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Amateur Radio

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JULY 1996

CQ

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Cover: Larry Smith, WA4QQV, Alvaton, KY

THE AMATEUR'S JOURNAL

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From your daily commute to Field Day to "home" station, the DX-70T is your ticket to adventure! Work all the bands, 160 through 6 and all the modes, including 10 and 6 meter FM repeaters. Catch that "rare DX" on the way to work; the speech compressor gives your signal added "punch." If CW's your thing, work it YOUR way, from above or below the carrier frequency; select the side-tone you like and then choose full QSK, semi or "automatic" break-in. And the drive home on a summer afternoon can become very special when you catch that "sporadic E" opening on 6 meters! Don't miss a moment of action; order your DX-70T today.



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 - 9600 bps packet ready!
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- RX - VHF 108 to 173.995 MHz, UHF 420 to 470 MHz
- MARS/CAP Modifiable (permits required)
- Cross-band repeater function



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- Alinco's Channel ScopeSM graphic band activity display
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- Aircraft band receive
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Full 2 meter/440 performance at an affordable price!

- 100 memory channels including cross-band memories
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- Cross-band repeater function
- Large controls, easy to operate, easy to program
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- MARS/CAP modifiable (permits required)
- Time-out timer
- With the optional EJ-24U CTCSS Tone Decoder Unit can operate in "tone squelch" receive AND search (tone scan) or a specific CTCSS tone in a received signal



Simple ■ Clean ■ Dependable



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ON THE COVER: Neat and tidy describes the shack of Larry Smith, WA4QQV, of Alvaton, Kentucky. Larry is an avid HF operator who takes his hobby seriously. Perhaps the "space people" at NASA could learn a thing or two about proper communication positions by looking at Larry's pristine setup. Larry is no stranger to *CQ*. If you want to see one of the most impressive antenna farms around, check out his multi-tower setup on the cover of our 1996-97 *CQ Amateur Radio* calendar. Stacked Yagis abound on just about every HF band at Larry's station. (Photo by Larry Mulvehill, WB2ZP1)



HF TREASURE

Intelligent Digital Enhanced Communications System

State-Of-The-Art IF-Stage DSP

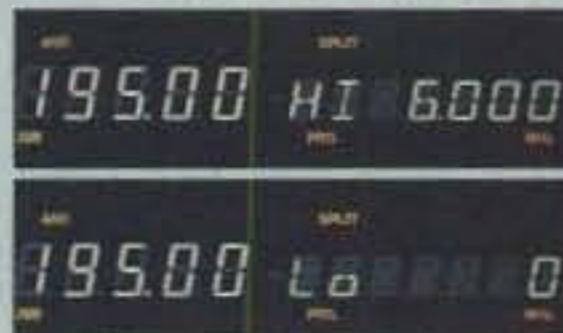
Once again Kenwood defines the standard with next generation DSP. Utilizing dual digital signal processing chips, the TS-870S captures wave forms at the IF stage (including AGC circuit) in realtime to provide unmatched clarity, noise reduction and control over inbound or outbound signals. The DSP chips deliver a dynamic range of 144dB, enabling you to detect previously unheard signals and customize the filtering system through the menu interface. No other transceiver on the market gives you this much power and flexibility.



Digital Filters

Applying complex algorithms at the IF stage allows you to attain filtering that is unattainable with conventional analog circuits. For instance, you can shape the filter sharp enough to obtain over 100dB out of pass band attenuation with virtually no signal loss. Through the menu-driven interface on the front panel, you can apply standard

filters or customize and store them for rapid and convenient access. And because it's all digital, there is no additional cost of optional filters!



Two Noise Reduction Methods

Choose from 2 methods of noise reduction: Line Enhancer Method (LEM) or Speech Processing/Auto Correlation (SPAC). LEM allows you to custom-shape a filter curve around a target signal, essentially 'carving' it out of the background noise — a powerful tool in SSB operation. For tough CW conditions use the SPAC function, which employs a statistical correlation algorithm to pull weak signals out of the background.

IF Digital Auto-Notch

Another benefit of IF-stage DSP is the ability to detect and eliminate broadcast carrier and continuous beat signals far more effectively than analog systems. It automatically tracks beat signal changes so you can 'set it and forget it'.

FREE
Radio Control Program
Software Included!

57.6 Kbps Computer Control

High speed computer control is available through a built-in RS-232C port and supplied Windows-compatible software called RCP (Radio Control Program). This enables access to most functions of the TS-870S including on/off, frequencies, bands, modes and more. It's also possible to "create" a customized screen radio, based on an original design or the included templates.



Built-In K1 LogiKey Keyer

Sophisticated CW operation is possible with the built-in K1 LogiKey electronic keyer with full or semi break-in, DSP-adjustable rise/fall times, and side tone monitor. A second keyer may also be connected to the TS-870S.

Easy-Access Menu System

Control all of the rig's functions through the menu-driven user interface on the front panel. It also incorporates a Quick Menu feature for rapid access to your most commonly used functions.

Dual Antenna and RX Out

Switch between 2 separate antenna systems from the front panel, plus attach an external receiver to the TS-870S for maximum antenna utilization.



Other Features

- Beat cancel
- Variable AGC
- Selectable voice equalizer (SSB & AM)
- Speech processor
- Selectable transmit equalizer
- 100 watts output on SSB, CW, FSK; 25 watts on AM
- 100 kHz - 30 MHz general coverage receiver
- Built-in automatic antenna tuner (TX & RX)
- Dual VFO with 100 channel memories plus 5 channel quick memory
- Full band scan, programmable band scan,

- group scan, memory scan with memory channel lock-out
- Built-in tone encoder
- High-quality 60-second digital recording unit option (DRU-3)
- Voice Synthesizer unit option (VS-2)
- Modifiable for MARS/CAP*

*Permits required for MARS and CAP use. Specifications guaranteed for Amateur bands only. Kenwood follows a policy of continuous advancement in development. For this reason, specifications may be changed without notice.

TS-870S

HF TRANSCEIVER

ISO 9002
Meets ISO Manufacturing
Quality System

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ZERO BIAS

AN EDITORIAL

The gods smiled mightily on the Dayton fleamarket this year. Friday morning it looked as if the rains would come as usual, but the skies cleared and it was sun and unusually high heat and humidity. The Bermuda High came to celebrate the Dayton Hamvention with the rest of us. The air-conditioning unit at our hotel was dead. It apparently had been moribund last year and finally gave up the ghost. Basically, it was very hot and uncomfortable. Somehow the rainy, cool weekends of Dayton's past looked very inviting.

As usual, I tried to cover most of the fleamarket on Friday morning before the arena opened to the public. And as usual, it was a futile task, as there was far too much stuff to see and examine in a few brief hours. Some of the fashion statements sported by the early shoppers were at times more interesting than the bestowed treasures. There was more "rolling stock" this year as every manner of wheeled cart and wagon was pressed into service. Hundreds of pounds of "stuff" was being wheeled around by bargain hunters gleeful in their purchases. I haven't the slightest idea what some of that "stuff" was or why they were so happy.

If you were a Collins (pre-Rockwell Collins) collector, then the fleamarket was true Nirvana. There was probably the largest assortment on display that I've seen in a long while, all of it going at high prices—at least they seemed high to me. I quickly scouted out Joe Fairclough, WB2JKJ (of the Radio Club of JHS 22) and his van just in case I found something a bit larger than usual that I just had to take home. He had a real treasure that had been sold already and was awaiting pick-up. He had a pretty primo set of Eldico Twins, including the control unit, which apparently had sold cheap. Oh, well. You win some; you lose some.

As it turned out, I didn't need to avail myself of Joe's van. There was some really interesting stuff out in the fleamarket, but nothing called out to me this year. It was a different story, however, on the inside. I did load up with a batch of small goodies that all fit in one of those blue canvas IBM bags that Mendelson sold a number of years back. The bag was pretty puffed out and heavy by the time I left on Sunday. I had to get a batch of coax patch cords (it really is easier than making them yourself) to replace the ones I normally use. During my great station construction project I had put all of my cables and patch cords in a carton for storage, and somehow my house ate the carton. It's nowhere to be found.

Quite a number of people came up to me at the *CQ* booth and wanted to know how the food was. I haven't really done food reviews in a while, but a quick check of the *Cuisine Quotient* revealed that the pretzels were as delectable as ever, although the barbecue sandwiches were my personal favorite. They featured a mystery meat dripping in a piquant red sauce served on a sesame-seed, uniformly shaped

bun. It was accompanied by an exquisite mid-'96 vintage Pepsi® perfectly served over a modicum of fresh ice in a waxed-paper cup. I couldn't get near the outdoor grills to sample their fare, as the lines were just too long. It did smell terrific, though, as I passed nearby and the billowing smoke and grease permeated my clothing.

Several median-age amateurs (younger than I) came up to the booth and inquired about increasing the readability of *CQ*. They felt that the lighter line weight of our type makes it more difficult to read. We looked into it when we got back, and starting next month we will phase in a heavier weight type (same point size) for our editorial material. That should clear up the problem for most of our readers.

Friday night at Dayton, Gail and I went downtown to the DX Banquet with Lew McCoy. There we had a chance to hobnob with all the big guns of DX. It's a wonderful event, and the food is good, too. It's an occasion where big guns and little pistols all can gather and swap tall stories, let their hair down (what's left of it), and let their egos run wild. I won a prize at the drawing—a year's subscription to the "Long Island DX Bulletin." It was donated by the person who won it last year, and he liked it so much that he wanted to pass on the favor. It guess it's up to me to do the same next year as a sort of DX Banquet tradition.

Saturday night John, K1AR, and *CQ* hosted the Contest Banquet at the same facility, and judging from what I heard and the way John looked the next day, it must have been a great time.

At the show there were a lot of new products to look at, poke, and ask questions about. Even though you try to pace yourself and maintain some sense of orientation, it's very easy to get buzzed out by sensory overload and forget exactly where it was you saw that "treasure." I found myself making notes on a large "floor plan" of both the arena and fleamarket areas so I could return for second and third looks.

It's interesting to note that high finance and banking technology have caught up to Dayton. Adjacent to the main entrance were automated teller cash machines, and folks were waiting in lines almost as long as those for the toilets. There really were some great bargains out there this year, and it would have been a shame to miss out on some of them.

I spent some time talking with Bob Cox, K3EST, about what it's like to be on the other side of the fence, editing a magazine and living with continual deadlines. (In case you didn't know, Bob is the editor of our new *CQ Contest* magazine.) In a lighter moment we reviewed some of the current serious thinking by serious thinking groups on the definition of country status. After a short and silly period of time we agreed that in order to be called a country, the land mass had to be able to support a McDonald's® with drive-through win-

dow and parking lot. It would be a great leveler. Apparently, well maybe more overtly than apparently, there was a bit of concern expressed over some recent operations.

I don't know how many people showed up this year, but it seemed a bit down from last year. It simply could have been that more folks were taking advantage of the sunshine to really scour the fleamarket in their search for the elusive perfect item. Whatever the final number, there was enough ego power radiating to fill the area. We might be the quiet, conservative family members at home, but at Dayton everyone is a tiger. Everyone is competitive there—who found better bargains, who has more countries, who has bigger antennas, and so on, right down to who has been to Dayton more times. At 31 times, I lost to a fellow at the AMSAT booth with 43. A heated discussion in front of our booth on who had more countries was allegedly won by an old timer who produced a card from Gondwana, albeit on moa skin. That gave new meaning to "I've got that!"

By Sunday morning everyone was acting silly and giddy from lack of sleep. Everything began to seem funny, which actually was a benefit for those who were flying home in the afternoon. The line at the metal detector in the airport was huge, with people trying to hand carry aboard all manner of indescribable objects. This was one week after the terrible crash in Florida, so everyone working at the airport was highly sensitive to strange objects. Passengers were going through trying to explain just what it was that they had to carry with them, while their friends called out all sorts of bizarre comments. Some of it was hilarious to us, but was not so funny to the folks who work there. Most of the people at the terminal area were returning amateurs, which meant an elaborate show and tell of all the great stuff everyone had bought. In most cases this scene was repeated at the other end of the trip at the baggage pick-up area.

For three or four days those of you who couldn't go to Dayton probably thought that a miracle had taken place and you had the bands all to yourself. All the big signals were gone, and whatever was out there belonged to you. By Sunday night it became obvious that you were wrong. Little by little the RF levels increased as everyone got on the air to tell everyone else what they had seen, experienced, and bought. It takes about a week to decompress from the experience and get back to normal adrenaline levels.

I don't know why it's Dayton and not Grand Forks. I do know that a tremendous number of people go to have a good time—a great time—and for some it's a once-in-a-lifetime experience. Just about all who go succeed in enjoying themselves. Maybe it's just that a lot of folks feel that it's okay to have a lot of fun with amateur radio.

73, Alan, K2EEK

The AEA VHF System

DSP-232™ Multi-Mode Data Controller

This new TNC offers unmatched performance on VHF and HF. Comes standard with

9600 and 1200 VHF Packet, plus all the popular HF modes. Has two switchable radio ports. Includes all the features of the PK-12 and PK-96. The superior filtering cuts through noise so you can connect. Full mailbox with 32K RAM, expandable to either 128K or 256K RAM.



PK-12™ 1200 bps Packet TNC

The PK-12 is an affordable way to get into Packet radio without compromising quality or features. The PK-12 is a 1200 bps TNC. It comes standard with 32K RAM for mailbox space and can be inexpensively expanded to 128K RAM. It has a full featured mailbox for handling messages. You have control over who can connect to your mailbox!

There is GPS firmware (APRS™ compatible) for integrating a GPS receiver with your PK-12 to transmit position information in Packet. The PK-12 works as a node with AEA's Gateway features. It is perfect on the bench or in the car. It is small, light, and can run on a 9-volt battery.

With the PK-12, you also get the DOS terminal control program PC PakRatt Lite™ and a copy of Bob Bruninga's APRS™ software for GPS applications. The PK-12 also includes DAMA BBS support, Expert/Beginner command sets, and identifies TCP/IP, TheNet, and NetRom stations.

IsoPole™ Base Station Antennas

Top performers for 144, 220, and 440 MHz. IsoPoles™ yield the maximum gain attainable for their respective lengths, plus a zero degree radiation angle which puts most of the signal right on the horizon. Great for voice and data.

Exceptional decoupling results in simple tuning and a significant reduction in TVI potential and noise pick-up. Broadband-typical SWR is 1.4 to 1 or better across the entire band. Perfect for voice or data base stations.

Aircraft and commercial versions are also available.

	IsoPole 144	IsoPole 220	IsoPole 440
Frequency	135-160MHz	210-220MHz	415-465MHz
2.1 Bandwidth	10MHz	15MHz	22MHz
	@ 146MHz	@220MHz	@435MHz
Power Rating	1KW	1KW	1KW
Length	125.5"	79.25"	46"
Wind Area	<1ft ²	<0.75ft ²	<0.2ft ²
Connector	SO-239	SO-239	Type N
Gain (on horizon)	3 dBd	3 dBd	3 dBd

SWR-121 V/U Antenna Analyst™

120-175, 200-225, and 400-475 MHz

This compact, battery powered unit measures, computes, and plots a curve of your VSWR vs. frequency on its high resolution LCD display. Control the unit via keypad. Covers 120-175, 200-225, and 400-475 MHz. View SWR over entire range, or at just one frequency. Measures return loss in dB. Self-contained RF source.

Interfaces with a PC for printing, saving plots to disk, and remote control with optional AEA AACOM™ software.

Other units for HF and commercial use.



DM-1™ Deviation Meter

Measure FM transmitter deviation on 144, 220, or 440 MHz. Two ranges allow accurate measurement of voice, data, DTMF, and sub-audible deviation. Measures CTCSS tones. Great for 9600 bps Packet. *European unit available.*



PK-96™ 9600/1200 bps Packet TNC

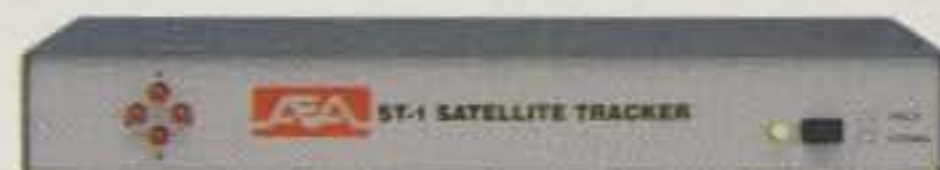
Get high performance with AEA's PK-96. The PK-96 is a 9600 and 1200 bps Packet TNC. It includes all the features of the PK-12, plus a DCD state machine for hearing weak signals with an open squelch, hardware HDLC which acts as a co-processor for accurate protocol conversion, and 9600 bps for satellites or terrestrial use. Two rear-panel TX level controls and a rear-panel reset switch. Full PakMail™ mailbox features.

Like the PK-12, the PK-96 includes GPS firmware for mapping and tracking other Packet/GPS operators. **Included with the PK-96 is a copy of Bob Bruninga's APRS™ software for GPS applications.**

The PK-96 works as a node and it identifies higher protocol stations such as TheNet, TCP/IP, and NetRom. The PK-96 even has a X1J3 option which lets it be a component in a TheNet node station. Includes DAMA support. **The DOS TNC control program PC PakRatt Lite™ is included.**

ST-1™ Satellite Tracker

Hardware plus computer software for automatic antenna tracking and transceiver tuning.



PC PakRatt™ for Windows 2.0

PC PakRatt for Windows controls the entire family of AEA TNCs. Works with Windows 3.1 & '95. The best terminal control program for your AEA TNC.

MacRatt™ III

The new MacRatt III terminal control program makes full use of the newer Mac computers. Controls all AEA data controllers for all modes.

AEA ACARS™

This demodulator and display software package lets you see the digital communications of aircraft on your computer screen. No TNC is needed. You need a 386 or better PC compatible computer, a VHF radio or scanner capable of covering 129-132 MHz and AEA ACARS. You will see flight info, cargo and fuel info., performance data, and much more.

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ANNOUNCEMENTS

•**Colorado Bighorn Museum of Amateur Radio Grand Re-opening** – The museum's festivities are scheduled for July 5–7 and include a dance, barbecue, swapfest, VE testing, and museum tours. The museum features 1000 pieces of amateur equipment from the 1920s through the 70s, radio periodicals, and service manuals. It is located in Genoa, Colorado. For an itinerary and list of accommodations, send an SASE to Don Zielinski, KØPVI, P.O. Box DX, Genoa, CO 80818 (telephone 719-763-2296); e-mail address <102675.3253@compuserve.com> or via packet at <KØPVI@KBØRYA.#NECO.CO.USA.NOAM>.

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

W2ZZJ, from Stratford, New York; The Fulton County Dr. Mahlon Loomis Committee; to commemorate the 170th anniversary of the birth of Dr. Mahlon Loomis, the American radio pioneer; July 20 and 21; from 1300–2000Z in the General class phone portion of 75, 40, 20, and 15 meters. Novice 10 meters phone, and area 2 meter FM repeaters. For a parchment certificate and literature send QSL, contact No., and No. 10 SASE (55¢) to W2ZZJ, 5738 STHWY 29A, Stratford, NY 13470.

W3ACH, from Chambersburg, Pennsylvania; The Cumberland Valley ARC; to commemorate the 132nd anniversary of the burning of Chambersburg; July 20, 1200–2100 UTC; operation on 3.870, 7.240, 14.250, and 147.12. For certificate, send name, address, and QSL to Cumberland Valley ARC, P.O. Box 172, Chambersburg, PA 17201.

5-land, from Austin, Texas; to observe the 21st Annual North American Naturalist Celebration; July 8–14; on the following frequencies: 7.265, 14.265, 21.365, and 28.465 ± QRM. For a certificate, send QSL and 9 × 12 SASE to Bob Redoutey, KF5KF, P.O. Box 200812, Austin, TX 78720-0812.

KE6TXA, from Grand Avenue, Corona, California; Corona Norco ARC; to mark the 100th anniversary of the City of Corona; July 13; operation on SSB on 14250 kHz, 21350 kHz, and 7250 kHz, and 146.535 MHz. For a commemorative QSL, send No. 10 SASE to CNARC, P.O. Box 253, Corona, CA 91719.

K6AA, from the Ft. MacArthur Military Museum, San Pedro, California; from Old Fort MacArthur Days; July 13–14 from 0800–2000 PDT on the 13th and 0800–1600 PDT on the 14th; SSB 7.260, 14.280, 50.150, and 144.250 MHz; FM Voice: 51.060 and 145.520 MHz. For a QSL card send QSL and 9 × 12 SASE to United Radio Amateur Club, Los Angeles Maritime Museum, Berth 84-Foot of Sixth Street, San Pedro, CA 90731.

K8EPV, from Port Huron, Michigan; 72nd running of the Port Huron to Macinac Island Yacht Race; 1400Z July 13 to 0200Z July 14 and 1400Z July 14 to 0200Z July 15; CW 10.110 and SSB 3.910, 7.272, 14.272, 28.393. For certificate send QSL and 9 × 12 SASE to K8EPV, P.O. Box 611230, Port Huron, MI 48061-1230.

W8TNO, from the Waterford Founders Day Festival, Waterford Township, Michigan; Oakland County ARS; July 27 from 1400–2200 UTC; operation in iGeneral portion of i40 meter phone band. For a certificate send QSL and a 9 × 11.5 SASE to W8TNO OCARS, P.O. Box 431-244, Pontiac, MI 48343-9998.

W8AL, Canton, Ohio; Canton ARC; to celebrate Pro Football Hall of Fame Week; July 26–28 from 1400–2400Z; CW 7.125; phone 7.265, 14.265, 21.365, and 28.425. For certificate send QSL and 9 × 12 SASE to Donald E. Perry, WQ8J, 968 Culverne Ave. NW, Massillon, OH 44647.

W8UMD, from Greenville, Ohio; Treaty City ARA; from Annie Oakley Parade and Festival; July 27–28; 1300–2300Z; General portions of the amateur bands. For a certificate, send QSL to W8UMD (T.C.A.R.A.), P.O. Box 91, Greenville, OH 45331.

K9JYX, from the Great Circus Train as it travels from Baraboo, Wisconsin's Circus World Museum to Milwaukee, carrying more than 60 restored circus wagons for the Great Circus Parade the following Sunday; operation on 20 or 40 meters around 7.240. For certificate send 9 × 12 SASE with three units of first-class postage to Don Evenson, K9JYX, 401 11th St., Baraboo, WI 53913.

W9UDU, from Racine, Wisconsin; Racine Megacycle Club; the 22nd anniversary of Salmon-A-Rama; July 21 from 1500–1900Z; operation on the lower portion of the General 40 and 20 meter sub-bands and 28.400. For certificate, send QSL and SASE to Racine Megacycle Club, W9UDU, Box 3, Racine, WI 53401-0003.

W9ZL, from "Pioneer Airport" Experimental Aircraft Association Fly-In and Convention, Oshkosh, Wisconsin; Fox Cities ARC; July 27–29 in the General phone portions of the HF bands and RTTY and CW as conditions permit. Send QSL and SASE to Wayne Pennings, WD9FLJ, 913 N. Mason, Appleton, WI 54914 for 8 × 10 picture certificate.

WØDCW, from St. Louis, Missouri; Suburban Radio Club; Fair St. Louis 4th of July celebration; July 4, 6, 7; on lower 25 kHz of General portion of the amateur bands both phone and CW. For certificate, send QSL and SASE to Bill Coby, KBØMWG, 4946 Pernod, St. Louis, MO 63139-1252 (10 AM to 5 PM CDT).

CY7TUB, from Nanaimo, British Columbia; Nanaimo ARA; from 30th anniversary of the Nanaimo to Vancouver Bathtub Race; 0100Z July 24 to 2359Z July 28; on phone and CW all HF bands (less 160 meters). For more information, check the DX Packet Cluster. Send QSL and SASE to VE7NA.

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

July 4, **24th Annual Fire Cracker Hamfest and Computer Show**, Emerick Cibort Park, Bressler Picnic Grounds, Harrisburg, Pennsylvania. Call 717-232-6087. (Exams.)

July 5–6, **Jackson County ARC 2nd Annual Hamfest**, Pascagoula Civic Center, Jackson County Fairgrounds, Pascagoula, Mississippi. Contact Kim, N5XGI, 19000 Busby Rd., Vancleave, MS 39565 (601-826-5811). (Exam info contact Bob Pierson, N7NE, 1216 Hickory Hill Dr., Gautier, MS 39553; 601-497-3096.)

July 6, **22nd Annual Ontario Hamfest '96**, Milton Fairgrounds, Milton, Ontario. Contact Burlington ARC, P.O. Box 85037, Burlington, ON L7R 4K3; or contact Norm, VE3CZI, 905-335-8962; packet VE3CZI@VE3DTV.

July 6, **Firecracker Hamfest**, Salisbury Civic Center, Salisbury, North Carolina. Contact Walter

(Continued on page 107)

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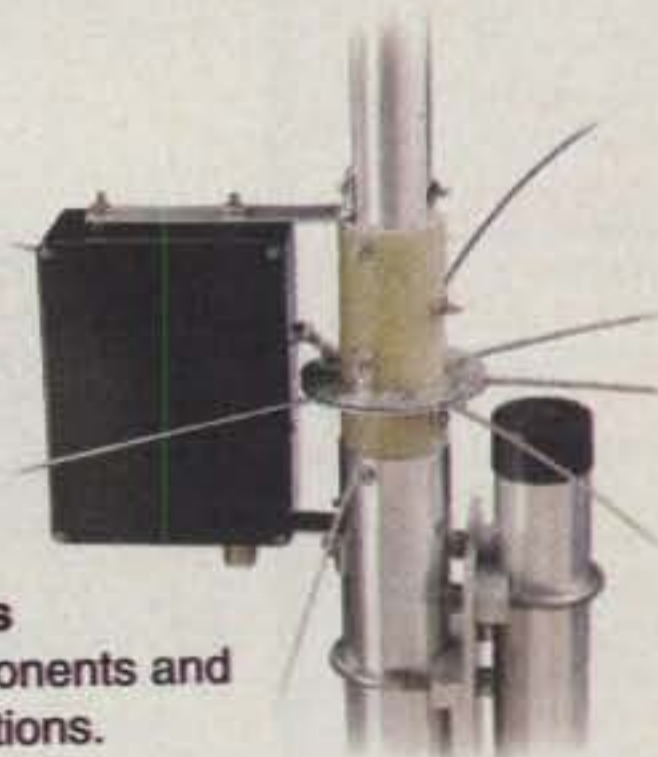
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Surplus Sojourn

This time out G4BXD shows us military electronic gear from eastern Europe and France. Once again he offers us a rare glimpse into the history of communications while showing us equipment that most of us never knew existed.

BY BEN NOCK*, G4BXD

As a slight deviation from the more normal "all singing, all dancing" latest wonders from the land of the rising sun, or indeed even the more usual war-time sets, this time I offer a selection of European sets probably not seen in the USA, and even quite rare in other countries.

Czech This Out!

The RM-31 wireless set is an HF transceiver operating AM or CW and covering 2 to 6 MHz. This tube rig, used in the Eastern European theater, is very solidly constructed. The interior of the set reminds one of the Racal RA17, modular cast housings sturdily bolted together forming a very resilient and strong piece of equipment.

I personally have two versions of this set. One is marked RM-31a and appears to be the standard tabletop version, with the handle on the top for moving about, etc. The other is simply marked RM-31, and is in a case obviously designed to be carried as a backpack.

Anyone familiar with the 18 set or the 62 set will know the type of metal lugs on the set which attach to the waist belt and shoulder straps. The case of the RM-31 is very similar, with this sort of fastening arrangement. The only apparent difference, certainly as far as the front panel goes, is that the backpack version has an additional antenna connector, much like a Belling Lee coax connector, which is not present on the table set. Both sets, however, have identical banana plug jacks for antenna and ground. It may well be though that the actual sets have been reboxed, as either set would seem to fit either case.

Additional items in the kit include a ZD-31a. This is a 12 volt power supply employing two rotary converters, one running all the time and the second only kicking in on transmit. It is unknown if the ZD-31a is intended for the RM-31a only or if it is supposed to be used with any version. It does in fact work with either set. There is also a matching ATU, designated the RM 31-3. This slides into a plate on the side of either set. The ATU does have both the coax connector and the banana jacks, so it can be



The RM-31a, with power supply on the right and spares box and headsets/mic satchel above. The ATU is on the left of the transceiver.



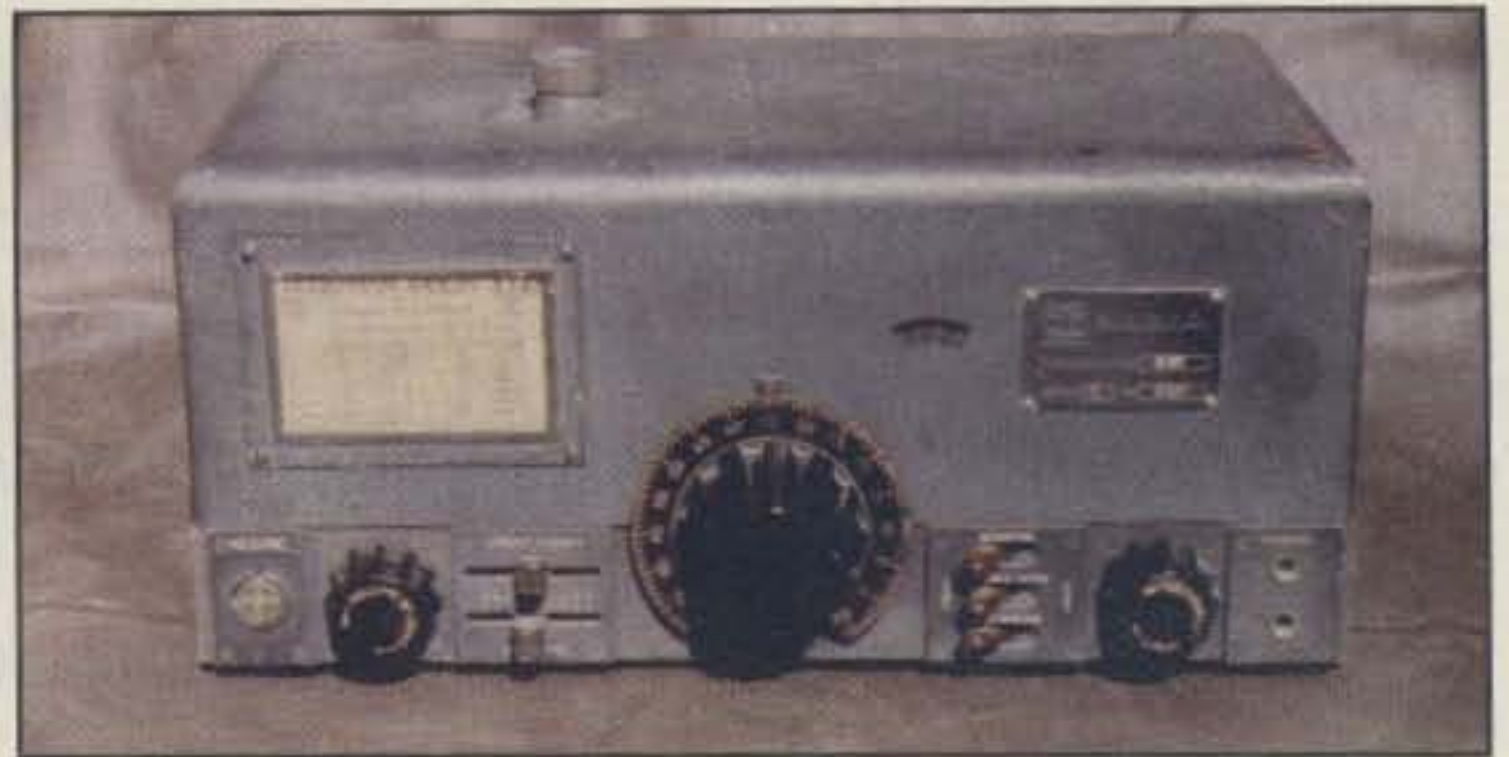
The RM-31a is shown on the left, with an internal view of the RM-31 on the right. Note the geared chain, which is operated during frequency selection.

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

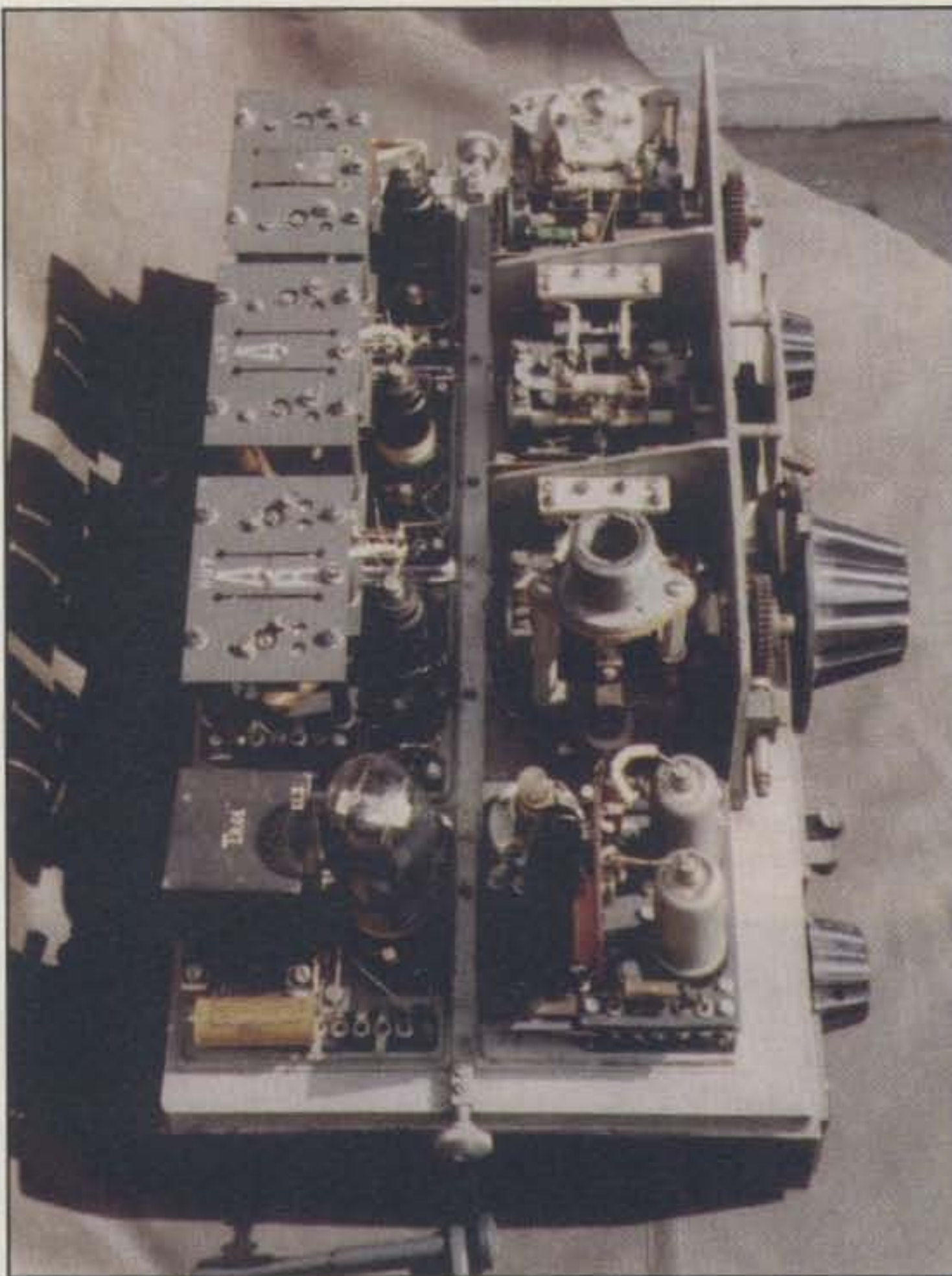


The RM-31 ATU and spares box. A spare amplifier tube can be seen at the front along with a dummy load device. ←

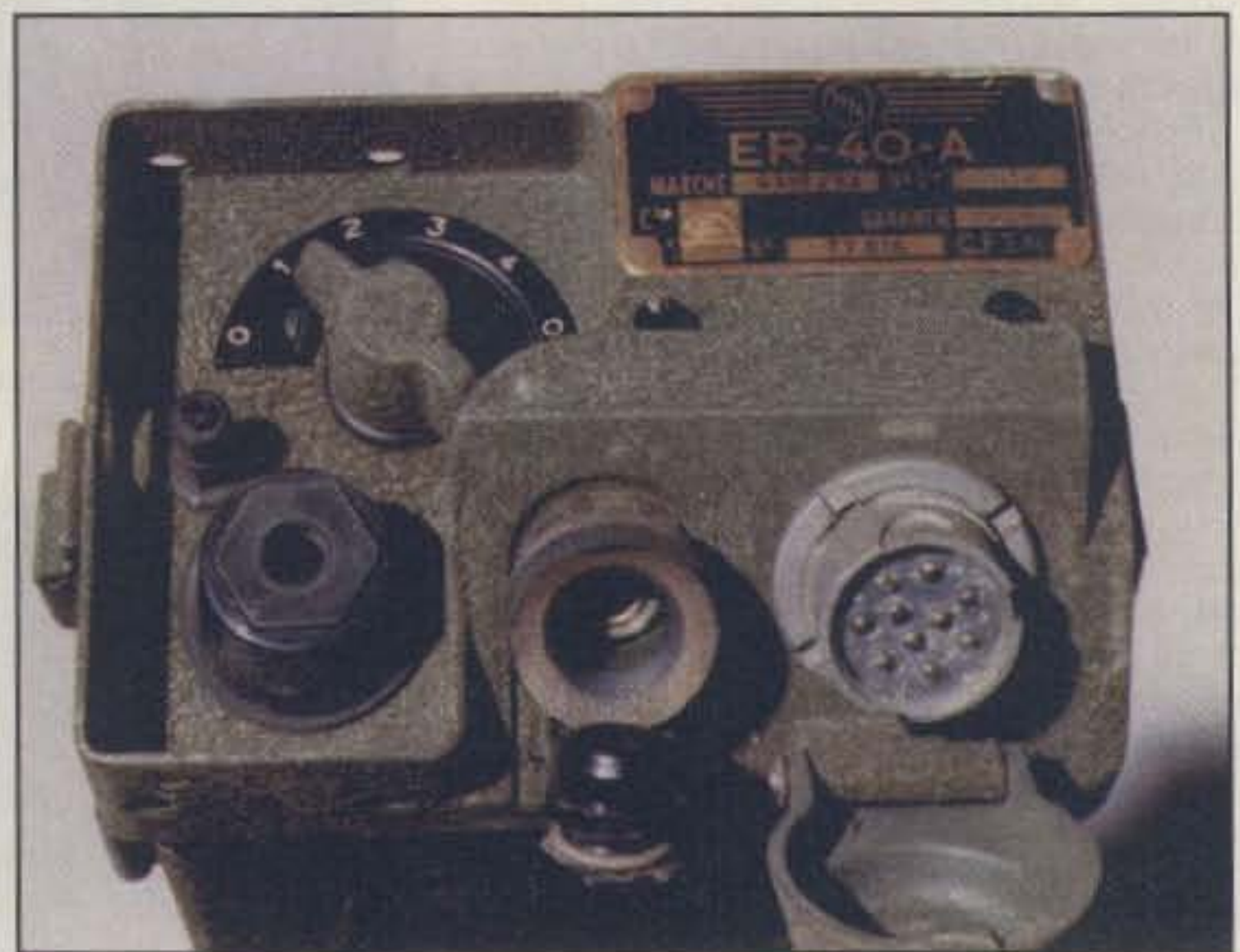
The R87C receiver. The antenna connector protrudes from the top of the case. The S-meter would plug into the 4-pin socket at the lower left.



Internal view of the R87C. The left-hand strip is IF to audio, top to bottom. On the right are the oscillator, mixer, and RF. The AGC/S meter circuits are at the lower right. ←



The ER-40A channel switch, and left to right along the bottom, the antenna, earphones, and handset connections. ↓



used with either set. The ATU incorporates an antenna current meter, tapped coils, and a tuning capacitor. Two more banana jacks at the top of the ATU are marked "Dipole," giving an indication as to antenna needs.

A kit of spares, marked MB 31-51a, contains spare tubes, including a PA tube, bulbs, and a couple of items that appear to be dummy loads for the set.

The actual frequency selection is by means of three main controls. The first control selects the MHz range, stepping from 2 to 5; the second control selects the 100 kHz range, step-

ping from 0 to 9; and the third control selects the 10 kHz range, again stepping from 0 to 9. A separate, two-position switch allows a 5 kHz step to be switched in or out.

The transceiver operates on AM, Modulated CW, or CW. The CW mode is provided with side-tone monitoring in the headphones. Other controls on the set include the RF and AF gain, and the four-position function switch, OFF/AM/ MCW/CW. Beneath a hinged cover on the front plate is a pair of levers which seem to adjust both the receive and transmit frequencies, but the hinged lid has an integral

switch which affects these settings when closed. The function of these levers, something to do with netting and fine tuning, is difficult to pin down.

Another hinged cover on the front panel allows a test meter to be inserted via a multi-pin plug/jack arrangement. The test meter allows monitoring of all the set's various voltages and presumably is used in fault tracing and checking on the set's performance.

There are no adjustments provided for the transmitter tuning, or for that matter as an antenna peaking control for the receiver, other



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KPC-9612 Monitors POCSAG Paging

Kantronics has updated the KPC-9612 firmware, now V7.0, to monitor 512 and 1200 bps numeric and alphanumeric RPC1 (pocsag) paging messages. V7.0 also supports page transmissions and a packet paging server. Ten new paging commands are added. Users may connect to MYPAGE @ 1200 or 9600 to initial a page. A Pagerlog and Pagebook may be established in RAM, assisting the sysop in maintaining and the remote operator in using the page server. The Pagerlog logs all pages sent and the Pagebook stores callsign and pager capcode pairs. Paging operations require a 9600-like "data ready" radio which attaches to the 9600 port of the KPC-9612.

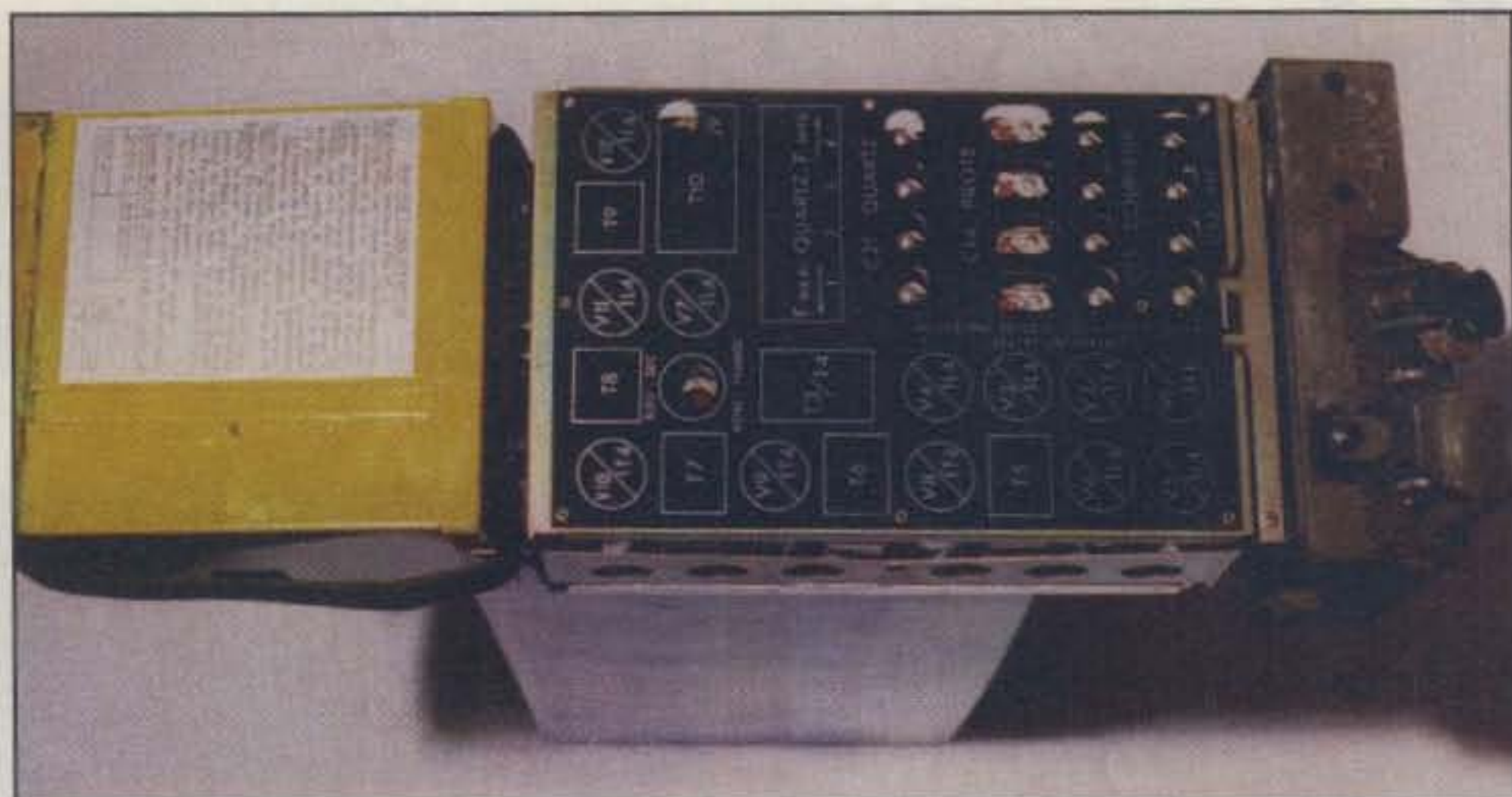


Data Sheets From our Website

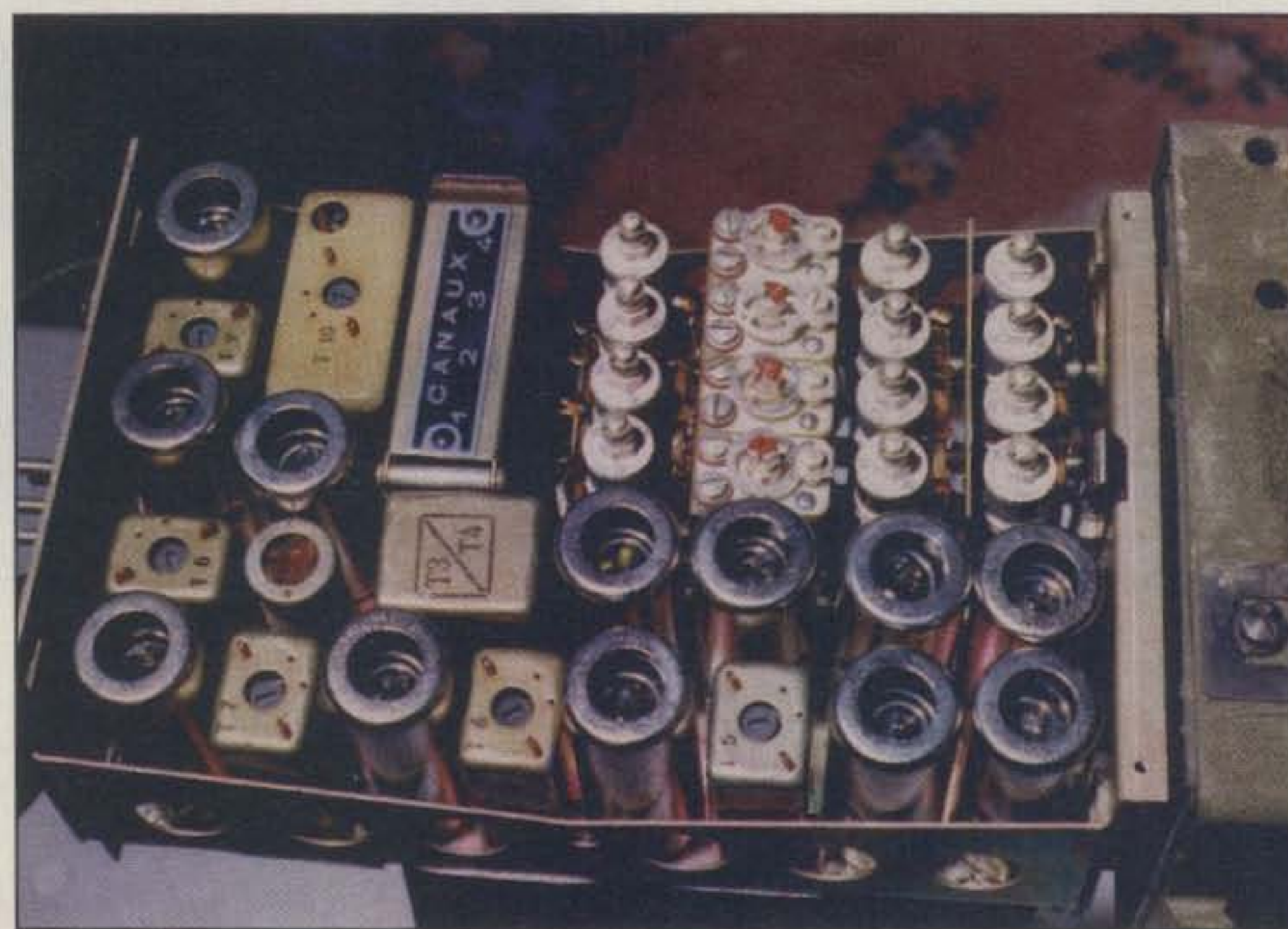
To receive data quickly on paging with the KPC-9612, version level on the KPC-3 or KAM Plus, or product data sheets, browse our INTERNET webpage: www.kantronics.com. E-mail forms are available at the site too. New to the web? Then reach our page with your browser by clicking on FILE, clicking on OPEN LOCATION, typing in www.kantronics.com, and hitting return. If your browser program supports file downloads, you can retrieve numerous application articles too. Or, just check in to see "what's new."

Kantronics

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Internal view of the ER-40A. The power supply unit is on the left. It plugs in and is held in place by straps.



Internal view of the ER-40A. Crystal bank is at the upper left. Four banks of trimmers are at the top right.

than frequency of operation. There are no plate peaking controls, plate tune and load for example, so one has to assume that the plate is tuned somehow as the various frequencies are selected. A selectivity control for reception is provided, however. This reduces the bandwidth from broad for AM to quite narrow for CW reception.

Inside the set are a number of connected geared wheels that all rotate in unison when the frequency is altered, as can be seen from the photographs. Perhaps preset conditions are activated for the different parts of the frequency coverage via a mechanical autotune system similar to the older Collins system.

Jacks are provided on the front panel for antenna and ground, two headphone jacks, two key jacks, and a jack for a microphone.

Using the equipment on the 80 (75) meter

band proved very interesting. Good contacts on AM were easily made, with reports of the audio be highly complimentary. CW contacts were easy, the variable selectivity of the receiver being especially useful in this mode.

Based on the field strength from other sets in operation from this site, the power output appears to be about 7 to 10 watts. The total current drawn from the 12 volt supply is only 8 amps. That's about 100 watts, assuming the rotary power source has an efficiency of 60% (60 watts to the set). Taking away the filament and other stages, consumption does not leave much for the plate stage alone.

A Piece of French Resistance

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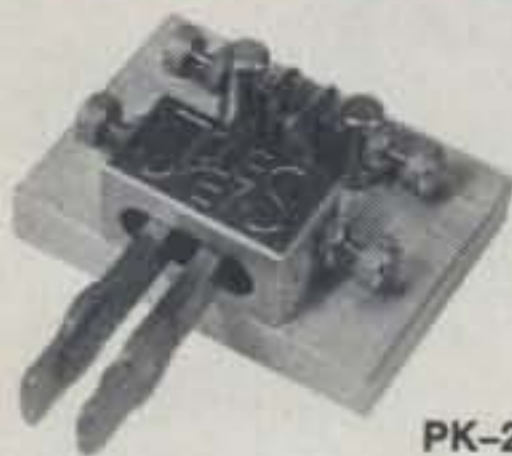
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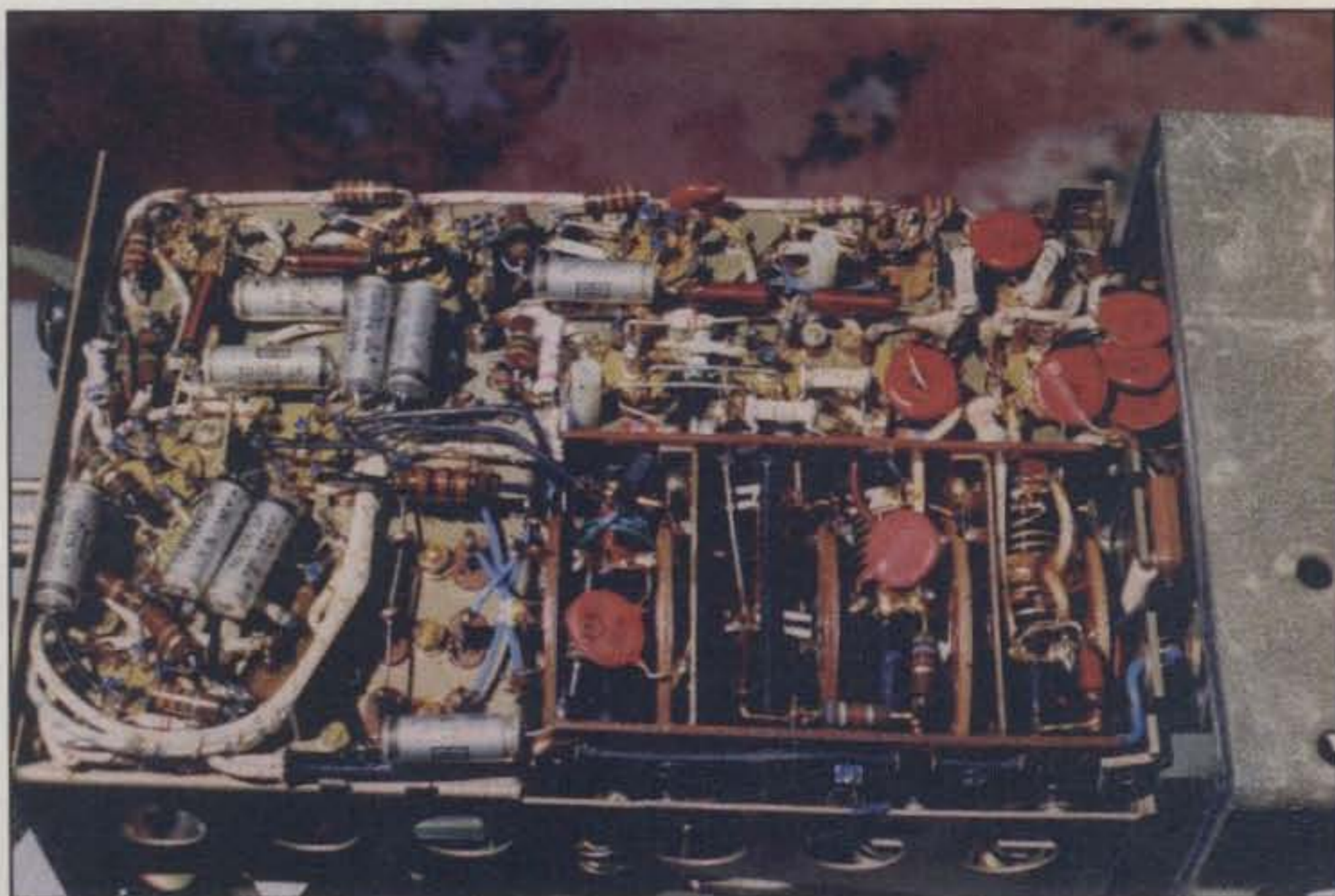
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Internal lower view of ER-40A. The VHF tuned circuits are on the lower right.



Close-up view of WW II German tubes.

receiver of World War II—the R87. Many British and American sets are well known—the R1155, the AR88, the BC348, and the 19 sets, for instance—but little is seen of those sets from across the channel, both allied and enemy, that were also used around the same period in history.

The S.A.D.I.R. R87 receiver, of French manufacture towards the end of the 1930s, is a VHF single-conversion receiver providing AM and CW reception in the band 1.6 to 12 meters. Many of these sets were taken over by the occupying forces in France during WW II and were used in monitoring and interception duties, then returning to French hands and service after the conflict.

From what can be gleaned from parts of a French article on the set that I have, it was used both as a ground station for aircraft radio reception and as a DF set in the field. The article makes reference to a quoted range of 3/4 mile, increasing to 6 miles, depending upon the height of the aircraft. The set, the R87C ver-

sion, and its interior layout are shown in the accompanying photographs.

A sensitivity of 5 μ V is claimed to give a 10 volt audio output into a high-impedance load for the C, D, E, and F versions, 3.5 μ V for 10 volts audio given for the HS version.

The set employs 11 of the 954 and 955 acorn tubes as push-pull RF, Mixer, and Local Oscillator stages. The Acorn tube is a miniature type, sitting in a rather squat holder, some even having top caps. In addition to the acorn tubes, 6L7, 6K7, and 6Q7 tubes are used for the remaining functions, an EL3 being used in the audio output stage.

There appears to have been five versions of the set: C, D, E, F, and the HS variety (A and B are not mentioned). The difference seems to have been in the frequency each set covered. Being European, the coverage is specified in meters. Hence:

type C—4.5 to 8 meters
type E—2.5 to 4.5 meters



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type D—8 to 12 meters
 type F—5 to 8.35 meters
 type HS—1.6 to 3 meters

The single acorn in a Hartley oscillator configuration in the C to F versions is replaced with two acorn tubes as a push-pull oscillator in the HS version. The IF tube is also altered, a 6AC7 being used in the place of a 6L7 and 6K7.

The set's IF is 3150 kHz, with the local oscillator on the high side. A 6Q7 double diode triode is used as audio and AGC detectors and AF preamp. AGC can be applied to both stages of IF amplification, with a manual IF gain pot also being provided.

The AGC amplifier, a 6K7, also provides drive for an external S meter, but was probably originally designed to drive something a little more sophisticated.

The BFO utilizes another 6K7, but there is no provision for externally adjusting the frequency while in use. The frequency is fixed at 3151 kHz, and obvious is only intended for CW reception.

Frequency readout is by way of a chart, similar to that used on the HRO receivers. This chart relates a varying number off the dial to a calibrated frequency list.

The EL3 audio output stage is transformer loaded to a high-impedance output fed to a rear-mounted socket. A connector on the rear provides the power-supply connection, and a 4-pin connector on the front panel is for connection to the "S meter" or alternative deflection devices.

The different sets will cover the 6, 4, and 2 meter bands as well as the odd commercial channel. The antenna connector is a large, twin-pinned coax connector that may prove a little difficult to source. Luckily, one came with the set I acquired, but finding suitable coaxial cable is another thing.

The set requires 6.3 volt filaments at 3.5 amps and a high voltage of 260 volts at 80 ma, and there is mention in the French article of a vibrator pack being available. Construction of the set is most robust, consisting of a very substantial aluminium die-cast chassis with die-cast units, separate units for the various stages, each individually screened.

While possibly hard to find, this set is nevertheless a worthwhile addition to any collection as a fine example of European war-time communications equipment.

Another "Soupçon" of French Cooking

The ER-40A appears to be a French version of the British 88 set, post WW II, possibly produced in the late 1940s, and certainly in the '50s. A small, four-channel, crystal-controlled VHF manpack, it differs from the 88 set in that it houses its batteries in the same box. In fact, the batteries housed in the base actually drive a vibrator pack that derives the high voltage needed. A 1.5 and a 4.5 volt battery are used, the 1.5 volt driving the heaters, and the 4.5 volt

battery driving the vibrator to produce the 100 volts needed for the plate.

The 12 tube set (14 in the 88 set) uses 4 in the transmit chain and 8 in the receiver. The same principle of frequency generation as in the 88 set is used, part of the receiver operating during transmit to provide a frequency lock.

The photos show the compact layout of the set, the upper cover having a well-defined component layout chart. The multi-pin connector on the top of the set is for the handset, the jack plug being used for small earplug-type speakers, and the single-hole antenna mount taking a fold-up whip of about 4 feet in length.

There are no controls, AF gain, squelch, etc., other than the frequency selection, the ON/OFF function being derived by rotating the channel switch full travel either way.

And Finally . . .

Some small artifacts of WW II recently found their way into my collection—a number of large "Acorn" type tubes about 50 mm high marked not only with the words "Wermacht" in gothic German script, but embellished with the eagle and swastika of the Third Reich. They are interesting stocking fillers to an interesting collection, I think.

