

ICD 08241

# Amateur Radio

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DECEMBER 1994

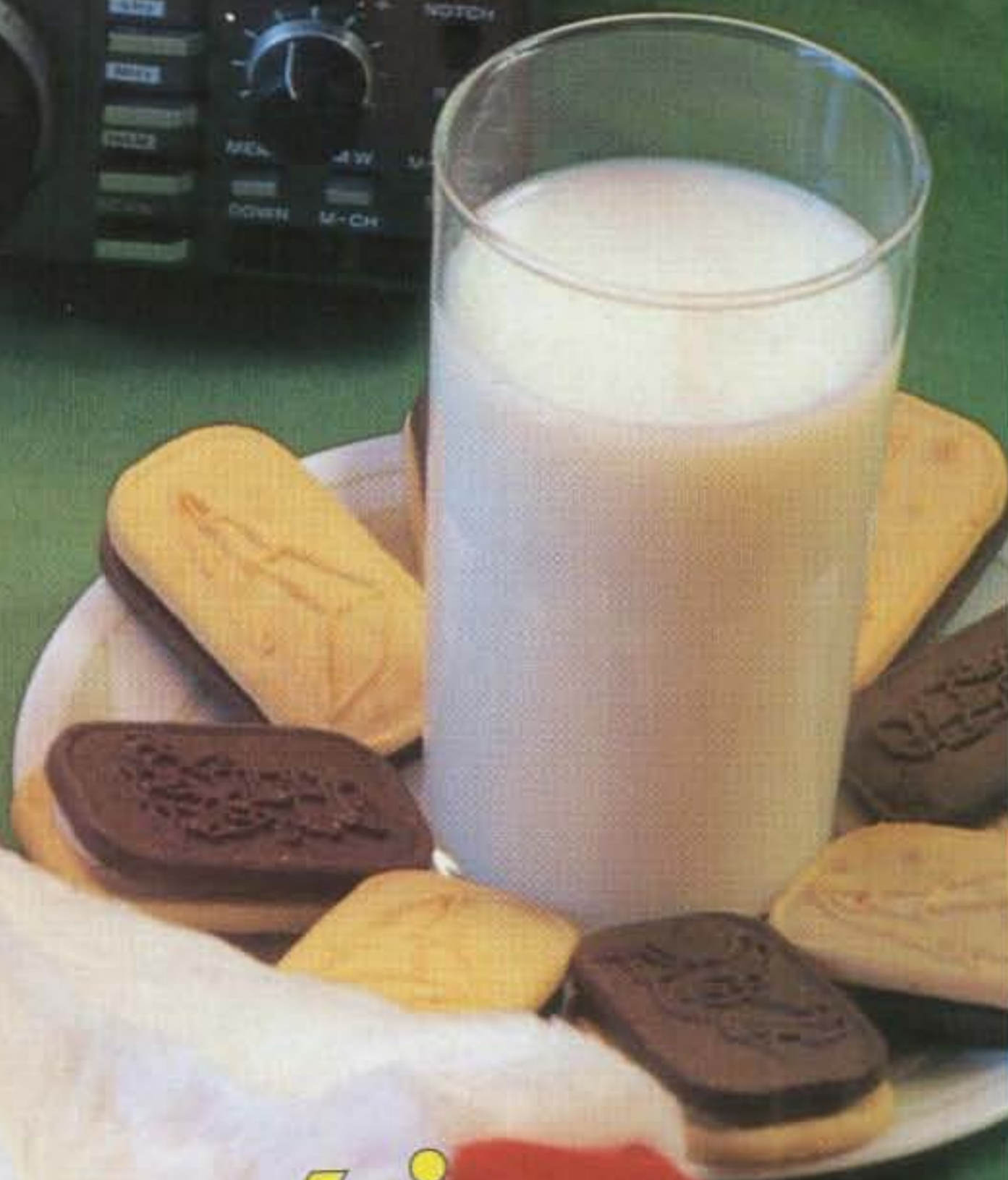
# CQ

1945

Our  
50th  
Year

1994

**Holiday  
Gift Catalog  
Inside!**



## *Season's Greetings*

U.S. \$3.95 CAN



AMATEUR'S JOURNAL

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Advanced technology moves Kenwood's HF rigs to the top.

**HOLIDAY CASH  
BACK OFFER!**

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dealer for details

(expires Dec. 31, 1994)

## TS-450SAT/S • TS-690S

- 160m to 10m amateur band operation, 500kHz to 30MHz general coverage receiver • 6m amateur band and 50-54MHz general coverage receiver (TS-690S)
- DDS (Direct Digital Synthesizer) & digital PLL system
- AIP (Advanced Intercept Point) system
- Automatic antenna tuner (built-in or optional)
- IF shift function tuning • AF notch filter
- Heavy duty cycle design • 100 memory channels



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- MOS-type FET final section • Dual frequency receive
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- DDS (Direct Digital Synthesizer) • Menu system
- AIP (Advanced Intercept Point) system
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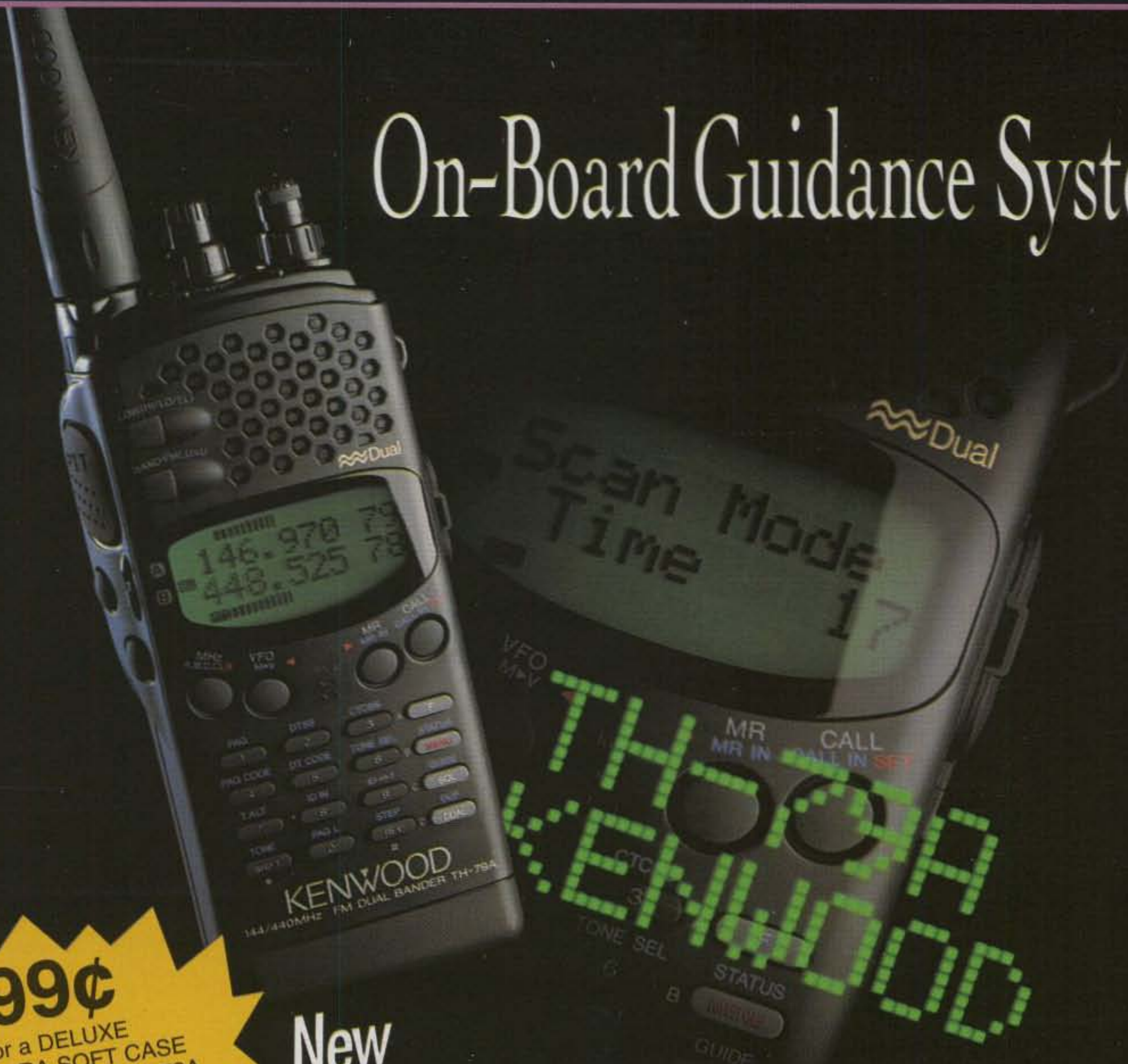
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- 2.7W output (144MHz), 2W output (440MHz) from MOS FET power module and supplied 6V battery; 5W output using optional PB-34
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- Modifiable for MARS/CAP use\*\*

\*Specifications guaranteed for Amateur bands only.

\*\*Permits required. Specifications guaranteed for Amateur bands only.

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# MIL-SPECS/TOP SPECS!

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These specifications guaranteed for Amateur band only.  
\*Current R&K2 versions with serial number 5080000 or later.

Pure and simple, the concept reads like this: "rock-solid performance with straightforward operation, at an affordable cost". And Kenwood's TM-241A (144MHz) FM mobile transceiver symbolizes this perfectly.

Great looks and rugged construction are just the beginning. The TM-241A's user-friendly controls make mobile QSOs a snap, and a powerful 50-watt amplifier lets you work simplex with confidence or hit those distant repeaters. Reception specs are equally impressive: intermod characteristics have been improved\* to reduce interference from strong adjacent band signals. Plus, there are 20 multi-function memory channels for programming combinations of frequency, sub-audible tone, and repeater offset.

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**The Radio  
 Amateur's Journal**



**ON THE COVER:** You probably never suspected that the jolly old elf was a CW man. Well, here's the evidence! May your holiday season be as bright, joyous, and bountiful as you deserve. And may our ham friends the world over enjoy peace and harmony in their lives. (Photo by Larry Mulvehill, WB2ZPI)

**DECEMBER 1994**

**VOL. 50, NO. 12**

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## EDITORIAL

This year is winding down and quickly coming to a close. I don't know about you, but there are still a number of things on my "1994 List" that will have to carry over and be added to my "1995 List." The rat's nest of wires coming into the shack is still there and yet another year older. On the other hand, some of my venerable "good stuff" is gone and happily ensconced in someone else's shack, making more room for me to add new "good stuff" in '95. We had our local amateur radio flea-market in mid-October, and I brought my pick-up truck packed full of genuine primo "good stuff." About five hours later I left with only two small cartons of "semi-good stuff" and enough dinero to get most everything on my holiday shopping list.

Typically, I start my holiday shopping in August, much to the dismay of everyone here at the office. I'm also a chronic catalog junkie, so each day my mail includes six to ten catalogs, increasing in number as the holidays approach. Along about the beginning of September the boxes start arriving, and that's when I get growls and stares from my fellow workers. I know it's tradition to wait until the absolute last minute, gird your loins, face the crowds at local malls, and get terribly anxious and aggravated over the self-imposed discomfort of rushing through the holiday experience. It's usually quite a shock to both the system and the check-book to get all the bills at once in January. Years ago I decided to try to beat the system by shopping earlier, spacing it out, and doing my best to have everything paid for by the time the holidays arrived. That meant starting in August. Another incentive for me to complete my shopping list early is that I do my shopping for myself last, after everyone on my list is taken care of. By November I'm champing at the bit to start working on my personal list—you know, the kind of stuff that's too hard to explain to others why you need it or where to get it.

Where to get it is not all that difficult. Just peruse the pages of this issue, and you'll find any number of places that will be more than happy to ship you anything you might want (providing, of course, that you can pay for it). You can check out the ads to see what's available in the way of new gear being introduced and read some of the specs. If you've followed my advice during the year, you've left the confines of the shack at least once to attend a hamfest, where you were able actually to see first hand what the rest of the world seemed to know about. One of the great things about going to hamfests

### K6XP A Silent Key

Robert F. (Bob) Huntington, K6XP, formerly W6TCQ, became a Silent Key on October 4, 1994 after suffering a stroke.

Bob was *CQ's* WPX Manager from 1973 to 1981. He held an Extra Class license, and was an avid DXer and WPX hunter. He had retired and moved from Torrance, California to Visalia, California, where he continued his amateur radio activities.

Bob is survived by his wife, Ginny, son Robert, Jr., and daughter, Marilyn. He will be sorely missed by his friends and fellow amateurs.

(besides fleamarkets) is the opportunity to see most of the gear that's advertised on the pages of *CQ*. In our geographic area there really isn't any place to see that much stuff on display.

Print advertising is a neat way to be introduced to a product, to get a quick run-down on what's being offered and its salient features. However, it's the picture that really gets us. If you take food advertising, for example—especially those ads on TV for some of the more popular fast-food places—the food somehow always looks bigger, fresher, and far more inviting than in real life. With amateur gear, the picture does get your attention and does whet your technical appetite. Unlike food advertising, though, amateur products as a rule look much better (and often bigger) in real life. Therefore, during the year when we travel to various hamfests, I make it a point to check out as many products as I can. It's sort of like going to a car dealership and kicking tires, slamming doors, and looking under the hood. At a hamfest I can tweak knobs, heft whatever it is to see how heavy it is (I don't know why), see how it's made, and like most amateurs try to pretend that I really know and understand what all the knobs and switches are for. I can (and do) ask questions to find out things, and in the process I can learn, to some extent at least, what those knobs and switches do. Generally, I do the same things at the various events which cater to some of my other interests and hobbies.

Along about November I usually know what it is that I'd like to add to my shack for the upcoming year. I also have an idea about a few other things that would be nice to have to enhance some of my other hobbies. It doesn't mean that I'm going to get all of it, but some of it is surely possible. Now all it takes is to let this period of

anticipation simmer and grow until I decide. I know what it is, what it costs, and where to get it. Reality dictates what is finally possible. I'm also a firm believer in the adage that one shouldn't get everything one wants, simply because it takes away the excitement of looking forward or that sense of anticipation.

By now everyone knows that the true purpose of this holiday season is definitely not the giving, exchanging, or buying one's own presents (it just seems that way). The purpose is celebration and the ability to rejoice in one's tradition and belief. The season does tend to make one experience the feelings of happiness, joy, and compassion, and a host of other warm and fuzzy sensations. When you feel good, you also tend to want to share that feeling and spread it around. So feel good about the season. Give, exchange, or get your own present, and as the song says, be happy.

Now is also the time to start thinking in terms of making those all too familiar New Year's resolutions. Most of us can keep them for at least an hour or two. Most of what we resolve to do (or not do) may be a bit grandiose in scope or far beyond a simple personality change. Maybe it's time to keep things simple; to take joy in more things, including amateur radio; and that ever popular goal, to be nicer to more people. I know it sounds easy, but it's hard to do. For amateurs, at least, let's try to listen more and talk less. It only requires doing nothing for longer periods while somebody else talks. Oh, we might try listening and comprehending what is being said, which would fill up the time when we're not talking. It kind of gives us something to do while we're waiting to talk.

Let's try to remember that amateur radio is something we enjoy and do in between periods of real life—family, work, and community. Let's also keep in mind that some of our DX friends are more than a prefix or part of our country total, and that in today's times they may not have the luxury of feeling as secure as we do with regard to real life, family, work, and community. Think about what these holidays mean and represent and the feelings they bring forth, if only for a little while. And there's no law that you can't feel that way all year round, too. We certainly hope you do.

In fact, we here at *CQ* hope you enjoy this holiday season to the fullest and feel the joy all through 1995. Come celebrate January with us as we mark our 50th anniversary in amateur radio publishing.

73, Alan, K2EEK

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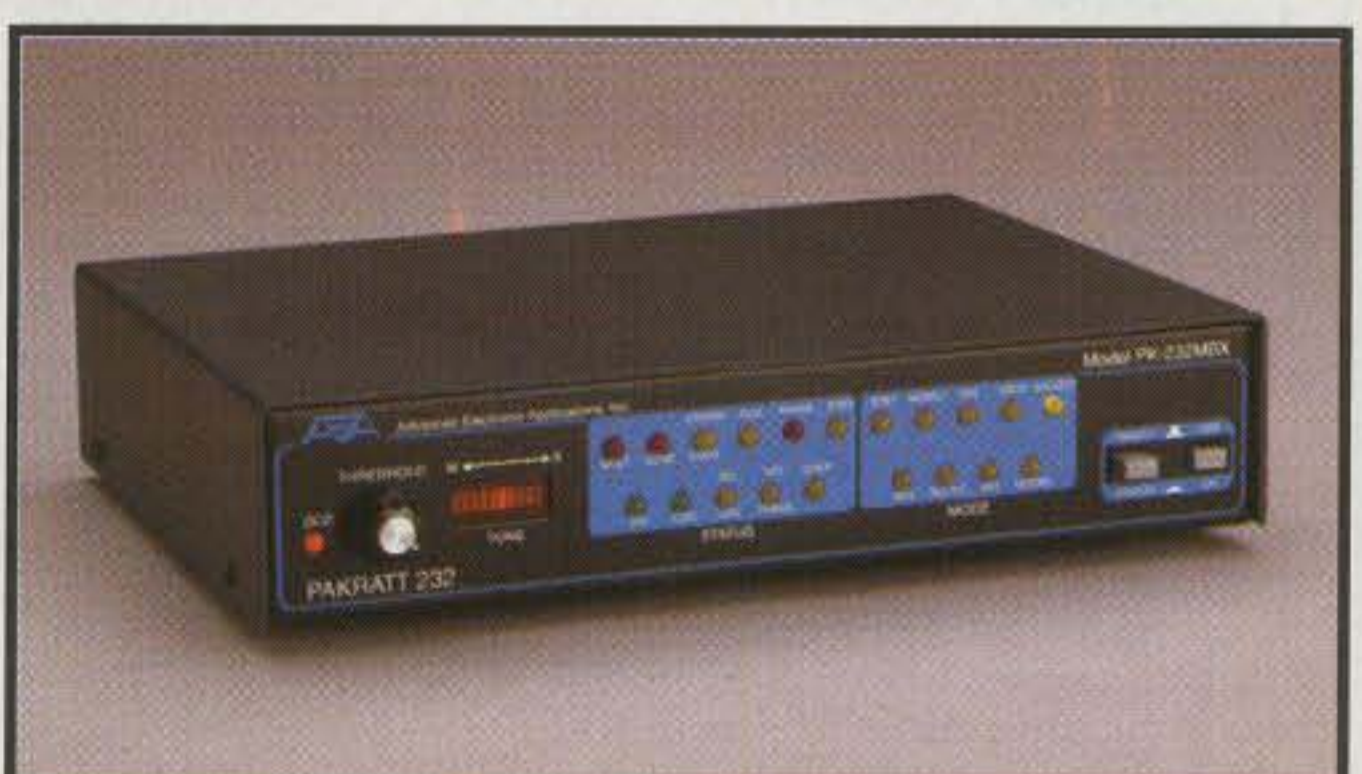


**DSP-2232**  
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# ANNOUNCEMENTS

• **The Dayton ARA, Inc. is offering scholarships** to amateurs graduating from high school in 1995. They are offering 8 scholarships in the amount of \$2,000 each. For more information and/or an application, contact: Stan Kuck, Scholarship Chairman at 513-748-0268; or write to: Dayton ARA

Scholarship Committee, 45 Cinnamon Ct., Springboro, OH 45066 (with SASE). Applications must be postmarked by May 15, 1995.

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

**N1CC**, from Christmas celebration, Albany, New York; Jim LaPorta; to cele-

brate Christmas; 1200-2200Z December 24 and 1600-2200Z December 25; on or around 28.475, 21.385, 14.260, 7.250, and 3.900 MHz. Special QSL card for QSO with SASE, DX via Buro. QSL to Jim LaPorta, N1CC, 21 High Dune Drive, Albany, NY 12203.

**K2BSA/4**, from Boy Scout 50 mile hike, Croatan National Forest, Havelock, North Carolina; Brightleaf ARC, W4AMC, and East Carolina Council, Boy Scouts of America; to commemorate the Boy Scouts' 10th Annual 50 mile hike; December 26-31; 10 meter band for Novice/Technicians and General portion of the 2, 10, 15, 17, 20, and 40 meters. For QSL for contacting K2BSA/4, send SASE to K2BSA/4, c/o BARC, P.O. Box 8387, Greenville, NC 27835.

**W3OK**, Christmas celebration, from Nazareth and Bethlehem, Pennsylvania; The Delaware-Lehigh ARC; December 17-18; 3.965, 7.265, 14.265, 21.365, 28.365. For certificate, send QSL and SASE to DLARC, RD4, Greystone Building, Nazareth, PA 18064.

**WO4K**, from the commemoration of Fort Christmas Museum, built Dec. 25, 1837; Fort Christmas, Florida; The Coronado Wireless Association; operation 25 kHz from the bottom of the General phone subbands and Novice 10 meter phone subband. For QSL, send a business-size SASE to Coronado Wireless Assn., Ft. Christmas S.E., P.O. Box 1361, Oak Hill, FL 32759.

**W5QX**, from Christmas celebration, Old Fort Concho, San Angelo, Texas; The San Angelo ARC; 1500Z December 2 to 2200Z December 4; General portions of the 40, 20, 15 meter subbands and the Novice 10 meter subband. For certificate send 9 x 12 SASE to AB5BG, 1210 Ardmore, San Angelo, TX 76905.

**KM6IH**, from 106th anniversary of the Tournament of Roses, the Wrigley Mansion, Pasadena, California; Relay Repeater Club; 1600-0200Z December 31 to January 2; 28.460, 21.335, 14.260, and 7.240 MHz. For a certificate send a QSL with contact number and a 9 x 12 SASE (postage 58¢). Enclose \$1.00 to cover printing costs. Mail to the Relay Repeater Club, P.O. Box 660081, Arcadia, CA 91066-0081.

**KB6JHP/Ø**, to commemorate the one-year anniversary of the arrival of the first B-2 Stealth Bomber, Whiteman AFB, Missouri; 1300Z Sat.-2300Z Sun., December 17-18; 80-10 meter General subbands. For QSL, send SASE to

(Continued on page 162)

## Our Alpha Delta Customers Say It Best!

Donald W. Reamer, KA3JWE  
265 Skyline Drive  
Easton, PA 18042-7024

Alpha Delta Communications, Inc.  
P.O. Box 620  
Manchester, KY 40962

Dear Sirs:

Thank you! It's great to see that a product really lives up to the reputation claimed in the advertising.

I have enclosed the model DELTA-2 coax switch for your inspection. I recently had a lightning strike near my house and had quite a bit of damage to numerous items throughout the house. Your switch was connected to my packet station which is on 24 hours a day. It was in the number 1 position. It saved my Kenwood TR-7800 from certain destruction. No damage was done to the radio at all! I thought that the engineers might like to see what happened to the switch, although they probably have seen it all by now anyway. I have already replaced the switch with a new one, a DELTA-4 this time. I have another DELTA-2 and a rotor protector on my other lines.

It seems that the only letters that people write anymore are to complain about something. Well, I like to write when I think a compliment is deserved. And your switches deserve a compliment. Thanks again for a good product.

Sincerely,

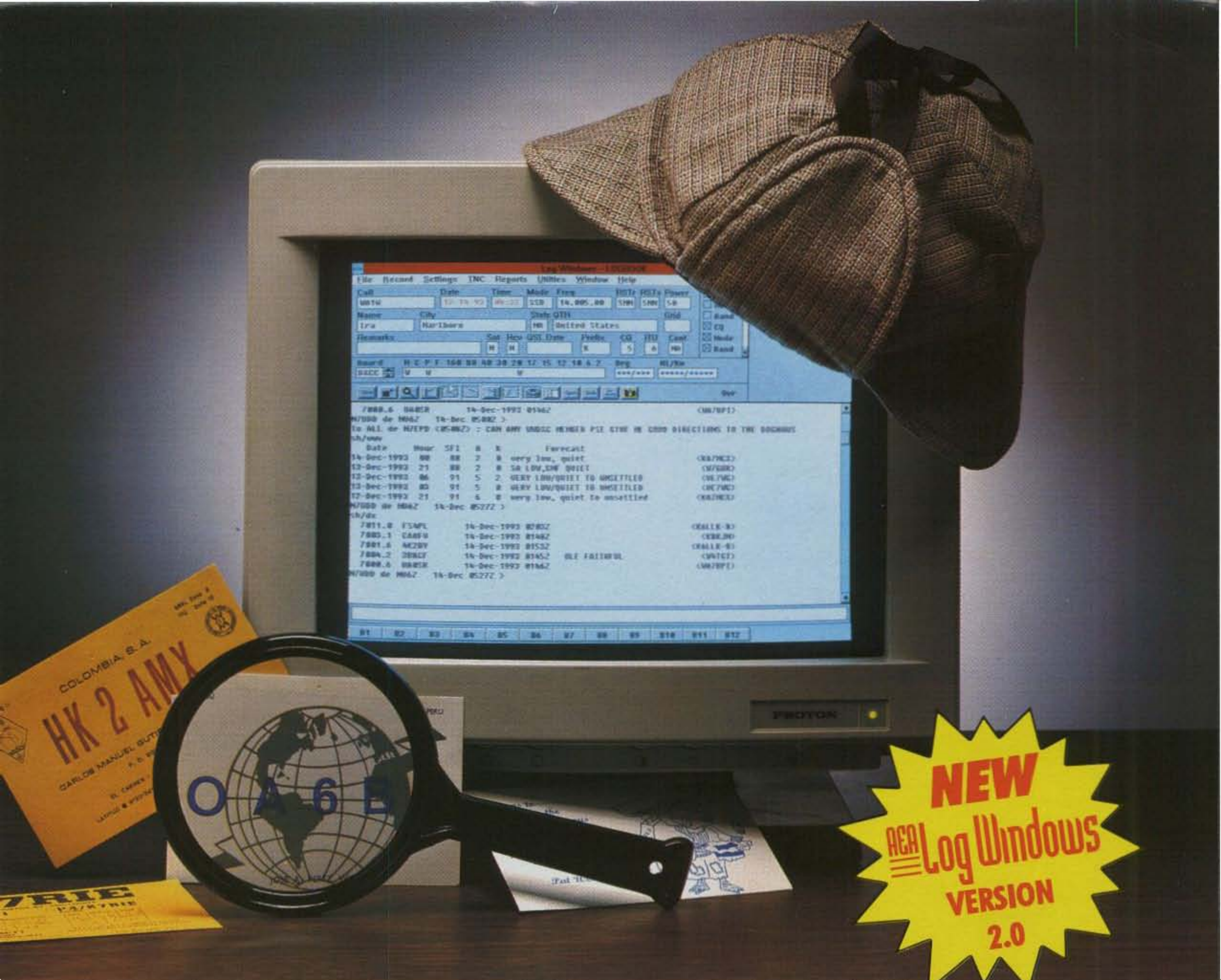
*Don*

Don, KA3JWE

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MODEL	A270-10S	
Frequency, MHz	144-148	430-450
Forward Gain, dBd	10	10
No. Elements	5	5
Front to Back Ratio, dB	20	18
SWR 1.2:1 Typical		
2:1 Bandwidth, MHz	≥4	≥10
Power Rating, Watts PEP	350	350
3dB Beamwidth, Degrees		
E Plane	52	52
H Plane	60	60
Boom Length, ft (m)	6.17 (1.9)	
Longest Element, in (cm)	40.3 (102.4)	
Turning Radius, ft (m)	6 (1.8)	
Mast Size Range, in (cm)	1.25-2 (3.2-5.1)	
Wind Load, ft <sup>2</sup> (m <sup>2</sup> )	.725 (.07)	
Weight, lb (kg)	1.8 (.81)	

MODEL	AR-270		AR-270B		ARX-270U/N	
Frequency, MHz	144-148 / 430-450		144-148 / 430-450		144-148 / 430-450	
Gain, dB	3.7	5.5	5.5	7.5	9	12
SWR 1.2:1 Typical						
2:1 Bandwidth, MHz	>4	>15	>4	>15	>4	>20
Power, Watts FM	250	250	250	250	200	200
Horizontal Radiation						
Pattern, Degrees	360	360	360	360	360	360
Height, ft. (m)	3.75 (1.13)		7.7 (2.3)		16.5 (5)	
Mast Size Range, in	1.25-2 (3.2-5.1)		1.25-2 (3.2-5.1)		1.25-2 (3.2-5.1)	
Radial Length, in (cm)	6.75 (17.1)		20 (51)		20.5 (52.1)	
Wind Load, ft <sup>2</sup> (m <sup>2</sup> )	0.27 (0.03)		0.47 (0.044)		0.95 (0.088)	
Weight, lb (kg)	2 (0.9)		2.4 (1.09)		5 (2.3)	
Construction style	High strength aluminum		High strength aluminum		Fiberglass enclosure	

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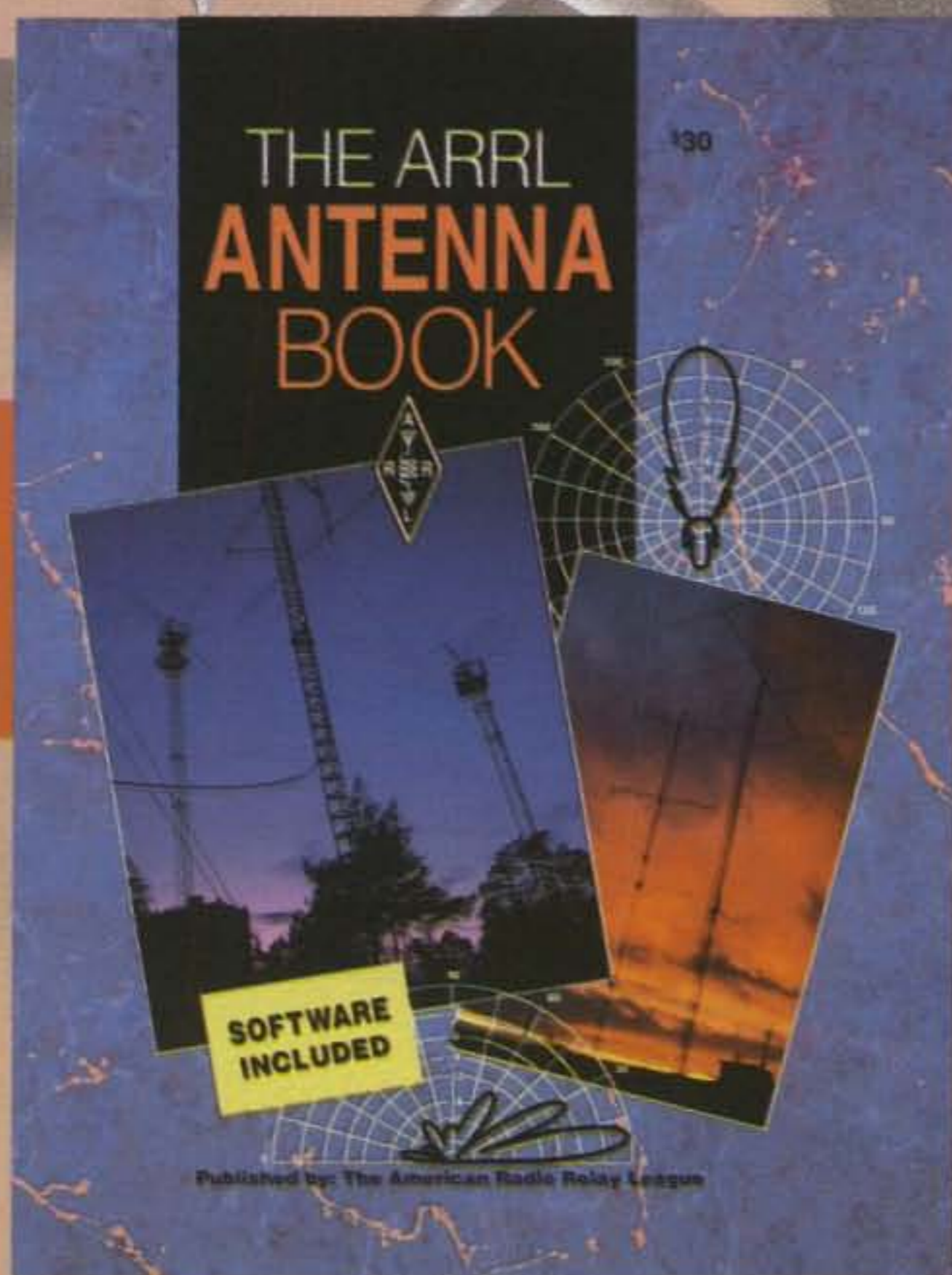
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**Over the years we've seen numerous articles on US surplus and several interesting articles on German WW II surplus. G4BXD now takes us on a delightful tour of both British and Canadian gear that we've probably never seen.**

## Surplus, A British Perspective

BY BEN NOCK\*, G4BXD

I really started collecting military sets as a serious venture some five years ago, although I have bought, sold, and used many war-time units in my 25 years of amateur radio.

I've been in contact with several US amateurs over the years, one in California on a regular basis. We have come to the conclusion that a lot of US collectors get to see very little of the sort of equipment available over here. In turn, there is very little US equipment in the UK, and what there is seems to have suffered at the hands of both the dreaded animal "modifierus anythingus insightus" and the ravages of the famed British weather.

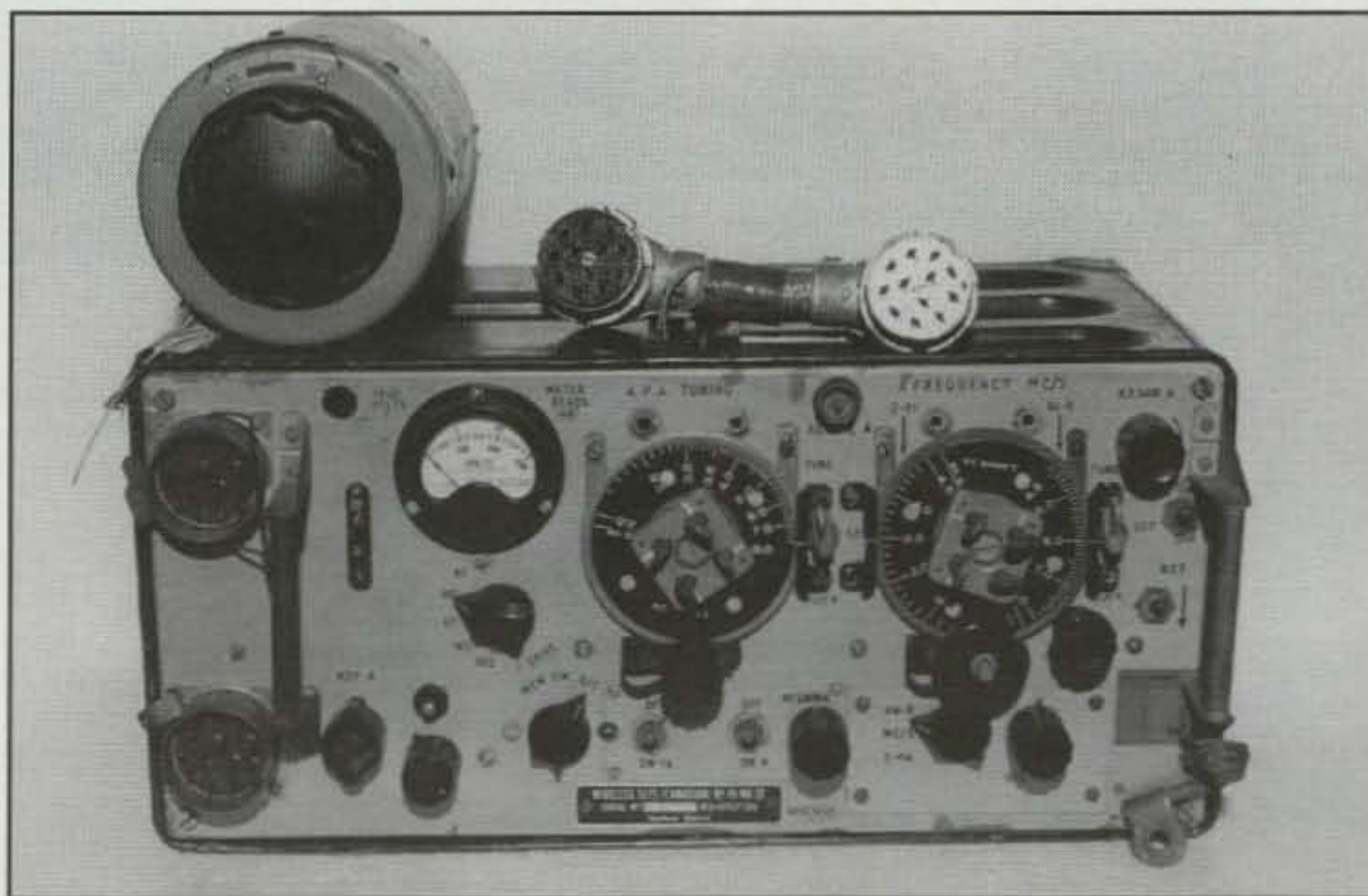
I offer for the delectation of the US collector a few of the sets, both war time and later, presently in this British collection, which is growing all the time. Once an affordable method of transportation across the pond can be found, the collection will increase in US content.

### Wireless Set 19

Probably one of our most famous units of WW II—in all theatres, in tanks, jeeps, on the back of pack animals, up mountains and in deserts—is the Model 19. I even have an example with a REME (Royal Electrical & Mechanical Engineers) workshop stamp on it dated 1957.

The 19 set was the mainstay of the British Army. Three versions were produced—the Mk I, II, and III. The sets cover 2.5 to 6.25 MHz in the Mk I, and 2 to 8 MHz in the Mk II and III in two bands. It is capable of AM, MCW, and CW operation. The set contains two systems, the HF system and a VHF unit operating around 230 MHz with a regenerative receiver and AM transmitter. The HF set was designed to run normally around 12 watts, or 30 watts with an external matching linear amplifier. The VHF portion was designed to run around 3 watts.

The 19 set uses an external power supply unit, the Mk I supply, utilizing a single dynamotor. The Mk II and III versions use



*The 19 set, Mk III, with antenna variometer and power supply connector. VHF tuning is just to the side of the left grab handle.*

two dynamotors, which when run on 12 VDC produced 275 and 500 volts DC. Other differences include an RF gain control on the Mk III, and slightly different switching of the intercom facility between the Mk's.

The 19 set uses nine tubes in the "A" set and six in the "B" set. The output tube in the "A" set is the popular 807. AM is achieved by low-level grid modulation. The "A" set operates into a 12 foot whip antenna on the back of the tank with the "Roller Coaster" antenna tuner in line, while the "B" set was designed to feed a 20 inch rod antenna.

The complete 19 set installation option is quite large. There are many control boxes, junction boxes, antenna arrangements, leads, and the like, all of which could all be used in numerous combinations and all of which made the set very versatile.

### The R1155 and T1154

The R1155 and T1154, the main equipment of the RAF during (and after) the war

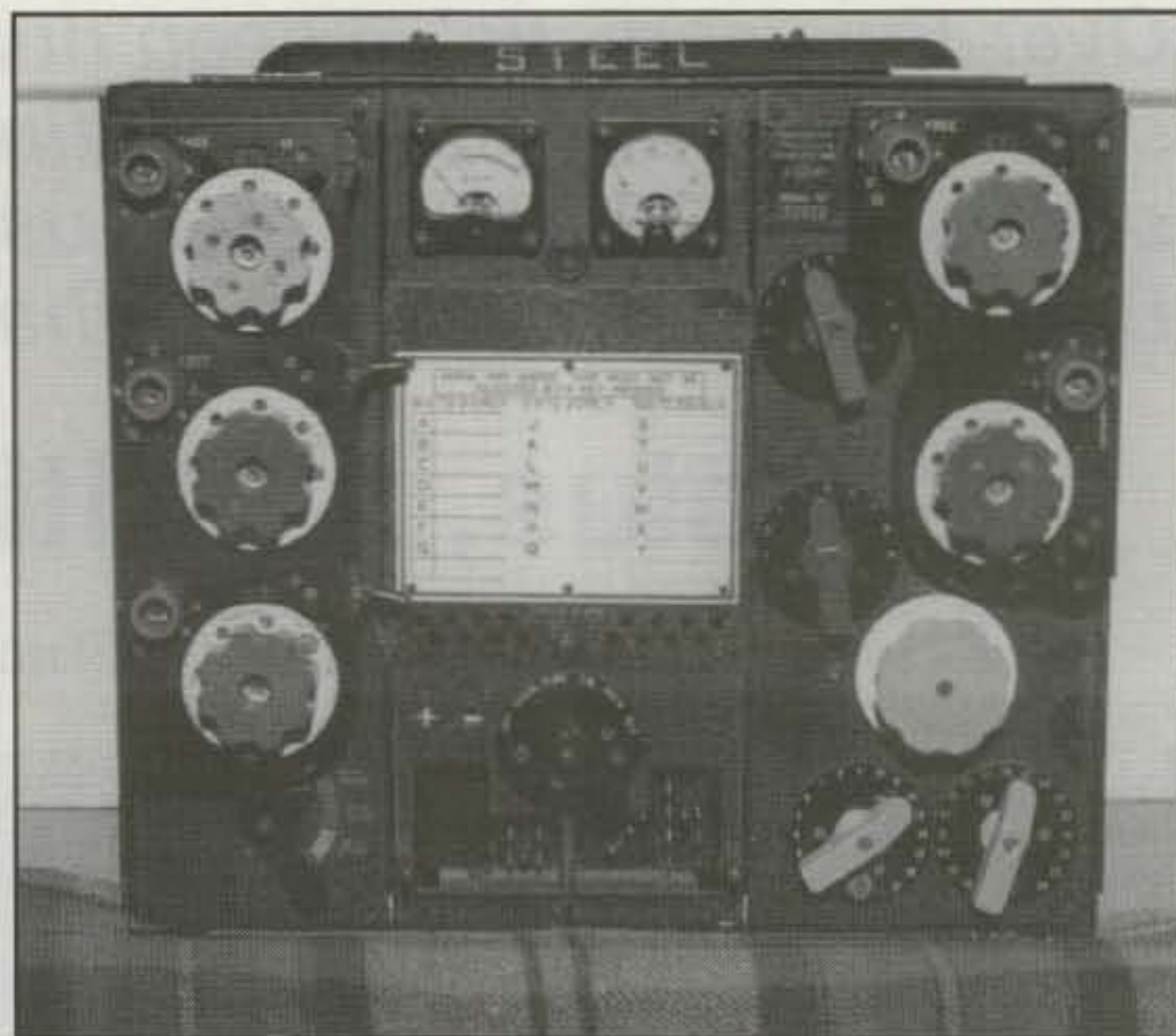
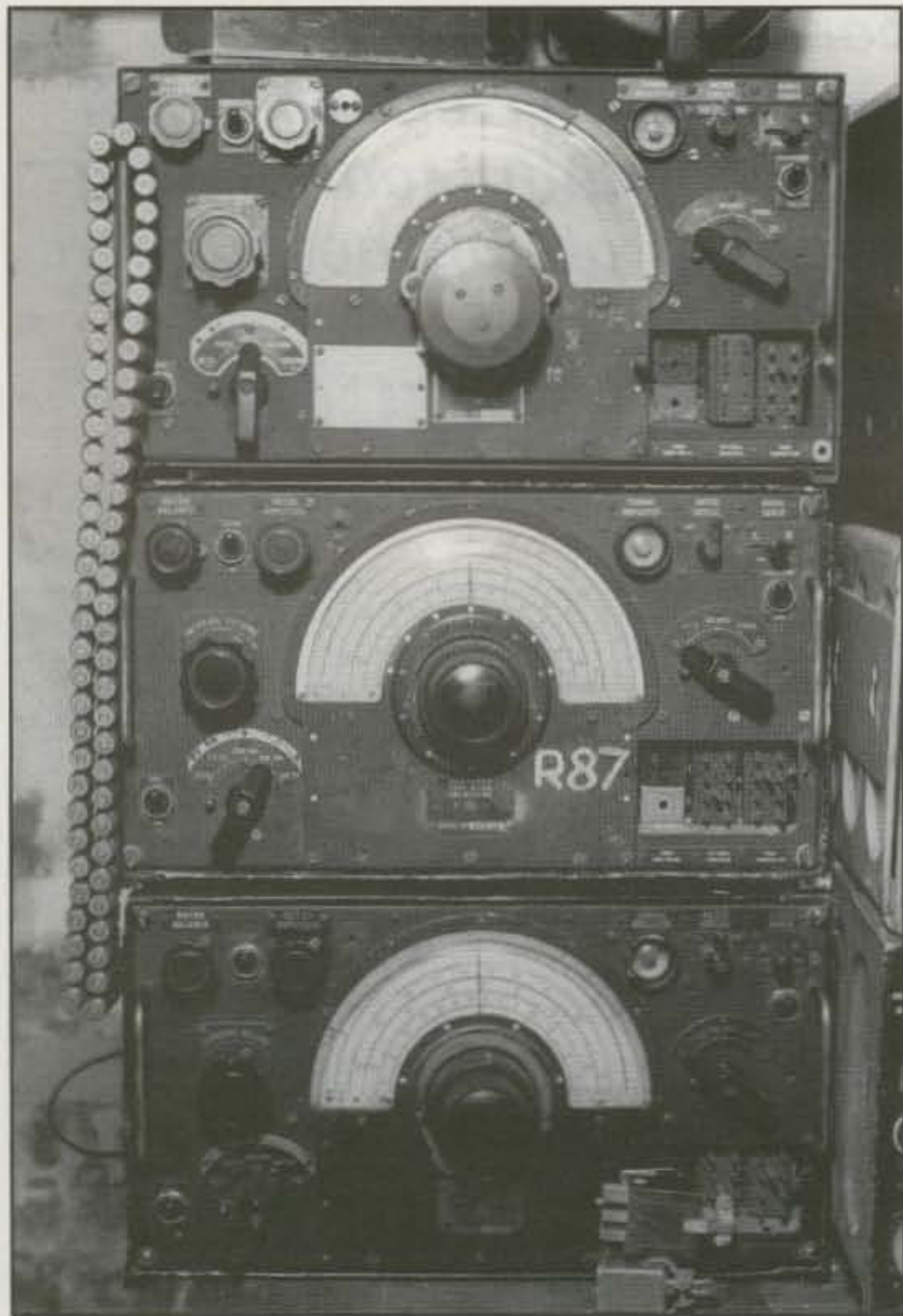
years, are again better known units of the period. In the UK it is very hard to find anyone who doesn't know these sets or has never played with one. The receiver in particular was a great favorite of the short-wave listener and the newcomer alike.

Used in the famous Lancaster bombers, these sets were also used in many other aircraft and in certain air/sea rescue applications. These sets reached service in late 1940 as replacements for the T1083/R1082 sets in use at that time.

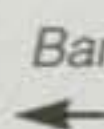
There were some 13 variations of the transmitter and 10 of the receiver. The variations primarily consist of either steel or aluminium cases and slightly different frequency coverages, the normal being 200–500 kHz, 3–5.5 MHz, and 5.5–10 MHz for the transmitter, and 75–500 kHz, 6–1500 kHz, and 3–18.5 MHz for the receiver. Some variations had the coverage altered to tune the 1.5–3 MHz section of the spectrum and these are sought after for use on 160 meters.

The transmitter uses four tubes, two in the PA giving about 20 watts AM, while the receiver has ten. The receiver has a

\*62 Cobden Street, Kidderminster, Worc. DY11 6RP England



The T1154 transmitter. The two meters (top center) measure antenna current and magneto feed current. Colored knobs match colored bands on the receiver dials for frequency selection.



Bank of R1155 receivers. Note slightly different tuning drive, the top one being a better slow-motion unit.

DF facility, enabling it to be used in conjunction with a loop aerial for navigation. The standard installation in a Lancaster bomber, for example, used two receivers and a transmitter. The transmitter and one receiver were used by the wireless operator, while the second receiver was used by the navigator. Power is obtained from two dynamotors providing around 1200 VDC for the power amplifier supply and a more normal level for the receiver.

### The CR100 Receiver

The CR100 Navy receiver, also known as the B28, is another of the most well-known receivers of WWII in the UK. In the CR100 range there are CR100, CR100/2, CR100/4, and CR100/5 versions.

This eleven-tube, six-band receiver weighs in at 82 lbs. Its dimensions of 16" x 16" x 12" also limit it in many of today's "under the stairs" shacks. Many folks are put off by the size and weight of these bargains, which is rather a shame given the performance these sets can deliver.

Sensitivity is quoted as 20 dB s/n on CW of 1 to 2 uV between 60 kHz to 11 MHz and 1.5 to 4 uV between 11 MHz to

30 MHz. This, along with variable selectivity of down to 100 Hz, makes the set very good on CW in a crowded band. Adjustment of selectivity, RF gain, BFO pitch, Manual or Auto AVC, and even the antenna trimmer all have to be at optimum to fully obtain the best results.

**Circuit Arrangement.** Two stages of RF amplification, employing variable- $\mu$  valves, are used ahead of the mixer stage, a triode hexode type valve with the triode section unused. The local oscillator oscillates on the high side of the signal on all bands.

The mixer output of 465 kHz is applied to the IF strip employing three tubes with variable coupling, and a crystal filter is used to provide the various bandwidths. A single tube operates as the AF detector, the AVC detector, and the first AF amplifier, feeding the recovered audio to the output tube.

The antenna feed arrangements are slightly different for the various sets. In the CR100 and CR100/4 receivers the input is suitable for a balanced feed if desired. There being two terminals marked "D" on the rear apron. For the CR100/2 and CR100/5 receivers one end

of the internal coupling coil is grounded and the other is connected to a coax socket marked "D" on the rear wall, presenting an impedance of approximately 100 ohms on all bands. The antenna socket marked "A" is a high-impedance feed suitable for a random length of wire.

**The Various Pass-Band Adjustments.** The settings possible for the various pass bands are:

6000 Hz—Best for speech, makes tuning broader, poor for QRM.

3000 Hz—Less background noise, better for SSB and crowded conditions.

1200 Hz—Used on bands 4/5/6, not good for speech.

300 Hz—Used on CW, chiefly on bands 1/2/3/4.

100 Hz—Great care in tuning and BFO pitch needed.

The 100 Hz pass band is only suited for a signal of good stability and slow signaling speeds. When receiving CW on broad pass bands and tuning through zero beat, it will be found that the signal is equally strong on both sides, but on the narrower pass-band setting one side will always be stronger than the other.

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- Pager sized, with built in telescoping whip antenna
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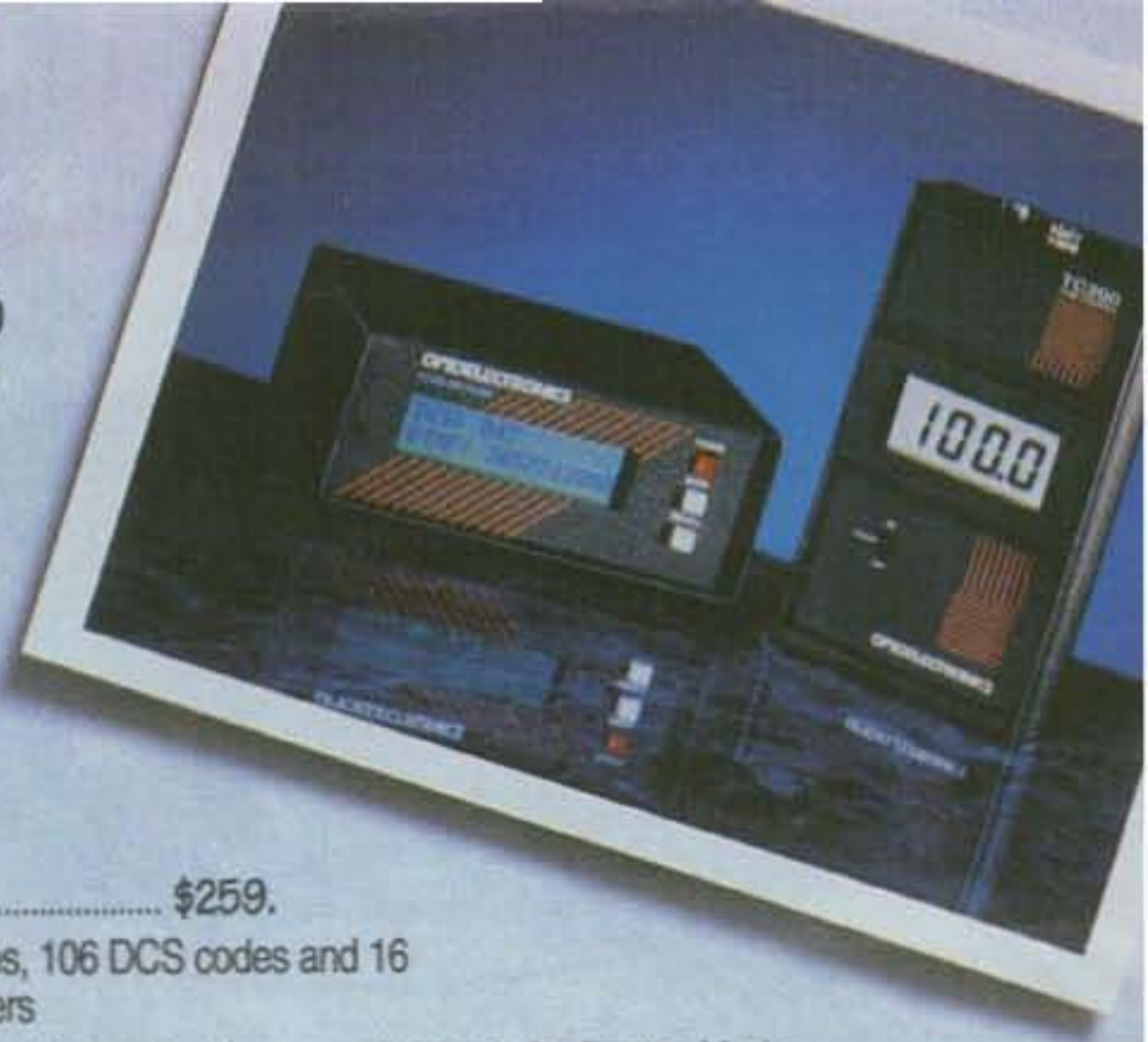
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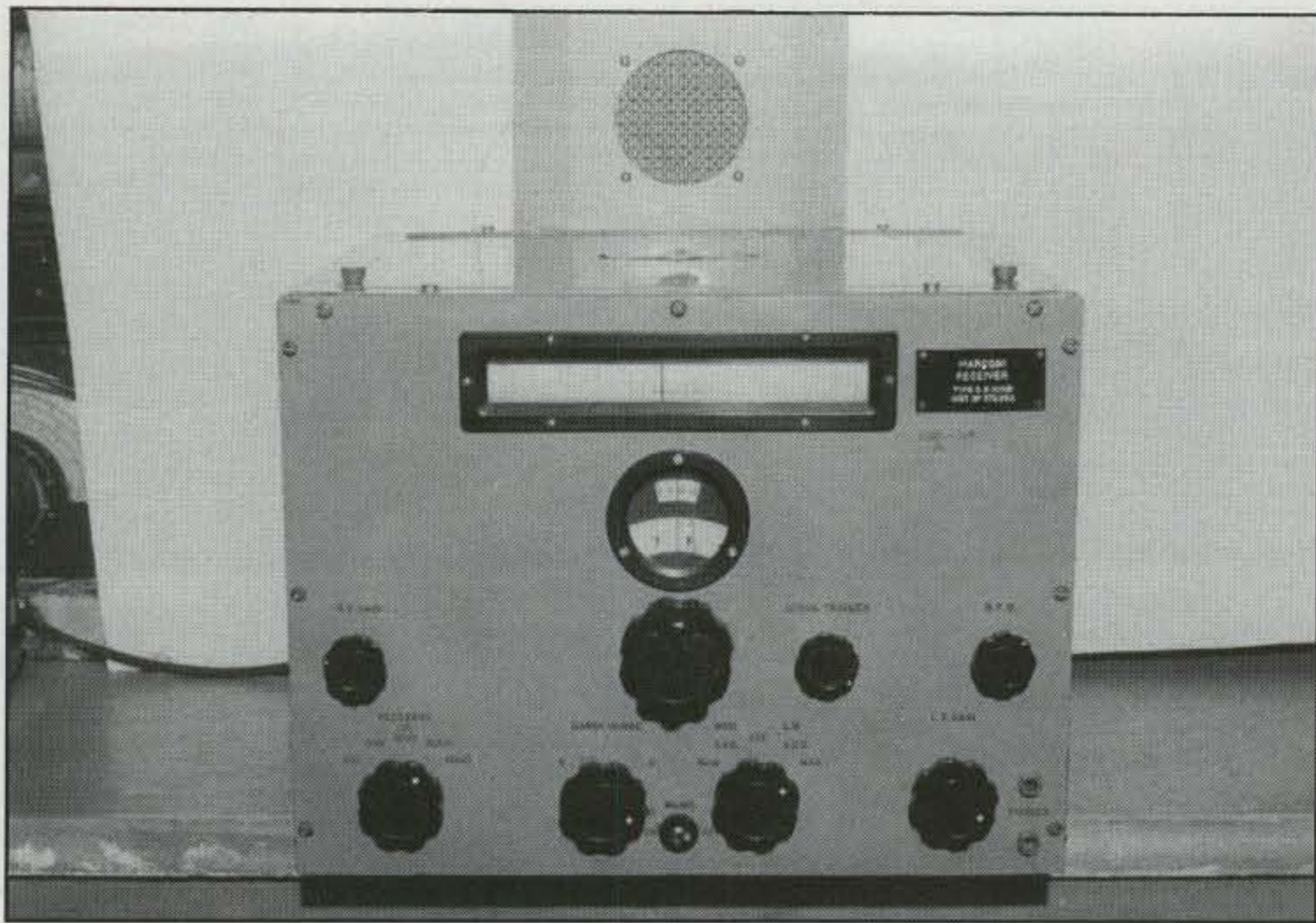
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The CR100/2 receiver. Note the clean layout, with controls easy to locate and operate. Logging scale is in the center window.

ply runs off 200 to 240 VAC. A 5-pin socket on the rear panel is used to supply the AC and feed to other equipment. This socket can also be used to supply the set from a mobile power supply. A rotary DC to DC converter, a Elect. Dyn. Con. WS-1571, 6 volt input, 190 volt 80 ma output, is used to supply the unit. An internal link has to be adjusted between AC filaments and DC filaments if DC is used.

The CR100/2 version has provision for desensitizing the receiver during transmissions and using it for side-tone monitoring.

**Cabinet Details.** The receiver cabinet is of an all-metal construction, 1/16 inch motor body steel, and consists of four sections—chassis, cover with hinged lid, front panel, and bottom plate.

### Wireless Set Canadian No. 29

The Wireless set Cnd No. 29, manufactured by RCA, was brought out in 1945 primarily for use in Armored Fighting Vehicles. In design the set is a direct replacement for the 19 set, being a similar size, using the same mounting holes, usable with the 19 set control box, and employing both an "A" set on HF and a "B" set on 235 MHz.

The circuitry of the 29 set differs greatly from that of the 19 set. Even the antenna tuner, almost identical in shape to the 19 set version, is different in that it is motorized—yes, motorized! The 29 set has three preset channels that when selected automatically reset the tuner.

The vehicle-mounted setup consists of the "A" set (2 MHz to 8 MHz), an "A" set power supply, a "B" set with power sup-

ply, the motorized antenna tuner, control unit No. C102, mic and headset assembly No. C21, key assembly No. 9 type 2/T, and aerial No. C9 with F section rods.

A quoted range of 8 to 10 miles on low power was made for the "A" set, equal to the 19 set barefoot, and 20 to 25 miles on high power, equal to the 19 set with amplifier. The "B" set operated on two channels, 235 MHz (in 19 set range) and 245 MHz, which meant it could be used to communicate with a 19 set. A range of 1000 yards could be expected on the "B" set frequencies, the same as the 19 set quoted range.

The "A" set power supply operates from 12 or 24 VDC. Two rotary dynamotors provide 150 and 400 volts high voltage for the set. Current consumption at 24 volts is 9 amps transmit and 2.4 amps receive. This equates to 18 amps at 12 volts for transmit and approximately 5 amps at 12 volts on receive. The power supply for the "B" set is housed in the "B" set case, consuming 2.1 amps at 24 volts for transmit and 1.7 amps on receive.

The No. 29 "A" set utilizes 19 tubes. These include 6AG5, 6AG7, 6AK6, 6C4, 6J6, and two 815s in the modulator and amplifier sections. The "B" set uses nine tubes and the intercom amplifier two. There appear to be five subchassis within the main chassis. These house the RF amp, the IF amps, the oscillators, the audio amps, and the oscillator amps. The modulator and power amplifier are on the main chassis along with the switching. A central, removable unit allows three preset frequencies to be called up while extracting the unit, and fitting an extension cable allows remote operation of channel

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### 087336 Technician Plus Theory \$34.95

This course is designed for licensed Novice hams wanting to Tech-Plus. Also included are 2 cassettes that parallel the textbook and rulebook. Covers FCC Element 3A.

### 087344 General Theory \$34.95

Gordon West prepares you to pass General Element 3B on 2 theory long-play cassettes. His new *General Theory Book* and FCC Rulebook are also included. There is even a 13 wpm code test to check your code speed for General Element 1B.

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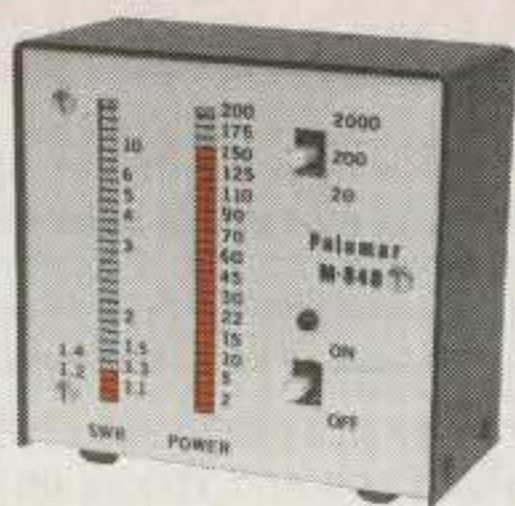
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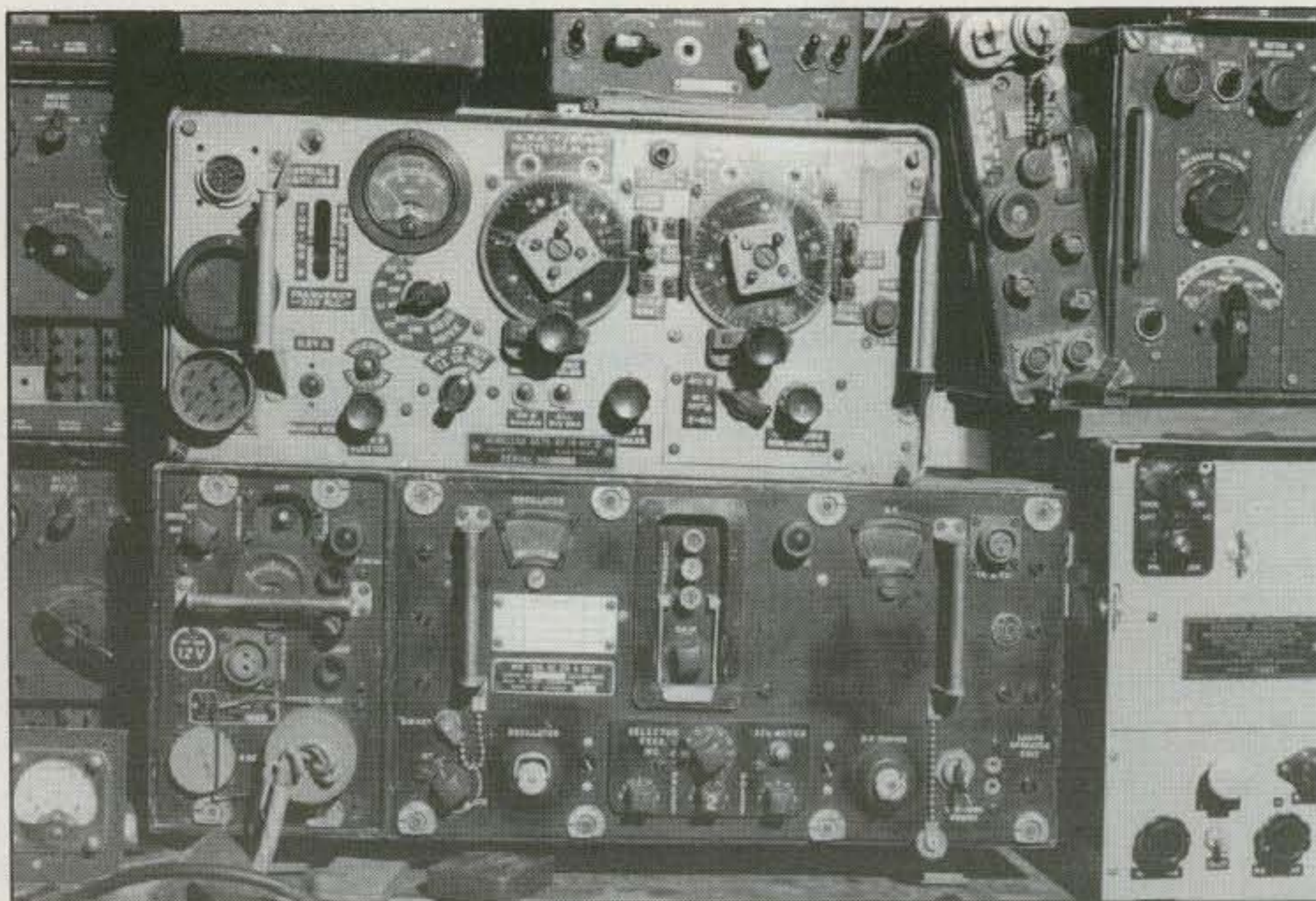
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The *CND 29* set with a *19 set Mk II* above it. Three channel push buttons are in the center pod, power supply on the left, connector motorized antenna tuner in the upper right corner.

and volume. Internal motors drive the tuning capacitors to the preset positions and the antenna tuning unit to resonance.

My equipment consists of the "A" set and "A" set power supply. If anyone has the "B" set or the tuner and wishes to part with it, I would be very happy to hear from you.

### Wireless Set Canadian No. 58 Mk 1\*/T

The purpose of this set was for short-range telephony in forward areas, intended primarily for inter-battalion use or for use by paratroops or other isolated troops working away from their HQ.

The set could also be used as a ground station, in the open or undercover. It could also be used as a pack while on the march or during maneuvers, at which time it was operated by the person carrying it.

The set weighs some 18.5 pounds without batteries, and battery packs weigh between 7 and 14 pounds. The set is 13.5 inches high, 8.25 inches wide, and 6.75 inches deep. A complete kit consists of some 35 items, such as Haversacks, web, battery, 1 off; wire, electric, VR, 25 ft., 1 off; fuses, cartridge, 1/32 amp, type 8AG, 2 off; and a Wireless Set Cdn No. 58 Mk 1\*/T, 1 off.

The set itself is housed in a waterproof box with a rubber seal trapped between the radio and a mounting plate fixed to the main box by several push and twist screws. There seem to be a few variations on the number of retaining screws used. My example has some 14 of these screws around the plate, where as other

models seen have only 4. There may indeed be other variations on this housing.

A large pin on the case rear panel lines up with a socket on the back of the radio and connects the antenna through the case. Once sealed and the lid shut, the set can be operated from the outside by depressing a large rubberized button, although the lid needs opening to retune the set.

### Receiver

The receiver uses five tubes: an RF amplifier, a mixer/oscillator, a stage of IF amplification, a diode detector/AF amp, and an audio output tube. The oscillator and RF circuits are permeability tuned, as commonly used in domestic car radios, with capacity trimmers for alignment. The set covers 6 to 9 MHz (50 to 33.3 meters) in one band. The sensitivity of the set is quoted as sufficient to give 1 milliwatt of audio output for an input of 3 microvolts.

### Transmitter

The signal frequency is generated by an oscillator running at half the required transmission frequency. The PA acts as a power doubler and is coupled to the antenna, again by a variable inductance. The oscillator grid and tank circuits are permeability tuned, capacity trimmers being provided to align the set. A netting switch allows the transmitter oscillator frequency to be aligned with an incoming signal.

Control grid modulation is used, but there is no adjustment of modulation

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## MFJ's world famous 3 KW Antenna Tuner

If you won't settle for less... here is the finest 3 KW tuner money can buy!

The MFJ-989C is not for everyone.

However, if you make the investment, you'll get the finest 3 KW antenna tuner money can buy.

Here's why...

### Massive Transmitting Capacitors

You get two massive 250 pf transmitting variable capacitors with detailed logging scales. They can handle amps of RF current and withstand 6000 RF volts because the plates are smoothed and polished and have extra wide spacing.

### Precision Roller Inductor

A precision roller inductor, 3 digit turns counter and spinner knob gives you exact inductance control for absolute minimum SWR.

Ball bearings on steel shafts give you a velvet smooth vernier feel and long term durability.

You won't have arcing problems



**\$349<sup>95</sup>**

with this roller inductor. Firm springs put high pressure on a plated contact wheel for excellent electrical contact.

Wide, low inductance straps are used for high currents and a new core minimizes RF loss.

### Cross-Needle Meter

You get a lighted peak and average reading Cross-Needle SWR/Wattmeter with 200 and 2000 watt ranges. Its new directional coupler gives you accurate readings from 1.8 to 30 MHz.

### Super Heavy Duty Balun

You get a super heavy duty current balun for balanced lines. It has two giant 2 1/2 inch powder iron toroid cores and is wound with Teflon® wire connected to high voltage ceramic feedthru insulators. It lets you operate high power into balanced feedlines without core saturation or voltage breakdown.

### Ceramic Antenna Switch

A two wafer 6 position ceramic antenna switch with extra large contacts gives you trouble free switching.

### Plus much, much more

You also get a 300 watt dummy load, full one year unconditional guarantee, flip stand, all aluminum cabinet, tough baked on paint, locking compound on all nuts and bolts. 3 KW PEP. 10 3/4x4 1/2x15 in. Don't settle for less, get yours today!

**More hams use MFJ tuners than all other tuners in the world! Why settle for an imitation when you can have the real thing?**

### MFJ's deluxe 300 Watt Tuner



MFJ-949E **\$139<sup>95</sup>** More hams use the MFJ-949E than any other antenna tuner in the world! Why? Because you get proven reliability, the ability to match just about anything and a one year unconditional guarantee.

You get a lighted peak and average reading Cross-Needle SWR/wattmeter, antenna switch, 4:1 balun for balanced lines, 1.8-30 MHz coverage and a full size dummy load that easily handles 300 watts of abusive tune-up power.

New 8 position antenna switch lets you pre-tune into dummy load to minimize QRM.

The inductor switch is designed for high RF voltages and currents--it's not a plastic switch made for small signals and wired with tiny gauge wire.

Each MFJ-949E cabinet is chemically treated and has a new tough scratch-proof vinyl cladding -- not paint that can scratch or chip off. You won't find a tougher, longer lasting finish anywhere.

### MFJ's versatile 1.5 KW Tuner



MFJ-962C Use your barefoot rig now and have **\$229<sup>95</sup>** the capacity to add a 1.5 KW PEP amplifier later! Lighted Cross-Needle SWR/Wattmeter. 6 position antenna switch, Teflon® wound balun, ceramic feedthru insulators for balanced lines. 1.8-30 MHz. 10 3/4x4 1/2x14 7/8 in.

### MFJ's portable/QRP Tuner

Tunes coax, balanced lines, MFJ-971 random wire 1.8-30 MHz. Cross-Needle Meter. SWR, 30/300 or 6 watt QRP ranges. 6x6 1/2x2 1/2 in. **\$89<sup>95</sup>**

### MFJ's super value Tuner



MFJ-941E **\$109<sup>95</sup>** The new MFJ-941E gives you a 300 watt PEP tuner with lighted Cross-Needle Meter that covers everything from 1.8-30 MHz for an incredible \$109.95.

Antenna switch selects 2 coax lines (direct or thru tuner), random wire, balanced line or external dummy load. 4:1 balun. 1000 volt capacitors.

### 2 Knob Differential-T™ Tuner



MFJ-986 **\$289<sup>95</sup>** The MFJ-986 Differential-T™ 2 knob tuner uses a differential capacitor to make tuning foolproof and easier than ever. It ends constant re-tuning with broadband coverage and gives you minimum SWR at only one best setting. 3 KW PEP. 1.8-30 MHz.

Roller inductor makes tuning smooth and easy. Turns counter lets you quickly re-tune to frequency. Lighted Cross-Needle Meter reads SWR/forward/reflected/peak/average power in 2 ranges. Current balun reduces feedline radiation and forces equal currents into unbalanced antennas.

### MFJ's mobile Tuner



MFJ-945D **\$89<sup>95</sup>** Don't leave home without this mobile tuner! Let the MFJ-945D extend your antenna bandwidth so you don't have to stop, go outside and adjust your mobile whip. Small 8x2x6 inches uses little room. Lighted Cross-Needle SWR/Wattmeter makes tuning easy while in motion. Has lamp switch. 1.8-30 MHz. 300 watts PEP. Mobile mount, MFJ-20, \$4.95.

### MFJ's smallest Versa Tuner

The MFJ-901B is our smallest -- 5x2x6 inches -- (and most affordable) 200 watt PEP tuner -- when both your space and your budget is limited. Great for matching solid state rigs to linear amps. **\$59<sup>95</sup>**

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Operate all bands anywhere with any transceiver with the MFJ-16010. It lets you turn a random wire into a transmitting antenna. 1.8-30 MHz. 200 watts PEP. Ultra small 2x3x4 inches. **\$39<sup>95</sup>**

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Creates artificial RF ground. Eliminates or reduces RF hot spots, RF feedback, TVI/RFI, weak signals caused by poor RF grounding. Also electrically places a far away RF ground directly at your rig by tuning out reactance of connecting wire. **\$79<sup>95</sup>**

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**MFJ... making quality affordable** CIRCLE 172 ON READER SERVICE CARD



The CND 58 set. The rod on the lid pushes against the RX/TX switch located on the bottom center of the set when the lid is closed.

depth. A three-pole push-to-talk type switch is situated in the lower center of the front panel. It switches the antenna, unshorts the transmitter oscillator output and connects it to the power amplifier, and switches the filament volts from receive to transmit tubes. A bar attached to the lid and operated from the outside simply pushes against the change-over switch and allows operation of the set in its closed position. The set is AM operation only.

### Range

The quoted ranges for different antennas that can be fitted to the 58 set are as follows:

- 12 foot rod antenna—5 miles
- 6 foot rod antenna—3 miles
- telescopic aerial, 8 foot—4 miles

A six-position switch enables the state of the batteries and the operation of the set to be monitored by a meter mounted on the front panel. In use, the set is attached to the soldier's webbing belts and straps. A webbing pouch is attached to the lid of the set to carry the antenna rods. Another pouch carries the battery packs. An assembly in the battery pack lid allows attachment of up to two headset/mics to the set along with the batteries.

Supplies are via a 10-pin lead and connector from the battery pack to the rear



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A Quality Transceiver for the Serious Low Power Operator



- All band operation 160m through 10m
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- Compact, truly portable, very low power drain (140ma @ 12v on receive)
- Built in iambic keyer
- 20 memories, Split, RIT

Now the features and performance you would expect in a full size rig are yours at half the size, half the price, and a tenth the power drain. You get the ability to sort out weak signals amid high power QRM; freedom from overload and precise filters. An *all band*, truly portable (5.5"Wx4"Hx6"D) compact, rugged transceiver whose low power drain means a weekend of use on a small battery.



**\$595**



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CIRCLE 57 ON READER SERVICE CARD

# MFJ-949E Deluxe 300 Watt Tuner

More hams use MFJ-949's than any other tuner in the world!  
Why settle for an imitation when you can have the real thing?

**In Stock at ham dealers everywhere!**

Pick one up at your favorite dealer -- no shipping, no waiting, no hassles

MFJ-949E

**\$139<sup>95</sup>**

Call your dealer for your best price  
Includes FREE AC adapter for meter light



**More hams use MFJ-949's than any other antenna tuner in the world!**

Why? Because the world's leading tuner has earned a worldwide reputation for being able to match just about anything.

MFJ-949's have been highly refined and have years of proven reliability.

Every MFJ-949E comes with... MFJ's famous one year *No Matter What*™ unconditional guarantee... first-rate performance... unbeatable quality... the best tuner value in ham radio -- all from the world's most trusted name in antenna tuners.

Now the latest MFJ-949E gives you even more features and more value than ever at a new lower price.

Why take chances with an imitation when you can have the *real thing* from the world's most trusted name in antenna tuners.

**More reasons why more hams use MFJ-949's than any other antenna tuner in the world...**

## Full 1.8-30 MHz Operation

1000 volt tuning capacitors, extra heavy duty inductor switch, Teflon® insulating washers and proper L/C ratio gives you arc-free no worries operation with up to 300 watts from 1.8 to 30 MHz.

## Lighted Cross-Needle Meter

MFJ's lighted Cross-Needle Meter shows you SWR, forward and reflected power *simultaneously*. It reads both *peak* and average power on 300 or 30 watt ranges.

The meter is illuminated for easy reading in dim light and has an ON/OFF lamp switch. The meter lamp uses 12 VDC or 110 VAC. A *free* AC adapter is included at no extra cost.

## Tunes any Antenna

The MFJ-949E tunes out SWR on dipoles, verticals, inverted vees, random wires, beams, mobile whips, shortwave receiving antennas... nearly anything!

Use coax feed, random wire or balanced lines. Has oversized *heavy duty* 4:1 balun.

## Super Antenna Switch

MFJ's 8 position *super* antenna switch lets you select two coax fed antennas, random wire/balanced line or built-in

dummy load for use through your MFJ-949E or direct to your transceiver.

MFJ's Cross-Needle SWR/Wattmeter is always active for monitoring forward and reflected power and SWR.

## QRM-Free PreTune™

MFJ's *QRM-Free PreTune*™ lets you pre-tune your MFJ-949E off-the-air into a built-in dummy load without causing QRM. Pre-tuning into a dummy load makes

tuning your actual antenna faster and easier.

## Full Size Dummy Load

The MFJ-949E has a *full size* non-inductive 50 ohm dummy load measuring 3/4 inch diameter by 5 inches. It *easily* handles 300 watts of abusive tune-up power.

You'll find it handy for tuning, testing and repairing your rig, setting power level, adjusting your mic gain and more.

*Watchout* for cheap midget size dummy loads that changes resistance as it heats up -- marginal ones could burn up your transceiver.

## Custom Inductor Switch

The inductor switch is the most likely component to burn up in *any* antenna tuner.

The inductor switch in the MFJ-949E was *custom* designed to withstand the extremely high RF voltages and currents that are developed in your tuner -- it's not a flimsy *plastic* switch made for small signals and wired with *tiny* gauge wire.

## Superior Cabinet

Each MFJ-949E cabinet is chemically treated and has a new tough scratch-proof vinyl cladding -- not paint that can scratch or chip off. You won't find a tougher, longer lasting finish anywhere.

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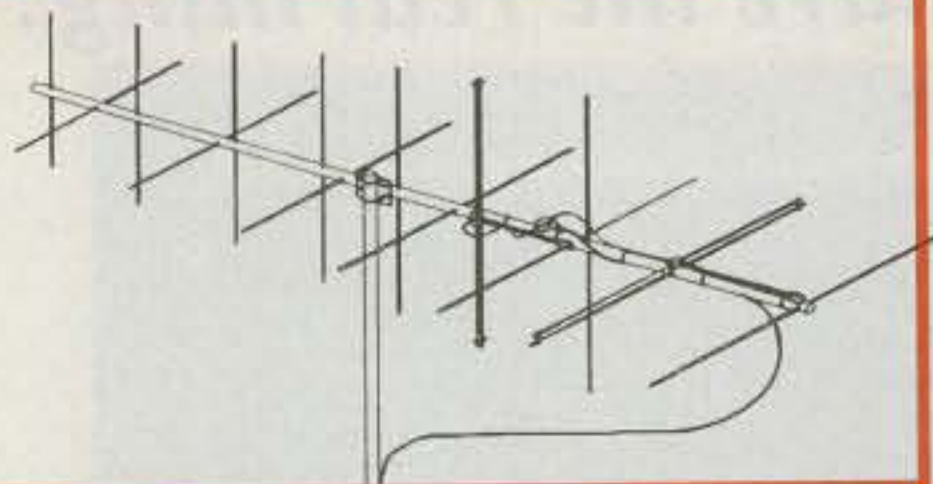
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**MFJ... making quality affordable** CIRCLE 159 ON READER SERVICE CARD

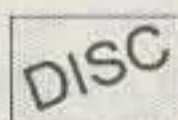
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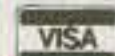
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Units are described by stack, left to right. Left stack: Russian antenna tuner, below is the 46 set, then the 62 set, the R1475, and R1155. Stack second from left: top 22 set, then BC-348q, and ZC1 Mk II. Next stack: TCS 6 and 12 setup. Right stack: top 18 set, another 18 set, and HRO rack-mounted receiver and power supply.

of the main case. This is then fed with cable through the mounting plate and ends in a plug that inserts into the main radio chassis front panel. In addition to the battery packs, a vibrator power supply was also available. The vibrator pack, contained in a webbing pouch, weighed 22.5 lbs. The vibrators were powered from rechargeable lead-acid batteries; charging 3 amps took 8 to 10 hours.

In ground-station use the set was simply positioned on flat ground, the antenna plugged into the rear socket, and away one went. In mobile use the set and batteries were strapped to the operator by the webbing belts and clips, the radio being around the chest and operated by the arm and hand coming around the set to reach the TX/RX push switch. A master on/off switch is also located on the rear of the case. The antenna passed up the chest of the operator, with the antenna rod pouch attached to the side of the set.

A 25 foot wire antenna was available for ground working. It was suggested that the wire be laid out on the ground in the direction that transmission was required, or hung from trees to get extra height. An adapter was available with two terminal posts; one fed the wire directly to the antenna socket on the set, while the other had a 40 mmFd (40 pF) capacitor in series with the connection. Either post could be used to obtain maximum deflection as indicated on the sender's meter in the output position.

### In Conclusion

These are just a few of the various sets

presently in my collection. I have submitted a general shot of one of my shacks and its operating position. Most of the sets work and are fired up regularly on local enthusiasts' nets, but if there are any US amateurs who would like to try an across-the-pond QSO, then I would be most happy to give it a go. I would suggest CW, though, as most of the kit is low-power AM, and hard to read if weak.

Other sets in my collection include the 18, 22, 31, 38, 46, 52, 62, 68, 88, 123, and 128 sets, plus various British frequency meters. I do have several items probably well known to the US collector. These include the HRO, AR88, and various Command sets.

### With Thanks

My thanks go to Mr. Hilderbrand, The Curator, Canadian Forces Comms and Electronics Museum, Ontario, Canada, and to Dave Lawrence, VE3LDG, for their assistance on the Canadian-made sets.

### References

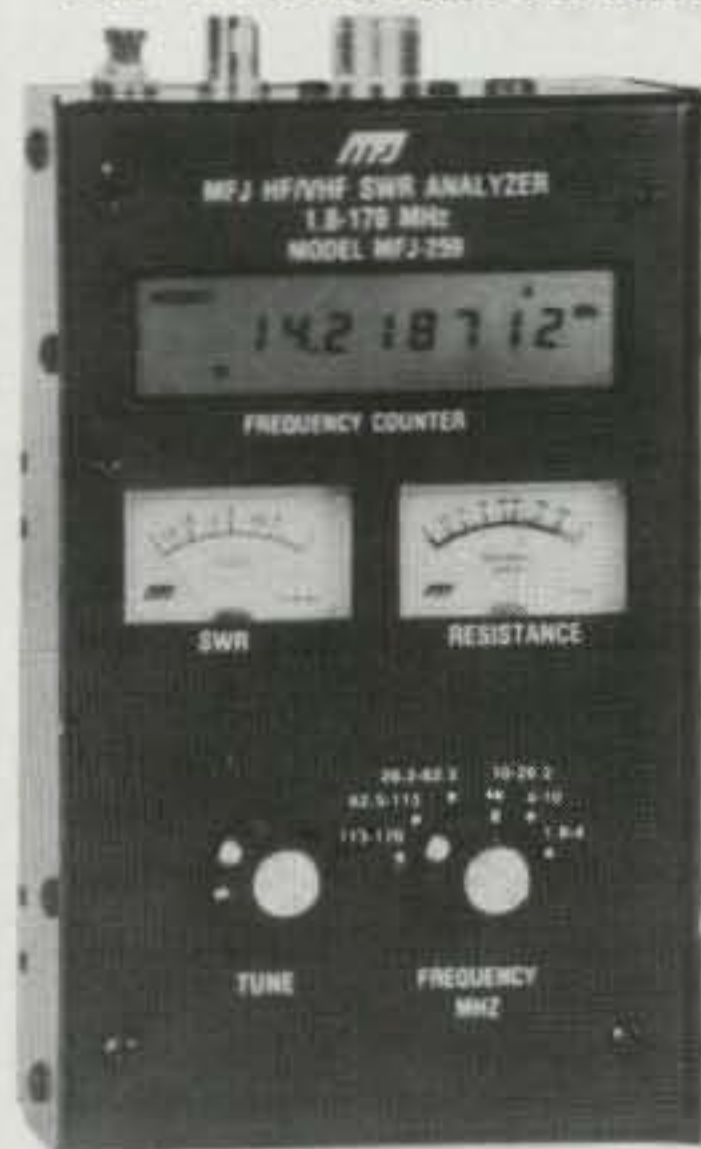
For the 19 set: Wireless Sets No. 19, Working Instructions, Z.A.21575, The War Office, 1955.

For the 58 set: Working Instructions, Wireless Set Cdn No. 58 Mk 1\*/T, and for the 29 set: Identification List & Echelon Repair Schedule, WS No. 29, published by The Directorate of Electrical and Communication Design, Master-General of Ordnance Branch, Department of National Defence, Ottawa, Canada, (58 set) 30 March 1944, (29 set) 15 Oct. 1946. ■



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Read your antenna SWR from 1.8-170 MHz... 10-digit LCD frequency counter... RF Resistance Meter™... smooth reduction-drive tuning... simple-to-use...



**What the MFJ-259 Does**  
The MFJ-259 gives you a complete picture of your antenna's performance anywhere between 1.8 and 170 MHz -- you can even check SWR outside the ham bands without violating FCC rules. Set the bandswitch and tune the dial--just like your transceiver. SWR is displayed instantly!

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Take the guesswork out of building matching networks and baluns for your antennas.

Watch the effects of spacing on radiation resistance as you adjust your antenna.

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Find your antenna's true resonant frequency from the shack.  
Tune the antennas on your

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Tune critical HF mobile antennas in seconds -- without subjecting your transceiver to high SWR.

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MFJ SWR Analyzers™ work so good, many antenna manufacturers use them in their lab and on the production line -- saving thousands of dollars in instrumentation costs! Professional installer and technicians use them worldwide.

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MFJ-209 MFJ-209 HF/VHF SWR Analyzer™ is same as MFJ-259 without LCD frequency counter and RF resistance meter. Has jack for external frequency counter. MFJ-249/MFJ-209 are 4x2½x6¾ inches and uses 8 AA cells or 110 VAC with MFJ-1312B, \$12.95.

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MFJ-29 Tote your MFJ-249, MFJ-259 or MFJ-209 SWR Analyzer™ anywhere with the MFJ-29 custom Carrying Pouch.

Made with a special foam-filled fabric, the MFJ-29 cushions blows, deflects scrapes, and protects knobs, meters and displays from harm.

Wear it around your waist, over your shoulder, or clip it onto the tower while you work--the fully-adjustable webbed-fabric carrying strap has snap hooks on both ends.

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MFJ-207 MFJ-207 10-160M SWR Analyzer™ If you're an HF man, this compact MFJ-207 HF SWR Analyzer™ will help you build 10-160 Meters antennas that'll make working DX almost routine.

Just plug in your coax to find the SWR of any HF antenna on any ham band 10-160 Meters. Has jack for external frequency counter. 7½x2½x2¼ inches.



MFJ-203 The MFJ-203 is a sensitive Bandswitched Dip Meter™ that covers all ham bands from 160-10 Meters. There are no plug-in tuning coils to keep up with or break.

Has detachable coupling coil, dual FET oscillator, op-amp meter amplifier and jack for external frequency counter. 7½x2½x2¼ in.



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MFJ-219 MFJ-219 440 MHz SWR Analyzer™ Read SWR of any antenna 420 to 450 MHz -- just plug coax of your antenna into SO-239 connector, set frequency and read SWR. Uses microwave integrated circuits and microstrip technology. Jack for external frequency counter. 7½x2½x2¼ in. MFJ-219N, \$99.95, same as MFJ-219 but with "N" connector.

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## CQ REVIEWS:

# The CTSVR Uni-Hat Antenna

BY LEW McCOY\*, W1ICP

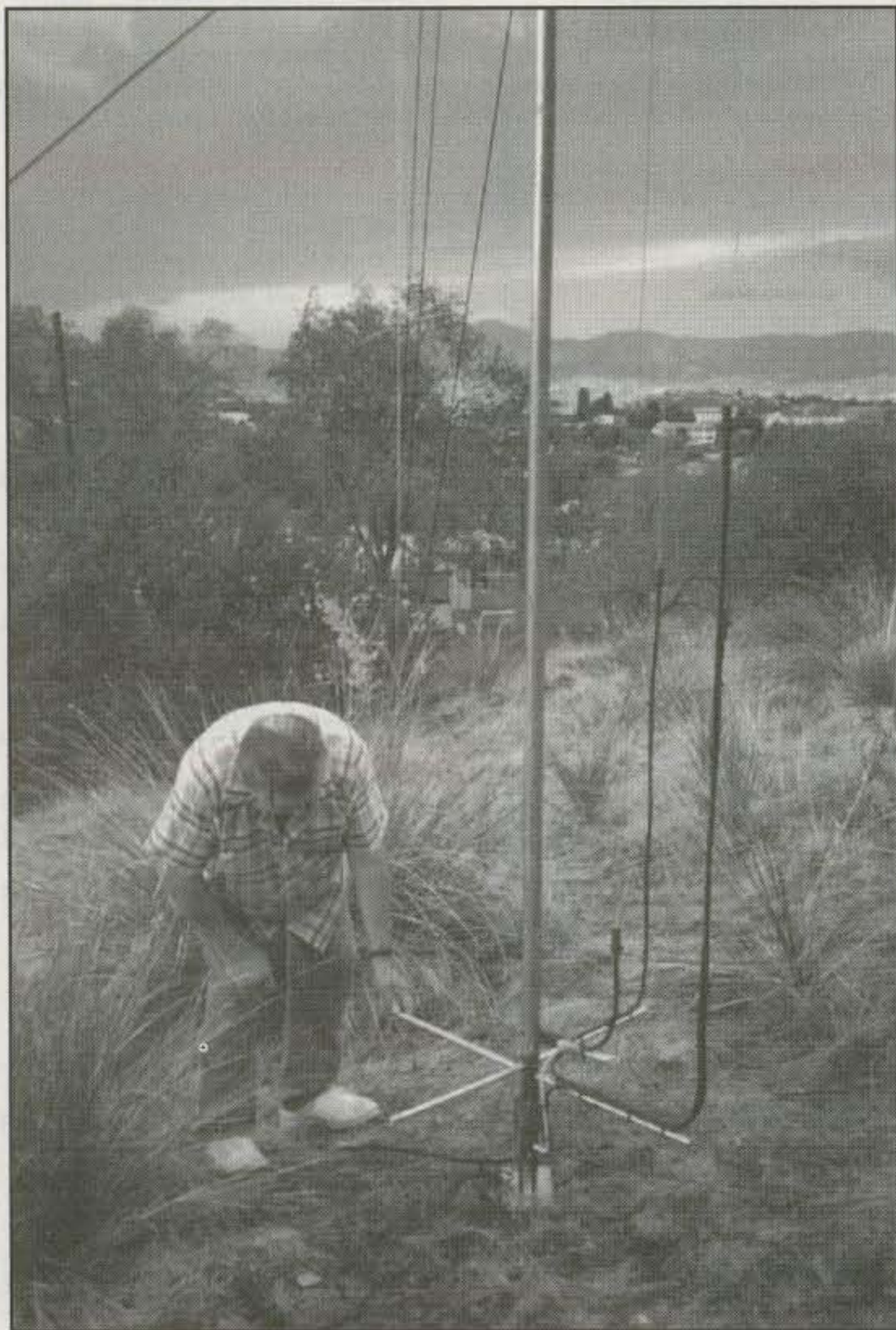
**T**he one place where we see constant development in amateur radio is in the area of antennas. Every once in a while someone comes up with something relatively new. Such is the case with the CTSVR vertical from Uni-Hat Corporation. The CTSVR stands for Capacitance Terminated Short Vertical Radiator. This is a multiband vertical, but unlike any I have ever seen before. Before going into details, let me explain one fact of life about antennas.

The *efficiency* of an antenna—any antenna—is one of its most important features. For the neophyte, let me explain efficiency as I see it. A resonant half-wave length dipole has a feed impedance of approximately 70 ohms. This is made up of two components—ohmic resistance and radiation resistance. Normally, for the average dipole this means an ohmic resistance of 2 or

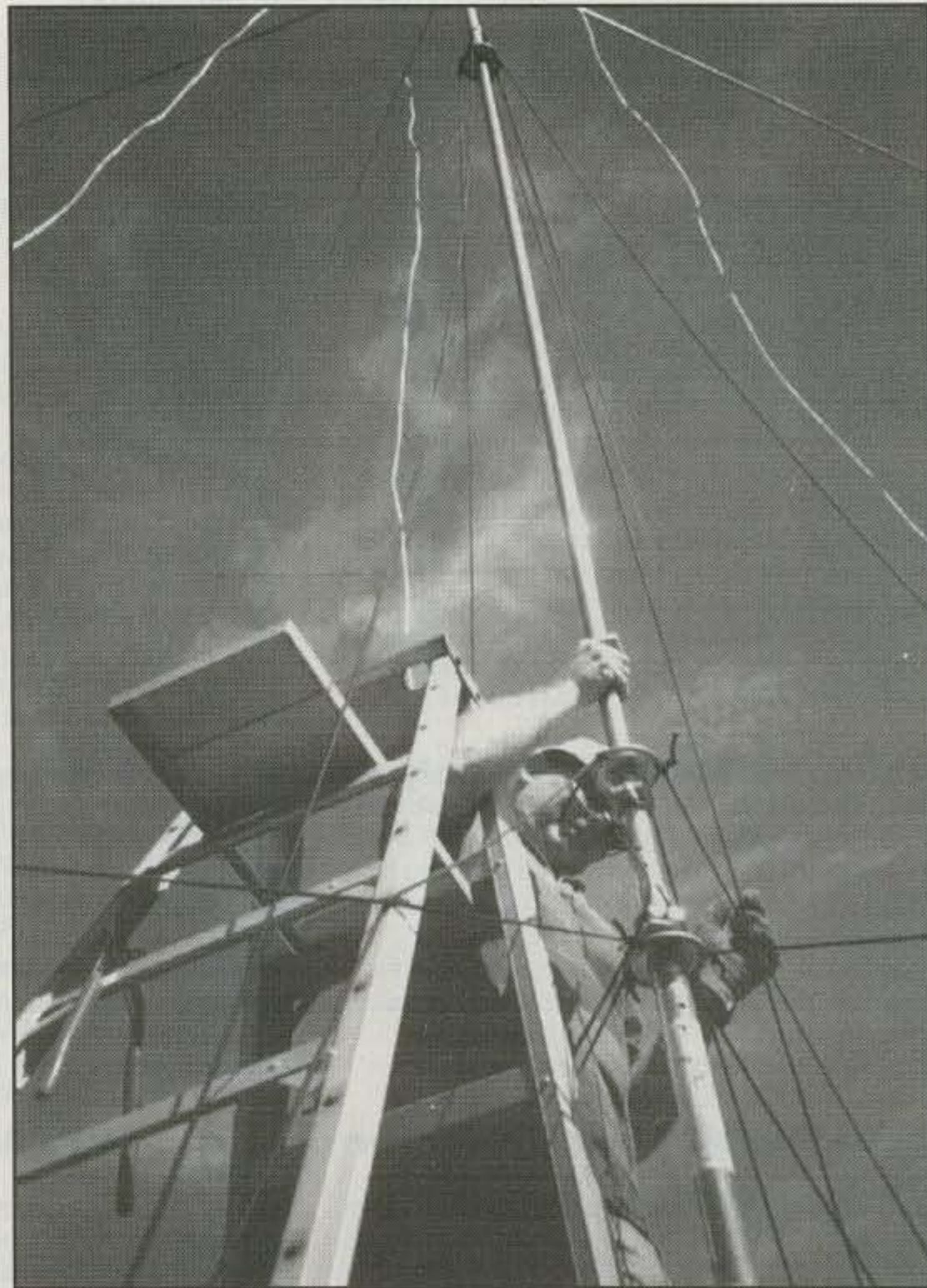
3 ohms and a radiation resistance of 67 or 68 ohms. Keep in mind that ohmic resistance creates lost power; the power fed to that part of the impedance is dissipated as heat. The radiation resistance is what really counts, because that is the part of the antenna that radiates your signal. In other words, if we fed 70 watts to this 70 ohm impedance dipole, about 2 watts would be lost, but 68 watts (most of our signal) would be radiated. This makes a full-size dipole one of the most efficient antennas ever created. Now here is the problem we encounter.

As we shorten the antenna physically, substituting coils or traps to "tune" the shortened antenna to resonance, we also knock the heck out of the radiation resistance. An excellent example is an 80 meter mobile whip with a center loading coil (or any loading method for that matter). Our radiation resistance drops to a fraction of an ohm! That's right—a fraction of an ohm is all we have. (Normally, in an car we look at 2, 3, or more ohms

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



Here is yours truly, W1ICP, examining the feed structure of the Uni-Hat. Not really visible are six radials, about 30 feet long.



The telescoping mast being raised. It consists of three sections. The mast serves as the antenna support, and while it is not part of the antenna, it is grounded. The amateur doing the work is Ed Goodman, N5NUG, one of the antenna designers.

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programmable pre-set filters . . . automatic multiple notch filter eliminates heterodynes  
. . . adaptive noise reduction reduces noise and QRN . . . for Voice, CW, Data . . .

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You get MFJ's *tunable* FIR linear phase filters that minimize ringing, prevent data errors and have "brick wall" filter response with up to 60 dB attenuation just 75 Hz away.

Only MFJ gives you 5 *tunable* DSP filters. You can *tune* each lowpass, highpass, notch, and bandpass filter including optimized SSB and CW filters. You can *vary* bandwidth to pinpoint and eliminate interference.

Only MFJ gives you 5 *factory* pre-set filters and 10 *programmable* pre-set filters that you can customize. Instantly remove QRM with a turn of a switch!

You get MFJ's *automatic* notch filter that searches for and eliminates *multiple* heterodynes.

You also get MFJ's advanced *adaptive* noise reduction. It silences background noise and QRN so much that SSB signals sound like a local FM repeater.

The *automatic* notch and *adaptive* noise reduction can be used with *all* relevant tunable and pre-set filters.

*Automatic* gain control (AGC) keeps audio level constant during signal fading.

## Automatic notch filter

MFJ's *automatic* notch filter searches for and eliminates *multiple* heterodynes. It's *milli-second* fast -- interfering CW and RTTY signals are also eliminated.

Voice signals aren't degraded because the notch is *extremely* narrow.

With up to 50 dB attenuation, you'll copy stations otherwise masked by heterodynes, miss fewer calls and be less exhausted.

Leave the *automatic* notch filter on during a phone contest and you'll never hear unwanted heterodynes of tuner-uppers.

You can *selectively* remove tones. Say, you're on CW and a couple of annoying CW stations appear nearby. You can use the *two* manually *tunable* notch filters -- an MFJ *exclusive* -- to completely knock them out.

## Adaptive noise reduction

Turning on *noise reduction* silences background noise. Noisy SSB, FM, AM, CW and Data signals become readable.

*Noise reduction* works in all filter modes and on all random noise -- white noise, impulse noise, static, ignition noise, power line noise, hiss and atmospheric noise.

The LMS algorithm gives you up to 20 dB of noise reduction. Noise reduction is adjustable to prevent signal distortion.

Reducing random noise reduces fatigue, especially when the band is noisy.

## Tunable highpass/lowpass filters

For Voice and Data, nothing beats MFJ's exclusive *tunable* highpass/lowpass FIR linear phase "brick wall" filters.

You can *tune* the lower cutoff frequency 200 to 2200 Hz and the upper cutoff frequency 1400 to 3400 Hz.

Signals just 75 Hz away literally disappear -- they are reduced a *thousand* times, 60 dB!

Unlike other filters, speech clarity is not reduced by envelope distortion caused by unequal time delay.

By adjusting the highpass and lowpass filters you can create *custom* filters for Voice, Data and other modes.

When signals are weak, you can improve copy by removing high and low speech frequencies. They contain little information but are full of noise that reduce readability.

On crowded HF bands, overlapping SSB signals make copying difficult. You can improve copy by slicing off some overlap with razor sharp "brick wall" responses.

