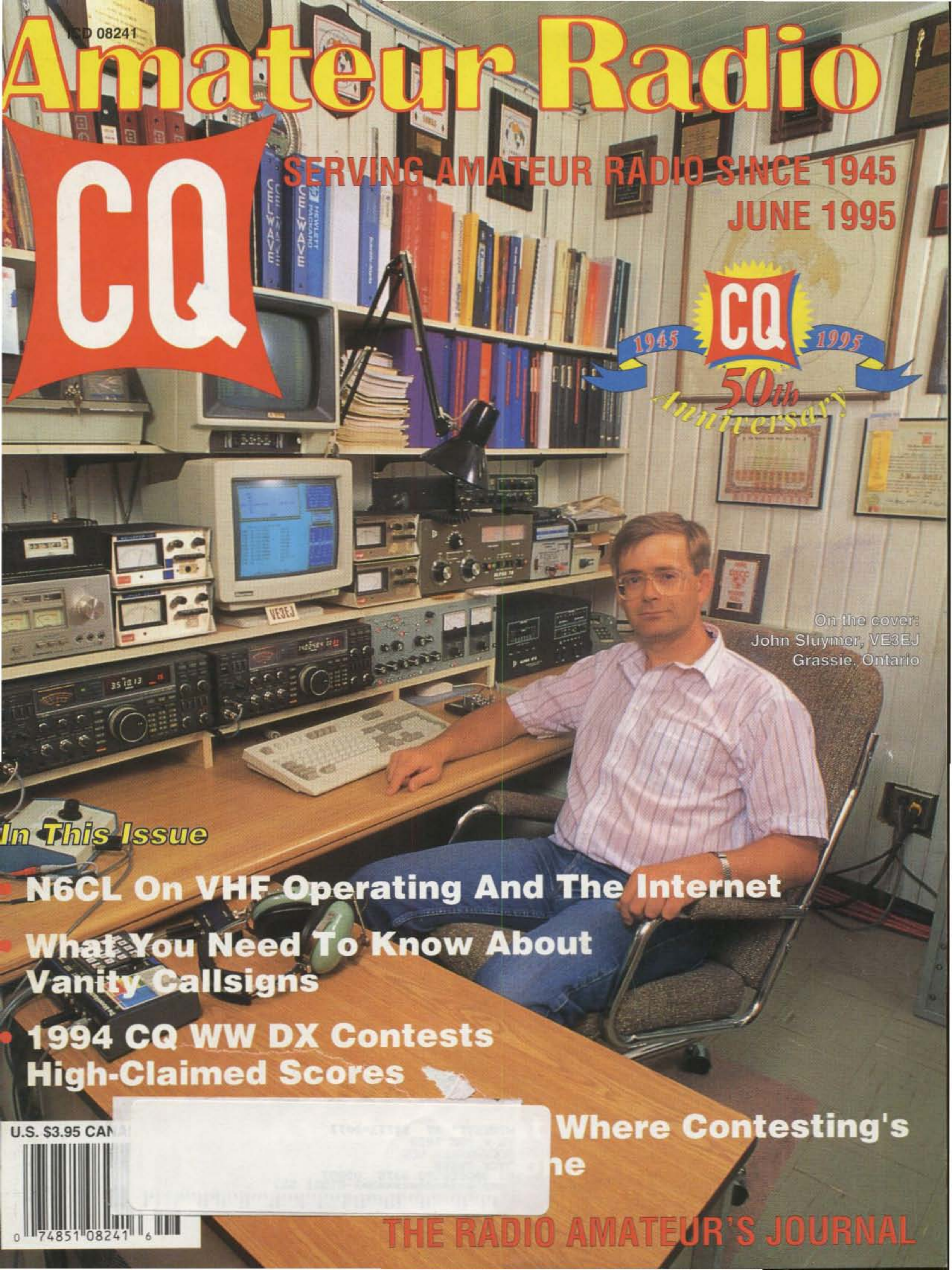


Amateur Radio

ISSN 08241

SERVING AMATEUR RADIO SINCE 1945
JUNE 1995

CQ



On the cover:
John Sluymer, VE3EJ
Grassie, Ontario

In This Issue

- N6CL On VHF Operating And The Internet
- What You Need To Know About Vanity Callsigns
- 1994 CQ WW DX Contests High-Claimed Scores



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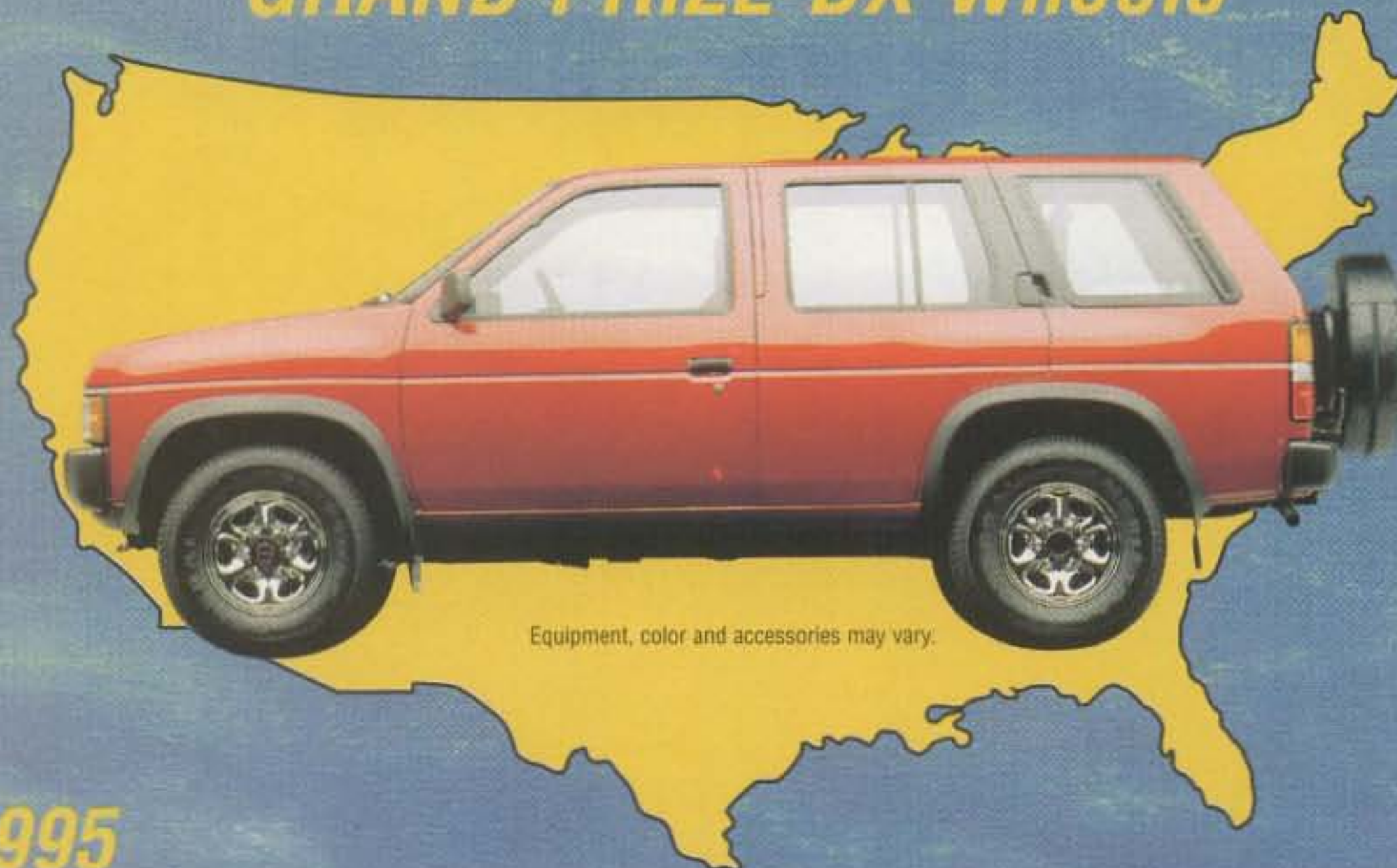
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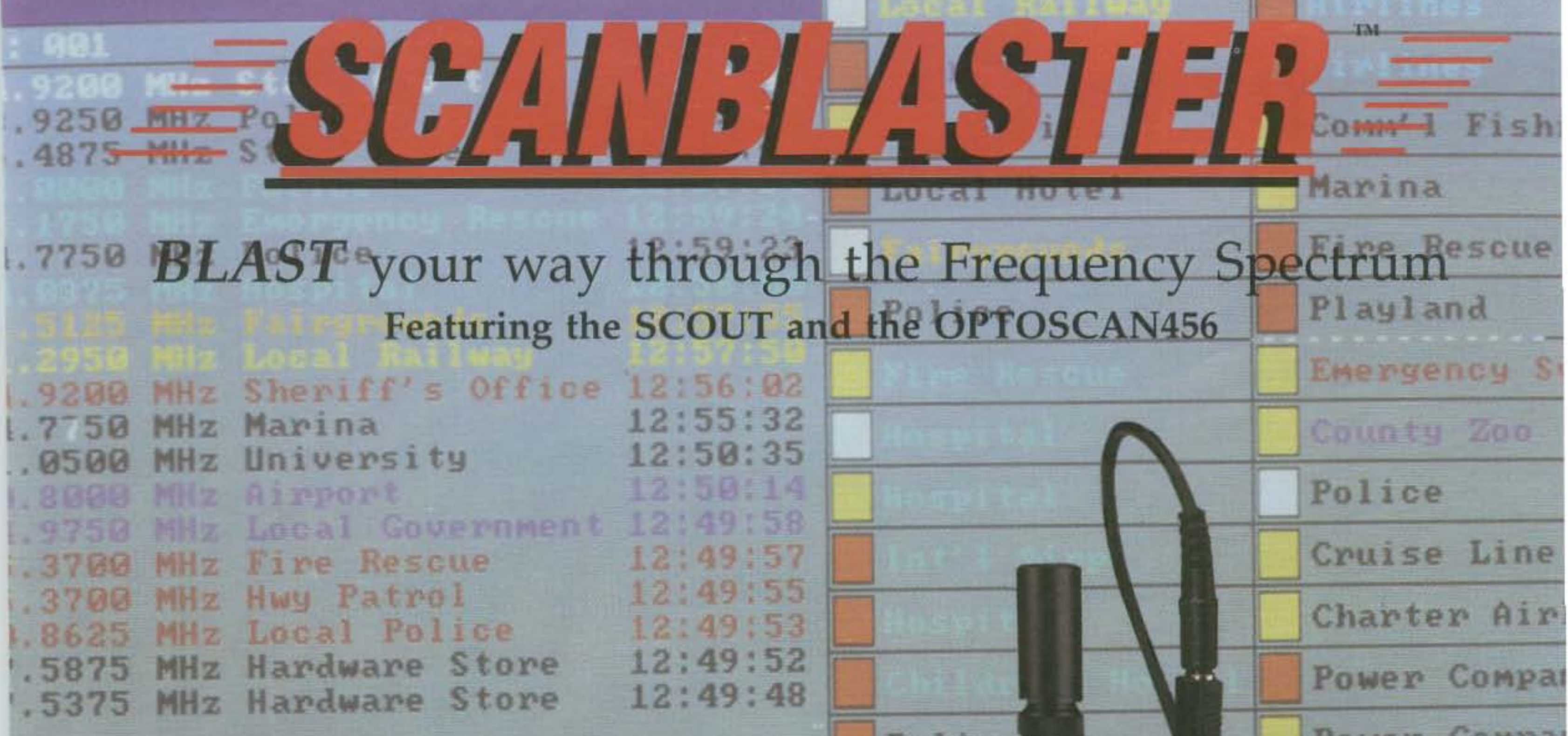
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The Radio Amateur's Journal



ON THE COVER: John Sluymer, VE3EJ, is no stranger to DXing and contests. His impressive accomplishments originate from this neat Grassie, Ontario setup. (Photo by Larry Mulvehill, WB2ZPI.)

JUNE 1995

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ZERO BIAS

EDITORIAL

With the flick of a switch, it was all over. In some ways the mourning process began, and who knows how long it will take or how far it will reach. Oh, life continued, scarcely missing a heartbeat, but it was truly quite different than it had been a few short minutes before. Once the moment was over, and the uncertain applause ceased, it was quiet, very quiet, and nothing moved save the text appearing on computer screens.

We had gathered about an hour or so earlier, 6 PM (2300 UT), on March 31, 1995 to witness and bear fact that a monumental change in both philosophy and technology was about to take place. It was a cool evening as the sun came down, and we were sitting in a pavilion-type tent adjacent to the building which houses NMN, the U.S. Coast Guard station. There were three operating positions set up at the leading edge of the tent nearest the building, along with a raised platform to accommodate featured speakers. There were three operators handling routine traffic on CW, and the evening air was alive with the sound. Very-large-screen TVs immediately reproduced the text as it was being sent and received. I couldn't tell exactly, but it seemed as though there were about 200 people who were invited to witness and take part in the upcoming ceremony.

While this really wasn't a party or cause for jubilation, it was still exciting to wait in almost disbelief for what was about to happen. We were formally going to say goodbye, farewell old friend, rest easy for a job well done; another has come to shoulder the load. In literally minutes CW would cease as a viable HF mode for the Coast Guard. It was a curious mix of emotions among the amateurs present, many of whom were Coast Guard personnel. Some voiced the conviction that CW should be maintained as a requirement for an amateur radio license, as it was a tradition, while at the same time they proudly hailed the demise of this tradition in favor of a new technology and a new tradition for the Coast Guard. We all like to hang on to what's old and familiar. It's like that bumper sticker you see once in a while that states, "Real Radio Glows In The Dark." It's hard to find a "radio" these days that does. To a different generation, the bumper sticker might have stated, "Real Radio Smells Like Ozone." It doesn't matter. Keep your glow-in-the-dark radios; we'll stick to spark. We know what's real!

The countdown started, and the time for the reason we all were there came nearer. Several distinguished officers spoke on the role of the Coast Guard over the years



As you approach the U.S. Coast Guard facility; NMN, in Chesapeake, Virginia, the first thing you notice is the large log-periodic antenna in front.



Here is one of the three stations set up outside to transmit the last CW message. The operator is TC3 Sergio Morales, who is also KP4FFW.

and how this new technology would greatly enhance and improve their efficiency and ability to provide aid and search-and-rescue efforts to mariners and ships at sea. While we all knew these words were true, it was still hard on some levels to finally accept that a significant era was about to be over. You could almost picture archaeologists a thousand or so years hence digging through the midden of this station, describing it in terms of the CW tradition and the radiomen era. Unlike other peoples, we knew the exact time and place where a new layer of sediment buried the old and gave sun to the new.

The final message was read to those

assembled, and the operators prepared to send it out exactly at 0000 UT. We all drew an analogy to amateur radio and CW requirements. This evening told us *what* would happen somewhere down the line, but not *when*. The clock ticked off the appropriate time, the order was given, and the message was sent out on three different frequencies by three different operators. Many in the audience diligently copied the message as it was being sent, I guess in some way to say that they did, and in another way to solidify that bond between CW and the Coast Guard that stretched many years.

(Continued on page 124)

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- * Tone burst function

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DUAL-BAND HANDHELDS

Once again KI6BP presents us with another intriguing Home-Brew Receiver (HBR) project, this time for 6 meters. You can have the fun of building your own receiver and the excitement of working a new band.

Build (and Use) A DX-Grade Six Meter Receiver

BY M. A. (MAC) CHAPMAN*, KI6BP

Six meter EME popularity is growing rapidly. Double- and triple-hop paths to Europe during the late spring and early summer months happen dozens of times each year. During the past few years there have been more than 250 countries worked on 6 meters, and more than 100 stations became DXCC members. You can be part of this fast-growing community starting with this challenging 6 meter Home-Brew Receiver (HBR) designed for small-signal low-noise reception.

Design

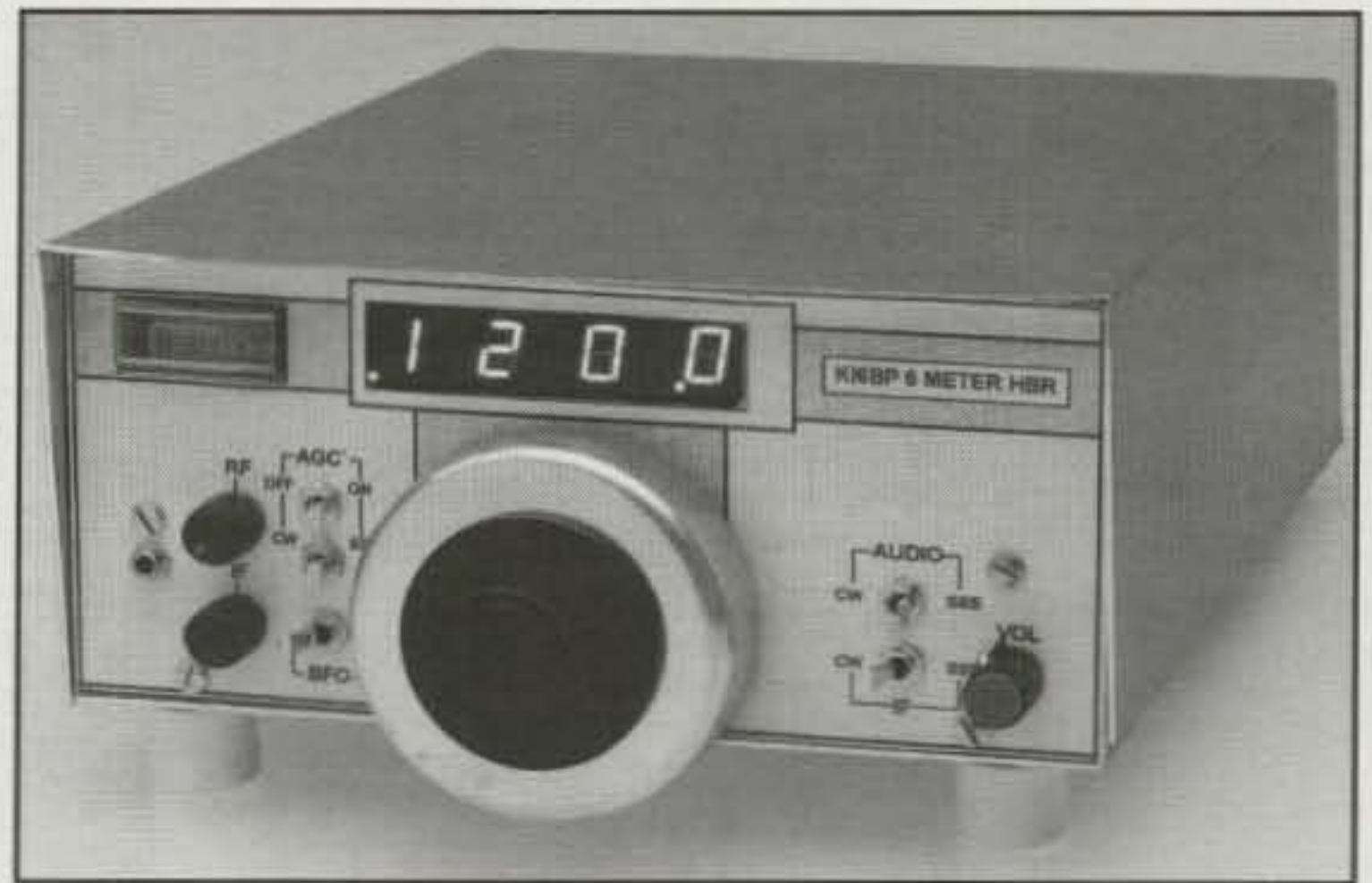
Many 6 meter receivers use a low-noise down converter into a standard HF system. However, converters often have few if any tuned circuits and easily pass undesired image signals into the system; you then end up with "birdies" in the passband. The other problem with converters is that they usually overload the IF stage, causing strong signal distortion. For 6 meter DX you need both low front-end noise and narrow passband selectivity. You have to give up something for this, and in this case it's tuning range. Since most 6 meter DX is around 50.1 MHz, we can confine our tuning range to the CW and SSB portion of the band.

Suppose you decided to build a 6 meter receiver from scratch. Which conversion scheme do you like best? Single conversion or double conversion? In my opinion, there isn't a strong reason for choosing one approach over the other. However, most dual-conversion designs discourage certain image problems. Also, depending on your approach, two mixer stages might be easier to implement. With these ideas in mind, you might come up with a scheme such as this: a down-converting double-conversion arrangement that has electronic attenuation, selectable crystal filters, an AGC, and a tuned-frequency digital readout. Your only frill might be an S-meter. You'll need all the other features for any serious 6 meter DX. A tuned-frequency digital readout is essential for E-skip and schedule work. A fast-acting AGC with a front-end attenuator will keep strong stations from destroying your ear drums when listening in the noise for a new country. Narrow pass-band selectable IF-stage filters are necessary to get the best possible CW or SSB reception during those short periods when a skip occurs.

RF and Mixer Stage

The RF stage in fig. 1 has a four-pole filter with an embedded low-noise common-gate JFET, Q1. The net stage gain is modest, about 10 dB, just large enough to overcome the first mixer-stage noise. I favor a common-gate arrangement for its clean match to the antenna filter. Usually a common-source input resistance is unpredictable and often needs a drain resistor or

*3615-21 Vista Bella, Oceanside, CA 92057 (Compuserv # 71773,3254)



If you take your time and have patience, you'll be rewarded with a great new 6 meter receiver and a lot of operating fun.

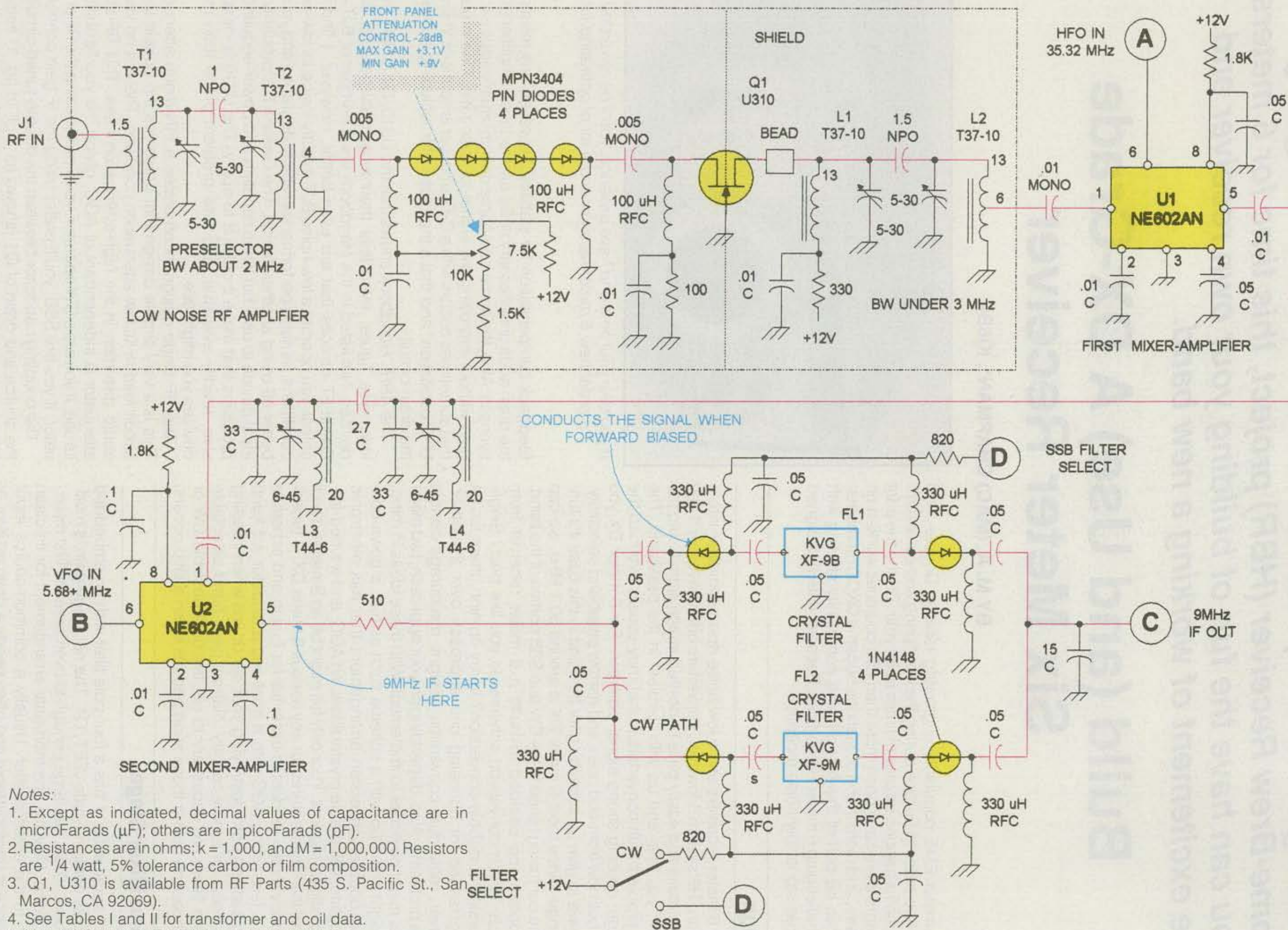
feedback compensation for stability. However, any resistor in the drain adds unnecessary noise and reduces amplifier effectiveness. Also, the common-source design usually adds excess gain without improving the signal-to-noise ratio. One problem that sometimes occurs with a C-G amplifier is spurious VHF and UHF oscillation, and that's the reason for including a bead in the drain circuit.

The ARRL Handbook shows that the U310, Q1, JFET¹ has a low noise figure, even less than most dual-gate MOSFET devices. Not listed in the Handbook are a number of BJT and GaAsFET devices that are even better. However, I find that unless you operate a low-noise BJT exactly inside its low-noise conditions, its noise performance rapidly degrades and you are better off using another device. The GaAsFET is probably the ideal device to use, but it has handling and power-sequencing problems that make it difficult to apply. The U310 is inexpensive, readily available, and less problem prone than many devices you might use.

The RF-stage design incorporates a PIN-diode attenuator. This is a very simple design that preserves the double tuned circuit load in its low-attenuation condition. There is no visible audio distortion in the high-attenuation case. This RF-stage attenuator is independent of AGC, giving the you flexibility in its use. If you are a CW operator, you'll prefer using the RF attenuator; if you like SSB, you'll prefer using the IF gain control.

The coupling capacitor between the double-tuned circuits in the source and drain of Q1 (shown as 1 pF in fig. 1) sets the RF-stage bandwidth. You can narrow the front-end bandwidth by reducing the size of this capacitor; however, as you decrease its value, the RF-stage insertion loss increases. A good trade

Fig. 1—Schematic diagram of the front-end stage: the RF amplifier, first and second mixers, and filter switching network.



Notes:

1. Except as indicated, decimal values of capacitance are in microFarads (μ F); others are in picoFarads (pF).
2. Resistances are in ohms; k = 1,000, and M = 1,000,000. Resistors are 1/4 watt, 5% tolerance carbon or film composition.
3. Q1, U310 is available from RF Parts (435 S. Pacific St., San Marcos, CA 92069).
4. See Tables I and II for transformer and coil data.
5. Use AWG #28 for T1, T2, L1, L2, L3, and L4.

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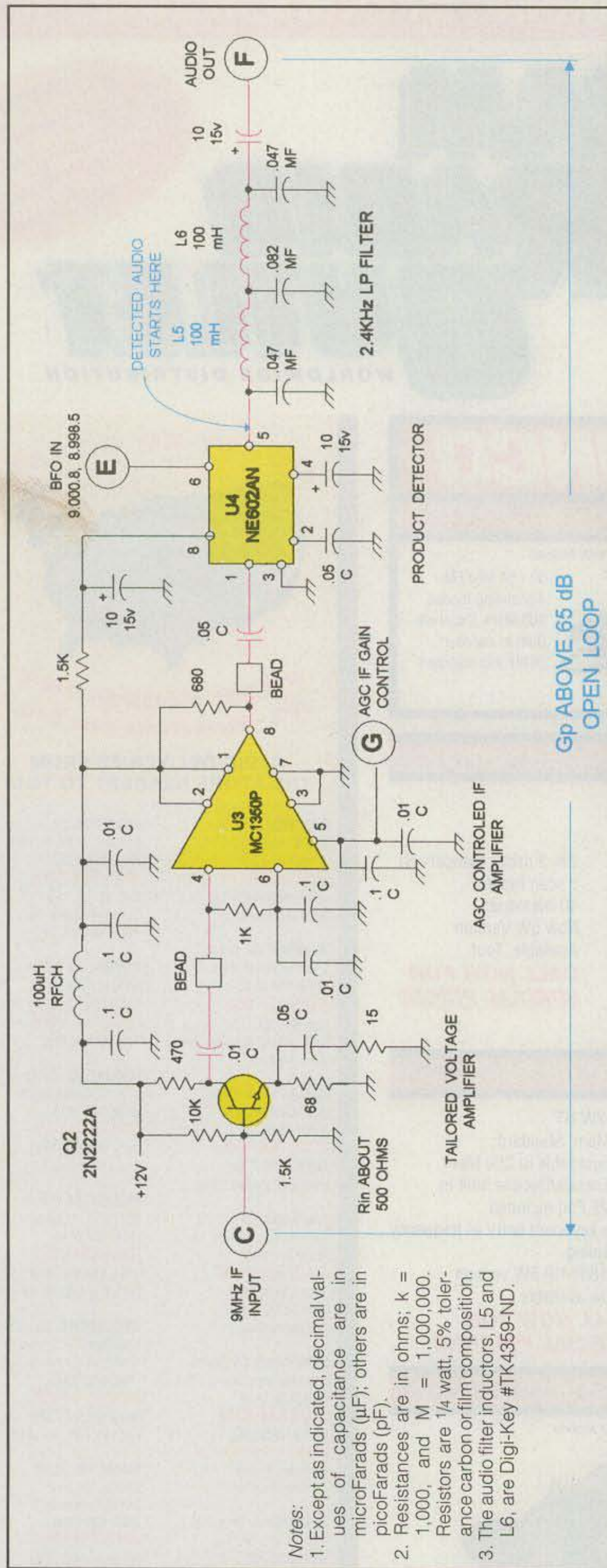
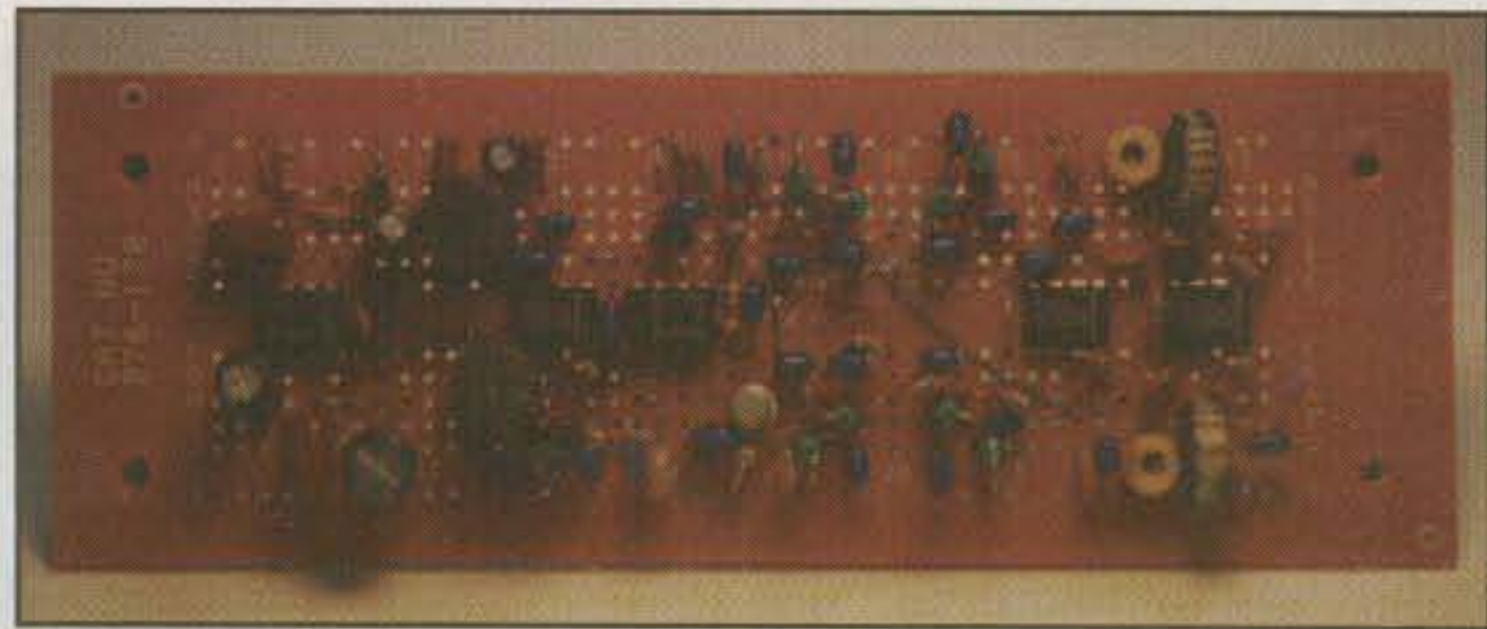


Fig. 2— Schematic diagram of the IF amplifier, product detector, and SSB audio filter.



This view shows the completed IF/Detector circuit board ready for testing prior to mounting into the chassis. The photo shows the typical circuit packaging possible utilizing these 2" x 6" low-cost multi-purpose boards from Radio Shack. It also shows the minimal component density used in this project, which simplifies soldering and allows for future circuit modifications and changes.



The bottom view shows the four main RF boards and the simple PC chassis construction. The front panel is on the left, and the rear panel is on the right. The rear circuit board is mounted into a cavity made from PC board parts tack-soldered to the main chassis. The uncluttered appearance results from using small coax and 30 AWG wire. The audio circuits are in the top board running front to back; the VFO and HFO are in the middle, with the AGC and BFO circuits mounted to a board on the bottom. The RF, IF, and Detector are mounted on the board inside the rear cavity. The oscillator shields are removed in this view for clarity. Both crystal filters are mounted on the rear panel.

between gain and bandwidth is when this coupling capacitance is between 0.50 pF and 1 pF. At 0.75 pF the circuit Q is about 30, making the two-pole bandwidth just over 1.6 MHz. Since the tuning range is about 300 kHz, the 3-dB-passband-to-tuning-range ratio is about 5, making reception flat across the range.

The first mixer, U1 in fig. 1, is an inexpensive active-double-balanced mixer.² The mixer output "sees" a matching double-tuned filter. The tuned-circuit input resistance blocks the 85 MHz image. The second mixer, U2, is another active mixer, the output signal of which is diode switched between two crystal filters. A simple 510 ohm resistor forces the mixer output signal to "act" as a 500 ohm source to match the crystal-filter input. The crystal-filter input resistance blocks the image signal. In several test designs I used a complex image termination scheme. However, as nice as these circuits looked on paper, their performance wasn't measurably better than this simple image-blocking approach.

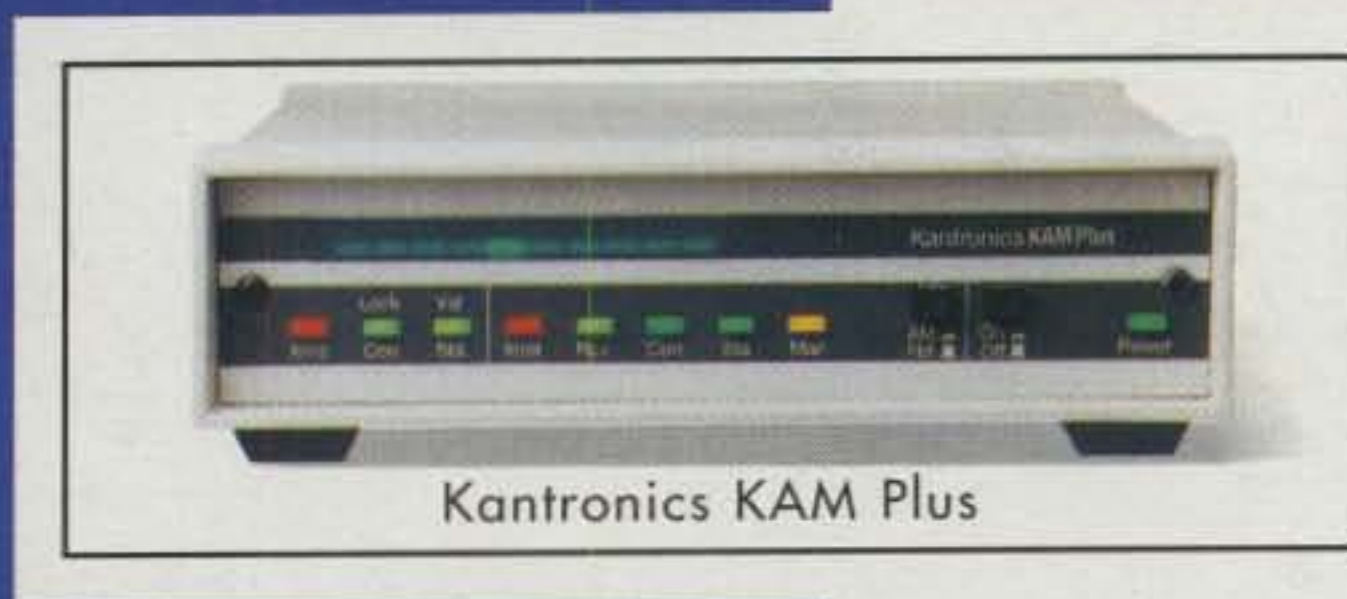
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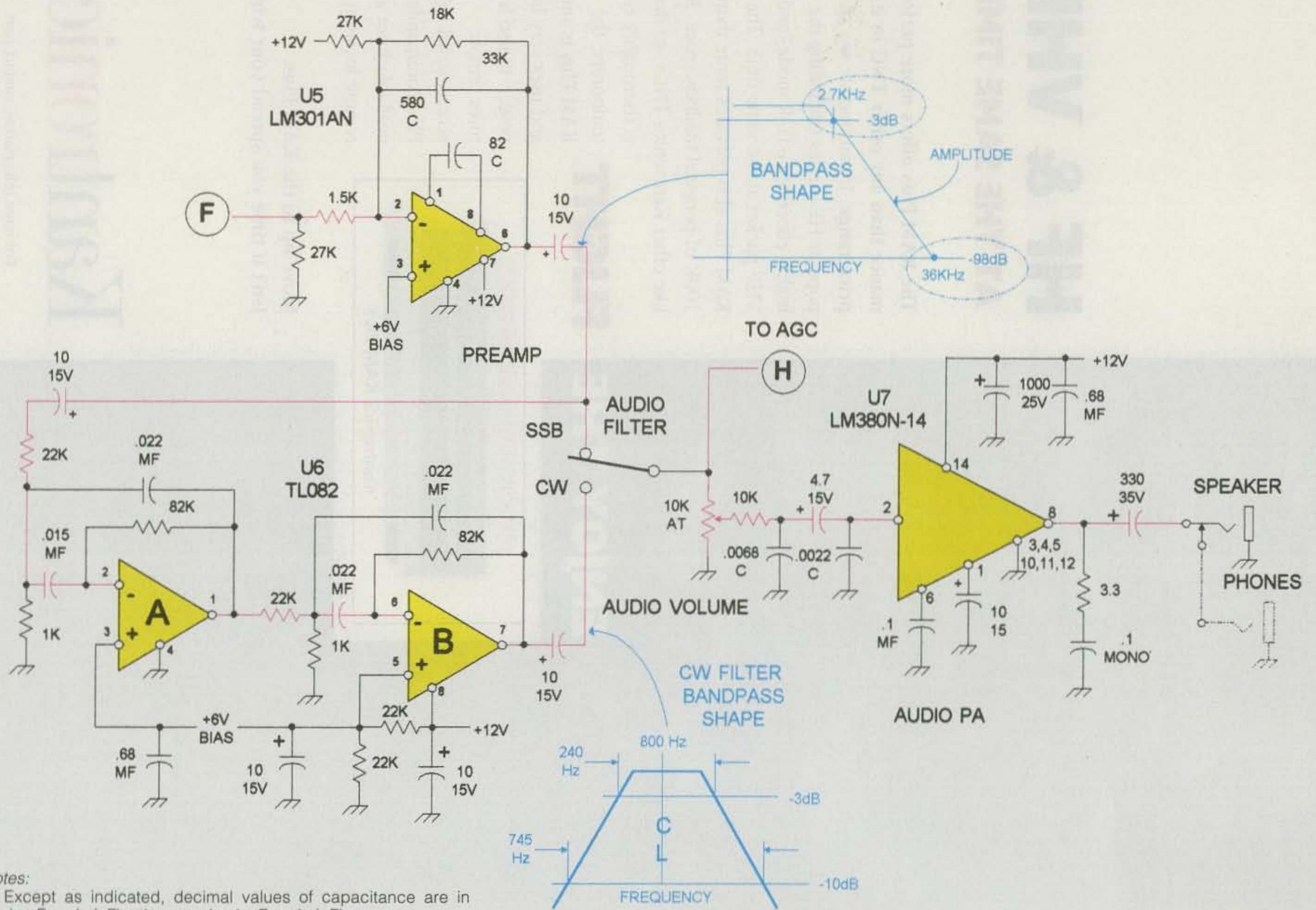


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Fig. 3—Schematic diagram of the audio system.



Notes:

1. Except as indicated, decimal values of capacitance are in microFarads (μ F); others are in picoFarads (pF).
2. Resistances are in ohms; k = 1,000, and M = 1,000,000. Resistors are 1/4 watt, 5% tolerance carbon or film composition.
3. The audio filters, L5 and L6, are Digi-Key #TK4359-ND.

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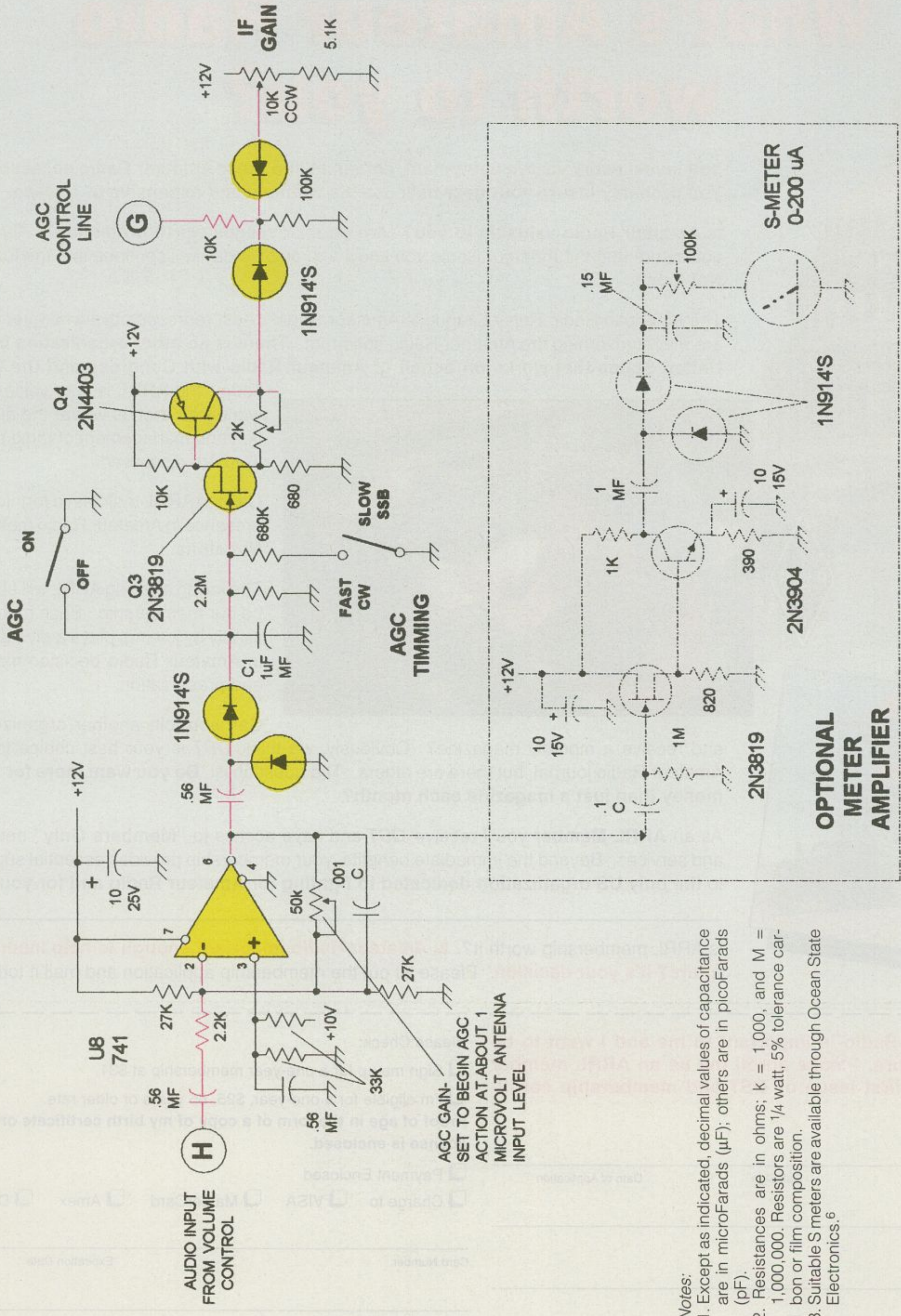


Fig. 4- Schematic diagram of the AGC and S-meter amplifier system.

- Notes:
1. Except as indicated, decimal values of capacitance are in microFarads (μF); others are in picoFarads (pF).
 2. Resistances are in ohms; k = 1,000, and M = 1,000,000. Resistors are 1/4 watt, 5% tolerance carbon or film composition.
 3. Suitable S meters are available through Ocean State Electronics.⁶

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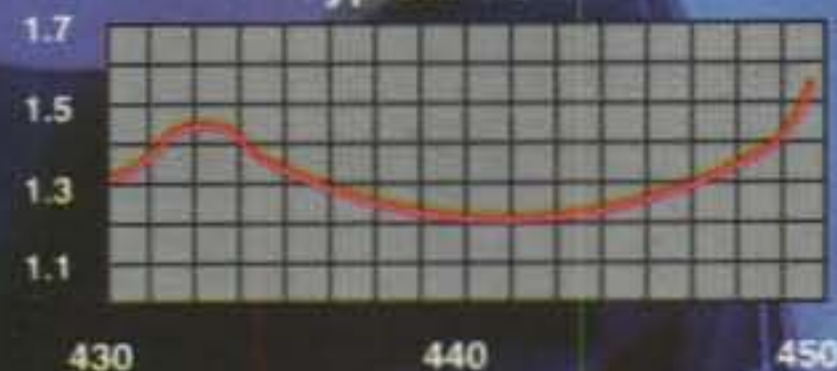
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IF and Detector Stage

Most 6 meter DX activity is between 50.100 and 50.150 MHz. Both CW and SSB signals use this DX window. Many signals are submicrovolt, and it is essential that the IF-stage pass-band be small to keep the signal-to-noise ratio high. For CW, the IF-stage filter, FL2, is 500 Hz. For SSB, the second filter, FL1, is 2.4 kHz. You could simply route the IF-stage signal to a front-panel toggle switch, or as in this design, you can use diode switching. The advantage of diode switching is it keeps signals inside the IF area; the added diode switch parts are a disadvantage. There is certainly nothing wrong with routing the IF-stage signal to the panel, and for some builders this might be preferable. However, the diode switch gives the builder a little more flexibility in mechanical arrangement and adds a certain "elegance" to the design.

Fig. 2 shows that the AGC-controlled amplifier, U3, follows a "tailored" BJT amplifier, Q2. This BJT amplifier has an input resistance matching the crystal filter and an output resistance matching the IF amplifier input. The IF-amplifier gain, U3, is low to reduce unwanted oscillation. Used this way, the amplifiers act as a large control valve set to limit IF-stage gain and respond to high signal levels with a proportional gain reduction.

Another active mixer, U4, acts as a product detector. The output signal passes through a full-wave LC low-pass filter. The input lumped capacitance acts as a dead short to image signals while the filter rolls detected audio off at about 3 kHz.

Audio and AGC

Fig. 3 shows the audio system. It starts with a simple op-amp stage the input resistance of which is the audio filter load. You can see in the pass-band sketch near U5 that the audio rolls off at about 2.7 kHz and needs no additional processing for SSB reception.

The audio couples to a SSB/CW selector switch and to a narrow-band CW filter. For most CW contacts you'll find the 2.7 kHz audio width is just fine, because the pass-band is reasonably narrow and free of most noise. Because station density on 6 meters is low, it's rarely necessary to use the added two-stage 300 Hz CW filter; however, there are certain E-skip and scatter conditions during which you will find it essential—essential not because of station interference, but because you get the advantage of improved signal-to-noise from a smaller audio bandwidth.

The audio amplifier in fig. 3 is reasonably strong. External parts keep its gain low, because the audio level is already high when it reaches this amplifier. At 12

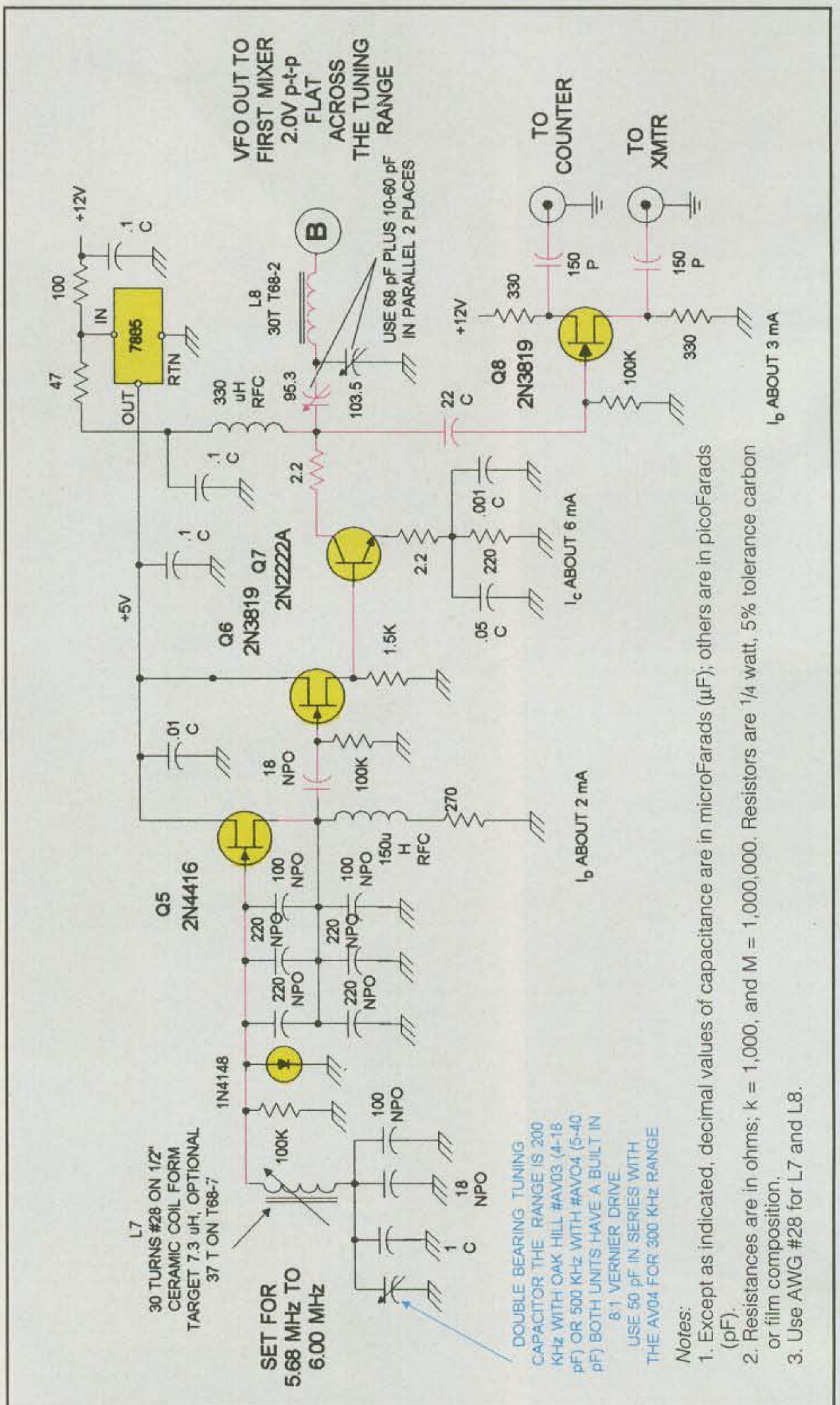


Fig. 5—Schematic diagram of the VFO.

volts the speaker power exceeds 1 watt.

Fig. 4 shows an audio-derived AGC scheme. This circuit, described in several journals, works well under most conditions. However, when you're working CW and background scatter chops any high-speed code, the advantage of an RF-stage attenuator becomes apparent. I favor using a combination of RF- and IF-

stage gain for most CW operation instead of AGC control.

Oscillators

There are three oscillators in the receiver, a tunable VFO, an HFO, and a selectable BFO. All three contribute to receiver

(Continued on page 130)

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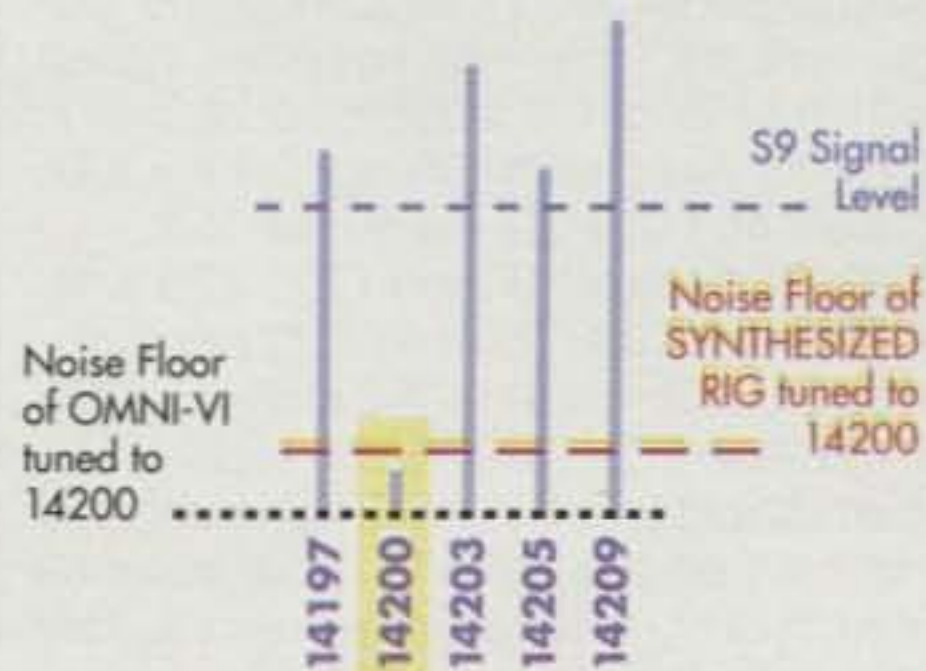
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Between your tower and your beam is a part of your antenna system as frequently ignored and underrated as your coax. Just how strong and durable is the mast supporting your beam?

A Layman's Guide To Mast Material

BY TOM TAORMINA*, K5RC

Several years ago Sid, K5XI, challenged me to help him build a contest and DX "Super-Station." His requirements were clear: Build a station that was world class and would require very little maintenance for at least ten years. On the surface that seemed like a simple matter of good engineering and selection of the best available materials. In fact, it turned out to be a year-long quest to find suitable antenna system components and an education in "design for survival." You see, I am part of the pragmatic generation of amateurs who had accepted the fact that you make do with what you can find, you improvise, you adapt, and you fix it when it breaks. My Elmer, Sam Harris, W1FZJ, was given credit for coining the motto "If it stayed up last winter, it wasn't big enough." Armed with 30 years of "making do," I found that designing for reliability was alien to me, and the availability of truly rugged antenna system components was just about non-existent.

At one of our design strategy meetings the subject of mast material was raised. My programmed response was to take a drive to one of the oil-field surplus dealers and find something in the scrap pile that looked like it would do the job. Sid suggested that I do a little more research. That led me to an article written by Stan Griffiths, W7NI, in an issue of *The National Contest Journal*.¹ Egad, did Sid really want me to clean the dust off my scientific calculator and solve equations? He did, I did, and it scared me into reality. I programmed the formulas into a spread-sheet so that I could plug in various antennas at various heights and quickly determine the necessary yield strength required for each scenario. Here are a few examples of my reality check.

First, the strongest mast material advertised by amateur suppliers is 2" x 1/4" wall 1026 Cold Drawn Steel rated at 87,000 PSI yield strength (yield strength is defined as the point to which the mast will deflect and not return to its original shape). If you placed a Hy-Gain TH7DX (9.4 ft.²) one foot above the tower top, on a 2" x 1/4" wall mast, at the advertised wind survival speed of the antenna (100 mph), the mast would only need to have a yield strength of about 16,000 PSI. Move that same antenna up to ten feet above the top of the tower, and the

Antenna(s)	Mast Height Above Tower	Material	Yield
VHF, Small HF	1 ft.	6061-T6 Aluminum	40,000 PSI
VHF, Small HF	5 ft.	1026 Cold Drawn Steel	72,000 PSI
Medium HF, VHF	8 ft.	1026 CDS Heat Treated	85,000 PSI
Large HF, VHF Stack	10 ft.	4130 CDS Chrome moly	110,000 PSI
Big HF, VHF Stacks	15 ft.	4130 CDS Chrome moly	120,000 PSI

Table I—Mast material shopping list.

mast yield strength would have to be over 91,000 PSI! Step up to a TH11DX (12.5 ft.²) and the yield strength at ten feet increases to a whopping 119,000 PSI, well beyond any mast material commonly available. At K5XI we wanted to mount a 5-element 20 meter beam (13 ft.²) at 15 feet above the tower. It would have required a 2" x 1/4" wall mast with 189,000 PSI, which doesn't exist!

Over the years, how many of us have "gotten away" with stacking a tribander and a shorty-forty on a piece of water pipe, or conduit, or aluminum mast? How many of us have had to suffer the headache and danger of taking down an array with a bent mast? Let's look at the alternatives for mast material.

The most common mast material is schedule 40 water pipe. It's cheap and it's available at the corner hardware store. Water pipe of 1 3/4" diameter is close to 2 inch OD, so it is convenient for most antennas and rotators. Before you drive to the hardware store, remember this about water pipe. It was designed to carry liquids and gasses. **You will never see any published structural data on water pipe because it was not meant to be used to support anything!** Other conveniently available products include EMT electrical conduit (which was meant to be bent!), TV antenna mast, and schedule 40 PVC plastic pipe. Again, none of these was designed to hold up an amateur radio antenna. They have their place in small VHF arrays (PVC pipe works well for horizontally stacking VHF antennas), but they will fail as supports for larger antennas.

The next magnet that attracts many of us is aluminum tubing. It makes dandy antennas, it's light, it's flexible, and it doesn't rust, but it has its limitations as mast material. In a follow-up article² W7NI explored the relative merits of aluminum mast and came up with some clear conclusions. The most popular (and available) aluminum tubing is 6061-T6. It has a yield strength of

40,000 PSI. To continue the example we started with, if you can safely place a TH7DX 9 feet above the tower on 2" x 1/4" wall steel tubing, the same size aluminum tubing can only safely support a TH7DX 4 feet above the tower. If you increase the wall thickness of the aluminum to match the strength of steel, the price of the aluminum essentially triples, and the weight difference becomes minimal. If you go to a stronger alloy of aluminum, such as 7075-T6, the price of the aluminum goes up to nearly ten times that of the steel.

Table I is a handy shopping list for mast material. The last choice on the list, but the first choice in mast material, should be 4130 Chrome moly steel. It is heavy (6 1/2 lbs. per foot for 3/8 inch wall), but it will safely hold up just about any commercial HF antenna at 10 to 15 feet above the top of the tower. It also lends itself nicely to stacking HF and large VHF arrays. Surprisingly, it is very cost competitive with 1026 steel and much less expensive than high-strength aluminum. The problem is that it is not generally available in small quantities.

Surfing the amateur magazines and catalogs, here are some relative prices, based on a 10 foot length of mast material.

6061-T6 Aluminum tubing, 2 inch OD, .250 wall, 40,000 PSI—\$4.50 per foot.

1026 CDS Steel, 2 inch OD, .250 wall, galvanized, 87,000 PSI—\$12.90 per foot.

4130 CDS Chrome moly, 2 inch OD, .375 wall, 120,000 PSI—\$13.75 per foot.

Mast should be a lifetime investment, and it shouldn't be the "fuse" in your antenna system. A bent mast can be extremely dangerous to take down.

Footnotes

1. *National Contest Journal*, Vol. 20 No. 1, January/February 1992 (reprint).

2. "Selecting Mast Material," *National Contest Journal*, Vol. 21 No. 2, March/April 1993.

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The MXM TXR-XX QRP Transceiver Kit

BY DOUG DeMAW*, W1FB/8

The increasing popularity of "getting back to the basics" in amateur radio has spawned thousands and thousands of QRP enthusiasts in recent years, and the movement is growing at an exponential rate as the price of commercially produced QRO equipment rises. A 2 or 5 watt CW transceiver or trans-receiver can be an effective tool for ragchewing or DXing if used with an efficient antenna and a modicum of operating skill. A number of QRP kits have appeared on the market in the past two decades, but some of them vanished from the scene only months after appearing. Poor design and inferior performance plagued some of the products that failed. Other low-power rigs became more sophisticated as succeeding models were developed, and the price tag soared accordingly. Bruce Williams, WA6IVC, of Smithville, Texas, recognized the need for a high-performance, modestly priced QRP transceiver kit that avoided the unnecessary gee-gaws found in some of the more costly QRP rigs being sold. He began to market bare-bones CW transceiver kits for 80, 40, 30, or 20 meters, and his MXM Industries products have been well accepted.

Receiver Highlights

I built and tested the 40 meter version of the MXM TXR-XX. It is a full-blown transceiver with both the receiver and transmitter controlled by a single internal VFO. The receiver is a double-conversion type that has a 4 MHz first IF and a 455 kHz second IF. An effective 4-pole crystal ladder filter (4 MHz) provides two orders of selectivity, depending upon the capacitors installed in the filter section. I opted for the narrow bandwidth,

* P.O. Box 250, Luther, MI 49656



The assembled MXM TXR-XX QRP Transceiver kit.

which appears to be approximately 250 Hz at the 3 dB points on the response curve.

The overall circuit contains four NE602 mixer/oscillator ICs, one MC3340 IF amplifier, and one LM380 audio power IC. There are seven discrete transistors and six diodes. A second IF filter (ceramic) is used at 455 kHz. Two 78L05 voltage regulators are used also.

The receiver has no S meter or AGC circuit. The overall receiver gain is controlled by a 50k-ohm pot that changes the gain of the IF amplifier. Frequency coverage, by means of a vernier type of tuning capacitor (supplied with the kit), is from 7.0 to 7.115 MHz. A half-wave, low-pass filter serves as a fixed-tuned front-end resonator for the receiver. It becomes the output filter for the transmitter during TRANSMIT. The circuit contains trimmer capacitors (two) for setting the BFO for the desired beat note and for establishing the desired frequency offset during TRANSMIT.

Transmitter Features

Full QSK is provided with the MXM transmitter circuit. A pair of 2N2222 transistors is used as the basis of a TR switch that allows instant break-in. This circuit switches the antenna and half-wave filter back and forth between the transmitter output and receiver input ports. This action is aided by two gating diodes. Back-to-back diodes are used at the receiver input terminal to offer RF protection during TRANSMIT.

Signal energy is routed from the NE602 transmitting mixer to cascaded (two) 2N2222s that function as untuned broadband amplifiers. The 2N2222 driver is coupled to the class C final amplifier (2SC799) via a broadband transformer. The collector



View of the rear panel of the transceiver. The offset control is for setting the BFO for the desired beat frequency tone. The front and rear panel paste-ons were computer-generated and printed on poster board with a laser printer.

of the PA stage is protected from high SWR and DC voltage spikes by means of a Zener diode that is bridged from collector to ground. The transmitter output power into a 50 ohm load is rated at 2 to 3 watts.

There is no sidetone oscillator included in the transceiver circuit. However, the receiver muting jumper wire can be omitted to allow direct monitoring of the transmitted signal by the receiver. This wire connects between two PC-board terminals that are marked "KK."

Physical Details

The kit is supplied with a quality PC board that contains silk-screened parts ID labels on the component side of the board. The main tuning capacitor and BFO adjustment air trimmer come with the kit, as does a raw aluminum, undrilled Minibox cabinet (2 1/2"H x 6 1/2"W x 5 1/2"D). The outside-view photos show the arrangement I used for the front and rear panels. White poster board was used to contain the computer-generated labels. The completed cardboard panels were sprayed with two coats of clear Krylon before affixing them to the Minibox with contact cement. The 0-150 tuning dial was drafted at 3x scale, then reduced on a copy machine to the size of my dial plate. The dial face was transferred to poster board while using a copy machine. It was then pasted to the circular aluminum plate that is attached to the tuning capacitor shaft. A 3/4 inch circular window serves as the viewing hole for the dial numbers.

The builder must provide his or her own panel hardware, including the 50k-ohm IF gain control. Required are a speaker jack, key jack, antenna jack and a +12 V jack or terminals.

My cabinet (see photo) was cleaned with rubbing alcohol and spray painted with two coats of gray automotive primer. This was followed with two spray coatings of Deft brand semi-gloss clear lacquer. Four adhesive-backed rubber feet (supplied with kit) are attached to the bottom of the box.

Assembly and Checkout

Assembly time will depend upon the skill and experience of the constructor. My PC board was stuffed and ready for testing after three hours with the 30 W pencil iron. The cabinet and tuning dial work took nearly a day to complete. The assembly instructions are easy to follow, but the tune-up data could be made clearer. I had to read that section of the manual two or three times before I was certain about how to proceed with final adjustments.

A scope and a signal generator need not be used to align the transceiver, but I found them quite helpful. A frequency counter is required for on-the-nose adjustments of two of the circuits.

Alignment and checkout can be done section by section as the circuit board is stuffed. The manual explains how to determine if the various circuits are functioning correctly before moving on to the next stage of circuit assembly. I recommend that this procedure be followed, especially by inexperienced builders.

Performance Characteristics

The receiver is very sensitive. A 0.15 microvolt signal from a generator is plainly audible in the earphones with the IF gain set at midrange. A 1 microvolt signal fully quiets the receiver background noise.

The IF filters function smoothly and no ringing was detected, even on very loud signals. However, the audio output into an 8 ohm speaker becomes a bit "grubby" with distortion at high settings of the IF gain control. This is fairly typical of the LM380 performance. The audio is clean at normal listening levels, especially when using headphones.

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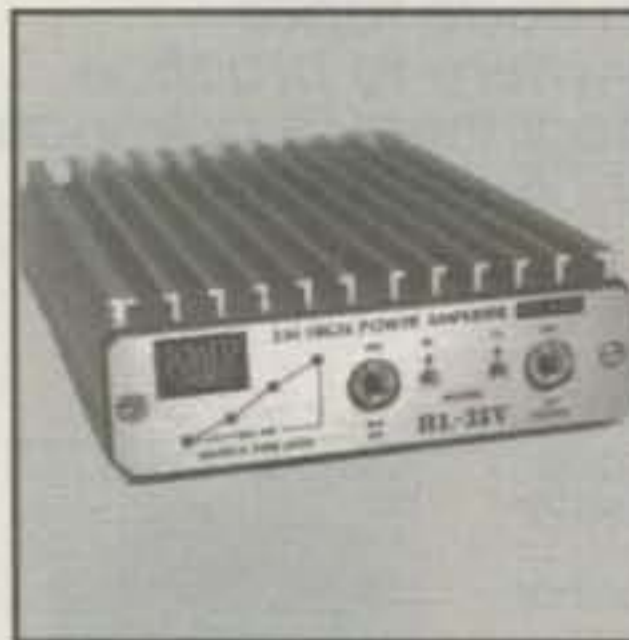
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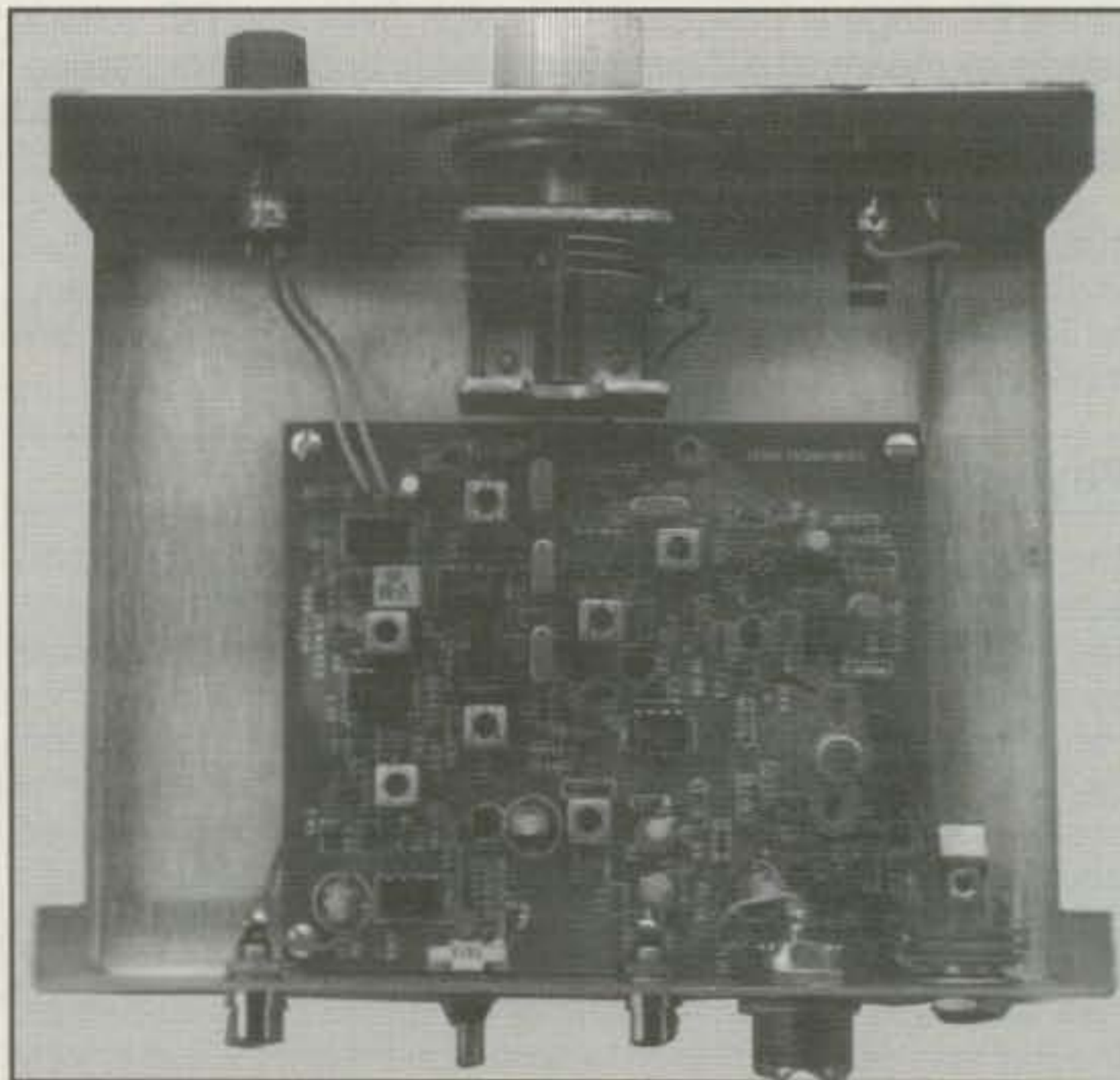
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Interior view of the assembled QRP transceiver. The PC board is mounted on metal standoff posts. The layout seen here was chosen to minimize the length of the leads that go from the PC board to the front and rear panels.

The CW note proved to be free of chirp¹ and clicks, and there were no detectable pops or clicks in the receiver output during the muting cycles on TRANSMIT.

The transmitter output power (a clean sine wave) into a 50 ohm load is 2.5 watts at +12 V and 3 watts output at +13.5 V. Key-down transceiver DC current is 340 mA. During no-signal receive periods current drain is 40 mA. These two numbers are essentially the same at 12 or 13.5 V.

Several QSOs resulted from a two-hour exercise with the QRP transceiver during the late afternoon of November 5. The antenna was a 160 meter inverted V at 70 feet, using tuned feeders. The greatest distance worked was 700 miles and the shortest path was 120 miles. Operation took place from Luther, Michigan on or near 7015 kHz. The signal reports ranged from RST 569 to RST 599.

Closing Comments

Not only does the MXM transceiver provide satisfactory performance, but it was a fun project during assembly and testing. It is small enough to carry on vacations and camping trips, and it can be operated from the standard 12 V vehicle battery for many hours without recharging. Quality components are used throughout the circuit and the longevity of the transceiver should be excellent if it is operated correctly.

The price class for the MXM TXR-XX is \$130 plus \$5 shipping. MXM will service inoperative kits for \$15. For more information about the MXM product line contact Bruce Williams, MXM Industries, Rt. 1, Box 156C, Smithville, TX 78957.

Footnote

1. The CW note may have chirp if T4 is not adjusted correctly. Monitor the signal with a separate receiver and adjust the T4 slug, consistent with maximum transmitter output power, to obtain a chirp-free note. ■

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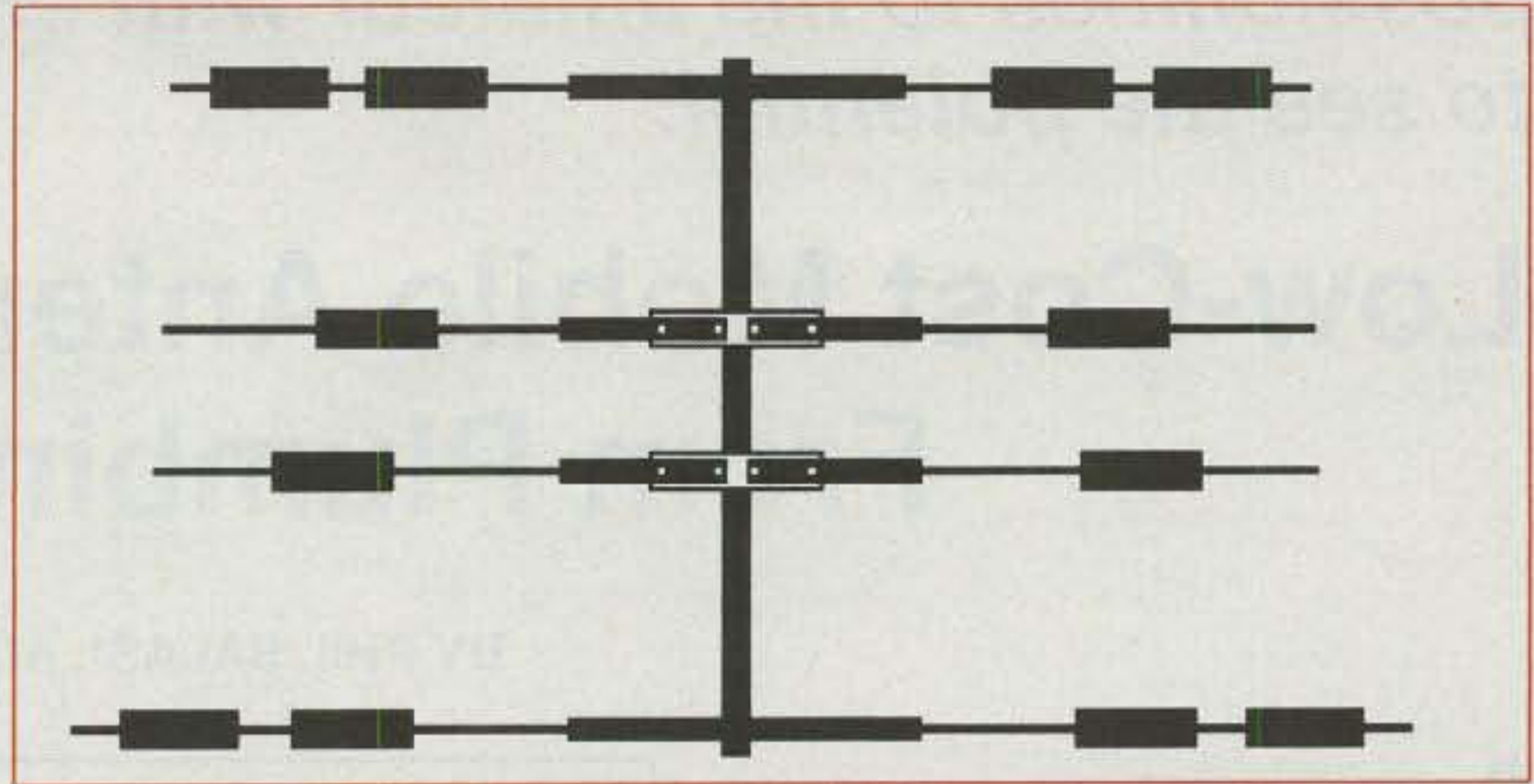
Forward Gain:	
10 Meter	7.9 dbd.
12 Meter	7.1 dbd.
15 Meter	6.9 dbd.
17 Meter	6.7 dbd.
20 Meter	6.5 dbd.
Front-to-Back Ratio:	
10 Meter	16 db.
12 Meter	5 db.
15 Meter	13 db.
17 Meter	12 db.
20 Meter	10 db
Power Rating:	
CW	1.5 KW
SSB	2.5 KW
Matching System: "Q" match	
Recommended coax: (RG-8-U/RG-213) 50/52 ohm	
SWR at resonant frequency: 1.0/1	
Boom Length: 14 ft.	
Turning Radius: 14 ft. 11 in.	
Recommended Mast Size: 2 in.	
Maximum Element Length: 26 ft. 8 in.	
Assembled Weight (approx.): 55 lbs.	
Wind Surface Area (in sq. ft.): 6.7 ft. ²	
Wind Load (EIA standard 80 M.P.H.): 160 lbs.	
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The TA-53-M can also have 30 or 40 meters added to its front Driven element. This 40 meter kit can be added at any time. The kit for 40 is the TA-40-KR. The TA-30-KR adds 30 meters.

