ICD 08241

Amateur Radio

CQ

SERVING AMATEUR RADIO SINCE 1945

NOVEMBER 1997

In This Issue:

- **Get Ready for Rising Sunspots: W6SAI Builds 10 and 15 Meter Antennas (page 48)**
- **Update An Old Heathkit Warrior Amplifier (page 30)**
- **DXpedition to Nauru, C21BH (page 9)**
- **CQ Reviews: The Alinco DX-70TH HF/VHF Transceiver (page 18) and The Ten-Tec 1208 6 Meter Transverter (page 36)**
- **WW II Radios of the Rising Sun (page 22)**
- **CQ 1997 WPX SSB Contest High-Claimed Scores (page 34)**

U.

n the cover: Bud Foster, K4ISV, Leitchfield, KY

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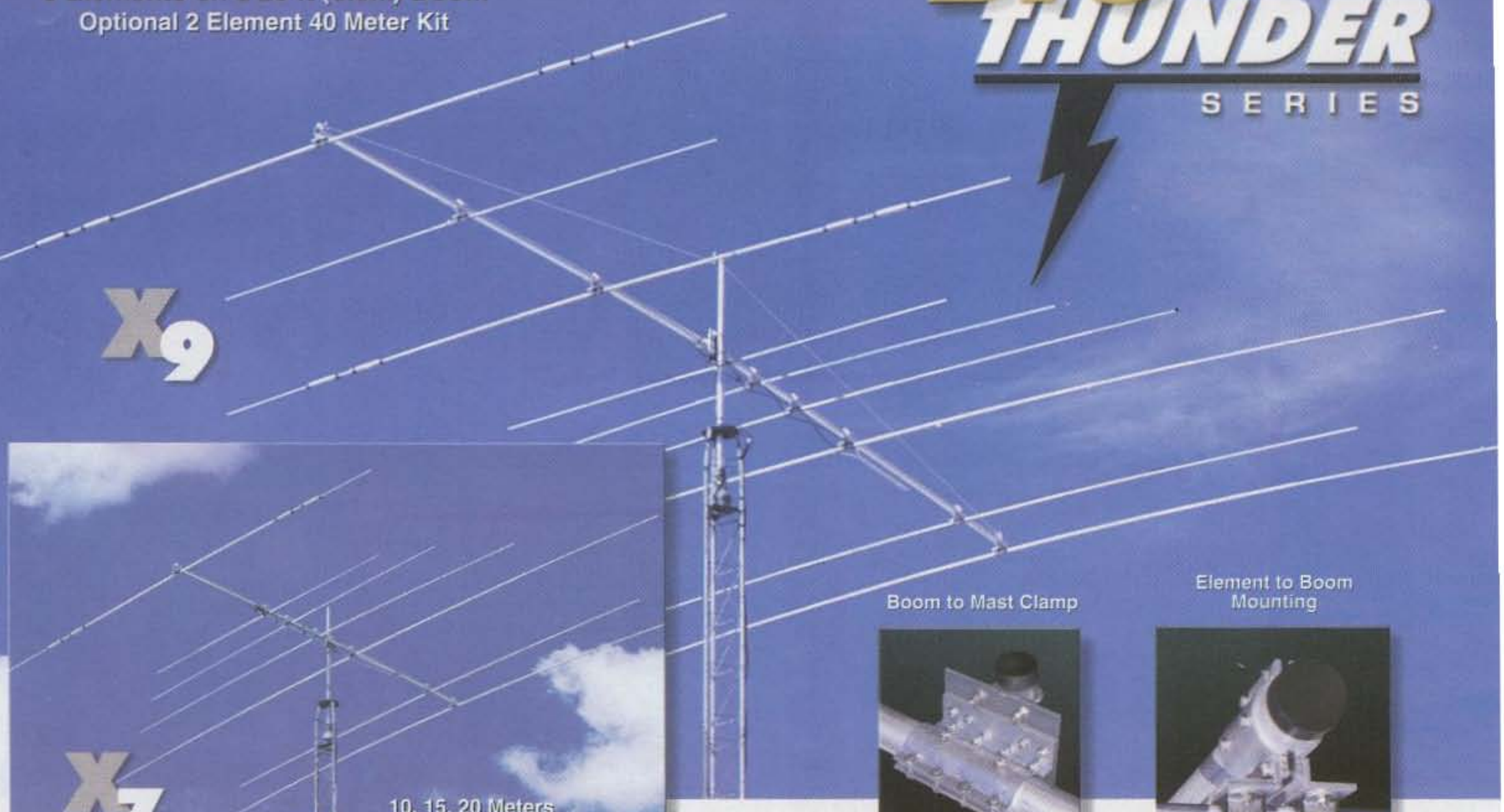
THE RADIO AMATEUR'S JOURNAL

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

BIG THUNDER SERIES

X9



X7

10, 15, 20 Meters
7 Elements on an 18 ft (5.5m) Boom
Optional Driven Element for 40 M

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**

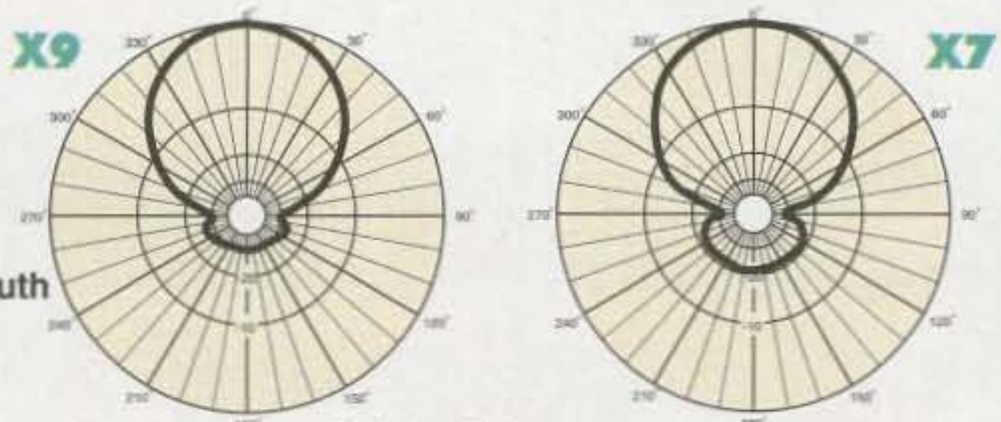
The new X9 and X7 Triband Yagis are geared to set new standards in both radiating performance and mechanical reliability. Cushcraft's product development team has employed the latest computer modeling technology to achieve a superior electrical design as well as elegant new mechanical hardware and assembly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

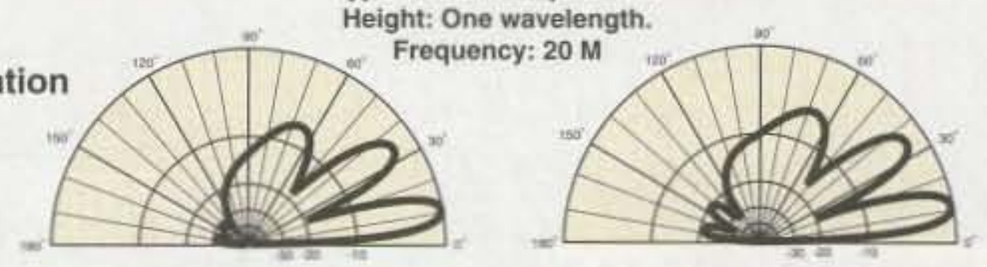
X9 X7

Azimuth



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

Elevation



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HF Radio Is a Whole New Ball Game

The Affordable Desktop HF Transceiver Is Here!

Alinco DX-77T

Loaded with features and packed with performance!

Alinco, Amateur Radio's Value Leader℠, has done the unbelievable. The DX-77T is a design achievement that puts a new HF desktop transceiver within your reach, at a low Alinco price! And this is no "bare bones" radio, nor is it a converted "channelized" adaptation. The DX-77T was designed from the beginning to be a quality Amateur Radio, full of features to enhance its performance and your enjoyment. Get ready for those great propagation days ahead...get a DX-77T!

- **Transmits on all HF U.S Amateur Bands, 10 ~ 160 Meters SSB, CW, AM, FM and Data**
- **General coverage receiver 150 KHz ~ 30 MHz, all modes**
- **100 watts output SSB, CW and FM, 40 watts AM**
- **Built-in speech processor**
- **Front panel mounted speaker with loud, clear audio**
- **Front panel jacks for convenient connections of key, headphones, external speaker and microphone**
- **QRM/QRN reduction with IF shift, standard CW audio filter and RF attenuator**
- **Built-in electronic keyer, adjustable from 5 ~ 50 wpm**
- **Full QSK, 7-step Semi Break-In operation or Auto Break-In CW modes**
- **100 memory channels, each stores mode, split, frequency, AGC, RF attenuation or gain**
- **Computer control with optional ERW-4**
- **Front panel CTCSS tone access for 10 Meter FM operations (50 tones)**
- **Two VFOs plus Memory operation mode**
- **Rear panel connectors for external amplifier, antenna, power, computer control/cloning**

Options

EDX-1 manual antenna tuner
EDX-2 auto antenna tuner
ERW-4 personal computer interface
EMS-14 desktop microphone
EDS-5 microphone extension cable
DM-340MVT DC regulated power supply


EDX-2


DM-340MVT

The DX-77T represents the quality, performance and value you've come to expect from Alinco!

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Ask your dealer about Alinco's 2-year extended warranty program

CQ Amateur Radio

NOVEMBER 1997 VOL. 53, NO. 11

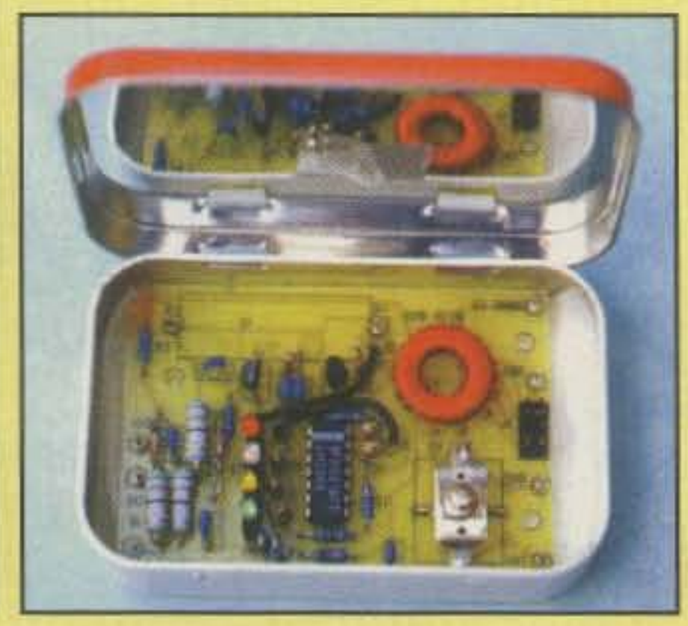
FEATURES

page 88

DEPARTMENTS

page 22

page 66



ON THE COVER: Bud Foster, K4ISV, Leitchfield, KY. (Photo by Larry Mulvehill, WB2ZPI)

Best Performance... Best Size...Best Price!

NEW! Sky Command Operating System (See your dealer for details)

Kenwood makes Digital Signal Processing technology available to everyone with the all-new TS-570D and TS-570S. Imagine a DSP radio that you can operate in the shack, the car, or on a remote DX island. These are the first DSP rigs that meet the needs of today's HF operator within a budget. From the first moment that you hear the incredibly clear and powerful audio and operate the new, common-sense ergonomic design, you will realize the TS-570D or TS-570S is the HF rig built for you.

The TS-570D and TS-570S offer the world's first CW AUTO TUNE feature which enables automatic zero-beating for CW operation. Advanced Kenwood design and features coupled with traditional Kenwood HF performance make the TS-570D/570S a masterpiece that you can proudly operate. If you have been waiting for a new DSP HF radio with performance at an affordable price, wait no more.

- **The RCP-2 Radio Control Program also allows the HF operator to design and program multiple radios with custom settings while conveniently saving them to a PC file for future use.**
- **Kenwood's Sky Command System option allows you to operate your TS-570D, TS-570S or TS-870S remotely with special version Kenwood TH-79ADH handhelds.**

Large LCD display features a 4-stage dimmer while the **7-digit alphanumeric sub-display** provides menu mode guidance, split frequency display and digital filter selection options. Easy-to-read **S/PWR/COMP/SWR/ALC** meters and an operating guidance feature help to greatly simplify operation.

16-bit DSP technology delivers superb audio quality on both transmit and receive. **Noise reduction** (line enhancer method and SPAC), **audio equalization** (voice/transmit equalizer and speech processor), **slope tuning** and **automatic IF filter bandwidth selections** can be operated with a touch of a button.

Power output can be set between 5 ~ 100 watts in 5 watt increments. 5 watt setting is ideal for QRP operation.

Preset auto antenna tuner with 22 sub-bands from 1.8 MHz - 30 MHz including 6M and memory for both antenna ports.

10-key direct frequency entry

World's first CW Auto Tune enables automatic zero-beating for CW operation.

Quick memory provides five channels for on-the-fly frequency control: **M.IN** stores data, **MR** recalls it.

Electronic keyer provides speed settings of between 0 and 100 wpm and dual key inputs on the back – one for the paddle and one for the key.

Menu system offers 46 types of functions to assist novice thru extra class operators.

A wealth of scanning capabilities enhance operability. Scan speed is variable and can be set for time-based or carrier-based resume. Scanning can work across channels, groups of 10 channels, all except locked out channels, or it can be programmed to scan a frequency range between two channels.

• Mobile/fixed station size (10-5/8 x 3-3/4 x 10-11/16 in) • Heavy-duty design • CW message memories
• CW reverse mode • Full break-in and semi break-in • High-speed 57600 bps PC control • Dedicated packet port

TS-570D / TS-570S

HF Transceiver HF + 6M Transceiver

With a half century of engineering and design experience to draw upon, Kenwood is changing the future of HF communications technology. High quality TX-RX audio reproduction with extremely effective DSP interference reduction delivers pleasing performance to your ear and over the air. You will also enjoy the large, easy-to-read LCD display with a built-in on-screen operator guidance system for simple operation. Features like 10-key direct frequency entry with new "soft-touch" keys, auto-antenna tuner, 100 to 5 watt for QRP operation, variable scanning speed, built-in CW keyer, ANT 1-ANT 2 ports, IF shift control, RS-232C com-port, 100 memory channels, CW reverse, optional VS-3 voice synthesizer and DRU-3A digital recording unit make the TS-570D or TS-570S the radio for you.

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ZERO BIAS

AN EDITORIAL

Old ways die hard, kicking and screaming, to the bitter end. But the end comes, just as the sun rises each day and change happens, sometimes incrementally and barely noticeable and sometimes simply with the stroke of a pen. To have any particular niche in the universe stand still, never change, and remain immutable forever invites the distinct possibility of being overtaken by events, technology, and changing social requirements—in other words, extinction.

We're all involved in a great hobby/service (or whatever you want to call it) that's in a phenomenal state of flux. Perceived assaults on our hobby and spectrum used to come one at a time, spaced out sufficiently to allow for an analytical pursuit of redress. These days the attacks are more numerous, better organized, and by far better financed by both large organizations and by our own governmental representatives. It's not just Little Leo with his voracious appetite or the recent scanner/monitoring debacle; it's a whole umbrella effect of fragmented, chipping-away movement that may not concern each of us directly, but in reality shows how vulnerable we all are when eventually it's our turn.

There are growing industries out there, unheard of ten years ago, with an insatiable need for spectrum and space to expand. One group has already petitioned for total relief from any and all local or state zoning regulations with regard to communications towers. They have more money to throw at this one project than any amateur group or organization could muster as an operating budget for a whole year. A short-sighted view is that we could ride their coattails should they make headway, and by extension get some small benefit for ourselves. The longer view is to wonder what else could become negotiable that wouldn't benefit us at all—in fact, just the opposite.

Do we look at the word *flux* as used above and try to really see the changes taking place, or do we ignore it and simply conjure up an image of a little metal can filled with some amber-colored goop that's used for soldering? It's akin to readers who write asking why the amateur radio magazines don't have the same type of building projects that used to run in the 1950s and '60s. Yes, I know that those projects helped to motivate us to get started and advance in amateur radio, plus gave us some competitive gear to use at a reasonable price. The technology was relatively simple, and for the most part all that was needed was a VOM and a VTVM to get anything working. Today you'd be hard pressed to get a replacement T for your VTVM. We all publish some projects, but most are not that suitable for a beginner with little or no experience, test equipment, and a number of specialized tools. While we may advocate for the system and world of our youth as a means of reaching today's equivalent, the truth is that 30 or 40 years have passed, and most of us cannot or will not repair our own transceiver should it break down. Little by little we've gotten very used to a certain level of "store bought" technology that we accept as normal or even minimal to our needs and that neither we nor a rank beginner could begin to duplicate today. Even the simple QRP rigs that we tout have become more and more complex and sophisticated, with far more features available than anything described in the 1950s and '60s.

The greatest tabu and the one area we won't truckle with is the CW requirement. Not only does this involve tradition, but also the great belief in the plot that all of this strictly involves money. These fixations keep us on the straight and narrow path of self-righteousness and salvation. Well, tradition is an important thing. This past summer, after 130 years, the British Navy gave up the use of visual Morse Code. No new operators will be trained. The masthead lights will remain dark and gradually will be decommissioned as ships are refit. However, they will keep the Aldis lights on the bridge as sort of a monument to tradition.

Last week I received a letter from a reader who adamantly stated that the no-code license was in fact a *sub rosa* plot by *CQ* and the ARRL to make money. Well, we all know how many large firms have come rushing to the amateur radio industry these past few years and have grown into financial giants. In the 1950s and '60s (the favorite time period of a lot of people) there were 200 to 300 amateur radio dealers throughout the country, and we all know how that number has shot up dramatically to about 50 today. Best of all, we're sort of envious of all those people trying to scratch out a living in the amateur radio industry who made it to the Forbes top 400 list. Apparently, the only reason people have left or leave the industry is they have made far too much money and want to rest up for a while.

Nostalgia is a wonderful place to visit, and part of its charm is the inability to live there anymore. It's not quite a loss of innocence, but it certainly is a better place, pristine and infinitely happier. What was, was simpler, well defined with clear-cut rules and no natural predators. It's the stuff dreams and Disneyland are made of, a world that should be, but isn't.

Nearly 200 years ago, a man in England named Ned Ludd faced the same dilemma when confronting the industrial revolution. Neither he nor the movement named for him could stop the inevitable. We're in that same precarious position now, sort of looking over the horizon and not liking what we see. We have these ineffable feelings about things over which basically we have no control and which are changing, so we'll kick and scream and try to stay in the same spot for as long as possible.

In the meantime new industries will be born, and new technologies will be developed which require more and more spectrum for "the common good." There will be more and more legislation protecting commercial interests from having to build equipment that is not prone to picking up RF interference or having to be encoded to ensure security. It's far easier and cheaper to blame and censure the hobbyist than it is to force some sort of compliance. If we appear vulnerable at this stage of our history, maybe it's because we are. Today there are a lot more people with a lot more money who would like what we have.

Let's face it: Little Johnny or Jane is not too likely to embark on a surface-mount technology project any more than we are. We might rationalize that if need be we could, but we'd have to hire Johnny or Jane anyway with his or her young eyesight to see the parts for us.

Years ago when I first started writing editorials, I commented on the anomaly whereby amateur radio magazines routinely ran articles on how to build things which in a sense were available off the shelf from people advertising in the same issues. Everyone accepted that condition as a given and normal. Then there was very little difference between the technology involved in a homebrew transmitter and a store-bought one. If you had the patience and some basic skills, you built whatever it was. Those subtle differences widened into an abyss of solid-state technology and manufacturing techniques that the basement workbench couldn't handle anymore. Looking back, another anomaly stands out. When it was much easier to build our own equipment, there was also three or four times the number of major equipment manufacturers, including a very viable domestic industry. No, I don't have a simple answer as to why, except that a great portion of our domestic market refused to accept the changes that were happening and compete accordingly. If you're old enough, you know where that led.

We've drawn too many lines in the sand and expect that everyone else will acquiesce. Well, at some point the government won't, other industries won't, and certainly our own amateur radio industry will reevaluate its own bottom line. We as a group can draw those lines in the sand, stick our collective heads in the sand, or even dig our heels into the sand, saying this far and no farther. Well, in all likelihood there's some communications group out there that we either don't know about or is just starting that is looking at all that sand piled up so indefensibly and is saying to themselves, "We can have it all, including the sand, which will put us in the glass business, too."

73, Alan, K2EEK

Built for Speed

The new R11 Test Receiver...

...If there's RF, you'll catch it!

The **NEW** R11 is a Nearfield FM Test Receiver capable of sweeping **30MHz - 2GHz** in less than one second. The R11 can lock onto a **5 watt UHF signal** as far away as **500 feet** and demodulate the signal through its built-in speaker. A unique feature of the R11 is its ability to determine what band the frequency is transmitting in and display it on its LED indicator. When speed is an issue, reach for the R11 Test Receiver, **You won't find a faster nearfield FM test receiver anywhere.**

Patent Number 5,471,408

FEATURES

- Frequency Range: Analog FM, 30MHz - 2GHz (Cellular frequencies blocked)
- Locks onto 5 watt UHF signals as far away as 500 feet
- Easy to use keypad functions: Frequency Hold, Frequency Skip, Frequency Lockout, and the Shift key feature for Audio Mute, Enable/Disable Lockouts, and Lockout Clear
- Squelch and Volume control knobs
- LED frequency range indication display
- Built-in speaker for instant frequency demodulation and headphone jack for earphone audio
- Interface with the Scout for Reaction Tune
- TA100S Telescoping whip antenna included
- Built-in NiCad batteries (4 hour discharge) and power supply included

Reaction Tune with Scout using optional CB-RT ($9)

Introductory Price

$399.

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ANNOUNCEMENTS

• The following Special Events are scheduled for November:

1-land, Bethlehem, Connecticut; Armored Forces ARA; to commemorate Veteran's Day; 0001Z Nov. 8 to 2400Z Nov. 11; operation on 14.325, 7.283, 21.375, 28.420. For certificate, send #10 SASE to Robert O'Neil, 283 Hard Hill Rd. N., Bethlehem, CT 06751.

