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Amateur Radio

CQ

SERVING AMATEUR RADIO SINCE 1945

JANUARY 1998

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U.S. $3.50

0 7485

Just look at all this great stuff!"
one III, N4CH, of Goode, VA.

O AMATEUR'S JOURNAL

10, 15, 20 Meters
9 Elements on a 28 ft (8.6m) Boom
Optional 2 Element 40 Meter Kit

BIG THUNDER SERIES

X9

Boom to Mast Clamp

Element to Boom Mounting

The Performance Tribander for the DX Years Just Ahead

- **New High Efficiency Computer Optimized Design for Maximum Gain and Ultra Clean Radiating Pattern**
- **100+ MPH Construction for Best Reliability and Long Life**
- **NEW *4L Log Cell* Driven Elements for better VSWR Bandwidth**
- **Trapless Driven Elements and Reflectors for Reliable Power Handling**
- **Interleaved Element Design for Mono-Band Performance**
- **Add-on kits available for 40 Meters**

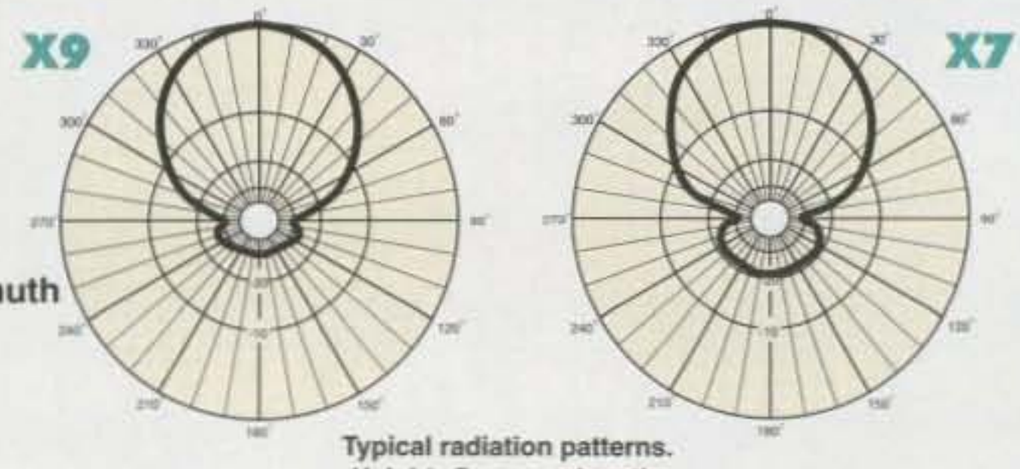
The new X9 and X7 Triband Yagis are geared to set new standards in both radiating performance and mechanical reliability. Cushcraft's product development team has employed the latest computer modeling technology to achieve a superior electrical design as well as elegant new mechanical hardware and assembly techniques.

Each mechanical component was designed to 100+ MPH wind survival with a 1.25 safety factor. Traps were eliminated from the high current driven elements and reflectors using the new *4L Log Cell* design, which yields virtual monoband performance and maximum power handling capability. Traps are employed only in the lower current directors for increased gain and sharper pattern. The result is a truly high performance antenna family which will easily handle the legal limit.

SPECIFICATIONS		X9	X7
Frequency Coverage (Meters)		10, 15, 20	10, 15, 20
Total number of Elements		9	7
Maximum Gain (dB)	20M	13.0 @ 14 deg	12.5 @ 14 deg
@ One Wavelength	15M	13.9 @ 12 deg	13.0 @ 12 deg
	10M	14.0 @ 15 deg	12.9 @ 14 deg
Maximum Front to Back Ratio (dB)		30	30
Number of Elements per Band		4	3
VSWR Minimum		1.1:1	1.1:1
VSWR 1.5:1 Bandwidth (KHz)	20M	350	600
	15M	450	750
	10M	1500	1700
Longest Element, ft (m)		36.5 (11.12)	37.2 (11.33)
Turning Radius, ft (m)		21.7 (6.61)	20.0 (6.09)
Boom Length, ft (m)		28 (8.53)	18 (5.49)
Boom Diameter, in (cm)		2-1/2 (6.35)	2-1/2 (6.35)
Maximum Mast Diameter OD, in (cm)		2-1/2 (6.35)	2-1/2 (6.35)
Maximum Wind Survival, mph (kph)		>100 (>161)	>100 (>161)
Maximum Wind Surface Area, ft² (m²)		9.9 (.92)	7.9 (.73)
Windload @ 80 mph, lb (kg)		255 (116)	202 (92)
Maximum Power Handling (KW)		2	2
Weight, lb. (kg)		85 (38.5)	60 (27.2)
List Price		$995	$675

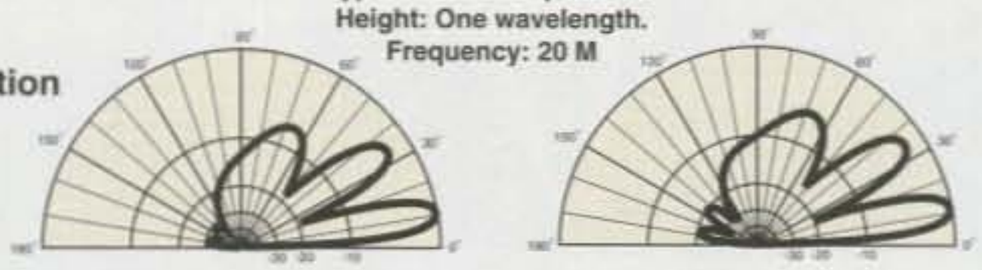
X9 X7

Azimuth



Typical radiation patterns.
Height: One wavelength.
Frequency: 20 M

Elevation



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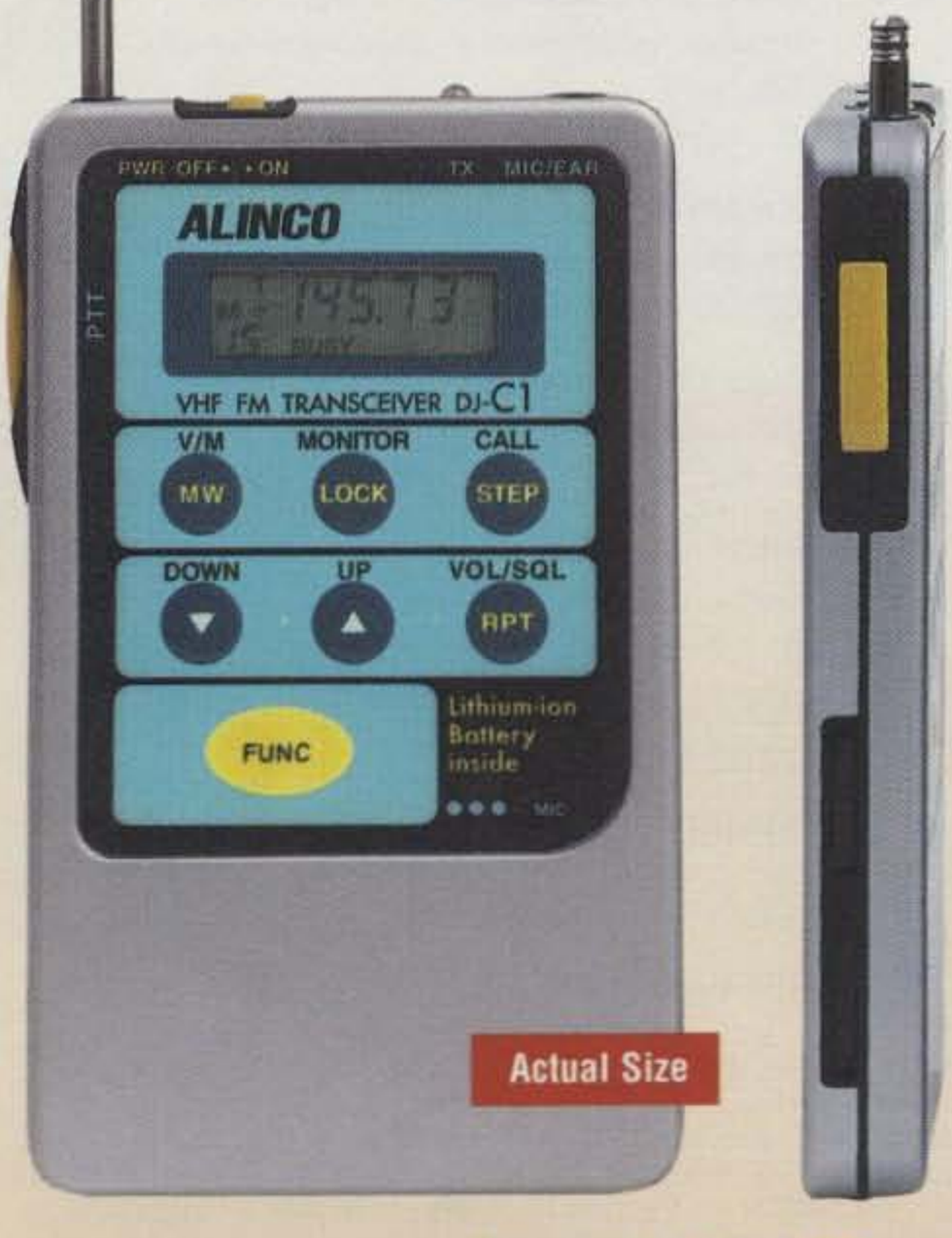
"Beyond Amazing"
Alinco Presents The Mini HT

So slim, *it hides in a shirt pocket.* Power to work repeaters many miles away. Clear, clean audio. 20 Memories plus a Call channel. And a Lithium ion battery that can go 100 hours between charges!

- 20 memories plus Call channel; each memory capable of non-standard splits
- CTCSS encode plus European tone burst
- 300 mW output
- Large capacity internal 500 mAh lithium ion battery
- Earphone/mic port
- Self-storing telescoping antenna
- Includes soft case, earphone, auxiliary wire "pocket" antenna and snap-in battery charger
- Fast 2-hour charging time
- 2.2" wide, 3.7" high, .41" deep



Actual Size

Alinco DJ-C1T 2 Meter (144 Mhz) Mini HT

- 144 ~ 147.995 MHz transmit range
- Extended receive 118 ~174 MHz including air band (AM)

Alinco DJ-C4T 70 cm (440 Mhz) Mini HT

- 420 ~ 449.995 MHz transmit range

The Alinco DJ-C1T and DJ-C4T represent breakthroughs in mini-radio technology. About the size of a credit card, one can be carried in pocket or purse. With it, you're ready to communicate anytime. Whether you're in business attire or running a marathon, these small, lightweight radios are easy to carry and easier to operate. You'll be amazed at the clean, crisp audio. The lithium ion battery is a revolution in power technology, going as long as 100 hours between charges. Be prepared to answer questions from other hams who see your DJ-C1T or DJ-C4T - even seasoned "veterans" have termed these radios "beyond amazing." The only thing we can add to that, is the low Alinco price!

Accessories Available

EDS-7 Adaptor Cable for use with speaker mics and headsets
EDC-36 Mobile charger
EMS-9Z speaker mic (requires EDS-7)
EMS-41 speaker mic (requires EDS-7)

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CQ Amateur Radio

JANUARY 1998 VOL. 54, NO. 1

FEATURES

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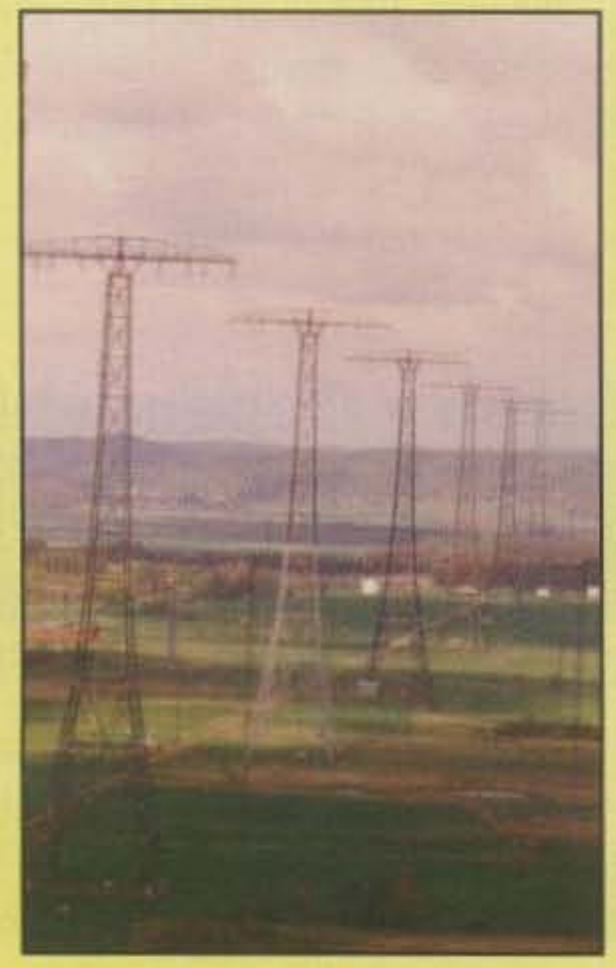

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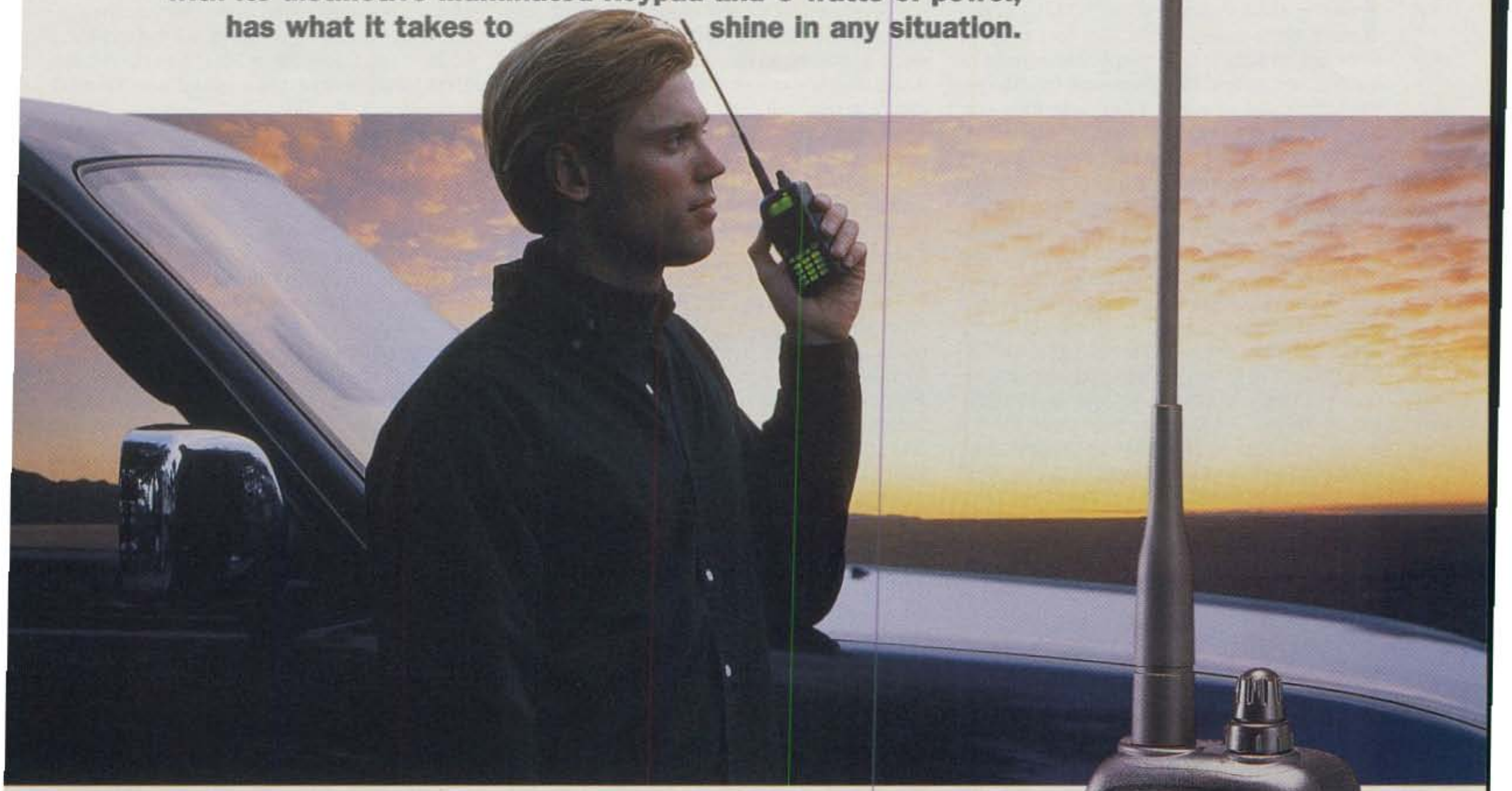
DEPARTMENTS

ON THE COVER: Herman Cone III, N4CH, shown here with his lovely wife Donna, N4RXL (a DXCC holder in her own right), at their QTH in Goode, VA. In case you haven't guessed, Herman is a bit compulsive about his amateur radio. He was first licensed in 1966 as WN4DBB, then as WB4DBB until picking up the "sanity call" in 1996. Herman is active on SSB and CW from 160 meters to 1300 MHz, has DXCC from 160 through 6 meters, and has VUCC 50–432 MHz. Herman has been building and maintaining repeaters on 5 bands for 25 years, but if there's a part of his passion we can appreciate in our own shacks, it's his passion for collecting, restoring, and operating vintage ham gear from the 1930s to the 1970s. For the past three years Herman's collection has played a major roll in the CQ Classics Calendars in magnificent photos shot by the Grand Master of still-life in ham radio photography, Joe Veras, N4QB. Thanks, Herman, for sharing your collection with thousands of fellow "old-time radio junkies." (Photo by Larry Mulvehill, WB2ZPI)

Look on the brighter side of handhelds

Kenwood's new TH-G71A dual-bander (144MHz/440MHz), with its distinctive illuminated keypad and 6 watts of power, has what it takes to shine in any situation.



TH-G71A 144/440/MHz FM DUAL BANDER

If you're looking for a compact dual-bander with all the right features, yet without the price tag that usually goes with high performance, there's no better choice than the TH-G71A.

Just hold it in your hand and it's immediately clear how well our new handheld transceiver is engineered. The ergonomic design, **illuminated keys** and **backlit display** all combine to make operation a breeze. As does the menu mode, which allows you to customize the TH-G71A by adjusting all major settings to your choice. Besides being easy to use, it also boasts extraordinary power – up to 6 watts (VHF) or 5.5 watts (UHF) of RF output (selectable) with its **high-performance antenna.** The speaker provides **powerful, refreshingly clear audio.**

Of course, power is only part of the picture. Features count. And you can count on the TH-G71A to offer what you'd only expect to find in far more expensive HTs. There are **200 memory channels** – allowing you to store transmit and receive frequencies independently. Memory data can even be edited and stored on your PC. Multiple scan functions are available, including programmable band scan, memory scan with memory channel lock-out, MHz scan and call scan. For each band there are TO (time-operated), CO (carrier-operated) and seek scan resume modes. With the Memory Name function you can choose to identify each channel with up to **6 alphanumeric characters.** DTMF memory and CTCSS tone encode/decode are provided.

The TH-G71A also scores well for stamina and reliability, boasting long battery life – thanks to a variety of power-saving features – and **MIL-STD 810E** compliance for rain & shock resistance. So there's no need to go easy on this dual-bander. It's built better and brighter in every way.

- **6W (VHF), 5.5W (UHF) at 13.8V DC**
- **PC programmable**
- **200 memory ch. with alphanumeric display**
- **MIL-STD 810E (rain & shock)**
- **CTCSS tone scan**
- **Wide-range coverage (incl. aircraft receive)***
- **DTMF memory (10 ch. up to 16 digits)**
- **Multiple scan modes**
- **Key illumination**
- **High-performance antenna**
- **HI/LOW/EL power output selectable**
- **TM-V7A remote control (DTMF remote)**

** Specifications are guaranteed for Amateur Bands only*

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ZERO BIAS

AN EDITORIAL

It's going to take a bit of time to get used to writing 1998 instead of 1997. Many of the resolutions made in the last few days of 1997 are already lost in the pervasiveness of habit, comfort, and the resistance to change. We tend to like things just the way they are. It's sort of the same thing with writing 1998. One day it's 1997, and the next it's 1998. Most of us wake up to experience another day, not necessarily to luxuriate in being a year older, especially if you're a median-aged amateur.

One really good thing about the beginning of a new year is that it's socially acceptable and even encouraged to entertain the thought of change, improvement, and the possibility of our personal enrichment. It's a time for setting goals, the things we'd like to see happen or do before it becomes time to write 1999. As amateurs, we tend to skip over the 12 month calendar and mark the passage of time according to the 11 year sunspot cycle. Maybe since our internal clock measures our "year" in terms of 132 months, we feel we have plenty of time to do whatever. Right now we've been at that long New Year's Eve party, waiting for the clock to strike and the bright, golden light of day to shine.

So while most of the world celebrates 1998, we amateurs are heralding the dawn of Cycle 23. Presumably, good times are ahead for both. Since our "years" are 132 months long, we can look back on the "year" that was, or several "years," and see the big events (or lack thereof) that are likely to shape the new "year," Cycle 23. Going back to Cycle 19, we find the introduction of the Novice license and probably the start of the concept of "real" amateurs. Real amateurs were those licensed the old-fashioned way before the Novice license. The Novice license brought in the first major growth pattern to amateur radio, and introduced those amateurs to tubes, crystals, surplus, AM, and, of course, CW. It also put life into a band that nobody (nobody "real," that is) wanted—namely, 2 meters. Cycle 19 also produced tremendous activity on 6 meters (5 meters to the Cycle 18 folks) with an influx of Technician class amateurs. While the unreal amateurs fought to communicate, the "real" amateurs fought tooth and nail over the change from AM to SSB.

Cycle 20 produced growth from another "unreal" source who also wanted to communicate—CBers. We as amateurs did everything in our power to castigate, demean, and generally put down a group of over 28,000,000 people who had the audacity to show the world that you could have fun communicating. We few hundred thousand were "real" (well, some of us anyway) and they weren't. We had these big, heavy, impressive receivers and transmitters, and all this scrofulous group had were little tiny boxes that did both jobs. We of course talked about important things, and all they managed to do was sound like long-haul truck drivers avoiding the police. Well, many CBers crossed the line and became licensed amateurs and by their presence encouraged manufacturers to produce those little tiny boxes that do both jobs for us, too. We now not only had transceivers, but we also got some special ones for something called 2 meter FM. We were starting to get a lot of people who wanted to communicate. The term "real" began to be generalized to mean anyone who had your class of license. People who had a higher class thought you, whatever your license class, were "unreal."

The dawn of Cycle 21 saw additional changes in technology and still new people coming into the hobby. Something called "computers" was making inroads along with a mode called packet that most of us didn't understand. Along with the curious phenomena came a host of new words and terms to learn. Some of the super-real amateurs wrote scathing letters to the editor stating that this stuff didn't belong in amateur radio journals and had no part in our glorious service (they still like to call it a service). Well, a lot of bright, curious, and enterprising people came into the amateur service/hobby just to be a part of this and to communicate their thoughts and ideas on how to make it better. Towards the end of Cycle 21, the formal, staid, government exams held in Federal buildings gave way to Volunteer Examiners, and even more people had the opportunity to take a test. Also in the works was a giant change in thinking and tradition which would boost our population to over 700,000 in Cycle 22.

Cycle 22, our last one, saw computer use among amateurs rise from curiosity to adjunct to absolute necessity. Packet radio has gone from simple DX spotting cluster to high-speed data transfer, emergency communications, and when coupled with GPS systems, immediate and reliable positioning.

While all of this is not only quite impressive (and totally unheard of or even dreamt about during Cycle 19), the big jump in our ranks came with the introduction of Novice Enhancement and the No-Code license. This last cycle produced some outstanding technology and a truly marvelous assortment of commercial gear. They were obviously wonderful years, judging by our numbers.

Just exactly who is "real" these days is also getting a bit blurry. Real now is sort of self-appointed (or anointed), and the words of their wisdom are spread about the globe via the means developed and fostered by those they consider "unreal." The hobby or service of amateur radio doesn't really look like or sound like what was going on during Cycle 19, 20, or most of 21, let alone during earlier cycles. The people today waiting around for the good times to roll don't feel that strong emotional tug to rekindle the good old days. They look at today, and the challenges of tomorrow and what they will bring. Some 52 or 53 percent of them have very little or no CW experience, and that number is growing. As the old song goes (circa Cycle 19 or 20), "You don't have to be a weatherman to see which way the wind is blowing."

The long New Year's Eve party is over, the sun is rising, and we're looking at Cycle 23. For those of us grounded in reality, it's also the start of 1998. It's probably easier to guess what we will see going into it. I think it's safe to say that the issue of CW will be long past unless we come up with a procrustean solution in the same manner as Incentive Licensing. The only thing that does seem certain is that the number of enthusiastically real amateurs will diminish through natural attrition, and the only real amateurs around will be from Cycles 20 and 21. Those of us who are left will have to listen to how hard it was to find a VE in the good old days and the amount of time spent scouring the 800 numbers to find a good deal on a rig. Whatever happens, the one certainty will be the complaints that the new breed of amateur has it too easy.

I don't know what the next leap in technology will bring, or whom it will bring along during Cycle 23. As I enter my fifth cycle as an amateur, I do know that this new cycle will end far differently than what I can safely predict today. Will the amateur radio of that day be "real"? Yes, it will be "real," as real as it's going to get. Nothing involved with amateur radio stipulates status quo, nor has anything stayed the same since the day I passed my first license exam. But rest easy. That's over a hundred months away.

As far as 1998 goes, we still have a full year ahead of activities and excitement. As conditions continue to improve, I'd expect to see the level of DXpedition activity increase as well as participation in contests and other operating events. It's a time for doing and not ruminating. It's a time to get out of the shack and get to your local, or not so local, hamfest to see firsthand the panoply of new technology ready for immediate use (and delivery). If you've ever been hesitant about trying something new or looking for ways to improve your skills, a hamfest forum is the place for you. It's really up to you to decide whether or not you want to have a good time. Time and sunspot cycles keep moving, and none of us can slow it down, change it, or keep it in place.

If you still want to expend energy on who's real or unreal, transfer some of that energy and volunteer for a local emergency preparedness group and help your community. If you still need an accurate definition of what's real, just go ahead and ask the victim of a flood or other disaster. It's also not a great idea to try to explain the nutritive benefits of granola to a hungry, homeless person.

73, Alan, K2EEK

SALE PRICE

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DB32 Antenna Optional

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The Scout® is the latest advancement in hand-held frequency counters; a frequency recorder that excels at finding and recording frequencies. The Scout frequency recorder is a revolutionary device that can **record up to 400 unique frequencies and store them in memory.**

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- Stores 400 Frequencies in memory
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- 10 digit LCD display with 16 segment RF bargraph
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- Download recorded frequencies to a PC using the optional OPTOLINX
- Beeper and Vibrator function will alert you when a frequency has been captured
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ANNOUNCEMENTS

•The following Special Events are scheduled for January:

W1BV, from Wallingford, Connecticut, the Albert Schweitzer Institute for the Humanities; to honor the birthday of Albert Schweitzer; 1500–2300Z Jan. 18; on 3817 and 1860. For an 8½ × 11 certificate, which includes the signature of Rhena Schweitzer Miller, the daughter of Albert Schweitzer, send QSL and a large SASE to W1BV, P.O. Box 550, Wallingford, CT 06492.

KB2YCT, from Nutley, New Jersey; to honor John L. Lewis, founder of C.I.O.; Robert D. Grant United Labor ARA; 1800Z Jan. 16 to 2300Z Jan. 19; on 28.420 and 52.525 (within 20 kHz). For certificate send QSL and SASE to KB2YCT/WA2VJA, 112 Prospect St., Nutley, NJ.

KI6YG, from Challenger Middle School, San Diego, California; to commemorate the 12th anniversary of the space shuttle *Challenger* tragedy; Challenger Middle School ARC; 1500–2400Z Jan. 28; on or near 14.250, 21.350, 28.350, and 146.52 simplex. QSL to Challenger Middle School ARC, 10810 Parkdale Ave., San Diego, CA 92126.

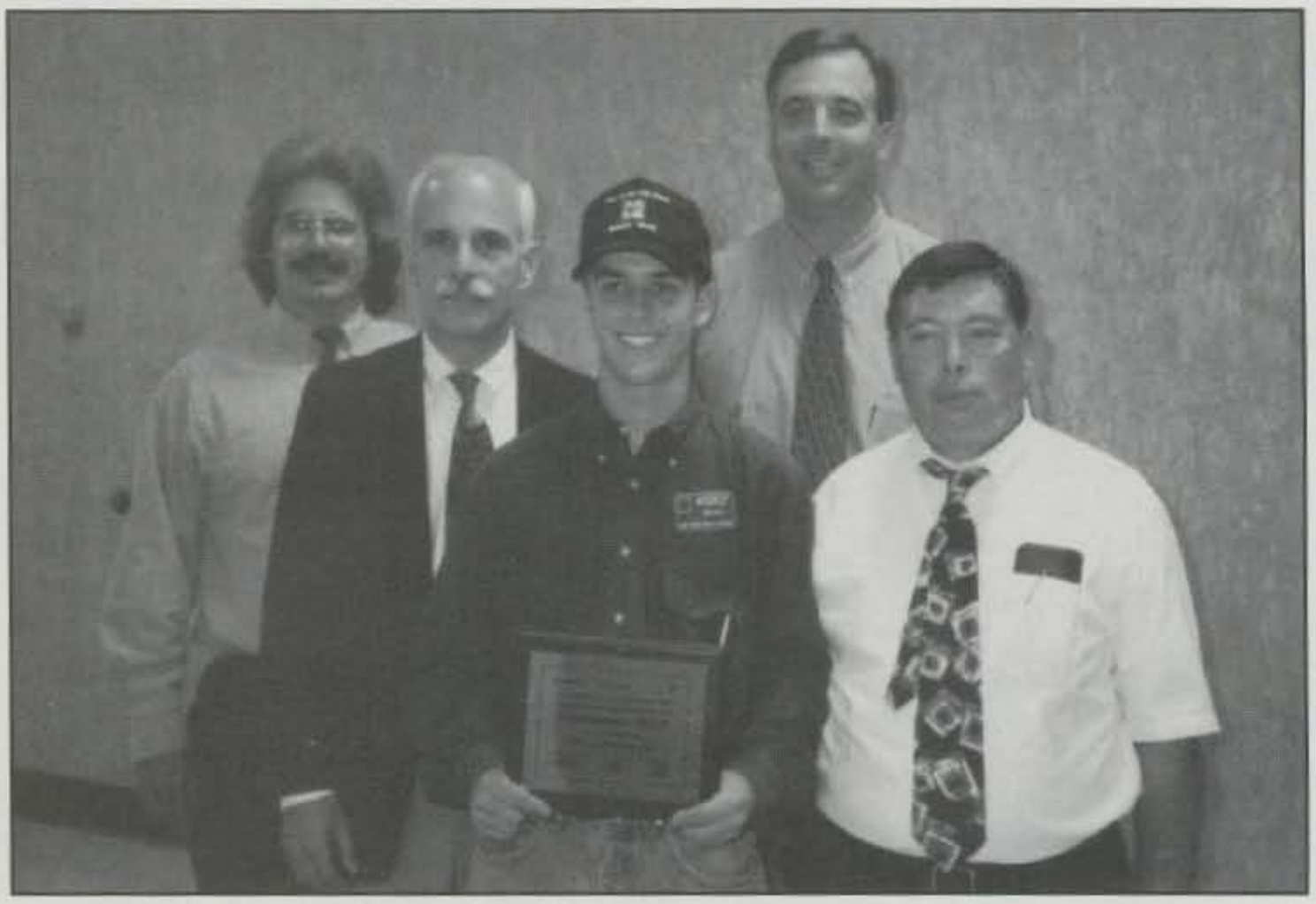
•The following hamfests, etc., are slated for January and early February:

Jan. 3, **Lakeway ARC Hamfest & Computer Show**, Talley Ward Recreation Center, Morristown, Tennessee. Contact Perry Hensley, N4PH, 423-828-4848, or by mail: Lakeway ARC, P.O. Box 895, Talbott, TN 37877-0895.

Jan. 3–4, **Southwest Florida Hamfest**, Ft. Myers, Florida. Contact Colleen Sammons, KQ4TR, 3667 Kelly Street, Ft. Myers, FL 33901 (phone 941-936-9431; e-mail: <csammons@ juno.com>).

Jan. 10, **ThunderBird ARC WestFest**, Glendale Community College, Glendale, Arizona. For info contact Mark Fellhauer, KC7BXS, phone 602-931-1204, e-mail <sparkfel@ primenet.com>.

Jan. 10, **Winter Superfest Swapmeet**, Larimer County Fairgrounds, Loveland,



Brian Mileshosky, N5ZGT, was presented with the 1997 Newsline Young Ham of the Year Award at the annual Huntsville Hamfest in Alabama. The award is co-sponsored by Yaesu USA and CQ magazine. Brian was first licensed at the age of 12 and is active on all bands and modes with the exception of SSTV, satellites, and microwave. He has a particular affinity for QRP and has been part of record-setting long-distance QSOs. He is Worldradio *magazine's Youth Columnist, encouraging other young people to join the amateur radio ranks, and has served as an Elmer to many boys and girls. Brian is 17 and has entered the University of New Mexico, enrolling in the School of Engineering with a career aspiration of possibly joining the Astronaut Corps. Pictured from left to right are Chip Margelli, K7JA, of Yaesu; CQ Advertising Manager Arnie Sposato, N2IQO; Brian, N5ZGT; Yaesu's Kevin Karamanos, WD6DIH; and Newsline Producer Bill Pasternak, WA6ITF. (Photo by N1RL)*

Colorado. Call 970-352-5304 (for table reservations call Jeanene Gage, NØYHY, 970-351-7327). (Exams.)

Jan. 11, **West Allis RAC Hamfest/ Swapfest**, Waukesha County Expo Center Forum, Waukesha, Wisconsin. Contact Phil Gural, W9NAW, 414-425-3649, or write with SASE to WARAC Swapfest, P.O. Box 1072, Milwaukee, WI 53201. (Exams.)

Jan. 17, **SELARC Hamfest**, Southeastern Louisiana University, University Center, Hammond, Louisiana. Contact Southeast Louisiana ARC, P.O. Box 1324, Hammond, LA 70404.

Jan. 17, **Amateur Radio & Youth Swap-n-Shop #5**, UAW Local 599, Leith Street, Flint, Michigan. Contact Ron, KG8IM, 810-785-6514, or Clay, KF8UI, 810-233-7889.

Jan. 17, **Northwest Missouri Winter Hamfest**, Ramada Inn, St. Joseph, Missouri. Contact Northwest Missouri Winter Hamfest, c/o Gaylen Pearson, WBØW, 1210 Midyett Rd., St. Joseph, MO 64506.

Jan. 18, **S.C.A.R.F. 3rd Annual Hamfest & Computer Show**, Hocking College, Nelsonville, Ohio. Contact Russ Ellis, N8MWK, 614-767-2226. (Exams.)

Jan. 18, **Richmond Frostfest '98**, The Showplace, Mechanicsville Tpke., Richmond, Virginia. Contact Todd or Amy McCoy, 804-330-3165, or write to P.O. Box 35021, Richmond, VA 23235. General info 804-739-2269 ext. FEST; internet: <http://frostfest.rats.net>. (Handicapped accessible.)

Jan. 18, **Metro 70cm Network Giant Electronic Fleamarket**, Lincoln High School, Yonkers, New York. For info contact Otto Supliski, WB2SLQ, 914-969-1053. (Exams.)

Jan. 24, **Tennessee Valley Amateur Radio Network Hamfest**, Gallatin Civic Center, gallatin, Tennessee. Contact Bill Ferrell, 1253 Woodvale Dr., Gallatin, TN 37066, or call 615-451-5992 and leave message. (Exams by preregistration only. Send 610, copy of license or certificate of successful completion, and SASE to Ronnie Gilley, 512 Hillside Dr., Gallatin, TN 37066.)

Jan. 25, **Wheaton Community Radio Amateurs 31st Annual Mid-Winter Hamfest**, Odeum Exposition Center, Villa Park, Illinois. Contact WCRA, P.O. Box QSL, Wheaton, IL 60189 (SASE), or check web page <www.w9ccu.org>.

Jan. 25, **Maryland Mobileers ARC Post Holiday Hamfest**, Odenton Vol. Fire Dept. Hall, Odenton, Maryland. Contact Bill Ziegler, KA6TYY, 1307 Ashburton Dr., Millersville, MD 21108 (410-987-2384 evenings). (Exams preregistration, contact Jerry Gavin, NU3D, 410-761-1423.)

Jan. 25, **Tusco ARC Hamfest**, Ohio National Guard Armory, Dover, Ohio. Contact Howard Blind, KD8KF, 6288 Echo Lake Rd. NE, New Philadelphia, OH 44663 (330-364-5258).

Jan. 31, **Lockport ARA Winter Auction**, at 3 PM at the Niagara County Cooperative Extension, 4-H Building (at the fairgrounds), Lockport, New York. Contact Floyd King, WA2ZVL, 716-434-1533, or see their web page: <http://www.localnet.com/~ae2t/lara/ auction.html>.

Feb. 2, **West Valley ARC Club Radio Equipment Auction**, 7 PM at St. Clement of Rome Catholic Church Social Hall, Sun City, Arizona. Contact WVARC, P.O. Box 1573, Sun City, AZ 85372 (phone 602-933-0854; e-mail: <watgl@juno.com>).

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As the author rightly points out, this is definitely a project for the more experienced builder. W9SR certainly can take pride in this project, a clear demonstration of patience and ingenuity.

The QRP 30 Plus
A Compact 30 Meter Transceiver

BY RICHARD W. STROUD*, W9SR

This project started innocently when I was browsing through the local fleamarket and ran across some terrific surplus plastic cabinets. I started to wonder what could be built into them. I had always been interested in QRP, and these seemed perfect for a small transceiver. I ended up using one cabinet for a 30 meter transceiver and a second cabinet for a matching 100 watt FET amplifier, which I will describe in a future article.

This project is intended primarily for the more experienced equipment builder. Although designed for only the 30 meter WARC band, this is a very complete little station with many of the bells and whistles, and it is a pleasure to operate. It is still small enough to be carried in one hand for portable use. The transceiver has a selectable RF output of either 4 or 8 watts and uses a sensitive superhet receiver with a sharply peaked audio output at about 750 Hz. By modifying the tuned circuits, the transceiver could be built for other bands.

The cabinets (Dick Smith H-2507) measure 7 1/2" × 10" × 3 1/4" and are presently available from several sources for three or four dollars. One source is Pembleton Electronics (1222 Progress Road, Ft. Wayne, IN 46808-1262). The cabinets have several mounting posts molded into the bottom, and these are used to support a double-sided PC board which acts as a chassis to hold heavier components and other board assemblies. Unused posts can be cut off with a pair of large cutters or a knife. Several mounting screws are supplied with the cabinet.

The original plastic panels supplied with the cabinet were discarded and the back panel replaced with a .087 thick aluminum panel. The front was replaced by a sheet of .032 aluminum covered by an engraved plastic panel, giving a total thickness of about .090 inches. These panels fit in the original groove around the front and rear inside perimeters of the cabinet. Engraved panels in several colors are available from L & C Engraving (111 W. Mill Street, Ossian, IN 46777).

The finished project—the QRP 30 Plus compact 30 meter transceiver.

The transceiver was built using surplus and readily available components. It includes an audio filter, RIT, band-edge calibrator, RF and AF gain controls, selectable sidetone level, and adjustable break-in delay. (See block diagram, fig. 1.)

An on-board regulator supplies 6 volts for a MFJ 422B keyer, which I normally use with the unit.

The dynamic range of the receiver has been kept high by the use of a low-gain RF amplifier and properly terminated mixer with a local oscillator injection of about 9 dBm. An audio-controlled AGC was originally included, but in practice it was found to be unnecessary if the RF gain control is properly used, and it is not worth the added complexity.

A dual-gate MOSFET, Q1, is used as an RF amplifier. A small amount of degeneration assures stability and lowers the gain of the circuit while maintaining a good noise figure. A panel-mounted 20 dB antenna attenuator can be switched in to reduce the signal level when necessary. The first mixer is terminated by the input circuit of Q16, which is resistive and near 50 ohms.

Local oscillator injection is developed by the FET oscillator/buffer combination. The VFO frequency control is a broadcast-type variable capacitor with a 6:1 vernier drive attached. The entire VFO is inside a drawn aluminum shield can with the oscillator components on a vertical board beside the variable capacitor. The toroid inductor, T5, is attached to the board with a nylon screw and cemented after adjustment. A mylar disc is fastened to the vernier drive, and attached adhe-

*Box 73, Liberty Center, IN 46766

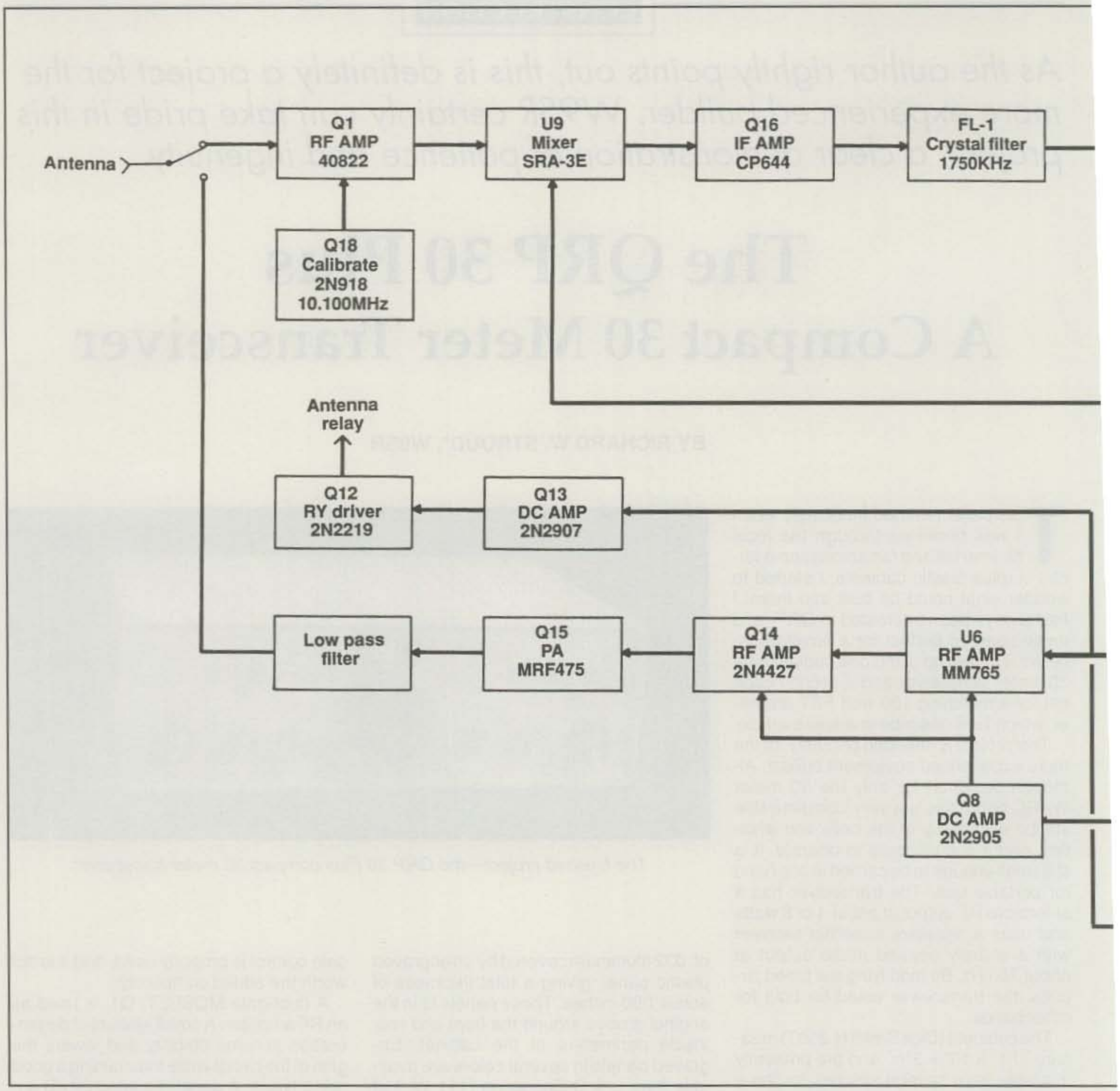
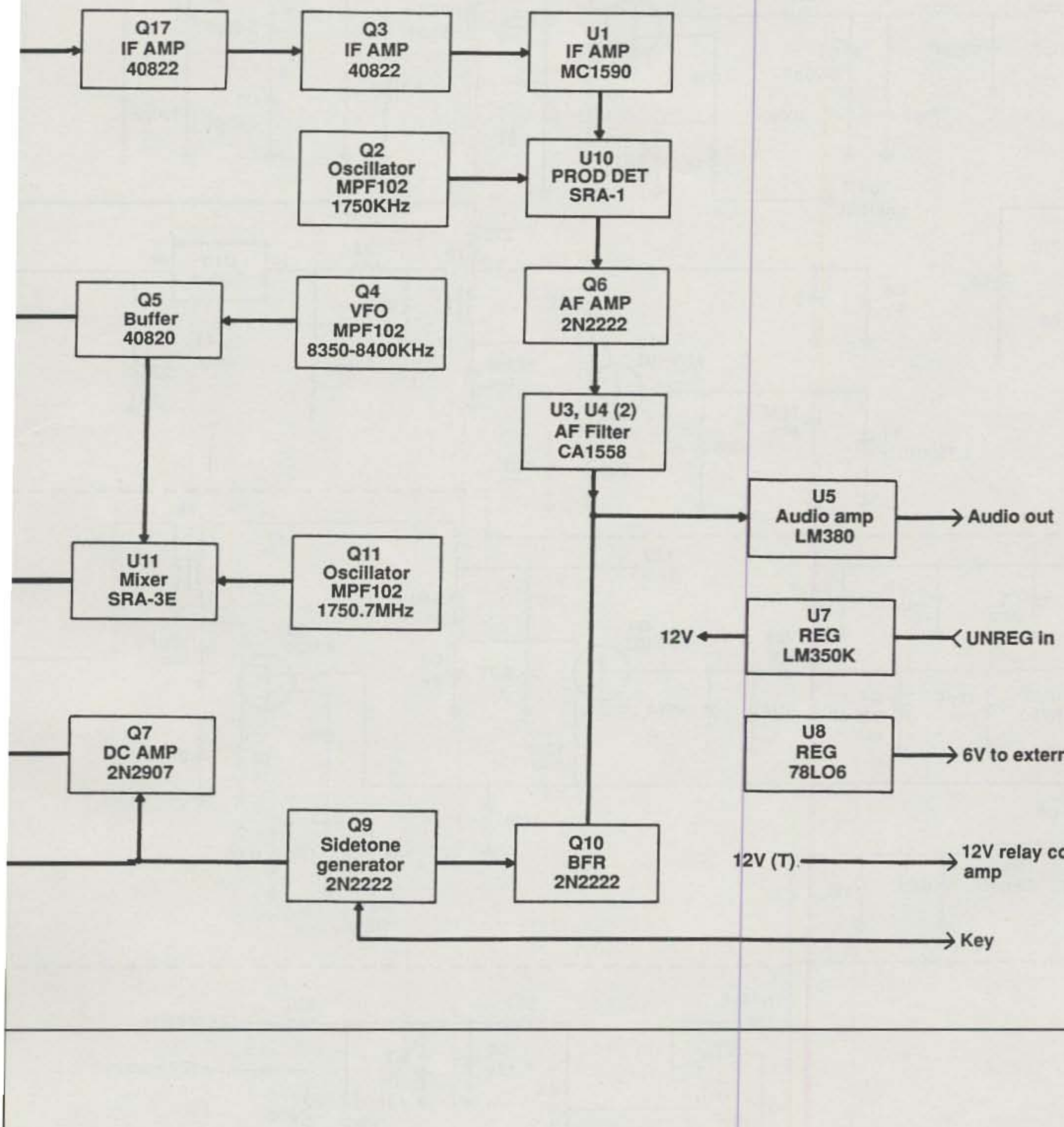


Fig. 1– Block diagram for the 30 meter QRP transceiver as described in the text. The unit was built using surplus and readily available parts.

sive paper allows hand calibration. The dial is back lighted. The oscillator is adjusted to cover the 50 kHz band, tuning from 8350 to 8400 kHz. The VFO also drives the transmit mixer, U11, at about 9 dBm. The RIT circuit, when switched on, tunes about 4 kHz each side of center frequency. This is an ideal place to use a digital readout as described by Doug DeMaw in the June 1997 issue of *CQ*. With a little ingenuity it could even be built into the transceiver. To drive the digital dial, connect its input to the receive mixer LO port through a 68 pF capacitor in series with an 820 ohm resistor.

Output of the high-level first IF amplifier, Q16, is matched to the 1750 kHz filter, FL1. This is a military surplus quartz filter, SMC 500317, presently on the surplus shelves, with a bandwidth of 3.1 kHz. This filter is followed by the audio filter, which narrows the final passband for CW work. A simple dual half-lattice filter may also be used for FL-1 as shown in fig. 3. This filter will give a more appropriate IF bandwidth of about 420 Hz.

Two dual-gate MOSFETs, with their gains controlled by the RF gain control, amplify the 1750 kHz IF signal, and it is further amplified by U1. A packaged diode mixer, U10, is used as the product detector with the injection coming from the 1.7500 MHz crystal oscillator, Q2.



The product detector output is filtered, then amplified by Q6. It was found that the RF choke in the base lead of Q6 needed to be shielded to remove a 60 cycle hum induced by the nearby power transformer. The active audio filter, U3 and U4, is peaked at 740 Hz and can be switched in at the front panel. Be sure to use 1% resistors and 5% poly capacitors in this circuit to take full advantage of the filter. Bandwidth of the filter is 94 Hz at the –3 dB points and 325 Hz at the –20 dB points.

The LM 380 audio amplifier has an output of up to a half watt. Response of the amplifier is 270 to 1700 Hz at the –3 dB points. An internal 8 ohm speaker is active unless the headphone plug is inserted or an external speaker is plugged in. The sidetone signal is added at the audio amplifier input to monitor keying.

The pierce crystal calibrator oscillates at 10.100 MHz, when switched on, to give a band-edge calibration point and to aid in initial VFO alignment.