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The TA-53-M was designed to give the Ham who would like to have a 3 element beam on "5" bands, but keep the size of the antenna to a minimum.

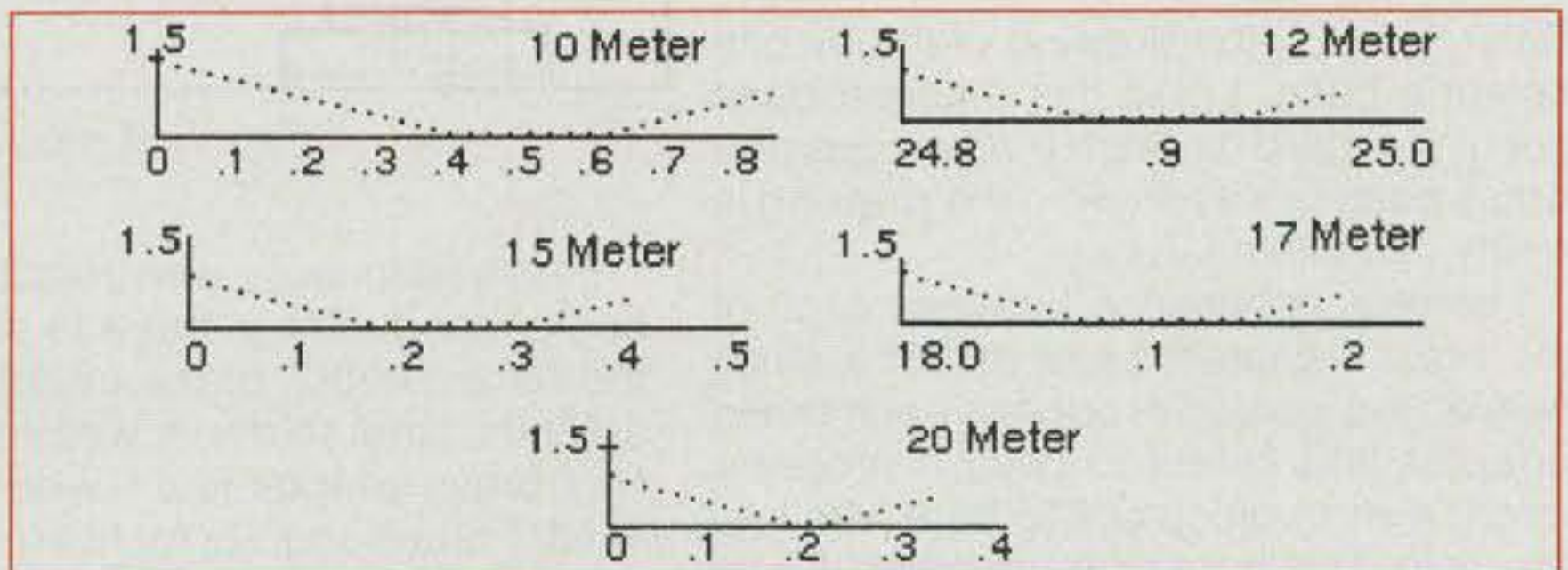
The design criteria was: 1. A single feed line. 2. A very broad band capability, which will work with the new solid state rigs. 3. An antenna that was as compact as possible to justify its use on five bands. 4. To tune it for optimum gain for a "5" band beam on a 14' boom. 5. To minimize the interaction of the close proximity of the various bands. 6. Build it to withstand any above average environments.

We feel this has been accomplished only at the expense of front to back. We considered this to be the least area of importance considering only one director and one reflector spaced over a 14' boom working on five bands.

For the ham that wants a heavy duty all around performer the TA-53-M is for you. It will equal or exceed anyone's 3 element beam on a 14 foot boom in the areas of gain, band width, and construction.

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Low-Cost Mobile Antenna Accessories From Plumbing Parts

BY PHIL SALAS*, AD5X

As has been said repeatedly, "Necessity is the mother of all invention." In my case, I needed to build a simple antenna mount which would easily mount on my Ford Explorer (no holes allowed, since it is really my XYL's Explorer!). This antenna mount would be used to support Hamsticks or a Carolina Bugcatcher, since these are my mobile antennas of choice. Also, I wanted to have a good, simple mount for my Big DK3 antenna, which I planned to mount on my Geo Metro.

From Don Johnson's *40 + 5 Years of HF Mobileering* book (available from World Radio) I learned that a $\frac{1}{8}$ NPT plumbing thread is really a $\frac{3}{8} \times 24$ thread—the "standard" thread for most mobile antennas. The $\frac{1}{8}$ NPT thread is tapered a bit, so you need to chase it with a $\frac{3}{8} \times 24$ tap. This is very easy to do. While poking around in the plumbing section of the hardware store, I also found out that a single-hole SO-239 UHF connector screws nicely into a $\frac{3}{8}$ NPT thread! This information was all it took for me to come up with several different mobile mounts.

The Mobile Mount

Refer to fig. 1, the drawing of the mobile antenna base. I built this antenna base out of standard $1\frac{1}{4}$ inch PVC pieces and brass adapters as shown. The drawing is pretty self-explanatory.

For interconnections between each of the brass adapters I just drilled a small hole on the inside flat edge of each brass adapter and soldered (with a propane torch) a short piece of #16 bare wire into this hole. This bare wire becomes the tie point for interconnections, as it is easy to solder to.

Next screw the brass adapters into the PVC adapters. Screw the UHF single-hole SO-239 connector into the $\frac{3}{8}$ NPT brass adapter. The $\frac{3}{8}$ NPT brass adapter is also tapered slightly, but this is fine for making a tight connection to the SO-239.

*1517 Creekside Drive, Richardson, TX 75081

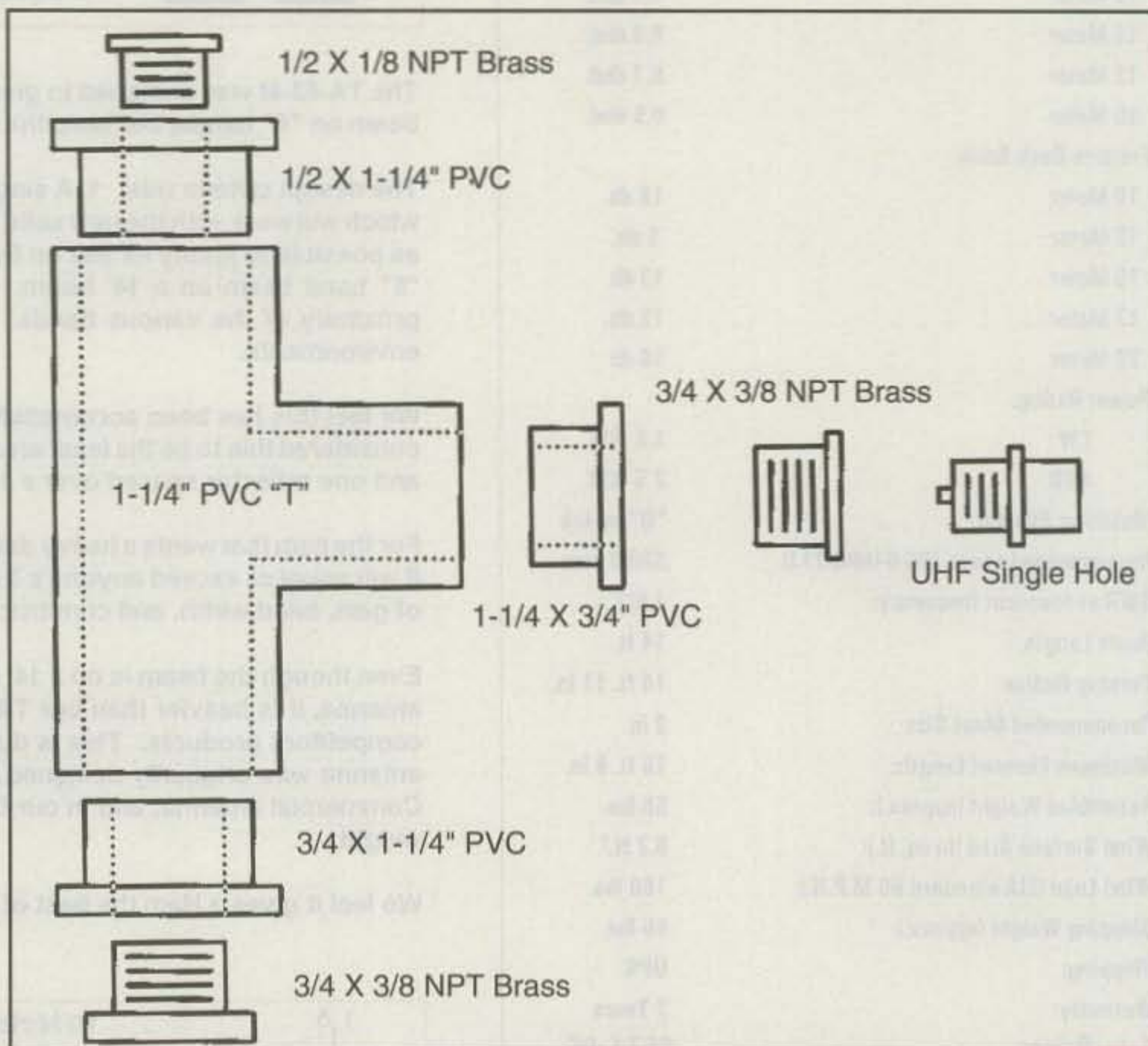


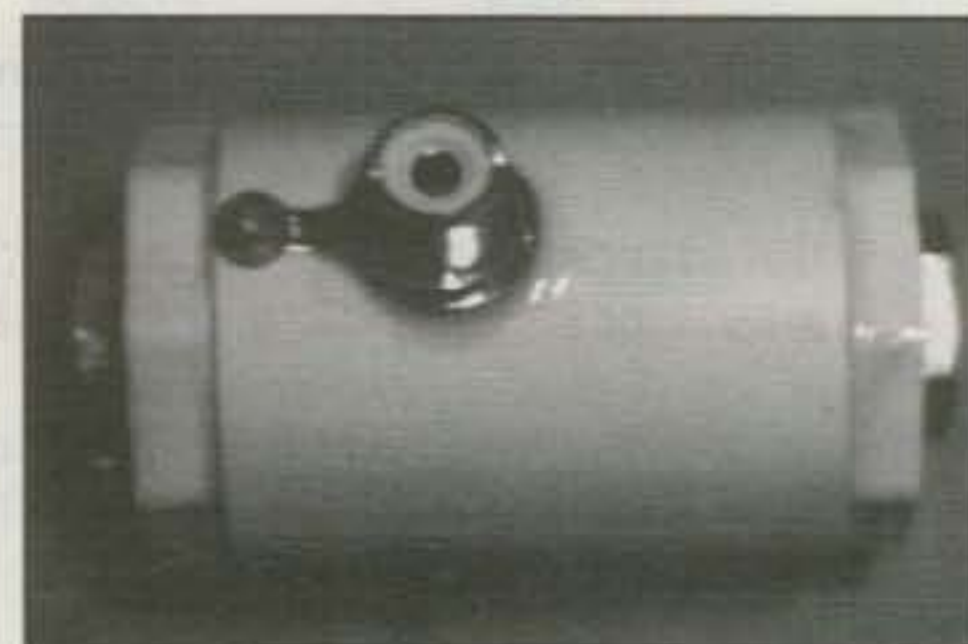
Fig. 1—A mobile antenna base mounting assembly.

Finally, connect a wire from the SO-239 center conductor to the wire soldered to the $\frac{1}{2} \times \frac{1}{8}$ NPT brass adapter for the antenna, and solder a wire from the $\frac{3}{8}$ NPT brass adapter to the wire in the $\frac{3}{4} \times \frac{1}{8}$ NPT brass adapter for the ground connection. This is all you need if your mobile antenna is a pretty good match to 50 ohms (like an Outbacker). However, most "high Q" mobile antennas require some sort of matching to 50 ohms. There are three popular ways you can match your antenna with this mobile mount.

Inductive Matching

This method assumes you make your antenna a little short (capacitive), and so

a shunt inductor to ground will match you to 50 ohms. A popular commercial, low-cost and easy-to-mount shunt inductor is the Lakeview "Inducti-match." *The ARRL Antenna Book* shows you how to build

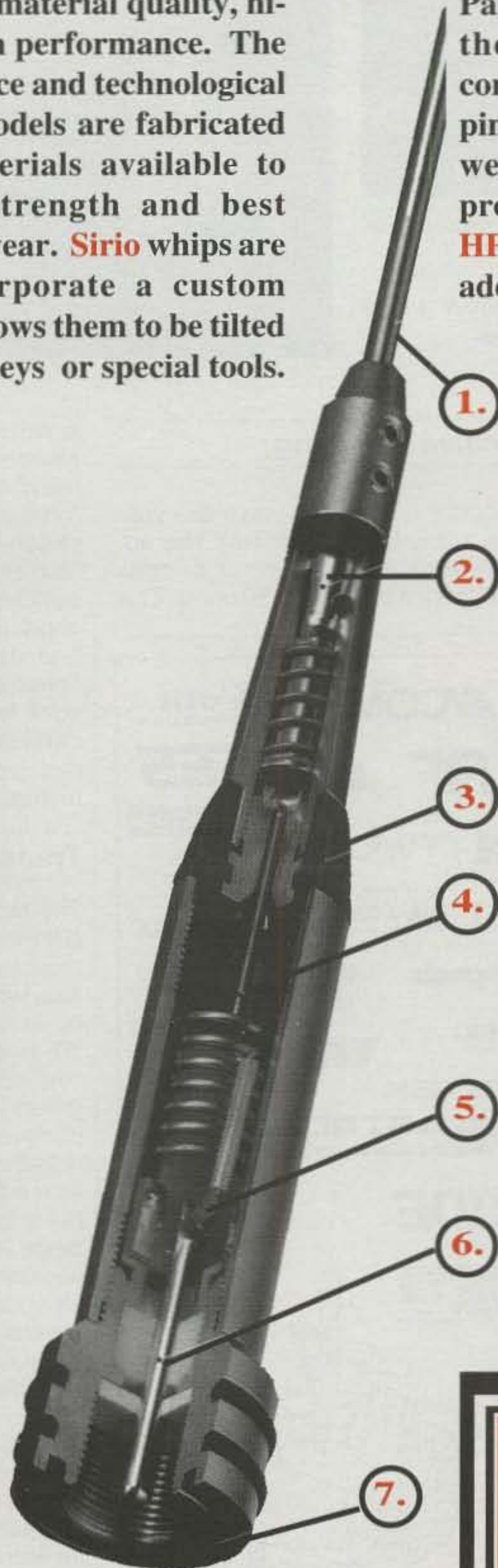
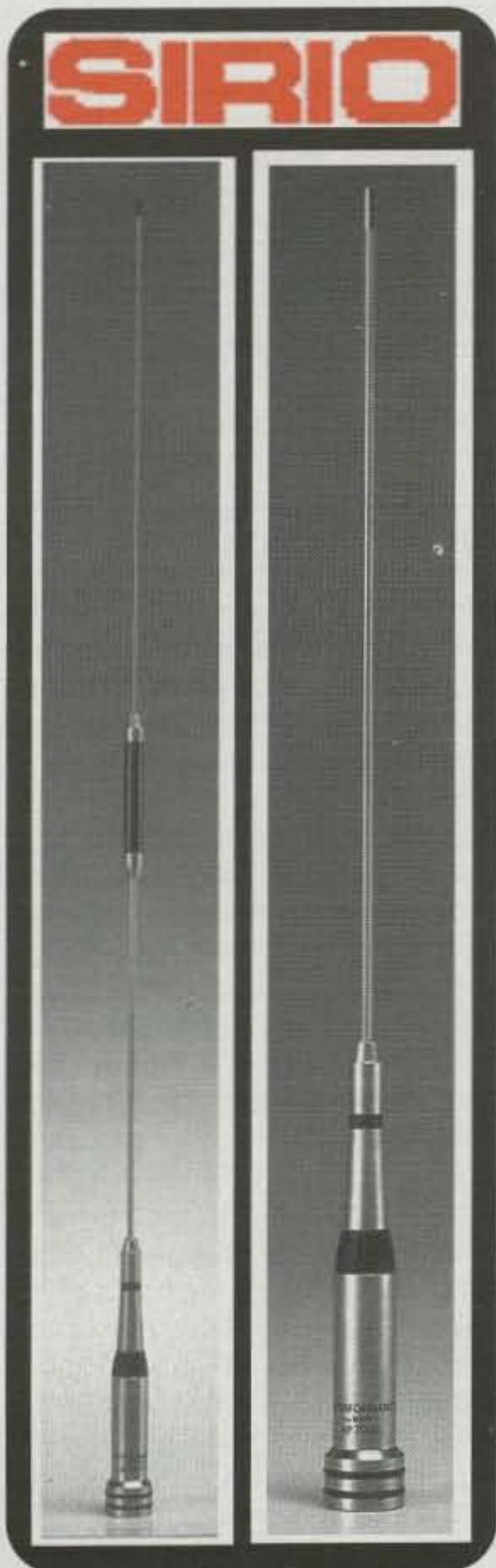


A simple mobile mount as per fig. 2.

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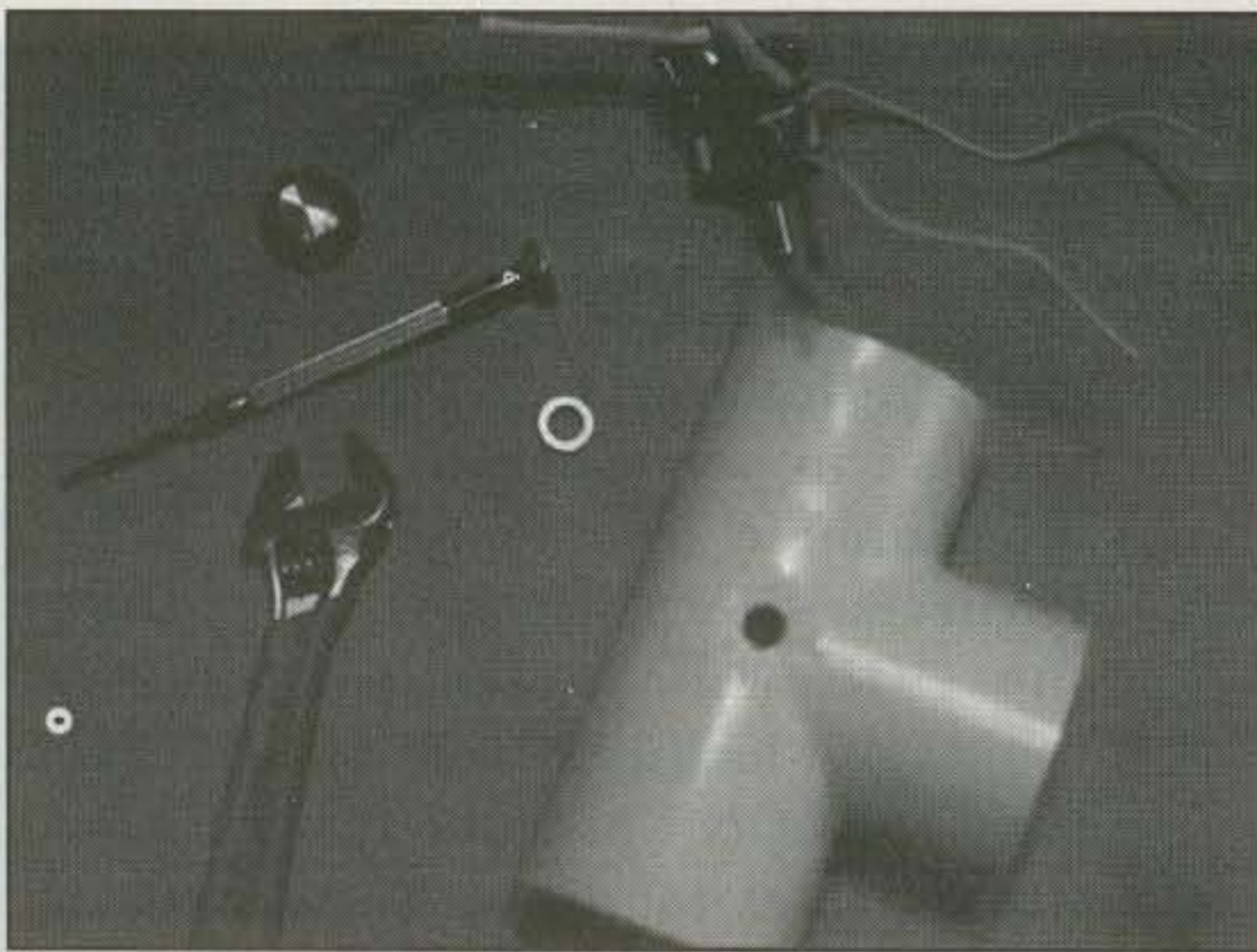


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↑ In this variation a switch/capacitor assembly is readied for internal mounting.

This view shows a mount with an internal transformer and a mount with an external "Inducti-Match." →



your own if you desire. With this method you must find the appropriate taps on the shunt inductor for each band. With inductive matching you can build a simpler antenna mount (fig. 2), since the matching will be external to the mount (see the photograph).

Capacitive Matching

The principle here is that you make your antenna a little long (inductive). The appropriate capacitor to ground at the coax input will then match you to 50 ohms. This

is well covered in *The Radio Amateur's Handbook*, *The ARRL Antenna Book*, and many other places. There is adequate room in our mount for a rotary switch to switch in different capacitors to ground (see the photo). I found a small rotary switch and used it to switch in 0 (no capacitor), 30, 100, 160, 220, 560, 780, and 1200 pF silver mica capacitors. These capacitors should be rated at 500 volts for a 100 watt transceiver. These capacitors permitted me to find a 1:1 SWR match on all frequency bands from 80-10 meters.

Transformer Matching

The radiation resistance of short mobile antennas is very low—i.e., in the few ohms or less category, especially below 20 meters. When you consider that ground losses in a mobile installation are around 10-15 ohms, you can see that the radiation resistance can "get lost" in the ground-loss resistance. Since you deliver power to the combination of radiation resistance and ground-loss resistance where the ground loss resistance is relatively constant and the radiation resistance is a minor portion of the total load, you can assume that the load resistance for your radio is relatively constant over several amateur bands.

For example, assuming 10 ohm ground loss, between 80 and 20 meters the actual load will probably vary from about 10 ohms at 80 meters (radiation resistance is <1 ohm) to around 20 ohms at 20 meters (radiation resistance is between 7 and 16 ohms, depending on base or center loading). If we use a 4:1 broadband transformer at the antenna, you can see we can actually have a pretty good SWR

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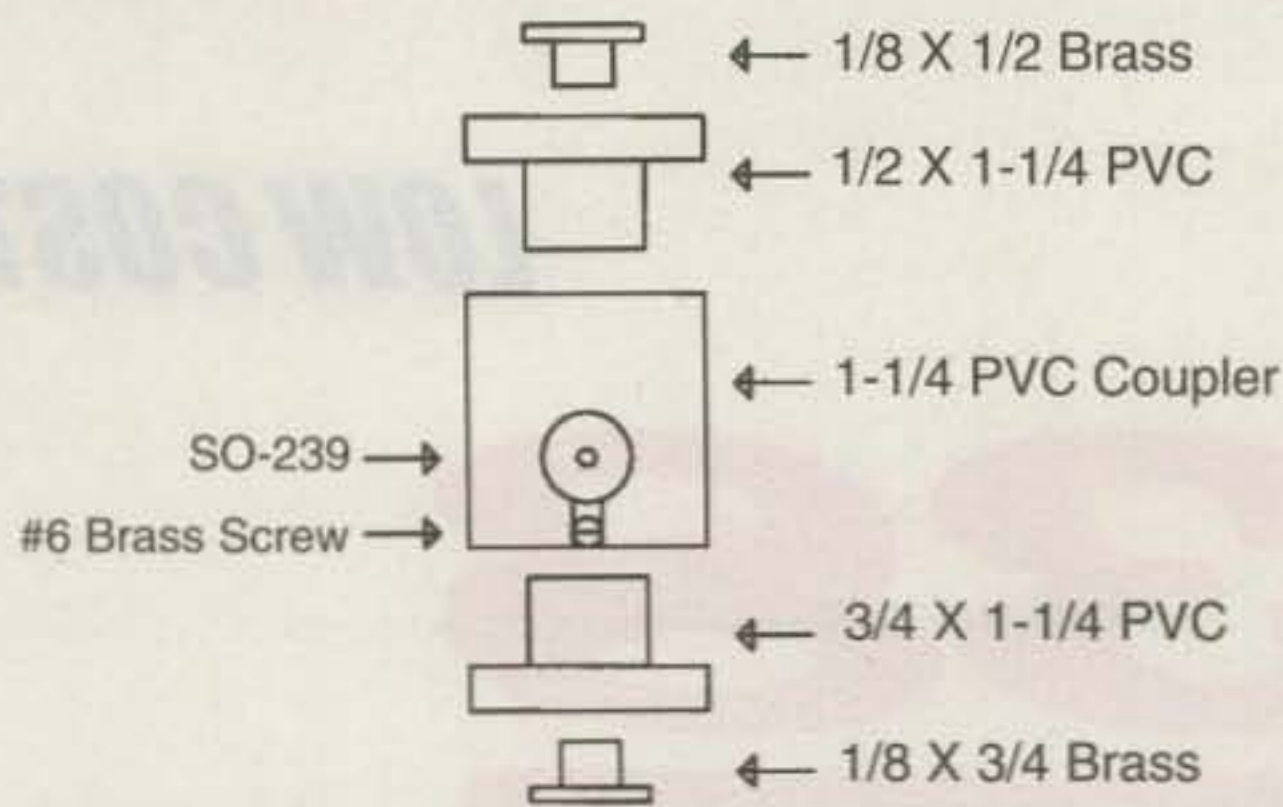


Fig. 2—A simple mobile antenna mount.

from 80–20 meters (40–80 ohms after the transformer, giving a 1.25–1.6 VSWR).

Don Johnson, W6AAQ, has popularized transformer matching for his "Big DK3" mobile antenna (the popular

"screwdriver" antennas). Don's transformer design is less than 4:1, giving a compromise over a broader frequency range. I built this transformer into the "T" antenna mount and found that this design

works very well up through 12 meters with my Big DK3, Hamsticks, and Carolina Bugcatcher.

The transformer consists of 14 bifilar turns of #18 enamel covered wire on a T106-2 (red) powdered iron torroid. The RF output is taken from a tapped point 11 turns from the RF input end. To build this transformer, it is best to use two different colored wires (spray painting one wire is acceptable). You'll need two 24 inch lengths of the wire. Wind them side by side for 14 turns (each wire goes through the torroid 14 times). Solder the end of the green wire to the beginning of the red wire (refer to *The Radio Amateur's Handbook* if you are unsure about how to wind a bifilar transformer). From the red-green soldered connection, count back three turns on the green wire on the outside of the torroid and carefully scrape away the insulation at this point and solder a wire to it. This is your RF output point. The free

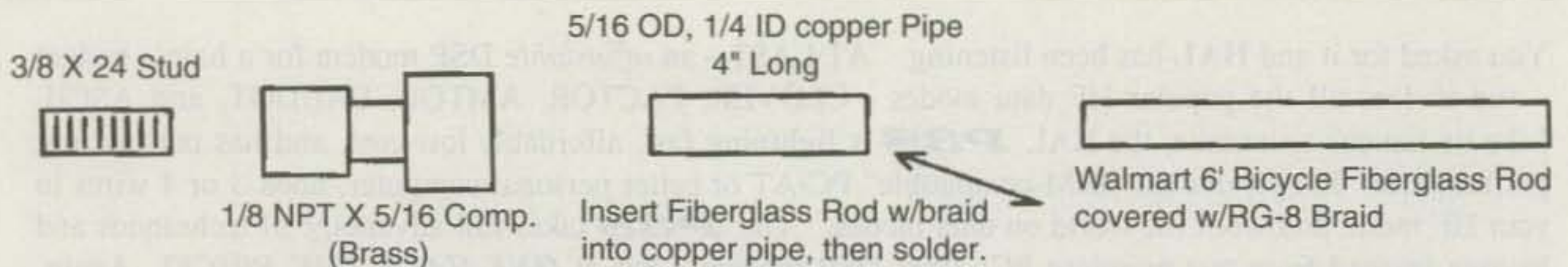


Fig. 3—Components for a 6 foot flexible-top mobile whip.

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PicoPacket Battery pack model with second serial port, 128k, RTC - \$239

PicoPacket/GPS. Same as model directly above plus internal GPS receiver and GPS antenna - \$599

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Extra battery pack - \$45

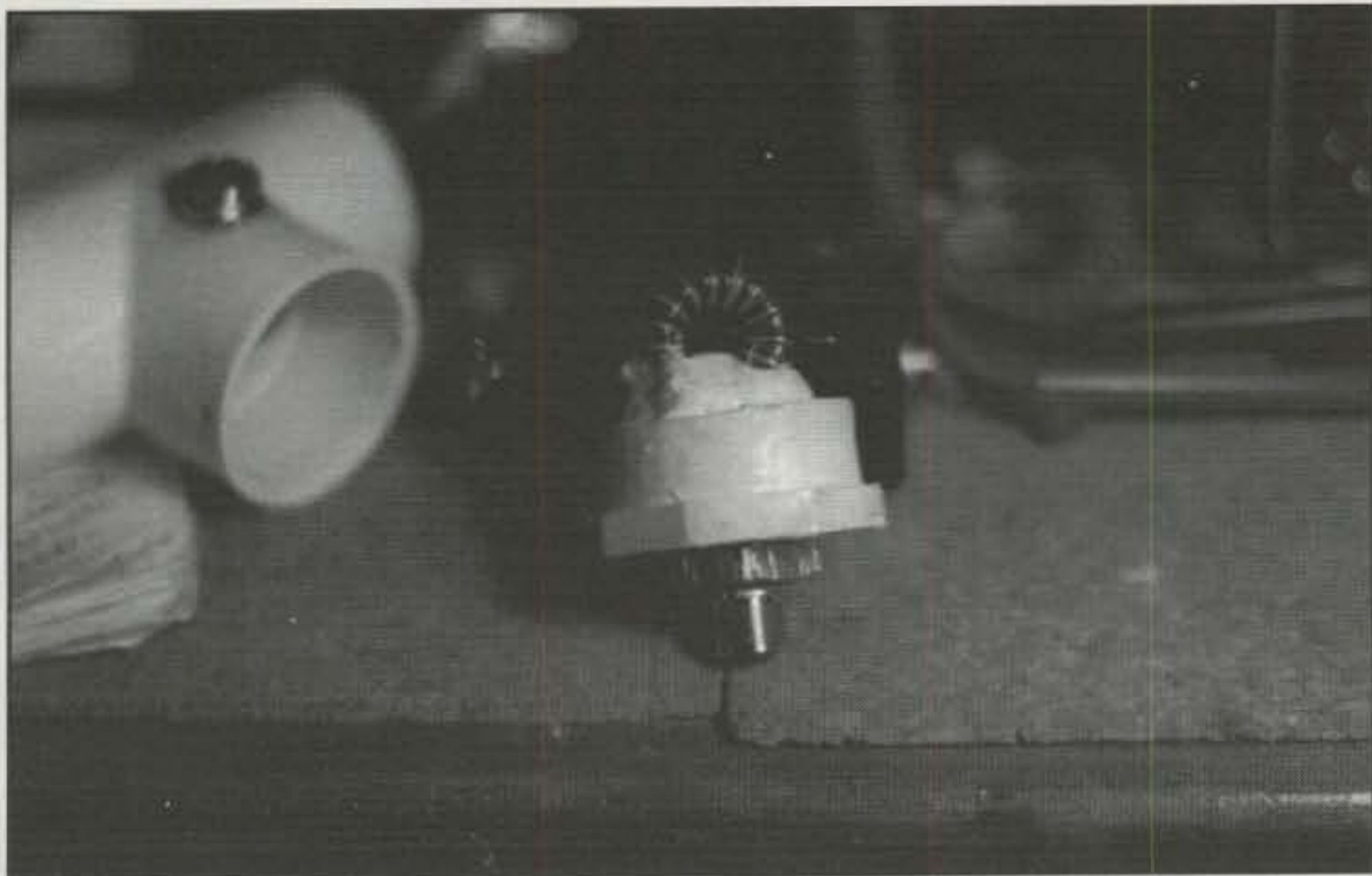
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Here the internal matching transformer is shown attached to the PVC with white silicon rubber. The torroid is described in the text.



The mobile mount for the Big DK3 includes a matching transformer. The additional cables supply power for the motor.

end of the green wire is the RF input, and the free end of the red wire should connect to ground.

I wired this transformer onto the SO-239 connector in the antenna base. For stability I attached the transformer to the PVC with white silicon rubber (use ammonia-, not acetic-acid-based silicon rubber).

Mobile Whip

Finally, how about a flexible and low-loss top whip for your mobile antenna? This

can mount over a center loading coil (like on my Big DK3) or even a base loading coil for short antennas. Most people use a CB-style stainless-steel whip. However, the low radiation resistances of mobile antennas, especially on 40 and 80 meters, seemed to preclude stainless steel because of the added losses. My top whip is easily and inexpensively constructed from a Walmart fiberglass bicycle rod (from a safety flag—around \$3), six feet of RG-8 braid, a short piece of $\frac{5}{16}$ inch OD copper pipe, a $\frac{1}{8}$ NPT $\times \frac{5}{16}$ compression brass adapter, a $\frac{3}{8} \times 24$ bolt, and 6 feet of $\frac{3}{8}$ inch heat shrink tubing.

To build this whip, pull the RG-8 braid over the fiberglass rod and push one end into the copper pipe. Solder the braid to the copper pipe. Insert the copper pipe into the $\frac{5}{16}$ compression fitting and tighten. I also soldered this interface (silver soldered with a propane torch). Screw a $\frac{3}{8} \times 24$ bolt into the $\frac{1}{8}$ NPT end of the brass adapter and tighten securely. Cut off the head of the $\frac{3}{8} \times 24$ bolt and file it as necessary so it will screw into a $\frac{3}{8} \times 24$ mount. Cover the braid-covered fiberglass rod with the $\frac{3}{8}$ inch heatshrink tubing and shrink in place. That's all there is to it. You now have a flexible, low-loss, and low-wind-resistance mobile whip.

Conclusion

Your local hardware store has a wealth of plumbing parts that can lead you to lots of inexpensive mobile antenna accessories. Once you start browsing in the plumbing section, you'll find yourself beginning to design mounts and accessories "on the fly." This article describes accessories I came up with. However, there are probably many more things you can create once you get going. Have fun!

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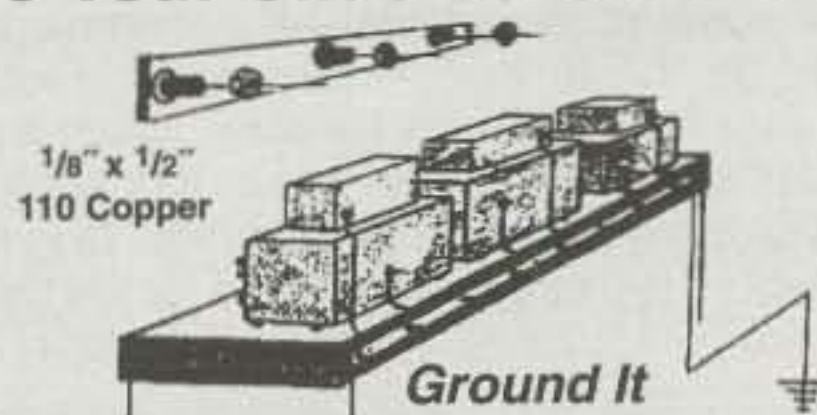
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G4BXD continues his odyssey through British military surplus. While seldom seen on this side of the Atlantic, some of this gear is quite intriguing, innovative, and in some cases still very serviceable for amateur radio use.

Surplus Electronic Gear A British Perspective—Part II

BY BEN NOCK*, G4BXD

Collecting military radios over the years, I have acquired a circle of friends and fellow collectors who show that a real interest in this field of radio communication is truly rewarding. I have many friends abroad (in the USA, Canada, and even Australia), but we all share the same problem—that is, to get hold of any of the other countries' treasures.

The size and weight of most of these sets is such that transportation charges are huge. The larger items of interest, weighing around 100 lbs., can cost anything up to several hundred dollars to ship overseas. Therefore, as the next best thing, written articles such as this at least allow the collector to read about and see the basics of some of the sets, to see inside them, and to learn about how they were used.

Continuing on from my previous article (Part I in the December 1994 issue of *CQ*), I will now cover some of the smaller sets—namely the 18, the 38, the 46, and the 88 sets. All of these sets are small man-pack versions, which were carried into battle by the brave foot soldier. Battery operated and limited in range, they still provided a line of communication for the fighting man.

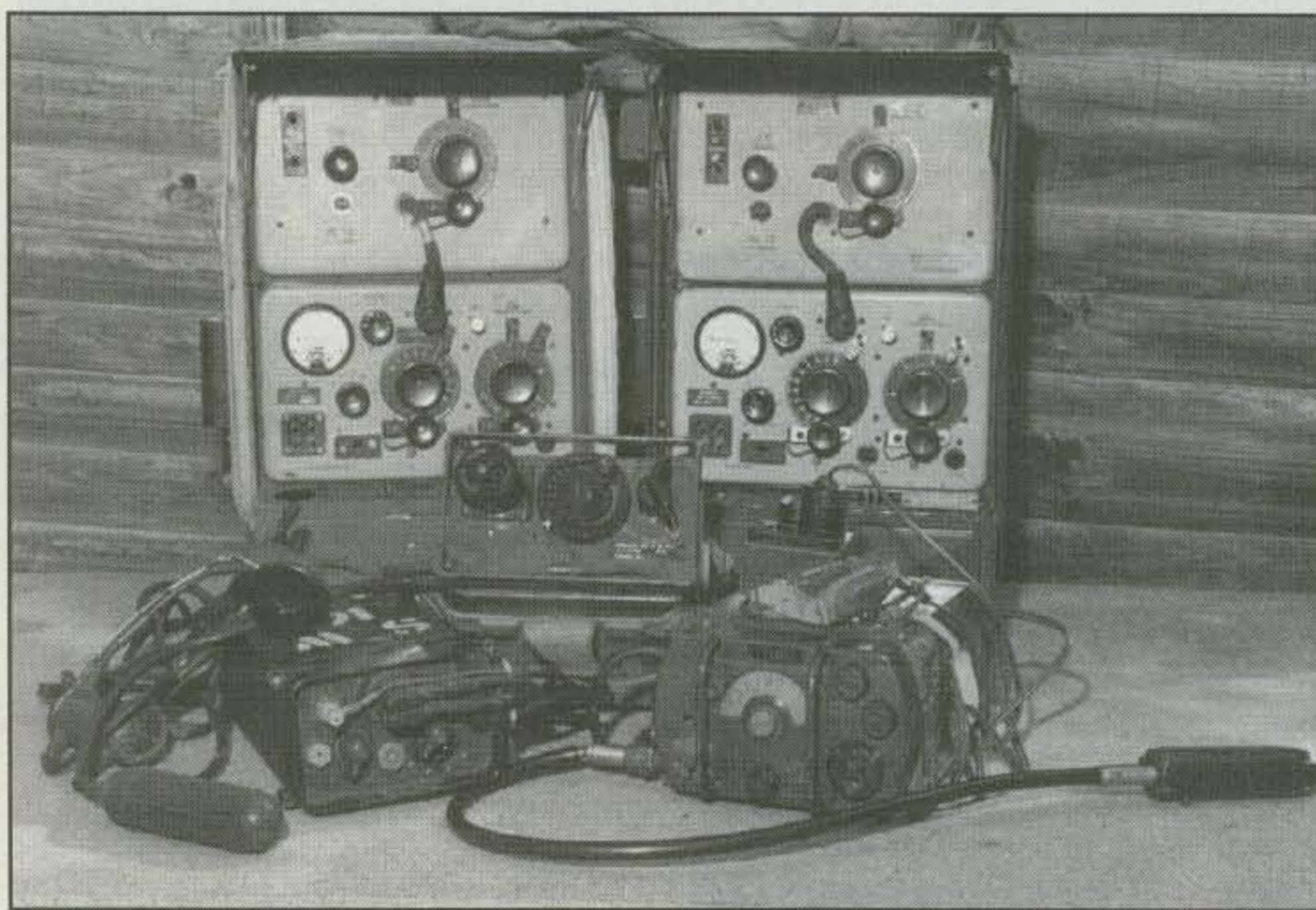
The Wireless Set No. 18

The largest of the sets being covered here, the 18 set provided a means of communication for all three services—Army, Navy, and Air Force. Produced from around 1940 on, over 70,000 were made and used in all the theaters of operation, from the deserts of North Africa to the landings at Arnham.

Designed for short-range infantry work—the Navy used them for coast watching and the RAF on airfields—the set operates from 6 to 9 MHz, AM or CW, and has an output of only 0.25 watt. There are four versions: an Mk 1, 2, and 3, and a T version. The T version is a tropicalized model, and the Mk 1 only ran AM, with no CW provision. The Mk 2 had CW added, and the largest quantity produced was of the Mk 3 variety.

The receiver is a single-conversion super-het employing four tubes. The set has an RF amplifier, a self-oscillating mixer, one stage of IF amplification, and a combined audio detector/AVC detector/AF amp and BFO stage!

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



At the rear of this view are two WS 18 units. The smaller three units shown are (left to right) a WS 88, a WS 38 MK II, and a WS 88 MK III.

The transmitter is a two-tube affair, a master oscillator and a PA stage. AM is by grid modulation, obtained from a carbon microphone via a modulation transformer, and CW is achieved by keying the HV to the PA screen. A front-panel meter allows monitoring of RX and TX filament supplies, the HV supply and current used, and the TX RF voltage, obtained from a coupling loop and rectifier circuit.

A net switch is provided to enable the transmitter to be tuned to the received frequency, a compensating capacitor even being switched in to allow for PA pulling. RX/TX switching is accomplished by switching the filament lines between receiver and transmitter. The microphone has the change-over switch fitted, and on CW a special key and lead are required, which incorporates the change-over switch as well as the key line.

The set is housed with the RX above the TX and with the batteries carried in the bottom of the case. Supplies of 150 VDC, 3 VDC, and 12 VDC grid bias are needed. The case has the antenna connector mounted on the side wall; this employs short rods, which when not in use,

were carried in retaining clips around the sides and rear wall of the set. Folding doors and a canvas cover complete the set's protection with the weight at about 32 lbs.

The sectional rods can be assembled into an 11 ft. whip which gave a quoted range of about 5 miles on AM and 10+ miles on CW. A shorter 6 ft. length could be used, with range then 2 to 5 miles AM and 4 to 10 miles on CW. Other antennas—including a 25 ft. length of wire just thrown on the ground, windoms, and half-wave wires—could be used for various locations.

As the set covers the 40 meter amateur band, a working example could be used on that band to provide a display. Certainly, CW contacts should be quite workable.

The Wireless Set No. 38

The No. 38 set, the production figures of which reached nearly 200,000 sets, was designed for short-range infantry use, which, with the use of a throat microphone, gave the operator a sim-

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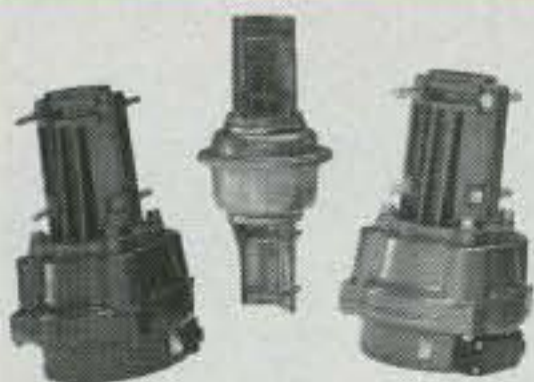
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G-800SDX \$25 OFF	Medium-duty	1 1/2-2 1/2 inches	12 1/2" H x 7 1/2" Dia.	Yes	17 Sq. Ft.
G-1000SDX \$25 OFF	Heavy-duty	1 1/2-2 1/2 inches	12 1/2" H x 7 1/2" Dia.	Yes	23 Sq. Ft.
G-2800SDX \$25 OFF	Extra Heavy-duty	1 7/8-2 1/2 inches	13 5/8" H x 8" Dia.	Yes	34 Sq. Ft.
G-5400B	Azimuth-Elevation Rotator combination	1 1/2-2 1/2 inches (Boom Dia. 1 1/4-1 5/8 in.)	Mounted together 12 1/2" H x 7 1/2" Dia.**	No	11 Sq. Ft.
G-500A	Elevation Only	1 1/2-2 1/2 inches (Boom Dia. 1 1/4-1 5/8 in.)	10 1/2" H x 7 1/2" Dia.	No	12 Sq. Ft.

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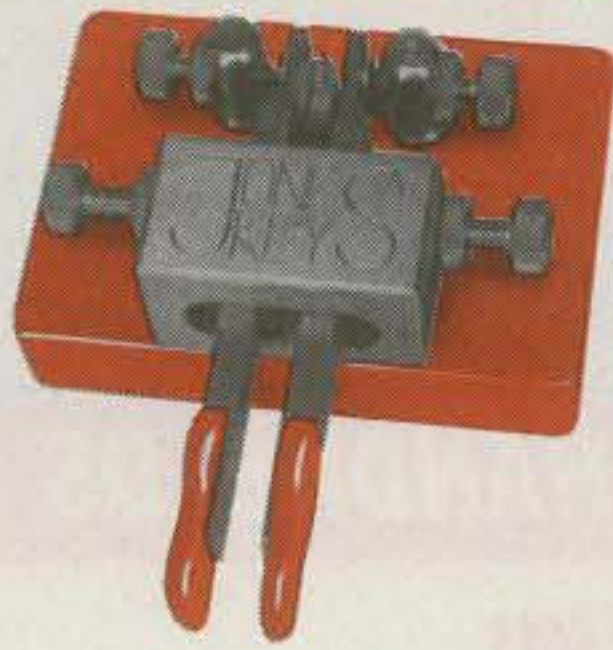
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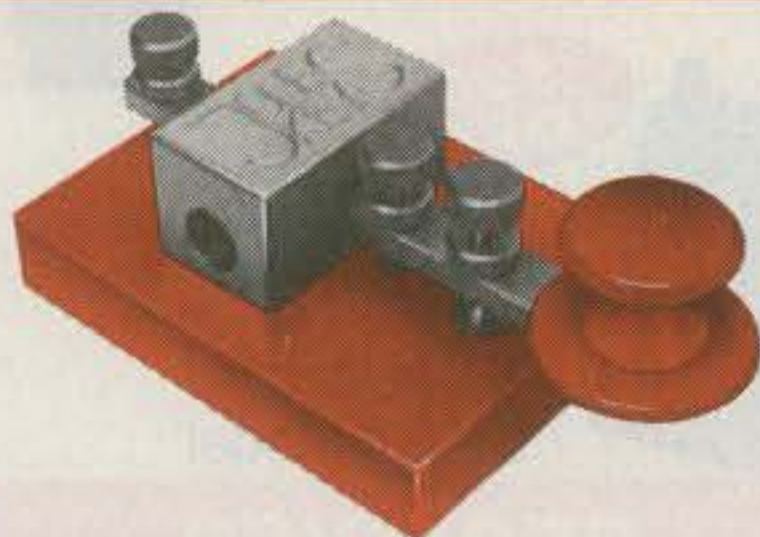
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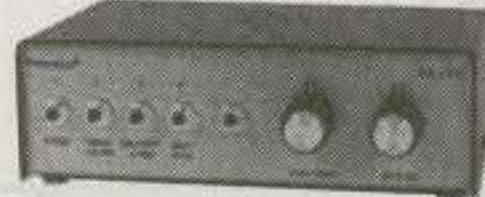
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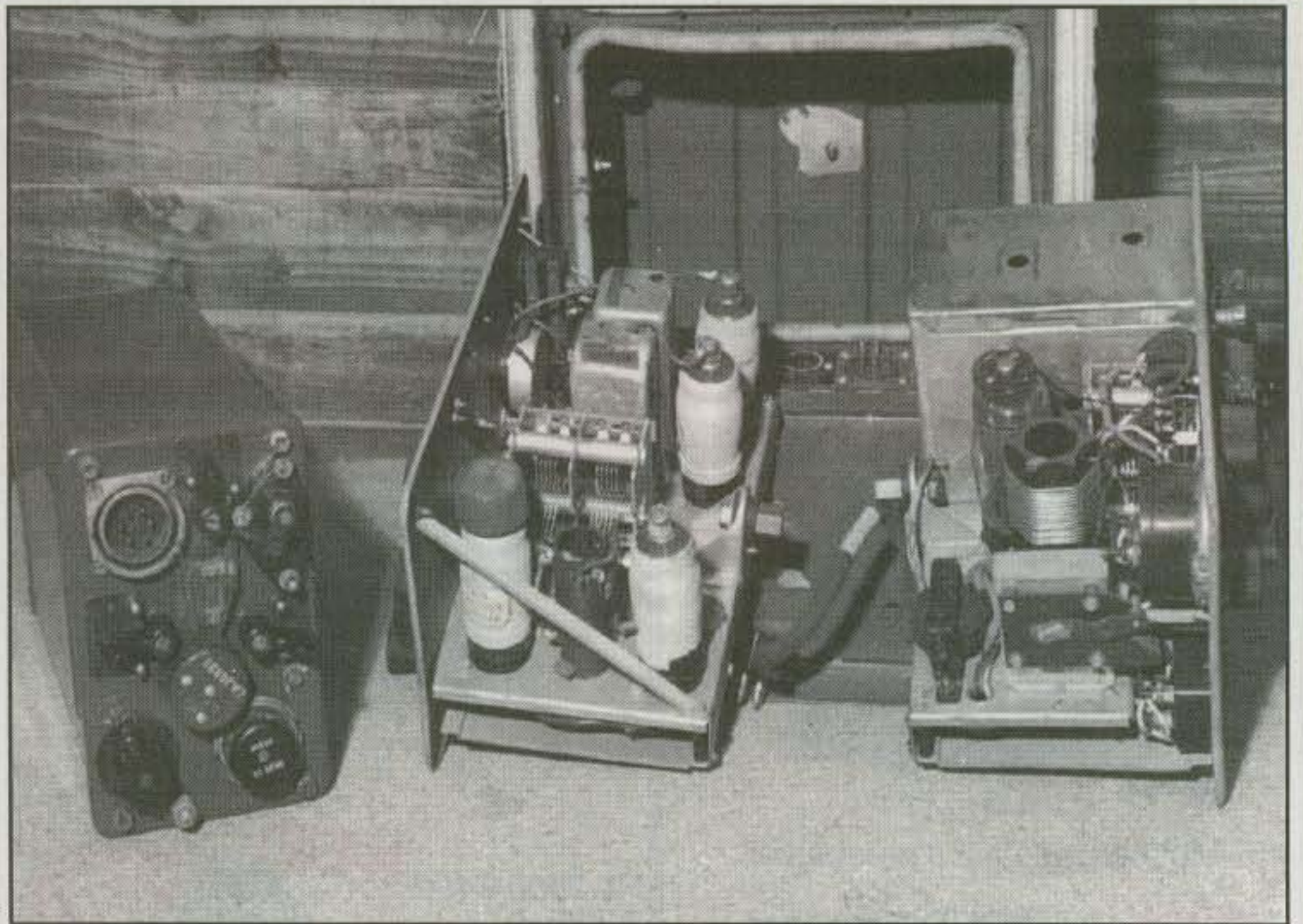


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Interior views of the WS 46 (left rear), WS 38 MK II (center rear), and WS 38 MK III (right). The WS 88 interior is shown in the center.

ple-to-operate, compact, and relatively light-weight transceiver.

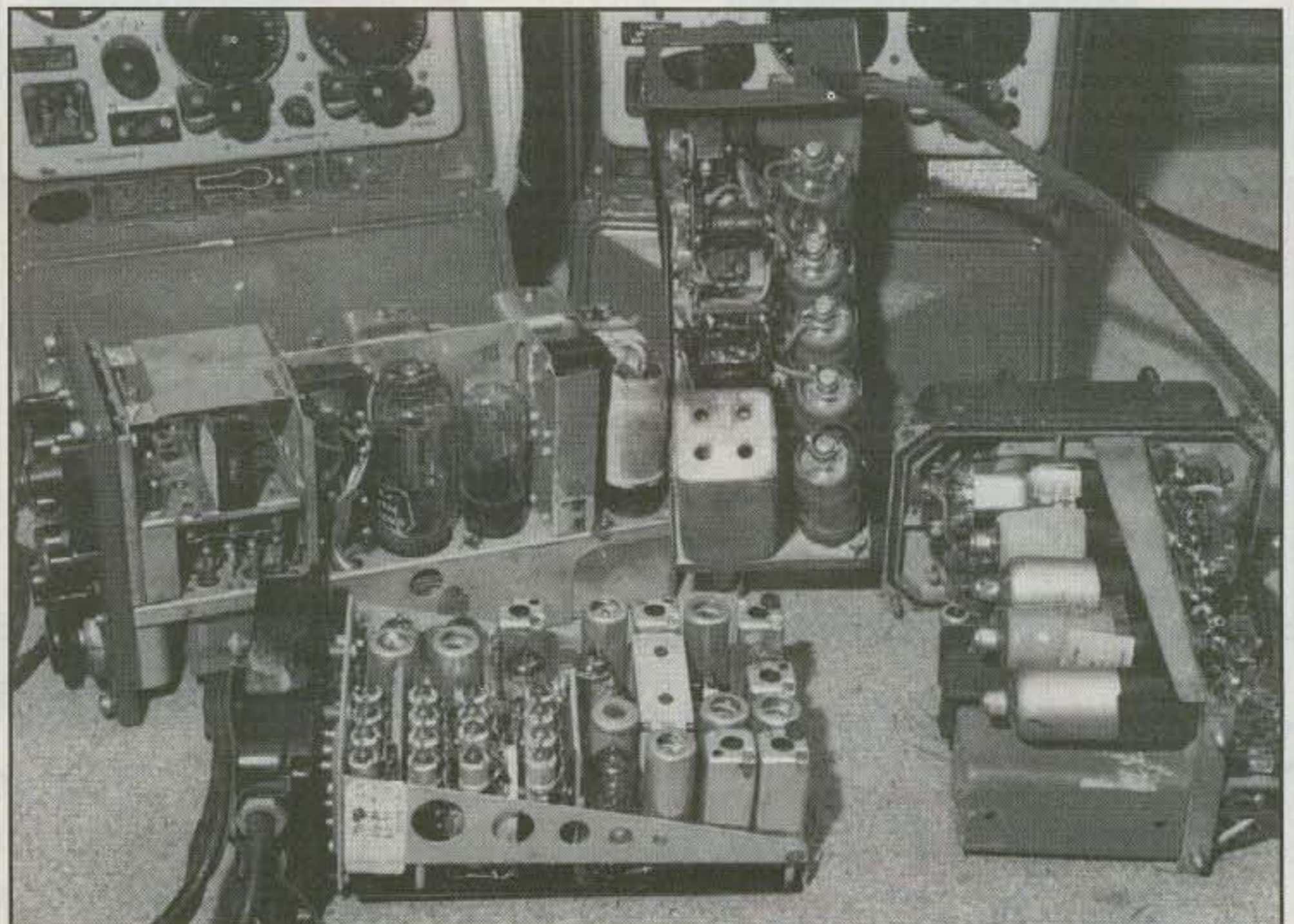
Three versions saw the light of day. The Mk 1 was developed from an experimental model around 1940-41. The Mk 1 and 2 are similar, and the Mk 3 (1944) was tropicalized with improvements in the electronics and mechanical construction. There is also an AFV (Armoured Fighting Vehicle) version that can be tied in with the 19 set and forms a communication link between motorized and foot troops.

This set covers 7.3 to 9 MHz with 200 mw of RF power output. Range is quoted as being

half a mile with a 4 ft. rod antenna or about 2 miles with the larger 12 ft. rod. Power is from a battery, 150 VDC and 3 VDC, and the sets weigh in at 22 lbs. for the Mk 2 and 21 lbs. for the Mk 3.

The set utilizes five tubes; two are common to both RX and TX operation. A master oscillator operates at half the TX frequency, the anode cct being used to double the frequency. This is fed to the PA tube, which is grid modulated by the RX AF amp tube now acting as the modulation amplifier.

On receive, a stage of RF amplification is



Here we see the WS 46 on the left, the interior of the WS 18 receiver in the center, and the interior of the WS 18 transmitter on the right.



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used, and the master oscillator is again used but with a shift in frequency such as when doubled, giving an IF of 285 kHz. A single tube operates as an IF amplifier, and, through the Reflex principle, an AF amplifier at the same time while on receive and as the modulation amp on transmit. A metal rectifier, a "Westector WX6," is used as the audio detector, which meant that the number of different tubes used in the set could be reduced to two.

An eight-pole three-position switch is used as OFF/ON, RX/TX switch, which switches HV and filament circuits but not the antenna. The tuned circuit used for the RF input to the receiver is common to the output circuit of the transmitter. Two input sockets are provided for long and short antenna rods.

The Mk 3 version has an extended ON/OFF, RX/TX switch on a solid "Bowden" cable type lead. While the Mk 1 and 2 were carried on the chest of the operator, the Mk 3 was designed to be carried on the operator's back with the solid cable coming around the operator.

A slight retuning of the set could allow it to

operate within the whole of the 40 meter band, and thus allow the set to be used as a working display.

The Wireless Set No. 46

This remarkable set, designed around 1941, was truly a stepping stone in radio communication under fire. The set can be immersed in water for a short period, is crystal controlled thus reducing the training time for operators, and runs as much as 1 to 1.5 watts on AM. Around 25,000 sets were produced.

Designed for infantry communication during beach landings and the like, the set is simple to operate, as it requires no "netting" onto a controlling station. The set has provision for three crystal channels in four ranges covering 3.6 to 9.1 MHz. The various ranges were selected by replacing a coil pack inside the set along with the crystals for the required channels within that range. Modes of operation are R/T (AM) or MCW only.

Coil Pack Ranges WS No. 46	Coded Color
Range 1 7.9 to 9.1 MHz	Yellow
Range 2 5.0 to 6.0 MHz	Blue
Range 3 6.4 to 7.6 MHz	White
Range 4 3.6 to 4.3 MHz	Red

The receiver is a single conversion superhet with an IF of 1550 kHz. There is no RF amplifier, the tuned antenna signal going straight to the mixer. A three-position crystal-controlled oscillator is used. Two stages of IF amplification are used, and a double diode triode acts as the detector, AVC generator, the AF being amplified by the second IF stage in a reflex circuit. The triode section of this tube is used as the microphone amplifier on transmit.

The transmitter is a single tube operating as a crystal-controlled oscillator/PA output stage. It is plate and screen modulated by the output of a push-pull stage that in turn is driven from the microphone amplifier. The microphone amplifier can be switched to form an audio oscillator of about 1 kHz for use in MCW mode.

The receive oscillator is on the low side of the antenna frequency except for the 3.6 to 4.3 MHz range, where it is on the high side, both by a difference of 1550 kHz of course. The transmit crystal is on the exact frequency required for transmission.

Fixed to the front of the set is a dummy load antenna unit equipped with a bulb, etc., that can be used to test the set's output, modulation depth, and battery condition. The set can use either a 7 ft. 6 inch whip while on the move or a 16 ft. whip from a stationary position. Other antennas—a 25 ft. ground wire, quarter-wave end-fed, etc.—can be used, and a special adapter with built-in series capacitors can be used as well.

The range is very dependent upon terrain and conditions as with all radio communication, but 8 to 10 miles could be expected from this set.

Power supplies are the same as the 18 set: 150, 3, and 12 VDC. The batteries were carried in a separate satchel, with the set's own satchel carrying the antenna rods.

The Wireless Set No. 88

This is the most complex of the sets covered in this article, using 14 tubes to produce an FM transceiver. This set was probably conceived

in the mid 1940s and was certainly produced in the late 1940s by E.K. Cole Ltd.

The set utilizes four tubes in the transmit line-up, but uses part of the receiver during transmit to produce an automatic frequency control (AFC) of the transmit frequency. There are two versions—the A and B sets. The A sets cover 40 to 42 MHz and are green in color. The B sets are black and cover 38 to 40 MHz, although a probable overlap in frequency is possible. There is also an AFV version, which was used as a successor to the 19 set B set and the 38 set AFV.

The receiver uses 10 tubes in a single-conversion superhet configuration with an IF of 3 MHz. The local oscillator is crystal controlled with four channels being available.

A separate RF amplifier feeds the mixer, which is supplied with the local oscillator output, the local oscillator acting as an oscillator and tripler, by the way. Three IF amplifier stages follow along with a limiter circuit. This feeds a pair of diodes in the discriminator, the output of which is fed to the AF amplifier stage to drive headphones.

The transmitter runs a reactance modulator which acts on the TX oscillator running at half the output frequency. This free-running oscillator is frequency locked, using the receive crystal standard, by passing a small amount of TX RF back through the receiver, and producing an error voltage which is used to correct any drift of the TX oscillator.

The output of the oscillator is doubled in the next stage, and then passed to the PA output tube. The PA output tuned circuit is again part of the receiver input path.

An FM output of around 250 mw can be expected from the set. The normal antenna was a 4 ft. whip. Either a headset or a miniature telephone-type handset would be used, with the RX/TX switch being a separate rubber-covered unit. Supplies to the set are via a three-pin plug/socket, and the set needs 90 VDC and 1.4 VDC provided by batteries or, in the case of the vehicle-mounted AFV set, a vibrator supply.

The 88 set can be modified (although regarded as an evil thought by the purist) to operate on the 10 meter amateur band. In this way the set could be used and shown working. The modification involves the addition of capacitors to the tuned circuits of the transmitter and the receiver oscillator. After these additions the set is re-crystaled up on spot frequencies in the 10 meter band and retuned. The crystal frequency is derived from the required band frequency in MHz, -3 MHz, then divided by 6.

The spot frequencies should be within 400 kHz of each other to avoid exceeding the set's tuning range.

Conclusion

The sets mentioned cover a span of some 10 to 15 years, from 1938-39 to the mid 1950s. In that time the sets got smaller and more compact. They go from a basic system using reaction to derive the BFO action, to a miniature tubed superhet running FM, frequency locked, at near VHF frequencies.

The No. 88 set was among the first of the miniature tubed sets, small lightweight sets that could easily be carried and operated by one man. The increased use of these miniature tubes led to a multitude of military sets, more of which I hope to cover in future articles.

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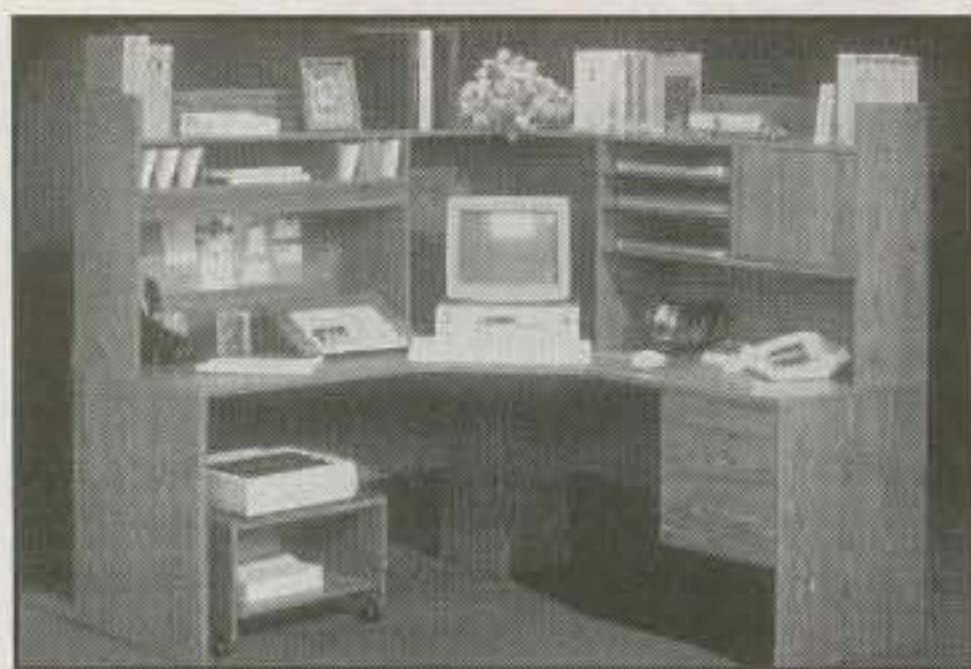
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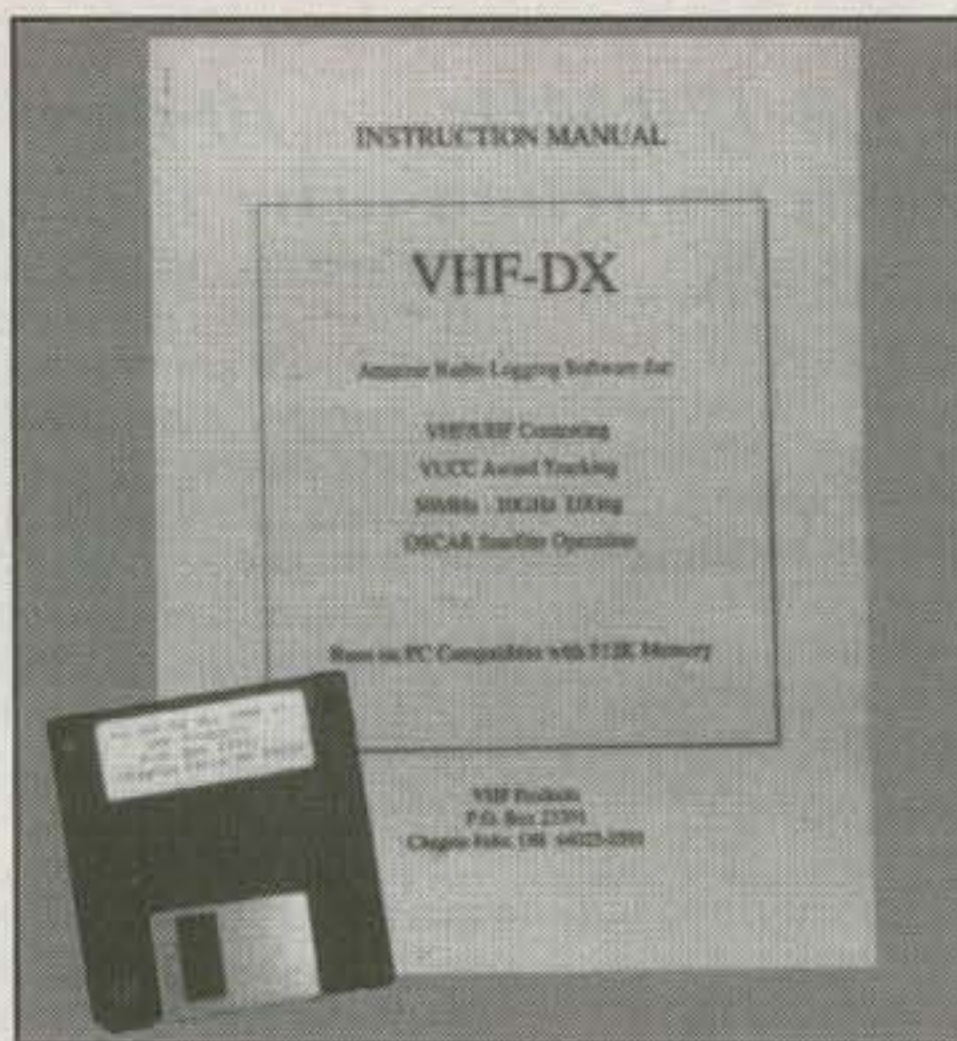


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(Continued on page 46)

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Full size performance . . . No ground or radials

Operate 10 bands: 75/80, 40, 30, 20, 17, 15, 12, 10, 6 and 2 Meters with one antenna
Separate full size radiators . . . End loading . . . Elevated top feed . . . Low Radiation Angle . . . Very wide bandwidth . . . Highest performance no ground vertical ever . . .

Operate 10 bands -- 75/80, 40, 30, 20, 17, 15, 12, 10, 6 and 2 Meters -- with this MFJ-1798 vertical antenna and get *full size performance* with no ground or radials!

Full size performance gives you high efficiency for more power radiated. The result? Stronger signals and more Q-5 QSOs.

Full size performance also gives you exceptionally wide bandwidths so you can use more of your hard earned frequencies.

Full size performance is achieved by using separate full size radiators for 2 through 20 Meters and highly efficient end loading for 30, 40 and 75/80 Meters.

You get very low radiation angle for exciting DX, automatic bandswitching, omni-directional coverage, low SWR and it handles 1500 watts PEP SSB.

MFJ's unique *Elevated Top Feed™* elevates the feedpoint *all the way to the top* of the antenna. It puts the maximum radiation point high up in the clear where it does the most good -- your signal gets out even if you're ground mounted.

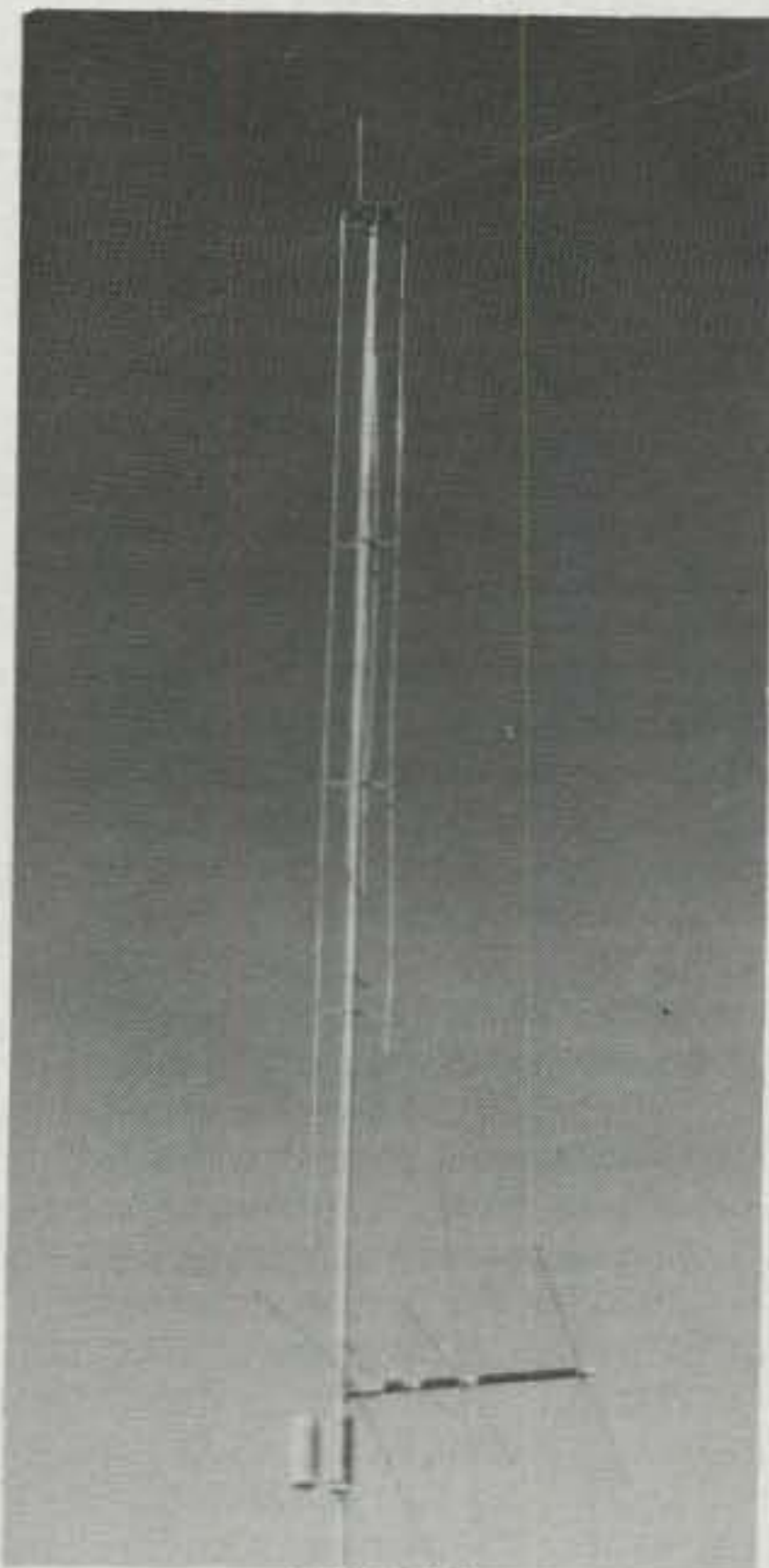
It's easy to tune because adjusting one band has minimum effect on the resonant frequency of other bands.

Self-supporting and just 20 feet tall, the MFJ-1798 mounts easily from ground level to tower top -- on small lots, backyards, apartments, condos, roof tops, tower mounts.

Separate Full Size Radiators

Separate full size quarter wave radiators are used on 20, 17, 15, 12, 10 and 2 Meters. On 6 Meters, the 17 Meter radiator becomes a 3/4 wave radiator.

The active radiator works as a stub to decouple everything beyond it. *In phase* antenna current flows



MFJ-1798

\$269⁹⁵

in all parallel radiators.

This forms a very large equivalent radiator and gives you incredible bandwidths.

These radiator stubs provide automatic bandswitching -- there is absolutely *no loss* due to loading coils or traps.

End Loading

On 30, 40, 75/80 Meters, end loading -- the most efficient form of loading -- gives you highly efficient performance, excellent bandwidth, low angle radiation and automatic bandswitching.

MFJ's unique *Frequency Adaptive L-Network™* provides automatic impedance matching for lowest SWR on these low bands.

Tuning to your favorite part of these bands is simple and is done at the *bottom* of the antenna.

No Ground or Radials Needed

You don't need a ground or radials because an effective counterpoise that's 12 feet across gives you *excellent* ground isolation.

You can mount it from ground level to roof top and get awesome performance.

No Feedline Radiation to Waste Power

The feedline is decoupled and isolated from the antenna with MFJ's exclusive *AirCore™* high power current balun. It's wound with Teflon® coax and *can't saturate*, no matter how high your power.

Built to Last

Incredibly strong solid fiberglass rod and large diameter 6061 T-6 aircraft strength aluminum tubing is used in the main structure.

Efficient high-Q coils are wound on tough *low loss* fiberglass forms using highly weather resistant Teflon® covered wire.

Teflon® is registered trademark of Dupont

MFJ Super Hi-Q Loop™

MFJ's tiny 36 inch diameter *high efficiency* loop antenna lets you operate 10 to 30 MHz *continuously* -- including the WARC bands!

It's ideal where space is limited -- apartments, small lots, mobile homes, attics, motor homes.

Enjoy both DX and local contacts when you mount it vertically. You get *both* low angle radiation for excellent DX *and* high angle radiation for local close-in contacts. Handles 150 watts.

Super easy-to-use! Only MFJ-1786 *Super Remote Control* has *Auto Band Selection™*. It auto-tunes to your desired band, then beeps to let you know. No control cable is needed.

Fast/slow tune push buttons and built-in two range *Cross-Needle* SWR/Wattmeter lets you quickly tune to your exact frequency.

All *welded* construction, no mechanical joints, welded butterfly capacitor with no rotating contacts, large 1.050 inch diameter *round* radiator -- not a lossy thin flat-strip -- gives you highest possible efficiency.

Each plate in MFJ's *superb* tuning capacitor is welded for low loss and *polished* to prevent high voltage arcing. It's welded to the radiator, has nylon bearing, anti-backlash mechanism, limit switches and a continuous *no-step* DC motor for *smooth precision* tuning.

A heavy duty 1/8 inch thick ABS plastic housing with ultraviolet inhibitors protects it. MFJ-1782, \$269.95. Same as MFJ-1786 but remote control has only fast/slow tune buttons.



MFJ-1786
\$299⁹⁵

Super 80/40M Vertical

Designed as a *high performance* antenna for 80 and 40 Meters, the MFJ-1792 features a *full size* quarter wave radiator for 40 Meters -- that's a full 33 feet of ruthless radiating power.

End loading -- the most efficient form of loading -- is used for 80 Meters. It's accomplished by a virtually lossless 4 1/2 foot capacitance hat and a high-Q coil wound with Teflon® wire on a *low-loss* fiberglass form.

The *entire length* radiates power.

High strength 6061-T6 aluminum tubing, super strong solid fiberglass insulator, *Frequency Adaptive L-Network™*, heavy duty *swing* mount. Handles 1500 watts PEP. Requires guying and radials, counterpoises or ground screen.

MFJ-1793, \$179.95. Same as MFJ-1792 but includes *full size* 20 Meter quarter wave radiator.

Box Fan Portable Loop

No, it's not a fan -- it's a high efficiency portable loop antenna that's about the same size and shape as a 2x2 foot box fan, complete with carrying handle.

Carry it like a suitcase, tuck it in a corner of your car or check it as baggage on a plane. When you get there, set it on a table or desk and enjoy ragchewing or DXing.

All welded construction, covers 14-30 MHz *continuously* including WARC bands, handles 150 watts. Remote control has fast/slow tune buttons. Separate control cable not needed.

MFJ-1792
\$159⁹⁵



MFJ halfwave Vertical

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

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

It's only 12 feet high and has a *tiny* 24 inch footprint! Mount it anywhere from ground level to tower top -- on apartments, condos, small lots, even motor homes. Perfect for vacations, field day, DX-pedition, camping.

Efficient *end loading*, no lossy traps. *Entire length* is always radiating. *Full size* halfwave on 2 and 6 Meters. High power *air-wound* choke balun eliminates feedline radiation. Adjusting one band has minimum effect on other bands.

Automatic bandswitching, low radiation angle, omni-directional, handles 1500 watts PEP. Goes together in an afternoon.



