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Amateur Radio

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JULY 1997

CQ

In This Issue:

- **Sunspot Cycle 23 is on the Rise! (page 108)**
- **Quick and Easy Curve Tracer Tests Components (page 9)**

Zepp and Double-Zepp Antennas for 40 Meters (page 20)

Curing RFI in Packet Radio (page 68)

Easier QRP With The "Muddle Module" (page 26)

K1AR's Tips on Hunting Contest Multipliers (page 86)

Piezo Igniter Driven ESD Testing (page 42)

W1FB Upgrades the QRN Squasher MK-II (page 62)

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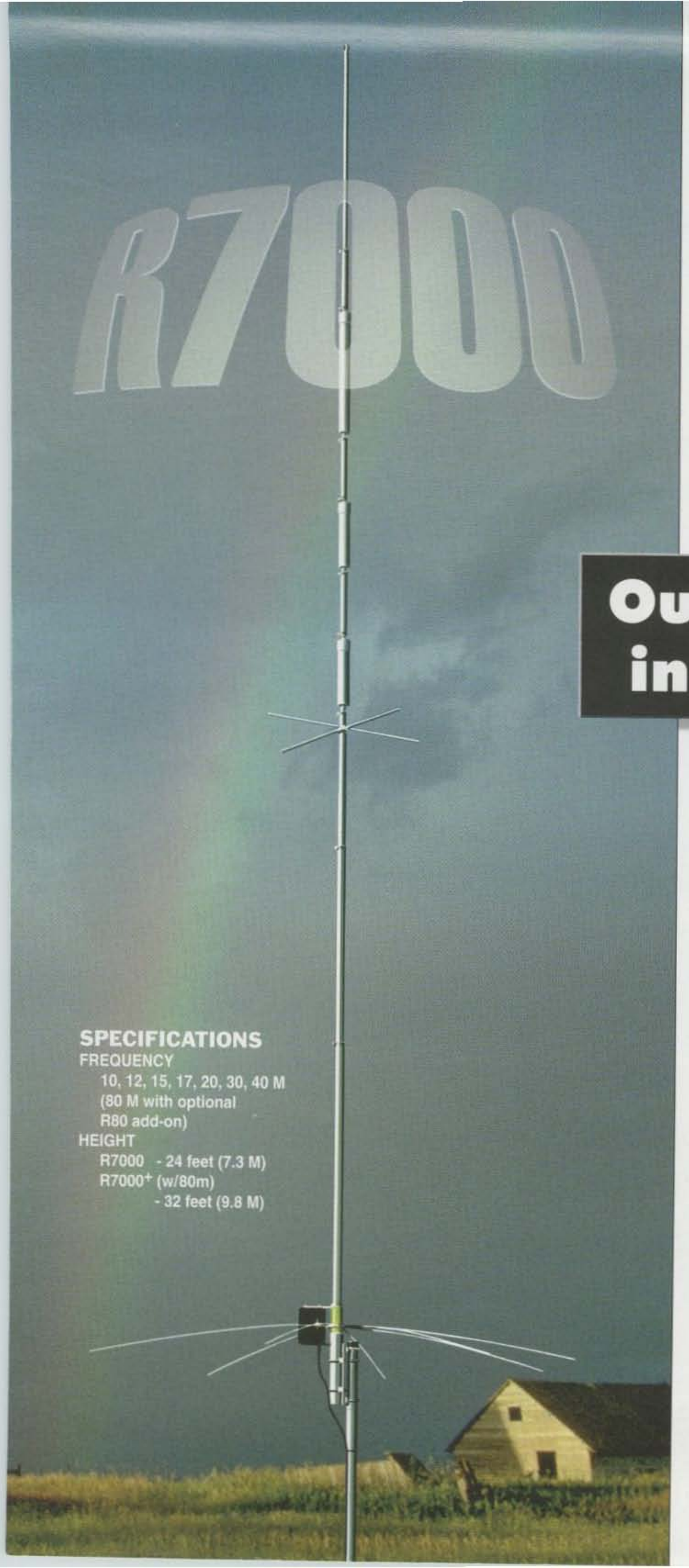
n the cover: Ron Bailey, AA4S, Shelby, NC

DIO AMATEUR'S JOURNAL



SPECIFICATIONS

FREQUENCY
10, 12, 15, 17, 20, 30, 40 M
(80 M with optional
R80 add-on)

HEIGHT
R7000 - 24 feet (7.3 M)
R7000+ (w/80m)
- 32 feet (9.8 M)

10, 12, 15, 17, 20, 30, 40 Mete

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ZERO BIAS

AN EDITORIAL

The other day, right after I returned from the annual trek to amateur radio nirvana, the Dayton Hamvention, I began to think about all the other Daytons I'd been to. It takes a bit of time to catch up on sleep and to let the pain subside after countless miles of walking and being overwhelmed by the sights. Counting booth setup days, I figure by now I've spent about nineteen weeks of my life at the Dayton Hamvention. That's one heck of a long party.

It's almost surreal to look at a lot of the "good stuff" being offered for sale in the fleamarket and to think back to earlier Daytons when that was the latest and best gear available. Now it's vintage or collectible and in some cases extremely expensive, selling above its original price. I can remember seeing some of the gear as new products being introduced at Dayton and being amazed at the wonder of it all, just as I was at this Dayton looking at what we have available now and today.

Something, though, remains the same even though technology has progressed by leaps and bounds. As the size and scope of Dayton increases, technology has made it easier to get lost or separated from friends and meeting places. Gone are the old Motorola packsets, giving way to the ever-shrinking multiband HT. Now endless numbers of people wander around seemingly speaking into their hands and asking "Where are you? I'm here." It's amazing that there's any scrimpit of spectrum left for anyone to use, but they go on walking and talking: "I'm near a car with antennas on it." "I'm in some building next to the booth that sells the watchamacallit; you know, the thing that Ernie wanted two years ago." Next year I expect to see APRS and GPS units in full use locating stalwart shoppers and fellow amateurs at adjoining urinals. Technology is a wonderful thing.

This year the attendance seemed a bit down, but the enthusiasm more than made up for it. The doom and gloom of the last few years apparently is gone, and people are indeed making serious purchases towards the burgeoning sunspot cycle. There were quite a number of heavy-duty rigs sold, the latest and the best there is, so you know what you're going to need in order to compete in the next go around. Of course there's always the very small contingent who are proud to say that they haven't added anything to their shacks since 1969, and everything still works fine. Besides wondering why they still come to Dayton, you can't help but think about all the stuff they're missing out on. There's a whole world of amateur radio, including new bands, that's simply lost to these people. Maybe they're still driving the same 1969 car, too.

There was a lot of great stuff for sale indoors and outdoors at the fleamarket as well. Judging from the lines at the arena ATM machine, a lot of other folks there thought so, too. I managed to find a few goodies at the right price and small enough (well, almost) to carry home. Anyone who leaves there empty-handed just isn't looking or trying to have a good time. For all those who keep asking me about the food, the Salisbury steak and barbecue sandwiches were pretty good. I didn't check out the Polish sausage and grease-dog stands outside as the lines were too long. However, from the smell of the billowing clouds of cooking smoke that permeated the fleamarket, I could tell that they probably tasted pretty good.

Dayton truly is one of the greatest amateur radio experiences you can have. About the only thing lacking was a lot of young people, the so-called new blood of our hobby. Without a doubt, the median-aged and senior amateur were well represented. Perhaps we should push for more Gen-X and Boomer participation as starters for the next century. There was is interesting article in the May issue of *Amateur Today*, the Australian magazine put out by the WIA. The article is entitled "Wanted: 100 Members To Replace The Dead! WIA Demographics Into The Next Century." Based on their numbers (about 5000 members) and actuarial tables for mortality, the WIA will need about 100 new members per year just to stay even. A rough mental guesstimate of ARRL membership would indicate 3000 to 4000 new members to achieve the same goal. It's a staggering number, just to stay even. It's not really a race against the clock, in most of our lifetimes, but it should be a prime motivator to try to increase our ranks over time with younger people. Let's at least try to drop the median age a few years.

Looking at Dayton and the other hamfests we attend, it's difficult to say just where amateur radio is heading in the next century. The panoply of equipment and technology that is available right now, off the shelf, is amazing and outstanding. Those wistful, romantic, nostalgic days of the 6L6 transmitter radiating heat throughout the shack are long gone except for collectors and history buffs. The technical side of our hobby has made monumental transitions in a relatively short period of time, changes which most of us accept and even relish. The human, social side of our hobby is dragging far behind, trying to validate and perpetuate attributions that were better served 20 or 30 years ago. The two don't jibe, and therein lies the conflict. The recent Heard Island DXpedition displayed the marvelous use of technology coupled with imagination to achieve spectacular results. You didn't have to understand how it all worked in order to use it, and you knew how you stood almost immediately. If you think about it, it's quite a stretch to try to fit all of the hardware available to that DXpedition with the traditional view of amateur radio.

Walking through the fleamarket at Dayton, perhaps the biggest one in amateur radio, it's interesting to note what you don't see anymore rather than the overabundance of used gear that you do see. There weren't a heck of a lot of, if any, discrete components. I didn't see any selection or variety of electrolytics over 50 volts, resistors, disc capacitors, variable capacitors, transformers, chokes, chassis, *et al.* If you were of a mind to build your own gear, you would have been hard-pressed to come up with enough parts to complete medium to large projects. Maybe it was an off year, or maybe that stuff doesn't sell anymore. It doesn't make any of this right or wrong; it's just the way it is. For the most part, what was there was usable, adaptable, or collectible, but not much in the way of buildable. It seems that the fleamarket knows the nature of the beast better than a lot of folks.

What was exciting and infectious was the spirit and enthusiasm of the attendees. With plenty of new and exciting gear to look at, some of which won't be available until later this year, a lot of people were talking about upgrading their stations and adding some of the new "necessities." It really didn't matter what aspect of the hobby you were interested in; from DC to light it all was there, so you had plenty to choose from. One thing I'm happy to note is that for us in median-agedom, it's getting easier to read the control information and to see what is displayed on the digital displays. It's probably a result of some of those engineers reaching median-agedom, too. In any event, these new screen displays pack a lot of easy-to-see information in a convenient form, and it's also neat to look at. While some of the displays on HF rigs are getting bigger, the relative sizes of HTs are getting smaller. There were a few the size of business cards—obviously thicker, but definitely in the small category. Another year or two and they'll come with tiny hooks to hang on your glasses.

Another Dayton has come and gone, the years pile up like country totals on some sort of DX Honor Roll. Some at the top of the list won't make it for the next Dayton and the rest will inch up that total by one. It's evident that we need some younger blood in the mix, folks just starting out on their way to the top of the list. I don't think that amateur radio is alone in seeking younger participants. Many other hobbies, endeavors, and pastimes are feeling the youth pinch, too. I do know that we have one of the best hobbies in the world, right now, today. I also know that it has changed radically in the years since I was first licensed and will change radically again in the years to come. We would be gravely mistaken if we believed that we could simply carve out a niche in time and just stay there. Each Dayton shows us what's ahead and the fleamarket there shows us where we've been. A look at the average age tells us where we are. Where we are is at a point where we have to look beyond ourselves, and work towards who'll be at Dayton 20 years from now. 73, Alan, K2EEK

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ANNOUNCEMENTS

• **Mt. Baker ARC** will celebrate 50 years of continuous organization. The club is very active in all phases of amateur radio including Field Day and RACES. They are now awaiting approval of a Sheriff Patrol plan whereby local amateurs will patrol areas where the Sheriff's forces are thin. Amateurs will observe and report only. Sixteen club members are active DXers and eleven are on the DXCC Honor Roll. One member is on the ARRL DX Advisory Committee. The birthday celebration will include operations from selected members' stations and special QSLs will be issued for contacts the weekend of July 11–13.

• **The following Special Events are scheduled for July:**

W1NRG, from W1AW station, Newington, Connecticut; The Meriden ARC; to celebrate the clubs' 50th anniversary; July 27; 1400–1930Z; General portion of 10, 15, and 20 meters and Novice 10 meter subband. For certificate, send QSL and 9 × 12 SASE to Meriden ARC, P.O. Box 583, Meriden, CT 06450.

W2CM, from the Museum of Science and Technology, Syracuse, New York; grand opening of the permanent amateur radio exhibit and operating station in the museum; 2100–0200Z July 25 and 1500–2200Z July 26; on 7030, 14030, 14240, 21350, and 28325. Send QSL to Museum of Science and Technology, 500 S. Franklin Street, Syracuse, NY 13202.

W2MO, Chittenango, New York; Madison-Oneida ARC; Chittenango Landing-Erie Canal Days; June 28; 1400–1800Z; General portion of 40 meters. For certificate, send QSL and SASE to MOARC, Box 241, Verona, NY 13478.

W2ZZJ, Stratford, New York; The Fulton County Dr. Mahlon Loomis Committee; to commemorate the 171st anniversary of the birth of Dr. Loomis, the American radio pioneer; July 19 and 20; 1300–2000Z; General phone portion of 75, 40, and 20 meters, Novice 10 meter phone band, and 2 meter FM repeaters. For certificate and literature, send QSL, contact number, and #10 SASE (55¢) to W2ZZJ, 5738 STHWY 29A, Stratford, NY 13470.

W5BI, WB5LYJ, NA5N, WA5WHN, near Corona, New Mexico; to commemorate the 50th anniversary of the "Crash at Corona;" July 3–5; 1700–2400Z daily; approximately 20 kHz up from the bottom edge of the General HF band edge, 6–40 meters (phone/SSB) and Novice/Technician (CW) HF section of 15 and 40 meters (QRP & QRO). SWL reports encouraged. For certificate, send 9 × 12 SASE, 2 units of US first class postage, and QSL to Jay Miller, WA5WHN, P.O. Box 6552, Albuquerque, NM 87197-6552.

5-land, from naturist resorts throughout North America; observing the 22nd Annual North American Naturist Awareness Celebration; July 7–13; operation on 7.265, 14.265, 21.365, and 28.465 ±QRM. For certificate, send QSL and 9 × 12 SASE to Bob Redoutey, N5KF, P.O. Box 200812, Austin, TX 78720-0812.

W6LV, The S.S. Lane Victory Cruise ship; San Pedro, California; S.S. Lane Victory ARC; 6 special nostalgia cruises during July, Aug., and Sept. on 28.800, 28.380, 21.350, 14.262, and 7.245. For certificate send 9 × 12 SASE with two units of postage, QSL card with contact number issued, to Lane Victory ARC, W6LV, Attn: QSL Mgr., P.O. Box 629, San Pedro, CA 90733-0629.

W6JBT, San Bernardino, California; Citrus Belt ARC 50th anniversary; July 26; 1600–0400Z; SSB on 3.850, 7.240, 14.250, 21.350, CW on random frequencies, 2 meter phone, and 2 meter packet. For certificate, send QSL and 9 × 12 SASE to W6JBT, P.O. Box 3788, San Bernardino, CA 92413.

KC8GXI, from Sistersville, West Virginia; Tyler County Amateur Radio Organization; to celebrate the last working sternwheel ferry on the Ohio River; July 19; 1400–2200Z; phone portion of General 80–10. For certificate, send QSL and 9 × 12 SASE to TCARO, P.O. Box 287, Middlebourne, WV 26149.

W8AL, Canton, Ohio; Canton ARC; annual Pro Football Hall of Fame Festival; July 25–27; 1300–2400; on 7.265, 14.265, 21.365, and 28.430. For certificate, send QSL and 9 × 12 SASE to Donald E. Perry, WQ8J, 968 Culverne Avenue, N.W., Massillon, OH 44647.

W8FY, Van Wert, Ohio; Holiday show, Historical Little Red Caboose; July 4; 1400–1900Z; lower General 40, 80, 20, and 2 meters, 146.850. For certificate, send QSL and 9 × 12 SASE to Van Wert ARC, Box 602, Van Wert, OH 45891-0602.

KGØYJ, from St. Charles County ARES annual field activation in Portage Des Sioux, Missouri; 2300Z July 11 to 1700Z July 12; on or near 3.870, 7.270, 14.270, and 28.370. For certificate send QSL and 9 × 12 SASE to Bill Bird, KGØYJ, 144 Ridgecrest Drive, Chesterfield, MO 63017-2653.

WØNOZ, from De Smet, South Dakota; 26th anniversary of Little House on the Prairie Pageant; 1700–0200Z daily July 12–13; phone 3.870, 7.265, 14.265, 21.340, 28.340 MHz; CW up 40 kHz from bottom of each band 80–10 meters. For certificate send SASE and QSL to Huron ARC, P.O. Box 205, Huron, SD 57350-0205 (for unfolded certificate send 9 × 12 with two units first-class postage).

CI3BWB, Sarnia, Ontario–Port Huron, Michigan; Lambton County Radio Club and Eastern Michigan ARC; to celebrate the opening of the new International Bluewater Bridge; 2000Z July 11 to 2000Z July 13; 30 kHz up from bottom of General CW bands and 10 kHz up from bottom of General phone bands. For commemorative QSL, send QSL and SASE to CI3BWB, 1065 Sheffield St., Sarnia, ON Canada N7S 4R7.

EI2V, Casement Aerodrome, Baldonnel, Dublin, Ireland; The Irish Air Corps; to celebrate the Corps' 75th anniversary; July 4–6; operation on SSB 7.055 and 14.275, and on CW 3.560, 7.020, 14.020, and 21.020. For more information, contact EI2V, Irish Air Corps Signals ARC, Casement Aerodrome, Baldonnel, Dublin 22, Ireland.

TMØVER, from the America/Gold Beach Museum, Versurmer, France; to commemorate the July 1, 1927 flight of US Navy Commander Byrd's first airmiail link flight from the US to France, and the opening of the museum; June 28 to July 7 on all bands CW and SSB. For a special QSL send QSL via the bureau or direct (in the latter case with self-addressed envelope and 2 IRCs) to The "America/Gold Beach" Museum, 2 Place Admiral Byrd, F. 14114 Versermer, France.

• **The following hamfests, etc., are scheduled for July:**

July 4, **July 4th Firecracker Hamfest**, Monagahan Fire Hall, Dillsburg, Pennsylvania. Contact HRAC Answer Line at 717-232-6087; e-mail <fabinfo@fabral.com>. (Exams.)

July 5, **23rd Annual Ontario Hamfest**, Milton Fairgrounds, Milton, Ontario. Contact Burlington ARC, P.O. Box 85037, Burlington, ON L7R 4K3; <www.bigwave.ca/~jefdavis/barc/>; or call Jeff, VE3COJ, at 905-335-4862.

July 5, **Firecracker Hamfest**, Salisbury Civic Center, Salisbury, North Carolina. Contact Walter, N4KVF, 3045 High Rock Rd., Gold Hill, NC 28071; phone 704-279-3391. (Exams.)

July 6, **6th Annual TARC Columbiana County Hamfest & Computer Show**, Columbiana Co. Fairgrounds, Lisbon, Ohio. Call Dave, KC8DUJ, or Paul, W8WIF, on repeater 146.700.

July 9, **Iowa City ARC Swapmeet**, K-Mart parking lot, Iowa City, Iowa. For more information, call John Poulton, WØCK, 729 Alpine Drive, Iowa City, IA 52245; phone 319-354-1735 (after 6:30 PM).

July 12, **Swapfest '97**, American Legion Post 434, Oak Creek, Wisconsin. Contact The South Milwaukee ARC, Inc., P.O. Box 102, South Milwaukee, WI 53172-0102. (Exams.)

July 13, 1997 **Batavia Hamfest,** Alexander Firemen's Recreation Grounds, Batavia, New York. Call 716-786-3622; or on the Web at <carlson@frontiernet.net>.

July 13, **Valley Forge Hamfest**, Kimberton Fire Company Fairgrounds, Kimberton, Pennsylvania. Contact MARC, P.O. Box 352, Villanova, PA 19085; or call Bob Haase, W3SA, at 610-293-1919; fax 610-293-7688; or e-mail <wb3joe@voicenet.com>.

July 13, **North Hills 12th Annual Hamfest**, Northland Public Library, Pittsburgh, Pennsylvania. Contact Bob Ferrey, Jr.,

(Continued on page 107)

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FT-1000MP HF Transceiver

- Enhanced Digital Signal Processing
- Dual RX
- Collins SSB filter built-in
- 100W, Power supply built-in

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FT-51R

2M/440mHz HT

- 2W standard
- 5W Optional
- Alpha Numeric
- 120 Memories
- Spectrascope
- DTMF Paging
- Coded SQL built-in

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Do you ever go through your junk box, dig out parts for a project, and then hesitate when you don't know if they're good or bad? Most of us toss the parts back into the box and either forget about the project or buy new parts. N2OZ has an easy way of checking some of those mystery parts while clearing out your junk box.

Build A Quick and Easy Curve Tracer To Test Components

BY LEW OZIMEK*, N2OZ

My ham shack is probably similar to most shacks which exist in this world. It consists of a predominance of commercial equipment, a smattering of homebrew units, some miscellaneous component parts of every description, and a very limited selection of test equipment.

In recent years commercial gear rapidly has replaced homemade equipment in many amateur stations. The reason for this trend is quite obvious: Available items keep getting better and better and the prices keep getting lower and lower. What other result can be expected? The dearth of homemade amateur items is frustrating. It is the antithesis of my early days in the hobby when the average individual who wanted a piece of electronic gear had little choice but to build it. How much satisfaction, pleasure, and personal technical growth has been lost by the movement towards purchased items? I defy anyone to quantify it.

An important prerequisite to success with homemade gear, however, is the availability of useful test equipment. Before I retired, I was able to borrow electronic test equipment from my place of employment without any difficulty. Now that source is no longer available, and I am reduced to making do with the meager assortment of test equipment I own or borrowing from friends in the hobby.

These facts certainly were prominent in my mind when I read a short article entitled an "Inexpensive Curve Tracer" in my amateur radio club newsletter. The author, M. Chisena, KA2ZEV, presented a schematic with a summary of the performance capability of a simple, versatile tester. The device apparently is well known to skilled technicians in the electronics industry who have used it for many, many years, but its history is lost to antiquity. Its potential capability fascinated me, and I felt that if it could come close to the performance parameters claimed, it would go a long way towards filling a big void in my home shop test capability.

The schematic for this tester is shown in fig. 1. The only components required are a 6.3 VAC transformer, three 150 ohm resistors (1/2 watt or larger), and some test leads. It requires an oscilloscope to provide the display. The only restriction is that the scope must accept separate inputs to the horizontal and vertical circuits. Otherwise anything goes. The scope I used is an old 5 MHz unit that a friend of mine built many years ago as part of a Bell & Howell Schools training course. He left it with me when he moved away, and I was on the verge of throwing it away because it barely provided a meaningful presentation. About all I could see on it were frequency waves present in a circuit under test without being able to analyze their content. Better scopes are surely available in every fleamarket at miniscule prices. However, my poor excuse for a scope worked superbly with the adapter in fig. 1.

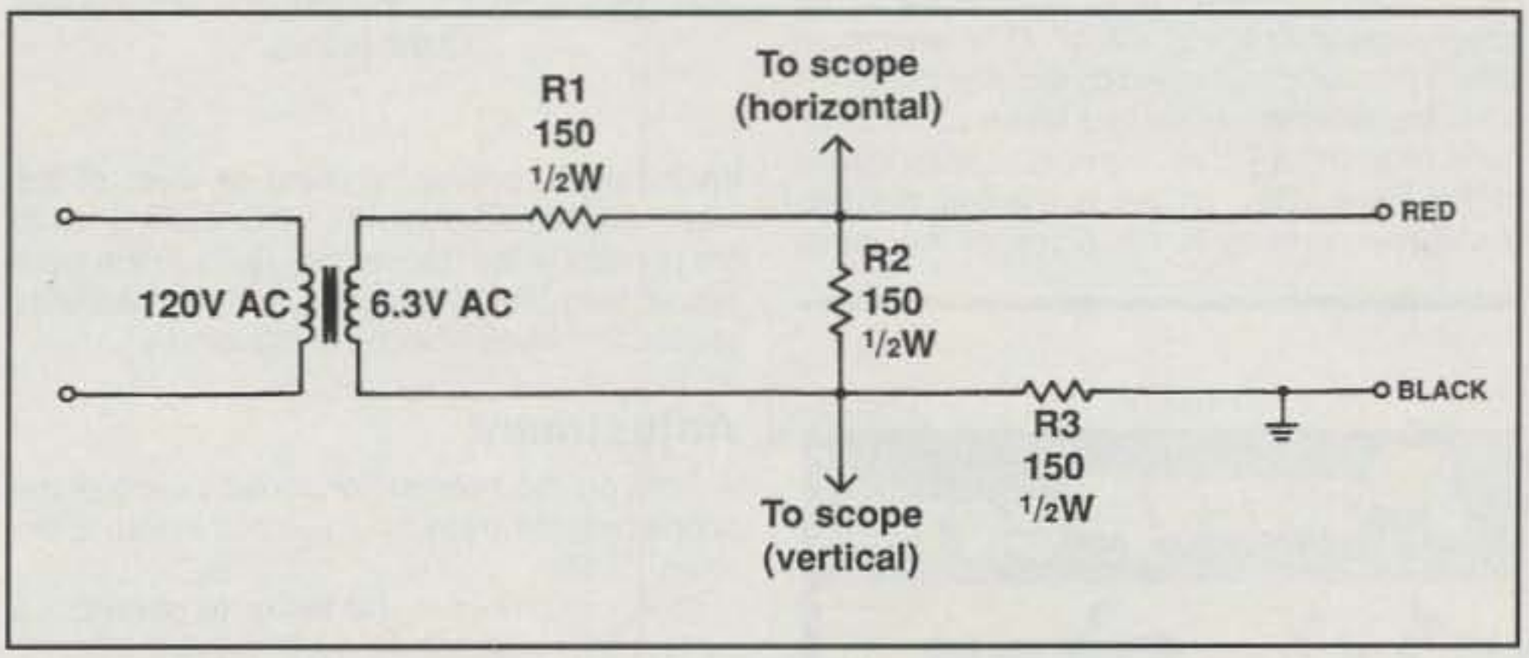

Fig. 1– Schematic of the "Curve Tracer" Component Tester. Input transformer is a small 6.3 volt filament unit. All resistors are 1/2 watt or larger.

Fig. 2 shows how the unit is connected to the scope. Note that the junction of R1 and R2 is connected to the horizontal input of the scope as well as to the red test lead. The junction of

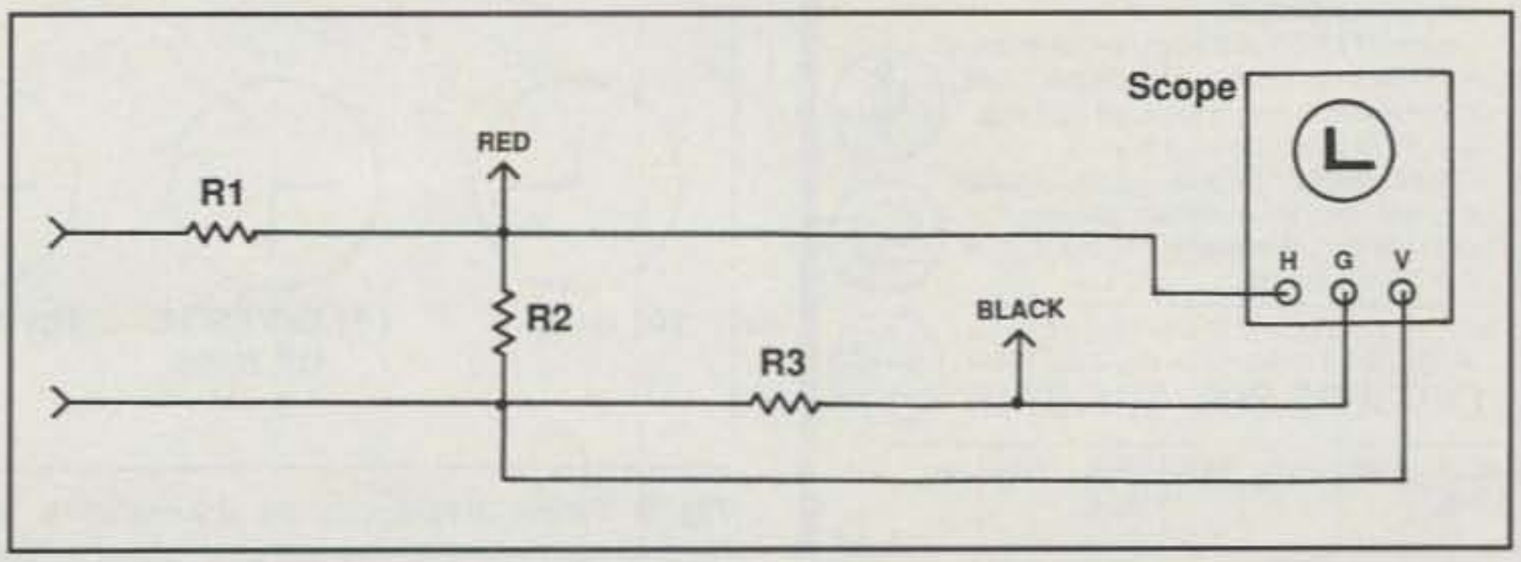

Fig. 2– Interconnection diagram showing the Curve Tracer connected to an oscilloscope. Only three connections are required on the scope: horizontal input, vertical input, and ground.

*37 Dolphin Lane, Northport, NY 11768

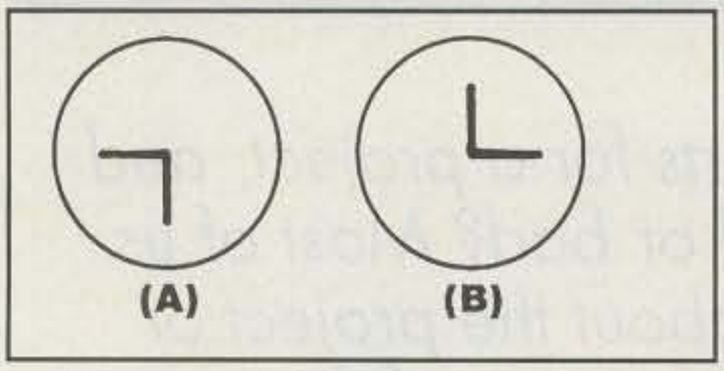

Fig. 3– Pattern displayed on the scope when a diode is tested. (A) Results when black probe is on the cathode and red is on the diode. (B) Results when test leads are reversed. Any reduction in the right angle shows a leaky junction (defective unit).

R2 and R3 goes to the vertical input. The output end of R3 is connected to the black probe and to ground on the oscilloscope. It is a very simple device to be sure.

Construction

Layout and assembly is a snap with so few components involved. Almost all of the parts came from my "junk" box, including a metal case measuring 4" × 2" × 2½". (The enclosure size is primarily controlled by the size of the 6.3 VAC transformer available.) Make all connections to terminal strips fastened appropriately in the case. Run all leads leaving the box through grommets in the sides of the metal enclosure to prevent chafing or wear of the wires. Remember that 110 VAC is being fed to the primary of the transformer. Secure the input power lead inside the case and take suitable precaution when working in this area.

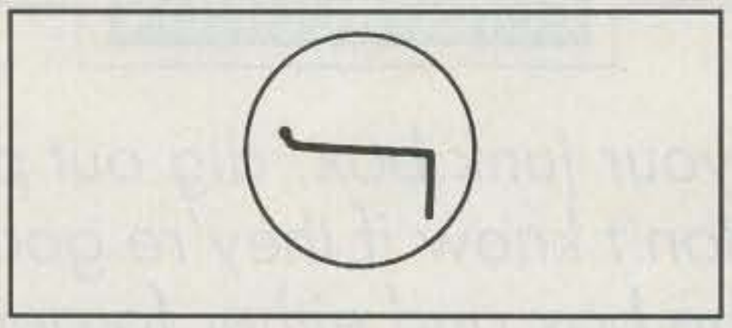

Fig. 4– Test pattern of a zener diode with the black lead on the cathode and the red lead on the anode.

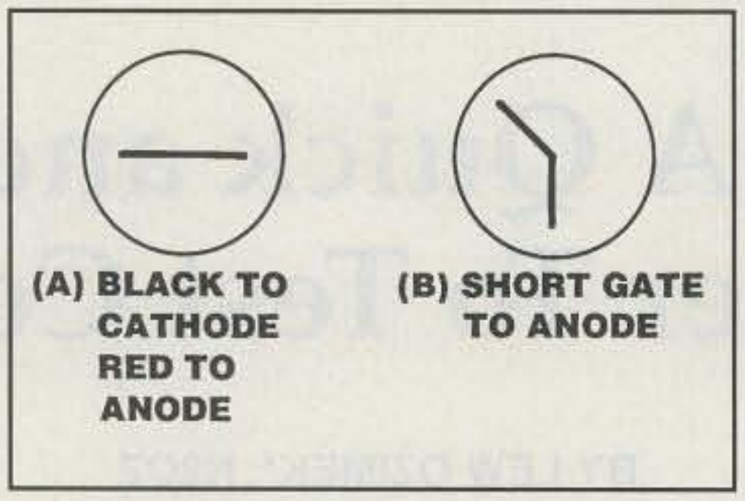

Fig. 5– Thyristor (SCR) test pattern. Again the black probe goes to the cathode and the red to the anode.

Adjustment

1. Turn off the internal horizontal sweep of the scope by turning the input selector switch to external or off.

2. Apply power to the tester to generate a horizontal scope sweep synched to the 60 Hz input frequency. Adjust the horizontal length on the scope to just fill the screen.

3. Short the red and black test leads to produce a vertical line. Adjust it to just fill the vertical screen.

That is the complete adjustment procedure. Nothing could be simpler!

Operation

The application of alternating voltages to both the horizontal and vertical deflection plates of an oscilloscope creates patterns called *Lissajous* figures. A common application of this technique is to compare two different frequencies (one frequency applied to the horizontal, the other to the vertical) to calibrate audio-frequency signal generators. In our tester the same frequency is applied to both plates so the *Lissajous* patterns are synchronized and stationary.

In order to use the tester, just touch the black and red probes to the leads of a component under test and observe the pattern on the scope. Since only 6 volts is being applied, there is no danger of damaging a component. In fact, the test leads can be interchanged during test without a problem. The only effect will be an inverse image on the screen for most of the components (not all). This will be shown in the examples below.

There is no limit to the types of discrete components you can test, including diodes, transistors, capacitors, resistors, ICs, and inductors. To effectively use the tester, you should create a catalog of test patterns for the types of components you expect to evaluate. Root through the supply of odds and ends of parts you may have accumulated over the years. Test them and record the results in the manner shown in this article. You will quickly develop the capability of easily evaluating results and recognizing failures. In fact, you may be amazed at how many defective components are stored in your spare-parts coffer. I certainly was. Be aware, though, that these tests provide a "go" "no-go" result. No real quantitative test results ensue.

Test Results

The following are the results of tests performed on miscellaneous components I found in my shack. The orientation of the test leads is shown for each of the tests with some examples of inverse patterns created when the leads are reversed. Since the black lead is connected to ground, it normally is connected to ground or equivalent of a component if appropriate. The results I obtained are analyzed and discussed as necessary. Any deviation from these normal patterns—such as leaky junctions (less than a 90 degree angle), shorts (vertical line), or opens (horizontal line)—are sure signs of a failure.

Diodes. Place the black probe on the cathode and the red on the anode. The resulting pattern is shown in fig. 3(A). Reversing the leads produces an inverse image as shown in fig. 3(B). The sharp 90 degree angle of the L pattern indicates that the diode is conducting in only one direction of the input AC sine wave.

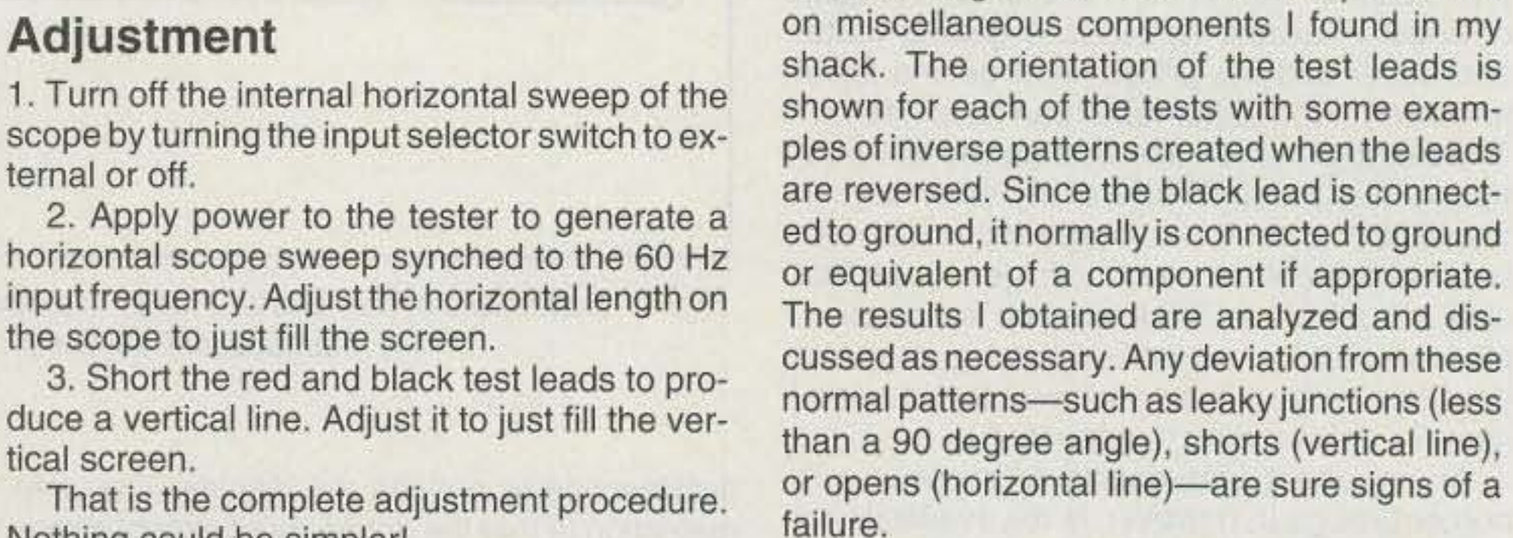

Fig. 6– Series of test patterns of transistors. (A) is an NPN and (C) is a PNP with the black test lead to the base and the red lead either to the collector or emitter. (B) and (D) are the reverse pattern, resulting when leads are reversed. In (E) a field effect transistor (FET) is shown with the black lead on the anode and red on the drain (D) or on the source (S).

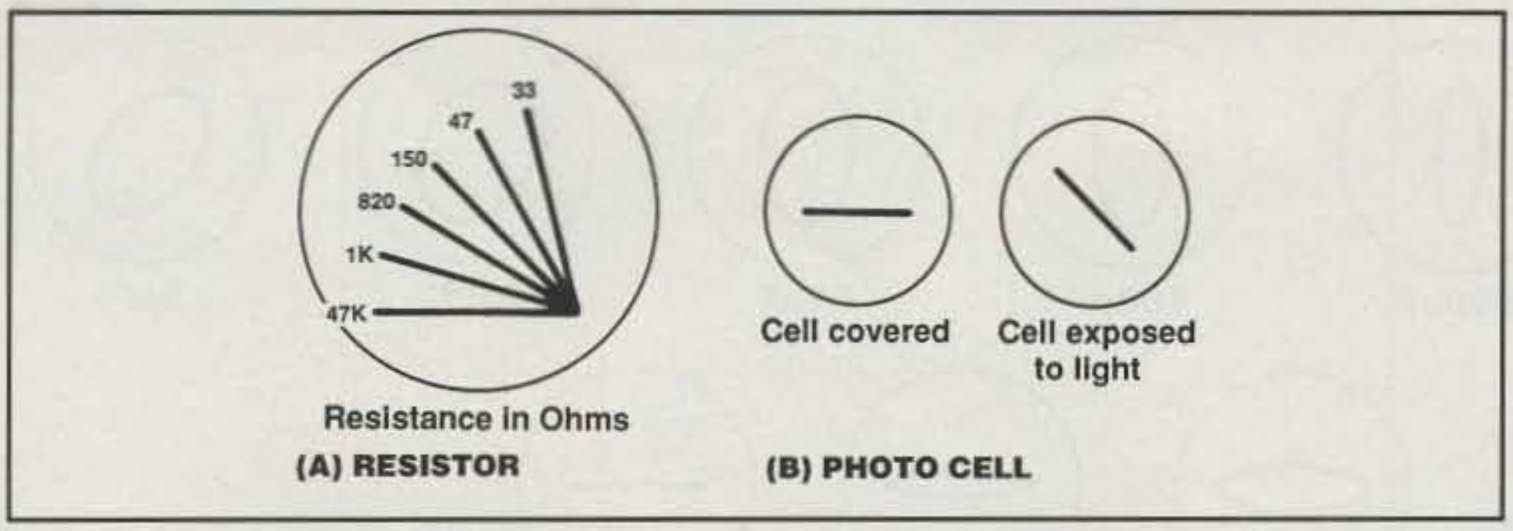

Fig. 7– (A) is the pattern for different values of resistors. In (B) the pattern of a photo cell is shown with the cell covered and cell exposed to light. Note the change in resistance following the pattern of (A).

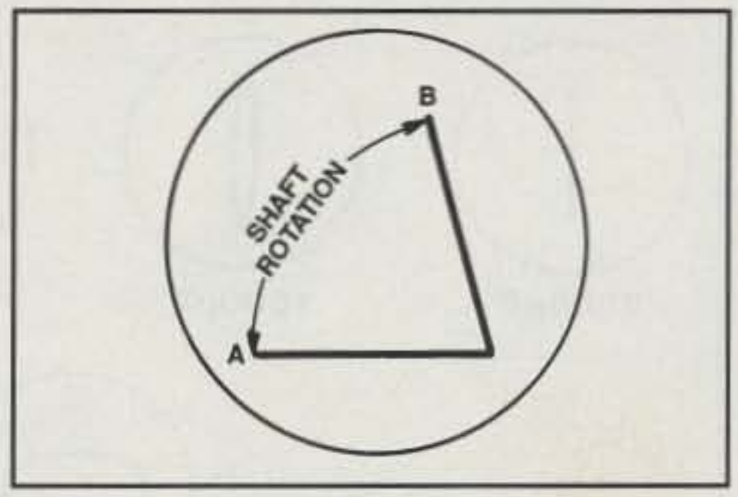

Fig. 8– Potentiometer pattern displayed on the scope. The slope depends on the resistance value. A jittery trace when the shaft is rotated indicates a noisy potentiometer.

Any reduction of that sharp angle shows a leaky diode; a good junction will always have a 90 degree (or close to it) angle.

Zener Diode. Again apply the black lead to the cathode and the red to the anode of a low-voltage zener (I used a 3.5 V). The resulting pattern of this diode duplicates fig. 3 with the addition of a turn up at the left edge of the pattern (fig. 4). The extra bend is caused by zener conduction. A zener above 6 volts will not show the turn up because only 6 volts is used in this circuit and no zener conduction occurs until its applied voltage exceeds the zener rating. The inverse is not shown here, but you can try it in your own tests.

SCR Thyristor. The test result of this device is shown in fig. 5. To get a meaningful reading place the black probe on the cathode (C) and the red probe on the anode (A) and short the gate to the anode. (A similar test can be done on TRIACS by using Main Terminals 1 and 2 (MT1, MT2) and bridging over the test probe.)

Transistors. Connect the black lead to the base of a transistor and the red lead to either the collector or emitter. The results are shown in fig. 6(A) for a NPN transistor and fig. 6(C) for a PNP. Reversing the leads results in the inverse pattern shown in figs. 6(B) and 6(D). Note how simple it is to identify NPN and PNP transistors by the patterns produced. A sharp 90 degree angle is important (I can't emphasize this too much.) to ensure that no leakage exists in the junctions. In fig. 6(E) a FET (field effect transistor) is shown. With the black lead on the anode the L pattern will be seen when the red lead is placed on D (drain) or on S (source).

Resistors. No lead orientation is required. The patterns in fig. 7(A) show that a 47K ohm resistor (or higher) presents a horizontal line. This line rotates towards the vertical as the resistance value decreases. It actually is a rough limited quantitative measurement of resistance.

A cadmium sulfide photo cell is shown in fig. 7(B). With the cell covered, the pattern shown is horizontal (open or very high resistance). When it is exposed to light, the trace reverts to a slanted line (resistor).

Potentiometers. Fig. 8 shows the change in a pattern as the control shaft is rotated. This pattern can fall anywhere from horizontal to vertical, depending on the value of resistance. If the line jiggles as the shaft is rotated, the potentiometer is noisy.

Capacitors. Fig. 9 presents the change in pattern from a 2000 µF (vertical line) to a 0.1 µF (horizontal line) capacitor. No test lead orientation applies. The low limit of my tester ap-

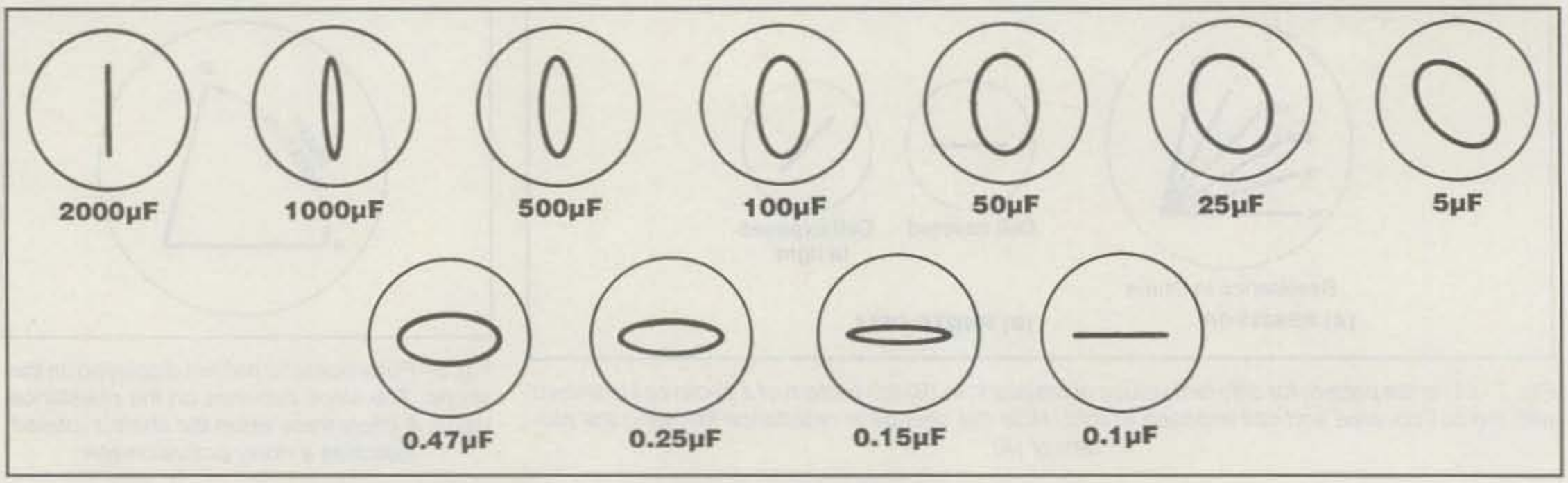

Fig. 9– Patterns of capacitors showing the variation displayed from a 2000 µF down to a 0.1 µF.

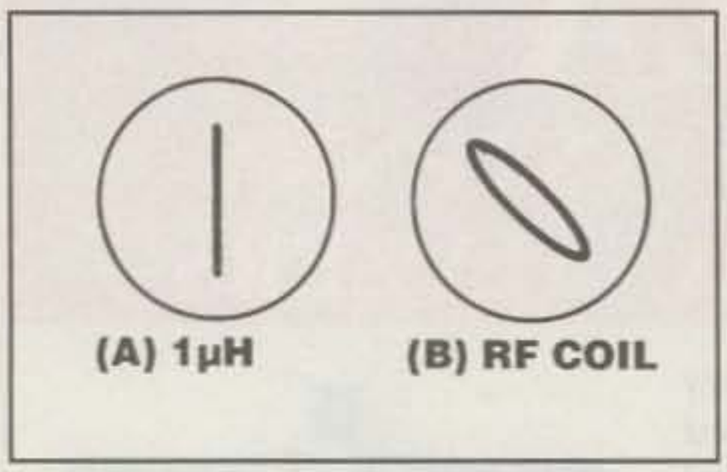

Fig. 10– Inductor's test results show a small inductance (1 µH) as a vertical line and a large inductor as a slanted loop.

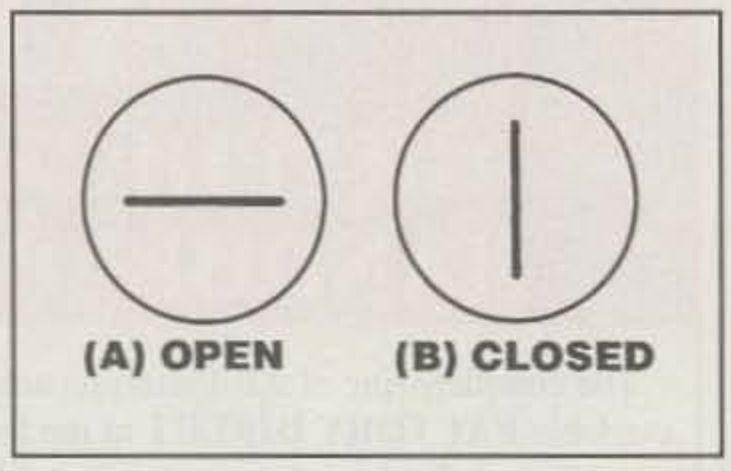

Fig. 11– Test results of a switch. When the switch is open (infinite resistance), a horizontal line is seen. When it is closed (zero resistance), a vertical line is shown.

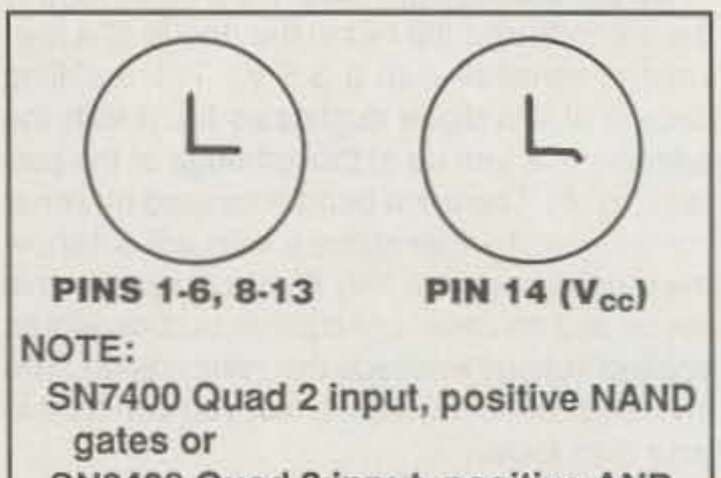

Fig. 12– Transistor test results with the black lead to IC ground connection (or Vss) and red lead to all other pins. All pins show the right-angle pattern (like a diode) except for Vcc, which includes an additional tail. Any decrease in the right-angle pattern shows a leaky junction.

pears to be 0.1 µF. In order to test smaller capacitors, the frequency of the input voltage must be increased, which may be a worthwhile experiment in the future.

Inductors. My availability of coils was very limited, but two different results are shown in fig. 10.

Switch. The tester shows a short as a vertical line and an open as a horizontal line. Fig. 11 shows the patterns for the two stages of a toggle switch. (Obviously, this test can be used on fuses, continuity checks, etc.)

Integrated Circuits. My miscellaneous ICs are predominantly TTL, so that is what I tested. The black lead is normally connected to ground (or Vss), and the red lead to the other pins in sequence. It helps to have available a diagram of the IC which shows the pin configuration, functions, and internal design. Examples of the importance of correlating results to the design of the IC are presented later on in this article.

Fig. 12 shows the results (all identical) of three different ICs. With black on ground (pin 7) a good 90 degree angle is seen on pins 1 to 6 and 8 to 13 (again, a leaky junction will reduce that angle). The Vcc input (pin 14) presents a unique pattern which is acceptable. Fig. 13 shows the design configuration of a SN7400 to allow you to correlate patterns to pin functions.

Fig. 14 is the pattern of a SN7413 with its internal design shown in fig. 15. The importance of the internal design is emphasized because it identifies NC pins (no connection) which show up as opens.

Fig. 16 displays the pattern of a SN7476. Here again we see the sharp Ls of a good IC and the unique pattern of Vcc.

I could keep going, but what I have shown is an excellent start of a signature pattern catalog. Whenever a pattern deviates from the standard, it probably means a failed component. I certainly was surprised at the number of defective components I had stored away. A little more time with this tester and all of my bad parts will be purged.

In Circuit Testing

Experiment with any chassis or unit that you can work on and not miss. But first be sure that **NO POWER IS APPLIED TO A CIRCUIT YOU ARE TESTING** with this device. Conduct the same types of tests described in the previous sections, but be aware that a wired circuit may place special loads and impedances on component junctions which are not present with a non-wired isolated device. The patterns in a wired circuit will not necessarily be identical to those shown in our catalog of signature patterns. My own experience has been that some patterns will be the same and other patterns will be unique, requiring further evaluation. On a questionable transistor, unsolder only the C and E leads and lift them to permit accurate testing of the transistor. One end of a diode may be lifted in a similar manner to verify test results. It is also conceivable that an IC may have to be lifted from the circuit to confirm test results.

To verify performance of my unit as an in-circuit tester, I decided to analyze my Heath Model 10-4550 10 MHz Dual Trace Oscilloscope. This scope has been inoperative for a number of years, and I gave up trying to repair it about five years ago, when after curing a series of problems, I could not find the source of a failure in the sweep circuits.

Heath "trouble locating guides" normally

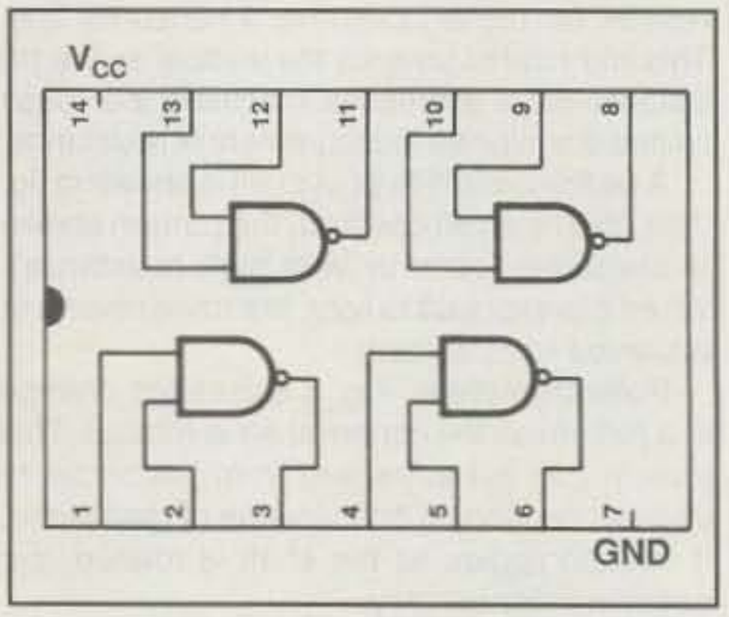

Fig. 13– Lead configuration/internal design of an SN7400 IC. Correlate the design to the test patterns in fig. 12.

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used voltage measurements to try to pinpoint problems. This was aided and abetted by a strong technical support group at Heath which is now no longer available. With this curve tester I decided to go through the horizontal sweep circuits, checking all of the key components. The entire process took less than an hour (one thing that expedited it is that Heath used sockets to hold ICs so no unsoldering of ICs was necessary). During the tests I found one defective transistor and three defective ICs. It was comforting to verify performance of some FETs and Zeners which had always been question marks to me in the past. I hate to think how many times I replaced a suspect part with a defective part not knowing that the replacement was bad. Now, finally, the culprits have been identified and replacements ordered. By the time this gets to print, I fully expect to have a working scope once again.

Reprise

I was pleasantly surprised by many things related to this tester. The low cost was expected, but the ease with which it was assembled and tested was a delight. The big point, however, is that the component test results far exceeded my expectations. I was able to make positive evaluations of a wide range of devices with a high level of confidence. With this tester I do not have to guess about the performance of parts. In a short time I know! Some individuals may not be comfortable with a "go" "no-go" device and would prefer quantitative tests. Personally, if I'm trying to make a repair, identification of a failed component is all I am interested in.

It is hoped that the reader will build this device and find it as effective as I have. It may lead to your trying your hand at repairing amateur radio gear as well as TVs, VCRs, audio systems, and what have you.

One last note: Horizontal output transistors on TVs and video displays do not test well. Many have built-in damper diodes which look like shorts to this tester.

Good luck and good repairs! ■

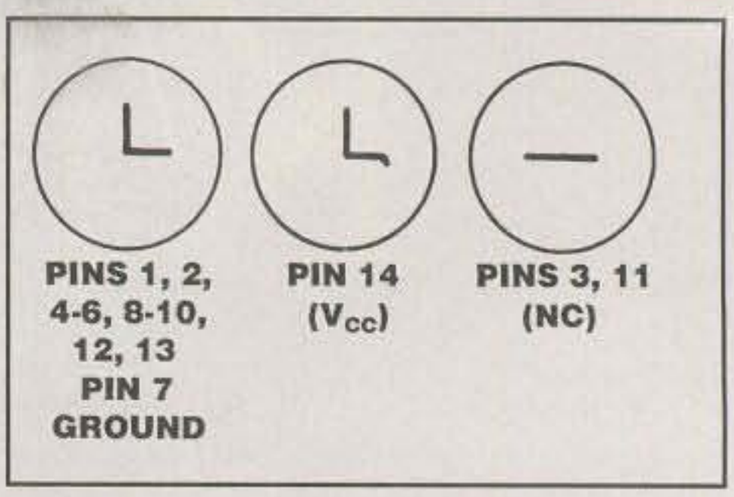

Fig. 14– Test pattern of an SN7413 with the black lead on ground and the red on other pins. The pattern is the same as that of an SN7400 except for pins 3 and 11, which have no internal connection (NC) show up as an open.

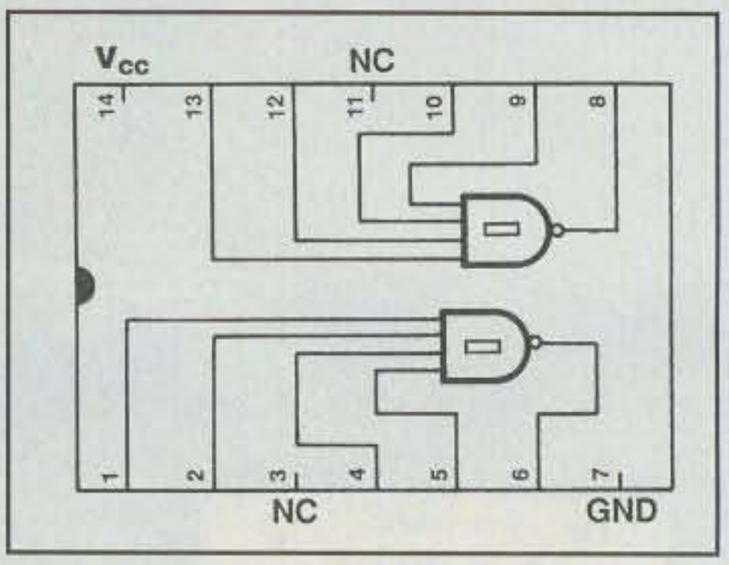

Fig. 15– Internal design of an SN7413 to show the correlation of the test pattern to the pin functions.

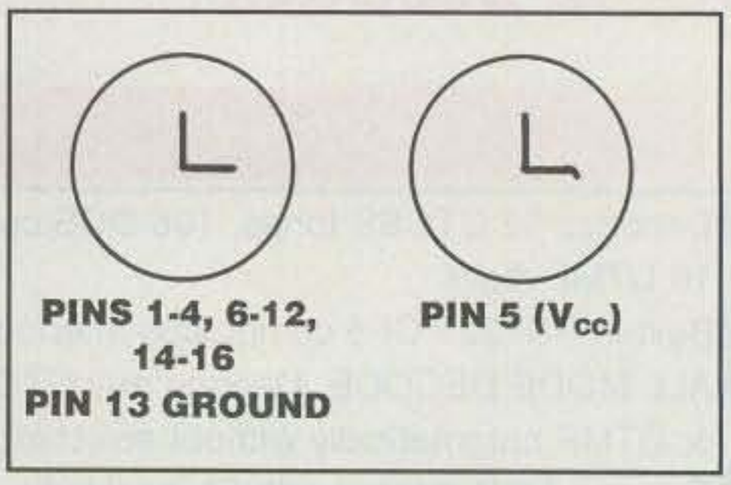

Fig. 16– Test pattern of an SN7476 again with the black lead on ground and the red on the other pins. Pattern is identical to fig. 12. As with all test patterns, the right angle is important because any decrease indicates a leaky junction and a defective IC.

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CIRCLE 151 ON READER SERVICE CARD

Many of the DXCC countries are remote islands and have only sporadic amateur radio activity. For a time until the end of 1996 VKØWH held down the fort on Macquarie Island, giving many a needed QSO.

A Look At Macquarie Island, VKØ

BY JIM SMITH*, VK9NS

Macquarie Island is an Australian Possession some 900 miles southeast of Hobart, the capital of Tasmania. Its position is 54°, 29' south and 158°, 58' east, and it is therefore a sub-Antarctic Island similar to Heard Island lying far to the west. The island is large, being some 20½ miles long by an average of 3 miles wide.

The climate on Macquarie is wet, with rain on over 300 days a year. It is also very windy, since the island is in the latitude known as the "Screaming Fifties." The temperature varies between a hot 10°C in summer months to –5 or –6°C in winter. This is not cold in comparison to winter in Siberia, but coupled with the moisture-laden atmosphere and windy conditions, the chill factor can be high and dangerous.

Background

Macquarie Island was first discovered in 1810 by Captain Hasselburg, master of the vessel *Persevearance*. Hasselburg was on yet another search for new sealing grounds, and he struck one of the mother lodes of nature, followed later by the Campbell islands. It took a mere 80 years of commercial exploitation to decimate the seal population, but there was an outcry in the 1890s when the sealers started on the penguins. In a rare show of "vision" (forced by a very powerful naturalist lobby), in 1933 the Australian government declared Macquarie Island a National Sanctuary.

The Present—More or Less

In 1948 the Australian National Antarctic Expedition (ANARE) set up a permanent base on the island. Today, almost 50 years later, they continue to add to the scientific knowledge of the area. The ongoing work being done on a day to day basis is led by some of the world's most dedicated scientific staff with multiple skills and interests.

In 1971 Macquarie Island was declared a Nature Reserve, and these days it is administered by the Tasmanian National Parks and Wildlife Service. Entry is restricted, but permits for special purposes can be obtained for limited access for a period of two days.

The QSL of Warren Hull, VKØWH, who was on Macquarie until the end of last year.

ANARE

The Macquarie Island ANARE Base is on the isthmus lying at the northern tip of the island and on the same site as the original Meteorology and Scientific Station founded by Douglas Mawson in 1911. Mawson achieved the pinnacle of Australian scientific research activities in Antarctica. He subsequently received a well-deserved knighthood for his work.

The ANARE Scientific Base is under the control of the Australian Antarctic Division in Hobart, Tasmania. The changeover of ANARE staff (recruited by Antarctic Division) occurs on a yearly basis in the spring. Sometimes there is a member of the team who is also a radio amateur. Until the end of 1996 Warren Hull, VKØWH, held down the fort on the amateur radio bands.

There is plenty of room on the island, except everything is crammed into the relatively tiny neck of the isthmus. When the "short-term, summer scientific visitors" are present, numbers swell to 60 or more. Things get decidedly crowded at the base, which is designed for a normal staffing of around 20 expeditioners. When things finally settle down and winter approaches, between 12 and 20 ANARE staff members remain to winter over.

Wireless Hill

Wireless Hill lies at the northerly end of the isthmus and was the site chosen by Mawson in 1911 for the radio masts, huts, and wireless equipment for a radio link between the island and the Australian mainland. This task is a well-

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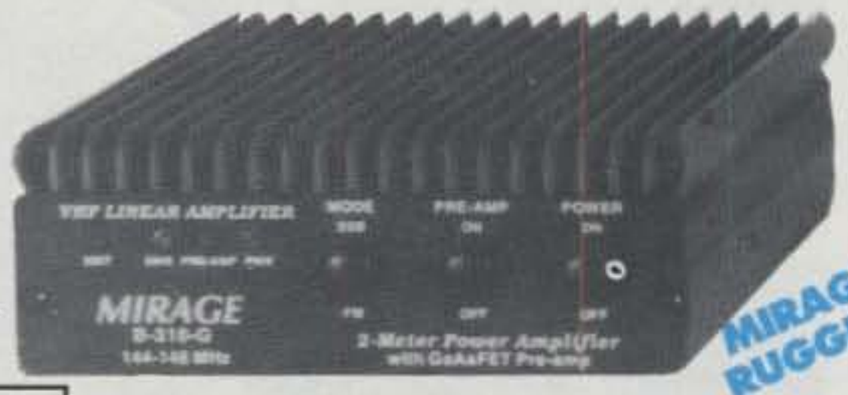

Power Curve -- typical B-310-G output power							
Watts Out	25	50	75	95	100	100+	100+
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For an incredibly low $199, you can boost your 2 Meter handheld to a super powerful 100 watt mobile or base!

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Talk further . . . Reach distant repeaters . . . Log onto faraway packet bulletin boards.

This rugged Mirage B-310-G amplifier operates *all modes*: FM, SSB and CW. It's perfect for *all* handhelds up to 8 watts *and* multi-mode SSB/CW/FM 2 Meter rigs.

***It's** great for the ICOM IC-706 -- you'll get 100 blockbuster watts on 2 Meters!*

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A built-in *low noise* GaAsFET receive pre-amp gives you 15 dB gain -- lets you dig out weak signals.

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Mirage's integrated *HeatsinkCabinet™* and whisper quiet fan gets heat out fast!

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Plus more . . .

Automatic RF sense Transmit/Receive switch. Remote keying jack. LEDs monitor "On Air", high SWR, pre-amp, power. Push buttons select SSB/FM, pre-amp, power. Draws 15 amps at 12-15 VDC.

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Dual Band 144/440 MHz Amp

$159.95 BD-35 Suggested Retail

Power Curve -- typical BD-35 output power							
Watts Out (2Meters)	30	40	45	45+	45+	45+	45+
Watts Out (440 MHz)	16	26	32	35+	35+	35+	35+
Watts In	1	2	3	4	5	6	7

***Add** this Mirage dual band amp and boost your handheld to 45 watts on 2 Meters or 35 watts on 440 MHz!*

Works with all FM handhelds up to 7 watts. Power Curve chart shows typical output power.

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- ***First-class strip-line techniques*** -- superb RF performance and reliability
- ***Custom wrap-around heatsink*** -- runs cool
- ***Reverse Polarity Protection*** -- saves your amp if you connect power backward
- ***Automatic RF sense Transmit/Receive switch*** -- makes operation easy
- ***Low input SWR*** -- keeps your handheld safe from overheating
- ***"On Air" LEDs*** -- for each band
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- ***Small size:*** just 5x1¾x5 inches
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- ***Legendary MIRAGE ruggedness***

Call your dealer today for your best price!

35 Watts for 2 Meter HTs

B-34-G

$89.95

Suggested Retail

Power Curve -- typical B-34-G output power								
Watts Out	18	30	33	35+	35+	35+	35+	35+
Watts In	1	2	3	4	5	6	7	8

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

MIRAGE RUGGED!