Output of the transmit crystal oscillator, at 1.7507 MHz, is mixed with the VFO signal at U11 to develop the 10.100 to 10.150 MHz transmit frequency. This signal is filtered, and then amplified by U6 and Q14. A shield made from PC board material is positioned between the bandpass filter (T7, T8, etc.) and the final amplifier area to prevent feedback. The shield is sol-

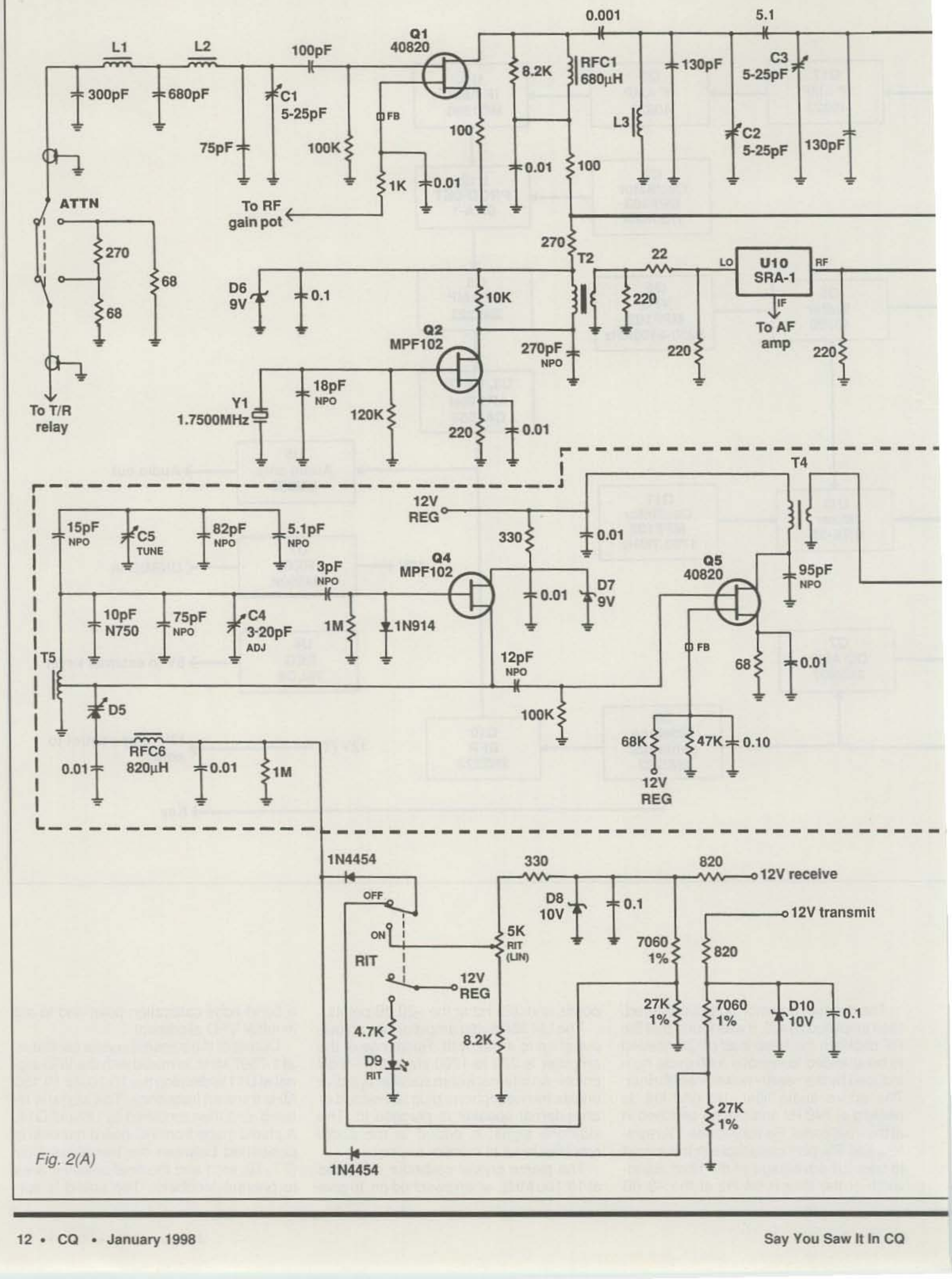


Fig. 2(A)

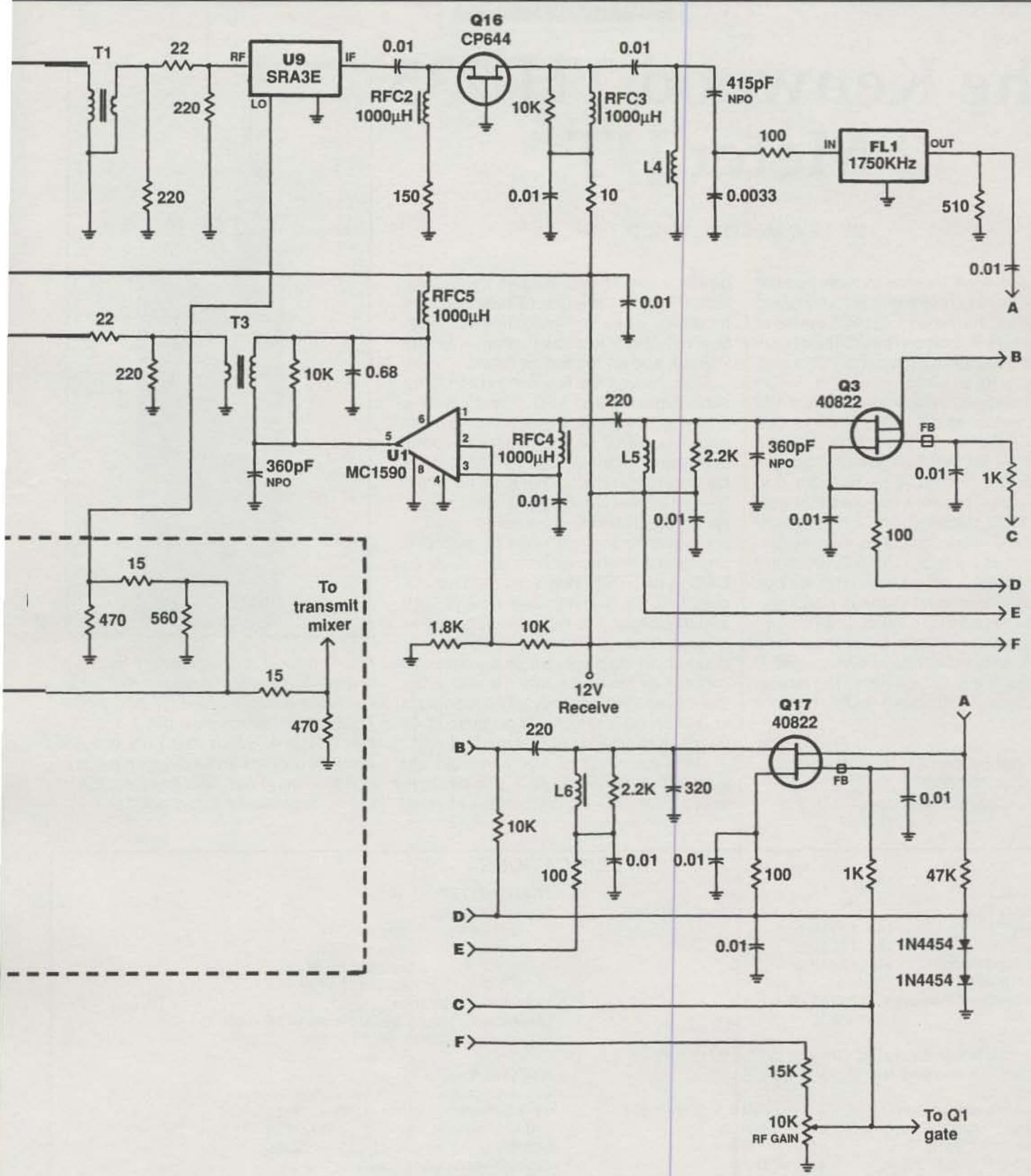


Fig. 2– Schematic diagram of the 30 meter transceiver. Only those parts requiring special identification are listed. Unless otherwise specified, all resistors are 1/4 watt, 5%, and capacitor values shown in decimals are in microFarads with 10% tolerance. Other capacitors are in picoFarads with 5% tolerance. Parts equivalent to those listed may be substituted. Cores are available from Palomar Engineers and crystals are from JAN Crystals. (Note: Fig. 2, parts A, B, and C, are continued on the next few pages.)

Fig. 2(A)

(Continued on page 98)

The Kenwood TH-235 2 Meter HT

BY LEW McCOY*, W1ICP

These days it's nice to note that the price of something is actually going down. Kenwood's TH-235 series of 2 meter HTs is a case in point. Their basic unit, the TH-235AK2 (no battery or charger), retails for $199.95.

The handheld measures 2.25"W × 1"D × 6.5"L, which is still rather small by old-time comparisons. The touchtone pad consists of 20 switches with the usual 1 through 0 numbers, plus asterisk and pound sign. There are switches that consist of MON (Monitor), VFO, MR (Memory), and F (Function). The four remaining switches are A, B, C, and D, which are used with the function switch for various controls. The manual instructs you, in detail, how to use these various keys.

The display shows frequency (very clearly), plus indicators showing various functions that may be in use. The indicators include F (Function), LOW, transmit power, a key which indicates transceiver lock, DT and CT (the letter T indicates tone function), + or – sign (indicates offset frequency), a star to show memory channel lockout, and an "on the air" sign.

Atop the unit are two knob controls for audio (volume) and VFO. The squelch is always active unless it is deactivated by an incoming signal or the Monitor button is depressed (I like this feature.). The squelch can be programmed either to be on weakly so as to hear weak signals or to be completely squelched to cut down all noise.

Frequency and data can be stored in any of the memory channels, such as CTCSS or DTSS. However, the tone access CTCSS is an optional item (TSU-8 $59.95). Storing of repeater frequencies is easy once you read the manual and understand the steps. It took me about 10 minutes to follow the manual and apply the steps to the handheld. The manual is very detailed and clear. It consists of 48 pages of simple to understand text.

Many functions of this handheld are selected or configured via a software controlled menu instead of using the physical

*Technical Editor, CQ, 1500 W. Idaho St., Silver City, NM 88061
e-mail: mccoy@zianet.com

The Kenwood 235 2 meter HT makes a neat package and at a reasonable price. Available versions of the HT include the TH-235AK2, which puts out 1.5 watts; the TH-235A, which also puts out 1.5 watts, but comes with a charger, battery, and touchtone pad; and the TH-235AH, a complete 5 watt unit.

SPECIFICATIONS

GENERAL

Frequency range:

USA/Canada	144–148 MHz
Europe	144–146 MHz
General market	144–148 MHz

Mode: F3E (FM)
Usable temperature range: –10°C to +50°C (+14°F to +122°F)
Rated voltage:
External power supply (DC IN)—7.5 to 16.0 V (13.8 V)
Battery terminals—6.8 to 15.0 V (7.2 V)
Current:

Receive with no signals	average 50 mA
Battery saver ON	approx. 14 mA
Transmit with H, 12.0 V	approx. 1.3 A
Transmit with H, 7.2 V	approx. 0.8 A
Transmit with L, 7.2 V	approx. 0.6 A

Grounding method: negative ground
Dimensions (W × H × D, projections included)[1]:
62.0 x 166.2 x 37.2 mm
(2.44 x 6.54 x 1.47 in.)
Weight[2]: approx. 361 g (12.7 oz.)
Microphone impedance: 2 k ohms
Antenna impedance: 50 ohms

TRANSMITTER

Power output:

H, 13.8 V	approx. 5 W
H, 12.0 V	approx. 5 W
H, 7.2 V	approx. 1.5 W
L, 7.2 V	approx. 1 W

Modulation: reactance
Maximum frequency deviation: within ±5 kHz
Spurious emissions: –60 dB or less

RECEIVER

Circuitry: double conversion superheterodyne
1st intermediate frequency: 38.85 MHz
2nd intermediate frequency: 450 kHz
Sensitivity (12 dB SINAD): 0.2 µV or less
Squelch sensitivity: 0.13 µV or less
Selectivity (–6 dB): 12 kHz or higher
Selectivity (–40 dB): 28 kHz or less
Audio output (10% distortion):
280 mW or higher (8 ohm load)

[1]With a PB-36 or BT-10 installed.
[2]PB-36 NiCd battery pack, antenna, and belt hook included.
Specifications are subject to change without notice due to developments in technology.

Table I– Specifications as stated in the manual. Our tests showed that the unit equaled the spec ratings or were slightly better.

controls. These functions include Battery Saver, Automatic power on or off, Beep on or off, TX inhibit, Tuning Control enable, DTSS TX delay, DTMF Tone TX hold, Busy Channel lockout, Time-out timer, DTSS Group code, and Automatic repeater offset.

There are a total of 60 memory channels available, and there are two methods available for storing transmit/receive frequencies and related data in memory channels. You can use each memory channel either as a Simplex or Split channel. Also, if you have more than one TH-235 transceiver, you can easily copy (clone) the contents of eleven memory channels to one of these transceivers.

I have been reviewing handhelds since the inception of FM and repeaters. I recall many years ago, when I worked at the ARRL, I drove down to New Jersey a few times along the New Jersey Turnpike, also widely know as Intermodulation Alley, to check out rigs. There are literally hundreds of VHF and UHF stations in that area, and the intermodulation problems are horrendous. Intermodulation is simply described as undesirable crud that is generated in a receiver simply because of its inability to handle many strong signals hitting the antenna and getting into the various stages at the same time. This generates a lot of interference to the desired signal. This has always been a problem in the design of FM receivers, and particularly so with handhelds simply because handhelds can easily be brought into the vicinity of such a mess. Latter-day handhelds have a number of modern designs to alleviate this problem. However, I still like to check out units under harsh conditions. But I don't plan to go back to New Jersey!

Fortunately—or unfortunately, depending on how you look at the situation—we have bad intermodulation areas not too far away from me—a place called Franklin Mountain in El Paso and another called South Mountain in Phoenix. Both locations are loaded with amateur repeaters, VHF and UHF commercial stations, TV, broadcast, etc. If a radio is lacking in any respect in receiving, operation in such areas will really reveal the receiver's deficiencies. I went to both areas with this Kenwood handheld and I have to say the handheld did a really fine job. Under those severe conditions it performed at least an eight on a scale of one to ten.

There are three versions of this Kenwood HT available. The basic unit is the TH-235AK2, which will put out 1.5 watts. The TH-235A also puts out 1.5 watts, but comes with a battery, charger, and touch-tone pad. There is also a complete 5 watt unit, the TH-235AH. Optional battery packs are available, as well as a battery holder (BT-10) to make your own pack.

For more information, write to Kenwood Communication Corp., P.O. Box 22745, 2201 E. Dominguez St., Long Beach, CA 90801-5745. ■

Here's a radio amateur's look at the amazing and sometimes mysterious "radio sub-basement" at the very bottom of the electromagnetic spectrum.

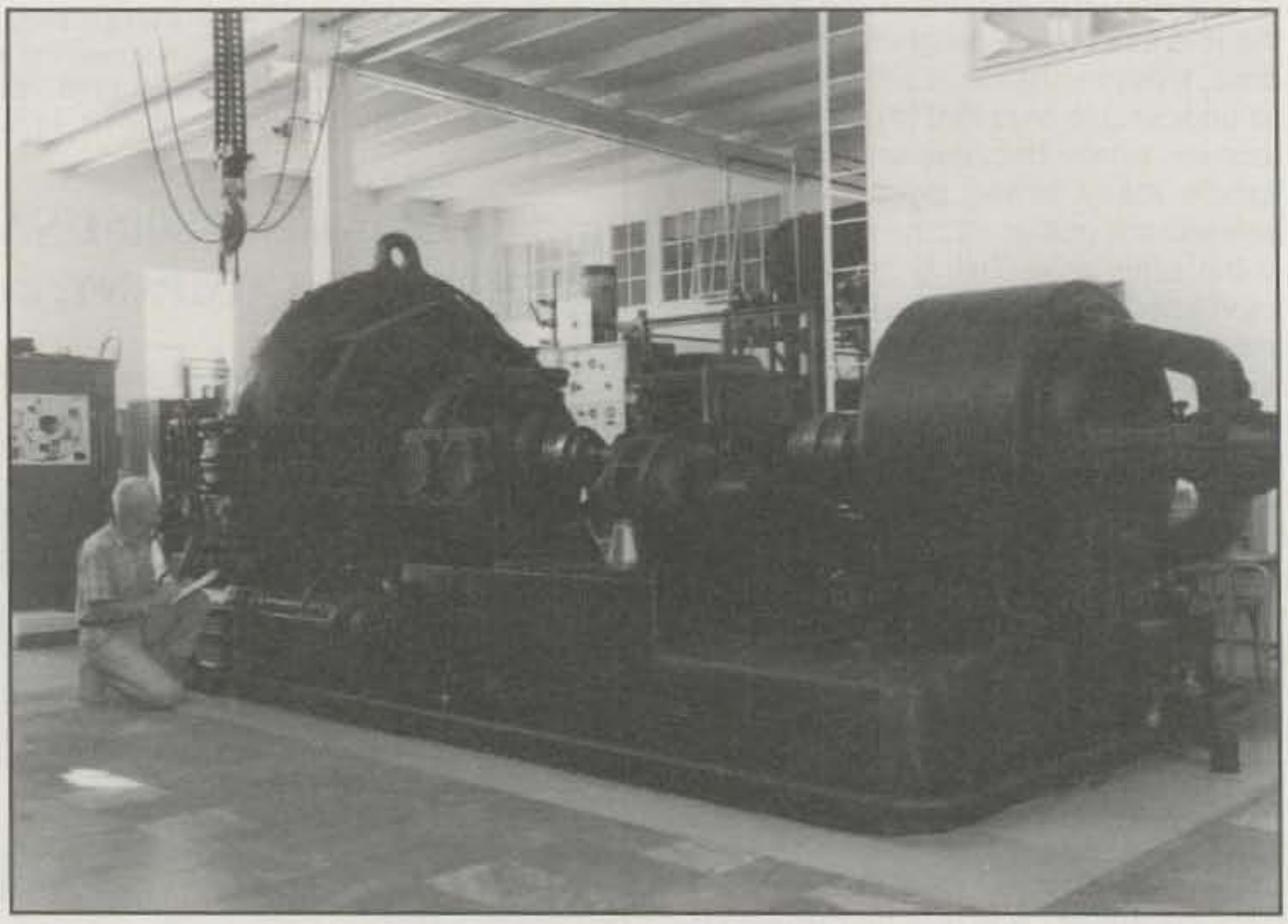
Longer Than Longwave

Part I—How Low Is Low?

BY KARL T. THURBER, JR.*, W8FX

Most radio amateurs are familiar with the radio spectrum above 160 meters, and a few hardy souls use the FCC's "Part 15" no-license "LowFERS" frequency allocations of 160 to 190 kHz (LowFERS stands for Low Frequency Experimental Radio Station). In the big scheme of things, however, these frequencies aren't actually *low*. So what about the *really* super-low frequencies, ones to which we amateurs rarely listen and on which we almost never transmit?

This article explores some "new lows" in the hobby—the "sub-basement" of the radio spectrum—by surveying the ULF (ultra low frequency), ELF (extremely low frequency), and VLF (very low frequency) regions lying below 30 kHz. The article presents signals you're likely to encounter, including natural, manmade, and even dangerous radio emissions. It also covers underground communications; phenomena and storm warning; ULF/ ELF/VLF propagation, equipment, and antennas; and some mysterious anomalies. Various resources are listed (see sidebar, Part II).



Alexanderson alternators were built by General Electric and RCA in the 1920s; only one is left. The device is a large, electromechanical high-frequency alternator with a high-speed rotor connected directly to an antenna. The only working station, at Grimeton, Sweden (shown here) broadcasts on ceremonial occasions on 17.2 kHz. (Photo courtesy Telia AB, Sweden)

The Sub-Basement and The Frequency Spectrum

To first place the sub-basement into perspective, the total usable electromagnetic (EM) spectrum is considered to extend from a few hertz (Hz) to about 300 gigahertz (GHz). Scientists break up this immense range of frequencies into smaller groupings or ranges for purposes of discussion and ease of understanding.

Although some references disagree in terms of exact ULF and ELF "break points," generally the lowest range is the ultra low frequencies (ULF), from 0 Hz to 3 Hz (yes, *hertz*, not kilohertz). Just above ULF lie the extremely low frequencies (ELF), from 3 Hz to 3 kHz. Above that, from 3 to 30 kHz, are the very low frequencies (VLF). Be aware that "VLF" may be applied loosely to any frequencies below 30 kHz; "longwave" (LW) loosely covers anything below 300 or sometimes 500 or 530 kHz. (We'll refer to ULF, ELF, and VLF as radio's sub-basement here.)

Next are the low frequencies (LF), from 30 to 300 kHz, the "top end" of longwave; amateur FCC "Part 15" LowFERS operate in a portion of this band, from 160–190 kHz. The medium frequencies (MF), or mediumwaves, extend from 300 to 3000 kHz (3 MHz); thus, 160 meters is a MF amateur band rather than an HF band.

From 3 MHz to 30 MHz are the high frequencies (HF), the "workhorse" amateur frequency allocations. Above them are the very high frequencies (VHF), from 30 to 300 MHz. The ultra high frequencies (UHF) extend from 300 to 3000 MHz, or 3 GHz. From 3 GHz to 30 GHz are the super high frequencies (SHF), and from 30 GHz to 300 GHz are the extremely high

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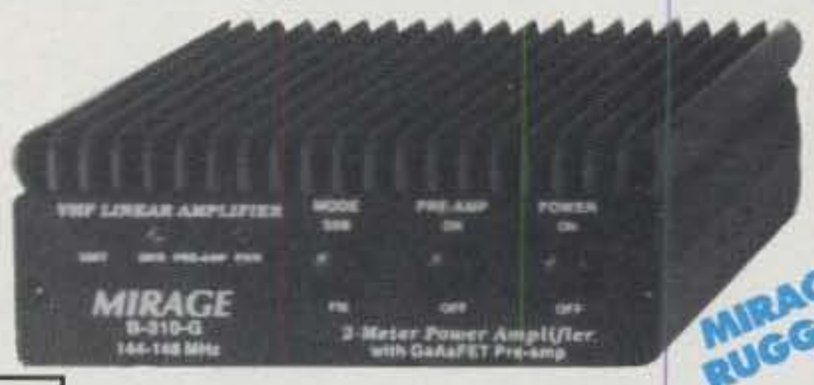

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Watts Out (440 MHz)	*16*	*26*	*32*	*35+*	*35+*	*35+*	*35+*
Watts In	*1*	*2*	*3*	*4*	*5*	*6*	*7*

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

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- ***Includes mobile bracket***
- ***Auto RF sense T/R switch***
- ***Custom heatsink, runs cool***
- ***Works with handhelds up to 8 watts***
- ***One year MIRAGE warranty***

MIRAGE RUGGED!

35 watts, FM only . . . $69.95

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

160 Watts on 2 Meters!

B-5016-G

$299

Suggested Retail

MIRAGE RUGGED!

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

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

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

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

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

Heavy-duty heatsink spans entire length of cabinet -- prevents overheating. Power transistors protected by MIRAGE's *Therm-O-Guard™*.

Fully protected from high SWR and excessive input power. Has warning LED.

Has smooth adjustable Transmit/Receive switching with remote external keying.

RC-1, $45, Remote Control. On/Off, pre-amp On/Off, selects SSB/FM. With 18-ft cable.

Draws 17-22 amps at 13.8 VDC. 12x3x5½ in.

More 160 Watt, 2 Meter Amplifiers . . .

B-2516-G, $299. For 10 to 35 watt mobile or base stations. 160 watts out for 25 watts in.

B-1016-G, $379. MIRAGE's most popular *dual purpose* HT *or* mobile/base amplifier. 160 watts out/10 W in. For 0.2-15 watt transceivers.

B-215-G, $379. MIRAGE's most popular *handheld* amp. 150 watts out/2 watts in; 160 watts out/3½ W in. For 0.25 to 5 watt handhelds.

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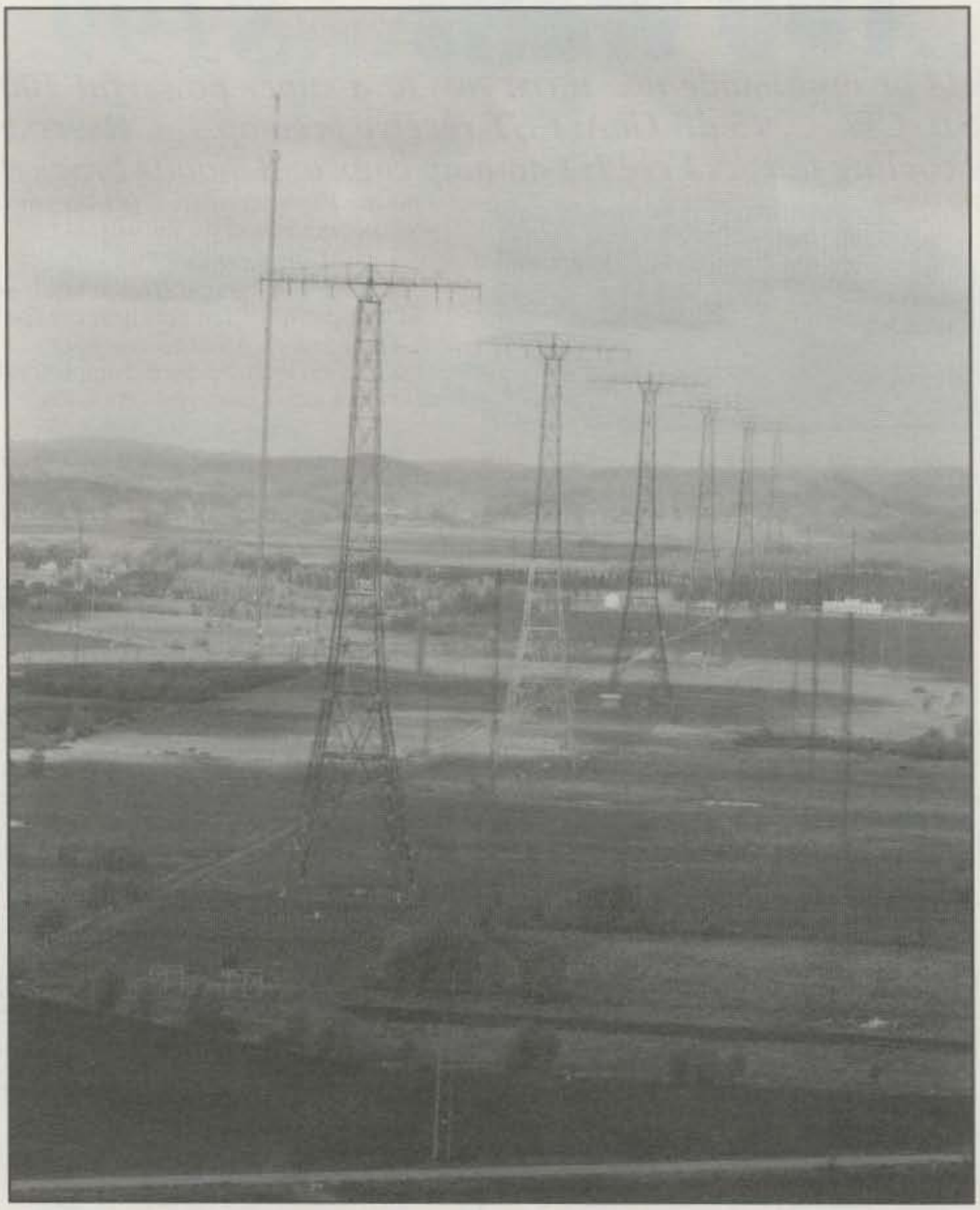


The massive towers associated with the Grimeton, Sweden Alexanderson alternator still are usable. The antenna system has six 127 meter high towers spaced 380 meters. On the top of each tower is a 50 meter long T-arm to carry the 12 wires feeding the six vertical antennas. (Photo courtesy Telia AB, Sweden)

frequencies (EHF). These "ultra highs" increasingly are eyed by companies seeking to put the spectrum to profitable commercial use.

Having placed the EM spectrum into its proper spectral perspective, let's descend directly to radio's sub-basement for a guided tour of the fascinating ELF, ULF, and VLF regions.

Who Goes There? Surveying ULF, ELF, and VLF

Down into the Sub-Basement. ULF, ELF, and VLF are known for unusual emissions and propagation phenomena. Typically these ranges are not used for regular communication, with the exception of radionavigation (Omega, at 10 kHz) or limited submarine communications (around 76 Hz). Instead, these frequencies are full of interesting and exciting natural and manmade emissions.

Project ELF. Project ELF (also known as Seafarer and Sanguine) is a gigantic Navy ELF system for reliably communicating with (or at least transmitting to) submarines at depths up to 400 feet. The one-way system reportedly transmits on 76 Hz and uses an antenna grid more than 50 miles (mi.) long. Few technical details are available. Project ELF is considered by environmentalists as a Cold War relic. The project is at huge sites at Republic, Michigan, and Clam Lake, Wisconsin.

Omega. Descending further into the sub-basement, on longer wavelengths you will find the Omega Radionavigation System. It works somewhat like LORAN, but around 10 to 14 kHz; this region is more stable from a propagation standpoint than the LF range used by LORAN-C. You can hardly miss the strange signals.

Omega's range is more than 8000 miles; a network of eight 10 KW stations covers the world. Omega signals are able to penetrate water to some extent, making it possible for submerged submarines to determine their positions using it. However, Omega is subject to some propagation disturbances and errors, particularly during magnetic storms. The newer Global Positioning System (GPS) satellites don't suffer propagation errors; by the year 2005 the Omega system probably will be obsolete and will shut down.

Standard Time and Frequency Stations. Most amateurs are familiar with HF standard time and frequency stations WWV (Colorado) and WWVH (Hawaii). However, you'll also find that basement-band frequencies are used by some time-and-frequency stations; they're favored because of the improvement in received signal accuracy that's possible by using low bands. At these frequencies, reception doesn't suffer the slight time delays and unpredictable atmospheric variations that distort HF stations.

Such errors make some lab applications impossible when the labs are far from the transmitter, especially when reception is via skywave. LF and longer waves travel almost completely by groundwave, making reception much steadier.

In 1960 the National Institute of Standards and Technology (NIST) station WWVB on 60 kHz was joined by WWVL on a sub-basement frequency—20 kHz—at the top of the audio range. WWVL probably was capable of producing the best quality signal of any NIST station. There were serious problems working at such wavelengths, though. For example, the station's phase (referring to time interval relationships between current and voltage) had to be controlled carefully to prevent errors. WWVL went dark in 1972, although WWVB still is on the air on 60 kHz.

Alternators from the Early Days of Radio. The Alexanderson alternator, a rudimentary wireless transmitter, was developed during the early 1900s by Ernst F. W. Alexanderson. It was a large, electromechanical HF sender with a high-speed rotor connected *directly* to an antenna. General Electric and RCA built 20 units for worldwide coverage, one of which was located on Long Island, New York. Today only Grimeton in Sweden exists. It cranked up in 1924 on 16.7 kHz (a wavelength of 18,000 meters) using the call SAQ.

This oldest VLF station broadcasts without using tubes or solid-state devices; the frequency is generated by an alternator much like what you have in your car, but thousands of times bigger. Power to the antenna system is about 200 KW.

Today the alternator is part of a muse-

"Our IC-756 hit the ground running – in large part because the steep learning curve encountered with some new transceivers simply didn't exist with the IC-756."

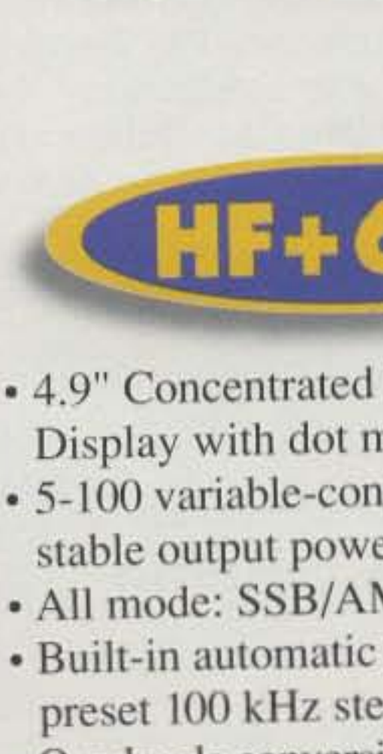
– *QST*, May 1997

ICOM's IC-756: See and HEAR the Performance

Advanced features, in the spirit of the IC-781.
But at a real down-to-Earth price.

HF+6M!

- 4.9" Concentrated Information LCD Display with dot matrix characters
- 5-100 variable-control watts of 100% stable output power (5-40 W on AM)
- All mode: SSB/AM/FM/CW/RTTY
- Built-in automatic antenna tuner with preset 100 kHz steps – RX and TX
- Quadruple conversion superheterodyne (triple conversion on FM)



- **True** dual watch (2 signal simultaneous reception)
- Twin passband tuning
- 2 slots for optional filters
- 101 memory channels
- High performance memory keyer
- Voice synthesizer (opt. UT-102 req.)
- Noise Reduction (NR)
- Auto DSP controlled notch filter
- Selectable Audio Peak Filter (APF)
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IF-DSP

"(Our IC-756) even worked on atmospheric noise, and it did not exhibit that annoying hollow sound we've noticed on some other DSP NR systems.

The ability to tweak transmit audio to taste was a real plus. Everyone's voice is different, and this DSP feature bursts through the old 'one size fits all' mentality…."

– *QST*, May 1997

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Options required for PC programming:
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third party serial cable with pins 1-8 & 20

WATCH AN IC-756 WORKING DEMO

QRX and let John Dunker, W9UR, take you on a 45 minute guided tour through the IC-756.

Visit your participating authorized ICOM dealer to view the video. John will walk you through the on-screen function key operations, memory settings, and band condition controls, plus offer some helpful tips to HF newcomers.

VALUE

Step up to a higher performance rig without paying a higher price.

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um complex, and it operates on ceremonial occasions, typically once a year, on 17.2 kHz using the callsign 7S6SAQ. The site, complete with six antenna towers and the 200 KW transmitter, is managed by Telia Mobitel (Telia AB), a Swedish mobile telephone company, and the radio museum of the Radio Historical Society of West Sweden.

Natural Radio

Natural Radio Background. Parts of the sub-basement, especially from about 100–11,000 Hz (0.1 to 11 kHz), are thick with "Natural Radio" emissions. These are signals from lightning storms, the Aurora Borealis (the Northern and Southern Lights), and the Earth's magnetic field, as the signals interact with the ionosphere and the Earth's magnetosphere. Many "sounds" are associated with Natural Radio; they occur at such low frequencies that they can be received and turned into distinctive sounds (fig. 1).

Atmospherics and Tweeks. Probably the easiest sub-basement emission you can detect is the atmospheric phenomenon known as "atmospherics" or "'sferics." Radio emissions from electrical storms worldwide interact with the Earth's magnetic field to create the audible sound of pops, chirps, and tweeks. Lightning-stroke energy is released at all frequencies simultaneously—from "DC to light," so to speak—with the greatest energy from 100 Hz to 11 kHz. Atmospherics follow the surface as groundwaves.

At night atmospherics may take on a musical pinging, ringing, or dripping characteristic, and so are known as *tweeks*. They are believed to be caused by lightning impulses that travel and disperse in resonant ducts or waveguides formed by the Earth's surface and the lower (D and E) ionospheric layers. Tweeks are centered around 1.5 to 2 kHz; they can change on an hourly basis, and from night to night and season to season.

Whistlers. Whistlers are the most common Natural Radio sound, other than simple lightning static. Although we don't completely understand their cause, we do know they are bursts of ELF/VLF radio energy initiated by lightning strikes, which appear to fall in pitch when listened to on a "whistler receiver." Whistlers can begin at over 10,000 Hz and fall to less than 200 Hz. Most of them range from 6,000 Hz down to 500 Hz.

You hear whistlers a few seconds after the lightning stroke or flash's "pop." They can be electrically ducted, traveling from one hemisphere and polar area to the other. You'll hear the most whistlers between midnight and an hour after sunrise. Other close relatives include strange "risers" and "hooks," plus other hissing, rushing, and blowing sounds, including crackling and popping from electrical storms and the so-called "dawn chorus."

The Chorus—Dawn and Otherwise. A "chorus train" is produced by lightning stroke impulses interacting with the Earth's magnetic field. Researchers believe the chorus is related to the Aurora

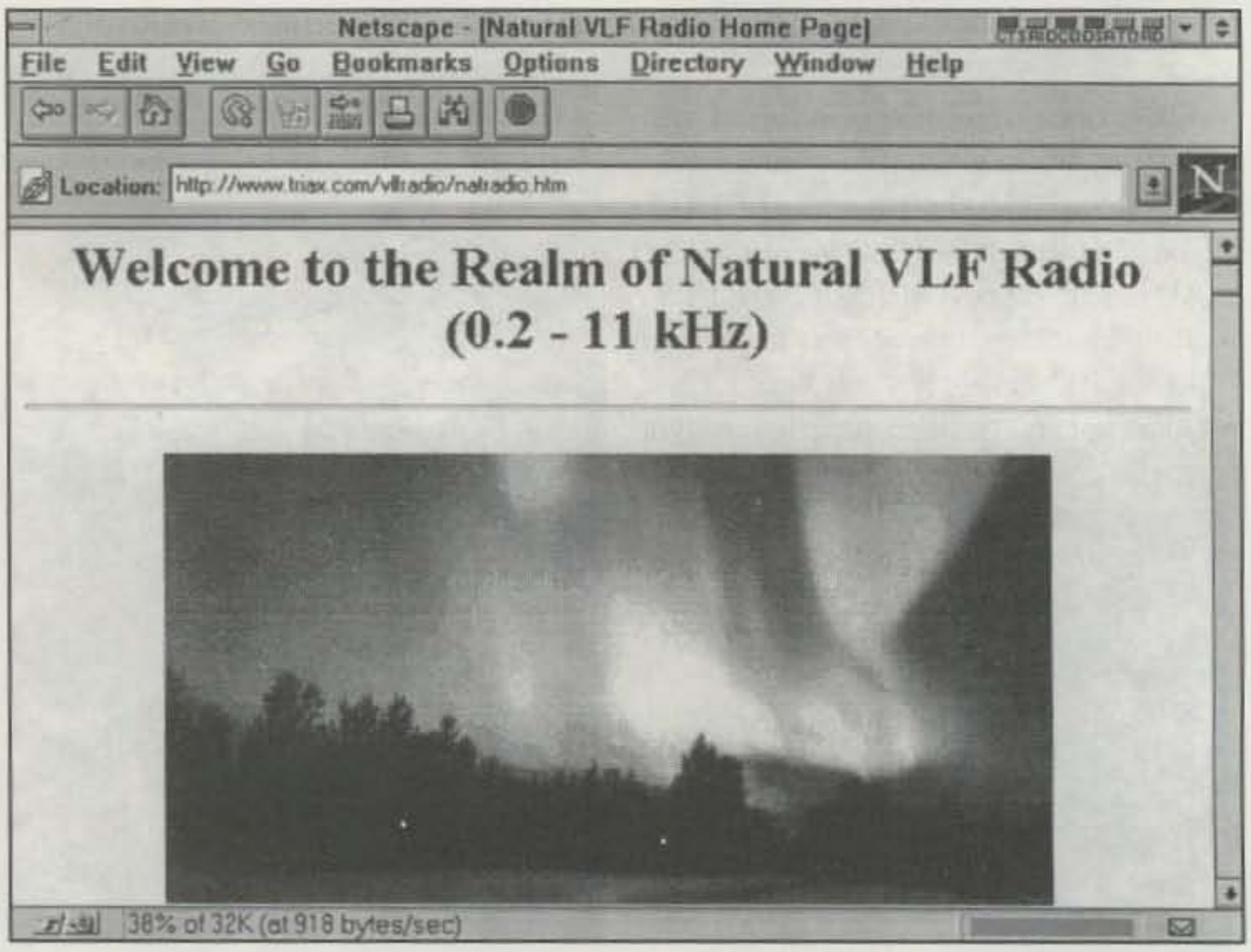


Fig. 1– Steve McGreevy's Natural VLF Radio Home Page includes a description of Natural Radio Sounds, along with actual sound bites. Shown is an auroral photo taken by Steve in northern Manitoba, Canada in August 1996. The Web page is at <http://www.triax.com/vlfradio/natradio.htm>.

Borealis of the Northern Hemisphere and the Aurora Australis of the Southern Hemisphere. You may hear the "auroral chorus" along with visual displays.

The chorus actually is several types of sounds mixed together. It resembles birds chirping; at other times it is frogs croaking or dogs barking. The chorus is heard shortly after sunrise; the chorus trains occur in bursts of chirps and squawks over about 2 to 5 seconds. It occurs several times a month during high sunspot activity, after solar flares or coronal ejections on the Sun barrage the magnetosphere with charged particles.

Man-Made and Dangerous Sub-Basement Emissions

Manmade Sub-Basement Emissions. Power-line "hum" from alternating current (AC) electric wires is a deterrent to sub-basement band listening. If you switch on an ELF/VLF receiver in your home, you probably won't hear anything but hum. Why is this?

While convenient for easy transmission and voltage transformation, AC lines generate hum. Most electrical "grids" cause the 50 or 60 Hz current to generate harmonics (multiples of 50 of 60 Hz, depending on where you live in the world), causing hum and buzz. Often the only effective solution to AC powerline hum is to find a receiving spot far away from power poles and wires.

Dangerous Sub-Basement Emissions. For years scientists have been concerned with the potentially dangerous effects of human exposure to ULF/ELF/VLF electric and magnetic fields, common in homes and businesses using electrical appliances, including video display terminals (VDTs). As yet there is no definitive answer to how such exposure from computers and some other home appliances actually affects your health.

High-energy ionizing radiation (X-ray) emission generally isn't a VDT health risk. Although X-rays are produced by VDTs, they're largely absorbed by the thick screen glass. VDT microwave and ultraviolet radiation usually is well within safety limits.

However, attention has focused on ULF/ELF/VLF nonionizing radiation, which may have a biological effect. Many household items, such as VDTs, produce electric and magnetic fields; some studies indicate that such fields can cause miscarriage, birth defects, or cancer. A great deal more research is needed.

Underground and Cave Communications

Cave communications presents many technical challenges. Such communications are of special importance to cave rescue organizations and to governments, which need dependable underground communications in hardened operations and warfighting centers.

Radio signals at more conventional frequencies are absorbed by rock and are not suitable for communication between caves and the surface. Since conventional radio is of limited use, special techniques must be used. Low-frequency radiation and induction, and earth current communications, represent viable alternative approaches to underground and cave-related speleological (cave exploring) communications problems.

Low Frequency Radiation and Induction. As the frequency is reduced, absorption by rock also is reduced, and radio in the VLF and ELF bands can be used productively for "through rock" radio. Unfortunately, a radio antenna needs to be of a length that's a significant proportion of a wavelength. Appropriately long antennas are impractical in small cave passages, so very short, compact antennas are used—antennas that work, but inefficiently.

Conventional radio uses the radiated EM field, observed at a distance—the *far field*. Closer is the *near field*, which includes the electric electrostatic field and the magnetic induction field. Unlike the radiated field, which transmits for a distance, the induction field decays rapidly and limits communications, but this usually isn't a problem in short-range cave communications.

You can effectively generate this "cave-friendly" induction field using a comparatively small antenna, often a simple multiturn loop spread on the ground. A number of cavers have experimented with VLF induction radio on 27 kHz FM.

Earth Current Communication. A method of communication that reportedly was used during World War I for front-line communications, and periodically reinvented by electronics enthusiasts, is earth current or baseband communications. Here an amplified audio signal is transmitted into a pair of widely spaced ground rods and received through an amplifier attached to another pair at a distance. The earth current not only propagates along the surface, but it also penetrates the earth and can be received using underground ground rods. Although results aren't as good as those achieved with induction radio, a baseband (audio) earth current system is simple. Carrier-based earth current transmitters generate an induction field as well, so that a widely spaced pair of ground rods will generate an induction signal over a much wider area than will a small loop. ■

(To Be Continued)

When you bought all those tools, you knew they would come in handy one day. Here's a clever idea you can use on that next amplifier project.

How To Make Your Own Tank Circuit Coil Form

BY BILL PICKINS*, WB5NGF

While building a 160 meter amplifier recently, I found it nearly impossible to buy a tank coil. In an old Barker & Williamson catalog I found the exact coil I needed. I called around the country trying to find one. No one stocked them. I called B & W and was informed that the coils were only made on special order, and there was a $50 fee just to set up the machine. I had several coils, but none were long enough. I needed a lot of inductance, since I had a high plate impedance to match. The calculated value of inductance was 32 microHenrys.

Using the ARRL inductance slide calculator, I found the necessary dimensions for 32 microHenrys. Since I wanted to use #10 wire, the dimensions required a 3 inch diameter, four turns per inch, for a length of 9 inches.

I purchased some plexiglas at the local glass store, and they cut it 3 inches wide and 2 feet long. It was 1/4 inch thick. I cut two pieces 10 inches long for my coil form.

I marked all four edges every 1/4 inch for a total of 36. I then set up my router table with a 1/8 inch straight bit and set the fence to allow a cut slightly less than the diameter of #10 wire. With the router table set up, I cut the 36 slots for the wire on all four edges of the plexiglas. I made one the mirror image of the other so that the extra one inch would be on the same end of both pieces.

I then set up the router table with a 1/4 inch straight bit. I set up the table to cut a quarter inch slot down the exact center of each piece for a distance of 5 inches. This has to be done in a mirror image to keep the extra one inch on each piece at the same end. The two pieces were then slipped together to form a long cross and secured with epoxy cement at several places.

I next wound a loose coil slightly larger in diameter than 3 inches. I found that a spray paint can is ideal. It has a concave bottom that allows the end of the wire to be secured by clamping with vise-grip pliers to the bottom rim of the can. The necessary turns were wound on the paint can and then removed. They were larger than the plexiglas form, but could be "threaded" onto it as one might put a nut on a bolt. I made sure that each turn fit tightly into the slots and worked the wire tight. This could only be done by drilling a 1/8 inch hole in each end of the form to secure the wire end. I then tightened the turns into the slots and secured to the 1/8 inch hole in the opposite end.

Several fellow amateurs have commented that the coil looks factory made. If smaller wire is to be used, the same procedure will work. Just use a band saw, coping saw, or hack saw to make slots the size of the wire being used.

*914 Sixth Street, Leland, MS 38756

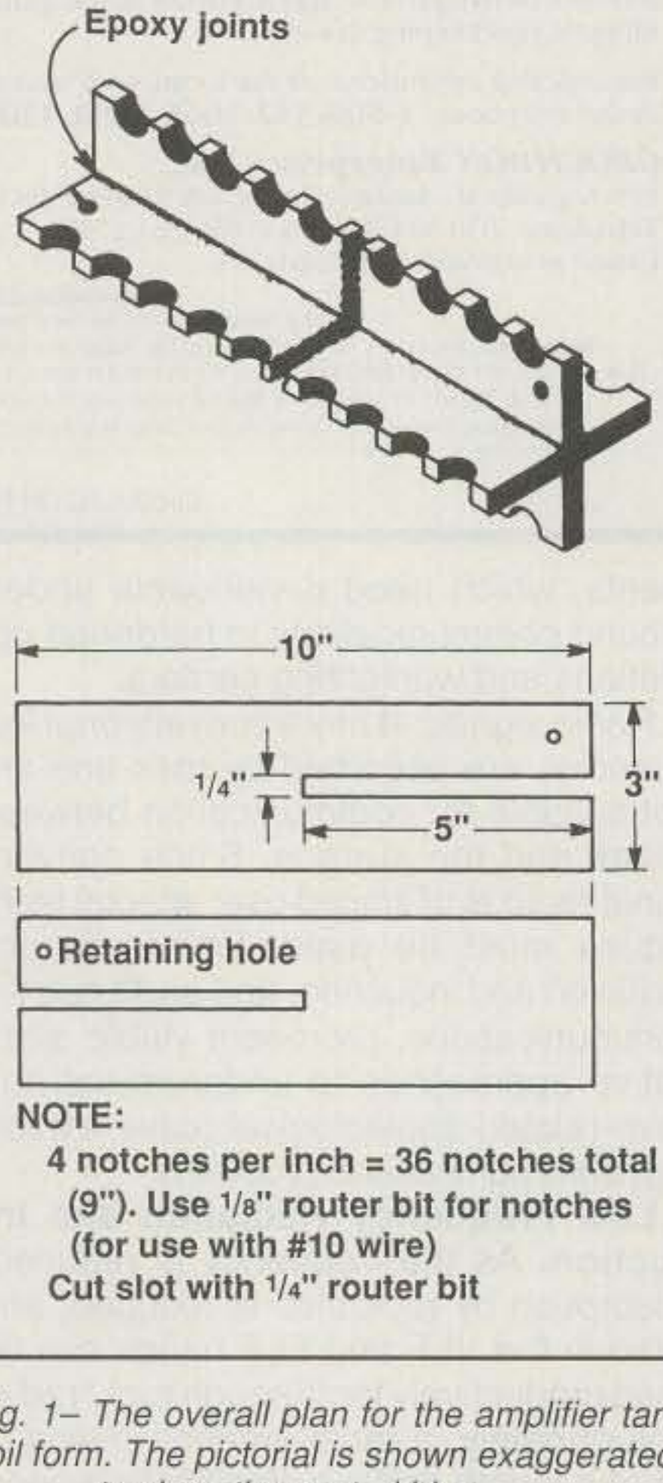
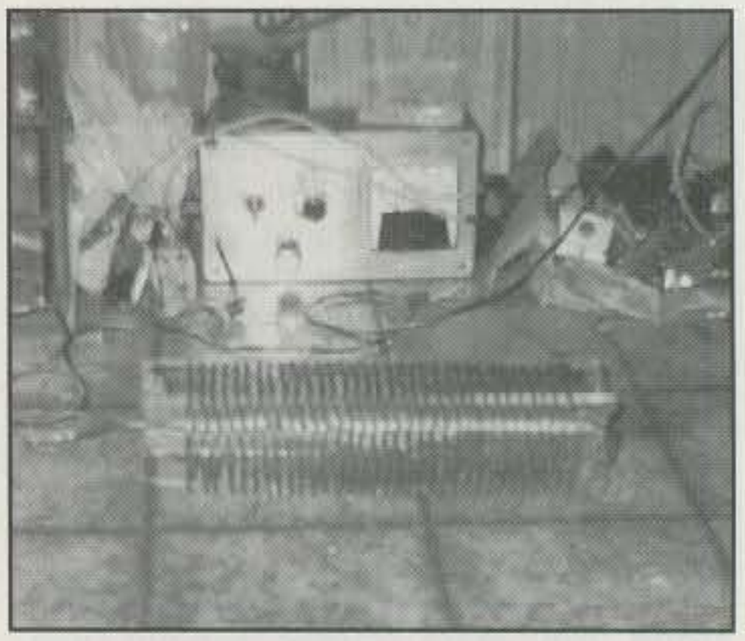
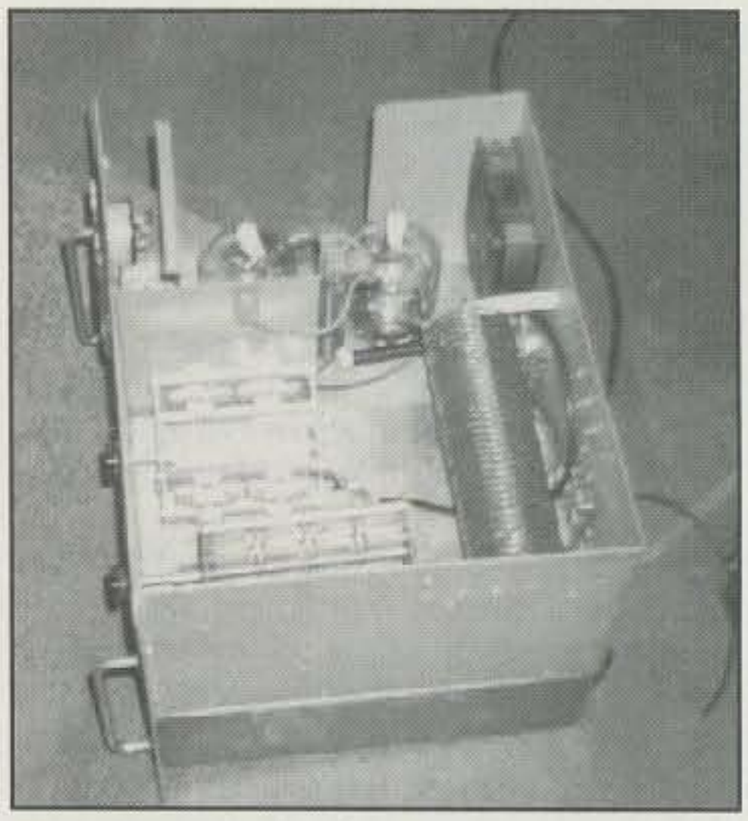


Fig. 1– The overall plan for the amplifier tank coil form. The pictorial is shown exaggerated to show the central idea.



The completed tank coil on the workbench prior to installation.



Here is the completed amplifier, which works great. It is now in use at AD4X.

I have found through experience that it is wise to make a coil longer than you need. It is easier to cut off turns than it is to add them.

The amplifier worked perfectly and loaded up on the first try. It is now in use by my friend David Baxter, AD4X. ■

AMERITRON . . . 800 Watts . . . $795

meritron AL-811H gives you four 811A tubes, 800 watts, superior quality -- for less money -- than he competitor's 3 tube 600 watt unit . . . Why settle for less power, less quality and pay more money?

AL-811H
$795
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AL-811
$649
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Only the Ameritron AL-811H gives you *four fully neutralized* 811A transmitting tubes. You get absolute stability and superb performance on higher bands that can't be matched by un-neutralized tubes.

Ameritron mounts the 811A tubes *vertically* -- not horizontally -- to prevent hot tube elements from sagging and shorting out. Others, using *potentially damaging horizontal mounting*, require special 811A tubes to retard sagging and shorting.

A *quiet*, powerful computer grade blower draws in plenty of cool air. It *pressurizes* the cabinet and efficiently cools your 811A tubes. Our air flow is so quiet, you'll hardly know it's there -- unlike noisy, poorly chosen blowers.

You also get efficient full size heavy duty tank coils, full height computer grade capacitors, heavy duty high silicon core power transformer, slug tuned input coils, operate/standby switch, transmit LED, ALC, dual meters, QSK compatibility with QSK-5 plus much more.

AL-811 has three 811A tubes and gives 600 Watts output for only $649.

Kilowatt AL-80B doubles average SSB power

AL-80B
$1195

The AL-80B kilowatt desktop linear can *double* your *average* SSB power output with high-level RF processing -- runs cooler because its 3-500Z completely turns off between words. It saves hundreds of watts wasted as heat.

You get a *full* killowatt PEP *output* from a whisper quiet desktop linear. It's a compact 8½x14x15½ inches and plugs into your nearest 120 VAC wall outlet. Covers all bands 160-15 Meters, including WARC and MARS bands.

You get 1000 watts *output* on SSB, 850 watts *output* on CW, 500 watts *output* on RTTY, an extra heavy duty power supply, 3-500Z tube, nearly 70% efficiency, tuned input, Pi/Pi-L output, inrush current protection, multi-voltage transformer, dual Cross-Needle meters, QSK compatibility, Two-Year Warranty, and much, much more! Made in U.S.A.

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AL-800H
$2295
Two tubes
1500 Watts plus

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Call your dealer for your best price!

AL-800
$1595
Single tube
1250 Watts

AMERITRON's new AL-800/H amps cover 160-15 Meters including WARC bands. The AL-800 has a single Eimac™ 3CX800A7 tube and produces 1250 Watts PEP. The AL-800H has two 3CX800A7s giving 1500 Watts *plus*.

Both amps have an adjustable slug tuned input circuit, grid protection, ALC control that is front panel adjustable,vernier reduction drives, heavy duty 32 pound grain oriented silicone steel core transformers and high capacitance computer grade filter capacitors.

These amplifiers have multi-voltage operation (14 user selectable AC line voltage from 90-140; 200-250 VAC), quiet pressurized ventilation systems, dual illuminated Cross-Needle meters that read peak forward and reflected power, SWR, high voltage, grid current and plate current.

Vernier reduction drives make tuning adjustments smooth and easy. Ameritron's exclusive *Step-Start Inrush Protection*™ stops damage to your amplifier from inrush current. Ameritron amps feature an attractive Lexan front panel decal and superior, all metal construction -- it's built to last! Ultra compact desktop size is perfect for your operating station. 8½x16½x14¼".

AMERITRON no tune Solid State Amplifiers

Ameritron ALS-500M Mobile no tune Solid State Amp has 500W out, covers 1.5-22 MHz

ALS-500M
$799
Suggested Retail

Ideal Mobile amplifier -- uses 13.8 Vdc mobile electrical system, very compact 3½x9x15 in., extremely quiet, 500W output, 1.5-22 MHz coverage, instant bandswitching, no tuning, no warm up, no tubes, SWR protected.

Ameritron ALS-600 no tune Solid State FET amp includes heavy duty power supply, 600 Watts out

ALS-600
$1299
Suggested Retail

No tuning, no fuss, no worries -- just turn it on and operate. *Includes* AC power supply, 600 W output, continuous 1.5-22 MHz coverage, instant bandswitching, *fully* SWR protected, extremely quiet, very compact. Amp is 6x9½x12 inches.

AMERITRON brings you the finest high power accessories!

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Replace 5 coax feedlines with a single coax. 1.2 SWR at 250 MHz. Useable to 450 MHz. 1kW at 150 MHz. **RCS-4, $139.** 4 position remote HF switch.

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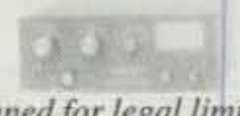
Oil cooled 50 ohm dummy load handles 1500 W for 5 minutes. SWR under 1.2 up to 30 MHz. Low SWR to 400 MHz.

ICP-120/240-$79

Stops power-up inrush current and absorbs momentary high voltage spikes to your amplifier. ICP-120 for 110-120V, ICP-240 for 220-240 V.

