-92.

Antonio Cardelli, I6FLD, updated his good record by claiming USA-CA All Counties #766, USA-CA 3000 #792, USA-CA 2500 #873, USA-CA 2000 #949, USA-CA 1500 #1037, and USA-CA 1000 #1237, All SSB, dated 5-21-92.

Richard T. Marshall, WB4CCT, completed his quest by filing his qualifying application for USA-CA All Counties #767, USA-CA 3000 #793, USA-CA 2500 #874, USA-CA 2000 #951, and USA-CA 1500 #1039, Mixed, dated 5-29-92.

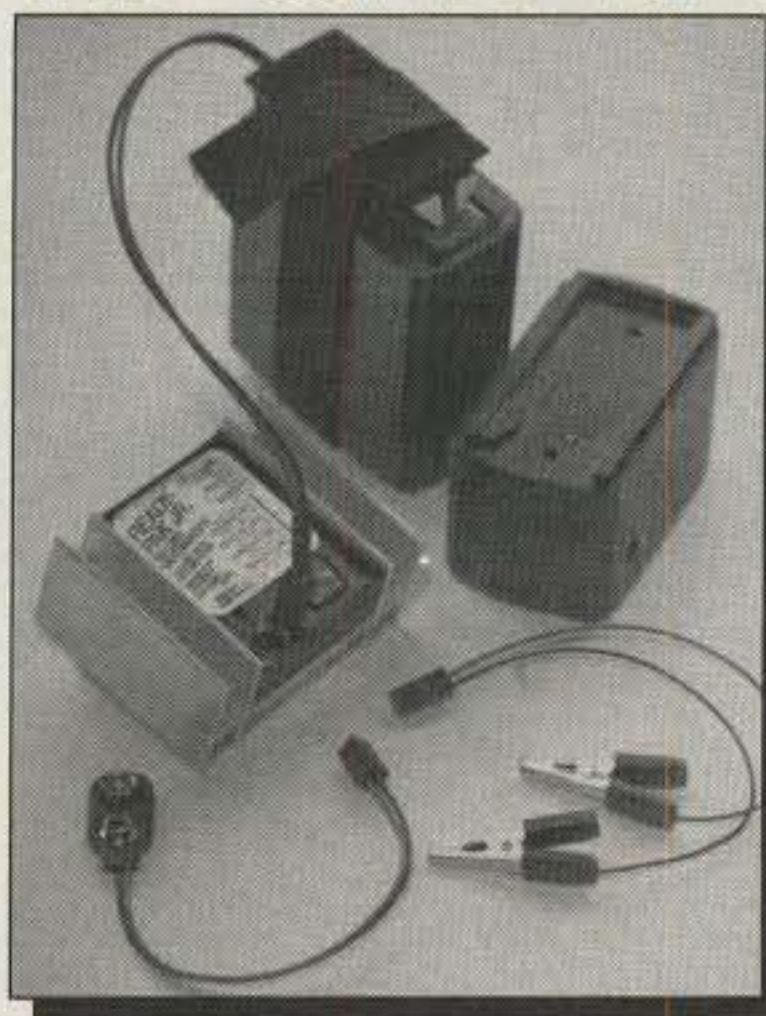
Karl Kneideinger, OE5CA, updated his good record and received USA-CA 2000 #948, Mixed, dated 5-16-92.

Rex E. Glew, ZL2ASM, submitted his good application for USA-CA 2000 #950, USA-CA 1500 #1038, USA-CA 1000 #1238, and USA-CA 500 #2611, Mixed, dated 5-26-92.

Thomas W. Condren, KA2ELH, received USA-CA 1500 #1035, Mixed, dated 6-3-91.

Michael D. Bailey, N1GCZ, got off to a good start in his quest by claiming USA-CA 1500 #1036, USA-CA 1000 #1236, and

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Virgilio Soria Valle, EA4CQT, USA-CA 500 #2606, 5-5-92.

USA-CA 500 #2608, All 20M SSB Mobile, dated 5-8-92.

USA-CA 500 certificates went to:

Virgilio Soria Valle, EA4CQT, USA-CA 500 #2606, Mixed, 5-5-92.

Aldo Tassara R., CE1YI, USA-CA 500 #2607, Mixed, 5-6-92.

Michael D. Bailey, N1GCZ, USA-CA 500 #2608, All 20M SSB Mobile, 5-8-92.

Gianfederico Madruzzo, IK0AZG, USA-CA 500 #2609, All SSB, 5-18-92.

Anthony W. W. Timme, G3CWW, USA-CA 500 #2610, All CW, 5-19-92.

Rex E. Glew, ZL2ASM, USA-CA 500 #2611, Mixed, 5-26-92.

Awards Available

The Amsterdam DX Certificate (ADXC).

The Amsterdam DX Club issues the Amsterdam DX Certificate to all radio amateurs who submit proof of 2-way communication with 10 members of the club and who received QSLs of the members concerned.

Contacts may be made over any period starting January 1, 1957 in any mode, and a log extract signed by yourself and two fellow amateurs will be accepted.

Costs: 6 International Reply Coupons, 3 U.S. dollars, 1 pound sterling (U.K.), or DF1. 5.—. Applications may be sent to ADXC-Club, P.O. Box 9, 1000 AA Amsterdam, Netherlands.

The Amsterdam DX Certificate was first issued in 1957 and it is the oldest city award in Holland. Due to this fact, amateurs whose QSLs were valid some years ago may have moved to other parts of Holland or are no longer active.

Only present ADXC members are listed in the current roster (see Table I). However, QSLs from stations backdated to January 1, 1957 who were members of the Amsterdam DX Club at the time of your QSO are still valid. They usually have some type of ADXC marks on them like "valid for ADXC" or "member ADXC."

During the years, numerous types of adhesive labels and stickers were used to publicize the award; older labels also have

a list of members printed on them. Some amateurs have the ADXC information printed on their QSLs and special QSLs for ADXC members were printed on a few occasions.

You may contact ADXC members also when they operate mobile, portable, or from a second QTH, or in fact from any QTH in Holland. Contacts with members operating abroad or Maritime Mobile are not valid.

In some countries, upgrading in license class or moving to another part of the country means also a new callsign. Contacts made under a previous callsign or a special prefix are valid for the award; however, all contacts must be made with your own individual callsign and from the same country. The award will be issued to the callsign shown in your application letter.



The Worked Antarctic Bases Award, sponsored by Associazione Radioamatori Italiani and Diamond DX Club.

Worked Antarctic Bases Award (WABA).

WABA is an award program for DXers interested in making contacts with stations operated in Antarctica. This means working any Antarctic base located from 60 to 90 degrees south, as by definition the Antarctic Continent starts at 60 degrees south.

WABA is sponsored by ARI (Associazione Radioamatori Italiani) and Diamond DX Club.

The award is available to licensed radio amateurs and SWLs for contacts starting with January 1, 1961, the year of the "The Antarctic Treaty." All bands from 10 to 160 meters, all modes, are valid. There are no restrictions on signal reports received or given. Currently, two separate classes of the award are available, Simple and Hard, plus Honour Roll and Top Honour Roll.

Requirements: Simple Class requires 15 contacts and confirmations from 15 differ-

PA0 ACM, ANH, ASD, AWJ, BEA, CHN, CLO, DOG, END, FCM, FL, FMK, HIL, HPO, IF, IWO, JAC, JEL, JPC, JVB, JWA, KHR, KST, LGJ, LGR, LRK, MFC, MIR, MJA, NIC, NLC, OI, PAN, PER, PJE, PRY, RDY, RHA, TAP, TKS, VDW, WFB, WIK, WIL, WS.

PA2 JSL, MAX, RPC, SWL.

PA3 AAI, ACC, ADA, ADI, AEO, AJW, AMI, ASD, ASF, ASI, AUB, AWX, AYA, BAC, BAV, BFX, BHY, BKW, BLV, BRO, BRR, BVA, BYS, CFN, CJG, CLN, CQJ, CSZ, CUP, CYA, CYM, CYN, DKU, DLK, DLP, DRZ, DUG, EAL, EAT, ECT, EHA, ELD, EQG, EWD, FBW.

PD0 AJQ, BAK, DCR, DLL, FFB, HAV, HFB, HHW, HXZ, JKU, JMG, JOV, LBD, LCV, LKN, LKX, LOH, MBU, MIA, MIZ, MLP, MVU, NBN, OZB, PDB.

PE0 WGA.

PE1 AMT, BFA, BMS, BVI, CDK, CRT, DGZ, DHN, EDY, FHS, FYF, GAY, GBV, GFI, GOA, GRD, GSN, GXY, HGR, HLT, HSL, HXL, IBA, IHT, IPG, ITP, IVU, IXP, IZL, JAN, KDM, KZK, LZH, MAL.

PI4AML, PI4ASD, PI4RCA, PI4VLA, PI9ZKA.

PD and PE stations work only on VHF.

Table 1—Membership Roster (as of January 1, 1990) of ADXC Club, issuer of The Amsterdam DX Certificate.

ent stations operating from Antarctica, representing at least 5 countries having bases there. Simple Class will have no endorsements or updates.

Hard Class requires 10 contacts and confirmations from stations operated from 10 different bases in Antarctica, representing at least 5 countries having bases there. Hard Class may be updated whenever the applicant wishes, to reach the Honour Roll and Top Honour Roll levels. Honour Roll requires 25 contacts and confirmations from stations operated from 25 different bases in Antarctica, representing at least 15 countries having bases there. Top Honour Roll requires 50 contacts and confirmations from stations operated from 50 different bases in Antarctica, representing at least 20 countries having bases there.

Send applications to the Diamond DX Club Awards Manager, I8IYW, Giuseppe Annuzzi, P.O. Box 5083, 80144 Naples, Italy. Application must include a detailed log extract showing: callsign of station worked, date, time, frequency, mode, RST received, name of Antarctic Base plus all QSL cards for the contacts listed. Members of Diamond DX Club need not send QSL cards, but some cards may be requested by the Award Manager for checking purposes. QSLs will be returned through the bureau; however, the applicant may send an SASE and request direct return of cards.

The fee for WABA, all classes, is 20,000 lire or 25 IRCs or 15 dollars US. The fee for endorsements is 3,000 lire or 2 US dollars or 3 IRCs, while Honour Roll and Top Honour Roll endorsements are free. Adhesive color flag endorsements of each of the countries having a base or bases in Antarctica are available for submitting at least 10% of the active bases belonging to that country, following the reference numbers in the WABA Directory.

Radio amateurs who have operated, or are operating, from any base in Antarctica have a right to apply automatically for WABA, Simple Class, without meeting the requirements specified above. Awards issued under this provision will carry a printed "Operator" flag.

Contacts with special call IR1ANT (operated from Torino, Italy on the occasion of the Antarctic Adventure on January 27, 1991), IY0A in Roma, Italy (the official station in communication daily with IA0PS in Antarctica), and IY8UN in Napoli, Italy (also in communication daily with IA0PS), are valid and can be used to help make up the 50% of bases needed to complete a country section or to qualify for a basic award, Simple or Hard.

A copy of the WABA Directory is available from the Diamond DX Club, c/o the Award Manager's address. The price is 5,000 lire or 6 IRCs or 4 US dollars to help defray printing and postage costs.

People having information regarding Antarctic Bases not included in the WABA Directory are asked to get in touch with or write to I8IYW or IK1GPG or I1HYW to update the directory. People helping in this way will be given Helper Credit by mention on the first page of the directory. Also, the Italian official ARI magazine *Radio Rivista* will publish twice yearly the callsigns and names of new WABA Award recipients and persons receiving upgrades.

Simple, Hard, Honour Roll, and Top Honour Roll Awards consist of an aluminum silk-screen-printed color plate, personalized, showing the Antarctic Continent; dimension 200 x 240 millimeters.

Birthplace of TV Award. Contact 5 Rigby, Idaho stations CW AM SSB. Send log information for verification. QSOs on 160 through 10 meters are valid; no 2 meter contacts.

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By Brian Beasley, K6STI

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By Gerald Williamson, K5GW

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.625"	.058"	.509"	.104	.50
.750"	.058"	.634"	.127	.57
.875"	.058"	.759"	.150	.65
1.000"	.058"	.884"	.202	.70
1.125"	.058"	1.009"	.229	.80
1.250"	.058"	1.134"	.255	.90
1.375"	.058"	1.259"	.283	1.05
1.500"	.058"	1.384"	.309	1.25
1.625"	.058"	1.509"	.336	1.45
1.750"	.058"	1.634"	.363	1.60
1.875"	.058"	1.759"	.384	1.70
2.000"	.058"	1.884"	.416	1.75
2.125"	.058"	2.009"	.443	1.85
6061-T6 EXTRUDED ALUMINUM TUBING				
.188"	SOLID	-	.032	.15
1.125"	.058"	1.009"	.229	.65
1.250"	.058"	1.134"	.255	.70
2.000"	.120"	1.760"	.833	2.35
2.000"	.250"	1.500"	1.616	3.75
2.500"	.120"	2.260"	1.055	2.95
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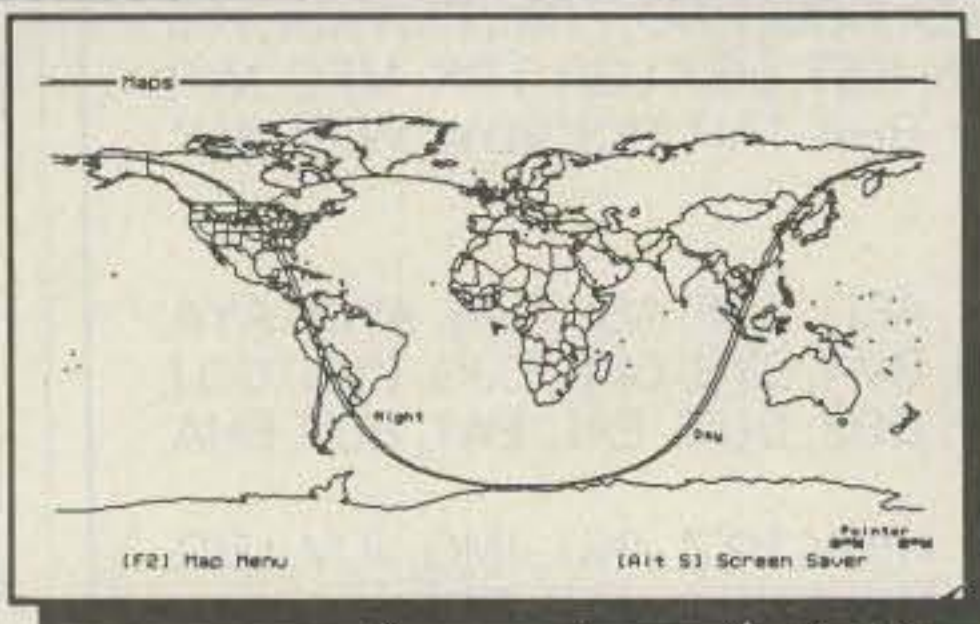
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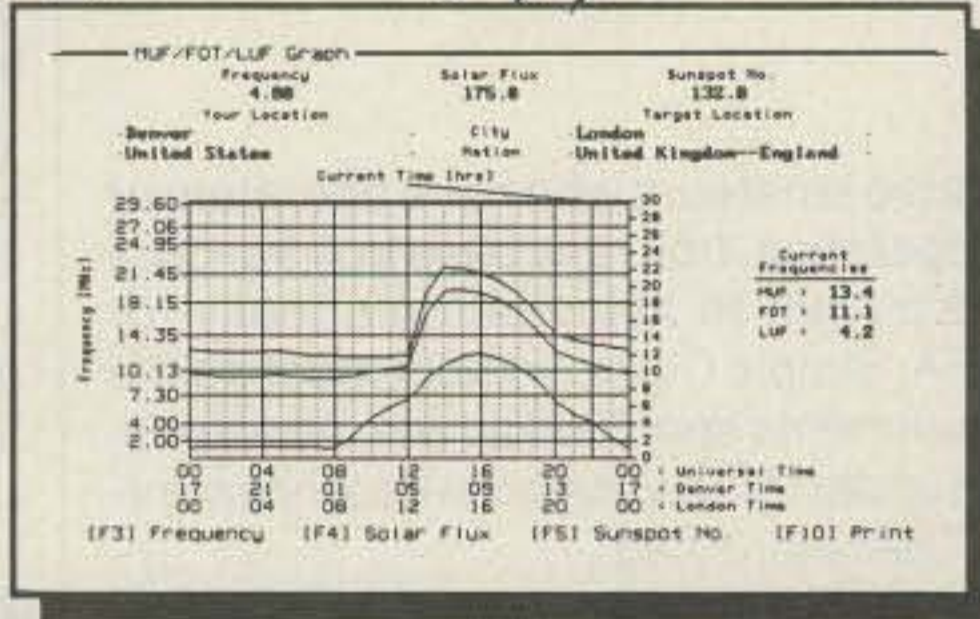
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Denver	0 Region	17	London		
Colorado	0 Region	17	Greater London		
United States	US	US	United Kingdom-England		
39°45'N	105°00'W		51°30'N	000°05'W	
Mon/05Jan92/1127	Day/Date/Time	Mon/05Jan92/1827			
0721/ 29°-289°	Sunrise/Grayline	0604/ 37°-211°			
1058/151°-331°	Sunset/Grayline	1687/143°-323°			
True Bearing		Short Path			
41°		387°			
221°		Long Path			
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Send your QSL and a #10 SASE if you are willing for the certificate to be folded; otherwise send a large SASE to hold the 8 1/2" x 11" certificate. If you only want an Idaho QSL, send SASE directly to the station worked.

Contacts after 1 January 1991 will be accepted. Send log information to W7LQU at the address shown in the *Callbook*.

Saskatoon Wheat Belt Award. The Saskatoon Wheat Belt Award is sponsored by the Saskatoon Amateur Radio Club, VE5AA, of Saskatoon, Saskatchewan. This award may be earned by an amateur radio operator who has made two-way contacts with ten amateur radio operators who are members of the Saskatoon Amateur Radio Club.



The Saskatoon Wheat Belt Award, sponsored by the Saskatoon Amateur Radio Club of Saskatoon, Saskatchewan.

This award is printed on good quality paper stock and is suitable for framing.

The rules for acquisition of this award are as follows:

1. All stations must maintain satisfactory two-way communications with a member of the SARC.
2. This contact can be on any amateur frequency, using any mode.
3. QSL cards are not required as proof of contact.
4. A certified copy of your log, signed by another amateur, is necessary.
5. This copy, along with two IRCs, should be mailed to ARS VE5AA, Box 751, Saskatoon, Saskatchewan S7K 3L7.

Of Interest To County Hunters

The MARAC North Central District Convention will be held in Appleton, Wisconsin, October 2-4, 1992. For details, get in touch with Bob Thorne, K9DAF, 8759 N. Clayton Avenue, Neenah, WI 54956.

See you all next month!

73, Dorothy, WB9RCY

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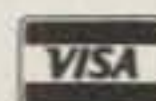
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H10-3	10m	6.46	1.04	1.79	\$190
H6-6	6m	9.41	1.02	1.91	\$200
H144-5	2m	9.10	1.05	1.39	\$ 69
H144-15	2m	13.73	1.02	1.68	\$145
H220-5	1.25m	9.20	1.02	1.30	\$ 65
H220-17	1.25m	13.53	1.02	1.29	\$150
H432-5	70cm	9.35	1.08	1.28	\$ 65
H432-24	70cm	16.14	1.04	1.83	\$145

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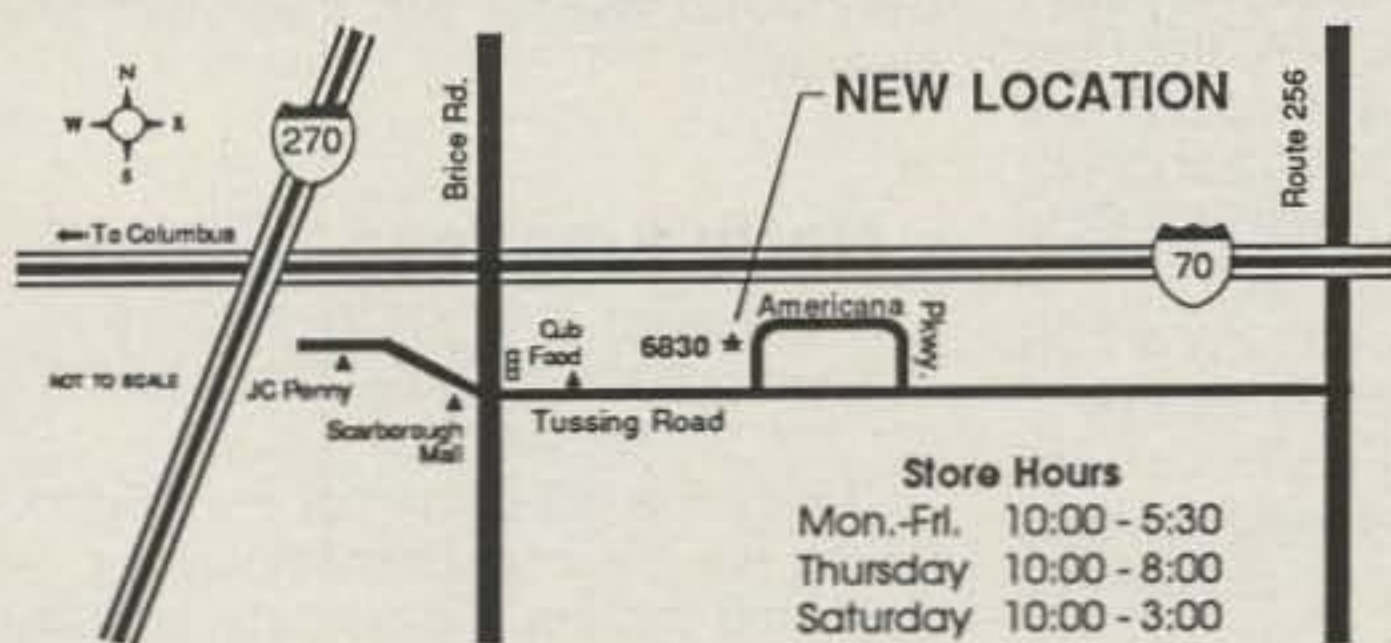


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CIRCLE 45 ON READER SERVICE CARD

NEWS/VIEWS OF ON-THE-AIR COMPETITION

1992 CQ Contest Survey

This month I am probing into some of this year's contest controversies/topics of interest as well as attempting to have a little fun. Surveys such as this one, while not scientific, provide a unique opportunity to measure the pulse of the contest community (and its sideline observers and critics). Please take the time not only to develop your individual response, but consider distributing the questions among your local contest clubs and other organizations. I hope you find the results to be as interesting as I expect them to be!

CQ WW Awards Update

Over the years I have received numerous questions about the CQ WW Awards Program. Let me take this opportunity to provide you with an update and some basic ground rules. My records indicate that we are completely up to date with the program through the 1990 contest (trophies and certificates). Given the problems of the 70s and early 80s, I am sure that there are a few of you who never received your hard-earned award. The good news is that if you fall into this category, it is not too late. Send me a brief note describing your situation, and I will work with you to resolve the matter.

It is very easy to order duplicate/replacement trophies. The current cost is \$50 per trophy. This type of request is commonly asked by multi-operator stations, or guest operator situations. While I can also provide this service for certificates, the labor intensive aspect of these requests often results in the need to place them at a lower priority.

While on the subject of certificates, I would like to highlight a comment in this year's CQ WW SSB write-up. Delivery times for CQ WW certificate awards can be substantially improved if you include a self-adhering address label with your log submission. If you think you may qualify for an award, this extra step would be a welcome attachment to your summary sheet.

On a final note, there are always a limited number of CQ WW trophy categories available for new sponsors. If you have an interest in participating, feel free to contact me at your convenience.

2 Baldwin Street, Windham, NH 03087

Calendar of Events

Aug.	29-30	Empire State QSO Party
Sept.	5-6	Bulgarian DX Contest
Sept.	5-6	All Asian SSB Contest
Sept.	6	North American CW Sprint
Sept.	6-20	FOC Late Summer CW QSO Party
Sept.	9-10	YLRL Howdy Days Contest
Sept.	12-13	Montana QSO Party
Sept.	12-13	Worked All Europe SSB Contest
Sept.	12-14	ARRL VHF QSO Party
Sept.	13	North American SSB Sprint
Sept.	19-20	Scandinavian CW Contest
Sept.	26-27	Scandinavian SSB Contest
Sept.	26-27	CQ WW RTTY Contest
Sept.	27-28	1992 Fall Classic Radio Exchange
Oct.	3-4	VK/ZL SSB DX Contest
Oct.	3-4	1992 F9AA Cup Contest
Oct.	10-11	VK/ZL CW DX Contest
Oct.	10-11	XV Concurso Iberoamericano
Oct.	14-15	YLRL CW Anniversary Party
Oct.	24-25	CQ WW SSB DX Contest
Oct.	28-29	YLRL SSB Anniversary Party
Nov.	7-9	ARRL Sweepstakes CW Contest
Nov.	14-15	Worked All Europe RTTY Contest
Nov.	21-23	ARRL Sweepstakes SSB Contest
Nov.	28-29	CQ WW CW DX Contest

Final Comments

Yet another correction has arrived regarding the working of 40 Zones on a band as a single operator in the CQ WW, this time from Bill Tippett, W0ZV. Bill completed his 20M WAZ by working G4CTQ/ST2 at 2224Z on Sunday in the 1983 CQ WW SSB Contest. Sorry for the oversight, Bill!

As you read this, the 1992 CQ WW SSB Contest is rapidly approaching. Even with the continuing decline in the current sunspot cycle, this year's event promises to live up to everyone's high expectations. Hope to see you there.

As always, please remember that the deadline for the December issue is October 1st.

73, John, K1AR

Bulgarian DX Contest

0000Z to 2400Z Sunday, Sept. 5-6

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

Classes: "A"—Single operator, all

band. "B"—Single operator, single band. "C"—Multi-operator, all band, single transmitter. "D"—SWL.

Exchange: RST and ITU Zone.

Points: QSOs with LZ stations, 6 points. With other stations in the same continent, 1 point. In other continents, 3 points.

SWLs must show calls of both stations heard. Score 3 points if both exchange numbers are copied; 1 point if only 1 is copied.

Multiplier: Total ITU Zones worked on each band.

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

Awards: Classes "A" and "C"—cups and medals to the three top world scorers and medals to the three continental leaders in each continent. Class "B"—medals to the top three scorers on each band in the world. Class "D"—medals to top three.

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

Mailing deadline is 30 days after the end of the contest to: Central Radio Club, P.O. Box 830, 1000 Sofia, Bulgaria.

Logs may also include applications for the many BFRA awards: NRB, W-100-LZ, 5 Bands LZ, W-28-Z, Black Sea, and Sofia awards.

North American "Sprint"

CW: Sept. 5 SSB: Sept. 12
Sunday 0000Z to 0359Z (Sat. night)

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

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

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

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

1992 CQ Magazine Contest Survey

Your Callsign (optional): _____

Contesting Experience (years): _____

1. If you were making a purchase today, what new radio would you select for your contest station?

1st Choice: _____

2nd Choice: _____

2. Do you feel it is "ethically acceptable" to tape record a contest and use the recording to prepare/edit your log after the contest?