My thanks go to Ms. Wendy Williams and Mr. Graham Wormald for assistance in the French translation, and to Messur Loustau, of Conflans Sainte Honorine, France, for supplying the R87 set and the documentation. ■

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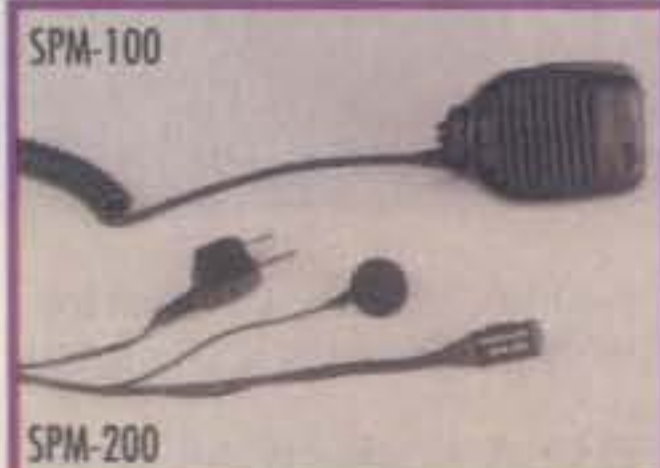
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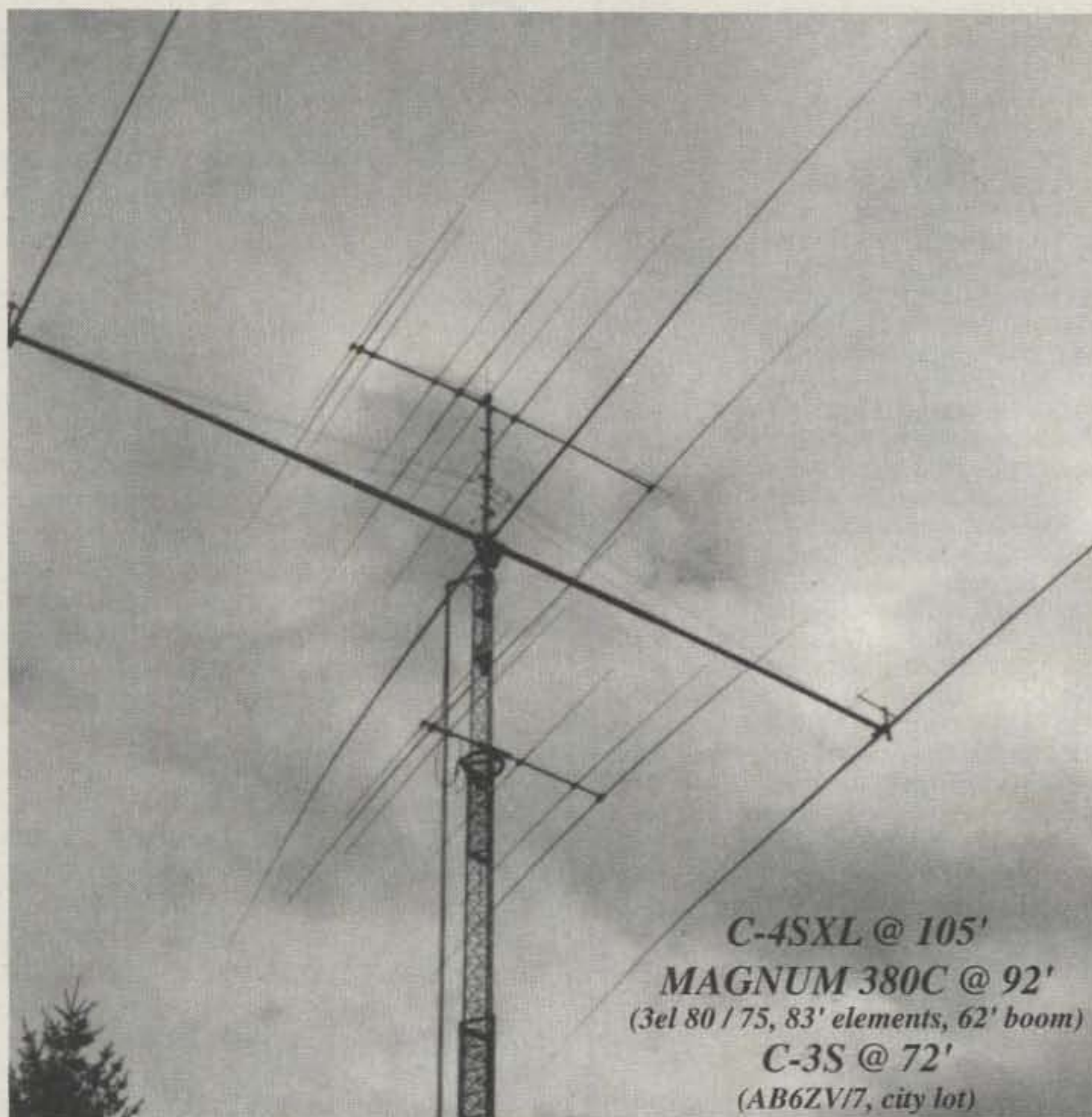
It used to be that using a tribander moved you into the "little gun" class for local competition. No longer.

Force 12 Classic 3-Band antennas are competitive with monoband installations because that is what they are. These antennas are three horizontally stacked and interlaced monobanders with a common driver cell. Each of the monobanders begins as a 2 element and is enhanced by the presence of the additional elements on the boom. To emphasize the effect of the design, the antennas have about 2.5dBd gain on 17 and 12 mtrs even though there are no elements resonant for bands. The driver is an improved open sleeve, developed and tested by **Force 12** in 1993. It excites 20-15-10 with a 50 ohm feedpoint and does not employ traps or phasing systems. This is the most efficient and simple multiband feed system ever used.

The Classic 3-Band series antennas average 4.5dBd gain on 20-15-10, more than the claimed higher numbers in trapped antenna specifications. For reference, a common 4 element 20 mtr monobander on a 26' boom has about 5.7dBd. When considering that the **C-3** has an 18' boom and the **C-3S** has a 12' boom, you can see these antennas provide a lot of gain for their size; not only on one band, but on all three. They have no traps to weather or blow up, no phasing lines to deal with and are rated at 5KW. They are also the lightest and have the lowest profile, while maintaining an 80 mph wind rating, with optional higher velocities. Average assembly time for a **C-3** is about 90 minutes and a **C-3S** is about 60. Everything comes ready to go with pre-aligned element-to-boom brackets, bundled elements and Easy-On™ mounting. All that is needed is simple hand tools and a hand riveter (available everywhere or from us). Slide the elements sections together with the supplied anti-oxidant, "pop" the rivets, bolt the elements on to the existing brackets and you are done. An RF choke or 1:1 balun should be used for the feedpoint.

The 40 mtr band can be added to either the **C-3** or **C-3S** to make the **C-4** and **C-4S**. The 37' 40 mtr dipole uses the **Force 12** linear loading system for highest efficiency and provides 130 kHz 2:1 coverage. A **C-4C** conversion is available for field upgrades. For those who would like 2 elements, the **C-4XL** is the core **C-3** with a 2el 40 on a 30' boom and the **C-4SXL** is the core **C-3S** with a 2el 40 on a 23' boom. There is also the **C-3XL**, which is a 3el 20, 3el 15 and 4el 10 on the same boom with three feedlines.

Stacking a pair of these antennas enables a physically small installation to compete with much larger monobanders. The computer model gives about 2.5dB more gain for the stack compared to a single antenna (27-35' vertical spacing); however, those who use stacks know the improvement is more dramatic. Taking into account only the 2.5dB, the stack is about even with a 40+' boomlength 20 mtr monobander; however, the added benefits of the stack, plus diversity in aiming makes a formidable installation. The photograph shows the **C-4SXL** for (2el 40 + 20-15-10) stacked above a **C-3S** (20-15-10). You might not need the 3 element 80 mtr in the middle! A rotatable dipole for 80/75 on the mast will be another eye-opener. They are available as the **EF-180S** (54' long), the **EF-180B** (66.5') and the **new EF-180C** (83').



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Optoelectronics' Scout Frequency Counter

BY PAUL CARR*, N4PC



The Optoelectronics Scout handheld frequency counter.

The Optoelectronics Scout is the latest advance in handheld frequency counters, but it is not equipment that you are going to use in the shack to measure the output frequency of a crystal oscillator. Its purpose is to determine and record the frequency of transmitted RF signals. The Scout is intended for use in recording frequencies for security, law enforcement, and recreational monitoring applications.

The Scout could easily be mistaken for a modern paging receiver. Its small size (3.7"H x 2.75"W x 1.2"D) makes it a natural to clip onto your belt for those "go anywhere, do any thing" applications.

The Scout will measure any transmitted frequency from 10 MHz to 1.4 GHz that is 10 to 15 dB stronger than the RF noise floor. The measurement time is 75 ms, and it has a 1 kHz resolution.

Don't let the small size of the unit fool you. Inside this miniature case is the latest in surveillance technology. Optoelectronics has developed technology (patent pending) that employs statistical analysis to filter out actual radio transmission frequencies from the background RF noise. The Scout will produce a coherent and stable count when a single dominant signal is 10 to 15 dB stronger than any other signal on the RF floor. A self-contained microprocessor evaluates each signal statistically to determine when an RF signal is dominant. This is the filtering process that was mentioned earlier.

After the RF signal is captured and recorded, it can be stored in memory. Up to 400 different frequencies can be stored along with 250 hits per frequency. There is a pager-style vibrator built in to alert the operator when frequencies are recorded during a walk-by.

As if these features were not enough, there is also Reaction Tuning™. When the Scout is connected through the ICOM CI-V interface to the ICOM R7000, R7100, R9000, or a Realistic PRO2005/6 modified to allow computer control (such as the OptoScan 456), it will automatically tune the scanner to the frequency most

recently captured. Furthermore, you can tune back through previously stored frequencies. This provides almost instant tuning of any transmitter in the area. It will also work with the AOR AR2700 and AR8000.

Operation of the Scout is very straightforward. On the front of the unit there are three slide switches and one pushbutton. Each control has two or more functions. The primary and secondary functions are clearly marked and easily understood.

The Scout has a large, easy-to-read display, and a nightlight for operation in subdued light or total darkness. It has an audio "beep" to inform you when a frequency has been received.

The operation time for the built-in nickel-cadmium battery is about six hours. This is good for a typical day of operation. The battery can be recharged in about two hours with the battery charger provided.

Optoelectronics provides a one-year warranty against defects in material and workmanship to the original purchaser. List price of the unit is \$449.00. For more information contact Optoelectronics, Inc., 5821 NE 14th Ave., Fort Lauderdale, FL 33334 (305-771-2052).

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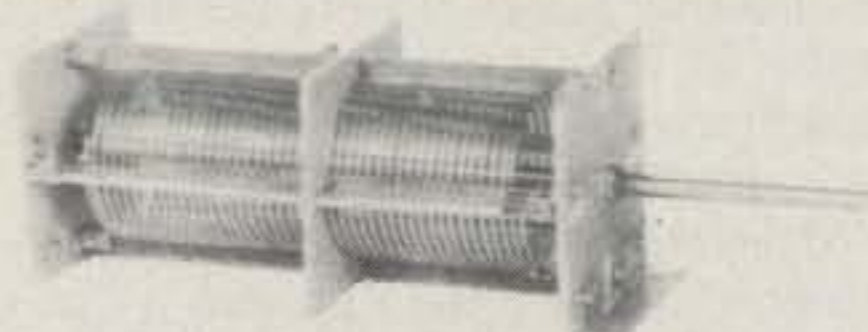
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You can select two coax antennas (directly or through tuner), balanced line/random wire, or built-in dummy load.

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MFJ's super heavy duty 3 KW current balun for balanced lines uses two giant 2 1/2 inch toroid cores. It's wound with Teflon® wire connected to high voltage glazed ceramic feedthrough insulators.

The MFJ-989C lets you safely operate high power into balanced feedlines without core saturation or voltage breakdown.

Some "legal limit" tuners have inferior voltage baluns with smaller diameter toroid cores and use soft plastic feedthrough insulators that can arc and melt.

More reasons why the MFJ-989C is the world's finest 3 KW tuner . . .

Built-in Dummy Load

A full-size 300 watt non-inductive 50 ohm dummy load is built into the MFJ-989C.

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

Some "legal limit" tuners don't have a built-in dummy load. They want you to pay for an external dummy load that just gets in your way.

Lighted Cross-Needle Meter

MFJ's lighted Cross-Needle SWR/Wattmeter lets you monitor SWR, forward and reflected power simultaneously. Read both peak and average power in two power ranges.

Sleek and Compact

The compact MFJ-989C slides right into your operating position -- you'll hardly know it's there. It's just 10 3/4 x 4 1/2 x 15 inches. Do you really want a bulky "legal limit" tuner that's bigger than your amplifier?

Superior Cabinet

The MFJ-989C's premium, low-profile all-aluminum cabinet has a sub-chassis that adds strength and RFI protection.

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

Detailed logging scales and legends are permanently silk screened on real aluminum front and back panels -- they aren't decals or glued-on paper strips that can peel off.

Superior Construction

Every MFJ-989C uses PEM nuts (not self-tapping screws), wing-nut for ground post (not a cheap nut), fire-retardant epoxy glass PC board (not canvas based), heavy gauge wire throughout (not small gauge), locking compound on nuts/bolts (not loose hardware).

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At Least I'm Not a "Football Widow"

Life isn't always easy for those who live with a dedicated amateur radio operator. This author is learning to adjust, and has even come up with an idea for a contest that can include the whole family.

BY BARBARA A. EDELMAN-HYMAN*

My daughter and I have taken up residence with a ham (known to some as KF2LC). Before the three of us moved into a house in need of a fair amount of work, we made a list. This list included items such as "caulk foundation," "install mouse-infested washing machine that's been sitting in the shed for 37 years," and "figure out what's making that noise in the attic."

Once we moved in, the ham installed two verticals and a beam and proclaimed himself finished. We haven't seen him since. We have, however, heard him—on the cordless phone while my mother related her most recent encounter in the frozen foods section and during my daughter's 387th viewing of *The Lion King*. He contested heavily one Saturday night, which coincided with my first and probably my only TV viewing of an obscure Portuguese film which does not exist on video.

Now none of this ranks up there with having a partner who's unfaithful or an alcoholic. My ham is a wonderful cook, does his own laundry, and is agreeable about allowing my daughter to rotate the beam on demand. ("Mommy, go outside and watch the antenna go around!") I would, however, like to be more involved in his avocation. I could learn Morse code, immerse myself in "Orbit" and "Logic," dabble in electronics, and take a licensing exam. I could also learn classical Greek, dance the lead in *Swan Lake*, and quit smoking. And I will do all those things as soon as I've figured what's making that noise up in the attic.

Meanwhile, I offer for your consideration a whole new twist on contesting: one which can involve the whole family (and the neighbors, if you haven't paid a whole lot of attention to reducing your harmonic emissions—think of it as a block party). I'll call it "All in the Family Contesting." Here's the framework.

Scoring is based on a point system. Number or location of QSOs is irrelevant.

In fact, you needn't make a single contact with another ham. Your goal is to interfere with telephones, TVs, and VCRs. Points are awarded on the quality of that which is interrupted and the annoyance level generated. It's a subtle and complicated system, but you folks are a subtle and complicated bunch.

As an example, the aforementioned telephone conversation with my mother would earn the ham no points. It doesn't matter that 80 percent of our conversation was inaudible to both of us. We haven't listened to each other for years. Likewise, interfering with *The Lion King* is worth nothing. Hearing "you're 5-9, kilowatt" during 387th rendition of "Hakuna Matata" is no hardship. (However, if the interference throws the child into a blue-faced tantrum, you automatically earn 10 points). On the other hand, the Portuguese movie interference is a 30-pointer: 10 points for quality, 10 points for rarity, and 10 points for the words I used to describe the radio and its operator.

I recommend that this contest take place during the Christmas season. The quality of program with which the ham can interfere is high. For one thing, there are loads of special presentations and beloved movies on TV. Also, many people are phoning faraway friends and relatives at this time of year. (Exception: If you call CQ through *It's A Wonderful Life*, you will annoy no one. In fact, you don't even belong in my contest. Go eat some fruitcake and make it an early night.)

Here's the scenario: mom, two kids, aunt, and uncle are in the family room. We all know where dad is. (I'm not promoting sexism here, but I've yet to hear a female voice respond to a CQ.) Two phones are in use, because everyone is on a call to Cousin Jack, who is stationed in Okinawa. The TV is tuned to a cable presentation of Luciano Pavarotti and Placido Domingo singing Christmas songs at Bethlehem. The security precautions involved in bringing this performance to television are so complicated that there is no doubt this is a once-in-a-

lifetime TV event. The ham is unaware of all this, being completely absorbed in the contest of the moment: The CQ WW XX. He's down there Tango-Hotel-Mexico'ing his little heart out.

As Cousin Jack is about to inform the family from 10,000 miles away that he's engaged to a wonderful Japanese woman, dad's QSOing a bunch of penguins, or maybe Penguin Island—no matter. Jack's happy Christmas announcement is lost in a sea of static and distorted voices. From Bethlehem "Adeste Fidelis" is being sung so beautifully that tears should be brought to the listeners' eyes. Instead, our happy family has curses on its lips, because as far as anyone can tell, Luciano and Placido are exchanging call signs. The interference-induced stress causes the two kids to start beating up on each other, which leads to mom and aunty heading out to the mall to do some last-minute shopping to the tune of \$500. Uncle then informs dad that he should take up fishing.

The score: 50 points each for the phone call and TV show. Multiply by six people (this includes Cousin Jack; I've left out his fiancée, but if your score is borderline, feel free to throw in peripheral participants) for a total of 600. If you get dirty looks from the neighbors the next day, that's another 200 points.

While "All in the Family Contesting" is certainly unorthodox, I believe it can be codified and standardized to a level that could make true competition a reality. (I'll do it if someone will pay me enough.)

I'll close with some random observations on life with a ham: a weekend social life which can be planned only in consultation with contest listings; a certain someone stomping around on the roof at 11:30 PM during an ice storm to reattach and readjust antennas; large and expensive pieces of electronics mysteriously appearing when a new refrigerator is desperately needed; and the unceasingly amazing island of politeness floating over the amateur airwaves in this very rude world. Fine business! ■

*P.O. Box 3548, Poughkeepsie, NY 12603

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Results of the 1995 CQ WW VHF Contest

BY JOE LYNCH*, N6CL



▲ Pierre Jolin, VE2PIJ, operated as XJ2PIJ in the QRP category from FN35 in Quebec. (Photo courtesy VE2PIJ)

← Damian Gendron, VE7ITI, and Scott Leaf, VE7ZVZ, two of the operators of the VE7MDX multi-op portable entry are shown proudly toting their banner. (Photo courtesy VE7MDX)

Conditions for the 1995 CQ VHF Contest were poor to fair to good, depending on where in the world you were. The total number of entrants was just over 100, which is down slightly from 1994.

The Winners

In the Single Operator Fixed category KB5IUA once again took the top spot. In the Portable Single Operator category K7ICW was the winner. In the Multi-Operator Fixed Class II category F6GVW won by making over 900 contacts on 2 meters. In the Multi-Operator Portable Class I category Mountain Top Associates operating under AC4RC was the winner. In the Multi-Operator Portable Class II category PA6VHF once again took first place. A look at the number of operators makes you wonder if they didn't have a picnic as well as operate. In the increasingly popular QRP category WB8K was the winner. In the Rover category perennial Rover AJØE took first place.

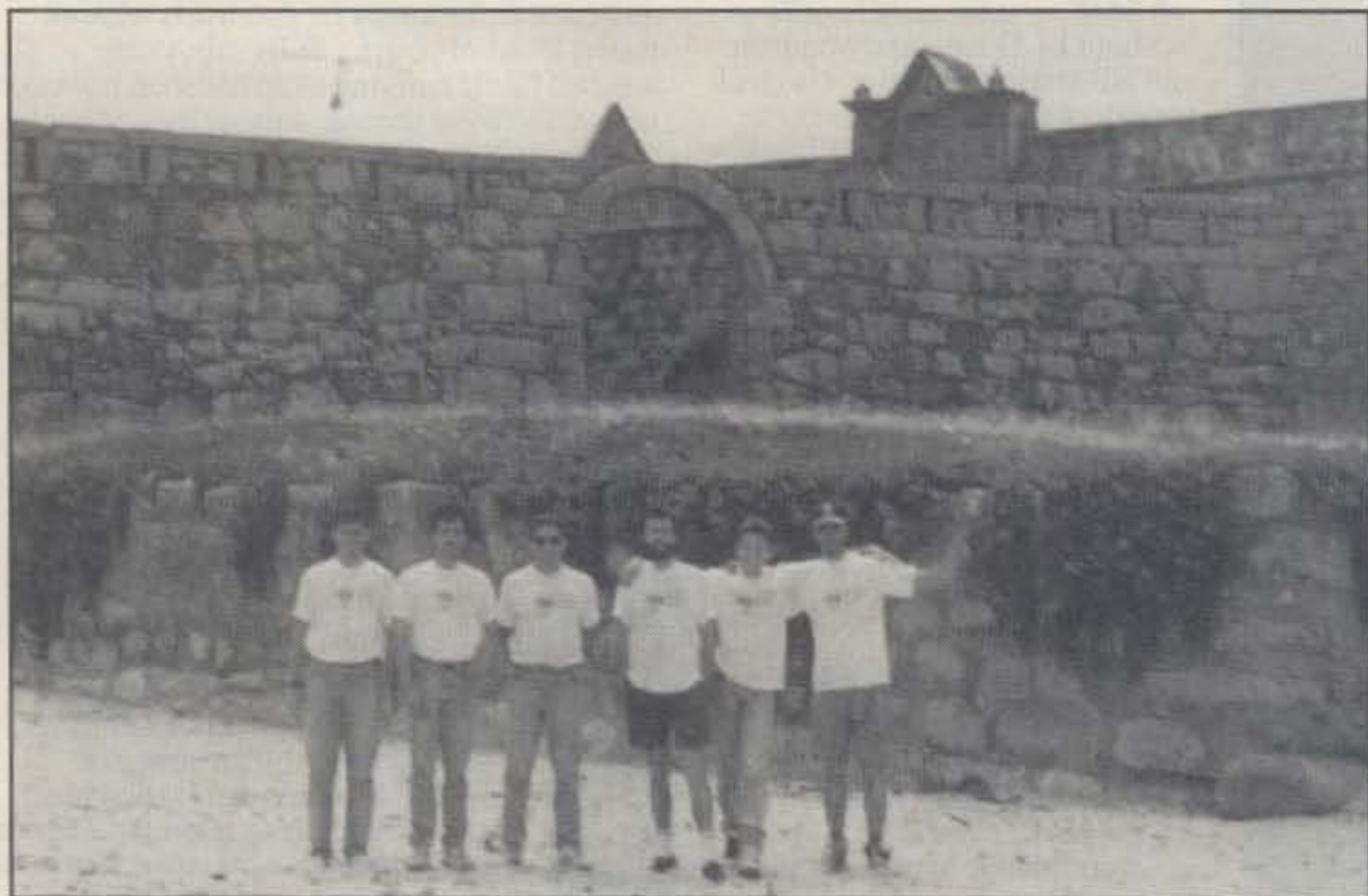
This and That

Scoring again this year was a problem,

particularly because of the switch over to the new format. The Europeans still had the old WPX logs and QST published the old rules, thereby adding to the confusion. Additionally, there were some mis-

takes on the summary sheet that didn't help matters.

My apologies go to those of you who sent requests for logs/summary sheets to my QTH. Unfortunately, your request ar-



Here is the Northern Portugal DX Group DXpedition/Contest team which operated CT1EEB. (Photo courtesy CT1EEB)

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

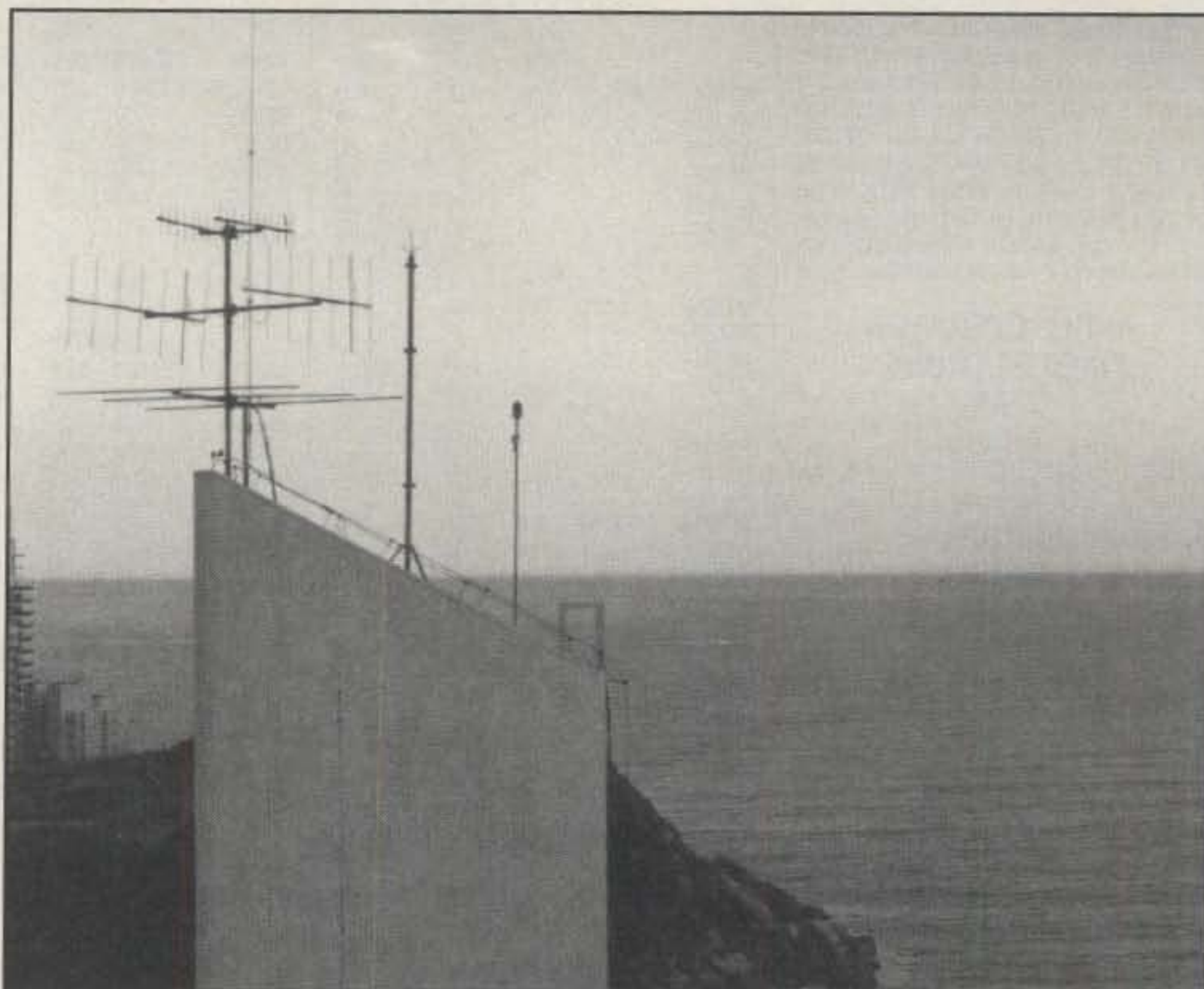
CATEGORY WINNERS

Single Operator Fixed: **KB5IUA**
 Portable Single Operator: **K7ICW**
 Multi-Operator Fixed Class II: **F6GVW**
 Multi-Operator Portable Class I: **AC4RC**
 Multi-Op Portable Class II: **PA6VHF**
 QRP: **WB8K**
 Rover: **AJ0E**

rived while I was out of the country, and because I didn't return until after the contest, I didn't receive your requests in time to forward them to CQ in New York. My apologies also go to Mark Casey, N1LZC. In the bottom of the box that I received from the post office upon my return was your empty envelope. I guess somewhere your logs have made it to the dead letter pile.

I hope to hear you all in the 1996 contest coming up 1800Z July 13 to 2100Z July 14, 1996. For complete rules for the contest see the June issue of CQ. There's also still time to send for logs from CQ if you hurry. Good luck in the contest!

73, Joe, N6CL



With a water vicinity QTH like this, it's no wonder that Gio Romanini, PY2CDS, made all those 2 meter contacts. (Photo courtesy PY2CDS)

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Say You Saw It In CQ

July 1996 • CQ • 23

Number groups after call letters denote following: Final score, number of QSOs (including multipliers for band and CW contacts), Total grid locators, Bands operated (A = 50, 7 = 70, B = 144, C = 222, D = 432, 9 = 902, E = 1296, F = 2304, G = 3456, H = 5670, I = 10G, J = 24G, L = Light), (in the case of Rovers) number of grid locators activated, additional operators. Certificate winners are listed in boldface type.

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EUROPE

Finland

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Germany

DL1ZC 9620 185 52 BDE

Italy

I1JTQ 1178 62 19 B

Spain

EH7CD 814 37 22 A

EB5GHL 204 17 12 B

EA3EAN 126 14 9 B

EA3AYK 120 15 8 B

EA5EIL 6 3 2 B

NORTH AMERICA

Canada

VY2KX 38048 328 116 ABD

VE2AWR 10767 111 97 A

Mexico

XE2HWB 2688 64 42 A

XE1AVM 1122 34 33 A

USA

W1

K5MA	28980	276	105	ABCD
K1CLN	5300	100	53	A
N1DYR	2640	60	44	ABD
N1QVE	775	31	25	AB
N1FWS	512	37	42	ABD
N1LZC	206	18	12	ABD

W2

N2UAH	8370	135	62	ABD
WB2YEH	5217	111	47	ABCD9EG
WB2WIH	3560	89	40	ABCD
N2RBJ	2346	69	34	ABD
N2QHS	476	28	17	ABD
WB2AMU	273	21	13	A

W3

N3QYA	30590	266	115	ABD
K3ZO	2030	57	35	AB
AA3GP	225	15	15	A

W4

WB2QLP	25092	246	102	ABD
KE4MPV	23700	237	100	A
N4MM	1938	53	38	A
AD4F	1708	61	28	AB

W5

KB5IUA	107800	550	196	ABCDE
KB5OAI	27280	248	110	ABCD
WM4Z	14007	161	87	ABD
WA5QCP	1404	39	36	A
KB5ZSK	455	35	13	ABCD

W6

KN6WY	1672	88	19	B
W6IST	1276	58	22	ABD
AC6EN	912	57	16	AB

W7

NC7K	37788	282	134	ABD
K7CW	11400	150	76	ABD
NJ7A	6850	137	50	ABCD9EF
N7GJD	1485	45	33	A
K7NV	1392	48	29	AB

W8

K8MR	30552	268	114	ABD
KE8FD	24910	235	106	ABCD9E
N8MKH	6300	100	63	ABD
K2YAZ	4704	98	48	ABCDE
WA8QNR	1440	45	32	A
W8WG	81	9	9	A

W9

NE0P/9 504 24 21 A

W0

K0GU	78660	460	171	A
N0LL	76152	456	167	ABCDE
N0WJX	19227	221	87	A
KB0ZQ	5184	108	48	ABCDE
N5MXU	5040	105	48	ABC
WG6K	4965	114	72	ABD
N0XKS	2542	62	41	A
N0QJM	2255	55	41	AB
WY0C	160	16	10	AB

SOUTH AMERICA

Brazil

PY2CDS 225 45 5 ABD

PORTABLE STATION SINGLE OPERATOR

EUROPE

Mallorca

EA6SA 10985 169 65 ABD

North America

USA

W2

AA2AM 1188 44 27 A

W7

K7ICW	34125	273	125	AB
N7MLD	5452	94	58	ABCD
W6RCW/7	2052	54	38	A

W8

N8PVT	1085	35	31	AB
AF1T/8	693	33	21	AB

W0

WA2HF1/0 14025 165 85 ABD

MULTI-OPERATOR FIXED CLASS II EUROPE

France

F6GVW 70917 921 77 B
(Ops. F6s CWN, GWV, HMQ, IFR)

NORTH AMERICA

USA

KN4QE 41472 288 144 ABD
(Ops. KN4QE, NG4C, N4ZWQ, WT4C)

MULTI-OPERATOR PORTABLE CLASS I NORTH AMERICA

USA

AC4RC 49680 345 144 ABCD9E
(Ops. WA1ZMS, WB2KMY, AC4RC, WA4RTS, W4WWQ, KA4YND)

MULTI-OPERATOR PORTABLE CLASS II EUROPE

Portugal

CT1EEB 882 49 18 BD
(Ops. CT1s ETZ, FAK, FDR)

The Netherlands

PA6VHF 115780 8827 140 ABD
(Ops. DG3LBK, DG8LAV, PA3s BIX, CEE)

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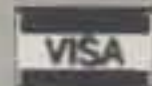
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USA

W1

KH6CP/1 1740 87 20 BCD9EFIJ
N1RSY 240 40 6 B

W2

KC2X 3375 75 45 A
N2PEB 117 13 9 A

W5

KC5EPL 3337 71 47 AB

W7

AA7VT 2943 109 27 ABCDE
N7WNC 140 20 7 B

W8

WB8K 21364 218 98 ABD
N8AXA 3195 71 45 ABC
AA8RR 702 39 18 ABC
N8ZAT 288 24 12 AB

W9

WD9IAB 1178 38 31 ABD

**ROVER
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W3

ND3F/R 32445 309 105 ABCDE 5
(Op. ND3A)

W4

KB4IJJ/R 1444 38 38 A 3
KB4NVD/R 450 30 15 BC 2

W6

K1FJM/R 207 23 9 AB 2

W7

K7ICW/R 6 3 2 A 2

W8

KR8L/R 285 19 15 AB 2
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W9

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CQ 7/96

An Easy-To-Build, Thermochromic RF Power Indicator

This project comes under the heading "What A Great Idea!" WB4TLM has come up with a marvelous use for something we usually toss away, while at the same time teaching us that simple things are not always simple.

BY RICHARD ARNDT*, WB4TLM

While sorting through a layer of stuff on the garage work bench, tossing some items into a drawer for potential projects and others into the pail, I came across a 9 volt Duracell® bubble package containing a battery tester. Many of these testers have been thrown away over the years, but this time an idea came to mind.

The 9 volt tester consists of four carbon film resistors of different values deposited on the back side of a small sheet of polyester plastic (fig. 1). These resistors are connected in parallel, forming a resistance of approximately 60 ohms. On the front side of the tester are layers of ink which create a window divided into three segments. The top layer is printed with thermochromic ink, which has the interesting property of changing colors based on temperature. The tester is designed to have the three segments on the front side directly opposite three resistors on the back side, leaving one resistor without an opposing segment.

Connections to a battery are provided by a silver-coated contact area on the tester. When connected, each resistor on the tester presents a load to the battery and dissipates an amount of heat relative to the power density of the battery. The thermochromic ink senses the temperature rise across each segment and changes from black to colorless, exposing a layer of yellow ink behind it. The cold to hot color transition region begins at around 127° F, and ends at around 145° F. This was determined by holding a tester in a pan of water on a stove and measuring temperature while heating the water.

After reviewing the design, it was obvious that the Duracell® tester was quite an ingenious idea, and it does an effective job of testing batteries. The apparent low inductive and capacitive design of the tester is what led to the idea of trying it as an RF power indicator for handie-talkies (HTs). All that was needed was an additional 300 ohm resistor in parallel with the tester to provide a 50 ohm load, and a method for connecting to an HT BNC antenna jack. Besides a few hand tools, the following materials were gathered to put together the RF power indicator:

- Empty TIC-TAC® breath-mint container
- 300 ohm ($\pm 10\%$) 1/4 watt carbon resistor

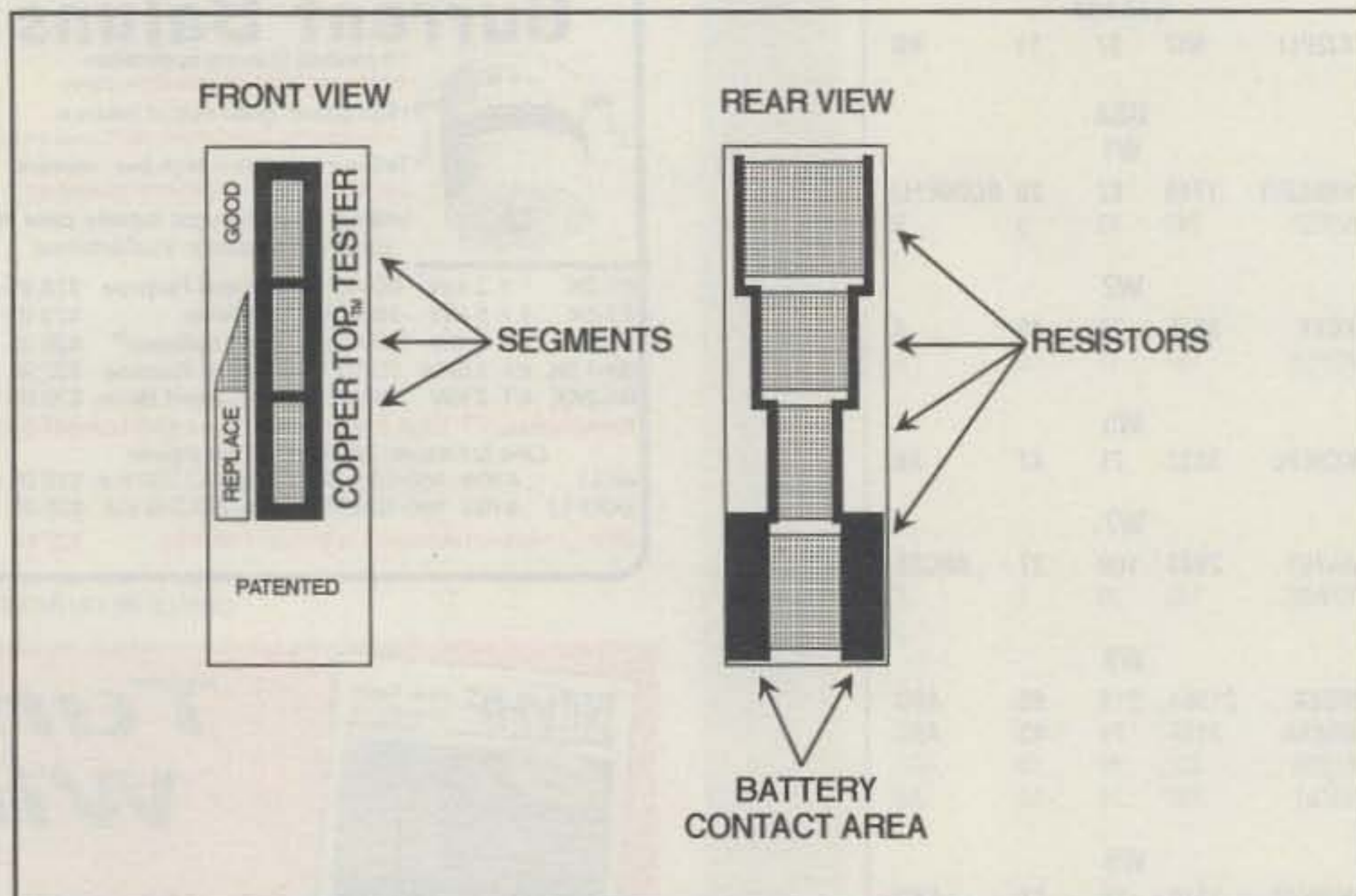
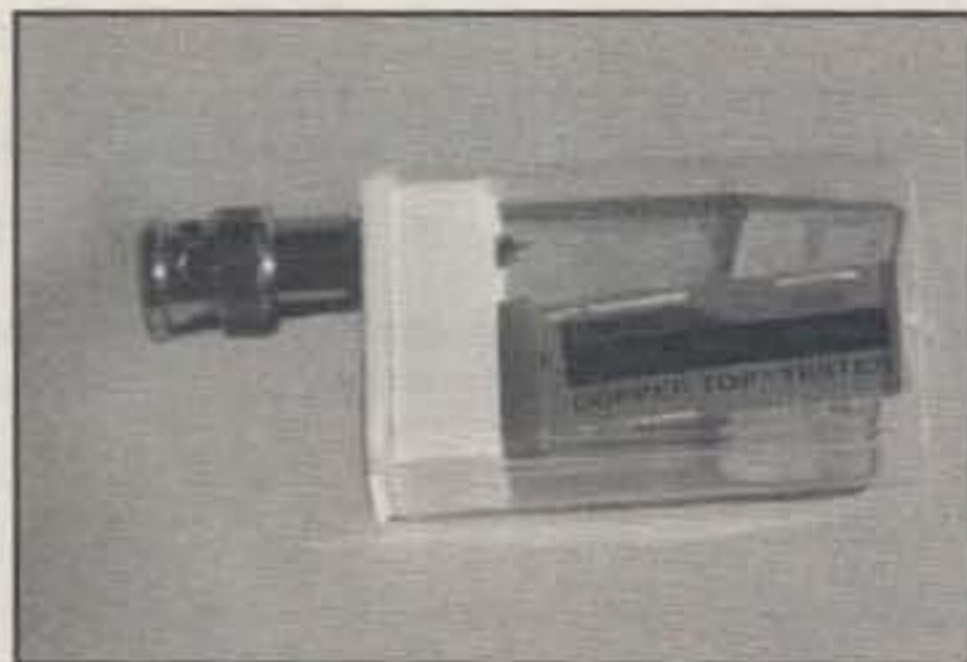


Fig. 1- The basic make-up of a Duracell® 9 volt battery tester.

- Two pieces of 3/4" x 3/4" double-sided PCB
- RadioShack 278-254 female phono jack to male BNC plug adapter
- RadioShack 274-321 male phono plug
- 6-32 x 3/8 screw, lock washer, insulating washer, and nut
- Small length of light-gauge wire

Cut out two pieces of double-sided PCB 3/4" x 3/4". Use an Exacto® knife to score and lift the copper from PCB #1 as shown in fig. 2. Next peel off the copper with a needle-nose pliers. The clearance around the 1/8 inch screw hole is to prevent shorting to the screw, and can be done by using a large drill bit as a



The completed unit is small, compact, and a guaranteed conversation starter at your next club meeting.



Front view of the battery tester strip and the associated container.

*P.O. Box 950512, Lake Mary, FL 32795-0512

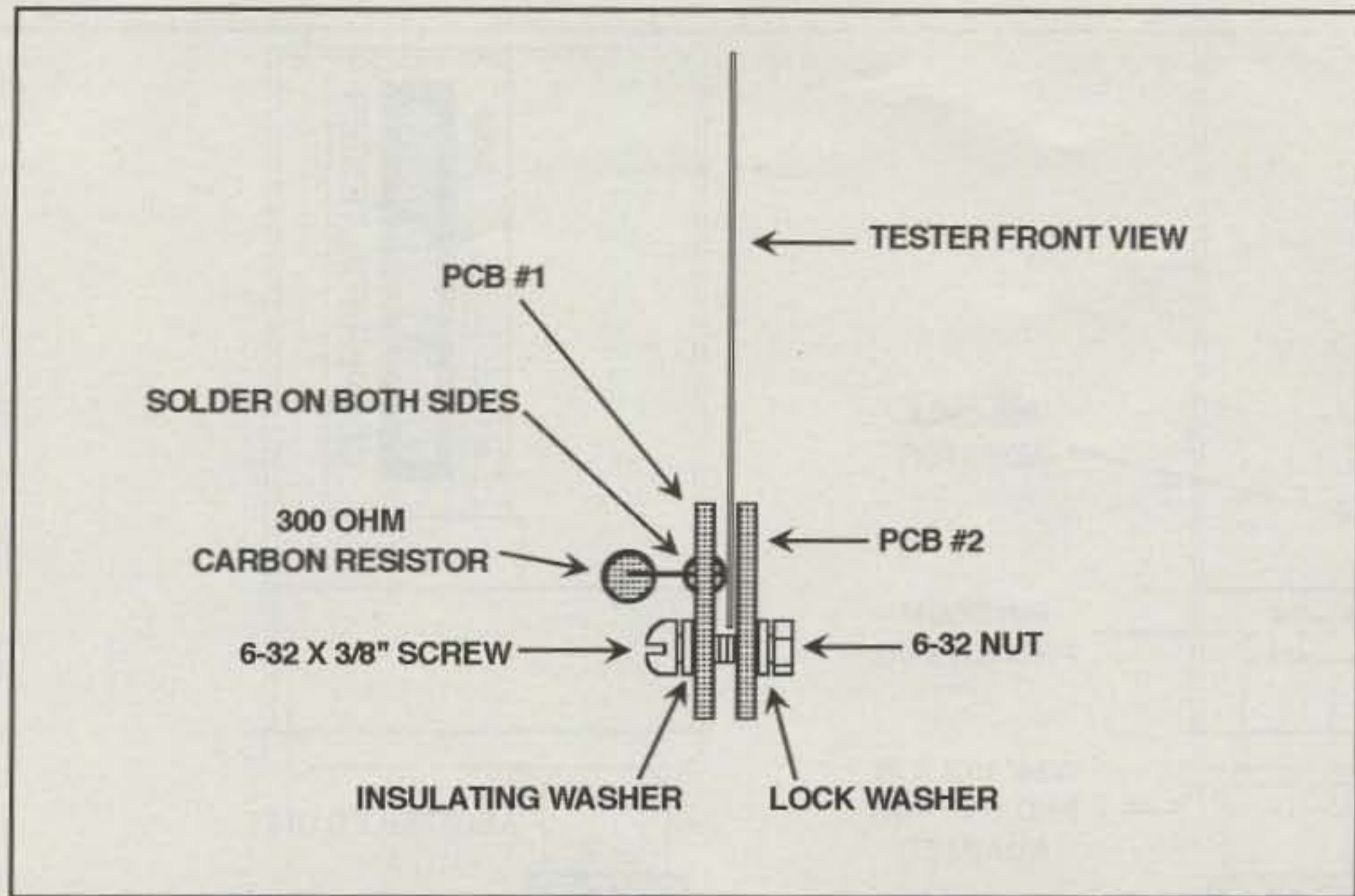


Fig. 2- Mechanical details for the two printed circuit board components.

counter sink. PCB #2 has the copper removed from both sides.

Once PCB #1 has been made, insert the leads of the 300 ohm resistor through the two 1/32 inch holes. Solder the resistor leads on both sides of the PCB. Cut off the resistor leads as close to the solder bead as possible, and then lightly file the lead so that it is smooth along the crown of the bead. The two solder beads provide the contact points to the battery tester. Carefully remove the tester from the blister pack, and assemble the tester and PCBs as shown in fig 3. When the screw is tightened down, the tester makes contact to the solder beads of PCB #1.

Drill a 5/16 inch hole through the removed end cap of the TIC-TAC® container (fig. 4). Press fit the phono jack end of the adapter through the 5/16 inch hole in the end cap so that the phono jack end is on the inside of the container. Solder a 1 1/2 inch piece of wire to the top of the barrel of the phono jack. Carefully

break loose the pin from the phono plug and solder a 1 1/2 inch piece of wire to the pin. Plug the pin into the phono jack. Solder the other ends of the wires to the PCB as shown, to make connections to the 300 ohm resistor and tester. Remove the label from the TIC-TAC® container using warm, soapy water. Next plug the tester into the adapter, and place the end cap back onto the TIC-TAC® container to complete construction.

By now a number of these units have been powered up. Typically, they indicate on the first segment around .45 watts, the second segment around .75 watts, and the third segment around 1.1 watts. Generally it takes about 30 seconds, at these power levels, for the segments to fully transition from the cold to hot temperature. Continuously applying power levels greater than 2 watts will begin to degrade the resistors, and 5 watts will melt the plastic segments in no time (10 seconds). A 50 ohm, 10 dB pad could be added to scale

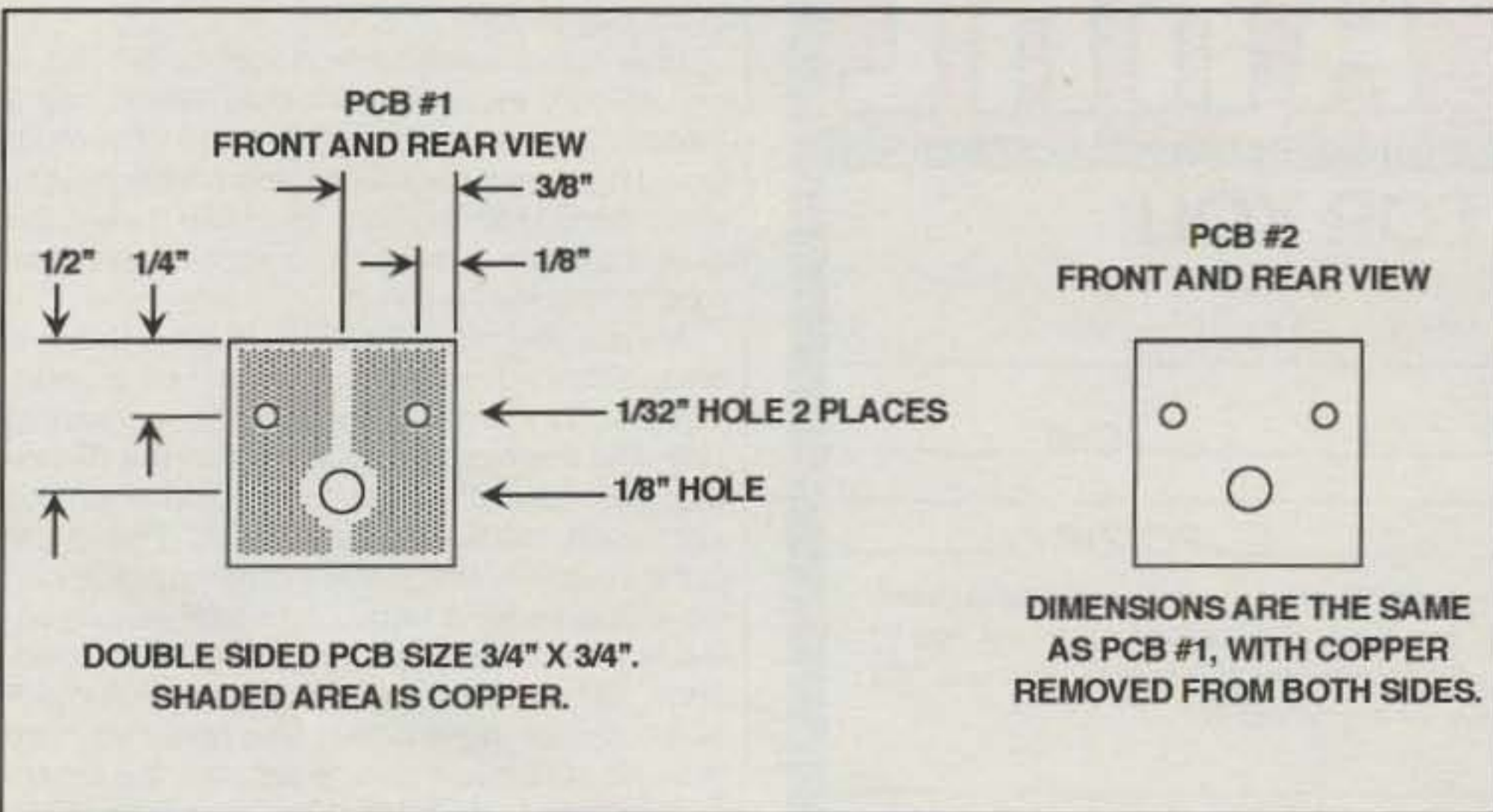


Fig. 3- Assembly details for the RF power indicator.



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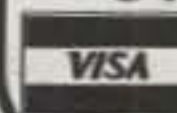
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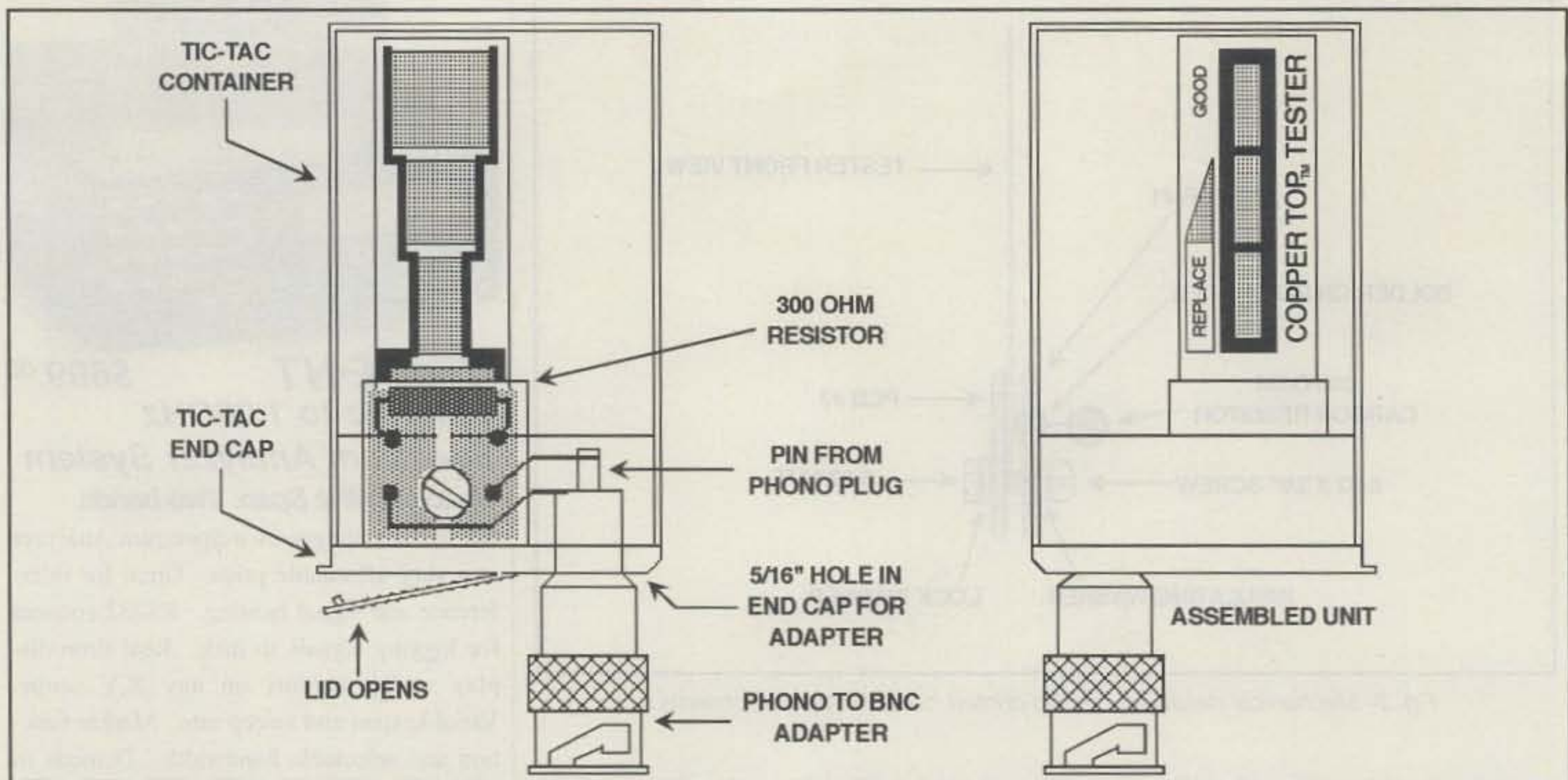


Fig. 4—The final assembly fits within a TIC-TAC® plastic container.

the tester range from 1 watt to 10 watts. SWR measurements up to 450 MHz were less than 1.3 to 1, providing the tester was not stressed by overheating. This unit does radiate, so be careful about keying up your local repeaters. Or better yet, have a thermochromic QSO to test it out!

The battery tester was invented by Robert Parker in Palm Desert, California. I had the pleasant opportunity of speaking with Mr. Parker by phone regarding the tester, and I discovered that he has been very active in thermochromic applications since the early 1970s. It began with his invention of the first "Digital

Thermometer" using thermochromic ink, patented in 1972. We all have seen this invention in some form or fashion, such as a desktop office thermometer, or a fish-tank water thermometer stuck to the glass, or a fever thermometer to be placed on the forehead of an infant, or in some other application.

Mr. Parker was also co-inventor of the "Mood Ring," which came out around 1974. Remember the Mood Ring? Somebody must, because millions have been sold. The Mood Ring was an idea that came out of studies using thermochromic ink in biofeedback applications. When a Mood Ring is placed on your fin-



Rear view of the unit out of the container. A bit of the PCB hardware and the resistor can be seen at the upper right.

ger, the thermochromic ink changes colors based on body temperature. This concept was spun off into other "mood" jewelry often found in novelty shops.

How about a soft turn-on light bulb? This is an ordinary incandescent bulb which has a thermochromic ink jacket. Instead of a room going from pitch darkness to instant brightness when turning on the light, this bulb makes the slow transition from dark to light as the thermochromic ink heats up.

Maybe you need the "Egg Right." This is a clear-plastic device shaped like half an egg. You place it in the water with eggs you want to boil. The thermochromic ink within the device displays color changes to indicate when the egg is soft, medium, or hard boiled. Then there is the reusable bottle thermometer which can be slipped over a baby bottle to measure liquid temperature. There are many other inventions, too numerous to mention here. A quick name search in the patent files revealed more than 40 of Robert Parker's patents, the majority of which were related to thermochromics. No doubt we will see more of his work in the future. Hey! How about a Thermochromic RF Power Indicator? ■



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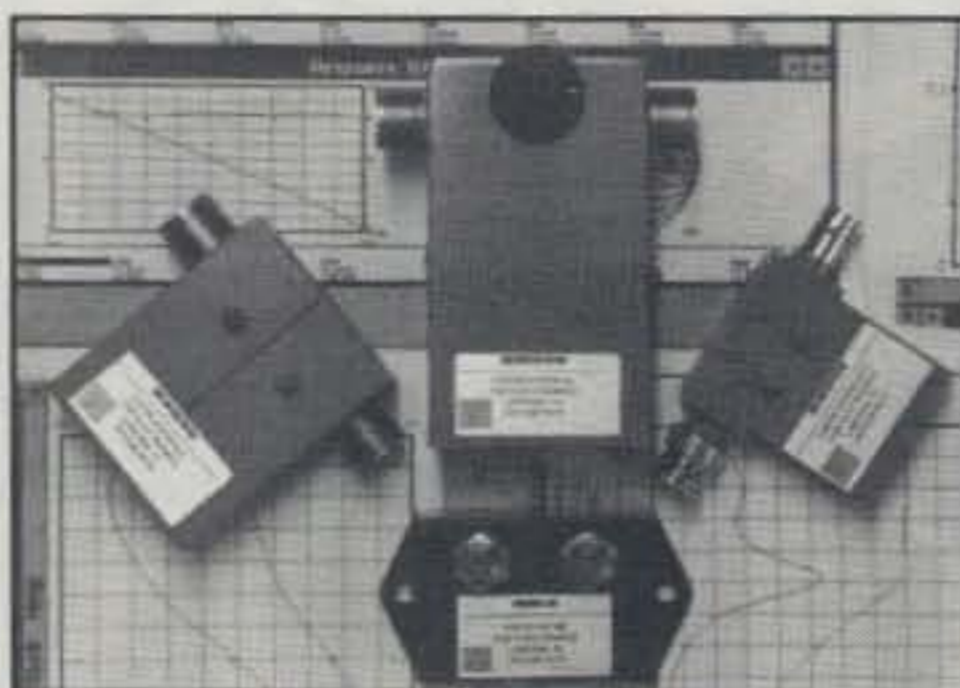
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PAR VHFDN152 Bandpass Filter

Par Electronics is now manufacturing a line of patent-pending filters to help solve the problem of intermod interference and desense on 2 meters. The VHFDN152 notches out paging services located in the 152-154 MHz range. Insertion loss is close to zero, VSWR is less than 1.2:1, and the filter allows for reception of the 120-175 MHz spectrum (except 152-154 MHz) for those radios so equipped. The unit is also transparent at 70 cm, allowing it to be left in line on dual-band radios with a single coaxial connector. Another smaller model rated at lower power (20W as opposed to 50W) has male and female BNC connectors, allowing it to be connected directly to an HT. Both models are made of brass housings and are priced at \$62 and \$68, respectively. Other models are available for UHF, custom-tuned frequencies and type N or BNC connector options.



For more information, contact Par Electronics, 6869 Bayshore Drive, Lantana, FL 33462 (phone 407-586-8278, fax 407-582-1234, e-mail to parf@aol.com), or circle number 100 on the reader service card.

JPS Revision 4.0 Firmware For the NIR-10

JPS Communications, Inc. now has Revision 4.0 Firmware available for the NIR-10 Noise and Interference Reduction Unit. The new firmware provides improved NIR (Spectral Subtraction) and Dynamic Peaking (PEAK) noise reduction modes. The new NIR upgrade also features an AUTO mode when the NIR control is turned fully clockwise. The PEAK function noise reduction level can be continually varied using the NIR control to give the most effective noise reduction in that mode. The NOTCH filter has been changed slightly to eliminate the "nasal" quality sometimes in "musical" voices. Also available is the SDK-12, a low-cost software development kit for use with the NIR-12 Dual DSP Noise/Interference Remover and Filter Unit.

For more information on either of these items, contact JPS Communications, Inc., P.O. Box 97757, Raleigh, NC 27624 (phone 919-790-1011), or circle number 101 on the reader service card.

MFJ-1778 G5RV Antenna

MFJ Enterprises, Inc. now has the MFJ-1778 G5RV antenna (MFJ-1778) in stock. The G5RV can be used as an inverted-Vee or sloper. With it the user can operate all bands, 80 through 10 meters, and even use it on 160 meters as a Marconi with a tuner and ground if used with an antenna tuner.

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Cubex "BUMBLEBEE" Quad

The Cubex Antenna Company has added a new product to their line of quad antennas. The BUMBLEBEE is a 6 meter two-element quad which is of all fiberglass construction with a heavy-duty aluminum mast-to-boom coupler. The antenna is fed directly with 52 ohm coax and features the exclusive Cubex tuning block which allows the antenna resonance point to be adjusted so that the entire 6 meter band can be used without completely changing the wire elements. The BUMBLEBEE comes with the driven element pre-marked for a resonant frequency of 50.4 MHz, which gives the antenna a bandwidth of 1.5 MHz at an SWR of less than 1.7 to 1. The antenna can be rotated for



horizontal or vertical polarization and has a boom length of 27 inches.

The BUMBLEBEE is available for \$69.95 F.O.B. Brea, California plus \$12.00 shipping and handling. For more information, contact The Cubex Company, 2671 Saturn Street, Unit E, Brea, CA 92621 (phone 714-577-9009; fax 714-577-9124), or circle number 103 on the reader service card.

AEA MacRatt™ III Now Available

Advanced Electronic Applications, Inc. (AEA) is now offering the new AEA TNC control program MacRatt™ III. AEA has re-engineered the new MacRatt III to fully utilize the features of the new Macintosh operating systems. The new software provides a multi-functional terminal control program for an AEA TNC. On packet, each station to which a user connects will have its own adjustable, split-screen window. Stream switching is automatic with just a click of the mouse on the window. A monitor/unproto window will display incoming packets. Unproto packets may even be sent while connected to others. For those TNCs with Pactor, Amtor, RTTY (Baudot & ASCII), Morse, etc., there are interfaces built in. Frequently used commands may be selected from the menus, dialog boxes, and buttons on the windows.

AEA MacRatt III supports VHF Packet (1200

and 9600 bps), HF Packet, Pactor, Amtor, Navtex, RTTY, Morse, TDM, and SIAM™. MacRatt III does not support black & white WeFax, QSO logging, or SSTV. MacRatt III requires Macintosh computers running System 6.05 or newer, 1 MB disk space, 4 MB RAM, a HD floppy drive, and an AEA TNC with August 1991 firmware or better. If your TNC has older firmware, you can purchase a full upgrade by calling AEA's upgrade hotline at 206-774-1722.

The suggested list price for AEA MacRatt III is \$99.00. Those who currently own MacRatt I or II can fully upgrade to the new version for \$55.00. For more information, contact AEA at 206-774-5554; or the 24-hour Literature Line at 206-712-8054; fax 206-775-2340; or write to AEA, P.O. Box C2160, Lynnwood, WA 98036; or circle number 105 on the reader service card.