ATR-15 Legal Limit Antenna Tuner . . . $399

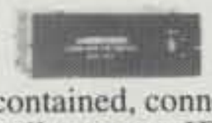


Designed for legal limit amplifiers! Covers 1.8-30 MHz, peak reading SWR/Wattmeter, 6 pos. antenna switch, 1:1 or 4:1 balun.

ARB-700 amp-to-radio interface . . . $29.95

Protects your costly transceiver from damage by *keying line transients*, steady state current and excessive voltages.

QSK-5 Pin Diode T/R Switch . . . $349



Self-contained, connects externally to most HF amps. Handles 2.5 KW PEP, 2 KW CW. Six times faster than vacuum relay. 6x4x9½ in.

AMERITRON offers the best selection of legal limit amplifiers

AMERITRON's* legal limit *amplifiers use Peter Dahl super heavy duty Hypersil® power transformer capable of 2500 watts!

Ameritron's most powerful Amplifier

AL-1500 *with Eimac® 8877 ceramic tube*
$2695
Suggested Retail

Ameritron's most powerful amplifier uses the herculean Eimac® 8877 ceramic tube. It's so powerful that 65 watts drive gives you the full legal output -- and it's just loafing because the power supply is capable of 2500 Watts PEP.

Ameritron's toughest legal limit Amp

AL-1200 *with Eimac® 3CX1200A7 tube*
$2195
Suggested Retail

Get ham radio's *toughest* tube with the Ameritron AL-1200 -- the Eimac 3CX1200A7. It has a 50 watt control grid dissipation. What makes the Ameritron AL-1200 stand out from other legal limit amplifiers? The answer: A super heavy duty power supply that loafs at full legal power -- it can deliver the power of more than 2500 watts PEP two tone output for a half hour.

Ameritron's most for your money legal limit linear amp with a pair of 3-500Z tubes

AL-82
$2095
Suggested Retail

This linear gives you full legal output using a *pair* of 3-500Zs. Most competing linears using 3-500Zs *can't* give you 1500 watts because their lightweight power supplies can't use these tubes to their full potential.

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CIRCLE 155 ON READER SERVICE CARD

Announcing:

The 41st Annual CQ World-Wide WPX Contest

SSB: March 28-29, 1998

CW: May 30-31, 1998

Starts: 0000 GMT Saturday Ends: 2400 GMT Sunday

I. Contest Period: Only 36 hours of the 48 hour contest period permitted for Single Operator stations. **Off periods must be a minimum of 60 minutes in length and clearly marked in the log. Listening time counts as operating time**. Multi-Operator stations may operate the full 48 hours.

II. Objective: Object of the contest is for amateurs around the world to contact as many amateurs in other parts of the world as possible during the contest period.

III. Bands: The 1.8, 3.5, 7, 14, 21, and 28 MHz bands may be used. No WARC bands.

IV. Types of Competition (for all categories): All entrants must operate within the limits of their chosen category when performing any activity that could impact their submitted score. Transmitters and receivers must be located within a 500 meter diamater circle or within the property limits of the station licensee, whichever is greater. All antennas must be physically connected by wires to the transmitters and receivers used by the entrant. Only the entrant's callsign can be used to aid the entrant's score.

1. Single Operator (Single band and All band)

(a) Single Operator stations are those at which one person performs all of the operating, logging, and spotting functions. **Only one transmitted signal is allowed at any time.**

(b) **Low Power:** Same as 1(a), except that **output power shall not exceed 100 watts.** Stations in this category will compete with other low power stations only.

(c) **QRP/p:** Same as 1(a) except that **output power shall not exceed 5 watts.** Stations in this category will compete with other QRP/p stations only.

(d) **Assisted:** Same as 1(a) except the **passive use (no self-spotting) of DX spotting nets or other forms of DX alerting are permitted.** Stations in this category will compete with other Assisted stations only.

(e) **Tribander/Single Element (TS):** Tribander (any type) with a single feedline from the transmitter to the antenna and single element (TS) category. During the contest, an entrant shall use only one (1) tribander for 10, 15, 20 meters and single element antennas on 40, 80, and 160.

(f) **Band Restricted (BR):** An eligible entrant must hold a license restricting operation to less than the six (6) contest bands (160, 80, 40, 20, 15, 10) on both modes. Examples of such licenses are: Novice, Technician, 4th class license, etc. Since frequency privileges differ from country to country, competition is within one's own country.

(g) **Rookie (R):** An entrant in this category shall have been licensed as a radio amateur three (3) years or less.

2. Multi-Operator (All band operation only)

(a) **Single-Transmitter:** Only one transmitter and one band permitted during the same time period (defined as 10 minutes).

(b) **Multi-Transmitter:** No limit to transmitters, but only one signal and running station allowed per band. *Note:* All transmitters and receivers must be located within a 500 meter diameter area or within property limits of the station licensee, whichever is greater. **All operation must take place from the same operating site.**

V. Exchange: RS(T) report plus a progressive contact three-digit serial number starting with 001 for the first contact. (Continue to four digits if past 999.) Multi-operator multi-transmitter stations use separate serial numbers for each band.

VI. Points:

(a) Contacts between stations on different continents are worth three (3) points on 28, 21, and 14 MHz and six (6) points on 7, 3.5, and 1.8 MHz.

(b) Contacts between stations on the same continent, but different countries, are worth one (1) point on 28, 21 & 14 MHz and two (2) points on 7, 3.5, and 1.8 MHz. **Exception: For North American stations only—contacts between stations within the North American boundaries are worth two (2) points on 28, 21, and 14 MHz and four (4) points on 7, 3.5, and 1.8 MHz.**

(c) Contacts between stations in the same country are permitted for multiplier credit but are worth zero (0) points.

VII. Multiplier: The multiplier is the number of **"valid"** prefixes worked. A PREFIX is counted only once regardless of the number of times the same prefix is worked.

(a) A PREFIX is the letter/numeral combination which forms the first part of the amateur call. Examples: N8, W8, WD8, HG1, HG19, KC2, OE2, OE25, etc. Any difference in the numbering, lettering, or order of same shall constitute a separate prefix. A station operating from a DXCC country different from that indicated by its callsign is required to sign portable. The portable prefix must be an authorized prefix of the country/call area of operation. In cases of portable operation, the portable designator will then become the prefix. Example: N8BJQ operating from Wake Island would sign N8BJQ/KH9 or N8BJQ/NH9. KH6XXX operating from Ohio must use an authorized prefix for the US 8th district (W8, K8, etc.). Portable designators without numbers will be assigned a zero (Ø) after the second letter of the portable designator to form the prefix. Example: N8BJQ/PA would become PAØ. All calls without numbers will be assigned a zero (Ø) after the first two letters to form the prefix. Example: XEFTJW would count as XEØ. Maritime mobile, mobile, /A, /E, /J, /P or interim license class identifiers do not count as prefixes.

(b) Special event, commemorative, and other unique prefix stations are encouraged to participate. Prefixes must be assigned by the licensing authority of the country of operation.

VII. Scoring:

1. Single Operator: (a) All Band score = total QSO points from all bands multiplied by the number of different prefixes worked (prefixes are counted only once). (b) Single Band score = total QSO points on the band multiplied by the number of different prefixes worked.

2. Multi-Operator: Scoring is the same as Single Operator, All Band.

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MFJ's *lighted* Cross-Needle Meter shows you SWR, forward and reflected power *simultaneously*. Read peak/average on 300/30 Watt ranges.

$149.95 MFJ-949E

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MFJ's *QRM-Free Pre-Tune™* lets you pre-tune your MFJ-949E *off-the-air* into its built-in dummy load.

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A *full size* -- 3/4 inch diameter by 5 inches -- non-inductive 50 ohm dummy load *easily* handles 300 watts of abusive tune-up power.

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The inductor switch is *custom* designed to withstand extremely high RF voltages and currents.

Superior Cabinet

Each MFJ-949E cabinet is chemically treated and has a new tough scratch-proof *vinyl* cladding. You won't find a tougher, longer lasting finish anywhere.

Detailed logging scales and legends are *permanently* silk screened on a real aluminum front panel and back panel.

Superior Construction

Every MFJ-949E uses Teflon® insulating washers, wing-nut for ground post, fire-retardant epoxy glass PC board, heavy .063 inch thick aluminum chassis, heavy gauge wire, custom cabinet.

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Every MFJ-949E is backed by MFJ's famous *No Matter What™* unconditional warranty. We'll repair or replace your MFJ-949E (at our option) *no matter what* for a full year.

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MFJ's *World famous* 3 kW Tuner

MFJ-989C **$349.95** *More hams use MFJ-989s than any other 3KW tuner in the world!*

The rugged MFJ-989C handles 3KW PEP SSB and covers 1.8 to 30 MHz including all MARS and WARC bands.

MFJ's new *AirCore™* Roller Inductor, three-digit turns counter and spinner knob gives you exact inductance control for absolute minimum SWR.

You can match dipoles, verticals, inverted vees, random wires, beams, mobile whips, shortwave -- nearly any antenna. Use coax or balanced lines.

You get everything you've ever wanted in a high power, full featured antenna tuner -- widest matching range, lighted Cross-Needle SWR/Wattmeter, antenna switch, built-in dummy load, balun, convenient flip stand -- all in a sleek, compact cabinet.

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MFJ-971 **$89.95** **Tunes** coax, balanced lines, random wire 1.8-30 MHz. Cross-Needle Meter. SWR, 30/*300 or 6 watt QRP* ranges. 6x6½x2½ in.

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MFJ-941E **$109.95** **The** new MFJ-941E gives you a 300 watt PEP tuner with *lighted* Cross-Needle Meter. Covers 1.8-30 MHz.

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

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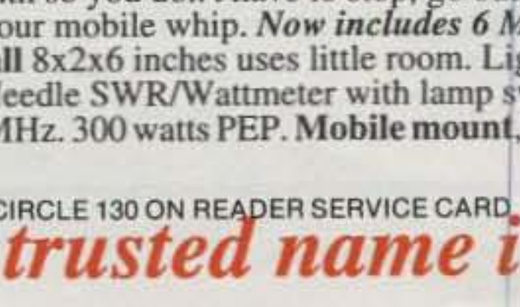
2 Knob Differential-T™ Tuner



MFJ-986 **$299.95** **The** MFJ-986 Differential-T™ 2 knob tuner uses a differential capacitor to make tuning foolproof and easier than ever. It ends constant re-tuning with broadband coverage and gives you minimum SWR at only one best setting. 3 KW PEP. 1.8-30 MHz.

Roller inductor makes tuning smooth and easy. Turns counter lets you quickly re-tune to frequency.

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MFJ's mobile Tuner

MFJ-945E **$99.95**

Don't leave home without this mobile tuner! Let the MFJ-945E extend your antenna bandwidth so you don't have to stop, go outside and adjust your mobile whip. ***Now includes 6 Meters***.

Small 8x2x6 inches uses little room. Lighted Cross-Needle SWR/Wattmeter with lamp switch. 1.8-30 MHz. 300 watts PEP. **Mobile mount**, MFJ-20, $4.95.

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MFJ-906 **$79.95**

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MFJ's smallest Versa Tuner

MFJ-901B **$69.95**

The MFJ-901B is our smallest --5x2x6 inches --(and most afford- able) 200 watt PEP tuner -- when both your space and your budget is limited. Great for matching solid state rigs to linear amps.

MFJ's random wire Tuner

MFJ-16010 **$39.95**

Operate all bands anywhere with any transceiver with the MFJ-16010. It lets you turn a random wire into a transmitting antenna. 1.8-30 MHz. 200 watts PEP. Ultra small 2x3x4 inches.

MFJ's VHF or UHF Tuners

MFJ-921 or MFJ-924 **$69.95**

MFJ-921 covers 2 Meters/220 MHz. **MFJ-924** covers 440 MHz. SWR/Wattmeter. 8x2½x3 in. Simple 2-knob tuning for mobile or base.

MFJ's artificial RF Ground

MFJ-931 **$79.95**

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

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3. A station may be worked once on each band for QSO point credit. **Prefix credit can be taken only once.**

IX. QRP/p Section: Single Operator only. Output power must not exceed 5 watts. **You must indicate QRP/p on the summary sheet and state the actual maximum output power used for all claimed contacts.** Results will be listed in a separate QRP/p section. Certificates will be awarded to each top-scoring QRP/p station in the order indicated in Section XI.

X. Low Power Section: Single Operator only. Output power must not exceed 100 watts. **You must indicate low power on the summary sheet and state the actual maximum output power used for all claimed contacts.** Results will be listed in a separate low power section and certificates will be awarded to each top-scoring low power station in the order indicated in Section XI.

XI Awards: Certificates will be awarded to the highest scoring station in each category listed under Section IV—

1. In every participating country;

2. In each call area of the United States, Canada, Australia, and Asiatic Russia.

All scores will be published. To be eligible for an award, a Single Operator station must show a minimum of 12 hours of operation and Multi-Operator stations must show a minimum of 24 hours of operation.

A single band log will be eligible for a single band award only. If a log contains more than one band, it will be judged as an all band entry unless specified otherwise.

In countries or sections where entries justify, second- and third-place awards will be made.

XII. Trophies, Plaques, and Donors:

SSB

Single Operator, All Band

WORLD—Stanley Cohen, WD8QDQ
USA—Atilano de Oms, PY5EG
EUROPE—Jim Hoffman, N5FA
SOUTH AMERICA—Ron Moorefield, W8ILC
OCEANIA—Phillip Fraizer, K6ZM Memorial
AFRICA—Peter Sprengel, PY5CC
*JAPAN—The DX Family Foundation
CANADA Low Power—Amateur Radio League of Alberta
WORLD QRP/p—Dayton Amateur Radio Assn.
USA QRP/p—Doug Zwiebel, KR2Q

Single Operator, Single Band

WORLD—John N. Reichert, N4RV
WORLD Low Power—Verne Fowler, W8BLA
WORLD 7 MHz—William D. Johnson, KVØQ
OCEANIA—D. Craig Boyer, AH9B
USA 28 MHz Novice/Tech—Jon Engelhardt, KAØZFX
USA 21 MHz—Bernie Welch, W8IMZ Memorial
USA 3.7 MHz—Lance Johnson Digital Graphics

Multi-Operator, Single Transmitter

USA—D. Craig Boyer, AH9B

Multi-Operator, Multi-Transmitter

NORTH AMERICA—Burt Curwen, KL7IRT Memorial
USA—Glenn Tracey, KC3EK

Contest Expedition

WORLD—Kansas City DX Club

CW

Single Operator, All Band

WORLD—Steve Bolia, N8BJQ
USA—Steve Bolia, N8BJQ
EUROPE—Ivo Bezer, 5B4ADA
OCEANIA—Tom Morton, KT6V
CANADA—Radio Amateurs of Canada (RAC)
*JAPAN—The DX Family Foundation
CANADA Low Power—Amateur Radio League of Alberta
USA QRP/p—Richard Arland, K7YHA

Single Operator, Single Band

WORLD—Pedro Piza, Sr., KP4ES Memorial
WORLD 7 MHz—William D. Johnson, KVØQ
WORLD 3.5 MHz—Lance Johnson Digital Graphics
OCEANIA—D. Craig Boyer, AH9B
USA—Kansas City DX Club
USA 28 MHz—Bernie Welch, W8IMZ Memorial
USA 21 MHz—Wayne Carroll, W4MPY

Multi-Operator, Single Transmitter

WORLD—Ron Blake, N4KE
USA—Austin Regal, N4WW

Contest Expedition

WORLD—Ed Roller, K4IA

Combined SSB/CW

Single Operator, All Band

WORLD—Al Slater, G3FXB Memorial
EUROPE—Les Nouvelles DX Group
USA—D. Craig Boyer, AH9B

Club

(SSB & CW)

WORLD—*CQ* Magazine
USA—Oklahoma DX Association

**Donor is responsible for this trophy.*

A station winning a World trophy will not be considered for a sub-area award. That trophy will be awarded to the runner-up for that area if the returns justify the award.

XIII. Club Competition: A trophy will be awarded each year to the club or group that has the highest aggregate scores from logs submitted by members. The club must be a local group and not a national organization. Participation is limited to members operating within a local geographical area **(exception: DXpeditions especially organized for operation in the contest and manned by members).** Indicate your club affiliation on the summary sheet. To be eligible for an award, a minimum of three logs must be received from a club.

XIV. Log Instructions:

(a) All times must be in GMT. All breaks must be clearly marked. Single Operator and Multi-Single logs must be submitted in chronological order. Multi-Multi logs must be submitted chronologically by band.

(b) All sent and received exchanges are to be logged.

(c) Prefix multipliers should be entered only the FIRST TIME they are worked.

(d) Logs must be checked for duplicate contacts, correct QSO points, and prefix multipliers. Duplicate contacts must be clearly shown. Computerized logs must be checked for typing accuracy. Original logs may be requested if further cross-checking is required.

(e) **An alpha/numeric check list of claimed PREFIX multipliers must be submitted with your log.**

(f) Each entry must be accompanied by a Summary Sheet listing all scoring information, the category of competition, and the entrant's name and mailing address in BLOCK LETTERS. Also submit a signed declaration that all contest rules and regulations for amateur radio in the country of operation have been observed.

(g) Official log and summary sheets are available from *CQ* for an SASE with sufficient postage *(please send in early)*. If official forms are not available, you may make your own.

(h) Disk submission of logs is encouraged. CT's *.BIN file or *.ALL file, N6TR's *.DAT file, NA's *.QDF file, or *.DBF files are preferred. An ASCII file containing all required information is also acceptable. Disk files must be in chronological order for Single Operator and Multi-Single stations and chronological by band for Multi-Multi stations. Please label your disks and name your files with the call used (for example: N8BJQ.BIN or N8BJQ.DAT). Disks will be **required** from top-scoring stations if requested.

(i) Logs may be submitted via e-mail to N8BJQ@ERINET.COM. Binary files may be sent providing they are in MIME or UUENCODE format. Internet submissions will also require a summary sheet and prefix multiplier sheet. Logs received via e-mail will be confirmed via e-mail upon receipt.

XV. Disqualification: Violation of amateur radio regulations in the country of the contestant, violation of the rules of the contest, unsportsmanlike conduct, taking credit for excessive duplicate contacts, unverifiable QSOs or multipliers will be deemed sufficient cause for disqualification. An entrant whose log is deemed by the WPX Contest Committee to contain a large number of discrepancies may be disqualified as a participant operator or station for a period of one year. If within a five year period the operator is disqualified a second time, he will be ineligible for any *CQ* contest awards for three years.

The use of non-amateur means—such as telephones, telegrams, packet, etc.—to solicit contacts or multipliers **during** the contest is unsportsmanlike and the entry is subject to disqualification. Actions and decisions of the WPX Contest Committee are official and final.

XIII. Deadline:

(a) All entries must be postmarked NO LATER than May 10, 1998 for the SSB section and July 10, 1998 for the CW section. E-mail logs are also subject to these deadlines. **Indicate SSB or CW on your envelope.** One extension of up to 30 days, for legitimate reasons, may be granted if requested from the Contest Director (N8BJQ). Logs postmarked after the deadline, or extension deadline if granted, may be listed in the results, but will be ineligible for any awards.

All logs go to: CQ Magazine, WPX Contest, 76 N. Broadway, Hicksville, NY 11801 USA. Questions pertaining to the WPX Contest can be sent to WPX Contest Director, Steve Bolia, N8BJQ, 7354 Thackery Road, Springfield, OH 45502 USA, or via e-mail to N8BJQ@ERINET.COM. ■

A lot of people enjoy using CW and probably quite a number set it aside once they get their license. Each has his or her own method for learning the code. In this article we follow VE3ERP's CW odyssey through the years as he learns and relearns the code.

Learn To Copy CW The Hard Way

BY GEORGE MURPHY*, VE3ERP

Press REWIND. Press STOP at the early 1930s: When I was a little kid I joined the Boy Scouts because they had a bunch of neat merit badges a kid could earn. I was especially fascinated by the Signalman badge, which would qualify me to communicate over distances farther than I could yell.

**77 McKenzie Street, Orillia, ON L3V 6A6 Canada*

There were two things you had to learn: semaphore signalling and Morse code. Semaphore required flags that you waved around, hoping the guy who was copying you could see you through the fog and would not think you were merely airing your armpits. I soon mastered semaphore and still use it occasionally on a hot summer day, but Morse code sounded like much more fun. You could use a flag, a whistle, a lamp, or, even more exciting, *electricity!* (When I was little kid, electricity was still a novelty.) I forced myself to learn Morse code by memorizing E, I, S, H; then T, M, O; then a bunch of other letters and numbers. I learned the code well enough to pass the merit badge test, then promptly forgot it. Sound familiar?

Press FAST FORWARD. Press STOP at World War II: I decided to volunteer my services to the Armed Forces as an experienced Semaphore Signalman. The very thought of valiantly flapping semaphore flags from the crow's nest of a wildly toss-

```
10 REM "CWHARD.BAS" (CW Cipher Groups) 03 MAR 97
20 CLS:X$=STRING$(79,32):DIM C$(90,3):KEY OFF
30 FOR Z=42 TO 90:READ Z$
40 C$(Z,1)=CHR$(Z):C$(Z,2)=" "+Z$
50 IF Z$="*"THEN D$="p10":GOTO 120
60 L=LEN(Z$):D$=""
70 FOR X=1 TO L:M$=MID$(Z$,X,1)
80 IF M$="."THEN N$="e30p30"
90 IF M$="-"THEN N$="e10p30"
100 D$=D$+N$:NEXT X
110 L=LEN(D$)-1:MID$(D$,L,1)="1"
120 C$(Z,3)=D$:NEXT Z
130 C$(42,1)="END":C$(45,1)="_"
140 CLS:PRINT " Current speed level is set at";S
150 PRINT " Press number in < > to set new level:"
160 FOR Z=1 TO 9:PRINT TAB(6)"<";Z;"> ";CHR$(241);
170 PRINT USING"###.# WPM";2.5+2.5*Z:NEXT Z
180 PRINT "  or < 0 > to EXIT...."
190 Z$=INKEY$:IF Z$=""THEN 190 ELSE S=ASC(Z$)
200 IF Z$="0"THEN CLS:END
210 IF S<48 OR S>57 THEN 190 ELSE S=S-48
220 SP=2.5*(S+1):S$=STR$(25*(S+1)):PLAY"MLO3t"+S$
230 CLS:PRINT " Do you want to (L)earn characters ";
240 PRINT "or (C)opy cipher groups?  (L/C)"
250 Z$=INKEY$:IF Z$="C"OR Z$="c"THEN 270
260 IF Z$="L"OR Z$="l"THEN 540 ELSE 250
270 CLS:INPUT " How many of 5-character groups";N
280 CLS:DIM A$(N*5+1):RANDOMIZE TIMER
290 LOCATE 12,27:PRINT "Sending group #   1 of";N
300 T1=TIMER:FOR Z=1 TO N*5
310 Y=INT(RND*100)
320 IF Y<44 OR Y>90 THEN Z=Z-1:GOTO 370
330 IF Y>57 AND Y<65 THEN Z=Z-1:GOTO 370
340 PLAY C$(Y,3):A$(Z)=C$(Y,1)
350 IF Z/5=INT(Z/5)THEN PLAY"p5"
360 LOCATE 12,43:PRINT USING "###";INT(1+(Z/5))
370 NEXT Z:CLS:LOCATE 12,33:PRINT ".....END....."
380 T2=TIMER:T=T2-T1:W=N/T*60
390 PLAY"p3":PLAY C$(42,3)
400 CLS:PRINT "This is what you just heard (";
410 PRINT CHR$(247);" is a pause -...-)"
420 PRINT :FOR I=1 TO Z:PRINT A$(I);
430 IF I/5=INT(I/5)THEN PRINT "  ";
440 IF I=Z THEN PRINT ""
450 NEXT I:PRINT
460 PRINT "Speed selected: about";SP;"WPM."
470 TT=(T2-T1)/60
480 PRINT "Transmission Time:";USING "##.### min.";TT
490 PRINT "Actual speed:";N;"groups ";CHR$(246);
500 PRINT " Time =";USING "###.# WPM";W
510 PRINT :PRINT "Press any key to continue..."
520 IF INKEY$=""THEN 520
530 ERASE A$:GOTO 140
540 CLS:RANDOMIZE TIMER
550 PRINT " Press 1 to hear a character or 0 to QUIT"
560 Z$=INKEY$:IF Z$=""THEN 560
570 IF Z$="0"THEN 140
580 IF Z$="1"THEN 590 ELSE 560
590 LOCATE CSRLIN-1:PRINT X$:LOCATE CSRLIN-1
600 Y=INT(RND*100):IF Y<44 OR Y>90 THEN 600
610 IF Y>57 AND Y<65 THEN 600
620 PLAY C$(Y,3)
630 PRINT" Press 2 to see the character just heard"
640 IF INKEY$="2"THEN 650 ELSE 640
650 LOCATE CSRLIN-1:PRINT X$:LOCATE CSRLIN-1
660 PRINT " "+C$(Y,1)+" "+C$(Y,2):GOTO 550
670 DATA .-.-.-,*,—..—,-...-,.-.-.-,-..-.,———
680 DATA .———,..—,...—,....-,.....,-....,—...
690 DATA —..,———.,*,*,*,*,*,..—..,*,.-,-...
700 DATA -.-.,-..,.,..-.,—.,.....,.,—,-.-,.-..
710 DATA —,-.,—,.—.,—.-,.-.,...,-,..-,....-
720 DATA .—,-..-,-.—,—..
```

Table I– VE3ERP's BASIC computer program to generate random CW cipher groups.

ing man-of-war during an Atlantic gale did not appeal to me, nor did the vision of heroically saving the garrison in the heat of battle by springing to the trench parapet and trying to flag down help from any friendly Marines who just might happen to be in the neighborhood.

I therefore opted for the romantic image of standing up in an open cockpit fearlessly signalling rude words in semaphore to the pilot of a red Fokker Triplane fast approaching from the rear. The recruiting officer advised me that most open cockpits now had canopies, so the Air Force shipped me off to learn Morse code at a Wireless School in Assinniboia, Saskatchewan. As soon as I could send "Assinniboia, Saskatchewan" in CW (at 5 words per minute it took most of the day), I passed the CW test, graduated to "artie" (R/T or radiotelephony) and promptly forgot all about CW. Sound familiar?

Press FAST FORWARD. Press STOP at 1960: Casting about for an interesting hobby, I decided to obtain an amateur radio license. This, of course, meant once again learning Morse code. Surprisingly, this time it came very easily. However, some years passed before I realized why. In any event, after spending the required time restricted to CW operation, I earned all-band voice privileges and soon forgot about CW. Sound familiar?

Press FAST FORWARD. Press STOP at the early 1990s: The Hi-Tech Age had arrived. All the old faithful homebrew gear in my shack had been replaced by complex, imported, store-bought appliances I did not understand, plus a computer plugged into the telephone line. I also had CB and some VHF gear. From what I was experiencing trying to communicate via the Internet, CB, and local VHF repeaters, I began to yearn for the bygone days of CW, when if nothing else, you at least knew the operator at the other end had some training in how to communicate effectively. I therefore decided it was finally time to get my code speed up and go back to CW. Sound familiar?

Press FAST FORWARD. Press STOP at a year later: I tried many of the advertised *easy* ways of learning to copy CW, including subliminal tape recordings and a song book containing Morse code in the form of music (this included a free guitar and an autographed photo of the Beatles). None of them worked, nose-to-nosing me with the fact that I would have to do it the *hard* way. Upon recollection, I realized the hard way (as with most things in life, the best way is usually the hard way) was the military method. The reason it works so well is because everything is sent in cipher, each cipher group consisting of five characters that make sense only to the Decipher Guy. Because the operator reading CW cipher has no idea what it means, or even what language it is in, full attention can be focused on one thing only —copying each character *exactly*. Once you get the hang of it, you never forget it.

The only remaining problem was finding a source of CW cipher signals. Since the world's military no longer use CW, there seemed little point in inciting a war just for code practice, so I wrote a BASIC computer program to generate random CW cipher groups (see Table I). (This program is a condensed version of the Code Trainer program in HAMCALC 26, a software collection of more than 160 programs of interest to radio amateurs and professionals. For a free 3¼" 1.44 Mb diskette containing HAMCALC 26 send a check or money order for US$5.00 [to cover the cost of materials and airmail] to the author, George Murphy, VE3ERP, 77 McKenzie St., Orillia, ON L3V 6A6, Canada.)

Whenever I feel my CW is slipping, a few sessions of copying cipher groups soon whips me back into shape. It has been said that you can't teach an old dog new tricks, but who says you can't reteach an old dog old tricks?

Press FAST FORWARD. Press STOP at today: CW detractors who try to copy cipher groups will claim it is nothing but gibberish. You want gibberish? I'll show you gibberish. Listen to any typical 75 meter SSB QSO.

Press REWIND. Press OFF. ■

Rubber Duckies may be great in the bathtub, but they may not always be what you need to punch that signal through to the repeater. W1ICP takes us from the rubber ducky to other simple, yet effective portable antennas for our HTs.

The J-Pole Antenna

A roll-it-up, stuff-it-in-your-pocket, portable alternative to the rubber ducky antenna

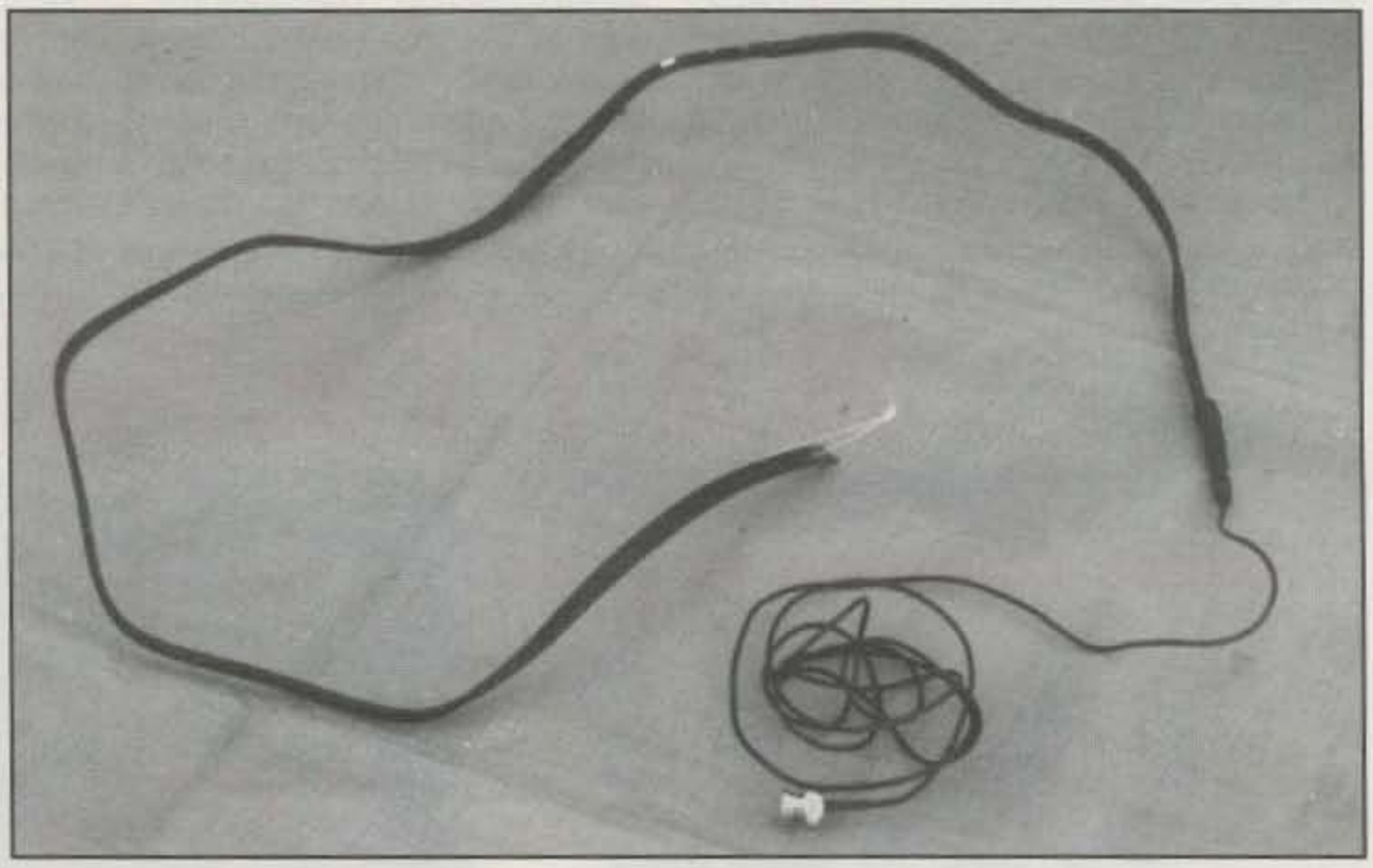
BY LEW McCOY*, W1ICP

All of our 2 meter users are more than familiar with the so-called "rubber ducky" antenna commonly used on handheld transceivers. I have no idea who originally came up with the name, but it certainly has been the way to describe these antennas. Usually the antenna consists of wire, sometimes a quarter wavelength, 19 inches (2 meters) long, wound around a flexible form. The form and the winding then are encased in a flexible rubber-type shield—hence the name "rubber." This antenna has a fitting which mates with one on top of the handheld transceiver. There is no real ground return, and as far as impedances, etc., are concerned, just forget that facet of this most popular antenna.

It is a strange phenomenon in amateur radio that the absolutely poorest antenna one could use is also is by far the most popular antenna. In fact, it is impossible to say exactly how bad the rubber ducky antenna is, say, compared to a half-wavelength dipole. This antenna is so popular because in most cases it is adequate and easy to use.

The main reason for the popularity of the rubber ducky is not in the antenna itself, but because the signal that is sent out is more than strong enough to capture a repeater and to produce contacts. However, as Shakespeare wrote, there is the rub. To be very honest, though, the rubber ducky is very inadequate, and often one fails to capture the repeater or to even hold it, when one really needs it.

*Technical Editor, CQ, 1500 W. Idaho St., Silver City, NM 88061
e-mail: mccoy@zianet.com

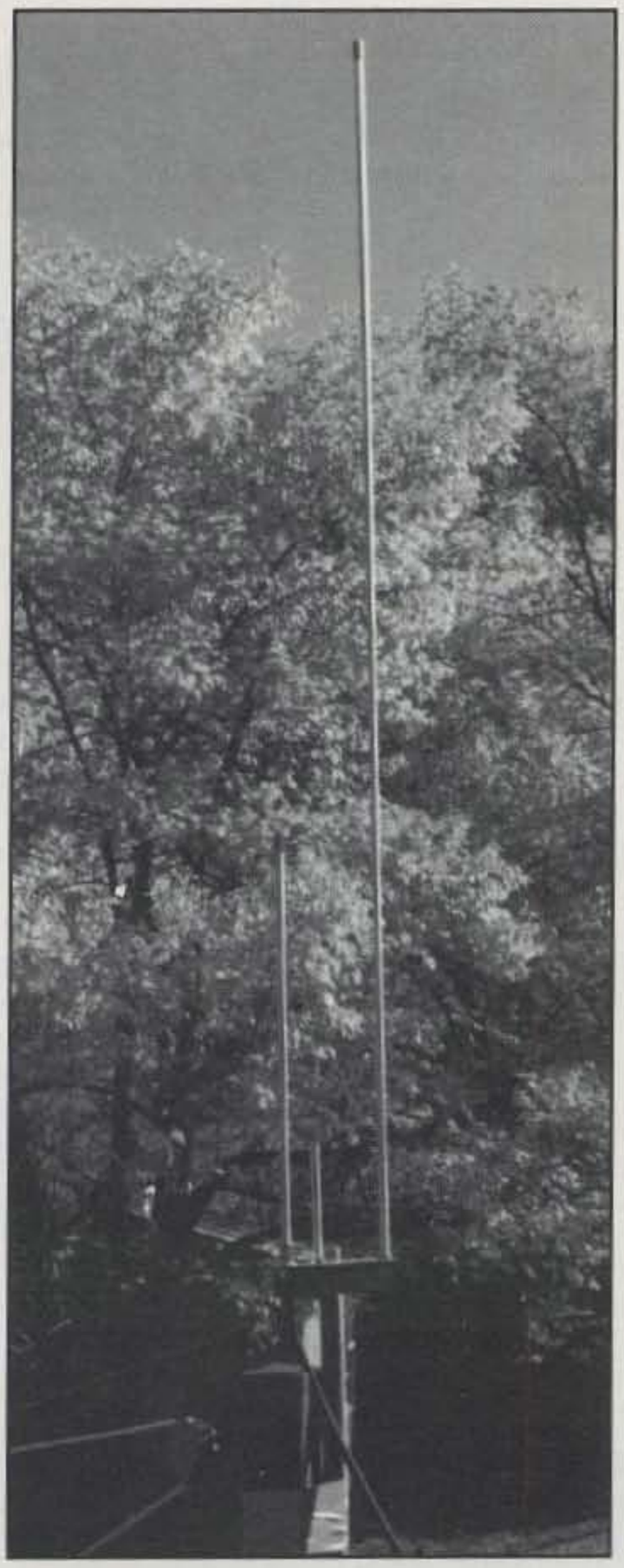


This is not the easiest antenna to photograph, but essentially it is the coiled up feed coax with a fitting for the rig. It looks like one continuous length of twin lead, but actually, refer to fig. 1, which shows the electrical detail. As pointed out in the text, if you don't want to build your own, Antennas West sells a completed unit.

We have all experienced this occurrence, so there is no point in belaboring it.

A few years back when I was visiting a club in Palm Springs, California, some of the amateurs there had come up with and were talking about a portable, roll-up-and-put-in-your-pocket type of antenna called a J pole, sometimes referred to as a J beam. Since then I've always kept one close at hand and take one with me when I travel. I'll describe it shortly so you can make your own.

New Mexico, where I live, is an area of national parks and forests and many mountain areas with corresponding deep ravines, arroyos, and in general rather wild terrain, with bears, mountain lions, rattlesnakes, and so on. We also have many people—hikers, campers, prospectors, and the like—who can and do manage to get lost. When that happens, search-and-rescue teams go out to find them. It has been determined that the use of amateur radio, and the use of repeaters, is a great aid in staying in touch with and directing the searchers. It is also true that many of



This antenna, made by Arrow Antennas and described in the text, is an excellent performer. The longest upright element is the J pole half wave; to its left is the 450 MHz J pole; and the matching quarter wave is at the far left.

the amateur newcomers to the hobby who get involved in the search and rescue have little, if any, technical knowledge of antennas and signal propagation. These people are basically communicators.

I recall one instance where this lack of knowledge showed up, and startlingly so. I was out with a group on a search and the amateur operator I was teamed up with tried to bring up the repeater (which was many miles away) with his handheld and rubber ducky antenna. He could not get a response and then told me that we would have to hike up a mountain to get a clear shot. (I was not about to climb a mountain at my age!) I dug into my pocket and took out my folded up J antenna, reached up and hung one end on the limb of a tree, and told him to remove the rub-

ber ducky and plug in my J pole. He did just that, and the repeater came booming back. I have never seen such amazement and astonishment on the face of an amateur. Since that time I have convinced many amateurs to carry rolled-up J pole antennas in their pocket. Whenever I travel, I always make sure I have such an antenna along. I have yet to be stymied by a bad motel or hotel room keeping me out of the local repeater.

The beauty of this simple antenna is that it is relatively cheap to build (it only costs a few dollars) or easy to buy ready-made. Antennas West (they run an ad here in *CQ*) has a J pole made from twin lead that is very inexpensive. Included in this article is a photo of their unit in case you don't want to build your own.

Exactly What is A J Pole?

So exactly what is a J pole? The J pole is a half-wavelength antenna which is fed at one end via a quarter wavelength of twin lead; at the other end of this quarter wave of twinlead is the 50 ohm coax, which goes to the rig.

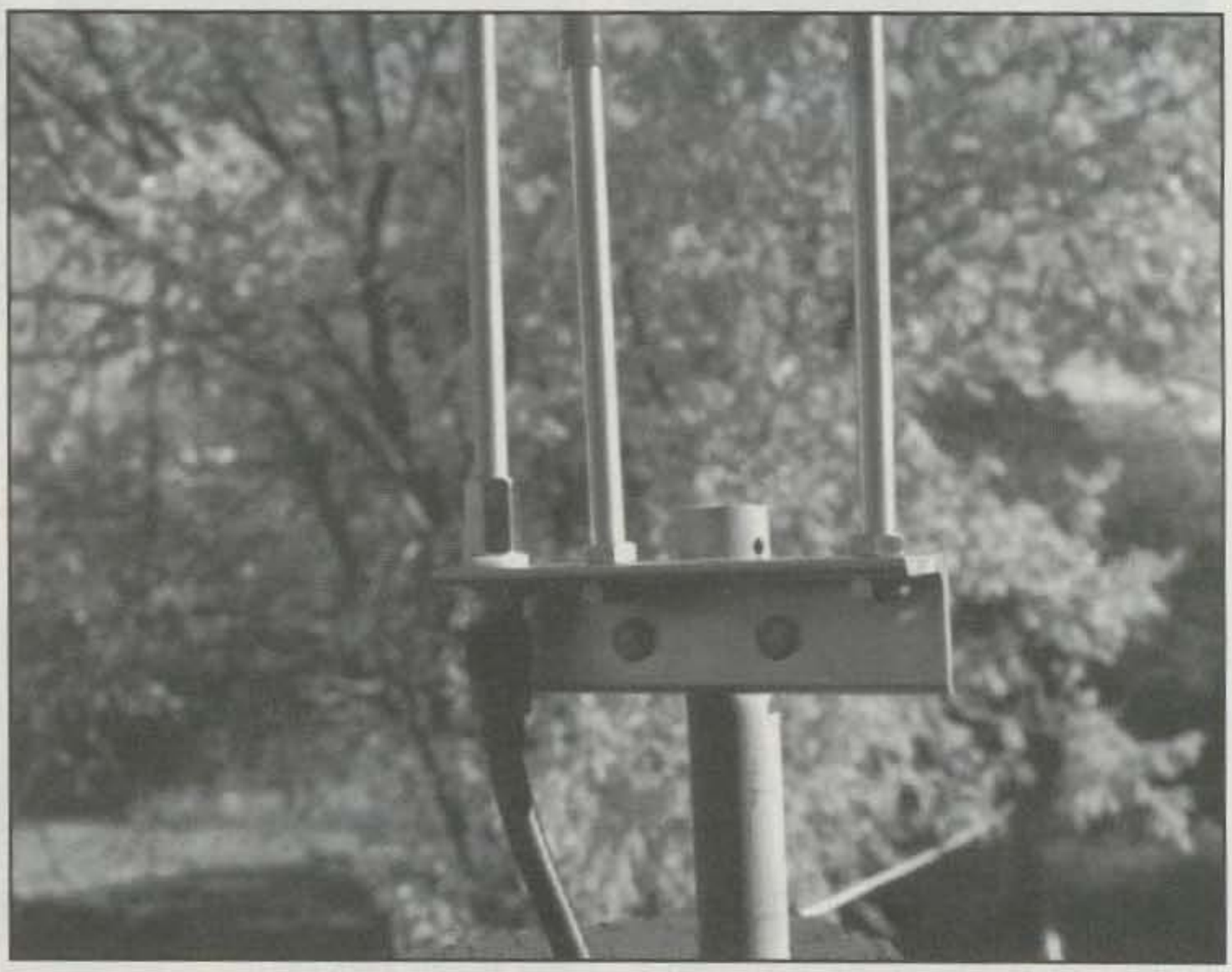
A little antenna knowledge at this point won't hurt, so here goes. A half-wave dipole, fed at the center of the half wave, has a center-fed impedance in the vicinity of 50 to 70 ohms. However, when we try to end feed this half wavelength, the impedance goes up to several thousand ohms. Therefore, we can use a quarter-wavelength "stub" to match this high impedance, and at the other end of the stub, where we attach the 50 ohm coax, there is a much lower impedance—right down at 50 ohms, what we want for our handheld. That is what we do with a J pole.

Table I shows various gains of commonly used antennas on 2 meters.

Fig. 1 shows the basic antenna setup. End feeding a half-wave dipole results in a very high impedance—much too high to attach coax directly to the end. The quarter-wave section steps this impedance down to the 50 ohm vicinity, making it possible to use 50 ohm feed.

This J pole is made from 300 ohm TV twinlead, a piece that is 54 1/2 inches long. Study the drawing in fig. 1 at (A) and (B). (B) shows what the electrical circuit of the J pole actually is. The long single wire is the half wave plus the quarter wave, while the short lead is the other section of the quarter wave. The quarter wave is shorted together at the very bottom, and the coax conductors are soldered to the quarter-wave stub 1 1/2 inches up from the bottom. These dimensions will provide the best match in the 146 MHz. range. However, the antenna dimensions will work well across the entire band.

At (A) in fig. 1 we have the actual twinlead antenna. Measure down the twin lead on one of the conductors, 36 inches, and at that point cut the wire and remove 1/2 inch of the wire below the cut. Actually remove that 1/2 inch of wire. Skin off a 1/2 inch of insulation on both sides of the twin lead at the bottom and then twist the two



This is a close-up of the base mounting of the Arrow J pole. The feed goes to the section on the left. The base design is really outstanding. Standing wave checks showed that my Bird wattmeter never left 1.2 to 1 across the entire 2 meter and 450 MHz bands. This is a very fine performing antenna.

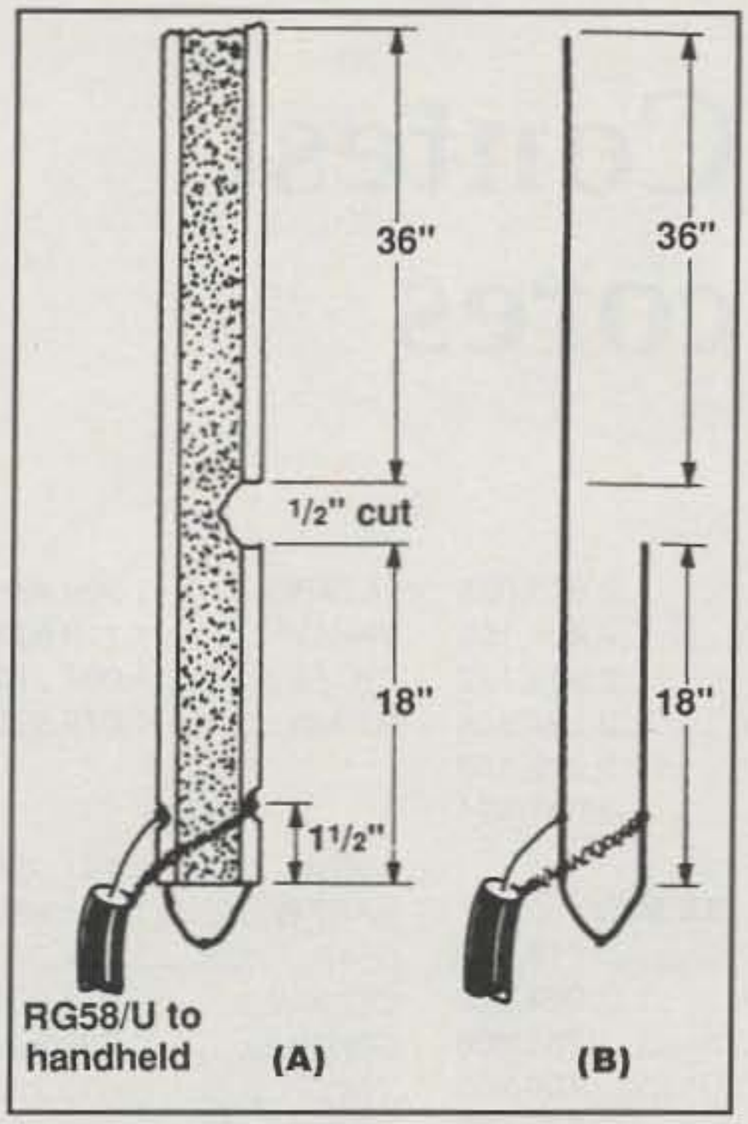


Fig. 1– At (A) is shown the construction information for the J pole. The bottom 18 inches of twin-lead is the quarter-wave matching section used to feed the bottom of the 36 inch, one-half wave section. The coax feed line (50 ohm coax) is used to connect to the rig. The line is tapped up 1 1/2 inches from the bottom of the assembly. I found an excellent match at this point; the antenna was less than 1.5 to 1 across the entire band. At (B) is the actual electrical circuit of the J pole. Basically, this antenna consists of a half-wave vertical (the 36 inch section) fed with a quarter-wave section to convert the very high impedance of the end-fed half wave down to 50 ohms. Keep in mind that this is a vertical antenna and it has a very low angle of radiation.

leads together and solder them. Next skin back the insulation 1 1/2 inches up from the end and connect your length of coax to those two points. Use insulated tape to cover the soldered end of the antenna so it won't accidentally make contact with the coax. Next tape the coax end firmly to the end so that the assembly is solid or more rugged. Your antenna is ready to use. I carefully measured the SWR bandwidth of this J pole and it was less than 1.5 to 1 across the 2 meter band.

The Arrow Antennas J Pole

If you've never used this type of antenna before, you are really going to be amazed. Many amateurs make fancy installations and use them as fixed antennas at home. Along those lines, when I mentioned on the antenna rec. forum on the Internet that I was going to write this article, Arrow Antennas sent me a combination 2 meter/450 MHz J pole for testing. I honestly was amazed at the fine workmanship. This is a very rugged antenna that can be used for mobile work or for fixed-station work. When I opened the package it only took me about 20 minutes to assemble the antenna. I mounted the antenna on a pipe on my wooden deck, which is about 12 feet above ground. I have a beam on 2 meters, so I thought a good comparison would be from the beam to the J pole. We have one repeater out here that is at least 50 airline miles from my location. Honestly, and I'm not joking, I couldn't tell any difference between the two antennas. I am sure the J beam didn't have the gain of the beam, but for practical purposes, my strength in to that far- away repeater certainly appeared the same. Incidentally, with a rubber ducky, *nada*—nothing—just background hiss!

Antenna Type	Gain or loss (dB) (compared to isotropic)
Isotropic antenna	0 gain
Quarter-wave ground plane	+0.3
Half-wave J pole	+2.147
Half-wave dipole	+2.147
Rubber ducky	There is no standard here because this antenna is impossible to measure, simply because all rubber duckies are different. But it is probably safe to assume that the "normal" rubber ducky, if there is such a thing, probably is only a very minimal fraction better than an isotropic, if even that. Also, there is absolutely no comparison of a rubber ducky to a J-pole, since the primary angle of radiation of a J pole is much lower than that of a rubber ducky. This is a big advantage in acquiring a repeater signal.

Table I– An isotropic antenna is a theoretical antenna and is used as a basic measurement figure. It is not a "real" world antenna, but if it could, it is an antenna that would radiate equally well in all directions. We therefore use it as a theoretical measurement standard.

To be honest, I had never heard of Arrow, but they have a nice catalog and make many different antennas. The J pole shown in the photo is designed for more or less fixed operation (it is not a fold-up type). There is a U bolt installed on the base of the antenna, and this U bolt can be attached to a pipe or mast to support the antenna. As I stated, this is a dual band J pole, taking care of 450 and 2 meters.

The measured SWR bandwidth of this antenna is very, very good. The SWR is less than 1.3 to 1 across the entire 2 meter band and the same across the 450 MHz. band. With the U-bolt assembly, this antenna can be mounted just about anywhere that suits you. I plan to put mine at the very top of my tower, over my low band beam. One point worth mentioning for those who don't know: While VHF and UHF antennas will work well at ground level heights, they will do a whole lot better when high and in the clear.

The Arrow J pole sells for under $40 and is available (as is their free catalog) from Arrow Antennas, 1833 S. Greeley Highway #B, Cheyenne, WY 82007 (307-638-2369).

Summary

If you don't want to make your own "roll up" J pole, Antennas West, which advertises in *CQ*, makes a model almost identical to the one I described for $19.95. They also make J poles for nearly all the low bands. I plan to do a review showing some of these handy, simple-to-use antennas. They also make a simple clip-on wire which they call a "Tiger Tail." When mounted under the rubber ducky on the handheld, the Tiger Tail makes the antenna into a sort of partial half wave, giving much better range than the rubber ducky alone.