YES NO

3. Are you in favor of the FCC implementing a fee-based (self-funded) system for amateurs to select their own callsigns?

YES NO

4. If you answered YES to Question 3, how much would you be willing to pay for a new callsign?

Amount: \$ _____

5. Do you feel there is a clique or significant elitist component within the contest community today (add comments below)?

YES NO

6. If appropriate, which contest computer logging program do you use?

7. Has the integration of technology into contesting gone too far?

YES NO

8. Do you feel there are too many contests?

YES NO

9. If you answered YES to Question 8, what do you recommend as a solution?

10. How would you rate the quality of log checking in the following contests (1 = Poor to 10 = Excellent):

CQ WW DX Contest: _____ ARRL DX Contest: _____

CQ WW WPX Contest: _____ ARRL SS Contest: _____

11. Do you currently have neighborhood problems with TVI, antenna restrictions, etc.?

TVI: None Mild Serious

Telephone: None Mild Serious

RFI (stereo, etc.): None Mild Serious

Antenna Restrictions: None Mild Serious

12. Do you think there are any *real* operating secrets among winning contest operators?

YES NO

13. What topic/feature would you like to see in a future CQ magazine Contest Column?

Comments (use additional sheet if necessary):

Return your survey responses to: John Dorr, K1AR, 2 Baldwin Street, Windham, NH 03087 USA

Deadline: December 31, 1992

VE7, VY1/VE8. Non-North American countries do not count as a multiplier.

Frequencies: Three bands only: 80, 40, and 20 meters. CW—3540, 7040, 14040. SSB—3850, 7225, 14250. (Plus or minus QRM.)

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

Team competition is limited to a maximum of 10 operators as a single unit. Pre-contest registration is required for each team before the start of the contest—with WN4KKN for CW and K7GM for SSB.

There are other detailed rules, a special QSY rule, disqualifying penalties, etc. I suggest you write to WN4KKN or K7GM if you do not have a copy of the NCJ.

Entries must be received no later than 30 days after the end of each "Sprint." The CW go to: Trey Garlough, WN4KKN, 331 Walnut, Santa Cruz, CA 95060. The SSB go to: Rick Niswander, K7GM, Box 2857, College Station, TX 77841.

FOC Late Summer CW QSO Party

0000Z Sat., Sept. 5 to 2400Z Sun., Sept. 20

This new operating event is promoted by the First Class Operator's Club (FOC). This affair is not a contest. Rather, it is an event open to all amateurs worldwide designed to create opportunities for meeting FOC members on the air and learn more about the organization and their passion for CW operating.

While operation is encouraged on all bands, FOC activity is on the "mainbands" (80-10) and centers around 25 kHz up from the lower band edge. Plaque awards will be offered to those members and non-members working the most FOC members overall as well as several other specialty awards (most European FOC members, etc.). Additional awards may be provided pending the decision of the operating committee. Logs and reports should be sent to: Peter Miles, G3KDB, 151 Leomansley View, Lichfield, Staffs, W13 8AU, England by October 31st.

YLRL Howdy Days Contest

1400Z Wed., Sep. 9 to 1700Z Thu., Sep. 10

This annual event is sponsored by the Young Ladies Radio League (YLRL) and is open to all licensed women operators around the world.

Classes: Single operator, CW and SSB.

Exchange: YLRL membership status (member or non-member) and QSO number.

Scoring: Score two points for each YLRL member worked. Score one point for each non-member QSO. There are no multipliers.

Frequencies: 3540-3725, 7040-7070, 14040-14070, 21120-21150, and 28150-28200 kHz for CW operation. 3940-3970, 7240-7270, 14250-14280, 21380-21410, 28300-28610 kHz for SSB operation.

Awards: Top-scoring YLRL member will receive her choice of YLRL pin, charm, or stationery. The top-scoring non-YLRL member will receive a one-year YLRL membership certificate. Logs must show date, time, band, callsign, QSO number sent/received, RS(T) sent/received, YLRL membership status, and claimed score for each QSO. The mailing deadline for logs is October 10th. Logs should be sent to: Carla Watson, WO6X, 473 Palo Cerde Dr., Sunnyvale, CA 94086.

ARRL VHF QSO Party

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

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

It is recommended that you send for official summary and log sheets. A large SASE will get you a supply. Address your request to the ARRL VHF Party, 225 Main St., Newington, CT 06111.

Scandinavian Contest

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

It's the world working the Scandinavians in this the 33rd Scandinavian Activity Contest (SAC). The same station may be worked on each band for QSO and multiplier credit.

The prefixes used in Scandinavia are: LA, LB, LG, LJ (Norway); JW (Svalbard & Bear Is.); JX (Jan Mayen); OF, OG, OH, OI (Finland); OH0 (Aland Is.); OH0M (Market Reef); OX (Greenland); OY (Faroe Is.); OZ (Denmark); SJ, SK, SL, SM (Sweden); TF (Iceland).

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

Classes: Single operator and multi-operator single transmitter, all band only. Multi-operator must remain on the same band for at least 10 minutes. Also QRP single operator (maximum of 10 watts output) and SWL (only SAC stations may be logged).

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

Points: European stations score 1 point for each SAC contact. Non-Europeans score 1 point on 14, 21, and 28 MHz, and 3 points on 3.5 and 7 MHz.

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

Final Score: The sum of QSO points from all bands times the sum of the multiplier from each band. Scoring for SWL's same as above.

Awards: Certificates to the winning station in each class, both CW and phone, in each country and each U.S.A. call area. QRP stations will be listed in one common list. The non-SAC SWL winner will be awarded. Plaques to the top-scoring station in each continent.

The usual disqualification criteria will be observed. Include a summary sheet and a dupe sheet for logs with more than 200 QSOs, and a signed declaration. Logs may also be submitted on MS-DOS formatted diskettes. Mailing deadline is October 31st. At press time, this year's rules were not available. Last year's logs went to: Harri Mantila, OH6YF, PL 30, Teuva, SF-64701 Finland. If required, we will run a correction in next month's calendar.

CQ WW RTTY Contest

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

This is the sixth annual RTTY Contest organized by CQ, and from the response to last year's contest, it has become one of the major RTTY competitions.

Bands: All five bands, 10 through 80 meters.

Classes: Single operator, single and all band, and single-op assisted all band only. Multi-operator, single transmitter, all band only.

Keep in mind that single operators are limited to 30 hours out of the 48-hour contest period. Off times may not be less than 3 hours in length. Multi-operator stations can operate the full 48 hours.

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

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

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

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

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

Complete and detailed rules were published in the July issue of *CQ* and should be reviewed for more detailed information.

The standard CQ log and summary sheets are recommended. It will make you scoring much easier. Sample forms are available from CQ. Include a large SASE (or IRC) with your request.

All entries must be postmarked no later than December 1st. An extension may be given upon a written request.

Logs go to: CQ RTTY Contest, ATT: Roy Gould KT1N, P.O. Box DX, Stow, MA 01775 USA. Requests for log forms go to: CQ Magazine, 76 N. Broadway, Hicksville, NY 11801.

Washington State Salmon Run

1200Z Sat., Sep. 26-0700Z Sun., Sep. 27
1200-2400Z Sun., Sep. 27

This state QSO party has reappeared under the sponsorship of the Western Washington DX Club and is open to amateurs worldwide on SSB and CW.

Classes: Single or Multi operator, Single Transmitter. Also, entrants may operate QRP or low power (100 watts or less) on SSB, CW, or mixed mode.

Exchange: RS(T) and QTH (State/Province/DXCC Country or Washington State county).

Scoring: Count 2 points for SSB and 3 points for CW. QSOs with CW Novice/Technicians are worth 6 points. The multipliers are Washington counties (maximum 39) or States/Provinces/DXCC Countries for Washington state stations. Credit multipliers only once per mode regardless of band. Stations can be worked on multiple bands.

Scoring: Final score is total QSO points times multiplier. Low-power stations multiply score by 2 and QRP by 3.

Frequencies: CW—1805, 3560, 7045, 14060, 21060, 28060. SSB—1815, 3925, 7260, 14280, 21380. Novices—3700, 7125, 21150, 28160.

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

The mailing deadline for logs is October 26th. Logs can be sent to: Western Washington DX Club, W7FR, Box 224, Mercer Island, WA 98040.

Fall Classic Radio Exchange

0000Z Sun., Sep. 27 - 0400Z Mon., Sep. 28

The 1992 Classic Exchange, "CX," is a celebration of the older commercial and homebrew equipment that was the pride of our ham shacks just a few short decades ago. The object is to restore, operate, and enjoy older equipment with like-minded amateurs. A classic radio is anything that

is older than 10 years (although not a requirement for participation).

Exchange: Name, RST, QTH, receiver/transmitter type. Each station may be worked with different equipment combinations on each band and mode.

Scoring: Multiply total QSOs by the following: Total number of different receivers and transmitters worked on each band and mode plus the total number of states/provinces/countries worked on each band and mode. Multiply that total by your personal Classic Multiplier (the total age of all receivers and transmitters used in your

station). Homebrew units count as 25 years unless they are older.

Frequencies: CW—60 kHz from the low band edge; SSB—3880, 7290, 14280, 21380. Novice/Technician use 20 kHz up from low band edge. Note that 7060 and 3560 tend to be the most popular operating frequencies.

Send logs, photos, comments, and anecdotes to Jim Hanlon, W8KGI, Box 581, Sandia Park, NM 87047; or Marty Reynolds, AA4RM, Box 13354, Atlanta, GA 30324. Include an SASE for the next CX newsletter.

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THINGS TO LEARN, PROJECTS TO BUILD, AND GEAR TO USE

Coax, SWR, and ATUs

I was leafing through a recent copy of *CQ* the other day and noticed there were 17 different antenna tuners advertised for sale by different manufacturers. In the same monthly issue in 1972 there were no tuners advertised at all! What's happened in 20 years? Why do we seem to need a device now that we didn't need then? Is it merely that manufacturers have found a new gadget to foist on unsuspecting hams? Or is the antenna tuner a welcome and needed addition to today's complete amateur radio station? To answer that question we have to go back to 1939 to a development that changed radio communication in a big way.

The Coax Cable

In 1939 a joint Army-Navy task force was given the goal of unifying various communication systems used by the military. One job was to specify a common RF transmission line capable of use up to 150 MHz. This was particularly important, as certain vital communications were to be moved to the then unused UHF range of 100 to 150 MHz. (The old amateur 2½ meter band was in that range, a fact that was conveniently ignored by the planners.)

The development of new, flexible insulating material (polyethylene) made the production of a low-loss coaxial cable practical. The idea was to use this cable (nomenclatured WC-549) for a 50 ohm RF cable system for transmitters, receivers, and antennas. All were to be designed to match the 50 ohm coax. It was a good concept, but was not fully implemented by the time the war ended. Even so, an improved version of the coax (RG-8/U) was manufactured in great quantities, and at the end of World War II large amounts of it were dumped on the surplus market to be sold for two to five cents a foot.

This made little impact on amateur radio at that time, as practically no equipment (except for some VHF rigs) was designed to be used with coax cable. Open-wire line or 300 ohm ribbon was the line of choice.

It was not until 1947 when Collins came out with the famous 32V transmitter using a pi-network output circuit that 50 ohm cable came into prominence in the ama-

teur world. Shortly thereafter, the famous Johnson Viking transmitter kit hit the market. It too had an output circuit designed for 50 ohm coax. And by 1950 the pi-network circuit and coax line were universally accepted as the RF "pipe line" for amateur HF transmitters and antennas.

The Surplus Coax

The stuff didn't cost very much in those early days. And it was good, too. Coax left over from World War II was readily available. It was the way to go.

Simple matching systems (gamma match and hairpin match) were devised to couple the coax to beam antennas. And by this time that valuable antenna accessory the SWR meter was available. Cheap and dirty ones could be had for \$10. Better ones cost much more.

The SWR meter gave a good insight into coax matching problems and guided many confused amateurs into proper operation of a 50 ohm transmission line.

There weren't many antenna tuners on the market, however! The Johnson "Matchbox" was a well-known one, but its circuitry bore little resemblance to today's tuners. Moreover, it was very tricky to use with a coax line. It had been designed for two-wire open transmission lines. If a coax-fed antenna required a tuner, the amateur built his own from surplus BC-610 plug-in coils. In most cases, though, a simple matching circuit at the antenna did the job and an antenna tuner was not required.

The Demise of the Pi-network

All the popular HF transmitters and transceivers of the 50s through the 70s made use of a pi-network output circuit which matched the final amplifier tubes to the 50 ohm coax line. Even the home-built kilowatt linears used the pi-output circuit. It was very forgiving. In most cases it could work into an SWR of 3-to-1, and some circuits could work into a 5-to-1 SWR mismatch. There was very little need for an auxiliary antenna tuner until two new developments came along. The first was the multiband antenna, and the second was the solid-state transmitter.

Multiband antennas were tricky; most could be loaded on some HF bands (pre-WARC days) by conventional tube-type

transmitters. SWR was high, to be sure, and in some instances the user had to trim the coax line to present a loadable impedance to the transmitter. The combination of the pi-network and line pruning saved the day. (The notion that the transmission line tuned the antenna grew out of the line trimming scheme. Not true.)

The second event that brought about the rebirth of the antenna tuner was the solid-state transmitter. Gone were the vacuum tubes and the flexible pi-network output circuits. In their place, the new transmitters incorporated wideband untuned transformers designed to match a 50 or 75 ohm coax line. To protect the output stage against high SWR, which could wipe out the transistors, tricky shutdown circuits were incorporated that decreased transmitter output as SWR rose. Many rigs reduced output as much as 50 percent when SWR rose above 1.5-to-1. That left little headroom for the large SWR variations presented by typical multiband antennas, or even for the SWR variations within a single amateur band. An 80 meter dipole, for example, cut to the low end of the band could show an SWR value of 5-to-1, or greater, at the high end of the band.

Today's Modern Antenna Tuner

With the advent of the solid-state transmitter in the late 1970s and its restricted matching range, ads started appearing once again in amateur magazines for antenna tuners (now called ATUs, or antenna tuning units). The new ATUs were not like the old antenna tuners which made use of a parallel-tuned, link-coupled circuit. The new designs were something else, indeed.

Look at the photos of the HF antenna tuners (ATUs or Transmatches) in the advertisements. Notice that they have three main tuning controls. Some of them have one rotary switch and two variable capacitors, while others have two rotary switches and one variable capacitor. This variation in design is caused by the fact that two types of networks are available to do the job (fig. 1). The first circuit uses the L-C-L design (coil-capacitor-coil), whereas the second circuit is C-L-C (capacitor-coil-capacitor). I prefer the first design, as the capacitor to ground provides a degree of harmonic attenuation that is not present in the C-L-C network.

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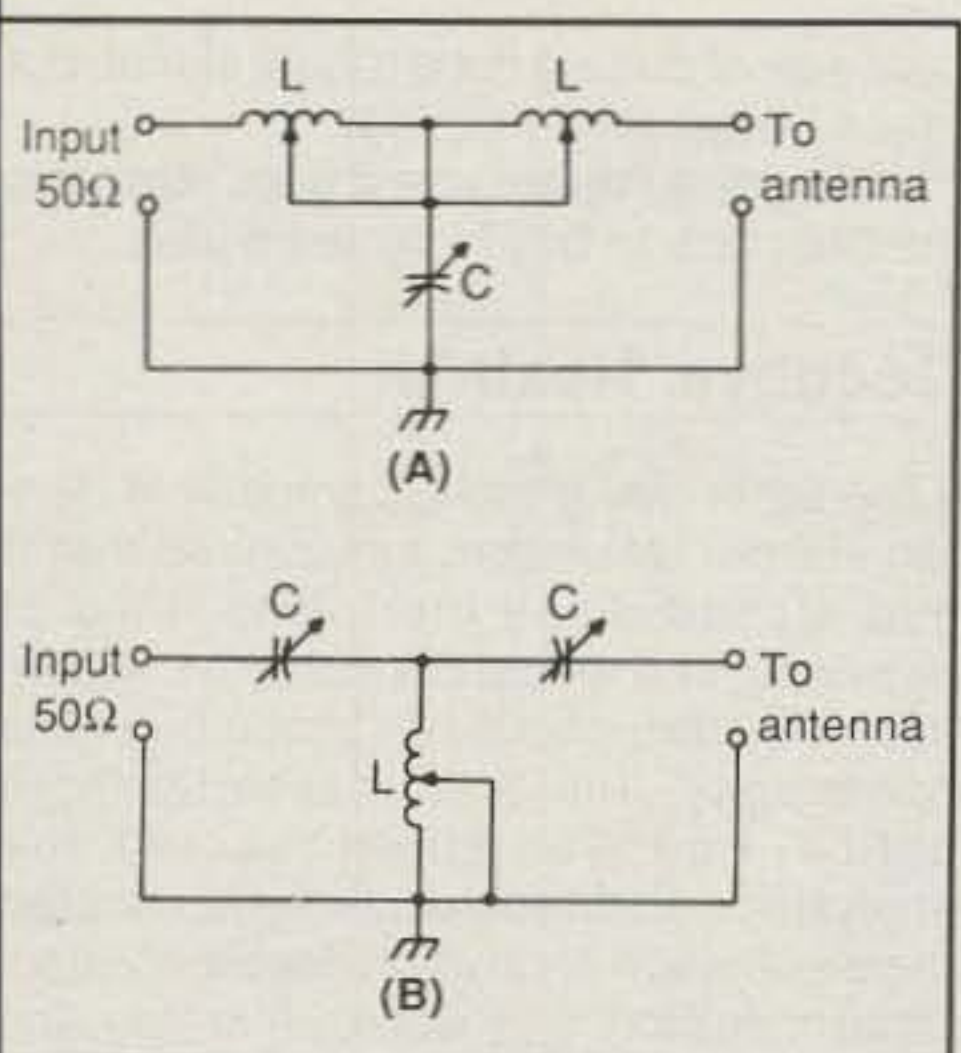


Fig. 1—(A) The L-C-L network. (B) The C-L-C network.

An inspection of the ad photos reveals that most available ATUs use the C-L-C design, possibly because it is less expensive to manufacture than the L-C-L design. Then, too, the C-L-C circuit requires only one adjustable inductor, which in many cases is a rotary one with a counter dial. That's very handy—and expensive. In any event, either type of ATU does the job of matching the 50 ohm transmitter output circuit to rather high values of antenna SWR that may be encountered in today's multiband antennas.

Some of the ATUs have built-in SWR meters to aid adjustment. Just twist the knobs for the lowest SWR! That's okay, but don't take the SWR readings too seriously. Most SWR indicators are fairly accurate at low SWR values, but under conditions of high SWR and parallel transmission line currents, only the best SWR meter will tell the truth. (More about the SWR meter in a future column).

The Four-to-One Balun

The adjustable ATUs are designed to match an antenna load having a high SWR and to provide a 50 ohm load to the transmitter having a low value of SWR. Since some multiband antennas feature a balanced, 300 ohm transmission line, the ATU incorporates a 4-to-1 balun between the balanced line and the unbalanced ATU network. This is supposed to match balanced loads in the 100 to 500 ohm range. Most baluns are wound on a ferrite core. Care must be taken not to overload the balun, as the core can become nonlinear under stress and generate copious transmitter harmonics!

The Bottom Line

In paper, then, the ATU can match a balanced or unbalanced line to the transmitter, regardless of what antenna is hung on

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the ATU antenna terminals. In practice, this is not true. The ATU has limits on input SWR and reactance. Step outside these limits and the ATU may flash over or perhaps overheat one of the inductors. It is always wise to tune up the ATU with low power (30 to 40 watts). Once all adjustments have been made, transmitter power is then advanced to the operating level.

I admit I bombed a 300 watt ATU with a 150 watt transmitter. I was tuning up at about 100 watts power level when I heard a "pop" inside the ATU and smoke started coming out through the vents in the cabinet. Quickly taking it apart, I found I had flashed and carbonized an insulator that held one inductor to the variable capacitor. There were a lot of volts across the capacitor! On 10 meters the insulator just couldn't stand the gaff. The solution was to replace the insulator with a new one hav-

ing better electrical characteristics and a longer flash-over path. After that, I tuned up at the 25 watt power level until I was sure everything was just right!

If you have a tube-type rig you can probably do without an ATU even though it will make life easier for you when jumping from band to band. The ATU is a necessity for a solid-state rig, unless it has a built-in antenna tuner that takes the place of the auxiliary ATU.

My solid-state transceiver has a built-in antenna tuner, but I still find an auxiliary ATU a big help, as the built-in tuner has a somewhat limited range.

It would seem, therefore, that the addition of an ATU will make a good amateur station a better one. With an ATU you can do crazy things such as using a 20 meter Yagi on 15 meters, or an 18 MHz dipole on 21 MHz, always observing the power limitation of the ATU and the balun. Not the

best way of putting out a robust signal, but much better than nothing!

I like my ATU and use it a lot. Which is the best one to buy? I have no idea.

Goodbye, Heathkit

"The other day a small company in Benton Harbor, Michigan announced that it had closed down one of its lines of business, and would henceforth concentrate on other products. In the business community, this event passed without notice. Had Wall Street reacted, the analysts undoubtedly would have cheered the elimination of an unprofitable division. Smart decision, they would have said, and the stock would have risen.

"For us electrical engineers, however, the decision of that little company signified the passing of an era—the end of a time when it was fun and profitable to tinker with electronics. The product that symbolized the electronic hobbyist is no more. It hurts to say it, but say it we must: goodbye Heathkit. We shall miss you.

"I miss that big box of little parts. I miss the growing check marks in the yellow manuals. Bravo, Heathkit. Thanks for a job well done."

(This commentary on Heathkit is by Robert W. Lucky and appeared in the "Reflections" column in the July 1992 issue of IEEE Spectrum magazine.)

Bob points out that because of VLS (very large scale integration) and automated assembly technology, building a kit doesn't make sense anymore. Today's black boxes have a few unmarked chips with zillions of pinouts mounted to a multi-layered board. The labels all say "No user serviceable parts inside." Alas, that's not my idea of electronics, nor is it Bob's. What do you think?

The Chalice With the Palace...

Yes, the dizzy little poem came from "The Court Jester" starring Danny Kaye. (It was not "The Inspector General," also starring Kaye.) My heads-up readers, armed with their VCR and a good memory, really knew this one. (Although some are confused over the actual lines, as I am!) In any event an Oscar Award to the following. Get it! Got it! Good!: K16IS, N2JGI, W1SU, N3EID, WB3AMO, WA8MCQ, VE2ZQ, KB0KFA, W8FEJ, KA0DBT, W4PWF, KB5KTY, N3GKP, WB7NRU, VE3BDE, W9ILY, WA2AMW, KM4BS, KH6B, N4OFS, N0IHM, KB7NTV, N7VZB, N5ECM, WA6DAL, N7BFN, N4VPN, KF0HV, N4ZC, 7Z2AB (KB0EVM), N1HOL, N5VR, W7YS, VE7IIT, WM3D, W7IV, N7HLI, NS2G, W1KBV, W1AIM, KL7IPV, WD6EKR, KC1OC, and KD0YZ. Congratulations, all!

Finally, W3HHG checks in with a complete understanding of "Moscow Rules. Good show! 73, Bill, W6SA/

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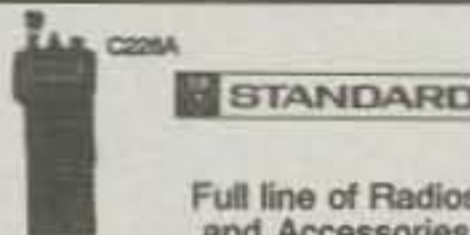


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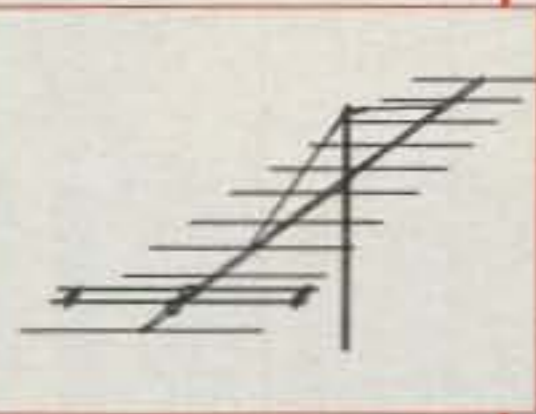
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2 Meter Milestones accomplished!!

Dave Blaschke, W5UN recently completed the first DXCC on 2 Meters. Dave has accomplished one of the rare feats in Ham Radio by working 100 countries using the moon as a reflector. Dave has been working Moonbounce for several years. He used his considerable CW skills combined with his quiet, ultra high gain M² Antennas.

In another miraculous weak signal moon-bounce feat, Gary Crabtree, KB8RQ has worked CO2KK in Cuba. Gary used his ultra quiet M² array while Arnie in Cuba was using 20 Watts and a 5 element antenna. Informed sources say that M² Antennas are the quietest on the market reportedly because the optimized computer designs are not compromised when the products are fabricated.



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M² arrays are trend setters!

OH2BC uses EME to get DXCC on 6

On July 3, 1992 Kari Leino, OH2BC made a 6 Meter contact completing the final requirement for DXCC. This contact was made by way of EME with Mike Staal, K6MYC/KH6 on the other half of the contact.

Kari was using four, M² 6M2.5WL. He said that "this was a dream contact, I never thought it could be possible." Mike, in Hawaii was using a single M² 6M2.5WL. This contact also sets a new 6 meter distance record using the moon as a passive reflector. The same two stations had contacted earlier in the year on June 3 when Mike was at his home in Friant California using the smaller 6M2WL M² antenna. Informed sources indicate a growing trend to use M² antennas for Moonbounce DX contacts on 6 Meters.

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NEWS OF COMMUNICATION AROUND THE WORLD

The Future of DX

The American Radio Relay League's Board of Directors has asked its advisory committees to consider the state of amateur radio in the next 10 to 20 years. Accordingly, the DX Advisory Committee (DXAC) is looking into the future of DX. Let's break out our crystal ball and see what DX might be like in the near future and a bit farther down the road. We'll begin with DXing tomorrow.

Bill, tomorrow's DXer, is in his shack early one evening when a gentle "bong-bong" announces the arrival of a DX spot from the local PacketCluster™ node. However, Bill doesn't even glance at the computer screen. He knows his logging program will let him know if he needs the contact. Bill's entire log is now stored in his computer, with markers to indicate countries worked but not yet confirmed, needed band-countries, and, of course, all-time New Ones. The computer compares the packet spot with Bill's need list and reports whether or not the spot is "needed."

Sure enough, an insistent "beep-beep" reveals that the spot, 4N2SS on 40 meters, is a new band-country for Bill. However, Bill still doesn't bother to look at the computer screen. "If the All-Time New One alarm goes off, then I'll get up and put on the headphones," Bill thinks while relays click and fans blow. Meanwhile, his new station control program appears to be working fine. Once the program decided the 4N2 was a new band-country, it turned on the transceiver, set the frequency to that announced on the packet spot, turned on the no-tune amplifier, selected the appropriate antenna through the automatic antenna switch, and even swung the antenna into the right direction. If Bill donned his headphones, he would hear the 4N2 clearly.