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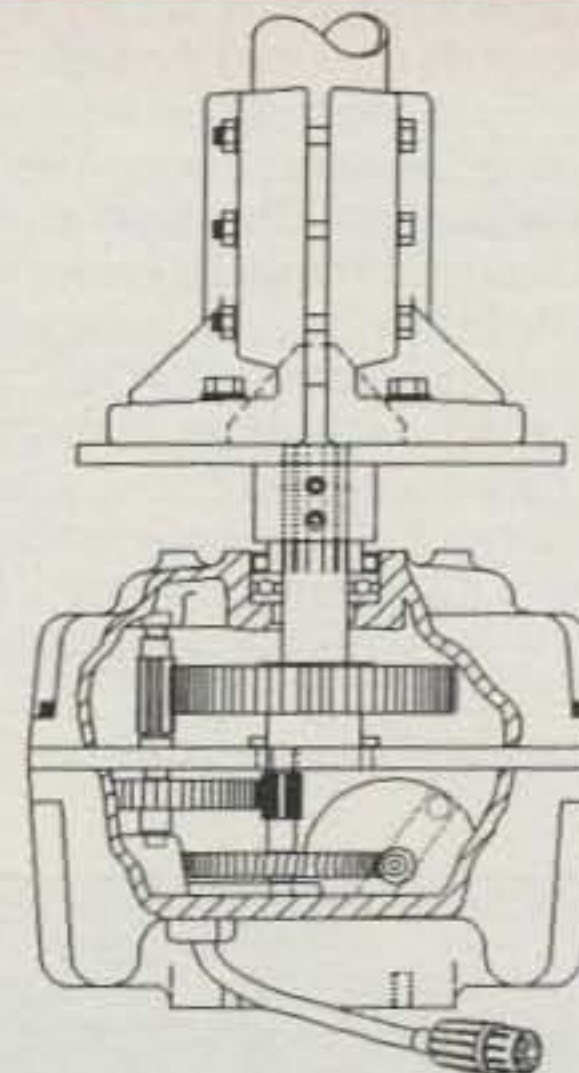
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The QRO Technologies QRO HF-1000 Linear Amplifier

BY PAUL CARR*, N4PC

Although my primary interest in amateur radio is QRP CW, high-power equipment is also part of my station. When I was asked to review this new linear, I accepted the assignment readily. I always find it interesting to get my hands on a new piece of equipment.

The QRO HF-1000 is a 1 kilowatt output linear that operates on 160 through 15 meters. The export model covers 160 through 10 meters. The amplifier uses a single 3-500C triode tube operating in grounded-grid class AB2.

I was especially interested in several points for this review: documentation, safety instructions, ease of tune-up, voltage regulation from key-up to key-down, and any innovations included in the unit.

The amplifier is shipped in three boxes. There is a large box which contains the amplifier and two smaller boxes which contain the power transformer and tube. When you open the amplifier box, you will find an extremely well-written instruction manual that will guide you through the final assembly of the unit. I was impressed with the fact that a safety notice precedes the transformer and tube installation instructions. If this is your first high-power amplifier, read and heed the safety instructions. There are lethal voltages inside the cabinet. The unit is protected by a safety interlock inside the cabinet, and by no means should you try to defeat its purpose. Follow the instructions for installing the transformer and tube and replacing the cabinet cover. Now on to the actual evaluation.

The manual gives approximate settings for the plate tuning and plate load control for each band. One thing I noticed was that there was an individual switch position for 160, 80, 40, 20, 17, 15, 12, and 10 meters. (The amplifier will come wired for 160 through 10 meters if proof of license is sent when the order is placed.) There are also corresponding input circuits from 160 through 10 meters.

Both the Tune and Load controls are vernier driven, which makes the tune-up procedure very smooth. Two lighted meters are used to monitor the amplifier functions. The meter on the left provides a constant monitor for the grid current. The meter on the right is a switched multimeter. There are positions to monitor plate voltage, plate current, power out, and ALC. The power output reading is in PEP, so there is no need for a separate wattmeter. I found the output calibration to be very accurate. There is a control mounted on the front panel to adjust the ALC voltage for the exciter. This is convenient, since the feedback voltage will vary from band to band.

The power transformer primary is tapped for just about any line voltage that will be encountered around the world. The unit comes wired

for 230 volts. The power supply is a full-wave capacitive-input voltage doubler. It is protected from damaging in-rush currents by a step-start circuit. There are eight 270 mFd computer-grade capacitors wired in series, which provides a capacitance of 33.75 mFd. This provides excellent high-voltage regulation.

I measured the plate voltage for the amplifier. With a line voltage of 230 volts, the resting plate voltage was 3000 volts. Under key-down conditions, the voltage dropped to 2700 volts (90% regulation). The output efficiency ranged from a low of 56% on 160 meters to a high of 64% on 20 meters. The output power ranged from 900 watts on 160 meters to 850 watts on 10 meters. The drive was 100 watts on all bands. At no time did the amplifier show signs of overheating. Another nice feature is that the internal fan is very quiet.

I tried another test for instability. With the high voltage on and no drive or load applied, I rotated the Tune and Load controls through their entire range on all bands. If there is any sign of abnormality, it normally will show up under these conditions. There was no sign of instability on any band. I will say that this is a clean amplifier.

The amplifier tank circuit is a pi-network arrangement, but it is a bit unconventional. There is a regular air-core inductor for 20 through 10 meters and a toroid inductor for 160 through 40 meters. The input of the network is designed to match the plate impedance of the tube, but the output is designed to match 200 ohms. The final transformation to 50 ohms is provided by a 4:1 toroidal transformer. This allows a load capacitor of smaller value, which saves space. Also, the 4:1 transformer provides a safety feature. If the plate blocking capacitors should short, the transformer will send the plate voltage to ground and blow the fuses in the power supply. There is satisfaction knowing that the output circuit is at DC ground potential. Both the Tune and Load capacitors are very rugged, and they look as if they would withstand any conditions to which they might be subjected.

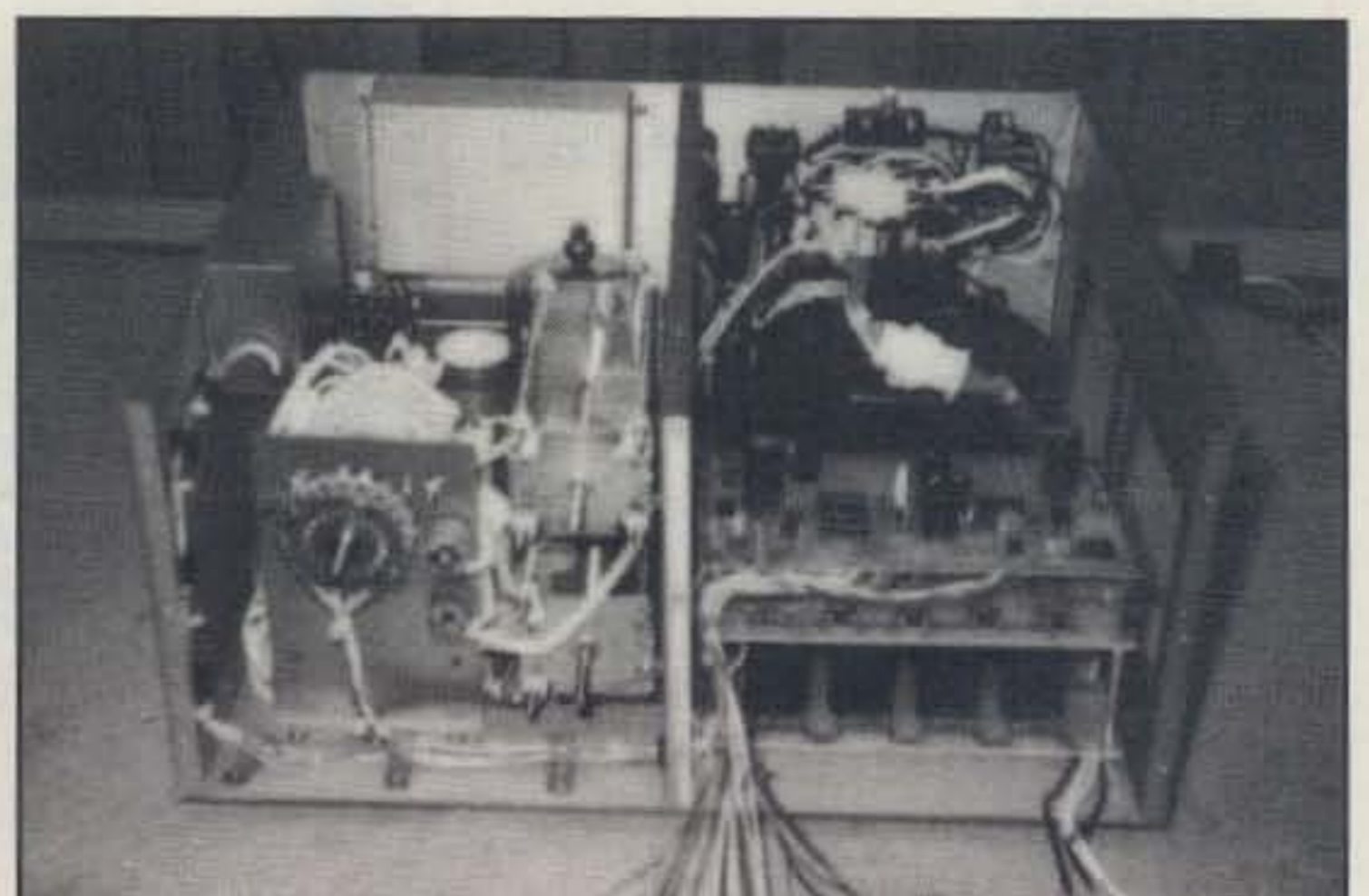
The HF-1000 has a full two-year warranty from the date of the original sale. It pays 100% of the parts and labor. You pay only the shipping cost to the factory. The tube is covered by the tube manufacturer by a separate warranty. The amplifier is sold factory direct, and as I mentioned earlier, if you supply proof of license when your order is placed, the unit will be furnished for full coverage from 160 through 10 meters. The unit measures 18"W x 15"D x 8 1/2"H. The shipping weight is 70 pounds.

The HF-1000 is available from QRO Technologies, 1117 West High Street, P.O. Box 939, Bryan, OH 43506 (419-636-2721). The cost is \$1495.00 for the basic unit, or \$1595.00 with the QSK option. ■

*97 West Point Rd., Jacksonville, AL 36265



Front view of the QRO HF-1000 amplifier. The unit features a nice, sleek design with easy-to-use controls.



Interior view of the QRO HF-1000 amplifier.

The Facts of Life

You don't have to be old or infirm to start wondering about what will happen to all your "good stuff" when you pass on. Will your spouse be saddled with a monumental archaeological task? Will a "kindly" fellow amateur offer \$.03 on a dollar to take care of everything? If you're like K2PMA, you'll start shedding some of that burden now, enjoy some new room around the house, and especially enjoy spending some new-found money.

BY BUDD MEYER*, K2PMA

A short time after I received my first Social Security check, an ethereal light came through the window of my radio room, laboratory, computer hutch, and all-purpose electronic stock room to illuminate four decades of test equipment, boxes of components, and amateur radio equipment. A thought struck me at the time—which was several do-nothing years ago. "Look at all this good stuff. What's going to happen to it when I've gone to the great DX land in the sky?"

Before continuing with the article, let me advise you that the situation at hand is neither morbid nor jocose; the listing of Silent Keys continues and eventually includes the best of us. The thought occurred to me that the surviving member of my family would be burdened with the task of clearing out a collection of "things" that she knew little about: a box of resistors, a voltmeter, a box I used to talk through and listen to that was called a transceiver, a bunch of strange-looking individual pieces the ultimate destination of which could be an incinerator. Having spent four decades surrounded by these things, they became almost a part of me. I spent those four decades in a hobby I enjoyed so much, a hobby that gave me a window on the world where I met most of my friends and acquaintances, where I enjoyed the verbal pleasures of dealing with my fellow amateurs all over the world. Having no heirs other than my wife—who, by the way, also enjoyed listening in on the activity as the perfect XYL—I became fearful of having her turn to an amateur friend who would help her dispose of my electronic estate. I have listened to many of these volunteers who mean well, but let's face it. It just isn't the same as your handling it yourself, which under the specific circumstance is, by definition, impossible.

So what to do? The situation we are dealing with here is an analogue to the making of wills. Less than fifty percent of the population have legal wills, and it's only after a probate judge hands your estate over to a stranger who is a lawyer and becomes your executor taking fees off the top that you realize that it's really a good idea to have a will(s). I think it took a decade

for us to overcome the inertia or whatever it is—to get wills. Making a will is a decision-making process limited to dispersing assets as opposed to disposing of material things such as resistors, transceivers, and the other good stuff I've collected over the years.

Well, fellows, after staring at the stuff in my radio room for a number of years—each year declaring that *now* is the time—I finally went and did it, and I'd like to tell you how. I'm not sure what caused me to overcome the lethargy, but during the five-year time frame I believe I had a couple of illnesses—nothing serious, mind you, but illnesses I've never had before and which had been described as illnesses of the aging. The time had come!

There are two primary approaches to disposing of merchandise that are available to amateurs. One is via hamfests, also called flea markets; the other is via private sale generated by responses from advertising in amateur radio publications. All the publications accept line by line "Ham Ads" which are handled differently than display ads. The former are sold by the word; anywhere from 20 cents up per word. The display ads are usually sold by the page or divisions of a page. Minimum sizes are one inch by one column. One inch is one inch but the column width varies from publication to publication. In the display ad space you can put in as much as you can legibly fit. There's an art to making up a ham ad. The publication reserves the right to stipulate the number of *letters* per line, which comes out as words per line and many an advertiser has spent days maximizing the information contained in a line of type using a minimum of words. Be advised that it pays to make clear what it is you are selling. Buy the extra word or two. Selling your entire ham shack requires a different message than selling individual radios.

The private sale is the route I chose and is the subject of this article. The beginning of your adventure is the very toughest part for either approach. First, you must decide absolutely and without reservation that "Yes! I'm going to clean out my ham shack so that my survivors won't be burdened with the task" and—most important—the usable equipment and components will not be sent to the trash pile. A

VTVM, a basic meter movement, resistors, tube tester, a signal generator have an almost infinite life. Just because a device uses tubes doesn't make it all bad. You must then take inventory. This is tough, especially if you waited too long as I did and became a fat, old man. It's no longer easy to get into those corners or under shelves. But you have to do this. Write it down.

For all intents and purposes, I have just finished a double session of sales via the ham ads. It was successful beyond my wildest dreams both financially and in dealing with the participants in the sale. I did not go through all the work involved just to make money. In the past I have tried to literally give away the merchandise I finally sold to schools, to groups of new amateurs, to not-for-profit organizations who dangle tax deductions which could put you into jail (not really). The schools wanted the stuff delivered, repainted, warranted for 2 years or 20,000 miles, and I was to spend three weeks explaining how the stuff worked.

The double session was two ads five months apart. The first ad of 45 words said that I had 40 years of goodies available. I named some of the merchandise but not nearly all, as an enticement and to keep the ad short and to the point. I asked the respondent to send an SASE (self-addressed stamped envelope) and even though, as I realized later, some of the newcomers to our hobby don't know what an SASE is, I received far more responses than I thought would happen. Upon receipt of the SASE, I sent out a 4-page list and this was a key to the success of the endeavor. The ads included my name and address but no phone number; you don't want to read your inventory over the phone. The list had my number and most of the sales were made via phone. The ads and the lists were directed to people who would be interested in some or all of a total range of merchandise available as opposed to the purchase of specific radio equipment and/or accessories.

I explained in the list the reason I was selling, the fact that all active equipment was in working order, a warranty disclaimer, and the financial terms. All sales required a bank check made out to me and was to include an agreed-upon shipping expense which was a

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W - 30

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Frequency: 500kHz - 1500MHz
Impedance: 50 Ohm
Material: Fiber Glass
Length: 43.3 inches
Connector: Low Loss "N" type
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SCANMASTER 1500

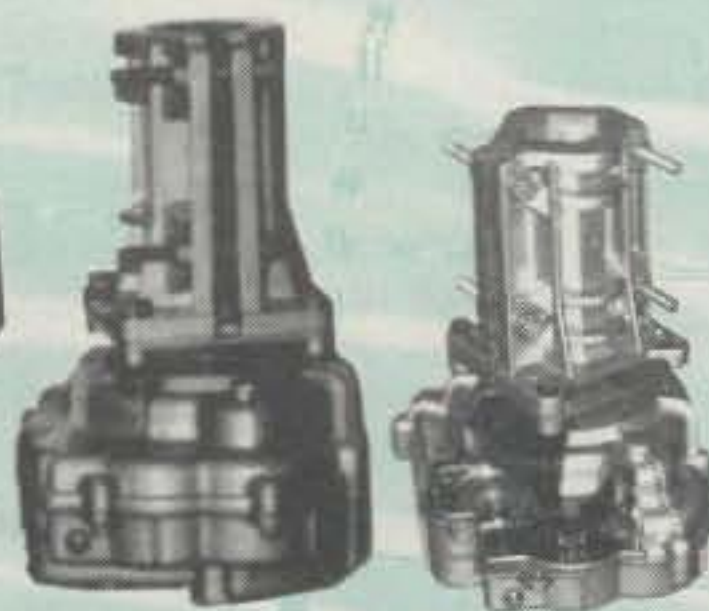


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Model	Roto Tq.	Brk. Tq.	Sq.Ft.	Vert. Load
HAM IV	66ft#	417ft#	15	400
RC5-1/3	43	506	13	880
G800SDX	43-79(2)	288	17	1320(1)

Model	Roto Tq.	Brk. Tq.	Sq.Ft.	Vert. Load#
T2X	83ft#	750ft#	20	800
RC5A-2-3	116	1085	25	1540



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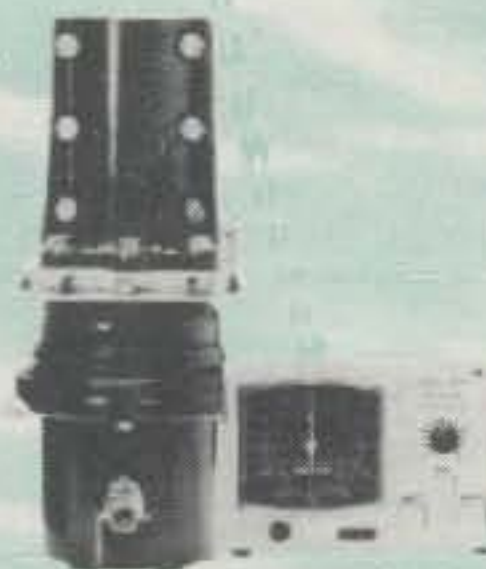
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1300MSAX

GD²1800kgm²
 1300MSAX is designed for larger antenna arrays and has forged steel gears that withstand large external forces. Double gear and twin drive design, plus powerful patented braking function. Preset and computer control. 100Volt motor for low power loss over long control cable runs. Compare to HDR300 & Yaesu G2800SDX.



747SRX/ 750FXX

GD²400kgm²
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It offers greater than +35dBm IP3 (Intercept Point 3) and greater than 100dBm dynamic range. The DMOS FET QUAD first mixer with NCO drive DDS offers the ultimate performance.

All this and great sensitivity better than 0.5µV for 10dB S/N in AM mode and better than 0.3µV for 10dB S/N in SSB. Selectivity too is razor sharp offering greater than 90dB @ 10kHz SSB and greater than 100dB @ 20kHz. No other receiver "in the class" nor indeed at considerably higher price can match the sheer performance excellence of the AR7030.



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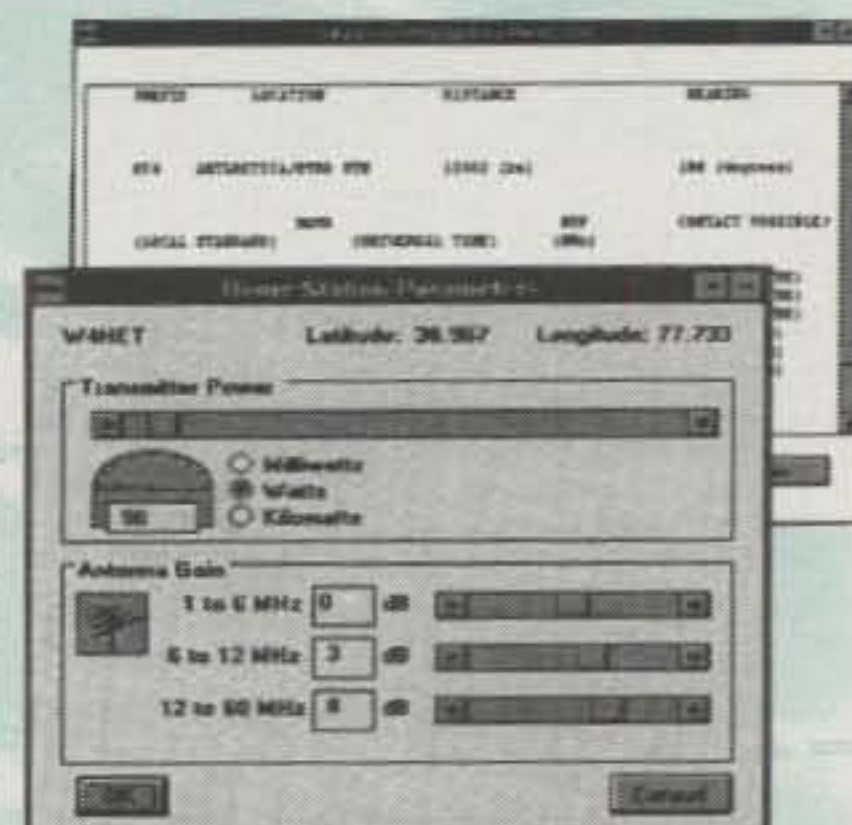


One Antenna Does It All! 25 - 1300MHz, the CREATE CLP Series offers outstanding performance with high forward gain and low transmitting VSWR of less than 2:1 across a broad range. Extra strong commercial grade aluminum and magnesium construction withstands the worst weather for unsurpassed long-term reliability. Multipurpose horizontally or vertically mounting with included hardware and complete instructions. Can pass as a conventional TV antenna. Perfect for apartment dwellers and those with limited space or antenna restrictions.



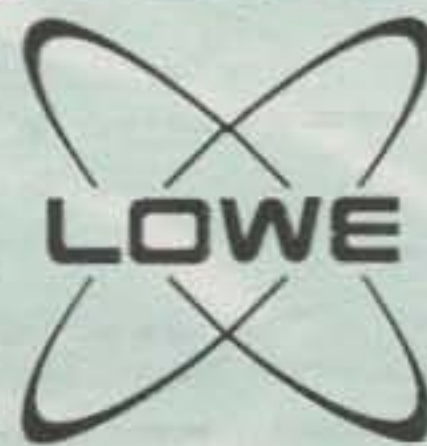
Skywave Propagation Prediction Software for Windows 3.1/Windows 95

Tell SKYCOM where you are, your transmitter power and antenna gain. Enter the current Sunspot Number or Solar Flux measurement. SKYCOM's windows simplify data entry. Pick a location from SKYCOM's database of over 400 call sign prefixes, using SKYCOM's database search tools or map. You can tailor the SKYCOM database to your own needs by adding additional locations. Instantly obtain prediction reports that tell you the best time and frequency for your transmission. You can also obtain a detailed report that lists the vertical critical frequency, frequency of Optimum Transmission, Signal to Noise ratio, and other data. SKYCOM 2.0 includes an on-line beam heading reference to the direct and long path bearing and distances (in miles and kilometers) from your home station to all locations in the SKYCOM database.



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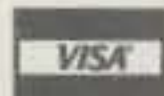
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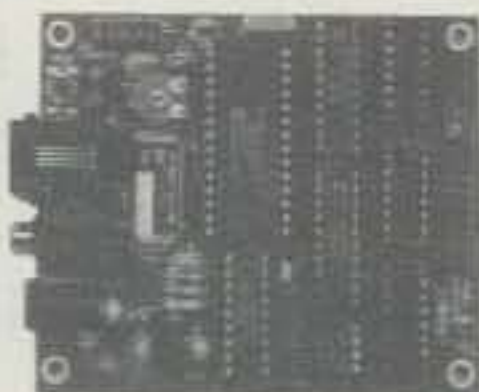
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CIRCLE 71 ON READER SERVICE CARD

guess—overage refunded. Trust me! I did receive one personal check, but it's not too dangerous to accept those because banks on both ends charge big money for bouncing checks. It's best that you wait for a personal check to clear, and this is going to hold up the buyer's receipt of the goods. Buyers always want the stuff in a hurry; you know, once you've made up your mind to buy something, you want it now. I'm not sure that this holds for all banks, but I learned that if you ask, a bank where you have an account may have special 24-hour clearance deposit slips for bank (teller) checks. Otherwise it can take five working days for a check to clear!

I then listed my inventory. I noted the manufacturer and described the equipment and mentioned some salient features. A very important part of selling capital equipment is the availability of operating and service manuals and schematics. Are they there or aren't they? Be very honest about the condition of the equipment. I firmly believe that if you try to "get away" with something you will only harm yourself. Dealing with a stranger, sometimes a continent away, can be very pleasurable.

Separate each item with a space. List your components as package deals. If you have a multidrawer parts cabinet full of good things as I did, describe the entire contents and attempt to sell it in one package. I went through the exercise of making a computer drawing of a 24 cabinet interlocked monolith showing the contents of each drawer. Fortunately, a smart local buyer came in, looked at the contents, picked up the whole set, and walked out with it—after COD, of course.

Make sure that prospective buyers know what it is they're buying. With all that I sold there was never any disappointment stated that I'm aware of. As I sold off inventory, I updated my list regularly because I found new things as I shipped items out. Keep the list up-to-date and date coded. A word to the wise: Keep one copy of each revised list you send out because you are going to adjust prices as you go along and you don't want items already sold continuing to show on your list.

I cannot stress too strongly the use of a multipage typed listing. If you don't have a word processor, take the list to a place that sells secretarial services. Try enlisting the aid of a secretary in your office. There are copying machines everywhere. Make copies only for current requests because the procedure becomes pretty dynamic and changes rapidly. Make it clear that sales are on a first-come, first-served basis and that you retain the right to choose the buyer. The "4-page list" seemed to intrigue the readers—two pages front and back. The number of pages is not as important as the perception of presenting a professional approach to the task at hand. There's no rule regarding the number of pages.

I still have items to sell; some of the things I didn't get calls for and probably never will and some major capital equipment I listed only recently when I realized how well the program went. I even have some items that I listed incorrectly—either in description, in packaging, even pricing.

I made a computer program that has the name and address of everyone who replied to my ads. Someday I'll figure out the best way to utilize it. In any case, it's a good backup had I lost SASEs.

Now we get to another important aspect of

clearing the shelves. Pricing is closely akin to witchcraft. I have been in the electronics businesses for close to 40 years, from audio design through UHF amplifier design, and from rookie engineer to plant manager to sales engineering. I guess I have more of a feel for the worth of a given whatchamacallit than a doctor ham, a lawyer ham, a teacher ham, a construction ham, and so on.

Don't be surprised to learn that the person you are dealing with is not in amateur radio. People buy all sorts of things for all sorts of reasons. Anyone who is finally going to do the right thing now and clear out useful electronics, passive or active, has probably had it for quite a while. Old it is, useless it is not. I have sold a VTVM that was more than 30 years young, an AM signal generator that a chap was anxious to get, a 40-year-old text book that happened to be the best of its kind ever published. My first list contained pricing that was the result of the wildest guessing you could imagine. I knew from the start, and I must impart the knowledge to the readers of this article, that it's not the worth that's in your heart but what it's worth in your head. The famous bottom line is, as always, is it worth more to you than to a prospective buyer.

With each individual listing of inventory, the last words in the description were BEST OFFER FROM . . . \$. I made every effort to put in a dollar figure. Sometimes I couldn't. I asked for feedback from respondents and got it. Be advised that the merchandise that sold first was the merchandise that had a price attached; it was not necessarily the final sale price, but it gave the buyer an idea of where we were at. There were cases where I asked for a specific price on an item and was paid more, much more than my listed price. You must steel yourself when pricing your beloved items; that thing of beauty in your eyes you've owned and handled for decades is an incipient "steal" to a prospective buyer, or a piece of junk. You must absolutely, positively suppress all emotion when pricing. I have found, however, that pricing for ham ads is not nearly as critical nor as tight as it is for fairs. Depending on geography, the prices you get at a fair, better known as a flea market—and those are the operative words—are much more difficult to achieve. No matter which way you sell your goodies, you will not become rich!

I mentioned above the pleasure of dealing with amateurs who agreed to make a purchase via my ham ad. In my inventory list I state that I didn't have the time nor inclination to bargain very much, but made it clear that nothing was cast in concrete. This was a whole other world from the experiences I have at flea markets. Sure, there was negotiation. It was yes or no, reasonable numbers, done as gentlemen.

It isn't all fun and games. You don't sit back and just collect the money . . . as large or small as it is. You do have to complete the transaction by shipping things out all over the country. You have to make absolutely certain that your shipment will stand the stress of bashing, bouncing, bobbing, blasting, beating . . . well, you get the idea. Because it was convenient, I shipped all but two packages via Parcel Post Insured.

I must mention the fact that since, by definition, people most interested in the subject of this article would likely be older rather than younger, convenience is a most important attribute to our endeavors. I did not wish to

carry anything weighing more than 20 lbs. If you can get your buyer to agree to it, the best way to handle shipments is by utilizing the services of packaging stores that have sprung up like weeds—probably in every medium-sized town in the country. The problem is expense. Yes, they'll pack it as it's supposed to be packed and ship it via the best method that packages can be moved—I speak of UPS, of course. I highly recommend that you convince the buyer to spend the extra cost to ship large and/or delicate objects. Packaging stores charge mightily for packing; there is a surcharge for UPS shipment and there is the UPS shipping charge—which is the most reasonable part of the deal. I did not utilize packaging stores at all. Get the dimensions of the item(s) and add about 4 inches minimum in three dimensions. Then you want to go to a supermarket where they are restocking shelves; these days it's practically 24 hours a day. Go down the aisles with a tape measure in hand and pick up a carton that has the correct dimensions. The clerk will be happy that he doesn't have to cart it to the binding machine, or ask the store manager for permission to go to where the boxes are being dismantled and bound. Be sure you get a carton that does not have the top cut off, is well constructed, and is sealed closed by its flaps on the bottom. You can purchase boxes at packaging stores at a reasonable price and they have a wide selection of sizes. The Post Office has a limited selection of cartons, and of course there are always office-supply megastores such as Staples and Office Max, but they usually ask you to buy multicarton packages, which may be wasteful.

There's a pleasant alternative to shipping via the Post Office, and that is UPS. You can take the carton to their depot or it can be picked up. The negative is that they charge for picking up if you don't have an account with them. Their rates are very reasonable, however, and I must relate the story of shipping an antique radio which weighed 34 lbs. plus another package of 14 lbs. I called 1 800 PICK-UPS and a sweet young thing in Texas said that there would be a UPS truck at my home by 2 PM the next day. You give her the weight—which the drivers confirm by "feel" and experience and dimensions of the carton(s)—where it's coming from, and where it's going to by ZIP code. She gives you the cost and you can pay the driver in cash or by *personal check*! Yep, the pickup was made right on time. If it weren't for the convenient UPS pickup, I would still have the radio, because there's no way I'm going to move 34 pounds!

The standard method of closing cartons today is with 2-inch wide sealing tape. Be sure you check the thickness of the tape measured in mils (.001 inch); you're looking for something in the 2.5 mil range. Don't buy the least expensive stuff. As a point of information, I had some rolls of standard 2 inch duct tape that I used up, and it worked so well that a UPS man complimented me on the package (What a thrill). You might want to add a strip of 3/4 inch filament tape around your package after you seal it up. That tape is terrific. Address the recipient with a bold, permanent marker pen and don't forget a return address. I cover the addresses with 3/4 inch clear Scotch-brand tape. No need to buy the special wide tape made for the purpose. Save your money.

Let's get to the dunnage; that's the pack-

aging material. You can buy or reuse bubble packing and/or polyethylene "peanuts." That stuff drives me nutty, but it's perfect packaging material. It can be purchased at packaging stores and office-supply stores. The problem is the usual requirement that you have to buy too much or too little. So I used newspaper. If you're careful and pay attention, there's nothing wrong with it. You roll it up like a log or in a ball and cover the bottom of the carton. Place the part in the middle of the carton horizontally and vertically and then stuff crushed paper around it. Don't make the logs too hard; they are supposed to "give." Use a lot of them; the more used the better the cushioning. As a last step, cushion the top of the item; make sure that the top of the carton "bows" outward a bit, so that you need a little pressure to close the top. Then take the carton and shake it. Nothing should feel or sound as though it is moving. You can make a shippable package using newspaper.

Wherever I could, I put little surprises in the

carton in the form of a hard-to-get spare tube, some fuses, pilot lights, whatever spare parts I had that would make the recipient know that I appreciate his trust in this seller and so that there is a smile on his face as he digs through the newspaper.

For all you Old Timers and future OTs, I hope to get you moving. When I looked at the great equipment and components stored in nooks and crannies, I decided that I didn't have the heart to just throw the stuff out. It is true that amateur radio has reached a nadir when it comes to having amateurs look at the inside of their equipment, much less build things. There are a surprising number of people out there who are interested in antique electronics and, believe it or not, in AM equipment. Some buyers surprised me with their reason for buying my goodies; some of the things I sold surprised me. I'd like to exhort you to help your heirs. If nothing else, don't let electronic inventory go to waste for lack of a little initiative. This article shows you how to do it. ■

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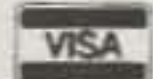


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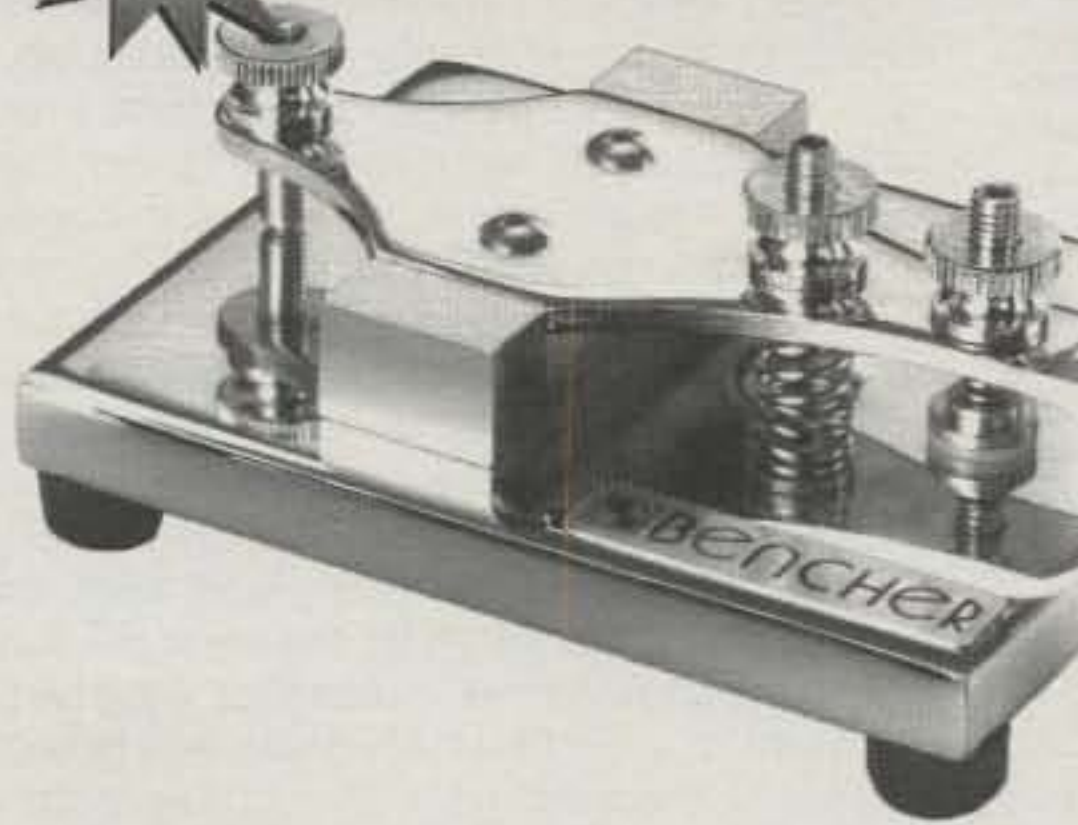
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ALL ABOUT THE WORLD ABOVE HF

Summertime Antenna Installation

It's halfway through the summer. Sporadic E has been especially good, but somehow you think that you're missing something. "Maybe," you think, "it's in the antennas." So you contemplate what you want to do, what you want to change. If this describes you, what follows are some safety ideas that will help you be safe while you experiment with your ideas for change.

As you well know, your antenna is an integral part of your amateur radio station. It is also one of the most difficult and dangerous parts of the station to work on or install. Here are some safety ideas to help alleviate or even eliminate some of the dangers of working on your antennas.

Before doing anything, sit down and read *The ARRL Antenna Handbook*, particularly the first chapter, as it is an excellent source of background information while you are planning the installation of your tower/antennas.

Throughout any antenna installation, give yourself plenty of time to finish the job. Take your time putting the antenna up and keep your mind on your work. It's never a good idea to put up any antenna just hours before you absolutely have to use it. The morning before the CQ WW VHF Contest is not the time to get started!

I know that Field Day encourages swift emergency installation of entire stations. Even then I think it's a good idea to go through a dry-run exercise before the quick installation of any antenna setup. This way you can go slowly and work out any bugs associated with your particular installation.

If you plan to work during this time of the year, have plenty of thirst quenchers, juice, and bananas available. Take frequent rest breaks and replace your lost liquids and potassium with the above-mentioned items. Sodas and beer are not what you want to be guzzling while working on the antenna.

Now for the installation: First, if this is an initial installation, or even if you are significantly upgrading your antenna farm, before beginning any work on your antennas plan every step. Draw a diagram and a plot plan of your house and lot showing the location and height of the antenna support (tower or telescoping mast), the length of guy wires, and the location and relative height of any power lines. Regarding power lines, note where the utility poles are relative to your lot and where the service drops leave the poles and attach to your house. There could be upwards of three different drops—one for electricity, one for the telephone, and one for cable TV—and each could be on a separate pole!

Speaking of power lines, they are the most important item to consider during your anten-

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VHF PLUS CALENDAR

July 7	Last quarter Moon. Moderate EME conditions.
July 13	Highest Moon declination.
July 13-14	CQ WW VHF Contest. (See last month's issue for rules.)
July 14	Very poor EME conditions.
July 15	New Moon.
July 17	Moon Apogee.
July 19-20	National Balloon Symposium. (See last month's column for details.)
July 21	Moderate EME conditions.
July 23	First quarter Moon.
July 26-28	Central States VHF Conference. (See text for details.)
July 27	Lowest Moon declination.
July 28	<i>Delta-Aquarids</i> meteor shower predicted peak. Extremely poor EME conditions.
July 30	Full Moon and Moon Perigee.

*EME conditions courtesy W5LUU.

na installation. According to OSHA, the Occupation, Safety, and Health Administration, the distance between an overhead power line and your antenna should be at least ten feet. Your local ordinances may require even more separation. Before beginning work, check with your electrical utility, telephone, and cable TV companies and local government offices for the regulations in your area.

Furthermore, when noting the location of those power lines, plan your antenna's location as if you expect it to fall. If your antenna is higher than the power lines, determine if it, the pole, the tower, or the guy wires will fall into the power lines on their way down. If you're planning to install your antenna on top of a dwelling that has a service drop from the utility pole, make sure your antenna, pole, tower, and/or guy wires won't fall on or anywhere near those service drops. You may think that you shouldn't be concerned with cable TV and telephone wires because low voltage travels through them. Consider this: A pulled telephone line, strained by a mast falling onto it, could cause a chain reaction resulting in the utility pole falling, thereby possibly taking down electrical wires.

Next choose your antenna support. Many VHF+ antennas are light weight and can be mounted safely on push-up or telescoping masts. Often these masts are installed on a roof. If you plan a rooftop installation, I recommend that you use a mast no longer than 30 feet. Although masts come in telescoping sections that reach heights of nearly 50 feet, the extra 20 feet make the installation potentially unstable. The 27 or so feet of the mast, coupled with the usual 15 feet at the peak of the roof of a single story dwelling, places your antenna up around 40 feet. That's plenty high enough for most casual weak-signal work, and often quite high enough for the serious DXer.

I once showed my installation to a well-known west coast DXer. My 5-element 6 meter quad was mounted on a 25 foot telescoping

mast on top of the house. The house is situated so that between northwest through west the antenna is just barely above the height of a freeway onramp and overpass. Additionally, to the south are plenty of trees. I reported to my friend that I had worked nearly 50 countries on 6 meters with that setup and a 150 watt brick. He replied that he couldn't see how. Nevertheless, the facts speak for themselves.

Incidentally, my first contact with that quad was with Alaska! Maybe it's the signal being reflected off the tops of the cars on the freeway during its initial takeoff that makes the difference in that direction. Maybe it's sort of an unusual ground gain effect. But I digress. Back to the subject.

About parts: Don't be cheap. Even though you are working with lightweight items, such as the mast and antenna, choose the best guy wires and guy hooks you can find. I once saw the results of one guy wire that broke on a 100 foot tower. The two other guy wires could not hold the antennas and everything came down, sheering off the tower at approximately the 65 foot level.

About help: I know that sometimes we macho men think that we can do it all by ourselves. Don't fall into that trap! Be sure to always have an assistant with you when installing antennas. This is a rule that I haven't always followed, to my regret, as you will see below. There are two reasons why you should always stick to this rule: First, any antenna installation is much easier with help, and second, but most important, it is much safer if you have help.

While working anywhere near the antenna, be sure that both you and your assistant are wearing hard hats. If not, it is very likely that a piece of the antenna hardware will take aim at your head on its way down.

Regarding ladders, always use an electrically safe ladder for any antenna work. One made from wood or a nonconducting material is satisfactory. Never step higher than the

second to the last step of your ladder. The top of the ladder is the point where the two sides are joined together. It is not for you to use as a step, nor to put tools, rotors, etc., on it. Furthermore, while you are on the ladder make sure that your assistant holds it at all times.

If you're going to install a telescoping mast on your roof, make sure the roof is safe, dry, and in good repair. When I worked for my brother in the construction business, I saw just how unsafe roofs in need of repair can be. We never experienced any injury because we took safety precautions when we were on the roof. Therefore, if the roof needs repair, have a professional make the repairs. In the meantime, stay off it until it's been fixed. Another thing: If the roof is wet, again stay off it.

When you're ready to go on the roof, take a handheld with you. Although it may be a bit embarrassing to ask someone on the repeater to come over and reset the ground-to-roof ladder for you should it fall (assuming both you and your assistant are on the roof together, or like me you are working without an assistant), it's far safer to call for help than to jump off the roof and reset it yourself. I speak from personal experience. I did not have a handheld and the ladder fell. I also did not have an assistant working with me! I had to find where the fence post reached up to the edge of the house, go to the edge of the roof, slide down to the top of the fence pole feet first, then gingerly work my way down the cross bars of the fence. It was not fun!

Remember, when you're on the roof, you can fall off. Know where cables, guy wires, and tools are in relation to your body. Wear shoes that have the necessary traction for walking on the incline of the roof. If the incline is too steep for you, stay off.

Here is a safety hint for staying on the roof: When I was in Montserrat on a mission trip working on a church roof following Hurricane Hugo a few years ago, I observed that the people on the team with me who were working toward the peak used a rope tied around their waist and secured to the underside of the opposite eave as a way of staying on the roof. Additionally, the carpenter on the team built continuous scaffolding across the side of the church where we were working. That way if someone had slid off, his or her (yes, we had women on the roof) fall would only have been a few feet. Fortunately, no one fell off.

You may think that safety ropes are a good idea for a pitched roof, but that you don't need one for a flat roof. Think again! One of the most dangerous roof jobs that I worked on with my brother was a flat roof. What made this job dangerous was that the building, a multi-story apartment building, was under the flight path of San Diego's Lindbergh Field airport. The jet wash of the landing planes was so terrific that we tied ropes around ourselves so as not to be blown off the roof!

When installing the mast on the roof, make sure the bottom of the mast has no way of moving. Use a tripod that's securely bolted to the roof and reinforced from underneath. How do you do this? Find out where the bolts of the tripod will be making their entrance into the attic by drilling a small hole through the roof at the mounting points of the tripod. In order to find your place in the attic, stick a piece of wire with white or light-colored insulation (white house wiring is perfect) through the hole so that you can spot it while you are inside the attic, mak-

ing sure that the wire doesn't fall through the hole from the outside.

Once you locate the holes inside the attic, next measure the distance between the joists (assuming that you didn't drill into one with your test holes, and you would know that when you tried to slide the wire into the hole). After completing that measurement, cut a 2 x 4 (minimum; 4 x 4 is preferred) to that length. Back inside the attic, place that 2 x 4 board between the joists, flush against the inside of the roof. Then securely nail it in place by using at least three nails through the joists, into each end of the 2 x 4 board. You may think that this is a lot of trouble to go through before installing your antenna. However, you will be very glad that you did it when that horrific wind comes by and attempts to tear your antenna, tripod and all, off the roof. One other thing: Don't be cheap on the wood. Use top-quality 2 x 4 wood for obvious reasons.

Here are a couple of things to do on the ground before working on the antenna on the roof. First, calculate the amount of guy wire you

need to reach the top section of the fully extended mast. Second, fully extend the mast, locating the matching holes where the cotter keys will be installed. Once fully extended, mark the mast by drawing a line all around the circumference of the smaller mast. Then draw a line from about a foot above the sleeve point to the sleeve point directly in line with the holes. Repeat this process for each section of the mast. These marks will be good indicators for you to know while you are raising the mast when you are about to reach the hole of the interior pole. Use an indelible marker so that water or sweat will not wash off the lines.

Once you are ready to work on the roof, make sure that you have everything up there with you. Your first order of business is to install the mast in the tripod. Next carefully extend the mast, without the rotor or antenna, and securely attach the guy wires to the guy points. Leave enough slack so the mast doesn't bind when it's fully extended. Now install the rotator first, then the antenna. Do not attempt to install the rotator and antenna simultaneously, as this is

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too much weight and bulk for you to carry while working over your head.

Never install an antenna that's too large for the mast capacity. If you have doubts, go to a place that sells television antennas and look at the largest log periodic they sell. If your antenna is bigger than that, use a tower or some other support.

That long-boom antenna may seem relatively light when you lift it. However, it presents a tremendous torque when whipped back and forth by 60 MPH winds. There's enough torque to damage the rotor break and cause the antenna to freewheel on the mast or even twist the mast. If you want to install a long-boom antenna on the roof, use a properly installed and guyed roof-mounted tower, and a mast with a minimum outside diameter of two inches. Always use a rotor that can support the wind load of the antenna. I am repeating myself here, but I must say that you should always use guy wires that can handle the wind load of the antenna, rotor, and mast. *Never* compromise on anything.

Once the antenna is in the air, make your mast turning adjustments for calibrating the rotator control box. (I've used a large pipe wrench snugly affixed to the base of the mast to make this adjustment.) Then tighten the guy wires and the bolts on the tripod to secure the mast.

Your antenna/mast installation is now a lighting rod. To counteract this attribute, attach one end of a number 8 wire to the base of the mast and connect the other end to an earth ground via the shortest path possible. An earth ground is an 8 foot long copper rod with its entire length pounded into the ground. I know that after 6 feet the hammer is heavy and the arms are very tired. However, you must resist the temptation to saw off that remaining length above ground. There are no substitutes for a proper earth ground.

What if you find you don't have the nerve to be on the roof? That's okay. Some members of our Montserrat roofing team didn't either, and that was respected by the other members. These "grounded" team members performed other very valuable services for the roofers. If you feel that you don't want to be on your roof, then stay off! Hire someone to professionally install your antennas. It's a lot less expensive to pay that person than to pay for your hospital bill should you lose your nerve and fall off!

If you are installing your antenna on a tower, first check with your local officials concerning zoning regulations, engineering requirements, and restrictions concerning tower installation in order to see what is permitted in your area. The FCC's regulation, known as PRB-1, does supersede local restrictions, but only to the extent that the local regulations should make "reasonable accommodations" for your antenna installations. It is up to you to find out what those "reasonable accommodations" are.

After determining what you can put up, then consult with the engineers of the tower company concerning anything that might be required for safe installation of the tower you've selected. Among the items to consider are the amount of concrete required for the base, the type of guy wires to use, the requirements for concrete at the guy anchor points, and the various additional hardware pieces you will need.

Always use a tower and rotor strong enough to withstand the wind load of the antennas you are installing. If your tower is to be guyed, make

sure the guy wires are the proper strength and won't travel into power lines should they snap. Carefully follow the manufacturer's instruction when installing the tower.

When on the tower, wear a safety belt designed to handle your weight. Check it every time you plan to use it for cuts or nicks in the leather. If the belt is cut or nicked, discard it and get a new one. As with the roof/mast installation above, have all members of your team wear hard hats. You may forget about the antenna or gin pole that's just above you as you're climbing up the tower. Also, you never know when a wrench or an antenna may come down. Resist the temptation to follow the item down. If it falls, even if it is your new \$300 antenna, let it go. It can be replaced; you can't!

Ground your tower to at least three 8 foot ground rods installed in a triangle around the base of the tower. These ground rods must be connected to each other and to each leg of the tower.

If your tower is a crank-up model, be sure that someone you know who can be contacted in an emergency knows how to lower it.

One final note about antennas: Don't work around or near any antenna that has power applied to it. According to the American National Standards Institute (ANSI), your body has an increased susceptibility to RF damage in the 30 MHz to 300 MHz range. The 6 and 2 meter and 135 cm amateur bands all fall within this frequency range.

Also, when thinking about RF energy keep in mind that your microwave oven uses microwaves to cook meat. Like it or not, your body is a piece of meat. A friend of mine once worked on a fire control radar antenna when it was live. He told me later that he felt parts of his body get warm from the RF radiation. The jury is still out on whether or not RF radiation can cause cancer or cataracts, but, it's better to be safe than sorry.

Current Contests

Elsewhere in this issue you will find the results of the 1995 CQ WW VHF Contest. This contest is always a bit of a sleeper because of the unpredictability of propagation. However, because of early indicators of sporadic-E (the weekend that I am composing this column, 11-12 May, has featured several good 6 meter openings), I think that we could have a major opening or two or three during the contest.

The rules for the contest were published in CQ last month. Please send to CQ headquarters in New York for logs. Do not send your request to me, as I do not keep a supply.

On the other hand, please send your *completed* logs to me at the address at the beginning of this column. Regarding that, I have just one minor request: Because I will be out of the country between 18 July and 8 August, I would appreciate it if you wait until after the 8th of August if you are going to send your log registered mail. I will not be there to claim it until after the 8th. Thanks.

Current Conferences

National Balloon Symposium: The National Balloon Symposium will be held 19-21 July in Ames, Iowa. Sponsored by the Iowa Space Grant Consortium, and Chaired by Ralph Walio, WØRPK, the symposium will feature both professional and amateur balloon launch sem-

inars. The purpose of the symposium is to encourage the exchange of ideas related to this activity. For more information, see last month's column or check out their home page, which is at <http://www.public.iastate.edu/~isgc>.

Central States VHF Society: The following is from CSVHF Society's home page: "The 30th annual conference of the Central States VHF Society will be held July 26-28, 1996 at the Thunderbird Hotel and Convention Center in Bloomington, Minnesota. The Thunderbird is adjacent to the Minneapolis-St. Paul International Airport and the Mall of America.

"The program will feature: technical presentations; antenna gain measurement; noise figure testing; VHF-UHF-Microwave fleamarket; and the opportunity to meet VHFers from across North America and beyond. We will also have a full family program with both organized group activities and suggestions for families who may prefer to do things on their own.

"We are within walking distance of the fabulous Mall of America. In response to my survey at Colorado Springs, we will have the use of a large hospitality suite for the family program and we will offer baby-sitting services. The hotel has indoor and outdoor pools. For reservations at the Thunderbird call 800-328-1931. We have a large block of rooms at a special rate of \$79+tax until July 1st. Because of its proximity to the mall, the hotel will be fully booked in advance for these nights. Make your reservations early!

"For those interested in extending their vacation in Minnesota, the Office of Tourism has a Web page. Resort bookings should also be made during the wintert. More information will be posted as it becomes available.

"The Northern Lights Radio Society and I look forward to greeting many of you later this month!—73, Paul Husby, WØUC."

For more info, check out their home page at <http://www.umn.edu/nlhome/m042/liebe009/>.

Current Meteor Showers

This month there are a number of minor showers. The most intense, the *delta-Aquarids*, is a southern latitude shower. It has produced in excess of 20 meteors per hour in the past. Its predicted peak is around 28 July at 1110 UTC.

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

Beginning around 17 July and lasting until approximately 14 August, you will see activity tied to the *Perseids* meteor shower. Its predicted peak is around 11 August. I will have more extensive coverage of this shower in next month's column.

The New AEA HALO-6 Antenna

Thanks to the popularity of ICOM's IC 706, several manufacturers are designing accessories to go along with it—and AEA is no exception.

While Mike Lamb, president of AEA, was pattering around Montana last summer, he came up with the design for a new 6 meter Halo-type antenna. Called the AEA HALO-6, this neat little antenna (the loop is 27 inches in diameter) is just what you need for that portable, mobile, or tight operating location on 6 meters.

The antenna has a 400 kHz bandwidth for a 2:1 SWR and a maximum power rating of 750 watts. You can stack two of them to get a little

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... Custom wrap around heatsink -- runs cool for extra long life

... Reverse Polarity Protection -- this Mirage feature can save your amp -- and your pride -- if you connect power backwards.

... Low input SWR -- keeps your handheld safe from overheating

... Positive-action RF sense transmit/receive switch -- ensures precision transceiving.

... LED indicators -- On-Air, receive preamp and power -- gives you confidence

... Pushbuttons -- select FM/SSB, receive preamp on/off and power on/off

... Free mobile mounting bracket

... Full one year MIRAGE warranty

... Legendary MIRAGE ruggedness

35 watts, FM only... \$79

B-34, \$79. 35 watts out for 2 watts in. Like B-34-G, FM only, less preamp, mobile bracket. 3 1/8 x 1 3/4 x 4 1/4 inches.



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Power Curve -- typical Mirage BD-35 output power

Watts Out (2Meters)	30	40	45	45+	45+	45+	45+
Watts Out (440 MHz)	16	26	32	35+	35+	35+	35+
Watts In	1	2	3	4	5	6	7

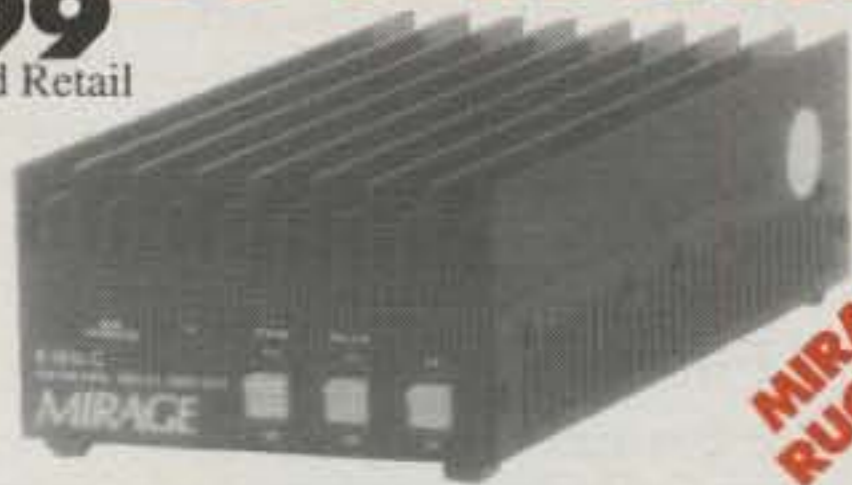
- 45 Watts on 2 Meter/35 W on 440 MHz
- Automatic Band Selection
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- Full Duplex Operation • 5x1 3/4 x 5 inches
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- Includes mobile bracket • "On-Air" LEDs
- Works with all FM handhelds up to 7 watts
- One year Mirage Warranty

Add this Mirage dual band amp and boost your handheld to a powerful mobile or base -- 45 watts on 2 Meters or 35 watts on 440 MHz!

Mirage's exclusive FullDuplexAmp™ lets you talk on one band and listen on the other band at the same time -- just like a telephone conversation! (Requires compatible HT)

B-5016-G
\$299
Suggested Retail

160 Watts on 2 Meters!



MIRAGE RUGGED!

Power Curve -- typical Mirage B-5016-G output power

Watts Out	130	135	140	145	150	155	160	165	170
Watts In	20	25	30	35	40	45	50	55	60

MIRAGE's most popular amplifier gives you 160 watts of brute power for 50 watts input!

The B-5016-G is ideal for your 20 to 60 watt 2 Meter mobile or base station. Power Curve chart shows typical output power for your input.

You'll talk further, longer and clearer on all modes -- FM, SSB or CW -- and hear weak signals better than you've ever heard before!

Low noise GaAsFET preamp gives you excellent 0.6 dB noise figure for pulling out weak signals. Select 20 dB or 15 dB gain to minimize receiver overload and intermod.

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

Your B-5016-G is fully protected with features found only in pricey commercial amps.

The Mirage B-5016-G prevents damage from high SWR or excessive input power by bypassing the power amplifier. LED warns you.

Your expensive power transistors are protected from overheating by MIRAGE's Therm-O-Guard™.

The B-5016-G knows when you're transmitting and kicks in 160 watts of power. Adjustable

time delay gives you smooth transmit/receive switching. Also has remote external keying.

Extra heavy-duty heatsink spans entire length of cabinet. Draws 17 to 22 amps from 13.8 VDC. 12x3x5 1/2 inches.

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B-215-G, \$379. MIRAGE's most popular handheld amp. 150 watts out/2 watts in; 160 watts out/3.5 W in. For 0.25 to 5 watt handhelds.

6 Meter Amplifiers (50-54 MHz)

Bust through 6 Meters with 150 watts of brute power and work exotic DX! The A-1015-G, \$389, is the world's most popular all mode FM/SSB/CW 6 Meter amplifier. For 1 to 15 watt

transceivers, 150 watts out for 10 in. A-1035-G, \$659, 350 watts out for 10 in. Both are a compact 12x3x5 1/2 inches.

70 cm Amplifiers (420-450 MHz)

MIRAGE's most popular 70 cm amp -- the D-3010N, \$365 -- gives 100 watts out for 30 in. For 5 to 45 watt mobile/base. D-1010-N, \$395, 100 watts out for 10 in. Dual purpose -- for handhelds or mobile/base. D-26-N, \$269, 60 watts out for 2 in, for handhelds.



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144-148	KP-1/2M	KP-2/2M
220-225	KP-1/220	KP-2/220
430-450	KP-1/440	KP-2/440

Amateur TV Amps

Industry standard ATV amps -- D-1010-ATVN, \$414, 82 watts PEP out / 10 in. D-100-ATVN, \$414, 82 watts PEP out / 2 in. (without sync compression)

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CIRCLE 167 ON READER SERVICE CARD

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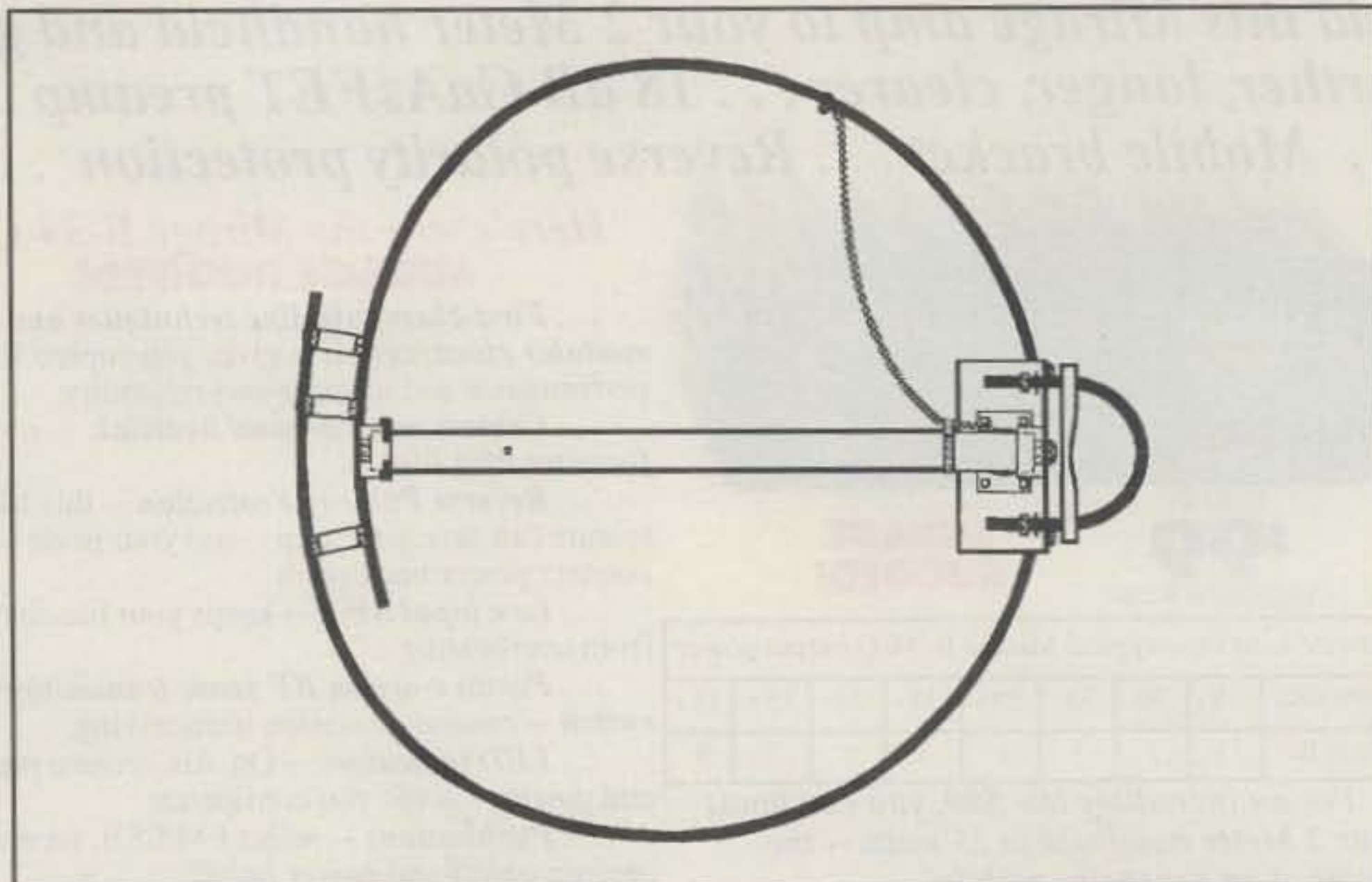


Fig. 1- Top view of AEA's new HALO-6 loop antenna. (See text for details.)

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A new all-band hf
mobile antenna!

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Easy-Off mounting
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CIRCLE 51 ON READER SERVICE CARD

Antenna Software by W7EL

EZNEC ("Easy-NEC") captures the power of the NEC-2 calculating engine while offering the same friendly, easy-to-use operation that made ELNEC famous. EZNEC lets you analyze nearly any kind of antenna - including quads, long Yagis, and antennas within inches of the ground - in its actual operating environment. Press a key and see its pattern. Another, its gain, beamwidth, and front/back ratio. See the SWR, feedpoint impedance, a 3-D view of the antenna, and much, much more. With 500 segment capability, you can model extremely complex antennas and their surroundings. Includes true current source and transmission line models. Requires 80386 or higher with coprocessor, 486DX, or Pentium, 2Mb available extended RAM, and EGA/VGA/SVGA graphics.

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

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

Prices - U.S. & Canada - EZNEC \$89, ELNEC \$49, postpaid. Other countries, add \$3. VISA AND MASTERCARD ACCEPTED

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P.O. Box 6658 fax 503-671-9046
Beaverton, OR 97007 email w7el@teleport.com

CIRCLE 62 ON READER SERVICE CARD

bit of gain (and increase overall power rating).