In conclusion, keep in mind that the simple J pole described here can possibly save your bacon in an emergency! ■

1997 CQ WPX CW Contest High-Claimed Scores

SINGLE OPERATOR
UNITED STATES
ALL BAND
N2NL 7,226,128
KQ2M 7,085,792
K3ZO 5,670,060
W4AN 5,485,500
WR6AAA 4,713,750
KT3Y.....4,559,235
NY4A 3,985,660
W3PP 3,928,308
K5YA 3,328,886
AA3B 3,300,090
K5ZD 3,144,704
N7DR.....2,549,898
WC4E 2,425,336
K1AR 2,138,994
AA4S 1,901,767
WV2LI.....1,797,450
K1VW 1,655,912
N6MU 1,583,088
KMØL.....1,552,590
KW2J 1,437,132

28 MHz
NN5AA.....29,400
AE4RO 27,552
WC4DX.....24,704
NX5M.....4,408
NA2X 2,912

21 MHz
N4BP 572,139
W4WA 307,518
K9OM 109,510
AE4SW 96,672
N1ET 24,442

14 MHz
KI1G 3,387,502
K8DX 2,673,125
K8GL 2,510,852
K2VV 2,506,296
WE9V 2,113,251
W9WI.....1,423,557
WØTM.....1,027,564
VE7UF/W7.....851,808
K9NW 675,364
KM5G 658,939

7 MHz
WA3KWU 2,005,466
W3BGN 1,015,044
NA5B 798,372
KØAV 423,384
N2ZX 418,950

3.5 MHz
K4ZW.....301,910
W1MK.....82,038
K2ONP 45,756
K2YR 45,562
NT6K 19,635

1.8 MHz
K1ZM 29,808

LOW POWER
ALL BAND
WQ5L 1,754,004
K1HTV 1,743,159
WA1LNP.....1,695,376
WO4O.....1,216,800
KC6CNV 1,168,384
W7YAQ.....1,092,599
WD5K 892,904
WK2G 835,992
WA3HAE 729,582
K1HT 723,387
AA4GA.....692,080
NW6S 688,551
N4CM 676,700
WO9S.....627,260
KV8Q 610,144
KN4QV 600,456
N2ED 561,005
K3MD.....528,775
WA8WV 468,048
WA1S 439,738

21 MHz
KN4Y 110,376
K2ACW.....27,921
NP4IW/WX6 9,486
K4WW 7,260
KU6T 7,055

14 MHz
WF1L.....657,640
K7ZA.....325,710
NJ3K.....208,152
N6RT 139,416
K5PN 137,852

7 MHz
NM5NM 574,544
N2TN 327,888
N2GM 284,876
N4OT 238,140
W3CP 160,822

1.8 MHz
N6CMF 260

DX
SINGLE OPERATOR
ALL BAND
3V8BB 12,235,104
ZD8Z.....11,801,692
VP5GN 10,680,094
IZ9R.....7,494,960
VE3EJ.....6,865,920
GIØKOW 6,504,954
OT7T 6,353,888
7X2RO.....6,183,744
TM8R.....5,354,440
XQ1IDM.....5,183,066
OM8A 4,812,160
4NØAV 4,756,840
EA2IA 4,619,520
DL6FBL 4,532,544
3DA5A 4,532,098
RN6BY.....4,527,576
HZ1AB 4,475,488
S53AJK.....4,405,313
JH5FXP 4,247,112
G3ZEM 4,188,775

28 MHz
9HØA 605,036
4X1VF.....69,620
YT1W.....50,949
UR7VA.....41,700
LZ6C.....36,400

21 MHz
ZP5XF 5,023,872
4X/OK1JR.....2,018,285
S5ØA.....1,401,969
S5ØC 1,045,476
EO6F 872,056

14 MHz
ZF2NE 4,227,340
HA3UU 3,962,700
TK5NN.....3,911,700
HC2SL.....3,842,146
OH5LF 3,490,170
OH1NOR 3,481,896
OK1RF.....3,467,464
VE7SZ 3,343,296
SP2FAX.....3,221,800
YM2ZW.....3,148,368

7 MHz
LU1IV.....8,107,984
V26BA 6,375,728
WP3CW.....5,285,248
IR4T.....2,874,690
YT7A.....2,653,028
TM4ZZ 2,428,160
YZ9M 2,343,132
US2YW.....2,024,548
DL6RAI 2,018,410
Z31GX 2,001,424

3.5 MHz
4O6A 919,620
FM5BH 864,142
S53R.....765,306
4N1A.....736,906
S55T 571,560

1.8 MHz
SP5GRM 249,516
S5ØU 223,200
4X4NJ.....210,248
YU1EA.....159,720
OM5CD.....155,490

LOW POWER
ALL BAND
WP2Z.....8,041,755
J87GU 2,519,454
GX4MBC 1,951,264
YU7CB.....1,857,905
S57J 1,751,221
YN6WFM 1,641,915
S51F 1,565,388
G3XTT 1,558,339
IKØYVV.....1,482,182
LU8HSO 1,396,380

28 MHz
LU9AUY.....192,780
LU3HIP 183,954
YU1CV.....120,712
LR2DW 44,388
S52OT 36,120

21 MHz
NP3A 1,455,790
TU4FF 1,341,472
L5ØV 982,917
PU2MHB.....945,906
CT1AOZ 756,792

14 MHz
ED3ALN.....2,252,050
4N7B.....2,068,781
7M1MCT.....1,756,656
UAØJQ.....1,454,221
RO3A.....1,438,906
HA8RH 1,419,872
JA7XBG.....1,336,488
VK2APK.....1,110,990
OK1FFU 1,087,310
RX9JN 1,079,891

7 MHz
XM7A.....2,141,034
RAØFW.....1,154,880
S54A.....1,054,240
OK1XW.....871,024
ON4RU 723,334
T94YT.....679,228
RAØFA.....657,199
HA3LN.....514,752
YZ1V.....503,608
HB9GCD.....454,272

3.5 MHz
HA8EU.....442,800
YU1KR.....368,184
OM5KM 329,840
S51W.....211,584
SP5GH 203,688

1.8 MHz
YU1RA.....101,382
UX2MF 28,296
RW4HHD.....9,928
F5RZJ.....6,018

TRIBANDER/
SINGLE ELEMENT
UNITED STATES
NY4A 3,985,660
WC4E 2,425,336
K3KO 2,041,080
WV2LI.....1,797,450
N6MU 1,583,088
KMØL.....1,552,590
KW2J 1,437,132
KO7Z 1,431,144
W4AU 1,275,102
N3NT 1,131,648

DX
3V8BB 12,235,104
3DA5A 4,532,098
S53AJK.....4,405,313
G3ZEM 4,188,775
4N9BW 4,090,215
7Z5OO.....4,001,804
TP9CE 3,249,624
4U1VIC 3,013,989
LY3MR.....2,782,261
YL8M 2,677,536

BAND RESTRICTED

OH3KCB.....275,576
LY3NJM.....184,392
OK2BUT 65,394
EC3AHO.....59,786
JAØBMS/1 50,031
FB1AVO 28,098

ROOKIE

LY3JY .....A.....898,372
TM5A .....A.....889,083
F5EJC.....A.....486,239
EA2CHI.....A.....148,208
ON4CAS ....A.....59,817
ON4CBW ...A.....29,040
KE6QXJ .....A.....14,812
KE4OAR ....A.....1,235
NP3A.....21..1,455,790
KGØUA.....14.....138,744
JD1BJT/M .14.....16,254

SINGLE OPERATOR ASSISTED UNITED STATES

WF3T.....4,302,037
K3MM 2,568,344
K3KO.....2,041,080
K4MA.....1,687,488
N5JR.....889,650
K3WW 816,007
AB2E 690,426
N3ED 683,016
W6TKF 440,910
AD6E 309,959

DX

CT3BX.....10,704,771
DK3GI.....4,633,824
DL1MFL.....1,417,167
IKØHBN 622,080
JA9XBW 569,454
ZZ2Z.....360,047
JF1SEK 285,105
JH4NMT 283,696
DL3OI 252,180
S57XX 230,685

MULTI-OPERATOR SINGLE TRANSMITTER UNITED STATES

NB1B 6,195,510
NQ4I 4,786,511
KVØQ.....4,390,890
N8NR.....4,249,500
KO7X.....2,885,397
KC7V 2,879,949
NU4Y 2,639,426
KR5DX.....2,025,660
NM6U 1,611,753
AC8W 844,160

DX

H22A.....13,673,150
IH9/OK5DX....11,043,760
JY9QJ.....9,335,424
HG1S.....7,816,875
NH2C.....7,164,906
EX9A 6,777,604
LZ9A 6,511,869
RK9CWW 6,277,600
EA3KU 6,081,775
9A7A.....5,930,619
OM5M.....5,553,056
RU6LWZ.....5,201,496
EA6ZY 4,763,124
SL3ZV.....4,571,244
JA5FDJ.....4,458,507
VE7ZZZ 4,426,620
VE7UBC 4,340,980
II2K 4,177,125
OH7AAC.....4,171,825
OHØE.....4,153,320

MULTI-OPERATOR MULTI-TRANSMITTER UNITED STATES

KG1D.....12,669,120
K3EST 7,523,901
W4MYA 3,987,288

DX

9A1A.....18,622,989
LY5A.....14,039,425
WL7E.....13,001,280
S52ZW.....12,598,976
KH7R.....12,110,588
RW2F 12,089,880
S53M 11,496,862
EA4ML.....10,848,050
PA6WPX.....10,623,150
6V6U.....9,938,896

QRP/p UNITED STATES

KR2Q .....A.....766,206
K1VUT .....A.....735,100
N1TM .....A.....519,248
KX1M .....A.....452,570
KA4RRU .....A.....422,484
KY5N.....28.....4,425
WA6FGV....21.....7,663
N7VY.....14.....30,636
K1SE.....14.....17,150
K2CS.....7.....84,320
KC8UR.....7.....44,100
W7DRA.....3.5 748

DX

P4ØW.....A..4,070,080
LY2FE.....A.....683,337
VE3KP .....A.....557,577
UT4USX.....A.....542,728
G4UOL.....A.....438,575
LW3EBJ.....28.....17,892
Z32DR.....21.....97,271
9A3GU .....21.....34,560
VE7SBO.....14....466,474
YU1GN.....14....245,079
YU1LM .....14....238,032
JH1GNU.....14....179,307
VE3SMA .....7.....59,160
JA1KJW .....7.....6,204
SP4GFG....3.5 ...141,024
HAØGK 3.5 52,416
S57M 1.8 43,500

CQ SHOWCASE

PAR Electronics VHF Horizontal Omni Antennas

PAR Electronics has announced two horizontally polarized, omnidirectional low-profile antennas for 6 and 2 meters. These triangular-shaped antennas yield an excellent omnidirectional pattern, maker says, and have approximately four times broader bandwidth than traditional halos, low wind profile, and negligible detuning with rain or fog. The antennas are machined from 6061T6 aluminum, fiberglass, and stainless steel hardware. Coaxial cable attachment is via a silver/teflon SO239 connector. Conservative power rating is 160 watts. Tuning requires no tools and is accomplished by a unique self-locking arrangement. The antennas are designed to mount on a vertical mast or tower leg up to 1.5 inches in diameter.

The antennas are available from Amateur Electronic Supply or factory direct. For more information contact PAR Electronics, 6869 Bayshore Drive, Lantana, FL 33462 (phone 561-586-8278; fax 561-582-1234; e-mail: <par@magg.net>; web: <http://www.rf-filters.com>), or circle number 107 on the reader service card.

Two New Cable Assemblies From CABLE X-PERTS

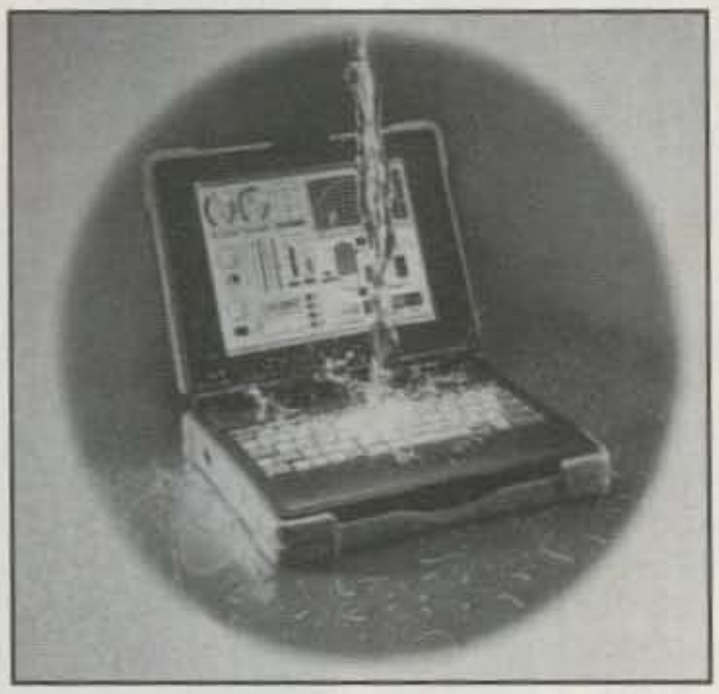
CABLE X-PERTS, INC. has added two cable assemblies to their product line. The first one is 6 ft. RG303/U with PL259 installed on each end (PN:RG303C6). The second is 18 ft. RG303/U with PL259 installed on each end (PN:RG303C18). Longer lengths or the bulk cable is also available. Each termination is soldered and tested for complete electrical and physical integrity. RG303/U is a high-temperature, high-power teflon coax. The over diameter is .195" with a solid silver center conductor and a mil-spec silver braid shield. RG303/U is rated at 30 MHz 1.9 dB loss per 100 ft. and 6000 watts PEP.

For further information, contact CABLE X-PERTS, INC., 416 Diens Dr., Wheeling, IL 60090 (phone 847-520-3003; fax 847-520-3444), or circle number 101 on the reader service card.

AMREL Rocky 2000 Plus Notebook Computer

AMREL's Rocky 2000 Plus is a ruggedized 6.4 lb. Pentium powered notebook computer. The bright yellow laptop combine PCI 64-bit technology with ZV cadbus, internal wireless modem, and pen-based and 11.3 inch wide screen LCD. AMREL's "Reverse Polarization Processing" technology allows a clear viewing screen in direct sunlight and eliminates "mirror imaging." It is a sporty model built to withstand outdoor conditions with its ABS casing and aluminum alloy bottom with waffled-wrapped rubber casing. The unit is shock proof and water resistant.

Available configurations are Pentium 133 MHz to 166 MHz CPU; standard 1.3 GB or upgrade to 2.1 GB HDD; standard



16 MB upgrades RAM up to 64 MB. Prices start at $4995. For more information, contact AMREL Systems, Inc., 11801 Goldring Rd., Arcadia, CA 91006 (phone 626-303-6688; fax 626-303-8538), or circle number 108 on the reader service card.

EZ-Mount from Cooper Mfg.

EZ-Mount, made by Cooper Manufacturing and distributed by Shack Attack, is a mobile-rig mounting system for cars, vans, trucks, RVs , and boats. No drilling or attachments are necessary; just mount the rig to the shelf of the EZ-Mount, place your external speakers below and hand-held mics on the sides, and even a paddle key can be added. Weight of the equipment keeps the EZ-Mount in place.When you park, disconnect the coax and cables and store the equipment.

EZ-Mount is made of Baltic birch and measures 9"H × 14"D at the base and is available in three different widths—8, 10, and 12 inches. It is sealed with a blue-gray

primer. It is priced at $24.95 plus $5 s/h. For more information or to order contact Shack Attack, P.O. Box 91, Enterprise, UT 84725 (phone orders 800-573-7388; fax orders 801-878-2100; e-mail: <kb7vrd@aol.com>; web: <www.vcnet.com/sa>), or circle 109 on the reader service card.

SG-7200 DSP HF Modem From SGC Inc.

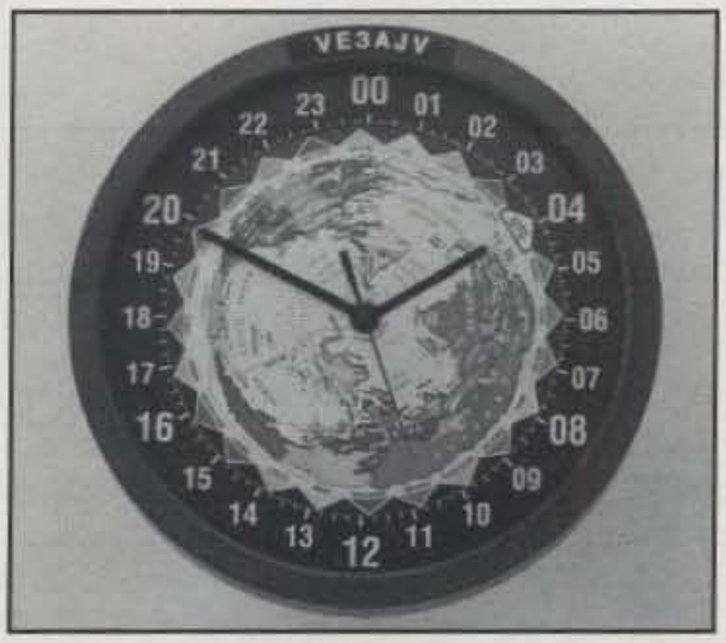
The SG-7200 allows mariners to transmit and receive e-mail via common carrier or receive weather bulletins and forecasts anywhere around the globe. The user just needs an HF radio with data compatibility and a laptop computer running SGC Com, a Windows 95 user friendly graphical interface, or any communications program. The SG-7200 features open hardware/software architecture running DOS 6.22. It works with public domain protocols or you can develop your own custom modem sets suitable for advanced protocol development.

The SG-7200's SmartEmailer™ can be used from remote areas to send and receive e-mail using the SG-7200 and an HF transceiver. Two standard RS-232 ports and two radio ports with PTT control make the SG-7200 quick and easy to install and operate, maker says. Its alphanumeric LCD back-lighted matrix display and LEDs keep the user informed of the modem's functions and tuning. For more information, contact SGC Inc., P.O. Box 3526, Bellevue, WA 98009 (425-746-6310; web:<http://www.sgcworld.com>), or circle 112 on the reader service card.

The DXing Clock From World View Time

Designed for the amateur radio operator, the DXing Clock consists of a flat, circular south polar view of the Earth with all 24 hour time zones color coded by land area. The perimeter of the map shows 24-hour indicators corresponding with each time zone. Each time zone indicator is labeled with a recognizable location from that time zone for easy reference. The hour hand is preset in the UTC time zone. This world map rotates like the Earth with a military-style time scale (24-hour clock) and is driven by a quartz movement requiring one AA battery. The clock can be personalized with callsign engraved on the plaque at no extra cost.

The DXing Clock is available in a black plastic case for $39.95 or solid walnut for $59.95 (plus $4 s/h). An 8 1/2" × 11" manual world time calculator is included free. Clocks are also available with AM-PM



time scale. For more information, contact World Time View Inc., P.O. Box 266, Brockville, ON, Canada K6V 5V5 (telephone 613-345-1537; fax 613-345-7264; e-mail <worldviewtimeinc@recorder.ca>; or on the web: <http://www.recorder.ca/worldtimeviewinc>), or circle number 110 on the reader service card.

ICOM IC-T7AHP Dual-Band HT

The ICOM IC-T7AHP dual-band (2 meter/440 MHz) Handheld transceiver now comes standard with a BP-173 battery pack, enabling it to have 4 watts of output power. The unit is about 4 inches in height and comes with a "thumb touch" lock switch and "single push action" feature selection (no function key). Changing bands is achieved by depressing the band key to toggle between 2 meters and 440 MHz. The unit can store up to 70 channels in any combination of UHF and VHF frequencies, has nine DTMF memories for auto-dialing, provides 50 separate encode and decode frequencies and a tone scan function, features a large alphanumeric display, and comes with a "guide" function for assistance on operation questions. The IC-T7AHP includes an optional microphone simple remote control function, auto power Off function, and optional cloning software for programming memory channels.

For more information, contact ICOM America, Inc., 2380 116th Ave. NE, Bellevue, WA 98004 (phone 425-454-8155; web: <http://www.icomamerica.com>), or circle 111 on the reader service card.

Wizard 2 From Kangaroo Tabor Software

Wizard 2 is a powerful HF propagation prediction software that builds on the Wizard and "Smart Reporting" foundation by adding user-configurable 3D color graphics and a new "Location Browser," along with all new multi-configuration enhancements. Wizard 2 features a Best Usable Band graph which displays frequency and signal-to-noise ratio by default, plus signal level, reliability, service probability, and signal take-off angle. A Dynamic Band graph provides these parameters at the MUF plus all user-selected frequencies, and more. Both graphs offer numerous user configuration options along with export and printing capabilities. An intelligent Mercator world map is dynamically linked to a full-feature database that includes DXCC list and U.S. counties. The user can plot database locations on the map and find database entries by clicking the map. Active-Status indicators show latitude/longitude, grid square, distance, azimuth, and sunrise/sunset times as the mouse is moved.

Wizard 2 requires Windows® 3.1 or '95 and a 486DX or better CPU. Introductory price is $49.95 plus $5 s/h (outside US add $2). For more information, contact Kangaroo Tabor Software, Rt. 2 Box 106, Farwell, TX 79325-9430 (e-mail: <ku5s@wtrt.net; web site: <http://www.wtrt.net/~ku5s>; orders may be faxed to 806-225-4006 with VISA or MasterCard info), or circle 106 on the reader service card.

MATH'S NOTES

WHAT'S NEW AND HOW TO USE IT

BY IRWIN MATH, WA2NDM

Some Further Ideas Regarding RFI and EMI

A very Happy New Year to all readers of this column once again, and to reiterate what I said last month, "May all of your dreams and wishes come true in the coming year."

Last month, as you will remember, we touched on the subject of RFI and bypassing. I say "touched," as I am sure that you all are well aware of the fact that volumes have been written, and will continue to be written, on the subject. This month, without straying too much from the topic, I hope you will bear with me while I offer a couple of ideas for locating sources of high-frequency spurious signals.

The following ideas stem from an application presented by the Hewlett Packard company in a "Hints for Better Scope Measurements" brochure distributed in May of last year. The technique involves simply shorting the ground lead on a standard oscilloscope probe to the tip and using the loop thus created to pick up EMI signals. Fig. 1 shows how to do this for those who can't visualize it. Set the scope for the most sensitive range, and you have an electromagnetic field "sniffer" that can be used over the bandwidth of your scope.

A more convenient and "professional" probe of this type can be made from some Teflon-insulated RG-174 miniature coax, a length of plastic tubing such as heavy drinking straw, a wooden dowel, and a BNC connector. This version is shown in fig. 2. First carefully assemble the BNC connector in the normal manner using the reducer or correct connector version for the miniature coax. Next strip the last inch of the jacket, 1/4 inch of the braid, and expose the center conductor as shown. Now thread the plastic straw and wooden dowel onto the coax. Carefully bend the stripped end of the coax back toward the braid making a loop and carefully solder the center conductor to the braid. Epoxy the plastic tubing and wooden dowel to each other in the correct orientation and you have a neat EMI probe. The shielded cable will attenuate pickup of the electrostatic portion of a signal and only allow the magnetic portion of the signal to be detected. This will result in a greater degree of accuracy in pinpointing the source of the signal. The fact that this is a direct connection to the scope without a 10:1 divider will give greater sensitivity than the probe/ ground clip method.

In use, you should slowly move the probe over any seams, grillwork, or other openings in a cabinet or enclosure to detect where RF is leaking out. Once this is found, corrective measures should then be taken to "plug" the leak. We used the above technique on a homebrew linear amplifier and found RF present at the glass surface of the grid/plate panel meter along the opening where the tuning and loading capacitor shafts came through the front panel and around the vent holes drilled along the rear of the cabinet. Judicious use of copper window screening and metal shaft bearing/ couplers solved the problem. The additional shielding also eliminated interference to a nearby computer that acted up every time the linear was keyed. Hopefully, now all RF was going only to the antenna, where it should.

Another useful tool in the hunt for unwanted EMI is the lowly AM transistor radio. These can often be had for less than a dollar at garage sales and make very sensitive detectors. The radio should be enclosed in an aluminum box and modified so that a small whip antenna can be used as a probe. The antenna should be connected to the "hot" side of the ferrite loop that these radios use as an antenna, and the audio output should be bypassed so that the only path into the radio is by way of the antenna. Fig. 3 shows one way to accomplish this.

In use, the antenna is extended fully to find the general area of the disturbance. Then, as you get closer and closer to the source of the interference, it is shortened, reducing sensitivity until you are "on top

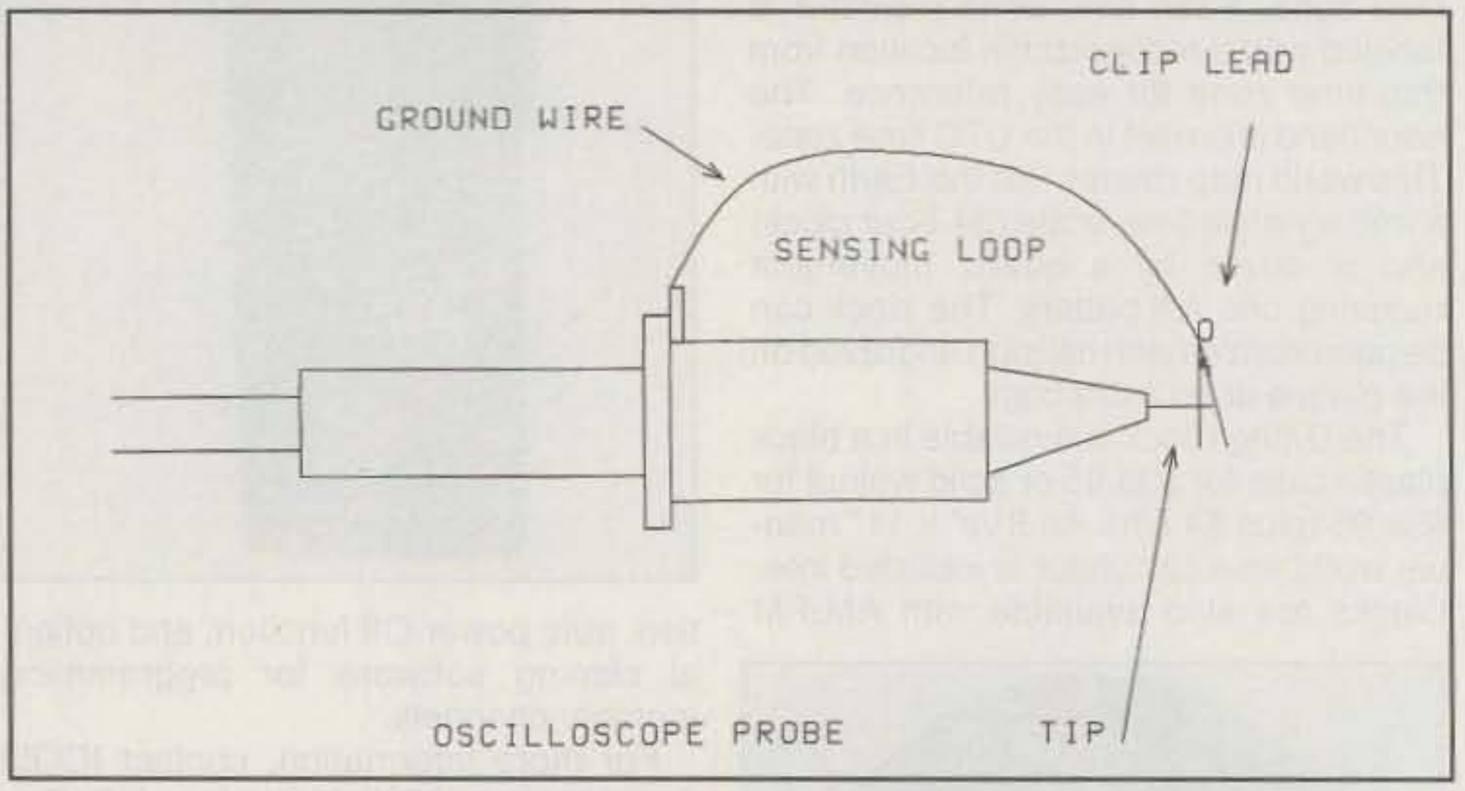


Fig. 1– Scope probe RF sensor.

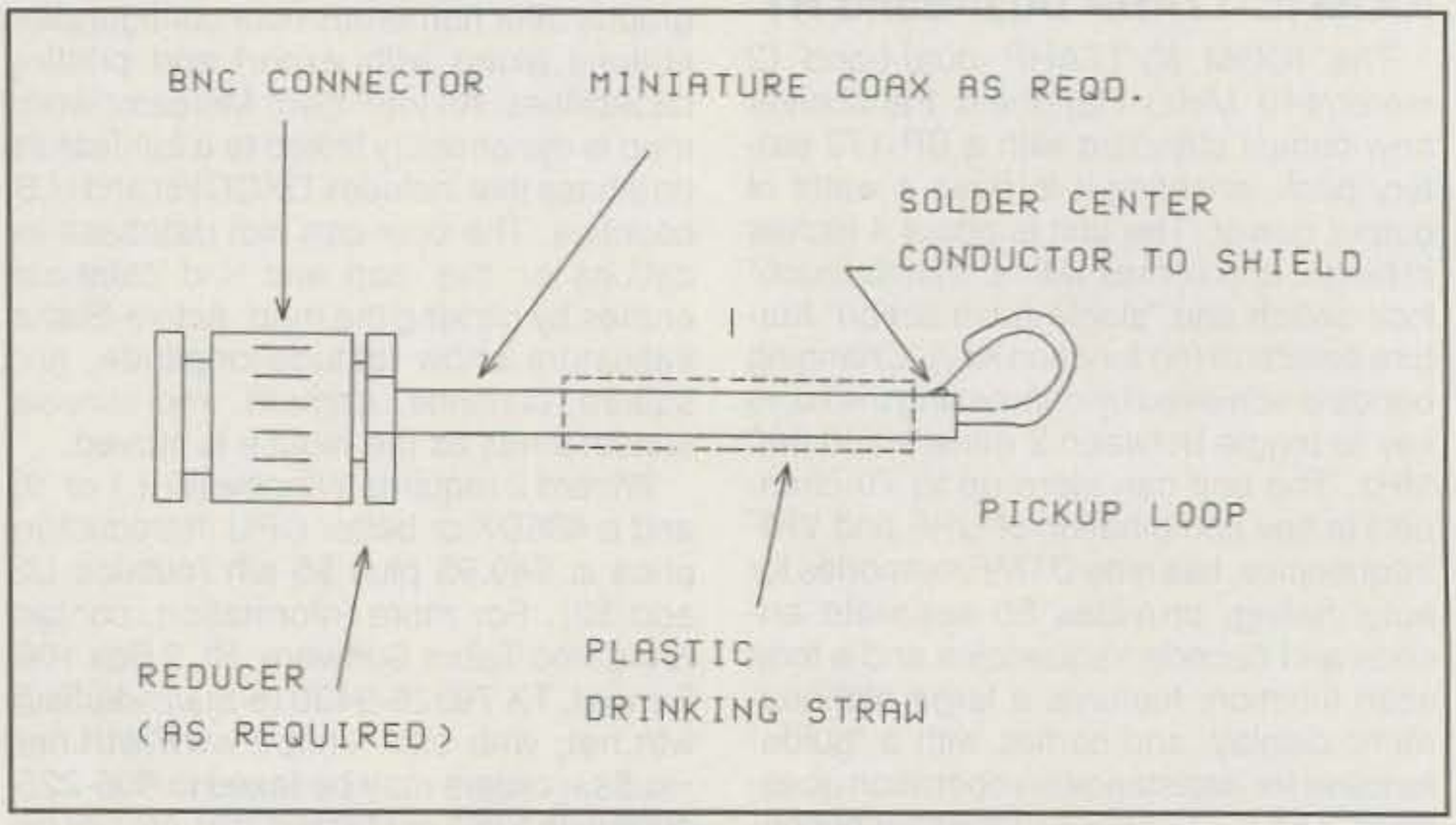


Fig. 2– Pickup loop described in text.

c/o CQ magazine

of the problem." This type of device will find poor ground connections, intermittent power lines, and a host of similar noise sources. We know of one instance where an AM radio was used to find static bursts caused by an old-fashioned copper rain gutter intermittently contacting a galvanized power feed conduit whenever the wind blew. You have also probably inadvertently employed this method to detect leakage or poor connections in your local electrical utilities overhead lines, when while listening to an AM radio station, you drove your car under a faulty power line. Remember listening to a series of loud static pops and crackles that built up to a peak as you approached the source then died out as you passed it?

Once you locate the source of your problem, the task is to eliminate or reduce the unwanted radiations. I will leave last month's discussion and the various tips and hints that abound in the literature to help you with that portion of the job. At least you will have some of the tools to check on your progress.

October '97 Column Correction

Before closing, I would like to correct an error in the October 1997 installment of this column. The "fig. 3" referred to in that column actually does not exist; my apologies to anyone who is still looking for it!

73, Irwin, WA2NDM

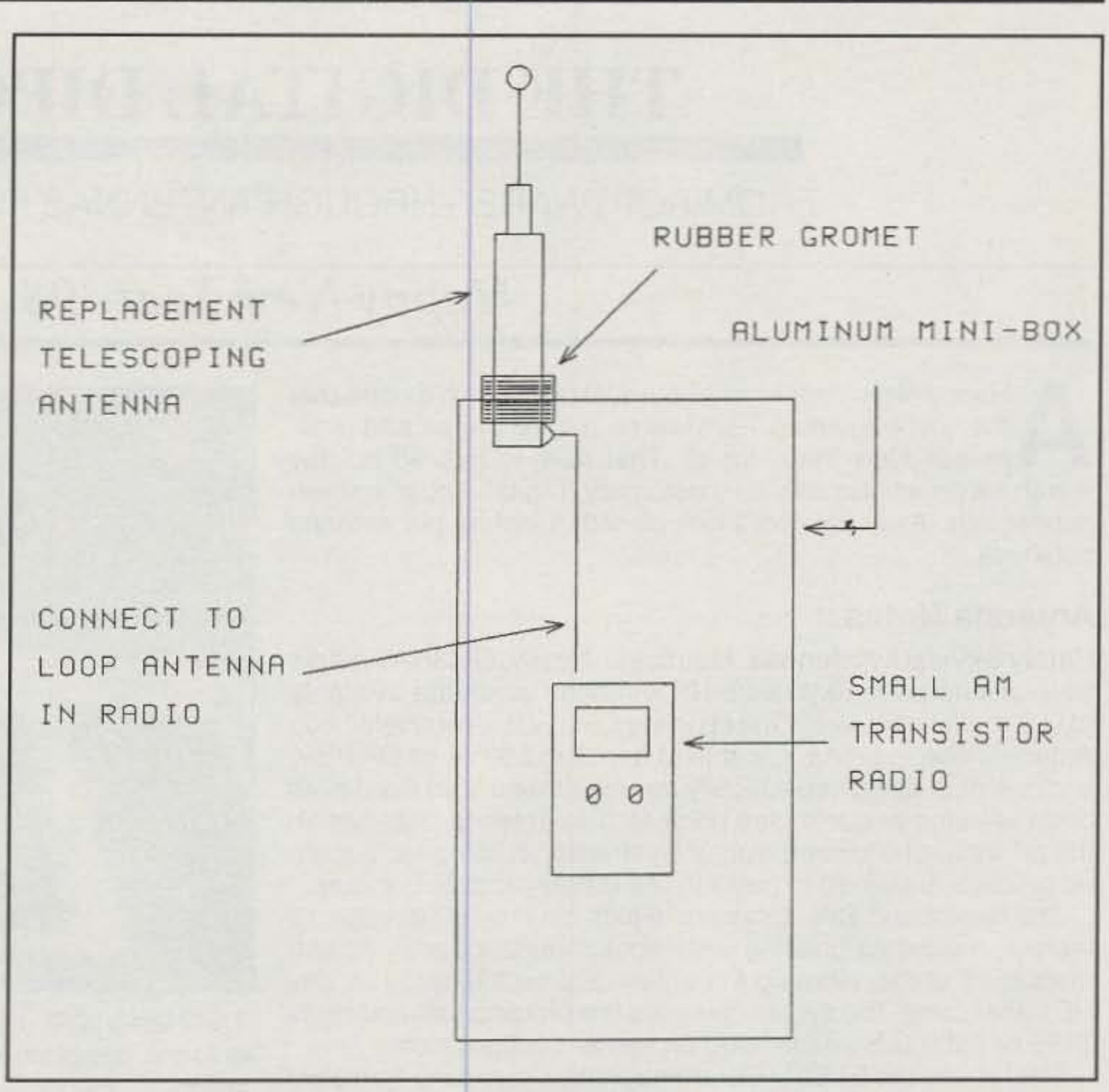


Fig. 3– Sensitive AM-radio-based EMI detector.

BY KARL T. THURBER, JR., W8FX

THE DIGITAL DIPOLE

FROM SOFTWARE THROUGH ANTENNAS FOR THE SHACK

Happy New Year '98

A Happy New Year to all of our *CQ* readers! We hope that the just-beginning 1998 will be a most happy and prosperous New Year for all. That said, in this '98 holiday month we'll continue with our customary "Digital Dipole" column happenings. As usual, we'll kick off with a look at our antenna notebook.

Antenna Notes

Hately Skyware Antennas. Maurice C. Hately, GM3HAT, offers several innovative Skyware® HF antennas which are available to U.S. radio amateurs. First up is the CFL 1 Crossed Field Loop Antenna. The antenna, capable of handling 200 watts RF PEP, is a compact design specifically for use at restricted fixed sites or on vehicles or boats (see photos). The antenna depends on the principle of "Pointing Vector Synthesis," a complex, patented process explained in detail in the Hately product literature.

The broadband CFL 1 system, which covers 160 through 10 meters, requires a phasing unit; input impedance after adjustment is 50 ohms, allowing the antenna to be fed easily by any HF transceiver. The system includes the phasing unit and costs $499 or $559 U.S., depending on feeder configuration.

Next up are the EMDR (Electromagnetic Delay-Line Radiator) 1 and 2 antennas. The EMDR is a compact wire HF antenna designed specifically for use in restricted sites where you can't erect a "normal" antenna. It also operates using the Pointing Vector Synthesis theory mentioned previously.

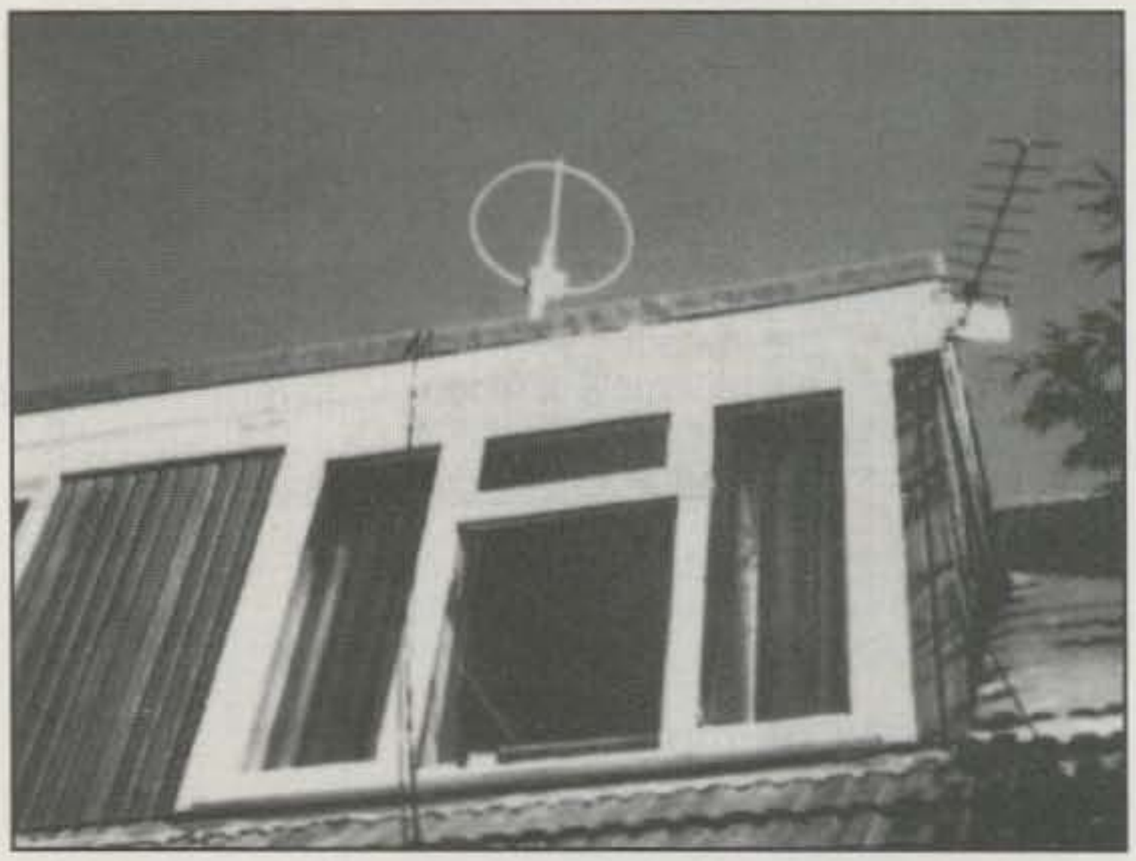
Maurice describes the EMDR antenna as a "developed form" of the Crossed Field antenna in the form of a slender, radiating delay line, consisting of a flat three-wire cable of low-loss polypropylene material. The antenna typically is slung over a house roof, or taken out to a tree from an upstairs window. Two versions are available— the EMDR 1 (28 ft. long, $369) and the EMDR 2 (51 ft. long, $399).

For more information and a detailed explanation of the operation of these unusual antennas, contact Hately Antenna Technology, 1 Kenfield Place, Aberdeen AB15 7UW, Scotland, U.K.

Traffie Technology HEX-BEAM™. Traffie Technology offers another non-mainstream technology antenna, the HEX-BEAM. It's dubbed a "miniaturized controlled field antenna" that takes the form of a high-performance, hexagonal shaped beam. According to the firm, with this configuration antenna size is reduced by 50 percent when compared with conventional antennas. Also, it is claimed that the efficiency of full half-wave elements is retained, and the resulting intense, flattened fields are phased and coupled to provide good gain and directivity. The antenna is unique in that it has no boom, traps, or matching networks.

The company states that while bigger usually is better when it comes to antennas, with the HEX-BEAM overall antenna performance—especially front-to-back (F/B) ratio—actually is *improved* by size reduction. Though half-size, performance is very similar to that of a two-element quad or a three-element Yagi. Overall, the antennas are about one-half as large and one-quarter to one-tenth the weight of conventional designs. Also, the wire arrays hold up well even under adverse climatological conditions.

289 Poplar Dr., Millbrook, AL 36054-1674



The Hately CFL 1 Crossed Field Loop Antenna is a compact antenna designed specifically for use at restricted sites or on vehicles or boats. The antenna depends on the principle of "Pointing Vector Synthesis," a complex, patented process explained in detail in the Hately product literature. The broadband CFL 1 system, which covers 160 through 10 meters, is described in the text of this month's column. The antenna is shown here in a typical fixed-station installation. (Photo courtesy Hately Antenna Technology)

Two types of HEX-BEAMs are available. The original Series I arrays are light, durable arrays for fixed station use and are built to order as mono- or multi-banders for 7–54 MHz; they're $89 to $759, depending on band configuration.

The low-profile Series II array is designed for portability in emergency, DXpedition, and mountaintopping operation, although it's similar to the Series I in performance. It's lightweight and collapsible, and covers 6–20 meters in either mono- or multi-band configuration. The sectional arms are designed to allow the array to "shrink" or "grow" as needed for the chosen band of operation using optional, easily stowed BAND-PACs™. The Series II portable arrays are priced from $359 to $479, depending on band configuration. A custom nylon tote-bag with strap is $79.

For spec sheets that describe the HEX-BEAM arrays in detail and offer extensive performance evaluation notes, contact Traffie Technology, 421 Jones Hill Road, Ashby, MA 01431-1801 (phone 1-888-599-BEAM). Various antenna and mast packages are available.

The TENNADYNE LPDAs Revisited. About seven years ago we first mentioned the lightweight Tennadyne Eagle LPDA (Log-Periodic Dipole Array) antenna, an array that covered all of the amateur bands from 14–30 MHz, including the so-called WARC bands, and all other frequencies in between. The extremely broadband antenna we described boasted multiple band operation with one feedline and boom, and with no traps, baluns, or tuning. As we noted, the antenna used the dual-boom or through-boom type of feedline that does away with

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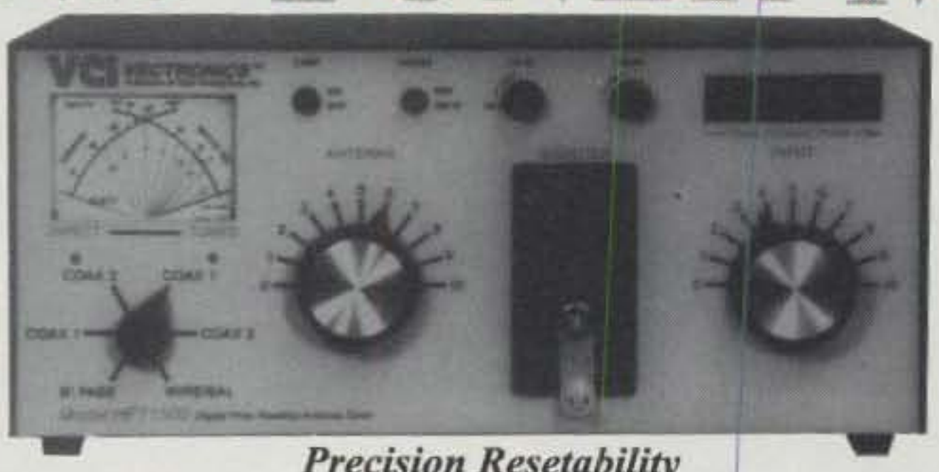

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Two *heavy duty* 4.5 kV transmitting variable capacitors and a massive *high current* roller inductor gives you arc-free operation up to 2 kW PEP SSB.

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***VECTRONICS'** exclusive* 21 segment bargraph display lets you visually follow your instantaneous voice peaks. Has level and delay controls.

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VC-300DLP
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VECTRONICS uses the finest components available to build the highest quality 300 Watt antenna tuner ever made.

You can tune any antenna 1.8-30 MHz. Custom 48 position switched inductor and continuous rotation 1000 Volt capacitors provide arc-free operation. Handles 300 Watts PEP SSB, (150 Watts on 1.8 MHz).

8 position antenna switch, built-in 50 ohm dummy load, peak reading backlit cross-needle SWR Power meter, 4:1 balun for balanced line antenna. Scratch-proof Lexan front panel. 10.2x9.4x3.5 in. Weighs 3.4 lbs.

300 Watt *Mobile* Tuner

VC-300M
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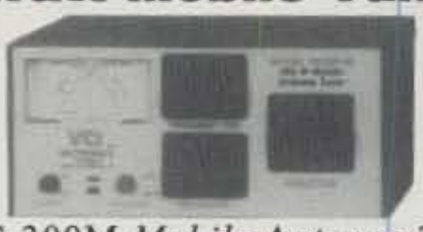

The VC-300M *Mobile* Antenna Tuner is compact, lightweight, easy-to-operate and is our most economical tuner.

It's compatible with *any* mobile antenna and *any* mobile HF transceiver and is compact enough to fit in the most compact car.

It can also be used at home with dipoles, vees, verticals, beams or quads fed by coax.

Backlit dual movement meter simultaneously monitors Power and SWR. Covers 1.8-30 MHz. Handles 300 Watts SSB PEP, 200 Watts continuous, (150 Watts on 1.8 MHz.). 7.25x8.75x3.6 in. Weighs 3.4 lbs.

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PM-30
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PM-30UV
$89.95

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

1500 Watt *dry* Dummy Load

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

Low Pass TVI Filter

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

High Pass TVI Filter

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

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The same compact Hately CFL 1 Crossed Field Loop antenna can be used as a mobile (shown here) or maritime station antenna where compactness is highly desirable. (Photo courtesy Hately Antenna Technology)

baluns while avoiding multi-resonant points common in the criss-crossed wire feed system.

Not sure just what an LPDA is? The LPDA is a very broadband, frequency-independent antenna system often employed by government and military users who need extensive frequency coverage. It's usually designed for multiband HF operation (although there are LPDAs for VHF and UHF) and consists of a system of driven elements in which not all of the elements are active on a given operating frequency. The result is an antenna covering a range of frequencies having a ratio of 2 to 1 or more. The good news is that the antenna's gain, feedpoint impedance, F/B ratio, and the like, remain fairly constant over the full operating range.

The LPDA in amateur applications can offer good multiband performance without being overly costly, unwieldly, or heavy. However, the LPDA can be mechanically difficult to construct, especially due to the phase-shifting feeder system it uses. TENNADYNE is trying to ease the pain with its series of LPDAs.

According to TENNADYNE's flyer, it now offers some nine HF LPDAs, ranging in price from the compact 12 ft. boom Model T6 ($365), to the monster 59 ft. boom Model T21 ($20,000). Most of the antennas in the product line are designed for HF use between 3 and 30 MHz in various range combinations. Also offered are two VHF/UHF LPDAs that cover either 26–1300 or 50–1300 MHz, priced at $295 and $240, respectively.

A four-page flyer contains an interesting, nine-point list of no-nonsense "antenna facts" derived from proprietor Chuck Brainard, KA1PM's experience with antenna modeling. For more information, contact TENNADYNE Corporation, HC 81, Box 347A, Junction, TX 76849 (915-446-4510).

Sommer T-25 and T-50 Vertical Antennas. Sommer Antennas has been a manufacturer of quality antennas for both amateur and professional use for more than 20 years. Developed by Walfried Sommer, DJ2UT, in Germany, the firm's flagship trapless multiband beams were introduced to the U.S. market at the 1984 Dayton Hamvention and have been manufactured in the U.S. since 1989. These no-trap driven arrays were developed to overcome trap losses in an effort to make multiband beams perform as well as monobanders despite the problems and the shortcomings involved with closely spaced designs.

Since first profiling Sommer Antennas more than a decade ago, we also noted several other antennas offered by the firm. These include the Tele-Command-System TCS80, a flexible ver-

tical antenna system that continuously covers all HF amateur bands from 75 through 10 meters. Another product we discussed was the HF SKYDISK, a close cousin of the broadband Discone popular on VHF and UHF. This antenna effectively does the work of a full-size, broadband HF Discone, without its awkward size, by providing only an element of the cone for each HF band.

Yet another product we noted was Sommer's Discone-based HF/VHF antenna combo. This was the Sommer Modified HF-VHF-Disconical DCL280, for installations where space is a problem. The antenna covers all HF amateur bands, including 160, 80, 40, 30, 20, 17, 15, 12, and 10 meters, plus 6 and 2 meters.

Recently, Sommer introduced two new vertical antennas—the Sommer T-25 and T-50 Terminated Frequency Independent Verticals; the no-trap, no-loading-coil antennas are similar, but are 25 and 50 ft. long, respectively. According to the manufacturer, the working principle of the two all-band HF vertical antennas is similar to that of rhombic, terminated longwire, T2FD (terminated folded dipole), and W3HH antennas.

These systems, which broadly fall into the category of "wave antennas," have a very wide operating range and make use of a terminating resistor. Both are fed by a 50 ohm coaxial cable; a coax broadband transformer produces a 50:200 ohm (1:4) match. The T-25 ($260) is designed primarily for 3.5–30 MHz operation, while the T-50 ($440) spans 1.0–30 MHz. Both claim maximum SWR of 1.5:1 and full legal power handling capability.

Spec sheets showing the antennas' construction details and theory of operation are available from Sommer Antennas, 395 W. Osceola Rd., Geneva, FL 32732-0710 (telephone 407-349-9114; e-mail <sommer1@ix.netcom.com>; on the web <http://www. sommerantennas.com>).

Comet CA-HV 40/20/15/10/6/2 Meter Antenna. The Japan-based Comet Antenna line of HF, VHF and UHF monoband, dual-band, and triband base, repeater, and mobile antennas is distributed in the U.S. exclusively by NCG Companies. The product line has grown significantly over the past decade, and we have briefly highlighted it in previous columns.

The latest Comet Antennas product flyer features a variety of antennas that cover HF through 2400 MHz. New to this catalog are two SWR and power meters, the NCG 2050 (for 1.6–60 MHz, 3 KW, $149.95) and the NCG 3000 (for 118–530 MHz, 200 W, $109.95). All Comet antennas are adjusted and tested at the factory for American amateur bands; no tuning is required.

One of the most recent antennas in the product lineup is the Model CA-HV Quad-Band Antenna. For mobile use, it was designed at ICOM's request for use with their new IC-706 HF/6 meter/2 meter radio. The antenna allows you to choose operation on two HF bands plus VHF operation on 6 and 2. The new antenna mates with PL-259 connectors and is 5 ft. 10 in. in height; it's $139.95. Special duplexers are available to combine the radio output connectors into a single connector to make best use of the multiband capabilities of the CA-HV antenna.

For a catalog and an application sheet showing possible multiband antenna configuration options, contact NCG Companies, 1275 North Grove St., Anaheim, CA 92806 (telephone 1-800-962-2611; e-mail <micks@cometantenna.com>; web <http://www.cometantenna.com>).

Alpha Delta Communications Catalog Update. Alpha Delta Communications is a major supplier of amateur and SWL HF antennas, lightning protection devices, coaxial switches, antenna hardware, and other antenna accessories. They recently issued an eight-page catalog that showcases their expanding product line.

The new catalog describes their classic DX series HF wire antennas, which include amateur and SWL slopers, no-trap multiband dipoles, and monoband dipoles; the RT, LT, and HV series Transi-Trap™ coax surge protectors, field-replaceable Arc-Plug™ and SEP static cartridges; Delta series two- and four-

position coax switches; and antenna hardware kits and insulators. Also included are the Aussie-made Outbacker® multiband mobile antennas that are now imported by Alpha Delta.

Something new to the catalog is the 12 ft. tall, portable Outbacker® Outreach™ Antenna, at $399 designed to be installed anywhere from patios to mountaintops, for all HF bands 160 through 10 meters. A companion matching network, the Outpost™, is a $199 tripod antenna coupler and ground-mount system which also matches the base impedance of all Outbacker antennas for portable and fixed station operation.

For a free catalog, contact Alpha Delta Communications, Inc., P.O. Box 620, Manchester, KY 40962 (606-598-2029).

Diamond Amateur Radio Product Catalog. Diamond Antenna has a new catalog of their imported VHF/UHF antennas and accessories, which now are exclusively distributed in the U.S. by RF Parts Company. The new, 12-page illustrated Diamond catalog offers a variety of base station and repeater antennas covering 6 meters and up; mobile antennas including both monoband and multiband types and a multiband HF/VHF mobile antenna; mobile antenna mounts and mounting kits; duplexers and triplexers for combining or splitting applications; and handie-talkie (HT) antennas, including dualband and triband types. Also found in the catalog are power and SWR meters, and various other accessories.

Incidentally, the Diamond distributor, RF Parts (profiled in last July's column), stocks a variety of often hard-to-find RF components. These range from "milliwatts to kilowatts," and include transmitting tubes; RF power and other transistors; RF power modules; several types of fixed and variable capacitors; RF chokes; filters; tube sockets, chimneys, and plate caps; vacuum and special-purpose relays; heatsinks; and more.

A Diamond Antenna catalog, retail price schedule, and dealer list are available from RF Parts Company, 435 South Pacific Street, San Marcos, CA 92069 (telephone 1-800-737-2787; or e-mail <rfp@rfparts.com>).

Antenna Specialists CB & Scanner Antenna Catalog. Antenna Specialists, now a division of Allen Telecom Group, Inc., long has been known for its diversified lines of base station and mobile communications antennas and accessories. These products are increasingly offered for the booming land mobile, cellular, business, and other emerging and hi-tech communications services. We covered their amateur radio catalog in the past; it showed a variety of 2 and 6 meter, 220 MHz, 70 cm, and 23 cm base station and mobile antennas, including the popular mobile "On-Glass"® windshield mount antennas.

Recently, the firm offered a 14-page catalog of CB and scanner mobile and base station antennas. The mobile antenna product line offers a variety of mounting options, including the popular On-Glass, magnet, trunk, side body, roof, and gutter mounts. CB fixed station beams and several mobile and fixed scanner antennas also are offered, including the popular MON-64 DISCAN™ Discone.

Incidentally, Antenna Specialists is the patent holder for the popular On-Glass window mount technology, widely used in mobile cellular antennas. The On-Glass system allows a two-way communications antenna to be mounted on the glass and transmit and receive virtually unimpeded through the glass. The RF signal is capacity coupled from the impedance matching network mounted inside, through the glass, to the base of the antenna outside. Reportedly, the impedance at the glass interface is high so that no significant signal energy is lost.