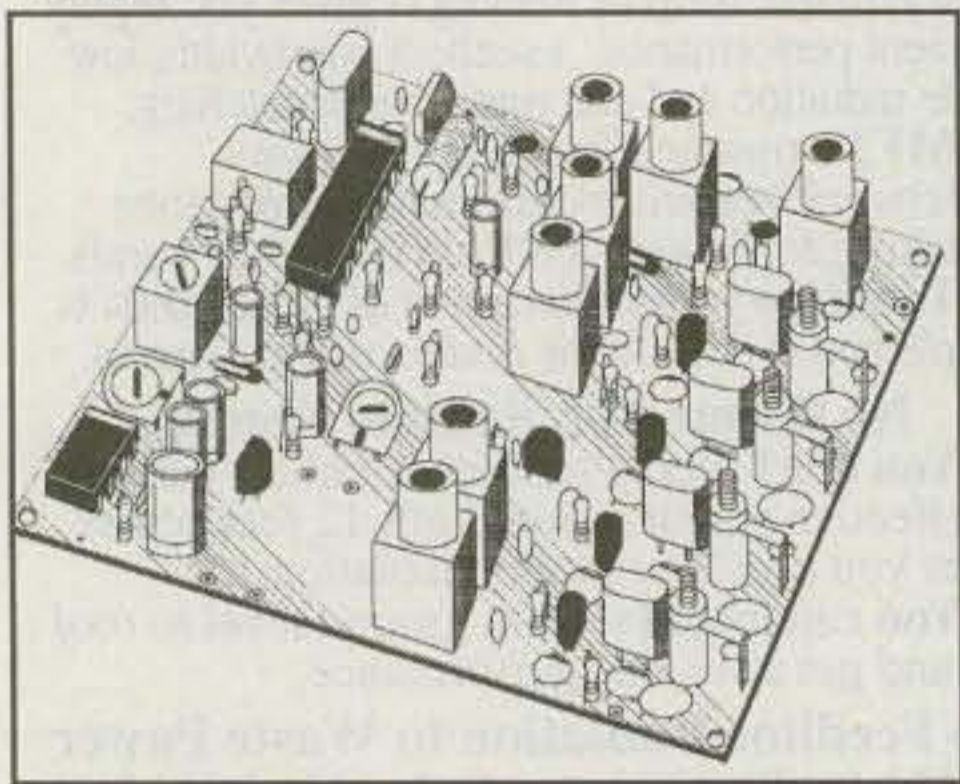
MFJ-1796
\$199⁹⁵

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Hamtronics R150 VHF Monitor Receiver

The new Hamtronics R150 is a full crystal-controlled dual-conversion receiver with 0.2 μ V sensitivity and 60 dB adjacent channel selectivity. This new unit uses a transceiver-grade IF filter instead of crystal filters. You can plug in crystals for up to four frequencies, which have channel frequencies separated by less than a few MHz. Selection is done by grounding one of the four control lines with an external switch you provide. Volume and squelch controls on the board can be preset for comfortable listening level. If you would like to be able to scan, a model AS-138 Scan Adapter is available.



Other new products available from Hamtronics include the model RWWV, a dedicated receiver made just for listening to the 10.000 MHz WWV broadcasts (\$59 for a kit; or \$99 for a wired and tested module); the R120 VHF aircraft band receiver (kit \$99, wired and tested \$219); and the CWID-2 module.

For more details, write to Hamtronics, Inc., 65-F Moul Rd., Hilton, NY 14468-9535 (phone 716-392-9430; FAX 716-392-9420), or circle number 104 on the reader service card.

New Rackmount Cases From Jensen Tools

A new line of shock-absorbent rackmount cases for 19 and 26 inch wide electronic equipment is now available from Jensen Tools. The line offers protection for the transport and storage of sensitive audio, video, and other broadcast and communications equipment. The cases are American-made and are molded from ultra-high molecular weight polyethylene. They are 50% lighter in weight than wood, and are impervious to most solvents, oils, fuels, and acids. Other features include molded-in ribbing and bumpers for strength, and tongue and groove aluminum valance with o-ring seals. Hardened steel 10-32 nut retainers clip to front pre-punched aluminum flange.

Fifteen inch rackmount cases are available



in 2, 4, 6, 8, 10, and 12 space sizes. The standard cases are all 15 inches deep (excluding end covers), and each space inside equals approximately 2 inches. Three 26 x 27 inch cases (8, 12, and 16 space models) are also offered with shock-mounted internal rack systems for maximum protection. These racks are larger and have mounting holes on each end. Prices vary. Call 800-426-1194 for a free copy of the Jensen 1995 Master Catalog. The cases are available from Jensen Tools, Inc., 7815 S. 46th Street, Phoenix, AZ 85044 (FAX 602-438-1690). For more information circle number 105 on the reader service card.

Ham Radio Software From Milestone Technologies

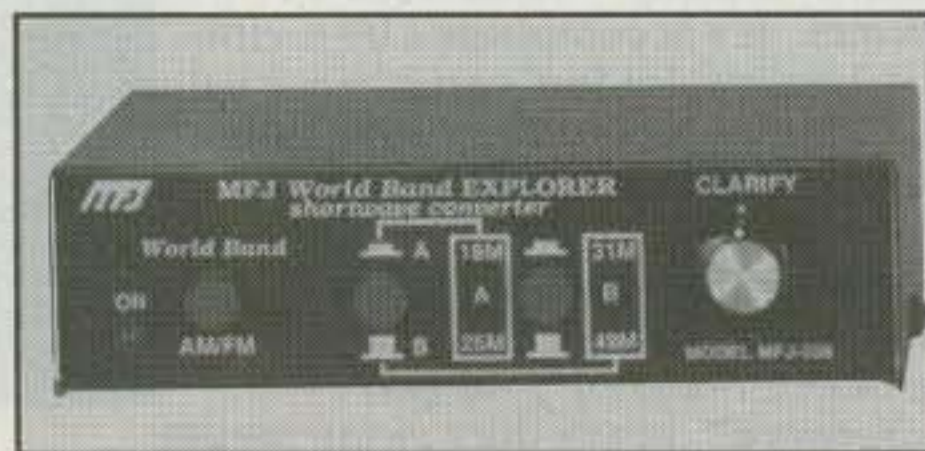
Milestone Technologies has announced the release of Version 5 of their Morse training program, CODEMASTER. CODEMASTER V incorporates a number of new features to make learning Morse code easier. One of the more significant enhancements is the ability to modify the Morse alphabet to include foreign characters or procedural symbols. Other new features include an emulated "hand key" and an arcade-style character recognition game.

CODEMASTER V is priced at \$24.95, with an upgrade price of \$12.50 for existing users. Anyone who purchased CODEMASTER v4.5 after March 30th should contact Milestone Technologies to arrange for a free upgrade.

Credit card and COD orders can be placed by calling Milestone Technologies toll free on 800-238-8205. For further information about CODEMASTER V, Milestone LOGMASTER, or Milestone's other products, contact Milestone Technologies, 3140 S. Peoria St., Unit K-156, Aurora, CO 80014-3155 (303-752-3382), or circle number 106 on the reader service card.

MFJ-306 World Band Explorer Mobile SW Converter

The MFJ-306 World Band Explorer mobile shortwave converter converts an AM car radio into a world band shortwave receiver at the push of a button. The MFJ-306 will monitor the entire 19, 25, 31, and 49 meter international shortwave broadcast bands. To install the unit unplug the car radio antenna, and plug it into the MJF-306. Then insert the MFJ-306 cable



into their radio antenna jack and connect 12 VDC. Push a button to select a band and then tune into world band stations on the car radio. The MFJ-306 works on all car radios, even newer digitally functioned dials. A built-in clarifier knob will lets the user tune in world band stations lodged between standard AM stations on newer digital radios.

The World Band Explorer measures 5" x 11 1/2" x 3 1/2" inches and has a standard Motorola antenna plug and jack. The MFJ-306 is priced at \$79.95. For more information, contact any MFJ dealer or MFJ Enterprises, Inc., P.O. Box 494, Mississippi State, MS 39762 (601-323-5869; FAX 601-323-6551; order toll-free 1-800-

647-1800); or circle number 107 on the reader service card.

Cable X-Perts "LAN" Cables

Cable X-Perts, Inc. has added computer "LAN" cables to their product line. The first in this series is RG58A/U "Thinnet" double shielded (foil + 95% braid) gray PVC jacket (PN:9907) UL rated CL2. It is stocked on 1000 ft. spools, but smaller lengths can be supplied. The next item is the 24GA Solid 4 Pair Level 5 LAN Cable (2404P-5). This product is UL verified to a Level 5 rating and UL rated to the CM/CMR fire code. This item is stocked on 1000 ft. "FAST-PAK" boxes (smaller lengths available). Also available are jumper cords in RG58/U w/BNC connectors installed at each end. The cords come in 6 ft. (PN:205-527) and 25 ft. (PN:205-540) lengths.

For a complete catalog, send an SASE to Cable X-Perts, 113 McHenry Road, Suite 240, Buffalo Grove, IL 60089-1797, or circle number 108 on the reader service card.

Lunar-Link Linear Amplifier and 2250 VDC Power Supply

Two new products from Lunar-Link Systems are the Model LA-70B, 70 cm Linear Amplifier and the Model PS-70, 2250 VDC Power Supply. The Model LA-70B is the first in Lunar-Link Systems' LA series of VHF and UHF linear amplifiers. Designed for the serious 432 MHz EME, DX, and contest operator, the LA-70B is a compact desktop RF deck that will generate up to 1500 watts of stable, highly linear power output. Primarily intended for intermittent SSB and keyed Morse code CW service, the LA-70B is also usable in continuous carrier modes such as FM at lower power output levels. The tuning range of the LA-70B covers the entire U.S. 70 cm amateur band (420-450 MHz). The capacitively tuned and loaded stripline plate circuit used in the unit delivers efficient operation between 600 and 1500 watts output. A pair of readily available, rugged 3CX800A7 ceramic metal triodes are used to provide stable linear operation with low drive power. Drive power is typically 70 watts for 1500 watts output. The LA-70B utilizes commercial-quality construction with cabinet parts formed from heavy-gauge aluminum alloy. The cost of the LA-70B assembled and tested without tubes is \$1,145. The kit version is \$945 without tubes.

Also available from Lunar-Link is the Model PS-70, 2250 VDC Power Supply for use with the LA Series of 1500 watt output VHF and UHF linear power amplifiers, as well as for other 1500 watt output class amplifiers that use multiple 3CX800A7, 8874, or similar type power tubes. The PS-70 features a heavy-duty 2.5 kVA power transformer that weighs 46 pounds and utilizes a core made from grain oriented high silicon steel. It utilizes a 57 μ F filter capacitor bank and a 230-240-250 volt tapped power transformer. The cost of the PS-70



MFJ TUNERS

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



\$349⁹⁵

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 3/4 x 4 1/2 x 15 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 More hams use the MFJ-949E than any other antenna tuner in the world! **\$139⁹⁵** 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 **\$229⁹⁵** 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 3/4 x 4 1/2 x 14 7/8 in.

MFJ's portable/QRP Tuner

Tunes coax, balanced lines, random wire 1.8-30 MHz. Cross-Needle Meter. SWR, 30/300 or 6 watt QRP ranges. 6x6 1/2 x 2 1/2 in. **\$89⁹⁵**

MFJ's super value Tuner



MFJ-941E The new MFJ-941E gives you a 300 watt PEP tuner with lighted **\$109⁹⁵** 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 The MFJ-986 Differential-T™ **\$289⁹⁵** 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 **\$89⁹⁵** 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-945D **\$89⁹⁵** 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. **\$59⁹⁵**

MFJ's random wire Tuner

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. **\$39⁹⁵**

MFJ's VHF or UHF Tuners

MFJ-921 or MFJ-924 **\$69⁹⁵** MFJ-921 covers 2 Meters/220 MHz. MFJ-924 covers 440 MHz. SWR/Wattmeter. 8x2 1/2 x 3 in. Simple 2-knob tuning for mobile or base.

MFJ's artificial RF Ground

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. **\$79⁹⁵**

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422	DC-30 Mhz., 15KW PEP	82.00
425	DC-54 Mhz., 600W PEP	38.00
426	DC-54 Mhz., 7,500W PEP	54.00

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assembled and tested is \$725. A kit version, the PS-70K, is available for \$635.

For more information, contact Lunar-Link Systems, 816 Summer Hill Road, Madison, CT 06443-1604 (203-421-3377), or circle number 109 on the reader service card.

ICOM IC-738 HF Transceiver

The ICOM IC-738 transceiver allows the user to work all the HF bands and receive 300 kHz to 29.995 MHz. SSB, CW, AM, and FM are built-in for a full 100 watts output (40 watts in FM). A heatsink with two large cooling fans



is for stable 100% duty cycle operation. The IC-738 incorporates next-generation circuitry with ICOM's Direct Digital Synthesizer (DDS) IC. The PLL unit provides frequency resolution to 1 Hz. One complete dial rotation is equal to 200 Hz. A built-in AT-170 next-generation automatic antenna tuner has preset memories for each 100 kHz steps, and "automatic retune" turns the AT-170 on and tunes when SWR exceeds 1.5:1. The IC-738 is equipped with two antenna connectors directed by an automatic antenna selector. The memory channels for each band memorize the selected antenna, antenna one or two. When you change the operating band, you don't have to manually change the antenna. The CW contest package includes built-in electronic keyer with separate key jack, full break-in (QSK), and separate jacks for an extended CW key or memory keyer. The Double Band Stacking Register (DBSR) memorizes two frequencies and the mode in each band so you can use it like two VFOs in one band.

The IC-738 comes with an HM-36 hand microphone, and the transceiver is compatible with ICOM's CI-V system for control from a personal computer. Suggested retail price of the IC-738 is \$1,935. For more information, contact ICOM America, Inc., 2380 116th Avenue N.E., Bellevue, WA 98004 (206-454-8155), or circle number 110 on the reader service card.

Radio Works' Catalog

The latest issue of the Radio Works General Catalog (#951) is an 80-page source book of high-performance wire antenna systems, antenna parts, and accessories. This issue features new products from several additional manufacturers, with a complete selection of coax, connectors, antenna wire, coax switches, power meters, insulators, etc.

General Catalog #951 is free and is sent by bulk-mail service. For extra fast priority-mail service, the price is \$2 to help cover the additional postage. For more information, or to order catalog #951, contact the Radio Works, Box 6159, Portsmouth, VA 23703 (800-280-8327; 804-484-0140; FAX 803-483-1873).

Interactive Game Software For Learning Code and Theory

ARE (Amateur Radio Education, Inc.) has announced Ham University, a new Windows program for learning amateur radio theory and Morse Code for all levels of licensing. The Ham University program has all the FCC updated amateur radio questions for Novice through Extra. The program uses the Windows interactive format and Hyper-Text Help files to assist in better understanding of the theory behind questions and answers. The Morse Code section of Ham University teaches the code with the default as the Gordon West method, but the student can also go the ARRL method or may create his or her own method of learning the letters, numbers, and required punctuation marks. Novice, General, and Extra class lessons help increase speed and prepare the student to pass the test. Pentode, the Morse Code game, offers an interactive challenge to advance students through different stages of learning code and speed-building. Pentode also has a Hall of Fame so that different students can compare their scores. System requirements are 386 computer or higher, Windows 3.1, DOS 5.0 or higher, and a sound card for Pentode, the Morse Code game.

For more information about Ham University, licensing classes, or the Gordon West Radio School tapes and books, contact ARE by telephone at 714-968-0042 or FAX 714-965-1016; write to ARE, 19032 Pauline Lane, Huntington Beach, CA 92646; or circle number 100 on the reader service card.

ASTRON POWER SUPPLIES

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SPECIAL FEATURES

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- INPUT VOLTAGE: 105-125 VAC
- OUTPUT VOLTAGE: 13.8 VDC \pm 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)

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• 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 1/2 x 7 1/2 x 9 3/4	12
SL-11R	•	•	7	11	2 1/2 x 7 x 9 3/4	12
SL-11S	•	•	7	11	2 1/2 x 7 1/2 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)	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 1/4 x 7 1/2 x 9 3/4	12

CQ REVIEWS:

The MFJ-259 HF/VHF SWR Analyzer

BY PAUL CARR*, N4PC

I must admit that when I hear about a new piece of test equipment my ears perk up. Needless to say, I was delighted when I was asked to review the new MFJ-259 SWR analyzer.

Although SWR analyzers have been out for many years, I have always felt that the results they gave were incomplete. Until now, a reading for resistance at resonance was not available. If the indicated SWR was 1.2:1, you didn't know if the antenna resistance was 40 or 60 ohms. I am happy to say that problem has been solved. A second meter has been added to provide the resistance at resonance. This addition has made the instrument significantly more versatile.

Let me give you a brief description of the MFJ-259. The unit consists of a signal generator that covers from 1.8 to 170 MHz. There is an SWR detection circuit and a circuit to determine the antenna resistance at the point of minimum SWR. There is also a very accurate, easy-to-read frequency counter. The numbers on the display are about 1/4 inch high and are easy to read even in full sunlight. These are the basic circuits contained in the unit. Now let me walk you through the basic operation of the device.

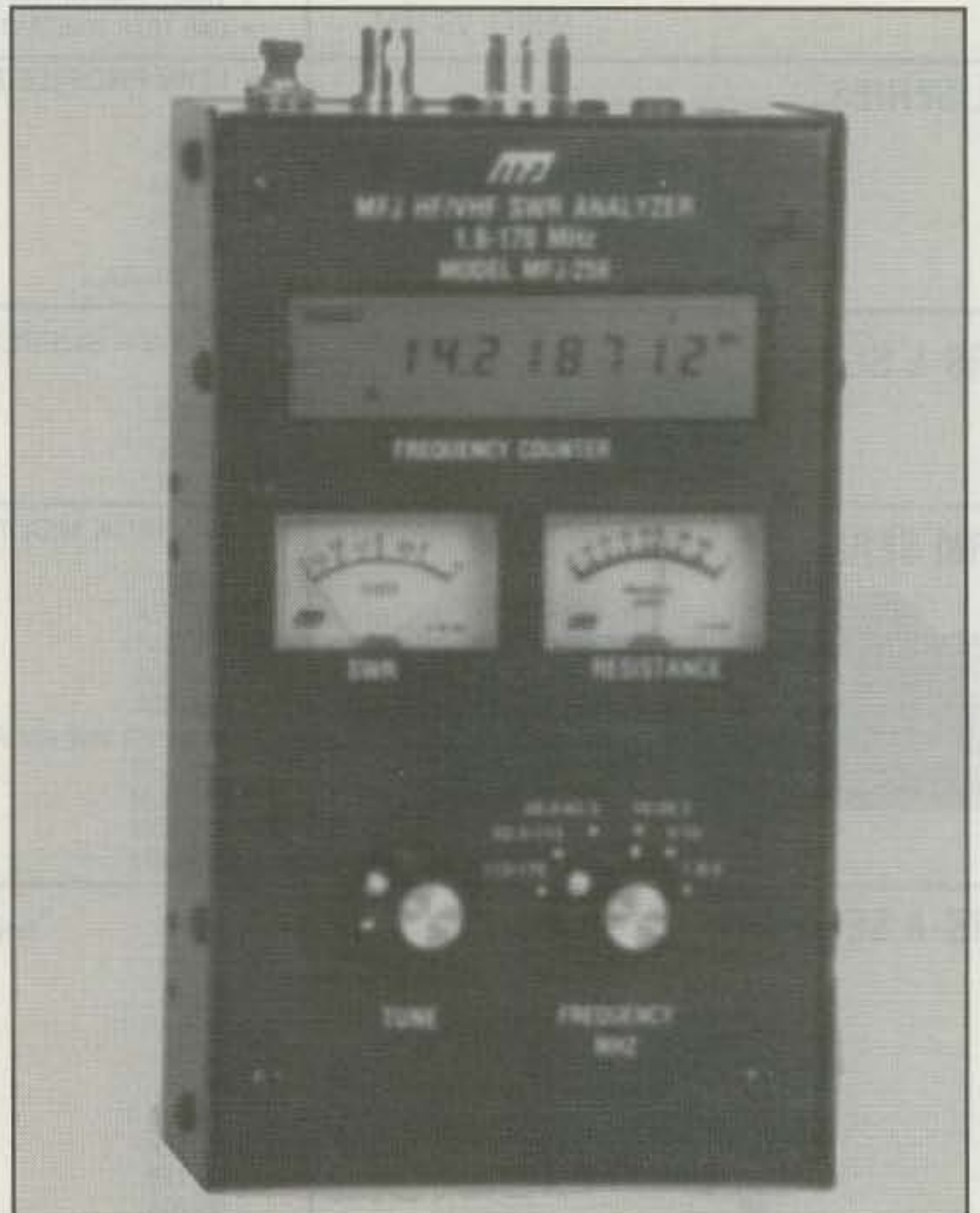
At the lower right of the unit is the band selection switch. The frequency spectrum is divided into six segments from 1.8 to 170 MHz. To check an antenna, connect the antenna feed to the coax connector located on the top of the unit. Rotate the TUNE control (lower left) until a dip occurs on the SWR indicator meter. The SWR is displayed on the left meter. On the meter to the right, the approximate resistance of the system is displayed.

To evaluate the MFJ-259 I built two antennas. Here are the results of my experiments with the well-known two-element quad. I chose the quad because there was much available data on that antenna (plus it was one of my favorite antennas).

First, I built a single quad loop for 17 meters according to the existing formula. I checked the resonance of the loop, and it was not resonant in the 17 meter band but much higher. The loop resistance was slightly greater than 100 ohms, as it was supposed to be. I then built a reflector loop according to existing formulas. The results were the same. It was resonant higher than expected and the resistance was over 100 ohms. I wanted to make measurements from the ground for two reasons: my body would not be in the antenna pattern to void the test results, and it was safer.

Next, with the aid of the '259, I cut two lengths of transmission line to one-half wavelength. I put the antenna elements together on a boom in standard configuration and raised the array into the air. With the one-half-wave stub connected to the reflector shorted, I checked the resonant frequency of the array. The '259 indicated an SWR of 1.5:1 and a resistance of approximately 75 ohms. The indicated resonant frequency was also slightly high. I then decreased the spacing of the elements on the boom and rechecked the measurements. After several attempts, I achieved the desired results—a 1:1 SWR and the desired front-to-back ratio. This unit makes tuning an antenna array very easy, because you can readily see the results of any changes that you make.

Let's look at some of the other uses of the '259. The accuracy



The MFJ-259 HF/VHF SWR Analyzer.

of the frequency counter was checked using WWV as a standard. The calibration was "on-the-nose." Further checks of the counter throughout the spectrum showed no deviation in accuracy. There is a switch on top of the '259 that allows the unit to function as a stand-alone counter. I recommend that you use a times one probe, since the sensitivity of the counter is on the order of 600 mv. The counter can measure from a few Hertz to about 200 MHz. The resolution of the display (gate time) is also selectable by a switch located on top of the unit.

Of course, the '259 can be used to adjust Transmatches. MFJ makes a switch for this purpose—the MFJ-1702. Connect the switch between your rig and the '259, tune to the desired frequency, and adjust your transmatch for an SWR of 1:1. When you are ready to operate, switch the '259 out of the line and you are ready to go on the air.

The MFJ-259 is totally portable. It can be powered by self-contained batteries or a separate AC supply. The instruction manual is well written and easy to read. Many other uses of the unit are explained in the booklet. MFJ also has an excellent 12-month warranty and a toll-free over-the-phone help policy. The MFJ-259 is priced at \$219.95, and it is available from MFJ Enterprises Inc., 921 Louisville Rd., Starkville, Mississippi 39759.

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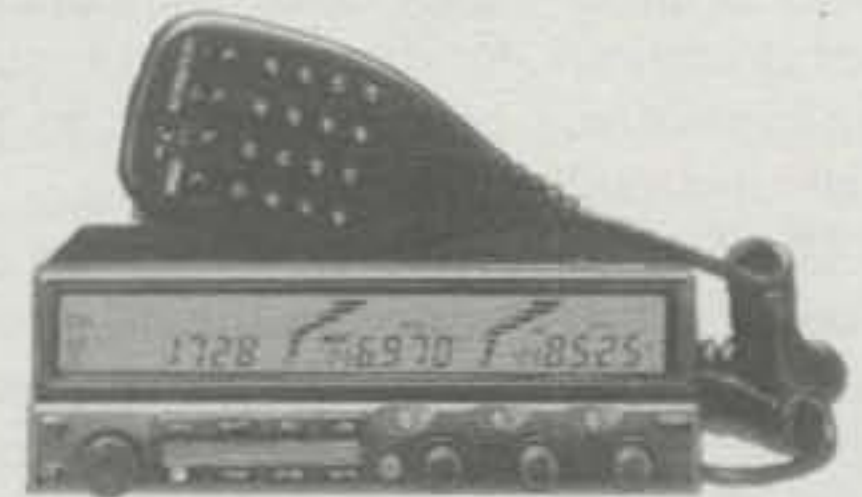
TS-50S



TH-79A



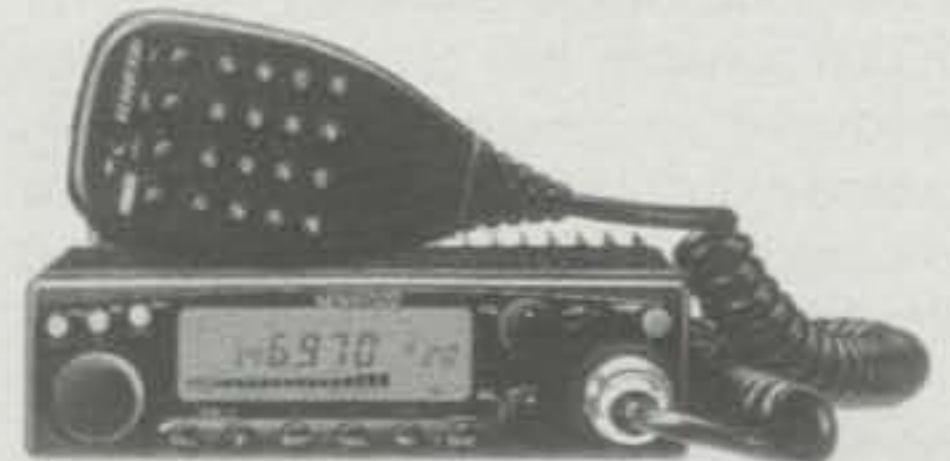
TH-28A



TM-742A



TM-733A



TM-241A



TM-255A

WHAT'S NEW AND HOW TO USE IT

Experimenting In The Lower Microwave Region

In the past couple of years, the FCC has set aside several frequencies in the lower microwave spectrum for commercial license-free wireless communications purposes. Potential applications for these frequencies include wireless local area computer interconnect networks, closed-circuit wireless video transmission systems, and short-range wireless data transmission systems, to mention but a few. While these types of systems are not necessarily of interest to amateurs, the wide range of inexpensive components being offered for designers of such equipment will certainly appeal to the UHF and microwave experimenter.

The commercial frequencies that are closest to those used by amateurs are 902 to 928 MHz (within the amateur band), 2400 to 2483.5 MHz (near and within the amateur 2390-2450 band) and 5725 to 5875 MHz (within the amateur 5650-5925 band). Commercial frequencies within the amateur bands, by the way, are to be used on a "shared" basis, so there is no guarantee of QRM-free operation. At these frequencies, however, a wide range of inexpensive components have recently "made their debut." A brief sampling of what is being offered follows.

From **Mini-circuits**, P.O. Box 350166, Brooklyn, NY 11235: In addition to a wide range of microwave and lower frequency RF components, this company has also introduced an inexpensive line of 8-pin surface-mount VNA amplifiers (Very New Amplifiers) for operation from 500-800 MHz, 800-1000 MHz, 1-2 GHz, and 2-2.5 GHz, with gains of 14 dB, 17 dB, 18 dB and 16 dB, respectively.

To complement these, Mini-circuits also has available a line of 12 volt Vcc voltage-controlled oscillators (VCOs) that cover the range of 25 to 1025 MHz (in 10 separate models). These oscillators typically put out +7 dBm (a little more than 4 milliwatts) and only cost about \$12 in quantities of 5 to 49 pieces. All are sup-

plied in 0.4 by 0.8 inch PC board mountable packages.

From **Siemens Components** (1-800-77-SIEMANS): New from Siemens is the low-cost CLY-15 Gallium Arsenide (GaAs) power FET. This device offers 7 dB of gain at 1.8 GHz with only 3 volts of Vcc and an output power capability of 1 watt. In addition, their BFP SIEGET product family, which consists of several devices offering noise figures of 1 to 2 dB at 1.8 GHz, will also be of interest.

From **M/A-COM** (1-800-366-2266): In addition to a host of other microwave components, M/A-COM has introduced the DS52-0001, a low-cost two-way miniature power divider with an insertion loss of only 0.5 dB, a port-to-port isolation of 23 dB, and a maximum operating frequency of 960 MHz. They have also introduced a low-cost GaAs general-purpose transistor, the MA4TF50, which exhibits a noise figure of 1 dB and gain of up to 12 dB at 4 GHz. This device can also be used as an oscillator up to 12 GHz. The company's MD58-0003 and AM55-0004, a chip set consisting of a complete RF front end (transmitter and receiver) for implementing a complete 1.8 GHz audio transceiver, should also be of interest, as should balun transformers that work from a few hundred kHz to well above 1000 MHz, and a host of other microwave communications support chips.

From **California Eastern Labs**, 4590 Patrick Henry Drive, Santa Clara, CA 95054: This west coast company is offering a series of bipolar transistors (from NEC) with bandwidths of up to 12 GHz, gains of up to 9 dB, and noise figures of 1.5 dB, all at operating voltages of 3 volts in micro-miniature 1.6x0.8 mm packages.

From **TRAK Microwave**, 4726 Eisenhower Blvd., Tampa, FL 33634: TRAK has just introduced a line of low-cost surface-mount mixers for use from 800 to 2000 MHz with local oscillator inputs of +10 to 17 dBm, conversion losses of 8 to 9 dB maximum and IF outputs up to 200 MHz.

From **Reeves-Hoffman**, 400 West North St., Carlisle, PA 17013: This well-known crystal manufacturer is now pro-

ducing a series of fundamental crystals at frequencies up to 155.25 MHz for use in fundamental frequency oscillators in higher frequency applications. Does this mean you can now build a 1 transistor 2 meter transmitter?

From **VARI-L Company**, 11101 East 51st Avenue, Denver, CO 80239: The PLL-400 low-cost phase-locked-loop synthesizer for use in the 700 to 3000 MHz range and the VCO-190 series of voltage-controlled oscillators with frequency ranges of 10 MHz to 3000 MHz and supply voltage range of 2.5 to 5 volts is now available along with this company's extensive line of RF oscillator products.

From **Z-Communications**, 9939 Via Pasar, San Diego, CA 92126: The V-series of VCOs for use over the range of 110 MHz to 2350 MHz for \$10.95 (list price) is now available. Also available are slightly more expensive units (\$24.95 list price) that extend the range to 4000 MHz. According to the manufacturer, all units can be shipped within 48 hours.

And the list goes on. . . . By no means is the above to be considered a complete, representative list. There are literally dozens of similar companies manufacturing comparable equipment, and to get a good handle of what is actually available, you should request a copy of one (or both) of the following magazines:

Wireless Design & Development Magazine, Gordon Publications, 301 Gibraltar Dr., Box 650, Morris Plains, NJ 07950-0650.

Microwaves & RF, Penton Publishers, 611 Route 46 West, Hasbrouck Heights, NJ 07604.

Microwave Product Digest, Octagon communications Inc., 167 South Broadway, Hastings-on-Hudson, NY 10706.

What you see in these magazines will certainly be eye-opening. It will also give you a good idea of what the future has in store for the experimenter, as well as for the consumer as the wireless revolution develops. One only wonders where the amateur radio community will fit into all of this.

73, Irwin, WA2NDM

c/o CQ magazine



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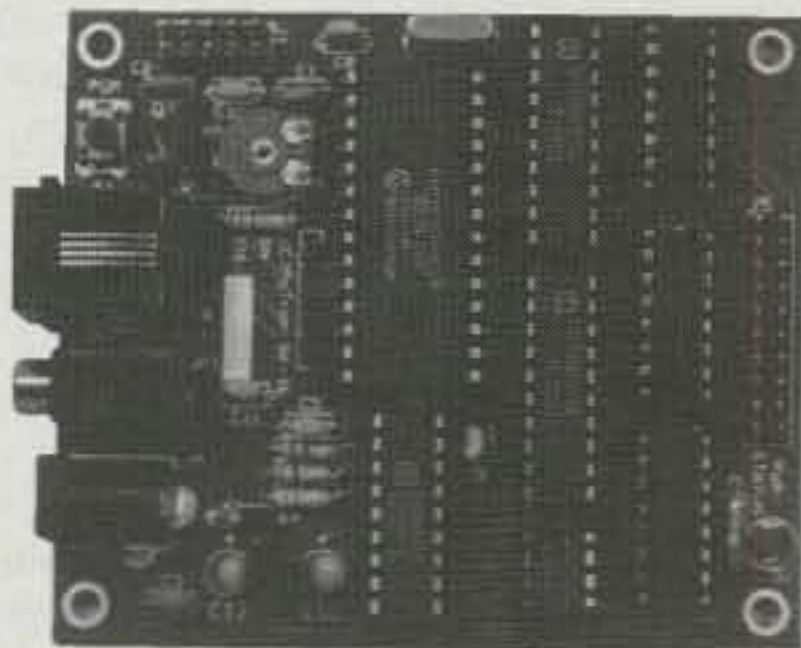
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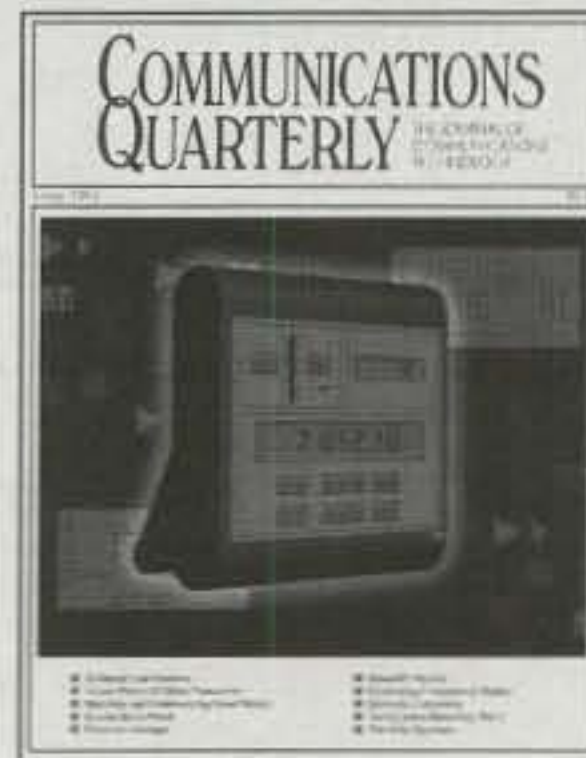
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Our Readers Say

History and Surplus

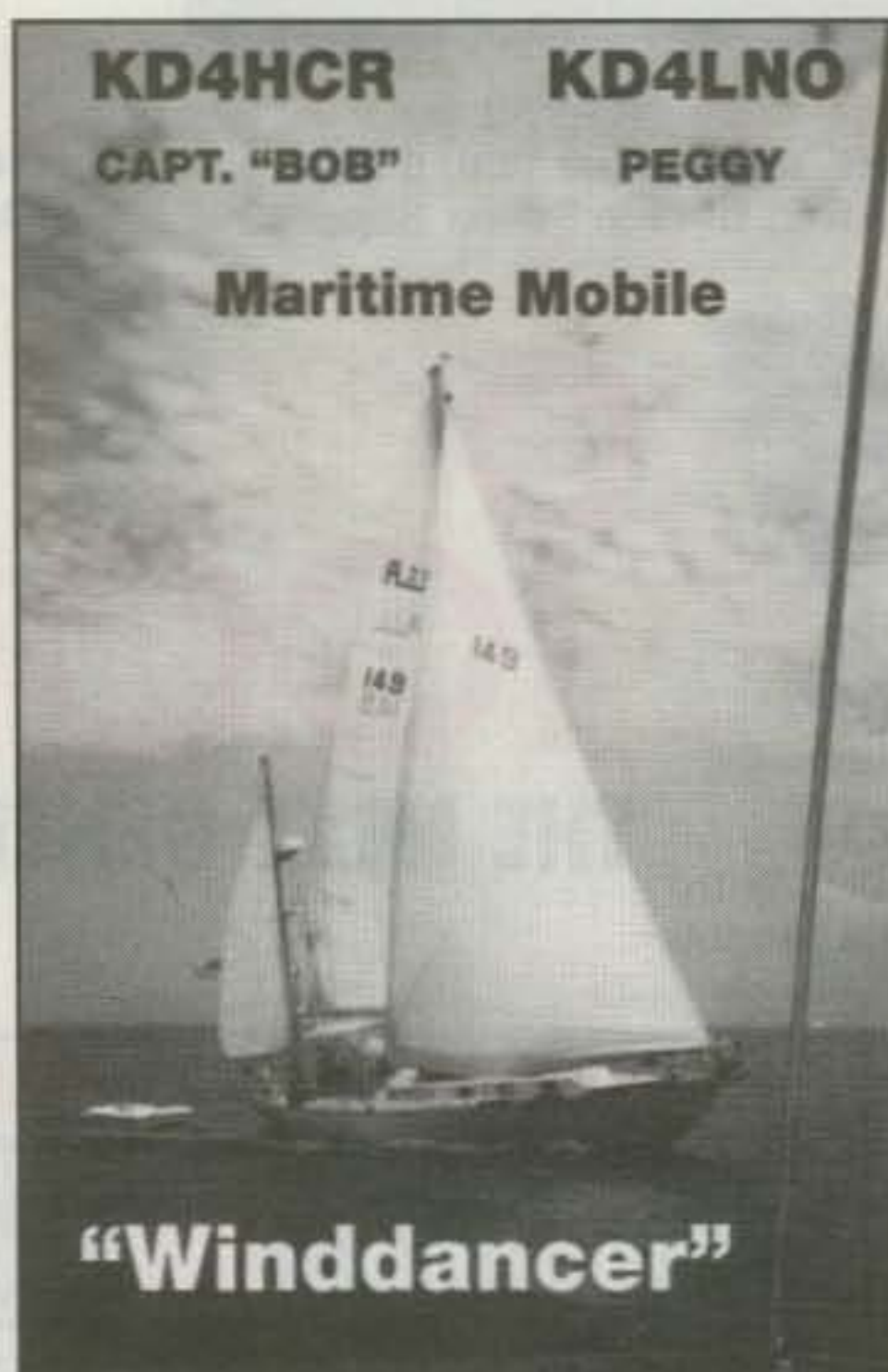
Editor, CQ:

Please accept my warmest congratulations on your magnificent 50th anniversary issue (January 1995). I first became interested in radio as a hobby in 1951, and was first licensed in South Africa as ZS1ZG in 1962. The commemorative articles in your January 1995 issue brought back many very pleasant memories of my involvement with amateur radio. The observations concerning WW II surplus radio gear as a factor in helping bring young people into the hobby struck a particularly strong chord with me; my first station consisted of a Royal Air Force R1155B receiver and a transmitter composed of a gutted and reworked ARC-5 rig.

This leads to another item for which I would like to express my sincere thanks: the article by Mr. Ben Nock, G4BXD, entitled "Surplus: A British Perspective" in your December 1994 issue. I grew up with many of the pieces of radio gear Mr. Nock describes, and even owned a few of them. In fact, it was the purchase for \$5.00 of a working 62 set in July 1962 that triggered me to "get off my duff" and go and take the amateur license test.

Again, many thanks for two fine issues of CQ.

Adam M. Farson, AB4OJ/VA3OJ



The QSL of KD4HCR and KD4LNO, Mary Esther, Florida.

testing, but I am sure it was going on.

Since those days in the '50s a lot has happened to my hobby. I now carry my VHF station in my pocket. I've gone from Novice to Extra (and decided to keep my 2x3 call). I share my HF station with a wonderful young lady I call my XYL (KD4LNO). And most of all, after all these years I have found a type of contesting I really enjoy. Instead of trying to rack up points, I just tune around the bands and listen for "CQ contest," and then I respond. The other station gets the points and I get a new contact. Although not a ragchew QSO, it's fun and I feel like I've helped a fellow ham. I call it "back-door contesting." I will never win a prize or get my name in print, but on the other hand, I feel like a winner each time. My first love is still "rag chewing," but in this age of ever-growing contesting, back-door contesting is a great way to keep current and "get on the air."

I have enclosed a picture of our rig. We live aboard a 37 foot sail boat these days. As you can see, the Nav station is mostly ham gear, not much room for extra junk.

Capt. Bob Grant, KD4HCR
Mary Esther, FL

P.S.: Almost forgot to mention, I grew up with CQ. Happy Anniversary!

"Slinky Dipole" Info Anyone?

Editor, CQ:

The information on the ferrite receiving loop for 160 meters in Bill Orr's column in the March issue was very timely. I had been contemplating improving low-band reception and this was just the ticket. Thanks.

While on the subject of antennas, does anyone have contact information for the Blacksburg Group that made the "Slinky Dipole"? I have been trying to obtain a replacement copy of the manual/tuning chart, but my letters to their P.O. Box in Virginia came back as no such address.

Thanks for a great magazine. Keep up the good work.

Dean Milner, VE1CBF
28 Castle Drive
Sydney, NS, B1S 2A2, Canada

so if the teacher intercepted them they could not be read aloud in class. How great it would have been to merely go simplex and transmit our message through our pocket-size HT. How handy it would have been to summon help when the school bully thought we needed an attitude adjustment.

Back in the '50s a large part of my hamming was more like SWLing. You just didn't buy much in the line of transmitters on an allowance of fifty cents a week, even supplemented by grass-cutting money. A store-bought transmitter was just a dream. There was a fair amount of surplus gear around, but it too was out of my budget. So for the first few years of hamming I had to be content to spend hours and hours sliding up and down the bands listening. I don't remember a lot of activity in the form of con-



WA6HXE's "CQ" clock made by his grandson.

CQ On Time

Editor, CQ:

Enclosed is a picture of a clock I received for Christmas. It was made by my grandson in Kansas. Unfortunately, he has not been bitten by the radio bug!

John Hunt, WA6HXE
Santa Clara, UT

Back-Door Contesting

Editor, CQ:

In 1957, if anyone had told me I would someday be able to put my entire VHF station in my shirt pocket I would have thought they had been exposed to a little too much QRM, or maybe had read a few too many Dick Tracy comic books. Of course, all of us kids who were into ham radios back in those days dreamed of owning a wrist radio. I remember how we used to pass notes in school writing in Morse Code



The station of KD4HCR and KD4LNO aboard their 37 foot sailboat.

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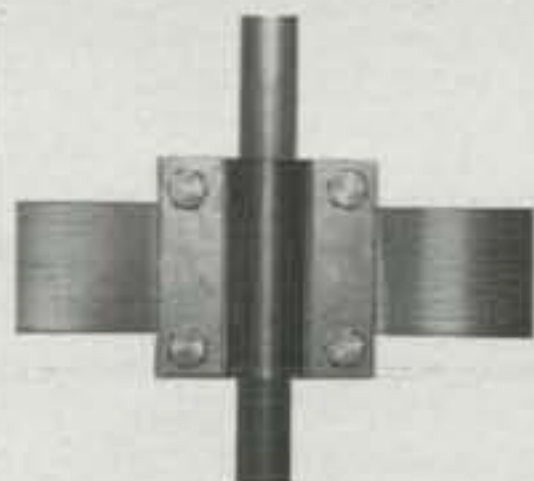
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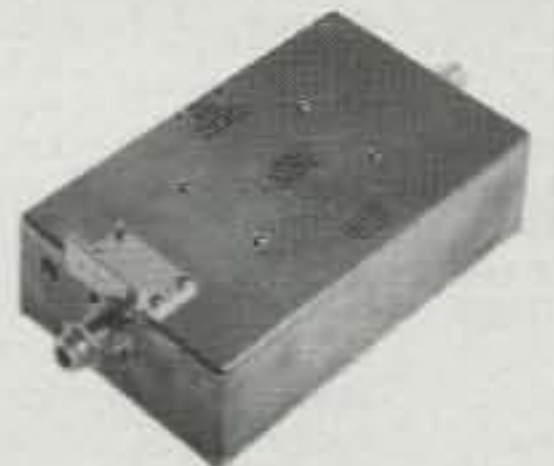
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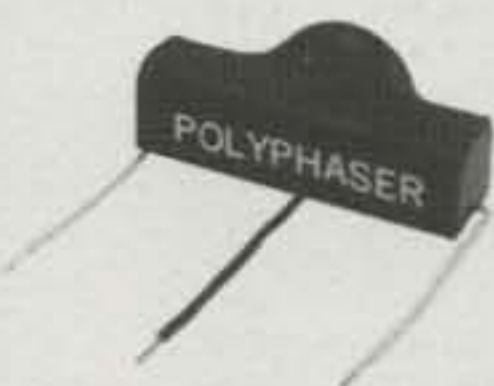
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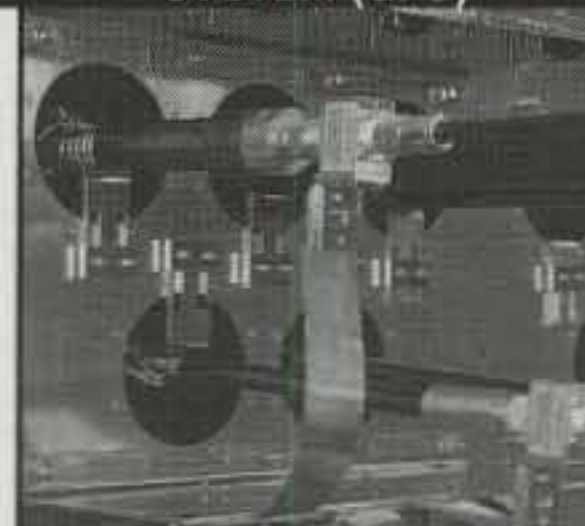
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P40E	15,408,642
EA8AH	12,279,260
8R1K	8,604,864
H28A	7,821,077
FR5DX	6,708,201
DU1/OH0XX	6,231,050
HK1HHX	5,567,130
CE3F	5,430,696
P39P	5,267,688
5N0GC	4,732,836
XX9TZ	4,079,082
S59A	4,011,090
WR6R/KH6	3,923,500
GW4BLE	3,893,862
5N0MVE	3,834,656
K1AR	3,500,180
S53EA	3,336,832
K5ZD/1	3,303,806
YU7AV	3,293,008
OH0MM	3,286,712

28 MHz

LU6ETB	1,766,772
PQ0MM	1,683,440
LU2QC	793,518
LU9MBY	740,530
HC7SK	720,020
ZV5A	639,032
LU1WFA	588,352
VP2VF	409,360

21 MHz

ZD8Z	3,546,425
PZ5DX	1,031,316
ZP6XR	880,376
KH6/WB6OKK	841,850
IQ4C	808,288
YZ1AU	802,692
S50K	785,312
5B4YX	775,390
PY3OC	734,700
TM5G	715,644
YT9C	674,560
S58AB	644,004

14 MHz

PY0FM	3,225,246
KP2A	2,289,495
CT3DL	1,989,733
V26AS	1,605,289
YW1A	1,521,900
P43A	1,353,440
IT9BLB	1,339,083
9A7A	1,148,928
EA8AFJ	1,024,650
9Y4NZ	976,448
EA8AM	973,080
S53M	955,098
V47NS	935,442
KH2V	918,309
EA8BWW	910,910

7 MHz

T11C	1,218,440
PJ9U	1,198,197
9M8R	1,085,120
S50A	680,732
4M5R	554,332
XQ8ABF	511,344
LU1IV	510,825
HG1S	502,128
S57AL	461,332
9Y4VU	458,476
YT7A	413,316

3.7 MHz

VP2EC	502,866
IG9/IV3TAN	320,235
YW5P	275,771
FS/KH8AL	212,908
9A1CRT	205,308
UN2L	189,699
W6RJ	186,258

YV2IF	176,626
OM3KII	175,716
G3NLY	164,372
VE7SZ	164,104
S57O	153,545
N6VI/KH6	153,342

1.8 MHz

IR4T	67,811
PA3DFT	64,296
F6EZV	61,460
LY1DR	56,644
DL/JA2FJ	44,870
S52CD	41,160
ES5RY	39,180
SM6DOI	37,290
4N7ZZ	34,827
9A1CRU	34,776

LOW POWER ALL BAND

D3X	3,739,680
VP2EJ	3,528,237
FM5DN	3,404,064
LR0N	2,197,420
9X5/VE3MJQ	2,193,466
5U7Y	1,617,815
LU8ADX	1,574,280
V31JU	1,527,111
XE1L	1,245,111
WA2VUY/VP2V	1,209,699
VP2MBA	1,135,490
EA1FBU	1,081,262
K2SG	1,055,150
CT1ENQ	1,054,578
TA2DS	1,020,624
LX1KC	1,011,275
EA3GHQ	1,011,275

28 MHz

LU3MAM	608,125
4X1VF	595,500
EA8AKN	557,091
LW2DBM	542,340
EA8IN	489,818
LU4FCZ	463,478
LU3HYS	460,590
LW2DFH	409,706
EA8BGY	409,323
7P8EZ	395,460
ZS6AXF	358,701

21 MHz

EA8CAL	464,942
UA4LCQ	420,444
ZP5XYE	400,520
YC3SPS	372,240
II6I	355,586
9A5Y	331,584
YB2PBX	328,040
J12UNR	308,022
GI4SNA	305,383

14 MHz

5L2PP	1,989,144
IB4M	1,044,270
PP5JD	692,335
XE3RKK	441,378
L20U	424,190
YV4DSB	415,811
S58FA	402,936
GI0UJG	348,588

7 MHz

CT3BD	222,360
T99W	104,784
RW9AB	90,712
RA3WA	65,751
UT0U	61,410
S51QZ	47,488
IK5WWF	44,897

3.7 MHz

CM3ZD	91,212
T94NE	84,372
IQ5Q	60,716
S51NM	55,692
OK1FPS	47,982
LZ1DM	46,020

UR7TZ	34,980
-------	--------

1.8 MHz

HA8EK	36,780
OZ3SK	28,334
DF9LJ	12,818
UR7CA	11,070
SP5CJQ	9,810
DL5MFL	8,096
UR3PDT	8,034

QRP ALL BAND

NP2Q	778,896
EA3AX	362,368
AA2U	189,442
N1AFC	160,560
YU70KN	154,971
EA1GT	152,656
OK1DKS	147,800
N4PYD	117,300
YU1LM	114,924
EA6SK	114,075
SP8EEX	111,800
OH5NHI	106,106

ASSISTED ALL BAND

P40W	11,404,890
TM2V	3,234,693
IR8A	2,815,605
DL6ET	2,100,298
N3AD	2,081,988
OM5A	2,005,330
ZS94F	1,953,248
K5NA/2	1,948,950
DL3KDV	1,937,012
SM3JLA	1,936,224
K3WW	1,883,028
DJ2YA	1,800,840

MULTI-OPERATOR SINGLE TRANSMITTER

HC8A	18,594,312
VP2E	12,022,335
VP5Y	10,198,905
IQ4A	9,713,640
6D2X	9,522,208
V59T	9,463,891
PT7CB	8,765,859
EA9OB	8,413,425
CT3EE	8,056,308
V31DX	8,030,360
CT5P	7,895,250
V7X	7,855,152
OT4T	7,483,944
PJ8Z	7,446,204
TK5EL	7,073,486
LZ9A	6,965,805
LU1VV	6,931,870
TM1C	6,858,432
9K2ZZ	6,669,368
XF4M	6,339,099
VG3EJ	6,193,010

MULTI-OPERATOR MULTI-TRANSMITTER

PJ1B	41,133,456
J6DX	30,254,355
EA9UK	20,163,927
V26B	18,883,800
LU4FM	18,656,204
ZF2J	15,074,160
HC0E	12,537,339
EM2I	12,442,595
HG73DX	11,814,000
G0KPW	11,682,154
3DA0Z	10,465,564
UU5J	10,338,748
OT4A	9,804,378
IR3R	9,469,070
W3LPL	9,364,575
N2RM	9,128,784

USA ALL BAND

K1AR	3,500,180
K5ZD/1	3,303,806
N4RJ	2,758,455

K3ZO	2,442,206
N6BV/1	2,273,005
N6AR/4	2,061,044
N2IC/0	1,946,052
K5MR	1,892,482
N8II	1,848,330
N2LT	1,843,840
W9RE	1,841,490
N2BA	1,814,050
W2SC/1	1,806,928
W3BGN	1,581,331
WX3N/0	1,382,212
N7AVK	1,358,800
WZ4F	1,308,384
W9ZRX	1,184,309
K1KI	1,125,774
AA4S	1,077,668
AB4RU	1,068,616

28 MHz

KE5FI	99,485
KC2X/4	83,700
N4BP	67,522
W4YV	60,030
KF7E/5	29,862
K9LA	26,373
WB2BZR/3	26,271
KC4YM	22,184
KC5CP	21,440

21 MHz

K4JPD	368,596
N4CT	216,752
K3ZJ/8	195,508
WA2QNW	102,221
K8OQL	100,079
KR4DL	87,172
WB5UDX	87,136
KD9ST	80,682
KC6X	64,428
WB6MZQ	59,888

14 MHz

KM1H	873,000
K2ZJ	388,522
K9JF/7	317,738
W5WMU	312,417
K6HNZ	292,446
N3HBX	247,940
K8GL	237,762
KN6M/5	235,002

7 MHz

K6NA	234,485
KC7EM	193,375
N6RO	154,764
W3GH	147,763
KV8Q	145,935
KV7S	129,708

3.7 MHz

W6RJ	186,258
WE3C	125,939
KO1F	118,230
W9LT/8	99,078
W4PZV	80,224
WA4CTA	65,700
K9HMB	34,265
KM8J	29,592
KK9V	29,400
W5EU	28,160

1.8 MHz

K1ZM/2	18,972
W2VO	5,547
N7DD	5,031
WT8N	4,100
W2FCR	3,990
AA4MM	3,168
K0CS	2,820

LOW POWER ALL BAND

K2SG	1,055,150
KD2NT	602,784
AA4GA	556,010
K0EJ/4	549,984
K7GM/4	521,208
KQ3V	477,312

WE6G/1	464,880
KR4GJ	449,564
N6WLX/8	436,583
WS1A	435,870
K2AZ	422,027
KA1ILG	412,680

28 MHz

KD4LAN	57,288
KC3PZ	38,718
N5OKR/3	22,814
K2EEK	17,520
WB4HFL	10,458
N2QWR	8,651

21 MHz

KO9Y	100,894
NI5M	99,876
AA5ZQ	56,240
NW7Q/0	48,960
KE2WE	46,269
K4HRB	43,575

14 MHz

N4MO	180,310
K2QMF	159,300
N7RO	118,584
W5FO	99,441
WA6KUI/4	99,384
WF1L	99,008
N4YGY	84,558

7 MHz

W9CH	30,702
N1XZ	19,558
AD8J/3	8,976
WW3S	7,742
WA6WPG	7,585
K4LDR	6,426

3.7 MHz

W1MK	13,664
WA2ASQ	5,040
AJ9K	364

1.8 MHz

NO0Y	902
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MULTI-OPERATOR SINGLE TRANSMITTER

KC1XX	3,928,140
K4ISV	3,755,164
N2NU	3,727,570
K1NG	3,239,453
K5XI	3,135,600
N3RS	3,090,936
K2TR	3,038,040
KS9K	2,631,736
K8AZ	2,298,558
KF2ET	2,206,268
AA1K/3	2,171,308
AA4NC	2,108,400
WX0B/5	2,105,733
N1AU	1,988,084
N2MM	1,978,812
W6EEN	1,791,576
W2AX/1	1,752,726
K9UWA	1,643,733
NX0I	1,636,843

MULTI-OPERATOR MULTI-TRANSMITTER

W3LPL	9,364,575
N2RM	9,128,784
K3LR	6,453,378
W4MYA	5,149,224
KY1H	4,678,696
N4ZC	3,720,984
NQ4I	

Expand your Horizon

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

Plus 17 & 12

Ham Radio Outlet
Sunnyvale, CA
(bird not included)

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

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

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

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

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

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

- ◆ The C-3 : 7 elements: riveted and tapered for a low profile, pleasing look; 18' boom, 5.6 sqft, 32 pounds, Easy-On™ mount.
- ◆ The C-3 has deep side nulls and a fine pattern; F/B 14-18 dB; fed with a single 50 ohm coax; 19.8' turning radius.
- ◆ The element-to-boom brackets are pre-aligned on the boom, so every element is straight and will not move.
- ◆ The C-4 maintains the same turning radius, weighs about 40 pounds, with separate feedline so that the C-3 remains intact.
- ◆ Force 12 has more than 60 HF antennas from 3 el 80/75 mtr yagis to 6 mtr beams. The **MAGNUM 2 / 2** shown above is a 2el 80/75 and 2el 40 mtr on a single boom with two feedlines. The **MAGNUM 2 / 2** uses EF-180B (66.5') elements on 80/75 and EF-140 (44.5') elements on 40. At about 14 sqft, the **MAGNUM 2 / 2** is the answer to gain on both bands. Other 80/40 available.
- ◆ Force 12 now offers magnetic transmitting / receiving loops for 40 and 80/75, perfect for limited space and NVIS use: the **MTR-66** (6'x6') and the **MTR-618** (6'x18'), both made with 2" tubing. These mount vertically on the ground, deck, balcony, etc.
- ◆ Force 12 has verticals for 40, 80/75 and 160 mtrs. Add to this the several 20-40 yagis, the 40-30-20 yagi and multiple band antennas like the 5BA (20-10) and the 4BA (17-10). Force 12 offers a pair of 50 ohm 1:1 baluns; fully tested and vacuum impregnated for reliability. The B-1 is rated at 3KW and the B-1/C commercial version with N-connector, rated at 25KW.

The C-3 is available at all 12 HAM RADIO OUTLET stores. List is \$489.00. The C-4 lists at \$649.00. Buy now & have fun!

For full brochure: (408) 720-9073, (800) 248-1985, FAX (408) 720-9055.

Force 12 East: Natan Huffman, W6XR (607) 275-9747

Internet: FORCE12@IBM.NET

In the U.K. & Europe: Vine Antenna Products, Ltd. Ron Stone, GW3YDX

Tel: +44 1691 831111, FAX +44 1691 831386

Why imagine the ultimate when you can have it?

FORCE 12, part of BUY U.S.A., Inc.

3015-B Copper Road, Santa Clara, CA 95051

Force 12
Antennas and Systems

G4KIV	559,200	HA3MQ	221,238	7 MHz	UR7TZ	34,980	CT5P	7,895,250	DL0WW	4,117,200	
CT1ELP	554,931	S54A	219,462	T99W	104,784	OM5KM	30,566	OT4T	7,483,944	GW8GT	4,047,187
28 MHz		OS5GQ	211,914	RA3WA	65,751	UX2MF	24,282	TK5EL	7,073,486	HB9H	4,017,828
OM5FA	234,465	IT9RYJ	201,831	UT0U	61,410	1.8 MHz		LZ9A	6,965,805	MULTI-OPERATOR MULTI-TRANSMITTER	
S50R	214,491	14 MHz		S51QZ	47,488	HA8EK	36,780	TM1C	6,858,432	EM2I	12,442,595
HA8UZ	191,400	IB4M	1,044,270	IK5WWF	44,897	OZ3SK	28,334	OH2M	5,284,258	HG73DX	11,814,000
EA7FTR	129,428	S58FA	402,936	F5BEG	38,016	DF9LJ	12,818	OM3A	5,173,696	G0KFW	11,682,154
CT1ERK	96,516	GI0UJG	348,588	EA3GJH	35,448	UR7CA	11,070	OE2S	5,085,720	UU5J	10,338,748
LZ2RS	95,238	S52OT	269,080	ER3DX	35,350	SP5CJQ	9,810	OK5W	5,069,204	OT4A	9,804,378
21 MHz		GI0SAP	214,428	3.7 MHz		DL5MFL	8,096	IR2W	5,003,685	IR3R	9,469,070
UA4LCQ	420,444	UR4LUG	208,240	T94NE	82,236	UR3PDT	8,034	ZA9A	4,745,347	RU6L	7,084,700
I16I	355,586	RN3QO	195,849	IQ5Q	60,716	MULTI-OPERATOR SINGLE TRANSMITTER		DF0HQ	4,715,568	PI4COM	5,921,162
9A5Y	331,584	S57U	187,330	S51NM	55,692	IQ4A	9,713,640	EA3KU	4,437,196	F6BEE	5,866,080
GI4SNA	305,383	IK4LZH	186,202	OK1FPS	47,982			CT8T	4,328,149		
S57J	233,616	S58WW	179,620	LZ1DM	46,020			IU4U	4,265,072		
								YT1AD	4,259,010		

The 1994 CQ WW DX CW Contest High-Claimed Scores

WORLD ALL BAND		OK1RF	622,104	YU1HA	59,169	N1AFC	228,501	K3LR	7,581,000	3.5 MHz	
EA8EA	12,854,450	9A7A	617,520	VK4XA	57,798	K4LTA	191,352	ZM2K	6,859,466	W1MK	206,132
P40F	12,585,648	7 MHz		UA0AGI	53,404	N7IR	164,016	JA3ZOH	6,512,896	WZ3Q	119,238
PY0FF	11,102,481	EA9EO	1,150,226	21 MHz		OH1LUZ	162,792	Z30A	6,510,713	K4PI	111,435
HC8N	10,420,416	PJ9U	1,121,869	KP4TQ	413,640	ASSISTED ALL BAND		JH5ZJS	5,731,698	WA4CTA	107,576
PZ5JR	8,452,080	TI1C	1,002,510	WP4/AA3BG	311,852	P40W	10,517,730	PI4COM	5,671,848	W9LT/8	89,337
H20A	7,521,310	9K2ZZ	958,358	VK2AYD	293,184	K12M	3,516,570	USA ALL BAND		WE3C	85,728
HC1OT	7,203,006	S50C	753,590	YZ1AU	279,524	OM3NA	3,036,488	KM1H	4,110,456	WB3GU	83,930
A71CW	6,524,159	S50A	752,930	LU5FDQ	237,720	K3WW	3,022,020	K5ZD/1	4,092,860	NU4Y	68,907
VS6WO	6,128,788	ZL3GQ	718,980	S57J	235,008	K1IU	2,536,264	W1KM	3,525,168	1.8 MHz	
HC8KU	5,672,200	OMBA	683,200	YB3FFB	233,886	AA2DU/1	2,434,122	N2NT	3,346,980	K4TEA	24,794
9M8X	5,454,636	YT7A	643,626	9A3ER	232,140	N3AD	2,250,423	N4RJ	3,343,215	WB9Z	24,640
ZS6EZ	5,401,207	A22MN	630,630	ON4RU	203,987	DJ2YA	1,939,751	N2LT	3,077,320	KV0Q	15,004
3G1X	4,139,394	9A3IQ	546,426	FK0P	203,448	K1DG	1,927,081	N6BV/1	2,846,922	W2VO	10,726
KM1H	4,110,456	VG7SZ	500,880	14 MHz		K2BU	1,887,171	K3ZO	2,837,403	KX4R	9,676
K5ZD/1	4,092,860	3.5 MHz		PT7CB	1,254,130	K5NA/2	1,848,460	W2SC/1	2,481,304	K5WXZ	5,152
KP2WJ2O	3,776,500	ZB2X	484,544	LU1ICX	407,226	K2LE	1,646,084	W4RX	2,409,218	LOW POWER ALL BAND	
DX1EA	3,766,896	SN3A	451,385	OL7Z	357,046	AA4NC	1,605,769	N6AR/4	2,409,204	W2UP/3	1,480,920
S59A	3,542,064	UN2L	441,894	SP9YDX	334,126	VS6BG	1,491,048	W3BGN	2,324,342	W1PH	1,303,452
W1KM	3,525,168	CT3FN	392,890	OH3LIM	300,875	NN3Q	1,429,418	KT3Y/4	2,265,430	K7GM/4	1,255,254
VK8TM	3,475,170	4N1A	327,474	OH6LBW	266,805	AA3B	1,333,216	K5MR	2,057,718	K7SV/4	1,064,250
YU7AV	3,449,581	OM5M	307,956	JA7SSB	243,252	DL2HBX	1,313,252	W1WEF	2,050,597	K2OMF	754,454
N2NT	3,346,980	S58A	291,584	S57U	208,575	K2PS	1,196,920	N2BA	2,019,328	K6XV	752,760
N4RJ	3,343,215	EA3KU	267,546	UU9JCF	197,478	F5NBX	1,176,650	K0RF	2,011,257	W6JTI	747,129
DL6RAI	3,233,816	SP7GIQ	254,487	JH6WHN	190,043	N4XR	1,131,316	W9RE	1,887,584	K2TE/1	746,060
TM7XX	3,147,178	S53DCM	252,160	N4MO	186,320	JW0I	1,077,780	N5RZ	1,824,268	KM1X	711,510
G4BUO	3,139,080	LY1DR	234,168	7 MHz		W3MM	1,056,632	K6NA	1,636,892	K5KLA	635,168
N2LT	3,077,320	S53O	213,125	YM2DS	624,750	MULTI-OPERATOR SINGLE TRANSMITTER		28 MHz		K4YV	33,490
F6FGZ	3,020,688	S59KW	212,004	YT7AR	531,180	IQ4A	8,955,156	KE3Q	49,500	W4YV	33,490
28 MHz		W1MK	206,132	UR5QSK	450,447	NP4Z	8,421,980	W4BP	30,094	N4BP	30,094
XR3A	825,110	HC7SK	203,112	KP4VA	242,100	LZ9A	8,225,600	W6ISQ	2,070	W6ISQ	2,070
LU6ETB	372,096	1.8 MHz		EABCN	210,888	OT4T	7,741,800	WA7KLK	2,050	WA7KLK	2,050
ZS6NW	302,614	4X4NJ	189,888	S54A	209,151	HZ1AB	7,247,760	21 MHz		KC2X/4	231,660
KG6DX	216,960	OM7A	136,372	UR3IEW	184,352	6D2X	7,033,230	W6YA	215,138	W6YA	215,138
EA6ZY	165,000	SP5GRM	129,140	PA3AAV	159,432	OH2M	7,002,750	K4ISV	214,866	K4ISV	214,866
S53EA	148,092	I3JSS	113,804	IQ9AF	157,665	C6AHX	6,954,955	N4CT	204,054	N4CT	204,054
HG0D	137,241	F6EZV	107,624	3.5 MHz		VE3EJ	6,728,774	K4JPD	194,600	K4JPD	194,600
S51AY	102,492	DL1IAO	105,644	UA0SMM	171,647	K1AR	6,713,460	W4PZV	169,250	W4PZV	169,250
EA9GK	91,700	IT9ZGY	88,466	S52OP	89,628	GX0AAA	6,534,200	K8OQL	124,137	K8OQL	124,137
4X/OK1JR	88,000	OZ1ING	85,184	OM3ZBU	85,814	TM9C	6,493,662	K9OM	63,700	K9OM	63,700
21 MHz		9A4D	78,876	LY2BZ	80,898	DF0HQ	6,448,372	W6BSY	55,440	W6BSY	55,440
ZP0Y	1,931,496	ES5MC	70,980	YA9YNC	65,160	G3LNS	5,663,840	14 MHz		K3EST/6	465,740
CR3U	816,858	T94DD	61,983	LY3ID	60,352	GB5DX	5,662,960	K2SX/1	445,876	K2SX/1	445,876
9Y4VU	739,815	LOW POWER ALL BAND		OK1RR	60,344	N2NU	5,556,980	K8GL	435,862	K8GL	435,862
EA9EU	678,249	9X5EE	4,379,388	SP2WDW	59,120	KC1XX	5,546,308	K0KE	416,208	K0KE	416,208
TU2MA	611,730	EA7CEZ	3,696,300	RW1AN	55,335	LU4FM	5,517,204	WM4Z/5	206,030	WM4Z/5	206,030
S50K	453,840	J80C	2,674,004	CO2VG	50,760	N3RS	5,339,940	W6QHS	195,834	W6QHS	195,834
EA7KW	418,304	ZF8BS	1,893,672	OH3NLP	50,220	OH7X	5,222,088	W1ZK	175,824	W1ZK	175,824
JH7DNO	359,520	EA5WU	1,750,584	1.8 MHz		IR2W	5,216,724	WB2ABD	172,777	WB2ABD	172,777
CS3T	352,938	S59AA	1,679,476	9A2OB	45,150	ZF1A	5,054,879	W9OF	170,955	W9OF	170,955
OH1AF	341,691	F6DDR	1,615,140	YU1RA	42,984	4U1VIC	5,006,210	KA6A/7	166,784	KA6A/7	166,784
14 MHz		W2UP/3	1,480,920	GI0KOW	41,580	MULTI-OPERATOR MULTI-TRANSMITTER		K9CAN	160,992	K9CAN	160,992
P40J	1,785,960	XE1/AA6RX	1,331,323	RX9ST	31,360	9G5AA	23,608,784	7 MHz		KC7EM	423,801
CR3P	1,370,220	W1PH	1,303,452	IV3KTY	20,406	VP5VW	21,956,910	N6AW	359,176	N6AW	359,176
KP2A	1,366,290	K7GM/4	1,255,254	OM2XW	20,022	HG73DX	16,333,200	W3GH	195,243	W3GH	195,243
OH0BH	1,142,609	5U7Y	1,243,920	ORP ALL BAND		YK0A	11,789,616	NX7K	173,810	NX7K	173,810
TG0AA	1,073,250	TA3D	1,197,914	TA4ZM	1,816,547	EM2I	10,623,744	K0OD	125,664	K0OD	125,664
9N6NA	989,757	9A2AJ	1,066,530	AA2U	535,572	RW9C	10,279,614	WB4MAI	121,448	WB4MAI	121,448
LZ5W	960,572	K7SV/4	1,064,250	LY3BA	497,511	W3LPL	10,230,816	W1FEA/6	110,250	W1FEA/6	110,250
IO9T	852,544	JH0KHR	1,061,530	UX8IX	420,783	UU5J	9,525,097	AD4MQ	87,252	AD4MQ	87,252
HK1HHX	816,785	28 MHz		I1BAY	401,793	N2RM	9,331,868	NJ2L/1	62,060	NJ2L/1	62,060
OH2PM	766,263	EA8/EA1AK	412,500	KP4DDB	337,680	J77J	8,755,656	3.5 MHz		AA9AX	12,449
OH6NIO	728,550	LW4DYI	289,575	DL3KVR	269,040	OL7O	8,586,957	K7WA	736	K7WA	736
S53M	710,430	YV3AJ	286,042	IK2LEY	248,939	RU1A	8,479,546	1.8 MHz		W2FCR	10,203
VE9ST	687,225	PJ2/PA0VDV	148,808	JA2IVK	243,951	K1KI	8,228,402				
OH8LQ	666,900										
OH1NSJ	635,537										
RZ9UA	627,238										

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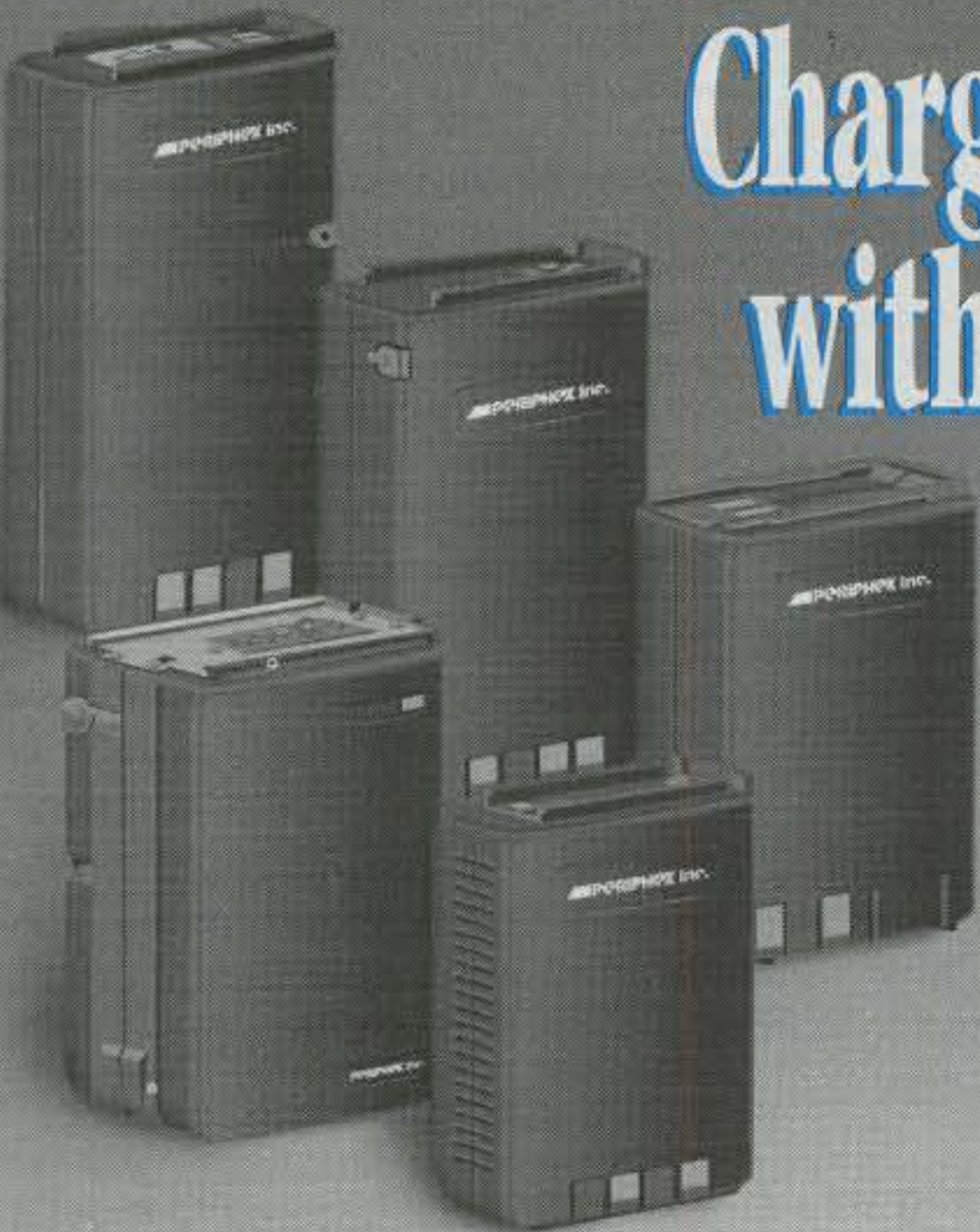
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BP-8	Icom 8.4v 1400mah	was \$75	NOW \$49⁹⁹
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Dynamic ALC™ doubles average SSB power
The AL-80B's exclusive *Dynamic ALC™* gives you high-level low-distortion RF processing. When activated, it can more 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 dots 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.

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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.

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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

AL-1500
\$2695⁰⁰
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.

Ameritron's Dual 3-500Z linear

AL-82
\$2095⁰⁰
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.

Ameritron's 3CX1200A7 linear

AL-1200
\$2195⁰⁰
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



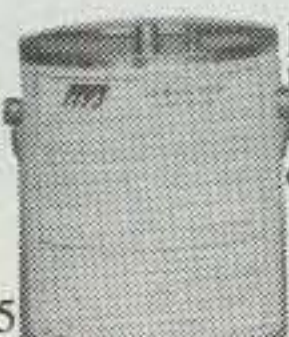
Ameritron -- the high power specialist -- brings you the ATR-15 antenna tuner that's designed for legal limit amplifiers. Heavy duty silver plated bandswitch virtually eliminates switch failure. High power transmitting capacitors. 1.8-30 MHz. Peak reading SWR/wattmeter. 6 position antenna switch. Selectable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

Legal Limit Dummy Load

ADL-1500X
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Suggested Retail

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



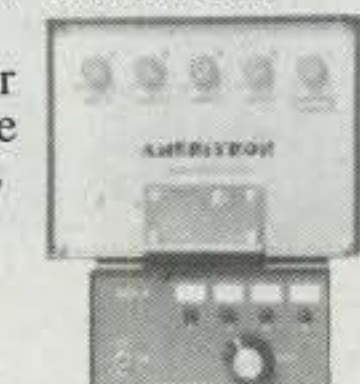
Remote Coax Switches

RCS-8V
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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
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Suggested Retail



QSK-5 Pin Diode T/R Switch

QSK-5
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NEWS OF CERTIFICATE AND AWARD COLLECTING

Dorothy Johnson, WB9RCY Silent Key

Only recently did we learn of the passing of Dorothy Johnson, WB9RCY, last year. Dorothy, USA-CA #320 (April 9, 1981), was CQ's USA-CA Award Custodian from 1982 to 1992. She was honored by her peers of the Mobile Amateur Radio Awards Club (MARAC) as the 1978 Mobile Operator of the Year and as County Hunter of the Year in 1979. Dorothy practiced amateur radio at its finest. She was always considerate and helpful to award chasers of the world.

Dorothy is missed by us all. Our condolences to her husband, Wayne, N9WA.

This month we salute James Paulick, KA9PZS, USA-CA #810.

Jim is a native of Minneapolis, Minnesota and is a retired Commander, USN, having won a battlefield commission during World War II. He is an engineering graduate of Rensselaer Polytechnic Institute, the Naval Post-Graduate school, and the Naval War College. Among his many naval assignments were Meteorology Instructor at the Naval Officer Candidate School, Newport, Rhode Island; Executive Officer of an underwater demolition team; and Technical Advisor for the movie *Frogman* starring Richard Widmark, Dana Andrews, and Garry Merrill.

Retiring after 23 years, Jim began a career managing shopping plazas in the midwest. He and his wife, Francis, have retired and now reside in Mentor, Minnesota. However, Jim remains active with various amateur radio activities.

Jim's interest in amateur radio began in 1979 when he was first licensed. He is a certified Skywarn Trained Observer and is a member of the Polk County Sheriff's Skywarn Team in Crookson, Minnesota.

Jim has been instrumental in maintaining the ranks of amateur radio by teaching Novice classes. He is also a National Volunteer Examiner Coordinator.

CQ congratulates Jim, KA9PZS, USA-CA #810 for his achievement and his contribution to amateur radio.