KB2YCT, Nutley, New Jersey; The Robert D. Grant United Labor ARA (RDGULARA); to commemorate CQ Veteran's Day; Nov. 8, 0001Z to Nov. 11, 2400Z; operation on 28.420 and 52.525. For certificate, send SASE to RDGULARA, P.O. Box 716, Nutley, NJ 07110-0716.

W4LMA,Marietta Georgia, following first flight of the USAF F-22 Raptor 01, Lockheed Employees ARC; 1200–2300Z Nov. 22; on 28.400, 21.115, 14.250, 7.045. Certificate for large SASE and QSL. Optional color photo for $2.00US. Send to W4LMA, LMEA Radio Club, 800 Walker St., Marietta, GA 30060-2730.

N5VA, Albuquerque, New Mexico Veteran's Medical Center, Albuquerque, New Mexico; AARC and N5VA; to honor all veterans; 1600–0400Z Nov. 11; operation on the lower general phone band and up on 10, 15, 17, 20, 40, 80 meters. For 9 × 11 certificate send large SASE, or for full-color QSL send regular SASE, to VAMC, 2100 Ridgecrest Dr. S.E., 117D, Albuquerque, NM 87108.

W8NJH, from Whitefish Point, Michigan, Stu Rockafellow ARS, to commemorate loss of *E. Fitzgerald* from Great Lakes Shipwreck Museum; 1300Z Nov. 8 to 1700Z Nov. 10; on 7.250, 14.250, 21.350, 28.350 (±20 kHz). For certificate send QSL to Dave Langston, KB8RAP, 1000 Town Center, Ste. 1200, Southfield, MI 48075 (248-948-4237).

VG3W, from the birthplace of Col. John McCrea, WWI surgeon and poet (author of "In Flander's Fields"), Ontario, Canada; Guelph ARC; local school children may use the station to send messages of peace and goodwill; 1400Z–2100Z Nov. 4–11; on 80–6 meters. For QSL, send QSL and SASE to Scott W. Smith, 296 Elizabeth St., Guelph, Ontario, Canada N1E 2X7.

• The following hamfests, auctions, etc. are scheduled for November:

Nov. 1, **Enid, Oklahoma Hamfest**, Garfield County Fairgrounds, Hoover Building, Enid, Oklahoma. For more information, contact Tom Worth, N5LWT, at 405-233-8473; or Fred Selfridge, N5QJX, at 405-242-3551. (Exams.)

Nov. 1, **Lake ARA Hamfest and Electronic Expo**, East Lake Chamber of Commerce, Sorrento, Florida. For more information, contact Chuck Crittendon, KE4EXM, P.O. Box 615, Altoona, FL 32705 (352-669-2075). (Exams.)

Nov. 1, **7th Annual Tri-City ARC Auction**, Senior Citizen's Center, Waterford Municipal Complex, Connecticut. Setup 9 AM; auction begins at 10 AM. Bring your equipment to be auctioned. For more information, contact Bob Dargel, KA1BB, 860-739-8016. (Handicapped accessible.)

Nov. 1, **13th Annual 6.91 Friendly Fest**, Waukesha County Expo Center Arena Forum, Waukesha, Wisconsin. For information contact Burt, N9VBI, at 414-328-0535; or on the web <http://www.execpc.com/~mrc/friendlyfest.htm>. (Exams.)

Nov. 1–2, **14th Annual Odessa Hamfest**,

(Continued on page 115)

Doug DeMaw, W1FB, Silent Key

We usually use the old Morse abbreviation SK to indicate Silent Key, or the passing of a fellow amateur. In this case, the SK could stand for Sad Knowledge, as we have lost a strong voice, a phenomenal advocate for amateur radio, a mind rich in technological possibilities, a teacher, a great writer, and most of all, a dear friend to all of us.

On Tuesday morning, September 30th, the phones began ringing and e-mail messages started arriving as the amateur radio world found out about and began to spread the word that Doug DeMaw, W1FB, had passed away the day before. Most of us knew he had been seriously ill this past year, fighting a glorious but losing battle with leukemia. He worked and wrote virtually to the end, always upbeat and never maudlin.

The measure of a man such as Doug is not so much a compilation of life-long deeds, of which he accomplished many, but rather it is the whole pattern and fabric of the life that led to those deeds. In Doug's life, both public and private, the pattern was simple, honest, and basic. He would see a need or problem, study it, roll up his sleeves, and work as hard as he could to solve the problem or make a situation better. Although deeds followed, the primary goal was action. When he decided to run for County Commissioner, it was to solve problems that existed, not to sit around and discuss them. He won the election and did what he had set out to do—correct a bad situation. It sounds simple, but it certainly wasn't, just as if you looked at a circuit from one of his famous projects and said that it too was simple. The beauty in both situations is the original thinking that went into the solution of how something should be done and being able to do it the first time. The fact that we could learn from and duplicate what he so easily described makes him one of the foremost teachers and writers in amateur radio history. Even the manuscripts which arrived here at *CQ* were things of beauty in their perfection. If it was worth doing, it was worth doing right.

While we all benefitted from Doug's prolific work, some of us were also fortunate to benefit from his presence and friendship. We all have lost that special person, that hero among us who made us feel that we could do anything.

Our deepest sympathies go out to Doug's wife Jean, W1CKK, and to his son Dave, N8HLE/1.

The ALPHA 87A...

Now more than ever, it's completely in a class by itself!

No other maximum legal power amplifier *comes even close* to the performance of the *ALPHA 87A*. No tube amp offers any semblance of its "hands-off" ease of use. No solid state amp has the *87A*'s brick-on-the-key *average* power capability, much less its enormous reserve of highly linear *peak* output.

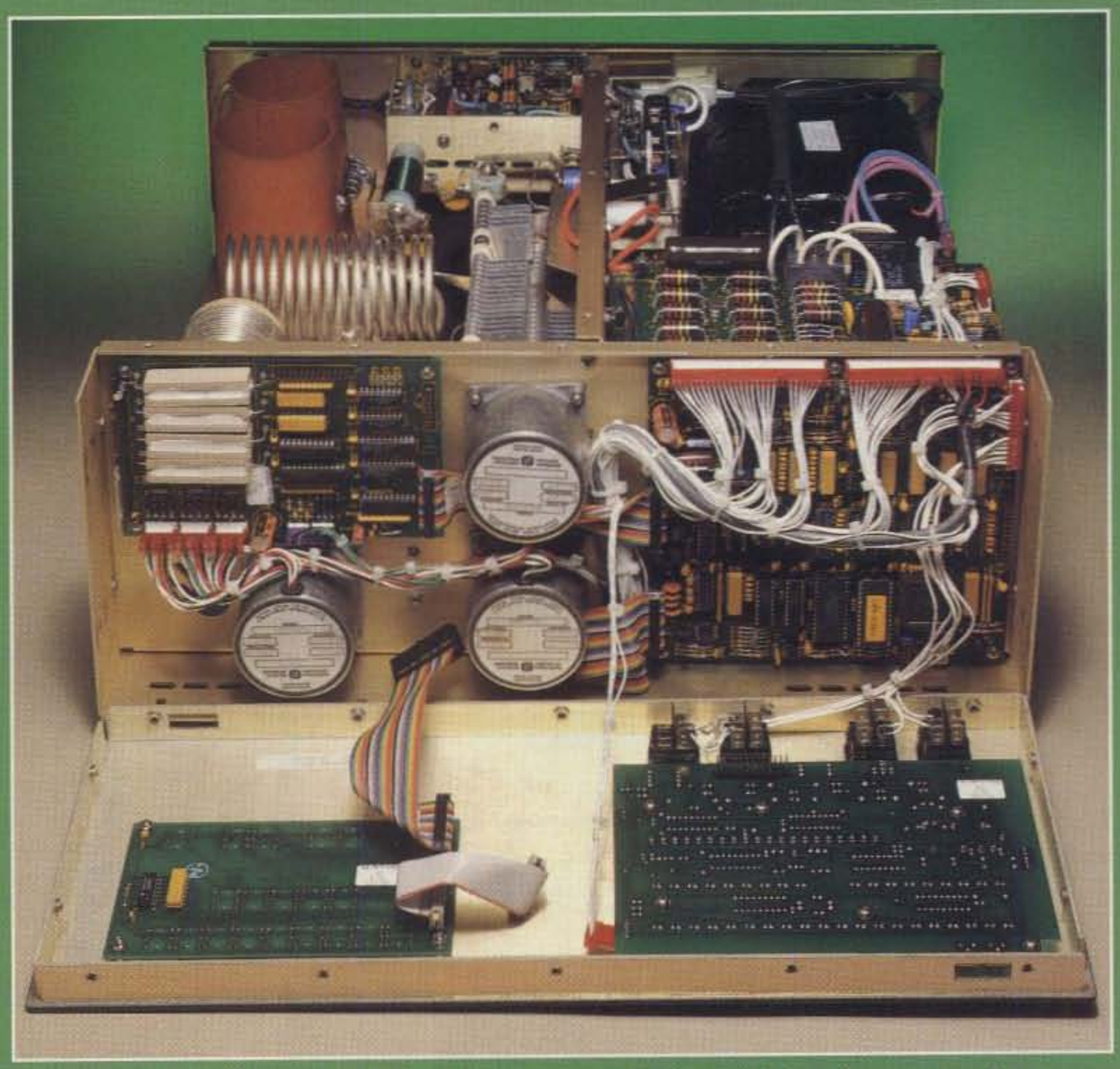
***ALPHA 87A* is the choice of hundreds of honor roll DXers and top contesters worldwide,** including perennial winners such as AI6V/P4ØV, N6TJ/ZD8Z, CT1BOH/P4ØE, OH2BH/EA8BH and W6QHS. Leading amateur radio magazines praise it effusively...

• ***QST* 6/92:** "...effortlessly delivers legal-limit power... delivers on all its promises... take time to admire the crafts-manship."

• ***CQ* 8/92:** "...extremely high quality...one of the most desired pieces of equipment in the amateur market...well over a ten... truly a beautiful piece of work."

• ***FUNK Amateur*** (Germany) 12/96 cover & 11 pages: "Ultimate Linear?"

• ***RadCom*** (U.K.) 2/97: "The *87A* really is the ultimate linear amplifier...the 'Rolls Royce' of all linear amplifiers."



Inside the *ALPHA 87A*, its superior quality is conspicuous. Our exclusive 4-year warranty and 30 day money-back guarantee further confirm it. But you must *use* the *87A* to fully appreciate the pleasure it can add to *your* operating.

***ALPHA**'s deliveries are now quicker and our service is among the fastest in the industry.*

*Why settle for anything less when you can try **ALPHA POWER** in your own station at no risk?*

Visit our web site at* www.alpha-power-inc.com *or call for literature and delivery information. Ask about WØID/W4ETO's home video, "The Ultimate Linear."

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The highlight of a person's 50th birthday shouldn't be receiving a new pair of socks. How about a gala party and DXpedition on the Pacific island of Nauru instead? When Martti Laine, OH2BH, reached 50, he obviously opted for Nauru.

C21BH

The Birthday DXpedition By OH2BH and Friends

BY MATS PERSSON, SM7PKK, AND TIM TOTTEN*, N4GN

There's a little bit of serendipity in the choice of Nauru as the setting for this historic event. Nauru is also a Finnish word, which in the Finnish dictionary is defined as "a fit of laughter" and "an island republic in the Central Pacific." Put the two together and you have the perfect place to celebrate a happy occasion.

The front of the C21BH QSL showing all the team members.

The planning of this DXpedition started in a most unusual way. Martti Laine, OH2BH, sent out a number of personal letters to friends around the globe, inviting them to join him for a very unusual birthday party. The party itself sounded normal enough, but the setting for these festivities was to be Nauru Island in the Central Pacific! When I received my invitation, I wasn't sure what was going on. I thought, "Either he is joking, or he is really serious about this birthday party!"

Either way, I was calculating in my mind if I could financially manage a trip like this. I came to the conclusion that maybe it was possible, keeping everything very tight. With this in mind, I sent Martti an e-mail with a positive response in return. If he was kidding around, then the joke would have been on him, as I was ready to do it! However, the next day I got a response saying he was happy to have me join. I also got some clues as to who else would likely be joining us.

Having given my final word, the DXpedition started to take form. It was already an unusual one in the way it was being planned. Everything was rather casual, with no lists of things to do or buy or prepare for before the trip. Every now and then Martti would send an e-mail to the participants, asking who could bring this or that. It was evident that this was going to be a leisure trip, kind of a birthday party tour, where the whole event would be a birthday present—even for the participants.

Every DXpedition Has Its Challenges

Everything was running along smoothly until we received a query from Ruben, C21RK, who was making all the arrangements for us on Nauru: Did we want alcohol at the birthday party? Depending on our answer, Ruben would book the appropriate place for the party. Well, of course there would be alcohol present, so we told him that. It was then that Murphy struck with full force. Ruben sent a fax advising that the champagne supply on the Island had recently been exhausted.

With this challenge before us, we now had to start taking this whole thing a bit more seriously! We decided to put Kan, JA1BK, in charge of the champagne. He was to bring 24 bottles of the bubbly liquid with him from Japan, even if we had to pay excess baggage charges for it. Other than this major obstacle, however, we didn't run into any problems while planning the trip.

Time was getting short and the DX-

*8309 Dawson Hill Road, Louisville, KY 40299-5317

An aerial view of Nauru. Notice the large areas which have been stripped of their phosphate deposits.

pedition team was shaping up quite well. The group consisted of Martti, OH2BH; his XYL Leena, OH2BE; Pekka, OH1RY; his XYL Tine; Tim, N4GN; John, K8YSE; Mats, SM7PKK; and Kan, JA1BK. The majority of the group planned to meet in Manila at the house of Robin, DU9RG.

The Manila Experience

Since I had never been to the Philippines, I arrived a few days early to have a look around and at least to see what Manila was all about. I had barely gotten off the plane when things started to go crazy. The Manila airport arrival area was a big mess with people running back and forth. Soon I joined the rest of the people, running around trying to locate my luggage.

We looked around on all the conveyor belts, but it was quite obvious that my luggage had been lost, along with the luggage for about 40 others who also had boarded in London. So there I was in Manila with no clothes and no antenna (the latter had been borrowed from Nils, SM6CAS). What a start this was!

I stayed in downtown Manila a few days before I headed out to Robin's house. The trip to his place was quite an experience. Since I was in the middle of the business district, so it was not difficult to find a taxi. Out into the street I went. One by one I stopped three different taxis and told them where I wanted to go. To my amazement, they all simply refused to take me, saying it would take too long. The fourth taxi finally agreed to take me, but I had to pay him a little extra.

The reason for their reluctance was quite obvious once we got on the way and I saw the traffic. It took about two hours to drive a distance that would normally take less than 30 minutes if there hadn't been

All six of Nauru's resident amateur radio operators came out for OH2BH's big 50th birthday celebration.

Nauru in a Nutshell

Located 37 miles south of the equator in the Pacific Ocean, Nauru is the world's smallest republic at 8.2 square miles. Nauru's closest neighbor is the island of Banaba (T33), some 185 miles away. Air service to Nauru is provided by the sole airplane of Air Nauru International.

Nauru gained complete independence from Australia in 1968. With one of the world's richest phosphate deposits, Nauru claimed to have the highest per capita income in the world during the early 1970s. Today, however, the phosphate has nearly been depleted, and efforts to invest for Nauru's future have come up short. The phosphate mining has turned this once beautiful island into something resembling a lunar landscape, and the people of Nauru are left with little to show for it.

In spite of the island's uncertain future, the 9000 or so citizens of the republic, the Nauruans, are a very happy bunch. They speak their native Nauruan language and move along following Nauru time. We all should learn the concept of Nauru time, which has nothing to do with hours or minutes, or with the busy schedules of our contemporary world. Nauru time is set by inspiration and enjoyment, and driven to some extent by that bright Pacific sun. It restores to life those original values once developed with the aim of providing a happy, extended life—the Nauru life.

so many cars. Manila is just a place with too many vehicles and far too few roads.

All the participants eventually arrived at Robin's house, except for JA1BK and K8YSE, who were planning to join us in Guam. We had a nice dinner party in the evening. Robin and his XYL Christine were the best hosts anyone could have. And I, for one, had never before been in a house as wonderful as theirs.

Late in the evening we started to nail down our last items, trying to figure out if there was anything we had forgotten. Since this trip had been rather loosely planned and organized, it was going to be interesting to see how it went along. Due to the heavy traffic, and the knowledge that we would be about 300 kilograms overweight, we headed out to the airport quite early.

Finally On Our Way

At the airport we met up with Hillar, N6HR, and his XYL Elsie, N7WDX, who had been confirmed on the trip at the last moment. With a little help from the official letters Ruben had provided, the check-in process went quite smoothly, even if Air Nauru was not too keen on the amount of luggage we had—especially when we told them the heavier luggage was still locked away in the customs area.

Martti's bags were not a problem, but since mine had been lost and then found again, I was advised they were stored in another area. When I arrived, they simply told me the luggage was locked in and I could not get it until the following day! I told them I was leaving in one hour, only to have them tell me that they would forward the luggage to Nauru on the next flight. As the next flight would be our return flight to Manila, I became a bit worried!

I started serious discussions with the customs people, explaining that I had to have the bags right then, not tomorrow or next week! They agreed to find the officer in charge who could authorize a special release for me. I waited.

Assuming the officer in charge would come in the same door the other person went out, I stood there and waited. Suddenly someone came up behind me and very rapidly asked if I wanted to talk to him. I barely had time to turn around before he continued.

"Oh, you don't want to talk to me," he said, turning to leave again. I quickly managed to stop him and told him that if he could release my luggage I was, of course, interested in talking to him. After about 20 to 30 minutes I finally had my luggage and we were on the move.

Before long we were en route to Nauru via Guam and Pohnpei. It was great to have the whole group on the same flight. JA1BK and K8YSE joined us in Guam as planned, so we had a very festive flight even though it took about 7 hours.

A Perfect Touchdown

Landing on Nauru was a treat. Suddenly, in the middle of the ocean, a small speck of land showed up. Nauru is the world's smallest republic. You barely see anything of the island before you touch down. It should be remembered that the closest land to this country is the even smaller island of Banaba (T33).

As we got off the plane, Ruben and some friends were waiting for us. In fact, they had a big Land Rover with a trailer waiting for all our luggage. Somehow we managed to get through customs and immigration very smoothly and proceeded straight to the Menen Hotel. We soon filled up the whole lobby with our stuff and then went around locating the most strategic rooms for our antennas. This meant we ended up scattered around the hotel.

Martti had booked the biggest suite for this occasion. It normally is used only for visiting dignitaries, and the guest book reflects the most-wanted DXCC countries in the region by the signatures of their heads of state. Since we had been flying all night and the birthday party was going to be that same evening, most of the team

Pekka, OH1RY, at the loading dock. These conveyor belts are used to fill the freighters with crushed phosphate.

went in for a nap. Pekka and I started to set up the 80 meter station, since he had set up a schedule with some friends later that evening.

After the assembly was completed, I went up to my room, which was attached to Martti and Leena's suite. Martti had just woken up, and he thought we should bring some champagne up to the suite to have a small pre-party celebration. I ran downstairs to the lobby and asked them for the champagne.

The Mystery of The Lost Champagne

"The champagne?" Hmmm . . . this was not the reply I wanted! They looked all around, but the champagne could not be found anywhere. We looked in every refrigerator, but we could find nothing. I went back up and told Martti.

After another hour, we both went down, as the time for the party was getting near. We went through the refrigerators again, but nobody seemed to recollect that they had taken care of the bottles. Martti and I were getting desperate. How could 24 bottles be lost in Nauru? It's a *very* small place, so the whole island would know if someone had found 24 bottles of bubbly.

We had almost given up when someone came by and told us that the champagne was locked away in the fish cooler. The party was saved!

Faxes for Martti from all over the world were starting to arrive at the hotel. This would continue for the next several days. Besides the faxes, Martti also received letters from dozens of national amateur radio societies congratulating him on his 50th birthday. The most unusual arrangement was made by Jun Hasegawa, the President of Yaesu, who somehow managed to organize an outstanding flower basket delivered directly to the party.

We gathered up the team for an opening celebration in the suite. From there we continued down to the party room, as the local guests were starting to arrive. There was a lot of food that was arranged in trays along the wall. Most of it had been flown in from New Zealand.

Among the guests we had all six local amateurs join in the festivities. To make the Nauruans feel welcome at the party, our group split up among the tables. We had a lot of fun, and even though most of the people didn't know us, we quickly became friends. The champagne was flowing and the food was enjoyed by all.

We sang happy birthday, of course, and once that song was finished, the Nauruans all sang their local celebration song in a very impressive four-part harmony! Another surprise was that a local songwriter had written and recorded a very special song in honor of the occasion. It became the theme song for our DXpedition, and we continued to play it during the remainder of the week. The party lasted until we were all too tired to go on. And we still had a DXpedition and a contest in which to take part!

The next morning we went around the island to see if we could find a better location radio-wise. It didn't take too long, since the island is very small. The only other hotel on Nauru is called Od-N-Aiwo. It is actually higher than the main hotel, and has the advantage of a flat roof with pillars for antenna support. The choice was easy. We talked it over with the rest of the team, and then we moved to the new hotel.

Did We Come Here To Sing Or To Make QSOs?

The setting up of the stations began immediately. It was decided to put an SSB and RTTY station at the hotel with a Cushcraft A3 tribander, a Create vertical for 80 and 40, a Yaesu FT1000MP transceiver, and a 1 KW FinnFet solid-state amplifier. Pekka and John primarily would be responsible for that station.

Also at the hotel, JA1BK set up a station to concentrate on the new bands—30, 17, and 12. N6HR also helped activate this station until the contest started.

We had already concluded we should have two stations active at C21RK's house for the CQ World-Wide CW Contest, making us legally a multi-multi entry, although we realized we would not be competitive with the larger six-transmitter entries. Ruben, who had been building a new tower, was not quite finished with his two-element quad, but he did everything

Tim, N4GN, and Mats, SM7PKK, operating C21BH during the 1996 CQ World-Wide DX CW Contest.

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Kan, JA1BK, concentrated on handing out C21BH QSOs on the 12, 17, and 30 meter bands.

Most of the RTTY QSOs at C21BH were logged by John, K8YSE.

in his power to get the antenna up before the contest. Pekka and I started putting together the other A3, as well as the verticals and wire antennas we needed for the contest. Seeing us work in the heat made Ruben's team work just as hard, and we soon had all the antennas up in good shape, with hours to spare before the contest. We concluded that we would have some interference in spite of the ICE filters, but nothing that would stop the team from doing a credible job anyway.