35 watts, FM only . . . $69.95

B-34, $69.95. 35 watts out for 2 watts in. Like B-34-G, FM only, less preamp, mobile bracket. 3⅛x1¾x4¼ inches.

160 Watts on 2 Meters!

B-5016-G

$299

Suggested Retail

MIRAGE RUGGED!

Power Curve -- typical B-5016-G output power								
Watts Out	130	135	140	145	150	155	160	165
Watts In	20	25	30	35	40	45	50	55

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

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

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

B-5016-G has legendary ruggedness. *We know of one that has been in constant use since 1979!*

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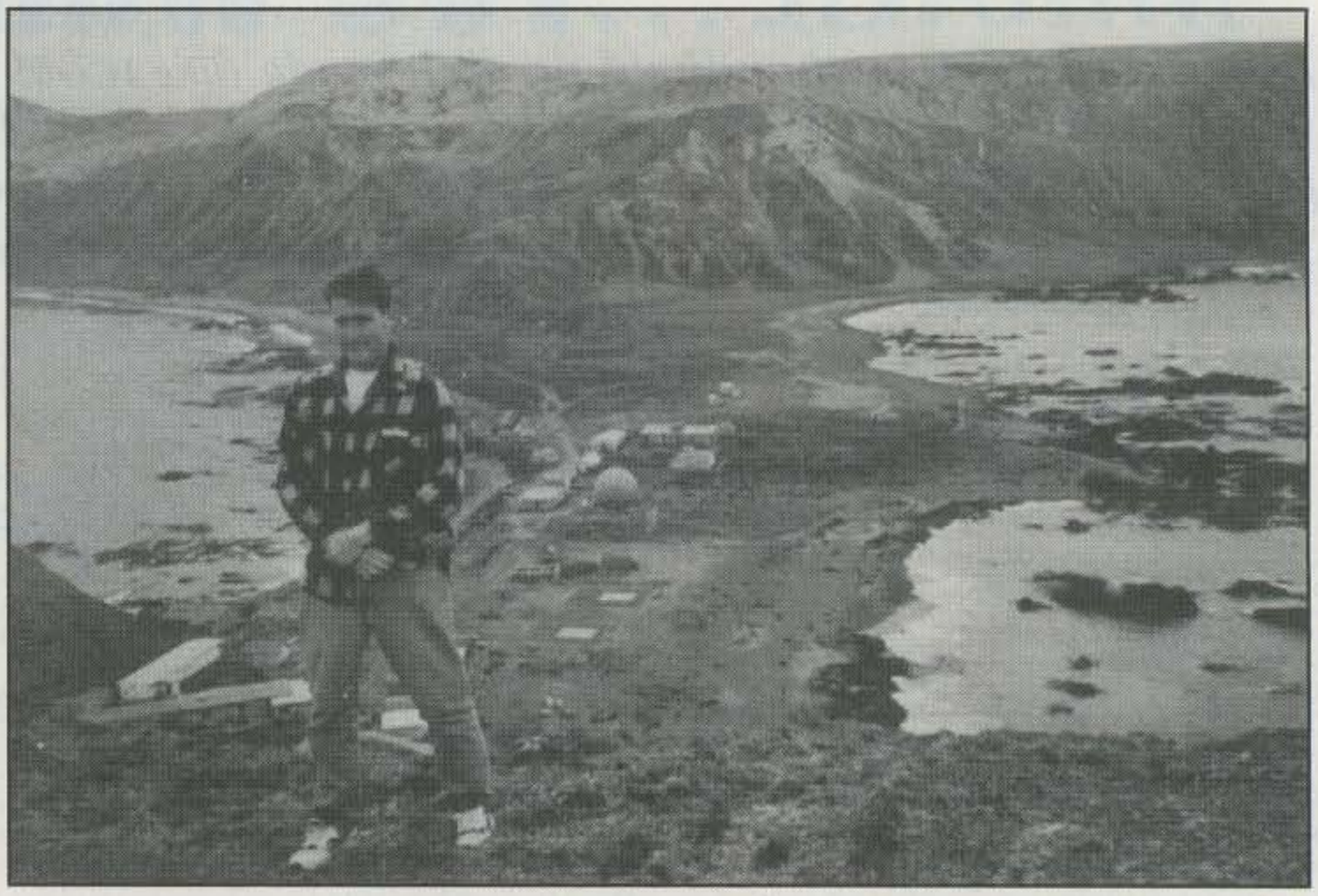


VKØWH on Wireless Hill with the Australian National Antarctic Expedition (ANARE) base on the isthmus in the background.

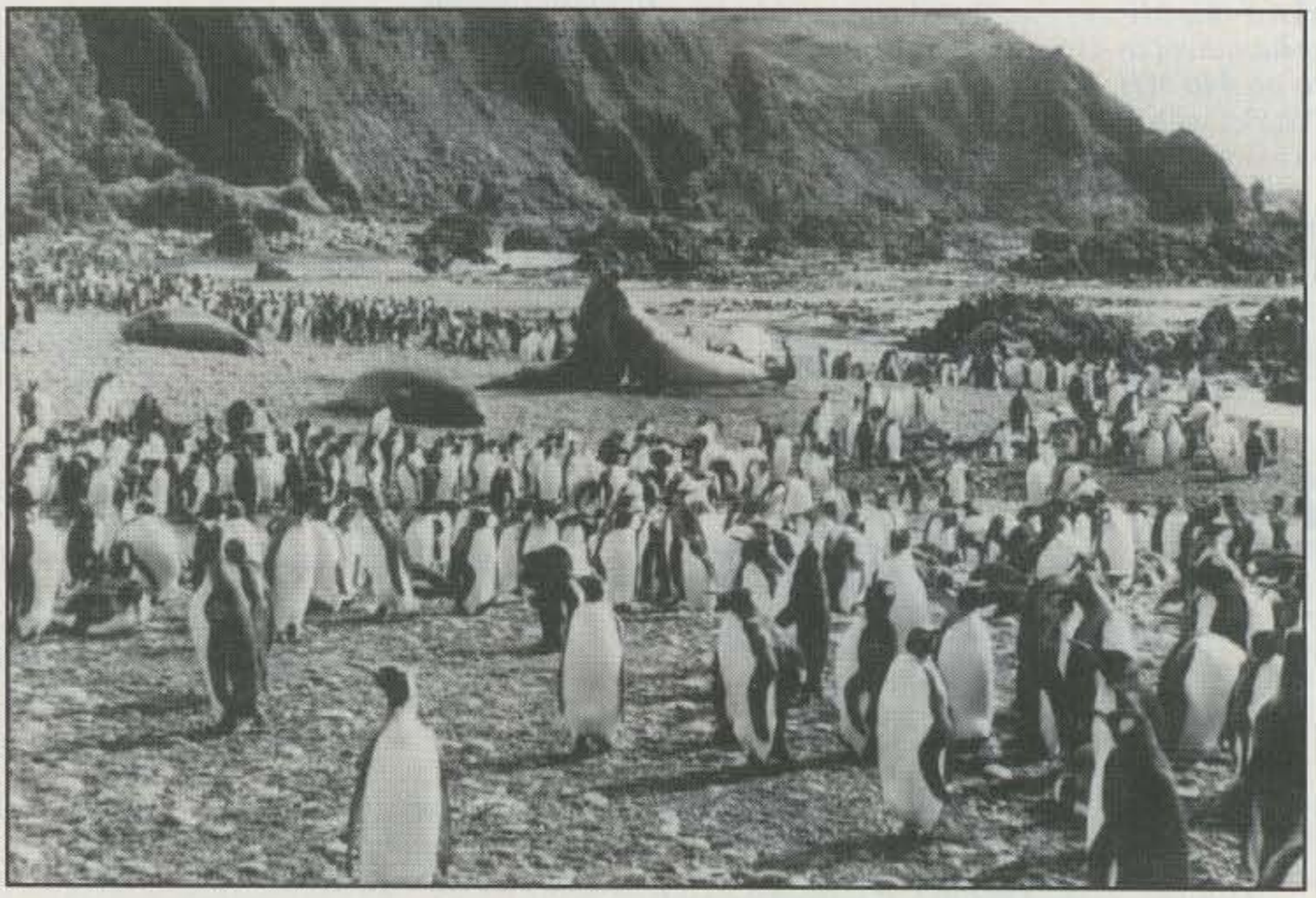
documented saga and in itself makes a great story. The archive film on the masts being installed should be seen by every radio amateur.

The Wildlife

Macquarie Island has a wealth of plants, birds, and animals. There are no trees, but it does have over 40 species of plants. Penguins are major members of the island bird community, and the King Penguin, the Rockhopper, the Gentoo, and the Royal Penguins, which breed on the island, are four of the world's 20 or so species of penguins. Their numbers are now considerable. The fur seals are back, and almost everything that was exploited so badly in the past has made a slow and steady recovery. Pictures of the island show a rare beauty—rough seas, sheltered bays, valleys, and thousands of sea birds. Skuas (the scavenger of these areas), Prion, Cormorants, and the Albatross, that miracle of birds, are all on show. In fact, Macquarie Island is a photographer's and naturalist's paradise.

Amateur Radio on Macquarie

Our hobby covers the whole world, with hardly a corner silent in radio terms. However, many of our DXCC countries are remote islands such as Bouvet, Heard, Marion, Kerguelen, Crozet, South Sandwich, and Macquarie Island. With the exception of DXpeditions, these DXCC countries usually have only sporadic activity,



The Royal Penguin colony on Macquarie. Four of the world's twenty or so species of penguins inhabit the island.

Warren, VKØWH, operating in the shack at the ANARE base on Macquarie Island. Note the straight key!

usually by a single radio amateur on a short-term basis. There is no guarantee of top-notch operators, or for that matter even an operator with any interest in DXing.

I have been lucky over many years in my involvement with Macquarie Island and the ANARE members who also were or are radio amateurs. This is partially due to my dealings with Antarctic Division over Heard Island. There is a bond among all of us who have "been south," and this includes Heard and Macquarie, as well as Antarctica itself.

It had been some years since Macquarie was active in an amateur radio sense. Warren, VKØWH, was in a very difficult and almost impossible situation, as the demand for QSOs was higher than he could possibly have satisfied. If you also consider the fact that he operated CW, many needing it as their last CW country (less North Korea, of course!), you can begin to understand.

On site there can be problems with local interference. Many of the scientific experiments have sensitive instruments. However, it is the propagation conditions which are the major limiting factor from these southerly areas. Propagation conditions (or the lack of them) can just shut down everything as a result of intense magnetic disturbances. The sight of the rippling green waves of magnetic light in the upper skies is absolutely magnificent, however. What I first saw was quite different from my annual view of the Northern Lights (Aurora Borealis) when I was a youngster.

Today things are even more difficult, with the sunspot cycle at a very low point, making QSOs a major challenge. When I listened to Warren, VKØWH, using Morse code (an almost unheard of mode from Macquarie) with a straight key and gradually improving his CW skill, it took me back in time to the days of many such operations—limited equipment, limited operating, etc. Warren brought back the feeling of real accomplishment to DXers making the QSO. Many of the QSL cards received had a short note talking about many sleepless nights and the thrill of working this very rare DXCC country. In short, DXers felt a sense of satisfaction.

Warren had no amateur radio equipment in its usual sense. He used commercial channelized equipment: three channels were programmed for 7010, 14040, and 14260 kHz. We, the DXers, could forget about split VFOs and all the trimmings. Although he listened with a tunable split, the tunable receiver left much to be desired. Being an old receiver it had an indifferent tuning rate, but as it had a good filter on CW, it worked much better in that mode.

The channelized receiver equipment was okay for commercial point-to-point work, but it was no match for the QRM of the DX wolf pack in full cry. Antennas were two Vee beams, which were always at the mercy of the wind and required frequent attention to feedlines and termination points. His signal went from S9 plus to a mere whisper when feedlines were intermittent after a storm.

Summary

I am indebted to Warren, VKØWH, for the photographs presented here. They were organized at my request, and his mother kindly had the film developed and then mailed me several photographs.

It is requested that when QSLing for VKØWH no other cards (for other callsigns) be enclosed. This really helps me. Please QSL with an SAE and return postage, and in response the fast return of a QSL card is promised. (It is hoped that this sounds like a reasonable request to you.) ■

We're coming into some prime antenna-building weather, and W6BNB has just the project for us. This one has been around for a long time and still works. Now we learn why.

A Close Look At The 40 Meter Zepp And Double-Zepp All-Band Antennas

BY BOB SHRADER*, W6BNB

This is a story about, in my opinion, the best, simplest all-band, fixed, amateur, wire-type antenna there is, bar none! This is a strong statement, but one agreed with by many amateurs.

The Simple 40 Meter Zepp Antenna

Every 15 or 20 years the Zepp antenna makes a come-back appearance in one form or another to the benefit of the newest generation of radio amateurs. The term "Zepp antenna" comes from its early use as a trailing wire antenna for old Ferdinand von Zeppelin's gas-bag airships of the '20s and '30s. To keep the antenna wire away from the body of the zeppelin, a tuned, non-radiating, open-wire, 1/4-wavelength (or some multiple of that) transmission line was dropped down out of the cabin. To the bottom of this tuned feeder system was connected a flexible wire antenna with a weight attached to its end. The term "tuned" transmission line or feeder means two parallel wires that have been cut to some multiple of a 1/4-wavelength at the frequency to be used. If the dirigible was working CW traffic on 36 meters, a 1/2-wave antenna wire 18 meters long could be connected to the end of one of the wires of an 18 meter long 1/2-wave 2-wire feedline, as an example. The common "J antenna" used on VHF and UHF bands is actually a Zepp antenna, but it is erected vertically.

With any type of 2-wire transmission line the currents in the two parallel conductors will always be traveling in opposite directions at any point in time. These opposite currents produce opposite-polarity, expanding magnetic fields. Because they are always of opposite polarity, from any distance away the two resulting fields appear as being essentially equal and opposite, and therefore zero. Such a transmission line has little losses in comparison to the dielectric losses that may occur in coaxial cables, and very little radiation of RF from it if the antenna is mismatched.

From basic antenna theory you probably remember that both ends of a 1/2-wavelength antenna wire in free space are said to have high impedance (high-Z). An "antenna tuner" (fig. 1) the original name for today's matchbox, transmatch, etc., if coupled to the low-Z (50 ohm) output of a modern-day transmitter, can produce a balanced high-Z circuit across its center-tapped, tuned inductance/capacitance (LC) output circuit.

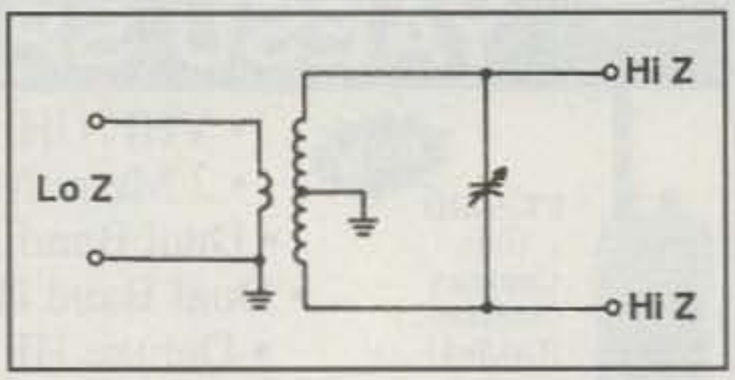


Fig. 1– A basic single-band antenna tuner.

A pair of parallel wires held apart a short distance (perhaps 2 to 12 inches) by insulated-material spacers and cut to a 1/2-wavelength at 7 MHz (66 ft.) will present a high-Z between the two ends of the transmission-line wires. (A 1/2-wave transmission line can also be used to couple between two low-Z circuits.) Any electrical 1/2-wavelength feed line repeats its impedance, high at both ends or low at both ends, depending on the source and load impedances across which it is connected. A 1/4-wavelength transmission line, on the other hand, reverses its impedances, high-to-low or low-to-high. If one end of a "resonant" 1/2-wave 7 MHz, 66 ft. antenna wire (high-Z) is connected to the top end of one of the wires of a 66 ft. long 2-wire transmission line, a Zepp antenna is formed (fig. 2). Surprisingly, the transmission line's other wire just hangs out there, connected to nothing except insulators that hold it in place.

The Zepp antenna forms a matched-impedance system, with everything connected together at high-Z points. The transmitter antenna tuner's high-Z output circuit connects to the high-Z input of a 1/2-wave transmission line. The high-Z output of the 1/2-wave transmission line connects to the high-Z end of a 1/2-wave flattop antenna wire. Since everything matches impedance-wise, such an antenna should accept power and radiate it very well, and it does.

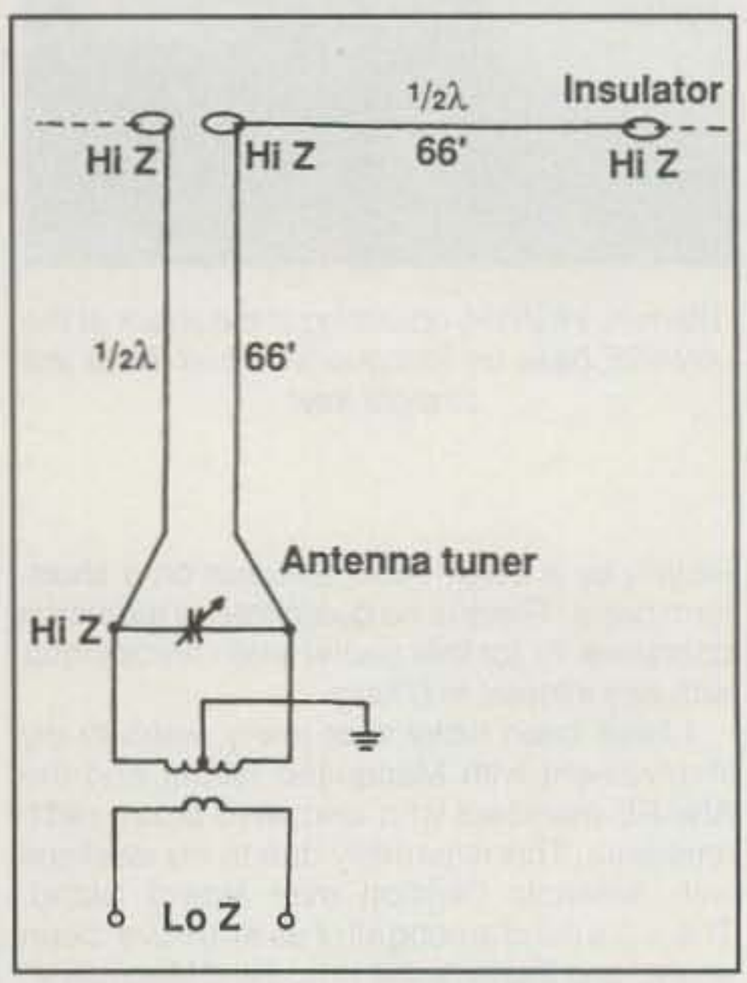


Fig. 2– The basic Zepp antenna for the 40 meter band.

If a Zepp were to be used on 7.05 MHz, in the CW portion of the 40 meter band, both the 1/2-wavelength transmission line and the 1/2-wavelength flattop would be about 66 ft. long. If you do the computations (length in feet of a 1/2-wavelength wire = $468/f_{MHz}$), it computes as 66.8 ft. long. But at 7.2 MHz, in the phone part of the band, it should be 65.0 ft. long. Actually, a 66 ft. flattop and 66 ft. feeder on 40 meters can have any slight improper length corrected merely by adjusting the antenna tuner knob a little whenever the transmitting frequency is changed. This can be accomplished by tuning for a minimum SWR indication on the transmitter's SWR meter, or on a separate SWR meter added between the transmitter and the antenna tuner. Tuning for a maximum indication on a field-strength meter in the shack (equidistant from both feed lines and as far away from them as possible) works quite well, too.

The radiation lobes for a horizontal 1/2-wave resonant antenna are known to be maximum

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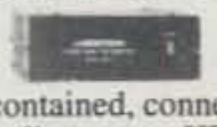

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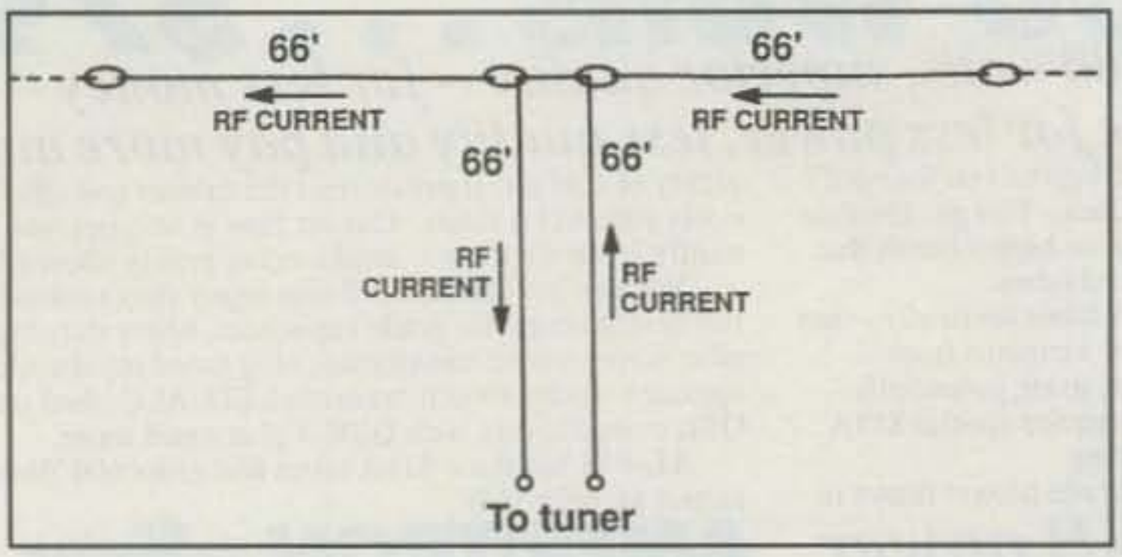

Fig. 3– A 40 meter Double-Zepp antenna. This drawing shows 1/2-wavelength flattop currents in phase, making it a 2-element beam.

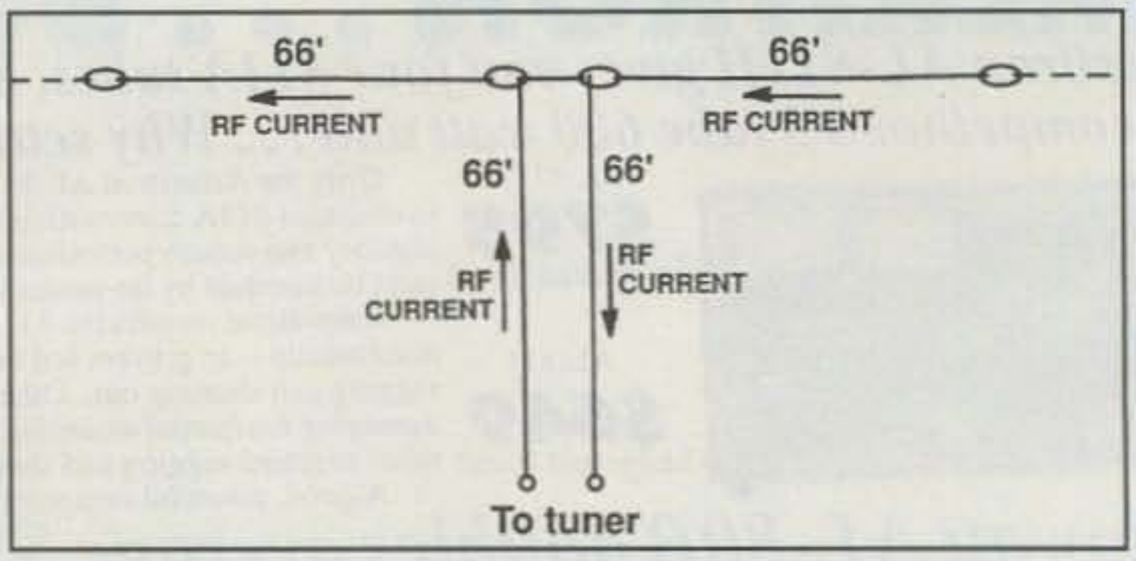

Fig. 4– The same antenna as fig. 3, but for 80 meters. This shows the flattop as a single 1/2-wavelength dipole antenna.

at right angles to the wire. Therefore, if your antenna wire runs north and south, you should transmit best east and west, right? Correct, but hold on. Distant amateurs to the north and south of you also will be receiving those parts of your radiated fields that travel upward at perhaps 20° to 80° and in line with your antenna wire. These are then either reflected or refracted (bent down) by the Heaviside layers. Any north/south amateurs theoretically will see your signals approaching them as vertically polarized waves from out of the Heaviside layers. You actually will be radiating a respectable amount of these vertically polarized signals in the north/ south directions for many hundreds or thousands of miles. Since the Heaviside layers tend to rotate the polarization of signals traveling through them, such refracted or reflected signals may be received at a distance as either horizontally or vertically polarized signals.

The Zepp on Higher Frequency Bands

One of the beauties of this antenna is that on the 20 meter band the same 66 ft. dimensions are now full-wavelengths. The full-wave flattop will still have high impedance at both ends (as well as also in the middle now). The same is true for the feeders. So everything still matches! Furthermore, all of the coupling points will also be high-Z points for the 15 and 10 meter bands. When operating as a full-wavelength antenna, there will be maximum radiation lobes at about 50° from the wire, and theoretically no radiation at 90° (at right angles to the wire). But here again the Heaviside layers get into the act. Radio waves hitting these constantly undulating layers may not only be shifted in polarity to some degree, but may be refracted in one direction or another. The radio waves wind up being dispersed into zones back on earth that simple antenna theory says should have no signal in them at all. This results in a fairly omnidirectional antenna.

On the higher frequency bands the antenna is progressively electrically longer and has more major radiation lobes. It begins to transmit most of its total radiated energy in the general directions of the antenna ends. However, it also develops minor lobes which radiate signals in other directions fairly well. As you can see, the Zepp should be quite a good all-band antenna when used on any HF band, but it does require an antenna tuner because it is using tuned feeders.

If the feeder is only a 1/4-wavelength long at a given frequency, its high-Z value end at the flattop will then appear as a low-Z at 1/4-wavelength away at the transmitter. To couple such a feedline's low-Z to the 50 ohm output of a transmitter a 1:1 balun could be used, or the tuner may have circuits in it that allow it to couple low-Z to low-Z.

Working 80 and 160 Meters With a 40 Meter Zepp

At first one might think that this would be impossible. However, if you connect the two 66 ft. feedline wires together at the shack and attach them to **one end** of the balanced antenna tuner output, you now have a wire antenna **1/2-wave** long for 80 meters (132 ft.). This provides a resonant high-Z end of the antenna for either of the high-Z points on the antenna tuner, and it works!

If the two feeders are connected together at the shack end, the whole antenna can also be used as a **1/4-wave** conductor for 160 meters, providing a ±37 ohm impedance to the transmitter. This can be plugged directly into the 50 ohm output connector of most modern transceivers and should provide a 50÷37, or 1:1.35 SWR match, which is very acceptable. If you want to tune to minimum SWR over the complete 160 meter band, add a 30-turn, 2 inch diameter, tapped coil to the bottom end of the feeder wires and in series with this a ±200 pF variable capacitor. Feed this into the transmitter output connector. By selecting the desired tap and varying the capacitor, you should be able to obtain a low SWR at any frequency on the 160 meter band. You will need a good ground for 160 meter work, though. This usually means at least 4 or more 1/4-wave radials connected to a 6 to 8 foot driven ground-rod as close to the transmitter as possible.

So far no mention has been made of one important point. Because the flattop wire is connected to only one of the simple 40 meter Zepp's two balanced 1/2-wave feed lines, the system is somewhat unbalanced. Some out-

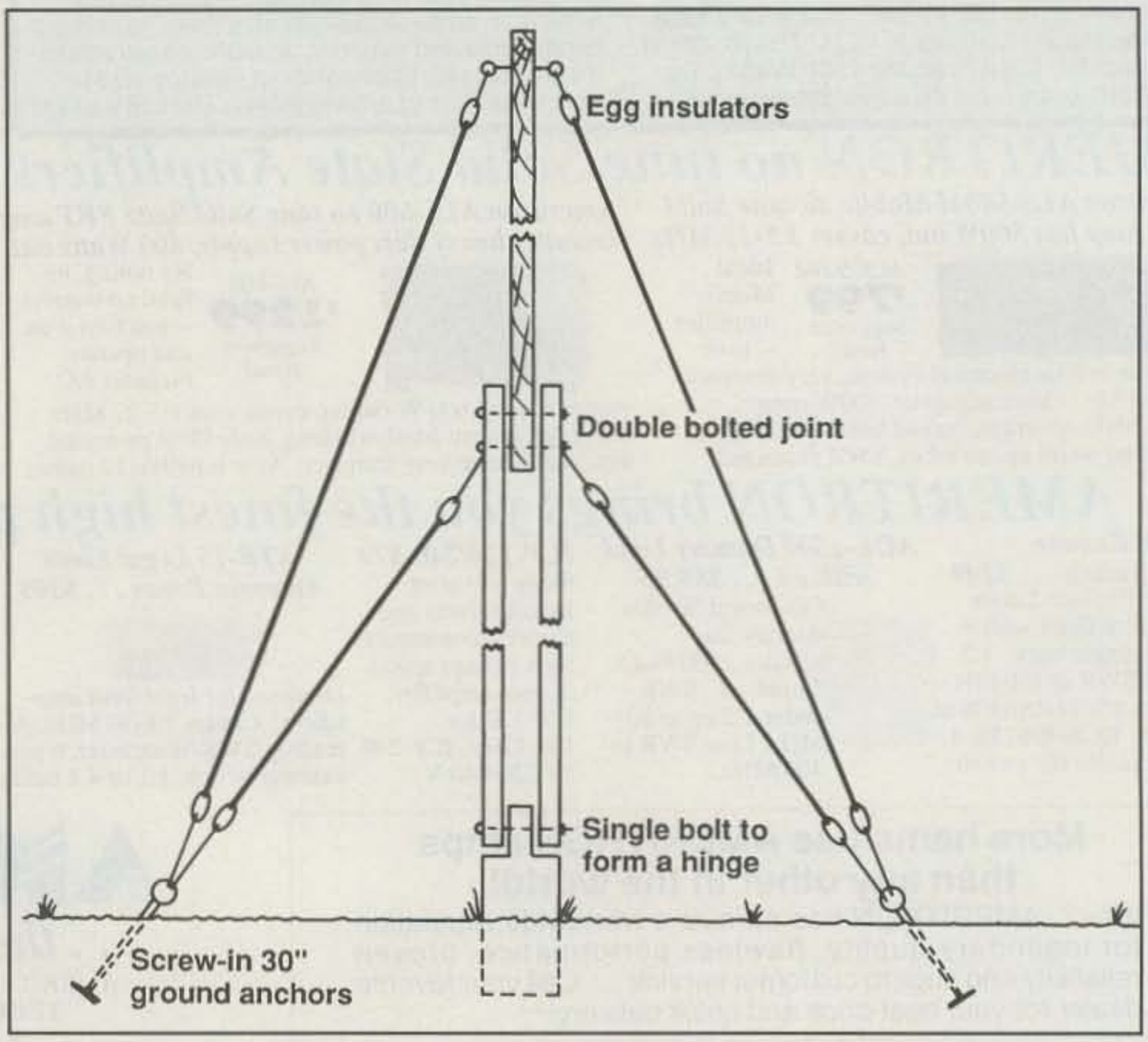

Fig. 5– Suggested design for antenna support pole, using 22 ft. 2 × 3 lumber.

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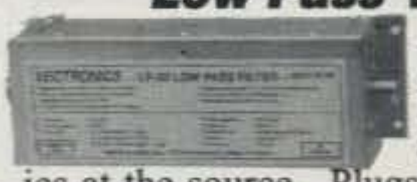
$79.95
PM-30UV
$89.95

PM-30, $79.95, for 1.8 to 60 MHz. Displays forward and reflected power and SWR simultaneously on dual movement Cross-Needle Meter. True *shielded* directional coupler assures accuracy. Backlit meter displays peak or average power in 300/3000 Watt ranges. First-rate construction includes scratch-proof case/front panel. 5.3x5.75x3.5 inches. SO-239 connectors.
For 144/220/440 MHz, 30/300 Watt ranges. PM-30UV, $89.95, has SO-239 connectors. PM-30UVN, $89.95, has N connectors. PM-30UVB, $89.95, has BNC connectors.

1500 Watt *dry* Dummy Load

DL-650M, $64.95. Handles 100 watts continuous, 1500 Watts for 10 seconds to 650 MHz. Ceramic resistor. SWR < 1.3. SO-239 connector. **DL-650MN, $69.95** has N connector.

Low Pass TVI Filter



LP-30, $69.95. Eliminates TVI by attenuating harmonics at the source. Plugs between transmitter and antenna or tuner. Handles 1500 watts.

High Pass TVI Filter

HPF-2, $24.95. Installs between VCR/TV and cable TV or antenna lead-in cable. Eliminates or reduces interference caused by nearby HF transmitters.

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of-phase RF voltage and current will be reflecting back down the unterminated feedline and not all of the RF will be radiated from the flattop out into the atmosphere. Because of the slightly unbalanced feedline currents, there is some radiation from the feeder. More important probably, there may be some increase in power-line noise (which is mostly vertically polarized) when receiving with the simple Zepp antenna. What can be done to prevent this unbalance?

The 40 Meter Double-Zepp

If connecting one 66 ft. flattop to the top of the tuned transmission line results in a somewhat unbalanced system, how about balancing the antenna by adding another similar 66 ft. flattop to the other top terminal of the feed-line (fig. 3). Now you have a really great antenna! This antenna can be called a 40 meter double-Zepp, or two 1/2-waves in phase, or a fixed 2-element beam on 40 meters. It also tunes and works well on the 80, 30, 20, 15, 17, 12, and 10 meter bands. Because currents at the top of the feeders are always 180° out of phase, they drive in-phase currents into the two halves of the flattop. Of course, the double-Zepp does require twice the real estate of a simple Zepp, but because its feedline is balanced, it does not pick up vertically polarized noises—a real advantage when listening for DX!

The 40 Meter Double-Zepp On 80 Meters

On 80 meters each of the flattop sections is only a 1/4-wave long, making the whole flattop a 1/2-wave fed at the center with a 66 ft. 1/4-wave transmission line (fig. 4). All impedances match on 80 meters because the feeder is now high-Z at the antenna tuner and low-Z at the center of the 80 meter dipole. It makes an excellent resonant, low-loss, horizontal-radiation *dipole* on 80 meters.

The 40 Meter Double-Zepp On 160 Meters

It may tune up and work, but not as well as one would like. On 160 meters the whole system, end to end, is 264 ft. long, or a 160 meter 1/2-wavelength. The center of this 1/2-wave wire, if opened, represents low-Z points. It can be coupled to the transmitter's 50 ohm output through a 1:1 balun. But the flattop, the only radiating portion of the antenna, is only a 1/4-wave long on this band. The antenna is a more efficient radiator if only one of the transmission lines is coupled to the transmitter's 50 ohm output fitting (as was done with the simple Zepp). The other feeder wire can be connected to the first, or left disconnected. Only a 1/4-wavelength wire is operating as the antenna now. For 160 meter operation, the transmitter must be connected to an adequate radial system as mentioned above. How well this antenna will radiate depends on its height and how good its ground-radial system is.

The Zepp, the double-Zepp, and the 80 meter dipole are Hertzian antennas. The ground system for Hertzian antennas is relatively unimportant. On the other hand, 1/4-wave antennas are Marconi types and use the earth as the other 1/4-wave needed to make them resonant 1/2-waves. (The earth can be considered a nearly infinite number of 1/4-waves.)

Erecting The Antennas

If you can get two ±66 ft. poles up and guyed, you will have a real winner. If you are like many of us, you may have to get along with perhaps a 4 × 4 redwood post sticking up a foot or so out of the ground, to which you can single-bolt two 22 ft. 2 × 3s, making a simple bottom hinge providing fairly easily pushed-up and lowered poles. At the end, between the two 2 × 3s, you can overlap by about 12 inches and double-bolt another 22 ft. 2 × 3, making the poles about 43 ft. high (fig. 5). I find that 30 inch screw-in ground anchors obtained from a vineyard supply store make excellent points to which guy wires can be tied. Guys should be insulated a couple of places using egg insulators, using wires **not measuring** 1/2-wavelength at any of the bands to be used. Only two poles would be required for a simple Zepp. The weight of the feeders attached to the middle of a double-Zepp 132 ft. long wires tends to pull the center of the antenna down too much. I use three poles in line, with about 70 ft. spacings between them for my double-Zepp. To the top of my center pole I nail a 12 inch 1 × 2 with insulators at both ends. The two flattops are attached to these insulators, as are the two transmission line wires. With the center pole taking all of the downward pull of the transmission line and flattops, none of the flattops or the three-each top and middle guy wires on the three poles have much strain on them, so they never have to be taut. If you are in an area where erecting an antenna requires a building permit, you might consider just hanging the antenna from properly spaced trees or buildings. I am out in the country and don't have to worry about little things like that.

Spacing of the Transmission Line

The amount of spacing between the feed-line wires is not critical. If closely spaced, 2 inches perhaps, the wires might conceivably vibrate in the wind and short together. If too wide apart, 18 inches perhaps, there may be a little radiation from them on higher frequency bands. Since a constant impedance along the feed lines is not important, the wires don't even have to be the same distance apart all along the line. Spacers should be inserted about 5 to 6 feet apart if the wires are spaced 5 to 6 inches—3 feet apart if the wires are spaced 3 inches—and so on. Spacers may be ceramic or plastic rods with holes at the ends to which the feeder wires are tied. Many a Zepp has worked well for many years using 6 inch wooden dowel spacers, if well dried and then boiled in wax, or oven-dried and then sprayed with several coats of clear acrylic enamel.

If you are pushed for space, you can always bend down the ends of any flattop-type antenna. Suppose you want a 132 ft. flattop for your 40 meter double-Zepp but you only have 100 ft. of real estate available. You could bend down the last 16 ft. at each end. Will it still be resonant at the same frequency? No, because when you bend an antenna wire back on itself completely (180°), by 16 ft. for example, you lose 16 ft. of its length. If you bend the wire down at a 90° angle toward ground (or to the east or west, etc.) you will be cancelling some of the inductance of the wire, so you will have to add a few feet of wire to make up for this loss. Also, if you bend your open-wire feeders at a sharp angle, you will find that you have to add a few feet to them to produce their desired resonant length. (This is not true with coaxial feeders, of course.)

If a north/south flattop double-Zepp wire antenna is erected in the shape of an "inverted-V" (tall antenna pole in the middle, much shorter poles at the ends of the flattop) there will be the normal horizontally polarized signals going east/west plus some augmented vertically polarized signals going north/south, producing a nearly omnidirectional energy radiation pattern.

You should be very pleased with the results obtained from the highly efficient open-wire-line fed 40 meter Zepp or the 40 meter double-Zepp. If you can double the lengths to produce an 80 meter Zepp, or an 80 meter double-Zepp, you will have an even better antenna. It all depends on whether you have 66 ft., 132 ft., or 264 ft. of real estate available. Any of these antennas is well worth a try. ■

VE3ERP shows us how to remodel the meddlesome muddle in the middle of the mess on your desk. It's easier to do than to say three times fast.

The QRP MudMod (Muddle Module)

BY GEORGE MURPHY*, VE3ERP

There is good news and bad news about QRP. The good news is QRP is fun, inexpensive, and educational. QRP homebrewing provides a sense of accomplishment that far outweighs anything experienced by pushing redundant buttons on a Pandora's Box that costs a couple of thousand dollars, is designed by an impersonal corporation, and is assembled by automated machinery in some far away factory. The bad news, however, is it does not take very long for your desktop to become a messy muddle of lovable little transmitters and receivers awash in an alligator (clip) infested sea of tangled wires.

There Is Help

You can restore order to this chaos by condensing the muddle into a module, thus creating a neat and tidy "MudMod" into which you plug your QRP rigs. This is not a construction article, but the suggestions presented may inspire you to build one to suit your own requirements. The objective is to design a MudMod that contains elements common to most simple QRP receivers and transmitters. Leave all these elements out of the rigs you build and simply plug the stripped-down rigs into the MudMod.

There is nothing new about any of this. The basic module was described in an issue of *QST* back in 1986.[1] The sidetone generator[2] and the L_o-T_{ECH} Transmatch[3] came from standard reference works. The power-supply circuit has been around since semiconductor came to mean more than just a guy with a part-time job with the railroad.

In the example shown, the MudMod provides the following:

- Input connections from a single power source.
- Power on/off switch for the whole QRP station.
- Semi break-in keying of any transmitter.
- Automatic on/off power switching of receiver and transmitter.
- Automatic antenna switching between receiver and transmitter.
- Reed relay keying of any type of transmitter keying circuit.
- Keying monitor.
- Key, audio output, and Transmatch jacks for the whole station.

*77 McKenzie St., Orillia, ON L3V 6A6 Canada

A Transmatch for single-wire antennas is also shown. Use a more sophisticated Transmatch if you have one. The whole station can be powered by whatever you have at hand, or you can build the simple, bare-bones QRP regulated power supply shown. While most 12 volt relays will work at lower voltages, a 12 volt supply is recommended, even if it means adding dropping resistors to the QRP rig you designed to run on a 1.5 volt watch battery or a lemon with two wires sticking out of it. If your transmitter is keyed by turning its power on and off, you can run a jumper between terminals H and L, and power the transmitter from terminal K.

How It All Works

When you turn the MudMod main power switch on, the station goes into **Receive** mode. To **Transmit**, all you do is start keying. In the next millisecond or so here is what happens:

1. Timer U1 turns on and stays on until you stop keying for the time period set by R1. In the meantime, every dit or dah you send resets the timer to keep it turned on.

2. Timer U1 turns the receiver off, turns the transmitter on, switches the antenna from the receiver to the transmitter, and turns on the sidetone generator. Q1 injects the sidetone into the audio output as the transmitter is keyed. Volume control R2 provides eardrum protection. QRP being what it is, sidetone volume should be set to a level about equal to the signal being received to prevent you from interpreting your loud sidetone as an RF power output indicator.

3. When keying has stopped for a preset time (such as between words or a longer pause between sentences), U1 turns off and the station returns to **Receive** mode. Start keying the next word and you are back in **Transmit** mode.

L_O-T_{ECH} Transmatch

Switch position A is for antenna lengths of 1/4 wavelength or odd multiples of 1/4 wavelength. Position B is for antenna lengths of 1/2 wavelength or any multiple thereof. Or you can employ the pragmatic position, disregard this instruction, and use the position that works best.

Pilot lamp PL1 is the SWR and RF output indicator. Fiddle with S1 and C1 for the brightest output of PL1. L2 consists of a few close-wound turns of insulated wire. Experiment with different pilot lamps, the number of turns, and the proximity of L2 to the antenna lead. Install the pilot lamp in a socket, because you may have to change lamps when you change rigs from a single transistor transmitter to a 5 watt "band blaster."

Typical values for C1 and L1 are:

Band	C1	L1
160 m	150–400 pF	41 µH
80 m	50–200 pF	20 µH
40 m	25–150 pF	10 µH
30 m	10–75 pF	7.5 µH
20 m	10–75 pF	5.3 µH
17 m	10–50 pF	4.2 µH
15 m	10–50 pF	3.5 µH
12 m	5–35 pF	3.0 µH
10 m	5–35 pF	2.5 µH

Oddball capacitor ranges can be obtained by combining fixed and variable capacitors in series or parallel. Inductors can be hand wound air-core coils or toroid jobs, all of which can be designed by tedious pencil and paper calculations or . . .

Finally

If you have a computer, you can custom design everything discussed herein and a whole bunch of other stuff by using HAMCALC ("Painless Math for Radio Amateurs") software. If you would like a free MS-DOS 3 1/2" 1.44 Mb HAMCALC disk (over 160 programs), just send me a check or money order for US$5 to cover my cost of materials and airmail postage and I will send one to you, anywhere in the world. I fully realize that five bucks may represent the entire budget for your next QRP rig, but that's the way it goes in the fast lane.

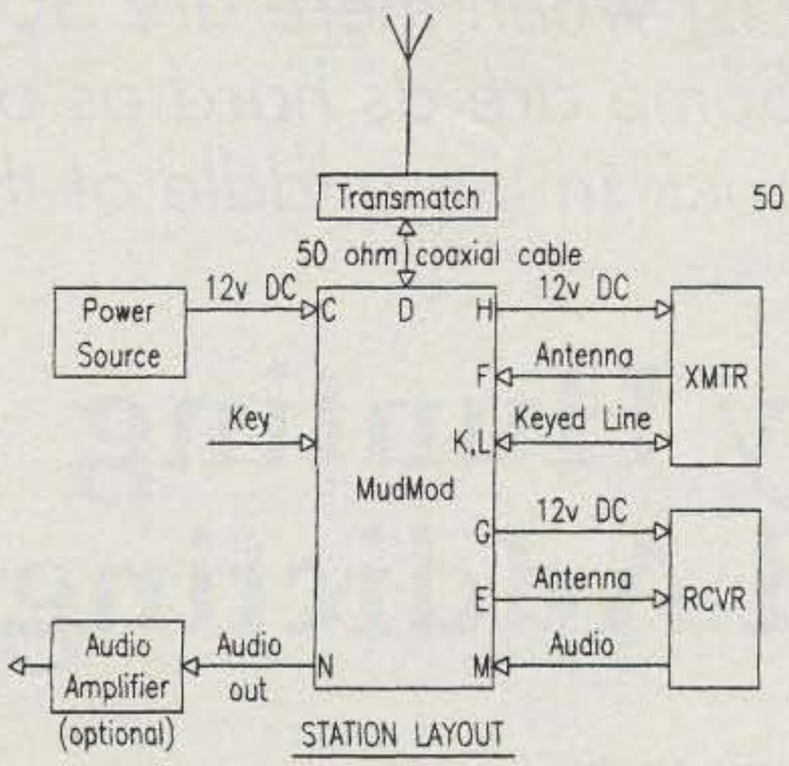
Footnotes

1. George Murphy, "The UnKeMo," *QST,* February 1986, p. 27. Unfortunately, there was an error in the schematic diagram, which I will be pleased to describe to anyone who asks.

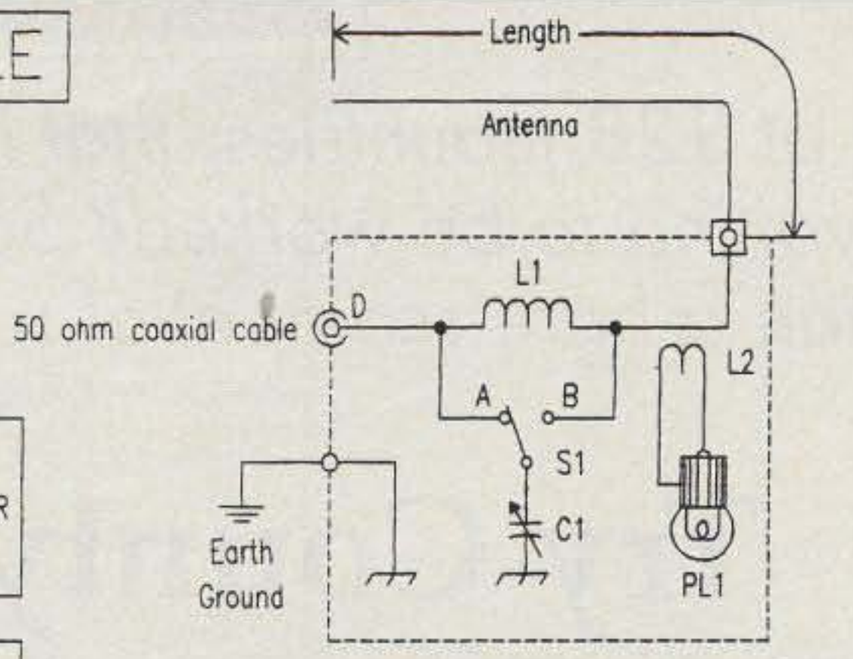
2. *ARRL Electronics Data Book,* 2nd Edition, p. 8-15, fig. 8-15(B).

3. *ARRL Electronics Data Book*, 1st Edition, p. 71, which also shows a universal pi-section circuit for *any* length of wire, requiring *two* expensive variable capacitors. In designing the MudMod I closed my eyes to this fact in the hope it would go away. ■

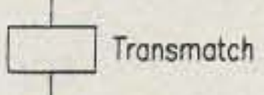
QRP MUDDLE MODULE

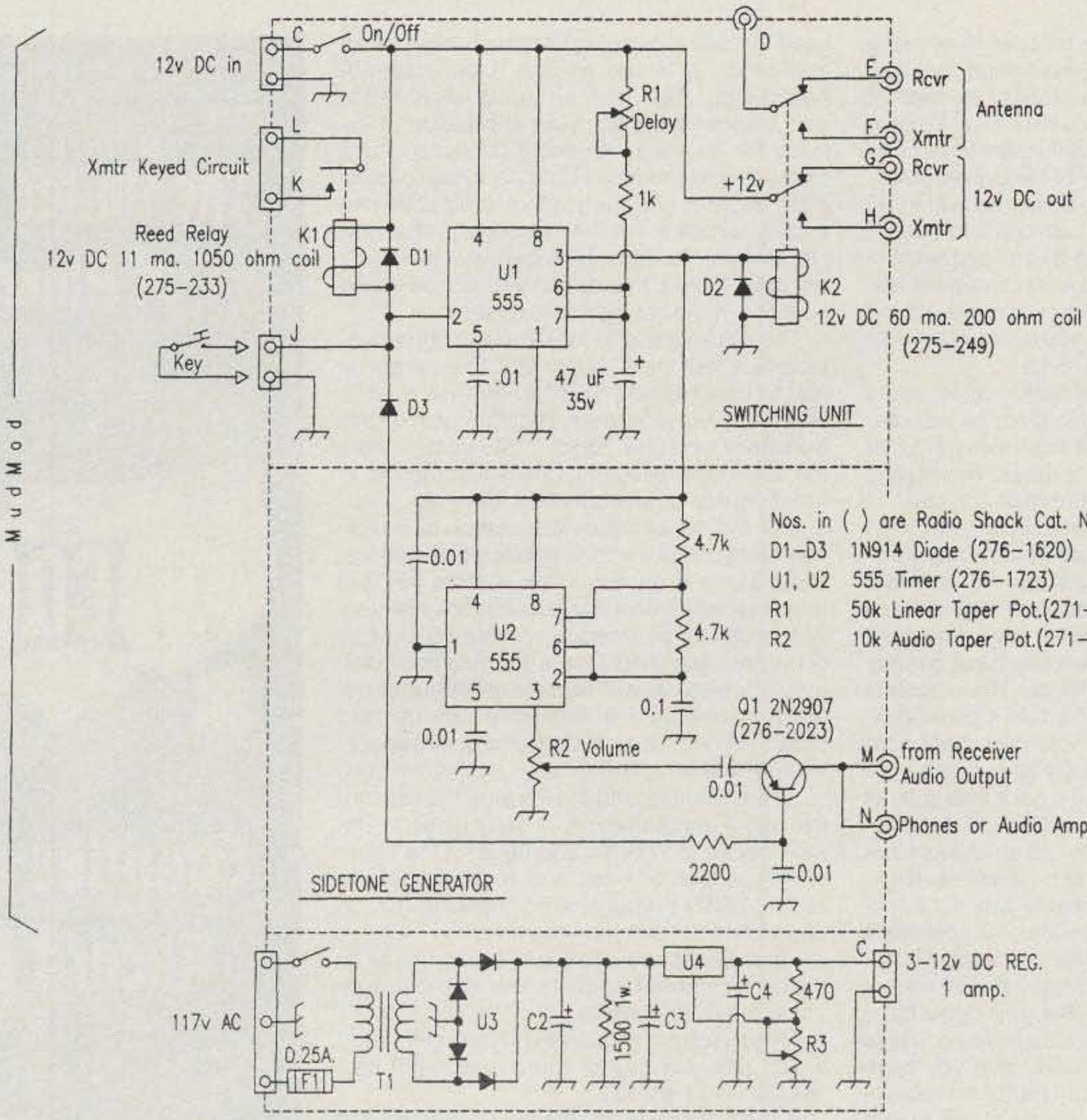


STATION LAYOUT



Lo-Tech TRANSMATCH for SINGLE-WIRE ANTENNA
(see text)





Nos. in ( ) are Radio Shack Cat. Nos.

D1-D3 1N914 Diode (276-1620)
U1, U2 555 Timer (276-1723)
R1 50k Linear Taper Pot.(271-1716)
R2 10k Audio Taper Pot.(271-1721)

QRP POWER SUPPLY

Nos. in ( ) are Radio Shack Cat. Nos.

C2 4700 uF 35 WVDC Electrolytic Capacitor (272-1022)
C3, C4 1.0 uF 35 WVDC Tantalum Capacitor (272-1434)
R3 5k Linear Potentiometer (271-1714)
T1 117v/12.6v 1.2 amp Transformer (273-1505)
U3 1.5 amp 100 PIV Full Wave Bridge Rectifier (276-1152)
U4 LM317 Voltage Regulator (276-1778)

Fig. 1– The schematic diagram for the QRP muddle module.

Why stop at 328 (countries, that is) when there are 3076 counties waiting to be worked? Some are as hard as or harder to work than a bare scrimpet of rock in the middle of the ocean.

Try County Hunting It's Fun and Addicting

BY BOB BOYD*, W1VXV

County hunting is the process of working toward the goal of confirmed two-way contacts with other stations in each of the 3076 counties of the United States. Did you know that only about 920 certificates have been issued by *CQ*, the sponsor of the United States County Award (USA-CA), in the more than 30 years that the program has been in place? Have you heard about the award and wanted to know more about how to work toward achieving it? Read on as the mystery is removed and tips are provided to enable you to easily achieve one or more of the award steps.

The USA-CA Award is available to amateurs everywhere and is issued to them as individuals for all county contacts regardless of what call or QTH was used, or the dates. This means that if you have lived in more than one state or country, or you have operated in another state or country while on a vacation trip or DXpedition, those county contacts can be counted. Since the award is issued in seven classes (500, 1000, 1500, 2000, 2500, 3000, and 3076 counties worked), you probably have already qualified for one or more steps! The complete rules and a copy of the "USA-CA Record Book" (which must be submitted with the initial award application) can be obtained by sending your request and $2.50 to *CQ*. To get a free copy of the rules only, send just an SASE.

Most QSL cards used by US amateurs have the county printed as part of the address. If that is not the case, and the county was not handwritten on the card by the sender, the post office Zip Code Directory can be used to resolve questions concerning what county the station was in.

Let's assume that at this point you have thumbed through all those shoeboxes and logs of past contacts, and you find that you have accumulated X number of county contacts—perhaps even enough for one of the award steps. What should you do next, and how can you accumulate even more two-way contacts in a minimum amount of time?

You must record the contacts in some manner so that you know what counties have been worked to date and what counties are outstanding. The "USA-CA Record Book" must be used for record-keeping until such time as an application is made for the initial USA-CA Award step. After that, an alphabetical listing may be submitted with your application. Certainly the best way to record contacts, track awards, and produce listings is to use a computer logging program. Most programs can quickly advise if you have worked, for example, Coffee, Georgia, or if you have worked it but don't have confirmation yet, or how many counties you have worked overall.

The quickest way to make many county contacts is to visit the 20 Meter Mobile Emergency and County Hunters SSB Net on 14.336 MHz. Most serious county hunters congregate on this frequency, and on 7.238 or 7.243 MHz, to work the various mobiles that check into the net to run a county or a county line. Normally a volunteer will act as net control station to coordinate net activities and announce the mobiles. Fixed stations do *not* check into the net, but they instead monitor the net and make contact with mobiles as needed. Amateurs new to county hunting should listen carefully and familiarize themselves with how the net operates before transmitting! Note that whole calls are used without phonetics, unless phonetics are specifically asked for.

If I am a mobile and it is my turn, the net control might announce me in this manner: "The next mobile is W1VXV and he is on the county line of Cumberland and Androscoggin in Maine. W1VXV, your starting time is 1645Z; go ahead and put out your counties."

I then would say: "This is W1VXV mobile on the county line of Cumberland and Androscoggin in the state of Maine, QRZ."

Many stations (hopefully) would call, and I would pick out one or more and might say: "K1ABC, you are 57."

K1ABC typically would reply: "I QSL the 57; you are also 57."

I would confirm by saying: "Thanks for the 57; N2XYZ you are . . ."

It is important to note several things. First, each station confirms what he received as a report from the other station. If this is not done, or is not correct, it is not a valid contact and won't be logged by the mobile. Second, the exchanges are brief with no other information usually given. The object after all is for as many stations as

CQ's "USA-CA Record Book" is required to apply for the initial USA-CA Award.

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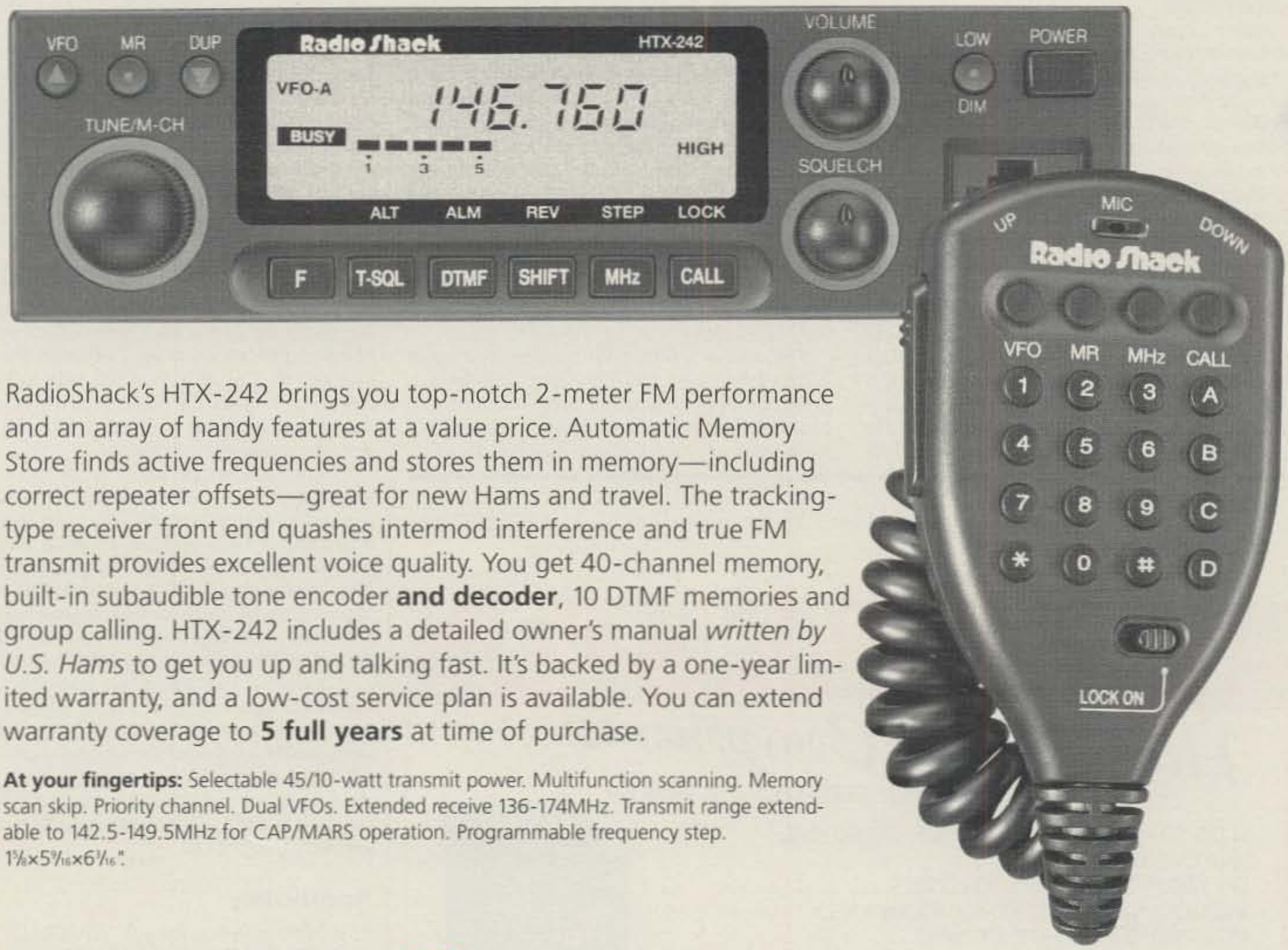

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CIRCLE 2 ON READER SERVICE CARD

possible to contact the mobile within his time period, which is usually ten minutes but may be less if there are many mobiles checked into the net. At the end of the ten minutes if stations are still calling, the mobile usually will be moved off net frequency to continue his run. After the strongest stations have been worked, weaker stations may have their call letters relayed to the mobile by the net control. The mobile and the station working him both must copy their signal reports unassisted. After exhausting the calling stations on 20 meters the mobile will usually QSY to 49, and perhaps even 75, if he has the capability. He may even go to CW at 14.0565 MHz. CW county hunting is very popular!

Depending upon how many hours he or she can spend on the net, it is possible to work 20, 30, or even 40 different counties in a day. If you have spent time hunting counties by yourself, you already know how slow it can be. Twenty new counties could take a long, long time.

Contacts with mobiles are confirmed by means of a mobile reply card (MRC). Fig. 1 shows a typical MRC, which confirms contacts with N4CD who was mobile in the nine indicated counties. You fill out the MRC with all the data (which can be for any number of counties) and mail it to the mobile with a self-addressed, stamped envelope (or you may use the mobile QSL bureau[1]). It is customary to mail your QSL card with the MRC the very first time you contact a mobile.

Many county hunters belong to the Mobile Amateur Radio Awards Club (MARAC), because it sponsors a large number of awards for working mobiles in different counties. For information on the MARAC program send a business-size envelope with two units of postage to the secretary.[2] MARAC publishes a monthly newsletter called the "County Line Road Runner," which is of interest to many county hunters. It also sponsors several contests, a national convention, and a number of district conventions each year. The 1998 national is planned for San Antonio, Texas.

There are many aids available for county hunting, but unfortunately that fact is not well-known. The B&B Shop[3] prints MRCs and publishes a county hunter handbook, directory, logbook, mapbook, and other aids. Write to Bill to ask about his "special 1000" offer which includes 1000 MRCs, the aids mentioned above, and the "USA-CA Record Book." I have found the books to be especially useful, and I cannot imagine hunting counties without them. For example, the map book contains a map of each of the 50 states with each county clearly outlined. With this tool and knowing the direction of travel of a mobile, you can quickly determine if he or she is headed toward a county you need.

Confirming QSO
FROM ARS N4CD **TO ARS** W1VXV
Mode: CW ☐ SSB ☒ FM ☐ MOBILE ☒ PORTABLE ☐ FIXED ☐
MARAC # _____ USA-CA # _____ 2nd Time # _____

DATE	UTC	MHZ	RST	ST	COUNTY	LC
6-28-96	1953	14.3	59	TX	WILBARGER ✓	
6-28-96	2103	14.3	55	TX	CHILDRESS ✓	
6-30-96	1341	14.3	55	CO	COSTILLA ✓	
7-7-96	2206	14.3	59	WY	PLATTE ✓	
7-9-96	1333	14.3	55	ND	ADAMS ✓	
7-9-96	1333	14.3	55	SD	PERKINS ✓	
7-9-96	1456	14.3	59	SD	CORSON ✓	
7-9-96	1653	14.3	55	SD	DEWEY ✓	
7-9-96	1940	14.3	55	SD	EDMUNDS ✓	

B&B Shop

Signature

Fig. 1– A typical validated mobile reply card.

The B&B Shop publishes a weekly newsletter call the "Weekly Hunter," which contains news of upcoming mobile trips and address changes, and they sell a computer program called PEACH, which allows lookup of QSL addresses of county hunters and printout of address labels. Incidently, I've found that county hunters return MRCs at the rate of 99.99%, a very pleasant experience indeed.

There is a Internet Web page located at <http://www.delve.com/ch/> which contains a great deal of information for county hunters and provides a news group where e-mail is posted. Here you can read through a sequence of e-mail to find, for example, how someone resolved an RFI problem, or get information on an upcoming mobile trip, or discover who qualified recently for what county hunters award.

You may find, as I did, that you'd like to operate mobile and put out counties as you travel. The only special requirement is that you have a method of logging every contact, because many of the stations that contact you in your travels will send you an MRC, which you need to validate and return in the provided SASE. Many mobileers find it easiest to use a tape recorder to capture each contact as it occurs. This saves time while you are putting out the counties, but requires that you transcribe the tape to paper later. This does take time from something else. Other mobileers prefer to write the paper log at the time of the QSO, instead of having to do so later. I've used the tape method, as well as a headset with VOX and paper-log with no real preference. Needless to say, a tape recorder is an absolute must if you operate while you are driving.

County hunting has become addictive and a way of life for many. Some county hunters have worked all counties three, four, and even five times and are working for still more awards. I will refocus my operating back on digital DXing after I complete USA-CA, but I definitely will be stopping by 14.336 from time to time to put out counties while mobiling and to chat with the many friends I have made during the past year.

I hope that this article has answered questions that you might have had about county hunting, and that it has piqued your interest enough so that you will join us on the net. If you still have questions, you may ask them there during a slack period on the net, or you may feel free to write to me, preferably by e-mail at <w1vxv@juno.com>. ■

Footnotes

1. ACES; Howard Siegel, WA2GLU, 15020 North 7th Dr., Phoenix, AZ 85023.
2. Don Mager, KE5WL, 406 Cherry Park Dr., Sherman, TX 75090.
3. Bill Nash, WØOWY, 13212 North 37th Ave., Phoenix, AZ 85029.

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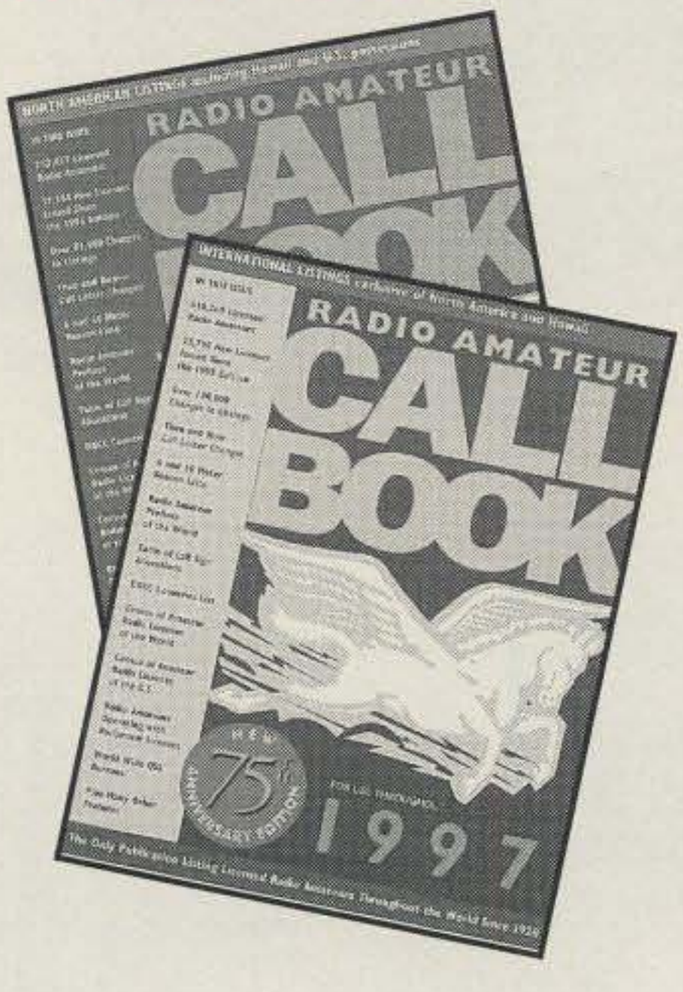

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G4BXD continues his odyssey through WW II military surplus electronic equipment. This time we look at two British units, the No. 22 and the No. 62 transceivers.