MARAC '95

Don't forget the Mobile Amateur Radio Awards Club Annual Convention in Hamburg, New York, July 5-9, 1995. My wife, Carol, has just completed a lovely red, white, and blue afghan with a matching tote bag for one of the many valuable door

Box 76, Pleasant Mount, PA 18453-0076

SPECIAL HONOR ROLL

Gene Barnes, KG5E
USA-CA All Counties #862
March 15, 1995

Clarence E. Crouch, KA4BHL
USA-CA All Counties #863
March 28, 1995

Ernest J. Zingleman, KS4Q
USA-CA All Counties #863
March 28, 1995

prizes. It is a lovely part of the country, so plan a visit that weekend!

Awards Issued

We call attention to a remarkable achievement: Willard W. Waite, W8GDQ, is receiving USA-CA #500 and USA-CA #1000 this month for making 1000 contacts on 160 meters. Way to go, John!

USA-CA 500 award winners: K5GE, Gene Barnes; VE6JAV, John A. Vogrinetz; OA4QV, Cesar A. Aguirre; KR1B, Robert L. Snowman; OE5NNN, Max Plohberger; LU8ESU, Jose A. Stragia; W8GDQ, Willard W. Waite; KA4BHL, Clarence E. Crouch; KS4Q, Ernest J. Zingleman; KE2FZ Eugene Harrington.

USA-CA 1000 award winners: K5GE, Gene Barnes; W8GDQ, Willard W. Waite; KA4BHL, Clarence E. Crouch; KS4Q, Ernest J. Zingleman; KE2FZ, Eugene Harrington.

USA-CA 1500 winners: K5GE, Gene Barnes; KA4BHL, Clarence E. Crouch; KS4Q, Ernest J. Zingleman; KE2FZ, Eugene Harrington.

HONOR ROLL

500		2000	
K5GE	2836	K5GE	1047
VE6JAV	2837	KA4BHL	1048
OA4QV	2838	KS4Q	1049
KR1B	2839	KE2FZ	1050
OE5NNN	2840		
LU8ESU	2841	2500	
W8GDQ	2842	K5GE	969
KA4BHL	2843	KA4BHL	970
KS4Q	2844	KS4Q	971
KE2FZ	2845	KE2FZ	972
1000		3000	
W8GDQ	1366	K5GE	887
K5GE	1367	KA4BHL	888
KA4BHL	1368	KS4Q	889
KS4Q	1369	KE2FZ	890
KE2FZ	1370		

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.

USA-CA 2000 winners: K5GE, Gene Barnes; KA4BHL, Clarence E. Crouch; KS4Q, Ernest J. Zingleman; KE2FZ, Eugene Harrington.

USA-CA 2500 winners: K5GE, Gene Barnes; KA4BHL, Clarence E. Crouch; KS4Q, Ernest J. Zingleman; KE2FZ, Eugene Harrington.

USA-CA 3000 winners: K5GE, Gene Barnes; KA4BHL, Clarence E. Crouch; KS4Q, Ernest J. Zingleman; KE2FZ, Eugene Harrington.

Until next month...73, Norm, WA3RTY



Jim Paulick, KA9PZS, USA-CA #810.

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- ★ Export, commercial and military (including MARS) communicators note that our higher power 8K ULTRA is also available for prompt delivery.

It is rugged, reliable, remotely tuned and offers full power and efficiency on all bands between 1.8 and 24 MHz. Frequencies above 24 MHz are available on export models. The amplifier offers 6 memory channels for automatic tuning on your choice of frequencies. A small, light-weight, remote control cabinet sits at the operating position, while the amplifier itself can be across the room, in a closet, or in the next room. We manufacture many other HF, VHF, and UHF amplifiers, all still available as before. All domestic and foreign inquiries are invited. Write for full specifications on the 3K Ultra or for our complete amplifier information packet. Don't wait any longer to own the amplifier you have always wanted.

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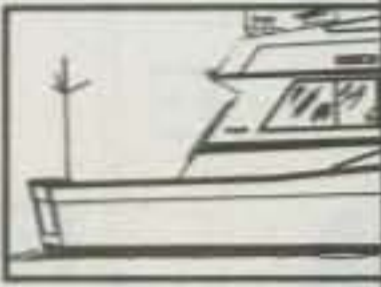
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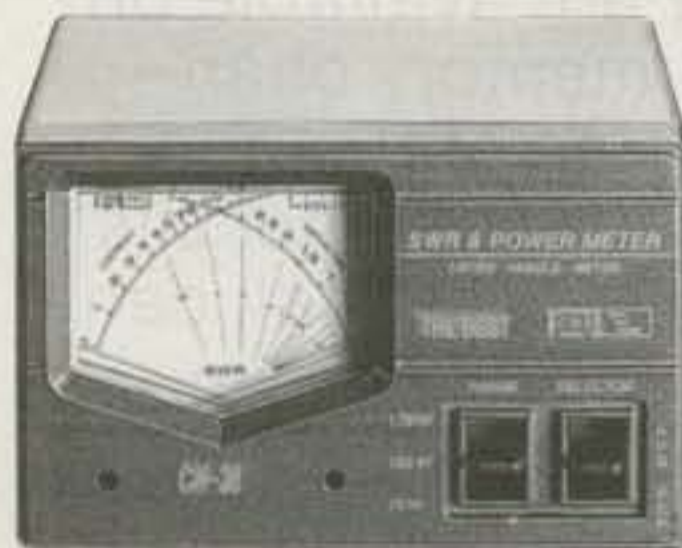
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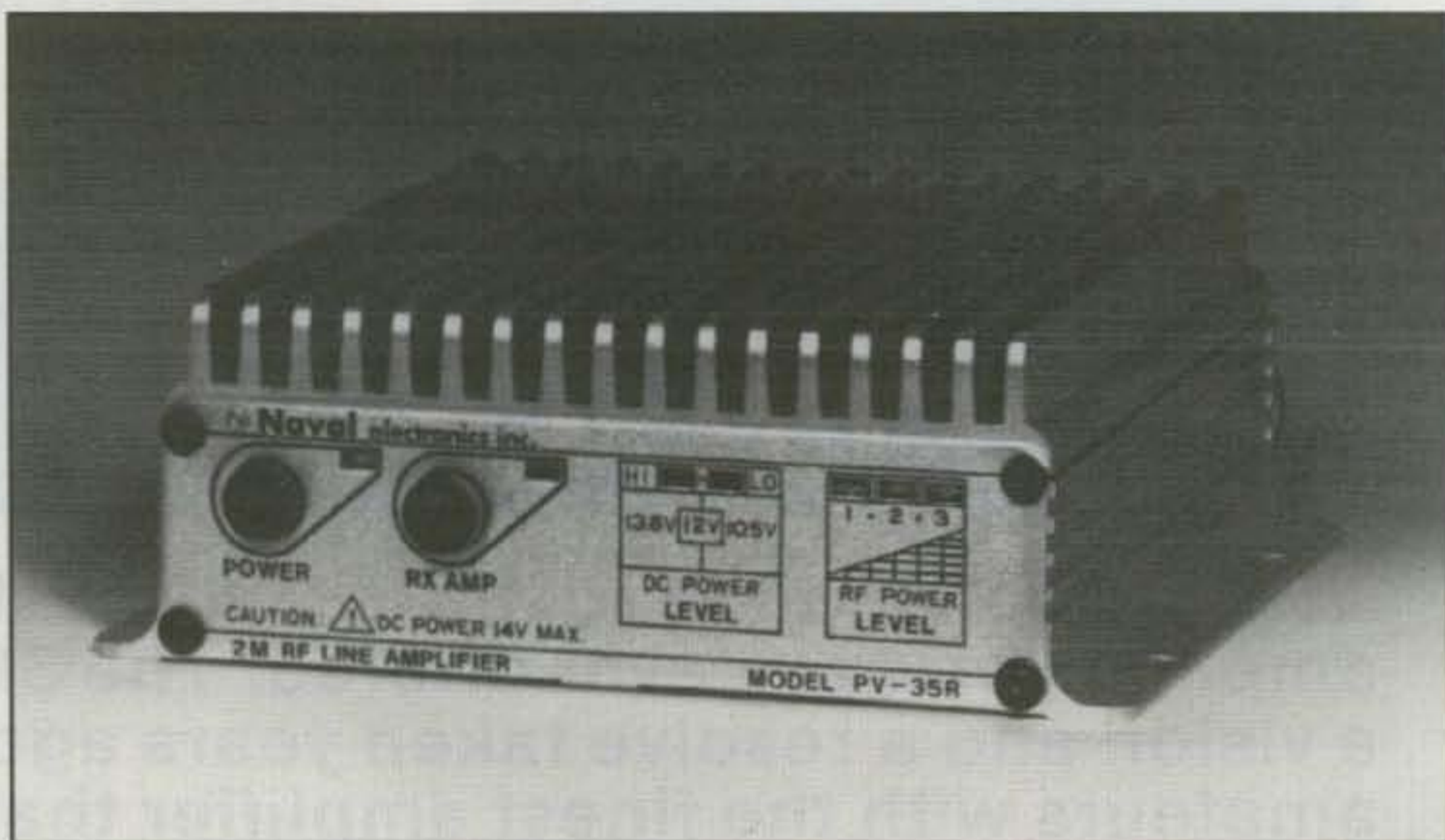
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CIRCLE 93 ON READER SERVICE CARD

CQ REVIEWS:

The Naval PV-35R 2 Meter Linear Amplifier

BY LEW McCOY*, W1ICP



The PV-35B presents a neat amplifier package. At the right is the power switch, and to its right is the receiver amplifier. The DC power levels are displayed via LEDs, as are the output levels.

The PV-35R, marketed by Naval Electronics, Inc., is a linear amplifier designed for 2 meter signal amplification, both on transmit and receive. Primarily, this amplifier is for use with a handheld in either base or mobile operation. The unit I had for review was not an "all mode" type, but an all-mode version can be had for an additional charge of \$10.00 for the modification. This means that in addition to 2 meter FM, the amplifier can be used with AM, standard FM, CW, SSB, RTTY, and packet.

Essentially, the amplifier provides 10 decibels of gain. I tested it at one-tenth watt input and got 1 watt out. Next, at 1 watt input I got 10 watts out. And last, at 3 watts input the amplifier put out 30 watts.

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

On the front of the amplifier are three LEDs which show the power output at either 10, 20, or 30 watts. This is a very handy display. Power-supply requirements are 10.5 volts to 14 volts (13.8) DC at 5 amperes. The amplifier measures only 4" x 4" x 2". It comes with UHF fittings.

The receiving preamp uses GaAS FETs and does an effective job on weak-signal amplification. I found the amplifier to be very useful in marginal repeater situations. Many times a repeater can be on a fringe for your operation, particularly if you are using a handheld. This amplifier, along with a reasonable antenna, will certainly cure such problems.

The PV-35R is manufactured by Naval Electronics, Inc., 5417 Jetview Circle, Tampa, FL 33634 (613-885-3789). The amplifier sells for \$149.00 plus \$7.50 shipping and handling.

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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!*

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- New improved Voice Noise Reduction software
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Timewave has sold more DSP units through its worldwide distribution network than any other manufacturer in amateur radio. And we listen to the satisfied customers who own Timewave's proven products. Their suggestions and ideas to our customer service and support help us keep Timewave ahead in its quest for the best in DSP!

Call Timewave for information on \$10 updates for older DSP-9+ and DSP-59+ Noise Filters.



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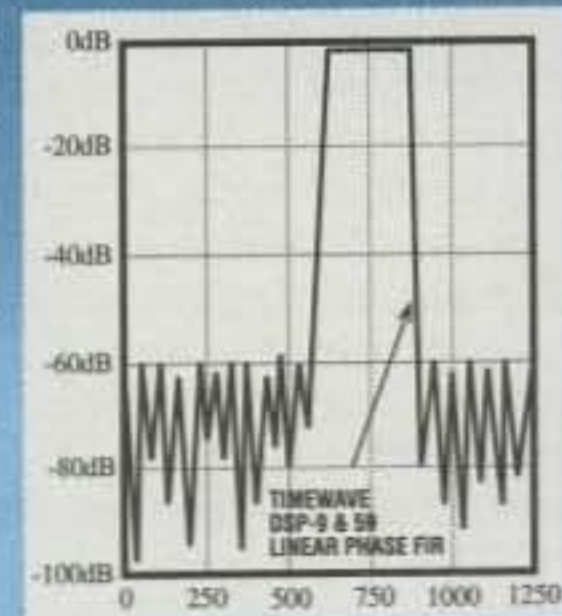
Now hundreds of CW and Bandpass filters allow the operator to select almost any filter combination. The easy turning filter knobs allow continuous coverage. Includes all data filters in the DSP-9+ plus G-TOR[®], SSTV, EME and WEFAX. Voice filters cover 200Hz to 3.4kHz. 13 CW center frequencies, CW bandwidths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



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"HOW TO" FOR THE NEWCOMER TO AMATEUR RADIO

Potpourri

This month's column features a variety of information which should be of interest to many readers.

Insurance

Many amateurs have their equipment insured through the ARRL's insurance program. Ham Radio Insurance Associates, Inc. (HRIA) now offers an alternative plan. HRIA president is Bill Hill, W3IBT. The HRIA plan does not charge any administrative fee, and it is available to all licensed amateurs. At an additional fee, it can cover antennas, rotators, and towers which have not been covered under the ARRL plan. Mechanical breakdown and electrical injury coverages are also available at extra cost. Their address is P.O. Box 201, Canonsburg, PA 15317-0201 (phone and FAX 1-800-545-8881).

Silent Keys Memorial Tree

The Southern Oregon Amateur Radio Club planted a 5 foot deodara cedar tree in the Merlin Memorial Park, which is located 9 miles north of Grants Pass. This tree is dedicated to the memory of all Oregon Silent Keys. A brass plaque will be attached to the tree, and it will have a drawing of a telegraph key etched on it. Fred Schotte, N7XNH, urges other clubs and individuals to honor their Silent Keys in a similar manner.

Publications

The April 1994 "Bill's Basics" column was exclusively devoted to amateur radio publications. The coverage in this article supplements that extensive article.

CQ Communications publishes a variety of magazines, books, and videos. In addition to CQ, the magazines include *Communications Quarterly* (an amateur radio magazine for the technically oriented ham), *Popular Communications* (for the shortwave and scanner buff), *Microcomputer Journal* (for the hands-on computer enthusiast), *Electronic Servicing & Technology* (for electronics and computer servicing people), and related buyer's guides. Also available are videos and books. The latest addition to CQ's line of books is *The NEW Shortwave Propagation Handbook* by W3ASK, N4XX, and K6GKU. For more information, see the CQ Books and Videos ad in this issue.

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Don Sanders, KE6JZK, of San Diego, California is an ex-student of Jack Dobbs, WB6AXW. Don is a technical editor who works on books about cars.

Low-Profile Amateur Radio (Hidden Antennas)
Physical Design of Yagi Antennas
Practical Wire Antennas
Reflections: Transmission Lines and Antennas
The ARRL Antenna Book
The ARRL Antenna Compendium Series
(3 volumes)
Transmission Line Transformers
W1FB's Antenna Notebook
Yagi Antenna Design

Callbooks and DX

International Callbook
North American Callbook
The Complete DX'er
The DXCC Companion: How To Work Your First 100 Countries
N6RJ's Second OP
FCC—The FCC Rule Book

Fiction

CQ Ghost Ship
Death Valley QTH
DX Brings Danger
Firewatch
Grand Canyon QSO
Hostage In The Woods
Murder By QRM
Night Signals
SOS At Midnight

History

Fifty Years of ARRL
From Spark To Space
200 Meters and Down

Instructor's Manuals

Novice/Technician
General

Proceedings of The ARRL National Educational Workshop

Interference and Direction Finding Interference Handbook
Radio Frequency Interference: How To Find It and Fix It
Transmitter Hunting: Radio Direction Finding Simplified

Introductory (books for new amateurs)

First Steps In Radio
Ham Radio Horizons: The Book, What Ham Radio Is All About And How To Get Started
Novice Notes: The Book
Operating An Amateur Radio Station
Understanding Basic Electronics
W1FB's Help For New Hams

Licensing Manuals

Now You're Talking—Novice and Code-Free Technician
Technician
General
Advanced
Extra
Morse Code: The Essential Language

Packet Radio/Computer/Radioteletype
Amateur Packet-Radio Link-Layer Protocol
In NOSintro: TCP/IP Over Packet Radio
Your Gateway To Packet Radio
Your Packet Companion
Your RTTY/AMTOR Companion

Practical Circuits

QRP Classics
Radio Communication Handbook—RSGB
Solid State Design For The Radio Amateur

W1FB's Design Notebook: Practical Circuits
For Experimenters
W1FB's QRP Notebook

Reference

ARRL Handbook For Radio Amateurs
Ferrell's Confidential Frequency List
Hints & Kinks For The Radio Amateur
Passport To World Band Radio
The ARRL DXCC Countries List
The ARRL Electronics Data Book
The ARRL Net Directory
The ARRL Operating Manual
The ARRL Radio Buyers Sourcebook,
2 volumes—ARRL Product Reviews
The ARRL Repeater Directory
The RSGB Amateur Radio Awards Booklet
The RSGB Operating Manual
World Radio TV Handbook
Your QRP Operating Companion

VHF/UHF

ARRL Satellite Anthology
ARRL Spread Spectrum Sourcebook
Beyond Line of Sight: A History Of VHF
Propagation From The Pages of QST
Microwave Handbook (3 volumes)
Radio Auroras
The ARRL UHF/Microwave Experimenter's
Manual
The Satellite Experimenter's Handbook
The VHF/UHF DX Book
VHF/UHF Manual
Weather Satellite Handbook
Your VHF Companion

Ameco Corporation, 224 East Second St.,
Mineola, NY 11501.
Novice Licensing Manual
Code-Free Technician Licensing Manual
Technician-Plus Licensing Manual

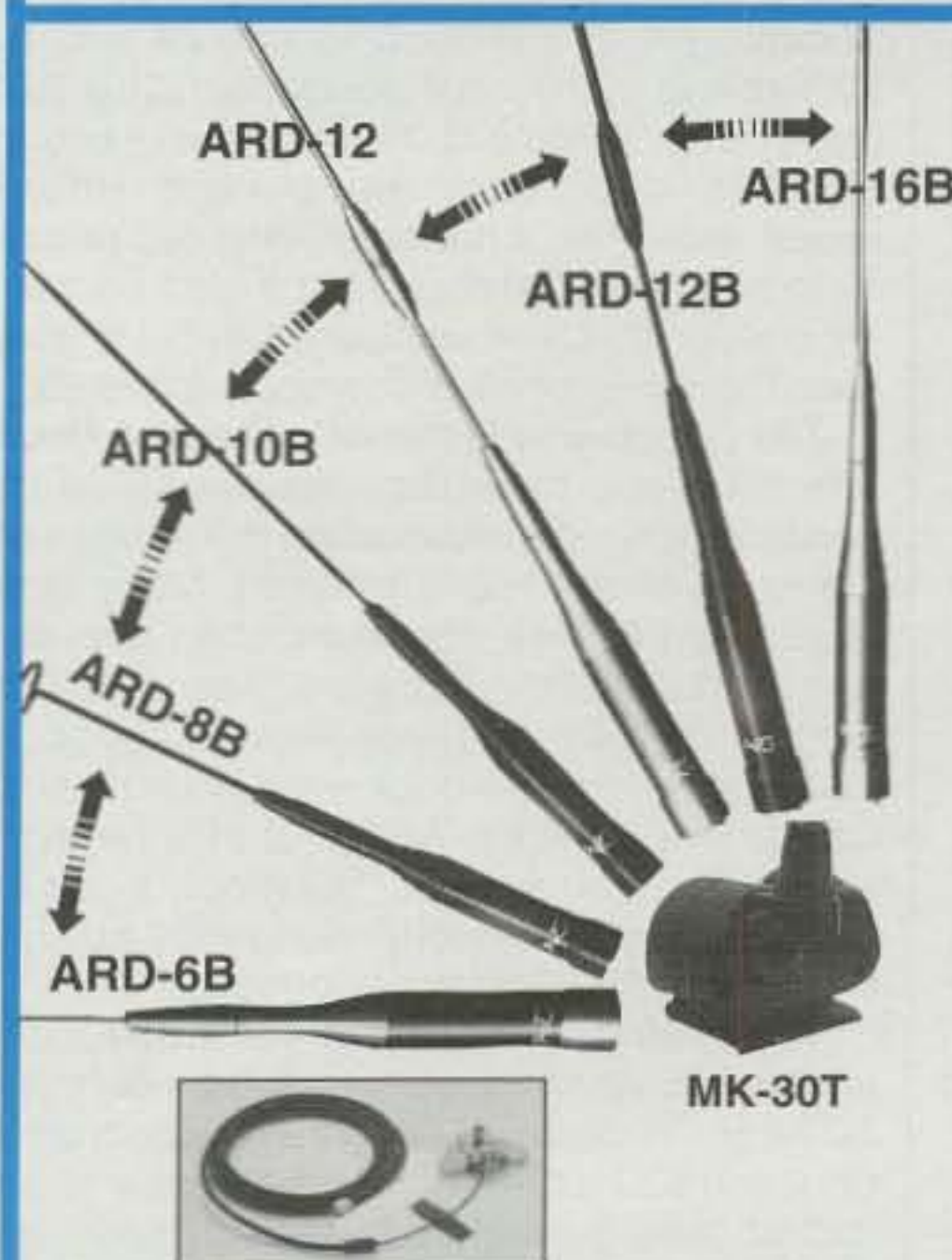


Gerry Santos-Cuyugan, DU1JUX, of Manila, The Philippines is an inspector at the Manila Airport, which gives him the chance to meet many amateurs. He was first licensed in 1992 and has progressed to a General class license. He is active on HF, VHF, and UHF, and has had contacts with more than 50 countries so far.

Artsci, Inc., P.O. Box 1428, Burbank, CA
91507.
Amateur Hambook
Federal Assignments (frequencies)
Ham Radio Atlas
Ham Radio Resource Guide (S.CA)
Lost Users Manuals (Alinco, ICOM, Kenwood,
Standard, Uniden, Yaesu, etc.)
North American Shortwave Frequency Guide
Police and Fire Communications Handbook

Quick-N-Easy Shortwave Listening
MFJ Enterprises, Inc., P.O. Box 494, Mis-
sissippi State, MS 39762.
Easy-Up Antennas
Golden Classics of Yesteryear
Ham Radio Communications Circuit Files
Mobile Handbook
Oscar Satellite Revue
Packet Radio Is Made Easy
The Fox Hunt Adventure

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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.

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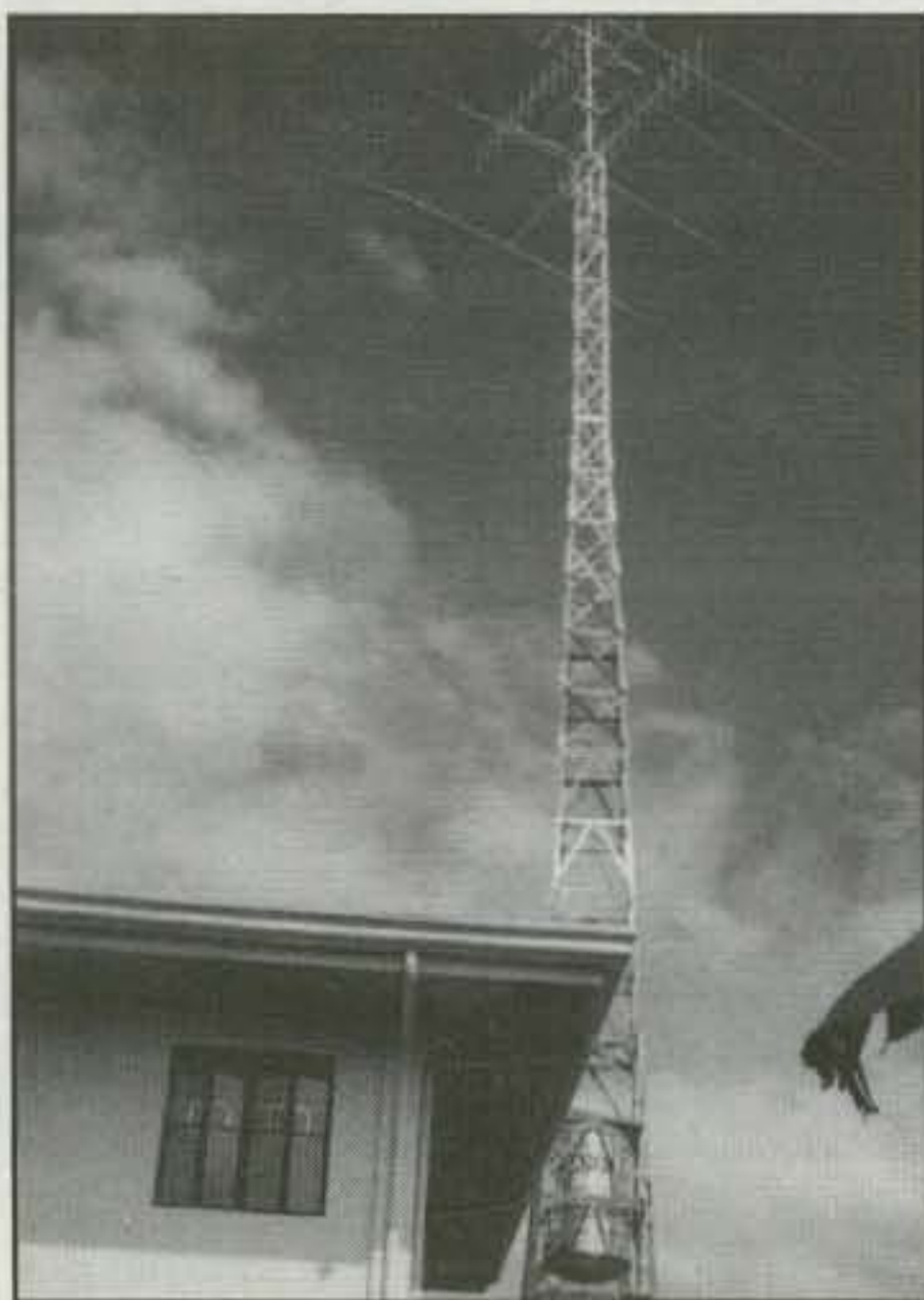
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The QTH of DU1JUX in Manila.

The Packet Radio Operator's Handbook
The Shortwave Listener's Guide For Apartment/Condo Dwellers
The Wonderful World of Ham Radio: An Introduction For Young People
Troubleshooting Antennas & Feedlines
National Amateur Radio Assn. (NARA),
 P.O. Box 598, Redmond, WA 98073-0598.
How To Get Started In Packet Radio

The Art and Skill Of Radio Telegraphy
Radio Amateur Callbook, P.O. Box 2013,
 1695 Oak Street, Lakewood, NJ 08701.
All About Cubical Quad Antennas
All About Vertical Antennas
All About VHF Amateur Radio
Beam Antenna Handbook
Interference Handbook
International Callbook
North American Callbook
Simple Low-Cost Wire Antennas for Radio Amateurs
The Radio Amateur Antenna Handbook
The W5YI Group, P.O. Box 565101, Dallas,
 TX 75356.
Be A Ham Operator
Various Licensing Materials
Tiare Publications, P.O. Box 493, Lake
 Geneva, WI 53147.
Basic Guide To VHF/UHF Ham Radio
Ham Radio Contesting
Low Power Communications—Basic QRP
Monitoring NASA Communications
Pse QSL! An Expert's Guide To Amateur Radio QSLing
The World Ham Net Directory
Weather Radio

Worldradio, P.O. Box 189490, 2120 28th
 Street, Sacramento, CA 95818.
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Satellite Times. This new publication covers satellite information from the lowest to the highest frequencies. The 90-page initial issue (Vol. 1, No. 1) is dated September/October 1994, and it has a cover price of \$3.50 (U.S.) or \$5.75 (Canada). The annual subscription rates are \$19.95 (U.S.) and \$26 (foreign). This

is a publication of Grove Enterprises, P.O. Box 98, Brasstown, NC 28902-0098. Bob Grove, WA4PYQ, is the owner and publisher of *Satellite Times*. The premiere issue covers amateur satellites, beginner's section, direct broadcast satellite programming, downlink, frequency guide, global positioning system, information highway, international TVRO, Jupiter fireworks, launch reports, listening to the cosmos, locations, music on spheres, new products, new items, orbital propagation, Primestar, revealing satellite mysteries, satellite antennas primer, schedules, shortwave broadcasts, terminology, transponders guide, uplink, and weather satellites. There are also advertisements to check out.

Aeronautical Frequencies. If you like to eavesdrop on aeronautical communications, the second edition of the *Worldwide Aeronautical Communications Frequency Directory* should be of interest to you. This 250-page soft-cover book lists 2,350 discrete frequencies, including full commercial and military coverages. Shortwave, VHF, and UHF voice communications frequencies are detailed in this directory. Shortwave and VHF digital communications frequencies are specified in this book, which has a cover price of \$19.95. For additional information, contact Universal Radio, 6830 Americana Parkway, Reynoldsburg, OH 43068.

Scanning Book. If you are a scanning enthusiast, TAB has a new book that may be of interest to you. The title is *Tuning in to RF Scanning*. It includes information which can help you select a suitable scanner, antenna, and accessories. Scanning clubs and scanner publications are listed in this 176-page book, which includes 150 illustrations. This book is priced at \$14.95 paperback and \$24.95 hardcover. If it is unavailable in a local bookstore, it can be obtained from TAB Books, Blue Ridge Summit, PA 17294-0850.

Shortwave Antennas Book. The second edition of *Build Your Own Shortwave Antennas* is now available from TAB Books, Blue Ridge Summit, PA 17294-0850. It should also be available in many local bookstores. This 224-page book contains 150 illustrations. It covers portable, directional, indoor, and limited-space antennas. It has been directed primarily to shortwave listeners, but it also contains information that new amateurs can put to good use. The cover price of this book is \$16.95.

The Shortwave Listener's Q and A Book. This 160-page book provides a detailed but easily understood introduction to the fascinating world of shortwave listening. Many amateurs expand their communication activities with shortwave listening; it is a great adjunct to our hobby. The text is supplemented by about 100 illustrations. This book was written by Anita Louise McCormick, KA8KGI. It may be available at local bookstores, but if not, it can be obtained from TAB Books, Blue Ridge Summit, PA 17294-0850. The cover price is \$12.95.

The 50 MHz DX Bulletin. If you are a 6 meter enthusiast, you may want to subscribe to the *50 MHz DX Bulletin*. The yearly subscription rates are \$20 for third-class mailings and \$25 for first-class mailings to Canada, Mexico, and the United States. The surface and air-mail rates elsewhere are \$25 and \$30, respectively. Additional information is available from Victor Frank, K6FV, 12450 Skyline Boulevard, Woodside, CA 94062-4541.

73, Bill, W6DDB

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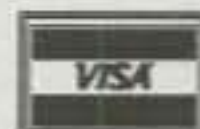


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TLK	TOP LOADING KIT FOR HF2V	\$19.95	BBLT-144A	2M MOBILE/TRUNK MOUNT	\$29.95
			BBLT-440	440 MOBILE/TRUNK MOUNT	\$29.95
			5BTM	TRAP VERT	\$99.95
			C-29	STAINLESS STEEL SPRING (4)	\$12.95
			C-32	BALL MOUNT (5)	\$8.95
			CG-220	220 MHZ COLLINEAR ANT.	\$21.95
			CGT-220	220 MOBILE ANT	\$36.95
			FXM	FX-MAG MOUNT	\$14.00
			FX-220	220 MHZ BASE LOAD ANT. W MAG MT	\$29.95
			G2537	FIXED ANT. 25-37MHZ (10 METER)	\$79.95
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			ANT	\$10.00	
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			RMX-10	10 METER 1KW RESONATOR/SPRING	\$24.95
			SF-220	200MHZ MOBILE ANTENNA	\$10.95
			TGM-1	TRUNK GROOVE MOUNT	\$9.95
			UGM	VHF-UHF 1/4 WAVE MAG MT. ANT	\$17.95
			VRK-1	RADIAL KIT FOR HF VERTICALS	\$25.95
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			AR-40	3 SQ FOOT ROTATOR COMPACT	\$139.95
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			153BA-S	15M 3EL BEAM	\$119.95
			155CA	15M BEAM	\$279.95
			203-BAS	3 ELEMENT 20 METER BEAM	\$219.95
			205BAS	5 ELEMENT 20 MTR MONOBAND ANT	\$399.95
			2BDQ-S	80/40 TRAP DOUBLET	\$59.95
			5BDQ-S	80/40/20/15/10M 94"TRAP DIPOLE	\$89.95
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			HB-144-GRI	2 METER MOBILE	\$29.95
			KLM		
			APS-1	ANT-POLARITY SWITCH (OSCAR)	\$29.95
			CJ-220	40" 220MHZ CLOSED 'J' ANT	\$39.95
			CJ-440	440 J-POLE-VERT	\$39.95
			KT34XA	UPDATE KIT	\$239.95
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			10M-4	10M BEAM	\$189.95
			15M4	15 METER 4 ELEMENT MONOBAND	\$210.00
			15M6	15 METER 6 ELEMENT MONOBAND	\$475.00
			17M-3	17M BEAM	\$299.95
			20M6	6 ELEMENT 20 METER MONOBAND	\$799.95
			40M-3	3 ELEMENT 40 MTR YAGI	\$639.95
			KP-2/6M	6 METER MAST MOUNTED PREAMP	\$99.95
			KP-2/220	220MHZ MAST MOUNTED PREAMP	\$99.95
			3-60-1:1	4KW PEP FERRITE CORE BALUN	\$45.00
			1.2-2N	POWER DIVIDER	\$29.95
			2M-4N	2 PORT 2 METER POWER DIVIDER	\$69.95
			2M-50	POWER DIVIDER	\$29.95
			2M-50N	POWER DIVIDER	\$29.95
			220-2N	220MHZ 2 PORT POWER DIVIDER	\$59.95
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			440-50N	POWER DIVIDER	\$29.95
			M2		
			23CM35EZ	35 ELEMENT 1.2 GIG, 18.4DBD BEAM	\$79.95
			2M-14CP	2 MTR 14 EL SATELLITE ANTENNA	\$129.95
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ANTENNAS & ACCESSORIES

A LOOK AT THE SHACK FROM BOTH ENDS OF THE COAX

BY KARL T. THURBER, JR., W8FX

Random Reflections—Part IV

This month we'll again update many of the Antennas and Accessories topics we covered in earlier columns; we'll cover a great deal of new territory, too. Let's begin with antennas.

Antenna Notes

Tri-Ex Towers. Many popular towers are free-standing crank-ups that let you do "antenna work" with the antenna near the ground and also permit you to safely lower the tower during high winds. A related convenience is the fold-over or tilting base tower, where you can fold over all or a portion of the tower. You must be careful in using these towers to avoid accidents, keeping in mind that free-standing towers are self-supporting *only* if they are installed and use a sturdy base that meets the manufacturer's specs.

Founded in 1954, and mindful of these requirements, Tri-Ex manufactures a variety of crank-up towers for the amateur radio community. The company's longstanding policy is to make a safe product and build the highest quality, most affordable crank-ups possible. Their towers comply with Electronic Industries Association (EIA) or Uniform Building Code (UBC) for steel antenna towers or antenna supporting structures.

Tri-Ex offers about 16 guyed and non-guyed crank-up designs in their 22-page catalog. These range from the MW-25 (25 ft. when extended, 11 ft. when nested) general-purpose, extendible crank-up tower to the TM-5100C (100 ft. extended, 29.5 ft. nested) Sky Needle. The latter is an esthetically beautiful and slender telescopic tower capable of supporting large loads. Various tower accessories are offered, including masts, mounting plates, thrust bearings, standoff kits, fold-over bases, cable slings, gin poles, motor control kits, winches, and other hardware.

For a catalog, contact Tri-Ex Tower Corporation, 7182 Rasmussen Avenue, Visalia, CA 93291 (209-651-7859).

Kilo-Tec J-Pole Kit. Kilo-Tec sells a variety of antenna parts and accessories. They offer several HF dipoles, including a multiband G5RV dipole and twinlead-fed 80-10 meter and 160-10 meter multiband dipoles that handle 2 KW PEP; custom-built antennas also are available. Accessories offered include center connectors, weather boot kits, pulleys, support rope, lightning arrestors, stainless eyebolts, baluns, antenna wire, openwire line, transmitting twinlead, antenna tuners, dummy loads, and RFI filters. Kilo-Tec also offers variable capacitors, roller inductors, turns counters, and other parts and components.

Recently, Kilo-Tec introduced a new and flexible J-pole kit for VHF and UHF operation (see figs. 1 and 2). The new kit is a rugged antenna with all parts furnished with the excep-

289 Poplar Drive, Millbrook, AL 36054

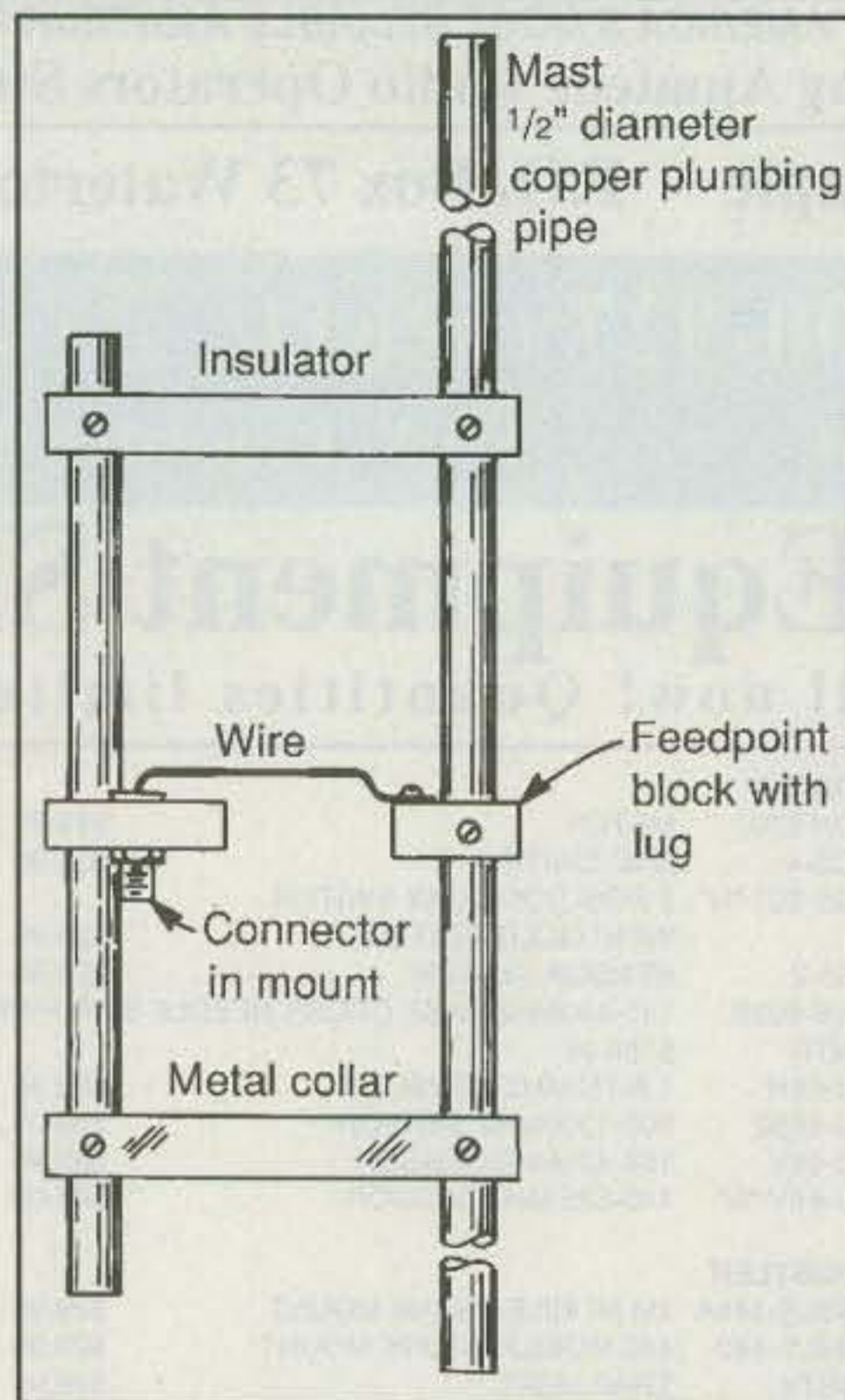


Fig. 1—The new Kilo-Tec J-pole kit is a rugged antenna assembled from a kit that has all parts furnished with the exception of two short lengths of 1/2 inch diameter copper plumbing pipe, which you supply. With the kit, you can design J-poles for 2 meters, 1 1/4 meters, and 70 cm. See this month's column for details.

tion of two short lengths of 1/2 inch diameter copper pipe, which you supply. Typical J-pole SWR at resonance is close to 1:1, with the antenna handling 1 KW.

With the Kilo-Tec kit, you can design J-poles for 2 meters, 1 1/4 meters, and 70 cm. You can even build a two-band version by using two kits on the same mast. Each J-pole operates independently and has its own feedline, so that the two antennas can be used simultaneously for transmit, receive, or full duplex. Overall size is the same as a one-band J-pole. A complete kit of parts, less the copper tubing but with assembly instructions, is \$24.95 plus shipping.

For more details, contact Kilo-Tec, P.O. Box 10, Oak View, CA 93022 (805-646-9645).

Universal Radio Information Pamphlets. There are three tower and antenna safety guidelines you should follow: (1) don't take any chances climbing a tower; (2) don't hesitate to quit if the session isn't going well; and (3) read and closely follow safety precautions when working with towers and antennas.

To this end, an informative, four-page "Antenna Safety Advisory" pamphlet is offered free from Universal Radio, Inc. It's actually one of

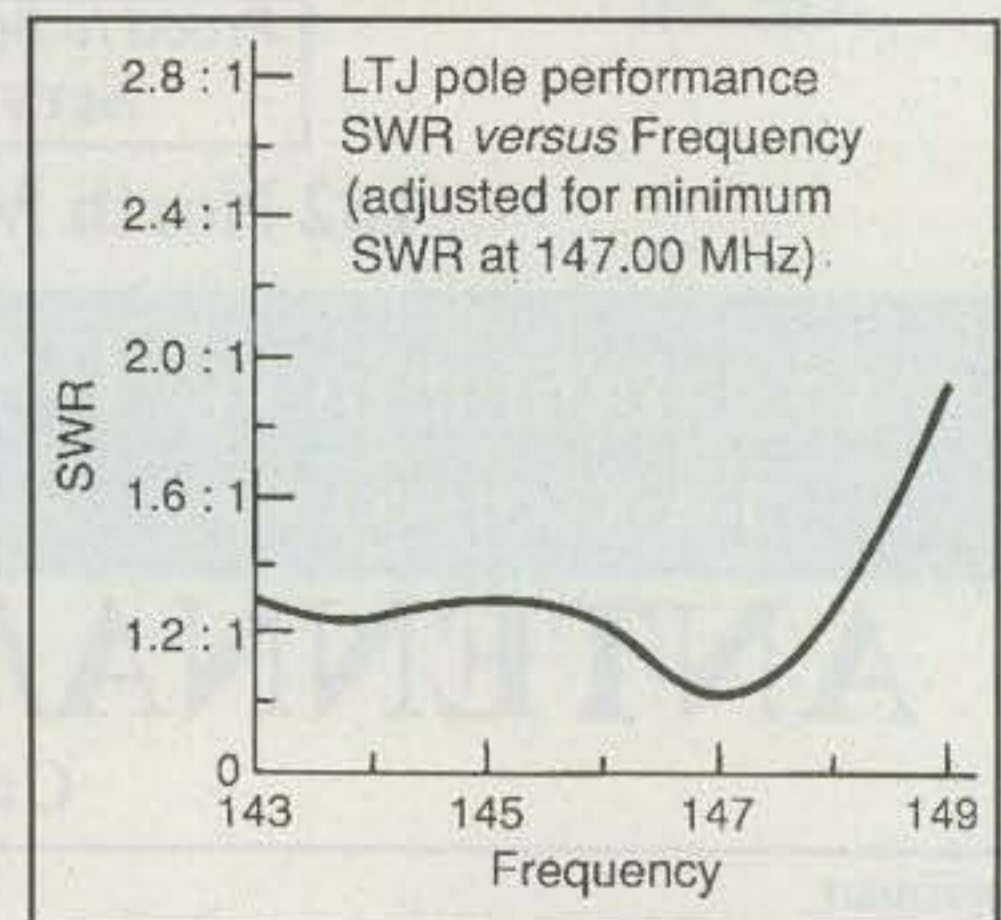


Fig. 2—The new Kilo-Tec J-Pole kit is billed as a low-cost, high-performance solution to your VHF and UHF antenna requirements. The antenna's typical SWR at resonance is claimed to be close to 1:1, with the antenna handling 1 KW. Shown here is the J-pole's performance in terms of SWR vs. frequency for 2 meters.

seven beginner-oriented "how-to" informational pamphlets that explore various aspects of amateur radio and shortwave listening. Available titles, besides the "Antenna Safety Advisory," include "Interested in Shortwave Radio?" "Interested in Amateur Radio?" "Installing RF Connectors," "Introduction to ACARS," "Listening to Radioteletype," and "Receiving FAX on Your Shortwave Radio." (Incidentally, ACARS, the Aircraft Communications Addressing and Reporting System, is specialized aircraft communications—VHF radioteletype that transmits data and messages between commercial aircraft and ground stations.)

Each pamphlet in the series is free if you send a self-addressed, stamped envelope (SASE) for the title(s) desired. Write to Universal Radio, Inc., 6830 Americana Pkwy., Reynoldsburg, OH 43068-4113 (1-800-431-3939).

C. Crane Co. Catalog. A wide-ranging "communications excitement" catalog especially for SWLs and scanner buffs is offered by this California firm. Product listings include antennas and radios for AM, FM, and shortwave listening; scanners; portable and solar power packs; books; and various accessories, including speakers, headphones, and "odds and ends."

The company's approach to listing items in their 70+ page catalog is interesting. They generally carry two basic lines of each item consisting of what they call the "best made" and the "best for the money." C. Crane also offers to special order or fabricate practically any radio product one might need, from special wiring or adapters to radios not listed. A 30-day satisfaction guarantee is offered on all products.

Catalogs are \$1 from C. Crane Co., 558 10th

Street, Fortuna, CA 95540-2350 (1-800-522-8863).

Radioware Catalog. In previous columns we noted the well-illustrated catalog of antennas and RF accessories for amateur, SWL, and scanner hobbyists offered by Radioware Corporation. Recently, the catalog has grown to over 60 pages. It includes amateur, SWL, and scanner antennas for HF, VHF, and UHF; antenna wire, including Flex-weave™ from Davis RF; antenna traps; baluns; RFI filters; antenna relays and switches; transmission line; lightning protection accessories; antenna insulators; mobile mounts; and other antenna components and accessories.

Prominently featured in the latest catalog are the Pasokon TV and digital capture board, SSTV Explorer software, and Digital Vision's ComputerEyes/RT system for real-time image capture. Practically everything in the catalog is illustrated with a photo, making it a handy resource for the beginner.

For a catalog, contact Radioware Corporation, P.O. Box 1478, Westford, MA 01886 (1-800-950-9273).

ANT FARM Antennas Update. As indicated in the August 1994 column, this small, self-described "cottage industry" style firm offers high-quality wire antenna kits for radio amateurs and SWLs at reasonable prices. Products offered include a 43 ft. long SWL antenna (the Sky Raider II) that covers 2.4-30 MHz and a high-performance, all-band 47 ft. amateur HF antenna for restricted space, the MB-2A. Other products include loaded dipoles and slopers for 160, 80, and 40 meters.

Proprietor Ike Kerschner, N3IK, advises that his new antennas include a very compact antenna for the HF bands and an HF multiband trap antenna. He also recently introduced a new vertical "gain type" VHF/UHF antenna, the Talking Stick; one model is for 2 meter amateur use, while another is a scanner antenna that covers 120 to 500 MHz.

For more details, contact The Ant Farm, P.O. Box 3196, Wescosville, PA 18106.

Spi-Ro Manufacturing Update. In past columns we've mentioned Spi-Ro as a good source of antenna accessories and parts. The latest six-page Spi-Ro flyer shows a number of amateur HF antennas, including all-band and limited-space dipoles, multiband trap dipoles and slopers, a SWL "longwire" antenna, and a variety of single band antennas. Most are factory assembled, but the firm also offers kit versions of each at up to \$12 less for those who prefer to assemble their own. Instructions are furnished.

The Spi-Ro flyer also shows baluns, transmatchers, center connectors, coax, ladderline, insulators, lightning protectors, support rope, surge protectors, traps, RFI suppression kits, and other parts and accessories. Contact Spi-Ro at P.O. Box 5500, Lakeland, FL 33807 (1-800-728-7594).

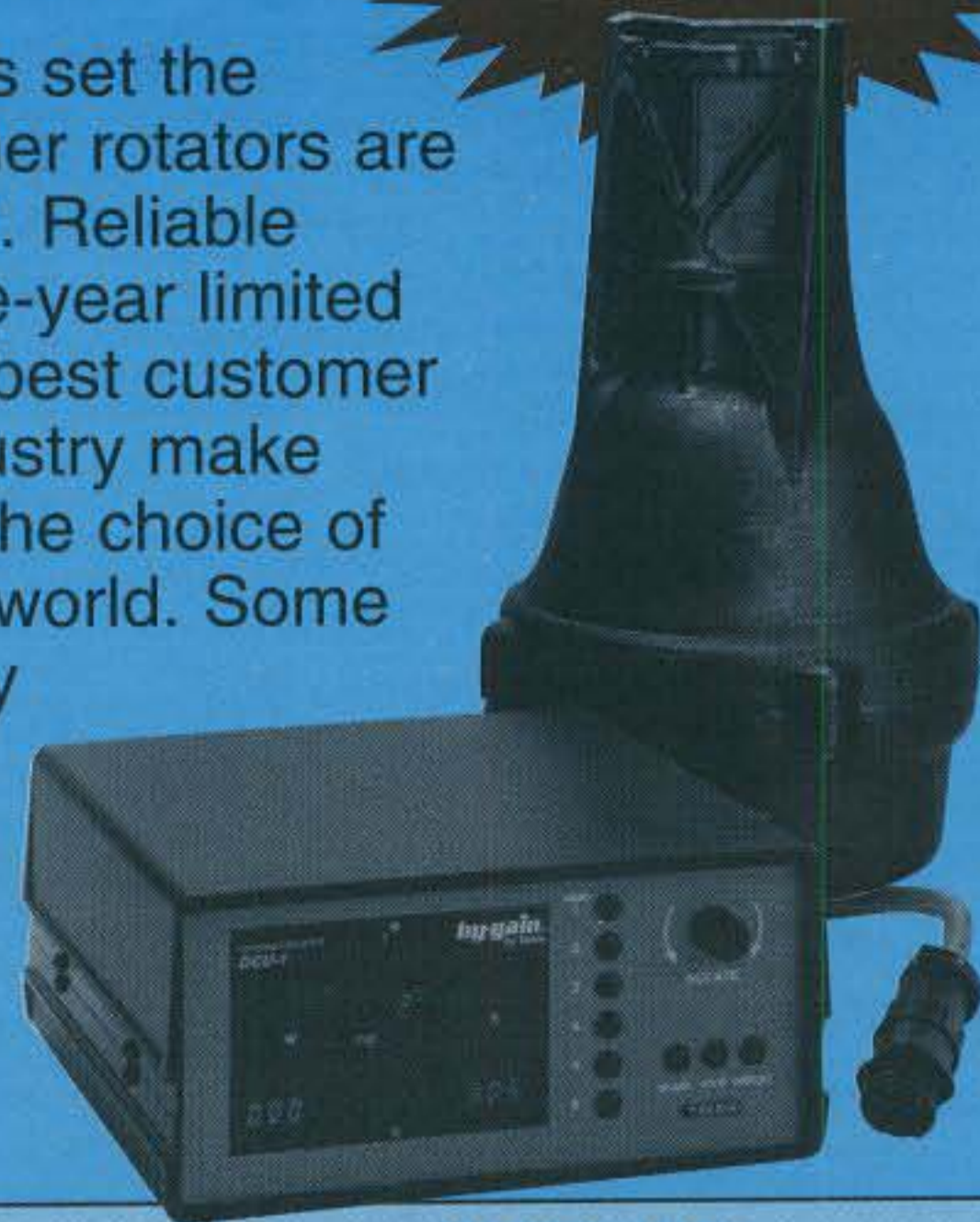
ONV Safety Belts and Climbing Accessories Update. The reality is that you're trusting your life to your safety belt every time you climb your tower. With this in mind, obtain a high-quality belt that's commercially manufactured, tested, and approved. Be sure to check your belt's condition each time you use it. Using a belt also frees up both hands and lets you lean back away from the tower to easily reach tools and hardware.

One good source of safety belts is the ONV Safety Belt Co., operated by Allen Massa,

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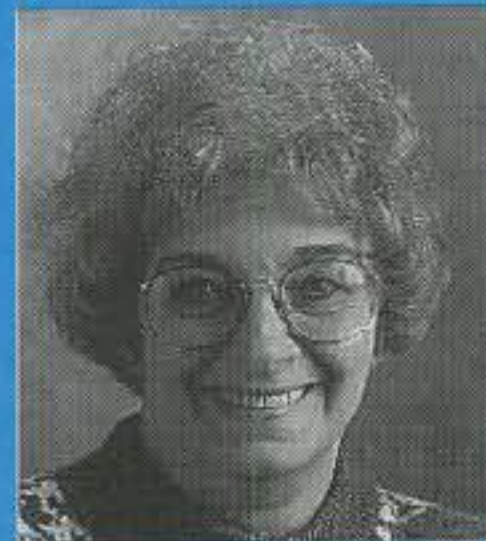


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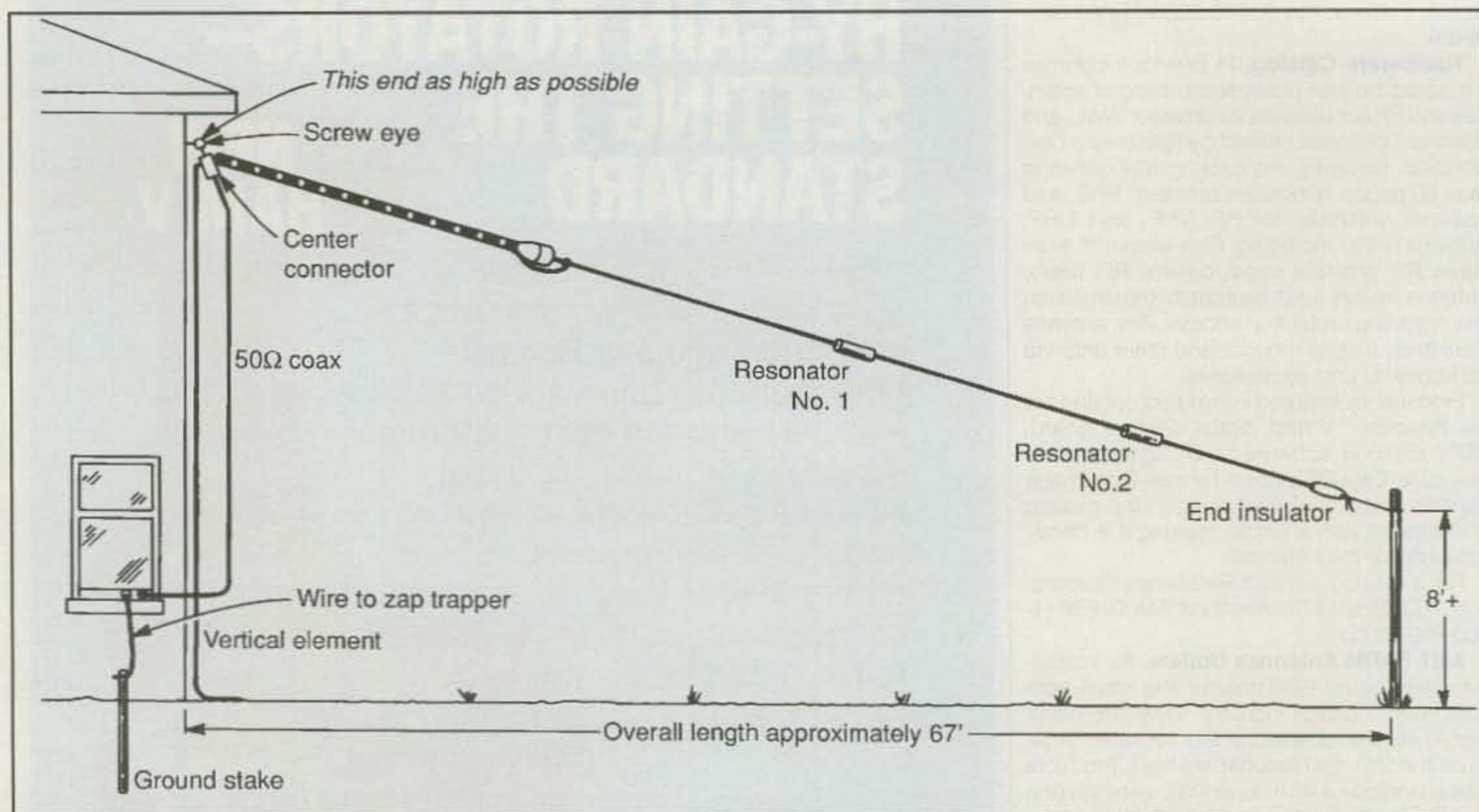


Fig. 3—The Eavesdropper SWL Antenna, originally designed by Bill Fanckboner, W9INN, has become a SWL antenna standard. It's an 8-trap, 43 foot long multiband sloper that covers the major shortwave broadcast bands from 11 to 75 meters with one feedline; twinlead and coax feed-line versions are offered, with the latter shown here. The \$79.95 antenna comes with a gas-tube lightning arrester. For more info, contact Antenna Supermarket, P.O. Box 563, Palatine, IL 60078 (708-359-7092).

WA2IZN, and Dorothy Massa, KB2DAD. A deluxe belt with a seat harness is \$89.95 and accommodates up to a 42 inch waist; a similar model to accommodate up to a 56 inch waist is \$10 extra. The regular ONV safety belt is \$74.95.

Various climbing accessories you'll find useful include tool pouches for carrying tools and hardware, extra snap hooks, lanyards, and safety lines. A safety-enhancing tower climbing lanyard, three feet in length, that has large "gorilla hooks" to clip on ONV safety belts is \$39.95. These large hooks are for added safety ascending and descending the tower by keeping you attached to the tower at all times—a requirement that many tower climbers fail to comply with. Handily, the hooks can be used with ladders. ONV also offers an accessory tool pouch for \$15.95. Bottom line: If you climb a tower, use a safety belt and keep your tools buttoned down to avoid dropping them on a helper. Don't work on your tower on a wet, windy, or stormy day, and don't use a metal ladder. The foremost consideration when doing tower and antenna work is, and must always be, personal safety.

For further information, contact ONV Safety Belt Co., P.O. Box 404, Ramsey, NJ 07446 (1-800-345-5634).

Glen Martin Engineering Update. If a new tower is on the horizon for you, check out the Glen Martin Engineering "solution to support" catalog. The catalog describes their line of rugged Voyager Structure System triangular (13 and 18 inch) aluminum towers, 8 and 9 ft. four-legged aluminum and stainless steel rooftop towers, aluminum telescoping towers, aluminum and galvanized steel masts, winches and winch cables, lightning protection hardware, Kevlar® guy wire and accessories, rotators,

thrust bearings, anchors, bases, other tower accessories, and complete tower packages.

The same catalog also describes the Martin Hazer, a unique "elevator system" for towers, an accessory that raises and lowers antennas with the turning of a winch. The Hazer was designed as an alternative to tower climbing. It's attractive to those who are "too old, too scared, or too tired" to climb in that it lets you lower your antenna and rotor for maintenance and adjustments without climbing. The catalog includes a detailed explanation of how the Hazer transit system works.

Steve Wilson, KØJW, reviewed the Hazer in April 1989 *CQ*, p. 20, and we featured the Hazer in our April 1990 column. Thus, we won't repeat all the details here. But to present a brief synopsis, the Hazer lowers the antenna and rotor to ground, keeping them in an upright position, allowing for changes, repairs, and protection from winds. The device is assembled around the tower at ground level. If it's installed when the tower is erected, no climbing is needed. However, on existing towers, you must install a plate and pulley assembly at the top.

The Hazer travels easily past tower braces and bolts. A built-in safety latch prevents accidental lowering by catching on the tower cross braces. When lowering with the Hazer, a control cable disengages the latch as the winch is turned. When fully elevated, the latch transfers the load from Hazer to tower, allowing 360-degree antenna rotation.

For a catalog, contact Glen Martin Engineering, Route 3, Box 322, Boonville, MO 65233 (816-882-2734).

KLM Antennas Update. The KLM antennas catalog includes a wealth of HF/VHF/UHF antennas and accessories. HF antennas include

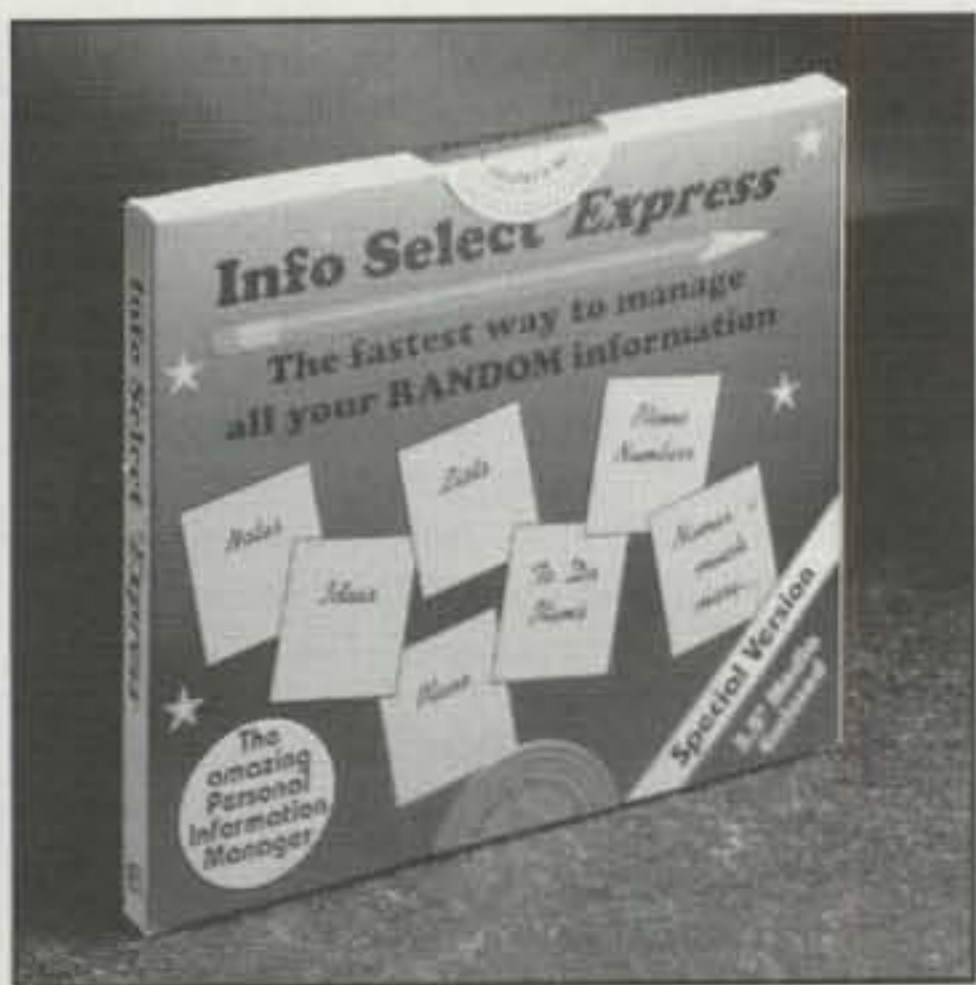
about 18 HF Yagis from 2 to 6 elements; 8 HF log-periodic antennas with from 6 to 15 elements; and 3 triband HF WARC antennas. Four HF verticals are offered, including a 160 meter model. Fourteen VHF Yagis are listed, ranging from 4 to 22 elements. Ten UHF Yagis are shown, ranging from 6 to 44 elements, including three "long boom" models covering 1260–1300 MHz. Available accessories include coax, sleeve, and ferrite baluns; antenna switchers; antenna couplers and power dividers; stacking frames; update kits; and fiber-glass masts.

Although KLM is best known for its beams, they also offer several VHF and UHF omnidirectional, standalone vertical antennas for fixed station use. Several conservatively rated commercial communications antennas also are described in the KLM catalog.

According to KLM's president, Bruce Scott, several new antenna products are being developed in KLM's new Monroe, Washington manufacturing facility and are expected to be announced after field testing. For a catalog, contact KLM Antennas, Inc., P.O. Box 694, Monroe, WA 98272 (206-794-2923).

W9INN Antennas Update. On several occasions we have profiled Bill Fanckboner, W9INN's amateur multiband slopers and dipoles, and his SWL receiving antennas. W9INN antennas are assembled complete with center connector, Dacron® line, spreaders, and other accessories except for coax, which you supply. W9INN's catalog includes sketches and configuration suggestions.

Bill has been selling antennas in a one-man operation for about 15 years and making them for more than 50 years. Bill's line features multiband slopers (9 versions) and dipoles (about 25 types) that boast coverage from 160



Info Select Express™ is an economical personal information manager (PIM) that, like its big brother, Info Select for Windows, adeptly handles the problem of managing "random information." The Express program features "pile of paper" note-gathering procedures. (Photo courtesy Micro Logic Corp.)

through 10 meters, including the 30, 17, and 12 meter WARC bands.

One of the newest W9INN antennas is the 93 ft. MPD-847 dipole for 80-40 meters and 17 meters, priced at \$72. Bill adds that, with the continuing decline in sunspot activity, amateurs are rediscovering the 160 meter band-switch position on their transceivers. Consequently, the bulk of his sales are of 160 meter antennas. The HPD-3-113' and the HPD-3-125' dipoles (each \$83) are very popular since they fit on most city lots. Both of these antennas also cover 80 and 40 meters.

For a catalog, contact W9INN Antennas, P.O. Box 393, Mt. Prospect, IL 60056 (708-394-3414).

We should mention that Bill also designed the 43 foot, 8-trap Eavesdropper™ shortwave receiving antenna (see fig. 3). Two versions of this multiband trap sloper, very popular with SWLs, as well as a 67 ft. end-fed, SWL "half-sloper," are sold by Antenna Supermarket, P.O. Box 563, Palatine, IL 60078 (708-359-7092).

Computer and Software Notes

Solar Max for the Mac. In April 1994 we described a DOS educational game for the IBM PC developed by Bob Brown, NM7M. As we noted, it is indeed a game, but one with a purpose: to raise the level of appreciation and understanding of HF propagation in DXing and in DX contesting. The game is played in a contesting mode, being designed for knowledgeable and competitive DXers. It pits them against a realistic model of the ionosphere that determines whether the band is open to the region.

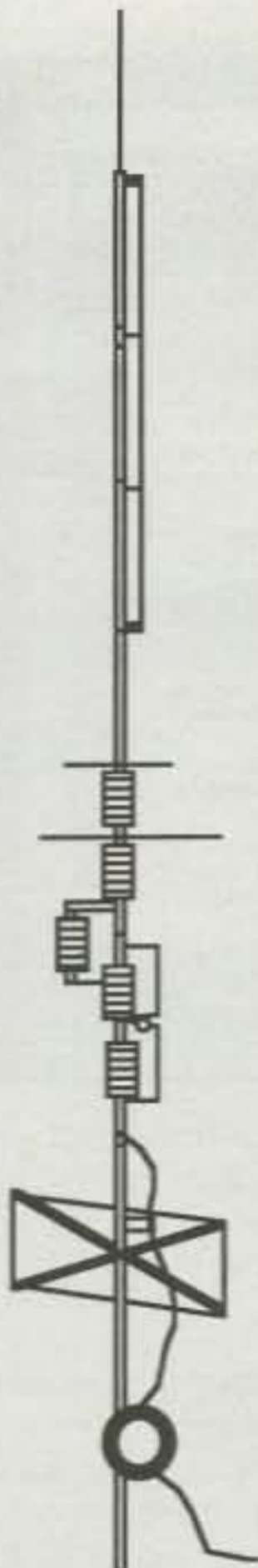
Tad Sargent, W0MPG, tells us that, at Bob's request, he's ported the game to the Apple Macintosh PC; it's functionally the same as Bob's DOS version. His Mac version runs on any version of the Mac, as long as it's using System 7 (most are these days). It's available for \$10 from Sunfollower Software, 3185 Endicott Drive, Boulder, CO 80303-6902. An international version, DX Max, and a Windows version should both be available soon.

Postscript: For those who missed the April

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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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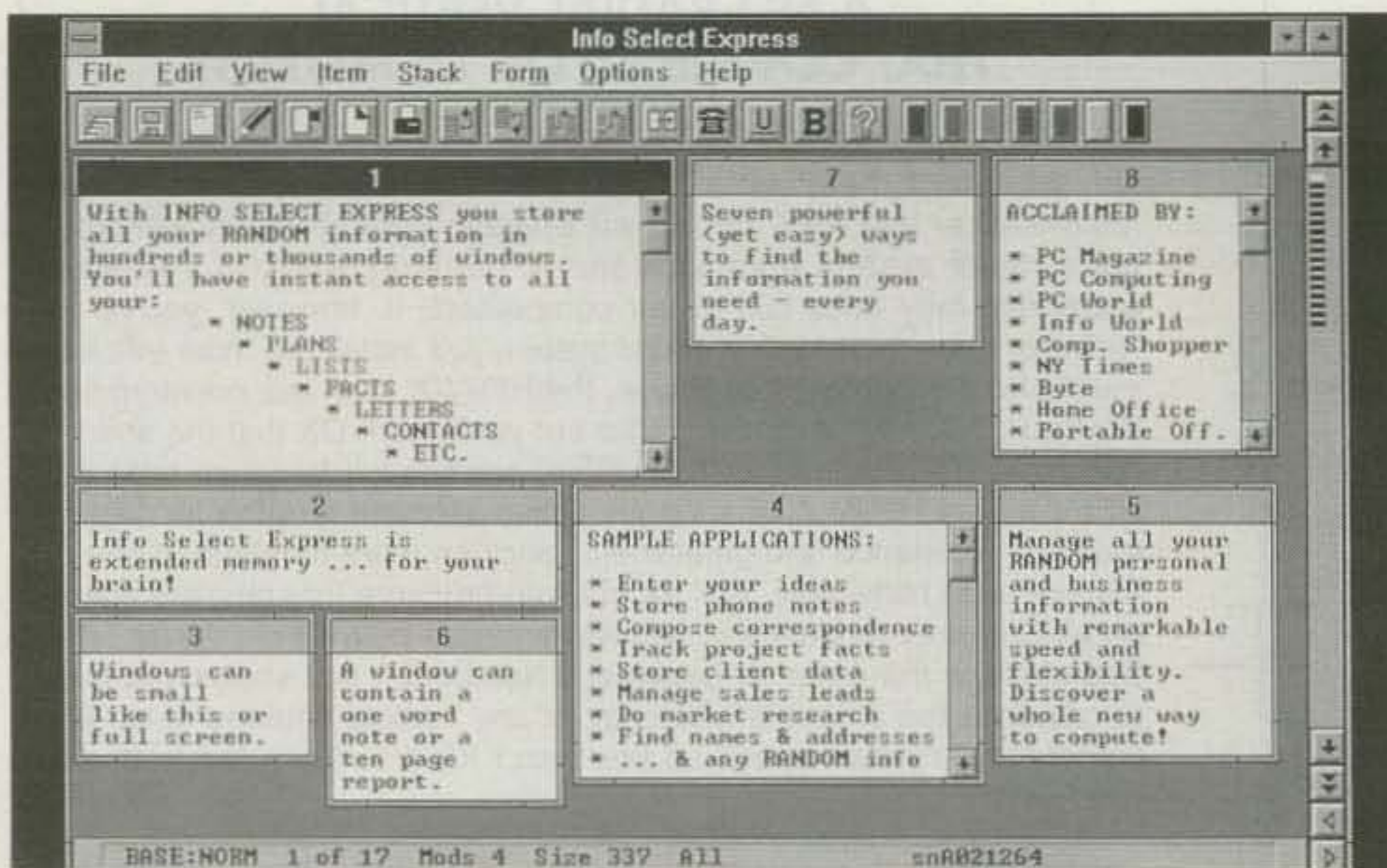
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The Express version of Info Select for Windows sports an interface that's lightning-fast in a graphical environment. Its low cost makes it the least expensive and fastest way to manage "random" information such as notes, ideas, contacts, plans, lists, and the like. Users can upgrade to the comprehensive version if they so desire. (Photo courtesy Micro Logic Corp.)

1994 column and would like the DOS Version of Solar Max, it's \$10 postpaid in the U.S. and \$11 (U.S. funds) in Canada for the domestic model; it's \$13 for overseas airmail of the export model. Contact Bob Brown, NM7M, 504 Channel View Dr., Anacortes, WA 98221.

AmSoft CD-ROM Update. In several columns we featured the "World of Ham Radio" shareware CD-ROM offered by Pete DeVolpi, KC3TL. This disc, now updated three times a year, in January, May, and September, gives you more than 700 MB of software in an amateur "software library" that reportedly is the most complete repository of amateur-radio-oriented software you can find.

The disc's files cover many of the latest amateur radio shareware and public-domain program releases. Subjects include antennas,

scanning, Morse/CW, engineering, licensing and examinations, formulas, logging, propagation, packet, RTTY, satellites, weather tracking, and more. Over 1350 equipment modification files are found. Also included is A+ Software's AmCall Logbook™, which works interactively with the AmSoft CD-ROM to fetch callsign data.

The disc is operated by a front-end program called CDVIEW.EXE, making it easy to move through the more than 20,000 files. With it, you can conveniently place files on diskettes or a hard drive, or just use the CD-ROM to directly preview software. Although the front end is a DOS program, it can be installed to work under Windows.

The disc also includes the complete FCC amateur callsign database. Over 750,000 call-

signs are found in seconds using an included "smart" search engine that lets you find an amateur radio operator by full or partial call-sign, a prior callsign, last name, first name, state, city, or zip code. Several separate foreign licensing databases are included.

The current AmSoft CD-ROM is \$39 plus \$3 shipping. The disc also is available on a subscription basis; a year's sub of three issues is \$99, and a newsletter keeps you up to date. For more information, contact AmSoft, P.O. Box 666, New Cumberland, PA 17070-0666 (717-938-8249).

Final Version, The SemWare Editor (TSE).

In the January 1994 column, we reported on a very advanced and powerful editor, The SemWare Editor (TSE), in its prerelease V1.0 form. After months of evaluating user reactions, we're happy to report that it's now available in its final V2 release form.

TSE is a full-featured, virtual-memory DOS text editor. It's highly useful for writing documents, maintaining program source files, and manipulating data files. The program is very compact and fast, and it's configurable to suit your own tastes. TSE lets you edit very large files (up to 64 MB), and it has a powerful macro programming language, SemWare Applications Language (SAL), to make the editor exceptionally flexible and extendible.

Features include mouse support; enhanced printing options; advanced search and replace; online help; spell checker; vertical and horizontal windows, to view and edit files; 26 bookmarks, to return to selected positions; support for fixed, variable, and hard tabs; and numerous utilities and productivity aids. The program supports line lengths up to 2032 characters.

Amazingly, a minimum installation requires only one executable program under 100 KB in size. TSE runs in as little as 170 KB of memory and uses only 2K of memory when shelling to DOS or running other programs.

TSE is \$109. For more details, contact SemWare Corporation, 4343 Shallowford Rd., Suite C3A, Marietta, GA 30062-5022 (1-800-467-3692). SemWare also offers other popular text editors, including QEdit® Advanced, QEdit TSR, and QEdit for OS/2.

Info Select Express. A PIM, or "personal information manager," is a database that allows you to enter, retrieve, analyze, and cross-reference data, both words and numbers. A PIM handles "random information" you encounter every day, such as notes, names, addresses, parts lists, project plans, and magazine articles. This type of information often doesn't fit into well-defined formats as does data you can place in a conventional database, so a PIM can help you deal with the hodgepodge of assorted, unstructured stuff that tends to fly across your desk.

In the April 1994 column we reviewed Micro Logic's Info Select for Windows (\$149.95). It's a very capable PIM, one that's easy to learn since it uses a data structure analogous to the familiar "stacks of paper" in which we accumulate information. Features include phone dialing, wordprocessing, and database functions; a computational capability; overviews of your information; and more.

To attract new users to its product line, Micro Logic recently developed an introductory Windows-based version to sell at a very low price, \$19.95, largely by packaging it in a box the size of a CD and using an online rather than

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Meter	YES	NO	YES	YES	YES

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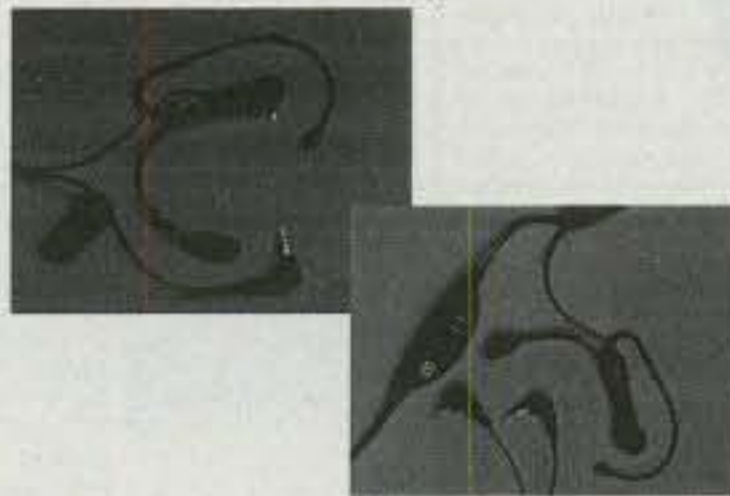
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The program is \$19.95 plus \$4.50 shipping from Micro Logic Corp., P.O. Box 70, Hackensack, NJ 07602 (1-800-342-5930).

Disk Manager Update. In last December's column, we profiled Ontrack Computer Systems' Disk Manager V6.03, a sophisticated 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.