While it requires a bit of assembly, you can have yours up and running in about an hour. With the included "U" bolt, you can mount it on a tower leg or on a mast off the back of your car. (The "U" bolt will permit a mast diameter up to two inches.) You can also use fishing line to suspend it in your attic. By mounting it in the attic, your neighbors will never know that you are on 6 meters!

Incidentally, mounting the antenna in this "free space" environment is probably the best way to preserve its omni-directional pattern. However, if you do plan to mount it in the attic, watch for house wiring, which includes telephone, intercom, and doorbell wires and cable TV coax. If the antenna is in close proximity to any of these wires, your transmitted signal may get into the electronic devices in your home.

The HALO-6 comes with an SO-239 connector. After you assemble it, all you have to do is attach your coax, tune the antenna according to the directions in the instruction book, and you're ready to get on the air and enjoy some of that summertime sporadic-E.

The retail price is \$69.95 plus shipping, and it is available from AEA at 2006 196th St. SW, P. O. Box C2160, Lynnwood, WA 98036 (phone 206-774-5554; fax 206-775-2340). Mike says that a 10 meter version is in the works, so watch for that in the near future.

IC-706 CW Dilemma

A problem that I first encountered while I was using the ICOM IC-736 has surfaced on the IC-706. The CW mode is configured for LSB. While this works fine for the lower band edge on HF, it causes problems on VHF when we want to switch to CW to work someone on USB. Ted Goldthorpe, WA4VCC, complained about this problem on the VHF reflector and found the solution. Below is what Ted wrote to the reflector once he found the "cure":

"Thanks to a hint from Frank, PA3BFM, here's how one can answer a USB station on CW with the ICOM 706. Some suggested that the CW-R function will do it. Not entirely so.

Yes, you must place the rig into CW-R, but then turn your IF shift all the way to the left. Bingo! You now can hear the station transmitting in USB with no problem, answer the station in CW, and that operator can copy your CW sigs with no problem. The other operator does not have to tune for the IC-706. This procedure takes all of 3 seconds, and if you are the 'distressed/weak' signal, this cross-mode concept comes in handy. It is also good for breaking SSB pile-ups.—73 de Ted, WA4VCC."

And Finally . . .

Back to Bosnia: As many of you know, I was in Bosnia last summer with the United Methodist Committee on Relief (UMCOR), which works with the United Nations High Commissioner on Refugees (UNHCR). I worked in the Youth House in Zenica, Bosnia. The Youth House is a safe haven where young people, ages 5-18, can go and hang out or take classes in many different fields. Last year I worked with the computer instructors, the director, and the newsletter editor.

Now that Sarajevo is supposedly "safe," UMCOR has established a Youth House in Novo (New) Sarajevo. Ironically, it is supposed to be within 200 meters of the "front lines." While in Sarajevo, I hope also to be able to meet the local amateur radio operators and report on their activities now that peace seems to have come to this area of the world. If I am successful in making these contacts, I will write about them in a forthcoming column.

My only regret in going to Sarajevo at this time (and it is a minor regret) is that I will miss the Central States VHF Society conference. Hopefully next year I will get to see you all, my friends who regularly attend the conferences.

Please continue to keep your correspondence coming my way. You have the address, phone and fax numbers, and the e-mail route at the beginning of the column.

Thanks again for all of your kind words about the column. Until next month . . .

73, Joe, N6CL

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- RIPPLE Less than 5mv peak to peak (full load & low line)

SL SERIES



- LOW PROFILE POWER SUPPLY

MODEL	Colors		Continuous Duty [Amps]	ICS* [Amps]	Size [IN] H x W x D	Shipping Wt. [lbs]
	Gray	Black				
SL-11A	•	•	7	11	2 ⁵ / ₈ x 7 ⁵ / ₈ x 9 ³ / ₄	12
SL-11R	•	•	7	11	2 ⁵ / ₈ x 7 x 9 ³ / ₄	12
SL-11R-MC	•	•	7	11	5 ³ / ₄ x 7 ¹ / ₄ x 9 ³ / ₄	13
SL-11R-GE	•	•	7	11	5 ³ / ₄ x 7 x 9 ³ / ₄	13
SL-11R-RA	•	•	7	11	4 ³ / ₄ x 7 x 9 ³ / ₄	13
SL-11R-EFJ	•	•	7	11	5 ¹ / ₈ x 7 ¹ / ₄ x 9 ³ / ₄	13
SL-11MG	•	•	7	11	5 ¹ / ₈ x 7 ¹ / ₈ x 9 ³ / ₄	13
SL-15R	•	•	12	15	2 ⁵ / ₈ x 7 x 9 ³ / ₄	13
SL-15R-GE	•	•	12	15	5 ¹ / ₈ x 7 ⁵ / ₈ x 9 ³ / ₄	14
SL-15R-RA	•	•	12	15	4 ³ / ₄ x 7 ¹ / ₄ x 9 ³ / ₄	14
SL-15R-EFJ	•	•	12	15	5 ¹ / ₈ x 7 ¹ / ₈ x 9 ³ / ₄	14

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 / ₈	48

RS-M SERIES



MODEL RS-35M

MODEL	Continuous Duty [Amps]	ICS* [Amps]	Size [IN] H x W x D	Shipping Wt. [lbs]
RS-12M	9	12	4 ¹ / ₂ x 8 x 9	13
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 / ₈	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
VS-70M	57	34	16	70	6 x 13 ³ / ₄ x 12 ¹ / ₂	48
• 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

WHAT'S NEW AND HOW TO USE IT

A New 800 to 1000 MHz "Micro-Transmitter" Chip

It's truly amazing! The letters keep coming regarding the various micro miniature transmitters and receivers we have been discussing this year. Perhaps the spark of homebrewing and experimenting has not died out yet! Anyway, I certainly am pleased that so many of you are ready to "heat up the old soldering iron," and I will continue to try to pass on as many similar applications of "modern" technology as I can. If you do choose to build any of the circuits, please don't hesitate to share your experiences with the rest of the readers of this column. I will be glad to publish comments or pictures of your creations.

To address some of the questions that you have asked in regard to the previous columns, let me offer the following:

1. The various transmitter and receiver chips described can usually be obtained from the larger semiconductor supply houses such as Newark Electronics or Digi-Key. In the event that they can't help you, don't hesitate to contact the manufacturer and ask for specific information as to who stocks it, or if they will be kind enough to furnish a sample. We do this all the time at the office, and it almost always results in success.

2. The various coils and/or tuned circuits called out in the transmitter and receiver circuits are for reference purposes only. Most really are not overly critical, and any homebrewer "worth his salt" should be able to come up with the proper values to resonate at the frequencies of interest. Just because a manufacturer suggests a particular value doesn't always mean that it is the optimum one. I can't even begin to count the number of application note articles I have come across describing "complete, finished" designs that needed extensive work to make the final result operate the way it was supposed to. Remember, the purpose of an application note is to describe a use or suggested use for a part, not necessarily to provide all the details for a complete manufacturable product. Above all, don't be afraid to experiment, as that's how you learn.

3. The "455 type" ceramic filters mentioned for some of the receivers are of the 455 kHz variety used in AM transistor radio IF applications. Most ceramic 455 kHz units will work, including the TOKO and Murata devices. Even units salvaged from old AM transistor radios may perform properly.

4. Finally, remember that the transmitters and receivers described cover the VHF and UHF range from 6 meters (50 MHz) to beyond 200 MHz. Plug-in breadboards probably will not work well, since the interconnection capacitance is too high, and the ground-plane is too far away to provide adequate shielding. Your best choice is either to use "dead bug" construction techniques with the shortest possible leads or perforated copper-clad G-10 circuit boards for your experiments. Also, don't

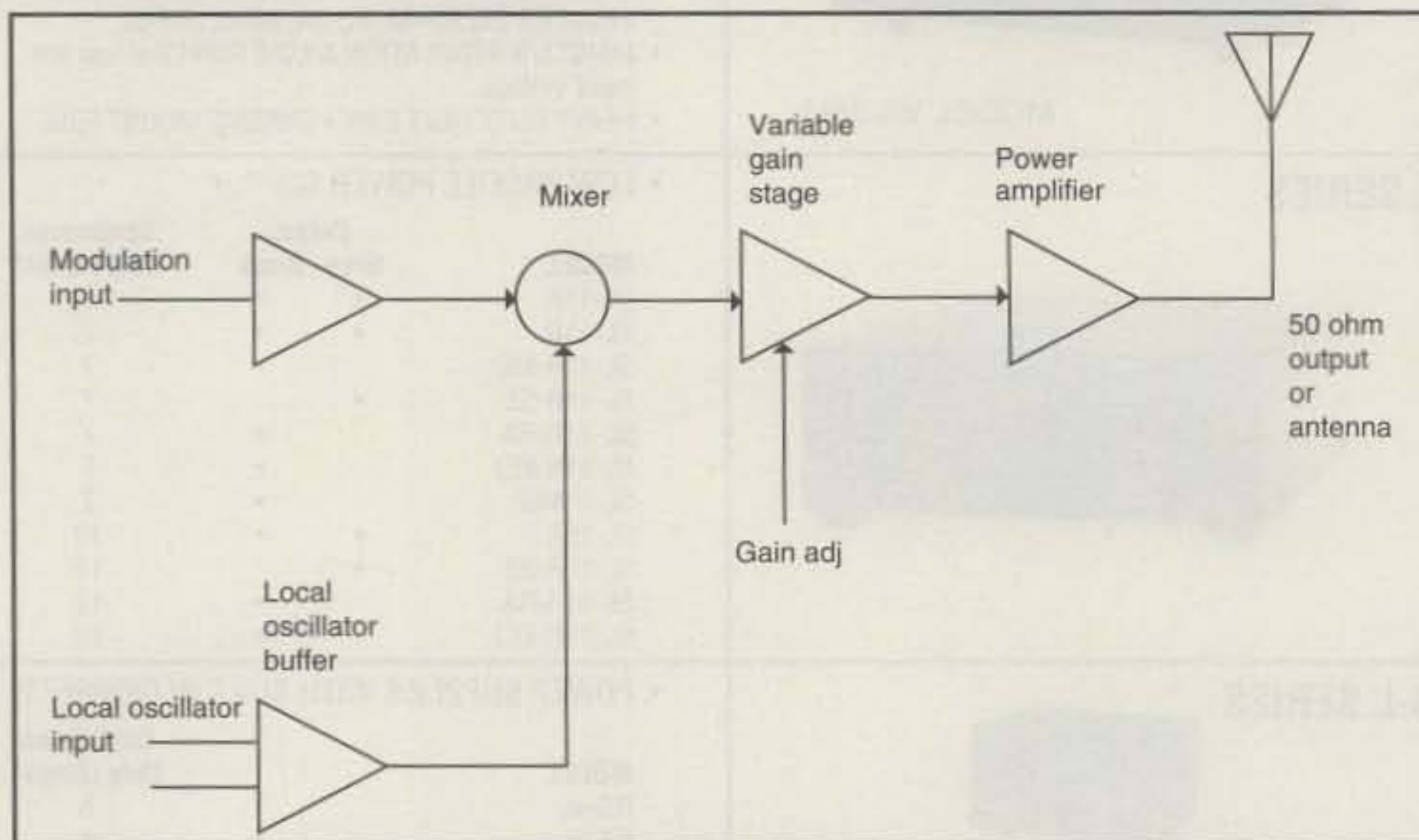


Fig. 1- Functional block diagram of MAX 2402.

forget to use plenty of 0.1 μ F, .01 μ F, and 100 pF bypass capacitors.

In keeping with the promise we just made, this month we will describe still another UHF transmitter chip that has made it to the market (and probably will generate additional questions). This chip is the MAXIM 2402, which is called by the manufacturer "an 800 MHz to

1000 MHz Transmitter." Originally designed for the new commercial license-free 902 to 928 MHz band and 900 MHz cordless telephones, the 20-pin surface-mount device will find use in the nearby amateur band as well.

Fig. 1 is a block diagram of the MAX 2402, and fig. 2 is the suggested operating circuit. As you can see, the chip contains a double-

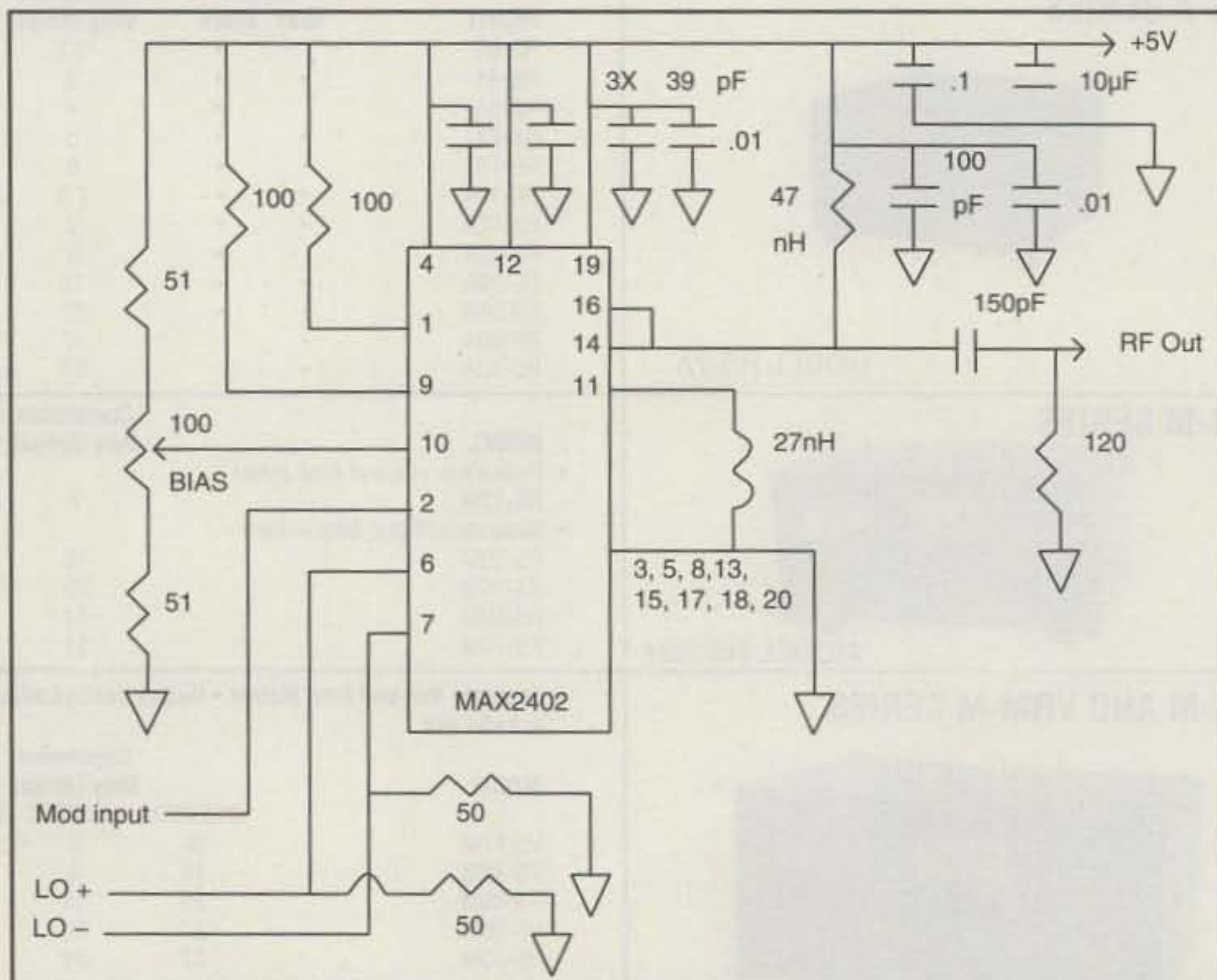


Fig. 2- Typical application circuit for MAX 2402.

balanced mixer, a buffered local oscillator input port, a variable gain stage, and a final power amplifier matched to 50 ohms at 800 to 1000 MHz. Power required is +5 volts single ended, and the chip comes in a tiny 20-pin SSOP package. In operation, a local oscillator is injected into the LO ports either signal ended or differential at a recommended injection level of 1 mw \pm 6 dB. The MOD input is then used for either analog modulation (up to 25 MHz) or digital modulation, depending on the application. This port is also usable for the transmission of data or as an input for spread-spectrum frequency-hopping applications. The variable gain input is used to control the drive to the final (over a 40 dB adjustment range). With proper drive the power amplifier will produce more than 100 mw into a 50 ohm load.

The application circuit of fig. 2 is derived from an evaluation kit that Maxim has available for the chip. If you plan to experiment with this device, purchasing this kit will make it much simpler to get on the air. Do not rule out homebrewing, however. If you send for the data sheet from Maxim, you will get a full parts list and suggested layout for an appropriate PC board. Before building the circuit, however, remember that you should have some UHF experience and the proper test equipment. You also will have to provide a local oscillator signal, since none is provided in the chip.

Cost for the MAX2402 is \$3.78 in lots of 1000 pieces, and somewhat higher for single quantities. Prices for the evaluation kit must be obtained from Maxim or one of their representatives at 120 San Gabriel Drive, Sunnyvale, CA 94086 (1-408-737-7600). 73, Irwin, WA2NDM

NEW & REVOLUTIONARY BALUNS and UNUNS

Dr. Jerry Sevick, W2FMI, researched, experimented and wound over 1000 Baluns and Ununs transformers for use in Amateur Radio and used over 1 mile of wires over a 20 year period. The results of his sensational work are these new powerful, 2 Kw to 10 Kw, 98% efficient, 1 Mhz to 50 Mhz Baluns and Ununs. His work is also featured in over 20 articles, and 3 books.

B A L U N S			PART NO.	PRICE
50 Ω :12.5 Ω	Direct Connect Yagi Beam		4:1-HB50	\$49.95
50 Ω :50 Ω	1/2 λ Dipole or Yagi Beam		1:1-HB50	\$49.95
50 Ω :75 Ω	1/2 λ Dipole at 0.22 λ above Ground		1.5:1-HB75	\$69.95
50 Ω :100 Ω	1/2 λ Dipole at 0.22 λ , 0.33 λ & Quad Loop		2:1-HB100	\$69.95
50 Ω :200 Ω	Folded Dipole, Log Periodic Beam		4:1-HBM200	\$49.95
50 Ω :200 Ω	Off Center Fed Antennas		4:1-HB/U200	\$69.95
50 Ω :200 Ω	10 Kw Antenna Tuners & G5RV Log Periodic Beam		4:1-HBHT200	\$69.95
50 Ω :300 Ω	300 Ω Ribbon Folded Dipole		6:1-HB300	\$69.95
50 Ω :300 Ω	Off Center Fed Antennas		6:1-HB/U300	\$89.95
50 Ω :450 Ω	Twin Lead/Ladder Line		9:1-HB450	\$89.95
50 Ω :600 Ω	Rhombic & V-Beam Antenna		12:1-HB600	\$199.95

U N U N S			PART NO.	IMPEDANCE MATCH	PRICE
2:1-HDU50	50 Ω :22 Ω & 25 Ω	\$49.95	9:1-HU50	50 Ω :5.56 Ω	\$49.95
2:1-HDU100	100 Ω & 112.5 Ω :50 Ω	\$49.95	1.78:1-HDU50	50 Ω :28 Ω & 12.5 Ω	\$49.95
1.5:1-HU75	75 Ω :50 Ω	\$49.95	1.56:1-HDU50	50 Ω :32 Ω & 18 Ω	\$49.95
4:1-HCU50	50 Ω :12.5 Ω	\$49.95	1.78:1-HMMU50	MULTIMATCH UNUN	\$69.95
9:1-HU50	50 Ω :5.56 Ω	\$49.95	BEV-U50 Beverage Ant. Unun		\$69.95
			50 Ω :800 Ω , 612 Ω , 450 Ω		

Try it at no risk whatsoever. Find out how these Baluns and Ununs can make your systems transmit further, put more power to your antenna, and get you more signal strength.

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ANC-4 Antenna Noise Canceller (not shown)

Eliminates power line noise before it enters the receiver to let you hear signals you did not know were there. Reduces any locally-generated noise typically 50dB. Useable between 100kHz and 80MHz. Noisewhip and wire antenna supplied with each unit. Auto xmit switchover up to 200W. Installed between the antenna and receiver. **\$175.00**



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ORDER LINE: 800.533.3819

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PACKET USER'S NOTEBOOK

CONNECTING YOU AND PACKET RADIO IN THE REAL WORLD

One Hand Washes The Other

One man's trash is another man's treasure. What a way to open a packet radio column! This month we are going to enlist digital information resources from the past, the present, and the future.

Not long ago (about four months) I received a call from an SNO (System Node Operator) in a southeastern coastal city. His ego factor was set to "rodomontade" and his remarks were set to dissuade. I'm not sure just what the point of his call was, except that he wanted me to know that he was about to leave the world of packet BBS sysoping.

I listened to this "digital dooms-day prophet" as he rambled on, complaining that the internet was affecting our hobby of packet radio. As he got deeper into his muddling, he made a statement that eluded to the manner in which he could get on the internet and go anyplace on earth. As he continued, he said he was taking his BBS off the air, and still further, he said, "I might never use amateur radio again." That was four months ago. Last week I saw his call-sign in the MHeard lists of several SEDAN nodes in the eastern USA.

I never gave it much thought until I saw him on again the next day. Over the last few weeks

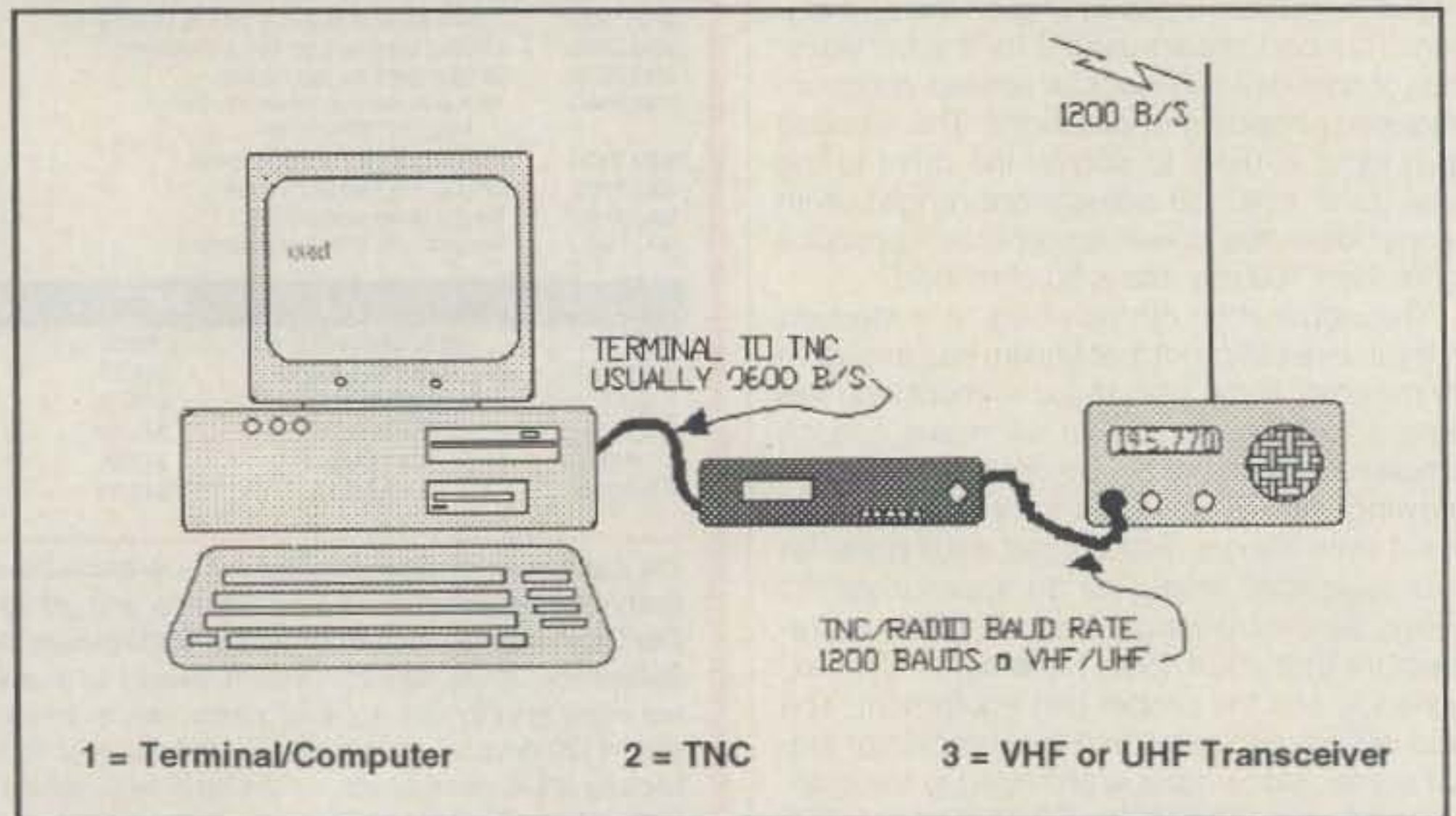


Fig. 1—The three main components of a packet station.

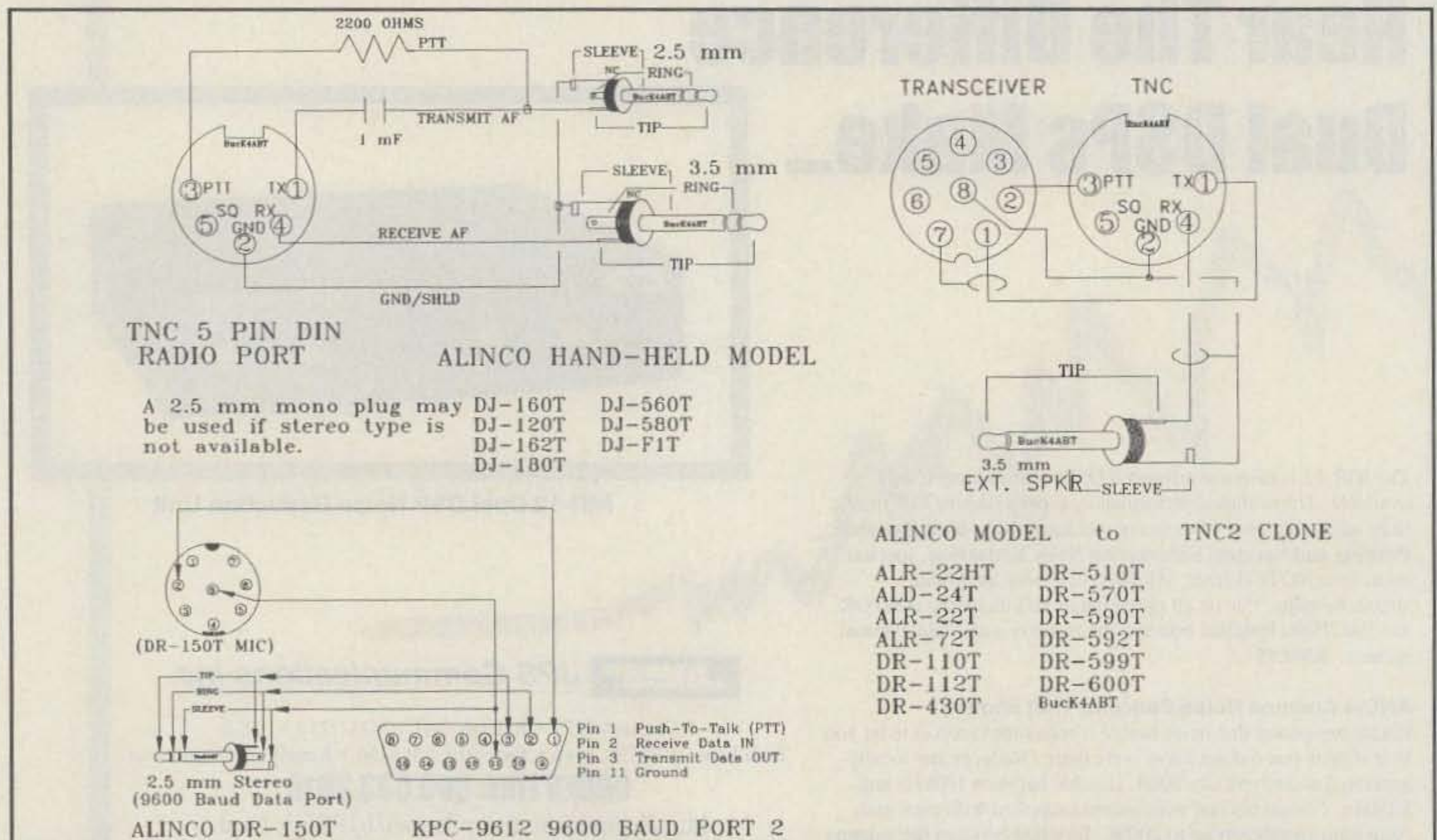
I've noticed that he is frequenting the packet networks more and more.

It's Not A Contest

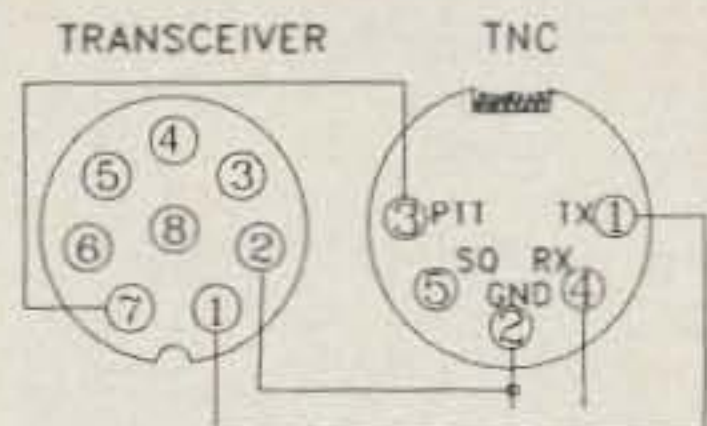
I too am an internet user. I too like the "novel-

ty" of the internet and the expedient manner in which I can send and receive e-mail. Still, I'm addicted to and dearly love the hobby of packet radio. Therein lies the difference. The internet is a "novelty," while packet radio is a "hobby." The internet is an information or resource

211 Luenburg Drive, Evington, VA 24550
buck4abt@usa.pipeline.com



Group 1—The Alinco radios that have been used successfully on packet.



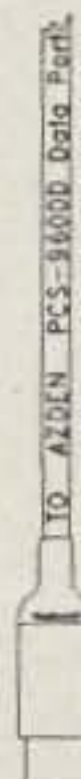
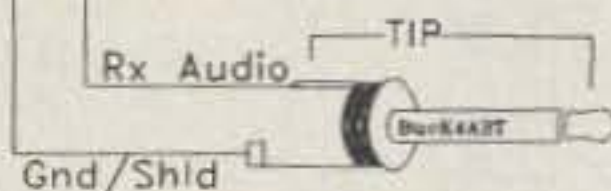
For the AZDEN transceivers that use 12 pin connectors, use EXT SPKR for Receive AF and the following pins for the Tx, PTT, and ground:

- PCS 2000 etc.
- TX AFSK = PIN 12
- PTT = PIN 9
- Ground = PIN 11

NOTE: Wiring the AZDEN PCS-9000 for 9600 is similar to the interface drawing of the Kenwood 251 9600 baud interface.

AZDEN MODELS

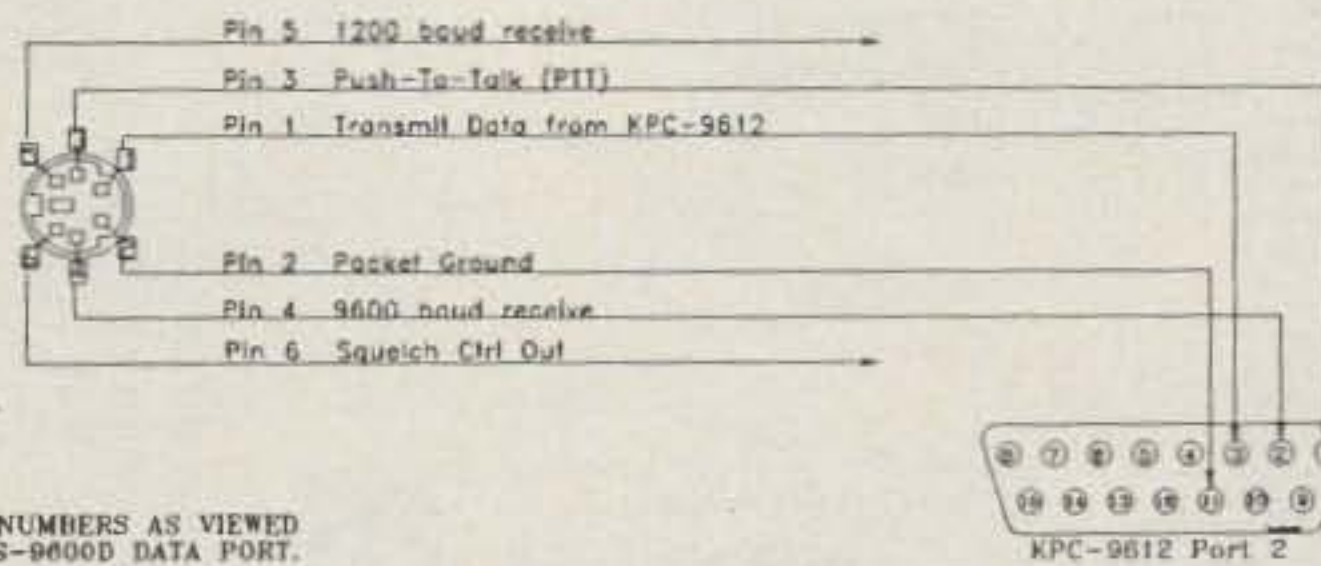
- PCS 5000
- PCS 6000
- PCS 7000



6 PIN "MINI DIN" SUPPLIED WITH THE PCS-96000.

CONNECTOR PIN NUMBERS AS VIEWED OUTSIDE THE PCS-96000 DATA PORT.

AZDEN PCS-96000 UHF

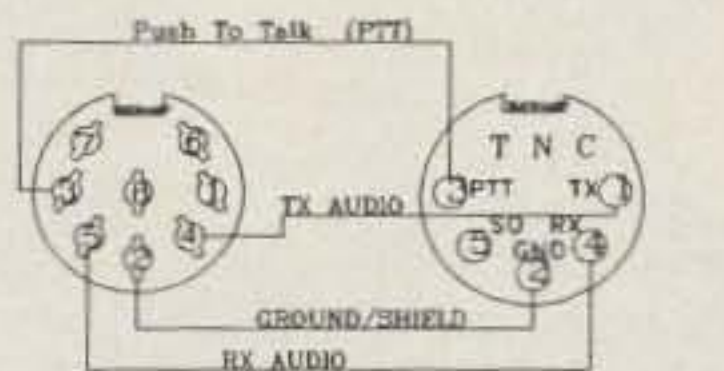


Pin 1 Push-To-Talk (PTT)
Pin 2 Receive Data IN
Pin 3 Transmit Data OUT
Pin 11 Ground

KPC-9612 Port 2

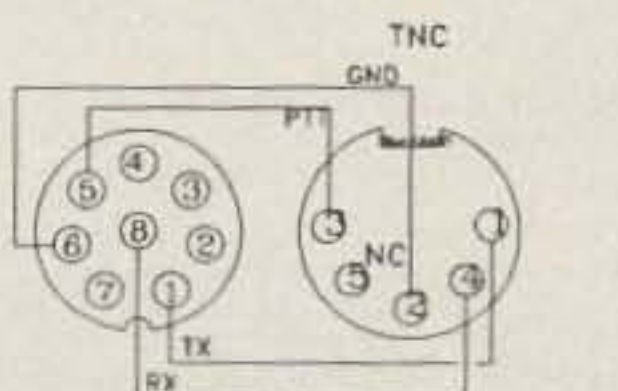
KANTRONICS KPC-9612 9600 BAUD PORT 2

Group 2- Shown here are the Azden transceivers that have been used successfully on packet.



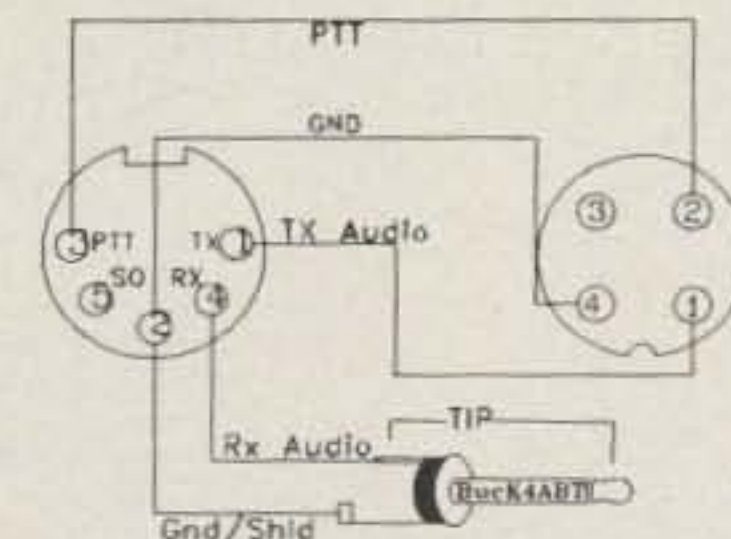
ICOM ACCESSORY PORT TNC RADIO PORT

IC-725
IC-728 If no 8 pin DIN plug is available, use a standard 5 pin DIN. It should plug into the 8 pin socket with no problem. All pins that are used are available on the 5 pin DIN connector.
IC-729
IC-735
IC-970



ICOM MODEL to TNC2

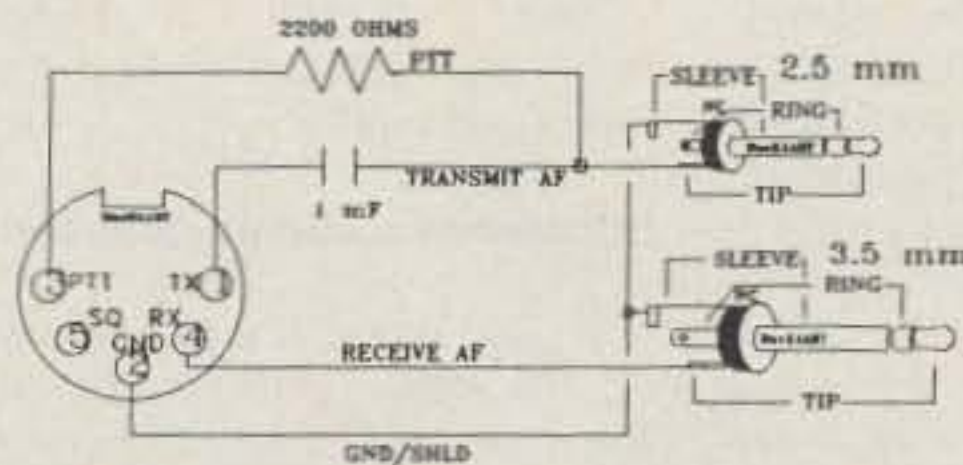
- | | | |
|---------|---------|--------|
| IC-1201 | IC-3200 | IC-707 |
| IC-1271 | IC-3210 | IC-720 |
| IC-1275 | IC-3220 | IC-725 |
| IC-228 | IC-37A | IC-726 |
| IC-229 | IC-38A | IC-728 |
| IC-22U | IC-375 | IC-729 |
| IC-2400 | IC-45 | IC-730 |
| IC-25 | IC-47 | IC-735 |
| IC-2500 | IC-471 | IC-737 |
| IC-255 | IC-475 | IC-740 |
| IC-260 | IC-48 | IC-745 |
| IC-27 | IC-490 | IC-751 |
| IC-271 | IC-505 | IC-761 |
| IC-275 | IC-551 | IC-765 |
| IC-28 | IC-560 | IC-761 |
| IC-290 | IC-575 | IC-801 |



TNC 5 PIN DIN PORT

ICOM 4 PIN MIC MODELS

- IC-202 IC-280
- IC-215 IC-402
- IC-22S IC-502
- IC-245 BucK4ABT

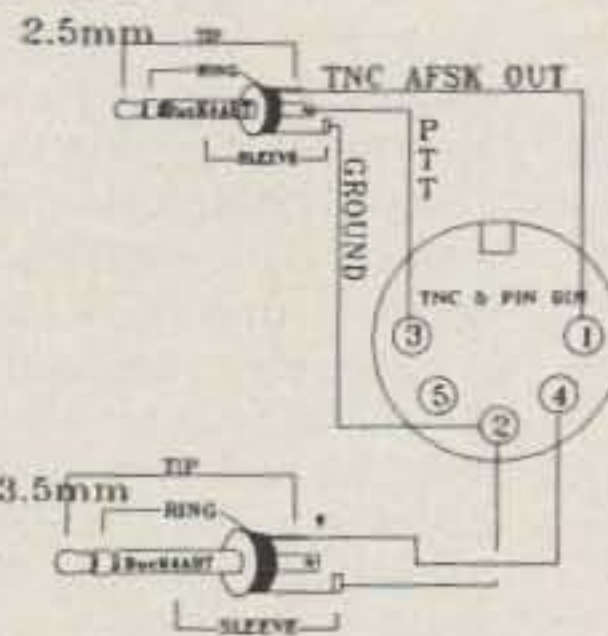


RADIO PORT

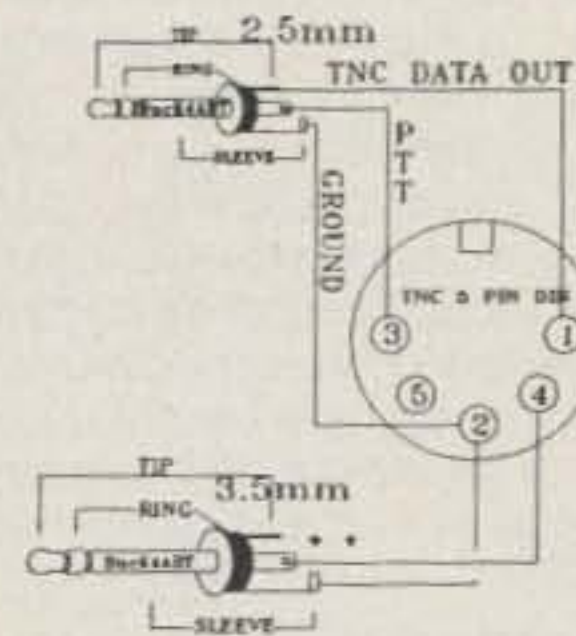
ICOM Hand Held Model

A 2.5 mm mono plug may be used when the 2.5 mm stereo type is not available.

- | | |
|-----------|-----------|
| IC-02 ## | IC-4 ## |
| IC-03 ## | IC-4G ## |
| IC-04 ## | IC-4S ## |
| IC-12 | IC-4SR ## |
| IC-12G | IC-P2 ## |
| IC-2 ## | IC-P3 ## |
| IC-24AT | IC-P4 ## |
| IC-2G ## | IC-U2 ## |
| IC-2GX ## | IC-U4 ## |
| IC-21 ## | IC-V21 ## |
| IC-2S ## | IC-W21 ## |
| IC-2SR ## | IC-W2A ## |
| IC-3 ## | IC-X21 ## |
| IC-3S ## | |

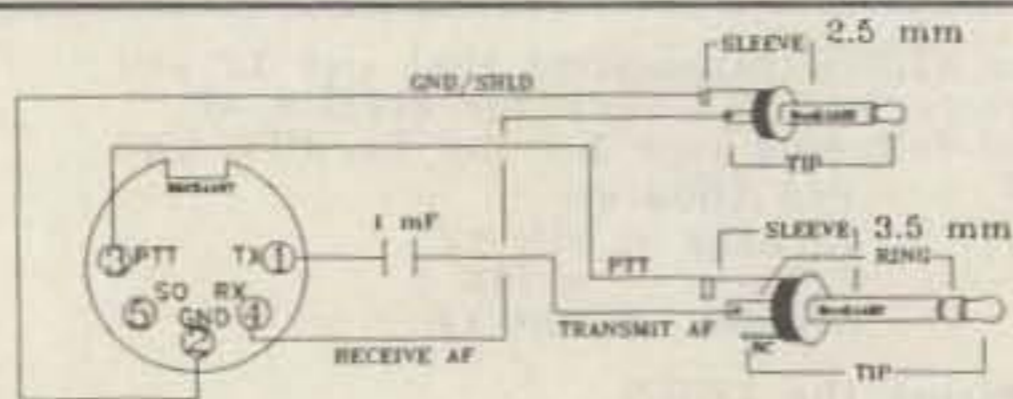


* 1200 baud connection (For receive audio only)



* 9600 baud connection (For receive audio only)

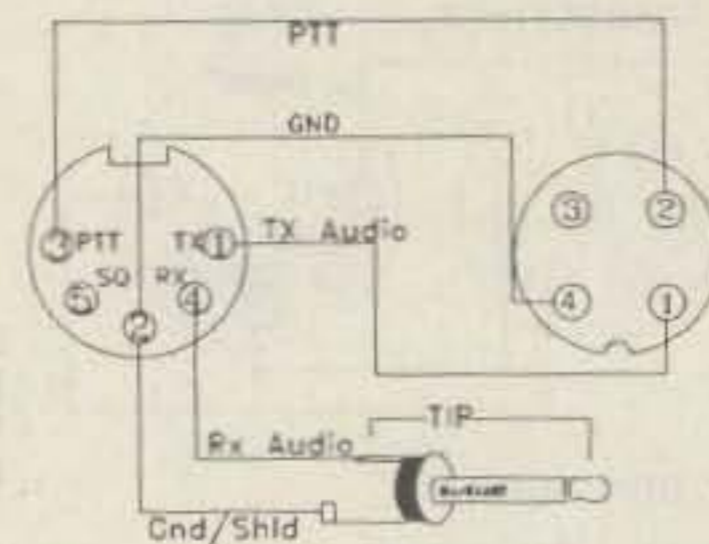
Group 3- Note that some of these ICOM radios used on packet have receive audio at pin 8 on the 8-pin microphone connectors.



TNC 5 PIN DIN RADIO PORT

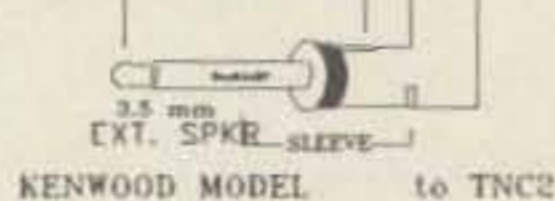
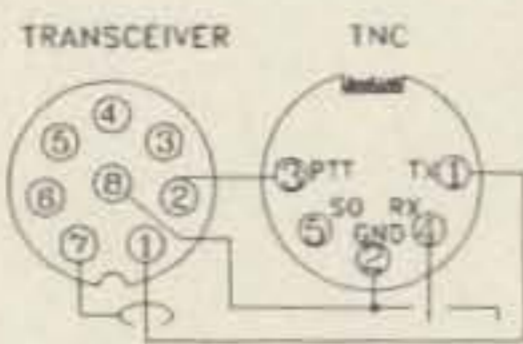
KENWOOD Hand Held

- | | |
|--------|---------|
| TH-205 | TH-41 |
| TH-21 | TH-42 |
| TH-215 | TH-45 |
| TH-22 | TH-47 |
| TH-25 | TH-48 |
| TH-225 | TH-75 |
| TH-27 | TH-77 |
| TH-28 | TH-78 |
| TH-31 | TH-2600 |
| TH-315 | |

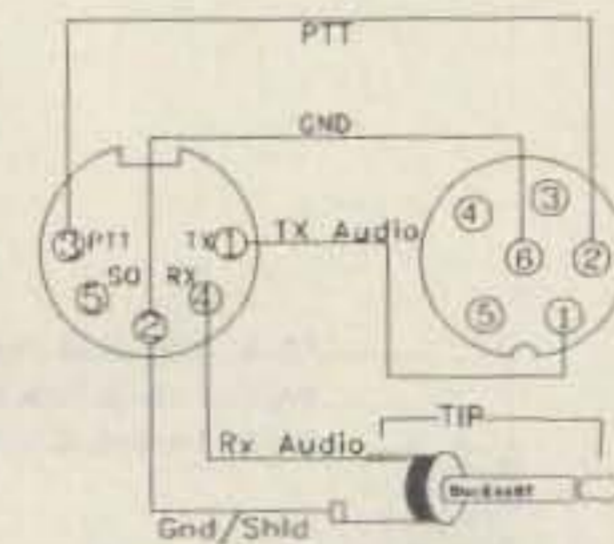
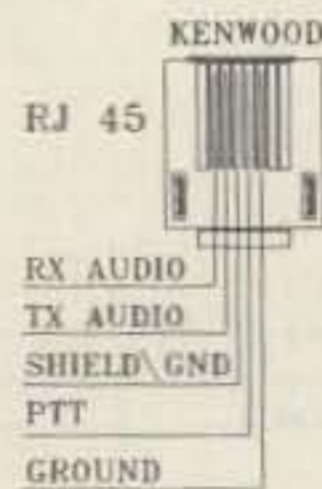


TNC 5 PIN DIN PORT KENWOOD 4 PIN MIC MODELS

- | | |
|---------|--------|
| TR-2200 | TS-520 |
| TR-2300 | TS-530 |
| TR-7400 | TS-700 |
| TS-120 | TS-820 |
| TS-130 | TS-830 |
| TS-490 | TS-900 |

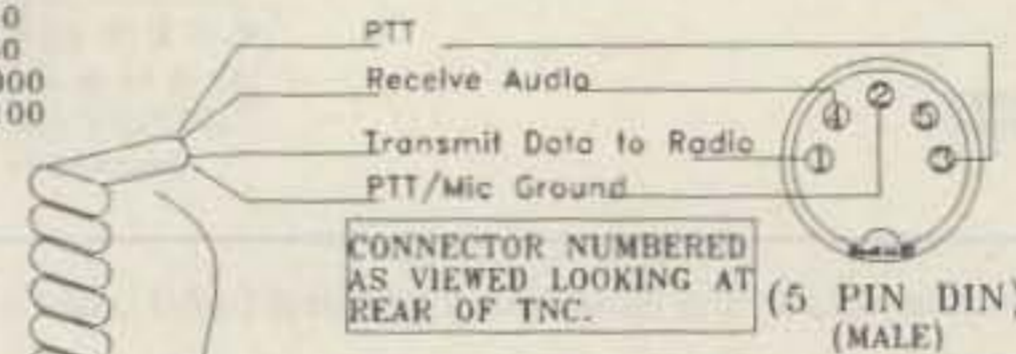


- | | | |
|---------|---------|---------|
| TM-201 | TM-531 | TS-680 |
| TM-221 | TM-541 | TS-690 |
| TM-231 | TM-621 | TS-701 |
| TM-241 | TM-631 | TS-711 |
| TM-2530 | TR-3200 | TS-780 |
| TM-2550 | TR-50 | TS-790 |
| TM-2570 | TR-751 | TS-811 |
| TM-321 | TR-851 | TS-850 |
| TM-331 | TS-140 | TS-930 |
| TM-3530 | TS-430 | TS-940 |
| TM-401 | TS-440 | TS-950 |
| TM-421 | TS-450 | TW-4000 |
| TM-441 | TS-670 | TW-4100 |



TNC 5 PIN DIN PORT KENWOOD 6 PIN Models

- | | |
|---------|---------|
| TR-7730 | TR-7950 |
| TR-7750 | TR-9000 |
| TR-7800 | TR-9130 |
| TR-7930 | TR-9500 |



TNC 2 OR CLONE WITH 9600 BAUD MODEM INSTALLED.

AVAILABLE FROM KENWOOD
(Part number PG-5A "Data Cable")

CONNECTOR NUMBERED AS VIEWED
OUTSIDE TRANSCEIVER DATA PORT



TO KENWOOD TM-251A DATA PORT

Group 4—The above Kenwood transceivers are packet compatible.

provider, while packet radio is an entertainment provider. To put these statements into perspective, one might go to school (information/learning), but there comes a time when it's time to play (be entertained/enjoy our hobby). Most of all, when a disaster strikes and the telephone lines are gone (hurricanes, tornadoes, earthquakes), where do we turn? Certainly not to the internet. Amateur radio (and as an extension, packet) are there because it is wireless, it is immediate, and most of all it is dependable.

One Medium Complements The Other

Sure, the internet has some good points to offer, and I for one use them. In fact, several webmasters use them. We use our home pages to spread the word about packet and amateur radio in general. Since putting the SEDAN home pages on the internet, I have had many users send me e-mail requesting books about pack-

et radio. In many instances I have received messages from web-site users saying that they are entering the ranks of amateur and packet radio as a result of having learned about it from an internet home page. They had the entry level of amateur radio explained to them in an easy-to-understand, concise manner.

There are several good sources of information about amateur radio on the internet. There are many web sites, such as the North East Digital Association (NEDA), Tucson Amateur Packet Radio (TAPR), Northern California Packet Radio Association (NCPRA), and Southeast Emergency Digital Association Networks (SEDAN). All of these have an amateur radio networking home page that allows anyone to download information from his or her web site. Not only can you learn about amateur and packet radio, but these pages even supply information that enables the user to interface a TNC to a transceiver, build a node, fashion a node gateway, construct a network, and on and on.

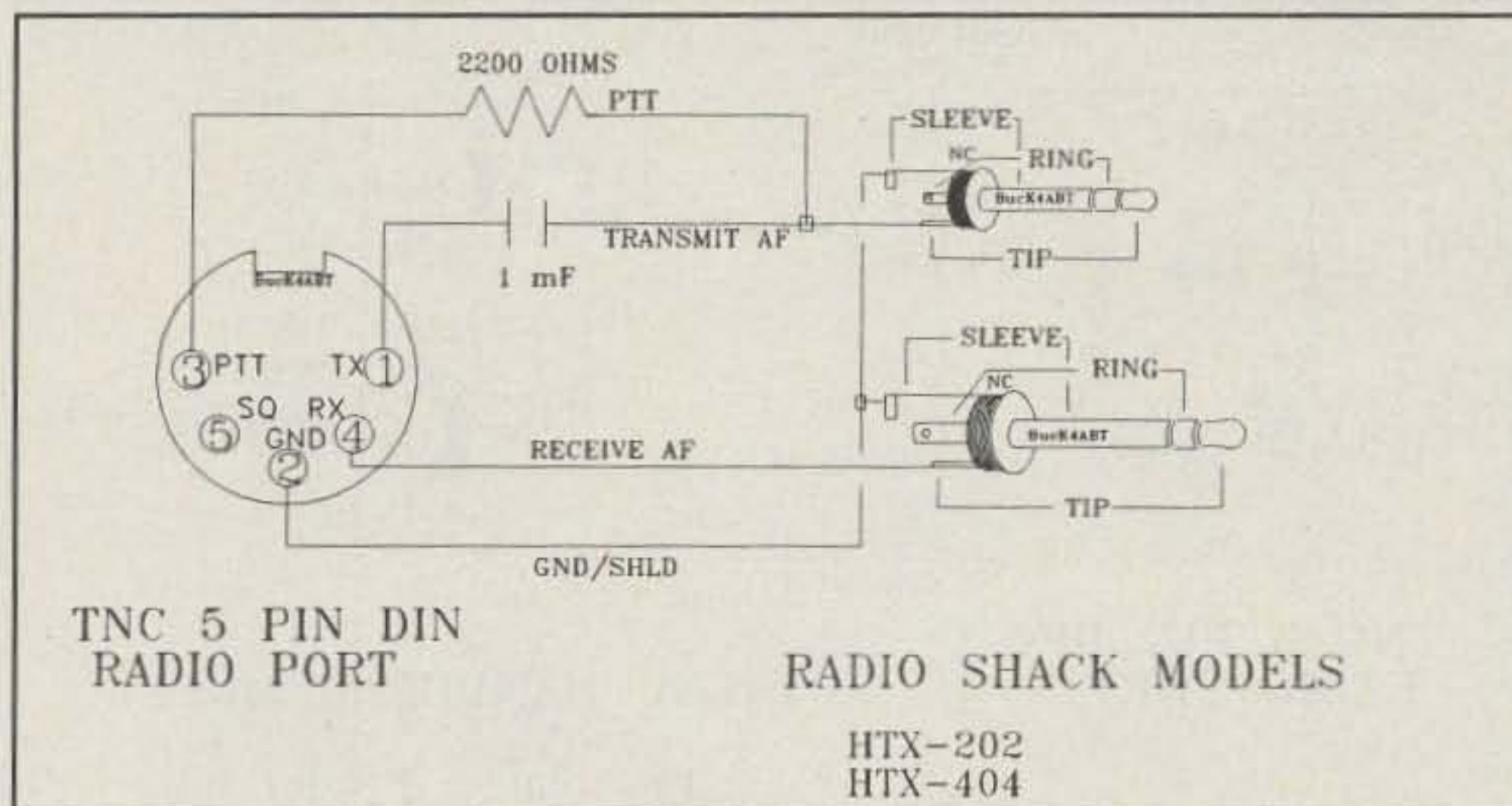
See for yourself. If you have internet capability, go to the packet home page at the following address:

<http://www.webcom.com/sedan>

If you would like to know more about the Southeastern Emergency Digital Association Networks (SEDAN), then go to the SEDAN home page at that same address.

Once you are into the loads of data in hyperspace, use one of the many "search-engines," such as *infoseek*, to locate the NEDA or TAPR home pages, or just search on "packet" for more digital data gathering.

As you are about to discover, there is an abundance of information about our hobby. If you are a reader who is not yet an amateur radio operator, look into the many home pages of the internet and discover how easy it is to become a ham. Who knows? You may even come across Gordon West on the internet, and



Group 5- The Radio Shack HTX-202 and HTX-404 can be used on packet. Note that some early HTX-202's may require longer TXDelay (TXDelay 40).

then you will surely discover how easy it really is to become an amateur!

From Future To Past In A Hyperlink

Amateur packet radio has been around since the early 1980s. It has progressed at a very rapid pace and has helped open many other modes of digital communications. Without boring you with a packet history lesson, I'll get directly into the good stuff that helps a new user get his or her packet station up and running in short order.

From time to time I like to include some help for the new packeteer and those new to the world of digital communications. When I first wrote *PACKET RADIO: The Easy Way!* in 1986, I felt that somehow the new or prospective packeteer would not feel comfortable with an attempt to set up his or her packet station without some type of guidance. That was when I decided to write the tutorial. I had to give amateur radio operators who might be willing to give packet radio a try a head start by taking them around the pitfalls I had experienced when I set up my first packet station. When I began my packet radio hobby, there were no neighbor

packeteers, no packet books, and no tutorials, and certainly there was no SEDAN home page on the internet that might have provided guidance for a beginning packeteer. Having said that, here then is a brief and easy-to-understand guide for the first-time packet radio operator.

What Do You Need To Begin Operating Packet?

The equipment needed to get on the air is a VHF transceiver, a computer or terminal, and a terminal node controller (TNC). There is packet activity on HF, but VHF is the best place to begin operating packet radio. The TNC contains a modem similar to the modem used to connect your computer to the internet page, except that it also contains special firmware specially designed for packet radio.

When you take the TNC out of the carton, most of the time you'll find the TNC connectors are supplied with the cables. The TNC manufacturer does not supply connectors on the other end of the cables, which attach to the transceiver and computer, because they have no idea what kind of radio to which you might be connecting the TNC. The burden is on the user to purchase the correct connector for the transceiver and computer that will be used with the TNC. Determine the kind of microphone, speaker jack, and computer serial comport connectors you're going to use. In some cases the TNC manufacturer furnishes only the connector for the TNC. This means that you must also furnish the cable that connects the TNC to your computer or terminal.

In most cases, a 25-pin RS-232 serial cable is used between the TNC and the computer.

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TC70-10 has adjustable RF out (1 to ≥10w p.e.p.) and sync stretcher to properly match RF Concepts 4-110 or Mirage D1010N-ATV amps for 100 Watts p.e.p. Specify 439.25, 434.0, 427.25 or 426.25 MHz, 2nd xtal add \$20. Hot GaAsfet downconverter varicap tunes whole 420-450 MHz band to your TV ch3. Transmit and camera video monitor output. 7.5x7.5x2.7".