British WW II Radio Gear

BY BEN NOCK*, G4BXD

While the Wireless No. 19 is perhaps the most well known set of World War II, certainly in the U.K. there were other sets of similar frequency coverage and operation that are worthy of mention and description and are also of great interest to collectors.

The standard frequency coverage of between 2 and 8 MHz is common to many sets. As mentioned in previous articles, the No. 19 set, No. 29 set, No. 38 set, No. 46 set, No. 29 set, No. 58 set, and No. 18 set, for instance, all could have interacted on a net frequency somewhere in the above band.

The Wireless Set No. 22

This lightweight version of a No. 19 set covers the same section of the spectrum, runs AM, MCW, and CW, and is of a similar size and construction, but in contrast it only runs very low power—1.5 watt CW and 1 watt R/T. Delivered around 1941, there were around 55,000 produced during its lifetime.

The No. 22 set was designed to be used as a vehicle station or as a ground station separate from the vehicle. In vehicle use a 12 foot rod antenna would have be used, while in the ground role a 16 foot antenna would be more standard. For improved range a further vertical sectional mast would be employed, raising the whip to a total height of 34 feet.

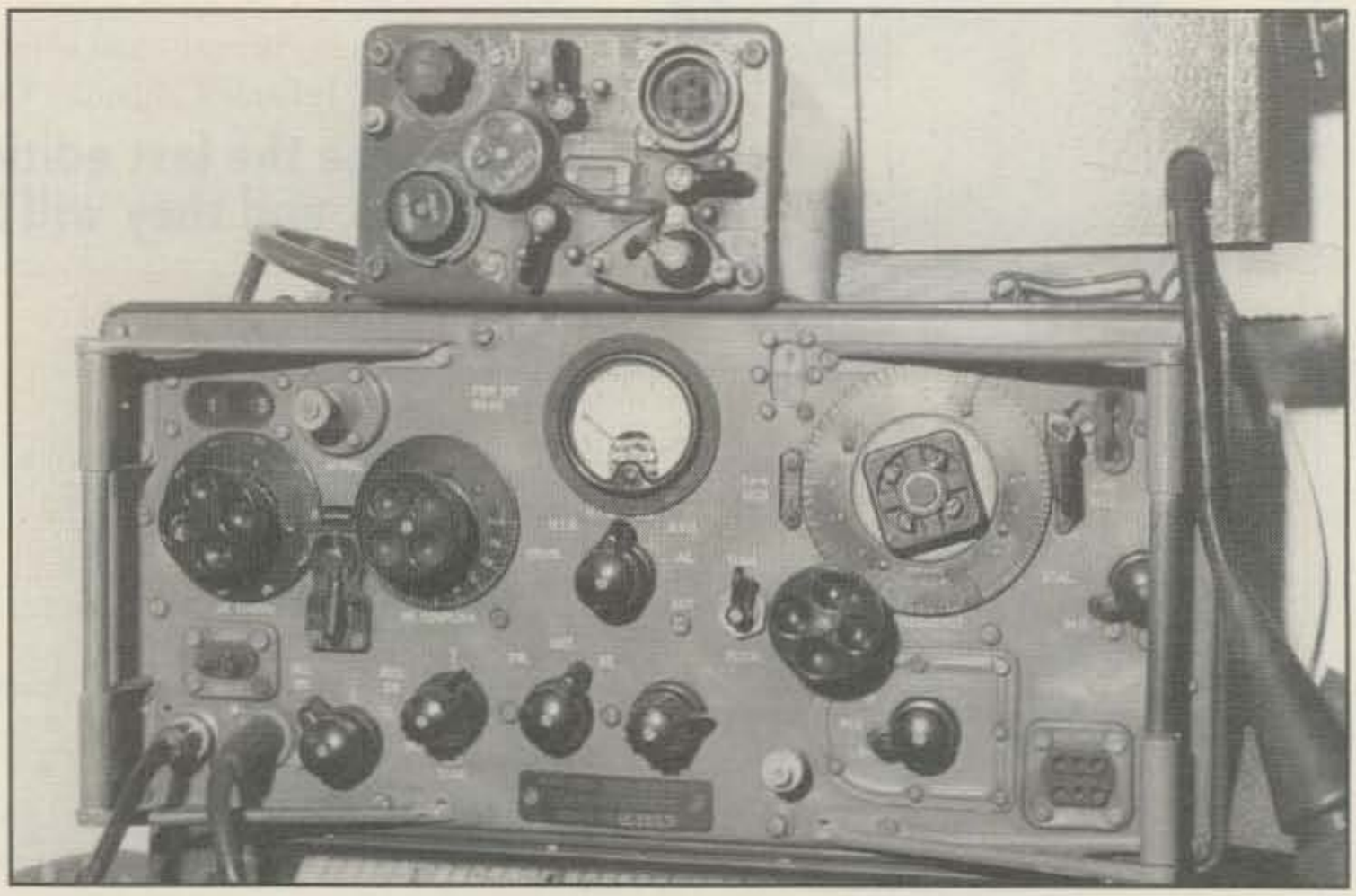
In the ground station role a further increase in range could be obtained using an inverted L antenna some 3/4 wave in length. Quoted R/T ranges for the various antennas are around 15 to 30 miles for the 12 foot rod on the move, 30 to 40 miles for the 34 foot rod stationary, and 50 miles and up for the 3/4-wave wire. Similar ranges are quoted for the CW mode—50 miles and up for the wire. Using a 1/2-wave antenna on 80 meters, I have worked 100 miles plus on CW and R/T, but that is to modern equipment at the other end.

The No. 22 set has a separate power supply, a vibrator pack, driven from 12 volts, which provides a single common high voltage of 325 volts at 80 mA. The filaments of the set run directly off the 12 volt supply.

The set employs 13 tubes. Three of these are common to receive and transmit functions. The receiver is a single-conversion superhet, employing 8 tubes, with a quoted sensitivity of 2 µV for 50 mw of audio output. The transmit-

*62 Cobden Street, Kidderminster, Worcs. DY11 6RP England

This is a front view of the wireless set No. 22. I typically use this on 80 meters for contacts up to 100 miles.



This front view shows the wireless set No. 62 MK II, with a wireless set No. 46 on top of it.

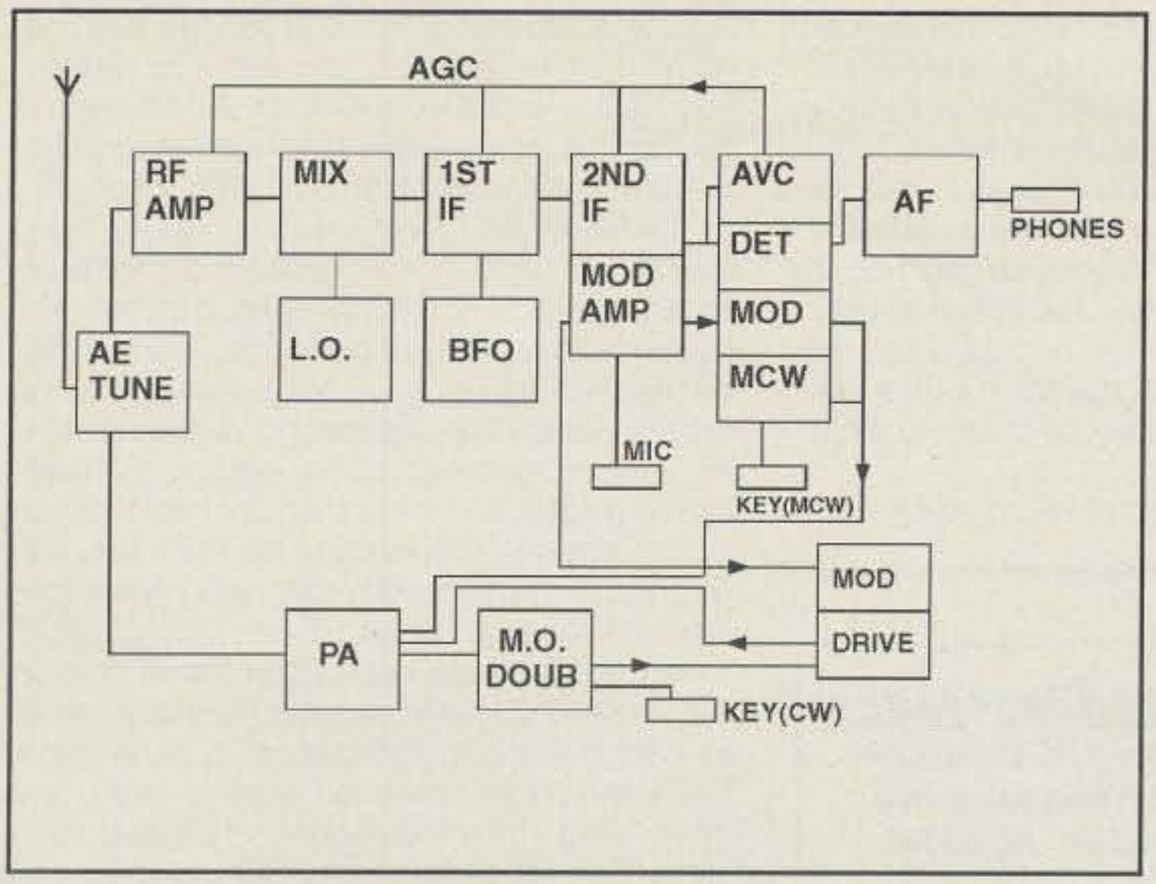
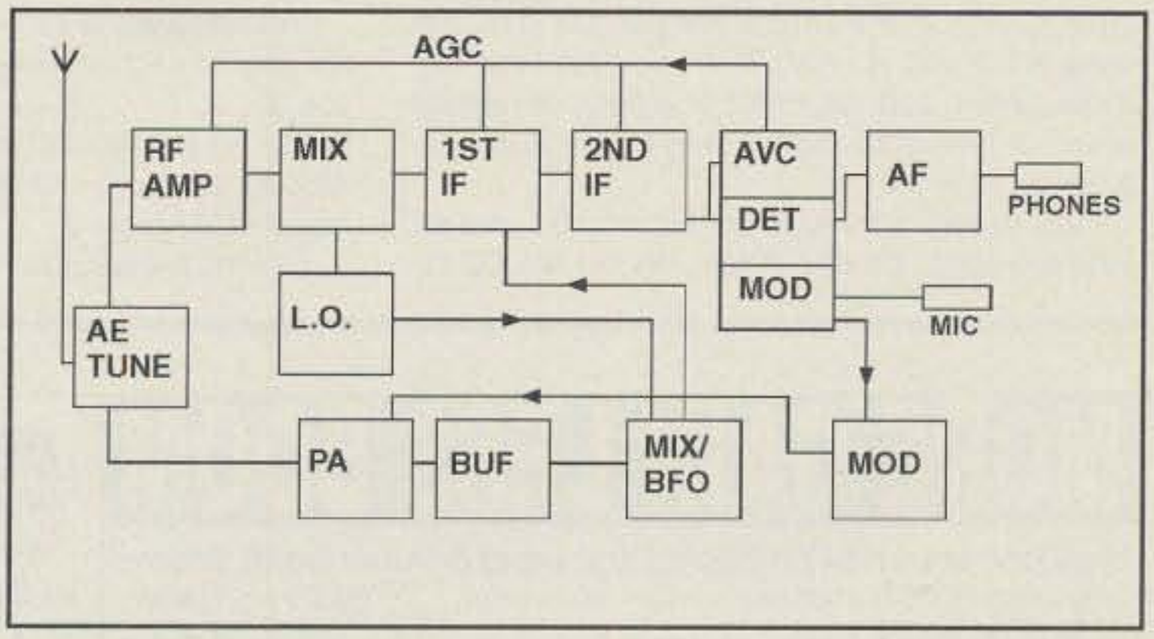


Fig. 1– Block diagram of the wireless set No. 22.

Fig. 2– Block diagram of the wireless set No. 62.



ter has a master oscillator operating at half the required RF frequency, which is then doubled before feeding to the output stage.

The transmitter output stage consists of three pentodes in parallel, grid modulated for AM and MCW. A system of automatically keeping the drive to the amplifier tubes constant is used, employing one half of a double-diode tube.

The tuned circuits for the receiver and transmitter are separate, but are tuned with a ganged four-section capacitor. Accurate netting is achieved with a separate "fine tune" control for the transmit master oscillator situated on the front panel.

The output tuned circuit for the transmitter is also the input tuned circuit for the receiver. A roller-inductor coil and series capacitor are used to tune and match the antenna to the transmitter and receiver. The block diagram of the wireless set No. 22 is shown in fig. 1. The filaments of the No. 22 set are wired in series parallel to even out the current drawn. The eight receiver tubes have 2 volt filaments. The remaining five tubes are indirectly heated.

The Wireless Set No. 62

Again, similar to the No. 19 and 22 sets, the WS No. 62 has a slightly extended frequency coverage (1.6 to 10 MHz) and again runs AM and CW, but has an RF power output similar to that of the No. 22 set. Delivered around 1944, there were only some 7350 produced.

The No. 62 set uses eleven tubes—seven as a single-conversion superhet and six in the transmitter, with three tubes being common to both circuits. A principle similar to that of the No. 19 set is used. The receiver BFO is used on transmit, mixed with the receiver local oscillator, giving the transmit frequency. The set uses a 12 volt supply. This powers the filament chain and an internal rotary generator which provides the high voltage. The block diagram is shown in fig. 2.

The antenna circuits of the No. 22 and 62 sets are quite similar. Again, on the No. 62 set the output antenna tuning components form the receiver input tuned circuit. A roller-inductor type coil is used along with a large variable capacitor to match and load the antenna. In this set a single beam pentode is used in the output stage, again being grid modulated on AM.

Intended as a replacement for the No. 22 set, the No. 62 set is lighter and easier to operate (or so the manual says !). There are two Marks of the No. 62 set, the Mk II being suitable for airborne use by the use of different harness attachments.

Antenna-wise, the No. 62 set could again be used with several different antennas, depending on the use, location, and distance wanted. Four, 8, 12, and 32 foot whips are described in the manual, along with a 100 foot wire arrangement for maximum communication range.

The No. 62 set does have the facility of being crystal controlled. A front-panel-mounted holder can take 10X or FT-243 crystal holders, the crystal control being on both receive and transmit, as the receiver local oscillator is common to both paths. The set can be vehicle mounted, mule carried, or man handled. In the man-pack configuration three men are needed: one to carry the set, one to carry the batteries, and another to carry the 60 watt pedal generator used to recharge the batteries.

Having used the set for some time now on the 160 and 80 meter amateur bands, it must be said that for its age the set is quite good. The keying note produced is quite stable and clean, with the modulation, while sounding "gritty," is enough for most QSOs. Using a 135 foot wire antenna, contacts around the UK have easily been made on both bands. There was a problem of broadcast interference on 160 meters, the Q of the front end tuned circuit not being enough to filter it out. I had to fit a small high-pass filter, with a cut-off around 1.5 MHz, between the antenna and the grid of the RF amp. This cured the problem and allowed 160 meter operation.

Other Sets of The Period

Along with the No. 19, 22, and 62 sets, other vehicle-mounted, short-range sets include the No. 2 set. Covering 1.875 to 5 MHz, this set ran 10 watts of AM, MCW, and CW. The No. 11 set, covering 4.2 to 7.5 MHz, produced 2 watts, or 6 watts in the high-power version. The No. 12 set, covering 1.2 to 17.5 MHz, produced 25 watts on CW and 7 watts on phone. The No. 21 set, again covering 4.2 to 7.5 MHz, produced 1.5 watts, a quoted range of 5 miles.

Bigger mobile sets such as the No. 12HP, 33, 52, and 63 sets all ran higher power: the No. 12HP and No. 33 some 250 watts phone, the No. 52 set some 70 watts phone, and the No. 63 set a massive 1000 watts between 3 and 20 MHz.

The real flea-power sets, ideal for the really serious QRPers, included the No. 8 set, covering 6 to 9 MHz, 0.25 watt. The No. 18 set was similar. The No. 31 set, covering 40 to 48 MHz, ran half a watt, and the No. 78 set, covering 2 to 10 MHz, ran a massive 200 mw.

As can be seen from the frequency coverage of the above sets, they all, at a push, could be used to communicate with each other across the various roles for which they were used.

There are a few other sets—those with short-lived productions—that have not been included here. Hopefully, these can be covered at a later date.

(For other articles by G4BXD on surplus gear see the following issues of CQ: "Surplus Electronic Gear, A British Perspective, Parts I [December 1994, p. 13] and II [June 1995, p. 36], and "Surplus Sojourn" [July 1996, p. 9].)

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The History of British Army Signals in WW II, Maj. Gen. R.F.H. Nalder, C.B., O.B.E.

"Working Instructions," wireless sets No. 22 and 62, R.E.M.E. Workshops. ■

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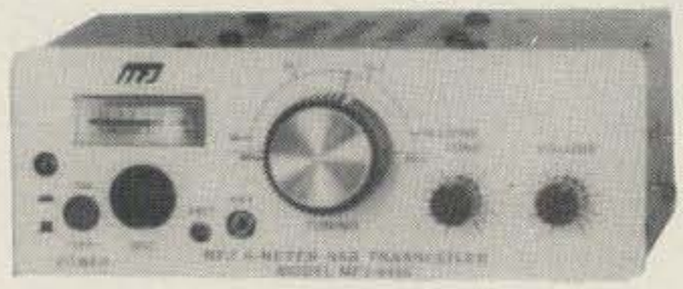

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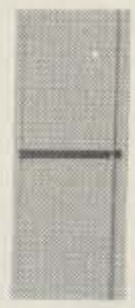

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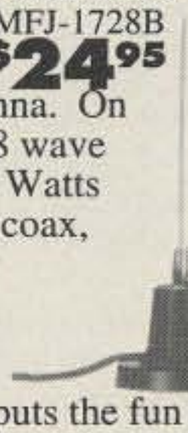

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The Birth of A Callbook

BY ALEX KACHMAR*, VE6HS

Mike Eliuk, VE6MY, is a quiet and unassuming kind of person. Upon meeting him you would not suspect he is the author of a very challenging and painstaking endeavor. Almost single-handedly, Mike set about compiling and publishing an English-language directory of Ukrainian amateurs. The Ukraine, with a population of over 52 million, was one of the key republics of the former Soviet Union. Mike's interest and involvement in this project coincides with the dramatic transformation that has taken place in the Ukraine, in the country itself and for amateur radio, over the the past five years. During the communist regime, amateur radio activity was totally subordinated to government and military control. After the Ukraine emerged as a free and newly independent country, normalization of the hobby, as we know it, began. This process is still going on.

Mike was always curious about the state of amateur radio in the Ukraine. In the summer of 1989 he had a QSO with a Ukrainian amateur, Mykola Pylypenko, UT5HA. This developed into regularly scheduled HF and packet contacts and correspondence. By 1990 he obtained a copy of a hard-to-find USSR Callbook, written in Russian and English. When the Ukraine was still part of the USSR, little was known about amateur radio activity there, but it was clear that the environment for the hobby left much to be desired. At the time, as many DXers will attest, on-the-air contacts with Soviet amateurs were brief, impersonal, and usually involved club stations with multiple operators. In fact, we now know that communist party monitors were always present in these stations to ensure that QSOs with foreign stations were limited to officially permitted dialogue. To most people the internal workings of the USSR remained a mystery. Outsiders, including amateurs, did not really differentiate between Russia and the other republics. All that changed after 1991, with the disintegration of the Soviet empire.

Following this historic event, communication with amateurs from that part of the world suddenly opened up. Even personal visits to many of the republics became possible, and individual travellers no longer required government "chaperones" to accompany them. However, it took time for old habits to die. For example, when in 1991 Mykola attempted to send Mike a newer version of the official USSR Callbook by mail, local postal officials would not allow it to leave the country on the grounds that it contained official "classified" information.

VE6SSC is the amateur radio station at the Edmonton Space and Science Center. It is operated by volunteer amateurs from the Edmonton area and has been instrumental in publicizing amateur radio and attracting prospective amateurs to the hobby. (VE6HS photo)

Mike, who was born in the Ukraine in 1932, finally decided to visit his native land in 1993. He met his old friend Mykola, and was able to observe first hand the condition of amateur radio there. Despite the country being a major center of electronic and computer technology, in the old USSR most amateur equipment was either homebrew or military surplus. During Soviet times, as with everything else, all authority and communication emanated from the center—i.e., Moscow. Consequently, when the Ukraine achieved independence, there was no administrative structure or appropriate legislation in place which specifically dealt with amateur radio. In fact, the formation of a national amateur radio organization, similar to the ARRL, was being discussed at a convention of amateurs only in 1995. As far as infrastructure was concerned, VHF and UHF repeater communication was virtually unheard of. Reciprocal third-party agreements with other countries did not exist.

Mike's trip to the Ukraine was followed up by Mykola's exchange visit to Canada in November 1995. While in Edmonton, Mike explained to the Ukrainian amateur how amateur radio is organized and administered in Canada, to give him some idea of what the Ukraine should strive for in creating favorable conditions for the hobby. Mykola also saw a variety of amateur setups and was particularly impressed with VE6SSC, the amateur station established at the Edmonton Space and Science Center, a major local attraction. One thing Mykola did bring to Canada, at last, was a copy of the most recent former USSR Callbook, written in the Russian language.

This proved to be opportune. Earlier that summer Mike had already decided he would do something concrete to assist Ukrainian amateurs and amateurs worldwide by publishing a distinct English-language call directory for the Ukraine. He had noted that the available

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international callbooks and databases did not accurately portray the total number and distribution of amateurs in the Ukraine. Even as late as 1995 one prominent directory reported four listings for Ukraine under the EM–EO callsigns and 82 under the UR–UZ callsigns. In the same publication the world amateur census showed only 78 amateurs for the entire country. This certainly did not reflect the almost 8000 amateurs who were officially licensed there. A closer inspection of the publication revealed that the majority of Ukrainian amateurs were scattered throughout the Russian listings. It appeared that the authors sorted all the former USSR callsigns alphanumerically, mistakenly following the North American callsign allocation system. Not satisfied with such incomplete and confusing information, Mike commenced the arduous task of compiling his directory.

He began work in earnest on the project in February 1996. The first step was to establish a data base for all the material he had assembled, utilizing a Windows computer program. Next he turned to the important task of cataloging, checking, and cross-referencing all the entries against QTHs and oblasts in which they were located. Oblasts, which are local government administrative units roughly corresponding to counties in the US, were selected as the most logical basis to group Ukrainian amateurs in the directory. This approach mirrored the official callsign system for amateurs, which designated an oblast identification letter within each callsign. The advantage of such grouping is that the general location of a station could easily bey established just by reading its callsign. This could prove very useful during contests and for awarding certificates in the future.

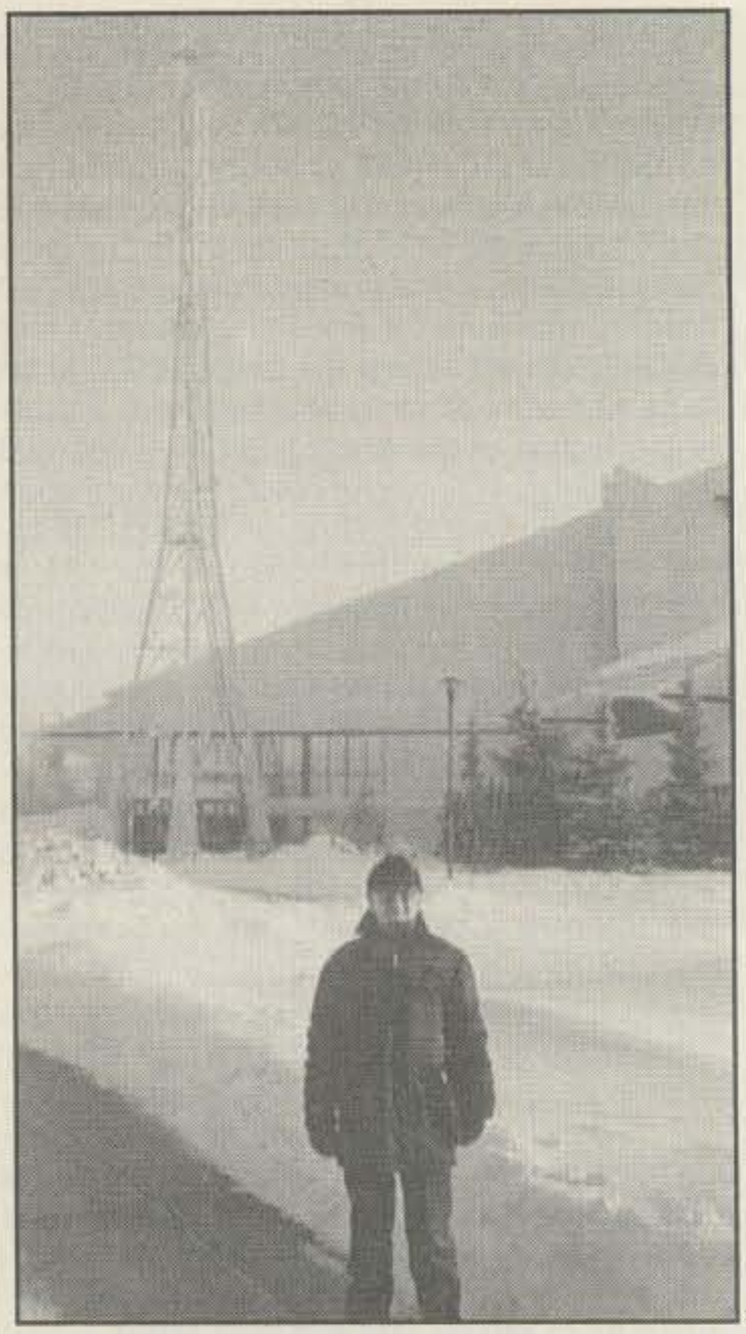
Mike says the most difficult part of the whole exercise was translating names of individuals in his source material from the Russian Cyrillic alphabet into the Ukrainian Cyrillic, and finally converting the Ukrainian names into English. Decisions had to be made whether first names should be shown in their English form or translated phonetically directly from Ukrainian—eg., Peter/Petro, Andrew/Andrei, Michael/Mikhailo, etc. The end result was that each case was treated on its own merit with many compromises having to be made along the way.

Place names were less of a problem. Because there are now officially sanctioned English spellings for Ukrainian geographic names, it was simply a matter of following these. Probably not too many people have noticed that in the last three or four years the Ukrainian version of geographic names, rather than the Russian one, has been appearing on Ukrainian maps and documents printed in English. Thus, on a contemporary map of the Ukraine, one can observe that the capital city, previously written as Kiev according to its Russian pronunciation, is now shown as Kyiv (pronounced Kay- yeew). The same applies to the river Dnipro, formerly spelled Dneiper, its Russian name. In some instances place names, and particularly street names, have been replaced entirely. For amateurs this is an important consideration when attempting to confirm QTHs in old log entries or when looking at outdated maps, especially for contest purposes. A note of caution therefore: What you might think are two different locations may actually be one and the same.

Once all this was sorted out, the actual inputting of all the entries was accomplished in a relatively smooth manner. Two months were spent on the most tedious part of the work—editing the draft copies of the directory and checking these for consistency and spelling errors page by page, line by line. The entire project, which involved staying late far into the night, took about four months to complete.

The finished product contains some 180 pages. It is divided into 23 sections, each representing a separate oblast. Each section identifies the particular oblast and its abbreviation; the latter is for the benefit of those amateurs not familiar with Slavic names. Below this the important oblast identification letter is shown. Entries are listed in alphabetical order using the last letter(s) of the callsign for this purpose. The callsign; full name of the amateur; postal code; city, town, or village; and street address form the individual listing. QSL information and the QSL bureau locations and their addresses are provided at the back of the directory.

The introduction to the directory contains a great deal of useful information. An oblast reference chart, explanation of the callsign system, and information on how to interpret individual callsigns are provided. Mike has also included some background material about himself and a brief description of amateur radio in the Ukraine today. A handy pronunciation guide for those who are communicating with Ukrainian amateurs but are unfamiliar with the language is also provided. It shows common first names and useful phrases in both Ukrainian and Russian. A map of the Ukraine showing all the oblasts and major cities and a table of geographical coordinates for 36 cities are included in the introduction.



VE6MY in front of the 42m/138ft antenna tower at VE6SSC on a cold January morning. Antennas on the tower include a 7-element HF Mosley beam, a 14-element VHF KLM beam, a 40 element 70 cm KLM satellite tracking beam, an omnidirectional vertical for ATV, and discones for VHF and UHF. (VE6HS photo)

Mike has an interesting history. Following his arrival in Canada after World War II, he enlisted in the Canadian Army and served in Korea in 1953 and 1954. He re-enlisted in the Signal Corps in 1957 and started his career in radio communication, electronics, and computers. Mike has been a licensed amateur since 1976. Upon leaving military service in 1963, he worked for numerous companies in the electronics field and retired from Syncrude Canada in 1992. Since then Mike has been involved full time in many amateur radio activities in the Edmonton area, such as assisting in VE6SSC operations, training prospective amateurs, and serving as a volunteer examiner.

The Ukrainian Amateur Radio Call Directory is available in hard copy and on 3.5 inch disks directly from its author. Mike hopes to make regular updates and improvements to the publication over the short term and anticipates that his effort will lead to the national amateur radio association in the Ukraine producing an official callbook for the country. In the meantime, he will be pleased to act as the contact for anyone who would like to assist, in whatever way possible, the further development of amateur radio in the Ukraine—a vital element of communication in a free and democratic society. He can be contacted as follows: Mike Eliuk, VE6MY, 17323 69th Avenue Apt. 1704, Edmonton AB, Canada T5T 3S8 (phone/fax 403-486 - 0375; e-mail <meliuk@oanet.com>; packet <VE6MY @VE6MC.#edm.ab.com.na>). ■

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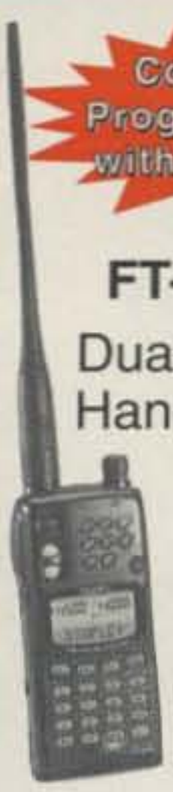

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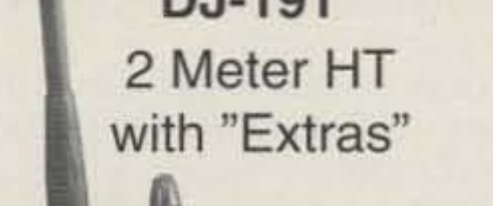

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Announcing:

The 1997 CQ World-Wide RTTY DX Contest

Starts 0000 UTC Saturday Ends 2400 UTC Sunday
September 27–28, 1997

I. **Announcing:** The 11th annual CQ WW RTTY DX Contest.

II. **Objective:** For amateurs around the world to contact other amateurs in as many *CQ* Zones and countries as possible using the digital modes.

III. **Contest Period:** 0000 UTC September 27 to 2400 UTC September 28, 1997.

Note: The total contest period is 48 hours. **All stations and operator classes** may operate the entire 48-hour period; there are **no required off time periods** for any entries.

Note the following operator classes.

IV. **Operator Classes:** There is a **High Power** category (greater than 150 watts) and a **Low Power** category (less than 150 watts). **Only** Single Operator **All Band** and **Multi-Op Single Transmitter** entries are eligible to enter the **High** or **Low Power** category. Enter one or the other, and so note on your log. Single Band entries, Single Operator Assisted, and Multi-Multi entries are **not** eligible to enter the High or Low Power category.

1. **Single Operator, All Band and Single Band.** One person performs all operating and logging functions. Use of spotting nets, DX Alert Packet systems, telephone, etc., is *not* permitted.

2. **Single Operator Assisted, All Band Only.** One person performs all operating and logging functions. However, the use of DX spotting nets or any other form of DX alerting assistance **is** allowed. The operator can change bands at any time. Single operator stations are allowed only one transmitted signal at any given time.

3. **Multi-Operator, Single Transmitter.** All band entry only. More than one person operates, logs, checks for duplicates, use of a spotting net, etc.

(a) Only one (1) transmitter and one (1) band permitted during the same time period (defined as ten [10] minutes). Once the station has begun operation on a given band, it *must* stay on that band for 10 minutes; listening time counts as operating time.

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

4. **Multi-Operator, Multi-Transmitter.** All band entry only. No limit to the number of transmitters, but only one (1) signal per band permitted.

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

V. **Entry Categories:** Single Operators may enter as (a) All Band High Power or Low Power; (b) Single Band; or (c) Single Operator Assisted All Band.

Multi-Operators may enter as (a) Multi-Op Single Transmitter, High Power or Low Power, All Band; or (b) Multi-Op Multi-Transmitter, All Band.

VI. **Modes:** Contacts may be made using Baudot, ASCII, AMTOR, PACTOR (FEC & ARQ), CLOVER, and Packet (no unattended operation or contacts through gateways or digipeaters).

VII. **Bands:** 80, 40, 20, 15, and 10 meters.

VIII. **Valid Contacts:** A given station may be contacted only **once** per band regardless of the digital *mode* employed. Additional contacts are allowed with the same station on each of the other bands as well.

IX. **Exchange:** Stations within the 48 continental United States and the 13 Canadian areas must transmit RST, State or VE area, and *CQ* Zone number. All other stations must transmit RST and *CQ* Zone number.

X. **Countries:** The ARRL and WAE country lists will be used.

Note: The USA and Canada count as country multipliers. *Example:* The first US State and Canadian area you work not only count as a multiplier for the state or area, but also count as a country multiplier for each band.

XI. **QSO Points:** One (1) QSO point for contacts within your own country. Two (2) QSO points for contacts outside your own country but within your own continent. Three (3) QSO points for contacts outside your own continent.

XII. **Multiplier Points:** One (1) multiplier point for each US state (48) and each Canadian area (13) on each band. One (1) multiplier point for each DX country in the ARRL and/or WAE lists on each band. *Note:* KL7 and KH6 are country multipliers only and not state multipliers. One (1) multiplier point for each *CQ* Zone worked on each band. Maximum of 40 Zones per band.

Note: Canadian areas are VO1, VO2, VE1 NB, VE1 NS, VE1 PEI, VE2, VE3, VE4, VE5, VE6, VE7, VE8 NWT, and VY Yukon.

XIII. **Final Score:** Total QSO points times the total multipliers equals the total claimed score.

XIV. **Contest entries and logging instructions:** CQ WW RTTY DX logs and forms should be used to facilitate scoring and checking. All logs **must** show:

1. Times in UTC.

2. All sent and received exchanges are to be logged (callsign, RST, Zone, country, State/VE, points claimed).

3. Indicate State/VE area, Zone, and Country Multiplier only the *first* time they are worked on *each band.*

4. Use a separate log sheet for *each band.*

5. A check list of duplicate contacts for *each band* (dupe sheet). Logs must be checked for duplicate contacts, correct QSO points, and multipliers. Submitted logs must show duplicate contacts clearly marked.

6. A *multiplier* check sheet for each band.

7. An overall *summary sheet* showing total QSOs, Points, Zones, Countries, and States/VE areas worked.

8. Each entry must be accompanied by a signed declaration that all contest rules and regulations for amateur radio in the country of operation have been observed.

Contest forms are available from *CQ* and the Contest Directors. Please include a large SASE with two units of US first-class postage or IRCs.

9. **Disks:** Logs may be sent on disk. Clearly label the outside of the disk with the call, file names, and type of program. All disks **must** be accompanied by a paper log satisfying all logging instructions.

10. **Internet:** Watch for an announcement of an Internet address to send your logs to also.

XV. **Disqualifications:** Operating in an unsportsmanlike manner, manipulating scores or times to achieve a score advantage, or failure to omit duplicate contacts which would reduce the overall score more than 2% are grounds for disqualification. The use of non-amateur means such as telephones, telegrams, etc., to elicit contacts or multipliers during the contest is unsportsmanlike, and the entry is subject to disqualification. Actions and decisions of the Contest Committee are official and final.

XVI. **Awards:** Plaques will be awarded to the first-place finishers in each of the operator classes. Certificates will be awarded to second and third places. Certificates will be awarded to the first-place finishers in each DXCC country. In countries or sections where returns justify, certificates may be awarded to second and third place. All scores will be published. To be eligible for an award, a Single Operator station must operate a minimum of 12 hours, and a Multi-Operator station a minimum of 18 hours. A Single Band entry is eligible for a single band award *only*. If a log contains more than one band, it will be judged an an all band entry, unless specified otherwise. All certificates and plaques will be issued to the licensee of the station used.

XVII. **Deadline:** All entries must be postmarked **no later** than December 1, 1997. An extension may be given if requested. **Low Power logs** should be mailed to: Roy Gould, K1RY, CQ WW RTTY DX Contest Director, P.O. Box DX, Stow, MA 01775 USA. **High Power logs** should be mailed to Ron Stailey, K5DJ, Co-Contest Director, 504 Dove Haven Drive, Round Rock, TX 78664.

XVIII. **Plaques (Donors):** Single Operator and Multi-Operator All Band plaques are awarded to the high scorer, either High Power or Low Power, whichever is highest.

Single Operator, All Band, High Power
World—Dunestar Systems
North America—TG9VT Memorial by K1RY & W2JGR
South America—Neal Sulmeyer, AE6E
Europe—HAL Communications Corp.
Oceania—Timewave Technology Inc.
Asia—David Busick, N5JJ Memorial (by K5AAD)
Africa—Phil Duff, NA4M
United States—John Devoldere, ON4UN

Single Operator, All Band, Low Power
World—Amateur Radio Trader
North America—Dick Stevens, N1RCT
South America—Open
Europe—Don Hill, AA5AU
Asia—Bruce D. Lee, KD6WW
Oceania—Open
Africa—Open
USA—Phil Duff, NA4M

Single Operator Assisted
World—*CQ* Magazine
North America—Jeff Bouvier, K1AM
USA—RTTY by WF1B
Other Continents—Open

Single Operator, Single Band
3.5 MHz—Neal Campbell, K3NC/ON9CNC
7.0 MHz—Tri-County DX Association
14 MHz—Kunihiko Fujii, JH1QDB
21 MHz—Denis Catalano, WD4KXB & Mike Trowbridge, KA4RRU
28 MHz—Open

Multi-Operator, Single Transmitter, High Power
World—Amateur Radio Trader
North America—Eddie Schneider, GØAZT
USA—TR Logging Software
Europe—Ron Stailey, K5DJ & Wayne Matlock, K7WM

Multi-Operator, Single Transmitter, Low Power
World—HAL Communications
North America—Don Hill, AA5AU & Eddie Schneider, GØAZT
USA—Platinum Coast Amateur Radio Society
Other Continents—Open

Multi-Operator, Multi-Transmitter
World—*CQ* magazine
Continents—Open

There are many plaques looking for sponsors: High Power, Low Power, Single Band, a specific country, Multi-Op by continent, etc. If you are interested, contact the contest co-director, Ron Stailey, K5DJ, 504 Dove Haven Drive, Round Rock, TX 78664 (Internet: k5dj@easy.com).

BY IRWIN MATH, WA2NDM

MATH'S NOTES

WHAT'S NEW AND HOW TO USE IT

Potpourri

This month I would like to offer several varied but unique ideas for you to consider. All are unusual in that they open new areas of investigation in ways in which you might not normally think of them.

Fig. 1 is a diagram of a technique to test semiconductors for susceptibility to ESD (electrostatic damage) as described in the September 1996 issue of *EDN Magazine.* What is unique about this technique is the use of a barbecue-type piezo-electric gas igniter to produce a fast rise-time, short-duration, high-voltage pulse. Those of you who are familiar with this type of device are aware that when you press the button or pull the trigger, a high-voltage spark jumps a small gap between two electrodes or between a center pin and a ground wire. The spark itself usually is composed of a short-duration pulse, 0.1 to 1 microseconds wide, at a high enough voltage to jump a 1/16 to 1/8 inch gap. Since 10,000 volts will jump a 1/4 inch gap (as a rule of thumb), the typical piezo device produces an output voltage level of approximately 5 KV—more than enough for testing semiconductor devices for electrostatic damage. The article goes on to further suggest that you use a 1/10 inch (or 2.5 mm) gap. If you plan to use this technique for ESD testing, keep in mind that you can blow a nonprotected chip, so proceed accordingly. A 10 ohm resistor has been added in series with the ground lead for oscilloscope measurements of peak pulse current levels. Every 0.1 volt (across this resistor) as read on the scope corresponds to 10 milliamperes of current. If you package the entire assembly in a small plastic or metal enclosure in the manner shown in fig. 2, you wind up with a neat, unique piece of test equipment.

A word of caution: The output of the piezo device is several thousand volts at very low average current. Although it is not life-threatening, you can get a significant shock, so be very careful when pushing the button.

A second schematic shows an attempt to control the piezo output. I have modified this circuit somewhat beyond that of the original intention, and the result is shown in fig. 3. Three 1N4007 1000 PIV high-voltage diodes have been added to assure a specific output polarity (in this case positive), and a string of 15 to 20 NE-2 neon lamps have been added to regu-

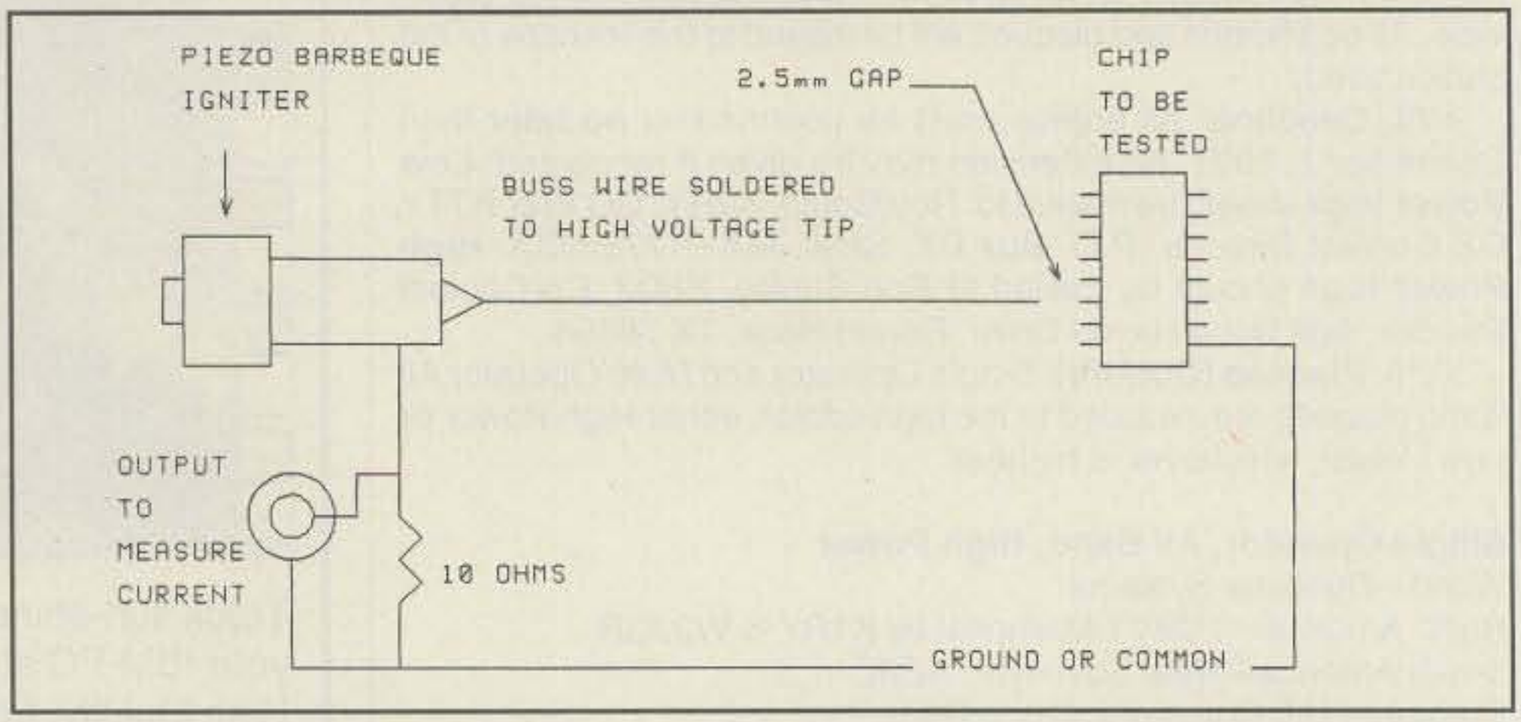

Fig. 1– Piezo igniter driven ESD tester.

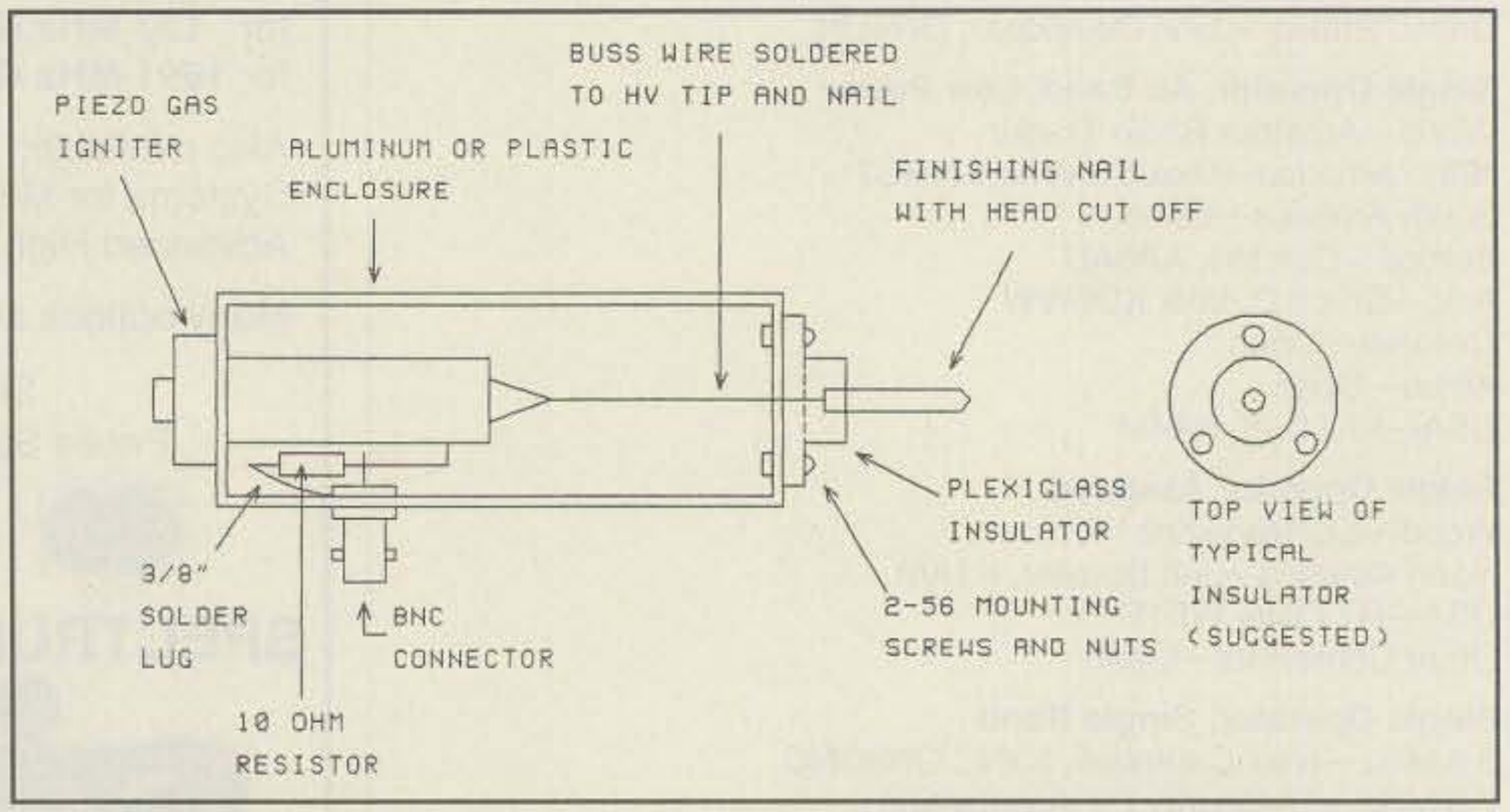

Fig. 2– Suggested mounting method for the tester.

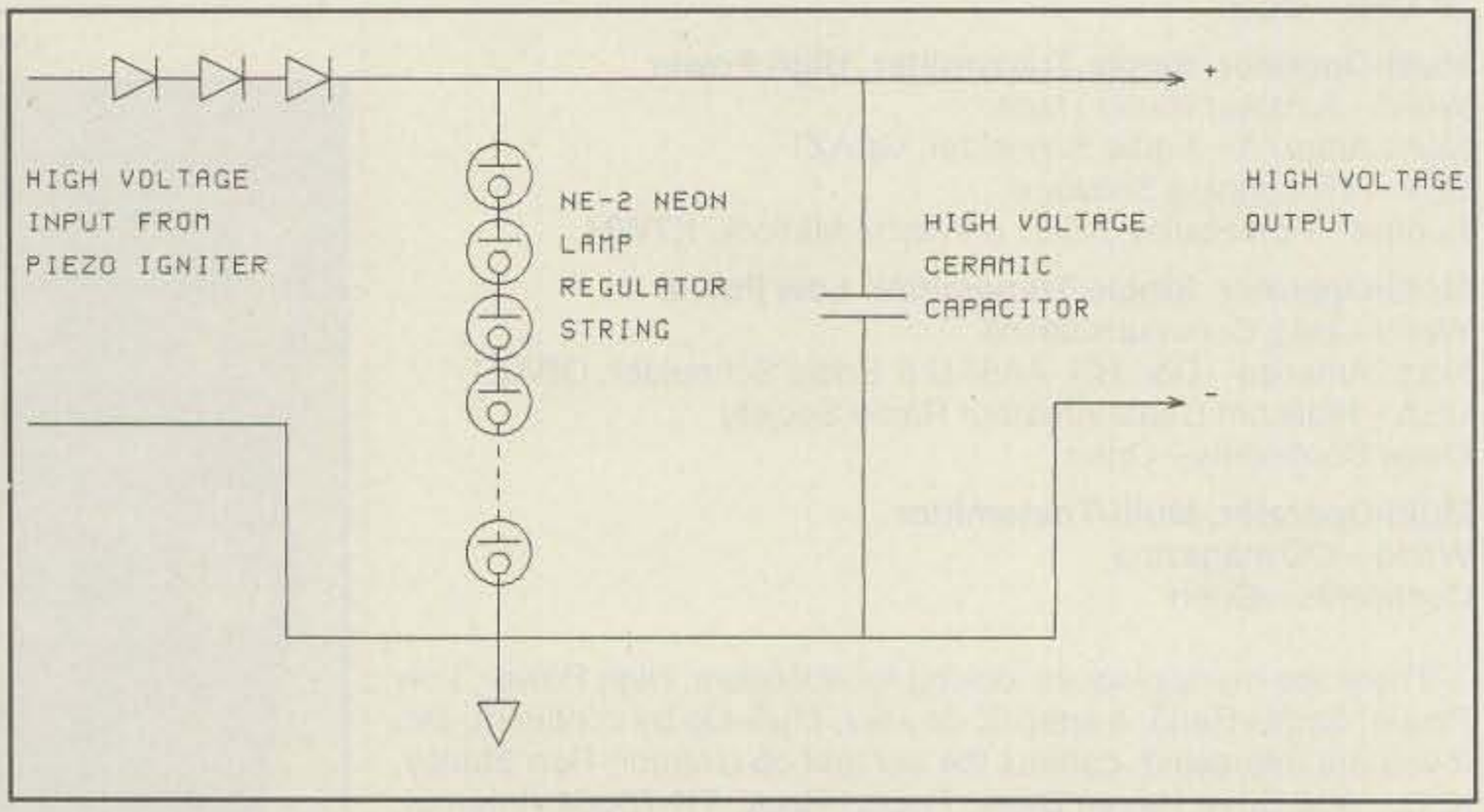

Fig. 3– Schematic diagram of the high-voltage power supply.

c/o CQ magazine

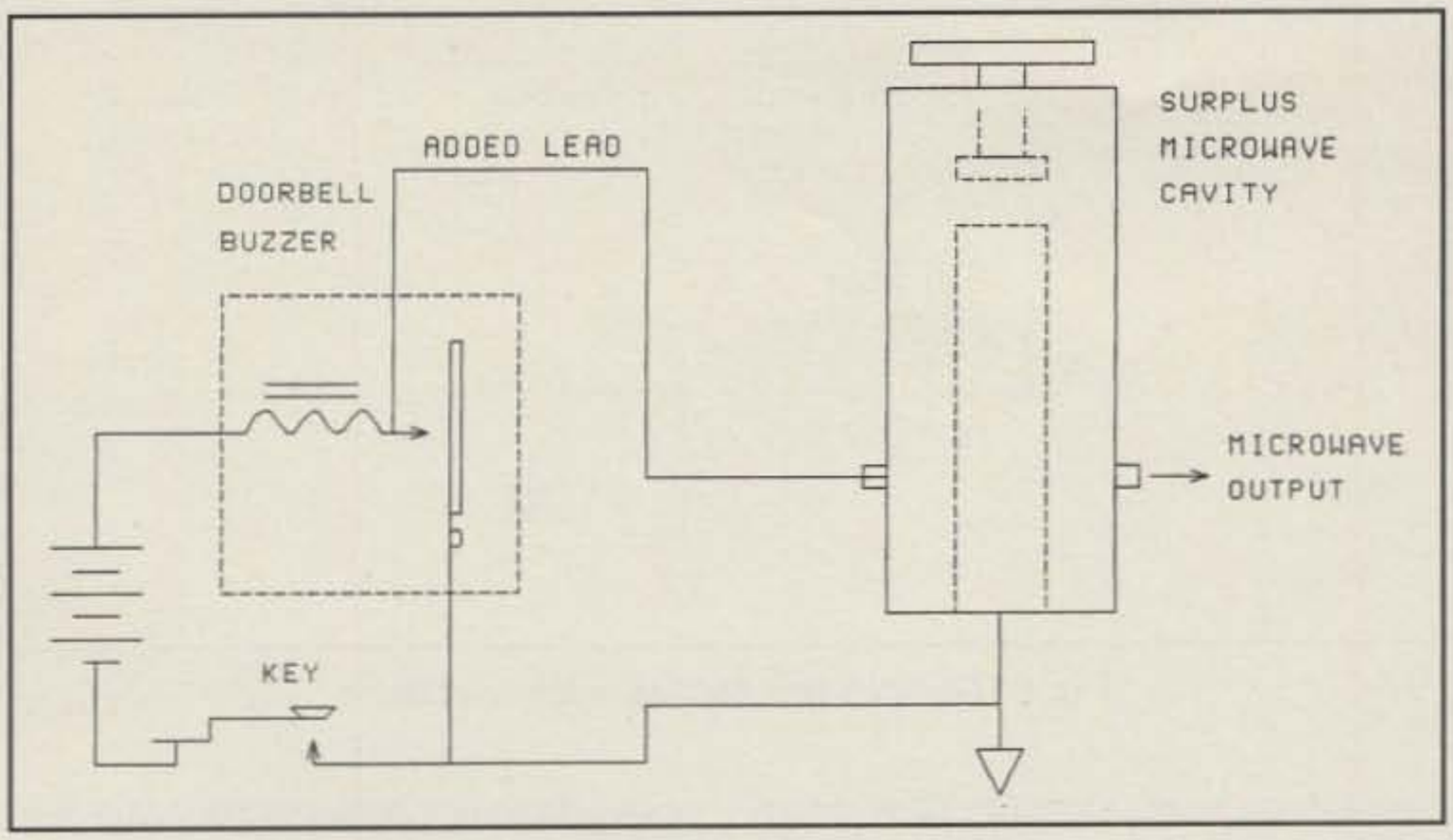

Fig. 4– The microwave signal source described in the text.

late the peak voltage to some extent. The number of NE-2's you can use will depend on the peak output of the particular piezo pulser you have. For rough calculations, each NE-2 will drop about 90 volts or so. For negative pulses reverse the polarity of the diodes. The neon lamps are bi-polar, so they can remain as is for both positive and negative outputs. Finally, a high-voltage ceramic capacitor has been included to store the "pulse energy." The value of this capacitor can be anywhere from 100 pF to 500 pF and should have a voltage rating at least 25 percent higher than the maximum expected output voltage. The result is a simple high-voltage supply (2000 to 3000 volts) that can be used to operate ultra-low-current devices such as radiation detectors (Geiger tubes and ion chambers) and many vacuum photo-diodes.

I must now repeat the previous words of caution. The output of this second circuit can also be several thousand volts at very low average current. Although this circuit also is not life-threatening, you still can get a significant shock, so be very careful when pushing the button!

Spark Microwave

Many years ago, in the heyday of the military surplus equipment market, there appeared a number of very well-made gold-plated cavities that were designed to resonate in the 1000 MHz+ region. These cavities originally were used as elements in frequency-measuring equipment and were quite stable. They even were tunable over a small range and were relatively inexpensive. Since for amateurs with limited budgets (at that time) it was difficult to generate RF at any microwave frequency, a scheme was developed to shock-excite these cavities with a spark from a simple door-bell buzzer. This scheme is shown in fig. 4. As simple as it was, it did work, and output levels of microwatts were the result. I even remem-

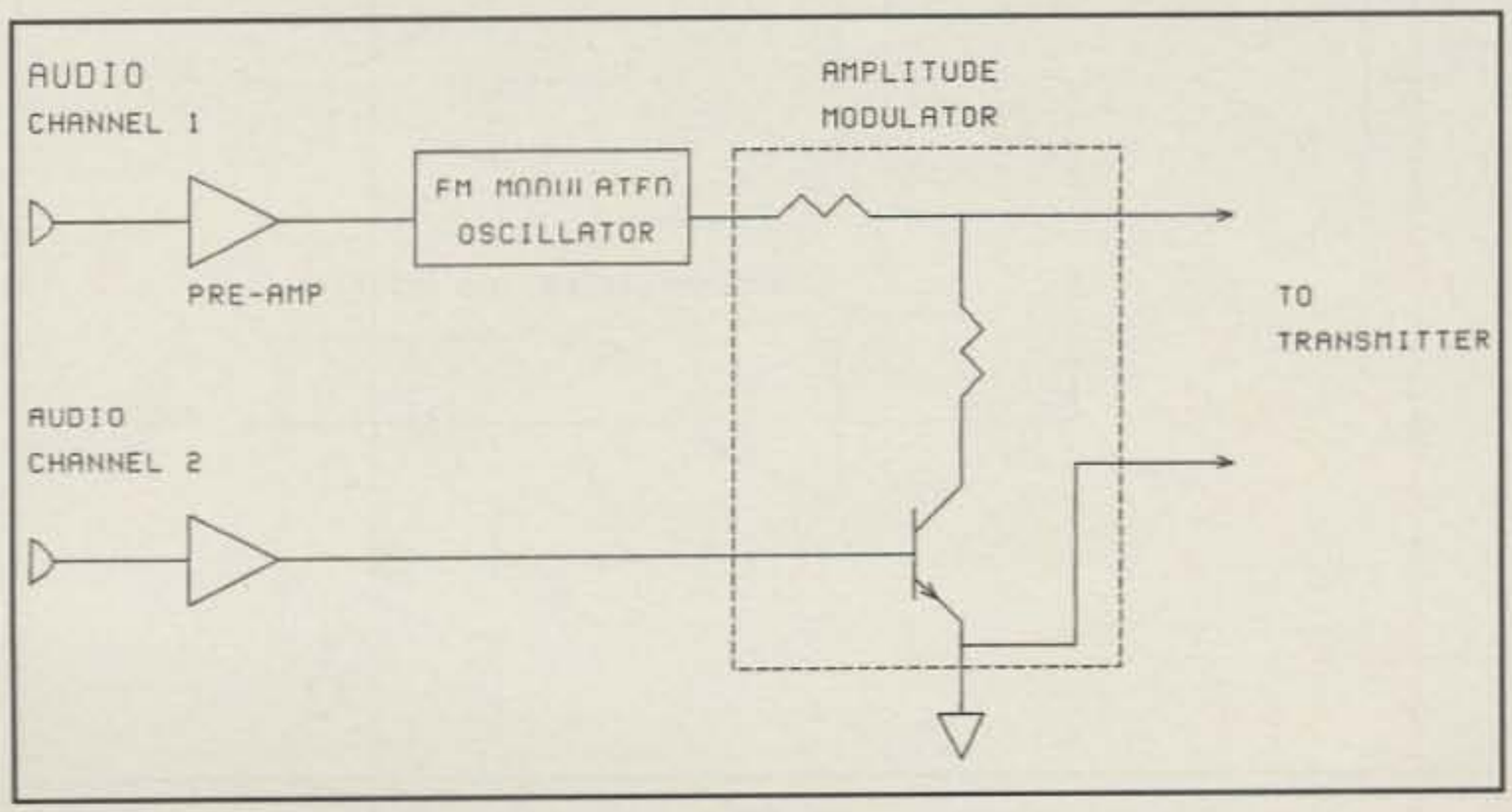

Fig. 5– Combination AM/FM transmitter scheme.

ber someone building a two-way CW link with a range of a few thousand feet using this scheme and a surplus 1N21 diode, which probably sounded terrible, but allowed experimentation at what was then a so-called "exotic" frequency. What always intrigued me about this was the use of the "prehistoric" RF generating method, the spark transmitter, to generate microwaves. I wonder how a similar application of an older technology can be projected into today's world and utilized to generate what would be considered "exotic" frequencies for the modern experimenter. Your comments are most welcome.

Multi-Modulation

My final offering this month concerns the subject of modulation. We all are familiar with AM and FM and their deviations such as SSB, PFM, PPM, and so on, but how about developing methods for combining two or more for multi-channel transmissions? Many conventional FM radio stations utilize sub-carriers for SCA broadcasts and commercial TV, which is predominantly AM for the video and uses a 4.5 MHz FM subcarrier for audio. Both of these broadcasting methods use separate carriers transmitted along the main carrier. My proposal is a little different.

Referring to fig. 5, a conventional RF oscillator is frequency modulated with a conventional audio signal by conventional techniques. The resulting FM modulated carrier then is applied to a conventional amplitude modulator instead of the unmodulated carrier that normally is used. The amplitude modulator is now driven by a second audio channel. The resulting signal is an AM modulated FM carrier that contains both audio channels and is shown in fig. 6.

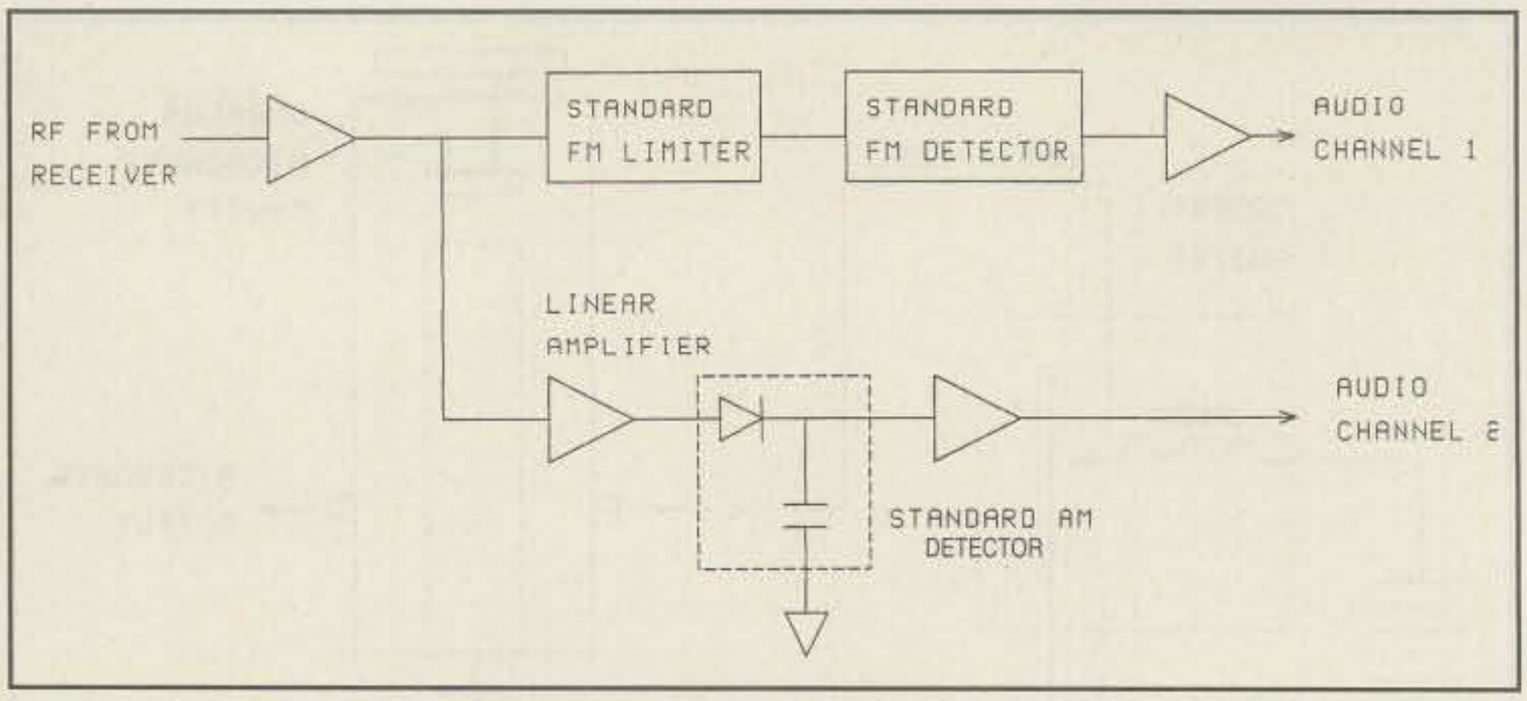

Fig. 6– Combination AM/FM receiver scheme.

Fig. 7 is a block diagram of the receiver for such a system. The first RF stage is conventional in both design and function. The amplified AM/FM RF signal is now split into two paths—the AM path and the FM path. In the FM path the signal is applied to a conventional limiter which eliminates the amplitude variation just as it is supposed to. The output of this limiter then goes to a conventional FM detector, and the result is the recovered first audio signal. In the AM path the AM/FM signal is amplified and applied to a conventional AM diode detector. Here the FM'd RF carrier is filtered out, just like the RF carrier would be in a conventional AM receiver, and the result is the second audio channel. Simple, isn't it? We actually have used this technique in a couple of fiber-optic products we manufacture, and it works quite well. Isolation between the FM and AM channels is better than 60 dB and probably could be much better if necessary. The two channels also do not have to be used for audio. One (or both) could be data, control signals, or whatever.