Murphy Pays A Visit

N4GN and I started off the contest, and we had a blast. Tim was on 20, while I started on 15. The pile-ups were huge and the logs were quickly filling up. Then, less than an hour into the contest, and with 279 QSOs in the log, the power died!

We quickly determined that it was not a fuse problem, since the whole neighborhood was without power. Ruben immediately took action and arranged for us to receive a generator within 20 minutes. He decided to investigate what was going on with the power company.

As promised, a Land Rover arrived with a generator, and we powered up again. We had barely gotten the pile-ups back, when the generator stopped. Of course, with our luck it had gone dry. There was no problem, though. They were very helpful and soon had us fixed up with some gas. We were back in business again.

Ruben came back and told us the power company was working on the lines just down the street, and it would take another hour before we would be back on full power again. This was no problem, as we had all the pile-ups we needed.

Multi-Multi, Nauru Style

We made up a rough schedule where N6HR and N4GN would operate one station, while Martti and I would take turns on the other, operating about four to five hours each shift. Since Ruben's house was several kilometers away from the hotel, we would take the Land Rover back and forth. With each shift change, the new operators would bring a big plate of tuna sandwiches prepared by Elsie. It seems tuna is one of the few things available in abundance locally. Nearly all other food items must be imported at great expense. Therefore, it was tuna sandwiches for breakfast, lunch, supper, and the occasional midnight snack.

Everything was going smoothly when we noticed that Ruben's old TS-930 was getting a bit hot, with some warning shots from the overcurrent protection circuitry. We had to take off the cover and bring in an extra fan to cool it down, as well as turn down the power to a minimum every now and then. Knowing the situation, we managed to keep the station running without breaking down.

The operator changes were very interesting, especially at night. We had a lot of fun with our loaner vehicle, which we figured to be about the same age as Martti. Tim kept kidding Martti that at least he was in better condition than the worn out old Land Rover!

Nauru is another of those countries

Martti, OH2BH, was presented with this plaque in honor of his birthday "from the gang and fans on the Isle of Laughter."

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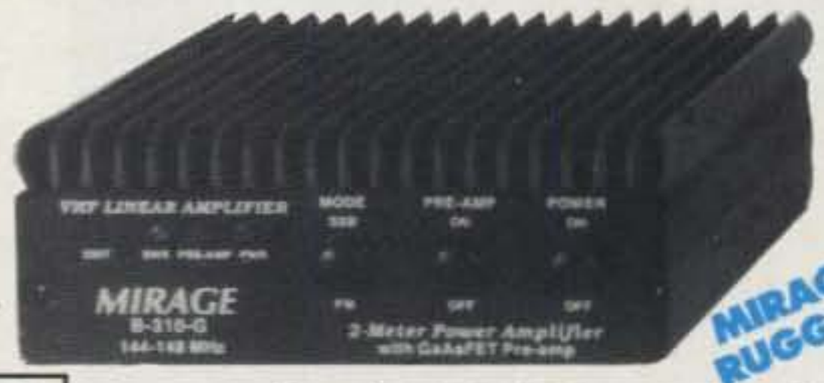

Power Curve -- typical B-310-G output power							
Watts Out	*25*	*50*	*75*	*95*	*100*	*100+*	*100+*
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Watts Out (440 MHz)	*16*	*26*	*32*	*35+*	*35+*	*35+*	*35+*
Watts In	*1*	*2*	*3*	*4*	*5*	*6*	*7*

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Watts In	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*

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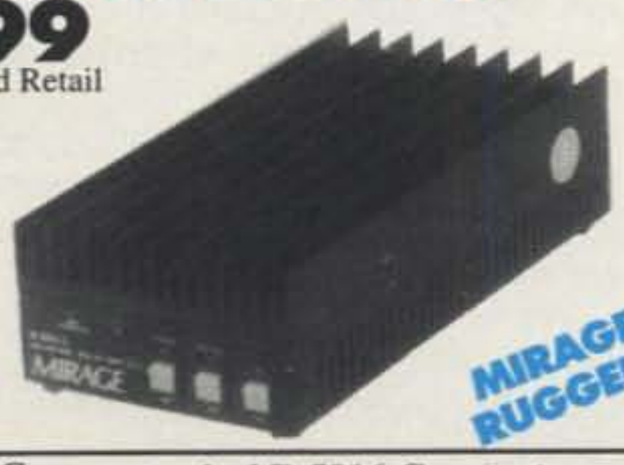

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Power Curve -- typical B-5016-G output power								
Watts Out	*130*	*135*	*140*	*145*	*150*	*155*	*160*	*165*
Watts In	*20*	*25*	*30*	*35*	*40*	*45*	*50*	*55*

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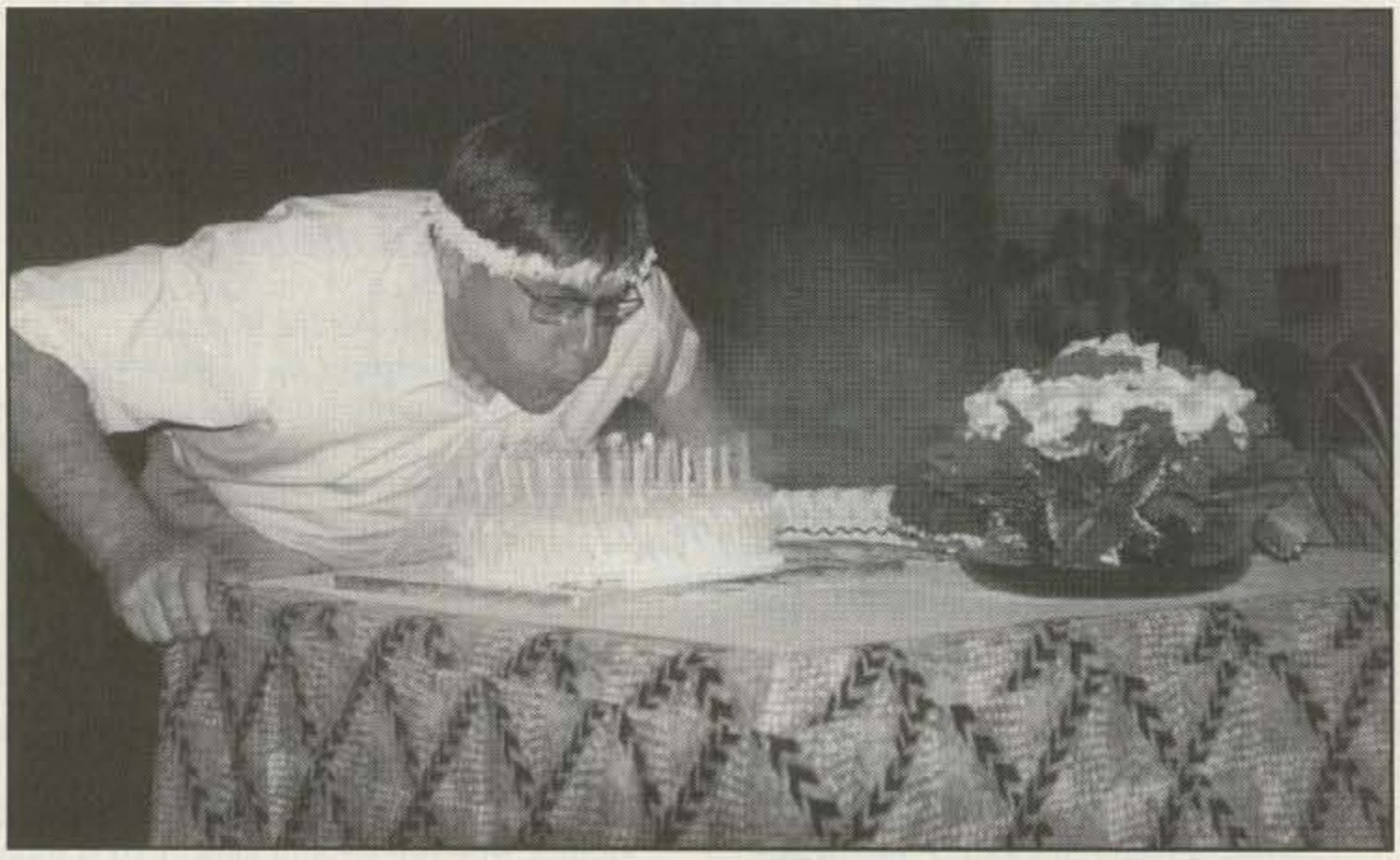


Martti, OH2BH/C21BH, is shown here making his wish for another half-century of good DX! (Photo by N4GN)

where they drive on the wrong side of the road. To make matters worse, during the whole trip I could only find three gears in the car. Martti was the only one who could find all the gears, but it sounded very painful for some of them. And the QRP headlights were almost no help at all.

Old Man Runs Out of Juice

Twice the Old Timer ran out of fuel. The first time he left the car on the road, and when he finally came back with fuel, it was gone! It had been towed away, and it took Ruben several hours to locate it again. It seems only certain people on the island are allowed to drive it, so Ruben had to pick it up himself. The next time he ran out of fuel, Martti had gone only 20 meters from the hotel, so it was easier to find it.

The contest came to an end with some 5100 QSOs in the log (before dupes)—not bad for two stations in the middle of the Pacific at the bottom of the solar cycle. We knew our European totals were small, meaning a low multiplier count, but we were pleased with the effort nonetheless. Everyone on the other end of the pile-ups seemed quite happy to have the C2 mult in their log.

After the contest we had a terrific barbecue party at Ruben's house. Ruben's XYL Rosa made sure there was a large spread. Several of the local amateurs showed up again. They were quite impressed with the interest in C2 that we had created. We actually logged several of the locals during the contest, and they seemed to be getting into the spirit of the event. Don't be surprised if you hear more local C2 activity in this year's contests!

The Daily Routine: Make QSOs and Drive Around

With a couple of days left on the island, we continued to operate after the contest. However, our goal now was to get more of the Deserving from the European continent in the log. It took every effort for them to get through, since they had the most difficult path. We had some good runs on 40 and 20 meters. We actually could run EU on 40 during local noontime in EU. It seemed the greyline zone went quite far south, as we worked DL, SP, PA, and other countries that we hadn't really figured would have that kind of propagation during those hours.

Tim spent the night working 80 and 160, although conditions on the low bands weren't nearly as good as they had been during the contest. K8YSE got the RTTY equipment hooked up and was able to pass out a new country to some even on that mode.

As the DXpedition was coming to an end, we did some sightseeing and picture taking. Since there is only one road around the island, there are not many detours to take. However, we did managed to find some really beautiful places that hadn't been destroyed by the phosphate mining.

We had a farewell party at the hotel and wrapped up the last pile-ups before taking down the antennas in the morning. The packing went smoothly. We left all the wire antennas up at Ruben's house so he could continue to activate the low bands.

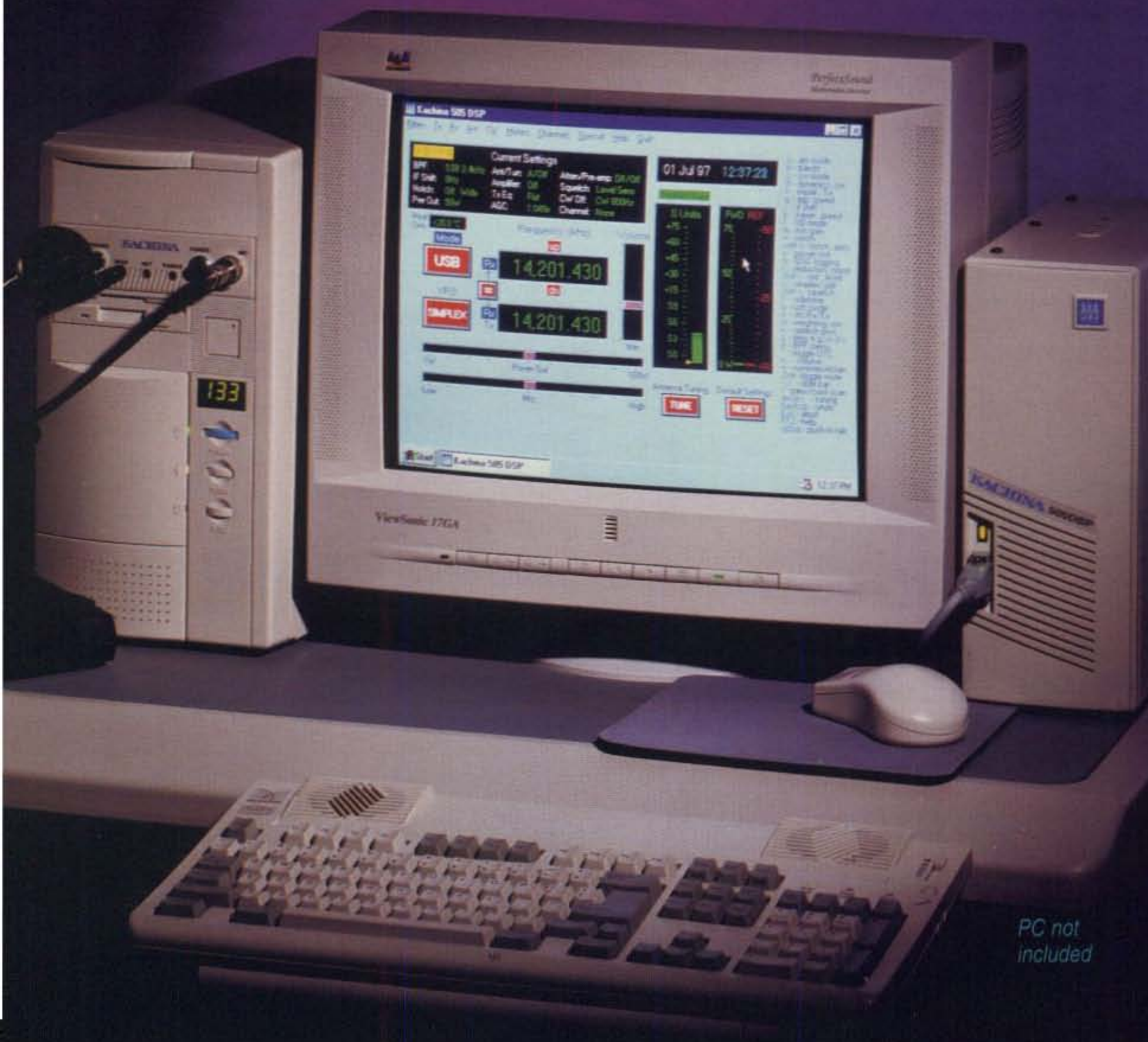
Heading Home

On the flight back to Manila we tried to type in some of the logs that were not already in the computer. After falling asleep a few times, though, we concluded it was better to wait. Our bodies were tired and ready to head home. We all had a good laugh when lunch was served on the flight. You guessed it—tuna sandwiches! (And no, they weren't as good as Elsie's.)

This was truly an unusual way to celebrate a 50th birthday, but it was well worth it. For all the participants it is a memory we will cherish as long as we live.

We wish to thank specifically the Go family—Robin, DU9RG, and his wife Christine, DU3YL—and all the Nauru people who helped out in many ways to make C21BH possible. We hope you enjoyed our efforts on the bands, and we all wish Martti the very best for his next 50 years.

The New Approach to HF Radio!



PC not included

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CIRCLE 4 ON READER SERVICE CARD

The Alinco DX-70TH HF/VHF Transceiver

BY BUCK ROGERS*, K4ABT

Across the half century that I've been an amateur radio operator, I've operated just about every kind of amateur radio station that can be imagined. My first transmitter was a homebrew rig constructed on an Atwater-Kent chassis that I cannibalized from a radio my grandfather had stashed in the barn loft. The power transformer was not the rock'em sock'em type that was used in later models. This one was used to power the number "45" audio output tube, and supply B+ to other plate circuits in this museum piece. I was able to get enough power out of it to make more than 300 volts, but even then I had to use a bridge circuit and the current was quite low. What I did not know was that the filament winding delivered approximately 4 volts AC!

After putting the power to the 6AG7 oscillator and the 6F6 final, I was only able to get about 5 watts out of the beast. I soon discovered my problem: The tubes I was using needed a full 6.3 volts (AC) to kick them into full emission. Once this problem was corrected, I found myself with a "killer-watt" that was making almost 30 watts of RF. Well, okay, 20 to 30 watts. As best as I can recall, it would illuminate a 25 watt bulb to full brilliance. Heaven only knows what the impedance of the bulb was. It didn't matter anyway, since I had no way of measuring it—while it was hot *or* cold.

I went through a few rock crushers (crystal controlled) rigs. Once I built a 304TL rig that ran almost 400 watts. I had found a pole-pig (utility power company "pole transformer") with a hyper-seal core. I turned it around and fed the 220 volt AC "drop side" and was able to get 2700 volts out. After I built the 866A mercury vapor bridge rectifier around it, I was able to provide power for just about any kilowatt arrangement I wanted. The problem was, I didn't have a more powerful tube to drive nor the funds to get one.

As time passed, a new firm called The Heath Company came into the amateur manufacturing marketplace. I had a Sky-Buddy receiver that did well. The Heath Company introduced a transmitter kit called the AT-1. I gazed at the AT-1 photo in an old issue of *CQ* magazine for a long time. It had some features I liked—namely, a meter! It boasted a power of 35 watts, and they supplied all the parts and tubes to make it air worthy. Best of all, the price was well under $50! By today's standards that's not a lot, so I won't say how much below $50 it was, because I don't like to see grown men and women cry.

I worked hard that summer, picking cotton and helping on my grandfather's farm, and at the end of summer I had amassed a fortune—enough to send a US Postal money order for the AT-1 to the Heath Company in Benton Harbor, Michigan. Yes, it was the one with the black knobs (in later models, Heath used gray knobs with the AT-1).

The Alinco DX-70TH HF/VHF transceiver.

The Best Part of The Story

Now that the amateur radio history session is over, the focus of the article is just about to begin.

The HF and VHF rigs and transceivers I've owned and operated over the decades all have been somewhat large and in some cases "hernia-makers," to say the least. They were not the type and size that you would care to haul up the hillside to the field day or contest site. Here is where the best part of this story really begins.

This week I experienced the most fun with the most feature-filled HF/VHF transceiver I've ever owned, the Alinco DX-70TH. This unit coupled with an automatic antenna tuner such as the Alinco EDX-2 will operate and tune into a wire or a mobile whip at the touch of a button.

The Alinco DX-70 comes in two varieties: the DX-70T and the DX-70TH. The DX-70T runs 100 watts on the HF bands and 10 watts out on 6 meters. The DX-70TH runs a full 100 watts output on all bands, 160 through 6 meters.

Having A "Field Day"

The fun really began as I sat waiting for the clock to strike 2 PM on Saturday, June

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

28th, Field Day. At almost the same moment as Field Day activities began, the 6 meter band opened to the west and northwest. I was operating as 2E VA FM07. Power was from a 1400 amp, 13.8 volt DC Dynasty/Voltex battery bank that was kept charged by a 4'×8' solar-panel array from Fowler Solar Electric.

For the next 7 hours I had my amateur radio fun experience for the year, working stations in Nevada, Wisconsin, North Dakota, South Dakota, Minnesota, Missouri, Illinois, Idaho, Oklahoma, Texas, and California. All this fun was being had with the Alinco DX-70TH, but the rest of the combo was nothing to write home about. The part that leaves me aghast is the puny antenna support structure that I used to temporarily raise my three-element beam. I had not planned to do a lot of 6 meter work, so I placed an MFJ-1762 three-element beam on two 10 foot sections (20 feet) of light-duty mast. No rotor, only the arm-strong rotation method was needed. However, I did not have to move the antenna all afternoon. The 100 watts SSB out of the Alinco DX-70TH took care of the rest. I did make one change in the default setup by pressing the function/H/L switches and rotating the multi-function control knob to set the Digital Audio Processor ON. After I made this change, my signal reports began to reflect it. I actually got hoarse answering all the calls. My log of contacts on 6 meters sideband is a testimonial to the performance of the DX-70TH and the 20 foot high MFJ-1762 three-element beam.

Before I get into how to interface the DX-70TH for packet operation (and other digital modes), let me fill you in on a few of the features of this super-compact little box of amateur radio dynamite.

Just For Openers

The DX-70TH covers the amateur bands HF 1.8–30 MHz and VHF 50–54 MHz in the SSB, AM, FM, and CW modes. Both the DX-70T and DX-70TH have separate antenna terminals for the HF and 50 MHz bands.

The receiver of the DX-70 is general coverage, covering from 150 kHz to 30 MHz and 50 to 54 MHz in all modes. The super-compact body size is approximately 7"W × 2¼"H × 9"D (178 mm × 58 mm × 228 mm). The detachable control panel allows you to install the transceiver with greater flexibility, whether it be in your car or your ham shack.

When it comes to getting rid of the unwanted noise, the interference eliminators built into the unit stand tall. The IF SHIFT function; built-in narrow filter standard for SSB, CW, and AM modes; and RF attenuator make up a very impressive means of rejecting unwanted signals.