You can also highpass filter out hum, pulses, rasp and other irritating low frequency noise.

## Tunable bandpass filters

Narrow band signals like CW and RTTY jump out of QRM when you switch in an MFJ *tunable* FIR bandpass filters.

You can *tune* the center frequency from 300 to 3400 Hz. And *vary* the bandwidth from 30 Hz to 2100 Hz -- from super tight CW filters to wide razor-sharp Data filters.

As you narrow the bandwidth, interfering signals drop out, because, just 60 Hz away, they're down by over 50 dB.

You can use *narrower* bandwidths to fight tough QRM because these linear phase filters don't distort signals with unequal time delays.

Even with the narrowest 30 Hz bandwidth,

you'll never have a problem with ringing.

One position gives you *two* tunable filters you can use together on one signal. For example, on RTTY, tune one filter to mark, the other to space and set the bandwidth tight for an incredibly sharp RTTY filter.

## 15 pre-set filters -- use factory set or program your own

You can select from *fifteen* convenient *pre-set* filters. Use them for SSB, AM, CW, packet, AMTOR, PACTOR, RTTY, SSTV, WeFAX, FAX or any mode you can think of.

If you don't like our *pre-set* filters, you can program your own -- an MFJ *exclusive!* Save center frequency/bandwidth, lowpass/highpass cutoffs, auto/manual notch and noise reduction -- all filter settings -- in 10 *programmable* filters.

Only MFJ gives you the best of both worlds -- *tunable* filters to eliminate nearly any QRM and fast convenient *pre-set* filters customized for any mode.

## Plus more . . .

A push-button bypasses your filter -- lets you hear the *entire* unfiltered signal.

**Built-in** two watt amplifier. Has volume control, input level control, speaker jack, headphone jack, accessory jack, PTT line and PTT sense and line level output. 9x2 1/2x6 in.

It plugs between your transceiver or receiver and external speaker or headphones. Use 12 VDC or 110 VAC with MFJ-1315. \$14.95.

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Automatically eliminate heterodynes, reduce noise and QRM on Voice, CW and Data. Call your favorite dealer for your *best* price and order your MFJ *super* DSP filter today!

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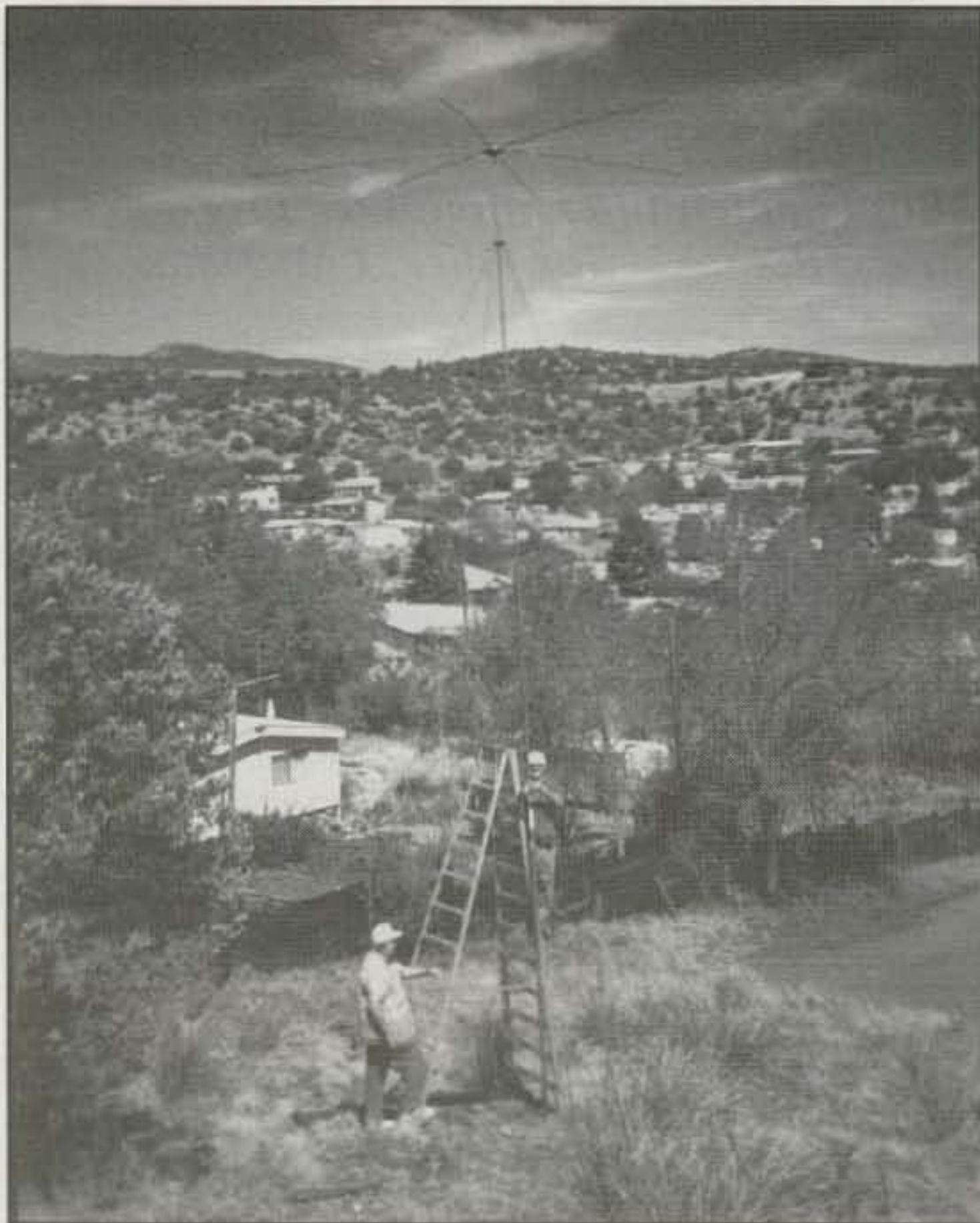
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*The test range(?). The antenna here is just about completed. My location is almost smack on the Continental Divide at 6300 feet. This view is looking towards north.*



*Here are W1ICP on the left and N5NUG on the right. We are checking the final adjustments. An MFJ-249 was used here to get the tuning where we wanted it.*

in ground body losses.) For the sake of discussion, let's say the impedance of such a whip is 4 ohms, of which 3.8 ohms is ohmic loss and 0.2 ohm is radiation resistance. If we put 100 watts into this antenna, we are going to lose most of the signal—well over 90 watts—as heat. That's very poor efficiency. However, our point here is that if we reduce the size of any antenna but keep it resonant, we lose efficiency. Now let's go to the CTSVR Uni-Hat and see what we have.

This antenna is designed to cover 160, 80, 40, and 18 meters under matched, resonant conditions. A word now about "bandwidth." In discussing antennas it is customary to describe the bandwidth for a given standing wave ratio. In other words, how far can one go in a band and stay under a 2 to 1 SWR? There is even another factor here. Nearly all transceivers these days are designed to shut down if the SWR goes over 2 to 1. That's more or less the reason we talk in terms of 2 to 1 bandwidth—simply because we know the transceiver will load, etc., within that range.

The 2 to 1 bandwidth for this antenna on 160 is 80 kHz, about 100 plus on 80, and the entire 40 and 18 MHz bands. With a wide-range Transmatch the antenna can be used on 20 and the other bands. The overall height of the antenna is 31 feet, making it a very short vertical for 160. However, the radiation resistance on 160 is right at 50 ohms, making it a very efficient antenna on 160 and the other bands.

So how is it done? Here we have an antenna that normally would have a very low impedance for 160. After all, a quarter-wavelength vertical would be on the order of 130 feet, so this antenna comes in at one-sixteenth wave. One of the owners of the Uni-Hat company (Ron Knott, K5YNR) wrote an article in *The ARRL Antenna Compendium*, 2nd edition, page 36—"Unipole Antennas, Theory and Practical Applications"—and

the Uni-Hat described here uses some of those general ideas.

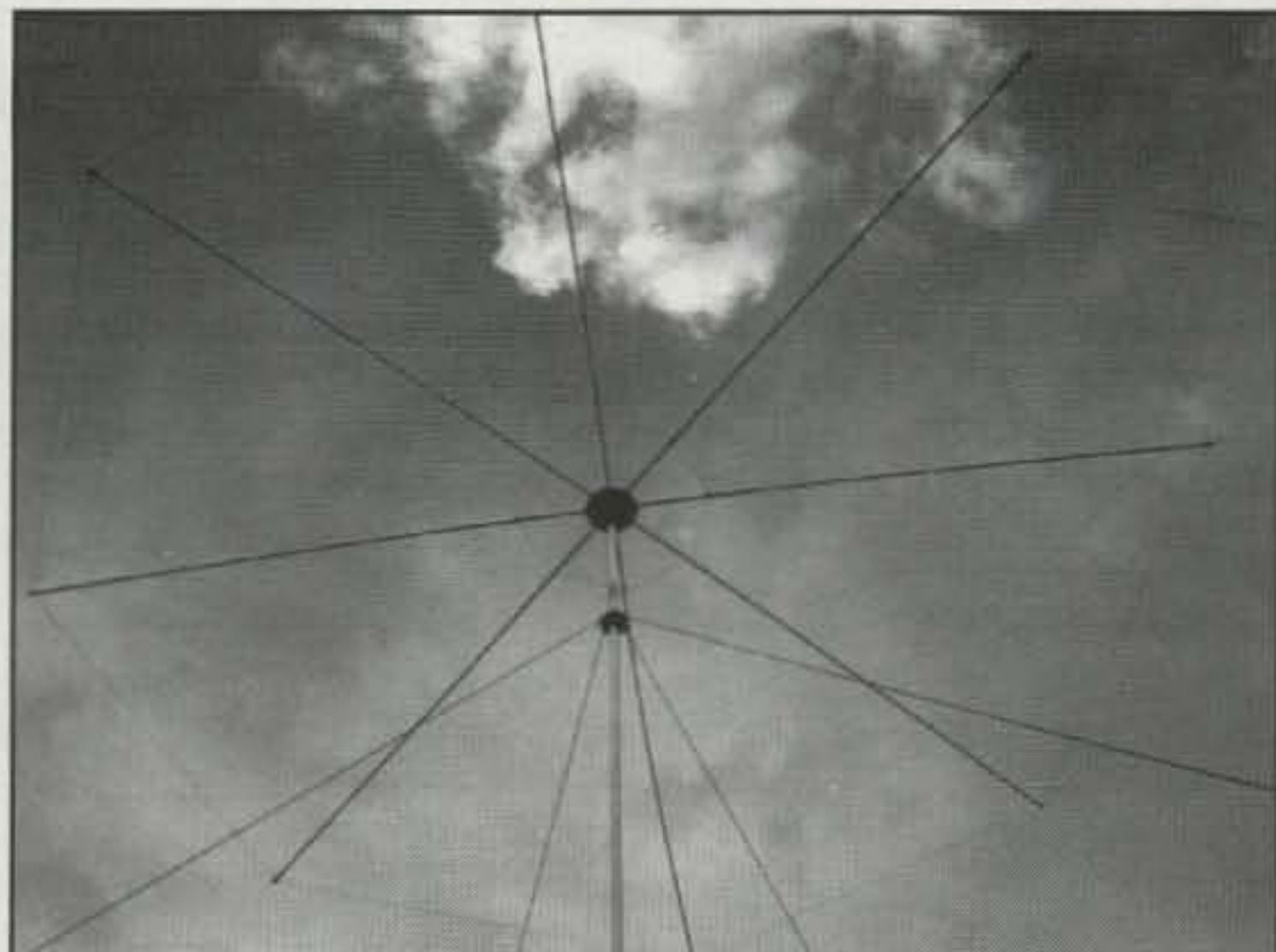
Ed Goodman, N5NUG, the other owner, did extensive work in designing this antenna for multiband use and practical construction.

The Uni-Hat is a 31 foot high antenna, structure supported by a guyed mast. There is a capacitive hat at the top, 15 feet in diameter, made up of aluminum spokes. From this top, four sleeve or skirt wires drop down to the bottom. These four wires make up the antenna on 160 meters.

Getting back to our radiation resistance efficiency, the theory behind this type of antenna can be likened to folded dipole or loop antenna. Essentially, the four skirt wires make up a one-sixteenth-wave folded dipole with an input impedance of 50 ohms. The manufacturer states that with a relative field strength meter moved up and down and parallel to the antenna, approximately 25 feet away, the meter indicates that radiation is greatest just below the top hat. The radiation diminishes as the meter approaches ground. This implies that the integrated current distribution is inverted from that of a conventional short vertical antenna. *Exact* matching details are not given here because of pending patent rights.

In any case, the antenna is a one-sixteenth wave on 160, one-eighth wave on 80, and one-quarter wave on 40. The antenna is supported by a telescoping 30 foot steel mast that takes four sets of lightweight, non-conducting guy lines. In my setup the Uni-Hat is installed on the north side of a mountain (6400 feet above sea level), and installation took less than 10 hours in 100 degree heat! We certainly drank a lot of water, though!

It is a well-established fact that "thick" antennas are better performers than "thin" ones. In the case of the 160 meter Uni-Hat we have four antenna wires spaced about four feet apart. This makes a relatively "thick" antenna. In another sense we



This is the top hat, which is 15 feet in diameter. Not visible is the inner wire ring which holds the four antenna wires.

have a four-conductor folded-dipole antenna. This gives us a very good radiation resistance, providing well over 90 percent efficiency on 160—with better efficiencies on the other bands.

A quarter-wavelength vertical has a base impedance of approximately 36 ohms. If a vertical antenna is reduced in length to one-eighth wavelength, the radiation resistance will reduce one-fourth that of a quarter-wave vertical, or 9 ohms. By using folded-dipole techniques, we can raise these radiation resistances on short antennas.

Folded dipoles at one time were very popular simply because

the feed impedances of folded dipoles were very close to the impedances of the then-available feed lines. Keep in mind that we are discussing an era when coax lines, while they existed, were not practical because of costs and other factors in the amateur fraternity. The impedances of these antennas range from 144 to 288 ohms. When 300 ohm twin lead became available with the advent of TV, the line made an ideal folded dipole, plus the same line made an excellent feed line. What happens when these high-impedance antennas are applied to verticals?

As the height (length) is reduced, the radiation resistance decreases. The reactance also increases, but in this case it is inductive (!), not capacitive. (This is an interesting fact that is not normally found in antenna textbooks.)

The impedance of a quarter-wavelength folded dipole is, of course, half the normal 288 ohms, or 144 ohms. When we reduce this folded dipole down to, say, one-eighth wavelength, the resistance decreases to one fourth the value, or 36 ohms (not too far from 50 ohms, our popular impedance value). I could go on in this discussion, but it should be apparent to anyone interested in antennas that (1) more conductors will juggle or raise impedance even though the antenna is very short electrically; and (2) the higher the radiation resistance, assuming resonance, the better the bandwidth.

So how does it work? Frankly, and very honestly, I have reviewed many vertical antennas—and put up many in my career. I was impressed with this antenna's performance. On 40, for comparison, I have a 180 foot dipole center fed with open-wire feeders at 60 feet above the ground. This is a superb antenna on 80 and 40. However, in my first tests on 40, using the A-B method, switching between the Uni-Hat and the dipole, I got a real surprise. In most cases, and I do mean "most," the Uni-Hat was slightly better—and quieter—than the dipole. As to 160, my wire dipole is a little short for the band, but should be better than the vertical. It wasn't, and by quite a difference.

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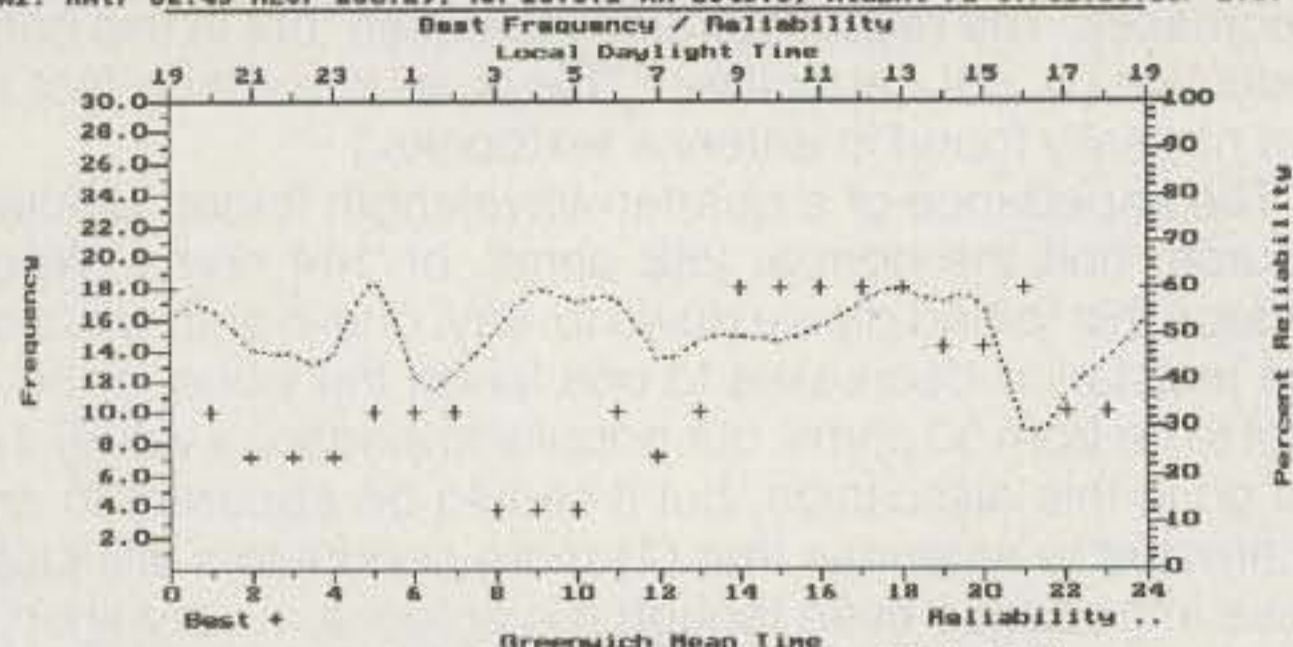
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(A) MUF, (B) 2.0 MHz, (C) 3.8 MHz, (D) 7.2 MHz, (E) 10.1 MHz, (F) 14.2 MHz  
(G) 18.1 MHz (H) 21.2 MHz (I) 24.9 MHz (J) 28.5 MHz (K) 29.6 MHz  
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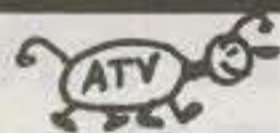
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Tom (W6ORG)  
Maryann (WB6YSS)

I was brought up in the old school that stated, "Verticals radiate equally poorly in all directions." Boy, that wasn't the case here!

I went to 80. Keep in mind that I now was running an eighth-wave vertical in height against the full-size plus dipole. Believe it or not, in most cases the two antennas were about equal, except that for long-distance stations the vertical produced contacts that were not audible on the dipole. Of course, that was almost to be expected, because the take-off angle on the Uni-Hat is only 10 degrees, which is much less than the dipole. When I say 10 degrees, that was carefully measured by the manufacturer.

The manual for the antenna is not an engineering afterthought. This manual is 50 pages—yes, that's right, 50 pages—long, very detailed, and profusely illustrated. Here are some of the specs:

Power Rating: 1.5 KW CW; 2.5 KW SSB.

Bandwidth, 2 to 1 SWR: 160 meters 80 kHz; 80 meters 100 kHz; 40 meters 250 kHz; 17 meters entire band.

Number of radials: 6, minimum, 25 feet long.

Foot print: 25 by 25 feet.

Wind-surface area: 9 square feet.

There is a lot of antenna theory that I have left out in discussing this antenna simply because of patent applications. I may be a little redundant here, but one thing I can mention is some information on transmission-line theory as it applies to this antenna. I don't mean the transmission line itself as used to feed the antenna, but simply theory to show how this antenna works.

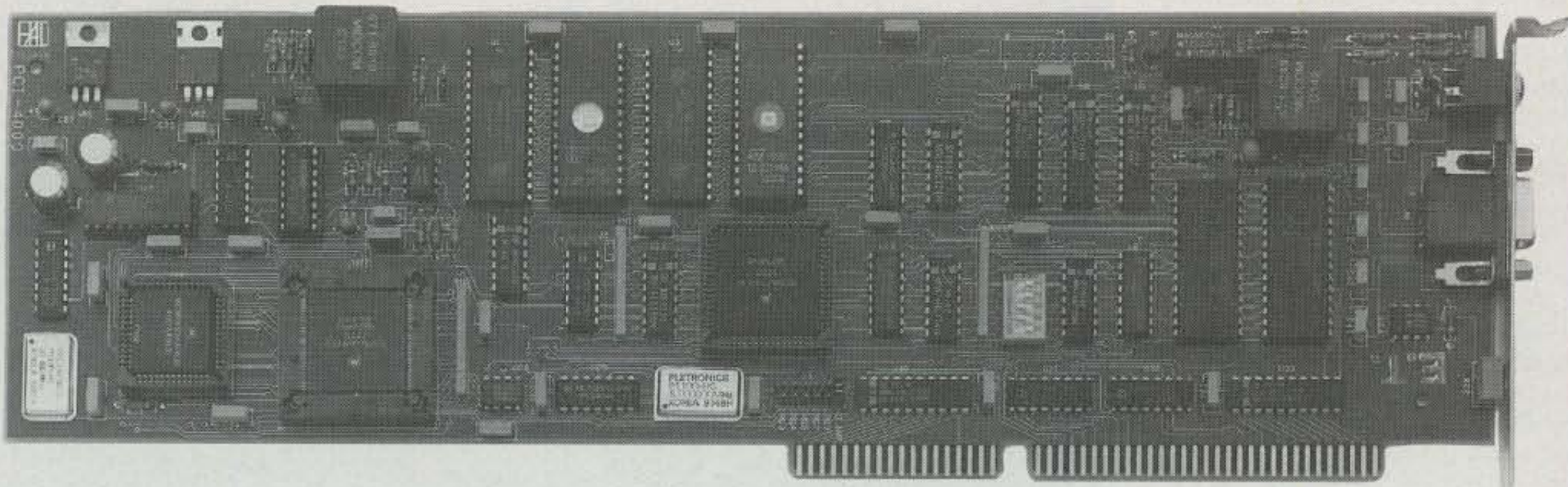
If a quarter wavelength section of open-wire transmission line is shorted at its far end, the input will look like the opposite, or an open circuit, as it is self-resonant and has infinite impedance. Because of this infinite input impedance the line will not accept power nor radiate. However, when the length is reduced below a quarter wavelength, the line is no longer resonant but becomes inductive at its input. Because it is still balanced, though, it will not radiate. If one side is grounded at the input, the current in line becomes unbalanced and the line will radiate and therefore function as an antenna. If the line is one-quarter wavelength long, the impedance will be 144 ohms with zero reactance. Now what is important to us is as the length decreases the impedance decreases and the input becomes more inductive. The antenna then operates as a short vertical folded dipole. Except, as I pointed out earlier, the antenna can have a respectable impedance, in this case close to 50 ohms.

As indicated earlier, it is well known that the main problem with electrically small or short antennas is the fact that the radiation resistance drops so low as to make the antenna be almost useless. Recently, it was found that placing an inductance in the grounded side of a short vertical folded antenna causes an increase in the input resistance. I am not discussing a loading coil here; that must be emphasized. This inductance functions as a resistance transformer, reflecting a larger value of resistance at the input than would be found without this inductance. It should be noted that this inductance is a relatively small value when compared to a conventional loading coil.

The reader is certain to assume that I am very impressed with the performance of this antenna, and he or she is correct. It is an impressive performer, to say the least. The mere fact that the antenna in the tests I have made apparently outperforms a full-size horizontal dipole is very exciting to me. At the time of this review (early September 1994) I had already logged some 160 meter DX, so I am looking forward to this winter season. Also, would you visualize a 20 meter version using these methods? About 4 feet high would take a kilowatt and really provide a low angle of radiation. Now that's something. Hopefully, I will review one soon.

The antenna lists for \$499 and is manufactured by Uni-Hat Corporation, 3816 Royal Lane, Suite 100, Dallas, TX 75229 (1-214-352-4623, 1-800-807-5646.

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# Results of the 1994 CQ WW 160 Meter DX Contests

BY DAVID L. THOMPSON\*, K4JRB

**T**he low-power and QRP gang now have their crack at certificates and their own top-score blocks. I look forward to more entries in both classes and even better scores as we ride the sunspot minimum for the next three years. For the record, a QRP or low-power station with the highest score in any state, province, or country wins a certificate if there are at least three entries. If the QRP score is over 5K or the low-power score is over 20K, the station gets a certificate regardless of the number of entries. However, if the top score is also a QRP or low-power station, then there will be no other winners in that category. There were a number of cases in which a low-power station was a top score and even a few cases in which a QRPer placed first, so we feel justified in this ruling. All stations listed in the block high scores do get certificates too, so there is always that final chance.

The master CW log increased again to 4203 stations with most of the rise in stateside stations. On SSB the master log passed 5000 by a wide margin with 5107 stations recorded. Thanks again to the many who made note of possible uniques. Less than 4% of those stations were true uniques, as once on the band they got carried away. Several even won certificates! Received were 759 CW logs and 475 SSB logs, for a record grand total of 1234 logs. This is an increase of 16.6% in only one year. KH6CC summed it up best when he said he could not find a hole anywhere on either mode.

This only points out the need to try and make a few holes for different continent QSOs. Just look at the number of European stations with a USA/VE count of zero! I am asking that at least the 1.830 to 1.835 window be kept open only for DX stations to work different continents. Please, no Statesiders or Europeans sitting in this area running stations! ON4UN points out that splits can cause confusion, so let a DX station have a small piece of the band so they can work stations outside the East Coast or Europe. Remember this is a DX contest, not just sweepstakes moved to 160 meters. Thanks for your help and cooperation.

All states were active on both modes, as were all Canadian provinces, including VY1 and VO2. Rare states and provinces still make good DXpedition sites, although January and February sure make operating from P4 or VP2 look inviting. There were again 114 countries logged on CW, and SSB countries increased by 4 to 107. AP2, BV, ZA, KC6, VS6, and PYØF on CW will make even all-banders reach for the switch. ZA, VS6, 9M2, A71, and A92 were counters the fortunate were able to log on SSB. OT4T put 80 countries in his log on CW for an increase of 11 from the high count last year. Chief op John points out that in reality he



"Mr. Sicily" to testers worldwide is IT9ZGY and his up-to-date shack.

worked 82, but for this contest USA states and Canadian provinces count rather than the single DXCC counters. OM7M and S5ØA logged 58 countries on SSB, but conditions were not good, and this is down from 1993's 61. We hope propagation will shine on both modes and make 1995 a stellar year.

## Aruba P4 At Contest Time

Aruba entries took three of the top plaques in 1994. An analysis of their logs showed they reach the states as well as any North American DX location, but they also work Europe, Africa, and Asia, which often don't make the USA/VE path. A high multiplier along with 10 points for virtually every QSO make for a winner almost every time. Perhaps PJ9 is about the only other place to compete with Aruba. The attempts by VP2EC, KP2A, and VP9AD show that the points do make the difference!

Say goodbye to Karelia as a WAE counter this year, and remember that maritime mobiles only count as 5 point QSOs no matter where they might be located. One challenge this year will be to equate the new ex-USSR calls with the country. Please double-check your logs so UXØ won't show as 10 points from Europe or ER2 is listed as European Russia instead of Moldava. Statesiders still send logs showing KC4, KC6, or KH8/W1 as DX counters. These

are the biggest errors found each year and should be double-checked before sending in your log. I am still amazed that many computer logs come in with these types of errors unchecked. Unreadable logs still are a problem, too. I sent three logs back for another copy this time. If you can't read your log, don't send it. This applies to both hand-written logs and computer printouts. One final log note regarding dupe sheets is in order here: Make sure the entire dupe list is on the printout. Too many logs are received with only part of the list. For the many Europeans, a dupe list is a list of all the calls you worked in alpha sort order. I use this for the master log and computer cross-checking!

## CW Contest January

The top single operator score was again K4PI using the call P49I with a score of 991,230. For the second year in a row he missed the one-million mark by just a handful of QSOs or one extra multiplier. Mike's score was just over 6K off his 1993 record. K2TW of FRC came in second as P4ØO with nearly 872K. N3RD out QSOed both Aruba entries by a wide margin, but the five-point USA/VE contacts made his VP9AD score only (did I say only?) reach 811,836. The top multi-operator score also came from Aruba, as WØCD and the Michigan

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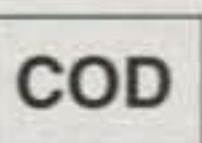


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N7AM and his balloon ready to go up.

gang cranked out a new world multi-op record at just over 803K and world fourth place. N5AU keyed VP2EC to fifth place with nearly 752K. ON4WW visited the ON4UN station and keyed OT4T to sixth world high and top European single op with 738K. This is a new European record! VE3EJ came through as usual with a top score and placed seventh with a multi-op effort of 635,819. John went to packet as his helper to rack up this fine score. The 9A1A multi-op group put Croatia at number eight with 513,422. K4XU showed up as one of the ops at this station. EA3KU went multi this time and put Spain at number nine with 507K. Ken, K4TEA, found poor conditions from KP2A, but still placed tenth with 498K. The WW2Y gang just missed the top ten, coming in eleventh by less than 7K (491,517). Peter's group increased their score by over 44K, but dropped from fourth to eleventh. Scratch your head over that one!

Tight CW single operator races in Alabama, Texas, Michigan, and the Netherlands plus Iowa and Slovakia in multi-operator highlight the certificate hunt. The boxes indicate the top ten scores for the USA and DX plus the top five VE. This year boxes for QRP and low power have been added. Placing in the boxes is a worthy goal of any contestant and is a sure indicator of a competitive station.

CW QSO leaders were KN8Z\* 1348, VP9AD 1319, VE3EJ\* 1195, WW2Y\* 1161, AB4RU\* 1159, N2LT 1142, K4VX 1119, NCØP\* 1077, VP2EC 1073, and OT4T 1043. (\*Denotes a multi-op station.) Highest DX totals outside of VP2EC and OT4T were P49I 879, 9A1A\* 865, and P4ØO 841. Five other DX stations broke into the top 50 in 1994.

Top country totals were OT4T 80, 9A1A\* 73, RK2FWA\* 71, OM7M\* 70, S5ØA 70, EA3KU\* 67, PA3DWD\* 67, OZ1LO 66, OK1DXS 66, and S59A, I4EAT\*, I4YSS, and LY3BS\* with 65.

The highest USA/VE was WW2Y\* with 59. K1ZM with 58 was the only other W/VE to break the top 50 country leaders.

K1ZM again topped the USA single operators with N2LT, W3LPL (KE9A operator), and W3BGN all breaking 300K. K4VX made a fine WØ score, and KN6M/5 and N5RZ made good shows from Texas (just look at the JA's in their logs!). NW6N scored nearly 164K from the west coast to lead the western group. WW2Y again topped the USA multi-ops with KN8Z, AB4RU, K1NG, and K3WW rounding out the top five. W7XR scored 265,677 to lead the west coast with N6DX just points behind. AA5BL, KYØA, and NCØP had fine scores from the mid-

## TROPHY WINNERS AND DONORS

### SINGLE OPERATOR CW

**WORLD BY K5AAD (N5JJ MEMORIAL):** Winner Mike Greenway, P49I.  
**USA BY K4TEA:** Winner Jeffery Briggs, K1ZM.  
**CANADA BY W8BLA:** Winner Ken Dixon, VE3KP.  
**ZONE 3 BY KM4MG:** Winner Bob Wending, NW6N.  
**ZONE 4 BY K5NA:** Winner Jerry Rosalius, WB9Z.  
**ZONE 5 BY WA4CUG:** Winner Lewis Tompkins, N2LT.  
**AFRICA BY K4MZW:** Winner Hermann Stein, CT3FN (HB9CRV).  
**ASIA BY NE4S:** Winner Riki Kline, 4X4NJ.  
**EUROPE BY N4TMW:** Winner John Devoldere, OT4T (ON4WW Operator).  
**OCEANIA BY KM4FV:** Winner Jack Wheeler, KH6CC.  
**SOUTH AMERICA BY K4JAG:** Winner Thomas J. Wall, P4ØO (K2TW).  
**JAPAN BY WØZV:** Winner Satoshi Hara, JH5FXP.

### SSB

**WORLD BY K5AAD (N5JJ MEMORIAL):** Winner Bob Brockman, P4ØJ (WX4G).  
**USA BY K4JRB:** Winner Steve McElroy, K4JPD (AE6E Operator).  
**CANADA BY K5NA:** Winner Don Dashney, VE3RM.  
**ZONE 3 BY N4ONI:** Winner Bob Wending, NW6N.  
**ZONE 4 BY KC4MJ:** Winner Jerry L. Fisher, NXØI.  
**ZONE 5 BY K4ODL:** Winner David L. Thompson, K4JRB.  
**AFRICA BY WB4ZNH:** Winner Hernani Correia, CR3R (CT3BX).  
**ASIA BY W8BLA (W4LVM MEMORIAL):** Winner Gennady Kolmakov, UA9MA.  
**EUROPE BY N4NX:** Winner V. Matuzevicius, LY3BS.  
**OCEANIA BY K4DLI & KB4SSS:** Winner Jack Wheeler, KH6CC.  
**SOUTH AMERICA BY AE6E:** Winner Elsa Ponson, YV1DRK.

### MULTI-OPERATOR CW

**WORLD BY N4RJ:** Winner George A. Guerin, P4ØGG (K8GG).  
**USA BY WS9V:** Winner Peter D. Hutter, WW2Y.

### SSB

**WORLD BY SOUTHEASTERN DX CLUB:** Winner Ron Hooper, AB4RU.  
**USA BY WB9Z:** Winner Don E. Barclay, N5OLS.

dle. With VE3EJ multi-op, VE3KP stepped forward as the top VE single op. VE3PN made a solid second place VE score.

CT3FN (HB9CRV) topped Africa single ops with 355,406. High Asia was 4X4NJ with nearly 382K. Jack, KH6CC, was again top Oceania at 242K. JH5FXP won high Japan with a fine 144K effort. He worked many Europeans and 10 states in his effort. The effort to get more 160 meter frequencies in Japan is still in the works, but for now listen for them from 1907 to 1912 kHz on CW only!

WA4PGM was the top world QRP score and top USA score. UX8IX was the top DX QRP. Positions two through five were very close, and all worked hard for every contact. Low power is more the norm for the DX station, so 5B4ADA placing first worldwide and DX stations taking all ten world slots is no surprise. A special Top 5 CW USA Low Power section of the Top Scores box has been added for this year, with K1BNQ duly noted as top USA.

## SSB Contest February

Bob, WX4G, traveled to Aruba and complained about poor conditions all the way to the top world score of 282,710 as P4ØJ. AB4RU retained his top multi-op position and came in second world high with 278K. VE3RM put on the amplifier and talked his way to third world high with 235K. N5OLS showed again that Texas can compete, with a fourth place showing at 229,473 and second place multi-operator. AE6E put the K4JPD superstition in fifth

(top USA single op) with 202,692. Sixth was another fine effort from the RK2FWA group at 185K. LY3BS was close behind with 183K for seventh place. WR8C again placed well as a multi from Ohio in eighth place with 182,700. LX4A was a strong multi operation from medium-rare Luxembourg in ninth place with nearly 172K. K4JRB wound up in tenth with another big score (171K) from Georgia. Dave was one of several operators who have been experiencing problems with those touch-on lights. Every 4 minutes he could not hear anything but S9+ signals for about 20 seconds even on the shielded receiving loop.

Of the single operators, K4JPD (AE6E) was the USA winner and VE3RM moved to the top VE. Noticeable in their absence on SSB were WB9Z, VE3EJ, K1ZM, and KD9SV. LY3BS made the top European score with I3MAU second. I3MAU says that Italy is too far south to win Europe or place in the top ten. Jody, VP5JM, was the top North American score; CR3R (CT3BX) was again top Africa; UA9MA topped Asia; and KH6CC (who else) was top Oceania. Top multi-ops included RK2FWA for Europe, KH6U for Oceania, and LU7DW from South America. There were no Asia or Africa multi SSB entries (hint, hint). AB4RU was top USA and world multi again, and VE2PK/VE3 topped Canada with VE3DC close behind.

Georgia was the place to be for top USA single operators. K4JPD (first), K4JRB (second), K4PI (third), KX4R (fifth), and WB4ZNH (tenth) took one half of the top ten. Kudos to NXØI and KVØQ for top ten scores from WØ! NW6N repeated his CW effort as top score from the West



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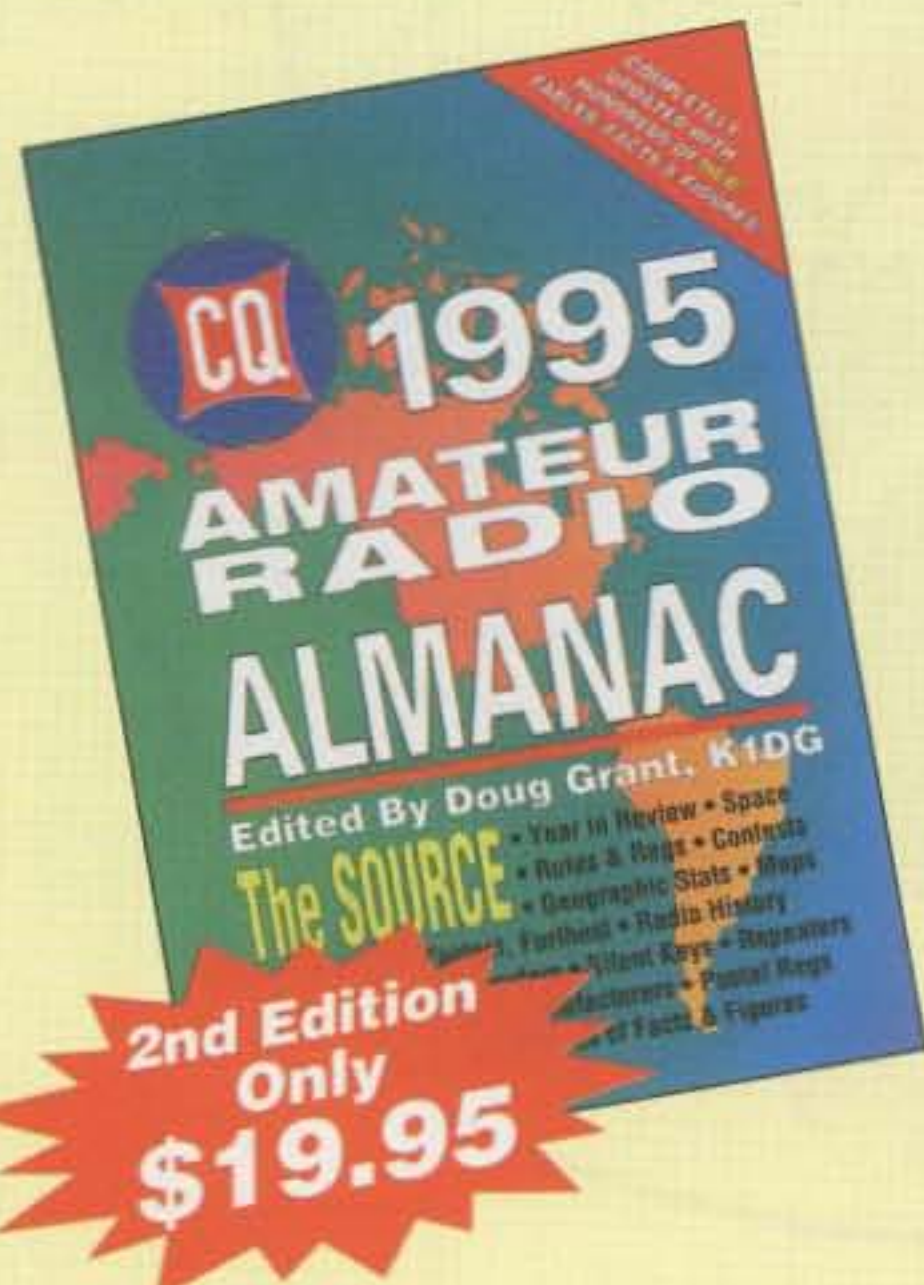
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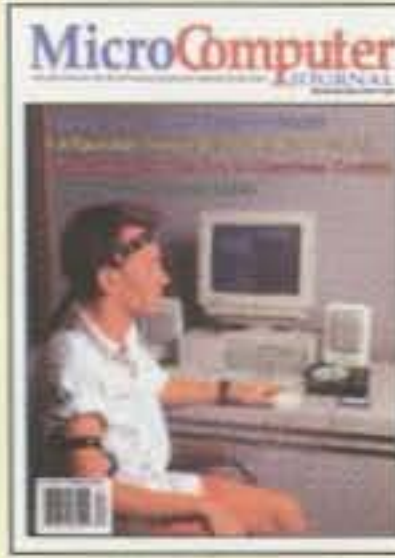


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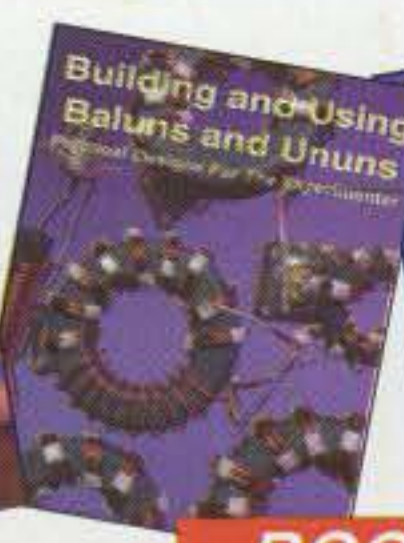
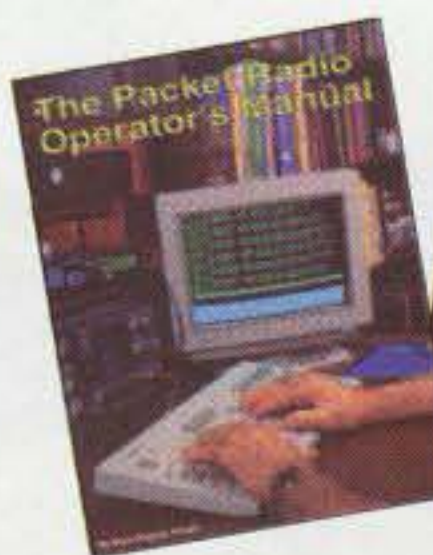
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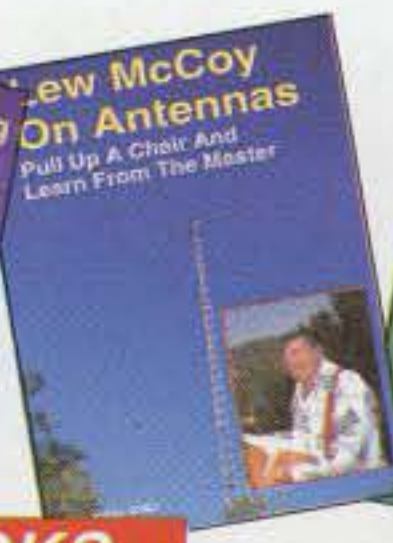
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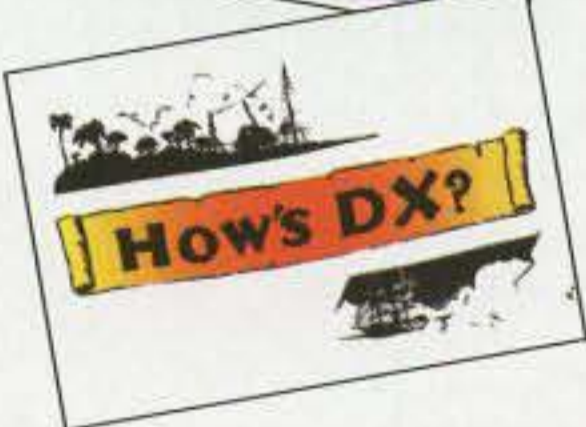


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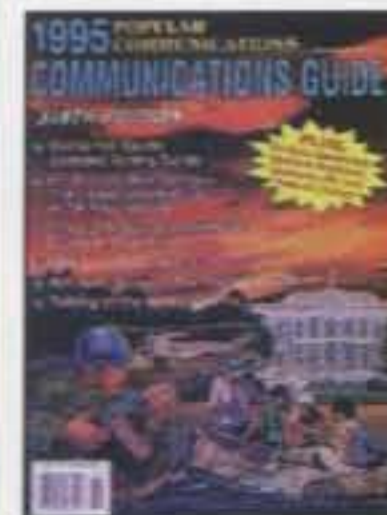
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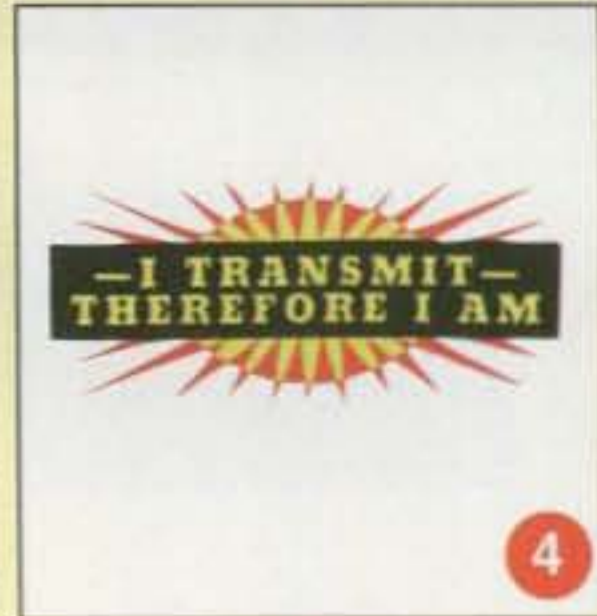


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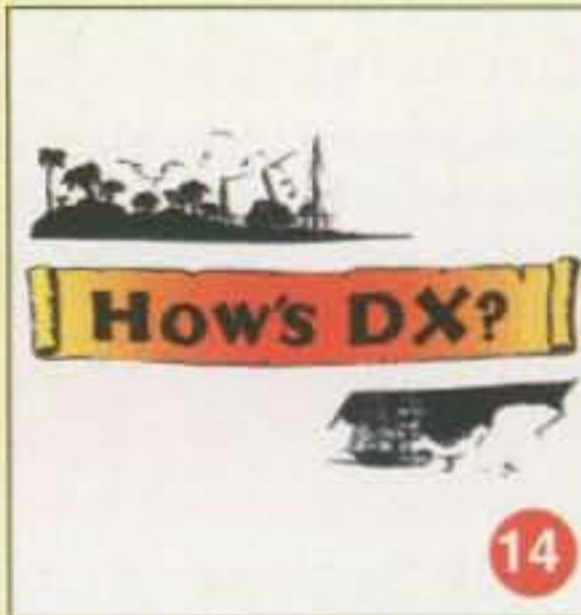
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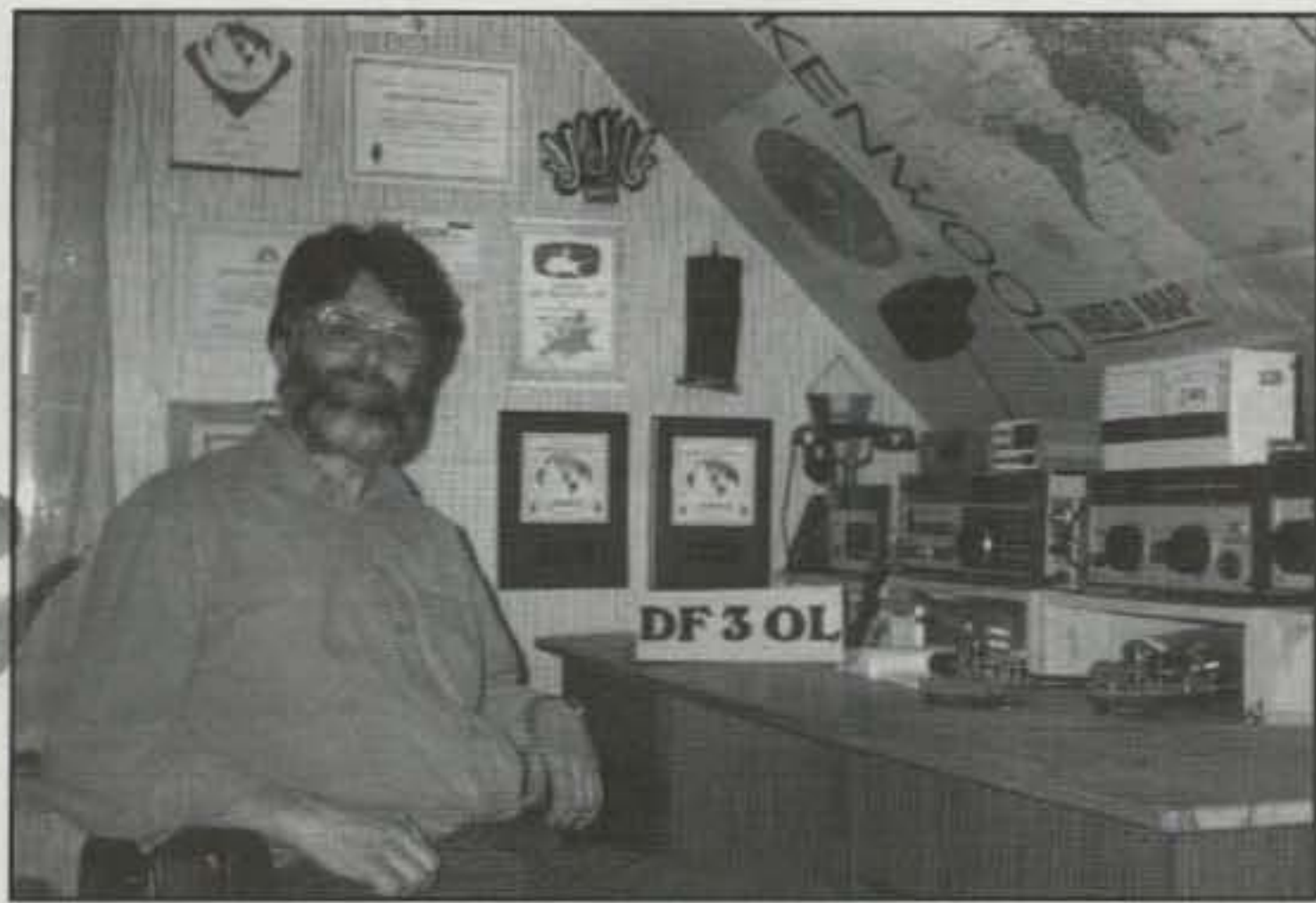
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4X/S53R shown at UN Headquarters in Jerusalem helped put Israel in many logs.

Coast. The top four multi-op USA scores after AB4RU included WR8C, W9UP, WW2Y, and N8ATR. N7DD made a big score from Arizona and deserves special praise.

QSO leaders were AB4RU\* 1277, N5OLS\* 1238, WR8C\* 1074, W9UP\* 1043, K4JPD 1039, NX0I\* 1039, KY1H\* 1017, K4PI 1011, N8ATR 991, and WD9INF 959. QSO leaders outside W/VE included UT5DK 723, LY3BS 679, and RK2FWA\* 655. The top country leaders were again an all DX affair lead by OM7M\* 58, S50A 58, I3MAU 57, LY3MR\* 56, SV8CS 56, RK2FWA\* 55, OM3CQR 55, 9A1A\* 54, LX4A\* 54, and T93N and S59SLO\* with 53. Top W/VE leaders were AB4RU\* 34 and K4JPD 27. Neither was even close to the top 50 country list.

WA4PGM took world high SSB QRP score as he did on CW, and RV3ME was the top DX station. Special kudos to WA4IAR for second-place world QRP on both modes! We need more QRP SSB activity. SSB is more equalized than CW with regard to low power. S53TK was world high, and K1BNQ was second world and top USA. Low power on SSB is tough, so congratulations to all the high scorers!

### Club Competition

The Frankford Radio Club turned on the heat and ran away with the club competition and a new club record. The Southeastern DX Club turned out the troops and the DXpeditions to place second. The surprise third-place finisher was the Slovenian DX Club, moving past the Yankee Clipper Contest Club, who come in fourth. The Mad River Contesters placed fifth. Several other clubs broke one million in 1994, too. Again, especially with DX stations I noted an unclear indication of intended club competition. The summary sheet must show **Club Competition = club name** to be listed. Club or organization names at the top of the summary sheet don't count. Also try to be consistent as to name or abbreviation so your club gets proper credit. Remember that three logs are required for a club listing. Club secretaries who send me lists of eligible members help their club, as I am willing to add or correct an entry for the final results. Good luck to all in '95!

### Helpers

Thanks to two PCs (a 386 and a 486); Helen (N4IN's XYL); my XYL, Jean; and Gail and the

CQ staff for their assistance. A special thanks to Karin at RT Systems for the use of SAM to make sure USA and Canadians were of the right class and location. Please don't send any more logs to N4IN's QTH; pass the word!

### Logging Notes

I have pointed out the major logging problems found again this year as I reported the main results. There are several other errors that you should consider before sending your log to me or any contest committee.

1. Make sure the points are correct for each QSO.
2. Look for busted calls or possible dupes,

such as P40I for P49I or WX4FG for WX4G. A few logs had calls run together too, such as W3GHN8II. I don't know whom you worked, so it comes out as a dud.

3. Check your log for correct dates and times. If it's wrong, correct it so the checkers can verify your QSOs.

4. Several sent me the wrong log, such as one for the ARRL 160 or the North American QSO party. Please be careful, or you can fail to score in either contest.

5. Please put the summary page first and try to have the log pages in order. A summary sheet from NA or CT is satisfactory, and there is no need to use the official sheet to repeat this information.



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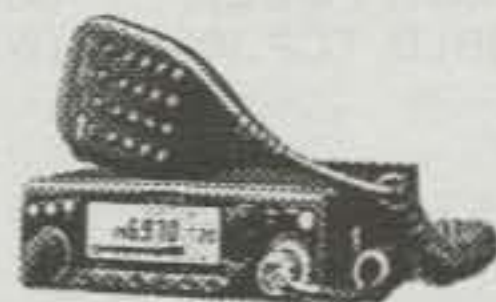
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N2LT	377,175	K4JRB	170,960
W3LPL	322,218	K4PI	165,765
W3BGN	301,212	NXØI	158,769
AA1K	294,819	KX4R	149,723
WB9Z	274,900	KVØQ	148,248
WA2SRQ	260,300	W3GH	137,156
KZ3H	222,177	N2LT	130,260
KN6M/5	218,284	W3TS	125,775
N5RZ	215,217	WB4ZNH	120,274

VE CW (TOP 5)		VE SSB (TOP 5)	
VE3KP	263,092	VE3RM	235,224
VE3PN	216,936	VE5RA	80,946
VE3RM	120,242	VE7IN	51,660
VE9AA	77,376	VE2QO	43,296
VE4JB	67,760	VA3WTO	36,224

DX CW (TOP 10)		DX SSB (TOP 10)	
P49I	991,230	P4ØJ	282,710
P4ØO	871,936	LY3BS	183,294
VP9AD	811,836	I3MAU	143,248
VP2EC	751,959	UT5DK	141,390
OT4T	738,192	S5ØA	132,691
KP2A	498,348	ON4AEK	124,848
4X4NJ	381,840	SV8CS	122,550
OZ1LO	380,016	F6EZV	104,754
CT3FN	355,406	OM3CQR	104,196
S54A	341,820	T93M	90,047

### MULTI-OPERATOR

CW (WORLD, TOP 10)		SSB (WORLD TOP 10)	
P4ØGG	803,330	AB4RU	278,024
VE3EJ	635,819	N5OLS	229,473
9A1A	513,422	RK2FWA	185,185
EA3KU	507,100	WR8C	182,700
WW2Y	491,517	LX4A	171,720
RK2FWA	418,590	W9UP	163,870
KN8Z	413,448	KY1H	159,942
OM7M	402,408	LY3MR	153,888
OM7A	401,280	WW2Y	148,993
PA3DWD	374,220	N8ATR	147,774

CW QRP (TOP 5)		SSB QRP (TOP 5)	
WA4PGM	66,080	WA4PGM	31,096
WA4IAR	33,312	WA4IAR	11,507
UX8IX	32,520	RV3ME	7,074
HB9DDZ	30,058	KA1CZF	5,962
KA4RRU	28,980	EU1EU	1,375

CW LOW POWER (WORLD, TOP 10)		SSB LOW POWER (WORLD, TOP 10)	
5B4ADA	258,894	S53TK	70,416
T93M	239,223	K1BNQ	67,222
S59AA	234,460	DL8PC	59,976
HA8EK	225,875	KE5FI	58,311
HA8BE	174,168	RA3WA	57,640
GØIVZ	161,322	DL3LAB	56,631
DJ6TK	157,315	KN6M/5	54,230
UA4WGU	152,458	DL7MAE	50,431
9A2OB	151,453	WA1UJU	49,008
S51FA	146,520	AC4EX	48,707

CW USA LOW POWER (TOP 5)			
K1BNQ	118,248	WA1UJU	94,020
K4TO	117,075	WA2ASM	85,617
AA1AB	108,801		

6. If a log is received unscored, the log is a check log—period!

Please make checking your log a pleasure rather than a chore.

I urge as many as possible to send me computer logs. I prefer NA or CT, but will accept any other logging program as long as I can find both the log and the dupe sheet. I use these to automatically check and verify the scores. Using statistical sampling, I check so many entries in each log with the top logs getting close attention. If several cross-checks fail to match, these logs are set aside for more intense inspection. The dupe sheet is the fastest hand way to check for matches or possible mislogging (KX4R as KR4X or K4JRB as K4JBR). The uniques in this contest are traditionally less than 4% even on the top logs, so those with more than 10% uniques are suspect. This year several stations had over 10% uniques, but cross-checked on the majority of contacts. Usually these are Russian or Ukraine listings, but occasionally they will show up as W or VE contacts. Be aware that you are being watched and your log will continue to get extra attention each year. Don't worry if you are not ready to send in a computer log yet. I still accept hand logs, but prefer either the official log forms or a hand-written substitute.

For those who do send in NA logs, please make sure the summary sheet shows QSOs, points, WVE multiplier, and country multiplier. I had to spend extra time verifying your point total and multipliers. This goes for any log summary. Just look at the scores to see why this is important.

Remember to always send along a hard copy of the computer logs as well as a diskette. This is a CQ Contest Committee requirement! Please send me a postcard or SAE or SASE with a stamp or IRC rather than the registered reply route. I live in fear of a log being returned because I forget to pick it up or am out of town.

### Next Time

The CQ 160 Meter CW Contest will be held the last full weekend in January 1995 (January 27, 28, and 29). The SSB Contest is the last full weekend of February 1995 (February 24, 25, 26). Times for both contests are 2200Z Friday start and 1600Z Sunday end. You penalize yourself if you miss the 2200Z start, as up to 60% of the winning scores are made in the first 6 to 9 hours. Last year at least one publication listed the start time as 1600Z on Friday. Thankfully only a few logs arrived with many QSOs before the official start time. Contacts made after 1600Z on Sunday carry a double penalty. No logs were submitted with any late contacts in 1994.

If you need a log sheet or summary sheet send a business-size SASE or SAE with 1 IRC to CQ 160 Contests, CQ Magazine, 76 North Broadway, Hicksville, NY 11801 USA. Make sure your computer log program puts 40 or 50 QSOs per page and provides totals for QSOs, points, and multipliers on *each page!* Every contact should include a location such as 599GA or 59GW. Multi-operators should either list the operator on each page or provide a summary of operator/hours. There are only two classifications—single operator and multi-operator. Using packet or a spotting net classifies an entry as multi-operator. Low power and QRP will be noted as per the complete

rules. Multi-operator stations are all listed as high power!

CW log mailing deadline is February 28, 1995, and the SSB log deadline is March 31, 1995. The only exception is both logs can be sent at the same time to arrive no later than the SSB deadline. Logs with postmarks after the deadline or that arrive after May 1, 1994 are subject to being labeled "checklogs." Send all logs to 160 Contest Director David L. Thompson, K4JRB, 4166 Mill Stone Court, Norcross, Georgia 30092 USA. Please indicate CW, SSB, or both on the envelope and send along photos. Again, good luck to all!

73, Dave, K4JRB

### Soapbox CW DX

Because of QRM it was more difficult to work stations during the contest than during a normal day. I called many stations without answer... *5NØNVE*. Every CQ 160 Contest gives me a new one... *UA9AT*. Wind broke our antenna and we operated only the first day... *SV2TSL*. QRM from power line makes copying stations hard here... *YL2GVW*. I am pleased with this year's results... *IT9ZGY*. Propagation poor to USA, good to Japan... *S5ØA*. Big guns made getting through to rarer DX hard; guess I need more power... *S59A*. Ex-USSR prefixes give some scoring problems... *SM6CTQ*. KH6IRT and KH6U surprised a bull while running the beverage... *KH6U*. Waited for the good European openings that never came... *WP4IIV*. My first 160 Meter Contest. Tried delta-loop and inverted V but never could get the Europeans to hear me... *E48CN*.

First 160 test for me, back next year with better antenna and amplifier... *UN7ID*. Sending something beside country should be tried in the contest... *G3VGG*. Await good North America opening next year... *OH1NSJ*. Must run decreased voltage on amplifier to stay within Dutch license limits... *PAØLOU*. Why do EU big guns call on the same frequency as DX?... *HB9DDZ*. European opening was not as good as expected. With all the Aruba stations on we all had to stay in our own segments of the band... *P49I (K4PI)*. Sorry we did not take a laptop and CT... *P4ØGG*. Support the window but not QSO... *OT4T*. Always a nice winter weekend... *F6EZV*. Mediocre conditions... *HZ1AB (Op. N4KT)*. 150 EU on Friday nite, but only 16 on Saturday (it was reverse with East Coast)... *VP9AD*. North America has more favored darkness than Europe or Middle East... *4X4NJ*.

EY8MM is my new call... *EY8MM (ex-UJ8JMM)*. Conditions not as good as 1993 especially for North America... *OK2PGG*. Never thought I'd see the day when five locals (ZS6NW, A22MN, Z21HS, ZS4TX, ZS6EZ) would brave summer thunderstorms for this contest... *ZS6EZ (Remember it's summer in the Southern Hemisphere!—ed.)*. Lost the last night as tower cracked in big storm... *LA7JO*. Probably the first 160 contest or 160 activity from Pakistan... *AP2MY (SP5DIR)*. Last major effort in this contest was 10 years ago. Much more activity now... *OZ1LO*. We need more band... several JA ops! My 12th straight 160 meter entry... *YU7SF*. Did not have enough of the local W2 stations as we did at 4U1UN... *ZF1A (W8BLA, K2UFT Ops.)*. Only one night of contesting this year as dipole broke and it was too cold outside to fix... *PI4ZLD*.

Thanks to those who heard my 40 watts... *US3IZ*. Still hear many DX stations that cannot hear me even with 500W PA... *OZ5DX*. It's a pity not to hear USA at my location... *UR4LRG*. Did not have time to operate this year... *JAØZRY*. Transmitter and receiver all homemade... *YO5AVN/3*. WW2Y was my first ever USA contact... *OZ8AE*. My location is near to JA... *RAØFU*. Conditions better to the east than USA... *E47AIN*.

### Soapbox CW WVE

It's about time to start disqualifying stations or at least imposing penalties for those who continue to oper-

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(south of the North Pole)

**NEWS BULLETIN**



**Merry Christmas from All the Gang**

Stan	WØIT	Darrell	WDØGDF
Tim	WDØFKC	David	KAØJDN
Marty	KBØIOW	Jason	KBØIUS
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## AGGREGATE CW AND SSB CLUB SCORES

(Minimum of three entries required for listing.)

CLUB NAME	SCORE	CW	SSB	CLUB NAME	SCORE	CW	SSB
FRANKFORD RADIO CLUB	8,663,249	P40O	WW2Y	SO ARIZONA DX ASSN.	251,106	N7CL	N7DD
SOUTHEASTERN DX CLUB	6,498,605	P49I	P40J	CAROLINA DX ASSN.	234,486	K4YYL	AA4V
SLOVENIA CONTEST CLUB	2,732,371	S59A	S50A	TOP OF EUROPE CLUB	219,678	SL3ZV	SL3ZV
YANKEE CLIPPER CONTEST CLUB	2,084,006	K1ZM	KY1H	DARC	187,122	DL1NCT	DL0MI
MAD RIVER RADIO CLUB	1,847,740	KN8Z	WR8C	SULTANS OF SHWING (SOS)	184,996	W9UP	W9UP
NORTH COAST CONTESTERS	1,522,529	VE3EJ	W3GH	HUDSON VALLEY CONTESTERS	182,041	K5NA	WA2JQK
RHEIN RUHR DX ASSN.	1,358,565	OT4T	T93M	PZK (POLAND)	168,124	SP8FHM	SP9KRT
NORTH TEXAS CONTEST CLUB	1,314,906	VP2EC	VP2EC	SW IDAHO DX CLUB	164,470	W7ZRC	KA7T
BAVARIAN CONTEST CLUB	1,150,351	PA3DWD	DL3LAB	MINNESOTA WIRELESS ASSN.	158,705	N0AXL	N0AXL
POTOMAC VALLEY RADIO CLUB	1,019,942	W3LPL	W9LT	FOND DU LAC ARC	136,918	ND9O	ND9O
KTU RADIO CLUB	730,572	LY3BS	LY3BS	URE (SPAIN)	135,906	EA3CCN	—
SOCIETY MIDWEST CONTESTERS	659,639	WB9Z	W9RE	ARROWHEAD ARC	132,311	AA0AW	KB0LBT
SO CALIFORNIA CONTEST CLUB	645,848	N6DX	N6DLU	MILE HIGH DX ASSN.	117,072	AA0NC	AA0NC
UPPER LAKE LIVINGSTON W.A.	444,993	AA5BL	N5OLS	SO FLORIDA DX ASSN.	107,063	K4KUZ	W4OVU
TEXAS DX SOCIETY	416,425	W5ASP	K5XI	CENTRAL TEXAS DX CLUB	101,286	N0DH	NA4M
NO CALIFORNIA CONTEST CLUB	345,295	AA6KX	W1FEA	NO ARIZONA DX ASSN.	91,198	NN7A	NF7E
KANSAS CITY DX CLUB	338,418	K0RWL	NX0I	MARRAD (UKRAINE)	88,280	UT8IM	—
CONTEST GROUP OUDE MAAS	328,728	PI4COM	PI4COM	WESTERN WASHINGTON DX CLUB	79,693	N7AM	—
LEFT COAST CONTEST CLUB	325,755	W7XR	—	SALT CITY DX ASSN.	71,315	KA2AOT	NA2A
NORTH ALABAMA DX CLUB	316,651	K4TO	KA2DRH	WESP PARK RADIOPS ARC	71,296	W8PN	W8IDM
OKLAHOMA DX ASSN.	314,975	AD1S	AD1S	NO SHENANDOAH DX ASSN.	66,757	N4MM	NB3O
KENTUCKY CONTEST CLUB	310,287	N4XM	KC4DWT	HAMFESTERS RADIO CLUB	62,874	W9LNQ	W9LNQ
LNDX (FRANCE)	302,278	F6EZV	F6EZV	SOUTH COAST WIRELESS SOC	45,772	N1HRA	N1HRA
ARI (ITALY)	268,481	I3VHO	I6FLD	MISSISSIPPI VALLEY DX CLUB	43,346	K0JPL	K0JPL
CENTRAL FLORIDA DX ASSN.	267,058	N6AR	AA4MM	LONG ISLAND DX ASSN.	42,824	KW2P	KF2ET
ROCHESTER DX ASSN.	253,544	K8FC	KA2PHQ				



SV8CS has the big 160 signal from Greece. He looks forward to more WVE contacts.

ate in the DX window . . . NA2M. Murphy spared me any real problems this year . . . K8FC. 160 sounded like 10 for awhile; worked 110 Europeans and ZA called me . . . K1NG. Got balloon up to 320 feet . . . K1VWL. Only a filament transformer away from QRO . . . K1JKS. I knew I was tired when I asked people I know to repeat their states . . . KZ3H. Next year beverages . . . K3UA. Pizza made keyboard feel like it had venier tuning . . . W3GH (W9XR Op.). Still need Alaska for 160 WAS . . . WK3I. Had better time Saturday night after repairing beverages . . . W3BGN. Line noise even on beverages and small loop . . . AA1K. Getting too old for all night contesting . . . N4JF. Finished my 160 loop four hours into the test, worked a JA so it works . . . K4IBP.

Thanks for adding QRP and low power categories . . . WA4PGM. First real contest submission . . . WR3O. First time in the contest and worked 43 of the 50 states . . . WD8AMV. What a thrill to finally work JA from Florida . . . N6AR. Not ready as QST published the

wrong dates . . . W4OVU. QRN and QRM awful, but had a great contest with 66 Europeans and 18 JA's worked . . . AB4RU. VK6HD and ZL3GQ both called me . . . NJ4F. Pulled out VQ9SS for his only USA contact . . . N4RJ. Relay starting sticking so gave the amplifier cabinet a good whack with the handle of the screwdriver. Every time it stuck, a good whack made it work again . . . KN4QS. Biggest thrill was having a W6 answer my QRP CQ . . . WA4IAR. Best turnout of participants ever . . . KB5UL. 50 dB over 9 snow static caused me to shut down from 0600 to 1100Z on Saturday. 61 JA QSOs helped make up for the downtime . . . N5RZ.

Power line noise raised noise level to S-7 on the beverages . . . AA5BL. How about a mid-summer contest for us addicts? . . . NW6N. Had N7DD on CW . . . N7CL. 150 JA's the first night . . . W7XR. Thanks to the east coasters that listened closely for my "tenth of a KW." . . . N7NV. Believe my score is a new record for Montana . . . N0PP/7. Where was Maine? . . .

WA7FAB. Climbed 70 foot tower to fix SWR problem . . . K7RO. Thanks to those who helped put up the antenna at my new QTH . . . NS7K (Operating from K7OA's new house). Window needs to be at least 10 kHz wide . . . N8II. New QTH, new antenna. Amazed at what I could do with low power . . . W8CAR. Still think low power entries are second class citizens . . . AA9AX. First time to work all 50 states . . . K9BG. My simple antenna works well with low power. There is no excuse for not participating . . . W9LNQ.

The only benefit to minus 30F is that the power line noise went away . . . WJ0M. Please apply teeth to the window to attract DX and keep the stations west of the east coast in the contest . . . KY0A. Disappointed to see many non-DX stations parked in the window . . . VE9AA. Second night was the pits . . . VE6LB. Second night was better . . . VO1AH.

### Soapbox SSB DX

Even more "grid lock" with at least 20 stations per kHz . . . KH6CC. Only USA worked was K4JPD . . . OM5R. Propagation was even worse than CW weekend . . . RV1CC. Conditions were awful. Would be a millionaire if I had one cent for each unanswered CQ call . . . LU2DKT. Maybe I'll get to work both days next time . . . OH1KAG. My transmitting antenna belongs to local medium wave radio station . . . SV3AQR. First year for legal 160 SSB operation in Norway . . . LA8GV. Where was the USA? . . . EA1FDI. Working 160 is bad enough; working SSB there is being crazy . . . UY2ZA. First time over 100K on SSB . . . OM7M. Sorry could not work contest on Saturday night . . . EU1EU. Glad to be back in the contest . . . YZ1MB. QSL me via EA3FQV . . . C31NA. USA did not hear me and only EI8GS from Europe . . . PP5JR.

Best DX was UA0IAK and AH8F . . . KH6U. No DX propagation this year . . . S50A. We called many USA but only a few QSOs . . . LU1FA. Static was too much for SSB . . . VP2EC (N5AU). Heard much more than I could work . . . AL7MX. Sorry for mistake in computer time . . . 9A1A. USA only S3 . . . G3NAS. Heard W3GH and N8ATR, but no QSO . . . G3UEG/P. Log looks like a VHF one . . . F6EZV. I am the owner of a private radio and TV station and this helps getting out . . . SV8CS. My first 160 meter contest and already worked 45 countries . . . SV2BFN. Nobody listens for Africa during the contest . . . 5N0MVE. Worked over a dozen South Americans . . . EI8GS. Ballon-supported antenna worked well . . . IO2L. Tried window to work WVE at 2300Z but too much QRM . . . I3MAU. Heard a few USA stations, but no QSO—maybe next year . . . PI4COM.

Tried three antennas, but got interaction. Heard USA Saturday night but no QSO... LX4A. Please listen for DX... YV1DRK. Worked from Martin Garcia Island (IOTA SA-055) with good conditions, but plenty of ants and misquitos... LU7DW. My first 160 contest. Heard AB4RU and P40J, but need more power (100 W)... E5BPE.

## Soapbox SSB W/VE

What happened to the DX window?... K1MUJ (Op. WA1HYN). Line noise very high, we'd like to apologize to all the stations we could not hear... WF1B. This contest would be more fun if there was a mandatory 8 hour off time during the day time... WW2Y. Had a great time in my 9 hours of operating... KA3SDP. Poo Pah conditions this year. Europe heard the first night, but they were not hearing many of us... WT3Q. A lot of good multipliers called me that I could not hear due to noise levels... K4PI. QRN horrible Saturday night... K14KR. Appreciate everyone staying with me to pull my QRPp signal out of the noise... WA4IAR. First exposure to 160 for most of the operators. We had a blast... KR4BD. Heavy QRN at the beginning of each evening... W4OVU. Who would have thought 160 would produce wall-to-wall signals all the way up to 1950 kHz!... N4UH.

Still having cockpit problems with CT... AA4MM. My first 160 experience. Inverted V had high SWR so power was less than 80 watts... K4JYO. This was the first year we worked all 50 states on both CW and SSB... AB4RU. Conditions seemed to be very good... N5IA. I would do better if I was not so weak waiting for a heart transplant... NO5H. Couldn't believe the pile-up for Mississippi... N5ASO. Stayed around after 1200Z each day to work the "rag-chewers." One station worked me on his tribander... N5OLS. This will be a real contest once I get an antenna up... KJ6HO. So many called me again as dupes that it was quicker to work them and not log them again... N6DLU (Note: This is very common especially in DX contests, but can be dangerous if the other station missed logging you the first time—ed. K4JRB).

Too many big guns in the window... NW6N. My equipment is "All American," being Ten-Tec and MFJ... W7VNJ. Did not hear much east coast, thus the low score... N7WWQ. Just another call used by the KC8MK/NZ4K group... WR8C. My two friends got their feet wet in 160 contesting... W9LT. Enjoyed the CW section so much I operated the SSB weekend, too... K0JN. Operated portable in Iowa... N0AXL. Thought I had a pretty good understanding of propagation until this weekend... KJ0B. Computer clock doesn't like RF... KV0Q. Only got to operate 6 hours, but had fun anyway... WA0DEY. Running 100 watts is QRP on 160 SSB... VE6JAV. Hard to work the East Coast; had to repeat the exchange several times... VE7ERY. Heard W/VE signals 59 to 59+, but only made 2/3rd QSO per hour (11 hours total) so please don't consider this entry a joke... VY1JA (rare Yukon).

## CW Multi-Op Station Crews

**9A1A:** K4XU, OH6XY, 9A2AW, 9A2KM, 9A2OG, 9A2RA, 9A2SD, 9A3GW, 9A3B, 9A2NK, 9A2VR, 9A3JB. **9A5D:** 9A2FK, 9A2TL, 9A4DU, NIK, GORAN, **AA0AW** & AA0BY, KB0JDX, KB0LBT, N0UOZ, KB0DBO, N0TCR, KB0LBS, N0WEZ, KB0LKD. **AA0NC** & KB0EBH, WA3TLF. **AA3B** & packet. **AA5BL** & N5OLS, N5NMX. **AA8U** & KF8QE, WX3M, K8MJZ. **AB4RU** & AA4GA, KB4GID. **AC4QT** & packet. **DF0BV:** DL6RAI, DF3CB, DL7MAE. **DK0EE:** DF4IJ, DL1MFL, DL4MCF, DL4MDO, DL4MEH. **DK0FFO:** DL2BWM, DL2BQJ, DL5BRA, DL5BTE. **DL9YX** & DF4XG, DK9HN. **EA3KU** & EA3AIR. **F6KLS:** F5NRG, DF3VM, DL4VAD. **G3TXF** & packet. **G3VGG:** G4AAL, G4IVJ, G3TQD, G3MRC, G3RLF. **HG5A:** HA5IW, HA5UA, HA5OM, HA5MK, HA7VB, HG5CCC. **HG6N:** HA6ND, HA6PX. **HG6V:** HA6FQ, HA6GK, HA6IAB, HA6GM, HA6IDL. **HZ1AB:** KM4E, SM0CXU, N4KT. **I2BBJ** & IK2DVG. **I4EAT** & I4EAT, I4IND, IK4DCT. **I4YSS** & IK4MED, I2VXJ, I4JMY, I4UFH. **IK2QE1** & IK2PFL, IK2JUB, IK2NCJ, IK2GWH, IK2MMF. **IK8BIZ** & IK8SKC, IK8SQR. **JA0ZRY:** JA0DGK, JP1NOM, JP1QGO, JR0BQD, JS3JSB, JA1YDU, JH0NZN, JF7TFK. **K0LIR:** N0KFE, N0IS, WB0IUN.

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WA0IYY, N0QEZ, WD0CHW, KB0KK, AA0A, KE0YO, NZOV, N0PKX, WD0FPY, N0LIK.

**K1JKS** & N1CEV. **K1NG** & K1G. **K1TWF** & packet. **K1VWL** & WA1U, N1EPU, AA1AK, WJ1B, W1QUW, N1TOL. **K2QMF** & packet. **K2SB** & packet. **K3ANS** & WF3H, N2BIM. **K3IPK** & packet. **K3JGJ** & packet. **K3UA** & packet. **K3WW** & packet. **K4IBP** & packet. **K5NA** & KU2Q. **K7RO** & K7RO, N6TR, KQ7I, NV7F, WB7SRW. **K8CX** & packet. **K8GM** & N8LX, N8EA, WA8ZDT. **K8JM** & N8TFR. **KB1H** & KB1H, WZ1R. **KD9SV** & KA9A, KC9LA. **KH6U** & KH6IRT, N6GOZ, AH6IO, HN6XO, NH6YI, WH6R, KJ9U, KH6RH, KH6HH. **KN4QS** & KK4QI, AB4KX, N4LXB, WA4AUX, N4YOS, KA2DRH, N4SEV.

**KN8Z** & WA8YVR, KA3GZS, N8JEC, WU8A, NZ8O, WX8T. **KO4WE** & KR4HQ. **KO4XF** & N4SE. **KY0A** & KVOQ, WB0HBS. **KY1H** & KB1W, K8IKE, AA1AS, NJ1F, KN1N, NS1M, KA1NCN. **LY2ZO**: LY3BBC, Lyr 346. **LY3BS** & LY2MW, Lyr 728. **N1HRA** & N9LVE, KA1VMG. **N2NU** & packet. **N2RM** & NQ4I. **N2VW** & packet. **N3RC** & packet. **N4RJ** & KM9P, K4BAI, AC4WO. **N4XM** & AB4RX, KC4WQ, KK4Q, NJ9C. **N4XMX** & packet. **N6DX** & N6VR, N6RVZ, N8SR, AD6C, WA6CDR. **N6ND** & K9VV, NL7GP. **N7CL** & N7CL, N7BXX, KV7B, N7DD, KF7NR, NY1I, KB7KZ.

**NA5Q** & packet. **NA7R** & N7VLM, KB7FGN. **NC0P** & WD0GVY, WA0FLS, WO0V. **NI6G** & KN6TT. **NJ4F** & K7SV, N4GUS. **NS7K** & K7OA. **NX1G** & packet. **OH1AA**: OH1MYA, OH1HD, OH1SY. **OH6WZ** & OH6MMC, OH6NEX, OH6NIO. **OK2KJU**: OK2BDX, OPERATORS **OK5W**: OK1AEZ, OK1CF, OK1JJB. **OM3KFO**: OM3PC, OM3TGT. **OM7A**: OM3UG, OM3GI, OM3CFT, OM3TGP, OM3CPL. **OM7M**: OM3PA, OM3TZW, OM3TMW, OM3TPV, OM3TZO. **P40GG**: K8GG, W8UVZ, W8SEY, W8CD. **PA3BAS** & PA3BAS, PA3AFF, PA3AUC, PA3BPL, PA3CLH, PA3DSB. **PA3FNE** & PA3FNE, PA3EYZ, PA3ERA.

**PI4ALK**: PA0XAW, PA3DLA. **PI4COM**: PA3BUD, PA3BBP, PA3ERC, PA3GBQ. **PI4ZLD**: PA3GCU, PA3EOB. **RK1OWZ**: UA1OZ, UA1-113-244, UA1-113-619, UA1OLT. **RZ1AWT**: UA1ARL, RV1AO, UA1-169-2475. **RK2FWA**: UA2DC, UA2FF, UA2FJ, UA2FM, RA2FA. **S53U**: S57WW, S57NXX. **S57C** & S51NA. **S59DRW**: S57AL, S56M. **S59SLO**: S57DX, S54AA.

**SK6EI**: SM6OEF, SM6GOR, SM6REA, SM6TOB, SM6LPF, SM6CMR, SM6LJP, SM6LPG. **SL3ZV**: SM3BDZ, SM3CVM, SM3EXO, SM3PXO. **SV2TSL**: SV2BFN, SV2BOH. **UA4PWA**: UA4PPR, UA4PBC, A. SHAKIRUV, UA4QM. **UR4QWW**: US5QNA, UR5QN.

**UT2IZZ**: UT2II, UT2IZ, UT2IO. **UT4UXW**: UT4UZ, UT5UQM, UT5URW, UT5-186-377. **UZ6LWZ**: RX6LPL, UA6-150-1103, UA6-150-1403. **VE3DC**: VE3QHQ, VE3OCY, VE3VMO, VE3VFR, VE3DSN, VE3OZY, VE3TJB, VE3RYI. **VE3OSZ** & VE3SMA. **VE6JY** & VE6UO, VE6BMX, VE6LDX. **VE7ZZZ**: VE7AV, ops. **W0BXR**: K0RW, N9TEL, NN9K, K9WA, N9AYK, W9TW, WG9X, WC9M, KK0U, N9OK, WB0FBP. **W1OP**: W1GS, ops. **W2GD** & packet. **W3FV** & packet. **W3MM** & WU3M, packet. **W3OV** & packet. **W4OVU** & K8UNP. **W4PRO** & K4IX, W4DHZ, N4DJ. **W5MPX** & W0TV. **W5XD** & packet.

**W7KYC**: N07V, ops. **W7XR** & K7SS. **W9AZ**: K9NR, K9IFO, AK9F, KE9MG, WC9B, N2CS, W9HBI, KF9IF. **WA6RKE**: AA6DT, W6/S52NC, N6NL, W6JU, W6HDO, KC6CEX, W6WYQ. **WB9CIF** & N9AG. **WD9INF** & K8AQM, W8IQ, AC8W, N8CQA, K8DD, N8AAT. **WJ2W** & packet. **WW2Y** & K2WI, N2NU, KZ2S, KE2PF, N2NT. **WY3T** & WR3H, N3JRX. **XE2/AA7IE**: AA7IE, WA7UQV. **YL1WW**: YL3CW, YL2AG, YL2UB. **ZF1A**: W8BLA, K2UFT.

## SSB Multi-Op Station Crews

**9A1A**: K4XU, 9A2HO, 9A2KM. **AA0NC** & KB0EBH, KG0KU. **AB4RU** & AA4GA, AC4WO, N9HZQ. **AH9B/W5** & packet. **DK0IW**: DL5MFL, DJ9MF, DJ9WE, DJ2CE. **DL0MI**: DF6VW, DL9YEK, DL9YEN, DL2YBW, DG6YHT, DL5YDD, DL1DWY, DL1DWY, DL4DRA. **DL7UTA** & packet. **G3UEG/P** & G3SVL. **HB9CXZ** & HB9FAQ, HB9BLQ, HB9DGX, HB9OBV. **IO2L**: IK2QEI, IK2PFL, IK2JUB, IK2NCJ, IK2SGC. **K2QMF** & packet. **K2TD** & packet. **K3JGJ** & packet. **K3WW** & packet. **K4TEA** & packet. **K5NA** & packet. **K9YUG** & WB9WUW. **KA2DRH** & KN4QS, KK4QI, WA4AUX, N4SEV, AB4RE, AB4KK.

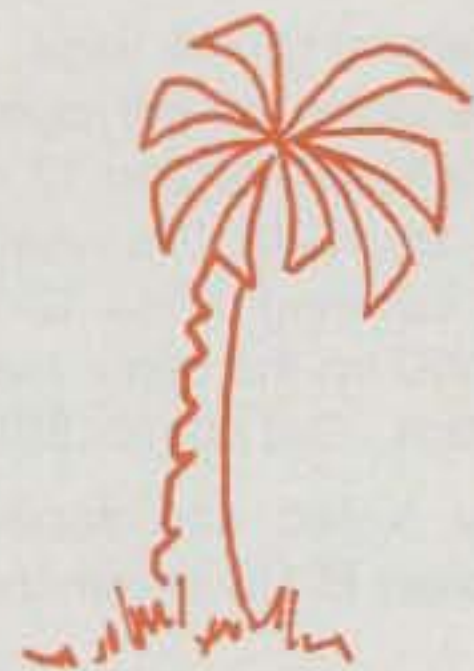
**KB0LBT** & AA0BY, KA0OJS. **KB9CEQ** & N9JF. **KE0RO** & KA0FPJ, N0BSA, KF0GM, KD0QL. **KF2ET** & packet. **KH6U** & KH6IRT, N6GOZ, AH6IO, NH6XO,

WH6R, KH6BM, KH6XQ, KH6VP, NH6YK. **KN2T** & KD2I, N2ORM, KN2L, KD2CI, WJ2D, N2RHM. **KR4BD** & K2YJL, N4CBR, AC4PY, KD4NAH, KD4NSY, KD4MFY, KB4CMQ, K4JMN, KD4NAJ. **KR4DL** & packet. **KR4HQ** & KO4WE. **KY1H** & AA2MF, AA1AS. **LU7DW** & LU3ABF, LU3DZB, LU8EWD, LW8EXF. **LX4A**: LX1AT, LX1IQ, LX1JH, LX1KC, LX1MO, LX1NW, LX1SP, LX1UN, LX2KW, DA1DW. **LY2ZO**: LY3BBB, Lyr 346, Lyr 728, Lyr 1853.

**LY3MR**: LY2BKF, LY1FF, LY3NFW, LY1DW. **N0KOV** & WB0ZLV, N0UJQ, WB0SRP. **N1HRA** & N9LYE, KA1VMG. **N2GQS** & packet. **N2VW** & packet. **N4FKO** & K4LTA. **N4XMX** & packet. **N5OLS** & AA5BL, N5NMX, N5NMY. **N6DLU** & W6FA, N6LL, WA6CDR. **N7DD** & N7BXX, W0YOY, WA7AHF, NY1I, KF7NR. **N8ATR** & WB8K, KF8UN, WA8BIN, N8DMM. **NB3O** & N4SLR. **NC0P** & N0AMI. **NS7K** & NS7B. **NX3A** & packet. **OM2I**: OM3CAV, OM3CTA, OM3YLA, OM3TXM, OM3TXW. **OM7M**: OM3TZW, OM3PA, OM3TMW. **PI4COM**: PA3CRC, PA3GBO, PA3EMO.

**RK2FWA**: UA2FC, UA2FF, UA2FJ, UA2FM, UA2FZ, RA2FA. **S53U**: S57WW, S57NXX. **S59SLO**: S54AA, S57DX. **SL3ZV**: SM3BDZ, SM3CVM, SM3EXO, SM3PXO. **UT4UXW**: UT4UZ, UT5UQM, UT5URW, UT5-186-377. **VE2PK/VE3** & VE3KWR, VE3LBZ. **VE3DC**: VE3AHQ, VE3DWG, VE3NYX, VE3OZY, VE3TJB, VE3DWG, VE3OCY, VE3VMO, VE3RYI. **VE6JY** & VE6SV, VE6NAP, VE6JKB, VE6LDX, VE6BHR. **VE7ZZZ**: VE7EME, VE7PTT, VE7RBL. **W0BXR**: K9AYK, KF0YN, N9LCW, N9FHX, N9TEL, N0LYK, WB9PVW, NN9K, AB9W, G3WJN, N0ONX, KA0UKA, N2AWE, KB9GMW, WB0FBP.

**W2GD** & packet. **W3FV** & packet. **W3OV** & packet. **W4NZJ** & K4AEK, KC4ZUA, JEFFERY S. **W4OVU** & K8UNP, KR4GJ. **W5XR** & N1HR, KB5TJZ, KB5PYE, KB5VLG. **W7VNJ**: N7VLM, N7VLN, AB7BJ, K7GLL, KB7FGN, N7GJK, WA6RLT, KB7QEF, KB7QEG. **W8BLA** & K2UFT, KE4FJP, KC4YBO. **W9AZ**: K9NR, K9IFO, AK9F, KE9MG, WC9B, KF9IF, K9NAH, N9LCY, WB9STR. **W9LT** & KR4IQ, KE4MF. **W9UP**: N0BSH, WE9V. **WA2JQK** & WA2UKP. **WB6EGE**: KI6LP, N6MO, KA6OPN, N6NQ, WB6WPO. **WD9INF** & KG8CW, KN8R. **WF1B** & WG1A, N1FGJ, WA1TMZ, WA1ZPI, K1IKN. **WJ2W** & packet. **WR8C** & KC8MK, NZ4K, KU8E, N8MFQ. **WT3Q** & N3ADL. **WW2Y** & packet. **WY2X** & NF2L. **WY3T** & KA3PVA, N3JRX, KA3DSV, N3FTI.



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**Alternate Hotel: Holiday Inn LeJeune Center** - \$70.00 Single, Double + Tax  
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<b>NEW JERSEY</b>				<b>COLORADO</b>			
WW2Y	148,993	866	57 16	KEØRO	53,795	475	50 3
WY2X	136,364	830	57 16	AAØNC	53,460	448	51 4
KN2T	131,765	778	57 16				
W2GD	109,269	639	58 13	<b>IOWA</b>			
N2VW	15,778	151	41 5	NCØP	116,935	814	55 10
K2TD	7,068	105	30 1	WØBXR	109,376	793	55 9
K3JGJ	1,456	44	16 0				
<b>NEW YORK</b>				<b>KANSAS</b>			
KF2ET	16,280	157	40 4	NØKOV	72,135	513	54 9
WA2JQK	13,301	124	43 4				
WJ2W	13,080	143	37 3	<b>MINNESOTA</b>			
K5NA	10,016	137	31 1	KBØLBT	41,525	351	54 1
N2GQS	6,020	100	28 0				
K2QMF	4,675	83	22 3	<b>CANADA</b>			
<b>DELAWARE</b>				<b>ONTARIO</b>			
NX3A	120,131	805	56 11	VE2PK/VE3	128,797	453	54 5
				VE3DC	113,832	447	51 3
<b>PENNSYLVANIA</b>				<b>ALBERTA</b>			
WT3Q	115,368	738	56 13	VE6JY	54,238	257	45 2
WY3T	78,183	552	56 7				
K3WW	60,684	507	45 7	<b>BRITISH COLUMBIA</b>			
W3OV	27,018	302	33 5	VE7ZZZ	68,573	309	41 6
W3FV	21,120	201	45 3				
<b>ALABAMA</b>				<b>EUROPE</b>			
KA2DRH	84,692	631	55 7	<b>CROATIA</b>			
				9A1A	110,754	401	0 54
<b>FLORIDA</b>				<b>ENGLAND</b>			
W4OVU	58,377	423	51 10	G3UEG/P	51,128	239	0 44
				<b>GERMANY</b>			
<b>GEORGIA</b>				DKØIW	37,638	208	0 41
AB4RU	278,024	1277	58 34	DLØMI	28,680	167	0 40
KR4HQ	68,640	465	55 10	DL7UTA	18,585	116	0 35
W8BLA	41,393	358	47 6	DL1DWY	3,026	41	0 17
W4NZJ	29,302	287	47 2				
KR4DL	21,050	193	48 2	<b>ITALY</b>			
K4TEA	13,902	151	38 4	IØ2L	104,244	434	0 51
N4XMX	8,244	110	35 1				
<b>KENTUCKY</b>				<b>KALININGRAD</b>			
KR4BD	26,880	258	45 3	RK2FWA	185,185	655	0 55
				<b>LITHUANIA</b>			
<b>TENNESSEE</b>				LY3MR	153,888	526	0 56
N4FKO	61,560	503	52 5	LY2ZO	79,950	382	0 41
				<b>LUXEMBOURG</b>			
<b>VIRGINIA</b>				LX4A	171,720	650	0 53
NB30	25,998	284	40 2				
<b>NEW MEXICO</b>				<b>NETHERLANDS</b>			
W5XR	31,819	314	43 4	PI4COM	75,072	331	0 46
				<b>SLOVAKIA</b>			
<b>OKLAHOMA</b>				OM7M	138,720	454	2 58
AH9B/W5	42,680	357	52 3	OM2I	80,135	345	0 47
				<b>SLOVENIA</b>			
<b>TEXAS</b>				S59SLO	102,856	401	0 52
N5OLS	229,473	1238	56 25	S53U	20,094	126	0 34
				<b>SWEDEN</b>			
<b>CALIFORNIA</b>				SL3ZV	30,562	161	0 37
N6DLU	66,240	484	53 7				
WB6EGE	14,516	167	35 3	<b>SWITZERLAND</b>			
				HB9CXZ	94,248	378	1 50
<b>ARIZONA</b>							
N7DD	126,258	853	54 12	<b>OCEANIA</b>			
				<b>HAWAII</b>			
<b>UTAH</b>				KH6U	106,600	222	44 6
NS7K	24,932	245	44 2				
				<b>SOUTH AMERICA</b>			
<b>WYOMING</b>				<b>ARGENTINA</b>			
W7VNJ	89,621	685	51 8	LU7DW	2,189	50	3 8
				<b>SSB CHECK LOGS:</b> Thanks to the following stations for their valuable check logs. C31LD, DL3BXX/P, EA1AJC, PAØTV, SP-0189-GD, VE4AAU, WB4RUA, WD5JMA, YV2IF.			
<b>OHIO</b>							
WR8C	182,700	1074	56 19				
N8ATR	147,774	991	56 10				
WD9INF	140,514	959	56 10				
<b>WEST VIRGINIA</b>							
W9LT	16,226	191	37 1				
<b>ILLINOIS</b>							
W9AZ	102,050	712	57 8				
KB9CEQ	45,258	364	53 4				
K9YUG	15,204	174	41 1				
<b>WISCONSIN</b>							
W9UP	163,870	1043	57 13				

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## **CQ Looks At Some New Coaxial Line Products**

BY LEW McCOY\*, W1ICP

**W**hile doing my annual walk-around at Dayton this year, I had occasion to visit with Ben Nemser, WA4DZS, the owner of Nema Electronics. A little later I also met with Press Jones, N8UG, of The Wireman company. I asked them what was new in coaxial lines. The information seemed so important to me that I decided to write this article and pass along the information. This then could be called "What's New In Coax." While in one sense this is not a product review, in another sense it is, simply because I describe some new commercial products.

First of all, Nema Electronics, which has always had a very fine reputation in the amateur market, is producing a new type of line, or rather a combination of lines. In this case Nema has enclosed both a complete coaxial cable and a rotor cable in a single weatherproof line. In essence, this means only a single line has to be run up the tower to the rotor and the beam. Nema encloses either RG8, RG213, or Belden 9913 coax, and an eight-conductor rotor cable into a UV-type jacket. They also informed me that they will do any custom-type jacketing. Their catalog presents in detail all types of wires, feed lines, and fittings. I have included their phone number and other information at the end of this article.

The Wireman's Press Jones is another feed-line specialist—or should I say "antenna specialist." Press has come up with some new lines that are improvements over what amateurs have been using for years. These lines are made for Press by Times Wire and Cable and are very low loss. Maybe at this point I had better explain the concept of loss.

All transmission lines have some loss, and this loss is in the form of ohmic resistance. The losses are rated in decibels, usually for 100 feet of line. For example, suppose you are running 100 watts out of your rig into a coax line that goes to the anten-

na. Also, let's assume that the line is 100 feet long and is rated at 3 dB loss per 100 feet. One thing easy to remember is that 3 dB is a ratio of 2 to 1. Therefore, 3 dB loss would mean that of your 100 watts, you would lose 50 watts in the line before the power actually reached the antenna.

What I have just explained happens when the 50 ohm coaxial line is matched to a 50 antenna or load and the standing wave ratio on the line is 1 to 1. If there is a mismatch, then the losses in the line increase. This is why it is important to keep SWR on coax as low as possible.

Table I lists the types of lines by their designation from Times Wire and Cable, The Wireman, and the RG number. In other words, the newer RG-58 is known as Times LMR-200 or CQ1002. The Wireman also has these cables with either a stranded or solid center conductor. The important point is that all these new cables have less loss. Senator Dirksen of Illinois was famous for a saying "A billion dollars here and a billion dollars there—pretty soon you are talking about real money!" Let's modify his saying for our purposes: "A decibel here and a decibel there—pretty soon you are talking about real power!"

Let's face a few facts. Amateur radio is a competitive hobby. If Joe Blow down the street gets better signal reports than you do, then you are going to be unhappy. And if you are honest, you will be the first to admit you hate to come in second! It is foolish to put up a good beam on a tall tower and then feed the beam with poorly made coax.

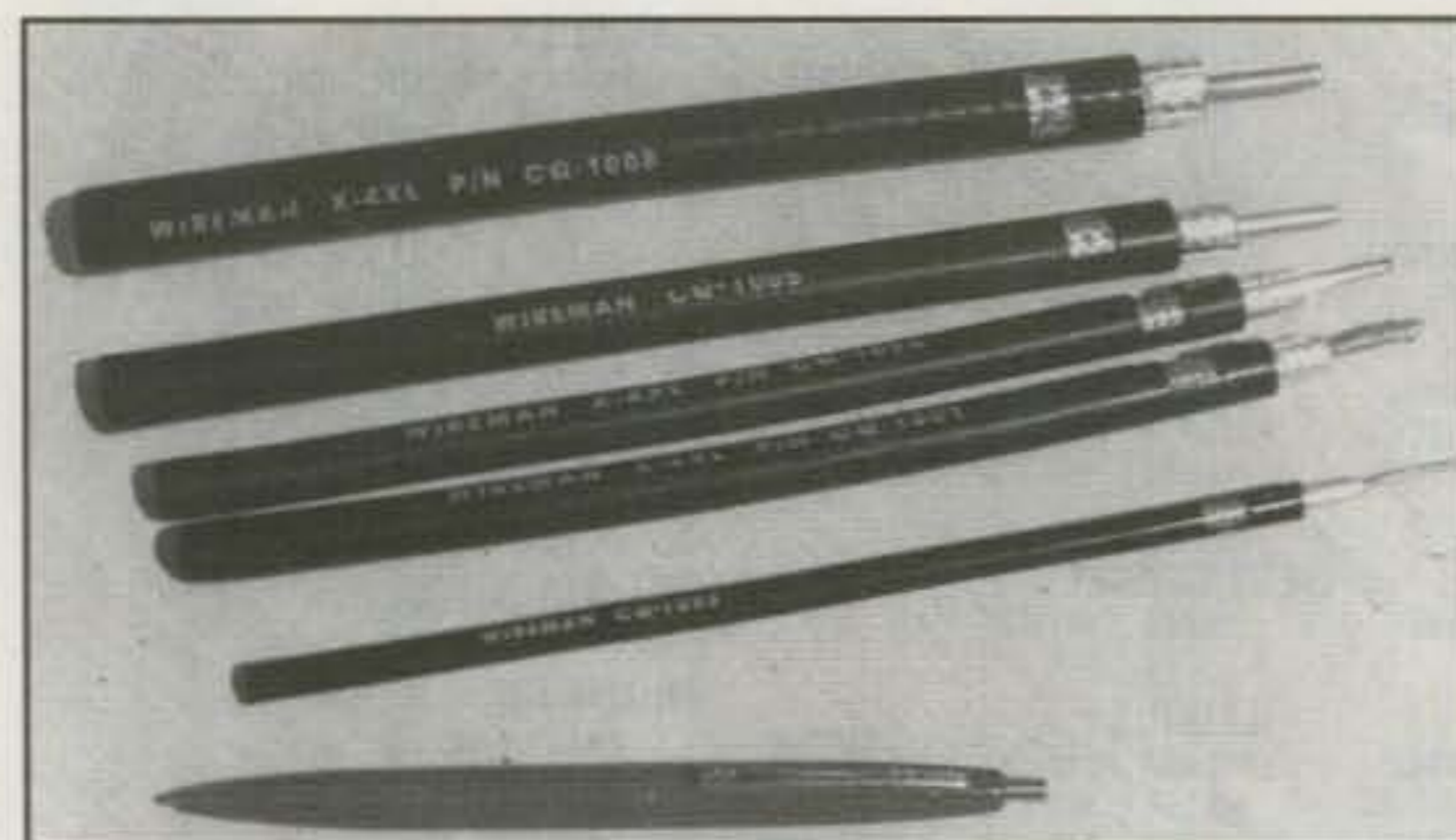
Getting back to these products listed in Table I, all these new lines have what I like to call 20-year life. The jackets on the coax are of a weatherproof material and meet government specs to last 20 years.