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9913 EQUAL FOIL+95% BRAID 2.7dB @ 400MHz	42/FT	40/FT
LMR 240 DBL SHLD (8X SIZE) IIIA JACKET 1.7dB @ 50MHz41/FT	.39/FT
LMR 400 DBL SHLD IIIA JACKET 2.7dB @ 450MHz	.....	53/FT	51/FT
LMR 400 ULTRA-FLEX DBL SHLD "TPE" JACKET 3.1dB @ 450MHz	.....	75/FT	72/FT
LMR 600 DBL SHLD IIIA JACKET 1.7dB @ 450MHz	.....	1.25/FT	1.20/FT
LDF4-50A 1/2" ANDREWS HELIX 1.5dB @ 450MHz	25FT&UP	.....	2.10/FT
FSJ-50 1/4" ANDREWS SUPERFLEX 2.23dB @ 150MHz	25FT&UP	.....	1.50/FT
COAX (50 OHM "HF" GROUP)		100FT/UP	500FT
RG213/U MIL-SPEC DIRECT BURIAL JACKET 1.5dB @ 50MHz	.....	.38/FT	.34/FT
RG8/U FOAM 95% BRD UV RESISTANT JACKET 1.2dB @ 50MHz	.....	.32/FT	.30/FT
RG8 MINI (X) 95% BRD BLK, UV RES JKT (GRY, CLR, or WHT JKT TOO)	.....	.15/FT	.13/FT
RG58/U SOLID CENTER COND 95% BRAID	.....	.15/FT	.13/FT
RG58A/U STRD CENTER COND 95% TC BRAID	.....	.17/FT	.15/FT
450 OHM SOLID 18GA CW LADDER LINE	.....	.12/FT	.10/FT
450 OHM STRD 18GA CCW LADDER LINE	.....	.18/FT	.17/FT
24GA SOLID 4/PAIR UNSHLD LAN CABLE "LEVEL 5" PVC JACKET	.....	.18/FT	.14/FT
RG214/U DBL SILVER SHLD MIL-SPEC	25FT&UP	.....	1.75/FT
RG142/U DBL SILVER SHLD MIL-SPEC "TEFLON"	25FT&UP	.....	1.25/FT
ROTOR & CONTROL CABLES		100FT/UP	500FT
5971 8/COND (2/18 6/22) BLK UV RES JKT. Recommended up to 125ft.	.....	.20/FT	.18/FT
4090 8/COND (2/16 6/22) BLK UV RES JKT. Recommended up to 200ft.	.....	.35/FT	.34/FT
1418 8/COND (2/14 6/18) BLK UV RES JKT. Recommended up to 300 ft.	.....	.47/FT	.45/FT
1216 8/COND (2/12 6/16) BLK UV RES JKT. Recommended up to 500ft.	.....	.78/FT	.74/FT
18GA STRD 4/COND PVC JKT	.....	.20/FT	.18/FT
18GA STRD 5/COND PVC JKT	.....	.22/FT	.20/FT
18GA STRD 6/COND PVC JKT	.....	.23/FT	.21/FT
18GA STRD 7/COND PVC JKT	.....	.25/FT	.23/FT
ANTENNA WIRE (UNINSULATED BARE COPPER)		100FT/UP	500FT
14GA 168 STRD "SUPERFLEX" (great for Quads & Portable set-ups etc)	.....	.12/FT	.10/FT
14GA 7 STRD "HARD DRAWN" (perfect for permanent Dipoles etc)	.....	.08/FT	.07/FT
14GA SOLID "COPPERWELD" (for very long spans etc.)	.....	.08/FT	.07/FT
14GA SOLID "SOFT DRAWN" (for ground radials etc.)	.....	.08/FT	.07/FT
3/16" DOUBLE BRAID "DACRON" ROPE 770#TEST WEATHERPROOF	.....	.12/FT	.09/FT
COAX W/SILVER TEFLON PL259's EA END (soldered & tested)		PRICE	
100FT "FLEXIBLE" 9913 FOIL+95% BRAID 2.7dB @ 400MHz	.....	\$65.00/EA	
50FT "FLEXIBLE" 9913 FOIL+95% BRAID 2.7dB @ 400MHz	.....	\$35.00/EA	
100FT RG213/U MIL-SPEC DIRECT BURIAL JKT 1.5dB @ 50MHz	.....	\$45.00/EA	
50FT RG213/U MIL-SPEC DIRECT BURIAL JKT 1.5dB @ 50MHz	.....	\$25.00/EA	
100FT RG8/U FOAM 95% BRD UV RESISTANT JKT 1.2dB @ 50MHz	.....	\$40.00/EA	
50FT RG8/U FOAM 95% BRD UV RESISTANT JKT 1.2dB @ 50MHz	.....	\$22.50/EA	
100FT RG8MINI(X) 95% BRD BLK UV RESISTANT JKT 2.5dB @ 50MHz	.....	\$21.00/EA	
FLEXIBLE 2/COND RED/BLK DC POWER "ZIP" CORD			
10GA (rated:30 amps)	25FT \$10.50	50FT \$18.00	100FT \$38.00
12GA (rated:20amps)	25FT \$8.00	50FT \$14.00	100FT \$26.00
14GA (rated:15amps)	25FT \$6.00	50FT \$10.00	100FT \$18.00
TINNED COPPER "FLAT" GROUNDING BRAID			
1" WIDE (equivalent to 7ga)	25FT \$22.00	50FT \$43.00	100FT \$85.00
1/2" WIDE (equivalent to 10ga)	25FT \$12.50	50FT \$24.00	100FT \$48.00
CONNECTORS			
PL 259 SILVER/TEFLON/GOLD TIP	10PC \$11.00	25PC \$25.00	50PC \$47.50
"N" (2PC) SILVER/TEFLON/GOLD TIP	10PC \$32.50	25PC \$75.00	50PC \$143.75
100PC \$90.00	250PC \$275.00	500PC \$518.75	1000PC \$1037.50

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Later models employ a 9-pin serial connector; thus you will need a 9-pin connector/cable. This may vary depending on the type and make of computer terminal being used. Check the serial comport of your computer to be sure of the type of connector that you will need. *Do this before going to the parts supply house!* In most cases the computer will have either a 9-pin male connector or a 25-pin male connector as the RS-232 serial comport. If this is the case, you will have to supply the female connector for the computer end of the cable. Be sure to note the number of pins on the computer/terminal connector.

The operating manuals supplied with most TNCs provide adequate directions for use of various computers. Look for the computer to terminal node controller (TNC) interface section in the TNC manual. In most cases the cable for your TNC to computer may be purchased ready-made from many computer vendors.

When all else fails, read the manual and set up procedures for your TNC very carefully. The manual that is supplied with your TNC may have information that is specific to the personality of your TNC.

The First Test Flight

Once you have everything wired and connected together, turn on the computer and load a terminal program. There are lots of terminal programs available for use with packet radio. An example of how the transceiver(s) are interfaced to the TNC is shown in fig. 1.

Terminal Programs For Packet Operation

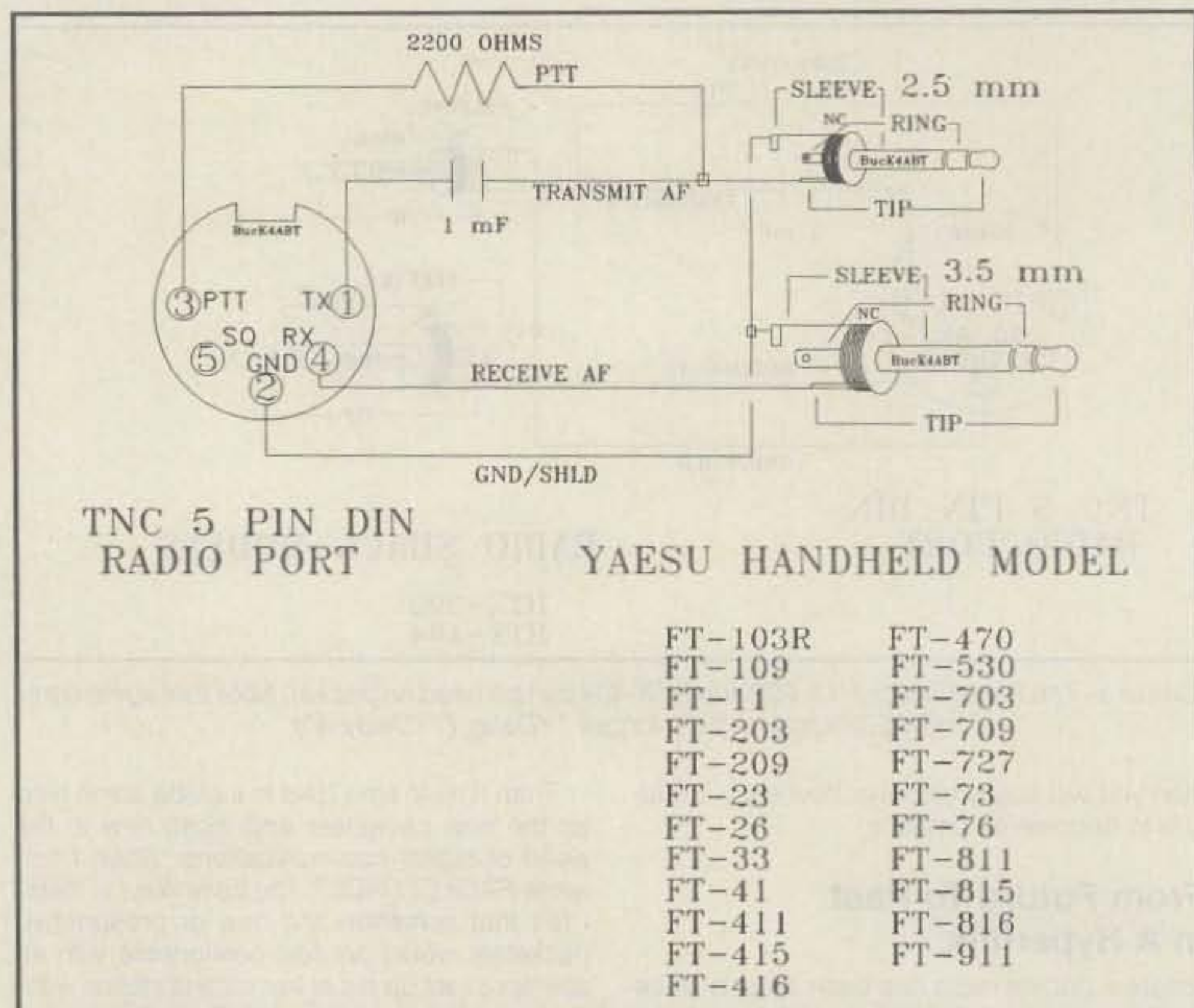
Many TNC providers offer terminal software that is specific to their TNCs. Still others have terminal software that runs under the Windows environment. You may wish to use the software that is offered by others, or you can get a copy of my terminal program—*free*.

If you have a PC or compatible computer but do not have a packet terminal program, send your return address and \$5.00 to cover the disk, mailer, and postage, and I will send you a powerful and feature-filled copy of BUXTERM.EXE (it is MS/DOS compatible *freeware*, so give a copy to a friend) along with the BUXTERM printed manual. Two *Packet Radio Handbooks* are included, and they too are free! There is no catch; it's free! You pay only the cost of priority postage, disk, and handling. I supply the (3.5 inch, 1.44 Mb) disk, mailer, and stamps. Mail to: Buck Rogers, K4ABT, 211 Luenburg Drive, Evington, Virginia 24550.

With The Terminal Program "Booted" We Begin

Next we switch on the VHF transceiver and turn up the volume a quarter turn, or just above the "9 o'clock" position. Make sure the squelch is not set too tight. The squelch should be set to a position where the transceiver is quiet. The squelch is set in a manner similar to what you would use for voice operation.

There are two communication speeds that are used in packet radio. It is necessary that each new packeteer be aware of the meaning of each speed and its relationship to his/her packet station. The first speed is the terminal to TNC baudrate. The second speed is the "ON AIR," or RADIO (VHF), baudrate. Since we are



Group 6—These Yaesu handhelds are also packet compatible. Some of the early models may require a larger value resistor than the 2200 ohm PTT dropping resistor.

about to begin operating in the VHF region, we will begin with an on-air BAUD speed of 1200 baud. ABAUD refers to the terminal to TNC, and HBAUD refers to the RADIO or ON-AIR baudrate (data speed). Most computers and TNCs will operate at an ABAUD of 9600 baud.

Let's Begin Having Fun

If you have followed the setup procedures outlined in the manual that comes with your TNC, then you are ready to take the plunge into the wonderful world of operating packet. Verify that all control, signal, and ground wires (PTT, RECEIVE, AFSK, and SIGNAL GROUND) are connected to the correct connector pins. To provide some help to the new packet user, I'm including several groups of interface and wiring diagrams for interconnecting the TNC to various transceivers. I hope I've included the diagram for your transceiver, as I've attempted to cover some of the popular brands and models. The drawing groups are for illustration purposes. I've used most of these interfaces. However, when I committed them to autocad drawings, I hope that I dotted all the "i"s and crossed all the "t"s.

Here it is in print. Please note: *Use caution if you use the drawings as a guide to interface the TNC to your radio.* And proceed at your own risk. I am not liable nor responsible for mistakes, errors, or omissions. You may wish to use your transceiver manual to confirm the connections.

Turn On The TNC!

When you first turn on the TNC, you may see garbled text on the screen. This is usually because the terminal to TNC baudrate is not set to the same parameters. Some TNCs will do a "search" mode to find the setting to which

you have your terminal program set. If at first you see garbage on the screen, then clear text begins to appear, you should follow the instructions that appear on the screen. If you are unable to establish communications with the TNC, review the TNC manual for further instructions. The baudrate of the TNC has to match the baudrate used by your computer terminal program and serial comport configuration. The comport speed (ABAUD) is easy to adjust. When the terminal to TNC parameters are correct, a message will appear on the screen showing the TNC manufacturer's name, firmware (EPROM) version, and date of program manufacture.

Perform a "control C" (press Ctrl and the letter C at the same time). This places the TNC into command (cmd:) mode. This is where all commands are issued from you to the TNC. Any command that is typed while in the cmd: mode is received by the TNC as a direct order.

Once in the command mode, you can press the [Enter] key, and each time you press the [Enter] key a cmd: prompt should appear on the screen. This is an indication that you have control (command) of the TNC.

The next step is to set our callsign into the TNC. To put our callsign into the TNC, at the cmd: prompt we type, followed by [Enter], the following:

MY (your call)

I send my callsign to my TNC in the following manner. Type, then hit [Enter], to the keyboard/TNC:

MYcall K4ABT [Enter]

You may now test the TNC to see if your callsign is indeed set into the TNC. To do so, type:

MY [Enter]

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The screen should display a response from the TNC with:

MYCALL [Yourcall]

If I enter:

MY [Enter]

the TNC should respond with:

MYCALL K4ABT

This confirms to us that the computer and TNC are communicating.

Now that you have entered your callsign as we have just described, followed by a carriage return (CR or [Enter]), you are ready to set other commands into the TNC. If there is no response

when you type **MY**, then try typing:

ECHO ON [Enter]

The **cmd:** should appear on the screen again, with a message similar to the following:

ECHO was OFF

Note: If you are seeing double letters (i.e., MMY CCAALLL) displayed when you type, this indicates that the ECHO command should be turned OFF. Type the following:

cmd: ECHO OFF

The TNC may respond with:

ECHO was ON

Here are some other commands that we should make active. Type them in as shown:

MON ON
MCOM ON
MCON OFF
MRPT ON

If you've wired the RS-232 interface cable using the RTS, CTS, Txd, Rxd, and Signal Ground leads, then set the XFLO command OFF. If you did *not* use the RTS and CTS signals, make sure the XFLO command is ON.

Ready For Action

There are many frequencies that are set aside for packet radio use. The SouthEastern Digital Association Networks (SEDAN) operate at 145.770 MHz. The following is a list of other VHF and UHF packet radio simplex frequencies (in MHz) that are a part of the SEDAN packet radio bandplan: 144.91, 144.93, 144.95, 144.97, 144.99, 145.010, 145.03, 145.05, 145.07, 145.09, 145.51, 145.53, 145.55, 145.57, 145.59, 145.61, 145.63, 145.65, 145.67, 145.69, 145.71, 145.73, 145.75, 145.77, and 145.79.

Included in the ARRL future band plans are several simplex (64 kB), 100 kHz backbone frequencies within the 219-220 MHz UHF band (FCC approved 16 March 1995 with restrictions; see the packet column, CQ, June 1995).

As I said earlier, make sure the **MONITOR** command is **ON**, and then watch the screen. If you have tuned to one of the packet frequencies mentioned above and you are not yet seeing data appear on the screen, then try the nationwide 1200 baud access packet frequency of 145.010 MHz.

When all else fails, call a packet friend and ask him or her to connect to your call. If you are using an SSID of your call, be sure to include this in the information you give the friend. While you are at it, ask if he/she uses an SSID.

What Is An SSID?

Now that I have you wondering what a SSID (Secondary Station IDentification) is, the following is a brief explanation.

In packet radio you can have up to 15 SSIDs. An example is K4ABT-1 through K4ABT-15. K4ABT without an SSID extension is considered the 0 (zero) SSID. Thus, we could have 16 different stations/calls on the air at the same time using our single callsign. That's where the numbers in the callsign come into play. The added numbers after the dash (for example, K4ABT-1, K4ABT-2, etc.) are used to distinguish the various station(s) or node(s).

To connect to a station or node which uses an SSID, it is important that we know what the SSID is before attempting a connect to that station. To try connecting to a station or node without having the appropriate SSID included in the connect sequence would be like trying to place a long-distance telephone call without using an area code—a crude analogy, but you get my drift.

You are about to embark upon one of the most fun-filled facets of the amateur radio hobby. Give it a try and experience the fun of wireless, digital data communications.

Let the fun begin!

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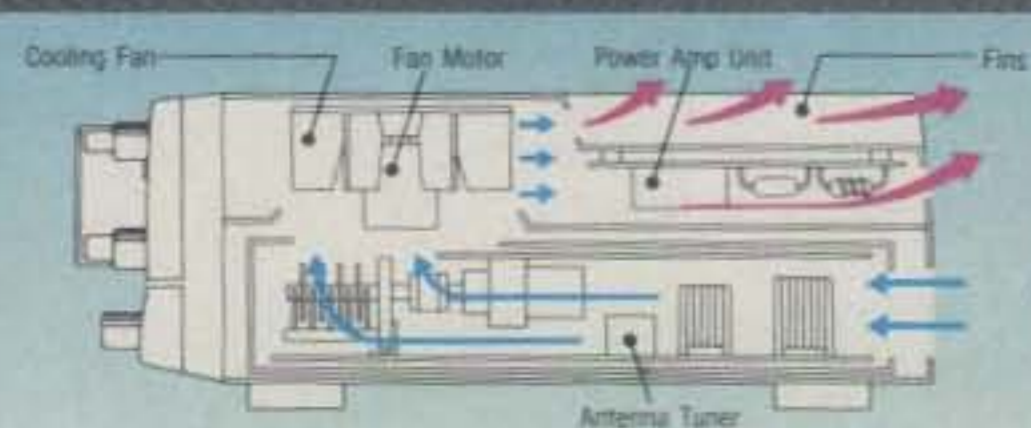


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ANTENNAS & ACCESSORIES

A LOOK AT THE SHACK FROM BOTH ENDS OF THE COAX

Update '96

This time we'll revisit and update many of the "Antennas and Accessories" topics covered in previous columns, and we'll also break some new ground. Let's get started with antennas.

Antenna Notes

LA1IC Multiband Coaxial Traps. Norwegian antenna experimenter Rolf Brevig, LA1IC, has come up with coaxial cable traps based on the classic W3DZZ HF multiband trap design. Rolf's traps reportedly provide resonances in the middle of the 80, 40, 20, and 15 meter bands, and at the high end of 10, as measured by an MFJ-259 SWR Analyzer. Rolf notes that several of the traps (see photo) now are in use in the harsh Norwegian climate.

While we're not sure if Rolf has set up his marketing plans just yet, he says that he wants to encourage others to construct traps similar to his through future publication of a construction article. He'd like to know if anyone invented such coaxial cable traps at an earlier date, or basic traps earlier than as described in Chester Buchanan, W3DZZ's landmark 1955 *QST* article.

We have some background on traps to offer, having devoted two columns to them in February and March 1981. W3DZZ first popularized the traps some 41 years ago in *QST*, but reportedly the concept can be traced back much farther. The roots go back to at least 1940, when radio engineer Howard K. Morgan published a rudimentary trap design in *Electronics* magazine. His concept involved the introduction of "lumped constants," or tuned circuits, at strategic points in a wire antenna to allow it to simultaneously develop resonance on two or more amateur bands.

Morgan's tuned circuits eventually became popular with amateurs. They ultimately found their way into a variety of multiband antennas, including Yagis and verticals, in addition to wire dipoles. The idea was to make a single, coax-fed antenna that could be used easily on several amateur bands with low SWR.

Traps are popular for many reasons, not the least of which is the fact that they often can replace a small antenna farm. They're popular—even though they can be cantankerous to tune up—largely because of the many feedline advantages of coaxial cable, RFI/TVI considerations, and touchy solid-state finals. Plus, there are trends to shrinking urban real-estate lots and cramped apartment/condo lifestyles. Restrictive covenants on land use and zoning ordinances that promote the erection of a minimum number of antennas also contribute to trap popularity.

One pair (two traps) normally are needed for each band (see fig. 1). Each set forms a dipole for the desired band, with the wire beyond the

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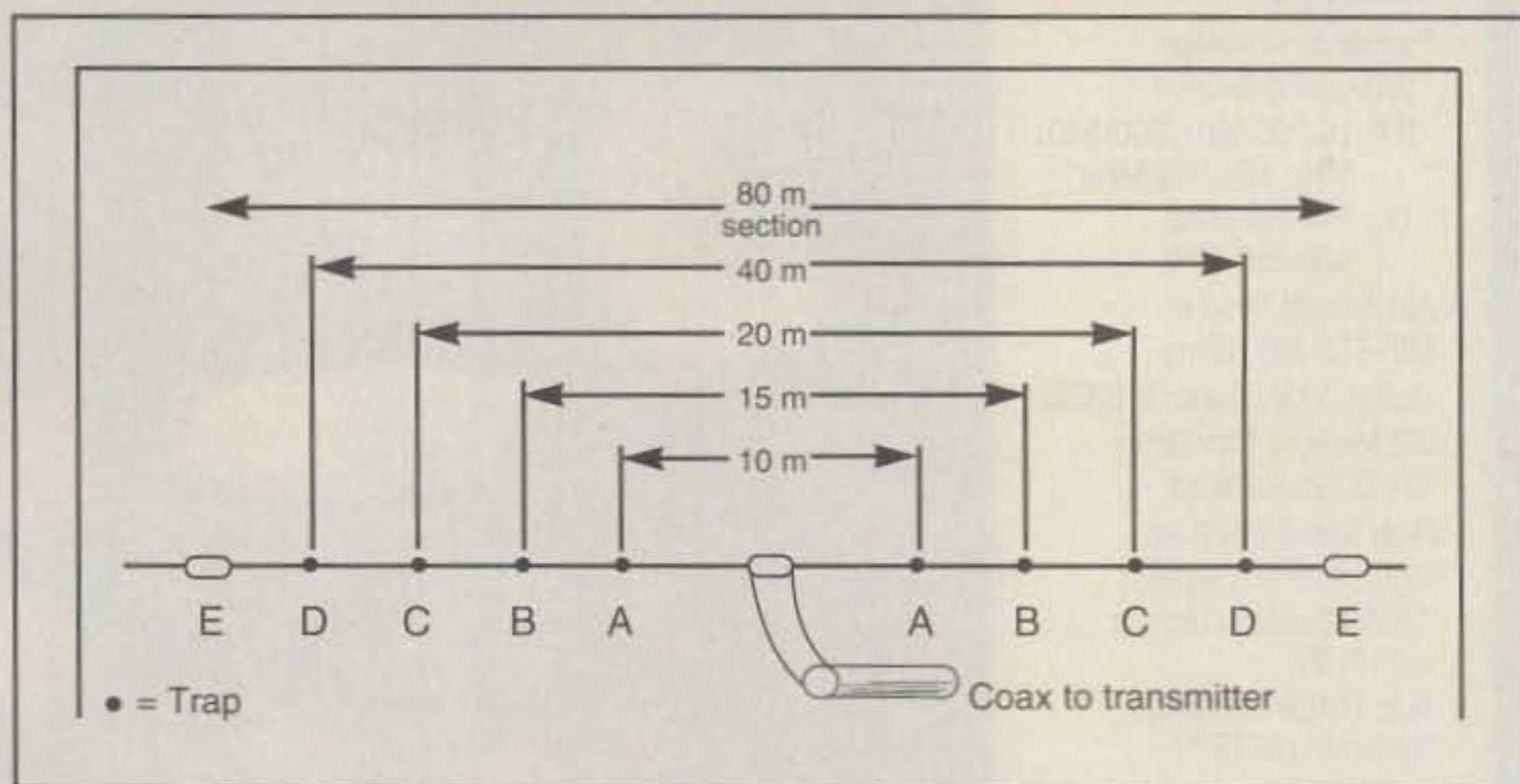


Fig. 1—Shown here is how traps work in a typical five-band, HF, multiple-trap antenna. The W3DZZ-based antenna design normally uses four pairs of traps for simultaneous resonance on five bands; other or additional band combinations may, of course, be used. The innermost section, A:A, makes up the 10 meter antenna. The traps at the end of this dipole section make up a resonant L/C circuit that isolates the outer portions of the antenna on 10 meters. The outer sections (B:B, C:C, and D:D) work in similar fashion for the lower bands. On the lowest band, normally 80 meters, the full antenna (E:E) is a half-wave dipole. You can build a five-band dipole with as few as one pair of traps, as did Rolf, LA1IC, but the antenna operates in harmonic mode on several bands, with resonance and SWR not easy to predict. The trap antenna normally is fed with coax; a balun isn't required, but may be used. (Source: Karl Thurber, "Antennas" column, *CQ*, February 1981, page 40.)

traps being "trapped out." Trap dipoles make reasonably good antennas, but they run into problems when five, six, or more band coverage is attempted. A major problem is the heavy weight of numerous traps and the difficulties in separately adjusting each trap. One partial "solution" is to use fewer traps. Other compromises are involved when as few as a single pair of traps is used, as in Rolf's approach.

In Rolf's one-pair trap design (fig. 2), his antenna is about 33 meters (approximately 108 ft.) long—a little shorter than a full-size 80 meter dipole. Trap placement is 6.4 to 6.7 meters in from each end, which makes the inner section of the antenna about 66 ft., a half-wave on 40 meters. The antenna design allows $3/2$ -wave operation on 20 meters, $5/2$ -wave operation on 15 meters, and $7/2$ -wave operation on 10 meters.

For more details on the LA1IC Multiband Coaxial Traps, contact Rolf Brevig, LA1IC, Dyrefaret 3, 3470 Slemmestad, Norway.

MFJ-1778 G5RV Antenna. We've mentioned the now-legendary G5RV antenna pioneered by Louis Varney, G5RV, many times, promoting it as a practical and easy-to-feed multiband HF antenna. The G5RV flattop usually is about 102 feet long and uses a 32 to 33 ft. openwire or ladderline matching section, using ladderline, openwire line, or coax feed to the transmitter.

Various designs and variants are seen (fig. 3). These include one using ladderline or open-

wire line all the way to the hamshack; another making use of a matching section plus a balun to make the transition to coax; and another with the antenna half-sized at about 51 ft. long. Use of an antenna tuner is recommended with all versions of the G5RV.

Louis preferred openwire line all the way in his original article, and he even devoted part of the article to the design of an antenna matcher to go with it. He also didn't claim it would match perfectly on all bands with a 32 or 33 foot length of ladderline as a matching section and coax to the transmitter.

Looking at the standard-size G5RV, with its 102 ft. flattop, we find it's an excellent choice for a multibander. However, there isn't anything magical about the antenna. The G5RV is just a special case of the long-popular multiband Zepp; the 102 ft. flattop length was chosen to be about $3/2$ wavelengths on 20 meters. This makes it work well, in the same manner that a 40 meter dipole works well on 15 meters, where it's $3/2$ wavelengths long. On the other bands the G5RV really is a multiband Zepp, so its "natural" feedline is open-wire line or ladderline all the way.

Recognizing, however, that coax feed is preferred by many users—even if they must use a transmatch to effect a good load to modern solid-state transceivers—many designs use ladderline as a matching section to allow operation with coax. One of these designs is

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offered by MFJ Enterprises as the MFJ-1778 G5RV antenna, and one of the best features is its low price (\$29.95).

The MFJ design (see photo) is fully assembled and includes 102 ft. of heavy-duty stranded copper wire (7 strands of 22-gauge wire, equivalent to 14-gauge), and 32.5 ft. of 450 ohm ladderline. The ladderline is terminated on both ends with custom fiberglass insulators, and a standard coax connector is mounted at the feedpoint end for convenient connection to coax. All you need add is a length of coax feedline and some rope.

For more information, contact MFJ Enterprises, Inc., P.O. Box 494, Mississippi State, MS 39762 (1-800-647-1800).

Software Notes

NEC-Win Basic for Windows. Yet another antenna design and analysis program has entered the arena: NEC-Win Basic for Windows. It boasts that it's the only such package that combines the NEC2 "core" with a graphical Windows interface and that has a price tag of less than \$100.

Although we haven't yet given the program a test drive, it appears to be an intuitive program designed to serve a variety of users, both beginners and experienced NEC users. Beginners can model antennas immediately by working through the examples; in minimum time, they can create antenna structures, analyze radiation patterns, and create three-dimensional (3-D) views.

Some of the program's capabilities include data entry in spreadsheet fashion, built-in

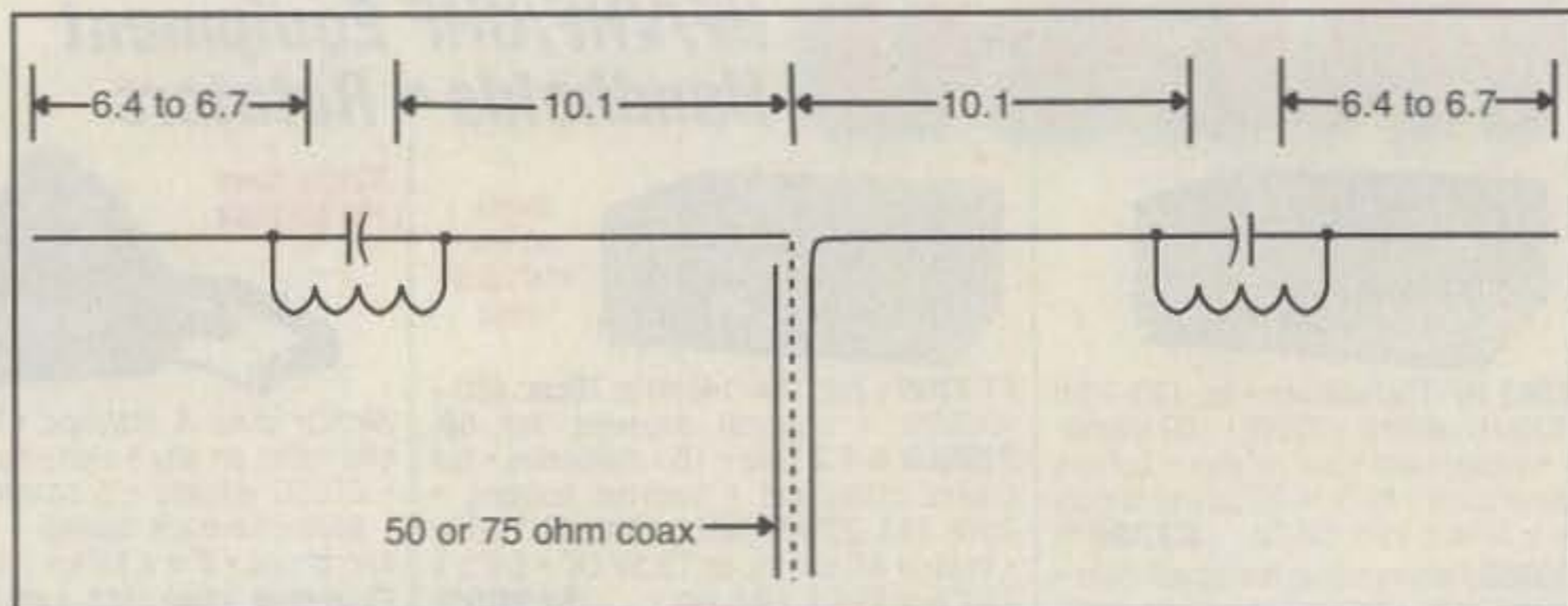


Fig. 2— Rolf Brevig, LA1IC, is perfecting and manufacturing these rugged multiband coaxial cable traps based on the W3DZZ design. They reportedly offer resonance (or harmonic relationships) in the middle of the 80, 40, 20, and 15 meter amateur bands, and at the high end of 10 meters. His two-trap configuration is shown here, with dimensions of the 33 meter long flat-top being given in meters in the European style of mathematical notation. (Source: Brevig, product literature.)

defaults for wire diameter, graphical ground-plane selection, real-time antenna rotation using a mouse, zoom and pan of the antenna structure, and overlay of multiple antenna patterns. Other features include comparison of multiple antenna files, 3-D surface plots of antenna patterns, custom printing of 2-D and 3-D patterns, robust pattern plotting and printing capabilities, and much more.

It handles 500 segments and is \$75; the 1500-segment version is \$95. Contact Paragon Technology, Inc., 200 Innovation Blvd., Suite 240, State College, PA 16803 (814-234-3335).

M*LOG™ & CODEMASTER V™. Milestone Technologies offers several programs for the IBM PC. These include accounting, pricing, inventory, addressbook, note-tracking, text file manipulation, reminder, and others. Two other programs are of interest to amateurs and SWLs: M*LOG™ and CODEMASTER V™.

M*LOG is full-featured radio log-keeping software for amateurs and SWLs to automate their log-keeping functions. Menu-controlled and user-friendly, its main features are the recording and printing of the station log, printing of QSL cards and labels, tracking QSL receipts and prefix confirmations, and printing

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an index of all stations worked. Multiple logs, user definition of fields and reports, data input from CD-ROM callsign databases, and real-time input and contest log checking are supported. It's \$34.95.

CODEMASTER V teaches Morse code in a flexible but structured environment. Once you've learned the code, it helps you improve copying skills by offering various forms of practice with fully adjustable parameters. Features include a beginner's tutorial, keyboard echo, random groups and words, a hand key, an arcade game, trial exams, an ASCII file sender, and a QSO generator. The program also supports foreign Morse alphabets. It's \$24.95.

For a flyer, contact Milestone Technologies, 3140 S. Peoria St., Unit K-156, Aurora, CO 70014-3155 (1-800-238-8205).

Street Atlas USA 3.0 and Phone Search USA. One of the big advantages of CD-ROM based software is the ability to use large databases and extensive graphics—data that otherwise would fill up one's hard drive in a flash. One capable CD-ROM product we noted in several columns, most recently in March '94, was DeLorme's slick Street Atlas USA™. It's a computerized street map that provides a virtually seamless map of all 50 states.

The newest version, Street Atlas 3.0, adds new search functions so you can search for any U.S. address practically any way you want. Simply entering an address and ZipCode produces an on-screen symbol at the address location. To ascertain a ZipCode, you can use the program's ZipCode search function or click on the map at the location in question.

The program has new custom map editing tools. You can add annotations, map notes, and distinctive symbols. Now you can save changes and edit them as desired. You also can customize the print layout, adjusting the width of the margins as well as the size and placement of the map title and legend. The program shows a latitude and longitude readout wherever the cursor is, and you can print maps with latitude and longitude grids.

Street Atlas USA also comes with a link to Phone Search USA, a comprehensive digital phone book containing more than 80 million residential and business numbers. You can look up listed phone numbers with Phone Search USA, and then locate the corresponding ad-

dress on Street Atlas USA maps. Truly neat!

With Phone Search USA, which comes on three CD-ROMs, you can quickly look up listings by name, phone number, or business type; and you can filter searches by state, city, and ZipCode. Mapping the locations for selected listings requires only a switch to the Street Atlas USA 3.0 CD; then at the touch of a button the addresses for the selected listings are displayed on the maps. You can customize the maps, adding symbols, or text, or map notes, and export Phone Search USA listings for use in database, wordprocessing, spreadsheet, or other applications.

Separately, each program is superb in its own right. Used together, however, you have a practically unbeatable mapping resource. You can locate destinations precisely, look up and locate lost friends and relatives, and create timesaving maps for various personal and business situations, to name just a few possibilities. Resourceful amateurs will, of course, think of many additional uses to which the combo can be put.

I enjoyed Street Atlas USA 3.0 and Phone Search USA immensely, which individually sell for about \$79 on the street. My only real complaints are that (1) the highly complementary programs are not bundled together and sold as a package, and (2) the currency and accuracy of some of the map data on which Street Atlas USA 3.0 relies is questionable (my own residential area still shows both unfamiliar and misspelled street names). For additional information contact DeLorme Mapping, P.O. Box 298, Lower Main Street, Freeport, ME 04032 (1-800-452-5931).

Postscript: If you love exploring the Internet, you'll likely enjoy the new DeLorme home page at <http://www.delorme.com>. Check it out.

Buckmaster HamCall Update. In several previous columns, most recently last October, we featured HamCall™. To recollect, it's a CD-ROM based computer database of all FCC-licensed amateur stations in the U.S., including club, military, and RACES calls, plus many international listings. Over 1.25 million callsigns are included in the database.

With HamCall you can look up U.S. calls by callsign, name, address, city, state, ZipCode, callsign suffix, or county; the lookup and data displayed internationally depends on country.

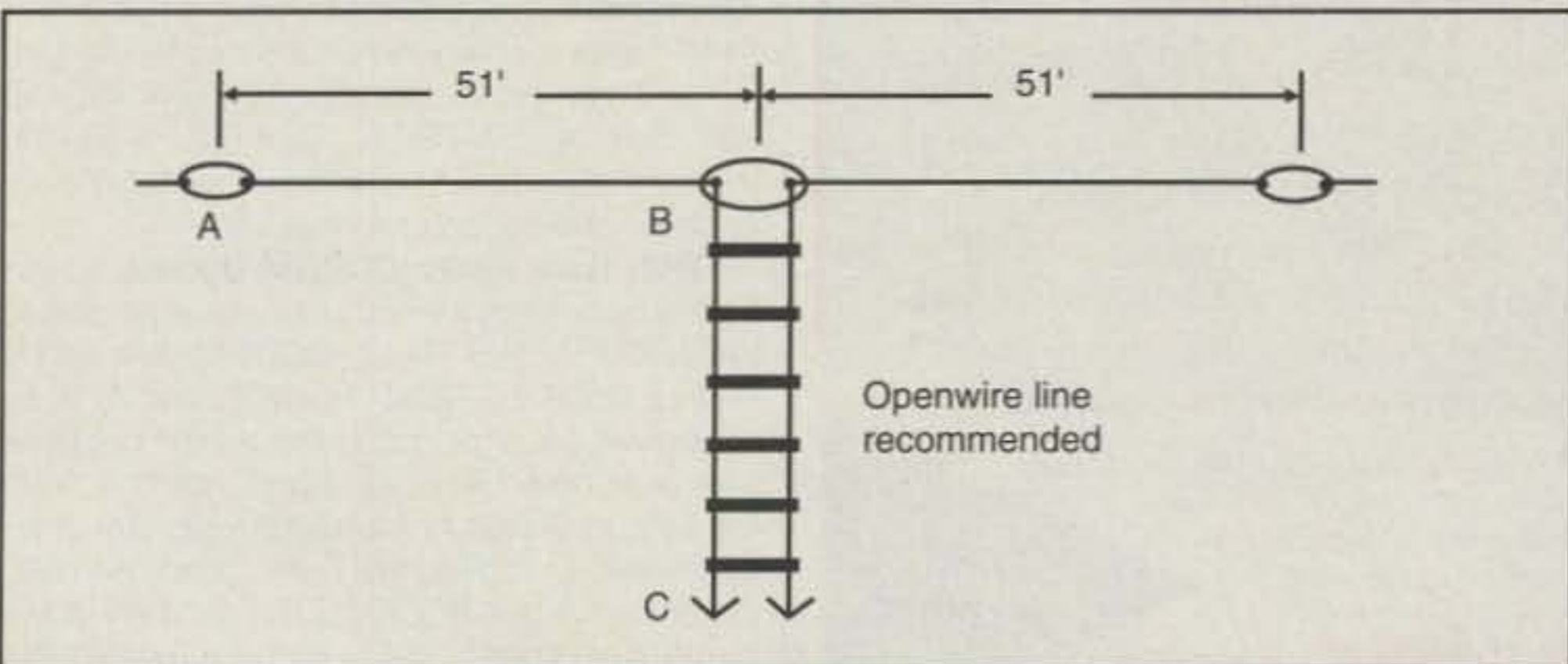


Fig. 3—A popular variant of the G5RV antenna that allows coax feed uses a 102 foot flattop with a 32 to 33 foot matching section of openwire line or ladderline, from point B to point C. At point C, a length of coax is connected for the run to the hamshack. Often a balun is used at this point to make the transition to coax. Use of an antenna tuner is recommended with the G5RV. (Source: Thurber, "Antennas & Accessories," CQ, Aug. 1989, p. 74.)

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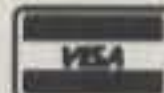
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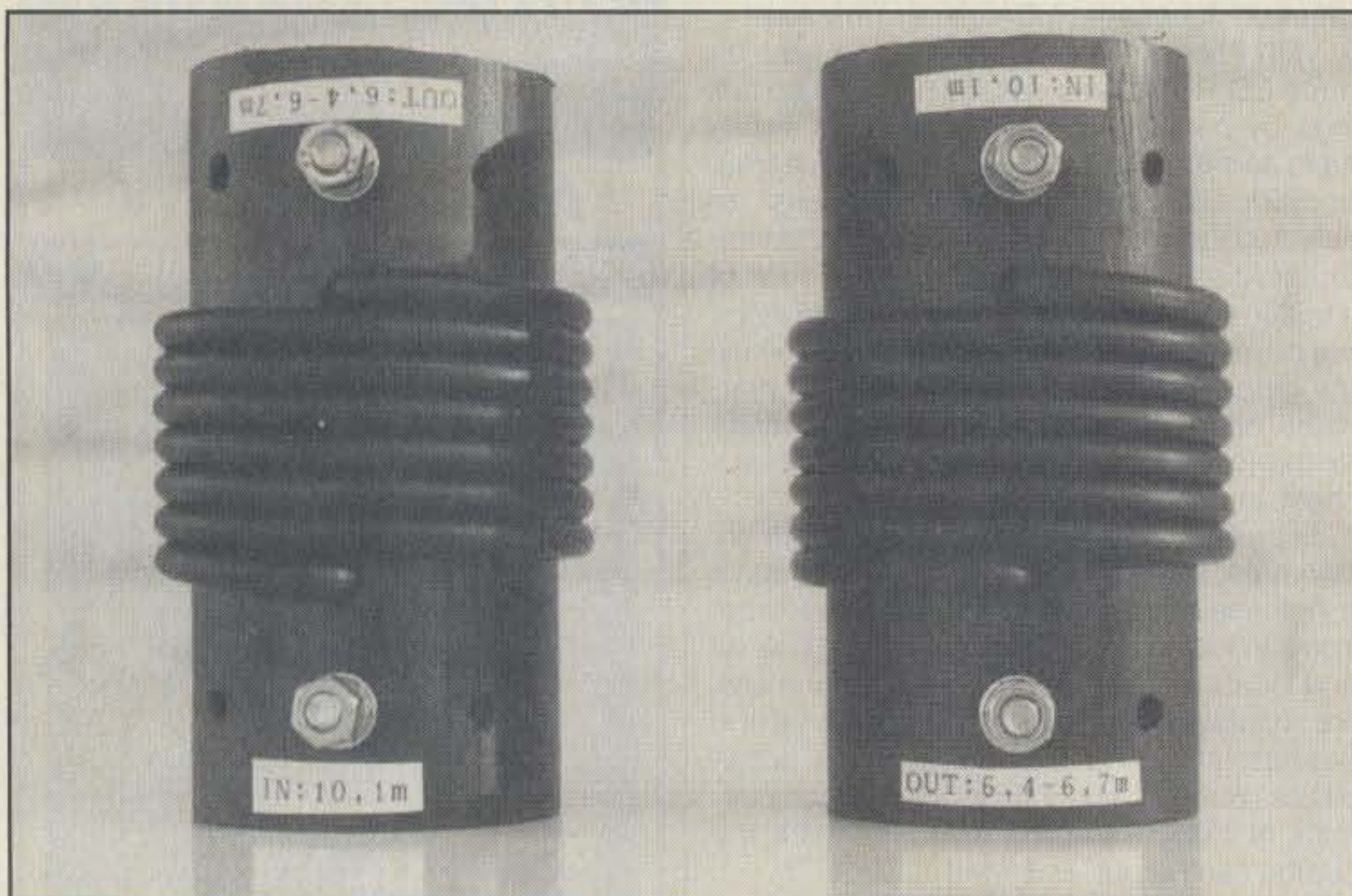
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Rolf Brevig, LA1IC, has designed a rugged pair of multiband coaxial cable traps based on the W3DZZ design to provide resonances in the middle of the 80, 40, 20, and 15 meter amateur bands and at the high end of 10 meters. Several of the new traps are now in use in the harsh Norwegian climate.

You also can copy output to disk, a database, or printer; generate labels and text files; and compile specialized databases. Station location is shown by high-precision latitude, longitude, and grid square. Program updates are issued in October and April.

HamCall has gone through various incremental improvements, yet is compatible with both Windows 3.1 and Windows 95. Now both the DOS and Windows search engines allow editing of data, so you can add new addresses or correct old records. Edited records ap-

pear automatically the next time you look up the callsign to which you made changes. A new feature lets you view a photo of the person you look up, assuming they have contributed one. Both the IBM PC and Mac can access the CD-ROM for callsign lookup; with a Mac you can retrieve by call, name, and ZipCode.

The CD-ROM also has hundreds of programs and datafiles of ham-related subjects; it sports over 40 MB of IBM PC shareware and public-domain programs, over 1000 text files, and 22 MB of Mac software. Latest callsign listings are available from the publisher's Web site at <http://www.buck.com>.

The CD-ROM is \$50 plus \$5 shipping from Buckmaster Publishing, Route 4, Box 1630, Mineral, VA 23117 (1-800-282-5628).

R&R Electronic Callbook Update. In several columns (November 1992, April 1993, and March 1994) we featured the specialized callbook program R&R, developed by Valery A. Kharchenko, RA6YR, and his company, Octavia. R&R, we noted, is the computer version of the Russian and Independent Republics Callbook, published by the Octavia Company, Ltd., P.O. Box 40, 352700, Maikop, Russia.

The R&R background is interesting. Reportedly, in 1988 Valery attempted to form a cooperative to publish the first directory. His application was refused by officials unfamiliar with "software" and "marketing." Despite official resistance, his first Russian callsign directory was published in May 1989.

After perestroika took hold, he founded Octavia Company, a "limited liability" firm. Octavia continued to publish paper callsign directories and later released R&R, which was conceived initially as shareware.

Various methods of distributing R&R were attempted with varying degrees of success. Now, apparently, Octavia Company has settled on worldwide distribution through Jan Bexner, SM7DEW. Some of the features of the DOS-based program include easy installation; a three-language (English, German, and Italian) interface; export and import of data; browsing and whole-database scanning; QSL bureau addresses; home addresses and telephone numbers of many amateurs; the ability to add entries to the database; and more.

The single issue price is \$25 U.S.; a subscription to the April and October issues is \$35 U.S. Payment may be made by international money order, Eurocheck, or cash (at your own risk). Personal checks are not accepted by Jan.

For more details, send an SASE or IRCs to Jan Bexner, SM7DEW, Box 92, S-34122, Ljungby, Sweden. You also can e-mail him at: jan.bexner@mailbox.swipnet.se.

QRZ! Ham Radio CDROM Update. In the February column we noted the latest update to the QRZ!™ Ham Radio CDROM offered by Walnut Creek CDROM. The \$29.95 disc is an extensive callsign database which contains well over one-million callsigns, not only from the United States, but also from several other countries. Compiled by Fred Lloyd, AA7BQ, the disc includes MSDOS, OS/2, and Windows compatible search and retrieval software to let you search by callsign, name, city, or ZipCode.

We also mentioned that on the horizon for future CD-ROM editions were digital QSL card images, amateurs' e-mail addresses and other personalized licensee information, and a new Mac callsign lookup program. These plans

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have come to fruition. Now the e-mail addresses of many amateurs are displayed along with callsign data, where available. An image viewer is included for displaying QSLs or photos as you browse through the main callsign database. Plus, there's a new Mac callsign lookup program on the disc.

Also on the disc are instructions for getting your e-mail address and images (photo or QSL) to Fred for inclusion in future editions and posting to the QRZ! Internet Web site. So if you're on the Internet, you can browse his Web site at <http://www.qrz.com> and add your info to his database.

You can send your e-mail address to him at updates@qrz.com; send GIF or other format images to his FTP site <http://ftp.qrz.com/tmp>; or send images to him by US Post Office mail on floppy disk. Fred will even digitize your image for you if you can't scan it yourself; these can be sent in his care to Walnut Creek CD-ROM (include an SASE if you want the image back).

For a catalog depicting a variety of interesting discs, in addition to QRZ!, contact Walnut Creek CD-ROM, 4041 Pike Lane, Suite D, Concord, CA 94520 (1-800-786-9907).

Norton Utilities and Norton Navigator for Win 95 CD-ROM. In the February column we also profiled several pioneering Symantec utilities for Windows 95, including Norton Navigator and Norton Utilities for Windows 95. We pointed to the need for such utility programs in view of the absence of a complete set of powerful Windows 95 disk utilities, and weaknesses in what might be called Windows desktop navigation and file management. We'll refer you back to that column for the details.

Symantec now tells us that they now have both programs available on multimedia CD-ROM, which should save you a good deal of toil and trouble in installation. Most affected by the new CD-ROM edition are the Norton Utilities, which now offer extension multimedia online resources that weren't practical to include on diskette. These resources include Disk Companion, which explains how the Windows 95 file system works; Memory Companion, which shows how to configure memory for best performance; and Norton Companion, which provides an introduction to the Norton Utilities as well as online tips and troubleshooting info.

The Norton Utilities CD-ROM edition is about \$10 more than the diskette edition, at a street price of about \$129 (\$69 trade-up); Norton Navigator CD-ROM is \$109 (\$49 trade-up). For more information, contact Symantec Corporation, 2500 Broadway, Suite 200, Santa Monica, CA 90404-3063 (1-800-441-7234).

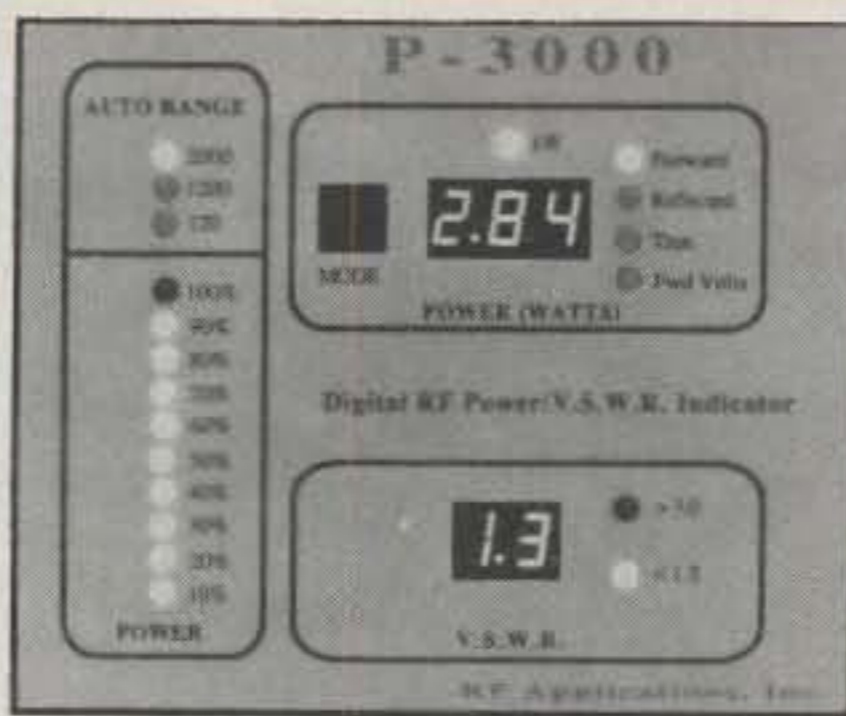
Books for the Hamshack

Two from CQ. Just in case you haven't noticed, CQ Communications' books, buyer's guides, videos, and other amateur radio goodies are proliferating. Not just books and videos are offered. There are calendars, T-shirts, and other "fun stuff" for the hobby.

I can't claim a hand in its production, but I find that the *CQ Amateur Radio 1996 Equipment Buyer's Guide* is a winner. The 160-page *Guide*, edited by Edith Lennon, N2ZRW, and Bernadette Schimmel, is chock full of features, specs, photos, and prices of nearly 3000 amateur products. There are practical features on

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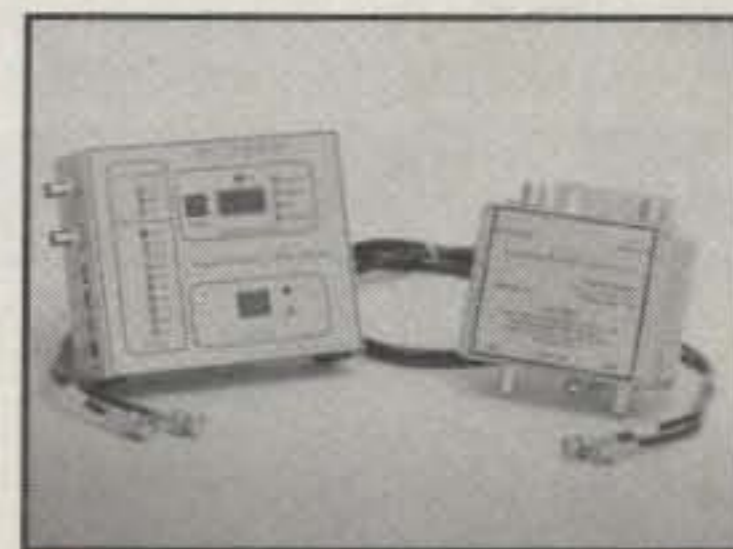
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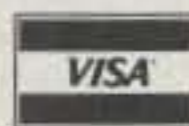
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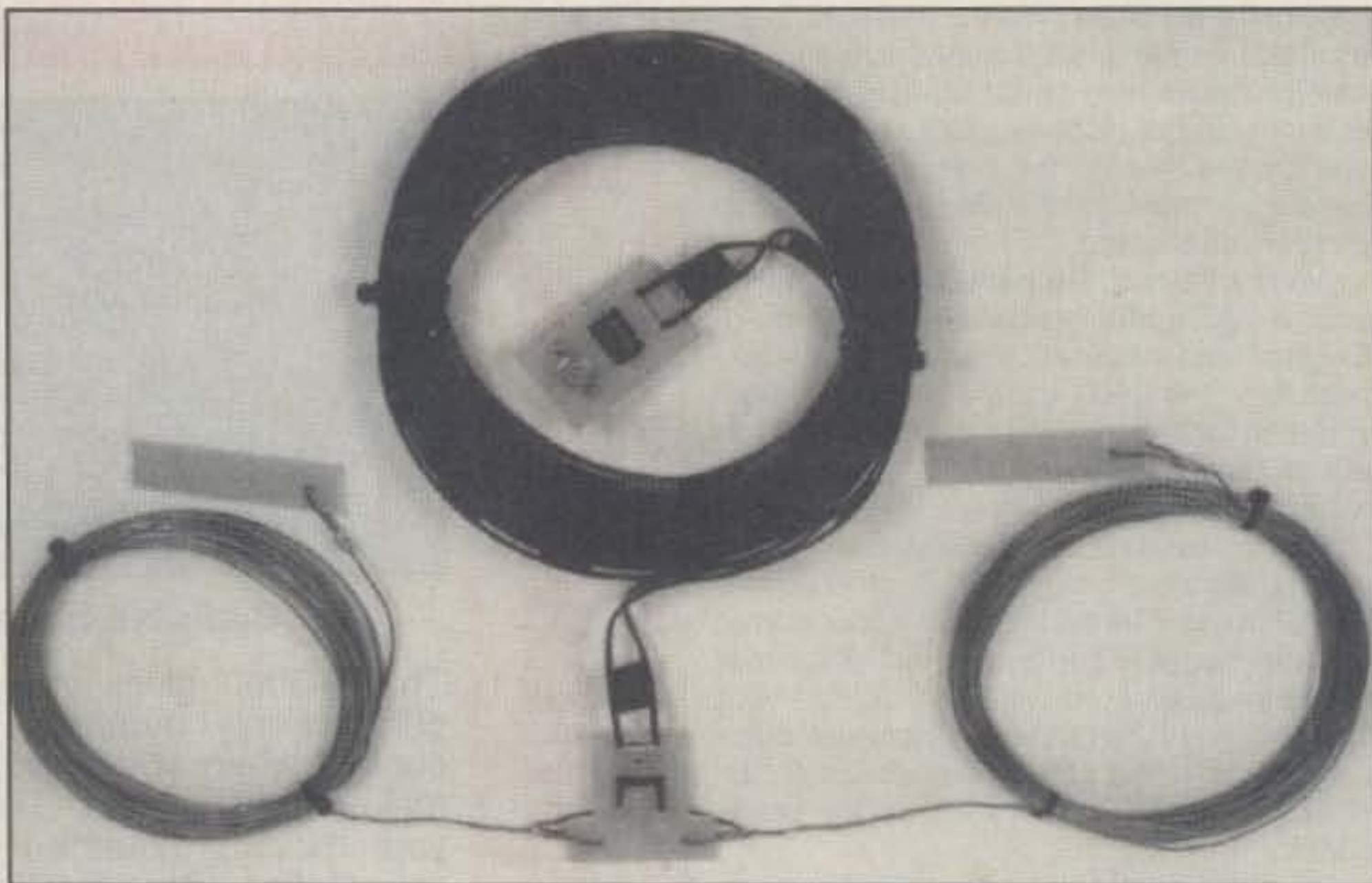
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Here's the complete G5RV multiband wire dipole antenna offered by MFJ, the MFJ-1778. The antenna, which can be installed as an inverted Vee or Sloper, is 102 ft. long, shorter than a full-size dipole for 80 meters. Using a 32.5 ft. matching section, the antenna is fed with coaxial cable. With an antenna tuner, you can operate all bands, 80 through 10 meters. You may also be able to use it successfully on 160 as a Marconi fed against ground.

buying HF and VHF/UHF radios, climbing the licensing pyramid, and of course, choosing the "perfect" antenna. There's also a back-of-the-book listing of over 650 manufacturers and dealers, which I find very useful. The *Guide* is \$5.95 plus shipping and handling.

There's also the third edition of the *CQ Amateur Radio Almanac* (1996), again edited by Doug Grant, K1DG. It bills itself as "ham radio's most comprehensive resource," and that it is. It contains thousands of facts and figures, as well as maps, graphs, photos, and more. Included in its 23 chapters are the FCC rules and regulations, operating tutorials, DX records, radio history, propagation data, contest information, QSL bureaus, and the like. There's also updated information on the past year in review, club listings, propagation forecasts, sunspot numbers, silent keys, postal regs, operating events, and considerably more.

My minor criticism of previous *Almanac* editions, which focused mainly on the too-small typeface, has largely been corrected by going to a larger typeface in text-intensive sections. The table of contents is better-organized than previously, although the index could still be more detailed. The *Almanac* is a super deal, especially since it's still pegged at \$19.95 plus shipping and handling. Both books are available from CQ, 76 N. Broadway, Hicksville, NY 11801 (orders 1-800-853-9797).

Two from Osborne McGraw-Hill. I'd like to draw your attention to the best-selling "Certified Tech Support" series of books, which were developed in cooperation with providers of "third party" tech support such as Stream International, Inc.

One of the most popular books in the series is *Windows 95 Answers: Certified Tech Support*, by Martin S. Matthews and Carole Boggs Matthews. Their software support book is a 352-page compilation of frequently asked questions and their answers, based on several hundred thousand actual tech support calls.

The publisher slyly suggests the book as an inexpensive alternative to calling Microsoft's tech support hotline to help you get Windows 95 up and running. The book is \$19.95.

Osborne McGraw-Hill also has come out with a 1996 edition of Harley Hahn's 1-million-copy seller *Internet Yellow Pages*; we profiled the second edition in last October's column. The third edition, now up to 830 yellow-tinted pages at the same \$29.95 price, constitutes an excellent overall guide to the Internet. This reference greatly assists you in finding whatever information you need quickly and easily; almost every type of human activity, including amateur radio, is represented. The book has a very detailed table of contents and index.

The books are available in bookstores, or contact Osborne McGraw-Hill, 2600 Tenth St., Berkeley, CA 94710 (1-800-227-0900).

The Mother of All Windows 95 Books.

Here we go with another monster (922-page) book/CD-ROM combo, this one also for Windows 95. It's *The Mother of All Windows 95 Books*, by Woody Leonhard and Barry Simon. The book is written in an unusually witty and idiosyncratic (not to mention corny) style, as though you were being instructed by someone's cranky mother with an endless variety of "motherly advice" on everything from setting up Windows 95 to tuning it and making it work the way you want it to work. A great deal of useful Windows 95 utility and application software is furnished on the accompanying CD-ROM.

If you like your computer advice strictly businesslike and straightforward, you probably won't enjoy reading this one. Otherwise, latch onto a copy of *The Mother of All Windows 95 Books* at your bookstore or contact Addison-Wesley Publishing Co., 1 Jacob Way, Reading, MA 01867 (1-800-277-1936).

Short Bursts

Amateur Radio Internet Shopper. The Internet rapidly is becoming a universal marketing

vehicle. Many business firms, individuals, and organizations have constructed Web site "home pages" as "virtual storefronts" ready to accept your dollars. Because the medium is so pervasive and inexpensive to use, just about anyone who has something to sell (or buy or trade) has a Web page advertising themselves and their business.

The Amateur Radio Internet Shopper (ARIS) keeps up with this trend. It was established to give the buyer a convenient means of shopping for new and used radio gear, and the seller an inexpensive means to advertise, both locally and worldwide. With ARIS you can shop from your home at your convenience. Most of the ads on the site are for amateur radio, electronic, electrical, computer, computer peripheral, and other related gear. The ads can take various forms, such as business-card postings, home-page space, job resumes, or classified ads.

For more information, contact Cox Enterprises, Inc., 15390 Mimosa Dr., Gulfport, MS 39503 (601-832-2511), or check out the ARIS home page at <http://www.cqinternet.com>.

DRMS Surplus Property Bargains. A government-operated swap meet? Well, almost. The Defense Reutilization and Marketing Service (DRMS), a federal agency, sells surplus Department of Defense (DOD) property to the public. There are bargains galore to be had, and current DOD drawdowns and inventory likely will mean many more surplus items coming to market.

DRMS disposes of excess personal property generated by the military services. Everything from buttons to battleships is disposed of through its programs, and there's lots of electrical, data processing, and communications goodies to be had. Headquartered in Battle Creek, Michigan, DRMS is a field activity of the Defense Logistics Agency (DLA). The actual disposal mission takes place at the nearly 200 local Defense Reutilization and Marketing Offices (DRMOs) worldwide, where property is first received and screened for reutilization or reuse within DOD.

DRMS also has an Internet Web site which has a searchable online catalog for government property. Such a real-time feature is well-suited to the transitory characteristics of the surplus market. Look for the DRMS site at <http://www.drms.dla.mil/index.html>.

A pamphlet "How to Buy Surplus Personal Property" is available from DRMS (P.O. Box 5275 DDRC, 2163 Airways Blvd., Memphis, TN 38114-5210) or from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. You should be able to get a free copy and other materials from local DRMS offices, many if not most of which are located on military installations. Check with your closest local office for their sales dates and procedures.

Looking Back Five

Five Years Ago in "Antennas and Accessories." Now you know what the column is for July 1996. But what was hot in July 1991? That column was "Antenna Potpourri—Part II."

We began with antennas, graphically displaying the damage to one amateur's antenna system caused by a tornado; the Gainesville,

Florida "over 10 ft." antenna tower ban as reported by the *Gainesville Sun* newspaper in 1990; Sabre Communications HF loop antennas; Lightning Bolt quads for HF through 440 MHz; Ireland Tune-Tenna™ systems for 144 and 440 MHz, by Frank Ireland, K4UUU; Heights Tower Systems, freestanding and crank-up telescoping aluminum towers; the MFJ-817 144/440 MHz wattmeter; YAGIMAX 2.20, an antenna analysis and design program from Lew Gordon, K4VX; and the MiniLab series of antenna design books and computer programs.

Turning to software, we examined SEEKER-PC, a computer-aided monitoring program for the Kenwood R-5000 receiver from AF Systems; the CBBS Mailbox System for the Amiga PC from Pete Hardie, VE5VA; the K4HAV 10-

10 Contest Logging Program (1010) from Hardy Data Systems; GEOCLOCK, a shareware program similar to DX EDGE and TERMINATOR, offered by Eric Scace, K3NA; and the GGTE Morse Tutor program by Warren Hoffnung, KF6VV. We also offered a compilation of tips on taking care of the floppy diskettes you use on your PC.