Recently, we learned that Ontrack introduced an enhanced version of Disk Manager that offers a Windows FastDisk driver to support the Windows 32-bit file access feature with IDE disk drives. It supports all configurations supported by the original Windows driver, in addition to features that Ontrack added.

Disk Manager is \$124.95, but inexpensive upgrades are available to current users. It's from Ontrack Computer Systems, 6321 Bury Dr., Minneapolis, MN 55346 (1-800-752-1333).

Books and Catalogs of Note

The Underground Frequency Guide. Do you love a mystery? A very intriguing new book is *The Underground Frequency Guide*, third edition, by Donald W. Schimmel. Don's book gives detailed information on strange, unusual, co-

vert, and mysterious radio communications. The *Guide* catalogs hundreds of frequencies and times where "strange radio signals" have been heard. With 224 pages in a 6" x 9" soft-cover format, the book offers an in-depth analysis of the more unusual signals you can hear on shortwave.

The author, incidentally, has been on the trail of shortwave mystery signals for years. As editor of the "Communications Confidential" column in *CQ's* sister publication, *Popular Communications*, Don closely follows these signals and keeps track of their operating patterns. The book is a product of the time and effort he has devoted to solve these mysteries. The section on the enigmatic "numbers stations" perhaps is the most exhaustive review of the subject ever presented, with several transmitter sites for these elusive stations being identified.

The *Guide* is \$14.95 at amateur dealers or from the publisher. Contact HighText Publications, Inc., P.O. Box 1489, Solana Beach, CA 92075 (1-800-247-6553).

New from Cygnus-Quasar. In a recent column, we took note of the definitive radio astronomy book by Professor John D. Kraus, W8JK, of The Ohio State University, *Radio Astronomy*. The 710-page, 1986 softcover classic is \$39.95 plus shipping and includes 430 illustrations, 300 examples and problems, and numerous references. We also noted that Cygnus-Quasar distributes or publishes four of Dr. Kraus' other highly authoritative and interesting books, including *Antennas*, *Electromagnetics*, *Our Cosmic Universe*, and *Big Ear*.

Just after wrapping up that column, Pam Hall at Cygnus-Quasar Books updated us on other scientific books and videos they offer. Most intriguing among these is Dr. Kraus' brand-new 1995 update, *Big Ear Two*. Subtitled "Listening for Other-Worlds," the new and much enlarged second edition brings the fascinating story of Big Ear, one of the world's largest "cosmic listening posts," up to date. The book describes how Big Ear was invented and built and now searches for signals from extraterrestrial civilizations. The 378-page softcover is \$14.95; hardbound is \$24.95 postpaid.

Interestingly, the book's 1995 publication marks 100 years since the first public demonstration of radio communication by Marconi in 1895, 60 years since the beginnings of radio astronomy by pioneers Karl Jansky and Grote Reber, and 40 years since the ground-breaking for Big Ear. It's also been about 20 years since the Big Ear source OH471 arguably was found to be "the blaze marking the edge of the universe."

Several VHS-format color videos are available that cover various radio astronomy and antenna subjects. These include *Grote Reber*, *The Founder of Radio Astronomy*; *Antennas: Our Electronic Eyes and Ears on the World*; *Demonstration-Lecture on Antennas and Radiation Phenomena*; and *Heinrich Hertz, Theorist and Experimenter*. All of these videos are presented by Dr. Kraus. Also available is another video, *Computer Graphics of Transient Radiation and Scattering Phenomena on Antennas and Wire Structures*, by J.A. Landt and E.K. Miller. The videos range in price from \$24.95 to \$29.95 plus \$3.50 s&h.

For more details, contact Cygnus-Quasar Books, P.O. Box 85, Powell, OH 43065 (614-548-7895).

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your home, hamshack, or office? If so, you'll be miles ahead in harnessing its many sophisticated features with three Macmillan computer books.

First is the massive Sams-imprint, 1373-page book/disk package, *WordPerfect for Windows Super Book*, by Marilyn Horn Claff, et al.; it offers thorough coverage of what's new in Version 6 and is \$39.95. A second book/disk package under the New Riders imprint is even thicker: the 1590-page *Inside WordPerfect 6 for Windows*, by Stephen Harris, et al. This one's for experienced users and is an excellent guide to the software's higher-level features; it's also \$39.95.

If you're not quite up to wrestling with these weighty tomes, a third book on my list that's oriented to beginner and intermediate users is *WordPerfect 6 for Windows Cook Book*, by Jennifer Fulton and Sherry Kinkoph. The 372-page Alpha book, at \$19.99, serves up many easy-to-follow "recipes" for quick and easy but impressive wordprocessing results.

These three books are available from Macmillan Computer Publishing, 201 West 103rd St., Indianapolis, IN 46290 (1-800-858-7674).

Turning to Osborne McGraw Hill, I found one WordPerfect book particularly interesting. It's the 313-page, \$16.95 *WordPerfect for Windows Answers*, by Mary Campbell. It provides answers to the most frequently asked questions from the simple to the arcane.

The book is part of the "Certified Tech Support" series. These Osborne McGraw-Hill software support books were developed in cooperation with Corporate Software, Inc. (CSI), a large provider of technical support. The solutions offered are based on the expe-

riences of CSI in responding to more than 250,000 support calls per year. Available editions include support for Lotus 1-2-3, DOS, Excel for Windows, Word for Windows, Lotus Notes, Microsoft Access, NetWare, and WordPerfect for Windows. Most books in the series are \$16.95.

Campbell's book is available from Osborne McGraw-Hill, Inc., 2600 Tenth St., Berkeley, CA 94710 (1-800-227-0900).

Looking Back Five

Five Years Ago in Antennas and Accessories. Now you know what the column looks like in June 1995. But, what did it feature in June 1990? "From the Notebook, Part V" was the title.

In that column, we passed along a nice hint from Richard Mollentine, WA0KKC, a cold-weather suggestion to prevent coaxial cable cracking and separation. We discussed the expanded beam and quad antenna product line of Bill Levey, WA4FAT's Alabama Amateur Electronics. We also highlighted the VHF and UHF radio direction-finding (RDF) equipment from Doppler Systems and discussed SWL antennas, including the popular Eavesdropper sloper, from Antenna Supermarket (it's also shown this month as fig. 3).

We also discussed the "Radio Telephone/Mobile Radio Installation Guidelines" brochure from the General Motors Engineering Center. And we noted new and interesting catalogs from Telrex, Universal Towers, Telewave, and Nema Electronics.

Software-wise, we profiled an antenna trap designing program by Larry East, W1HUE; a

programmable calculator program by B. O. Lowery, W4NLG, for the Radio Shack scientific calculator; Microsystems Software's Handy-CODE AR, Morse Code input software that provides "alternate access" for handicapped individuals; and HAMLOG, a logging program by Ernest J. Sandoe, KA1AWH, for IBM PC, Apple, and CP/M computers.

We also examined SquareNote 3.0, the "Idea Librarian" information manager and free form database for the IBM PC; and PC Globe 3.0 and PC USA, geography-based graphic database programs for the IBM PC. In the same column, we mentioned the retiring of our trusty Commodore 128 computer and our concurrent "graduation" from a 512K CorData PC-XT computer to a then-snazzy, 16 MHz Gateway 2000 386SX PC. We also offered some tips on buying a PC.

If you find a topic we covered in this or a previous column of interest, please obtain the back issue directly from CQ's New York office, rather than requesting the article from us. Most back issues are available from CQ for \$3.50 postpaid. (CQ also offers various "back issues specials" to complete your collection. Check their ad in this issue, or call them at 1-800-853-9797 to order back issues.)

Wrap-Up

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

Overheard: When you take something apart to fix a very minor malfunction, you'll likely cause a very major malfunction.

73, Karl, W8FX

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Az: Mtr 62.43 Recv 260.29, NM 1375.1 KM 2546.5, Midnt F2 Sr/Ss:10.13/ 1.37

Best Frequency / Reliability
Local Daylight Time

19 21 23 1 3 5 7 9 11 13 15 17 19
30.0
28.0
26.0
24.0
22.0
20.0
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0

Frequency
Percent Reliability

0 2 4 6 8 10 12 14 16 18 20 22 24
Best + Reliability ..

Greenwich Mean Time
Select Parameter by Number, Band by Letter or press (Q) to Quit
(1) SNR, (2) Reliability, (3) Mtr take-off angle, (4) Mtr Ant Gain
(5) Recv Ant Gain, (6) S-Meter, (7) dB Microvolt, (8) dBu, (9) Best
(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

Select Output by Function key
(F1) SEP 37 (F2) OCT 35 (F3) NOV 34 (F4) DEC 33 (F5) JAN 31 (F6) FEB 30
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A LOOK AT THE WORLD AROUND US

On The Road Again—More Mobile Fun!

The warm days of summer and the season for outdoor hamming have finally returned, and I am sure you will agree it is not a week too soon! I assume everyone is looking forward to enjoying all the leisure time possible this year, right? Bearing in mind those thoughts, this month's column features another blowout "mobiling special." I will also add some helpful notes and views of new goodies as we go to keep everything interesting. Fair enough? The bands have been a mite flat during the winter months, true, but they are perking up a bit every day, and it is time to frolic! Go for it!

Do I sense a few readers saying they probably do not spend enough time traveling or face too many entanglements with traffic to consider big-time mobiling? On the contrary. No one says you must be in motion to enjoy mobiling. Indeed, a car is simply a convenient

way to carry a pretuned and ready-to-operate station anywhere you go, from office parking lots to relatives' driveways. Even a few unexpected minutes on the air beats never finding time to get on the air! Yes, and stationary mobiling is not the only game on wheels (or wings!). I am looking forward to trying some new stunts such as Caterpillar-CW and motorscooter QRP while vacationing at the beach this summer. How about you? In fact, let's make that "unusual mobile setup" an open challenge and spotlight some of the more clever ideas in our next mobiling column. Any takers? Need some more ideas to get your creative thoughts going? Check out this month's featured ideas. They are terrific!

Wheelchair Mobile

Leading the show in unique mobiles is Sumter Hickman, KB5QHD, of Plainview, Texas (pho-

tos 1 and 2). Sumter rolls out in style with a Kenwood TS-50S pumping 100 watts into an elevated Hustler-and-Ham Stick antenna. The rig is powered by a 35 amp gel cell battery, and the usual operating time is 3 to 5 hours between recharges. Notice this setup is completely self-contained and works while moving or stopped. It is also arranged for ultra-convenient operation with a mini desk for the gear and VOX for the (Heil) boom microphone headset. Clever!

The antenna system is particularly interesting, as it uses two whips in an "L" configuration. The main/vertical section is a Hustler mast with a 40 meter resonator. It is raised by PVC tubing, so the resonator is 8 feet above Sumter's head and the whip's tip is 13.5 feet above ground. That has to look more impressive in reality than in the photos. It is taller than many mobile antennas on the road. The horizontal section (which connects to the coax shield via a non-insulated mounting bracket)

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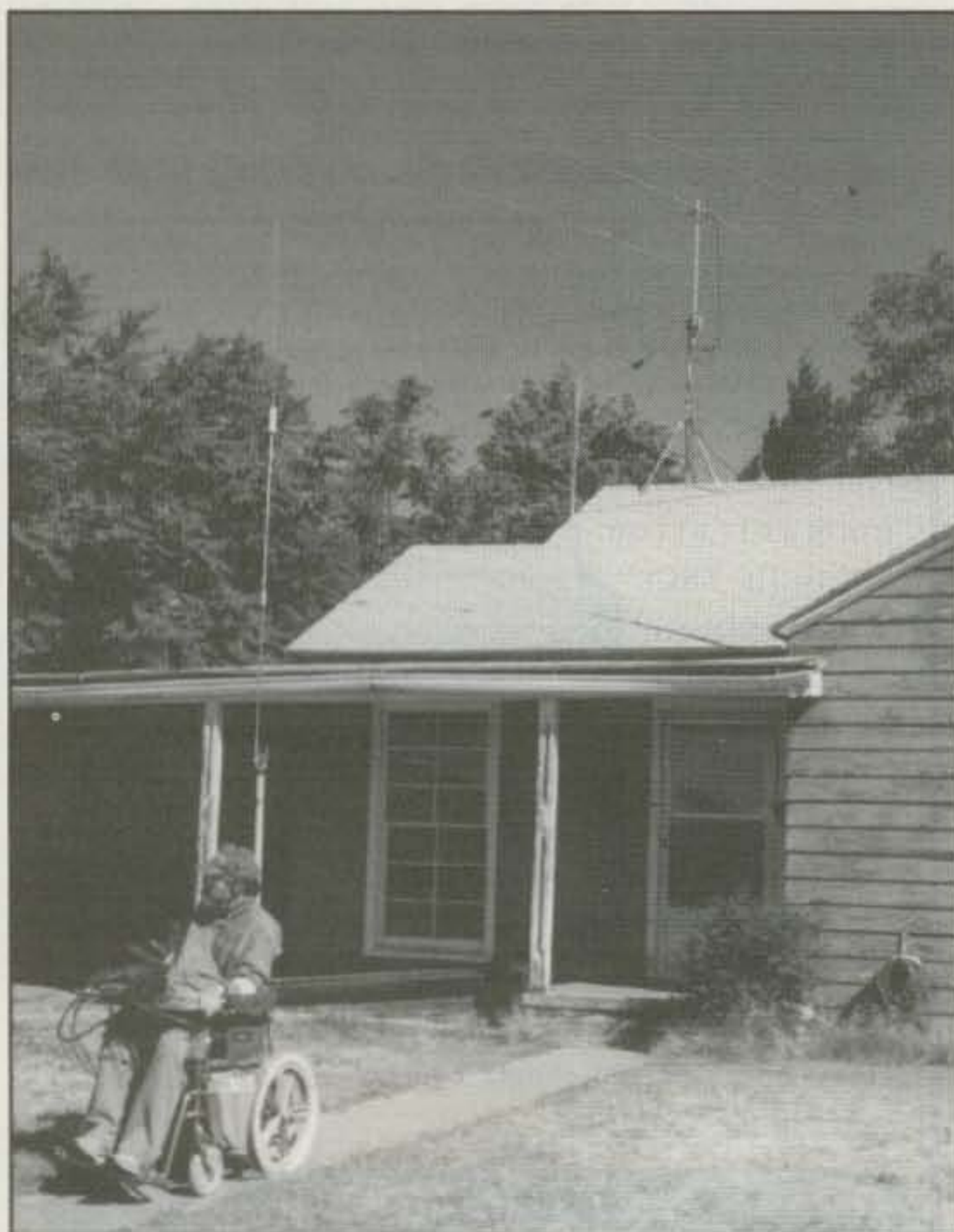


Photo 1—Sumter Hickman, KB5QHD, rolls like a big wheel in his 100 watt wheelchair mobile setup. Check out that elevated antenna. It's almost as tall as a fixed station vertical and radiates a great signal. (Photo and wheelchair mobile design by Larry Cruise, AA5TA)

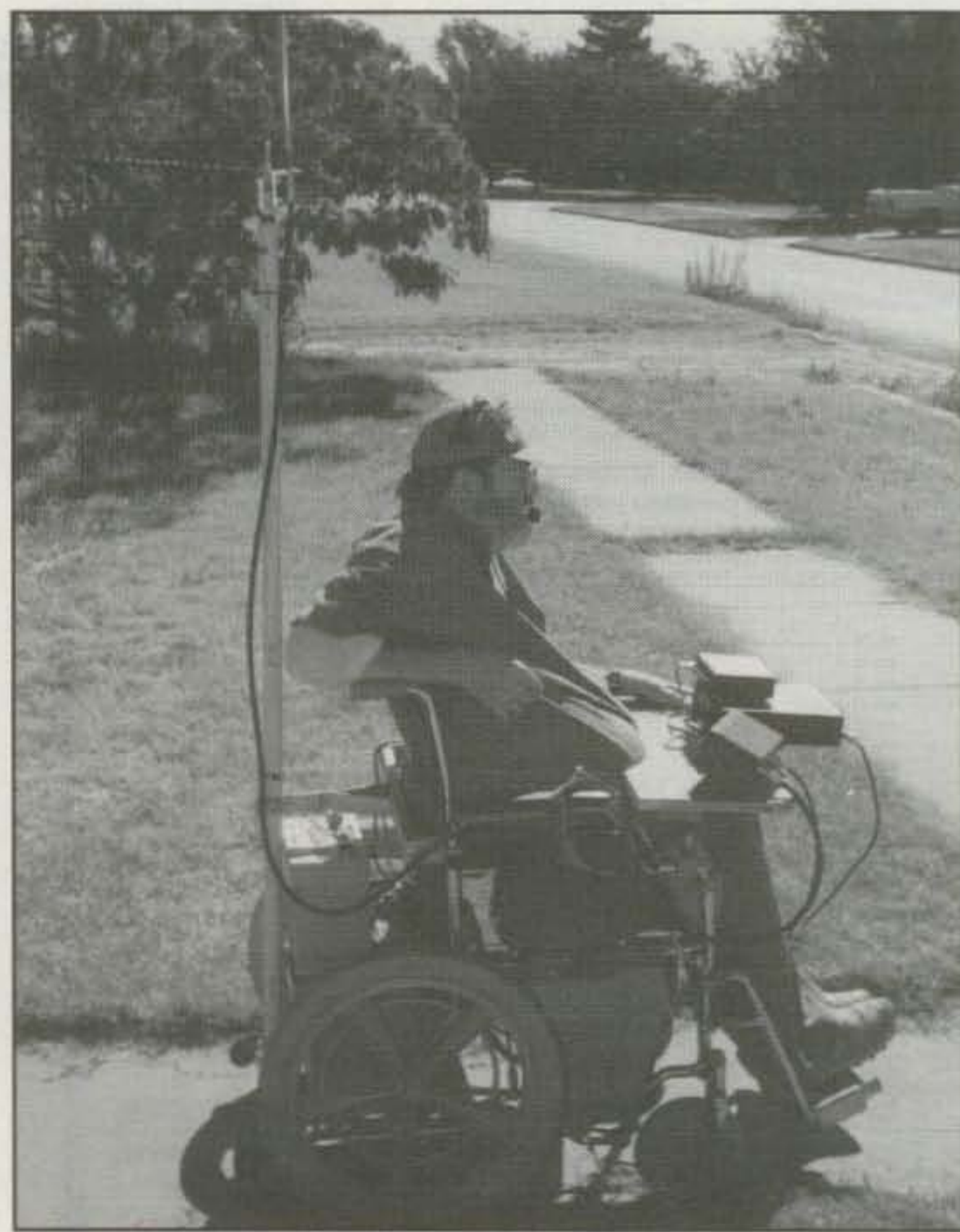


Photo 2—Side view of KB5QHD/WC showing mini desk with TS-50, VOX, wattmeter, and boom mic. Battery is mounted between chair and PVC pipe supporting antenna. Look carefully and you can see approximately half of the counterpoise whip extending horizontally behind the chair.

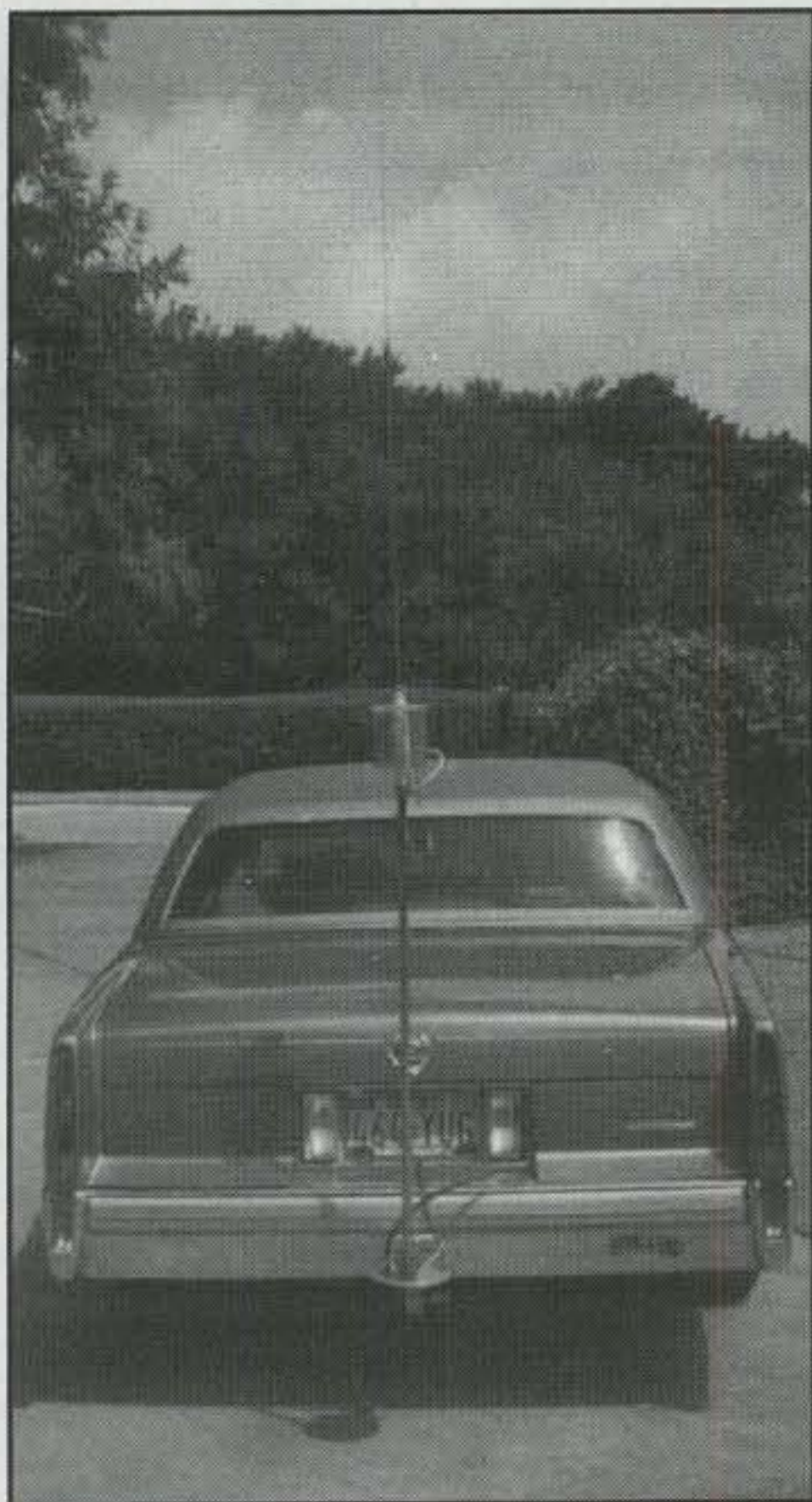


Photo 3- Bob Wallace, W5HIA, knows how to combine mobiling and traveling in luxury. Sleek Caddy is set up with trunk-mounted kilowatt amplifier and super-tall Bugcatcher ready to "RF" everything in sight. (Details in text.)

serves as a counterpoise and compensates for the missing metal auto body below the antenna. The full wheelchair mobile setup was engineered and made by Larry Cruise, AA5TA. Does it "get out"? You bet! That raised antenna radiates an outstanding signal. Sumter made over 20 QSOs on 40 meters during his first hour of wheelchair mobiling. He continues to make contacts galore, and signal reports usually range from S8 to 10 or 15 dB over S9. Jolly good show, old boy!

Cadillac KW Mobile

Our next "interesting mobile" story comes from Bob Wallace, W5HIA, another Texan enjoying outdoor hamming in a big way. Bob uses a TS-50S driving a homebrew kilowatt amplifier tucked in the trunk of his sleek-looking Caddy shown in photo 3. The antenna is a 13 foot tall all-band Bugcatcher with a large open-air loading coil and hefty base impedance-matching coil. It is mounted on a trailer hitch bolted to the car's frame, and includes extra ground wires bolted between the hitch, the car's frame, and the floor of the trunk (elaborate!).

Bob said his first real surprise occurred when he passed a long 18 wheeler while transmitting at the kilowatt level, and the car's motor died. Evidently, the trailer's large span of metal reflected RF energy into the Caddy's computers. Fortunately, Bob was able to restart the vehicle after a brief roadside rest and check-out. He contacted General Motors' electronic division in Detroit, and they suggested shield-

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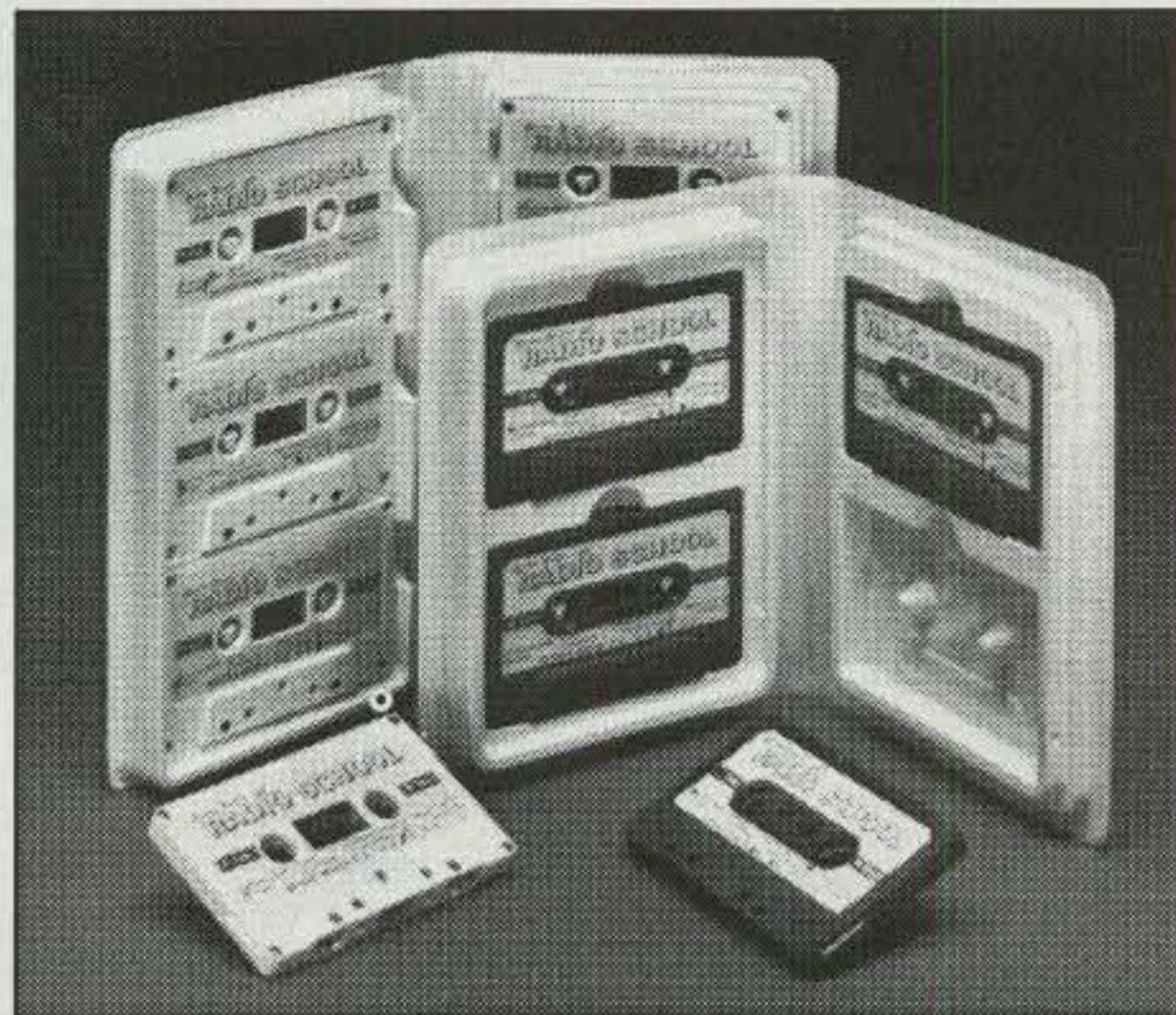
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0552RH	25-40	375	55	-/-	Repeater HPA

144 MHz					
1403G	1-5	10-50	6	15/0.6	LPA
1406G	25	100	12	15/0.6	Standard
1409G	2	150	25	15/0.6	Standard
1409R	2	150	24	-/-	Repeater
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1410R	10	160	24	-/-	Repeater
1412G	25-45	160	20	15/0.6	Standard
1412R	25-45	160	19	-/-	Repeater
1450G	5	350	56	15/0.6	HPA
1450RH	5	350	56	-/-	Repeater HPA
1452G	25	350	50	15/0.6	HPA
1452RH	25	350	50	-/-	Repeater HPA
1454G	50-100	350	40	15/0.6	HPA
1454RH	50-100	350	40	-/-	Repeater HPA

220 MHz					
2203G	1-5	10-40	6	14/0.7	LPA
2210G	10	130	20	14/0.7	Standard
2210R	10	130	19	-/-	Repeater
2212G	30	130	16	14/0.7	Standard
2212R	30	130	15	-/-	Repeater
2250G	5	220	40	14/0.7	HPA
2250RH	5	250	40	-/-	Repeater HPA
2252G	25	220	36	14/0.7	HPA
2252RH	25	250	36	-/-	Repeater HPA
2254G	75	220	32	14/0.7	HPA
2254RH	75	250	32	-/-	Repeater HPA

440 MHz					
4403G	1-5	7-25	4	12/1.1	LPA
4410G	10	100	19	12/1.1	Standard
4410R	10	100	18	-/-	Repeater
4412G	20-30	100	19	12/1.1	Standard
4412R	20-30	100	18	-/-	Repeater
4448G	5	100	22	12/1.1	HPA
4448R	5	100	22	-/-	Repeater HPA
4450G	5-10	175	34	12/1.1	HPA
4450RE	5-10	175	34	-/-	Repeater HPA
4452G	25	175	29	12/1.1	HPA
4452RE	25	175	29	-/-	Repeater HPA
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144 MHz	1420N	.5	24	N
220 MHz	2220B	.5	22	BNC
220 MHz	2220N	.5	22	N
440 MHz	4420B	.5	18	GNC
440 MHz	4420N	.5	18	N
1.2 GHz	1020B	.9	14	BNC
1.2 GHz	1020N	.9	14	N



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Photo 4—Terlin Aerial's outdoor tuning and test facility in western Australia. Note the Outbacker mobile antennas are being checked for low SWR and wide bandwidth with an AEA Antenna Analyzer. (Photo via Don Arnold, WD4FSY)

ing both of the car's computers with aluminum foil. After the dealership performed said cure, and at the supervisor's request, Bob checked the results from the parking lot. The engine ran perfectly with the rig running 100 watts and barely surged at the KW level, but RF energy zapped three computers in nearby offices. I bet this setup even makes bugs caught in the coil glow in the dark at night!

Bob surmised kilowatt-level mobiling should be limited to wide-open spaces, but the next time out another 18 wheeler sneaked up next to him while he was working 17 meters. *Kasput!* The motor croaked again. Fortunately, it also started again. Back to the barefoot level again. Hmm... A knowledgeable contact suggested switching to double-braided coax, so the change was implemented while rerouting the cable for even less computer interference. The coax was routed through the middle of the floorboard in front of the front seat (right where it connected to the TS-50), under the vehicle, and along the frame on the passenger's side to the trunk. Another cable was then routed from the trunk-mounted amplifier to the trailer-hitch antenna mount. Presto! No more motor stalling or stumbling, even at the KW level on 18-wheeler alley! Bob is now the happy mobil-er you hear with the killer signal on 17 meters.

Handy Antenna Tuning Aid

Say you are looking for an easy way to tune up a homebrew mobile antenna or set coil tap points on a multiband Bugcatcher? Take a cue from Terlin Aerials in Australia (manufacturer of the popular Outbacker mobile antenna), and check out AEA's new HF Antenna Analyzer shown in photos 4 and 5. This little gem is completely self-contained, it covers 1.0 to 32 MHz (a similar-looking model covers 2 meters, 222 MHz, and 70 cm), and it cuts an often lengthy process down to only a few minutes.

The AEA Antenna Analyzer is a snap to use.

You just plug an antenna's cable into its top-mounted socket, select any desired frequency range and bandwidth, and the unit will plot the resultant SWR vs. frequency curve on its LCD panel. You can then shorten the antenna's top stinger or jumper a turn or two of its loading coil to raise the resonant/center frequency, or lengthen the whip or add one or two coil turns to lower the frequency. If the antenna's center frequency hits your desired operating range but SWR is still a mite high, just "roll your own" base impedance-matching coil. A half dozen turns of any convenient diameter between 1 and 3 inches usually works fine. Connect one coil end to the antenna's base right at the mount, leave the other end loose, and then ground-tap coil turns until you achieve a 1:1 SWR. You do not even need a transceiver in the car while tuning the antenna. After tuning is finished, bring out your rig and enjoy the results.

I recently used an AEA Antenna Analyzer to help in modifying a couple of homebrew whips, and must say it is a treat. I especially like its different tone beeps for "working alone assistance." After propping the analyzer on the seat and connecting my antenna, I just moved coil taps until the analyzer's "SWR sampling" beeps shifted from a high to low pitch. Bingo—one ready-to-use antenna! Everything in life should be that simple! Want more info on the Antenna Analyzer? Write to AEA at 2006 196th St. S.W., Lynnwood, WA 98306, or call them at 206-775-7373.

No-Holes Antenna Mount For Pickup Trucks

Next up is a new and quite clever solution to an increasingly common puzzle: how to mount a mobile antenna on a pickup truck. Fewer and fewer people like installing body mounts. Mag mounts without added straps usually lack

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Cosmos 86

Date	UTC
30/01/95	17:44:20
Azimuth	Elevation
205.5°	24.3°
Range	Height
2672km	1483km
Squint	Mode
N/A	N/A
Doppler	Phase
N/A	186
UMD	Eclipse
1.23	Towards
Panel Ill.	Sun angle
N/A	N/A
Latitude	Longitude
23.50°N	5.49°E
Next set in 00:02 hrs	

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Date	UTC
30/01/95	17:44:20
Azimuth	Elevation
301.6°	-38.3°
Range	Height
8829km	599km
Squint	Mode
N/A	N/A
Doppler	Phase
N/A	99
UMD	Eclipse
0.80	Away
Panel Ill.	Sun angle
N/A	N/A
Latitude	Longitude
28.28°N	91.35°W
Next rise in 12:32 hrs	
Visible for 00:03 hrs	

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Feed Point Impedance:50 Ohm (+/-5)

SWR: 1.5:1

Recommended Feed Line: RG213/U

Ground Rod: 4' Minimum

Number of Radials: 6

Radial Length: 34'

Height: 31' 1"

Mast: Telescoping

Top Hat: 17' Dia. Aluminum and
#14 Copperweld Wire

Foot Print w/4 Guy System: 25' x 25'
Area

Wind Surface Area: Approx. 9 Sq. Ft.

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CIRCLE 122 ON READER SERVICE CARD

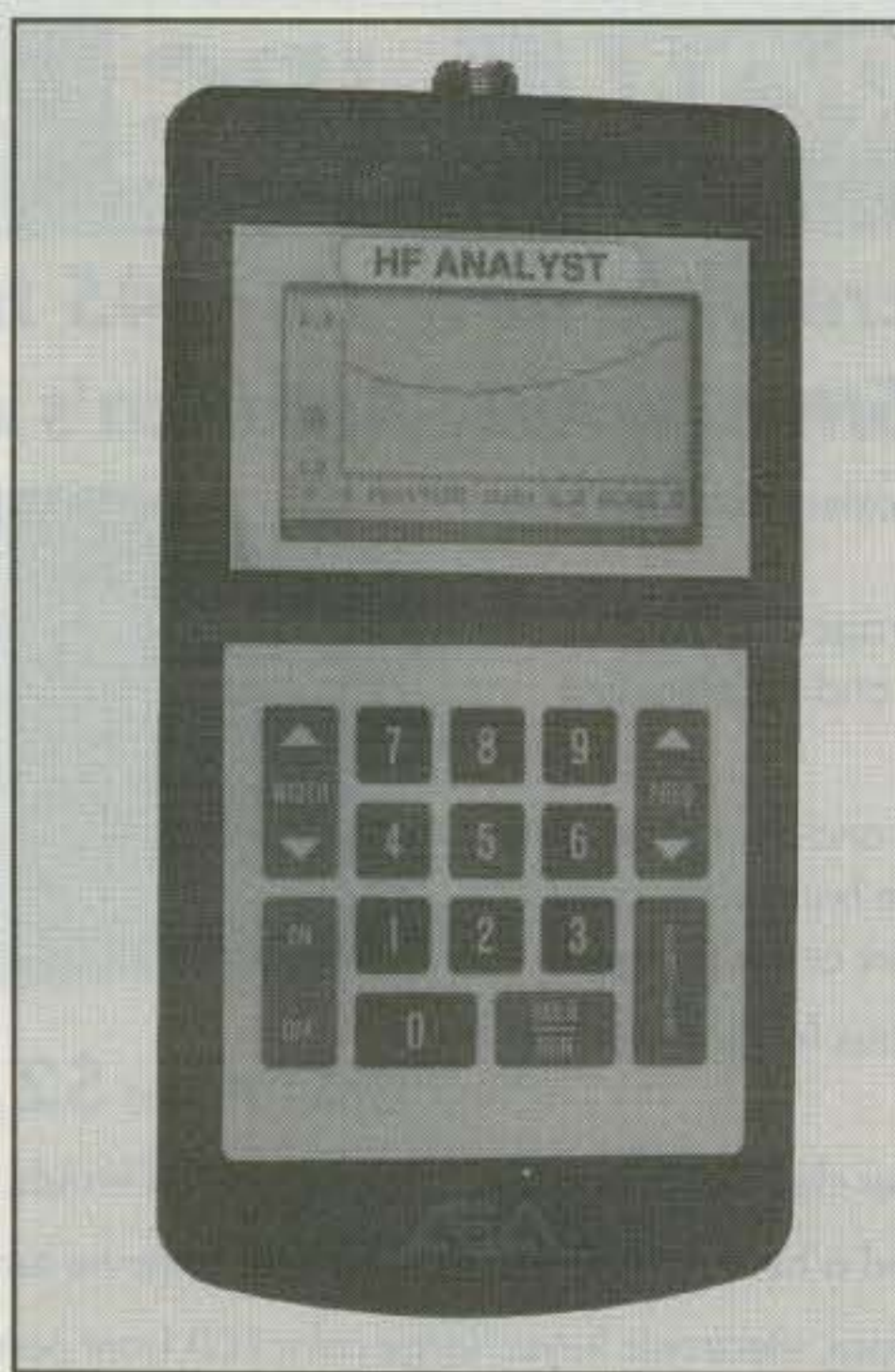


Photo 5- Close-up view of the AEA Antenna Analyzer. A center frequency and desired bandwidth can be entered directly on the front keypad, and the resultant response curve will be plotted on the LCD panel. Unit is available in both HF and VHF/UHF versions, and checks antennas without any additional equipment.

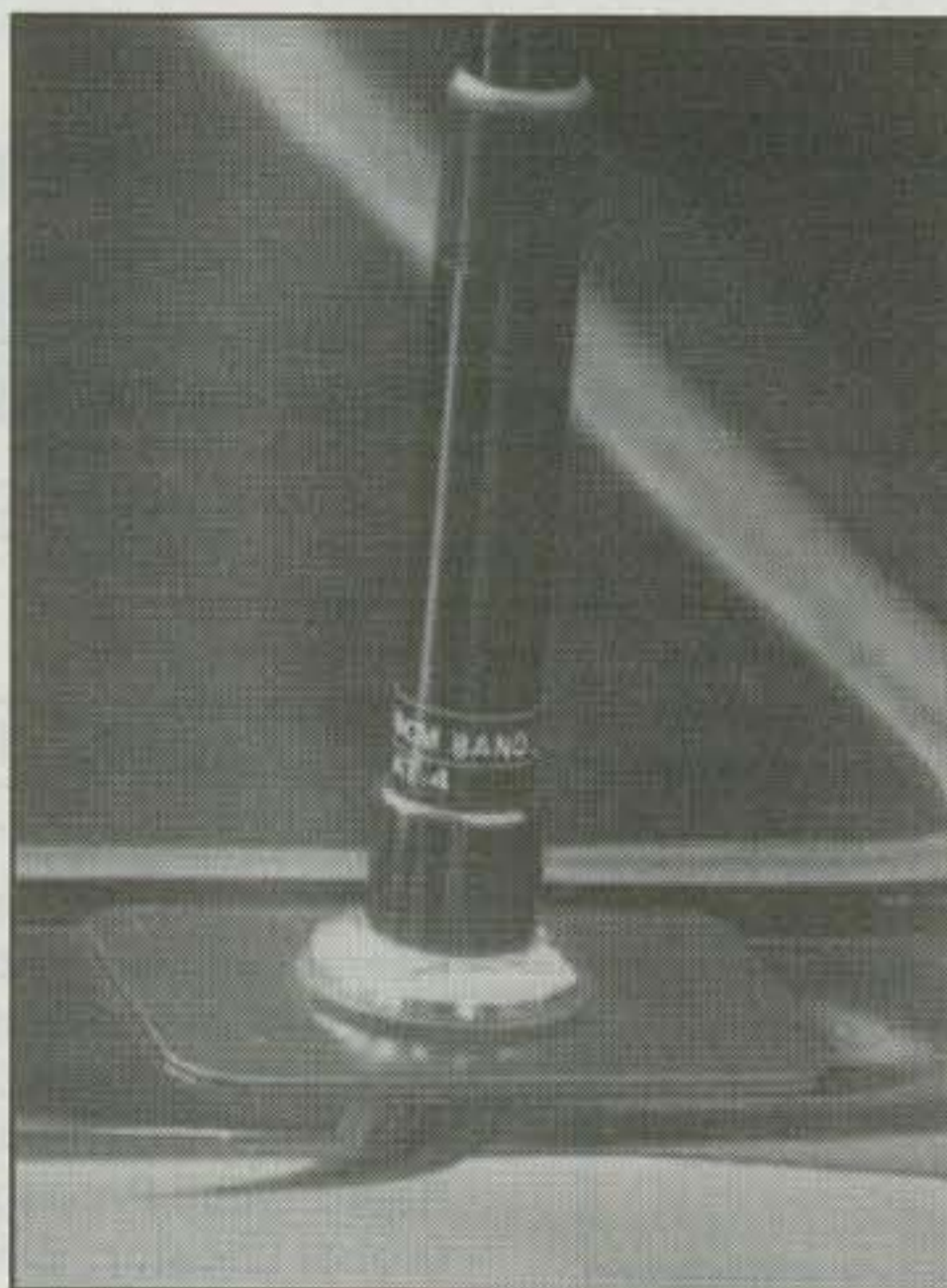


Photo 6- How (and where) do you quick-install a mobile antenna on a pickup truck? Check out this new stake pocket mount from TDC Products. It taps into an existing bedframe hole, looks neat, and holds great.

good grounding abilities, and bumper mounts (if available) seldom raise an antenna high enough for good signal radiation. TDC Products (2927 Potomac Avenue, Mesquite, TX 75149, phone 214-288-6892) thus devised the "Stake Pocket Antenna Mount" shown in photo 6. You bolt an SO-239 or 3/8-24 thread socket to mate with your antenna into this spring

steel clip's predrilled hole, tap the clip/mount into one of the pickup bed's four corner holes, and screw on an antenna. The process is so easy that you probably will want to add three more mounts and antennas to make a full-blown phased array. Now that would be truckin' with class!

The pocket mount is flat on the top, and its (out of view) spring clips are strong enough to hold almost any medium-size antenna, such as a Ham Stick, in place without requiring nylon guys. When you later sell the truck, just pry off the pocket mount to restore stock condition. These mounts are available to fit GM and Ford trucks (possibly other models upon request). Contact TDC directly for more details.

Good Mobile Entertainment

We all have experienced the old "dead band syndrome," but it always seems to be a real downer when mobiling. What to do? Snap one of the new "Seek You" music cassettes or CDs by Andrew John Huddleston and Lissa Lade-foged (The Ham Band) into your car's stereo and perk up to a few fun radio songs such as "Trip to Dayton," "The Contest," "Rotuma Bound," and more. I recently checked out this new country CD, and by jove, it is good listening. The musicians are professionals all the way, and each of the album's 14 songs relates an interesting amateur radio story. I think you too will enjoy "Seek You." Who knows? Andrew, OZ1XJ, may be the next station you QSO on 20 meters. "Seek You" tapes and CDs are available direct from Bonneville Music, P.O. Box 8521, Moscow, ID 83843 (phone 1-800-721-4077).

A "Trekkie's" Delight

Before parting the new goodies category, I must spotlight the most unique little gems yet for out-of-car portable use or hamfesting with an FM handheld: Comet's "micro talkie" speaker-mic shown in photo 7. This elite treat is smaller than your thumb (1" x 1.75"), and it looks just like an FM talkie with its readout illuminated. Its built-in speaker and microphone sound surprisingly good, its push-to-talk switch actually works/keys your rig, it has a rear clip for attaching to a shirt, and it has a 38 inch cable with plugs to fit most handhelds. This has to be the closest thing to a Star Trek "Comm Badge" yet, and it really generates interest during use.

The first time I demonstrated this tiny item to friends, I kept my handheld out of sight and let only the speaker-mic show. They went bonkers over it! The next time I clipped it to a sports-coat cuff and routed the cable up a sleeve to the talkie nestled in a vest pocket. That "communicator jacket" idea drove the natives wild with envy. These petite Comet speaker mics are now available from "800 dealers" nationwide, so ring them up and get your own setup going soon. Specify a model HM-P4K for a Kenwood talkie, an HM-P4Y for a Yaesu, or an HM-P4F for an ICOM, Alinco, or Standard unit. If you need more information and/or rig-interfacing help, check with Mick at Comet (1-800-962-2611). He's a "can-do" guy!

Wind Down

Once again it's time to ride off into the sunset, but we've yet to tell you about the dead mouse

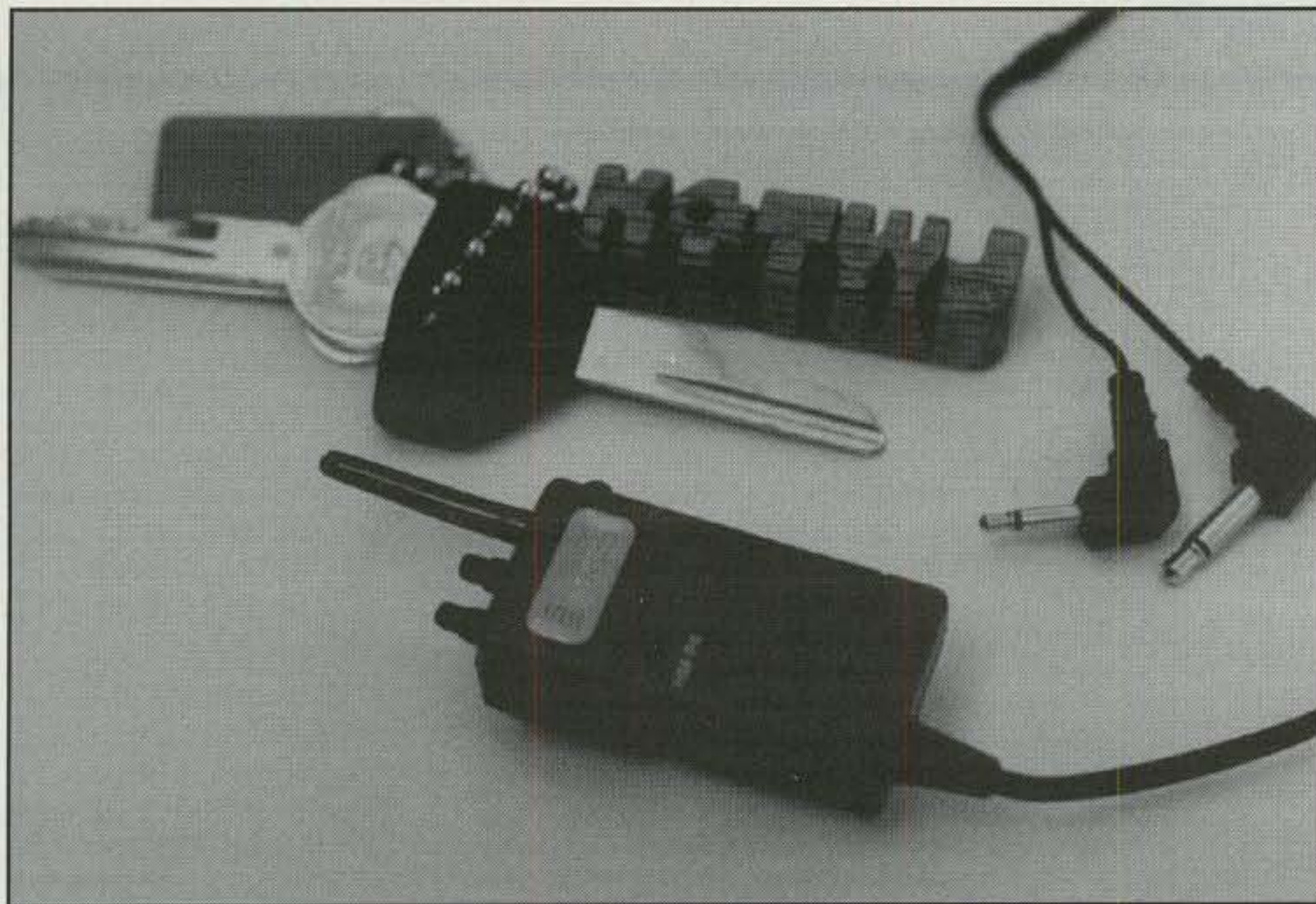


Photo 7- What's this? An FM handheld as small as a car key? Almost. It's Comet's new micro speaker mic, and it works with most popular handhelds.

resurrected as a (mobile) cricket. Say what? During late 1993 Terry Wirth, K7ACN, told me about his plights and pitfalls going CW mobile. He had a dire problem with expensive paddles falling off the seat, contacts being overcome with dust, and hiding a flashy paddle from covetous eyes when he was not in the car. Desperation set in, so he purchased a

defunct computer mouse at a hamfest and rewired its cable directly to the microswitches to make a "two button paddle." He then put the mouse/paddle on the seat or on his knee and sent code with his index finger and thumb pushing the mouse buttons (hence my reference to the cricket concept; see last month's "Keys" column for more details). The cricket-

ing mouse idea was cheap, effective, and rugged, so I too made one and tried it. I just cut original circuit-board traces to microswitches, resoldered the cable connections, cut off unused cable wires, and added a plug to fit my keyer. The results? It is a mite awkward to use, but fun! It is also an easy-to-replace item should it meet with ill fate. If you too try "mouse cricketing CW," Terry recommends a Microsoft two-button mouse as having the best feel.

Finally, bicycle mobileers and all true mobile enthusiasts are encouraged to listen for the "Ride Around Wyoming" bicycle group between June 11 and 16. Approximately 200 bicyclists will be riding from Wyoming to South Dakota during this week-long venture, and several amateurs in the group plan to work 40 and 20 meters during evening relaxation times. A similar trip is planned for next year. If you would like to join in, contact R.A.W., 18 Paradise Drive, Sheridan, WY 82801.

That's all the time and space available this month. Stay tuned, however, as more good topics are lined up for the coming months. Meanwhile, let's QSO on 30 CW some week-night soon or on 20 SSB (14.180-14.226 MHz) between 2130 and 2200 GMT some Sunday.

73, Dave, K4TJW

Schurr Keys Addendum

The Schurr line of keys featured in this column over the last few years is available in the United States through Electronic Switch Co. Inc., 4343 Shallowford Road, Suite E-6, Marietta, GA 30062, and their dealer network.

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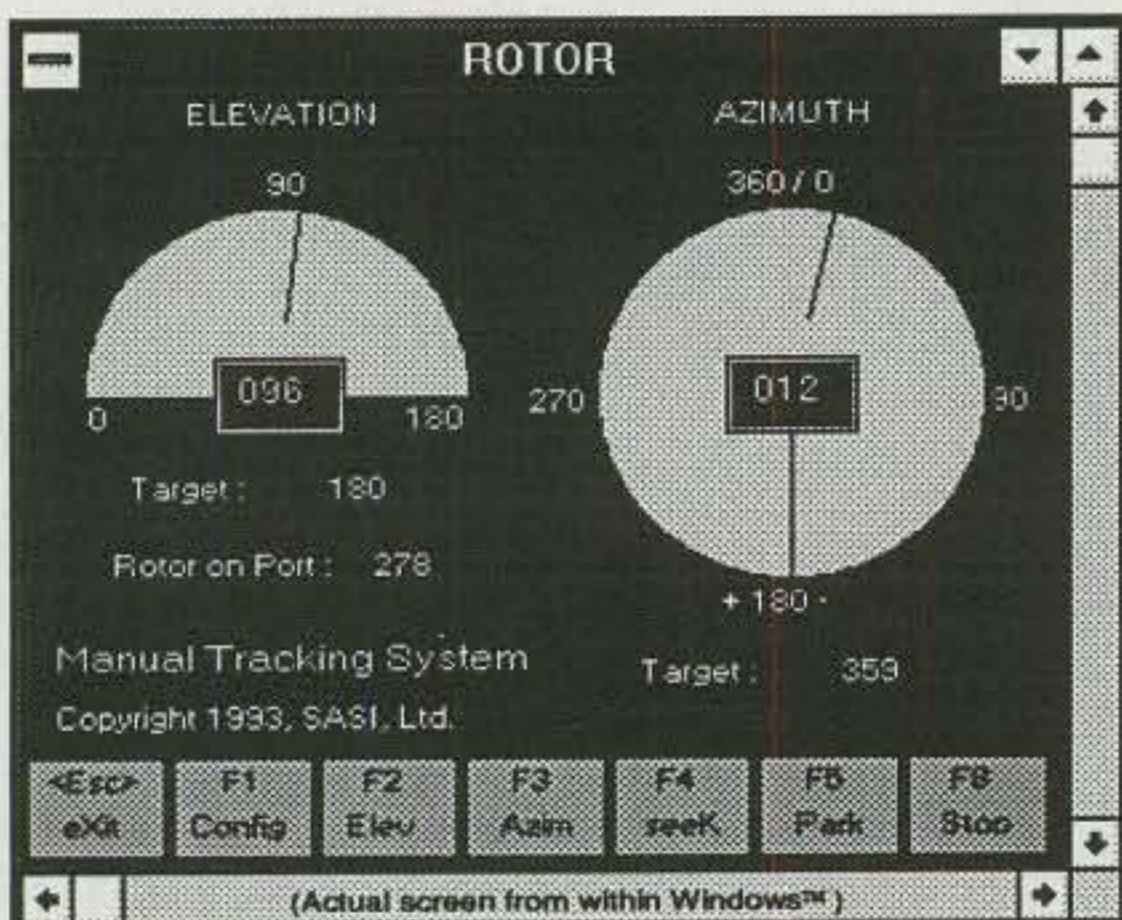
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CONSTRUCTION PROJECTS, TECHNIQUES, AND THEORYs

Eliminate BC-Band Interference

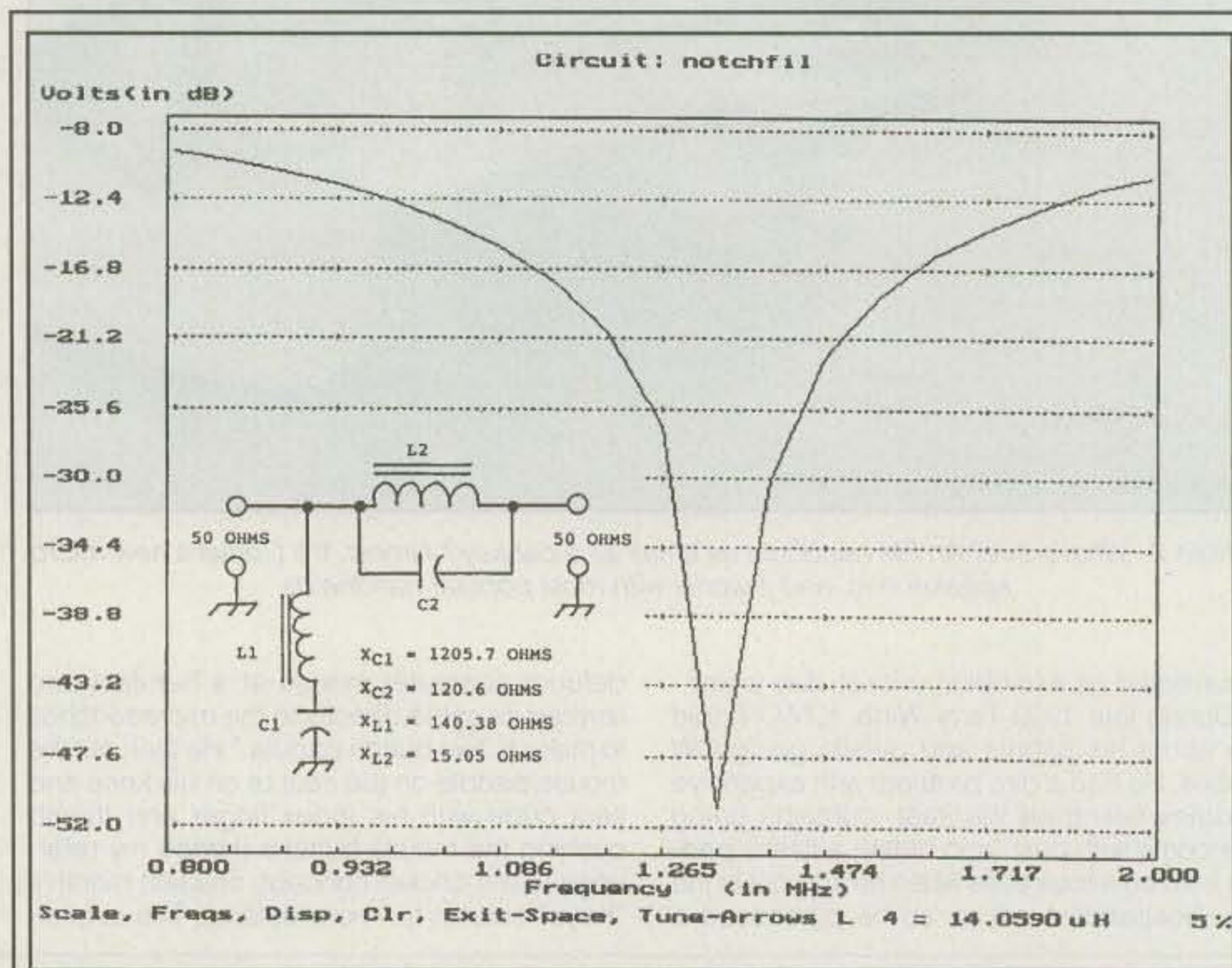
Amateurs who live in metropolitan areas where powerful AM broadcast stations degrade amateur-band receiver performance can find relief by using band-reject filters or wave traps. The effects of front-end overloading from strong BC-band signals become manifest in the form of desensing and unwanted spurious signals and beat notes throughout all or part of the tuning range of the amateur station receiver. Even though the receiver may have high dynamic range, nearby broadcast stations—especially those 50 KW giants—can cause havoc by creating intermod problems in the mixers of station receivers. This article describes three methods for getting rid of the BC-band energy before it disrupts MF and HF band reception.

Using Wave Traps

A single parallel-resonant or series-resonant wave trap can often resolve a receiver overload problem if it is tuned to the interfering BC frequency. A combination of parallel and series traps is shown in fig. 1. Only one of the traps (optional) can be inserted in series with the coaxial feed line to the receiver (parallel trap) or from the center conductor of the coaxial cable (series trap) to ground. A coax T adapter is handy for adding a series trap. In either situation it is important that the trap have a high Q in order to be effective. This means that a high-Q inductor and capacitor must be used. Polystyrene or silver-mica capacitors provide acceptable Q. Air-wound coils or those wound on 125 μ i ferrite cores (No. 61 material) yield high Q.

Fig. 1 contains the circuit for a more elegant trap that uses series and parallel elements for maximum signal rejection. The response curve shows a deep notch at 1320 kHz. The AC analysis in fig. 1 indicates a high $-j$ component for frequencies from 1.8 through 7 MHz. This does not seriously affect most receivers. However, if the user wishes to minimize the SWR at the receiver input port, he can "force" a 50 ohm characteristic by inserting a 50 ohm, 3 dB resistive pad between the trap and the input of the receiver. Conversely, the resistive component at MF and HF looks good, as the chart reveals.

X_C and X_L values are listed in the circuit of fig. 1. Traps may be designed for any BC-band frequency by utilizing those numbers. The component values for the 1320 kHz example are $C1 = 100$ pF, $C2 = 1000$ pF, $L1 = 140.38$ μ H, and $L2 = 14.0$ μ H. In order to obtain on-the-nose trap adjustment, it is necessary to add a low-value trimmer capacitor across each



Frequency	AC Volts at node 3	Phase (deg.)	Volts (dBV)	Delay (μ sec.)	R	Z (in) +/-	J
100.0 kHz	0.4978	-5.2	-6.06		50.11	+j	8.729
129.2 kHz	0.4965	-6.7	-6.08	0.1447	50.17	+j	11.32
166.8 kHz	0.4942	-8.7	-6.12	0.1458	50.25	+j	14.72
215.4 kHz	0.4904	-11.2	-6.19	0.1477	50.40	+j	19.24
278.3 kHz	0.4840	-14.7	-6.30	0.1509	50.64	+j	25.34
359.4 kHz	0.4730	-19.2	-6.50	0.1563	51.07	+j	33.85
464.2 kHz	0.4534	-25.5	-6.87	0.1653	51.91	+j	46.42
599.5 kHz	0.4177	-34.2	-7.58	0.1800	53.80	+j	66.94
774.3 kHz	0.3504	-47.0	-9.11	0.2032	59.51	+j	108.3
1.000 MHz	0.2261	-66.2	-12.91	0.2366	102.0	+j	264.3
1.292 MHz	0.0279	-108.1	-31.08	0.3985	10.26	-j	98.81
1.668 MHz	0.1742	74.3	-15.18	1.3106	234.0	-j	509.0
2.154 MHz	0.3211	52.2	-9.87	0.1262	63.09	-j	131.5
2.783 MHz	0.4027	37.7	-7.90	0.0641	54.44	-j	76.07
3.594 MHz	0.4458	27.8	-7.02	0.0337	52.04	-j	51.47
4.642 MHz	0.4690	20.9	-6.58	0.0183	51.06	-j	37.10
5.995 MHz	0.4820	15.9	-6.34	0.0103	50.59	-j	27.60
7.743 MHz	0.4894	12.2	-6.21	0.0059	50.34	-j	20.88
10.00 MHz	0.4937	9.4	-6.13	0.0035	50.20	-j	15.95

Fig. 1—Schematic diagram, response curve, and AC analysis for a BC-band rejection trap. This example is resonant at 1320 kHz. L1 has 45 turns of No. 28 enameled wire on an Amidon FT-50-61 ferrite toroid. L2 has 25 turns of No. 24 enameled wire on an FT-50-63 ferrite toroid. The X_C and X_L values listed may be used to design the trap for other frequencies (see text).

fixed-value capacitor. When this is done, the builder must slightly reduce the values of $C1$ and $C2$, or one or two turns can be removed from $L1$ and $L2$. Tweaking is done by placing the trap in the feed line to a BC-band receiver,

tuning in the offending station, and adjusting the trimmers for minimum received signal strength. The trap does not need to be readjusted when it is relocated to the receiver input port. High-Q slug-tuned inductors can be used

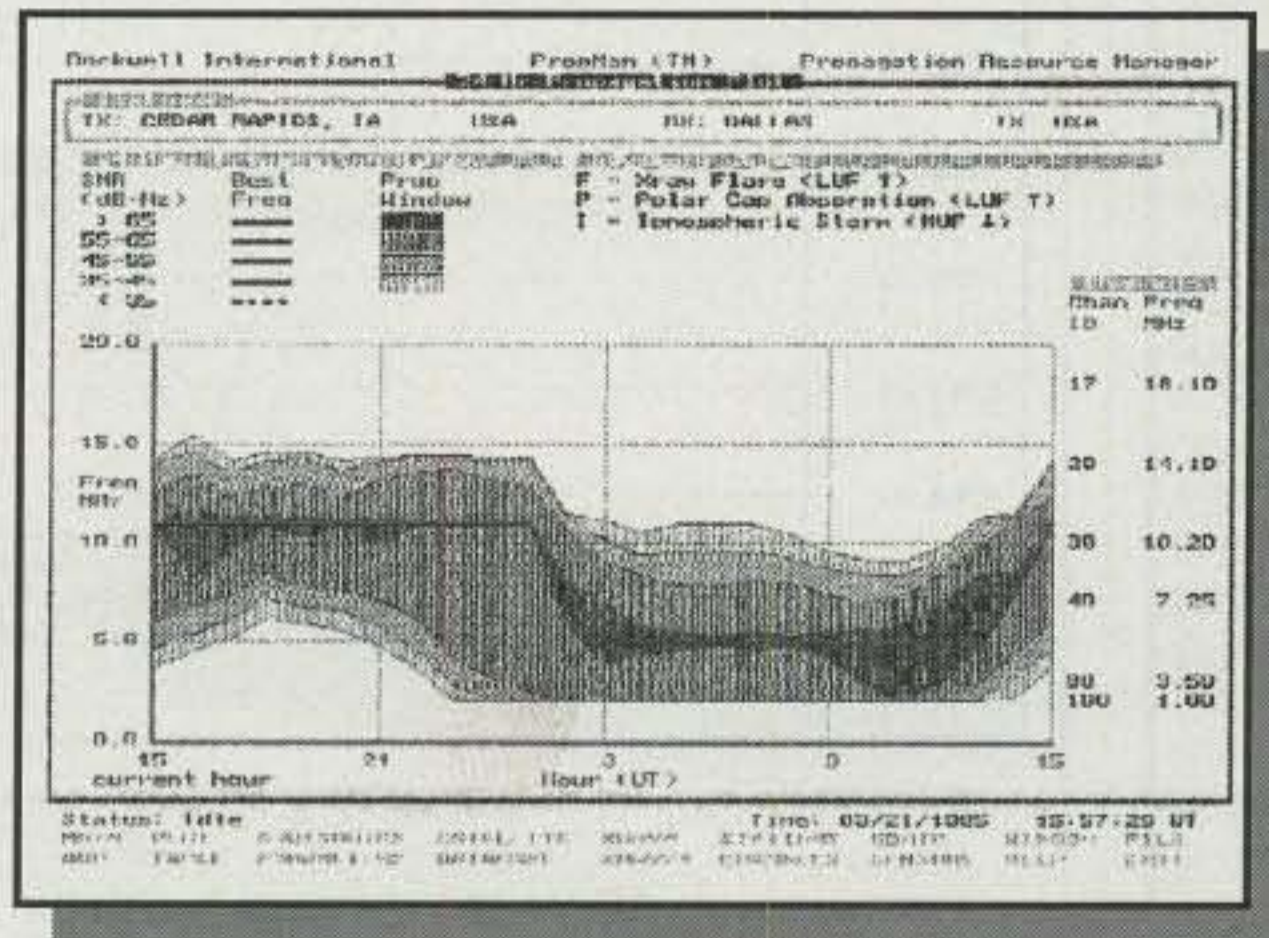
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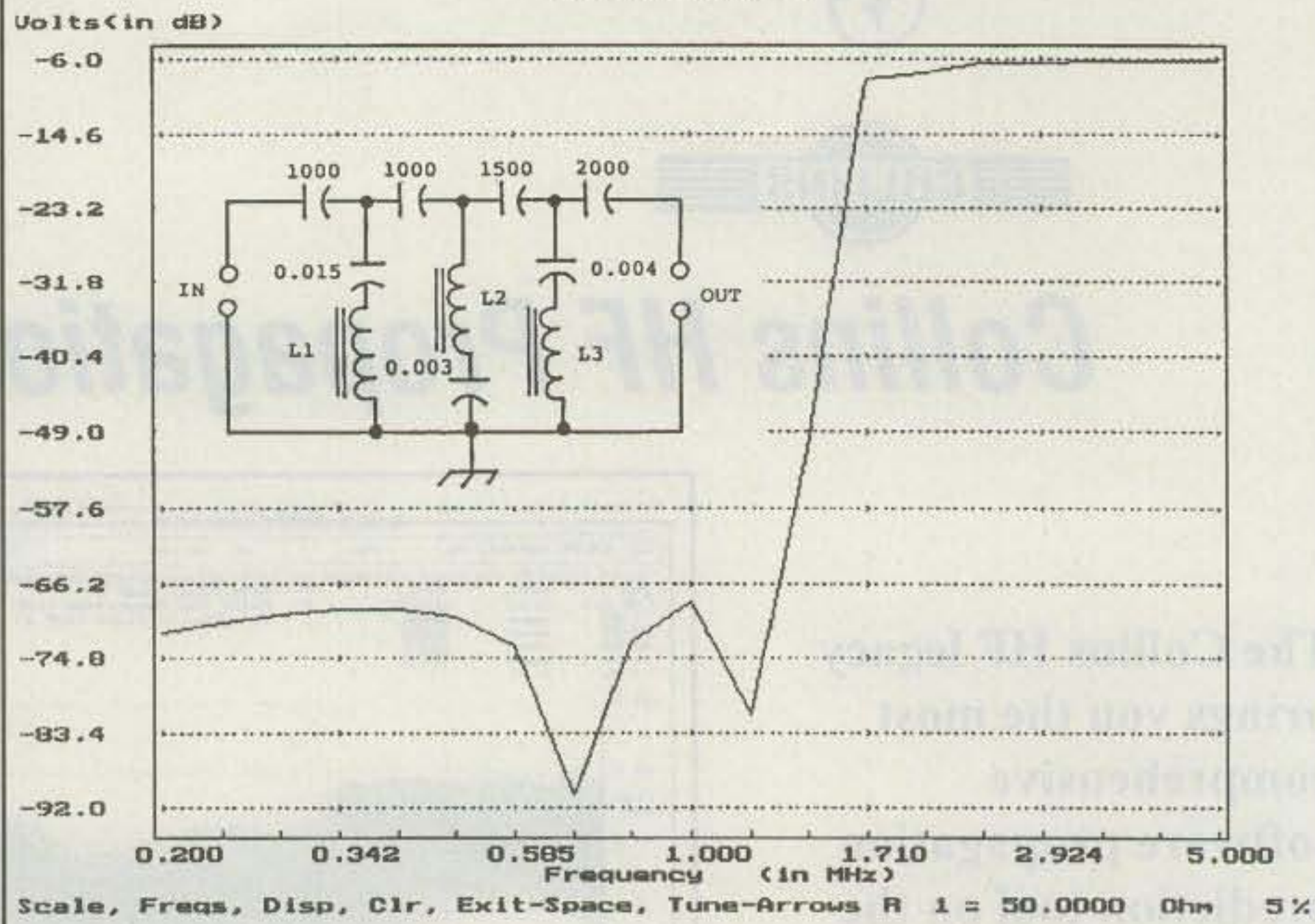
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Frequency	AC Volts at node 8	Phase (deg.)	Volts (dBV)	Delay (µsec.)	Z (in) R	+/-	J
200 kHz	0.0003	81.4	-71.76		0.871	-j	842.4
239.2 kHz	0.0003	79.7	-70.64	0.1188	0.737	-j	703.1
286.0 kHz	0.0003	77.7	-69.72	0.1189	0.626	-j	586.3
342.0 kHz	0.0003	75.3	-69.12	0.1192	0.536	-j	488.3
409.0 kHz	0.0004	72.4	-69.08	0.1193	0.464	-j	406.0
489.0 kHz	0.0003	69.0	-70.06	0.1187	0.406	-j	336.7
584.8 kHz	0.0002	65.1	-73.41	0.1133	0.363	-j	278.1
699.3 kHz	0.0000	67.8	-90.54	0.0644	0.333	-j	228.3
836.3 kHz	0.0002	-129.4	-73.09	3.3034	0.317	-j	185.6
1.000 MHz	0.0004	-137.1	-68.29	0.1306	0.318	-j	148.4
1.196 MHz	0.0001	-142.3	-81.36	0.0737	0.348	-j	115.1
1.430 MHz	0.0028	-175.5	-51.07	0.3941	0.468	-j	82.91
1.710 MHz	0.3861	62.2	-8.27	1.2139	29.75	-j	38.94
2.045 MHz	0.4219	-67.7	-7.50	1.0770	20.95	-j	20.03
2.445 MHz	0.4791	-146.1	-6.39	0.5439	65.73	-j	19.29
2.924 MHz	0.4732	169.8	-6.50	0.2562	56.69	-j	30.98
3.497 MHz	0.4839	137.4	-6.30	0.1568	55.21	-j	22.29
4.181 MHz	0.4883	112.0	-6.23	0.1031	59.93	-j	17.34
5.000 MHz	0.4879	92.1	-6.23	0.0675	63.56	-j	17.24

Fig. 2—Schematic diagram, response curve, and AC analysis for a band-reject filter that notches out the entire AM BC band. L1 (3.3 µH) has 26 turns of No. 26 enameled wire on an Amidon T50-2 toroid. L2 (5 µH) contains 32 turns of No. 26 enameled wire on a T50-2 toroid. L3 (4.16 µH) has 29 turns of No. 26 enameled wire on a T50-2 toroid core.

at L1 and L2 if trimmers are not employed across C1 and C2. The coils can then be tweaked to the desired notch frequency.

A Band-Reject Filter

The entire AM BC band can be notched out by using a band-reject filter of the type shown in fig. 2. The response curve indicates that attenuation extends into the LF region as well. The filter is designed around standard-value capacitors. Polystyrene or silver-mica capacitors are recommended for best circuit Q. The inductances in this filter are small enough to permit the use of

No. 2 powdered-iron toroid cores (T50-2).

The AC analysis in fig. 2 shows that the -j factors at 1.8 MHz and above are more manageable than for the trap in fig. 1. Therefore, it should not be necessary to use a resistive pad between the filter and the receiver to ensure a low SWR.

Ladder Attenuator

The onslaught of strong BC-band energy can be minimized by using an attenuator at the front end of the receiver. Attenuators may also be used for minimizing overload effects (degrad-

ed dynamic range) from strong in-band signals. The trade-off when using attenuators is a decline in receiver signal-to-noise ratio. Step attenuators also are useful for giving accurate comparisons in signal strength, such as when another operator switches between antennas A and B while asking for a comparative report. Receiver S meters are seldom accurate enough for other than relative comparisons.

Fig. 3 shows the circuit for a ladder attenuator that can be built on a two-pole, five-position rotary wafer switch. Standard-value 1/4 watt resistors are used for the pads. Care must be taken to avoid placing the attenuator or the BC-band filters in the transmit line of the station. Each of them would be destroyed almost immediately at power levels above 1 or 2 watts.

Construction Notes

The trap, filter, and attenuator should be contained in shield boxes (or inside the receiver cabinet) in order to prevent RF energy from being picked up by the circuit. Performance of these circuits could suffer without the shielding.

All component leads should be short and direct in each of the three circuits. This will minimize unwanted stray inductance. Best performance for the band-reject filter in fig. 2 will be realized if each section of the filter is placed in its own shield compartment. This is especially true if non-toroidal coils are used. The self-shielding nature of toroids should provide ample isolation if the coils are separated by 1

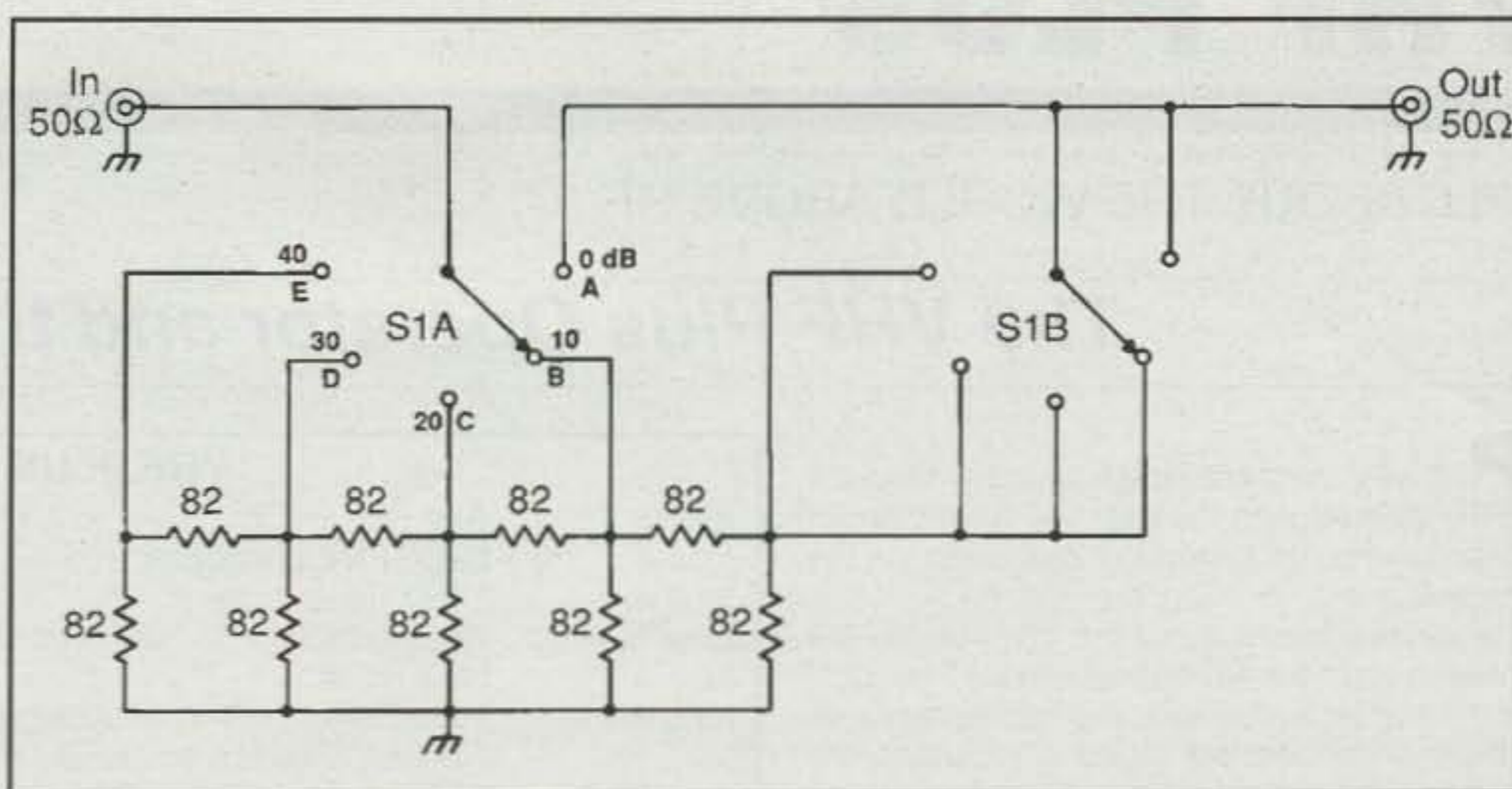


Fig. 3—Schematic diagram of a ladder attenuator for use at the receiver front end. Resistors are 1/4 watt carbon film. S1 is a two-pole, 5-position rotary wafer switch. The steps are from 0 to 40 dB in 10 dB increments.

inch. An earth ground should be connected to the metal boxes of the circuits in figs. 1 and 2.