To give the newer amateur an example of the improvement in cable, look in Table I at RG-58 and its loss at 150 MHz. The losses for the older types of RG-58 was on the order of 6 dB. This loss for this newer cable is only 4 dB. You need to realize

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



*This is the Nema line described in the text. Note that the rotor control cable and the feed-line coax are all enclosed.*



*These are some of the new lines described and listed in Table I. You will note in the table the low losses of these lines.*

## CABLE DESIGNATIONS

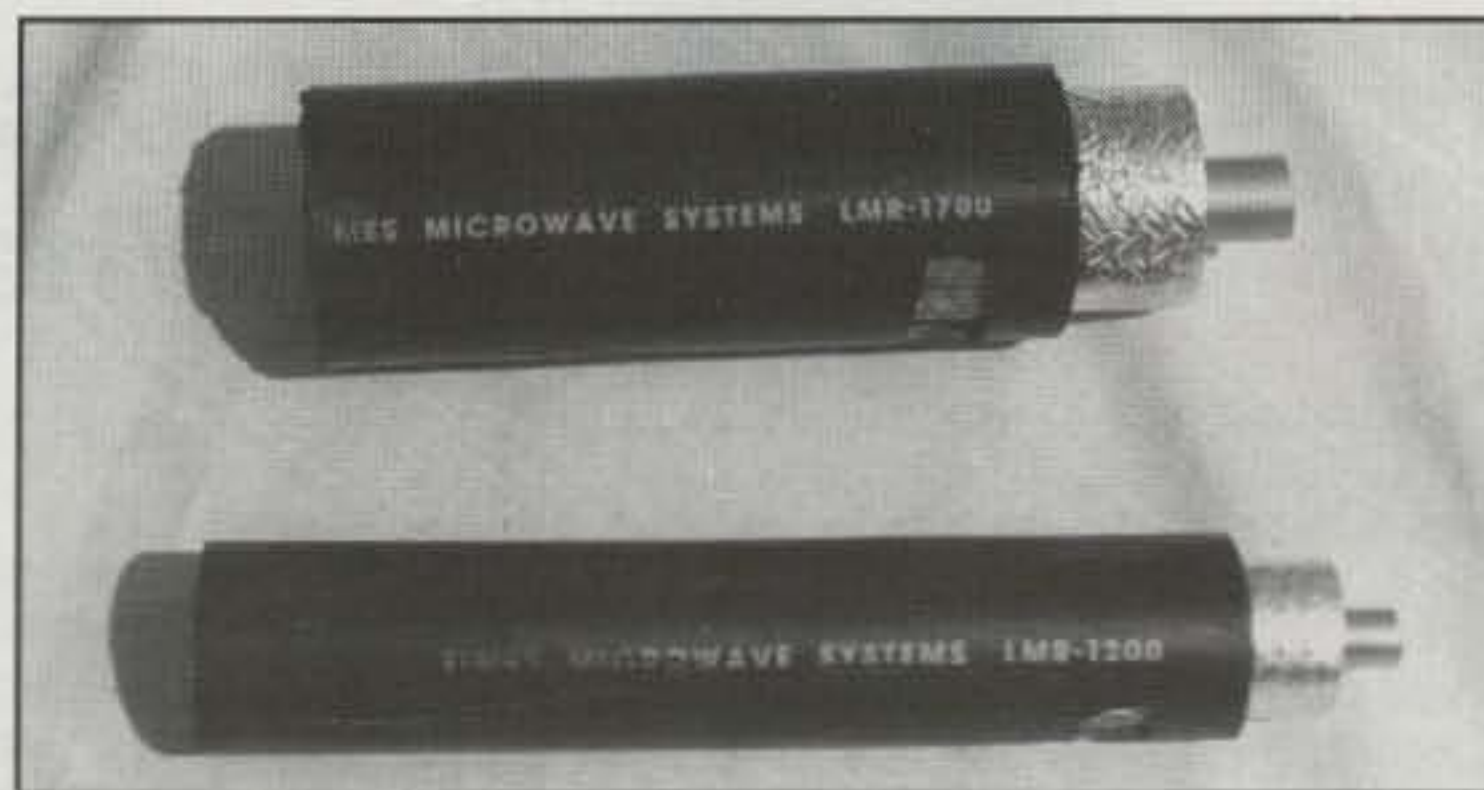
Frequency	LMR200 CQ1022/RG58 0.195" dia. Atten./Max. Pwr	LMR240 CQ1004/RG8X 0.240" dia. Atten./Max. Pwr	LMR400 CQ1001/RG8 0.405" dia. Atten./Max. Pwr	LMR500 CQ1005/New 0.500" dia. Atten./Max. Pwr
30 MHz	1.8dB/670W	1.3dB/980W	0.7dB/2100W	0.54dB/2800W
50 MHz	2.3dB/520W	1.7dB/750W	0.9dB/1700W	0.7dB/2200W
150 MHz	4.0dB/300W	3.0dB/420W	1.5dB/1000W	1.2dB/1200W
220 MHz	4.8dB/250W	3.7dB/340W	1.8dB/830W	1.49dB/1000W
450 MHz	6.9dB/170W	5.3dB/240W	2.7dB/550W	2.17dB/700W
900 MHz	9.9dB/120W	7.6dB/170W	3.9dB/380W	3.1dB/490W

Table I— This table of popular coaxial line types, specifically for amateur use, was taken from the Times Wire and Cable catalog (both The Wireman and Nema Electronics carry these lines). Under cable designations, the first number is the Times Wire number followed by The Wireman's number, followed by the similar RG designation (i.e., LMR200/CQ1022/RG58). The attenuation figures given in this table are for 100 feet of line. These cables are rated for a 20-year lifetime and most can be buried. Your choice of cable depends on factors such as your installation, the frequencies to be used, and so on.

that this is a 30 percent improvement over the RG-58 of just a few years ago. Two dB difference is considerable. Even more startling is the difference in some of the hardline coax as compared to some of these newer non-hardline types, such as LM400, which is an RG-8 type. Note the loss on 450 MHz is 2.7 dB (100 feet). RG-385 is a hardline, comparable diameter to RG8, and its loss is 2.5 dB per 100 feet at 450 MHz. However, the difference in cost of these hardlines compared to LM 400 is appreciable. Actually, the hardline costs twice as much and there is no real difference in loss. So if your club is putting up repeaters, and you do need low-loss lines, these new lines certainly fit the bill at a very respectable savings in dollars.

Many of these new cable have jackets that are practically impervious to weather, moisture, etc. The lines can be buried, or better, buried inside PVC pipe.

These days it's fairly easy, efficient, and economical to not only improve your shack but also dress it up a bit. ■



Poor man's hardline. For more detailed information on these two types call The Wireman. His 800 number is listed monthly in his ad in CQ.

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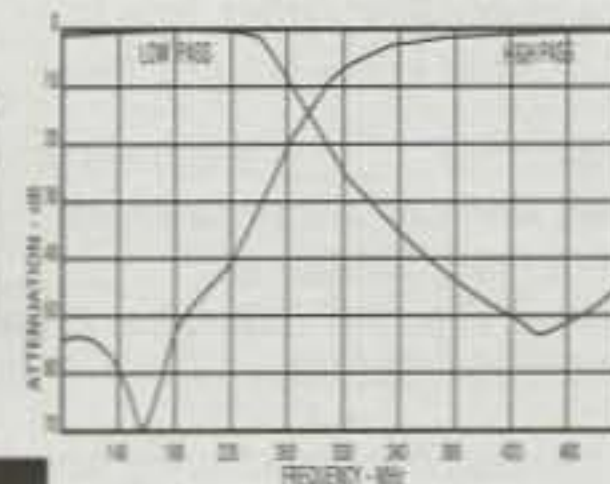
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**Get ready! CQ's Golden Anniversary gala begins next month. Don't miss out!**



## CQ's Golden Anniversary What's In Store For You

BY RICHARD S. MOSESON\*, NW2L

**CQ** turns 50 years old next month. If you're a regular reader, then you'll know we've got a lot in store for you. Here's a quick look at what's ahead (including a sneak preview of something we haven't told you about yet—our exciting *CQ Golden Giveaway!*):

**January 1995 CQ:** An extra-special double issue that's destined to become a collector's item. We'll look back at the past 50 years, decade by decade, with a special focus on three areas:

**Amateur Radio History**—CQ columnists and authors Bill Orr, W6SAI, and Joe Lynch, N6CL, explore the major advances and developments that have transformed our hobby since 1945. *This is the only history of amateur radio after 1945, and the first comprehensive look at the hobby since 1936!*

**Highlights of CQ History**—Current and former editors, publishers, columnists, and authors reminisce about the origins and early days of CQ, along with highlights of the past half-century and "Golden Memories" from some of our long-time readers.

**World and Technological History**—Despite the fact that we all know better, amateur radio isn't really the most important thing in the world. In order to understand its role and its impact on the events that have shaped our world in the past 50 years, it's important to view our hobby against the backdrop of historical events. CQ Anniversary Coordinator Rich Moseson, NW2L, provides this perspective in a five-part series of easy-to-read, personalized accounts of world history.

**Plus**—CQ Columnist Bill Orr, W6SAI, guides us through CQ's "pre-history"; Bryan Bergeron, NU1N, looks into his crystal ball to report on amateur radio's "future history"; Neil Friedman, N3DF, explores the "other half" of CQ's history (our library of reference books, which began in 1947), and CQ's columnists look back at the history and development of their special areas over the past 50 years.

\*CQ 50th Anniversary Coordinator

And—we'll be announcing the *CQ Golden Giveaway*, our 50th anniversary sweepstakes with dozens of great prizes, including the grand prize of an all-expense-paid trip for two to the 1996 Dayton Hamvention. All this and more is coming up in January's CQ!

### We're Not Done Yet . . .

**On the Air**—CQ is giving amateurs from around the world the chance to join our 50th anniversary celebration through a variety of operating activities and opportunities.

**The CQ Gang Activity** is our kickoff event. Between January 1 and 15 anyone who has ever been connected with CQ (even if you wrote one article 35 years ago) may sign "/50" after his/her callsign; you can win a great certificate by working as many "/50" stations as you can. (Complete rules were published in last month's CQ and are posted on CompuServe and America Online. Rules, log sheets, and application forms are also available for a large SASE to "CQ Gang Awards," c/o CQ, *The Radio Amateur's Journal*, 76 North Broadway, Hicksville, NY 11801.

**The CQ/50 Gold Awards**—All year long you'll have the chance to discover new ways to enjoy amateur radio and to challenge your operating abilities while you work toward this award and its many endorsements. The basic CQ/50 award is earned by simply contacting 50 other amateurs on the radio, and the challenges grow from there. Details were published in October's CQ and once again are posted on CompuServe and America Online. Rules, log sheets, and application forms are also available for a large SASE to "CQ/50 Gold Awards," c/o CQ, *The Radio Amateur's Journal*, 76 North Broadway, Hicksville, NY 11801.

That's a preview of what's coming up next month and next year as CQ's Golden Anniversary gala gets going! We hope you'll join the fun and stay with us as we begin our second half-century of service to amateur radio. ■



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# ANTENNAS & ACCESSORIES

A LOOK AT THE SHACK FROM BOTH ENDS OF THE COAX

BY KARL T. THURBER, JR., W8FX

## Antenna Notebook—Part V

Last month when we got together we featured a variety of antennas and accessories topics. We're still on the same track this month, so let's get started without any delay. First let's look at antennas.

### Antenna Notes

**WA1FFL Ladder. Loc.** Jim Hagerty, WA1FFL, has introduced a new product for the wire antenna aficionado. It's the Ladder-Loc (patent and trademark pending), which he developed to give the ladderline user a custom-molded platform with a built-in strain relief and supports for wire antennas.

Ladder-Loc is intended to work with the 3 inch rectangular "window" stamped in 450 ohm ladderline. The piece may be suspended using the top wing hole (see fig. 1). This works well for loops and inverted Vees, offering a strong support that takes the antenna weight off of the antenna wires. Jim furnishes a five-page set of instructions and an installation guide having a variety of tips on mounting, insulation trimming, sealants, wire dressing, soldering, hardware, and more.

The WA1FFL Ladder-Loc is available directly from Jim for \$11.95 plus \$3.00 for USPS Priority Mail shipping. Contact Jim Hagerty, WA1FFL, 64 Nonquit Lane, Tiverton, RI 02878 (401-624-4739). Ladder-Loc also can be obtained from Radioware Corp., P.O. Box 1478, Westford, MA 01886 (1-800-950-9273).

**High Sierra HS-100 HF Mobile Antenna.** Bob Cobler, WQ6B, is proud of his all-weather HS-100 HF mobile antenna system, which was well-received at this year's Dayton Hamvention. The HS-100 is a remotely controlled, 3.5 to 30 MHz HF vertical radiator with weather shield and base mounting hardware.

The HS-100 uses various techniques to achieve broad bandwidth over a 10:1 range with high performance. These techniques are based on the proven DK-3 mobile antenna design pioneered by Don Johnson, W6AAQ. The HS-100 antenna is essentially a commercialized, heavy-duty version of the W6AAQ DK-3 with several additional features.

The HS-100 uses a movable (variable) center loading coil that partially resides inside the lower mast (see fig. 2). Only the inductor turns that are visible above the top of the lower mast are active. The turns hidden inside the mast are rendered inactive by a decoupling collar assembly that connects the bottom-most exposed turn of the inductor to the top of the lower mast. The turns effectively taken out of service in this manner are claimed to not detract from performance.

The resonant frequency of the 4.5 lb. antenna is continuously variable, making it useful for MARS, commercial, government, and SWL applications; a small DC motor and gear as-

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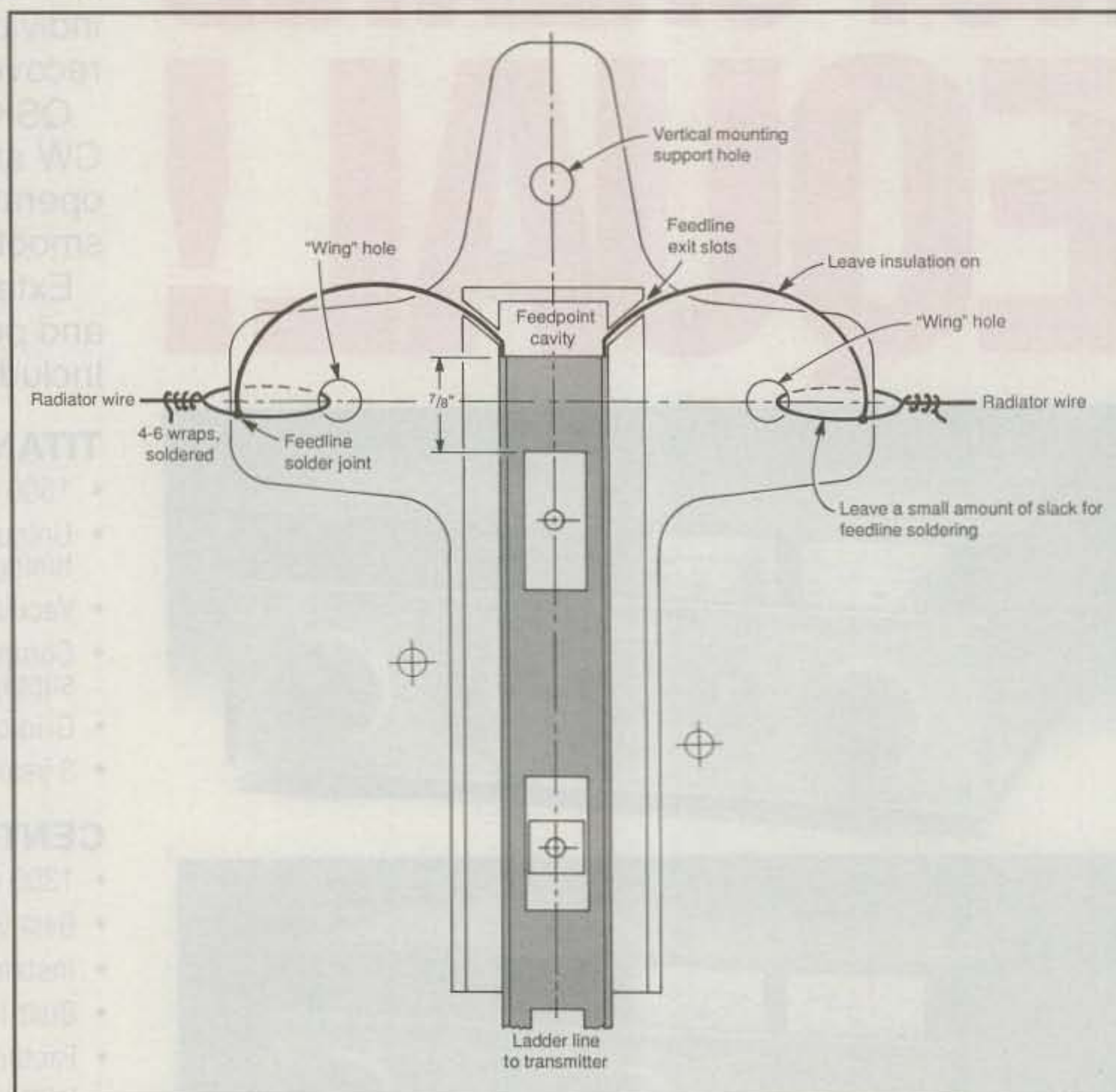


Fig. 1—Of special interest to wire antenna and ladderline aficionados, the WA1FFL Ladder-Loc center support and molded strain relief is a "natural" for 450 ohm rectangular-window ladderline. Nylon bolts are included. (See the text of this month's column for details.)

sembly are used to move the inductor up and down. A simple motor reversing switch controls the antenna from the operating position for easily and quickly changing frequency or band.

The antenna's power rating is a conservative 200 watts PEP SSB on all bands and up to 500 watts on some bands. A toroidal transformer mounted inside the lower mast section provides a good match to 50 ohm cable (SWR less than 2:1) across the antenna's entire range, so an external antenna tuner isn't required.

The basic antenna is priced at \$289. This includes the weather shield and base mounting hardware kit but does not include coax, DC power cable, coax connectors, or motor control switch (these are available in a \$35 installation kit). A multipurpose mounting bracket and a universal tilt-over amount, as well as other accessories, are offered. Contact High Sierra Antennas, Box 2389, Nevada City, CA 95959 (916-273-3415).

**Creative Designs CLP 5130 Series Log Periodic.** Do you want multiband coverage but have room for only one array on your tower?

One practical solution, on both HF and VHF/UHF, is the log periodic beam. The type typically used by amateurs is based on the planar log periodic design, the geometry of which repeats periodically with respect to the logarithm of the design frequency—hence the term.

The log periodic is a very broadband, frequency-independent antenna system. It is usually designed for multiband HF operation, although there are log periodics for VHF and UHF, such as the antennas highlighted this month. The antennas' gain, feedpoint impedance, F/B ratio, and the like, remain essentially constant over the full operating range. The typical log periodic exhibits an SWR of less than 2:1, with a gain of 9.5 dBi (7.4 dBd) or more, over the full operating range.

Creative Designs (or "Create Design") manufactures a complete line of high-power, heavy-duty VHF/UHF beam antennas for the serious contester and DXer. Included in their line are two VHF/UHF log periodics—the CLP5130 Series. The antennas offer good performance with high forward gain and a low transmitting

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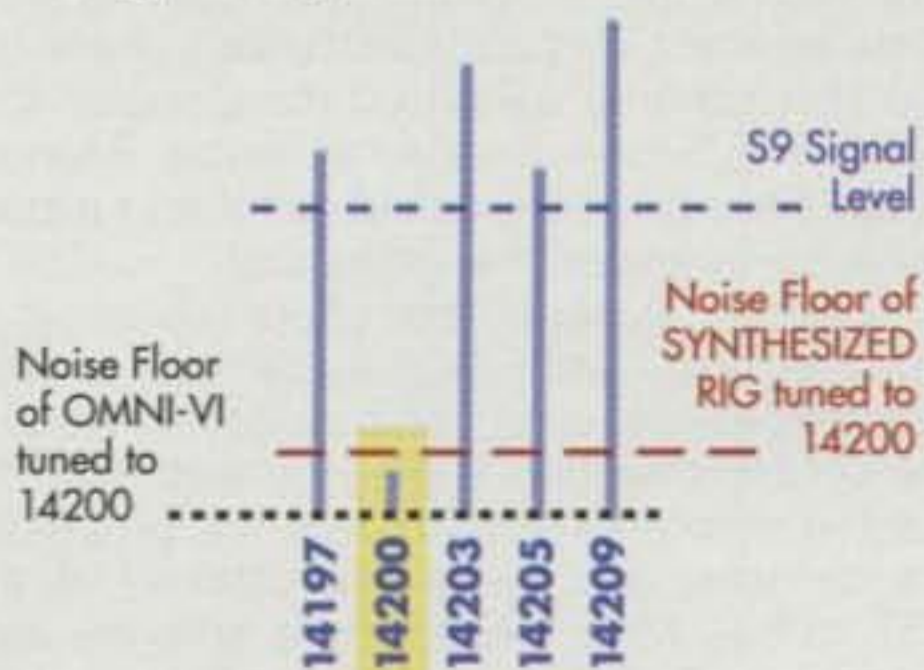
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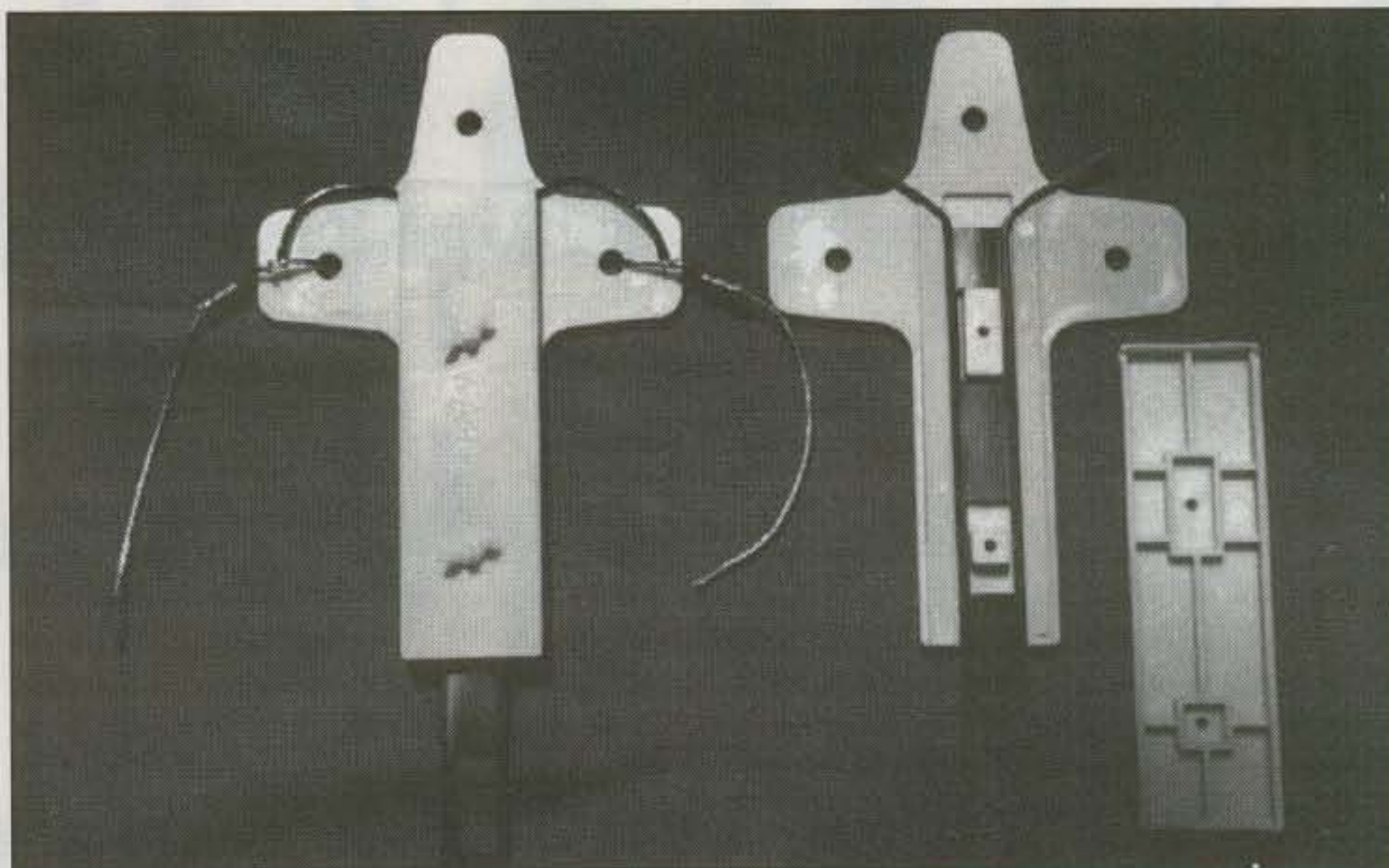
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Here's an opened view of the WA1FFL Ladder-Loc. It's intended to work with the 3 inch rectangular "window" stamped in the ladderline. It's furnished with an instruction guide that offers a variety of installation tips and techniques. The device may be suspended using the top wing hole, if you prefer. See text for details. (WA1FFL photo)

SWR across a broad range. They also can pass as TV antennas, of interest to apartment dwellers and those with limited space. The antennas' strong commercial-grade aluminum and magnesium construction is designed to withstand severe weather. The antennas may be mounted horizontally or vertically.

The 25-element CLP5130-1 is usable on 50 through 1300 MHz. It's also suitable for FM broadcast reception, scanning, VHF/UHF TV, aeronautical communications, and business-band use. Forward gain is claimed to be 10-12 dBi, comparable to a four-element Yagi. It's \$299. The 20-element CLP5130-2 has similar characteristics, but is more compact and covers 105 through 1300 MHz. Its reported gain is 11-13 dBi, with a price tag of \$164.

The antennas are distributed by EDCO. Through its dealers, EDCO also handles Creative Design roof towers (three models), rotators, and thrust bearings. For more information and pricing contact Electronic Distributors Corporation, 325 Mill St., Vienna, VA 22180 (703-938-8105).

**AEA SWR-121 Graphical Antenna Analyser.** We have examined several "do-it-all" antenna analyzers in the column, including the Autek Research RF-1 RF Analyst and several MFJ SWR analyzers. We have found all to be excellent products, with relatively small differences in features and pricing among them that make a particular analyzer more suitable to a given user.

Among the most interesting units in this class of instrument is the AEA SWR-121 Antenna Analyser. The SWR-121 combines a microprocessor-controlled frequency synthesizer with an accurate, low-power SWR bridge. A full-featured keypad lets you select the center frequency, frequency range, and step size.

The LCD readout displays the antenna's SWR curve over an entire range, not just for one frequency. In fact, the SWR-121's key selling point is its graphic screen display of your HF antenna's performance over its useful operating spectrum, showing SWR versus frequency. The display shows SWR and return loss at the antenna's center frequency. The unit also can

be used to test coax by measuring return loss. An RS-232 interface allows for remote control, remote display, and saving of plots.

Several other important features are offered. These include automatic SWR scaling, digital SWR readout both at the center frequency and the top of the plot, an internal beeper for audible SWR indication, and an automatic battery-saver function.

Two SWR-121 models are offered. The SWR-121 HF covers 1-32 MHz and retails for \$399. The SWR-121 V/U covers 120-175, 200-225, and 400-475 MHz; it's \$469. Optional menu-driven control and display software for the IBM PC and the HF analyzer is \$75. (The HF model was favorably reviewed by Paul Carr, N4PC, in June CQ.)

For a free catalog and additional technical information, contact Advanced Electronic Applications, Inc., P.O. Box C2160, 2006 196th St. S.W., Lynnwood, WA 98036 (1-800-432-8873).

**Doppler Systems RDF.** If you're into radio direction finding (RDF) work, you're familiar with the problems using amplitude-sensitive methods. A more sophisticated approach has been available for years, but mostly for well-heeled users. This approach uses a phase detection scheme based on the Doppler shift principle. Such advanced schemes unfortunately have been too complicated and expensive for widespread amateur use.

Doppler Systems, Inc. offers two series of professional-quality RDF systems. The 4000 series provides an economical solution to VHF and UHF direction finding by including the antenna mixing circuitry with the processor and display unit. It's for applications over the 52 to 500 MHz range where antenna feed length is 45 feet or less. Four processor/display models (the DDF4001 through DDF4004) are available, from \$595 to \$835.

The accessory mobile antenna system is the DDF4060, a set of four matched quarterwave whips covering 136-500 MHz that are supported on magnetically mounted bases for mobile operation. They're \$225. Other frequency ranges are available.

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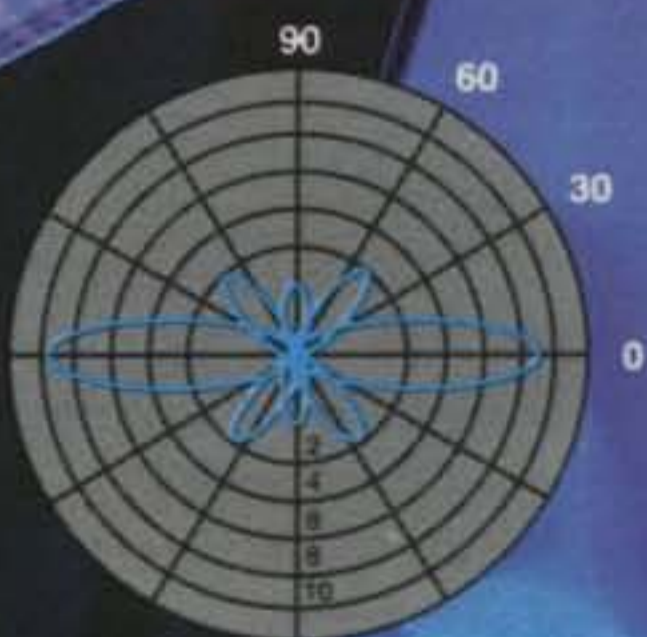
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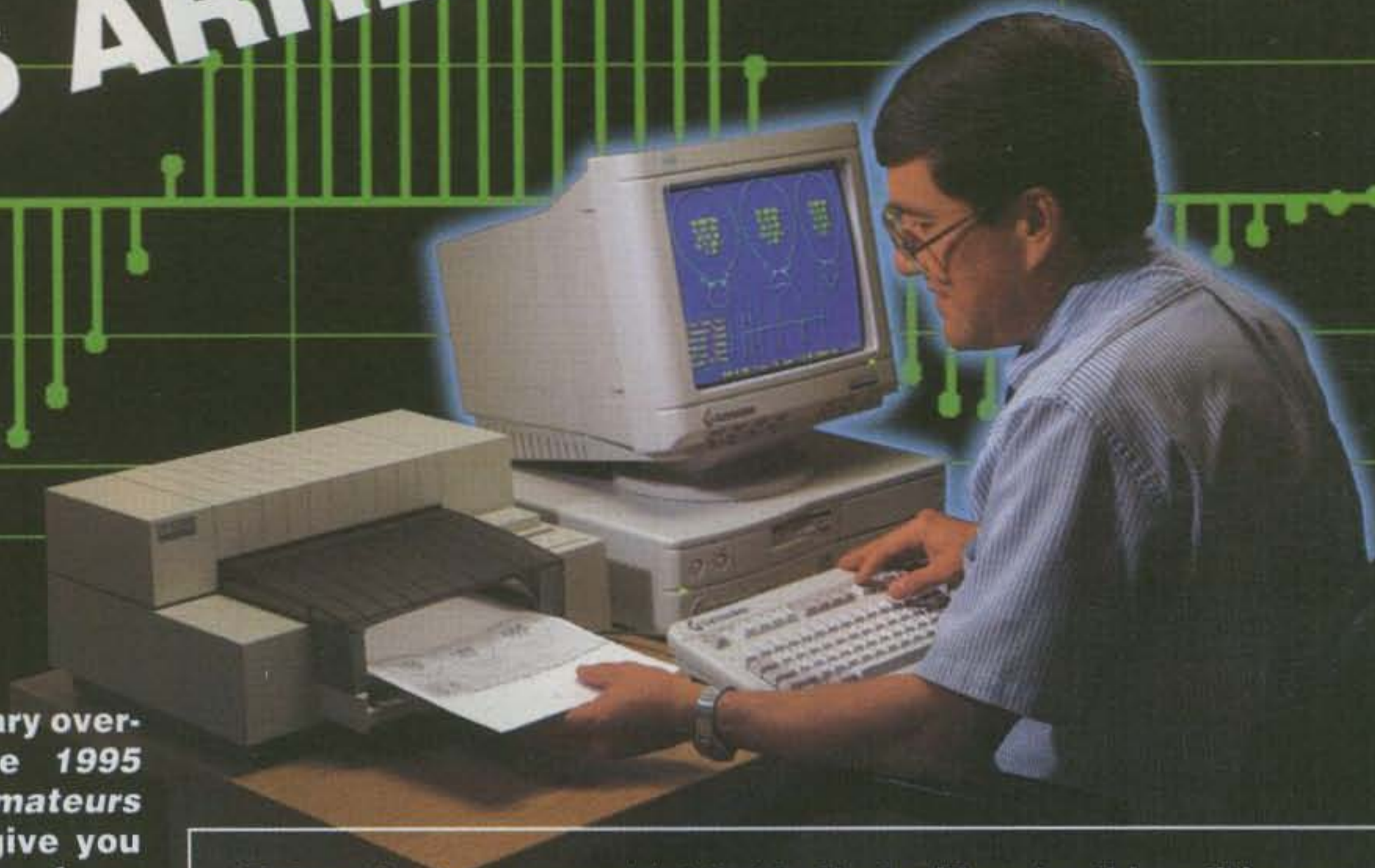


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This is it—an extraordinary overhaul—we've rebuilt the 1995 *Handbook for Radio Amateurs* from the ground up to give you what you've been asking for—and more!

For more than 65 years, this has been the annually published "bible" of Amateur Radio electronics and communication, and 1995 marks the year of a major improvement.

For this edition, the ARRL assembled the best and most knowledgeable writers on subjects ranging from analog electronic theory to transceivers; repeaters to DSP; circuit construction to interference; transmission lines to antennas and propagation. Whether you're a seasoned operator or a beginner, you can't do without this brand-new edition, because if it's ham radio, it's in the 1995 *Handbook*.

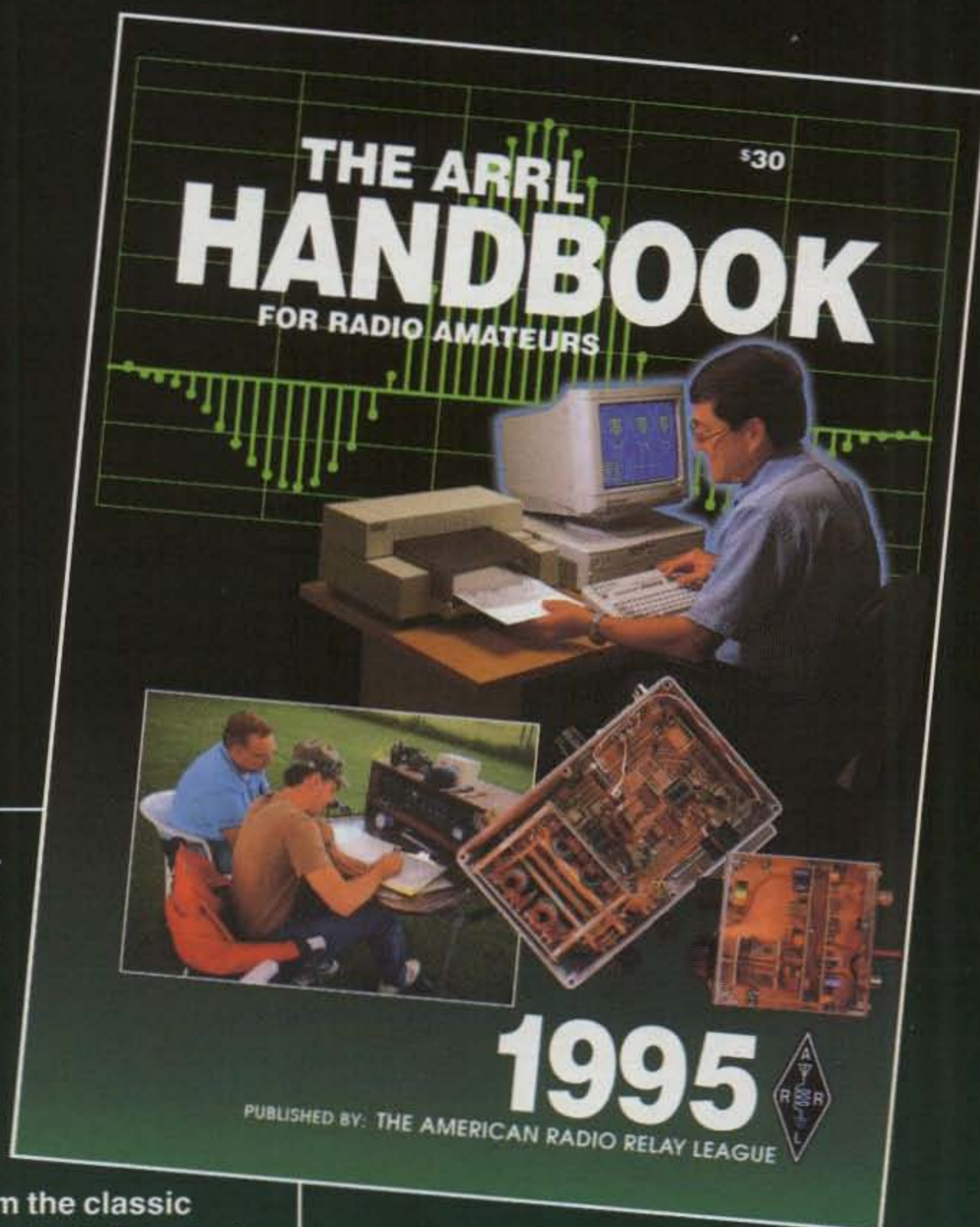
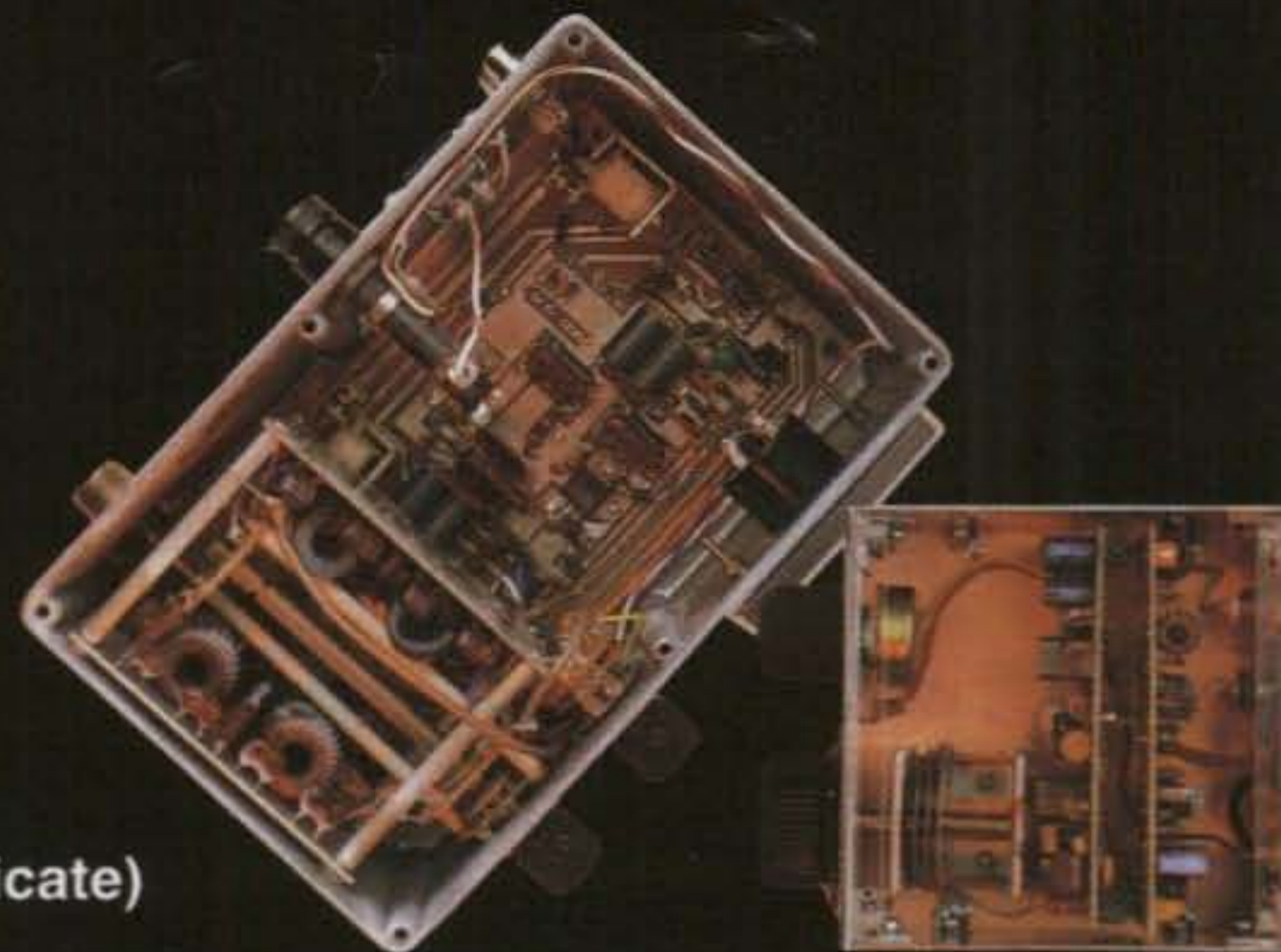
Take a look at some highlights that will make this edition an instant classic:

- In the Modes chapter, you'll find an overview of the ways hams communicate, from the on/off keying of Morse code to the complex, powerful digital techniques that will define Amateur Radio communication into the next century.
- Whether you're an experienced builder or a neophyte, you'll find the Circuit Construction chapter useful, as it takes you from schematic to finished project.
- The AC/RF Sources chapter explains, clearly and concisely, modern oscillator and synthesizer design.
- Mathematics for Amateur Radio provides a refresher course in the math concepts that form the basis of ham radio and electronics.
- The Station Setup and Accessories chapter shows how to set up or enhance your station for top performance; among other projects, it includes a boom/headset mike and three computer interfaces.
- In the Transceivers chapter, you'll learn about the systems and design that go into modern radio equipment. Projects include a beginner's shortwave receiver, QRP transceivers and a potent 50-W solid-state linear power amplifier.
- The References chapter organizes, in one convenient place, the tables and charts hams need and use most often.

Need more? Here's the actual lineup—chapter by chapter:

- 1: What is Amateur Radio?
- 2: Activities
- 3: Modes
- 4: Mathematics for Amateur Radio
- 5: DC Theory and Resistive Components
- 6: AC Theory and Reactive Components
- 7: Digital Signal Theory and Components
- 8: Analog Signal Theory and Components
- 9: Safety
- 10: Real-World Components
- 11: Power Supplies and Projects
- 12: Modulation Sources (What and How We Communicate)
- 13: Amplifiers and Projects
- 14: AC/RF Sources (Oscillators and Synthesizers)
- 15: Mixers, Modulation and Demodulation
- 16: Filters and Projects
- 17: Receivers, Transmitters, Transceivers and Projects
- 18: Digital Signal Processing
- 19: Transmission Lines
- 20: Antennas and Projects
- 21: Propagation
- 22: Station Set-Up and Accessory Projects
- 23: Specialized Communication Systems, Techniques and Projects
- 24: Component Data
- 25: Circuit Construction
- 26: Test Procedures and Projects
- 27: Troubleshooting and Repair
- 28: Electromagnetic Interference
- 29: Regulations
- 30: References

It's comprehensive, accurate, authoritative, clear and painstakingly researched. For almost 7 decades it's been trusted and respected worldwide as the leading publication of its kind. This is a huge value and an indispensable tool for the active radio amateur or electronic communication hobbyist. It combines experience that's evolved from the classic days of Amateur Radio's birth with today's latest advances in communication technology, design, theory and hands-on practical projects, ideas and reference material. More than 1200 pages, packed with new information and projects. Don't miss the brand new edition everyone will be talking about. Order your copy today.



THE 1995 ARRL HANDBOOK  
FOR RADIO AMATEURS  
Retail: \$30 Softcover,  
ARRL Order No. 1727  
Publication Date: Oct 1994



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CIRCLE 148 ON READER SERVICE CARD

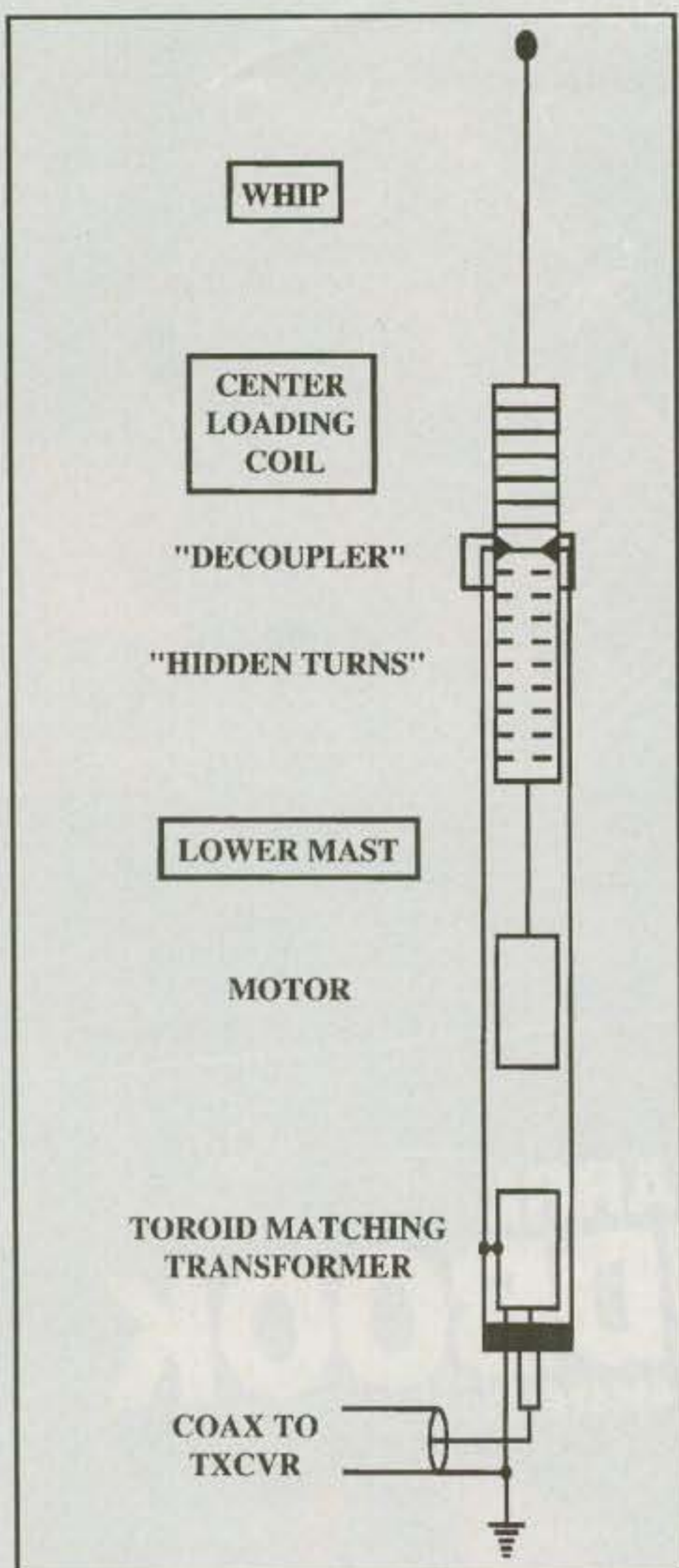


Fig. 2- The High Sierra HS-100 is a remotely controlled 3.5 to 30 MHz HF mobile antenna system that achieves broad bandwidth with high performance. It's furnished complete with weather shield and base mounting hardware. The antenna uses a movable (variable) center loading coil that partially resides inside the lower mast.

els priced from \$520 to \$755), features expanded frequency coverage (52-1000 MHz) using remote RF summing circuits. The summing circuits are available in either a magnetic-mount version for mobile use or with a U-bolt bracket for mast mounting. The 5000 series is especially for use above 500 MHz and/or where antenna placement requires feedlines over 45 feet. A typical installation requires a processor/display unit, an RF summer, and one or more antennas. Several RF summers and mobile and fixed antennas are offered.

System operation can be explained in terms of Doppler shift: As an antenna rotating at the end of an arm moves toward the RF source, the apparent frequency increases; but as the antenna recedes from the source, the apparent frequency decreases. This shift occurs at the same rate at which the antenna rotates, and the phase of this shift contains the desired bearing information.

In a quasi-Doppler system, multiple antennas are electronically combined to simulate a physically rotating antenna. The technique used by Doppler Systems combines four an-

tenna outputs to prevent desensitizing the receiver. When used with a Narrow-Band FM (NBFM) receiver, the up-down frequency shift is detected and can be heard as a 300 Hz tone. The direction finder processes this tone to display the bearing. FM signals are normally used, but AM also can be used.

Further details are available from Doppler Systems, Inc., P.O. Box 2780, Carefree, AZ 85377 (602-488-9755).

**Sinclabs Products.** We highlighted Sinclabs in the October 1992 column. Recently Dana Shtun, VE3DSS, of Sinclabs sent us a flyer and data sheets outlining Sinclabs' current products. These products include the "Intermod Killer" bandpass filter for 2 meters, available in three different passbands; 70 cm and 23 cm duplexers for FM voice repeaters and packet; a 2 meter/70 cm dual band mobile antenna and diplexer; and a 223 MHz duplexer.

For a catalog, contact Sinclabs Amateur Radio Products, 85 Mary St., Aurora, Ontario, Canada L4G 3G9 (1-800-263-3275). U.S. amateurs may place orders through Sinclair Radio Laboratories, 675 Ensminger Road, Tonawanda, NY 14150 (716-874-3682).

**TechSonic Milliwatt.** A new line of QRP transmitter kits is offered for 20, 30, and 40 meters by TechSonic. The little 3 watt rigs feature low current drain for long battery life and clean, chirp-free keying. Output is adjustable from under 100 mw to 3 watts by changing the DC supply voltage.

The rig's output transistor is fully SWR protected, and a receiver antenna jack is provided. Frequency control is via VXO over a 5 to 10 kHz range, depending on band; a crystal is included with each unit. The kits are furnished complete; they include the PC board, all components, connectors, pre-wound coils, and full instructions. A matching receiver kit should be available by the time you read this. Portable dipole kits also are available for \$24.95.

Interestingly, TechSonic heavily stresses its "customer first, last, and always" support policy. They guarantee the kit's success and your satisfaction, offering a money-back guarantee.

What's really interesting is their recognition that "kits are different," requiring a special guarantee. The guarantee states that after an honest and diligent attempt by any kit builder to properly build a TechSonic kit, they will repair, replace, rebuild, resolder, test, tune, align, and/or debug the kit and return it promptly, free of charge; you just pay shipping to and from TechSonic. Sounds great to me, and to anyone else who's a little shaky with a soldering iron!

More information is available from TechSonic, 1642 Butler Pike, Suite 127, Conshohocken, PA 19428 (610-834-1978).

**Digi-Field FS Meter Update.** In the June 1993 column we highlighted the I.C. Engineering Digi-Field FS Meters. These are available in two models (A and B, having differing sensitivities) which claim a frequency response from DC to 12 GHz. The meters are especially good for antenna experiments, comparisons, and adjustments. As we noted then, they're very useful in observing antenna radiation patterns.

You also can use the units to observe feedline radiation, measure RF levels in equipment, sniff RF from 60 Hz noise sources such as motors, and even detect microwave oven leakage. Since our 1993 column there have been several hands-on favorable reports on the Digi-Field units. Check out Doug DeMaw, W1FB's detailed, hands-on review that appeared in last July's CQ.

The units have gone up in price slightly since we first noted them. They're each now \$139.95 from I.C. Engineering, 16350 Ventura Blvd., Suite 125, Encino, CA 91436 (1-800-343-5358).

## Soft Side Notes

**SKYCOM.** SKYCOM is a very comprehensive and powerful HF ionospheric signal analyst program that claims to be superior to many of the propagation prediction programs that are currently available. The software is said to be the only package that will handle practically every known phenomenon that can disturb radio communications. These include the Equatorial Anomaly, the location of the auroral

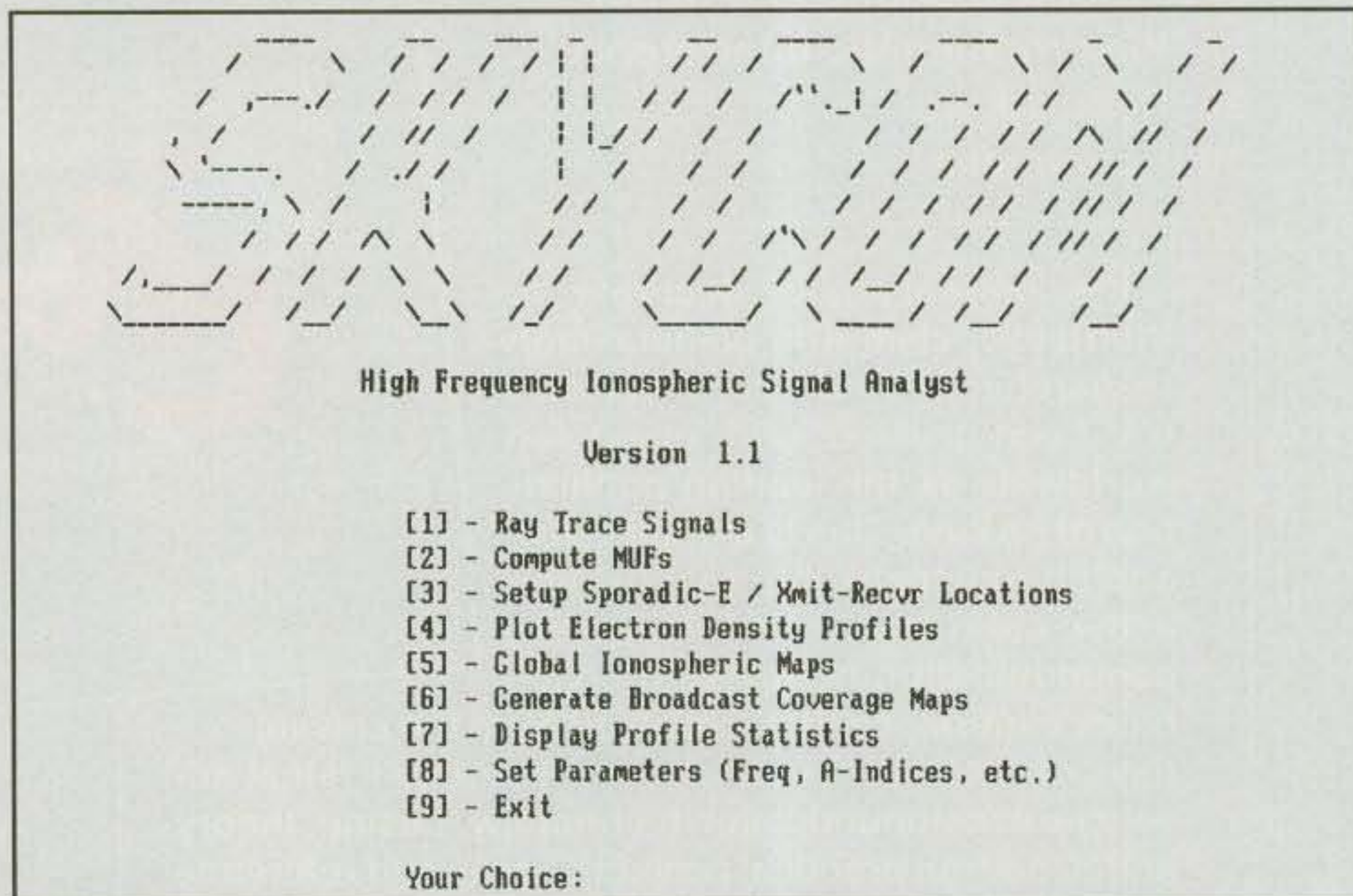


Fig. 3- Shown here is the SKYCOM High Frequency Ionospheric Signal Analyst main menu. SKYCOM is a powerful propagation prediction program that claims to be superior to many currently available propagation programs. The software is said to be the only package available that will handle practically every known phenomenon that can disturb radio communications.



# SIRIO

## THE HI-PERFORMANCE ANTENNA YOU'LL DEPEND ON! DUAL & MONO BAND HI-GAIN MOBILE WHIP ANTENNAS

UNSURPASSED SIRIO ANTENNAS, KNOWN THROUGHOUT EUROPE AS THE FINEST COMMUNICATION ANTENNAS AVAILABLE ANYWHERE IN THE WORLD, MAKE THEIR WAY TO YOUR FAVORITE HAM STORE! SIRIO OFFERS A UNIQUE COMBINATION OF FINE OLD WORLD CRAFTSMANSHIP AND STATE-OF-THE-ART ENGINEERING. SIRIO USES ONLY THE HIGHEST QUALITY MATERIALS AVAILABLE, MAKING OTHER ANTENNAS PALE BY COMPARISON!

- High quality materials - Gold plated RF connectors & solid brass castings, 17/7 PH stainless steel, anti-corodal aluminum, teflon insulators, & even stainless steel hardware.
- Custom VSWR & bandwidth charts - with every model, actual antenna test range results, not theoretical printouts.
- Factory pre-tuned - while fully tunable, they are shipped pre-tuned for North American bands, with custom tuning available.
- Best DC ground potential for maximum static & lightning protection

### HP 2070 2M/70CM DUAL BAND

Type:	VHF 1/4 Lambda UHF 3/4 Lambda
Impedence:	50 Ohms
Frequency Range:	VHF 144-148MHz UHF 440-450MHz
Polarization:	Vertical
VSWR: at freq. res.	<1.2:1
Max. Power:	VHF 75 Watts, UHF 50 Watts
Bandwidth: at VSWR 1.5:1	VHF/UHF 10MHz
Gain:	VHF 0 dBd - 2.15 dBi UHF 3.8 dBd - 5.95 dBi
Connection:	UHF Female with gold plates center conductor and PTFE (TEFLON) insulator
Length:	approx. 18.5 inch.
Weight:	approx. 8.8 oz.



### HP 200 2m Mono Band

Type:	VHF 3/4 Lambda
Impedence:	50 OHms
Frequency Range:	144 - 148MHz
Polarization:	Vertical
VSWR: at freq. res.	<1.2:1
Max. Power:	150 Watts
Bandwidth: at VSWR 1.5:1	4MHz
Gain:	4 dBd - 6.15 dBi
Connection:	UHF Female with gold plated center conductor and PTFE (TEFLON) Insulator
Length:	approx. 60.6 inch.
Weight:	approx. 11.8 oz.



### HP 200 C 2m Mono Band

Type:	VHF 3/4 Lambda
Impedence:	50 Ohms
Frequency Range:	144 - 148 MHz
Polarization:	Vertical
VSWR: at freq. res.	<1.2:1
Max. Power:	150 Watts
Bandwidth: at VSWR 1.5:1	4MHz
Gain:	4 dBd - 6.15 dBi
Connection:	UHF Female with gold plated center conductor and PTFE (TEFLON) Insulator
Length:	approx. 60.6 inch
Weight:	approx. 11.8 oz.



### HP 7000 70cm Mono Band

Type:	UHF 5/8 Lambda
Impedence:	50 Ohms
Frequency Range:	440 - 450MHz
Polarization:	Vertical
VSWR: at freq. res.	<1.2:1
Max. Power:	75 Watts
Bandwidth: at VSWR 1.5:1	10MHz
Gain:	3.2 dBd - 5.35 dBi
Connection:	UHF Femal with gold plated center conductor and PTFE (TEFLON) Insulator
Length:	approx. 18.5
Weight:	approx: 8.8oz.



### HP 7000 C 70cm Mono Band

Type:	UHF 2 x 5/8 Lambda
Impedence:	50 Ohms
Frequency Range:	440-450MHz
Polarization:	Vertical
VSWR: at freq. res.	<1.2:1
Max. Power:	75 Watts
Bandwidth: at VSWR 1.5:1	10MHz
Gain:	6 dBd - 8.15 dBi
Connection:	UHF Female with gold plated center conductor and PTFE (TEFLON) Insulator
Length:	approx. 34.6 inch.
Weight:	approx. 10.9 oz.



### HP 2070 H 2m/70cm Dual Band

Type:	VHF 1/2 Lambda UHF 2 x 5/8 Lambda
Impedence:	50 Ohms
Frequency Range:	VHF 144 - 148MHz UHF 440 - 450MHz
Polarization:	Vertical
VSWR: at freq. res.	<1.2:1
Max. Power:	VHF 150 Watts, UHF 100 Watts
Bandwidth: at VSWR 1.5:1	VHF 4 MHz UHF 6 MHz
Gain:	VHF 3 dBd - 5.15 dBi UHF 6 dBd - 8.15 dBi
Connection:	UHF Female with gold plated center conductor and PTFE (TEFLON) insulator
Length:	approx. 41.3 inch.
Weight:	approx. 11.6 oz.



These super High Performance antennas, as well as the complete SIRIO antenna line for Amateur, Commercial, Marine and Cellular are now available. Contact your favorite dealer or call EDCO for the dealer nearest you. SIRIO offers High performance antennas at unbeatable prices!



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Vienna, Va. 22180  
PH 703-938-8105

Exclusive Distributors for North & So. America

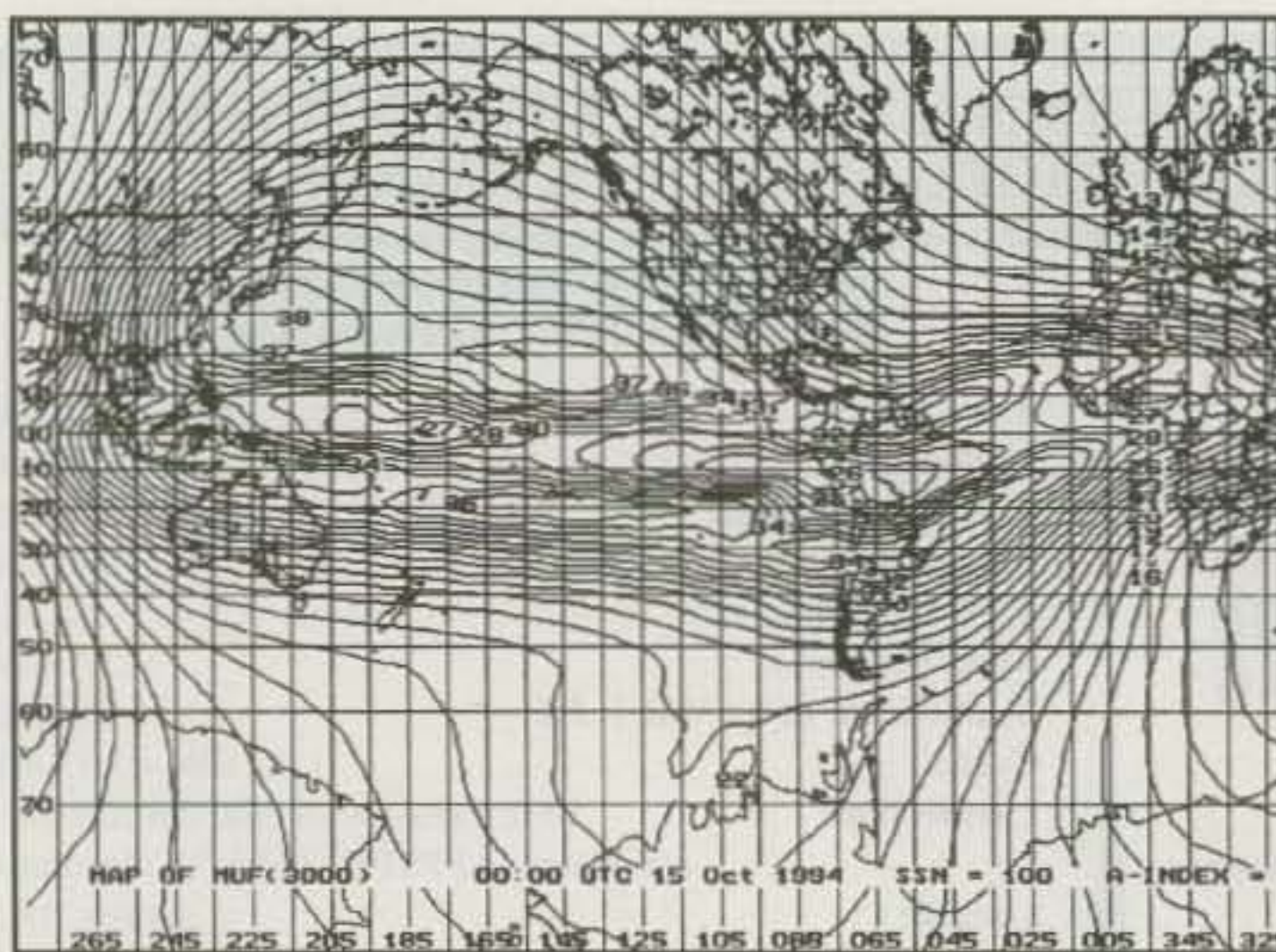


Fig. 4—SKYCOM can produce exceptionally detailed, high-quality maps of almost every ionospheric parameter relevant to radio communications, and it can do this using a variety of map projections. Here's a typical global map produced by SKYCOM showing Maximum Usable Frequency (MUF) for 3000 km distances.

zones, changes in electronic density with geomagnetic activity, sporadic-E, solar flares, Polar Cap Absorption (PCA), the Winter Anomaly, grayline modes, and more.

Although SKYCOM runs slower than many propagation programs, it reportedly is more accurate, since it ray-traces signals through ionospheric models that have been adjusted for various types of geophysical activity. The program produces very useful global ionospheric maps of maximum usable frequencies, critical E- or F2-layer frequencies, electron density, and more. It can also produce cross-section maps of the ionosphere for any signal path. Almost all parameters can be plotted on a variety of world maps, including various polar and cylindrical projections. SKYCOM also produces "broadcast coverage" maps of signal quality, multipathing, signal focusing, and propagation delays.

Although it produces a mind-boggling range of maps and statistical information, the package is fairly simple to use and requires no more information than is available from radio station WWV or WWVH. About the only fly in the ointment, so to speak, is that the program is a bit pricey for casual amateur use at \$179 (\$200 with a printed manual), although multiple orders to radio clubs are \$139. A very instructive technical brochure is available from Solar Terrestrial Dispatch, P.O. Box 357, Stirling, Alberta, Canada T0K 2E0 (see figs. 3 and 4).

**Disk Manager.** A very useful but rather unsung utility software package that has been around for several years is Ontrack Computer Systems' Disk Manager. Billed as "the original hard disk installation utility for DOS," it makes it a snap to initialize, partition, and prepare for use practically any hard disk drive—even the largest and most sophisticated drives.

The latest version, 6.03, helps make hard-drive installation simple for both the novice and more experienced user, while offering additional options for advanced users. The latest version supports drives up to 8 gigabytes in capacity with 2 gigabytes per partition, and it has a dynamic drive overlay which allows users to install an IDE drive larger than 528 MB as a single bootable partition. Easy, advanced, or custom installation options are offered, and

complete performance diagnostics and data protection features are included. For the beginner, there's a "fast preparation" option that completely installs IDE and SCSI drives in less than one minute.

Disk Manager is \$124.95. It's from Ontrack Computer Systems, 6321 Bury Drive, Minneapolis, MN 55346 (1-800-752-1333).

## Book Topix

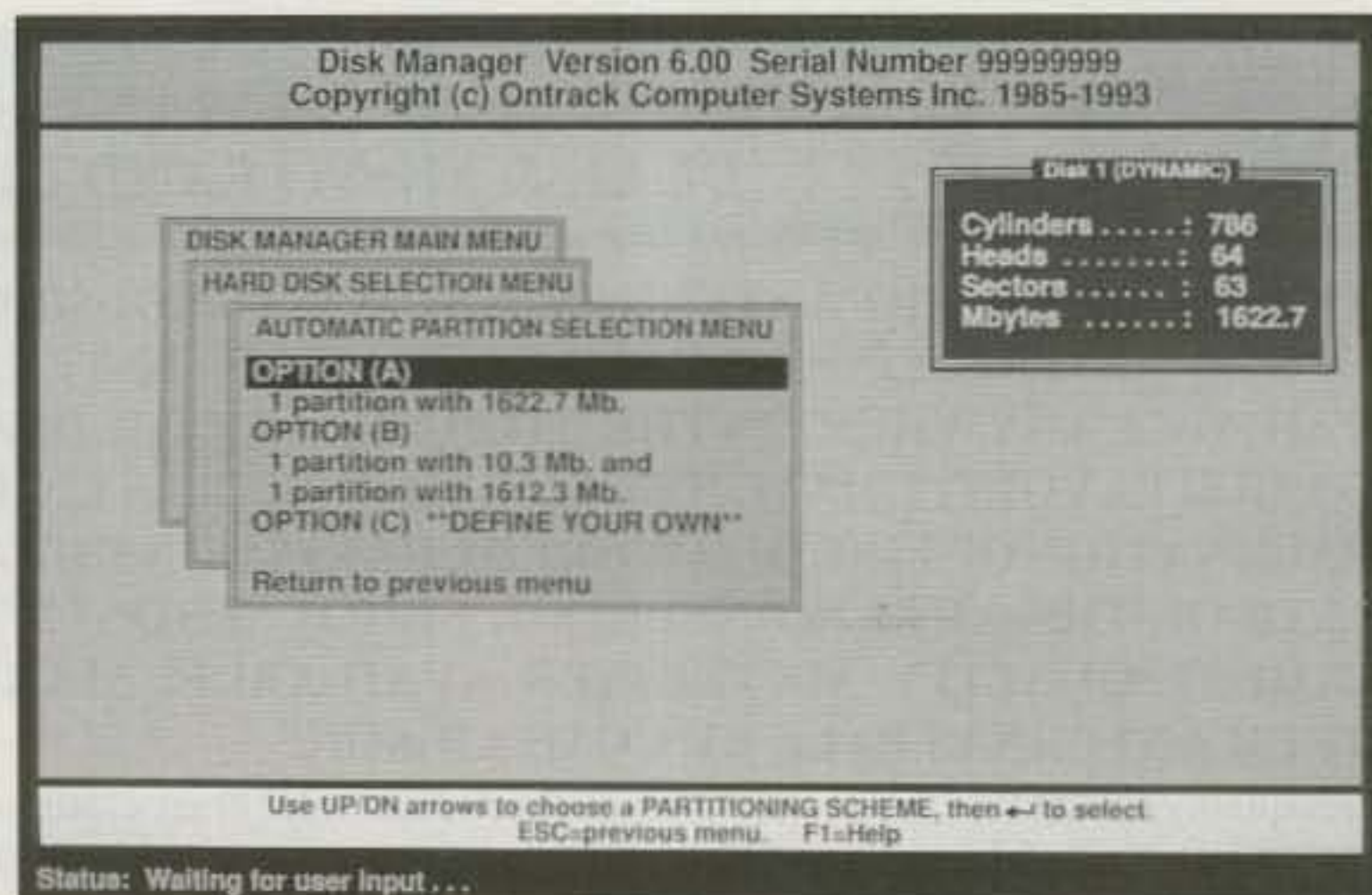
**Xantek DX Edge.** We've described Xantek's novel grayline and propagation forecasting products before, beginning with the original plastic slide-rule DX EDGE and continuing with computerized versions for the Commodore 64 and IBM PC (see the January 1989 column). Recently Xantek's Tony Japha, N2UN, sent me one of the latest versions of the slide-rule DX EDGE. The new color version replaces the black-and-white version that's been one of the most popular DX operating aids around since it was introduced in 1981.

To review, the DX EDGE is used to determine optimum DX contact timing, especially the best times and bands for long-path and grayline communications. It's also used for estimating when both ends of the contact will be in darkness (for the lower frequency bands) or when the two points will be in daylight (for the higher bands). Many users have found grayline calculation capability quite important since especially good propagation often occurs during times of sunrise and sunset.

The new DX EDGE includes a double map of the world and 12 slides, one for each month. The shape of the grayline—the line that separates daylight and darkness—changes throughout the year, and each slide shows the grayline for that month. A four-page set of instructions is included.

The DX EDGE is sold at major radio dealers for \$24.95. A flyer is available from Xantek, Inc., P.O. Box 834, Madison Square Station, New York, NY 10159 (212-673-7646).

**History of the Personal Computer.** I long have been fascinated by tales of the early days of the personal computer and the people who pioneered PC development. Each month I eagerly await *Computer Shopper* to read the



*Disk Manager helps make drive installation simple for both the novice and the more experienced user, while offering additional options for advanced users. The latest version supports drives up to 8 gigabytes. For the beginner, the software contains a "fast preparation" option that completely installs IDE and SCSI drives in less than one minute. (Photo courtesy Ontrack Computer Systems)*

"Whatever Happened To . . . ?" column written by Editor-in-Chief Emeritus Stan Veit. Stan, through his front-line interest in computers, his ownership of a 1970s computer store, and his writings for *Popular Electronics*, *Computers and Electronics*, and *Computer Shopper*, was a true eyewitness to history. My only complaint about Stan's work is that there is only so much he could fit into his monthly column in *Computer Shopper*.

That perspective changed when Ralph Roberts, WA4NUO, of WorldComm Press, sent me a copy of Stan's new *History of the Personal Computer*. This interesting, 298-page book chronicles the details of the PC revolution from the viewpoint of an insider. He begins with the Altair, IMSAI, and Apple, and continues to today's PCs—even including rip-off computers and others that never made it out of the factory or that lasted a very short time. Stan's book tells you just where PCs came from, and it reveals to you the fascinating stories of the personalities and the machines that led up to the sleek and powerful PC that likely resides on your desktop.

Although it is slightly marred by some typographical and grammatical errors, it's nevertheless a genuine keepsake at \$19.95. It's from WorldComm Press, 65 Macedonia Road, Alexander, NC 28701 (704-252-9515).

**Controlling the World With Your PC.** High-Text Publications is largely devoted to publishing for the amateur community, its proprietor being noted amateur writer Harry Helms, AA6FW. But Harry and HighText also are into computers.

One of HighText's latest computer books is by Paul Bergman and is cleverly titled *Controlling the World with Your PC*. Not about a mad scientist's dreams, the book/disk package is really a cookbook of some 40 circuits designed to connect directly to the parallel printer port of an IBM compatible PC. These circuits can handle many real-world jobs, such as controlling motors, detecting the presence of moisture and fluids, monitoring a burglar alarm system, and similar tasks.

To do things like that you need hardware to go between your PC and the object to be controlled, and you also need software to tell your

# Ameritron doubles average SSB power . . .

**NEW AL-80B kilowatt output desktop linear can double your average SSB power output with high-level RF processing . . . it also runs cooler because its Eimac 3-500Z tube completely turns off between words . . .**

Ameritron's all NEW AL-80B kilowatt output desktop linear can double your average SSB power output with high-level RF processing using Ameritron's exclusive *Dynamic ALC™*.

You get cooler operation because the AL-80B's exclusive *Instantaneous RF Bias™* completely turns off the Eimac 3-500Z tube between words. It saves hundreds of watts wasted as heat.

You get a full kilowatt PEP output from a whisper quiet desktop linear. It's a compact 8½"H x 14"D x 15¼" W and plugs into your nearest 120 VAC wall outlet. Covers all bands 160-15 Meters, including WARC and MARS bands (user modified for 10/12 Meters with license).

You get 1000 watts output on SSB, 850 watts output on CW, 500 watts output on RTTY, an extra heavy duty power supply, genuine Eimac 3-500Z tube, nearly 70% efficiency, tuned input, Pi/Pi-L output, inrush current protection, multi-voltage transformer, dual Cross-Needle meters, QSK compatibility, Two-Year Warranty, Made in USA, plus much more for only \$1195.

### Dynamic ALC™ doubles average SSB power

The AL-80B's exclusive *Dynamic ALC™* gives you high-level low-distortion RF processing. When activated, it can more than double your average SSB power and produce up to 6 dB improvement in intelligibility. It maximizes your talk power without distortion and splatter.

A convenient front panel control lets you adjust your output power level.

### Instantaneous RF Bias™ eliminates heat

The AL-80B's exclusive *Instantaneous RF Bias™* completely turns off the Eimac 3-500Z tube (except filaments) between words and dashes. It eliminates hundreds of watts wasted as heat to give you cooler operation and longer component life.

### Gutsy Heavy-Duty Power Supply

The guts of the AL-80B is its heavy heavy duty power supply. A 26 pound transformer using a high silicone steel core, computer grade capacitors, heavy duty bleeders and ten 3 amp, 1000 V power rectifiers give you a stiff 2700 volts fully loaded. Many amplifiers using two 3-500Zs use such small power supplies they don't deliver much more power output than the AL-80B.



**NEW! \$1195** Ameritron AL-80B  
Suggested Retail

### Genuine Eimac® 3-500Z Tube

The AL-80B uses a genuine Eimac® 3-500Z tube warranted by Eimac® -- not cheaper, less reliable 3-500Zs used by some competitors.

### 600 WATTS OUT... \$649

A tough low cost linear with REAL transmitting tubes!

Ameritron's new AL-811 linear amplifier gives you plenty of power to bust thru QRM. You get a quiet desk top linear that's so compact it'll slide right into your operating position -- you'll hardly know it's there . . . until QRM sets in. And you can conveniently plug it into your nearest 120 VAC outlet.

You get three tough vertically mounted 811A transmitting tubes, extra heavy duty power supply, all HF band coverage, pressurized ventilation, tuned input, dual illuminated meters, adjustable ALC, standby switch, transmit LED, UPS shippable and much more.

Select the 3 tube 600 watt out AL-811, \$649 -- or the new 4 tube 800 watt out AL-811H, \$795.

### 70% efficiency

The AL-80B is built on a rugged steel chassis. It has a separate RF compartment that's fully shielded to keep RF from leaking out. This keeps RFI and TVI to a minimum.

Superb RF design and layout, Hi-Q tank circuit and commercially rated RF power components give you nearly 70% plate efficiency over the entire operating range. Your power goes into your antenna instead of heating up your amplifier.

A whisper quiet internal fan draws in cool air over power supply components and pressurizes the 3-500Z tube compartment to remove heat for longest life.

**Tuned Input lets your rig deliver full output**  
A 50 ohm broadband Pi-Network tuned input is used.

### Pi/Pi-L Output Network

A carefully designed Pi/Pi-L output network using the optimum Q for each band gives you exceptionally smooth tuning, extremely wide matching range, full band coverage and peak performance at all power levels.

Has ball bearing vernier reduction drives with logging scales on plate and load controls.

### Step-Start Inrush Protection™

*Step-Start Inrush Protection™* stops damaging inrush current with a start up sequence that's easy on your tube and power supply components.

### Multi-Voltage Power Transformer

Ameritron's exclusive *Multi-Voltage Power Transformer* lets you optimize for different line voltage. You can select from 14 different primary voltages from 90 to 140 VAC and 205 to 250 VAC.

### Dual Illuminated Cross-Needle Meters

Ameritron's dual illuminated cross-needle meters give you *four separate meters* to monitor your operating conditions -- you can tell right away if something is wrong.

### QSK Compatible

The fast custom T/R (transmit/receive) relay in the AL-80B switches nearly as fast as some vacuum relay QSK T/R switches.

For lightning fast QSK operation use the optional external Ameritron *electronic PIN diode QSK-5 T/R switch* or the internal QSK-5PC. Please contact Ameritron for details.

### Plus more . . .

An *Standby* switch lets you run barefoot, but you can instantly switch to full power if you need it.

Has transmit LED; 12 VDC, 200 mA jack; 12 VDC keying relay for solid state and tube rigs; tough, nearly indestructible Lexan-over-aluminum front panel. Two year limited warranty.

## AMERITRON offers the best selection of legal limit linears!

These 3 rugged linears all use a super heavy duty hypersil® power supply capable of 2500 watts!

Ameritron's most powerful amplifier

Ameritron's Dual 3-500Z linear

Ameritron's 3CX1200A7 linear

AL-1500  
**\$2695<sup>00</sup>**  
Suggested Retail



Ameritron super power amplifier uses the herculean Eimac® 8877 ceramic tube.

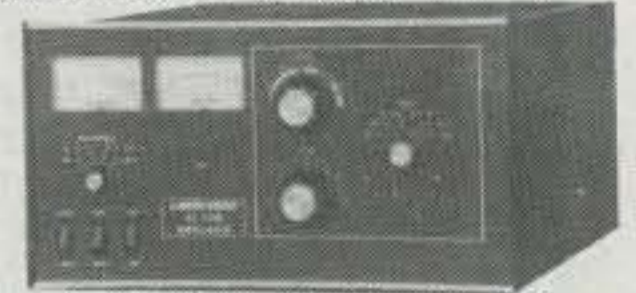
It's so powerful that 65 watts drive gives you full legal output—and it's just loafing because the power supply is capable of 2500 watts PEP.

AL-82  
**\$2095<sup>00</sup>**  
Suggested Retail



This linear gives you full legal output using a pair of Eimac® 3-500Zs. Some competing linears using dual 3-500Zs don't give you 1500 watts because their lightweight power supplies can't use the tubes to their full potential.

AL-1200  
**\$2195<sup>00</sup>**  
Suggested Retail



Get ham radio's toughest tube with the Ameritron AL-1200—the Eimac 3CX1200A7. It has a 50 watt control grid dissipation—12 times tougher than the 4 watt rating of the 3CX800A7—yet you get the same full legal output as you get from a pair of 3CX800A7s.

## AMERITRON brings you the finest high power accessories!

Legal limit antenna tuner

ATR-15  
**\$399**  
Suggested Retail

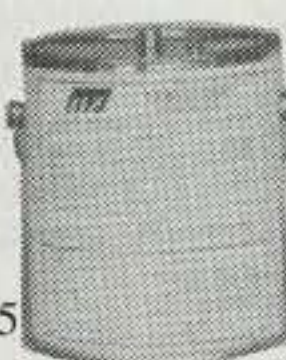


Ameritron — the high power specialist — brings you the ATR-15 antenna tuner that's designed for legal limit amplifiers. Heavy duty silver plated bandswitch virtually eliminates switch failure. High power transmitting capacitors. 1.8-30 MHz. Peak reading SWR/wattmeter. 6 position antenna switch. Selectable 1:1 or 4:1 balun. 5¼ x 13¼ x 13½ inches. Meter lamps uses 12 VDC.

Legal Limit Dummy Load

Oil cooled 50 ohm dummy load. Handle 1500 W for 5 min. SWR under 1.2 up to 30 MHz. Low SWR to 400 MHz. 7½" H x 6 5/8" D. ADL-1500X without oil, \$39.95. ADL-1500 with oil, \$59.95

ADL-1500X  
**\$39<sup>50</sup>**  
Suggested Retail



Remote Coax Switches

RCS-8V  
**\$149**  
Suggested Retail

RCS-8V, DC-UHF 5 KW Coax Switch. Replace 5 coax feedlines with one with this Remote Coax switch. Weatherproof box mounts outdoors on your tower or mast. Attractive control unit sits on your operating desk. Low SWR to 250 MHz. Usable to 450 MHz. Low loss. Rated at 5 KW to 30 MHz, 1 KW at 150 MHz. RCS-8VN, \$159.00 with "N" connectors.

RCS-4, \$134.00, 4 position HF switch. Similar to RCS-8V. No control cable needed. Handles 1500 watts continuous.

RCS-4  
**\$134<sup>50</sup>**  
Suggested Retail



QSK-5 Pin Diode T/R Switch

QSK-5  
**\$349**  
Suggested Retail



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124WB 144 To 148-MHz., 4-Element Beam .....	49.00
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PC what to do. The book offers these things. Although not a textbook, it's a goldmine of ideas for electronics and computer engineers, students, and hobbyists. It tells how to use the parallel printer port for 8-bit data input, convert DTMF tone inputs to binary values, convert analog inputs to digital form, and output analog voltages from the printer port—all of this without requiring any modifications to the PC itself.

The 268-page softcover includes an MS-DOS disk of programs and is \$29.95. It's available from bookstores, electronics and computer dealers, and HighText Publications, Inc., 125 N. Acacia Ave., Suite 110, Solana Beach, CA 92075 (1-800-247-6553).

**Books for LowFERS.** Although the radio world long has pointed to ever-higher frequencies, there's a great deal of activity below the 160 meter amateur band. For example, for many years there have been hobbyists who focus on the so-called "Part 15 bands" (160 to 190 kHz and 510 to 1705 kHz); they're known as LowFERS (for Low Frequency Experimental Radio Station) and MedFERS (for those who experiment on the medium-frequency bands). These terms were coined by Ken Cornell, W2IMB, who operates a Part 15 longwave beacon station "KEN" on 187.5 kHz.

Ken offers the *Low and Medium Frequency Scrapbook*, a 100+ page compendium of information on these bands. His scrapbook provides basic low-frequency information and equipment designs for reception and transmission. The book has useful information for would-be beacon operators and experimenters, an introduction to the 1750 meter band, and several resource lists.

The 20th anniversary 8th edition is priced at \$17.50 postpaid book rate, or \$18.75 via first-class mail. For a copy contact Ken Cornell, 225 Baltimore Ave., Point Pleasant Beach, NJ 08742 (908-899-1664).

**Two Listener Titles from Universal Radio.**

While we're on low-band (MF and LF) radio, let me suggest *The World Below 500 KiloHertz*, by L. Peter Carron, Jr. The 64-page booklet is a good introduction to the longwaves. It also describes such pursuits as solar flare monitoring, earthquake precursors, underground and underwater radio transmissions, military communications, and more. It's \$5.95 postpaid.

A second listener-oriented text from Universal Radio is the 52-page *Discover DXing!—An Introduction to AM, FM and TV DXing*, by John Zondlo. The book is mostly about mediumwave DX listening, but it also covers equipment and techniques for VHF/UHF TV and FM band DXing. It's also \$5.95 postpaid. Both are from Universal Radio, Inc., 6830 Americana Pkwy., Reynoldsburg, OH 43068-4113 (1-800-431-3939).

**Solar Flare and Earthquake Monitoring.**

The use of unusually low frequencies (ELF, VLF, and LF) for monitoring solar flares and their effects on radio propagation is an interesting field, and it's one that's wide open for experimentation by amateurs and others. By monitoring such low frequencies, it's possible to observe important solar-related phenomena such as SIDs (Sudden Ionospheric Disturbances), SESs (Sudden Enhancement of Signals), and SEAs (Sudden Enhancement of Atmospherics).

An even more interesting and possibly more speculative field involves monitoring ELF, VLF, and LF to investigate electromagnetic radiation that may be precursors of imminent earthquakes. Professionals and casual experiment-

ers alike are investigating intriguing earthquake precursor activities involving longwave radio.

A monthly newsletter, *Geo-Monitor*, covers earthquake activities worldwide and contains many descriptions of electronic equipment for earthquake precursors. The newsletter covers amateur and scientific earthquake prediction, amateur geophysical monitoring, cave exploring, pre-earthquake animal behavior, and even "borderland" myths and theories about earthquakes. *Geo-Monitor* is published by Vincent T. Migliore at 65 Washington St., Suite 400, Santa Clara, CA 95050 (408-749-6770). A subscription costs \$22 per year domestic and \$30 overseas airmail.

Finally, a branch of the National Speleological Society publishes *Speleonics* several times a year; it's useful to cave explorers interested in LF. Information is available from Frank Reid, W9MKV, Box 5283, Bloomington, IN 47407.

**Short Bursts**

**The Longwave Club of America.** Since 1974 longwave listeners (LWLs) have had a forum in the Longwave Club of America (LWCA). The LWCA was formed to promote LW DXing, experimenting on frequencies below 530 kHz, 1750 meter band activity, and other diverse LW listening pursuits.

The organization has about 500 members and publishes *The LOWDOWN*, a LW-oriented newsletter. It's a monthly that contains up-to-date loggings, beacon station information, LowFER and MedFER activities, and equipment designs. There are several active special-interest columns and features that appear in *The LOWDOWN*. These include beacons, LW loggings, the 1750 meter band, earthquake precursors, and unusual atmospheric noises and effects such as "whistlers."

Membership in the LWCA and a one-year subscription to *The LOWDOWN* is \$18 in the U.S., \$19 in Canada, and \$26 overseas. Membership information is available from publisher Bill Oliver at The Longwave Club of America, 45 Wildflower Rd., Levittown, PA 19057 (215-945-0543).

Incidentally, a good way to update your knowledge of beacon stations is with Ken Stryker's *Aero/Marine Beacon Guide*, available through the LWCA. His timely guide mainly deals with radiobeacons, but it does list the government's Groundwave Emergency Network (GWEN) and other beacon-like stations.

Also, if you're intrigued by the strange phenomenon known as "whistlers" and other unusual atmospheric noises and effects that extend down in frequency well into the audio frequency range, *The LOWDOWN* features a monthly column of so-called "natural radio" news. The columnist, Michael Mideke, offers a Whistler Hunter's Guide for \$6; a companion audiotape, *Introduction to Natural Radio*, is \$10. It's available from Michael Mideke, P.O. Box 123, San Simeon, CA 93452.

**Wrap-Up**

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

*Overheard:* Unfortunately, computer program complexity usually grows until it exceeds the capabilities of the programmer who must maintain it!

73, Karl, W8FX

Attention Timewave  
DSP9+ and DSP59+  
Owners!

## New DSP-9+ & DSP59+ Upgrades Available!

Timewave will have upgrade EPROMS available November 1, 1994 for the DSP-59+ and the DSP-9+. In keeping with the Timewave policy of providing the best possible products for our customers (and because it's impossible to keep our engineers from constantly coming up with great new ideas), we are upgrading two products which are less than one year old. We've added new features, revised other features, moved control modes to the front panel, and tweaked some filters. Many of these features are a result of our engineers and sales staff listening to our customers, while others are a result of our continuing research and development program.

For a detailed description of the new features, call, write or FAX Timewave after October 25, 1994. Don't worry, the cost of this upgrade is not high - only \$10.00 will cover the cost of a new program EPROM delivered post-paid in the United States. FREE upgrade EPROMS will be available for DSP59+ or DSP9+ purchased after September 1, 1994. Upgrade EPROM kits, as well as DSP-9+ and DSP-59+ units with the new EPROM installed will be shipped from Timewave on Nov. 1, 1994.



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# Noise Killers+

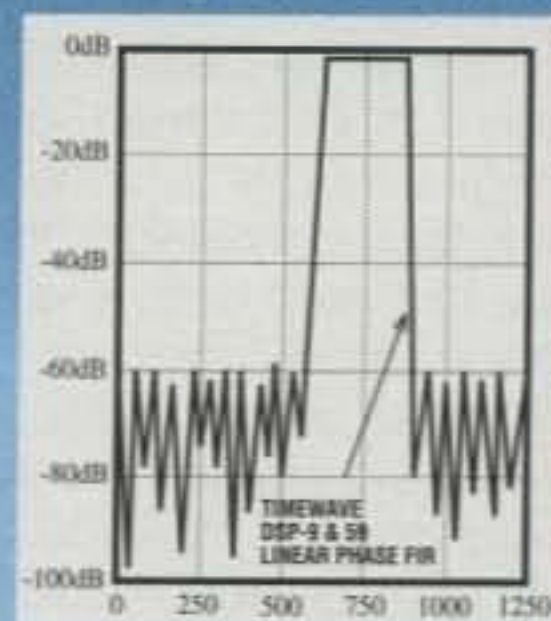
## Advanced DSP Noise Filters For Voice, CW, and Data Modes

The TW DSP-9+ and DSP-59+ improve reception by simultaneously reducing random noise up to 20dB and heterodynes up to 50dB. TW DSP filters feature third generation 16 bit processing, providing razor sharp audio for SSB, CW and Data modes. Both have AGC for wider dynamic range and signal boosting/peaking, relay bypass and self test modes. A station requirement for weak signal, noisy band operation during the *LOW SUN SPOT CYCLE!*



### NEW! DSP-59+ Multi-Mode Filter

Now hundreds of CW and Bandpass filters allow the operator to select almost any filter combination. The easy turning filter knobs allow continuous coverage. Includes all data filters in the DSP-9+ plus G-TOR®, SSTV, EME and WEFAX. Voice filters cover 200Hz to 3.4kHz. 13 CW center frequencies, CW bandwidths from 25Hz to 600Hz and a CW marker to spot the center of narrow filters.



DSP-59+ &  
DSP-9+ give  
steep-skiirt  
filtering!

### NEW! DSP-9+ Multi-Mode Filter

Push button selectable bandpass and automatic notch filters. SSB filters 1.6, 2.0, 2.4kHz, CW 100, 200 and 500 Hz. Programmable CW center frequencies 400/500/600/800Hz. HF data filters, HF Packet, PACTOR, G-TOR®, AMTOR, AM and RTTY with programmable center frequencies for North America and Europe.

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# PACKET USER'S NOTEBOOK

CONNECTING YOU AND PACKET RADIO IN THE REAL WORLD

BY BUCK ROGERS, K4ABT

## Travels, Toys, and TNCs

Last month I was in Taiwan dodging the likes of Typhoon Fred. At this month's writing I've departed Manchester, England, and I'm now enroute to Stockholm, Sweden with a few hours of layover in Oslo, Norway. I try to give Al Dorhoffer, K2EEK, a phone call from each country I visit, so he can add another country to his Worked Buck Via Telephone (WBVT) list. This time he blew it, as he was out to early dinner. Dick Ross, K2MGA, got the points and credit for Sweden and Iceland contacts instead. By the way, Dick, thanks. Just as you said, the correct pronunciation of Reykjavik, Iceland came in handy, as they are sensitive about that name. Except for a couple of photos that I'll be talking about in a later column, that covers my recent travels for this month.

We have a lot to cover this month, so let's get going.

### But First A Word From Santa

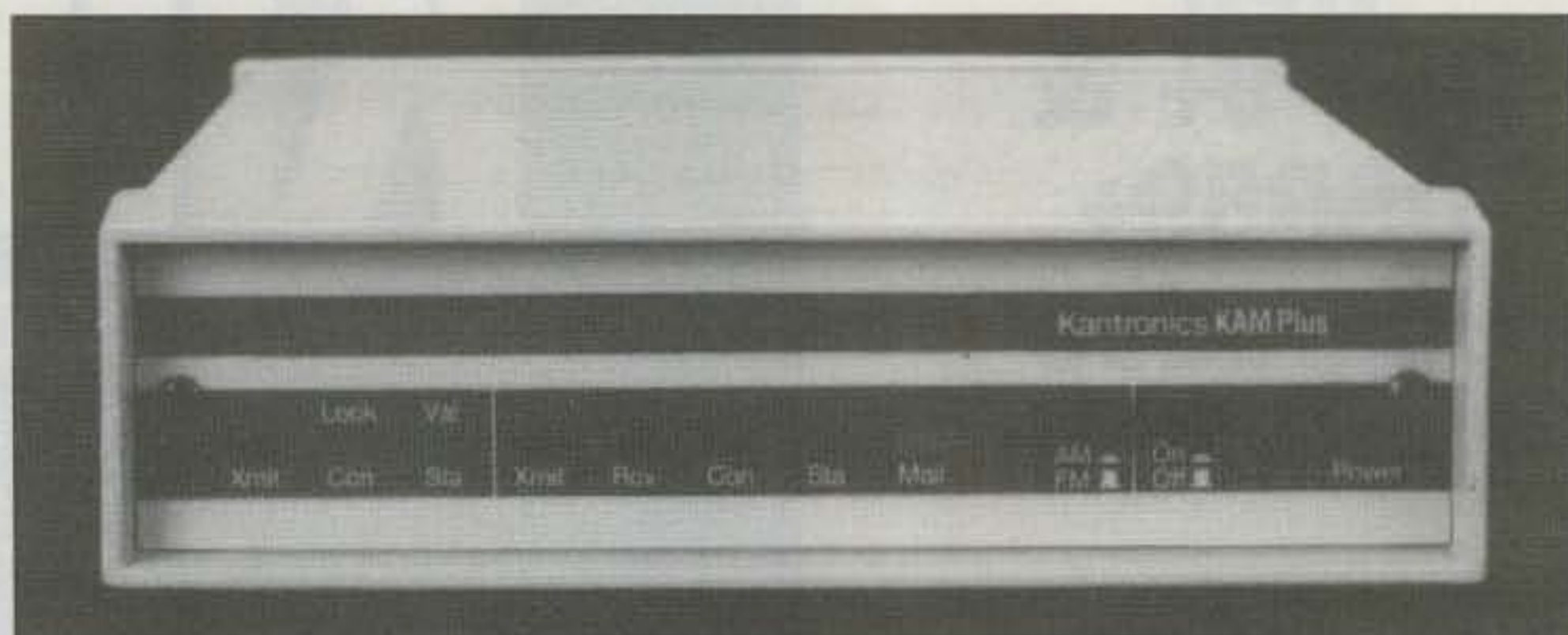
With the gift selections that are going to pour into stockings this year, I'll wager that at least half of you are looking towards the tree with TNC fever. Or maybe you have in mind a second transceiver that can be dedicated exclusively to packet operations. Well, if you want to drop a hint to the old red-nosed chap, consider for a moment some of the new trends that are offered to the packet user.

For the VHF packet operator it will be a leap into 9600 baud with both feet. And the HFer might consider the HAL CLOVER patch. Within the CLOVER card from HAL there is more than just CLOVER. Other digital modes to fill the needs of the HF operator are available, too.

At the VHF and UHF end of the spectrum there is more hardware than we have space here to describe. Most of the TNC manufacturers are well into production of their latest release for 9600 baud.

Aside from the 9600 baud TNCs, there is a new breed of 9600 baud radios. The most recent release of transceivers is part of a well thought out program to launch the new 9600 baud operator into the next level of packet communications.

Think about it... 9600 baud. That's four times the speed we've come to know and dislike. Once you try 9600 baud, you'll feel



Kantronics KAM Plus multi-mode TNC.



MFJ-1278 multi-mode data controller.

as if you've acquired a taste for lobster rather than catfish.

The transceiver manufacturers have improved the IF bandpass such that 9600 baud is as easy to run as 1200 baud was when we had the IC-28, the TA-221, and so on. At the same time these new transceivers have direct FSK audio links into the frequency-modulated stage of our transceivers.

The good that we have seen coming out of all this is that the TNC manufacturers have risen to the cause and provided us with adequate audio drive, along with a variable level control. This enables us to set the transmit audio level without tear-

ing into the transceiver and changing the deviation of the voice level just to satisfy the use of packet.

### Setting Priorities

Making the choice of a TNC is easy. In a recent article I discussed one of the new tried and proven combination 1200 and 9600 baud TNCs. I have several 9600 baud TNCs that I use for access to various 9600 baud networks or 9600 baud BBS ports. The AEA PK-96 is performing well, along with the PacComm 9600 baud modems. I have a pair of MFJ 1270-CQ Turbo Plus units running at 9600 baud to



The AEA PK-900 multi-mode unit.

211 Luenburg Drive, Evington, VA 24550

# THE CHOICE IS SIMPLE

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**2K CLASSIC X** console. 2000 W PEP output, 80 to 15 meters, 1.8 to 30 MHz.

**2KD classic** desk top. 2000 W PEP, 80 to 15 meters, 3.5 to 30 MHz.

**3K CLASSIC Mk II** console. 2000 W PEP, 80 to 15 meters, 3.5 to 30 MHz.

**3K PREMIER** console. 2000 W PEP, 160 to 15 meters, 1.8 to 30 MHz.

**3KD PREMIER** desk top. 2000 W PEP, 160 to 15 meters, 1.8 to 30 MHz.

**2002-A** desk top. 1200 W SSB, 400 W continuous operation, 144 to 148 MHz. (100 to 300 MHz

available on commercial models).

**2002-A** desk top. 1200 W SSB, 400W continuous operation, 220 to 225 MHz.

**2006-A** desk top. 1200 W SSB, 400 W continuous operation, 50 to 54 MHz. (30 to 100 MHz available on commercial models).

**3002-A** console. 2000 W SSB, 1000 W continuous operation, 144 to 148 MHz.

**3004-A** console. 2000 W SSB, 1000 W continuous operation, 430 to 450 MHz.

**3006-A** console. 2000 W SSB, 1000 W continuous operation, 50 to 54 MHz. (30 to 100 MHz available



## 3K Classic Mk II

We think this is the world's finest Amateur linear amplifier. It contains all of the famous Henry amplifier features plus the magnificent 3CX1200A7 tube, heavy duty power supply components and advanced antenna switch relay for semi break-in on CW... the amplifier of every Amateur's dreams. The 3K Classic/X with 10 meter capability is available for sale outside the USA where FCC type acceptance is not required.

on commercial models).