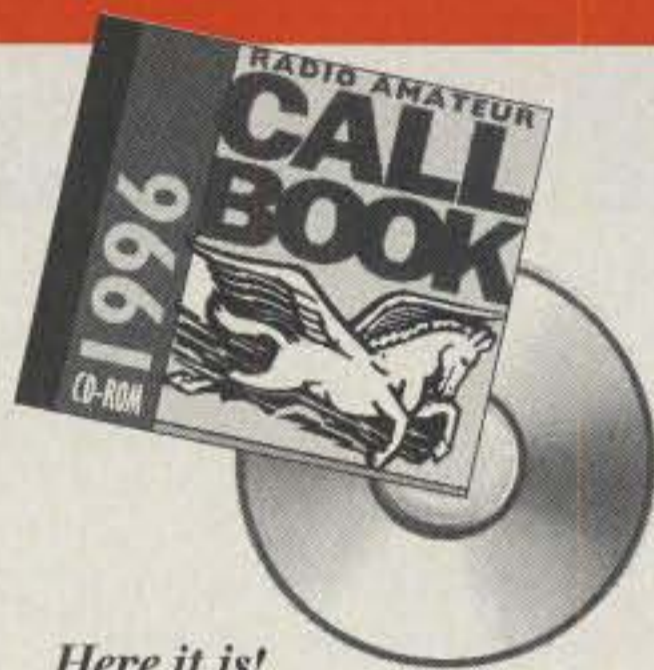
Wrap-Up

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

Overheard: One thing I've learned is that you shouldn't hold a \$2000 meeting where you work just to solve a \$100 problem.

73, Karl, W8FX

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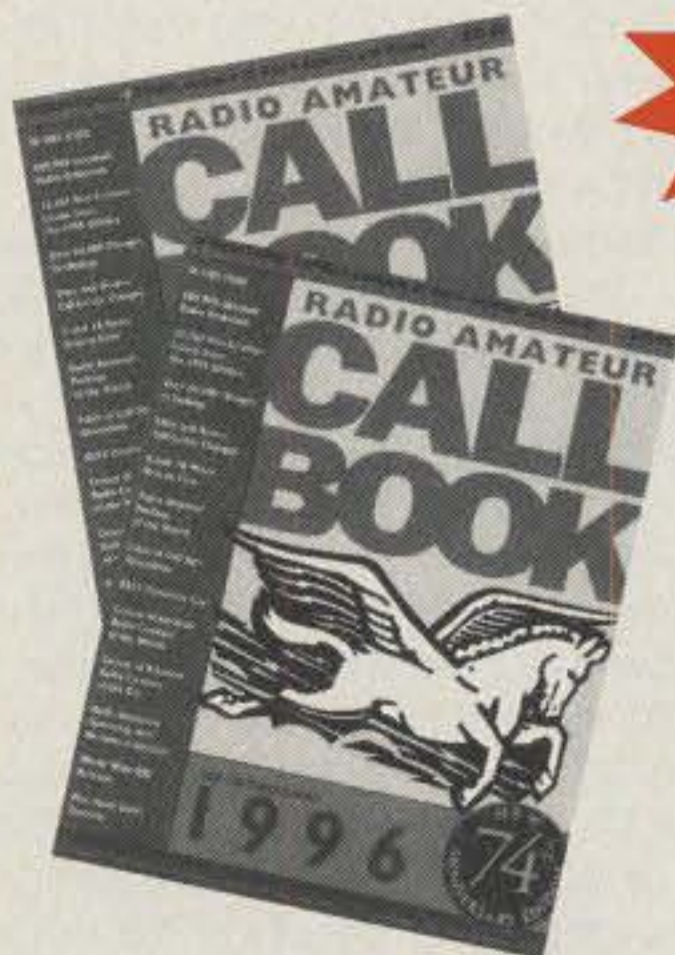
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DOUG'S DESK

CONSTRUCTION PROJECTS, TECHNIQUES, AND THEORY

Build A 40 Meter QRP Titan

QRP enthusiasts are thought of by some QRO operators as masochists. The dedicated QRP person, on the other hand, tends to view herself or himself as a champion amid the clutter of high-power signals when a solid contact is made with a distant station. Operating QRP is not unlike being a purist fisherman who uses only homemade artificial lures. There is a feeling of achievement and satisfaction resulting from working, for example, a ZL amateur with one's homemade, 5 watt QRP transmitter. Some QRPers consider 5 watts as QRO. Many low-power operators work with only milliwatts of transmitter output power. Surprising distances-per-watt can be spanned with as little as 100 mW of power. Good band conditions and a quality antenna make QRP operation routinely successful. The 20 and 40 meter CW bands are especially popular among QRPers, but 15 and 30 meters offer opportunities for low-power DXing as well.

The established worldwide QRP rules call for no more than 5 watts of CW output power. The upper limit for QRP SSB operation is 10 watts PEP. The 1 and 2 watt power levels are especially popular for CW operation. This is because low-current, AC-operated DC power supplies, or batteries, are relatively inexpensive.

A 40 Meter, 5 Watt QRP Transmitter

It's nice to know that an etched, drilled, and tinned PC board is available for projects that are described in *CQ* and other amateur publications. This project is no exception.¹ A scale etching pattern is included for those who wish to make their own boards.

Fig. 1 is the circuit for this month's project. Frequency control is by means of a VXO that has provisions for two crystals. S1 selects the crystal of choice. Plated AT-cut crystals, in HC-6/U holders, yield approximately 8 kHz of shift across the tuning range of VXO capacitor C4. Thus, an operating range of roughly 16 kHz may be expected from Y1 and Y2. Increasing the inductance of L1 will allow wider frequency excursions for the crystals. Use caution, because too large an inductance will cause Q1 to function as a VFO rather than a VXO. Stability with a VXO is excellent, whereas a VFO will exhibit both short- and long-term drift.

Output from Q1 is taken from its gate. The waveform is the cleanest at this circuit point, and hence the choice. This minimizes the transfer of unwanted harmonic currents to the succeeding transmitter stages. The Q1 output is amplified by narrow-band stage Q2. The tuned circuit (C8 and T1) further purifies the waveform, which is fed to linear broadband amplifier Q3. The output energy from Q3 is "laundered" further by a 3-element low-pass filter, C14, C15, and L2. This



The completed 40 meter, 5 watt QRP Titan.

network matches the 200 ohm output of Q3 to the 15 ohm impedance of the Q4 base.

A Motorola MRF475 is used as the power amplifier, Q4. Various Japanese 2SC-series transistors of equivalent characteristics may be substituted at Q4. Make certain the pinout matches that of an MRF475. Transistors such as the 2SC2092 and the 2SC1909 are likely substitutes.

Q4 is a broadband amplifier with shunt feedback to stabilize it and to level the gain from 1.8 through 30 MHz (in the event you wish to modify the circuit for use on a different band). Feedback is sampled by a one-turn link in T2. R15 is chosen to provide the level of feedback needed. FB1 and FB2 act as a shunt inductance in the feedback path.

SWR protection is provided by Zener diode D3. The normal maximum collector RF-voltage swing is 24. Therefore, the 33 volt Zener diode does not conduct until the peak voltage reaches 33. This can happen when self-oscillation occurs. The latter condition may become manifest if the transmitter is terminated in a load that presents a high SWR, such as when there is a shorted or open condition at the antenna port. C19 has negligible effect on the output signal at 7 MHz, but bypasses VHF harmonics that are present at the Q4 collector.

Harmonic output from the circuit in fig. 1 is sufficiently low to permit using a simple 5-element low-pass output filter. All spurious products are 40 dB or greater below peak output power into a 50 ohm load.

Keying, Spotting, and Sidetone

The fig. 1 circuit includes a PNP keying switch, Q7. Keyed-waveform shaping via C30, C32,

C33, and R21 prevents clicks. Q7 is cut off by reverse bias when the key is open. Closure of the key causes Q7 to be forward biased to make the transistor conduct. When this happens, operating voltage reaches keyed stages Q1, Q2, and Q3. Since Q4 operates class C, its operating voltage is always present. Only microamperes of collector current flow in Q4 during the key-up state. Almost any TO-5 size PNP transistor may be used at Q7, provided it can safely accommodate the combined currents of Q1, Q2, and Q3.

Q5 and Q6 represent a circuit I burgled from a W7ZO1 design. This multivibrator produces a sidetone for monitoring your sending. Output from this circuit may be routed to the input of an audio amplifier stage in the receiver. A good connection point would be the high end of the audio-gain control. R22 in fig. 1 is adjusted for an ear-comfortable tone level. Use shielded audio cable between the transmitter and the receiver to prevent hum pickup.

S2 is a spotting switch to permit matching the tone of the desired CW signal (via C4) before transmitting. D2 prevents Q3 from being activated during the SPOT function. This minimizes the strength of the spotting signal, which prevents the receiver from being overwhelmed.

The photograph of the interior shows that a rear-panel jack is connected to the front-panel key jack. This extra circuit may be used to trigger an external receiver muting circuit. The same control line may be used to operate a break-in delay TR circuit of the type described in the second edition of *W1FB'S QRP Notebook*, page 143. If you prefer full QSK, you can add the circuit on page 141 of the same book.² In any event, you will need some type of TR circuit for use with this transmitter.

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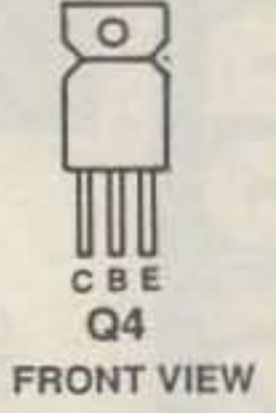
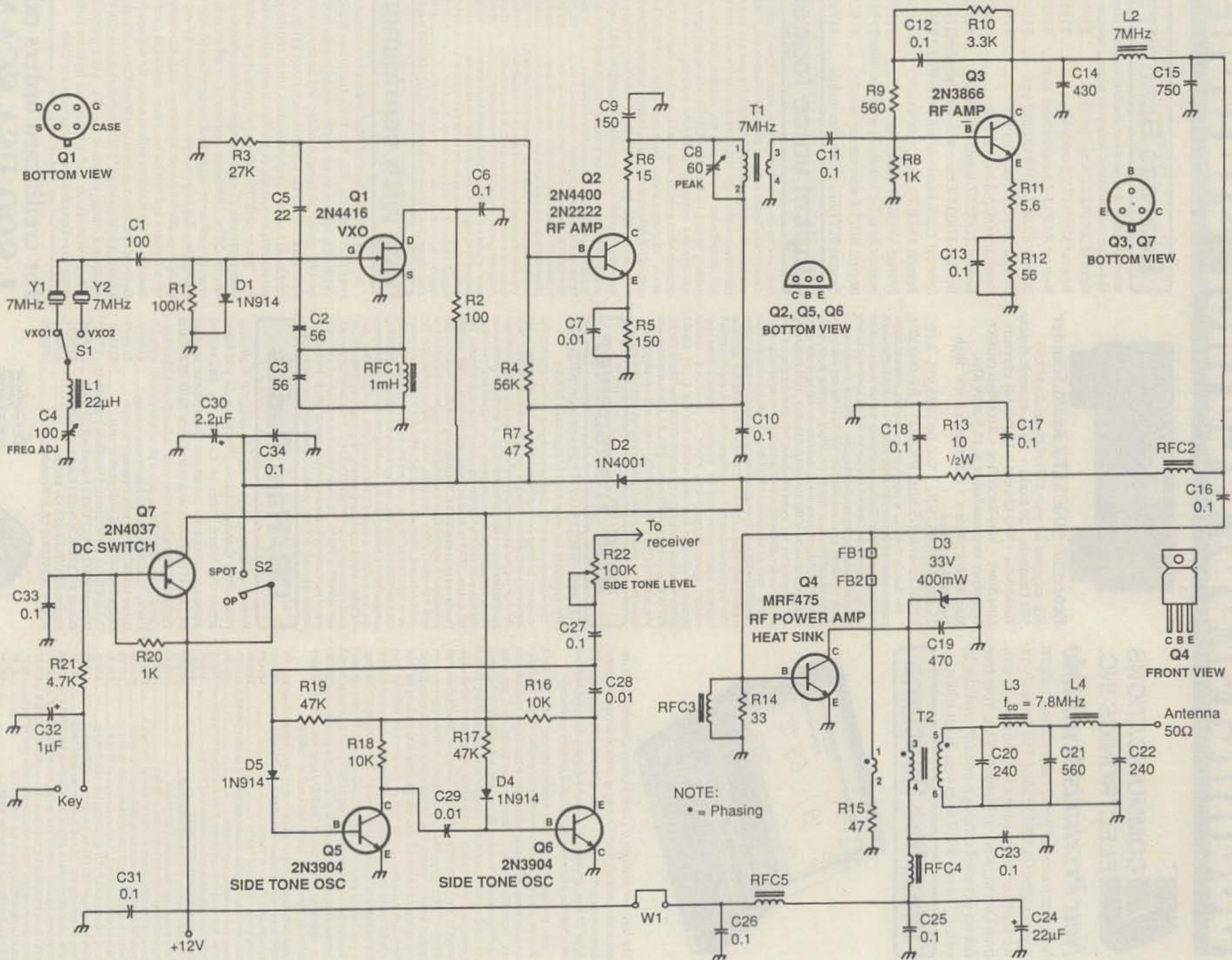
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NOTE:
* = Phasing

Parts List

C2—Miniature 100 pF variable capacitor
 C8—Miniature plastic 60 pF trimmer capacitor
 C14, 15, 19, 20, 21, 22—Silver mica or polystyrene
 C28, 29—Polystyrene or mylar high-Q capacitors
 D1—1N914 or other high-speed switching diode
 D2—1 A, 50-PRV rectifier
 D3—33 or 36 V, 400 mW Zener
 FB1, FB2—Miniature Amidon ferrite bead, FB-43-301
 L1—Miniature 22 μ H RF choke
 L2—1.15 μ H toroidal inductor. Wind 19 turns of no. 26 enam. wire on an Amidon T37-6 core.
 L3, L4—1.12 μ H toroidal inductor. Wind 17 turns of no. 24 enam. wire on T50-6 Amidon cores.
 RFC1—Miniature 1 mH RF choke
 RFC2-RFC5—15 μ H choke. Wind 15 turns of no. 28 enam. wire on Amidon FT-24-43 ferrite (850 μ i) toroids.
 S1, S2—Miniature SPDT toggle
 T1—Toroidal transformer. Primary, 3 μ H. Wind 27 turns of no. 28 enam. wire on an Amidon T37-2 toroid. Secondary has 6 turns of no. 26 wire spread over all of the primary.
 T2—Broadband 1:1.8 turns ratio transformer. Use an Amidon BN-202-43 balun core. Winding 1,2 is a one-turn, U-shaped turn through core. Winding 3,4 has 3 turns of no. 26 enam. wire. Winding 5,6 consists of 6 turns of no. 26 wire. Mount vertically on board and affix in position with epoxy cement.
 W1—Jumper wire
 Y1, Y2—30 pF load capacitance, GP International Crystal Co. or JAN Crystals (see text). HC-6/U PC-mount crystal sockets available from International Crystal Co.

← Fig. 1—Schematic diagram of the 5 watt transmitter. Capacitance is in pF, except for those units with decimal values, which are in μ F. Polarized capacitors are electrolytic or tantalum. Resistors are 1/4 watt carbon composition or carbon film types. K = 1000.

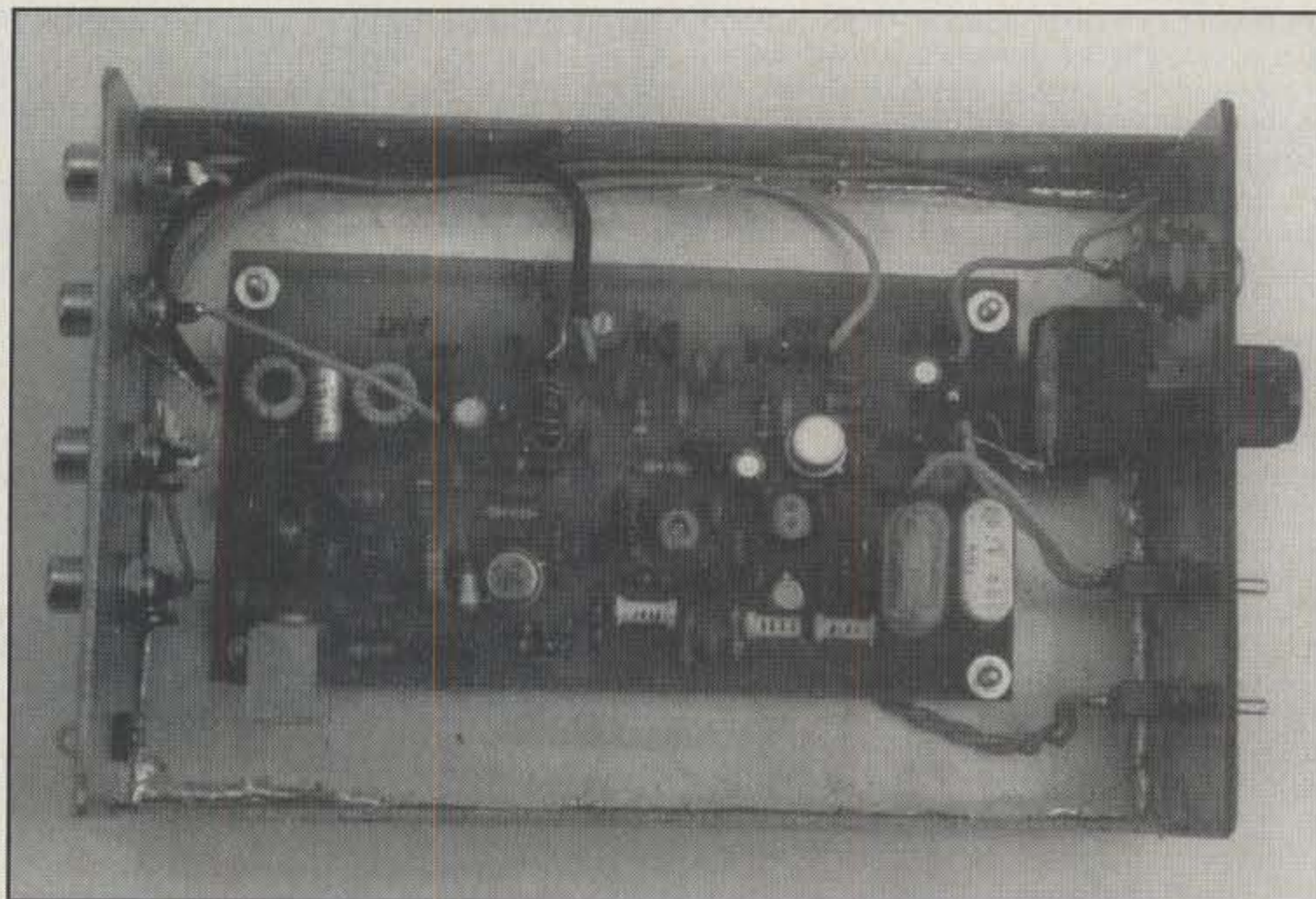
Jumper wire W1 in fig. 1 permits the insertion of a DC ammeter for monitoring the collector current of Q4. It also can be used for cutting off the supply voltage to Q4 during receive, should that be your wish.

Construction Tips

Being an inveterate builder and an avowed miser, I avoided buying a costly commercially made enclosure for this project. Rather, I constructed the box from sections of PC board and soldered them together using a 30 watt pencil-type iron.

The photo shows a square heat sink attached to the tab of final amplifier Q4 (left rear of photo). I used a piece of square brass that was in my junk box. A thick piece of aluminum can be bent into a U shape and used as a heat sink. Whatever you choose, make certain it has sufficient mass to keep the heat sink no more than moderately hot after a 3 minute key-down period. In other words, it should never become too hot to keep your finger pressed against it. Although my cabinet does not have an air vent over Q4, it would be wise to cut a 1 inch hole in the lid over that area of the PC board. An intake vent should be added on the side of the lid, near Q4. Bronze window screen can be soldered over the holes on the inside of the cover. This will keep the bugs out when camping!

My cabinet measures 2"H x 4"W x 6 1/2"D.



Internal view of the assembled transmitter. The PC board is mounted 1/2 inch metal standoff posts.

More space will be necessary if you include a break-in delay TR or full QSK module.

I created my front and rear paste-on panel covers with my computer while using Word-

Perfect 6.0a in the graphics mode (ALT F9). I created a figure box and specified an extra-wide border for it. The completed designs were printed on white posterboard and sprayed with

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two coatings of clear lacquer. These labeled covers were attached to the panels with woodworker's contact cement. Holes were cut in the paper cover to match the predrilled holes in the panels. This can be done easily with an X-Acto® knife which has a sharp blade. When creating panel artwork in this way it is prudent to adjust the document line spacing for 0.25 rather than 1. This makes it easier to place the labels exactly where you want them, vertically.

The completed cabinet cover (outside area) was abraded with medium-grade sandpaper to ensure that the paint would adhere to it more tenaciously than to a smooth surface. Gray automotive primer spray paint was used for the finish. It was then treated with two coatings of Deft brand clear, semi-gloss spray lacquer. Polyurethane spray will provide an even tougher protective coating.

A scale etching template is provided in fig. 2. A parts-placement overlay, as viewed from the component side of the PC board, is presented in fig. 3. Most of the components for this transmitter can be obtained from Mouser Electronics.³ The toroid cores are available from Amidon Associates, Inc.⁴

Some Closing Comments

This transmitter requires a regulated 12 or 13.6 volt, 2 amp DC power supply. Output power will be 5 to 5½ watts at 13.6 volts. It will be slightly less at 12 volts.

Emphasis in this design has been placed on purity of the output waveform. Chirpless, click-free keying is also a feature of merit. There should be no TVI caused by this transmitter.

A useful portable or fixed-station transceiver package can be assembled by adding a direct-conversion receiver. The VXO out-

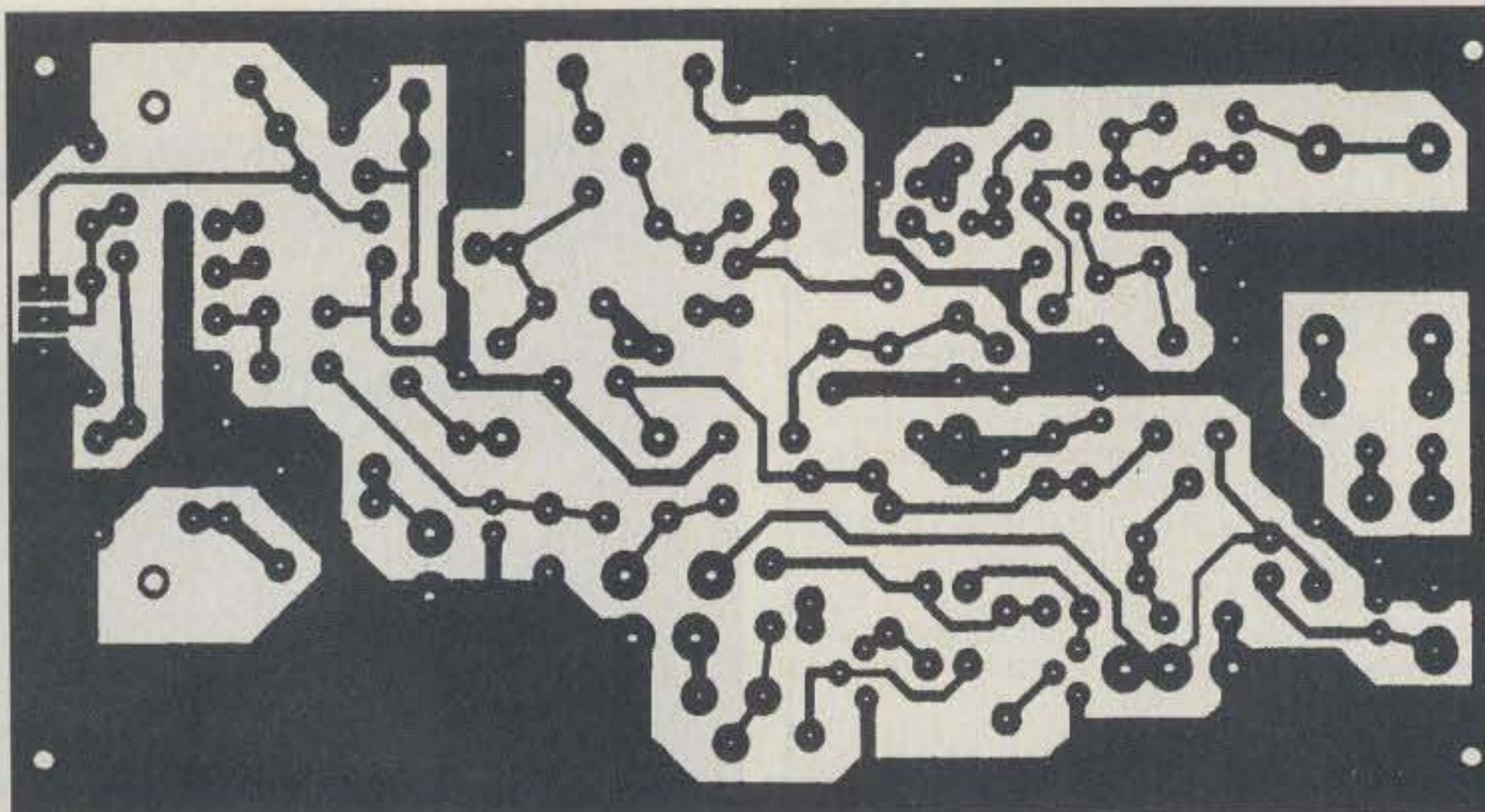


Fig. 2—Scale etching pattern for the PC board as viewed from the etched-foil side.

put signal can be used for the receiver local oscillator. If this is done, the VXO will need to have an offset circuit added. A switching diode (1N914) and a small trimmer capacitor can be used for this by connecting the trimmer in parallel with C4, with the diode switch at the ground end of the trimmer. The diode would be turned on during TRANSMIT and the trimmer adjusted for a transmit frequency 700 Hz lower than the receive frequency. The switching-diode voltage could be keyed on and off by the external TR circuit.

If you haven't explored the challenging world of QRP operation, now is your chance to become involved. This transmitter is easy to construct

and make operate, and best of all you won't need a Wall Street tycoon to help you finance it!

Notes

1. FAR Circuits, 18N640 Field Court, Dundee, IL 60118 (phone 708-426-2431 after 6 PM CST).
2. The ARRL, Inc., 225 Main Street, Newington, CT 06111.
3. Mouser Electronics, Inc., 2401 Hwy. 287 N., Mansfield, TX 76063-4827 (phone 800-346-6873 for catalog or ordering).
4. Amidon Associates, Inc., 3122 Alpine Ave., Santa Ana, CA 92704 (phone 714-850-4660; catalog available). 73, Doug, W1FB

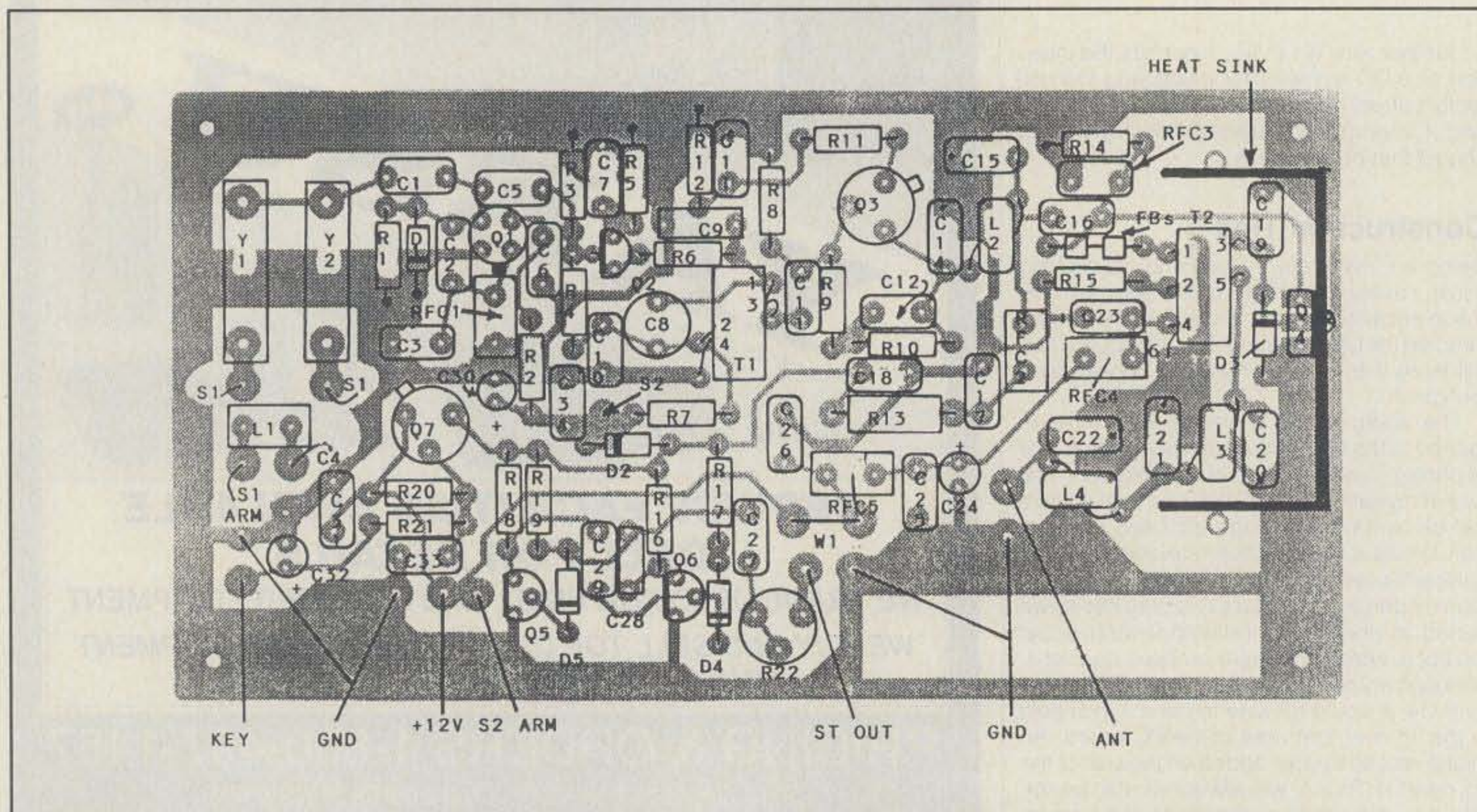


Fig. 3—Parts-placement overlay, not to scale, as viewed from the component side of the board.

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FISTS CW Club

The International Morse Preservation Society initiated the FISTS CW Club in England during 1987, and they attracted more than 300 members within one year. This organization consists of amateurs who enjoy the art of communicating by means of Morse Code. Proficient code operators are encouraged to slow down to work less experienced amateurs. The purposes of FISTS are to further Morse Code use on all bands, to encourage newcomers to use Morse Code, and to promote friendships between operators. This organization promotes activity and membership by new and experienced amateurs. You cannot be too slow or too poor a code operator to participate in FISTS activities. Morse Code contacts concentrate output power in a very narrow spectrum, thereby providing highly efficient communication opportunities. In addition, Morse Code allows many more signals to be packed into less frequency spectrum than is required by any other mode of communication. There is very little chance that anyone will break into a two-way code contact to extend it into a roundtable one. The more proficient an amateur becomes in the use of Morse Code, the less likely he or she is to use any other type of emission. In any case, it is advisable to develop a reasonable Morse Code proficiency.

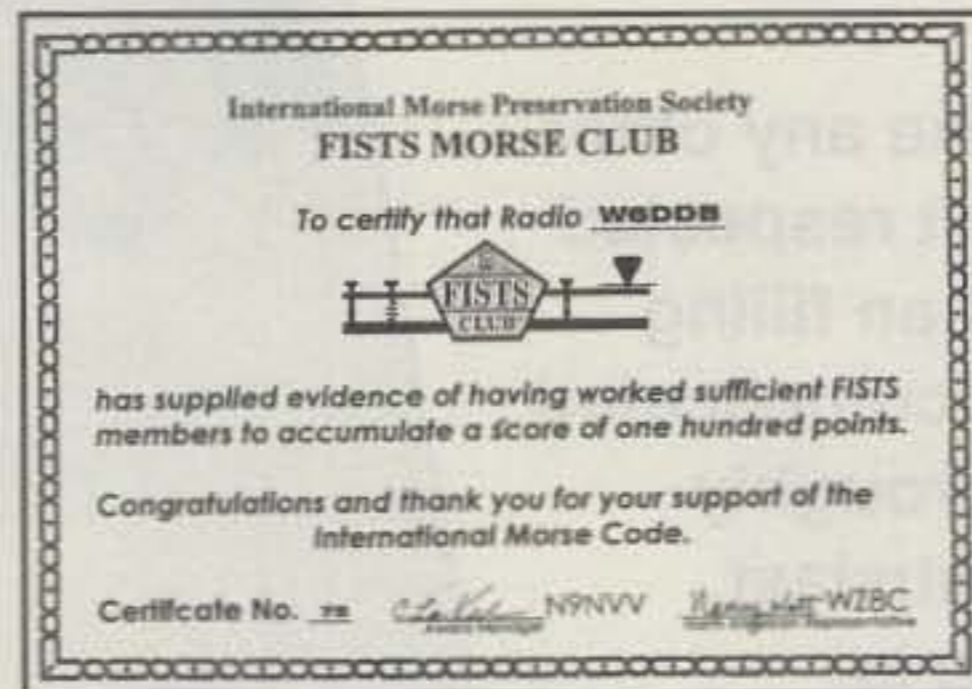
The following paragraphs detail some of the FISTS features which may be of interest.

Activities. Pete Kozup, K8OUA, is FISTS Activities Manager. His address is 5115 North Park Avenue, Warren, OH 44481. Most of these activities are low-pressure events which new amateurs find comfortable and enjoyable.

The Spring Sprint is a four-hour event held the second Saturday each May. It is open to FISTS members and non-members. The Fall Sprint is a four-hour event held the second Saturday each October. These Sprint events are basically QSO parties; they are not high-pressure, high-speed contests.

The Straight Key Week is run from the FISTS Headquarters in England to commemorate when Geo Longden, G3ZQS, founded the organization. It is open to all amateurs, whether or not they use straight keys; however, you must use only a straight key to be a contender in the contest. This is another opportunity to ragchew with other amateurs. Nominations for the best straight key fist are sent to Geo Longden, G3ZQS, 119 Cemetery Road, Darwen, Lancs BB3 2LZ, England, United Kingdom. The callsign of the FISTS club station in England is GØIPX.

A Novice Roundup was conducted February 24 to March 3 during 1996, since the ARRL dropped it. I worked about a dozen Novice or Technician-Plus operators during this event, as compared to a few hundred contacts worked during past ARRL Novice Roundups.



The Century Award offered by FISTS.

Increased publicity should improve NR participation in the future.

A slow-speed traffic net meets Tuesdays and Thursdays at 9 PM Eastern time on 3682 kHz. It demonstrates proper message handling techniques, preparing amateurs to participate in section traffic nets. Pete Kozup, K8OUA, runs this net.

A slow-speed QSO group starts at 8 PM Eastern time on 3720 kHz Wednesdays with Charlie Cotterman, KA8OQF, in charge. He uses the Dayton Amateur Radio Club's W8BI callsign.

The Sunday QSO parties are headed by Scott Bauer, KE3NV. This activity starts at 2000 UTC on 14058 kHz, plus a second party starting at 2400 UTC on 7058 kHz. Relays are appreciated during these parties.

The suggested frequencies for FISTS contacts include 3682, 3720, 7058, 14058, 21058, and 28058 kHz. All amateurs are urged to make contacts on these frequencies. DX FISTS contacts are most likely on 15, 20, and 40 meters from the start of an hour to 15 minutes later. Novice and Technician-Plus operators are encouraged to call and listen on 3685, 7125, and 21125 kHz, particularly at the start of each new hour.

The code Buddies Program pairs up inexperienced and experienced operators to provide practice which will improve the code proficiency of the newcomer. Anyone who needs such help, or is willing to provide it, should contact K8OUA.

Awards. Lee Kuhn, N9NVV, handles the FISTS Awards Program. His address is 4530 North 15th Street, Terre Haute, IN 47805. The Century Award requires an applicant to earn 100 points. Each contact with an American or Canadian FISTS member counts for one point and contacts with foreign amateurs are worth two points each.

Lee also handles the Novice/Technician Ragchewers Award, which requires an applicant to accumulate 50 points. Each FISTS Novice and Technician contact is worth two points, whereas non-FISTS Novice and Technician contacts are worth one point each. Each contact must include the exchange of name, QTH, and RST report data, plus at least one more

item of information. Each contact must be a regular chat, not just a contest-type QSO. Lee has to wait to receive each Century Award number from England. Applicants are asked to be patient when waiting to receive the award.

Membership Lists. Ed Hayes, N7CFA, manages the updating and distribution of FISTS membership lists. His address is 2628 Lilac Street, Longview, WA 98632. Corrections and changes should be sent to Ed. If you want a copy of the current list, request it from Ed, and remember to enclose an SASE (52 cents) with your request.

Newsletters. Nancy Kott, WZ8C, takes care of the "North American Memo." Her address is P.O. Box 47, Hadley, MI 48440-0047. The yearly subscription rate is \$15 and checks should be made payable to FISTS. Additional amateurs in the same family are accepted at no extra charge, but just one newsletter is sent to each family. The dues date is the anniversary of the date you join FISTS for North American members, whereas it is the first of September for overseas members. About twelve newsletters are published each year. Newsletter advertisements are printed free for FISTS members. A talking newsletter is distributed in England, and one may be generated in North America if enough interest is evidenced.

QSL Bureau. John Hugentober, N8FU, runs the FISTS QSL Bureau. Members are urged to submit self-addressed, stamped envelopes to John. Domestic and foreign QSL cards to other FISTS amateurs can be handled via the FISTS QSL Bureau. John forwards North American cards to the FISTS QSL Bureau in England for distribution to DX amateurs.

QSL Cards. These cards range in price from \$18.95 for 100 to \$75.95 for 1000. They can be ordered by writing to FISTS Club QSL Cards, c/o Goods to Go, 103 Orchard Hill Lane, Brewster, NY 10509. Organization affiliation indications (ARRL, AMSAT, CRRL, RNARS, QCWA, OOTC, YLRL, etc.) cost an additional dollar each. Grid square, CQ zone, ITU zone, and 10-X can be added at no extra charge.

Photobook. Ken Kott, WK8F, is gathering pictures of FISTS members to be included in a photobook. His address is 25206 Hayes, Roseville, MI 48066.

Supplies. Joe Falcone, AA8HV, handles sales of beautiful heavy, ceramic, dark-blue coffee-type mugs which have the FISTS logo in gold front and back. The cost is \$6.50 each, including shipping and handling. Checks should be made payable to Joe Falcone.

Octagon patches are three by three inches. FISTS is highlighted in red, CW Club is in bright blue, and the edging/lines are black against a light-blue background. These \$1.50 embroidered patches are made in America. FISTS logo pins are gold with a light-blue enamel background. The price is \$3.50 each. The self-adhering stickers are about one inch in diameter with black printing on a gold background. The stickers are sold at \$5.00 for 200. These

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Andrew McIntire, KBØQLY, of Clifton, Colorado is a Technician-Plus amateur working towards a General license. He shares a radio room with his mom and dad, who are also amateurs. Their station includes a Kenwood TS-140S transceiver, a 40 meter inverted Vee antenna, and an Oak Hills Research Explorer 2 QRP rig. They also have the ICOM 02AT he is shown holding in this picture. I have worked KBØQLY on the 40 meter Novice code band.

Patterson Graphics, 226 Wise's Grove Road, New Brighton, PA 15066-3610.

CQ VHF Ham Radio Above 50 MHz

If you are interested in operating on frequencies above 50 MHz, you should consider subscribing to this relatively new magazine published by CQ Communications. It is filled with information that is useful to VHF (30-300 MHz) and UHF (300-3000 MHz) enthusiasts. If you want information regarding this magazine, write to *CQ VHF*, 76 North Broadway, Hicksville, NY 11801 (phone 516-681-2922; fax 516-681-2926).

Copperweld Wire

Several of my previous articles extol the use of copperweld antenna wire, since it does not stretch off frequency and it is extremely strong. Also, it is a single strand of wire that is not subject to the inductive effect associated with multi-strand wire. It consists of a steel center which provides great strength, with an outside coating of copper which provides excellent

conductivity of radio frequency currents. Previous antenna articles have stressed the need to avoid abrasion points which could wear off the copper coating and expose the steel center to oxidation and eventual breakage. Cecil Crider, WE8D, advised me that he encountered antenna failure caused by abrasion, so a word to the wise.

Printed Aids

My previous columns contain information that is useful to new and aspiring amateurs. Many of these items have been reprinted for distribution to students of licensing courses I instruct. For ease of use, these printed aids have been separated into six categories. These categories are introduction, code, theory, station, operating, and miscellaneous. Fifteen dollars brings a complete set of current printed aids, including shipping costs. A list of these printed aids will be sent to anyone who requests it and sends a business-size (#10) self-addressed, stamped envelope to my California address. Licensing-course instructors are welcome to revise and/or duplicate these items to suit their requirements.

73, Bill, W6DDB

patches, pins, and stickers can be ordered from Irene Kott, WO8E, 25206 Hayes, Roseville, MI 48066. Shipping costs are included in the stated prices.

The Art and Skill of Telegraphy was written by William Pierpont, NØHFF. It has about 135 pages and it costs \$10, including the shipping charge. The printer could have done a much better job, but the contents are worth the price. This book can be purchased from Lee Fitzsimmons, WU6Q, 22153 Lassen View Drive, Palo Cedro, CA 96073.

Summary. As of the date this article is being written, there are 2117 FISTS members and on-the-air activity is fair despite poor band conditions. FISTS has something to offer to everyone who is interested in Morse Code. The organization actively seeks the support and comments of Morse Code enthusiasts. It is hoped that many amateurs will take advantage of the opportunity to acquire the code speeds they need to upgrade to higher class licenses.

License Display Certificate

Gene Patterson, KC3RT, offers a very nice customized license display certificate which fits standard 8.5" x 11" picture frames. The flags of 18 countries are shown in bright colors along its bottom and right side. One's callsign is added vertically to the lower left side of the certificate and a space is highlighted indicating where the larger license should be attached. Additional information can be requested from

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CONTEST CALENDAR

NEWS/VIEWS OF ON-THE-AIR COMPETITION

The Internet: Contest Friend or Foe?

As we wallow in the misery that has come from decreasing growth in HF operators, and few new contesters in particular, reasons are being sought for why this decline is happening. As has been pointed out numerous times in recent years, we are also an aging group. As I'm writing this, I'm about to begin my 15th trek to Dayton. Each year that I attend this incredible event I see more gray hair, deeper facial lines, and perhaps of most note, very few new contesters!

The most common explanations for the quandary described above are two-fold: sunspot activity and the incursion of high-technology, particularly in the form of computers and the Internet. Of course, there's nothing we can do about the solar cycle except simply wait it out. We've suffered from this predictable phenomenon before, and we will again eleven years hence.

When considering the Internet, the most common "knee-jerk" opinion I hear is that it is simply the enemy. With the growth of high-speed transmission circuits, voice technology, and low-cost home access, the demise of amateur radio and contesting has been predicted with greater regularity. While we shouldn't take the Internet threat lightly, I'm reporting this month that it can also be our friend.

As a very "casual" Internet user equipped with a 28.8KB modem, my impressions of this medium and the "web" are less than glowing. My experience is that "web surfing" can be a tediously slow environment at times, especially if you are interested in viewing lots of images and graphics. Most Internet promoters are predicting, however, that the current limitations will be short-lived, and I agree. Assuming that performance issues eventually will disappear in the not too distant future, the quantity of information of interest to contesters is huge and readily available. What follows is a summary of what I've discovered from a variety of sources. While there may be some information overlap between sites, this is a list that you'll want to have right by your computer at all times!

Useful Internet Web Sites For Contesters

WZ1V. One of the best sources of information that can be found anywhere is the web site mega-list compiled by Ron Klimas, WZ1V. His URL address is: <[http://uhavax.hartford.edu/disk\\$userdata/faculty/newsvhf/www/ham-www.html](http://uhavax.hartford.edu/disk$userdata/faculty/newsvhf/www/ham-www.html)>. Here's just the table of contents:

Businesses

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Manufacturers
Repair
Software/Computer

c/o CQ magazine
Internet: p00259@psilink.com
Compuserve ID: 71301,424

Calendar of Events

June	22-23	ARRL Field Day
June	22-23	RSGB 160M CW Contest
July	1	RAC Canada Day Contest
July	13-14	1996 CQ WW VHF Contest
July	13-14	IARU HF World Championship/WRTC 96
July	14	QRP ARCI Summer Sprint
July	20-21	NAQP RTTY Contest
July	27-28	RSGB IOTA Contest
July	27-28	Venezuela CW DX Contest
Aug.	3	European HF Championship
Aug.	3-4	YO DX Contest
Aug.	3-4	ARRL UHF Contest
Aug.	10-11	Worked All Europe CW Contest
Aug.	10-11	Maryland-DC QSO Party
Aug.	17-18	SARTG WW RTTY Contest
Aug.	17-19	New Jersey QSO Party
Aug.	24-25	North American SSB QSO Party
Aug.	24-25	Utah Centennial QSO Party
Sept.	1	Panama XXV Anniversary Contest
Sept.	7-8	All Asian SSB DX Contest
Sept.	7-8	LZ DX Contest
Sept.	14-15	Worked All Europe SSB Contest
Sept.	14-16	ARRL VHF QSO Party
Sept.	28-29	1996 CQ WW RTTY DX Contest
Oct.	12-13	Pennsylvania QSO Party

Hamfests & Online Swap
Publications
Non-Ham

Clubs (non-specific)

National/International
Local (USA)
Local (Canada)
Local (non-North America)
University (North America)
University (non-North America)
Company Related
Non-Ham Common Interest

Special Interest Groups and Clubs

Antennas
Antique or Vintage
ATV & SSTV
Contesting
Digital Radio (and Packet)
Direction Finding
DX
Emergency, Service & Special Event
Handicapped or Disabled
Homebrew
Linux
Microwave
Space
Spread Spectrum
Weak Signal (EME, Meteor, etc.)

Information

Amateur Radio practice exams
Aurora
Callsign Servers
General Information
Governmental Bodies
Repeaters
Scanner Enthusiast Resources

July's Contest Tip of the Month

Keep a few prepackaged CRT wipes handy during a contest. Looking at a dirty computer screen for 48 hours can be very distracting, as well as creating unnecessary eyestrain. You'll find them at K-Mart and most good office supply stores (tnx, AA3JU).

Software Archives and Shareware
Solar Flux Info/MUF/etc.
Technology Resources
Time
Web Resources and Search Mechanisms

Miscellaneous

Individual Home Pages
Other Index Pages and Ham-Related Lists
BBS and Internet Ties

New or changed URLs

My guess is that if you can't find what you want here, it doesn't exist!

CQ Contest. As mentioned last month, our *CQ Contest* magazine has its own web site. It too is filled with useful sources of information as well as editorial details for past and future issues. Check out URL: <<http://www/access/digex.et/~cqmag>>. Note that this is a new and recently shortened address from the one reported last month.

Solar and Geophysical Data. If your interest is getting the latest in solar data, you will want to look at <<http://holly.cc.uleth.ca/solar>>. What you'll find is the Solar Terrestrial Dispatch that includes: Solar Images; X-Ray Plots; Solar Maps; Current solar geophysical indices; Archives; and Real-time Ionospheric and Auroral Maps generated from MUF, F- or E-layer penetration, F-layer height/elevation angle criteria.

Contesters' E-Mail Addresses. If you need that elusive address of one of your fellow contesters, try one of the following e-mail lookup sites (tnx KJ7CH):

Bigfoot <<http://bigfoot.com>>
WhoWhere <<http://whowhere.com>>
Lookup <<http://lookup.com>>
Four11 <<http://four11.com>>
Okra <<http://okra.ucr.edu/okra/>>
Switchboard <<http://www/switchboard.com>>
(mostly physical addresses & phone numbers)

Contesting On-Line. One of the more innovative Internet efforts designed specifically for contesters has come from a collaborative effort led by Bill Fisher, KM9P. His company, Akorn Access, has implemented a fascinating web-site that includes a plethora of information for contesters. The primary goal of this site is to provide tools and information to help contesters improve their skills as well as attract new competitors to our ranks.

In addition to the usual useful pointers to other sites, Bill has included rate sheets from

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major stations for most major contests over the past 5-plus years. He has also started profiling individual stations, complete with inside/outside photographic images and station/operator details. N6TR is currently on-line with many more planned. Look for this great resource at <<http://www.contesting.com>>.

Bill is also providing, for a modest monthly charge, your own customized e-mail address and Internet connect using the format <call-sign@contesting.com>. If you're interested in obtaining an address, you can reach Bill at 800-995-4274 or via e-mail at <KM9P@contesting.com>.

CQ-Contest. You've probably heard and read about the Internet contest reflector administered by Trey Garlough, WN4KKN. It's a electronic "watering hole" of sorts where information pertinent to contesting is discussed and distributed to literally thousands of subscribers. If you want to be part of that crowd, send an e-mail to <CQ-Contest-request@tgv.com>. Simply put the word "subscribe" in the body of the message and you will be automatically added to the list's distribution.

The fact is that I've only scratched the surface on this topic. I'm sure that even while I've been writing this, several more useful sites have emerged. Is the Internet our friend, too? You bet it is!

WRTC-96 Awards Program Announcement

Over the past few months WRTC-96 has been getting good coverage in *CQ* and other places. In case you've missed it, here's an update.

Fifty-two teams of top amateur radio contest operators from 30 countries will travel to San Francisco July 10-15 to compete head-to-head in the 1996 World Radiosport Team Championship (WRTC-96). These operators were selected for this competition by national amateur radio organizations, leading contest clubs, and an international panel of judges. Among their ranks are the holders of world records in virtually every major HF contest.

The WRTC competition is a "sub-competition" within the framework of the larger IARU HF World Championship contest scheduled for the weekend of July 13 and 14, 1996. The WRTC competitors will enter the IARU contest as 52 two-person multi-operator, single-transmitter entries. All 52 teams will be located near San Francisco Bay on flat terrain in relatively close physical proximity so as to minimize propagation differences, and all will run exactly 100 watts output into nearly identical antenna systems. By eliminating many of the station and propagation variables normally associated with radio contesting, the WRTC strives to present a meaningful competition in which the winners can rightfully claim to be "the best of the best."

Although the WRTC stations will be competing only with each other, they can work anybody and everybody operating in the IARU contest. The WRTC stations will be on the air from 12:00 UTC July 13 until 06:00 UTC July 14 on 40, 20, 15, and 10 meters. You can work them once on CW and once on SSB on each of these bands, so the maximum number of QSOs possible will be 4 (bands) x 2 (modes) x 52 (stations): a total of 416 possible QSOs. The WRTC stations will be easy to identify because they will be signing 52 distinctive "1x1" call signs specially approved by the

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MH-PB-32 - 900mah 6v	Yaesu
MH-PB-33 - 1200mah 6v	MH-FNB-12 - 900mah 12v
MH-PB-34 - 900mah 9.6v	MH-FNB-27 - 900mah 12v
	MH-FNB-38 - 650mah 9.6v
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MH-BP-8 - 1200mah 8.4v	
MH-BP-8H - 1800mah 8.4v	
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South America

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ITU Zone 6 (No SF)

Donor: WRTC-90 (Seattle) Organizing Committee

ITU Zone 6 (SF)

Donor: Dick Dievendorff, AA6MC

ITU Zone 7

Donor: Bill Hider, N3RR

ITU Zone 8

Donor: Frankford Radio Club

ITU Zone 11

Donor: Dennis Motschenbacher, AA7VB

ITU Zone 18

Donor: Nokia Corporation

ITU Zone 27

Donor: Western Washington DX Club

ITU Zone 28

Donor: A.R.I.—Italy

ITU Zone 29

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ITU Zone 37

(Donor being sought)

Federal Communications Commission for the competition. These callsigns are W6A through W6Z and K6A through K6Z.

Several incentives exist to encourage everyone to find and work the WRTC teams. Those who "slice through" the pileups will earn a customized WRTC letter opener endorsed for making 10, 25, 50, 75, or 100 QSOs on any combination of bands and modes. If you're lucky enough to achieve a "grand slam" by working all 52 different 1x1 callsigns, you'll garner a special commemorative deck of WRTC playing cards. If you are among the top 300 stations who make the most QSOs with WRTC teams, you'll win a beautiful WRTC T-shirt.

Numerous radio clubs and individuals have donated plaques to be awarded to amateurs in specific geographical areas who make the most QSOs with WRTC team stations. These areas are Worldwide (excluding the San Francisco Bay area); Africa, Asia, Oceania, and South America; ITU Zone 6 (excluding the SF Bay Area), Zone 6 (SF Bay Area), Zone 7, Zone 8, Zone 11, Zone 18, Zone 27, Zone 28, Zone 29, and Zone 37.

Each WRTC team using a 1x1 callsign will have a unique, distinctive QSL card, so work them all to collect the set. WRTC stations will QSL 100 percent via the bureau, so it will not be necessary for you to send your QSL to them.

The competition organizers will use a computer for processing the 52 WRTC station logs to generate QSL labels and to determine award eligibility, so you do not need to submit your log. This means that if you have any doubt whether a WRTC station got your call right, you should work it again, as there will be no chance to correct your callsign after the contest.

The WRTC Committee will publish the list of stations qualifying for awards in various ama-

teur radio publications and on the Internet contest and DX reflectors shortly after the event. If you make the list and want to receive your award(s), send a self-addressed adhesive mailing label (not an SASE) containing your name, callsign, and address to WRTC-96, Inc., c/o Rusty Epps, W6OAT, 651 Handley Trail, Redwood City, CA 94062 USA.

For the letter opener or the playing cards, include \$2.00 or 4 IRCs to cover postage and handling; \$5.00 or 10 IRCs for the T-shirt (and be sure to include a note specifying your shirt size: S, M, L, XL, or XXL). Please submit your request before December 31, 1996.

Final Comments

That's all the room I have for this month. As usual, please submit your contest announcements for October CQ no later than August 1st.
73, John, K1AR

Canada Day Contest

0000-2359Z, Sat., July 1

Each year on July 1st, the anniversary of Canada's confederation, the Radio Amateurs of Canada sponsors the Canada Day Contest. Amateurs from around the world are invited to Canada's birthday party on the air.

Classes: Single operator—all band (high power, 100 watts, and QRP), single band, and multi-operator.

Exchange: Canadians send RS(T) and province/territory. Foreign entries send RS(T) and serial number beginning with 001.

Points: Any station may work any other station for credit. A QSO with a Canadian station is worth 10 points. Canadian stations with an RAC, VCA, or QST suffix are worth 20 points. Stations outside of Canada are worth 2 points.

Multipliers: Credit 1 multiplier per band and mode worked for Canadian provinces and territories (12 maximum). Final score is total QSO points times your multiplier.

Entrants must submit a summary sheet showing score calculation as well as a dupe sheet, multiplier checklist, and logs. Send entries to: RAC, 614 Norris Court, Unit 6, Kingston, Ontario, K7P 2R9, Canada by July 31st. Results will be published in the Canadian *TCA Journal* (contact RAC for further information) and will be sent to all certificate winners.

Venezuelan Contest

SSB: July 6-7 CW: July 27-28
0000Z Sat. to 2400Z Sun.

This is the 35th annual contest celebrating Venezuela's independence. It's a worldwide-type contest, so do not confine your activity to working YVs only. Working other DX is encouraged. Use all bands, 80-10 meters (no WARC bands).

Classes: Single operator, single and all band, and multi-operator, single and multi-transmitter. (No limit to transmitters, but only one signal per band).

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

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

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

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

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

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

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

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

CQ WW VHF Contest

1800Z Sat. to 2100Z Sun., July 13-14

The popularity of this one continues to grow. Be sure to review the full set of rules found in the June issue of CQ. For log sheets send an SASE to CQ VHF Contest, 76 North Broadway, Hicksville, NY 11801. Unlike CQ's other contests, mail your logs directly to the Contest Director: Joe Lynch, N6CL, CQ VHF Contest Chairman, P.O. Box 73, Oklahoma City, OK 73101. Please be sure to mark "VHF Contest Logs" on the envelope.

IARU HF Championship

1200Z Sat. to 1200Z Sun., July 13-14

This is the 11th annual IARU World HF Championship. All six bands, 10 through 160 meters, and the full 24 hours may be used by both single and multi-operator stations (no WARC bands). **Note: The WRTC '96 competition will run during the 1200-0600Z contest period.**

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

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

Points: Contacts within own zone or with an HQ station count as 1 point. Contacts within own continent but different zone are 3 points and 5 points with different continents.

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

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

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

Entries with more than 500 QSOs are required to include a dupe sheet with log. A 3 QSO reduction will be assessed for each duplicate QSO for which credit has been taken.

Disqualification may occur if the overall score is reduced by 2% or more.

It is recommended that you check QST (April 1996 issue) for more detailed information. A large SASE with 2 IRCs (or equivalent) will get you official forms and an ITU zone/prefix/continent map. Mailing deadline for entries is August 14th to: IARU HQ, Box 310905, Newington, CT 06131-0905.

QRP QRCI Summer Homebrew Sprint

2000-2400Z Sat., July 14

Sponsored by the QRP ARC International, this one is a real shorty on CW only. The goal is to encourage QRP operation with home-made equipment.

Classes: Single operator—all band, single band, high band (20, 15, 10, 6 meters), and low band (160, 80, 40 meters).

Exchange: Signal report and QTH (state, province, country) and QRP ARCI number, if appropriate, or power output if non-member.

Frequencies: Use 1830, 3560, 3710, 7040, 7110, 14060, 21060, 21110, 28060, 28110, and 50060 kHz.

Scoring: Credit 5 QSO points for QSOs with any ARCI member; 2 points for non-members (4 points outside of your continent). Bonus points should be applied to your score for using homebrew equipment. Credit 2000 points for a homebrew transmitter, 3000 points for a receiver, and 5000 points for a homemade transceiver. Final score is the total QSO points times the sum of all states, provinces, and countries worked times an output power mul-

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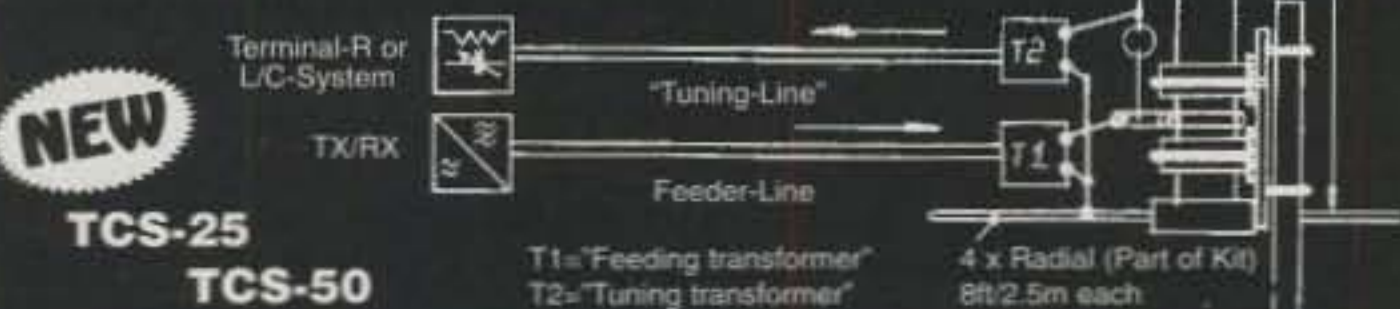
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tiplier (>5W = 1, <5W = 7, <1W = 10, <250MW = 15), plus bonus points.

Logs should be postmarked no later than August 14th and sent to: QRP ARCI Contest Manager, Cam Hartford, N6GA, 1959 Bridgeport Ave., Claremont, CA 91711, or via e-mail c/o <CamQRP@cybert8t.com>.

North American QSO Party RTTY Contest

1800Z Sat. to 0600Z Sun., July 20-21

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

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

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

Exchange: Operator name and station lo-

cation (state, province, or country).

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

Team Competition: Team competition is limited to a maximum of five single operator stations (two minimum) as a single entry unit.

Pre-contest Requirement: To qualify as a team entry, you must register the name, call-sign of each operator, and call-sign of the station operated should the operator be a guest at a station other than his own (e.g., N4RJ op. by KM9P). Teams must be registered with AB5KD.

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

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

Send all entries to Ron Stailey, AB5KD, 504 Dove Haven Drive, Round Rock, TX 78664-5926. Entries must be postmarked no later than

30 days after the party to be eligible for awards. Logs may be submitted on disk in the form of MS-DOS compatible ASCII files or .BIN format from WF1B's logging program.

RSGB Islands On The Air Contest

1200Z to 1200Z Sat. to Sun., July 27-28

Following the great success of last year's edition, this event is a fantastic opportunity to work IOTA contacts around the world.

Classes: Single operator—CW, SSB, or mixed modes, single operator limited (only 12 hours of operation), multi-single (island stations only), SWL.

Exchange: RS(T) and serial number (e.g., 599001) plus IOTA if applicable.

Frequencies: Contest operation is on 80-10 meters (no WARC activity). Avoid operation in the high portions of band segments (e.g., 14300-14350 kHz).

Scoring: Each contact with an IOTA island counts 15 points. Other contacts count 5 points except those within your own country, which are worth 2 points. Multipliers are the total of different IOTA references contacted on each band per mode. The final score is the total of QSO points on all bands added together times the total of multipliers.

Awards: There are a number of trophies and certificates available for this one. If you're looking to add to your shack's wallpaper, this one is for you.

Entries must be postmarked by August 31st and mailed to: RSGB IOTA Contest, c/o S. Knowles, G3UFY, 77 Bensham Manor Road, Thornton Heath, Surrey, CR7 7AF, England.

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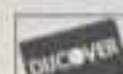
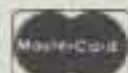
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NEWS OF COMMUNICATION AROUND THE WORLD

July is IOTA Month

Running out of new countries to work? Frustrated with the poor high-band conditions at the bottom of the sunspot cycle? Looking for a new challenge to keep your DXing skills honed? The Islands On The Air programme may be just the solution to your mid-summer, bottom of the sunspot cycle blues. And July is a great time to get involved in the programme (as they spell it in England, home of the IOTA). In addition to the many island DXpeditioners on the road during the month, the IOTA contest at the end of July offers scores of possible contacts for both beginning and experienced island chasers.

The IOTA programme was founded in 1964 by the late Geoff Watts, a British shortwave listener (SWL). (Geoff was the founder and long-term editor of the *DX News Sheet*, the British counterpart to *The DX Bulletin*. For his efforts as editor, inventing the IOTA programme, and many other services to the DX community, Geoff was elected to the CQ DX Hall of Fame in 1977, the only non-amateur ever to be so honored.) The Radio Society of Great Britain (RSGB) assumed sponsorship of the programme in 1985, at Geoff's request. Since 1985 the programme has grown enormously, spreading worldwide from its initial European concentration. The RSGB has sold more than 8000 IOTA directories, an item necessary to apply for any IOTA award. The RSGB estimates that 20,000 amateurs are actively participating in the IOTA programme, a number comparable to that of the DXCC program (the stateside spelling).