If you like CW operation, the DX-70TH

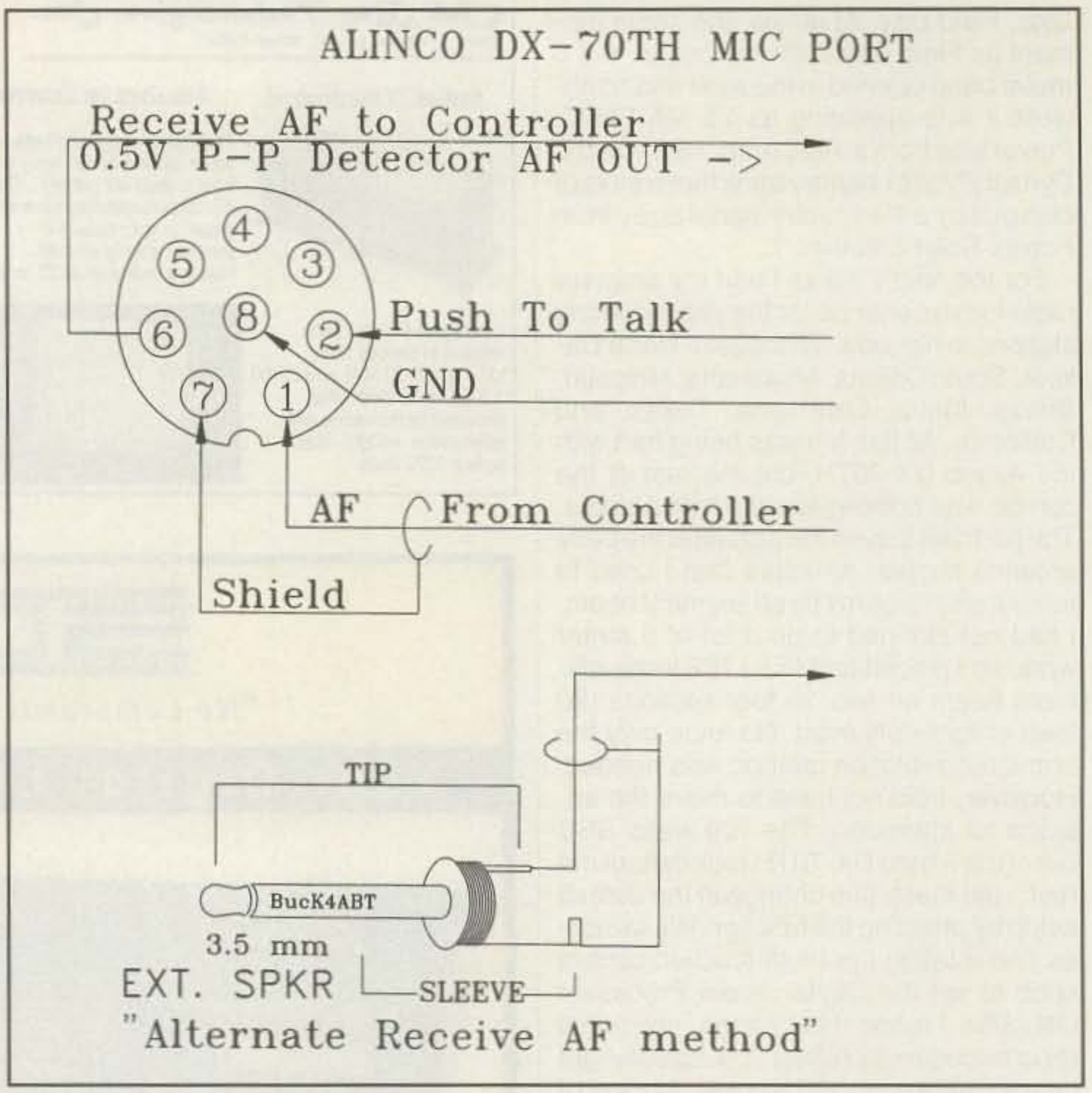

Fig. 1– The Alinco DX-70TH interface.

enables you to receive CW signals from either upper or lower sides of the carrier frequency. A Selectable Sidetone and Selectable Full Break-in (QSK), Semi Break-in (in 7 steps), and Auto Break-in (delay time automatically adjusted with keying speed) place you in the class with the top CW competitors.

There's much more, but space is limited, so I'll stop with this one final feature note: The Alinco DX-70TH has 100 memory channels that enable the user to store modes, filters, split-frequencies, AGC, attenuator or pre-amplify, and noise blanker settings. Needless to say, I am truly impressed with the DX-70TH.

Digital Interfacing Made Easy

When the DX-70TH arrived, I read the manual—well, almost all of it. The manual was clear, describing the feature details within the unit itself.

I set some of the features of the DX-70TH into action and connected the antenna. Next I attached the unit to my Astron 13.5 volt, 25 amp DC supply. I turned it on, tuned to a 75 meter SSB frequency, and tuned it. Within a short time I was in QSO (mid-day) with Jim, N4JA, in South Carolina and Blant, WA4NRU, in Georgia. Not bad when we consider they had horizontal antennas, my antenna was a 40 foot vertical length of wire, my DX-70TH was barefoot (no linear/PA), and my QTH is central Virginia. The opening bell with the DX-70TH was ringing clear.

My next step was to turn on the solder station here in the lab to interface the DX-70TH to my multi-mode digital controller. I was about to try the unit at HF in the digital modes.

First I had to find the mic data I/O port instructions in the manual. A quick look at the table of contents revealed a complete section dedicated to digital mode(s) interfacing. A turn to section 2-11, page 2-22 of the manual brought me to something similar to fig. 1. The line at the top of the page reads "RTTY, Packet, FAX, and SSTV Operation." That about covers it, unless you want to toss in the rest of my digital interests, such as AmTor, G-Tor, PacTor, and a few other "Tors."

For now we are having fun with the digital modes and the Alinco DX-70TH. The DX-70TH is priced at $1074, while the DX-70T is $957. For more information about the DX-70 series, contact Alinco Electronics, Inc., 438 Amapola Avenue, Suite 130, Torrance, CA 90501 (telephone 310-618-8616, fax 310-618-8758). ■

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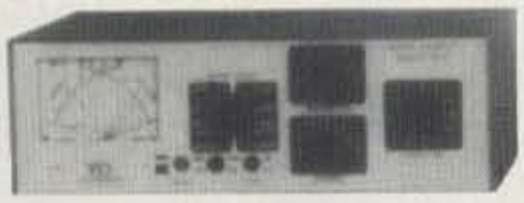

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The VC-300M *Mobile* Antenna Tuner is compact, lightweight, easy-to-operate and is our most economical tuner.

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.

SWR/Power Meters

PM-30
$79.95
PM-30UV
$89.95

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

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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.

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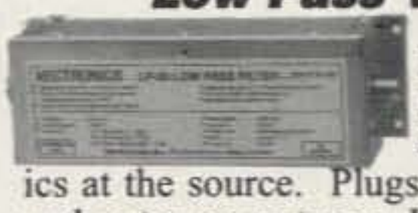

LP-30, $69.95. Eliminates TVI by attenuating harmonics at the source. Plugs between transmitter and antenna or tuner. Handles 1500 watts.

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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CIRCLE 15 ON READER SERVICE CARD

Once again G4BXD offers us a rare glimpse of history. Some of the equipment, although 60 years old, is quite innovative and remarkable for its time. Ben also maintains and is curator of the Military Wireless In The Midlands Museum.

Radios of The Rising Sun

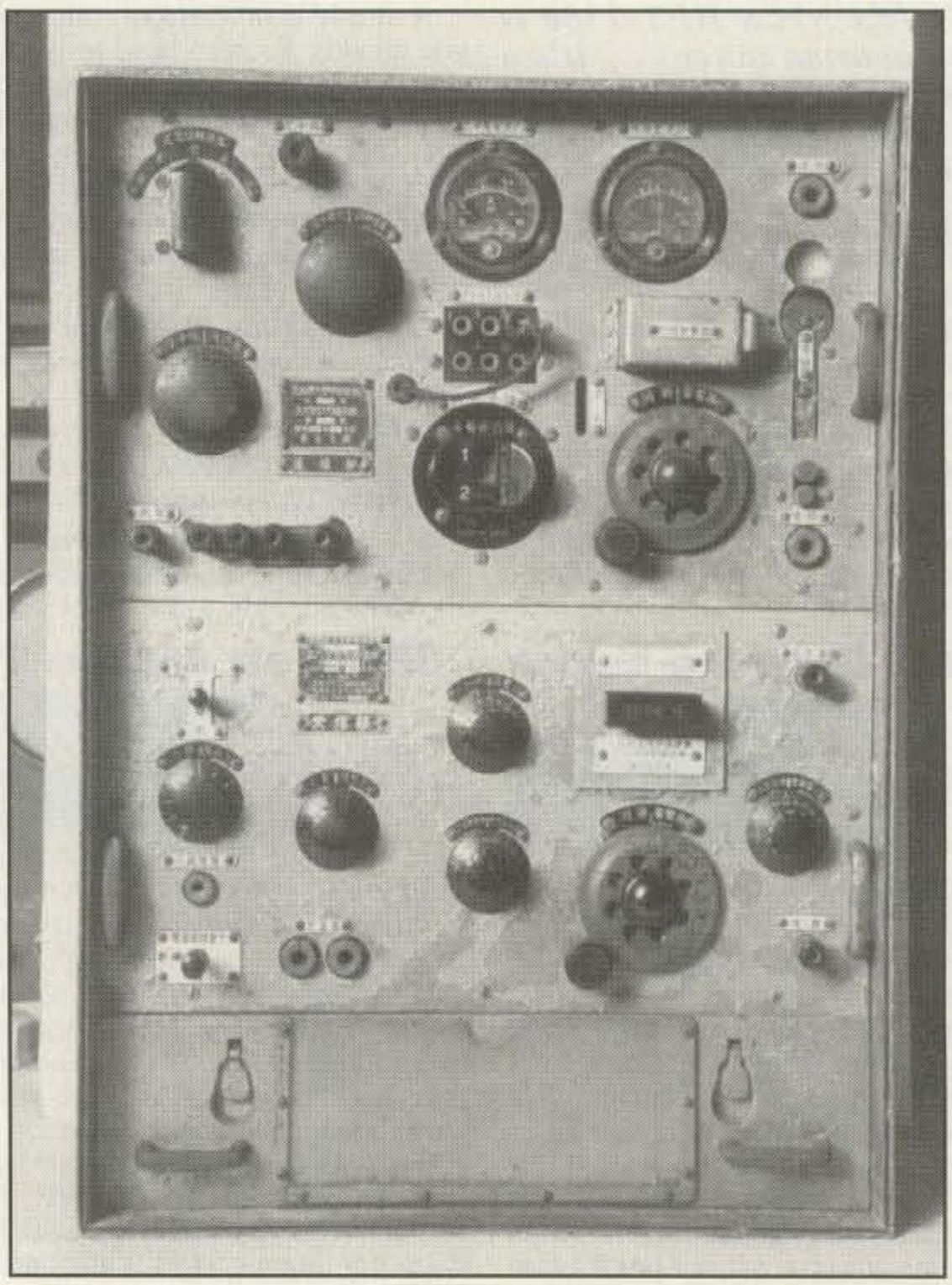
BY BEN NOCK*, G4BXD

One of the nice things about the collecting hobby is that one never knows what will arrive next. So it was that a couple of additions to the collection appeared, and being somewhat unusual, prompted this short account.

Japanese war-time sets are few and far between. I had seen several in other well-established museums and at the odd auction, but had never—until now—owned one. The day came when I took delivery of these two war-time sets (in fact, made pre-war) to add to a post-war Japanese receiver I already had.

The war sets were comprised of a mule-carried HF receiver transmitter and a man-carried short-range VHF transceiver, while the post-war set was a large tabletop-model HF receiver. The post-war receiver (mid-1950s) was delivered in very good condition, with the exception of the fact that the lid of the receiver had been pushed in during its trip from Japan to England. A couple of hefty screwdrivers and a lot of strength later the lid was pried back to its correct position, with thankfully no permanent damage having been done.

The two pre-war sets arrived in a totally different state—paint flaking off, dirty, cobwebs galore, and many years of dust. They needed a lot of cleaning to even get them into presentable shape, long before thoughts of getting them working.



The S-P3A set as it arrived (although after an initial cleaning) had flaking paint and odd broken bits. It was a sorry little set. The transmitter is on the top, receiver in the middle, and battery tray on the bottom.

The Pre-War Sets

Japanese pre-war and war-time sets apparently were far behind those of the British and American equivalents in technology and finish. Little faith in their own equipment seems to have been demonstrated, as typical spares kits, carried with the sets, even included nuts, bolts, washers, oil, and repairing insulating tape.

Some copying is evident in some of the design features of Japanese sets. British, US, and even German sets obviously supplied ideas which were incorporated into Japanese war-time sets. Even some of the components were surplus stock purchased from suppliers in other countries.

The mule set, designated S-P3A, is very similar to the British Wireless sets No. 18/48/68 in some respects, in that it has three components: a receiver, a transmitter, and a battery space. In addition to the batteries carried within the set, an external hand-cranked generator was needed to power the transmitter. Designed as a guerrilla warfare set, it was carried either by the mule, poor thing, or by a four-man team who carried the set

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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.

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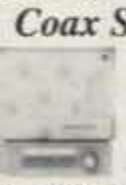

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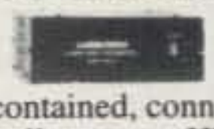

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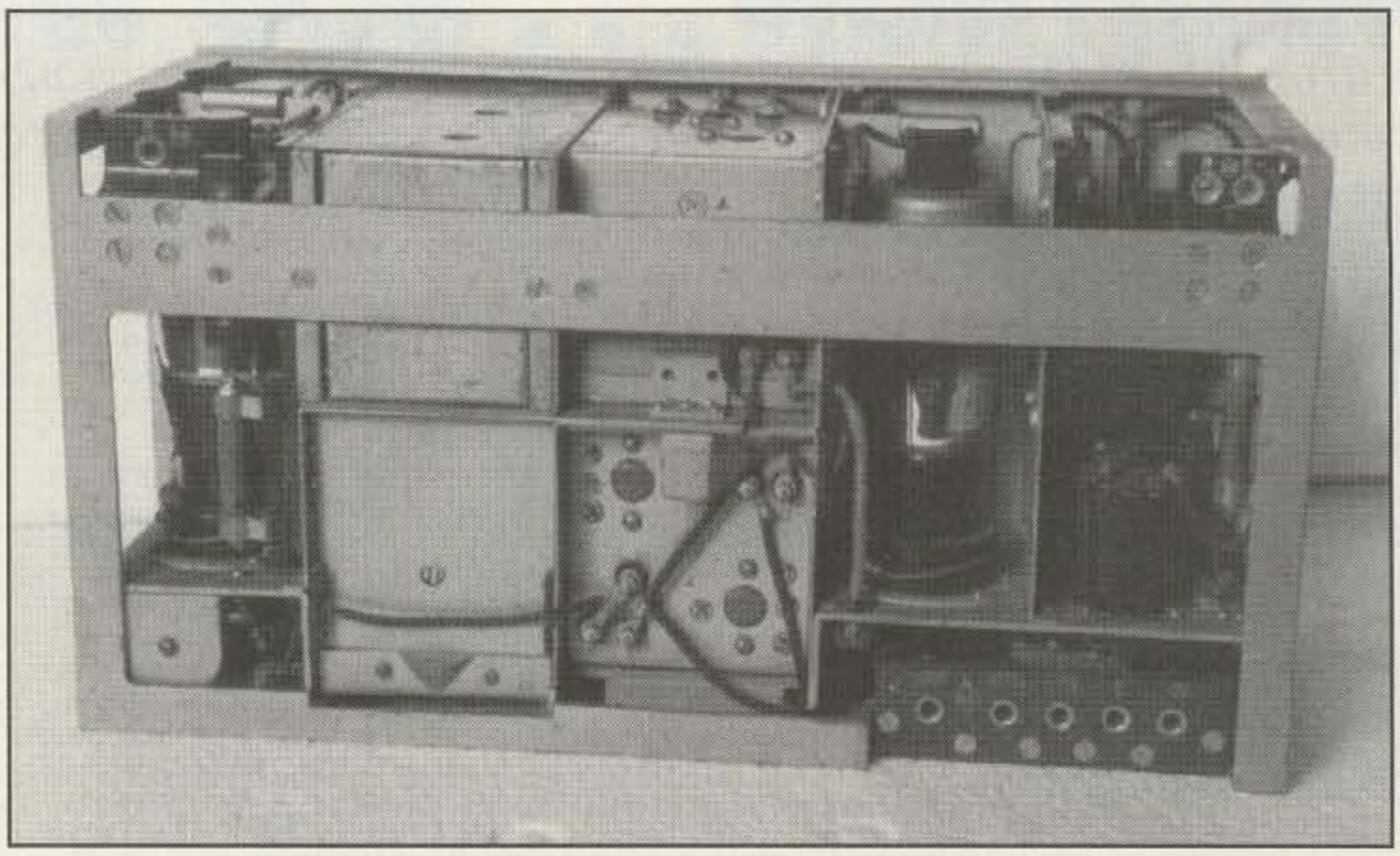


Rear of the receiver showing the supply board. This connects with a similar plug in the case, which then connects with the battery tray.

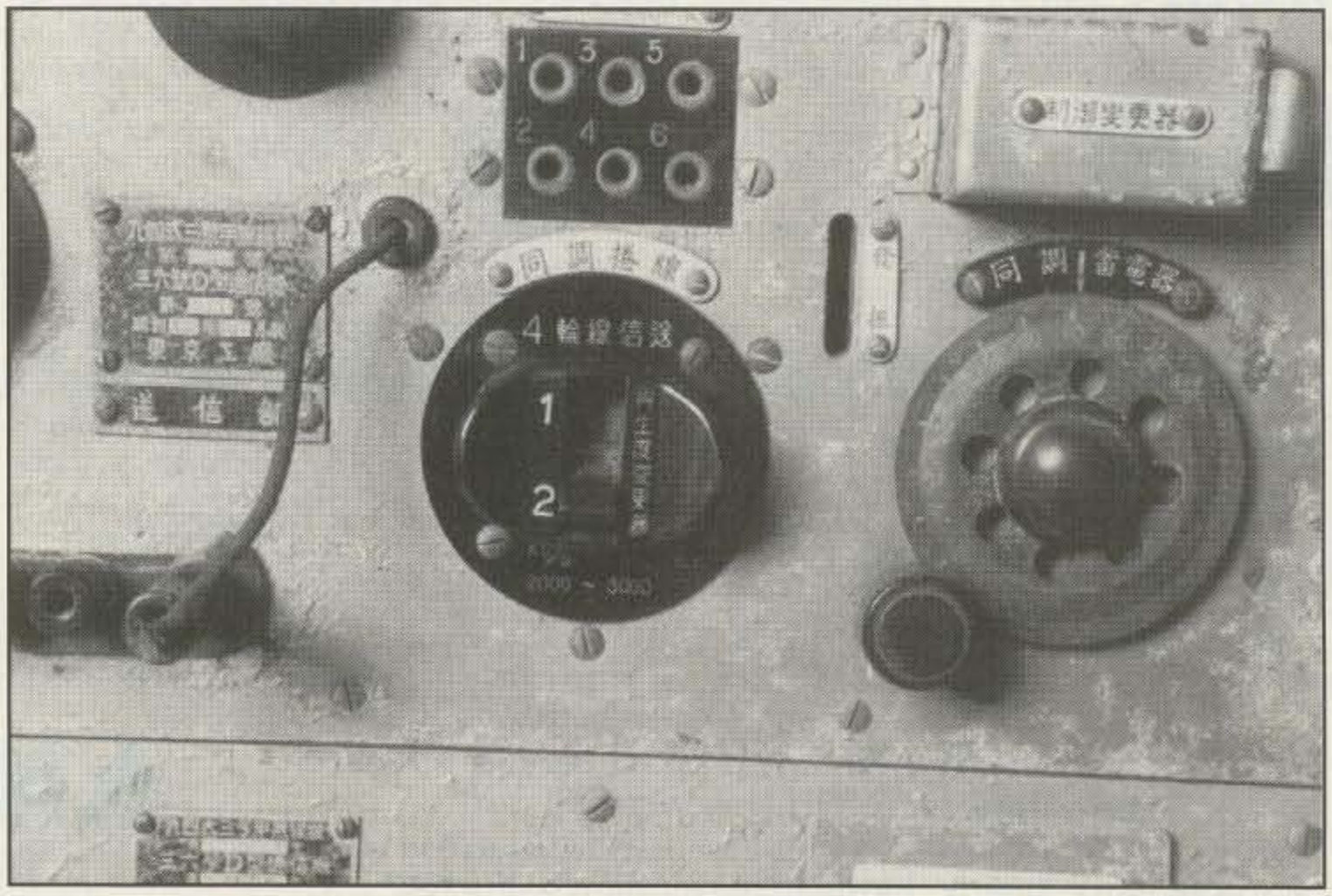
and accessories between them on bamboo poles.

The S-P3A differs from the British WS No. 18 breed in that the transmit power is around 10 to 15 watts, CW only. The transmitter uses a single tube, while the receiver uses five tubes in a standard superhet design.

The nomenclature plates on the case and transmitter date them as May 1939, while the receiver is dated December 1938, although this set seems to have been around since at least 1932. The serial numbers for the case and transmitter match, while that of the receiver is different. Much like the No. 18 sets, when they went in for repair, a unit would have been removed and replaced with a working example. This is why many No. 18 sets have different numbers for the case and transmitter and receiver units.

Presumably, the original case and set went in for repair during the years, and the matching receiver was removed and a working example fitted. The unit then was returned to active service, probably as quickly as possible.

Dating Japanese equipment is a little different from dating western units. There is a number on the plate, something like 13 and then another number—say, 12. This makes the date the 12th month of the 13th year of the reign of the Emperor, or the Showa. As the war-time emperor Hiro-



Close-up of the transmitter dial and coil unit. This coil is marked 2000-3000 kHz. The plug board above the coil is for antenna taps. The crystal, if fitted, goes behind the small door above the tuning dial.

The name plate on the case. The top line says "Military Secret." The date, 14:5, is clearly visible, making it the fifth month of the fourteenth year of Showa—1939.

hito was crowned in 1925, the number 13 makes the year of manufacture 1938.

Translation of the name plates on the case and set (kindly undertaken by my friend Ikuo Fujimura in Japan) revealed the set to be Wireless Set Type 94, No. 3A. There also seems to have been B, C, and possibly other variants. It was also known as Communication Set 36D (?), made in May 1939 (on the case and transmitter plates) by the Tokyo Works For Military. I would also like to acknowledge the assistance of Toshiki Matsuura in Japan in obtaining the missing power amplifier tube for the set.

The receiver plate stated the same type numbers but with the date of December 1938. A trademark is shown, along with the name Nippon Communication Industries Co. Ltd., Ohmori Branch Office, Sanyo Works.

The transmitter uses a single tube (UY510B) as a self-oscillating power amplifier stage, either fully tunable or crystal controlled. Various plug-in coils allow a range of between 400 and 5700 kHz. The keying line is in the high-voltage feed; hence the chirp and drift must have been quite evident. A small pull-down Morse key is fitted to the front of the transmitter, with a jack socket allowing an external key to be used if need be.

A power output of about 10 watts or so could be expected to give—into a 90 foot long wire antenna with two 65 foot counterpoise wires—a possible range of 20 to 500 miles, depending upon frequency and time of day, of course. High voltage was 500 volts with filaments at 7 volts. The power for the transmitter was provided by a hand-cranked generator.