However, Bill is content to let his CW copying program do the work. Once the computer has found the appropriate station, it will send Bill's call in flawless, computer-generated CW. The artificial intelligence (AI) program then kicks in to copy Bill's callsign from the 4N2. The program misses the first call, but catches the second, and smoothly acknowledges the 599, and even thanks the 4N2 for a new band-country. Contact made, the program shuts down the rig and amplifier, switches

to the dummy load, and rotates the antenna back into the wind. The next time Bill turns on his printer, a flag will ask him to insert label stock. The logging program will produce both a label for his QSL card containing all contact data, and a mailing label, from the built-in CD-ROM database of US and foreign license information. Bill need only paste the QSO label on his card, put the label on an airmail envelope, with IRCs and a self-addressed return envelope, and the QSL will be ready to go. The logging program will automatically update Bill's band-country file, and work, but not confirm, any 4N2s on 40 meters until the contact is QSLed. Bill's sole involvement in the contact is to stuff the QSL card in the envelope.

Sound far-fetched? Not really. The *only* part of the above scenario that doesn't already exist is the AI program to copy Bill's callsign from the 4N2. Everything else is commercially available today. If a DXer can copy his or her own callsign, the computer and modern digital radios can do the rest. Hard-disc capacity, high-memory management, and interfaces can replace paper logs, tuning, and even listening. DX has moved into the digital era. The Digital Voice Processor™ from K1EA Software makes this scene possible on SSB, as well. The computer can call the DX station, and acknowledge the report, all without Bill having to find his microphone.

Of course, not all DXers have the state-of-the-art equipment and computer capacity to totally automate their station. Nor would most DXers be interested in such a passive DX experience. However, the equipment and computer programs already exist for the DXer who wants to work stations without effort. And with the current rate of progress on both AI programs and increasing computer for the buck, this scene is not far in the future.

The computer hasn't completely replaced DX skills; *someone* had to hear the 4N2 first and put out the packet announcement. The computer has taken over many of the mundane tasks of DX, such as logging, keeping track of what you need and don't need, and even tuning the radio and turning the antenna. The DXer who wants to make use of the computer's ability to streamline DX can automate as much of the process as desired.

If this is tomorrow's DX, what will the field be like in 10 to 20 years? Let's pull out



Wen-Lung Chen, BV6IA (left), shows KM2X the only sixth call area Taiwan station.



JT1BG is the first Mongolian station to earn 5-Band Worked All Zones.



Alex, RV4HA (ex-UA4HVV), operated UU6U from Mount Elbrus in the Caucasus mountains in April.

the crystal ball again and look at Bill in the year 2010.

Bill is outside, relaxing next to his pool when he hears the click of his antenna system moving into operation. The tower extends from the camouflaged shed, with the antenna elements extending as it rises. Bill guesses that the Peter I Island operator must be on the air, because nothing less than an all-time New One will activate the

The WPX Program

Mixed

1567 IK1GPG 1568 JA1FY

SSB

2320 IK1GPG 2322 EA5AH
2321 NI4P 2323 EA7CWA

CW

2743 YB2FEA 2744 JA0CGJ

WPNX

272 N8QFC

Endorsements

Mixed: 450 IK1GPG, JA1FY. 500 IK1GPG. 550 IK1GPG. 600 IK1GPG. 650 IK1GPG, VE7CXN, OZ-DR-2044. 700 VE3OMM, OZ-DR-2044. 750 VE3OMM. 800 I1TBE. 850 I1TBE. 900 W4USW. I1TBE. 950 I1TBE. 1000 KF4FP, I1TBE. 1050 I1TBE. 1100 I1TBE. 1150 I1TBE. 1200 K5GOE. I1TBE. 1250 K5GOE, LU8DY, I1TBE. 1300 I1TBE. 1350 I1TBE. 1400 I1TBE. 1450 I1TBE. 1700 IK2ILH, HA5NK. 1850 WB2YQH. 1900 W5AWT. 1950 W5AWT. 2000 W5AWT. 2050 W5AWT. 2350 I8RFD. 2600 I1EEW. 2650 I1EEW. 2850 SM3EVR. 2900 SM3EVR.

SSB: 350 IK1GPG, EA5AH, EA7CWA. 400 JE1GZB, IK1GPG, EA5AH, EA7CWA. 450 JE1GZB, IK1GPG, VE7CXN, IK6JYY, EA5AH, EA7CWA, UA4CX. 500 JE1GZB, IK1GPG, EA5AH, EA7CWA, UA4CX. 550 JE1GZB, IK1GPG, EA5AH, EA7CWA, UA4CX. 600 IK1GPG, TI2SAH, EA5AH, EA7CWA, UA4CX. 650 IK1GPG, TI2SAH, EA5AH, EA7CWA, UA4CX. 700 TI2SAH, EA5AH, EA7CWA, HP2CWB, UA4CX. 750 TI2SAH, EA5AH, EA7CWA, UA4CX. 800 TI2SAH, EA7CWA. 850 EA7CWA. 1050 WB6SRK. 1150 K5GOE. 1200 K2EEK. 1250 LU8DY. 1600 G4SSH, KL7AF. 1800 LU8ESU, K5RPC. 1850 LU8ESU. 2000 I8RFD. 2300 I1EEW.

CW: 350 YB2FEA, JA0CGJ. 400 YB2FEA, JA0CGJ. 450 YB2FEA, JA0CGJ. 500 YB2FEA, JA0CGJ, JA1GTF. 550 F5DE, OK1DCE, YB2FEA, JA1GTF. 600 YB2FEA, JA1GTF. 650 F5DE, YB2FEA, JA1GTF. 700 F5DE, VE3OMM, YB2FEA, JA5GTF. 750 F5DE, YB2FEA, JA1GTF. 800 F5DE, YB2FEA, JA1GTF. 850 F5DE, JA1GTF. 900 F5DE, JA9CWJ, JA1GTF. 950 F5DE, JA9CWJ, JA1GTF. 1000 F5DE, JA9CWJ, JA1GTF. 1050 F5DE, JA9CWJ, JA1GTF. 1100 F5DE, JA9CWJ, JA1GTF. 1150 F5DE, JA9CWJ, JA1GTF. 1200 JA9CWJ, JA1GTF. 1250 JA9CWJ, I1EEW, I8RFD, JA1GTF. 1300 JA9CWJ, JA1GTF. 1350 JA9CWJ, JA1GTF. 1400 JA9CWJ, JA1GTF. 1450 JA9CWJ, G3VQO, JA1GTF. 1500 JA9CWJ, JA1GTF. 1550 JA9CWJ, JA1GTF. 1600 JA9CWJ, JA1GTF. 1650 W8IQ, JA1GTF.

10 Meters: WD4REX, DK7NP, DF2RG
15 Meters: DK7NP, DF2RG
20 Meters: OZ-DR-2044, DK7NP, DF2RG
40 Meters: VE3OMM, DK7NP, DF2RG, HA5NK
80 Meters: DK7NP, DF2RG, HA5NK
160 Meters: DF2RG

Asia: IK6JYY, OZ-DR-2044, DK7NP, HP9CVO, DF2RG
Africa: DK7NP, DF2RG
No. Amer.: DF2RG
So. Amer.: W2EMW, NG9L, DF2RG
Europe: HP2CWB, DF2RG, UA4CX
Oceania: DF2RG

Award of Excellence: KC7EM

Award of Excellence 160M Bar: KA5TQF

Award of Excellence Plaque Holders: I8YRK, W4CRW, SM0AJU, K5UR, K6XP, N5TV, K2VV, VE3XN, W6OUL, DL1MD, DJ7CX, DL3RK, WB4SIJ, SM6DHU, N4KE, I2UIY, DL7AA, ON4QX, WA8YTM, YU2DX, OK3EA, I4EAT, OK1MP, N4NO, ZL3GQ, VK9NS, DE0DXM, DK4SY, UR2**, AB9O, FM5WD, I2DMK, W4BOY, I0JX, SM6CST, VE1NG, I1JQJ, WA1JMP, PY2DBU, H18LC, KA5W, K0JN, W4VQ, KF2O, K3UA, HA8XX, HA8UB, W8CNL, K7LJ, W1JR, F9RM, W5UR, WB8ZRL, SM3EVR, CT1FL, K2SHZ, UP1BZZ, W8RSW, WA4QMO, EA7OH, K2POF, DJ4XA, IT9TQH, W8ILC, K2POA, N6JV, W2HG, ONL-4003, VE7DP, K9BG, W5AWT, KB0G, HB9CSA, F6BVB, W1BWS, YU7SF, G4BUE, N3ED, DF1SD, K7CU, I1POR, LU3YLW4, NN4Q, KA3A, YB0TK, VE7WJ, VE7IG, K9QRF, YU2NA, N2AC, W4UW, NX0I, W9NUF, N4NX, SM0DJZ, DK5AD, WB4RUA, DK5AD, WD9IIC, W3ARK, I6DQE, LA7JO, VK4SS, K6JG, I1EEW, I8RFD, I3CRW, VE3FXR, N4MM, KC7EM, ZS6BCR, CT1YH, IV3PVD, KA5RNH, ZP5JCY, F1HWW, KC8PG, NE4F, VE3MS, K9LJN.

Award of Excellence Plaque Holders with 160 Meter Endorsement: FM5WD, SM0DJZ, DK5AD, SM6CST, I1JQJ, PY2DBU, W3ARK, H18LC, KA5W, UR2**, VE3XN, K6XP, LA7JO, W4VQ, K6JG, K3UA, HA8UB, W4CRW, N4MM, K7LJ, SM0AJU, KF2O, SM3EVR, K5UR, UP1BZZ, OK1MP, N5TV, K2POF, W8CNL, DJ4XA, IT9TQH, DL9RK, N6JV, ONL-4003, W1JR, W6OUL, W5AWT, KB0G, F6BVB, W4BOY, YU7SF, W5UR, N4NO, DF1SD, K7CU, I1POR, W8RSW, N4KE, I2UIY, YB0TK, W8ILC, W1BWS, VE7WJ, K9QRF, NN4Q, W4UW, K9QRF, NN4Q, W4UW, NX0I, G4BUE, LU3YLW4, I4EAT, WB4RUA, VE7WJ, N4NX, DE0DXM, VE7IG, K9BG, I1EEW, AB9O, CT1YH, IV3PVD, KA5RNH, ZP5JCY.

Complete rules and application forms may be obtained by sending a business-size self-addressed, stamped envelope (foreign stations send extra postage if air-mail desired) to: "CQ WPX Awards," 880, CR13, Clovis, NM 88101-9511 USA.

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U.S. PATENT #4,360,814 -
Canadian Patent #1,145,456 -
England Patent #2,046,529. Other Patents Pending

CIRCLE 31 ON READER SERVICE CARD

September 1992 • CQ • 113



power in broad daylight. Zoning regulations permit daytime use of the tower to 30 minutes a week. Bill considers going into the shack to watch the contact, which will be for his last DXCC country, but decides against it. "The system can take care of itself," he thinks.

Meanwhile the computer checks its files against the electronic version of *The DX Bulletin* downloaded the previous day. The time and frequency seem to indicate that the 3Y is legitimate. Propagation predictions, based on the latest solar indices downloaded every three hours, suggest the long path has the highest probability of success. It turns the antenna accordingly. The announcement in *The DX Bulletin* said the 3Y would be listening 5-10 kHz up; the computer sends the appropriate split

information to the knobless black box that is the latest transceiver from Japan. It is entirely digital, and all functions are controlled from a keyboard.

The computer has no trouble finding the 3Y signal on the long path; every modern transceiver has a built-in "squawk" identifier, which is easily decoded by all rigs. The serial number of the 3Y rig matches that published for the DXpedition. The computer begins tuning the second receiver to the split frequency, while keeping the main receiver on the 3Y. The AI program looks for a match between the stations calling, and those the 3Y is answering. Because most DXers are using voice synthesis, this is an easy task. The days of the enormous pile-ups, stations calling out of turn, and the dreaded last-two-letter syn-

drome are gone. The program will call only when the DX station is listening, and will answer only when the DX station gets at least three characters of the call correct.

Bill has selected the Swedish variation of the random tuning device that prevents every single automated station from calling on exactly the same frequency, at the same time. The Swedish variant jumps the transmitted signal in 500 Hz steps to either side of the last successful contact. Bill heard at the last club meeting that SM0AGD had programmed the 3Y rig, and Eric likes the wide jumps. Sure enough, his decision pays off, and the 3Y contact is in the log. But this time Bill doesn't even have to put the QSL card in the envelope.

As the DX satellite, known worldwide as "Martti," passes over the automatic station on Peter I Island, the 3Y uploads the latest log information. Twenty minutes later Martti will beam this information to the receiving station at ARRL headquarters. Bill's computer has already sent record of the 3Y contact to the ARRL, via the dedicated DX BBS system, in lieu of a QSL. As the data from the 3Y is downloaded from Martti, it is compared to the outstanding contact confirmation requests on file. When the 3Y log shows the contact with Bill, Bill's DXCC record is automatically credited with the QSO. Less than two hours have passed since Bill's antenna rose above his home to make the contact. Since this is the last country Bill needs to "have 'em all," the computer will tell Bill that he is now eligible for the Worked All Countries plaque. However, few DXers are ordering the plaque these days, since more than 10,000 DXers have worked every DXCC country.

DXing without live bodies at either end of the QSO? Electronic confirmations? Automatic crediting of the QSO and up-dating the DXCC record? Is this the future of DX? Again, there is nothing very far-fetched in this scene. Other than the AI voice recognition program, all parts of the scene are available today. Twenty years of computer progress should put the rest within easy reach.

We already have automated digital DX stations, and contacts with these stations count for DXCC credit, even though a computer is on one end of the QSO. It is but a small step from this to the fully automated, solar-powered DXpedition box. Instead of the expense and potential hazards of landing a large team of operators on a remote island, the DXpedition organizers could assemble a weather-proof rig and antenna farm, and simply arrange to have it delivered. The box would operate for years, providing contacts on any mode or band. Once enough of the boxes have been placed on the remote islands, new DX challenges are limited to political changes in country boundaries.

As far as the DXAC is concerned, this possible future DX scene will not require

The WAZ Program

<p style="text-align: center;">Single Band WAZ</p> <p style="text-align: center;">10 Meter SSB</p> <p>429 KE4VU 432 N4PYD 430 N5ORT 433 VE7AHA 431 WD4MBE</p> <p style="text-align: center;">15 Meter SSB</p> <p>423 JI4POR 425 VE7AHA 424 IV3MUC</p> <p style="text-align: center;">17 Meter SSB</p> <p>3 YB0WR</p> <p style="text-align: center;">20 Meter SSB</p> <p>880 ON4ACB 889 IV3MUC 888 EA5AH 890 W9NO</p> <p style="text-align: center;">10 Meter CW</p> <p>131 VE7AHA</p> <p style="text-align: center;">12 Meter CW</p> <p>8 SM5AKT</p> <p style="text-align: center;">15 Meter CW</p> <p>231 WA4JTI</p> <p style="text-align: center;">17 Meter CW</p> <p>5 SM5AKT 6 SM3EVR</p> <p style="text-align: center;">20 Meter CW</p> <p>421 WA4JTI 422 I6DOE</p> <p style="text-align: center;">80 Meter CW</p> <p>33 JA1HOT</p>	<p style="text-align: center;">17 Mixed</p> <p>10 K8MFO 11 VE3XN</p> <p style="text-align: center;">All CW</p> <p>13 WB0IHR</p> <p style="text-align: center;">All Phone</p> <p>609 WF2S 611 W9NO 610 K2AJY</p> <p style="text-align: center;">All Band WAZ SSB</p> <table border="0" style="width: 100%;"> <tr><td>3955 W3SAI 3961 SM6TEU</td></tr> <tr><td>3956 IK2JYT 3962 NO0C</td></tr> <tr><td>3957 W9RZW 3963 N4XDQ</td></tr> <tr><td>3958 WB4DBB 3964 AA0BS</td></tr> <tr><td>3959 N1IJU 3965 K2AJY</td></tr> <tr><td>3960 WF2S 3966 JF5DSU</td></tr> </table> <p style="text-align: center;">CW/Phone</p> <table border="0" style="width: 100%;"> <tr><td>7228 UA3AGW 7233 LX1MU (CW)</td></tr> <tr><td>7229 WF2S 7234 W6YLL (CW)</td></tr> <tr><td>7230 OZ5TDR (CW) 7235 K2AJY</td></tr> <tr><td>7231 N6ITW 7236 DJ8UO</td></tr> <tr><td>7232 EA5DJH (QRP) 7237 JG1WNO</td></tr> </table>	3955 W3SAI 3961 SM6TEU	3956 IK2JYT 3962 NO0C	3957 W9RZW 3963 N4XDQ	3958 WB4DBB 3964 AA0BS	3959 N1IJU 3965 K2AJY	3960 WF2S 3966 JF5DSU	7228 UA3AGW 7233 LX1MU (CW)	7229 WF2S 7234 W6YLL (CW)	7230 OZ5TDR (CW) 7235 K2AJY	7231 N6ITW 7236 DJ8UO	7232 EA5DJH (QRP) 7237 JG1WNO
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7232 EA5DJH (QRP) 7237 JG1WNO												

Applications and reprints of the latest rules may be obtained by sending a self-addressed stamped envelope (75 cents) size 4 1/2 x 9 1/2 to the WAZ Manager, Jim Dionne, K1MEM, 31 DeMarco Rd., Sudbury, MA 01776. Applicants forwarding QSL cards either direct to the WAZ manager or to a check point should include sufficient postage for safe return of their QSL cards. The processing fee for all CQ awards is \$4.00 for subscribers and \$10 for non-subscribers. Please make all checks payable to the Awards Manager. In order to qualify for the subscriber rate, please enclose your latest CQ mailing label with your application. Send any questions to K1MEM by mail and include an SASE (please do not telephone).

any changes in DXCC rules, except for the acceptance of electronic confirmations in lieu of paper QSL cards. The DXAC recently voted down a proposal to accept facsimile and electronic confirmations. However, of all the ideas explored above, the single one most likely to affect all DXers the most will be an alternative to the paper QSL card.

Current DXpeditions must put almost as much effort into the confirmation process as in the DXpedition itself. In too many cases the cards aren't out for months. In many parts of the world postal theft creates major problems in mail delivery. Changing postal and exchange rates complicate the QSLing process. Why not do away with paper QSLs, except as a personal memento?

Increasing numbers of DXpeditions are putting their logs on computer today. It would be a relatively small step to compare that computer log with a confirmation request, also in computerized form. A DXer who worked a given DX station would send that information to the DXCC desk at ARRL headquarters on a disc or via modem. When the log of the DX station arrived at ARRL headquarters, outstanding confirmation requests could be reviewed, and the DXer's DXCC record automatically updated. Paper QSLs would not be necessary.

There are some potential problems with this process. For example, the DX station

5 Band WAZ

As of May 31, 1992, 341 stations have attained the 200 zone level.

New recipients of 5 Band WAZ Award with all 200 zones confirmed:

JA2DSY
JA7HMZ
OH3JF

The top contenders for 5 Band WAZ are:

N4WW, 199	W9WAQ, 199
SP9PT, 199	K6EID, 199
K6YRA, 199	IK8CNT, 199
PY7ZZ, 199	W1JR, 199
DL9WW, 199	W8SEY, 199
K0CS, 199	N7RT, 199
KB0G, 199	VE7AHA, 199
AA4KT, 199	I8IGS, 198
K7UR, 199	SM6AHS, 198
K9EL, 199	K1ST, 198
NA0Y, 199	4X4DK, 198
VE7DX, 199	UA3AGW, 198
W0PGI, 199	KL7Y, 198
W2YY, 199	

786 Stations have attained the 150 zone level as of May 31, 1992.

Applications and reprints of the latest rules may be obtained by sending a self-addressed stamped envelope (75 cents) size 4 1/2 x 9 1/2 to the WAZ Manager, Jim Dionne, K1MEM, 31 De Marco Rd., Sudbury, MA 01776. Applicants should include sufficient postage for safe return of their QSL cards. The processing fee for all CQ awards is \$4.00 for subscribers and \$10 for non-subscribers. Please make all checks payable to the Awards Manager. In order to qualify for the subscriber rate, please enclose your latest CQ mailing label with your application. Send any questions to K1MEM by mail and include an SASE (please do not telephone).

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amous regions. Four of those republics have proclaimed their independence from the former federal republic of Yugoslavia. Three of those republics have been recognized internationally: by the European Community, by the US, and by admission to the United Nations. These actions virtually ensure recognition of these republics as new DXCC countries, based on IARU DXCC Deletion Criterion C: Partition. These three republics are: **Croatia YU2**, **Slovenia YU3**, and **Bosnia-Herzegovina YU4**.

Essentially the only question remaining in separate DXCC status for these three republics is the effective start date. Several dates are possible: proclamation of independence, recognition by the EC, recognition by the US, or some other landmark. (January 1, 1992 might be a reasonable date; it has the advantage of ease of administration.) Whatever date is chosen, it is *in the past*. In other words, contacts with stations in YU2, YU3, and YU4 made now will almost certainly count for the new DXCC countries.

However, before you rush to "move" YU2s, etc., to different bands and modes, note that ex-Yugoslavia is in the midst of the worst European bloodshed since WW2, with thousands of people killed, cities destroyed, etc. Perhaps we can let the killing stop before we push for contacts.

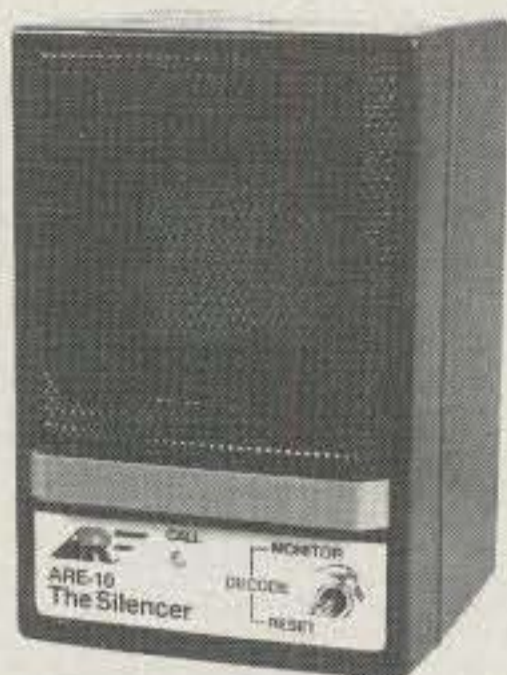
As to the rest of the country, **YU5 Macedonia** is the other republic to proclaim independence. However, international recognition has been held up by protests from the Greeks, who say they have the rights to that name from the days of Alexander the Great. Macedonia hasn't existed as an independent country since BC148, but the fact that a dispute is 2000 years in the past means nothing to the Greeks. At some point in the future the question of the name of the republic will be resolved, and "Macedonia" (or whatever) will have the same status as the above three republics. Again, a reasonable start date will be in the past.

The only remaining fragments of former Yugoslavia are the republics of **Serbia YU1**, **Montenegro YU6**, and the autonomous provinces of **Vojvodina YU7** and **Kosovo YU8**. (YU9 and YU are special prefixes, used from various republics.) Could these entities remain together, and assert they are the legitimate heirs of the former Yugoslavia (as they have done to some point), they will *not* be a new DXCC country. The Partition Deletion Criterion clearly states: "The partition category is not employed when the original political entity continues in some form." Thus, current YU1s, YU6s, YU7s, and YU8s will likely count as the old YU Yugoslavia.

Note that Yugoslavia has use of the prefixes of YU, YT, YZ, 4N, and 4O. YU has been used above for simplicity. Once the dust settles, the newly independent countries will ask the ITU for unique prefixes. Note also that as of mid-June there were petitions before the DXAC to add any

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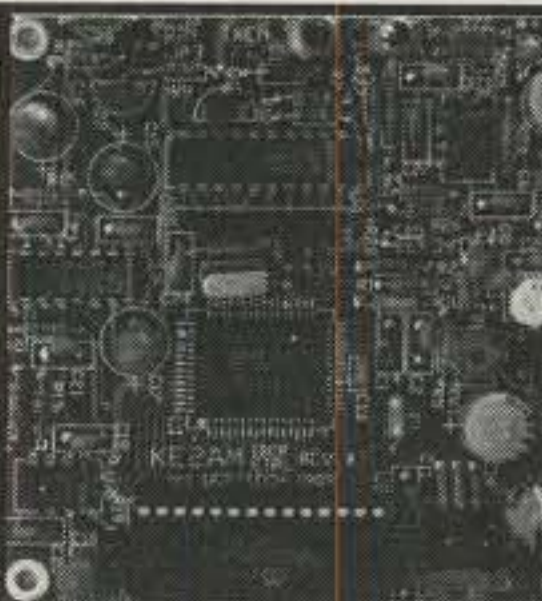
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3D2P0 to VK30T	CY8SAB to VE1CBK	OD5/LA4GHA to LA4GHA	V63BJ to JG3RGL
3X8HNU to F6FNU	D68BD to DJ6SI	OH8YY to OH2AY	V63BW to W5EW
4J1FS to OH2BU	DL1FZ/C6A to DL1FZ	OK1IAI/YA to OK1IAI	V63DX to JA7HMZ
4J4JJ to UG6JJ	EA9/DK7ZB to DK7ZB	P29WK to N3ART	V73CT to OKDXA
4K1YAR to UA3YAR	EA9UK to EA9LZE	R3K to OH7AB	VK9WM to K7IOO
4K2/UV6ABL to UA9MA	EH4MC to EA4CP	RE5Q to RB5QF	VP2E0H to K8BL
4K4/UA6WCG to IBYRK	EN4AA to UZ4AWB	RO40A to SP9HWN	VP2M/W9PT0 to W9PT0
4L6SMC to OH7AB	EX2FP to UF6DZ	RW73WA to RW9WA	VP2MLD to KC4DWI
4U1WB to N4ZR	EX3A to UW3AA	RY0I to NA3O	VP8BZL to KA6V
4U7ITU to DK7UY	EX9DZ to UF6DZ	S79FI to HB9AFI	VP8C8C to AA6BB
4Z4DX to F6FNU	EZ4AP to RA4PO	S92AA to F6AXX	VP8CFM to GM4KLO
5B4ADA to K2VHW	F6IRF/XU to FD1GTR	S92QM to ON4QM	VP8CCK to K1IED
5B4ADR to YU2AJ	FE10GG to F6DGT	SM8FWW/OJ8 to WA4JTK	VQ9RS to ND8F
5H3RA to JA3PAU	FF8XX to F6EXV	SU1HV to IS0LYN	VQ9WN to K7IOO
5T5CJ to W4BAA	FG/N2HNO to JH4IFF	SV8HS/SX5 to DJ8MT	VS6GA to KG6ZQ
5V7JG to F6AJA	F05BI to F6HSI	SV8HW/SV9 to KA5EJA	XX9AW to K9YC
5Z4BI to W4FRU	FR/DJ6SI to DJ6SI	SV8IG/9 to IK0EFR	YB2ARO to W7TSQ
6W6JX to F6FNU	FS4PL to FG4BG	SV5/DE300G to DE300G	YB30SE to W7TSQ
707JL to G0IAS	GU5LP to G5LP	SV7BAY/SV5 to SV7BAY	YJ8RN to N9NRU
707RM to G0IAS	HB8/DJ1BP to DJ1BP	SV9/W8G to KQ8M	YK1AO to F5XX
807HO to JE1BQT	HC8JG to WA6ZEF	TL8JL to K4UTE	Z2IHO to DFZRG
807PJ to PA8CRA	HF8POL to SP9DWT	TM5CHA to F6BFH	ZA1TAJ to I2MQP
807WP to JA1WPX	HH7PV to AA5DW	TP1CE to F6FQK	ZD8Z to VE3HO
8S0ITU to SK0CC	HK8/W6JKV to W6JKV	TR8JWH to G4TWT	ZF1DX to VE7AGC
9H3JR to DJ8QJ	HK3MAE/HK8 to HK3MAE	TT8ZH to F6KSE	ZF1JE to VE7FJE
9J2B0 to W6ORD	HP1XQN to WT3K	TU2MA to OH7XM	ZP2AA to ZP5YV
9J2SZ to SP8DIP	HU1FT to DL7FT	TU4SR to OH8SR	ZP4AA to ZP5YV
9K2MM to 9K2AR	HZ1AB to K8PYD	UC2AAA to F6AML	ZP6CW to ZP6XDW
9L38M to VE3VON	HZ1HZ to N7RO	UD6DR to GW3CDP	9L1MR to P.O. Box 966, Free- town, Sierra Leone
9M8AJ to AA5AZ	IIG1TU to IT9TOH	UF6FJ to OZ1HPS	BZ4RA to P.O. Box 538, Nan- jing, PRC
9X5JA to W0ZUZ	J28F0 to F6FNU	UH8EA to W5BWA	HJ3SDY to P.O. Box 47917, Bog- ota, Colombia
A22MN to WA8JOC	J5UAI to NW8F	UJ8KAC/RU9U to UJ8JMG	005ZZ to P.O. Box 782, Tripoli, Lebanon
A71AZ to SP9UO	J88BS to WA4WIP	UJ8RA to UA9AB	UX1A to P.O. Box 417, St. Pet- tersburg, 191011, Russia
AM15DWX to EA3DWW	JW5NM to LA5NM	UM9MWB/P to UA4FLA	
AM9IB to EA9IB	JY9ZK to KA5ZMK	US6CH to G0NKZ	
BZ4BV to BY4RSA	KC4USV to KG5GH	UU6U/P to OH7AB	
BZ4RCW to BY4WNG	KH2T/KH8 to AA4UJ	UZ8FWA to UA0FH	
C3/F6AUS to F6AUS	KH2X to KH2BP	UZ73W0 to UV9WZ	
C31LJ to VE3SUN			

new countries from former Yugoslavia, yet.