To reflect the growing interest in the Islands On The Air programme, the RSGB recently has elevated its IOTA Committee to Full Committee status. This raises the level of IOTA to that of the full High-Frequency committee, encompassing all HF awards and contests of the society. Mrs. Eva Telenius-Lowe (the wife of Steve Telenius-Lowe, G4JVG, ex-P29DX) is the administrator of the programme at RSGB headquarters, while long-time IOTA manager Roger Ballister, G3KMA, continues to handle day-to-day IOTA affairs.

The concept of the IOTA programme is simple: Work as many of the island groups listed in the IOTA directory as possible. There are 18 separate awards in the programme, ranging from the entry-level basic award for working and confirming 100 island groups to the Plaque of Excellence for snagging 750 island groups. Note that the programme is limited to island groups listed in the official IOTA directory. The programme does *not* offer credits for every single island in the world, but groups many separate islands into specific reference numbers, listed by continent. Furthermore, the islands must be of sufficient size and separation from the mainland to meet the IOTA specifications. Also, the IOTA programme is for offshore islands, and not those in lakes, largely enclosed bays, or manmade. The IOTA Com-

mittee has made an exhaustive search of maps and atlases to identify potential IOTA qualifiers; all such are listed in the directory.

The first thing to do to start chasing IOTA island groups is to obtain a copy of the current IOTA directory. Stateside DXers can get one for \$10 from Dewitt Jones, W4BAA, P.O. Box 379, Glen Arbor, MI 49636. Looking through the directory, the DXer will note that all separate DXCC countries that are islands have IOTA reference numbers—i.e., Montserrat is NA-103. (IOTA reference numbers include a two-letter continent designation and a number issued in sequence as new island groups are added to the list of activated islands.)

In many cases, an individual DXCC country may consist of more than one IOTA reference. For example, the DXCC country of Turks and Caicos is divided into Turks (NA-003) and Caicos (NA-002). The Bahamas consist of six separate IOTA references. Any active DXer probably has dozens of IOTA groups already confirmed. There are nearly 150 DXCC countries that have individual IOTA reference numbers. If you have a substantial number of DXCC countries confirmed, you are well on your way toward the basic IOTA award for working 100 IOTA groups. (Full details of how to apply for the various IOTA awards are in the directory.)

You should also check through your QSL card collection for additional IOTA confirmations that are not separate DXCC countries. There are over 1000 of these, so an active DXer is certain to have many IOTA confirmations in hand. Most island DXpeditioners know to put the IOTA reference number for their operation on their QSL card.

Once you have mined your existing card collection for IOTA countries, it's time to get on the air and work some more. July is an excellent time to do this, thanks to numerous IOTA DXpeditions and the IOTA contest July 27–28. To start, tune to the international IOTA frequency of 14260 kHz. If there is an IOTA net in progress, listen to the net controller for information as to who is available and when to call. (The IOTA programme has very specific rules for net contacts, prohibiting the relay of call-signs and reports or any other sort of "assistance." The minimum requirements for an IOTA contact made on a net are spelled out in the directory.)

Once you have mined 14260 kHz, try the other IOTA frequencies: 3755, 7055, 18128, 21260, 24950, 28460, and 28560 kHz on SSB; 3530, 10115, 14040, 18098, 21040, 24920, and 18040 kHz on CW. There is IOTA activity on many of these frequencies at all hours, especially during the summer.

As with the DXCC program, there are many aids to assist the active island chaser. *The DX Bulletin* lists current and future IOTA DXpeditions, as do many of the other DX newsletters. Remember that trips to many of the rarer IOTA islands may be affected by the weather; don't be too upset if an announced operation fails to materialize. The would-be DXpeditioners will probably try again. Also note that many islands



SV1CWY, YZ7AA, and SV2AEL operated as J46ISL from Amoliani Island (EU-049) in last year's IOTA contest.

are put on the air with little advance warning or fanfare. Monitoring 14260 kHz is the best way to keep up-to-date on island activity.

The weekends are excellent times to chase islands; many island DXpeditioners activate islands for brief periods on weekend trips. And this brings up one of the most exciting parts of the IOTA programme: the chance for nearly anybody to be "rare" DX! The IOTA directory lists 40 group references off the US coast. DXers living near the coast can actually drive to many of these groups; others can be reached via regularly scheduled ferry service. Some of the islands, such as Long Island and Rhode Island (the island, not the state), have resident amateurs.

More experienced island DXpeditioners may attempt an even greater and more rewarding operation: putting an island group on the air for the first time. In contrast to the DXCC program where all countries have been activated at least once, there are hundreds of IOTA island groups that have never been on the air. These groups are easy to identify, as they have no reference number in the IOTA directory. While all but one of the 40 US mainland IOTA groups had seen an accredited operation by 1995, there are numerous potential IOTA New Ones waiting for an intrepid operator or two to put them on the air. Imagine the excitement of being on the receiving end of a pile-up from an all-time New One!

The beginning island DXpeditioner should

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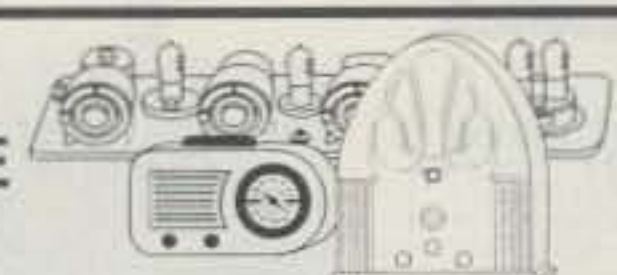
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The WPX Program

SSB

2579.....EA5RD 2582.....WD8ANZ
 2580.....JL2HUJ 2583.....BV4OQ
 2581.....US1DX 2584.....DF1IC

CW

2910.....IK0TUG 2911.....LU6VCD

Mixed

1737.....JH5OXF 1739.....IK6QGE
 1738.....JA4NHG

Mixed: 450 JH5OXF, JA4NHG, 500 JH5OXF, JA4NHG, 550 JH5OXF, JA4NHG, 600 JH5OXF, JA4NHG, 650 JH5OXF, JA4NHG, JA1-20762/BV, 700 JH5OXF, JA4NHG, JA1-20762/BV, 750 JA4NHG, JA1-20762/BV, 800 JA4NHG, JA1-20762/BV, 850 JA4NHG, 900 WW0E, JA4NHG, 950 JA4NHG, 1700 IS0MVE, 1750 IS0MVE, 1800 IS0MVE, 3300 11EEW, 3350 I2PJA, 11EEW, 3400 I2PJA, 3850 W2FXA.

SSB: 350 JL2HUJ, US1DX, DF1IC, 400 JL2HUJ, US1DX, DF1IC, 450 JL2HUJ, US1DX, KG5VI, DF1IC, 500 JP1RIW/BV, US1DX, DF1IC, 550 JP1RIW/BV, US1DX, DF1IC, 600 US1DX, DF1IC, 650 US1DX, DF1IC, 700 US1DX, DF1IC, 2050 KF7RU.

CW: 350 IK0TUG, 500 WA7OBH, 1250 WA2EYA, 1500 IS0MVE, 1550 IS0MVE, 1600 IS0MVE, 1650 IS0MVE, 11EEW, 2250 W8IQ, G3OCA, 2300 G3OCA, 2350 G3OCA, 2400 G3OCA, 2450 G3OCA, 2500 G3OCA, 2550 G3OCA, 2600 G3OCA, 2650 G3OCA, 2700 G3OCA, 3350 I2PJA, 3400 I2PJA.

10 Meters: US1DX
 15 Meters: JL2HUJ
 20 Meters: DF2IS
 40 Meters: OH2-612, DF2IS
 160 Meters: US1DX, WA7OBH

Asia: US1DX
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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.

probably work up to such efforts gradually, starting with activating some of the rarer nearby islands. The IOTA directory includes a list of such rare groups. Even an operation for a not-so-rare IOTA group can put the DXpeditioner on the end of a significant pile-up.

To give beginning island chasers a taste of what July may offer, here are some of the island DXpeditions planned for the month. (Remember that last-minute changes or poor weather may result in cancellation of some of these operations.)

John Reisenauer, **NL7TB**, secretary of the US Islands Award Program, will make another attempt to put the Barren Islands on the air for the first time. This group off the Alaskan coast was the target of a previous, unsuccessful attempt. Let's hope weather and Murphy cooperate this year. Look for NI6V/KL7, NL7TB, and others from Barren July 5-8, especially on 14260 kHz. QSL to NL7TB at Rt. 2, Box 2161, Benton City, WA 99320.

Another possible all-time New One for IOTA is Croker Island off the Australian coast. Look for **VI8CI** or **VK8CI** July 17-24, operated by Stuart, VK8NSB. QSL to VK8HA direct or via the Australian bureau.

GJ3RTE/p on SSB and **GJ3SWH/p** on CW will operate from Les Minquiries Plateau (EU-099) June 28-July 1, with two stations on 80-10 meters. QSL both calls to G3SWH.

GM0NES/p will be active from the Orkney Islands (EU-009) June 29-July 7, with operators Manny, G7HSP; Don, G0NES; Derek,

G7DKX; Peter, G7BXA; and SWL Jack. QSL via G7DKX.

The 1996 IOTA contest runs 1200Z Saturday July 27 to 1200Z Sunday, July 28. Check the contest column in this issue for more info.

Here are just some of the planned IOTA contest operations:

GW4VEQ from the Welsh Islands (EU-124).
G0WJF from Lundy Island (EU-120) by K6ZH.

AA7RW from Guemes Island (NA-065).

WB8YJF on Ocracoke Island (NA-067) July 27-Aug. 3, CW only. Lionel, G5LP; Steve, G3VMW; and Fred, G4BWP, operating as **GW5LP/p** on Anglesey Island (EU-124).

G3WOI from the Isle of Wight (EU-120) with G3ZGC, G3KLH, G0ORH, and others from the Newbury Radio Club in a multi-op effort. QSL via G3WOI.

CT1BOH and other members of the Portuguese DX Group Contest Team on Berlenga Island (EU-040).

F6JSZ/p on CW and **F5CCO/p** on SSB will be on Planier Island (EU-095). QSL home addresses: Mark Kentell, F6JSZ, P.O. Box 76, 19002 Tulle Cedex, France; and Eric Fayolle, F5CCO, P.O. Box 29, 43300 Langeac, France.

9H3?? by G3OZE and G4JVG July 25-31 on Malta (EU-03).

GW4VEQ on Anglesey Island (EU-124).

VE2SEI and other members of the Montreal West Island Radio Club from Seal Island in the Nova Scotia South group (NA-126). QSL via VE2CWI.

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12 Meter CW

14HB9AMO

15 Meter CW

266KØDEQ

17 Meter CW

18HB9AMO

30 Meter CW

19DJ5JH 20HB9AMO

All CW

90WC7N

160 Meter WAZ

86 VO1NA.....30 Zones

All Band WAZ SSB

4323DL8HD 4326JA1DIO
4324DJ9SO 4327KDØEY
4325SV2CWY

CW/Phone

7662W6OVO 7667WA4LXZ
7663DK3DG (CW) 7668JAØRYN
7664HA1AG (CW) 76699A2NO
7665DL9FCD 7670JA1DIO (CW)
7666DL4BCJ (CW) 7671JR1HVJ (CW)

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.

GMØPCA/p on Benbecula Island (EU-010) by Ken, GØPCA, and others. QSL GØPCA.

KG6VI and others on San Miguel Island (NA-144). QSL home call.

Non-IOTA DX Activity This Month

Eric, F5CCO, plans to take a radio on his honeymoon on St. Lucia June 27-July 4. When not otherwise occupied, he will make a few contacts. QSL home address, given above.

Blind amateur Terry, G3WUX, travels with the Trans-Greenland Expedition July 10-August 25. He will operate as **OX/G3WUX/p** on 14002 kHz CW and 14200 kHz on SSB, using 5 watts into a Windom antenna. QSL home call. (Greenland is (NA-018).)

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1110 RG8X 95% shield (mini 8)15
1130 RG213/U 95% shield mil spec NCV jkt36
1140 RG214/U dbl silver shld mil spec 1.85
1705 RG142B/U dbl silver shld, teflon ins 1.50
1450 RG174/U 50 ohm. 100" od mil spec14
1410 RG58/U mil type 50 ohm 95% shield12

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NM78CC N conn 7/8" corr. copper m/f 67.50
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CW

K2TQC.....328	9A2AA.....326	IT9TQH.....326	W6DN.....324	DJ2PJ.....322	N6CW.....316	WB4UBD.....310	K7JYE.....302	K8JJC.....290
K1MEM.....328	N4KG.....326	WA4IUM.....326	G4BWP.....324	W1WAI.....322	KA5TQF.....316	OH3NM.....310	WA4DAN.....301	LA7JO.....289
K2FL.....328	OK1MP.....326	WA8DXA.....326	W0HZ.....324	AA5NK.....321	W3BBL.....315	WB6OKK.....310	HA5NK.....301	KH6CF.....289
K9BWQ.....328	W0IZ.....326	N5FW.....326	W0JLC.....324	ON4QX.....321	N4AH.....315	WB4DBB.....310	WG5G/QRPP.....301	YU1AB.....288
K2ENT.....328	PA0XPQ.....326	EA2IA.....326	N7RO.....324	K9QVB.....321	IK2ILH.....315	K4CXY.....309	W6YQ.....301	DJ1YH.....288
K3UA.....327	W2FXA.....326	N6AR.....325	W7OM.....324	W8XD.....321	K2JF.....314	VE7DX.....309	YU1TR.....300	YU7FW.....286
K6JG.....327	SM6CST.....326	K8NA.....325	W7CNL.....324	HA5DA.....321	AA2X.....314	K4JLD.....309	YU2TW.....299	G4MVA.....285
W9DWQ.....326	N4JF.....326	KZ4V.....325	W7ULC.....323	IT9ZGY.....320	4N7ZZ.....314	VE9RJ.....309	YV5ANT.....299	F6HMJ.....284
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K9MM.....326	AA4KT.....326	N7MC.....325	KUBS.....323	WB5MTV.....319	K9DDO.....312	N3DQN.....306	HB9DDZ.....297	HB9AFI.....278
K2OWE.....326	K9IW.....326	IT9VDQ.....325	AG9S.....322	N5FG.....319	K1VHS.....311	N5HB.....306	W7HT.....296	W4UW.....277
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K2FL.....328	YV1KZ.....326	KZ4V.....326	I8LEL.....325	WW1N.....323	I4SAT.....320	KV2S.....315	VE3DLR.....306	WA3KKO.....290
DJ9ZB.....328	EA4DO.....326	VE3GMT.....326	K7LAY.....325	K4SBH.....323	I8LEL.....320	WA9RCQ.....315	W3YEY.....306	N5QDE.....290
EA2IA.....328	W9OKL.....326	OZ3SK.....326	PY4OY.....325	WB2JZK.....323	K4JLD.....320	I0SGF.....315	KFBUN.....306	OE7KWT.....290
K2ENT.....328	9A2AA.....326	W4EEE.....326	IT9ZGY.....325	CE7ZK.....323	WE2L.....320	N3ARK.....315	XE1MDX.....305	4X6DK.....290
OZ5EV.....328	KD8V.....326	KE4VU.....326	IT9TQH.....325	K2ARO.....323	EA3EQT.....320	KA4RAW.....315	W6SHY.....305	IK2PZG.....289
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I4EAT.....326	OE2EGL.....326	LA7JO.....326	YV1CLM.....324	Ti2HP.....321	AA4AH.....318	N6RJV.....312	YU2TW.....300	YU1TR.....280
KB8DB.....326	SV1ADG.....326	VE7DX.....326	YV5CWO.....324	I8XTX.....321	G4GED.....318	ZS6BBY.....311	AB4UF.....300	KK4TR.....280
VE3XN.....326	CX2CB.....326	YV1CLM.....326	W5LLU.....324	I8YRK.....321	W6NLG.....318	WA9IVU.....311	WB4UHN.....300	KN4RI.....280
YU1AB.....326	K5OVC.....326	N6AW.....326	I8KCI.....324	K4POV.....321	IK8GCS.....318	IN3ANE.....311	KB8NTY.....300	W0IKD.....279
N4MM.....326	W4UNP.....326	ZP5JCY.....326	I1POR.....324	KS2I.....321	W6MFC.....318	F1OZF.....311	WB6GFJ.....299	WZ3E.....279
N7RO.....326	Ti2CC.....326	K5TVC.....326	VE4AT.....324	OA4OS.....321	KF5AR.....318	E16FR.....311	VE3CKP.....299	EA3CWT.....278
YS1GMV.....326	WA4ECA.....326	WB3DNA.....325	DU9RG.....324	W7ULC.....321	I8IYW.....318	WA2FKF.....311	EA3CB.....299	WN5MBS.....277
K9MM.....326	I0ZV.....326	AA6BB.....325	KD5ZM.....324	W3AZD.....321	Ni5D.....318	KD5ZD.....310	EA5GKE.....298	VE2DRN.....277
4Z4DX.....326	I4LCK.....326	I8ACB.....325	K0HQW.....324	W0ULU.....321	W8YTM.....318	KA5RNH.....310	KJ9N.....298	G0LRX.....277
ZL1AGO.....326	K7EHI.....326	N6AR.....325	W7FP.....324	KB8O.....321	CT1EEB.....318	I2MQP.....310	KB5WQ.....294	KC6AWX.....276
KF7SH.....326	IK0IOL.....326	WD8MGQ.....325	KA5TTC.....324	OE7SEL.....321	W6SHY.....318	HA6NF.....310	IT9VDQ.....293	OA4EI.....276
ZS6LW.....326	IT9TGO.....326	K8LJG.....325	KE5PO.....324	VE2GHZ.....321	WB6PSY.....317	EA5RJ.....309	KG6LF.....293	NC3C.....275
VK4LC.....326	ZL1HY.....326	K8NA.....325	KB7VD.....324	LU1JDL.....320	WB3CQN.....317	XE1MD.....308	KJ5LJ.....293	F5NBX.....275
YV5AIP.....326	XE1L.....326	IK8CNT.....325	N8YV.....323	KF8VW.....320	9H4G.....317	CT1AHU.....308	Ti2LTA.....292	VE2AJT.....275
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K9IW.....326	VE3MR.....326	W4UW.....325	K9HQM.....323	K4CXY.....320	XE1XM.....316	AB4IQ.....307	N6ITW.....291	

RTTY

K2ENT.....321	WB4UBD.....300	Ni4H.....288	K3UA.....280	I1JQJ.....273	KE5PO.....263	W4EEU.....250	KB8DB.....242	G4BWP.....222
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is celebrating the 150th anniversary of the raising of the Bear Flag in 1846. The flag, which is now the state flag, was over Sonoma (the California Republic) until the American Flag was raised on July 9. The Valley of the Moon Amateur Radio Club is participating in this celebration with a special event station which has been granted the use of the special callsign **N6S**. Operations are going to take place on VHF/UHF, QRP, and HF SSB/CW. The operating frequencies for HF are: RTTY—3625, 7082, 10132, 14082, and 21082 kHz; SSB—3930/3830, 7245, 14270, 18138, and 21370 kHz; CW—3530, 7030, 10110, 14030, 18078, and 21030 kHz; QRP—3560, 7040, 14060, and 21060 kHz. QSL to N6KM.

ZK1MJZ and **ZK1AGW** will be operated by Stanley, K8MJZ; Bruce, AA8U; and Marilyn, AG8W, July 11–20, including an entry in the IARU HF Championship, when they will use the callsign **ZL1AAU**. QSL with SASE to Bruce Lal-

lathin, AA8U, 9221 Ford Rd., Rives Junction, MI 49277.

Up-Coming DX Gatherings

The 1996 Pacific Northwest DX Convention is July 19–21 at the Monarch Hotel in Clackamas, Oregon (near Portland). Call the hotel at 1-800-492-8700 and ask for the convention rate. Registration checks should be made out to the Willamette Valley DX Club (this year's host), and sent to Ron Hylton, AD7L, P.O. Box 7296, Aloha, OR 97007-7296. Registration for the program only is \$15, the banquet is \$25 (specify prime rib or salmon), and breakfast is \$10.

The 1996 New Orleans International DX Convention is August 30–31 at the Royal Sonesta Hotel on Bourbon Street in the historic French Quarter of New Orleans. Additional information is available from Wondy, K5KR, at 504-837-1485. This is an excellent, high-class

gathering in a wife-approved location. Plan to attend this year.

The Northern Illinois DX Association has announced that the 44th Annual W9DXCC DX Convention and Banquet will be held Saturday, September 7, at the Holiday Inn, Rolling Meadows, Illinois. There will be interesting programs, guest DX speakers, industry representatives, contests, exhibits, QSL checking, hospitality suites, banquet activities, and more. For information contact: Chairman Phil Camera, KB9CRY, at 708-343-1696, fax 708-343-4394, or e-mail <lphil@aol.com>.

QSL Notes

QSL **L4D** via LU4DLL, Radio Club 9 de Julio, Box 134 (6500) 9 de Julio, Buenos Aires, Argentina.

QSL **LT5E** via LU1EYW.

QSL **DX1EA, OH0XX/DU1, CP6/OH0XX,**



The New IOTA logo reflects the growing participation of the RSGB in the programme.

CP6AA (1996 WPX SSB), and **YV5A** (CQWW CW 1995) via Olli Rissanen, OH0XX, Suite 599, 1313 So. Military Trail, Deerfield Beach, FL 33442.

QSL **9Y4/YT1AD**, **J68DA**, **V29AD**, **V26AS** (ARRL SSB 1996), and the following operations of **3V8BB**: Apr. 29-May 5, 1995; July 24-29, 1995; Oct. 14-31, 1995; Mar. 28-Apr. 2, 1996; and May 23-30, 1996 via YT1AD.

QSL **ZW0X** (Apr. 22-23, 1995) and **ZW0C** (Nov. 3-5, 1995) via Mario Justino Souza, PS8DX, Rua Anturios 884, Mirasol 59000, Natal RN, Brazil.

QSL **6E2X**, **6D0Z**, **6D8Z**, and **XE2Z** via AA6BB.

QSL **A92GD** via K1SE, P.O. Box 685, Manassas Park, VA 22111-0685.

QSL **FP/AD1F** via John Nowacki, AD1E, 43 Heath Rd., Kennebunk, ME 04043.

QSL **PY2ASF** via Joyce Wilhelm, N9STL, 519 S. Pennsylvania Ave., Belleville, IL 62220.

QSL **PP2ZDX** via Bob Hinshaw, WD6L.

QSL **8R1K** in the 1995 SSB and CW, 1994 SSB, and 1993 SSB CQWW contests via OH6DO.

QSL **TU4EI**, **TU5EV**, **XT2JB**, **9L/TU5EV**, and **3C1/TU4EI** via operator Jim Bennett, KM4P, P.O. Box 12141, Arlington, VA 22219.

QSL **J48ISL** via SV2AEL.

QSL Moktar Bensmain, **7X5JF**, c/o Dr. Amari, 9 bis Rampe Louni Arezki, 16019 Algiers-Kettani, Algeria.

QSL **SV0HW/SV9** via WA1ECA.

QSL **SV0HV/SV9** and **XV3UU** (1991) via Rod Huckabay, KA5EJX, 4002 70th St., Lubbock, TX 79413-5918.

Ed Durbajlo, SP1MHV, reports that all the QSLs for his **OD5/** operation were put into the



John Reissenauer, NL7TB, on last year's attempt to put Barren Island on the air for the first time. His team is trying again in 1996.

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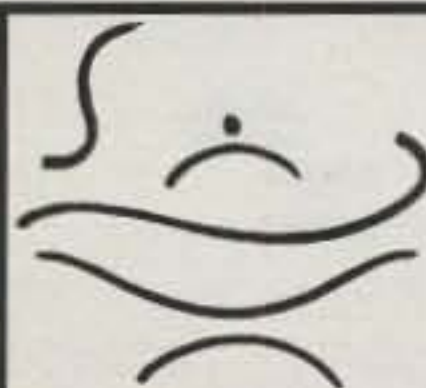
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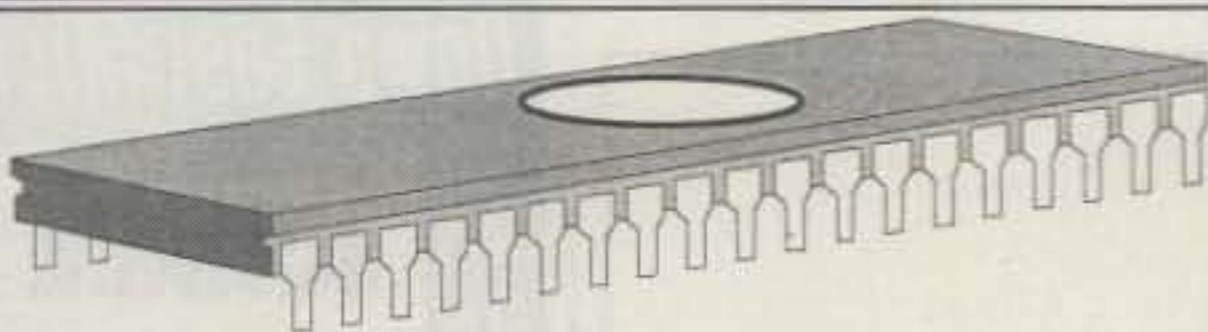
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5 Band WAZ

As of March 31, 1996, 435 stations have attained the 200 Zone level.

New recipients of 5 Band WAZ Award with all 200 Zones confirmed:

DK6ED

The top contenders for 5 Band WAZ (zones needed, 80 meters):

- | | |
|-----------------------|----------------------|
| N4WW, 199 (26) | DL3ZA, 199 (31) |
| AA4KT, 199 (26) | OE6MKG, 199 (31) |
| K7UR, 199 (34) | H8IB, 199 (2 on 15) |
| NA0Y, 199 (26) | DK1FW, 199 (31) |
| W0PGI, 199 (26) | SM6AHS, 198 (12, 31) |
| W2YY, 199 (26) | UA3AGW, 198 (1, 12) |
| W9WAQ, 199 (26) | VO1FB, 198 (19, 27) |
| W1JR, 199 (23) | EA5BCK, 198 (27, 39) |
| VE7AHA, 199 (34) | KZ4V, 198 (22, 26) |
| W1FZ, 199 (26) | K4PI, 198 (23, 26) |
| IK2GNW, 199 (1) | G3KDB, 198 (1, 12) |
| W9CH, 199 (26) | DK2GZ, 198 (1, 24) |
| AC0M, 199 (34) | KG9N, 198 (18, 22) |
| IK8BOE, 199 (31) | KM2P, 198 (22, 26) |
| JA2IVK, 199 (34, 40m) | GM3YOR, 198 (12, 31) |
| K1ST, 199 (26) | DK0EE, 198 (19, 31) |
| AB0P, 199 (23) | K0SR, 198 (22, 23) |
| KL7Y, 199 (34) | YO3APJ, 198 (29, 35) |
| UY5XE, 199 (27) | OH2DW, 198 (1, 31) |
| NN7X, 199 (34) | K3NW, 198 (23, 26) |

The following have qualified for the basic 5 Band WAZ Award:

- | | |
|------------------|-------------------|
| DK6ED, 200 Zones | OK1ABP, 175 Zones |
| H8IB, 199 Zones | HB9BLQ, 196 Zones |
| SV8ZC, 156 Zones | |

Endorsements:

- | | |
|------------------|------------------|
| KE2PF, 170 Zones | K6FG, 185 Zones |
| US1DX, 195 Zones | DK1FW, 199 Zones |

999 Stations have attained the 150 Zone level as of March 31, 1996.

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.

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CIRCLE 117 ON READER SERVICE CARD

bureau system in December. Anyone still needing a card may get one before August via P.O. Box 11, 78-300 Swidwin-1, Poland.

QSL **HC6CR** and **HD6CR** via Dr. Rick Dorsch, NE8Z, P.O. Box 616, Hamburg, MI 48139-0616. This is a **new** address.

QSL the 1996-97 operations of **VK8DX** via operator Ace Jansen, N3AHA, 42857 Hollywood Park Place, Ashburn, VA 22011.

QSL most operations of **VP2EZ** via Glenn Johnson, WA0PUJ. (That call was accidentally issued to another operator in Feb. 1996; for those few QSLs, see AA7VB's new address in Issue 830.—ed.)

QSL **C56AA**, **C56WW**, and **C56/G0UCT** via G0UCT.

QSL **TK5NI** and **FK8HC** via HH2HM, P.O. Box 104, 22650 Ploubalay, France.

QSL **A61AM** via KA5TQF.

QSL **3D2OQ**, **3D2SN**, and **ZK1SSN** via operator Lars Nordlund, SM5BOQ, Rankhusvegen 15, S-19630 Kungsaengen, Sweden.

VU2DK says mail from outside India is often being opened and contents removed. He suggests using well-sealed, opaque envelopes and avoiding the folded return envelope.

CQ DX Awards Program

SSB

2186.....WA4AEI 2188.....KD8IW
2187.....YT1AT

CW

937.....NJ8R 939.....WA7SNY
938.....9A2NO

SSB Endorsements

320.....K4MZU/328	320.....K9BWQ/327
320.....K2TQC/328	320.....W8YDB/327
320.....K2FL/328	320.....K5TVC/326
320.....DJ9ZB/328	320.....OE7SEL/321
320.....EA2IA/328	320.....VE2GHZ/321
320.....K2ENT/328	320.....KD8IW/320
320.....OZ5EV/328	310.....N5HSF/316
320.....VE1YX/328	300.....DK5WQ/305
320.....W6EUF/328	300.....WA4AEI/301
320.....K2JLA/328	275.....KF7VC/295
320.....K6JG/327	275.....YT1AT/281
320.....WA6OET/327	3.5-7 MHz.....AB4NS
320.....K3UA/327	3.5-7 MHz.....N8LIQ

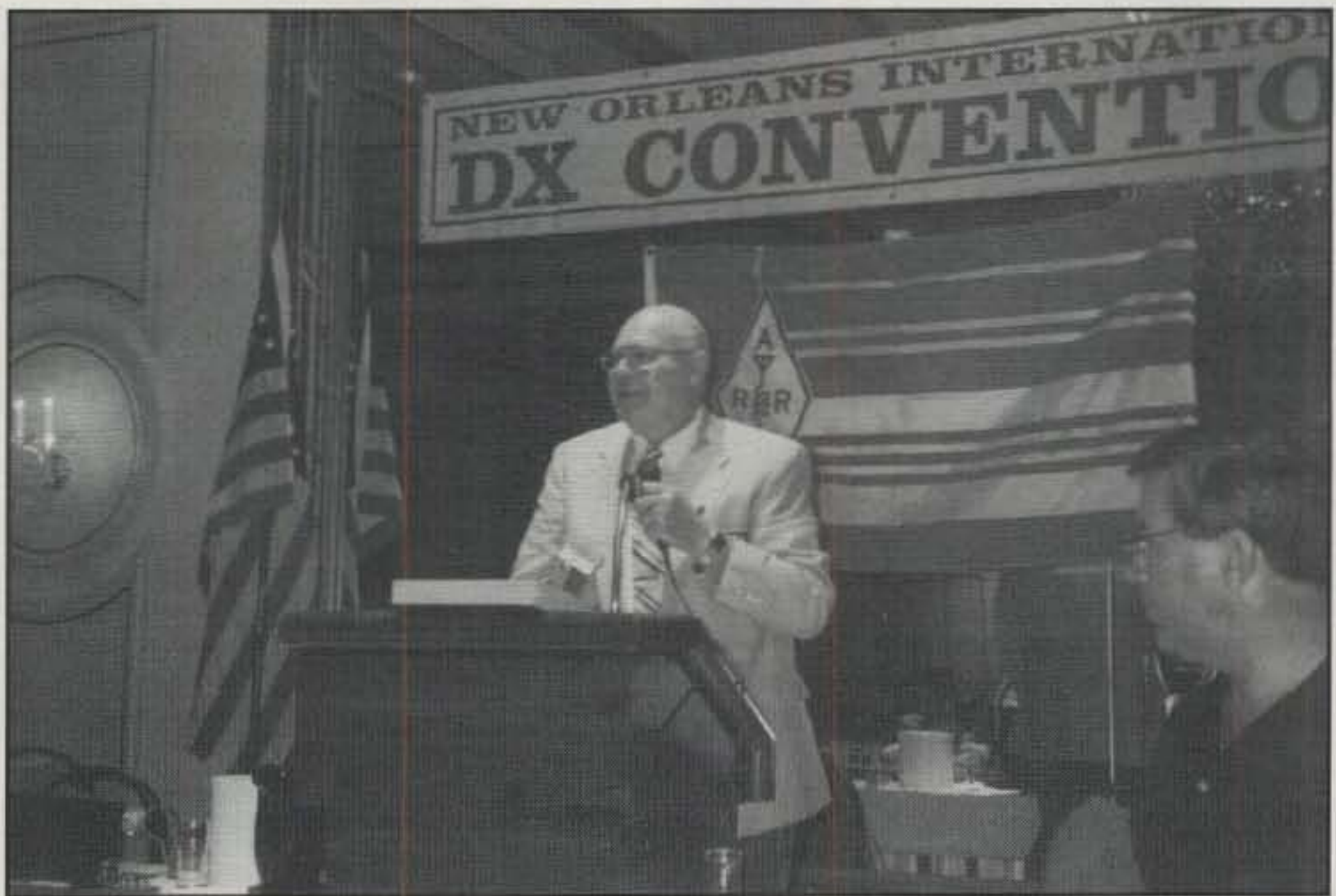
CW Endorsements

320.....K2TQC/328	320.....W7CNL/324
320.....K1MEM/328	320.....IT9VDQ/325
320.....K2FL/328	320.....WA8DXA/320
320.....K9BWQ/328	310.....K2JLA/319
320.....K2ENT/328	310.....WB4DBB/310
320.....K3UA/327	300.....N5HB/305
320.....K6JG/327	150.....9A2NO/161
320.....WA4IUM/326	

RTTY Endorsements

320.....K2ENT/321 275.....K3UA/280
300.....WB4UBD/300

Total number of active countries is 328. The basic award fee for subscribers to CQ is \$4. For non-subscribers, it is \$10. In order to qualify for the reduced subscriber rate, please enclose your latest CQ mailing label with your application. Endorsement stickers are \$1.00. Updates not involving the issuance of a sticker are made free when an SASE is enclosed for confirmation of total. Rules and application forms for the CQ DX Awards Program may be obtained by sending a business-size, No. 10 envelope, self-addressed and stamped, to CQ DX Awards Manager, Billy Williams, N4UF, Box 9673, Jacksonville, FL 32208 U.S.A. DX stations must include extra postage for airmail reply. Please make all checks payable to the awards manager.



Wendy Wondergem, K5KR, is the chairman of the New Orleans International DX Convention. Don't miss this very well-managed convention next month.

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UG-21B/U	N Male RG-8, 213, 214 Kings	5.00
9913/PIN	N Male Pin for 9913, 9086, 8214 Fits UG-21 D/U & UG-21 B/U's	1.50
UG-21D/9913	N Male for RG-8 with 9913 Pin	4.00
UG-21B/9913	N Male for RG-8 with 9913 Pin	6.00
UG-146A/U	N Male to SO-239, Teflon USA	6.50
UG-83B/U	N Female to PL-259, Teflon USA	6.50

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QSL **HI8**, **HI3/WA2VUY**, and **HI3/NO2R** via WA2VUY.

QSL **AP5N** and **AR5N** via operator Andrzej Makowski, SP5DIR, P.O. Box 36, 00-976 Warszawa 13, Poland.

QSL **OM3PA** and **OM3TZW** via Budovatel'ska 599/25, 95804 Partizanske, Slovak Rep.

QSL Tony Selmes, **A45ZN**, via P.O. Box 981, Muscat, Sultanate of Oman, Arabia.

QSL **9M8CC** via operator Peter Borsboom, PD0ALB, Madridwg 299, Vlaardingen, 3137AN, Netherlands.

QSL **ZL7CW** via WB8YJF and **ZL7PYD** via K8PYD.

QSL **ZC6B**, **TA2ZI**, and **OE6CLD** via new manager K9JJR, who replaces former manager WA6EQX.

QSL only the 1985 operation of **TR8IG** via N6CW. QSL the current operation direct to P.O. Box 740, Libreville, Gabon.

KA9RLJ, QSL manager for Patrick, **HH2PK**, says he has not received logs from Haiti since 1994. He is not answering cards until he receives the logs.

The early April **3V8BB** operation by some



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M1850A	50', 16 sq ft, 85 MPH w/Hazer 6	\$2292.64
M1860A	60', 15 sq ft, 85 MPH w/Hazer 7	\$3195.00
M1870A	70', 15 sq ft, 85 MPH w/Hazer 7	\$3485.00

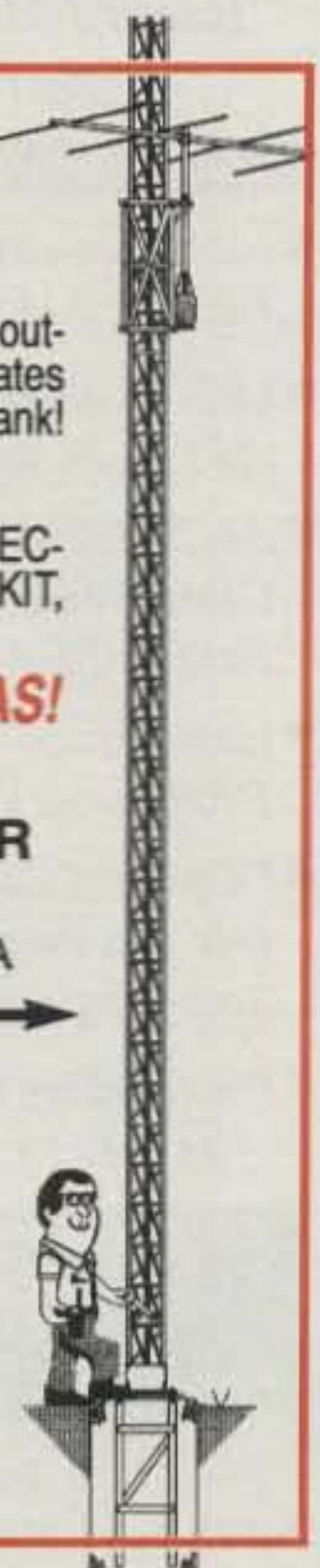
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Czech operators should be confirmed by the OK DX Foundation, P.O. Box 73, 29306 Bradlec, Czech Republic.

QSL **3A2WPX** to 3A2HN.

QSL the WPX contest callsign of **XR8S** via operator Luis Prado, CE8SFG, P.O. Box 1048, Punta Arenas, Chile.

QSL **8P6AZ** to C. L. Toppin, Changi, Maxwell Hill, Christ Church, Barbados.

QSL **8P6EH** to Venice Richards, Hope Field, Christ Church, Barbados.

QSL **8P6ER** to Gary Field, Prior Park House, St. James, Barbados.

QSL **DSØDX** via HL1XP.

QSL **HL1OUX** to Hwang Young Su, 515-105

Do Sigae Bal Apartment, Gayang Dong, Gang, Seo Gu, Seoul, Korea.

QSL **HL1SWT** to Kim Pil Sik, 515-105 Do Sigae Bal Apartment, Gayang Dong, Gang, Seo Gu, Seoul, Korea.

QSL **HL3EDN** to Im-Suck Chae, P.O. Box 472, Taejon 300-604, Korea.

QSL **PJ9C** to K1CPJ.

QSL **KP2CE** to Stephen Johnson, P.O. Box 10614, St. Thomas, VI 00801.

QSL **SV1DPJ** to Vasilis Kontothanasis, P.O. Box 127, GR-30100 Agrinion, Greece.

QSL **TO5M** (1995) via K9GS.

QSL **ZF2FT** to N5OCD.

73, Chod, VP2ML

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3C1DX to EA6BH
3D2RW to ZL1AMO
3DAØCA to W4DR
3DAØMA to DK8FS
4B1CO to XE1BEF
4F2IR to DU3DO
4J3M to UD6DJ
4K6DFT to UA9AB
4K8F to UA9AB
4L4KK to SV2AEL
4MØI to I2CBM
4N7DW to YU7BJ
4U1UN to WB8LFO
5H1HW to I5JHW
5NØT to F2YT
5N3/SP5XAR to SP5CPR
5V7MD to AB7BB
5X4F to KB4EKY
7Q7EH to W1EH
7Q7JL to GØIAS
7Q7RM to GØIAS
7Q7SB to AB4IQ
7Z1IS to SMØOFG
8P9DX to VE3ICR
8P9FW to DK7IH
9A3A/4U to 9A2AJ
9G1BJ to G4XTA
9G5BQ to PA3GBQ
9G5RC to N1OCS
9H3SB to DL5XAT
9J2SZ to SP8DIP
9K2JH to KE4JG
9K2ZC to KC4ELO
9L1MG to NW8F
9L1PG to NW8F
9M2TO to JAØDMV
9M8CC to PBØALB
9Q5TR to 4Z5DP

9U/EA1FH to EA1FFC
9U/F5FHI to F2VX
9X4WW to ON5NT
A41KJ to N5FTR
A92GD to K1SE
AL7EL/KH9 to K4HQI
C31LJ to VE3GEJ
C53HG to W3HCW
C56AA to GØUCT
C56CW to DL7DF/DL7UJO
CEØY/DK9FN to DK9FN
CO2JD to HI3JH
DL5XX/HC8 to KU9C
EL2AY to WA3HUP
EM1KA to 9H3UP
FG5HR to F6BUM
FØØDI to DK1RV
FØBYØS to JA3IG
FP5EJ to K2RW
FR5HR to F5RRH
FT5WE to F5GTW
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KG4GC to KQ4GC
LU6Z to LU6EF
LY96SD to LY2ZO
LZØA to LZ1KDP
NP4A to W3HMK
OD5RY to N4JR

ØM7DX to W3HMK
P29WK to N3ART
P4ØMR to VE3MR
P4ØWA to K9UWA
P49I to K4PI
P49V to A16V
PJ8/W9LNQ to N9ALC
PJ9JT to W1AX
PQ5L to PP5LL
PT5T to PP5LL
PYØFZ to PY7ZZ
PYØTI to PY1UP
PZ5JB to N3BTE
R1FJZ/FJL to DF7RX
SØ8HW to SP8AG
SU3AM to DL5ZBV
T3Z2 to N7YL
T77BL to T78A
T9/DI6XY to ØH3GZ
T92A to S57MX
T93M to K2PF
T99W to DL1QQ
TA2DS to WA3HUP
TG/KØ9FOX to N9ISN
TJ1GB to WA6SLO
TJ1PD to N5DRV
TL8MS to DL6NW
TT8FT to DL7FT
TT8SS to F6FNU
TU2DP to K4MQL
UØØAZ to W3HMK
UØ9MA/C91 to DK8FS
V31JZ to NN7A
V31ML to N5FTR
V31RC to WG9L
V31RL to NG7S
V4ØZ to AA7VB
V44KJ to WB2TSL
V47NZ to NØBSH

V47W to AA7VB
V51CM to WA2JUN
V73GT to WF5T
VK4FW/P to VK4CRR
VK9CR to DK7NP
VK9XY to DK7NP
VP2EHF to KA3DBN
VP2ESJ to W5SJ
VP2MDY to NW8F
VP2MHP to JA1ØEM
VP5/JJ2ØEH to JJ2ØEH
VP5/JJ2ØXI to JJ2ØXI
VR2NR to WA3RHW
VR2RJ to JH1BED
XT2DP to WB2YQH
XT2JF to N5DRV
XV1A to UAØFM
YS1ZV to KB5IPQ
YW5P to WS4E
Z32XA to KM6ON
Z35ØGBC to Z37GBC
Z37DRS to YU5DRS
ZØ7JP to N5FTR
ZØ7VJ to G4ZVJ
ZØ9CR to KA1DE
ZF2CA to I4ALU
ZF2KV to NØKV
ZK1ATV to LA1TV
ZK1ØI to DK1RV
ZK1NJX to LA9JX
ZK1PYD to K8PYD
ZK1WTS to WT8S
ZL7BTB to ØH5TB
ZS/UA9MA to DK8FS
ZS6/G3SGØ to G3SGØ
ZS64RI to KA1JC
ZSM6A to WA3HUP
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OUR READERS SAY

"Surplus Sidelights" Revisited

Editor, CQ:

I read Gordon White's article "Surplus Sidelights" in the November 1995 issue of CQ (on page 27) and enjoyed it very much. I encourage you to print more articles of this type for those of us who missed this era in ham radio. What about other companies and other radios? Keep up the good work!

Bill Johnson, WB5RYB
Fayetteville, GA

Thanks For The "Slinky" Info

Editor, CQ:

I wrote a while ago looking for a copy of the manual for the "Slinky Dipole" or the tuning information for same ("Our Readers Say," June 1995 CQ, page 54). The response was unbelievable! I received about 50 replies! I should now have my "Slinky" tuned with no problems, barring Murphy.

Too many of you replied for me to thank you all personally, but I would like to thank you all collectively. I can think of no other hobby where such helpfulness is so readily forthcoming. It shows what the best part of ham radio is all about.

Dean Milner, VE1CBF
Sydney, NS, Canada

PRB-1 Discussion Continued

Editor, CQ:

J. L. Baker, WK3U, makes a number of very important points in his article on the effect of PRB-1 court decisions in the February 1996 issue. He suggests the importance of expert witnesses and the need to clearly justify with expert testimony why a specific height is needed when making a presentation before a local zoning board. He also stresses the importance of compromise in some cases by both sides. But his last sentence says it all for me: "A lawsuit is something no amateur radio operator should have to face in order to provide a valuable service to the community and the nation."

Certainly no ham should have to face it alone. Often villages and towns make no provision for amateur antennas and the choice is court or another hobby. I had my own experience with my little village shortly after PRB-1 was issued in 1986. After the village threatened to take me to court if I did not take my tower down, I took the unusual action of running for town trustee, and while I did not win—I really didn't expect to—I did not come in last. Just before the next election the town ended my political career by granting me a permit for my tower rather than taking me to court.

It has also been my experience for the past six years as ARRL Local Government Liaison, and now State Government Liaison for the NYC/LI Section in the ARRL Hudson Division, that some amateurs are faced with the prospect of a law suit in order to install an effective antenna system. Most of the time when local government has an ordinance on the books which limits the height of any structure (a tower and antenna is a structure), the amateur is not financially able to challenge a denial of variance in court. In most cases he or she simply does not have the money for legal expenses, so gives in and either finds another hobby or settles for a dipole or vertical. I am also aware of instances where towns have even challenged verticals and dipoles which exceeded their height requirement of about thirty feet. City hall has unlimited financial resources to enforce its restrictive ordinances—your tax dollars.

Almost three years ago along with a group of local amateurs I formed a not-for-profit group we called R.A.D.I.O., Inc. (Radio Amateurs Defense and Information Organization) with a number of goals, including fund-raising to finance legal challenges. A number of highly qualified expert witnesses (K2YEW, K2RIW, and W2QUV) who could provide testimony at zoning board hearings on issues of engineering safety, the need for the height requested, EMI hazards, and interference were members of the group. To date we have been involved in almost twenty "tower cases" or hearings on proposed ordinances. We have made highly professional presentations, as one of our volunteers is a licensed P.E. who makes a good portion of his income as a professional witness (K2YEW), while another is a former broadcaster (KS2G) now working as a public relations director for a large New York City hospital. As a result, we were successful in all but one case and that case did go to the state court. That was the NK2T case in the Town of Hempstead on Long Island. While our lawyer did get assistance and advice from ARRL council Chris Imlay, we received no money from the ARRL to pay the almost \$30,000 in legal fees. Yet we were able to raise close to \$22,000 from generous individual amateurs around the country and local clubs with a balance of just under \$2,000 remaining.

We accomplished quite a bit in the process. We showed local hams that you can beat city hall when you unite. The latest issue of the "FCC Rulebook" contains the precedent-setting letter written by the FCC's Ralph Haller to the Town of Hempstead telling them that they could not use interference as a reason for denying the permit for the 56 foot tower the case centered around. We enlisted the aid of a U.S. Congressman, Peter King, to make that happen. Two other hams in the same town also received permits for their towers as a result of the case, and we are now negotiating with town officials for an ordinance that will permit crank-up towers even higher than the 56 foot tower involved in the case. The town now understands that with 1400 licensed hams residing in the district, we can have a decisive impact in elections for trustees, which are typically won by only 1500 votes.

The important issue was that NK2T did not have to go it alone. Hams must help other hams who face a lawsuit. NK2T spent almost \$7000 of his own money in legal bills, but like most of us, he didn't have the money to go it alone for the entire legal bill. The \$30,000 legal bill would have broken the family piggy bank. I'm not sure we could have raised the money to take the case to federal court had the battle continued.

The experience pointed out the need for a foundation or national organization separate from the ARRL, which has a policy not to fund any of these cases, to take over the task of funding at least some of these court challenges, if only to a limited extent. It's my hope that R.A.D.I.O. may someday accomplish that task on more than a regional basis. We will continue to need such an organization until the FCC rules that the minimum height which any local government may specify for an amateur antenna is 70 feet, and somehow I don't think that will happen anytime soon, but I do pray for it. Until then, keep the PRB-1 articles coming.

Frank Fallon, N2FF
ARRL State Government Liaison NYC/LI
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AWARDS

NEWS OF CERTIFICATE AND AWARD COLLECTING

This month we feature enterprising county hunters Don Flynn, K3IMC, and Mark Behrens, WB9OOG, and their World Wide Web site for county hunters at URL <<http://www.delve.com>>. The web site is divided into these sections:

Events—news of upcoming conventions and other gatherings of county hunters, contests, etc.

Net Frequencies—a complete listing of all established county hunting frequencies (any changes will be listed here).

Planned Trips—a list of trips planned by mobile county hunters.

Forum—a place for discussion, debate and suggestions, solutions for installing mobile rigs, etc.

Mail Directory—an up-to-date listing of all county hunters' e-mail addresses.

Special Needs—a section devoted to the special needs of the county hunting community.

Awards—a listing of all of the county hunting awards, including CQ's prestigious USA-CA All Counties Award. The Mobile Amateur Radio Awards Club awards are also listed.

Services & Products—a catalog of county hunting aids, such as computer logging programs.

Interesting Links—HyperText links to other amateur-radio-related web sites, callbook databases, etc.

Don and Mark have developed a very useful tool for their fellow county hunters, and their efforts certainly are appreciated. Thanks, guys.

Here are URLs for some other sites on the World Wide Web that may be of interest to county hunters.

<<http://www.switchboard.com>> An interactive telephone number database. Look up old friends, service buddies, or classmates. Also includes a business directory. An excellent resource for all.

<<http://www.mapquest.com>> An interactive map program. Especially useful for mobile operators planning trips. About as detailed as you could wish.

<<http://pages.prodigy.com/MARS.html>> A site for the Pennsylvania Navy/Marine Corps Amateur Radio Service (MARS). It has hypertext links to other Armed Forces amateur radio services. Useful for anyone who would like information about this aspect of amateur radio.

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USA-CA 500: Robert L. Rizor, N8COI,

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W1VXV.....1407	3000
	N8COI.....915

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.

#2915; R.C. Bob Boyd, W1VXV, #2916; Frederic Donati, F5NBX, #2917; and Klaus Minkner, DL6ZXG, #2918.

USA-CA 1000: Robert L. Rizor, N8COI, #1406; R.C. Bob Boyd, W1VXV, #1407.

USA-CA 1500: Robert L. Rizor, N8COI, #1080.

USA-CA 2000: Robert L. Rizor, N8COI, #1080.

USA-CA 2500: Robert L. Rizor, N8COI, #1009.

USA-CA 3000: Robert L. Rizor, N8COI, #915.

Special Endorsement: F. H. "Herby" Werry, DJ3OE, USA-CA All Counties #596, 12/10/88. Submitted documentation for All Two-Way CW Endorsement.

Awards Available

Historic Military Communications Awards. The following awards are available from W8KBF. Any standard military communications equipment in use by any nation before September 1, 1958 qualifies. Use of solid-state equipment is *not* allowed. Both transmitter and receiver must be military. Contacts, verified by QSL cards, must have been made after January 1, 1995. Photos of the equipment must be included and must show the complete station, including antenna. No RF amps are allowed.

Contacts are based on US states and/or Canadian provinces. Washington, DC counts as a state, and Yukon and Northwest Territories count as a province.

SPECIAL HONOR ROLL

Robert L. Rizor, N8COI
USA-CA All Counties #898
April 28, 1996



Historic Military Communications Award available from W8KBF.

Award requests should be sent to Sam Hevener, W8KBF, 3583 Everett Road, Richfield, OH 44286-9723; telephone 216-659-3244 from 11 AM to 6 PM ET. (Remember that a photo of the station must be included.) All who qualify will be awarded a handsome 8.5" x 11" red, white, and blue certificate free of charge. A \$3.00 fee, however, will be charged for the return of the QSL cards and photos. These will be returned via priority airmail along with the certificate.

Medal of Honor Award. Requires the use of any vintage military communications system with both the transmitter and receiver or transceiver powered by the original military vibrator power supply, handcrank generator, or dry-cell batteries. The dry-cell batteries can be of current civilian manufacture. No AC battery eliminators are allowed. The entire system must be military and complete, including the antenna. Fifteen states and/or provinces must be verified to qualify for the award. Transmitter output must be less than 10 watts.

Silver Star Award. This is a historic military display award for non-amateurs. Provide photos of a *complete* military communications display at three different public shows. The primary theme must be communications. A standard tactical radio set installed in a jeep or tank does *not* qualify. The display must be a *major* communications system such as a complete SCR-299 radio truck, complete B-17 radio compartment, etc. A photo and statement signed by two officials of *each* show are required. Museums *do not* qualify.

What constitutes a major display will be determined by W8KBF.

Bronze Star Award. The applicant must use any standard military communication system powered by the original military dynamotor; either 6, 12, or 24/28 volt input; original 115 VAC, 400- to 1200-cycle power supply or 115 volt DC ship-board power. Both transmitter and receiver must be powered as above and use the original military antenna. The transmitter output must be less than 30 watts. Twenty-five states and/or provinces must be verified to qualify for this award.

Soldier's Medal Award. Use any military communications systems with either the transmitter and/or receiver powered by a 115VAC/ 230VAC, 50/60 cycle power supply. The power supply may be either military or homebrew. The antenna need not be military. Forty-five states and/or provinces must be verified to qualify. Transmitter output must be less than 400 watts. The time period of the transmitter and receiver need not match.

Also available are special endorsements for the above awards. These include WWII Aircraft Command Set, WWII Tank Set, WWII Bomber Set, WWII Radio Truck, and others.

Chinese Taipei Amateur Radio League Award Program. The following awards are available from the Chinese Taipei Amateur Radio League.

Worked Chinese Prefixes Award. Contact different Chinese prefixes BA, BT, BO, BV, BY, BZ, and 3H-3U. For the basic award contact 20 prefixes; for the Class B award contact 30 prefixes; for the Class A award contact 40 prefixes. No repeater contacts are allowed, but satellite contacts are accepted. The award is available for all CW, all SSB, or mixed modes, all bands.

Worked All Taiwan Districts Award. Contact an amateur station located in each of the 10 call areas (1 through 0) of Taiwan. There are no band or mode restrictions, but repeaters may not be used.

10,000 Award. To qualify for this award you must contact amateurs in towns in Taiwan with different three-digit postal codes. The codes must add up to at least 10,000. Each code may only be used once. All bands and modes are allowed, but no repeater contacts.

General requirements for the Chinese Taipei ARL Awards Program are as follows. GCR or photocopies will be accepted. All contacts must be with land-based stations, and all contacts must have been made from the same QTH. The fee for each award is US\$5 or 10 IRCs. Apply to: CTARL Award Manager, P.O. Box 93, Taipei, Taiwan, ROC.

73, Norm, WA3RTY

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WASHINGTON READOUT

REGULATORY NEWS IN THE WORLD OF AMATEUR RADIO

Morse Code Waivers For The Handicapped

We get many letters from readers. One of the subjects that keeps cropping up is Morse code waivers. One such letter—which is similar to many others we have received—is from K.C. Jones, W6OB, of Hemet, California. Jones is a VE and he "... is very concerned about the abuse of the code waiver program."

Jones believes that 90% of the applicants who obtain Morse code waivers from their doctor are not legitimately disabled. He calls these code applicants "end runners." In other words, these people have found a loop-hole way to obtain higher class amateur radio licenses without passing the required code tests. This month let's look into Morse code waivers and how they came about.

Why Pass The Code Anyway?

The International Radio Regulations require that amateur radio operators, except those operating exclusively at frequencies above 144 MHz, be proficient in manual telegraphy. ITU Article 32 states: "Any person seeking a license to operate the apparatus of an amateur station shall prove that he is able to send correctly by hand and to receive correctly by ear texts in Morse code signals. The administrations concerned may, however, waive this requirement in the case of stations making use exclusively of frequencies above 30 MHz."

The FCC is bound by this regulation, since it is a 1979 ITU World Administrative Radio Conference agreement that was ratified as a treaty obligation of the United States. It is important to point out, though, that the international law does not specify a code speed or how telegraphy proficiency should be demonstrated.

Up until June 1990 the FCC firmly declined to approve any deviation from Article 32. How waivers of the Morse code requirement came about is an interesting story.

In 1978, in response to two petitions (RM-2567 and RM-3138), the FCC initiated a rule making (Docket No. 78-250) which looked toward reducing or eliminating the Morse code requirements for handicapped persons seeking licenses in the Amateur Service. Amateurs were flabbergasted, however, when the Commission surprisingly added, "If it creates a class of amateur radio operator license with no telegraphy requirement, the class will be available to any applicant ... not limited to those with certain disabilities."

Amateurs interpreted that statement to mean the Commission would be using the disabled as their justification for the long-rumored and long-awaited no-code license. The ARRL objected profusely to allowing the shortcomings of the handicapped to be used as the

grounds for a no-code amateur ticket for everyone. Even disabled persons protested, and especially those who had already struggled to pass the telegraphy requirements.

On March 11, 1982 the FCC was persuaded to think better of their handicapped approach to a no-code license, and they killed their proposal. They did it on the basis that FCC examiners couldn't determine who indeed was incapacitated.

In 1983 the FCC began turning over amateur radio testing to the Amateur Service itself, and their handicapped testing rules remained in place. Administering VEs were instructed to "accommodate" an examinee whose physical disabilities require a special exam procedure. VEs could read exam questions to blind applicants, or employ blinking lights or vibrating surfaces, but no waivers of the code requirements were permitted. Even the new Part 97 Rules 1989 update continued the procedure.

The decision to abruptly change this long-standing policy was political rather than regulatory. The FCC's Personal Radio Branch was extremely surprised that the new procedures were wished on them by the Bush administration. They had no alternative but to adopt them. Here is how it happened.

Handicapped Amateur Gets Policy Changed

The road to code waivers began in 1989. Tom McMillen, WB3HGW, of Johnstown, Pennsylvania had been a Technician class licensee for 15 years and badly wanted to upgrade to the General class. There was no question that he was physically unable to do so since he had epilepsy, was paralyzed, and was confined to a wheelchair.

According to his doctor, McMillen's disability and the effects of medication prevented him from raising his Morse code speed to the required 13 wpm. In light of his handicap, he asked the FCC to waive the code examination. The FCC, in keeping with its long-time traditional policy that the requirements for amateur licenses are the same for everyone, declined McMillen's request.

Volunteer examiners have always had some flexibility to modify their examination procedures to meet special needs. However, the rules didn't permit eliminating the Morse code exam completely, and that is what McMillen wanted. His physician supplied a letter confirming his disability. The FCC advised him that the "... ARRL was against it," implying that changes in the policy would be hard to obtain. The ARRL told McMillen in a letter that he should contact the Handi-Hams organization, which assists handicapped amateurs. (Handi-Hams Courage Center, 3915 Golden Valley Rd., Golden Valley, MN 55422; telephone 612-520-0515.) Instead he wrote about his situation to Jordan's King Hussein, who holds the

JY1 amateur callsign recognized around the world. A Jordanian official replied sympathetically, and wrote that the king had contacted President George Bush to request intervention on McMillen's behalf.

President Bush referred Hussein's letter to the State Department, where officials responsible for Jordanian affairs together with members of the National Security Council staff reviewed the case. In February of 1990 King Hussein himself wrote to WB3HGW, stating that Bush had replied that the government would try to help McMillen and others with similar disabilities.

On June 13, 1990 McMillen received a telephone call from the FCC to tell him that his request for waiver of the 13 wpm requirement was granted. A letter of confirmation arrived soon thereafter.

FCC Adopts Interim Policy

Amateur radio license examinations are organized by Volunteer Examiner Coordinators, who hold an annual meeting. Their 1990 conference was held the week following the granting of the McMillen code waiver. At that meeting the FCC announced interim examination procedures for handicapped applicants who wish to request a waiver of the code requirements. It was a big shock to those VECs in attendance, since it was a 180-degree change in code testing policy. Here is what the FCC's Johnny Johnston, W3BE, said in his remarks.

"The interest on Capitol Hill for handicapped persons is also being felt at the Commission. There is a renewed concern about the degree of accommodation provided in your operator license examinations.

"The impetus for this concern is coming from two sources. One source was expected. We have always had to deal with requests for waiver of the telegraphy examinations from persons who claimed their handicap put them at a disadvantage in obtaining an amateur operator license. Lately, however, the number of such requests seem to be picking up. Three persons have filed discrimination complaints under the disability and rehabilitation legislation.

"The other source may surprise you. It is coming from your own ranks—your VEs. I suppose that when you only encounter the handicap examination issue from a distance, it is easy to rigidly insist, 'I passed the code test. That proves that any fool can do it!'

"Most amateurs held a similar view until the VE system came along. Before then you didn't have to give the heartbreaking news to persons who have a severe handicap that keeps them out of amateur radio. Our examiners did that nasty little job for you. But now it is the VEs who have to do it. They are on the firing line. More and more they are becoming sensitized to the very real problems some handicapped persons have in passing the code tests.

National Volunteer Examiner Coordinator, P.O. Box 565101, Dallas, Texas 75356-5101 (817-461-6443)

"In many cases these persons would be an asset to your service. In practically all cases, moreover, the pleasure they would receive from amateur radio would greatly improve the quality of their lives. As a result, the Commission found itself in the uncomfortable bureaucratic position of having to defend the amateur community's position regarding the Morse code against concerning, caring, amateur operators.

"We are asking you to implement two new procedures. The first is to make additional accommodations for handicapped examinees who have a special problem in proving they have mastered the required code speed. . . .

"Where it is warranted, handicapped examinees should be able to take the code exam one sentence, or one phrase, or one word, or even one character at a time. Where it is warranted, a sending test should be substituted for the receiving test. Hopefully, you can come up with other accommodations.