The receiver again has a plug-in coil unit, five in all, giving a coverage of 350 kHz to 6 MHz. It is noticeable, though, that on the plug-in coil packs there are only three holes, allowing the adjustment of trimming capacitors. No provision seems evident to adjust the inductance, and hence obtain a good tracking of the tuned circuits.

Both tuning dials, on the receiver and transmitter, are simply marked 0–100. There is provision on the front of the battery tray for a chart to be mounted, similar to that used on the HRO receiver, where the frequency can be read off a scale to correspond with the dial marks.

The receiver uses 5 tubes in all—types UF134, UF109, UZ133, and UZ135 (two UF134's are used). The set is a single-conversion superhet with an IF of 265 kHz. It had a quoted sensitivity of 7 to 15 uV on CW and 7 to 90 uV on AM, depending upon the band, for a 20 dB signal-to-noise ratio using regeneration in the IF stages to increase gain. The lower compartment of the case houses the receiver batteries.

The construction of the set is quite different from that used in typical British equipment. The first impression was that it was similar to those methods used in German war-time sets—very compartmentalized, very straight wiring, lots of cast bits. The wiring goes north and south, east and west—*i.e.*, it turns at right angles quite a lot rather than meandering across the set like crazy spaghetti.

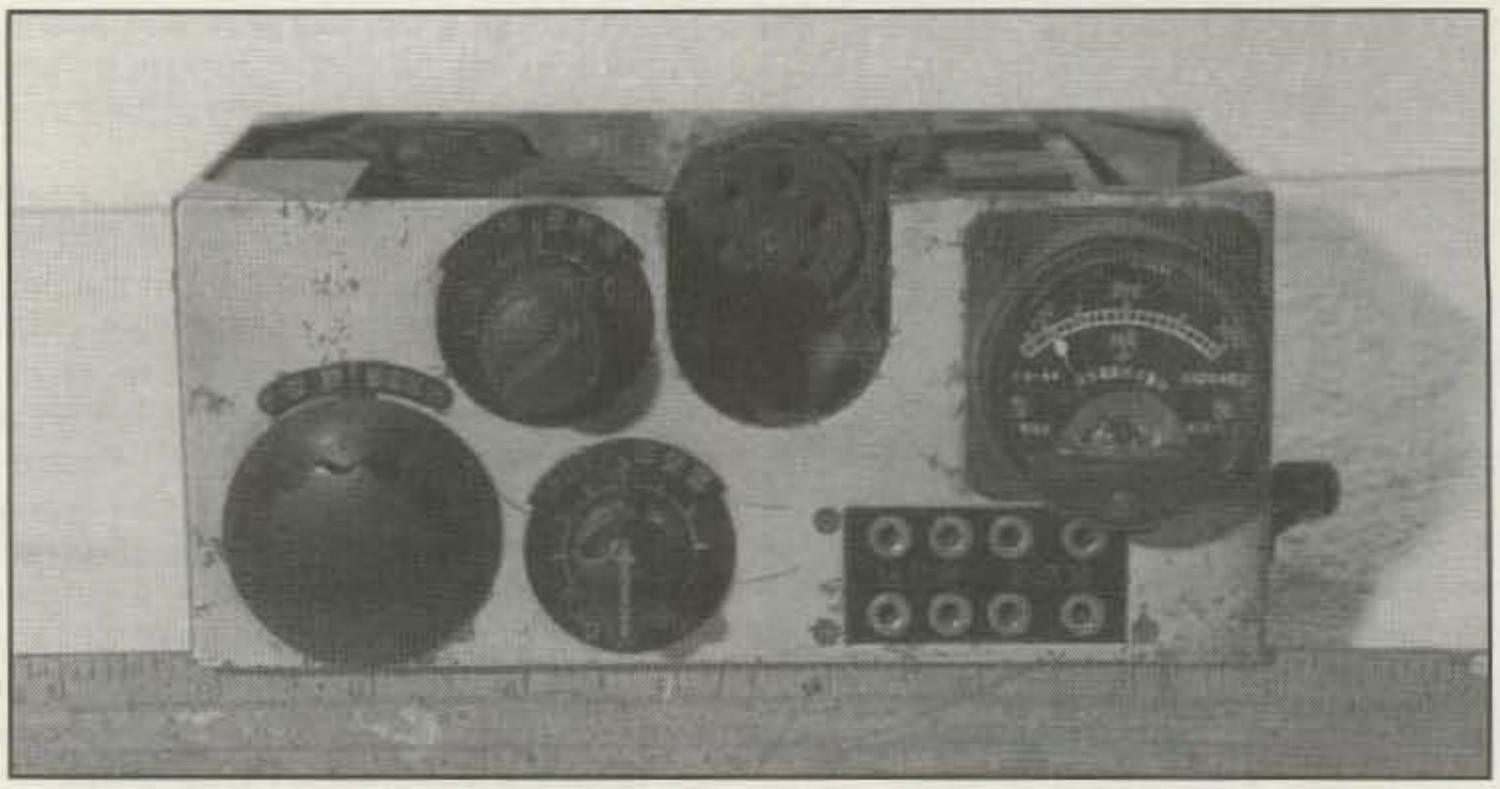
Considering the climate and conditions in which these sets were expected to work, it is interesting to note that these sets are not "tropicalized" as we know British sets to be. True, some consideration of humidity has been incorporated. The tuning capacitors have plastic (?) covers around them, all the resistors in the P3A are mounted in holders (much like fuses), and there is plenty of room between wires. However, the various coils and wound components do not have that well-loved covering of varnish found in our sets. Cotton-covered wire seems to be used quite a lot, and the capacitors resemble German types of the period in their construction. The transformers used in this set seem of very poor construction. Indeed, measurements of other units have shown a poor response.

Small Man Pack Set

Another recent acquisition is a much smaller Japanese rig, obviously a man pack, this time VHF judging by the size of the coils. It is a very interesting piece of equipment. Not having any details at all on this rig, I posed the question to an internet group that has members who also have an interest in military gear.

Bob, NA4G, a member of the group, responded with the following:

"Your little Japanese rig sounds like the man pack VHF set that used the clone of the type 19 tube. It covered about 60–70



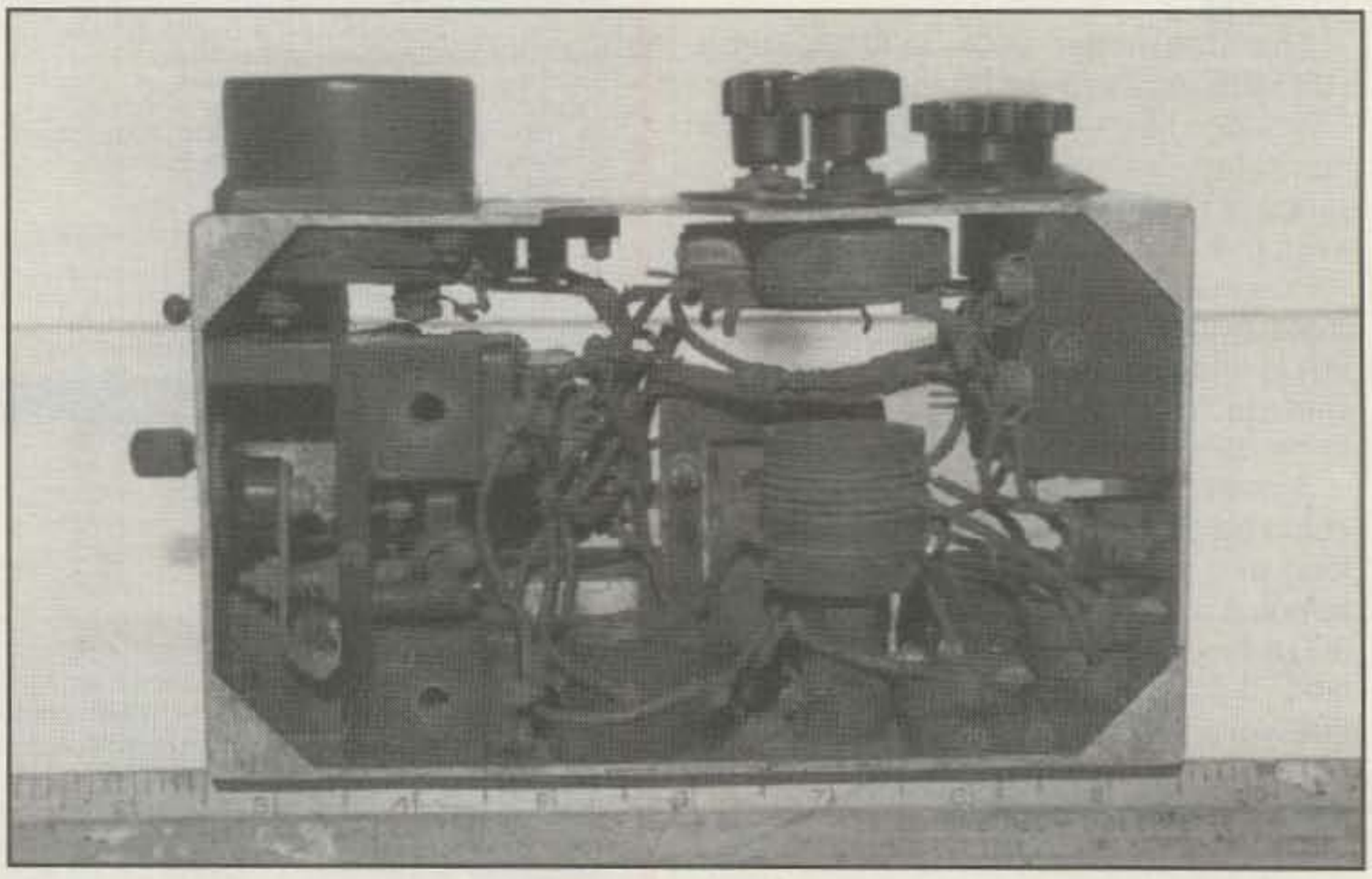
The front of the small portable unit showing the tube base behind. The meter measures antenna current. The eight-way plug board is for headphones and microphone. The tuning knob is on the lower left.

MHz or so and was a complete single-tube transceiver (after the amateur 5 meter style of the mid 1930s) in a small aluminum case about 5" × 8" × 3" with a leather cover. It is a beautifully designed little set that would make a nice play toy if you can get it up and running. The problem is that the headset and microphone connectors are usually long gone (as were mine), as is the antenna (a diamond loop thing that clipped onto the set about 3 feet square).

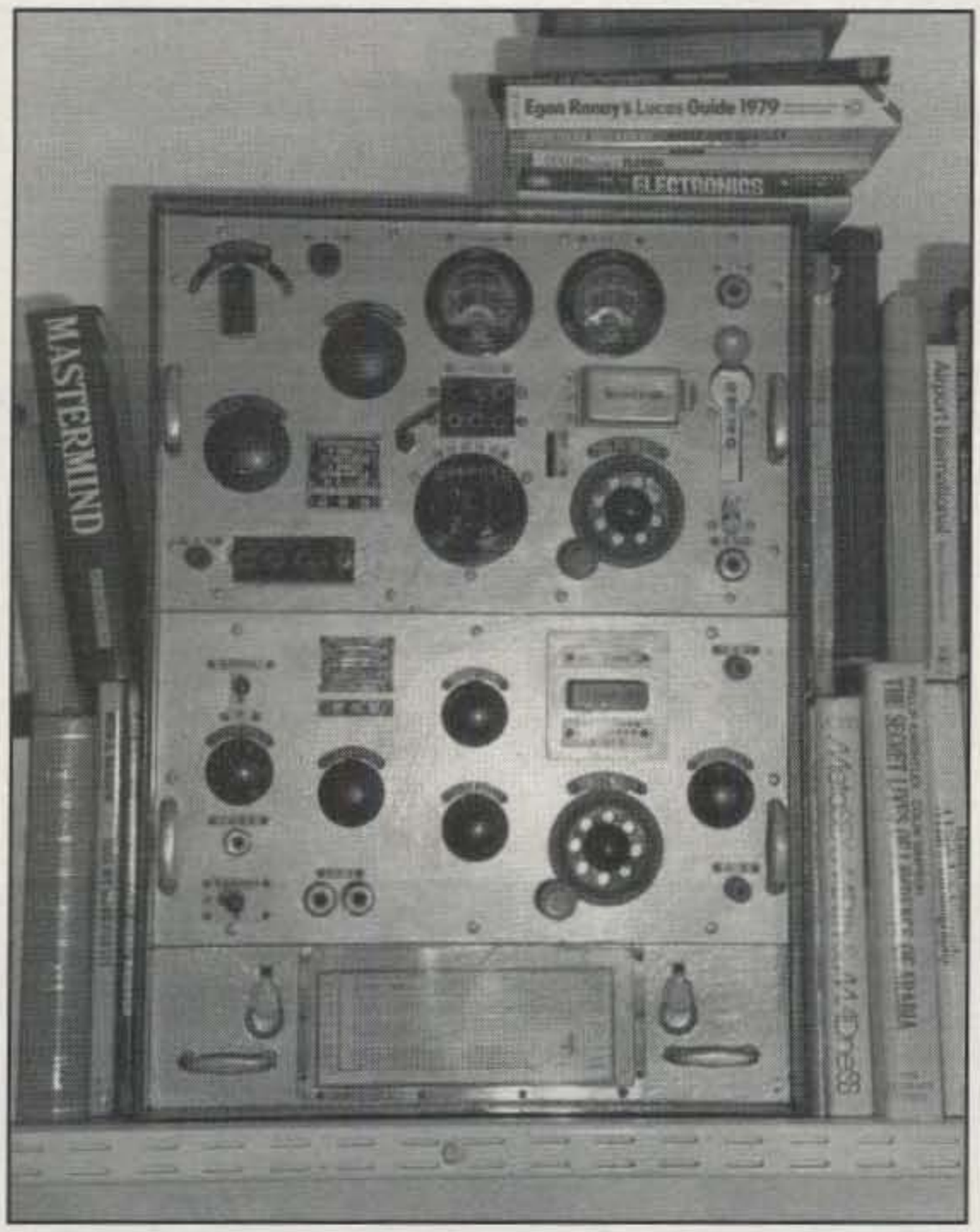
"The type 19 tube was used as a detector and audio in one switch position and I think a dual oscillator or oscillator and modulator in the other position. A small hand-crank generator set was used with it for power. The small Morse key button on the side of the case was what intrigued me when I ran across the one I had at a hamfest about ten years back. A marvel of engineering in the mid-30s."

Another member, Mac, WØNAX, said, "I have one of these also and I'm sure it is a walkie-talkie. Mine came with the tube, a dual triode UZ30MC, one half of which is used as a grid-plate (?) oscillator, the other half as modulator. The meter does read up to 300 mA and is in series with the antenna, which plugs into jack #1. I have a hand-drawn schematic by whomever owned it before me, and I'd be happy to send you a copy for whatever it is worth if you send me your postal address." He kindly sent it to me.

Member Steve Finelli passed on the following info: "I looked through my WW II directory of Japanese equipment entitled *Japanese Radio Communication Equip-*



Inside the small set, sockets one and two are where the antenna went. The main tuning coil is visible in the bottom center of the photo. The Morse key is just visible on the lower left.



The P3A proudly on display. I fabricated a replacement chart for the battery-tray holder, guessing on its likely appearance.

ment TME 11 – 227A dated December 1944. It pictures a set similar to your description. Model 94 Mark 6 Wireless Set: Mark 23 Type H Transmitter (walkie-talkie). It uses one type UZ 30MC tube. It has a 300 mA meter in the upper right corner. Under it are the eight jacks. The tube socket is in upper center. There is a total of four knobs to its left. Frequency coverage is 24.0 to 47.0 MHz; output is 0.2 watts; size is $7^3/_8$H × $5^3/_8$W × $3^3/_8$D. Use was as a walkie-talkie for short-distance two-way communication: It was designed for regimental headquarters, used in lower echelons. Power requirements: 135 V @ 40 mA and 3 V @ 250 mA. Of the eight jacks, four on the left are for microphones, and four on the right are for headphones."

While most of Steve's comments are interesting, the set he mentioned has four knobs. This one only has three knobs. It is quite likely, though, that they are of the same family of sets, perhaps with a different mark or version.

Restoration

Restoration was relatively easy. Since all the dial plates were screwed to the front panel, they all came off, as did all the knobs—with the exception of one, which proved to be a real pain to free up. Eventually all the knobs, labels, meters, and terminals came off, leaving a nice flat surface on which to work. Rubbing down and re-spraying was easy—much easier than trying to work around lettering on the front panel that you could never replace. The brass handles were polished and all the Bakelite knobs and fittings cleaned up nicely, as did the name plates for the case, transmitter, and receiver.

Reassembly was easy. All the little screws had been cleaned and replaced. The knobs and terminals went back, as did the meters. The finished unit does look very smart on a shelf in the house. Even though I had the missing power amplifier tube replaced by my friend in Japan, I do not think I will fire up the set. Even if it works, the performance of the receiver and transmitter will be far below that needed on today's crowded bands. It is better the set remains as an example of the technology and design of that far away land, in that far away time. It is a real museum piece.

Acknowledgements

I must thank Jack Jenner, G3ETJ, for giving me the opportunity to acquire such interesting sets; members of the Boat-Anchours Internet group; and Toshiki Matsuura and Ikuo Fujimura for their help in researching these sets. ■

Like the Phoenix rising from the ashes, this valiant (oops, wrong company) Warrior lives to fight the pile-ups another day.

The Heathkit Warrior Updated Plus 160 Meters

BY PAUL CARR*, N4PC

Professionally, I teach mathematics at a community college. In this capacity I encounter people of all ages and from all walks of life. Recently I had a chance to renew an old acquaintance. I recognized one of my students (past retirement age) from my earlier days in amateur radio. Professionally, Mel was semi-retired. He found himself with time on his hands, so he decided to enroll in some classes at our college. He was an excellent student. You easily could tell that he applied his professional work ethic to his class assignments.

One day during a coffee break our conversation turned to amateur radio. I found that his interest had waned, and he had not been active for many years. He stated a very familiar theme: During one of his relocations the amateur radio gear stayed packed, and he never got back on the air. He had accomplished his radio goals and had moved into an area where outside antennas were forbidden. Now he would enjoy amateur radio in retrospect.

As we talked about his equipment, I began to hear names from the 1960s and 1970s. When asked what he intended to do with the remaining equipment, he said he would keep his transceiver so that he could listen to the bands occasionally.

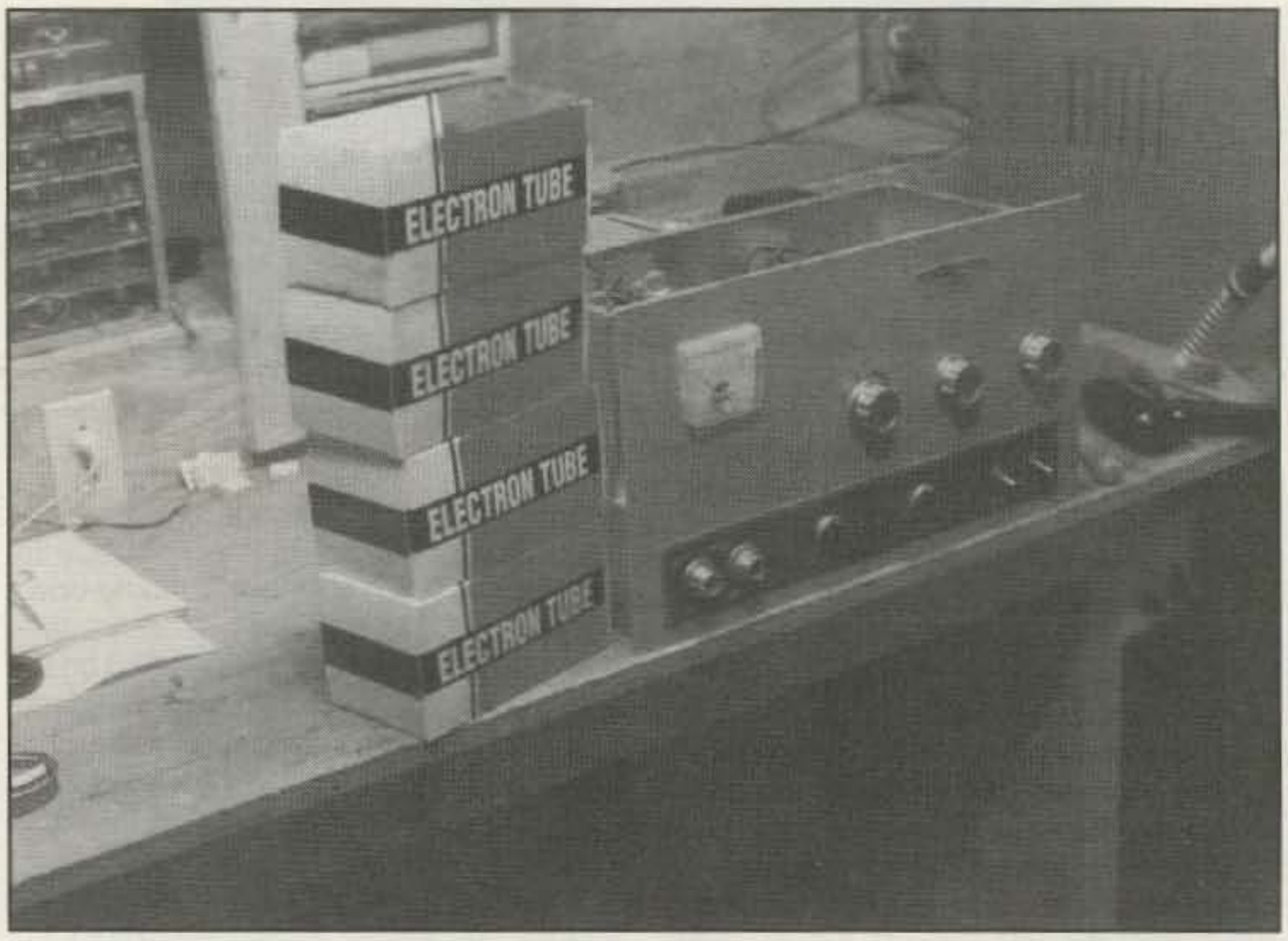
"What about your linear amplifier?" I asked.

"Oh, I have no further use for it. Do you want it?" he replied.

A few days later I was transferring a classic Heathkit Warrior from his shiney black Cadillac Sports Coupe to my faded red Nissan sedan. That's how I came by the equipment for this "fun project."