September DX Activity

The Southern Counties Amateur Radio Association (SCARA) will operate **K2BR** from the site of the Miss America pageant in Atlantic City, New Jersey, September 14-19. Listen 25 kHz up from the bottom of the General-class phone subbands on SSB, and 65 kHz up on CW. QSL with a business-sized self-addressed, stamped envelope to SCARA, Box 121, Linwood, NJ 08221. Atlantic City is on Absecon Island, NA-111 for Islands On The Air.

Ralph Hirsch, K1RH, will operate **FP** from St. Pierre and Miquelon September 9-14. Ralph usually operates near 025 kHz on CW. QSL home call. On the other side of the world, Shima, JQ3EEL, will operate as **V63SM** from Pohnpei in Micronesia September 4-13. All bands, CW and SSB. QSL via home call.

ON4USA/P will commemorate the 48th anniversary of the liberation of Belgium by US First Army troops, September 12-13. The Verviers Radio-Amateurs Group will operate from the World War II cemetery of Henri-Chapelle, in eastern Belgium. QSL via ON5PL, Box 11, B-4800 Verviers 1, Belgium.

QSL Notes

QSL the special-event station **CU35MB** from May via Jos Gabriel Alves Silva,

CU3AN, P.O. Box 157, 9702 Angra Do Heroismo Codex, Azores islands.

WB2YQH handles QSLs for several **Bermuda VP9** stations, including **VP9MM, VP9MN, VP9MP, VP9NMW, KF2GM, VP9**, and Bermuda Field Day special event stations **VP9YL** and **VP9OM**. Bob also handles QSLs for Peter, XT2BW.



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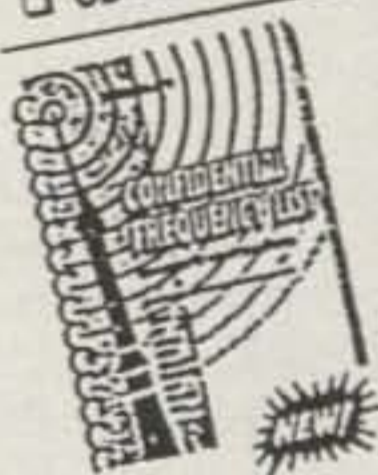


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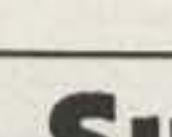
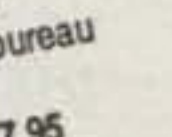
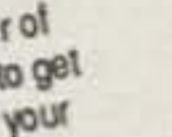
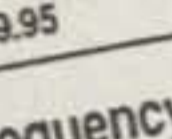
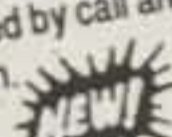
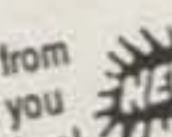
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320	IBACB/323	310	KA5TOF/312
320	K9IW/323	310	XE1ZLW/311
320	N6AHU/323	275	N5ORT/289
320	YS1GMV/323	250	K2EEK/266
320	OE2EGL/322	200	N2JSB/222
320	T12HP/322	150	HP2CWB/185
320	WA4IUM/321	150	KO4VT/150
320	VE4AT/321	28 MHz	KO4VT
320	KE4VU/321	28 MHz	N5ORT
320	IK8CNT/321	28 MHz	HP2CWB
320	W7FP/320	28 MHz	N2JSB
320	WZ4I/320	3.5/7 MHz	KA5TOF
310	KU9I/317		

CW Endorsements

320	K9IW/320	300	K2JLA/300
310	W0HZ/318	275	KA5TOF/295
310	WA4IUM/315	250	KA3JWJ/253
300	W8XD/301	200	IK0ADY/201

Total number of active countries is 323. The basic award fee for subscribers to CQ is \$4. For non-subscribers, it is \$10. In order to qualify for the reduced subscriber rate, please enclose your latest CQ mailing label with your application. Endorsement stickers are \$1.00. Updates not involving the issuance of a sticker are made free when an SASE is enclosed for confirmation of total. Rules and application forms for the CQ DX Awards Program may be obtained by sending a business size, No. 10 envelope, self-addressed and stamped, to CQ DX Awards Manager, Billy Williams, N4UF, Box 9673, Jacksonville, FL 32208 U.S.A. DX stations must include extra postage for air-mail reply. Please make all checks payable to the awards manager.

Dan Morehouse, AK1E, says he has been unable to get logs from **TR8JLD**, and thus cannot provide QSLs.

LU2CN, who is supposedly QSL manager for some Argentine Antarctic stations, including **LU1ZA**, has moved. His new address: Servicio Auxiliar de Radioaficionados de la Armada, Av. Libertador 8209, 1457 Buenos Aires, Argentina.

QSL the March **PY0FZ** Fernando operation via Fred Souto Maior, PY7ZZ, Rua Almeida belo 241 Apt. 302, Bairro Novo, Olin-da PE 53120, Brasil. QSLs with one new (airmail) IRC or sufficient postage will be sent direct. Note that US\$1 currently does *not* cover return postage to the US. (A special Brazilian stamp without a denomination, called a tarifa postal internacional, is sufficient.)

Leo Ferreira, PP1CZ, is QSL manager for **PP0MAG** from Trindade and **PY0MAG** from Fernando. His new address is: Box 01-1928, 29001 Vitoria ES, Brazil.

QSL the 1992 WPX SSB operation of **PW2A** via PY2EYE (*not* PT2BW). PY2EYE is also QSL manager for **ZY2NY**. Return airmail postage in Brazil is currently US \$1.40; QSL cards via the PY2 bureau are welcome.

Karl Mesquita Leite, PS7KM, has an expanded postal code. His new address is Caixa Postal 385, 59001-970 Natal RN, Brasil. Cards received with US\$1 or 1 IRC will be returned via the bureau. Karl can confirm: **ZY0SS, ZY0SW, ZY0SY, ZY0FRT, ZY0FK, ZY0FZB, ZY0FCA, ZY0FMC, ZY0FMN, ZY0FCM, ZY0RK,**

ZY0AK, ZY0TK, ZY0TR, ZY0TF, PY0SK, PY0SR, PY0AK, PY0RK, PY0TK, PY0FK, PY0FKL, ZY7EK, ZW7KM, S9/PS7ABT, ZW7AB, ZW7BX, ZW7JN.

Katsuhide Kawase, JH8BKL, is QSL manager for the UNICEF Ham Club of Japan. Their operations include **HP1XFG, HP1XFJ, HS0JUA, HS0IYY, HS0C, JH8YDY/JD1, 5H1YK, 7Q7JA, 7Q7JA/HI8, V51/7Q7JA, 9J2HN, and 9N88C.**

QSL the April **UI8T** operation by UI8IAY, UI8ID, and UI8IAJ with SAE and 2 IRCs to UI8IAY, P.O. Box 32, Samarkand 703000 Uzbek Republic. Don't send US\$1s.

Ulli Helgert, DL5MBY, wants to close out his logs for **3V8AL** (1982) and **8Q7BW** (1983). His address is Appenzellerstr. 53 W-8000 Munich 71, Germany.

QSL **4S7SGG** (1982), **8Q7QJ** (1982-83), and **VP2M/DK3QJ** via DK3QJ.

QSL the 1992 WPX SSB operations of **8A2DX** and **YE2C** via Sidik Tandjung YB2FRR, P.O. Box 6050, Semarang 50060, Central Java, Indonesia.

QSL **8Q7XX** via Udo Saechting, DJ8M (*not* DJ0MT), August-Bier-Weg 1, D-3180 Wolfsburg, Germany.

QSL the May operation of **I19ITU** from Sicily via Maurizio Tramuto, IT9TQH, Via P. Paolo Vasta 19, 90144 Palermo, Italy

Patrick Cardoz, **HH2PK**, QSLs direct via his home address: P.O. Box 1095, Port-au-Prince, Haiti, Leeward Islands. He suggests registered mail to avoid losses.

The **ZS0Z** Penguin Island cards are beginning to go out, says operator/manager Chris Burger, ZS6EZ (ex-ZS6BCR). Chris reports that duplicate requests go to the "back of the queue unopened" for now.

According to HI3LFE, president of the Union Dominicana de Radioaficionados HI3JMP is *not* the QSL manager for the club as stated in the June column, and neither is the club responsible for HI3JMP's QSLs. QSLs for **HI1UD, HI2UD, HI3UD, HI3UD/HI4, HI4UD, HI5UD, HI6UD, HI7UD, HI9UD, and HI500UD** should be sent directly to UDRA, HI3 QSL Service P.O. Box 449-3, Santiago, Dominican Republic.

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Effective 2/20/92 Recorded Delivery Service on International mail is available to a limited number of countries. Postal Bulletin 21809 dated 2/20/92, page 9, contains the updated details of Recorded Delivery Service and in section 385 of the International Mail Manual. Personnel must offer Recorded Delivery Service only to the following countries: Afghanistan, Bahrain, Belgium, Bolivia, Brunei, Bulgaria, Burkina Faso, Cameroon, China, Colombia, Czechoslovakia, Fiji, Greece, Guinea, Guyana, Iraq, Italy, Korea (Republic of), Libya, Malaysia, New Zealand, Oman, Pakistan, Romania, Spain, Swaziland, Syria, Turkey, and Venezuela.

73, Chod, VP2M

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REGULATORY HAPPENINGS FROM THE WORLD OF AMATEUR RADIO

FCC Proposes to Relax Restrictions On Business Communications

"The proposed changes . . . would increase the amateur community's responsibilities for self-regulation and cooperation in the use of their assigned frequencies."

—FCC News Release

Last fall we wrote about the possibility that the FCC might be changing the amateur radio communications content regulations. Sections 97.111 and 97.113 of the Rules spell out the types of operation that are permissible and prohibited on the amateur bands. We have been writing this column for many years now, and this article generated more letters and controversy than any other that we have written!

We were tipped off by a speech given by FCC bureau chief Ralph Haller at the August 1991 ARRL National Convention held in Saginaw, Michigan. Haller, a career FCC engineer, is certainly very familiar with amateur radio. He was with the FCC's Field Operations Bureau for many years before becoming the government official charged with overseeing all private radio services, which includes the amateur radio. Haller also holds an Extra Class amateur ticket.

We weren't able to attend the Saginaw convention, so we did the next best thing. We asked the FCC's Personal Radio Branch for a copy of his remarks. We were furnished with a multi-page typewritten copy. It was an "eye opener," to say the least. Haller asked the American Radio Relay League to support non-amateur communications on the amateur bands.

He said that the FCC had received many requests to allow logistic communications support for parades, races, and the like, government and public safety communications, instruction in the classroom utilizing amateur radio, news gathering, transacting personal business, retransmitting communications from other services . . . and the like.

*National Volunteer Examiner Coordinator,
P.O. Box 565101, Dallas, TX 75356-5101
(817-0461-6443)*

Haller suggested a new category of subordinate on-the-air amateur radio activity to be known as "Secondary" communications. Basically, this classification would allow amateurs to participate in previously prohibited communications when the amateur bands were not being used for presently authorized operation. Non-amateur communications " . . . would have to be limited to only those areas where the FCC regulates communications because of the prohibitions in the International Regulations," he said.

Regular amateur and emergency communications would continue to take precedence and non-amateur communications would only be permitted when amateur band loading permitted. Haller defined emergency work as operation during a disaster, safety of life, protection of property, station in distress, and RACES (Races Amateur Civil Emergency Service) communications. He said primary usage relates to the amateur service; specifically regulations, operating procedures and practices, electronics, station equipment, and the like.

Amateurs would still be prohibited from selling a communication service that uses amateur service frequencies, although "The control operator of an amateur station may accept compensation for periods of time during which the station is transmitting Morse practice, information bulletins, and classroom instruction."

Haller said he hoped the amateur community would " . . . give this suggestion . . . careful attention. You could be of great assistance to those in need of better communications, and properly implemented, this approach should have no adverse effect upon what you are now doing."

To make matters even more controversial, according to the printed speech, the concept was based on a theory of "excess capacity." In this day of critical spectrum shortages, an acknowledgment by the amateur community that our bands could support other than amateur activity seemed dangerous to us.

If our spectrum could sustain additional non-amateur and business communications, why wouldn't the FCC not be tempted to simply reallocate our valuable frequencies to other non-amateur and business services. They have certainly done it before. Make no mistake about it, ham

radio's most valuable asset is the frequencies we have scattered throughout the electro-magnetic spectrum.

I'm convinced that if we didn't have them first, the amateur operator wouldn't have them at all! The situation is not unlike the plight of the American Indian who once seemingly owned all land—only to be later herded onto steadily reduced patches. Although there have been some exceptions, the American amateur radio operator has been gathered into constantly diminishing spectrum.

Haller later told us that he didn't mean the Amateur Service had excess spectrum. "Excess capacity means you can do something more," he said, "and still get your basic communications through. . . . excess capacity is not a spectrum term." Haller also said he deviated somewhat from his printed text and was not sure if he even used the words "excess capacity."

FCC Proposes Non-Amateur Communications

On June 18 the FCC adopted its long-awaited Notice of Proposed Rulemaking (NPRM) to change the "Prohibited Transmissions" rule in the Amateur Radio Service (Rule 97.113). Developed over many years, the current rule is designed to preserve the service's noncommercial nature while permitting it to be used for certain public service applications.

The rule has long given some amateurs grief, particularly those involved in mass public service events such as races and parades. Organizers of these activities may prefer the help of amateur volunteers and their radios instead of having to obtain communications through other services such as Business Radio or cellular phones.

The limitation appears closer to home when amateurs cannot legally use their radios to conduct communications such as hamfest "talk-ins." Amateurs may currently transmit only certain kinds of public service event communications—mostly related to safety—and may not use their frequencies for the ordinary transportation and administrative operations of an event or agency.

In response to requests from the ARRL and others, "The FCC has proposed amending its rules for the amateur service

by lessening restrictions on the scope of the permissible communications that amateur stations may transmit," the Commission said in a news release. "Specifically, the proposal includes greater flexibility to transmit communications for public service projects and personal matters." It is not known at this point if the NPRM supports the Emergency, Primary, and Secondary amateur communications concept first presented in Saginaw.

"While eliminating some of the existing restrictions would provide the flexibility to expand public service activities and satisfy the personal communications interests, the potential for commercial exploitation and abuse of the amateur service's allocated frequencies could increase," the FCC noted.

In adopting the ARRL's proposed revision, the FCC said that the general prohibition against amateur stations transmitting messages for hire or for material compensation, direct or indirect, would remain. The revision "would allow amateur stations to transmit occasionally certain types of communications that are now prohibited," the FCC said. The matter was presented to the FCC for a vote at its meeting on Thursday, June 18. Here is a transcript:

Commissioners Adopt Notice of Proposed Rulemaking (Personal Radio Branch Senior Analyst William Cross:) "Good morning, Mr. Chairman and Commissioners. The Amateur Service is for technically inclined individuals who derive personal satisfaction from understanding and using radio technology.

"They engage in self-training, information exchange, and experimentation. Many licensees also use their stations voluntarily to provide non-commercial, public service communications. This tradition of serving the public is a hallmark of the Amateur Service.

"The rules, however, contain pecuniary interest restrictions that limit the types of communications that amateur operator stations can transmit. These constraints sometimes discourage licensees from providing public service communications to the extent they desire.

"For example, licensees cannot provide logistical or news-gathering communications at events such as parades or marathons, and they cannot supplement the communications systems of police, fire or rescue agencies. Further, there is growing interest in making greater use of the Amateur Service for personal communications.

"As a result, a number of operators and organizations have expressed interest in broadening the scope of communications that can be transmitted by amateur stations. We have received several petitions including one from the American Radio Relay League, requesting a relaxation of the restrictions in the rules. The item before you, therefore, proposes the amendment the League suggests.

"Under this proposal, licensees who are teachers, for example, could use their stations in classroom instruction. Licensees could provide logistical communications for races and other public gatherings. And, they could gather and report data to government agencies, such

as the National Weather Service. Licensees would also have more flexibility in using their stations in their personal activities.

"This proposal is not intended to alter, in any way, the nature and purpose of the Amateur Service. Rather, it would allow licensees to better serve the public, and to enhance their personal communications capabilities. The Bureau recommends that you adopt this Notice of Proposed Rulemaking." (The NPRM passes unanimously; end of FCC meeting transcript.)

Private Radio Bureau Chief Haller made a few additional comments at the press conference that followed the FCC meeting. He noted that the NPRM does not propose to allow routine retransmission of music in the Amateur Service except for some situations, as when NASA sends music to the

Space Shuttle. NASA does this as a gag or a wakeup call to astronauts and some amateurs who retransmit Space Shuttle communications (permitted by Rule §97.113(e)) may have been concerned about the legal status of such music on the amateur bands. Haller also noted that the NPRM does not propose any changes to the rules that prohibit indecent or obscene material on amateur frequencies.

We asked him about how the FCC will define the words "occasionally" or "on a regular basis," key terms that will govern how often amateurs will be able to conduct the communications that are now prohibited. He replied that the FCC will look to the comments for suggestions on how to define these terms.

At press time the actual text of the

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NPRM was not yet available. The Federal Communications Commission did distribute the following Press Release, however. (Quote follows)

FCC Proposes Relaxing Restrictions on Permissible Communications in Amateur Service

"The FCC has proposed amending its rules for the amateur service by lessening restrictions on the scope of the permissible communications that amateur stations may transmit. Specifically, the proposal includes greater flexibility to transmit communications for public service projects and personal matters.

"The Commission noted that many individuals in the amateur community appear to strongly support relaxing one or more of the existing restrictions on the scope of amateur services communications. The restrictions were resigned to protect the non-commercial character of the amateur service and ensure its basis and purpose, i.e., as a reservoir of volunteer communicators, technicians and electronics experts dedicated to advancing the radio art, to provide public service communications particularly in times of emergencies, and to enhance international goodwill, could be carried out.

"While eliminating some of the existing restrictions would provide the flexibility to expand public service activities and satisfy the personal communications interests, the potential for commercial exploitation and abuse of the amateur service's allocated frequencies could increase.

"Specifically, the Commission proposed the revision suggested by the American Radio Relay

League. This revision would allow amateur stations to transmit occasionally certain types of communications that are now prohibited. The intent of the suggested revision is to allow amateur operators who so desire greater flexibility to increase their public service communications activities, for example, in support of parades, races, and other such public gatherings. The general prohibition against amateur stations transmitting messages for hire or for material compensation, direct or indirect, however, would remain in the rules.

"These proposals are not intended to alter in any way the nature and purpose of the amateur service. The proposed changes, however, would increase the amateur community's responsibilities for self-regulation and cooperation in the use of their allocated frequencies.

"Action by the Commission, June 18, 1992, by Notice of Proposed Rulemaking." (End of Press Release)

When available, the NPRM should thoroughly discuss the FCC thinking and put forth specific proposed regulations. We will have a more detailed account of the FCC's view on amateur service communications once we receive it. As with all new proposed rulemaking, the public will have a chance to comment on the proceeding.

Background of 'No Business' Communications Rule!

The NPRM certainly did not come as a sur-

prise. The ARRL and the FCC's Private Radio Bureau have been discussing the matter of more liberal amateur communications for more than a year. The FCC has been the object of considerable lobbying, letter writing, phone calls, petitions . . . even Congressional inquiries on the subject of prohibited and permissible amateur communications. The Commission asked for the League's views on the matter earlier last year.

Although the FCC meeting to consider the NPRM only mentioned the proposal from the American Radio Relay League, it is well known that the Federal Communications Commission has received dozens of other requests and petitions for relaxation of §97.113, the so-called "no-business" rule, some of which were associated with the item.

The ARRL only addressed greater flexibility for amateur radio operators to transmit communications for public service projects in their proposal. Other requests ask for permission to transact personal and logistical business. These apparently were proposed as rule amendments in the NPRM.

ARRL Submits Proposal

The League responded to the Saginaw speech by submitting a 14-page, single-spaced, typewritten letter in January of this

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year outlining its ideas for additional amateur communications capability. The letter was treated as a Petition for Rulemaking by the FCC, since it contained a suggested regulatory restatement of Section 97.113—the “no business” rule. That proposal and others have apparently formed the basis for the Commission’s NPRM.

“While there is occasionally only a fine line between proper use of amateur radio for public service communications and improper exploitation of amateurs by non-licensees,” ARRL said, “the League continues to believe that the rules should err in favor of flexibility, recognizing that the self-regulating character of the radio amateur is a reasonable means of providing the proper balance.”

The League’s proposed restatement of Section 97.113 was based on four principles and “... constitutes a middle ground between removal of all rules governing business communications, and the present interpretational status of §97.113,” the ARRL said.

The four principles cited were:

1. Communications in exchange for compensation are prohibited;
2. Communications for the benefit of one’s employer are prohibited;
3. Communications in which the control operator or licensee have a pecuniary interest are prohibited; and
4. “... the Amateur Service shall not be regularly substituted for other licensed radio services.”

The ARRL did not define what “regularly substituted” meant except to say that while volunteer communications might be provided for an occasional event—such as the Rose Bowl Parade—they could not be regularly provided for services which have their own assigned frequencies such as “... routine riding with police on patrol.”

The League said music should be prohibited. Another petitioner, Michael R. Reynolds, W0KIE, of Tulsa, Oklahoma, wanted permission to retransmit all NASA audio and video communications between the space shuttle and earth stations. Henry Ruh, KB9FO, of Des Plaines, Illinois, petitioned the FCC (assigned RM-7896) to allow the retransmission of any information—including NASA select and weather radar—not protected by copyright, including background or incidental soundtrack music.

Prohibited Communications On The Amateur Bands

Seven pages of the 14-page proposal by the American Radio Relay League contained a rather detailed and interesting chronological history of the prohibition of business communications in the Amateur Service.

The ARRL said that prior to 1983, business communications in the Amateur Ra-

dio Service were not expressly outlawed in the rules. A problem arises, however, when regulations attempted to address the fact that others besides the licensee and the general public may benefit from amateur communications.

The current definition of an amateur as a person “... interested in radio technique solely with a personal aim and without pecuniary interest” was adopted by the International Telegraph Conference (the previous name of the ITU) held in Washington in 1927.

In 1928 the Federal Radio Commission (which became the FCC in 1934) enacted rules prohibiting amateurs from transmitting “... news, music, lectures, sermons, or any form of entertainment or to conduct any form of commercial correspondence.”

In the 1950s Rules provided that an amateur station “... shall not be used to transmit or receive messages for hire, nor for communication for material compensation, direct or indirect, paid or promised.” That limitation is essentially the same as contained in the current Section 97.113(b).

In 1971 the FCC concluded that “... unlimited operation in behalf of such organizations [as the Eye Bank Association, Red Cross and other charitable organizations] could generate large numbers of new networks and the use of amateur radio as a medium for the organized advocacy of social, political, or economic views could pre-empt amateur frequencies to the exclusion of the individual amateur for whom the service was intended.”

Until 1972 the Rules prohibited licensing of an amateur radio station to a “... school, company, corporation, association or other organization, nor for its use...” The phrase “nor for its use” was intended to prevent amateurs from using the amateur service for their employer’s business communications.

In 1972 new third-party traffic rules prohibited amateur radio from being “... used for any pecuniary interest to any party or for commercial communications.” A later court ruling, however, distinguished occasional public service amateur communications from commercial use of the service.

In 1983 the FCC further clarified their third-party traffic rules with an Order stating, “... the Amateur Service should not be used as an alternative to the land mobile, broadcast, maritime or common carrier radio services, all of which have been established by appropriate regulatory processes.”

The Order also provided an interpretation of the term “business communications” in “... the broadest context. It includes all types of communications which are intended to facilitate the regular business or commercial affairs of any party, whether individual or organization, whether for profit or not-for-profit, whether char-

itable or commercial, and whether government or non-government.”

This interpretation effectively disallowed virtually all communications in support of Red Cross efforts, since the regular business of the Red Cross involves relief work, regularly coordinated by amateurs. Another still later clarification held that “... the Order does not prohibit amateur radio operators from participating in the routine events of traditional public service activities. ... Although they may incidentally ‘benefit’ the sponsor, their main purpose is to provide a service to the public, which is the real beneficiary ...”

The ARRL pointed out that while the FCC has always been properly concerned about exploitation of the Amateur Radio Service by non-amateur licensees for private benefit, “... one of the most basic purposes of the Amateur Radio Service, in addition to providing emergency communications, has been the provision of public service communications at events sponsored by private and governmental organizations.” The ARRL says it “... has always supported minimal content regulations in this area, and continues to do so.”