**2004-A** desk top. 1200 W SSB, 600 continuous operation, 430 to 450 MHz.

Amplifiers for amateur radio is only part of the picture. We also design and manufacture amplifiers for commercial, MARS, military, short wave broadcast, VHF link, domestic, foreign. . . Henry amplifiers go everywhere for diverse services. HF point-to-point, SSB, AM, FM, RTTY, packet, meteor burst, digital, marine shore station. If you need a special purpose vacuum tube amplifier for a specific frequency from 2 MHz to 500 MHz at power levels up to 10,000 watts, we invite your inquiry.

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Commercial users, remember the superb new 8K ULTRA is now in full production and drawing unbridled praise from users.

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The PacComm HandiPacket.

access the SEDAN 9600 baud backbone. On the 9600 baud backbone I have several DRSI DPK-9600 running TheNET X-1J2 node firmware.

The MFJ, PacComm, and DRSI 9600 baud TNCs are easily modified to run the X-1J2 code. I'm told that the PK-96 will soon be compatible with X-1J2 firmware.

Alinco, ICOM, Kenwood, and Yaesu now have available 9600 baud ready radios. These transceivers can operate voice for repeater use or for packet ra-

dios, 1200 through 9600 baud.

I'm told there is another new kid on the block soon to be announced that may make for easy access to 9600 baud. This time it is a "data only" transceiver. The power is said to be between 5 and 10 watts, and it is crystal controlled to provide for an even faster TXDelay. The first of this family will be manufactured for VHF operation, with another one to follow later that will operate at UHF. Best of all is the price. I'm told that the VHF version will sell for under \$100 dollars. We'll see.

### One Great Stocking Stuffer

With the grace of a skunk entering a concert hall during a performance, I've decided to tread on soft soil and suggest the ultimate stocking stuffer for the hamshack. What could be a better holiday gift for the new, or for that matter the veteran, packeteer than a new computer? A "pentium" 90, no less. Add to this package a super-fast hard disk, a CD ROM, and a dot 28 pitch (or better) Super VGA color monitor. Install a new version (3.11 or higher) of Microsoft Windows, and then

get that favorite packet terminal program that runs within the Windows environment and you will have one happy camper in your household this Christmas.

### For The New Computer User

There are loads of books that can jumpstart the new computer user to a level that can make him or her look like a pro. QUE books has one book called "EASY" Windows and another called "EASY" Word.

When it comes to books for packet radio, look at the list of packet books in CQ's Book Shop. One of CQ's books that I love to suggest is *The Packet Radio Operator's Manual*, or *PROM*.

### Summary

Well, I've run out of time for this month. I'm late, as they've just announced the boarding of my flight to Oslo, Norway—again.

I hope you all have very Happy Holidays, and see you in the New Year!

de BucK4ABT @ KQ4OK.VA.USA.NA

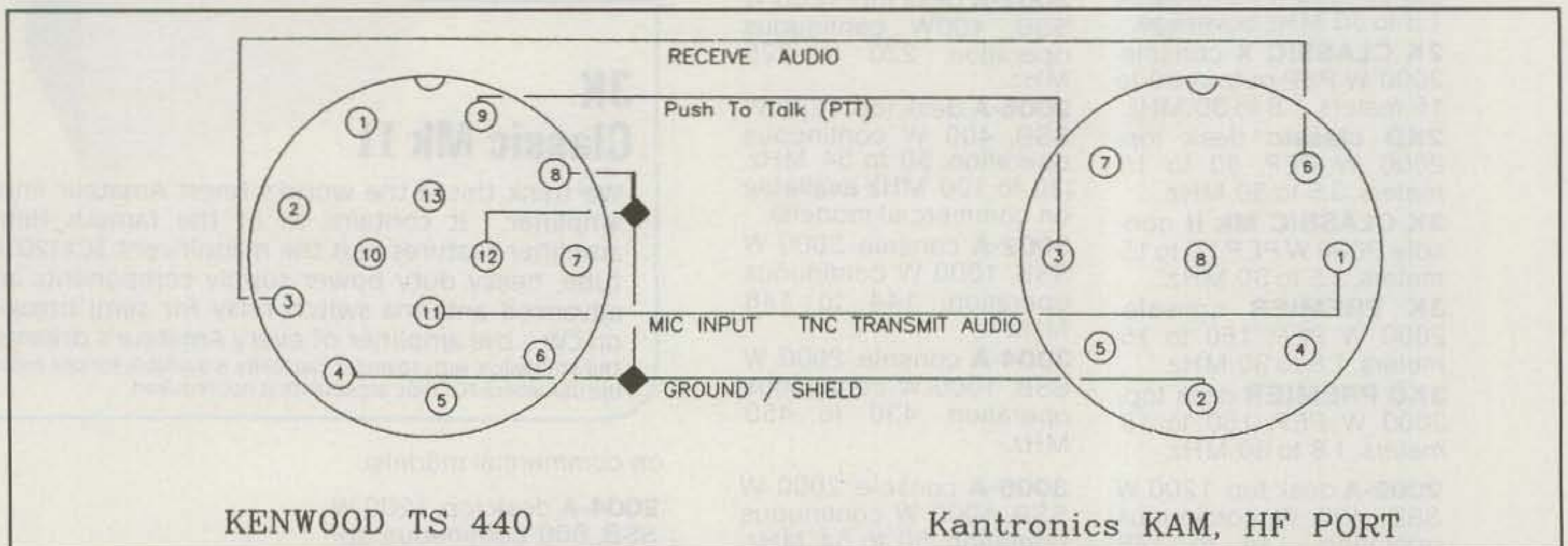


Fig. 1— For the notebook: Kenwood TS-440 to the Kantronics KAM, HF port.

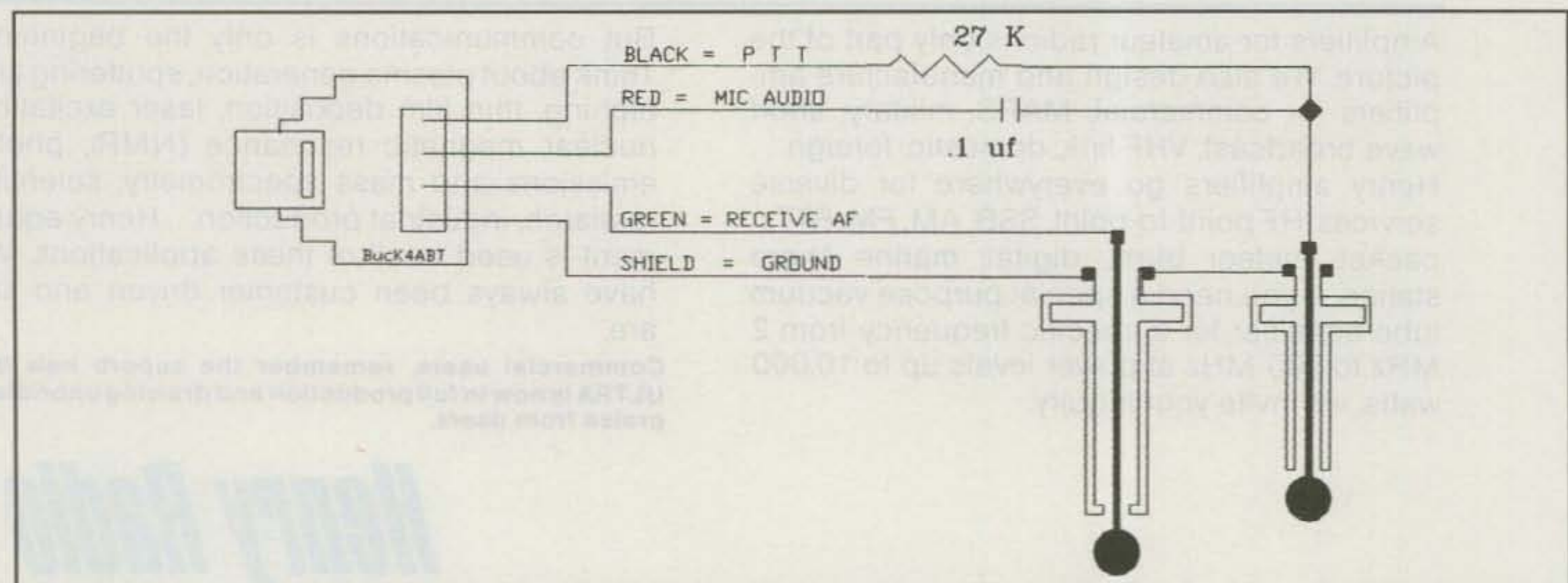


Fig. 2— For the notebook: Heath HK-21 "Pocket Packet" to the ICOM IC-02AT or IC-2AT hand-held transceiver.



# THE PATCOMM PC-1610

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ALL THIS  
FOR ONLY  
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The PC-1610 has begun to revolutionize CW & RTTY/ASCII operation on the HF bands. The "Plug-in & Operate" concept is making digital operation a snap, with only a standard IBM\* type AT keyboard required for RTTY/ASCII operation. Received data is displayed on the built in LCD display or an external RS-232 serial device such as a "Dumb Terminal." The PC-1610 offers the following features:

- Built-in AT keyboard interface (keyboard optional)
- 160-10M ham band coverage
- USB/LSB/CW/FSK modes
- 75W output power
- Built in digital power/SWR meter
- DDS VFO with 1Hz step size
- Selectable variable speed/fixed 10Hz step VFO tuning
- Built-in 24hr clock
- 90 tunable memories
- 1 scratchpad memory
- 9 (256 character) keyboard data buffers
- Built-in 5-75 wpm IAMBIC keyer
- Built-in 2.4KHz, 1.8KHz, 500Hz, 200 Hz & RTTY filters
- Notch filter
- Select 1 of 3 antennas from front panel

Specifications are subject to change without notice.  
\* IBM AT is a registered trademark of the IBM Corporation.

<ul style="list-style-type: none"> <li>■ Basic display lets you know exactly where you are.</li> </ul>	<ul style="list-style-type: none"> <li>■ Standard Display shows RX/TX VFO freq's, time and current memory</li> </ul>
<pre>14.03510-T 0930 14.03510-R 1000</pre>	
<ul style="list-style-type: none"> <li>■ Send &amp; Receive in: CW / RTTY(BAUDOT) / ASCII</li> </ul>	
<pre>TNX FER Q50, 73</pre>	<p>← Incoming data</p> <p>← Outgoing data appears here</p>
<ul style="list-style-type: none"> <li>■ Store up to nine 256 character messages.</li> </ul>	<ul style="list-style-type: none"> <li>■ Messages can be: edited, sent &amp; appended to outgoing message</li> </ul>
<pre>14.03510-T 0930 3&gt; CANNED MSG █</pre>	<p>← Format &amp; Edit stored MSG's here</p>
<p><b>PC-1610 =</b> <span style="border: 1px solid black; padding: 2px;">HF XCVR</span> + <span style="border: 1px solid black; padding: 2px;">PC</span></p> <p style="text-align: center;">+</p> <p style="text-align: center;"><span style="border: 1px solid black; padding: 2px;">DATA CNTRLR</span></p> <p style="text-align: center;">+</p> <p style="text-align: center;"><span style="border: 1px solid black; padding: 2px;">O</span></p>	
<ul style="list-style-type: none"> <li>■ The PC-1610 Performs the functions of an HF Transceiver, Computer, Data Controller and Control Software all in one package.</li> </ul>	

*The PC-1610 has too many features to adequately describe in one ad... call or write for a detailed brochure—Major Credit Cards Accepted.*

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## A LOOK AT THE WORLD AROUND US

### A Holiday Special: Goodies Galore!

**C**ondimento Saludos, Heureux Conge, Shiawase na Kyuujitsu. Whatever language you say it in, the message rings clear: Season's Greetings and Happy Holidays to all! Yes, friends, that festive time of the year returns, and we are once again diverting our views from special interests to spotlight everyone's favorite subject: new amateur radio goodies! Forget those shoes, jackets, stereos, cars, and other stuff you can get anytime. We are focusing on the ultimate gifts and self-rewards that make life great! Kick back, relax, let your imagination soar, then order up two or three featured items that capture your fancy. There is no better way to really liven up the holidays!

This year's holiday column includes something for everyone (naturally!), but our main focus or theme is showing newer licensees some easy and inexpensive ways to expand their horizons. As I have pointed out in past columns, our amateur radio world has more areas of interest and enjoyment than a diamond has facets. You need only check an area new to you to start the fun and excitement of your first days in amateur radio over again. Everything is waiting at your fingertips, so go for it!

Now let's preview some neat items guaranteed to make your holidays (and 1995!) extra special. Remember to order goodies from dealers or manufacturers, not from me. I am simply your guide on this window-shopping tour, and the tour does not end here. It continues throughout the ad pages of *CQ*. Order early to avoid sold-out disappointments and holiday shipping delays. Now enjoy!

#### Super Starters

I have noticed many new licensees start out with a super fancy (complex!) dual-band handheld transceiver for use at home or in the car, but soon shift to an easier-to-understand 2 meter rig for mobiling. The handheld is then ignored much of the time, and this is justified by "It's too large to carry in my pocket, so I left it in the car." How might you modify that arrangement, be the envy of the local crowd, and save a few coins at the same time? Think unique. As an example, check out the world's smallest 2 meter handheld, Standard's new C108A shown in photo 1.

4941 Scenic View Drive, Birmingham, AL 35210



Photo 1— The world's smallest 2 meter handheld transceiver, Standard's C108A, is a heart-throb any amateur would love. Unit is easy to operate, has extended receive without modification, and hides in the palm of your hand. It is shown with optional charger, vinyl case, and quick-draw belt pouch.

This li'l pup measures a mere 3"H x 2"W x 1"D, operates 144 to 148 MHz, plus receives the aircraft band (119–130 MHz), public services (150–160 MHz), NOAA weather (162 MHz) and gets lost in a shirt pocket! It's a cinch to use and has 20 memories, all PL tones, scans, goes anywhere, and has a reasonable price tag. Output power is approximately 1/4 watt. However, I have found that "QRP level" quite sufficient for talking with friends on neighborhood repeaters. This is one item any amateur would love as a holiday gift! The micro-talkie's optional accessories are also fantastic, and include a palm-size battery charger, two styles of carrying cases, and a tiny speaker-mic with DTMF keypad for autopatching. The C108A is available from dealers nationwide. If you cannot find one or would like to view Standard's new video on the C108A, call them direct at 312-763-0081 for assistance.

Now let's focus on spiffing up your mobile setup. Owners of vans and jeeps always run into entanglements with antenna mounts, so our relentless pursuit for perfection turned up a neat solution: Maldol's "RVM" mount shown in photo 2.

This critter bolts to the vehicle's spare-

tire mounting bracket, extends above the roof line for good signal radiation, and looks like a million dollars (well-mounted amateur antennas just add class to any car!). It should be available through ama-

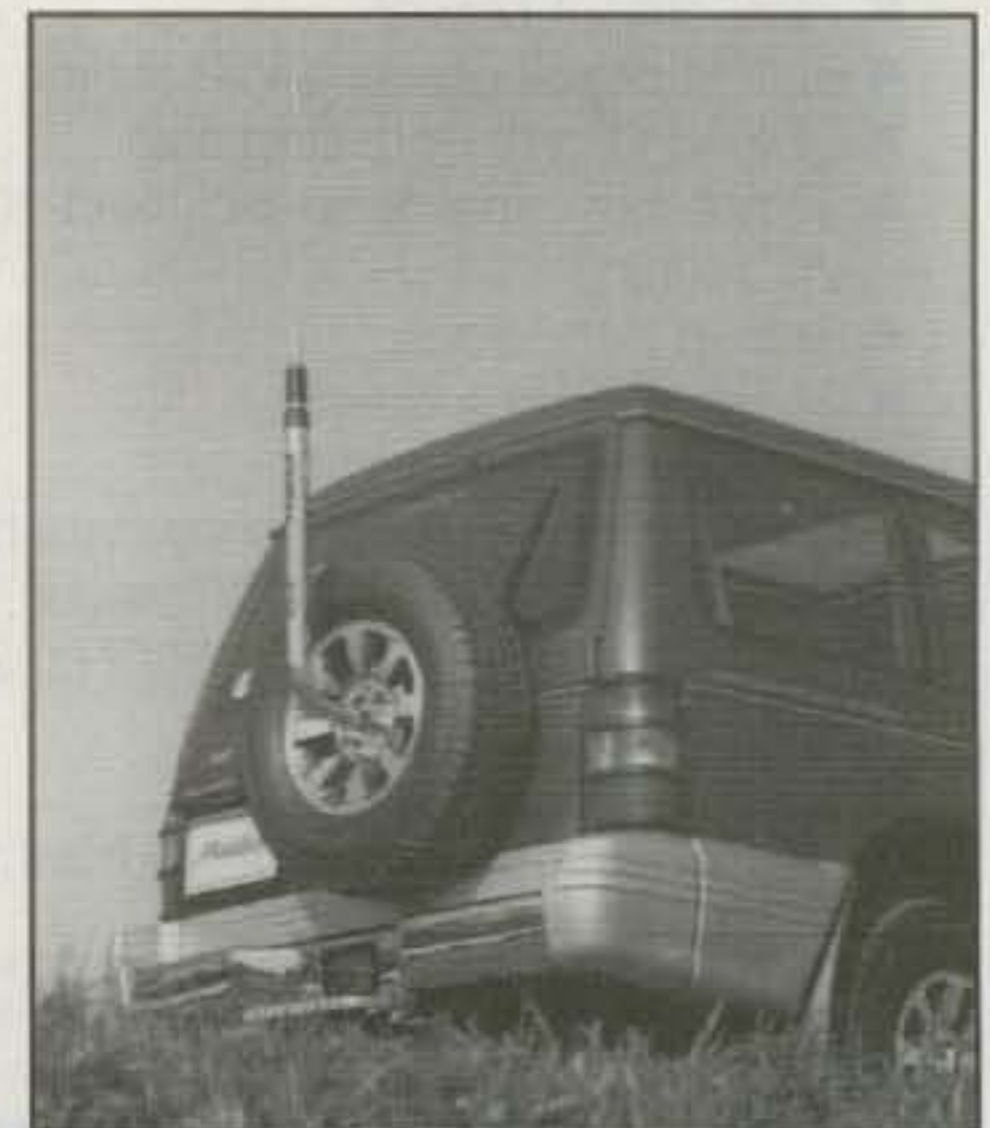


Photo 2— Maldol's new RVM antenna mount is the perfect item for mobileers in jeeps or vans. It bolts to spare tire bracket, holds antenna above roof level, and looks great.

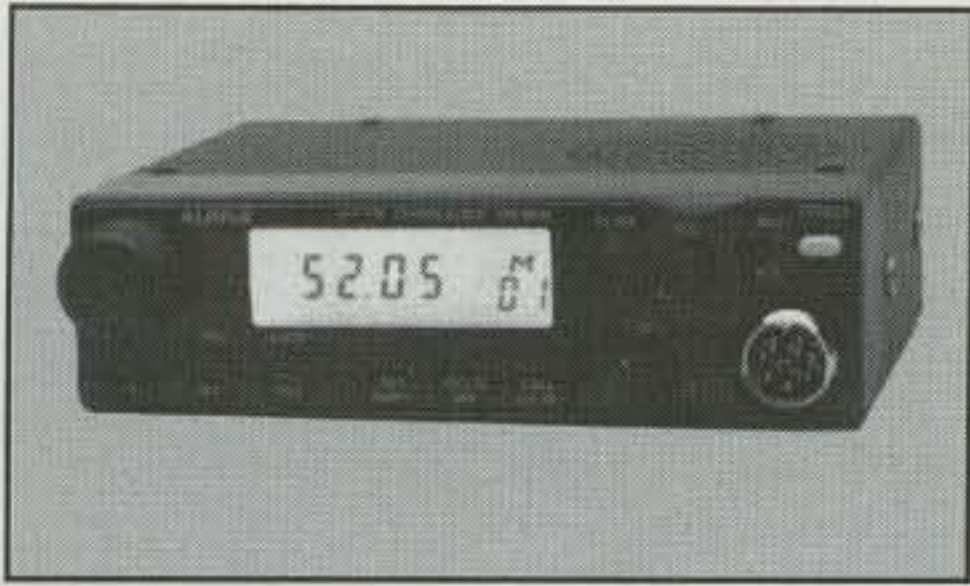


Photo 3— Here is a terrific way to join 6 meter FM action—Alinco's new DR-MO6 transceiver. Rig is exceptionally small and works like a champ.

teur radio dealers. If you have difficulty finding it (or one of Maldol's good-looking antennas to use with it), call "Maldol Jim" at 206-525-1896, or write to Maldol at 4711 N.E. 50th Street, Seattle, WA 98105 for help.

Assuming you are now geared up for 2 meter action and a few dollars ahead to boot, checking out a previously overlooked area (or two!) is a terrific idea. A good starting point I think you will like is 6 meter FM, as it is similar to 2 meters in "direct" and "repeater" activities but less crowded and occasionally "open" for nationwide DX. You might talk through a local repeater one day (or hour) and chat with folks on the other side of the country

via a repeater two or three states away the next day (or hour). Power requirements are low, antennas are small, and occasional DX openings keep things interesting. This "low VHF" band (52 to 54 MHz for FM) is open to all licensees (except Novices), and it can be a blast.

A great way to get rolling on 6 meters is by using a new model FM transceiver such as Alinco's DR-MO6 shown in photo 3. This rig is the same size as, and looks identical to, Alinco's popular DR-130T 2 meter FM transceiver. The only difference is its display shows 50 MHz rather than 144 MHz. The DR-MO6 covers 50 to 54 MHz and has selectable tuning steps, 100 memories, 50 PL tones, scans, beeps, runs 10 watts output, and (best of all) it is economically priced. The DR-MO6 is available from amateur radio dealers nationwide.

As a finishing touch, you need a good antenna for your 6 meter setup. Maldol again comes to the rescue with their compact 50HS-2HB two-element beam shown in photo 4. This antenna measures 9.5 feet wide by 2.5 feet long, has 6 dB gain to quadruple your rig's signal strength, and can be turned by a small TV antenna rotor (or by hand, if its support mast is near your window). If you prefer a mobile antenna for 6 meters, incidentally, Maldol again has you covered with their ARS-50. Look for Maldol's products

at amateur radio dealers.

Now step back and compliment yourself on getting started in special interests, plus selecting gear everyone will envy.

## Going and Growing

Our views of holiday delights continue with a relatively new HF transceiver that is a gem for mobiling, vacationing, getting your feet wet in "low band" fun, or even serious home operating. That transceiver is Ten-Tec's Scout shown in photo 5. This budget-conscious radio is barely larger than a dual-band FM rig, but its operation on "low bands" such as 20, 17, 15, or 10 meters extends your mobile (or home) horizons from statewide to worldwide. If you are really creative, visualize making a "combo carrying case" to hold the Scout, a 10 amp battery, and support a mobile whip. The results would be a complete handheld HF station for patio, beach, or even "walking portable" use. That would really be an attention grabber!

Ten-Tec's Scout works both SSB and CW with 50 watts output, great CW QSK (break-in operation), built-in keyer, SWR metering, adjustable bandwidth filters, and top-mounted speaker. It runs off 12 volts at 10 amps, which means you can even quick-connect it to your car's cigarette lighter socket, and comes with one plug-in band module of your choice. Ad-

# Maldol Antennas For Today's Amateur

## PERFORMANCE PLUS! THE ARD SERIES 2m/70 cm ANTENNAS

Meet the hottest new line of dualband mobile antennas on the road today. Maldol's ARD Series. They are world-famous for style and performance and extend the range of any mobile rig new or old. ARDs are pretuned, broadbanded, weatherproof, available in chrome or black finish, and truly make the going first class!

Model	Height	Signal Gain (dbs)	Power(max)
ARD5B	19.3"	2m:/70cm:3.8	120w
ARD6/6B	26.5"	2m:2.6/70cm:4.9	100w
ARD10/10B	34.4"	2m:3.0/70cm:5.5	120w
ARD11/11B	41.5"	2m:3.7/70cm:6.1	120w
ARD12/12B	48.2"	2m:4.3/70cm:6.8	150w
ARD16/16B	64.8"	2m:5.0/70cm:7.7	150w

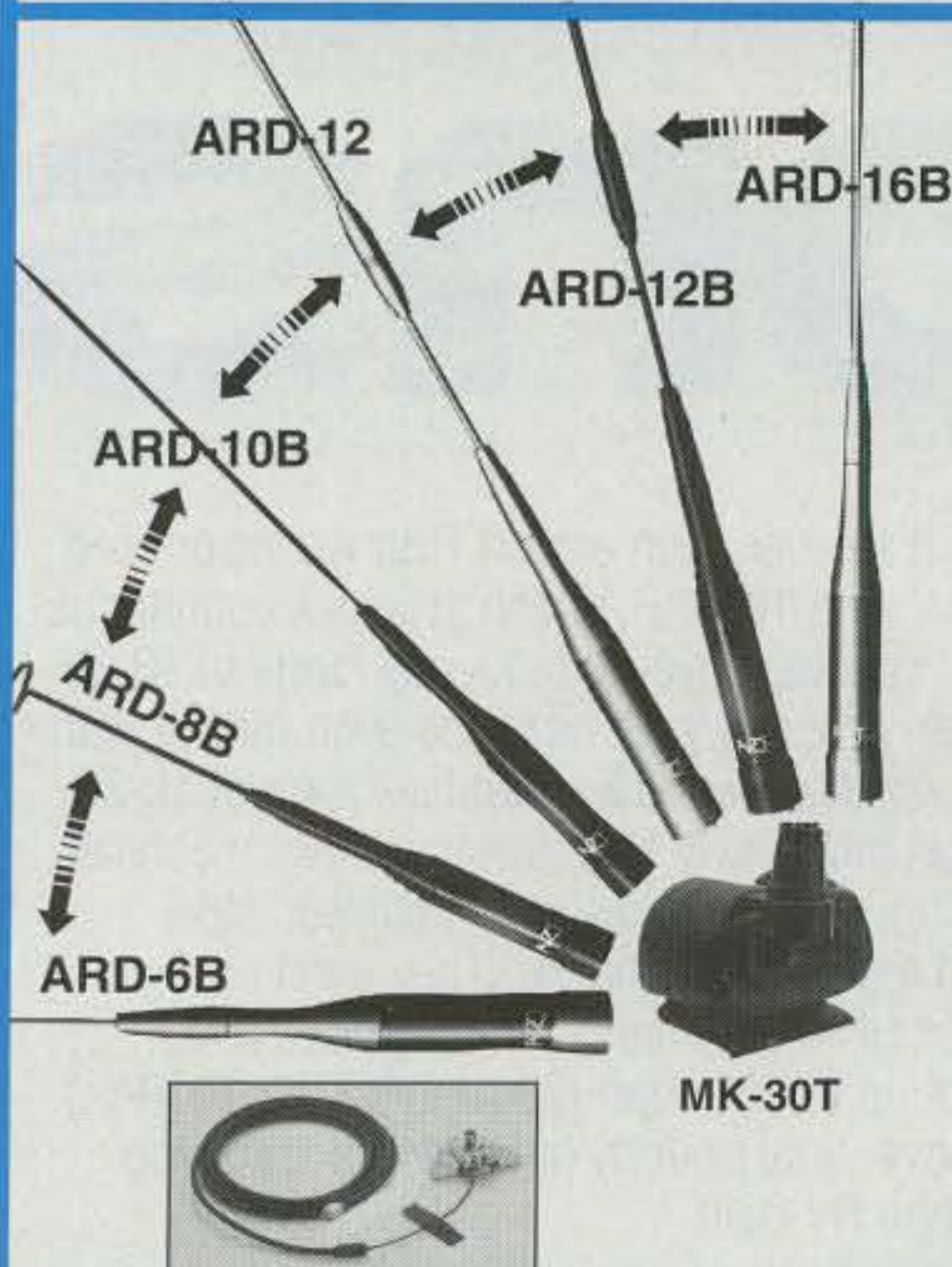
Selection Guide: Taller models give max range, shorter models are good choices for use in cities and parking decks. Models with /B are black finish.

### MK-30 MOTORIZED TILT-OVER MOUNT

The mobileer's dream! Ideal mate for ARDs, but also works great with other antennas up to 56" tall. Neat motorized unit quick-installs on trunk lid. Remote up/down switch fits under dash. Permits one-touch tilting for low overhangs. **NOTHING ELSE LIKE IT.** MK-30T/Trunk lid, R/Roof gutter, H/Hatchback, K/Auto Rack. Also available AM-01B manual tilt-over mount.

### RG-4M AND NL SERIES MATING CABLE SETS

For quick, easy and professional installation of full antenna system. Preinstalled antenna socket and screw-apart PL-259 for routing through crevices. The finishing touch! Economical RG-4M or NL5MM with thin end for routing around narrow trunk edges.



## Maldol USA Sales Office

4711 N.E. 50th Street, Seattle, WA 98105

AnswerFax: 206-525-1896 Fax: 206-524-7826 E-Mail: MALDOLUS@connected.com Prodigy: VJSH80A

South America Controles Radiocomunicaciones S.R.L.

Loyola 412 (1414) Buenos Aires, Argentina Tel 54(1)775-4837 Fax: 54(1)833-2100

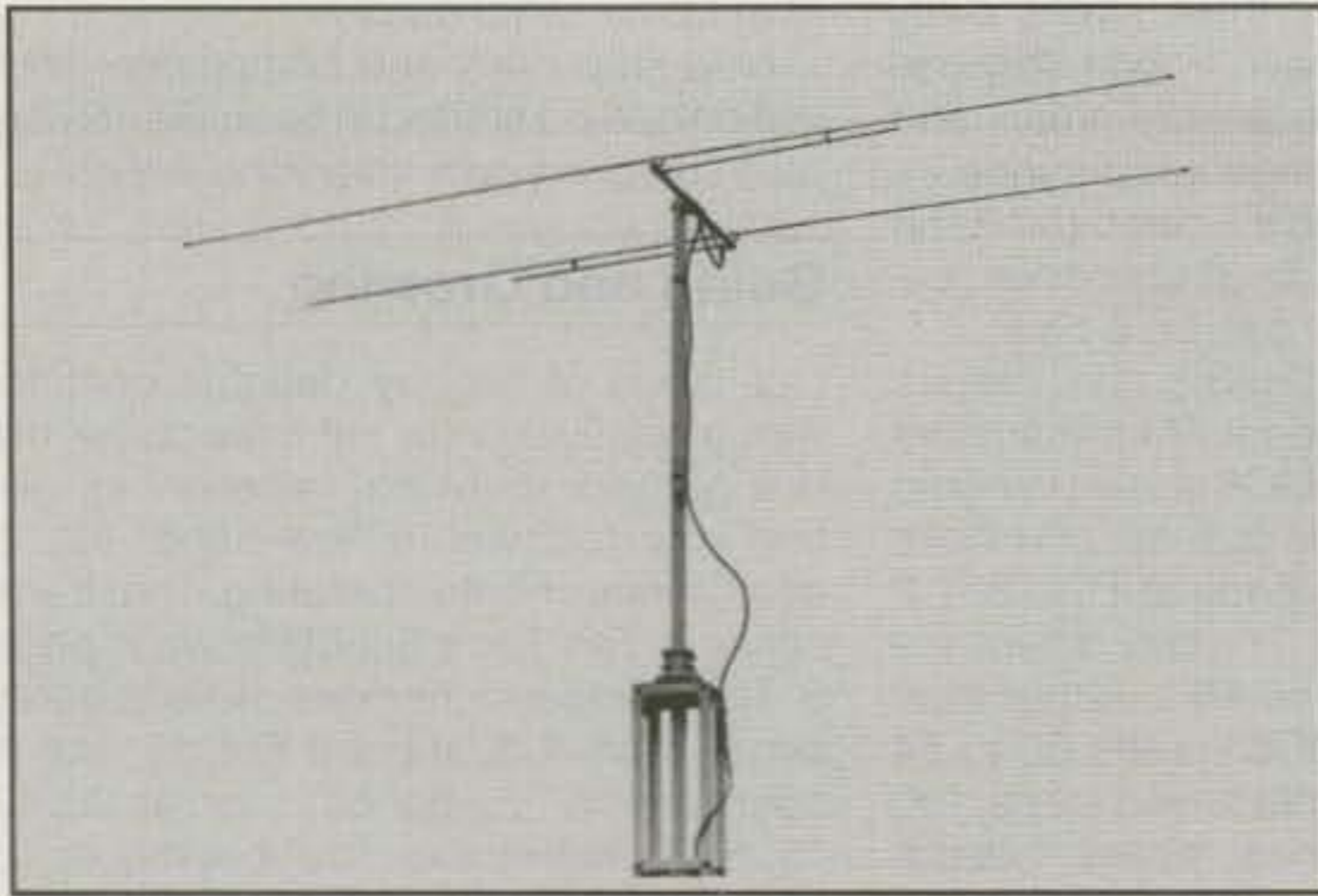


Photo 4— Reaching out and making DX contacts on 6 meters is a ball with Maldol's new 50HS-2HB beam. It mounts on any lightweight TV mast and even goes portable.



Photo 5— Gearing up for low-band fun need not be expensive: Ten-Tec's Scout proves that fact every day. The Scout runs 50 watts and has several impressive features. It is a real "fun rig!"

ditional band modules (160–10 meters) are available from Ten-Tec. Scouts are sold directly by Ten-Tec, 1185 Dolly Parton Parkway, Sevierville, TN 37862 (telephone 1-800-833-7373). Get cracking, as the low bands are where the real action is!

Say you are a Tech licensee and cannot work the hot DX bands such as 20 or 17 meters, and you never got into Morse code above 5 wpm? Don't fret. You probably have not been exposed to the fun side of code. Remember Morse and Q

codes are an international language—a common tongue among all nations. Talking with your fingers is also a skill of which you can be proud, especially when you learn to handle a key or paddle like a musician handles a guitar or piano. What is involved in learning or increasing your code speed? Glad you asked.

MFJ Enterprises recently introduced their Model 411 Personal Morse Code Tutor (photo 6), and I have been excited about this item since first seeing it at the

Huntsville (Aug. '94) Hamfest. It is pocket-size, fully self-contained, and "plays" Morse code in all kinds of examiner-type formats on its built-in speaker. Code speed is selectable from almost zilch (learning letters) to super pro (too fast for hand printing). The MFJ-411 is an item you can use for years and then pass on to a (new amateur) friend. It is sold by dealers nationwide, or you can order it directly from MFJ Enterprises (telephone 1-800-647-1800).

# Broaden Your Horizons

**NEW!**

1010AA HF Log  
Periodic Antenna

**hy-gain.**  
by Telex

It's never been easier! First we introduced the 1009AA, which provides continuous coverage over a frequency range of 13-30 MHz. Now you can broaden your horizons even further with the new 1010AA, which covers the extended range of 10-30 MHz. Both antennas include Hy-Gain hallmarks like machined parts, tapered tubing, corrosion-resistant stainless steel hardware and field tested performance. They erect easily, rotate with a T<sup>2</sup>X or HDR-300, handle 2 kW power and withstand winds of up to 100 mph (93 mph on the 1010AA). Call now and discover why nobody has manufactured log periodics longer than Hy-Gain.

Telex Communications, Inc. • 8601 East Cornhusker Highway  
Lincoln, NE 68505 USA • Telephone: 402/467-5321 • Fax: 402/467-3279  
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## ASTRON POWER SUPPLIES

• HEAVY DUTY • HIGH QUALITY • RUGGED • RELIABLE •



MODEL VS-50M

### SPECIAL FEATURES

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

### PERFORMANCE SPECIFICATIONS

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

### SL SERIES



### • LOW PROFILE POWER SUPPLY

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

### RS-L SERIES



### • POWER SUPPLIES WITH BUILT IN CIGARETTE LIGHTER RECEPTACLE

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

### RM SERIES



MODEL RM-35M

### • 19" RACK MOUNT POWER SUPPLIES

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

### RS-A SERIES



MODEL RS-7A

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

### RS-M SERIES



MODEL RS-35M

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

### VS-M AND VRM-M SERIES



MODEL VS-35M

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

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

### RS-S SERIES



MODEL RS-12S

### • Built in speaker

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

**AZDEN**

# THE 6 METER FM LEADER

**THE MAGIC BAND - SIX METERS.** The best of both HF and VHF. Enjoy great DX during band openings and full repeater operation at other times.

**BUILT TO MIL-STD-810 2 YEAR WARRANTY**

SPECIFICATIONS	PCS-7500H	AZ-61
Frequencies: RX	46-54 MHz	46-54 MHz
TX	50-54 MHz	50-54 MHz
Power:	50/5 Watts	5/0.5 Watts
Sensitivity:	< 0.19 $\mu$ V for 12 dB SINAD	< 0.16 $\mu$ V for 12 dB SINAD
Memories:	20	40
Tones:	38	38
Keypad:	Backlit DTMF	Prog. and DTMF
DC Power:	+13.8 vDC @ 9 amps (typ)	+12 vDC @ 1.5 amps (typ) operates over +6 to +16 vDC
Size:	2"Hx5.5"Wx7.25"D	6.85"Hx2.6"Wx1.3"D

**TO PLACE ORDERS  
CALL 1-800-643-7655**



**PCS-7500H MOBILE**



**AZ-61 HANDHELD**



**AZDEN**  
COMMUNICATIONS DIVISION

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(516)328-7501 FAX (516) 328-7506

CIRCLE 18 ON READER SERVICE CARD

Maybe you already know Morse code, but would feel more comfortable with a "crutch" or assistant when copying stations off the air (just in case someone sends too fast). No problem. MFJ's new 462 Morse/RTTY/AMTOR reader shown in photo 7 will "back you up" and help build confidence. It plugs into your rig's earphone socket (push the plug in only half way so you can listen while reading) and displays incoming Morse on its 32-character, two-line readout. The MFJ-462 is also handy when you are working CW and must step out of the room for a couple of minutes. Just leave it running while you are gone (it can store over 5 minutes of copy in its RAM), then quickly read the other station's message and continue the QSO when you return. Oh, yes: the MFJ-462 can also direct connect to a printer (like that old 9-pin job left from upgrading your computer) for hard copy. The '462 is also sold by dealers or MFJ Enterprises.

As a parting shot in our CW crusade, the spotlight now turns to the miniature jewelry-like iambic paddle shown in photo 8. This beauty is handmade, fitted with precision adjustments, polished to a brilliant luster, and individually engraved with an owner's call letters. It has a brass mechanism, glazed black steel base, and magnetic bottom plate/cushion for quick-snapping onto a rig's case. This collector's item is made to order by Gordon

Crowhurst, G4ZPY, and his new bride, Brenda. Their address is 41 Mill Dam Lane, Burscough, Ormskirk, Lancs, England L40 7TG. Order early, as Gordon usually gets backlogged during the holidays.

## Bringing It All Together

Our next item is a new to the market goodie that promises to be a super hit among all mobileers—Gamber-Johnson's multi-

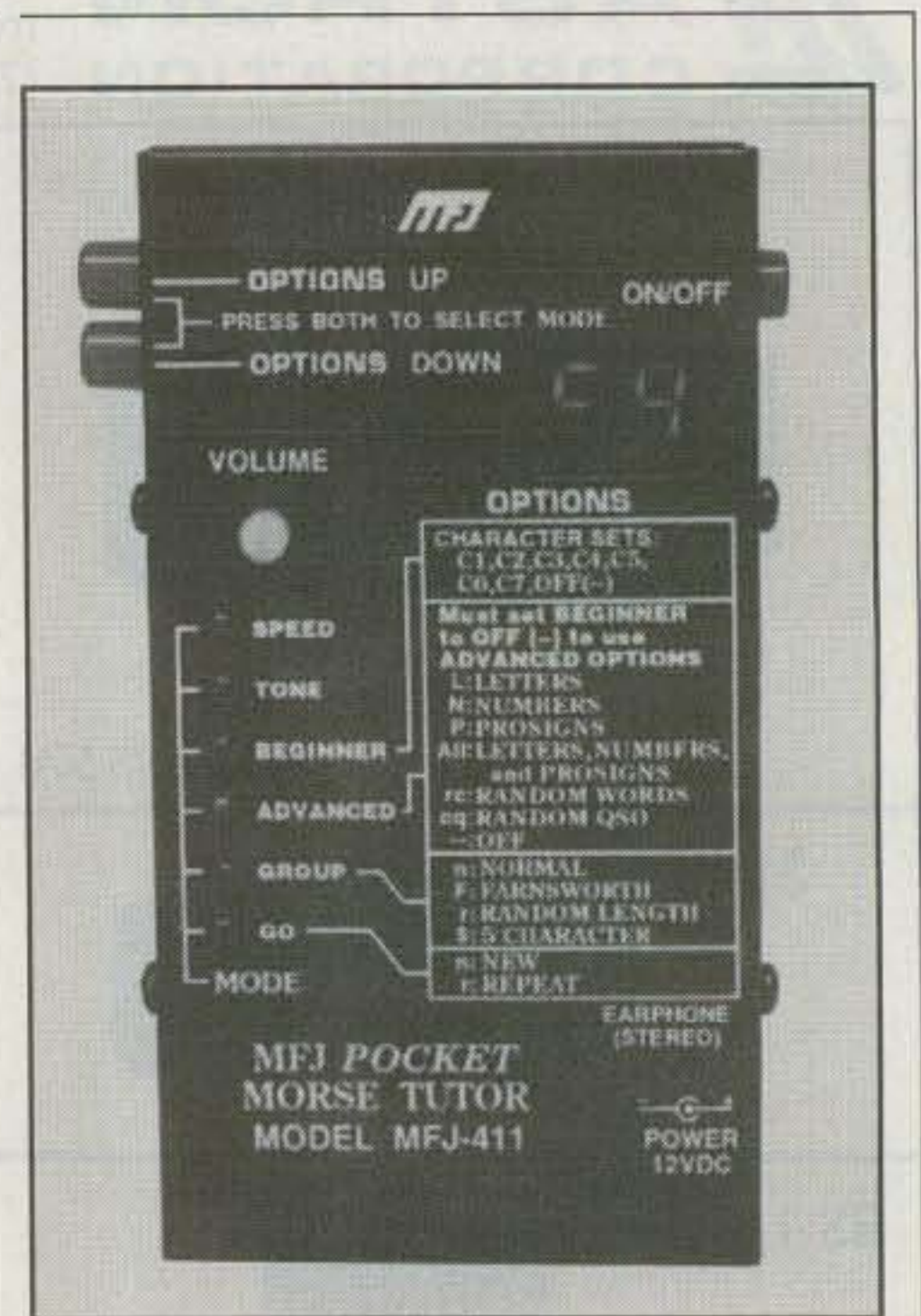


Photo 6— Learning Morse code or increasing your copy speed is both easy and fun with the right tools, such as MFJ's new Model 411 Personal Morse Code Tutor. It is fully self-contained for use anywhere and anytime.

rig "Stackmaster" mounting system (photo 9). The mount is available in two or four rig versions, with or without a multi-angle tilt feature, and floor brackets to fit almost any vehicle. If you shy away from drilling holes, floor brackets that secure to seat bolts are also available. Stackmasters are designed to hold transceivers of different sizes, so you could load one up with a 2 meter rig, 6 meter rig, HF rig and maybe a scanner, angle everything like an airplane cockpit, and roll out in high style. Stackmasters (and several other unique style mounts) are available from Gamber-Johnson, 801 Francis St., Stevens Point,



Photo 7— Need a "back-up assistant" for copying code (or RTTY!) off the air? Connect this new MFJ-462 to your transceiver's earphone socket and it prints incoming text right on its built-in screen. A discarded printer can even be plugged directly into it for a hard-copy readout!

# INTRODUCING THE 9600 BAUD PACKET LEADER

This all new 9600 Baud Azden Digital Radio is plug and play ready, from the front panel. High speed pin diode TX/RX switching and direct crystal modulation deliver ultra-fast TXDelay times. Wide RF input range and wideband IF offer full capability down to 430 MHz.

**BUILT TO MIL-STD-810 2 YEAR WARRANTY**

## GENERAL SPECIFICATIONS

Frequency Range	(TX & RX) 430-450 Mhz
Display	Backlit amber LCD
Memories	20 in two banks
PL Encode	38 built-in tones
Power	+13.8 V @ 9 Amps
Temperature	-10 to +60 degrees C
TX/RX Switching	Solid State
Dimensions	2"Hx5.5"Wx7.25"D 500mm H, 140mm W, 182mm D

## RECEIVER

Receiving system	Double conversion Superheterodyne
Intermediate frequency	1st-45 Mhz, 2nd-455 KHz (20KHz BW)
Sensitivity	<0.19 $\mu$ V for 12 dB SINAD
Adjacent channel selectivity (30 KHz channel separation)	>70dB
Intermodulation	>60dB

## TRANSMITTER

Output Power	35/10 watts (Hi/Lo)
Modulation System	Voice-Variable reactance FM Data-Crystal direct FM
Deviation	$\pm$ 5 KHz
Spurious radiation	>60dB



**THE PCS-96000**

**TO PLACE ORDERS  
CALL 1-800-643-7655**



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COMMUNICATIONS DIVISION

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CIRCLE 19 ON READER SERVICE CARD

tos of "super stations" and expeditions. The videos are terrific "show and tell" guidance into DXing, satellites, packet, contesting, VHF, or just explaining the world of amateur radio to friends. All of these items are reasonably priced and can be ordered right now by calling 1-800-853-9797. Ring them up!

It appears we have filled available space for this time. Here's wishing you the

best of everything during the holidays and throughout the new year. Hopefully, we will have a chance to meet on-the-air during the holidays. I still have some Wild Woody WARC keys and a few other goodies to pass out, so let's chat! I frequent 14.180-14.225 MHz 2245-2330 GMT Sundays and 10.1 to 10.110 MHz 0230-0300 weeknights.

73, Dave, K4TWJ



Photo 10- A neat collection of radio T-shirts, amateur radio photo calendars, and "how to" videos from CQ round out the holiday season. Items are low-priced and available toll-free 1-800-853-9797.

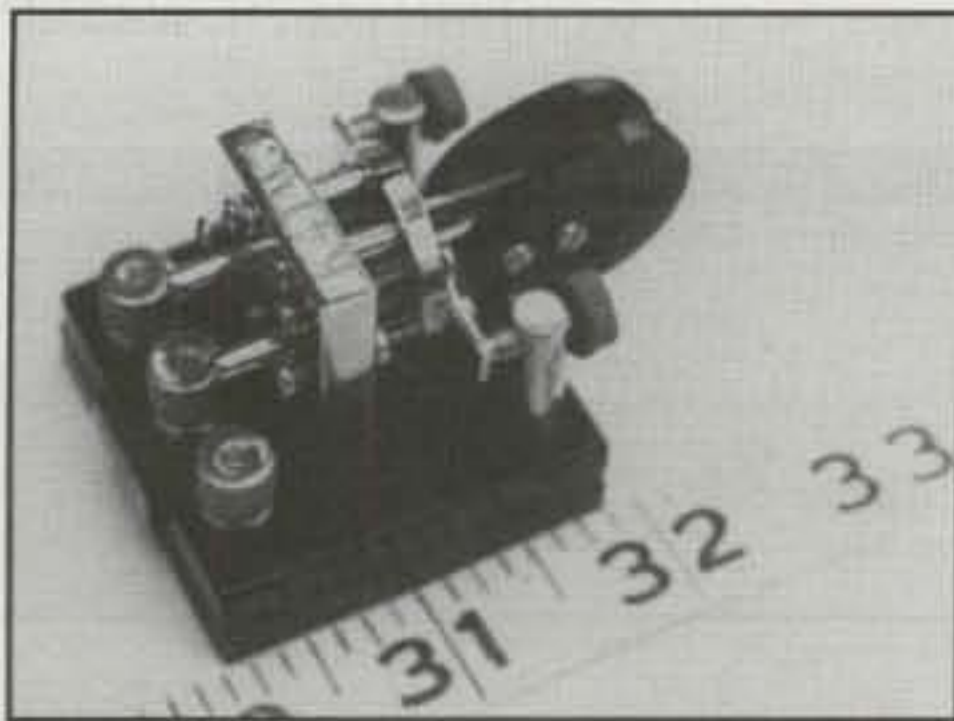


Photo 8- Almost jewelry, small enough to slip in a pocket, and a delight to use describe G4ZPY's famous 3-in-1 miniature paddle. It is a wonderful item every amateur will love!

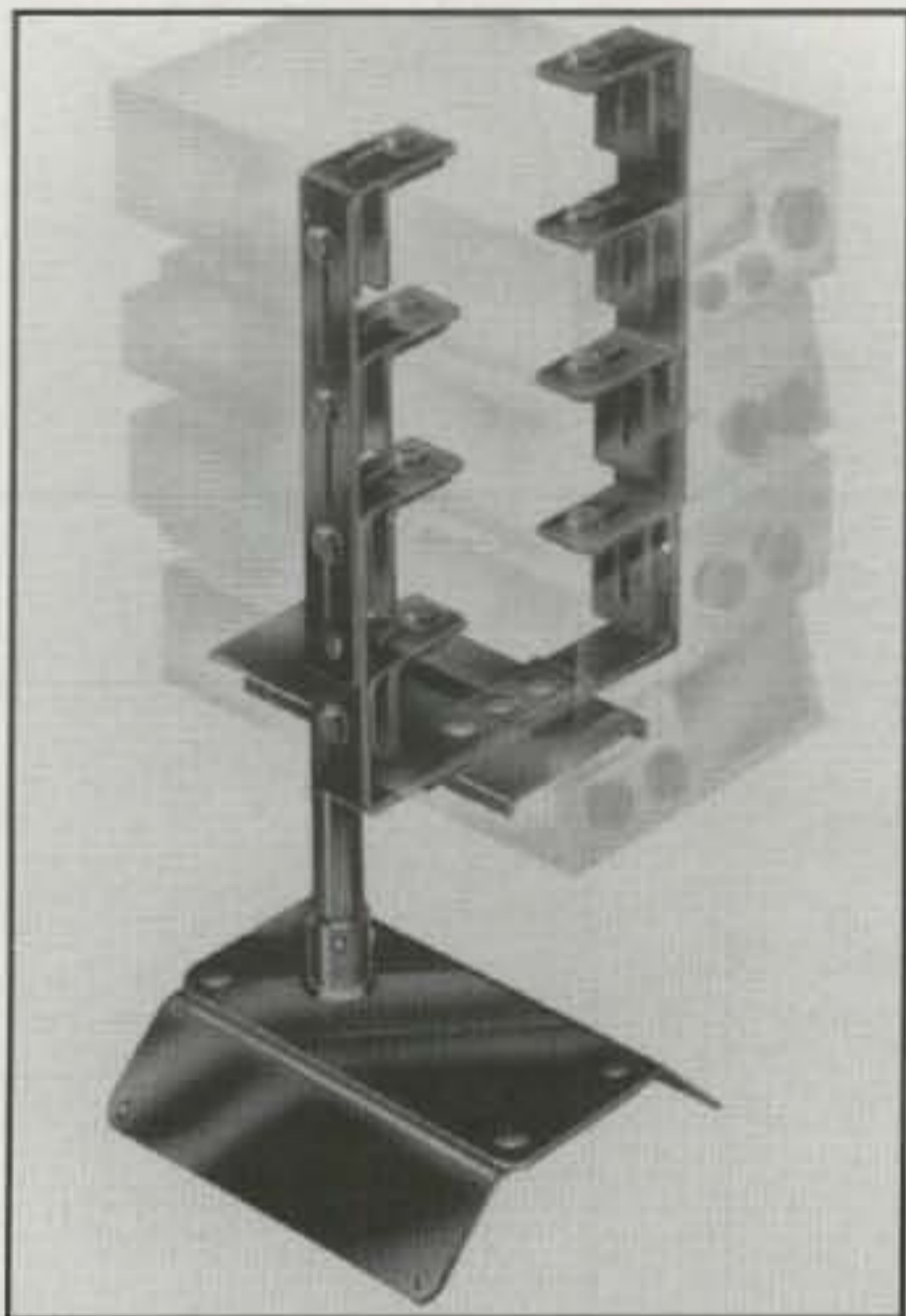


Photo 9- Making its amateur radio debut this month is Gamber-Johnson's famous "Stackmaster" mobile multi-rig mount. Item is available in two or four transceiver versions for floor or seat bolt mounting as discussed in text.

WI 54481 (telephone 1-800-GJ MOUNT). While talking with them, also ask about their (single rig) Super Slide mount that includes automatic power, speaker, key, and antenna connections. It's nice!

## Special Treats

We wrap up this year's views with a pot-pourri of delights everyone will like: CQ's new radio T-shirts, amateur radio calendars, and VHS videos shown in photo 10. You can mix-and-match these items any way you want. Just order soon in case supplies run out. The T-shirts are available with numerous designs, including the famous CQ logo, classic Vibroplex and Viking logo, and more. There are two styles of calendars: one with pictures of old-time rigs and keys, and one with pho-

## WHAT'S NEW AND HOW TO USE IT

### Manipulating Relays

I would first like to thank the many readers who caught my error in the August 1994 "Math's Notes." The series diode indeed will not block the back EMF due to the fact that the inductance of the relay coil will force the diode to remain forward biased and conducting. It was this sort of thinking that got us into trouble in the first place.

As long as we are on the subject of relays, I thought it would be a good idea to pass on a couple of "tricks" we've learned over the years to increase the versatility of relays.

We all know that when we apply a voltage to the coil of a relay, the relay eventually closes after a delay of 5 to 10 milliseconds (due to the current build-up in the coil). In some cases this delay is desirable, such as when you want a circuit to "warm up" before applying high B+ voltages. Normally, in such an application you would add a 555 timer (or something similar) and all of its associated circuitry. There is a simpler way, however, and only a couple of parts are really necessary.

Fig. 1 is a method that can be used to delay the pull-in time of a relay by as much as a second or more, depending on the components chosen. As you can see, a relay with a coil voltage that is half the available supply is connected in series with a resistor that would normally drop the supply to the correct value for the relay. A capacitor is then added across the relay coil so that when power is first applied, the capacitor must charge. Then when the voltage across the capacitor reaches the correct level, the relay closes. The resistor and capacitor form a simple RC delay network. Calculating values is a bit difficult, as different relays will pull in at different voltages, and not necessarily the rated coil voltage. The desired delay is achieved by "cut and try," but for simplicity (two components) you cannot beat it.

Fig. 2 is the opposite. Here a relay pull-in time is shortened. As in the first example, the relay coil is at half the supply level and the resistor again drops it to the correct value. The capacitor, however, is now connected across the dropping resistor. When power is applied, the capacitor acts as a momentary short, allowing a pulse of full power to be applied to the

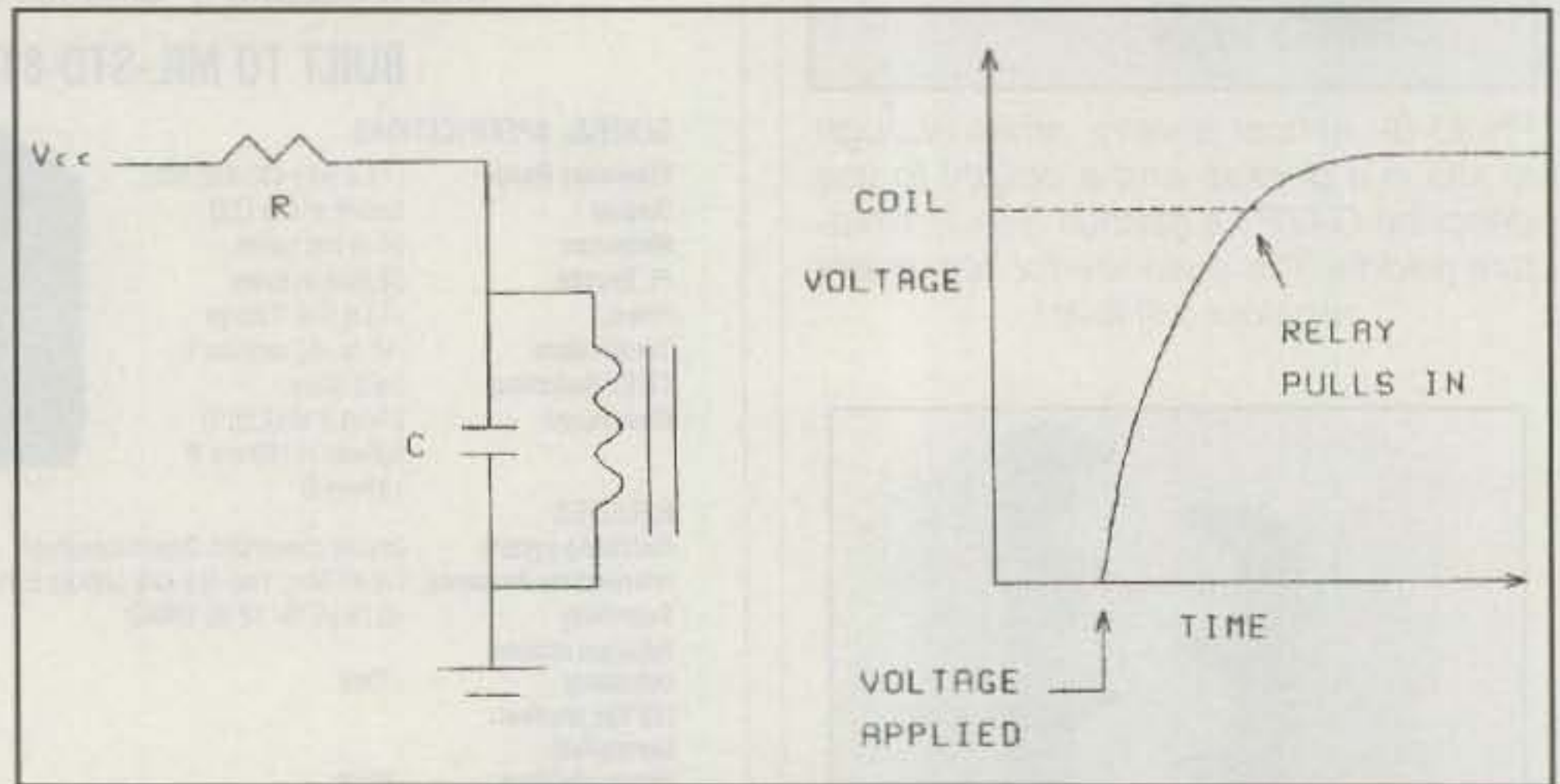


Fig. 1—Delaying the pull-in time of a relay.

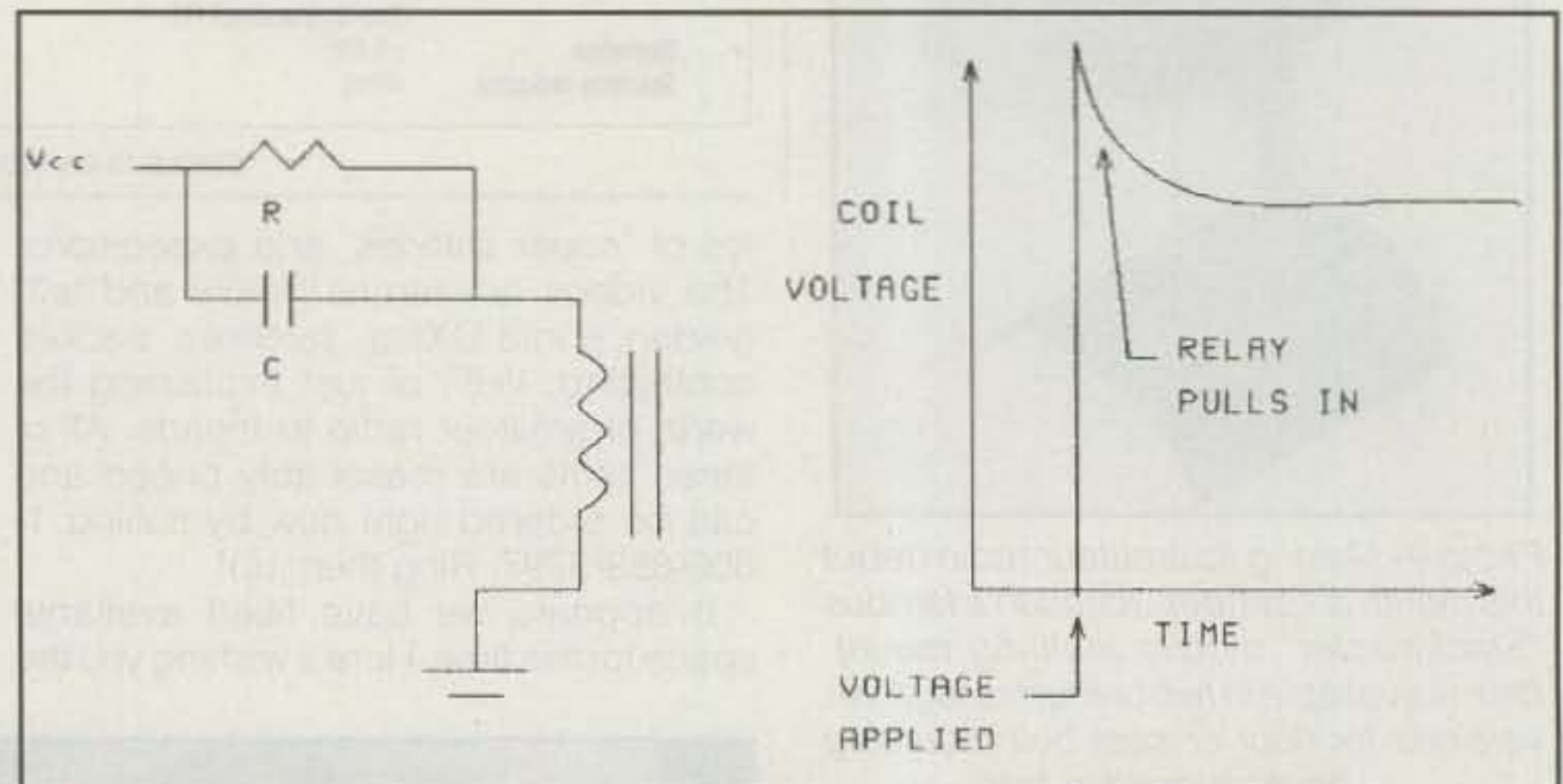


Fig. 2—Making a relay pull in faster.

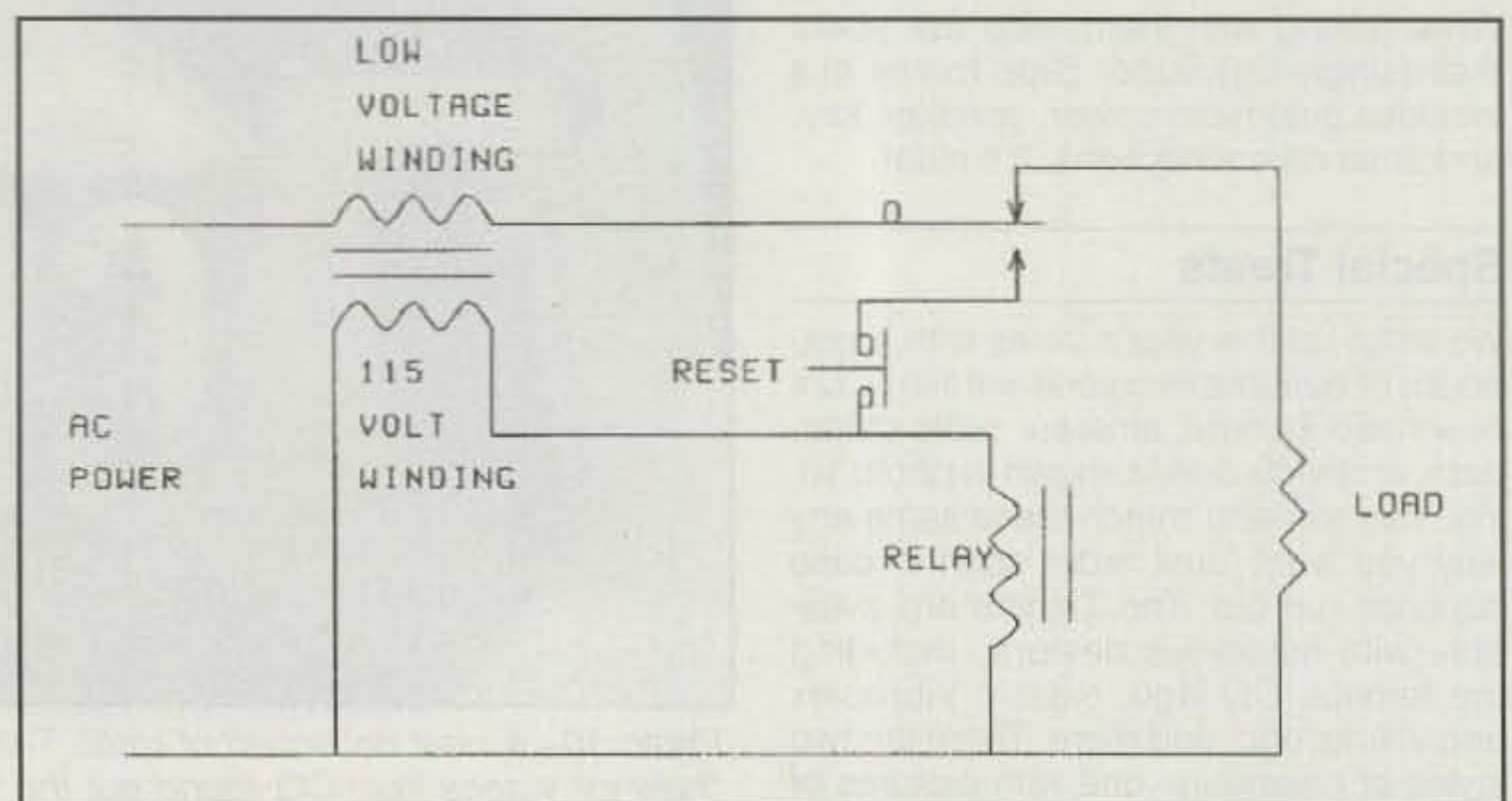


Fig. 3—Using a relay as a circuit breaker.

\* c/o CQ magazine



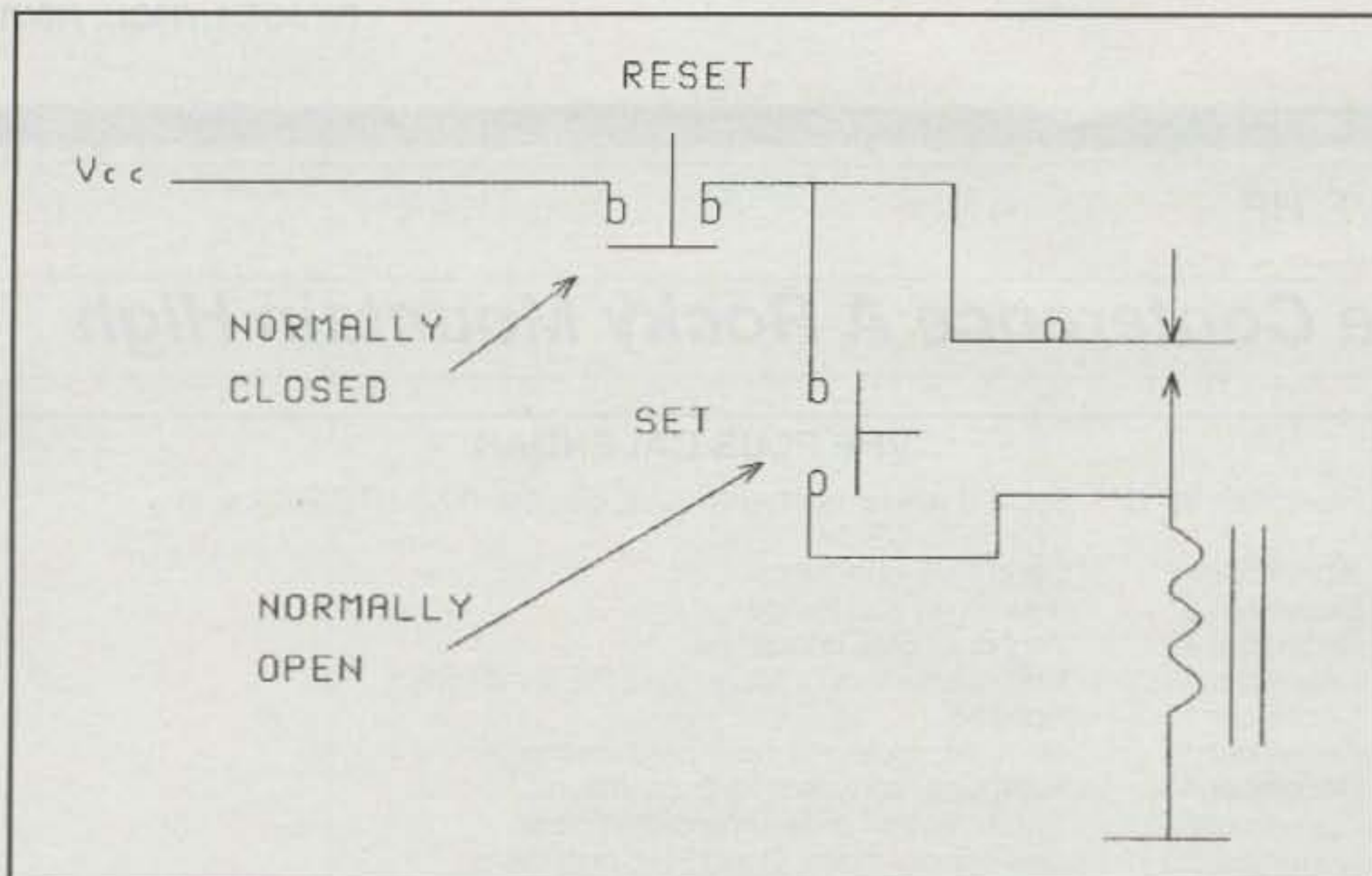


Fig. 4— Simple latching relay circuit.

relay coil. This gives the armature a healthy "push," and the relay pulls in faster than it normally would. After a few milliseconds the capacitor becomes charged and the holding voltage drops to the correct value. Again, this is a "cut and try" method, but it works quite well.

Fig. 3 is a simple way to use a relay as

a resettable circuit breaker for AC loads. A small filament transformer is used in reverse to step up the voltage at its secondary to 115 VAC. The current needed in the secondary to achieve this is roughly a function of the normal current rating of the secondary winding and the minimum pull-in voltage of the AC relay coil.

A common 6.3 volt 1.2 ampere transformer will "trip" the relay at about 1 ampere of secondary current, which corresponds to about 120 watts at the load. Once the relay does trip, it stays latched by means of its own contacts. Pressing the push-button switch interrupts the coil circuit and resets the system. Different transformers will produce different trip points, and by shunting the secondary with low-value resistors, you can vary the operating point a little bit as well. Be careful when working with the AC line, however. The 115 volts can be deadly to the careless.

Our final offering is the circuit shown in fig. 4. This is a simple way to latch a relay with only two components—a "set" and a "reset" push-button. The circuit is simplicity itself and requires no additional components other than the switches and relay.

While all of the above may seem simple-minded, the "tricks" shown can be very useful, especially when the various functions are "suddenly required" after a design is finished.

At this time of the year I would like to wish all of my readers a Happy and Healthy New Year, and I hope that the coming year is the one in which all of your dreams will be fulfilled.

73, Irwin, WA2NDM

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## ALL ABOUT THE WORLD ABOVE HF

### Microwave Update Conference A Rocky Mountain High

**E**xactly 100 of the top US microwave enthusiasts from across the country gathered at Estes Park, Colorado for the annual Microwave Update conference. The fellowship and atmosphere shared by the participants made them feel as though they had been on a retreat with their best friends in the hobby. And for your editor, being in Colorado for the first time in many years provided me with the opportunity to meet many of the VHF and microwave enthusiasts in that state.

Keith Pugh, vice-president of operations for AMSAT-NA, led the seminars with a talk on Phase 3-D (a very important future satellite and a topic to which we will devote more space in a future issue of this column). Keith was followed by Garry Hess, K3SIW, who gave a report on microwave activity in the Chicago area.

Al Ward, WB5LUA, gave a talk on low-noise amplifier design. Following Al was a talk by Tom Williams, WA1MBA, on a wide-band 2-10 GHz dish feed.

After lunch Paul Wade, N1BWT, spoke on secrets of parabolic dish antennas. Paul was followed by Rick Campbell, KK7B. Just before his talk on getting on the air from DC to daylight, a totally surprised Rick was presented with his plaque for being the co-winner of the 1994 Central States VHF Society Chambers award.

Kent Britain, WA5VJB, talked about what is new in surplus. Following Kent, Tom Williams, WA1MBA, spoke on his record-setting 120 GHz QSO with Jim Mead, WB2BYW. Dave Glawson, WA6CGR, spoke on a universal PLL system for microwave use. Wes Atchison, WA5TKU, finished the day with a talk on YIG device applications.

Saturday morning started with Jack Henry, N6XQ, describing microwave activity from California and Mexico and his record-breaking 10 GHz QSO. Incidentally, Jack reported an unofficial score for the ARRL 10 GHz contest in excess of 50k. Jack was followed by a home-brewer's workshop led by Al Ward, WB5LUA, Jim Davey, WA8NLC, and Rick Campbell, KK7B.

Steve Noll, WA6EJO, made a presentation and demonstration on practical and affordable amateur lightwave communications. Mel Graves, WR0I, spoke on estimating sun noise based on WWV measurements.

Barry Malowanchuk, VE4MA, gave a talk on developing a 903/1296 MHz power amp using the Y-730 tube. Barry was followed by a panel discussion on microwave EME contacts. The members of the panel were Al Ward, WB5LUA; Dave Meier, N4MW; Kent Britain, WA5VJB; Barry Malowanchuk, VE4MA; and Jim Vogler, WA7CJO.

A video tape of Down East Microwave produced by Bill Olson, W3HQT, provided a humorous tour of Bill's company. The video also

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#### VHF PLUS CALENDAR

November 26-27	Second weekend of ARRL EME contest, 0000 UTC 26 Nov. to 2400 UTC 27 Nov.
November 27	Good EME conditions.
December 2	New moon and Perigee.
December 4	Very poor EME conditions.
December 11	First quarter moon. Moderate EME conditions.
December 13	Apogee.
December 14	<i>Geminids</i> meteor shower predicted peak.
December 18	Full moon. Very poor EME conditions.
December 22	<i>Ursids</i> meteor shower predicted peak.
December 25	Last quarter moon. Good EME conditions.
December 30	Perigee.
January 1	New moon. Very poor EME conditions.
January 4	<i>Quadrantids</i> meteor shower predicted peak.

included filling a mock rushed order for a 432 MHz transverter for Tom Whitted, WA8WZG, who did not know of the planned spoof.

The conference ended with a slide presentation by your editor of my trip to Cuba for this year's June VHF QSO Party.

This year's conference was made all the more successful by the excellent direction of Bill McCaa, KØRZ. It seemed that Bill was everywhere making sure everyone was satisfied with the conference.

Next year's conference will be in Arlington, Texas at the La Quinta Inn, probably the first

or second weekend of October. Watch this column for an announcement of it.

#### VE3ONT Update

As this column is being prepared word has reached me that VE3ONT will probably not have been able to be on the air for the October EME weekend. At the last minute their operation was preempted by a worldwide supernova observation experiment. They are still planning for the November weekend. As currently planned, the November operation will be on



This row of 10 GHz contest ops was set up in Cabot, Vermont for the first weekend of the ARRL 10 GHz contest. From left to right are Lee, KB1PL; Dale, AF1T; John, K1FWP; Paul, N1BWT; Chip, W1AIM; Beth, N1SAI; Matt, KB1VC; Byron, N1EKV; and Larry, K1LPS. What is not clear from the black-and-white photo is the abundance of yellow T-shirts. Once you operate on 10 GHz with this group in Vermont, you are given a yellow T-shirt, sort of a special memento from a special club at a special place. (Photo courtesy N1RWM)



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144 MHz both days. However, please listen to the EME nets on 14.345MHz for further announcements in the event of schedule adjustments. Because this magazine is in the mail in mid-November, I am including an announcement of the revised schedule here, hoping that this one will make it.

## Western States Weak Signal Society Formation Meeting

The formation meeting of the Western States Weak Signal Society took place over the weekend of 17-18 September at the ranch of Ron Hammel, KC6WLC, near Frazier Mountain. The ranch had convenient parking, rest rooms, charcoal barbecues, a beer keg, meeting room, chairs, podium, swap tables, vendors tables, and plenty of fresh air (no Los Angeles smog!) along with continuous tours of Ron's shack and antenna farm.

The meeting, which was planned by David, KI6FF, and Hank, W6GGV, included good barbecue and several technical talks. Hank put together the technical talks and David coordinated the other details, including programs for the YLs who attended.

At 1:30 PM on Saturday afternoon Cliff, K8BUW, gave the first talk, entitled "RF & the Human Problems." Mike Staal, K6MYC, followed with a talk entitled "Antennas—Where Are We Going." Bob, W6SYA, gave a talk entitled "1296-2304 MHz Transverter System Considerations." According to Jim, WB2ODH, "This talk was well documented by his handouts and presented in Bob's usual way, which encourages group discussions."

Bob was followed by Pat, N6RMJ, who gave a speech on meteor scatter propagation intriguingly titled "Grid Square Grabbers." Apparently, his talk grabbed a lot of attention judging by the lively discussions of different techniques and ideas of how to get better results and how, when, and where to schedule meteor scatter schedules.

Todd Evans, KB6IGC, followed Pat with a talk that showed how to monitor for meteors by listening to distant FM broadcast stations. Todd's talk also featured how to use a tape recorder, a voice clock in conjunction with the FM receiver to determine the peak times for meteor activity. Although a bit controversial, one of Todd's secrets was letting the audience know that one does not have to call the entire 15 second sequence; just listen to the FM receiver for the burst and then transmit. Your editor does not necessarily agree with this technique because there are times when a burst not long enough to show on the FM receiver is, however, long enough to make a meteor schedule QSO complete.

Stu, K6YAZ, who represented Kenwood, followed Todd with a talk entitled "History of SSB." Hank, W6GGV, then followed with a talk titled "VHF/UHF Circuit Design." Following the talks, David, KI6FF, chaired the groups decisions on naming their informal group. The group determined that their organization would be the "Western States Weak Signal Society." The group then appointed David, KI6FF, secretary/treasurer; Hank, W6GGV, technical coordinator; and Ron, KC6WLC, as president.

Following election of officers the new organization developed a mission statement: the function and purpose of the society is to protect all weak-signal portions of the VHF/UHF and microwave amateur radio spectrum. The



Oscar Morales, CO2OJ, operating as CO2OJ-Rover during the 1994 June VHF QSO Party.

organization then appointed a committee to develop a charter and bylaws. Included on the committee were KJ6ZH, N6RMJ, WB2ODH, KA5S, WB6WLR, and NJ6J.

Sunday morning Pat and Todd demonstrated meteor scatter propagation via a pre-arranged schedule with Doug, W2CRS. It was reported that after great patience both a ping and a DX FM broadcast station were heard simultaneously, resulting in a partial QSO. After extending the schedule, a full QSO was finally completed. After breakfast Miles, N7WLS, gave a clinic on N-type connectors.

The organizers of the meeting were very appreciative of the support given by M<sup>2</sup>, Kenwood, and ICOM. Additionally, they were indebted to Ron, KC6WLC, for providing the meeting place and for his great hospitality.

If you are in southern California and wish to participate in regular on-the-air meetings of the Western States Weak Signal Society, look for them on Sunday evenings at 8:00 PM local on 144.240 MHz SSB. Additionally, they can be found on Tuesday evenings at the same time on 432.120 MHz, also on SSB. Finally, on Wednesday nights, also at 8:00 PM, also on 144.240 MHz SSB, they have established a Swap Net. For these nets David Peters, KI5FF, is net control, and Hank Meyer, W6GGV, arranges the technical topics.

Thanks from your editor go to the "West Coast VHFer" newsletter and Jim, WB2ODH, for the write-up on this organization's birth.

## Treybig Barbecue Almost As Big As Ever

Larry Hazelwood, W5NZS, reported that while some of the usual attendees of Jimmy Treybig, W6JKV's annual barbecue were at the Microwave Update conference, there were still around 50 present to enjoy the fixings. Among the DX ops was 6 meter DXer Bo Nilsson, SM7FJE, who was on his way to a convention in the Los Angeles area and Wasya, UAØSN, who was in the Palo Alto area on business.

## CO2OJ/Rover

The following was written by Oscar Morales, CO2OJ, describing from his perspective what it was like to be the first DX Rover station.

"A Rover? Why not! During the planning for the participation of four North American hams in a Cuban contest station for the 1994



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Steve Noll, WA6EJO, talks about how economical it is to get on light at the 1994 Microwave Update Conference.

ARRL June QSO Party, I exchanged many e-mail messages with Joe Lynch, N6CL, via the Internet, as he was the leader of the North American team for this operation. In his last one, just a few hours before he left Oklahoma City, he innocently asked me, "Why don't we try a Rover?"

"At this point, I didn't even considered the idea. We had planned three contest stations in three different grid locators, we were still very busy running after the many supplies needed for the operation, and most of all, we were very busy trying to have everything ready for the arrival of the North American team. In that moment the idea of planning a Rover operation would be for some of our group so crazy that I didn't tell the rest of the Cubans about it. How-

ever, I must admit I started thinking about it.

"Later I realized that in Cuba we have often operated something very similar to a Rover in our 2 meter FM Contest in which the multipliers were, instead of the grid locators, the municipalities. I had once activated three of them that had no VHF hams.

"When I met Joe at the Havana Airport, one of the first things he asked me was, 'What about the Rover?' However, I had not made up my decision yet. There were too many things to set up for a Rover. Maybe it was too late for that. Maybe I was too tired. At that moment, I didn't know.

"During the trip from the airport to the hotel, Joe spoke with enthusiasm about the Rover station and, step by step, I started getting involved. I arrived at some conclusions: At the COØFRC station we had more than one radio and antennas for the 6 and 2 meter bands, so the extras could be used for the Rover station. The grid locator of Bellomonte was EL83, but no more than 10 miles to the east were some hills very near the coast at EL93. It was possible that we could be able to activate at least two grids for the Rover. We were four North American hams and five Cubans operator for five bands at COØFRC, so Joe and I were not critical.

"I had coax, connectors, and two little telescopic masts of about 15 feet in length that we could use. We had a car and could buy more gas. (By now I am starting to think that crazy ideas can be very contagious!)

"Before I left the hotel, and without asking anyone else's opinion, I finally made up my mind: A Rover Station for the QSO Party? Why not!

"Once the decision was made, Joe and I dis-

cussed which callsign we would use for the station. Joe wanted "CO2OJ" and I defended "CO2/N6CL." It was Joe's idea; he deserved the honor. After an endless discussion Lauren Libby, KXØO, Janet Margelli, WA7WMB, and the rest of the group convinced me with the only argument I considered valid. CO2/N6CL-Rover would be too long of a callsign for a contest station.

"Saturday morning, while Joe went for gas for our van, I checked the radios, coaxes, and connectors and practiced the assembly and disassembly of the masts and antennas. After lunch Joe connected the 6 and 2 meter rigs to the van's battery, connected a magnetic 2 meter 5/8-wavelength whip that CO2KG had lent us for the 6 meter radio. He quickly made the first QSO from the Rover station. We congratulated each other with a handshake! His "crazy" idea was almost a reality; CO2OJ-Rover station was now ready to travel.

"We had decided to start the contest from EL93, so we said goodbye to the COØFRC crew. The 1800 UTC time caught up with us as we were traveling east along the Via Blanca Road. When we reached the EL93 line Joe began calling "CQ Six, CO2OJ ROOOOVER, EL93." But the conditions had changed; 6 and 2 meters were dead. . . . Hello, Mr. Murphy!

"We arrived at the site, installed the 4-element Yagi for the 6 meter station and the whip to one of the van's side for horizontal polarization on 2 meters, and started calling CQ. Fifteen minutes later the 2 meter radio quit transmitting. Hey, Mr. Murphy, hello again!

"For the next two hours we kept calling on 6 meters, turning the antenna to one side and then to the other, trying not to show what we

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were feeling to the other, all the while making only a few QSOs. Almost at 2100 UTC, when we were thinking of returning back to Bellomonte, the 6 meter band came alive quite suddenly, and like in a marathon race, Joe made one QSO after another.

"At sunset the band closed again, so while in the middle of a tropical storm we returned back to pick up supper for the crew at Bellomonte with more than 150 QSOs and 50 grid locators in our log.

"Immediately upon our return to the Bellomonte site, we asked Jose Amador, CO2JA, the technical adviser of the Cuban VHF-UHF Group and one of the COØFRC operators, to take a look at our now silent 2 meter rig. We were lucky. It was only a broken cable on the microphone jack, so the next day we would be on 2 meters from EL83 (or at least, that was what we thought!).

"Sunday was born the same way as Saturday died—very poor conditions in almost all bands. Nevertheless, about 10 AM we prepared our things and drove away to the Via Blanca Road, this time heading to the west, and parked in a place near the tropo antennas that were constructed in the 1950s for communications between Cuba and USA. Poor propagation on both bands netted only a few QSOs (some of them in Cuba). The 2 meter radio broke again, this time accompanied with sparks and a little smoke. I am beginning to wonder if maybe we should have logged Mr. Murphy with us as an extra operator!

"However, not all the news was bad. One of our few QSOs was with Lazaro, CO2LE, a very enthusiastic VHFer who lives near the Havana Airport. He told us about a place about 20 minutes from his QTH, in EL82. He had used this place in portable operations in some of our

national FM contests. He explained to us that it was more than 100 meters over sea level and has 'special' conditions. Joe and I exchanged a glance thinking of our third grid and immediately scheduled with Lazaro the time and place to meet him in the afternoon.

"Mr. Murphy had prepared for us another surprise, this time as a tropical storm like I haven't seen in several years! We had to stay at Bellomonte helping the COØFRC crew move down the antennas, tie down the tent, etc. Finally, at 4 PM and in the middle of a heavy rain, we got underway to that 'special' place at EL82. As we crossed the Havana City from west to east, I started making QSOs on 2 meters FM on a simplex frequency.

"After meeting Lazaro at his home near the airport he guided us to the place he knew. We arrived still under a heavy rain and, as I installed the 6 meter Yagi, Joe started calling CQ with the whip as antenna and . . . goal! Joe made a few QSOs with some Texas and Oklahoma hams.

"It looked for us as if the band was getting opened so I frantically finished installing the antenna. I yelled, 'The Yagi is ready, Joe!' Joe connected the Yagi and . . . nothing, no signals. Back to the whip. . . the same. We were wrong; the 6 meter band was closed and those Oklahoma hams were the last foreign stations that any Cuban operator heard in the '94 QSO Party.

"But not everything was lost. We were still in contest so we connected my hand-held to the 2 meter brick and started working Cuban stations on FM simplex. When the battery died, Joe connected the hand-held to the 12 volts from the van's battery and continued making QSOs until we were so wet and tired that we agreed that it was time to return back to Bellomonte.

"Very late in the night we met the COØFRC crew, along with their scores and accomplishments. All of us celebrated the 'happy end' of what started as a 'crazy' idea and ended as the first Cuban DX Rover.

"Now I know why Joe likes Rovering so much. I hadn't had so much fun since I was a child. Rover operation is probably the wildest, craziest, and funniest way of participating in a contest. I don't know if the CO2OJ/Rover station's score will be good enough for any award. However, that is not so important.

Working the Rover with Joe taught me many things about our hobby, about the friendship between persons of different countries, and about the goodwill that surrounds the hobby of ham radio, but most of all, it has also shown me what must be one of the philosophies of our lives: Each challenge must have its own 'Why not!'

### More Rumored Sept. Scores

The "N.E.W.S. Letter," the newsletter of the North East Weak Signal Group, reports the following rumored scores for the ARRL September VHF QSO Party: In the multi-op category, W2SZ/1, 744 k; W3ZZ, 652 k; AA4S, 529 k; WØUC/9, 301 k; W4IY, 239 k; K1TR, 70 k; K3MQH, 512 k; and WB1GQR, 110 k.

In the single op category: WA8WZG, 315 k; WA2TEO, 224 k; K1RZ, 203 k; KA1ZE, 101 k; WZ1V, 72 k; KH6CP/1 (operating QRP), 65 k; and N1DPM, 27 k.

Also in the single op category was **Larry Lambert, NØLL**, with 128 k. Larry reports that he too had a 6 meter opening that netted him

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...7 grids, which was better than the VHF QSO Party totals. He said the big opening started at 2022 UTC on the 11th and it lasted on and off through the end of the contest. Larry worked stations on both coasts during the 6 meter openings. He pointed out that the Rovers accounted for 131 of his total of 437 QSOs.

**Bill LeBaron, W0MTK**, while not participating in the contest, also reported sporadic-E contacts during the contest period. He also reported that John, K7VNU/Ø, set up east-southeast of Rangle, Colorado and that Barry Bradley, WB7REL, set up near Castle Dale, Utah for the contest.

**Shep Shepard, W7HAH**, reported that the contest was full of surprises, with plenty of sporadic-E on 6 meters. **Jim, WB2ODH, Ed, WA6DJS**, and **Dick, WA6JOX**, all scrambled up Frazier Mountain, each to work different categories during the contest. It was reported that all had terrific success.

## Still More Perseids Reports

The following is from **Bill Sattler, N0XX**: "I went out portable for the *Perseids* to CN83, operating from a 5500 foot hilltop with 500 watts and a 24 foot Yagi. On Wednesday evening, the 11th UTC, I ran nine skeds and completed seven with KE7NS, KB7FUV, KE7OI, N6RMJ, N6RPM, W0KEA, and WB6WLR. Some of the skeds took most of the period, but I did have some good long burns.

"On Thursday evening conditions seems significantly worse than Wednesday, with very few bursts until about 0700 UTC, when I completed with NJ7A, WB6FCS, and K1FJM. At

about 0900 things picked up with nearly continuous bursts until 1100. On randoms I worked W7XU, AA7A, K6ODV, NW7O, KØRI, N7ANL, KJ7F, W2CRS, KB5CSB, and K7CA. Lots of long burns during this period, up to 3 minutes. However, as you know, not all that many people to work here in the west and a lot of operators who didn't know meteor protocols (60 second CQ's, spelling their names and QTHs, etc.) so I worked just about everyone available. Completed with WA7JTM, VE7KPB, and VE6TA later in the morning on schedules. After 1800 things got very quiet out here.

"Tom, AA7NH, was supposed to come up Thursday PM to spell me but wasn't able to make it. At that time I'd been up for two days with no sleep, so I drove home and sacked out (2 PM Friday until 11 AM Saturday!). There was very little activity on Saturday, but I was able to complete a couple of randoms just by monitoring 144.200 MHz and breaking in when I heard people chatting during long bursts.

"All in all, a good 'ordinary' *Perseids* from out here. However, it was one of the most amazing experiences I've ever had for one reason. I operated portable on a mountaintop and set up outside, so I could see the sky while operating. During the peak on Friday morning, I could see the rocks coming down and hear the bursts simultaneously! During the peak, I just waited until I saw a rock in the southeast and called a quick CQ, usually producing results (also minimizing QRM!). At times there were four or five meteors in the sky at the same time. At one time, I saw a huge burn on the southeast horizon and AA7A and others were in for about 5 minutes. It was incredibly exciting to run 2 meter meteors while watching them



Tom Williams, WA1MBA, tells how to construct a wide-band 2-10 GHz dish feed at the 1994 Microwave Update conference.

come down. I really hated to see the sun come up! I've never heard anyone describe watching meteors and getting burns off them. It may be because of being on a mountaintop. I don't know. but I highly recommend it for anyone.

"Anyway, that's all on the *Perseids*. Been building some HF Yagis (3 element 40 meter Yagis and 6 element 20's) for customers and so keeping busy. Trying to get up 16 Yagi array for 2 meters EME, but will probably be next spring due to the start of the rainy season here. If I dig a hole now, it will just turn into a swimming pool overnight.

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RS300	1-15	30A	24A	7x6x9	18
PS120M	3-15	12A	9.2A	5x4x9	11
PS50TM	8-15	5.2A	4.2A	6x3x8	6

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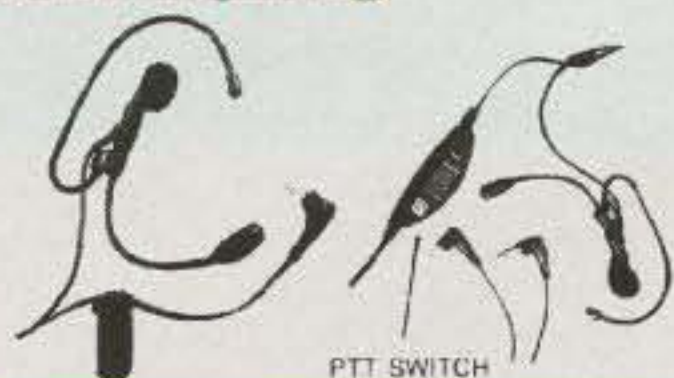
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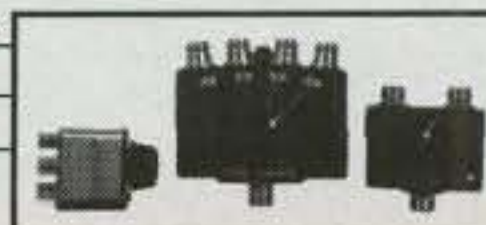
MODEL	FREQ. RANGE	POWER RANGE	CONN. TYPE	MIN SWR DETECT
DP830	1.8-150MHz 140-525MHz	0-1.5kW 0-150kW	UHF & N	< 1W
NS660A	1.8-150MHz	30/300/ 3kW	UHF	< 8W
CN101	1.8-150MHz	15/150/ 1.5kW	UHF	< 4W
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CN460M	140-450MHz	15/150W	UHF	< 3W

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VSWR	below 0.12	below 1:1.3 at 1.3GHz
Insertion Loss	less than 0.2 dB	< 1.2 dB at 1- 2 GHz
Isolation	60 dB 600Mhz	50dB 1 Ghz
Connector	SO239	N
Output Port	2	2

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- ❑ RIT/ $\Delta$ Tx Functions
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- ❑ Pre Amplifier (20 db)
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- ❑ Menu Selectable CW Filters
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- ❑ Direct Keyboard Entry
- ❑ Hand Microphone Included (HM-36)
- ❑ Computer Control Port (CI-V)



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**CW Contest Package** Our built-in electronic keyer with separate key jack, full break-in (QSK) and separate jacks for an extended CW key or memory keyer, make a competitive package for CW contesting. For example, use a memory keyer (or TNC with CW capability) to make contacts easily, then use your paddle for normal operation.

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CIRCLE 146 ON READER SERVICE CARD

*Quality*

"I was sick during the Hawaii tropo opening. Guys only 75 miles west of me worked into Hawaii, so I'm sure I could have done it, but was laid out in bed. Darn!

"That's all for now. I'll try to keep in touch and send you some updates from the VHF desert of the rainy Pacific Northwest.—73 Bill Sattler, NØXX."

The following is from the "N.E.W.S. Letter" newsletter: **Dave Collins, K2LME** (FN31), worked KA9CFD (EN40), WA2VOI (EN15), NØJPE (EN13), all over 1200 miles. **Edson Bristol, W1RJA** (FN31), worked KC4LOT (EM86), KØFF (EM84), and N9KRP. **Roger Amidon, K2SMN** (FN20), worked WA2VOI (EN15), NØJpE (EN13), K8BHZ (EN75), KC8P (EN77), K1GAO (FN66), plus several randoms. **Jerome Byrd, K3GNC** (FM29), worked KD4LT (EM81) for a new one plus randoms. **Mark McMillan, N7EIJ** (FN42), worked five new states, KA2DRH (EM64), WA2VOI (EN15), KC4QWZ (EM66), NA4R (EM83), and WA4MVI (EM84). **Ray Bohmer, N1GDP** (FN55), worked WA2VOI (EN15), WB5IGF (EM45), VE4ZK (EO12), K4TO (EM77), and CY9CWI (FN97).

**John Godwin, KB5IUA** (EL29), reported that he made 17 of 24 skeds on 2 meters and one of eight skeds on 222 MHz. He also reports that of the 2 meter contacts, four were over 1300 miles. In addition to the 17 completions on 2 meters, John reported working two stations by tailgating another station and one random station.

## On The Air

**Two More 2 Meter DXCC Awards Coming Up:** Two more EMEers have completed the

magic 100 country total on 2 meters. **Dan, HB9CRQ**, reports working EA9AI for country number 100. Additionally, he worked JX7DFA for country number 101. **Franco, I2FAK**, reports also working JX7DFA, but for his country number 100. Congratulations to both gentlemen for completing this extremely difficult goal.

**Wilson Works Japan:** On 24 September Paul Wilson, W4HHK, worked JA4BLC, for his first JA QSO on 13 cm. Copy on Paul's end was light, but on BLC's end it was good enough for him to give Paul an "O" for a signal report.

**Aurora Reported in Northeast and Northwest:** The following report is via the Internet from Steve Harrison, KOØU/4:

"A short aurora session occurred very late on Monday night/Tuesday morning of 3/4 October. The session was preceded by the onset of a minor solar storm which caused the A and K index numbers to rise significantly during the daylight hours of Monday. By midday Tuesday the A index hit 67 as reported on the East Coast DX cluster. The K index climbed to 4 by 0000 UTC Monday but remained below 5 until almost 0600 UTC on Tuesday morning.

"As far as I know, no aurora QSOs took place until after 0600 when KU2A and several others in the northeastern US first reported radio aurora conditions. The aurora apparently developed very rapidly and KD4UPF/FM08 worked KU2A on 144 MHz SSB around 0615 UTC. I had given up before 0530 and already gone to bed. KD4UPF also reported that he heard the W5VAS beacon on 50.059 MHz via aurora shortly after his QSO with KU2A. The last QSO apparently occurred before 0700.

"The K index was reported at 7 at both 0600

and 0900 on the DX cluster, and was 3 by 1200 on Tuesday morning. Solar Terrestrial Dispatch, a commercial outfit which publishes solar data and analysis software both on the Internet and elsewhere, reports this storm resulted from a coronal hole which is now out of sight on the solar disk. STD reported that visible aurora was observed as far south as the border of Ohio/Kentucky; Tim Totten, KJ4VH, apparently heard (or perhaps saw) aurora in the Spokane, Washington area.

"Although a number of East Coast V/UHFers kept watch throughout the remainder of the week, there was apparently no further auroral occurrence."

**6 Meters Opens to South America: Tommy Taylor, W7RV** (DM43bl), reports that from 2110 to about 2200 UTC on 9 October 6 meters was open to LU (GF05) from Arizona. He stated that it sounded like TE mode, speculating that F<sub>2</sub> would most likely be wishful thinking. He reported he worked the following stations: LU8EIO, LW5EJU, and LU6DLB, all with good signals with LW5EJU peaking at S9 + 10 dB. He also noted that plenty of QSB was observed. He concludes his report by saying, "Never give up on 6 meters!"

Your editor also received a report from Bill LeBaron, WØMTK, stating that **John Godwin, KB5IUA**, also worked the Argentineans. Bill also reports that at about the same time he had sporadic-E into Texas and Oklahoma.