The entire point of this description, and this month's column as well, is not necessarily to suggest home construction projects, but to show you that with a bit of thought existing circuitry and components can be used in unique and interesting ways. My aim is to prod your brain to think about such unconventional applications for conventional circuits and components, and perhaps you will come up with something truly novel that will benefit us all. If you do, I hope you will feel free to share it with us.

73, Irwin, WA2NDM

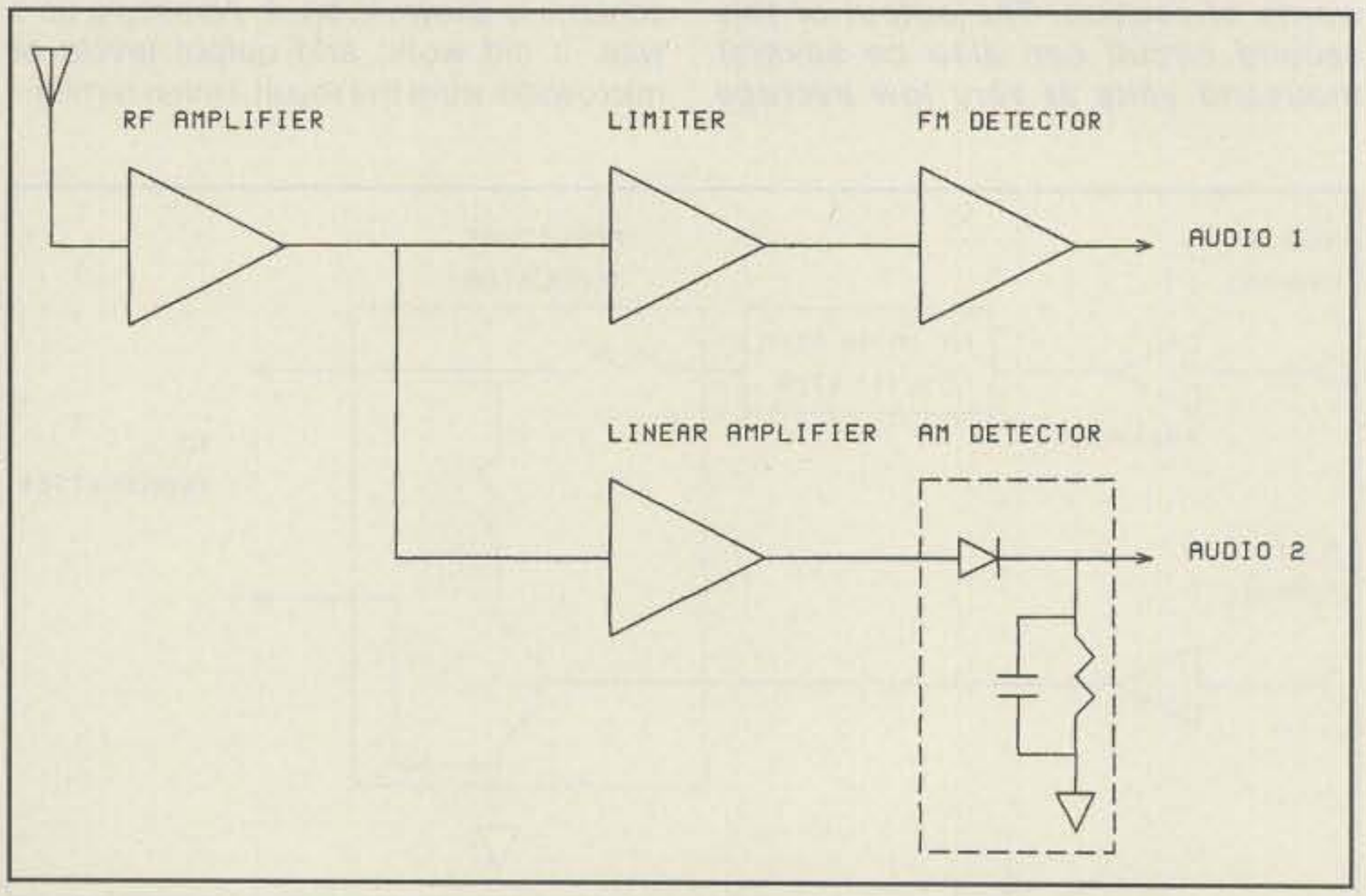

Fig. 7– Combination AM/FM receiver block diagram.

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BY KARL T. THURBER, JR., W8FX

ANTENNAS & ACCESSORIES

A LOOK AT THE SHACK FROM BOTH ENDS OF THE COAX

July Junket

My dictionary says that the word "junket" refers to a feast of merrymaking or a pleasure excursion, especially one undertaken at public expense. Well, this month's column surely isn't at public expense, and it may not exactly be a merrymaking feast, but hopefully it *will* be a pleasurable excursion, as we examine the usual staples of this column. Let's begin with antennas.

Antenna Notes

Two New Tuners from LDG Electronics. Dwayne Kincaid, WD8OYG, has designed a fully automatic HF antenna tuner intended to operate substantially better and faster than the internal automatic tuners found in many transceivers. His design, which effectively merges the modern microprocessor with the popular "L"-network, appeared in his article "An Automatic Antenna Tuner: The AT-11," in *QST* for January 1996. The tuner has the potential to make time-consuming knob-twisting and roller-cranking obsolete (see photo).

The microprocessor-controlled, high-efficiency switched "L"-network *QST* design tunes 1.8-30 MHz, working with dipoles, verticals, Vees, beams, and other coax-fed antennas. It handles 100 watts over 8 to 650 ohms, tunes in less than 4 seconds, and sports a front-panel LED SWR indicator (SWR bandwidth is about 200 kHz on average). The AT-11 doesn't require band or frequency data from the radio. Instead, it includes a programmed 6HC11 microprocessor that's smart about these parameters.

The AT-11 operates in two modes—automatic and semiautomatic. In the automatic mode, the tuner starts tuning if the SWR goes above 3:1. In the semiautomatic mode, it seeks a match only when you have the "tune" push-button depressed. It also has manual up/down inductor and capacitor controls for fine tuning. You only have to make a few simple adjustments to calibrate the SWR and power sensors, requiring only a transmitter, dummy load, and DC voltmeter for these tasks.

You can build the AT-11 from the *QST* article, or get a complete parts kit from Dwayne for $150 plus $8 s/h ($180 plus $10 s/h with the pictured enclosure). It's $219 assembled.

New for 1997 is a similar but flea-power tuner, the QRP Automatic Antenna Tuner Kit (see photo). Modeled after the original AT-11, it also is an efficient, microprocessor-controlled unit, but designed for QRP operation. Its power range is 0.1 to 10 watts over the same frequency range. Some of the specs of its big brother have been improved. For example, it tunes 6 to 800 ohm loads in under 3 seconds (1.5 seconds average). The QRP unit operates from 11 to 14 VDC and requires an average 75 mA. It's $100 plus $6 s/h; quantity discounts are available for clubs and dealers. The QRP tuner has about 150 parts; Dwayne says the kit takes but 2 to 4 hours, or one or two evenings, to complete.

For more info, contact LDG Electronics, 1445 Parran Road, St. Leonard, MD 20685 (410-586-2177; e-mail <ldg@radix.net>). You can also check out the LDG Electronics Web page for other products Dwayne offers; you'll find it at <http://www.radix.net/~ldg>.

Bilal Isotrons Revisited. Do physically small antennas work as well as their full-size counterparts? Usually not, to be honest and realistic, but often the smaller antennas mean that you can operate successfully in locations and situations where larger antennas are impractical or impossible to install.

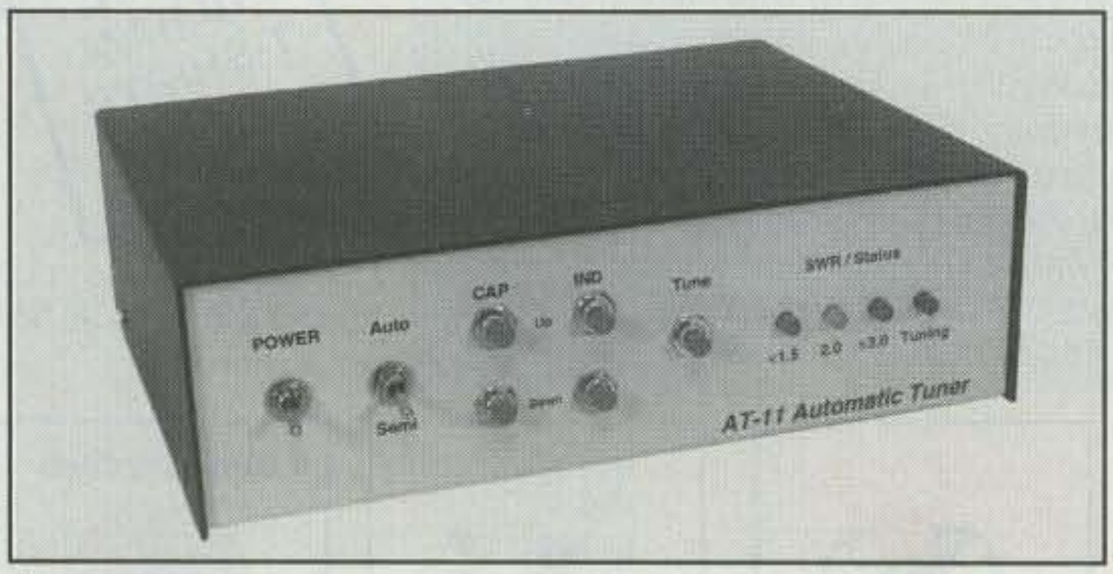
The Bilal Company is a small antenna manufacturing firm, active since 1975, which produces the Isotron antennas. According to the company's proprietor, Ralph Bilal, WDØEJA, he began marketing the compact antennas for those with space restrictions and those who are looking for "something different" in their antenna systems.

The antennas, which we last profiled in December 1993, are designed especially for portable and restricted space, and lend themselves to emergency, Field Day, motel, maritime, and similar use where large antennas are problematical. Back-to-back mounting for multiband use is possible. Construction is of tempered aluminum, PVC, cast acrylic, and stainless-steel fasteners.

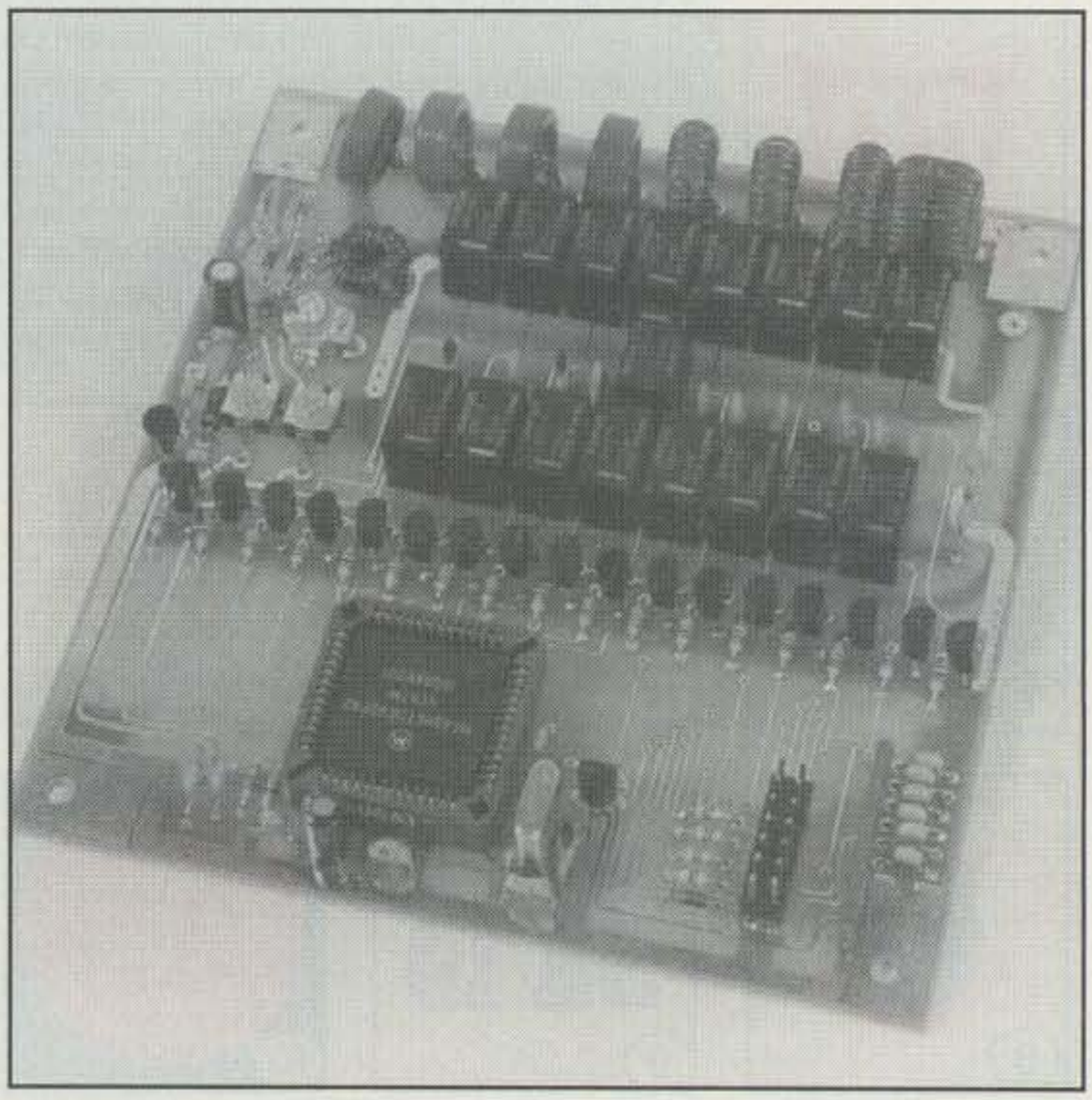
Single-band Isotrons are available for 160, 80, 40, 30, 20, 17, 15, 12, and 10 meters. These range in price from $44.95 to $149.95, depending on band. Other models covering the 11 meter CB band and MARS, CAP, and FAA frequencies also are available.

In addition, a new and improved, easier-to-tune, heavy-duty 160 meter model, the Isotron 160C, is $159.95. Also available are several

289 Poplar Drive, Millbrook, AL 36054



The LDG Electronics AT-11 Automatic Antenna Tuner is based on a design by Dwayne Kincaid, WD8OYG, which appeared in January 1996 QST. It's a high-efficiency, microprocessor-controlled, switched "L"-network engineered to work with dipoles, inverted Vees, beams, or any coax-fed antenna. It's available assembled or in kit form. See the text of this month's column for details. (Photo courtesy LDG Electronics)



The LDG Electronics QRP Automatic Antenna Tuner Kit is based on the AT-11 Automatic Antenna Tuner, originally described in QST, and is intended to load and tune the same set of coax-fed antennas. Designed to handle 10 watts RF or less, several performance specs of its AT-11 big brother have been enhanced. The $100 unit is available only in kit form. (Photo courtesy LDG Electronics)

combination models that allow two- or three-band operation with a single feedline. The combos include the 80/40 Special, which includes both 80 and 40 meters ($128); and a 10, 15, and 20 meter three-band special ($137). Alternately, you can make up any combination of two- or three-band units—for example, an 80/30 meter or a 10/12/17 meter combo.

For more information, contact Bilal Company, 137 Manchester Drive, Florissant, CO 80816 (719-687-0650). (The Isotrons were reviewed in November 1994 *73 Amateur Radio Today*; a copy of the review is included with the firm's product literature.)

RF Parts Company Catalog. This San Marcos, California based firm stocks a wide variety of often hard-to-find RF components. The components offered range from "milliwatts to kilowatts," and include transmitting tubes; RF power and other transistors; RF power modules; several types of fixed and variable capacitors; RF chokes; filters; tube sockets, chimneys, and plate caps; vacuum and special-purpose relays; heatsinks; and more.

One of the highlights of their catalog is their wide assortment of transmitting tubes. Included are custom types from Eimac, Amperex, Svetlana, Taylor, and other manufacturers, plus their own RFP brand. Among the tube offerings are the ruggedized, military-grade 6146Ws from ECG-Sylvania's last production run; RFP/Svetlana premium-grade 811A, 572B, and 3-500ZG types; several specially matched audiophile tube pairs; and other high-power, heavy-duty types with graphite plates.

One section of the catalog, entitled "Tube Applications and Suggestions," is quite instructive, offering a number of useful tube usage tips. It includes information on matched RF amplifier tubes, use of TV sweep tubes as RF power amplifiers, practical tube power-handling capabilities, tube burn-in and life considerations, and receiving and special-purpose tubes.

For a free catalog, contact RF Parts Company, 435 South Pacific Street, San Marcos, CA 92069 (1-800-737-2787).

NEMAL 1997 Cable and Connector Selection Guide. In previous columns, we mentioned the free NEMAL Cable and Connector Selection Guide. As we noted, although the NEMAL catalog is geared toward commercial, government, military, and export users, amateurs can use the guide as a standard shack or workshop reference that provides electrical and physical specs on more than 1000 cable, connector, and interconnect products.

The 1997 Guide, at 45 pages, depicts a variety of new items, including wire and cable, cable assemblies, adapters, accessories, and broadcast products. Various connector types and applications are covered: RF, audio, fiber optic, high voltage, telephone, CATV, data transmission, and more.

Several cable products are of special interest to amateurs. NEMAL offers antenna wire; tinned copper braid; coaxial, twinaxial, and triaxial cable; copper antenna wire; hookup wire; hardline and semi-rigid cable; and rotor cable. Also offered is their "Amateur Radio Composite Cable," or Hamcable™, in several different configurations. This oval-shaped cable puts coaxial and rotor cable under a common jacket; it's available with RG-8, RG-213, and Belden 9913 coax types.

The guide is from NEMAL Electronics International, Inc., 12240 N.E. 14th Ave., North Miami, FL 33161 (phone 1-800-522-2253; e-

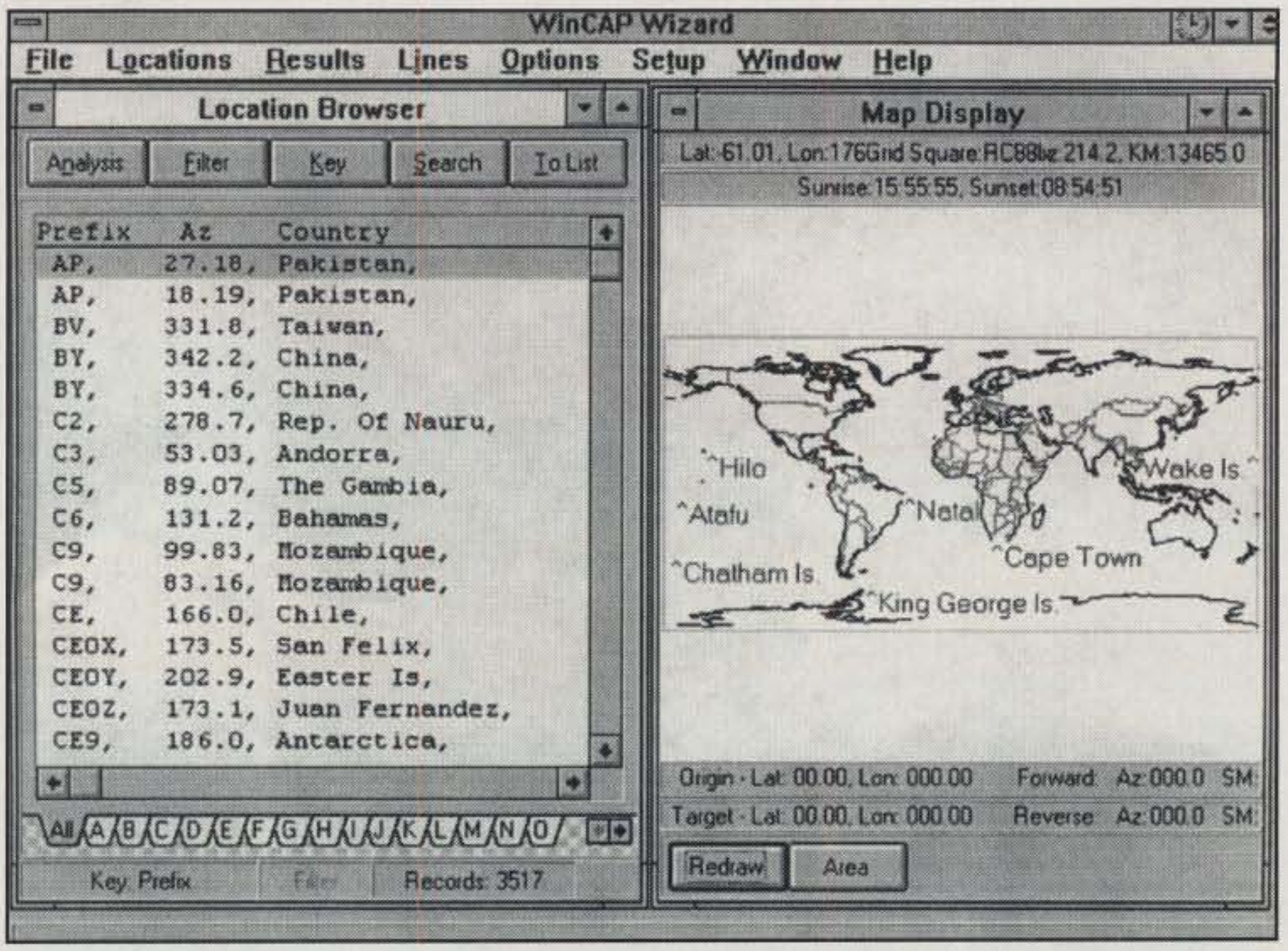


Fig. 1– WinCAP Wizard is a simple-to-use HF propagation prediction program from Kangaroo Tabor Software, makers of the professional quality Computer Assisted Prediction Manager (CAPMan). Wizard takes an innovative approach to propagation prediction and analysis, being designed to do away with buzzwords and technical jargon. The powerful yet friendly interface and smart reporting features are welcomed by newcomers and old timers alike. You can make analyses from the Location Browser or from the Map Display. (See the text of this month's column for details.)

mail <nemal@internetco.com>). You also can check their Web site <http://www.nemal.com>, and obtain technical data sheets, installation instructions, and other information via automated fax document retrieval by calling 305-981-9800.

Soft Stuff

WinCAP Wizard. There's no shortage of propagation analysis and prediction programs today. However, some of the current crop of programs are difficult to use and interpret, being developed primarily for heavy-duty commercial and government users, or for amateurs who want to undertake sophisticated, long-term station and antenna planning. Many amateurs and SWLs simply want to see what the bands are doing. They just want to know when and where to operate—the best time to try, the best band to use, and the signal strength to expect.

From Jim Tabor, KU5S, the developer of CAPMan (short for Computer Assisted Prediction Manager) comes a new entry into the propagation prediction derby. His new program is WinCAP Wizard for Windows, which takes an innovative approach to propagation prediction and analysis. The program effectively does away with buzzwords and technical jargon, and it eliminates the hassle of interpreting raw technical data. The powerful, yet friendly propagation browser interface and smart reporting features should be welcomed by newcomers and oldtimers alike.

Wizard, like its big brother CAPMan, accesses the power of the fast, 32-bit IonCAP+ prediction engine, but Wizard insulates you from its complexity. (As many readers know, IonCAP is a standard by which other propagation prediction programs and engines are judged. But IonCAP itself has been notorious for being somewhat difficult to learn and rather cumbersome to use.)

Wizard is intuitive to use in a "real time interactive" manner, and it strives hard to balance ease of configuration and use with information requirements. With the program, there are no raw data to interpret and no technical terms to learn; its "smart reporting" produces up to four easy-to-understand reports based on your station power and antenna configurations.

The tabular reports tell you what you want to know at a glance. They include the (1) Best Band Summary, an hourly look at the band most likely to provide the best quality for a comm circuit; (2) All Band Summary, a 24-hour overview of expected circuit quality (poor, fair, good, or excellent) by hour for each band; (3) Band Summary Plus, which adds additional data, including a circuit's "service probability," most reliable propagation mode, antenna take-off angle, and Maximum Usable Frequency (MUF); and (4) Dynamic Band Summary, which lets you toggle between several prediction perspectives, such as CW/SSB operating modes, signal quality, signal-to-noise (S/N) ratio, propagation mode, and service probability.

The program's interface includes an intelligent Mercator projection world map that's dynamically linked to a database of more than 3500 locations which include DXCC countries and U.S. counties. There's a two-way link between the "Smart Map" and the "Location Browser" (see fig. 1); you can plot database locations on the map and find database entries simply by clicking on the map. On-screen indicators immediately show you geographic (lati-

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Wizard is $29.95 plus $5 s/h from Kangaroo Tabor Software, Route 2, Box 106, Farwell, TX 79325-9430 (fax 806-225-4006; e-mail <ku5s@wtrt.net>). You can also check out Jim's Web site at <http://www.wtrt.net/~ku5s>; the site also offers a detailed, point-by-point comparison of CAPMan vs. Wizard. CAPMan is also on the Web at <http://www.ourworld.compuserve.com/homepages/KU5S>.

Postscript: We reviewed CAPMan in May and November 1994. The professional program, up to at least V3.0 now, is for those who need a more sophisticated analysis. It's $89, and a contour map option, CAPMap, is $29.95. Also see R. Dean Straw, N6BV's reviews and comparisons of several heavy-duty HF propagation prediction programs, including CAPMan, in September and October 1996 *QST*. (Wizard wasn't offered at the time of the *QST* reviews.)

QRZ Ham Radio CDROM. Since we first covered it, the QRZ™ Ham Radio CDROM has really come into its own, having been updated at least eight times. The heart of the disc is the extensive callsign database and the sophisticated search and retrieval software that lets you click and point your way through over 985,000 callsigns of amateurs in the U.S. and a steadily growing number of foreign countries.

Each station listing includes the name, address, and other license data, if available, compiled in an easy-to-read format that allows you to find most records in under two seconds. No hard disk space is needed; the callsign search software is on the disc. The most recent editions of QRZ provide on-disc point-and-click support for Windows 95 and NT, Windows 3.1, and the Mac OS. Other search programs run under MS-DOS, OS/2, and other platforms.

The newest addition to the growing family of QRZ database programs (all included on the same CD) is QRZ/32, a 32-bit search engine for Windows 95 and Windows NT. If you're not ready for either yet, there's no problem, since the QRZ CDROM still includes the same Windows 3.1 interface as in the previous editions.

The newer editions provide all the capabilities of the Windows 3.1 version, plus new features. These include over 800 digital QSL cards, more than 55,000 e-mail addresses, the latest vanity callsigns, a built-in text editor, a 17-button multi-function toolbar, automatic storage of personal contact data, a QSL postcard generator, user-customizable fonts and screen colors, and a new multi-page printing system. Still other features include the capability to run multiple simultaneous lookups, the ability to browse images and look up callsigns at the same time, and expanded online help. Most, although not all, of the QRZ features are available through the Win 3.1 interface.

The 600+ MB QRZ CDROM includes the complete text of the FCC approved license examinations, along with current FCC rules and regulations. There also are hundreds of shareware utilities; Morse Code, satellite tracking, TCP/IP, packet, and mapping programs; beacon lists; and clip art included on the disk. There's even a section containing Sound Blaster™ compatible audio test tracks which you can use to set up and test packet, RTTY, and AMTOR stations in a variety of data formats. QRZ also includes the official ARRL information server archives.

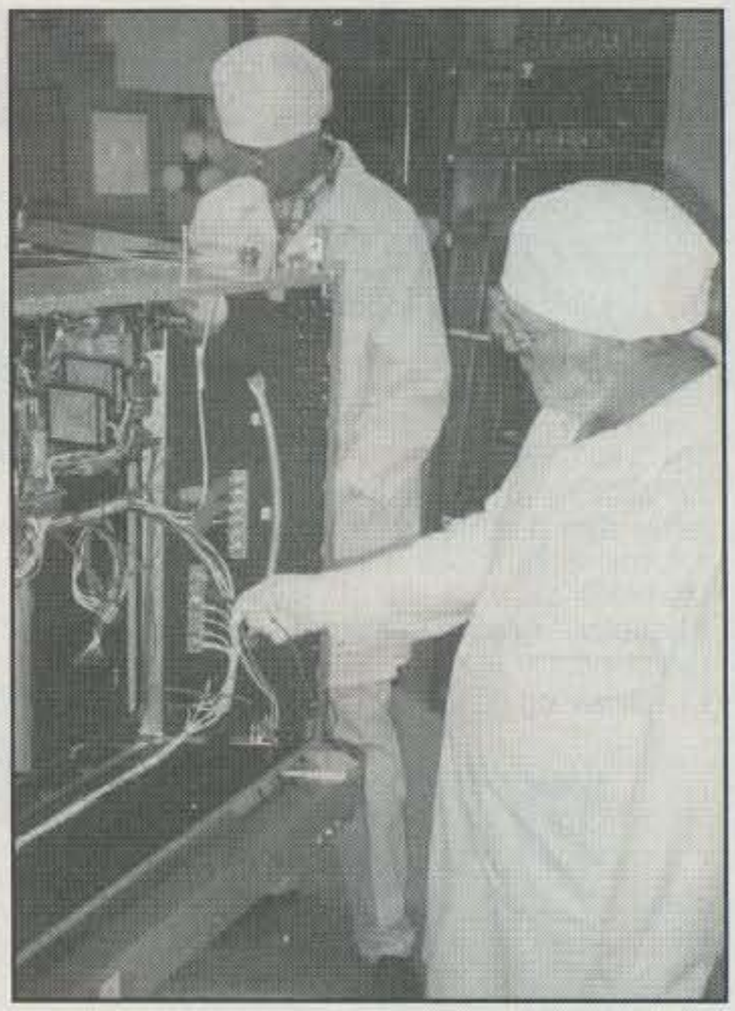
The QRZ Ham Radio CDROM lists for $29.95 and is published on a semi-annual basis. For a catalog depicting a variety of interesting disks in addition to QRZ, contact Walnut Creek CDROM, 4041 Pike Lane, Suite D-906, Concord, CA 94520 (1-800-786-9907). The QRZ Ham Radio CDROM also is available from Fred at QRZ, P.O. Box 62807, Colorado Springs, CO 80962-2807 (e-mail <aa7bq@ qrz.com>). You can check out his Web site at <http://www.qrz.com> and the QRZ FTP archives at <ftp://ftp.qrz.com>; you can try out the QRZ CDROM online while visiting the QRZ Web site.

From The Bookshelf

Shortwave Receivers Past and Present. This 1997 book by Fred Osterman, N8EKU, in a much-expanded 2nd edition, includes detailed information on some of the world's most popular receivers. It's for the radio collector, the informed receiver buyer, or anyone—SWL or radio amateur—who's interested in the history and development of shortwave radios. If names such as Collins, National, Hallicrafters, and Hammarlund make you pine for the glow of vacuum tubes, this compendium is for you.

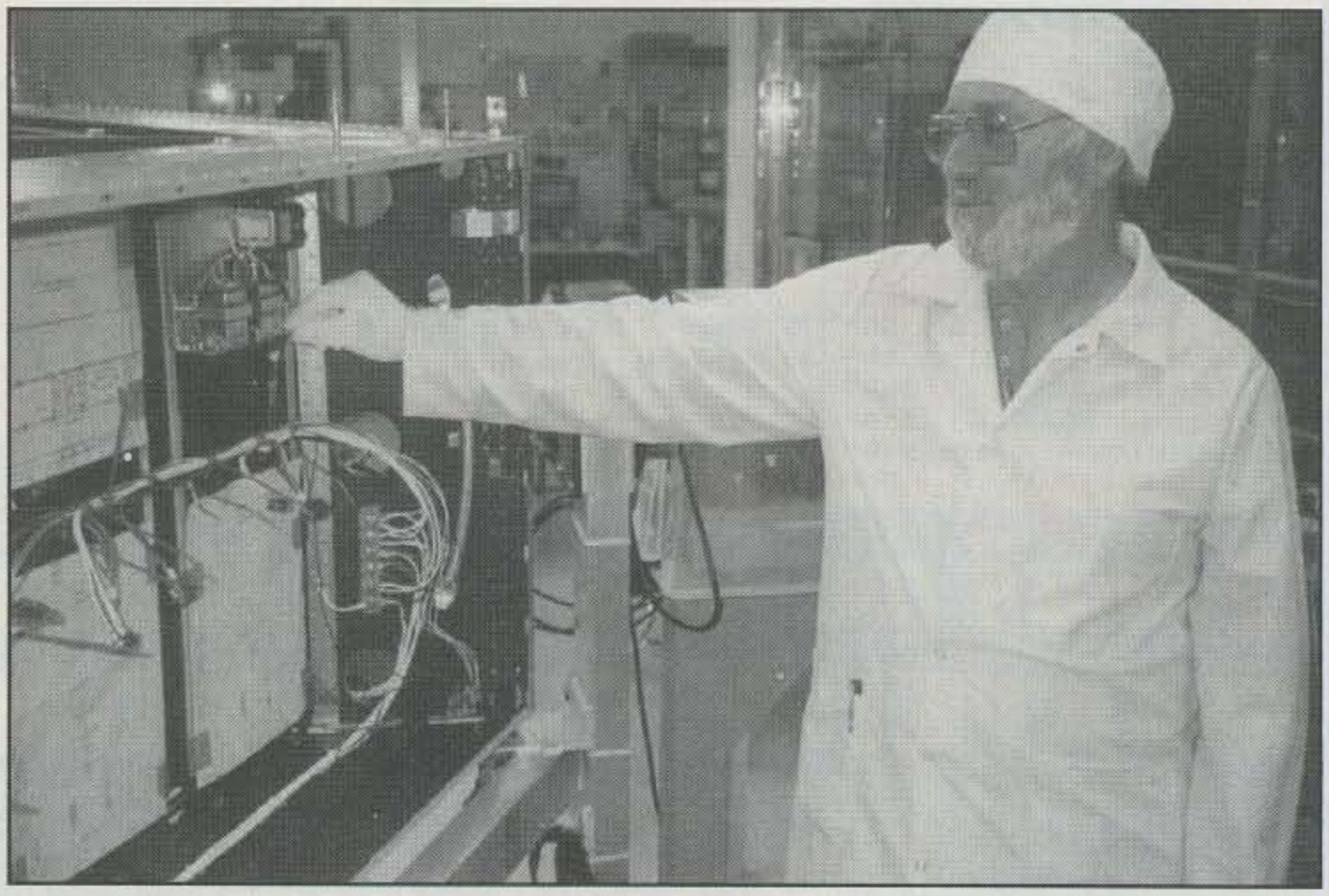
The 351-page, 80-chapter "blue book" covers tube and solid-state communications receivers from 1945 to 1996. Over 500 sets from 70 manufacturers are featured, with commentary on 400 variants. Reference information includes receiver type, date sold, size and weight, features, reviews, specifications, new and used values and "value ratings," availability, and a photo. There's even a "briefly mentioned" chapter on extremely rare radios, and another chapter on "receivers that never were," phantom radios that never went beyond the prototype stage.

Printed on high-quality glossy paper, the book is a good value at $19.95 plus $2 s/h. Contact Universal Radio, Inc., 6830 Americana Pkwy., Reynoldsburg, OH 43068-4113 (phone 1-800-431-3939; e-mail <dx@universal-radio.com>). Check out their Web page at <www.universal-radio.com>.

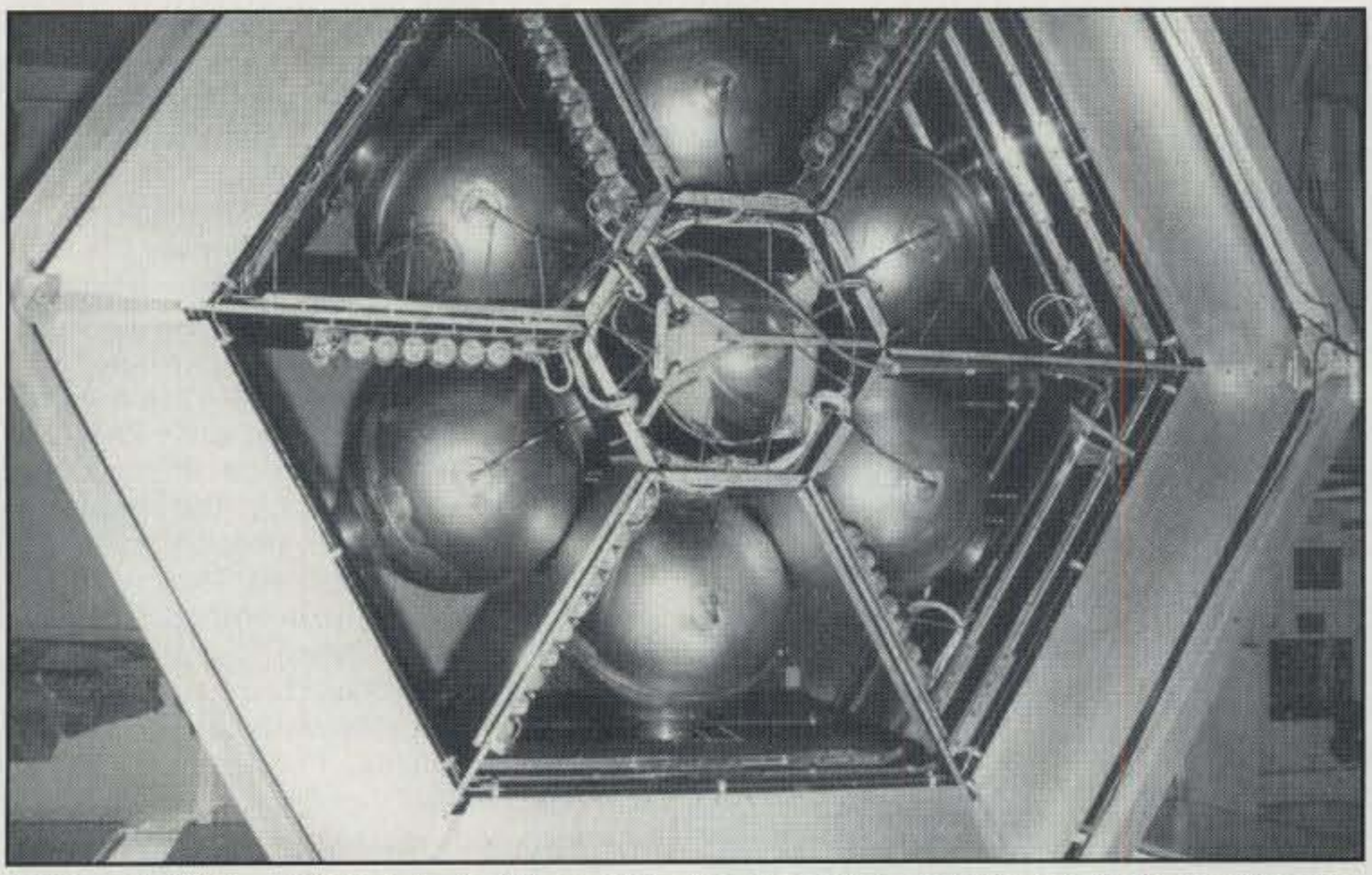


In a scene reminiscent of a hospital operating room at the Phase 3D International Satellite Integration Laboratory at Orlando, Florida, AMSAT Phase 3D Integration Laboratory Manager Lou McFadin, W5DID (right), and Stan Wood, WA4NFY, AMSAT-NA Assistant VP, Engineering (left), perform extensive continuity tests of the Phase 3D wiring harness. (AMSAT-NA photo by Keith Baker, KB1SF)

Passport to World Band Radio and RDI White Papers. If your interests include shortwave listening, you'll likely want to obtain the 1997 edition of *Passport to World Band Radio*. A "must have" for SWLs, it provides data on all shortwave broadcast stations from 2.3 to 26



Here AMSAT Laboratory Manager Lou McFadin, W5DID, points out the satellite's VHF/UHF antenna relays in this photo taken at the Phase 3D Lab. The high-power, "space-rated" relays were provided by Dow-Key Corp. to switch receivers and transmitters between high-gain and omnidirectional VHF/UHF antennas on the spacecraft. The 2 meter transmitter position is located just below Lou's hand. (AMSAT-NA photo by Keith Baker, KB1SF)



In this mid-October 1996 photo the Phase 3D battery mounting and integration effort nears completion at the Phase 3D International Satellite Integration Laboratory in Orlando. The Phase 3D satellite is a cooperative international amateur radio project, with major work being done in several countries besides the United States. Assembly, checkout, and integration are taking place in Orlando, Florida. (AMSAT-NA photo by Keith Baker, KB1SF)

MHz, along with shortwave radio reviews. Station name, location, frequency, time, language, and power are provided. The annual guide by Lawrence Magne is published by International Broadcast Services (IBS) Ltd. and priced at $19.95.

The same publisher also offers a series of in-depth Radio Database International White Papers® that include reviews of selected premium receivers. These are $6.95 each, postpaid from IBS; fax them for a list of available papers. For more information, contact International Broadcasting Services (IBS), Ltd., Box 300, Penn's Park, PA 18943 (215-794-8252). (Fax to 215-794-3396 for a list of current White Papers.)

1997 Passport to Web Radio. Radio amateurs and SWLs know what it is to DX the world on the HF amateur and shortwave bands. However, computer users with Internet access now can DX without a radio, using their PC to do the listening. Today, in addition to international shortwave broadcasters, even the thousands of radio stations around the world with just local or national coverage can put their programming online for a global audience. And the audience can hear the broadcasts without interference and static.

The technology that makes this phenomenon possible is called audio streaming. "Streaming" means you don't have to download an entire audio file (which could consume many megabytes of valuable hard disk space and take lots of time) before you hear anything. For streaming to work, you must equip your PC with a sound card and speakers. You also need audio "plug-in" software for your Web browser, such as the two free programs, RealAudio from Progressive Networks (found at <http://www.realaudio.com>), or Xing's multimedia StreamWorks (at <http://www.xingtech.com>).

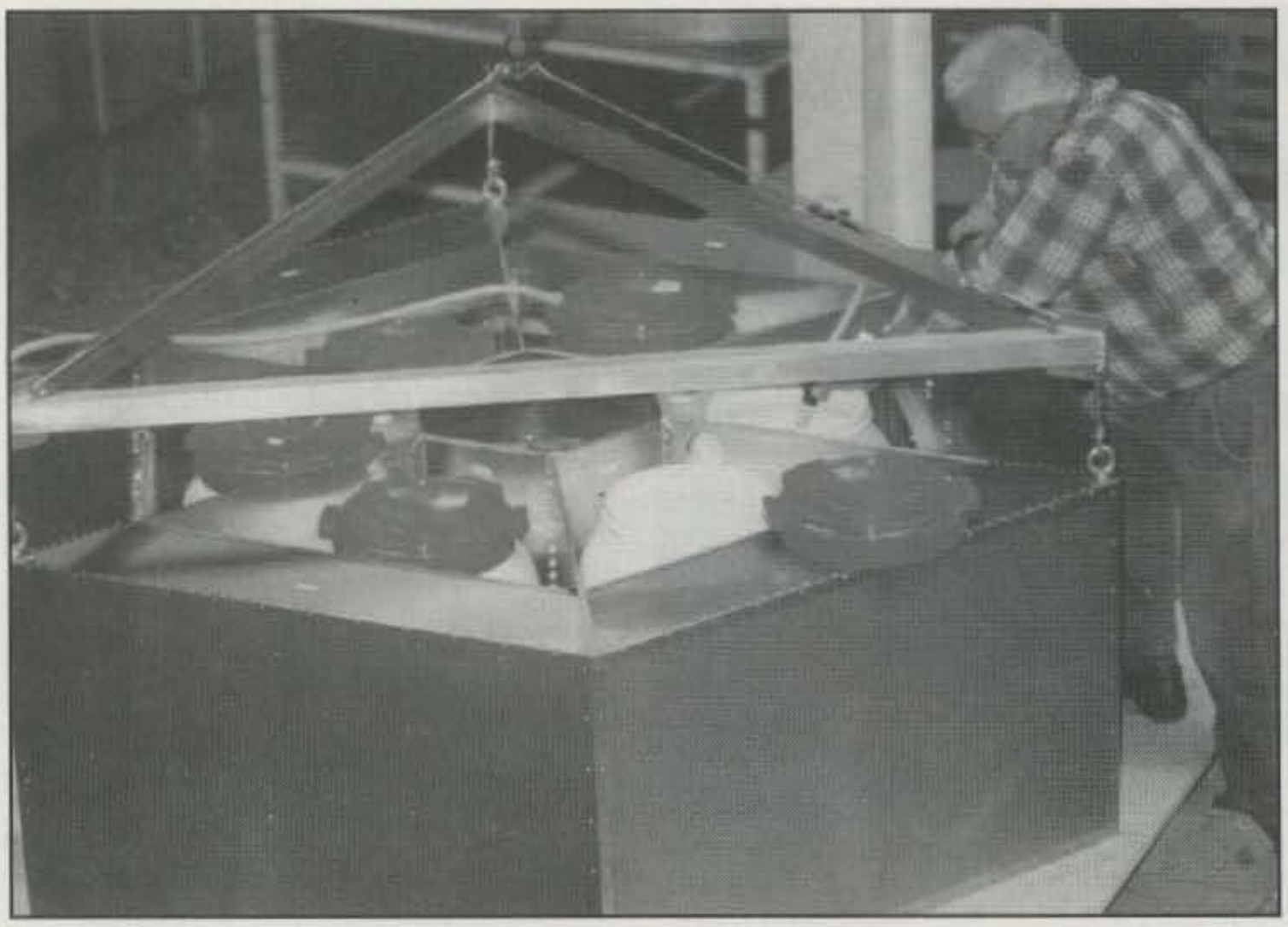
The online audio players work adequately with 14.4 Kbps modems, but the more modem "bandwidth" you have, the better. Regardless of the speed of your connection, however, you won't hear high-fi audio; speech sounds much better than music. Streaming technology has improved steadily, however, and it soon may yield crisp, near CD-quality sound.

The first print guide to online Web radio now is available. The highly readable, 144-page 1997 *Passport to Web Radio* ($19.95, from the publisher of *Passport to World Band Radio*) surveys the offerings of some 400 stations worldwide. It's a comprehensive guide to get you started and to suggest stations and programs to follow. Listings cover stations that put programs on the Web live or that replay recordings of shows. The book is $22.95 including s/h from IBS at the address we noted above.

World Radio TV Handbook (WRTH). The *WRTH* is recognized as the most authoritative and up-to-date publication on the world's longwave, mediumwave, shortwave, and TV stations. The book features listings of stations primarily by country, with a frequency cross-reference. Besides station information and operating schedules, the *WRTH* reviews receivers, and it prints the names and addresses of radio listener clubs and key broadcasting personnel, along with maps showing current political boundaries. The $24.95 1997 50th anniversary edition is available from radio booksellers. Also offered from this publisher is the *WRTH Satellite Broadcasting Guide* at $24.95.

For more information, contact Billboard Publications, Inc., 1515 Broadway, New York, NY 10036 (212-764-7300). (Mail orders are filled by Billboard Books, P.O. Box 2013, Lakewood, NJ 08701.)

Getting On Track With APRS. Just what is the Automatic Packet Reporting System (APRS) all about? APRS, a map-based tracking system, sends and receives station location or position information. It provides a real-time, graphic map display of participating stations, which are shown as symbols on a map



Here AMSAT-DL's Konrad Mueller, DG7FDQ, adds water to one of the "propellant tanks" of the Phase 3D engineering model. The photo was taken just prior to the first spacecraft dynamic tests of the AMSAT Phase 3D spaceframe and launch structure while mated with an Ariane 5 test stand. Konrad mounted plastic water jugs into the model to simulate propellant tanks. He also added wood blocks in the equipment bays to simulate electronic modules. The tests investigated how well the spacecraft and carrying structures will perform. (AMSAT-NA photo by Keith Baker, KB1SF)

on your PC screen. The position information includes as a minimum latitude, longitude, and station type. APRS is very useful for emergencies, exercises, weather nets, and other types of events. When used with a Global Positioning System (GPS) receiver, APRS is ideal for tracking moving stations.

A new ARRL book, *Getting on Track with APRS: A Hands-On Guide to the Automatic Packet Reporting System,* by Stan Horzepa, WA1LOU, places the APRS potential in perspective and lets anyone with a packet station and computer join in the fun. Stan's primer is intended to be a one-stop reference for installing and using APRS software. Separate sections cover DOS, Windows, and Mac platforms. Chapters include software, mapmaking, hardware requirements, and specialized uses such as direction finding, telemetry, and DX plotting. The 1996 book is $14.95 from the ARRL, 225 Main St., Newington, CT 06111-1494 (860-594-0200).

CRB Research Books 1997 Catalog. From the variety of correspondence I receive, I'm continually surprised by the number of radio amateurs who also are shortwave listeners (SWLs), scanner enthusiasts, CBers, amateur spies, law enforcement wannabes, computer hackers, and the like.

I've found that CRB Research Books includes among its titles books catering to this rather eclectic audience—more so than most other radio booksellers. Sure, some of the titles in the catalog have to be taken with the proverbial "grain of salt," but if nothing else, perusing the catalog is fun, and some of the titles certainly are interesting enough to check out.

Some fascinating new titles I found in the 1997 catalog include *Underground Bases and Tunnels: What is the Government Trying to Hide?* by Richard Sauder; *The Ultimate Spy Book,* by H. Keith Melton; *Pirate Radio: The Incredible Saga of America's Underground Illegal Broadcasters,* by Andy Yoder; *Angels Don't Play This HAARP: Advances in Tesla Technology,* by Nick Begich; *How to Investigate by Computer,* by R. D. Thomas; and *The License Plate Book,* by Thomson C. Murray. These are just a few of the unconventional titles I uncovered, in addition to mainstream amateur, SWL, and scanner monitoring topics you'd expect to find.

For a very interesting book catalog, contact CRB Research Books, Inc., P.O. Box 56, Commack, NY 11725 (516-543-9169).

Short Bursts

AMSAT Phase 3D Activity Update. The AMSAT sponsored Phase 3D international satellite has been envisioned as a replacement for the now-expired OSCAR 13. It's also the largest and most advanced amateur satellite ever built, aimed at reducing the cost and complexity of satellite-capable amateur stations.

We highlighted details of Phase 3D in several columns, so we won't repeat them here. But we will reiterate the fact that Phase 3D is a cooperative international amateur radio project. Major work is being done in Germany, South Africa, Finland, Slovenia, Hungary, the Czech Republic, Belgium, Japan, and other countries besides the United States. Assembly, checkout, and integration are being undertaken in Orlando, Florida.

Unfortunately, the project has received some setbacks. As you undoubtedly know, the first flight test of the Ariane 5 launch vehicle was destroyed by ground command just 40 seconds into the flight, as it was launched from the European Space Agency's French Guiana launch facility. While we're all fortunate that no amateur radio satellites were aboard the ill-fated mission, the disaster threw a monkey wrench into the future launch schedule, to say the least. So where do we go from here?

At this writing, several months in advance of when you're actually reading it, the Phase 3D spacecraft is manifested on an upcoming Ariane flight, probably in July. This means that launch is imminent, or possibly even that launch already has occurred. This means that our comments may have been (hopefully favorably) "overtaken by events." For more details on the launch schedule, check out the AMSAT Web page. It's at <http://www.amsat.org>.

In the meantime, Keith Baker, KB1SF, AMSAT Executive Vice President, continues to update us and the amateur community at large on Phase 3D happenings. Keith sent me another thick packet of interesting photos showing more of the hardware details of the new satellite as it's prepared for launch. I'm pleased to share several photos with you this month.

Looking Back Five

Five Years Ago in Antennas and Accessories. Okay, so now you know what the column is like for July 1997. But what was "hot" five years ago, in July 1992? That column, "Book Nook," dealt with books and catalogs for the radio hamshack.

We began by highlighting several ARRL antenna books, including the *ARRL Antenna Book* and *Antenna Compendium,* Volumes 1 and 2. We looked at MFJ's *The Modern Amateur's Mobile Handbook* and "K4TWJ's Classics of Amateur Radio 1992 Calendar," showing radio collectibles, both by Dave Ingram, K4TWJ. We also examined *Communications Receivers,* 2nd Edition, by Ray Moore, ex-K1DBR, from RSM Communications; *Buying a Used Shortwave Receiver,* by Fred Osterman, N8EKU, from Universal Radio; and several other books from a variety of publishers. We also highlighted the Larsen Electronics catalogs, plus a new catalog from Vectronics.

In July 92 we had room only for a few hardware items. We perused the LRU-1 lightning reducer and SGR-1 attenuator box from Electron Processing, and the MFJ-912 W9INN Balun Box. In software, we featured PSQSL, a utility for processing QSL card labels, from Gary C. Sutcliffe, W9XT; and Resonant Circuit and Inductor Design, a free PC utility program offered by Austin Custom Antenna. We also mentioned some policies on sending us amateur radio software for review. Finally, turning to history, we discussed interesting but conflicting ideas relating to the true origins of the word "ham" as applied to radio amateurs.

Wrap-Up

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

Overheard: No doubt about it—the easiest and best way to clean up a mess is simply to prevent it in the first place.

73, Karl, W8FX

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SS-12	10	12	2.3 x 6 x 9	3.4
SS-18	15	18	2.3 x 6 x 9	3.6
SS-25	20	25	2 7/8 x 7 x 9 3/8	4.2
SS-30	25	30	3 3/4 x 7 x 9 5/8	5
SS-25M*	20	25	2 7/8 x 7 x 9 3/8	4.2
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BY DAVE INGRAM, K4TWJ

WORLD OF IDEAS

A LOOK AT THE WORLD AROUND US

A Friendly Chat and Mobiling '97

Heads up, gang! July is upon us, we are in the middle of vacation season, and it is once again time to talk mobiling. Whether traveling the big roads, thrashing the wheat field, or relaxing while parked in a driveway, amateur radio operating from the car has more going for it today than ever before. How so? The HF bands are often wide open yet only lightly populated, QRM is quite low, and even low-power signals are getting out great. Fire up your rig and check out what you've been missing! Those of us on the air need some stateside QSOs as a reality check. Working straight DX is fun, but it sure can get lonely!

Before getting into the mobile scene, I would like to thank everyone for their continuing encouragement and support of my columns, books, and "at the moment" projects. Most delightful are fast-moving contesters who respond to my quick amidst-the-multitude call with "Hello, Dave" or "K4TWJ—Is this Dave Ingram?" Kind words such as these are our greatest reward. Thanks, and may the force of good signals always be with you!

During recent months, incidentally, I have become quite concerned over the low number of stateside stations heard on our HF bands—and "sideline opinions" regarding who should be privileged to use them. As a classic old folk song says, "Where have all the flowers gone?" Here are some observed examples.

Many times the majority of stations I hear on a band are DX, and their CQs are answered by DX. Likewise, a creditable number of my CQs are answered by DX rather than U.S. stations. Working anyone I hear with low power is "duck soup." Competition is only miniscule. This may be ham heaven, but it is also a mite frightening! If you are only going by packet cluster DX reports and quick-tuning a band rather than calling CQ and kindling activity, gang, you are missing the boat. Manufacturers and importers should also take note here. Trying to sell fancy transceivers with DSP is easier only when folks are motivated enough to exercise their rig's on/off switch!

What has happened? Have we talked up the Internet and talked down encouraging newcomers to the point where it is coming back to haunt us? Amateur radio is dependable and reliable emergency and preparedness communications—a completely wireless medium without hourly fees and with a pool of skillful operators of high integrity. Compare those credentials to wide-open and beyond-control Internet access. Amateur radio is special—very special—and we are responsible for its continued growth and success, not its demise. Let's pull together to reinspire enthusiasm like the "good old days"!

Another quick note warrants mention. Your requests for more QRP coverage and more "keep us soldering" projects have been noted, and more views favoring those areas are planned for future columns. Stay tuned! And speaking of QRP, do you remember the little hot-sauce-powered Micronaut transmitter we featured in our March '97 column? Thanks to Steve Bornstein, K8IDN, a mating receiver kit is now available (photo 2). The receiver uses an NE602 and LM380 plus 17 other parts, is direct-conversion with varicap tuning around 7040 kHz (crystal supplied), and is only a tad larger than my Micronaut transmitter. The receivers are available from Steve, K8IDN, 475 East North Broadway, Columbus, Ohio 43214 for $18 postpaid. I still have the mating Micronaut transmitter kits available for the same price (K4TWJ, 4941 Scenic View Drive, Birmingham, AL 35210). More details on Micronauts coming soon. Now let's talk mobiling.

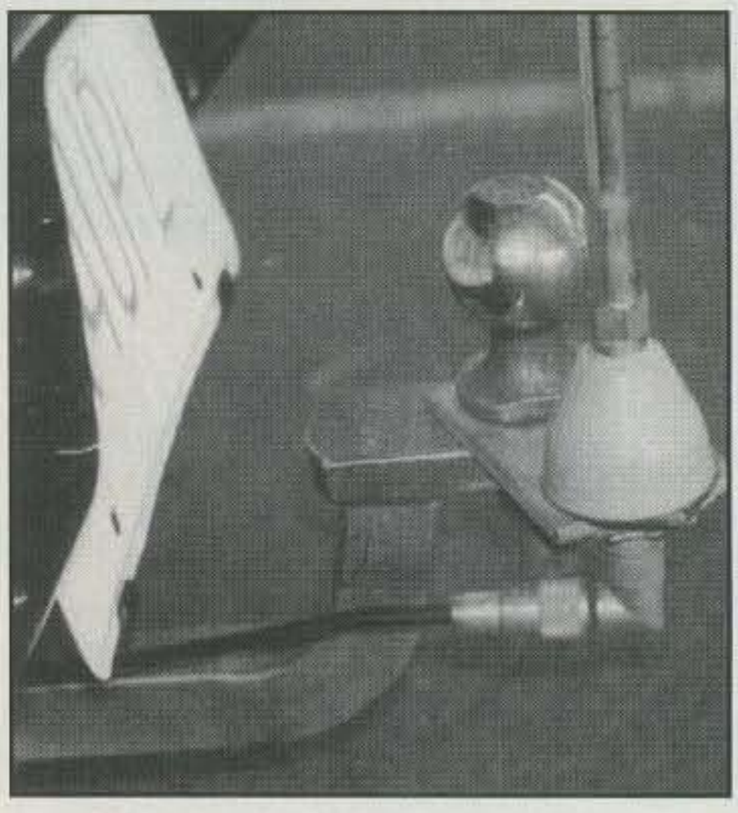

Photo 1– Does this mobile-antenna mounting arrangement look similar to yours? Can you spot its deficiencies? Study the photo and then (no peeking!) compare your answer to our discussion near the end of this column.

Keep On Truckin'

When Bill Hays, KD4GHQ, moved up to a new 4 × 4 truck, he decided it was time to go HF mobile in high style. His resul-

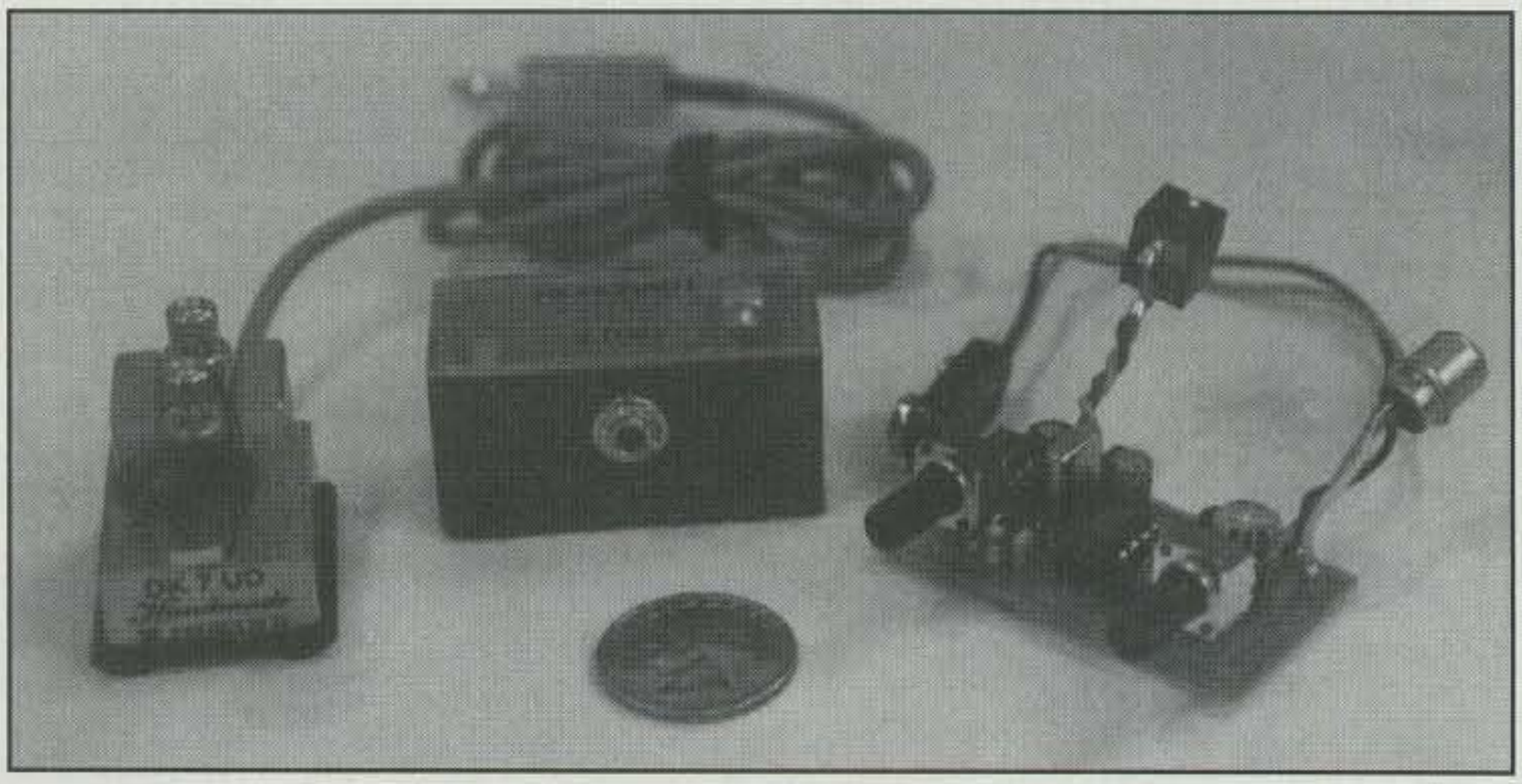

Photo 2– Carry a complete HF station in your shirt pocket? You bet! A couple of Micronauts do the trick. Shown here with a quarter for size reference is my Micronaut transmitter (middle) and K8IDN's mating receiver (right). The receiver's PC board is a fraction larger than the transmitter's board. Both items are available in easy-to-assemble kits. The miniature key, incidentally, was handmade by DK7UD and belongs to K8IDN.

4941 Scenic View Drive, Birmingham, AL 35210

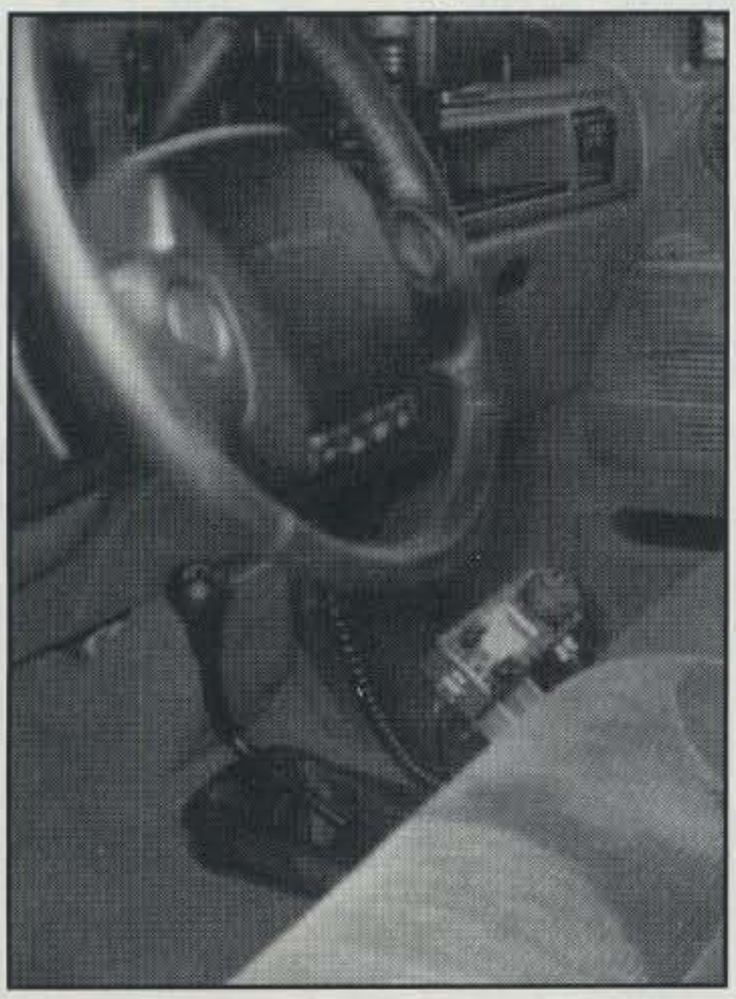

Photo 3– Interior view of KD4GHQ's trim and clean "work it all" mobile setup. The all-red upholstery is complemented by a remote-mounted IC-706, with the control head attached to a fold-away bracket.

tant setup, shown in photo 3, is a formidable example of what the well-equipped mobile is sporting in 1997. Bill installed an ultra-compact ICOM IC-706 behind the truck's seat and ran a remoting cable to the control head mounted on a fold-away bracket in front of the seat. The interior layout is slick as a button, and it lets him lean back comfortably rather than straining forward when tuning the bands or operating.

Agri Mobile

A couple of months after last year's mobiling column was published, Mark Hilvety, N9PLE/Agri Mobile, answered one of my late Sunday afternoon CQs around 14.200 MHz.

"What kind of mobile do you have there?" I asked.

"I'm in a tractor," Mark replied.

"No kidding! Are you sitting on the tractor with the rig mounted on the hood and the antenna clipped to the fender? How is the heat and noise? Have you tried CW, too?" I asked.

Mark responded with "No, I'm in an air-conditioned and glass-enclosed cab, hamming after working a few hundred acres of farmland."

Now my curiosity was really piqued. "Do you have a picture of that setup?" I asked.

"Sure," Mark replied. "I'll send you a couple of them." (Mark is a super congenial chap.)