Some Background

The Heathkit Warrior was designed for use on the 80 through 10 meter amateur bands. It used four 811A tubes and was rated for an input power of 1000 watts on SSB and CW. It had an untuned input, and it was designed to be driven by a 100 watt output transceiver.



The venerable Warrior awaits its new tubes to wrap up the modification.

Plan of Attack

My objectives were very simple. I wanted to make the linear perform as well as it did originally, and I wanted to extend the coverage to 160 meters. I began by doing a thorough inspection of the entire unit. I took careful notes during the process. Since I intended to modernize the unit, I checked for places to install the additional components that would be needed. Luckily, there was plenty of room and component crowding would not be a problem.

Implementation

The first step in the restoration process was to replace all the heat-stressed components. All of the solder joints were inspected and repaired as necessary. Next I checked all meter shunts and limiting resistors. It does no good to have a meter on the front of the equipment if you are unsure of the readings that it provides.

I then addressed the problem of the antenna change-over relay. From my "goodie trove" I chose a relay that had 10 amp, double-pole, double-throw contacts and a 24 volt coil. I needed a small power

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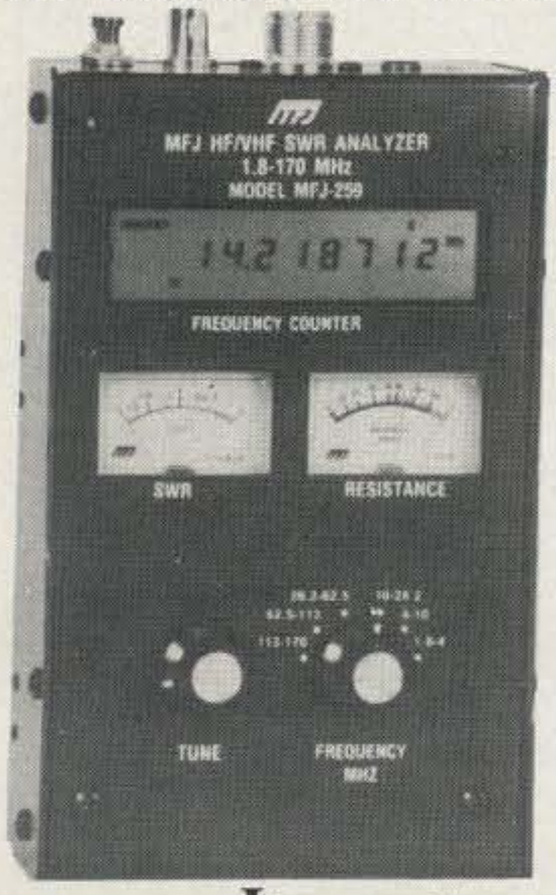

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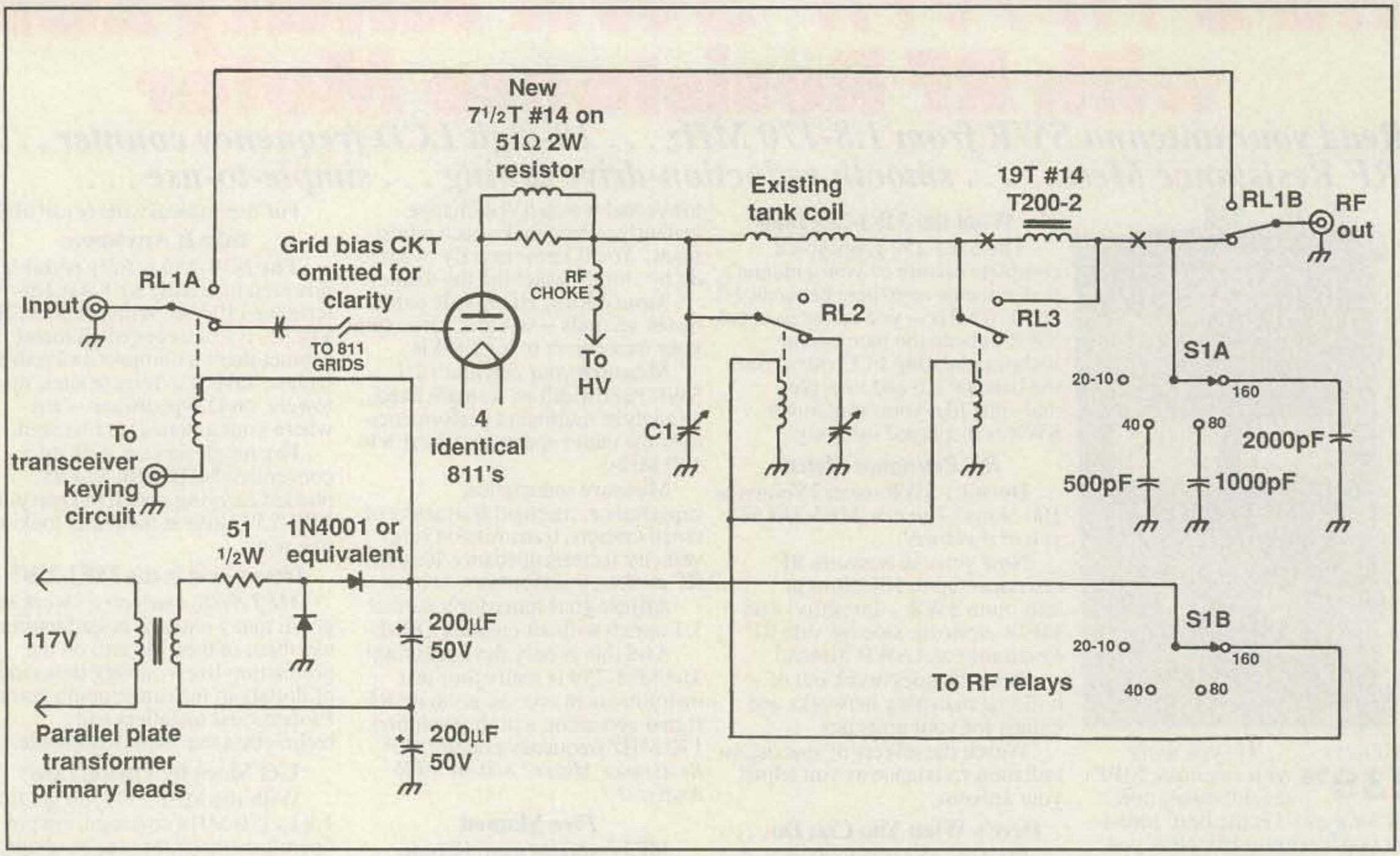
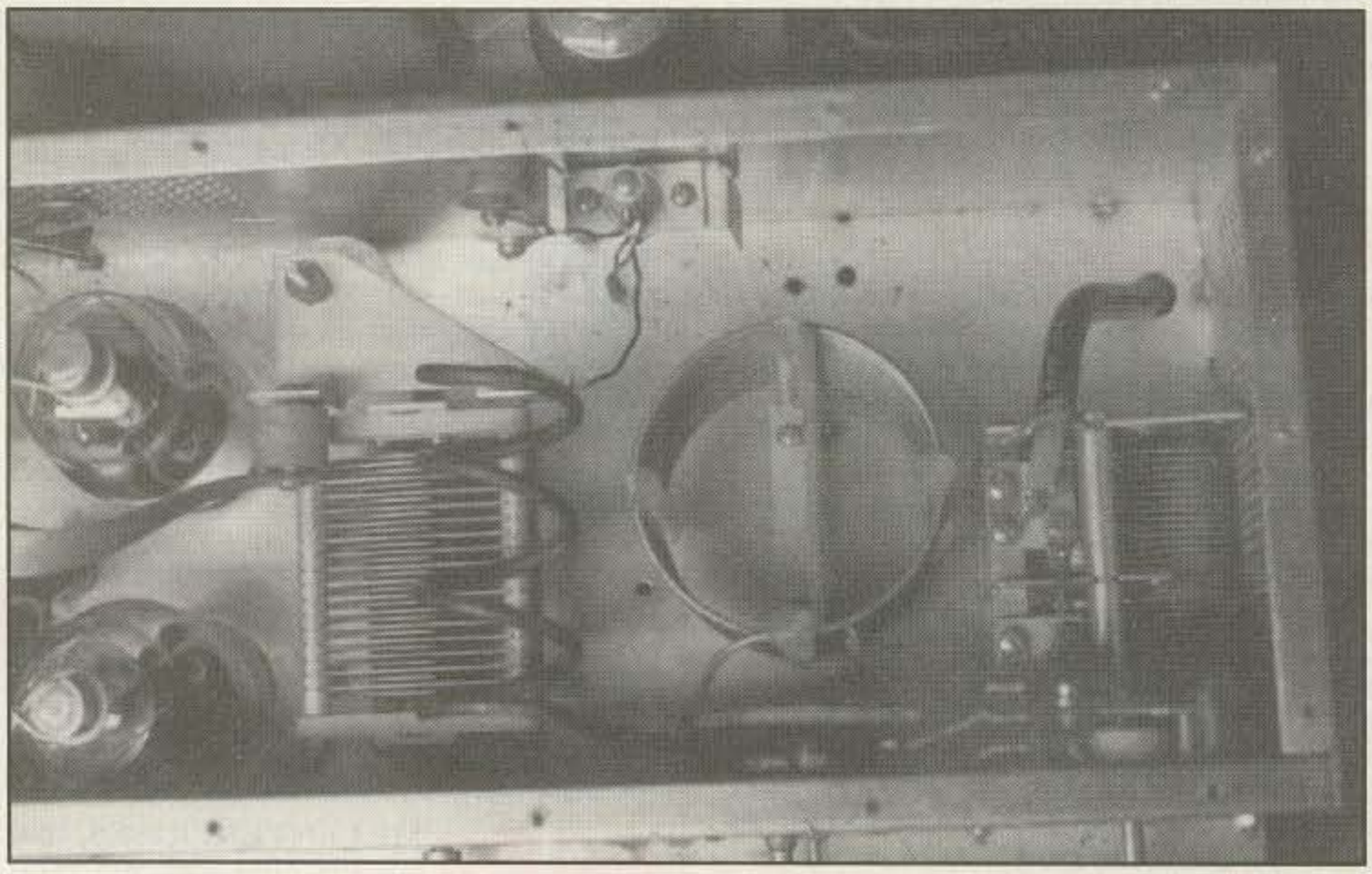


Fig. 1– Modifications for updating the Heathkit Warrior amplifier, plus the inclusion of 160 meters.

supply for the relays, and I chose a 1 amp 12 volt unit from my junk box. I wired the transformer in a voltage-doubler configuration. I found an RCA-type phono plug to use as a convenient point to connect the keying line from my transceiver. A quick check showed that all modifications were working well, so on to the RF deck.

I planned to replace the original 811A's with new Svetlana tubes provided by George Badger, W6TC. I had noticed during my inspection process that the existing parasitic supressors showed signs of heat stress. I discussed the fact with Frank Shields, W5TJ, during one of our early round-tables on 3829 kHz. Frank had replaced other 811A's with the new Svetlana tubes, and he suggested that I rebuild the supressors with 7 1/2 turns of 16-gauge wire wrapped on a 51 ohm 2 watt resistor. I took Frank's suggestion, and the problem of self-oscillation was gone. Everything looked good so far. I did preliminary tests at my work bench into a dummy load, and the old rig performed flawlessly. The only thing required was a slight touch-up of the neutralization capacitor. Subsequent tests on the air were completely satisfactory, so on to the modification for 160 meters.



The interior view of the RF compartment. Most of the older rigs had more than enough room to spare so that changes could be made easily.

Top-Band Conversion

Conversion of the Warrior to cover 160 meters requires adding some additional coils and capacitors plus a technique to switch the components into the circuit. In order to maintain the same "Q" in the PI network, the value of both capacitors and the inductor of the network must be increased. For the modification of C1, I paralleled two high-voltage "door-knob" capacitors of 220 pF and 100 pF. Since the capacitors are on the high-voltage end of the network, I used a vacuum relay purchased at a hamfest. Do not try to use a low-voltage relay at this point. The contacts will arc!

For additional inductance for the circuit I wound 19 turns of #14 Formvar-coated wire evenly spaced on an Amidon T200-2 powdered iron core. The number of turns may vary slightly, so some experimentation may be necessary. I mounted the coil between two pieces of plexiglass

and bolted the assembly to the RF compartment front wall. I chose another 24 volt, double-pole, double-throw relay with the contacts wired in parallel to switch the coil. You can use lower voltage contacts at this end of the network, since it is on the low-voltage end of the circuit. I fabricated a small bracket and mounted it adjacent to the coil.

It is also necessary to do a bit of modification on the antenna end of the coil. The loading capacitor needs to be shunted with additional capacitance for 160 meters. I needed to add a rotary switch to provide the functions of switching to 160 meters and adding the necessary capacity for proper operation.

The two 500 pF capacitors used in the original loading scheme mounted in the RF compartment beneath the bandswitch need to be removed. I added a new double-pole, four-position rotary switch which activates the components needed on 160 meters. In the extreme clockwise position the relays are activated, and a 2000 pF capacitor is switched in parallel with C2. One position to the left, a 1000 pF capacitor is switched into the circuit, and the switching relays for 160 meters are deactivated. One position further to the left switches a 500 pF capacitor in parallel with C2 for proper operation on 40 meters. In the extreme counter-clockwise position the loading capacitor is unshunted, permitting proper operation on 20 through 10 meters. The new arrangement works properly on all bands. Just watch where the switch is positioned.

On The Air

I am happy to report that the linear works as well as I had hoped it would. It works as well on 80 through 10 meters as it did originally, and it functions well on 160 meters. The output was 600 watts or more on all bands, and there was no sign of instability. The original objective had been met!

Acknowledgements

An undertaking of this type would never have reached fruition without the help and encouragement of many people. First, my deepest thanks go to Mel Malcove for the gift of the Warrior. I must also extend my appreciation to George Badger, W6TC, who provided the 811A's. I have found the tube to be rugged and dependable, and I would recommend it for replacements in gear requiring this tube. Finally, my thanks go to my friends on 3839 kHz. Their critiques and encouragement were deeply appreciated. They are a great group, and I am happy to call them my friends!

The Heathkit Warrior was introduced at the end of the AM era, and as a result the components are very "heavy duty." I plan to have the unit in service for many years.

1997 CQ WPX SSB Contest
High-Claimed Scores

SINGLE OPERATOR
ALL BAND
UNITED STATES

KQ2M 4,857,624
K3ZO 3,008,000
NB1B 2,890,768
KV0Q 2,881,960
K4AB 2,123,912
W4AN 2,023,560
K7RI 1,959,584
WB9Z 1,893,801
K4VUD 1,428,399
NC7M 1,401,830
KW0KW 1,367,744
NQ4I 1,310,064
W9LT 1,121,662
*WA4ZXA 1,022,329
N4ZZ 958,818
NK6O 850,506
K1SD 761,264
K6BZ 752,984
W1CU 725,835
RNO9Z 711,227

28 MHz

W4YV 43,956
*WB2BZR/3/T 9,204
K0WUI 8,112
W7AYY 7,866
*W7USA 4,653

21 MHz

W5VX 244,528
WA0ETC 85,925
*WA7BNM 69,069
WT4K 63,578
*W4TD 41,382

14 MHz

WE3V 2,113,251
N3HBX 787,572
K7ZZ 376,380
*N4MO 353,472
W7FP 347,085

7 MHz

*W6KY 252,436
KC4YM 192,262
*KW4T 122,760
*WA4QDM 49,610
*AA9IA 48,280

3.7 MHz

KE1Y 1,074,672
W6RJ 1,023,360
N3OC 114,680
W5FO 83,232
AG4W 63,648

1.8 MHz

W4ZV 86,332
AA4MM 34,304
KN2T 16,650
K0CS 9,752

LOW POWER
ALL BAND

WA4ZXA 1,022,329
WD5K 521,740
WS1A 500,038
WO4O 448,749
NY3Y 443,751
NA2Q 358,560
KR4QI 330,084
AC0W 327,320
N2ED 255,258
W7ZMD 255,095

28 MHz

WB2BZR/3/T 9,204
W7USA 4,653
WB4HFL 4,624
W9CNF/M 672
WB0GFV 504

21 MHz

WA7BNM 69,069
W4TD 41,382
KU6T 30,600
K0BCN 19,264
WJ7S 13,490

14 MHz

N4MO 353,472
WF1L 303,696
AK0A 179,305
KF6HAN 174,404
KB8IBS 161,392

7 MHz

W6KY 252,436
KW4T 122,760
WA4QDM 49,610
AA9IA 48,280
N5XUS 23,980

3.7 MHz

KB3AFT 5,760
N8LIQ 3,172
N6TPT 360

TRIBANDER/SINGLE ELE

K4VUD 1,428,399
NC7M 1,401,830
N4ZZ 958,818
K6BZ 752,984
W1CU 725,835
NO9Z 711,227
KM0L 709,316
WC4E 703,578
KC6X 657,476
W6TKF 588,264

LOW POWER

WD5K 521,740
NA2Q 358,560
AC6WD 207,214
N9VVV 160,460
KA0WWT 113,184
WR0A 111,672
NN5T 109,917
K3QK 98,674
KD6DAE 94,346
K6UM 92,901

SINGLE OPERATOR
ALL BAND
DX

P40V 14,960,725
TI0C 13,844,175
4V2A 12,210,675
TS8A 11,526,732
8R1K 10,999,100
CT3BX 9,646,512
NH7A 8,591,709
5N0T 8,473,500
HC1OT 6,939,744
VE3EJ 6,424,564
JY9QJ 5,527,392
OT7T 5,305,340
5X4F 5,044,598
KQ2M 4,857,624
*KP2/KF8UM 4,772,124
JH5ZJS 4,676,060
OD5NJ 4,668,356
YT1BB 4,481,720
9K2HN 4,465,968
UA9MA 4,335,936
RN6BY 4,326,511
TK5NN 4,285,340
FM5CD 4,201,117
GI0KOW 4,077,084
CW6V 3,871,725

28 MHz

LU8AQE 559,630
*LU4VZ 504,216
LU2DW 456,688
*LU8HSO 335,654
*PP5UB 308,962
ZD8DEZ 243,648
*LW6EQG 174,125
*PY2SR 167,757
*LU7HTJ 140,818
*PU2MHB 134,520

21 MHz

ZX5F 10,312,104
LT1F 5,268,558
ZP5XF 4,004,991
LU4HAW 3,095,174
*PP5UA 1,712,000
4F3GDX 1,623,447
*VK4MGA 1,598,766
5X1T 1,465,280
FM5GU 1,384,952
ZP6CC 1,314,612

14 MHz

EA8AH 11,536,668
LP5H 4,153,225
EA9AM 3,940,288
WH6CQH 3,771,486
OK1RI 3,761,380
IQ4A 2,927,981
HD2RG 2,780,229
ZV8C 2,518,992
YT0A 2,221,320
OH1JD 2,215,516

7 MHz

ZX9A 11,010,280
XQ8ABF 6,455,020
LU6MFD 4,428,192
RE0A 3,655,008
5B4MF 3,231,228
AH8A 2,897,880
KH6FKG 2,189,376
YT7A 2,161,452
*VE7SV 2,028,444
HA9RE 1,880,112

3.7 MHz

EA8/OH1MA 4,519,824
4N1A 1,605,900
6D2X 1,109,760
S55T 1,106,700
KE1Y 1,074,672
OE3A 1,055,088
W6RJ 1,023,360
TA3W 1,003,244
S57O 905,168
HA8JV 901,728

1.8 MHz

VE3BMV/1 432,352
S54E 379,620
S57M 285,648
LY1FW 232,638
OZ3SK 214,722
*UN2O 196,308
*UU4JMG 110,622
OM7RU 104,160
EA8ZS 93,960
W4ZV 86,332

LOW POWER
ALL BAND

KP2/KF8UM 4,772,124
FM5DN 3,486,820
LQ0N 3,269,370
VP5E 2,410,200
LU8HLI 1,628,958
LU5EWO 1,381,380
RA0FA 1,342,565
UA9CAW 1,194,336
YN6WFM 1,192,260
WP4NHM 1,079,325

28 MHz

LU4VZ 504,216
LU8HSO 335,654
PP5UB 308,962
LW6EQG 174,125
PY2SR 167,757
LU7HTJ 140,818
PU2MHB 134,520
ZW1B 93,408
LU4HMV 75,616
PU2MRY 74,245

21 MHz

PP5UA 1,712,000
VK4MGA 1,598,766
L5V 1,261,316
3B8/DL6UAA 1,061,775
4F4IX 792,285
LU1HTF 612,890
KP4/AA2OX 464,515
LU3ES 422,988
PY4OY 301,498
YC0WWW 177,184

14 MHz

LS9F 2,153,859
4N7B 1,219,710
DU1COO 729,280
PT2AW 708,111
DF7YU 633,046
Z39M 619,648
RN3QO 485,958
JH7VHZ 392,129
N4MO 353,472
LU8EWD 332,004

7 MHz

VE7SV 2,028,444
RA0FU 1,018,240
LX1KC 709,840
UR7CA 670,140
RA3WA 410,440
OH4KBC 381,728
TA3J 364,560
S54A 320,880
UR7TZ 295,390
YO3GOD 264,160

3.7 MHz

NP3D 852,110
OK1FFU 437,760
YU1FJK 361,368
YO2LIF 339,840
OM5KM 334,020
9A3QK 303,996
S57KNC 278,000
YW5S 273,980
OZ2ZZZ 170,834
PA0MIR 159,600

1.8 MHz

UN2O 196,308
UU4JMG 110,622
RA4NW 85,250
ES1CH 68,834
UA4UDF 59,520

TRIBANDER/SINGLE ELE

TS8A 11,526,732
*KP2/KF8UM 4,772,124
9K2HN 4,465,968
UA9MA 4,335,936
CW6V 3,871,725
VE9AA 3,017,020
4N9BW 2,836,995
FK8HC 2,760,936
UT4UZ 2,413,920
LY5W 2,074,448

LOW POWER

*KP2/KF8UM 4,772,124
LU8HLI 1,628,958
LU5EWO 1,381,380
YN6WFM 1,192,260
S51F 876,040
YT0X 784,672
EA9IB 767,844
XE3LMV 761,760
EA8KK 544,644
WD5K 521,740

SINGLE OPERATOR
ASSISTED
UNITED STATES

W6XR 1,860,790
AA3JU 935,656
W5HVV 785,610
KA7ZUM 763,650
N5JR 724,960
W8AEF 584,278
KC0ZC 469,098
KB0WY 435,768
N6CCL 396,134
W9RM 307,818