**10 GHz Long Island Style:** This is by Bruce Wood, N2LIV, and is from the "N.E.W.S. Letter," the newsletter of the Northeast Weak Signal Group:

"Well we finally made it. Not one, not two, but three separate individuals have made con-



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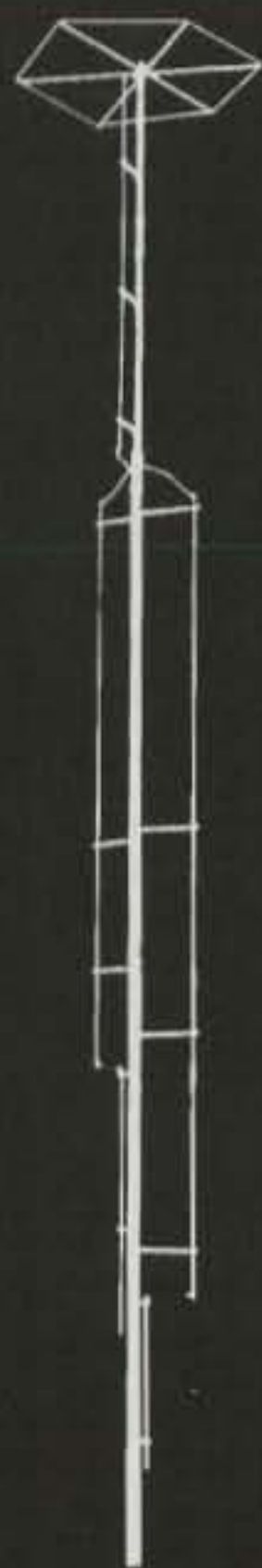
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Voyager DX



Challenger DX



Eagle DX

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

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

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

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

The secret is out and people in the know say:

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

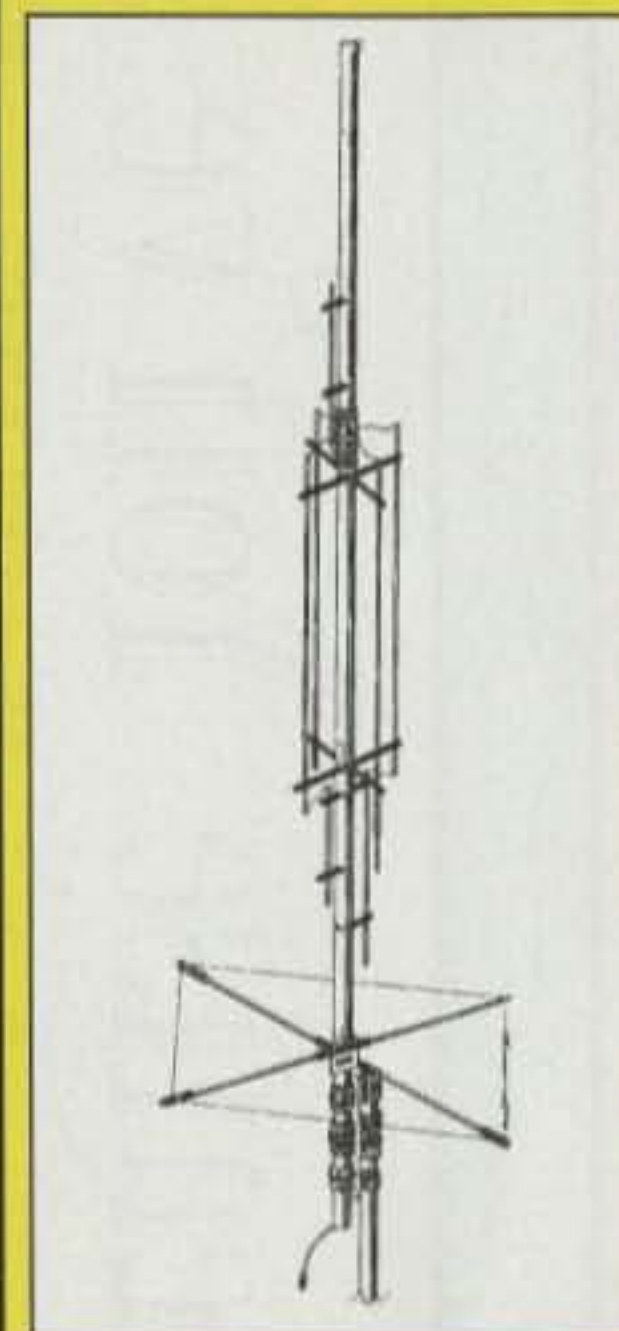
**73**—"This is a real DX antenna, much quieter than other verticals."

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

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

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

## New Release: TITAN DX



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

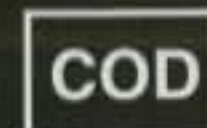
MODEL	BANDS OF OPERATION											HT	WT	MOUNT	COUNTER-POISE	COST
	2m	6m	10m	12m	15m	17m	20m	30m	40m	80m	160m					
Challenger DX	■	■	■	■	■		■		■	■		31.5'	21 lbs	Drop In Ground Mount	3 Wires @ 25'	\$259
Eagle DX			■	■	■	■	■		■			21.5'	19 lbs	1-1/4" pipe	80" Rigid	\$269
Titan DX			■	■	■	■	■	■	■	■		25'	25 lbs	1-1/4" pipe	80" Rigid	\$289
Voyager DX							■		■	■	■	45'	39 lbs	Hinged Base	3 Wires @ 57'	\$399

Just Released

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**(407) 778-3728**



### What a Great Stocking Stuffer! Tucker TA-500

Dual Band (2m/70cm)  
Magnet-Mount  
Mobile Antenna

This inexpensive little dual-band mag-mount will give you great performance for years to come. It features a 19" stainless steel whip with an attractive "cellular look". The 3" magnet is one of the strongest we've seen and has a protective pad on the bottom for scratch-free installation. Handles 200 W with an SWR of less than 2:1 all across 2m and from 435-450 MHz. Unity gain on 2m, 2.1 dB gain on 440. Comes with 14' of coax with PL-259 connector and FREE PL-259 to BNC connector for portable operation with your HT. 1 year warranty and our Tucker SatisfactionPlus guarantee. Made in USA.

\$14.95



### Tucker T-200

300 Watt Dry Dummy Load

Our new T-200 makes tuning up a breeze. It handles 300 W with an SWR of less than 1.5:1 from DC-600 MHz.

The resistor used in our T-200 is of a special ceramic construction which has stronger composition and offers better performance than the carbonum resistors used in most dummy loads. SO-239 connectors. Quality construction, with an attractive blue and gray finish that looks good in any shack. Built to last in the USA. One year warranty and our Tucker SatisfactionPlus guarantee.

\$27.95



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### Introducing The New Tucker SWR/Power Meter!

### Tucker TM-3000HF

1.8-60 MHz Cross-Needle  
SWR/PWR Meter



The new Tucker TM-3000HF displays forward power, reflected power and SWR SIMULTANEOUSLY on its dual movement meter system! The readings' accuracy is assured because we use a TRUE SHIELDED DIRECTIONAL COUPLER. The meter is backlit (AC ADAPTER INCLUDED AT NO CHARGE!) and displays either peak or average power in 300 and 3000 W scales. Construction is first-rate. We use an aluminum case with chemically treated scratch and chip resistance. Our front-panel is reverse-printed lexan that is virtually scratch-proof as well. High quality connectors and screws are used throughout. Of course, your complete satisfaction is assured by our exclusive SATISFACTION PLUS GUARANTEE.

Specifications: Power Handling: 300/3000 W, scale selectable; Frequency Range: 1.8-60 MHz; Connectors: High Quality SO-239 (input/output); Power Requirement: 9-12 VDC (AC adapter included); Size: 5.3"(135mm)W x 5.75"(146mm)D x 3.5"(89mm)H; Weight: 1.2 lbs (55kg)

PRICES LIMITED TO STOCK ON HAND

### Heil BM-10

Boomset

The tried-and-true BM-10 is unique in its design. Weighing only 8oz., the headpieces are soft and comfortable for pro-longed use in contests and DXpeditions. Due to the special rim design of the earphone, they exhibit a high "close-out" of external noises - so desirable in multi-op setups. The entire boomset is extremely versatile allowing removal or adjustment of each headpiece or mic boom to suite your needs, yet remains sturdy to meet the rigorous demands of extended hours of operation. This unit is available with either the HC-4 "DX Dream-Machine" mic element or the HC-5 full range mic element. Specify mic element choice and radio (Icom, Kenwood, Yaesu or Ten-Tec) when ordering.



\$79

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# Because You've Been

### Icom IC-2iA

2m H.T.

This shirt-pocket sized radio eliminates the myriad of buttons found on most other HTs and allows you the simplest operation of any handheld. Sophisticated features such as 10 memories, scan modes, 24 hour clock, advanced power saving functions, tone squelch, and much more are included. Up to 5 W output is available in this unit that measures only 2.3" x 3.6" x 1.2". Leave all those complicated buttons behind - step up to the simple-to-use but powerful IC-2iA!

Popular Accessories:

- BP-121: 7.2 V, 400 mAH Battery .....\$62
- BP-122: 7.2 V, 700 mAH Battery .....\$64
- BP-123: 7.2 V, 1200 mAH Battery .....\$90
- BP-124: 12 V (5W) Battery .....\$104
- BP-120: "AA" Battery Case .....\$25
- BC-79A: Rapid Charger (requires AD-26 adapter, \$12) .....\$149
- CP-13L: Cig. Lighter Cable w/noise-filter .....\$29
- LC-83: Carrying-Case for Radio w/BP-121 .....\$25
- LC-84: Carrying-Case for Radio w/BP-120/122 .....\$25
- LC-85: Carrying-Case for Radio w/BP-123/124 .....\$25



\$199

### Alinco DJ-G1T

2m Handheld

This new handheld from Alinco features the unique Channel Scope that shows the signal strengths of 7 frequencies simultaneously! You can monitor either VFO frequencies or keep track of local repeater frequencies in memory. This is Alinco's most advanced handheld with 2m wide (108 to 174 MHz) and 440 MHz dual receive coverage. 80 memory channels come standard with 39 CTCSS tones, DTMF squelch, 2 types of priority watch, 6 scan types, illuminated keypad and an on air/busy lamp. The DJ-G1T takes you into a new age of 2m operation!

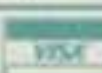

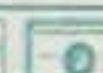

Accessories:

- EBP-30N 7.2 V/700 mAH Battery .....\$59
- EBP-31N 7.2 V/1200 mAH Battery .....\$76
- EBP-32N 12 V/722 mAH Battery .....\$92
- EDH-14 "AA" Battery Pack .....\$20
- EDC-52 Quick Charger .....\$116
- EMS-8Z Speaker/Mic w/Remote Control .....\$47
- ESC-23 Soft Case For DJ-G1T w/EBP-30N .....\$21
- ESC-24 Soft Case For DJ-G1T w/EBP-31N/32N .....\$22
- EDC-36 Filtered Cigarette Lighter Cord .....\$19.95



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### Tucker TF-144

2m Intermod Filter

Don't Let Intermod Ruin Your Hamming...

If you are like most us, your 2m radio becomes filled with the squawks and beeps of intermodulation distortion or "intermod" whenever you get close to an urban area. This is caused by the thousands of high-power pagers, FM broadcast stations, cellular sites and other nearby VHF transmissions that overload your 2m receiver's sensitive front end. Most modern transceivers don't have the helical filtering to stop intermod from getting in.

Our Filter Stops Intermod...

Our team of RF engineers have designed a 3 pole filter that will end your intermod problems forever. Our goal was to design the finest, tightest intermod filter available and, after exhaustive testing, we have done so. The TF-144 automatically switches on during receive and attenuates out-of-band signals by as much as 50 dB or more (see graph).

Easy To Use...

Simply install the TF-144 in-line between your antenna and the antenna input of your mobile rig or handheld and hook up the attached wire to +12 VDC (it draws only minimum current). We even supply a wire connector for attaching it to your existing 12 V transceiver hookup. The TF-144 takes care of the rest. It automatically switches on during receive and off during transmit. Nothing could be easier!

Your Warranty And Our Exclusive Tucker SatisfactionPlus Guarantee...

The TF-144, like all of our other Tucker Brand Products is built to last. It is designed and manufactured to industrial standards, not the typical "amateur grade" quality found in most amateur radio accessories. Our exclusive SatisfactionPlus Guarantee means you will be more than satisfied with the TF-144's performance - if not, simply send it back within 30 days - NO QUESTIONS ASKED!

Specifications: Passband: 144-148 MHz (2m Amateur); Connectors: SO-239; Power Requirement: 10-15 VDC less than 100 mA; Dimensions: 2.5" x 1.75" x 1.75" MADE IN USA



\$59

### NEW Alinco DR-M06T

50 MHz FM Mobile Transceiver

Weary of the regular contacts on the 2m/70cm bands? With Alinco's new DR-M06 6m mobile transceiver, you will find exciting communications on the 6 meter band. Working DX is possible over several hundred miles taking advantage of many forms of propagation of this lowest amateur VHF band; ground wave, direct wave, sporadic-E, F2 reflection, and backscatters, just to name a few. Even without favorable propagation conditions, the 6 meters is sporadic-E ionosphere - single E-skip can allow you to communicate with stations as far away as a 1000 miles. However unpredictable occurrence of sporadic-E may be, more and more enthusiasts stay on 6 meters for routine contacts plus the bonus excitement. Now it's your turn to enjoy 6 meters with Alinco's DR-M06!

Specifications:

- General: Frequency range: 50-54 MHz; Modulation: F3E (FM); Tuning step: 5, 10, 12.5, 15, 20, 25 kHz; Ant. impedance: 50 Ω Unbalanced; Power voltage: 13.8 VDC; Current consumption: TX (HD) approx. 3.0 A / RX approx. 0.6 A; Dimensions: 140(W) x 40(H) x 115(D) mm; Wt. (body only): 760 g; Memory channel: 100 channels; Frequency offset: 0 to +15.995 MHz freely, programmable in each channel; CTCSS: 50 tone encoder installed (decoder optional); Time-out-timer: 30-450 sec.; Microphone: EMS-11 DTMF Microphone
- Transmitter: Output power: 10 W (high) / 1 W (low); Modulation method: Variable reactance; Max. freq. deviation: ± 5 kHz; Spurious better than -60 dB
- Receiver: System: double-conversion superhet; Intermediate freq: 10.7 MHz/455 kHz; Sensitivity: -16 dB (12 dB SINAD); Selectivity: ± 6 kHz or under -6 dB, ± 15 kHz or under -60 dB; Speaker impedance: 8 Ω; AF output: min. 2.5 W at 10% dist.



\$389

# Good This Year...

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## Tucker T-1000 The Best 300 W Tuner

The Tucker T-1000 has been designed to give you more than any other tuner currently available for 300 W and its construction will let you appreciate its many features for years to come. Covers the frequency range from 1.8 to 30 MHz; 3.5 to 30 MHz, continuous 300 watts; 150 W on 1.8 MHz. Utilizes continuous rotation capacitors to provide superior transmitter/antenna tuning. Inductance is setup using a 12-position switched inductor. Antenna Selector: six positions: COAX 1 tuned and DIRECT, COAX 2 tuned and DIRECT, bypass and balanced antenna. Power Switch: high and low (300 W/30 W). Comes complete with a 1 year warranty and our risk-free Tucker SatisfactionPlus guarantee. Dimensions: 10.2" x 9.4" x 3.5". Weight: 3.4 lbs. Get the best, order your T-1000 today!

"I was impressed with the appearance of the T-1000 right out of the box... it's so easy to use and operation is very smooth... keep up the good work!"

M. T. Charlottesville VA

\$139

## Tucker TA-150 Dual Band (2m/70cm) Glassmount Antenna

Our new TA-150 is THE through-the-glass antenna for those of you with dual band mobiles. It gives you 2.6 dB of gain on 2m and 6.3 dB of gain on 440 MHz! 26" black stainless steel whip w/50 W power handling capability. 14' of coax and all mounting hardware included. Typical

**Tucker SatisfactionPlus**  
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Tucker TRK-1 Remount Kit for TA-100/150: \$7.95



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**Export Sales Welcome!**

## Tucker T-3000 Legal Limit Antenna Tuner



We built the Tucker T-1000 to be the finest 300 W antenna tuner made. You responded by making it the hottest-selling tuner in Amateur Radio! You also told us you wanted to see us develop a legal-limit version of the T-1000... well, here it is!

- Easy, Arc-Free 1.8-30 MHz Operation
- Great Tuning Options
- More Metering
- Superior Materials And Assembly
- Outstanding Customer Support
- One Year Warranty And Our Exclusive Satisfaction Plus Guarantee
- Better Construction, More Value, Tucker Support And Service... The Choice Is Clear: The New Tucker T-3000!

**Specifications:**  
RF Power: 1000 W single tone continuous, 2 kW PEP SSB  
Frequency Range: 1.8-30 MHz, continuously variable  
Transmitter/Antenna Tuning: Continuous Rotation 4.5 kV capacitors  
Inductance: 28 uH roller inductor w/#10 tin-plated wire, Delrin/Teflon body  
Antenna Selector: 6 position ceramic coax switch: COAX 1 Tuned and Tuner Bypass, COAX 2 Tuned and Tuner Bypass, Bypass and Balanced Antenna  
Metering: Cross-Needle SWR/PWR with High and Low (300/3000 W) position, 21 LED Bar-Graph meter for Peak SSB reading  
Connectors: Coax 1&2 SO-239 connectors, Bypass SO-239 connector, Balanced Line Dual High Voltage Delrin terminal Posts with 4:1 2.5 kw balun  
End-Fed Wire High Voltage Delrin Terminal Post  
Dimensions: 5.5"(140mm)H x 12.5"(318mm)W x 12"(305mm)D  
Weight: 10 lbs. (4.5 kg)

\$399

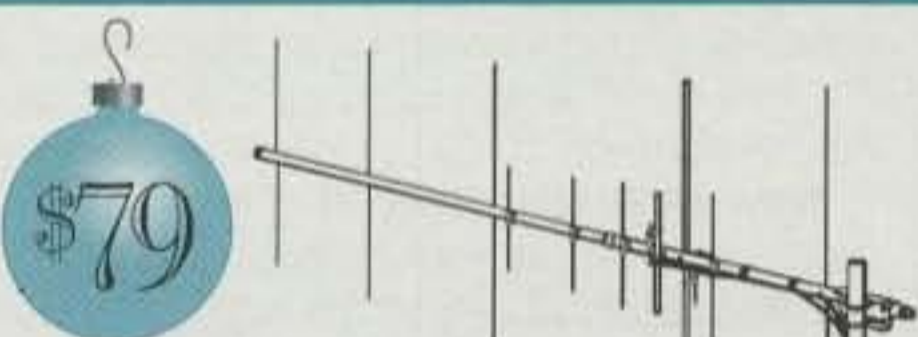
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## Cushcraft A270-10S 10 dB Dual Band Yagi

Increase your range by using the new A270-10S. You can point the antenna at stations while you are in QSO with them. This will direct more of your output power when transmitting while reducing interference and increasing signal strength when receiving.

Frequency:	144-148	430-450
No. Elements:	5	5
Forward Gain, dBd:	10	10
Front to Back Ratio, dB:	20	18
SWR 1.2:1 Typical:		
2:1 Bandwidth, MHz:	>4	>10
Power, Watts PEP:	350	350
3dB Beamwidth, Deg:		
E Plane:	52	52
H Plane:	60	60
Boom Length, ft (m):	6.17 (1.9)	
Longest Element, in (cm):	40.3 (102.4)	
Turning Radius, ft (m):	6 (1.8)	
Mast Size Range, in (cm):	1.25-2 (3.2-5.1)	
Wind Load, ft <sup>2</sup> (m <sup>2</sup> ):	725 (.07)	
Weight, lb (kg):	1.8 (.81)	

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## Zurich 12V/3A Power Supply

The Perfect Match For Your HT!

Operate your handheld as a base station. This great little regulated power supply will power any HT we sell to the full 5 W output power easily and cleanly. With lighted power switch, banana posts for connecting. The 12 V is clean enough to allow straight operation to your HT- no filtered cord needed. Makes a great gift for any ham.



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## Comet HM-P2 Mini Speaker/Microphone.

- Ultra-light weight
  - Mini-size
  - High power
  - Condenser mic provides clear TX audio
  - Rear clip for collar tie, etc.
- HM-P2K: For Kenwood  
HM-P2F: For Yaesu/Icom/Standard/Alinco/etc



Great Stocking Stuffer!

\$32.95

## Comet GP-9

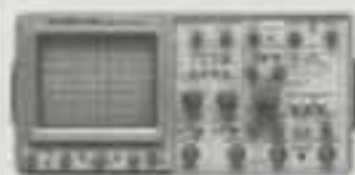
2m/70cm Fixed-Station Antenna

Featuring the COMET exclusive SLC System for maximum gain, and stable resonant frequencies. Wide band, and like all COMET Antennas, pre-tuned. Heavy-duty fiberglass and a compression washer within the ABS connecting joint prevents moisture/pollution contamination. Simply use the included stainless steel mounting brackets and your mast, and you're ready to experience COMET DualBand performance.

- Gain & Wave:  
144 MHz: 8.5 dBi 5/8 wave x 3  
446 MHz: 11.9 dBi 5/8 wave x 8
- VSWR: 1.5:1 or less
- Max Power: 200 Watts
- Length: 17' 8"
- Weight: 5 lbs 11 oz
- Mounting to Mast Size: 1 1/4-2 1/2
- Connector: SO-239 or Female N-type
- Construction: Heavy-duty fiberglass, 3 sections



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Rick Campbell, KK7B (left), and Jim Davey, WA8NLC (right), display their Chambers award plaques awarded at the 1994 Central States VHF Society conference. In the center is Kent Britain, WA5VJB, Chairman of the Awards Committee for the CSVHF Society. Because of his absence from the CSVHF Society conference, Rick's plaque was given to him at the Microwave Update conference.

tact on 10 GHz narrow band with Dick, K2RIW's home station. The significance of these events was that it represents the first time native Long Islanders have made contact with other Long Islanders and did so operating from home with homebrewed stations. Until this time most contacts on the island have resulted from out-of-state (NJ) amateurs operating portable here.

"On 21 August Ron, N2NKJ, made contact at 5.5 miles from his driveway running 1/4 watt. On 27 August Mike, WB2GLW, through his second story window with less than 0 dBm output made contact with Dick at 7.9 miles. Finally, on 7 September I made contact at 10.2 miles running approximately 1 watt to an 18 dB horn mounted on a step ladder 7 feet above ground.

Because of the heavy tree and leaf cover signals seemed to peak in all directions, even 180 degrees off the true bearing. As I disassembled the temporary setup I was still able to receive Dick's 200 MW signal with just an SMA cable. I wonder if an SMA connector qualifies as an 1/8 wavelength ground plane antenna.

"Two of us were using converted 14 and 12 GHz boards as described in the April 1994 'N.E.W.S. Letter' and 1994 Eastern VHF/ UHF Proceedings as supplied by Chuck, WB6IGP, from the San Bernadino Microwave Group. (Chuck is also with the San Diego Microwave Group and has been the VHF editor for 73 Magazine.—ed.) Now all I need to do is finish packaging everything for portable use and complete my 30 inch dish with a shepherds crook feed and an 11 GHz Chaparral TVRO horn. Once completed we can make some real contacts with the New England and New Jersey guys."

**10 GHz Scatter:** The following is from Charlie Suckling, G3WDG, who sent it over the Internet. Greg McIntyre, AA5C, picked it up and submitted it to "Feed Point."

"Had some really fantastic rain scatter conditions on Sunday which coincided with one of our monthly 10 GHz contests. There seemed to have been some massive thunderstorm activity somewhere over Belgium, and quit a lot of UK to Germany, and UK to Holland QSOs were made, up to 780 km (485 miles)! Signals were quite good, up to 15 to 20 dB over the noise, all with the auroral sound typical of rain scatter.

"Our best QSO was 735 km (456 miles) into south Germany near Stuttgart. The propagation brought lots of new grids for Petra and me. My tropo total is now 40. All the activity was direct on 10 GHz with no talkback. For awhile it sounded more like a good 2 meter aurora, lots of stations and plenty of QRM!

Also worked a new one on 10 GHz EME (F6KXS) on Sunday to bring the initials up to 11. Yes, K9KFR was our last QSO into the US (fourth state on 10 GHz; only 46 more to go!)."

**New JA 10 GHz Record:** "Feed Point" passes along a report from Hatsuo, JA1VOK, stating that JR3EDZ/5 and JH1UGF/2 appear to have made a new Japanese 10 GHz record with an FM QSO over a distance of 460 km (287 miles). Hatsuo also reports that JM3KMO/3 and JA1HNZ completed a 270 km (168 mile) QSO on 5.6 GHz.

## Several Complete 2 Meter WAS Via EME

Thanks to Gerald Williamson, K5GW, and Bob Taylor, WB5LBT, several stations completed WAS by working Nebraska over the weekend of 1-2 October. Gerald and Bob set up a station just outside Lincoln and worked 43 stations during the weekend. Among those who completed WAS were LA8YB and HB9CRQ.

The station consisted of four of Gerald's 10-element Yagis rotated by a Yaesu 5400 Az-el rotator. The antennas were driven by Bob's 8877 two meter amplifier. Gerald reported hearing echoes "right off the bat." Gerald also stated that they worked two Yagi stations, PAØJMV (who also has 80 countries worked with two Yagis) and VE1KG.

Gerald said that they had excellent support from the local Lincoln amateur radio club. He stated that they supplied personnel to assist in

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### HIGH POWER (2Kw - 10Kw) BALUN TO MATCH 50Ω COAXIAL TO:

			PART NO.	PRICE
12.5Ω	Balanced	Direct Connect Yagi Beam	4:1-HB50	\$39.95
50Ω	Balanced	1/2λ Dipole or Yagi Beam	1:1-HB50	\$39.95
75Ω	Balanced	1/2λ Dipole at 0.22λ above Ground	1.5:1-HVB75	\$59.95
100Ω	Balanced	1/2λ Dipole at 0.22λ, 0.33λ & Quad Loop	2:1-HB100	\$59.95
200Ω	Balanced	Folded Dipole, Log Periodic Beam	4:1-HBM200	\$39.95
200Ω	Balanced & Unbalanced	Off Center Fed Antennas	4:1-HB/U200	\$59.95
200Ω	Balanced	10Kw Antenna Tuners & G5RV Log Periodic Beam	4:1-HBHT200	\$59.95
300Ω	Balanced	300Ω Ribbon Folded Dipole	6:1-HB300	\$59.95
300Ω	Balanced & Unbalanced	Off Center Fed Antennas	6:1-HB/U300	\$89.95
450Ω	Balanced	Twin Lead/Ladder Line	9:1-HB450	\$89.95
600Ω	Balanced	Rhombic & V-Beam Antenna	12:1-HB600	\$199.95

UNUN: for ground fed antennas, verticals, slopers, inverted L

PART NO.	IMPEDANCE MATCH	PRICE
2:1-HDU50 (2 Ratios) (connecting 50Ω coaxial to junction of two 50Ω parallel coaxial)	50:22Ω 50:25Ω	\$49.95
2:1-HDU100 (2 Ratios)	112.5:50Ω 100:50Ω	\$49.95
1.5:1-HU75 (connecting 50Ω coaxial to 75Ω coaxial)	75:50Ω	\$49.95
4:1-HCU50	50:12.5Ω	\$49.95
9:1-HU50	50:5.56Ω	\$49.95
1.78:1-HDU50 (2 Ratios)	50:28Ω 50:12.5Ω	\$49.95
1.56:1-HDU50 (2 Ratios)	50:32Ω 50:18Ω	\$49.95
1.78:1-HMMU50 MULTIMATCH UNUN (8 different ratios; can be used for Beverage Antenna)		\$69.95

Unconditional money back guarantee for 1 year on completed unit.

All designs, when used according to instructions, are guaranteed to give outstanding performances. Comparisons with other matching transformers are invited.

NOTE: OTHER BALUN & UNUN TRANSFORMERS AVAILABLE. PLEASE CALL OR WRITE FOR ADDITIONAL DETAIL.

- BOOKS: 1) "Transmission Line Transformers Design Handbooks", by Jerry Sevick, W2FMI, Amidon Associates, Inc., 1991. \$8.00 ea.  
2) "Transmission Line Transformers", by Jerry Sevick, W2FMI, APRIL, 1990. \$20.00 ea.

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# The All-American Pro Receiver Goes Amateur!



## HF-1000

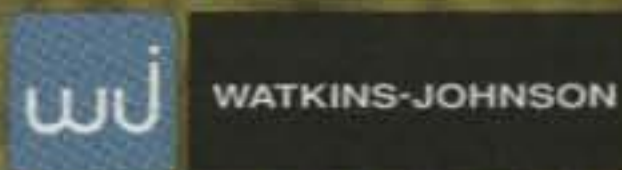
Since 1957, Watkins-Johnson Company has been the leading supplier of high quality, high performance receivers for governments and military worldwide. Now, through the magic of digital signal processing and state-of-the-art manufacturing technology, W-J offers the HF-1000 Digital Receiver to short-wave listeners and HAM stations.

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### Features:

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- 58 Standard IF Bandwidths with exceptional shape factors

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- 3 Fast, Flexible Scanning Modes
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- Bandpass Tuning
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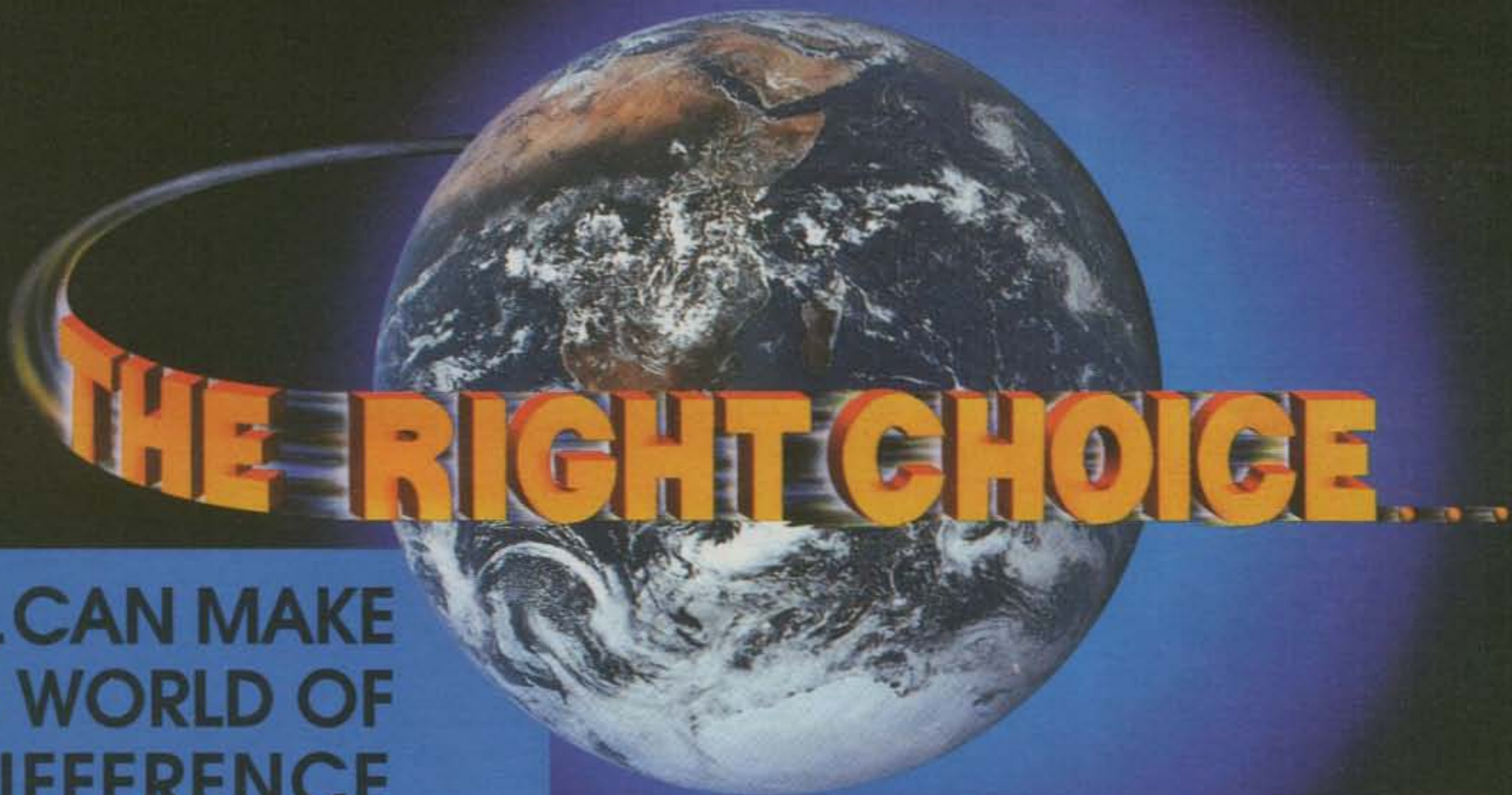
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setting up the EME equipment and HF equipment so Gerald and Bob could check into the EME net.

### Current Meteor Showers

Two showers occur this month. The first, the *Geminids*, is predicted to peak between 0030 and 0200 UTC, 14 December. It is a good north-south shower, producing an average of 100 to 110 meteors per hour at its peak.

The second, the *Ursids*, is predicted to peak somewhere between 1700 UTC, 22 December and 0630 UTC, 23 December. It is an east-west shower, producing an average of only 5 to 10 meteors per hour at its peak.

### Current Contests

The Bavarian Contest Club (BCC) invites all active meteor scatter enthusiasts to join the MS contest held during the *Geminids* shower of 1994. The aim of the contest is to generate more activity on the random frequency and make MS random operation more popular. It will also provide interesting information about MS propagation at various times of the shower. And it will give the little pistols a chance to work the big guns who are usually just out for grid locator hunting.

**Contest period:** 10 December, 0000 UTC to 14 December 1994, 2400 UTC.

**Modes:** Category I CW only, Category II SSB only. No mixed mode operation.

**Participation:** Single Operator or Multi-Operator allowed, but no separate score listings. During the contest it is allowed to change the QTH to another grid square. In this case the same station can be worked again. The new QTH must be indicated by the callsign (e.g., RB5EC, UB5Q/RB5EC). Sked-QSOs do not count for the contest.

**Frequencies:** CW—It is recommended to use the frequency range from 144.095 to 144.105 MHz for CQ calls using the IARU Region 1 Procedure (letter system, see appendix). SSB—It is recommended to use the frequency range specified for MS operation in your region. There are no frequency limits. Only one TX signal is allowed at any one time.

**Exchange:** Full callsigns, reports and final rogers.

**Scoring:** A complete random CW MS QSO counts 1 QSO point. A CW random MS QSO achieved using the letter system counts 3 QSO points. A complete random SSB MS QSO counts 1 QSO point. Duplicate contacts are not valid (exception: change of QTH).

**Multiplier:** Sum of different prefixes worked. Prefixes are defined according to WPX rules (example: DL5, DL8, DJ1, DA0, DF9, I2, IK2, IW2, IT9, EA3, EB3, RK2, W7, WB7, PA0, PA3 are different prefixes).

**Final Score:** Total QSO points times multiplier (example: 38 complete CW QSOs, of which 23 were made according to the IARU letter system, with 32 different prefixes gives a final score of 2,688).

**Logs:** The following data must be included—operator's name, callsign, address, QTH locator and category. Multi-op stations list all operators; for each QSO date, time in UTC, worked station, report sent and report received must be given. Mark all QSOs which were conducted using the IARU-Region-1 letter system. Also technical data about equipment and antennas used should be stated. Deadline is

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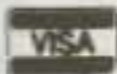
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**Awards:** The winner of the contest is the station with the highest score in its category. If two stations submit equal scores, the log with the better multiplier wins. First-, second-, and third-place winners will receive prizes; country winners will receive certificates. Printed results will be sent to all participating stations.

**Send logs to:** Bavarian Contest Club, MS Contest, Kelheimwinzerstrasse 40, 93309 Kelheim, Germany.

### Wiseman Back To Bahamas

Bill Wiseman, KM1E/C6AGN, reports that he plans to return to Green Turtle Bay in the Bahamas around 10 December. He will operate from there through approximately 1 March. Following a month trip back to Maine, he will again operate from C6 from 1 April through mid-May. His QSL manager is KA1DIG.

### Fred Fish, W5FF Grid Locator Leader

Fred Fish, W5FF, is the world leader in grid locators worked on 6 meters. To date he has worked 828 and has cards for 826. Fred considers the 48 contiguous state total of grid locators to be 484. He defines these as those which can be driven into with any ordinary car. Of these Fred has worked 481. He is missing FM26 in North Carolina and FN64 and FN67 both in Maine. Fred says that if anyone is planning a trip to one of these three grids, please call him collect at 505-281-5537 to arrange a sked.

To date Fred has also received QSLs from 128 countries. His wife, Lee, K5FF, has confirmed 123 countries. Via the moon, on 6 meters Fred has worked ten stations in four states and five countries. Lee has also worked four states but only four countries, having not worked VE6JW.

### And Finally . . .

**When friends become family:** For my trip to the Microwave Update conference, I rode with Bobette, N5UDJ, and Jerome, K5IS, Doerrie, and their daughter, Jennifer, KA5WMJ. More than 24 hours on the road together (both ways) helped me to become much better acquainted with my friends from the northern part of the Texas panhandle.

I have known Jerome for several years. He is the ARRL Affiliated Club Coordinator for the West Texas Section. Because of his close proximity to the Oklahoma panhandle, he has been a great help to me in my performing my duties as section manager by presenting me and the League to the Oklahoma panhandle amateurs.

After my return to the world of VHF I discovered that Jerome and I had something else in common—our interest in weak signal VHF communications. All the more reason to be friends.

You may recall in the October issue of this column I led the coverage of the Central States VHF Society conference with the talk given by Bobette and Jerome. Bobette is a physics teacher at Perryton Elementary in Perryton, Texas. She has used the hobby of amateur radio to pique her students' interest in science (and has gotten a few new licensees in the process). She is well respected in her school district for her innovative approach to educating her students.



Bobette, N5UDJ, and Jerome, K5IS (who is partially obscured because of the angle of the photo), Doerrie take a relaxing moment away from amateur radio to enjoy the view of Boulder Falls, Colorado.

Seeing Jerome and Bobette at hamfests and conferences of mutual interest has only helped to cement the relationship with them. This trip, however, I had the pleasure of meeting their daughter, Jennifer. Jennifer is a brilliant young lady who shows much promise as she pursues the rest of her education leading hopefully to a career in international law. Incidentally, she recently graduated cum laude (that's Latin for "very smart") with a dual major in political science and Spanish from Southwest Texas State University. She lists on her biographical information sheet that she is interested in DX, VHF, special events station activities, emergency communications, and Field Day. Now that's a real ham!

For me to be made to feel part of his family caused me to reflect on the whole trip. The friendship and fellowship shared by the participants of the conference was like being with family. Making friends is the most important aspect of this hobby. In the years that I have been writing this column I have made many special friends, friends who are interested in seeing others enjoy the fun and the camaraderie of the hobby. It was especially gratifying to see so many of my friends during the Microwave Update conference and watch as they willingly and unselfishly shared of their knowledge. I didn't notice, but I think that someone must have put up a sign outside the entrance door to the conference room that said "Egos checked here." And that is as it should be throughout this wonderful hobby. Because we are family, we are interested in the betterment of each other.

My best wishes to you and your family this holiday season. My thanks to all of you who send me reports, to you who participate in the VHF reflectors on the Internet, and to those of you who send me a copy of your newsletter. You can see that I freely rob from them to make this column as great as it is!

If you have a report that you want me to "rob from" please send it to me at the address on the first page of this column. Be sure, however, that you have the correct zip code. It is 73101. If you want to FAX it, call 405-528-0746; if you want to call me, my voice number is 405-528-6625; and if you want to send something via Internet, my address is 72124.2734@compuserve.com. Until next month . . .

73, Joe, N6CL

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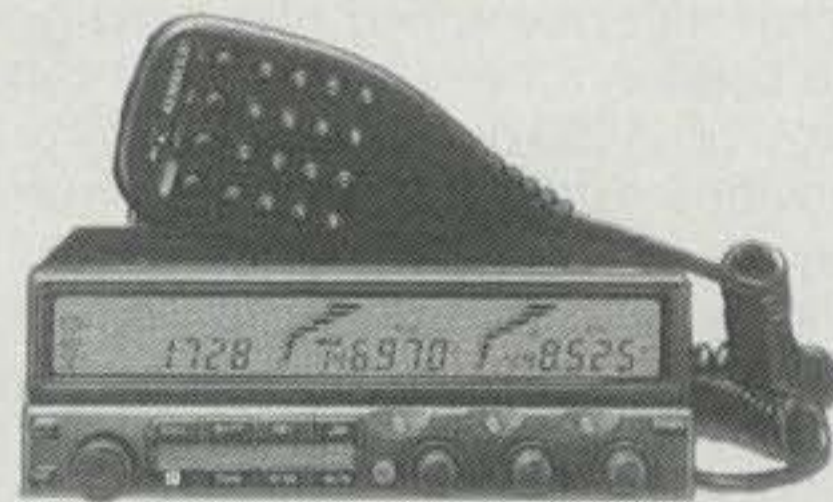
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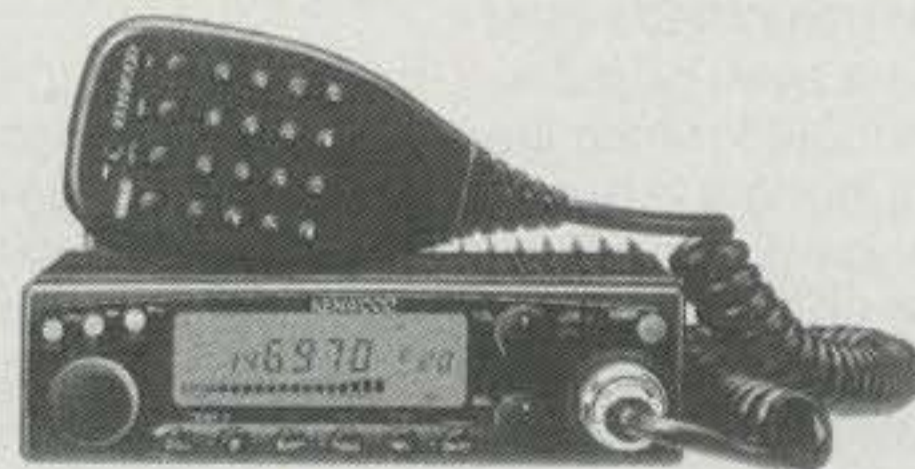
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## CONSTRUCTION PROJECTS, TECHNIQUES, AND THEORYs

## Getting Started With QRP

Thousands of amateur radio experimenters have embraced the QRP (low power) operating mode, and the movement is worldwide. What draws these enthusiasts into this interesting facet of our pastime? There are many reasons for becoming involved with QRP operating, but the primary motivations seem to be the challenge of working DX with flea power, building one's equipment at low cost, avoiding complex circuitry, and practicing on-the-air ecology. A similar movement is taking place in the area of camping and competition shooting, in which muzzle-loading rifles and pistols are used in a camp setting that reflects the 1750-1850 period in U.S. history. This provides a temporary escape from today's fast-paced lifestyle, provides a challenge in shooting skills, and ensures a laid-back environment while enjoying primitive camping and the wearing of period clothing. I have a number of amateur radio friends who are "buckskinners," N8TDR, K8EAG, K9BXG, and K8SFF, along with myself and my XYL, Jean, W1CCK.

QRP offers a laid-back approach to building and operating. A rig can be assembled over a weekend with low-cost components that are readily obtainable. This appeals to many of us who have grown weary of \$1500+ transceivers and the associated equipment that adds to the cost of the station. A dedicated QRPer can work the world with 1 or 2 watts while having only \$5 or \$10 invested in his or her homemade gear.

It is even possible to break DX pile-ups with QRP transmitters. I know, because I've done it a number of times. It all depends on timing and calling the DX station up or down from his frequency. If you enjoy tinkering and smelling hot rosin, it may be time for you to construct a QRP transmitter and enjoy the low-power challenge!

### That First Rig—Keep It Simple

If you are patient and want to start with a simple QRP rig, the circuit in fig. 1 may appeal to you. It represents the most basic oscillator/transmitter you can build. It is designed for 40 meters, which offers reasonable propagation around the

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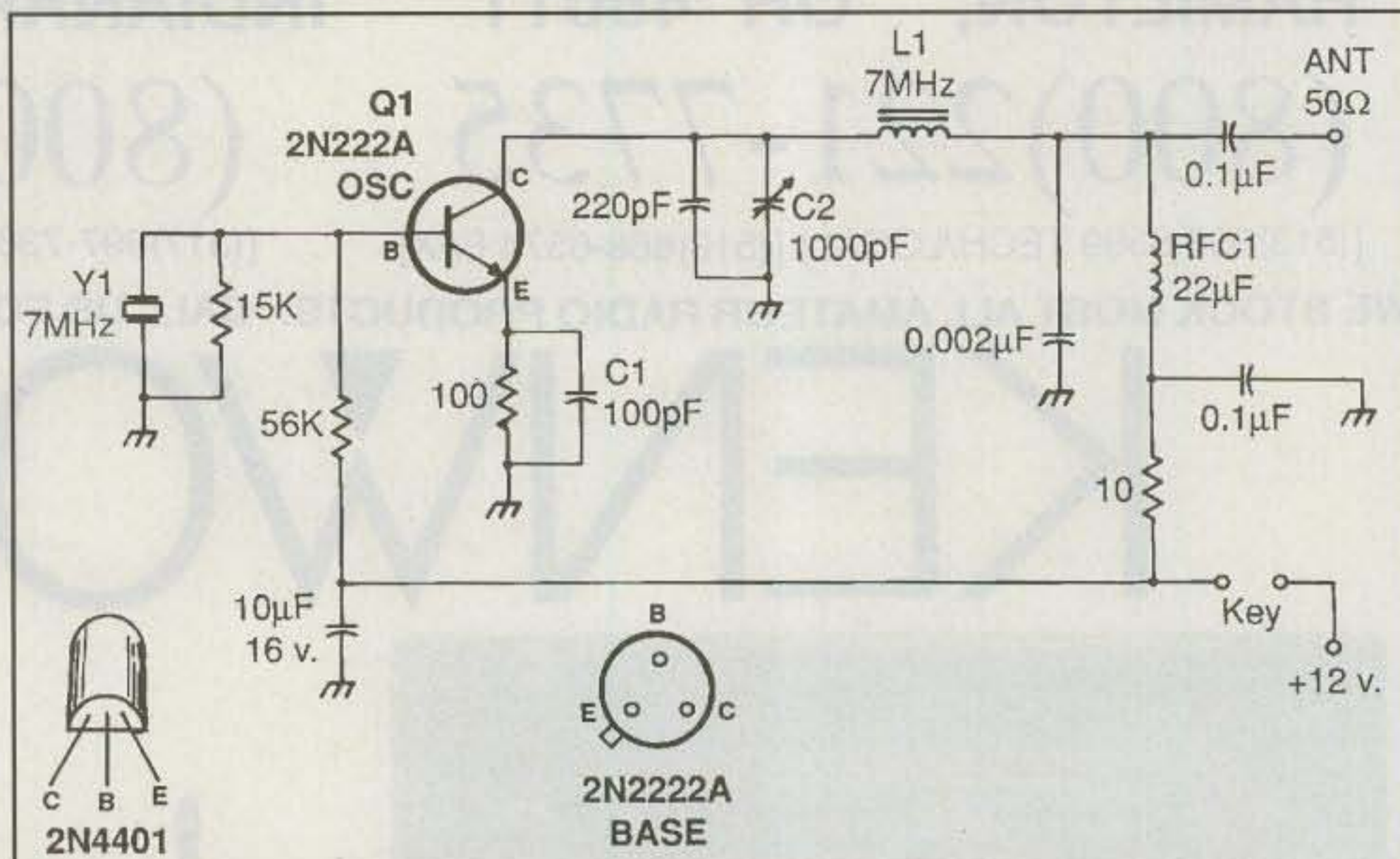


Fig. 1—Schematic diagram of a simple 1/4 watt CW transmitter. C2 is a 1000 pF mica trimmer. L1 has 14 turns of No. 24 enameled wire on an Amidon Associates T50-6 toroid core. RFC1 is a miniature 22 µH RF choke. Resistors are 1/4 watt carbon film. Y1 is a 40 meter fundamental crystal.

clock. The output power of this small transmitter is on the order of 1/4 watt. Surprising distances can be spanned with such low power, provided an effective antenna is used. I have worked California stations from Connecticut with only 0.25 watt of power on 7 MHz. It is not unusual to receive signal reports of RST 569 over so long a path during the dark hours.

A low-cost 2N2222A or 2N4401 transistor may be used at Q1 of fig. 1. C1 has a critical value ( $X_C = 227$  ohms), since it determines the feedback for the oscillator. The collector impedance of Q1 is on the order of 300 ohms at 0.25 watt of output power. The pi-network tank circuit is designed for a loaded Q of 12 and a transformation from 300 to 50 ohms. C2 is tuned for maximum output power, consistent with a chirp-free CW note. This circuit requires an antenna that presents a 50 ohm load to the transmitter. Keying is done by opening and closing the +12 volt supply line.

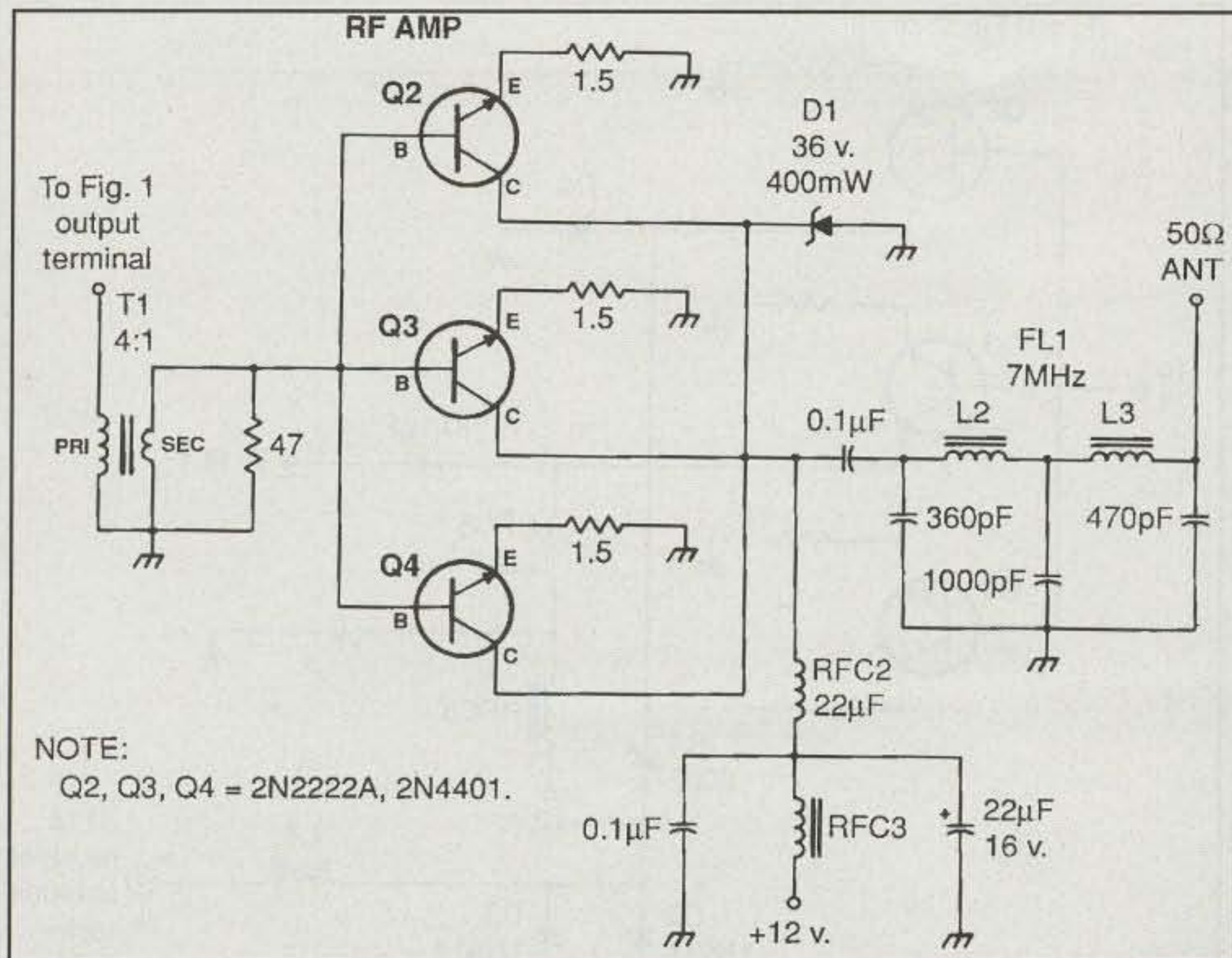
### Boosting The Power To 1 Watt

A 6 dB increase in signal strength will result if the circuit in fig. 2 is added at the output of the fig. 1 transmitter. The three 2N2222As or 2N4401s operate in class C and will elevate the output power to ap-

proximately 1 watt. A 6 dB increase in signal strength can often mean the difference between being copied or becoming lost in the noise. This amplifier is inexpensive and capable of being assembled in a couple of hours. T1 matches the output of the fig. 1 transmitter to the input (roughly 12 ohms) of the three-transistor amplifier. The 47 ohm resistor across the T1 secondary lowers the Q of the transformer as an aid to preventing self-oscillation of the three amplifier transistors. Zener diode D1 protects Q2, Q3, and Q4 from damage in the presence of a high SWR or voltage spikes that may be present on the +12 V bus. It clamps at 36 V, which is less than the PK-PK RF voltage on the collectors during normal operation into a 50 ohm load. The amplifier need not be keyed. Since it operates in class C, it draws only microamperes of current during standby. Therefore, there is no need to remove the operating voltage while in the receive mode.

### Adding A Keying Switch

Fig. 3 shows how to add a PNP switching transistor that will key the transmitter and minimize key clicks. Q5 conducts when the base is shorted to ground by the key or keyer, thereby allowing DC current to



NOTE:  
Q2, Q3, Q4 = 2N2222A, 2N4401.

Fig. 2—Circuit for a low-cost 1 watt power amplifier to be used with the fig. 1 oscillator circuit. D1 is a 33 or 36 volt, 400 mw or 1 watt Zener diode. L2 (1.7  $\mu$ H) has 20 turns of No. 26 enameled wire on a T50-6 toroid core. L3 (1.13  $\mu$ H) has 17 turns of No. 26 enameled wire on a T50-6 toroid. RFC2 is a 22  $\mu$ H miniature RF choke. RFC3 has 10 turns of No. 26 enameled wire on an Amidon Assoc. FT-37-43 ferrite toroid. Capacitors in FL1 are silver mica or polystyrene. T1 is a 4:1 broadband transformer with 12 turns of No. 26 wire (pri) on an FT-37-43 ferrite toroid. The secondary winding has 6 turns of No. 26 enameled wire over the primary winding.

flow through Q5 from the +12 V supply to Q1 during transmit. This simple circuit is used in many QRP rigs.

### Shifting The Crystal Frequency

Fig. 3 also illustrates a method for caus-

ing the crystal frequency to shift 7 to 8 kHz above the marked value. The addition of C3 and RFC4 creates what is known as a VXO (variable crystal oscillator) circuit. Adjustment of C3 changes the operating frequency. The greater the C3 capacitance the lower the operating frequency. Plated AT-cut crystals provide

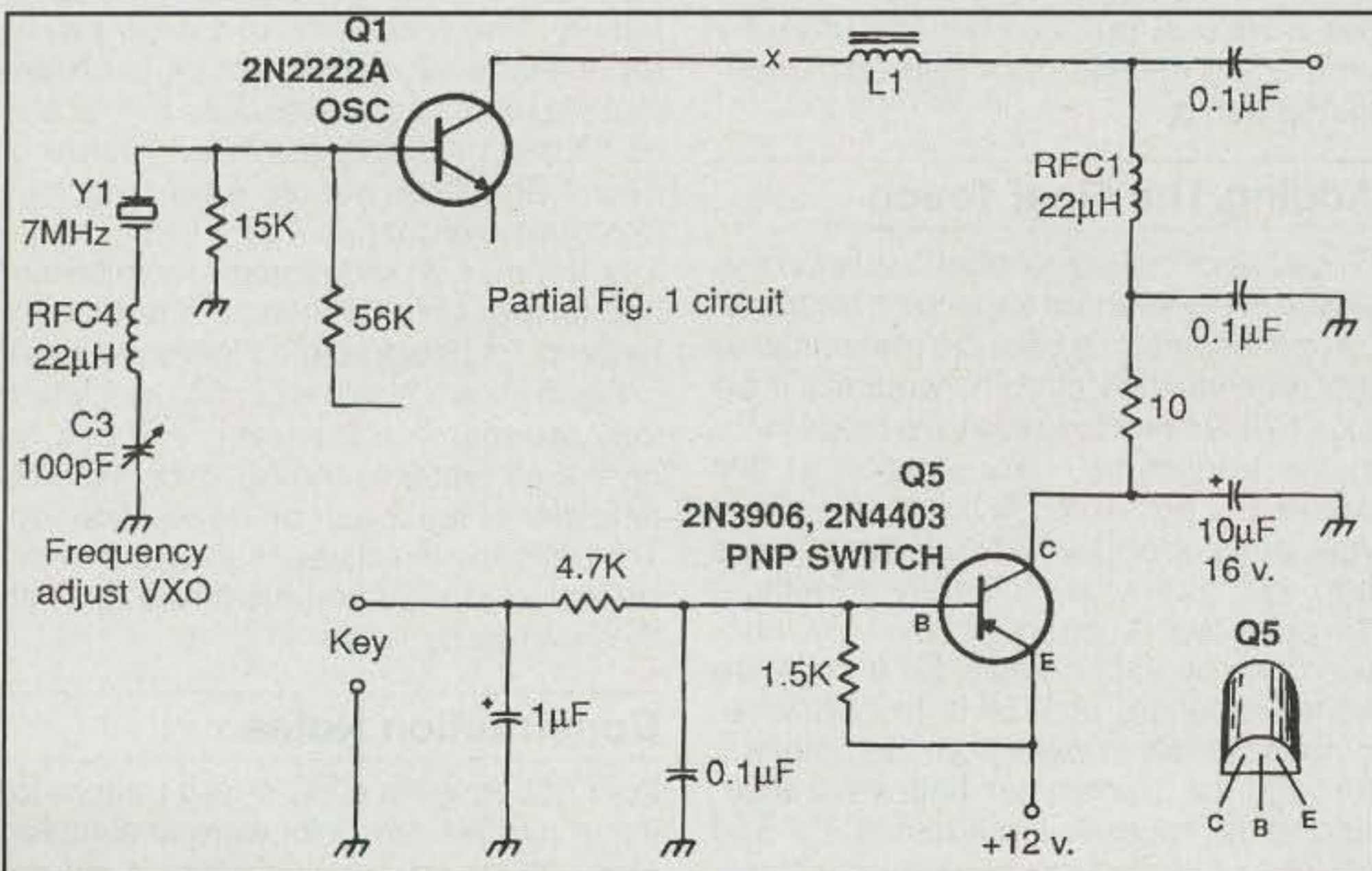


Fig. 3—Method for converting the fig. 1 circuit for VXO operation. C3 is a 100 pF air variable, panel mounted. RFC4 is a miniature 22  $\mu$ H RF choke. (See text for circuit explanation.)

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1412R	25-45	160	19	+	Repeater
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4412R	20-30	100	18	+	Repeater
4448G	5	100	22	12/1.1	HPA
4448R	5	100	22	+	Repeater HPA
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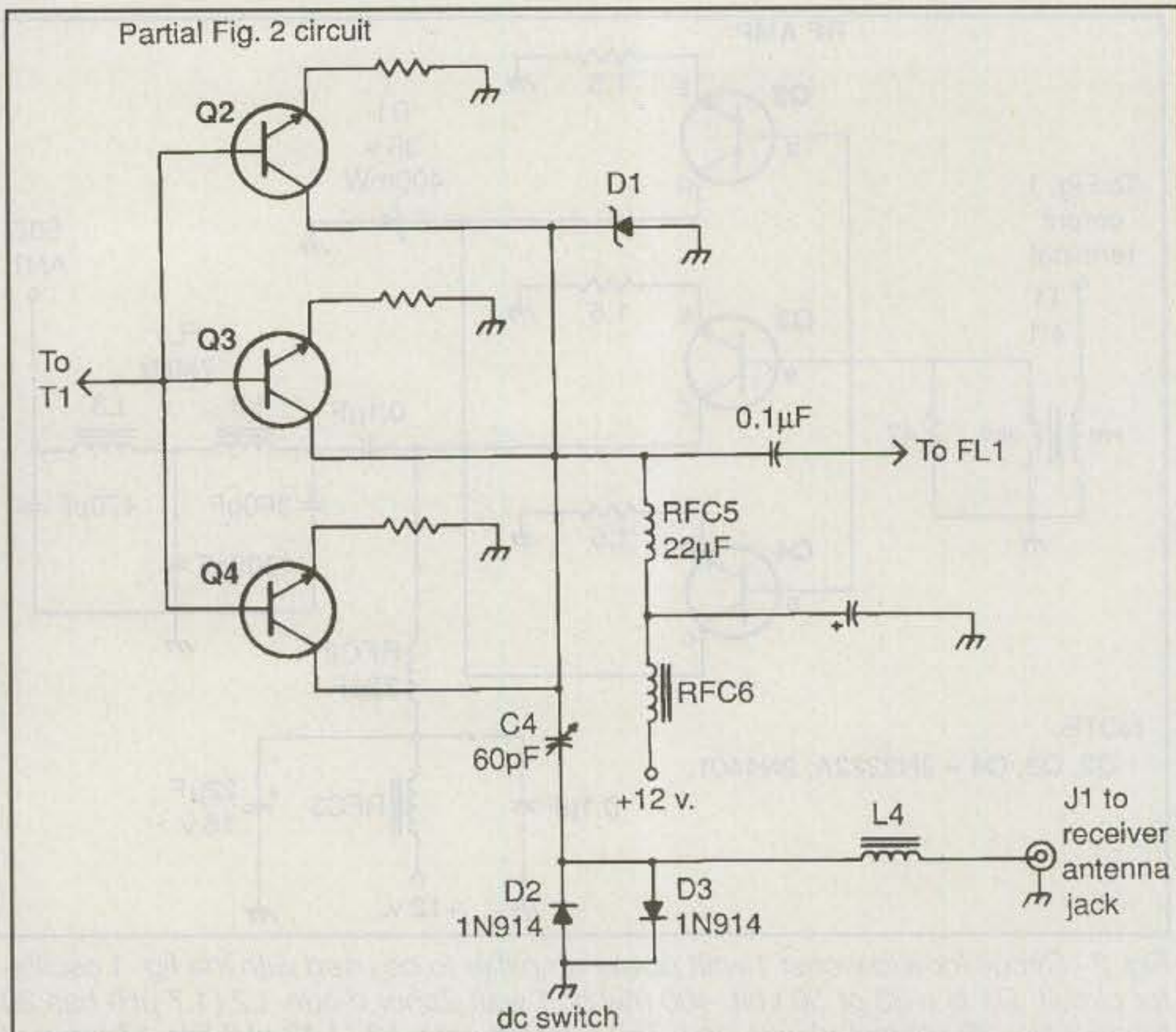


Fig. 4—Circuit details for providing QSK in the QRP transmitter. C4 is a 60 pF plastic or ceramic trimmer. D1 and D2 are 1N914 silicon small-signal diodes. L4 is a 12.9  $\mu$ H coil. Wind 51 turns of No. 30 enameled wire on an Amidon T50-2 toroid core. When adding this circuit, it is necessary to reduce the FL1 input capacitor value (360 pF) to 320 pF, since C4 adds 40 pF to the filter input circuit during transmit. This can be accomplished by paralleling a 270 and a 47 pF capacitor.

the greatest frequency shift. Crystals in FT-243 holders generally are restricted to shifts of 3–4 kHz. The change in frequency is nonlinear. Specifically, the smaller the C5 capacitance becomes, the faster the shift in frequency. The addition of the keying transistor and the VXO components can be done after the basic circuits are built and put into service, thereby embracing the laid-back approach mentioned earlier.

### Adding The Final Touch

Since the circuits described earlier in this article require an arrangement for transferring the antenna from the transmitter to the receiver (TR circuit), wouldn't it be nice to have that function take place within the transmitter? The solution to this problem is presented in fig. 4. The circuit was developed by W7ZOI some years ago, and it provides full break-in without the delay that is common to the VOX function of some transceivers. C4 and L4 are series-resonant at 7 MHz to permit received signals to pass from the antenna, through the transmitter half-wave filter, and to the receiver input circuit. D2 and D3 act as closed switches during transmit, thereby grounding the receiver input circuit. The diodes conduct when trans-

mitter RF voltage reaches them through C4. This presents a short circuit at the input of the receiver. C4 is adjusted for maximum received signal strength. The nominal capacitance for C4 is 40 pF. However, 40 pF of fixed-value capacitance may be used instead of the trimmer, and the performance will be satisfactory. The reactance of C4 ( $X_C$ ) must equal the reactance ( $X_L$ ) of L4 to ensure that maximum signal reaches the receiver. L4 can be eliminated in the interest of circuit simplicity, but there will be a loss in received-signal energy if this is done. The trimmer provides some compensation for possible variations in the inductance of L4 (few toroid coils are precise).

Fig. 5 shows how the circuits look when they are married. However, you can go on the air first with the fig. 1 circuit. The amplifier of fig. 2 can be added later on. The bells and whistles of figs. 3 and 4 may be included after you have had fun with the first two circuits.

### Construction Notes

I did not develop a PC-board pattern for these circuits. My units were assembled (ugly style) on small pieces of single-sided, unetched PC board. I used 560k ohm, 1/4 watt resistors as insulating stand-



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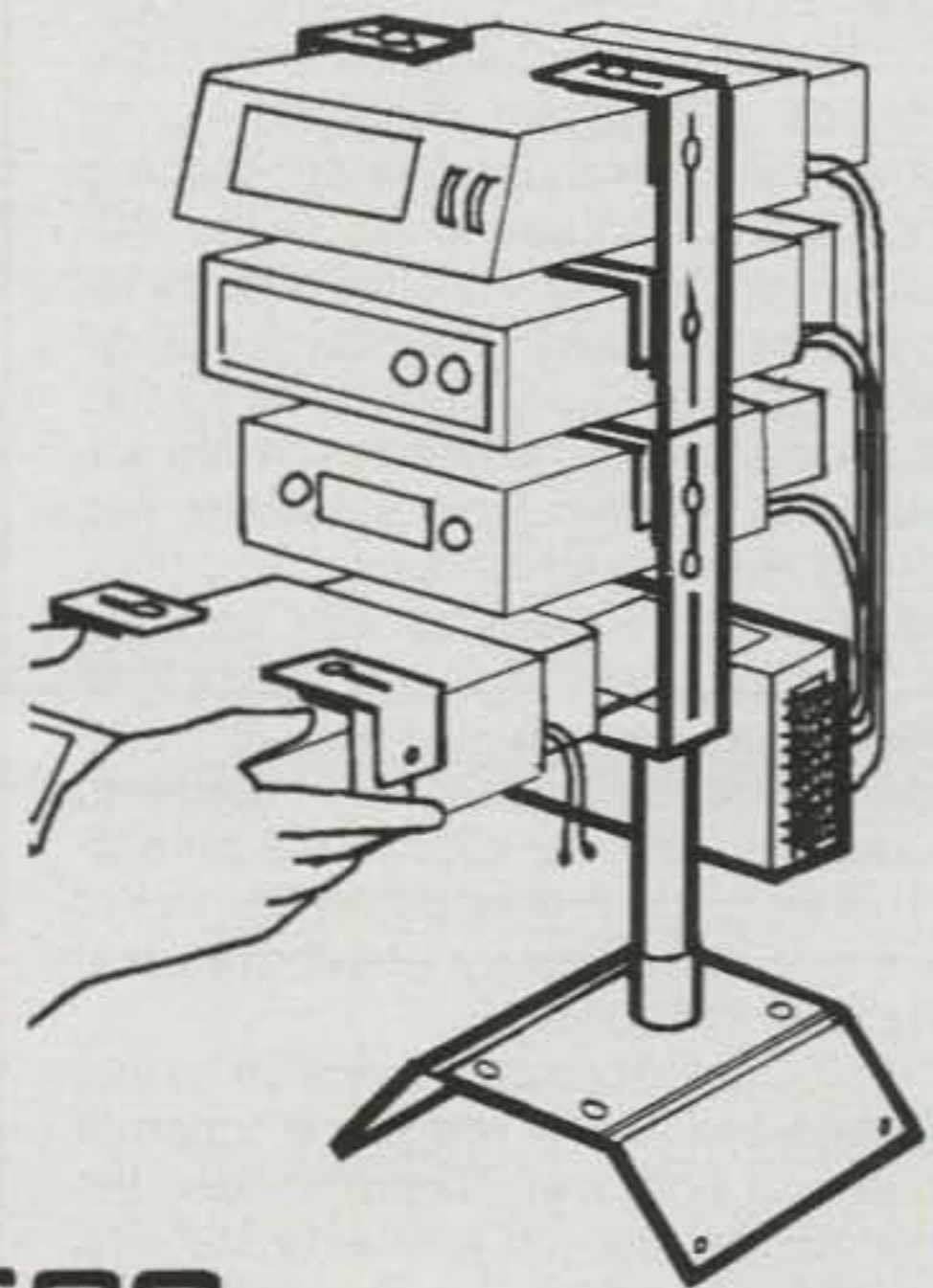
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## Striking News

From PolyPhaser

May 1994

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Volume 3, Number 2

### New Earth Radiation Belt Has Interstellar Matter

NASA's Solar Anomalous and Magnetospheric Particle Explorer (SAMPEX) has confirmed the location of a new belt around the Earth that is composed of different particles than the Earth's two Van Allen belts. Within the inner (lower) Van Allen belt which is mostly composed of protons, the SAMPEX shows a belt of cosmic

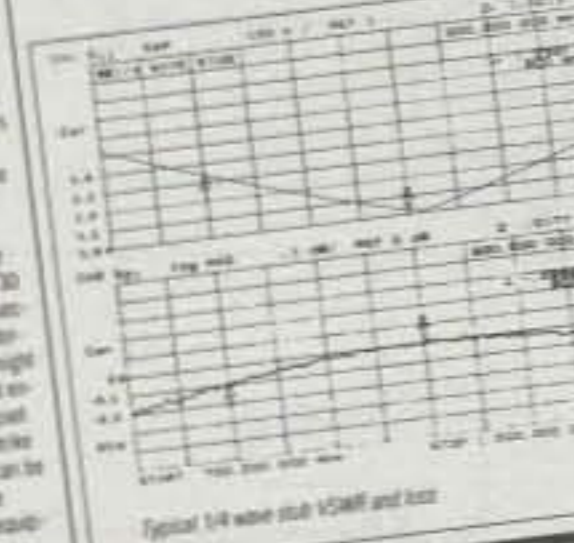
ray nuclei composed of so-called anomalous cosmic rays. These rays are the result of solar wind interacting with interstellar atomic nuclei. At roughly 6000 km elevation, at the equator, was the start of the nuclei detection. The density increases with the latitude of transport activity. The greatest density was above 8000 km over

the South Atlantic anomaly. This is where the Earth's tilted magnetic field brings the belts closest to the surface. This is also where there is a high incidence of lightning. This find may lead to a further understanding of the Earth's upper atmosphere which effects our lightning and weather patterns.

### Why dc Continuity Protectors, Like Simple Gas Tubes and 1/4 Wave Stubs, Don't Work

The dc type gas tube protector covers a large bandwidth, from dc to 10kHz (higher is possible). Few used this bandwidth, the military being the exception. Since lightning has most of its energy in the low frequency area below 1 MHz, the equipment connected to such a protector will have the peak voltage prior to the gas tube's firing as well as the tube's arcing voltage for the duration of the strike. First, if the connected equipment has a dc path to ground, the gas tube will never fire. Typically receivers and cavities are a few of the kinds of equipment with dc paths across their inputs. In the case of receivers, the short to ground is from a static drain inductor. The incoming surge will follow the dc path to ground. The only way to get the gas tube to fire is to have a very fast or short. The only way to get the gas tube to fire is to have a very fast or short. The only way to get the gas tube to fire is to have a very fast or short. The only way to get the gas tube to fire is to have a very fast or short.

strike energy with the equipment. By taking a conventional 1/4 wave stub can be made. Since the center conductor to shield, a 1/4 wave stub can be made. Since the stub section has a high impedance at the cut frequency, it may be used with a tie connector as a short across the transmission line. The stub is a frequency of lightning are attenuated. Like an antenna, the stub is a



# Do You Know...

- ▶ 1/4λ stub protectors ring with lightning energy?
- ▶ which material shields lightning's H field?
- ▶ dc continuity RF protectors don't work?
- ▶ why single point grounding works best?
- ▶ about latent equipment damage?

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Fig. 5—Composite diagram of the individual circuits discussed in this article.

off posts (any high-value resistor is okay) where circuit connections were necessary. One resistor pigtail is soldered to the PC board, and the remaining one is used as a tie point. An alternative approach is to cut 1/4 inch square grids in the PC-board copper to form isolated pads for circuit connections. This may be done easily with a hacksaw. A hobby motor tool and a router bit can be used to create isolated pads on the copper surface in lieu of doing this with a hacksaw.

All RF leads should be kept as short and direct as possible. In-line, rather than parallel, placement of the oscillator and amplifier circuits is necessary in order to discourage self-oscillation of the amplifier. This technique reduces the transfer of unwanted stray energy (feedback) that can cause instability.

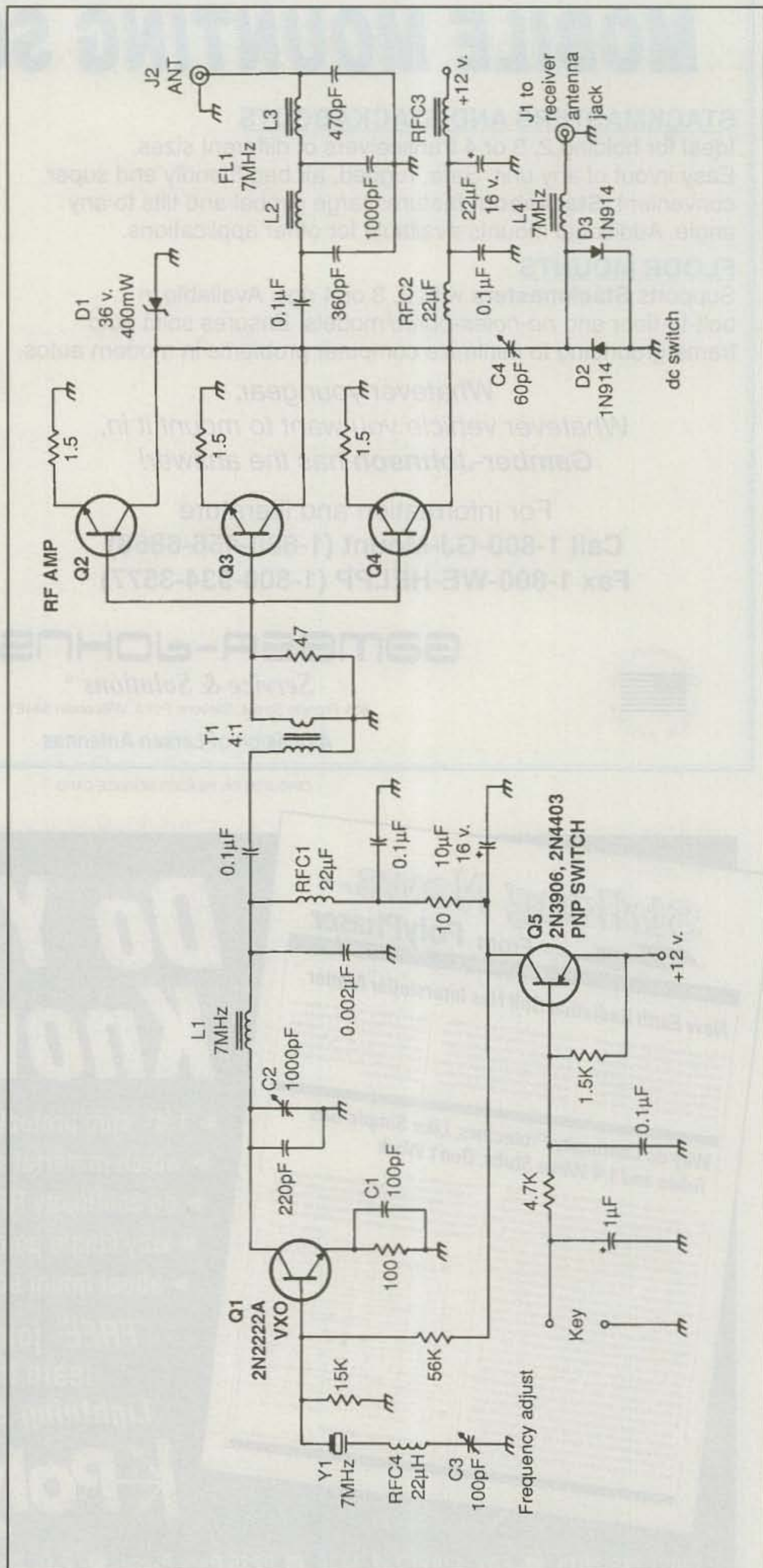
It is prudent to build the amplifier so that the three 2N2222As are close together and in a straight line. This minimizes the transistor lead length and aids stability. Also, the in-line format makes it easy to attach a 1 x 1 inch copper, brass, or aluminum heat sink to the tops of the 2N2222As by means of epoxy cement. If 2N4401s are used, the heat sink can be glued to the flat sides of the transistors. Although using a heat sink is not mandatory, it will keep the transistors cool and extend their lives. A single T0-5 type of RF transistor may be substituted for the three smaller devices. For example, a 2N3866, 2N4427, 2N3553, or similar transistor will provide 1 watt of output power when driven by the fig. 1 oscillator.

### End Notes

If you are now convinced that assembling a QRP transmitter is easy to do, and that it isn't necessary to mortgage your home to buy the components, perhaps this is the time to try your hand in this fascinating and rewarding facet of our amateur radio pastime. Earning your WAS award with QRP could be a goal worth considering, just for "openers."

DX can be worked with low power, especially on CW. I recall a 5 year period in my life when I chose 2 watts as the maximum CW power level for my operating. I worked 42 countries on 7 MHz during 33 days of casual operation while using a square, vertically erected, 40 meter, full-wave wire loop that was only 6 feet off the ground on the bottom side. The antenna was broadside east and west, and operation was from Connecticut with 2 watts of transmitter output power. Numerous homemade QRP receivers, transmitters, and related gear is described in W1FB's *QRP Notebook* (an ARRL publication).

73, Doug, W1FB



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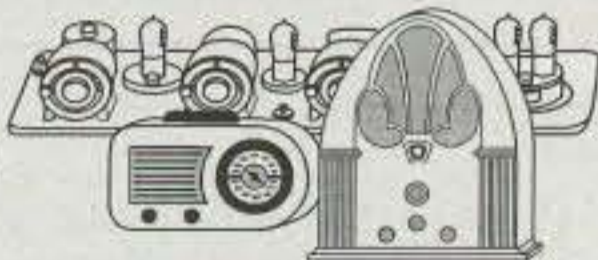
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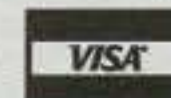
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## NEWS OF CERTIFICATE AND AWARD COLLECTING

This month we congratulate USA-CA award holder:

### Al Kaiser, N1API USA-CA #806, 7-1-93

Al is 49 years old, and when not chasing counties he works in the air-conditioning and building repair business. N1API was first licensed in 1979 as a General class amateur. He is now an Extra class license holder and has held the same call all along.



Al Kaiser, N1API, USA-CA #806.

Al started out on 10 meters QRP in 1979. That was just about the right time, since 10 was just opening up for the winter. It was also one year before the peak of the solar cycle. And 10 meters was hot! Al's father, W1JAX (SK 1973), had been an amateur since about 1935, so Al was pretty familiar with many aspects of amateur radio, including DXing, 10-10, County Hunting, and WAS. He jumped into

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KA3MMM	2791	KE0AY	1119
KE0AY	2792	N4UGH	1120
N4UGH	2793		
WB9CAT	2794	<b>2000</b>	
IV3JWR	2795	W9MSE	1025
KB9AIT	2796	W1NHJ	1026
UC2AW	2797	KA3MMM	1027
		KE0AY	1028
		N4UGH	1029
<b>1000</b>			
ZF2AG	1331	<b>2500</b>	
WB8FSV	1332	KA3MMM	949
W9MSE	1333	KE0AY	950
W0GWT	1334	N4UGH	951
KA3MMM	1335	W9MSE	852
KE0AY	1336		
N4UGH	1337	<b>3000</b>	
		KA3MMM	870
<b>1500</b>		KE0AY	871
ZF2AG	1115	N4UGH	872
W9MSE	1116		

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 \$2.00. To qualify for the special subscriber rate, please send a recent CQ mailing label with your application. To be eligible for the USA-CA Award, applicants must comply with the rules of the program as set forth in the revised USA-CA Rules and Program dated June 15, 1991. A complete copy of the rules may be obtained by sending an SASE to Norm Van Raay, WA3RTY, USA-CA Award Manager, Box 76, Pleasant Mount, PA 18453-0076 USA. DX stations must include extra postage for airmail reply.

most of these areas with both feet.

County Hunting for Al started when he checked his 10-10 and WAS QSL cards and found that he was well on his way toward USA-CA. He picked up his first big rig, a TS-820S, and that opened up other bands for him. While working toward 5 Band WAS, he discovered the County Hunters Net on 14.336.

### SPECIAL HONOR ROLL

Elwood H. Austin, KA3MMM  
USA-CA All Counties #847  
September 11, 1994

Frank Tissot, KE0AY  
USA-CA All Counties #847  
September 15, 1994

Patricia K. Edwards, N4UGH  
USA-CA All Counties #849  
September 17, 1994

Al tried a short mobile stint in the early 1880s, but a poor electrical system in his Chevrolet put QRT to that effort. A heavy workload in the mid-80s forced Al into a period of inactivity. He soon realized, however, that if he ever wanted to get his USA-CA number, he'd better get back on the ball.

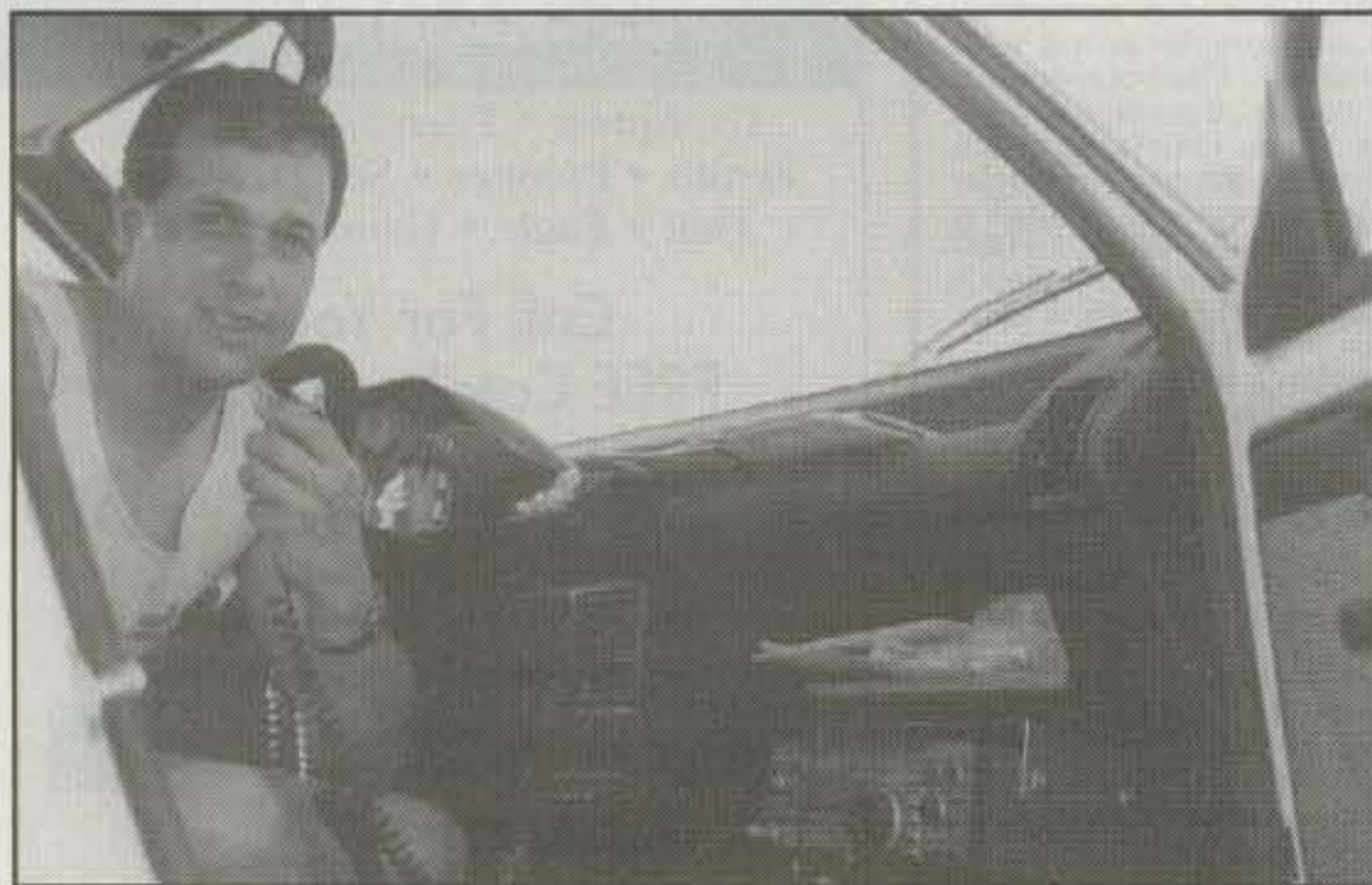
Over the past 15 years Al has talked to many County Hunters and has met a few for eyeball QSOs. One thing is for certain: without the help of many mobiles and county hunters, he would never have received USA-CA #806. He is now again "mobile," giving back some of what was given to him.

Perhaps we'll see Al at next year's MARAC convention in upstate New York!

### Awards Issued

**USA-CA 500:** W9MSE #2790; KA3MMM #2791; KE0AY #2792; N4UGH #2793; WB9CAT #2794; IV3JWR #2795; KB9AIT #2796; UC2AW #2797.

**USA-CA 1000:** ZF2AG #1331; WB8FSV #1332; W9MSE #1333; W0GWT #1334;



Shlomy (Moni) Shafir, 4X6ZK/M, sent these pictures depicting his mobile operation for the Holy Land Award program from Zfat in north Israel and the Kineret (Sea of Galilee). I wonder if he was on a county line?!

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The Wrocław Award issued by Polish  
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KA3MMM #1335; KEØAY #1336; N4UGH  
#1337.

**USA-CA 1500:** ZF2AG #1115; W9MSE  
#1116; W1NHJ #1117; KA3MMM #1118;  
KEØAY #1119; N4UGH #1120.

**USA-CA 2000:** W9MSE #1025; W1NHJ  
#1026; KA3MMM #1027; KEØAY #1028;  
N4UGH #1029.

**USA-CA 2500:** KA3MMM #949; KEØAY  
#950; N4UGH #951; W9MSE #852.

**USA-CA 3000:** KA3MMM #870; KEØAY  
#871; N4UGH #872.

## Award News

**Wrocław Award.** The Wrocław Award is issued by the Polish Amateur Radio Club station, SP6PKQ, "IKAR," located in Wrocław, Poland. The award is available to licensed stations for contacting stations in Wrocław which have been operating since 6 May 1945.

**Requirements:** DX stations 10 points; EU stations 15 points.

**Scoring:** Each QSO 2 points; each QSO with SP6PKQ 5 points; each QSO with prefixes SPØ, SR, SN, SQØ, 3Z 7 points; each QSO made during the celebration of the "Days of Wrocław" (May 6-10) counts double. Contact with stations may be repeated on all bands and with different modes of emission. The same conditions apply to SWL stations.

Ten IRCs must accompany each application to cover cost of the award. The application must be confirmed by your club or two licensed amateurs and should be sent to the club station address.

## On A Personal Note

I spent a few hours at the Binghamton, New York Hamfest on October 1, 1994. Just like Dayton, it poured cats and dogs. Everyone seemed to be having a good time however, and the crowd was good. Congratulations to Binghamton amateurs on a nice gathering.

73, Norm, WA3RTY

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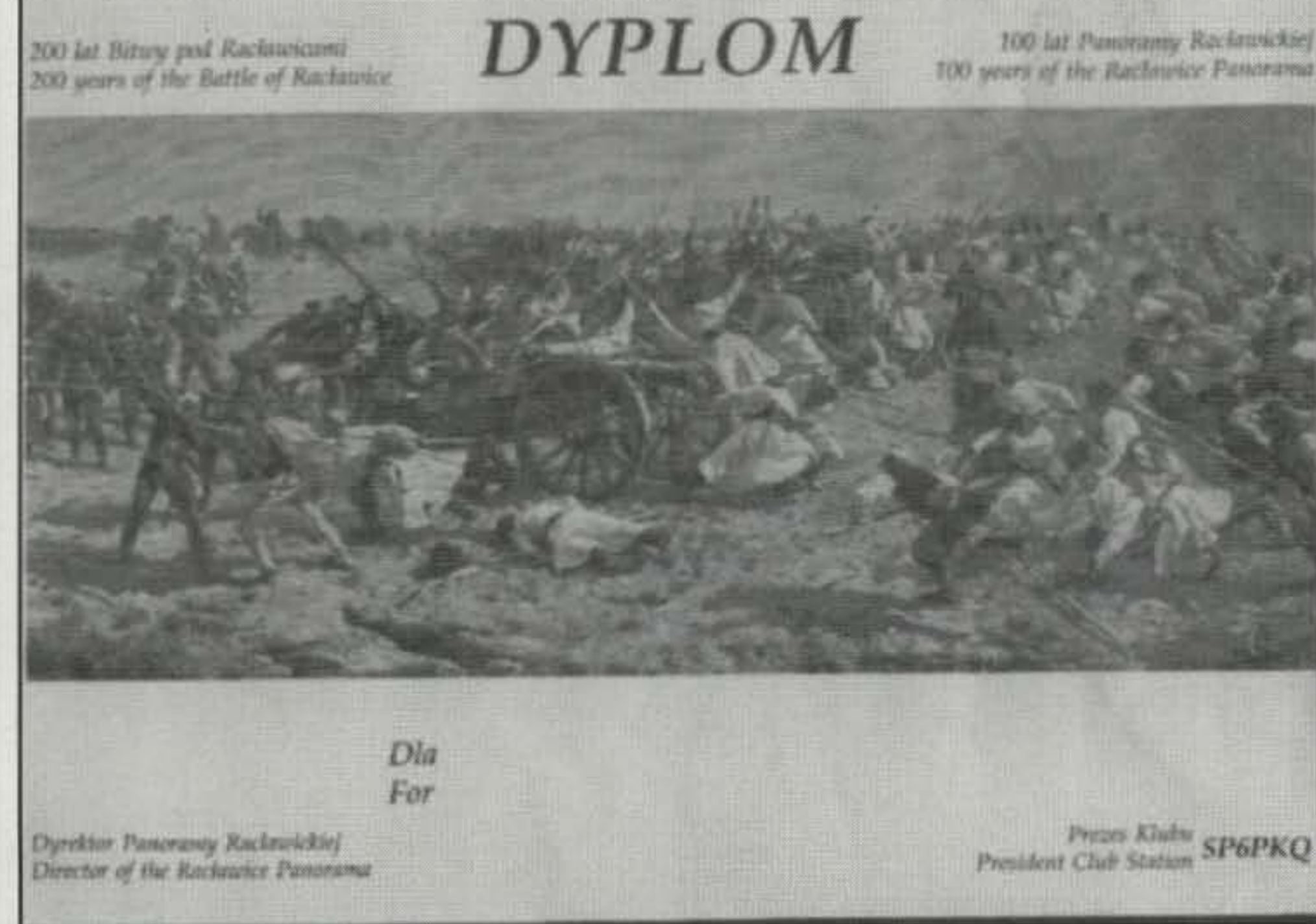
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## A Nifty Shortwave Receiver For The Beginner

**W**ant something to give to a young child for a Christmas or birthday present? You can either build this inexpensive shortwave receiver yourself, or give it as a kit to be assembled by the user. It is inexpensive (about \$20 worth of components) and sure-fire in performance.

The receiver design is by Charles Kitchen of Analog Devices, Wilmington, Massachusetts. It was described in the "Design Ideas" section of *EDN* magazine, the design magazine of the electronics industry.<sup>1</sup>

The circuit of this simple receiver is

48 Campbell Lane, Menlo Park, CA 94025

shown in fig. 1. With the coil shown, the tuning range is 5 to 10 MHz. This covers the 40 meter amateur band and several international broadcast bands. Adding or subtracting turns from coil L1 will change the tuning range.

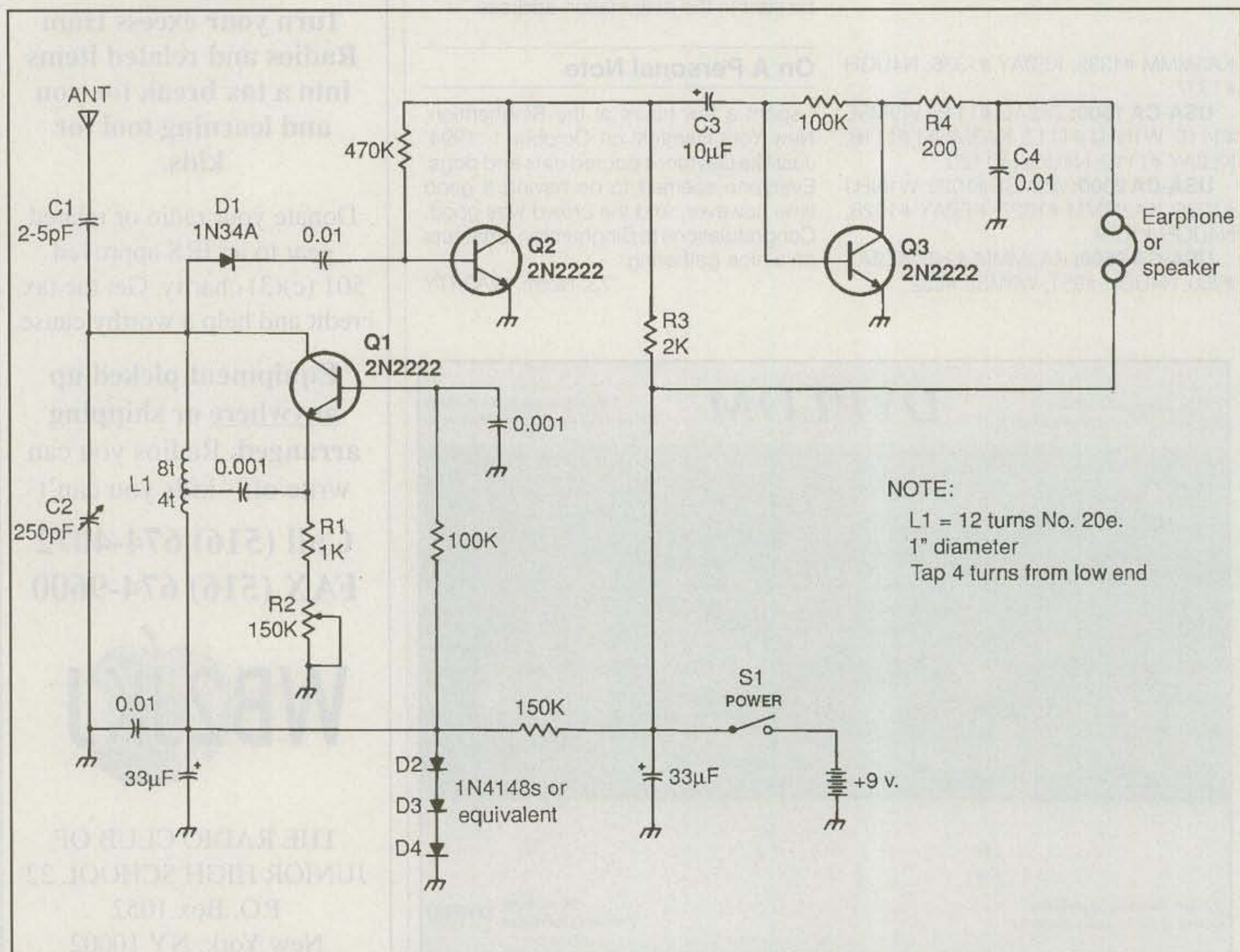
Transistor Q1 serves as a high-gain regenerative RF stage. The regeneration greatly increases the selectivity of the circuit and also provides SSB reception. Level of regeneration is provided by varying the emitter bias by means of R2. For reception of most signals, R2 is adjusted to the edge of oscillation.

Diode D1 serves as a signal detector, coupled to a two-stage transistor amplifi-

er (Q2, Q3), which has sufficient output level to drive headphones or a small speaker.

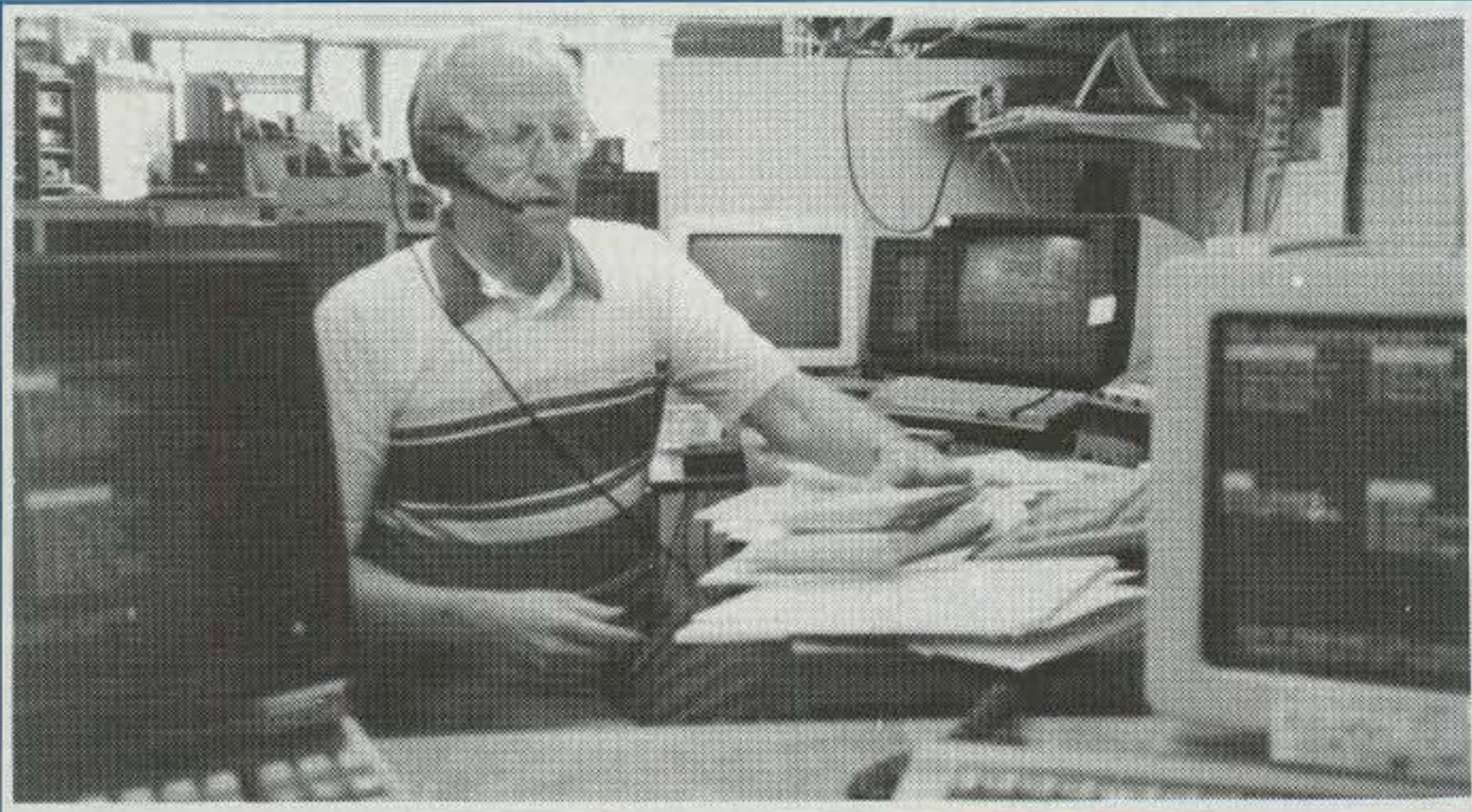
You can add an audio volume control by making R3 (2K) a potentiometer and connecting capacitor C3 to the variable arm. Components R4 and C4 form a low-pass filter that improves sound quality and prevents circuit instability. Diodes D2, D3, D4 are a simple voltage regulator for Q1, which minimizes drift. Coil L1 is one inch in diameter. It can be wound on a plastic film can or pill bottle.

If a short whip antenna is used, it should be connected directly to the top of coil L1. A larger antenna for better reception



NOTE:  
L1 = 12 turns No. 20e.  
1" diameter  
Tap 4 turns from low end

Fig. 1—An inexpensive shortwave receiver for the beginner.