We probably will have more to say about this issue next month. By then we will have had time to receive and digest the actual wording of the Notice of Proposed Rulemaking.

73, Fred, W5YI

Personal Autopatch

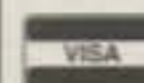
Make and receive telephone calls from your mobile or HT with your own personal autopatch. Just plug the SDP-600 Smart Patch into any RJ-11 phone jack and connect to any transceiver’s microphone/speaker jack.



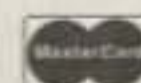
- Selectable full duplex or simplex mode.
- Turnaround beeps on simplex.
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CIRCLE 25 ON READER SERVICE CARD

WHAT'S NEW AND HOW TO USE IT

Most of our portable equipment operates from batteries, and to get the common voltages needed by most circuitry, a number of batteries are often used. It is not uncommon to use eight D cells to produce 12 volts or several transistor radio batteries to obtain a \pm voltage supply for an op-amp circuit. Simply interconnecting such batteries is often inconvenient, not to mention the cost. Modern IC circuitry, however, can simplify matters to the point where a single D cell can power almost anything you can build (within its power capability, of course).

Maxim Electronics of Sunnyvale, California has available several DC/DC converters that transform the output of a single 1½ volt battery to 5 volts at current levels of up to 450 milliamperes and at an efficiency of approximately 80%. While this may not be the thing for a 2 meter transceiver, it is certainly ideal for all sorts of portable equipment. The particular chips that perform this function are the MAX654, MAX656, and MAX657.

Fig. 1 is the block diagram of a converter that converts a 1.5 volt battery to regulated 5 volts (± 0.5 volts) at currents up to about 40 ma. The circuit uses the MAX654 and six components (not counting the battery) and is ideal for powering portable digital circuitry of all kinds. In operation the battery is connected in series with a low-loss inductor, L2, and a switch as well as a rectifier and filter capacitor. When the switch is closed, the current builds up in the inductor. When the switch opens, the interrupted current produces a voltage across the inductor that is opposite in polarity from the input and in series with the battery. This voltage adds to that of the battery and provides the output current to the load. The cycling of the switch is controlled by an on-chip oscillator that is turned on and off as a function of the output voltage. As a result, the output receives pulses of power (voltage and current) when necessary, maintaining 5 volts across the load.

The complete schematic diagram of the converter is shown in fig. 2. The only critical component is low-loss inductor L2. Since all of the current for the load flows through this inductor, it must have a very low series resistance and not saturate when load current flows through it. The recommended value for L2 is 47 μ H with an internal resistance of .05 ohms. Such an inductor is available from Caddell & Burns, Mineola, New York (516-746-2310)

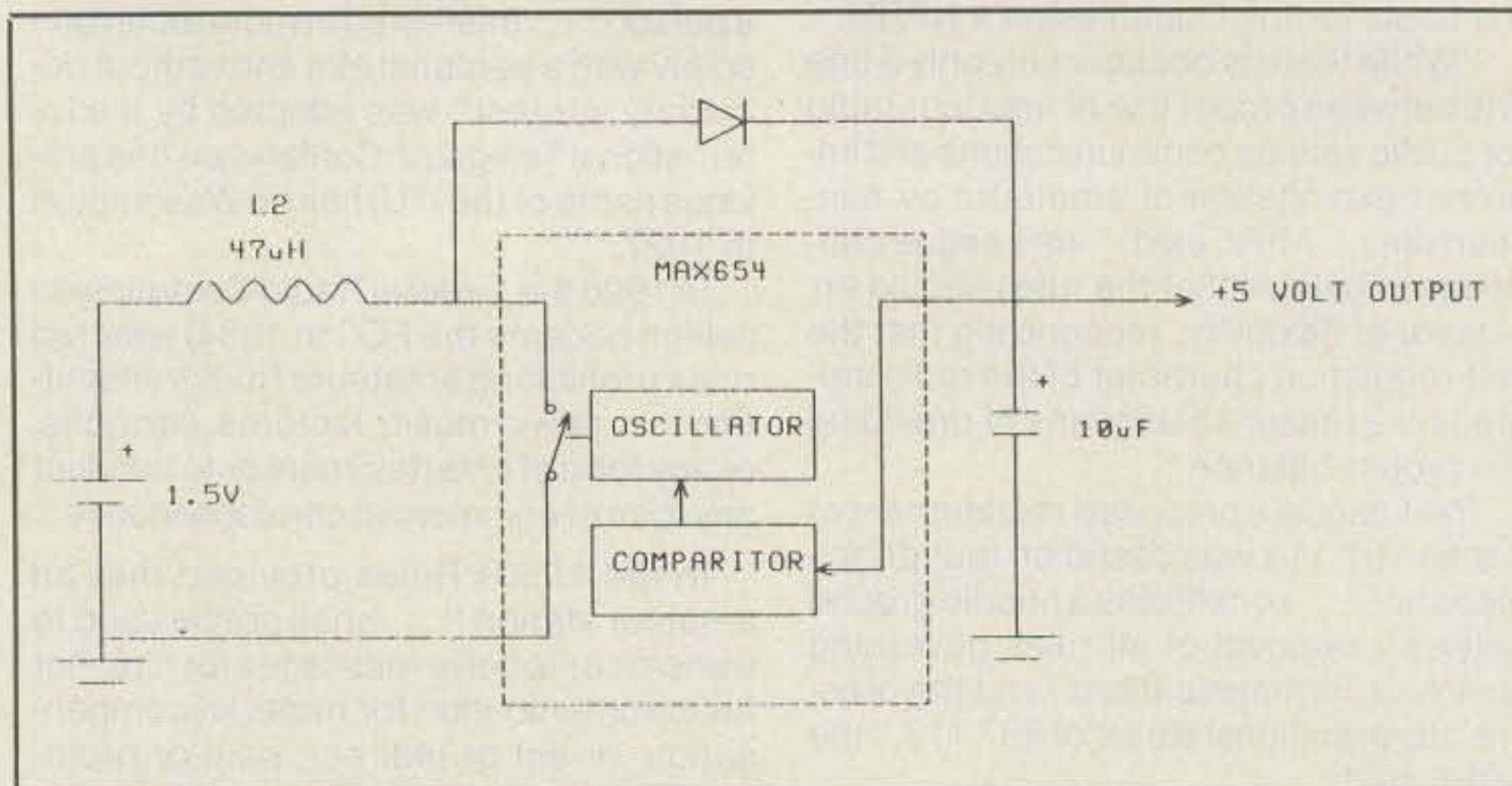


Fig. 1—Block diagram of the MAX654 DC/DC converter.

as their part number 6860-09. The other inductor, L1, can be a standard 4.7 mH RF choke as long as its internal resistance is less than 40 ohms.

With all components connected as shown, the circuit should operate immediately and continue to do so until the battery voltage drops below 1.15 volts.

The other chips in the series are designed to produce greater output currents (still at 5 volts). The MAX657 will produce output currents of up to 60 ma in the same circuit as fig. 2, while the MAX656 can de-

liver up to 170 ma with an external power FET. This circuit is shown in fig. 3 and requires different values for the inductors. In this circuit, L2, the 12 μ H inductor is the critical one. A suitable unit is available from the same source as part number 7200-02. The other choke can be a standard 3.3 mH device with an internal resistance less than 40 ohms as in the first case.

In applications where outputs greater than 5 volts are desired, the MAX632 and 633 fit the bill. Both operate from 3 volts, so you will need an additional 1.5 volt bat-

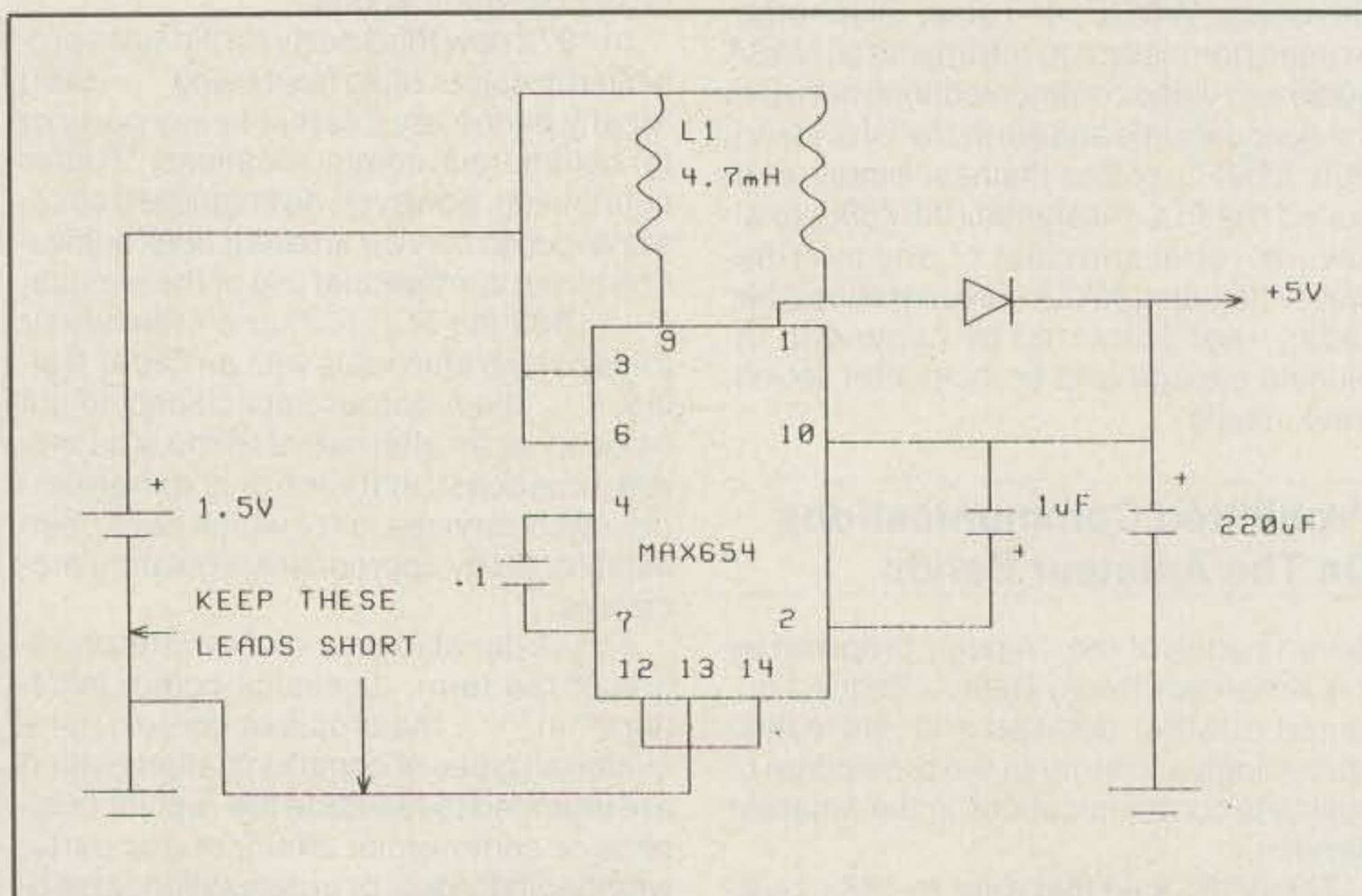


Fig. 2—1.5 volt to 5 volt converter circuit.

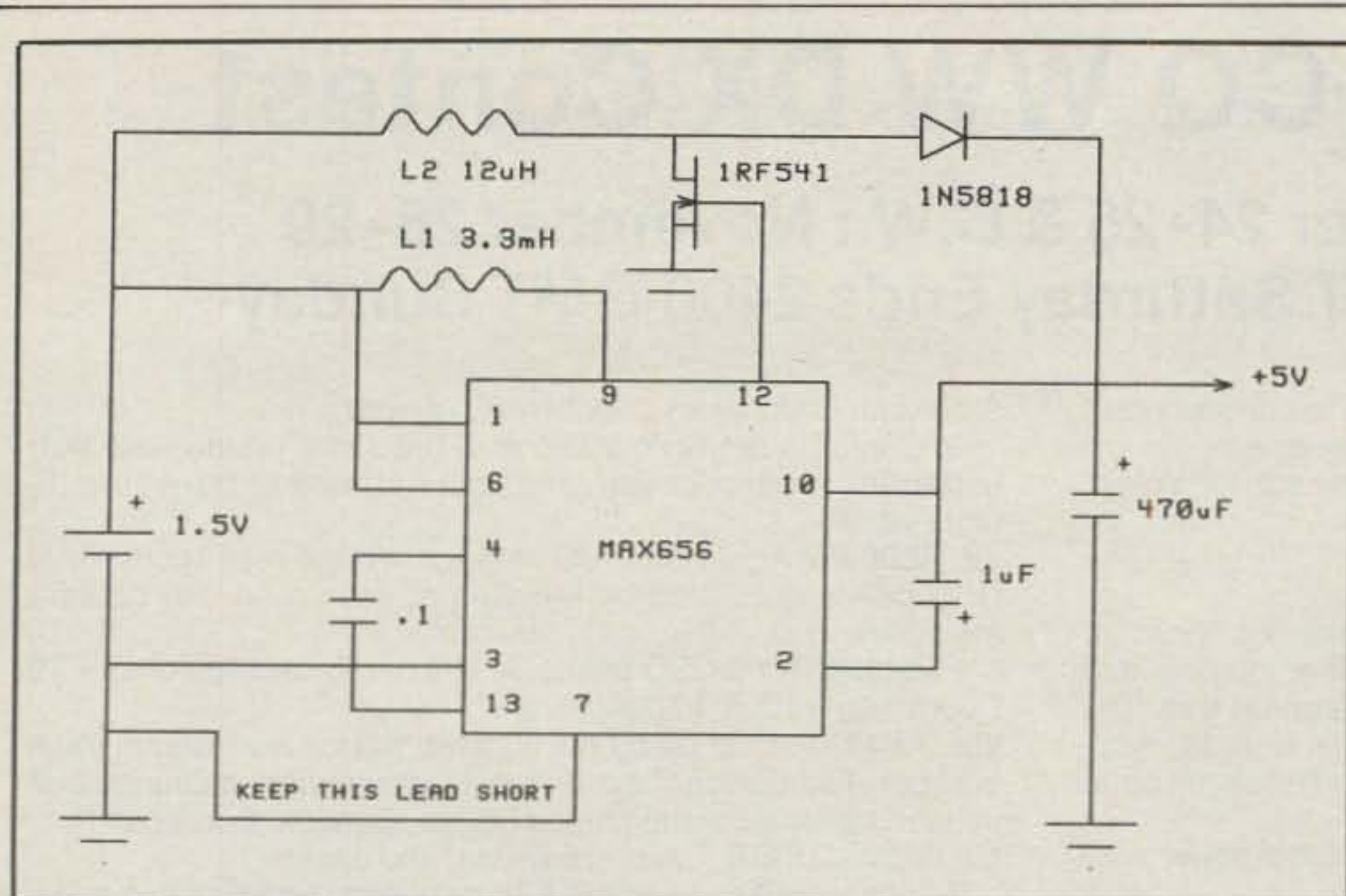


Fig. 3- High current 1.5 volt to 5 volt converter.

tery. The MAX632 will produce a regulated 12 volts (± 0.6 volts) at up to 25 ma with an efficiency of 85% and the MAX633, 15 volts (± 0.75 volts) at up to 35 ma with an efficiency of 90%. Furthermore, these devices may be connected to produce a variable output if desired. If these are of interest to you, contact MAXIM at 408-737-7600 for additional details.

By using integrated circuits such as the ones described, all sorts of portable equipment can easily be powered by a couple of readily available C or D cells. Furthermore, by using the common rechargeable D batteries now becoming more and more popular, even the replacement problem can be overcome.

73, Irwin, WA2NDM

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Get your rubber duck outside with the BWM-1 Window Mount. This handy mount clips over your car's window and lets your antenna get out and above the car roof giving you better range into your local or distant repeater. High quality BNC to BNC connector can be used on your own coax or with optional 6'

50 ohm, Model BC 6-174 Cable, priced at only \$ 10.95* You can buy both the mount and the 6' cable for \$ 23.00* (cable and antenna shown in photo are extra cost options)

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CIRCLE 66 ON READER SERVICE CARD



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CIRCLE 53 ON READER SERVICE CARD

The 1992 CQ WW DX Contest

Phone: October 24-25 & C.W.: November 28-29
Starts 0000 GMT Saturday Ends 2400 GMT Sunday

I. OBJECTIVE: For amateurs around the world to contact other amateurs in as many zones and countries as possible.

II. BANDS: All bands, 1.8 through 28 MHz, except for WARC bands.

III. TYPE OF COMPETITION:

1. Single Operator (single band and all band).

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

b. **Low Power.** Same as 1(a) except that the **output power** shall not exceed 100 watts.

c. QRPp. Power must not exceed 5 watts output. Stations in this category will be competing only with other QRPp stations for awards.

d. Single Operator Assisted. Single operator stations are those at which one person performs all of the operating and logging functions. The use of DX spotting nets or any other form of DX alerting assistance *is* allowed. The operator can change bands at any time.

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

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

b. Multi-Transmitter (no limit to transmitters **but only one signal and running station allowed per band**).

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

3. **Team Contesting.** A team consists of any five radio amateurs operating in the single operator category. A person can be on only one team per mode. Competing on a team will not prevent any team member from submitting his personal score for a radio club. A team score will be the sum of all the team member scores. SSB and CW teams are totally separate. That is, a member of an SSB team can be on a totally different CW team. A list of a team's members must be received at CQ Headquarters by the time the contest begins. Mail or FAX the list to CQ, Att: Team Contest, 76 North Broadway, Hicksville, NY 11801 U.S.A.; FAX 516-681-2926. Awards will be given to the top teams on each mode.

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

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

V. MULTIPLIER: Two types of multiplier will be used.

1. A multiplier of one (1) for each different zone contacted on each band.

2. A multiplier of one (1) for each different country contacted on each band.

Stations are permitted to contact their own country and zone for multiplier credit. The CQ Zone Map, DXCC country list, WAE country list, and WAC boundaries are standards.

VI. POINTS: 1. Contacts between stations on different continents are worth three (3) points.

2. Contacts between stations on the same continent but different countries, one (1) point. *Exception:* For North American stations *only*, contacts between stations within the North

American boundaries count two (2) points.

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

VII. SCORING: All stations: the final score is the result of the total QSO points multiplied by the sum of your zone and country multiplier.

Example: 1000 QSO points × 100 multiplier (30 Zones + 70 Countries) = 100,000 (final score).

VIII. AWARDS: First place certificates will be awarded in each category listed under Sec. III in every participating country and in each call area of the United States, Canada, European Russia, Asiatic USSR, Czechoslovakia, and Japan.

All scores will be published. To be eligible for an award, a Single Operator station must show a minimum of 12 hours of operation. Multi-operator stations must operate a minimum of 24 hours. A single-band log is eligible for a single-band award *only*. If a log contains more than one band it will be judged as an all-band entry, unless specified otherwise.

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

All certificates and plaques will be issued to the licensee of the station used.

IX. TROPHIES & PLAQUES (Donors)

PHONE

Single Operator, All Band

World—Dave Rosen, K2GM—WA2RAU Memorial
World—Single Operator Assisted—Richard Newell, AK1A
World—QRPp—Doc Sayre, N7AVK
U.S.A.—Potomac Valley R.C.—KC8C Memorial
Carib./C.A.—Alex M. Kasevich, VP2MM
Europe—Potomac Valley R.C.—W4BVV Memorial
Africa—Gordon Marshall, W6RR
Asia—Japan CQ Publishing Company Ltd.
Japan—Japan Crazy Contesters Club
Oceania—Northern California DX Club
South America—CQ Magazine

Single Operator, Single Band

World—28 MHz—Joel Chalmers, KG6DX
World—21 MHz—CQ Magazine
World—14 MHz—North Jersey DX Assn.—K2HLB Memorial
World—7 MHz—Fred Laun, K3ZO—K7ZZ Memorial
World—3.8 MHz—Fred Capossela, K6SSS
U.S.A.—28 MHz—Donald Thomas, N6DT
U.S.A.—21 MHz—Bill Gioia, K2EK
U.S.A.—14 MHz—Southern California DX Club
U.S.A.—7 MHz—Stanley Cohen, WD8QDQ
U.S.A.—3.8 MHz—Arnold Tamchin, W2HCW
Carib./C.A.—Pedro Piza, Jr., NP4A—KP4ES Memorial
Europe—28 MHz—Chod Harris, VP2ML
Europe—21 MHz—Robert Starling, N4GVF
Europe—14 MHz—A.G. Anderson, GM3BCL
Europe—7 MHz—Roger Burt, N4ZC
Japan—28 MHz—Take Yokoyama, JL1BLW
Japan—21 MHz—DX Family Foundation

Multi-Operator, Single Transmitter

World—So. Calif. DX Club—W6AM Memorial
U.S.A.—Carolina DX Association
Europe—Bob Cox, K3EST
Carib./C.A.—K3NA and KN3T

Multi-Operator, Multi-Transmitter

World—W6QHS and KK6QM
U.S.A.—Black Hole Contest Club
Europe—Finnish Amateur Radio League
Japan—Nippon Television Network Corp.

Trade In & Up at Tucker!

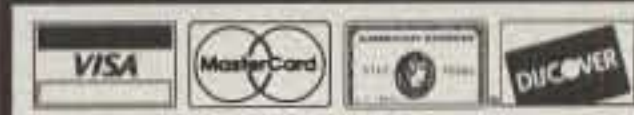
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TEK 465 Scope

This small & rugged scope contains a bright, 8x10 cm CRT display. Operation is simplified with single-function push buttons. A front-panel push button allows any waveform to be instantly displayed. This can be a real convenience when external trigger signals are frequently used as timing references.

- Dual trace 5 mV/div to 5 V/div
- DC to 100 MHz bandwidth
- Time base A: 0.05 μ sec/div to 0.5 sec/div in 22 steps
- Time base B: 0.05 μ sec/div to 50 msec/div in 19 steps
- Portable - weighs 25.3 lbs.



\$795

TEK 453 Dual Trace Scope

- Bandwidth is DC to 50 MHz at 20 mV/div
- Chopped, Alt sweep mode
- Deflection accuracy is within $\pm 3\%$ of indicated deflection with VARIABLE control fully clockwise
- Vertical deflection factor of 5 mV/div to 10 V/div in 11 calibrated steps for each channel
- Calibrated time base 0.1 μ sec/div to 5 sec/div
- Calibrated mixed sweep & sweep delay
- 6X10 division CRT

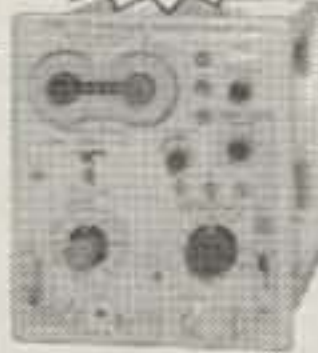


\$299

TEK 115 Spectrum Analyzer

This Unit is designed for use with any Tektronix oscilloscope accepting letter- or 1-series plug-in units.

- Calibrated center frequency range is from 50 Hz to 990 kHz in 10 Hz steps with a variable of > 10 kHz
- Calibrated dispersion range is 10 Hz to 100 kHz
- Input impedance is 1 M Ω shunted by 30 pF
- Outputs include a recorder output, markers and oscillator output



\$199

HP 9835A

- HP's Price...\$10,400
- HP enhanced basic language
- Built-in tape cartridge
- Uses composite video display
- IEEE 488 compatible
- 3 I/O ports

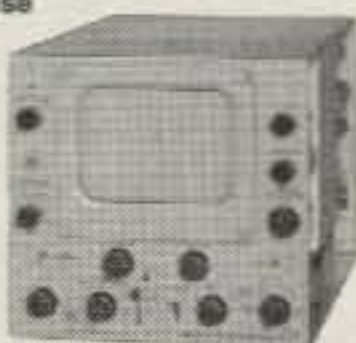


\$495

TEK 529/RM529 TV Waveform Monitor

The 529 is one of the most popular units of its type. It features line selector, positive field selector, bright waveform displays, and DC restoration.

- DC - 8 MHz Response
- 0.12 - 1.5 V Sensitivity
- Four Video Response Characteristics
- High-Pass, Low-Pass, IEEE, & Flat

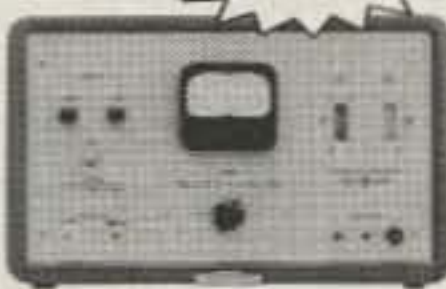


\$699

HP 434A Calorimetric Power Meter

Completely self-contained and requires no external detectors or mounts. The wider frequency response allows it to be calibrated by a known DC source.

- 10 W average, 1 kW peak
- Frequency range is DC-12.4 GHz
- 0.01 W to 10 W in seven ranges
- 50 Ω input impedance
- Direct power readings



\$175

HP 606B HF Signal Generator

This comes operationally-checked and with operating manual. The 606B is easy to use and covers the frequency range of 50 kHz to 65 MHz in six bands.

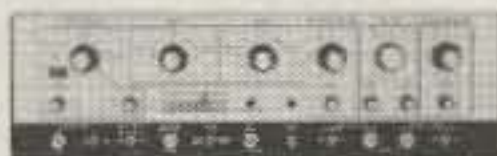
- 50 kHz - 65 MHz
- 0.1 μ V - 3 V output
- 1% Frequency accuracy
- 0 - 95% AM
- +23 to -120 dBm



\$350

Datapulse 110B Pulse Generator

- Versatile, high performance, laboratory pulse generator
- Single or double pulse
- Repetition rate from 5 Hz to 50 MHz, Double pulse maximum rate of 25 MHz
- Pulse amplitude is $> \pm 10$ V into 50 Ω
- Pulse rise/fall time typically 4 nsec rise time and 6 nsec fall time
- Internal and external trigger, Single Cycle, Gated Operation



\$395

High Frequency Oscilloscope Probe

Includes sprung hook, 6" ground lead, BNC adapter, IC test tip, trimmer tool, and storage pouch.