14 MHz

*WR3L 73,650
*W9HV 49,410
WA2ZGO 38,781

7 MHz

N1HRW 265,230

LOW POWER
ALL BAND

KE3XG 54,108
N2TTT 33,500
WB3ECU 27,071

14 MHz

WR3L 73,650
W9HV 49,410

DX
ALL BAND

TM7XX 2,780,332
JM4UQM 2,381,475
W6XR 1,860,790
IO4A 1,465,728
*YU1NR 1,349,300
EA5BHK 1,298,856
DK7ZT 1,149,876
AA3JU 935,656
W5HVV 785,610
KA7ZUM 763,650

28 MHz

EA3AML 7,936
*JL4CVG 7,367

21 MHz

EA3EJI 97,125
IU2D 96,624
JQ1NGT 96,564

14 MHz

DL3NED 1,447,270
DL7IO 1,177,691
F5PGP 1,058,000
EA3CKX 1,052,694
RW4WR 845,543

7 MHz

N1HRW 265,230
S58MU 65,296

3.7 MHz

EA3DX 441,540
YT4TD 104,784

1.8 MHz

DL7VRO 169,092

LOW POWER
ALL BAND

YU1NR 1,349,300
ON5GQ 709,590
IY4M 488,750
YO2LDE 267,386
S50U 217,005

28 MHz

JL4CVG 7,367

21 MHz

JR9NVB 59,150

14 MHz

WR3L 73,650
W9HV 49,410

7 MHz

S58MU 65,296

QRP/p
UNITED STATES

KC6ETY .....A 279,792
N7VY .....A 278,967
N1TM .....A 172,520
KC5WCO .....A 57,060
KG5U .....A 46,168
N7IR .....A 25,840
NT5CC 28 2,754
N1AFC 21 12,505
WA6FGV 21 8,487
W6CN 14 49,500
N8XA 14 4,730
W8QZA/6 .....7 10,164
K9FOH 7 4,320

DX

LY3BA .....A 422,820
KC6ETY .....A 279,792
N7VY .....A 278,967
SP7LZD .....A 257,530
7J6ACT .....A 208,624
N1TM .....A 172,520
OK1DKS .....A 138,432
LU1VK .....A 107,381
DL2IAN .....A 86,764
KC5WCO .....A 57,060
LW7EGO 28 8,060
JF3EIU 28 2,821
LU2HNP 21 39,483
JI5BKF 21 35,100
UA4SKW 14 199,320
JR4DAH 14 67,536
S59D 7 125,970
IK8HOE 7 14,994
SP4GFG 3.7 155,806
UX2MF 3.7 148,400
RW4HHD 1.8 54,136
YO4FRF 1.8 8,820

MULTI-OPERATOR
SINGLE TRANSMITTER
UNITED STATES

K5ZD 5,289,639
KC7V 2,696,100
WW5DX 2,307,646
NY4A 2,145,164
WR4K 2,132,256
NK7U 2,112,613
KZ6X 1,947,780
N8NR 1,778,621
N6MI 1,539,000
AAØYX 988,980

DX

ZXØF 25,517,180
IZ9Z 11,657,960
HG1S 9,186,237
C4ØM 8,753,550
IR4T 7,564,320
3DA5A 7,425,200
JA1BRK/DU1 6,570,720
LZ9A 6,303,206
CV1T 6,137,523
T9DX 6,099,209
OE3S 5,966,898
3E1DX 5,872,160
RK9CWW 5,858,802
9A7A 5,500,467
K5ZD 5,289,639
EX9A 4,901,116
KP3P 4,861,536
SØ2R 4,735,192
TM2V 4,635,088
RU6LWZ 4,537,296

MULTI-OPERATOR
MULTI-TRANSMITTER
UNITED STATES

AEØM 8,165,408
NE6N 3,389,892
WM2V 708,968
NE9U 522,020
N5KB 234,094

DX

WP3X 23,555,880
KH7R 20,147,380
LU4FM 18,473,910
4M1X 16,814,160
9A1A 16,791,460
S52A 15,050,090
OT7A 14,075,810
S53M 8,535,200
AEØM 8,165,408
LY7A 4,959,307

The Ten-Tec 1208 6 Meter Transverter

BY DOUG DeMAW*, W1FB

The 6 meter band offers an interesting opportunity to get started with non-FM VHF. Although a number of commercial HF transceivers include the 6 meter band at additional cost, a large number of older HF rigs do not accommodate the 6 meter enthusiast. Those who want to operate at 50 MHz without buying a 6 meter transceiver or an HF-band transceiver that includes the 6 meter band may use a transverter in combination with an existing HF transceiver to utilize the 50, 144, or 432 MHz frequencies. Ten-Tec wisely included a 6 meter transverter in its growing line of T-Kits. I was attracted to the No. 1208 transverter after reading about its features in the T-Kit catalog. I concluded that the 1208 merited a product review after observing the quality of the design and the excellent hardware used in the product. The heavy-duty metal cabinet is impressive by itself.

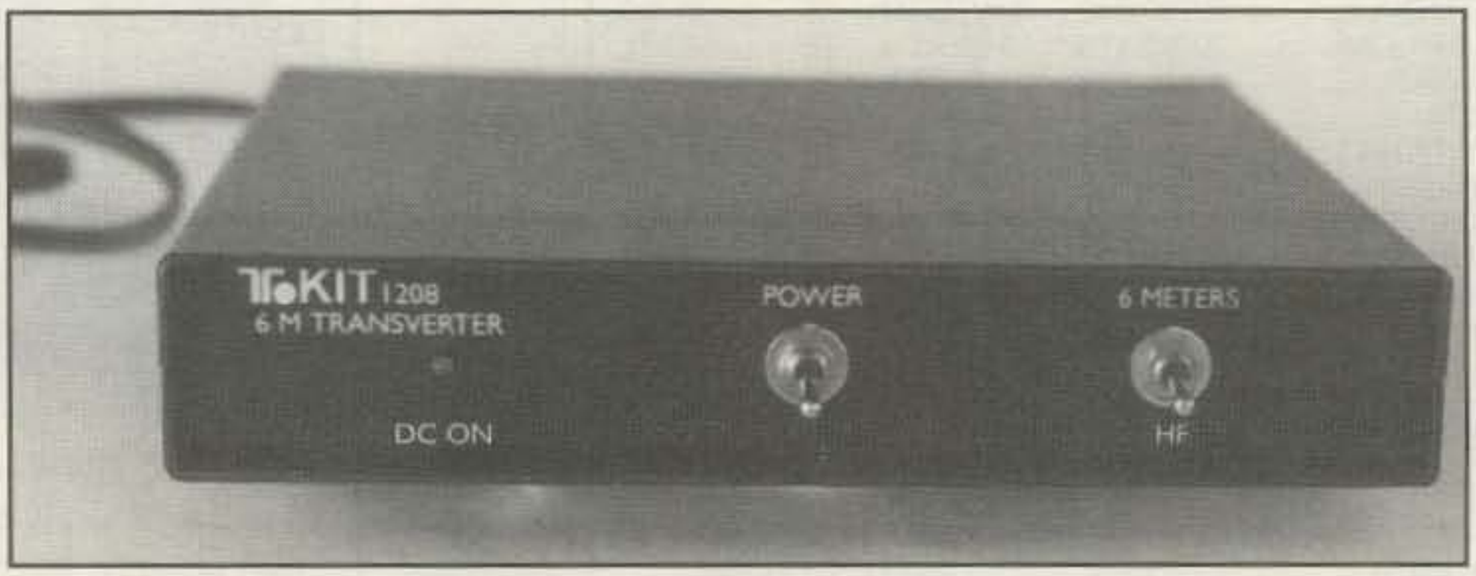


Photo A– The Ten-Tec 1208 six meter transverter.

Circuit Highlights

Fig. 1 is a hybrid diagram I drafted to illustrate the main points of the 1208 circuit. Q7 and Q8 provide the 36 MHz heterodyne frequency required for mixing with the 14 MHz HF transceiver energy to produce the 6 meter signal. A doubly balanced diode-ring mixer is used during transmit and receive to mix 36 MHz with 14 MHz on transmit, and 36 MHz with 50 MHz incoming signals during receive, to provide a tunable IF at 14 MHz.

Output from the mixer is amplified at 50 MHz during transmit. Q9 and Q10 are low-level RF amplifiers. Q11 is the driver. Push-pull 2SC1971s (Q12 and Q13) operate as the linear final amplifier. The output transistors are rated conservatively. They should last a long time. Specified peak output power is 8 watts minimum. Each 2SC1971 is rated for 7 watts of output power at 175 MHz when using a +13.5 volt Vcc. Driving power for a single 2SC1971 is 0.6 watts. Driver transistor Q11 is also husky. The 2SC1970 will produce 1.3 watts of output power at 175 MHz with 0.12 watt of drive. These three transistors are properly heat-sinked to ensure safe operation.

A 7-element low-pass filter is included between the PA stage and the antenna to attenuate all harmonics by 55 dB or greater, referenced to peak output power.

There are no relays in the transverter. All T-R switching is done with PIN diodes and a 5-transistor electronic switching circuit which is not shown in fig. 1.

The receiving preamplifier, Q15, is protected by two diodes (D19 and D20) that conduct when positive voltage is applied to them in the transmit mode. A J310 JFET is used as a post mixer IF amplifier during receive. It boosts the 14 MHz IF signal from the mixer to assure ample overall receive gain. This transistor is not shown in fig. 1.

S1 is a front-panel switch that allows the user to select 6 meter or HF operation. The transverter is bypassed when S1 is set for HF operation. This manual switching circuit will safely accommodate up to 100 watts of RF power in the bypass mode. A second panel switch serves as a power ON/OFF selector in the +12 volt supply line. A red LED illuminates when the power is turned on.

Assembling The Transverter

I needed 12 hours to assemble and test the 1208 transverter. Assembly is tedious and requires that the builder pay close attention to the well-written assembly manual. There is an errata sheet that comes with the kit. I strongly advise that you make corrections to the basic manual before you start construction. I made an errata notation in the column where the book describes the installation of the mini T3 balun transformer. For reasons I cannot fathom, I ignored my own notation and failed to check the errata sheet during that step. The result was only milliwatts of output power from the tranverter at checkout. A call to Ten-Tec revealed that T3 was the most common cause for the power output problem. I read the errata sheet and learned that I had to remove the transformer and rotate it 90 degrees on the PC board. Suddenly I was getting 12 watts of output power! I am happy to say I made no other errors during assembly. Inexperienced builders may require a few more hours of assembly time to complete this project. However, even a beginner should be able to manage this kit. Circuit performance tests are suggested at various points as you assemble the kit. This makes it easier to locate wiring or assembly problems rather than when the entire circuit is tested at completion.

The double-sided PC board is loaded with components. A view of the top of the board, after assembly, is shown in photo B. The wiring between the front-panel bypass switch and the three SO-239 connectors on the rear panel is done with RG-174 coaxial cable. Two tie wraps are provided for bundling the RG-174 neatly.

I was impressed with the accuracy of the parts and hardware count. I had exactly the required number of components for the project. My bonus hardware "leftover" was one black 4-40 flathead screw.

It is a pleasure to find a product that uses Amphenol SO-239 coax fittings rather than RCA phono jacks for antenna connectors. There are three S0-239s on the rear of the transverter. No need for troublesome adapters when attaching RG-8 or RG-58 cable to the unit!

A heavy-duty, fused power cable is

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

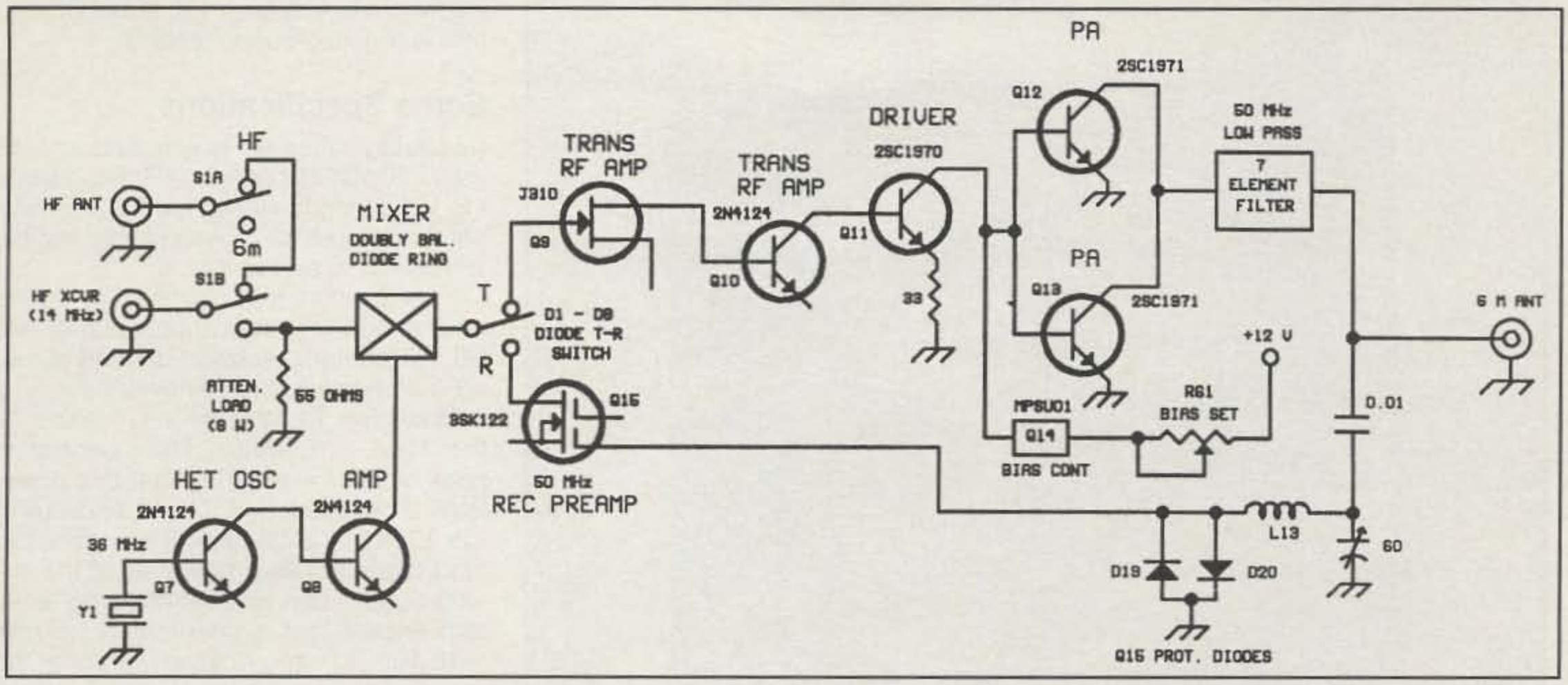


Fig. 1– Hybrid diagram of the basic 1208 transverter to illustrate how it functions. The 5-transistor T-R switching circuit has been ommitted, as has the post mixer 14 MHz receive amplifier.

included with the kit. It is used for powering the 1208 from an outboard +12 to +13.5 volt, 4 amp regulated DC supply.

Tune-up and Operation

Step No. 1 is to align the converter portion of the transverter. I used a 14 MHz receiver and a URM-25 signal generator during alignment. If you don't have access to a signal generator that covers the 6 meter band, you may use another HF transmitter as the signal source by selecting an HF frequency that is harmonically related to 6 meters. For example, the fifth harmonic of 10.105 MHz falls at 50.525 MHz. If your HF transmitter does not cover the 30 meter band, you may use the seventh harmonic of 7.150 MHz in the 40 meter band. This will be heard at 50.05 MHz. Adjust the level of the test signal until you hear it in the receiver to which the 1208 is attached. The manual indicates which coils and trimmers to adjust for peak signal response.

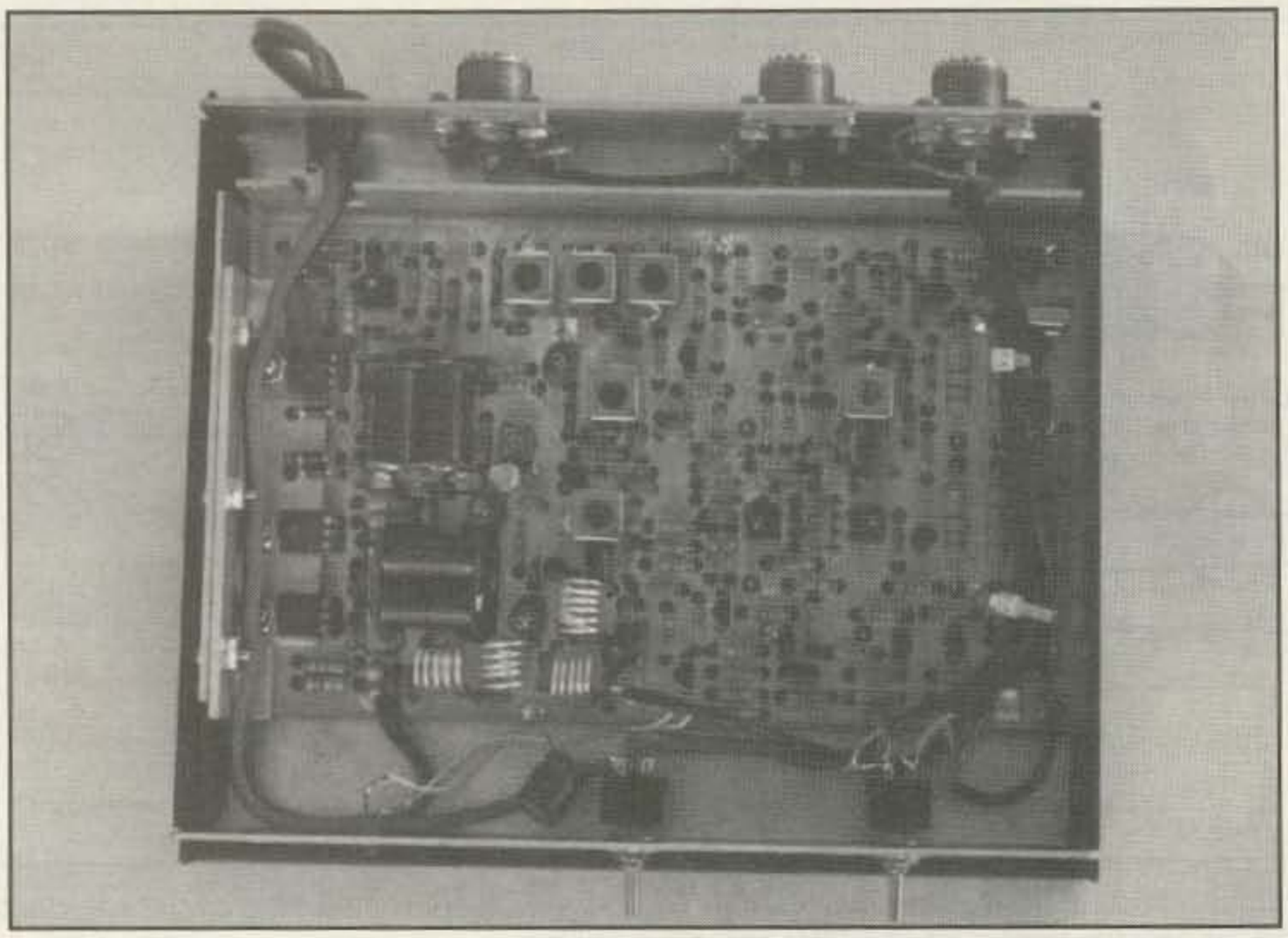


Photo B– Interior of the 1208 6 meter transverter showing the high-density circuit and clean layout. Three SO-239 coax connectors are used in lieu of the usual RCA phono jacks found in kits and certain small equipment.

The frequency of the heterodyne oscillator should be checked and adjusted, as required. An accurate frequency counter is the best device for calibrating the 36 MHz oscillator. Connect the counter to test point TP5 on the PC board. Adjust C22 for a reading of 36.000 MHz. The range of the calibration trimmer for my unit would not allow the frequency to be shifted to exactly 36.000 MHz. The best result I could obtain was a reading of 36.000823 MHz. Variations in crystal characteristics can account for some units being incapable of "dead on" adjustment. Crystal aging with operating time will often require recalibration of the oscillator. The user should be aware that 36.000823 is entirely acceptable for amateur work on 6 meters. Factually, I struggled to find this one picky fault in the 1208 transverter!

The builder must set the idling current for the final amplifier. This is done while monitoring the overall current taken by the transverter in the transmit mode, but without RF drive applied. Trim pot R61 is adjusted for a DC current increase of 200 mA.

The final setup requires peaking the tuned circuits for the transmitter portion of the 1208. This calls for a plastic hex tuning tool. Output from the transverter is fed to an SWR indicator and a 50 ohm dummy antenna. The specified circuits are tweaked for maximum RF power output. I was amazed to observe an unmodulated carrier output of 12 watts (TS-570D in the AM mode at 5 watts) while using a 13.5 volt DC supply. This nicely exceeds the 8 watts minimum power output rating set by Ten-Tec. A current of approximately 3.8 amps is drawn at peak output power during transmit. A modest 170 mA of DC current is required during receive.

Some Specifications

Receiving sensitivity is specified as 0.15 µV for 10 dB SNR @ a 2.4 kHz bandwidth. I found during my tests that a 0.1 µV signal from my URM-25 was plainly audible when I tuned across it.

Feedthrough from 20 meters during receive on 6 meters is approximately –75 dB. HF antenna isolation is rated at –60 dB (not measured by reviewer).

Maximum 14 MHz RF drive power to the 1208 is 5 watts. The operator is responsible for ensuring that this power level is not exceeded. The input circuit of the 1208 has a 55 ohm, 8 watt resistive load that dissipates nearly all of the driving power. Two other attenuating resistors ensure that approximately 30 mW (–15 dBm) of transmit energy reaches the mixer. Care must be taken to never exceed 5 watts of 14 MHz driving power. Excessive drive can quickly damage the transverter and its internal resistive load.

The dimensions of the assembled unit are $1\frac{5}{16}$"H × $7\frac{1}{4}$"W × $6\frac{1}{8}$"D. The 1208 weighs 2.5 pounds. The thick-wall aluminum case is painted black. The lettering is in white.