Closing Comments

There is nothing new about any of the circuits in this article. The component values specified were obtained via NOVA software (available from RF Engineering, RD #1, Box 587, Chango Lake Road, Norwich, NY 13815). The

tweaking options in the program were utilized to select component values that would yield optimum performance.

If you live near commercial AM stations and have been hearing strange birdies and frigglies in your receiver, chances are that overloading is occurring. The circuits in this article will probably cure your problem if your receiver has been affected by RF pollution.

73, Doug, W1FB

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ALL ABOUT THE WORLD ABOVE HF

The VHF Plus Operator and the Internet

Probably the most significant growth in the VHF+ world during the past few years has not been on the air. Instead, it has been via the Internet.

Everyone hears about the Internet. Via the Internet you even have access to the President of the United States. With the increasing availability of modem-equipped computers, the average guy or gal finds it quite easy to get on the "information super highway."

Over the nearly four years I have been editing this column, I noticed a significant increase in the number of VHF+ operators on the Internet. Naturally, I am gathering a significantly larger amount of my news for this column from it.

In the past I have reported on packet networks that supplied real-time information of band openings, etc. Now comes word via the Internet of what might be the first significant international use of the Internet to take advantage of VHF+ conditions as they happen.

On 7 April the following report from Frank Van Dijk, PA3BFM, appeared on the VHF reflector over the Internet: "Hello. I'm in the middle of a very good aurora here in JO22OC. On 6 meters I worked OK1DDO in JO60 and heard S59A from JN76. Many G, GM, GW, OZ, SM, LA, DL, ON, PA stns were hrd/wrkd. We hear stations this far south very rarely on aurora. Between 1630 and 1700 UTC all signals were extremely strong. I could hear all beacons nNorth of me, including the ones in OH and ES (Estonia). The tone quality tended towards clear and normal sound. At around 1700 signals weakened but aurora was still strong on 48,250 TV and the 49,75 TV cluster. Hopefully it returns at midnight . . . 73 and cu all on 6 meters.—PA3BFM Frank JO22OC."

Spotting the posting, Paul Husby, WØUC, took advantage of the real-time reporting of it. He later reported the following to me: "You may have seen the post by PA3BFM on the VHF reflector of an aurora in progress on 4/7; his message was distributed early Friday afternoon. I alerted several locals who were able to catch the opening in the late afternoon and evening. This was the first real-time posting I have seen of a propagation event. The Internet has tremendous potential as a medium for alerting operators to openings, as well as studying openings on a global basis. People with easy access should be encouraged to report propagation events as they happen!"

By now you probably have two questions: How can I get on the Internet and what is a reflector? Many have access to the Internet via E-mail at places of employment. However, for the vast majority of us that is not an option. What is available are the growing number of services that provide access to the Internet. There are services that allow you virtually unlimited access, and then there are services that allow just the ability to send and receive messages across it.

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VHF PLUS CALENDAR

June 1	Apogee.
June 4	Good EME conditions.
June 6	First quarter moon.
June 7	<i>Arietids</i> Meteor Shower predicted peak.
June 9	New moon.
June 9-11	Ham-Com Convention, Arlington, Texas. Nordic Conference in Sandefjord, Norway. (See text for details.)
June 10-12	ARRL June VHF QSO Party, 1800 UTC 10 June to 0300 UTC 12 June.
June 11	Moderate EME conditions.
June 13	Perigee, full moon, and lowest declination.
June 17-18	SMIRK 6 meter contest, 0000 UTC, 17 June to 2400 UTC 18 June.
June 18	Good EME conditions.
June 19	Last quarter moon.
June 24-25	ARRL Field Day.
June 25	Poor EME conditions.
June 26	Highest declination.
June 27	New moon.
June 29	<i>Beta Taurids</i> meteor shower predicted peak.

EME conditions days provided by W5LUU.

Perhaps the most popular domestic services are offered by organizations such as CompuServe, Prodigy, Genie, and America On-Line. All of these allow access to the Internet. Almost all offer a free month's access as a way of trying out their services.

Pricing can vary widely. For example, while AOL charges a flat fee of \$9.95 per month, CompuServe charges "postage" for all messages you receive outside of its system or affiliates in addition to its flat fee. (Because of the sheer volume of mail I receive via the reflectors, I have recently opted to use my AOL account to pick up this traffic, thereby saving myself between \$20 and \$30 per month postage.)

A reflector is a system set up to receive, copy, and send out messages automatically to a list of subscribers. On VHF there are currently four reflectors—two reporting on VHF+, one on EME, and one on the Rover issues. You can subscribe to these reflectors by sending a message to the host's subscription E-mail address, which is usually different than the E-mail address for posting messages to its reflector. Following are subscription and reflector addresses for the four current reflectors. For the U.S. VHF reflector (most popular), send sub message to VHF-request@W6YX.stanford.edu. In the body of the message simply put the word "subscribe." To post messages to its reflector, send them to VHF@W6YX.stanford.edu. To cancel a subscription, send a message to its subscription E-mail address with the word "unsubscribe" in the body of the message.

For the European reflector the procedure is the same. Subscription addresses are: VHF-request.icon_fonts@xeroxaffiliates.xerox.com; and for the reflector addresses the following: VHF.icon_fonts@xeroxaffiliates.xerox.com.

For the Rover reflector, the process is also

the same. Their address are, for subscriptions: VHF-rover-request@sttng.eng.pko.dec.com; reflector: VHF-rover@sttng.eng.pko.dec.com.

For the EME reflector, the subscription address is listserv@vm.stlawu.edu and the reflector address is moon-net@vm.stlawu.edu.

You can also find forums within the various services listed above. For example, CompuServe has a forum called Hamnet. Note, however, most of these services charge an additional fee to participate in these forums.

How to you reach me via the Internet? As I mentioned above, I subscribe to both CompuServe and AOL. My CompuServe address is 72124.2734@compuserve.com. My AOL address is JoeN6CL@AOL.com. I check CompuServe daily as this is the address most know. However, I tend to let the mail build up on AOL and check it every few days.

Carrots Flying Over Nebraska?

Carl Zimmer, writing in January 1995 *Discover* magazine, describes mysterious flashes of light that have recently been observed and videotaped by Walter Lyons, an atmospheric scientist at Mission Research Corporation in Fort Collins, Colorado. Lyons reports that he has made hundreds of videos of these mysterious flashes of light, sometimes referred to as "sprites," that reach upwards of 50 miles into the sky. He has even given some of them names. Among the names are Angel of Death, Blessed Trinity, and Dancing Carrots.

In 1993 Lyons decided to investigate century-old claims by locals of seeing momentary flashes of light above thunderstorms. To do his research Lyons set up a video camera on Yucca Ridge, a point 12 miles northeast of Fort Collins, Colorado. From that location he was

able to have unobstructed views for several hundred miles eastward over the Great Plains.

During that summer Lyons' video camera captured over 600 optical flashes. Last summer he repeated his experiment and was able to tape hundreds more.

According to Zimmer, these flashes come in various colors, such as orange and salmon, and extend upwards of 50 miles above the tops of thunderstorm clouds. Zimmer goes on to say that the Department of Energy satellite ALEXIS, which is able to detect bursts of radio waves released during nuclear explosions, has registered more than 100 such flashes "... coming from Earth's atmosphere that have no identifiable man-made source. Normal lightning releases radio waves, but these flashes are 10,000 times more powerful."

Zimmer also reports that in 1991 NASA launched the Compton Gamma Ray Observatory to collect gamma rays from black holes and other sources in space. However, the satellite has been detecting "... dozens of gamma-ray flashes, each lasting a few milliseconds ..." from the Earth's surface.

Zimmer goes on to say that researchers speculate that the flashes originate in the stratosphere, where the air is thin enough for these flashes to escape. Zimmer further states that no one seems to know how these flashes are produced. He says that the only indication of their origin is that they seem to be generated above the tops of thunderstorms. He speculates that "... tops of clouds may become so charged that they create upside-down 'superbolts' of lightning that race up through the stratosphere. Or the clouds may create electric fields of such strength and size that they ionize huge volumes of air and make them glow like fluorescent lightbulbs. Or both these things happen."

Zimmer concludes by quoting Lyons as saying, "All we know for now is that the more we look above thunderstorms, the weirder it gets."

In my October 1994 column, in my conclusion to my reference to the August 1994 *Aviation Week and Space Technology* magazine article about sprites, I speculate the following: "Perhaps there is an association that causes both [sprites and sporadic-E]. Perhaps the ionization in the E-layer is the fuel that helps trigger certain thunderstorms."

I wonder if the ionization in the E-layer is the source of electrical charge that, combined with weather events just right, charges up the clouds, thereby turning them into thunderstorm clouds. I also wonder if these sprites are an indication not of energy being transferred from the clouds upwards into the stratosphere, but downwards from ionized E-layer clouds. Where would this E-layer ionization come from? From the Sun, of course. But, that is a subject for another host of speculations.

My thanks to Dave Batcho, N5JHV, who reported this article on the VHF reflector on the Internet.

VE6, VE7 to Alaska Via 6 Meter Aurora

On 1 April, around 0300 UTC, Rudy Stam, VE7FEI, noticed that he was picking up the VE6QRM beacon (DO30, 50.023 MHz). Immediately, he began calling CQ. It wasn't until 0343 that he raised VE6NA (DO20). He then worked VE6BCC (DO33) and VE7DRC (DO00). Then, faintly, he started hearing KL7NO call-

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ing CQ. Rudy worked Al, exchanging 51A reports both ways. Rudy went on to work VE6BMR (DO33), and Al went on to work VE6BCC and VE6NA before the band closed at around 0430.

During my interview with Al, he reported that during last year's June VHF QSO Party he heard a station give the grid locator of "EL83." Mistakenly thinking that the grid locator was in Texas, he moved up the band and started calling CQ, whereupon he worked two stations in New Mexico. It was only after reading our reports of our operations in Cuba that he realized that he had heard us and missed an opportunity to work us!

On The Air

I have received some reports of the huge tropo opening that stretched across the southeast. Brent Lemons, N5TML (EM14), states, "(On 22 March) I awoke to a great band opening. I wished I hadn't had to go to work. Everyone on 2 meters was running about 40-50 over S9. 432 MHz was terrific. I dressed and brushed my teeth between QSOs." No time for a shower, huh, Brent.

Among the stations Brent worked between 1258 and 1323 UTC were: on 2 meters and 70 cm, WB5KYK (EM51) and N0KBH (EL88); on 2 meters, KC4NJM (EL94), K4DZP (EL95) WB4MJE (EL94), KC5BTG (EM40), WA4DFO (EL87), and W5VAS (EM40); and on 70 cm, K4DTZ (EL88).

Bill Tynan, W3XO/5, reported the following: "The late days of March brought some of the best tropo that I have experienced in many years of VHF operation. Apparently, it began Monday evening March 20, but I didn't discover it until the following evening. I was tipped off while trying to watch Nova via Austin, TX Ch. 18, about 90 miles east of me. It is picked up by our local cable system, which has its head-end about one-quarter mile north of me. Before the program was over, it was impossible to see or hear. In fact, another station took over completely at times.

"A couple of quick QSOs with KD5WDK Corpus Christi EL17 and KC5VMC Spring, TX EM20 informed me that the previous evening had been good. For example, KC5VMC said that XE3EB had been in. But it was time for the AMSAT 75 meter net, so I took out an hour for it—keeping an ear out for signals on 144.2.

"When that net was over, and I hadn't heard much on 2 meters, I decided to try listening to the Houston 2 meter AMSAT net on the 147.1 repeater. I was able to hear most of it even with cross polarization. (I do not have a vertical antenna on the tower.) After that net was over, returning to 144.2, I heard and worked XE3EB EL51 at 0456Z (3/22). His signals were 5x8. We tried 222, but no luck. The only other station worked that night was KC5FLJ Corpus Christi EL17.

"The next morning, I worked WB4MJF EL94 at 1311Z, KE4NJM EL94 at 1312Z, WD4OMG EL87 at 1319Z, W4FMB EL95 at 1322Z, several Texas stations, K5HFE EL49 at 1330Z, WA4EWA EM63 at 1336Z (the farthest north I heard during the opening), KQ4PI EL999 at 1350Z, and WB4JEM EL87 (5x9) at 1351Z. We switched to 222 and made it with him copying me 5x7 and me giving him a 5x3. I run no pre-amp on 222 and just 100 W from a Mirage amp. I also worked KQ4PI on 222 at 1357Z. He gave me a 5x4 and I gave him a 3x2. At 1425Z I

worked K2RTH/4 EL95 with S-9+ signals both ways. At 1452Z I had a quick QSO with one of my regular contacts, W5FJM in east Texas, about 300 miles. He was S-9+, likewise WF8C/5 in Houston. At 1542Z I worked KB5IUA EL29 near Houston on 432, just to prove it was working. At 1630Z I had another QSO with KE4NJM.

"Then, at 1541Z, I worked K2RTH/4 again to set up a sked on 432. We completed on that band at 1652 for my best DX on that band, ever. Signals weren't real loud. I gave him a 439 on CW. I have no preamp on 70 and run only 100 W to a Mirage D1010 and about 100 feet of coax. I need to do some work here. Bruce's 222 amp was down, preventing a try on that band. I also worked KE4NJM and K4DZP on 432. It is interesting to note that K2RTH's signals were still in very well at noon my time.

"The next evening, beginning at 0402Z (Thursday morning UTC), I worked WA1GUD EL87 on 2 meters, followed by WA4GHK EL95 at 0404Z, WA5ZEF EL87 at 0408Z, N4RFN EL87 at 0411Z, W2BZY EL97 at 0414Z, WA4LOX EL87 at 0445Z, KC5KBO EM50 at 0446Z, and N4YKM EL96 at 0447Z.

"At 0450Z I worked a piece of VHF history, Frank Lester, W4AMJ. In 1939, as W2AMJ from Burgenfield, NJ, Frank ran regular skeds with Mel Wilson, W1DEI, Natick, Mass. (They hadn't invented two-letter state codes in those days.) I have always thought that this was one demonstration that amateurs first took advantage of tropospheric scatter.

"At 0456Z I worked KE4FML EM60. Then at 0506Z, after setting up on 2 meters, I worked K2RTH/4 on 222. (He had fixed his problem.) At 0513 IZ also completed with KQ4PI on 222.

"At 0521Z I worked KE4KVV EM80 on 2 meters. At 0240Z (Thursday evening local time) I worked K2RTH/4 again on 2 meters, but things were on the way out. Signals were 5x2 both ways. Friday morning it was obvious that I was out of the propagation. But stations to the East were still working into Florida.

"The first evening I ran 150 W to a Cushcraft 4218 at 75 feet on 2 meters. However, the next morning, and for the rest of the opening, I put on the 700 W amp. On 125 cm I ran an M² 220-7WL 23-element Yagi at 78 feet, and on 432 one of the same manufacturer's 432-9WL's at 81 feet. It is interesting to note that my 125 cm antenna is longer by 4 feet than my 2 meter antenna.

"I am located in EM00kd about 65 miles northwest of San Antonio at 2100 feet msl. At the start of this opening, I believe that the height helped, but it certainly didn't later on. I haven't counted the grids or even the states yet, but it sure was a productive and fun couple of days."

The late days of March and early days of April have also been good for Oscar Morales, CO2OJ. The following posting on the Internet shares some of that success.

"Hello, VHFers. Yesterday (10 April), I had a tropo opening on 2 meters into Texas. I worked KB5IUA, EL29. My longest distance QSO on this band, 1400+ kms (870 miles). Reports of hearing my CQs in EM57 and EM00. Today, from afternoon to almost 0400Z good opening in 6 meters to Louisiana, Texas, and Argentina. It looks like the fun in the magic band is starting. Hope to meet you on 2 or 6 from now on.

Randy Galloway, KN4QS, reports the following: "We had an opening on 2 meters from

here in EM64 to Texas and northern Mexico this morning. Signals were generally good, but had no luck on higher bands. We worked: WB5DGREM20@1233Z, XE2MEL06@1240Z (first Mexico station on 2 meters for me!), W5UWB EL17 @1 1308Z. Heard a lot of others on, but had other things going on in shack.

New 6 meter Beacon

The new beacon JW7SIX is QRV from JQ88AD since April 7! It runs 10 W RF into a 4-element Yagi on the frequency 50.047 MHz. Until the end of May the antenna will be beaming towards Europe (AZ 190 degrees). Thereafter it will be turned around and aiming towards VE8/KL7 (AZ 340 degrees) for the summer Es season.

The equipment is operated by LA0BY. The transmitter was supplied by Arvo, ES1CW, and the antenna was donated by Sigg, DF9WB. Many thanks!

Listening for beacons is only half the fun, and some efforts are made to stimulate QSO activity. The local club station, JW5E, being situated in JQ73SG, will be equipped with a rotatable 5-element beam and a 28/50 MHz transverter (from May). In case you should monitor JW7SIX, the following amateurs may be called by telephone: Mathias Bjerrang, JW5NM, phone +47-790-21152 (OP at JW5E); Ola Johan Oestvig, JW8GV, phone +47-790-21583 (OP at JW5E); Stefan Heck, JW0BY, phone +47-776-35144 (mainland number).

All three amateurs can be QRV from the club station within 10 minutes. JW0BY will also have the possibility of operating from the beacon location. Calls between 23-06 UT should be avoided. JW0BY will not be permanently in JW, and therefore only the mainland phone number is given (please do NOT phone any other numbers for JW0BY, as those are exclusively for QRL purpose). In urgent cases the information may be routed through the other amateurs, the mainland number, or through Neil, G0JHC (phone +44-772-742710).

Reception reports are very welcome and can be sent to Stefan Heck, LA0BY, Floyvegen 25, N-9020 Tromsdalen, Norway (E-Mail address: stefan@eiscat.no). It would be good if the reports include information on QTF, possible signal distortion, other signals copied at same time, etc.

The beacon operating parameters will be reconsidered for the next year, depending on the experience obtained in the 1995 season. Already it is planned to relocate the JW7SIX beacon to a better QTH in the autumn and replace the Yagi antenna with an omnidirectional pattern.

Thanks to LA0BY for the above report via the Internet.

June Planned Trips

I have been notified of the following stations' operations:

V31RD—6 May to 8 June, 6 meters
VP9/W3EP—22-30 May, 6 meters
D44BC—1-14 June, 6 meters
WB9AJZ/CM87-82 or DM12-DL29—mid-June, 6 meters
OX3LX—2 June to 7 July, 6 meters
C6AFP—3-17 June, 6 and 2 meters
VP2ECW—3-12 June, 6 meters
ZF8OC/ZF8—4-11 June, 6 and 2 meters

HR/W6JKV—8-18 June, 6 and 2 meters
 WA4VCC/FM26—10-18 June, 6 meters and
 70 cm
 XE2AWK/many grids—30 June to 5 July, 6
 meters

Additionally, Chip Margelli, K7JA, reports
 that the Yaesu DX-Caribe Cruise '95 will oper-
 ate the following schedule:

FK42 (P4, Aruba)—16-18 June
 FK53, 63, 74, 84, 85—19-20 June
 FK95 (J7, Dominica)—19-20 June
 FK95, 94, 93—21 June
 GK03 (8P, Barbados)—21 June
 GK03, FK93—22 June
 FK94 (FM, Martinique)—22 June
 FK94, 84, 83, 73, 63, 62—23-24 June
 FK52 (PJ, Curacao)—23-24 June
 FK52, 42—25 June

Chip states the following: "EME activity will
 be for approximately one hour in each of the
 following windows as they may apply on a par-
 ticular day: Caribbean moonset (for North Amer-
 ica/JA), Caribbean moonrise (Europe), and/
 or European moonset.

"Operation will be on CW only, using ap-
 proximately 1000 watts (with special permis-
 sion on some of the islands) and two 10-ele-
 ment Yagis. Will transmit on 144.028 MHz, and
 will listen for station transmitting between
 144.029 and 144.031 MHz (we will compen-
 sate for Doppler on our end; do not transmit
 outside of 144.029-144.031 MHz). We will
 transmit on even minutes (e.g. 0300, 0302,
 0304, etc.) for 60 seconds, and will listen on
 odd minutes (e.g. 0301, 0305, 0307, etc.) for
 60 seconds. All QSOs will be random.

"The times of operation will be 1400-2100
 UTC except on Aruba before the June 18 de-
 parture." Updated information will probably be
 available on the EME nets (on Sunday after-
 noons).

Finally, Tim Marek, NC7K, plans an exten-
 sive grid locator trip covering late June and
 early July.

VHF-DX Contest Logging Software

It's the month of the beginning of the VHF con-
 test season. You have a computer and you are
 looking for an inexpensive software package
 that will do everything for you. I have recently
 come across just such an item.

About a year ago Mark Hoersten, N8VEA,
 developed VHF-DX, a contest logging soft-
 ware program designed for VHF contests. Af-
 ter several months of beta testing version 2 was
 released early this spring. I have used a copy
 of it and I am quite satisfied with its versatility.

Among the features are the following: It sup-
 ports all ARRL VHF contests. It generates an
 ARRL standard file format to either disk or print-
 er. It is ready to be E-mailed to Billy Lunt, KR1R,
 at ARRL (Billy's E-mail address: blunt@arrl.org).
 It has real-time scoring of your contest activi-
 ty. It displays QSO and grid totals by band. It
 lists previous QSOs with the same station. This
 gives you an idea of what band you still have
 to work the other station on. Along with this fea-
 ture is dupe checking.

It gives you an indication of when you have
 worked a new grid. In this function it also sup-
 ports four- or six-character grid indicators.

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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

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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		\$69.95
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Additionally, it checks for proper grid format.

While logging, you only have to enter the call and the grid. All the rest of the pertinent data are entered automatically. It does, however, allow for optional entries. The optional entries are state, signal report, flag to send QSL card, operator's name, QTH, and pertinent remarks. Additionally, on-screen date and time are displayed as part of the real-time logging feature.

Not only is this software an excellent contest logging program, it is a very good tool for keeping track of your VUCC and WAS totals. It supports all VHF+ bands through 10 GHz plus OSCAR satellite modes (on satellites it adds the transponder mode for the frequency). And, it shows an on-screen display of grid and state totals by band, including satellite, indicating both the total worked and the total confirmed.

The program will generate several types of reports. Among them are VUCC, WAS, QSL management (worked/confirmed), band log, and date-time reports.

What about rovers? When the /R is indicated in the call, the logging program indicates that it is a rover contact. For dupe checking, it will search both the call and grid, thereby eliminating a false dupe indication based on the call alone.

For multi-op stations, the import function allows for combining multiple logs into one log file.

The program can log up to 7000 QSOs per file. What about your past logs? You can create an ASCII file that can be imported into the logging program for modification and updating, thereby developing a standard format for all of your VHF logging.

What if you're like me? You don't have a computer to take into the field or you don't want to risk damaging your notebook while you're bouncing around in your rover vehicle. No problem. You can manually enter the date and times when copying your log from that paper copy.

Here's a suggestion for using the program and the Internet: Too often I will get a phone call from someone who is experiencing a hot band opening. That person wants to tell me all the stations he or she has worked. It is best for me to have that information in a written form. With this software program you can do one of two things: You can generate a hard copy and fax it to me or you can generate an ASCII file and send it to me over the Internet (actually, just send me a copy of your log file). I then have the report so that I can cull the information from it for this column. I hate to mention it, but this program will generate a standard format that my friendly competitor, Emil Pocock, W3EP, can use for the standings boxes in *QST*.

This program runs on MS- or PC-DOS, with 512K of RAM. It does not need any special graphics support. It takes up less than 175K of memory, which means that it can be run from a low density 5.25 inch floppy.

Most of all, this software comes with excellent documentation. As a writer, I am a stickler for documentation. I have found Mark's manual to be very thorough, answering all of my questions about the software's operation.

So, how do you get your copy? Send \$16.95 to VHF Products, P.O. Box 23391, Chagrin Falls, OH 44023. You can call Mark if you have any questions about the product, but he isn't presently accepting any phone orders. Please note: Despite the ridiculously low price, this

software is not shareware. It is copyrighted and licensed to a single user. Mark has spent many hours developing it and I am sure that he would hate to see it show up on the bulletin boards. Thanks for your courtesy regarding this.

Current Contests

ARRL June VHF QSO Party: The complete rules for this contest are in the May issue of *QST*. Needless to say, owing partly to the controversy surrounding the date shift last year, the contest is now back on its regular weekend with a rumored resolve that it will never be shifted again.

Classic Rover Contest: Parallel to the June VHF QSO Party, a group of VHF Rover enthusiasts are planning a Classic Rover contest. Participants will sign /RC on CW and announce Rover Classic on phone. For more information, write to Jim Mitzlaff, WB9SNR, 1727 N. Chestnut Ave., Arlington Heights, IL 60004. Awards are planned for the winners of the contest.

SMIRK Contest: The SMIRK QSO Party, sponsored by the Six Meter International Radio Klub, will be held from 0000Z June 17 to 2400Z June 18 (48 hours). This is a 6 meter operation, and all contacts between the 48 contiguous states must be made above 50.125 MHz. Exchange callsign, SMIRK number, and grid square. No crossband or partial contacts allowed. Score 2 points for each contact with a SMIRK member and 1 point for each contact with a non-SMIRK member. Your final score is the total number of points times the total number of grid squares worked.

Certificates will be issued to the high scorer in each state, province, or foreign geographical division. Non-SMIRK members will receive awards if no entry is received from a SMIRK member in their geographical division.

Note: We have deleted the requirement to be a paid-up member to receive an award. If we insisted on that, there wouldn't be many awards—hi. Besides, the idea is to have a fun contest and encourage everyone to participate and try for an award.

Send a legal-sized SASE for a copy of the log forms. Log requests and logs (postmarked no later than July 17) should be sent to Pat Rose, W5OZI, P.O. Box 393, Junction, TX 76849-0393.

1995 50 MHz DX Marathon: The "50 MHz DX Bulletin" is sponsoring a marathon for radio amateurs and SWLs alike with the purpose of investigating long-distance sporadic-E propagation in the Northern Hemisphere, but it is open to participants worldwide using any propagation mode. Stations reported as heard need not be radio amateurs, but their (audio) carrier must be within the 50-54 MHz amateur band. You may work (hear) a repeater like the Brazilian transponder, but you may take credit only for working the repeater or transponder, not the station being repeated.

Period: 0000Z June 10, 1995 to 0000Z July 10, 1995. *Frequencies:* 50-54 MHz. *Over-the-air Exchange:* Calls (but you are expected to log more information). *Logging:* Date, Time in UTC; Callsign, location or grid field, signal report, and frequency (within 5 kHz) of the station being heard or worked. *Points:* Stations under 4400 km distant, 0 points (but used for multipliers). (Thus, only one <4400 km station need be logged per grid field). Stations between 4400 and 8800 km, 1 point for one-way (heard), 3 points for two-way contact. Stations

over 8800 km distant, 2 points for one-way, 6 points for two-way.

Multiplier: Grid fields (the first two letters of the grid square). *Scoring:* (Contact points + 1) × Grid Fields. Example: You hear both ends of a QSO between a station under 4400 km and a station over 4400 km. The closer station gets 0 points, but is good for a grid field multiplier if you haven't logged anyone in that grid field yet. The more distant station gets 1 point and a grid field multiplier if you haven't logged anyone in that grid field yet.

Send logs with your own grid square(s) or coordinates sufficient to confirm distances to: 50 MHz DX Bulletin, P.O. Box 762, Menlo Park, CA 94026 U.S.A. to arrive by August 31, 1994.

Field Day: Field Day will be held on its traditional fourth weekend. It is always quite an exciting time for sporadic-E possibilities. Those on the east coast and Dave Batcho, N5JHV, will remember how they were able to work Europe just before and during the early parts of the contest. The rest of us enjoyed long sporadic-E openings (I worked nearly a hundred contacts while traveling across the state of Oklahoma).

Current Conferences

Ham-Com is scheduled for the same weekend as the ARRL VHF QSO Party. Nevertheless, some of the guys from North Texas Microwave Society will hold their traditional forums during the convention.

For more information, contact Ham-Com, Inc., 6208 Preston Road, Dallas, TX 75205-1655, or call 214-522-5003 (FAX 214-521-0016). A number of hotels, within easy driving distance, are priced between \$30 (Motel 6) and \$110 (Marriott) per night.

The following information was received from LA1BR: Invitation to the 17th Nordic VHF-UHF-SHF Meeting, June 9-11, 1995, Sandefjord (approximately 62 miles south of Oslo), Norway.

We hereby have the pleasure to invite you to the annual VHF-UHF-VHF meeting 1995. The meeting will be held at the YMCA scout camp near Sandefjord.

Activities: There will be lectures on several technical topics. This time we will take special care of new hams interested in VHF and above DX-work. General discussions on VHF and above related matters, with information from the Vienna meeting. One of the topics will be future band-planning. Fleamarket, AMSAT station and radio stations from 50 MHz up.

Family activities: This year we hope you will bring your family, because this time there will be a lot of activities for those not interested in amateur radio. We can mention canoe, kayak, sand beach, football field, and mountaineering climbing.

Accommodation and prices: Indoor accommodation possibilities in 4, 6, or 8 bedrooms as well as camping site. Remember to bring your own sleeping bag or similar. No kitchens for making your meals available.

Prices: All included from Friday to Sunday (bed) NOK 650. All included from Friday to Sunday (camp.) NOK 550. Above prices include: free coffee/tea, all meals including ham dinner and accommodation. Bed (one night) NOK 125; meals (one day) NOK 175; ham dinner NOK 150; camping (one night) NOK 50.

After the Saturday evening dinner there will be dance with a live orchestra. Please note alcohol restrictions, as this is a YMCA camp.

Location: The camp is located on a little island just outside the city of Sandefjord, and is called "Knattholmen leirsted." If you arrive by car, follow the road No. 303 from Sandefjord, and drive in the direction of Tonsberg. Some km north of Sandefjord follow the road to Nattholmen. Check-in and guide frequency 145.450 MHz or R6.

Reservations: Transportation from Stromstad-Sandefjord and Fredrikshavn-Larvik ferries will be arranged if needed. Give us the following information when making reservations: name and callsign, name of family members, day of arrival, bed or camping, meals and ham dinner. Send reservation to: Helge Karlsen, LA1BR, N-2355 GAUPEN, Packet: LA1BR@LA5G.RAU.E.NOR.EU, Phone/Fax: +47 623 54282 (0900-1700).

Thanks to Jukka, OH6DD, for this report via the Internet.

Current Meteor Showers

Between 29 May and 19 June, the *Arietids* meteor shower will once again be evident. This is a daytime shower with the peak predicted to occur around 0941 UTC (± 12 hours) on 7 June. Activity from this shower will be evident for around eight days, centered around the peak. At its peak, you can expect around 60 meteors per hour traveling at a velocity of around 37 km/sec (23 miles per second).

On 16 June the *June Lyrids* is expected to peak at around 1815 UTC (± 3 hours). Maximal

observed meteor activity is around 10 per hour, traveling at a velocity of 31 km/sec. (around 19 miles per second). Because this meteor level is not much above the background level of regular meteor activity, some feel that the shower is no longer around. However, if it is, the peak activity will occur over two days, centered around the peak time.

On 29 June the *Beta Taurids* is expected to peak. Because it is a daytime shower, not much is known about the stream of activity. However, according to the book *Meteors* by Neil Bone, this and the *Arietids* are two of the more active *radio* showers of the year. Peak activity for this shower seems to favor a north-south path.

Around the same time, a minor shower has also been active in the past. The *June Bootids* has shown activity centered around 28 June. However, no evidence for this shower has existed for several decades.

Predicting Meteor Shower Peaks: For listing possible peaks of meteor showers for this column, I am using a program called "Compact Meteor Scatter Software." It is authored by Ilkka Yrjölä, OH5IY, and is available on both the WB4YZA (704-284-4854) and WZ1V (203-768-4758) BBSs, both of which are configured for 14.4 kbaud and N-8-1 format. In addition to predicting peaks of 15 major and many minor showers, this program is designed to be used to key your radio for European-type CW meteor skeds. If you download it and start using it, send Ilkka a message that you are doing so as

a way of encouraging him to continue to update it.

Down East Microwave Sold

Down East Microwave has been split up and sold to two of the associates who have done work for the company. The transverters, amplifiers, preamps, and other electronic equipment has gone to Steve Kostro, N2CEI. Steve will retain the company name and his address is 954 CR519, Frenchtown, NJ 08825, phone 996-3584.

The antenna portion of the business has gone to Dave Olean, K1WHS. His company name and address is: Directive Systems, RR1 Box 282, West Lebanon, ME 04027, phone/fax 207-658-7758.

And Finally

Thanks to all of you who have sent me reports. Please continue doing so to my address on the first page of this column. You can also send me E-mail to the addresses found elsewhere in this column, or call me at 405-528-6625, or fax me at 405-528-0746.

Thanks to all of you who have sent messages of support to me concerning my brother. Not much to report on Bill, except that he is holding his own.

Until next month . . .

73, Joe, N6CL



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NEWS/VIEWS OF ON-THE-AIR COMPETITION

Where Has All The Youth in Contesting Gone?

It seems that no matter where you read about amateur radio in general and contesting in particular, the subject of the youth comes up. Lately I've been thinking about this topic in a little more depth. Here at the office I've been playing with one of my latest toys, a new Pentium 90 PC with all the bells and whistles. Naturally, it comes with a fully functional multimedia system which allows me to use the latest CD-ROM based callsign retrieval systems. As many of you probably know, in addition to an amateur's address these databases include a variety of information such as his license expiration date and class, county, birth date, and so on. It's fun sometimes to be talking to a customer on the telephone and ask him what he did recently to celebrate his birthday as I'm looking at the data on my screen. Doesn't this kind of remind you of "big brother" watching?

The birth-date information on my CD is what got me thinking about this topic again this month. Just for fun, I pulled out last year's CQ WW DX results and discovered some discouraging information. Upon sampling a few random areas of the results (single call areas, certificate winners only, non-certificate winners, etc.), I confirmed that we are an aging lot indeed. Although the numbers varied a bit, no matter how I cut the sample, I continually came up with an average age between 40 and 50 years old. Perhaps even more shocking was what happened when I intentionally looked for young operators. In 5 separate attempts, it took me an average of 132 callsign entries to find a participant under the age of 20, and 101 entries to uncover one under 25! Put another way, contesting has lost its youth! This isn't a situation that's evolving; it has already happened.

Certainly, this is not a problem limited exclusively to contesters. It is, in fact, a general problem with the hobby as a whole. As I recently looked at my 12-year-old son's lack of interest in amateur radio, I asked him what there was about it that "turned him off."

He said that the distractions from PCs, global communicating on E-mail/information services, increased pressure to perform in school, and other factors make amateur radio not appealing to him. As recently as last night, he was in my shack and began asking questions about my packet radio setup with its computer—not about the fancy transceiver and amplifier sitting next to it.

I've been reading of late about some youth-oriented contest activities that I would like to encourage all of you to think about. Recently, several contesters have been opening up their stations to multi-operator efforts specifically focused on the youth and non-contesters. In some cases participants have been all hams, while in others it has been an operation with

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Calendar of Events

May	20-21	Michigan QSO Party
May	27-28	CQ WW CW WPX Contest
June	10	Portugal Day Contest
June	10-11	ANARTS WW RTTY Contest
June	10-12	ARRL June VHF QSO Party
June	17-18	All Asian CW DX Contest
June	17-18	SMIRK QSO Party
June	24-25	ARRL Field Day
June	24-25	RSGB Summer 1.8 MHz Contest
June	24-25	SP-QRP International Contest
July	1	RAC Canada Day Contest
July	1-2	Venezuela SSB DX Contest
July	8-9	CQ WW VHF Contest
July	8-9	IARU HF World Championship
July	22-23	Venezuela CW DX Contest
July	22-23	SEANET '95 CW Contest
July	29-30	RSGB IOTA Contest
Aug.	5-6	YO DX Contest
Aug.	5-6	ARRL UHF Contest
Aug.	12-13	Maryland-DC QSO Party
Aug.	12-13	Great New Mexico Chile Chase
Aug.	19-20	SEANET '95 SSB Contest
Aug.	19-21	New Jersey QSO Party
Sept.	2-3	All Asian SSB DX Contest
Sept.	2-3	Bulgarian DX Contest
Sept.	9-11	ARRL Sept. VHF Contest

virtually no licensed amateurs involved. The point is that while there are real distractions in the world that are moving younger operators away from contesting, we still have something very significant to offer—if only we were better marketers! In every case I've heard about, these youth-oriented contest operations have been wildly successful, resulting in new licenses as well as contest converts. In a future

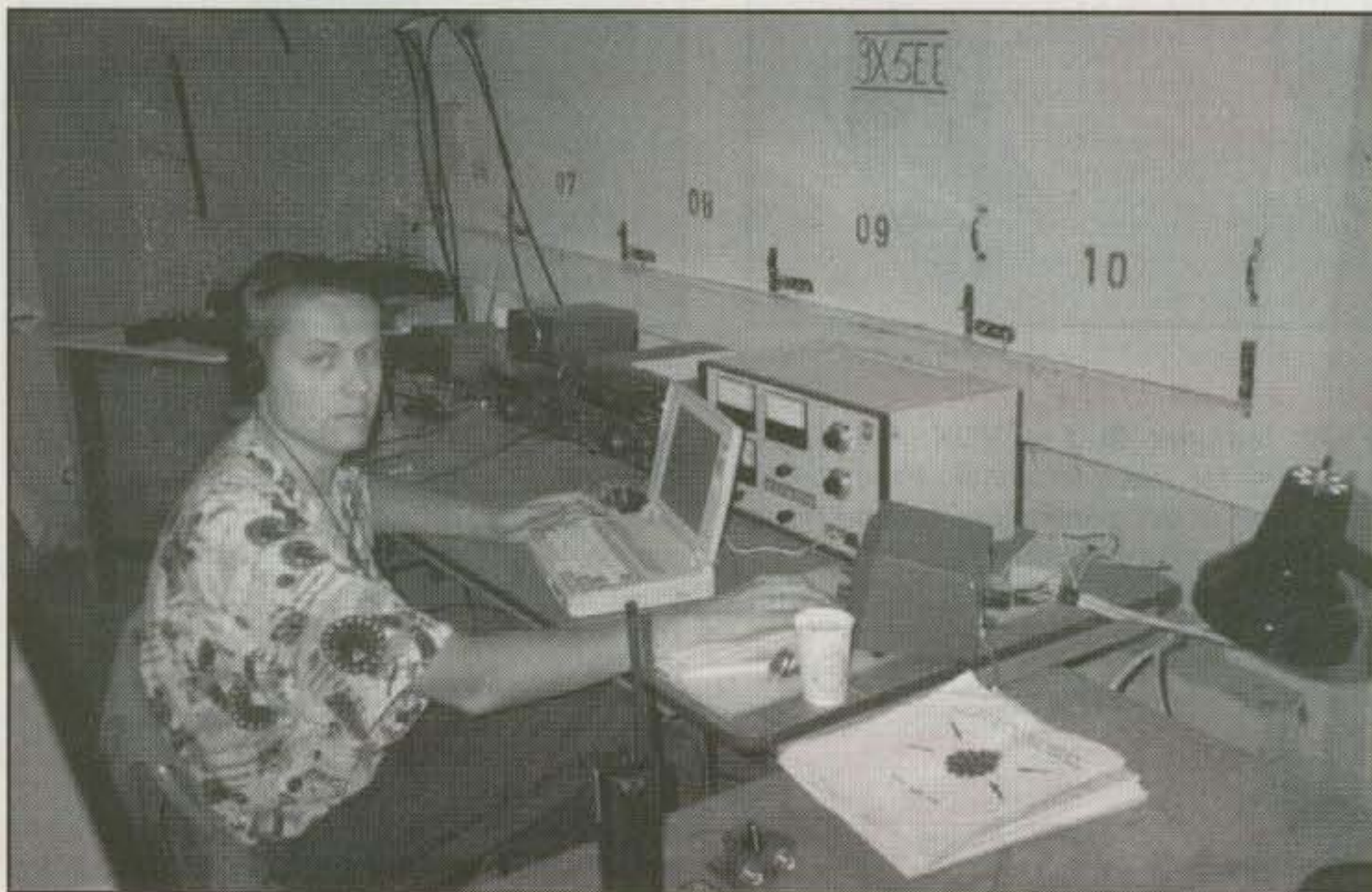
June's Contest Tip

We say it every year. It's late May and there are over five months before the CQ WW DX SSB Contest. The next thing you know, it's October 15th and your 3-element 40 meter beam is still resting on sawhorses. Be up to the challenge. Make this the summer when you get an early start on your outside antenna projects!

column I hope to profile one of them so that you can read for yourself what has gone into generating their enthusiasm for contesting. While even some contesters may complain that there are too many contests on the calendar these days, this level of activity does present a significant opportunity to introduce a local contingent to the world of contest operating. This can be done in a fun and exciting way without the explosiveness of a CQ WW or ARRL DX-type event. Use your imagination, and I'm sure you can come up with something that can be fun for everyone.

Now we have to move on to contest sponsors. About two years ago Radio Bookstore led by Craig Clark, NX1G, began sponsoring an under-21 trophy in the CQ WW DX Contest. Although this award is largely symbolic, it was a great start to recognizing youth in contesting. Considering that most of us get very few tangible benefits from our contesting efforts (an occasional certificate, plaque, or mention in a magazine), contest sponsors need to increase their recognition of youthful participation in contesting with more awards, editorial coverage, and so forth.

Perhaps one of the best opportunities to



Here's Alex, PA3DZN, at the operating position of 9X5EE during the '94 CQ WW.

gather youthful members into our fold is via contest clubs. Let's face it: Today's typical contest club meeting is not exactly an easy place to bring 17-year-old kids into the fold. Put yourself in their shoes as they walk into a meeting room with a bunch of overweight, gray-haired men in their mid-40s or so talking a language that is from another planet. However, if we begin to consciously think of ways to use this vast resource—the contest club—as a recruitment tool for young contesters, it can work. When was the last time a contest club meeting had a presentation given by a 20-year-old contester? How about at the Contest Forum at Dayton for that matter? Consider developing local club award programs that specifically recognize youthful accomplishments. Use your newsletters to profile these kids. When you begin thinking about the possibilities, you can really get excited about the potential opportunities.

Bob Cox, K3EST, has recently embarked on a project that has already yielded encouraging results. In light of the recent growth of Internet-based amateur radio news groups (reflectors), he has started one specifically for young contesters. It, by definition, creates an environment for a peer-oriented group using the very technology that they love. The last time I checked, Bob reported that he has a few dozen users registered with the ranks growing. It's this kind of innovation that we "old folks" need to be thinking about for our passion to flourish in the future.

Finally, consider, as an individual contester, the possibility of taking someone under your own personal arm. Put another way, look for another young amateur as an opportunity for you to be a "contesting Elmer." Most of us in our early contesting days stumbled into the sport. We either operated at our local club's Field Day or randomly discovered on-the-air events such as Sweepstakes or the Novice Roundup. This 1960s method of recruitment no longer works, and today's demographics bear this out.

I know that you've all heard or read about this topic before. Maybe you're part of the recruitment process; maybe some of you just don't care. However, if there is any aspect of contesting and amateur radio in general that can have the largest impact on the future, youth recruitment is it. Tell me about your success so that I can share it with our readers. Remember, at this point this is still our game to lose.

Contesting 9X5 Style

If you've turned on your radio lately, you at the very least have bumped into a high-speed operator signing 9X5EE. Behind that skillful use of the key is Alex, PA3DZN. One of Alex's goals during his stay in Kigali was to put 9X on the air during the 1994 CQ WW DX CW Contest. In reality, planning participation in the contest was a last-minute decision for Alex, as many other factors entered into his schedule. Alex's license showed up only two weeks before the contest. Furthermore, it was only one week prior to the World-Wide that his QTH was identified—a military base outside of Kigali where permission was given to use an existing 10-element log periodic for 10–40 meters. On the afternoon before the contest Alex strung up an inverted-Vee for 80 meters, but much to his chagrin the station's Henry 3K did not work, yielding poor results on 80 and 40 meters. All

in all it was fun, and Alex passes along his thanks for the many QSOs you made with him during the contest and his stay in Rwanda.

CQ Contest Hall of Fame

It has become a tradition that CQ inducts one or more candidates into our Contest Hall of Fame during the Contest Banquet at the Dayton Hamvention. This year was no exception. It's with pride that I can report the following new members of this prestigious circle:

Ken Wolff, K1EA
Dick Norton, N6AA
Jim Neiger, N6TJ
Tine Brajnik, S52AA

Ken Wolff, K1EA. Ken's contributions to contesting are well known. His development of the CT contest logging program revolutionized contest operating and virtually eliminated the use of paper logs. As an operator, Ken is no stranger to winning either. Ken has been a winner of the Single Operator, All Band category in the CQ WW DX CW Contest. In addition, he has assembled a championship station that has been a dominant force in DX contesting throughout the 1980s and into the '90s.

Dick Norton, N6AA. Dick has been a perennial DX contest winner. From his days as a single operator at 9Y4VT, he has achieved one world-high score after another, being one of the most prolific champions in DX contest history from QTHs all over the world. He is also an invaluable member of the CQ Contest Committee.

Jim Neiger, N6TJ. Jim is a long-time participant and winner of DX contests around the world. Although most recently recognized for his world-class operations from ZD8Z, Jim has been a serious competitor from scores of locations for decades. Whether it be SSB or CW, Jim is one of the best operators in the world!

Tine Brajnik, S52AA. Tine is best known for his contest operations as YU3EY, YT3AA, and most recently S50A. He has been one of Europe's most consistent contest winners. Additionally, he was a participant in the 1990 WRTC Championship. Of special note are Tine's efforts in facilitating the growth of amateur radio and contesting in Slovenia. Tine has been a major influence on the interest and generation of new contesters throughout his country, an effort that should make him feel very proud.

Final Comments

Lately I've been receiving an increasing number of letters and comments from you. I appreciate your feedback to this column. It not only gives me a different perspective on various topics covered here, but helps guide the content of future columns. As I've said in the past, keep your input coming!

Please remember to send your Contest Calendar submissions to me for the September issue no later than July 1st.

73, John, K1AR

Portugal Day Contest

0000–2400Z Sat., June 10

This is the 5th running of the Portugal Day Contest sponsored by Rede dos Emissores Portugueses. It is on SSB only on 80–10 meters

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(no WARC bands) with recommended operation limited to the IARU's Region 1 band plan.

Classes: Single Operator, All Band, SSB.

Exchange: Portuguese stations send signal report and their District/Region. All others use signal report and sequential number.

Scoring: QSOs with non-Portuguese stations are worth 3 points. Contacts with Portuguese stations are worth 6 points. You may QSO the same station on different bands.

Multipliers: You may take multiplier credit for each Portuguese District and DXCC country you work. Contacts within your own DXCC country only count for multiplier credit. Final score is total QSO points from all bands times the sum of all multipliers.

Awards: Plaques will be awarded to the top five world-high scorers. Certificates are also available, including a participation award to any station working 25 or more Portuguese and/or EA stations.

Logs must be postmarked no later than July 31st and should be sent to: REP Award/Contest Manager, P.O. Box 2483, 1112 Lisboa Codex, Portugal.

ANARTS WW RTTY Contest

0000Z Sat., to 2400Z Sun., June 10-11

Sponsored by the Australian National Amateur Radio Teleprinter Society, this is the world working the world on all digital modes, 80-10 meters.

Classes: Single Op, Multi-Single, SWL.

Exchange: RST, Time (UTC), and CQ Zone.

Scoring: This contest uses a complicated scoring method. A chart is available that calculates QSO points based on the zone location of the station you work. For space reasons, we cannot publish the table. Perhaps you can obtain one via FAX or a local RTTY enthusiast. Multipliers are DXCC countries, continents. In addition, bonus points may be credited for working VK stations; 100 points 14 MHz, 200 points 21 MHz, 300 points 28 MHz, 400 points 7 MHz, 500 points 3.5 MHz. Final score is total QSO points times multiplier.

Awards: Awards will be issued for the first three places, on both a worldwide and country basis.

All logs must be **received** by September 1st and sent to: Contest Manager, ANARTS, P.O. Box 93, Toongabbie, NSW 2146, Australia.

ARRL VHF Contest

1800-0300Z Sat. to Mon., June 10-12

Action will be found on the 50, 144, 220, and 420 MHz bands, and even higher up in the spectrum.

The scoring varies with the different bands used, and there are certain requirements and restrictions in the rules. Complete rules can be found in the May issue of *QST*.

I recommend that you write to ARRL Headquarters for official forms. Include an SASE with your request to: ARRL VHF Contest, 225 Main Street, Newington, CT 06111.

All Asian DX Contest

CW: June 17-18 Phone: Sept. 2-3
0000Z Sat., to 2400Z Sun.

This is the 36th year of this activity sponsored by the JARL. The exchange is between Asian countries and the rest of the world.

Classes: Single Operator, both single- and multi-band. Multi-Operator, both single- and multi-transmitter, all band only (one signal per band only).

Club stations are classified as multi-operator, and each operator will give his age in the exchange.

Exchange: For OMs—RS(T) plus age of operator. For YLs—RS(T) and 00.

Scoring: 3 points for contacts on 160; 2 points for contacts on 80; 1 point on all other bands.

Multiplier: Asians credit one multiplier for each different DXCC country worked per band. Non-Asians use the number of Asian prefixes worked on each band (CQ WPX list).

Final Score: Total QSO points from all bands times the total number of multipliers worked.

Note: JD1 stations on Ogasawara are in Asia, and JD1 stations on Minami Torishima are in Oceania.

Awards: Certificates to the top scorers, both phone and CW in each country and U.S. call area. In each class, both single band and all band, up to the fifth rank, depending on the number of log returns. Medals will be awarded to the all-band continental leaders both single and multi-operator.

Logs: Keep all times in GMT. Use a separate column for the country or prefix multiplier, and fill in only the first time it is worked. Use a separate log for each band. Include a summary sheet showing the scoring and other information, and a signed declaration that all rules and regulations have been observed.

There is a strict disqualification clause for taking credit for duplicate contacts in excess of 2% of the total on each band, as well as other infractions.

Logs must be received no later than Sept. 30th for the Phone section, and July 30th for CW. They go to: JARL, Contest Committee, P.O. Box 377, Tokyo Central, Japan.

Asian Country List: A4, A5, A6, A7, A9, AP, BV, BY, CR9, EP, HL/HM, HS, HZ/7Z, JA-JS, JD1, JT, JY, OD, S2, TA, all C.I.S. DXCC countries, VS6/VR2, VU, VU4, VU7, XU, XV/3W, XW, XZ, YA, YI, YK, ZC4/5B4, 1S, 4S, 4X/4Z, 70, 8Q, 9K, 9M2, 9N, 9V.

ARRL Field Day

1800-2100Z Sat. to Sun., June 24-25

Without a doubt this activity generates more stateside participation in manpower than any other amateur radio activity. It is mostly a club-organized event, and requires that the coordinator be knowledgeable about all the various operating/technical requirements.

Entries are separated into many classes. Rules and requirements are quite extensive and will be found in the May issue of *QST*. It is advisable that you read them thoroughly.

Note: Starting last year, WARC-band Field Day QSOs are not permitted.

Official log forms are a must. Direct your request with a large SASE to the ARRL, ARRL Field Day, 225 Main Street, Newington, CT 06111.

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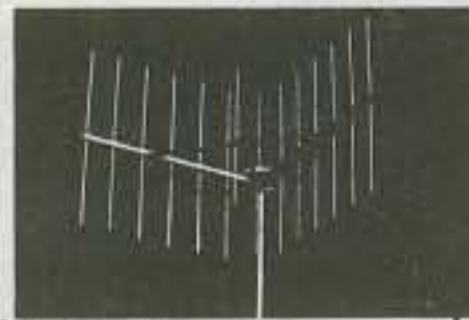
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Davis Anemometer Mast Mount 7890-P	\$15.95
Weatherlink Software for IBM PC/Version 3.0 7862-P	\$139.95
Weatherlink Software for Apple-Version 3.0 7866-P	\$139.95
4-Conductor 40' (12.2 m) extension cable 7876-P	\$17.95
6-Conductor 40' (12.2 m) extension cable 7878-P	\$21.95
8-Conductor 25' (7.6 m) junction box cable 7880-P	\$14.95
8-Conductor 50' (15.2 m) junction box cable 7881-P	\$24.95
8-Conductor 100' (30.5 m) junction box cable 7882-P	\$44.95
Modem Adaptor 25-pin for communications port 7870-P	\$9.95
Car/Boat/RV Lighter Cord 7873-P	\$9.95
2400 baud modem for Weatherlink MEXT-P	\$39.95
Talking weather card - Call 313-994-9000 for demo ITI-P	\$474.95
Weatherlink language disks: Française, Deutsche, Italiana, Española 7863-P	\$24.95
Barometer, Indoor Hygrometer & Thermometer, Clock/Calendar BA888-P	\$99.95
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Thermometer with transparent calendar & clock display by OSI TC188-P	\$19.95
Thermometer with AM/FM clock radio by Oregon Scientific CR388-P	\$39.95
Indoor/Outdoor Thermometer with Jumbo Display by OSI JB880EX-P	\$24.95



Bearcat® 9000XLT-P Radio Scanner
Mfg. suggested list price \$769.95/CE Special \$374.95
500 Channels • 20 banks • Alpha numeric display
Turbo Scan • VFO Control • 10 Priority channels
Auto Store • Auto Recording • Reception counter
Frequency step resolution 5, 12.5 & 25 KHz.
Size: 10-1/2" Wide x 7-1/2" Deep x 3-3/8" High

Frequency Coverage:
25.000-549.995 MHz., 760.000-823.995 MHz.,
849.0125-868.995 MHz., 894.0125-1,300.000 MHz.

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

CB/GMRS Radios



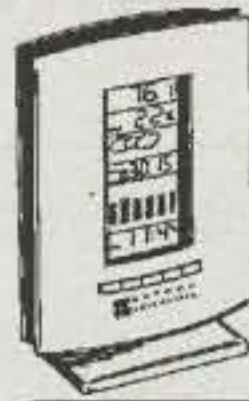
The new Maxon GMRS 210+3 transceiver is a PLL synthesized 10 channel radio on General Mobile Radio Service frequencies. Two repeater channels are programmable and one channel (462.675 MHz) is set aside for emergency and safety communications. The seven remaining

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

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Uniden GMR100-P GMRS Handheld	\$144.95
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The Oregon Scientific BA888-P forecasting barometer displays rising, falling and constant barometric trends. Other features include 6-line advanced liquid crystal display, weather forecast shows sunny, cloudy, slightly cloudy or rainy, °C or °F selectable, indoor relative humidity, indoor temperature, barometric pressure bar graph shows trend for past 24 hours, clock/calendar/alarm.

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Grundig Yacht Boy 400-P digital portable shortwave receiver - 40 memory presets	\$179.95
Grundig Yacht Boy 230-P portable shortwave receiver	\$109.95
Sangean AT800-P portable 20 memory shortwave receiver	\$69.95
Sangean AT803A-P portable shortwave w/AC adapter - 9 memory presets	\$129.95
Sangean AT808-P portable 45 memory shortwave receiver	\$149.95
Sangean AT818CS-P portable shortwave receiver with cassette recorder	\$209.95
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PACKET USER'S NOTEBOOK

CONNECTING YOU AND PACKET RADIO IN THE REAL WORLD

BY BUCK ROGERS, K4ABT

Where Do We Go From Here?

QST de W1AW
ARRL Bulletin 25 ARLB025
From ARRL Headquarters
Newington, CT, March 17, 1995
To all radio amateurs

SB QST ARL ARLB025
ARRL025 Amateurs Get 219 MHz

The FCC has released a Report and Order in ET Docket No. 93-40 allocating the 219 to 220 MHz band on a secondary basis to the Amateur Service for point-to-point fixed digital message forwarding systems. The allocation had been requested by the ARRL as partial compensation for the loss of the 220 to 222 MHz band.

When the new rules take effect, on a date that has not yet been announced, Technician and higher class amateur licensees will be

permitted to use digital emissions of up to 100 kHz bandwidth and no more than 50 watts PEP output. The primary occupant of the band is the Automated Maritime Telecommunications Systems (AMTS). To protect the primary occupant, the ARRL has been designated as the national contact point for all amateur operations in the 219 to 220 MHz band and is responsible for maintaining a database of all amateur operations in the band. All amateur stations must notify the ARRL at least 30 days prior to initiation of operations in the 219 to 220 MHz band. Amateur stations within 50 miles of an AMTS coast station must obtain the written approval of the AMTS licensee prior to operating. Amateur stations within 398 miles of an AMTS coast station must notify the AMTS licensee in writing at least 30 days prior to initiation of operations. The ARRL will assist amateurs in fulfilling these requirements. Amateur stations operating in the 219 to 220 MHz band are not permitted to interfere with, nor are they protected from interference by, primary service operations in and adjacent to the band.

The FCC action climaxes almost six years of effort by the ARRL.

It took a while longer than they thought, but in any case, we now have some semblance of a set of nationwide backbone frequencies. The truth is that these frequencies are not going to be available to anyone and everyone who wishes to have one.

In addition to the requirements relating to the Automated Maritime Telecommunications Systems (AMTS), there are other considerations that must be taken into account. We can rest assured there will also be a time limit or period allowed for the applicant to install and have the node operating. Only a System Node Operator (SNO) who is ready to install a fully functional node on one of the frequencies will be granted coordination.

Without building the bridge before the trench is dug, I should point out that no action will be taken until the ARRL has a full and comprehensive listing of all AMTS stations and locations. Further, there will be no purpose in contacting the League until they release the full analysis and associated band plans.

The ARRL and committee are working out these details as we speak.

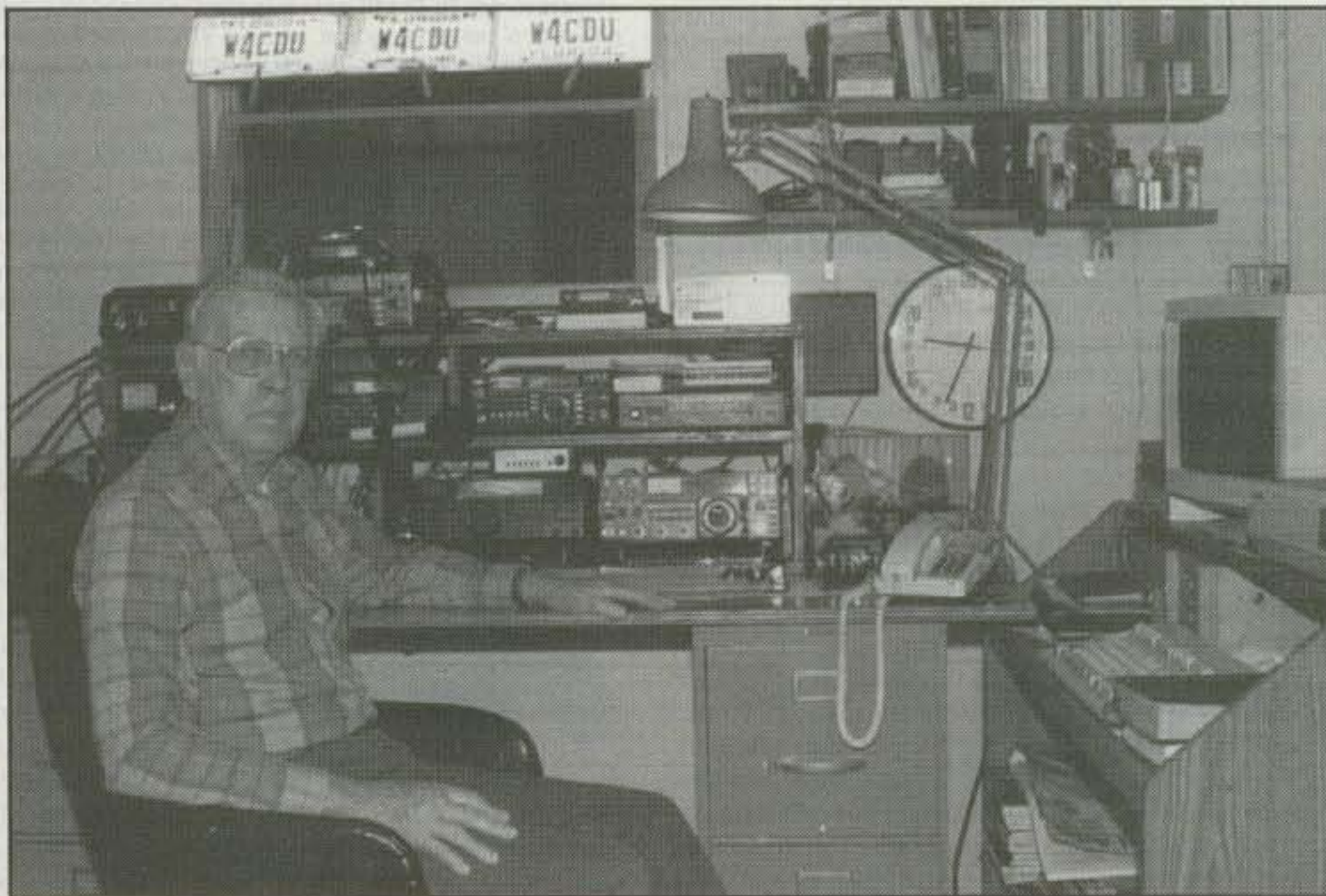
The supporting frequencies for the ten wide-band (100 kHz) frequencies are as follows: 219.050, 219.150, 219.250, 219.350, 219.450, 219.550, 219.650, 219.750, 219.859, and 219.950 MHz.

Packet "Limited-Access Information Superhighway"

Now that we have the platform for our packet radio "Limited-Access Information Superhighway," we have to do a bit of planning with regard to what vehicle we wish to use trekking this digital superhighway of the future.

For openers, where are all the transceivers that will pass 64 kilobites, or even 38,400 baud? Let's give it a break and try for even

211 Luenburg Drive, Evington, VA 24550



John Herb, W4CDU, is the system node operator (SNO) of the Ocala, Florida SEDAN node.

19,200 baud. Wow, now there's a real number we can deal with. Somehow we've learned the rounded numbers in multiples of 64 kb, such as 128k, 256k, 512k, 1024k, 2048k, etc., up to 64 kb. Somewhere in there lies the 56 kb that fits nicely into the scheme of things related to the 100 kHz bandpass we have to work with.

For whatever it's worth, let's "get real" and try to fashion this packet band plan into usable spectrum. The ARRL will be getting lots of input. I hope they will listen to the wisdom and judgment from those of us who remember the beginning of our present-day packet system.

There are some who will not dare to make the following statement: I wish we could recall for a short period the days when packet radio

first began. If, as in if we could, the first thing I would change or add is an rigid and unyielding band plan for our present-day packet (and I use the term loosely) "networks."

This time (present day), with the newly acquired addition of 100 kHz wide frequencies, we have a chance to apply the "right-stuff." If we do not, then we may as well relegate these channels to the same archives as the 140 mile-per-gallon Tucker Carburetor.

Packet Radio Is Fun!

Packet can be even more fun if we govern ourselves accordingly—now! We have to address

the process from both directions. First, we give the transceiver manufacturers reason to listen, letting them know the potential sales numbers they are looking at. This sales figure is nothing to scoff at either. As a matter of interest, one packet controller manufacturer recently told me that to date they've sold almost a quarter of a million packet controllers. That means if we look at the "big four" TNC makers, there should be almost a million TNCs out there.

Now for the transceiver original equipment manufacturers (OEMs). All of the TNC owners are potential buyers of, or will be upgrading to, 9600 baud soon. When they do, there again will come the need for some enterprising manufacturer to provide a high-speed trunking transceiver.

As a matter of interest, Kantronics and PacComm (Tekk) first came off top-dead-center and introduced some real data-capable radios. Not far behind was MFJ with the 1200 and 9600 baud data-ready transceiver.

"High Speed"— 9600 Baud To 56 Kilobaud

Alinco, ICOM, Kenwood, Yaesu: here's your chance to cash in on an emerging market. Aw, phooey—I've talked this line before, and it took five years for anyone to react. In 1988 we tried to get the attention of the transceiver makers, but to little avail.

In 1990 some attention was given to us when we began modifying the Alinco 120 for 9600 baud use. Later other transceiver mods began to pop up, but who wants to be continually cannibalizing good voice transceivers for data service? For openers, we take the chance of doing as much harm to the radio as we do good. One slip in the area of a surface-mounted component and the rig is history, or out of the way until a replacement is obtained.

We are interested in having fun, in digital communications, in speed . . . so why hasn't

some OEM come up with a decent transceiver that will deliver data beginning at 9600 baud and upward?

The bottom line, or the last word (thought I'd kick in some clichés), is we want an economical transceiver that is COTS, an old acronym with a new meaning—Commercial, Off-The-Shelf).

Except for a few transceiver makers (Azden did their homework in the PCS-9600D, and it shows), most of the fully dedicated data-ready radios are made in the USA. There are few, if any, *data only* transceivers that target packet radio users and that are available from the major transceiver builders.

219 to 220 MHz is Here

Without making more noise about the needs and requirements of the digital amateur, let's close this part of our quest by asking the OEM to plan for the next packet generation that is about to appear. Have a product ready to market when the inevitable happens.

The 219 to 220 MHz band is ready to harvest. However, while the OEM is about it, let that wide-bandwidth data-ready transceiver have an output power above 10 watts. Most of all, build it with the capability to cover all the frequencies that are available to the digital operator in the 219 to 220 and the 223 to 225 MHz band. Both the packet radio operator and the transceiver manufacturers will be served by this undertaking.

We Have The Clout and The Momentum

Having gathered the momentum and the numbers that give us the prominence to exert influence, it's time we make known to the OEMs and packet radio vendors our needs and requirements. The ARRL and the FCC have done their part. Now it's our turn!

So many times you, the readers, have written asking that I be a more vocal conduit for you. This column is attempting to do just that. I've been guilty of not passing along the things you have been saying to me all along. If this month's column is not heard, then I'll escalate the topic into a full-blown campaign.

The vehicle to make our "requirements" known is this column. Another means to communicate the high-speed data-only radios is to make use of the BBSes, the Internet Packet Forums, and the very medium that we use every day—keyboard-to-keyboard connects. A short letter, a note, any way that you can convey a message that reflects your (our) feelings is what is now needed to get results.

My shouting and pouncing on my hat should not be the only message that is sent. This column will do its part, but you can reinforce these words by making this same message known to the OEMs. Even if you have to call, write, or FAX the OEM a copy of this column, *just do it!*

Good Packet "Things" Are Happening

The Southeastern Emergency Digital Association Networks (SEDAN) is adding new nodes to the system at a rate of two a week. This is another reflection of the use and application of packet radio.

At the recent Charlotte Hamfest and the Atlanta Ham Radio '95 show the discussion of

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the use of the SEDAN was of interest to many weather- and safety-conscious packeteers. The Sky-Warn and Weather-Watch groups in concert with various ARES members found that the SEDAN fulfills many of their urgent needs.

The SEDAN (see fig. 1) spans nine states and provides the mechanism that enables the user to communicate weather information of a threatening nature to and from the weather service offices in each area or region. When the SEDAN is not being used as an emergency communications network, it may be used for normal keyboard contacts between individual stations along the network. It is really something to see a station near Washington, DC keyboarding with a station in Atlanta, Georgia.

As I write this month's column, more new 9600 baud nodes are being added to the more than 100 nodes of the SEDAN. These are the point-to-point backbone node/gateways.

The SEDAN backbone is building into a system of nodes that enables the local port 1200 baud users to access the 9600 baud backbone from 145.770 MHz or another frequency at 1200 baud. Once into the local area node, the keyboard traffic is routed onto the limited access point-to-point backbone to the destination 9600 to 1200 baud gateway node.

Wrap Up

If you would like an updated map of the SEDAN, send me an SASE (32 cents postage) and I'll see that a new map, along with the SEDAN Guidelines and Practices, is on its way to you pronto.

If you wish to have the SEDAN map, the free packet handbook(s), and the BUXTERM terminal program (all are free), include a formatted MS/DOS disk and a large 9" x 12" envelope with \$3.00 postage, and the above items will be sent to you priority mail. (I do not furnish postage, address envelopes, or format disks.)

Although the first section of these handbooks is written for the new packet radio operator, the second half is especially useful to the system node operator (SNO) who wishes to build a network node or gateway. There are two books in this set. I wrote one of the books around the MFJ version of the TNC-2 as an X-1J4 node. This includes the installation of the MFJ-52B DEVIation and remote metering PCB. The second book I wrote covers the use of the AEA PK-96 (PKX-1J4) as a dual-baud (baud-rate is software selectable, by remote SYSOP command) node. In both handbooks I've included all the necessary drawings and instructions to build the nodes and gateways.

If you would like a copy of the X-1J4 TNC-2 or the PKX-1J4 PK-96 node code, be sure to include a formatted MS/DOS disk. Please note that the TNC-2 code is *not* the same code as the PKX-1J4 node code. I can usually place both versions on a single disk, provided that you use a 3.5 inch, 1.44 megabyte disk.

Credits

Both the X-1J4 and the PKX-1J4 node code and most of the documentation is written by Dave Roberts, G8KBB. The supporting hardware DEVIation and ADC metering circuits are designed by Neville Pattinson, G0JVU. The IP documentation is written by Fiona Pattinson, G7ANH.

Happy Packeting!

73, BucK4ABT @ W4CA.VA.USA.NA

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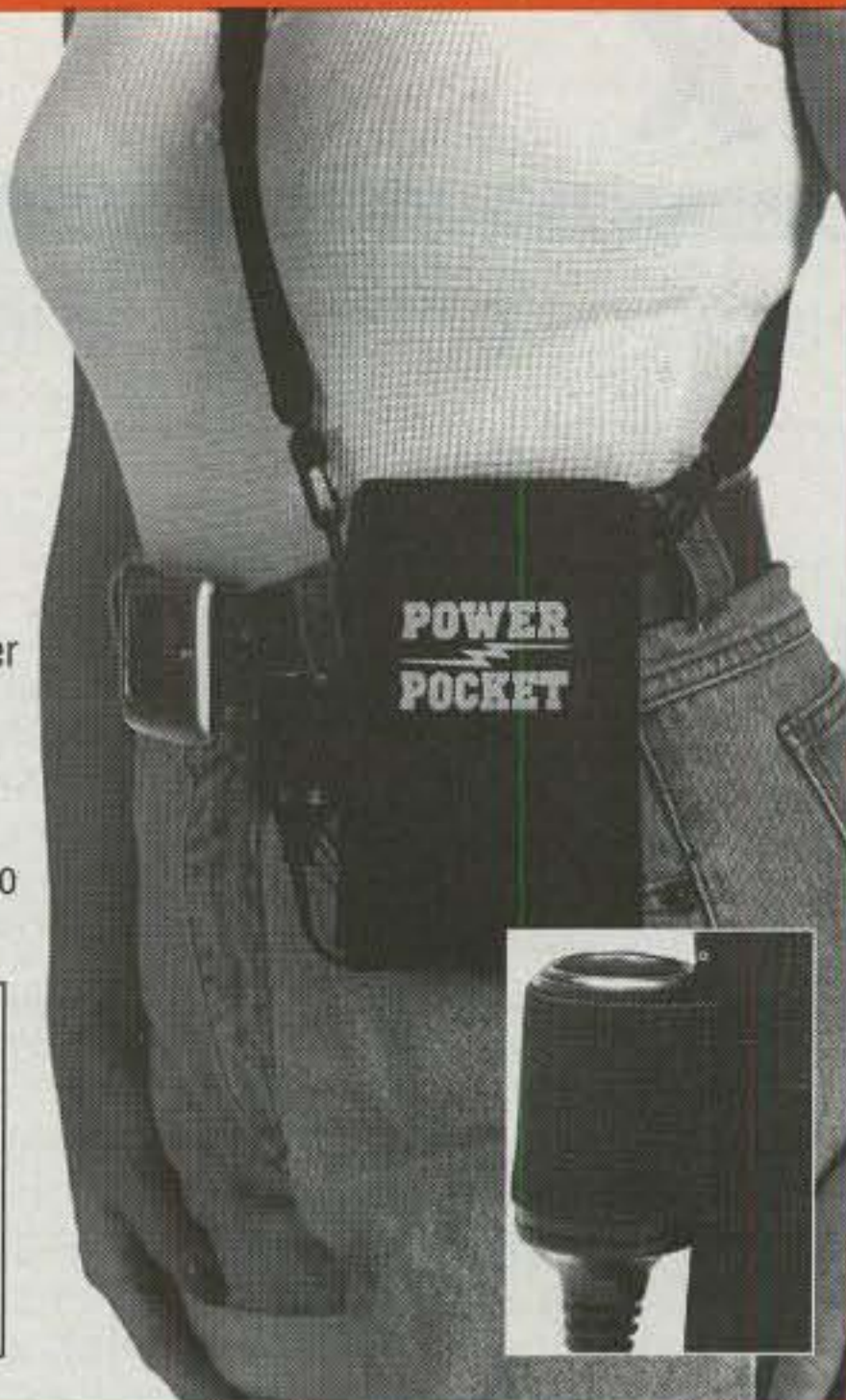
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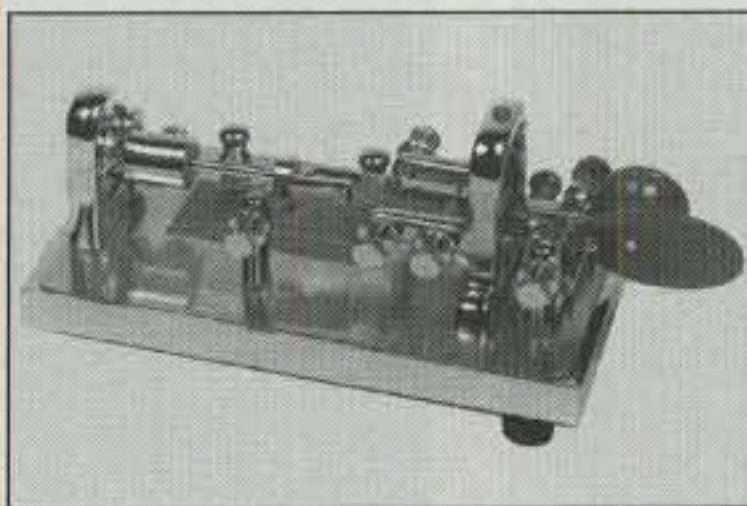
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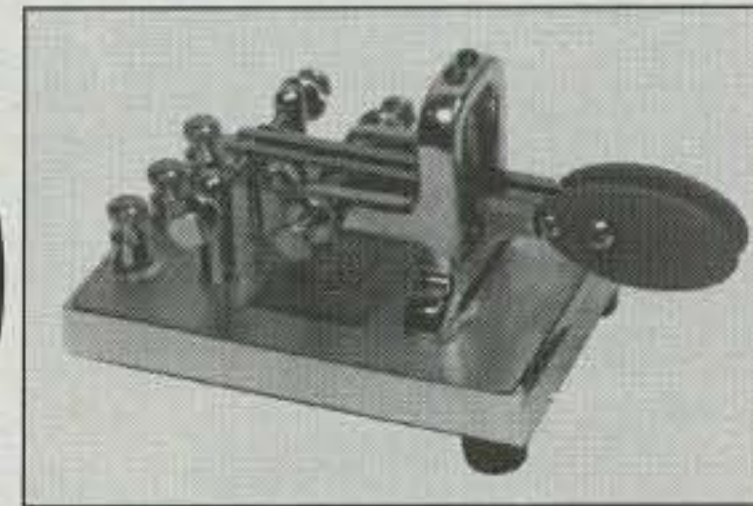
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CIRCLE 124 ON READER SERVICE CARD

NEWS OF COMMUNICATION AROUND THE WORLD

Gaza

In mid-December 1994 four Japanese amateurs operated from the Gaza Strip, Palestine. The operators signed their home calls /Gaza, since the International Telecommunications Union (ITU) has not allocated a callsign block to Palestine. This operation was "officially allowed by the Ministry of Telecommunications and Post of the Palestinian Authority." Is this a potential new DXCC country?

This operation was not the first amateur radio out of Palestine since the 1960s. It was preceded by a few contacts made by Dr. Sami Tarazi using the callsign **ZC6B**. Dr. Tarazi received that call in 1948, when the British were still in charge of the Palestinian Mandate, but he never used it because of the ensuing war.

As of press time, neither of these operations had been accepted for DXCC credit for any country. In fact, the DXCC desk has not received any documentation or request to accredit either operation. It is highly unlikely that the ZC6B contacts will ever be good for other than souvenir value, and the /Gaza are also unlikely to be valid for DXCC. To understand why, we have to look closely at the Gaza Strip.

A Little History

Don't worry. We're not about to attempt a complete history of the Gaza Strip. That would not only be beyond the scope of this analysis, but would fill many volumes. Instead, we concentrate on the post-WW II history, in keeping with the 1945 start date of the current DXCC program. We should begin, however, with a mention of the long history of Gaza.

The city of Gaza is one of the oldest cities in

the world, dating back to well before 3000 BC. (Nearby Jericho has been occupied for about 10,000 years!) Since its founding, Gaza has been occupied by a string of conquerors, including the Egyptian pharaohs, the Assyrians, Scythians, Babylonians, Persians, Romans, Muslims, Crusaders, Ottomans, British, and currently the Israeli.

The area's relatively plentiful water supplies (compared to the surrounding desert) and strategic location between Africa and Europe have attracted the long list of occupiers.