The proprietary adhesive system developed by the firm combines an all-weather, double-sided foam tape adhesive for quick installation along with a fast-curing silicone adhesive for a long-lasting hold. With this system there is no need to drill any holes in the glass.

For a catalog, contact Allen Telecom Group, Inc., Antenna Specialists Division, 30500 Bruce Industrial Parkway, Cleveland, OH 44139-3996 (216-349-8400).

Soft Stuff

DSP Blaster 2.0. In the December '96 column we profiled Brian Beezley, K6STI's DSP Blaster™ software. As most readers know, Brian publishes respected PC antenna modeling software, much of which we have discussed. Brian also publishes non-antenna-related software, which we have described from time to time.

As we noted previously, DSP Blaster provides DSP filtering without DSP hardware; it uses your PC's processor and sound card to replace expensive, hardware-based "DSP black boxes." Unlike regular analog communications processors, DSP units use software to encode and decode signals. Under DSP, the incoming audio is converted into digital data for processing by the DSP software, which decisively rejects noise and interference according to the bandwidth you specify.

The new version, DSP Blaster 2.0, sports a long list of features especially designed to support robust coherent CW reception. These include coherent stereo processing of CW signals; tunable highpass, lowpass, and bandpass filters; output dither; enhanced adaptive noise reduction; automatic gain control (AGC); and automatic fine tuning.

Getting down to details, the new version (which can run in the background with

contest logging programs) provides SSB, CW, image, and data filters with adjustable bandwidth; highly optimized adaptive noise reduction; and automatic CW peaking and notch filters to greatly enhance CW reception. The program displays the signal waveform, spectrum, and CW phase to provide insight about the signals you're hearing. And it's all controlled by clicking on an on-screen system block diagram with your mouse!

DSP Blaster 2.0 ($125) requires at least a 486DX processor, VGA display, and 16-bit Creative Labs sound card. For more information on the program and an application note explaining coherent reception of CW signals, contact Brian Beezley, K6STI, 3532 Linda Vista Dr., San Marcos, CA 92069 (telephone 619-599-4962; e-mail <k6sti@n2.net>). You also can download a demo copy of the program from N1RCT's Web page at <www.megalink.net/~n1rct>.

ARRL TravelPlus for Repeaters™ CD-ROM. In several previous columns we highlighted various CD-ROM based mapping software. The programs we examined included DeLorme Street Atlas USA™, a slick computerized street map of the entire country; Global Explorer™, a "computer globe" that presents the world in much greater detail than any computer or printed atlas; and AAA Map'n'Go®, which brings all kinds of sophisticated North American travel planning information to your PC.

The point of mentioning this is to note that missing from these otherwise excellent mapping products was a database of VHF/UHF amateur repeater site listings, which would be of great benefit to traveling amateurs. Of course, I made the suggestion to the manufacturer (DeLorme) that repeater sites be included in the future, but question whether my suggestion would be implemented for the use of the relatively small amateur market.

In any case, it looks like the ARRL staff read my mind. They recently developed a standalone CD-ROM product that closely incorporates what I had in mind. That product is the TravelPlus for Repeaters CD-ROM, and it includes the entire ARRL Repeater DataSource for selecting, sorting, and printing custom VHF and UHF repeater listings.

While the specialized ARRL product doesn't pretend to be a comprehensive mapping and travel planning package to directly compete with DeLorme and other mapping software, it does include colorful maps with major and state highways in the U.S. and major highways in Canada. Its main benefit is that it very handily lets you locate repeaters along any travel route in the United States and Canada, and access repeater data in a variety of ways.

With TravelPlus you can travel a route and find all repeaters within a range you specify on whatever bands you select, identify all repeaters up to 500 miles distant, print map screens or repeater lists based on your travel route, customize the presentation of repeater information to meet your needs, and save route files and repeater list files to disk for future reference or for linking routes from one map set to another. The help files include a useful "quick tour" of the program, a short tutorial to help get you started.

All in all, TravelPlus is a much-awaited program to help keep you in touch, reasonably priced at $39.95 plus $4 s/h. For more information, contact the American Radio Relay League (ARRL), 225 Main Street, Newington, CT 0611-1494 (telephone 1-888-277-5289; e-mail <pubsales@arrl.org>; web <http://www.arrl.org>).

Postscript: Maybe I shouldn't mention it in the same breath as the ARRL's TravelPlus, but I should nevertheless mention that Artsci Publishing has an easily accessed (and free) online database of open repeaters in all states. You'll find the Artsci database at <http://www.artiscipub.com/repmain.shtml>.

HAMCALC Revisited. In several previous columns we noted George "Murph" Murphy, VE3ERP's free, DOS-based HAMCALC software program, which he bills as providing "painless calculations for amateur radio operators." In a recent letter Murph notes that the freeware program continues to grow since its introduction in 1993, thanks to the interest, encouragement, and suggestions from its many amateur and professional users. HAMCALC presently includes over 170 "painless" math and design programs of interest not only to radio amateurs, but to professional engineers and university faculties.

The program constantly is being upgraded (it's up to at least Version 28, and probably higher by the time you read this). The Main Menu has a history option that lists the major changes made in the most recent previous versions. If you want to keep up-to-date, you can send Murph a note from time to time and let him know the version number and date of your latest copy of HAMCALC (as shown on the initial Main Menu display). If the current version is a later one, he'll send it to you on a 3.5 in. 1.44 MB diskette and ask you to remit U.S. $5 to cover the costs of materials. If your version still is current, he'll put you on the list to receive the next version as soon as it becomes available.

Murph offers one note of caution: HAMCALC, which is freeware and not to be sold, currently is being offered "for sale" on the Internet and elsewhere as an unauthorized inclusion in some CD-ROM disc sets. The HAMCALC versions seen on the Internet and on CD-ROMs invariably are outdated, he says, and so he suggests disregarding any version of HAMCALC you may see elsewhere.

For more information or a copy of HAMCALC, contact George Murphy, VE3ERP, 77 McKenzie St., Orillia, ON L3V 6A6, Canada.

Wrap-Up

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

Overheard: What better time to restate the fact that for most of us, there really is no place like home for the holidays.

73, Karl, W8FX

BY DAVE INGRAM, K4TWJ

WORLD OF IDEAS

A LOOK AT THE WORLD AROUND US

Small Rigs Are Big News in '98

Happy New Year, friends, and may 1998 prove to be a blowout good one for you! Even at this early date, the outlook for improved band conditions, more on-the-air fun, and more neat little go-anywhere rigs is better than ever. In fact, these may be the "prime times" some folks apparently have been striving to instigate. Thanks to their dedication in maintaining strict licensing structures while simultaneously "talking up" use of the Internet, even the always busy 20 meters is becoming void of heavy QRM. Finding a clear frequency for a QSO and/or working QRP is a cinch, but is this not akin to stabbing ourselves in the back? Will there be an amateur radio world for future generations to enjoy and reflect on the merits of our endeavors, or will we continue diverting them to 2 meter FM and the Internet?

Suppose you were a curious onlooker serious about getting started in amateur radio and an old pro simply handed you a license manual and suggested you check the Internet for more information. Disillusioned and pressured to make your own way in today's highly competitive world, would you not say, "Heck, why bother? I can just add a sound card, mic, and speaker to my computer and talk with random-selected people around the globe via the Internet." Emergency preparedness? Reliable wireless communications? They can just use a cell phone, they say. Lost sheep for sure! It is worse than the heartbreak of psoriasis!

Let's all pull together in 1998 to promote the "bright lights and glamour" side of amateur radio and provide real (genuine!) "Helping Elmer" encouragement for future generations to join our ranks. Now that's a New Year's resolution worth pursuing!

Your continuing encouragement to spotlight more small rigs and kits in this column is incredible! It is equalled only by your reports of big-time success using low-power gear on the air. As our friend, Ed Sylvester, KE4OGI, says, "A little QRP goes a long way."

Yet another delight is featured in this month's column (the SST from Wilderness Radio). However, understand our "World of Ideas" format covers many areas, and we must shift focus every couple of months. I have been promising to feature Survival Communications, for example, and CW devotees are anxious for another keys show-and-tell. The good news is I have been putting together and preparing to self-publish a new book on QRP in 1998. With a little luck, the first printed copies should be available between now and April. The book is absolutely packed with hot "build 'em" circuits, homebrewing ideas, details on presently available kits and rigs, QRP operating secrets, clubs, on-the-air activities, and more. Once again, we are holding old-time prices: The book's cost is $15 plus $2 shipping. My promotions budget is zero, so this will probably be the only announcement of the book you will see for several months. Remember it! Tell your friends, too! Drop me an SASE (K4TWJ, 4941 Scenic View Dr., Birmingham, AL 35210) for more details, ordering info, or to reserve your copy.

4941 Scenic View Dr., Birmingham, AL 35210

A Rising Star: The SST

A couple of years ago Wayne Burdick, N6KR, and Bob Dyer, KD6VIO, realized they had a parallel interest in QRP, and the idea of producing some very special kits under the name of Wilderness Radio evolved. Initial products from the small company included an upgraded version of the NorCal 40A and today's popular "Sierra" transceiver (see photo 1). Then around the same time we highlighted NorCal's 38 Special in this column, Wilderness revealed their latest treat—the pocket-size SST (Simple Superhet Transceiver) shown in photo 2. The SST was temporarily upstaged by the 38 Special, which like many club-produced

Photo 1– Wilderness Radio's premier transceiver kit is the well-known "Sierra." The unit shown is a popular deluxe version and belongs to Stan Cooper, K4DRD.

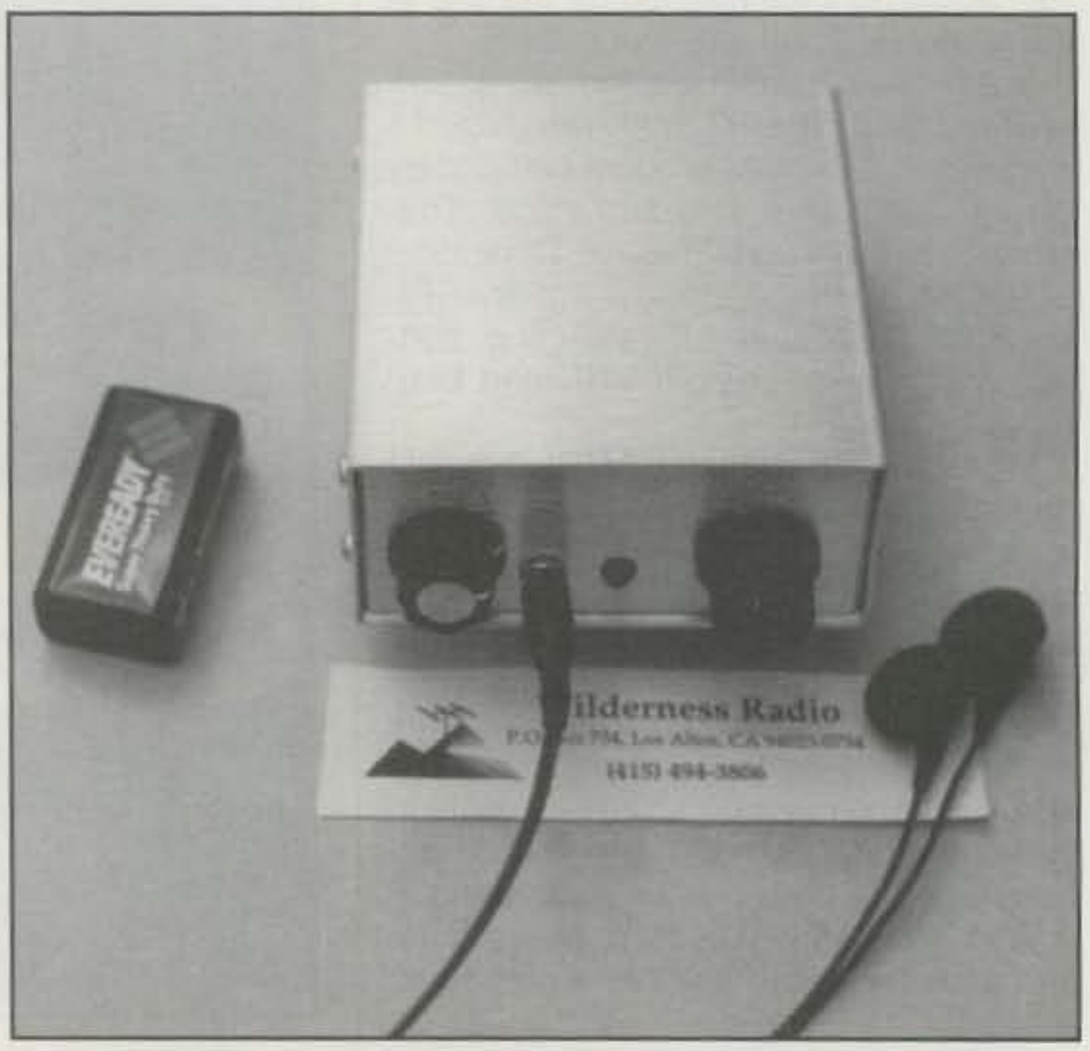

Photo 2– The new coat-pocket-size SST kit transceiver from Wilderness Radio. The unit can be powered by a 12 to 15 volt DC source for 2 to 3 watts output, or by an internally mounted 9 volt battery for stand-alone operation at the 1 watt level. Performance is outstanding for a "77 parts" rig. Now I'm stumped on the best color to paint its enclosure. Somehow, conventional black with black knobs does not do it justice.

The New Approach to HF Radio!

PC not included

The Kachina 505DSP Computer Controlled Transceiver

Features:

- Works with any Computer Running Windows 3.1, 95 or NT
- Covers all Amateur HF Bands plus General Coverage Receiver
- IF Stage 16/24 Bit Digital Signal Processing (DSP)
- II DSP Bandpass Filter Widths from 100 Hz to 3.5 kHz (6 kHz in AM Mode)
- Band Activity Display with "Point and Click" Frequency Tuning
- On-screen Antenna "Smith" Chart, Logging Software and Help Menus
- Automatic Frequency Calibration from WWV or Other External Standard
- "Snapshot" Keys for Instant Recall of Frequencies and Settings
- Optional Internal Antenna Tuner

The Kachina 505DSP Computer Controlled HF Transceiver After twenty years of building commercial transceivers in Arizona, Kachina has decided the time is right for a new approach to amateur radio. The Kachina 505DSP is nothing short of a revolution in HF transceivers.

Why Use Knobs if You Have Windows? The old-fashioned front panel has become too cluttered to be useful. Too many knobs, too many buttons. Kachina's 505DSP transceiver connects to your computer's serial port and is completely controlled under Windows™. With optional cables, the radio may be remotely located up to 75 feet away from your computer. Imagine combining a state-of-the-art DSP transceiver with the processing power and graphics capabilities of your PC and you'll soon wonder why all radios aren't designed this way. Why settle for a tiny LCD display when your computer monitor can simultaneously show band activity, antenna impedance, heat sink temperature, SWR, forward and/or reflected power and a host of other information?

16/24 Bit DSP/DDS Performance In addition to 100% computer control, the Kachina 505DSP offers exceptional 16/24 bit DSP/DDS performance. IF stage DSP, "brick-wall" digital filtering, adaptive notch filters and digital noise reduction, combined with low in-band IMD and high signal-to-noise ratio, produce an excellent sounding receiver. Sophisticated DSP technology achieves performance levels unimaginable in the analog world. The transmitter also benefits from precise 16/24 bit processing. Excellent carrier and opposite-sideband suppression is obtained using superior phasing-method algorithms. The RF compressor will add *lots* of punch to your transmitted signal without adding lots of bandwidth, and the TX equalizer will allow you to tailor your transmitted audio for more highs or lows.

Seeing is Believing American-made and designed, and able to stand on its own against the world's best, the 505DSP is bound to set the standard for all that follow. But don't take our word for it. Visit our website at http://www.kachina-az.com for detailed specifications, to download a demo version of our control software, or to see a current list of Kachina dealers displaying demonstration models in their showrooms.

Windows is a trademark of Microsoft Corp.
Specifications and features subject to change without notice.

KACHINA COMMUNICATIONS, INC.
P.O. Box 1949, Cottonwood, Arizona 86326, U.S.A.
Fax: (520) 634-8053, Tel: (520) 634-7828
E-Mail: sales@kachina-az.com

CIRCLE 4 ON READER SERVICE CARD

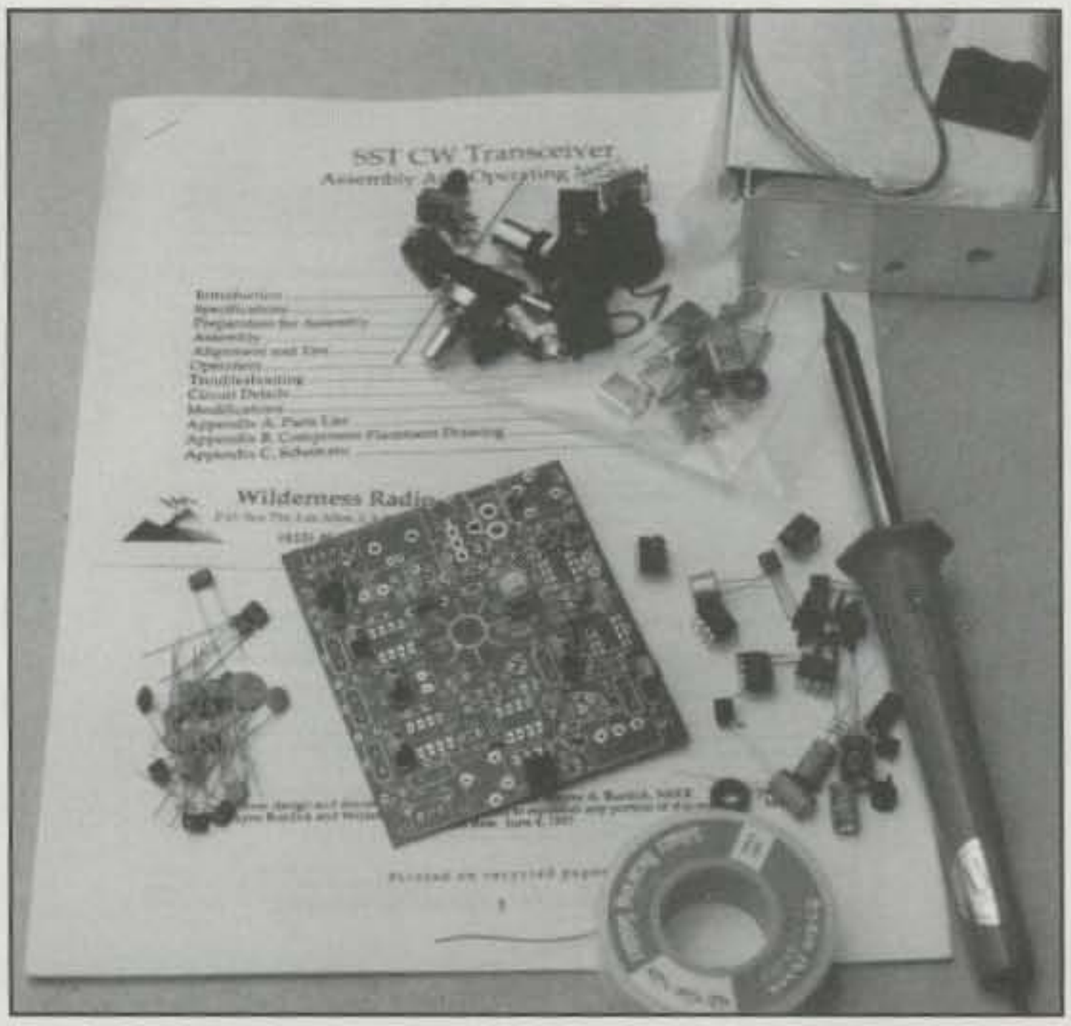

Photo 3– The SST kit as received and ready for assembly. Truthfully, I was over-enthusiastic and almost forgot to shoot this "45 minutes into construction" photo. Disc capacitors are at the 7 o'clock position; connectors, controls, crystals, and components for a selected band are at 12 noon; solid-state devices are at 3 o'clock; and electrolytics are at 5 o'clock.

kits, was supplied "bare bones style" (less options, off-board components, and case) to yield an unbelievably low price. Ah, but a new year dawns, all 38 Special kits have been sold, and the SST is standing tall as today's top mini-rig for portable operating stints, camping, and backpacking. Considering the SST kit includes all parts, connectors, controls, knobs, and a predrilled custom enclosure for $85 plus $3 shipping, it is an irresistible bargain!

The SST is available in a 20, 30, or 40 meter version, has a variactor tuned VXO for rock-solid frequency stability, and delivers 1 to 3 watts output, depending on its power source. Frequency coverage with the supplied VXO crystal is approximately 10 kHz around 7,040 kHz on 40, 15 kHz around 10.112 kHz on 30, and 20 kHz around 14,050 kHz on 20. There is extra room in its 1.5" × 3.2" × 3.5" enclosure to add a 9 volt battery for stand-alone field use at the 1 watt level (use a 1200 maH lithium battery for ultra-long life). I modified a 12 volt DC wall adapter to power my 20 meter SST indoors, use an R5 vertical antenna, and work most of the stations called. Many times stations even call me or answer my CQs. I just look at the little SST and its "wall wart" in amazement. Now this is hammin'!

The SST's receiver section sports a three-pole crystal filter with 400 Hz bandwidth (and no "ringing"!), it has an exceptionally low noise floor, and it is quite sensitive. Both RF and AF gain controls are included, plus audio-derived AGC with a front-panel-mounted LED indicates signal strength during receive and output on transmit. PIN diode switching is used for full break-in operation without any trace of clicks or thumps, and keying is monitored by allowing a perfectly attenuated amount of the actual transmit signal to ride through RF-protected receiver stages during keydown. You can thus hear the quality of your own signal and tune in other stations to the same tone for "zero beat

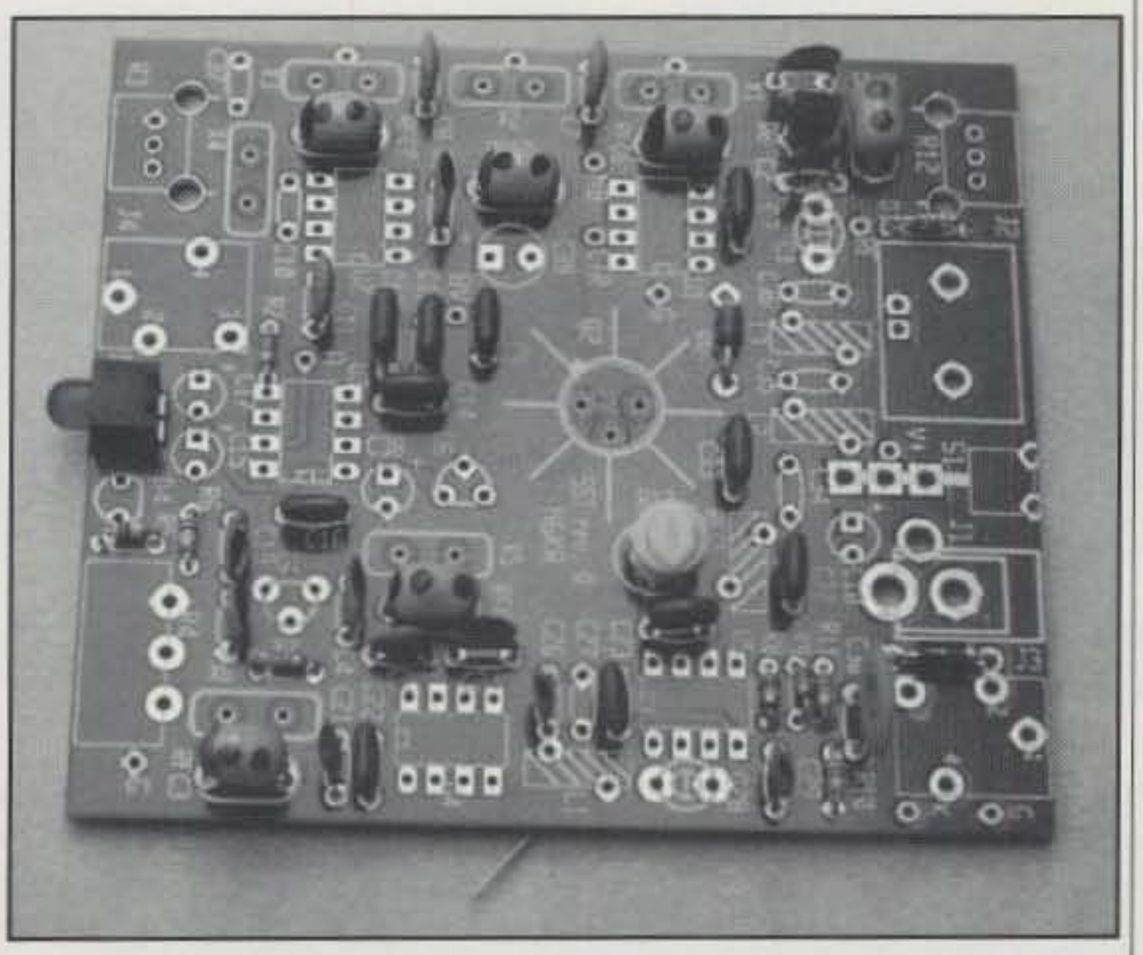

Photo 4– This photo was taken approximately three hours into assembly, with most resistors, disc capacitors, and molded inductors installed. Why so long? I check each component before installation, then retrace the previous day's work before continuing. Left side with LED near center is front: AF gain will mount to its left side and tuning pot will mount to its right. Note plated-through holes for reliable operation under various outdoor conditions.

operation." The volume of both come out equal and can be varied with the AF gain. A pair of NE602s and an LM386 plus a JFET in the VXO comprise the receiver section. On the transmit side, the VXO feeds another NE602 mixer, which in turn feeds an LT1252 buffer that drives a 2N3553 power amplifier.

Attention to finer details and optimized use of components set the SST apart from other NE602-based rigs. Designer Wayne Burdick, N6KR, really did his homework on this one! A clever

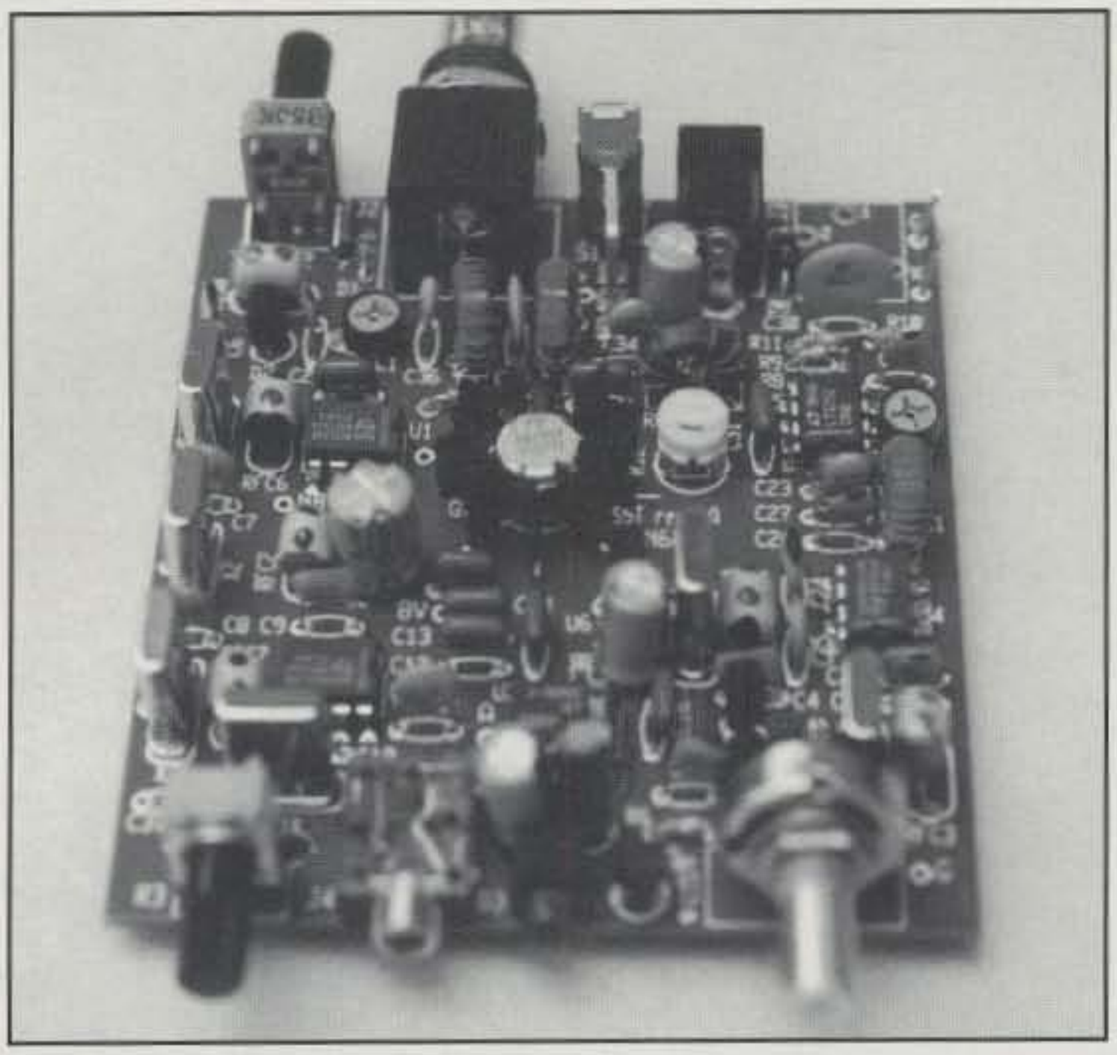

Photo 5– The completed SST transceiver ready to install in its custom enclosure. Three crystals on the left form the IF filter. The power output transistor sits in a hefty heat sink near the middle. All controls, connectors, etc., mount directly on the board. No external wiring is required.

to open the squelch (receive hiss) when you first begin the receiver alignment.

We are going to align only the oscillator, multiplier, and RF deck. The IF and mixer sections should not need aligning. Mixer and IF alignment is almost never required. Do not attempt to align the mixer or IF stages of the receiver without a dependable service monitor such as the IFR 1200S. If the IF and mixer stages do need alignment, then it is best to obtain the service manual and do a complete receiver alignment.

You may use whatever signal source you wish to perform the simple RF deck alignment. I use the IFR 1200S to perform all of the receiver and transmit exciter aligning.

With a low-level, on-frequency signal injected at the antenna input, on the OSC/MULT board (see fig. 3) peak C406. Peak C411 and C416 in a similar manner. If the signal is not heard, raise the output of the signal source to a point where the signal is heard. Set C307 fully CCW.

Peak C411, then peak C416, and again step through the same setup again, peaking C406, C411, and then C416. Next peak C307.

Continue with the peaking of the RF tuning points at C305. As you adjust the RF section the receive signal will begin to rise. Readjust the signal level out of the signal generator to prevent overloading the RF section. It is better to align with a low (noisy) signal to assure the best receiver sensitivity when the alignment is complete.

Next peak C304, adjust the signal generator level for a slightly noisy signal, and then peak C305. Reduce the signal generator level as needed to keep the received signal slightly noisy. Peak C305 to obtain the highest peak meter reading with the lowest signal generator level.

Next peak C304. Use the same method as we have already described: Obtain the highest peak meter reading with the lowest signal generator level. Continue to adjust the RF deck, adjusting C303, then C302 and C301.

The frequency of the receiver crystal element can be adjusted by turning the "piston" trimmer at the crystal element top (see F1/RX in fig. 3). The frequency can be measured directly with a frequency counter connected to the junction of C418 and C419 on the oscillator/multiplier board. When reading the frequency at this point, remember that the frequency will be 11.2 MHz lower than the actual receive operating frequency.

I simply injected an on-frequency signal from the IFR 1200S and tuned the piston capacitor for optimum sensitivity.

MASTR EXEC II Transmitter Alignment

Transmitter alignment is performed while keying the transmitter. Do not hold the transmitter (PTT) keyed for long periods, especially if you are tuning one of the MASTR EXEC II 110 watt radios.

Be sure you have connected a dummy load that is rated at or above the power "output" level of the radio. Monitor the power meter or wattmeter while peaking T101. Next peak T102 and T103. As the power begins to rise, release the PTT switch and allow a moment for the PA to cool down.

Again key the radio and peak T104, T105, T106, T107, and T108. Let the PA's cool (unkey for a minute). While keying the radio again, peak (retune) T102, T103, and T104. The final adjustments are made by "touching up" using T107 and T108. You are now at the high-powered stages, so proceed with caution. Do not allow the final/PA to overheat, especially if you are tuning a 110 watt MASTR EXEC II.

For all practical purposes, if you *are* tuning a 110 watt MASTR EXEC II, reduce the power output below 100 watts. Even for packet radio use, this is ample power to reach that next hilltop or node. To adjust power, use the power control pot on the RF power amplifier main board (see fig. 3).

RF Power Output Adjustment

With the top cover removed from the transceiver, the RF amplifier is located in the extreme rear of the unit, next to the heat sink fins. A thin metal RF shield is over the RF power amplifier circuit board. At the left side of the shield there is a square hole for access to the test plug. Lift and remove the shield. Near the indicated location shown in fig. 3 there is a pot labeled R8. It is normally a blue adjustment potentiometer. This is the RF output power adjustment: To lower power turn the pot counterclockwise; to raise power move the pot clockwise. There are two other blue pots in the right rear of the RF PA compartment. **These pots are factory preset and should not be adjusted!**

Be sure you have an RF wattmeter and a dummy load connected when making the following adjustment. If you've already installed the 5-pin DIN connector, you can "key" the transmitter by placing a jumper between DIN pins 2 and 3. One final note when working with the high-powered (110 watts) MASTR Executive II radio. It is not wise to operate the high power below 40 watts of RF output power.

"Net" The Transmit Frequency

The transmit frequency is adjusted at F1/TX with the piston capacitor (see fig. 3, "transmit exciter board"). Be sure to use a frequency counter or a good service monitor when netting the transmit frequency.

Transmitter deviation is set using R104 (see fig. 3, "transmit exciter board"). When making the deviation settings for 1200 baud packet, set the AFSK signal from the TNC to 3.5 kHz. **Do not** allow the deviation to exceed this level. For the record, I maintain 3.0 kHz deviation on all my radios, both 9600 baud and 1200 baud.

Keep Your Cool

The radio should be mounted in such a manner so as to provide good air circulation through the heat sink fins located on the rear of the unit. A small fan or forced air circulation is even better and will prolong the life of the power transistors.

Make Ready The MFJ-1270C

To transform the MFJ-1270C Rev 11 into a TheNET X-1J4 node, see fig. 4 and the steps beneath it. EPROMs for the MFJ-1270C to convert the TNC into TheNET X-1J4 node service are available from MFJ Enterprises, Inc. Call 1-800-647-1800 for price and related information. You should have the *callsign, SSID, alias, and password* information ready when placing an order for the X-1J4 EPROM.

Now we are having fun packeting! You can contact me at <BucK4ABT@inmind.com> or <K4ABT@sedan.org>. Visit the SEDAN Packet Networking pages at <http://www.sedan.org>.

73 de BucK4ABT

BACK TO BASICS

HOW IT ALL STARTED

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BY JOE LYNCH, N6CL

VHF PLUS

ALL ABOUT THE WORLD ABOVE HF

Shopping To Properly Equip Your Station

You're a new amateur radio operator. You decided to pass the test as part of giving yourself a treat for the holidays. Now, however, you have to put together that ideal first station.

It's the day after Christmas and you didn't get what you were looking for "under the tree" (or, maybe you have this magazine just before Christmas and you're considering what needs to go "under the tree" for yourself and are looking to drop a few hints here and there). The following just might be the advice you're looking for in buying and setting up your first station.

There are several questions you'll want to ask yourself before you proceed to design that ideal first station. They are: Where do I live? What license class do I ultimately want to attain? What are my interests in the hobby? Of the three major product divisions, what HF transceivers, VHF base/mobile transceivers, and handhelds do I want to make as my basic station? Because this is a column related to VHF and above, most of the material in it will be related to this particular portion of frequency spectrum allocated to amateur radio use. Even so, the basic questions here do apply across the hobby.

Where do you live? The first question you must ask in assembling your station is "Where will I put my station?" The ultimate answer to this question depends a lot on where you live. Do you live in an apartment, a house with a small lot, a house with a large lot, in the country with virtually unlimited space, or do you just want (or have) to set up in your car?

What license class do you ultimately want to attain? Are you a Novice class licensee? If so, do you want to use your HF operating privileges? Do you want to use CW? Do you want to upgrade right away, or do you want (or have) to wait awhile? Are you a straight Technician class licensee or did you also pass the Morse code test with your Technician class theory tests, and thus have been licensed as a Technician Plus class licensee? If you don't have HF privileges, do you want to stay on VHF or do you want to learn the code and upgrade so that you can operate on HF?

Are you one of those whiz kids who sat for and passed all the license tests at the same time and currently hold an Extra class license? If so, do you want to spend much of your time on HF, or do you want to explore the last of the frontiers of amateur radio by using SSB and CW to work DX on the VHF and above bands?

P.O. Box 73, Oklahoma City, OK 73101
(phone 405-528-6625; fax 405-528-0746)
Internet jlynch@post.cis.smu.edu
Compuserve 72124.2734@compuserv.com

VHF Plus Calendar

Jan. 4	*Quads* meteor shower predicted peak. Good EME conditions.
Jan. 5	First Quarter Moon.
Jan. 11	Poor EME conditions. Highest Moon declination.
Jan. 12	Full Moon.
Jan. 17-19	ARRL VHF Sweepstakes. *(See text for details.)*
Jan. 18	Moon Apogee. Moderate EME conditions.
Jan. 20	Last Quarter Moon.
Jan. 25	Lowest Moon declination. Very Poor EME conditions.
Jan. 28	New Moon.
Jan. 30	Moon Perigee.

**EME conditions courtesy W5LUU.*

What are your interests in the hobby? As you can see from the question on your class of license, your interests are somewhat (not completely) dictated by your license class, now or in the future. Even if you're a Novice or a straight Technician class, most interests, or specialties, are wide open to you. Some of these are weak-signal VHF, packet, SSTV, ATV, and satellite. Other interests include traffic handling, public service, and equipment construction.

Of the three major product divisions, what HF transceivers, VHF base/mobile transceivers, and handhelds do you want to use as your basic station? The answer to this final question depends a lot on the answers to all the above questions. Do you want to get on HF? If so, there are several equipment decisions associated with that decision. Do you want to operate on VHF through the local repeaters? If so, you'll look at several options related to that decision. Do you want to own a handheld radio? If so, you'll consider several choices related to that option. Let's examine several scenarios in setting up your VHF station.

VHF/UHF Base/Mobile Transceivers

If you're a standard Technician class licensee or you want to limit your activities to the VHF/UHF frequencies for the time being, you'll be interested in establishing a station for these bands. Let's look at what makes up a VHF/UHF base/mobile station.

Let's first start with the transceiver. Most major manufacturers offer a transceiver that is powered by 12 volts DC. This makes the radio versatile enough to work in your home with a DC power supply and in your car from your battery. For you this means that you can grab the same radio you're using in the house and go somewhere with it in your car.

What should you look for in the radio? By far the most popular band on VHF is 2 meters. However, its popularity may also be a deterrent for some people—but not entirely. If you live in an area in which 2 meters is highly congested or you plan on exploring some of the other VHF/UHF bands at a future date, then you might want to consider a dual-band transceiver, or even a tri-band transceiver. The other two most popular bands are 70 cm and 23 cm. However, both 135 cm and 6 meters are also gaining in popularity.

Most manufacturers offer a single-band transceiver. Most also offer dual-band transceivers. A few even offer a tri-band transceiver. Often with the tri-band radio you have a choice of the third band. You can pick the band in light of what's most popular in your area or what may be your particular interest in other frequencies. For example, when I had a choice of the third band in my tri-band transceiver, I chose 6 meters because of my interest in working DX on FM when the band is open during the summer months.

What are some of the other features to look for? A quick-release front control panel is a very attractive feature for two reasons: the security of taking it with you when you leave your car, and the ability to mount the front panel on the dash board (where there may be limited installation space) and the main portion of the radio in some other part of the car where there's more room for it.

The ability to use the dual- or tri-band radio as a repeater is another feature. Almost all of the radios have that characteristic. However, it's a cross-band repeater, and the radio isn't designed for the continuous duty that the commercial-grade repeaters endure. Therefore, it's something to consider as an option, but not as one to replace the commercial-grade repeater.

Memory is another features. There are two types of memories: one for frequencies and the other for phone numbers.

While it's nice to have lots of memories, it really isn't necessary to have more than 25 to 30 frequency memories and 5 to 10 phone number memories.

With regard to frequency memories, it's important to be able to program at least one of the memories for the occasional "odd split" repeater frequency offset.

With regard to telephone memories, it's important to be able to program enough digits in order to dial the repeater's access code and the telephone number (even a 10 or an 11 digit long-distance number, if necessary).

Another feature is the ability to program the memory channel with the correct CTCSS, or subaudible tone. This tone is used for access by some repeaters in order to keep down the QRM. Most manufacturers offer this feature either built in or as an option. Without it, however, you may be "locked out" of some repeaters.

Another item is a wireless microphone. A couple of manufacturers offer such a feature. If you have ever had your mic cable get tangled up in your steering wheel, you'll certainly see the attraction of that product.

How much power should your transceiver run? Twenty five watts on 2 meters is more than adequate. Even 10 or 5 watts may be enough for most communications. However, it's nice to have a little higher power if it's needed. Radios made for the higher VHF/UHF bands tend to have less power available. This is because the price of the components for the higher power is somewhat more than the manufacturer can pay and still make the radio affordable to most of us. Nevertheless, the lack of QRM on these bands and the difference in propagation can, most of the time, compensate for the lower power.

Antennas

What about antennas? If you're going to use the radio in your home, you might want to consider a base-station antenna installation. If your radio has more than one band, then obviously, you'll need an antenna for more than one band. Several manufacturers offer dual-band vertical antennas. Because of their light weight, they can be installed on the side of the roof, the side of a chimney, or on a properly guyed telescoping TV mast.

With a dual-band antenna that has one connection and a radio that has two ports, you'll need a duplexer for combining the signals of both bands into the same coax. At least a couple of manufacturers have such a product. Make sure the one you select is rated for the maximum power output of your radio.

For installation in your car you have to make a couple of decisions. First, do you want to drill a hole in the roof or the trunk or somewhere else? This is a hard decision if your car is new or nearly new. However, even an owner of an older car is sensitive about putting holes in it that will still be there once he or she parts with it.

The alternative is a magnetic- (or mag) mount antenna. One very important consideration of a mag-mount antenna is that water collects between the antenna and where you have it mounted on the car. This means that careful attention must be given to that condition or the combination of the vibration of the mag-mount antenna on the surface of the metal coupled with the water can cause a rust problem. If that happens, you could be looking at a new paint job for the car.

Linear Amplifiers

What about a linear amplifier? These amplifiers, commonly known as bricks, are available for power levels between 30 watts and 350 watts. If you need to work into a repeater that's at least 50 or more miles from you, or if mobile you travel away from the normal coverage of your repeater, then you might want to consider a brick.

Remember, however, that you need only run the minimum power necessary to maintain the contact. That's an FCC rule. Additionally, running too much power into a local repeater can cause problems of overload on the front end of the receiver in the repeater, thereby distorting your signal on the output.

More Considerations

One thing to consider when using your radio mobile is your concentration. As the saying goes, some of us "can't walk and chew gum at the same time." Neither can some of us talk on a radio and drive. If that's you, then don't. Wait until you're parked before getting on the radio. Your life isn't worth your hobby.

Another thing to keep in mind is the use of headphones. Some state automobile regulations prohibit the use of headphones, while others only permit the use of headphones that cover a single ear. Know your state regulations before making the decision to use headphones.

The Ultimate in Convenience

The ability to take one's amateur radio station anywhere has been polished through the handheld radio. These radio have come a long way since World War II, when they were more like "arm held." Today's compact radio can fit inside your purse or your jacket pocket.

These ultra compact radios aren't for everyone, however. If you're like me (I have to hold everything a bit farther away now), then you may have trouble seeing the lettering above the keys on the keypad. Also, the smaller the radio, the smaller the keypad. Pushing the right button on the smaller keypad may be a bit more difficult than it is on a bit bigger one.

Because you're carrying your whole station with you, you're also carrying your power source. With no way of renewing that power source, it eventually will discharge. Therefore, some features to watch for in a handheld are ways of saving power.

One such feature is a battery saver function. This shuts off the receiver when there's no signal present. An associated function is sometimes called the "sleep" mode. You can program the radio to turn off altogether after a certain length of time. A third feature is a high/low power switch.

Of course, one other thing to consider when purchasing a handheld is a spare battery. Speaking of batteries, many radios come with a choice of batteries. The bigger battery may mean a longer time between charges or it may mean the ability to run higher power. Look carefully at your selections before making a decision on additional batteries.

Look also at how the battery is recharged. Having exposed terminals can prove potentially dangerous, even to the point of possibly starting a fire. If you think that isn't possible, see the topic below entitled "Handhelds and House Fires."

Some of the other features to look for in a handheld are some of the same features found in the base/mobile radios—the number and types of memories, CTCSS compatible, and dual-band capability.

Another factor is the antenna. By design, because of its compactness the whip antenna is a compromise. If you're having trouble accessing a particular repeater, you may need a bigger antenna. There are several on the market that are designed for the handheld.

What about using the handheld from the car? Most handhelds have an input port for a separate power source. Most also supply an optional cable that will plug into the cigarette lighter and the radio.

If you use the radio in the car, you'll need an external antenna because the metal of the car is too much of an obstacle for the signal of the radio to overcome.

One consideration, however, in using an outside antenna with a handheld is crosstalk. In order to compensate for the small antenna supplied with the handheld, most manufactures design the receiver to be very sensitive. Couple that sensitivity with a bigger antenna, especially one which has some gain, and you can receive unwanted signals from other nearby frequencies. There's nothing wrong with the radio or the antenna or the other stations' signals. It's just one of those compromises that you may have to live with.

Using Your Equipment Out of the Band Legally

Do you have an interest in handling messages (traffic handling)? You might want to join a worldwide organization that's connected with the U.S. military. Known as MARS, or Military Affiliated Radio System, this organization works through each of the three major branches of the military to handle messages and phone patches for its members.

The MARS system is principally composed of amateurs such as you who volunteer their time to handle this traffic. The system uses military frequencies just outside the amateurs bands. The nets are conducted according to strict regulations.

If you're interested, you must have equipment that's capable of, or easily modified to, operate on these frequencies. If it's easily modified, the manufacturer will, with proper documentation from you, tell you how to modify your radio. Most manufacturers will also do the modification for you for a nominal fee.

MARS networks are operational in every state. If you want more information, contact the state representative for the branch of service that interests you. If you don't know who that is, then write to the address of the individual branch as follows:

• Air Force MARS, Chief, Air Force MARS, HQ, AFCC/DOOCC, Scott AFB, IL 62225-6001

• Army MARS, HQ Army MARS, US Army Information Systems Command, AS-OPS-OA, Ft. Huachuca, AZ 85613

• Navy-Marine Corps MARS, Director, Navy-Marine Corps MARS, Naval Communications Unit, Washington, DC 20390 -5161

Being an Amateur With Physical Limitations

Amateur radio is a hobby that offers a way to bypass some of the physical limitations some of us have. It provides an outlet and a source for meeting new friends on a basis of equality. This hobby can open doors worldwide that aren't normally available to persons with physical limitations.

Because my fiancée, Carol King, K5CPZ, cannot see, she finds that the equipment she uses must have certain features. Either the radio has direct frequency entry or a voice readout. While it's best to have both, it doesn't always come that way. Therefore, if she's using a radio with just direct frequency entry, she isn't entirely sure what frequency she's on without entering it again, just to be sure. If she's relying on a radio that just has a voice readout, then she must turn the VFO knob so far, stop and check her frequency, and then turn the knob again. It's a bit cumbersome, but at least she's sure of the frequency she's on. For HF, Carol also uses an audio tuner to make sure that her radio is properly matched to the antenna.

As innovative as her use of these items is to accommodate her limitations, they cannot necessarily help someone who has

other types of limitations. If you have certain limitations, it's advisable to get some help in figuring out what will work for you.

Handi Hams is a nationwide organization that specializes in helping persons with limitations. It maintains an equipment pool and information on the types of equipment available to persons with physical limitations. It also assists those who are interested in becoming amateur radio operators or upgrading their license class through materials and classes.

For information or assistance with your limitations, contact them at 3915 Golden Valley Rd., Golden Valley, MN 55422. You can reach them by phone at the following numbers: voice 612-588-0811 or 612-520-0516; fax 612-520-0577; or TDD 612-520-0245.

The FCC recognizes that some of us cannot meet some of the requirements for upgrading our amateur license. Therefore, if you have a doctor certified limitation that affects your ability to copy Morse code at a rate faster than 5 WPM, then the FCC can waive the requirements for the General or Extra class Morse code tests.

Also, while not waiving the theory test requirements for any of the license classes, the FCC has allowed VECs much leeway in the administering of these examinations for persons with limitations. If you have need for special considerations, contact the VEC program in your area or the ARRL or W5YI VEC programs for more information.

Handhelds and House Fires

You wouldn't think that a lowly handheld radio could set your house on fire. However, that nearly happened to an amateur in the Midwest. He had scattered items from his school bag across his bed. Somehow the metal spiral of his notebook came in contact with both terminals of the battery of his handheld.

In short order the spiral heated to such a point to cause the notebook and bedding to start burning. If it hadn't been for the amateur noticing the fire, the ultimate results could have been disastrous.

Do you think that it couldn't happen to you? Some amateurs who carry their handhelds or spare battery packs in their pockets report that because of keys and other metal objects shorting the terminals, they have had burn holes develop in those pockets!

How can this happen? Nickel-cadmium batteries are designed with a low internal resistance, which makes for the ability to deliver high current for so many of the applications we see them used in, such as the handheld, motorized tools, etc.

If a nickel-cadmium battery pack has external contacts for charging purposes that aren't protected either by design or by diodes, or if a battery pack's terminals come in contact with a path that will short

it out (such as sticking your spare battery pack in your pocket with your keys, change, etc.), then a large current could flow for a long enough time that will heat it and the object shorting it. As has been demonstrated, the resultant heat could start a fire!

When using a handheld be sure to protect the battery-pack terminals from accidental contact with metal objects. Failure to do so may result in having to use another radio to call the fire department!

The Challenge of VHF/UHF Weak-Signal Operation

Operating on the VHF and above bands originally was a challenge for most amateur radio operators. Before World War II almost all operation was experimental. Even until the mid-1970s most operation was reserved for the operator challenged by the unknown frontiers of the bands.

However, with the development of the FM repeater, these bands flourished with activity, and the emphasis shifted away from exploration and toward the day-to-day communication now so common on the bands.

Nevertheless, so-called "weak signal" operators never went away. While their activities seemed to be confined to particular portions of the band, they continued. Because of contests and awards programs, particularly the VUCC, this interest continues to experience growth. Certain manufacturers recognize that there exists a niche market and thus supply equipment for the bands.

Building a weak-signal VHF station is in some ways similar to building an HF station, particularly for the lower VHF bands, such as 6 and 2 meters, and 70 cm. However, for most of the other bands you probably will have to consider building your radio, either by designing it yourself or by building a kit.

Probably the most popular band is 6 meters, followed closely by 2 meters. There are single-band transceivers, as well as HF transceivers that include 6 and 2 meters, currently available. There are also several suppliers of antennas for this band. For 2 meters there are also single-band radios, plus multi-band radios that include this band. For 135 cm, because of the previous uncertainty of the band, most manufacturers pulled out of supplying equipment for it. For 70 cm there are manufacturers who supply multi-band radios, some of which are also designed for satellite work and some of which are the same radios used for 2 meters.

Few radios are commercially available for the 902 MHz band, nor for any band above 2300 MHz. The principal selection of equipment comes from a couple of manufacturers who supply kits. Therefore, if your interests lie on these microwave bands, you also have to have an interest in building your own equipment.

Antennas for the VHF and above bands are available for all the bands up through 1296 MHz. Beyond that band you'll want to consider building your own.

The heart of your weak-signal station is the radio. All major manufacturers offer many choices of radios. Most transceivers have built-in filters for more selective reception, or they have provisions for adding them later. Only some transceivers have built-in antenna tuners. However, some have provisions for controlling an external one.

For CW, all transceivers have a built-in side tone or feed back a sample of the signal through the audio section for you to hear what you're sending. Some transceivers even have built-in keyers.

Most transceivers come equipped with a microphone. Although there is a jack available for headphones, none come with them. Some transceivers are shipped computer controllable; others are upgradable to be computer controlled.

Some of the other features in various transceivers include direct frequency entry, memories, multiple noise limiters, dual receivers, digital voice readout, digital recorders, digital signal processing, built-in pre-amp, microphone processor, and ports for a separate receiver antenna. You have many choices and a few decisions to make when selecting the radio.

Perhaps the most important item to include in the radio in order to avoid equipment obsolescence is the ability to control the radio with your computer, whether now or later. However, the other obsolescence is your outgrowing the radio. Here is where you must make a decision using the menu of options presented above.

If you're going to spend most of the time ragchewing on SSB with your buddies and are only occasionally going to chase DX and enter contests, then you will not need many of the options. However, if you're going to be serious about using your equipment to its fullest capabilities, then more of these options become requirements for you. For example, if you're going to spend much of your operating time on CW (such as almost required for serious EME work), then filters for that mode, and even the built-in keyer, may be items to consider in your ultimate purchase.

Other items to consider are amplifiers and antenna feedlines. As explained in the main article above, there are several amplifiers available for VHF and above. However, for weak-signal work you might want to explore the amps on the higher end of the power levels. Even for 6 and 2 meters, extremely low-loss coax cables and connectors are a must.

As for feedlines, above 2 meters all coax seems to have nearly unacceptable attenuation problems. Therefore, you

must look at hardline as a possible solution for feeding the antenna.

Phase 3D Update at AMSAT Annual Meeting

AMSAT officials say they are confident that the Phase 3D (P3D) satellite will be launched sometime this year, although nothing is yet scheduled. The announcement came at the 1997 AMSAT-NA Space Symposium and annual meeting held October 17–19 in Toronto, Ontario, along with an update on changes made to the satellite in order to meet new European Space Agency (ESA) structural requirements. P3D Integration Laboratory Manager Lou McFaddin, W5DID, said 128 parts had to be added or modified to make the necessary changes. ESA revised its requirements after the explosion of the Ariane 501 rocket just seconds after liftoff last February. The time required to make those changes made it impossible for P3D to be launched as scheduled on Ariane 502 (still on the ground as this is written).