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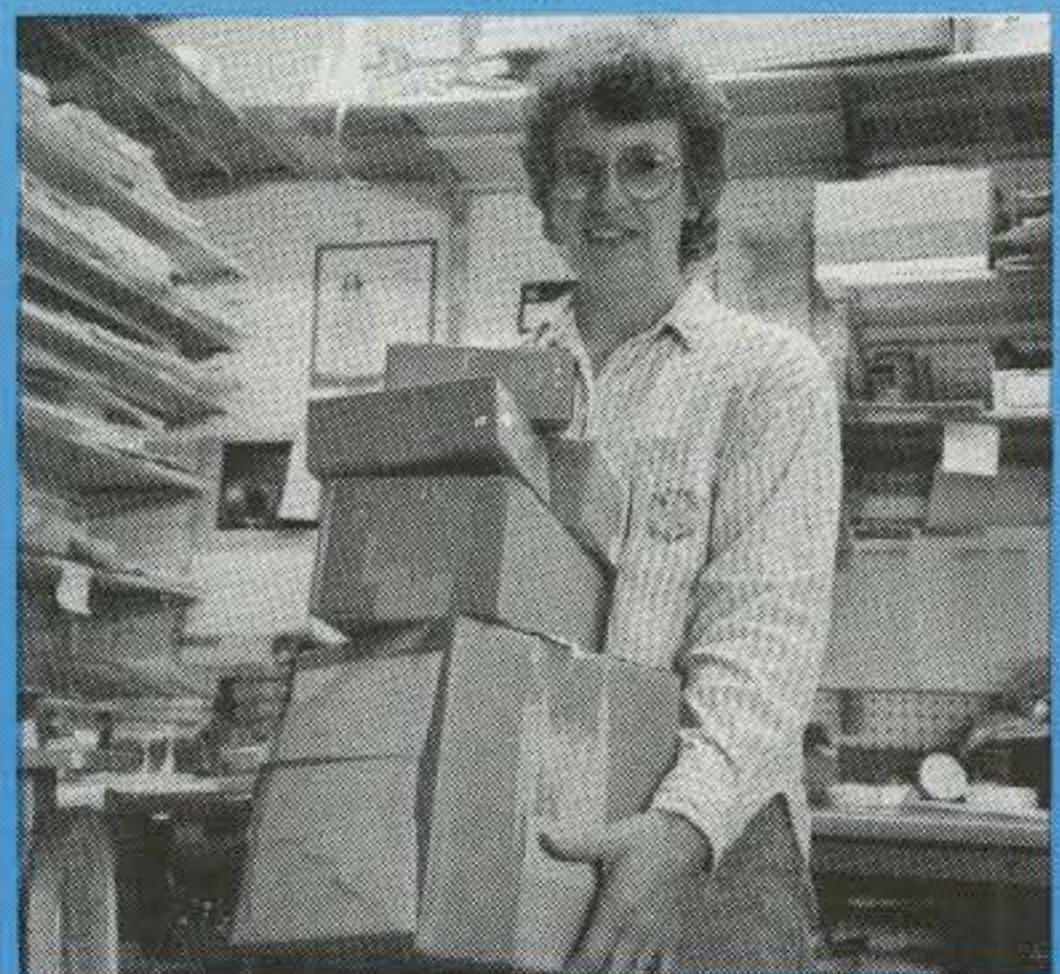
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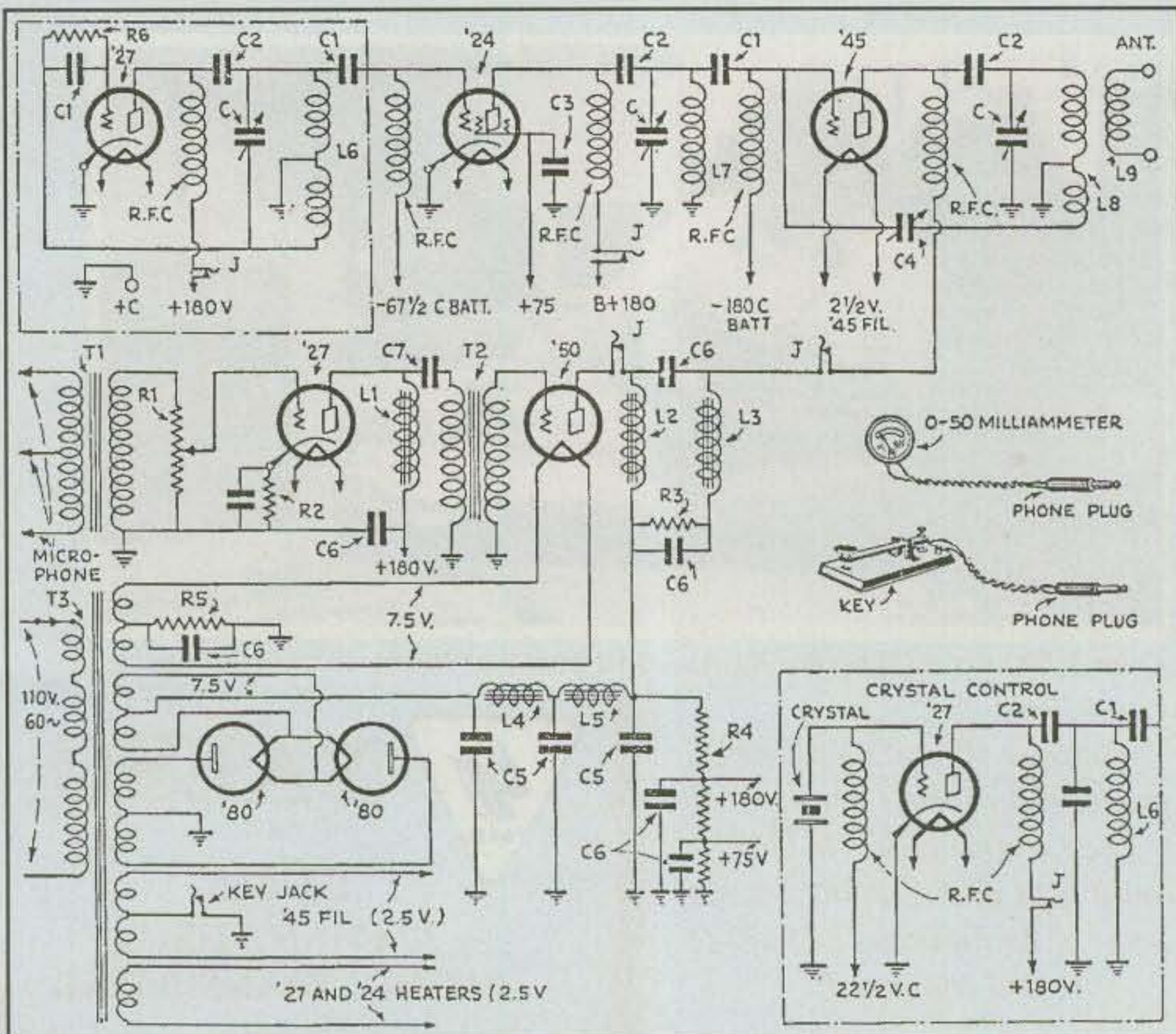


Fig. 2—A simple 1932-style phone transmitter.

is coupled through capacitor C1 to prevent overload and tuning "dead spots."

The receiver draws less than 10 ma from a single 9 volt battery, and the power level of Q1 is low enough so that the oscillating detector does not interfere with other receivers in the area.

### A Latter-Day SW-3?

It's tempting to compare this simple, modern regenerative receiver with the famous National SW-3 receiver, which was a popular inexpensive shortwave receiver on the market for nearly two decades.

In the '30s the SW-3, less power supply, cost about \$150 in terms of today's inflated dollar. It was a three-tube circuit (RF amplifier, detector, and audio stage) and consumed about 180 volts at about 30 ma.

The SW-3 used two plug-in coils per range, and a complete set of coils covered 10 meters to the long waves. Additional coils provided bandspread reception for the amateur bands.

Operationally, the SW-3 was very sensitive in the regenerative state, and broad as a barn-door when regeneration was reduced. It was susceptible to signal overload, frequency stability was poor, and the receiver was microphonic on the higher frequencies. Even so, with all of these problems it was a state-of-the-art design in 1933, and the SW-3 is a sought-after item among collectors of old-time radios.

Those who have operated an SW-3 will be impressed with the attributes of Charles Kitchin's receiver. I propose you build this little gem, and you'll understand why I think Mr. Kitchin is the modern-day James Millen!

### A "Modern" Phone Transmitter

For those nostalgic amateurs for whom the mention of the SW-3 receiver brings tears to their eyes, I offer this fine phone transmitter circuit, straight from the pages of an early 1932 issue of *Radio News* magazine (fig. 2).

The 8-tube transmitter operates on 160 meters and delivers a 5 watt AM/CW signal. It requires a 450 volt power supply, and 67 1/2 and 180 volts of battery bias.

This little monster employs a 27 tube (either self-excited, or as a crystal oscillator), a 24 screen grid tube as a driver stage, and a 45 as a class-C amplifier, running about 9 watts input.

A double-button carbon mic is used, followed by a 27 speech amplifier, transformer coupled to a 50 class A modulator. The modulator runs at 450 volts.

No additional details on components are available, but an old timer can make an educated guess at all of them. Unfortunately, there are two errors in the power supply circuit. First, the rectifier tubes are type 81s, not type 80s. Second, filament voltage for the 81s is noted as 7.5 volts for half the filament winding. It should be 7.5 volts across the whole winding!



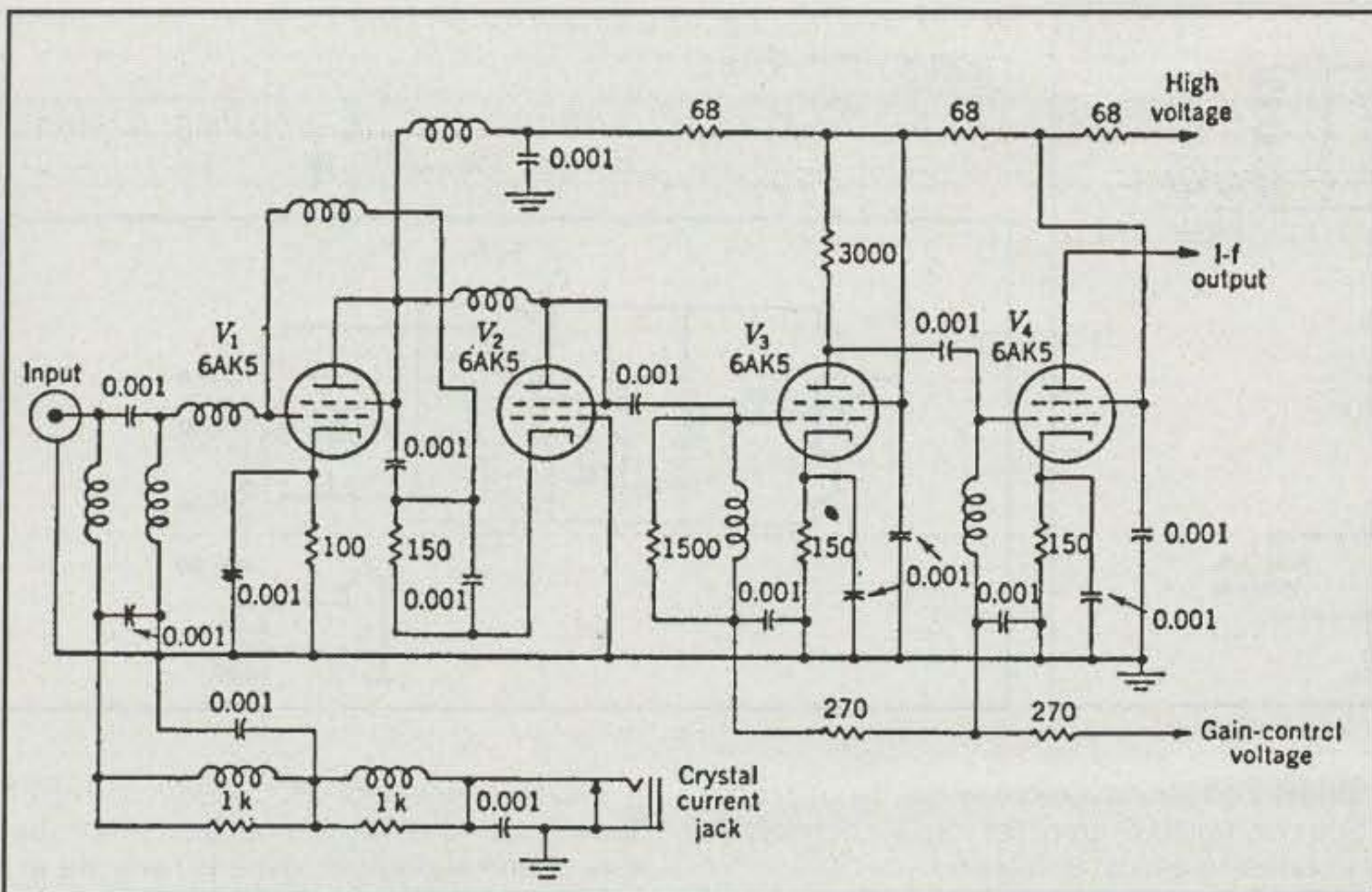


Fig. 3—The post-war cascode VHF amplifier. (Drawing from "Volume 18.")

Sharp-eyed readers will also note that the plate tuning capacitor of the alternative crystal oscillator is drawn as a fixed unit, not as the required variable capacitor.

Aside from these minor drawing goofs, the circuit should work and be built easily by old timers with a big junk box! Alternatively, the whole thing could be duplicated today with four transistors and a 12 volt supply! Take your choice.

## The Quest For A Better 2 Meter Receiver

The following material on VHF tubes is contributed by Hank Olson, W6GXN. Hank is a historian of early radio techniques and communication.

World War II was over and hams had a new lease on life! Not only were they back on the air, but those who had been part of the war effort were well aware that a wealth of military communication equipment would be either directly useful, or easily converted for the new VHF ham bands.

The first problem of post-war VHF operators was that all the gear built before the war, or that which had been made for the War Emergency Radio Service (WERS) during the war, was on the wrong frequency! The old 2½ meter band was gone forever to serve the needs of aircraft communication, and in its place was the new 2 meter band, some 25 percent higher in frequency. Since most of the old 2½ meter equipment used tubes that were strained to "just make it" to 112 MHz, these designs were not readily converted to the new band.

On the positive side was the fact that war research had created many new tubes and techniques that were to make the new band better than any of the pre-war VHFers could have imagined!

The old band had been mostly populated with modulated oscillator transmitters and super-regenerative receivers and, for equip-

ment reasons, was therefore a short-distance band, with few exceptions.

But now the post-war VHF ham could buy a crystal-controlled SCR-522 transmitter/receiver surplus for almost the price he'd paid for parts for a modulated oscillator. The SCR-522 gave the VHFer a powerful transmitter that worked directly on 2 meters using 8 MHz crystals. The receiver section of the SCR-522, although not as easy to use as the transmitter because of mechanical problems, was a superheterodyne and pointed the way toward the stability and narrowband VHF receivers that were soon to come.

The SCR-522 and other equipment, such as the BC-1068 receiver, got hams past the modulated oscillator concept. Now it was time for experimenters to refine this gear to create the high power, narrow band, low noise systems needed for super-VHF DX.

### Volume 18

Low noise, high sensitivity receivers for radar service had received intensive research during the war. When the results of this research were declassified and released in the MIT Radiation Laboratories series of books, it was a renaissance to those who took the trouble to read and understand the material. Volume 18 in the series ("Vacuum Tube Amplifiers"), by Valley and Walman, was the key to improved receiver sensitivity (fig. 3).

Most hams were not aware of such arcane publications as the "Rad-Lab" series, since these volumes were written for the engineering world.<sup>2</sup> General publication of the material appeared in the "Proceedings" of the IRE in June 1948. By March 1949 a cascode RF amplifier built by W1EZV appeared in QST (fig. 4).

During this formative period, VHF hams were doing their own experimentation on 2 meter front-ends using cheap surplus tubes. The 6AK5, 6J6, 6J4, and 7F8 tubes held promise and were widely used. The 6J6 and 7F8 were high-gain twin triodes useful as a push-pull, cross-neutralized amplifier, or as a combination oscillator-mixer (fig. 5). The 6J4 was designed for use as a grounded-grid amplifier, and the 6AK5 could be used as a tri-

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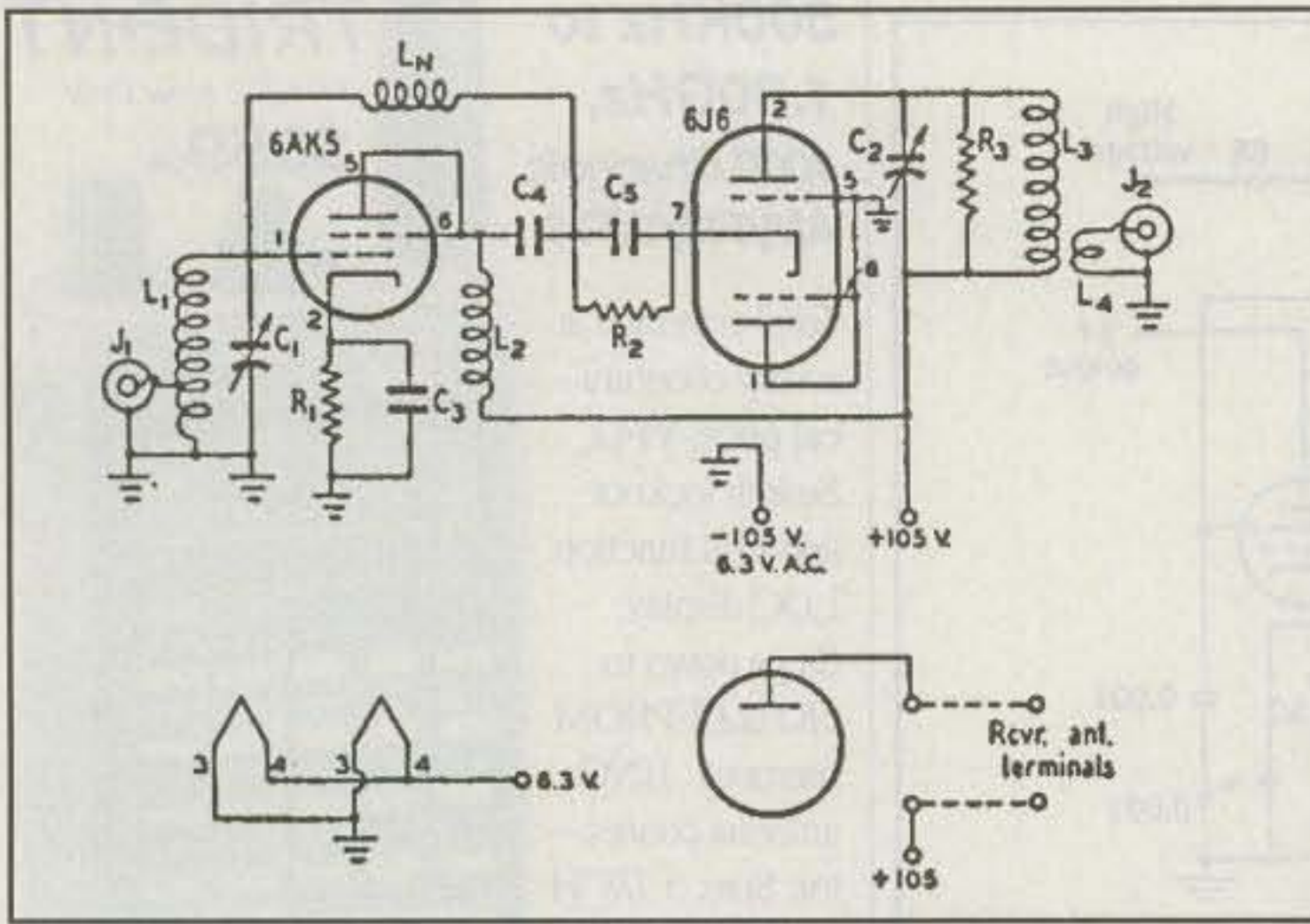
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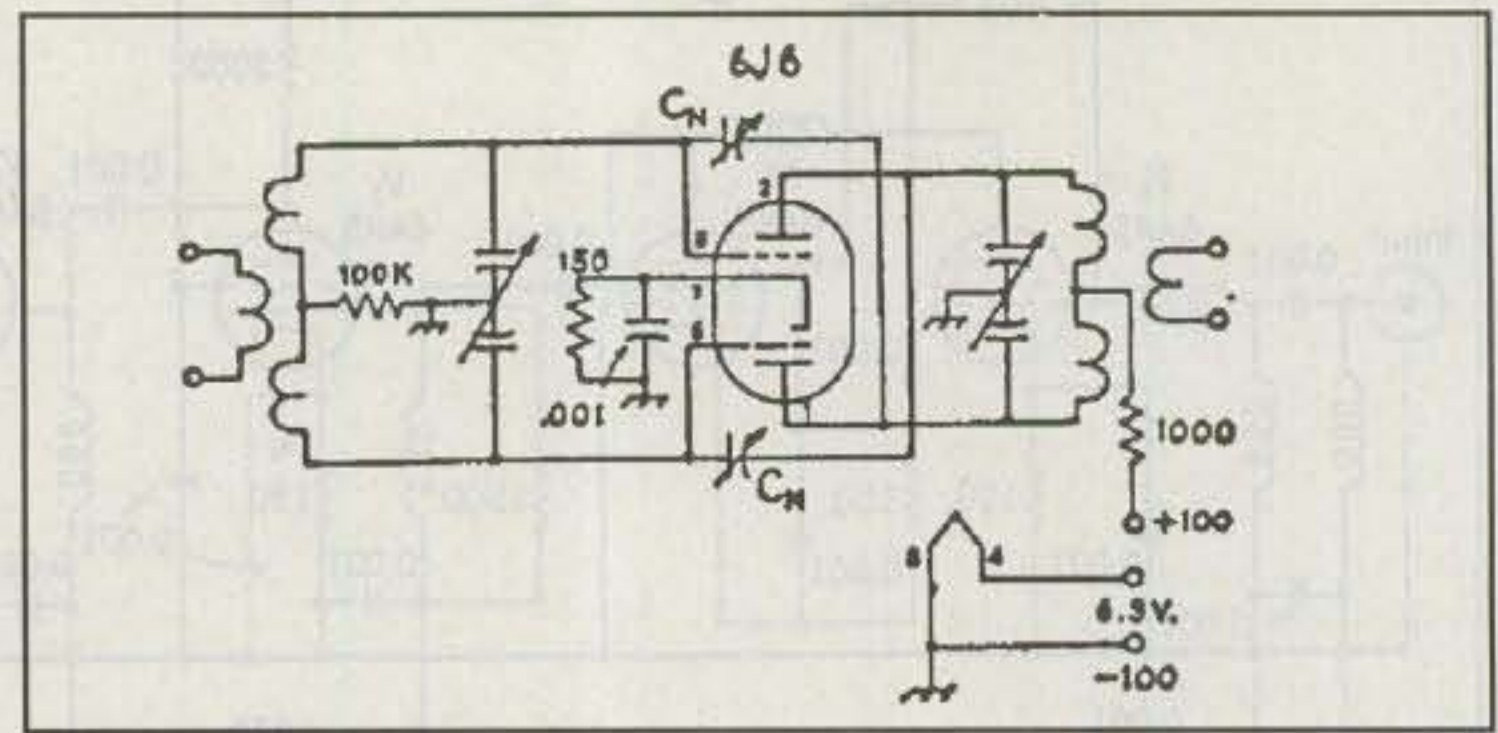
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← Fig. 4—The cascode circuit for 50 MHz by W1EZV. (Drawing courtesy the ARRL.)

Fig. 5—The popular push-pull 6J6 RF amplifier. (Drawing courtesy the ARRL.) ↓



ode or pentode. The 6J6 caught on as a popular tube, and it generally provided lower noise figure than the other readily available types.

The new-post war 12AT7 was next used in the push-pull circuit, followed by the 2C51/5670 as "the latest and best" tube for the push-pull circuit.

#### The 630TS TV Receiver

As far as commercial post-war VHF design, the 7F8 was quickly incorporated into the Browning FM tuner for the new 88–108 MHz band. Also, in the TV industry, the first large production series of receivers, the RCA 630TS (30 tubes!), used three 6J6s in its tuner. And, as RCA licensed the 630TS design to the

industry on very favorable terms, the use of the 6J6 push-pull RF amplifier for TV channels 2–13 became almost universal.

The summation of "Volume 18" was that noise figure would improve inversely as transconductance and input capacitance. Also, that triodes were lowest in noise because they lacked the partition noise of multigrad tubes and finally, that there was an advantage to using the cascode configuration. The relatively rare Western Electric 416 and 417 were used with great success and some hams even used a new, small transmitting tube, the 2C39, as a receiver front end.

In the TV and FM tuner industry, the cascode circuit and a new series of tubes were

eventually developed: 6BQ7, 6BK7, and 6BZ7. Because of quantity production, the tubes were cheap enough for general ham use at 2 meters.

Towards the end of the tube era, transistors began to infiltrate both the TV/FM and VHF ham equipments. Early germanium transistors were not able to compete with the noise performance that the best tubes would provide, but eventually the Philco and Sprague MADT types became competitive with tubes, as far as noise figure was concerned.

The tube industry fought back with the Nuvistor, but it was a rear-guard battle, too little and too late. The new silicon bipolar transistors and later FETs were to become pre-

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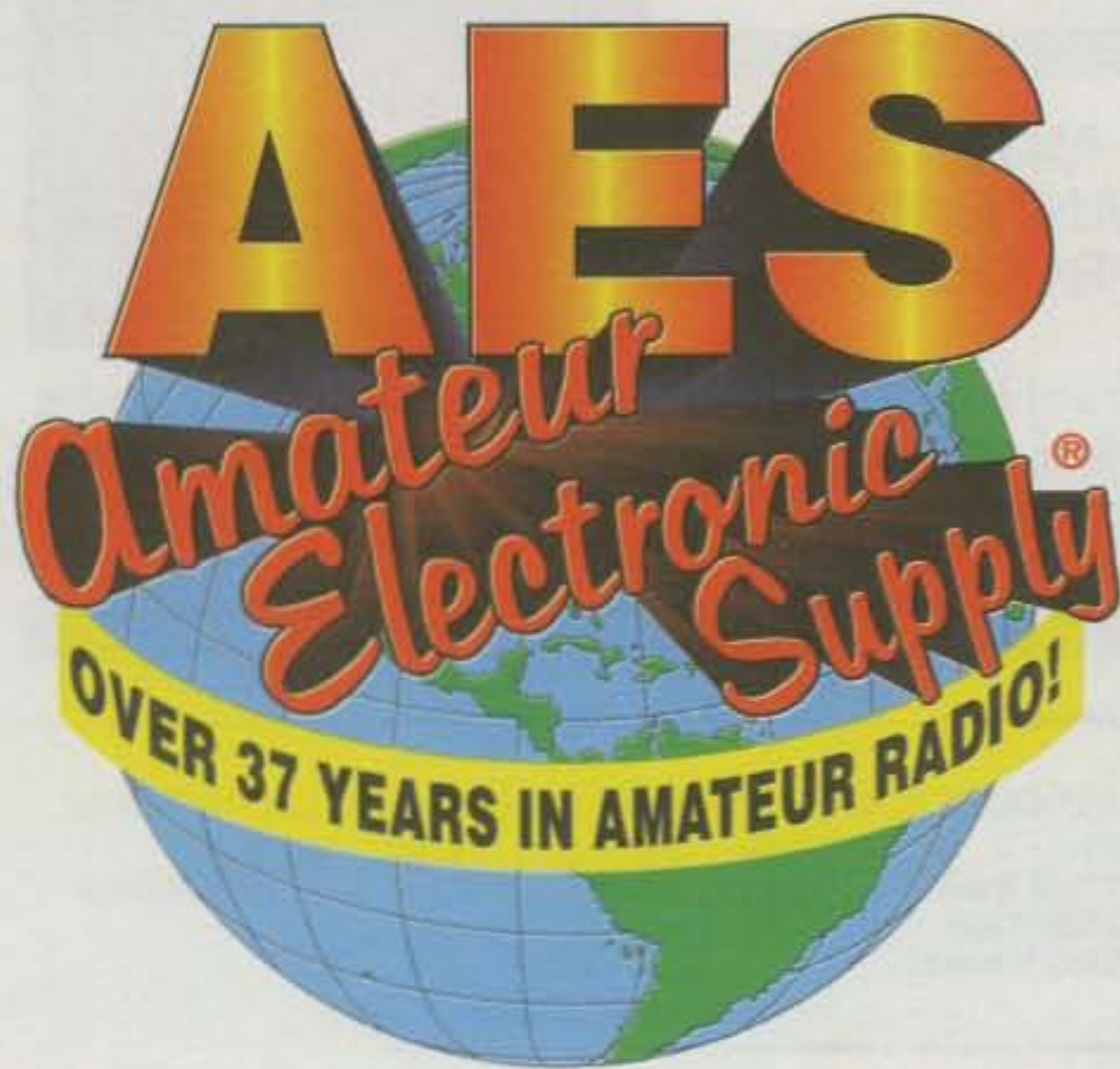
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**FT-890/AT HF Transceiver** • tx: 160 to 10m Amateur Bands • rx: 100kHz to 30MHz • 32 memories plus two VFOs per band • 100w • automatic antenna tuner • IPO • DDS • FSP • automatic 10 meter repeater offset • selectable CTCSS encode • requires 13.5VDC @ 20A • 9 1/2" w x 3 1/2" x 9 1/2" d, 12.3 lbs.

**FT-890** • above, without antenna tuner.



**FT-900/AT HF Transceiver** • tx: 160 to 10m Amateur Bands • rx: 100kHz to 30MHz • 100W • 100 memories • built-in antenna tuner • front sub-panel optionally mounts separately from the main body • CTCSS encode with repeater offset • twin stacking VFOs. **FT-900** • does not have built-in antenna tuner.



**FT-736R Multi-Mode U/V Full Duplex Base** 2 meters: 144-148MHz; 70cm: 430-450MHz • optional modules for 50, 220MHz and 1.2 GHz • 100 memories • full duplex crossband with inverted tracking (AO-13) • data in/out jack • 25w (144, 220 & 440MHz) 10w (50 & 1.2GHz) • built-in AC power supply or 13.5VDC • 5 1/2" h x 14 1/2" w x 11 1/2" d, 19.8 lbs.



**FT-5200/6200 Dual Band Mobiles** 32 memories • CTCSS encode • dual receive • built-in duplexer • cross band repeat • remote capability • 5 1/2" w x 1 1/2" h x 6" d, 2 lbs.  
**FT-5200** • 2M/440MHz (50/35w).  
**FT-6200** • 440MHz/1.2GHz (35/10w)  
**FT-5100** • Like FT-5200 w/o remote capability.



**FT-2200/7200 Mobiles** 50 memories • DTMF page/coded squelch • backlit DTMF mic • 5 1/2" w x 1 1/2" h x 6 1/2" d, 2.8 lbs.  
**FT-2200** • 2m with 110-180MHz rx (50w).  
**FT-7200** • 440MHz (35w)



**FT7400H Mobile (left)** • 440MHz (35w) • 31 memories • alpha display • track tuning • CTCSS encode • backlit DTMF microphone • 6 1/2" w x 1 1/2" h x 7" d, 3.3 lbs.  
**FT-912RH Mobile (right)** • 1.2GHz  
**FT-2500M 2m Mobile (not pix)** • 50w • 31 memories • CTCSS encode • scan • backlit DTMF mic • 6" w x 1 1/2" h x 7" d, 1 1/2 lbs.



**VHF/UHF Multi-Purpose Mobiles/Portables** FM/SSB/CW • 2w with 12V @ 1.1A, or optional battery case • DTMF mic w/up-down tune • dual VFOs • 10 memories • scan • LCD display • strap • 2 1/2" h 6 1/2" w x 7 1/2" d, 2.6 lbs.

**FT-290RMkII** 2m (25w) • **FT-690RMkII** 6m (10w) • **FT-790RMkII** 430-450MHz (25w)



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**FT-815** 440 HT/batt/chgr..... **CLOSEOUT** \$299<sup>ms</sup>  
**FT-816** • 440 MHz HT/batt/chgr, black HT  
**FT-23R-17** • 2.5w 2 meter FM HT  
**FT-23R-12** • as above but 2 meters, 5w  
**FT-33R** • 5w 220 MHz FM HT  
**FT-530** • 2m/440 FM HT w/TTP  
**FT-11R** • 1.5w 2 meter FM HT  
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**FT-41R** • 440MHz FM HT

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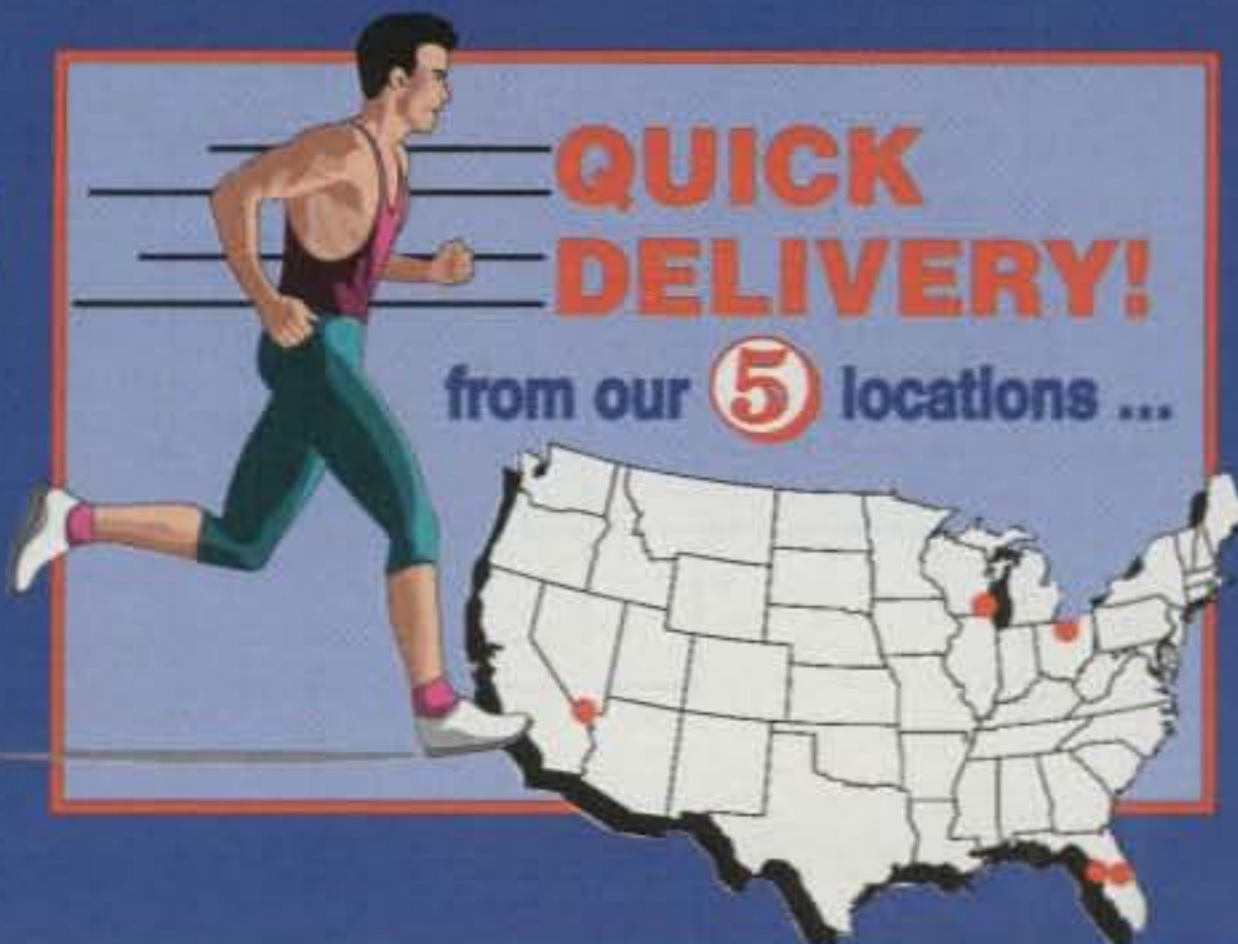
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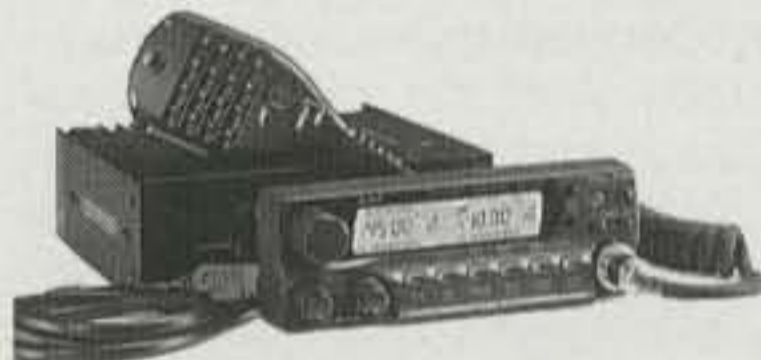
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**DR-600TB 2m/440MHz Twin Band Mobile** 45W (2m)/35W 440 MHz • receives 118-174 (including AM and 410-470 MHz • 40 memories • scan • full duplex cross band operation • remotes from any DTMF capable 2m or 70cm unit • separate VHF/UHF outputs • separate controls for each band • CTCSS and DTMF encode • 5½" w x 2" h x 7" d, 3½ lbs.

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**DR-1200TH2** • The 9600 baud version.

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**DJ-180T DJ-580T DJ-F1T DJ-G1T**

**DJ-180T 2m HT** • E-Z to operate! • receives 130-174 MHz • 2.0W, 5W with optional battery. Illuminated LCD display • 16 digit DTMF • 10 memories • 5½" h x 2¾" w x 1¾" d.

**DJ-180TH** • Same as DJ-180T, 5W standard.

**DJ-580T 2m/440MHz Twin Band HT** • 2.5W • receives 130-174 & 410-470MHz. Modifies for MARS/CAP tx, + 118-136MHz+ • 40 memories • CTCSS encode/decode • DTMF encode • DSQ • full duplex cross band repeat • scan • autodialer • back-lit keypad • simult. rx on both bands-separate controls • 6½" h x 2¾" w x 1¾" d, 0.97 lbs.

**DJ-F1T 2m Mini HT** • 2.5W • receives 130-174MHz and 118-136MHz • scanning • autodialer • back lit keypad, 40 memories • call channel • CTCSS • DTMF encode • DSQ paging • 4¾" h x 2¾" w x 1¾" d, 14 oz.

**DJ-F1T/HP** • Same as DJ-1FT but 5W • 12V 600mah nicad battery standard.

**DJ-G1T 2m HT** • 2m tx/rx + 440MHz and AM aircraft receive • Channel Scope spectrum analyzer • 80 memories -5 for autodialer • Crossband semi-duplex operation • DSQ paging • Scan • 4¾" h x 1¾" w x 1¾" d, 12.6 oz.

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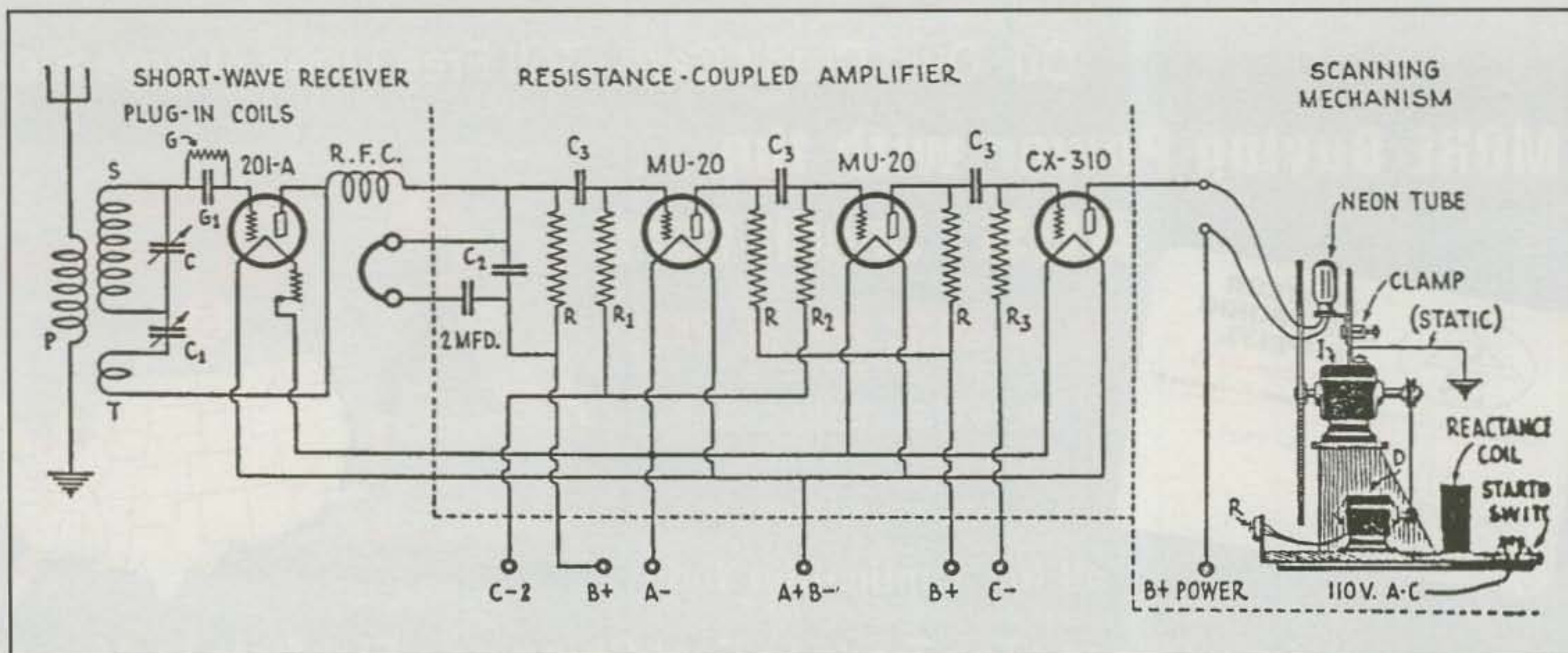


Fig. 6—A four-tube television receiver of the early 1930s. Mechanical, motor-driven scanning disk was used.

eminent in the never-ending quest for lower VHF noise figure. Like the dinosaur, the VHF vacuum tube faded into history and into museums of collectors of old radio gear.

### Television on 40 and 20?

In the period 1928–29 there was great interest in television among a few home enthusiasts. A handful of experimental stations were transmitting crude images (48 lines, 15 frames per second) on an experimental basis at about 187 meters. Signal bandwidth was restricted to 100 kHz. These signals were easily received and a crude image could be recovered using a "flying disc" receiver.

Less well-known were experimental television transmissions on higher frequencies. Was long-distance TV reception possible? W8XAV (KDKA) ran a 60-line, 20-frame transmitter (2 kw peak) on 62.5 meters, and W1XAY (Lexington, Massachusetts) was on 62 meters with 300 watts, peak.

Higher in frequency, W3XK (Washington, DC) ran 250 watts on 47 meters and W2XAD (WGY) ran on 19.56 meters. RCA had a 5 kw station (W2XBW) near the 20 meter amateur band, and in Los Angeles W6XC was on 66 meters.

The Federal Radio Commission also proposed amateur TV transmissions in the 5 meter amateur band, but it is unknown if there was any experimental work in this band at this early date.

Many receivers in use were simple circuits (fig. 6). A regenerative detector, followed by three stages of audio, drove a neon tube, placed behind a motor-driven scanning disk. The disk had spiral lines of holes, through which the viewer peered at the neon lamp. Adjusting the speed of the disk would bring the picture in sync with the transmitter, and if the viewer was lucky and everything worked right, a fuzzy picture would be seen, about half an inch on a side. A magnifying glass was of great help!

The question was could a viewer pick

up this fragile picture over hundreds of miles on a frequency subject to fading, such as 40 or 20 meters. The answer was apparently no, with a few exceptions. A viewer in Wisconsin picked up the Washington, DC transmissions and he could see faint pictures for periods up to 10 minutes. This circuit was about 700 miles. Another viewer in Chicago picked up the same station, but was unable to synchronize the picture.

The high-frequency experiments lasted only about a year, and the Federal Radio Commission finally set up formal TV bands which covered 101 to 109 meters and 130 to 150 meters. Many experimental stations operated on these bands until the mid-1930s. With the advent of electronic scanning and the need for greater signal bandwidths, the move of TV to the VHF region was necessary and all high-frequency television experiments were halted.

### The Mailbag

Many thanks to the following for their letters and contributions to this column: W8WN, W3IBT, PY2AUC, AG9C, N4SU, VE7MJY, W5INU, K6BSU, WA5JCI, K6OPZ, WA3ZOR, W6PYK, VE3DNR, W0MFI, W5IO, and K0IMA.

73, Bill, W6SAI

### Footnotes

1. EDN, *Engineering Design News*, Cahners Publishing Co., Newton, MA 02158. A controlled-circulation publication.
2. Valley and Walman, "Vacuum Tube Amplifiers," Volume 18, MIT Series, McGraw-Hill Book Co., NY (1948).



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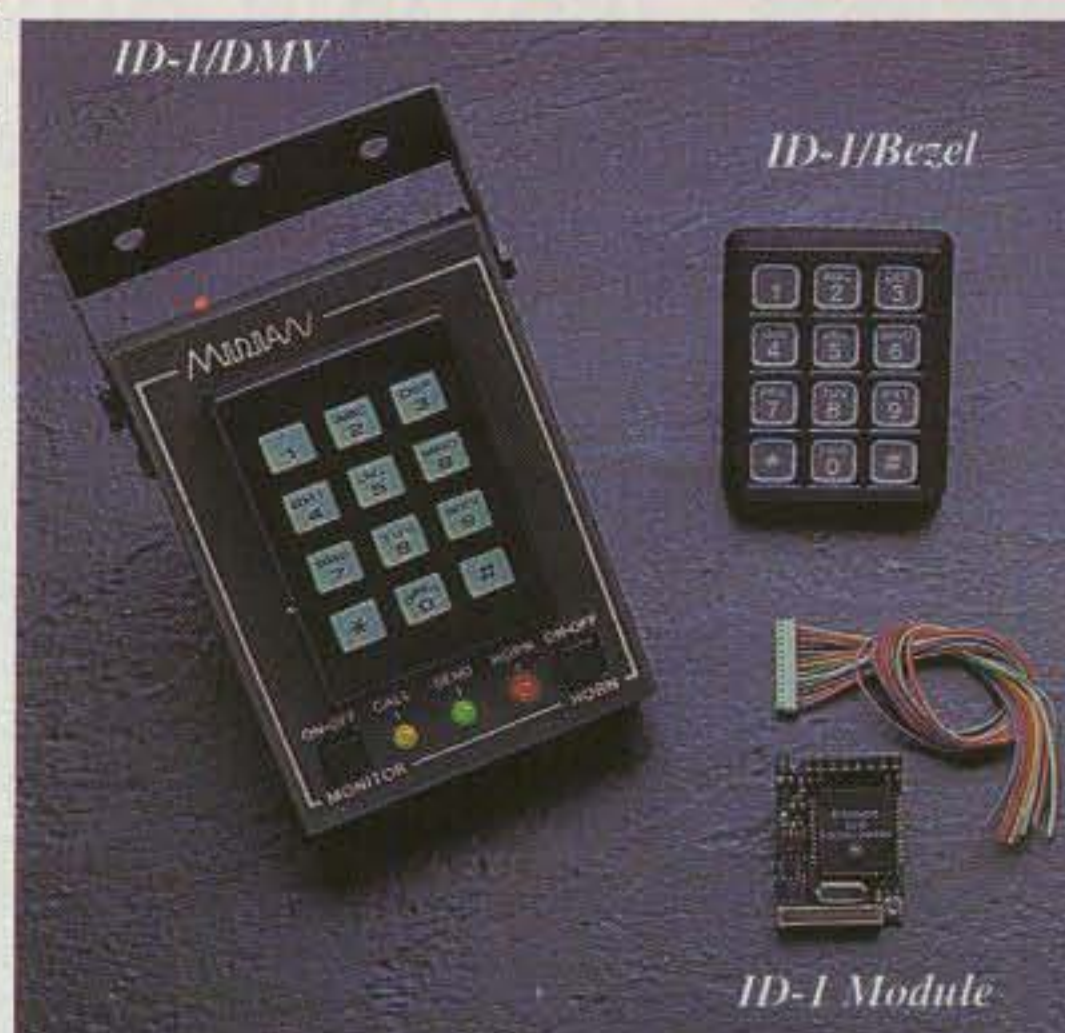
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- Five year warranty for both parts and labor

## ID-1 Morse Code Identifier Features

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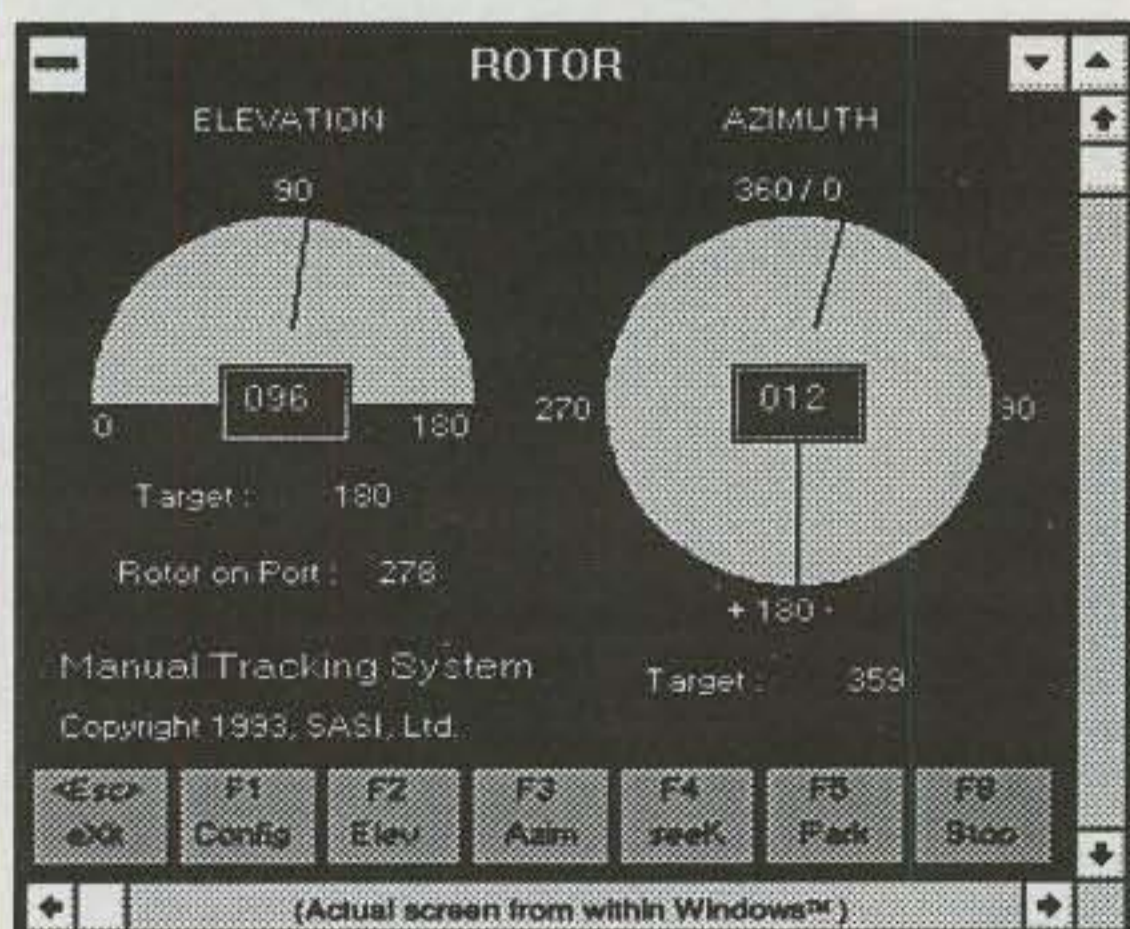
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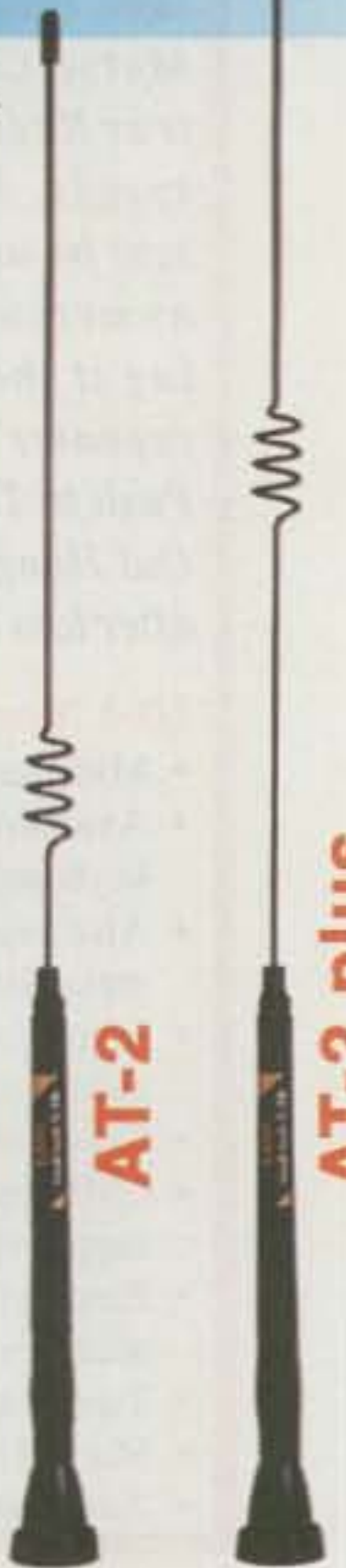
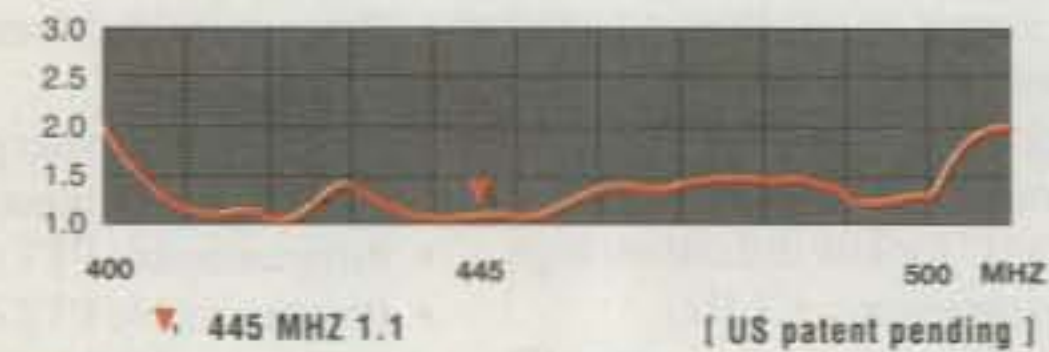
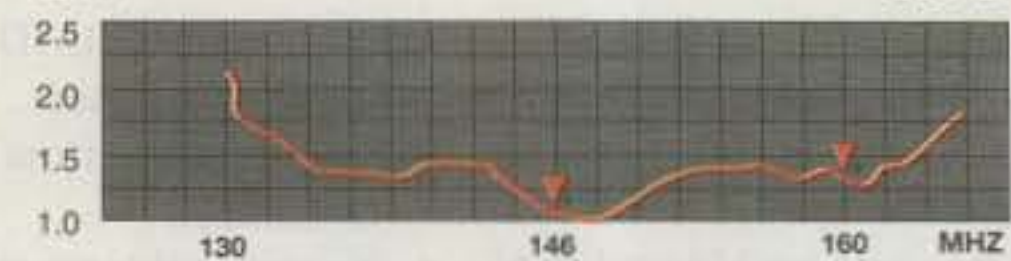
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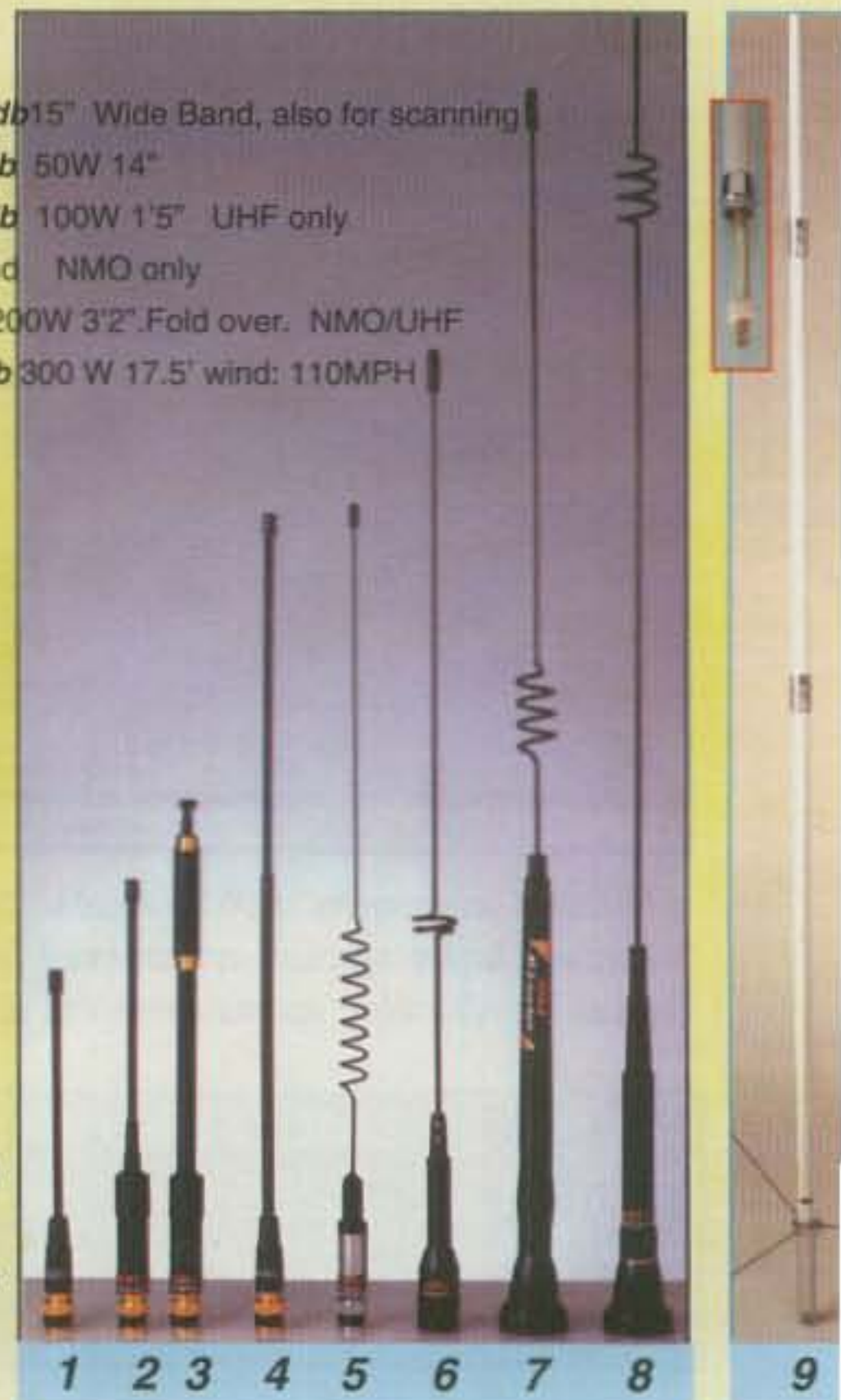


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## NEWS/VIEWS OF ON-THE-AIR COMPETITION

### Operating From a Superstation

**T**his time of year often brings out our biggest dreams in radio. The holidays generate gift lists that include enhancements to our stations, and of course we're right in the middle of the contest season.

Over the years I've had the great fortune to use some of the biggest contest stations in the world. They have included W3AU, KØRF, W2PV, K1OX, and K1EA to name just a few. For the majority of you who have never had the chance to experience my good luck, I thought you'd enjoy hearing about life from a superstation. The goal here is not to depress you to the point of leaving the hobby, but is simply to share some good old-fashioned war stories.

Most people suspect that operating from gigantic stations is akin to using a Voice of America relay station. Is that always the case? Absolutely not! However, there are many times when it feels that VOA would take a back seat to the feeling of dominance that you get while using this operating environment. There's no doubt that being one of the loudest has its advantages. It's not so much that you can muscle others around on the band—being the big bad bully—but rather you can enjoy the luxury of not being muscled yourself. In looking over my old logs, especially those generated by computer, it's obvious that with signal strength comes the ability to stay on one frequency for long periods of time. There was one stretch in the 1990 CQ WW from K1EA's station where I was on one single 10 meter frequency for over 6 hours (with a second radio helping me find multipliers on other bands!). Running stations from a superstation is one of the great experiences of contesting. It can become so easy to think that everyone is doing the same thing, when in reality you could be the only station on the band having such great success.

Getting back to my earlier thought, big station operating does not always give you carte blanche ability to hold any frequency on a permanent basis. Years ago I was operating on 10 meters at W2PV. At that time Jim had a Telrex Big Bertha with 10 over 10 Yagis on 28 MHz. With 20 elements pointing towards Europe, you would think that you were the king of the bands, especially in the late 1970s. There was one hour during a European run when another USA station came a little close to my frequency and made my 150/hour rate come to a virtual standstill. Expecting another large mult-op to be the culprit, I discovered that it was actually a small station in Northern Vermont using a tribander at 60 feet. Imagine the shock on my face! Fortunately, Jim talked me out of disassembling the Yagis, just chalking it up to radiation angles.

Another exciting aspect of big station operating is calling in pile-ups. Without exception, from my experience all superstations have their relative directional strengths and weak-

*c/o CQ magazine*

#### Calendar of Events

<b>Nov.</b>	<b>26-27</b>	<b>CQ WW DX CW Contest</b>
Dec.	2-4	ARRL 160 Meter Contest
Dec.	10-11	ARRL 10 Meter Contest
Dec.	31	RAC Canada Winter Contest
Dec.	31	ARRL Straight Key Night
Jan.	7-8	ARRL RTTY Roundup
Jan.	7-8	Michigan QRP CW Contest
Jan.	7-8	North Amer. CW QSO Party
Jan.	14-15	North Amer. SSB QSO Party
Jan.	14-15	HA DX Contest
Jan.	21-22	ARRL VHF Sweepstakes
Jan.	21-22	YL-ISSB CW QSO Party
<b>Jan.</b>	<b>27-29</b>	<b>CQ WW 160 M CW Contest</b>
Feb.	18-19	ARRL CW DX Contest
Feb.	18-19	YL-ISSB SSB QSO Party
Feb.	19	Colorado QRP Club QSO Party
<b>Feb.</b>	<b>24-26</b>	<b>CQ WW 160 M SSB Contest</b>
Mar.	4-5	ARRL SSB DX Contest

nesses. W2PV, for example, was not especially loud to the west. We found ourselves waiting in many pile-ups in that direction. However, to Africa he could lift receivers off the table remotely. I used to love blowing through one African multiplier pile-up after another (remember, we didn't have packet radio in those days). Another surprise for you may be the fact that from K1EA's station our claim is to be "just another guy with a beam" in all directions but Europe. So much for the belief that winning contest stations have to be the loudest in every direction. It seems that being loud in the right direction (e.g., Europe) is what really counts and that's been Ken's focus for years. Far and away the best multiplier station I have ever used was W3AU. Ed Bissell erected, with a lot of help, one of the loudest amateur stations I ever had the chance to operate. North, south, east, or west, pile-ups were not drudgery, but fun! No matter from where you operate, however, there always seems to be another station that consistently beats you, making you wonder about the antenna hardware and location that they must enjoy!

Now on to the matter of low-band operating. In the old days it used to be that a 40 meter beam was the key to standing out in the crowd. Now it seems they are almost as common as dipoles in some parts of the world. In recent years 40 meters has become a critical part of the superstation operating strategy. On SSB, and with declining sunspots, it's not uncommon for 40 meters to be the starting band for an East Coast USA single operator station. Although running 40 meter Europeans may seem somewhat mundane, especially from the East Coast, I experienced the excitement of running JAs from K1EA's station in an opening that never repeated itself again. Yes, I understand the yawning that I'm hearing from the Pacific and W6 readers, but for an East Coast station this is a big deal—even from a large

#### December's Contest Tip

I've heard from so many people about sending speeds in CW contests that I thought it was worthy of mention in this month's contest tip. If you're an experienced CW contester, try taking the time occasionally to slow down. There may be a number of more casual participants who are waiting in the wings to call you. The key is they need to be able to copy your callsign. You may be doubly surprised to snag a rare multiplier once in a while, too!

#### December's Quotable Quote

"A considerable amount of research has been attempted to answer the criticism expressed by several West Coast stations that our last international test employed a method of scoring that automatically discriminated in favor of East Coast amateurs, due to the preponderance of European amateurs and the larger number of European countries." (See this month's column for comments on the source of this quote!)

station setup. That year I worked over 75 JAs in a run that made me keep looking at the dial to be sure I wasn't on 20 meters. It just doesn't get any better than that!

Of course, there are 80 and 160 meters. Although I haven't used some of the recent 80 meter superstations such as KC1XX and W3LPL, there is still an incredible experience to be had when running Europeans at 90/hour during peak times. Also, I cannot forget to tell you the story of running 25 Europeans on 160 SSB in the early '80s with signals that were sometimes over S9!

So what's the point of all this? Well, it's certainly not to brag or to discourage you if you have a "little pistol" setup. Actually, whatever your experience, contesting is fun, and that's why so many people operate and enjoy it! Whether you have the good fortune to use a big station from the East Coast, or just a dipole in Minnesota, contesting offers something for everyone. Keep that in mind as we enter 1995 and the real doldrums of the solar minimum.

#### A Special Prize For December's Quotable Quote

This year many of you may have been following some of the debate from various sources on the possible need for equalizing contest scores. The principal idea is that certain geographic locations have an unfair advantage to significant amateur population centers such as Europe in major contests such as the CQ World-Wide. There have been as many suggestions as there are QSL card designs, mak-

## Contest Errata 1993 CQ WW CW

K2PH should have been listed as the operator of AK3Z in the Single Operator, All Band category.

AA7FK should have been listed as a certificate winner in the Low Power, 7 MHz, 7th Call Area category.

K7SV should have been listed as a low power entry, not high power as printed.

KA6SAR should have been listed as the operator of W6EEN in the Single Operator, All Band Category.

## 1994 CQ WW WPX CW

WX9E/Ø was left out of the CW Multi-Single results. They finished #3 USA with 4,822,847 points.

ing this a never-ending topic to say the least.

As it turns out, this is a debate that has been going on for much longer than anyone could have believed—and with just as little consensus. Join in the fun this month by identifying the date and source of our **December Quotable Quote**. If you are the first person to do so correctly, we'll send you a copy of our new *CQ 1995 Amateur Radio Almanac*. After all, anyone with that much interest in radio trivia will certainly appreciate the prize! In the absence of the specific source, I'll accept the closest estimate of the month and year of publication. All entries must be postmarked by January 15, 1995. Watch for an announcement of the winner in a future contest column.

## New Additions To CQ's Book Library

CQ is introducing a number of new products this month (see the ads in this issue) that will be of interest to contesters. They include:

- *The 1995 Amateur Radio Almanac*, 2nd Edition, by Doug Grant, K1DG.
- *Building and Using Baluns and Ununs*, by Jerry Sevick, W2FMI.
- *Lew McCoy on Antennas*, by Lew McCoy, W1ICP.

All of these new titles should be in every contest operator's library. Call CQ's order line at 800-853-9797 if you're interested, or see our ads elsewhere in this issue.

## Final Comments

I've had record numbers of responses to this year's contest survey. Many of you sent your answers to me electronically, proof of the "digital" age in which we all belong. I'll be reporting the results soon, so get ready for more insight into to what's going on in the minds of contesters today.

If you haven't noticed yet, we recently announced the CQ "Gang" Award in November CQ in conjunction with our 50th anniversary. This operating event will prove to be an exciting activity for all, and I look forward to working many of you in early January. Check out November CQ, page 92, for the details.

Speaking of January, be sure to look for our 50th anniversary edition of CQ. In addition to the usual editorial content, there will be lots of history and nostalgia for everyone. I'll be taking a look at the history of contesting over the past

50 years. That should be plenty of fun!

Finally, although hard to believe, the holidays are already upon us. It's my desire that you and yours have a safe and joyous time with friends and family. As always, the deadline for the March Contest Calendar is January 1st.

73, John, K1AR

## ARRL 10 Meter Contest

0000Z Sat. to 2400Z Sun., Dec. 10-11

This is the 22nd annual 10 Meter Contest organized by the ARRL. It's an extremely active competition in which stations can work each other within their own country as well as around the world.

A maximum of 36 hours operating time is permitted out of the 48-hour contest period for all stations. The same station can be worked on SSB and again on CW for QSO points.

**Categories:** Single operator, mixed mode, SSB only and CW only. Multi-operator, single transmitter, mixed mode only.

**Exchange:** WVE stations (including KH6 and KL7) send RS(T) and state or province. DX stations (including KH2, KP4, etc.) send RS(T) and QSO number starting with 001. Maritime or aeronautical mobile stations use RS(T) and ITU region. Novice/Tech stations must identify themselves with a /N or /T designator.

**Scoring:** SSB QSOs are worth 2 points, CW 4 points, Novice/Tech CW QSOs 8 points.

**Multiplier:** U.S. states (50 plus District of Columbia), Canadian provinces (NB, PEI, NS, VE2-8, VY1, VO1, VO2), DXCC countries, and ITU regions (1, 2, 3).

**Final Score:** Total QSO points times the sum of U.S. states, Canadian provinces, DX countries, and ITU regions, per mode.

**Awards:** Certificates will be awarded to the top-scoring single operator station in each category (including /N and /T) for each ARRL section and DXCC country. Additionally, the top-scoring multi-operator station in each ARRL division and each continent will receive certificates.

Indicate a new multiplier only the first time it is worked. Dupe sheets are required for logs with 500 or more QSOs. The usual disqualification criteria will be enforced. A large SASE will get you log and instruction forms. The standard ARRL policy for electronic logs applies to this contest (contact the ARRL Contest Branch if you have any questions).

Mailing deadline for all entries is January 12th to: ARRL 10 Meter Contest, 225 Main St., Newington, CT 06111.

## ARRL Straight Key Night

0000Z to 2359Z, Jan. 1  
(7 PM Fri. to 7 PM Sat., EST)

This is a friendly meeting on the air using a straight key only. Suggested frequencies on 80, 40, and 20 meters are 60 to 80 kHz up from lower band edges, 10 kHz from lower edge of Novice bands.

Use SKN instead of RST in the exchange to clue-in other stations. Include a list of stations worked plus your vote for the best fist heard during that period (not necessarily one you've worked).

This is not a contest, so any additional chatter is encouraged.

Send your report and vote for "best fist" and "most interesting QSO" to ARRL SKN, 225 Main Street, Newington, CT 06111 by January 10th.

## Too Busy To Learn CW?

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## "HOW TO" FOR THE NEWCOMER TO AMATEUR RADIO

### Goodies—Part I

**T**his article contains information about amateur radio specialty items. I have included a wide variety of items which amateurs can wear and use. Equipment and accessories directly related to signal reception and/or transmission are not included in this article. Where prices are shown, they are only included to provide some idea of cost; exact current costs should be requested from the seller before ordering any item. State sales taxes may apply, but they are not included in this article. Also, prepaid charges only apply to shipments being made to U.S.A. addresses.

If you are aware of similar items which should be included in articles of this type, please send such information to my California address, as it appears on this page. It is hoped that this article will make amateur radio a bit more interesting and pleasant for many readers. I believe in advertising amateur radio. Everyone who knows me knows that I am an amateur. I have my callsign on everything that can be marked to show my amateur radio affiliation. People frequently ask me what W6DDB means, which gives me a chance to tell them a little bit about amateur radio. Some of these explanations have eventually resulted in new amateurs.

#### ARRL

The American Radio Relay League (ARRL) has a nice assortment of items. Most of the League items are only available to members. These items are listed in this article for the benefit of ARRL members. Amateur Radio Emergency Services (ARES) items are available as follows: (a) black and gold stickers (2 per package) 50¢; (b) red, white, and blue stickers (2 per package) 50¢; (c) black and gold decals or red, white, and blue decals \$1 each; (d) plus black and gold patches, or red, white, and blue patches, \$3 each. The 5 inch member (diamond) decals \$1. Life-member decals (5 per package) \$1. ARRL flag license plate \$5. Cloth ARRL flag patch \$5, and 4 inch diamond patch \$1.25. ARRL flag pin \$5, membership pin \$3, and life-membership (replacement) pin \$3. Life-membership plaque \$25. Set of 50 ARRL member letterhead stationery sheets with 50 matching business-size (#10) envelopes (separately) \$5. Spark to Space items are available as follows: hats \$7 and patches \$3. Exact details can be requested from ARRL, Publications Sales, 225 Main Street, Newington, CT 06111 (phone 203-666-1541, FAX 203-665-7531).

#### Badges

Curiosity Sales markets full-color, engraved callsign tags. Custom designs are available. A sample is available for \$3. Customized patch-

45527 Third Street East, Lancaster, CA 93535-1802

es and pins are also sold. Their address is 211 Main Street, Norway, ME 04268 (phone, FAX 207-743-7799).

LQV Engraving markets callsign desk plates, identification badges, and small signs. His 3 by 5 inch convention-size badge provides up to three lines of 3/4 inch lettering. These items are available in a wide variety of colors, fasteners, and sizes. Your request (with SASE) will bring a data sheet with prices. The address is P.O. Box 4133, Overland Park, KS 66204-0133. J.L. "Mac" McCoy, WØLQV, runs this company.

R. Woish sells two-color callsign badges showing callsign, name, and state. Photograph buttons are also available. Both items sell for \$3 each. The address is 32F Plymouth Park, Conshohocken, PA 19428.

(Also see *Caps Unlimited*, *R&J Fial Enterprises*, *Radio Bookstore*, *Trophies by Edco*, and *W5YI Group*.)

#### Beam Headings

Forest L. Addis, K4UAR, offers a 25-page alpha-numeric list showing beam headings to about 1300 domestic (U.S.A.) and DX locations relative to one's home station location. His list includes beam return headings, intervening distances, latitudes, and longitudes. The price is \$7.95 and the address is 2291 Midvale Circle, Tucker, GA 30084 (404-938-6816).

Jack Hurray, W8JBU, offers laserjet printed beam headings from one's QTH in three versions. The DXCC version costs \$10.95. The DXCC/WAS version is \$15.95. A deluxe combination DXCC and WAS version, printed on cotton fiber paper and presentation-bound with heavy cover stock, sells for \$24.45. Their address is Box 397, Hinckley, OH 44233.

#### Belt Buckles

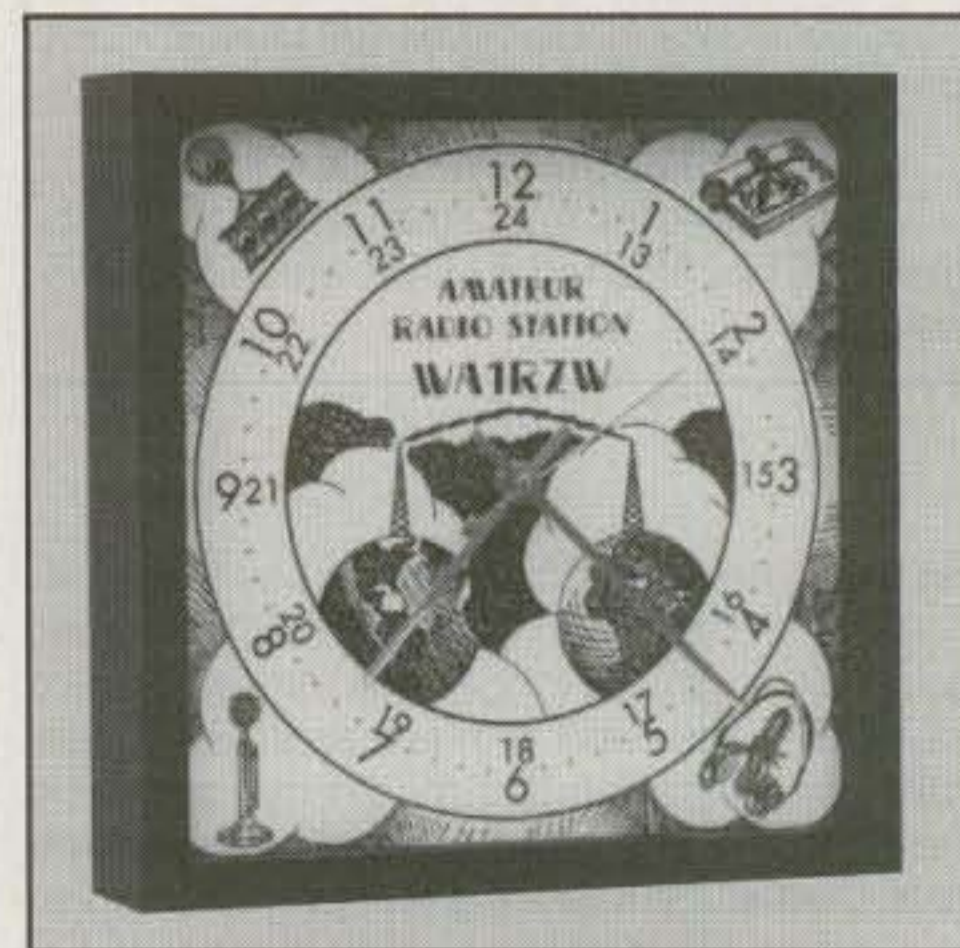
Leather Together sells brass buckles for \$26.90, which includes s&h charges. The six-digit maximum accommodates callsigns. Their address is 1821 East 22nd Street, Merced, CA 95340 (209-722-7932).

#### Calendars

CQ sells their Amateur Radio Calendar, which shows antennas and stations, and Classics Calendar. Each sells for \$9.95 plus \$2 s&h. Order five or more and the shipping is free. The address is CQ Communications, 76 N. Broadway, Hicksville, NY 11801.

#### Clocks/Watches

Amateur Radio Excellence sells a 9 inch square by 2 inch thick desk or wall clock with laminated original artwork plus one's callsign. This clock includes a quality quartz movement that is powered by an included single AA-size

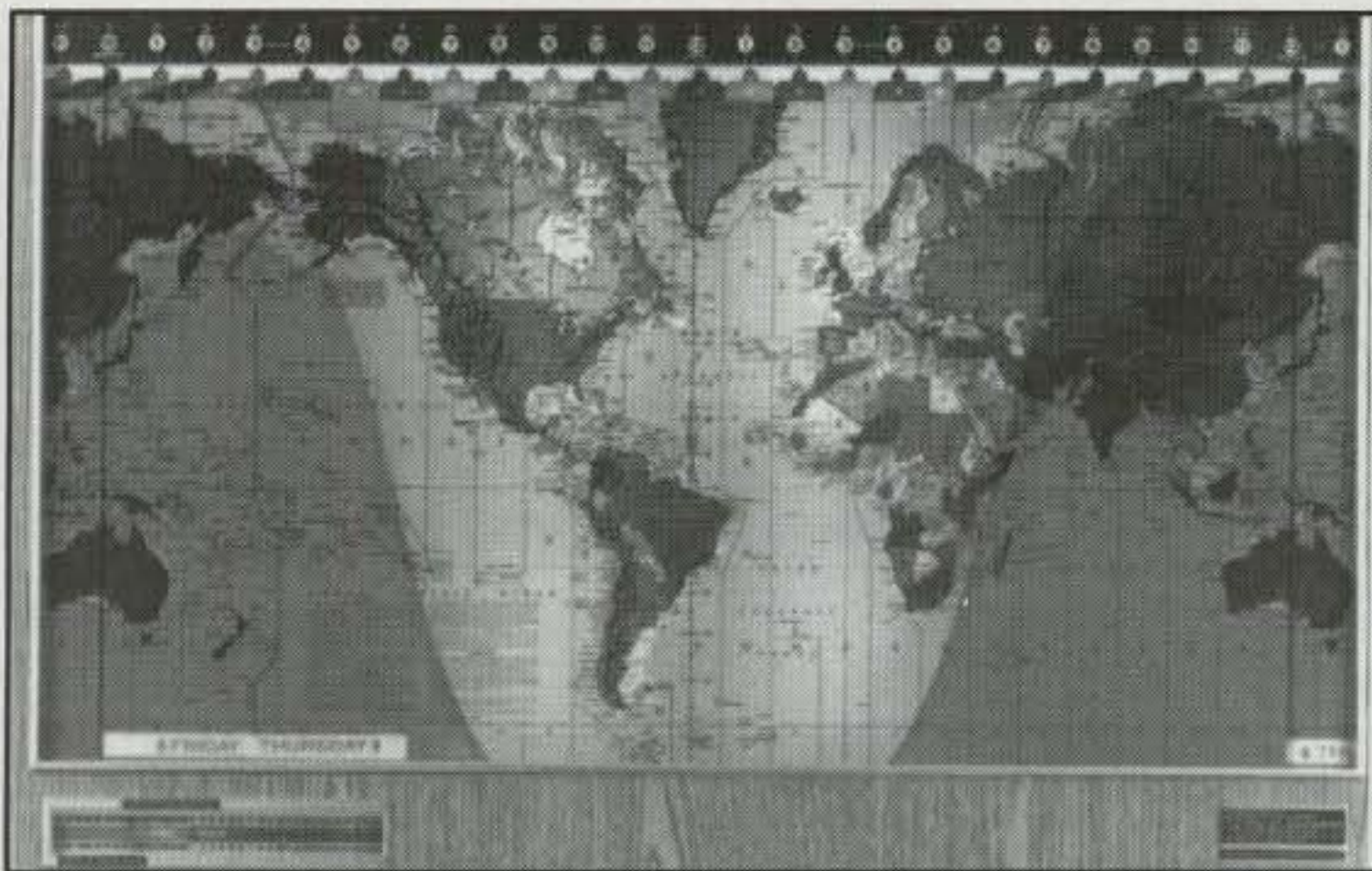


Available from Amateur Radio Excellence is a desk or wall clock which shows original amateur radio artwork and callsign.

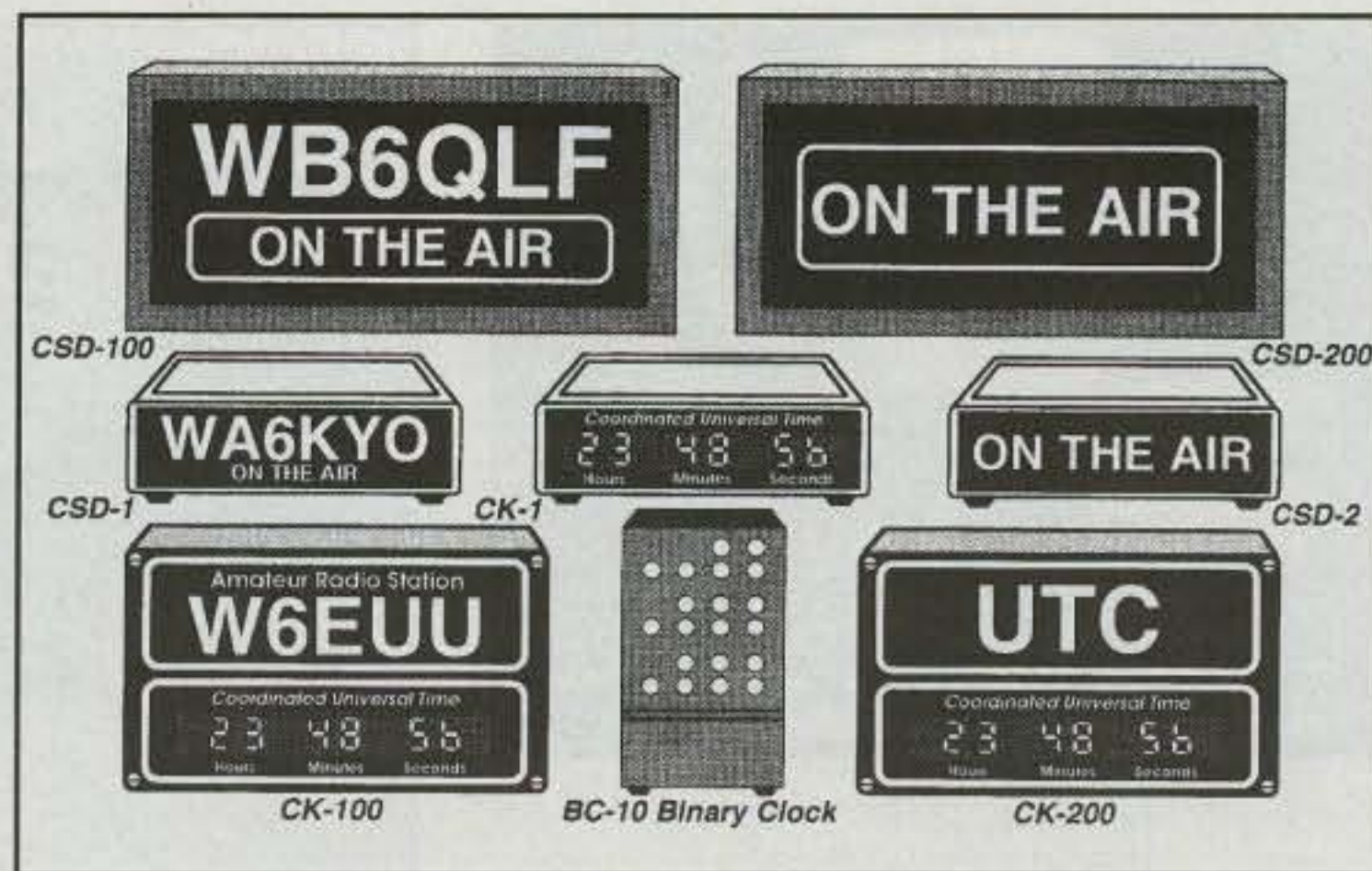
battery. The clock face shows an antique radio, handkey, earphones, and microphone, plus 1 to 12 and 13 to 24 time indications. Price is \$44.49, including domestic shipping charges. The frame is available in a choice of simulated walnut, simulated light oak, or black leather. The address is Box 1551, Manchester, NH 03105 (603-625-8374).

Many radio operators are familiar with the special clocks used in radio shacks aboard ships. These 6 inch diameter clocks are new and the real thing, but they are not cheap. The black phenolic quartz (40101) and electric (20881) clocks cost \$249 and \$549, respectively. The brass quartz (40100) and electric (20880) clocks are priced at \$486 and \$786, respectively. These special clocks show the international silent periods (15–18 and 45–48 minutes past each hour) highlighted in red. Available on special order are 8.5 inch versions of black phenolic mechanical (20874) and quartz (40094) radioroom clocks. Contact Baker Lyman and Company, Inc., P.O. Box 838, Metairie, LA 70004 (phone 504-831-3685, FAX 504-831-3786).

Larry Abelkop, WA4LPV, is a distributor of the Seth Thomas clocks, which are popular with amateurs. His model 708 clock features a 24 hour face, quartz movement, step second hand, and a shatter-resistant face. The model 710 clock is the same as the model 708 clock, except it has the standard 12 hour face. The 708 and 710 clocks are 2.75 inches deep and 14 inches in diameter. They sell at \$38.45 each, which includes s&h to domestic addresses. The model 2616 sells at the same price as the 708 and 710. The 2616 has large (1.8 inch) red LED numerals which display either 12 or 24 hour time. This clock is mounted in a wood grain case which has a flip-out stand for desktop use. Battery backup capability, plus a battery low backup indicator, are included in this



Geochron Enterprises world time indicator.



Whiterook Products Company RF-actuated call sign displays and clocks.

6.5 x 9.5 x 2.125 inch clock. Their address is B.A. Fox, Inc., P.O. Box 6206, Spartanburg, SC 29304-6206 (phone 803-582-6464, FAX 803-582-6744).

Gabay Tool offers UTC and local-time wall clocks at \$26.50 and \$14.65 each, respectively, ppd. George Gabay, N9QQR, initially made these clocks just for use in his own station. His address is W5541 Buckhorn Drive, New Lisbon, WI 53950.

Geochron Enterprises offers four models of their world time indicator. Each model displays daylight and darkness, sunrise and sunset, correct time in each zone, day of the week, and date of the month. Prices range between \$1295 to \$2465, plus shipping charges and

costs of any desired accessories. Each model is 34 x 22 x 5 inches. Their address is 899 Arguello Street, Redwood City, CA 94063 (toll-free 800-342-1661, FAX 415-361-1780).

Tom Lange, KC6UEC, sells quality quartz analog wristwatches at \$27.95, including s&h. These watches are in a yellow metal case and they include a leather band. One's call sign is added to the face of the watch in one of six selectable styles. These styles include a tower, license plate, transceiver, and three HT configurations. Tom also sells vanity license plates and clocks. The address is Thomas Lang Company, 9438 East Broadway, Temple City, CA 91780-2445 (818-287-5004). Allow one month for delivery.

Whiterook Products Company sells an RF actuated call sign display (Model CSD-1) which lights up to display one's call sign while transmitting 5 watts (or more) on any HF, VHF, or UHF frequency. The price is \$54.45. A 12 VDC adapter (Model DC-1) is included. A delay is built in to eliminate flickering during transmissions. If you prefer "ON THE AIR" in large lettering instead of having your call sign displayed in large letters with "on the air" displayed in smaller letters below your call sign, you can order their Model CSD-2 at the same price. The CSD-100 and CSD-200 are larger versions (5.0 x 1.5 x 5.25 inches) of the CSD-1 and CSD-2, respectively. These displays are easy to mount on walls. Their size is 15.25 x

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The SP200 also comes equipped with a stereo/mono headphone jack for private listening, and an automatic tape activator so that you never have to miss anything.

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Callsign ceramic mugs available from Imagine That Graphics.

7.25 x 2.0 inches. Each model sells at \$94.45. Their Model CK-1 is 5 x 1.5 x 5.25 inches; it provides UTC time in a bright red LED display featuring 6-digit (hours, minutes, and seconds) time. The CK-1 price is \$74.45. The model CK-100 includes the 6-digit UTC clock with one's unlit call sign above it. The CK-100 price is \$79.45. The size of the KC-100 is 6.25 x 3.75 x 2.0 inches, and it is easy to mount on a wall. Unlike other manufacturer's models, the CK-1 and CK-100 operate accurately from AC house power, eliminating the need for batteries. The CK-100 is also available with UTC instead of call sign; this version is the CK-200 and it is priced at \$74.45. The BC-10 binary clock also costs \$74.45; it displays 12 or 24 hour time in the binary format. Each clock purchase price includes the \$4.50 s&h fee. House power adapters are available for use with all of these clocks. John Roblin, WA6KYO, suggests submitting orders well in advance of Christmas. A free catalog covering these products is available. The address is 309 South Brookshire Avenue, Ventura, CA 93003 (phone and FAX 805-339-0702).

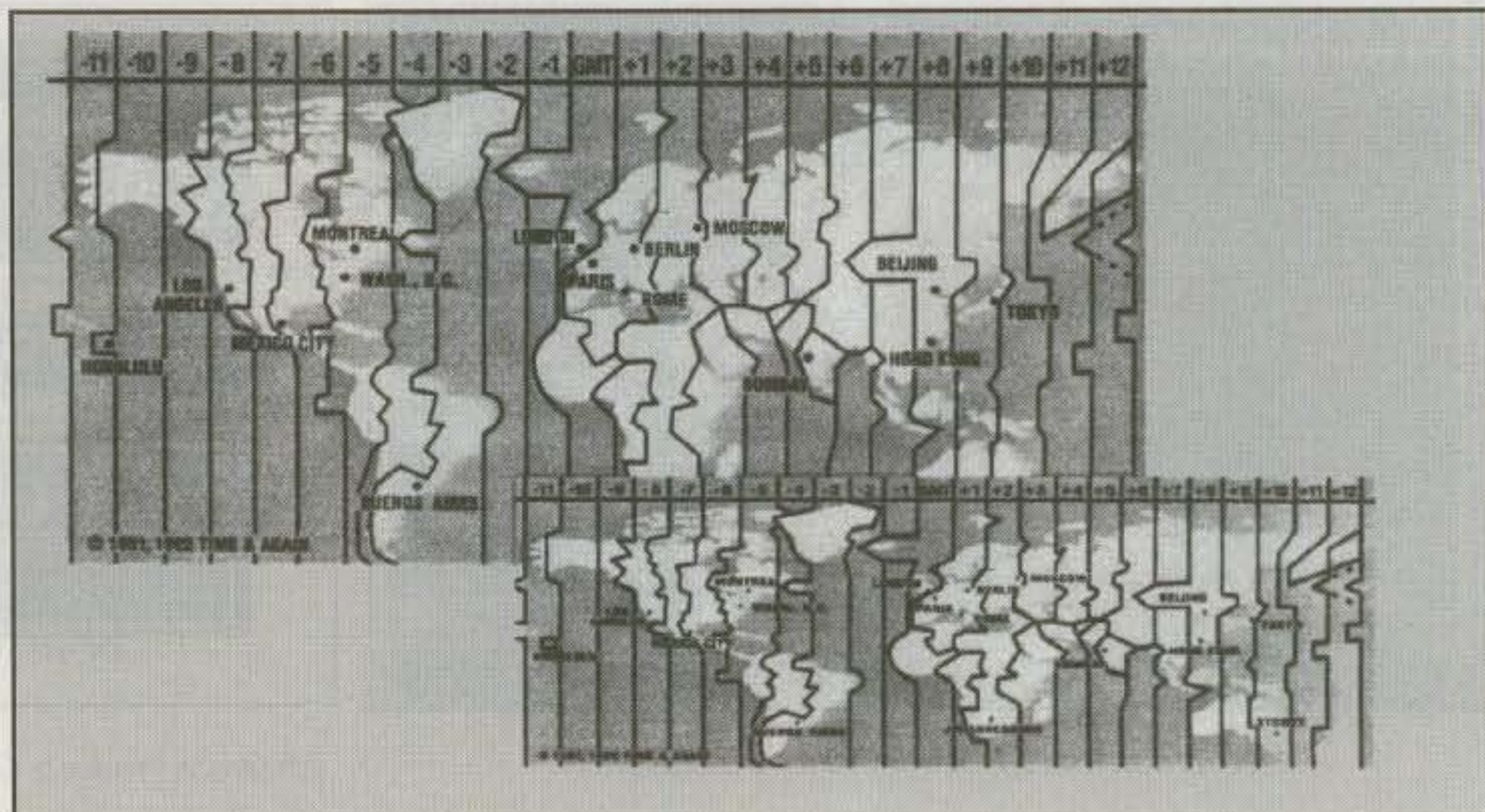
(Also see *Azimuth Communications and MFJ.*)

## Clothes

Adventure Bound Enterprises provides embroidered caps, jackets, shirts, and other items. Club logos with personalized call signs are their specialty. Cap prices range from \$8 to \$12, depending on type of cap (twill or mesh) and amount of embroidery ordered. These prices include s&h fees. The address is 467 Quail Ridge, Warrenton, MO 63383 (314-456-2213).

CQ offers T-shirts with a choice of 12 print designs. These shirts are available in large and extra large sizes at \$17.95, including s&h charges. Extra-extra large T-shirts cost \$2 more each. Sweatshirts are also sold with the same assortment of designs; they are priced at \$29.95, including s&h charges. The XXL price is \$2 more. Address is CQ Communications, Inc., 76 North Broadway, Hicksville, NY 11801 (orders 800-853-9797).

The Embroidery Warehouse sells summer (mesh) and winter (corduroy) caps at \$11.00 and \$12.00 each ppd, respectively. The embroidered name, call sign, and town/city can have a maximum of 14, 6, and 14 letters/numbers, including spaces, respectively. Summer caps are red or royal blue mesh and bill, with a white foam front. Embroidery match-



Time & Again international time-zone map decals.

es the cap color. Full corduroy (winter) caps are red or navy blue with gold embroidery. White or gold scrambled eggs can be added to the bill of a cap at an additional charge of \$1.50 per cap. The address is P.O. Box 1476, Severna Park, MD 21146.

Personalized Photo offers caps, golf shirts, jackets, magnetic QSL cards, and T-shirts. The golf shirts have one's name and call sign embroidered on the left front; they sell at \$18.95, with a \$2 additional fee for the extra-extra-large size. They are available in dark green, navy blue, red, teal, and white. The nylon coach's jacket is sold in black, brown, gold, green, maroon, navy blue, red, royal blue, and white. It features a drawstring waist, embroidered name and call sign (in white), lining, and snap closures at \$24.95. Your QSL card can be applied to a magnetic backing at six for \$5. White T-shirts have one's name and call sign in black at the left front and they sell for \$9.95 each. Logo can be added to right front for \$2 more. QSL card can also be added to the back of a T-shirt for \$5 more. Cap colors are black, gold, green, light blue, maroon, navy blue, red, and white. One's name and call sign are printed in black on other nylon caps which also have a white front and a mesh back. If preferred, a logo can be printed on these \$6.95 caps, which are sold in the same colors as the QSL card caps. Other specialty items being sold by Al Jordan, WB1GKO, include 17 by 20 inch aprons (\$9.95), laminated calendars (\$8.95), QSL sweatshirts (\$18.95), and 13 x 14 inch tote bags (\$9.95). The address is P.O. Box 370244, West Hartford, CT 06137 (phone 203-233-7277, FAX 203-236-3719). As usual, shipping charges are extra over the stated prices.

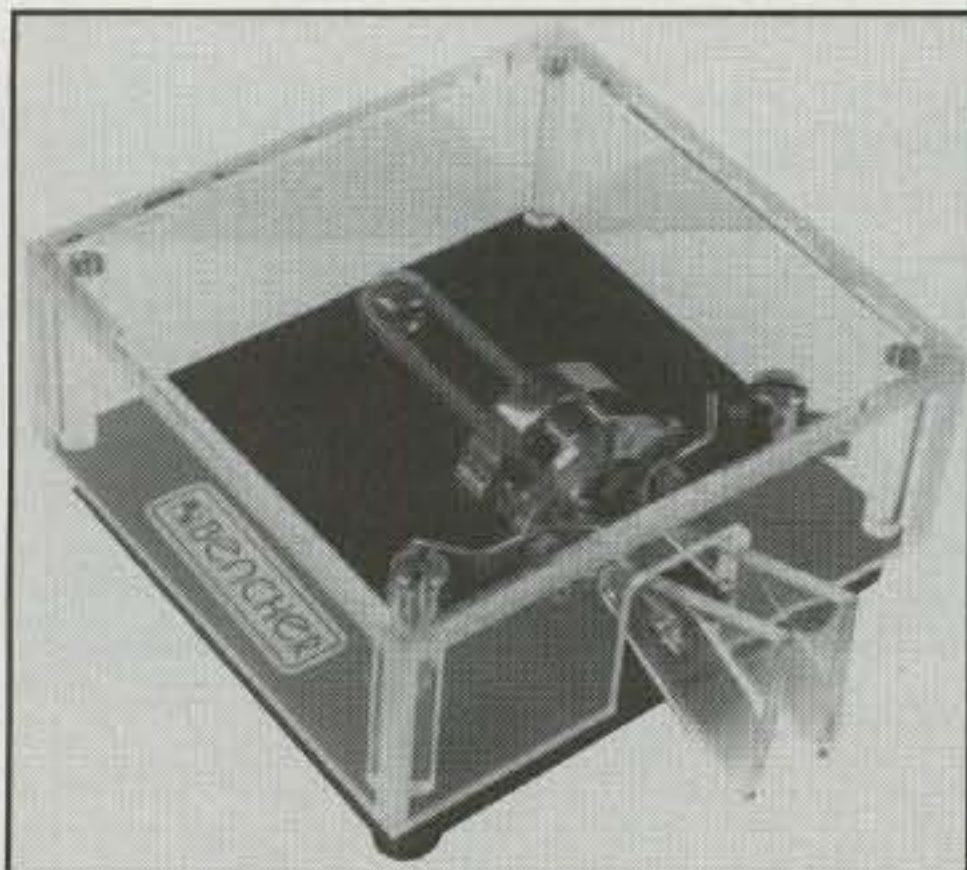
Paul Washa, WØTOK, sells T-shirts and sweatshirts featuring an enlarged reproduction of the 1964-65 five-cent amateur radio stamp. T-shirts sell in all sizes (S, M, L, XL, and XXL) for \$10 each ppd. High-quality white sweatshirts sell for \$23 each in sizes S through XL and at \$26 each for XXL, delivered. A second variation shows AMATEUR RADIO printed across the globe of our world and surrounded by ONE WORLD/ONE LANGUAGE. These shirts are available in ash grey, jade green, light blue, red, royal blue, and white. T-shirts and sweatshirts sell at \$12 and \$25 each, respectively. XXL sweatshirts cost \$28 each.

If two (or more) of the same item are ordered, the price is one dollar less on each item. The desired size must be specified, of course. Paul also markets 58 books regarding electricity, electronics, and radio. If you are interested in books, you could request his current list, enclosing your SASE. Paul also sells pins (\$5), key chains (\$6), and money clips (\$6) featuring the same amateur radio stamp. The address is 4916 Three Points Boulevard, Mound, MN 55364-1245.

Rod Williams offers an interesting variety of personalized caps, jackets, and T-shirts. Each item can be embroidered to show one's call sign, name, and other information. His address is Box 352365, Toledo, OH 43635 (phone 419-843-2014). Rod offers a ten percent discount to clubs which place multiple-item orders to be shipped to one address. If you want more information about Rod's products, you can request his catalog. Rod offers quick service.

Ann Wright, N6BOP, sells a very good assortment of T-shirts, golf shirts, and caps. T-shirts and golf shirts are available in beige (tan), light blue, light yellow, or white. Other light colors are available upon special requests from clubs or other groups, and they can be printed front and back. A red ARRL logo is available in two sizes (1.375 by 3 inches and 2.25 by 5 inches). The lettering style can be ivy open or sportswear. Letter color choices are black, brown, green, maroon, orange, red, and royal blue. T-shirts cost \$14.30 ppd, printed both sides. Golf shirts cost \$19.30 each printed one side, and \$20.30 each printed both sides. Anne's caps have a foam front with a mesh back, and they are size adjustable. Caps sell for \$9.30 each ppd. Cap print styles are the same as for shirts, and the print can be in a variety of colors. Anne's address is 2272 Kellogg Park Drive, Pomona, CA 91768 (909-629-0646).