I expected to see something a mite unusual, but when the photos arrived, they blew this city boy away (see photos

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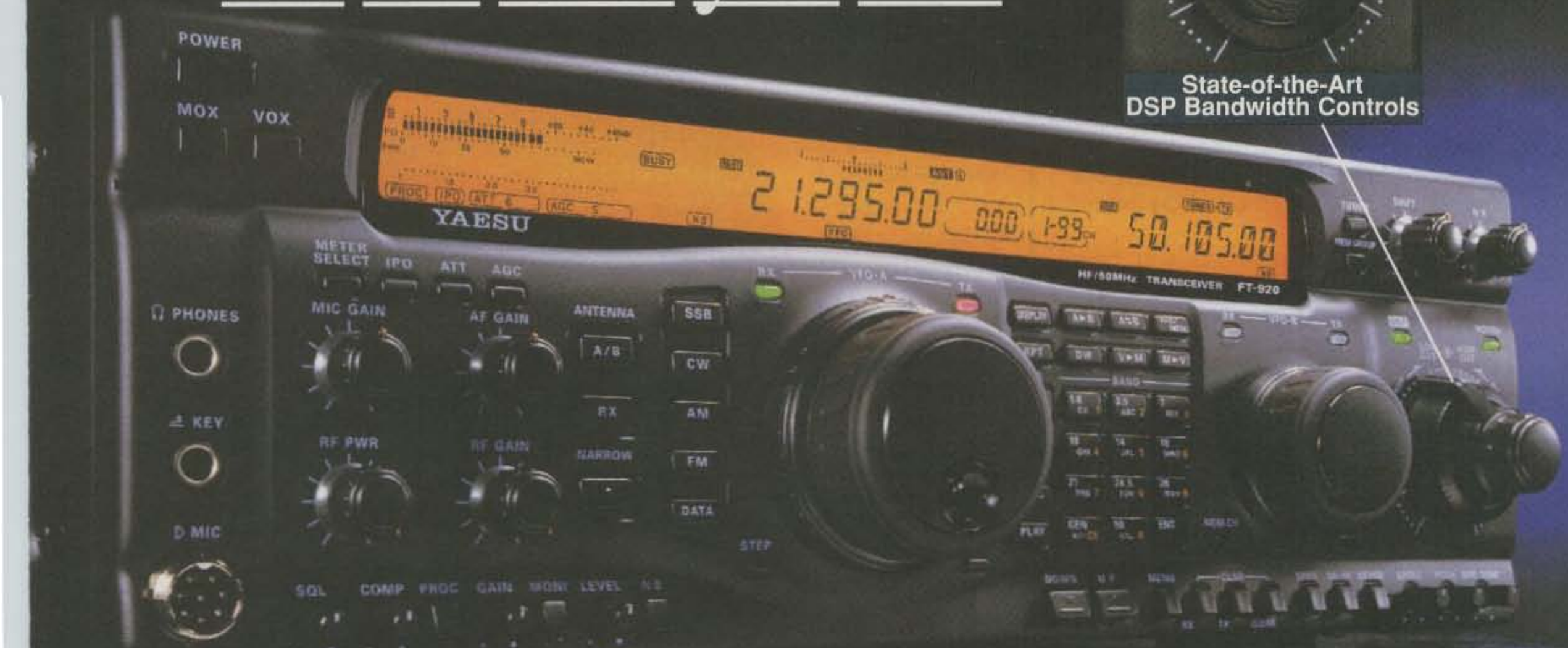

Specifications subject to change without notice. Specifications guaranteed only within amateur bands. Some accessories and/or options are standard in certain areas. Check with your local Yaesu dealer for specific details. Collins is a trademark of Rockwell International Corporation.

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Photo 4– N9PLE works the world plus OSCAR satellites from down on the farm with this clever tractor mobile setup. An Outbacker "Perth" antenna is attached to the cab, and a 2 meter/70 cm antenna is mounted forward on the hood. The tank on the front pours on the juice while the tiller on the rear rakes in the DX.

4, 5, and 6). Mark's tractor mobile is definitely in the big-time class, and it is complete with a large drum on the front for spraying or fertilizing and a big tilling . . . thing . . . attached to the rear (I may be as green as a gourd when it comes to farming, but I'm sharp as a tack about amateur gear!). Mounted inside the cab is a Yaesu FT-890AT for HF, and a Yaesu FT-5100 dualbander for 2 meters and 70 cm (photo 5). An aviation-type headset with boom microphone and long extension cable provides hands-free mobiling while allowing plenty of mobility. Look above the FT-5100, and you will also see a cell telephone and some type of range calibrations on the windshield. Spending a day in this tractor's cab would be a gas!

Photo 5– A cockpit view of N9PLE's setup with the HF and VHF/UHF rigs plus the headset and cell phone. Now this is the way to handle farming!

When asked if tractor mobiles really have more fun, Mark reflected on some of his more memorable contacts. The first DX station he worked was G4WZD via the long path, and the chap could not believe he was QSOing a tractor mobile down on the farm. Next was VE6ITV on 2 meters/70 cm via AO27. Now that's putting a dualband rig to good use! Mark also had a long chat with WB2JKJ in New York and answered various questions about farming from junior high school students. During another stint he worked KM6TN aboard the WW II submarine *U.S.S. Pompanito* at Fisherman's Wharf in California. Mark has experienced more excitement operating on the farm than some folks do from home stations.

There are a couple of noteworthy points to this story: Being able to get on the air during what many of us call inopportune times has its unique rewards. Further, a well-planned mobile setup need not always be "in motion" to be enjoyable. Operating while stopped off the beaten path is one of its special "take it with you" treats. Jolly good show, Mark Hilvety!

Shifting to the high seas, Mark Calderazzo, WB4UOK/MM2, shares a view of his 198 meter long, 34 thousand ton mobile (photo 7). Mark is one of the radio officers aboard this cargo ship traveling between the east coast of the U.S. and South America, and he squeezes in DXing the bands plus homebrewing projects during off-duty times. Possibly you remember his neat one-tube transmitter featured in a past classic rigs column. Not only is Mark's mobile large enough to support a full-size wire antenna (and "get out" great amidst all that salt water), he even has a chauffeur and nice meals!

Are there other unusual mobiles out there? Let's hear from you. Share photos of your setup, and we'll give you some well-deserved recognition!

Now, friends, it's time for our lesson of the month. Looking back at photo 1, I asked you what seemed incorrect about that HF mobile antenna setup spotted at a hamfest. Yes, you can assume the mount is electrically grounded to the car's frame and the proper band whip is being used. If you said the antenna's base should be raised and/or placed over some of the vehicle's metal body for a better ground plane effect, you are correct. However, such measures are not always feasible on modern cars. Notice the antenna's connector and right-angle adapter are fully exposed to the weather. PL-259s and SO-239s are not waterproof. Here they are close to the road and catch all the rain spray and grime kicked up from the vehicle's tires. Capillary action will pull the moisture into the coax and render it useless in a short time. A good wrapping with hand-moldable Coax Seal® will ensure it stays weatherproof year after year. We

Photo 6– Posing at his tractor's cab, Mark gives us a closer view of his HF antenna and long extension cord for hands-free mobiling. The photo evidently was taken before rather than after a hard day in the field.

use the stuff on our home antennas, but often forget that mobile antennas need equal or better protection. Keep those fittings dry for happy mobiling, gang!

Conclusion

That winds down this month's column, and we hope you enjoyed the views and notes. I planned to include details on a neat CW mobile delight, the miniature TICK-1 keyer kit available from Embedded Research (P.O. Box 92492, Rochester, NY 14692), but the column's deadline hit before I could shoot the photos. This keyer's circuit board is one inch-square, and speed control plus a host of features are accessed by a single push-button. I presently am squeezing the whole thing into a 1" × 1" × 2" box. More details on this amazing shirt-pocket keyer next month. Meanwhile, here's hoping we meet on 30 meters one weeknight soon at around 0130 GMT.

73, Dave, K4TWJ

Photo 7– WB4UOK's mobile sports a full-size antenna, chauffeur at the wheel, and a killer ground plane setup. The cargo ship Sea Wolf *runs between the U.S. and South America. Listen for Mark on 30 and 40 meters during evening hours.*

BY DOUG DeMAW, W1FB

DOUG'S DESK

CONSTRUCTION PROJECTS, TECHNIQUES, AND THEORY

QRN Squasher Upgrades

The W1FB QRN Squasher MK-II that appeared in June 1996 issue of *CQ* stimulated more interest than I anticipated. Equipment manufacturers and scores of amateurs contacted me about the circuit. In the course of communicating with people who had built and were using the MK-II unit, I gathered ideas that inspired the development of the MK-III Squasher described here.

Some Problems Reported

I received scattered reports of overloading caused by nearby commercial AM broadcast stations. I confess to a blind spot: The nearest BC station to this location in northwest lower Michigan is some 28 miles distant. A high-pass filter for correcting the problem is described in this article. The filter may be added to the earlier MK-II unit simply by cutting a PC board conductor and inserting the filter at that location (see fig. 1).

Some builders chose to use separate switches for the DC power and the bypass functions. This caused damage to the output transistor in the Squasher when transmitting if the power ON/OFF switch was in the OFF position, thereby preventing the T-R relay, K1, from cycling. The MK-III version has "back-door" protection for those times when the user has cockpit trouble. A 1/10 amp fuse protects the output components of the circuit. A 50 mA pilot lamp may be substituted for the fuse.

Circuit Additions

Fig. 2 is the circuit for the MK-III QRN Squasher. Like its brother the MK-II, it will null manmade noise by up to 50 dB. The earlier **Balance** control is eliminated to simplify adjustment. Phasing transformer T3 has been added to replace the function of the old **Balance** control. Now there are but two controls to adjust for obtaining a noise null.

Noise amplifier Q4 is new. It permits using a shorter noise antenna. This stage provides 10 dB of gain. The added boost allows the user to carry the **RF Gain** control (R15) at a higher set-

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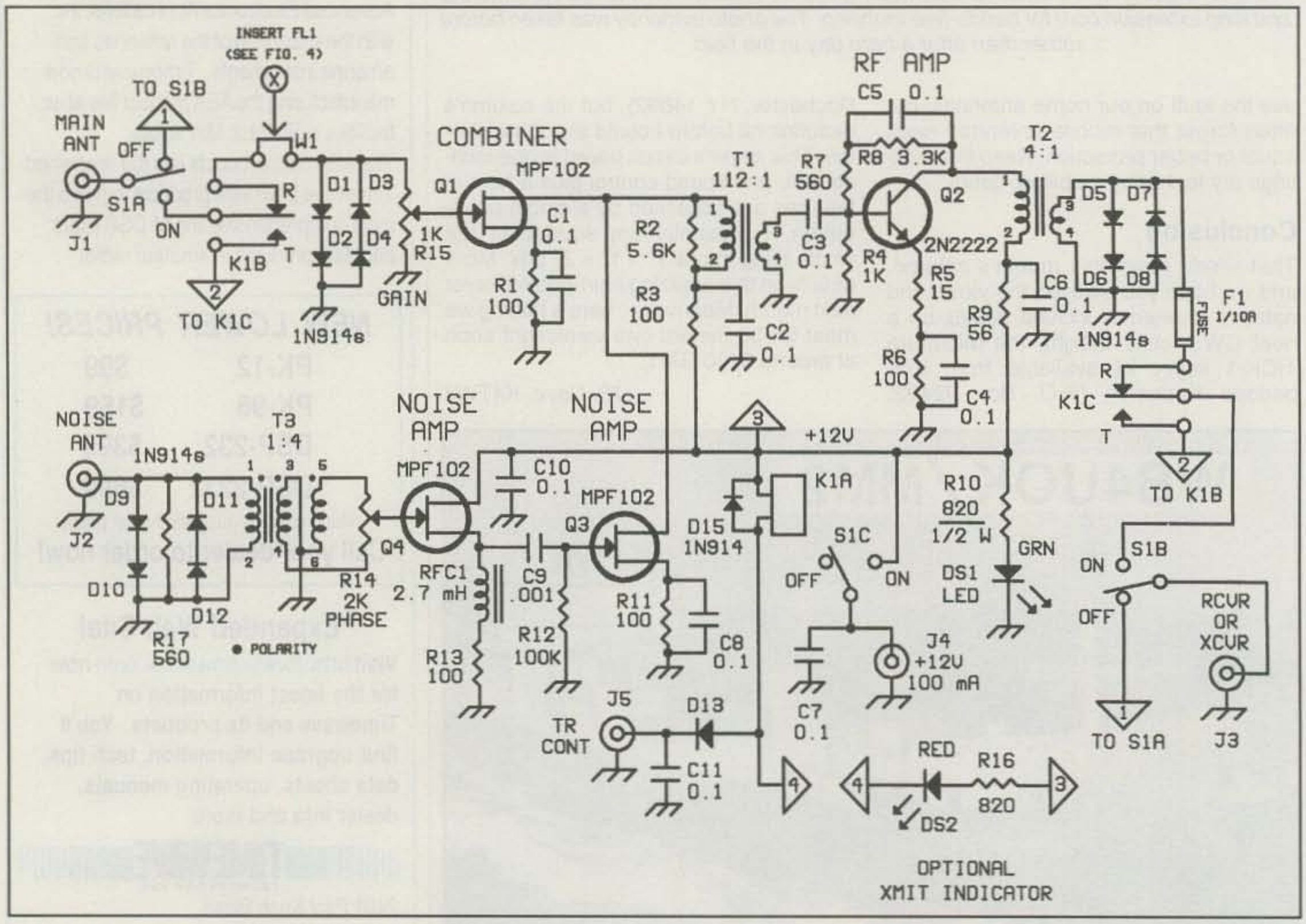


Fig. 1– Schematic diagram of the MK-III QRN Squasher. Capacitance is in µF. Capacitors are mini disc or matchhead ceramic, 50 or 100 V. Resistors are 1/4 W carbon unless otherwise indicated. K1 is a DPDT PC-mount 12 VDC, 16-pin DIP relay, Omron No. G5V-2-DC12 (Digi-Key no. Z768-ND).[5] RFC1 is a miniature 2.7 mH RF choke. R14 and R15 are panel-mount, linear-taper carbon controls. S1 is a 3-pole, 3-position rotary wafer switch (1 position not used), Mouser No. 10WW033. T1 has 30 turns of No. 28 enam. wire on an Amidon FT-37-43 ferrite toroid (850 μ_i). Secondary has 10 turns of No. 28 enam. wire. T2 has 16 primary turns of No. 28 enam. wire on an Amidon FT-37-43 toroid. Use 8 turns of No. 28 for the secondary winding. T3 has 16 trifilar turns of No. 28 enam. wire on an Amidon FT-50-43 toroid (observe polarity). W1 is a jumper wire.

The W1FB QRN Squasher MK-III.

ting. This results in greater overall circuit gain at the noise null.

Q2 has been changed from a source-follower JFET to a class A fed-back bipolar transistor amplifier. This modification provides a signal increase of 5 dB over the MK-II version.

A second LED indicator has been added (DS2). This is optional for those who wish to illuminate a red LED during **Transmit.** This feature tells the operator that relay K1 is switching properly.

Some Noise-Canceller History

Two *CQ* readers wrote letters in which they mentioned early-day noise-cancelling techniques that might be of interest to the readers. Fig. 2 shows how a passive noise reducer circuit was configured in the early days of radio. This circuit appeared in an old edition of the *Radio Handbook* which was edited by Frank Jones, W6AJF. The difficulty encountered with this circuit was its critical adjustment. All three variable capacitors needed to be juggled until a noise null occurred. Furthermore, as is true of all passive circuits with their inherent losses, there was moderate attenuation of the desired signal. Also, the LC circuits had to be tailored for each band of operation. Conversely, modern noise cancellers are broadband devices that are not lossy. They require no tuned circuits.

Circuits similar to that in fig. 2 were used in some WW II military receivers for the purpose of removing ignition noise during mobile operation. A two- or three-turn center-tapped link was wound over the grounded end of the receiver tuned circuit input coil and connected to the tuning capacitors as shown in fig. 2. Separate links were required for each band of operation, thereby making the circuit awkward to install and manipulate.

Theory of Operation

Most RF energy can be cancelled if the amplitude of the two energies is equal and of opposite phase (180 degree shift). Passive and active QRN eliminators operate on this principle. The desired signal, along with local man-made noise of a specific phase and amplitude, arrives at J1 of fig. 1. Noise and the desired signal arrive also via J2 from the short noise antenna. Energy from the noise antenna is amplified by Q3 and Q4 after the desired phase reversal is secured by means of **Phase** control R14.

Noise of equal amplitude (set by R15) and opposite phase (R14) is combined in the drain circuits of Q1 and Q3 to provide cancellation. The resultant "laundered" signal is amplified 15 dB by Q2, then routed to the receiver via J3.

The question has been asked, "Why isn't the desired signal cancelled, too?" This was explained in the June 1996 *CQ* article, but some amateurs took me to task on the Internet and claimed my information was incorrect and my circuit could not and would not work. It is my understanding that none of the critics built and tested the MK-II Squasher. They merely were

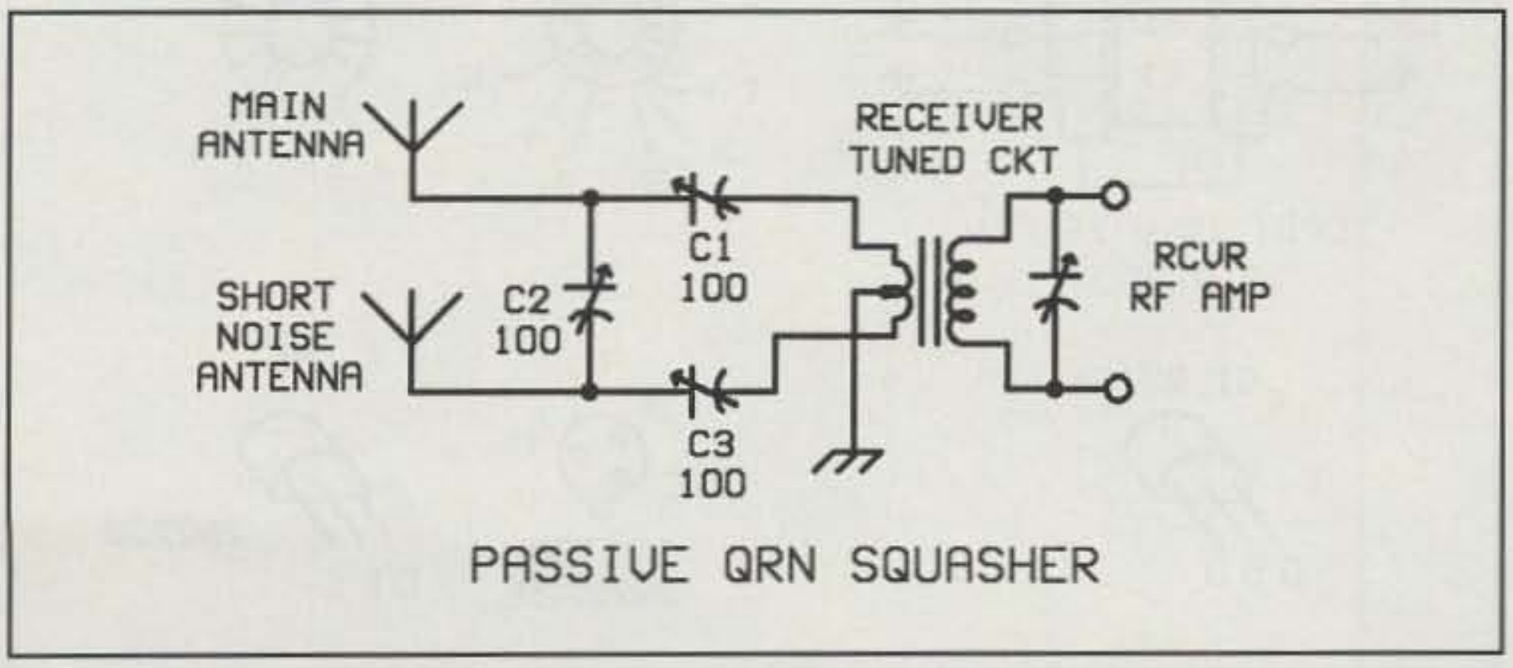


Fig. 2– Circuit for an early-day L-C noise-cancelling network for use ahead of a receiver.

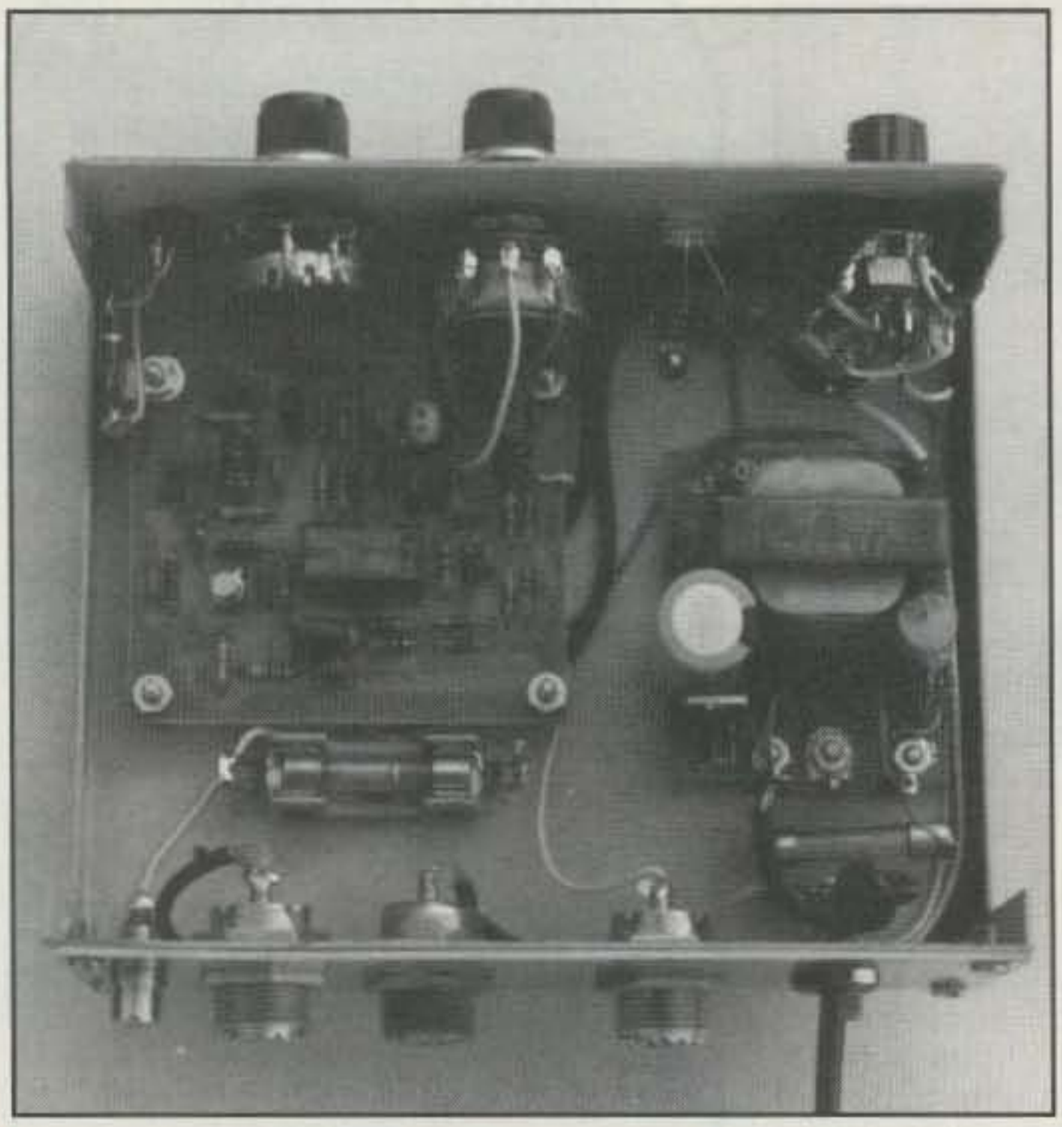
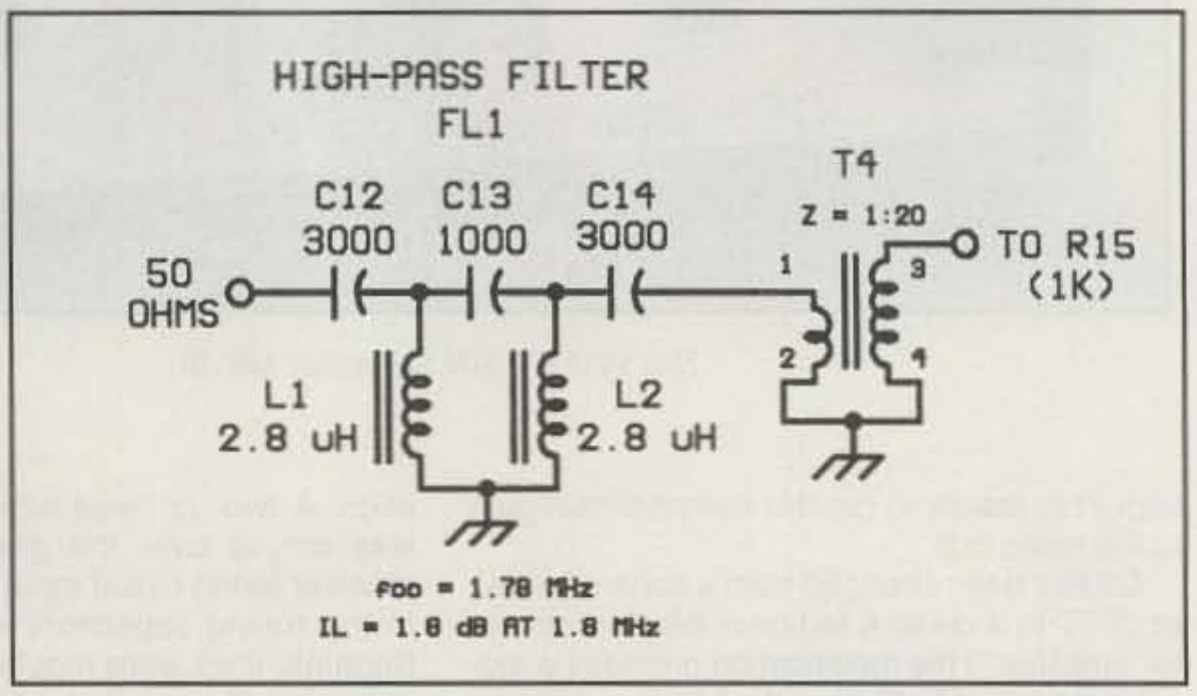


Fig. 3– Interior view of the MK-III QRN Squasher. A regulated +12 V, 100 mA power supply is used in this model.

Fig. 4– Circuit for a high-pass filter that can be inserted at "X" in fig. 1 to eliminate overloading from AM broadcast signals. C12, C13, and C14 are polystyrene or silver-mica capacitors (or combinations thereof to obtain the required values). L1 and L2 (2.7 µH) have 30 turns of No. 28 enam. wire on Amidon T37-6 (yellow) powdered-iron toroids. Keep all leads short. T4 secondary has 16 turns of No. 28 enam. wire on an Amidon FT-37-43 toroid. Use 4 turns of No. 28 wire for the primary winding.



engaging in "Monday morning engineering."

The desired signal energy is not cancelled, because it arrives from both antennas with a changing phase and amplitude. Signals refracted from the sky are constantly undergoing phase, polarity, and amplitude changes. Therefore, they are not affected by a circuit that requires constant energy amplitude and phase. Local noise generally remains at the same amplitude and phase, which makes nulling a simple matter without significant attenuation of the desired signals. However, ground-wave signals with constant amplitude and phase can be nulled with the fig. 1 circuit. TV birdies (15.750 kHz horizontal oscillator harmonics) can also be cancelled with the Squasher.

High-Pass Filter

A 5-element Butterworth high-pass filter is shown in fig. 4. It attenuates signals below 1.75 MHz to prevent overloading of the Squasher from strong BC-band signals. Those who live in urban areas may find it necessary to add FL1 at the point marked "X" in fig. 1. Do not use FL1 if it is not needed. Install a jumper wire (W1) across the PC-board terminals provided for FL1. T4 is included to effect an impedance match between a 50 ohm antenna and the 1K ohm resistive load presented by R15. Although it is not essential to ensure a matched condition without FL1, the filter requires a proper termination in order to perform as designed. If you are a perfectionist, you may wish to include T4 at point "X" of fig. 1 even if you do not include FL1. A slight improvement in overall gain can be expected if this is done.

High Q capacitors of close tolerance are required for FL1. Polystyrene or silver-mica capacitors are recommended for C12, C13, and C14. No. 6 (yellow) powdered-iron toroid cores should be used for L1 and L2 to ensure high Q.

Construction Data

Various VHF JFETs are suitable at Q1, Q3, and Q4 of fig. 1. Devices such as the J310 or the 2N4416 are high-quality transistors that may be used in place of MPF102s. The 2N4416s are top-grade FETs. These have excellent pinch-off characteristics and high g_m. Dual-gate MOSFETs, such as the 40673 or 3N211, can be used if the gates are joined to form a single-gate FET.

A circuit board for this project is available.[1] It is arranged for a DPDT 16-pin DIP relay (see fig. 5 for relay details). If you lay out your own PC board, you may use any DPDT 12 volt DC relay, such as those sold by Radio Shack.

It is important to keep the leads between R14 and the PC board as short as practicable. This helps ensure that the desired 180-degree phase shift can be obtained. Furthermore, excessive lead length between the board and R14 and R15 may cause the FETs to self-oscillate. This can produce unwanted wide-band noise that will mask weak signals. R17 in fig. 1 provides a load which prevents Q4 from self-oscillating and creating wide-band noise. Without R17 the short noise antenna exhibits an unwanted high impedance at the input of T3.

Fig. 3 shows the interior of the MK-III Squasher. I included a small 12 VDC power supply for convenience of operation. The 120 VAC primary of the power supply is switched on and off by S1C of fig. 1. A 0.5 amp fuse is used in one leg of the 120 VAC line. A 12 VDC, 100 mA wall transformer may be used to power the Squasher.

I created a computer-generated, paste-on cover for the front panel by means WordPerfect 6.0. A scale pattern is provided in fig. 6. A similar layout can be made in WordPerfect 5.1 if you have a computer. Create a figure box with a thick border and then add the labels. The pattern is transferred to white posterboard with a photocopy machine, sprayed with two coatings

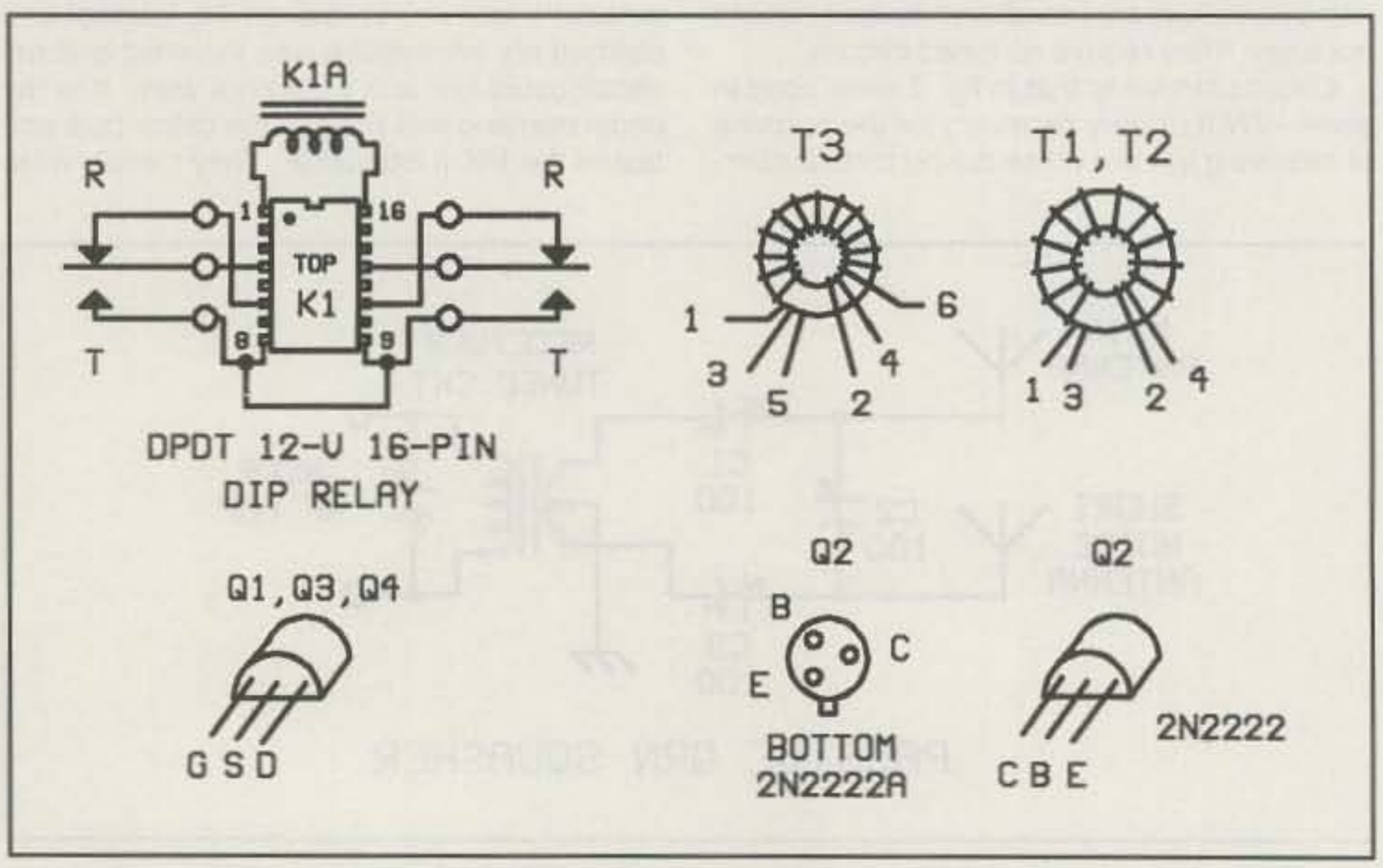


Fig. 5– Pinout information for K1 and the transformers used in the fig. 1 circuit.

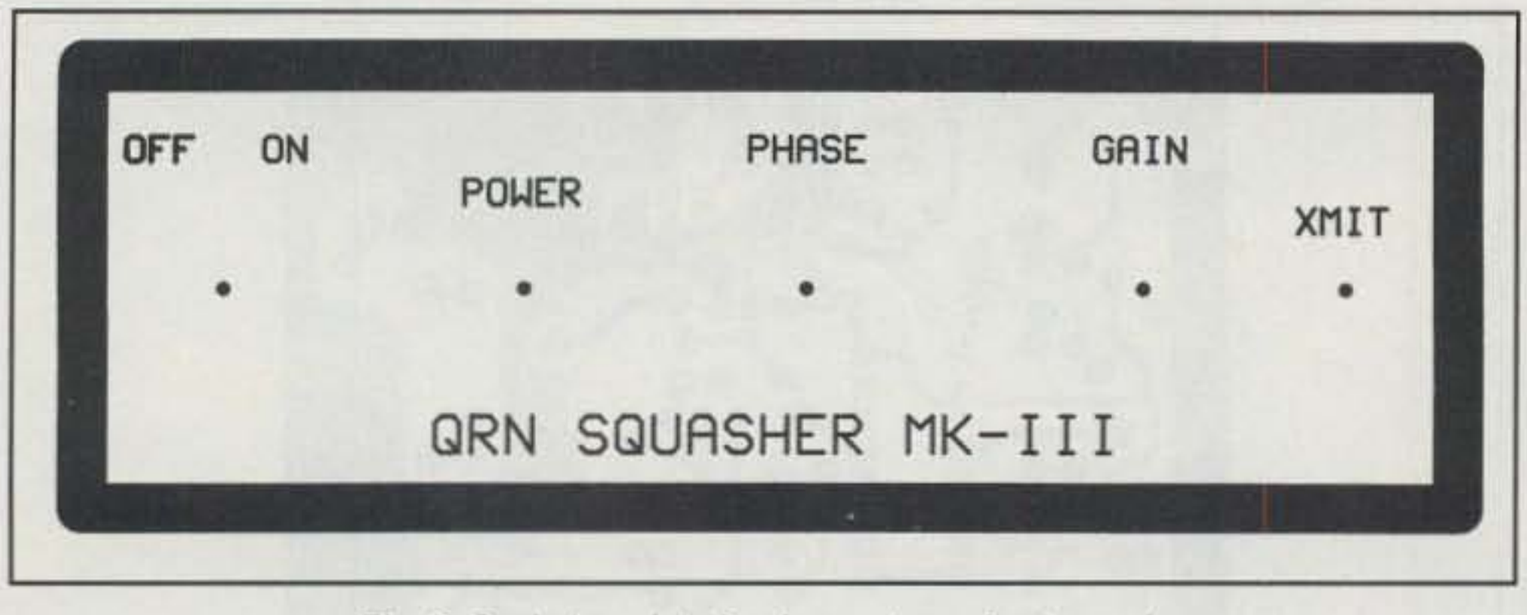
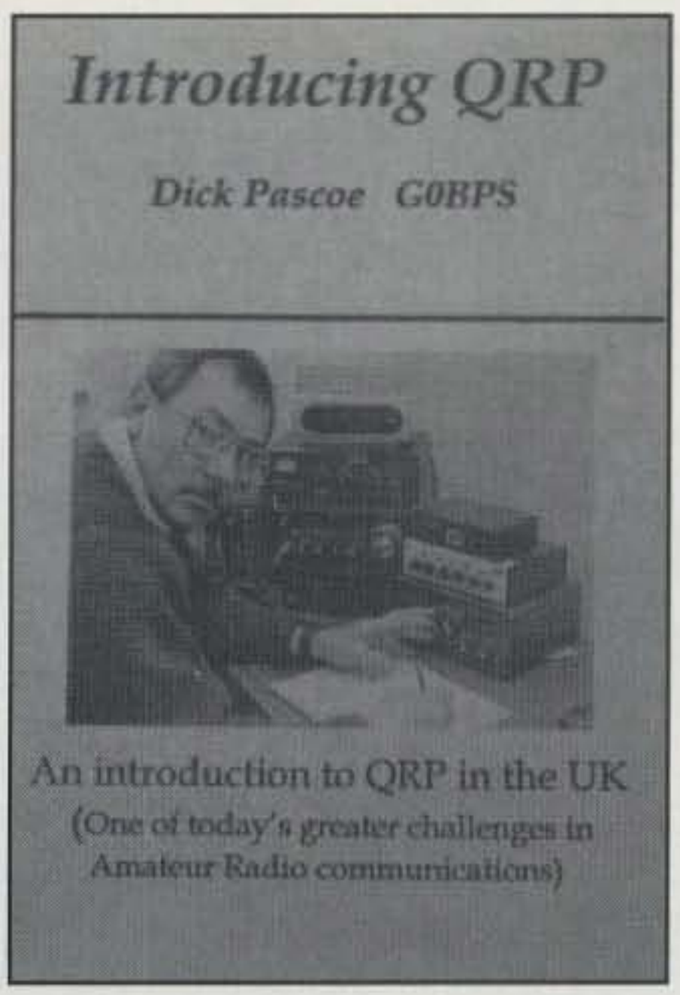


Fig. 6–Scale template for the paste-on front panel.

of clear lacquer, and then pasted on the front panel of the enclosure with contact cement. You can use the fig. 6 pattern if you make your project box from sections of PC board. I used a computer A/B switch box that I bought for $1.00 at a hamfest.

RG-174 miniature 50 ohm coax cable is used for all RF wiring between S1, the rear-panel RF jacks, and the PC board. Ground the shield braids of the cables at each end. This will minimize unwanted signal leakage between the input and output ports of the Squasher.

The large green LED (DS1) seen at the left of the front-panel view is a 3/8 inch diameter unit



Introducing QRP, *by Dick Pascoe, GØBPS, presents an introduction to the history and skills of low-power operating in the United Kingdom. Since QRP operating is no different in the U.K. than it is elsewhere in the world, this is a book that should appeal to low-power operators the world over.*

Introducing QRP

By Dick Pascoe, GØBPS

The growing popularity of low-power (QRP) operation has spawned another book on this subject. The latest entry comes from the United Kingdom. *Introducing QRP* is the first book of its kind to originate in England. It was written by well-known QRPer Dick Pascoe, GØBPS, who operates Kanga Products in the U.K. Dick's theme is an introduction to the history and skills of low-power operating in the United Kingdom. He stresses that "power is no substitute for operating skill." It is worth noting that low-power operating in the U.K. is no different than elswehere in the world. Therefore, the book should appeal to QRPers worldwide.

There are ten chapters in the book, including What is QRP?, History of QRP in the U.K., Typical QRP Equipment, Station Accessories, Operating Skills, and Construction Techniques, plus Simple Receivers, Simple Transmitters, and Computers in the Shack. Two appendices treat the Q codes in use today and QRP clubs around the world.

The author takes the neophyte by the hand and walks him or her through the subject of QRP. Experienced QRPers should find the book a delightful reading experience for obtaining the Brits' slant on low-power operation.

Dick includes an overview of QRP clubs in the U.K. and elsewhere in the world. QRP ARCI (Amateur Radio Club International) in the USA is discussed, along with the G-QRP Club of England, of which I am a member. The Rev. George Dobbs, G3RJV, is a principal in the G-QRP Club. He is known worldwide for his editorship of the G-QRP journal, *SPRAT*, and for his technical contributions to the low-power art.

There is a discussion of modest but effective antennas for QRP operation. A simple, practical receiver is described (The Sudden Receiver). It uses two ICs for the complete circuit. Two inexpensive, easy-to-build CW transmitters (The OXO and ONER) are detailed in the book. These projects can be built and made operational by almost any beginner, regardless of his or her previous workbench experience.

There are 74 pages of information in this soft-cover booklet. It measures 6" × 8 1/4" and is printed on quality white paper. There are eight full-page photo of worldwide QRP notables.

Books may be purchased in the USA from Bill Kelsey, N8ET, 3521 Spring Lake Drive, Findlay, OH 45840. E-mail to <Kanga@mail.bright.net>. The author may be reached at <dick@kanga.demon.co.uk>. Book price: $10, plus $3 shipping.

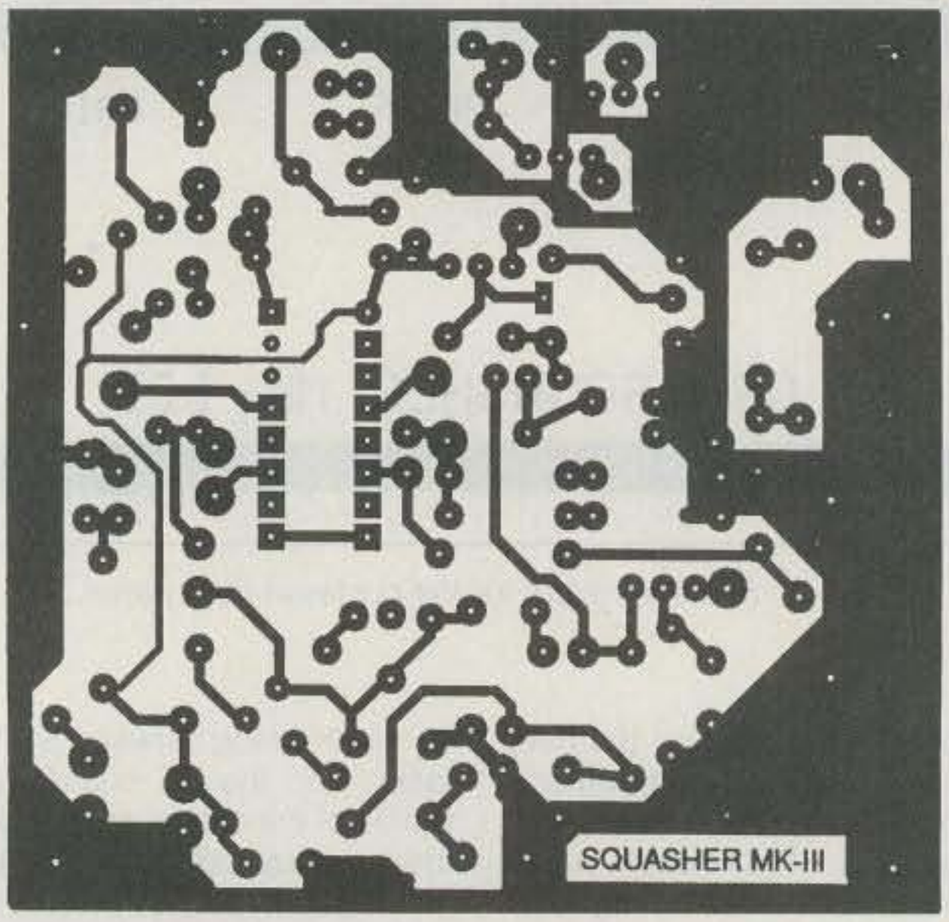


Fig. 7– Scale etching pattern for the MK-III Squasher as viewed from the etched side.

I purchased from Hosfelt Electronics.[2] A smaller green LED of the type used at DS2 (far right in photo) is also suitable.

Protective fuse F1, seen in the fig. 3 interior view, is mounted near the PC board in a chassis-mount fuse holder. Two insulating terminals may be substituted for the fuse holder if you carefully solder the fuse to them.

When looking at the interior view, you will observe that the dropping resistors for the two LEDs are outboard from the PC board. This results from using a preliminary prototype board that did not include the resistors. R10 and R16 are included on the final version of the MK-III PC board.

The likelihood of damage from transmitting

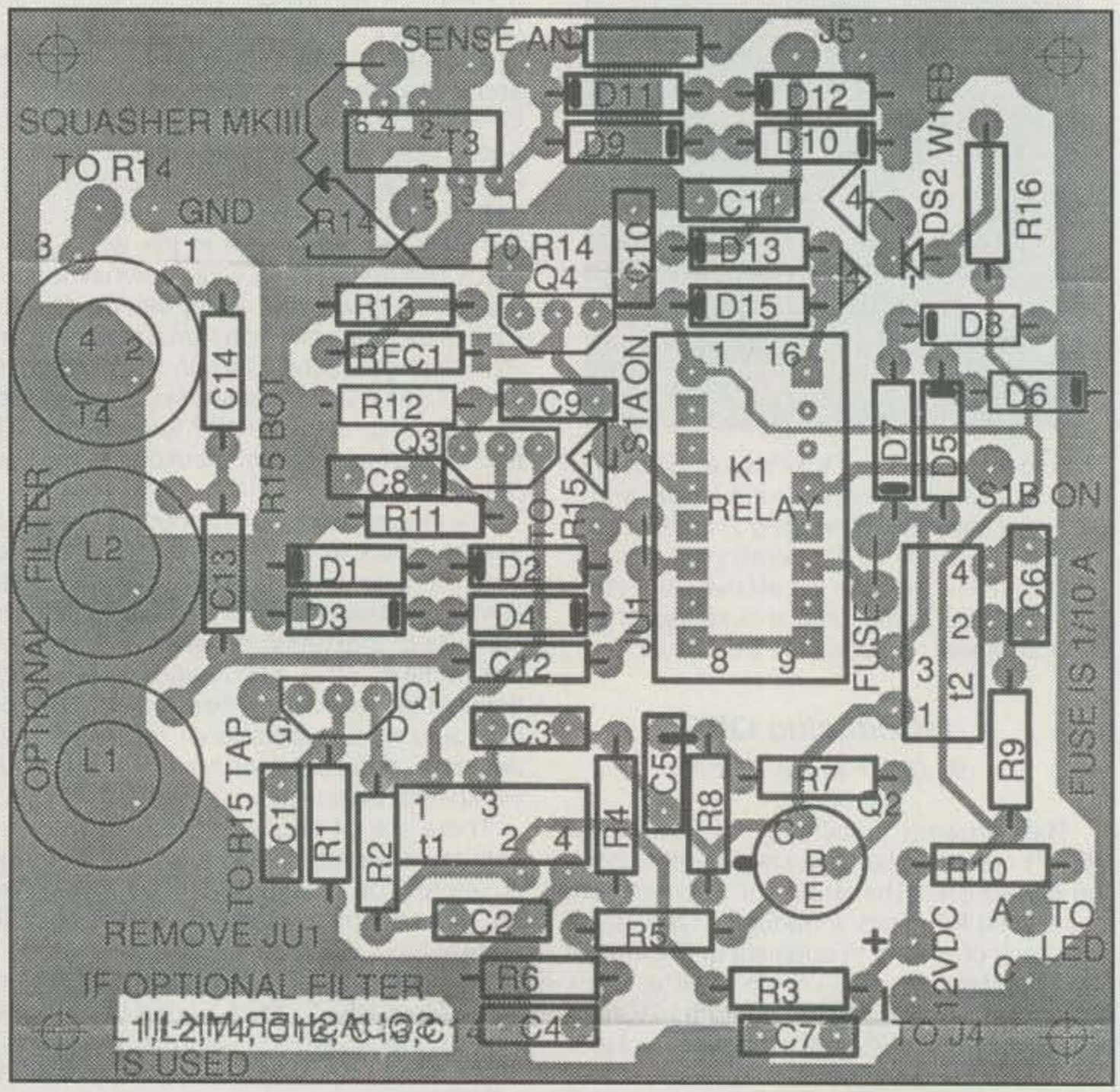


Fig. 8– Parts-placement guide for the MK-III Squasher as seen from the component side.

When looking at the interior view, you will observe that the dropping resistors for the two LEDs are outboard from the PC board. This results from using a preliminary prototype board that did not include the resistors. R10 and R16 are included on the final version of the MK-III PC board.

The likelihood of damage from transmitting

into the MK-III Squasher rear end can be avoided by using a 3-P, 2-position wafer switch at S1. These switches can be purchased from Mouser Electronics for a modest price.[3] The toroid cores for this project are available by mail.[4]

A scale etching pattern is provided in fig. 7. A parts-placement guide is shown in fig. 8.

Adjusting The Squasher

Some of those who constructed the MK-II Squasher reported difficulty in adjusting the controls for minimum noise without degrading the desired signal. The easiest method for adjustment is to turn the **Gain** control to minimum, then adjust R14 of fig. 1 for a noise null. Next, advance **Gain** control R15 until the noise is heard weakly. Readjust the **Phase** control for a null. Repeat these steps until a point is reached where the **Phase** control no longer reduces the noise energy. For the earlier MK-II version, the **Phase, Balance,** and **Gain** controls should be adjusted alternately in the same fashion.

The length of the noise antenna must be greater at 1.8 and 3.5 MHz than for the upper part of the HF spectrum in order to sample sufficient noise. A wire length of 30 feet seems to be a good compromise for 1.8 through 30 MHz at my QTH. My noise antenna is parallel to the power lines (100 foot distance) and 4 feet above ground in a horizontal format. You should experiment with the length, polarity, and location of your noise antenna for best results. Sampling the noise from your AC power line by means of a toroidal pickup transformer and routing the energy to J2 of fig. 1 may eliminate the need for an external noise antenna. Power-line noise sampling was used successfully for noise cancellers in the past.

Installation

The Squasher is inserted between the 50 ohm station antenna and the receiver or transceiver. If you use a linear amplifier, you may install the Squasher between the transceiver and the amplifier. The relay control line for the transmitter and linear amplifier must be connected to J5 (TR Control) of fig. 1. This actuates K1 to permit switching around the Squasher during transmit. *Note:* Relay failure will cause fuse F1 to blow, thereby protecting the Squasher. The MK-III unit will safely accommodate up to 100 watts of RF power during transmit.

Summary Remarks

It is important to realize that this QRN Squasher and similar devices are not effective for reducing atmospheric noise such as static crashes. They will work, however, for eliminating corona static from an antenna. Also, the Squasher can null only one noise energy at a given time. Manmade noise from additional sources will still be heard. I have been asked if two Squashers in series would be effective when two noise sources exist. In theory, yes. I have not tried that technique.

There are times when the Squasher causes a slight reduction in signal strength at the noise null. Generally, this does not exceed one S unit. Conversely, depending upon the type of noise present, there is a signal gain of up to one S unit when using the Squasher.

I have been asked if this circuit can be used at 146 MHz. Design changes would be required for effective VHF operation. The bypass and coupling capacitors, and the broadband transformer cores, would have to be changed from the fig. 1 values. Shorter and wider connecting leads and PC board conductors would be mandatory toward ensuring circuit balance and overall gain. The MK-II and MK-III models are effective from 500 kHz to 50 MHz.

Footnotes

1. FAR Circuits, 18N640 Field Court, Dundee, IL 60118. Phone 847-836-9148 to order. Price: $4.25 plus $1.50 s&h.

2. Hosfelt Electronics, 2700 Sunset Blvd., Steubenville, OH 43952. Phone 1-800-524-6464 to order. Catalog available.

3. Mouser Electronics, 2401 Highway 287 N., Mansfield, TX 76063-4827. Phone 1-800-346-6873 to order. Catalog available.

4. Amidon Associates, Inc., 250 Briggs Ave., Costa Mesa, CA 92626. Phone 714-850-4660 to order. Catalog available.

5. Digi-Key Corp., 701 Brooks Ave. S., Thief River Falls, MN 56701-0677. Phone 1-800-344-4539 to order. Catalog available.

BY BUCK ROGERS, K4ABT

PACKET USER'S NOTEBOOK

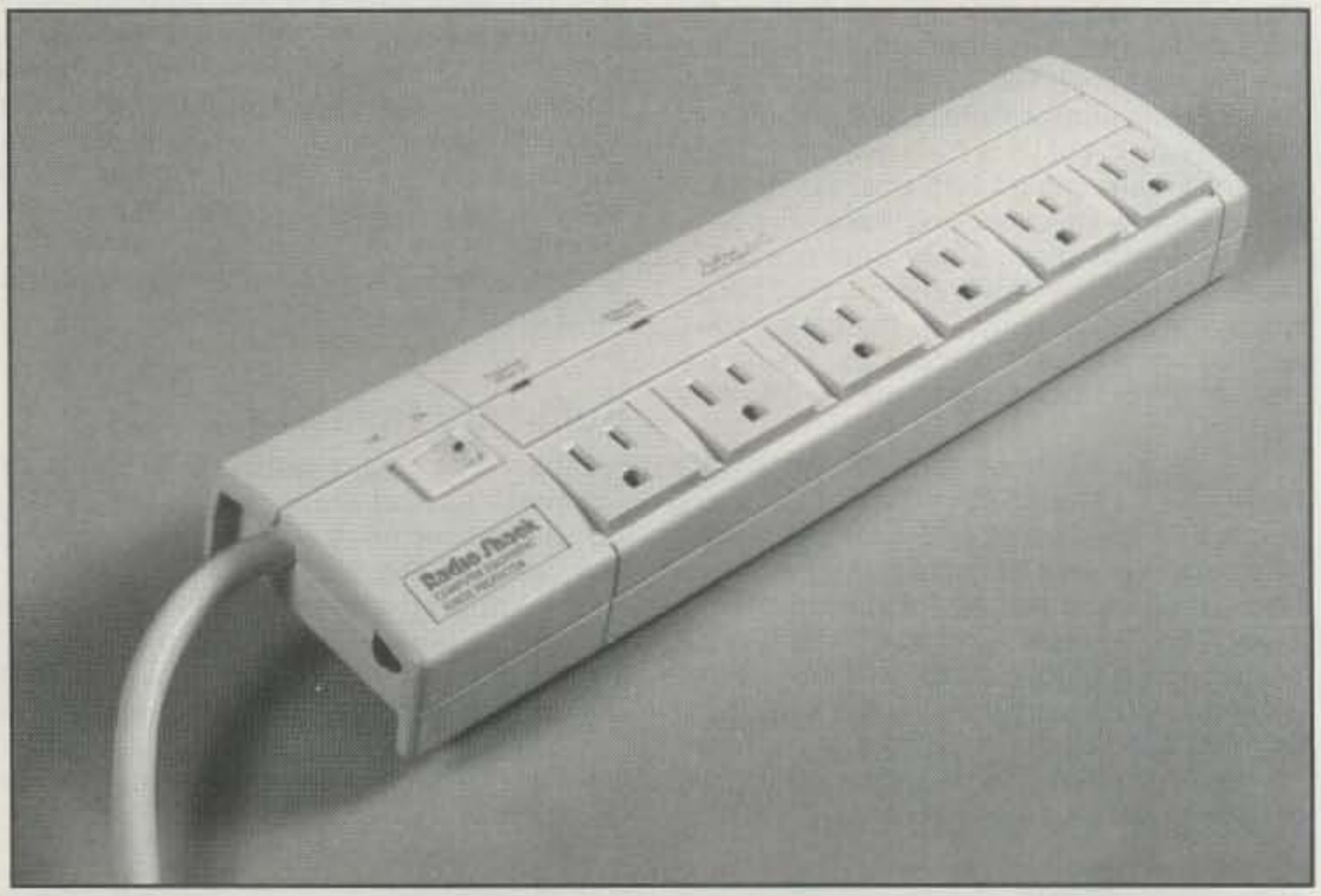
CONNECTING YOU AND PACKET RADIO IN THE REAL WORLD

The Cause and Cure of RFI in Packet Radio

In the digital world of packet radio there is no place for radio frequency interference (RFI). Some specific modes of amateur radio can tolerate a few effects of RFI, but packet radio appears to have exclusive rights to nonspecific forms of RFI.

The nature of digital communications is in the rise and fall times of various types of digital data. Aside from AFSK, other modulation techniques, including FSK, are now being used to increase the speeds of digital data through the airwaves. Soon we will see the results, as base-rectified RFI begins to appear with some of the current digital modulating methods such as Minimum Shift Keying (MSK) and Quadrature Phase Shift Keying (QPSK).

Let's explore the reasons why our packets may not be printing on other packet station screens, or the incoming packets may not be printing on our screen. The reasons may be the fault of something other than incorrect terminal parameters.



This six-outlet computer-grade surge protector from RadioShack offers three-line surge protection. It features 55 dB noise filter. Audible and visual alarms warn of disabled surge suppression. (RS model No. 61-2120, photo courtesy RadioShack.)

Hum vs RFI

It could very well be that you have hum and even distorted audio caused by poor power supply regulation or RFI. Let's not quibble as to the reasons why. Instead let's investigate the device that we use to exterminate this troublesome delinquent. At best we must suppress the nuisance that is at the root of the RFI.

Effective Ground System

A good ground is "worth its salt" in the HF and VHF packet station, although the ground is not the absolute answer. In the April 1997 issue of *CQ* we discussed various grounding techniques, both inside and outside the packet station. I omitted a couple of note-worthy items.

First of all, several readers wanted to know why I use a quarter-inch thick copper plate as my "ground window" when some vendors offer only an eighth-inch thick copper bus. In my business I travel to many countries throughout the world. I probably visit as many (if not more) communications sites and installations as anyone else in the free world. After viewing a ground window that had a large hole blown in the eighth-inch copper ground window by a lightning hit, I elected to use a more substantial (thicker) ground window. After all, the purpose of using the ground window as the common point for all site grounds is to give the lightning a solid and short path to ground. In addition, when a number 2/0 (00) stranded copper wire is attached to the ground window, the connecting lug that is often used to make the attachment is a quarter inch thick. To use a copper ground window that is only half as thick as the connecting lug is asking for trouble, when the copper plate won't handle the current load that the wire-lug will.

211 Luenburg Drive, Evington, VA 24550
e-mail: buck4abt@inmind.com

Several other letters asked where to obtain information on NexTek's quarter-wave shorted stub and gas-discharge-tube lightning protectors. The information follows: NexTek, Inc., 439 Littleton Road, Westford, MA 01886 (phone 508-486-0582; fax 508-486-0583; Internet <http://www.ultranet.com/~nextek/>).

Shorter is Better

Use the ground as you need to, but remember this: *A ground loses its effectiveness if the length of the ground wire exceeds an eighth of a wavelength at the frequency of operation.* If you happen to be using the 10 meter band, this works out to be just over 4 feet in length. Beyond that, the ground-wire length becomes a radiator. In effect, a ground loop is created, and the problems related to RFI commence. As we go up in frequency to the VHF spectrum, we see that the wavelength gets shorter and so does the effective length of our grounds. At VHF and UHF we must be extremely careful with the ground-wire lengths (distance between the driven ground rod and the equipment), because a 20 inch length of ground wire can become a radiator or even an "absorption pick-up loop" at our favorite packet frequency. For this reason, I subscribe to the rationale of using copper strap.

When possible and where space permits, I like to use copper strap to make the connection between the ground window and the outside perimeter ground. If 2, 4, or 6 inch wide copper strap is out of the question, then using more than one ground wire between the ground and the ground window reduces the inductance and thus the resistance to ground from the ground window.

The larger the conductor, the better. There are times when the ground is just too far away or the ability to get to a good ground is out of the question. In the rare case when this happens to you (and here I'm not making any recommendations), you might wish to try an "artificial ground" similar to the MFJ-931. This device may remove the worry of having a long ground lead from a cold-water pipe or ground rod to the equipment. If your cold-water pipe is PVC—sorry, Charlie! The artificial ground enables the user to tune the reactance out of the long ground wire, and makes the ground rod appear to be close to the HF equipment. The purpose of the artificial ground is to displace the stray RF to ground or present a quick DC path to any RF that may appear on the ground wire connected to the equipment. Thus, the RF is displaced before it has a chance to get to the system ground. As for lightning, I'm not going to speculate.

RFI at VHF and UHF: A Split Personality

As technology increases, most things change for the better, except the age-old enigma called RFI. At numerous times I've chased the ugly vermin around my computer room, only to discover the RFI felon would appear somewhere else. The last time I discovered noise and hum on my signal (both transmit and receive), I

decided then and there to get rid of this dreaded nuisance once and for all. It didn't take long to learn that a good ground was only one part of the cure. It took time, but at length I prevailed—or at least I've had a contented packet life ever since.

One of my encounters with RFI was in the early days of VHF packet. We were developing a new packet radio network, and as many of us will recall, the TNC (sometimes called the "PAD") was not inside a metal box, nor was there a lot of circuit-board trace by-passing as we now have in the TNCs. At best, it was a couple of homebrew printed circuit boards sitting on two strips of wood. If I had the power amplifier on, when I pressed the enter key to send a packet to a connected station all heck would break loose. Having had a couple of connected stations tell me they couldn't print all of my packets because there seemed to be a roughness to my signal, or hum on the carrier, I began looking for the source of the annoyance.

Note: An indicator of possible RFI problems can be a large number of "TRIES" even though the signal strength of the two direct connected stations is good and the modulation is optimum!

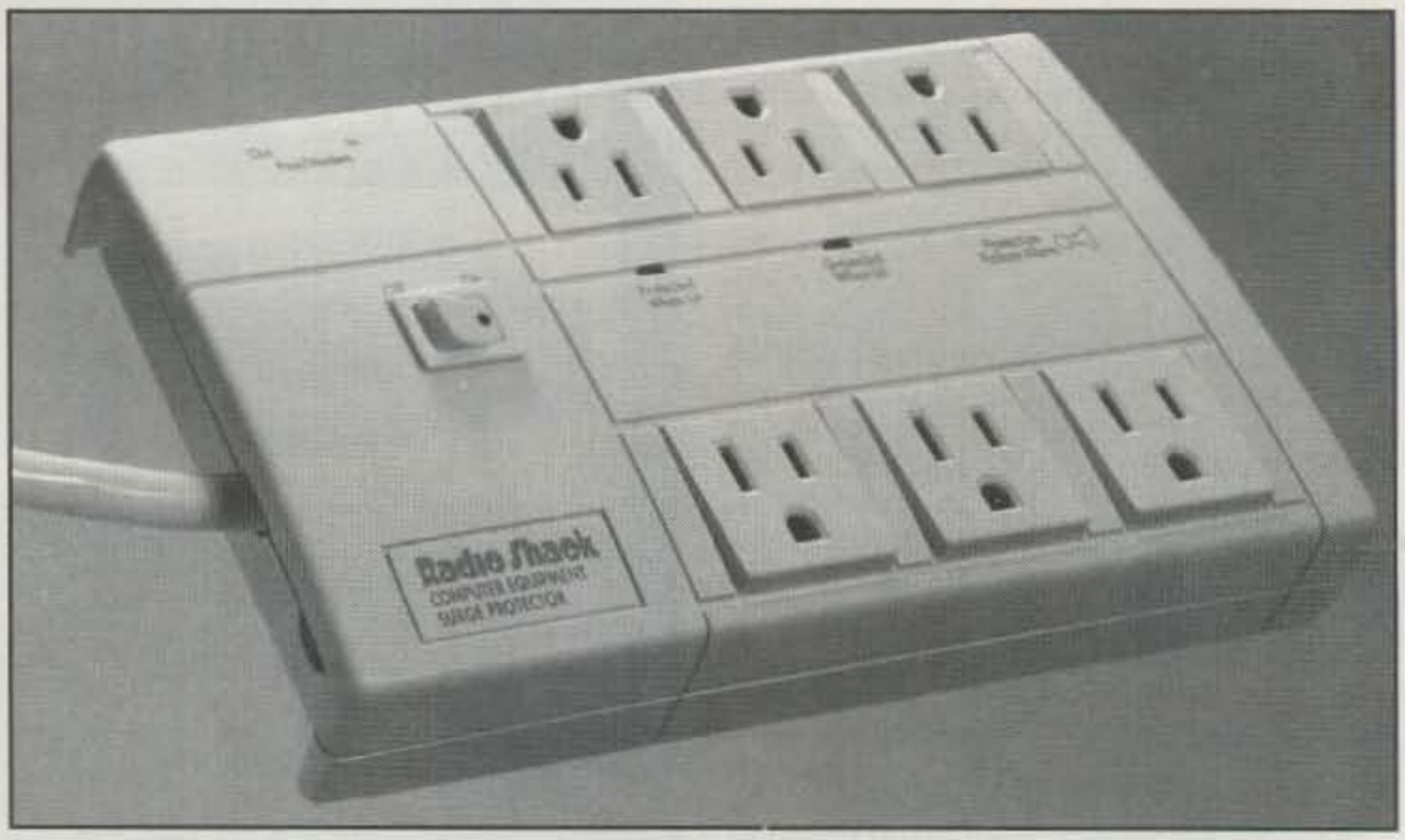
As many of us have done in the past, I misread the description of the symptom that was given to me by the connected station and began my search for the problem by looking at the ripple from my power supply. It turned out that the supply was a clean power source, as could be seen with a scope. In the absence of a scope, I used a digital volt/ohmmeter and watched the I/R drop during the transition from the load to no load (transmit to receive) condition. If the voltage was no more than a few millivolts (a hundred or so, but no more than 200 M/V) change in the meter movement, I would let it pass and go on to some other possible cause of the trouble.

RFI gives no clue as to where it will appear, whether in the transmit or the receive portion of the packet station. If the report indicates the presence of RFI in the transmit audio, then I head for the TNC end of the interface cable that connects the TNC to the transceiver.

The first thing we do to stop RFI from becoming a base rectified DC component within the transceiver or the TNC is to place ferrite beads on the AFSK Mic audio lead at the TNC. The Amidon FB 73-1801 works well in this application. Another means of subduing RFI is to place a .001 µFd 25 volt capacitor from microphone input to ground. I avoid the latter step if I can, because some of the audio frequencies are also by-passed to ground. In addition, most TNC manufacturers now install the correct by-pass capacitors inside the TNC. To add extra by-passing external to the TNC could radically change the audio equalization and compound the problem instead of improve on it.

Many times the receive line is fed to the same connector, and while I'm inside the connector shell, it makes sense to protect the receive lines from RFI as much as I can. I add the same type ferrite bead to the receive line as was used on the transmit audio line. I even go a bit further and place one on the PTT wire, which in 85% of the cases is inside this shell. The inclusion of the PTT line is optional and space dependent.