The British were in charge of Gaza, and the rest of the Palestinian Mandate, at the end of WW II. They were assigned control of the area in 1918, taking over from the Ottoman Empire, which had ruled the region for the previous 400 years. However, the British were reluctant occupiers of Palestine, and didn't really want to be the arbitrators of the increasing frictions between the Palestinians and Jews seeking to establish a homeland in the area. The United Nations voted in 1947 to divide the Palestinian Mandate into separate Arab and Jewish states.

Thus, from the post-WW II start of the current DXCC program, until the British left in mid-1948, contacts with amateurs in the area counted for the DXCC country of Palestine. The ZC6 prefix was assigned by the British to the Mandate.

When the British pulled out of Palestine, the Jews in the area unilaterally proclaimed themselves the State of Israel, with territory amounting to about half of the Palestinian Mandate, along the lines of the 1947 UN vote. Armies from the adjacent Arab states immediately attacked the new nation, the first of many Arab-Israeli armed conflicts. When the two sides agreed to an armistice in 1949, Israel had increased in size by about 30%, thanks to its success on the battlefield. That war caused

more than 700,000 Arab refugees to flee what was now Israel, many into the Gaza Strip. The Israelis confiscated the property that the refugees left behind, further infuriating the Arab Palestinians.

Neighboring Egypt annexed the Gaza Strip, but never granted Egyptian citizenship to the refugees nor to the original inhabitants of the region. The Arab Palestinians were left stateless, in refugee camps for the most part, and without any real government. The United Nations provided some relief efforts in the areas not under Israeli control. In terms of amateur radio, operations were conducted under UN licensing, with both ZC6 and 4X callsign prefixes. (Technically, neither prefix was correct, as the British no longer had any authority over the area, and neither was it, with the exception of half of Jerusalem, Israeli territory.)

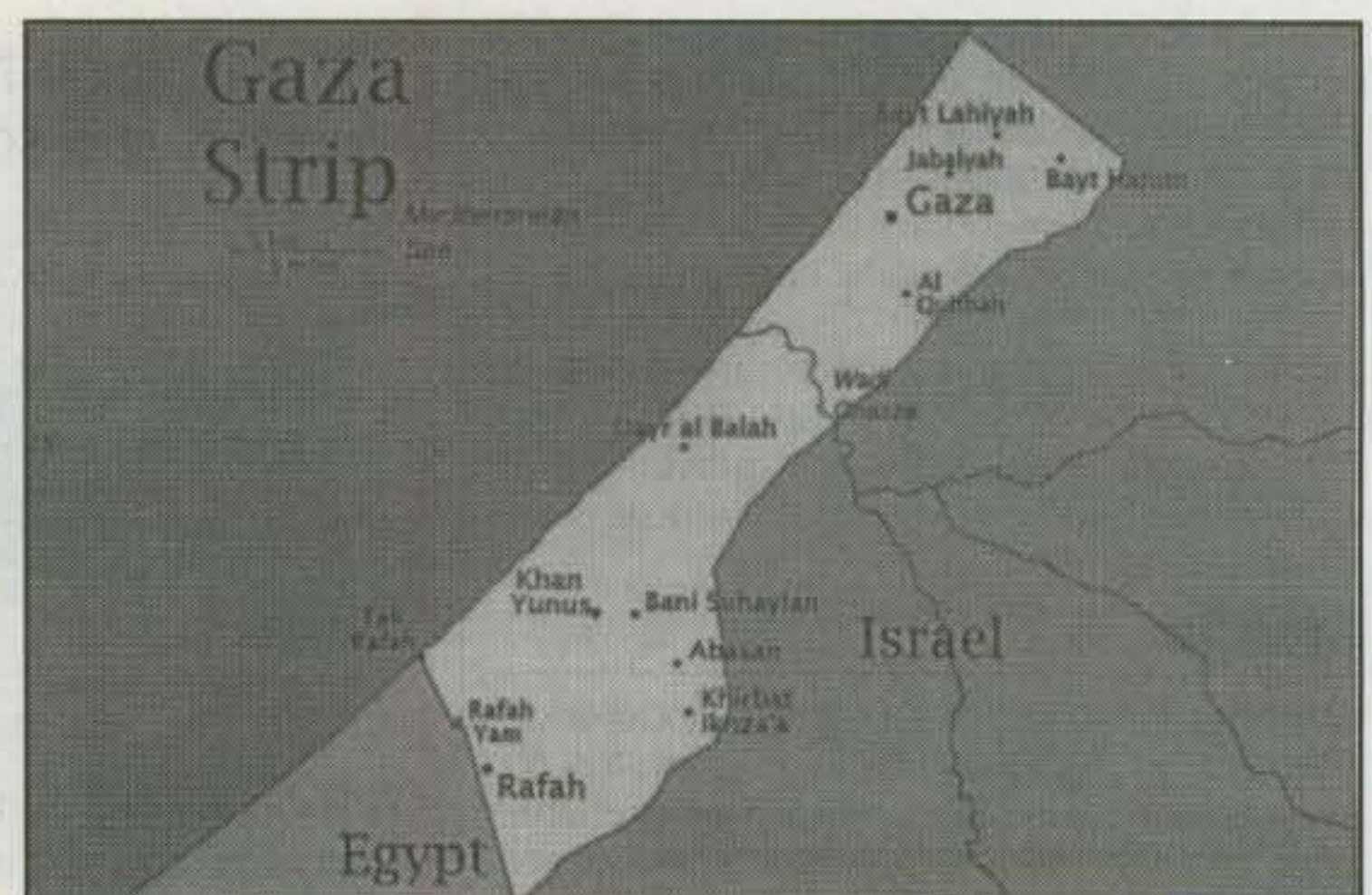
In 1956 Israel conquered the Gaza Strip, as well as the entire Sinai Peninsula, in about a week. Gaza was under Israeli occupation for several months before pressure from the United Nations made Israel withdraw to its 1949 borders, and return Gaza and the Sinai to the Egyptians. Once again amateur operation from Gaza was under UN control. While most of the DXCC credits for Palestine were for contacts with stations in the Israeli half of Jerusalem, the last DXCC-accredited operation from Palestine was in the summer of 1965, when Gus Browning, W4BPD, and Ami Shami, 4X4DK, operated as **4X1DK** for the UN's communications headquarters.

The Israelis again conquered Gaza and the Sinai in the Six-Day War in June 1967. This time the Israelis had no intention of relinquishing control of the conquered lands, and stated so. This led to the deletion of the DXCC country listing of Palestine, effective June 30, 1968.

P.O. Box 50, Fulton, CA 95439



Location of the Gaza Strip in the Middle East.



A detailed map of Gaza, which is beginning to take steps toward self-determination—toward sovereignty, to use the DXCC country criteria terminology.

The WPX Program

SSB

2502.....HK6ISX 2506.....KB7RDK
 2503.....IK4THK 2507.....KD4HXT
 2504.....N3MCJ 2508.....WB2BZR
 2505.....JA8DGO

CW

2865.....EA5FV 2868.....DL6CHG
 2866.....JJ3OLZ 2869.....SK0BU
 2867.....JE3UUS 2870.....IK3QAR

MIXED

1700.....K9LJN

VPX

281.....DE4ASS

WPX

280.....WB2BZR

Mixed: 450 K9LJN, 500 K9LJN, 550 K9LJN, 600 KB5OHT, K9LJN, 650 KB5OHT, K9LJN, 700 K9LJN, 750 K9LJN, 800 K9LJN, 850 K9LJN, 900 K9LJN, 950 K9LJN, 1000 K9LJN, 1050 CT1EEB, K9LJN, AA7FL, 1100 CT1EEB, K9LJN, AA7FL, 1150 CT1EEB, K9LJN, 1350 K9LJN, 1400 K9LJN, 1450 K9LJN, 1500 DK4SY, K9LJN, 1550 DK4SY, K9LJN, 1600 DK4SY, EA1JO, K9LJN, 1650 DK4SY, EA1JU, WB3DNA, K9LJN, 1700 DK4SY, EA1JO, WB3DNA, K9LJN, 1750 DK4SY, K4RDU, EA1JO, K9LJN, 1800 DK4SY, K4RDU, EA1JO, K9LJN, 1850 DK4SY, EA1JO, K9LJN, 1900 DK4SY, EA1JO, K9LJN, 1950 DK4SY, K9LJN, 2000 DK4SY, K9LJN, 2050 DK4SY, K9LJN, 2100 DK4SY, 2150 DK4SY, 2200 DK4SY, 2250 DK4SY, 2300 DK4SY, 2350 DK4SY, 2400 DK4SY, 2450 DK4SY, 2500 DK4SY, 2700 KF2O, 3000 W5AWT.

SSB: 350 HK6ISX, JA8DGO, N2LYF, KD4HXT, WB2BZR, 400 HK6ISX, JA8DGO, N2LYV, WB2BZR, 450 HK6ISX, JA8DGO, WB2BZR, N2LYV, 500 HK6ISX, WB2BZR, N2LYV, 550 HK6ISX, WB2BZR, 600 HK6ISX, WB2BZR, 650 HK6ISX, WB2BZR, 700 HK6ISX, WB2BZR, 750 HK6ISX, WB2BZR, 800 HK6ISX, WB2BZR, 850 HK6ISX, 900 HK6ISX, EA1JO, 950 HK6ISX, EA1JO, 1000 HK6ISX, EA1JO, 1050 HK6ISX, CT1EEB, EA1JO, 1100 HK6ISX, CT1EEB, EA1JO, 1150 HK6ISX, CT1EEB, 1200 HK6ISX, CT1EEB, 1250 HK6ISX, CT1EEB, IK2AEQ, 1300 HK6ISX, 1350 HK6ISX, 1350 HK6ISX, 1400 HK6ISX, 1450 HK6ISX, 1500 HK6ISX, 1550 HK6ISX, 1600 HK6ISX, 1650 HK6ISX, 1700 HK6ISX, 2300 KF2O, 2350 LU8ESU.

CW: 350 JM1VKW, JE3UUS, DL6CHG, SK0BU, IK3QAR, KU0A, 400 IV3BKL, JM1VKW, SK0BU, IK3QAR, 450 IV3BKL, JM1VKW, KB5OHT, SK0BU, IK3QAR, 500 KB5OHT, IK3QAR, 550 KB5OHT, IK3QAR, 600 IK3QAR, 650 IK3QAR, 700 IK3QAR, 750 IK3QAR, IK5TSS, 800 IK5TSS, 1150 JA7FFN, 1350 EA1JO, 1400 EA1JO, 2450 EA1JO, 1500 EA1JO, 1550 EA1JO, 1800 KF2OL.

10 Meters: KD4HXT
 15 Meters: JA8DGO
 80 Meters: CT1EEB

Asia: JE3UUS, SK0BU
 Africa: CT1EEB
 No. Amer.: N3MCJ, IK5TSS
 So. Amer.: WA3GBW
 Europe: JM1VKW, SK0BU
 Oceania: CT1EEB, KB7RDK

Award of Excellence: K0IFL.

Award of Excellence 160 Meter Bar: K0IFL, K9LJN.

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, ZL3GO, VK9NS, DE0DXM, DK4SY, UR2QD, AB9O, FM5WD, I2DMK, W4BQY, I0JX, SM6CST, VE1NG, I1JQJ, WA1JMP, PY2DBU, HI8LC, KA5W, K8JN, 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, WD9IIC, W3ARK, I6DQE, LA7JO, VK4SS, K6JG, I1EEW, I8RFD, I3CRW, VEFXR, N4MM, KC7EM, ZS6BCR, CT1YH, IV3PVD, KA5RNH, ZP5JCY, F1HWW, KC8PG, NE4F, VE3MS, K9LJN, ZS6EZ, YU2AA, I1WXY, IK2ILH, DE0DAQ, LU1DOW, N1IR, IK4GME, WX3N, KC6X, N6IBP, W5ODD, I0RIZ, I2MQP, I5ZJK, JA0SU, S51NU, K9XR, W8ULU, HB9DDZ, F6HJM, I2EOW, IK2MRZ, KS4S, KA1CLV, WZ1R, CT4UW.

Award of Excellence Plaque Holders with 160 Meter Endorsement: CT1YH, IV3PVE, KA5RNH, ZP5JCY, AB9O,

FM5WD, SM0DJZ, DK5AD, SM6CST, I1JQJ, PY2DBU, W3ARK, HI8LC, KA5W, UR2QD, VE3XN, K6XP, LA7JO, W4VQ, K6JG, K3UA, HA8UB, W4CRW, N4MM, K7LJ, SM0AJU, KF2O, SM3EVR, K5UR, UP1BZZ, OK1MP, N5TV, K2POF, W8CNL, DJ4XA, IT9TQH, DL9RK, N6JV, ONL-4003, W1JR, W6OUL, W5AWT, KB0G, F6BVB, W4BQY, YU7SF, W5UR, N4NO, DF1SD, K7CU, I1POR, W8RSW, N4KE, I2UIY, YB0TK, W8ILC, W1BWS, VE7WJ, K9QFR, NN4Q, W4UW, NX0I, G4BUE, LU3YLW4, I4EAT, WB4RUA, VE7WJ, N4NX, DE0DXM, VE7IG, K9BG, I1EEW, AB9O, CT1YH, IV3PVD, KA5RNH, ZP5JCY, I2MQP, I0RIZ, W5ODD, WX3N, IK4GME, HA8XX, YU1AB, F6HJM, HB9DDZ, K9XR, K8JN, ZS6EZ, JA0SU, I5ZJK, I2EOW, KS4S, KA1CLV.

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.

The announcement of the deletion in the July 1968 issue of *QST* stated that Palestine, comprised of the UN Truce Area bordering on Israel, no longer existed and therefore is deleted. Any amateur operations from the Israeli-occupied regions would be under the control of Israel, with a 4X/4Z callsign, and count for Israel for DXCC purposes.

Skipping over countless attempts to resolve this conflict by political means, and the 1973 attempt to do so with force of arms, we come to the May 1994 Agreement between the government of the State of Israel and the Palestine Liberation Organization (PLO), the UN-recognized representative of the Palestinian people. (Israel fought against having the PLO represent the Palestinians because the charter of the PLO calls for armed struggle to eliminate the "illegal state" of Israel.)

Under the Agreement, Israel would gradually withdraw its military forces from Gaza (and the Jericho region) and turn control of the territories over to the Palestine Authority. Eventually, if the peace process succeeds, there will be a separate Arab Palestine as well as the State of Israel in the region, as envisioned by the United Nations in 1947. If this does come

to pass, this will be the first Palestinian state under Palestinian control for some 3000 years!

Getting back to amateur operation from Gaza, it is clear that prior to the Agreement, any operation from Gaza would have to be licensed by Israel, and would count for Israel for DXCC. If the peace process holds, and an independent state of Palestine comes to pass, that will undoubtedly count as a separate DXCC country, with its own ITU-assigned prefix. But what about operations *now*, between the signing of the Agreement, and the widespread international recognition of the Palestine state at some point in the future?

We are clearly in a gray area. Gaza is beginning to take steps toward self-determination—toward sovereignty, to use the key word in the DXCC country criteria. At what point along the path between occupied territory and obvious independence does a "country" become eligible for separate DXCC country status? Any petition for separate DXCC country status for Palestine would have to carefully document the signs of sovereignty, and then the DX Advisory Committee would have to make its decision. (Note that no such petition has been filed, as of press date.)

IF YOU TURN THIS PAGE, YOU GET SOMETHING

FREE



Hide, JO3XEQ, operated /Gaza from the Gaza Strip, under the Palestinian national flag.

One obvious place to start is with the Agreement itself. What does it say about control over telecommunications, if anything? Cutting through the carefully worded chaff to find the grains of facts in the 13-page Agreement is not easy. However, we can locate some key phrases that might shed some light on the degree of Palestinian sovereignty.

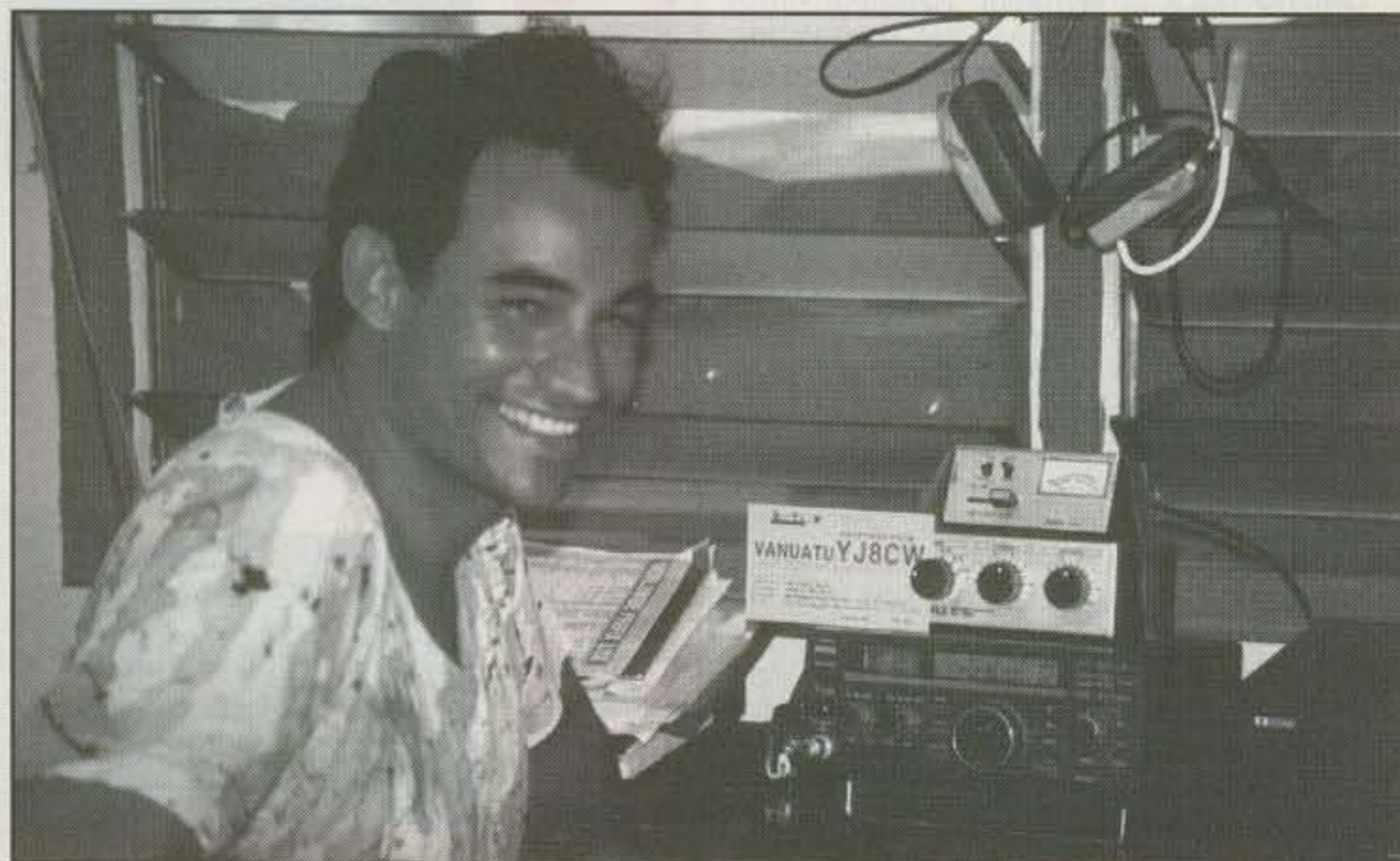
First, the Palestine Authority definitely has control over *internal* security in Gaza and Jericho (Article II:6). However, jurisdiction over *external* matters is clearly withheld from the Palestinian Authority. Article V:1.b states that Palestine Authority "jurisdiction does *not* include foreign relations . . ." (*emphasis added*). Continuing on to Article V:3.b, we find that Israel has authority over the "electromagnetic sphere," which sounds like lawyerese for radio and television. Article VI:2.a is clearer: "The Palestinian Authority will *not* have powers and responsibilities in the sphere of foreign relations . . ." (*again, emphasis added*).

The DXCC country criteria are quite clear on the need to have control over foreign relations to claim sovereignty and separate DXCC status. The first sentence of the Point 1: Government, criterion reads: "An independent country or nation-state having *sovereignty* (that is, a body politic or society united together, occupying a definite territory and having a definite population, politically organized and controlled under one exclusive regime, and *engaging in foreign relations [emphasis added]*—including the capacity to carry out obligations of international law and applicable international agreements) constitutes a separate DXCC country by reason of *Government*." Palestine qualifies up to the phrase about foreign relations. Such are very clearly denied in the Agreement, and remain under the control of Israel.

We can also look at the specific characteristics used to review entities that are not totally independent. These include membership in the specialized agencies of the UN, such as the ITU (no); authorized use of ITU-assigned callsign prefixes (no); diplomatic relations (no; specifically reserved for Israel in the Agreement, including embassies); and regulation of foreign trade and commerce, customs, immigration and licensing, and the issuance of currency and stamps (well, maybe). On the last item, the Palestinian Authority has issued its own stamps, and even issued passports (two—one to PLO Chairman Yasser Arafat and one to Egyptian President Hosni Mubarak). However, the recent DXAC decision turning down French Polynesia as a Point 1 country shows little support for entities that meet just a few of the latter requirements.

The very clear Agreement wording reserving foreign relations to Israel would most likely prevent any separate DXCC status for Palestine at this time. Further, if the amateur operation is not licensed by Israel, it probably wouldn't even meet DXCC accreditation rules for "proper licensing." Hence, despite the letter of authorization from the Ministry of Telecommunications and Post of the Palestinian Authority, the /Gaza operations are not likely to be of much DXCC value.

None of this is stopping DXers and others from trying to claim some DXCC significance



Collin, YJ8CW, operates out of Port Vila in Vanuatu. (DK7PE photo)

The WAZ Program Single Band WAZ

20 Meter SSB

964KD1HN

40 Meter SSB

81XE1VIC

80 Meter SSB

64XE1VIC

10 Meter CW

147N6DX

15 Meter CW

260N6DX

20 Meter CW

4549A3SM	457N6DX
455VE3IAY	458JA2IU
456HB9BGV	

30 Meter CW

16N6DX

40 Meter CW

178DK4TA 179HB9BGV

80 Meter CW

44N6DX

All CW

67VE1UK 68DJ9SO

Satellite

14OE3JIS

WNZ

60—10M SSB ...KD4HXT (28 zones)

All Band WAZ SSB

4257N5BLK

CW/Phone

7549K8BN	7554DL9GCF
7550OD5PL	7555N2PLE
7551KQ9O	7556OE5HIL (CW)
7552SP5GRM	7557DL6LBD
7553DL4FAP (CW)	7558DL6LA

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.

for Gaza operations, of course. In support of same, DXers can point to support from PLO leader Yasser Arafat for the Palestine Wireless Group, also called the Palestine Amateur Radio Association.

Operations from Gaza under the present Agreement are thus very unlikely to qualify for DXCC credit for Palestine. Any petition for separate DXCC status for Palestine under the present Agreement is most likely doomed to failure, due to the lack of foreign relations of the Palestinian Authority. However, if relations between Israel and the Palestinians continue

5 Band WAZ

As of February 28, 1995, 408 stations have attained the 200 Zone level.

New recipients of 5 Band WAZ Award with all 200 Zones confirmed:

SP3IOE
SP6CDK

The top contenders for 5 Band WAZ (zones needed, 80 meters):

N4WW, 199 (26)	ABØP, 199 (23)
K6YRA, 199 (34)	VE1AST, 199 (18)
AA4KT, 199 (26)	K2ENT, 199 (28)
K7UR, 199 (34)	SM6AHS, 198 (12, 31)
NAØY, 199 (26)	UA3AGW, 198 (1, 12)
WØPGI, 199 (26)	KL7Y, 198 (34, 36)
W2YY, 199 (26)	VO1FB, 198 (19, 27)
W9WAQ, 199 (26)	EA5BCK, 198 (27, 39)
W1JR, 199 (23)	KZ4V, 198 (22, 26)
VE7AHA, 199 (34)	K4PI, 198 (23, 26)
W1FZ, 199 (26)	G3KDB, 198 (1, 12)
IK2GNW, 199 (1)	DK2GZ, 198 (1, 24)
W9CH, 199 (26)	UY5XE, 198 (24, 27)
ACØM, 199 (34)	N5FG, 198 (22, 34 on 40)
IK8BQE, 199 (31)	KG9N, 198 (18, 22)
JA2IVK, 199 (34, 40m)	W2UE/7, 198 (18, 18on40)
KA5W, 199 (26)	KM2P, 198 (22, 26)
K1ST, 199 (26)	

The following have qualified for the basic 5 Band WAZ Award:

SP5GRM, 197 Zones	W4ZYT, 166 Zones
WS5E, 183 Zones	HA5DA, 175 Zones
SP6CDK, 200 Zones	

Endorsements:

SP3IOE, 200 Zones	HB9BGV, 184 Zones
K2ENT, 199 Zones	

951 Stations have attained the 150 Zone level as of February 28, 1995.

Rules and applications for the WAZ program may be obtained by sending a large SAE with two units of postage or an address label and \$1.00 to: WAZ Manager, Jim Dionne, K1MEM, 31 DeMarco Road, Sudbury, MA 01776. The processing fee for all CQ awards is \$4.00 for subscribers (please include your most recent CQ mailing label or a copy) and \$10.00 for nonsubscribers. Please make all checks payable to the Award Manager. Applicants sending QSL cards to a CQ checkpoint or the Award Manager must include return postage. Questions regarding the WAZ Award may be sent to K1MEM with an SASE.

to improve, DXers may see a new country in the region in the future. Incidentally, any such Palestinian state would probably *not* be a reinstatement of the previously deleted country of Palestine, as happened with Western Sahara and Eritrea. Any modern Palestinian state would have little in common with the 1940s ZC6 British-controlled entity.

June Activities

Two special-event stations will mark the G7 Summit in Halifax, Nova Scotia, Canada, during June. The summit is June 15-17, but stations **CG7D** and **CG7H** will be active the entire month, under the sponsorship of the Dartmouth and Halifax amateur radio clubs, respectively. A special QSL card and certificate will be issued. QSL to VE1FO, P.O. Box 663, Halifax NS, Canada B3J 2T3.

Another Canadian special-event station is **VF1L**, which will be active June 1 - August 31. This station commemorates the 250th anniversary of the final fall of the Fortress of Louisbourg, on the east coast of Cape Breton Islands (NA-010 for Islands On The Air). All Cape Breton amateurs may use the VF1 prefix in

place of their usual VE1 prefix during the same three-month period. No QSL route mentioned for VF1L, but QSL the VF1 calls via the corresponding VE1.

Finally, operations from the US Coast Guard's square-rigged barque *Eagle* June 30 to July 5 will mark the Special Olympics from New Haven, Connecticut. **K1RH/Eagle/MM** will be active on CW and SSB on the usual DX frequencies. QSL K1RH to Ralph Hirsch, 172 Newton Road, Woodbridge, CT 06525.

DXing Aids

Dieter Konrad, OE2DYL, offers a variety of DXing aids. "DX Nets Around the World" contains data about more than 100 active DX nets. "Contests Around the Year" lists many international and domestic contests. "ARRL DXCC Country List" includes active and deleted countries. "Russian DXCC Country, Prefix, and Oblast List" is updated as of the time of the order. Each aid is US\$5, including airmail postage (no checks, please). Address: Rosengasse 1, A-5020 Salzburg, Austria.

"World Top Band Frequency Allocation Tables." The latest version of Dennis Peterson, N7CKD's list of the 160 meter allocations for every current ARRL country is now available from Dennis for US\$5 for stateside DXers, US\$6 for Canadians, and US\$7 for DX (US funds only, please). Contact Dennis at 4248 A St. SE, Auburn, WA 98002.

QSL Notes

QSLs for **9G5TL**, from the 1994 CQ WW DX SSB Contest, can be sent to Jack Sheldon, Jr., P.O. Box 31898, Mesa, AZ 85275. QSL requests for contacts made outside the 1994 CQ WW DX SSB Contest can be sent to the *Callbook* addresses of the individual operators: **9G5JR** to WA7LNW, **9G5MB** to AA7NO, **9G5MT** to WY7K, **9G5RM** to NZ7E, **9G5WH** to KF7AY.

QSL **J28FD** via his home call: Patrick La-Beaume, F5LBM, 38 Chemin du Plateau, 67500 Haguenau, France. (His *Callbook* address is incorrect.) He hadn't received the **J20UFT** cards from the printer, as of late February.

The new QSL route for **ZA1MH** is via Vladimir Kova_eshki, Z32KV, Box 10, 96330 Struga, Republic of Macedonia.

QSL routes for some Macedonian stations: **Z32JA** via WA4JTK; **Z32XA** via KM6ON; and **Z31VP** via DJØLZ.

I2MQP reports that mail sent to **ZA1B** was not picked up, and returned to I2MQP. Thus, he cannot confirm contacts with ZA1B. He returned the cards sent to him, paying the postage himself. No word on how to QSL ZA1B.

QSL **BV/JQ1VNM** via home call: Kuniyasu Miyakoshi, 25-20 Kawawadai Tsuzuki-ku, Yokohama-city, Kanagawa 224, Japan. Direct or via the JARL bureau.

QSL **BV/JG1EGG** via home call: Masafumi Oikawa, 3-34-6 Yakou, Tsurumi-ku, Yokohama-city, Kanagawa 230, Japan. Direct or via the JARL bureau.

QSL **ZF2EW** via operator Clint Wise, W1XN, 27 Wilson Road, Kittery, ME 03904.

QSL **ZS95WRT** via Box 683, Florida Hills 1716, Republic of South Africa. Note that this is *not* Walvis Bay.

QSL **LX9EG**, **LX4A**, **LX1JA**-, **LX1JB**-,



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LX0SNJ, LX50V, LX75LGS, LX95VEC, S5/LX1NO, R6/LX1NO, KM6RY, and T94NE direct or via the LX bureau to Norbert Oberweis LX1NO, 5 Cite Oricher-Hoehl, L-8036 Strassen, Luxembourg.

CE8SFG was a multi-single entry in the WPX SSB from Punta Arenas. QSL to P.O. Box 1048, Punta Arenas, Chile.

QSL UX2HO/UX6H via Tony Petroncari, I2PJA, Via E. Togni 87, 27043 Broni, Italy, direct or via the Italian bureau.

QSL Z32XA via Mike Jakiela, KM6ON, P.O. Box 286, Poway, CA 92074-0286.

QSL the Feb. 12-17 Easter Island DXpedition of CE0/W0JF via the operator's home address: Yardley Beers, 740 Willowbrook Road, Boulder, CO 80302.

QSL Cuban stations CM6RS, CM6DE, CM6LP, CO6DD, CO6AI, CO8AS, and CO8RC/7 via CT1ESO, P.O. Box 207, 8900 V. R. St. Antonio, Portugal.

QSL VP2MEM via operator W4MYA.

YWRCV Aves Island cards haven't yet been printed, says YV5EED, relayed by YV5DTA.

QSL XX9TZ, XX9TR, XX9X, 9M6BH, and 9M8X via KU9C.

V73C has a new QSL manager: Bruce Smith, N4GAK, 15 Henderson St., Fayetteville, TN 37334. Ken says he answered the direct and bureau cards he received previously.

QSL CR1BWW and CT8BWW via Manuel Alberto C. Marques (Marq), CT1BWW, P.O. Box 41, 2780 Oeiras, Portugal. Marq can confirm other BWW-suffix Portuguese special-event callsigns.

QSL club station V85BG via V85GA, and not via G3JKX.

UU8J is the contest callsign of Rusty Muhamezianov, UU7JF; QSL at Mate Zalki St. 9-32, Simferopol, Crimea 333053, Ukraine.

QSL ZF2PP via K9PW and ZF2DC via AA9D.

5X1F has a new QSL manager: WA1ECA. Former manager WB1DQC became a Silent Key March 1.



Tom, DU7CC (ex-SMCNS/DU7), uses verticals standing out in sea water to provide low-band contacts from the Philippines.

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- Built in iambic keyer
- 20 memories, Split, RIT

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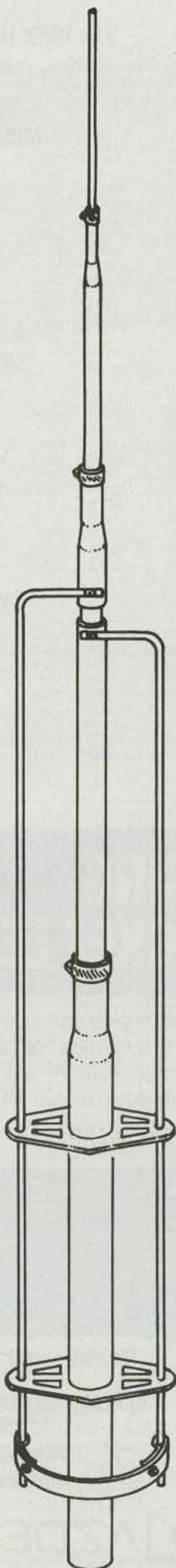
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The WPX Honor Roll

The WPX Honor Roll is based on the current confirmed prefixes which are submitted by separate application in strict conformance with CQ Master Prefix List. Scores are based on the current prefix total regardless of an operator's all-time count. Honor Roll must be up-dated annually by addition to, or confirmation of, present total. If no up-date, file will be made inactive. Lifetime Honor Roll fee is \$4.00 (U.S.) for each mode, with no fee for additions.

MIXED

4656	9A2AA	3194	SM3EVR	2806	HA8XX	2384	K8LJG	1996	KS4S	1663	WB3DNA	1359	K0IFL	1145	HA8QC	824	JR3TOE
4589	F9RM	3144	I2UIY	2752	YU7BCD	2354	WB2YQH	1994	K2OLG	1650	CT1QF	1323	W9IAL	1130	G4SDJ	796	OZ-2044
4312	K2VV	3121	N4MM	2725	K9BG	2350	I2EOW	1989	KB0G	1611	LU8DY	1320	KS0Z	1130	WT3W	761	EA2BNU
3715	IT9TQH	3106	W1BWS	2711	HA0DU	2309	S53EO	1928	WE2L	1607	I0AOF	1317	NH6T	1082	IK2DUW	743	VE6JAV
3674	EA2IA	3050	YU1AB	2693	K9AGB	2221	HA5NK	1907	NV9S	1537	YB0TK	1301	I1-50156	1078	IT9JPK	680	EA5FV
3480	K6JG	3046	I1EEW	2634	N2AC	2176	S51NU	1893	W9IL	1502	WZ1R	1289	HP2CWB	1057	HB9DDZ	677	EA1AUI
3437	W2FXA	3026	N4UU	2625	KF2O	2157	W4UW	1887	S58MU	1445	AE5B	1285	W0IZV	1041	AA7FL	671	KB5OHT
3417	VE3XN	2992	WA8YTM	2583	IT9QDS	2125	DK5AD	1870	SM6CST	1433	I2EAY	1280	WK3Z	1018	N4PYD	655	W2EZ
3353	N6JV	2989	KA5W	2488	HA0HW	2078	W8UMR	1858	W3KH	1397	EA3CWK	1277	K9BQL	994	VE6BMX		
3342	N4NO	2920	W9DWQ	2480	K2POF	2052	IK2JLH	1853	G4OBK	1376	KC6X	1249	I1ZQD	977	WB2PCF		
3226	N9AF	2909	PA0SNG	2463	4N7ZZ	2047	N2AIF	1812	KA5TQF	1368	JN3SAC	1206	WA3HUP	889	VE3OMM		
3214	I2PJA	2810	YU7SF	2441	I2MQP	2037	W6OUL	1674	PY2DBU	1359	ND3A	1167	OZ1ACB	883	WU1F		

SSB

4524	F9RM	2716	EA8AKN	2472	I4ZSQ	2122	PY4OY	1850	KF7RU	1492	N2AIF	1280	HA5NK	1086	KC6X	844	S51NU
4026	I0ZV	2703	I2UIY	2397	I5ZJK	2089	I2EOW	1809	K2POF	1468	K2EEK	1277	HP6AYV	1071	WZ1R	843	WU1F
3710	IT9TQH	2675	F2VX	2342	W8YTM	2052	CT1AHU	1802	WE2L	1459	CT1DIZ	1255	K8MDU	1049	KB4HU	841	I6KYL
3633	K2VV	2651	OZ5EV	2332	I2MQP	1991	EA2AOM	1689	LU8DY	1408	CT1BWW	1253	G4OBK	1045	WA2FKF	818	EA8BWW
3596	VE1YX	2644	I6ZJC	2272	LU8ESU	1984	K5RPC	1650	WA6SLO	1404	W6OUL	1246	IK2AEQ	1030	AA6BB	799	EA3EQT
3512	ZL3NS	2623	NJ0C	2252	KF2O	1980	EA5AT	1648	N6FX	1390	AE5B	1200	T30JH	1030	NH6T	796	EA8BGY
3245	K6JG	2601	N4NO	2250	EA3AQC	1963	W4UW	1630	W5AWT	1385	EA5OL	1162	HP2CWB	1008	ND3A	783	CE5FSB
3208	I2PJA	2598	I1EEW	2193	WA4QMQ	1957	4X6DK	1616	K8LJG	1369	DK5WQ	1147	K9BQL	1007	IT9JPK	778	JR3TOE
3137	WD8MGQ	2581	PA0SNG	2183	WF4V	1937	N4UU	1613	YU7SF	1362	K3IXD	1127	EA3KB	954	K0IFL	714	KE4BM
2967	CT4NH	2561	I4CSP	2168	CT4UW	1936	CX6BZ	1563	IK2DUU	1339	OE2EGL	1105	KB0G	934	WT3W	680	N3DRO
2782	N4MM	2524	HA8XX	2147	W9DWQ	1863	IN3QCI	1538	KS4S	1339	IK0EIM	1101	EA1KK	926	DF7HX	611	IK4HPU
2738	EA2IA	2499	KA5W	2145	YU7BCD	1860	CT1BY	1532	KA5TQF	1296	I1-21171	1089	WB6SRK	916	EA1AX	601	KJ8F

CW

3707	IT9TQH	2668	N4UU	2029	S51NR	1827	K8LJC	1666	ZS6EZ	1419	KS4S	1111	EA6AA	965	4X6DK	715	EA2BNU
3690	K2VV	2573	YU7SF	2018	W8IQ	1826	W5AWT	1625	N2AIF	1418	SM5DAC	1100	9A3SM	925	ND3A	706	HB9DDZ
3584	WA2HZR	2296	LZ1XL	1950	KA7T	1796	KF2O	1620	S58MU	1401	G4MVA	1085	AC5K	915	KC6X	676	HL5AP
3338	N6JV	2279	W8YTM	1944	S51NU	1795	HA8XX	1612	I7PXV	1395	EA7BD	1081	WZ1R	857	PY4WS	657	VE6BMX
3066	VE7CNE	2253	G4UOL	1906	JA9CWJ	1755	N6FX	1526	W6OUL	1302	LU2YA	1070	9A2HF	848	NH6T	640	K0IFL
2886	N4NO	2204	KA5W	1870	K2POF	1748	SM6CST	1498	I1EEW	1257	EA7TG	1022	H18LC	836	KL7UR	603	I2EOW
2841	YU7LS	2202	YU7BCD	1861	G3VQO	1730	W1WAI	1473	IK3GER	1226	JN3SAC	1011	W4UW	814	K5TSS		
2708	EA2IA	2126	N4MM	1829	T14SU	1678	OZ5UR	1438	DJ1YH	1200	IK2ECP	1007	W9IAL	787	VE3OMM		
2691	K6JG	2109	I2UIY	1828	HA5NK	1672	KB0G	1434	G4OBK	1186	KA1CLV	967	KA5TQF	750	K2LUQ		

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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



THE PCS-9600

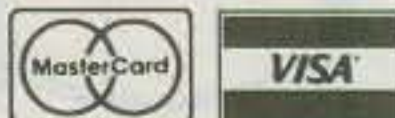
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Receiving system	Double conversion Superheterodyne
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Adjacent channel selectivity (30 KHz channel separation)	>70dB
Intermodulation	>60dB

TRANSMITTER

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Spurious radiation	>60dB

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2132HA6NF 2134K8VKI

SSB Endorsements

320.....K2JLA/327	310.....HA6NF/310
320.....IT9TGO/327	300.....CT1EEB/309
320.....W9OKL/327	300.....AB4IQ/307
320.....ZL1HY/327	300.....OA4QV/305
320.....KA3HXO/327	275.....KQ4GC/298
320.....IT9TQH/326	250.....OA4DX/262
320.....OA4ED/325	200.....K8VKI/247
320.....DU9RG/324	3.5/7 MHz.....CT1EEB
320.....K4JLD/320	28 MHz.....CT1EEB
310.....W8AXI/316	OSCAR.....CT1EEB
310.....W6SHY/315	

CW Endorsements

320.....N5FW/326	300.....K4JLD/308
320.....IT9TQH/326	275.....YV5ANT/299
310.....N5FG/313	

RTTY Endorsements

250.....K3UA/268

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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3A50LZ to W3HCW
3D2XC to JE1DXC
4E9RG to DU9RG
4K4POL/A to UA0KCL
4N7ZZ to YU7FIJ
5H/9Q5MRC to G3MRC
5R8AL to WA4VDE
5U7AA to HH2HM
7J1ATX to OH1TX
7Q7JL to G0IAS
7S30WG to SM3CVM
7Z500 to W1AF
8P6BE to KU9C
8P6JQ to K9JJR
8P9CT to K9JJR
8P9CU to K9JJR
8P9EM to G3VBL
8P9HG to DJ3NY
8Q7BX to I4ALU
9G1SD to WA0UOX
9J2XX to JH3RRA
9K2MU to WA4JTK
9M8BT to N5FTR
9M8FH to N5FTR
9M8LL to N5FTR
9M8PF8 to PB0ALB
9Q5TT to ON5NT
9X5EE to PA3DLM
9Y4SF to WA4JTK
A22MN to WA8JOC
A35RK to KK6H
A41KJ to N5FTR
AA5DX/KP4 to N2AU
C31SD to CT1AMK
C6AHY to WA4WTG
C91J to N5FTR
CN2GB to EA9KB
CN2SM to EA4EI
CO2HR to HI3JH
CO2MA to HI3JH
CO2OV4 to CO4QH
CO6AP to W3HCW
CU1AC to W2FXA
CW8B to LU8DPM
CX0CW to LU8DPM
CX8BBH to LU8DPM

D2EGH to CT1EGH
D68UY to DK7UY
DP1KGI to DD6UAB
ER3MM to UO5OIV
ER5AL to YO4BII
ET1WK to LX1UN
ET3YU to YU1FW
EU3FT to W3HCW
EU6MM to IK2QPR
EW1MM to W3HCW
EW6WW to IK2QPR
EX0M to DF8WS
EX8F to DL8FCU
FG/K5BDX to K5BDX
FG5GI to F6GWX
FK/7K1WLE to 7K1WLE
FK/JM1WBB to 7K1WLE
FK/JN1BSH to 7K1WLE
FK/JO1SIT to 7K1WLE
FK/JP1IHT to 7K1WLE
FY5GJ to F2YT
FY5YE to W5JLU
GB0SJA to GW0SGL
H44MS to DL2GAC
H5ANX/H5ABP to A22RS
HA8LLK to HA8LKE
HH2/N3SIY to KB5IPQ
HI7V to HI7JM
HP1XBH to W4YC
HR1LW to JA1LW
HS0ZAK to N4TMW
HS0ZAL to N4TMW
J68AR to K9BQL
J75A to N6ZS
J79YL to KQ1F
KC4AAA to NC6J
KG4WH to KD4NKW
KP2A to W3HNC
KP4SB to KD8IW
L50D to LU8DPM
LP3C to LU3CF
LX4A to LX1NO
LZ4AX to LZ1KBB
OD5PL to HB9CRV
OH1KAG/TF to OH3NE
OH1NOA/OD5 to OH1MRR

OJ0/N0AFW to WA2FIJ
OM0AA to OM3CVN
OS5CD to ON5CD
OX3XR to OZ3PZ
P49I to K4PI
P49V to AI6V
PA56XMT to PA0LVB
PI50NWX to PA0LVB
PI9IRC to PA3EZL
PZ5DX to K3BYV
PZ5JR to K3BYV
R1FJC to RW6HS
R1FJL to JA3AFR
R9WA to W3HCW
RK0QXY to UA0KCL
RK2FWA to DK4VW
RL00 to IK2QPR
RW2F to DK4VW
S79KMB to KN2N
S79UAA to DL6UAA
SP5GRM to SP5ES
ST2AA to WB2RAJ
T20XC to JE1DXC
T30XC to JE1DXC
T5AR to SM0DJZ
T93A/4U to 9A2AJ
TF/OH1KAG to OH3NE
TG9IKN to KC5AGX
TI4/AA7JM to WA5TUD
TI4CF to TI2CF
TL8NG to WA1ECA
TM0TRS to F6KEQ
TM5T to F6KCE
TN2M to DL7VRO
TN4U to DL7VRO
TU5EV to W3HCW
UA0QJG/0 to UA1AGC
UA9XS to W3HCW
UL00B to IK2QPR
UL70B to IK2QPR
UN20 to IK2QPR
UR0MC to UB2MC
V31TP to WC0W
V51HK to DL6OBS
V77Y to KL7Y
V7X to KH6HH (94CQWW)

VA1S to VE1AL
VE3UWC/4U to KD4DIO
VK9CR to DJ5CQ
VK9XY to DJ5CQ
VP2EY to HB9SL
VP2MBO to W9PTO
VP2MEJ to W5ASP
VP2MFP to WD9DZV
VP8CBC to W4FRU
VP9IN to WB2YQH
VP9MZ to WB2YQH
VP9NC to WB2YQH
VQ9XX to WY8Q
VS6WV to K0TLM
WR6R/KH6 to N2AU
X5EBL to YU1FW
XE1L to WA3HUP
XN9JA to VY1JA
XQ8ABF to LU8DPM
XT2BW to WB2YQH
XU7VK to HA0HW
XU95HA to HA0HW
XW2A to JA2EZD
XX9AS to KU9C
XX9TYD to K8PYD
YJ0AFU to NA5U
YL1XZ to IK2QPR
YQ0FR to Y08FR
YS1XS to WD4PDZ
Z21BA to N5FTR
ZA1AJ to OK2PSZ
ZA1Z to HB9BGN
ZD8Z to VE3HO
ZF1A to K9LA (94CQWW)
ZF2NG to K9WYI
ZF2UO to N9JCL
ZF2VZ to N1MFW
ZK1VDX to DL3BUM
ZK1VTK to DL3BUM
ZL4TT to ZL1HS
ZL7FD to DK8FD
ZL7ZB to DJ4ZB
ZS95WRT to ZS6AJS
ZZ5AVM to PP5LL

Effective March 31, W0IJN is no longer QSL manager for CX7BY.

IK2QPR handles cards for YL1XZ, EU6MM, EW6WW, UN20, UL70B, RL00, UL00B, UC2WO, UC1WWO, UQ1GXZ, EO2CWO, EX8MF, UM8MFO, UC7W, UC1WWO/RC4, and I12R.

QSL IB4M direct only to I4ABF.

QSL I14N and I14M direct or via the Italian bureau to I4MES.

QSL IR4R direct or via the Italian bureau to IK4ALM.

Mac, W3HCW, has added PT7WX, RX9TX, 9A2OP, and 9K2MA to the long list of stations he manages.

QSL HS0ZAQ via K9ECE. Don also has logs for KP6BD on Kingman Reef and KP6AL on Palmyra from June 1977.

QSL contest call LT5E via LU1EYW.

QSL XE1BGM/3 direct to Bernardo Garcia Mendoza, P.O. Box 882, Pozarica, Vera Cruz, Mexico.

QSL VP2MDE and VP2MEM via K5GN, and VP2MEJ via W5ASP.

QSL VP2MFM via Denis Catalano, WD4KXB, 14453 Alps Dr., Woodbridge, VA 22193.

QSL 9I30ZIN (SSB only), 9J2CE, and 7Q7CE via operator Ely Camin, IN3VZE, Corso 3 Novembre 136/2, 38100 Trento, Italy.

QSL WT20/VE1 via K5MK, and WT20/VE8 via WT20.

QSL ST2/G40JW via John Munroe, W7KCN, 1450 Island View Ave., Bellingham, WA 98225.

QSL 1C0ZZ from Grozny, Chechnya, direct only via Peter, UU6JF, P.O. Box 10, Kerch 334500 Ukraine. Peter handles cards for several Ukrainian stations.

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What You Need To Know About Vanity Callsigns

The current station callsign system dates back to 1978, when the existing amateur callsign system was replaced. Actually, the new sequential callsign system was adopted right after a very messy FCC scandal that involved illegal \$100 payments for desirable amateur station callsigns. An official at the FCC's Gettysburg, Pennsylvania licensing facility ended up going to jail over the matter.

Effective March 24, 1978 "All amateur callsign policies and procedures, written or unwritten, are cancelled and replaced. No requests for specific callsigns will be honored," the FCC said in a public notice. Stations that held more than one callsign had to submit one of them for cancellation by October 1, 1978. "No new secondary or special event station licenses will be issued."

Future amateur station callsigns would now be assigned in strict sequential order according to a list of five major groups (see Table I). The licensee's mailing address determines the district number. When all callsigns within a block have been assigned, the next assignment is made from the next consecutive block within a group. When all blocks assigned to a group have been allocated, callsigns from the next lower group are assigned.

The sequential callsign system continues in force to this day. It shortly will be joined by another callsign program, the vanity callsign system. It has a long and interesting history—one which is not generally known.

Contrary to what you may have heard, the American Radio Relay League played absolutely no part in originating the vanity callsign program. The ARRL claims that they "supported" the program—and well they did, but only after it was enacted into law.

Both the ARRL and the FCC were caught off guard when Congress approved vanity callsigns. Neither knew it was coming! The legislation that permits amateurs to choose their own station callsign is actually the work of a single, very persistent amateur, acting alone. He simply would not take no for an answer.

How It All Began

The campaign to obtain a station callsign of choice began five years ago in June 1990, when a retired Extra Class amateur from Tyler, Texas—Jim Wills, N5HCT—filed a Petition for Rule Making. He wanted his old WA5EHQ callsign back. His petition was in response to an April 19, 1990 FCC Public Notice concerning the assignment of amateur radio station callsigns. The Commission had said they did not have the capability to issue specific combinations of station call letters.

Wills requested that amateurs be allowed to

National Volunteer Examiner Coordinator, P.O. Box 565101, Dallas, TX 75356-5101 (817-461-6443)

SEQUENTIAL AMATEUR CALLSIGN SYSTEM		
For The 48 Continental United States		
Group A	Amateur Extra	Contains all K, N, and W 1x2, most 2x1, and most "A" prefixed 2x2 callsigns. 1x1 format callsigns will not be issued.
Group B	Advanced	Contains most K, N, and W prefixed 2x2 callsigns.
Group C	Technician & General	Contains all N 1x3 callsigns. Unassigned W and K prefixed 1x3 callsigns will not be issued.
Group D	Novice	Contains most K and W prefixed 2x3 callsigns. The letter X may not be the first digit of the suffix. No provision was made for AA-AL and NA-NZ prefixed 2x3 callsigns.
Group X*	RACES Club Military Recreation Repeaters Temporary Licenses	Contains WC prefixed 2x3 callsigns. Contains WK prefixed 2x3 callsigns. Contains WM prefixed 2x3 callsigns. Contains WR prefixed 2x3 callsigns. Contains WC prefixed 2x3 callsigns.
For The Non-contiguous United States and Possessions		
Group A	Amateur Extra	Contains AH, KH, NH, WH 2x1 callsigns (Pacific Area). Contains AL7, KL7, NL7, WL7 2x1 callsigns (Alaska). Contains KP, NP, WP 2x1 callsigns (Atlantic Area).
Group B	Advanced	Contains AH, KH, NH, WH 2x2 callsigns (Pacific Area). Contains AL7 2x2 callsigns (Alaska). Contains KP 2x2 callsigns (Atlantic Area).
Group C	Technician & General	Contains KH, NH, WH 2x2 callsigns (Pacific Area). Contains KL7, NL7, WL7 2x2 callsigns (Alaska). Contains NP, WP 2x2 callsigns (Atlantic Area).
Group D	Novice	Contains KH, WH 2x3 callsigns (Pacific Area). Contains KL7, WL7 2x3 callsigns (Alaska). Contains KP, WP 2x3 callsigns (Atlantic Area).
<p>The U.S. amateur callsign format consists of a one- or two-letter prefix followed by a single geographical digit, followed by a one-, two-, or three-letter suffix. Single-letter prefixes are either K, N, or W. Two-letter prefix combinations are either AA-AL, KA-KZ, NA-NZ, or WA-WZ. A callsign will not be changed unless the licensee specifically requests, and is eligible for a change. The licensee always has the option to keep the current callsign upon license renewal, upgrade, change of station location, change of mailing address, or change of name.</p> <p>*Some Group X callsigns were issued prior to March 1978, but this program was not continued by the FCC.</p>		

Table I—The sequential amateur station callsign system, approved in 1978.

specify three callsign choices in order of preference and attach a \$30 fee to the FCC requesting a callsign change. "The Federal Budget and the amateur community all gain from this proposal," he said. His petition was denied by the FCC, they said because of the statutory exemption of amateur service applications from fees.

That did not stop Wills. He began writing to his congressmen concerning the reassignment of unused, dormant callsigns. First, he contacted Senator Phil Gramm, then Representative Ralph M. Hall. These inquiries also ended up at the FCC, and the answer was the same: "... Congressional intent is clear that all fees from amateur radio licensees are strick-

en since they do not operate for profit..." Wills also wrote to Larry E. Price, W4RA, then president of the ARRL, but got little help.

Still not willing to take no for an answer, Wills next wrote to President Bush! Again, the answer came back from the FCC's Private Radio Bureau Chief, Ralph Haller: "... we cannot collect a fee for any amateur service application, including a fee for unused callsigns. Moreover, any amateur service fee requirement would require a statutory amendment which would require action by the Congress."

Wills then tried the National Telecommunications and Information Administration, the White House advisor on telecommunications matters. NTIA's Janice Obuchowski told Wills:

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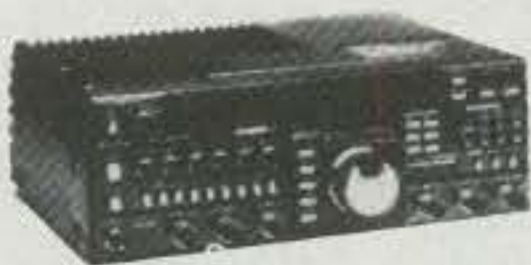


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"The Department of Commerce does not have the authority to regulate callsigns." She referred Wills' letter to FCC Chairman Alfred C. Sikes, adding "... you may wish to express your views to your representatives in Congress."

On December 9, 1991 Congressman Ralph Hall wrote Wills: "I've shared your idea with the staff of the Telecommunications Subcommittee, and they are currently conducting an inquiry in conjunction with the FCC to determine whether such a fee would collect enough money to pay for itself. If so, we may be able to make the necessary legislative changes in the FCC reauthorization bill to put such a 'vanity callsign fee' into effect."

In mid-1992 FCC Chairman Al Sikes awarded K3VOA to the Voice of America Ham Club on their 50th anniversary. They were previously K3EKA. It thus appeared that waivers of the rules were possible if you knew the right people. Wills wrote another letter complaining to Sikes on June 3rd. Private Radio Bureau Deputy Chief Beverly Baker answered that letter explaining, "... the extraordinary circumstances presented in the VOA request that persuaded us to make a single exception."

On June 12th a letter jointly signed by Edward J. Markey and Congressman Ralph M. Hall was sent to FCC Chairman Sikes. It said, "We are writing to you on behalf of several amateur radio operators who are interested in the establishment of an FCC system for allotting distinctive callsigns. Such callsigns would be available at a fee to radio operators, in order to recover the total cost associated with the program." The addition of Markey's signature to the letter added renewed importance! Markey controlled the FCC budget.

The answer this time came from Chairman Alfred C. Sikes himself! He said that the FCC had been unable "... to establish a system of distinctive callsigns because of the specialized handling, resource limitations and the inability of our current computer system to perform this specialized function. A distinctive callsign program would require a new automated system at an approximate cost of \$250,000." He added, "... Congress has not given the FCC the legal authority to retain the fees collected to offset program costs."

On January 13, 1993 Congressman Hall again wrote to Jim Wills. "Al Sikes raises a legitimate complaint about the lack of FCC resources, but he misses the point Ed Markey and I were talking about when we sent our June 12th letter to the Commission Chairman. A self-funding program of granting special callsigns to ham radio enthusiasts would not place additional demands on FCC resources as long as the FCC set fees at an appropriate level," Hall said. "I was not aware of the statements made by Amateur Radio Bureau (sic) Chief Haller, but it appears that—with or without the knowledge of Chairman Sikes—the FCC is already moving towards implementing a specialized callsign program."

What had happened was the FCC was planning to retire its old (circa 1970) Honeywell computer in the fall of 1994 and replace it with an updated licensing system. The new amateur processing system would have more capabilities than previously was the case.

At the Annual VEC Conference in June 1993 Personal Radio Branch Chief John B. Johnston tipped off the Volunteer Examiner Coordinators: "A new computer system coming on line shortly is being programmed to provide per-

sonalized Amateur callsigns which would require a fee." He added, "... in the future it might be possible for Amateurs to obtain any unassigned callsign."

"It's important to note, however, that the FCC will still need permission from Congress to collect fees," Congressman Hall said. "My staff has already started discussion about this issue with the staff of Telecommunications Subcommittee Chairman Ed Markey. I'm confident that he will support a legislative proposal which would allow the FCC to collect fees for specialized callsigns."

In early 1994 both the House of Representatives and the U.S. Senate approved legislation that authorizes the Federal Communications Commission to assess and collect "cost of regulation" fees. The so-called "user fees" would be charged to the benefactors of FCC services rather than to all taxpayers. The Mass Media, Common Carrier, and Private Radio Bureaus were all included.

The plan was that the FCC would issue unique amateur station callsigns at a cost of \$7.00 per year to the ham radio community! Even the FCC was not aware of the short four-word line in President Clinton's well-publicized Deficit Reduction Plan that authorizes the Commission to issue special "vanity" callsigns to the amateur community.

Tucked away on page 57 of that bill is a list of regulatory fees that the FCC may "... assess and collect." The payment is required to be "... in advance for a number of years not to exceed the term of the license held by the payor." This meant that a special callsign for its ten-year fee would cost \$70.00. It read:

Bureau/Category	Annual Regulatory Fee
Private Radio Bureau	
Amateur vanity callsigns	7

President Clinton lobbied long and hard to get his Deficit Reduction Plan through Congress. It passed the House by only two votes (218 to 216), and Vice-President Al Gore had to break a 50-50 tie in the Senate. President Clinton signed the measure into law on Tuesday, August 10, 1994. The special callsign program still had to go through rule-making before it could be implemented by the Private Radio Bureau—a lengthy process that normally takes a year or more.

FCC Proposes Amateur Vanity Callsigns

The American Radio Relay League immediately formed an Ad Hoc Committee on Vanity Call Signs. One of their conclusions was that a specialized callsign system should be phased in with a series of four three-month windows before opening the system to all. Previously held callsigns regardless of license class, format, or call district should be available first. The second, third, and fourth windows would be by license class. The committee also felt that the fee should be a one-time occurrence rather than \$70 every ten-year license term.

The FCC's version of vanity callsigns was adopted on December 13, 1993. PR Docket 97-305 provided for allowing amateur radio operators to select any unassigned station

callsign of their choice. The FCC envisioned that an amateur station callsign would become available for reassignment after two years following license expiration or the death of a licensee, whichever is sooner. The FCC did not propose any type of "phase in" program. Instead all callsigns would become available on a first-come first-serve basis. This was very controversial! Many amateurs thought they deserved priority in selecting a special station callsign.

The Notice of Proposed Rulemaking called for any callsign selected to be within the framework of the sequential callsign system wherein certain groups of callsigns are designated for each license class. This meant that Extra Class amateurs could select any available callsign in Group A, B, C, or D. Advanced amateurs would only qualify for Groups B, C, and D; Techs, Tech Plus, and General could request a Group C or D callsign. In other words, a Novice would not be able to choose an available Group "A" amateur Extra callsign. Amateurs may only hold one primary station callsign and must relinquish their current callsign when their chosen "vanity" callsign is assigned.

A new FCC Form 610-V (for Vanity) would permit the amateur to list a maximum of ten callsigns in order of preference. While Congress set a \$70 fee for a ten-year term "vanity" station callsign, the ARRL wanted a one-time \$150 processing fee. And they set about lobbying Congress for the change. The \$150 charge was indeed added to a telecommunications deregulation bill under consideration, but it went down to defeat after the Republicans seized power in November. We now understand that the FCC is proposing to lower the fee for a vanity callsign to only \$30 for a ten-year term.

FCC Adopts Vanity Callsigns

After a year of consideration, on December 23, 1994 the FCC Commissioners adopted final rules implementing vanity callsigns in the Amateur Service. There were not too many surprises over the initial proposal, but there were some. Here are some excerpts from that Order.

"Until recently, we have been unable to accommodate the many thousands of requests that we receive for callsigns of the licensee's choice. One of our many steps of reinventing Government is to implement new licensing processing capabilities that make it practicable to grant such requests. To this end, we proposed a vanity callsign system, and asked for public comment on our proposal. We further proposed to use our increased capabilities to resume issuing new club and military recreation station licenses."

"The comments confirm the ardent desire of many amateur operators to select the callsigns for their stations and their willingness to pay a fee for this service. There were, moreover, several excellent improvements to the proposed system suggested."

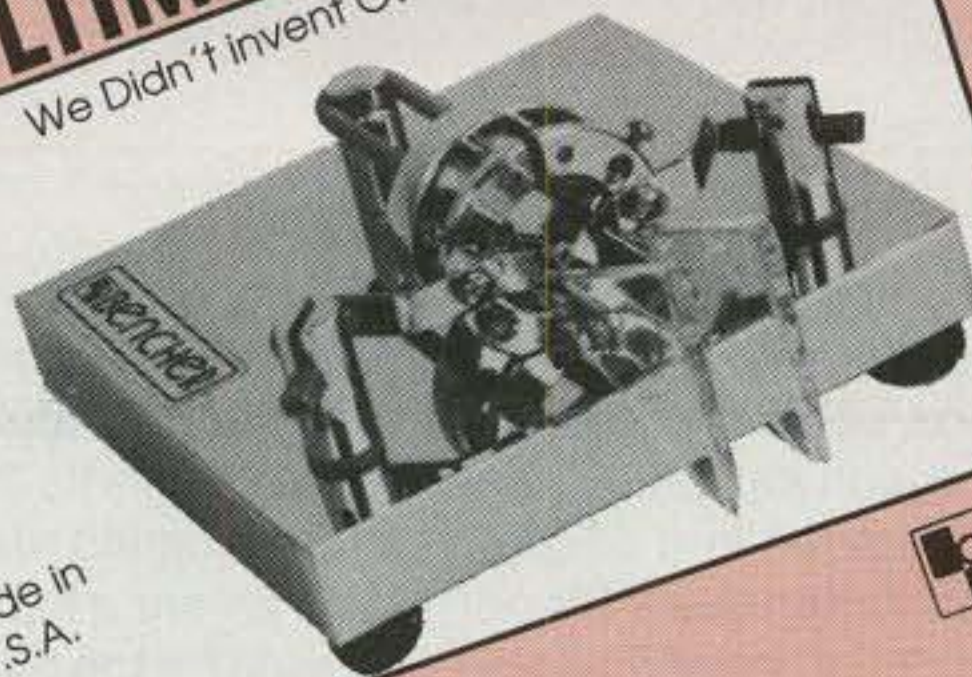
"A major concern of the amateur service community is that the system adopted for allocation of vanity callsigns be fair and equitable. Specifically, many commenters suggested using a method of priority with respect to filing applications for vanity callsigns. The ARRL's suggested method is to open the system gradually through four 'starting gates.'"

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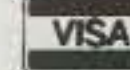


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either an individual or a club, to apply for that callsign, or where the holder is deceased, a close relative could apply.

"Gate Two would allow the 69,000 amateur Extra Class operators, who have passed the most difficult license examinations, to apply.

"Gate Three would allow the 115,000 Advanced Class operators, who have passed the second most difficult license examinations, to apply.

"Gate Four would open the system to any licensee. As of January 31, 1995, there were 678,610 amateur stations licensed by the Commission.

"A club station license trustee [acting with written consent of a close relative] would also be allowed to apply for the callsign of a deceased former holder."

The FCC agreed that such a system was fair and persuasive. "Given the strong interest in vanity callsigns shown in the comments, it is obvious that the number of applications filed initially could be very large. We agree that a filing priority schedule would be helpful in maintaining fairness and efficiency during the initial implementation of the system, as well as ease administrative burdens on the Commission."

The FCC adopted the ARRL's suggested starting gates and said they will announce the opening of each gate by a Public Notice. The first gate will open as soon as the new FCC Form 610-V is available, and the Gettysburg licensing facility is prepared to begin processing the applications. The Paperwork Reduction Act of 1980 requires that all FCC forms be approved by the FCC's Office of Manage-

ment and Budget. This review normally takes a minimum of three months. It could be summer before the form is approved and released.

Gate One will open the system to the smallest group—that is, a few thousand prior holders and close relatives of deceased prior holders. The FCC defined close relatives as the spouse, child, grandchild, stepchild, parent, grandparent, stepparent, brother, sister, stepbrother, stepsister, aunt, uncle, niece, nephew, or in-law of the deceased.

Applicants will be required to send the Form 610-V together with the required fee to the FCC's fee collection contractor, currently the Mellon Bank in Pittsburgh, Pennsylvania. Initially a maximum of ten callsign choices in order of preference was to be listed on the form. At the ARRL's suggestion, however, this number has now been increased to 25 callsigns, thus increasing the chances of requesting an assignable callsign.

After receiving the forms from the Mellon Bank, the FCC will confirm that you are eligible for the first callsign on your list. The license data base as it then exists will be searched. If the callsign is assignable to your station, your license will be modified to show that callsign. Otherwise, the search will be repeated using the other callsigns in your order of preference until a callsign is selected. Should no callsign on your list be assignable to your station, the callsign that you vacated will again be shown on your license.

Military recreation and RACES stations are not eligible to apply for a vanity callsign. If you have recently filed a regular FCC Form 610 or

610-B (club station application) for any purpose, you are not eligible to apply for a vanity callsign until you receive your license document. Choose your list of callsigns very carefully. List only callsigns from the groups for which your operator class is eligible and which you believe are unassigned. Give the exact prefix, numeral, and suffix for each callsign. Do not request callsigns in general terms. A request such as "Any callsign with my initials" cannot be accommodated. You may not request that a callsign be reserved for future assignment.

There was support in the comments for resumption of the issuance of new club station licenses and the FCC has agreed. Organizations not already holding a club station license must first apply for and receive a license before they can file an application for a vanity club callsign with the Mellon Bank.

Effective March 24, 1995 the Commission began accepting applications for new club and military recreation station licenses. If you wish to apply for a club callsign, the current Form 610B may be used by entering "NEW" in Item 1 under "expiration date" until a new version of the Form 610B is released. Mail completed forms to the Federal Communications Commission, 1270 Fairfield Road, Gettysburg, PA 17325-7245.

One point that the FCC did not go along with was the ARRL's request that an applicant be permitted to request only those callsigns that are assignable to stations in the callsign region where the licensee resides. The Commission said they carefully considered this suggestion and decided not to impose that limitation since "... the applicant's choice of vanity callsigns would be reduced to ten percent or less of the callsigns that would otherwise be assignable to the station. A limitation based upon the person's place of residence, moreover, could easily be circumvented by using a mailing address in another callsign region."

The ARRL promptly filed a Petition for Reconsideration on this issue which, at this writing, is still under consideration by the FCC. The Commission also elected to impose a two-year waiting period before a vacated callsign could be reassigned to cut down on callsign "trafficking."

The ARRL's request that the 780 one-by-one callsigns (for example, W1A is a 1x1 callsign) be made available only to certain special event stations was also approved and will be addressed in a separate proceeding.

The FCC cannot provide current callsign status data. The license database is available from some private publishers on computer disks or CD ROM. However, since vanity callsign requests will continually be accepted and processed, there is no guarantee that a callsign that appears to be available on the license database will be available when your request is processed.

Since the W5YI Group has access to the FCC's data base, we will be offering a service to assist the amateur community in preparing their vanity callsign preference list. The FCC Form 610-V is not yet available, but it will be available from W5YI at no cost just as soon as it is published. It could be available by the time you read this column. Send a large self-addressed stamped envelope to us at: Vanity Call Signs, P.O. Box 565101, Dallas, TX 75356.

73, Fred, W5YI

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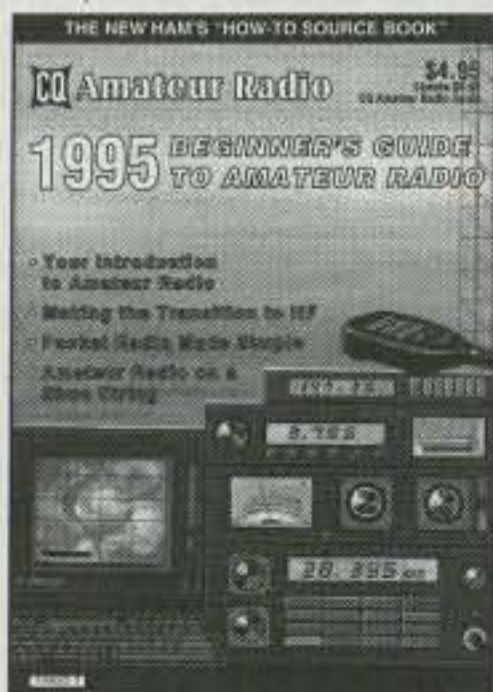
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THE SCIENCE OF PREDICTING RADIO CONDITIONS

Sunspot Cycle Update

The present solar cycle, the 22nd observed since accurate records have been kept, continues to decline slowly towards a minimum, which is now expected to occur sometime between mid-1996 and early 1997.

The progress of sunspot Cycle 22 from its beginning in September 1986 through December 1994 is shown in Table I. Predicted values for 1995 are also shown.

The Royal Observatory of Belgium reports a mean sunspot number of 30 for February 1995. Daily values ranged between a high of 47 recorded on February 22 and a low of 12 on February 8th.

February's mean value results in a 12-month running smoothed sunspot number of 27 centered on August 1994. This is a drop in two numbers from the previous month's level. A smoothed sunspot number of approximately 17 is forecast for June 1995.

The Dominion Radio Astrophysical Observatory at Penticton, British Columbia reports an adjusted mean value of 83 for the February 1995 10.7 cm solar flux level. This results in a smoothed value of 82 centered on August 1994. A level in the low 70s is expected during June 1995.

June Propagation

Twenty meters looks like it should be the best band for DX propagation during June. Expect it to open just after sunrise, and to remain open for a few hours in almost all directions. When conditions are Low Normal or better, chances are good for openings to Europe, Central and South America, the South Pacific, Australasia, and the Far East before noontime absorption sets in. A second, and usually stronger, peak is expected during the late afternoon, when good openings should be possible towards Europe, Africa, Central and South America, and the Middle East. After sunset, and until midnight, look for good openings to South America, Antarctica, the South Pacific, Australasia, and the Far East. When conditions are High Normal or better, there may also be post-sundown openings on 20 meters to Europe, Africa, and the Middle East.

Not too much DX is expected on 15 or 17 meters this month, but some should be possible. When conditions are at least Low Normal, expect fairly good openings towards Central and South America as early as 9 AM. The best time for these openings, however, should be during the afternoon hours and possibly as late as the sundown period. The band may also open occasionally from the eastern half of the United States towards Africa, and from the western half towards the South Pacific, Australasia, and the Far East. The best time to check for these openings is during the afternoon

LAST MINUTE FORECAST

Day-to-Day Conditions Expected for June 1995

Propagation Index.....	Expected Signal Quality			
	(4)	(3)	(2)	(1)
Above Normal: 11-12, 14, 24-25	A	A	B	C
High Normal: 7, 9-10, 13, 15, 20-21	A	B	C	C-D
Low Normal: 3-6, 8, 18-19, 22-23, 26-28	B	C	D	D-E
Below Normal: 1-2, 17, 29, 30	C	C-D	D-E	E
Disturbed: 16	C	D	E	E

Where expected signal quality is: A—Excellent opening, exceptionally strong, steady signals greater than S9.

B—Good opening, moderately strong signals varying between S6 and S9, with little fading or noise.

C—Fair opening, signals between moderately strong and weak, varying between S9 and S6, with some fading and noise.

D—Poor opening, with weak signals varying between S1 and S3, and with considerable fading and noise.

E—No opening expected.

HOW TO USE THIS FORECAST

1. Find propagation index associated with particular band opening from Propagation Charts appearing on the following pages.
2. With the propagation index, use the above table to find the expected signal quality associated with the band opening for any date of the month. For example, an opening shown in the charts with a propagation index of 3 will be fair-to-poor (C-D) on June 1st and 2nd, fair (C) from June 3rd to 6th, good (B) on the 7th, etc.

hours, especially when conditions are High Normal or better.

Few, if any, DX openings are expected on 12 or 10 meters, except to those areas of the Caribbean and Central America within a 1300 mile range of short-skip sporadic-E openings

from the USA. An occasional longer opening into South America may be possible during the late afternoon hours, when conditions are High Normal or better.

Longer hours of daylight and seasonally higher levels of static should reduce considerably the chances for DX openings on 30, 40, 80, and 160 meters. Some fairly good openings, however, are forecast to several areas of the world for 30 and 40 meters during the hours of darkness and the sunrise period. Somewhat fewer, but often good openings should also be possible on 80 meters during much of the same time period.

Plenty of good short-skip openings are expected on the HF bands during June. For distances less than 250 miles try 80 meters during the day and 160 meters at night. For openings between 250 and 750 miles, 40 and 30 meters should be best during the day and 80 meters at night. For openings beyond 750 miles, 20 meters should be optimum during the day and 30 and 40 meters at night. Frequent short-skip, sporadic-E type openings are also expected on 10, 12, 15, and 17 meters over distances between approximately 600 and 1300 miles.

VHF Ionospheric Openings

Expect a considerable increase in sporadic-E propagation during June and the summer months. This should result in fairly frequent 6 meter openings over a range of approximately 1000 to 1400 miles. During periods of geographically widespread ionization, two-hop 6 meter openings may occasionally be possible up to about 2300 miles. An occasional 2 meter short-skip opening, between approximately 1200 and 1400 miles, may also be possible during periods of intense sporadic-E ionization. Short-skip openings are most likely to occur between 10 AM and 2 PM and again between 6 and 10 PM local daylight time, al-

Month	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Jan.		18	58	142	151	148	124	71	37	<u>21</u>
Feb.		20	65	145	153	148	115	69	35	<u>21</u>
Mar.		22	71	150	152	147	108	67	34	<u>20</u>
Apr.		24	78	154	149	146	103	63	34	<u>19</u>
May		26	84	157	147	146	100	60	33	<u>18</u>
June		28	94	158	144	145	97	56	31	<u>17</u>
July		31	104	159*	141	146	91	55	29	<u>16</u>
Aug.		35	114	158	141	147	84	52	27	<u>16</u>
Sept.		39	121	157	142	145	80	48	<u>25</u>	<u>16</u>
Oct.	13	44	125	157	142	142	76	45	<u>24</u>	<u>15</u>
Nov.	15	47	130	158	144	138	74	41	<u>23</u>	<u>14</u>
Dec.	16	51	138	153	144	132	73	38	<u>22</u>	<u>13</u>

Table I—Progress of sunspot Cycle 22 and predictions for the remainder of 1995. Predicted values are shown underlined. The peak value for Cycle 22 is shown with an asterisk (*). (Based upon data supplied by the National Geophysical Data Center, Boulder, Colorado.)

11307 Clara Street, Silver Spring, MD 20902

HOW TO USE THE DX PROPAGATION CHARTS

1. Use chart appropriate to your transmitter location. The Eastern USA Chart can be used in the 1, 2, 3, 4, 8, KP4, KG4, and KV4 areas in the USA and adjacent call areas in Canada; the Central USA Chart in the 5, 9, and 0 areas; the Western USA Chart in the 6 and 7 areas; and with somewhat less accuracy in the KH6 and KL7 areas.

2. The predicted times of openings are found under the appropriate meter band column (10 through 80 meters) for a particular DX region, as shown in the left-hand column of the charts. An * indicates the best time to listen for 160 meter openings.

3. The propagation index is the number that appears in () after the time of each predicted opening. The index indicates the number of days during the month on which the opening is expected to take place as follows:

- (4) Opening should occur on more than 22 days
- (3) Opening should occur between 14 and 22 days
- (2) Opening should occur between 7 and 13 days
- (1) Opening should occur on less than 7 days

Refer to the "Last Minute Forecast" at the beginning of this column for the actual dates on which an opening with a specific propagation index is likely to occur, and the signal quality that can be expected.

4. Times shown in the charts are in the 24-hour system, where 00 is midnight; 12 is noon; 01 is 1 A.M.; 13 is 1 P.M., etc. Appropriate daylight time is used, not GMT. To convert to GMT, add to the times shown in the appropriate chart 7 hours in PDT Zone, 6 hours in MDT Zone, 5 hours in CDT Zone, and 4 hours in EDT Zone. For example, 14 hours in Washington, D.C. is 18 GMT. When it is 20 hours in Los Angeles, it is 03 GMT, etc.

5. The charts are based upon a transmitted power of 250 watts CW, or 1 kw, PEP on sideband, into a dipole antenna a quarter-wavelength above ground on 160 and 80 meters, and a half-wavelength above ground on 40 and 20 meters, and a wavelength above ground on 15 and 10 meters. For each 10 dB gain above these reference levels, the propagation index will increase by one level; for each 10 dB loss, it will lower by one level.

6. Propagation data contained in the charts has been prepared from basic data published by the Institute for Telecommunication Sciences of the U.S. Dept of Commerce, Boulder, Colorado 80302.