- Switchable X1, X10; rugged probe
- Bandwidth of 10 MHz (X1); 100 MHz (X10)



\$23.95

HP 411A RF Millivoltmeter

- Measures from 0.01 V RMS to 10 V RMS full scale
- Frequency range from 500 kHz to 1 GHz
- Accuracy of $\pm 3\%$ of full scale (from 500 kHz to 50 MHz)
- Two linear voltage scales, 0 to 1 & 0 to 3 calibrated in RMS; dB scale is calibrated from +3 to -12 dB, 0 dB = 1 mW in 50 Ω



\$149

Hickok 1605M Electronic Multimeter

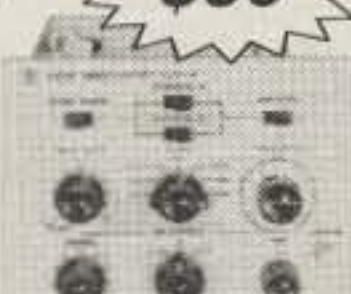
- Measures a wide range of AC voltage, DC voltage, current and resistance
- DC voltmeter range is from 0 to $\pm 1,500$ V, accurate to $\pm 2\%$ of full scale value at any point on the scale.
- DC current range 0 to ± 150 mA with special ranges of ± 1.5 , 5 & 15 nA using the DC voltmeter probe
- Resistance measurements can be made from under 1 Ω to over 500 M Ω
- AC voltage can be measured from 0.5 to 300V (rms) from 20 Hz to 700 MHz



\$99

HP 3304A Sweeper Plug-In

- For use w/HP 3300A Function Generator
- Voltage range adjustable 0 to ± 16 V
- Positive or negative output polarity
- Frequency range of 0.01 Hz to 100



\$39

HP 204C/H20 Oscillator

- Rechargeable batteries
- Wide ranged oscillator, solid state & highly portable
- Frequency range from 5 Hz to 1.2 MHz
- Output is 5 V into an open circuit & 2.5 V into 600 Ω
- Output impedance is 600 Ω
- The output is variable with greater than 20 dB attenuation for an open circuit output of less than 50 mV RMS



\$199

Bird 611 RF Wattmeter

- Frequency from 30 - 500 MHz
- Power of 2-80 W; Ranges are 0-20 & 0-80 W
- Coaxial output circuit, 51.5 Ω nominal
- CW, AM, FM or TV type modulation signals



\$139

Collins 651S1 General Purpose HF Receiver

A completely solid state desktop unit that provides 297,500 channels in the 250 kHz to 29.9999 MHz frequency range and features direct reading digital display of the operating frequency. AM, SSB, & CW Standard.

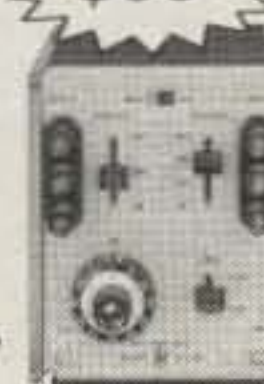


\$1500

HP 353A Patch Panel

Used in conjunction with an oscillator & a voltmeter to measure transmission & system characteristics such as attenuation, frequency response and gain.

- Input and output frequency range from 50 Hz to 560 kHz
- Input impedance 135, 600, 900 Ω and bridging (10K) center tapped
- Output impedance 135, 600, and 900 Ω center tapped
- Maximum level is +22 dBm (10 V at 600 Ω)
- Attenuation of 110 dB in 1 dB steps



\$59

COMPUTERS

Apple Macintosh Plus

- 1 MB RAM
- 1 Floppy Drive
- Built-in Monitor
- 2.5 MB RAM \$449
- 4.0 MB RAM \$499



\$399

True Blue IBM PC

- 640K RAM
- 360K floppy drive
- 10 MB hard drive
- Keyboard
- Includes mono monitor
- 90-day warranty
- -20 MB HD- \$309
- -30 MB HD- \$369



\$279

HP 2686A Laserjet Printer

- 8 PPM
- Letter, Legal & Envelope
- Quiet Printer



\$695

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ELECTRONICS & COMPUTERS



Contest Expeditions

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

CW

Single Operator, All Band

World—Albert Kahn, K4FW—W9IOP Memorial
World—Single Operator Assisted—Richard Newell, AK1A
World—QRPP—Gene Walsh, N2AA
U.S.A.—Frankford Radio Club
Canada—Canadian DX Association
Carib./C.A.—Larry Brockman, N6AR
Europe—Edward Bissell, W3AU
Africa—Gordon Marshall, W6RR
Asia—Japan CQ Publishing Company Ltd.
Japan—Japan Crazy Contesters Club
Oceania—Maui Amateur Radio Club
So. Amer.—Venezuela DX Club

Single Operator, Single Band

World—28 MHz—Joel Chalmers, KG6DX
World—21 MHz—Don Busick, K5AAD—N5JJ Memorial
World—14 MHz—North Jersey DX Assn.—W2JT Memorial
World—7 MHz—Alex M. Kasevich, VP2MM
World—3.5 MHz—Fred Capossela, K6SSS
World—1.8 MHz—Kenneth Byers, Jr., K4TEA
U.S.A.—28 MHz—Robert Clark, K6JYO
U.S.A.—21 MHz—Wayne Carroll, W4MPY
U.S.A.—14 MHz—Northern Illinois DX Association
U.S.A.—7 MHz—Jan Perkins, N6AW—W6AM Memorial
U.S.A.—3.5 MHz—N7BG and AA7FM
U.S.A.—1.8 MHz—Peter Hutter, WW2Y
Canada—Canadian Amateur Radio Federation
Carib./C.A.—Thomas Wall, K2TW
Europe—28 MHz—Southern New England DX Club
Europe—21 MHz—Robert Naumann, KR2J
Europe—14 MHz—Al Slater, G3FXB
Europe—1.8 MHz—John Crovelli, W2GD
Japan—21 MHz—DX Family Foundation

Multi-Operator, Single Transmitter

World—Anthony Susen, W3AOH
U.S.A.—Douglas Zwiebel, KR2Q
Canada—Eastern Canadian DX Assn.
Carib./C.A.—Ralph Bellas, Jr., K9ZO
Europe—Friends of K3AO—K3AO Memorial

Multi-Operator, Multi-Transmitter

World—Hazard Reeves, K2GL Memorial
World—SSB/CW Combined—Ehrhorn Technological
Operations
U.S.A.—James Rafferty, N6RJ
Europe—Finnish Amateur Radio League
Japan—Nippon Television Network Corp.

Contest Expeditions

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

Special—Single Operator Awards

World—All Band—CW—Most QSOs—KV4AA Memorial
(From the 14270 kHz Group)

Club

World—SSB/CW—CQ Magazine, W1WY Memorial
Non-USA—SSB/CW—No. Calif. Contest Club—N6AUV
Memorial

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

X. CLUB COMPETITION:

1. The club must be a local group and not a national organization.
2. Participation is limited to members operating within a local geographic area defined as within a 275 km radius from center of club area (except for DXpeditions especially organized for operation in the contest; club contributions of DXpedition scores are percentaged to the number of club members on the DXpedition).
3. To be listed, a minimum of 3 logs must be received from a

club and an officer of the club must submit a list of participating members and their scores, both on phone and c.w.

XI. LOG INSTRUCTIONS:

1. All times must be in GMT.
2. All sent and received exchanges are to be logged.
3. Indicate zone and country multiplier only the FIRST TIME it is worked on each band.
4. Logs must be checked for duplicate contacts, correct QSO points and multipliers. Submitted logs must have duplicate contacts clearly shown.
5. IBM-compatible disks (MS-DOS compatible; a separate ASCII file for each band, for example N6AR.10 = N6AR's 10 meter log; or K1EA CT.Bin file, for example K3EST.BIN) are encouraged. The committee can require a disk for possible top scores on request, provided that the paper log or dupe checking material as originally submitted was a computer printout. The outside of the disk should be labeled clearly with the Call of the entrant, the files included, the mode (SSB or CW), and the category. Disks **must** be accompanied by a paper log satisfying all logging instructions.

6. Use a separate sheet for each band.

7. Each entry must be accompanied by a summary sheet showing all scoring information, category of competition, contestant's name and address in BLOCK LETTERS, and a signed declaration that all contest rules and regulations for amateur radio in the country of operation have been observed.

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

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

9. All entrants are required to submit cross-check sheets for each band on which 200 or more QSOs were made. All other entrants are encouraged to submit cross-check sheets.

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

11. QRPP and low power stations must indicate same on their summary sheets and state the actual maximum power output used, with a signed declaration.

XII. DISQUALIFICATION: Violation of amateur radio regulations in the country of the contestant, or the rules of the contest; unsportsmanlike conduct; taking credit for excessive duplicate contacts; unverifiable QSOs; or unverifiable multipliers will be deemed sufficient cause for disqualification. (Incorrectly logged calls will be counted as unverifiable contacts.)

An entrant whose log is deemed by the Committee to contain a large number of discrepancies may be disqualified from eligibility for an award, both as a participant operator or station, for one year. If an operator is disqualified a second time within 5 years, he will be ineligible for any CQ contest awards for 3 years.

The use of nonamateur means such as telephones, telegrams, etc., to elicit contacts or multipliers **during** a contest is unsportsmanlike and the entry is subject to disqualification.

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

XIII. DEADLINE:

1. All entries must be postmarked NO LATER than December 1, 1992 for the Phone section and January 15, 1993 for the CW section. Indicate phone or CW on the envelope.

2. An extension of up to one month may be given if requested by letter or other means. The granted extension must be confirmed by letter sent to one of the two contest directors, must state a legitimate reason, and the request must be received before the log mailing deadline. Logs postmarked after the extension deadline may be listed in the results but will be declared ineligible for an award.

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

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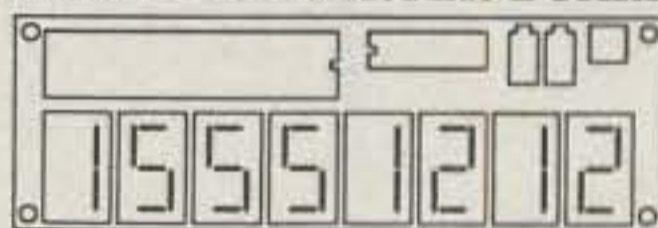
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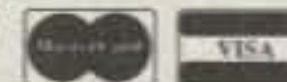
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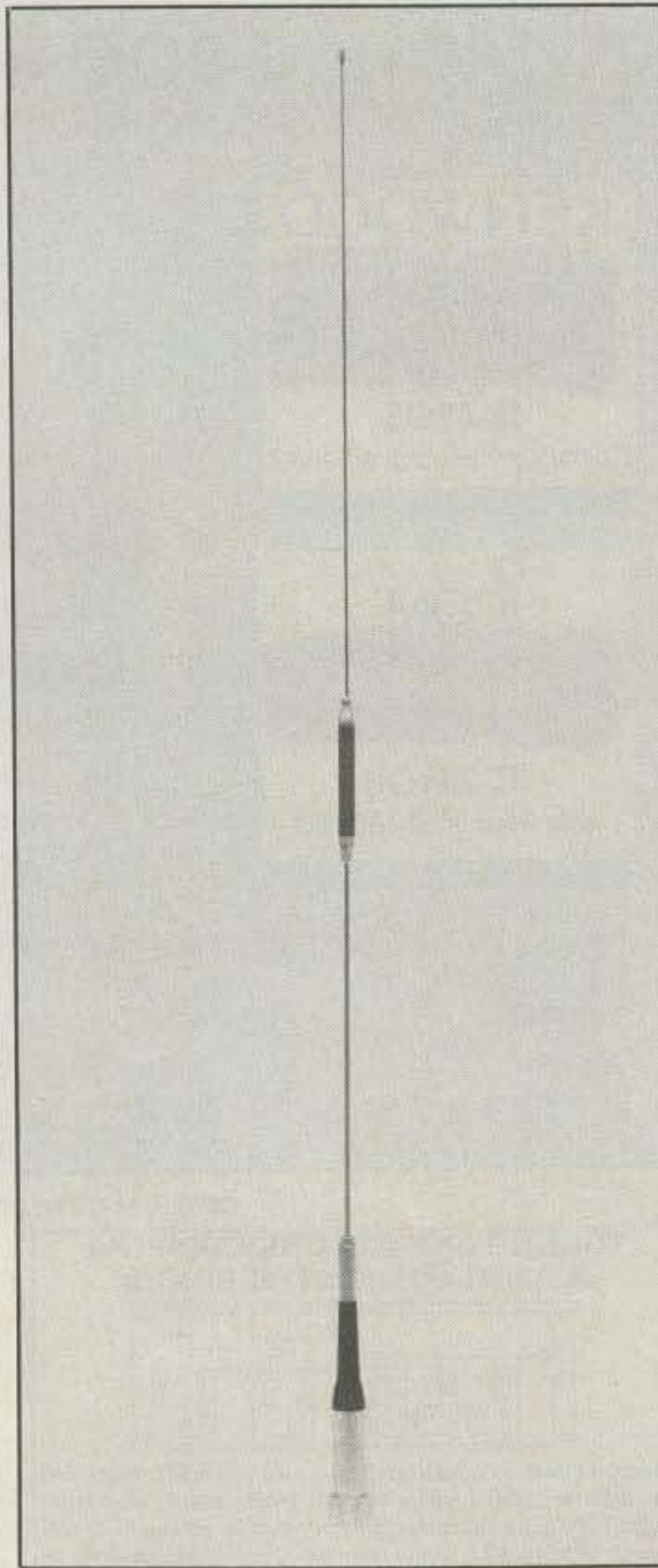
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For more information, contact NCG Company, 1275 North Grove St., Anaheim, CA 92806 (714-630-4541), or circle number 104 on the reader service card.

ACE Communications Receiver Downconverter

ACE Communications has announced an 800 MHz frequency downconverter which converts the frequency range of 806 to 900 MHz down



to 406 to 500 MHz. The unit measures 3" H x 2" W x 1 1/2" D. A new surface-mount prescaler/synthesizer referenced to a precision quartz crystal clock is used for frequency stability. BNC connectors, plus an internal battery, are used to facilitate versatility; the converter can operate on hand-held receivers.

Suggested retail price of the DC89 is \$89. For more information, contact ACE Communications, 10707 East 106th Street, Fishers, IN 46038 (317-842-7115), or circle number 109 on the reader service card.

Periphex Battery Packs For ICOM Handhelds

Periphex has announced longer operating time, higher capacity, lower cost batteries for the ICOM P2, P3, and P4 handheld radios. The BP-112S (7.2 volts, 800 maH) offers a 15% increase in operating time at low power, the



BP-114S (7.2 volts 1700 maH) offers a 45% increase in operating time at low power, and the BP-115S (12 volts, 800 maH) offers a 100% increase in operating time at 5 watts output. Also available is the standard BP-113 (7.2 volts, 1200 maH).

All battery packs include overcharge protection over-temperature protection, short-circuit protection, and a one-year warranty. They are completely compatible with appropriate ICOM chargers. For more information on these or other battery packs, contact Periphex, Inc., 115-1B Hurley Road, Oxford, CT 06478 (203-264-3985), or circle number 105 on the reader service card.



Low Receivers From EEB

Low receivers are now available in the U.S. and Canada. Quality design, construction, and performance are the trademarks of these British radios. HF150 is the latest hi-tech receiver, covering 30 kHz to 30 MHz, AM, SSB, and synchro detection. It is equipped with 2.5 and 7 kHz filters, 60 memories, and a large LCD readout. It accepts three antennas, balanced wire, whip, and 50 ohm. Optional keypad entry, 10-15 VDC power 150-250 ma, optional 8 nickel-cadmium

or alkaline AA batteries, and optional AC adapter. It has an all metal alloy case, 7.3" x 3.2" x 6.3", and weighs less than three pounds. The unit is available for under \$700.

For more information, contact Electronic Equipment Bank (EEB), 323 Mill Street N.E., Vienna, VA 22180 (800-368-3270), or circle number 102 on the reader service card.

YagiStress Antenna Modeling

YagiStress version 1.0, a new structural modeling software, determines the safe wind speeds for elements and boom of Yagi-Uda designs. During analysis, the antenna is rotated through 90 degrees of azimuth providing the total wind load of the entire antenna, torque on the mast and rotor, and stress in all boom sections for each direction. Other calculations provide best and worst case surface areas, antenna weight, turning radius, and the gravitational balance point and counterweight if required. Wind torque compensation devices may also be modeled.

The program contains a reference database of common tubing sizes and popular alloys, and comes with a starter set of antenna models. An operating manual is included on the diskette describing program operation and design techniques, and may be requested in MS Word, Word Perfect, and ASCII standard formats. YagiStress is written for IBM compatible PCs, 512K RAM with or without coprocessor. Price is \$50 (plus 7.25% in CA); include name, callsign, address, phone number, and specify documentation format. For more information, contact Kurt Andress, NI6W, 2538 S. Center St., Santa Ana, CA 92704 (714-957-3371) or circle number 108 on the reader service card.

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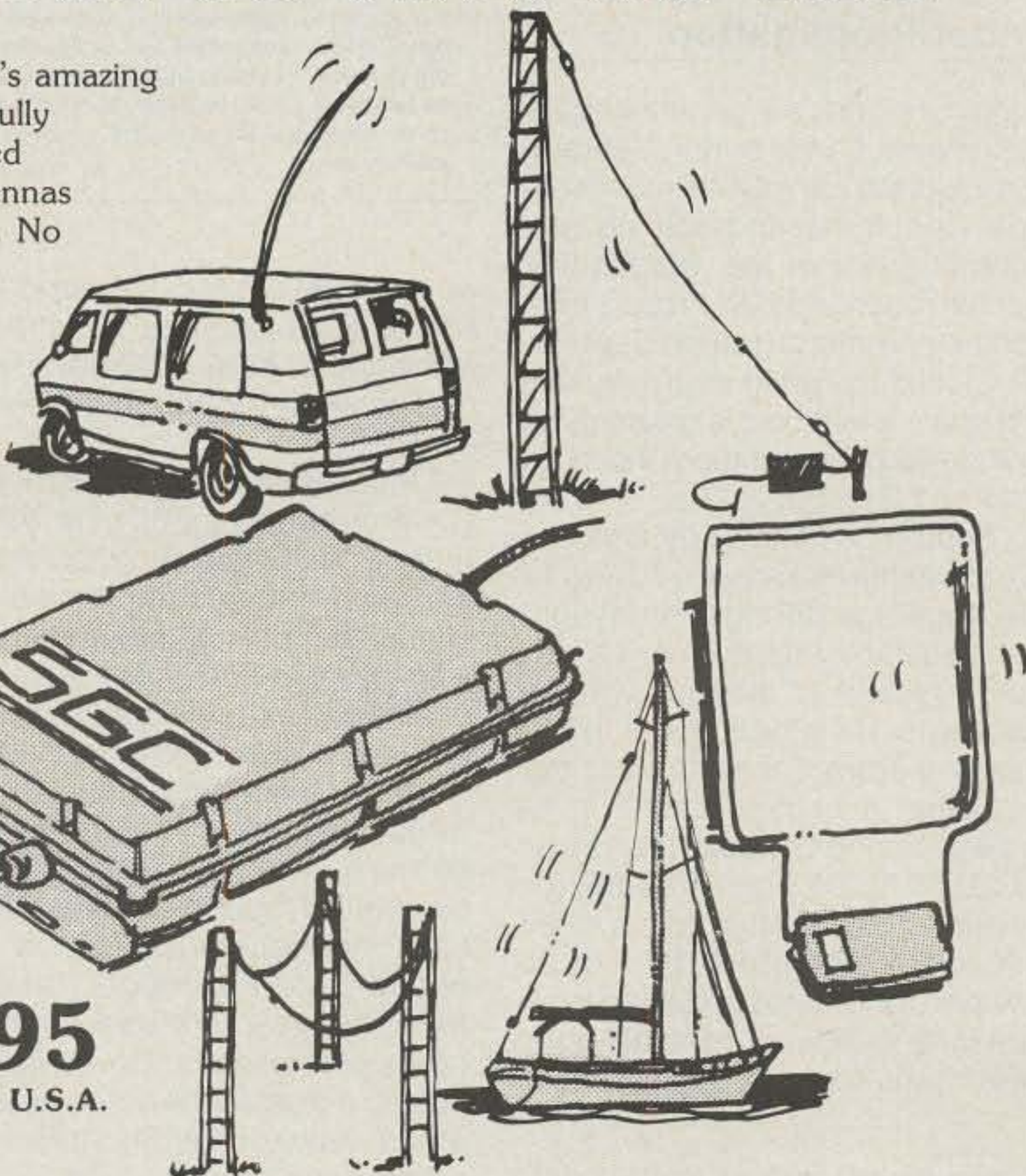
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THE SCIENCE OF PREDICTING RADIO CONDITIONS

Solar Cycle Progress

There is now convincing evidence that sunspot Cycle 22, which remained relatively constant for well over a year, is again declining.

Solar activity took a sharp drop during May. The Royal Observatory of Belgium reports a mean sunspot number of 73.5 for the month. This is the lowest monthly mean observed since May 1988. It results in a 12-month running smoothed sunspot of 138 centered on November 1991. This is a decline of four points from the October level. The solar cycle is measured by the level of smoothed sunspot number, which is an average of the mean values for the previous 12 months. A smoothed sunspot number of approximately 105 is forecast for September 1992.

As expected, there was a corresponding sharp decrease in 10.7 solar flux level during May. According to daily observations made at Penticton, B.C. by the Dominion Radio Astrophysical Observatory, the mean monthly level of 10.7 cm solar flux was 125.5 units. This results in a smoothed level of 195 centered on November 1991.

September Propagation

Propagation conditions are generally quite variable on the HF bands during September. This is usually a transitional month between typically summer and typically wintertime conditions. For this reason this month's column contains DX Propagation Charts for the one-month period September 15 to October 15, rather than the usual two-month span. This month's column also contains Short-Skip Propagation Charts for September and October.

During September and early October expect a noticeable increase in 10 and 12 meter DX openings during the daylight hours. A considerable improvement is also expected on 15 and 17 meters, with the bands opening for DX shortly after sunrise, and remaining open to one area of the world or another until past sunset. It will probably be a toss-up between the 15 and 20 meter bands for DX honors during the sunlight hours of September, with a slight edge in favor of 20 meters. Expect 20 meters to open for DX at sunrise and to remain open for a window of several hours, during which time it should be possible to

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LAST MINUTE FORECAST

Day-to-Day Conditions Expected for September 1992

Propagation Index	Expected Signal Quality			
	(4)	(3)	(2)	(1)
Above Normal: 4-5, 13, 20, 22	A	A	B	C
High Normal: 3, 6-7, 11, 14-15, 18-19, 21, 23, 30	A	B	C	C-D
Low Normal: 2, 10, 12, 16-17, 24-25, 28-29	B	C	D	D-E
Below Normal: 1, 8, 26	C	C-D	D-E	E
Disturbed: 9, 27	C-D	D	E	E

Where expected signal quality is: A—Excellent opening, exceptionally strong, steady signals greater than S9.
B—Good opening, moderately strong signals varying between S6 and S9, with little fading or noise.
C—Fair opening, signals between moderately strong and weak, varying between S3 and S6, with some fading and noise.
D—Poor opening, with weak signals varying between S1 and S3, and with considerable fading and noise.
E—No opening expected.
3 dB per S-unit.

HOW TO USE THIS FORECAST

1. Find propagation index associated with particular band opening from Propagation Charts appearing on the following pages.
2. With the propagation index, use the above table to find the expected signal quality associated with the band opening for any day of the month. For example, an opening shown in the charts with a propagation index of 3 will be fair-to-poor (C-D) on September 1st, good-to-fair (B-C) on the 2nd, good (B) on the 3rd, excellent (A) on the 4th and 5th, etc.

work in most areas of the world. Conditions should dip a bit during the high noon hours, with another peak in worldwide openings expected during the late afternoon and evening.

Once the sun has set, look for improved DX conditions on 30, 40, 80, and 160 meters. With increasing hours of darkness and decreasing static levels, openings should be more numerous on these bands, with stronger and quieter signals. Expect peak signals from a generally easterly direction at approximately midnight, and from the west at sunrise. Signals from other directions will generally remain strong during much of the night-time period. While 40 meters is expected to be the best band for world-wide DX during this period, be sure to check 20 and 30 meters for some good DX openings during the hours of darkness. Openings should be possible toward the south and equatorial areas, towards the South Pacific, and to other areas as well.

For short-skip propagation during Sep-

tember and October, use 80 meters during the day for openings shorter than 250 miles, and either 80 or 160 meters at night over this range. For openings between 250 and 750 miles, try 30 and 40 meters during the day and 80 meters at night. For distances between 750 and 1300 miles, the best bet should be 20 meters by day, 30 and 40 meters from sundown to midnight, and 80 meters from midnight to sunrise. For openings beyond 1300 miles, try either 15, 17, or 20 meters during the day, and 30 and 40 meters during the hours of darkness. Check 10 and 12 meters for some fairly good openings beyond 1300 miles during the afternoon hours, particularly when conditions are High Normal or better.

Equinoctial Propagation

September 22nd will mark the fall, or autumnal, equinox. On this day the sun will cross the plane of the earth's equator as it appears to travel from northern to southern skies, and the hours of daylight and darkness are equal in length throughout the world. Sunrise should take place at approximately 6 AM local time and sunset at about 6 PM local time, no matter where you are.

For a period of approximately two weeks before to about two weeks after the autumnal equinox, the characteristics of the ionosphere are similar over large areas of the world in comparison to the widely different characteristics that are observed during the summer and winter seasons. For this reason, the equinoctial periods (a similar period, called the spring equinox, occurs on March 21st) are generally considered to be the best times for DX openings between the temperate regions of the northern and southern hemispheres.

Gray-line DX conditions are also peak during equinoctial periods. These are long openings that occur during the sunrise and sunset periods as signals appear to follow the day-night terminator. Over the pole DX and long-path openings are expected to increase considerably during late September, and stations along the terminator should provide strong signal openings.

From mid-September through mid-October look for a considerable improvement in openings between the USA and South America, to the South Pacific area and Australasia, to southern Asia, and to



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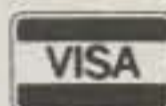
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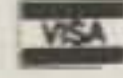
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HOW TO USE THE SHORT-SKIP CHARTS

1. In the Short-Skip Charts 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 charts. For the Alaska and Hawaii charts the predicted times of openings are found under the appropriate meter band column (10 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 80 meter openings.

2. The propagation index is the number that appears in parentheses () after the time of each predicted opening. In the Short-Skip Charts 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. In the Short-Skip Charts 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 HDT. To convert to standard time in other USA time zones add 2 hours in the PDT zone, 3 hours in the MDT zone, 4 hours in the CDT zone, and 5 hours in the EDT zone. Add 10 hours to convert from HDT to GMT. For example, when it is 12 noon in Honolulu, it is 14, or 2 PM, in Los Angeles; 17, or 5 PM, in Washington, DC; and 22 GMT. Time shown in the Alaska chart is given in GMT. To convert to standard time in other areas of the USA subtract 8 hours in the PDT zone, 7 hours in the MDT zone, 6 hours in the CDT zone, and 5 hours in the EDT zone. For example, at 20 GMT it is 15, or 3 PM, in New York City.

4. The Short-Skip Charts are 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 US Dept. of Commerce, Boulder, Colorado 80302.