When you have completed these additions, you may want to add a few ounces of prevention, or as the case may be, "some more cure." There are some devices made of a ferrite compound that snap together to form a closed loop around the cable. They are constructed in such



This six-outlet surge protector and noise filter from RadioShack also features built-in telephone jacks to help protect modems and fax machines from fast transient surges entering through the phone lines. It features one picosecond clamping response time; three-stage, three-line protection; 55 dB noise filter; and heavy-duty power cord. An audible alarm sounds to let you know if the surge suppressor circuit has become disabled. (RS model No. 61-2122, photo courtesy RadioShack.)

a manner as to be wrapped with a wire or cable, and both pieces are held together by a plastic retainer. These chokes are quick and easy to install on any cable up to a half inch in diameter. There is no cutting or soldering to be done. Just follow the easy installation instructions and you can almost see the problems go away. In fact, if you are using one of the older model home computers as a terminal, you are already aware of the kind of RFI that can be generated by these beasts. You can use the snap-together RF choke to eliminate most, if not all, of the RFI in the system by winding several turns of the computer-to-TNC interface cable through the snap-together choke. It may take more than one of these snap-together ferrite chokes to make the job complete, but for me the end result was well worth the effort.

As it turns out, they must have known what we needed, because in the final clean-up I used one on the radio-to-TNC cable and two on the terminal-to-TNC RS232 cable. If your station has a problem with RF in the telephone lines, try placing a .1 mFd, 600 volt capacitor directly across the telephone line. In a few cases where I've had RFI from the HF packet (and voice) station, I've added a 2.5 mH RF choke in series with each side of the phone line. The RF choke should have wire size suitable to sustain the current contained in the line when ringing current is present.

One word of caution: When adding any device to the phone line or interface, be sure you are adding it on the subscriber side of the interconnect box. The phone company attitude becomes "terse" when someone places "foreign" devices inside their equipment.

The MOV

Finally we get around to the metal oxide varistor (MOV). This device can cover a multitude of crimes, some of which are in the RFI category. First and foremost is the ability of the MOV to chop noise and impulse-induced spikes from the power lines. Metal oxide varistors have been used in my computer room for 14 years, and I can attest to the effectiveness of this product as a protective device. The MOV does more than reduce spikes and line noise. Its intended use is to shunt the line in the event of a power surge and pop the fuse, thus protecting the equipment up ahead. They work! The response time is measured in nanoseconds, and sometimes they don't recover. If they don't recover or they are shattered, so goes the way that your equipment could have gone. The price is minimal by comparison.

The science and theory of these little buggers makes for some good reading, but I won't go into it here. They can be purchased in the form of an AC plug adapter or as an add-on unit which appears very much like a large ceramic capacitor. Most Radio Shack stores, computer stores, and electronic supply houses carry these devices.

The open MOV looks much like a ceramic capacitor and may be purchased singly for installation inside the equipment. The MOV comes in various voltage ratings and should be fitted to the power input application. The cost of an MOV represents a small price to pay for the amount of insurance they provide. The MOV can be found at most electronics supply stores and at some electrical wholesalers.

With a few components and a little time you can have a better packet signal on the air and better protection for your valuable equipment. This will make your hobby more enjoyable to you and to the connected station.

Glossary of Packet Terms

Going back to our continuing glossary of packet terms, which we began in the March issue, this month we take you from the "P's" through the "R's."

PacComm, Packet Radio Systems Inc.:

PacComm designs, manufactures, and markets a range of packet radio products, both amateur and commercial.

Packet: Amateur AX.25 communications; a structured group of binary digits in a pre-arranged sequence containing synchronization, address, control, and error-checking data. A packet is a block of many characters (or bytes) which are sent together along with a few extra characters (overhear/checksum) used to guarantee that the data is completely error free. The packet includes addressing information so that the receiving station knows the source and destination of the packet.

PacketCluster: A proprietary software from Pavilion Software. It creates a specialized system for DXers and operates with all users connected in such a way that DX information can be distributed in "real time."

Packet Network: A network dedicated to the routing and delivery of data through-put in the form of standardized "packets." An example is the SouthEastern Digital Association Networks (SEDAN), an AX.25/X1/X2 network.

Packet Switching: The technique in which a stream of data is broken into standardized units called "packets," each of which contains address, sequence, control, size, and error-checking information in addition to the user data. Specialized packet switches operate on this added information to move the packets to their destination in the proper sequence and present them in a contiguous stream.

Parameters: In TheNET X-1J4 nodeware there is a list of values used by the System Node Operator (SNO) to configure options within the node. These 26 values affect 85 percent of the X-1J4 node personality. The balance of the X-1J4 behavior is controlled by the 17 "MODE" commands.

Parity Bit: A check bit appended to an array of binary digits to make the sum of all the digits always odd or always even.

Parity Check: A checking method that determines if the sum of all the digits in an array is odd or even.

Path: This word is used to mean the nodes, digis, and servers that must be used to pass data from one point to another. Often a path may be specified without including some intermediate nodes if the knowledge of those nodes is not necessary to pass the data or make a connection.

PBBS (Personal Bulletin Board System): This and the PMS acronym indicate a mail box that is contained inside a normal user TNC, as in "personal message system." A limited-function BBS contained within a user's TNC firmware with which the user can enter or receive personal messages. Usually referred to by one of the commercial trade names such as MBX, MailBox, PBBS, PMS, Mail Drop, etc.

PC (Personal Computer): Usually refers to a computer that is identical in function to a product by IBM that was marketed as an IBM PC. They are more correctly referred to as IBM-compatible PCs. PC could mean any kind of computer that is used by an individual for general purposes.

PID (Protocol ID): The first byte of the packet frame which identifies which protocol is used for the packet frame.

PM (Phase Modulation): A modulation technique in which the phase of the carrier is changed in relation to the modulating signal.

PMS (Personal Message System): See PBBS.

Point-to-Point: A packet radio communications circuit between two terminals only. No intervening node.

Polling: In packet terms, polling is a collision avoidance method in which one master station queries each of the users on the channel if he or she has a packet to transmit. The slave stations will not transmit until they have been "polled" by the master station. In this way no two stations will transmit at the same time, thus avoiding collisions.

Port: Entrance or access point to a computer, multiplexer device, or packet radio network where signals may be supplied, extracted, or observed. An input/output channel or connector on a node or TNC. A TNC normally has one or more radio ports hooked to a radio transceiver(s) and an RS-232 or serial port that may be connected to the user's terminal (computer) or another node serial port in the case of a TheNET (or other type of higher level node) node stack. A port may also refer to a special-purpose node such as a user-port, IP port, backbone port, etc.

PROM (Programmable Read Only Memory): See EPROM. Also the acronym for *The Packet Radio Operator's Manual,* a book available from CQ Communications.

Protocol: A communications protocol is the set of rules and procedures used to implement a technique or method of communications. The

rules for maintaining communications between similar devices. As with AX.25, maintaining orderly error-free data flow and data link control. A set of procedures for establishing and controlling the transmission of information. There are many different protocols for many different purposes. AX.25 is a protocol which describes how small computers can talk to each other—e.g., SDLC, Bisync.

PSK (Phase Shift Keying): A data modulation method in which binary data is encoded as discrete changes in the phase of the carrier signal. In amateur packet, PSK is used mainly on OSCAR satellite data communications.

Pulse: In communications, typically a signal characterized by a constant amplitude and duration; the line signal representation of a binary digit.

QPSK: Quadrature Phase-Shift keying.

QRM: Manmade interference on a radio frequency, intentional or not.

QRN: Natural interference on a radio frequency. Lightning and solar noise (very weak signal work) are examples of natural interference.

Queue: A delay in forwarding data or traffic caused by the inability of the system or network to handle the quantity of data being attempted.

Radio Frequency: A broad part of the electromagnetic spectrum ranging from above audio frequencies to beneath infrared; characterized by the use of antennas to couple signals to the Earth's magnetic field.

RAM (Random Access Memory): That part of a computer or TNC that is holding data, or memory during the power "ON" period. If the RAM has "battery backup," the memory remains in the RAM until it is changed. If the RAM has no battery backup, no memory remains when power is removed. An IC in a computer that holds data only so long as power is applied. The RAM is usually used only for storage during the execution of a program. TNCs use RAM for temporary storage of messages and parameters. Normally, TNC RAM is powered (battery backed) all the time using a lithium battery in the TNC.

Response Time: A measure of time from entering a data field on a remote terminal until the response is delivered to the remote by a central computer. A frequent measure of the overall performance of a Packet Radio Node Network (PRNN). The time between sending data to a remote device before an expected response returns to the originating station.

Retry: Retry is the process by which a packet that is sent and not acknowledged will be resent by the sending station. This retry is repeated until the acknowledgment is received or until a "retry counter" reaches its limit and the circuit is terminated.

ROM (Read Only Memory): A non-volatile memory IC used to permanently store operating programs in computers and other digital devices. ROMs come in many forms, such as FROM (Field Programmable ROM), EPROM (Erasable Programmable ROM), EEPROM (Electrically Erasable Programmable ROM), OTP (One Time Programmable ROM), etc.

ROM Image: The set of binary data that is programmed into an EPROM.

Routing Table: A matrix associated with a packet radio network control protocol giving the preferred network link directions beyond that point. *(See also Locked Route.)*

RS-232: A set of signals accepted as a "standard" by the Electronics Industries Association (EIA), designed to make the interfacing of computers and networks easier. RS-232-C is the current Electronics Industry Association (EIA) standard for the most common signals used between computers. A signal which uses the RS-232 standard is often said to be RS-232. The computer-to-TNC connection uses RS-232 signals. Normal computer internal data signals use ground and +5 volts to indicate a zero or a one.

RTS (Ready To Send): A control on a RS-232 port that indicates that the device has data ready to send. On some devices the DTR line is used instead of RTS. RTS is often used in conjunction with the CTS signal to engage "hardware handshaking."

RXData: Received Data stream produced by a modem demodulator.

Until next month, Have Fun Packeting, and visit the Packet Radio Networking Home Pages at <http://www.sedan.orge-Mail>.

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BY JOE LYNCH, N6CL

VHF PLUS

ALL ABOUT THE WORLD ABOVE HF

On The Ultra Highs With Ed Tilton, W1HDQ

"What is DX? To the low-frequency phone or CW man it is any section of the country remote from the part in which he lives. To the 20 and 40 meter men DX has to be something rare: mere miles are not enough. To the experimenter on the micro-waves, DX may be anything farther than he can shout. DX then is relative—anything which you, or the fellow in the next block, cannot work regularly, with comparative ease. Herein lies the basic appeal of UHF operation—the ever-changing DX horizon."

With that opening paragraph Ed Tilton, W1HDQ, launched the first-ever VHF-related column in an amateur radio magazine. Beginning as "On the Ultra Highs," Ed's first column appeared in the December 1939 issue of *QST*. This was not Ed's first contribution to *QST* or amateur radio. He was active on the VHF+ frequencies as far back as the early '30s.

Many of us now old timers were deeply saddened to receive the news conveyed in the following ARRL bulletin in mid-April:

"ARRL Headquarters was saddened to learn that VHF pioneer and former *QST* VHF Editor Ed Tilton, W1HDQ, of Spring Hill, Florida, died March 1. He was 89. In December 1939, Tilton inaugurated the first *QST* column devoted to VHF. Originally called "On the Ultra Highs," it eventually became "The World Above 50 MHz." Tilton edited the VHF column until he retired from the ARRL staff in 1960, reporting on-the-air activity and encouraging experimentation initially on the then 56 and 112 MHz amateur allocations and, later, on all VHF and UHF bands. The UHF DX Records box—the precursor of today's standings boxes—debuted in 1940.

"During World War II, Tilton worked as a field engineer for the military on radar projects, mostly at Pearl Harbor and Guam, and became acquainted with the great technological progress the military was making in the VHF-UHF spectrum. Even while occupied with his military duties, he still managed to file occasional columns throughout the war years.

"In 1947, Tilton established the first WAS standings box for 6 meters. In 1955, he proposed establishing the first calling frequencies for the 6 and 2 meter bands. Following his retirement, Tilton remained a *QST* Contributing Editor. He was the author of the ARRL's first *VHF Manual* and wrote numerous articles for *QST*.

"Tilton's column inspired an entire generation of VHF and UHF enthusiasts and encouraged such activities as EME, meteor scatter, and auroral propagation. He was considered an authority on sunspots and solar flares and their effects on propagation. As ARRL Executive Vice President David Sumner, K1ZZ, put it: 'Ed Tilton was one of the outstanding amateur scientists of his generation. Perhaps more than any other individual, he led the exploration of the extended-range properties of the VHF and UHF bands.'

"Tilton was a life member of the ARRL. He also belonged to the QCWA and the Spring Hill ARC. He was a native of Springfield, Massachusetts. His wife, Leitha, died in 1995. His sister, Ruby, is among the survivors. He [was] interred in Canton, Connecticut. Donations in Ed Tilton's name may be made to the Hospice of the Florida Suncoast, 300 E. Bay Drive, Largo, FL 34640."

I first met Ed (via the landline) when he edited my article "The Maunder Minimum," which appeared in July 1976 *QST*. (The "Maunder Minimum" is the title assigned to a period of prolonged absence of sunspot activity between the mid 18th and early 19th century.) In those days there was much fascination surrounding predicting the next sunspot cycle (cycle 21). Ted Cohen, N4XX, had written a piece that stated the cycle would be lower than the previous and have a long, flat peak. Several of us disputed Ted's findings, most notably Bob Rose, K6GKU, at the old Naval Electronic Laboratory Center in San Diego. When I came across Jack Eddy's piece on the Maunder Minimum in *Nature* magazine, I thought I had something that would refute Ted's claim, because Jack was using forier analysis to extend Maunder's work into the future to predict higher sunspot cycles instead of lower, as Ted was predicting.

(In writing in his book *Observing the Sun*, Cambridge University Press, 1991, Peter O. Taylor has concurred with Jack that evidence exists to indicate that we are headed for another Grand Maximum of a long-term solar cycle that stretches into 200-300 years in periodicity and that this maximum will probably occur within the 21st century.)

Ed thought I had something as well. He took the piece I wrote, edited it, and got it published in *QST*. The following February, Bob Rose and a number of others at NELC published their predictions (again with Ed's help). (I wrote a sidebar article to theirs summarizing the various theories floating around at that time.)

Bob and the others at NELC had a particular interest in the then rise in sunspot activity because the U.S. Government was interested in its effect on the decaying orbit of Skylab. The NELC scientists correctly predicted the earlier decay of Skylab based on their analysis of the rise in cycle 21. Thanks to Ed, the amateur community benefitted from their knowledge.

Ed was not one to just report on VHF+ activities. Last November we celebrated the 50th anniversary of Ed's successful transatlantic SWL report. Here is what I wrote in the November 1996 column:

"On 24 November 1946, Ed Tilton, W1HDQ, was heard on 6 meters almost simultaneously by Clive Heightman, G6DH, and Hilton O'Heffernan, G5BY. Pronouncements of their receptions of Ed's signals were made on 10 meters. Attempts were made to make it an entirely VHF contact with G5BY transmitting on 58.632 MHz. However, Ed did not copy Hilton's signal because the MUF did not reach that frequency.

"At about the same time that Ed was making his historic cross-band QSO, a couple of U.S. amateurs were making the first F_2 contact on 6 meters. Grid, W4GJO, operating from Orlando, Florida, and W6QG, operating from Santa Ana, California, made contact with each other. Additionally, W4IUJ in West Palm Beach was heard by W6QG, working W6FPV at the same time. Ed reported in his "The World Above 50 Mc" column that these contacts were firsts of two sorts. They were the first F_2 contacts and the first Florida to California contacts reported on this band."

Ed also set the standard for what would be considered valid meteor-scatter QSOs on the VHF+ frequencies. When Paul Wilson, W4HHK, and Tommy Thompson, W2UK, made their history-making attempts at meteor scatter on 2 meters, because this mode of propagation was experimental, no definition for what was considered a QSO existed. Therefore, Paul and Tommy looked to the League, specifically to Ed, to define what was necessary for a complete QSO. Ed's definition was both operators had to acknowledge to each other that they had

VHF PLUS CALENDAR

June 21-July 21	50 MHz Marathon Contest. (See column for details.)
July 4	New Moon.
July 6	Moderate EME conditions.
July 10	Moon apogee.
July 12	First quarter Moon.
July 12-13	CQ World-Wide VHF Contest (see last month's column for details). 6 Meter Internet Contest (see column for details).
July 13	Poor EME conditions.
July 18	Lowest Moon declination.
July 20	Full Moon. Moderate EME conditions.
July 22	Moon perigee.
July 26	Last quarter Moon.
July 28	*Delta-Aquarids* meteor shower predicted peak.
July 31	Highest Moon declination.

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N6CL Receives Peace and Justice Award

CQ's "VHF Plus" columnist Joe Lynch, N6CL, was the recent recipient of Southern Methodist University's William K. McElvaney Peace and Justice Award. Lynch was cited for his humanitarian work through the use of amateur radio on mission trips to Cuba and Bosnia, his leadership activities in amateur radio during the aftermath of the Oklahoma City bombing, and his continuing promotion of peace and justice issues through his editorship of his amateur radio column and his co-editing the "Perkins Newsletter," the weekly newsletter of the Perkins School of Theology. As part of the award, Lynch received a $500 stipend to be used to continue his work in the area of peace and justice. During the presentation, which was made on the campus of SMU on May 11, 1997, it was noted that Lynch was the first seminary student/graduate student of SMU to receive the prestigious award.

We, the staff of *CQ* magazine, salute Joe for being honored for his use of amateur radio to promote the cause of peace and justice throughout the world.

received both calls and the correct signal report; the latter had to be confirmed by repeating the signal report received back to the other operator.

Reliance on Ed's definition caused their first claimed contact in August 1953 to be rejected. It wasn't until the second contact on 22 October 1953 that both Paul and Tommy received enough information from each other for Ed to consider the QSO to be complete.

During the passage of time the definition of what is considered a QSO has undergone little change. The only slight change is the signal report received need not be repeated back to the other operator. A simple acknowledgement by using the word "Roger" on voice or "R" on CW is considered enough acknowledgement.

It is ironic that Ed's opening paragraph would prove prophetic to the field of weak-signal communication. Ed lived long enough to glimpse into the future, which includes the probable launch of the Phase 3 D satellite later this year. Even so, how we marvel today as to that "ever-changing" definition of DX. As Ed wrote: "DX then is relative—anything which you, or the fellow in the next block, cannot work regularly, with comparative ease. Herein lies the basic appeal of UHF operation—the ever-changing DX horizon." Soon we will be able to regularly, with comparative ease, work amateurs on 10 GHz via Phase 3 D. I wonder what the change in the DX horizon will be. Somehow, I think that Ed now knows.

Ed was in failing health for a number of years. While it is sad that we in the hobby no longer have Ed with us, we do have the records of his many accomplishments, the results of his contributions to our hobby, and anecdotes of our encounters with this wonderful gentleman of the hobby. In memory of him, we say a fond 73 to our hero and pioneer of the "Ultra Highs."

The First FM Repeaters

For many new operators their very first introduction to amateur radio is via the FM repeater. However, repeater operation on the VHF+ amateur bands actually began in the early 1930s. One of the first stations was relay station W1AWW, which operated on the old 5 meter band from an old lookout tower near Springfield, Massachusetts beginning around 1932.

While it was a bit of a historical accident, this early repeater operation was on FM! Because the rig was a modulated oscillator, there were more FM than AM products on the signal. However, in those days it didn't really matter.

Owing to the theory "If you can't see it, you can't work it," many felt that communications beyond line-of-sight on the VHF+ frequencies were not possible. Thus, construction of relay stations on the Atlantic seaboard helped boost signals of small transmitters on the old 5 meter band enough to get past that pseudo barrier.

Incidentally, although wryly attributed to Ed Tilton, W1HDQ, the origination of the above quoted theory has been lost in history. If Ed did originate it, and was serious (and only he knew, but forgot whether he did or not), then he was later proven wrong many times, most notably by his own actions when on November 24, 1946 he was heard by G6DH on 6 meters for the first-ever trans-Atlantic VHF SWL report of a U.S. operator.

In the beginning these "repeater" stations were only set up on weekends, when amateurs had the time to play. Stations were manned all the time they were set up, because in those days the relay station consisted of a transmitter and several receivers. When the relay operator heard a station on a particular receiver, he would patch the audio from that receiver to the transmitter. After the station ceased transmitting, the relay operator would disconnect the audio patch and wait for the next station to start transmitting. If it was transmitting on another frequency, the relay operator would have to connect that receiver's audio to the transmitter. As you can see, the process was cumbersome at best!

The success of these stations brought the same problems we experience today. With more interest came more operators—and overcrowding. Additionally, operators who felt that over-the-horizon communications were possible on the VHF+ frequencies disdained the use of relay stations for communications. Championed by Ross Hull, their cause was given much impetus when in 1934 his experiments in tropospheric enhancement were successful.

Ross Hull was an Australian who moved to the U.S. and got a job at the American Radio Relay League (ARRL) in the early 1930s. Because of his alien status he did not get licensed as a U.S. amateur. However, until his untimely death by electrocution, he contributed much to the hobby both here in the U.S. and in his home country of Australia, particularly in the area of over-the-horizon VHF communications. In honor of Ross, each December the Australians hold a VHF contest named after him.)

As more and more operators constructed higher power stations to use this form of propagation, operators using less powerful equipment were either obliterated by the stronger signals or squeezed out of the band.

Interestingly enough, owing to Hull's discovery, the second great dilemma of the VHF+ amateur bands was born—frequency management, or what is more commonly known as

ADDENDUM

1995 CQ Worldwide VHF Contest Results: The following logs were accidentally not scored. Where they represent winners, certificates will be sent.

Category	Call	Score	Bands Operated
SF	CO2JA	1,260	A
SF	N5HHS	90,288	ABD
SF	WAØBWE	35,420	ABCD9EFG
QRP	NØHJZ	36,240	ABCDEF
Rover	WA6FIT/R	16,640	ABDE 4 grids

1996 CQ Worldwide VHF Contest Results: The following logs were accidentally not scored. Where they represent winners, certificates will be sent.

Category	Call	Score	Bands Operated
SF	N7GJD	200	ABD
SF	NØXKS	368	A
SP	FA1UEK/P	220	B
SP	EA1DVY/EH1DVY/P	204	AB
MIIF	N5CLU	2,139	ABD
MIIP	F1TZZ/P	2,556	BD

band planning. It's a problem that, except for some "band-aid" type solutions along the way, continues to this day.

While World War II shut down the amateur bands, it didn't curtail interest in FM operation. Given a boost just before the war by Edwin Armstrong, commercial users, particularly point-to-point communicators, found FM superior to AM for communicating. Following the war amateurs took a cautious but renewed interest in the FM mode.

Even though narrowband FM experiments on 75 meters in 1946 showed that FM was superior to AM, amateurs were reluctant to embrace it. Unfortunately, the almost parallel development of SSB all but doomed FM operation on the HF bands.

However, the VHF+ amateur bands were another issue. Because of the growth in commercial FM operation, the FCC required all but the broadcast users *and amateurs* to convert from wide-band FM (15 kHz) to narrow-band FM. This action immediately created a surplus market for radios that were no longer usable in commercial service. Nevertheless, amateurs were still slow to embrace this form of communications. It took the availability of equipment, the demonstrated superiority of FM over AM in overriding manmade noise, and the knowledge that the mode was less apt to cause audio rectification problems in non-amateur radio equipment (in those days your neighbor's new Hi-Fi) to cause amateurs to seriously consider FM as a viable mode. Couple all these factors with the growth of the amateur population on the VHF+ frequencies as a result of the newly created Technician and Novice class licenses (in those days Novices had voice privileges on the 2 meter amateur band between 145 and 147 MHz, the same as the Technicians at the time), and suddenly there was interest in calling attention to FM repeater operation.

Despite all the factors pushing toward FM operation, there was continued resistance from AM operators. In the 1950s early repeaters were AM modulated. As a newly licensed amateur in 1960, I watched the transition from AM to FM. Initially, amateurs in the southern California area constructed and set up AM repeaters. However, as FM modulation continued to be demonstrated as the superior mode because of its imperviousness to heterodyning and fluttering, more and more repeaters were built for FM. Also, because the surplus of FM equipment included repeaters, more repeater owners went with FM. Before long, FM repeaters were the dominant form of relayed communications.

Parallel to this development, commercial manufacturers entered the market with compact and easily transportable solid-state radios. This led to another interesting turn of events.

In the early 1960s many amateurs who had General class privileges and operated mobile confined their operation to 75 meters for point-to-point communications. However, the problems of skip and signal loss stemming from locations in valleys, between tall buildings, or under bridges, plagued these operators. Couple these problems with the enormous antennas required, and the fact that one had to have the higher class license to operate on 75 meters, and you can see that this type of AM operation had serious drawbacks. Therefore, as word spread about the superiority of FM VHF communications and the availability of more and reliable repeaters, HF mobile operation for close-in communications all but ceased. Suddenly, more amateurs than ever were looking to the repeater for reliable local communications. Even die-hard 6 meter operators began to flee that band for the 2 meter FM repeater.

As a result, the VHF+ frequencies became increasingly crowded. The FCC repealed Novice phone privileges on 2 meters partly because of increasing pressure on that band to accommodate all the repeaters. At the same time, the FCC gave the Technicians use of all but the bottom 100 kHz of the band in order to accommodate this growth and to "keep them legal," because by now repeater outputs were being activated in the "General" (147 MHz) portion of the band. (In those days the FCC considered it illegal to repeat licensees' transmissions onto frequencies not authorized to them.)

During the late 1960s and early 1970s repeater growth mushroomed, so much so that bands began to fill up. Repeater operation spread first to 70 cm and then to 125 cm. Eventually, the 23 cm amateur band began filling up with repeaters. With all this growth, repeater wars developed. The challenge as to

WBNOA's ARC, Gordon West's mobile amateur radio station. (Photo courtesy WB6NOA)

"who owned the frequency" led to the formation of repeater coordinating councils.

While this growth continued, other interest groups felt the pressures of these operations. It was the conflict of 1934 in reverse. Now, however, the pressure was on the weak-signal and satellite users.

These developments led to band planning. With input from representatives of the various users of the bands, the ARRL developed band plans to accommodate each type of user in his or her portion of the band. While these were gentlemen's agreements, it was hoped that the spirit of cooperation, self-policing, and self-discipline would hold the line between each user type. This has worked in many cases. A few years back, however, weak-signal users felt that after the loss of the bottom 2 MHz of the 125 cm amateur band (which included their segment of operation), they needed protection from encroachment by the tremendous growth of repeaters on that band. Ultimately, the FCC agreed and developed regulations that assigned a portion of the band to "experimental" (read weak signal) use, exclusively.

Where are we today? It's almost automatic. You get your license, you go to the amateur radio store (or hamfest, or telephone), purchase your handheld radio, open the box, connect everything, and start transmitting. It's almost that simple. However, there are a few technical aspects of operating a repeater that you should know. You also need to learn FM repeater operating protocol. For more information on that subject, you can either look it up in one of my previous columns or buy my book, *The VHF "How To" Book* from *CQ*. You will find it advertised elsewhere in this issue or call *CQ* to order your copy.

New 6 M Calling Frequency?

Due to a lot of discussion, both on the air and via the VHF reflector, Emil Pocock, W3EP, has proposed in his column, "The World Above 50 MHz," in the May 1997 issue of *QST* that we move off the traditional 6 meter calling frequency of 50.125 MHz and on to a new calling frequency of 50.200 MHz. Other suggestions have been for 50.150 MHz as being the new calling frequency. Activity on the VHF reflector indicates that people are trying to listen to all three. Now that we have had nearly a summer of sporadic-E activity, what have been the results of these changes in the calling frequency? What is your opinion of the changes? Please let me hear from you.

First Egyptian 6 Meter QSOs

Thanks to Chris Gare, G3WOS, and the UK Six Metre Group, Ezzat, SU1ER, is now very active on 6 meters. Writing to Chris, Ezzat commented that he was 61 and had been an amateur for 24 years, but this first QSO on 6 meters made him extremely happy. His first QSO was with IW9DSW. Since then, he has worked several other Italian stations, including IKØOKY, IKØBAL, IKØVAQ. Hopefully, as this summer sporadic-E season progresses, your call will be added to his log.

Current Conference

Central States VHF Conference: The annual Central States VHF Conference will be held in Hot Springs, Arkansas, 24–27 July. For more information, see last month's column or their home page at <http://www.csvhf.org>.

Current Meteor Showers

This month there are a number of minor showers. The most intense, the *delta-Aquarids*, is a southern latitude shower. It has produced in excess of 20 meteors per hour in the past. Its predicted peak is around 28 July at 1720 UTC.

The only northern latitude shower is the *alpha Cygnids*, which is supposed to peak around 20 July, but with a rate of only five meteors per hour.

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

Current Contests

The **CQ Worldwide VHF Contest** is scheduled for 12–13 July. For complete rules, see the May issue of *CQ* or my home page at <http://www.smu.edu/~jlynch/hamradio.html>.

Inside Gordon West's new mobile amateur radio station. This photo shows the console with removable heads from Kenwood and ICOM radios. (Photo courtesy WB6NOA)

Internet 6 Meter Contest: Piggy-backing on *CQ*'s contest is the Internet 6 Meter Contest. Growing from an increased interest in a world-wide 6 meter only contest, a group from the VHF reflector has decided to sponsor a 6 meter only contest. The contest will run the same time as *CQ*'s contest plus three more hours after the end of the *CQ* contest. For the complete rules of the contest, see this month's "Contest Calendar" column by K1AR.

50 MHz DX Marathon Contest: The following is from Victor Frank, K6FV: The "50 MHz DX Bulletin" is sponsoring its fourth 50 MHz DX Marathon, in which the object is to work 6 meter stations in as many grid fields (10 degree x 20 degree areas) as possible. (The grid field is the first two letters of a grid locator.) This year's contest period will run from 0000 UTC 21 June to 0000 UTC 21 July.

Only one QSO per station worked should be reported unless either station has changed grid fields. Furthermore, only one QSO of distance shorter than 4400 km should be reported per grid field. It is thus expected that participants will abstract those QSOs qualifying form their regular and contest logs. The only over-the-air exchange required is the callsigns, but you are expected to log date and time in UTC and to report the location or grid locator with sufficient accuracy to verify the distance.

Scoring: Six points for QSOs with stations more distant than 8800 km; 3 points for QSOs with stations between 4400 and 8800 km; 0 points (but a multiplier for new grid fields) for QSOs with stations closer than 4400 km.

Multiplier: Number of grid fields. Final score = (contact points +1) × grid fields.

Logs should be posted by August 10, 1997 to: The 50 MHz DX Bulletin, 12450 Skyline Blvd., Woodside, CA 94062-4541. For more information, you can contact Frank via e-mail at <frank@sneezy.sri.com>.

Honduras on 6 Meters

Masa Kakimote, JF3KQA, reports that his friend, Masa, JE3XRX, should now be on the

air from Honduras with the call HR1XRX. He should be active until the end of June 1998. He lives in a small village with no electricity, but already has a solar cell and a car battery. His equipment is an FT-690, plus a linear for a maximum of 50 watts into a small beam antenna. More information should be posted on the VHF reflector, or you can e-mail Masa, JF3KQA, at <kakimoto@okk.sei.co.jp>.

New SMIRK Reflector

George, NØEOQ, and Lisa, KAØNNO, Lowell, report that they have established a SMIRK reflector. The reflector deals with any questions about the Six Meter International Radio Klub and the SMIRK web site, or to make skeds with other SMIRK members. You can use the reflector to help new amateurs obtain info about 6 meter operations, discuss 6 meter equipment modifications, or antenna design, or pass on any DX QSL information, whether new or old.

To subscribe, send e-mail to <majordomo@qso.net>. Do not put anything in the subject line. In the body, write "subscribe smirk <e-mail address>" (without quotes and < > signs). SMIRK's home page is <http://www.cswnet.com/~ka0nno/page3.html#SMIRK HOMEPAGE>.

VHF Activity in Puerto Rico

The following information is from Braulio Feliciano, Jr., KP4HX: "At the present time we are encourage the VHF activity on the Island on 6 meters as well as 2 meters DX. Recently Raymond, KP3AB, along with a local group called the 'Caribbean Net' put on the air the first 6 meter FM repeater 51.200/51.700 located at Monte Maravilla in the center part of the island linked via a 2 meter repeater net covering coast to coast as well as the U.S. Virgin islands and the Dominican Republic.

"The most active VHFers in this moment are KP4EIT, KP4A, WP4KJJ, WP4LUU, WP4O, WP4KIA, KP3AM, KP4AZG, WP4ARJ, KP4UK, and me, KP4HX. The newcomers are Jose, WP4MSL, and his family—his wife, Josefine, NP3MB, and their daughters Adriana, NP3MC, and Rosalinda, WP4NLY. You can find them around 23:00 UTC almost daily on 50.110 and 144.200 MHz.

"Marcos, KP4UK, has a new rig the JST-245 and puts out a big signal from his nice location, and Pablo, KP4F, also gets on the air with his new ICOM IC-756; congratulations to both colleagues. Last week I received my first transatlantic QSL from Avelino Martin, EH8BPX, at Tenerife, Canary Islands. Some of my recent DX contacts include ZF2, V44, FG5, FM5, YV4, CO2, P49, LU, LW, CX, ZP, PY, XQ3, 9Y4, and of course the VEs and the U.S. stations.

"We are planning to improve our working conditions for this summer season, especially the SMIRK June contest and the VHF QSO Party. Well, that's all from the beautiful island of Puerto Rico. Best 73's and good DX. See you soon on the magic band!"

Errata

Curt Roseman, K9AKS, pointed out to me that my statement in the May column about the 1985 220 MHz sporadic-*E* contacts being the only on record was incorrect. Curt is right. On 22 June 1994 Andy Blackburn, WD4AFY, worked Jim Roseman, W9UD, and Peter Beedlow, NN9K. What was significant about this opening was the MUF was above 222 MHz for over an hour.

New NOA's Ark

After 20 years of faithful emergency communications service, the Gordon West black station wagon will retire and "NOA's ARC" Amateur Radio Communications vehicle will take over. Gordo indicates the new ARC unit will be used for both classroom demonstrations as well as VHF/UHF microwave DXpeditions.

"This unit will be added to our water grid arsenal, now allowing us the capabilities of attending regional amateur radio shows, and having all our microwave equipment onboard," comments Gordon West, WB6NOA. "It will also serve as an emergency communications vehicle for our local American Red Cross Chapter, plus emergency communications to the City of Costa Mesa, California," adds West.

West's new communications vehicle is built around a Chevrolet 22' G30, 1 ton, extended van chassis with a 7.4 liter 454 CID EFI V8 gas engine. There will be a 4.5 KW generator installed beneath the rear radio operating area to provide plenty of power for all amateur radio equipment onboard. The upper portion of the vehicle is built by Home & Park Motorhomes in Ontario, Canada, called Roadtrek. The roof is all fiberglass, but will contain built-in copper screening for good RF shielding between the antenna and the passenger compartment.

"All of the antennas will feature lip-mount and gutter-mount technology from leading antenna manufacturers such as Diamond and Comet. We also have a motorized antenna lay-down mount from Maldol," comments West.

"This idea of 'no holes' was to specifically test the new generation of antenna mounts that secure firmly to almost any ridge, lip, or metal edge. We will even run a full-length, high-frequency whip off the rear door tire mount, and again, we will only go with off-the-shelf antenna mounts available at amateur radio stores," adds West.

"Built into the screen area separating the metal sides of the vehicle and the fiberglass roof will be an automatic high-frequency antenna coupler with a long-wire attachment. This could allow us to string up a long wire, using the screen as well as the chassis sides of the vehicle for a great ground plane system."

"This arrangement would allow us to put a strong signal on 75 meters, the coordination band for weak-signal tropo and meteor-scatter work," comments West.

Long-boom Yagi antennas will be carried on the inside. The booms would be separated so as not to exceed the length of the vehicle. The Yagis would operate either fixed direction or, for now, via the "Armstrong" rotor system.

"We will have 160 meters through 10,000 MHz and every manufacturer will have at least one operating unit in this communications vehicle," comments West. "This will allow students to enjoy hands-on exposure to every brand sold through dealers or direct, and this way our mobile classroom will support everyone in the industry equally," adds West.

Plans also call for large magnetic signs with the phrase AMATEUR RADIO ON THE AIR so that the vehicle may also travel as an amateur radio information center. We plan to make this unit very visible during amateur operating events such as Field Day and simulated emergency tests. We will also carry amateur radio information packages, including amateur radio magazines, ARRL information sheets, amateur publications, along with manufacturer frequency charts and "Welcome to Ham Radio" guides.

There will be three operating positions inside the vehicle—the front for high-frequency, mid-section for VHF and UHF, and the rear area which will carry satellite and data equipment.

Plans call for a West Coast "Shakedown" and then other engagements throughout the rest of the country. Gordon West's wife, Suzy West, N6GLF, looks forward to driving while "Gordo" scurries around inside keeping everything on the air "ARC Mobile."

And Finally . . .

This is the month of our VHF contest. I expect to be home this year for the first time in two years, so I hope to be participating. Even so, the Sunday of the contest is my fiancee, Carol King, K5CPZ's birthday, so I will be QRT for at least part of the time on that day.

This month is a bit of a catch-up month, as I am out of school for a month between semesters. Therefore, I am catching up on a few loose ends, particularly in misplaced logs for the VHF contests of years past. To those affected by my misplacements, I am very sorry. My thanks go to you who continue to support this column with your input and to those who write and e-mail me your encouragements. Some of you wonder how I continue to write the column with my busy school schedule. Frankly, so do I. It is only possible with your input. I will continue to write the column, again with your invaluable help. Until next month . . . 73, Joe, N6CL

BY BILL WELSH, W6DDB

BILL'S BASICS

"HOW TO" FOR THE NEWCOMER TO AMATEUR RADIO

Onward and Upward—Part II of IV

The first part of this four-part series covered alternative licensing, what code is, code advantages, code tests, word count system, dit-to-dah relationships, required code symbols, additional code symbols, and foreign codes. This month we will cover learning code, operating, and code sending devices.

Learning Code

Learn code by sound, not by sight. It is not unusual for students to make flash cards with the printed character on one side and the code symbol on the other side. These cards are helpful if you are going to practice code with another person. However, you should not just use flash cards to visually learn code; they must be used in conjunction with an oscillator and key used to send each character. The use of a blinker light or flashlight as a code learning aid is a bad practice. Copying code by sight is entirely different than copying it by sound. Avoid using visual practice because it will slow down your progress in learning to copy code by sound.

There are no dots and dashes in code; there are only dits and dahs. Do not learn code by dots and dashes, because it will seriously hamper your efforts to increase receiving speed. If you have learned the code as combinations of dots and dashes, you make two transpositions each time you copy a symbol. If you hear dit-dah, you convert that to dot-dash and then recognize dot-dash as the letter A. Avoid this unnecessary extra step. Learn to directly associate each dit and dah code symbol with the specific character it represents.

Another common error is learning the code symbols for the alphabet in sequence from A through Z. Do not do this, because you would tend to run through the entire alphabet in your mind each time you hear a symbol. Code practice sessions must be short and regular to be most effective. Practice 20 to 40 minutes at a time and no more than twice per day. However, it is necessary to hold practice sessions about 5 days per week. Most new students mentally convert printed signs into code wherever they are seen. This is good practice as long as you mentally change them into dit and dah symbols, not dot and dash symbols. Send a few code symbols and you will quickly convince yourself that you are listening to dits and dahs, not dots and dashes.

The following combinations of symbols are helpful to people learning code. It is better to learn the code in a random fashion instead of in sequences or combinations. However, most students will resort to combinations, so they are included here for your convenience.

If one is just learning the International Morse Code, it may help to learn some of the letters in pairs. Each letter appears twice in the following alphabetical list.

A	.–	N	–.
B	–...	V	...–
D	–..	U	..–
F	..–.	L	.–..
G	––.	W	.––
L	.–..	F	..–.
N	–.	A	.–
Q	––.–	Y	–.––
U	..–	D	–..
V	...–	B	–...
W	.––	G	––.
Y	–.––	Q	––.–
A	.–	N	–.
U	..–	D	–..
V	...–	B	–...
4	....–	6	–....
E	.	T	–
I	..	M	––
S	...	O	–––
H	....	(none)	
5	.....	Ø	–––––

Some students find it easier to use the following examples. The harder symbol is produced by running together the two easier symbols following the first letter (the more difficult symbol) in each word.

F	Fin	F/IN	..–./.. –.
J	Jam	J/AM	.–––/.– ––
L	Led	L/ED	.–../. –..
P	Pan	P/AN	.––./.– –.
V	Via	V/IA	...–/.. .–

The code symbols for the letters Q and Z sound like "here comes the bride" from the "Wedding March" and "daddy did it," respectively. The preceding aids are just intended to help those who are trying to become familiar with the code. These aids are quickly forgotten as one becomes familiar with the sound associated with each code symbol.

Code Practice Items

The amateur radio catalogs and magazines advertise a variety of code practice oscillators (CPO), headphones, keys, magnetic tape recordings, computer programs, and other items designed to help students acquire good code proficiency. Electronic keyers and receiver sections in transceivers are helpful devices. If you are going to purchase a CPO, select one with variable tone, adjustable volume, and a headset jack which disconnects any internal loudspeaker.

Headset use minimizes annoyance to other people in your home and helps you concentrate better on your code practice, since you are not disturbed by household noises. If you are going to purchase a set of headphones for later use in your amateur station, get a good set of communications headphones. Wide audio range (high fidelity) earphones are not good for this purpose. You need extremely sensitive headphones with limited audio range reproduction capability. Comfort and light weight are also of major importance in selecting headphones, since they sometimes are worn for long periods of time. A dual headphone set is better than the single earphone type. It is best to select a set that has soft replaceable/cleanable muffs, which increase wearing comfort and better isolate you from household noises.

Taped Code Checks

One of the best ways to improve your code proficiency is to record an item and listen to it at a

Cecelia Herson, N5ZZD, provided this picture of three-year-old Hannah Bate sitting on her grandfather's lap in his shack. Paul Herson, KA5Y, lives in Trinidad, Texas.

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later date. I advise my students to clip articles out of newspapers and magazines. Select articles that contain quite a few numbers and punctuation marks. Cross out punctuation marks you do not have to know to pass the FCC code exams and insert work signs and punctuation marks that are required.

Record about a 20 minute code run. Then put the cassette tape and printed material away for 7 to 14 days. Record several of these runs per week, if you have time to do it. When you take a tape out to listen to it, do not read the printed material before you listen to the recording. Carefully copy exactly what you previously recorded and listen a second time through to check that you copied everything as it was taped. Afterwards, check what you copied against the original article you meant to tape. Check each letter, number, work sign, and punctuation mark.

You quickly will learn which symbols you must improve to become a better operator. You can effectively and constructively criticize your own sending by using this procedure. Improper spacing causes most of the trouble. When a symbol is spaced apart, it becomes two (or more) other symbols. When letters are run together, they can form other symbols or characters which may or may not have meaning. When words are run together, or separated in the middle, the resultant copy can be difficult to understand. Frequent use of cassette recordings can help anyone become a much better operator in a short time. A major advantage of using this system is that you can do everything yourself; you do not need anyone to help you improve your code capability.

Operating

Once you have your code proficiency up to about 7 words per minute (35 letters per minute), you should make arrangements with a local volunteer examiner group to take your FCC 5 wpm code test. The best code practice is obtained by operating on the air, and it is a lot more interesting than any other code improvement system.

On-The-Air Practice. Nothing increases code proficiency faster than on-the-air operation. When you must copy what the other operator is saying, you try a lot harder to make perfect copy. It's this natural extra effort that makes actual operation more effective code practice than listening to tapes, records, or other code-practice transmissions. There's nothing more frustrating than encountering a beginner who doesn't operate regularly after we've helped her/him earn a license and set up a station.

Sending Tips. Whenever you practice sending code with a handkey, place a heavy coin on the flat wrist area of the hand you send with. The correct sending motion involves raising and lowering the wrist. If your sending motion is correct, the coin will stay on the flat of your wrist. If your motion is wrong, the coin will fall off. If you make the mistake of sending code with your fingers, your symbol spacing will be poor and other operators will not like the disjointed sound of your sending. The nail of the forefinger should overlap the forward edge of the key knob. The knuckle of the forefinger should always bend out to accommodate normal extra wrist pressure. If the forefinger knuckle is bent in (back), it indicates that the operator is finger tapping instead of sending with the wrist. Grasp the key knob between the thumb and middle finger and just hold it tight enough to prevent your hand from coming off the key. Curl your two small fingers loosely out of the way and keep your arm, wrist, and hand relaxed and in a straight line. Mount your key on a piece of wood or plastic that is no more than one quarter inch thick.

If your key has a skirt, take it off to avoid bad sending habits. A skirt is a flat washer about the size of a half dollar that is located immediately below the knob. Adjust your key to have about one sixteenth of an inch of space between the contacts and set the return spring to a point where a reasonable amount of force is needed to close the keying contacts. These adjustments will help you avoid finger-tapping tendencies because finger tapping requires very light spring tension and close contacts.

Correcting Sending Errors. There are two accepted ways to indicate that a sending error has been made and that a correction will be sent. One way is to send seven or more consecutive dits. The other (preferred) way is to send a question mark which when sent out of normal context indicates that a word or group is immediately going to be repeated. If the error occurs in the first letter of a word, or in a single letter word such as A or I, send the error sign and repeat from the start of the preceding word or group. If the error occurs after the first symbol has been correctly sent, send the error signal and start again at the beginning of the word or group in which the error occurred. If you even think you might have made an error, there is nothing wrong with sending the repetition sign and repeating the word or group you do not think was sent well enough.

Code Tapes

If you have little (or no) knowledge of the International Morse code (also known as the International Telegraphic Alphabet Number One), I have a set of 15 cassette tapes which can be used to take one from no knowledge of this code to a receiving speed of about 15 words per minute. These tapes have been used very successfully by several thousands of my ex-students. They include tips on shortcuts used by top code operators. The cost of a complete set of these tapes is $35, which includes shipping and handling charges.

Keys

Handkeys. It has been my experience that nothing develops confirmed voice-only amateurs faster than bad sending practices. The best way to develop a good fist is to learn how to use a good handkey (manual telegraph key) and to stick with it until your code-receiving proficiency has reached 10 to 15 wpm. Proper spacing between letters and words helps make code pleasant to copy at any speed.

Do not use a junk handkey because that

Preben Jakobsen, OZ5AAH, lives in Greve, Denmark. He is chairman of the International Police Association (IPA), which has a membership of 263,000 current or retired officers in 59 countries. IPS sponsors several awards, including The Golden Badge Award (USA); J. Edgar Hoover Award (USA), The Shamrock Award (Ireland); The Hercule Poirot Award (Belgium); The Sherlock Holmes Award (Germany); and The Windmill Award (The Netherlands). Recent special IPA operations include EA7/OZ5IPA, OH0/OZ5IPA, OX3IPA, and OY5IPA. IPA enjoys non-governmental status in the United Nations. The first IPA club callsign is OZ5IPA, which was issued during 1972. Several IPA clubs now exist. If you want information about the IPA and/or IPA awards, contact Preben Jakobsen, 9 Knoldager, DK 2670 Greve, Denmark. Note in the photo the unusual weight used to hold his keyer in place.

makes it more difficult to develop proper sending technique. Select a good handkey with an adjustable key contacts gap, adjustable return spring (keying) pressure, well-machined (smooth) and adjustable arm pivot points and matching pivot-point receptacles, good alignment between the entire upper and lower keying contact surfaces, plus good plating on the keying contacts.

Many handkeys are not acceptable, so take care to select a good one. It is not safe to assume that all handkeys are good, since even some expensive ones are not acceptable.

Avoid the use of a skirt on the knob of a handkey because it tends to encourage improper grasp of the knob, resulting in poorly sent code characters. A skirt is a flat piece of insulating material about the size of a half-dollar, and it is located immediately below the handkey knob. A new operator would most likely let his/her fingers rest against the top of a skirt. This failure to properly hold the knob impairs normal transfer of force as the wrist is raised and lowered while sending. The resulting degradation of the sending action ruins consistency in the lengths of dits and dahs and causes uneven spacing between individual parts of code characters.

Some handkeys are mounted on large base plates that raise the knob uncomfortably high above the operating surface of the table. Some handkeys have such poor alignment between the upper and lower keying contacts that very little of the total contact surface functions when the key is closed.

It helps to mount a handkey so it will not move as you send. The handkey can be mounted on the operating table, but it is usually mounted on a thin but heavy piece of plastic or wood to avoid marring the table surface. If the handkey is to be attached to a base, the base should not be more than 1/2 inch thick, and it should be at least 3 inches wide by 8 inches long. The handkey should be mounted near one end of the base with the key knob towards the center of the base. Modern adhesives make it easy to mount handkeys on a wide variety of base materials. Whether it is mounted on a base or directly on the operating table, the handkey is positioned where it is comfortable to reach when the operator is seated close to the table with his/her elbow on the table, and with the forearm in line with the key.

Rhythm is easily developed while using a good manual (hand) telegraph key. Accuracy is the most important initial objective. Develop good spacing and accuracy. Speed will increase easily and naturally as you work contacts on the air. You can actually practice the sending motion without a handkey. Simply sit in close to the table or desk, place your arm in a comfortable position with your elbow on the table, and practice raising and dropping your wrist as you would do it to send specific code symbols. This simple procedure is surprisingly effective in helping finger tappers overcome early bad sending habits. Another effective way to overcome finger tapping is to exaggerate the length of the dahs when sending.

It is easier to achieve proper spacing technique using a manual key when you are initially learning to send code. This enables you to continue using good spacing when you shift to a high-speed keying device. The manual key also allows you to send the longer dahs that

are appropriate when sending slow code. Once you achieve a code receiving (not sending) speed of about 17 wpm, it is advisable to start using a high-speed keying device. I use a manual key, a bug (semi-automatic key), and a paddle with an electronic keyer in my station. I am most proficient using a bug, since that is the device I have used for half a century. However, I do not recommend that new amateurs switch to a bug from a manual key; it is much better to make the change to a paddle with an electronic keyer. This combination is easier to master than a bug, and the electronic keyer does a lot of things a bug cannot do. Whether you switch to a bug or an electronic keyer and paddle, practice using your high-speed key off the air. Tape your sending and copy it later to determine its readability.

Bugs and Keyers. There are several other keying devices besides the manual telegraph key (handkey). The semi-automatic key remains popular with some of the more proficient operators. These are commonly referred to as "bugs," because the trademark of the company (Vibroplex), which manufactured thousands of them, is a bug. The bug produces a series of evenly spaced dits when the sending lever is moved to one side and the operator moves the same lever in the other direction to manually produce each required dah. In other words, the dits are automatically produced and the dahs are manually sent; that is why this device is called a semi-automatic key.

Some fully automatic keys have been produced that operate with a pendulum action that is similar to that of the semi-automatic key when it produces dits; however, dits and dahs are automatically produced when the sending lever is moved to one side or the other.

There is now a wide variety of keyers available, and they provide many desirable features that are not available with handkeys or bugs. Some keyers have the paddle (sending instrument) built in, but the paddle must be separately obtained with many other keyers. It is easier to master a keyer than a bug, and both bugs and keyers are easier to use at high speeds than handkeys. Keyers can include features such as a sidetone oscillator (which lets you hear the code being sent during practice or real transmissions), monitor volume level, speed adjustment, weight adjustment (length of dit to dah relationship), and programming (which permits a repetition call to be automatically sent at the flick of a switch).

The versatility of modern keyers is truly amazing. It is advisable to use a handkey until a code receiving proficiency of about 17 wpm has been developed. When you reach this point it is best to switch to a bug or keyer. If you plan to use both a bug and a keyer, it is good to use your left hand with one and your right hand with the other. The differences in timing and sending action do not seem to cause too much trouble when you do not use the same hand for sending with both a bug and a keyer.

Interim Summary

This completes the second part of this four-part article. The third part covers station considerations such as location, desk or table, lighting, clock, headphones, equipment, filters, antennas, coaxial cable, writing instruments, etc. The operating factors included in this part are bands and times, listening, tuning, short CQ calls, and same frequency use.

73, Bill, W6DDB

BY JOHN DORR, K1AR

CONTEST CALENDAR

NEWS/VIEWS OF ON-THE-AIR COMPETITION

Multiplying Your Contest Score!

July's Contest Tip of the Month

Whether you've experienced the loss of a contest log in the mail or not, this tip is for you. Unless you've joined the Internet computer revolution for log submissions, it still pays to include a postpaid postcard with your paper entry. At the very least, it will serve as verification that your log was received. It also may afford you the opportunity to resubmit your "lost" log before it's too late. Nothing can improve a contest score more than ensuring it is received by the contest sponsor!

Based on my experience and that of others, I have learned that finding multipliers in contesting is truly an art form. There always seem to be a few guys who lead the pack in this category. I have always been impressed with the totals that Tom Frenaye, K1KI, amasses every time he enters the single operator circuit. Over the years I've discussed the importance of multiplier hunting to competitive contesting, and while I concluded that multipliers are not the most critical component of a winning score, they certainly should not be overlooked by any means!

So what is the secret of this skill? Although I don't have all the answers, I do have some thoughts that you may find useful in your own efforts to improve your contest scores. One of the most significant aspects of multiplier hunting is knowing when and when not to look for them. Obviously, this is a function of the type of station you are using. The bigger stations generally do not focus on working of multipliers per se during running periods, such as with the early morning East Coast European runs. Smaller stations, on the other hand, may want to take advantage of this time, because good multipliers can be found without the enormous pile-ups brought out by the slowness of the afternoon hours.

Looking Where They Ain't!

I have always subscribed to the theory that part of the secret of finding multipliers is to look where other guys do not. For example, tuning very high in the band (e.g., above 14300, 21350, etc.), using odd times and beam headings (e.g., long path Asia on 15 meters at 0800Z), net operations (not the "last two" types, but local/regional operations), and so forth can bring rich rewards. I wish I had 25 cents for every time I've found a rare country or zone using this method with little or no one calling the DX station! Again from a small station perspective, think about the complaints that DX stations most often rise to the surface: "I called CQ endlessly, but everyone's beams were pointed at Europe!" This translates into a multiplier opportunity. Consider taking a few minutes, if your run rate is not what you would like it to be, and point your beam toward Africa or the south, tuning the bands slowly. This is an excellent time to find those 7P8, V5, EL, VP8, CP, HC8 multipliers. And more often than not, they rarely have anyone calling them.

8 Anchor Lane, Mt. Sinai, NY 11766-1200
e-mail K1AR@contesting.com
Compuserve ID: 71301,424

CALENDAR OF EVENTS

June	28-29	ARRL Field Day
July	1	RAC Canada Day Contest
July	5-6	Venezuela SSB DX Contest
July	**12-13**	**CQ WW VHF Contest**
July	12-13	Internet 6 Meter DX Contest
July	19-20	NAQP RTTY Contest
July	26-27	Venezuela CW DX Contest
Aug.	2-3	Summer Ten-Ten SSB Contest
Aug.	2-3	YO DX Contest
Aug.	2-3	ARRL UHF Contest
Aug.	9-10	Maryland-DC QSO Party
Aug.	16-17	New Jersey QSO Party
Aug.	23-24	TOEC CW WW Grid Contest
Sept.	6-7	LZ DX Contest
Sept.	6-7	All Asian SSB DX Contest
Sept.	13-15	ARRL VHF QSO Party
Sept.	18-20	YLRL Howdy Days
Oct.	10	Ten-Ten October Sprint
Oct.	11-12	Pennsylvania QSO Party
Oct.	**25-26**	**CQ WW SSB DX Contest**
Nov.	1-3	ARRL CW Sweepstakes
Nov.	7-9	Japan Int'l SSB DX Contest
Nov.	15-17	ARRL SSB Sweepstakes
Nov.	**29-30**	**CQ WW CW DX Contest**

Passing 'Em

When building multiplier totals, there is another aspect that is a skill onto itself: passing stations to other bands. The concept is simple to describe, but often difficult to implement. Passing a multiplier is nothing more than asking a contest station to move to another band where that multiplier is needed. It sounds simple, but this is an excellent example of how delivery is everything. Most contesters fit into two categories: the casual operator who is just "giving out points" and the serious competitor trying to maximize a final score.

You will find that the former category's participants more often than not are willing to help you out by moving to another band—if you only *ask!* However, the approach you take is the most important point. If you say something like "Can you go to 20 meters now?" it is very easy for the response to be a quick "No!" However, if you are a bit more aggressive and say, "I really need to work you on 20 meters. . . . let's QSY to 14275 and I'll call you *now*, okay?" it requires a different response from the other end and that answer is more often than not the one you want to hear. Obviously, you want to make it as easy as possible, so try to make your passing frequency a simple change of the band switch (e.g., move from 21325 to 14325, etc.).

Passing multipliers is catching on, much to the chagrin of many DX stations who seem to be moved endlessly about the bands by unsuspecting USA competitors. Your success will depend on how convincing you sound and the patience of the DX operator. Some will say that you have crossed the reasonable line when you blast through a 15 meter DX pile-up with 200 people calling and ask the guy to move to 20. This is where you need to decide how much you value your friendships and reputation. In any event, remember that you don't have to be using a superstation to achieve success.

Tuning With Vigor

Earlier I mentioned that part of the skill in finding multipliers involves careful tuning. Have you ever tortured yourself by comparing your log with a friend's results? Frequently I have marveled at the number of rare multipliers that make it into one log (even on several bands) while being totally absent from another.

Many years ago I was comparing results with several other top competitors to find out that I was the only station in the group that did not work Father Moran, 9N1MM. To add insult to injury, I did work several nearby VUs, an AP, and a 4S7. The point is that when you are searching for multipliers, you must tune that VFO slowly and deliberately—over and over. I guarantee that no matter how many times you pass through a band, you'll miss something, and that lost opportunity results in a lower score.

Finally, the art of working multipliers is something that takes practice and skill. You need, over time, to be able to easily recognize stations you have already worked. Keep an ear keenly alert for weak stations at all times, starting at the low end of the band and working your way to the top. Of course, there's no excuse for missing easy ones, especially your own country. A little extra attention to this area of contesting can have an immediate impact on your results, and let you have just a little more fun. Good luck!

Beefing Up That 40 Meter Beam

If you own or are planning on purchasing the popular Cushcraft 40-2CD 2-element 40 meter Yagi, the following information should be of great interest to you. Although there are many fine 40 meter Yagis on the market, Cushcraft has enjoyed tremendous success with its 40-2CD. This prosperity has come in part from the product's lightweight construction and ease of installation.

Unfortunately, many amateurs' locations suffer from high winds and extreme winter weather. Fellow contester and consulting engineer Mike Wetzel, W9RE, has solved this problem by offering upgrade kits at a very reasonable price. The kit consists of all necessary tubing and/or thicker boom-to-mast and element-to-boom plates. Also included are stainless-steel bolts for pinning the element-to-

boom plates and hose clamps to go around the driven element.

The price for a 100 MPH kit is $150, which includes shipping by UPS. If you are also interested in the upgraded plates, the price increases to $175. For more information, contact Mike at his callbook address: 7880 Shelbyville Road, Indianapolis, IN 46259.

Closing Remarks

I'm typing this month's column at 11:30 PM while riding on yet another plane to points unknown. Lately it seems that I'm in the air more than on the ground! I'm sure that those of you enjoying high-technology careers can understand my plight.

Starting next month, I want to rekindle an old favorite of this column: personal profiles of fellow contesters and contest stations. Be on the outlook for some facts about your peers that may surprise you.

As usual, please submit your contest announcements to me no later than August 1st for inclusion in the October issue of *CQ*.

73, John, K1AR

Venezuelan Contest

SSB: July 5–6 CW: July 26–27
0000Z Sat. to 2400Z Sun.

This is the 36th annual contest celebrating Venezuela's independence. It's a worldwide contest, so do not confine your activity to working YVs only. Working other DX is encouraged. Use all bands, 80–10 meters (no WARC bands).

Classes: Single Operator, Single and All Band, and Multi-Operator, Single and Multi-Transmitter. (No limit to transmitters, but only one signal per band.)

Exchange: RS(T) and QSO number (e.g., 59001).

Points: Contacts between stations in the same country count as 1 point. QSOs between stations in different countries but the same continent count 3 points. QSOs between stations on different continents count 5 points.

Multiplier: One for each YV call area, and one for each different country worked on each band (including your own).

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

Awards: A plaque will be awarded to the highest scorer in each operating class. Certificates will be distributed to stations making more than 20% of the next highest score.

Use a separate log sheet for each band. Each YV call area (9) and each country (DXCC list) should be indicated in a separate column only the first time it is worked on each band.

Include a summary sheet showing the scoring, your name and address in block letters, and the usual signed declaration that all contest rules and regulations for amateur radio in the country of the contestant have been observed.

Mailing deadline is September 30th for SSB logs and October 31st for CW. They go to: Radio Club Venezolano, Concurso Independencia, P.O. Box 2285, Carcas, 1010-A, Venezuela.

CQ WW VHF Contest

1800Z Sat. to 2100Z Sun., July 12–13

Be sure to review the full set of rules found in the May issue of *CQ*. Logs may be mailed to *CQ* or directly to the Contest Director: Joe Lynch, N6CL, CQ VHF Contest Chairman, P.O. Box 73, Oklahoma City, OK 73101 Be sure to mark VHF Contest Logs on the envelope.

Internet 6m DX Contest

1800Z Sat. to 2359Z Sun., July 12–13

Running concurrently with the CQ WW VHF Contest, the objective of this new one is to work as many stations on 6 meters as possible (SSB/CW only), especially DX, in the alloted time frame. Extra credit is given for those who work DX stations in far away grids.

Categories: Single Operator (USA/VE and DX), Single Operator QRP (USA/VE and DX), and Multi-Operator (USA/VE and DX).

Category Description: *Single Operator*—one operator performs all logging and operating functions of the station. Multipliers can be passed from other VHF bands if desired. A single operator means the same operator for the duration of the contest. *Single Operator QRP*—same rules as above but limited to 10 watts or less RF output. *Multi-Operator*—one or more operators. Having a second operator searching for multipliers, the use of a packet spotting network, or the use of relief operators places you in the Multi-Operator category. Only one transmitted signal at a time is allowed. Passing from other bands is allowed.

Exchange: Callsign and grid square.

Scoring: Each QSO in your continent is worth 1 point. QSOs with stations outside your continent count 3 points. For this contest, North America is USA/VE only.

Bonus points: 10 QSO points can be taken for every unique grid field worked (i.e., EM, FM,

FN, FL, DN, IM, etc.). Multipliers are unique grid squares the first time they are worked, plus each unique ARRL DXCC country the first time it is worked, including W/VE. Count your own country for credit the first time it is worked.

Final score: Total QSO points plus bonus points, and multiply the sum times the total of grids plus DXCC countries worked.

Awards: Plaques to the top finishers in each sponsored category. All first-place plaques have been sponsored. Certificates will be awarded to the top five finishers in each category.

Logs must be postmarked not later than 30 days after the last day of the contest. A signed summary sheet is required to be sent (for paper logs). ASCII logs can be sent via the Internet to <ramirezk@emi.com>. No binary files (i.e., CT.bin). ASCII logs can be sent as a Mime encoded attachment. The log checking committee will consist of volunteers who are very active 6 meter ops. Entrants will lose an extra multiplier for each incorrectly logged unique multiplier. Entrants will lose an extra QSO for each incorrectly logged QSO. Send disks or paper logs to: Internet 6m DX Contest, 2131 Woodruff Rd. 2100-250, Greenville, South Carolina, 29607 U.S.A. After submitting your CQ WW VHF log to the sponsor, you can simply separate the 6 meter log and re-score it to reflect the different multipliers, bonus point values, and score. Anyone participating in the CQ WW VHF Contest is eligible to send in an Internet DX 6 meter log.

IARU HF Championship

1200Z Sat. to 1200Z Sun., July 12–13

This is the 12th annual IARU World HF Championship. All six bands, 10 through 160 meters, and the full 24 hours may be used by both single and multiple-operator stations. (No WARC bands.)

Categories: Single Operator, CW only, phone only, and mixed modes. Multi-Operator, single transmitter, mixed mode only. Stations must remain on a band for at least 10 minutes. (Exception: Only IARU member-society HQ stations may operate simultaneously on more than one band with one transmitter on each band/mode.)

Exchange: RS(T) and ITU zone. *HQ stations:* RS(T) and official society abbreviation.

Points: Contacts within own zone or with an HQ station count as one point. Contacts within own continent but different zone are 3 points, and 5 points with different continents.

Multiplier: Total number of ITU zones plus IARU HQ stations worked on each band.

Final Score: Total QSO points from all bands times the total multiplier.

Awards: Certificates will be awarded to the top scorer in each category, state, ITU zone, and DXCC country. In addition, achievement awards will be issued to those making at least 250 QSOs or having a multiplier of 50 or more.

Entries with more than 500 QSOs are required to include a dupe sheet with the log. A three QSO reduction will be assessed for each duplicate QSO for which credit has been taken. Disqualification may occur if the overall score is reduced by 2% or more.

It is recommended that you check out the ARRL's web site at <www.arrl.org> for more detailed information. A large SASE with 2 IRCs (or equivalent) will get you official forms and an ITU zone/prefix/continent map. Mailing deadline for entries is August 13th to: IARU HQ, Box 310905, Newington, CT 06131-0905.

North American QSO Party RTTY Contest

1800Z Sat. to 0600Z Sun., July 19–20

The object of this one is to work as many North American stations (and/or other stations if you are in North America) as possible during the contest period. North American stations are defined by the rules of the CQ WW DX Contests with the addition of KH6.

Classes: Single operator and Multi-Operator, two transmitters. Multi-operator stations must keep a separate log for each transmitter and must have at least 10 minutes between band changes. Use of helpers or spotting nets by single operator entrants is not permitted. Single operator entrants may only have one transmitted signal at a time. Output power must be limited to 150 watts for eligible entries. Multi-operator stations may operate for the entire 12 hour period. Single operator stations may operate 10 out of 12 hours. Off-times must be at least 30 minutes in length and must be clearly marked in the log.

Bands: 80–10 meters only (no WARC bands). You may work a station once per band. Suggested frequencies are 3585, 7085, 14085, 21085, and 28085 kHz. Try 10 meters at 1900Z and 2000Z, and 15 meters at 1930Z and 2030Z.

Exchange: Operator name and station location (state, province, or country).

Scoring: Multiply total valid contacts by the sum of multipliers worked on each band. Multipliers are states (including KH6 and KL7), Canadian call areas (VE1–VE8, VO1, VO2, VY1, and VY2), and other North American countries. Do not count USA, Canada, KH6, or KL7 as countries. Non-North American countries do not count as multipliers, but may be worked for QSO credit.

Team Competition: Team competition is limited to a maximum of five single operator stations (two minimum) as a single entry unit. *Pre-contest Requirement:* To qualify as a team entry, you must register the name and callsign of each operator, and callsign of the station operated should the operator be a guest at a station other than his own (e.g., N4RJ op. by KM9P). Teams must be registered with AB5KD.

Penalties: For each unmarked duplicate QSO, you lose that contact plus an additional three contacts; for each QSO for which you are not in the other station's log, you lose that QSO plus an additional one contact; and for each QSO for which the log data is incorrectly copied in any respect, you lose that contact. Entries with score reductions greater than 5% will be disqualified.

Awards: Trophies will be awarded for the high score in each of the following categories: Single Operator (W6OTC sponsor) and Multi-Operator (WF1B sponsor). Certificates of merit will be awarded to the highest scoring entrant with at least 200 QSOs from each state, province, and North American country.

Send all entries to Ron Stailey, AB5KD, 504 Dove Haven Drive, Round Rock, TX 78664-5926. Entries must be postmarked no later than 30 days after the party to be eligible for awards. Logs may be submitted on disk in the form of MS-DOS compatible ASCII files or .BIN format from WF1B's logging program.

OUR READERS SAY

See You on The HF Bands

Editor, *CQ:*

I am writing to thank you for a great publication. I look forward to every issue. I especially like the attention you devote to nostalgic stories and gear. The "World of Ideas" column by Dave Ingram, K4TWJ, is my favorite.