The following Yaesu items are available from Flags and Marketing Unlimited, 3783 East Desert Inn Road, Las Vegas, NV 89121 (phone 702-456-3609). Each item shows the Yaesu emblem and/or name. Crest is embroidered on corduroy caps (\$5.95 each), jackets (\$38 each), pinnacle V-neck red, white, or navy-blue sweaters (\$27.50 each), and white or navy-blue polo shirts (\$21 each). Silk screening is used on red, white or blue sweatshirts (\$13.50 each), and red, white, or blue T-shirts (\$6.80 each). Jackets are silver polyester/cot-



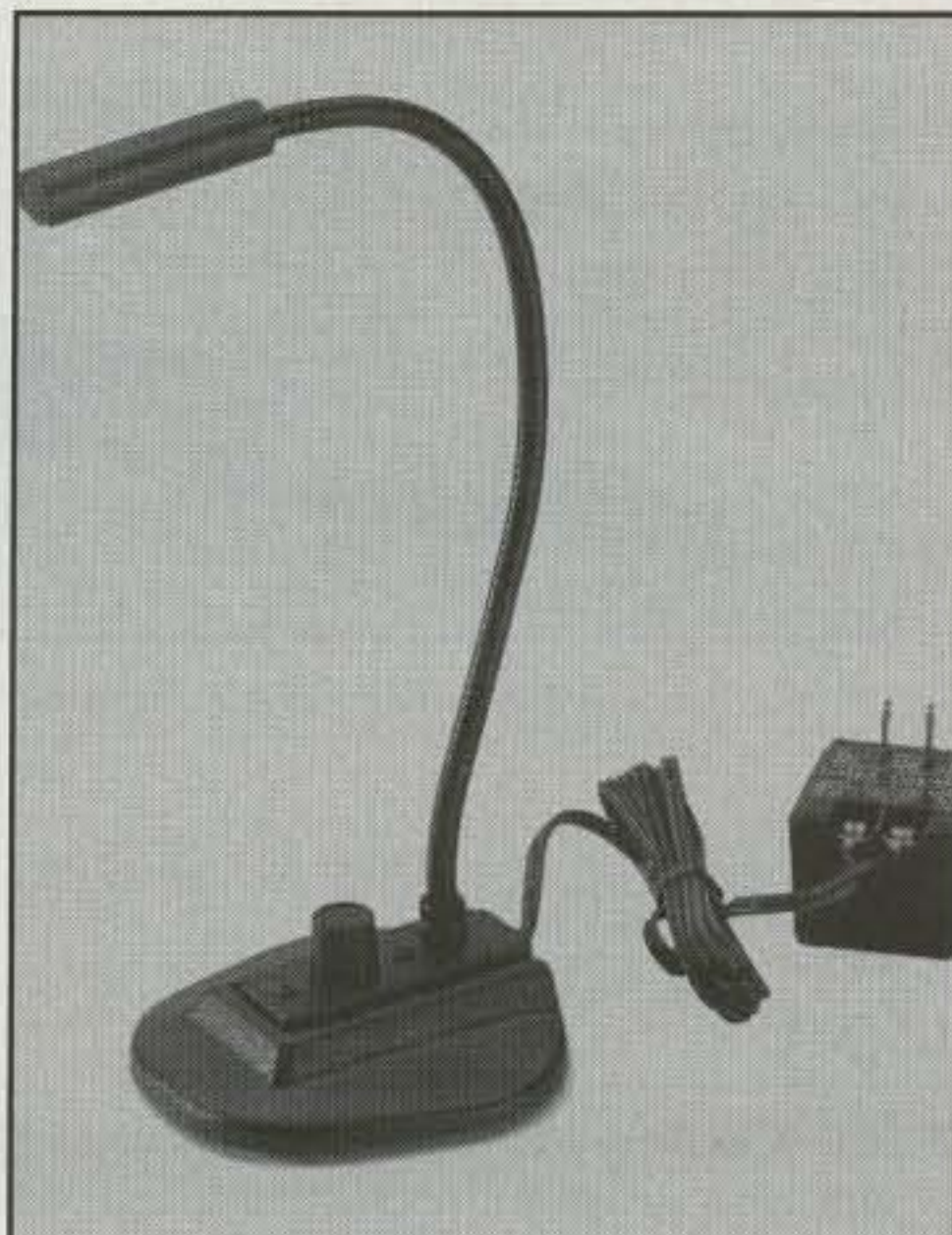
WB3EVL's dust cover for the Bencher paddle.

ton. The adjustable-size corduroy caps are navy blue or silver. Shipping charges are extra. Extra-extra-large (XXL) size items cost \$2 to \$4.50 more each. Allow 4 to 6 weeks delivery time. Write for a brochure if you are interested in these Yaesu-related items.

(Also see ARRL, Caps Unlimited, Radio Bookstore, and Vibroplex.)

### Cups/Mugs

Walt Fleisher, KK6RG, markets callsign ceramic mugs showing one's name and/or callsign on one side (\$17.95) or on both sides (\$20.95). These prices include s&h charges. Their address is Imagine That Graphics, P.O. Box 2700, Anaheim, CA 92814 (714-772-7484).



The Littlite variable-intensity desk lamp from Littlite/CAE.

Jane Peake, KD4GUL, sells custom-made, 11-ounce, white ceramic mugs displaying her customers' designs and/or photographs. Callsigns, names, and other information can be displayed on one or both sides of the mug, using any font style and any color combination. These mugs have a design area that is 3.75 inches wide by 3.0 inches high on each side. The colors are permanent. The cups are microwave and dishwasher safe. Cups cus-

tomized on only one side are priced at \$15 each, whereas those customized on both sides are priced at \$19 each, including s&h charges. Organizations are welcome to obtain quotes on quantity orders at reduced prices. The address is J & W Associates, 272 Farm Road, Marietta, GA 30067-4076 (404-984-9479).

(Also see MFJ, Vibroplex, and W5YI Group.)

### Decals

Time & Again sells international time-zone map decals in two sizes. The continents are shown in silver against a blue background on these durable polyester self-adhering decals. They can be displayed conveniently on one's radio equipment. The 2.25 by 4.75 inch decals cost \$2 each. The 1.25 by 3.75 inch decals cost \$1.50 apiece. A set of two decals (one each size) costs \$3. Purchasers are requested to include an SASE with the orders. The address is P.O. Box 306, Dickinson, TX 77539 (713-337-5319). Time-zone maps are based on the concept that the Sun appears to pass through 15 degrees of longitude each hour. With 24 hours in a day and 15 degrees of movement per hour, 360 degrees of apparent sun movement occur each day. Each time zone is bracketed by a time zone to the east that is one hour ahead, and a time zone to the west that is one hour behind. World time zones became officially recognized by the International Meridian Conference in 1884. These decals are useful to anyone who regularly contacts people and groups in other parts of the world. Some of the world's major cities are shown on these decals. Full payment must accompany each order.



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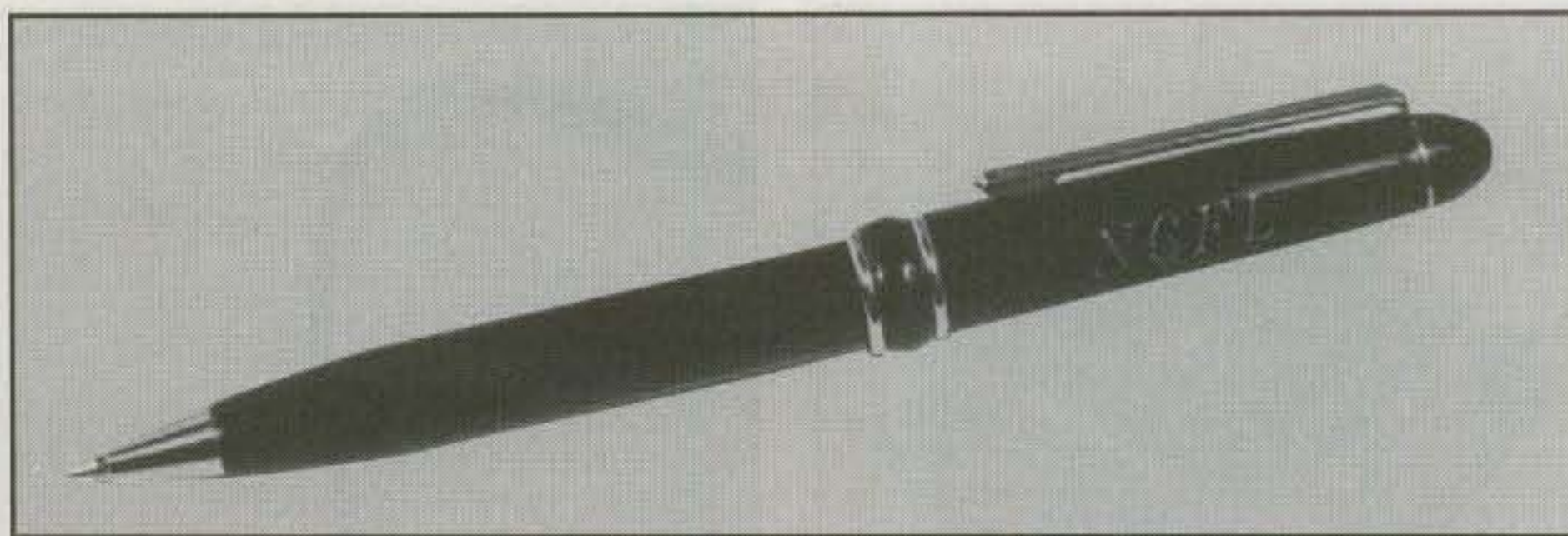
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Kilo-Tec pens can be engraved with callsign and/or name.

(Also see ARRL, Caps Unlimited, Larry Plotkin and Radio Bookstore.)

### ICOM

ICOM America, Inc., offers free VHF/UHF charts, HF frequency charts, deacds, and posters. Their address is 2380 116th Ave. NE, Bellevue, WA 98009-9029 (206-454-8155).

### Key Covers

Larry Stamm, WB3EVL, sells a dust cover which can be left in place while the Bencher paddle is in use. The 3/16 inch plexiglas cover fits directly on the base of the keyer, with the paddles protruding through a window in the cover. The cover keeps the keying contacts and the rest of the keyer free of dust. One's callsign is engraved on the lower side of the cover's top surface to be easily read from above. The price per engraved cover is \$13, including s&h costs. Larry's address is 28 Totton Rd., Kutztown, PA 19530 (610-683-7850).

### Key Rings/Chains

Leather & West sells custom-made, hand-tooled leather products with one's name, initials, and/or callsign on them. Belts, hanging signs, key rings, purses, and wallets are a few of the available products. Their address is 67 Causeway Road, West Swanzey, NH 03469 (603-352-6256).

(Also see R&J Fial Enterprises, Leather & West, Paul Washa, and W5YI Group.)

### License-Plate Items

You can buy a 2.25 by 1.125 inch keychain showing your callsign on a miniature version of your state's vehicle license plate. The price is \$5.25 each, including s&h charges. The address is Andrew Plaks, N6RKO, 3151 Fleetwood Drive, Riverside, CA 92503.

R&J Fial Enterprises sells metal license-plate frames and license-plate key tags/badges. The frames are available in black matte or chrome. Up to 18 spaces can be used in the top space of the frame. A maximum of 26 spaces can be used in the space at the bottom of the frame. The face/lettering color combinations available are black/white, blue/white, gold/black, green/white, red/white, white/black, white/blue, white/red, and yellow/black. The face color is listed first in each pair, with the lettering color following it. License plates are priced at \$12.45 for regular mail and \$12.85 for priority mail. The plastic, miniature license-plates replicas are sold for all 50

states. These can be ordered for use as badges or key tags. One line of engraving is included in the \$4.95 basic price. Add 50¢ more if a second line of engraving is desired. Up to six tags/badges can be shipped for \$1. MasterCard and Visa orders are welcome. Their address is 5366 Camino Real, Riverside, CA 92509 (phone 909-360-0961, FAX 909-685-8008). Shipping charges are included in the stated prices, but sales tax is additional.

(Also see ARRL and W5YI Group.)

### Lights

One of the best accessories I have added to my station during the past decade is a simple variable-intensity desk lamp called Littlite. It can be operated on 12 VDC or 115 VAC. It has a weighted base and color filters available as accessories. This lamp is available in a variety of forms, and it has a useful variety of accessories. A printed flyer can be requested from Littlite/CAE, Inc., 10087 Industrial Drive, P.O. Box 430, Hamburg, MI 48139 (phone 313-231-9373, FAX 313-231-1631). The lamp can be secured in place using the snap mount supplied with it. Screws are provided for mounting the lamp directly to a desired surface.

### Maps

FBenterprises sells ten regional repeater maps which cover all 50 states. These maps are on 8.5 by 5.5 inch plastic laminated cards which are spiral bound into regional guides that each cover six states. Two meter repeaters are presented in color on the front of each card, whereas 222-1290 MHz repeaters are detailed on the reverse side of each card. Each guide costs \$12.95, including s&h charges. FBenterprises offers a 16-page catalog (for \$2) which lists many publications that are of interest to amateurs. Publications in this catalog include an amateur handbook, DXCC tracking cards, federal government frequency assignments, lost users manuals, marine radio, QSO helper, radio/tech modifications, regional repeater map guides, state repeater maps, shortwave listeners' book, SWL reference cards, U.S. repeater handbook, and a worldwide radio atlas. Their address is FBenterprises, 23801 N.W. First Avenue, Ridgefield, WA 98642-8830 (800-377-2339).

U.S. Scanner Publications offers a 25 inch high by 37 inch wide world map which includes a lot of information useful to amateurs. A few of these features are the ARRL DXCC list, international callsign allocations, radio frequency allocation bargraphs, and Novice through Extra Class 2 through 160 meter operating privileges. Their address is P.O. Box 14923, Port-



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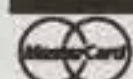
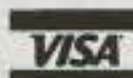
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recovery of RTTY and HF packet radio information signals. A single front panel switch selects any of these filters. Easy hookup to rigs speaker jack.

\* The W9GR DSP II is the most popular DSP on the market — Thousands in use worldwide!

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SDP-600 Personal Autopatch, fully wired.....\$249.95 SDPA 12 volt power supply unit .....\$11.95

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The j•Com Transceiver Control Computer Interface is functionally identical to the Kenwood IF-232C, Icom CT-17, Yaesu FIF-232C, Ten-Tec 305 and Heath computer interfaces. It will work with all radios and rig control software which use these interfaces.

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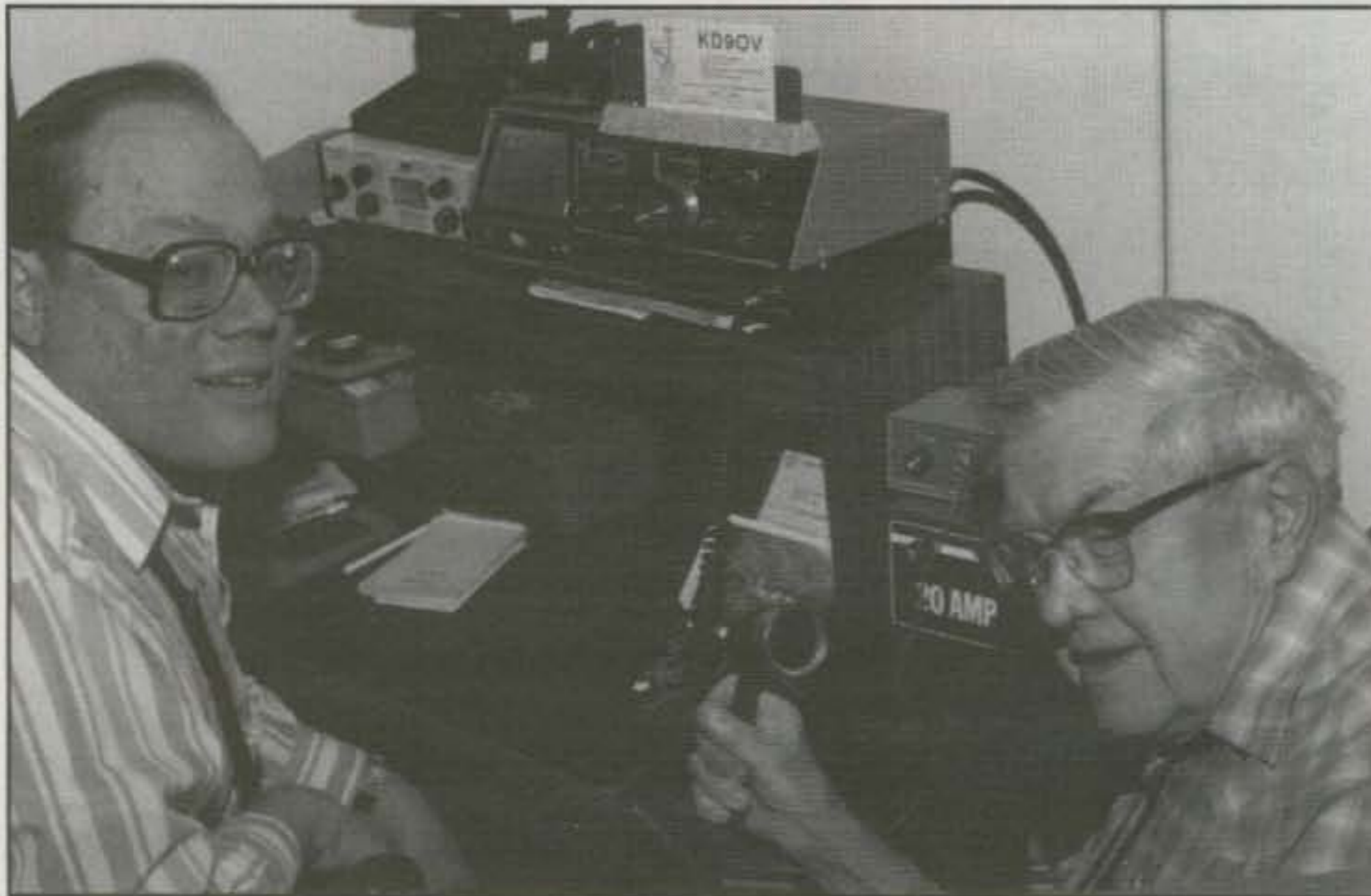


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CIRCLE 60 ON READER SERVICE CARD



Left to right are Brian Campbell, KD9OV, and Don Fenimore in the radio shack of the Grace Village Retirement Home in Winona Lake, Indiana. Brian and Don maintain a weekly schedule with Lois Liebert, N9GMG/YV2, in Rubio, Venezuela. Lois is Don's daughter. She is a teacher missionary. Grace Village strongly encourages amateur radio operation by providing the radio room, equipment, and accessories. The shack includes an Atlas 210X transceiver, an MFJ antenna tuner, and a Mosley trap vertical antenna.

land, OR 97214 (phone 1-800-890-7992, FAX 503-233-5176). The price per map is \$23.90, including s&h fees.

Vector Control Systems offers a plastic laminated Great Circle Map of the Earth. The overall size is approximately 22.5 (wide) by 21.5 (high) inches with a pertinent (information) size of about 20.25 (wide) by 19.5 (high) inches. The diameter of the Earth presentation is 18 inches. The continents are outlined in black against a white background, and the countries are outlined in green. Amateur radio callsigns of countries are shown in red. Your stated location is shown at the center of the map with lines every 10 degrees showing true beam headings to all parts of the world. Distances are shown by 2000 mile rings centered around

your station. Three versions of these full-color Great Circle Maps are available. A laminated 16 or 22 inch version is priced at \$35, including shipping and handling charges. A customized beam-heading DXCC list is included at no extra charge with the preceding \$35 item. A framed 16 inch version of this map sells at \$59.95, including s&h charges. A beam indicator version of this Great Circle Map sells for \$189.95, plus a \$10 s&h fee (to U.S.A. addresses). It has bright LED indicators which show 5 degree resolution. It has a decorative 16 x 16 x 1 inch frame. It also features an adjustable beam width and long-path indicator. A simple rotor connection enables one to see the beam heading displayed on this Beam Indicator. This map is a useful and decorative addition to

one's shack. The address is 1655 N. Mountain, Suite 104-45, Upland, CA 91784 (phone 909-985-6250, FAX 909-985-3482).

## Patches

Caps Unlimited sells a 2 by 3 inch embroidered SKYWARN patch with heat-seal adhesive backing. It shows a black tornado inside a fluorescent orange eye, and it has the word SKYWATCH below the eye. This patch is also available on a black baseball-type summer cap. They sell the same kind of cap (one size fits all) with the words AMATEUR RADIO COMMUNICATIONS centered between a pair of lightning bolts in day-glo bright chartreuse. RACES decals are sold to RACES members. They are self-adhesive on the front side for attachment inside vehicle windows and windshields. It is advisable to request a copy of their sales data sheet to obtain detailed information regarding their entire product line. The address is P.O. Box 460118, Garland, TX 75046-0118 (214-276-0413). They also sell identification badges and embroidered patches. As usual, an SASE would be appreciated if you request data.

(Also see ARRL, Curiosity Sales, and Larry Plotkin.)

## Pens

Kilo-Tec offers a variety of pens which can be engraved to show callsign and/or name. These pens feature free engraving of up to 25 letters or numbers (including spaces), gold-toned clip and accents, high-gloss black-lacquer finish, iridium point nibs, solid-brass casings, and standard refills. Ballpoint and rollerpoint pens cost \$15.75 to \$19.95 each, depending on the quantity. Fountain pens range from \$20.75 to \$24.95 each, according to quantity. The ballpoint pen is also sold with a nickel-silver finish. A \$4 s&h fee applies to each order. Kilo-Tec's address is P.O. Box 10, Oak View, CA 93022 (805-646-9645).

## Pins

Fallert's Engraving sells callsign pins of one line (1 by 3 inches) for \$1.25, two lines (1 by 3 inches) for \$1.50, and three lines (1.5 by 3 inches) for \$2 each p/pd. Add 29 cents per pin to pay s&h costs. Any desired logo (ARRL, CD, MARS, etc.) can be added at 75 cents more per pin. The address is 27 Verlynn Avenue, Hamilton, OH 45013 (513-892-9169).

Larry Plotkin, K4JXI, sells a nice assortment of club pins, decals, medals, patches, and ribbons. His assortment is too extensive to cover in this article. Complete details can be requested from Lane 4 Awards, P.O. Box 451591, Sunrise, FL 33345 (phone 305-742-8609, FAX 305-592-5854).

(Also see ARRL, Curiosity Sales, and Paul Washa.)

## Mid-Article Summary

The concluding part of this article covers plaques/trophies, publications, purses, QSL items, ribbons, rubber stamps, safety items, signs, software, stationery, tote bags, video tapes, and wallets.

73, Bill, W6DDB

# TENNADYNE

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T12	12	13-30 MHz	30 FT	\$765.00
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The advantages as you put more elements into the same frequency range are:  
Gain - SWR - F:B.

(Surface shipping pre-paid in North America.) To order or, for specs. call/write:  
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PH/FAX 719-395-4100

# Scanners/CB/Ham/Shortwave

**COMMUNICATIONS ELECTRONICS INC.**  
Emergency Operations Center

**26th Anniversary Special**  
**Save \$30.00**  
on Bearcat® 8500XLT scanner  
or RELM WHS150 VHF transceiver.

Celebrate our 26th anniversary with special savings on your choice of a new Bearcat 8500XLT scanner or RELM WHS150 VHF five watt transceiver. This coupon must be included with your prepaid order. Offer valid only on orders mailed directly to Communications Electronics Inc., P.O. Box 1045 - Dept. CQ1294, Ann Arbor, Michigan 48106 U.S.A. Coupon expires January 31, 1995. Limit one coupon per item. Coupon may be photocopied. Coupon may not be used in conjunction with any other offer. Credit cards are excluded from this offer. Void where prohibited.

## Bearcat Scanners

### Bearcat 200XLT-K Radio Scanner

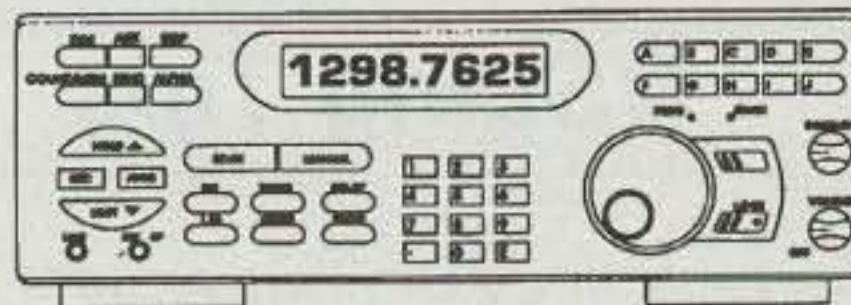
Mfg. suggested list price \$509.95/CE price \$198.95  
200 Channels • 10 Banks • Cellular Modifiable  
Heavy duty carry case • Illuminated LCD • Search  
Size: 2-3/4" Wide x 1-1/4" Deep x 7-1/2" High  
Frequency Coverage: 29.000 - 54.000, 118.000-174.00, 406.000-512.000, 806.000 - 823.9875, 849.0125 - 868.9875, 894.0125 - 956.0000 MHz.

Recently, the FCC amended Parts 2 and 15 of its rules to prohibit the manufacture and importation of scanning radios capable of intercepting the 800 MHz. cellular telephone service. The Electronics Communications Privacy Act prohibits the intentional interception of cellular telephone transmissions. Supplies of scanners that are capable of being easily modified to receive full 800 MHz. coverage such as the Bearcat 200XLT are in *critically* short supply. Today could be your last chance to buy your Bearcat 200XLT scanner. Signal intelligence experts, public safety agencies and people with inquiring minds that want to know, depend on the Bearcat 200XLT *handheld* scanner to intercept just about any radio transmission. You can also program frequencies such as police, fire, emergency, race cars, marine, weather, and other broadcasts into 10 banks of 20 channels each.

A modification sheet with instructions to restore full 800 MHz. coverage for our Bearcat 200XLT or Bearcat 2500XLT may be ordered for \$8.00. To order your Bearcat scanner, call 1-800-USA-SCAN.

### Other Bearcat Scanners

Bearcat 8500XLT-K base/mobile \$368.95  
NEW Bearcat 3000XLT-K handheld\* \$379.95  
Bearcat 890XLT-K base/mobile ..... \$228.95  
Bearcat 855XLT-K base ..... \$148.95  
Bearcat 760XLT-K base/mobile ..... \$198.95  
Bearcat 700A-K info mobile ..... \$148.95  
Bearcat 560XLA-K base/mobile ..... \$83.95  
Bearcat 220XLT-K handheld ..... \$228.95  
Bearcat 200XLT-K handheld ..... \$198.95  
Bearcat 178XLT-K base/WX alert .... \$133.95  
Sportcat 150-K handheld ..... \$178.95  
Bearcat 148XLT-K base/WX alert ..... \$88.95  
Bearcat 120XLT-K handheld ..... \$148.95  
Bearcat BCT2-K info mobile ..... \$138.95



### Bearcat 8500XLT-K Radio Scanner

Mfg. suggested list price \$689.95/CE price \$368.95  
500 Channels • 20 banks • Alphanumeric display  
Turbo Scan • VFO Control • Priority channels  
Auto Store • Auto Recording • Reception counter  
Frequency step resolution 5, 12.5, 25 & 50 KHz.  
Size: 10-1/2" Wide x 7-1/2" Deep x 3-3/8" High

Frequency Coverage:  
25.000 - 28.995 MHz. (AM), 29.000 - 54.000 MHz. (NFM),  
54.000 - 71.995 MHz. (WFM), 72.000 - 75.995 MHz. (NFM),  
76.000 - 107.995 MHz. (WFM), 108.000 - 136.995 MHz. (AM)  
137.000 - 173.995 MHz. (NFM), 174.000 - 215.995 MHz. (WFM),  
216.000 - 224.995 MHz. (NFM), 225.000 - 399.995 MHz. (AM)  
400.000 - 511.995 MHz. (NFM), 512.000 - 549.995 MHz. (WFM)  
760.000 - 823.9875 MHz (NFM), 849.0125 - 868.9875 MHz (NFM)  
894.0125 - 1,300.000 MHz. (NFM).

The new Bearcat 8500XLT gives you pure scanning satisfaction with amazing features like Turbo Scan. This lightning-fast technology featuring a triple conversion RF system, enables Uniden's best scanner to scan and search up to 100 channels per second. Because the frequency coverage is so large, a very fast scanning system is essential to keep up with the action. Other features include *VFO Control* - (Variable Frequency Oscillator) which allows you to adjust the large rotary tuner to select the desired frequency or channel. *Counter Display* - Lets you count and record each channel while scanning. *Auto Store* - Automatically stores all active frequencies within the specified bank(s). *Auto Recording* - This feature lets you record channel activity from the scanner onto a tape recorder. You can even get an optional *CTCSS Tone Board* (Continuous Tone Control Squelch System) which allows the squelch to be broken during scanning only when a correct CTCSS tone is received. *20 banks* - Each bank contains 25 channels, useful for storing similar frequencies in order to maintain faster scanning cycles. For maximum scanning enjoyment, order the following optional accessories: *PS001* Cigarette lighter power cord for temporary operation from your vehicle's cigarette lighter \$14.95; *PS002* DC power cord - enables permanent operation from your vehicle's fuse box \$14.95; *MB001* Mobile mounting bracket \$14.95; *BC005* CTCSS Tone Board \$54.95; *EX711* External speaker with mounting bracket & 10 feet of cable with plug attached \$19.95. The BC8500XLT comes with AC adapter, telescopic antenna, owner's manual and one year limited warranty from Uniden. Order your BC8500XLT from Communications Electronics Inc. today.

## CB/GMRS Radios



A National Weather Service (NWS) receiver with automatic emergency broadcast activation has been added to the legendary Cobra 29 CB radio. The integrated NWS receiver in the Cobra 29LTDWX will *automatically* activate to receive emergency announcements about severe weather and travel conditions. A special tone-alert signal broadcast by the NWS activates the weather receiver and overrides any CB radio reception for monitoring the warning message.

Cobra 29LTDWX-K CB/Weather Alert.. \$129.95  
Cobra 2000GTL-K SSB Deluxe CB Base \$389.95  
Cobra HH40-K CB 40 ch. Handheld ..... \$99.95  
Uniden GMR100-K GMRS Handheld ..... \$159.95  
Uniden WASHINGTON-K SSB CB Base. \$189.95  
Uniden GRANTXL-K SSB CB Mobile ..... \$139.95  
Uniden PRO538W-K CB & Weather ..... \$59.95



## Weather Stations

Now you can be your own weather reporter with the Davis Weather Monitor II. Our top-of-the-line weather station combines the most advanced weather monitoring technologies available into one incredible package. Glance at the display, and see wind direction and wind speed on the compass rose. Check the barometric trend arrow to see if the pressure is rising or falling. Push a button, and read indoor and outdoor temperature, wind chill, humidity and barometric pressure. Our package deal includes the ultra high resolution 1/100 inch rain collector part #7852-K, and the external temperature/humidity sensor, part #7859-K. The package deal is order #DAV1-K for \$479.95 plus \$15.00 shipping. If you have a personal computer, when you order the optional Weatherlink computer software for \$139.95, you'll have a powerful computerized weather station at an incredible price. For the IBM PC or equivalent order part #7862-K. Apple Mac Plus or higher including PowerBook, order part number 7866-K.

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



Davis Weather Monitor II 7440-K ..... \$334.95  
Davis Weather Wizard III 7425-K ..... \$154.95  
Davis Remote Display Unit 7815-K ..... \$84.95  
Davis Rain Collector II 0.01" 7852-K ..... \$59.95  
Davis Rain Collector II 0.2 mm 7852M-K ..... \$59.95  
External Temperature/Humidity Sensor 7859-K ..... \$99.95  
Davis Anemometer Mast Mount 7890-K ..... \$15.95  
Weatherlink Software for IBM PC-Version 3.0 7862-K ..... \$139.95  
Weatherlink Software for Apple-Version 3.0 7866-K ..... \$139.95  
4-Conductor 40' (12.2 m) extension cable 7876-K ..... \$17.95  
6-Conductor 40' (12.2 m) extension cable 7878-K ..... \$21.95  
8-Conductor 25' (7.6 m) junction box cable 7880-K ..... \$14.95  
8-Conductor 50' (15.2 m) junction box cable 7881-K ..... \$24.95  
8-Conductor 100' (30.5 m) junction box cable 7882-K ..... \$44.95  
Modem Adaptor 25-pin for communications port 7870-K ..... \$9.95  
Car/Boat/RV Lighter Cord 7873-K ..... \$9.95  
2400 baud modem for Weatherlink MEXT-K ..... \$39.95  
Weatherlink language disks: Française, Deutsche, Italiana, Española 7863-K \$24.95

## Other neat stuff

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Grundig Yacht Boy 400-K digital portable shortwave receiver - 40 memory presets \$199.95  
Grundig Yacht Boy 230-K portable shortwave receiver ..... \$139.95  
Sangean AT8800-K portable 20 memory shortwave receiver ..... \$69.95  
Sangean AT8803A-K portable shortwave receiver w/AC adapter - 9 memory presets \$148.95  
Sangean AT8806-K portable 45 memory shortwave receiver ..... \$159.95  
Sangean AT8818CS-K portable shortwave receiver with cassette recorder ..... \$209.95  
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FANS P161P-K 60 name/number caller ID, unwanted call blocker, automatic paging \$149.95  
SNI ID200-K Bouncer name/number caller ID, call reject, forward to machine ..... \$89.95  
ICOM GP22-K handheld global positioning system (GPS) ..... \$599.95  
WR200-K weather radio with National Weather Service storm alert ..... \$39.95  
RELM WHS150-K VHF handheld 5 watt, 16 channel transceiver ..... \$339.95  
RELM RH256NB-K VHF 25 watt, 16 channel synthesized transceiver ..... \$289.95  
Ranger RC12950-K 25 watt 10 meter ham radio transceiver ..... \$239.95  
Ranger RC12970-K 100 watt 10 meter ham radio transceiver ..... \$369.95  
Uniden LRD9100SW-K Super Wideband Laser/Radar Detector ..... \$139.95  
MEZ-K Map Expert CD Rom for IBM PC by DeLorme Mapping ..... \$299.95  
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ANTSGBNC-K glass mount scanner antenna with BNC connector ..... \$29.95  
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It's easy to order from CEI. Mail orders to: Communications Electronics Inc., Emergency Operations Center, P.O. Box 1045, Ann Arbor, Michigan 48106 U.S.A. Add \$15.00 per radio or telephone product for U.P.S. ground shipping and handling in the continental U.S.A. unless otherwise stated. Add \$8.00 shipping for all accessories and publications. Add \$8.00 shipping per antenna. For Canada, Puerto Rico, Hawaii, Alaska, P.O. Box, or APO/FPO delivery, shipping charges are two times continental U.S. rates. Michigan residents add state sales tax. No COD's. No returns or exchanges after 31 days. 10% surcharge for net 10 billing to qualified accounts. All sales are subject to availability, acceptance and verification. Prices, terms and specifications are subject to change without notice. We welcome your Discover, Visa, American Express or MasterCard. Call 1-800-USA-SCAN to order toll-free. Call 313-996-8888 if outside the U.S.A. FAX anytime, dial 313-663-8888. For technical assistance to solve your communications problem, call the Communications Electronics technical support hotline for \$2.00 per minute at 1-900-555-SCAN. Scanner Distribution Center and CEI logos are trademarks of Communications Electronics Inc. Sale dates 11/1/94 - 1/31/95 AD #110194GEN Copyright © 1994 Communications Electronics Inc. \* New product - available 60-90 days after receipt of order.

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## NEWS OF COMMUNICATION AROUND THE WORLD

## QSLing Tips

The decline of Sunspot Cycle 22 has seriously cut into DXing success. The higher bands have been particularly hard hit, with 10 meters essentially useless and even 15 meters spotty at best. DXers find 20 meters increasingly crowded and pile-ups much more intense. Working new ones at the bottom of a sunspot cycle is significantly more difficult than increasing one's country total during high levels of solar activity.

The relative scarcity of new ones has prompted many DXers to go back through their logs, looking for previously worked contacts that have never been confirmed. The same effort that once put a new country in the log may now best be expended chasing confirmations of old contacts.

There have been several changes in recent months that have affected QSLing. Understanding these changes, and how best to deal with them, can improve QSLing success rates. Among these changes are the decline of the exchange value of the US dollar, standardization of European postage rates, increasing theft in foreign post offices, and the so-called "new" IRC. Let's look at these problems and see how the well-informed DXer can get around them.

The problem of the declining value of the US dollar in foreign countries has particularly affected QSLing to Japan and Germany. In both of these countries a single US\$1 no longer pays for the minimum airmail postage rate back to the US. The minimum airmail postage rate from Japan to the US is 110 yen. This rate is good up to 10 grams. The weight of a return envelope and a single QSL card is around 7 to 8 grams. Therefore, the 110 yen will pay for the return of a single card from Japan, but probably not two cards in the same envelope.

One US dollar, however, is worth about 100 yen. This means that a Japanese DX station or QSL manager loses money on every return envelope containing US\$1. On an occasional basis this isn't much, but it quickly adds up. For a major DXpedition the shortfall can be substantial.

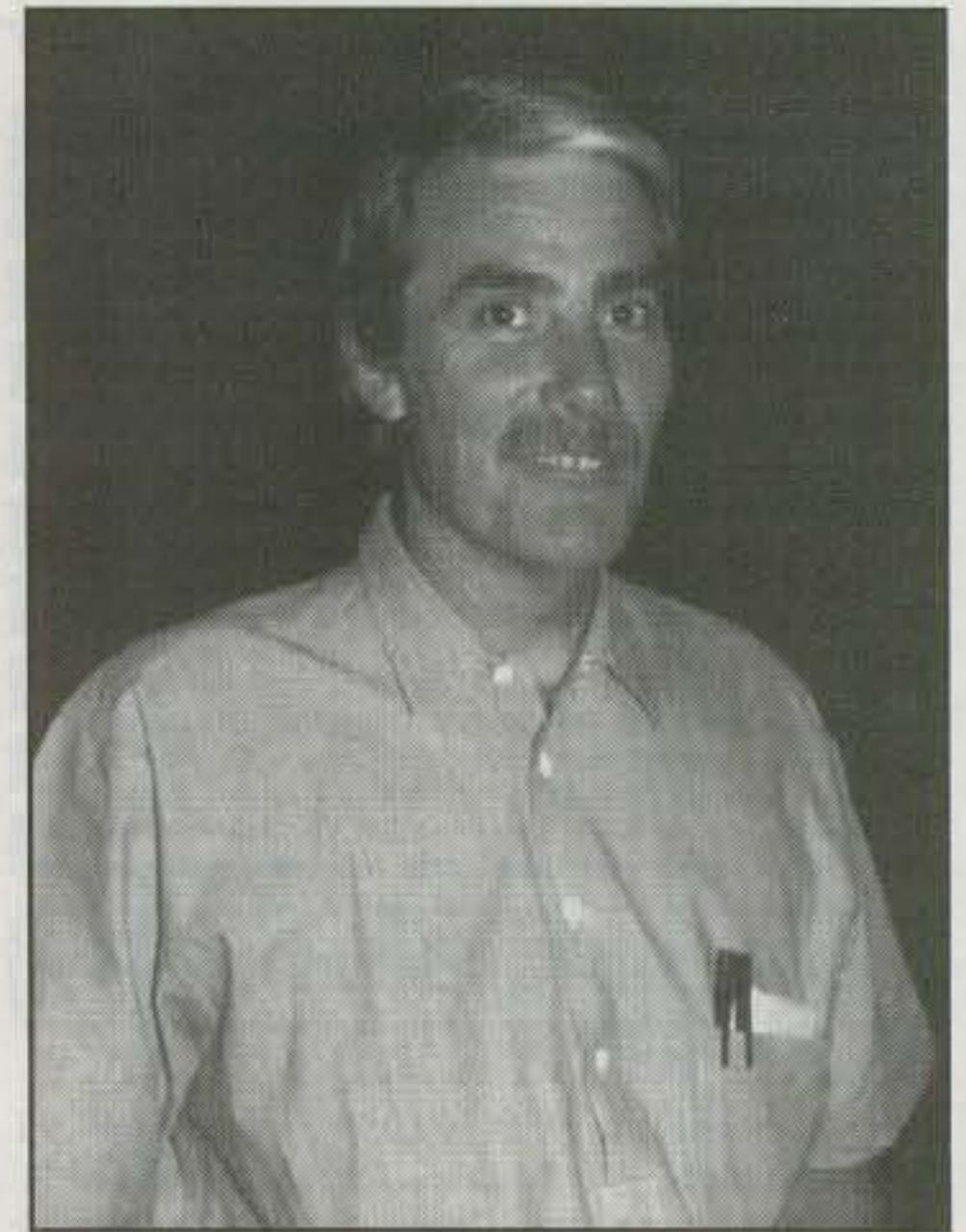
Fortunately, there is a simple solution. In Japan an International Reply Coupon (IRC) may be exchanged for 130 yen worth of postage. This more than covers the return of a single QSL card. Since US DXers can purchase IRCs at their local

post office at a cost of \$0.95, IRCs are cheaper than "greenstamps" (US\$1 bills) for return postage from Japan. Thus, use of an IRC instead of a US\$1 is better on both ends. So at least until the US dollar bounces back from its current low value, use IRCs instead of US\$1 to pay for return postage from Japan.

(Interestingly, Japan does not follow the standard practice of exchanging IRCs for the *minimum* airmail postage to another country, which is 90 yen in this case. They exchange IRCs for the *highest* minimum-weight airmail rate—130 yen, which is the rate from Japan to Africa and South America.)

Unfortunately, this solution won't work with Germany. The declining exchange value of the US dollar has dropped it below the minimum airmail postage rate. In fact, US\$1 won't even cover the *surface* postage rate back to the US. The airmail rate from Germany to the US is 3 German marks, which is just under US\$2, at an exchange rate of 1.55 marks to the dollar. The surface postage rate is 2 marks, or about \$1.30. Unlike Japan, Germany *does* follow the standard practice of exchanging IRCs for the lowest airmail rate to another country. In this case, they use the airmail rate to other European countries, which is only one mark, or about US\$0.65.

This means that IRCs are *not* the best



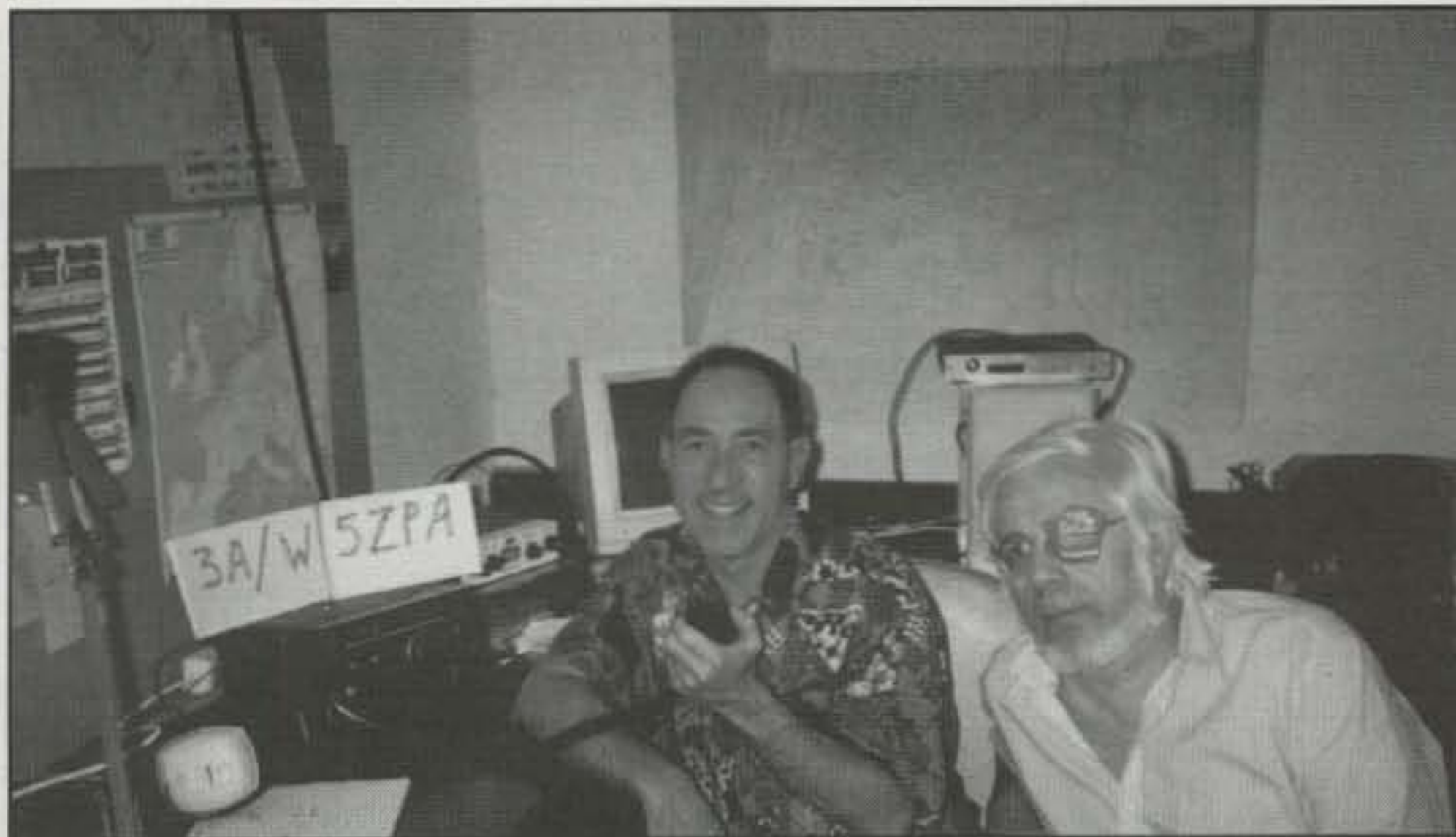
Dr. Vince Thompson, K5VT, will be the chief CW operator on the January South Georgia Island DXpedition.

value for return postage from German amateurs. It would take three IRCs to pay for airmail return postage to the US. US\$2 is less expensive. The good news is that this pays for 25 grams, enough to return at least six QSL cards in the same envelope. For those German stations that accept the practice, DXers might con-



Ricardo Grueneberg, LU2BRG, has worked 186 zones toward 5-Band WAZ in only four years. He earned the first Argentine 15 and 20 meter WAZs.

P.O. Box 50, Fulton, CA 95439



Mike Mayer, 3A/W5ZPA, visited with John Cooper, 3A2LU, last August.

sider pooling their QSL requests to Germany. (Note that some stations, such as DJ6SI, won't respond to such multiple requests.)

While Germany has one of the highest airmail postage rates in Europe, the problem of one US dollar not covering return postage is not limited to that country. This

is due in part to the standardization of postage rates within the European Community. As part of the wide-spread elimination of barriers between members of the European Community, mail between member countries is treated as mail within a given country. The rate for standard 20-gram letters is fixed for all member

### The WPX Program

#### SSB

2472 .....EA3CWT 2474 .....WS1A  
2473 .....EA1KK 2475 .....N1OAZ

#### CW

2838 .....IK4TYQ 2840 .....PT2CJ  
2839 .....9A3SM 2841 .....HA7XL

#### MIXED

1679 .....N1OAZ 1681 .....JR4RGH  
1680 .....JR3TOE

Mixed: 450 WS1A, JR3TOE, JR4RGH. 500 WS1A, JR3TOE. 550 WS1A, JR3TOE. 600 WS1A, JR3TOE. 650 WS1A, JR3TOE. 700 WS1A, JR3TOE. 750 WS1A, JR3TOE. 800 WS1A, JR3TOE. 850 WS1A. 900 WS1A. 950 WS1A. 1000 WS1A. 1150 KF4FP. 1300 W0IZV. 1350 I1-21171. 1400 I121171. 1600 LU8DY. 2100 HA5NK. 2150 HA5NK. 2400 KF2O. 2450 KF2O. 2500 KF2O. 2550 KF2O. 2600 KF2O. 2650 KF2O. 3030 I1EEW.

SSB. 350 N6ONO, JE1VJT, EA3CWT, EA1KK. 400 JE1VJT, EA3CWT, EA1KK. 450 EA3CWT, EA1ET, EA1KK, KA3LCF, JF1VJT. 500 EA3CWT, EA1ET, EA1KK, KA3LCF. 550 EA3CWT, EA1KK, KA3LCF. 600 EA3CWT, KD5ZD, EA1KK, KA3LCF. 650 EA3CWT, EA1KK, DL8AAV. 700 EA3CWT, EA1KK, DL8AAV. 750 EA3CWT, EA1KK. 800 EA3CWT, EA1KK, JR3TOE. 850 EA3CWT, EA1KK, DF7HX. 900 EA3CWT, KF7IO, EA1KK. 950 KF7IO, EA1KK. 1000 KF7IO, EA1KK. 1050 KF7IO, EA1KK. 1100 KF4FP. 1600 LU8DY. 2050 KF2O. 2100 KF2O. 2150 KF2O. 2200 KF2O. 2250 KF2O. 2300 LU8ESU. 2650 I1EEW.

CW: 350 9A3SM, HA7XL. 400 WD6CKT, 9A3SM, HA7XL. 450 WB6CKT, 9A3SM, DL1GPG, HA7XL. 500 9A3SM, DL1GPG, HA7XL. 550 HA7XL. 600 HA7XL. 650 WW0E, K2LUQ, HA7XL. 700 HA7XL. 750 HA7XL. 800 HA7XL. 850 HA7XL. 900 HA7XL. 950 GW3SB, HA7XL. 1000 HA7XL. 1050 HA7XL. 1100 HA7XL. 1150 HA7XL. 1200 EA7TG, HA7XL. 1250 EA7TG, HA7XL. 1300 EA7TG, HA7XL. 1350 HA7XL. 1400 HA7XL. 1450 HA7XL. 1500 I1EEW, HA7XL. 1550 HA7XL. 1600 KF2O, HA7XL. 1650 KF2O. 1700 KF2O. 1750 KF2O.

10 Meters: JA2AH  
15 Meters: JA2AH  
20 Meters: KA3LCF, JA2AH  
40 Meters: JA2AH  
160 Meters: KF2O

Asia: JA2AH, HA7XL  
Africa: JA2AH  
No. Amer.: JA2AH, HA7XL  
So. Amer.: JA2AH, HA7XL  
Europe: K2LUQ, KA3LCF, JA2AH, HA7XL  
Oceania: N6ONO, JA2AH

**Award of Excellence Plaque Holders:** I8YRK, W4CRW, SM0AJU, K5UR, K6XP, N5TV, K2VV, VE3XN, W6OUL, DL1MD, DJ7CX, DL3RK, WB4SIJ, SM6DHU, N4KE, I2UIY, DL7AA, ON4QX, WA8YTM, YU2DX, OK3EA, I4EAT, OK1MP, N4NO, ZL3GQ, VK9NS, DE0DXM, DK4SY, UR2QD, AB9O, FM5WD, I2DMK, W4BQY, I0JX, SM6CST, VE1NG, I1JQJ, WA1JMP, PY2DBU, H18LC, KA5W, K0JN, W4VQ, KF2O, K3UA, HA8XX, HA8UB, W8CNL, K7LJ, W1JR, F9RM, W5UR, WB8ZRL, SM3EVR, CT1FL, K2SHZ, UP1BZZ, W8RSW, WA4QMQ, EA7OH, K2POF, DJ4XA, IT9TQH, W8ILC, K2POA, N6JV, W2HG, ONL-4003, VE7DP, K9BG, W5AWT, KB0G, HB9CSA, F6BVB, W1BWS, YU7SF, G4BUE, N3ED, DF1SD, K7CU, I1POR, LU3YLW4, NN4Q, KA3A, YB0TK, VE7WJ, VE7IG, K9QRF, YU2NA, N2AC, W4UW, NX0I, W9NUF, N4NX, SM0DJZ, DK5AD, WB4RUA, DK5AD, WD9IC, W3ARK, I6DQE, LA7JO, VK4SS, K6JG, I1EEW, I8RFD, I3CRW, VEFXR, N4MM, KC7EM, ZS6BCR, CT1YH, IV3PVD, KA5RNH, ZP5JCY, F1HWP, KC8PG, NE4F, VE3MS, K9LJN, ZS6EZ, YU2AA, I1WXY, IK2ILH, DE0DAQ, LU1DOW, N1IR, IK4GME, WX3N, KC6X, N6IBP, W5ODD, I0RIZ, I2MOP.

**Award of Excellence Plaque Holders with 160 Meter Endorsement:** CT1YH, IV3PVE, KA5RNH, ZP5JCY, AB9O, FM5WD, SM0DJZ, DK5AD, SM6CST, I1JQJ, PY2DBU, W3ARK, H18LC, KA5W, UR2QD, VE3XN, K6XP, LA7JO, W4VQ, K6JG, K3UA, HA8UB, W4CRW, N4MM, K7LJ, SM0AJU, KF2O, SM3EVR, K5UR, UP1BZZ, OK1MP, N5TV, K2POF, W8CNL, DJ4XA, IT9TQH, DL9RK, N6JV, ONL-4003, W1JR, W6OUL, W5AWT, KB0G, F6BVB, W4BQY, YU7SF, W5UR, N4NO, DF1SD, K7CU, I1POR, W8RSW, N4KE, I2UIY, YB0TK, W8ILC, W1BWS, VE7WJ, K9QRF, NN4Q, W4UW, NX0I, G4BUE, LU3YLW4, I4EAT, WB4RUA, VE7WJ, N4NX, DE0DXM, VE7IG, K9BG, I1EEW, AB9O, CT1YH, IV3PVD, KA5RNH, ZP5JCY, I2MOP, I0RIZ, W5ODD, WX3N, IK4GME, HA8XX, YU1AB.

Complete rules and application forms may be obtained by sending a business-size self-addressed, stamped envelope (foreign stations send extra postage if airmail desired) to: "CQ WPX Awards," P.O. Box 593, Clovis, NM 88101-9511 USA.

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TM733A	\$30	TS950	Call
TM742A	\$40	TS50S	\$50

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Dual Band  
Tri Band  
Mobiles



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Mobiles



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TH22AT • TH79A • TH28A

# Spider Antenna

U.S. Patents 4348825, 4400895 Made in U.S.A.

Spider™ Family of Multi-Band Antennas

**GO WITH THE ORIGINAL NO HASSLE, MULTIPLE BAND ANTENNA**

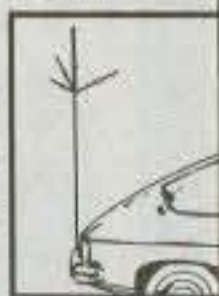
Four amateur bands (10, 15, 20, and 40 meters) at your command without having to change resonators or retune — just band switch your rig. Also available are the 75, 12, 17 and 30 meter bands. Needs no antenna tuner. Custom made with highest quality workmanship and materials.

**Wherever you roam, on Land or Sea . . . or even at Home**



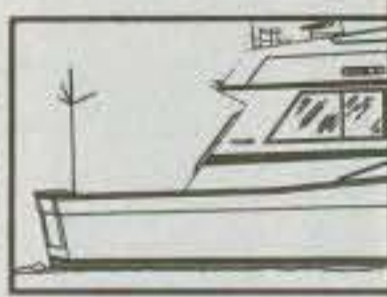
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Suitable for use on any motor vehicle from a compact automobile to a motor home or trailer. Work four bands without stopping to change resonators.



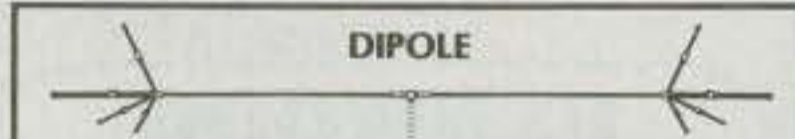
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The Spider™ Maritimer is for use on or near the ocean. Highly polished stainless steel and nickel-chrome plated brass. Commercial marine frequencies (8, 12, 16 and 22 MHz) are also available.



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If you live in an apartment, condominium or restricted area, the Spider™ may well be the answer to your antenna problems.



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## The WAZ Program Single Band WAZ

### 10 Meter SSB

480 .....IK2DUW

### 12 Meter SSB

8 .....i2JQ

### 15 Meter CW

258 .....JA0HC

### 20 Meter CW

449 .....UA3ECJ

### 40 Meter CW

175 .....N9AU

### All CW

59 .....DL7VKD

### All Band WAZ SSB

4208 .....JH1FVE	4214 .....WD0GLF
4209 .....DF3IN	4215 .....DF3IS
4210 .....DL1SDN	4216 .....JJ1CZR
4211 .....IK6PBX	4217 .....K6ICS
4212 .....N5QDE	4218 .....JR1KAG
4213 .....GM3EDZ	

### CW/Phone

7487 .....DL6YH	7492 .....N3CAM
7488 .....DK8NM (CW)	7493 .....Z31RQ (CW)
7489 .....OK1JKR (CW)	7494 .....OE7JLI (CW)
7490 .....IK1OWC (CW)	7495 .....JG1UZD
7491 .....DL1SDN (CW)	7496 .....JJ1CZR

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.

countries and is currently ECU 0.44, or about US\$0.50. (The same rate applies to other European countries who are not members of the EU, but is for surface mail, not airmail.)

While this standardization is good news for European DXers, it spells problems for US amateurs. The minimum airmail postage rate to countries outside of Europe is at least twice the rate within Europe. Many countries add surcharges onto this minimum rate. This means that one US dollar probably won't cover airmail return postage, especially as more European countries adjust their postage rates to conform to European Community standards.

I occasionally receive requests from DXers to print a list of countries for which the US dollar is not enough for return postage. Unfortunately, this is impossible due to the fluctuating value of the US dol-

lar and rapidly changing postage rates in other countries. The DXer's best bet, when possible, is to ask the DX station what form of return postage is best: US dollars, IRCs, or unused stamps of that country. An alternative, albeit expensive, is to include *both* a US dollar *and* an IRC for return postage. This will cover every European country except for Germany, for which US\$2 is the best choice.

While the changes in postage rates and the declining value of the US dollar have made QSLing much more expensive in Europe and Japan, at least DXers in those countries don't have to deal with much mail theft. The problem of postal workers stealing mail for its valuable contents is widespread and getting worse. In Russia and the other countries of the former USSR—as well as in many Asian, African, and now South American countries—mail theft by postal workers is epidemic. Hand-held scanners can detect the magnetic ink used to print most world currencies. A postal worker can wave such a scanner across a tray full of mail and pick out any with valuable contents. Needless to say, such mail seldom gets delivered after the valuable contents are removed.

Avoiding mail theft is much more difficult than simply increasing the amount of return postage. While there is no one perfect method to get around this problem, there are several things an informed DXer can do to reduce the chances of having his or her QSL request plundered.

The first step is to eliminate any call-signs on your QSL mail. This includes your return address. Many DXers use rubber stamps of address labels with their call-sign preprinted. If you think that mail theft might be a problem, don't use these methods. Use return-address labels from a non-amateur member of the family, or print or type it without a call-sign.

The next most useful way to reduce mail theft is to avoid the folded envelope. Many DXers include their return self-addressed envelope (SAE) folded inside the outer envelope. Foreign postal workers quickly catch on to the fact that those bulky, lumpy envelopes frequently contain valuable contents. The best way to eliminate this problem is to use a larger outer envelope. Ideally, use nesting airmail envelopes so that the return SAE fits into the outer envelope snugly, but without folding. Several vendors sell such airmail envelopes; I get mine from William J. Plum, 12 Glenn Road, Flemington, NJ 08822. An additional bonus of these airmail envelopes is they will hold the oversized cards favored by some DX stations.

The best way around the problem of currency-tripping scanners is to not include cash in a QSL request. Use either IRCs or mint postage for that country. (Plum sells such mint stamps, as do several other sources.) Keep in mind the fact

## 5 Band WAZ

As of August 31, 1994, 397 stations have attained the 200 Zone level.

New recipients of 5 Band WAZ Award with all 200 Zones confirmed:

DL1SDN  
VE7DX

The top contenders for 5 Band WAZ (zones needed, 80 meters):

N4WW, 199 (26)	K1ST, 199 (26)
K6YRA, 199 (34)	4X6DK, 199 (4)
AA4KT, 199 (26)	I1POR, 199 (1)
K7UR, 199 (34)	ABØP, 199 (23)
NAØY, 199 (26)	SM6AHS, 198 (12, 31)
WØPGI, 199 (26)	UA3AGW, 198 (1, 12)
W2YY, 199 (26)	KL7Y, 198 (34, 36)
W9WAQ, 199 (26)	VO1FB, 198 (19, 27)
W1JR, 199 (23)	EA5BCK, 198 (27, 39)
VE7AHA, 199 (34)	KZ4V, 198 (22, 26)
W1FZ, 199 (26)	K4PI, 198 (23, 26)
IK2GNW, 199 (1)	G3KDB, 198 (1, 12)
W9CH, 199 (26)	DK2GZ, 198 (1, 24)
ACØM, 199 (34)	UY5XE, 198 (24, 27)
IK8BQE, 199 (31)	N5FG, 198 (22, 34 on 40)
JA2IVK, 199 (34, 40m)	KG9N, 198 (18, 22)
KM5W, 199 (26)	

Endorsements:

NN7X, 197 Zones	EA2KL, 199 Zones
DL1SDN, 200 Zones	VE7DX, 200 Zones
KG9N, 198 Zones	

915 Stations have attained the 150 Zone level as of August 31, 1994.

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.

that postage rates can change quickly, especially in countries with a high inflation rate, such as Brazil. You should order only sufficient stamps for current QSL needs. When in doubt, include one or two IRCs.

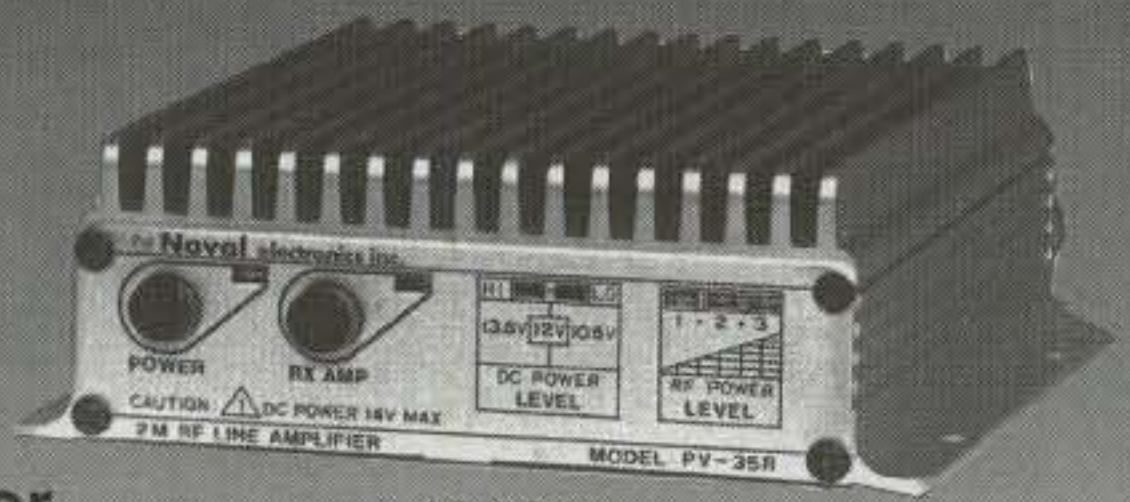
Speaking of IRCs, misinformation continues to circulate about the so-called "new" IRC and its conversion value. Two years ago the wording on the back of the IRC was changed from "exchangeable . . . for the minimum postage for an unregistered letter sent by surface to a foreign country" to "exchangeable . . . for the minimum postage for a priority item or an unregistered letter sent by air to a foreign country."

For some time DXers sought out the "new" airmail IRC, believing (incorrectly) that only these new IRCs were exchangeable minimum for airmail postage. In fact, the change in wording on the IRC merely reflected a fundamental change in the exchange of all current, valid IRCs. All such IRCs, regardless of the wording on the back, can be exchanged for the minimum airmail postage to a foreign country. There is no practical difference between the "new" IRCs and those with the older wording.

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AN779H 20W EB27A 300W  
EB104 600W

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### MIXED

4689.....F9RM	3144.....I2UIY	2795.....YU7SF	2392.....4N7ZZ	2047.....N2AIF	1829.....SM6CST	1537.....YB0TK	1249.....I1ZQD	1014.....IT9JPK
4542.....9A2AA	3125.....I2PJA	2752.....YU7BCD	2350.....I2EOW	2037.....W6OUL	1829.....W9IL	1516.....HA9PP	1242.....NH6T	1008.....CT1EEB
4259.....K2VV	3115.....SM3EVR	2711.....HA0DU	2321.....K2POF	2018.....HA5NK	1819.....G4OBK	1471.....OE6CLD	1212.....HP2CWB	977.....WB2PCF
3596.....EA2IA	3106.....W1BWS	2676.....K9BG	2309.....S53EO	1994.....K2OLG	1777.....W3KH	1433.....I2EAY	1206.....WA3HUP	943.....VE6BMX
3527.....IT9TQH	3050.....YU1AB	2650.....SM7TV	2308.....HA0IT	1959.....WB4RUA	1760.....IK2ILH	1376.....KC6X	1186.....JN3SAC	889.....VE3OMM
3417.....VE3XN	3047.....N4MM	2584.....N2AC	2239.....K8LJG	1957.....S51NU	1719.....S58MU	1286.....K0IFL	1174.....W0JIE	883.....WU1F
3415.....K6JG	2989.....KA5W	2582.....KF2O	2232.....WB2YQH	1928.....WE2L	1674.....VE9RJ	1285.....KS0Z	1167.....OZ1ACB	824.....JR3TOE
3342.....N4NO	2966.....I1EEW	2548.....IT9QDS	2216.....K5UR	1918.....VE3MS	1651.....CT1QF	1285.....W0IZV	1145.....HA8QC	796.....OZ-2044
3335.....W2FXA	2920.....W9DWQ	2441.....I2MQP	2138.....KL7AF	1912.....KS4S	1598.....CT1YH	1280.....WK3Z	1093.....AB5C	655.....W2EZ
3259.....N6JV	2907.....WA8YTM	2418.....HA0HW	2137.....W4UW	1867.....KB0G	1555.....WB3DNA	1261.....W9IAL	1082.....IK2DUW	638.....KD1CJ
3192.....N9AF	2880.....N4UU	2410.....K9AGB	2125.....DK5AD	1848.....WB2ABD	1540.....LU8DY	1251.....K9XR	1057.....HB9DDZ	605.....VE6JAV
3180.....K6XP	2823.....PA0SNG	2396.....SM6DHU						

### SSB

4524.....F9RM	2648.....EA2IA	2248.....WA8YTM	1984.....K5RPC	1695.....K2POF	1408.....N2AC	1225.....G4OBK	1011.....CT1EEB	800.....EA3EQT
4026.....I0ZV	2644.....I6ZJC	2243.....LU8ESU	1980.....EA5AT	1673.....HA0IT	1404.....W6OUL	1196.....IK2AEQ	985.....NH6T	796.....EA8BGY
3633.....K2VV	2601.....N4NO	2207.....EA3AQC	1952.....W4UW	1673.....KL7AF	1388.....WN5MBS	1176.....HA5NK	977.....K9XR	778.....JR3TOE
3521.....IT9TQH	2582.....EA8AKN	2207.....KF2O	1916.....EA2AOM	1650.....WA6SLO	1342.....CT1BWW	1161.....NG9L	897.....KA0IFL	774.....EA1KN
3512.....ZL3NS	2575.....NJ0C	2193.....WA4QMQ	1876.....4X6DK	1618.....LU8DY	1339.....IK0EIM	1148.....F6FNA	878.....SV3AQR	699.....SM6CST
3494.....VE1YX	2572.....F2VX	2183.....WF4V	1876.....K5UR	1608.....N6FX	1327.....DK5WQ	1107.....WA2FKF	866.....EA1AX	674.....KE4BM
3179.....F6DZU	2564.....I1EEW	2163.....I8KCI	1863.....IN3QCI	1588.....YU7SF	1308.....KB0C	1100.....HP2CWB	865.....T30JH	672.....I0UVP
3175.....K6JG	2504.....PA0SNG	2147.....W9DWQ	1850.....N4UU	1533.....K8LJG	1296.....I1-21171	1089.....WB6SRK	845.....CT1YH	666.....N3DRO
3136.....WD8MGQ	2499.....KA5W	2145.....YU7BCD	1811.....CX6BZ	1492.....N2AIF	1277.....HP6AYV	1086.....KC6X	843.....WU1F	651.....S51NU
3116.....I2PJA	2486.....I4CSP	2141.....CT4UW	1802.....WE2L	1465.....OE6CLD	1272.....W5ILR	1059.....G4SDJ	841.....I6KYL	650.....VE9RJ
2892.....CT4NH	2472.....I4ZSQ	2122.....PY4OY	1802.....CT1BY	1459.....CT1DIZ	1262.....I3ZSX	1045.....KB0G	822.....EA3EQT	620.....UA1ZO
2726.....N4MM	2397.....I5ZJK	2089.....I2EOW	1783.....SM6DHU	1446.....K2EEK	1235.....OE2EGL	1028.....VE3MS	821.....DF7HX	611.....IK4HPU
2703.....I2UIY	2332.....I2MQP	1997.....CT1AHU	1751.....KF7RU	1435.....KS4S	1234.....K8MDU	1020.....EA2IF	818.....EA8BWW	601.....HB9DDZ
2651.....OZ5EV								

### CW

3640.....K2VV	2500.....YU7SF	1963.....W8IQ	1768.....K5UR	1666.....ZS6EZ	1546.....KB0G	1338.....KS4S	1007.....W9IAL	787.....NH6T
3520.....IT9TQH	2361.....N2AC	1946.....S51NR	1757.....KF2O	1653.....W1WAI	1526.....W6OUL	1319.....SM5DAC	1006.....AC5K	786.....K9XR
3510.....WA2HZR	2343.....W9DWQ	1897.....KA7T	1756.....HA0IT	1652.....HA5NK	1497.....S58MU	1284.....EA6BD	983.....W4UW	768.....JA3ARM
3344.....N6JV	2296.....LZ1XL	1887.....EA7AZA	1739.....K2POF	1650.....OK1CZ	1494.....I1EEW	1263.....LU2YA	966.....EA2CIN	749.....AA6WJ
2998.....VE7CNE	2213.....WA8YTM	1861.....G3VQO	1708.....SM6CST	1650.....KL7AF	1422.....IK3GER	1200.....IK2ECP	915.....KC6X	706.....HB9DDZ
2886.....N4NO	2204.....KA5W	1829.....TI4SU	1703.....N6FX	1625.....N2AIF	1398.....G4OBK	1186.....KA1CLV	898.....W0JIE	658.....HB9CSM
2729.....YU7LS	2202.....YU7BCD	1803.....JA9CWJ	1698.....G4SSH	1595.....VE9RJ	1386.....DJ1YH	1094.....EA7TG	845.....4X6DK	646.....K2LUQ
2632.....EA2IA	2155.....G4UOL	1795.....S51NU	1680.....K8LJG	1555.....I7PXV	1351.....VE3MS	1072.....JN3SAC	830.....PY4WS	622.....VE6BMX
2629.....K6JG	2109.....I2UIY	1782.....SM6DHU	1678.....OZ5UR	1546.....W5AWT	1345.....G4MVA	1051.....EA6AA	787.....VE3OMM	619.....K0IFL
2528.....N4UU	2069.....N4MM							

As mentioned above, this does *not* mean that a single IRC will automatically cover the cost of return airmail postage to the US. In many countries airmail rates vary according to destination. Thus, airmail letters from Europe to the US may require more than a single IRC. Again, postage and exchange rates change too quickly to print a definitive list of such cases; ask on the air if possible. If not, err on the side of generosity. With a few notable exceptions, DX stations and QSL managers are lucky to break even on their mailings. Any extra postage will probably be well used to help pay for those who cannot afford return postage, for shipments of bureau cards, etc.

Take care when purchasing IRCs that the US postal worker correctly stamps your IRCs. To be valid, an IRC should be stamped by the issuing post office on the *left* side. (The *redeeming* post office stamps it on the right side.) More than 10% of circulating IRCs are not stamped, or incorrectly stamped on the left.

The US Postal Service currently sells IRCs for \$0.95 and exchanges them for \$0.50 worth of postage. When US postage rates increase in 1995, look for both

of these figures to increase. The proposed 10% across the board rate increase will bump foreign airmail postage to \$0.55, and the domestic rate to \$0.32. DXers should remember to send some of the incremental "G" stamps to their incoming QSL bureau. And note that these undenominated stamps *cannot* be used for overseas postage.

These hints won't guarantee QSLing success, but they should improve your return rate. Good luck!

### DX News

**Romeo Stepanenko and P5RS7, by Kan Mizoguchi, JA1BK.** "The DXpedition of Romeo has included YA0RR, 1S0RR, XY0RR, P5RS7, and 5A0RR. Though the early DXpeditions were approved for DXCC credit, P5RS7 and 5A0RR have not been. Now it has been announced that P5RS7 will not be allowed for DXCC credit.

"I coordinated P5RS7 in co-operation with Romeo, because Romeo had obtained the license and shown it to me in order to receive support. The license was in the form of diplomatic documents

between the Ministry of Defense of the Ukraine and the government of the Democratic People's Republic of Korea, including clear statement that amateur radio would be exceptionally permitted. Of course it had signatures as well as the official seal. (A similar license had been used for the XY0RR operation.)

"Later, we found that the P5RS7 operation was actually done from Lebediny (42 degrees, 35' north latitude, 130 degrees, 40' east longitude) in Russian territory. This is located 20 kilometers north of Hassan, the border city between Russia and the Democratic People's Republic of Korea.

"As a result of this discovery, it appears that the documents mentioned above may have been counterfeit.

"I was taken in, and you, the DXer, were taken in as well. With regard to the well-intentioned donations from DXers around the world, those over \$6.00 have been returned. Please forgive me for this. And I would appreciate it if I may have your consent to find use for the small ones and SASE for the next valuable DXpedition."

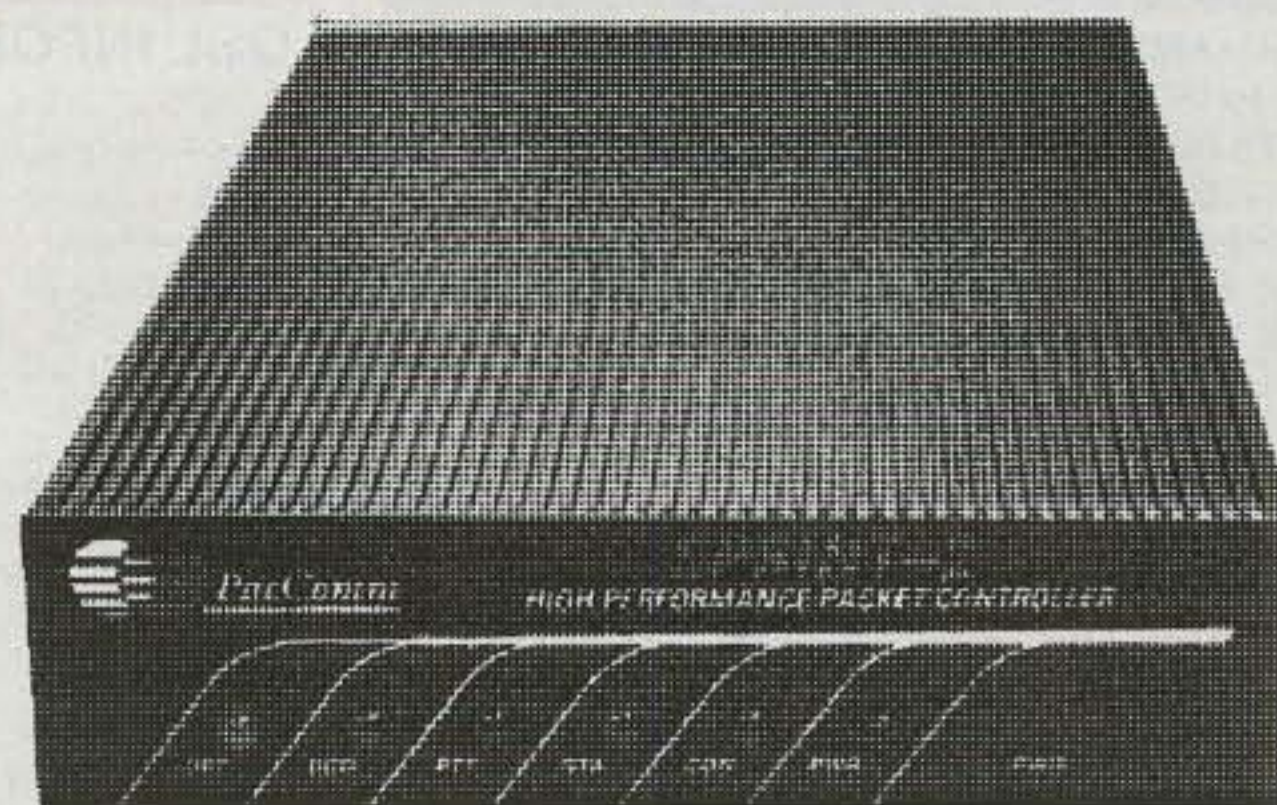
**Kingdom of Seborga, by Mario Ambrosi, I2MQP.** "In the last few weeks infor-



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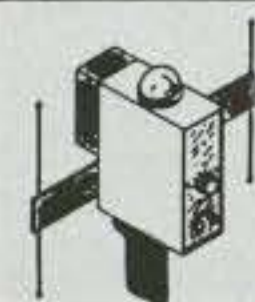
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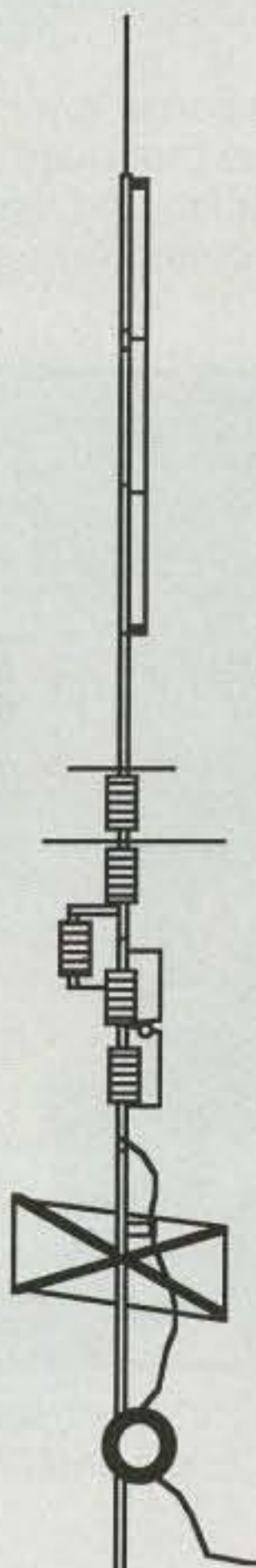
No, we won't insult your intelligence by telling you that it's a "halfwave" or that ANY vertical will operate more efficiently without a good radial system than with one; it certainly won't! If you want expensive fairy tales talk to our competitors! If, however, you've no room for even the smallest radial system just install the most efficient multiband vertical in the business, the HF9V-X, over our counterpoise kit. You'll not only save a tidy sum but you'll work DX that the shorter and more lossy no-radial "halfwaves" can't touch because both the HF6V-X and HF9V-X use longer active element lengths for higher radiation resistance and greater efficiency on more bands than any of the so-called halfwaves. Ask for our free brochure for complete specs on all Butternut models and receive technical note DLS-1 "Dirty Little Secrets from the Antenna Designer's Notebook") that shows you how to calculate the probable efficiency of any vertical antenna using the manufacturer's own specs so you won't have to learn the truth the hard way!



Model HF9V-X (shown to the left) for 80/75, 40, 30, 20, 17, 15, 12, 10 and 6 meters.



Model CPX counterpoise kit for Butternut models HF9V-X, HF6V, and HF6V-X; substitutes for ground or elevated radials. Self-supporting tubing bolts onto base of antenna. Mast not provided.

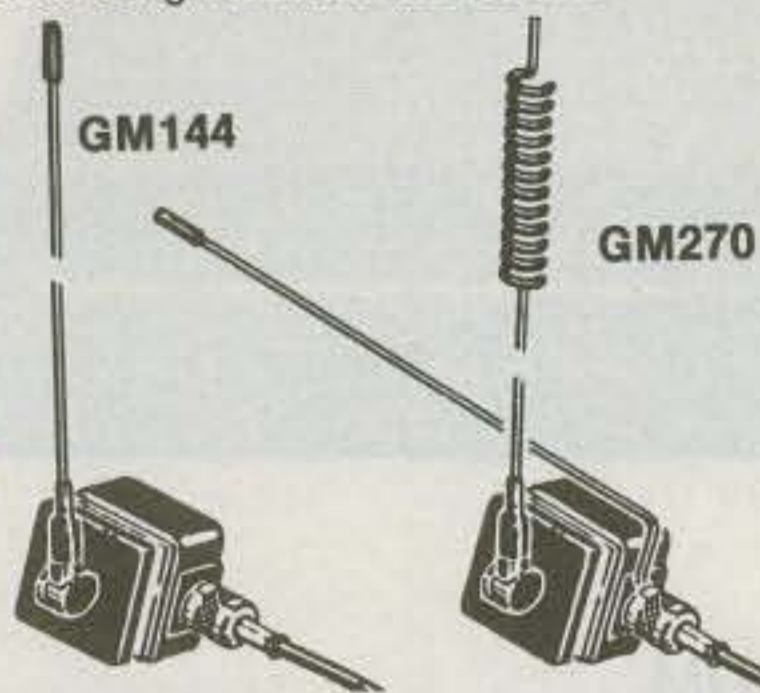


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- New micro magnet look
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- Ready to use
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#### Technical Data

- MM144B 2m: 19" tall  
1/4 wave whip
- MM450B 70cm: 6.5" tall  
1/4 wave whip
- MM270B 2m/70cm: 19" tall  
1/4 wave 2m,  
5/8 wave 70 cm

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## QSL INFORMATION

3G1X to CE1IDM  
3XY0A to YU1FW  
4J3M to UD6DJ  
4K9W to DL6KVA  
4L0G to RF6FM  
4L1AA to CT1CJJ  
4L50 to CT1CJJ  
4N70AL to YU7AL  
4N70DX to YU1DX  
4N7DW to YU7BJ  
4X6UO to WB3CQN  
5N0/DL9GMM to DL9GMM  
5N0GC to F2YT  
5N3ALE to DJ2VZ  
5U7Y to JG3UPM  
5W0BY to JA2FBY  
5W0JA to JF2RZJ  
5X1F to WB1DQC  
6V1A to 6W6JX  
7Q7LA to G0IAS  
7Z1AB to KN4F  
7Z1IS to OE6EEG  
9K2MU to WA4JTK  
9K2YAZ to N2YAZ  
9K2ZC to KC4ELO  
9K2ZZ to W8CNL  
9M8BT to N5FTR  
9V1YC to AA5BT  
A22EX to N4CID  
A35MW to VK2BEX  
A35VI to K8VIR  
A35XC to JE1DXC  
B00M to BV2KI  
BZ5HAN to BZ5HZ  
C53HG to W3HCW  
C19HF to VE1NH  
CP4CR to IK2UVU  
CS8EGW to CT1EGW  
CY9CWI to VE2CWI  
D3X to CT1EGH  
EA8BYR to WA1ECA  
EU1YL to UC3AB  
EU7SA to RC2SA  
EV1F to UC2AFC  
EW1WZ to DL1OY  
EW3LB to W3HNK  
EX0A to DF8WS  
EX0M to DF8WS

EX0V to DF8WS  
EX8DX to F5OJO  
EX8F to DL8FCU  
EY8WW to DL8WN  
FG5GZ to F6CLK  
FK8FI to F6GZA  
FK8GJ to F6CXJ  
FK8GT to F6GZA  
FP/KA1NCN to AA1AS  
FR5ZU/T to VE2NW  
FS5PL to FG5BG  
FY5GJ to F2YT  
H44/JA10EM to JA10EM  
HB0/DL1RNW to DL1RNW  
HC8JG to WA6ZEF  
HL9BS to N2BSA  
HP1XXD to N4NFM(94CB)  
HS0ZBJ to W8GIO  
I1A/0SG1 to I1RBJ  
IC8SDA to IK8CQH  
IS1A/0S1A to I1RBJ  
IY4FGM to I4IKW  
JW/DK8ZJ to DK8ZJ  
JW0GB to LA8PF  
JW0H to LA5NM  
JW0I to SP3ASN  
JW4LN to LA4LN  
JY8FN to DK9FN  
L3CW to LU6BEG  
LX9UN to LX1NJ  
OD5JY to OE6EEG  
OH0/OZ5IPA to OZ5AAH  
OH0BDA to OH2BDA  
OM5XX to OK3CQR  
OM9SIAD to OM3CTA  
OQ50USA to ON4RAT  
OX3GX to WA3KSN  
P20VH to VK4CRR  
P29VH to VK4CRR  
P40MX to JR4PMX  
PY0FF to W9VA  
R0/G3MHV to G3MHV  
R0/KA6ZYF to KA6ZYF  
R1FJL to RA10A  
R3/G3MHV to G3MHV  
R3/KA6ZYF to KA6ZYF  
R9/G3MHV to G3MHV  
R9/KA6ZYF to KA6ZYF  
RA0A/K4EWG to K4EWG  
RK10WZ to WA7OBH  
S21ZG to W4FRU

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SV/WY3V to WB2RQW  
T31BA to DL2ZAD  
T31BB to DF6FK  
T32Z to N7YL  
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T92X to KA9WQW  
T99W to DL1QQ  
TA1/K4UEE to K4UEE  
TM2H to F5JCG  
TN0CW to DK7PE  
TR8CA to F6CBC  
TT8/F5IXR to F5MXH  
TU2ZR to SM3DMP  
TU4EI to W3HCW  
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UA0QBA to UC2WP  
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UE9WTL to G3MHV  
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US5WE/US8P to SP5IUL  
UX4UA to DK1RV  
V31RD to G4SMC  
V47KEP to DL8WAA  
V85BG to G3JKX  
V85KX to G3JKX  
VK6DX to AB4ZD  
VP2EP to DL8WAA  
VP2MR to N5DXD  
VP2VE to WA2NHA  
VP5/AB5MF to AB5MF  
VP5JM to W3HNK  
VP9MZ to WB2YQH  
VQ9KC to AA7AN  
VQ9TP to N5TP  
VR2IH to G4RQK  
XU7VK to HA0HW  
XX9AS to KU9C  
Y11DZ to WA4JTK  
YP700BV to YO6EZ  
YS1DRF to W2PD  
YS1XS to WD4PDZ  
YW171LM to WS4E  
Z21BA to N5FTR  
Z31GX to YU5GBC  
Z31PK to YU5XVD  
Z37GBC to YU5GBC  
ZA1AJ to OK2PSZ  
ZA1J to I2MQP  
ZL3KG to WB6EQX

mation has been circulating about the Kingdom of Seborga.

"The Kingdom of Seborga exists only in the mind of someone that does suffer from the high temperature, and this year in Italy it was very hot during August.

"It is only a joke and a reason to attract tourists during summer. We have many places like that. Even in Florence there are some events when people in old costumes remember the old state of Florence. The same happens in Venice, and



Rudi Klos, DK7PE (right), discusses the future of amateur radio in the Congo with ONPT officials Mr. Francois and Mr. Ewenque. Rudi made 6000 contacts as TN0CW on his trip.

in many other places in Italy, but only mentally sick people could think this is independence. If you take the last twenty hundred years, almost every city had a period of independence. We do not think this is enough to be considered a possible new country.

"Seborga people pay taxes to Italy, they have a major that is part of the Italian state, they have the Italian police, they use Italian stamps and Italian money, they have a normal post office, like every other small village in Italy. There is nothing like a kingdom of Seborga, if not to play during summer.

"Some [DX news] bulletins reported that I1RBJ had just returned from the ITU and that everything was OK. F8RU, retired member of ITU, checked with Philippe Capitaine, HB9RKG, the president of 4U1ITU, asking if this was true. Philippe said not at all. I1RBJ telephoned him (it was the time of the 0S1A call). He replied that this call was not to be used. ITU does not deal with individuals but only with member Administrations, so he could not have received any reply whether favourable or unfavourable.

"We would like to recall to you[r] attention also the fact that I1RBJ, some years ago declared also he did make a DXpedition to 7O1. We did receive, a few weeks later, a statement from the 7O1 telecom administration claiming against this statement and informing that they did not give authorization to him, and that he did not go to 7O1 at all. This was published in our [Associazione Radiotechnia Italiana, ARI] magazine. I1RBJ is not a member of our Association anymore."

The **Northern California DX Foundation** loans videos and slide shows on DX-related topics. There is no charge for these loans, other than paying for the postage, which runs about US\$3 each way in the US. The new curator is Ron Steiner, K6KEO, 3154 Dominic Drive, Castro Valley, CA 94546 (phone 510-886-6874).

**RSGB DX News Sheet** announced in a recent issue that "IOTA—30 Years On," a 60-page anniversary booklet with stories about IOTA operations, items about the program, complete IOTA certificate listings (if you've ever received an IOTA award, your call will be listed), current Most Wanted islands, the 1994 honor roll, photos of island chasers, and much more, will be available by early October. It's available for \$12 (or 18 IRCs) from: Roger Balister, G3KMA, La Quinta, Mimbri-bridge, Chobham, Woking, Surrey GU24 8AR, England. No checks from overseas.

### Upcoming DXpeditions

The big news in the near future is the **South Georgia Island DXpedition** set for Jan. 4-19, 1995. AI Hernandez, WA3YVN;

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R50	0.5 mH	1.50ma	\$8
500-1	0.5 mH	2.50ma	\$11
4531	1 mH	200ma	\$9
4200	1 mH	400ma	\$15
4537	2.5 mH	200ma	\$9
R1005	10 mH	125ma	\$13

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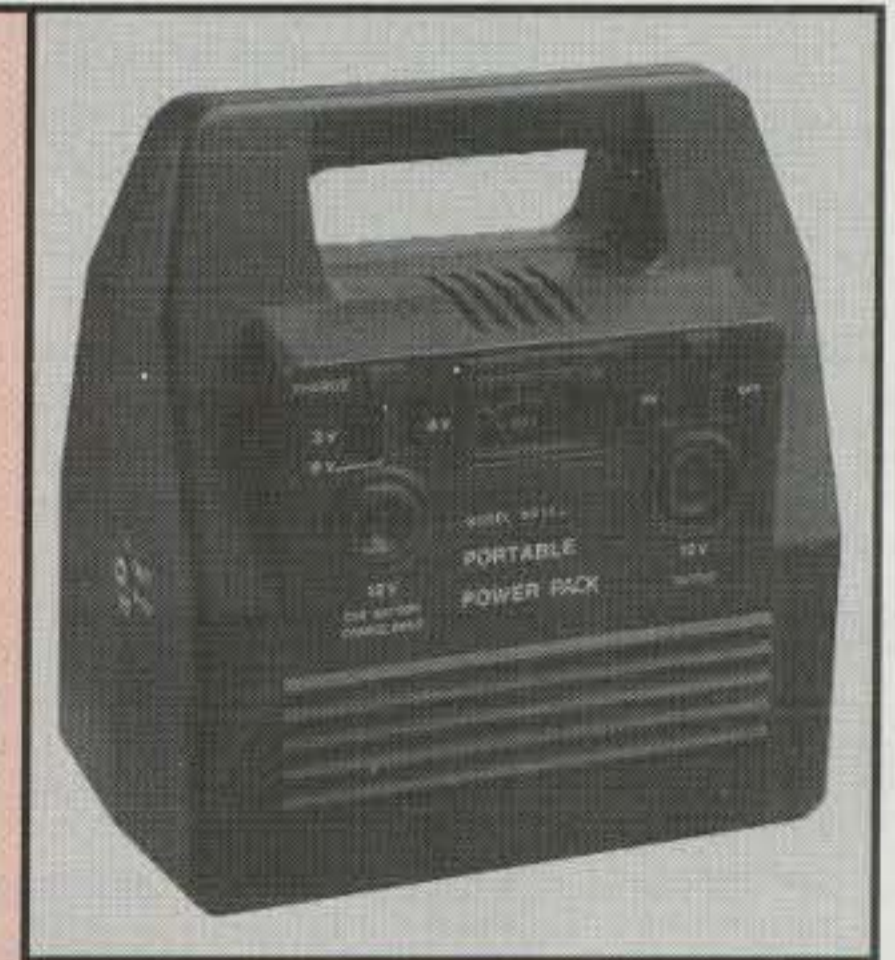
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SEE REVIEWS NOV '94 CQ MAY '94 73

Jan Heise, WA4VQD; and Vince Thompson, K5VT, will operate from the abandoned whaling station of Grytviken on South Georgia on all bands, CW, SSB, and RTTY. The operators will run full power into beam antennas, and plan effective low-band operation as well. QSL to INDEXA, c/o John Parrott, W4FRU, P.O. Box 5127, Suffolk, VA 23435.

Dieter, DL3KDV, is traveling in the Caribbean this month. He'll operate from **St. Vincent J8** Nov. 18 to Dec. 12, and from **Dominica J7** Dec. 12 to Jan. 5. He'll be on all bands and modes. QSL to his home address.

Another German, Ralf, DL2FDK, will operate from **Thailand HS** Dec. 9 to Jan. 9. He'll be on 40, 20, 15, and 10 meters, SSB and digital modes only. QSL home call.

Finally, **VA1S** will mark the contributions of Marconi to radio throughout December. The station will operate from Cape Breton Island (NA-010 for IOTA).

Commemorative QSLs cards will be available from VE1AL for SASE or SAE and return postage. A certificate is available free of charge to those stations who work VA1S on five or more bands; the charge is US\$4 or eight IRCs for those making at least one contact.

### QSL Notes

Randy Martin, KØEU, operator and QSL route for **9G1XA**, has moved. His new address is: 8985 West Jefferson Ave., Denver, CO 80235.

QSL Hugh Paul, **TA2ZI**, via WB6EQX, and **not** via the Turkish bureau, which handles cards for its members only.

QSL **UK7R** and **UK8AX** via Gene Schumat, UA9AB, P.O. Box 17, 457100 Troitsk, Chelyabinskoy Oblast, Russia. Note that one IRC is not sufficient for airmail return postage from the USSR at this time; UA9AB requests two IRCs or US\$1. (*US\$1 are not recommended to Russia.—ed.*)

### CQ DX Awards Program SSB

2103.....WS1A      2104.....N1OAZ

### CW

905.....IK4JOK      907.....KA4IKH  
906.....WQ1T

### SSB Endorsements

320.....K5OVC/327	310.....K7TCL/314
320.....W4UNP/327	310.....K1VHS/313
320.....T12CC/327	300.....WA2FKF/308
320.....K7LAY/326	300.....DL3DXX/305
320.....PY4OY/326	275.....IK2DUW/287
320.....N4KEL/M/325	275.....VE7HAM/279
320.....YV5CWO/324	250.....WZ3E/273
320.....I8KCI/324	1.8 MHz.....DL3DXX
320.....KØHQB/323	28 MHz.....WS1A
320.....ZS6A00/322	Mobile.....KF8UN

### CW Endorsements

320.....DL3DXX/322	275.....KØHQB/294
310.....K1VHS/311	275.....G4MVA/276
310.....KA7T/310	250.....N4KEL/M/271
300.....WG5G/QRP	

### RTTY Endorsements

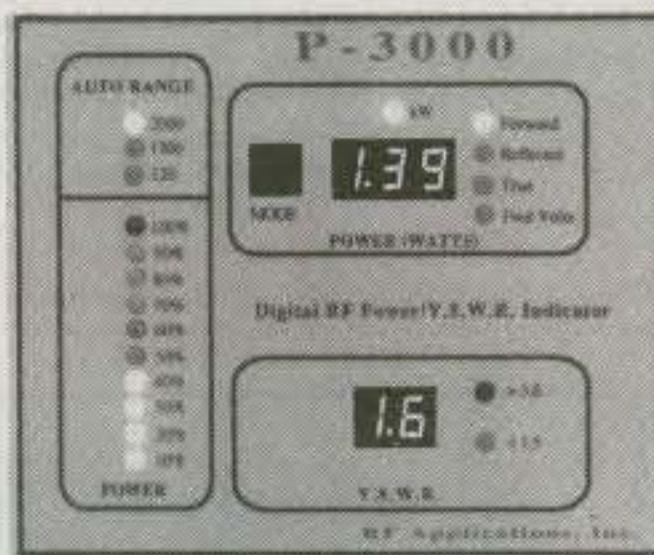
250.....W4EEU/250

Total number of active countries is 327. The basic award fee for subscribers to CQ is \$4. For non-subscribers, it is \$10. In order to qualify for the reduced subscriber rate, please enclose your latest CQ mailing label with your application. Endorsement stickers are \$1.00. Updates not involving the issuance of a sticker are made free when an SASE is enclosed for confirmation of total. Rules and application forms for the CQ DX Awards Program may be obtained by sending a business-size, No. 10 envelope, self-addressed and stamped, to CQ DX Awards Manager, Billy Williams, N4UF, Box 9673, Jacksonville, FL 32208 U.S.A. DX stations must include extra postage for airmail reply. Please make all checks payable to the awards manager.

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QSL Randy Jones, **TJ1JR**, via Adam Boettiger, N7VEW, 6911 Naches Heights Road, Yakima, WA 98908. SASE is appreciated.

The first batch of **ZS9Z/V51Z** QSL cards has been mailed. More than half of the requests received have been answered. The others are being handled in order received.

QSL **RLØG**, **RX7QF**, **ULØQF**, **UL7QF**, and **UNØG** via N8LYM.

QSL **CQ2I** (IOTA EU-150) via WA1ECA.  
 QSL Andres Nyberg, **EA8CN**, direct to Media Cuesta 9, Viv 4, E-38417 Los Reales, Tenerife, Spain.

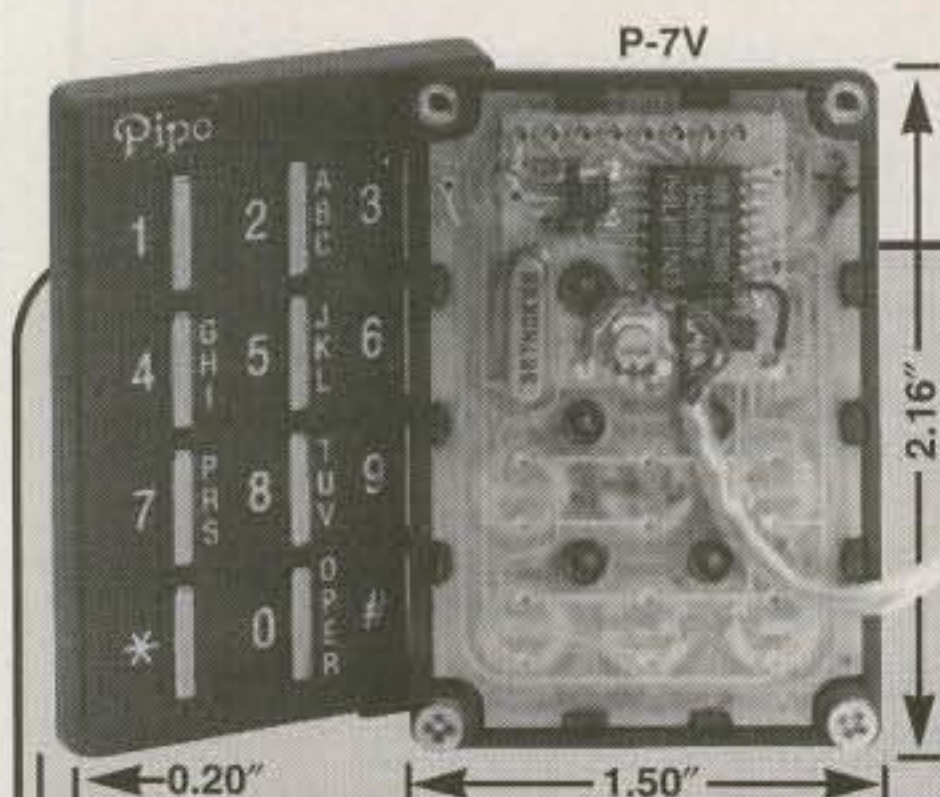
**QSL Good Guys:** PAØRYS, QSL manager for **XU3DWC**, returned two IRCs and second US\$1, after multiple requests and "donations."

**SK3IK** and **OH6NIO** both returned one of two US\$1 sent with QSL requests!

**QSL Bad Guys:** EA3JE returned via the bureau a QSL request sent with SAE and US\$2.

**Not Managers:** W1RAN is **not** the manager for DU6BG. AHØW (ex-AA7FM) does **not** have cards or logs for **3W4DK** any longer; Frank has requested the USA/VE logs and/or cards and will announce if they do arrive.