Conference presentations tended to fall into three major categories—those related to P3D or its systems; what AMSAT might do after P3D is launched; and different ways in which the Internet and World Wide Web may be used to the advantage of amateurs in general and satellite operators in particular.

The AMSAT meeting also featured the third annual International Amateur Radio Union (IARU) Satellite Symposium, the first such international gathering ever held in North America. It was hosted by IARU Satellite Advisor Hans van de Groenendaal, ZS5AKV, and IARU Region 2 President Tom Atkins, VE3CDM. Topics on the agenda included a proposal to form a worldwide satellite monitoring service, aimed at identifying non-amateur stations operating on satellite frequencies; discussion of the role of the IARU Satellite Frequency Coordinator, and a presentation on proposed frequencies for manned space operations. Future IARU Satellite Symposia will alternate between Europe and North America.

Current Contests

ARRL VHF Sweepstakes: This annual winter classic takes place 17–19 January, beginning 1800 UTC 17 January and ending 0300 UTC 19 January. Exchange is your grid square. This is the only VHF contest that features club competition.

The complete rules appear in December 1997 *QST*. Rules plus log/summary sheets are also available electronically from the League from several different sources, including their bulletin board (860-594-0306) and their home page <http://www.arrl.org> via the World Wide Web. As always, send or electronically file log and summary sheets to the ARRL.

Current Meteor Showers

The *Quads:* The *Quandrantids* (*Quads*) is a brief, but very active meteor shower. Expected peak is around 0010 UTC on 4 January. The actual peak can occur 3½ hours of the predicted peak. The best paths are north-south. Long-duration meteors can be expected about 1½ hours after the predicted peak. As always, look to 3818 or 3843 kHz in the evening hours for opportunities for schedules.

And Finally . . .

It's time to start thinking about those New Year's resolutions. How many new grids on which band are you going to work? How many new states? Is WAS in sight on any of the bands? How many new countries on 6 or 2 meters? High on your list should be: How many new hams will you help get licensed?

As I write this, WARC 98 is underway. We do not have any information yet as to the outcome. What about the Little Leo threat? We just don't know yet. I read a report out of South Africa the other day, however, that spoke of two different encroachments into their 70 cm bands. Last year I reported on other countries and how amateur bands are being threatened or outright taken from the amateurs despite international treaties!

The only way we can fight back and curb our losses is via numbers. We must increase the number of amateurs so that we can mount an offense based on the numbers who use the amateurs bands. This numerical offensive force must be united! We can have all the numbers in the world, but if we are fighting among ourselves, we lose the big battles. Therefore, I reiterate that it is absolutely necessary that each one of us gets others into the hobby. And we must start with the young people.

Working here on a college campus daily confirms for me the absolute necessity of getting our new recruits while they are young. Once we do, we will have them for life—for all of their lives—which means that they become our replacements. Our seniors did a wonderful job of recruiting us. However, we are woefully falling down on the job.

My conclusion: When making your New Year's resolution list, make sure that it includes Elmer duties at your local amateur radio club at the very least. You will be glad you did.

Until next month . . . 73, Joe, N6CL

DX

BY CHOD HARRIS, VP2ML

NEWS OF COMMUNICATION AROUND THE WORLD

DXCC 2000

At its regular January meeting the ARRL Board of Directors will consider (and probably adopt) the report of the DXCC 2000 Committee. This is the group that has been charged with refining the DX Century Club (DXCC) rules as we move into the next century. While the final report of the Committee has not been released, we can get a good idea of what will be in that report from the *interim* report of the DXCC 2000 Committee.

That interim report recommends two significant changes to the DXCC country criteria, the rules used to determine if a given region should count as a separate country for DXCC. The interim report focuses on the two most flawed aspects of the country criteria: definition of a "Point 1" country and the minimum-size rule.

The definition of a Point 1 country has produced considerable controversy in recent years. (Point 1 refers to DXCC countries that are included by reason of government.) The existing rule is rather vague and is subject to much interpretation. The interim report suggests simplifying the rule as follows: "For a country to be on the DXCC List, by reason of government, it must meet one of the three listed requirements: (1) be a member state of the United Nations; (2) be a member of the International Amateur Radio Union (IARU); (3) have an official ITU-assigned callsign allotment."

The first of these requirements is very straightforward. Most of the countries that an average citizen considers "real" countries are member states of the United Nations (UN). However, there are several entities that are clearly countries to most people but are not member states of the UN. The most obvious is Switzerland, a country that takes neutrality seriously enough to avoid even membership in the UN. Other states that fall into this category include Macao, Tonga, Tuvalu, Monaco, Holy See (Vatican City State), Kiribati, and South Africa.

The third requirement sweeps up most of these non-UN states. All of the above countries have official ITU-assigned prefixes, except for Macao, which presently uses the Portuguese prefix block of XX. The combination of UN membership or ITU prefix allocation covers almost all of what most people would consider to be a "real" country by reason of government.

Why, then, have the second requirement? As I have discussed in these pages in the past, Taiwan certainly falls into the group of "real" countries for most people. However, Taiwan is not a member of the UN, nor does it have its own ITU-assigned callsign allocation. All the B-prefix callsigns are assigned to what we call China. However, Taiwan does have an amateur radio society that is a member of the IARU, and thus would qualify as a Point 1 country by the second requirement. (That requirement should be rewritten, however, to say "has an amateur radio organization that is a member of the IARU," as amateur radio societies, and not countries, are members of the IARU.)

This proposed rule change is certainly easier to understand and administrate than the existing rule. Considering the three requirements, almost every one of the countries now on the DXCC list by reason of government would be included. Two exceptions are Western Sahara and SMOM. The proposed rule would not have allowed either of these countries to be added to the DXCC list.

Note, however, that changing the country criteria will *not* result in the elimination of these countries from the DXCC list. Existing countries are "grandfathered," based on the interpretation of the rules at the time they were added to the DXCC list. They add to the list of "Point 0" countries, those which were added to the DXCC list in the past but no longer qualify under the current rules. There are some 60 of these entities on the DXCC list.

Why the fuss about Point 1? The DXCC country criteria for separation by water or another DXCC country are based on whether the "parent" country is on the DXCC list by reason of government. As an example, the Austral Islands of French Polynesia have twice been considered for separate DXCC status, along with the Marquesas island group. Under the existing rule, there was some disagreement among DXers as to the status of the "parent" country of French Polynesia. Some DXers argued that French Polynesia was a Point 1 country, which would allow the Australs and Marquesas to qualify as separate countries under Point 2, separation by water. (The DX Advisory Committee did not buy this argument, turning down both applications for separate country status.)

However, under the proposed rule, since French Polynesia has its own IARU society (CORA), it would thus qualify as a Point 1 country. Should Point 1 be revised as proposed in this interim report, look for a third application for separate DXCC status for these two island groups. Under the new rule, the application would most likely be accepted.

Should this occur, a question quickly will arise as to the appropriate starting

The 9M6HIL Special Event team. From left to right are Doris, 9M6DU; Alfons, 9M6MU; Jani, YBØUS; Bob, NØRN; Bob, N2OO/9M6OO; and Rashid, 9M2RS.

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e-mail: chod@compuserve.com

Force 12, "THE ORIGINAL"

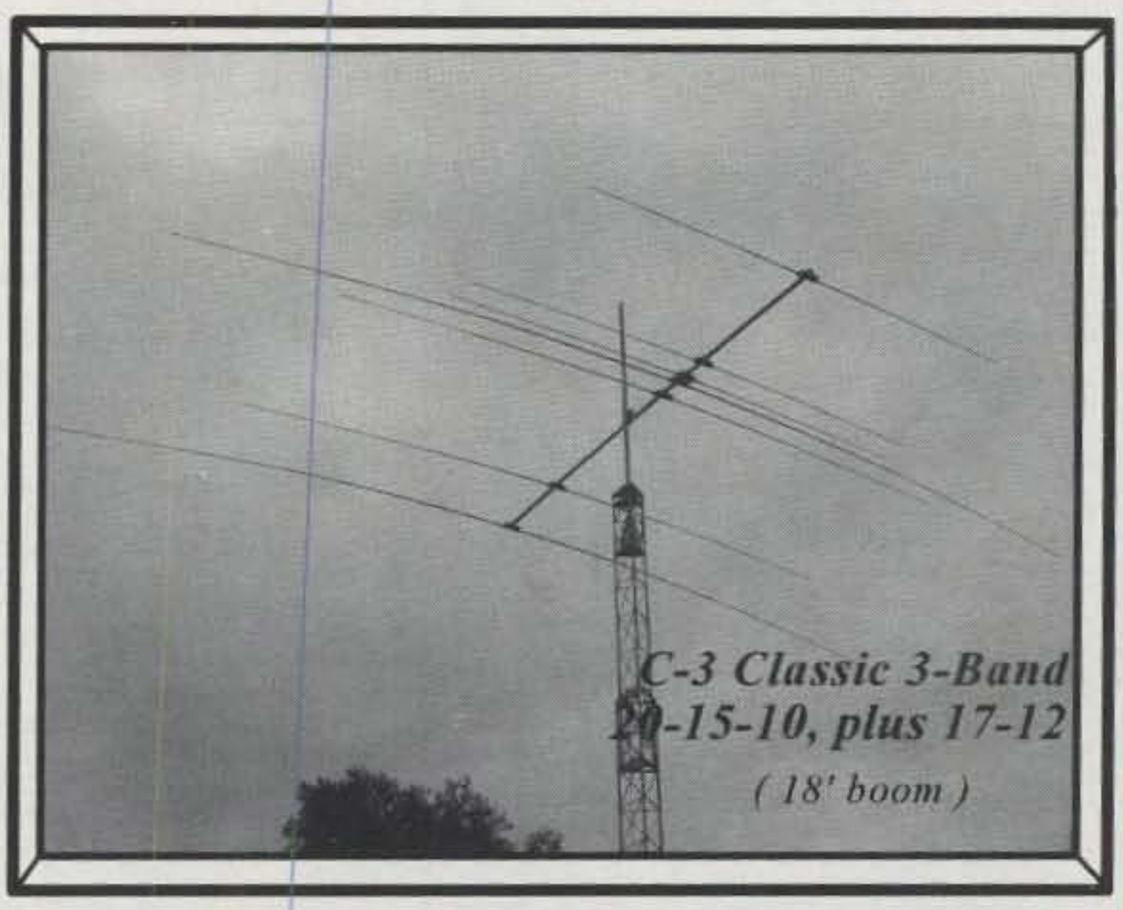
This is the 4th Birthday of the *C-3*.

In October, 1993, during the California QSO Party, the *C-3* was delivered by 'Dr. Tom', (N6BT). It was a long awaited delivery, as it had taken 2 years of development and invention. It was a beautiful, new arrival and changed the world of antennas forever.

The C-3 became the World's First TRAPLESS TRIBANDER.

Like fine art, there is only one original: FORCE 12

Not only does the *C-3* provide outstanding performance on 20-15-10, it also has real gain on the 17 & 12 mtr WARC bands, making a great 5-band beam. After delivering several hundred *C-3*'s and receiving scores of unsolicited testimonials, Force 12 wants **you** to share in the excitement of the *C-3* and the entire *C-Series* line.



C-3 Classic 3-Band 20-15-10, plus 17-12
(18' boom)

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CHECK OUT OUR SPECIAL PRICES

To celebrate the 4th birthday of the tremendous C-3,
FORCE 12 is making a LIMITED TIME, DIRECT SALES OFFER.
Place your order now to get an original 'C' model antenna at these special prices:

Model		List Price	Sale Price	D-Model
C-3	20-10, 18' boom	$525	$450	$498
C-4	40, 20-10, 18' boom	675	575	635
C-4XL	2el40, 20-10, 30' boom	895	775	849
C-3S	20-10, 12' boom	450	385	420
C-4S	40, 20-10, 12' boom	595	500	550
C-4SXL	2el40, 20-10, 23' boom	849	725	800
C-3XL/D	320, 315, 410, 32' boom	1190		1000
B-1 Balun	3KW 1:1 Force 12 balun	40	35	

Antennas are standardly rated for minimum 80 mph. 'D' models are 100 mph. Special order 'H' for 120 mph.
The *C-3*, *C-4*, *C-3S*, *C-4S* ship in our standard 4' box, excellent for DXpeditions (another FORCE 12 first!).

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Internet: force12e@lightlink.net
Force 12 Web Site ***http://www.QTH.com/force 12***
3015-B Copper Road, Santa Clara, CA 95051

CIRCLE 124 ON READER SERVICE CARD

The WPX Program

SSB

2655.....RA6JZ 2657.....IK2VUE
2656.....K3BSA 2658.....9A9R

CW

2969.....DL5CM 2970.....9A9R

Mixed

1791.....9A9R

CW: 350 AI9L, IK4QJH, DL5CM, 9A9R. 400 DL5CM, 9A9R. 450 9A9R. 500 AA1KS, 9A9R. 550 9A9R. 600 WD6CKT, 9A9R. 950 W9IL. 1000 W9IL. 1050 W9IL. 1100 W9IL. 1150 LU5EWO. 1200 LU5EWO. 1550 I2EAY. 2050 KF2O. 2100 KF20.
SSB: 350 RA6JZ, K3BSA, IK2VUE, 9A9R. 400 IK2VUE, 9A9R. 450 IK2VUE, 9A9R. 500 IK2VUE, 9A9R. 550 IK2VUE, 9A9R. 600 IK2VUE, 9A9R. 650 IK2VUE, 9A9R. 700 IK2VUE, 9A9R. 750 IK2VUE, 9A9R. 800 IK2VUE, 9A9R. 850 IK2VUE. 900 IK2VUE, I2EAY. 950 WA7OBH, IK2VUE, AA1KS. 1000 IK2VUE, WA7OBH. 1050 IK2VUE. 1100 IK2VUE. 2400 KS3F, 2500 KF20. 2550 KF2O.
Mixed: 450 9A9R. 500 9A9R. 550 9A9R. 600 9A9R. 650 9A9R. 700 9A9R. 750 9A9R. 800 9A9R. 850 9A9R. 900 9A9R. 950 IK2QJH, 9A9R, W2EZ. 1000 IK2QJH, AA1KS, 9A9R, W2EZ. 1050 WD6CKT, AA1KS, 9A9R. 1100 9A9R. 1150 AA1KS. 1200 WA3GNW. 1500 JA7FFN. 1650 OZ1ACB, JN3SAC. 1700 OZ1ACB, JN3SAC. 1750 JN3SAC. 1800 I2EAY. 2200 W9IL. 2250 W9IL. 2300 W9IL. 2350 W9IL. 2400 W9IL. 2950 KF20. 3000 KF20. 3700 N6JV. 3750 N6JV.

10 meters: YC2OK, 9A9R
15 meters: YC2OK, 9A9R
20 meters: RA6JZ, 9A9R
40 meters: JH5OXF, YC2OK, OZ1ACB, 9A9R
80 meters: AI9L, YC2OK, 9A9R
160 meters: WA7OBH

Asia: RA6JZ, YU1JU, 9A9R
Africa: 9A9R
No. America: 9A9R
So. America: 9A9R
Europe: JI6URU, RA6JZ, AA1KS, 9A9R
Oceania: 9A9R

Award of Excellence: VR2UW, 9A9R
Award of Excellence with 160 Meter Bar: VR2UW

Award of Excellence Plaque Holders: K6JG, N4MM, W4CRW, K5UR, K2VV, VE3XN, DL1MD, DJ7CX, DL3RK, WB4SIJ, DL7AA, ON4QX, 9A2AA, OK3EA, OK1MP, N4NO, ZL3GQ, W4BQY, IØJX, WA1JMP, KØJN, W4VQ, KF2O, W8CNL, W1JR, F9RM, W5UR, CT1FL, W8RSW, WA4QMQ, W8ILC, VE7DP, K9BG, W1BWS, G4BUE, N3ED, LU3YL/W4, NN4Q, KA3A, VE7WJ, VE7IG, N2AC, W9NUF, N4NX, SMØDJZ, DK5AD, WD9IIC, W3ARK, LA7JO, VK4SS. I8YRK, SMØAJU, N5TV, W6OUL, WB8ZRL, WA8YTM, SM6DHU, N4KE, I2UIY, I4EAT, VK9NS, DEØDXM, DK4SY, UR2QD, AB9O, FM5WD, I2DMK, SM6CST, VE1NG, I1JQJ, PY2DBU, HI8LC, KA5W, K3UA, HA8XX, K7LJ, SM3EVR, K2SHZ, UP1BZZ, EA7OH, K2POF, DJ4XA, IT9TQH, K2POA, N6JV, W2HG, ONL-4003, W5AWT, KBØG, HB9CSA, F6BVB, YU7SF, DF1SD, K7CU, I1POR, K9LJN, YBØTK, K9QFR, YU2NA, W4UW, NXØI, WB4RUA, I6DQE, I1EEW, I8RFD, I3CRW, VE3MS, NE4F, KC8PG, F1HWB, ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, KC7EM, YU1AB, IK2ILH, DEØDAQ, I1WXY, LU1DOW, N1IR, IV4GME, VE9RJ, WX3N, HB9AUT, KC6X, N6IBP, W5ODD. IØRIZ, I2MQP, F6HMJ, HB9DDZ, WØULU, K9XR, JAØSU, I5ZJK, I2EOW, IK2MRZ, KS4S, KA1CLV, WZ1R, CT4UW, KØIFL, WT3W, IN3NJB, S5ØA, IK1GPG, AA6WJ, W3AP, OE1EMN, W9IL, S53EO, DF7GK, S57J, EA8BM, DL1EY.

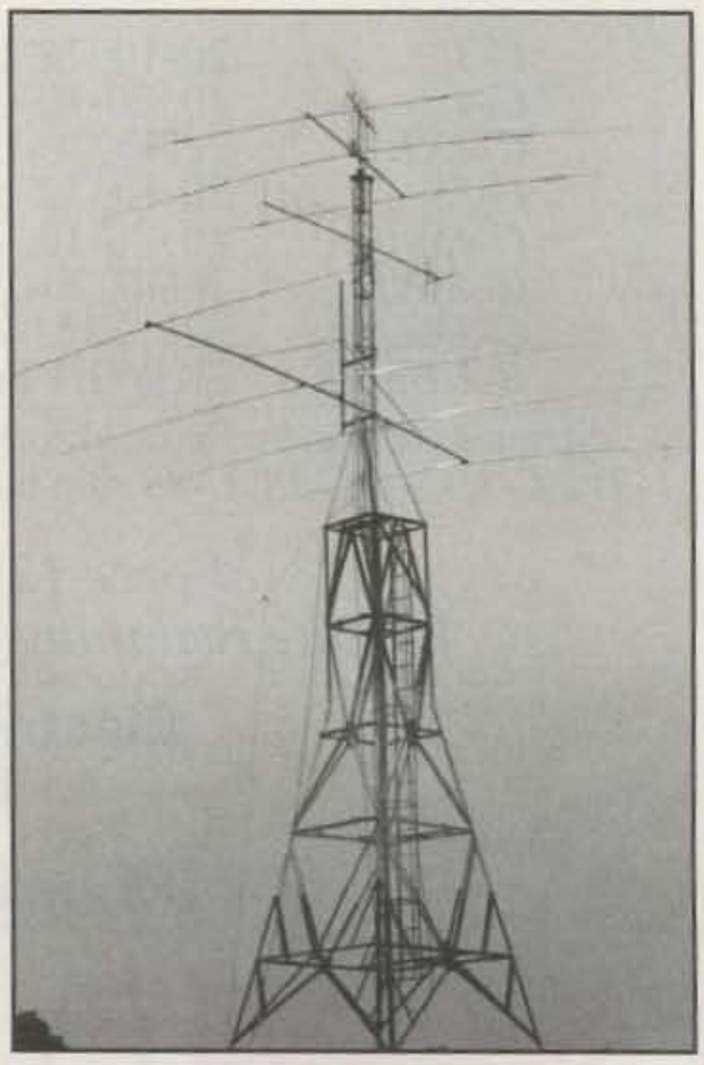
Award of Excellence Plaque Holders with 160 Meter Endorsement: K6JG, N4MM, W4CRW, K5UR, VE3XN, DL3RK, OK1MP, N4NO, W4BQY, W4VQ, KF2O, W8CNL, W1JR, W5UR, W8RSW, W8ILC, K9BG, W1BWS, G4BUE, LU3YL/W4, NN4Q, VE7WJ, VE7IG, W9NUF, N4NX, SMØDJZ, DK5AD, W3ARK, LA7JO, SMØAJU, N5TV, W6OUL, N4KE, I2UIY, I4EAT, VK9NS, DEØDXM, UR2QD, AB9O, FM5WD, SM6CST, I1JQJ, PY2DBU, HI8LC, KA5W, K3UA, K7LJ, SM3EVR, UP1BZZ, K2POF, IT9TQH, N6JV, ONL-4003, W5AWT, KBØG, F6BVB, YU7SF, DF1SD, K7CU, I1POR, YBØTK, K9QFR, W4UW, NXØI, WB4RUA, I1EEW, ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, YU1AB, IK4GME, WX3N, W5ODD, IØRIZ, I2MQP, F6HMJ, HB9DDZ, K9XR, JAØSU, I5ZJK, I2EOW, KS4S, KA1CLV, KØIFL, WT3W, IN3NJB, S5ØA, IK1GPG, AA6WJ, W3AP, S53EO, S57J, DL1EY.

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.

date for separate DXCC status, an item that has been ill-considered in the past, as demonstrated by Eritrea and Banaba Island. Since the Australs and Marquesas have been twice considered, and twice turned down, by the DXAC, under the existing rules any amateur operation prior to the change in the country criteria should not count for the new countries. (There have been two significant operations from the island groups, in 1989 by F2CW and F6EXV and in 1994 by JA1BK and NX1L.)

These island groups are not the only potential new DXCC countries that will arise from changing the Point 1 rule. As *any* DXCC country that has a member society of the IARU will suddenly become a legitimate Point 1 country, then separation by water or another DXCC country will come into play. Look for the map experts to scour the globe for more potential New Ones. Also look for formation of new IARU societies in some places. I haven't sat down with my atlas to make a complete count, but previous research suggests that there are at least six possible new countries that may be added to the DXCC list, should Point 1 be changed as suggested above.

The other significant proposed change



The main tower at 9M6AAC at the Hillview Gardens Resort is topped with a Cushcraft A3WS beam for 30, 17, and 12 meters at 85 feet and a CD204 at 70 feet.

5 Band WAZ

As of September 30, 1997, 466 stations have attained the 200 Zone level.

New recipients of 5 Band WAZ Award with all 200 Zones confirmed:

none

The top contenders for 5 Band WAZ (zones needed, 80 meters):

N4WW, 199 (26)
AA4KT, 199 (26)
K7UR, 199 (34)
WØPGI, 199 (26)
W2YY, 199 (26)
W9WAQ, 199 (26)
VE7AHA, 199 (34)
W1FZ, 199 (26)
W9CH, 199 (26)
ACØM, 199 (34)
IK8BQE, 199 (31)
JA2IVK,199 (34,40m)
K1ST, 199 (26)
ABØP, 199 (23)
KL7Y, 199 (34)
UY5XE, 199 (27)
NN7X, 199 (34)
DL3ZA, 199 (31)
OE6MKG, 199 (31)
HA8IB, 199 (2 on 15)
OH2DB, 199 (1)
IK1AOD, 199 (1)
DF3CB, 199 (1)
F6CPO, 199 (1)
W6SR, 199 (37)
S57J, 199 (2)
W3UR, 199 (23)
KC7V, 199 (34)
GM3YOR, 199 (31)
KZ4V, 199 (26)
UA3AGW, 198 (1, 12)
VO1FB, 198 (19, 27)
EA5BCK, 198 (27, 39)
K4PI, 198 (23, 26)
G3KDB, 198 (1, 12)
DK2GZ, 198 (1, 24)
KG9N, 198 (18, 22)
KM2P, 198 (22, 26)
DKØEE, 198 (19,31)
KØSR, 198 (22, 23)
K3NW, 198 (23, 26)
UA4PO, 198 (1, 2)
K5RT, 198 (22, 23)
JA1DM, 198 (2, 40)
OE1ZL, 198 (1,31)
9A5I, 198 (1, 16)
KE9A, 198 (18,23)

The following have qualified for the basic 5 Band WAZ Award:

UY5ZZ, 190 Zones

Endorsements:

W4DC, 190 Zones
W4UW, 187 Zones

1059 Stations have attained the 150 Zone level as of September 30, 1997.

Rules and applications for the WAZ program may be obtained by sending a large SAE with two units of postage or an address label and $1.00 to: WAZ Manager, Jim Dionne, K1MEM, 31 DeMarco Road, Sudbury, MA 01776. The processing fee for all *CQ* awards is $4.00 for subscribers (please include your most recent *CQ* mailing label or a copy) and $10.00 for nonsubscribers. Please make all checks payable to the Award Manager. Applicants sending QSL cards to a *CQ* checkpoint or the Award Manager must include return postage. Questions regarding the WAZ Award may be sent to K1MEM with an SASE.

The WAZ Program

Single Band WAZ

15 Meter SSB

509 ..... YCØSBV

20 Meter SSB

1014 ..... AA8LL

160 Meter WAZ

119 ..... IV3PRK, 40 Zones New

All Band WAZ

SSB

4402 ..... DF1UP
4403 ..... GØFYX
4404 ..... WN9NBT
4405 ..... CP2DL
4406 ..... DL9TJ
4407 ..... DL3OV

CW/Phone

7762 ..... WN9NBT
7763 ..... DL1DWT
7764 ..... DJ3MZ (CW)
7765 ..... K4DGJ

All CW

107 ..... W7KW

Rules and applications for the WAZ program may be obtained by sending a large SAE with two units of postage or an address label and $1.00 to: WAZ Manager, Jim Dionne, K1MEM, 31 DeMarco Road, Sudbury, MA 01776. The processing fee for all *CQ* awards is $4.00 for subscribers (please include your most recent *CQ* mailing label or a copy) and $10.00 for nonsubscribers. Please make all checks payable to the Award Manager. Applicants sending QSL cards to a *CQ* checkpoint or the Award Manager must include return postage. Questions regarding the WAZ Award may be sent to K1MEM with an SASE.

to the DXCC rules is a replacement of the flawed "minimum-size" rule in Point 2, which refers to islands. As a backlash to Scarborough Reef, which many DXers did not feel was worthy of separate DXCC status, the DXCC country criteria were revised to include a minimum-size specification. However, the language of the rule was incorrect. The interim report of the DXCC 2000 Committee recommends changing the minimum-size rules to the following: for DXCC country consideration, an island "must consist of two points separated by not less than 100 meters of connected land above the high-tide mark, as demonstrated on a chart of sufficient scale. For purposes of this award, any island less than this size shall not be considered in the application of the water-separation rules." Again, adopting this rule will *not* mean that Scarborough Reef will be dropped from the DXCC list.

This change probably will be supported by most DXers. It is relatively straightforward and easy to understand and administrate. However, while they're at it, why not delete the "human habitation" requirement from Point 2(c)? ("Rocks which cannot sustain human habitation shall not be considered for DXCC country status.") "Sustain human habitation" is wide open to varying interpretations and is, frankly, unnecessary, given a useful minimum-size rule.

The DXCC 2000 Committee has also recommended converting the distance figures in the DXCC rules to the metric system, a recognition that the award program is truly international in scope. The interim report suggests changing the 225 mile separation rule for islands to 350 kilometers (a small reduction) and changing the 500 mile limit for additional island countries to 800 kilometers, another minor reduction. Further, the report suggests changing the 75 mile separation distance to 100 kilometers, a 13% reduction. These minor changes probably will not add any new countries to the DXCC list, but some of the map experts may be able to find a previously overlooked entity that meets the new criteria.

The DXCC 2000 Committee has also recommended some changes in the DXCC award structure. The five mode awards continue with country-level endorsements and Honor Rolls. (The five

CQ DX Honor Roll

The CQ DX Honor Roll recognizes those DXers who have submitted proof of confirmation with 275 or more ACTIVE countries for the mode indicated. The ARRL DXCC Countries List is used as the country standard. Honor Roll listing is automatic when submitting application or endorsement for 275 or more countries. Deleted countries do not count and are dropped from listing as they occur. Currently there are 328 countries. To remain on the CQ DX Honor Roll, annual updates are required. Honor Roll updates may be made at any time, in any number. Updates indicating "no change" will be accepted to meet the annual requirement. All updates must be accompanied by an SASE for confirmation. The fee for endorsement involving the issuance of a sticker is $1.00.

CW

K2TQC....328
K1MEM....328
K2FL....328
K9BWQ....328
K2ENT....328
DL8CM....328
N7RO....328
WØIZ....328
G4BWP....328
K6JG....328
I4EAT....328
SM6CST....328
W2UE....328
W2FXA....328
N4KG....328
K8PV....328
W4QB....328
K2OWE....328
K6LEB....328
W6DN....327
K3UA....327
N7FU....327
N4MM....327
IT9TQH....327
K4CEB....327
WA4IUM....327
K4IQJ....327
F3TH....327
EA2IA....327
K9MM....326
9A2AA....326
OK1MP....326
N4JF....326
W9WAQ....326
AA4KT....326
K9IW....326
YU1HA....326
I5XIM....326
PAØXPQ....326
WA8DXA....326
N5FW....326
W7OM....326
WØHZ....326
N6AR....325
K8NA....325
KZ4V....325
I1JQJ....325
IT9VDQ....325
W8XD....325
K8LJG....325
W7CNL....325
IT9QDS....324
WØJLC....324
W7CNL....324
KB4HU....324
N5FG....324
DJ2PJ....324
W7ULC....323
WA4JTI....323
W4OEL....323
KUØS....323
W1WAI....323
WB5MTV....323
K2JLA....323
AG9S....322
NC9T....322
DL3DXX....322
KA5TQF....322
4N7ZZ....322
AA5NK....321
ON4QX....321
K9QVB....321
HA5DA....321
IK2ILH....321
K1HDO....321
IT9ZGY....320
VE7CNE....320
W6SR....320
KA7T....319
K6CU....319
N6AV....318
VE7DX....318
I4LCK....317
N6CW....316
N4CH....316
W3BBL....315
N4AH....315
NØFW....315
AA2X....314
W5OG....313
WB4UBD....313
G3KMQ....313
K9DDO....312
WB4DBB....312
K1VHS....311
WA8YTM....311
N6AW....311
N5HB....311
I1EEW....311
OH3NM....310
LA7JO....310
K2JF....310
OZ5UR....310
K4CXY....309
K4JLD....309
VE9RJ....309
9A2AJ....309
W3II....308
N1HN....308
HB9DDZ....307
CT1YH....305
K7JS....305
G2FFO....303
K7EHI....302
W7IIT....302
K8JJC....302
WA4DAN....301
HA5NK....301
WG5G/QRPp..301
W6YQ....301
N4OT....301
YU1TR....300
YU2TW....300
KE5PO....300
YV5ANT....299
KØHQW....296
KH6CF....294
YU1AB....294
G4MVA....294
I2EOW....294
KB8O....292
F6HMJ....292
IKØADY....290
DJ1YH....288
YU7FW....286
KF5PE....282
W4UW....282
LU3DSI....282
WG7A....276
PY4WS....276

SSB

K4MZU....328
K2TQC....328
K2FL....328
DJ9ZB....328
EA2IA....328
K2ENT....328
OZ5EV....328
VE1YX....328
W6EUF....328
K2JLA....328
N7RO....328
K6YRA....328
W6BCQ....328
K5OVC....328
KZ2P....328
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AA6BB....328
EA4DO....328
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SM6CST....328
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YU1AB....328
F9RM....328
PY4OY....328
OZ3SK....328
XE1L....328
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CX4HS....328
N4MM....328
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W7OM....328
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K7JS....328
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W6DN....328
I4LCK....328
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IT9TGO....328
WD8MGQ....328
I1EEW....328
IØZV....328
VE3MR....328
DL9OH....328
ZL1AGO....328
SV1ADG....328
K3UA....327
K9BWQ....327
WØYDB....327
W4QB....327
VE3MRS....327
OE2EGL....327
K8CSG....327
K1UO....327
WB4UBD....327
K7LAY....327
W2FXA....327
IK8CNT....327
N4KG....327
K8PV....327
SV1ADG....327
LA7JO....327
K5TVC....327
W9SS....326
WA4IUM....326
WB1DQC....326
XE1AE....326
KA3HXO....326
VE3XN....326
YS1GMV....326
K9MM....326
KF7SH....326
ZS6LW....326
VK4LC....326
YV5AIP....326
K9IW....326
WA4JTI....326
YV1AJ....326
YV1KZ....326
W9OKL....326
9A2AA....326
DL6KG....326
KØKG....326
OK1MP....326
WB3CQN....326
I2QMU....326
PAØXPQ....326
N4JF....326
KB4HU....326
KC4MJ....326
CX2CB....326
TI2CC....326
IKØIOL....326
ZL1HY....326
YU1HA....326
W4NKI....326
KZ4V....326
VE3GMT....326
W4EEE....326
KE4VU....326
AG9S....326
WA4WTG....326
WD8PUG....326
W2CC....326
VE2WY....326
AA4KT....326
PT2TF....326
KM2P....326
N5FW....326
K9HDZ....326
WA3HUP....326
YV1CLM....326
N6AW....326
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modes are mixed, phone, CW, digital, and satellite.) Deleted countries will count toward totals. A confusing line in the interim report says that "future countries that are withdrawn from the DXCC list would not be added to the deleted list." There is no mention of countries that are deleted under Section III Deletion criteria. Withdraw usually means that the country should never have counted, which is very different from deletion under the published criteria. Perhaps the final report will clear up this ambiguity.

The DXCC band awards will consist of 10 single-band awards, for 160, 80, 40, 20, 17, 15, 12, 10, 6, and 2 meters. There would be no Honor Rolls for single-band awards. Deleted and withdrawn countries will *not* count for the band awards.

Two new awards are recommended in the interim report. The first is the DXCC 2000 Challenge award, based on the total of band-countries 160–6 meters, not including 30 meters. This is simply the total of band countries. Appropriate recognition awards will be available at levels of 1000, 1500, 2000, and 2500 band-countries. This award will make the lives of DXpeditioners more difficult, as more DXers will be looking for contacts on more bands. To accommodate the increased demand for individual band contacts, DXpeditioners will have to plan for operating on more bands for longer periods of time.

The DXer with the higher total of band countries on September 30th of each year will win a special trophy.

The other proposed award is a one-shot DXCC 2000 award for working 100 or more countries in the year 2000. Similar to the 1987 Golden Jubilee DXCC award, this award is non-endorseable and no QSL cards will be required.

The interim report also lays out some changes to the way published recognition of DXCC standing will be printed in *QST* and the *DXCC Yearbook*.

One final item of interest: The report recommends that changes be made in the DXCC fee structure to allow the fee changes to cover 90% of the program's

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38th ANNUAL

TROPICAL HAMBOREE® & ARRL FLORIDA STATE CONVENTION

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FEBRUARY 7 - 8, 1998

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ON-SITE EARLY-BIRD EVENTS

FEBRUARY 5 – NOVICE/TECHNICIAN EXAM THEORY REVIEW BY GORDON WEST
WITH LIVE DEMONSTRATIONS AND WORKING EQUIPMENT
9:00 A.M. - 5:00 P.M. (One Hour Lunch Break) $25.00

FIVE WPM CODE TEST PREPARATION REVIEW – 6 P.M. - 9 P.M. – $10.00

FEBRUARY 6 – GENERAL TEST CODE AND THEORY REVIEW BY GORDON WEST
9:00 A.M. - 5:00 P.M. (One Hour Lunch Break) $25.00

These will be Mr. West's only Southeast Coast classes, so sign up now and begin your home-study with ARRL or West materials. Contact Hamboree Chairman for full details.

FEBRUARY 6 – ARRL RF SAFETY WORKSHOP by Ed Hare W1RFI, ARRL Laboratory Supervisor
$20.00 ARRL Members, $25.00 Non-Members. Sign up with ARRL Education Dept., 225 Main St. Newington, CT 06111

FEBRUARY 7 - 8
RFI PRESENTATION • INTRODUCTION TO AMATEUR RADIO DISPLAY • LEGAL & FREQUENCY CHALLENGES • AMATEUR RADIO FOR THE HANDICAPPED • APRS • VHF TRANSMITTER HUNT • YOUTH FORUM • PROGRAMS BY AMSAT, ARRL, DXPEDITIONS, AND MORE • COMMERCIAL EXHIBITS • THREE SWAP AREAS • TWO ON-SITE EXAM SESSIONS • FIELD CHECKING FOR DXCC AND CQ AWARDS • NEW CRAFT SECTION & ALTERNATIVE INTEREST PROGRAMS

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Mention "Tropical Hamboree" Cutoff date is January 22, 1998

TICKET, CAMP, TABLE PAYMENTS **PAYABLE TO: DADE RADIO CLUB OF MIAMI, INC.**
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BOOTH & TABLE INQUIRIES: email: edg@elink.net, Tel: 305-642-4139, Fax: 305-642-1648
HOMEPAGE: www.hamboree.org

QSL INFORMATION

3A/N9NC to OM2SA
3A/WØYR to OM2SA
3B8/CX4CR to CX3CE
3D2KY to JA3MVI
3D2MF to ZL2MF
3D2XU to PA3AXU
3W5FS to 7L1MFS
3W5KDN to JR2KDN
3W5KVR to JI6KVR
3W5MNB to JA2MNB
4I9RG to DU9RG
4S7YLR to DL9GCP
4S7ZNG to DK1ZN
4X2T to N2AU
4X6TT to N2AU
5H1/G3SWH to G3SWH
5H3/G3SWH to G3SWH
6V1C to 6W1QV
7Z5OO to N2AU
8Q7KD to EA1BD
8Q7XX to EA4DX
9M6CT to VR2CT
9M6JM to JHØSPE
9U5L to PA3DMH
9X/RW3AH to RA3AR
A22EW to KB2UCO
A35MJ to KS7D
A41LK to UA9AB
A61AO to N1DG
A61AT to Pirate
AP2TJ to W3HNK
AP2ZP to Pirate
BV0DX to KA6SPQ
C6AJT to W4CJK
CS6S to CT1ERK
CW1D to CX1AK
CY0DX to VA3EU
E22AAC to HS1RU
EL2JR to KB3U
EW4DX to F1NGP
F5PYI to UA9AB
FG5BG to KF2DQJ
FOØCQ to KA7CQQ
FOØKK to W6KK
FOØRT to N6RT
FOØRW to W6RW
FO8DX to KG6AR
FP/KG8CO to K8AQM
FW5IW to OH5UQ
G4VXE to G3SWH
GX4BJC/P to GØDBX
HC5C to W5AJ
HQ3CW to DL7DF
HQ3DX to DL7DF
HR3/DL7DF to DL7DF
I2JSB to UA9AB
IC8JAH to IC8SDL
II7A to IØYKN
II9ZZ to IT9PKO
IMØA to ISØLJJ
J38AT to NØAT
J38DD to KC5AK
J38EA to N7UE
J38L to WA8LOW
J38LL to N6LL
J38NA to NH7C
J38R to W6SR
J38RO to K6RO
J38YL to KC5DJI
J41OG to SV1BSX
J41WCA to SV1BSX
JW2PA to LA2PA
KØA to KØRX
KØDEQ to UA9AB
KG4VN to K3VN
KG4WB to N2WB
KHØ/W1BRK to JA1BRK
KH2/W2IMO to WB2OQY
KH5/N4BQW to WA4FFW
KH5K/N4BQW to Pirate
KH6JEB to KH7RS
KH6JHM to KH6BZF
KP4DQ to UA9AB
M1BCG to G3SWH
OD5PN to LX1NO
OD5/9K2MU to WA4JTK
OT8T to ON4UN
P29AS to K6VNX
P3A to W3HNK
P4/N5IP to N5FTR
P4/NE8Z to K8LJG
P4ØDC to K3LP
P4ØE to W3HNK
R1FJV to UA3AGS
RK9AWC to UA9AB
RK9AY to UA9AB
RW9UZZ to UA9AB
S91FC to CT1EAT
S92FC to CT1EAT
S97A to CT1EAT
SNØSUL to SP5UAF
ST9C to Pirate
SV9/G4VXE to G3SWH
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T88HN to JF1VXB
TT8BE to F6FNU
TZ6SI to DJ6SI
UA9UST to UA9AB
UI8B to G3SWH
UU4JDD to KD1PW
V26ED to WA3WSJ
V26KW to K3TEJ
VE3EJ to N5TJ
VKØANARE to VK1AUS
VK6BAT to N6ZZ
VK9LK to VK2ICV
VP9/AJ2U to K1EFI
VP9/US1IDX to N5FG
VR2BG to VS6BG
VR97BG to VS6BG
VS6UP to VS6GH
VS96BG to VS6BG
VS98BG to VS6BG
VY7V to VE7DUG
W2B to K2WE
WHØ/WH2Q to JI1DLZ
WH6DEF to KH6BZF
XX9TDM to VS6BG
ZAØSI to Pirate
ZC4DX to 4Z4DX
ZD8V to KF4OOX
ZF2DE/ZF8 to N4BP
ZF2DN/ZF8 to N4BP
ZF2VR to WB8WCU
ZL1HS to UA9AB
ZPØR to W3HNK
ZPØZ to W3HNK
ZP5XF to LU2BRG
3B8GE to Rajhen Rungapamestry, 81 Ylang Ylang Ave., Quatre Bornes, Mauritius
9K6POW to Kuwait ARS, P.O. Box 5240, Safat 13053 Kuwait
9V1AG to Robert M. Limb, The Waterside #20-01, 1 Tanjong Rhu Rd., Singapore 436879, Rep. of Singapore
AP2AMR to Arbab Amir, House #1, Street #40, G-10/4, Islamabad 44000, Pakistan
BA1CO to Ping Ke Cheng, P.O. Box 6111, Beijing, China
BA1DU to Alan Kung, P.O. Box 8091, Beijing 100088, China
BA1RA to X. C. Zhu, P.O. Box 6111, Beijing, China
BA1SS to C. S. Wang, 811-1061 Zhong Guan Cun, Beijing 100080, China
BD7YA to Li Hongmin, Mechanical & Electrical Engineering Dept., Changsha Railway University, Changsha 410075, China
BD9SA to Yin, Security Dept., Xining Steel Works, Qinghai 810005, China
BT1IARU to Chinese Radio Sports Association, P.O. Box 6106, Beijing 100061, China
BT7C to Chinese Youth Amateur Radio Competition, P.O. Box 652, Guangzhou 510220, China
BT7D to Chinese Youth Amateur Radio Competition, P.O. Box 652, Guangzhou 510220, China
BV2PC to Carl Chen, P.O. Box 1-113, Yung-Ho, Taiwan
BV2RR to G. G. Chang, P.O. Box 117-822, Taipei, Taiwan
BV7ID to Tony Chang, P.O. Box 19-91, Fong San, Taiwan
BXØYL to Christine, P.O. Box 163, Feng-Yuan 420, Taiwan
BY4BZB to Za Bei Coaching Center of Science & Technology for Teenagers, P.O. Box 083-105, Shanghai, China
BY7KH to Amateur Radio Station of Guangzhou Haizhu Children's Palace, P.O. Box 652, Guangzhou 510220, China
CU7AA to Altino da Costa Goulart, Rua Principe Alberto do Monaco, 18, P-9900 Horta, Faial, Acores, Portugal
DS5WKW to Jong-Ho Jang, Jugong Apt. 2-501, Jangsung-Dong, Pohang 791-260, Korea
DU3NXE to Chuck Kresge, 222 Villa Leonor, Limay, Bataan 2103, Philippines
E21EJC to Krissada Futrakul, 365/1647 Moo 2, Phutthabucha Road, Bangmod Ratburana, Bangkok 10140, Thailand
FP5KE to P.O. Box 1343, F-97500 Saint-Pierre et Miquelon, France
HKØFBF to Maria Nelcy de Bard, P.O. Box 842, San Andres Isl., Colombia
HKØHEU to Richards F. Bard, P.O. Box 842, San Andres Isl., Colombia
HLØCAC to Chon Buk University Amateur Radio Club Station, 664-14 Iga Duck Jin Dong, Chonju 560-756, Korea
HLØCBD to P.O. Box 110, Kwangju, Korea
HLØRIG to Dongshin University Amateur Radio Club Station, 252 Daehodong, Naju, Chonnam 520-714, Korea
HL1TXQ to Pil Young Kim, #302 Eun Hang House, Teogyewon Myoun 250-5 Namyangju, Kyung Kido 472-820, Korea
HL4GAV to Dr. In-Soo Choi, P.O. Box 133, Chonju 561-190, Korea
HL5NTN to Suk Bong Kim, 733-144, Dong Chun-Dong, Kyong-Ju 780-190, Korea
HSØ/IK4MRH to Nerio Baratta, 18/5 Kamala Beach, Phuket Kathu 83000, Thailand
JT1BL to N. Batchuluun, P.O. Box 602, Ulanbator 44, Mongolia, via Japan
P43HK to Hubertus J. M. Kelkboom, Bloemond 12, Aruba
RA3AR to Toivo P. Laimitainen, P.O. Box 228, 188350 Gatchina, Russia
V31AR to Tony Alcoser, 117 4th Ave., Corozal Town, Belize
YB9AS to H. Ali Sattar, Jln. Raya Puputan II/C 15, Denpasar, Bali 80235 Indonesia
YB9CCB to Andi Chandra, P.O. Box 2051, Kuta, Bali 80361, Indonesia
YC1MW to Chandra Wiriadinata, P.O. Box 28, Sukabumi, Indonesia
YC9BU to Kadek Kariana Sp., P.O. Box 106, Singaraja 81100, Indonesia
ZF1DJ to John Darby, P.O. Box 1565, Grand Cayman, Cayman Islands
ZK1JD to Jim Ditchburn, P.O. Box 491, Rarotonga, Cook Islands
ZP6KAA to Jorgen Kristian Johansen, C. C. 21101, Palma Loma, Luque, Paraguay

The table of QSL managers is courtesy of John Shelton, K1XN, editor of The GOLIST, P.O. Box 3071, Paris, TN 38242 (phone 901-641-0109; e-mail: <golist@iswt.com>).

direct costs. In other words, look for significantly higher administration fees for DXCC submissions.

DXers with comments on suggestions on the interim DXCC 2000 Committee may contact Committee Chairman John Kanode, N4MM, prior to the ARRL Board of Directors meeting mid-month.

Current DXpeditions

January is usually the best month to work the Antarctic regions. This is midsummer in the southern hemisphere, and the many nations that have seasonal Antarctic bases fire up these bases at this time of year. Also, the population of the year-round bases increases dramatically during the short summer.

In years past the Russians were a very large presence in the Antarctic, with numerous 4K1 stations on from the mainland and 4K1F on the South Shetlands. However, the Russians have eliminated staffing of most of these bases. The South Pole station KC4AAA is quite active, and as a bonus can be used to count for any of the *CQ* Zones that converge at that point. KC4USA at Little America is another active station. HFØPOL, the Polish base in the South Shetlands, has been one of the most reliable Antarctic stations during the long winter. Other nations with bases in the region include Argentina LU-Z–, Chile CE9, France FT–Y–, Belgium OR4, Australia VKØ, United Kingdom

Chuck Pharis operates as KK6NE/T4 at the Pan Am Games in Havana, Cuba.

VP8, New Zealand ZL5, South Africa ZS1, and Japan 8J1.

Visalia DX Convention

The joint meeting of the Northern and South California DX Clubs (the official name of the Visalia DX Convention) returns to Visalia in 1998 on May 1–3, again at the Holiday Inn. The Southern Cal Club is the hosting organization this year. Preregistration before April 15 is $55. Send your check made out to the International DX Convention to Don Bostrom, N6IC, 4447 Atoll Avenue, Sherman Oaks, CA 91433, with choice of chicken, salmon, or prime rib for the Saturday banquet. The telephone number of the Holiday Inn is 209-651-5000. Other hotels in the area are the Radisson downtown at 209-636-1111 and the nearby Lamplighter at 209-732-4511. 73, Chod, VP2ML

CQ DX Awards Program

SSB

2238	LU7AGG	2239	K3BSA

CW

966	PY4WS

SSB Endorsements

320	SV1ADG/328	275	W5OXA/296
320	WØULU/321	275	VE7HAM/284
310	KF8UN/319	150	LU7AGG/174

CW Endorsements

320	K6LEB/328	275	WG7A/282
320	F3TH/327	275	PY4WS/276
320	EA2IA/327	250	KF8UN/268
320	WB5MTV/323	28 MHz	K6HMS
310	WB4UBD/313	3.5–7 MHz	K6HMS
275	F6HMJ/292		

RTTY Endorsements

310	WB4UBD/310

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.

BY JOHN DORR, K1AR

CONTEST CALENDAR

NEWS/VIEWS OF ON-THE-AIR COMPETITION

Let's Try Again—Our 1998 Contest Resolutions

January's Contest Tip Of the Month

Try to be more aggressive when a station calls you and you miss part of his callsign. Rather than saying "Alpha Radio, your call again?" take the high road and say "Alpha Radio you're 59001 . . . your call?" More often than not, you will eliminate an unnecessary round of transmissions, making your operating more efficient and productive.

Fellow contesters, that time of year has again come upon us—the time for resolving ourselves to greatness in contesting. It's a time when we're in a brief contest season lull (although you'd never know it by looking at January's calendar). In addition to our never-ending attempts to initiate exercise programs, spend more time with our families, improve our work ethic, and commit to more disciplined financial budgeting, there is the issue of being a better contester in 1998. Here's a partially fun and mostly serious list for you to consider:

- I will always sign my entire callsign in every contest.
- I will never intentionally take someone else's frequency.
- I will never log a QSO unless I'm absolutely sure of the exchange and call.
- I will religiously repeat the entire callsign of the station I am working during each QSO.
- I will always verify the callsign of the station I am working from a DX spot on packet before logging him.
- My logs will always be submitted in a clear format before the mailing deadline; I will strive to submit my scores electronically to ease the log checkers' task.
- I will plan this year's antenna projects during the winter and begin construction on the first warm spring weekend.
- My entire station will be ready for the fall operating season 30 days before the start of the CQ WW SSB Contest.
- I will always solder the ground on my PL-259 connections.
- I promise to answer all my incoming bureau QSL cards—even the SWL cards!
- I will be sure to respond to the current *CQ* magazine "Contest Calendar Survey."

2 Mitchell Pond Road, Windham, NH 03087
e-mail: K1AR@contesting.com

Calendar of Events

Dec.	21	Internet CW Sprint Contest
Dec.	27-28	Stew Perry Topband Dist. Challenge
Dec.	28	RAC Canada Winter Contest
Jan.	1	ARRL Straight Key Night
Jan.	3-4	Hunting Lions on the Air CW Con.
Jan.	3-4	ARRL RTTY Roundup
Jan.	3-4	Northern NY QSO Party
Jan.	9-11	Japan Int'l Low Band CW Contest
Jan.	10-11	Hunting Lions on the Air SSB Con.
Jan.	10-11	North Amer. CW QSO Party
Jan.	17-18	YL-ISSB CW QSO Party
Jan.	17-18	North Amer. SSB QSO Party
Jan.	17-19	ARRL VHF Sweepstakes
Jan.	18	HA DX Contest
Jan.	**23-25**	**CQ WW 160 M CW Contest**
Jan.	24-25	REF CW Contest
Jn.31-Fb.1		UBA SSB Contest
Feb.	1-2	Classic Radio Exchange
Feb.	7-8	Vermont QSO Party
Feb.	7-8	Ten-Ten Winter SSB QSO Party
Feb.	8	North Amer. SSB Sprint
Feb.	14-15	PACC Contest
Feb.	14-15	World-Wide RTTY WPX Contest
Feb.	14-15	RSGB 1.8 MHz Contest
Feb.	15	North American CW Sprint
Feb.	21-22	ARRL CW DX Contest
Feb.	21-22	REF SSB Contest
Fb. 27-Mr. 1		**CQ WW 160 M SSB Contest**
Fb. 28-Mr. 1		North Carolina QSO Party
Fb. 28–Mr. 1		UBA CW Contest
Mar.	7-8	ARRL SSB DX Contest
Mar.	14-15	Wisconsin QSO Party
Mar.	17-18	CLARA HF Contest

- I will periodically check to see if someone else wants to take over the rig when participating at a multi-op.
- I will always act as if I were using *my* callsign when operating from someone else's station in the next contest.

There are probably a few dozen more suggestions/goals that could be added to the list above, so don't let this limit stop you from being a better contester. If you make progress with just a few of the items above, you'll be a significantly improved operator. I guarantee it!

Gerry Mathis, W3GM, Silent Key

Over the years as *CQ*'s Contest Editor I've had the occasional and unfortunate task of reporting the loss of one of our own. The time has come yet again.

In late October of last year former Eastern Pennsylvania Section Communications Manager Gerry Mathis, W3GM, of Pennsburg, Pennsylvania, passed away. He was 86. As W3BES, the callsign he earned in 1930, Mathis was ARRL SCM for eastern Pennsylvania from the late 1930s until 1951.

When the Ohio River flooded in 1937 and a detachment of Philadelphia police was sent to Louisville to help, W3BES acted as a relay station to keep Philadelphia in touch with Louisville. Some of his transmissions were broadcast over local radio station WFIL to keep the public informed about the disaster.

Mathis's professional life also revolved around electronics and radio. He was employed by a number of different radio-related companies. Many amateurs will remember him from Consolidated Radio, where he built custom transmitters for various prominent amateurs.

During World War II Mathis was active in the War Emergency Radio Services (WERS) and then went to the First Fighter Command to organize the air-to-ground communication.

Mathis was a member of the Frankford Radio Club and constructed a multi-multi contest station where he trained many club members in the art of contesting. His crowning achievement as a contester was his being inducted into *CQ*'s Contest Hall of Fame.

In 1991 the ARRL Atlantic Division honored Gerry Mathis with the Grand Ole Ham award. This award recognizes outstanding amateurs for a lifetime of service to others. *(Thanks to the ARRL for the information above—ed.)*

Dave Pascoe, KM3T, adds the following words:

"Gerry was one of my Elmers during my early years in contesting. I operated a couple of times at his multi-multi station and once as a single-op in the ARRL 160M Contest. Gerry was a real gentleman and spent many hours bringing new contesters into the hobby. His knowledge of radio and his knack for 'getting things working' was amazing. He was a true giver to the amateur radio community.