40	08-10 (1-3) 10-12 (2-4) 12-18 (3-4) 18-19 (2-3) 19-21 (1-2) 21-06 (0-1) 06-08 (0-2)	08-10 (3-4) 10-12 (4-3) 12-16 (4-2) 16-18 (4-3) 18-19 (3-4) 19-21 (2-4) 21-23 (1-4) 23-03 (1-3) 03-06 (1-2) 06-08 (2-3)	08-10 (4-2) 10-12 (3-1) 12-16 (2-1) 16-18 (3-2) 18-19 (4-2) 19-20 (4-3) 20-23 (4) 23-03 (3-4) 03-06 (2-3) 06-08 (3-4)	08-10 (2-1) 10-16 (1-0) 16-18 (2-1) 18-19 (2) 19-20 (3) 20-21 (4-3) 21-03 (4) 03-05 (3-4) 05-06 (3) 06-08 (4-3)
80	07-09 (3-4) 09-12 (4) 12-19 (4-3) 19-23 (4) 23-05 (3-4) 05-07 (2-3)	07-09 (4-2) 09-12 (4-1) 12-17 (3-1) 17-19 (3-2) 19-21 (4-3) 21-05 (4) 05-06 (3-4) 06-07 (3)	07-09 (2-1) 09-17 (1-0) 17-19 (2-1) 19-21 (3-2) 21-22 (4-3) 22-04 (4) 04-06 (4-3) 06-07 (3-2)	07-09 (1) 09-17 (0) 17-19 (1) 19-21 (2) 21-22 (3-2) 22-04 (4-3) 04-06 (3-2) 06-07 (2-1)
160	17-19 (1-0) 19-21 (2-1) 21-06 (4) 06-08 (3-2) 08-10 (2-1) 10-12 (1-0)	18-20 (1-0) 20-21 (1) 21-03 (4-3) 03-06 (3-2) 06-08 (2-1) 08-10 (1-0)	20-21 (1-0) 21-23 (3-1) 23-03 (3) 03-06 (2-1) 06-08 (1)	21-23 (1-0) 23-03 (3-2) 03-06 (1) 06-08 (1-0)

HOW TO USE THE DX PROPAGATION CHARTS

1. Use chart appropriate to your transmitter location. The Eastern USA Chart can be used in the 1, 2, 3, 4, 8, KP4, KG4, and KV4 areas in the USA and adjacent call areas in Canada; the Central USA Chart in the 5, 9, and 0 areas; the Western USA Chart in the 6 and 7 areas; and with somewhat less accuracy in the KH6 and KL7 areas.

2. The predicted times of openings are found under the appropriate meter band column (10 through 80 meters) for a particular DX region, as shown in the left-hand column of the charts. An * indicates the best time to listen for 160 meter openings.

3. The propagation index is the number that appears in () after the time of each predicted opening. The index indicates the number of days during the month on which the opening is expected to take place as follows:

- (4) Opening should occur on more than 22 days
- (3) Opening should occur between 14 and 22 days
- (2) Opening should occur between 7 and 13 days
- (1) Opening should occur on less than 7 days

Refer to the "Last Minute Forecast" at the beginning of this column for the actual dates on which an opening with a specific propagation index is likely to occur, and the signal quality that can be expected.

4. Times shown in the charts are in the 24-hour system, where 00 is midnight; 12 is noon; 01 is 1 A.M.; 13 is 1 P.M., etc. Appropriate daylight time is used, not GMT. To convert to GMT, add to the times shown in the appropriate chart 7 hours in PDT Zone, 6 hours in MDT Zone, 5 hours in CDT Zone, and 4 hours in EDT Zone. For example, 14 hours in Washington, D.C. is 18 GMT. When it is 20 hours in Los Angeles, it is 03 GMT, etc.

5. The charts are based upon a transmitted power of 250 watts CW, or 1 kw, PEP on sideband, into a dipole antenna a quarter-wavelength above ground on 160 and 80 meters, and a half-wavelength above ground on 40 and 20 meters, and a wavelength above ground on 15 and 10 meters. For each 10 dB gain above these reference levels, the propagation index will increase by one level; for each 10 dB loss, it will lower by one level.

6. Propagation data contained in the charts has been prepared from basic data published by the Institute for Telecommunication Sciences of the U.S. Dept. of Commerce, Boulder, Colorado 80302.

ALASKA September & October 1992 Openings Given in GMT

TO:	10 Meters	15 Meters	20 Meters	40/80 Meters
Eastern USA	19-22 (1)	17-19 (1) 19-23 (2) 23-00 (1)	12-15 (1) 18-21 (1) 21-23 (2) 23-01 (3) 01-02 (2) 02-04 (1)	08-12 (1)
Central USA	20-00 (1)	17-19 (1) 19-21 (2) 21-23 (3) 23-01 (2) 01-02 (1)	13-22 (1) 22-00 (2) 00-03 (3) 03-04 (2) 04-06 (1)	08-11 (1) 11-13 (2) 13-14 (1) 11-13 (1)*
Western USA	20-22 (1) 22-01 (2) 01-02 (1)	18-21 (1) 21-22 (2) 22-00 (4) 00-01 (3) 01-02 (2) 02-03 (1)	16-18 (1) 18-20 (3) 20-00 (2) 00-02 (3) 02-03 (4) 03-04 (3) 04-05 (2) 05-07 (1)	08-11 (1) 11-14 (2) 14-16 (1) 11-14 (1)*

September 15 - October 15, 1992 Time Zone: EDT (24-Hour Time) EASTERN USA TO:

	10 Meters	15 Meters	20 Meters	40/80 Meters
Western & Central Europe & North Africa	09-11 (1) 11-12 (2) 12-14 (1)	08-09 (1) 09-11 (2) 11-14 (4) 14-15 (3) 15-16 (2) 16-17 (1)	03-04 (1) 04-06 (2) 06-10 (3) 10-12 (2) 12-15 (3) 15-17 (4) 17-19 (3) 19-20 (2) 20-21 (1)	18-19 (1) 19-21 (2) 21-23 (3) 23-02 (4) 02-03 (3) 03-04 (2) 04-05 (1) 20-22 (1)* 22-01 (2)* 01-04 (1)*
Northern Europe & European USSR	09-12 (1)	08-09 (1) 09-10 (2) 10-12 (3) 12-13 (2) 13-15 (1)	03-06 (1) 06-08 (2) 08-11 (3) 11-13 (2) 13-17 (3) 17-18 (2) 18-20 (1)	18-20 (1) 20-04 (2) 04-06 (1) 21-04 (1)*
Eastern Mediterranean & Middle East	10-13 (1)	08-09 (1) 09-12 (2) 12-14 (3) 14-16 (2) 16-17 (1)	07-09 (2) 09-15 (1) 15-17 (2) 17-20 (3) 20-21 (2) 21-23 (1) 23-01 (2) 01-07 (1)	19-21 (1) 21-00 (2) 00-01 (1) 22-23 (1)*
Western Africa	11-13 (1) 13-14 (2) 14-16 (3) 16-17 (2) 17-18 (1)	07-09 (1) 09-13 (2) 13-15 (3) 15-17 (4) 17-18 (3) 18-19 (2) 19-20 (1)	05-08 (2) 08-15 (1) 15-17 (2) 17-18 (3) 18-21 (4) 21-23 (3) 23-03 (2) 03-05 (1)	20-23 (1) 23-02 (2) 02-04 (1) 00-03 (1)*
Eastern & Central Africa	13-15 (1) 15-17 (2) 17-18 (1)	08-09 (1) 09-13 (2) 13-15 (3) 15-17 (4) 17-18 (3) 18-19 (2) 19-20 (1)	12-14 (1) 14-17 (2) 17-21 (3) 21-01 (2) 01-02 (1)	20-02 (1) 00-01 (1)*

CQ Short-Skip Propagation Chart September & October 1992 Local Daylight Savings Time At Path Mid-Point (24-Hour Time System)

Band (Meters)	Distance Between Stations (Miles)			
	50-250	250-750	750-1300	1300-2300
10	N/L	10-21 (0-1)	08-10 (1) 10-13 (1-2) 13-15 (1-3) 15-16 (1-2) 16-21 (0-1)	08-10 (1) 10-13 (2) 13-15 (3) 15-16 (2-3) 16-17 (1-2) 17-19 (1) 19-21 (1-0)
15	N/L	08-10 (0-1) 10-15 (0-2) 15-21 (0-1)	08-09 (1) 09-10 (1-2) 10-15 (2-4) 15-17 (1-4) 17-18 (1-3) 18-20 (1-2) 20-21 (1) 21-08 (0-1)	08-09 (1) 09-10 (2-3) 10-11 (4-3) 11-17 (4) 17-18 (3) 18-19 (2-3) 19-20 (2) 20-21 (1) 21-08 (1-0)
20	12-14 (0-1) 14-16 (0-2) 16-22 (0-1)	08-09 (0-1) 09-10 (0-2) 10-11 (0-3) 11-12 (0-4) 12-14 (1-4) 14-16 (2-4) 16-18 (1-4) 18-19 (1-3) 19-22 (1-2) 22-08 (0-1)	06-08 (1-2) 08-09 (1-3) 09-10 (2-4) 10-11 (3-4) 11-18 (4) 18-19 (3-4) 19-21 (3-4) 21-22 (2-3) 22-00 (1-2) 00-06 (1)	06-08 (2) 08-09 (3) 09-14 (4-2) 14-16 (4-3) 16-19 (4) 19-21 (3-4) 21-22 (3) 22-23 (2-3) 23-00 (2) 00-06 (1)

HAWAII September & October 1992 Openings Given in Hawaiian Standard Time

TO:	10 Meters	15 Meters	20 Meters	40/80 Meters
Eastern USA	08-10 (1) 10-13 (2) 13-14 (1)	07-11 (1) 11-12 (2) 12-14 (3) 14-15 (2) 15-16 (1)	11-13 (1) 13-14 (2) 14-18 (3) 18-20 (2) 20-04 (1) 04-07 (2) 07-08 (1)	18-20 (1) 20-22 (2) 22-00 (3) 00-02 (2) 02-03 (1) 10-21 (1)* 21-00 (2)* 00-01 (1)*
Central USA	08-10 (1) 10-14 (2) 14-16 (1)	07-10 (1) 10-12 (2) 12-16 (3) 16-17 (2) 17-18 (1)	09-13 (1) 13-14 (2) 14-15 (3) 15-18 (4) 18-19 (3) 19-21 (2) 21-04 (1) 04-09 (2)	18-20 (1) 20-22 (2) 22-02 (3) 02-04 (2) 04-05 (1) 19-21 (1)* 21-00 (2)* 00-02 (1)*
Western USA	08-09 (1) 09-10 (2) 10-15 (3) 15-16 (2) 16-17 (1)	07-09 (1) 09-10 (2) 10-13 (3) 13-15 (4) 15-16 (3) 16-17 (2) 17-19 (1)	10-12 (2) 12-14 (3) 14-18 (4) 18-20 (3) 20-00 (2) 00-05 (1) 05-06 (2) 06-10 (3)	18-19 (1) 19-20 (2) 20-02 (4) 02-04 (3) 04-05 (2) 05-06 (1) 19-20 (1)* 20-22 (2)* 22-02 (3)* 02-04 (2)* 04-05 (1)*

Southern Africa	09-11 (1) 11-13 (2) 13-14 (1)	08-11 (1) 11-12 (2) 12-13 (3) 13-15 (4) 15-16 (3) 16-17 (2) 17-18 (1)	14-16 (1) 16-19 (2) 19-23 (3) 23-01 (2) 01-02 (1) 06-08 (1)	19-22 (1) 22-00 (2) 00-02 (1) 23-01 (1)*	Caribbean, Central America & Northern Countries of South America	10-11 (1) 11-14 (2) 14-17 (4) 17-18 (2) 18-19 (1)	08-09 (1) 09-10 (2) 10-13 (3) 13-18 (4) 18-19 (3) 19-20 (2) 20-21 (1)	04-06 (1) 06-07 (2) 07-08 (3) 08-10 (4) 10-15 (2) 15-17 (3) 17-22 (4) 22-03 (3) 03-04 (2)	19-20 (1) 20-21 (2) 21-04 (4) 04-06 (3) 06-07 (2) 07-08 (1) 21-23 (1)* 23-04 (2)* 04-06 (1)*	Northern Europe & European USSR	09-11 (1)	08-10 (1) 10-12 (2) 12-14 (1)	06-07 (1) 07-10 (2) 10-12 (1) 12-13 (2) 13-15 (3) 15-16 (2) 16-18 (1) 22-01 (1)	20-23 (1) 23-01 (2) 01-02 (1) 22-01 (1)*
Central & South Asia	09-11 (1) 19-21 (1)	09-10 (1) 10-12 (2) 12-13 (1) 20-22 (1)	07-08 (1) 08-10 (2) 10-12 (1) 17-19 (1) 19-22 (2) 22-00 (1)	05-07 (1) 20-23 (1)	Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	09-10 (1) 10-12 (2) 12-14 (1) 14-15 (2) 15-17 (4) 17-18 (3) 18-19 (1)	08-09 (1) 09-11 (2) 11-14 (1) 14-16 (2) 16-17 (3) 17-19 (4) 19-20 (3) 20-21 (2) 21-22 (1)	11-16 (1) 16-17 (2) 17-20 (3) 20-01 (4) 01-03 (3) 03-04 (2) 04-07 (1) 07-08 (2) 08-10 (3) 10-11 (2)	21-00 (1) 00-05 (2) 05-07 (1) 01-06 (1)*	Eastern Mediterranean & Middle East	10-12 (1)	08-10 (1) 10-13 (2) 13-14 (1)	06-07 (1) 07-09 (2) 09-15 (1) 15-18 (2) 18-21 (1) 21-23 (2) 23-00 (1)	20-23 (1) 21-23 (1)*
Southeast Asia	11-13 (1) 18-20 (1)	09-11 (1) 14-16 (1) 18-19 (1) 19-20 (2) 20-21 (1)	06-07 (1) 07-10 (2) 10-12 (1) 15-18 (1) 20-21 (1) 21-23 (2) 23-01 (1)	06-08 (1)	McMurdo Sound Antarctica	16-18 (1)	12-15 (1) 15-18 (2) 18-19 (3) 19-20 (2) 20-21 (1)	16-18 (1) 18-21 (2) 21-23 (3) 23-01 (2) 01-03 (1) 07-09 (1)	23-01 (1) 01-05 (2) 04-06 (1) 04-06 (1)*	Western Africa	11-13 (1) 13-15 (2) 15-17 (1)	07-10 (1) 10-13 (2) 13-15 (3) 15-17 (4) 17-18 (2) 18-19 (1)	05-06 (1) 06-08 (2) 08-15 (3) 15-17 (2) 17-18 (3) 18-19 (4) 19-22 (3) 22-00 (2) 00-01 (1)	20-23 (1) 23-01 (2) 01-02 (1) 23-01 (1)*
Far East	18-20 (1)	10-12 (1) 16-18 (1) 18-20 (2) 20-21 (1)	07-08 (1) 08-10 (2) 10-12 (1) 17-20 (1) 20-22 (2) 22-00 (1)	05-08 (1) 18-19 (1) 06-07 (1)*						Eastern & Central Africa	12-15 (1)	09-11 (1) 11-15 (2) 15-16 (3) 16-17 (2) 17-18 (1)	13-15 (1) 15-17 (2) 17-19 (3) 19-21 (2) 21-22 (1)	21-00 (1)
South Pacific & New Zealand	09-15 (1) 15-17 (2) 17-19 (3) 19-20 (2) 20-21 (1)	09-14 (1) 14-18 (2) 18-20 (3) 20-21 (2) 21-22 (1)	08-10 (3) 10-12 (2) 12-20 (1) 20-23 (2) 23-03 (3) 03-07 (1)	01-02 (1) 02-03 (2) 03-06 (3) 06-08 (2) 08-09 (1) 03-05 (1)* 05-07 (2)* 07-08 (1)*						Southern Africa	10-11 (1) 11-13 (2) 13-14 (1)	07-09 (1) 09-12 (2) 12-13 (3) 13-14 (4) 14-15 (3) 15-16 (2) 16-17 (1)	06-08 (2) 08-14 (1) 14-16 (2) 16-19 (3) 19-21 (2) 21-23 (1) 23-01 (2) 01-02 (1)	20-21 (1) 21-23 (2) 23-01 (1) 21-23 (1)*
Australasia	10-12 (1) 16-17 (1) 17-19 (2) 19-20 (1)	09-11 (1) 14-17 (1) 17-18 (2) 18-20 (3) 20-21 (2) 21-22 (1)	07-09 (2) 09-11 (3) 11-13 (2) 13-16 (1) 16-18 (2) 18-21 (1) 21-23 (2) 23-01 (3) 01-03 (2) 03-07 (1)	02-04 (1) 04-06 (2) 06-07 (3) 07-08 (2) 08-09 (1) 04-05 (1)* 05-06 (2)* 06-07 (1)*						Central & South Asia	09-11 (1) 18-20 (1)	09-11 (1) 18-19 (1) 19-21 (2) 21-22 (1)	07-08 (1) 08-10 (2) 10-12 (1) 17-19 (1) 19-21 (2) 21-23 (1)	06-08 (1) 19-21 (1)

**Time Zones: CDT & MDT
(24-Hour Time)
CENTRAL USA TO:**

	10 Meters	15 Meters	20 Meters	40/80 Meters
Western & Central Europe & North Africa	09-12 (1)	08-10 (1) 10-11 (2) 11-13 (3) 13-14 (2) 14-16 (1)	06-07 (1) 07-10 (2) 10-13 (3) 13-14 (2) 14-16 (2) 16-17 (3) 17-20 (2) 20-23 (1)	18-20 (1) 20-23 (2) 23-01 (3) 01-02 (2) 02-03 (1) 21-23 (1)* 23-01 (2)* 01-02 (1)*

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Southeast Asia	10-12 (1) 18-20 (1)	09-11 (1) 14-17 (1) 17-19 (2) 19-21 (1)	06-08 (1) 08-10 (2) 10-13 (1) 16-21 (1) 21-00 (2) 00-02 (1)	05-09 (1)
Far East	17-18 (1) 18-19 (2) 19-20 (1)	10-16 (1) 16-18 (2) 18-20 (3) 20-21 (2) 21-22 (1)	07-08 (1) 08-10 (3) 10-12 (2) 17-21 (1) 21-00 (2) 00-02 (1)	03-05 (1) 05-08 (2) 08-09 (1) 06-08 (1)*
South Pacific & New Zealand	13-15 (1) 15-17 (2) 17-19 (3) 19-20 (2) 20-21 (1)	09-13 (1) 13-17 (2) 17-19 (4) 19-20 (3) 20-21 (2) 21-23 (1)	07-08 (2) 08-11 (3) 11-13 (2) 13-18 (1) 18-20 (2) 20-22 (3) 22-00 (4) 00-01 (3) 00-03 (2) 03-07 (1)	00-01 (1) 01-06 (3) 06-08 (4) 08-09 (2) 09-10 (1) 09-10 (1)* 04-07 (2)* 07-08 (1)*
Australasia	14-16 (1) 16-18 (2) 18-19 (3) 19-20 (2) 20-21 (1)	09-11 (1) 13-17 (1) 17-19 (2) 19-20 (3) 20-21 (2) 21-22 (1)	16-18 (2) 18-21 (1) 21-23 (2) 23-03 (3) 03-04 (2) 04-07 (1) 07-09 (2) 09-11 (3) 11-13 (2) 13-16 (1)	02-03 (1) 03-05 (2) 05-07 (3) 07-08 (2) 08-09 (1) 05-06 (1)* 06-07 (2)* 07-08 (1)*
Caribbean, Central America & Northern Countries of South America	09-10 (1) 10-11 (2) 11-13 (3) 13-16 (4) 16-18 (2) 18-19 (1)	07-08 (1) 08-10 (2) 10-13 (3) 13-17 (4) 17-18 (3) 18-20 (2) 20-21 (1)	07-10 (4) 10-12 (3) 12-15 (2) 15-17 (3) 17-22 (4) 22-01 (3) 01-03 (2) 03-05 (1) 05-07 (2)	19-20 (1) 20-21 (2) 21-01 (3) 01-05 (4) 05-06 (3) 06-07 (2) 07-08 (1) 20-23 (1)* 23-05 (2)* 05-06 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	09-10 (1) 10-13 (2) 13-15 (3) 15-17 (4) 17-18 (2) 18-19 (1)	07-08 (1) 08-11 (3) 11-15 (2) 15-16 (3) 16-19 (4) 19-20 (3) 20-21 (2) 21-22 (1)	04-08 (1) 08-10 (2) 10-16 (1) 16-18 (2) 18-20 (3) 20-23 (4) 23-02 (3) 02-04 (2)	21-00 (1) 00-04 (2) 04-06 (1) 01-05 (1)*
McMurdo Sound, Antarctica	15-18 (1)	11-16 (1) 16-18 (2) 18-19 (3) 19-20 (2) 20-21 (1)	08-09 (1) 17-19 (1) 19-20 (2) 20-23 (3) 23-00 (2) 00-03 (2)	00-03 (1) 03-05 (2) 05-07 (1) 04-06 (1)*

**Time Zones: PDT
(24-Hour Time)
WESTERN USA TO:**

	10 Meters	15 Meters	20 Meters	40/80 Meters
Western Europe & North Africa	09-11 (1)	08-09 (1) 09-12 (2) 12-14 (1)	06-07 (1) 07-10 (2) 10-13 (1) 13-14 (2) 14-16 (3) 16-17 (2) 17-19 (1)	20-21 (1) 21-23 (2) 23-00 (1) 21-23 (1)*
Central & Northern Europe & European USSR	NIL	08-09 (1) 09-11 (2) 11-13 (1)	06-07 (1) 07-09 (2) 09-12 (1) 12-14 (2) 14-16 (2) 21-23 (1)	20-00 (1) 20-22 (1)*
Eastern Mediterranean & Middle East	NIL	08-09 (1) 09-11 (2) 11-12 (1) 20-22 (1)	06-07 (1) 07-10 (2) 10-13 (1) 15-16 (1) 19-20 (1) 20-22 (2) 22-23 (1)	20-23 (1)
Western & Central Africa	11-12 (1) 12-14 (2) 14-15 (1)	08-10 (1) 10-13 (2) 13-16 (3) 16-17 (2) 17-18 (1)	06-07 (1) 07-09 (2) 09-14 (1) 14-15 (2) 15-16 (3) 16-18 (4) 18-20 (3) 20-22 (2) 22-00 (1)	21-00 (1)

Eastern Africa	11-14 (1)	10-13 (1) 13-16 (2) 16-17 (1)	07-09 (1) 12-15 (1) 15-19 (2) 19-21 (1)	20-22 (1)
Southern Africa	10-13 (1)	07-09 (1) 09-11 (2) 11-13 (3) 13-15 (2) 15-16 (1)	05-07 (1) 07-09 (2) 09-10 (1) 12-14 (1) 14-16 (2) 16-18 (3) 18-19 (2) 19-22 (1) 22-00 (2) 00-01 (1)	19-22 (1)
Central & South Asia	17-19 (1)	08-11 (1) 16-17 (1) 17-19 (2) 19-21 (1)	07-08 (1) 08-11 (2) 11-13 (1) 17-19 (1) 19-21 (2) 21-23 (1)	06-08 (1) 19-21 (1)
Southeast Asia	16-19 (1)	10-11 (1) 11-13 (2) 13-16 (1) 16-18 (2) 18-21 (1)	05-07 (1) 07-09 (3) 09-11 (2) 11-12 (1) 21-23 (1) 23-01 (2) 01-02 (1)	01-03 (1) 03-06 (2) 06-08 (1) 03-06 (1)*
Far East	16-17 (1) 17-18 (2) 18-19 (1)	14-15 (1) 15-17 (2) 17-19 (3) 19-20 (2) 20-21 (1)	07-08 (1) 08-09 (2) 09-10 (4) 10-13 (3) 13-15 (2) 15-20 (1) 20-22 (2) 22-00 (3) 00-01 (2) 01-03 (1)	01-03 (1) 03-07 (2) 07-08 (3) 08-09 (1) 03-05 (1)* 05-07 (2)* 07-08 (1)*
South Pacific & New Zealand	11-13 (1) 13-15 (2) 15-17 (3) 17-19 (2) 19-20 (1)	09-11 (1) 11-13 (3) 13-17 (2) 17-19 (3) 19-21 (4)	13-19 (1) 19-21 (2) 21-23 (3) 23-01 (4) 01-03 (3) 03-05 (2) 05-06 (1) 06-07 (2) 07-09 (3) 09-13 (2)	21-22 (1) 22-23 (2) 23-00 (3) 00-05 (4) 05-07 (3) 07-08 (2) 08-09 (1) 23-02 (1)* 02-06 (2)* 06-07 (1)*
Australasia	14-15 (1) 15-17 (2) 17-19 (3) 19-20 (2) 20-21 (1)	08-10 (1) 13-17 (1) 17-19 (2) 19-21 (3) 21-22 (2) 22-23 (1)	19-21 (1) 21-23 (2) 23-01 (4) 01-03 (2) 03-04 (1) 04-07 (1) 07-08 (2) 08-10 (3) 10-12 (2) 12-13 (1)	01-02 (1) 02-03 (2) 03-06 (3) 06-08 (2) 08-09 (1) 02-04 (1)* 04-06 (2)* 06-07 (1)*
Caribbean, Central America & Northern Countries of South America	09-10 (1) 10-11 (2) 11-13 (3) 13-15 (4) 15-16 (3) 16-17 (2) 17-18 (1)	07-08 (1) 08-10 (3) 10-12 (2) 12-15 (3) 15-17 (4) 17-18 (3) 18-19 (2) 19-20 (1)	06-08 (4) 08-10 (3) 10-15 (2) 15-17 (3) 17-23 (4) 23-01 (3) 01-03 (2) 03-05 (1) 05-06 (2)	19-21 (1) 21-02 (3) 02-04 (2) 04-07 (1) 20-22 (1)* 22-03 (2)* 03-05 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	09-10 (1) 10-12 (2) 12-14 (3) 14-16 (4) 16-17 (3) 17-18 (2)	07-08 (1) 08-09 (2) 09-13 (1) 13-15 (2) 15-16 (3) 16-19 (4) 19-20 (2) 20-21 (1)	06-15 (1) 15-17 (2) 17-19 (3) 19-23 (4) 23-01 (3) 01-06 (2)	21-23 (1) 23-02 (2) 02-04 (1) 00-03 (1)*
McMurdo Sound, Antarctica	14-18 (1)	11-15 (1) 15-17 (2) 17-19 (3) 19-20 (2) 20-21 (1)	08-10 (1) 17-19 (1) 19-20 (2) 20-23 (3) 01-03 (1)	01-03 (1) 03-05 (2) 05-07 (1) 03-06 (1)*

*Indicates best times to listen for 80 meter openings. Openings on 160 meters are also likely to occur during those times when 80 meter openings are shown with a propagation index of (2) or higher.
**Indicates best times to listen for F-2 layer openings on 6 meters.
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.

southern Africa and Antarctica. The improvement should take place on all HF bands, but it will be most noticeable on 15, 17, and 20 meters during the day and 30 and 40 meters at night.

VHF Ionospheric Openings

Solar activity is still high enough to support some F2-layer DX openings on the 6 meter band from the USA to some areas of the world. Conditions should favor openings into the southern hemisphere, with the best times being late afternoon hours. This month's DX Propagation Charts contain forecasts for 6 meter DX openings.

A seasonal improvement is expected for trans-equatorial (TE) openings on 6 meters, mainly between southern locations in the USA and South America. The best time to look for TE openings is between 8 and 11 PM local standard time. While F2-layer openings on 6 meters are generally steady and quite strong, TE openings are usually weak, and often accompanied by severe flutter fading.