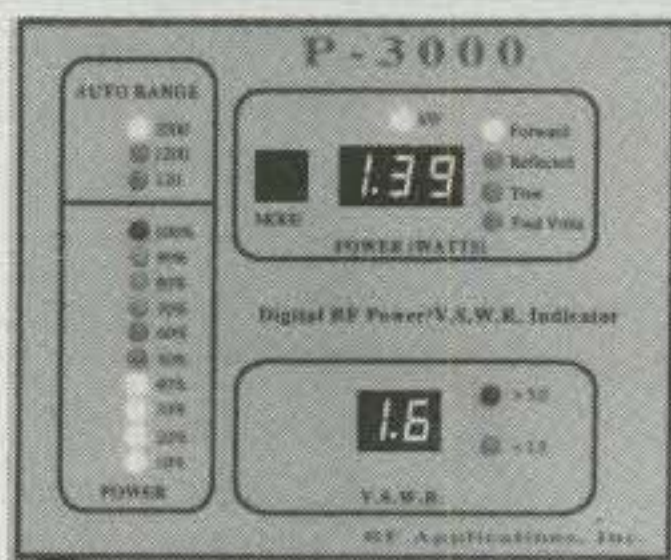
June 15–August 15, 1995 Time Zone: EDT (24-Hour Time) EASTERN USA TO:

	15 Meters	20 Meters	40 Meters	80 Meters
Western & Central	13-18 (1)	06-07 (1)	19-21 (1)	21-22 (1)
Europe & North Africa		07-09 (2)	21-22 (2)	22-00 (2)
		09-14 (1)	22-00 (3)	00-01 (1)
		14-16 (2)	00-01 (2)	22-00 (1)*
		16-17 (3)	01-02 (1)	
		17-18 (4)		
		18-19 (3)		
		19-20 (2)		
		20-22 (1)		
Northern & Eastern Europe	Nil	06-07 (1)	20-21 (1)	21-23 (1)
		07-09 (2)	21-23 (2)	
		09-15 (1)	23-00 (1)	
		15-18 (2)		
		18-19 (3)		
		19-22 (2)		
		22-00 (1)		
Eastern Mediterranean & Middle East	11-13 (1)	13-15 (1)	20-22 (1)	22-00 (1)
	16-17 (1)	15-17 (2)	22-00 (2)	
		17-19 (3)	00-01 (1)	
		19-20 (2)		
		20-22 (1)		
		22-00 (2)		
		00-06 (1)		
		06-08 (2)		
		08-09 (1)		
Western Africa	11-14 (1)	05-06 (1)	20-22 (1)	21-01 (1)
	14-17 (2)	06-07 (2)	22-01 (2)	
	17-18 (1)	07-15 (1)	01-02 (1)	
		15-17 (2)		
		17-18 (3)		
		18-20 (4)		
		20-21 (3)		
		21-23 (2)		
		23-01 (1)		

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EB104 (600W)	
AR347 (1000W)	



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Eastern & Central Africa	11-16 (1)	16-18 (1) 18-20 (2) 20-21 (1)	22-00 (1)	22-00 (1)
Southern Africa	11-13 (1)	01-03 (1) 05-07 (1) 15-16 (1) 16-18 (2) 18-19 (1)	20-21 (1) 21-01 (2) 01-02 (1)	22-01 (1)* 23-01 (1)*
Central & South Asia	Nil	07-10 (1) 20-23 (1)	05-07 (1) 20-22 (1)	Nil
Southeast Asia	Nil	07-10 (1) 19-23 (1)	Nil	Nil
Far East	Nil	07-08 (1) 08-10 (2) 10-12 (1) 20-23 (1)	04-06 (1)	Nil
South Pacific & New Zealand	19-22 (1)	19-21 (1) 21-01 (2) 01-07 (1) 07-10 (2) 10-12 (1)	02-03 (1) 03-06 (2) 06-07 (1)	03-06 (1) 03-05 (1)*
Australasia	19-22 (1)	06-08 (1) 08-09 (2) 09-12 (1) 17-19 (1) 21-23 (1) 23-01 (2) 01-04 (1)	03-04 (1) 04-06 (2) 06-07 (1)	03-06 (1)
Caribbean, Central America & Northern Countries of South America	15-17 (1)** 09-12 (1) 12-15 (2) 15-18 (3) 18-20 (2) 20-21 (1)	06-07 (1) 07-08 (2) 08-10 (4) 10-12 (3) 12-16 (2) 16-18 (3) 18-21 (4) 21-23 (3) 23-00 (2) 00-02 (1)	20-22 (1) 22-23 (2) 23-03 (3) 03-05 (2) 05-07 (1)	22-00 (1) 00-04 (2) 04-06 (1) 02-05 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	14-17 (1)** 09-12 (1) 12-15 (2) 15-17 (3) 17-19 (2) 19-20 (1)	06-08 (1) 08-09 (2) 09-15 (1) 15-17 (2) 17-19 (3) 19-20 (4) 20-22 (3) 22-00 (2) 00-04 (1)	21-23 (1) 23-03 (2) 03-06 (1)	00-05 (1) 01-04 (1)*
McMurdo Sound, Antarctica	Nil	20-22 (1) 22-00 (2) 00-02 (1)	00-03 (1) 03-06 (2) 06-07 (1)	03-06 (1)

June 15–August 15, 1995
Time Zones: CDT & MDT
(24-Hour Time)
CENTRAL USA TO:

	15 Meters	20 Meters	40 Meters	80 Meters
Western & Southern Europe & North Africa	13-17 (1)	06-07 (1) 07-09 (2) 09-14 (1) 14-16 (2) 16-18 (3) 18-19 (2) 19-21 (1)	20-22 (1) 22-00 (2) 00-02 (1)	21-00 (1)
Northern & Eastern Europe	Nil	06-07 (1) 07-09 (2) 09-14 (1) 14-17 (2) 17-20 (1) 20-22 (2) 22-23 (1)	20-23 (1)	21-23 (1)
Eastern Mediterranean & Middle East	Nil	07-09 (1) 14-15 (1) 15-17 (2) 17-19 (1) 19-21 (2) 21-22 (1)	20-23 (1)	Nil
Western Africa	14-16 (1)	06-08 (1) 13-15 (1) 15-17 (2) 17-18 (3) 18-19 (2) 19-21 (1)	20-00 (1)	21-23 (1)

Eastern & Central Africa	Nil	16-18 (1) 18-20 (2) 20-21 (1)	20-23 (1)	Nil
Southern Africa	10-12 (1)	05-07 (1) 14-15 (1) 15-17 (2) 17-18 (1) 22-00 (1)	21-23 (1) 23-00 (2) 00-01 (1)	22-00 (1)
Central & South Asia	Nil	09-11 (1) 18-20 (1) 20-22 (2) 22-00 (1)	05-07 (1) 19-21 (1)	Nil
Southeast Asia	19-21 (1)	08-10 (1) 20-21 (1) 21-23 (2) 23-00 (1)	05-07 (1)	Nil
Far East	20-22 (1)	07-08 (1) 08-11 (2) 11-21 (1) 21-23 (2) 23-01 (1)	04-07 (1)	04-06 (1)
South Pacific & New Zealand	15-19 (1) 19-21 (2) 21-22 (1)	17-19 (1) 19-22 (2) 22-00 (3) 00-02 (2) 02-07 (1) 07-10 (2) 10-14 (1)	01-03 (1) 03-04 (2) 04-06 (3) 06-07 (2) 07-08 (1)	01-04 (1) 04-05 (2) 05-06 (1) 03-05 (1)*
Australasia	16-18 (1) 20-22 (1)	06-07 (1) 07-09 (2) 09-11 (1) 15-17 (1) 20-22 (1) 22-00 (3) 00-02 (2) 02-04 (1)	01-03 (1) 03-06 (2) 06-07 (1)	03-06 (1)
Caribbean, Central America & Northern Countries of South America	15-18 (1)** 09-13 (1) 13-15 (2) 15-18 (3) 18-19 (2) 19-20 (1)	06-07 (1) 07-08 (3) 08-10 (4) 10-12 (3) 12-16 (2) 16-18 (3) 18-20 (4) 20-22 (3) 22-00 (2) 00-02 (1)	20-22 (1) 22-23 (2) 23-03 (3) 03-05 (2) 05-06 (1)	22-00 (1) 00-04 (2) 04-05 (1) 00-04 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	14-17 (1)** 09-12 (1) 12-14 (2) 14-17 (3) 17-18 (2) 18-19 (1)	06-07 (1) 07-09 (2) 09-15 (1) 15-17 (2) 17-18 (3) 18-20 (4) 20-21 (3) 21-23 (2) 23-02 (1)	21-23 (1) 23-03 (2) 03-05 (1)	22-04 (1) 00-03 (1)*
McMurdo Sound, Antarctica	Nil	18-21 (1) 21-23 (2) 23-01 (1)	22-04 (1) 04-06 (2) 06-07 (1)	04-06 (1)

June 15–August 15, 1995
Time Zone: PDT (24-Hour Time)
WESTERN USA TO:

	15 Meters	20 Meters	40 Meters	80 Meters
Western & Southern Europe & North Africa	Nil	06-07 (1) 07-08 (2) 08-14 (1) 14-17 (2) 17-19 (1) 22-00 (1)	20-23 (1)	Nil
Central, Northern & Eastern Europe	Nil	06-07 (1) 07-09 (2) 09-14 (1) 14-16 (2) 16-18 (1) 21-23 (1)	20-22 (1)	Nil
Eastern Mediterranean & Middle East	Nil	06-08 (1) 14-16 (1) 19-20 (1) 20-21 (2) 21-22 (1)	20-22 (1)	Nil
Western Africa	10-14 (1)	07-09 (1) 14-16 (1) 16-17 (2) 17-19 (3) 19-20 (2) 20-21 (1)	20-23 (1)	Nil

Eastern & Central Africa	Nil	14-16 (1) 16-18 (2) 18-19 (1) 06-08 (1)	Nil	Nil
Southern Africa	Nil	06-08 (1) 13-16 (1) 22-00 (1)	20-21 (1) 21-22 (2) 22-23 (1)	20-22 (1)
Central & South Asia	Nil	07-08 (1) 08-10 (2) 10-11 (1) 18-20 (1) 20-22 (2) 22-23 (1)	05-07 (1) 18-20 (1)	Nil
Southeast Asia	19-23 (1)	07-09 (1) 09-11 (2) 11-12 (1) 21-23 (1) 23-01 (2) 01-03 (1)	03-05 (1) 05-06 (2) 06-07 (1)	04-06 (1)
Far East	14-16 (1) 20-23 (1)	07-10 (2) 10-13 (1) 21-23 (1) 23-00 (2) 00-02 (3) 02-04 (2) 04-07 (1)	02-03 (1) 03-04 (2) 04-05 (3) 05-06 (2) 06-07 (1)	03-06 (1)
South Pacific & New Zealand	13-15 (1) 15-17 (2) 17-19 (3) 19-20 (2) 20-21 (1)	02-07 (1) 07-10 (2) 10-16 (1) 16-18 (2) 18-19 (3) 19-22 (4) 00-02 (2)	23-01 (1) 01-02 (2) 02-06 (3) 06-07 (2) 07-08 (1)	00-02 (1) 02-06 (2) 06-07 (1) 02-05 (1)*
Australasia	15-18 (1) 18-21 (2) 21-22 (1)	19-21 (1) 21-22 (2) 22-00 (3) 00-01 (2) 01-07 (1) 07-09 (2) 09-13 (1) 13-15 (2) 15-16 (1)	00-01 (1) 01-04 (2) 04-06 (3) 06-07 (2) 07-08 (1)	02-05 (1) 05-06 (2) 06-07 (1) 04-06 (1)*
Caribbean, Central America & Northern Countries of South America	15-18 (1)** 10-13 (1) 13-15 (2) 15-18 (3) 18-19 (2) 19-20 (1)	06-07 (1) 07-10 (3) 10-15 (2) 15-18 (3) 18-21 (4) 21-22 (3) 22-23 (2) 23-02 (1)	19-21 (1) 21-22 (2) 22-03 (3) 03-05 (2) 05-06 (1)	20-21 (1) 21-03 (2) 03-05 (1) 23-04 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	12-16 (1)** 10-12 (1) 12-13 (2) 13-15 (3) 15-17 (2) 17-18 (1)	05-07 (1) 07-09 (2) 09-15 (1) 15-17 (2) 17-18 (3) 18-19 (4) 19-20 (3) 20-22 (2) 22-00 (1)	20-21 (1) 21-23 (2) 23-01 (1) 01-03 (2) 03-04 (1)	22-03 (1) 00-02 (1)*
McMurdo Sound, Antarctica	16-18 (1)	17-20 (1) 20-22 (2) 23-01 (1) 07-09 (1)	21-23 (1) 02-03 (1) 03-06 (2) 06-07 (1)	04-06 (1)

*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.

though they can occur at other times as well.

Look for some meteor activity between June 7 and 9, which could increase the possibility for meteor-scatter-type openings on the VHF bands.

Check the "Last Minute Forecast" at the beginning of this column for those days during June that are expected to be Below Normal or Disturbed on the HF bands. These are the days on which auroral and other types of ionospheric propagation may be possible on the VHF bands.

This month's CQ Propagation Charts contain DX predictions for the period June 15

through August 15, 1995. Short-Skip Charts for June, for openings between 50 and 2300 miles, and from Hawaii and Alaska, appeared in last month's column.

The NEW Shortwave Propagation Handbook

After much research and writing on the part of myself, Dr. Theodore J. Cohen, N4XX, and Robert B. Rose, K6GKU, over the past year, and with the added editorial and book assembly talents of Gail Schieber, Managing Editor of CQ, *The NEW Shortwave Propagation Handbook* is now available from CQ.



Completely revised and updated, the book contains approximately twice the information of the original *Shortwave Propagation Handbook*, which is now out of print. The new vol-



ume explains the theory behind ionospheric propagation, the sunspot cycle, and the science of propagation forecasting; shows you how to make your own forecasts; and even looks at ionospheric propagation on the VHF bands. A complete chapter is devoted to computer propagation programs, and another chapter contains propagation prediction charts to all areas of the world for all phases of a solar cycle so that you will be on the right band at the right time for openings.

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73, George, W3ASK

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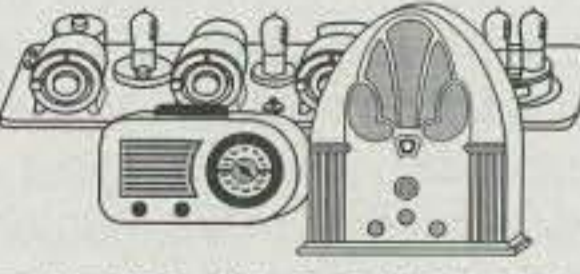
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This is TC3 Sergio Morales, KP4FFW, at the reception, where we had a chance to have dinner together.

As the operators finished they were applauded, and the order was given to formally retire the keys. They were dutifully and ceremoniously collected in one small chest and carried off. In a sense it was over. Radio traffic was still being sent and received, but it was quiet, very quiet, and the night air would never again be punctuated with the sounds we had heard just a few minutes earlier.

Afterward we were invited to tour the new facilities and inspect the operating setups. Obviously it is impressive, and there is no question that the Coast Guard is up to and more than capable of handling any and all situations presented. It was just as obvious that both enlisted personnel and officers were highly educated, trained, especially motivated, and extremely dedicated to their task. The job basically is the same; only the means are different.

Following the tour, we were invited to a reception where it was possible to spend some time talking to a few members of the NMN team. In particular, I had the good fortune of sharing a table with TC3 Sergio Morales, who is also KP4FFW. Sergio was one of the three operators to send the last CW message from NMN. TC refers to Technical Specialist and replaced the old rank RM (Radioman) some time ago. I commented that it was both an honor and a mixed blessing to be chosen to send the last CW message. He was emphatic, though, in his belief that the new system is more efficient, more in tune with today's state-of-the-art technology, more accurate, and generates quicker response times. The amateur side of him, however, would definitely miss the sound of CW filling the air.

While we were talking I asked him whether he was a "Lifer"—I guess a term from my generation of service as a ground-pounder. I explained that I was curious to know if he planned on making a career out of the Coast Guard and how

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CQ CQ CQ DE NMN NMN

BT

O 010001Z APR 95
FM COGARD CAMSLANT CHESAPEAKE VA/NMN
TO ALL
BT

USCG NOW CLOSING DOWN CONTINUOUS HFCW WATCH CEASING ALL MORSE
CODE OPS IN THE HF BAND. AS WE CONCLUDE OUR WATCH WE WISH THE
MARITIME COMMUNITY FAIR WINDS AND FOLLOWING SEAS. WE ARE PROUD
OF OUR TRADITION AND LONG STANDING SERVICE TO THE MARINER ON
MORSE CODE BEGINNING IN 1901 WITH THE REVENUE CUTTER SERVICE
EXPERIMENTING WITH WIRELESS AS A MEANS TO COMMUNICATE ON LAND AND
SEA TO THE FIRST MORSE CODE RADIO INSTALLED ABOARD CUTTER GRANT
IN 1903. OUR ORIG COMMS MISSION WAS TO RCV DISTRESS ALERTS. BUT
SINCE 1901 THE CG HAS FAITHFULLY AND DILIGENTLY LISTENED FOR
TRAFFIC RESPONDING TO HUNDREDS OF THOUSANDS OF CALLS FM MARINERS
IN NEED OF ASSIST OR RPTG POSITION WK NAV OR SAFETY INFO. OVER
THE YRS WE HAVE PROVIDED MARINERS WITH URGENT SAFETY AND NAV
WARNINGS OVER HFCW AND RCVD VESSEL LOCATION UPDATES FOR THE AMVER
SYS. WE WILL FEEL A SENSE OF LOSS WITH THE PASSING OF CW. THE
NEED FOR OPERATORS WITH SENSITIVE EARS AND A FAST PRECISE KEY
WILL BE REPLACED BY COMPUTERS MODEMS AND AUTO ALARMS. THE
SPECIAL EMOTION AND EXCITEMENT ENJOYED BY CW OPERATORS CANNOT BE
DUPLICATED AND THE CHILLING S O S SIGNAL WILL NEVER AGAIN BE RCVD
BY A CG UNIT. BUT CW HAS RUN ITS COURSE AND WE NOW LOOK FWD TO
SERVING YOU ON THE NEXT GENERATION OF COMM SYSTEMS VIA THE GMDSS.
FM ALL CG TELECOMM SPECIALISTS WE BID YOU 73. WHAT HATH GOD
WROUGHT. SIGNED CG CAMSLANT.

BT

DE NMN VA

```

This is the historic document, the last HF CW message sent by the U.S. Coast Guard from NMN at 0000 UT, April 1, 1995.

long he had been in. What followed, and what occurred to me later as I drove back to my hotel, drew very deep parallels to amateur radio. During our conversation Sergio told me about his amateur radio background in Puerto Rico, and how through amateur radio he found himself seated there on that night. About seven or eight years earlier he had seen an ad in his local newspaper. It was a Coast Guard Reserve recruitment ad; they were looking for radio operators. Sergio had been an amateur for quite a few years and prided himself on his CW ability. He was able to pass the entrance examinations, including copying Morse code error-free at 25 WPM. The transition from Reserve to full-time took a few years, but a career was in the making. It is apparent when talking to him that he is very proud of the Coast Guard, and his association and contribution to it.

I began to wonder how many other young men and women gathered there began their service career by utilizing their amateur radio skills. The next obvious point was, whatever the number, they would be the last. The Coast Guard would no longer represent a market for this specific skill. The door to a career opportunity based on this entree were now closed forever. How soon, if ever, the other services will follow suit is anybody's guess. So much for a transferable skill.

As far as amateur radio goes, this wasn't the end of the world. We still have

the option to use CW and the license requirements for it. I felt, though, that I was witnessing the beginning of the end, and as much as people want to kick and scream, it is coming. The Coast Guard just has faced reality more quickly and far more expeditiously. They have to; lives depend on it. We therefore have the luxury of enjoying or grumbling about our CW tradition a bit or a lot longer.

I do hope when the end of CW as a requirement in the amateur service does come that we treat the occasion with the same honor, dignity, and love I saw that evening. Friends gathered and paid their respects, then said good-bye and thank you. Yes, it was sad, and I'm sure there will be a period of mourning. The future, though, is bright—very bright—and the mourning will pass and the memories will last.

I would like to thank TC3 Sergio Morales, KP4FFW, for his time and patience; Master Chief Petty Officer James Wren; and TC2 Rhonda Duncan for their help in guiding me to NMN. I would especially like to thank Commander F. L. Montoya, Commanding Officer, Communication Area Master Station Atlantic—NMN (CAMSLANT) for his gracious and cordial invitation to be part of this historic event. I would also like to thank the men and women of CAMSLANT for their dedication to duty on our behalf.

73, Alan, K2EEK

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DR-610T 2m/440MHz Dual Band Mobile New! 50/35W • 144-148MHz tx, 108-174MHz (AM, FM) rx; 420-470 MHz tx, 438-450 MHz rx • 2 VFOs • 120 memories • channel scope • 4 scan modes • 9600 bps ready • CTCSS encoder • built-in duplexer • Bell • Priority • DSQ • 5 1/2" w x 1 1/2" h x 6 1/2" d, 2 1/2 lbs.



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ANNOUNCEMENTS

(from page 6)

June 11, **Pleasant Hill Computer and Hamfest**, Pleasant Hill Fire Co., 5 miles south of Hanover, Pennsylvania. Contact Rodger Gibson, N3ICJ, P.O. Box 820, Hanover, PA 17331 (410-239-8451). (Exams.)

June 11, **CWRA 18th Annual Swapfest**, University Center, University of Wisconsin-Stevens Point Campus, Stevens Point, Wisconsin. Contact Art Wysocki, N9BCA, 3356 April Lane, Stevens Point, WI 54481 (715-344-2984). (Handicapped accessible; exams.)

June 11, **Six Meter Club of Chicago 38th Annual Hamfest**, Santa Fe Park, Willow Springs, Illinois. For info send SASE to Mike Corbett, K9ENZ, 606 South Fenton Ave., Romeoville, IL 60441.

June 11, **The Hall of Science ARC Hamfest**, New York Hall of Science parking lot, Flushing Meadow Park, Queens, New York. Call (evenings only) Charles Becker, WA2JUJ, 516-694-3955; or Arnie Schiffman, WB2YXB, 718-343-0172.

June 16-17, **W4MM/Albany, Georgia ARC Hamfest, Southnet Digital Conference and Georgia Computer Fair**, James H. Gray Civic Center, Albany, Georgia. Contact Arthur Shipley, N4GPJ, 3109 Harvest Lane, Albany, GA 31707(912-439-2351; FAX 912-439-8224). (Exams.)

June 17, **Cortland Hamfest**, Cortland County Fairgrounds, Cortland, New York. Call 607-756-6550 (evenings/weekends).

June 17, **Bluefield Hamfest/Computer Fair**, Brushfork National Guard Armory, Bluefield, West Virginia. Contact Tom Gordon, WW8D, 505 Union Street, Bluefield, WV 24701 (304-325-3145); or Jim Perdue, KC8NG, Route 5 Box 457, Bluefield, WV 24701 (304-325-3058).

June 17, **5th Annual MARC Hamfest and Computer Show**, Live Oaks Career Development Campus, Milford, Ohio. Send SASE for info to MARC, 3309 Orion Avenue, Cincinnati, OH 45213; or call Gerry, 1-513-677-9255. (Exams.)

June 17, **MARC 20th Annual Hamfest**, Midland National Guard Armory, Midland, Michigan. Contact MARC Hamfest, P.O. Box 1049, Midland, MI 48641 (SASE); or call 517-832-3053 evenings/weekends. (Exams.)

June 17, **Raritan Valley Radio Club '95 Hamfest**, Columbia Park, Dunellen, New Jersey. Call John Manana, WA2F, 908-722-9045; or Bob Pearson, WB2CVL, 908-846-2056 before 8 PM.

June 17, **Bangor Hamfest**, Hermon Elementary School, Bangor, Maine. Contact Roger W. Dole, RR #2, Box 730, Bangor, ME 04401 (207-848-3846). (Exams.)

June 17, **NARC 2nd Annual Hamfest**, in the Agriculture Building and the adjoining building at the Tennessee State Fairgrounds, Nashville, Tennessee. For info send SASE to NARC Hamfest, Murray Jones, K4ANH, 1044 Forest Harbor Drive, Hendersonville, TN 37075 (615-824-7216).

June 18, **23rd Annual Dad's Day Hamfest**, Lake County Fairgrounds, Crown Point, Indiana. Contact John Gianotti, KF9GW, 1513 Camellia Drive, Munster, IN 46321 (219-922-1065). (Exams.)

June 18, **Father's Day Hamfest**, Volunteer Fire Co. Carnival Grounds, Walkersville, Maryland. Contact Eric Gammeter, N8AAY, 10494 Balmoral Place, New Market, MD 21774 (301-865-0865).

June 18, **MIT Radio Society/Harvard Wireless Club Flea Market**, Cambridge, Massachusetts. Contact W1GSL, P.O. Box 397082 MIT BR., Cambridge, MA 02139-7082.

June 18, **Cuyahoga ARS Hamfest and Computer Show**, Nordon High School, Macedonia, Ohio. Call Rich James, 216-468-2035.

June 18, **Santa Maria Swapfest**, Unocal Newlove Picnic Grounds, south of Santa Maria, California. Contact Santa Maria Swapfest, P.O. Box 2067, Orcutt, CA 93457-2067, or call Rick, KB5OO, 805-937-8337.

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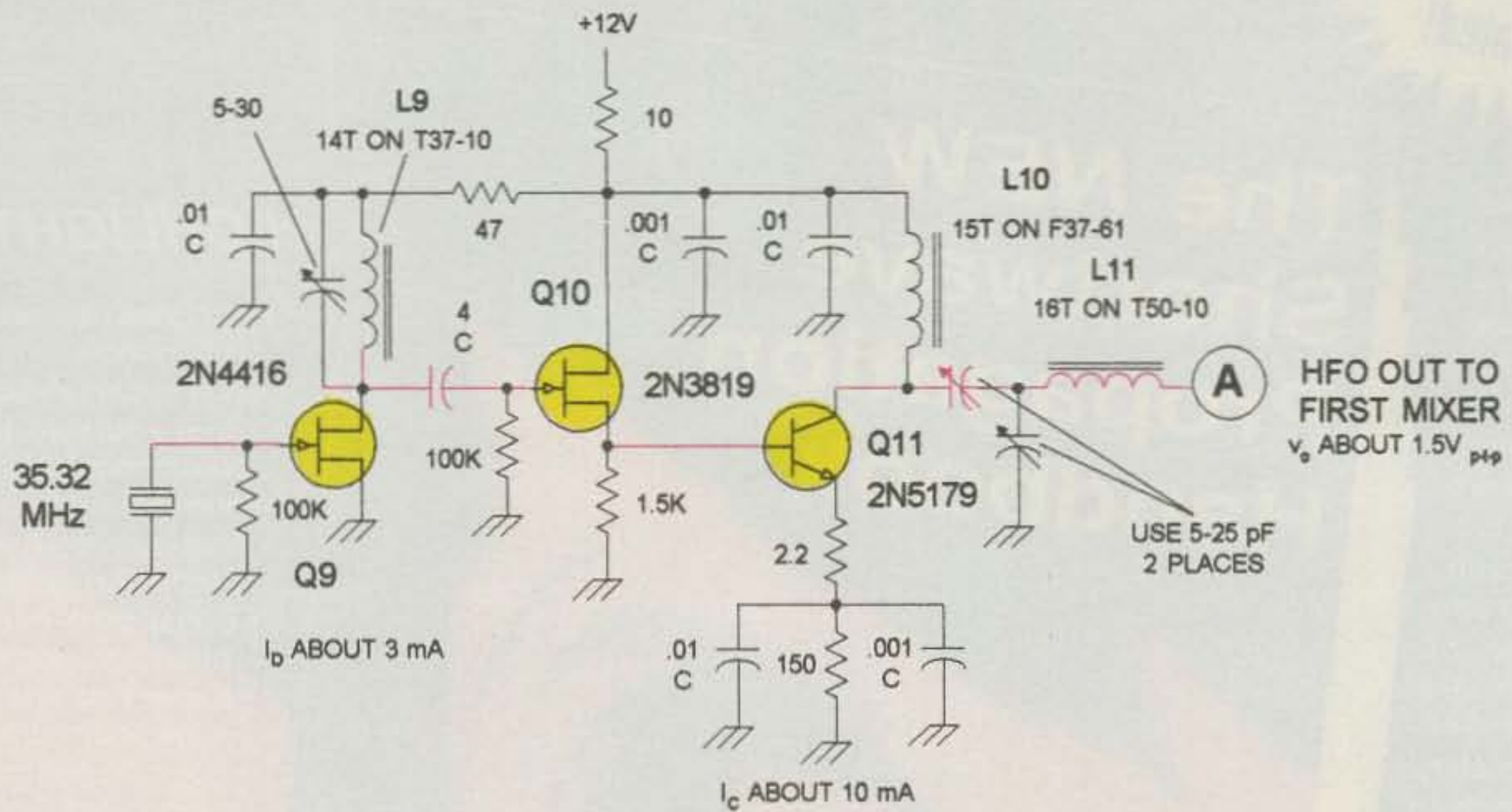
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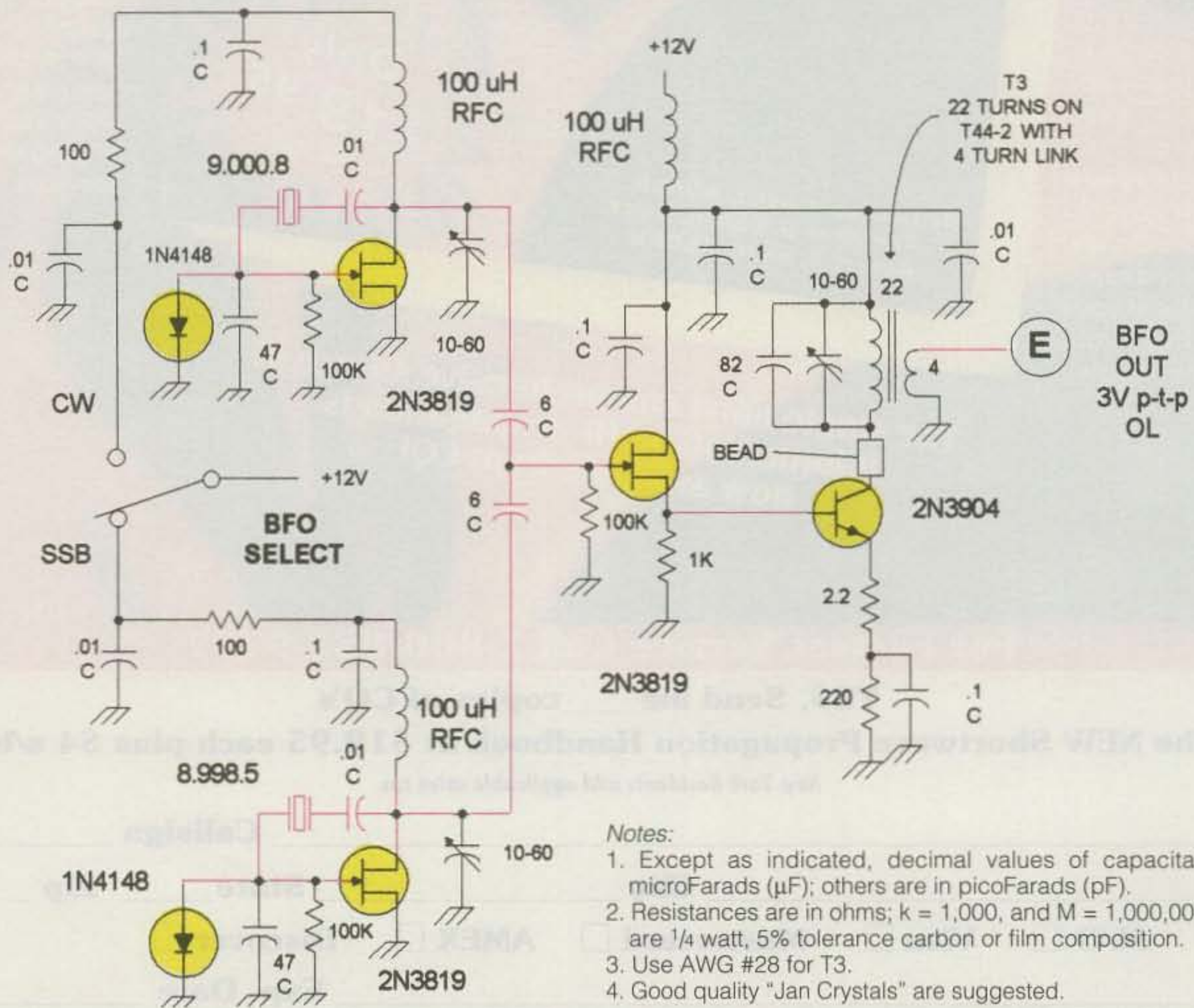
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Notes:

1. Except as indicated, decimal values of capacitance are in microFarads (μF); others are in picoFarads (pF).
2. Resistances are in ohms; k = 1,000, and M = 1,000,000. Resistors are 1/4 watt, 5% tolerance carbon or film composition.
3. Use AWG #28 for L9, L10, and L11.

Fig. 6- Schematic diagram of the HFO.



Notes:

1. Except as indicated, decimal values of capacitance are in microFarads (μF); others are in picoFarads (pF).
2. Resistances are in ohms; k = 1,000, and M = 1,000,000. Resistors are 1/4 watt, 5% tolerance carbon or film composition.
3. Use AWG #28.
4. Good quality "Jan Crystals" are suggested.

Fig. 7- Schematic diagram of the BFO.

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er stability. You can't just have a good VFO and let the other two go their way. It is important in a dual-conversion scheme to keep the stability of all oscillators low. Therefore, all three oscillator designs trade stability and signal quality for minimum part count.

The VFO in fig. 5 is a W1FB Clapp circuit with a DC-coupled FET-to-BJT amplifier. All frequency-sensitive capacitors are NPO³ types selected for minimum drift. The output stage is a C-C-L circuit that I prefer over the popular Pi-network. This circuit is less sensitive to inductance variations and usually needs smaller capacitors. Compared to the Pi-circuit, I find the C-C-L network more forgiving with part and device variations. There is a small intentional mismatch between the VFO and second mixer that reduces unwanted oscillation.

There are design details for two VFO tuning ranges. Obviously, the wider range tunes the full CW and SSB bandwidth. I suggest the narrow tuning range if your primary interest is the DX portion of the band and you rely on the tuning capacitor built-in 8:1 reduction drive. This will give you 50 kHz per revolution tuning, and in most cases that's adequate. A simple FET buffer on the output splits the counter and external transmitter signals.

The 35.32 MHz HFO in fig. 6 is a straightforward tripler, Q9, followed by a DC-coupled FET buffer and BJT amplifier, Q10 and Q11. Like the VFO, the simple C-C-L network acts as a low-pass filter. Why 35.32 MHz? Because nothing you do to shield your system will avoid some second-IF signal "leak-through" from the antenna or DC power source. If you choose a 36 MHz HFO frequency, the second IF ends up in the middle of 20 meters. Chances are there is a multi-kilowatt station down the street that you will hear clear as a bell. If you look across the 14-15 MHz band, the 14.6-14.9 MHz region is pretty quiet and makes a good compromise.

The BFO shown in fig. 7 has two separate crystal oscillators, Q12 and Q15, selected by a front-panel switch to generate either an SSB or a CW beat signal. Although a single-diode-switched

oscillator might look appealing, diode-switched BFO oscillators are unstable in both frequency and amplitude. The problem is the interaction between crystals and their trimmers. With some "twiddling," these circuits usually work okay. However, I prefer to use a design that requires less effort to ensure stable operation. It also gives you the flexibility to use different crystal types.

The BFO output stage is an LC network set to match the collector to the product detector. Because the BFO level is quite high, the signal is slightly detuned at final assembly for minimum distortion of detected audio.

Construction

Everyone who builds an HBR has a different set of priorities. It depends a lot on what you want your end result to be—whether you want something "cobbled" together, or something that you can put on your desk with a degree of pride. An HBR is a "get what you put in." Its quality is proportional to the effort you put in. If you want something that works well and looks good, you need to relax and take your time building one stage at a time. Test each stage and understand how it works before going to another. When you get to the last stage, all you need to do is "tweak" a little, and presto, it's done!

I am not against printed circuit boards in one-of-a-kind projects; however, my experience shows that it's a lot easier and cheaper to use general-purpose boards. When you decide to make changes, you are not restricted to a dedicated circuit arrangement. This HBR needed four general-purpose PC boards (Archer Experimenter part #276-170) to mount all parts. These boards, available from Radio Shack, are ideal for either digital or analog circuits. Parts insert into the board top (bare) side and solder on the foil side. The foil etched pattern connects rows of five holes on either side of the center as well as two long bus-rows on the edges. Ideally, each stage is breadboarded on a solderless socket, tested to ensure its proper operation and moved to the PCB one stage at a time. You can see in the photos that the assembled boards mount to a large sheet of PC material which acts as a master chassis and single ground plane. Using PC material for a chassis adds a degree of flexibility to your project, because you can solder shields or tie points as needed.

To protect the oscillators, I installed shields (not shown in the photos) between and around these stages. I reinforced the VFO section with two extra PC boards to stiffen the entire region under the tuning capacitor and oscillator circuits. The variable capacitor suggested in the schematic has an 8:1 built-in vernier drive. The VFO tunes about 350 kHz, with an 8:1 reduction; each capacitor shaft revolution represents about 90 kHz. This is marginal. I solved the problem by adding a 6:1 vernier in series with the capacitor shaft. Therefore, it takes 24 revolutions to tune the full 350 kHz, or about 15 kHz per revolution. This obviously is too much resolution for general tuning. My solution was to arrange two knobs (see the photograph) with the outer knob driving the capacitor shaft directly and the inner knob driving the capacitor shaft through a 6:1 reduction. This coaxial scheme lets you tune band-end to band-end with four turns of the outer knob, or you can resolve a region with the inner knob adding another 6:1 reduction.

I built the RF stage on a short piece of PC-board material and mounted it in a separate chassis compartment. The IF-stage assembly, including the audio filters, needs one complete board. Another board mounts the audio and final PA. The BFO and AGC parts mount on a fourth board. Soldering a small strap from each board assembly to the main PC-board chassis helps ensure adequate grounding. The two crystal filters mount to the rear panel with short coax jumpers carrying signals to and from the IF-stage board. Similarly, a piece of PC-board material acts as a front panel. Using PC-board material for the chassis and panels has several advantages. The material is strong, light



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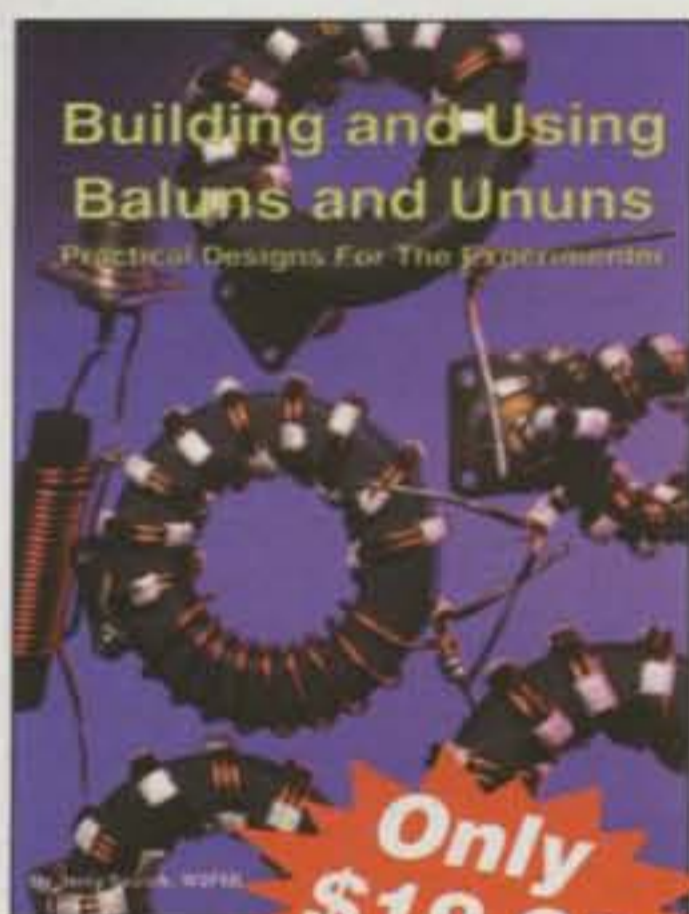


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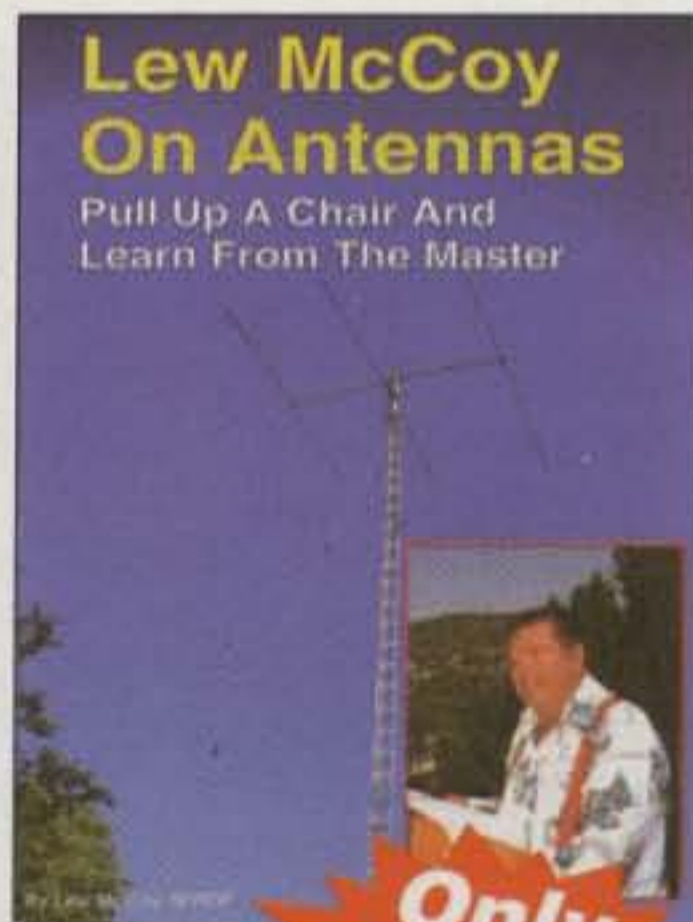
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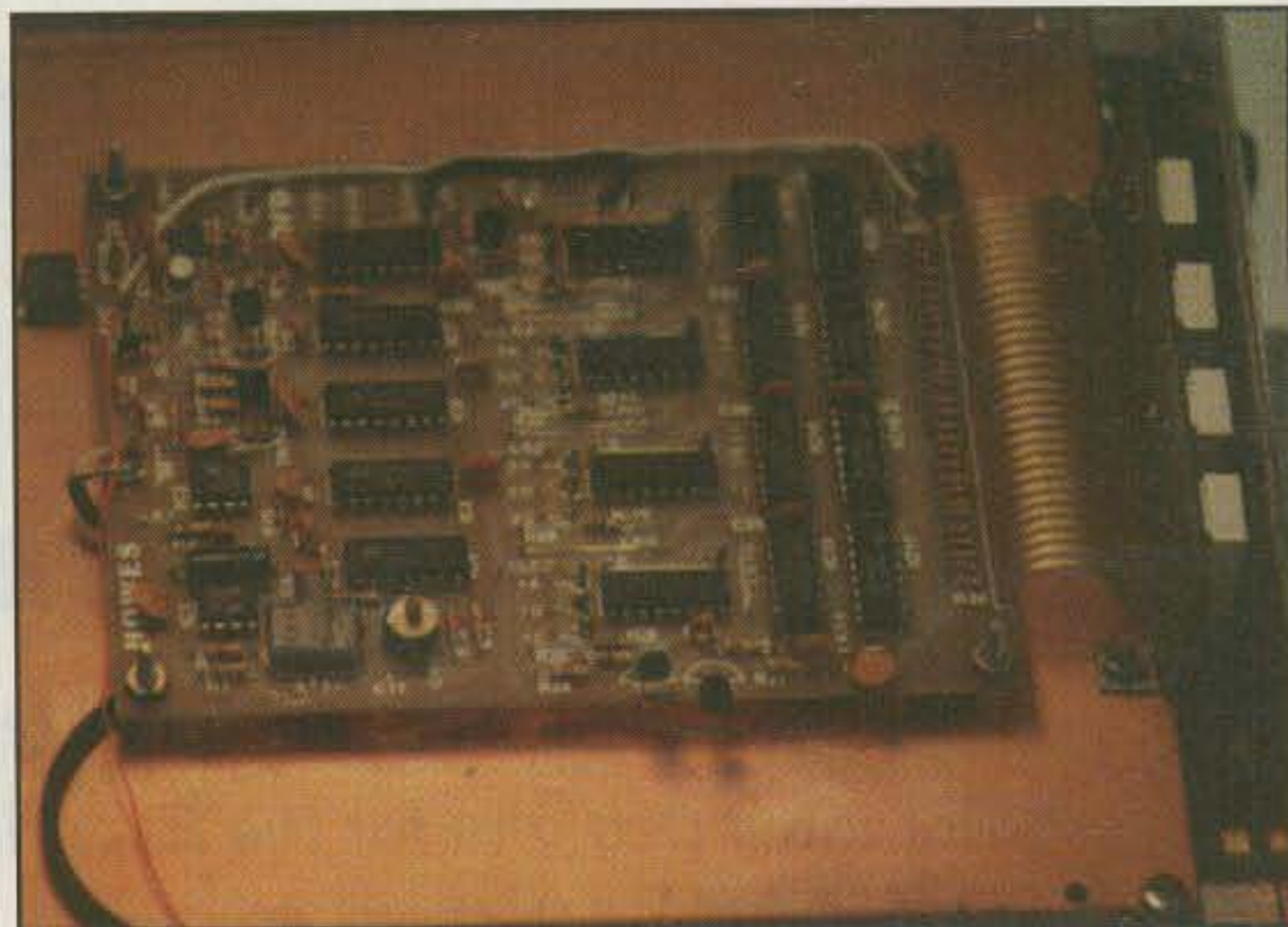
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Top internal view, with covers removed, shows the digital frequency counter. The front panel is to the right. The counter mounts to a large PC sheet which isolates the digital circuits from other sensitive RF circuits mounted underneath. The RF input connector, power, audio, and both crystal filters are mounted on the rear panel.

weight, and easily formed using normal "shack" hand tools. Soldering it together gives strength and a stiff ground.

The front-panel decal is a home-PC-generated layout printed on plain paper, multi-coated with Krylon, and glued to the panel face. The outer top cover is a thin piece of aluminum formed over a wooden board.

To simplify wiring and reduce the finished assembly size, I favor using 30-gauge solid wire. There isn't enough current in these circuits to justify using larger wire. In addition, small-diameter coaxes or twisted pairs helps keep things neat. Both the small coax and 30-gauge wires need a little extra preparation time, but the results are worth the effort.

Testing

Don't wait until you get to the end to start testing and aligning your HBR. Start testing as you install each stage. At the same time you test a stage, you can align it. This way, when you finish construction, your alignment becomes a simple tweaking activity. You have already debugged each stage and pre-aligned it, so now it's only a matter of peaking your receiver for a particular band section. I favor peaking at 50.125 MHz.

Trick: Put jumpers across the crystal-filter terminals during your initial testing. This will simplify your testing and IF-stage assembly. After you are confident everything is working properly, remove the jumpers. With the filters in place, you need a low-drift signal generator. By adding jumpers across the crystal filter terminals, you can use a source that "wiggles" all over and still do a creditable job of alignment. The second fringe benefit is you can delay buying those expensive filters until the end. You'll find the receiver has surprising on-the-air performance without filters.

The beat-oscillator level entering the mixers is critical. Too low an oscillator signal reduces conversion gain; too much signal causes distortion. The oscillators in this design are very strong and need trimming to reduce distortion. Using an antenna source near 2 microvolts, sequentially adjust the oscillators (while monitoring the detected audio (in the 300 Hz filter position) for minimum visible distortion, but still maintain good gain.

For optimum receiver alignment you need a stable 0.25 microvolt source. You should have a visible detected audio signal with an antenna signal under 0.1 microvolt in the CW position. The overall receiver S+N/N should be greater than 10 dB

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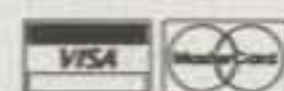
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Digital Frequency Readout

Including a digital counter in your HBR for tuned frequency control is not a frill. During skip openings and schedules it's essential to know where you are tuning. On 6 meters you often try to work DX at a specified frequency and time. To avoid guessing, the design incorporates a Howes⁴ DFD4 digital counter that displays the exact tuned frequency. The counter works by counting the VFO and displaying data in the format .125.3, meaning 125.3 kHz. The rest simply "spills off" the counter. Small internal jumpers program the counter to offset the VFO count start point and display the actual tuned frequency.

There are several inexpensive programmable digital counter kits available. The two I recommend are the CCI model No. TK-1 and C. M. Howes model No. DFD4. The DFD4 advantages are low front-panel profile, built-in 5 volt regulator, and small clock pulse. It is available as a kit with all parts or fully assembled. The TK-1⁵ requires more front-panel space, needs a separate 5 volt regulator, and generates a strong clock pulse which (without extra filtering and shielding) can contaminate the audio. The TK-1 is not available as a complete kit, but is available either fully assembled or as an empty PC board with complete instructions; you furnish the parts. All TK-1 parts are available from OSE.⁶ The instructions in both units completely describe how to assemble, test, and program the counter. In both cases they start counting at some value other than zero so that the display coincides with the tuned frequency. Both the Howes and CCI counters are very simple and require about one evening to build.

Closing Comments

You can simplify all the circuits in this HBR. The trade-off is per-

formance. If your interest is less performance, then an inexpensive commercial receiver might be a better option. If you want to reach down and snag some choice 6 meter DX, this HBR is for you.

About The Author

K16BP retired from the University of California San Diego Physics Department. He was active in astrophysics research (gamma-ray spectroscopy) under grant funding from NASA for satellite experiment development. Besides professional publications, K16BP generated many amateur radio receiver articles in the late 1960s and early 1970s and is currently working on a 15 meter Novice station design.

Footnotes

1. The U309 and U310 JFET devices are available through RF Power Transistors, 435 S. Pacific St., San Marcos, CA 92069 (phone 1-619-744-0700; FAX 1-619-744-1943).

2. The NE602 is a low-power VHF DBM with an input amplifier, oscillator buffer, and voltage regulator on board. Its principal advantages are low cost, excellent gain and sensitivity, and reasonably low noise.

3. One source for NPO capacitors, PIN diodes, active devices, and other HBR parts is Oak Hill Research, 20879 Madison Street, Big Rapids, MI 49307 (1-616-796-0920).

4. The Howes counter kit is available through Townsend Electronics, Inc., P.O. Box 415, Pierceton, IN 46562 (phone 1-219-594-3661; FAX 1-219-594-5580).

5. The PC-board set (three parts) and counter-assembly instruction packet are available from Communications Concepts, Inc., 508 Millstone Drive, Xenia, OH 45385 (1-513-426-8600).

6. Ocean State Electronics, P.O. Box 1458, 6 Industrial Drive, Westerly, RI 02891 (1-800-866-6626).

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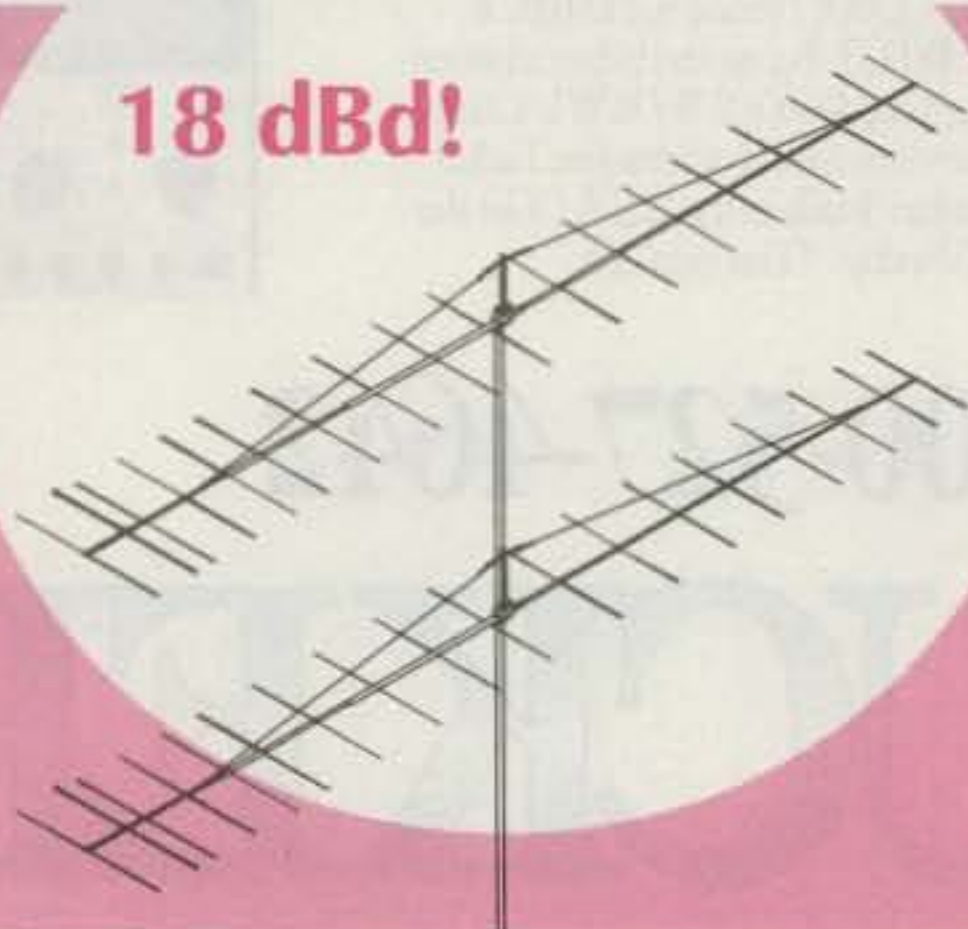
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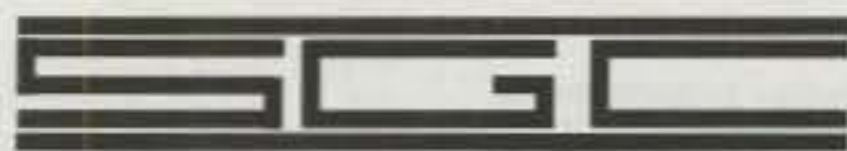
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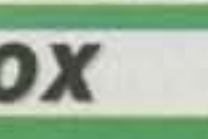
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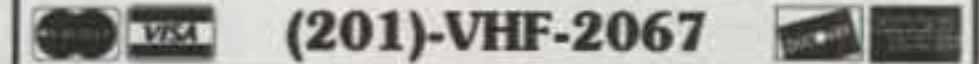
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1798.....	\$229	9020.....	\$144
209.....	\$ 94	9420.....	\$179
249.....	\$165	934.....	\$144
259.....	\$188	949E.....	\$119
283, 284, 285, 286.....	\$ 22	962C.....	\$195
346.....	\$169	986.....	\$242
407.....	\$ 63	989C.....	\$292

Call For Cash Discounts



C158A
2 Meter Handheld With 20 Memories, Extended Receive, CTCSS En/Decode, 5 Watts At 12 VDC

MIDLAND® SALE



2 Meter/440MHz Dual Band Antenna NMO Mag Mount Super Priced For Mobile Fun

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8 HF Bands On 1 Whip No Coils To Change, No Tuner HF Mobiling Fun, Plug And Play

NEW LOW PRICES

5 Watts MIDLAND®



73-005
Compact 2 Meter HT Wide Band Receive, 20 Memories, DTMF Pad

\$199.95

ALINCO	DIAMOND	MFJ	UNIDEN	    No surcharge for credit cards.
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Lowest Prices On MFJ From Radio Center, USA

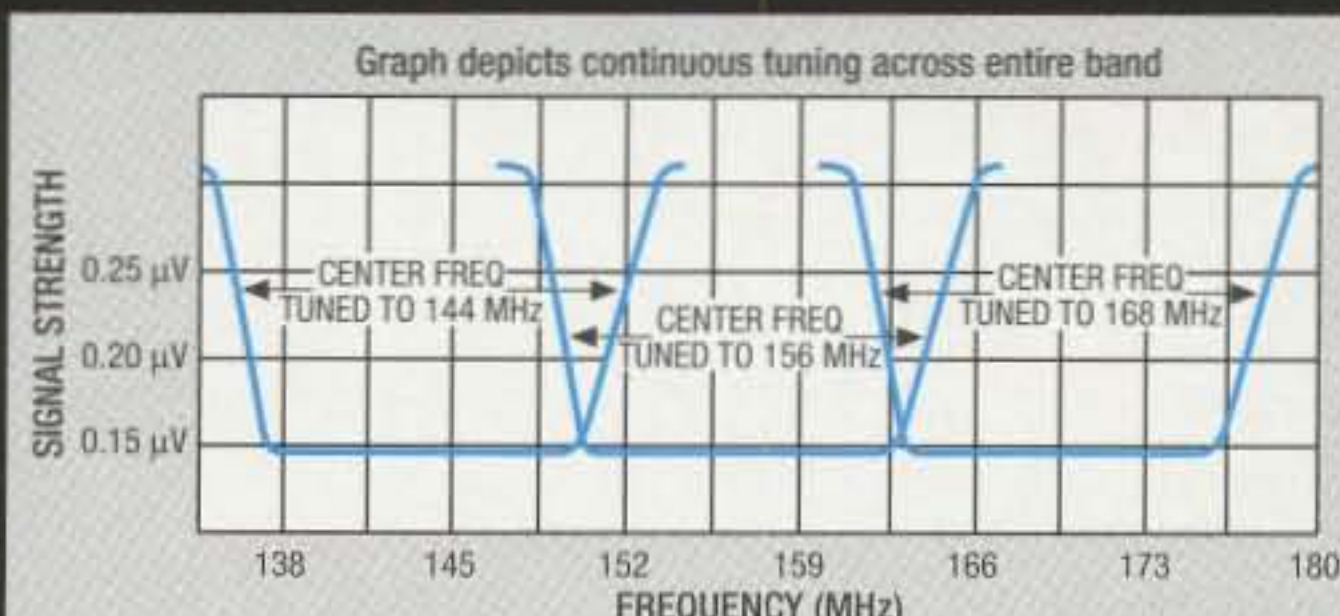
Complete MFJ Stock On Hand Call For Pricing!

Advanced Track Tuning, Mil Spec, true FM. All in one radio!

Outside, you can easily see why the FT-2500M stands up to the shock and vibration like no other. We engineered the first mobile radio to meet the rigid standards set by the U.S. Military back in the '80s, and that same critical design is in the FT-2500M. From the simplified front panel, rubber coated knobs, durable pebbled finish coating, and huge Omni-Glow™ display to the one-piece die-cast chassis, the FT-2500M can take whatever you throw at it!

Inside, the electrical circuitry meets standards so uncompromising the FT-2500M can respond like no other radio. Built-in 3-Stage Advance Track Tuning (ATT), automatically retunes from 140 to 174 MHz permitting consistent receiver sensitivity across the entire band.

But there's more. Like alpha-numeric display capability! Lets you program a frequency or a 4-character name on any of the 31 memories. With three selectable power output levels and up to 50 watt power output, the FT-2500M extra large heat sink means forced air cooling is not necessary. And, as a bonus, Yaesu's



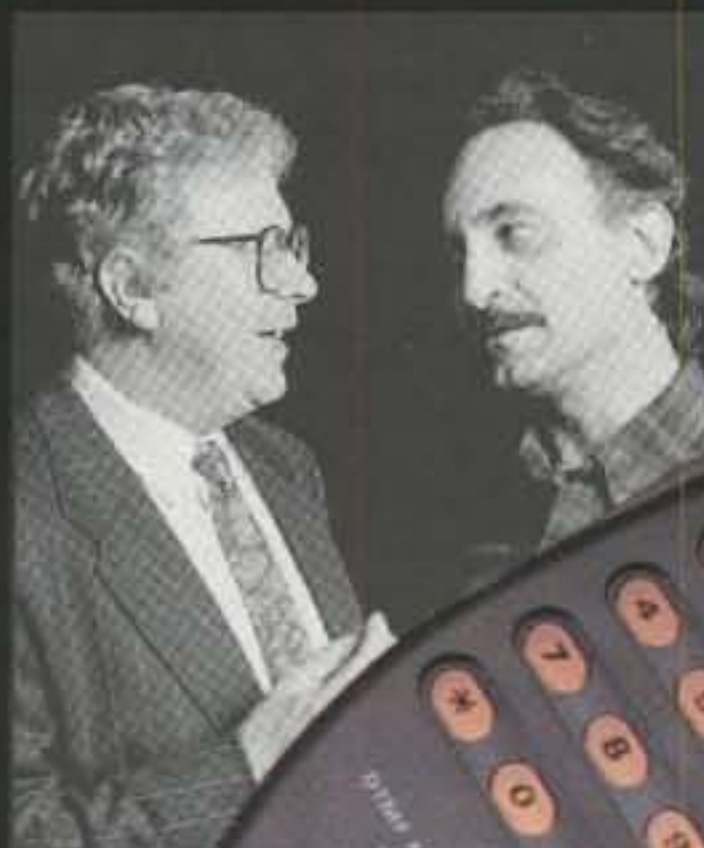
3-Stage Advance Track Tuning (ATT) – The exclusive 3-Stage Advance Track tuning front end automatically adjusts band width sensitivity across the entire receiver range, while maintaining selectivity specifications. ATT significantly reduces interference from inter-modulation and front end overload.

exclusive backlit DTMF mic comes with every FT-2500M. Experts say the FT-2500M is the only commercial-grade amateur radio available. So, for tough manufacturing standards, inside and out, with true FM clarity, and outstanding performance, the FT-2500M is your mobile.

YAESU
Performance without compromise.™

"Just look inside. Military spec really means something to Yaesu!"

"A QST review says 'the FT-2500M exhibited superior 10 MHz offset IMD dynamic range of 103 db!'"



"This Advanced Track Tuning practically eliminates intermod!"

"Yaesu did it again."

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
- Omni-Glow™ Display, largest available
- **Power Output:**
FT-2500M 50/20/5 Watts
FT-7400H 35/15/5 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:**
FP-800 20 Amp HD Power Supply w/ Front Mounted Speaker
FRC-6 DTMF Paging Unit
FTS-17A CTCSS Decode Unit
SP-4 External Mobile Speaker w/ Audio Filters

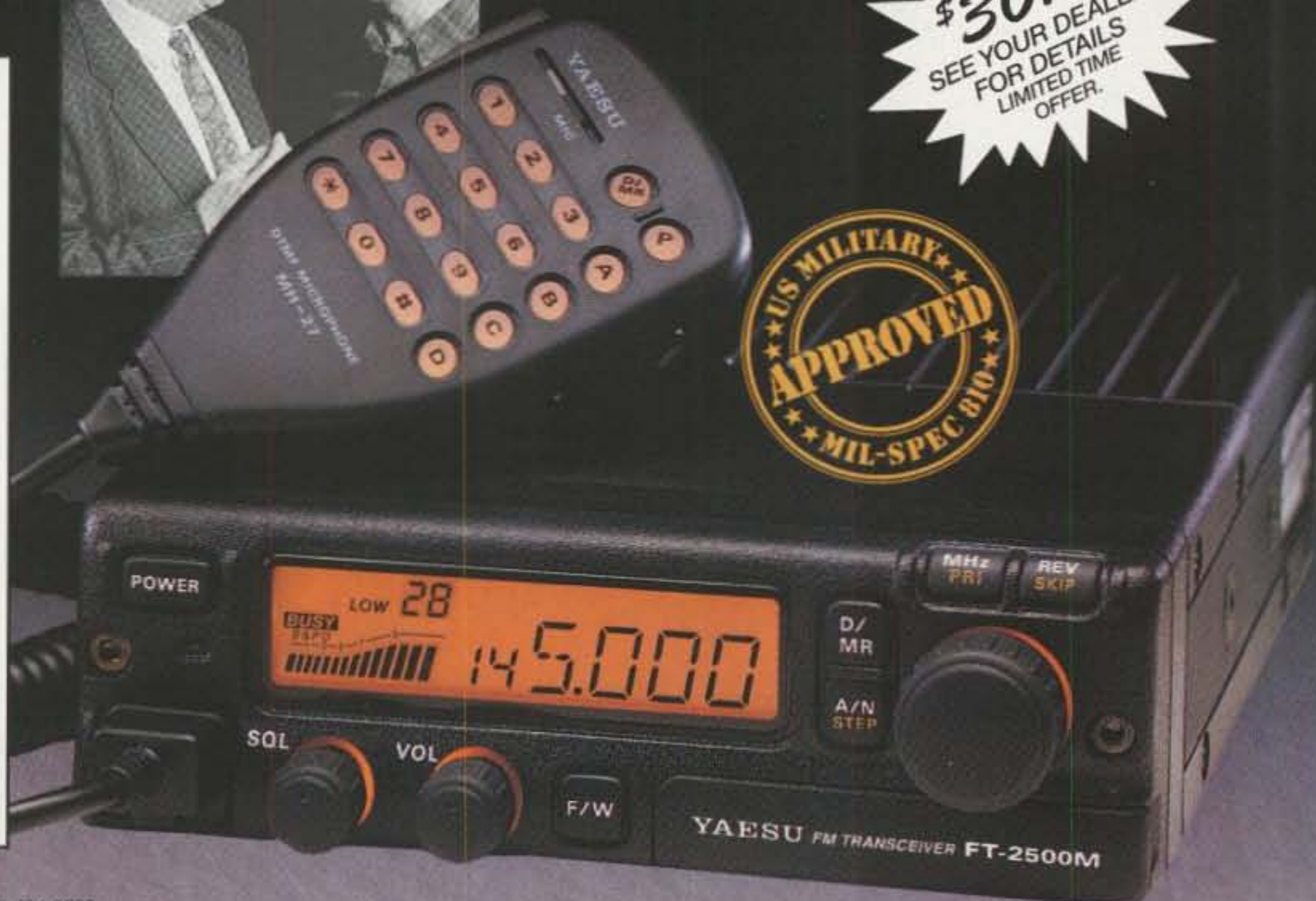
*FT-2500M

\$30.00 OFF
SEE YOUR DEALER FOR DETAILS
LIMITED TIME OFFER.

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 50/20/5 Watts (FT-7200 35/15/5 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.



Dual Band Mobile FT-8500



Specifications

- **Frequency Coverage:**
2m RX: 110-174 MHz
TX: 144-148 MHz
70 cm RX: 420-500 MHz
TX: 430-450 MHz
- Spectra-Analyzer™ w/adjustable signal width, spacing & span markers
- 6-Character Alpha-Numeric Display
- 110 Memories (in 5 memory banks)
- Omni-Glow™ Display
- Digital voltage display
- Selectable 1200/9600 baud
- 3-Level Auto-Mute w/Mute Timer
- V+V, U+U, V+U Dual Receive
- 3 Power Output Levels
2 m 50/10/5 Watt
70 cm 35/10/5 Watt
- Built-in Auto Power Off (APO) and Time-out Timer (TOT)
- MIL-STD 810/C Rating
- 9 Memory DTMF Autodialer
- Handy Cloning Feature
- 3 Scanning Modes w/ Clear Scan
- Adjustable LCD Contrast/Brightness Control
- **Accessories:**
Consult your local Yaesu dealer.

Yaesu again demonstrates their world leadership position in 2-way radio communications with the introduction of the FT-8500 and Smart Controller™ Microphone. The deluxe, compact FT-8500 defines "high-tech" in mobile engineering. Just four simple flicks of the Smart Controller™ Microphone "joystick"-type lever, and you command frequencies, memories and every adjustment you need. Over 50 separate functions from the palm of your hand!

The Smart Controller™ Microphone isn't the only engineering advancement in the FT-8500. Watch the unique Spectra-Analyzer™ exhibit station activity above and below your current operating channel. Search out signal activity, then QSY direct for a QSO! See the digital voltage read-out monitor your car battery voltage big and bold in the Omni-Glow™ display. Work V+V, U+U or V+U frequencies and view custom alpha-numeric messages at the same time. There are other great features, too! Like handy cloning, selectable 1200/9600 baud, and a rear-panel data jack for packet! All of this and more in the ultimate deluxe, compact FT-8500 dual band mobile.

See the extraordinary FT-8500 Dual Band Mobile at your Yaesu dealer today, and find out how this dramatic change will affect mobile technology for you from this day forward.

FT-5100 Unbeatable Value!

Specifications: Frequency Coverage: 2 m-130-174 MHz RX, 144-148 MHz TX, 70 cm-430-450 MHz RX/TX • 94 Memories (47 per band) • Dual in-Band Receive, V+V, U+U, V+U • DTMF Paging & Coded Squelch • Packet Radio TNC Jack • CTCSS Encode built-in • Built-in Antenna Duplexer • Back-lit DTMF Mic • Automatic 8-Level Display Dimmer • RF Power: 2 m: 50/5 W (high/low), 70 cm: 35/5 W (high/low).
Accessories: See your authorized Yaesu dealer.



FT2500M/7400H
2 m or 70 cm
Rugged Mil Spec.

FT-2200/7200
2 m or 70 cm
Fits anywhere!



YAESU
Performance without compromise.™

**NEW
DUAL BAND**

Never before has Yaesu technology changed an industry so dramatically.

Rear-panel data jack for packet with 6-pin connections for Data Input, PTT, 9600 bps and 1200 bps Receive Data, Squelch Status, Ground.



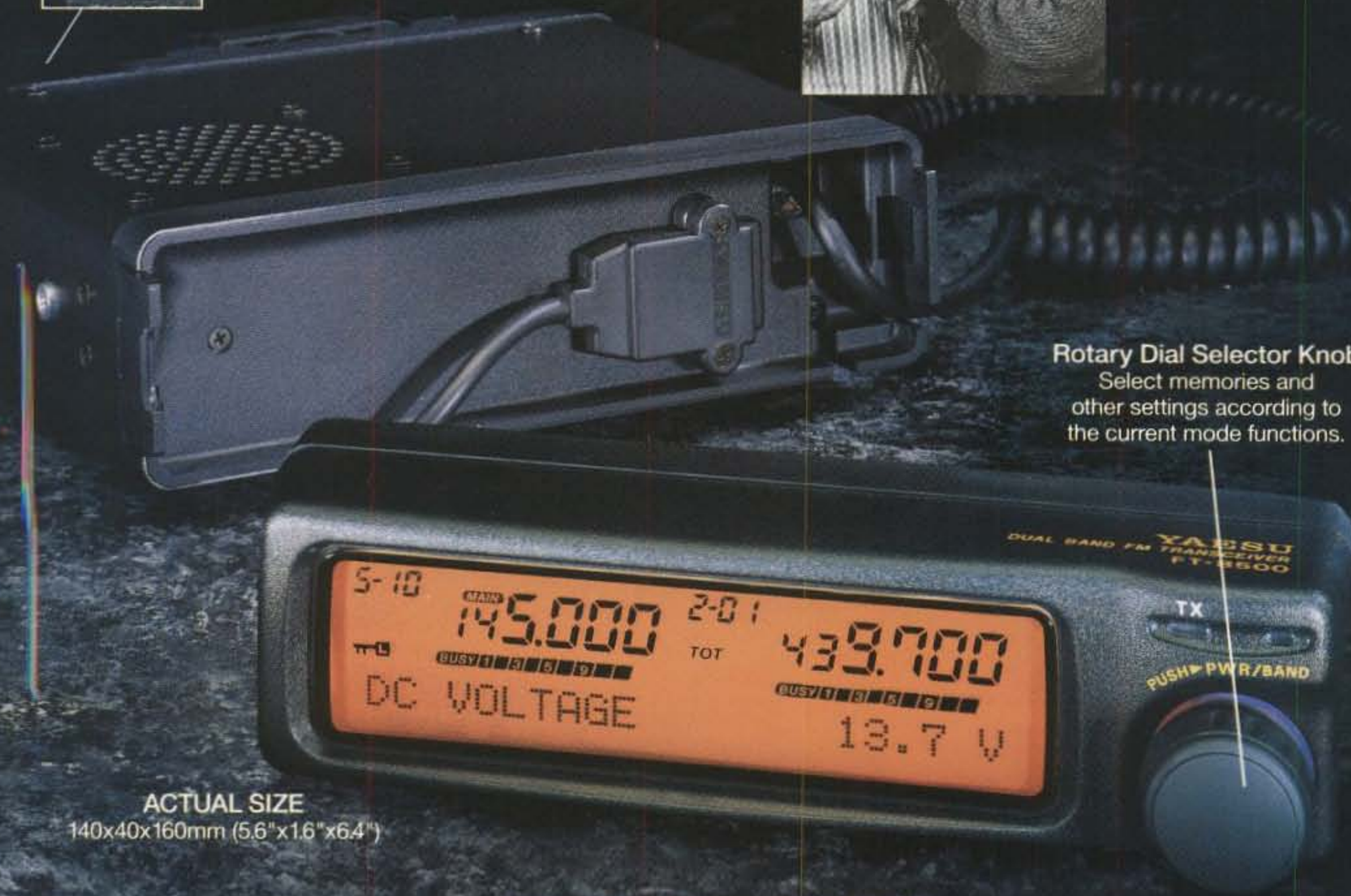
"With the Smart Controller Mic, all the radio functions are in your hand."

"And, look, the digital voltage readout monitors my car battery voltage!"



"Spectra-Analyzer lets me check out channel activity in UHF, VHF, and keep track of my favorite repeaters, too."

"Yaesu did it again!"



Rotary Dial Selector Knob
Select memories and other settings according to the current mode functions.

ACTUAL SIZE
140x40x160mm (5.6"x1.6"x6.4")

Omni-Glow™ LCD Dual-Band Display

VHF&VHF, UHF&UHF, VHF&UHF
Select three dual band configurations. Display settings are accessible from the Smart Controller™ Microphone "joystick"-type lever and keys, and the front panel Rotary Dial knob.

Unique Spectra-Analyzer™ displays station activity above and below the current operating channel in the Dial (VFO) mode. Use Spectra-Analyzer™ to search out signal activity, then QSY direct for a QSO.

Programmable XCVR Status Display
Another Yaesu exclusive, the built-in digital voltage display, monitors automobile battery voltage.



Menu Programming/Custom Settings
The menu loop contains 13 headings and a total of 53 entries encompassing most functions and settings. 6-character alpha-numeric display is located below the frequency window.

In Memory Recall (MR) mode, all programmed channels within a selected memory bank (up to ten channels) are displayed. In both Dial and MR, the display shows relative signal strength of all monitored stations.

Menu-Selectable Packet Baud Rate
Select 1200 or 9600 bps packet operation from the user menu. Move unique Smart Controller™ Microphone "joystick"-type lever left to right to select.

NEW! Pull out signals
no one else can!



ICOM

IC-775 DSP

**UNSURPASSED SIGNAL QUALITY...
WITH REVOLUTIONARY DSP
TECHNOLOGY ON
TRANSMIT AND RECEIVE**

ICOM next generation technology for HF operators is now available! The IC-775DSP (also available without DSP as the IC-775, a version which can be modified at any time with the optional UI-100) is engineered from the ground up, using next generation design and components, offering a combination of features and performance you'll find nowhere else.

- **TRANSMIT DSP*** Precise control of transmit signals at the modulation stage produces a high quality SSB transmit signal that analog methods can't match.
- **RECEIVE DSP*** The digital signal processor separates the desired signal out from the noise before it enters the audio amplifier! Pull very weak signals right out of the noise!
- **ADVANCED INTERFERENCE REJECTION AND NOISE REDUCTION** Digital automatic notch, digital low/high pass filters*, digital ultra-narrow CW filter*, manual IF notch,

manual audio peak filter, CW reverse mode and a noise blanker (with adjustable level and width) are next generation features providing incredibly clear signals.

- **DUAL WATCH** Dual watch with 2 independent tuning knobs enables monitoring of 2 frequencies... simultaneously.
- **TWIN PASS BAND TUNING** Allows you to zero in on and isolate a signal from both sides of the pass band. Ideal for contests, nets, etc...!
- **200 WATTS** Power MOS FETs in all stages of the PA unit provide excellent signal quality, good IMD characteristics and reliable full-duty cycle operation.
- **BUILT IN ANTENNA TUNER** A high speed tuner is built in and matches the connected antenna in all ham bands, including 160 m.
- **NEW DDS** The new Direct Digital Synthesizer system uses a new PLL which operates without a mixer and uses a single crystal which provides very high stability.
- **CW FEATURES** CW enthusiasts will love the electronic memory keyer, CW pitch control, CW reverse, full break-in (QSK) and two key jacks.

Features you've only dreamed of:

- ICOM DSP on Transmit and Receive
- Noise Reduction/Auto Notch*
- Twin Pass Band Tuning
- Dual Receive
- 200W MOS FET PA with built-in Power Supply
- Digital Noise Reduction*:
 - Digital Low and High Pass Filters
 - Digital Modulation/Demodulation
 - Digital Automatic Notch
 - Digital Ultra-Narrow CW Filter
 - Digital Automatic APF (Audio Peak Filter)
- Rx 100kHz-29.990 MHz
- New Single Crystal Control DDS
- RTTY/DATA Mode
- HF Packet Ready
- IF Notch
- APF (Audio Peak Filter)
- Quick-Split Function
- Memory CW Keyer
- CW Pitch Control & CW Reverse Mode
- Two CW Key Jacks
- 1Hz Tuning and Display
- Large LCD with new CFL Back Light
- Built-In Automatic Antenna Tuner
- Dual Antenna System
- Selectable Pre-Amp (2 Levels) and RF Attenuator (3 Levels)
- Triple Band Stacking Register
- Built-In Tone Encoder
- VOX
- 99 Memory Channels
- XFC
- Noise Blanker with Adjustable Level and Width
- AGC with Adjustable Time Constant
- RF Speech Compressor
- Optional SSB filters
- Optional Speech Synthesizer

The new IC-775 DSP is the next generation rig you've been patiently waiting for. For more information about the IC-775DSP or the IC-775, visit your local ICOM dealer, contact ICOM Technical Support on the Hamnet forum on CompuServe® @ 75540.525, (Internet: 77540.525 @ compuserve.com) or call ICOM's brochure hotline for more information: (206) 450-6088.

ICOM
Experience the Quality

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