73, Chod, VP2ML



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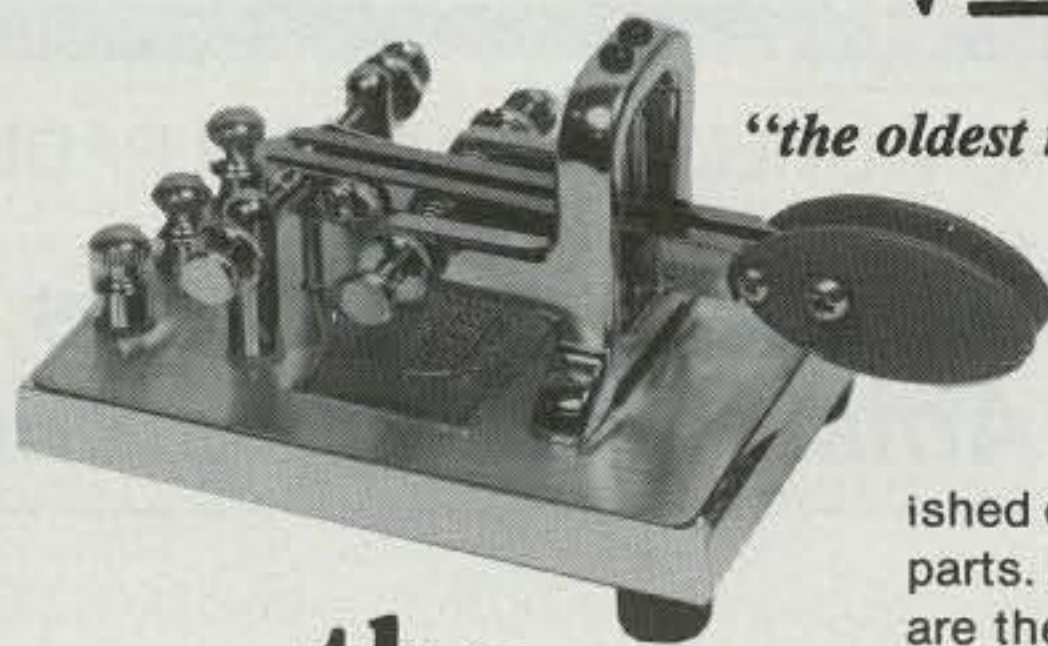
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## *New RF Exposure Standards Could Impact Amateur Radio Stations*

**T**his FCC proceeding has the potential to impact every amateur radio operator—especially those who operate an amateur station in a residential neighborhood! The radio-frequency safety guidelines currently used by the FCC are now some twelve years old. There seems to be a growing feeling in scientific circles that they are outdated—especially in view of more stringent standards used by many other countries.

As you are aware, there has been much written in the media about the possible health hazards of EMR—electro-magnetic radiation—especially at radio frequency levels. The danger has never been proven, however. But research (including some involving amateur radio operators) has loosely linked RF to cancer, especially leukemia.

The FCC now feels that they now must respond to this growing evidence by updating their radio-frequency safety standards. The National Environmental Policy Act of 1969 (NEPA) requires the FCC to take environmental effects into consideration when performing their rule-making function.

It is the responsibility of the applicant to make an initial determination as to whether environmental information must be submitted and so indicate on the appropriate FCC application form. In the case of RF radiation, the environmental effect would be the relative health risk to people living or working near or at the radio station in question. Private land mobile, cellular radio, and amateur radio stations are categorically excluded from this self-certification procedure.

### **What is Radio-Frequency Radiation?**

Electromagnetic radiation consists of waves of electric and magnetic energy moving together through space. The alternating current waves generated in a transmitting radio antenna create electromagnetic waves that radiate away from the antenna at the speed of light and can be picked up by a receiving antenna.

The electromagnetic spectrum in-

cludes everything from extremely low frequency (ELF) radiation (with very long wavelengths) to X-rays and gamma rays, which have very high frequencies and correspondingly short wavelengths. In between these extremes lie radio (RF) waves, which are generally defined as EMRs, with frequencies in the range of about 3 kiloHertz to 300 gigaHertz. Most radio transmitters generate radio-frequency waves which are varied in some way to carry information.

### **But Are They Dangerous?**

The energy associated with EMR depends primarily on its frequency (or wavelength) and power. The higher the frequency and the power, the greater the potential hazard. That is why VHF and UHF have greater amounts of energy than HF.

Moonbounce (also known as EME, for Earth-Moon-Earth) transmissions, for example, take place at VHF and higher frequencies using high power and high-gain arrays. They obviously have the potential of being very dangerous.

EMR can be ionizing or non-ionizing. Ionization is a process whereby electrons are stripped from atoms and molecules, producing molecular changes that can lead to significant genetic damage in biological tissue. The energy associated with radio frequencies is termed "non-ionizing" and is less energetic (and therefore less dangerous) than the "ionizing" radiation associated with X-rays and gamma rays. Just how much less dangerous is really not known. What is known, however, is that radio-frequency radiation can heat biological tissue.

Medical applications of RF radiation include a technique called diathermy, which takes advantage of RF energy's ability to heat tissue below the body's surface very rapidly. High intensities of RF radiation in a microwave oven cook food. High-power densities on the order of 100 milliwatts per cubic centimeter can result in heating of the human body and an increase in body temperature. Tissue damage ("thermal effects") can result primarily because of the body's inability to cope with or dissipate the excessive heat. Human eyes and testicles are particularly vulnerable. As a general rule, the lev-

els of RF radiation encountered by the public are far below the levels necessary to produce significant heating and increased body temperature.

In recent years, however, there have been many reports of "non-thermal" effects which have included changes in the immune system, hearing problems, neurological and behavioral effects, and links between EMR and the action of certain drugs. There have been suggestions that microwaves might be involved in cancer promotion.

The FCC's Office of Engineering and Technology admits that "It is possible that 'non-thermal' mechanisms exist that could cause harmful biological effects in animals exposed to RF radiation." No proof exists, however, that this is the case.

### **What Are The Safe Levels Of Exposure?**

In a nutshell, no one really knows. There is currently no official mandatory U.S. federal standard for protection of the public from potentially hazardous exposure to RF radiation.

The exposure standards in Europe and the Eastern countries are generally more restrictive than the existing guidelines in most western nations. This is because eastern standards are based on levels where it is believed no biological effects of any sort would occur, rather than where recognized hazards exist. Western standards generally are based on levels where hazards are known to exist, and a safety factor is then incorporated to provide sufficient protection.

The FCC's jurisdiction does not lie in the health and safety area. Instead it must rely on other agencies and organizations for guidance. It is generally agreed that the federal responsibility for developing national guidelines for public exposure to non-ionizing radiation rests with the U.S. Environmental Protection Agency (EPA). Strangely, the EPA has recently abandoned its "Federal Guidance for RF Radiation" effort which would have recommended safe levels of exposure for the public. Their reason for discontinuing their work on the federal non-ionizing EMR exposure standard was due, they said, to budgetary constraints and a lack of resources.

*National Volunteer Examiner Coordinator, P.O. Box 565101, Dallas, TX 75356-5101 (817-461-6443)*

The FCC currently uses the 1982 "advisory guidelines" based on ANSI (the American National Standards Institute) for the purposes of evaluating environmental impact from the RF transmitters it regulates. This guideline recommends frequency-dependent exposure limits covering RF frequencies beginning at 300 kHz with more than 7 watts of input power.

### The FCC and The New Exposure Standard

The Commission now wants to use the more stringent safety standards recommended jointly in 1992 by the American National Standards Institute (ANSI) and the Institute of Electrical and Electronic Engineers (IEEE).

The new RF safety standard (ANSI/IEEE C95.1-1992) contains a number of significant differences from the 1982 ANSI recommendations. They are generally more restrictive and extend the frequency range under consideration to cover frequencies from 3 kHz to 300 GHz. This also includes the 60-cycle power-line frequencies that have been under biological-hazard suspicion for some time. (The 1982 standards covered EMR fields from 300 kHz to 100 GHz.)

The new standard also looks at two sets

of RF exposure in different surroundings—one for "controlled" (user or worker aware) environments, the other for "uncontrolled" conditions which involve the general public. Amateur stations get involved in both "controlled" and "uncontrolled" environments. That is, the amateur radio operator is aware of the potential for RF exposure, but their neighbors might not be.

The 1992 guidelines also, for the first time, include specific restrictions on currents induced in the human body by RF fields. In addition, these guidelines contain significant changes in allowable exclusions and power levels permitted for certain low-power devices, such as handheld and cellular radios. Amateur handheld transceivers (since they usually radiated less than 7 watts) were excluded by the 1982 guidelines. The 1992 standards include all hand-held radios where the antenna comes in close proximity to the head.

The new RF safety standards raise extremely complex engineering and public health issues and could have a huge impact on radio amateurs. Besides replacing the old 1982 ANSI guidelines, the FCC proposes to eliminate the categorical exemption for radio amateurs. This could result in amateurs having to prove that their transmissions do not expose anyone

to RF radiation in excess of the new 1992 ANSI guidelines. Amateurs might have to calculate the field intensities of their transmissions and/or certify to the FCC that their operations pose no health hazard. This is easier said than done! The FCC has not explained how amateurs would be expected to prove that they meet the new ANSI standard.

The question everyone is asking, of course, is what is considered to be the maximum safe effective radiated power levels that would ensure safe exposure to both the amateur radio operator as well as adjacent neighbors in a residential setting. This question cannot easily be answered, since the resulting RF fields depend upon the frequency of the RF field, antenna height, lateral distance from the antenna, antenna radiation patterns, and of course the power level.

A 100 watt mobile station at 144 MHz may well produce fields in excess of the ANSI guideline inside the vehicle. Handheld transceivers and indoor antennas may produce significant localized fields near the antenna. Specialized operations (such as EME moonbounce) involve high-gain antennas and high power levels.

All transmitters with less than 7 watts of output power were categorically exempt under the old ANSI standard. The new standard, however, reduces that exemp-

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tion by a factor of five (to 1.4 watts) for exposure to persons not aware of the RF fields.

FCC licensees (including radio amateurs) might have to undertake costly steps to minimize public exposure to RF energy. And the fact that there are questions about the safety of RF energy sources could lead to new restrictions on amateur antennas by local governments and homeowners associations, among other rulemaking authorities.

Much has already been written in amateur radio publications and elsewhere about the controversial question of EMR

and its potential biological health hazards. Even the amateur radio community does not seem to be in agreement on the RF safety issue. The American Radio Relay League's blue-ribbon committee on the Biological Effects of RF Energy resigned en masse this past year in a dispute with the League's leadership. That Committee had consisted of some of the nation's leading RF researchers.

## Government Studies Amateur Stations

In 1990 the FCC (Office of Engineering

and Technology) and the U.S. Environmental Protection Agency (National Air & Radiation Environmental Laboratory and Office of Radiation Programs) participated in a joint study. The objective was to determine potential levels of exposure to RF radiation for amateur operators and other people who may be present in the immediate vicinity of the station.

With the assistance of Dr. Wayne Overbeck, N6NB, nine amateur stations were selected in southern California for the study. Power levels were as high as practical in order to create "worst case" situations. A variety of antennas were also used, including dipoles, Yagis, attic-mounted antennas and verticals. Frequencies chosen for the study were those typically used by many amateurs.

The maximum electric and magnetic field-strength levels measured at the amateur stations were then compared with the RF exposure guidelines issued by the American National Standards Institute in 1982 (ANSI C95.1-1982) and to the newer ANSI/IEEE C95.1-1992 standard. Both controlled and uncontrolled environment readings were taken. The results of this study indicated that amateur radio facilities can generate electric and magnetic fields near antennas and transmitting equipment that in some cases may approach or exceed accepted limits for human exposure. The study (which was not publicly released) concluded:

"For most of the stations visited, existing or proposed RF protection guidelines would not be exceeded in normally accessible areas. However, at higher power levels or with different facility configurations at other stations, higher exposures could not be ruled out, since there is such a large variety of possible station characteristics and operating parameters.

"In particular, it should be kept in mind that even though this study was designed to evaluate typical stations, it represents only a small sampling of many possible amateur radio facilities.

"Precautionary measures should be sufficient to prevent exposure of the amateur operator or other persons to RF levels in excess of protection guidelines. Examples of such measures would be:

- using the minimum power necessary for a transmission;
- minimizing transmission time so time-averaged exposures are acceptable;
- determining where high-field areas exist and restrict access to them during transmissions; and
- mounting antennas as high above ground as practical."

All of the comments and reply comments from the public have been analyzed and FCC action on ET Docket No. 93-62 is expected at any time.

73, Fred, W5YI

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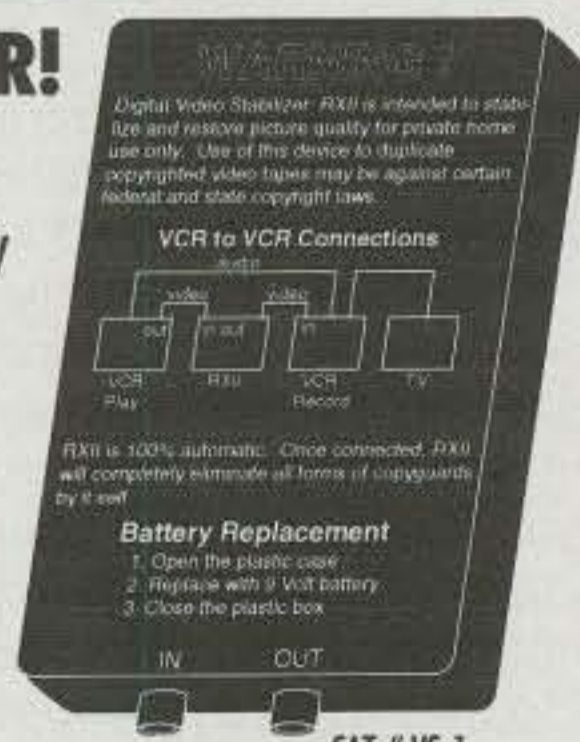
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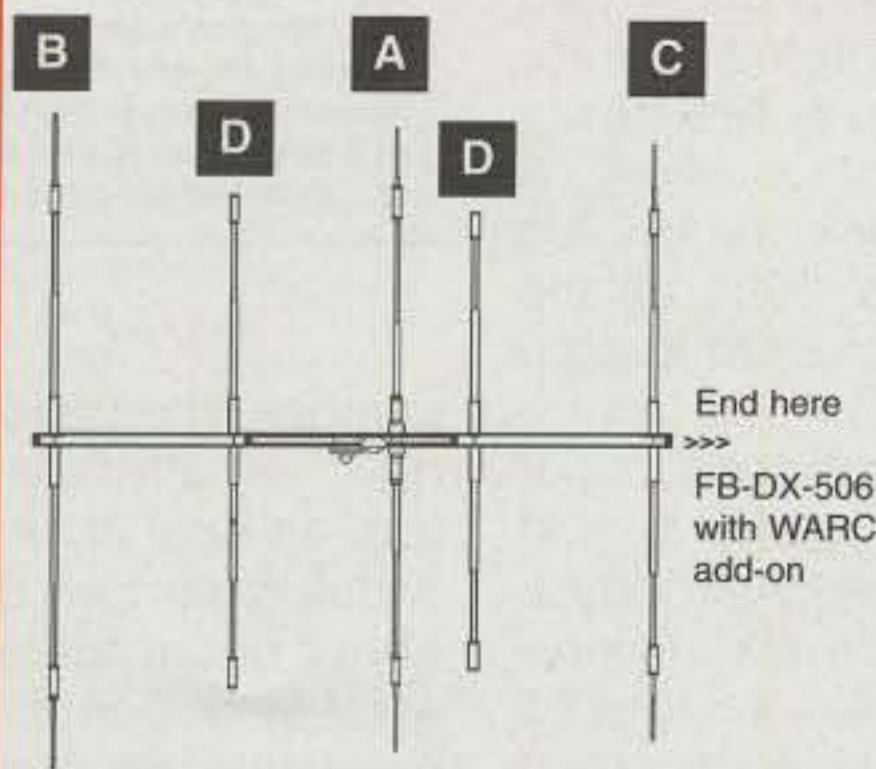


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	Band	Gain DBI
<b>A</b> Start with this	10-15-20	2.2-2.2-2.2
<b>B</b> Makes a 2-element beam	6.2/6.2/5.2	
<b>C</b> Makes a 3-element beam	9.2/8.2/7.7	
<b>D</b> Makes a 5-element beam	9.2/9.2/8.7	
<b>Finally *</b>	10-12-15-17-20-30	7.7-8.2-9.2-7-6.8-6.4
5-element-6 band	Gain DBI	

\* You can add in lieu of WARC 40m kit to FB33/53 only

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CIRCLE 39 ON READER SERVICE CARD

December 1994 • CQ • 139

## THE SCIENCE OF PREDICTING RADIO CONDITIONS

### 1994: Low Sunspot Phase Began; Decline in HF Conditions Noted

**S**unspot Cycle 22 continued to decline during 1994 much as expected. The year began with a smoothed count of 37, and the cycle is estimated to drop into the low 20s by the end of the year. This marks an important phase in the life of Cycle 22. The sunspot cycle is arbitrarily divided into several phases between very intense and low. When the smoothed count drops below 30, this is considered to be the beginning of the low phase. Propagation on the HF bands is most seriously affected during the low phase of solar activity. Cycle 22 entered the low phase during 1994. This phase is expected to last for at least the next three years, through the end of Cycle 22 and until the new cycle, Cycle 23, reaches the count of 30 on its way up. Fig. 1 plots the progress of Cycle 22 since its beginning in 1985 to date in terms of "Annual Mean Sunspot Numbers."

The Royal Observatory of Belgium, the world's official keeper of sunspot records, reports a mean sunspot number of 23 for August 1994. Daily values ranged between a high of 44 on August 14 to a low of 10 on the 2nd and 22nd. The mean level for August results in a 12-month smoothed sunspot number of 35 centered on February 1994. This is a drop of two points from the previous month's level. A smoothed sunspot number in the low 20s is forecast for December 1994 as the 22nd sunspot cycle is expected to continue its steady decline.

A corresponding 10.7 cm mean solar flux level of 78 was reported for August 1994 by the Dominion Radio Astrophysical Observatory at Penticton, B.C. This results in a smoothed solar flux value of 91 centered on February 1994. A smoothed 10.7 cm flux level of approximately 83 is expected during December 1994.

The sunspot cycle is expected to continue its slow but steady decline through the New Year. Next month's column will feature a forecast of solar activity expected during 1995, as well as a prediction for the remainder of Cycle 22 and the expected beginning of Cycle 23.

#### December Band Openings

Twenty meters should continue to be the best band for worldwide DX during De-

11307 Clara St., Silver Spring, MD 20902

#### LAST MINUTE FORECAST

Day-to-Day Conditions Expected for December 1994

Propagation Index.....	Expected Signal Quality			
	(4)	(3)	(2)	(1)
Above Normal: 5, 8-9, 14, 21	A	A	B	C
High Normal: 4, 7, 15, 19-20, 22, 31	A	B	C	C-D
Low Normal: 1-3, 6, 10, 13, 17-18, 23-24, 28-30	B	C	D	D-E
Below Normal: 11-12, 16, 25, 27	C	C-D	D-E	E
Disturbed: 26	C-D	D	E	E

Where expected signal quality is: A—Excellent opening, exceptionally strong, steady signals greater than S9.

B—Good opening, moderately strong signals varying between S6 and S9, with little fading or noise.

C—Fair opening, signals between moderately strong and weak, varying between S9 and S6, with some fading and noise.

D—Poor opening, with weak signals varying between S1 and S3, and with considerable fading and noise.

E—No opening expected.

#### HOW TO USE THIS FORECAST

1. Find *propagation index* associated with particular band opening from Propagation Charts appearing on the following pages.
2. With the *propagation index*, use the above table to find the expected signal quality associated with the band opening for any date of the month. For example, an opening shown in the charts with a *propagation index* of 3 will be fair (C) on December 1-3, good (B) on the 4th, Excellent (A) on the 5th, etc.

ember. The band should open on most days just after sunrise and remain open until an hour or two after sunset. Signals should peak towards Europe and the east about noon, towards Africa during the early afternoon, towards South America during the late afternoon, towards the Pacific area and Australasia during the early evenings, and towards Antarctica a bit later in the evening. When conditions are High or Above Normal, the band may remain open for DX until as late as midnight. Even though we're near the bottom of the present sunspot cycle, look for some fairly good DX openings on 15 meters when conditions are High or Above Normal. Check for openings towards Europe, Africa, and the east before noon, towards South America during the early afternoon, and towards the Pacific and Australasia during the late afternoon. Although not likely to happen very often, look for some 10 and 12 meter DX openings when con-

#### Bulletin

This issue of CQ should reach most readers in time for the CW weekend of the CQ World-Wide DX Contest, November 26 and 27. Here is an updated day-to-day propagation forecast for the weekend made at press time. Conditions may not be quite as good as we forecast last month. It still looks like at least Low Normal conditions on Saturday, November 26th, increasing to High Normal at times. However, a drop in conditions appears likely now for Sunday. The day should start with Low Normal conditions, but there is an increasing possibility that a period of radio storminess could begin during the afternoon, driving conditions into the Below Normal range during the last hours of the contest weekend.

ditions are High or Above Normal. Best bet is for openings towards South America during the early afternoon, although the band may also open briefly towards Africa from the eastern half of the country and towards the Pacific and Australasia from the western half.

With the hours of darkness at a maximum in the northern hemisphere, and static levels at seasonally low values, a considerable improvement is expected in DX propagation during the hours of darkness on the 30, 40, 80, and 160 meter bands. Thirty and 40 meters should open for DX during the early afternoon, with the first signals coming from Europe. After sundown the band should open to Africa and to South America. Signals from the Pacific area, the Far East, and Australasia should peak just before sunrise, but the band may remain open for an hour or two later. Fairly good DX is also expected on 80 meters between sundown and sunrise. Signals from Europe, Africa, and the east should peak before midnight; signals from South America should be in for most of the hours of darkness; signals from South America should be in for most of the hours of darkness; signals from Australasia and the Pacific area should peak just before sunrise. There will be many nights during December when 80 meters will be the best band for DX propagation. Check 30, 40, and 80 meters for long-path openings during the sunrise and sunset periods.

December should be an active month for 160 meter DXers, with the ARRL 160

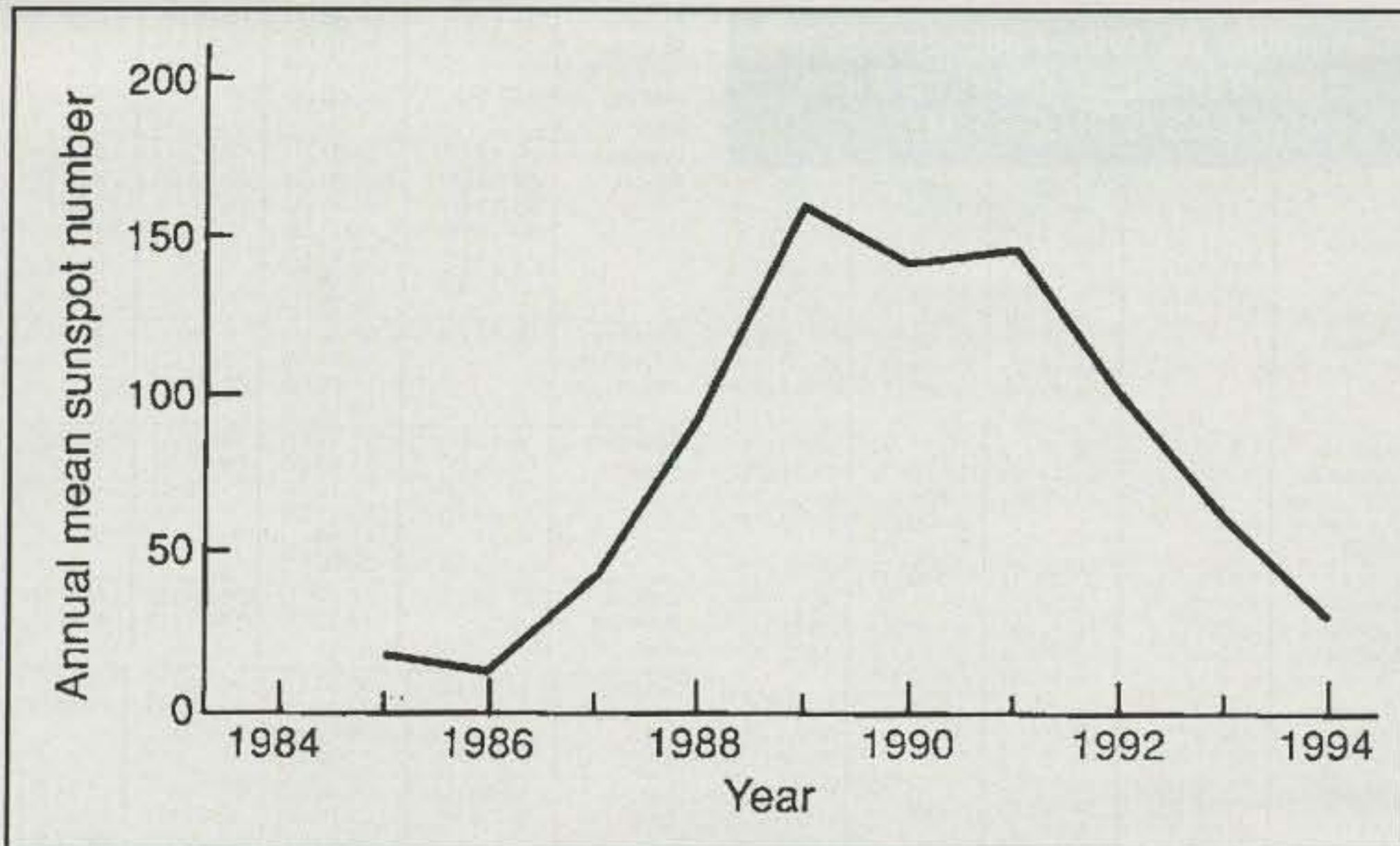


Fig. 1—Smoothed sunspot numbers to date for Cycle 21 in graph form.

Meter Contest scheduled for December 2-4. Expect fairly good conditions on this band, probably better than they have been during the past 10 years. Conditions on 160 meters are generally at their best during periods of very low solar activity. Look for openings towards Europe and the east as early as 8 PM in the EST time zone, with the band remaining open until 2 AM. Check for European openings in

the CST time zone between 8 PM and 1 AM, from 8 PM to midnight in the MST zone, and to 11 PM in the PST zone. Some openings towards the south, especially to the Caribbean area, should be possible from about 10 PM to 2 AM in all time zones, and possibly right up until local sunrise. Openings towards the Pacific and Australasia favor west coast stations, but it will be worth looking for these open-

### HOW TO USE THE DX PROPAGATION CHARTS

1. Use chart appropriate to your transmitter location. The Eastern USA Chart can be used in the 1, 2, 3, 4, 8, KP4, KG4, and KV4 areas in the USA and adjacent call areas in Canada; the Central USA Chart in the 5, 9, and 0 areas; the Western USA Chart in the 6 and 7 areas; and with somewhat less accuracy in the KH6 and KL7 areas.

2. The predicted times of openings are found under the appropriate meter band column (15 through 80 meters) for a particular DX region, as shown in the left-hand column of the charts. An \* indicates the best time to listen for 160 meter openings. An \*\* indicates best time to check for 10 meter openings.

3. The propagation index is the number that appears in ( ) after the time of each predicted opening. The index indicates the number of days during the month on which the opening is expected to take place as follows:

- (4) Opening should occur on more than 22 days
- (3) Opening should occur between 14 and 22 days
- (2) Opening should occur between 7 and 13 days
- (1) Opening should occur on less than 7 days

Refer to the "Last Minute Forecast" at the beginning of this column for the actual dates on which an opening with a specific propagation index is likely to occur, and the signal quality that can be expected.

4. Times shown in the charts are in the 24-hour system, where 00 is midnight; 12 is noon; 01 is 1 A.M.; 13 is 1 P.M., etc. Appropriate standard time is used, not GMT. To convert to GMT, add to the times shown in the appropriate chart 8 hours in PST Zone, 7 hours in MST Zone, 6 hours in CST Zone, and 5 hours in EST Zone. For example, 13 hours in Washington, D.C. is 18 GMT. When it is 20 hours in Los Angeles, it is 04 GMT, etc.

5. The charts are based upon a transmitted power of 250 watts CW, or 1 kw, PEP on sideband, into a dipole antenna a quarter-wavelength above ground on 160 and 80 meters, and a half-wavelength above ground on 40 and 20 meters, and a wavelength above ground on 15 and 10 meters. For each 10 dB gain above these reference levels, the propagation index will increase by one level; for each 10 dB loss, it will lower by one level.

6. Propagation data contained in the charts has been prepared from basic data published by the Institute for Telecommunication Sciences of the U.S. Dept of Commerce, Boulder, Colorado 80302.

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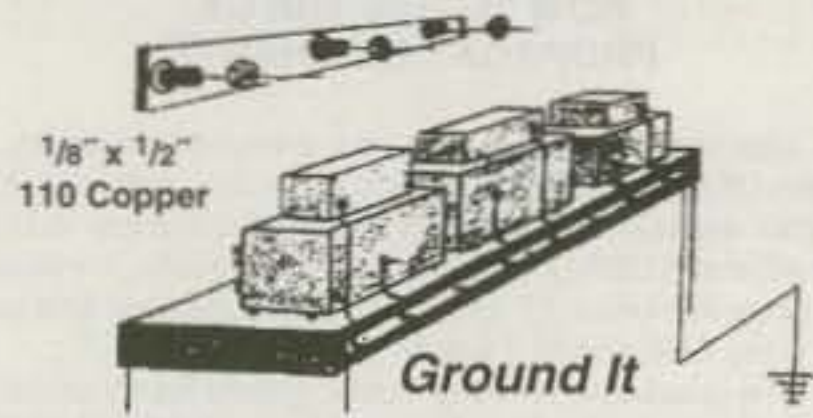
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## December 15, 1994–February 15, 1995

Time Zone: EST (24-Hour Time)  
**EASTERN USA TO:**

	15 Meters	20 Meters	40 Meters	80 Meters
Western & Central Europe & North Africa	09-11 (1)** 08-09 (1) 09-11 (2) 11-12 (1)	06-07 (1) 07-08 (2) 08-10 (3) 10-12 (4) 12-13 (3) 13-14 (2) 14-15 (1)	15-16 (1) 16-17 (2) 17-19 (3) 19-01 (2) 01-03 (3) 03-04 (2) 04-05 (1)	17-19 (1) 19-20 (2) 20-02 (3) 02-03 (2) 03-04 (1) 20-00 (1)* 00-02 (2)* 02-03 (1)*
Northern Europe & CIS (former European USSR)	08-10 (1)	06-07 (1) 07-11 (2) 11-12 (1)	15-17 (1) 17-19 (2) 19-01 (1) 01-03 (1) 01-02 (2) 02-03 (1)	17-19 (1) 19-01 (2) 01-03 (1) 21-00 (1)*
Eastern Mediterranean & Middle East	08-09 (1) 09-10 (2) 10-11 (1)	07-08 (1) 08-10 (2) 10-12 (3) 12-14 (2) 14-15 (1)	17-19 (1) 19-21 (2) 21-00 (1) 00-01 (2) 01-02 (1)	18-20 (1) 20-22 (2) 22-00 (1) 20-22 (1)*
Western Africa	10-12 (1)** 08-09 (1) 09-11 (2) 11-13 (3) 13-14 (2) 14-15 (1)	06-07 (1) 07-09 (2) 09-12 (1) 12-14 (2) 14-16 (3) 16-17 (2) 17-18 (1)	18-20 (1) 20-23 (2) 23-02 (1) 02-03 (2) 03-04 (1)	19-22 (1) 22-01 (2) 01-03 (1) 22-01 (1)*
Eastern & Central Africa	08-11 (1) 11-13 (2) 13-14 (1)	07-13 (1) 13-16 (2) 16-18 (1)	18-20 (1) 20-23 (2) 23-01 (1)	19-00 (1)
Southern Africa	10-13 (1)** 08-09 (1) 09-11 (2) 11-13 (3) 13-14 (2) 14-15 (1)	07-09 (1) 12-14 (1) 14-15 (2) 15-16 (3) 16-17 (2) 17-19 (1)	18-20 (1) 20-22 (1) 22-00 (1) 22-00 (1)	19-22 (1)
Central & South Asia	16-18 (1)	07-10 (1) 19-21 (1)	06-08 (1) 18-22 (1)	06-07 (1) 18-20 (1)
South-east Asia	16-18 (1)	07-10 (1) 17-20 (1)	06-08 (1) 18-21 (1)	06-07 (1) 18-20 (1)
Far East	16-18 (1)	06-07 (1) 07-09 (2) 09-11 (1) 15-17 (1) 17-19 (2) 19-21 (1)	05-08 (1) 17-18 (1)	05-08 (1) 17-18 (1)
South Pacific & New Zealand	13-15 (1)** 12-14 (1) 14-17 (2) 17-18 (1)	05-07 (1) 07-10 (2) 10-18 (1) 18-20 (2) 20-22 (1)	01-02 (1) 02-04 (2) 04-07 (3) 07-08 (2) 08-09 (1)	04-05 (1) 05-07 (2) 07-08 (1) 04-07 (1)*
Australasia	14-16 (1)** 12-15 (1) 15-17 (2) 17-18 (1)	06-07 (1) 07-10 (2) 10-12 (1) 15-16 (1) 16-19 (2) 19-21 (1)	03-05 (1) 05-08 (2) 08-09 (1) 17-19 (1)	05-06 (1) 06-07 (2) 07-08 (1) 17-18 (1) 05-07 (1)*
Caribbean, Central America & Northern Countries of South America	10-15 (1)** 08-09 (1) 09-12 (2) 12-16 (3) 16-17 (2) 17-18 (1)	06-07 (1) 07-08 (3) 08-09 (4) 09-11 (3) 11-15 (2) 15-17 (3) 17-18 (4) 18-19 (2) 19-20 (1) 22-00 (1) 01-03 (1)	17-18 (1) 18-19 (2) 19-21 (3) 21-03 (2) 03-06 (3) 06-07 (2) 07-08 (1)	18-20 (1) 20-21 (2) 21-04 (3) 04-06 (2) 06-07 (1) 21-03 (1)* 03-05 (2)* 05-06 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina and Uruguay	11-15 (1)** 08-09 (1) 09-11 (2) 11-13 (1) 13-14 (2) 14-15 (3) 15-16 (2) 16-17 (1)	06-07 (1) 07-09 (2) 09-10 (1) 12-14 (1) 14-15 (2) 15-16 (3) 16-17 (4) 17-18 (3) 18-19 (2) 19-20 (1) 22-00 (1)	19-21 (1) 21-02 (2) 02-05 (1) 05-06 (2) 06-07 (1)	21-03 (1) 03-05 (2) 05-06 (1) 03-05 (1)*
McMurdo Sound, Antarctica	15-17 (1)	07-09 (1) 17-18 (1) 18-20 (2) 20-22 (1) 22-00 (2) 00-02 (1)	22-00 (1) 00-02 (2) 02-06 (1)	Nil

## Time Zones: CST & MST (24-Hour Time) CENTRAL USA TO:

	15 Meters	20 Meters	40 Meters	80 Meters
Western & Southern Europe & North Africa	09-11 (1)	06-08 (1) 08-10 (2) 10-12 (3) 12-13 (2) 13-15 (1)	15-17 (1) 17-19 (2) 19-12 (3) 23-01 (2) 01-02 (1)	17-19 (1) 19-00 (2) 00-01 (1) 20-01 (1)*
Northern Europe & CIS (former European USSR)	08-11 (1)	07-08 (1) 08-11 (2) 11-12 (1)	16-18 (1) 18-19 (2) 19-22 (1) 22-00 (2) 00-01 (1)	18-00 (1) 20-00 (1)*

	15 Meters	20 Meters	40 Meters	80 Meters
Eastern Mediterranean & Middle East	08-11 (1)	07-09 (1) 09-12 (2) 12-14 (1) 22-00 (1)	17-19 (1) 19-22 (2) 22-23 (1)	19-22 (1)
Western Africa	09-12 (1)** 08-09 (1) 09-11 (2) 11-13 (3) 13-14 (2) 14-15 (1)	06-07 (1) 07-09 (2) 09-11 (1) 11-13 (2) 13-15 (3) 15-16 (2) 16-18 (1)	17-20 (1) 20-23 (2) 23-01 (1)	19-22 (1) 22-23 (2) 23-00 (1) 21-23 (1)*
Eastern & Central Africa	09-12 (1)	07-12 (1) 12-14 (2) 14-16 (3) 16-17 (1)	18-19 (1) 19-21 (2) 21-23 (1)	19-22 (1)
Southern Africa	10-12 (1)** 08-10 (1) 10-13 (2) 13-14 (1)	07-13 (1) 13-15 (2) 15-16 (3) 16-17 (2) 17-18 (1) 22-00 (1)	18-19 (1) 19-21 (2) 21-23 (1)	19-22 (1)
Central & South Asia	17-19 (1)	07-10 (1) 19-21 (1)	06-08 (1) 18-21 (1)	06-07 (1) 18-20 (1)
South-east Asia	17-19 (1)	06-07 (1) 07-09 (2) 09-12 (1) 17-20 (1)	06-08 (1) 17-19 (1)	06-07 (1) 17-19 (1)
Far East	17-19 (1)	06-07 (1) 07-09 (2) 09-11 (1) 15-17 (1) 17-19 (2) 19-20 (1)	01-03 (1) 03-07 (2) 07-08 (1)	02-04 (1) 04-06 (2) 06-07 (1) 04-06 (1)*
South Pacific & New Zealand	12-16 (1)** 11-13 (1) 13-15 (2) 15-17 (3) 17-18 (2) 18-19 (1)	06-07 (1) 07-11 (2) 11-16 (1) 16-17 (2) 17-19 (3) 19-20 (2) 20-21 (1)	23-01 (1) 01-02 (2) 02-06 (3) 06-07 (2) 07-09 (1)	00-01 (1) 01-06 (2) 06-08 (1) 03-07 (1)*
Australasia	14-17 (1)** 11-15 (1) 15-17 (2) 17-18 (1)	07-08 (1) 08-11 (2) 11-18 (1) 18-20 (2) 20-21 (1)	01-03 (1) 03-07 (3) 07-08 (2) 08-09 (1)	03-05 (1) 05-07 (2) 07-08 (1) 04-07 (1)*
Caribbean, Central America and Northern Countries of South America	10-15 (1)** 08-09 (1) 09-10 (2) 10-13 (3) 13-15 (4) 15-16 (3) 16-17 (1)	06-07 (1) 07-10 (3) 10-14 (2) 14-16 (3) 16-17 (4) 17-18 (3) 18-19 (2) 19-21 (1) 23-01 (1)	18-20 (1) 20-22 (2) 22-00 (3) 00-04 (2) 04-06 (3) 06-07 (1)	19-21 (1) 21-05 (2) 05-06 (1) 23-05 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina and Uruguay	11-15 (1)* 08-09 (1) 09-11 (2) 11-13 (1) 13-14 (2) 14-15 (3) 15-16 (2) 16-17 (1)	06-07 (1) 07-09 (2) 09-13 (1) 13-14 (2) 14-15 (3) 15-17 (4) 17-18 (3) 18-19 (2) 19-20 (1) 22-00 (1)	19-21 (1) 21-02 (2) 02-04 (1) 04-06 (2) 06-07 (1)	21-05 (1) 00-04 (1)*
McMurdo Sound, Antarctica	15-17 (1)	07-08 (1) 08-09 (2) 09-11 (1) 17-18 (1) 18-20 (2) 20-22 (1) 22-00 (2) 00-01 (1)	22-00 (1) 00-02 (2) 02-06 (1)	Nil

## Time Zone: PST (24-Hour Time) WESTERN USA TO:

	15 Meters	20 Meters	40 Meters	80 Meters
Western & Southern Europe & North Africa	08-10 (1)	06-07 (1) 07-11 (2) 11-13 (1) 23-01 (1)	17-21 (1) 21-23 (2) 23-01 (1)	18-20 (1) 20-22 (2) 22-23 (1) 19-22 (1)*
Northern Europe & CIS (former European USSR)	08-10 (1)	06-07 (1) 07-10 (2) 10-12 (1) 23-01 (1)	17-00 (1)	19-22 (1) 19-21 (1)*
Eastern Mediterranean & Middle East	08-10 (1)	07-10 (1) 10-12 (2) 12-13 (1) 21-23 (1)	06-08 (1) 18-22 (2)	06-08 (1) 18-21 (1)
Western Africa	09-11 (1)** 08-09 (1) 09-12 (2) 12-13 (1)	07-10 (1) 10-13 (2) 13-16 (3) 16-17 (2) 17-18 (1)	18-23 (1)	19-22 (1)
Eastern & Central Africa	09-11 (1)	08-10 (1) 13-16 (1) 21-23 (1)	06-08 (1) 18-22 (1)	06-08 (1) 18-21 (1)
Southern Africa	08-10 (1) 10-12 (2) 12-14 (1)	09-13 (1) 13-16 (2) 16-18 (1) 23-01 (1)	18-21 (1)	18-20 (1)

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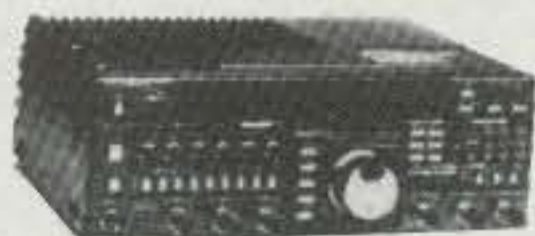
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ings in all time zones between 4 AM and sunrise. A good rule to remember about 160 meter DX openings is that conditions tend to peak about the time that the sun rises at the easternmost terminal of a DX path, or during the night-to-day "grayline" period.

Short-skip conditions during December favor the 40 and 80 meter bands for daytime openings less than 250 miles in length. Try 80 and 160 meters for this same distance at night. For openings between 250 and 750 miles, 40 meters should be optimum during the day and both 80 and 160 meters at night. Try 20 meters during the day for openings between 750 and 1300 miles; 30, 40, or 80 meters from sunset to midnight; and 80 meters from midnight through the sunrise period. Try 30 and 40 meters again for an hour or so after sunrise. For openings between 1300 miles and the maximum one-hop distance of 2300 miles, 17, 15, or 20 meters should be optimum during the day; 20, 30, and 40 meters from sundown to midnight; and 40 and 80 meters from midnight to sunrise. Ten and 12 meters should also provide some short-skip openings between 1300 and 2300 miles during the daylight period, when conditions are High Normal or better.

This month's column contains DX Propagation Charts valid through February 1995. Note that the "band" column headings have been changed this month to re-

flect the changes in propagation conditions expected during the present minimal solar period. Short-Skip Propagation Charts for use during December appeared in last month's column.

### VHF Ionospheric Openings

Quite a bit of meteor shower activity is expected during December. *Geminids*, a major meteor shower, should take place between December 4 and 16. It is expected to peak with a meteor rate of about one a minute on December 13. This should permit some fairly good meteor-type openings on 10, 6, and 2 meters. A second, but less intense shower period, called *Ursids*, is expected later in the month. This shower should take place between December 17 and 24, peaking on the 22nd with a meteor rate of about 15 an hour.

A secondary seasonal peak in sporadic-E propagation usually takes place during December (the major peak is during the summer months). This should result in occasional short-skip openings on 10 and 6 meters as short as a few hundred miles and as long as 1400 miles.

Some auroral-type VHF ionospheric openings are also likely to occur during December, especially when ionospheric conditions on the HF bands are Below Normal or Disturbed. Be sure to check the Last Minute Forecast at the beginning of

Central & South Asia	17-19 (1)	08-10 (1) 17-18 (1) 18-19 (2) 19-20 (1)	05-08 (1) 17-19 (1)	05-07 (1)
South-east Asia	14-15 (1) 15-17 (2) 17-18 (1)	08-10 (1) 13-16 (1) 16-18 (2) 18-20 (1)	01-04 (1) 04-07 (2) 07-09 (1)	04-07 (1)
Far East	14-15 (1) 15-17 (2) 17-18 (1)	08-10 (1) 13-14 (1) 14-15 (2) 15-17 (3) 17-18 (2) 18-19 (1)	22-00 (1) 00-02 (2) 02-06 (3) 06-08 (2) 08-10 (1)	23-01 (1) 01-06 (2) 06-08 (1) 01-06 (1)*
South Pacific & New Zealand	14-16 (1)** 11-13 (1) 13-14 (2) 14-16 (3) 16-18 (2) 18-19 (1)	07-08 (1) 08-13 (2) 13-15 (1) 15-16 (2) 16-18 (4) 18-19 (2) 19-21 (1)	20-22 (1) 22-00 (2) 00-07 (3) 07-08 (2) 08-09 (1)	00-03 (1) 03-06 (2) 06-08 (1) 03-06 (1)*
Australasia	14-16 (1)** 12-13 (1) 13-15 (2) 15-17 (3) 17-18 (1)	07-08 (1) 08-11 (2) 11-17 (1) 17-18 (2) 18-19 (3) 19-20 (2) 20-21 (1)	01-03 (1) 03-05 (2) 05-07 (3) 07-08 (2) 08-09 (1)	03-05 (1) 05-06 (2) 06-08 (1) 04-07 (1)*
Caribbean, Central America and Northern Countries of South America	11-14 (1)** 08-09 (1) 09-10 (2) 10-12 (3) 12-14 (4) 14-15 (3) 15-16 (2) 16-17 (1)	06-07 (1) 07-09 (3) 09-13 (2) 13-15 (3) 15-16 (4) 16-17 (3) 17-18 (2) 18-00 (1) 00-02 (2) 02-03 (1)	18-20 (1) 20-21 (2) 21-23 (3) 23-01 (2) 01-03 (3) 03-04 (2) 04-05 (1)	19-21 (1) 21-03 (2) 03-04 (1) 21-03 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina and Uruguay	11-14 (1)** 08-10 (1) 10-12 (2) 12-14 (3) 14-15 (2) 15-16 (1)	06-07 (1) 07-09 (2) 09-13 (1) 13-15 (2) 15-16 (3) 16-17 (4) 17-18 (2) 18-21 (1)	19-21 (1) 21-00 (2) 00-02 (1) 02-04 (2) 04-06 (1)	22-05 (1) 00-04 (1)*
McMurdo Sound, Antarctica	14-16 (1)	07-08 (1) 08-09 (2) 09-11 (1) 15-17 (1) 17-19 (2) 19-21 (1) 21-23 (2) 23-01 (1)	21-00 (1) 00-02 (2) 02-05 (1)	Nil

\*Indicates best time for 160 meter openings.

\*\*Indicates best time for 10 meter openings.

For 12 meter openings interpolate between 10 and 15 meter openings.

For 17 meter openings interpolate between 15 and 20 meter openings.

For 30 meter openings interpolate between 40 and 20 meter openings.

this column for those days that are forecast to be in these categories during the month.

During years of high solar activity, F-layer DX propagation on 6 meters was often possible to many areas of the world during December. With the present cycle near minimum, this will not be the case this December. For the very patient, however, a transequatorial scatter or TE-opening may be possible on 6 meters between the southern half of the USA and South America. Openings, if any, will likely be few and far between, and will be distorted by flutter fading. The best time to try for a TE-opening is between 8 and 11 PM.

### Season's Greetings

The editor of this column would like to take this opportunity to extend his warmest greetings for the Holiday Season to everyone, everywhere. Good wishes for peace, good health, and good propagation during 1995, despite declining sunspot activity.

73, George, W3ASK

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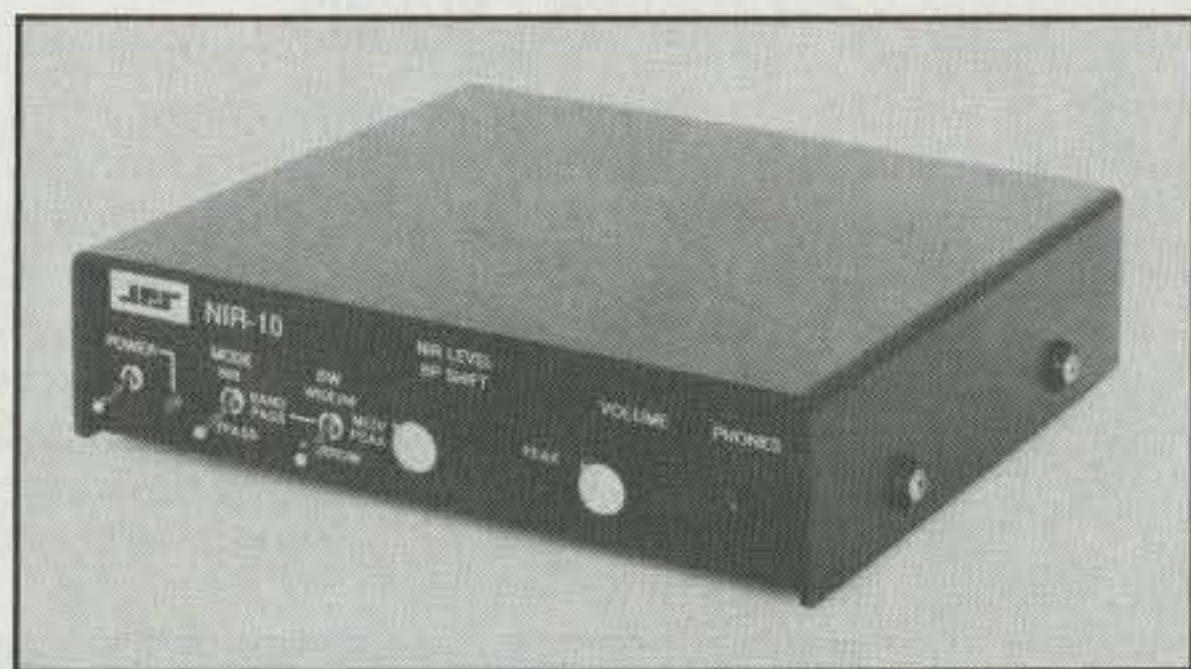
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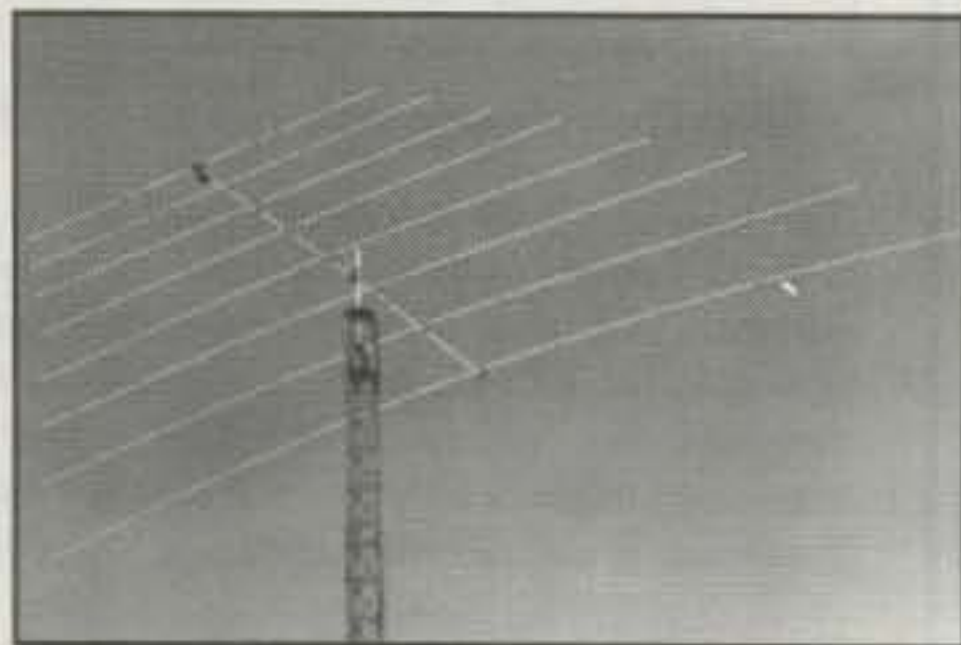
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The ALS500M requires 13.8 VDC at 80 amps peak current for the PA transistors and separate line for 12-15 VDC at 4 amps for control and bias circuits. For more information contact Ameritron, 921 Willow Road, Starkville, MS 39759 (601-323-8211; FAX 601-323-6551), or circle number 101 on the reader service card.



## Cushcraft ASL-2010 Skylog Log Periodic

The new Cushcraft ASL 2010 Skylog Log Periodic antenna is a single antenna that covers 10 meters through 20 meters (actually 13.5 through 32 MHz), eliminating the need for two Yagis to cover the traditional bands and 12 and 17 meters. It uses a single feed line (balun included), and thus there is no need to switch antennas when changing bands. The antenna does not use traps, reducing the wind load (10.1 sq. ft.). It is not power limited and will operate at full legal limit continuously.



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(Continued on p. 148)



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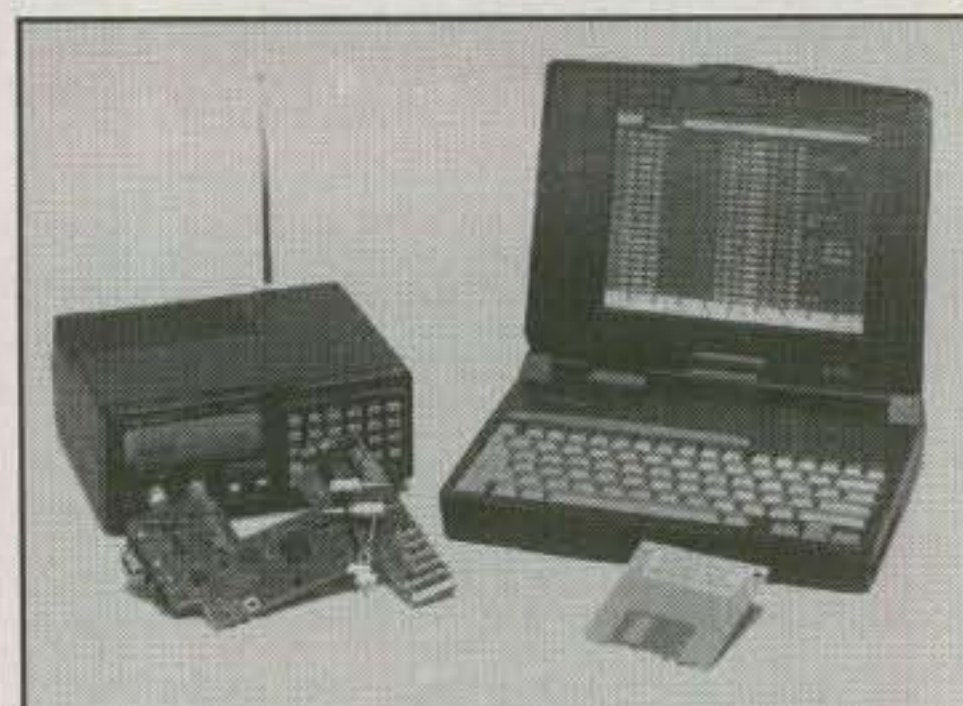
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**(201)-VHF-2067**



CIRCLE 15 ON READER SERVICE CARD



### OptoScan 456 Computer Interface

Optoelectronics has announced the Opto-Scan 456 system for us with the Realistic PRO-2005 and Pro-2006 Scanning Receivers. The system includes hardware and software for full computer control of all scanning functions. In addition, it includes CTCSS Tone, DCS Code, and DTMF character reading integrated with the software scan and log functions. As part of the introductory package, Custom Opto-Scan 456 software for the PC is provided. All the user need supply is the radio. The included software is an OEM version of Scan\*Star.

The complete installation kit, Model OS465, includes the assembled and tested controller board, mounting hardware, OptoScan 456 software for the PC, and installation manual, and is priced at \$299. For more information, contact Optoelectronics Inc., 5821 NE 14th Ave., Ft. Lauderdale, FL 33334, or circle number 106 on the reader service card.

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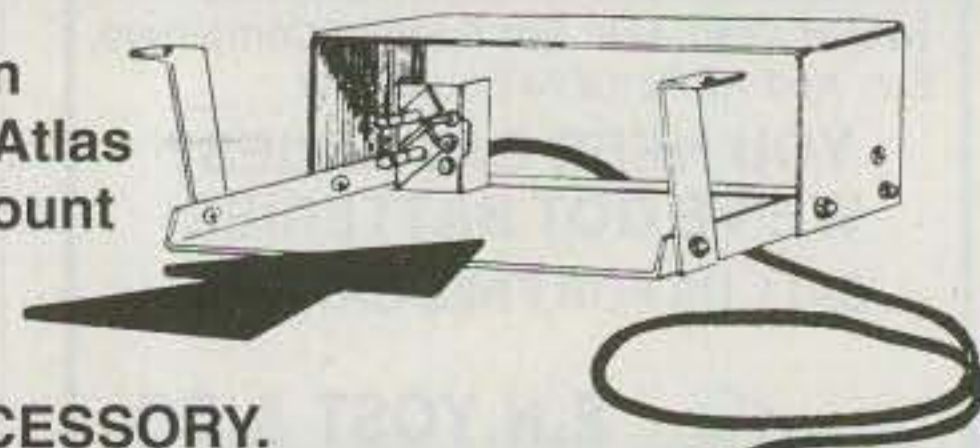
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MA-850	24'6"	85 ft.	10 sq. ft.	\$3489
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TX-455	21'0"	55 ft.	18 sq. ft.	\$1489
TX-472	23'8"	72 ft.	18 sq. ft.	\$2449
TX-489	24'4"	89 ft.	18 sq. ft.	\$4269
HDX-538	22'6"	38 ft.	30 sq. ft.	\$1279
HDX-555	22'0"	55 ft.	30 sq. ft.	\$2239
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1.625"	.058"	1.509"	\$1.75/ft.
1.750"	.058"	1.634"	\$2.00/ft.
1.875"	.058"	1.759"	\$2.10/ft.
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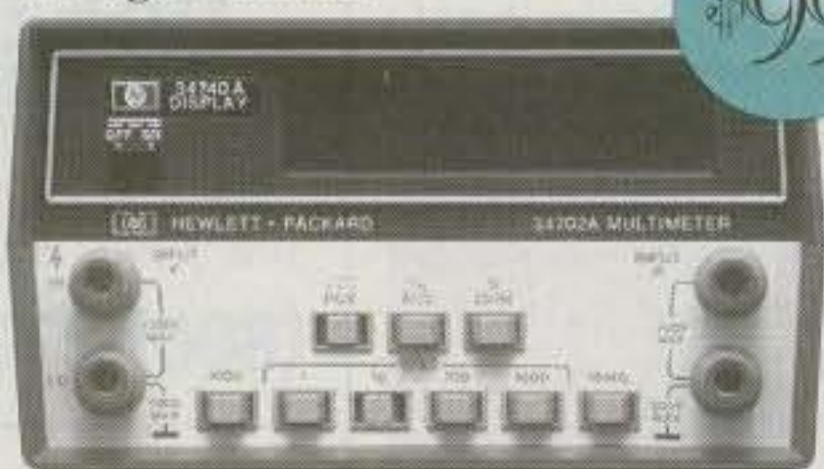
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**Hewlett Packard 34740A/34702A**  
4 1/2 Digit Voltmeter



\$99

The 34740A display locks into the 34702A Voltmeter Module to form a complete DVM System.

Using a clear LED display with four full digits plus 100% over-ranging (4 1/2-digits), this system delivers the resolution required by many applications. The front panel is designed to save time and confusion; functions and ranges are clearly labeled and all maximum voltages are indicated at the input terminals.

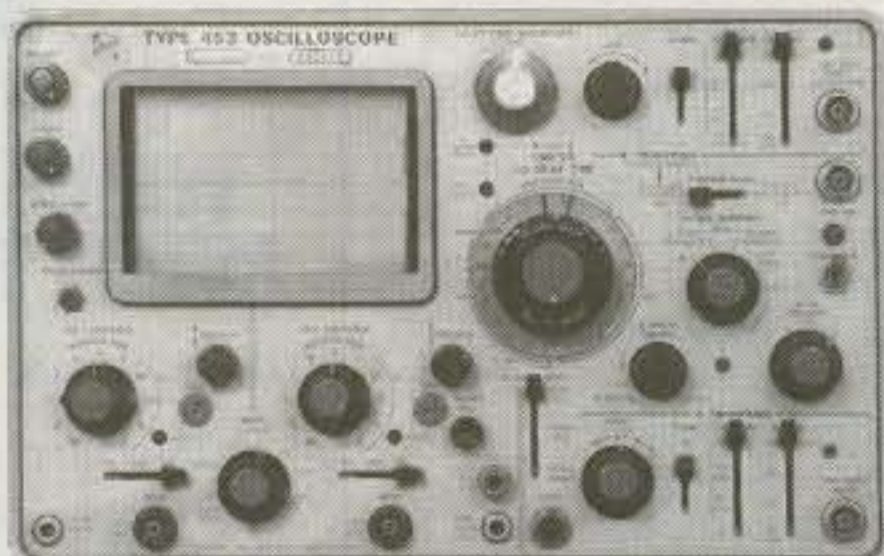
Provides four ranges for both AC and DC voltage (positive and negative 1, 10, 100, and 1000 V full scale) plus six ranges for measuring resistance (100 Ω to 10 MΩ). AC function covers the 45 Hz to 100 kHz frequency range.

Call for availability of other meter modules.

All Test Instruments Include Manuals and are Completely Operational Unless Otherwise Stated

**Tektronix 453**

50 MHz, Dual-Trace Oscilloscope



This dual-trace portable Oscilloscope has a 50 MHz bandwidth, a rise time of less than 7 nS, 5 mV to 10 V/div calibrated Amplitude deflection factors, calibrated A (primary) time base: 0.1 μS to 5 S/div, a dual time base, and delayed sweep. It's a rugged oscilloscope with a solid steel feel that's a rare find these days. The 453 is ideal for both lab and field use, and offers many features.

When you connect the channel 'A' output to a DVM or counter, you'll get a simultaneous digital and analog readout. An oscilloscope can see that important distortion, or lack of it. You can also cascade it into channel 'B' for 1 mV/div sensitivity.

The P31 CRT is 6 X 10 divisions in size and that is plenty clear. Its cathode draws 10kV for bright, sharp traces yet it maintains ≤ 0.1 divisions of distortion. The gratitudes are internal to prevent misreading of the measurements.

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For added protection, front covers are available for an additional \$25.

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TREAT

**Hewlett Packard 353A Patch Panel**

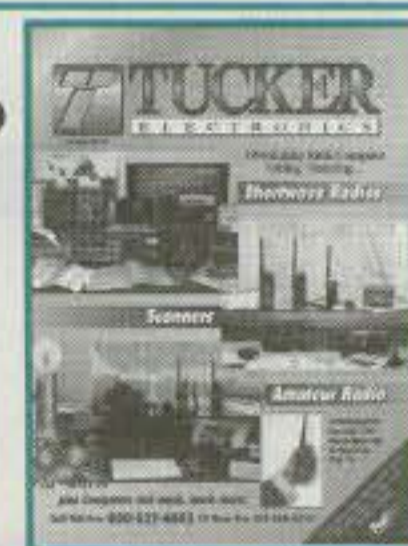
Used in conjunction with an oscillator and a voltmeter to measure transmission and system characteristics such as attenuation, frequency response and gain

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- Output impedance 135, 600, and 900 Ω center tapped
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- Attenuation of 110 dB in 1 dB steps



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This useful instrument generates a broad band noise signal which can be used in a variety of applications.

The 5 Hz to 5 MHz noise has a uniform spectrum level, especially useful in noise and vibration testing of mechanical and electrical systems. A switchable low pass filter allows the upper frequency cutoff to be set at 20 kHz, 500 kHz, or 5 MHz. Output level is controlled by a 4-step attenuator with 20 dB steps and a continuously variable control providing a calibrated, metered output from less than 30 μV to 3 V (depending on filter setting). Audio spectrum level uniformity is rated at ±1 dB. In addition, a pink noise filter can be attached to the front output terminals when the 1390B is to be used with a constant percentage bandwidth analyzer.

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**Hewlett Packard 10833A**  
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**10833B**  
2 Meters Length

**10833C**  
4 Meters Length

**10833D**  
.5 Meters Length

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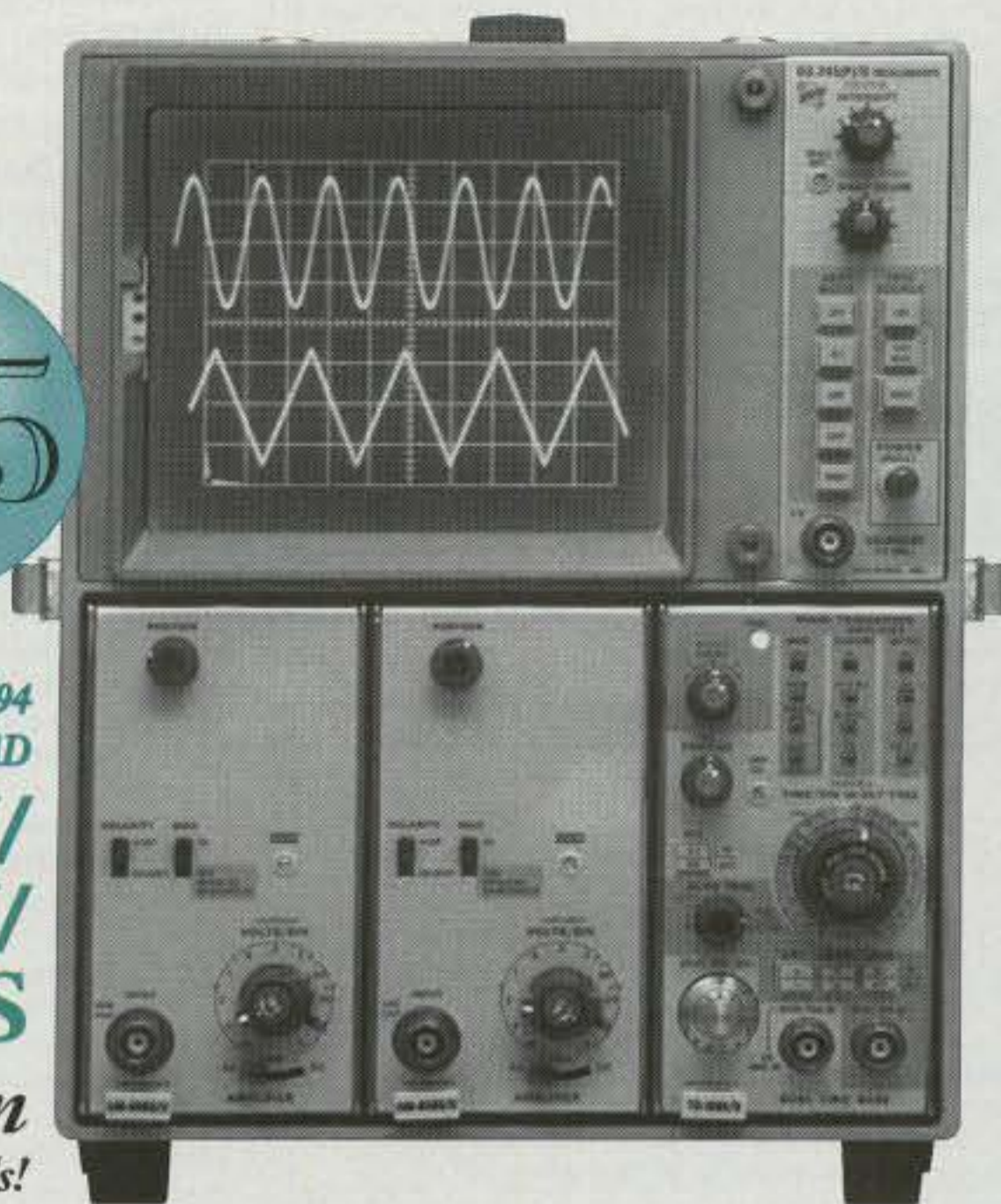
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output for your own assurance and the professional styling of internal graticules to eliminate parallax errors. Look, with Tektronix, you know the quality is superior, the unit is easy to use, the accuracy is there (and will be), and that this oscilloscope will be dependable for a long time- it always has!

### The Tektronix 7A15AN Vertical Plug-Ins

The Tektronix 7A15AN Vertical Plug-Ins (AM-6565/U) that come with this set are perfect. They can see a signal as small as 500 micro-Volts or as large as 80 Volts and with the right probe you can see 1,000 Volts. The AC/DC coupling switch allows you to cut out the DC component of a signal if you wish. They each have a variable GAIN adjustment knob and convenient POSITION knob to give you more control of the display. The 7A15AN has a polarity switch so that you can compare signals while ADD'ing. It also has a MAG switch that lets you magnify the signal 10 times, a user-accessible GAIN calibration adjustment, and a high input impedance, BNC jack that won't alter the operation of the circuitry under test.

Now consider the benefits of having TWO 7A15AN Vertical Plug-Ins in a 7603N Mainframe. The unit can serve as an ideal Comparator! Instead of being limited to reversing the polarity of only one channel, you'll be able to reverse the polarity of either, neither or both. You can also magnify either, neither or both channels at will.

### Tektronix 7B53AN Time Base Plug-In

Here is the easy-to-use, lighted-push-button Tektronix 7B53AN Dual Time Base Plug-In (TD-1085/U). This time base will trigger on signals as fast as 100 MHz and has a variety of ways to sweep: AUTO, normal, single, delayed (with its own triggering control and delayed-time multiplier), intensified, and mixed sweep modes. Sweep speeds are from 50 nS to 5 seconds per division in 25 calibrated steps. Of course, there's a variable sweep control and a signal slope control so you can see the signal just as you like.

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Together, the two 7A15AN Vertical Plug-Ins and the 7B53AN Horizontal Plug-In, while based in the reliable 7603N mainframe, make a ready and able team.

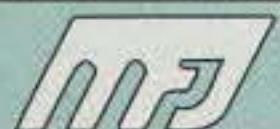
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Ideal for high noise environment.



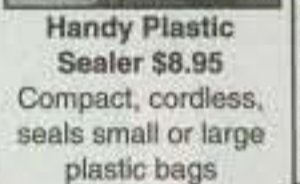
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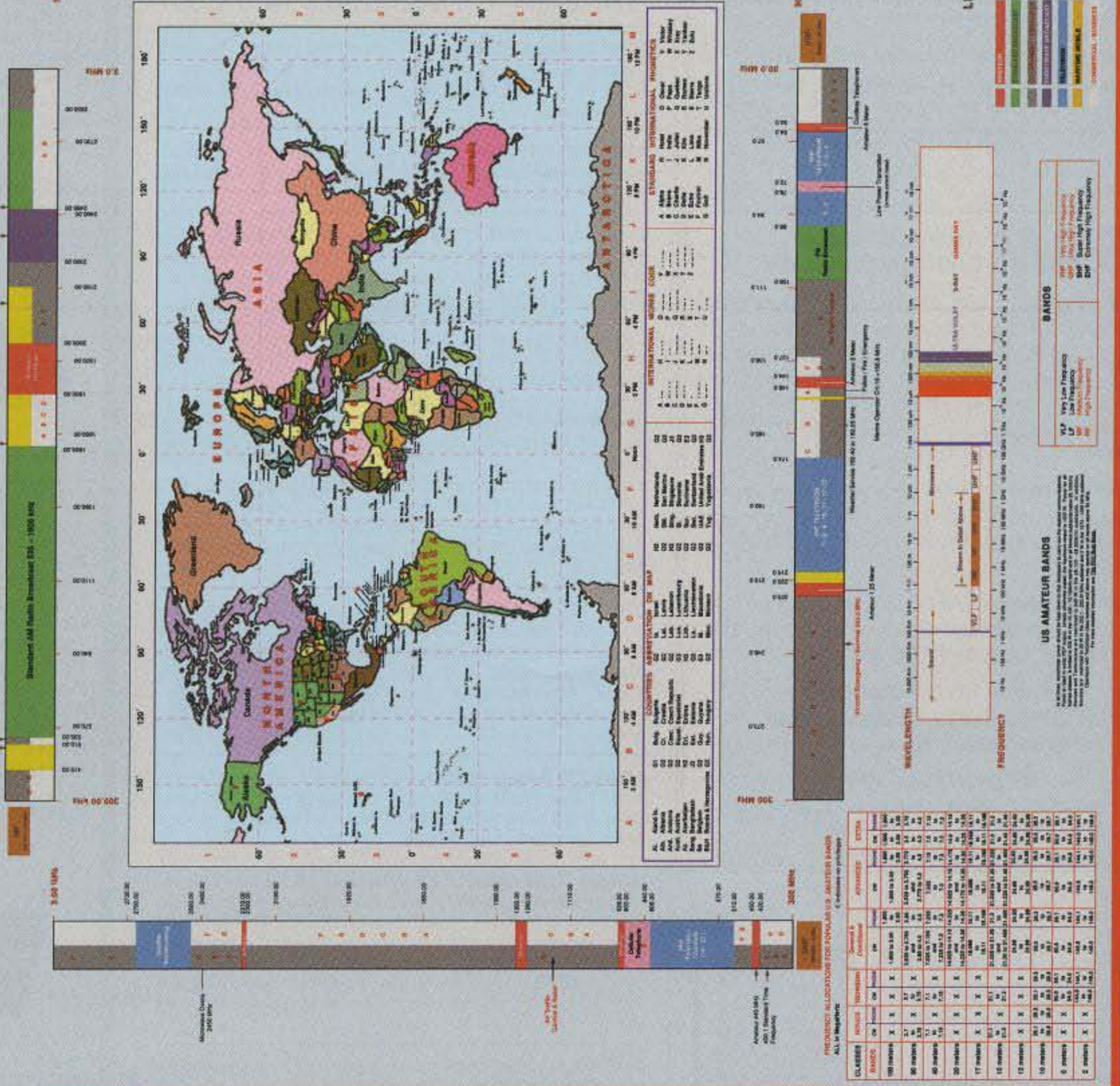
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SO SOUTH AMERICA	3A	3A
	3B	3B
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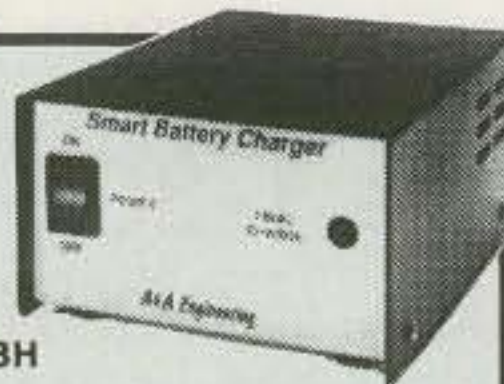
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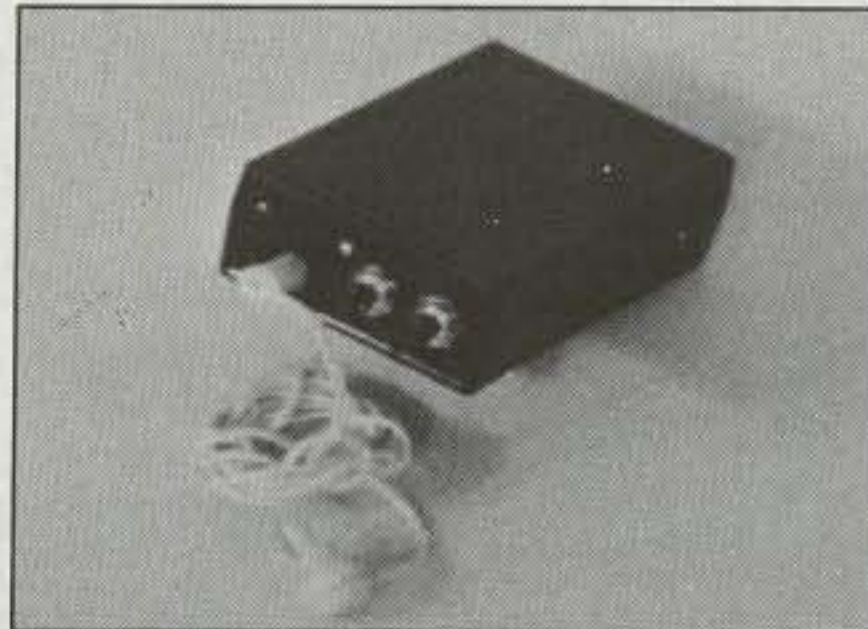
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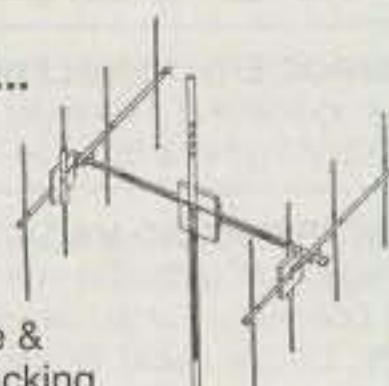
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CIRCLE 52 ON READER SERVICE CARD

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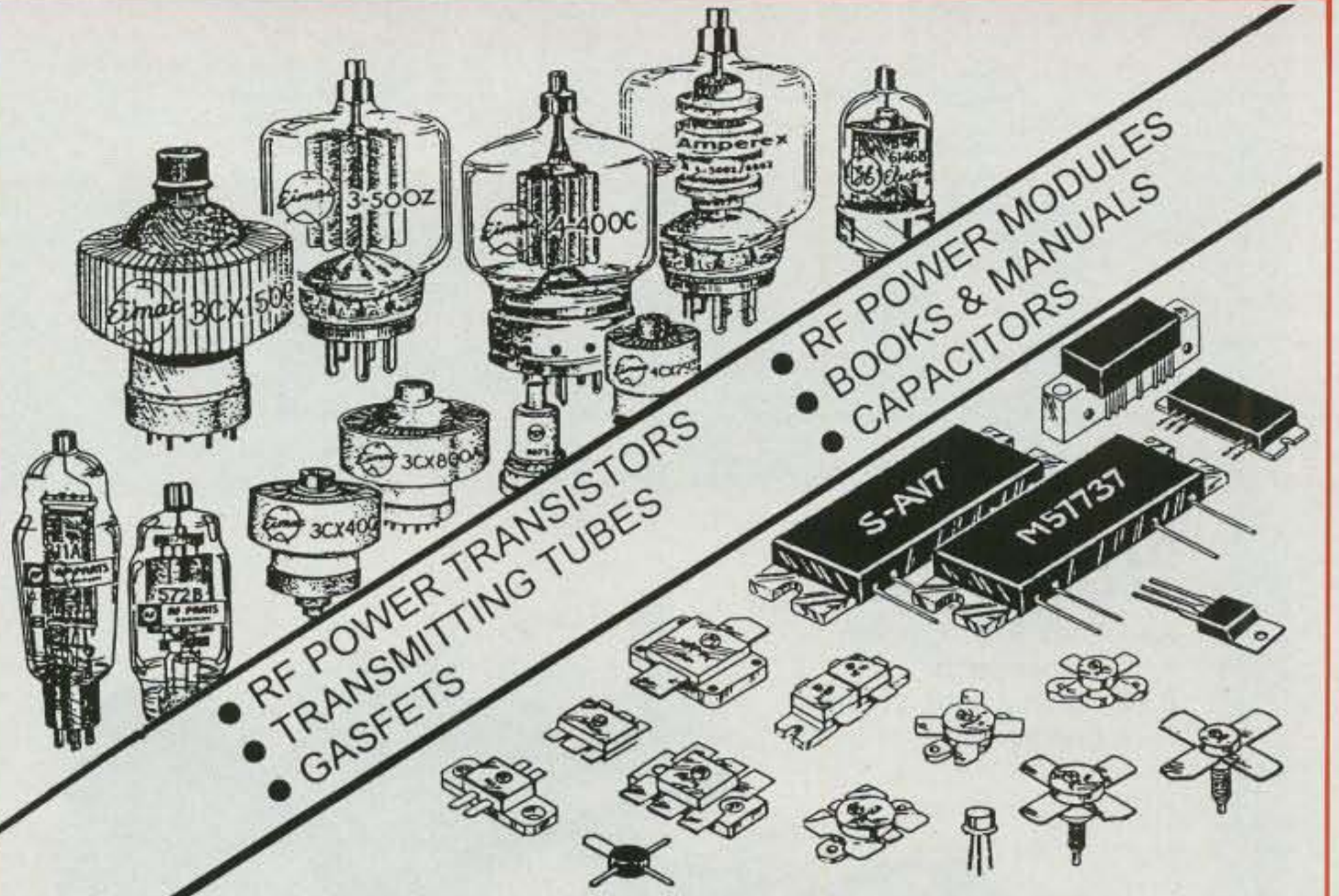
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# RF POWER



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**BENCHER Engineered 1:1 Balun** converts unbalanced coax to a balanced feed, properly driving the antenna and reducing radiation from the feed line.

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POWER RATING	..... 1.5 kw CONTINUOUS
<b>ZA-1A Balun</b>	<b>HWK Boom Hardware Kit</b>

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CIRCLE 21 ON READER SERVICE CARD

## ANNOUNCEMENTS

(from page 6)

KB6JHP/Ø, 740 Arnold Ave., #931, Whiteman AFB, MO 65305-5315.

**W9WWI**, from holiday season celebration, Bethlehem, Indiana; December 10 and 11; operation will be in the General 80-15 meter phone bands, the Novice 10 meter subband, and on 2 meters. For certificate, send QSL and SASE to CCARC, P.O. Box 532, Jeffersonville, IN 47130.

**NQØG**, from Port of Lights, Kimberling City, Missouri; Kimberling ARC; 1500-1900Z December 10 and 11; operation in the lower portions of the 80, 40, 20, and 15 meter bands. For certificate send QSL and SASE to Chamber of Commerce, P.O. Box 495, Kimberling City, MO 65686.

• **The following hamfests, etc., are slated for late November and December:**

Nov. 26, **Greater New Orleans Hamfest**, St. Bernard Cultural Center, Chalmette, Louisiana. For further information, contact the New Orleans ARC, Inc., P.O. Box 51822, New Orleans, LA 70152-1822.

Dec. 3, **14th Annual Greater Greensboro Hamfest & Computer Show**, Greensboro Coliseum Complex Special Events Center, Greensboro, North Carolina. For further information, contact 76 Group, P.O. Box 7862, Greensboro, NC 27417-0862; or call REALTALK at 910-299-2525 (enter 0076 at prompt). (Exams).

Dec. 3, **The North Coast ARC Fall Hamfest**, St. Clarence Church, North Olmstead, Ohio. For more information, contact Dan Sarama, KB8A, at 216-267-5083, or connect to the NCARC Packet BBS "C NO8M" on 145.73, dial 216-779-6350 and use the commands: D NCARC/ HAMFEST.LOC, D NCARC/ HAMFEST.INF.

Dec. 3, **Superstition ARC Hamfest**, Mesa Community College campus, Mesa, Arizona. For more information, call 1-602-898-9158.

Dec. 4, **Hazel Park ARC 29th Annual Swap and Shop**, Hazel Park High School, Hazel Park, Michigan. For information contact HPARC, Box 368, Hazel Park, MI 48030.

Dec. 10, **The Annual Courage Center Handi-Ham Winter Hamfest**, The Eagles Club, Faribault, Minnesota. For information contact Don Franz, WØFIT, 1114 Frank Avenue, Albert Lea, Minnesota 56007.

Dec. 10, **Central Illinois Winter Superfest**, Turner Jr. High School, Jacksonville, Illinois. For more information contact Tim Childers at 217-245-2061. (Handicapped accessible; exams).



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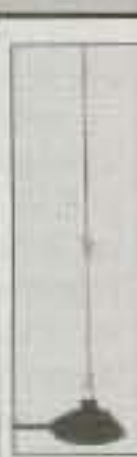
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	TUNERS	 <p><b>MFJ-989C</b> 3KW Roller Inductor Tuner Cross-Needle Meter, Built-In Dummy Load Matches 160-10 Meters</p>	 <p><b>MFJ-986</b> 3Kw Roller Inductor Tuner Easy-To-Use, 1.8-30MHz, Cross-Needle Meter</p>	 <p><b>MFJ-962C</b> 1.5 Kw Versa Tuner III Cross-Needle SWR/Power Meter, Handles 1500W PEP 6-Position Ant. Switch</p>	 <p><b>MFJ-949E</b> 1.8-30MHz Antenna Tuner World's Best Selling Amateur Tuner Dummy Load, 8-Pos. Ant. Switch.</p>	 <p><b>MFJ-934</b> Antenna Tuner/Artificial Ground Covers 1.8-30MHz, Up To 300 Watts Turns A Random Wire Into An Effective Ant. That Works</p>		
		SWR METERS	 <p><b>MFJ-259</b> HF/VHF SWR Analyzer w/ RF Resistance Meter 1.8-170MHz, 10 Digit LCD Frequency Counter</p>	 <p><b>MFJ-249</b> 1.9-170MHz SWR Analyzer 10 Digit LCD Frequency Counter Smooth Tuning</p>	 <p><b>MFJ-815B</b> 1.8-60MHz SWR/Wattmeter 200/2000W w/Forward 50/500W Reflected MFJ-817 Covers 144 &amp; 440MHz</p>	 <p><b>MFJ-864</b> SWR/Wattmeter covers 1.8-60, 144 And 440MHz Read Forward And Reflected Power Simultaneously</p>	 <p><b>MFJ-860</b> HF SWR/Wattmeter Covers 1.8-60MHz MFJ-862 Same As Above For 144,220 And 440MHz</p>	
			PACKET	 <p><b>MFJ-1278B</b> Multi-Mode Data Controller Pactor, Color SSTV, Packet, AMTOR, RTTY, ASCII, Navtex, CW Plus More</p>	 <p><b>MFJ-1276</b> Packet Plus PACTOR Controller. HF/VHF TNC Precision Tuning and 32K Mailbox Memory</p>	 <p><b>MFJ-1270CQ</b> Packet Controller VHF/HF Packet TNC With New 9600 baud Capability</p>	 <p><b>MFJ-1270C</b> Packet Controller VHF/HF Packet TNC TAPR TNC-2 Compatible Free AC Power Supply</p>	 <p><b>MFJ-1272B</b> TNC/Mic Switch. Push Button Switch For Choosing Your Microphone Or TNC. HF, VHF Or UHF</p>
				SUPER BUYS	 <p><b>MFJ-784</b> Super DSP Filter Automatically Eliminates Heterodynes, Reduces Noise and Interference On Nearly Any Mode</p>	 <p><b>MFJ-452</b> CW Keyboard, 2 Line LCD Display, CW Keyboard, Iambic Keyer</p>	 <p><b>MFJ-493</b> Menu Driven Memory Keyer/Keyboard. Save And Play Messages, Set Speed, Weight, Sidetone Etc. Plus 32,000 Character Memory</p>	 <p><b>MFJ-490</b> Memory, Keyer/Bencher Paddle Combo. Message Memories, Morse Trainer, Sidetone, Auto. Serial Numbering Plus Bencher Paddle</p>
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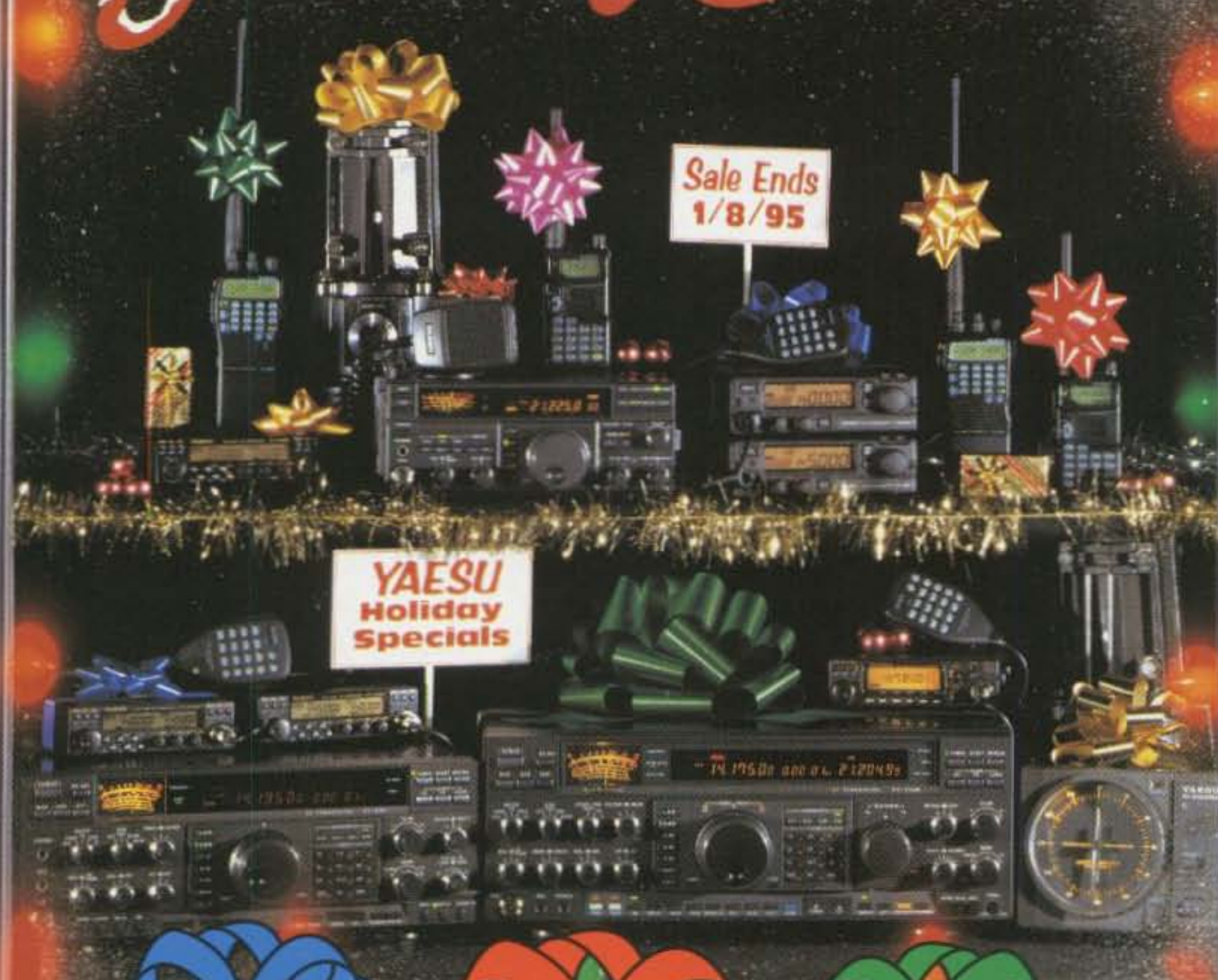
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Only one Dial/Volume knob  
required for easier use.

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An 8 character alpha-numeric user help menu scrolls operation instructions in the bottom of the large, backlit display.

MH-29A2B  
LCD Display Mic  
with Remote  
Functions.  
(Optional)

The new FT-51R Dual Band HT is state-of-the-art, and easy to use!

So easy, you won't need an operating manual. Its exclusive, scrolling instruction menu located in the large, backlit display "window", guides you through total operation while simultaneously viewing the main display window.

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"I can see two frequencies and alpha-numeric all at the same time."

"Scrolling instructions tell me what to do next!"



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FT-51R  
2 1/4" W x 4 3/4" H x 1 1/8" D  
(2 Watt version shown.)

memories. A cloning feature duplicates favorite channels to another FT-51R.

A digital battery voltage display, five power output levels, the largest backlit dual band HT keypad made, Smart Mute™, two VFOs on both VHF and UHF, as well as available 2 Watt and 5 Watt versions, round out the exciting FT-51R. Plus, the optional MH-29A2B Display Microphone allows you to control volume and also access Memory, VFO, Call Channel, Band Selection and scanning functions. All of this in world's smallest dual band HT radio!

See the FT-51R with "windows" at your Yaesu dealer today!

"I use the Spectrascope to find new contacts faster."

"Yaesu did it again!"

### Specifications

- Frequency Coverage
  - VHF RX: 110-180 MHz
  - TX: 144-148 MHz
  - UHF RX: 420-470 MHz
  - TX: 430-450 MHz
- Spectrascope™ Display
- Scrolling User Help Menu
- Alpha-Numeric 8 Character Display
- Up/Down Volume/Squelch Controls & Display
- Selectable Sub-Band TX Mute
- Automatic Tone Search (ATS)
- Digital Battery Voltage Display
- AM Aircraft Receive
- Scanning Light System (SLS)
- 120 Memory Channels (80 w/Alpha-Numeric)
- Large Backlit Keypad & Display
- Automatic Repeater Shift (ARS)
- Multiple Scanning Modes
- 3 Selectable Scan Stop Modes with Scan Skip
- Selectable 6-way Lock Functions
- Automatic Power Off (APO)
- TX/RX Battery Savers Built-in
- Handy Cloning Feature
- 5 Selectable Power Output Levels
- 5 Watt and 2 Watt versions
- Selectable RX Smart Mute™
- Cross-Band & One-Way Repeat Functions
- DTMF Paging/Coded Squelch Built-in

#### Accessories

Consult your local dealer.

**YAESU**  
Performance without compromise.™

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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.

# FT-2500M/FT-7400H 2m/70cm Mobiles



## Specifications

- **Frequency Coverage:**
  - FT-2500M
    - RX: 140-174 MHz
    - TX: 144-148 MHz
  - FT-7400H
    - RX/TX: 430-450 MHz
- Rugged Military Spec Design
- Advanced Track Tuning (ATT)
- Selectable Alpha-Numeric Display
- Largest Display Available
- Power Output:
  - FT-2500M 50/25/5 Watts
  - FT-7400H 35/20/5 Watts
- Flip Up Front Control Panel Hides Seldom Used Buttons
- Backlit DTMF Mic
- 31 Memory Channels
- CTCSS Encode Built-in
- Automatic Power Off (APO)\*
- Time-Out Timer (TOT)\*
- Manual\* or Automatic Backlighting Adjustment
- **Accessories:**
  - FTS-17A CTCSS Decode Unit
  - FRC-6 DTMF Paging Unit
  - SP-4 External Speaker
  - FP-800 Power Supply

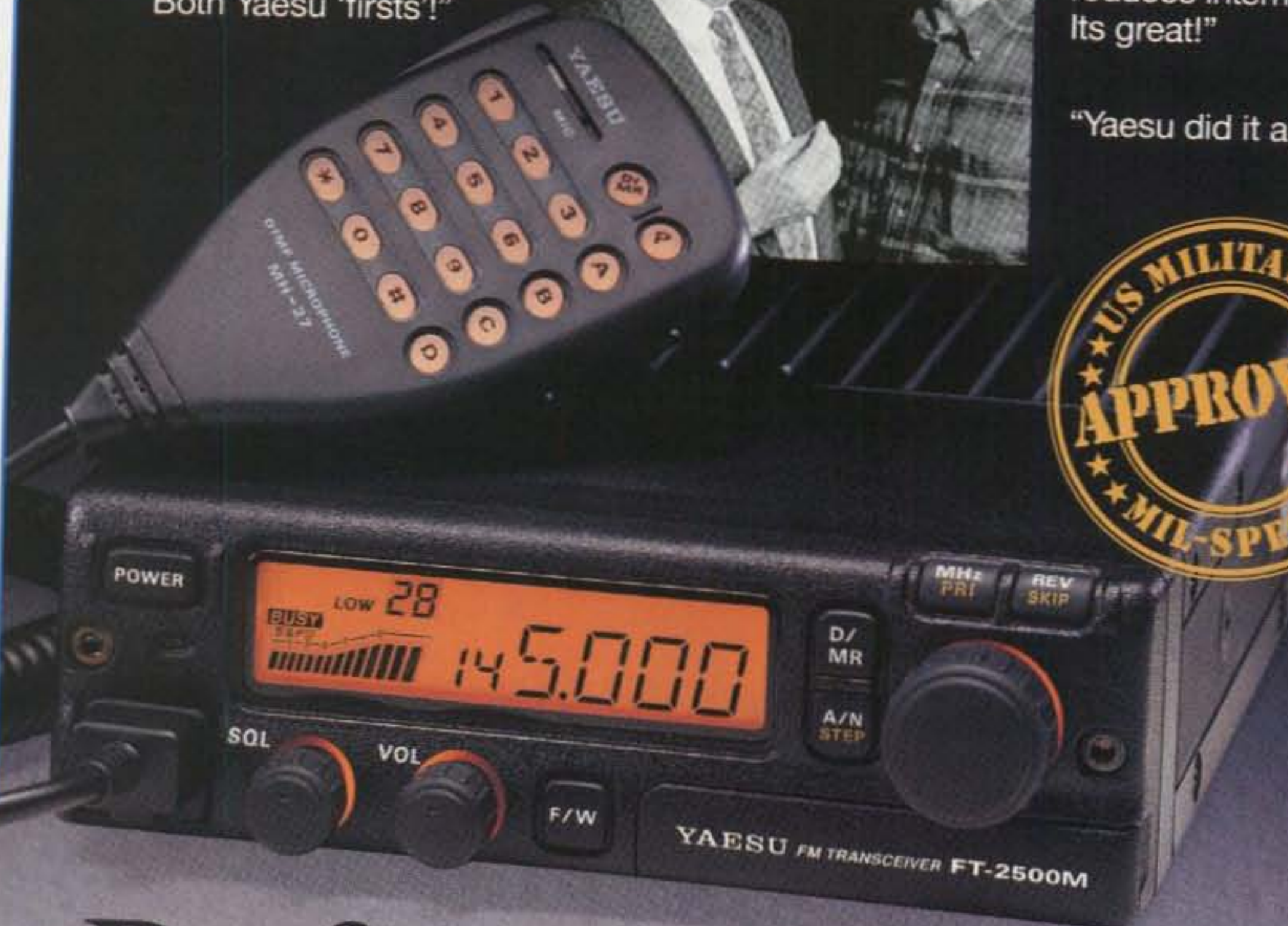
\*FT-2500M

"No other mobile has a Military spec rating. This radio can really take it!"

"New Omni-Glow display and backlit DTMF Mic, too. Both Yaesu 'firsts!'"

"3-stage advanced track tuning really reduces intermod. Its great!"

"Yaesu did it again."



## Performance beyond the call of duty.

Just when you thought you had the most formidable mobile built, we made the FT-2500M – the next evolution of powerful, rugged mobile radios.

The FT-2500M takes the durable quality, features, and performance of the popular FT-2400H and goes one better! A new easy-to-operate front panel design with rubber coated knobs, new, large state of the art Omni-Glow display to provide enhanced viewing at all angles and light levels, and Yaesu's exclusive 3-Stage Advance Track Tuning feature that reduces intermodulation and front-end overload puts the FT-2500M as close as you can get to commercial grade performance in amateur frequencies.

The FT-2500M is the only mobile with a Military spec rating and the most often used controls on the front and

those you "set and forget" neatly hidden. It's the first mobile radio with a backlit DTMF mic, too. With its extra large heat sink and one-piece die-cast chassis, the tough FT-2500M is unlike any other mobile in its class.

Test the mettle of your mobile. If it doesn't measure up to the endurance standards of the U.S. Military, get the FT-2500M. For flawless performance in rough and rugged situations, the FT-2500M is really formidable – just what you'd expect from Yaesu. See it at your dealer today!

# YAESU

Performance without compromise.™

### FT-2200/7200

Just 5.5"W x 1.6"H x 6.5"D, the FT-2200/7200 radios are designed to fit into today's more compact cars with ease.

- SPECIFICATIONS** • Frequency Coverage:  
FT-2200 RX: 110-180 MHz, TX: 144-148 MHz.  
FT-7200 RX/TX: 430-450 MHz. • Wide Receiver Coverage: 110-180 MHz • AM "Aircraft" Receive: 110-139 MHz • Built-in DTMF Paging/Coded Squelch • Selectable Channel Only Display • 10 Memory DTMF Auto Dialer • Backlit DTMF Mic • Power Output 50/25/5 Watts (FT-7200 35 Watts) • 50 Memory Channels • Remote Operation w/ Optional MW-2 • CTCSS Encode Built-in • Optional Digital Voice Storage System.  
Accessories: See your authorized Yaesu dealer.



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RAG CHEW WITH THE BEST OF 'EM

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A \$120 VALUE!



**WITH THE PURCHASE OF ANY ICOM RADIO ON THIS PAGE!**

Limited offer—see below for details



**IC-77**  
• HF-100 W (AM-25 W)



**IC-707**  
• HF-100 W (AM-25 W)



**IC-728**  
• HF-100 W (AM-40 W)



**IC-2330A**  
• 2 M (45 W)  
• 220 MHz (25 W)

Enjoy free-flowing conversation and free-hands radio operation with an ICOM EX-1514 vox! Purchase any ICOM radio listed on this page from a participating dealer and receive the EX-1514 absolutely FREE.

To find more information about these or any other ICOM radios, or to locate your nearest ICOM dealer, call (206)450-6088.

\* EX-1514 retail value - \$120.00. Limited to stock on hand. Offer may end without notice.



**IC-275H**  
• 100 W • 144 MHz • Multi Mode



**IC-475H**  
• 75 W • 440 MHz • Multi Mode



**IC-575H**  
• 100 W • Multi Mode  
• 28 MHz (10 M)/50 MHz (6 M)



**IC-820H**  
• Dual Band, All Mode  
• 45 W (2 M), 40 W (440 MHz)



**IC-970H**  
• Multi Band, All Mode  
• 144 MHz /440 MHz Built-in (1.2 GHz optional)

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