"One experience stands out in my mind: Friday afternoon before the 1983 CQ WW CW Contest. Two verticals in his 80 meter 4-square snapped in the middle due to severe ice loading. Gerry and his crew braved the deep snow and freezing temperatures to put the broken verticals back up. The event sticks in my mind because of his dedication in the face of adverse conditions.

"Gerry will be sorely missed. Rest well up there, OM."

Reviewing *DXing on the Edge—The Thrill of 160 Meters*

By Jeff Briggs, K1ZM

If you haven't run across this literary gem, you need to stop in your tracks and make a phone call today. Jeff Briggs, K1ZM, well-known DXer and contest operator, has produced a masterpiece on the history and excitement of 160 meters. Jeff's 270 confirmed countries on 160 meters makes him one of the leaders in the DX chase and a certified expert on the band, its history, and challenges.

Jeff has chronicled the history of *Topband,* as aficionados of 160 meters like to call it, from the start of operation in the early 1930s until today.

This is not necessarily a book exclusively targeted at 160 meter operators. Any active amateur will gain insight into low band operating when he or she read about the experiences of Jeff and dozens of other successful 160 meter DXers/contesters. Also, I guarantee that you will find the inclusion of an audio CD containing some truly exotic QSOs well worth the price of the book all by itself (K1ZM's QSO with XZ1N is one of my favorites).

This one's a winner! *DXing on the Edge—The Thrill of 160 Meters* is available from dealers selling ARRL publications or directly from ARRL Publication Sales, 225 Main Street, Newington, CT 06111-1494 (telephone 888-277-5289; fax 860-594-0303). Use ARRL Order No. 6354 when ordering your copy. The current retail price is $29.95, plus shipping.

Closing Thoughts

Your 1997 CQ Contest Surveys are pouring into my mailbox on a daily basis. Thanks for taking the time to make this year's survey a success. It's not too late to send your own response in to me. If you prefer, you can take a quick moment and reply electronically. The easiest way to reach me these days is via <K1AR@contesting.com>.

As always, I need to receive your "Contest Calendar" submissions for the April issue no later than February 1st. Make sure you send your information to my home QTH (shown at the beginning of this column), please!

73, John, K1AR

ARRL RTTY Roundup

1800Z Sat. to 2400Z Sun., Jan. 3–4

This is the 10th annual all-digital contest sponsored by the ARRL. Any station may work any other station worldwide. You may operate more than one digital mode, but QSOs and multipliers are counted once only regardless of modes used.

Operation is limited to 24 hours out of the 30-hour contest period. Two rest periods must be taken in two separate blocks of time and must be clearly marked in the log.

Modes: Baudot, RTTY, ASCII, AMTOR, and packet (attended operation only).

Bands: 3.5–30 MHz on those frequencies recommended for digital operation (no 10, 18, or 24 MHz).

Categories: Single Operator, Multi-Band—(1) less than 150 watts output, (2) 150 watts or more. Also Multi-Operator, Single Transmitter, All Band.

Exchange: Signal report and QTH. State for the U.S., province for Canada. DX will send a serial QSO number.

Scoring: One point per QSO. A station may be worked once per band for QSO credit.

Multiplier: Each US state (48), each VE province (12), and each DXCC country, count-

ed only once, not once per band (KH6 and KL7 are countries; VO1/VO2 counts as one VE province).

Entries with 200 or more contacts must submit a duplicate QSO check sheet.

Awards: Certificates to the top-single operator, both low and high power, and multi-operator scorers in each ARRL/RAC section, and each DXCC country. Novice/Tech entrant with at least 50 QSOs will also receive a certificate.

Contest forms are recommended and are available from the ARRL for an SASE and two units of first-class postage.

Postmark your entry by February 8th and send it to: ARRL RTTY Contest, 225 Main Street, Newington, CT 06111.

Japan Int'l DX CW Contest (Low Band)

2200Z Fri. to 2200Z Sun., Jan. 9–11

The object for this one is for amateurs around the world to work as many JA stations in as many JA prefectures as possible. The contest is sponsored by *Five-Nine* magazine. The maximum operating period is 30 hours (except for JAs, who can use the full 48 hour period) with off periods longer than 60 minutes. This is the low band edition (others to follow in subsequent months), and operation is limited to 160–40 meters, exclusively.

Classes: Single Operator-high power/low power/all band/single band; multi operator; marine mobile.

Exchange: JA-RST and prefecture number (1–50); others send RST and CQ Zone.

Scoring: 160 meters 4 points, 80 meters 2 points, 40 meters 1 point per QSO. Multipliers are total prefectures worked per band (DXCC countries for JA). Final score is total QSO points times multiplier.

Awards: Plaques and awards will be sent to the winners in each class around the world. A special contest award will be offered to anyone working all Japanese prefectures during the contest period.

All logs must be postmarked no later than February 28th and should be sent to: JIDX LFCW Contest, c/o *Five-Nine* magazine, P.O. Box 59, Kamata, Tokyo, 144 Japan. E-mail log submissions will be judged with the time stamp of the e-mail and should be sent to <jidx-log @dumpty.nal.go.jp>. Contest results will be sent to anyone including one IRC and an SAE.

1998 North American QSO Party

CW: 1800Z Sat. to 0600Z Sun., Jan. 10–11
SSB: 1800Z Sat. to 0600Z Sun., Jan. 17–18

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

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

Mode: CW only in CW parties. Phone only in phone parties.

Bands: 160–10 meters only (no WARC bands). You may work a station once per band. Suggested frequencies are 1815, 3535, 7035, 14035, 21035, and 28035 (20 kHz up from band edge for Novice) on CW; and 1865, 3850, 7225, 14250, 21300, and 28450 on phone. Try 10 meters at 1900Z and 2000Z, 15 meters at 1930Z and 2030Z, and 160 meters at 0430Z and 0530Z.

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

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

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

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

Awards: A total of five trophies will be awarded for the high score in each of the following categories: Single Operator CW and Phone, Multi-Operator CW and Phone, and Single Operator Combined score. 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 CW North American QSO Party entries to Bob Selbrede, K6ZZ, 6200 Natoma Ave., Mojave, CA 93501. All SSB logs go to Steve Merchant, K6AW, 1795 Cravens Lane, Carpenteria, CA 93013. 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, only.

HA DX Contest

0000Z to 2400Z Sun., Jan. 18

Sponsored by the Hungarian Radioamateur Society, this is one of several very popular Eastern European national contests. The contest is CW only and stations may only be worked once per band.

Classes: Single Operator Single Band, Single Operator All Band, Multi-Operator Single Transmitter, Multi-Operator Multi-Transmitter, and SWL.

Exchange: RST plus serial number (599001). HA stations will also send a two-let-

ter code corresponding to their county. The possible codes are BA, BE, BP, BN, BO, CS, FE, GY, HA, HE, KO, NO, PE, SA, SO, SZ, TO, VA, VE, and ZA.

Scoring: Count 6 points per HA QSO and 3 points for non-HA QSOs on other continents. Final score is total QSO points times the sum of HA counties worked per band.

Entries are due 6 weeks after the contest and should be sent to: Hungarian DX Club, Box 79, Paks, H-7031 Hungary.

ARRL VHF Sweepstakes

1900Z Sat. to 0400Z Mon., Jan 17–19

This is the 51st ARRL January VHF Sweepstakes. ARRL Headquarters recommends that you use the official log forms. The forms will help make your log keeping and scoring much easier. A large SASE to Newington will get you the necessary forms.

Complete rules will be found on the ARRL's web site at <www.arrl.org>. They are a bit complicated, so look them over carefully.

1995 YL-ISSB QSO Party

CW: Jan. 17–18 SSB: Feb. 21–22
0001Z Saturday to 2359Z Sunday

This event is open to all, although emphasis is on membership involvement.

Exchange: Signal report, state/province/country, name, ISSB number (if member).

Categories: Single Operator, DX-W/K Partner, YL/OM Team.

Scoring: Credit 3 points for member contacts within the same continent; 6 points for member contacts in different continents; and 1 point for non-member QSOs. You can credit one multiplier for working both DX-W/K team members, each YL/OM team, US State, Canadian province, DX country, and VK/ZL call area. Multiply your score by two if you use less than 250 watts throughout the party.

Frequencies: Use the General portion of the bands. Avoid net operations. Check 40/80 meters on the hour.

Awards: Certificates will be awarded to the top three scorers in each category. A special ZL award will be sent to the station working the most ZL contacts.

Logs must be received by April 30th and should be sent to Rhonda Livingston, N4KNF, 2160 Ivy Street, Port Charlotte, FL 33952.

CQ WW 160 Meter Contest

CW: Jan. 23–25 SSB: Feb. 27–Mar. 1
2200Z Friday to 1600Z Sunday

Complete rules were published in the November issue. The following is a brief overview.

Exchange: RS(T) and QTH. State for US, areas for Canada, country abbreviation for DX.

Scoring: Contacts with stations in own country 2 points, other countries in same continent 5 points, with other continents 10 points.

Multiplier: Each U.S. state (48), Canadian area (13), and DX country. (ARRL and WAE country lists and WAC boundaries are the standards.) Note that Washington D.C. is now a new multiplier (same as state).

Awards: Certificates to the top-scoring stations in each U.S. state, Canadian area, and DX country, as well as an assortment of plaques for U.S. and world winners.

Penalties: Three contacts will be deleted for

each duplicate that has not been removed.

Disqualification: Taking credit for excessive duplicate contacts and the usual assortment of rules violations and unsportsmanlike conduct.

Mailing deadline for logs is February 28th for CW and March 31st for SSB.

Logs should be sent directly to: CQ 160 Meter Contest, David L. Thompson, K4JRB, 4166 Mill Stone Court, Norcross, GA 30092. *Be sure to indicate CW or SSB on the envelope.*

U.B.A. Contest

SSB: 1300Z Sat. to 1300Z Sun., Jn. 31-Fb. 1
CW: 1300Z Sat. to 1300Z Sun., Fb. 28-Mr. 1

This one is sponsored by the Belgium Amateur Radio Union (U.B.A.) and is any station working any other worldwide. Numerous operating awards are available and contest QSOs may be credited towards these awards.

Classes: 5 categories exist—Single Operator, All Band/Single Band, Multi-Operator/Single Transmitter, QRP 5 watts, and SWL. In all categories *only one* transceiver (or receiver) is allowed at any time during the contest. Only one transmitted signal is permitted at any time during the contest, so *no* multiplier station permitted. The use of DX-cluster facilities is permitted for all categories.

Frequencies: CW—3500–3560, 7000–7035, 1400–14060, 21000–21060, 28000–28060 kHz. SSB—3600–3650, 3700–3800, 7040–7100, 14125–14300, 21175–21350, 28400–28700 kHz. Note that ON stations are only allowed 1830 to 1850 kHz on 160. It is mandatory to respect the IARU Region I band plan and the IARU Region I contest preferred frequencies.

Exchange: RS(T) and consecutive serial number. Belgian stations also give their province abbreviation.

Multipliers: All Belgian Provinces, prefixes—ON4-9, DA1-2—and European Community countries. A QSO with a Belgian station can give you 2 multipliers—province and prefix.

Scoring: QSOs with ON count 10 points. European QSOs count 3 points. All others are 1 point. Final score is total QSO points times total multipliers.

Awards: There are several awards available, including trophies and certificates to the high scorers in each operating class. The 11th European Union Trophy will be awarded to the highest scoring EU member station from both the CW and SSB Class B competition.

Send your final results no later than 30 days after each contest mode to UBAHF Contest Committee, Carine Ramon, ON7LX, Bruggesteenweg 77, B-8755 Ruiselede, Belgium. Computer logs on 5¼ or 3½ inch diskettes can only be accepted if the file format is ASCII. One QSO per record is mandatory (ending with CR/LF) for computer processing. The name of the file will be MYCALL.LOG (MYCALL being your own call). The file format of MYCALL.LOG by EI5DI or the logs generated by the ARI contest program are preferred. Logs via e-mail are accepted at <ON7TK-ON7LX@innet.be>. A confirmation will be sent when the log arrives.

1998 REF Contest

CW: 0600Z Sat. to 1800Z Sun., Jan. 24–25
SSB: 0600Z Sat. To 1800Z Sun., Fb. 21–22

The Reseau des Emetteurs Francais (REF) invites radio amateurs from around the world to participate in the REF Contest. The object of the contest is to establish as many QSOs as possible between radio amateurs around the world and French stations. French stations are defined as (1) stations from France and Corsica, (2) French military stations in Germany, and (3) overseas territories and departments (i.e., FG, FH, FJ, FK, FM, FO, FP, FR, FS, FT, FW, and FY). Operation is on 80–10 meters only (no WARC bands).

Classes: Single Operator, All Band and Single Band; Multi-Single; and SWL.

Exchange: RS(T) and serial number. French stations give RS(T) and their department number. Overseas territories use RS(T) and their prefix.

Scoring: Credit one point for QSOs within the same continent and three points for QSOs with another continent. All QSOs with "French Speaking Countries" stations are worth 5 points (C3, CN, D6, HB, HH, HI, J2, LX, OD, ON, TJ, TL, TN, TP2CE, TR, TT, TU. TY, TZ, VE2, XT, YJ, 3A, 3V, 3X, 4U1ITU, 5R, 5T, 5U, 5V, 6W, and 7X). Multipliers are French departments, military stations, and territories per band. A special multiplier may be taken for working F6REF/00 per band.

Awards will be sent to the first-place single- and multi-operator winner of each country. All logs must be received before March 15 (CW) and April 15 (SSB). Send your entries to Reseau des Emetteurs Francais, REF Contest, BP 7429, 37074 Tours, Cedex 2, France.

BY TED MELINOSKY, K1BV

AWARDS

NEWS OF CERTIFICATE AND AWARD COLLECTING

Six new USA-CA 3076 Special Honor Roll listings! This has to be a record, and we congratulate the effort that went into this achievement. It was a great way to start my first column for *CQ*.

Yes, the *CQ* "Awards" column has a new editor. Norm, WA3RTY, has retired, and I've agreed to pick up the reins. It's like coming home. This column is where I first developed an interest in awards and county hunting way back in the early 1960s when the column was written by K6BX. I began to hunt counties at that time, and unlike those devoted persons listed at the beginning of this article, I still need about 225 to complete the award. Some old-time county hunters may have some of the rare Kentucky counties I gave out in 1966–67 when I lived in Louisville. Now I live in semi-rural New Hampshire, in sort-of-rare Cheshire county, and in my free time I enjoy chasing DX, acting as a QSL manager for EY8MM and EY8WW, working on the next edition of my *DX Awards Directory*, or listening to the chatter on 14.336 in the evening hoping for a new county to show up. Oh, yes: I have a full-time job as a Business Insurance regulatory, product development, and automation specialist with a small but growing mutual insurance company in Keene, New Hampshire.

Shortly after I started receiving the first USA-CA applications, I was asked to review the USA-CA rule regarding sending a copy of the *CQ Counties Award Record Book* as the record-keeping tool and application. This requirement was started many years ago, well before personal computing became such an important part of the ham shack. Many county hunters keep records of counties worked and confirmed on a PC data base. It's time for a change. Effective immediately, you may submit any level of USA-CA Award application on a PC-printed listing from your computer. This list should be in alphabetical order by state and by county within the state. Attach a copy of the page or the exact same text that is used on the inside back cover of the Record Book as your signed certification for the award and the witness form on the outside back cover for the two witnesses and their signatures. This will ensure that your application may be understood and handled correctly the first time.

This column is being written at about the time the official USA-CA records are being packed up to be shipped from WA3RTY to the *CQ* magazine editorial offices. There are other ongoing issues which will have to be addressed, and I expect to get to them when *CQ* sorts things out and sends me the current materials, files, records, and of course USA-CA Award supply.

As this column develops, I'll provide a little more emphasis on the world of awards and certificates. I think that there are about 3000 different awards available. Each month I'll present the rules for some

65 Glebe Road, Spofford, NH 03462-4411
e-mail: k1bv@top.monad.net

USA-CA Special Honor Roll

Chris Kielich, K6CF
USA-CA All Counties #930
October 17, 1997

Eldon M. Hall, N8STF
USA-CA All Counties #931
October 15, 1997

James K. Landers, AC4XL
USA-CA All Counties #932
October 17, 1997

Ronald McClanahan, NX4P
USA-CA All Counties #933
October 23, 1997

Donald Simmonds, N5XG
USA-CA All Counties #934
October 25, 1997

Frank L. Yohe, Jr., AA9JJ
USA-CA All Counties #935
October 28, 1997

USA-CA Honor Roll

500		2000	
K6CF	2982	K6CF	1111
N8STF	2983	N8STF	1112
AC4XL	2984	AC4XL	1113
NX4P	2985	NX4P	1114
N5XG	2986	N5XG	1115
AA9JJ	2987	AA9JJ	1116

1000		2500	
K6CF	2449	K6CF	1037
N8STF	2450	N8STF	1038
AC4XL	2451	AC4XL	1039
NX4P	2452	NX4P	1040
N5XG	2453	N5XG	1041
AA9JJ	2454	AA9JJ	1042

1500		3000	
K6CF	1208	K6CF	947
N8STF	1209	N8STF	948
AC4XL	1210	AC4XL	949
NX4P	1211	NX4P	950
N5XG	1212	N5XG	951
AA9JJ	1213	AA9JJ	952

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. To qualify for the special subscriber rate, please send a recent *CQ* mailing label with your application. Initial application may be submitted in the USA-CA Record Book, which may be obtained from *CQ* Magazine, 76 North Broadway, Hicksville, NY 11801 USA for $2.50, or by a PC-printed computer listing which is in alphabetical order by state and county within the state. 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 March 1, 1997. A complete copy of the rules may be obtained by sending an SASE to Ted Melinosky, K1BV, 65 Glebe Road, Spofford, NH 03462-4411 USA. DX stations must include extra postage for airmail reply.

Edison Toledo, PY2CC, designed the special certificates available for Brazil's 73 Awards Team Collection.

The W73NA 73 Awards Team Collection certificate available for working 73 cities in North America.

Switzerland's Alpstein Award is a very attractive, full color certificate. The award requires contacts to be made by April 30, 1998, so you still have some time!

new ones and some established old favorites. For those of you who use the Internet, there are a number of interesting resources for awards information on the information highway as well. Each month I'll present a few places to visit. So hang on, and let's start the travel by looking at a handsome selection from Brazil. Edison, PY2CC, has designed this handsome set of 12 awards with the theme of the amateur radio greeting—73!

Awards Available

Brazil's 73 Awards Team Collection. Contacts must be made on or after 1 January 1973. All bands and modes may be used. Endorsements are available for band or mode. Send GCR list and fee of US$10 or 12 IRCs for each award. Apply to: Edison Toledo, PY2CC, P.O. Box 1, Porto Ferreira - SP, 13660-970, Brazil. Internet WWW: <http://www.geocities.com/capecanaveral/5956>.

You can check on the status of your application by using Edison's e-mail address: <edpy2cc@ibm.net>.

W73BR: Work 73 cities in Brazil, including the capital cities of 20 states.

W73SA: Work 73 cities in South America.

W73EU: Work 73 cities in Europe.

W73CAC: Work 73 cities in Central America and the Caribbean.

W73NA: Work 73 cities in North America.

W73AF: Work 73 cities in Africa.

W73IS: Work 73 islands of the world, including a minimum of 3 islands from each continent.

W73AS: Work 73 cities in Asia.

W73PO: Work 73 cities in the Pacific Ocean area.

W73CC: Work 73 capital cities in the world.

W73AW: Work 5 awards from the 73 Awards Team collection as shown above. (This award is free.)

WA73AW: Work all 73 Awards Team awards as shown above (award is free).

Note: Registered mail is strongly suggested when sending funds.

Switzerland Alpstein Award. This next award is probably one of the most beautiful examples of certificate printing I've seen. It features an aerial photograph of the Swiss Alps in full color, and it measures 12½" × 16". A summer view, it shows how the snow-capped mountains transition to green valleys and snow-fed lakes and streams. The detail is amazing.

General Requirements: This is a short-term special event award and requires contacts to be made during the period 1 April 1997 to 30 April 1998, so you've got a few months to earn it. The purpose of the award is to commemorate the 50th Jubilee Award of the USKA St. Gallen Section anniversary. On HF Europeans need 40 points, and others just need 20 points. Above 30 MHz all stations must earn 15 points. Contacts with HB5CC count 5 points per band. Contact any stations in the following Swiss Cantons for 1 point per band: AR, AI, SG, and TG. Each station may be worked one time per band. Each of the four Cantons has to be worked at least one time. No QSOs via repeater, digipeater, crossband, or crossmode. The awards are issued for HF, VHF, and SWL. Send GCR list and US$7, DM12, 105Fr., or 7 IRCs to: Albert Zahner, HB9BCK, Scherzingerstr. 23, 8595 Altnau, Switzerland. Internet WWW: <http://hamfest. base.org>.

USA SWL-100 Award. The next award has a slightly misleading title, but Joe, K3CHP, is aiming at the amateur operator in an effort to create a demand for SWL QSLs, thereby resulting in a better level of QSL card exchange. This in turn may lead to an increased interest in becoming amateurs among SWLs. I'm sure that each batch of DX QSLs you receive from your bureau contains one or two SWL cards. You don't throw them away, do you? Like many others, I would send one of my own cards back and throw the SWL card onto a pile in the file cabinet where my cards live. After many years, it's grown to be a big pile, and if this is your case, here's an award that may reward you for keeping them!

General Requirements: Acquire SWL QSLs/reports from different countries in 25, 50, 75, and 100 country increments. The award is free of charge and has no date limitations. Send to the sponsor a list of the cards for the level for which you are applying, plus the cards themselves. Include enough postage to ensure the return of the cards. If you operated under different calls, provide a copy of any back-up documentation. A permanent record of your submissions will be kept for upgrading to a higher country increment. The award is administered by K3CHP, and if he is unable to administer the program in the future, he indicates that arrangements will be made with a reputable and established club for its continuation. Send the material to: Joe Mikuckis, K3CHP, 6913 Furman Parkway, Riverdale, MD 20737.

Israel's 50th Anniversary Award. Joseph Obstfeld, 4X6KJ, was kind enough to send me the rules for a short-term award commemorating Israel's 50th anniversary. It is perfectly timed for this January column, which gives you the four month opportunity to earn it. No sample was provided, so no picture appears.

General Requirements. This award

K3CHP's SWL-100 Award is available for acquiring SWL QSLs/reports from different countries in 25, 50, 75, and 100 country increments.

commemorates the 50th anniversary of the State of Israel and the establishment of the Israel Amateur Radio Club. The activity period starts 1 January 1998 and ends at midnight on the 1st of May 1998, which is the date of Israel's 50th Independence Day. The aim is to contact as many Israeli amateurs as possible. To honor the IARC founders, a special callsign will be used by those amateurs who belong to the founders group (Pioneers). They will use the prefix 4X50.

Special event stations will be active to commemorate any 4X Silent Keys who belonged to the founders group. They will use the 4X50 prefix and the Silent Key's old suffix ending with /SK (for example, 4X50BX/SK).

Each contact with an IARC member will count one point. Each contact with a "Pioneer Station" will count five points.

The following point requirements have been established for the awards:

Basic—50 points including 2 pioneer stations.

Bronze—100 points including 4 pioneer stations.

Silver—150 points including 6 pioneer stations.

Gold—200 points including 8 pioneer stations.

Platinum—250 points including 10 pioneer stations.

For SWLs the same rules apply, providing the log extract shows the particulars of both stations heard. A special 50th anniversary Israel State Medal will be awarded to the three highest scorers in each of IARU Regions I, II, and III. Logs must be sent to the IARC Award Manager before 30 June 1998. Send to: P.O. Box 17600, Tel Aviv 61176, Israel. Internet e-mail: <josepho@shani.net>.

Internet Locations of The Month

The Island Chasers Page is published by SWL S. Morice and features current IOTA data, island-based award rules, complete lists of the coastal and extraterritorial islands of France, plus loads of links to other Island WWW pages. The URL is: <http://www.micronet.fr/~smorice>.

The second WWW site worth a visit contains a complete and updated list of German DOKs. Award hunters know that most German awards require contacts with different combinations of these club designations. In my experience, over 99% of German stations include this info on their QSL cards. The WWW address is quite long and complicated, so type carefully: <http://www.rrze.uni-erlangen.de/~unrz45/BCC/current/dokdl5vu>. If you are serious about collecting DOKs, it should be possible to save and download this file into your database application.

Summary

Let me close my first *CQ* column with a request to award sponsors for copies of your rules and sample certificates. *CQ* magazine is the only USA amateur magazine to support this very interesting part of our hobby. Its pages provide an excellent forum for award publicity. Your material should be sent directly to me at 65 Glebe Road, Spofford, NH 03462-4411; e-mail: <k1bv@top.monad.net>.

73, Ted, K1BV

PRODUCT LINEUP

MILITARY AND COMMERCIAL PRODUCTS

ST8000A **- Ruggedized HF Modem, MIL connectors, high MTBF, touch panel controls**

ST8000 **- HF Modem, Tuneable Mark/Space tones, memories, space tuning indicator, up to 1200 baud FSK**

ARQ1000B **- Error Correction Terminal, CCIR-476/625 TOR ARQ/FEC**

HFCS1000 **- High Frequency Communications Simulator, Training device simulates HF receiver operation, .5 to 30 Mhz**

LP1210 **- Ten Channel ruggedized Loop Power Supply, 10 channels, MIL 188 to neutral loop, 100K hrs MTBF**

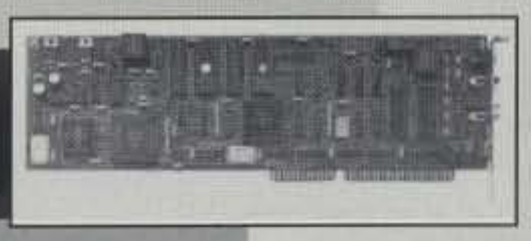
LP1200A **- Loop Power Supply, 1 channel, polar or neutral, 20/60 ma, RS232/MIL188, motor control**

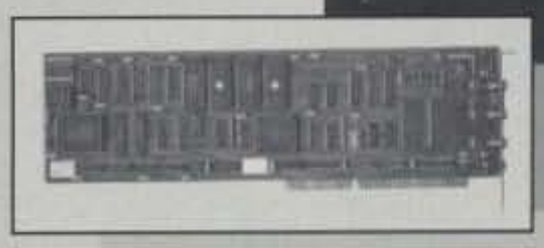
DS3486 **- Radio Data Communications Terminal, Rack mount, 486, VGA, Floppy drive, 420 Mb Hard Drive**

DSP PRODUCTS

DSP4100 **- DSP Modem, Stand-alone DSP modem for CLOVER, Clover 2000, TOR, Pactor, RTTY and ASCII. + 12 VDC.**

PCI4000+ **- HF DSP MODEM, PC plug-in card. Operates CLOVER, CLOVER2000, TOR, RTTY and ASCII**





P38 **- HF DSP MODEM, PC Plug-in card. Designed with the Amateur in mind. Operates CLOVER, Pactor, AMTOR, RTTY and ASCII**

FAX4100 **- FAX-OVER-RADIO Interface, Interfaces a G3 FAX machine to the DSP4100/CLOVER2000 Modem.**

LI4100 **- Line Interface for FAX4100, Share G3 Fax machine between phone lines and FAX4100.**

CLOVER2K **- Voice Bandwidth CLOVER software, for PCI4000 and DSP2000, TOR, Pactor, RTTY and ASCII. +12 VDC.**

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BY FREDERICK O. MAIA, W5YI

WASHINGTON READOUT

REGULATORY NEWS IN THE WORLD OF AMATEUR RADIO

Vanity Station Callsigns Now Available To All Amateurs

One of the disadvantages in writing a monthly column is that sometimes the lead time between writing and publishing is such that things change by the time your article appears in print. Such was the case with last month's column in which we discussed "vanity" amateur station callsigns. Shortly after we said there was no news on when Gate 4 of the Vanity Call Sign System would open, the FCC issued a Notice saying it would open on December 2, 1997.

More than 500,000 amateurs (about 70% of the entire amateur operator community) now become eligible to apply for a new callsign on that date. Most will want a one-by-three format starting with a prefix of K, N, or W. A 1×3 format means one prefix letter, one numeral (Ø through 9) and three suffix letters (AAA through ZZZ.) The 1×3 "W" calls will undoubtedly be the most popular, since it was the first prefix issued to radio amateurs.

Unlike 1×2 format callsigns, there are plenty of 1×3 format callsigns available! There are nearly half a million unassigned 1×3 callsigns—enough for everyone who wants one!

Types of Vanity Callsigns

First of all, let's define a "vanity" callsign. They are like vanity automobile car license plates. In a nutshell, the Vanity Call Sign System offers you the opportunity to request a specific call for your personal amateur station or for your club station.

One of the rules of the program is that you must hold a sequentially issued callsign before you can trade it in for a station callsign of your choice. Military recreation and RACES (Radio Amateur Civil Emergency Service) stations are not eligible for a vanity callsign under any circumstances.

There are different categories of vanity callsigns. For example, former holders may obtain a callsign that was previously assigned to their primary, secondary, repeater, auxiliary link, control, or space station. Close relatives and club stations may also request the callsign of a deceased amateur or member. There are many guidelines that apply to those instances, but we won't go into them here.

National Volunteer Examiner Coordinator, P.O. Box 565101, Dallas, TX 75356-5101 (817-461-6443; e-mail W5YI@W5YI.org)

This month we want to concentrate on where the majority of the vanity callsign action will occur—that being individual General, Technician Plus, and Technician class amateur radio operators who merely want a 1×3 callsign containing specific call letters.

It is very important that you read these vanity callsign ground rules carefully if you plan to change your callsign. There are indeed many pitfalls. The downside is if you don't follow the guidelines, your application could be rejected and you will have to file for a time-consuming refund and start all over again! And by that time, the callsign you want may already have been selected by someone else!

Filing Gate 4 Opens December 2, 1997

The FCC adopted a "gate opening" approach to phasing in the Vanity Call Sign System. The "callsigns of choice" program began on May 31, 1996 when Gate 1 opened to former callsign holders. Gate 2 (September 23, 1996) permitted amateur Extra class operators to select a station callsign, followed by the Advanced class, who got their chance on August 6, 1997. About 25,000 vanity callsign requests have been processed by the FCC as of this writing.

Effective December 2, 1997 all of the remaining license classes (General, Technician Plus, Technician, and Novice) amateur operators were permitted to request a vanity callsign. This is the gate most of you had been waiting for!

If your application was received prior to December 2nd, or if you do not qualify under the standards detailed below, your application will be dismissed. Amateur Extra and Advanced class operators continue to be eligible to file for a vanity callsign under filing gates previously opened.

File your request on either, but not both, the interactive electronically-filed FCC Forms 610-V and 159 or the paper document FCC Forms 610-V and 159. Both versions are available online from the FCC's Internet Web site located at URL: <http://www.fcc.gov/wtb/amateur>.

To facilitate the processing of requests for vanity callsigns each workday, electronically-filed Forms 610-V for which the filing fee and Form 159 have been received will be processed first, followed by the document Forms 610-V and 159.

Unlike your first sequentially issued station callsign, vanity callsigns are not free. They cost money because Congress was convinced back in 1993 that amateurs would pay for a preferential callsign. It was a lone Texas amateur, working with his congressman, who got the vanity callsign provision inserted into an FCC appropriations bill. It surprised both the FCC and the ARRL! However, it took another three years of gut-wrenching controversies over how the program would be implemented before the first callsigns of choice started being issued.

The initial regulatory fee was $30 for a special callsign. One of the features of regulatory fees, however, is that they can be adjusted depending upon FCC budgetary needs and the cost of the service to the government. On September 15, 1997 the FCC boosted the vanity callsign fee to $50. While that may seem high, the fact is that an enormous amount of expensive computer programming has gone into the program. It is just not a simple case of changing a callsign in the database.

The $50 fee can be paid in two ways: either by a check or money order payable to "FCC," or by a credit card (VISA or MasterCard only). Do not send cash.

Filing For Your Callsign Electronically

The two forms that you will need are the FCC 610V, Amateur Station Vanity Call Sign Request, and the FCC 159, Remittance Advice. There are both electronic and paper versions of these two forms.

If you have a personal computer and access to the Internet's World Wide Web, you may want to electronically file your own vanity callsign application. To do this, you will use the electronic Forms 610-V and 159 located on FCC's web site at <http://www.fcc.gov/wtb/amateur>. There are also online vanity and sequential callsign system "Fact Sheets" and FAQs (frequently asked questions). You can also get general information about the vanity callsign system toll free by calling the FCC's National Call Center at 1-888-225-5322 (CALLFCC).

Using The Interactive Electronically-Filed Forms

Once you are on the web site, you can access instructions by clicking your mouse

WEB & Internet Access
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DAYTON hamvention®

May 15, 16, 17, 1998 ■ Hara Arena, Dayton Ohio

SPONSORED BY THE DAYTON AMATEUR RADIO ASSOCIATION, INC.

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- Advanced registration orders must be postmarked no later than May 1 (USA) or April 24 (Canada).
- Ticket requests that are received **AFTER** the deadline will be processed and **HELD** for pick-up at the Hara Arena box office beginning Wednesday, May 13 at 9:00 a.m.

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See our Web site for more information. (www.hamvention.org)

- **Inside Exhibit Booths**
  For an application, please Fax (937) 376-4648 or E-mail to exhibits@hamvention.org
- **Outdoor Flea Market Space**
  For an application, please Fax (937) 276-8902 or E-mail to fleamkt@hamvention.org
  Flea market spaces are sold IN ADVANCE ONLY. No spaces sold at gate!

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To be listed in our program and on our Web site, please Fax (937) 274-8369 or E-mail to info@hamvention.org

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Please type or print your name and address clearly!

	Quantity		
Admission (valid all 3 days)	_____	@ $15.00*	= $ _____
Grand Banquet	_____	@ $30.00**	= $ _____
Alternate Activities			
Saturday Luncheon	_____	@ $10.00	= $ _____
Credit Card Service Charge.	_____	@ $1.25/ticket	= $ _____
		Total $	_____

* $20.00 at door **$35.00 at door, if available

❑ ❑ _____ Call

Expiration Date: _____ Month _____ Year

Name _____

Address _____

City _____ State _____ Zip _____

Daytime Phone ( ) _____ Evening Phone ( ) _____

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button with the pointer on the highlighted portion of the item for which you need assistance. Press your <enter> key to submit your application. If you have provided the required information, the screen will prompt you with an online FCC Form 159 that you must complete, print, and mail together with the fee to Federal Communications Commission, P.O. Box 358994, Pittsburgh, PA 15251-5994. Do *not* send to the FCC's licensing facility in Gettysburg, PA. The Form 159 and the fee must be received within ten (10) days of electronically filing your Form 610-V or your application will be rejected and you will have to start all over again!

Using The Document Forms 610-V and 159

You can get these two paper forms in a number of ways. The document FCC Form 610-V is available for Internet downloading from <http://www.fcc.gov/formpage.html>. The document Forms 610-V and 159 are also available from the Fax-on-Demand system by calling (202) 418-0177 from the handset of a facsimile machine, or from the FCC's forms contractor by calling toll free (800) 418-FORM (3676). We also have a supply here at the W5YI Group for which there is no charge, but please enclose a large business-size, self-addressed, stamped envelope.

Your application package (completed paper document Form 610-V with a copy of your license attached, Form 159, and the $50 fee in a sealed envelope) must show this mailing address: Federal Communications Commission, Amateur Vanity Call Sign Request, P.O. Box 358924, Pittsburgh, PA 15251-5924. Note that the post office box number is different from the one you use to forward electronically filed paperwork!

If your application package is delivered by hand or courier, it must be prepared as described and sealed in a second, outer envelope showing this courier address: Federal Communications Commission, c/o Mellon Bank, 525 William Penn Way, 27th Floor, Room 153- 2713, Pittsburgh, PA 15259, Attn: Wholesale Lockbox Shift Supervisor. Do not use the courier address as a mailing address and vice-versa.

Requesting A Vanity Callsign

You must hold an unexpired amateur operator/primary station license grant of the proper operator class, as described below, to request a vanity callsign for your primary station. To request a vanity callsign for a club station, you must also hold an unexpired club station license grant listing you as the license trustee.

Your name and mailing address as shown on your current license grant must be correct. If your license grant has expired, or if your name or address has changed, you must first request modification of your license grant to show the correct information by filing FCC Form 610, or in the case of a club station, FCC Form 610-B. You may *only* use the 610 versions dated September 1997, since previous versions do not contain a new required RF exposure safety certification statement.

A big question is "How do you know which callsigns are available on a specific day?" There are a number of amateur licensee data bases on the Internet to roughly verify that the callsign you are requesting is not already assigned. Some of these data bases are more accurate than others.

In any event, be aware that just because the callsign is not listed in either the FCC or a third-party data base, does *not* mean that it is available! For example, callsigns generally are not available for reassignment for two years following license expiration, surrender, revocation, setting aside or being voided. And there are a number of callsign suffixes that are not assignable under any circumstances (such as callsigns having the letters SOS or QRA–QUZ as the suffix.)

This month's column is aimed at the General, Technician, and Technician Plus operator who is eligible for an available 1×3 format callsign. They may, of course, select a 2×3 format if they want. (i.e., KA1AAA). Novice class operators may choose only a Group D 2×3 callsign.

A callsign of a deceased amateur is assignable two years following death. If the callsign is still shown as active, the license grant must be deleted from the licensee database. This is accomplished by submitting a signed request for license grant cancellation accompanied by a copy of a newspaper obituary or death certificate to the FCC, 1270 Fairfield Road, Gettysburg, PA 17325-7245 prior to filing the application for a vanity callsign. Do not file for the callsign of a deceased amateur until you know the callsign you want has been deleted as an active callsign!

The FCC's autogrant system does not include review of any document, except a copy of your license, attached to Forms 159 and 610-V. The FCC cannot provide current callsign status data. You can check on the assignment status of callsigns, however, by contacting the FCC's copy contractor, International Transcription Services (717-337-1433). There is a charge for their service which is dependent upon the amount of research time necessary. A cheaper way is to use a private callsign availability service.

Since vanity callsign requests are constantly accepted, there is no guarantee that a callsign that appears to be available will be there when your request is processed by the FCC. Furthermore, new call-

signs become available every month when old callsigns are purged from the database because they have not been used for two years.

The W5YI Group offers a custom callsign availability computer disk. This $15.95 (plus $3 shipping) disk indicates every possible 1×3 callsign that is available for reassignment on a particular date. It also takes into consideration callsigns that are in the two year "gap" and those which cannot be assigned for one reason or another. We have shipped more than a thousand! If you order the disk from the W5YI Group, we will handle the filing of your vanity callsign Form 610-V application without further charge. Call 800-669-9594 for more information.

General Rules That Apply To Your Callsign Choice

You may list up to 25 callsigns in the order of your preference on the Form 610-V. The callsign must have been unassigned for at least two years. The exact prefix, numeral, and suffix must be given for each callsign. The FCC will not honor any requests stated in general terms, such as "any callsign with my initials" or "any callsign having the prefix (or suffix) —."

The first assignable callsign on the list for which the requestor is eligible will be shown on the license grant for the requestor's station and the original callsign will be vacated. The vacated call will not be available for reassignment for two years.

Should no requested callsign be assignable to the station, the original callsign will continue to be shown on the license grant. In other words, you get back your original callsign if none of your selections are available. You will be able to file for a refund of your $50 filing fee, but it takes time. It is therefore better to do it right the first time.

As a resident of the continental U.S. (determined by your mailing address) holding a General, Technician or Technician Plus license, you are eligible for any 1×3 callsign beginning with K, N, or W.

You do not have to request a callsign with a specific district numeral in the callsign. In other words, you may request a callsign in district 2 (New York, for example) even though your mailing address is in California (callsign district 6.)

Callsign group eligibility is determined by the requestor's class of operator license:

Amateur Extra—Group A, B, C, or D.
Advanced—Group B, C, or D.
General—Group C or D.
Technician Plus Class—Group C or D.
Technician Class—Group C or D.
Novice Class—Group D.

In general, a Group A callsign is one which has a 1×2, 2×1, or AA–AK×2 format. Group B includes 2×2 formats, Group C 1×3, and Group D 2×3.

Only residents with mailing addresses outside the 48 lower states may request prefixes reserved for Alaska, Puerto Rico, Hawaii, or the Pacific or Caribbean islands. These prefixes include AH, AL, KH, KL, KP, NH, NL, and NP. They too are eligible for 1×3 callsigns beginning with K, N, or W.

Getting a new station callsign is a very important event in the life of an amateur radio operator. It will become your identity on the air for life and will be more recognizable than your given name! Be sure to put a lot of thought into its selection. And be careful to follow all of the FCC guidelines when making your request. See you next month. 73, Fred, W5YI

BY GEORGE JACOBS, W3ASK

PROPAGATION

THE SCIENCE OF PREDICTING RADIO CONDITIONS

1998 Looks Like A Very Good Year!

FLASH!
CQ WW DX Contest SSB Weekend Encounters Some Storminess, But Turns Out Okay

Extensive geomagnetic, solar, and ionospheric data evaluated by early November confirms that several periods of radio storminess occurred during the CQ WW DX SSB Contest weekend. These dropped overall conditions from the expected High Normal to mostly Low Normal, with periods of both Below Normal and High Normal. Table I shows the worldwide K_p index of geomagnetic activity for both October 25th and 26th. There were nine hours of unsettled or minor storm conditions reported on both days, but with improved conditions on the 26th. Table II shows general ratings of propagation conditions observed during the contest weekend in various geographical areas of the world. Overall, propagation conditions during the 1997 WW DX SSB Contest weekend were not as good as originally expected, but conditions were still better than they have been in several years, particularly on the 10, 15, and 20 meter bands. We will have a review of the CW contest weekend in next month's column.

The new sunspot cycle, Cycle 23, is now in its second year, and it is expected to rise rapidly during 1998. According to scientists at the National Geophysical Data Center (NOAA) in Boulder, Colorado, the new year is expected to begin at a smoothed sunspot level in the low 40s, and the cycle is expected to rise to approximately the mid-80s by year's end. Table III shows the progress of Cycle 23, with predictions for 1998.

For HF propagation analysis, a sunspot cycle can arbitrarily be broken down into the following phases:

Solar Phase	Smoothed Sunspot Number Range
Low	<30
Moderate	30–60
High	60–90
Very High	90–120
Intense	>120

The recent years of low solar activity have ended and are now history. We are now in the Moderate Phase, and by the end of the year Cycle 23 is expected to enter the High Phase.

At a recent meeting of the world's leading solar scientists there was confirmation that Cycle 23 is expected to be an intense sunspot cycle, with the likelihood that its peak will reach a level of 130 or greater sometime during the year 2000. We will have more about the expected progress of Cycle 23 in an upcoming column.

11307 Clara St., Silver Spring, MD 20902
e-mail: g.jacobs@ieee.org

LAST-MINUTE FORECAST

Day-to-Day Conditions Expected for January 1998

Propagation Index.....	Expected Signal Quality (4)	(3)	(2)	(1)
Above Normal: 3, 6-7, 20-21 30	A	A	B	C
High Normal: 2, 4-5, 8-9, 19, 27, 29, 31	A	B	C	C-D
Low Normal: 1, 10-11, 14-15, 17-18, 22-24, 28	B	C-B	C-D	D-E
Below Normal: 12-13, 25-26	C	C-D	D-E	E
Disturbed: 16	C-D	D	E	E

Where expected signal quality is:

A—Excellent opening, exceptionally strong, steady signals greater than S9.

B—Good opening, moderately strong signals varying between S6 and S9+, with little fading or noise.

C—Fair opening, signals between moderately strong and weak, varying between S3 and S9, with some fading and noise.

D—Poor opening, with weak signals varying between S1 and S6, with considerable fading and noise.

E—No opening expected.

HOW TO USE THIS FORECAST

1. Find the *propagation index* associated with the particular path opening from the Propagation Charts appearing on the following pages.

2. With the *propagation index,* use the above table to find the *expected* signal quality associated with the path opening for any given day of the month. For example, an opening shown in the Propagation Charts with a *propagation index* of 3 will be fair to good (C-B) on Jan. 1st, good (B) on the 2nd, excellent (A) on the 3rd, good (B) on the 4th and 5th, excellent (A) on the 6th and 7th, etc.

Sunspot Cycle 23 Progress

The Royal Observatory of Belgium, the world's official keeper of sunspot records, reports a monthly mean sunspot number of 53 for September 1997. This was the highest level of monthly sunspot activity since January 1994. There were no spotless days during September. The high for the month was 91, reached on September 9th, and the low was 14, recorded on the 20th. September's mean value results in a smoothed running sunspot number of 14 centered on March 1997. A smoothed sunspot level of approximately 42 is expected for January 1998.

Canada's Dominion Radio Astrophysical Observatory in Penticton, B.C. reports a corresponding mean 10.7 cm solar flux level of 97 for September 1997. This results in a smoothed level of 76 centered on March 1997. A level of approximately 98 is forecast for January 1998.

Better Days Coming On The HF Bands

Here is a thumb-nail sketch of propagation conditions expected during 1998 on each amateur band between 6 and 160 meters.

6 Meters: *F-2* layer ionospheric DX openings are likely during daylight hours by the end of the year. Improved short-skip openings are expected during the sporadic-*E* summer season.

10 Meters: Asleep for the past few years, this band is expected to become wide awake during 1998 with an increasing number of DX openings during the daylight hours, especially during the equinox and winter months. Expect improved short-skip openings during the summer sporadic-*E* season.

12 Meters: Should behave very much like the 10 meter band, but open somewhat more frequently to more areas of the world, and remain open for an hour or two longer.

15 Meters: An increasing number of openings expected. It should be a very good band for worldwide DX during the daylight hours of 1998, particularly during the equinox and winter months, but also during the summer months.

Planetary K_p Index	UT 00–03	03–06	06–09	09–12	12–15	15–18	18–21	21–24
Oct. 25	5*	5*	2	4**	3	3	2	3
Oct. 26	4**	3	0	1	3	4**	3	4**

*Table I– Worldwide geomagnetic indices (planetary K_p) reported every three hours during the SSB Contest weekend of October 25–26. *Indicates minor storminess. **Indicates active, unsettled conditions. All other values indicate quiet, non-storm geomagnetic conditions.*

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 80 meter openings.

2. The propagation index is the number that appears in ( ) after the time of each predicted opening. On 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. In the Short-Skip Chart appropriate *standard* time is used at the path midpoint. For example on a circuit between Maine and Florida, the time shown would be EST, on a circuit between New York and Texas, the time at the midpoint would be CST, etc. Times shown in the Hawaii Chart are in HST. To convert to standard time in other USA time zones add 2 hours in the PST zone; 3 hours in the MST zone; 4 hours in the CST zone; and 5 hours in the EST zone. Add 10 hours to convert from HST to GMT. For example, when it is 12 noon in Honolulu, it is 14 or 2 PM in Los Angeles; 17 or 5 PM in Washington, D.C.; and 22 GMT. Time shown in the Alaska Chart is given in GMT. To convert to *standard* time in other areas of the USA subtract 8 hours in the PST zone; 7 hours in the MST zone; 6 hours in the CST zone; and 5 hours in the EST zone. For example, at 20 GMT it is 15 or 3 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
January & February 1998
Local Standard Time
At Path Midpoint
(24-Hour Time System)

Band (meters)	*Distance Between Stations (miles)* 50-250	250-750	750-1300	1300-2300
10	Nil	Nil	10-15 (0-1)	08-10 (0-1) 10-15 (1-2) 15-17 (0-1)
15	Nil	10-16 (0-1)	08-09 (0-1) 09-10 (0-2) 10-15 (1-3) 15-16 (1-2) 16-18 (0-1)	07-08 (0-1) 08-09 (1-3) 09-10 (2-3) 10-15 (3-4) 15-16 (2-3) 16-18 (1) 18-19 (0-1)
20	Nil	08-10 (0-1) 10-14 (0-3) 14-16 (0-2) 16-18 (0-1)	06-07 (0-1) 07-08 (0-2) 08-10 (1-4) 10-14 (3-4) 14-16 (2-4) 16-18 (1-2) 18-19 (0-2) 19-21 (0-1)	06-07 (1) 07-08 (2) 08-10 (4) 10-14 (4-3) 14-16 (4) 16-17 (2-4) 17-18 (2-3) 18-19 (2) 19-21 (1)
40	07-08 (0-1) 08-09 (1-2) 09-10 (2-4) 10-16 (3-4) 16-17 (3) 17-19 (1-2)	07-08 (1-2) 08-09 (2-3) 09-11 (4) 11-15 (4-3) 15-17 (3-4) 17-19 (2-3)	07-08 (2) 08-09 (3-1) 09-11 (4-1) 11-15 (3-1) 15-17 (4-2) 17-19 (3-4)	07-08 (2-1) 08-15 (1-0) 15-17 (2) 17-19 (4-3) 19-22 (4) 22-02 (3-4)
80	07-08 (1-2) 08-09 (3-4) 09-19 (4) 19-21 (3-4) 21-23 (2-1) 23-03 (1-2) 03-07 (1)	07-08 (2) 08-10 (4-2) 10-16 (4-1) 16-18 (4-2) 18-21 (4) 21-23 (3-4) 23-03 (2-3) 03-07 (1-3)	07-08 (2-1) 08-10 (2-0) 10-16 (1-0) 16-18 (2-1) 18-20 (4-3) 20-23 (4) 23-05 (3) 05-07 (3-2)	07-08 (0-1) 08-16 (0) 16-18 (1-0) 18-20 (3-2) 20-23 (4) 23-03 (3) 03-05 (3-2) 05-07 (2-1)
160	09-17 (1-0) 17-19 (3-2) 19-05 (4) 05-07 (3) 07-09 (2-1)	17-18 (2-1) 18-19 (2) 19-21 (4-3) 21-05 (4) 05-06 (3) 06-07 (3-1) 07-09 (1-0)	17-18 (1-0) 18-19 (2-1) 19-21 (3-1) 21-03 (4-3) 03-05 (4) 05-06 (3-2) 06-07 (1)	18-19 (1-0) 19-21 (2-1) 21-03 (3) 03-05 (4-2) 05-06 (2) 06-07 (1-0)

ALASKA
Openings Given in GMT#

To:	*10 Meters*	*15 Meters*	*20 Meters*	*40/80* Meters*
Eastern USA	Nil	18-20 (1) 20-22 (2) 22-23 (1)	16-22 (1) 22-00 (2) 00-02 (1)	04-13 (1) 07-12 (1)*
Central USA	20-23 (1)	19-22 (1) 22-00 (2) 00-01(1)	17-23 (1) 23-01 (2) 01-03(1)	03-14 (1) 07-12 (1)*
Western	20-00 (1)	19-22 (1) 22-00 (2) 00-02 (1)	18-20 (2) 20-01 (3) 01-02 (2) 02-04 (1)	04-05 (1) 05-12 (2) 12-15 (1) 15-16 (2) 16-17 (1) 05-12 (1)* 12-15 (2)* 15-17 (1)*

HAWAII
Openings Given in Hawaiian Standard Time#

To:	*10 Meters*	*15 Meters*	*20 Meters*	*40/80* Meters*
Eastern USA	08-13 (1)	06-08 (1) 08-12 (2) 12-15 (3) 15-16 (2) 16-17 (1)	06-08 (2) 08-12 (1) 12-15 (2) 15-16 (3) 16-17 (2) 17-19 (1)	17-19 (1) 19-21 (2) 21-00 (3) 00-03 (2) 03-04 (1) 19-21 (1)* 21-01 (2)* 01-03 (1)*
Central USA	07-09 (1) 09-12 (2) 12-14 (1)	06-07 (1) 07-08 (2) 08-13 (3) 13-15 (4) 15-16 (2) 16-18 (1)	06-07 (1) 07-10 (2) 10-13 (1) 13-14 (2) 14-17 (3) 17-18 (2) 18-20 (1)	17-19 (1) 19-20 (2) 20-03 (3) 03-04 (2) 04-06 (1) 19-20 (1)* 20-22 (2)* 22-01 (3)* 01-03 (2)* 03-05 (1)*
Western USA	09-11 (1) 11-14 (2) 14-16 (1)	06-07 (1) 07-08 (2) 08-14 (4) 14-15 (3) 15-16 (2) 16-18 (1)	06-07 (2) 07-10 (4) 10-14 (3) 14-16 (4) 16-17 (3) 17-18 (2) 18-20 (1)	16-18 (1) 18-19 (2) 19-22 (4) 22-02 (3) 02-04 (2) 04-09 (1) 19-20 (1)* 20-22 (2)* 22-04 (3)* 04-05 (2)* 05-07 (1)*

* Indicates best time to listen for 80 meter openings. Openings on 160 meters are also likely to occur during those times when 80 meter openings are shown with a propagation index of (2) or higher.

For 12 meter openings interpolate between 10 and 15 meter openings.

For 17 meter openings interpolate between 15 and 20 meter openings.

For 30 meter openings interpolate between 40 and 20 meter openings.

Note: The Alaska and Hawaii Propagation Charts are intended for distances *greater* than 1300 miles. For shorter distances use the preceding Short-Skip Chart.

#See explanation in "How To Use Short-Skip Charts" in this column.