I have been a ham for eleven months and am only a General class. I feel code is important. I don't have a radio for HF yet, just an HT my Elmer gave me. I can't afford one of those high-tech radios, so I'm building my own from Dave's column. I wrote to him with questions about his "Red Hot Radio" (*CQ,* September 1995 issue), and he gave me a quick reply.

Thank you, Dave, and *CQ* for enabling me to realize a dream. I'll see you soon on the HF bands.

Dave Pote, HL9RK/KC7RKH
Songtan, South Korea

Both Sides Win

Editor, *CQ:*

I am a life member of *CQ,* and in the May issue I read the announcement about your home page. I must say that it is very impressive, representing a nice, clean format and a job well done. Thank you for this new electronic extension to *CQ (see the editor's note below).*

Due to work and school issues (completing my MBA degree), there is not much time for radio operation. This limits my low band operation to early Sunday mornings where I meet up with friends on 7.176.5 MHz starting at about 1100 UTC. The group includes Ken, W9ZMR; Tom, W7UF; Jerry, K9GD; Ed, N9XJU; Steve, W5JK; Jim, W9OS; John, WB9UYR; Jay, W4UU; and a host of others who drop in and out. I find that if I can drag myself out of the crib and start talking to this crew I feel a whole lot better about starting a new week.

Here, then, I offer to you my observation that good conversation among friends can play an important part in the lure of amateur radio. The more diverse and mind stretching the subjects, the more we find that other stations will check in and participate. Often the conversation gets so fascinating that you hate to sign out. It draws you back the next week for another dose of good feelings.

Another observation: Most of the group is very concerned with giving something back to the hobby. Either through work with their local clubs or as mentors to a new or older amateur, most report that both sides win. And so, too, does the hobby.

Bob Kirby, K3NT
Richardson, TX

(CQ can be visited on the World Wide Web at <http://members.aol.com/cqmagazine/>. You'll find a little about the magazine and be able to download information packs for brand-new amateurs and for people who aren't even sure what amateur radio is all about. You'll also be able to check out CQ's book and video selections and link to other CQ publications and several other amateur radio related sites. You can also send us e-mail via the web page or by sending a message to <cqmagazine@aol.com>. —ed.)

On The Cover!

Editor, *CQ:*

Thank you very much for using my photo for the April cover! When I started in ham radio I didn't even imagine that this might happen someday! It's a highlight of my ham career. Good job on the write-up, too. My wife and I went to the local radio store to take my photo in front of the magazine rack.

Richard Boyd, KE3Q
Bowie, MD

(Larry Mulvehill, WB2ZPI, shoots all the covers for CQ, CQ VHF, Popular Communications, and CQ's calendars. He is always looking for new ideas. If you have or know of a particularly photogenic setting you feel might lend itself to a good cover or calendar shot, let us know. Send your ideas and snapshots [for our reference] to Larry Mulvehill, WB2ZPI, 32 Comanche Dr., Oceanport, NJ 07757. Include an SASE if you want your snapshots returned.)

BY NORM VAN RAAY, WA3RTY

AWARDS

NEWS OF CERTIFICATE AND AWARD COLLECTING

This month we have a variety of awards to cover. We start with the European World Wide Award, progress through the Worked All Republic of Belarus Dipolma and the Copper Coin of Falun Award, and end with the Ukrainian DXpedition Foundation and Yugoslav awards.

SPECIAL HONOR ROLL

Jim Vickonoff, AA7AM
USA-CA All Counties # 923
April 11, 1997

HONOR ROLL

500
AA7AM.....2968
N1HHW.....2969
DL8YR 2970

1000
AA7AM.....1339

1500
AA7AM.....1200

2000
AA7AM.....1104

2500
AA7AM.....1032

3000
AA7AM.....939

The total number of counties for credit for the United States of America Counties Award is 3076. The basic award fee for subscribers is $4.00. For nonsubscribers it is $10.00. Initial application must be submitted in the USA-CA Record Book, which may be obtained from *CQ* Magazine, 76 North Broadway, Hicksville, NY 11801 USA for $2.50. To qualify for the special subscriber rate, please send a recent *CQ* mailing label with your application. To be eligible for the USA-CA Award, applicants must comply with the rules of the program as set forth in the revised USA-CA Rules and Program dated March1\, 1997. A complete copy of the rules may be obtained by sending an SASE to Norm Van Raay, WA3RTY, USA-CA Award Manager, Box 76, Pleasant Mount, PA 18453-0076 USA. DX stations must include extra postage for airmail reply.

Awards Available

The European World Wide Award. The following information was sent to us by F5PYI. The European World Wide Award (EWWA) is available to all licensed amateur radio stations and SWLs who fulfill the following requirements. All stations worked must be land-based stations. All stations must have been contacted from the same country as included in the EWWA country list, and contacts must have taken place since January 1, 1980.

HF: 200 confirmed contacts with 200 different countries are required for Mixed (CW/phone/RTTY), CW, Phone, and RTTY modes. For Monoband required are 100 countries on 160, 80, 40, and 30 meters; and 200 countries on 20, 17, 15, 12, or 10 meters. Monoband is obtainable in Mixed, CW, Phone, and RTTY. The 5 Band EWWA certificate is available for working and confirming 100 countries on each of the following bands: 80, 40, 20, 15, and 10 meters. It is obtainable in Mixed, CW, Phone, and RTTY modes. The 9 Band EWWA is the same as the 5 Band EWWA, but in each of the following bands: 160, 80, 40, 30, 20, 17, 15, 12, and 10 meters. To qualify for the Top List HF EWWA a total of 300 confirmed country contacts are required in Mixed, CW, Phone, RTTY.

VHF: 144 or 50 MHz, 50 confirmed contacts with 50 different countries in the VHF bands. It is available in FM, SSB, CW, or Mixed modes.

Satellite: 100 confirmed contacts with 100 different countries.

A log extract signed by two licensed amateurs and containing callsign, country, mode, frequency or band, and date should be sent to the award manager: Francis Kremer, F6FQK, 31 rue Louis Pasteur, 67490 Dettwiller, France. Fee for the award is $10US or 12 IRCs.

EWWA Country List: A2–7, A9, AP, BV, BY, C2, C3, C6, C9, CE, CEØ Easter Isl., CEØ San Felix, CEØ Juan Fernandez, CM, CN, CP, CT, CT3, CU, CX, D2, D4, D6, DL, DU, EA, EA8, EA9 Ceuta, EA9 Melilla, EI, EL, EP, ES, ET, E3, F/TK, FG/FM/FS, FH, FK, FO, FO Marquises, FO Australes, FO Rapa, FP, FR Reunion, FR Juan de Nova, FR Tromelin, FR Gloriosos, FR Europa, FT5W, FT5X, FT5Z, FW, FY, G/GD/GU/GJ, GI, GM, GW, H4, HA, HB, HBØ, HC, HC8, HH, HI, HK, HKØ St. Andres, HL, HP, HR, HS, HV, HZ, I/IS/IT, J2, J3, J5, J6, J7, J8, JA, JD Minami, JD Ogasawara, JT, JW, JX, JY, K, KC6/T8, KH2, KH4, KH5, KH6, KH8, KH9, KHØ, KL7, KP2/4, LA, LU, LX, LY, LZ, OA, OD, OE, OH/OHØ, OK, OM, ON, OX, OY, OZ, P2, P4, P5, PA, PJ Netherlands Antilles, PJ St. Maartenn/Saba/ Eustasius, PY, PYØ Trinidad, PZ, S2, S5, S7, S9, SM, SP, ST, SU, SV, T2, T30, T31, T32, T33, T5, T7, T9, TA, TF, TG, TI TI9, TJ, TL, TN, TP, TR, TT, TU, TY, TZ, UA, R1FJ, UA2, UA9/Ø, UR (ex UB), EU (UC), 4K (UD), 4L (UF), EK (UG), EZ (UH), UK (UI), EY (UJ), UN (UL), EX (UM), ER (UO), V2–5, V63, V73, V8, VE, VK, VK9C, VK9L, VK9N, VK9W/Z, VK9X, VKØ Macquarie, VKØ Heard, VP2E/M/V, VP5, VP8 Falkland, VP8 South Georgia, VP8 South Orkney, VP8 South Shetland, VP8 South Sandwich, VP9, VQ9, VR6, VS6, VU, VU7 Andamann, XE, XF, XT, XU, XW, XX9, XZ, YA, YB, YI, YJ, YK, YL, YN, YO, YS, YU, YV, Z2, Z3, ZA, ZB, ZC6 Cisjordania, ZC6 Gaza, ZD7, ZD8, ZD9, ZF, ZK1 North Cook, ZK1 South Cook, ZK2, ZK3, ZL, ZL Antipodes/County, ZL7, ZL8, ZL9, ZP, ZS, ZS8, 3A, 3B6–9, 3C, 3CØ, 3D2 Fiji, 3D2 Rotuma, 3DAØ, 3V, 3W, 3X, 4S, 4U1UN, 4U1ITU, 4U1VIC, 4X, 5A, 5B, 5H, 5N, 5R, 5T, 5U, 5V, 5W, 5X, 5Z, 6W, 6Y, 7O/4W Yemen, 7O/4W Socotra Isl., 7P, 7Q7X, 8P, 8Q, 8R, 9A, 9G, 9H, 9J, 9K, 9L, 9MØ Spratley, 9M2, 9M6, 9N, 9Q, 9U, 9V, 9X, 9Y, AT Antarctica, CE9 Ant., DPØ Ant., EM Ant., FT5Y Ant., G/VP8 Ant., I Ant., KC4 Ant., LU Ant., VKØ Ant., ZL Ant., ZS Ant., R1A Ant., 3Y Ant., 8J Ant.

The Worked All Republic of Belarus Diploma. The Belarussian Federation of Radioamateurs and Radiosportsmen offers the WARB award to radio amateurs and SWLs for two-way contacts or heard contacts with amateur radio stations in all six regions of the Republic of Belarus and its capital, Minsk. QSOs/SWL after January 1, 1994 in any band and mode are valid. Only one QSO/SWL with each Belarussian station is valid for the award regardless of the bands or modes. Contacts with Belarussian stations using in the prefixes numbers other than 1, 2, 3, 4, 6, 7, and 8 are not valid for the award.

The minimum number of contacts with each of the regions is as follows: for applicants from Belarus, 50 contacts; from CIS countries, 25 contacts; all other countries, 15 contacts. The names of the regions of the Republic of Belarus and Minsk, as well as their corresponding numbers in the prefixes of the radio stations is the following: Town of Minsk 1, Minsk region 2, Brest region 3, Grodno region 4, Vitebsk region 6, Mogilev region 7, Gomel region 8.

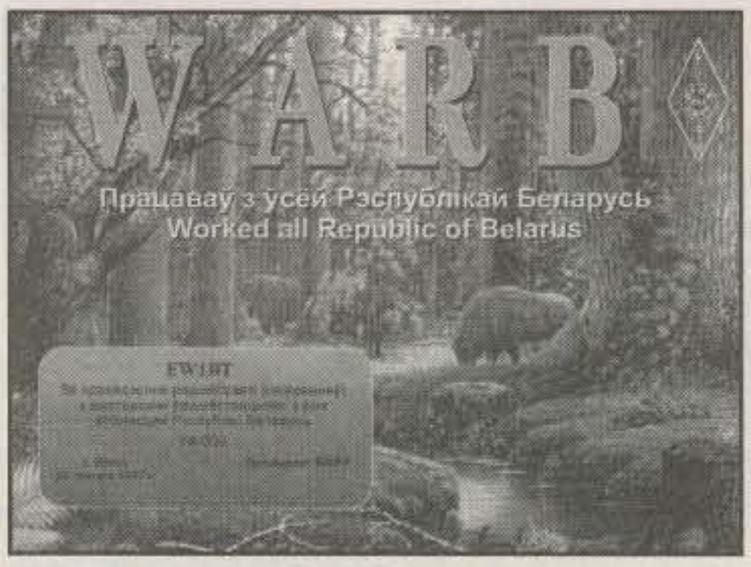
To apply send a logbook extract verified by either a local radio club or two licensed amateurs. Callsigns in the application should be sorted out in ascending order or numbers in the callsigns. Cost of the award is Belarus applicants $1.50US (3 IRCs), CIS countries $2.00US, and all other countries $5.00US (10 IRCs).

Applications and payment should be sent to award manager George M. Radion, EU1AR, P.O. Box 469, Minsk 220050, Rep. of Belarus.

The Copper Coin of Falun Award. The CCAF is issued by the Falu Radio Club of Sweden and consists of a handmade, engraved miniature ($2^7/_8$" × $2^7/_8$" × $^1/_8$"; weight 4.6 oz.) in copper of a one daler piece from 1715. The award can be achieved by all licensed radio amateurs who have made contact with the members of the club. Only one contact per station and band after January 1, 1966 will be counted.

At least 10 points according to the following list are required:

1.8 MHz— 5 points for zones 14, 15, 16, and 20; 10 points for all other zones.



The Worked All Republics of Belarus award is offered by the Belarussian Federation of Radioamateurs and Radiosportsmen.

The Copper Coin Award of Falun was presented to VKØIR in a special box.

Box 76, Pleasant Mount, PA 18453
e-mail wa3rty@epix.net

The Copper Coin Award of Falun is issued by the Falu Radio Club of Sweden. Pictured here outside of the club headquarters are SM4JCY, SM4ATJ, SM4PEL, SM4RMH, SM4DLS, and SM4GL, six members of this group. They are holding the copper coin that was presented to VKØIR for their recent Heard Island operation.

3.5 MHz— 2 points for zones 14, 15, 16, 20; 5 points all other zones.

7.0 MHz—2 points for zones 14, 15, 16, 20; 4 points all other zones.

10 MHz—2 points zones 14, 15, 16, 20; 3 points all other zones.

14 MHz—2 points zones 14, 15, 16, 20; 3 points all other zones.

18 MHz—2 points zones 14, 15, 16, 20; 3 points all other zones.

21 MHz—2 points zones 14, 15, 16, 20; 3 points all other zones.

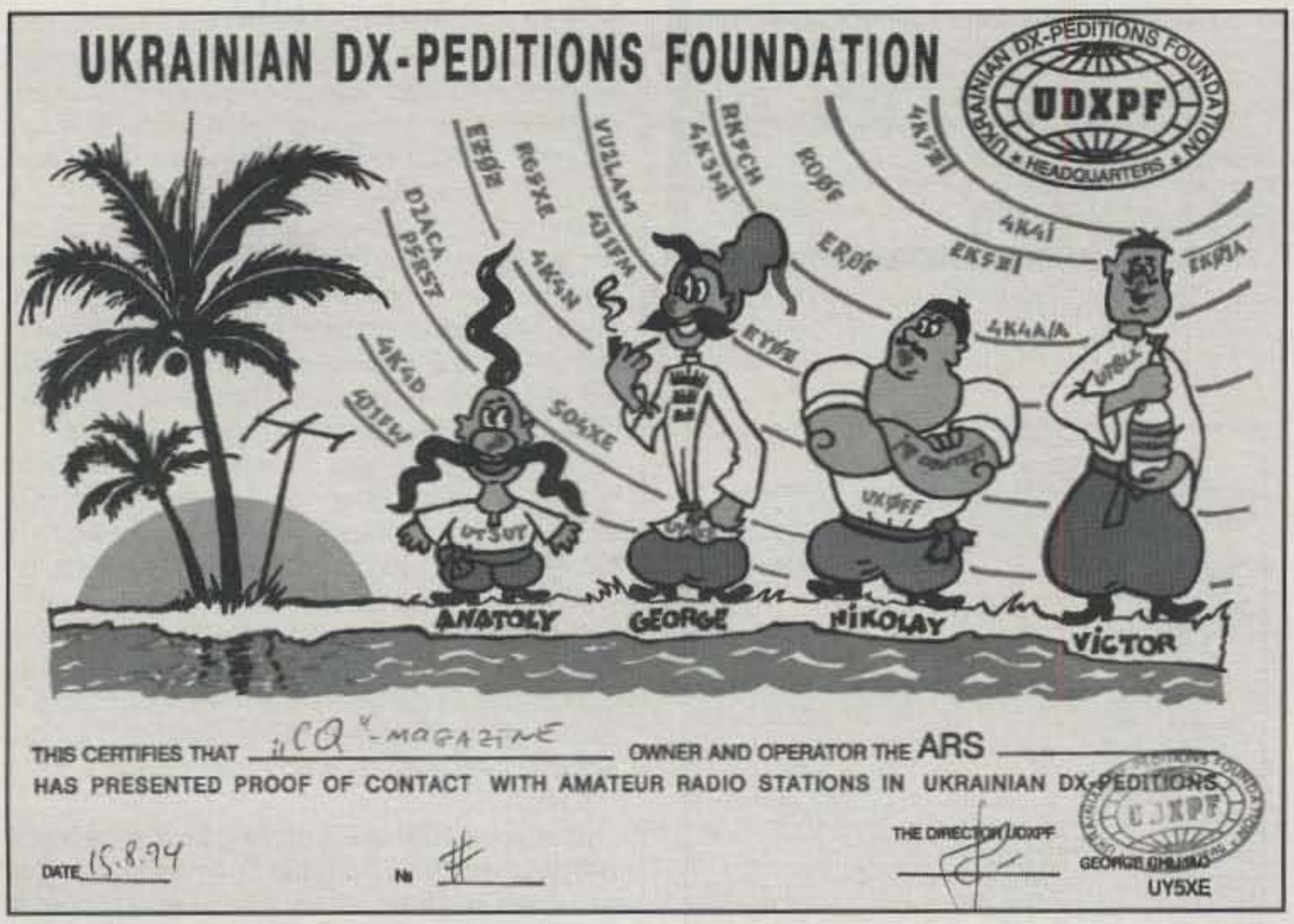
24 MHz— 2 points zones 14, 15, 16, 20; 3 points all other zones.

28 MHz—2 points zones 14, 15, 16, 20; 3 points all other zones.

All contacts have to be made on the same mode (i.e., CW, AM, SSB, etc.). Twenty points are required for stations situated within 50 kilometers from the Falun center.

Send application with QSL, record of contacts claimed and $20US (or 18 IRCs) to Falu Radio Club, Box 701, S-791 29 Falun, Sweden. Before an application can be approved, all amateur radio stations with whom the claimant has been in contact must have received the applicant's QSL card.

The Ukrainian DXpeditions Foundation Awards. The UDXPF was founded on February 1, 1994. Its aim is to organize DXpeditions by Ukrainian radio amateurs and to popularize the UDXPF, IOTA, RRA, WABA, WSA, and



Ukrainian DXpeditions Foundation's UDXPF Award is issued for contacts with amateur radio stations of Ukrainian DXpeditions.

other award programs. The UDXPF carries out the coordination of its activity with IOTA HQ, the RRC, the Diamond DX Club, and others. Members of the foundation are George Chlijanc, UY5XE; Victor Rusinov, UT8LL; Nick Lavreka, UXØFF; and Anatoly Kirilenko, UT3UY.

The UDXPF award is available to radio amateurs who accumulate 150 points. A plaque is available for those who achieve 200 points. Both are any band and mode. For awards and plaques, QSOs count with any DXpeditions organized by Ukrainian radio amateurs and with international DXpeditions in which Ukrainian radio amateurs were members.

Send application (including callsign, date of QSO, and points) verified by two licensed radio amateurs. Price for the list of DXpedition callsigns is 1 IRC.

Points are accumulated as follows: DXpedition in Ukraine 1 point; continental DXpedition in Europe 2 points; DXpedition on the island or /MM in Europe 3 points; continental DXpedition outside Europe 4 points; e. DXpedition on the island or /MM outside Europe 5 points; DXpedition to a new country (see DXCC list), or new Antarctic base for WABA, or new island for IOTA/RRA 8 points.

Send applications to: UDXPF Headquarters, George Chlijanc, UY5XE, P.O. Box 19, Lviv, Ukraine, 290000.

New Rules for The Yugoslav Awards. Awards issued by Savez Radio-Amatera Jugoslavije (SJA) are available to all licensed radio amateurs and shortwave listeners throughout the world. All applications must include a GCR list of Yugoslav radio amateur stations with whom contacts were established. Contacts with Yugoslav stations may be made on all amateur bands, using all modes of transmission. Contacts via repeaters and other active translators are not allowed.

The award fee is 10 IRCs. Applications should be sent to the following address: Savez Radio-Amatera Jugoslavije, Award Manager, P.O. Box 48, YU-1 1000 Beograd, Yugoslavia.

WAYUG (Worked All Yugoslavia) Award. This award is issued for contacting all call areas in the Federal Republic of Yugoslavia—YU6, YU7, and YU8. All other prefixes allocated to Yugoslavia (YT, YZ, 4N, and 4O) are valid as well. The starting date for all contacts is May 9, 1992. European stations must contact five YU1 stations, five YU7 stations, one YU6 station, and one YU8 station. DX stations must contact three YU1 stations, three YU7 stations, one YU6 station, and one YU8 station. SRJ headquarters station YUØSRJ can be used as a substitute for one missing QSO.

HAYUG (Heard All Yugoslavia) Award. This award is available to SWLs. The rules are the same as for the WAYUG Award.

WAYUG VHF/UHF Award. This award is issued for contacting Yugoslav VHF/UHF stations located in tile grids of the VVW locator belonging to the Federal Republic of Yugoslavia. The grid squares are the following: JN 91, JN 92, JN 93, JN 94, JN 95, JN 96, KN 02, KN 03, KN 04, KN 05, KN 06, KN 12, KN 13, and KN 14 (fourteen squares). Applicants must contact at least five different squares on VHF and two squares on UHF. As an alternative, ten different squares on VHF are sufficient. Starting date for all contacts is May 9, 1992.

Awards Issued

USA-CA 500: Jim Vickonoff, AA7AM, #2968, Robert J. Cyr, N1HHW, #2969, Peter Kallfelz, DL8YR, #2970.

USA-CA 1000: Jim Vickonoff, AA7AM, #1339.
USA-CA 1500: Jim Vickonoff, AA7AM, #1200.
USA-CA 2000: Jim Vickonoff, AA7AM, #1104.
USA-CA 2500: Jim Vickonoff, AA7AM, #1032.
USA-CA 3000: Jim Vickonoff, AA7AM, #939.

On A Personal Note

Well, spring has finally come to the "Endless Mountains of Northeastern Pennsylvania." It was a mild winter by local standards, and fortunately nothing like the mid-westerners have been enduring this year.

My health continues to be excellent following bypass surgery in December. Each day sets a new record for staying out of the hospital. More important, I'm able to walk on my treadmill for 45 minutes a day and get close to 3 miles with no discomfort at all. Thanks to all of you nice folks out there for your well wishes.

My wife, Carol, and I made a major decision two weeks ago. After considering everything, we put our home up for sale. *If*—and that's a big *if*—it sells, we plan to relocate to Lebanon County, Pennsylvania. A number of factors entered into our decision: the cold weather, the huge size of our home, and the distance from our children. Last year was particularly difficult for our children. I spent 66 days in the hospital, and they were so far away they couldn't make the trip.

If anyone out there is looking for a large home with a tower and a Sommer beam antenna, give us a call or drop us an e-mail at the e-mail address shown at the beginning of this column.

73, Norm, WA3RTY

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by Bob Haviland, W4MB

Second Printing

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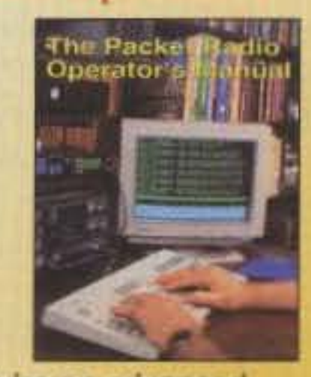

by Buck Rogers, K4ABT

CQ has published an excellent introduction and guide to packet operation. It's the perfect single source, whether you're an advanced user or just starting out.

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The Vertical Antenna Handbook

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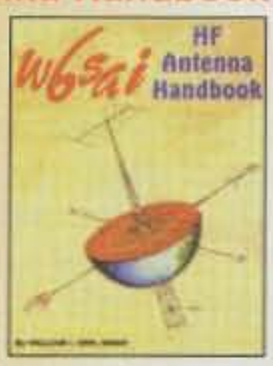
W6SAI HF Antenna Handbook



by Bill Orr, W6SAI

Nearly 200 pages filled with dozens of inexpensive, practical antenna projects that work! This invaluable resource will guide you through the construction of wire, loop, yagi and vertical antennas.

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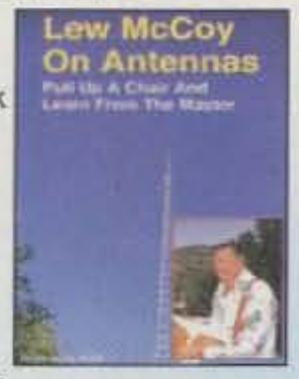

This is truly a unique antenna book that's a must for every amateur. Unlike many technical publications, Lew presents his invaluable information in a casual, non-intimidating way for anyone!

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DX

BY CHOD HARRIS, VP2ML

NEWS OF COMMUNICATION AROUND THE WORLD

The Lynx DX Club Convention

Many stateside DXers have attended various DX conventions, from the huge Dayton HamVention, to Visalia, to one of the smaller regional events. The format of these gatherings, making allowances for differences in size, is quite similar. But what about DX conventions in other parts of the world? A glimpse of how another very different kind of DX convention is organized might spark new ideas and excitement for stateside DX conventions. Since I just happened to be in Portugal the first weekend in May, the weekend of the Lynx DX Club convention, I'll share some of my impressions of that gathering.

The Lynx DX Club is an active group of mostly Portuguese and Spanish DXers, with a few members from other countries in Europe. The convention goers seemed significantly younger and more cosmopolitan than similar stateside groups. Most attendees were fluent in several languages, for example, but that is far more common in multi-lingual Europe than in the US.

As with stateside conventions, the Lynx DX Convention began on Friday. The convention site was a three-star hotel in the heart of the new center of Porto, Portugal's second largest city, in the north of the country. The main meeting room was on the ninth floor, offering sweeping views of the city and out to the Atlantic Ocean. (It seems very strange to see the Atlantic to the *west*.)

P.O. Box 50, Fulton, CA 95439

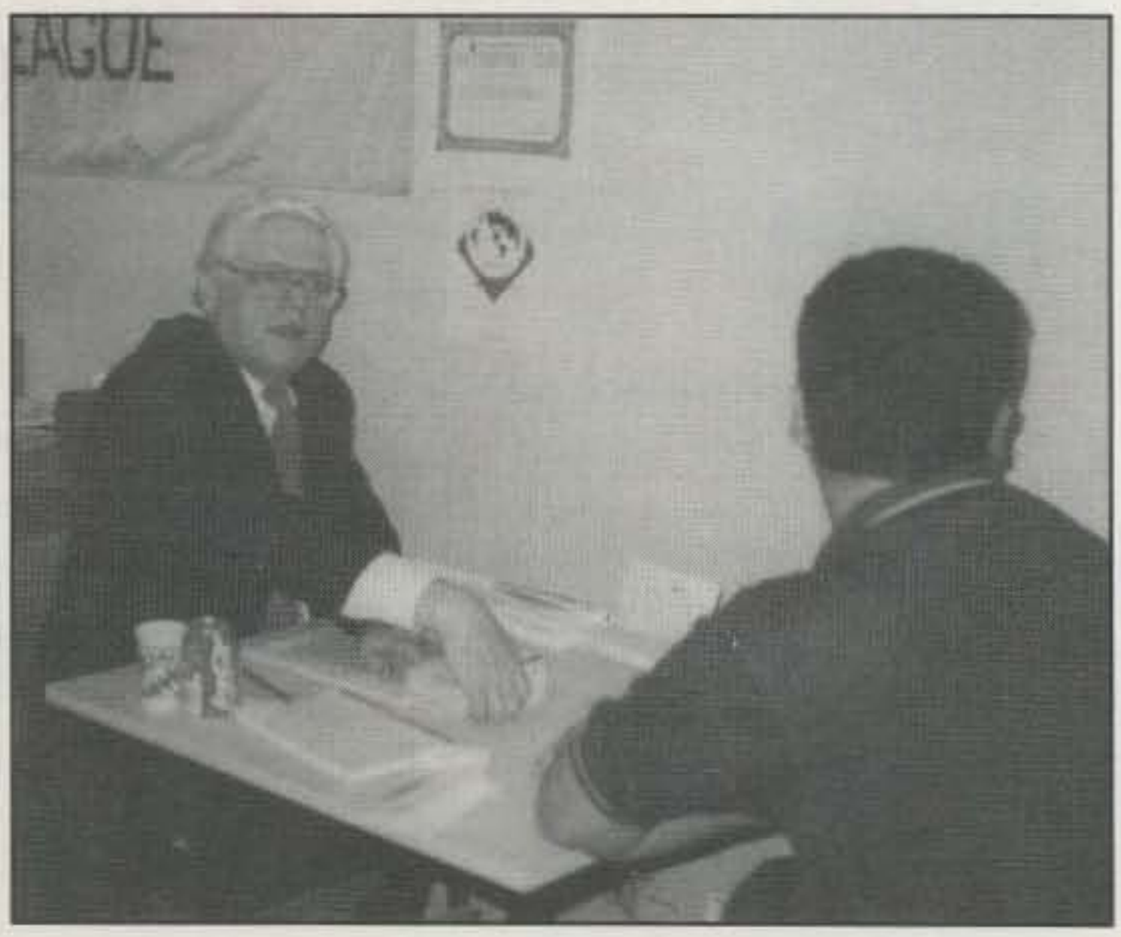
Convention organizer CT1BH was on hand to personally greet the new arrivals, taking a special effort to make non-members welcome. The initial scene was similar to that of stateside gatherings, with DXers who may not have seen their fellow members in a year renewing their relationships. The one important difference was that the conversations were in several languages and often shifted from one language to another as an additional DXer joined the conversation. Another difference was the almost complete lack of call-sign badges. In this tightly knit group most members knew each other by sight and badges weren't necessary.

The first official function was a cocktail party, similar to what a DXer might encounter at a stateside convention. However, this party, at the nearby home of CT1BH, was different from any such stateside event. Uniformed attendants passed silver trays of delights among the guests, including caviar, smoked salmon, shrimp, and dozens of local specialities. The bar included premium Scotch and 35-year-old port wine, items seldom found in a stateside cocktail party. The guests, including a very high proportion of wives, milled about under CT1BH's huge tower, which was crowned with a TH-11. That is, they milled about until one enterprising DXer located CT1BH's shack and announced that BS7H was on from Scarborough Reef. Instantly, the garden was almost empty of amateurs; only the wives and the three DXers who had already worked Scarborough remained. The rest piled into CT1BH's shack to work one of the Most Wanted countries in the world.

While BS7H was loud on 14023 kHz, however, the visitors searched in vain for a CW key! The gleaming wooden operating desk was bare except for a microphone. The DXers quickly dragged their host away from his own party in search of a key. "I know I have one in here somewhere," he murmured, while pawing through dusty boxes and cabinets. The visiting DXers grew more anxious by the moment, but he finally located the key—a hand key thickly covered in layers of dust. It took a few seconds to cannibalize one of the PK-232 RTTY cables for CW duty, and the visitors jockeyed for position to try to work the team on the rocks, nearly halfway around the world.

The evening continued just as in a stateside convention, with the DXers gathering in smaller groups to find a place to eat and talk DX. The stories became more outrageous as the evening wore on, again similar to a stateside event. With dinner not starting until 11 PM, however, it ran later. Fortunately, there were no events scheduled on Saturday morning, most likely because of the anticipated late evening.

DJ9ZB operates as 7O1A from Yemen.



Bill Kennamer, K5FUV, checks DXCC QSL cards at the big Friedrichschafen amateur radio convention in Germany.

At noon on Saturday the DXers began a stroll down Porto's narrow, winding, stone-paved streets to the Port Wine Manor House, which is set amidst an extensive botanical garden. (Portugal was unable to import petroleum products during part of the reign of Dr. Antonio Salazar, and many streets were paved with rough-hewn, brick-sized stones.) The Manor House is a well-restored stone house overlooking the Douro River and the Atlantic Ocean. In neatly tended rose gardens the conventioneers sipped fine white port wine, dry and sweet, carefully chilled.

"What?" you ask. "White port? Dry port? Chilled port?"

While Americans almost universally associate port with a sticky sweet after-dinner drink, port is not a specific wine, but rather a wine-growing region to the east of the city of Porto, the very first such designated area in the world. Port is produced in red, white, and other versions, and with a range of sweetness. The dry, white versions are best served very cold. It's amazing what you learn at a DX convention.

Following this enjoyable interlude, the group continued down Porto's narrow streets to the Douro river and gathered in one of Porto's famed riverside cafes for a late lunch. After the mandatory discussion of up-coming changes in the current DXCC countries list (see last month's column), the topic of conversation turned to the future of the DXCC program in the next century, a topic much on the minds of DXers today. The discussion reflected some of the deep differences of opinion that DXers have about how best to save the DXCC program from stagnation. (With about 70% of DXers who have sent cards to the ARRL in the last two years already on the Honor Roll, the program threatens to grind to a halt without some new challenges to pursue.)

Master contester and near top-of-the-Honor-Roller (when he gets around to sending in his QSLs) Jose, CT1BOH, argued that we need a steady flow of new countries to keep interest high. Possible ways to accomplish this might be to reduce the 225 mile limit to 200 miles, or relax the definition of a Point One country (country by means of government) to create new island qualifiers, such as the Australs of French Polynesia.

Gerald, F2VX, took a broader view, saying we should use DX to help save amateur bands from being taken over for other uses in individual countries. He cites the case of Guatemala, where all amateur bands above 2 meters have been given to commercial users, cutting the amateurs out completely. Gerald had just returned from a two-week trip to Yemen 7O, which included a long visit with the head of telecommunications there. That government official knew exactly what amateur radio is, and even knew the position of

Ken Miller, K6IR; Dieter Stumpp, DL1SDN; Fred Hopengarten, K1VR; and VKØIR co-leader Peter Casier, ON6TT, shown here at the Dayton HamVention last year.

The WPX Program

SSB

2633.....KF9YT 2635.....AC6DD
2634.....EA5BM

CW

2949.....JK1VSL 2951.....WB3LUF
2950.....EA5BM

Mixed

1778.....ON4CAS 1780.....Z31JA
1779.....EA5BM 1781.....S50B

CW: 350 EA5BM. 400 EA5BM. 450 EA5BM. 500 EA5BM. 550 EA5BM. 600 EA5BM. 650 EA5BM. 700 EA5BM. 750 EA5BM. 800 EA5BM. 850 EA5BM. 900 EA5BM. 950 EA5BM. 1000 EA5BM. 1050 EA5BM. 1100 EA5BM. 1150 EA5BM. 1200 EA5BM. 1250 EA5BM. 1300 EA5BM. 1350 EA5BM. 1400 EA5BM. 1450 EA5BM. 1500 I2EAY. 1750 I7PXV. 1800 I7PXV. 2650 K9QVM. 2700 K9QVB. 2750 K9QVB. 2800 K9QVB.

SSB: 350 KF9YT, EA5BM, BD4DW, AC6DD. 400 KF9YT, EA5BM, BD4DW, AC6DD. 450 KF9YT, EA5BM, AC6DD. 500 EA5BM. 550 EA5BM. 600 EA5BM. 650 EA5BM. 700 .EA5BM. 750 EA5BM. 800 EA5BM. 850 EA5BM, I2EAY. 900 EA5BM. 4000 ZL3NS.

Mixed: EA5BM, Z31JA, S50B. 500 EA5BM, Z31JA, S50B. 550 EA5BM, Z31JA, S50B. 600 EA5BM, Z31JA, S50B. 650 EA5BM, Z31JA. 700 EA5BM, Z31JA. 750 EA5BM, Z31JA, N7WWQ. 800 EA5BM, Z31JA, N7WWQ. 850 EA5BM, Z31JA. 900 EA5BM, Z31JA. 950 EA5BM, Z31JA. 1000 EA5BM, Z31JA. 1050 EA5BM, Z31JA. 1100 EA5BM, LU5EWO, Z31JA. 1150 EA5BM, Z31JA. 1200 EA5BM, Z31JA. 1250 EA5BM, Z31JA. 1300 EA5BM, Z31JA. 1350 EA5BM, Z31JA. 1400 EA5BM, Z31JA. 1450 EA5BM, Z31JA. 1500 EA5BM, Z31JA. 1550 EA5BM, Z31JA. 1600 EA5BM, Z31JA. 1650 EA5BM, Z31JA. 1700 EA5BM, Z31JA. 1750 Z31JA, I2EAY. 1800 Z31JA.

10 Meters: EA5BM
15 meters: EA5BM, AC6DD
20 meters: EA5BM, AC6DD
40 meters: EA5BM
80 meters: EA5BM, AC6DD
160 meters: AC6DD

Asia: EA5BM, AC6DD
Africa: EA5BM
No. America: EA5BM, AC6DD, WB3LUF
So. America: EA5BM
Europe: EA5BM, AC6DD
Oceania: EA5BM, AC6DD

Award of Excellence: EA5BM

Award of Excellence Plaque Holders: K6JG, N4MM, W4CRW, K5UR, K2VV, VE3XN, DL1MD, DJ7CX, DL3RK, WB4SIJ, DL7AA, ON4QX, 9A2AA, OK3EA, OK1MP, N4NO, ZL3GQ, W4BQY, IØJX, WA1JMP, KØJN, W4VQ, KF2O, W8CNL, W1JR, F9RM, W5UR, CT1FL, W8RSW, WA4QMQ, W8ILC, VE7DP, K9BG, W1BWS, G4BUE, N3ED, LU3YL/W4, NN4Q, KA3A, VE7WJ, VE7IG, N2AC, W9NUF, N4NX, SMØDJZ, DK5AD, WD9IIC, W3ARK, LA7JO, VK4SS. I8YRK, SMØAJU, N5TV, W6OUL, WB8ZRL, WA8YTM, SM6DHU, N4KE, I2UIY, I4EAT, VK9NS, DEØDXM, DK4SY, UR2QD, AB9O, FM5WD, I2DMK, SM6CST, VE1NG, I1JQJ, PY2DBU, HI8LC, KA5W, K3UA, HA8XX, K7LJ, SM3EVR, K2SHZ, UP1BZZ, EA7OH, K2POF, DJ4XA, IT9TQH, K2POA, N6JV, W2HG, ONL-4003, W5AWT, KBØG, HB9CSA, F6BVB, YU7SF, DF1SD, K7CU, I1POR, K9LJN, YBØTK, K9QFR, YU2NA, W4UW, NXØI, WB4RUA, I6DQE, I1EEW, I8RFD, I3CRW, VE3MS, NE4F, KC8PG, F1HWB, ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, KC7EM, YU1AB, IK2ILH, DEØDAQ, I1WXY, LU1DOW, N1IR, IV4GME, VE9RJ, WX3N, HB9AUT, KC6X, N6IBP, W5ODD, IØRIZ, I2MQP, F6HMJ, HB9DDZ, WØULU, K9XR, JAØSU, I5ZJK, I2EOW, IK2MRZ, KS4S, KA1CLV, WZ1R, CT4UW, KØIFL, WT3W, IN3NJB, S50A, IK1GPG, AA6WJ, W3AP, OE1EMN, W9IL, S53EO, DF7GK, S57J, EA8BM, DL1EY, KØDEQ.

Award of Excellence Plaque with 160 Meter Endorsement: K6JG, N4MM, W4CRW, K5UR, VE3XN, DL3RK, OK1MP, N4NO, W4BQY, W4VQ, KF2O, W8CNL, W1JR, W5UR, W8RSW, W8ILC, K9BG, W1BWS, G4BUE, LU3YL/W4, NN4Q, VE7WJ, VE7IG, W9NUF, N4NX, SMØDJZ, DK5AD, W3ARK, LA7JO, SMØAJU, N5TV, W6OUL, N4KE, I2UIY, I4EAT, VK9NS, DEØDXM, UR2QD, AB9O, FM5WD, SM6CST, I1JQJ, PY2DBU, HI8LC, KA5W, K3UA, K7LJ, SM3EVR, UP1BZZ, K2POF, IT9TQH, N6JV, ONL-4003, W5AWT, KBØG, F6BVB, YU7SF, DF1SD, K7CU, I1POR, YBØTK, K9QFR, W4UW, NX0I, WB4RUA, I1EEW, ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, YU1AB, IK4GME, WX3N, W5ODD, IØRIZ, I2MQP, F6HMJ, HB9DDZ, K9XR, JAØSU, I5ZJK, I2EOW, KS4S, KA1CLV, KØIFL, WT3W, IN3NJB, S50A, IK1GPG, AA6WJ, W3AP, S53EO, S57J, DL1EY, KØDEQ.

Complete rules and application forms may be obtained by sending a business-size, self-addressed, stamped envelope (foreigh\n stations send extra postage if airmail desired) to "CQ WPX Awards," P.O. Box 593, Clovis, NM 88101-9511 USA.

The WAZ Program

Single Band WAZ

20 Meter SSB

1004 ..... JR4VMS

30 Meter CW

24 ..... 4N7ZZ

40 Meter CW

190 ..... JA3GN

ALL CW

99 ..... IK3WBW

RTTY

104 ..... K3TZV

160 Meter WAZ

27 ..... IT9ZGY, 40 Zones Endorsement
50 ..... OK1DOT, 39 Zones Endorsement

All Band WAZ

SSB

4377 ..... ND5S
4378 ..... JHØJQS
4379 ..... F5PWH
4380 ..... N4PQX
4381 ..... F5LKH
4382 ..... IK6WQU
4383 ..... IK6IJF

CW/Phone

7738 ..... JH8FBX (CW)
7739 ..... NØJR
7740 ..... DJ5IL

Rules and applications for the WAZ program may be obtained by sending a large SAE with two units of postage or an address label and $1.00 to: WAZ Manager, Jim Dionne, K1MEM, 31 DeMarco Road, Sudbury, MA 01776. The processing fee for all *CQ* awards is $4.00 for subscribers (please include your most recent *CQ* mailing label or a copy) and $10.00 for nonsubscribers. Please make all checks payable to the Award Manager. Applicants sending QSL cards to a *CQ* checkpoint or the Award Manager must include return postage. Questions regarding the WAZ Award may be sent to K1MEM with an SASE.

CQ DX Awards Program

SSB

2223 ..... EA3EAN
2224 ..... YV4VN

CW

960 ..... EA1EZZ
961 ..... JE6KLR

SSB Endorsements

320 ..... KZ2P/328
320 ..... IØZV/328
320 ..... SV1ADG/327
320 ..... K8LJG/327
320 ..... N4CH/325
320 ..... 4N7ZZ/324
320 ..... OE7SEL/322
320 ..... W8AXI/320
310 ..... W6NW/316
275 ..... YV4VN/299
275 ..... WD9ACQ/280

CW Endorsements

320 ..... K8LJG/325
320 ..... W6SR/320
310 ..... 4N7ZZ/319
310 ..... N4CH/315
310 ..... G3KMQ/313
200 ..... IKØTUG/215

RTTY Endorsements

275 ..... K3UA/285

Total number of active countries is 328. The basic award fee for subscribers to *CQ* is $4. For non-subscribers, it is $10. In order to qualify for the reduced subscriber rate, please enclose your latest *CQ* mailing label with your application. Endorsement stickers are $1.00. Updates not involving the issuance of a sticker are made free when an SASE is enclosed for confirmation of total. Rules and application forms for the CQ DX Awards Program may be obtained by sending a business-size, No. 10 envelope, self-addressed and stamped, to CQ DX Awards Manager, Billy Williams, N4UF, Box 9673, Jacksonville, FL 32208 U.S.A. DX stations must include extra postage for airmail reply. Please make all checks payable to the awards manager.

Yemen on the Most Wanted countries list, thanks to dozens of letters and faxes asking (and in some cases demanding) permission to operate to satisfy the growing demand for Yemen contacts. Given the suspicious nature of military officials toward anyone in Yemen with a transmitter, none of these requests will be honored in the foreseeable future. However, the telecom official made an important point to Gerald: "What's in amateur radio for *us*, the Yemeni?"

It is one thing to argue that Yemen should be put on the air to benefit DXers, but where does the benefit lie for Yemen and those other countries that similarly prohibit amateur radio? Gerald made the point that we should be making an effort to set up training programs and club stations so that the Yemeni can make good use of the self-training aspect of amateur radio. A program similar to that used to open Albania to amateur radio would be the way to prevent further loss of amateurs bands, he explained. (DXers are reminded that the DXCC 2000 study is currently underway, and the committee welcomes comments and suggestions from any amateur. You can contact the committee care of ARRL Headquarters.)

As the luncheon progressed through the traditional Portuguese dish of grilled sardines, the conversation wandered further afield. Don Miller, ex-W9NWV, is due out of prison soon, and the older DXers wondered if he would hit the DXpedition trail again. The younger DXers had no idea who Don Miller is, of course, but the old timers took his request to be considered for CQ's DX Hall of Fame seriously. Other topics included Danny Weil and his many *Yasme* boats, and many contest stories. CT1BOH capped my goof of starting CQ WW one hour early with his effort to make CQ WPX CW contacts in late April, a full month early!

Following this lunch, which concluded after 4 PM, the group commandeered a fleet of taxis for the ride back to the hotel and the beginning of the formal DX program itself. The program began with a tongue-in-cheek DXpedition video about a trip to Seborga TØ, presented by Gerald, F2VX. The fact that the commentary was all in French didn't seem to bother the native Portuguese and Spanish speaking attendees. This was followed by a Dr. of DX quiz, which certainly was a dilly. Among the questions were toughies such as what is Martti Laine's brother's callsign? What is JA1UT's first name? What kind of key did RA3AUU use during the VKØIR Heard Island DXpedition? What is the receiving conversion scheme for the FT1000MP? What tube is used in the HF2500E? How many CQ Zones can

CQ DX Honor Roll

The CQ DX Honor Roll recognizes those DXers who have submitted proof of confirmation with 275 or more ACTIVE countries for the mode indicated. The ARRL DXCC Countries List is used as the country standard. Honor Roll listing is automatic when submitting application or endorsement for 275 or more countries. Deleted countries do not count and are dropped from listing as they occur. Currently there are 328 countries. To remain on the CQ DX Honor Roll, annual updates are required. Honor Roll updates may be made at any time, in any number. Updates indicating "no change" will be accepted to meet the annual requirement. All updates must be accompanied by an SASE for confirmation. The fee for endorsement involving the issuance of a sticker is $1.00.

CW

K2TQC 328	W6DN 327	W9WAQ 326	IT9VDQ 325	W1WAI 322	N6AV 318	N6AW 311	WA4DAN 301	LA7JO 289
K1MEM 328	K3UA 327	AA4KT 326	W8XD 325	K2JLA 322	VE7DX 318	N5HB 311	HA5NK 301	9A2AJ 289
K2FL 328	N7MC 327	K9IW 326	K4IQJ 325	KA5TQF 322	I4LCK 317	I1EEW 311	WG5G/QRPp 301	DJ1YH 288
K9BWQ 328	N4MM 327	YU1HA 326	K8LJG 324	AA5NK 321	N6CW 316	OH3NM 310	W6YQ 301	YU7FW 286
K2ENT 328	K6LEB 327	I5XIM 326	IT9QDS 324	ON4QX 321	W3BBL 315	K4CXY 309	N4OT 301	F6HMJ 284
DL8CM 328	IT9TQH 327	WA4IUM 326	WØJLC 324	K9QVB 321	N4AH 315	K4JLD 309	YU1TR 300	KF5PE 282
N7RO 328	W4QB 326	WA8DXA 326	W7CNL 324	HA5DA 321	N4CH 315	VE9RJ 309	YU2TW 300	LU3DSI 282
WØIZ 328	W9DWQ 326	N5FW 326	KB4HU 324	WB5MTV 321	K2JF 314	W3II 308	KE5PO 300	W4UW 279
G4BWP 328	DL1PM 326	EA2IA 326	W7ULC 323	IK2ILH 321	AA2X 314	N1HN 307	YV5ANT 299	WG7A 276
K6JG 328	K9MM 326	W7OM 326	WA4JTI 323	K1HDO 321	W5OG 313	HB9DDZ 305	KØHQW 296	
I4EAT 328	K2OWE 326	WØHZ 326	W4OEL 323	IT9ZGY 320	WB4UBD 313	CT1YH 305	KH6CF 294	
SM6CST 328	K4CEB 326	F3TH 326	KUØS 323	VE7CNE 320	G3KMQ 313	OZ5UR 304	YU1AB 294	
W2UE 328	9A2AA 326	N6AR 325	DJ2PJ 323	W6SR 320	K9DDO 312	G2FFO 303	G4MVA 294	
W2FXA 328	OK1MP 326	K8NA 325	AG9S 322	N5FG 319	K7JYE 312	K7EHI 302	I2EOW 294	
N4KG 328	PAØXPQ 326	KZ4V 325	NC9T 322	KA7T 319	K1VHS 311	W7IIT 302	KB8O 292	
K8PV 328	N4JF 326	I1JQJ 325	DL3DXX 322	4N7ZZ 319	WA8YTM 311	K8JJC 302	IKØADY 290	

SSB

K4MZU 328	IT9TQH 328	W9OKL 326	KE5PO 326	NC9T 323	K4CXY 320	WA9RCQ 315	TI2TEB 306	DJ2UU 291
K2TQC 328	IT9TGO 328	9A2AA 326	XE1VIC 326	K9HQM 323	G4ADD 320	N3ARK 315	VE3DLR 306	4X6DK 291
K2FL 328	WD8MGQ 328	DL6KG 326	W6SR 326	KC5P 323	I4WZK 320	N4HK 315	W3YEY 306	WA3KKO 290
DJ9ZB 328	I1EEW 328	KØKG 326	I8ACB 325	WDØGML 323	I4SAT 320	K2AJY 315	KF8UN 305	N5QDE 290
EA2IA 328	IØZV 328	OK1MP 326	N6AR 325	WW1N 323	WE2L 320	K7TCL 315	XE1MDX 305	OE7KWT 290
K2ENT 328	K3UA 327	WB3CQN 326	K8NA 325	K4SBH 323	EA3EQT 320	NØAMI 314	DK5WQ 305	N6CFQ 290
OZ5EV 328	K9BWQ 327	I2QMU 326	AI8M 325	WB2JZK 323	WS9V 320	OE6CLD 314	EA5OL 305	IK2PZG 289
VE1YX 328	WØYDB 327	PAØXPQ 326	W4UW 325	CE7ZK 323	KØFP 320	W5RUK 314	G4NXG/M 304	LU3HBO 289
W6EUF 328	W4QB 327	N4JF 326	VE2PJ 325	K2ARO 323	KE3A 320	DL3DXX 314	KJ6HO 304	KF7VC 288
K2JLA 328	VE3MR 327	KB4HU 326	I8LEL 325	LU7HJM 323	N4CSF 320	OH5KL 313	VE3CKP 304	OK1AWZ 287
N7RO 328	VE3MRS 327	KC4MJ 326	IT9ZGY 325	KA9I 323	W8AXI 320	WDØDMN 313	WB2NQT 303	IK2DUW 287
K6YRA 328	OE2EGL 327	CX2CB 326	K6LEB 325	N5FG 323	W6SHY 320	KD9CN 313	EA3CWK 303	IK8BMW 286
W6BCQ 328	K8CSG 327	TI2CC 326	IK1GPG 325	KB8O 323	ON5KL 319	K1VHS 313	EA3BT 303	TU2QW 286
K5OVC 328	K1UO 327	WA4ECA 326	I1JQJ 325	WN5IJZ 322	WA4DAN 319	OA4QV 313	WA9BDX 302	NM5O 285
KZ2P 328	DL9OH 327	IKØIOL 326	VE7WJ 325	XE1CI 322	KI3L 319	EA1JG 313	WA8MEM 302	EA1AYN 285
VE7DX 328	WB4UBD 327	ZL1HY 326	AI8S 325	WB4PUD 322	VE3HO 319	W1LQQ 313	KD4YT 302	KQ4WD 284
AA6BB 328	K7LAY 327	YU1HA 326	K1HDO 325	LZ1HA 322	XE1MD 319	I4CSP 313	CT1YH 302	IK2HBX 284
EA4DO 328	W2FXA 327	W4NKI 326	N4CH 325	ZS6AOO 322	KB1JU 319	K4LR 312	RA2YA 301	KE6CF 283
ZL3NS 328	IK8CNT 327	KZ4V 326	KC8EU 324	WA5HWB 322	YV1JV 319	ZL1BOQ 312	W2LZX 301	WZ3E 283
K6JG 328	N4KG 327	VE3GMT 326	N4KEL/M 324	VE2GHZ 322	PY2DBU 319	WA9IVU 311	XE2DU 301	YC3OSE 282
WA6OET 328	K8PV 327	W4EEE 326	IK8BQE 324	TI2JJP 322	IØSGF 319	KD5ZD 312	AB4NS 301	VE7HAM 282
SM6CST 328	SV1ADG 327	KE4VU 326	AA5NK 324	AB7AU 322	K9QVB 318	WA2FKF 312	WP4AFA 300	WN6J 281
W3GG 328	K8LJG 327	AG9S 326	K2JF 324	KD8IW 322	KB5FU 318	ZS6BBY 311	YU2TW 300	KK4TR 281
I4EAT 328	W9DWQ 326	WA4WTG 326	WB5TED 324	OE7SEL 322	AA4AH 318	IN3ANE 311	AB4UF 300	YU1TR 280
W4UNP 328	W9SS 326	WD8PUG 326	W2FGY 324	VE4ACY 322	G4GED 318	F1OZF 311	WB4UHN 300	KN4RI 280
YU1AB 328	WA4IUM 326	W2CC 326	YV5CWO 324	W5XQ 321	IK8GCS 318	EI6FR 311	KB8NTY 300	WD9ACQ 280
F9RM 328	WB1DQC 326	VE2WY 326	W5LLU 324	KA5TQF 321	W6MFC 318	WT4K 311	YT7TY 300	WØIKD 279
PY4OY 328	XE1AE 326	AA4KT 326	I8KCI 324	TI2HP 321	KF5AR 318	YZ7AA 311	K6BZ 300	EA3CWT 278
OZ3SK 328	KA3HXO 326	PT2TF 326	I1POR 324	I8XTX 321	I8IYW 318	WA5SUE 311	WB6GFJ 299	WN5MBS 277
XE1L 328	VE3XN 326	KM2P 326	VE4AT 324	I8YRK 321	NI5D 318	GM4XLU 311	VE3CKP 299	VE2DRN 277
4Z4DX 328	YS1GMV 326	N5FW 326	KD5ZM 324	K4PQV 321	WA8YTM 318	KA5RNH 310	YV4VN 299	GØLRX 277
CX4HS 328	K9MM 326	K9HDZ 326	KØHQW 324	KS2I 321	F6BFI 318	I2MQP 310	EA5GKE 298	9A9R 277
N4MM 328	ZL1AGO 326	WA3HUP 326	W7FP 324	OA4OS 321	KX5V 318	HA6NF 310	KJ9N 298	KC6AWX 276
OE3WWB 328	KF7SH 326	LA7JO 326	KA5TTC 324	W7ULC 321	WB6PSY 317	KF7RU 310	KB5WQ 294	OA4EI 276
IK1GPG 328	ZS6LW 326	YV1CLM 326	K4JLD 324	W3AZD 321	9H4G 317	K4JDJ 310	IT9VDQ 293	NC3C 275
W7OM 328	VK4LC 326	N6AW 326	KB2MY 324	WØULU 321	WA6DTG 317	AB4IQ 310	KJ5LJ 293	F5NBX 275
K4MQG 328	YV5AIP 326	ZP5JCY 326	EA3BKI 324	WDØBNC 321	XE1XM 317	EA5RJ 309	TI2LTA 292	VE2AJT 275
K7EHI 328	K9IW 326	K5TVC 326	4N7ZZ 324	CT1EEB 321	N5HSF 316	CT1AHU 308	W5OXA 292	US1IDX 275
DU9RG 328	WA4JTI 326	KB7VD 326	YV5IVB 324	LU1JDL 320	KB1HC 316	EA3CB 308	K2EEK 291	Z31JA 275
W6DN 328	YV1AJ 326	WB3DNA 325	N2VW 324	KF8VW 320	W6NW 315	W9IL 307	W6WL 291	
I4LCK 328	YV1KZ 326	I2EOW 326	K8YVI 323	IØAMU 320	KV2S 315	N6AV 306	YB1RED 291	

RTTY

K2ENT 321	WB4UBD 304	K3UA 285	EA5FKI 284	I1JQJ 273	W4EEU 269	KE5PO 268	G4BWP 256	W4QB 255
NI4H 320								

KC4AAA count for? What is the CQ Zone of Heard Island? Despite the fact that the quiz was in Spanish, I attempted it, but could not even begin to answer even half the questions. No doctorate in DX for me! One highlight of the quiz was watching VKØIR DXpeditioner Michel, EA8AFJ, translate the Spanish questions into French for fellow Heard Island operator Ghis, ON5NT! (These two ended up winning the quiz competition, sharing the title of Dr. DX.)

The DX program continued with the feature presentation of Heard Island slides and video by ON5NT, in English, with occasional translations by EA8AFJ. Among the highlights of the slide show were Ghis' comments that the two most valuable items they took to Heard were the tractor and the toilet, the surprise birthday cake aboard the ship on the way to Heard for KØIR, and the presence on the ship of one of the non-hams from VK9NS's ill-fated Heard Island operation, who said it was very emotional to revisit the place from which he had almost lost his life during the return voyage.

Other highlights of the Heard Island slides included some interesting details about the operation. The off-loading of the 34 tons of gear and 20 operators took 51 flights, but only 5 hours. Thanks to fine (for Heard) weather the first two days, the gang got all the shelters and most of the 47 antennas up quickly, and thus were able to get on the air as soon as possible. Ghis commented that co-leader Bob, KK6EK, had prohibited any alcohol being taken to Heard, but Bob always seemed to be able to produce a bottle of wine or champagne when the occasion arose. Also, two not-to-be-named US operators brought along a giant penguin suit so that they could be photographed among Heard's many birds wearing their own plumage! A 6 foot inflatable penguin appeared in many of the candid slides. (For more about the Heard Island opera-

QSL INFORMATION

1B1AD to DK7ZZ
3DAØJA to JH7FQK
3EØS to HP2CWB
3XY3A to F5IEV
3Y2GV to LA2GV
3ZØRY to SP4TKK
4B1AC to XE1BEF
4F3CV to HB9CXZ
4K7FA to OE3SGU
4K8F to UA9AB
4L2DX — pirate
4L5A to IK3HHX
4N1Z to YU1AVQ
4S7BRG to HB9BRM
4X1VF to K1FJ
5B4AGI to N4JR
5H3ES to DF9SU
5NØT to F2YT
5R8DP to JA1OEM
5R8EE to FR5EL
5WØNY to DJ3NY
5X1D to SMØBFJ
5X1T to ON5NT
5Z4EE to K1RH
6D2X to K5TSQ
6K97WFK to HL1IWD
6O5DX to F5PYI
6W1QV to F6FNU
6YØA to K3DI
7J1AAP to KH6BZF
7O1A to JH1AJT
7P8ZZ to W4DR
7Q7EH to AA9HD
7XØAD to EA4URE
7X2CR to ISØLYN
7Z1AB to KN4F
7Z5OO to W1AF
8P9AP to K2WE
8P9JA to K4MA
8Q7AF to I8RIZ
8Q7BV to HB9DIF
9G1BJ to G4ZCA
9G1XA to K1ER
9HØA to LA2TO
9H1EL to LA2TO
9J2GA to F5PYI
9J2OR to W4CER
9K2F to 9K2HN
9L1MA to WØHSC
9M2AG to JA9AG
9M2EU to JA2EJI
9M6AG to JA9AG
9M6TCR to KQ1F
9M6TPR to KQ1F
9N1RHM to KV5V
9Q2L to PA3DMH
9Q5TR to 4Z5DP
9U5DX to F2VX
9V1XQ to G4PKP
9X4WW to ON5NT
9X5HF to LA2HFA
A22BW to DK3KD
A35CE to DL2GBT
A35RK to W7TSQ
A61AJ to K3LP
A71BY to F5PYI
A92FZ to W3HCW
AH1A to K1ER
AP2KSD to IK7JTF
AX9AZ to VK6UE
AZ9W to LU5UL
BV5GQ to BV5AO
C31IL to K1RH
C4ØM to 5B4AFM
C56CW to DL7DF
C6AFP to N4JQQ
C91CO to W4DR
CM8DC to IKØZKK
CN36GI to CN8GI
CO8TW to W3HNK
CP4BT to DL9OT
CP8XA to DG9NB
CS7PSP to CT1EDX
CT1FJK to OH2BZ
CW6V to W3HNK
CX8DX to F1NGP
D25L to PA3DMH
D68KS to DL1DA
D68XS to DL4XS
DAØPLG to DL1DCY
E21CJN to K3WUW
EK6OCM to K6EID
EL2AB to IKØPHY
EL2DT to IKØPHY
EM1HO to I2JPA
EMOF to OE5EIN
EN2H to I2PJA
EO6F to OE5EIN
ER5OK to DJ5MN
ES1WN to ES1AX
EU1XX to UC2LCQ
EW1NY to N8LCU
EXØV to KL7H/W6
EX8DX to IK2QPR
EY1ZA to W3HNK
EY8RR to N7RR
FG5FC to F6DZU
FK8HC to VK4FW
FK8VHM to F5TLP
FM5DN to KU9C
FOØZR to K1RH
FP5CJ to VE2FB
FR5DT to F6FNU
FT5ZG to F5RQQ
FY5FJ to IK2HTW
GMØKJW to GØKJW
H5ANX to ZS6EW
H8ØS to HP2CWB
HBØCZS to HB9CZS
HD2RG to HC2RG
HF1GD to SP2BIK
HG1LPS to HA1CC
HOØS to HP2CWB
HP1XBI to F6AJA
HP1XVH to N0JT
HQ1JPT to HR1JPT
HR2KOS to KB5IPQ
HS6CMT to JA7FYF
HS9AL to I4LCK
HV4NAC to IKØFVC
HZ1AB to K8PYD
IIØFR to IKØRNR
IQ4T to IK4HVR
J28JY to F6BFH
J28PP to F5PWH
J37XC to W2BJI
J39A to KQ1F
J41AG to SV1CIB
J43CRN to SV3YY
J52AK to IV3TIQ
J52DW to LX2DA
J6DX to N9AG
J75T to DL6LAU
J77FT to DL7FT
JWØL to G8APB
JW5HE to OZ8RO
JW5NM to LA5NM
JX7DFA to LA7DFA
JY8CR to DL4VCR
KC4AAC to KE9AS
KC6BP to AA8HZ
KC6VW to JA6BSM
KG4AN to KD4FSS
KG4GC to WT4K
KHØAC to K7ZA
KP2AD to OK1AJY
KP3EE to WP4U
L7ØFM to LU4FM
LM1SKI to LA1K
LS9F to LU5FCI
LX9DIG to DL3JTN
LZØA to LZ1KDP
LZØL to LZ1KCP
M7G to G1AHM
MUØASP to F5SHQ
MWØAQD to W1A0D
NH7A to N2AU
NP3D to K3CN
NP4A to W3HNK
OA4DHW to N5FTR
OA4SS to KB6J
OD5PL to HB9CRV
OE3S to OE2GEN
OHØA to OH2BH
OK8EAR to DL6RDE
OL3A to OK1AYP
OL5T to OK1MUJ
OM9A to OM3EI
OX3GL — pirate
OX3IPA to OZ5AAH
OX3XR to OZ3PZ
OY2H to IØWDX
OY3QN to OZ1ACB
P29TL to KF9TH
P29VIG to JA3IG
P4ØDC to AA6DC
P4ØWA to K9UWA
PJ2MI to K2PEQ
PJ5AA to W1AF
PJ7UQ to W3HNK
PJ8CW to K1BXE
PJ9C to K1CPJ
PJ9JT to W1AX
PQ5W to PP5WG
PYØTI to PY1UP
PZ5HP to JA1OEM
PZ5JB to AA3OE
R1ANZ to UW1ZC
RAØFF to N6FF
RA2FBC to DJ1OJ
RA9CKQ to W3HNK
RKØQXY to UAØKCL
RW2F to DK4VW
SØ1M to EA7EL
SØ2R to EA2JG
SØRASD to EA2JG
S21XX to DL3NEO
S79DQW to SM7DQW
S79HP to JA1OEM
S92AT to NJ2D
SUØERA to SU1ER
SU1CS to 9K2CS
SU3AM to DL1FCM
SV5DZZ to IZ2AEQ
SX2THE to SV2TSL
TØØPB to F5SSG
TØØXL to F5XL
TØ9BDX to F2VX
T22MS to DL2GAC
T3ØA to KU9C
T32HA to VE7AHA
T48RAC to VE3ESE
T5EC to DLØMAR
T77CD to IØMWI
T88JA to JA6BSM
T88X to JE6DND
T93M to K2PF
T93Y to N2UE
TA2FE to KK3S
TA2IJ to DJ9ZB
TA3ZJ to DL3FDU
TG8IGE to WK60
TIØC to W3HNK
TI2GSC to TI2GSC
TJ1PD to N5DRV
TK5XN to F2YT
TMØPX to F5BZB
TM1C to F6CTT
TOØR to W4FRU
TP9CE to F6FQK
TS8A to YT1AD
TT8AM to IK7JTF
TU4CN to K1RH
TU4FF to OH8SR
U1ZA to U1ZA
UAØAZ to W3HNK
UA9OS to W3HNK
UN2O to IK2QPR
UR4WW to WR3L
V26B to WT3Q
V26E to AB2E
V26NA to KX9X
V31EV to NSØB
V31TP to WCØW
V47CA to VE3BW
V51BG to V51BG
V51C to ZS1IS
V51GC to W3HCW
V51SG to V51SG
V63CK to AA8HZ
V63CP to JH1BLP
V63KU to JA6NL
V73GT to WF5T
V73TR to AA8HZ
V85HY to JA1WTR
VI3GP to VK3ER
VKØIR to W4FRU
VKØTS to VK1AUS
VK2XN to VK2XN
VK8NGE to VK4FW
VK9XZ to VK6UE
VP2EC to N5AU
VP2EJT to G3PJT
VP2MEP to W5LVM
VP2VI to AB1U
VP5A to WE3C
VP8CTR to UX1KA
VP8PTG to G4RFV
VP9ID to K1EFI
VQ9DW to KB8UCL
VQ9KH to WJ5R
VQ9ZZ to NS1L
VS97BG to VS6BG
WP2Z to KE2VB
WP3X to W3FG
WP4Q to KP4CKY
X5BYZ to YU7KMN
X5SO to YU1KN
XE2L to XE2DV
XF4CA to XE1BEF
XL9NJ to K2NJ
XR8S to CE8SFG
XT2AR to W4BYG
XT2DB to F5LGQ
XU2FB to N4JR
XU5AM to W7AAM
XV7TH to SK7AX
XX9AW to KU9C
XX9X to OH2BH
XX9Y to W3HCW
YBØASI to WA4FVT
YB2BRW to N2UE
YC3UUQ to YB3BC
YI1AK to KC5HWR
YI1FLY to KK3S
YI1US to WA3HUP
YJØANY to DJ3NY
YJ8AA to VK4AAR
YM2KC to TA2FE
YM2ZW to OK1TN
YN6WFM to JA6WFM
YO3AC to W3HNK
YT0X to YU7AL
Z21KW to GØMVM
Z24S to W3HNK
Z31CN to YU5CN
Z32XA to KM6ON
Z37CXY to YU5CXY
ZA1M to IK2HTW
ZB2CN to DJ9WH
ZD7HI to N2AU
ZD7JP to N5FTR
ZD7WRG to WA2JUN
ZD86ØCC to GØDEZ
ZD8CJK to KF4OOX
ZD9BV to W4FRU
ZD9CR to KA1DE
ZF2AU to W5AU
ZF2DR to K5RQ
ZF2LA to K9LA
ZF2NK to KBØYKN
ZK1DI to DK1RV
ZK2HP to JA1OEM
ZL4WA to ZL4WA
ZL7ZB to DJ4ZB
ZPØV to ZP5WYV
ZP2EHA to DH1PAL
ZS6IR to DL4JZ
ZS6YG to WØYA
ZS8IR to ZS6EZ
ZV8KL to PY4KL
ZW2SA to PY2EUY
ZXØF to PY5EG
ZYØSG to PT7AA
ZYØSK to PS7KM
ZY8M to PT2GTI
ZZØZ to PY1NEZ

NOTES:
QSLs for **CT9M** go via **CT3DL**, and *not* via CT1BOH.