"The second procedure we are asking you to implement is in response to interim policy directions we have received from the Commissioners. The Private Radio Bureau will grant a request for waiver of Element 1(B) (the 13 words-per-minute telegraphy examination) or 1(C) (20 wpm wherever):

1. The examinee now holds at least a Novice Class operator license;
2. The examinee requests a waiver of Section §97.511 for Element 1(B) or 1(C); and
3. The examinee submits a physician's certificate stating that, due to a severe handicap under the 1988 Developmental Disabilities

Act, the examinee is unable to meet the 13 or 20 wpm requirement.)

"A waiver of a Commission rule cannot be granted by a VE or a VEC. The procedure we have in mind is for the handicapped examinee to submit a package to the administering VEs consisting of the waiver request and the physician's certificate attached to FCC Form 610.

"The VEs administer the necessary written tests, and if successful, submit the package to the coordinating VEC. . . .

"We understand your concern about cheating. Maybe you or the VEs will want to verify that the certificate is not fraudulent. You can check to make sure that the physician actually exists, or that the physician actually issued the certificate. You are not being asked, however, to be medical experts. We do not expect you or your VEs to make medical judgments. You must not engage in disputing the physician's certification that, due to the person's severe handicap, the person cannot meet the telegraphy speed requirement. . . .

"We will be initiating a rule-making proceeding to implement the new policy directly into Section §97.505, Element Credit, so that the waiver request will be unnecessary."

The VECs in attendance wondered how a VE transmits Morse code text at a specified speed "one sentence, phrase, word, or character at a time." The answer, of course, is that you can't if you must pause for a response after each character. It appeared that a severely handicapped person would be able to take Element 1(A) (the 5 wpm telegraphy exam) at no specific code speed and then receive a

waiver for the higher (13 and 20 wpm) speeds.

Strangely, the Handi-Hams people did not seem to be in favor of granting code waivers to disabled applicants. We were told by their director, "This whole thing is a slap in the face for a lot of handicapped persons who have worked very hard to achieve the telegraphy requirement. You can walk into most any doctors' offices and say I want to get my ham license and I am blind and I just really can't get the code. The doctor will agree that ham radio will be a good activity for you and will give you a letter. I think just because we feel sorry for people does not necessarily help them."

FCC Issues Handicapped Code Waiver Proposal

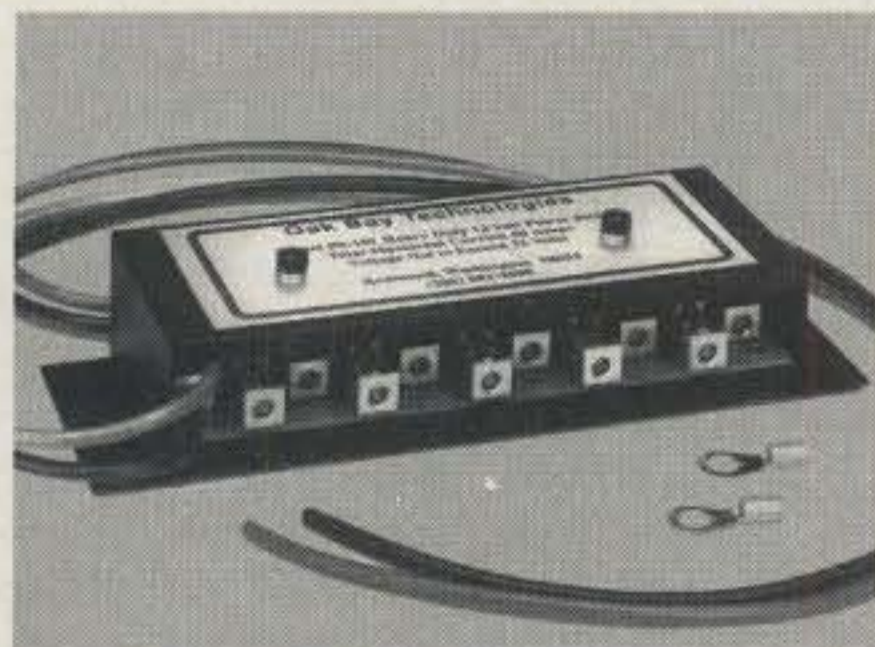
As promised, the FCC produced a written Notice of Proposed Rulemaking (PR Docket 90-356) to make the Amateur Service more accessible to the disabled. The NPRM coincided with the passage by Congress of the Americans in Disabilities Act and its signing into law by the President.

The FCC noted that code proficiency is required by international law, but " . . . those regulations are silent as to the exact code speed that one must attain in order to qualify for an amateur operator license.

"We believe that this proposal is consistent with the evident national concern for all Americans with disabilities. The instant proposal provides such persons with an opportunity to contribute to the nation's welfare by engaging more fully in amateur service activities and to

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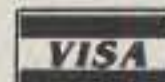
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enjoy even greater benefits from their membership in the amateur community."

In accordance with the Rehabilitation Act of 1973, the FCC defined the term *severely handicapped individual* as a person with a severe physical or mental disability which seriously limits one or more functional capacities. Under the proposed rules, the VEs would give examination credit to severely handicapped licensees seeking exemption from the 13 wpm or the 20 wpm telegraphy examinations. The examinees would also be required to show an authentic certification signed by a physician attesting they cannot pass these examinations because of physical or mental disabilities.

The ARRL noted in its comments that the FCC made no mention in their NPRM that after Jordan's King Hussein, JY1, wrote to the government, President Bush intervened with the FCC to exempt handicapped amateurs from higher speed CW tests. "The action in this proceeding would take action specifically deemed 'not sound licensing policy' only eight years ago, without any enunciated rationale for the departure from prior policy." Here the

ARRL was referring to the 1982 FCC decision not to grant handicapped exemptions.

In December 1990 the FCC essentially adopted its proposal to make the Amateur Service more accessible to persons with handicaps. The new rules eliminated the need for disabled persons to pass more than a five word-per-minute telegraphy examination, and even then the test may be administered one character at a time with pauses between each character for a response from the applicant.

A provision was made in the rules (Part 97 section §97.509) permitting "The administering VEs [to] require a physician's certification indicating the nature of the disability before determining which, if any, special procedures must be used."

Code Administration Instructions Changed

All VECs have modified their Morse code administration instructions to provide for the severely handicapped.

At the beginning 5 words-per-minute level,

volunteer examiners may substitute sending tests for telegraphy receiving examinations. Furthermore, telegraphy examinations may be paused to allow candidates to speak or write out phrases, words, or in extreme cases character-by-character. A score of 70% correct is considered to be a passing score.

Severely handicapped applicants who have passed the 5 words-per-minute in some manner may apply for a waiver of the 13 and 20 wpm code examination. This is done by submitting an FCC application form 610 to a VE team with Section 3 completed by a doctor.

The physician must be a medical doctor (M.D.) or a doctor of osteopathy (D.O.). The doctor must certify that he has "considered the accommodations that could be made for the person's disability and has determined that, even with accommodations, this person would be unable to pass a 13 or 20 words-per-minute telegraphy examination."

The FCC Form 610 also contains a "Notice to Physician Certifying to a Disability." This notice is very thorough and explains Morse code examination procedures and existing accommodations for the handicapped. "The VEs rely upon you to make the necessary medical determination for them using your professional judgment. You are being asked to decide if the person's handicap is so severe that he/she cannot pass the examination even when the VEs employ their accommodative procedures. The impairment, moreover, will last more than one year. This procedure is not intended to exempt a person who simply wants to avoid expending the effort necessary to acquire greater skill in telegraphy."

The FCC Form 610 is not only signed by the doctor, but the patient (applicant) also who must agree to release to the FCC any medical information deemed necessary to process his amateur radio operator application.

How Has The Program Worked Out?

For the legitimately handicapped person it has worked out very well. The opinion of the majority of VE teams, however, is that many applicants who appear for testing with a Form 610 code waiver are not deserving. Instead, they are trying to beat the system.

It is difficult to fault the medical profession, however. Doctors are indeed very busy, and signing insurance and other forms is a daily occurrence. I can remember a few years ago when I had a neck operation. While I was in the doctor's office, his assistant brought in a bunch of papers that needed signatures. She laid the forms out carefully on his desk with just the areas showing that needed a signature. He signed them all and then went about seeing more patients. Had one of those forms been an FCC Form 610, he would not have known it. He was merely trying to get the paperwork out of the way so he could go on to more important things. Therein lies the problem with doctor-certified Morse code waivers.

There is reason to believe, however, that Morse code may not be required for anyone in the future. Commercial Morse code will be coming to an end for ships at sea in 1999. It is in the phase-out period now. In that year the international community will be considering ending it for amateur radio operators as well.

73, Fred, W5YI

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PROPAGATION

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Sunspot Low—We're Right In The Middle Of It

Accurately predicting the end of one sunspot cycle and the beginning of another is extremely difficult, and there are always differences of opinion even among the experts. The following four predictions for the end of sunspot Cycle 22 and the beginning of Cycle 23 have been made by the world's leading solar experts.

- Based on sunspot statistics and observations, the Space Environmental Center (NOAA), Boulder, Colorado predicted that the end of Cycle 22 took place during May 1996. But based on solar flux observations, they predict that it will occur during December 1996.

- The IPS Radio and Space Services of Australia predicts that it will take place during June 1996.

- The Royal Observatory of Belgium, the world's official keeper of sunspot records, predicts Cycle 22 to end during November 1996.

- The National Geophysical Data Center, Boulder, Colorado also predicts the present cycle to end during November 1996.

According to the experts, the end of Cycle 22 may have already occurred this past May, but if not, it seems to be almost certain that a new cycle will begin by the end of 1996. Assuming that this will come to pass, it won't be until mid to late 1997 before it can be confirmed. Based on sunspot statistics, the end of a solar cycle is defined by the lowest value of smoothed sunspot number (SSN), after which the numbers start to increase again, marking the beginning of a new cycle. The SSN is a 12-month running average of monthly sunspot numbers, and hence there is a delay of six months before a smoothed value is available for a particular month. Additional time will be required to make sure that the numbers have begun to rise.

There is a 250 year continuous record of daily sunspot statistics. These statistics have been used to mark the ending and beginning of 22 sunspot cycles. About 50 years ago radio solar flux measurements began to be taken. This is proving to be a more sensitive and accurate way to measure solar activity. However, with such a wealth of statistical data sunspot counts continue to be used to define cycle progression. In this respect, it is interesting to note that the Space Environmental Center calls for the end of Cycle 22 during May 1996 based on smoothed sunspot count, and December 1996 based on smoothed radio solar flux data.

To further complicate the determination of the demise of Cycle 22, sunspots contain magnetic fields. Spots from a new cycle have reversed magnetic polarity from spots of an old cycle. Based on magnetic field measurements, the end of one cycle and the beginning of the next one take place when there are an equal number of old and new spots.

It is possible that each of the three methods used to determine the end of Cycle 22

LAST MINUTE FORECAST

Day-to-Day Conditions Expected for July 1996

Propagation Index.....	Expected Signal Quality			
	(4)	(3)	(2)	(1)
Above Normal: 17-18, 24-25	A	A	B	C
High Normal: 1, 6, 13, 15-16 19-21, 26, 28	A	B	C	C-D
Low Normal: 2, 4-5, 7-8, 11-12 14, 22-23, 27, 29-31	B	C	D	D-E
Below Normal: 3, 10	C	C-D	D-E	E
Disturbed: 9	C-D	D	E	E

Where expected signal quality is: A—Excellent opening, exceptionally strong, steady signals greater than S9.

B—Good opening, moderately strong signals varying between S6 and S9, with little fading or noise.

C—Fair opening, signals between moderately strong and weak, varying between S9 and S6, with some fading and noise.

D—Poor opening, with weak signals varying between S1 and S3, and with considerable fading and noise.

E—No opening expected.

HOW TO USE THIS FORECAST

1. Find propagation index associated with particular band opening from Propagation Charts appearing on the following pages.
2. With the propagation index, use the above table to find the expected signal quality associated with the band opening for any date of the month. For example, an opening shown in the charts with a propagation index of 3 will be good (B) on July 1st, fair (C) on the 2nd, fair-to-poor (C-D) on the 3rd, fair (C) on the 4th and 5th, etc. During the IARU HF World Championship expect good (B) conditions on July 13th and fair (C) conditions of the 14th.

(smoothed sunspot numbers, smoothed radio solar flux levels, and sunspot magnetic field changes) may produce different dates. If this should occur, scientists throughout the world will convene to determine an agreed-upon date.

While we won't know for sure until late next year the exact date Cycle 22 ended and Cycle 23 began, it is very likely that we are now witnessing the very last months of the present cycle, if in fact it has not already ended!

Sunspot Cycle Progress

The present solar cycle, the 22nd observed since accurate records have been kept, continues its slow decline, much as expected.

Dr. André Koeckelenbergh, Director of the Royal Observatory of Belgium, reports a monthly mean sunspot number of 9 for March 1996. Daily values ranged between a high of 23 on March 26 and a low of 0, which occurred on 10 days during the month. This results in a 12-month running smoothed sunspot number of 14 centered on September 1995. This is a drop of two points since the previous month.

There was a corresponding decrease in the 10.7 cm radio solar flux level, as observed at Canada's Dominion Radio Astrophysical Ob-

servatory located at Penticton, BC. A level of 70 was reported for March 1996. This results in a smoothed running number of 75 centered on September 1995.

A smoothed sunspot count of approximately 7 is forecast for July 1996, with a corresponding smoothed level of approximately 72 for the 10.7 cm solar flux.

This month's column has detailed Short-Skip Propagation Charts based on a smoothed sunspot number of 7, as well as charts centered on Hawaii and Alaska, valid for July and August 1996. The Short-Skip Charts contain forecasts for band-by-band openings between distances of 50 and 2300 miles. For detailed DX forecasts over greater distances refer to the DX Propagation Charts for July which appeared in last month's column. For an assessment of day-to-day conditions expected during the month, see the Last-Minute Forecast which appears at the beginning of this column.

Mail Bag

Colin McIntyre, Queensland, Australia, writes: ... Can the commencement of a new sunspot cycle be detected without the reference of knowledge of sunspot activity—i.e., solely by the 10.7 cm radio solar flux level? If so please explain briefly. For example, what is the difference between the flux of the ending of one cycle and the beginning of the next?

I believe that Colin's questions were answered earlier in this column, but I will add a bit more information.

Yes, as mentioned previously, 12-month smoothed values of monthly 10.7 cm radio solar flux levels can be used to determine a date for the ending of one cycle and the beginning of another. When the smoothed levels begin to increase, a new cycle has started. Unlike changes in the polarity of the magnetic fields that surround old and new sunspots, there are no observable changes in solar flux other than their levels. Solar flux is a more sensitive and accurate measurement of solar activity which has been available for about 50 years. Smoothed sunspot counts continue to be used, however, because there is a continuous record of nearly 250 years worth of data available.

On the subject of radio solar flux, Zacharias Liangas writes from Greece: ... Is solar flux uniform throughout the globe? I mean are the values given daily by NOAA from the gopher server valid throughout the world, or are they different for different areas of the world?

The world's official keeper of 10.7 cm radio solar flux is Canada's Dominion Radio Astrophysical Observatory in Penticton, British Columbia. Equipment in observatories in other parts of the world is calibrated against the receiving equipment at Penticton. This adjustment takes into account the differences in sun-earth distances that occur in various areas of the world. The adjusted values of 10.7 cm radio solar flux measured at Penticton at 1700 UT

HOW TO USE THE SHORT-SKIP CHARTS

1. In the Short-Skip Chart, the predicted times of openings can be found under the appropriate distance column of a particular meter band (10 through 160 meters) as shown in the left-hand column of the chart. For the Alaska and Hawaii Charts the predicted times of openings are found under the appropriate meter band column (15 through 80 meters) for a particular geographical region of the continental USA as shown in the left-hand column of the charts. An * indicates the best time to listen for 160 meter openings. An ** indicates possible 10 meter openings.

2. The propagation index is the number that appears in () after the time of each predicted opening. In the Short-Skip Chart, where two numerals are shown within a single set of parentheses, the first applies to the shorter distance for which the forecast is made, and the second to the greater distance. The index indicates the number of days during the month on which the opening is expected to take place, as follows:

- (4) Opening should occur on more than 22 days
- (3) Opening should occur between 14 and 22 days
- (2) Opening should occur between 7 and 13 days
- (1) Opening should occur on less than 7 days

Refer to the "Last-Minute Forecast" at the beginning of this column for the actual dates on which an opening with a specific propagation index is likely to occur, and the signal quality that can be expected.

3. Times shown in the charts are in the 24-hour system, where 00 is midnight, 12 is noon, 01 is 1 AM, 13 is 1 PM, etc. On the Short-Skip Chart appropriate daylight time is used at the path midpoint. For example on a circuit between Maine and Florida, the time shown would be EDT, on a circuit between New York and Texas, the time at the midpoint would be CDT, etc. Times shown in the Hawaii Chart are in HST. To convert to daylight time in other USA time zones add 3 hours in the PDT zone; 4 hours in the MDT zone; 5 hours in the CDT zone; and 6 hours in the EDT zone. Add 10 hours to convert from HST to GMT. For example, when it is 12 noon in Honolulu, it is 15 or 3 PM in Los Angeles; 18 or 6 PM in Washington, D.C.; and 22 GMT. Time shown in the Alaska Chart is given in GMT. To convert to daylight time in other areas of the USA subtract 7 hours in the PDT zone; 6 hours in the MDT zone; 5 hours in the CDT zone; and 4 hours in the EDT zone. For example, at 20 GMT it is 16 or 4 PM in New York City.

4. The Short-Skip Chart is based upon a transmitted power of 75 watts CW or 300 watts PEP on sideband; the Alaska and Hawaii Charts are based upon a transmitter power of 250 watts CW or 1 KW PEP on sideband. A dipole antenna a quarter-wavelength above ground is assumed for 160 and 80 meters, a half-wave above ground on 40 and 20 meters, and a wavelength above ground on 15 and 10 meters. For each 10 dB gain above these reference levels, the propagation index will increase by one level; for each 10 dB loss, it will lower by one level.

5. Propagation data contained in the charts has been prepared from basic data published by the Institute for Telecommunication Sciences of the U.S. Dept. of Commerce, Boulder, Colorado 80302.

CQ Short-Skip Propagation Chart July & August 1996 Local Daylight Savings Time At Path Mid-Point

Band (Meters)	Distance Between Stations (Miles)	Distance Between Stations (Miles)			
		50-250	250-750	750-1300	1300-2300
10	Nil	08-10 (0-1)	08-10 (1)	08-10 (1-0)	
		10-14 (0-3)	10-14 (3)	10-14 (3-0)	
		14-18 (0-1)	14-18 (1-2)	14-18 (2-0)	
		18-22 (0-2)	18-22 (2-3)	18-22 (3-0)	
		22-08 (0-1)	22-08 (1)	22-08 (1-0)	
15	Nil	08-10 (0-2)	08-10 (2)	08-10 (2-0)	
		10-14 (0-3)	10-14 (3)	10-14 (3-0)	
		14-18 (0-2)	14-18 (2)	14-16 (2-0)	
		18-20 (0-3)	18-20 (3)	16-18 (2-1)	
		20-22 (0-2)	20-22 (2)	18-20 (3-1)	
20	10-00 (0-1)	07-10 (0-2)	07-10 (2)	07-10 (2)	
		10-16 (1-4)	10-16 (4)	10-16 (4-2)	
		16-21 (1-3)	16-19 (3)	16-19 (3)	
		21-00 (1-2)	19-21 (3-4)	19-21 (4)	
		00-07 (0-1)	21-00 (2-3)	21-23 (3-2)	
		00-07 (1-2)	23-00 (3-1)		
			00-05 (2-0)		
			05-07 (2-1)		

40	08-12 (1-2)	08-10 (2-3)	08-10 (3-1)	08-10 (1-0)
	12-16 (1-4)	10-12 (2)	10-16 (2-0)	10-16 (0)
	16-20 (2-4)	12-16 (4-2)	16-18 (3-1)	16-18 (1-0)
	20-23 (1-2)	16-18 (4-3)	18-21 (4-3)	18-21 (3-2)
	23-08 (0-1)	18-20 (4)	21-23 (4)	21-06 (4)
		20-23 (2-4)	23-06 (3-4)	
		23-08 (1-3)	06-08 (3)	
80	07-12 (3-4)	08-10 (4-1)	08-10 (1-0)	08-19 (0)
	12-17 (4-3)	10-12 (4-0)	10-17 (0)	19-21 (1-0)
	17-22 (4)	12-17 (3-0)	17-19 (0-1)	21-23 (2-1)
	22-05 (3-4)	17-19 (4-1)	19-21 (2-1)	23-04 (4-3)
	05-07 (3)	19-21 (4-2)	21-23 (3-2)	04-05 (4-2)
		21-23 (4-3)	23-05 (4)	05-06 (3-1)
		23-05 (4)	05-07 (3)	06-07 (3-0)
		05-07 (3)	07-08 (2-1)	07-08 (1-0)
		07-08 (4-2)		
160	18-19 (1-0)	19-20 (1-0)	21-22 (1)	21-23 (1-0)
	19-20 (1)	20-21 (2-0)	22-01 (2-1)	23-01 (1)
	20-22 (3-2)	21-22 (2-1)	01-04 (2)	01-06 (2-1)
	22-00 (4-3)	22-00 (3-2)	04-06 (3-2)	06-07 (1-0)
	00-06 (4)	00-04 (4-2)	06-07 (1)	
	06-08 (3-2)	04-06 (4-3)	07-08 (1-0)	
	08-09 (1)	06-08 (2-1)		
	09-10 (1-0)	08-09 (0-1)		

HAWAII July & August 1996 Openings Given in Hawaiian Standard Time

To:	15 Meters	20 Meters	40 Meters	80 Meters
Eastern USA	12-14 (1) 14-15 (2) 15-16 (1)	02-05 (1) 05-07 (2) 07-14 (1) 14-16 (2) 16-18 (3) 18-19 (2) 19-20 (1)	18-20 (1) 20-00 (2) 00-02 (1)	20-21 (1) 21-23 (2) 23-01 (1)
Central USA	09-13 (1) 13-17 (2) 17-19 (1)	04-05 (1) 05-07 (3) 07-09 (2) 09-13 (1) 13-16 (2) 16-18 (4) 18-19 (3) 19-20 (2) 20-22 (1)	18-21 (1) 21-22 (2) 22-01 (3) 01-02 (2) 02-03 (1)	20-22 (1) 22-01 (2) 01-02 (1) 21-02 (1)*
Western USA	08-09 (1) 09-11 (2) 11-13 (1) 13-15 (2) 15-17 (3) 17-18 (2) 18-19 (2) 14-16 (1)**	04-06 (1) 06-08 (2) 08-11 (3) 11-15 (2) 15-16 (3) 16-18 (4) 18-19 (3) 19-20 (2) 21-23 (1)	18-19 (1) 19-20 (2) 20-22 (3) 22-02 (4) 02-04 (3) 04-05 (2) 05-06 (1)	19-20 (1) 20-22 (2) 22-02 (3) 02-03 (2) 03-04 (1) 23-03 (1)*

ALASKA July & August 1996 Openings Given in GMT

To:	15 Meters	20 Meters	40 Meters	80 Meters
Eastern USA	Nil	12-15 (1) 22-01 (1) 01-03 (2) 03-05 (1)	07-10 (1)	Nil
Central USA	00-03 (1)	13-16 (1) 23-01 (1) 01-04 (2) 04-05 (1)	08-12 (1)	Nil
Western USA	02-05 (1)	14-16 (1) 16-18 (2) 18-00 (1) 00-02 (2) 02-05 (3) 05-06 (2) 06-08 (1)	07-09 (1) 09-13 (2) 13-15 (1)	10-13 (1)

*Indicates best time to listen for 160 m openings.
**Indicates best time for 10 meter openings.
For 12 m openings interpolate between 10 and 15 m openings.
For 17 m openings interpolate between 15 and 20 m openings.
For 30 m openings interpolate between 40 and 20 m openings.
Note: The Alaska and Hawaii Propagation Charts are intended for distances greater than 1300 miles. For shorter distances, use the preceding Short-Skip Propagation Chart.

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daily show the energy being received at the mean distance between the sun and earth, and are valid throughout the world.

July Propagation

With longer hours of daylight and the sun high in the northern sky, HF propagation conditions should be considerably more stable during July than they were during the spring months.

Twenty meters should be the optimum band for DX propagation during the month. The band should remain open to one area of the world or another from sunrise through midnight, and at times almost around the clock. Peak conditions should take place for several hours after local sunrise, and again during the late afternoon and early evening hours. During these peak periods 20 meters may be open in almost all directions at the same time.

With declining solar activity and the dol-

drums of summertime propagation, not much DX propagation is expected on 15 and 17 meters, and even less on 10 and 12 meters. Fifteen and 17 meters should still open fairly frequently towards the south. Short-skip openings into the Caribbean area and Central America may be possible as early as 10 AM. Longer skip openings should take place later in the day, between 3 and 6 PM local daylight time. The bands may open occasionally during the late afternoon to Africa, and during the early evening to the Pacific area and Australasia. On 10 and 12 meters the only DX looks like short-skip openings during the day towards the Caribbean and Central America and a very occasional longer skip opening towards South America during the afternoon.

During the hours of darkness, 30 and 40 meters should open to many areas of the world, but seasonally high static levels may often mar DX reception. High static levels are also ex-

pected to hinder DX conditions on 80 meters, although some good long-distance openings are forecast during the hours of darkness. Not many DX openings are expected on 160 meters during July because of seasonally high levels of static and solar absorption.

Peak Short-Skip Conditions

This month's column contains Short-Skip Propagation Charts for July and August, as well as charts centered on Hawaii and Alaska. The Short-Skip Chart contains propagation forecasts for distances between 50 and 2300 miles from your transmitting locations.

Short-skip propagation conditions are expected to be optimum during July as a result of a seasonal peak in sporadic-E propagation. During the daylight hours considerable short-skip openings are forecast for 10, 12, 15, and 17 meters over distances ranging between approximately 500 and 1300 miles, with some openings extending out to beyond 2000 miles. Around-the-clock short-skip openings are expected on 20 meters between distances of 300 and about 2300 miles. Conditions on 20 meters should peak during the late afternoon and the early evening.

Good daytime short-skip openings on 30 and 40 meters are forecast for distances between 100 and 750 miles, with good nighttime openings expected between 250 and 2300 miles. Conditions on 80 meters are also expected to be good during the daylight hours, with openings up to approximately 300 miles. During the hours of darkness good openings should be possible up to the one-hop limit of 2300 miles. While no short-skip openings are expected on 160 meters during the daylight hours, some good openings should be possible during the hours of darkness up to at least 1300 miles and as long as 2300 miles.

VHF Ionospheric Openings

The best bet for ionospheric openings on 6 and 2 meters during July should be during periods of very intense sporadic-E propagation. Fairly frequent 6 meter openings should be possible over distances ranging between approximately 600 and 1300 miles, with some openings extending out to about 2000 miles, and possibly beyond. Few 2 meter openings are expected, but some could take place between 1000 and 1300 miles as a result of sporadic-E ionization. While sporadic-E openings can take place at just about any time, statistics indicate that conditions for 6 and 2 meter openings peak for a few hours before noon and again during the late afternoon and early evening. During July you can expect openings on 6 meters on three out of four days. Openings may last from a few minutes up to several hours. Considerably fewer openings are expected on 2 meters.

Some VHF meteor activity should take place during the *Delta Aquarids* shower. This is a major shower which should occur between July 29 and 31, peaking at 2 AM EDT on the 30th with a meteor count of about 20 an hour.

Some VHF openings are also likely to occur during auroral activity. Check the Last-Minute Forecast at the beginning of this column for periods that are expected to be Disturbed or Below Normal during July. These are the dates on which auroral-type short-skip openings are likely to occur on the VHF bands.

73, George, W3ASK

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

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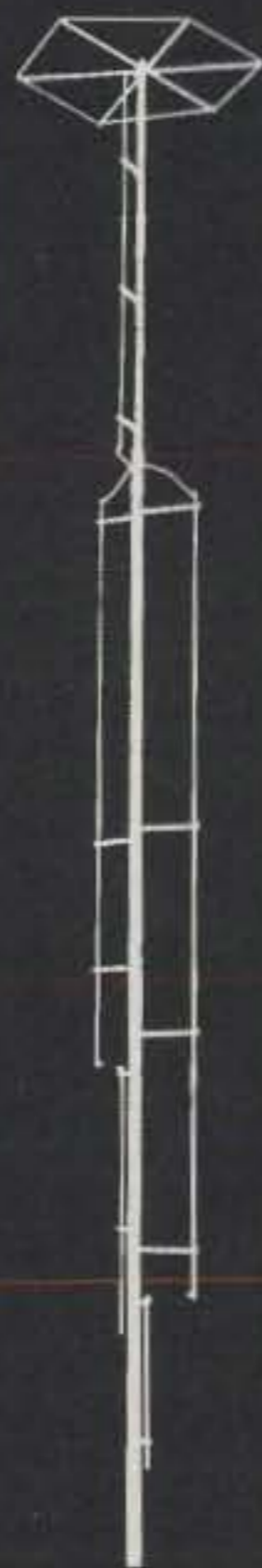
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GAP: THE PERFECT ANTENNA

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



Voyager DX



Challenger DX



Eagle DX

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

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

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

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

The secret is out and people in the know say:

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

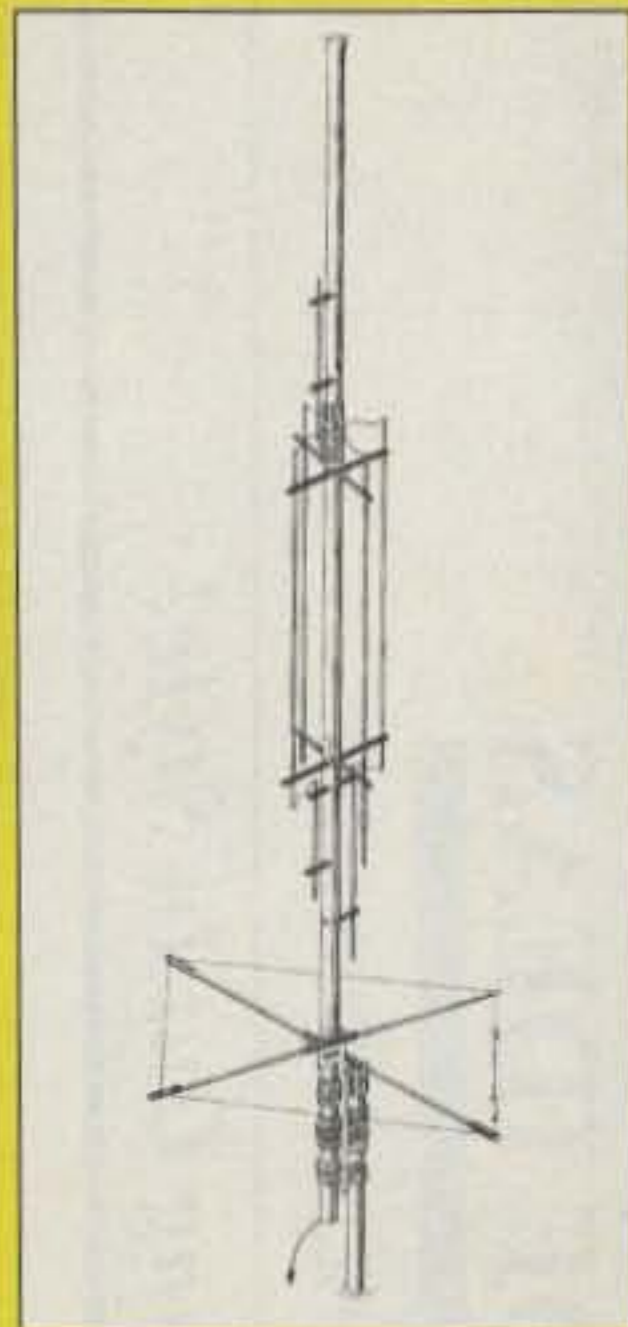
73—"This is a real DX antenna, much quieter than other verticals."

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

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

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

New Release: TITAN DX



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

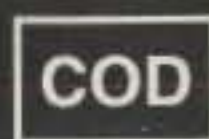
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	2m	6m	10m	12m	15m	17m	20m	30m	40m	80m	160m					
Challenger DX	■	■	■	■	■		■		■	■		31.5'	21 lbs	Drop In Ground Mount	3 Wires @ 25'	\$259
Eagle DX			■	■	■	■	■		■			21.5'	19 lbs	1-1/4" pipe	80" Rigid	\$269
Titan DX			■	■	■	■	■	■	■	■		25'	25 lbs	1-1/4"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

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Mobiling '96: Rolling Out In Style!

Warm weather is bringing out more than sunshine and flowers this year. Mobilers are back on the road, and they are sporting some really neat setups to boot. Yes, summer has returned, the bands are perk-ing up more each day, and hamming on wheels is once again back in vogue.

Say you are more than ready for a cheerful change of pace? Big-time mobiling could well be the answer! Where are some good areas for traveling or visiting? Anywhere upbeat, of course! If you live within a two or three hour drive of a coastal area, weekend island hopping on a mini IOTA expedition is always a blast. Alternately, you might check out a few of the new casinos springing up around the country (watch the gambling, however; those folks play with real money!). Actually, you need not be trekking along a highway or byway to enjoy mobiling fun. A car is simply a convenient way to carry your ready-to-operate setup anywhere you go. "Stationary mobiling" also has its own attractions and benefits! You only live once, so make every day special!

What are the hot topics in mobiling today? New cars, new rigs, and new antennas (always antennas!), naturally! The word "new" usually means "changes" (which we amateurs interpret as "adapt or modify and come out even better"), so this month and next month we will highlight a variety of ideas to help you put together the best mobile setup yet. Use them in a mix-and-match manner as suits you.

Let's start with information on a terrific new antenna and some custom mounts, and then progress to notes on vehicles and rigs. Buckle up. We're once again moving at a fast pace to get in all the details possible!

Fortex's "Big Daddy" Antenna

Say you're familiar with most of today's popular mobile antennas, but don't recognize the tall, elaborate-looking job shown in photo 1? Well, meet the new all-band, super-performing Stealth designed by Jim Blankenship, KN4TV, Vice-President of Fortex Enterprises, Inc. (7712-b Timberlake Road, Lynchburg, VA 24502; telephone 804-239-6524). It's quite large, but is a real romper. The Stealth stands 10 feet 2 inches tall as shown. Its design is similar to bugcatcher-type antennas (center loading with an open-air coil, tall whip, and base impedance-matching coil), but this one is not susceptible to weathering, detuning, and mobiling damage like a regular bugcatcher-type.

The lower mast section, top whip, and all metal parts are stainless steel. Even the springs in the snap-in coil taps are stainless steel. This thing is built to last a lifetime! The lower mast section is one inch in diameter with a wide flange on each end for extra surface strength and support. In fact, it is almost strong

enough to pull a trailer. Obviously, it can handle the largest coil and whip you could put on a car. The loading coil is 5 1/2 inches in diameter, high Q, low loss, made of stainless-steel tempered spring stock, and wound on a framework you can stand on (photo 2). Nothing seems to affect it—not heavy rain, ice, highway winds, or tree-limb bangs. Machine work in the coil's upper and lower fittings is exquisite. The base impedance-matching coil is also built like a battleship and has a frame that seems indestructible (photo 3). Finally, the optional quick disconnect is five times more solid than usual and has a massive locknut. I do not mean to sound nutty over this antenna, but it really is awesome.

Fortex Enterprises, Inc. makes the Stealth in several versions. The usual version (featured in this month's photos) works 80 through 15 meters. A shorter whip can be used for 10 meters. An optional coil is available for 160 meters. It can also be tapped for 80 and 40 meters, but a shorter coil is desirable for optimum "Q" on the upper frequency bands. Finally, the mast and whip are available in a low-profile matte finish or a mirror polished finish to fit your preference.

So how do you install an antenna of such magnitude on one of today's new "bumper-less" cars? Fortex also makes custom bolt-to-



Photo 1— There's no better way to enjoy mobiling than with a snazzy car, a neat new rig, and a killer new antenna. The "blow 'em all away" radiator shown is the custom-made Stealth produced by Fortex Enterprises, Inc., and it gets out great! (Photo by Joe Veras, N4QB)



Photo 2— Close-up view of center loading coil in the Fortex Stealth antenna. The coil, taps, and all fittings are stainless steel. The item is 7 1/2 inches tall, 5 1/2 inches in diameter, and covers 80–15 meters. (Photo courtesy N4QB)

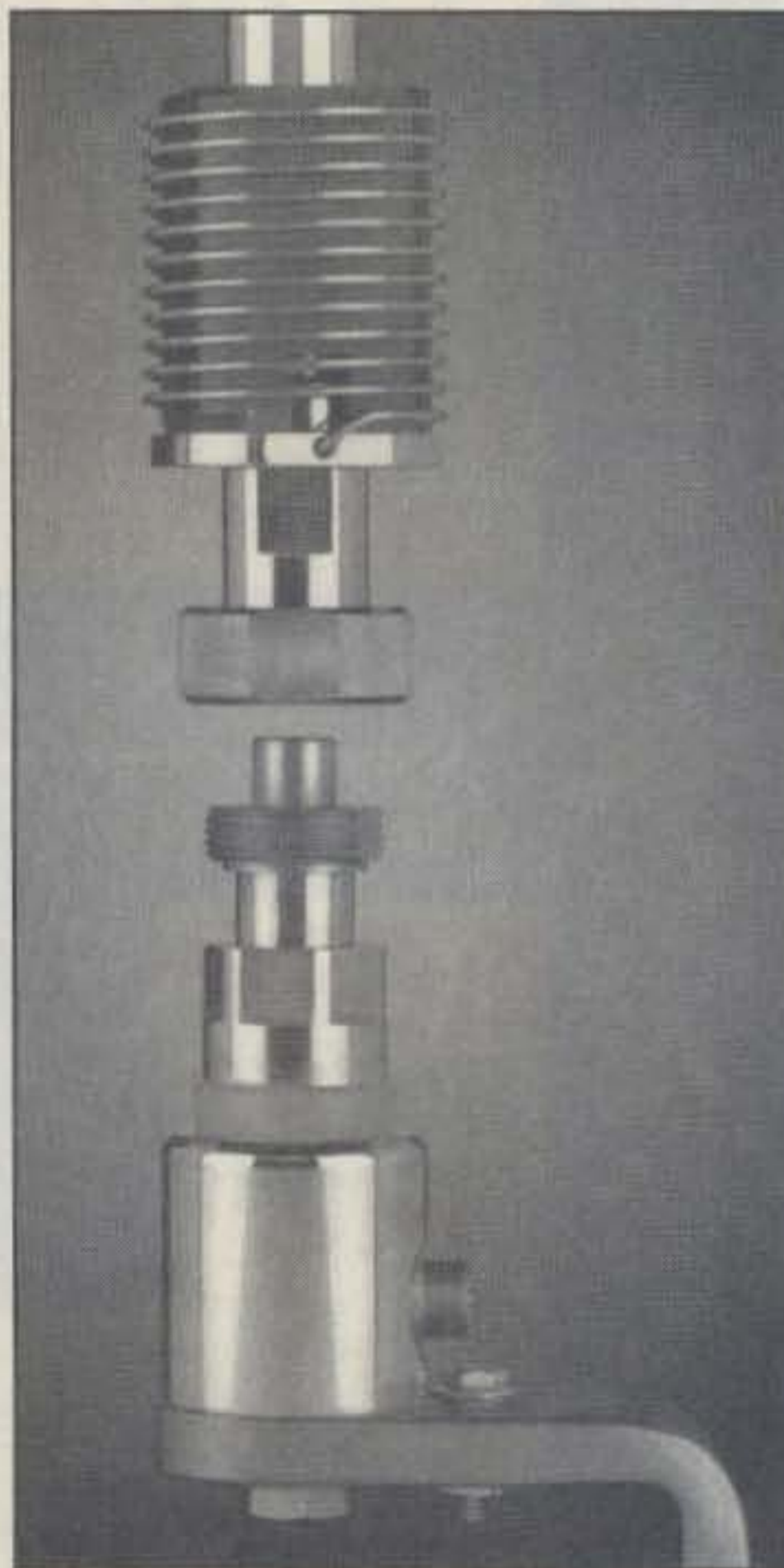


Photo 3— This close-up and "exploded" view shows base impedance-matching coil, mast end, quick disconnect, base fitting with SO-239, and part of custom mount in new Fortex Stealth antenna. (Photo by Joe Veras, N4QB)

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on filtering. The TS-870S has several filter positions already in place ranging from 1000 hz to 50hz bandwidth on CW, 6khz to 800 hz bandwidth on SSB, AM, FM, or FSK. The Kenwood TS-870S is fully computer-controllable through a built-in 57.6 Kbps interface and Microsoft Windows compatible software (supplied). You can expand the functionality of the rig by setting up virtually any combination of settings (including on/off control) for frequencies, bands, modes, and any other parameters with this software program. It also features a built-in Logikey Keyer with 4 programmable memories, CW pitch control, CW reverse mode, 100 watt output, automatic antenna tuner, Advanced Intercept Point (AIP), Multiple scanning modes including group scan for the 100 memories, menu function control of DSP and 69 other functions, receiver antenna input for hookup for an external receiver to a dedicated connector to access other frequencies on the same antenna being used by the TS-870S, quick memory, TF-set (transmit Frequency Set), dual antenna terminals for (2) differ-



TS-850S/AT

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Compact Mobile

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Photo 4—My custom Forex mount bolts to the car's underbody frame, contours around the bumper area, supports any size antenna, and solves an otherwise impossible problem.

frame mounts, and they are superb. Two examples are shown in photos 4 and 5. My mount saddles the car's main square channel frame, bolts through existing holes, angles around the bumper area, and has a massive base fixture for the antenna. It is painted to match the car and actually adds sharp "ham class" to the

vehicle—honest! Fortex did such an accurate job of making the mount that I installed it in 30 minutes using only a rubber mallet and open-end wrench. Photographer Joe Veras, N4QB, has a Mercedes, so Fortex made his mount to clamp onto the rear bumper's inside frame (steel). It too snapped right into place. Clever!

How does the Fortex Stealth perform, you ask? Like a champ, naturally! It pumps out a rollicking good signal and has a noticeable "big signal" advantage over smaller mobile antennas. It has only been on my Camaro for a short time, but I have already worked some good DX with it, and I am confident it will radiate a killer signal while vacationing and IOTAing after writing this column (more details later). Meanwhile, I feel quite confident recommending that anyone who wants a really hot mobile antenna should ring up Jim Blankenship, KN4TV, and the crew at Fortex.

New Cars, New Transceivers

Interior space in new cars seems to be decreasing more every year, and installing a medium-size transceiver in console-equipped vehicles has become a formidable challenge in personal ingenuity. The days of bolting a simple mount under a dash or strapping a rig to the front of a seat are rapidly fading in the sunset. Fortunately, full-featured mini transceivers with removable front panels are now available from several manufacturers. Larger "removable" rigs such as Yaesu's FT-900 are



Photo 5—Joe Veras's custom Fortex mount looks somewhat similar to mine, but it clamps to the steel bumper's inside frame rather than a body frame channel. The Fortex mounts are the best we have ever seen. (Photo by N4QB)

popular for semi-permanent installations (sit the main unit behind or under a seat, and then buy a second control panel for in-house use). Smaller transceivers such as Kenwood's TS-50, ICOM's IC-706, and Alinco's DX-70 are ideal for squeezing in and out of limited spaces, so the complete rig can easily be

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Photo 6—The vertical or "front section" of my new car's console blocked all available rig mounting space, so XYL WB4OEE and I replaced it with a homebrewed mounting shelf. The shelf can supporting almost any new mini transceiver (see text). (Photo by N4QB)



antenna's PL-259 shell. This step ensures solid grounding right at the rig, minimizes RF feedback, and streamlines transceiver hookups.

The "mount" is presently in use and working out fine, but refinements continue. By the time this column appears in print, I should have added metal braces with mounting "ears" so two transceivers can be slid in or out of the console in a flash. Cardboard side covers upholstered with cloth to match the interior and a small 12 volt fan to aid rig cooling will round out the dash setup. Will the expansions stop

there? Probably not, but I'll keep you posted on my quest for perfection. I plan to adapt one of the new computer "big chip" cooling fans that snap onto high-speed CPUs for rig cooling, as they are inexpensive, small, and easy to mount (photo 7). The key to successfully using these fans is positioning them to help a transceiver's internal fan (usually by pushing fresh air into top or bottom "breathing slots" or pulling hot air from the rear heat sink) rather than blowing hot air back into the rig. Miniature fans are great, but must be used properly.

Photo 7— Ultra-small 12 volt DC fans such as those used on computer CPU chips are ideal for moving extra air to help internal cooling fans of transceivers that are squeezed into tight places.

moved around for fixed, mobile, and portable operations. Every mobile setup is unique and we all learn from looking at arrangements of others, so let's now discuss a couple of interesting setups.

My own arrangement for quick and easy setup and operation with various HF and VHF transceivers in my 1996 Chevy Camaro is shown in photo 6. I removed the center console's vertical section (which was held in place by one bolt and four small plastic rivets). Then XYL WB4OEE made a small platform to straddle the transmission hump and serve as a rig mounting shelf. A small bungee cord that could hook under edges of the gearshift lever's console was then added to secure a transceiver on the cloth-covered platform. Next a section of black cloth to cover the rig's front and sides when the car was left unattended was attached under the dash with Velcro® straps. Finally, a flexible braid strap was added between a frame-attached brace (originally used to secure the console's vertical section) and the



Photo 8— Rather than replacing his car's vertical/front console, W4CEC made a custom rig platform that fits into an existing groove. It is held steady by a vertical dowel and a small angle bracket at the rear. When not in use, a cover matching the dash fits over the transceiver (more details in text).

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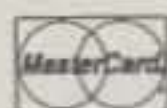


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When I removed the previously discussed vertical section of the car's center console, incidentally, I was quite surprised to find a very small gauge wire connected to the cigarette lighter socket (like most cars, it was also fused at 20 amps!). The wire disappeared into a tight squeeze between the carpet and the floor with only a light wrap of masking tape for protection. I'm convinced such wimpy wiring is a total fire hazard, and such cost-cutting measures are ridiculous enough to soon appear in many other models of cars. I thus encourage all amateurs to connect/cable any rig running over 10 watts directly to the battery rather than the cigarette-lighter socket, especially when mobiling in an unfamiliar rental car. A word to the wise should be sufficient!

The previous story described how I solved the center console entanglement in my car (I removed it). A good friend, Erskine Jackson, W4CEC, took an alternate approach by working/building around his car's console, and his arrangement came out even better (photo 8). Close investigation of the (1992 Pontiac Grand Am) interior revealed a small yet distinct groove between the upper end of the console's vertical section and the main dash. Erskine fitted a half-inch thick sheet of wood in the groove, visualized it serving as a shelf for his transceiver, and noted his wrist fell right where a tuning knob would be when using the armrest. He then measured the platform's height above the gearshift and the rig's dimensions, and cut a wood platform to size. After covering the platform with material to match the dash, he cut and painted a wood dowel for a front brace. A short "extension cord" was then made for the rig's DC cable so that when the transceiver was removed, the extension could be unplugged and the main DC cable slipped back out of view behind the console. The brace could then be popped out, the platform removed from its groove, and *viola*—everything returned to original condition. As a final topping, Erskine added an 83-1AP right-angle SO-239 adapter for easy antenna connection and modified the above-rig vent so half of its air conditioning cools the rig while the other half cools the operator.

Photos cannot give the full details of W4CEC's overall setup. It was a work of amateur radio art. I say "was" because Erskine recently traded vehicles. He promised to share views of his new super-custom installation in a '96 Dodge Caravan soon. Hopefully, they will be ready for Part II next month.

Mobile Rig Protector

The day after writing our "cockpit stories," a new company known as Lynics sent us a sample of their lightning surge protector (photo 9). Company president Kiyoshi Endo, AE4EZ, explained the item's most appealing feature is protecting a home station transceiver from harmful voltage surges (those often-overlooked static discharges produced by large lightning bolts). These static surges can peck microscopic holes in transistor bases of "front end" stages until copying DX or even semi-weak stations eventually becomes impossible. Kiyoshi also explained the item's secondary benefit is protecting a receiver's RF stages from loss of sensitivity due to neighborhood stations transmitting on adjacent frequencies



Photo 9—The new Lynics lightning surge protector is designed for home/base-station use, but it strikes me as a "natural" for mobiling. In addition, it provides a convenient "no fumbles" solution to rig grounding.

and bands (yes, off-frequency RF can be harmful to your transceiver).

The old "radio logic" then hit me right between the headlights. Mobile stations are subjected to everything from surprise thunderstorms to operation close to other mobile stations, but we seldom remember or have time to disconnect the antenna to avoid "front end abuse." A Lynics surge protector could be a real life saver for mobile rigs, too! An ounce of prevention is worth a pound of cure, right? Installing one is a cinch: Just plug your antenna cable into it, plug it into your transceiver, then connect a ground strap between its shell-attached screw and the car's frame. Every mobile setup needs a good at-transceiver ground to minimize RF feedback, so the Lynics surge protector serves two quite beneficial purposes with one easy hookup. The unit works from HF to 1 GHz with very low loss and handles up to 1 KW.

Although Lynics is a new name to U.S. amateurs, the company is a leading manufacturer of RF connectors and lightning surge protectors in Japan. They have now expanded into the U.S. and are selling direct to amateurs and dealers. You can order a protector by contacting Lynics International Corp. at 8 Amberjack Blvd., Suite 362, Newnan, GA 30265 (telephone 770-251-2235).

Before wrapping up this month's column, one additional tidbit of information warrants sharing—namely, how I achieved the high-gloss finish on my mobile chariot shown in photo 1. I have always applied plenty of "elbow grease" waxing to my cars to maintain a showroom (or better!) condition, but like many of you I'm sure, I seem to run out of steam and have less time for chores each year. I recently discovered "Slick Finish," a unique urethane wax made and sold by well-known car detailer Leonard Slick here in Birmingham. It is super quick and easy to apply, produces a killer gloss, and protects like crazy. If you appreciate a sharp-looking cat, ring up Mr. Slick at 205-252-6221 and try a bottle. Over the years I have tried all kinds of super waxes and have found Slick Finish tops!

Conclusion

That winds up this month, gang, but there are more mobiling ideas and new product information coming in Part II next month. Stay tuned, keep 'em between the lines, and let's QSO mobile-to-mobile on 30 CW or 20 SSB.

73, Dave, K4TWJ

Announcements (from page 6)

Bastow, N4KVF, 3045 High Rock Rd., Gold Hill, North Carolina 28071 (704-279-3391 until June 28; 803-266-7900 after June 28).

July 7, **5th Annual Columbiana County Hamfest & Computer Show**, Columbiana County Fairgrounds, Lisbon, Ohio. Send SASE to Dick Sisley, K8JKB, 1218 Northside Ave., East Liverpool, OH 43920 (1-330-385-1245).

July 7, **17th Annual Wilkes-Barre Hamfest**, Luzerne County Fairgrounds, Dallas, Pennsylvania. Contact Bob Michael, WB3FAA, at 717-288-3532; or Mike Benish, K3SAE, at 717-388-6863. (Exams.)

July 13, **Swapfest '96**, American Legion Post 434, Oak Creek, Wisconsin. Send SASE to South Milwaukee ARC, Inc., P.O. Box 102, South Milwaukee, WI 53172-0102. (Exams.)

July 14, **18th Annual Sussex County Hamfest**, Sussex County Fairgrounds, Augusta, New Jersey. Contact Daniel Carter, N2ERH, 8 Carter Lane, Branchville, NJ 07826 (201-948-6999). (Handicapped accessible.)

July 14, **North Hills ARC 11th Annual Hamfest**, Northland Public Library, Pittsburgh, Pennsylvania. Contact John W. Sibenac, KE3PI, 216 Kinvara Drive, Pittsburgh, PA 15237 (412-487-2740). (Handicapped accessible.)

July 14, **The Fox River Radio League Hamfest**, Waubensee Community College, Sugar Grove, Illinois. Contact Diana Skube, WD9API, c/o FRRL, P.O. Box 673, Batavia, IL 60510 (708-293-7485). (Exams.)

July 14, **The Mid-Atlantic ARC Hamfest '96**, Kimberton Fire Co. Fairgrounds, Kimberton, Pennsylvania. Contact Bob Haase, W3SA, 610-293-1919; or fax 610-293-7688; e-mail wb3joe@voicenet.com; or write to MARC, P.O. Box 352, Vallanovia, PA 19085.

July 20, **24th Annual Cary, NC Mid-Summer Swapfest**, Cary Community Center, Cary, North Carolina. Contact Cary ARC, P.O. Box 53, Cary, NC 27512 (SASE). (Exams 11 AM; contact Vince Yakamavich, AA4MY, 220 Carriage Trail, Raleigh, NC 27614.)

July 19-21, **ARCA Ft. Tuthill Hamfest**, Coconino County Fairgrounds, Flagstaff, Arizona. Contact the Amateur Radio Council of Arizona, P.O. Box 32756, Phoenix, AZ 85064-2756; phone 602-440-2039; fax 602-439-4484; e-mail arcathill@aol.com. (Exams.)

July 20, **NOARSFEST '96**, Lorain County Fairgrounds, Wellington, Ohio. Contact Stan Zupan, AA8IN, 32549 Walker Rd., Avon Lake, OH 44012-2228; phone 216-933-4261 (before 9:30 PM); or e-mail 75131.3561@compuserve.com. (Exams.)

July 21, **RCARC Summerfest '96**, at the Bald Hill Cultural Center, Farmingville, New York. Contact Scott Johnson, N2ZKB, 516-395-2263; Emil Tilolona, KD1F, at 516-696-0610; or John Mark, KB2QQ, at 516-689-6343.

July 21, **Indiana County ARC 4th Annual Summerfest/Computer and Ham Radio Fair**, Red Barn Sportsman Club, near Homer City, Pennsylvania. Contact Bill McMillen, KE3QM, RD2, Box 157AB, Marion Center, PA 15759 (412-397-2702).

July 21, **Van Wert ARC Hamfest and Computer Show**, Van Wert County Fairgrounds, Van Wert, Ohio. Call Bob High, KA8IAF, 419-795-5763 (before 5 PM); or Bob, WD8LPY, 419-238-1877 (after 5 PM). (Exams by preregistration; call or send SASE to Bob High, 12838 Tomlinson Rd., Rockford, OH 45822.)

July 26-27, **Milton ARC Hamfest/Swapmeet**, Santa Rosa County Auditorium, Milton, Florida. Contact Don Sams, KE4FSC, 904-983-9518; or Mark McAnally, KE4QKN, internet at KE4QKN@aol.com.

July 26-27, **23rd Annual Ham Holidays '96**, Oklahoma State Fair Park at the Hobbies, Arts & Crafts Building, Oklahoma. Write to Ham Holidays '96, P.O. 95942, Oklahoma City, OK 73143; or e-mail to nilpn@aol.com. (Exams.)

July 27, **Sugar River Amateur Radio Festival**, Sugar River Community Room and Town Common, Newport, New Hampshire. Call Rob, N1CIR, 603-863-5383. (Exams.)

July 27, **5th Annual "Last Minute" Hamfest**, USF Tampa Campus, Tampa, Florida. Call 813-979-0033; e-mail douglass@suntan.eng.usf.edu; or write to USF Radio and Electronics Club, 4202 E. Fowler Ave., Ctr. 2416, Tampa, FL 33620. (Exams.)

July 27, **21st Annual MARC Hamfest**, Midland Community Center, Midland, Michigan. Write to MARC Hamfest, P.O. Box 1049, Midland, MI 48641 (SASE), or call 517-832-3053 (eves or weekends). (Exams.)

July 27-28, **HamCation**, Bahia Shrine Temple, Orlando, Florida. Call Cecil F. Morehouse, K4KEN, 407-281-9169. (Exams.)

July 28, **Ashtabula County Hamfest and Computer Show**, Nappi's Party Center, Ashtabula, Ohio. Contact Ken Stenback, A18S, 722 Lyndon Ave., Ashtabula, OH 44004 (216-964-7316 eves. and weekends before 9 PM).

July 28, **1996 Batavia, New York Hamfest**, Alexander Firemen's Grounds, Alexander, New York. Send LSASE to Barb Carlson, 26 Burke Drive, Batavia, NY 14020, or call 716-343-5580.

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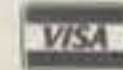
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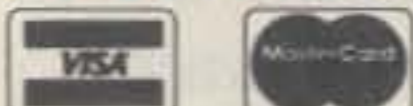
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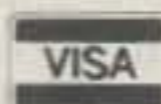
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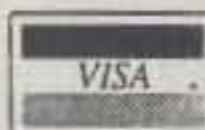
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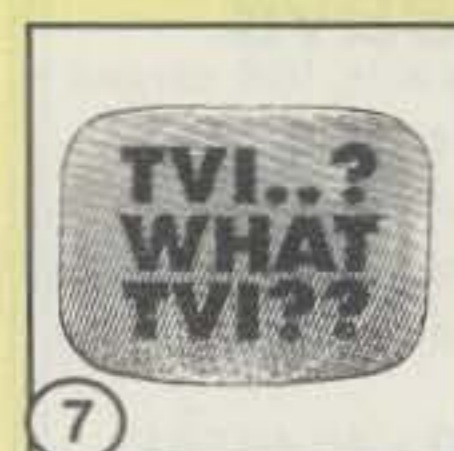
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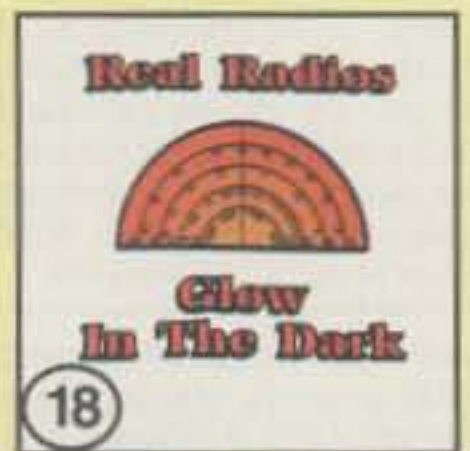
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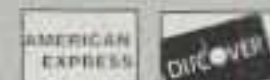


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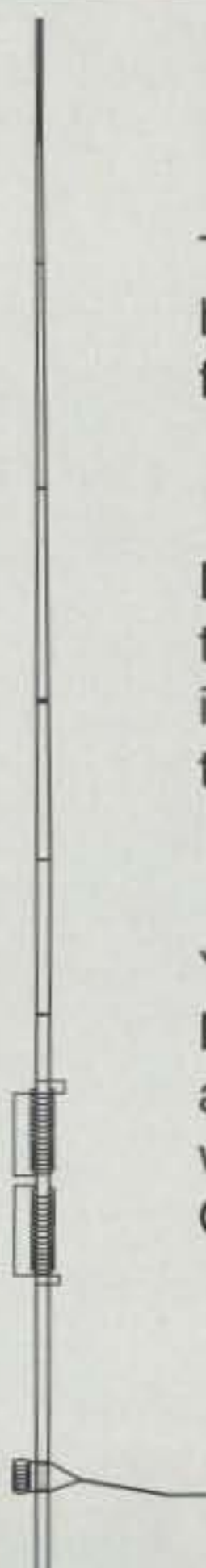
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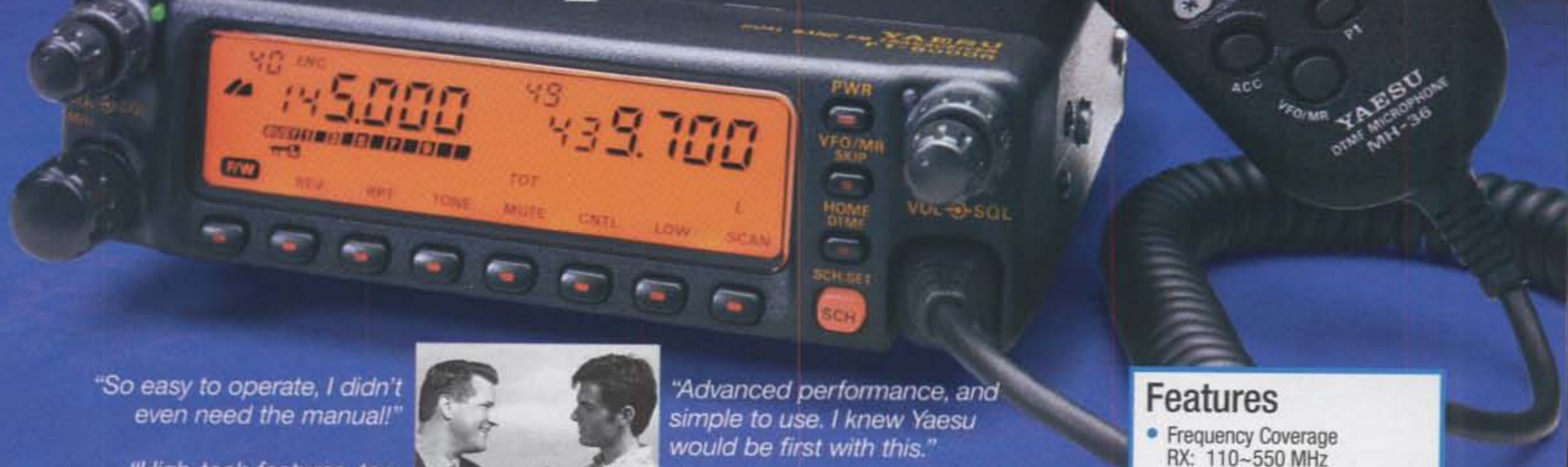
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- Fast/Slow AGC
- High Dynamic Range/Low Distortion
- Built-in Electronic Keyer
- Direct Keyboard Entry
- Hand Microphone Included (HM-36)
- Computer Control Port (CI-V)

NEXT GENERATION TECHNOLOGY

Next Generation Circuitry

DDS (Direct Digital Synthesis) ICOM's unique DDS IC is used for the LPL Circuit. High tech and compact, the PLL unit improves frequency resolution to 1 Hz step. You'll experience an analog feeling of the tuning, faster PLL lockup times, improved phase noise blocking and high dynamic range.

Next Generation Tuner

AT-170 Advanced Tuner Preset memories, in 100kHz steps, provide very high speed tuning. "Automatic re-tune" turns the AT-170 on, and tunes, when SWR exceeds 1.5:1 "Through inhibit" permits tuning at SWR conditions up to 3:1 (when your antenna can't be tuned to 1.5:1). "Sensitive/Normal" gives you the choice of minimum possible SWR or 1.5:1. This eliminates tuning each time you transmit, unless desired.

Next Generation Duty Cycle

100% Full Duty The final power amplifier outputs a stable 100 W in SSB, CW and FM modes. The aluminum die cast frame, large heatsink and innovative twin cooling fan system stabilize the PA circuit to ensure 100% duty cycle operation.

Next Generation Frequency Management

Quick Split Operation Pre-programmable offsets, simultaneous display of Tx and Rx frequencies and XFC (Transmit Frequency Change) give you a competitive edge when calling Dx stations operating split frequencies. "Split Lock" permits changes in your transmit frequency while protecting your receive frequency against accidental changes.

Next Generation CW Operation

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

*See your dealer for details

PRICE REDUCED!

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