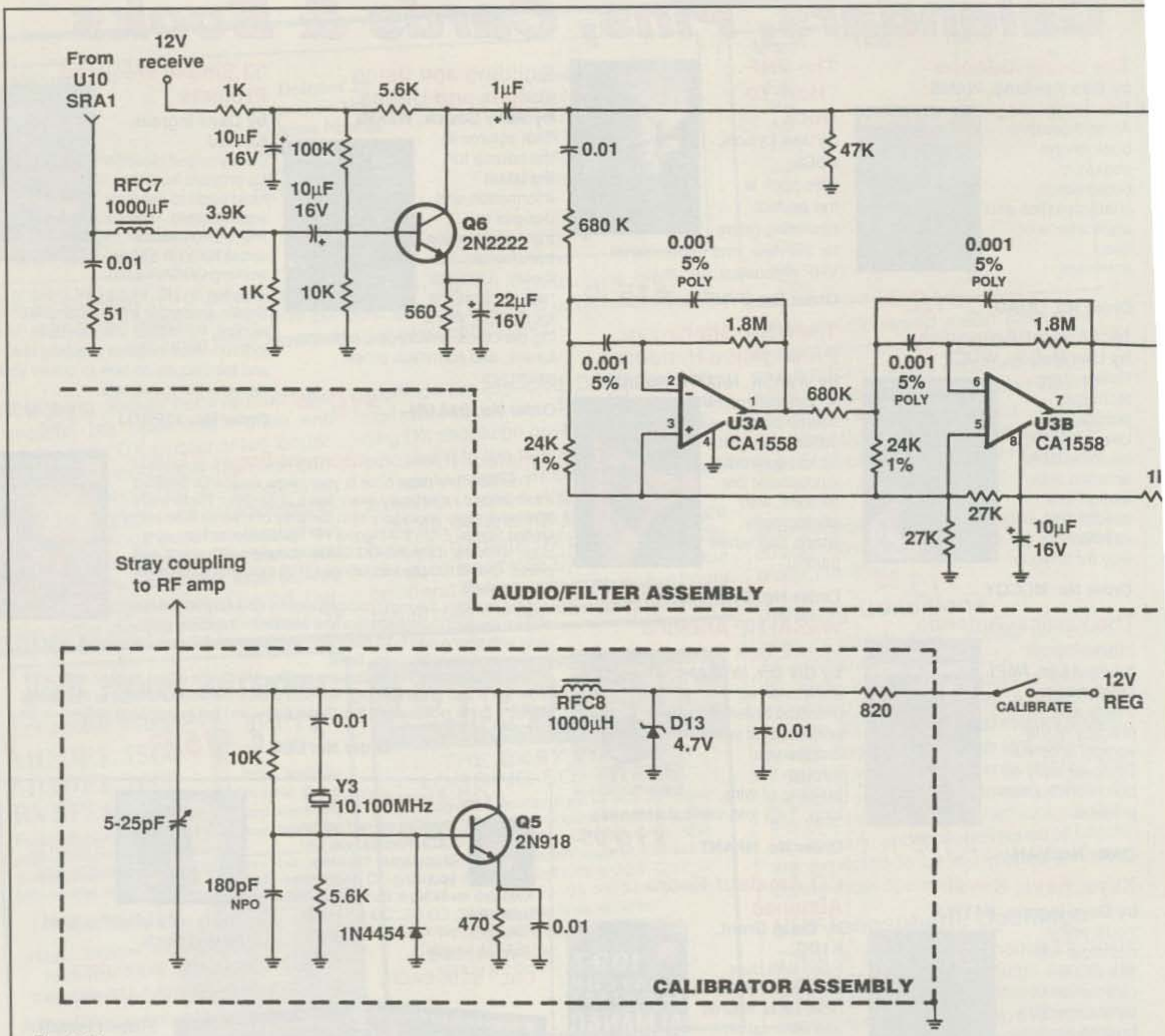


Fig. 2(B)

Parts List *(Fig. 2)*

C1, C2, C3, C6, C7: 5–25 pF miniature trimmer capacitor.
C4: 3–20 pF piston trimmer capacitor, panel-mount style, NPO.
C5: 10–205 pF broadcast-type variable capacitor, TRW 260190-5.
D1, D2, D3, D4: 3 amp, 200 PIV diode, Radio Shack 276-1143.
D5: DKV 6533, MV2113 voltage variable capacitance diode.
D6, D7, D12: 9 volt, 400 mw zener diode, Mouser Electronics 592-1N757A.
D8, D10: 10 volt, 400 mw zener diode, Mouser Electronics 592-1N758A.
D9, D11: Red LED, Radio Shack 276-026 (276-078 holder).
D13: 5 volt, 400 mw zener diode, Mouser Electronics 592-1N751A.
DS1: Miniature 12 volt pilot bulb, Radio Shack 272-1092.
FB: Ferrite bead, Palomar FB-1-43.
FL1: 1750 kHz USB surplus filter, SMC-500317 (see text).
L1: 12 turns #24 enam. spaced wire diameter, T50-6 core.
L2: 29 turns #24 enam. close wound, T50-6 core.
L3: 19 turns #24 enam. close wound, T44-6 core.
L4: 60 turns #28 enam. over wound, T44-2 core.
L5: 64 turns #28 enam. over wound, T44-2 core.
L6: 68 turns #28 enam. over wound, T44-2 core.
L7, L8: 12 turns #22 enam. close wound, T50-2 core.
L9: 17 turns #24 enam. close wound, T50-6 core.
L10: 2 turns #28 teflon insulated through BLN-68-61 binocular core.
Q1, Q3, Q5, Q17: 40820, 40822, 40673 dual-gate MOSFET.
Q2, Q4, Q11: MPF102 field effect transistor.
Q6, Q9, Q10: 2N2222 NPN transistor.
Q7, Q13: 2N2907 PNP transistor.
Q8: 2N2905 PNP transistor.
Q12: 2N2219 NPN transistor.
Q14: 2N4427, 2N3866 NPN RF power transistor.

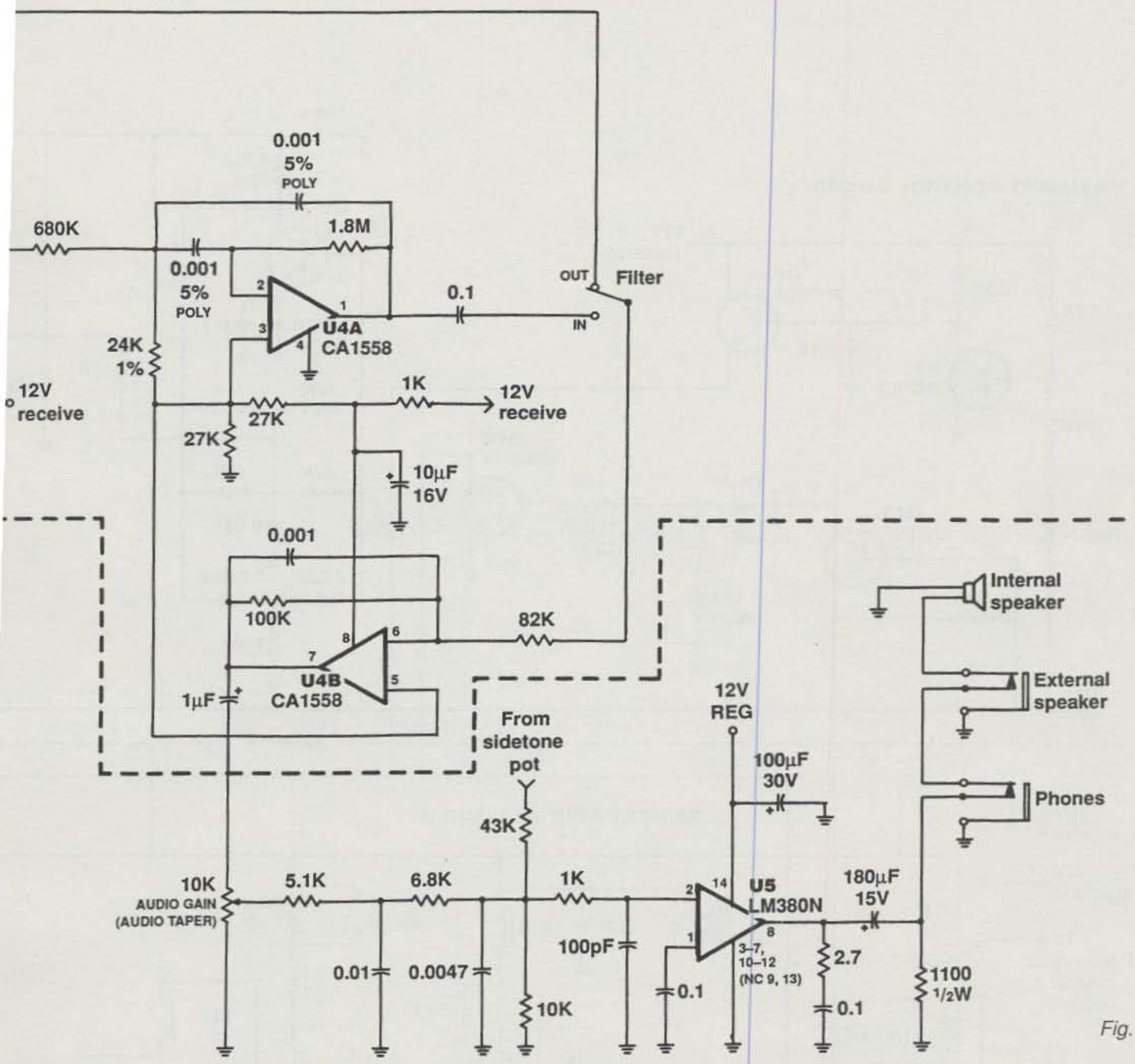


Fig. 2(B)

Q15: MRF475 NPN RF power transistor.
Q16: CP644, J309 RF junction FET.
Q18: 2N918 NPN transistor.
RFC1: 680 microHenry min. choke, Mouser Electronics 434-22-681.
RFC2, RFC3, RFC4, RFC5, RFC7, RFC8: 1000 microHenry min. choke, Mouser Electronics 434-22-102.
RFC6: 820 microHenry min. choke, Mouser Electronics 434-22-821.
RY1: 12 volt DPDT relay, 185 ohms, Allied Control T154X-862.
T1: 19 turns #24 enam. close wound on T44-6 core, sec. 3 turns.
T2, T6: 70 turns #28 enam. over wound on T44-2 core, sec. 8 turns.
T3: 64 turns #28 enam. over wound on T44-2 core, sec. 6 turns.
T4: 15 turns #24 enam. close wound on F37-61 core, sec. 2 turns.
T5: 28 turns #24 enam. close wound on T50-6 core, tap 6 turns.
T7, T8: 18 turns #22 enam. close wound on T50-6 core, sec. 3 turns.
T9: Power transformer, pri 115 volts, sec. 12.6 volts, 2 amps min.
T10: 6 turns bifilar #24 enam. on F50A-61 core, space over 3/4 of form.
T11: 9 turns bifilar #24 enam. on F50A-61 core, space over 3/4 of form.
U1: MC1590 IC amplifier.
U3, U4: CA 1558 operational amplifier.
U5: LM380 IC audio amplifier.
U6: MWA 130 RF amplifier.
U7: LM350K IC adjustable regulator.
U8: 78LO6 6 volt regulator.
U9, U10, U11: Mixer, Mini Circuits SRA-3, SRA-1, or equivalent.
Y1: 1750.00 kHz crystal, 20 pF par. resonance, 25 ppm, HC 33 holder.
Y2: 1750.70 kHz crystal, 20 pF par. resonance, 25 ppm, HC 33 holder.
Y3: 10.100 MHz crystal, fundamental mode, series res. 25 ppm, HC 18 holder.

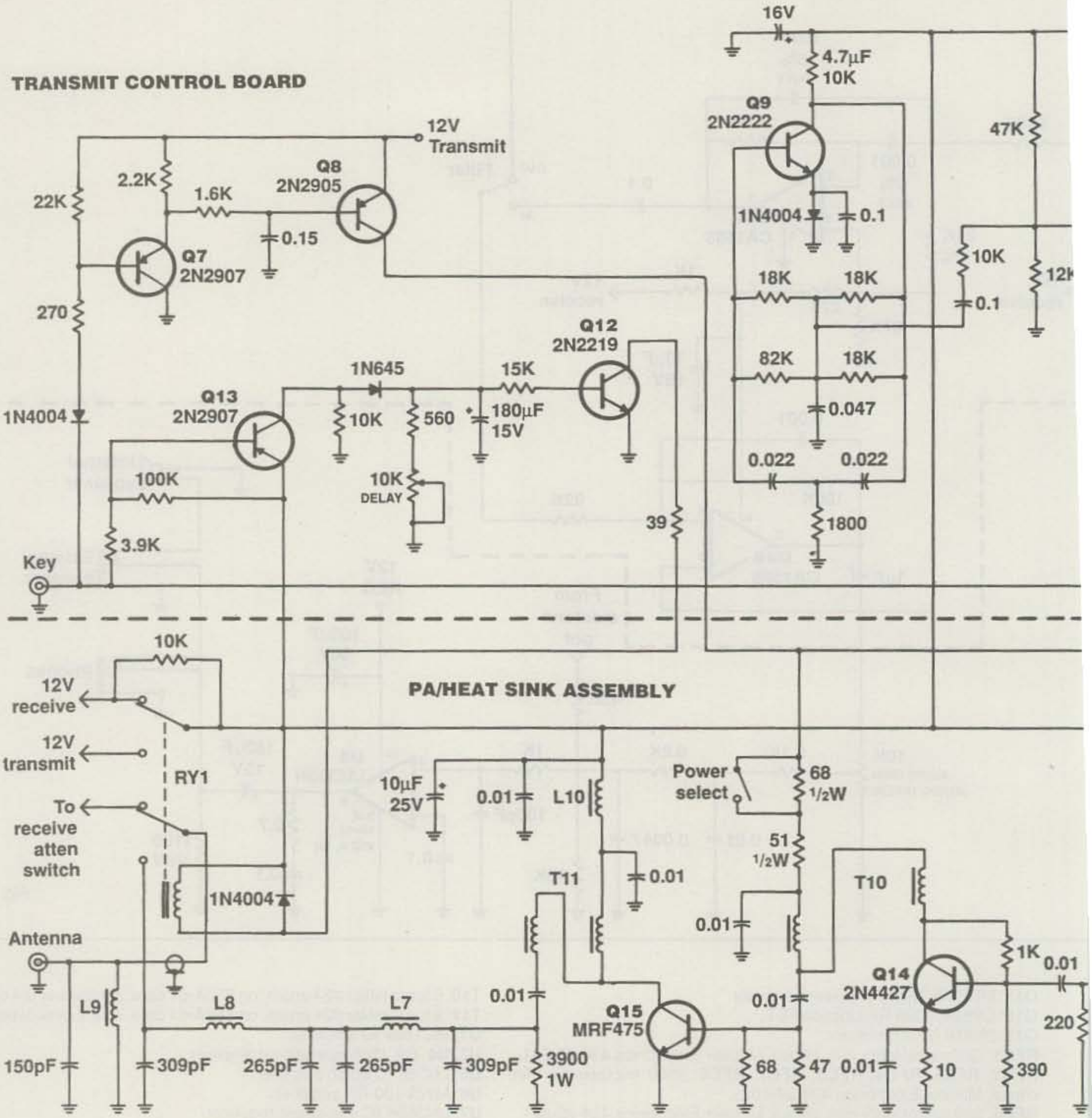


Fig. 2(C)

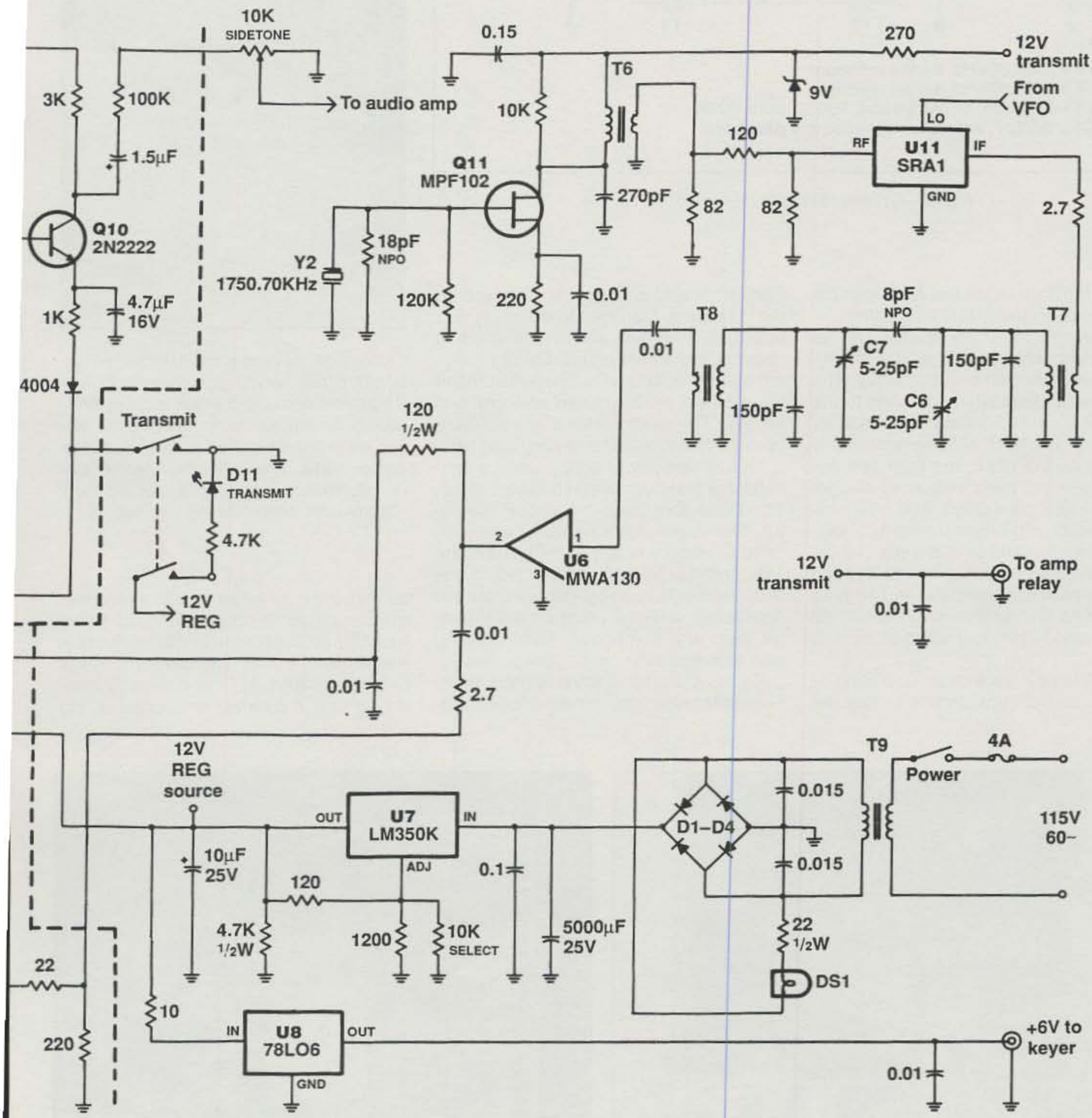
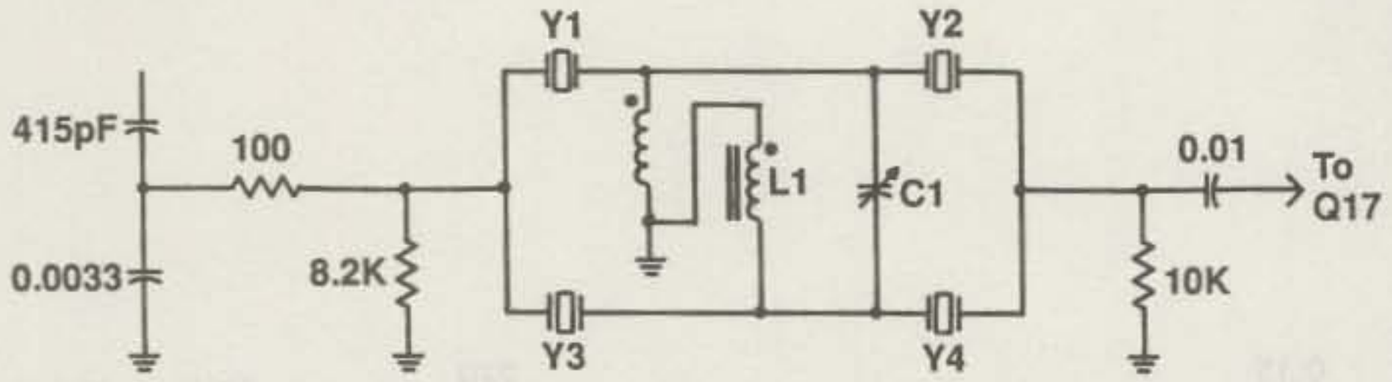

10K
SIDETONE
To audio amp
3K
100K
1.5µF
Q10
2N2222
1K
4.7µF
16V
4004
Transmit
D11
TRANSMIT
4.7K
12V
REG
0.15
10K
T6
Q11
MPF102
270pF
Y2
1750.70KHz
18pF
NPO
120K
220
0.01
9V
270
12V
transmit
From
VFO
LO
RF
U11
SRA1
IF
GND
120
82
82
2.7
8pF
NPO
T8
T7
0.01
C7
5-25pF
150pF
150pF
C6
5-25pF
120
1/2W
2
1
3
U6
MWA130
0.01
2.7
12V
transmit
To amp
relay
0.01
12V
REG
source
OUT
U7
LM350K
IN
ADJ
10µF
25V
120
4.7K
1/2W
1200
10K
SELECT
0.1
5000µF
25V
D1–D4
0.015
0.015
T9
4A
Power
115V
60~
22
1/2W
DS1
22
220
10
IN
U8
78LO6
OUT
GND
+6V to
keyer
0.01

Fig. 2(C)



NOTES:

Y1, Y4 = 1750.50KHz, series resonant
Y2, Y3 = 1750.90KHz, series resonant
L1 = 27 turns, bifilar wound, F50-61 core, #28E
C1 = 5-25pF, adjust for symmetrical passband

Fig. 3– An alternate filter design for FL1.

Fig. 4–Bottom view of main printed wiring board, which serves as a chassis. This is a double-sided board which is cut as necessary for clearance. Isolation pads are cut in the foil for use as tie points. Some components are mounted below the board, which is spaced about 3/8 inch above the bottom of the cabinet.

dered to the main PC board. A clip-on heat sink is used on the 2N4427 amplifier.

All transmit components after U6, as well as the changeover relay, are mounted on a vertical heat sink assembly. The rear panel is thermally connected to the heat sink by use of an aluminum spacer and screw. The MRF 475 final amplifier is mounted by the tab to the heat sink assembly using a mica insulating washer and heat sink compound. The heat sink remains cool with long test periods of key-down operation and over 8 watts output.

The amplifier output is routed through the low-pass harmonic filter and relay to the antenna. Output level can be switched from 4 watts (QRP) to 8 watts at the rear panel.

The sidetone generator, operating at 750 Hz, and control circuits to key the transmitter and changeover relay are on the Transmit Control Board. This PC board is mounted above the product detector/audio filter board. These boards are spaced apart and supported from the main board by aluminum spacers and screws. The sidetone level is adjustable from the panel, as is the keying hang time.

The 12 volt power supply uses a conventional transformer and bridge rectifier. The DC output feeds a LM350K regulator. The output of this regulator is adjusted to 12 volts by selecting the value of the 10K nominal resistor connected to the "Adj" terminal. The regulator is mounted on a small heat sink using a mica insulator, heat sink compound, and insulating shoulder washers.

To adjust the transceiver is not difficult. First determine that the detector oscillator is running by listening with a receiver, or monitor with a scope at the LO terminal of the product detector. Next adjust the frequency of the VFO to cover the range of 8350 to 8400 kHz. This is done by monitoring with a receiver or counter at the

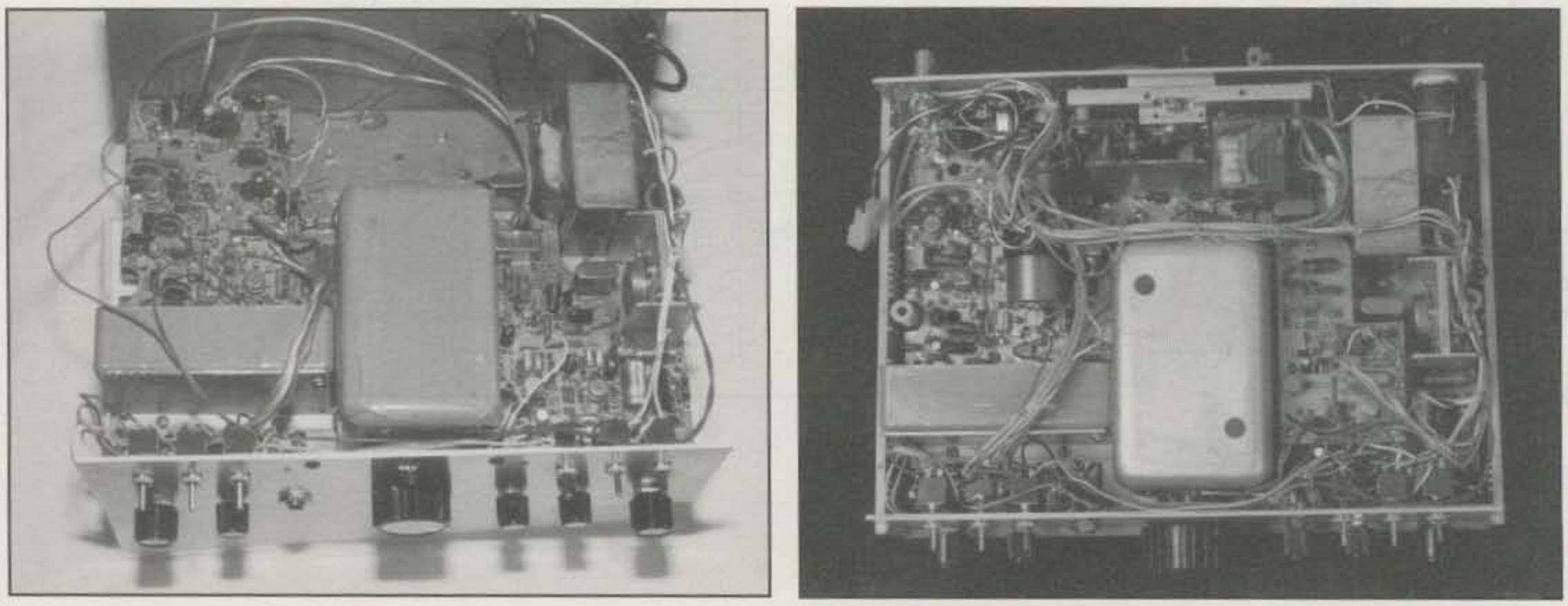


Fig. 5– (A) Top view of the transceiver during assembly. The VFO cover is temporarily protected by tape at this point. The transmitter assembly, transmit control board, and crystal calibrator are not installed in this photo. The RF/IF circuits are to the left, and the audio, regulator, and power supply circuitry is to the right. The detector, 1750 kHz crystal oscillator, and audio filter circuits are on a board which is mounted to the right of the VFO shield can. This board is supported by spacers attached to the main board. (B) The completed unit is packed fairly tight.

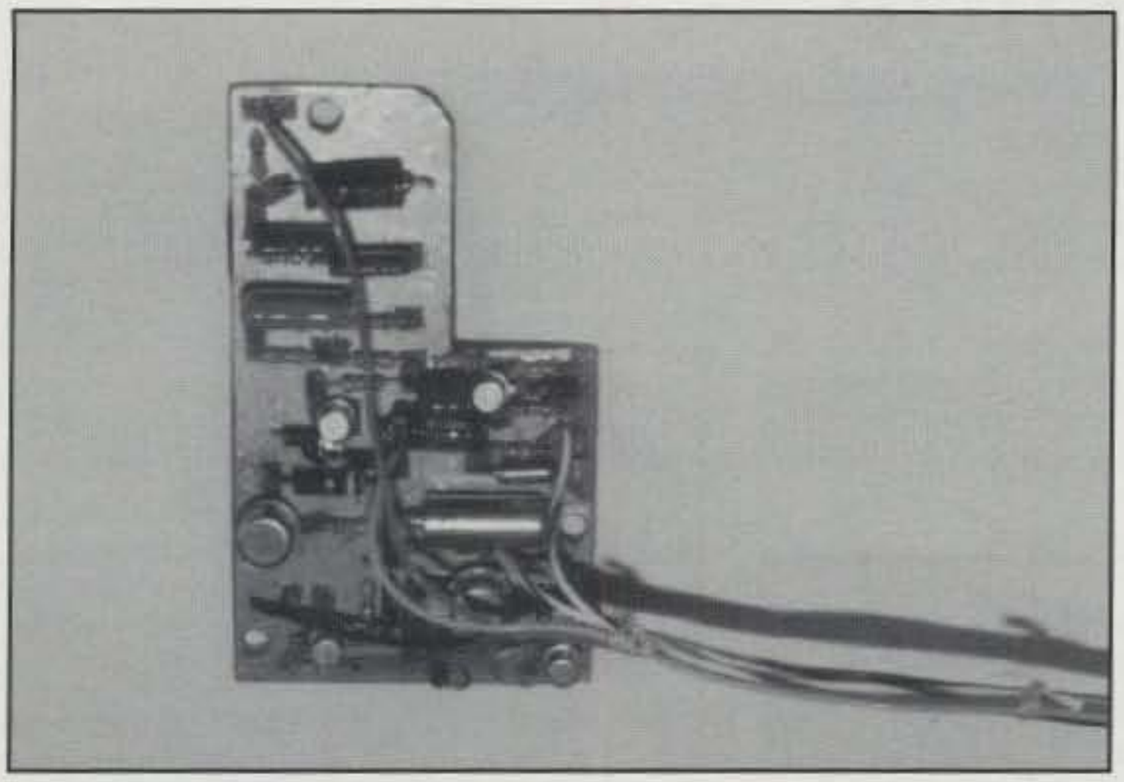


Fig. 6– Transmit control board which controls keying and transmit delay. The sidetone generator, Q9, and related components are also on this assembly. This board assembly is mounted on spacers above the detector/audio filter PC board.

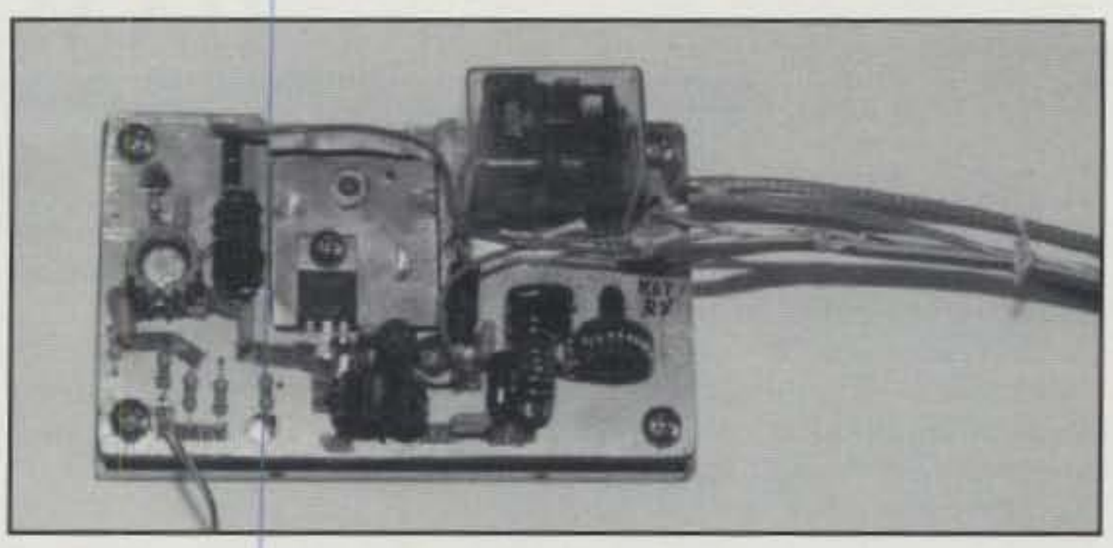


Fig. 7– Transmitter board and heat sink assembly. Q14 and Q15 circuitry is on this "U"-shaped double-sided board, as are the low-pass filter components and the changeover relay, RY1. The heat sink is 1/4 inch thick aluminum measuring 3 3/4 inches wide by 2 1/4 inches high. It is tapped on the edge for bolting to the main board. A second, smaller (1 inch by 1 1/8 inch) aluminum plate is bolted to the first, and the board is spaced away from the heat sink so the Q15 tab can be bolted to the aluminum. A mica washer, insulator, and heat sink compound are used for mounting Q15.

receiver mixer LO port. Adjust the turns of T5 slightly and adjust the piston trimmer capacitor, C4, to allow the tuning capacitor, C5, to cover the range from minimum to maximum capacity. With an on-channel signal at the antenna input, adjust C1, C2, and C3 for maximum sensitivity. You should be able to detect signals considerably below a half microvolt after alignment.

Place the unit in transmit and into a dummy load. Assure that the transmit oscillator, Q11, is functioning. Next monitor the RF output level and adjust C6 and C7 for maximum output.

Results have been gratifying, and I was surprised at the enjoyment you can have on this band using only 4 watts of output power. Many DX stations have been worked over the past year using a long-wire antenna and tuner.

I wish to thank Fred Gantzer, WØAWD, for building the dial escutcheon, and Freeze Frame Photography for the photos.

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PACKET RADIO AND MORE! Join TAPR, connect with the largest amateur radio digital group in the U.S. Creators of the TNC-2 standard, now working on Spread Spectrum technology. Benefits: newsletter, software, discount on kits and publications. $20/year US/Can/Mex; $25 elsewhere. Visa/MC. When joining, mention *CQ* and receive TAPR's Packet Radio: What? Why? How? ($12 value) FREE! Internet: tapr@tapr.org Web: http://www.tapr.org Phone: 817-383-0000 Address: 8987-309 E Tanque Verde Road, #337, Tucson, AZ 85749-9399.

RAINBOW Amateur Radio Association, the gay/lesbian ham club with active HF nets, newsletter, uncensored listserv, privacy respected.. E-mail RARA@EN.COM or mail to Dept. A, P.O. Box 191, Chesterland, OH 44026-0191.

HAM TRADER YELLOW SHEETS: Number one place to buy, sell, trade ham radio equipment for the last 36 years. Published twice a month—mailed first class. Ad deadline one week prior to mailing, which assures quick results. One-year subscription (24 issues) $18.00. P.O.B. 2057, Glen Ellyn, IL 60138-2057 or P.O. Box 15142, Seattle, WA 98115. For sample copy send #10 self-addressed envelope. E-mail: Internet: HTYS@aol.com

PHASED ARRAY NETWORKS by COMTEK SYSTEMS deliver gain and front to back. Call 704-542-4808; fax 704-542-9652. COMTEK SYSTEMS, P.O. Box 470565, Charlotte, NC 28247.

FOR SALE: CQ/Ham Radio/QST/73 magazines and binders. SASE brings data sheet. W6DDB, 45527 Third Street East, Lancaster, CA 93535-1802.

Advertiser's Index

(continued on page 107)

DX HEADING MAPS AND LISTS: W2HOJ, 800-941-2252.

FREE GUIDE "THE TEN MOST COMMON TOWER BUILDING MISTAKES": Written by well-known tower expert Steve Morris, K7LXC, this guide will help you avoid dangerous mistakes. TOWER TECH, Box 572, Woodinville, WA 98072; e-mail UpTheTower@aol.com or call 800-TOWERS8.

CLASSIC RADIOS: RadioFinder web list revised weekly: <www.radiofinder.com>; telephone/fax 1-313-454-1890; or <finder@radiofinder.com>.

B&B WITH A HAM! Enjoy hamming from Hawaii. Join those who have chased DX from beautiful upcountry Maui! (Non-smokers only, thanks.) "SEA Q MAUI," KH6SQ, call collect 808-572-7914. Or e-mail: terry.clayton@mauigateway.com

VP5 – Be DX: Newly constructed 2BR/2BA villa with rig and antennas overlooking north coast of beautiful Middle Caicos. Telephone 904-282-0158, or e-mail islands@ southeast.net

TELEGRAPH MUSEUM: http://www.chss.montclair.edu/~pererat/telegraph.html KEYS/PHOTOS wanted! Collector/Historian: W1TP/K2DCY, 11 Squirehill, North Caldwell, NJ 07006.

KENWOOD TS-520SE $350; DRAKE TR4C/AC4 $350. K1BW, 413-538-7861.

HEATH, DRAKE, MORE: Radios, manuals, parts. SWL receivers. List $1.00 and SASE. Joseph Bedlovies, P.O. Box 139, Stratford, CT 06497.

PLEASE CHECK OUT: http://www.GLR.com/dwm

MINIATURE LITTLE RED KEY and our new 1 inch high-speed paddle. Info W3MKE. Fantastic!

WANT: 8873 tube, conversion info for Heath SB230. K9ALD, 217-586-4958. **ATTENTION DXers: —"QRZ DX"—since 1979.** Your best source for weekly DX information. Send #10 **SASE** for sample/rates. **"The DX Magazine"** Bi-monthly—Full of DXpedition reports, QSL information, Awards, DX news, technical articles, and more. Send $2.00 for sample/rates. DX Publishing, Inc., P.O. Box DX, Leicester, NC 28748-0249. Phone/FAX: 704-683-0709.

HAMVENTION Updated Information on best motels, routes, and restaurants for 1998. Send $5.00 and business SASE to "Vention", P.O. Box 395, Vandalia, OH 45377-0395.

KENWOOD TS-950SDX, Digital Recording Unit, remote RM1, voice synthesizer, DSP, filters, auto ant. tuner, kKeyer, 150 watts, MOSFETs finals, sub-band receiver with filter, built-in PWR supply, mic, manuals, original box, immaculate, low hours. $2750 plus shipping. N6GO, 1409 Heartstring Court, Henderson, NV 89015. Call after 1 PM PST 702-564-5311.

ORLANDO HamCation(sm): February 13, 14 & 15, 1998. The Orlando Amateur Radio Club will hold the annual Orlando HamCation(sm) at the Central Florida Fairgrounds, 4603 Colonial Drive, Orlando, FL. Satellite workshop Friday and High Speed Code Copying Contest plus Fox Hunt on Saturday. Contact Tim Starr, AE4NJ, P.O. Box 547811, Orlando, FL 32854, or call 407-850-9258 for info. On the Web: **http://www.oarc.org/hamcat.html**

FREE Ham Gospel Tracts, SASE. N3FTT, 5133 Gramercy, Clifton Heights, PA 19018.

HEARD ISLAND commemorative T-shirts, same shirt as team is wearing on QSL card. Proceeds benefit VKØIR DXpedition. Fast order turnaround in time for Christmas. Personal checks on U.S. banks okay. Please no credit cards. Sizes remaining: large, extra-large, XXXL. 100% cotton, U.S. made. $20 Priority Mail stateside, $25 DX Air Mail, postage included. Tom Anderson, WW5L, 3505 Cliffwood Drive, Bedford, Texas 76021-2043 (phone 817-498-2820; e-mail WW5L@gte.net).

INTERNATIONAL RADIO now has filters for YAESU FT-920, 1000-MP, and other recent models: 400 Hz CW, 2.1 kHz SSB—with drop-in installation! We now also carry COLLINS FILTERS for Yaesu radios: 500 Hz CW, 2.5 kHz SSB, or 6 kHz AM. Phone: 541-459-5623 Tues.–Sat. Fax any time 541-459-5632. E-mail inrad@rosenet.net or see our new catalog and order directly off the web: http://www.qth.com/INRAD

HEATHKITS WANTED: Premium Prices paid for unassembled Heathkits. Rob, W3DX, 804-971-6812 evenings or e-mail Robcap@aol.com

DP-8 Multiband Antenna contains 8 full-size dipoles for 3.5–148 MHz. $139 plus $8 shipping. Morse Code Computer Interface with CW Filter $69.95 plus $3 shipping. Free Catalog. Dynamic Electronics, Box 896, Hartsells, AL 35640 (phone 205-773-2758; Fax 773-7295; web http://www.hsv.tis.net/~dei).

CONTEST STATION FOR RENT: Chalet 9,000 ft. in Colorado Rockies. Two-element, 40 meter beam @ 85 ft., 8-element log periodic @ 50 ft., slopers on 75. TS930SAT and Alpha. WØLSD, Ken, Box 156, Buena Vista, CO 81211 (telephone 719-395-6547; e-mail diverken@chaffee.net

OVER 2500 DIFFERENT DX AWARDS from 122 DXCC countries listed. K1BV DX Awards Directory. Put your QSLs to work for you! $21 postpaid. Ted Melinosky, 65 Glebe Road, Spofford, NH 03462-4411. http://top.monad.net/~k1bv

TiCK Keyers! TiCK-2 chip $10, kit $21 ppd. Send SASE for more info. Embedded Research, P.O. Box 92492, Rochester, NY 14692. http://www.frontiernet.net/~embres or e-mail embres@frontiernet.net

PICTURE QSL CARDS of your shack, etc., from your photo or black ink artwork. 500 $28.00, 1000 $44.50. Also non-picture cards. Custom-printed cards, send specifications for estimate. Send 2 stamps for illustrated literature. Generous sample kit $2.00, half pound of samples $3.00. RAUM'S, 8617 Orchard Road, Coopersburg, PA 18036. FAX or phone 215-679-7238.

WANTED: Western Electric Audio Equipment. 1927–1960s. Amplifiers, mixing boards, microphones, preamps, speaker parts, tubes, etc. Call 1-800-251-5454.

SX88 Hallicrafters receiver wanted. Jim, W6OU, 714-528-5652.

QSLs FROM TPI: New Designs, Full Color, Satisfaction Guaranteed. SASE for brochure. TPI, 1660 State Road, Cuyahoga Falls, OH 44223 (telephone 330-929-2288).

RF TEST TECHNICIAN for Arizona manufacturer. Minimum 2 years experience required in testing/trouble-shooting RF and digital circuits to component level. $11-15 hourly, depending upon qualifications and experience, plus full medical/dental. Call (520) 634-7828 or send resume to Kachina Communications, Inc., P.O. Box 1949, Cottonwood, AZ 86326

Advertiser's Index *(cont'd)*

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Let me know what I can do to help.
Arnie Sposato, N2IQO
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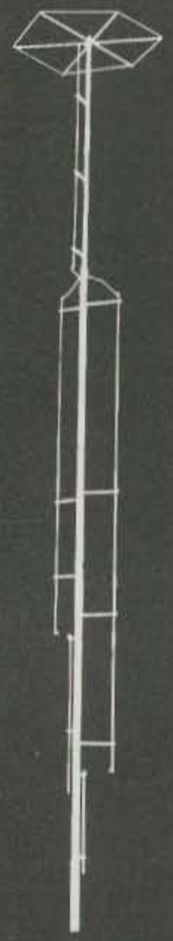
e-mail:arniecq@aol.com

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.

Eagle DX

Challenger DX



Voyager DX

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

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

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

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

The secret is out and people in the know say:

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

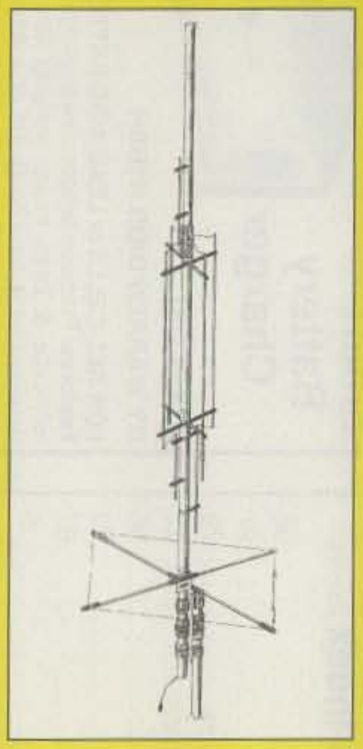
73–"This is a real DX antenna, much quieter than other verticals."

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

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

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

Latest Release: **TITAN DX**



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

MODEL	BANDS OF OPERATION											HT	WT	MOUNT	COUNTER-POISE	COST
	2m	6m	10m	12m	15m	17m	20m	30m	40m	80m	160m					
Challenger DX	■	■	■	■	■		■		■	■		31.5'	21 lbs	Drop In Ground Mount	3 Wires @ 25'	$259
Eagle DX			■	■	■	■	■		■			21.5'	19 lbs	1-1/4" pipe	80" Rigid	$269
Titan DX			■	■	■	■	■	■	■	■		25'	25 lbs	1-1/4" pipe	80" Rigid	$299
Voyager DX							■		■	■	■	45'	39 lbs	Hinged Base	3 Wires @ 57'	$399

GAP ANTENNA PRODUCTS INC.
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Vero Beach, FL 32967

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2m/70cm Mobiles **FT-2500M/FT-7400H**

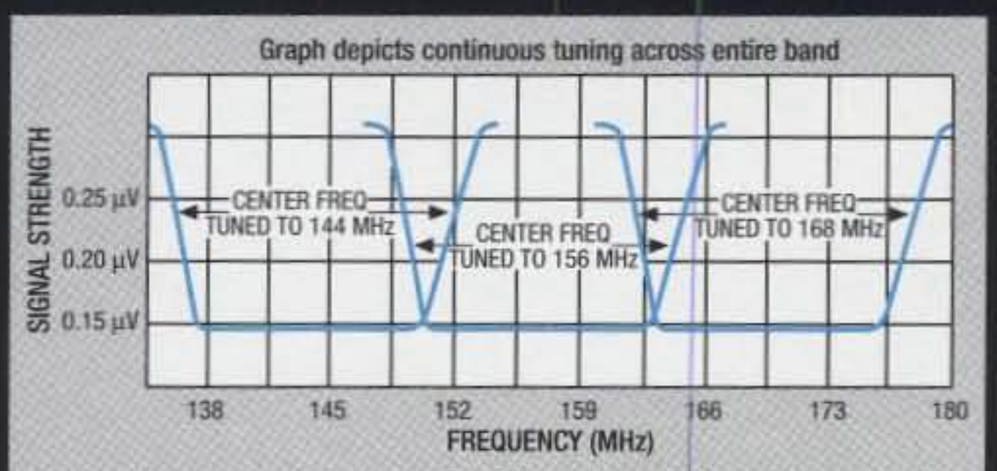
Advanced Track Tuning, Mil Spec, true FM. All in one radio!

Outside, you can easily see why the FT-2500M stands up to the shock and vibration like no other. We engineered the first mobile radio to meet the rigid standards set by the U.S. Military back in the '80s, and that same critical design is in the FT-2500M. From the simplified front panel, rubber coated knobs, durable pebbled finish coating, and huge Omni-Glow™ display to the one-piece die-cast chassis, the FT-2500M can take whatever you throw at it!

Inside, the electrical circuitry meets standards so uncompromising the FT-2500M can respond like no other radio. Built-in 3-Stage Advance Track Tuning (ATT), automatically retunes from 140 to 174 MHz permitting consistent receiver sensitivity across the entire band.

But there's more. Like alpha-numeric display capability! Lets you program a frequency or a 4-character name on any of the 31 memories. With three selectable power output levels and up to 50 watt power output, the FT-2500M extra large heat sink means forced air cooling is not necessary. And, as a bonus, Yaesu's exclusive backlit DTMF mic comes with every FT-2500M.

Experts say the FT-2500M is the only commercial-grade amateur radio available. So, for tough manufacturing standards, inside and out, with true FM clarity, and outstanding performance, the FT-2500M is your mobile.



3-Stage Advance Track Tuning (ATT) – The exclusive 3-Stage Advance Track tuning front end automatically adjusts band width sensitivity across the entire receiver range, while maintaining selectivity specifications. ATT significantly reduces interference from inter-modulation and front end overload.

Specifications

- **Frequency Coverage:**
  FT-2500M
  RX: 140-174 MHz
  TX: 144-148 MHz
  FT-7400H
  RX/TX: 430-450 MHz
- Rugged Military Spec Design
- Advanced Track Tuning (ATT)
- Selectable Alpha-Numeric Display
- Omni-Glow™ Display, largest available
- Power Output:
  FT-2500M 50/20/5 Watts
  FT-7400H 35/15/5 Watts
- Flip Up Front Control Panel hides seldom used buttons
- Backlit DTMF Mic
- 31 Memory Channels
- CTCSS Encode Built-in
- Automatic Power Off (APO)*
- Time-Out Timer (TOT)*
- Manual* or Automatic Backlighting Adjustment
- **Accessories:**

FP-800	20 Amp HD Power Supply w/ Front Mounted Speaker
FRC-6	DTMF Paging Unit
FTS-17A	CTCSS Decode Unit
SP-4	External Mobile Speaker w/ Audio Filters

*FT-2500M

YAESU

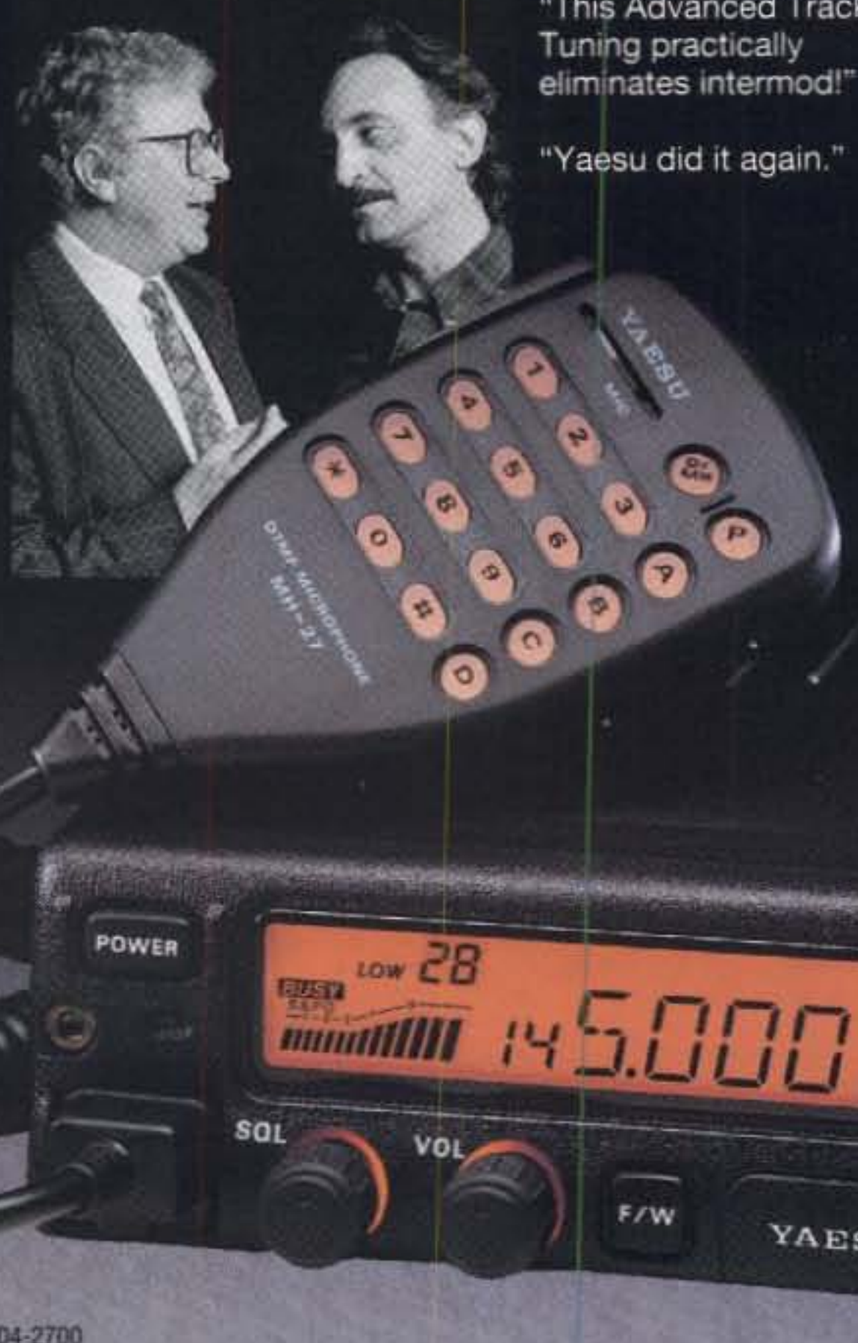
Performance without compromise.℠

"Just look inside. Military spec really means something to Yaesu!"

"A QST review says 'the FT-2500M exhibited superior 10 MHz offset IMD dynamic range of 103 db!'"

"This Advanced Track Tuning practically eliminates intermod!"

"Yaesu did it again."



FT-3000M

High-Powered 2-m FM Transceiver
Feature-rich, 70 full watts of TX power, and built to the tough performance standards you've come to expect from Yaesu.
FEATURES • Frequency Coverage Wide Band Receive-- RX:110-180 MHz, 300-520 MHz, 800-999 MHz* TX:144-148 MHz • AM Aircraft Receive • MIL-STD 810 Rating • Interactive Programming • High Power Output: 70 Watts, plus 50, 25 and 10 Watts • Quick-Touch™ Dual Concentric Control Knob • Twin Cooling Fans • ADMS-2 Windows™ Programmable • Digital Coded Squelch (DCS) • 81 Memory Channels • Auto Range Transpond System™ (ARTS™) • 1200/9600 Baud Packet Compatible • Smart-Search™ • Alphanumeric Display • Dual Watch • Full line of accessories
*800 MHz Cellular blocked

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

3 Filter Selections Right on the Front Panel

For SSB: wide (2.8 kHz)*, medium (2.4 kHz), narrow (1.9 kHz)*

For CW: wide (2.4 kHz), medium (500 Hz)*, narrow (250 or 350 Hz)*

The IC-706MKII comes with 2.4 kHz and 8 kHz filters already installed. An asterisk (*) means that the filter is optional equipment available from your ICOM dealer.

ICOM IC-706MKII

Base station performance with mobile-sized versatility

The ICOM IC-706MKII HF/VHF all mode transceiver is a powerful combination of next generation technology and ICOM's time-tested craftsmanship. Whether you use the IC-706MKII for base station activity, for mobile operations or on DX'peditions you can't go wrong.

Compact Design

Extremely small and compact, this radio packs all of the features of a top class HF rig in a mobile-sized unit.

- Dimensions: 167(w) x 58(h) x 200(d)mm (6-9/16 x 2-9/32 x 7-7/8 inches)
- 2.5 kg (5.5 lbs)

HF+6M+2M

Cover all modes (SSB,CW,RTTY,AM and FM) from HF to 6 meters AND 2 meters. A powerful 100 watts of output power on HF and 6 meters with 20 watts on 2 meters.

Easy Operation

Switch bands with the touch of a button! The individual band change keys provide quick and easy QSY – the SUB DIAL for easy second VFO operation and RIT adjustment control. Each band stores pre-amp/attenuator and tuner ON/OFF settings.

Other Great Features:

- Enhanced 0.03-200 MHz broadband all mode receive
- Slots for 2 optional crystal filters
- Quiet Thermally Controlled Cooling Fan
- Crossband Split Operation
- Superior Transmit Audio Characteristics
- Large Speaker
- Tone Squelch (option UT-86 required)
- New 350 Hz RTTY Filter (opt.FL-232)

- Detachable Front Panel (Option OPC-581 required)
- "S" menu for quick access to 3 bands
- Built-in CI-V serial communications port
- Spectrum Scope
- IF Shift
- Narrow-FM
- 102 Memory Channels with Alphanumeric Display
- Large Dot-Matrix Display
- Optional UT-102 Voice Synthesizer
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- Optional PS-85 DC Power Supply
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