Although sporadic-E ionization should fall off considerably during September, compared to summer levels, some 6 meter short-skip openings should still be possible over distances ranging between approximately 1000 and 1300 miles. The best time to check for such openings is before noon and again during the early evening hours.

Although no major meteor showers are expected during September, some minor ones may permit meteor-scatter-type openings on the VHF bands during the first two or three days of the month, and again for several days after September 20.

There is often a seasonal increase in auroral activity during the equinoctial periods, so expect some 6 and 12 meter auroral-type short-skip openings during the month. The best possibilities for such openings should coincide with periods of expected storminess on the HF bands. Check the Last Minute Forecast at the beginning of this column for those days during September that are expected to be Below Normal or Disturbed.

CQ DX Contest Special 1992

The 1992 contest weekends will mark the 41st consecutive CQ WW DX Contest for which this column has contained special propagation forecasts. This year's contest weekends are:

October 24-25—Phone Section
November 28-29—CW Section
In the tradition of the past 41 years, there will appear in next month's Propagation column a special, comprehensive forecast which will focus on both sections of the contest. Besides the latest updated propagation predictions to all areas of the world, the column will also contain pointers for scoring as many points as possible.

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DR-599T 2m/70cm Remotable Twinband FM Mobile 45W VHF-35W UHF. 144/440MHz tx, 138-174MHz and 420-470MHz rx (mod. for aircraft band rx and MARS/CAP tx). 28 memories. Detachable control head (optional kit). Remote controls from any DTMF capable 2m or 70cm xcvr (decoder required). Separate VHF/UHF outputs. Full duplex cross band repeat function, simultaneous receive on both bands. Dual LCD, separate vol/squelch controls for both bands. CTCSS & DTMF encoder. 5 1/2" w x 2" h x 7" d, 3 3/4 lbs **★ \$624⁹⁵**

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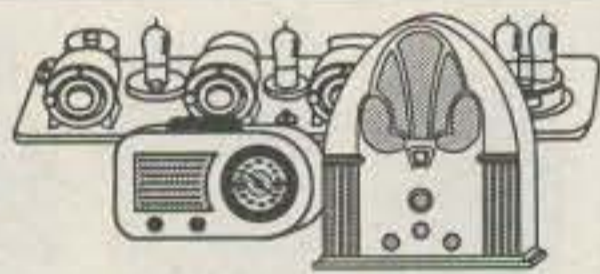
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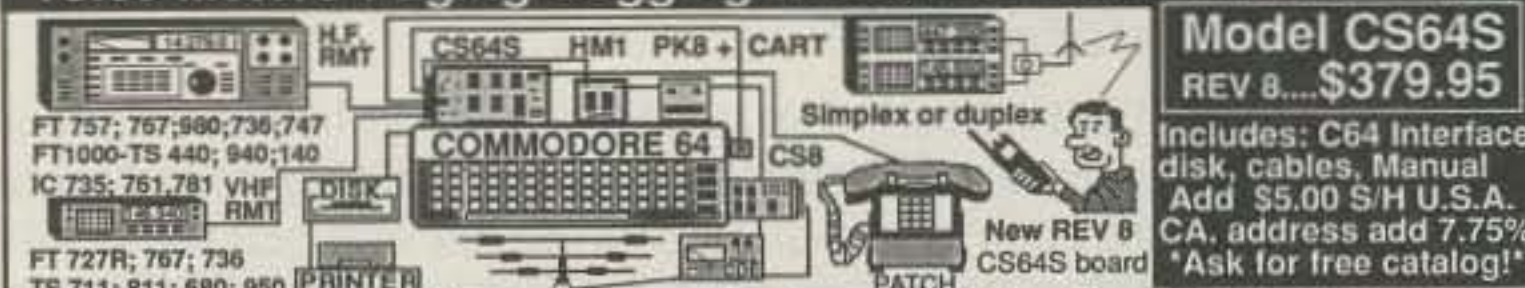
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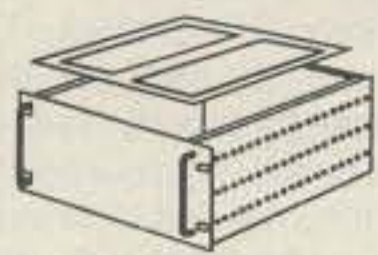
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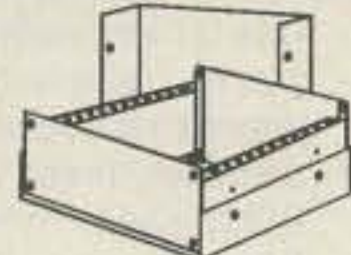
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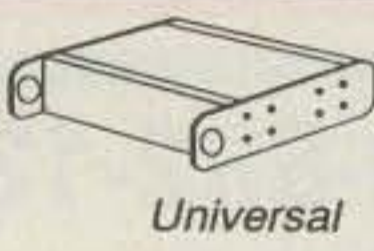


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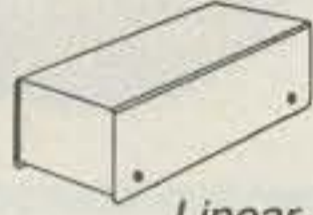
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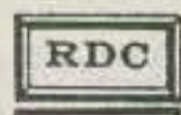
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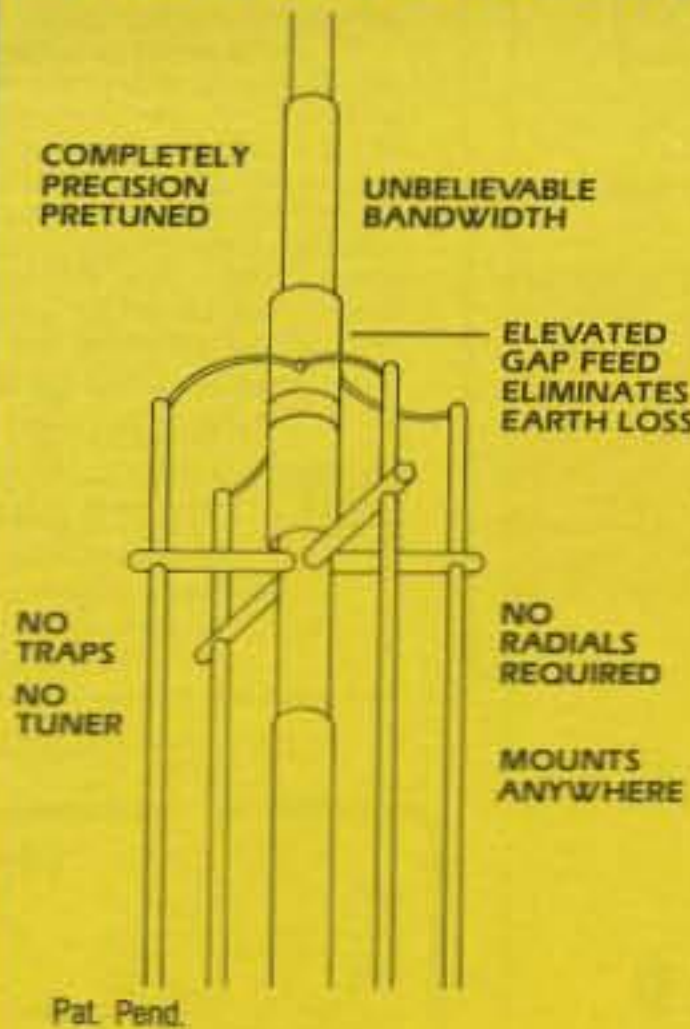
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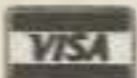
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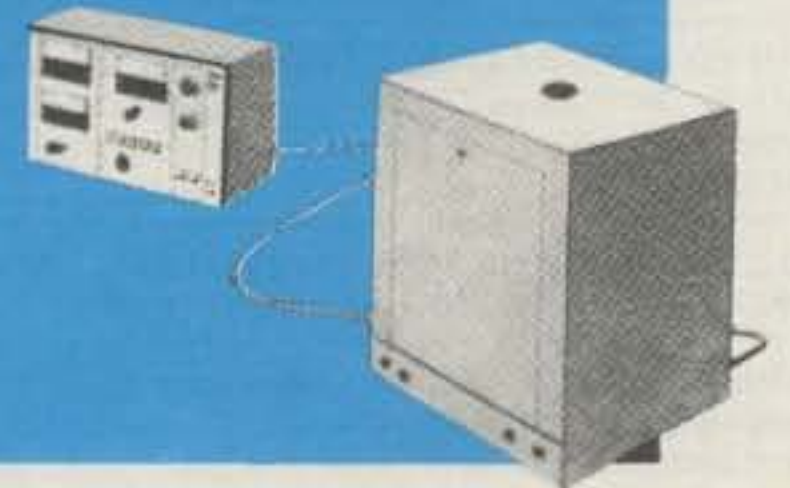
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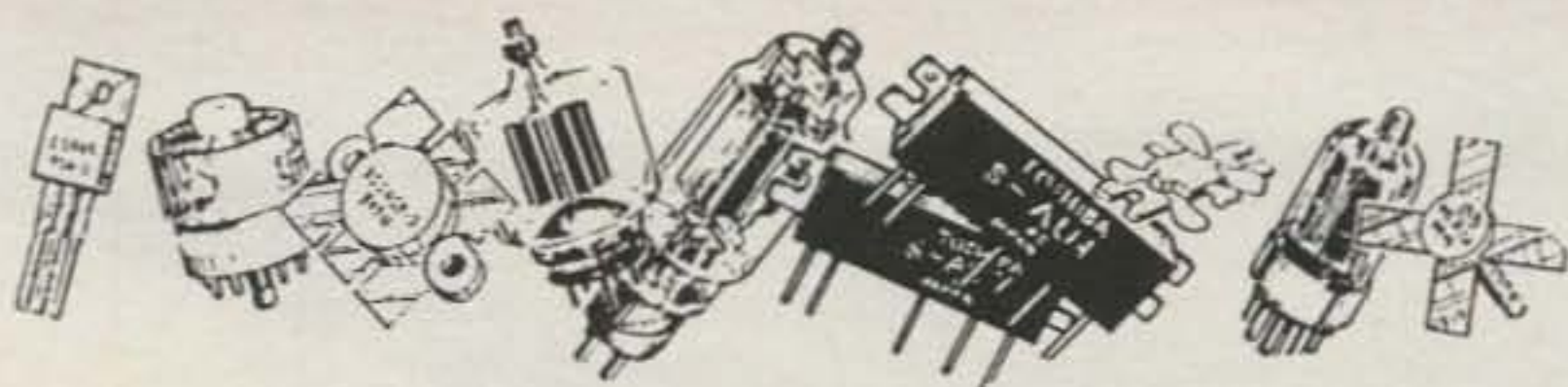
It is rugged, reliable, remotely tuned and offers full power and efficiency on all bands between 1.8 and 24 MHz. Frequencies above 24 MHz are available on export models. The amplifier offers 6 memory channels for automatic tuning on your choice of frequencies. A small, light-weight, remote control cabinet sits at the operating position, while the amplifier itself can be across the room, in a closet, or in the next room. We manufacture many other HF, VHF, and UHF amplifiers, all still available as before. All domestic and foreign inquiries are invited. Write for full specifications on the 3K Ultra or for our complete amplifier information packet. Don't wait any longer to own the amplifier you have always wanted.

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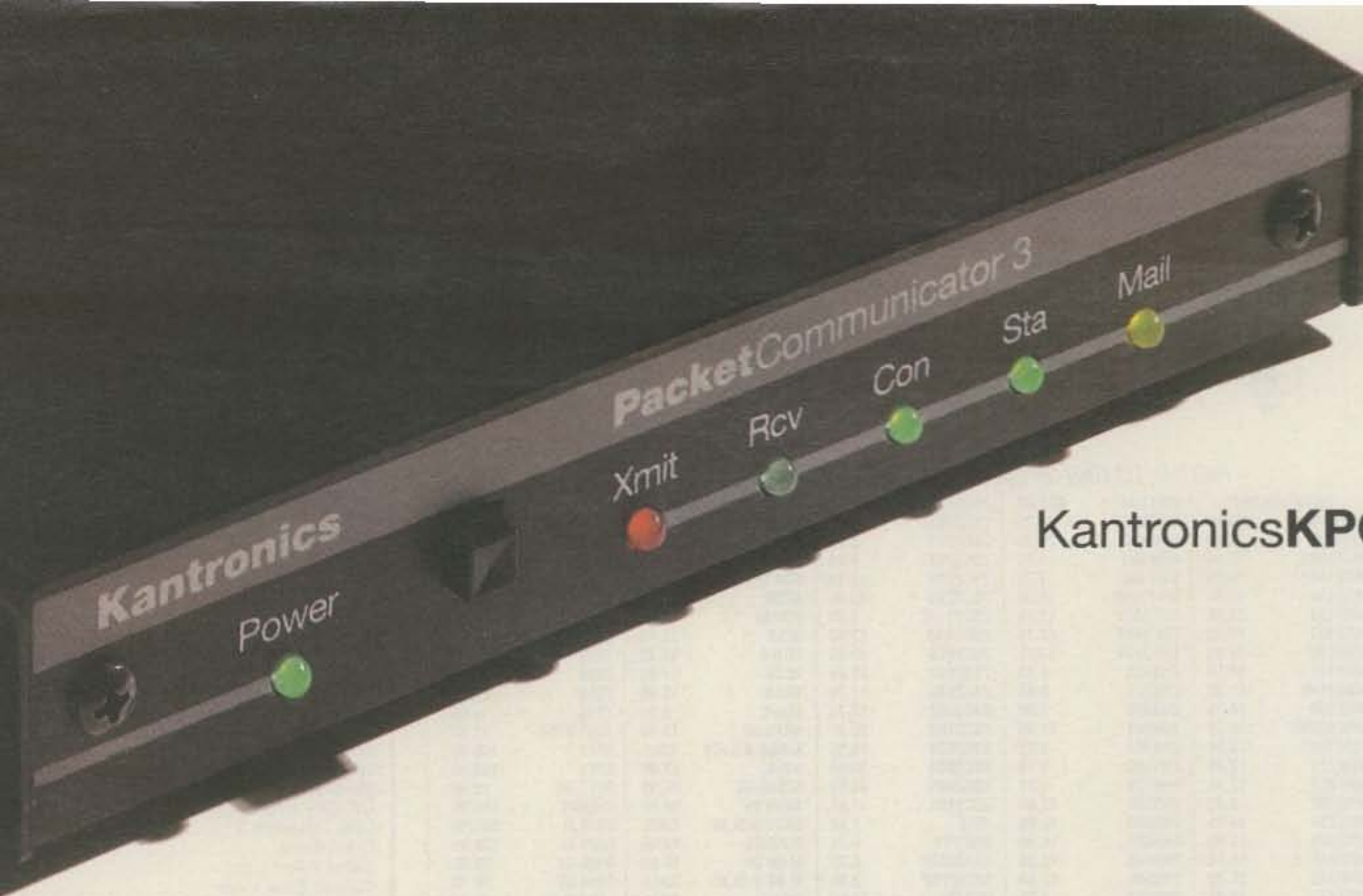
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Kantronics KPC3

Low Power High Performance

Designed for user friendly operation, but with an eye to the advanced packeteer too, the Kantronics Packet Communicator 3 delivers high TNC performance with low power in a compact package.

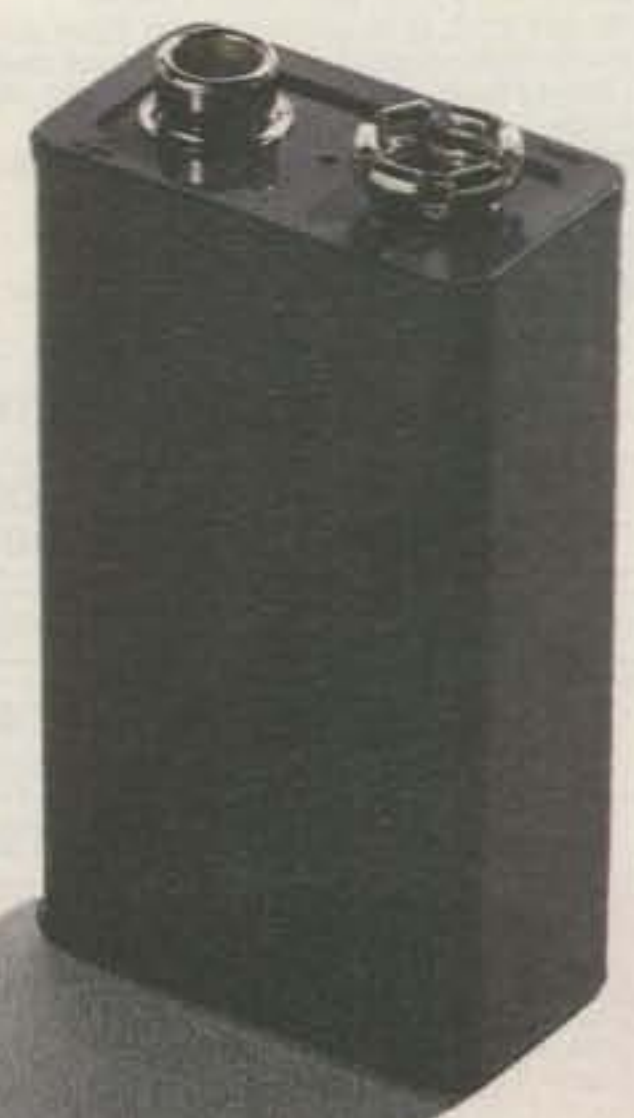
The **KPC3** features an improved **DualLevel™** command set. The **NEWUSER** level provides 23 commands most often used in basic packet while an expert level provides access to the **KPC3's** full 130 plus command set. The **KPC3** also has Kantronics version 5.0 firmware. Add the **KPC3** "Getting Started" and advanced reference manuals and you have a TNC that not only gets you up and running fast but a TNC sophisticated enough to keep you running with the state of the art.

The **KPC3** provides status information at a glance via its six LEDs. The unit may be powered by an external supply or an internal 9-volt battery and features 32K of battery backed RAM expandable to 512K.

Additional features include Kantronics PBBS with reverse forwarding, message header editing, a mail waiting LED, remote sysop access and Kantronics KA-Node. Kiss mode and Kantronics Host mode are also provided for TCP/IP compatibility and advanced operation.

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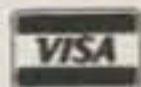


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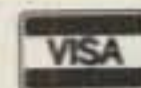
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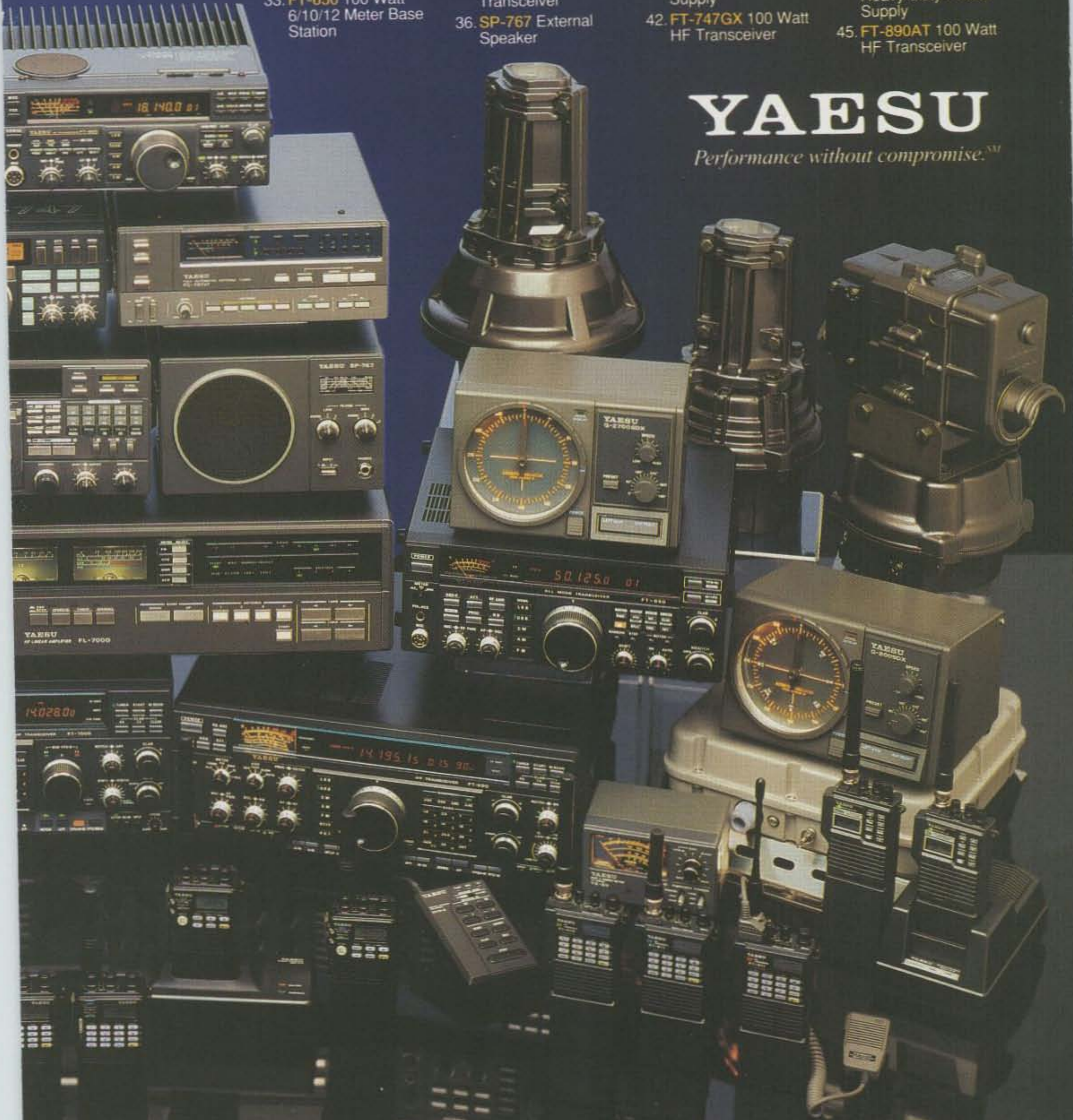
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42. **FT-747GX** 100 Watt HF Transceiver

43. **FC-757AT** Desktop Automatic Antenna Tuner

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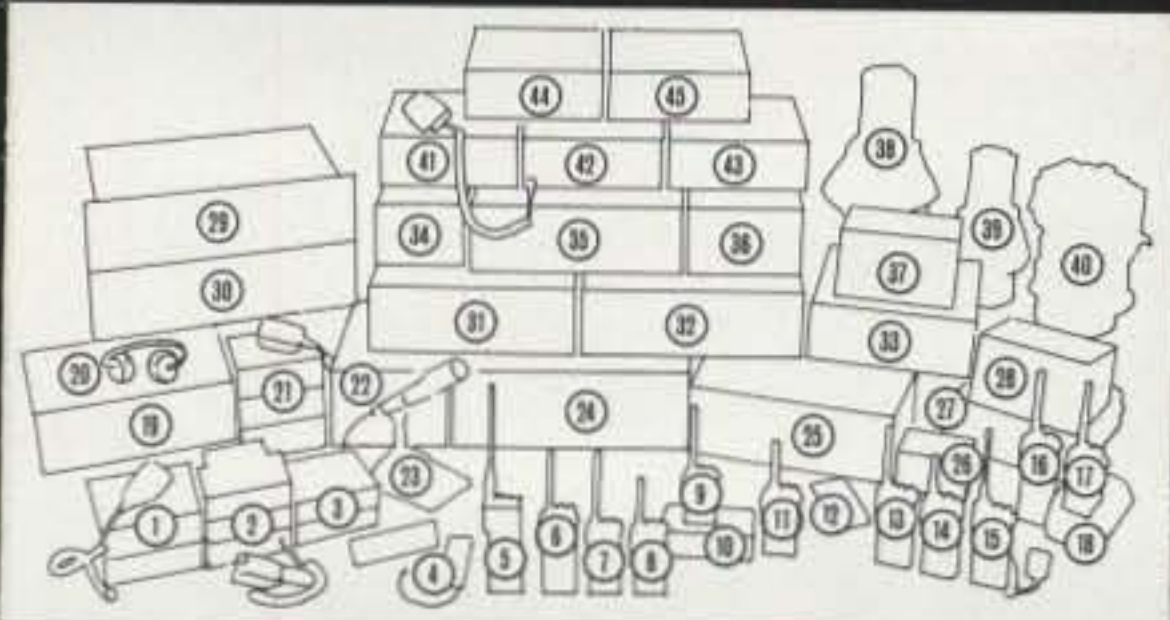
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Remote Control
Microphone | 11. FT-76 440 MHz HT | 22. SP-5 External
Speaker | |
| 5. FT-470 Dual-Band HT | 12. DVS-2 HF Digital
Voice Recorder | 23. MD-1C8 Desk
Microphone | |
| 6. FT-530 New
Dual-Band HT | 13. FT-411E 2-Meter HT | 24. FT-1000 200 Watt
HF Transceiver | |
| 7. FT-415 2-Meter HT | 14. FT-811 440 MHz HT | | |
| | 15. FT-911 1.2 GHz HT | | |
| | 16. FT-33R 220 MHz HT | | |
| | 17. FT-23R 2-Meter HT | | |
| | 18. NC-37 Rapid Charger | | |



Discover Why The Most Advanced Compact On The Road...



...Is So Easy To Operate.

Introducing the IC-3230 Dual Band Mobile

One-Touch Mobile Radio

The IC-3230 was designed for the mobile FM'er who wants high performance and ease of use. The 3230 is a **one-touch** transceiver for the most often-used functions. It's simple and safe to use while driving. Main functions are activated with **one-touch action switches**. Hold the same button in slightly longer to access secondary functions—no need to hunt for a separate function switch.

Human Engineered

The color-coded, illuminated controls and the display are laid out the way people naturally use radios: UHF on the right, VHF on the left, each independently controlled. And with the optional **Talk-Back** feature, your eyes never have

to leave the road to change frequencies. The 3230's voice synthesizer tells you just where you are! The same option works with **crossband repeat**, which gives your DTMF handheld the range and power of your mobile. TalkBack lets your handheld tell you what frequency your 3230 is set to.

And, of course, **full-duplex operation** means you can use your mobile with the ease of a telephone—including 14 memories, single-button autopatch, autodialing and 911 access.

A Base Station, Too!

ICOM's mobiles aren't just for the road anymore. With the optional PS 45/PS 200 power supply, the fun continues! The PS45 becomes a

docking station for your 3230 to slip in and becomes an excellent entry-level station. Or buy one for home, one for road, and stay in touch!

IC-3230: A High-Performance Pack in an Easy-To-Use Compact.

For Information
(And Where You Can Get A Test Drive)
Call

1-800-999-9877

ICOM America, Inc. 2380-116th Ave. N.E.
Bellevue, WA 98004

All stated specifications subject to change without notice or omissions.
All ICOM radios significantly exceed FCC regulations limiting emissions. 3230792



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Simply the Best