QSL **DX1CW** (and **4G1A** in the contests) via CW PHIL Inc., POB 1048, Manilla, Philippines 1099 (*not* via JA3GN).

KB6GJX' Suppressed W.W. II Memoir Reissued

After being suppressed for nearly 50 years, Robinson Crusoe USN: The Adventures of George R. Tweed, RM1 USN, on Japanese-Held Guam has been republished in an annotated and updated edition. This story was reviewed by Bill Orr in the October 1996 edition of CQ Amateur Radio pp. 32–33.

This is a tale of fear and courage; hardship and ingenuity; luck and self-reliance. It is a story of a man trapped in a frightening situation who made the most of that situation. It is a story that will be vaguely familiar to old sailors, a few old hams and all who have visited Guam since 1945.

On December 7, 1941, the Imperial Japanese Navy bombed Pearl Harbor, Hawaii; bringing America into the Second World War. On that same day they bombed Guam. Unlike Hawaii, however, the bombing of Guam was followed up by invasion and occupation—the only populated American territory to suffer such a fate. The sound of the fighting awakened Radioman First Class George Ray Tweed. The rest of the story is the subject of the book.

After the war, Tweed collaborated with Blake Clark to write Robinson Crusoe USN: The Adventures of George R. Tweed, Rmlc on Jap-Held Guam (sic). The book was a resounding success but it was suppressed by two powerful families and the Catholic Church. It was unavailable for almost 50 years.

Every word and photo that was in the original edition is in the 50th Anniversary Edition. The original pagination, the ugly (at least by 1990s standards) cover design and the "creative" spelling—"dingy fever," for example—were all maintained.

At the end ther is a brief narrative of the remainder of George Ray Tweed's life. It continues the "as told to" style of the original. "Endnotes," includes some clarifications and additional information about the characters and issues presented.

Although the work was never reprinted in book form, it was later made into a movie starring Jeffrey entitled "No Man is an Island."

Although the book is in the public domain, Dolores Tweed, Tweed's widow, receives royalty checks. Aside from its historical importance Robinson Crusoe USN: The Adventures of George Tweed, RM1 USN, on Japanese-Held Guam is a wonderful story.

This is not a book likely to find its way into most bookstores. Some local book stores may be willing to special order it but it is available from the publisher for the list price of $24.95 which includes shipping, within the US, by priority mail. Send a check to: The Pacific Research Institute, P.O. Box 26270, Barrigada, Guam 96921.

tion, see last month's *CQ*, and get the new book on the subject from author KK6EK.)

Ghis next presented the VKØIR DXpedition video. This professionally photographed and edited video is one of very best such endeavors ever. With 20 operators, the VKØIR team had the luxury of assigning 9V1YC the exclusive task of documenting the operation, rather than filming whenever someone had a spare moment. This meant the photographer didn't have to put down the camera during important times such as landing and leaving and putting up big verticals (which required a lot of hands). Few DXpedition videos capture these crucial moments, and their inclusion is one of the reasons why the VKØIR video is unique.

The video gives a good overview of the operation, probably the largest, most organized, and most expensive DXpedition ever attempted. Chartering a 120 meter long ship (that's almost 400 feet for the non-metric crowd), shipping many tons of gear to Reunion island, making sure that the operators didn't miss even the smallest band opening, and much more all gives DXers at least a glimpse at what happens behind the scenes of a major DXpedition to a remote location. This is a video well worth adding to your DX collection, as it stands up to viewing again and again.

Among the many highlights were the perplexed penguin and the ingenious way the team made the PacSat rig work, an essential ingredient in the very important task of getting the log information back to the real world on a daily basis. The single best image is the expression on KØIR's face as he makes the very first contact as VKØIR, appropriately with head pilot ON4UN. The sheer joy of *finally* getting on the air after several years of work and the bitter disappointment of the previous year may give viewers some indication of why these DXpeditioners go off to these unpleasant places. (The 1995 Heard Island DXpedition was postponed when an Australian took the team's $100,000 boat deposit and disappeared; KØIR was the leader of that attempt, making the 1997 success all that more important to him.) No more hints about the VKØIR video; buy your own copy from KK6EK.

While the amateurs listened to VKØIR stories, the spouses enjoyed a boat ride on the Douro river, passing under four of the five giant bridges that cross it.

At the conclusion of the VKØIR presentation, the group retired to their rooms to get dressed for the banquet. The bar opened at 9:30 PM, with an excellent gourmet dinner following at about 10:30 PM. That's the time most DXers at Visalia want to go to sleep! Following the dinner, the attendees eagerly awaited the presentations and awards, and the all-important prize drawings, including several specifically for the many women attending the banquet. No long, boring DXpedition slide show at this dinner! I don't know when the party finally broke up. I had to head back to my room and bed at 1 AM, with the group still in full swing.

While there were many similarities between the Lynx DX Club's convention and a regional DX gathering in the states, there were also many differences. The Lynx convention had a very European feel to it, appropriate to its location. The DXers appeared to be better informed about the current state of DXing and definitely were younger than those at the stateside conventions I have attended. And the non-DX related events, especially those including spouses, gave the gathering an atmosphere very different from any stateside event, with the possible exception of the New Orleans International DX Convention, which also features fine banquet food in a luxury hotel with many attractions for the non-DXer. Remember, the NOIDXC is next month. 73, Chod, VP2ML

5 Band WAZ

As of March 31, 1997, 454 stations have attained the 200 Zone level.

New recipients of 5 Band WAZ Award with all 200 Zones confirmed:

EA5BYP

The top contenders for 5 Band WAZ (zones needed, 80 meters):

N4WW, 199 (26)
AA4KT, 199 (26)
K7UR, 199 (34)
NAØY, 199 (26)
WØPGI, 199 (26)
W2YY, 199 (26)
W9WAQ, 199 (26)
W1JR, 199 (23)
VE7AHA, 199 (34)
W1FZ, 199 (26)
W9CH, 199 (26)
ACØM, 199 (34)
IK8BQE, 199 (31)
JA2IVK,199 (34,40m)
K1ST, 199 (26)
ABØP, 199 (23)
KL7Y, 199 (34)
UY5XE, 199 (27)
NN7X, 199 (34)
DL3ZA, 199 (31)
OE6MKG, 199 (31)
HA8IB, 199 (2 on 15)
DK1FW, 199 (31)
OH2DW, 199 (1)
IK1AOD, 199 (1)
DF3CB, 199 (1)
F6CPO, 199 (31)
W6SR, 199 (37)
S57J, 199 (2)
UA3AGW, 198 (1, 12)
VO1FB, 198 (1, 12)
EA5BCK, 198 (27, 39)
KZ4V, 198 (22, 26)
K4PI, 198 (22, 26)
G3KDB, 198 (1, 12)
DK2GZ, 198 (1, 24)
KG9N, 198 (18, 22)
KM2P, 198 (22, 26)
GM3YOR, 198 (12, 31)
DKØEE, 198 (19,31)
KØSR, 198 (22, 23)
K3NW, 198 (23, 26)
W3RU, 198 (23, 26)
UA4PO, 198 (1, 2)
K5RT, 198 (22, 23)
JA1DM, 198 (1, 31)
OE1ZL, 198 (1,31)

The following have qualified for the basic 5 Band WAZ Award:
None

Endorsements:
1036 Stations have attained the 150 Zone level as of

WN4KKN, 195 Zones
OE1ZL, 198 Zones
NT5C, 196 Zones
K5MC, 164 Zones
W6SR, 199 Zones
S57J, 199 Zones
EA5BYP, 200 Zones

March 31, 1997.

Rules and applications for the WAZ program may be obtained by sending a large SAE with two units of postage or an address label and $1.00 to: WAZ Manager, Jim Dionne, K1MEM, 31 DeMarco Road, Sudbury, MA 01776. The processing fee for all *CQ* awards is $4.00 for subscribers (please include your most recent *CQ* mailing label or a copy) and $10.00 for nonsubscribers. Please make all checks payable to the Award Manager. Applicants sending QSL cards to a *CQ* checkpoint or the Award Manager must include return postage. Questions regarding the WAZ Award may be sent to K1MEM with an SASE.

SHOWCASE

High Sierra HS-1500 Antenna

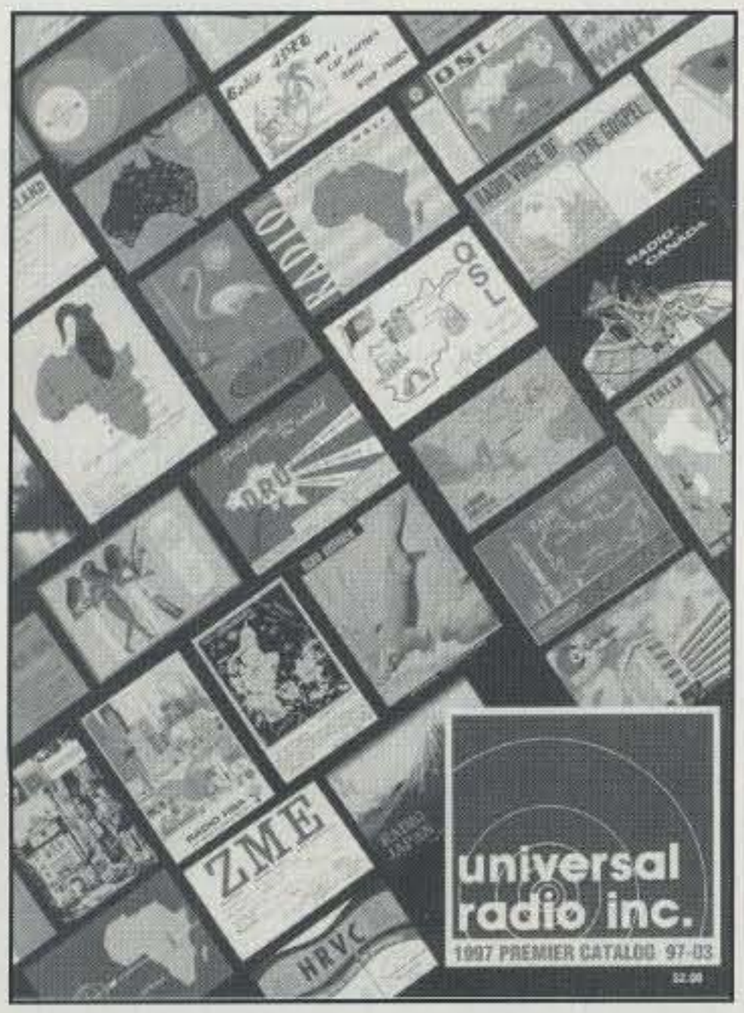
High Sierra Antennas has introduced model HS-1500, the newest in the company's series of all-band, HF mobile antennas. The principal improvement in the HS-1500 is a new motor and gear drive mechanism which allows installation of sensors to provide positional information for remote readouts, frequency presets, and other enhancements. The ability to provide positional information will be demonstrated at this year's Dayton Hamvention.

Other changes in the HS-1500 include better RF isolation of the motor control system from the antenna and a new weather-shield design. Additional details on the HS-1500 can be obtained from the company's Web site: <www.hsantennas.com/info>; e-mail <cobler @hsantennas.com>; phone 916-273-3415; fax 916-273-7561; by writing to High Sierra Antennas, Box 2389, Nevada City, CA 95959; or by circling 100 on the reader service card.

Universal Radio 1997 Communications Catalog

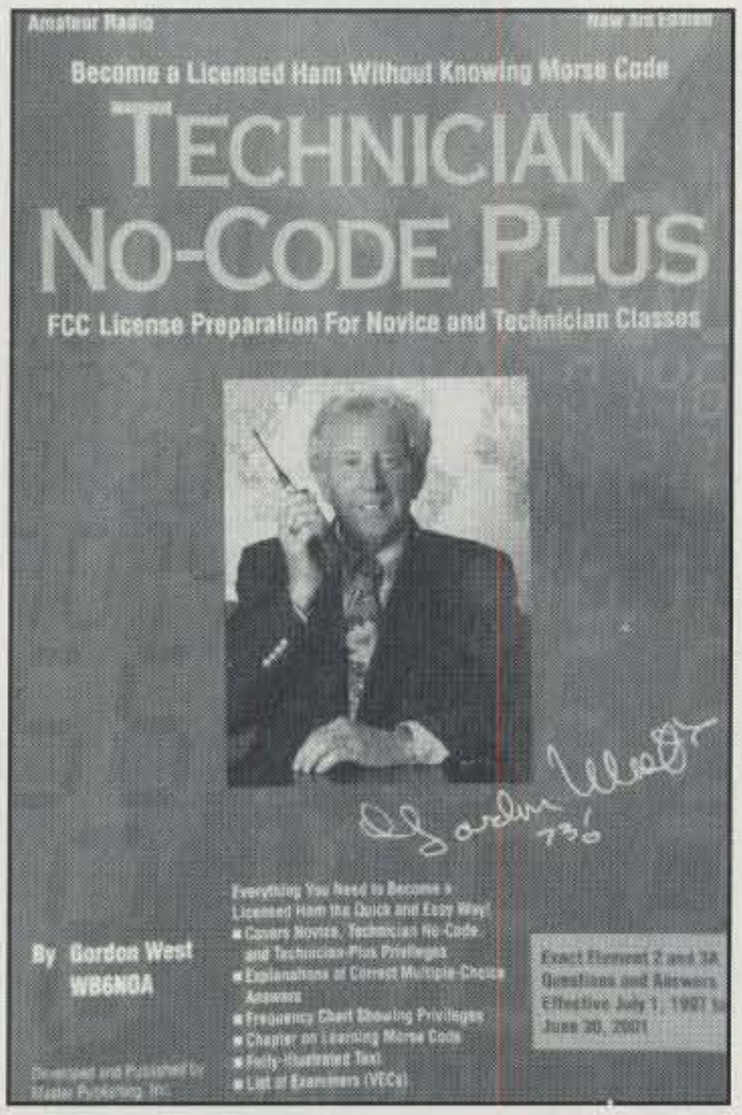
Universal Radio has released its new 1997 Premier Communications Catalog. Catalog #97–03 is 100 pages in an 8.5" × 11" format. It covers equipment for the amateur and shortwave and scanner enthusiast and includes a variety of antennas, headphones, books and accessories. Some of the new items included in this catalog are the Drake SW-2 Receiver; Japan Radio Company NRD-345 Receiver; ICOM R-10 Wideband Receiver and 756 Transceiver; Kenwood TS-570D/S Transceivers; and SGC products.

To receive a free catalog via 4th class mail ($1 for first-class mail; 5 IRCs for international delivery) send your request to Universal Radio, Inc., 6830 Americana Parkway, Reynoldsburg, OH 43068-4113; or call 614-866-4267; fax 614-866-2339; e-mail <dx@universal-radio.com>; on the web <www.universal-radio.com>; or circle number 101 on the reader service card.



West's Updated Novice/Tech Book and Cassettes

The new Gordon West Novice/Technician theory book is now expanded to 320 pages, and includes the Novice and Technician class question pool and multiple-choice answers, plus an explanation of the correct answer. The question pools have ben revised for exams from July 1, 1997 to June 30, 2001. The new edition of this book also includes chapters about license structure, vanity callsigns, rules, and a specific chapter on the importance of understanding why Morse code may be important to amateur radio. Six new audio cassettes parallel the question pools, and give the sounds behind many questions and answers. The cassettes now cover both Novice and Technician class question pools, including the hundreds of new questions on Sub-element 0, "RF Safety." The tapes also introduce the listener to the sounds of Morse code. They sell for under $30.



For more information, contact Gordon West Radio Schools, 2414 College Dr., Costa Mesa, CA 92626, or circle number 102 on the reader service card. The materials are carried by amateur radio dealers. Orders may also be placed through the W5YI Group at 800-669-9594.

Power Triode For Audio From Svetlana

Svetlana Electron Devices, Inc. has announced the availability of the 3CX300A1 power triode for audio. It is a powerful metal-ceramic triode usable for audio amplifiers in Class A, AB, or B, or as a power-supply pass device. It offers high transconductance (20,000 micro-Siemens typ.), low plate resistance (450 ohms typ.); plate ratings maximum DC supply voltage 1800 volts and maximum dissipation 300 watts with forced-air cooling; ceramic-metal construction with cathode and grid rigidly mounted on coaxial cones; massive external anode machined from solid copper for rugged-

ness and tolerance of high temperatures. It fits Svetlana SK2A socket, standard loktal sockets, or special sockets intended for the 4CX250B tetrode. It is well uited for push-pull amplifiers, maker says.

For more information, contact Svetlana Electron Devices Headquarters, 8200 S. Memorial Parkway, Huntsville, AL 35802 (telephone 205-882-1344; fax 205-880-8077; e-mail <engineering@svetlana.com>; or circle number 103 on the reader service card.

C3I Announces Acquisition Of Rutland Arrays

C3I recently acquired the assets of the former Rutland Arrays. Rutland Arrays produced high-performance Yagis designed by Steve Powlishen, K1FO. C3I will continue to produce most of the same model antennas for 2 meters, 1¼ meters, and 70 cm. In addition C3I will introduce a complete line of 6 meter antennas from 4 elements to 12 elements. New long Yagis for 2 meters, 1¼ meters, and 70 cm will also be offered. For the UHF operator, Yagis for 33 cm and 23 cm will be introduced. Prices of the new antennas range from $89.95 to $229.95. A complete line of antenna accessories such as power dividers, phasing lines, and stacking frames, plus parts for the do-it-yourselfer, will also be available

For more information, contact C3I at 1-800-445-7747; fax 1-703-753-2692; via the Web at <www.c3iusa.com>; or circle number 104 on the reader service card.

Windows Logging Software For DXers

DX4WIN is an amateur radio logging program for Windows. The software was designed for both the serious and casual DXer. If you use a contesting program, DX4WIN can import your log after the contest. Some of the features of DX4WIN include: support for DXCC, WAS, and WAS (mixed, mode and band); 5 band DXCC, 5 band WAZ; separate flags to track the mixed mode and band awards; support for county, IOTA, TenTen, and WPX awards; a full-function CW keyboard which works under Windows; user programmable memories accessed using function keys; support for the Buckmaster, Flying Horse, QRZ! and Amsoft Callsign databases on CDROM; support for the GOLIST to obtain QSL manager information; a

number of import/export filters avialable to import QSOs from other logging programs; multiple logs; runs under Windows and Windows95; and much more.

DXWIN can be ordered for $69.95 plus shipping. A demonstration version is available for $5.00, the cost of which can be deducted when ordering the licensed version. Include your callsign when ordering. For more information, contact Rapidan Data Systems, 3601 Plank Road, Suite 389, Fredericksburg, VA 22407 (phone 540-785-2669; fax 540-786-0658; e-mail <sbookout@mnsinc.com>; Web <http://www.erols.com/pvander>; or circle number 105 on the reader service card.

Celtronic Battery Saver Systems

Celtronic Battery Saver Systems reverse the electro-chemical imbalance caused by the normal use and recharge of the nickel-cadmium, nickel metal hydride, and lithium ion chemistry batteries. A patented technology guarantees to re-energize to full capacity all serviceable batteries used in two-way radios, cordless tools, cellphones, laptop computers, video cameras,

survey and emergency equipment, and more, maker says.

For more information, contact Wenco Electronics, 1224 N.E. Walnut #207, Roseburg, OR 97470 (phone toll-free 888-258-8787; fax 541-459-5294) or circle number 106 on the reader service card.

Alinco"Pocket Size" 2 Meter HT

The DJ-S11T from Alinco is a "pocket size" handie-talkie transceiver designed to operate on the 2 meter (144–148 MHz) band. The new HT, slightly larger than most pagers, runs on 3 AA cells. The unit features 21 non-volatile memories; CTCSS encoder (50 tones); offset capability up to 15.995 MHz can transmit through all of the U.S. 2 meter band; pager "alert" alarm; hi/low transmit power setting; MARS/CAP capability; packet capability; and more. It comes with a belt clip and carry strap.

The DJ-S11T options available include the traditional speaker mic and cigar-lighter external power converter cord (12 to 5.5 VDC), vox-operated tie-pin microphone or vox-operated headset to the nickel cadmium battery pack, charger, and a soft case. Price is around $150.

For more information, contact Alinco, 438 Amapola Ave., Suite 130, Torrance, CA 90501 (phone 310-618-8616; fax 310-618-8758), or circle number 107 on the reader service card.

Aluma BD-60HD Mobile Van Unit

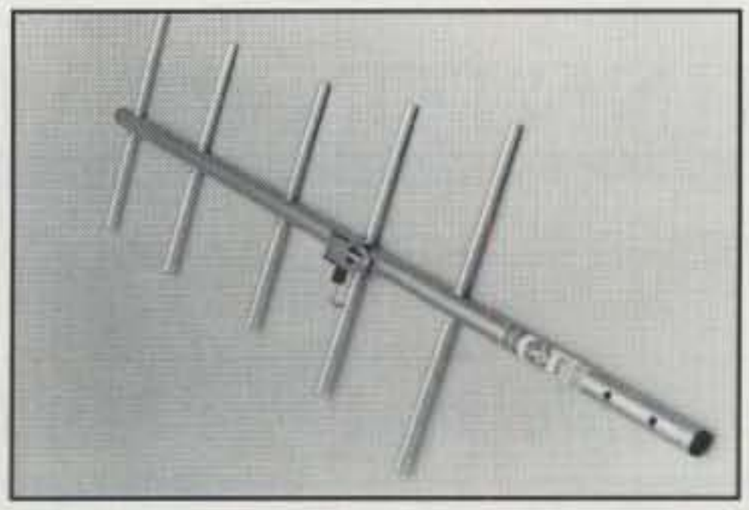
Aluma Tower Company, Inc. has added the Model BD-60HD Mobile Van Unit to their product line. The unit is designed specifically to mount on a vehicle and is suited to temporary communications. The aluminum tower transports in a horizontal position. Once on site, the tower can be tilted to the vertical position and cranked up to desired height. Mobile van units are available from 35 to 100 feet and come complete with a tower, track, and carriage.

For more information, contact Aluma Tower Company, Inc., P.O. Box 2806-CT, Vero Beach, FL 32961-2806 (telephone 561-567-

3423; fax 561-567-3432; e-mail <atc@alumatower.com>; Web <http://www.alumatower.com>; or circle number 109 on the reader service card.

Larsen's New UHF Yagi Line

Larsen Electronics has added a new YA3 UHF line of Yagi directional antennas to its products. The compact five-element design offers 10 dB gain and is available in frequencies from 406–512 MHz. The YA3 features durable aluminum construction, heavy-duty 3/8 inch staked elements, and a fully weatherized



gamma unit. Standard mounting provides for both vertical and horizontal positioning on up to a 2 1/8 inch pipe. An optional reinforced mounting bracket is also available. For additional gain, the YA3 may be stacked using Larsen's stacking kits. YA3 450 specs include: 1.5:1 VSWR, 60°/ 50° beamwidth, DC ground lightning protection, 34.5 inch length, 13.25 inch width, 1.68 lb. weight, 10 dB gain, 20 dB front-to-back ratio, UHF or N connector, 300 watt power rating, and 100 mph windload.

For more information, contact Larsen Electronics, Inc., 3611 N.E. 112th Ave., Vancouver, WA 98682 (phone 800-426-1656; fax 800-525-6749), or circle number 110 on the reader service card.

Solder-It MJ-500 Deluxe Micro-Jet Torch

The new ergonomically designed Micro-Jet Butane Torch produces a pinpoint 2400F flame and is fueled by a refillable butane fuel cell (included) or by disposable cigarette lighters. Additional new features include a front trigger ignition and chain secured nozzle safety cap. Included with the MJ-500 is a free syringe of Solder-It Silver Bearing Low Temperature Solder Paste. Micro-Jet can be used for coax connectors, emergency repairs, camping, crafts, electronics, heat shrink tubing, and other household, hobby, and professional repair applications. It is priced at $24.95 plus $5.00 s/h.

For more information, contact Solder-It Co., P.O. Box 20100, Cleveland, OH 44120 (phone 800-897-8989; on the Web http://www.solder-it.com), or circle number 108 on the reader service card.

BY FREDERICK O. MAIA, W5YI

WASHINGTON READOUT

REGULATORY NEWS IN THE WORLD OF AMATEUR RADIO

Amateur Radio and The 21st Century

The following are remarks by Fred Maia, W5YI, made during a debate with Nancy Kott, WZ8C, who heads up the U.S. Chapter of F.I.S.T.S., a pro-CW organization. F.I.S.T.S. believes that the international Morse code requirement should be retained as a prerequisite to any HF amateur band operation. The debate took place on April 27, 1997 on the "Ham Radio and More" radio show hosted by Len Winkler, KB7LPW. It was repeated at the Dayton Hamvention, May 17, 1997.

Amateur radio is the oldest radio service. What started as a CW hobby is now many things to many people. It exists to provide public service, as a technical hobby, to improve communication skills, as a non-commercial personal radio service, and to enhance international goodwill. The Amateur Radio Service was never created as a family radio service, but it has become that also.

Nowhere in either the international or FCC rules does it mention that one of the purposes of the Amateur Service is to be Morse proficient. There is, however, an international rule which requires Morse knowledge when the operation takes place under 30 MHz. In the United States, over the last 30 years amateur radio has developed into a structured hobby with Morse code being the primary licensing ingredient. Thus, our technical hobby is really based on a non-technical art form.

Two of the flawed concepts in amateur radio are that the "crown jewel" is the ability to operate on HF and that if we don't have a Morse code requirement, millions of people will commandeer our bands like CB. I don't believe either of these notions. First of all, in recent years the reliability and importance of the VHF/UHF and higher frequency bands has been proven. If anything, the microwaves are more valuable than HF. Commercial interests have paid billions of dollars for these frequencies. Second, we have theory testing requirements, which tends to limit the number of licensed amateurs.

I simply do not believe that abolishing code testing will result in a glorified CB radio service. I heard that claim when code was abolished at the VHF level. It didn't happen. Sure, we have a few bad apples, but overall, today's Technician amateur is a credit to our hobby. It is safe to assume that higher classes—even without a code requirement—would grow at about the same rate or less.

Under the current system the number of amateurs upgrading to higher class licenses is shrinking. Ten years ago 60 percent of all amateurs were at the General and higher class level. Today that figure is down to about 40%—and dropping. At the end of 1996 there were less amateurs at these class levels than the year prior. Only the code-free Technician class is growing.

HF operators are aging and HF interest is declining. Many manufacturers and dealers are going out of business. This is translating into lowered advertising revenue for amateur radio publications and is resulting in higher membership dues needed by the ARRL. At the rate we're going, it won't be long before we have more Technician class amateurs than the rest of the amateur classes combined. I believe that the answer to a stagnating, aging hobby is to revitalize the system.

Do I think there is a justification for the presence of Morse code in amateur radio? Yes, I do. There are large numbers of people worldwide who enjoy using it. I also believe, however, that new technologies such as the Internet and cellular phone are diminishing amateur radio. You don't require a license there—only equipment. Operating CW on the HF bands is fun, but it makes little sense from a regulatory standpoint to require proficiency in a mode that will not—and need not—be used.

I think the code should be voluntary. I believe that the CW requirement has kept otherwise qualified people out of the hobby. That is something we cannot afford to do when commercial interests are targeting our valuable frequencies. The radio spectrum is public property, and the government will dole out the frequencies to those who will benefit the most. We need to refocus our energy. Remember: Without spectrum there is no amateur radio.

Just How Important is CW?

I personally find CW operating fun, satisfying, and rewarding—and I hold DXCC–CW only. It is clear to me, however, that not everyone feels this way. It used to be that amateur radio provided a way to meet new people over great distances. Today new wireless and wireline technologies have removed the magic from amateur radio. There is a big gap between the amateur operator of yesterday and today's communications enthusiast. What we consider the mainstream of amateur radio is pretty much obsolete technology to the kids of today, who are the life blood of our hobby. And as Internet voice and video advances, the gap will become wider.

By today's digital communications standards CW is slow and inefficient. To an outsider the code requirement is a sacrifice that eats up an excessive amount of valuable learning time. Most won't do it, but that doesn't mean they are undesirable people.

CW testing is now not only a form of social discrimination, but it has also served to divide the amateur community. The so-called "in crowd" knows CW. The "out crowd" does not. Most no-code amateurs do not believe that they are "wanted" by the long-term amateurs. As a general rule, no-code amateurs do not participate with them—nor are they joining the ARRL.

If Morse code knowledge were voluntary, many new and existing amateurs would be transmitting also in HF—and our hobby would have more participants. Unfortunately, many existing HF operators do not want more participants whom they perceive as competition to their signals. This is also part of the problem.

Just because I learned the code doesn't mean that everyone else should have to. Morse code is only one mode and does not deserve special emphasis above any other analog or digital mode. I really see no reason why Morse code needs to be transcribed by ear when machines can do it so much better, at much faster baud rates and with better accuracy.

The current rules permit amateurs who have passed the minimum 5 words-per-minute code requirement to obtain a waiver of the higher speeds if they have a doctor-certified handicap. It doesn't seem hard to get. Even a learning disability qualifies. If an applicant can't pass the slow speed requirement, then they take the exam one character at a time, at no particular speed. It hardly seems to be an equitable arrangement, and there are widespread abuses raising the question of fairness.

There appears to be a widespread belief among old timers that people "filtered" through Morse code testing are better candidates for amateur radio, or that eliminating the Morse code requirement would allow standards to fall. These people relate personal sacrifice to quality. There is no credible evidence, though, that Morse speed testing sifts out those with potentially good behavior. I listen to 80, 40, and 20 meters all the time, and I frequently am ashamed of what I hear from amateurs who went through the CW "cleansing process." It appears to me that the greatest enforcement problems come from amateurs who are Morse code proficient.

We need to ensure ham radio's survival in the coming century. As it is now, a "true" amateur radio operator seems to be defined as one having Morse code proficiency. Amateur radio needs to be modernized, and abolishing code testing I believe should be one part of it. In reality, Morse code testing is a form of "hazing," and that's not something our federal government should condone, much less participate in. The objective of licensing is not to prove one's worth in terms of time, effort, or sacrifice. The purpose of testing and licensing is to confirm the minimum qualifications needed to con-

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tribute to spectrum management and to minimize interference to others.

I know dozens of exceptionally well-qualified people who have resisted joining our ranks simply because of the Morse code hazing ritual. I do not buy into the theory that otherwise qualified operators are lazy. However, this is what many code advocates seem to think. I am distressed by those pro-coders who feel obligated to attack the motives of anyone who does not agree with their position. The fact remains that from a regulatory standpoint, it makes no sense to require manual Morse code proficiency in order to gain access to totally unrelated privileges in the HF bands.

I see no point in having Morse code testing at all. If a person wishes to operate CW, he or she will learn and do it. One of the neat features of amateur radio is that you can participate in many modes without the necessity of proving proficiency. Requiring Morse code testing to access HF voice bands makes little sense, because the code no longer serves any regulatory or safety purpose. No one is against the use of CW on the amateur bands. What is objectionable is Morse code testing in order to be authorized to use voice below 30 MHz.

It is true that Morse code equipment is simpler, less expensive, easily home constructed, and an ideal mode for weak-signal and propagation experimentation. However, that certainly is not a reason to force the mode on everyone. Besides, few amateurs homebrew their equipment today. In addition, I do not believe that Morse code is the only practical means of ensuring that amateur stations across the globe are capable of communicating with one other. Anything that is possible via Morse code is possible by any digital mode.

From a purely technical standpoint, manual CW on the unreliable HF bands is a very inefficient way to pass communications. Traffic can be passed faster, more accurately, and automatically forwarded with the various digital modes available to us today. One of the biggest advantages of packet and the newer digital modes is their unattended nature. You can eliminate completely the human operator from all handling except at origination and receipt. This speeds the message on its way much faster and eliminates the errors that human relay operators using manual Morse code would introduce.

Let's Talk About Emergency Use

Many advocates of continued Morse code testing say that the code is still a significant communications tool outside of recreational amateur Morse code activity. I don't believe it, and apparently neither do the various governments of the world, since they all are discontinuing commercial, military, and maritime Morse code.

The fact of the matter is that the days when amateurs provided the only emergency communication are virtually over, what with the widespread availability of cellular phones and small portable satellite stations. When public service by amateurs is called for, it's almost exclusively phone operation.

It's also a mistaken notion that CW gets through when all other modes fail. There are self-correcting digital techniques that can get through when manual Morse cannot. Morse code is very, very seldom used by amateurs during an emergency.

The U.S., Canadian, British, and French Coast Guards no longer even listen on 500 kHz, which for 75 years was the CW cornerstone of maritime distress communications. Nowadays no ship captain relies on Morse code for emergency communications since there are many superior methods available. If Morse code was of any value in emergencies, it would be used.

By 1999 all commercial ships sailing the high seas will have to be equipped with digital and satellite emergency communications and automatic float-free beacons. CW is out. It won't even be used for backup purposes. In short, the world has abandoned Morse code in favor of faster, better, and more reliable techniques.

In Conclusion

I believe the Morse code debate is over and that the decision has already been made. Canada, the United Kingdom, the United States delegations, and many others are already on record as favoring abolishing the code requirement in the amateur service. The U.S. delegation wanted to eliminate it at the last WARC in 1979 and voted to do so.

The bottom line is that when a requirement is no longer of any value, the requirement must be dropped or changed. Even in the case of the ARRL survey question asking if individual countries should be allowed to decide if code should be required, of the respondents 52% said yes, 38% said no, and 10% had no opinion.

It appears, however, that the ARRL will support the wishes of its membership, that wish being to retain the code requirement. Being a membership organization of essentially long-term operators who have passed the code requirement, they have little choice. It is unfortunate that more no-coders aren't League members so that their voice would be heard. We need to promote ARRL membership for all.

The preliminary finding of the IARU is that the Morse code requirement should be eliminated. Their reason given is that it will be many years before the issue can be considered again. They said, "It is unrealistic to expect that Article S25, having been placed on the agenda for WRC-99, will again be reviewed at another conference in the foreseeable future." I believe they see the handwriting on the wall.

There is no question in my mind that the Morse code testing requirement will be eliminated at WRC-99. The battle has already been decided, and many of the gyrations that the ARRL and IARU are going through are really unnecessary and artificial. We really should be spending our time considering the more productive issue of what, if anything, should replace the code test. We all need to compromise and develop a new plan for amateur radio's future. There is a place for all modes—CW and non-CW. All the arguing over Morse code is getting us nowhere.

As one old timer recently said, "I am sad to see code go. It was fun. But progress goes on. Nostalgia is not a good reason to continue the requirement." In short, the rest of the communications world has already changed. It is time for amateur radio to follow. You know, we used to be leaders.

73, Fred, W5YI

(If you would like to comment on the above, you can reach Fred Maia, W5YI, at the following e-mail address: W5YI@W5YI.com.)

Announcements *(from page 6)*

N3DOK, at 412-367-2393; or e-mail <bferrey@nauticom.net>; or through the North Hills ARC Web site at <http://nharc.pgh.pa.us>. (Handicapped accessible.)

July 13, **Fox River Radio League 1997 Hamfest**, Waubonsee Community College, Sugar Grove, Illinois. Contact Diana Skube, WD9API, c/o FRRL, P.O. Box 673, Batavia, IL 60510; or call 630-293-7485. (Exams.)

July 19, **25th Annual Cary Mid-Summer Swapfest**, Cary, North Carolina. For more information, send SASE to the Cary ARC, P.O. Box 53, Cary, NC 27512.

July 19, **Coos County Annual Hamfest**, North Bend Junior High School, Coos Bay/North Bend, Oregon. Contact Hugh MacDonald, N7OKM, P.O. Box 1822, Bandon, OR 97411(541-347-7019); or Bob Mason, N7DCD, 599½ North Cedar St., Coquille, OR 97423 (541-396-4479).

July 19, **Sugar River ARC Amateur Radio Festival & Fleamarket**, Newport, New Hampshire Common. Contact Rob, N1CIR, 603-863-5383. (Exams.)

July 19, **NOARSFEST**, Lorain County Fairgrounds, Wellington, Ohio. Contact John, KC8AOX, 528 2nd Street B, Elyria, OH 44035; phone 216-322-0081; e-mail <kc8aox@qsl.net>; Web <www.ohio. net/~noars>. (Exams.)

July 20, **Van Wert ARC 10th Annual Hamfest**, Van Wert County Fairgrounds, Van Wert, Ohio. For more information, send SASE to VWARC, P.O. Box 602, Van Wert, OH 45891-0602; or call Bob, WD8LPY, 419-238-1877; e-mail <barnesrl@bright.net>; Web http://www.bright.net/~barnesrl/w8fy.htm>. (Exams.)

July 20, **MidAtlantic DX and Repeater Association Sweatfest '97**, MARC Train Station, Brunswick, Maryland. Contact The MidAtlantic DX & Repeater Association, 230 N. Potomac St., Hagerstown, MD 21740; phone 310-416-8447 Box #109; on the Web <http://members.aol.com/madraclub>; e-mail <madraclub@aol.com>. (Exams.)

July 20, **MIT Electronics Research Society/Radio Society & Harvard Wireless Club Fleamarket**, Albany and Main St., Cambridge, Massachusetts. For more information, call 617-253-3776.

July 20, **The Sussex County ARC 19th Annual Hamfest**, Sussex County Fairgrounds, Augusta, New Jersey. Contact Daniel Carter, N2ERH, 8 Carter Lane, Branchville, NJ 07826 (201-948-6999).

July 25–26, **Ham Holidays '97**, Oklahoma State Fair Park (Hobbies, Arts & Crafts Building), Oklahoma City, Oklahoma. For more information via the Web, check the CORA Web site at: <www.geocities.com/heartland/7332>. Address other inquiries to Ham Holidays '97, P.O. 95942, Oklahoma City, OK 73143; or e-mail <n1lpn@swbell.net>. (Exams.)

July 25–27, **ARCA Ft. Tuthill Hamfest and Arizona State Convention**, Coconino County Fairgrounds, Flagstaff, Arizona. Contact the Amateur Radio Council of Arizona at 602-440-2039. (Exams.)

July 25–27, **46th Annual Pacific Northwest DX Convention**, Richmond Inn, Richmond, British Columbia. For information, contact Ken Thompson, VE7BXG, P.O. Box 3048, Blaine, WA 98231.

July 26, **Rockfords Hamfest and Computerfair**, Winnebago County Fairgrounds, Pecatonica, Illinois. Contact Marsha, KB9NGN, 815-399-9233; or RARA, P.O. Box 8465, Rockford, IL 61126-8465.

July 26, **22nd Annual Western Carolina Hamfest**, Haywood County Fairgrounds, near Waynesville and Lake Junaluska, North Carolina. For more information, call Tommy Queen, K4BNP, 704-258-2639; e-mail <k4bnp@juno.com>. (Exams.)

July 27, **BRATS Maryland Hamfest and Computer Fest**, Timonium Fairgrounds, Baltimore, Maryland. Contact BRATS Hamfest, P.O. Box 5915, Baltimore, MD 21282-5915; phone/fax 410-467-4634; e-mail <brats@smart.net>; on the Web at <http://www.smart.net/~brats>. (Handicapped accessible; exams.)

July 27, **Racine Hamfest '97**, Racine Megacycle Club, South Hills Country Club, Racine, Wisconsin. For more information, contact Dave Voss, WB9USI, at 414-554-7565. (Exams.)

BY GEORGE JACOBS, W3ASK

PROPAGATION

THE SCIENCE OF PREDICTING RADIO CONDITIONS

Increasing Evidence Cycle 23 Began During May 1996

Solar scientists throughout the world continue to ponder the exact date to assign to the beginning of sunspot Cycle 23. There is, however, an increasing amount of natural evidence which seems to pinpoint the birth date of the new cycle as May 1996.

Table I shows the smoothed sunspot numbers and the smoothed 10.7 cm solar flux values recorded during 1996, including the latest available, which is for September. These smoothed values are based on the average of mean values recorded over a 12-month period. For this reason smoothed values are 6 months behind the latest available mean values.

In addition to increasing levels of sunspots and solar flux values, scientists have reported increases in x-ray and other emissions from the sun, as well as an increase in the number of new cycle spots.

The monthly mean sunspot count for March 1997 was 8.8. This is based on observations made at more than 40 solar observatories throughout the world, and compiled and coordinated by Dr. André Koeckelenbergh of the Royal Observatory of Belgium. The largest number of spots reported was observed on March 5 with a count of 25. There were 12 days during the month when the sun was spotless. The mean number for March results in a smoothed number of 8.5 centered on September 1996. This smoothed number is the average of the monthly mean values between March 1996 and March 1997.

There was a corresponding increase in the level of 10.7 cm solar flux as measured at Canada's Dominion Radio Astrophysical Observatory located at Penticton, BC. A mean level of 73 was reported for March 1997. This results in a smoothed value of 72.1 centered on September 1996.

LAST-MINUTE FORECAST

Day-to-Day Conditions Expected for July 1997

	Expected Signal Quality			
Propagation Index.....	**(4)**	**(3)**	**(2)**	**(1)**
Above Normal: 4, 10, 19-20, 31	A	A	B	C
High Normal: 3, 5-7, 9, 11, 21-22, 30	A	B	C	C-D
Low Normal: 1-2, 8, 14-15, 17-18, 26-29	B	C-B	C-D	D-E
Below Normal: 12, 16, 23, 25	C	C-D	D-E	E
Disturbed: 13, 24	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 S9, with some fading and noise.

D—Poor opening, with weak signals varying between S1 and S6, with considerable fading and noise.

E—No opening expected.

HOW TO USE THIS FORECAST

1. Find the *propagation index* associated with the particular path opening from the Propagation Charts appearing on the following pages.

2. With the *propagation index*, use the above table to find the expected signal quality associated with the path opening for any given day of the month. For example, an opening shown in the Propagation Charts with a *propagation index* of 3 will be fair to good (C-B) on July 1st – 3rd, Excellent (A) on the 4th, good (B) on the 5th, fair to poor (C-D) on the 6th, etc.

1996	Smoothed Sunspot Number	Smoothed 10.7 cm Solar Flux
Jan.	10.4	72.4
Feb.	10.1	72.2
Mar.	9.7	72.2
Apr.	8.6	71.6
May	8.1*	71.4*
Jun.	8.6	71.8
Jul.	8.5	72.0
Aug.	8.4	72.1
Sep.	8.5	72.1

Table I– Smoothed sunspot numbers and 10.7 cm solar flux levels recorded during 1996. The asterisk (*) Indicates the apparent beginning of Cycle 23. Values shown are preliminary.

July Solar Predictions

While off to a very slow start, the new cycle is expected to increase more rapidly in the following months. Scientists, however, continue to disagree as to how fast the new cycle will grow. The National Geophysical Data Center in Boulder is calling for a smoothed level of 11 for July 1997. Just a few streets away in Boulder, the Space Environmental Center of NOAA forecasts a level of 44 for this July! In Brussels, Dr. Koeckelenbergh is calling for a level of 14. A solar flux level in the 80s is expected for this July.

From The Mail Box

I am an SWL and I want to find the propagation forecast on the Internet. Could you please send me Internet addresses where I can find this information. Thank you. 73, Pierre-Emmanuel Lefebvre, Montbeliard, France (e-mail <plefebvre@francemultimedia.fr>).

Pierre, there are many sources of propagation on the web pages of the Internet. I have linked the following most popular ones to my web page: Space Environmental Center (USA), Solar Terrestrial Dispatch (Canada), and the Ionospheric Propagation Services (Australia). I am planning to link several additional sources in the near future. You can find my web page at <http://www.gjainc.com>.

11307 Clara Street, Silver Spring, MD 20902
e-mail: g.jacobs@ieee.org

George, I am writing to thank you for 46 years of CQ "Propagation" columns. While I was first an SWL in 1957–58, it got me into amateur radio and I have enjoyed it ever since. I do remember the great Cycle 19 and so I unfortunately expected every cycle since then to be like 19. I can remember the days when 10 meters was crowded and open all night. The past few cycles were not like that. This past cycle 10 meters seemed to have been at its worst.

Thank you for all your hard work year after year. I would suggest that you show up at a PVRC or NCDXA meeting here in the DC area sometime so that we (your readers) could meet you to thank you in person. 73, Dave, W4JVN (e-mail <dklim@erols.com>).

Many thanks, Dave, for the nice words. Yes, Cycle 19 may have produced once-in-a-lifetime propagation conditions on the HF bands. We are in a new cycle now (#23), and it is beginning to rise slowly. By this winter I expect that there should again be some good 10 meter DX openings. Many scientists believe that this cycle may be higher than the last one, and so we may expect some really good openings in a year or two. While we may be surprised by Mother Nature, it is unlikely that Cycle 23 will match Cycle 19 in intensity.

Hi, George. I just read in the March CQ that you have been writing your column for 46 years. I knew that, because I read your first column back in the same month when I got my first license in Toronto as VE3DIL. Guys like you, Bill Orr, and "Scratchi" were my heroes (and still are). George, I am just one of your readers, but I want to say thanks for all those years of your contributions to amateur radio propagation. Your column has helped me tremendously over the years. You should be in the Guiness Book of Records. *73 de Lee, ZL2AL (ex-VE3DIL, VE3OE, VE3LJ, ZL7AA, and ZL8RI on Raoul last year!) <leith@inhb.co.nz>.*

I know that I speak for myself, Bill Orr, "Scratchi," and all of us here at *CQ* when I say that it is really the old-time readers of *CQ* like you who are our heroes. It is correspondence like yours that makes us all feel that the time spent is well worthwhile. Many thanks.

July Propagation

As a result of the expected increase in solar activity, HF propagation conditions this July should be somewhat improved over last year's conditions. With longer hours of daylight and the sun high in the northern sky, HF propagation conditions should be considerably more stable during July than they were during the spring months.

Twenty meters should be the optimum band for DX propagation during the month. The band should remain open to one area of the world or another from sunrise through midnight, and at

HOW TO USE THE SHORT-SKIP CHARTS

1. In the Short-Skip Chart, the predicted times of openings can be found under the appropriate distance column of a particular meter band (10 through 160 meters) as shown in the left-hand column of the chart. For the Alaska and Hawaii Charts the predicted times of openings are found under the appropriate meter band column (15 through 80 meters) for a particular geographical region of the continental USA as shown in the left-hand column of the charts. An * indicates the best time to listen for 160 meter openings. An ** indicates possible 10 meter openings.

2. The *propagation index* is the number that appears in ( ) after the time of each predicted opening. In the Short-Skip Chart, where two numerals are shown within a single set of parentheses, the first applies to the shorter distance for which the forecast is made, and the second to the greater distance. The index indicates the number of *days* during the month on which the opening is expected to take place, as follows:

(4) Opening should occur on more than 22 days
(3) Opening should occur between 14 and 22 days
(2) Opening should occur between 7 and 13 days
(1) Opening should occur on less than 7 days

Refer to the "Last-Minute Forecast" at the beginning of this column for the actual dates on which an opening with a specific *propagation index* is likely to occur, and the signal quality that can be expected.

3. Times shown in the charts are in the 24-hour system, where 00 is midnight; 12 is noon; 01 is 1 AM; 13 is 1 PM, etc. On the Short-Skip Chart appropriate *daylight* time is used at the path midpoint. For example on a circuit between Maine and Florida, the time shown would be EDT, on a circuit between New York and Texas, the time at the midpoint would be CDT, etc. Times shown in the Hawaii Chart are in HST. To convert to daylight time in other USA time zones add 3 hours in the PDT zone; 4 hours in the MDT zone; 5 hours in the CDT zone; and 6 hours in the EDT zone. Add 10 hours to convert from HST to GMT. For example, when it is 12 noon in Honolulu, it is 15 or 3 PM in Los Angeles; 18 or 6 PM in Washington, D.C.; and 22 GMT. Time shown in the Alaska Chart is given in GMT. To convert to *daylight* time in other areas of the USA subtract 7 hours in the PDT zone; 6 hours in the MDT zone; 5 hours in the CDT zone; and 4 hours in the EDT zone. For example, at 20 GMT it is 16 or 4 PM in New York City.

4. The Short-Skip Chart is based upon a transmitted power of 75 watts CW or 300 watts PEP on sideband; the Alaska and Hawaii Charts are based upon a transmitter power of 250 watts CW or 1 KW PEP on sideband. A dipole antenna a quarter-wavelength above ground is assumed for 160 and 80 meters, a half-wave above ground on 40 and 20 meters, and a wavelength above ground on 15 and 10 meters. For each 10 dB gain above these reference levels, the *propagation index* will increase by one level; for each 10 dB loss, it will lower by one level.

5. Propagation data contained in the charts has been prepared from basic data published by the Institute for Telecommunication Sciences of the U.S. Dept. of Commerce, Boulder, Colorado 80302.

are forecast during the hours of darkness. Not many DX openings are expected on 160 meters during July because of seasonally high levels of static and solar absorption.

Peak Short-Skip Conditions

This month's column contains Short-Skip Propagation Charts for July and August, as well as charts centered on Hawaii and Alaska. The Short-Skip Charts contains propagation forecasts for distances between 50 and 2300 miles from your transmitting locations.

Short-skip propagation conditions are expected to be optimum during July as a result of a seasonal peak in sporadic-*E* propagation. During the daylight hours considerable short-skip openings are forecast for 10, 12, 15, and 17 meters over distances ranging between approximately 500 and 1300 miles, with some openings extending out to beyond 2000 miles. Around-the-clock short-skip openings are expected to take place almost around the clock. Peak conditions should take place for several hours after local sunrise, and again during the late afternoon and early evening hours. During these peak periods 20 meters may be open in almost all directions at the same time.

With increasing solar activity 15 and 17 meters should open fairly frequently towards the south. Short-skip openings into the Caribbean area and Central America may be possible as early as 10 AM. Longer skip openings should take place later in the day, between 3 and 6 PM local daylight time. The bands may open occasionally during the late afternoon to Africa and possibly Europe, and during the early evening to the Pacific area and Australasia. On 10 and 12 meters the only DX looks like short-skip openings during the day towards the Caribbean and Central America and an occasional longer skip opening towards South America and perhaps Africa during the afternoon.

During the hours of darkness, 30 and 40 meters should open to many areas of the world, but seasonally high static levels may often mar DX reception. High static levels are also expected to hinder DX conditions on 80 meters, although some good long-distance openings

CQ Short-Skip Propagation Chart
July & August 1997
Local Daylight Savings Time
At Path Mid-Point

Band (Meters)	Distance Between Stations (Miles)			
	50-250	*250-750*	*750-1300*	*1300-2300*
10	*Nil*	08-10 (0-1) 10-14 (0-3) 14-18 (0-1) 18-22 (0-2) 22-08 (0-1)	08-10 (1) 10-14 (3) 14-18 (1-2) 18-22 (2-3) 22-08 (1)	08-10 (1-0) 10-14 (3-0) 14-18 (2-0) 18-22 (3-0) 22-08 (1-0)
15	*Nil*	08-10 (0-2) 10-14 (0-3) 14-18 (0-2) 18-20 (0-3) 20-22 (0-2) 22-08 (0-1)	08-10 (2) 10-14 (3) 14-18 (2) 18-20 (3) 20-22 (2) 22-00 (1-2) 00-08 (1)	08-10 (2-0) 10-14 (3-0) 14-16 (2-0) 16-18 (2-1) 18-20 (3-1) 20-21 (2-1) 21-00 (2-0) 00-08 (1-0)
20	10-00 (0-1)	07-10 (0-2) 10-16 (1-4) 16-21 (1-3) 21-00 (1-2) 00-07 (0-1)	07-10 (2) 10-16 (4) 16-19 (3) 19-21 (3-4) 21-00 (2-3) 00-07 (1-2)	07-10 (2) 10-16 (4-2) 16-19 (3) 19-21 (4) 21-23 (3-2) 23-00 (3-1) 00-05 (2-0) 05-07 (2-1)
40	08-12 (1-2) 12-16 (1-4) 16-20 (2-4) 20-23 (1-2) 23-08 (0-1)	08-10 (2-3) 10-12 (2) 12-16 (4-2) 16-18 (4-3) 18-20 (4) 20-23 (2-4) 23-08 (1-3)	08-10 (3-1) 10-16 (2-0) 16-18 (3-1) 18-21 (4-3) 21-23 (4) 23-06 (3-4) 06-08 (3)	08-10 (1-0) 10-16 (0) 16-18 (1-0) 18-21 (3-2) 21-06 (4) 06-08 (3-1)
80	07-12 (3-4) 12-17 (4-3) 17-22 (4)	08-10 (4-1) 10-12 (4-0) 12-17 (3-0)	08-10 (1-0) 10-17 (0) 17-19 (0-1)	08-19 (0) 19-21 (1-0) 21-23 (2-1)
	22-05 (3-4) 05-07 (3)	17-19 (4-1) 19-21 (4-2) 21-23 (4-3) 23-05 (4) 05-07 (3) 07-08 (4-2)	19-21 (2-1) 21-23 (3-2) 23-05 (4) 05-07 (3) 07-08 (2-1)	23-04 (4-3) 04-05 (4-2) 05-06 (3-1) 06-07 (3-0) 07-08 (1-0)
160	18-19 (1-0) 19-20 (1) 20-22 (3-2) 22-00 (4-3) 00-06 (4) 06-08 (3-2) 08-09 (1) 09-10 (1-0)	19-20 (1-0) 20-21 (2-0) 21-22 (2-1) 22-00 (3-2) 00-04 (4-2) 04-06 (4-3) 06-08 (2-1) 08-09 (0-1)	21-22 (1) 22-01 (2-1) 01-04 (2) 04-06 (3-2) 06-07 (1) 07-08 (1-0)	21-23 (1-0) 23-01 (1) 01-06 (2-1) 06-07 (1-0)

HAWAII
July & August 1997
Openings Given in Hawaiian Standard Time

To:	*15 Meters*	*20 Meters*	*40 Meters*	*80 Meters*
Eastern USA	12-14 (1) 14-15 (2) 15-16 (1)	02-05 (1) 05-07 (2) 07-14 (1) 14-16 (2) 16-18 (3) 18-19 (2) 19-20 (1)	18-20 (1) 20-00 (2) 00-02 (1)	20-21 (1) 21-23 (2) 23-01 (1)
Central USA	09-13 (1) 13-17 (2) 17-19 (1)	04-05 (1) 05-07 (3) 07-09 (2) 09-13 (1) 13-16 (2) 16-18 (4) 18-19 (3) 19-20 (2) 20-22 (1)	18-21 (1) 21-22 (2) 22-01 (3) 01-02 (2) 02-03 (1)	20-22 (1) 22-01 (2) 01-02 (1) 21-02 (1)*
Western USA	08-09 (1) 09-11 (2) 11-13 (1) 13-15 (2) 15-17 (3) 17-18 (2) 18-19 (2) 14-16 (1)**	04-06 (1) 06-08 (2) 08-11 (3) 11-15 (2) 15-16 (3) 16-18 (4) 18-19 (3) 19-21 (2) 21-23 (1)	18-19 (1) 19-20 (2) 20-22 (3) 22-02 (4) 02-04 (3) 04-05 (2) 05-06 (1)	19-20 (1) 20-22 (2) 22-02 (3) 02-03 (2) 03-04 (1) 23-03 (1)*

ALASKA
July & August 1997
Openings Given in GMT

To:	*15 Meters*	*20 Meters*	*40 Meters*	*80 Meters*
Eastern USA	*Nil*	12-15 (1) 22-01 (1) 01-03 (2) 03-05 (1)	07-10 (1)	*Nil*
Central USA	00-03 (1)	13-16 (1) 23-01 (1) 01-04 (2) 04-05 (1)	08-12 (1)	*Nil*
Western USA	02-05 (1)	14-16 (1) 16-18 (2) 18-00 (1) 00-02 (2) 02-05 (3) 05-06 (2) 06-08 (1)	07-09 (1) 09-13 (2) 13-15 (1)	10-13 (1)

*Indicates best time to listen for 160 meter openings.
**Indicates best time for 10 meter openings.
For 12 m openings interpolate between 10 and 15 m openings.
For 17 m openings interpolate between 15 and 20 m openings.
For 30 m openings interpolate between 40 and 20 m openings.
Note: The Alaska and Hawaii Porpagation Charts are intended for distances *greater* than 1300 miles. For shorter distances, use the preceding Short-Skip Propagation Chart.

pected on 20 meters between distances of 300 and about 2300 miles. Conditions on 20 meters should peak during the late afternoon and the early evening.

Good daytime short-skip openings on 30 and 40 meters are forecast for distances between 100 and 750 miles, with good nighttime openings expected between 250 and 2300 miles. Conditions on 80 meters are also expected to be good during the daylight hours, with openings up to approximately 300 miles. During the hours of darkness, good openings should be possible up to the one-hop limit of 2300 miles. While no short-skip openings are expected on 160 meters during the daylight hours, some good openings should be possible during the hours of darkness up to at least 1300 miles as and long as 2300 miles.

W3ASK (left) at a recent reunion near Vienna, Austria with Dr. Ing. Gunter (Gynt) Haubenberger, OE3HGW. George and Gynt have worked very closely together for the past 45 years in the field of HF propagation. Here they are seen discussing the new sunspot cycle over a Vienna Schnitzel. (Photo by Bea)

VHF Ionospheric Openings

The best bet for ionospheric openings on 6 and 2 meters during July should be during periods of very intense sporadic-*E* propagation. Fairly frequent 6 meter openings should be possible over distances ranging between approximately 600 and 1300 miles, with some openings extending out to about 2000 miles, and possibly beyond. Few 2 meter openings are expected, but some could take place between 1000 and 1300 miles as a result of sporadic-*E* ionization. While sporadic-*E* openings can take place at just about any time, statistics indicate that conditions for 6 and 2 meter openings peak for a few hours before noon and again during the late afternoon and early evening. During July you can expect openings on 6 meters on three out of four days. Openings may last from a few minutes up to several hours. Considerably fewer openings are expected on 2 meters.

Some VHF meteor activity should take place during the *Delta Aquarids* shower. This is a major shower which should occur between July 28 and 30, peaking at 2 AM EDT on the 29th with a meteor count of about 20 an hour.

Some VHF openings are also likely to occur during auroral activity. Check the Last-Minute Forecast at the beginning of this column for periods that are expected to be Disturbed or Below Normal during July. These are the dates on which auroral-type short-skip openings are likely to occur on the VHF bands.

73, George, W3ASK

CIRCLE 57 ON READER SERVICE CARD

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AWARD for proven contact with one zone 12 station. Send log and $5.00US for fee to: CE2NJ, Hanga Roa 590, Valparaiso, Chile.

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SX88 Hallicrafters receiver wanted. Jim, W6OU, 714-528-5652.

ASTRON Power Supply, brand new w/warranty, RS20M $99, RS35M $145, RS50M $209, RS70M $249. Call for other models, 818-286-0118.

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WANTED: OLD QSL CARDS—Paying $1–$100+ each for QSL cards **with postage stamps** mailed from JAPAN before 1955. Send cards or photocopies to Gary Tanaka, 1139 Bal Harbor Blvd., Punta Gorda, FL 33950.

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(continued on page 115)

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DX HEADING MAPS: W2HOJ, 800-941-2252.

QRP Monoband Transceiver Kits for 80, 40, 30, 20. Superhet, QSK, RIT, VBT, 5W. SASE for more info. **EMTECH**, 3641A Preble St., Bremerton, WA 98312 (phone 360-415-0804; e-mail http://www.isomedia.com/homes/starbuck/emtech.htm).

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HAM location, beautiful all-brick rancher, 4700 sq. ft. home includes home office, HAM shack (radio room), antennas, 3 tiled full baths, 3 or more bedrooms, 3 dens. The 3 car garage and smoking room are not included in the 4700 sq. ft. Sturdy quality construction. Type of heat is great for sinuses and very warm. Acre lot, back fully fenced and very quiet and private, secure gates, separate dog kennel, olympic-size well-kept swimming pool. Located on mountain ridge, quiet prestigious neighborhood, nice homes all around, great schools. Located 55 miles from Baltimore and Washington, DC. Ideal location to work in DC, with easy accessibility by train. House and property will be inspected, one year warranty. Pictures, property plat, layout, amenities list, and features in a booklet available to serious buyers for $5 cash, check, or money order. Contact: W3BAG, Box 609, Braddock Heights, MD 21714, or call 301-473-5825.

RCI-2950/2970: Modification manual. Power, modulation, clarifier, NB & RF gain modifications. Parts included. $20.00 ppd money order, $26.35 COD. Scott, P.O. Box 225, St. Clair, MO 63077 (314-629-4294).

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WANTED: Copy of RADIO NEWS dated 3 February 1944. Also audio filter made by U.T.C. type TGT or TGU. Morriss, G4GEN, Pippingford Park, Nutley, Sussex, TN22 3HW, England.

WEATHER SATELLITE and MIR/SHUTTLE 2M Antennas. Woodhouse Communication, P.O. Box 73, Plainwell, MI 49080. Voice 616-226-8873; fax 616-226-9073; web site www.view2earth.com

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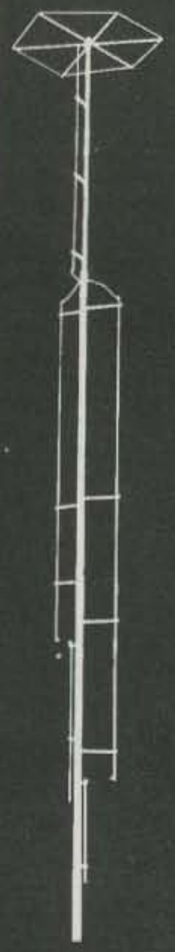
Eagle DX

Challenger DX



Voyager DX

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

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

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

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

The secret is out and people in the know say:

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

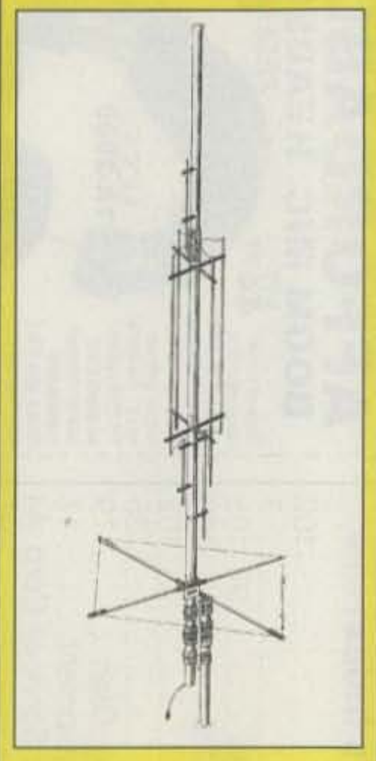
73–"This is a real DX antenna, much quieter than other verticals."

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

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

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

Latest Release: **TITAN DX**



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

MODEL	BANDS OF OPERATION											HT	WT	MOUNT	COUNTER-POISE	COST
	2m	6m	10m	12m	15m	17m	20m	30m	40m	80m	160m					
Challenger DX	■	■	■	■	■		■		■	■		31.5'	21 lbs	Drop In Ground Mount	3 Wires @ 25'	$259
Eagle DX			■	■	■	■	■		■			21.5'	19 lbs	1-1/4" pipe	80" Rigid	$269
Titan DX			■	■	■	■	■	■	■	■		25'	25 lbs	1-1/4" pipe	80" Rigid	$299
Voyager DX							■		■	■	■	45'	39 lbs	Hinged Base	3 Wires @ 57'	$399

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  - 750~1300 MHz*
  - TX: 144~148 MHz
  - 430~450 MHz
- Detachable Front Panel (remotable w/optional YSK-8100)
- 3 Power Output Levels
  - 2m 50/20/5 Watt
  - 70cm 35/20/5 Watt
- 208 Memory Channels
- Enhanced Smart Search™
- CTCSS Encode
- Built-in Duplexer
- S-Meter Squelch
- Dual Receive (V+V,U+U,V+U)
- Crossband Repeat (bidirectional or one-way)
- PC Programmable w/optional ADMS-2D
- Digital Battery Voltage Display
- Auto Power Off (APO)
- Omni-Glow™ Display
- 1200/9600 bps Packet Compatible
- Alternating-Band Memory Selection (ABMS)
- DTMF Autodialer (6 Memories)
- Time Out Timer (TOT)
- Accessories: Consult your local Yaesu dealer.

*Cellular & 900 MHz Cordless Phone frequencies blocked.

50W/VHF
35W/UHF

NOW AVAILABLE!

For the ham who's always wanted an IC-781...

Introducing ICOM's IC-756

Advanced features and performance, in the spirit of the IC-781.
But at a real down-to-Earth price.

HF+6M!

ICOM uses next generation technology to combine high performance and advanced features in an easy-to-control package: the all new IC-756!

- 4.9" Concentrated Information LCD Display with dot matrix characters
- 5-100 variable-control watts of 100% stable output power (5-40 W on AM)

☞ *Large soft key buttons allow for on-screen control of alphanumeric naming, programmable "memo-pad" info, attenuation levels, antenna selection, AGC speed, and more!*

- SSB/AM/FM/CW/RTTY
- Fast, built-in automatic antenna tuner with preset 100 kHz steps
- Dual watch
- Twin passband tuning
- 101 memory channels
- 13.8 volt operation

IF-DSP

New, adjustable IF-DSP on transmit and receive! Bring in signals crisp & sharp, and send clean for improved QSOs.

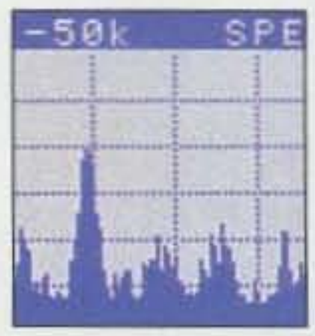
- Noise reduction
- Auto IF notch filter
- Selectable Audio Peak Filter (APF)
- Phase Shift Network (PSN) modulation/demodulation

plus:

- **PC programmable†:** ICOM's CI-V interface is built-in
- High-performance memory keyer

PC Ready!

☞ *Use the IC-756's LCD spectrum scope to visually find nearby airwave activity! The displayed info scrolls as the frequency changes!*



- Noise blanker on/off control
- Speech synthesizer
- Voice synthesizer (option UT-102 required)

VALUE

Step up to a higher performance rig. The IC-756 is built 100% ICOM reliable, and it's priced only slightly higher than other models with far fewer features.

Call ICOM's brochure hotline today at 206-450-6088 or see the IC-756 at your ICOM dealer!

ICOM®
PC Powered!
http://www.icomamerica.com

NOW AVAILABLE!

† Option CT-17 required. Questions? Contact ICOM Technical Support in the HamNet forum on CompuServe @ 77540,525 (Internet:75540.525@compuserve.com)