Final Comments

Coverage of the 6 meter band is accomplished by tuning the HF transceiver from 14.000 to 14.350 MHz. Therefore, 50.000 MHz coincides with 14.000 MHz and 50.350 MHz falls at 14.350 MHz. This indicates that a relatively small portion of the 6 meter band is covered with the 1208. If the tunable IF had been 28 MHz, there would have been greater coverage of 6 meters. However, using 28 MHz as a tunable IF would cause some spurious responses to be transmitted.

I was pleasantly surprised on July 5, 1997 when I gave my callsign on the 50.2 MHz SSB calling frequency at 1555Z and was answered by N8OMS in Arkansas. I received an S9 signal report from the barefoot 1208 tranverter. The antenna was (shame on me) a 160 meter inverted V at 70 feet with 450 ohm ladder-line feeders. A homemade 6 meter Transmatch/SWR indicator was used at the station end of the antenna.

I found the instruction/assembly manual to be clearly written and complete. The price class of the 1208 transverter is a mere $95. Frankly, I am unable to understand how Ten-Tec can offer this quality kit for so little. I consider it the bargain of the century.

The manufacturer is Ten-Tec, Inc., 1185 Dolly Parton Parkway, Sevierville, TN 37862-3710. To order call 1-800-833-7373 or e-mail to <sales@tentec.com>. A kit catalog is available on request. ■

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SHOWCASE

PowerPort 73 From Cutting Edge Enterprises

PowerPort 73 is a triple outlet 12 volt portable power supply that provides 7 amp hours capacity, three DC outlets, and comes in a sturdy, padded nylon carrying case. The automatic two-stage charger comes fully charged, ready to go. Size is 8" × 2 3/4" × 4 1/4", and weight is 6 lbs. The PowerPort 73 is priced at $76.95. For more information, contact Cutting Edge Enterprises, 1803 Mission St. #546, Santa Cruz, CA 95060 (800-206-0115; e-mail <cutedgent@aol.com>), or circle number 101 on the reader service card.

MFJ-8631 220 MHz Data Radio

The MFJ-8631 is ready to use as a dedicated data transceiver for the 220 MHz band on factory-installed 223.700 MHz. It has all of the features of the 2 meter version and provides up to 3 watts output. All data rates from 1200 to 9600 baud can be run. The MFJ-8631 is compatible with all TNCs that have hardware DCDs. They are also compatible with most TNCs that have software DCDs. Plug in an appropriate TNC cable available through MFJ, your antenna, 12 VDC, and you're ready for error-free packet.

The unit also has Ultra-fast PIN diode switching, providing near instantaneous changeover between transmit and receive. A dual conversion receiver, 0.25 µV low-noise preamp, double-tuned front end provide weak-signal reception and freedom from intermod. The narrow 10.7 MHz IF filter and special full data-bandwidth 455 kHz IF filter offer optimum passband and steep skirts for error-free data reception. Unsquelched audio feeds directly to your TNC for fast DCD response.

The MFJ-8631 is priced at $139.95. For more information, contact MFJ Enterprises, Inc., P.O. Box 494, Mississippi State, MS 39762 (phone 601-323-5869; orders 800-647-1800; fax 601-323-6551; or circle number 102 on the reader service card.

RF Prototype Systems Low Cost Test Sources

RF Prototype Systems can provide low-cost, phase-locked sources from 1 to 4500 MHz, off the shelf, with custom options to 20 GHz. Control options include on-board DIP switches, IEEE-4888, or complete embedded solutions with front-panel keyboard and display. The sources are easy to use and are well suited for engineering lab and production test stations, maker says.

For more information, contact RF Prototype Systems, 9400 Activity Rd., Suite J, San Diego, CA 92126 (phone 619-689-9715; fax 619-689-9733; or toll-free [outside California] 800-874-8037), or circle 103 on the reader service card.

Svetlana 3CX6000A7 Triode

Svetlana Electron Devices has added the 3CX6000A7/YU148 power triode to their product line. The triode is a drop-in replacement for the 3CX6000A7/YU148 used in popular FM transmitters. This tube is designed with a modern mesh filament

which provides long-life performance. The Svetlana 3CX6000A7/YU148 is manufactured with high alumina ceramic doped with chromium and molybdenum. This combination results in a true metal/ceramic chemical bond, providing a stronger bond, and allowing higher processing temperatures.

For more information, contact Svetlana Electron Devices, Inc., 8200 S. Memorial Pkwy., Huntsville, AL 35802 (phone 205-882-1344; fax 205-880-8077; e-mail <sales@svetlana. com>; or circle number 104 on the reader service card.

Techtoyz® Micro DTMF Decoder From Optoelectronics

Optoelectronics, Inc. has announced Techtoyz®, a new line of test equipment housed in beeper-style cases. The Techtoyz® Micro DTMF Decoder can be used for portable, hands- free operation. With its built-in microphone, DTMF tones are automatically decoded from the signal source of tape recorders, receivers, two-way radios, or anything else where touch tone can be heard by the Micro DTMF Decoder. There is also a built-in audio input jack for direct connection to any receiver's speaker output. The Micro DTMF Decoder can decode up to 12.5 characters per second while displaying the characters on its 12- digit LCD display. All DTMF characters are automatically stored in a 2000 character non-volatile memory and can be recalled by pushing scroll buttons. The unit's beeper-style case and belt clip make it convenient for field operation. It will operate up to 200 hours with a single "AA" alkaline battery. The unit is priced at $89.

For more information, contact Optoelectronics, Inc., 5821 N.E. 14th Ave., Ft. Lauderdale, FL 33334; phone 954-771-2050; fax 954-771-2052; orders 1-800-327-5912; or circle number 105 on the reader service card.

CIRCLE 75 ON READER SERVICE CARD

Here's a way to dress up your shack with some handsome certificates, meet some interesting people, and help out a good cause.

There's No Event Like A Special Event

BY BILLY B. JOHNSON*, WB5RYB

Amateur radio is a multifaceted hobby by offering many different avenues of entertainment. One of the most fun (and least publicized) activities in our hobby is the operation of Special Event Stations. Usually these stations are on the air to celebrate a memorable event or activity which is not necessarily related to amateur radio.

Contacting a Special Event Station is not like contesting. The operators are more laid-back and interested in chatting about the Special Event or celebration. They usually will discuss the weather, their rigs, antennas, and other things of mutual interest.

The Special Event celebration can be local or national in scope. Sometimes it's just a group of amateurs who decided to operate as a Special Event Station, make a lot of contacts, and enjoy themselves and amateur radio. The North Texas High Frequency Association of Denton, Texas did this in 1980 and 1981. A Special Event Station was operated by this group from Telephone, Texas. From conversations I had over the air with this band of traveling amateurs, I could tell they seemed to relish "working phone from Telephone." A nice certificate confirming our contact was printed on high-quality paper and mailed both years. The certificates even had pictures of the operators and the town of Telephone. For this fun-loving group of amateurs, just going to Telephone seemed to be a Special Event.

Over the years I have worked several groups like this, but none were as well organized and most did not furnish a certificate commemorating the contact. One thing Special Event Stations of this type seem to have in common is having fun and enjoying amateur radio.

One of the most interesting Special Event Stations celebrating a national event was W3USS. This station, which operates from the Russell Senate Office Building in Washington, D.C., was on the air on January 17, 1993 to celebrate the 52nd Presidential Inauguration. The certificate, which was mailed to all amateurs who contacted this station, will be a collector's item.

Several Special Event Stations operate on an annual basis. One which comes to mind is the Yacht Race Special Event Station set up each year to celebrate and publicize the 259 mile Lake Huron yacht race from Port Huron to Mackinaw Island. Look for this Special Event Station around the middle of July each year.

Another "interesting" Special Event Station operates in conjunction with the Miss America pageant each year. A contact with this station will produce a QSL card with a picture of the newly crowned Miss America. Look for this station operating from Atlantic City, New Jersey in September of each year.

Most of the Special Event Stations celebrate a local or regional event. Many of these stations furnish an attractive certificate provided you furnish the SASE.

Collecting these certificates is another part of the amateur radio hobby which can be very enjoyable. A Special Event Station usually will furnish a certificate rather than a QSL. Some of these certificates are very attractive, and depending on the event, they may become collector's items. Over the years I have worked Special Event Stations that were operated from submarines, from aircraft carriers, from International Falls, Minnesota (where the temperature was –22° and the wind-chill was –34°), from the birthplace of U.S. Transatlantic Radio, from the Alabama International Motor Speedway, and from a hot-air balloon, to name only a few.

Several years ago, while living in Crossett, Arkansas, I had the opportunity to participate in a Special Event Station. The celebration was a local festival called "Wiggins Cabin Days," and KA5ZAR and myself were the principal operators. It was fun and gave me a new appreciation for the many Special Event Stations I have worked over the years.

No special equipment is required to work a Special Event Station. It can be accomplished by big guns and little pistols alike. If you are interested in working a Special Event Station, the best way to start is by looking in *CQ* or *QST*. Both magazines carry a list of Special Event Stations that will be on the air each month. I keep a calendar in the shack and record the operating time and frequencies of these stations as soon as I receive the above magazines. This way I won't forget to look for the station.

Fairs, festivals, and other high-attendance functions can provide an excellent vehicle for the introduction of amateur radio to the general public. Many people get to see amateur radio in action for the first time when they see a Special Event Station in operation.

The next time you are tuning across the band and hear a Special Event Station, take time to work it. Both of you will enjoy the contact. Better yet, why not operate as a Special Event Station? You'll enjoy being on the receiving end of a pile-up and several hundred of us will enjoy working you.

*195 Royal Ridge Way, Fayetteville, GA 30214

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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.

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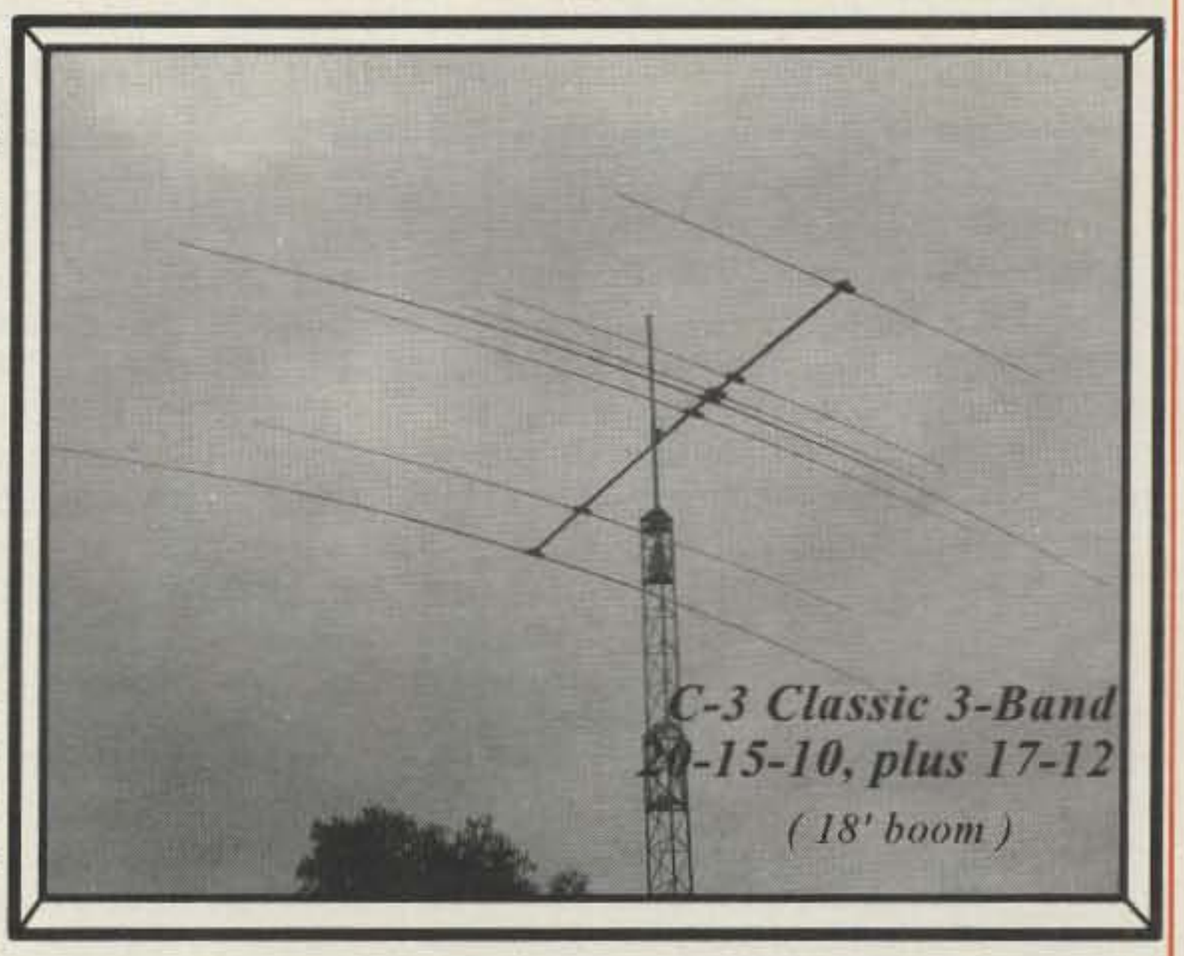

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C-4S	40, 20-10, 12' boom	595	500	550
C-4SXL	2el40, 20-10, 23' boom	849	725	800
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BY IRWIN MATH, WA2NDM

MATH'S NOTES

WHAT'S NEW AND HOW TO USE IT

Upgrade That Old Test Equipment

Several months ago we published a list of surplus dealers specializing in used electronic test equipment and indicated some of the various bargains that could be found through these sources. The response from many of our readers was very positive, and many of you took advantage by upgrading your own lab. However, in all fairness to those of you who might not have the funds to purchase such "gems," but who have older test equipment that for one reason or another you feel you are "stuck with," do not despair. All is not necessarily lost.

The most important factor in using older equipment is not how jazzy it looks or how many features it boasts, but how accurate the measurements you can make with it actually are.The easiest and least expensive way to determine this is to obtain and/or build a few inexpensive "standards" that you can use to periodically check and calibrate the equipment you do have. This route is almost always much less costly than purchasing new equipment, and the construction of most "standards" should be well within everyone's means.

The obvious primary measurements you usually need to make are voltage, current, and resistance. This is almost always done with anything from a 4 1/2 digit DVM, to an old Simpson 260, or even a $10 "bargain." Needless to say, the accuracy of the readings can vary anywhere from a fraction of a percent to tens of percentage points, depending on the age and condition of the meter.

To check the accuracy of the ohmmeter portion of such instruments, simply obtain several inexpensive precision resistors, mount them in an aluminum minibox as shown in fig. 1, and use them as a "reference" whenever you need to make a precise measurement. Choosing the values shown will allow you to check most ohmmeter ranges. One percent resistors are available (brand new) for as little as 10 cents each, and even 0.1 percent devices cost less than a dollar each from most of the major electronic distributors. If you choose to solder the resistors to the binding posts (which is a good idea), just be careful when installing that you do not overheat the device and thereby compromise the accuracy.

Fig. 2 shows a couple of simple DC voltage standards you can build with inexpensive, high-accuracy voltage reference ICs and a few other common parts to check the DC accuracy of the meter. These standards can also be built into a small mini-box and can be either AC-line or battery powered as desired. For higher voltages you can stack references or zener diodes as shown in fig. 3 and then hand-select one or more in the string for the exact voltage you wish or even bring out taps to make the standard more versatile. The resistors shown in the zener string are to equalize currents and can be any high value that will not interfere with the zener voltages. The dropping resistor in the zener string should be chosen to allow 10 to 15 milliamperes of total current to flow. When working with voltages above 10 to 15 volts, however, be sure to exercise caution. If you are able to borrow a calibrated meter from a sympathetic friend, the calibration of either scheme will be quite simple. Remember, you do not need even number voltages, only values that fall within the various meter ranges that you normally use.

Current measurements are a bit more

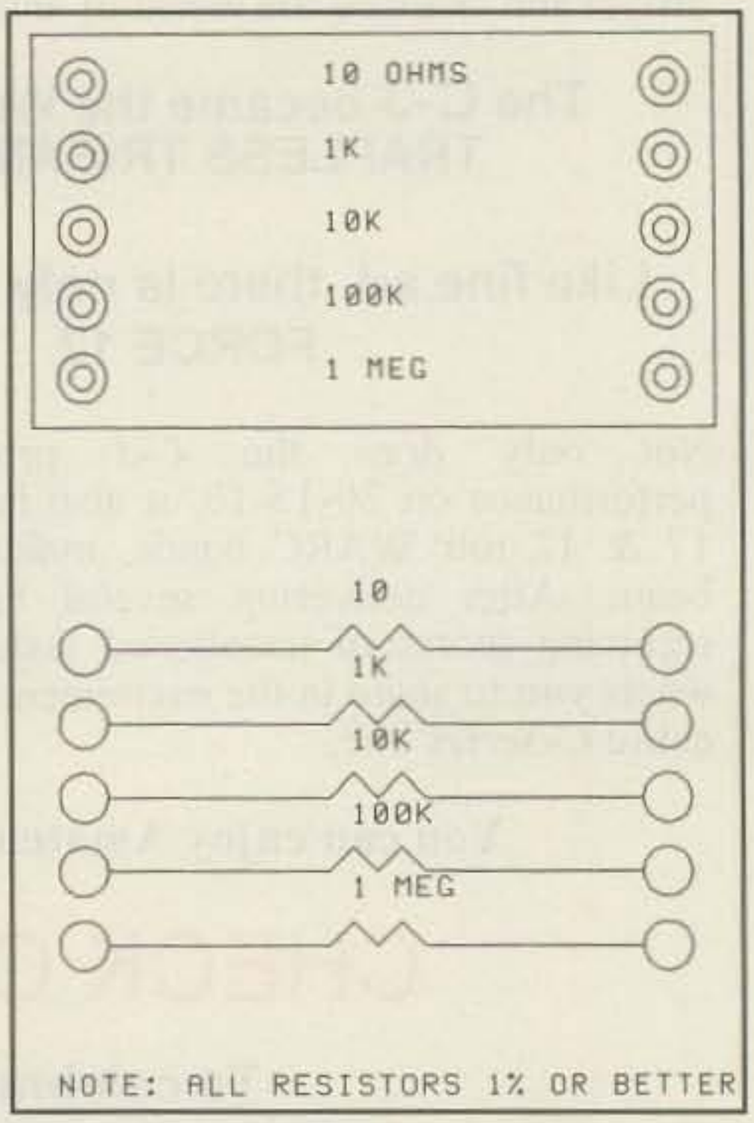


Fig. 1– Simple standard using precision resistors.

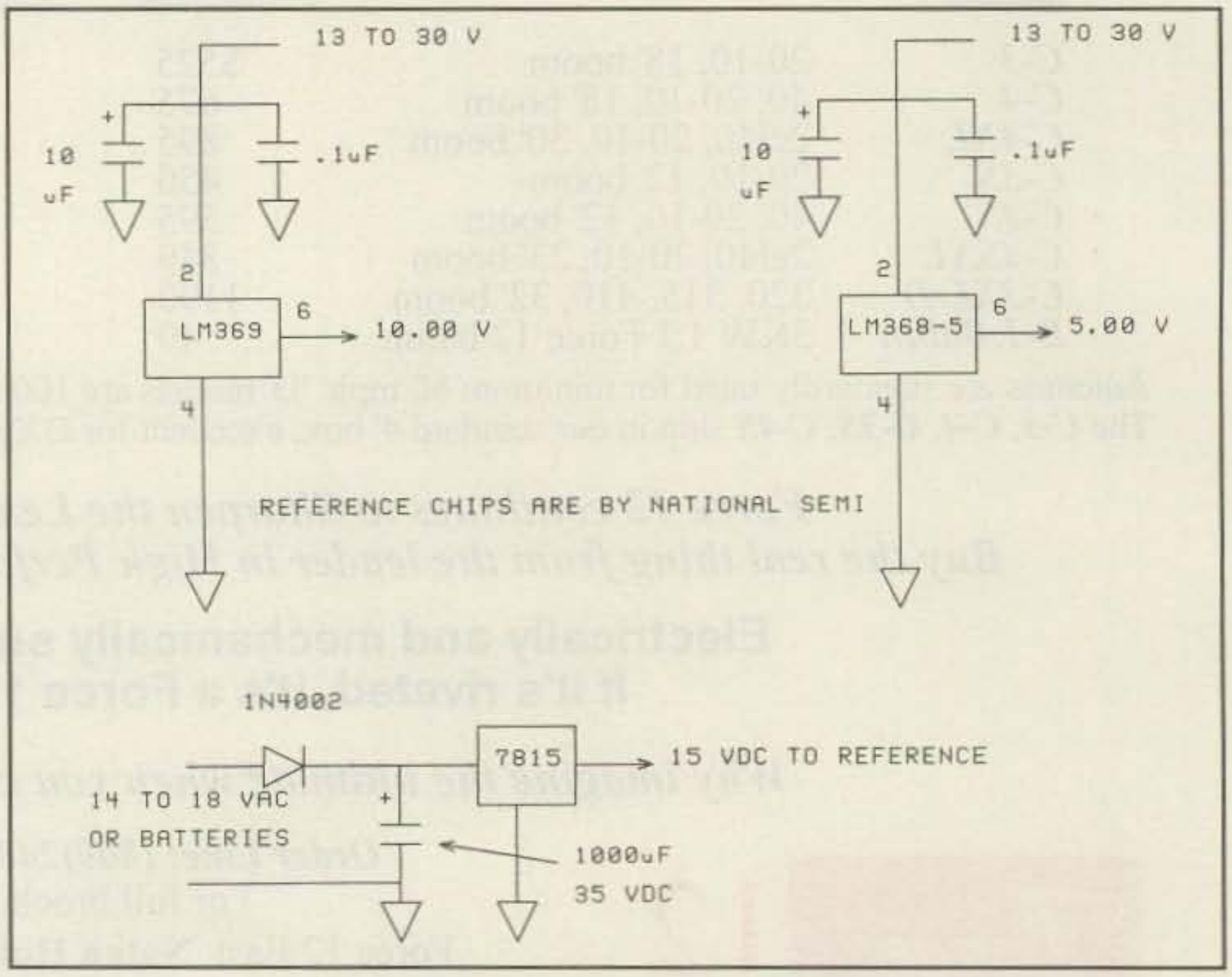


Fig. 2– Two high-precision voltage sources.

c/o CQ magazine

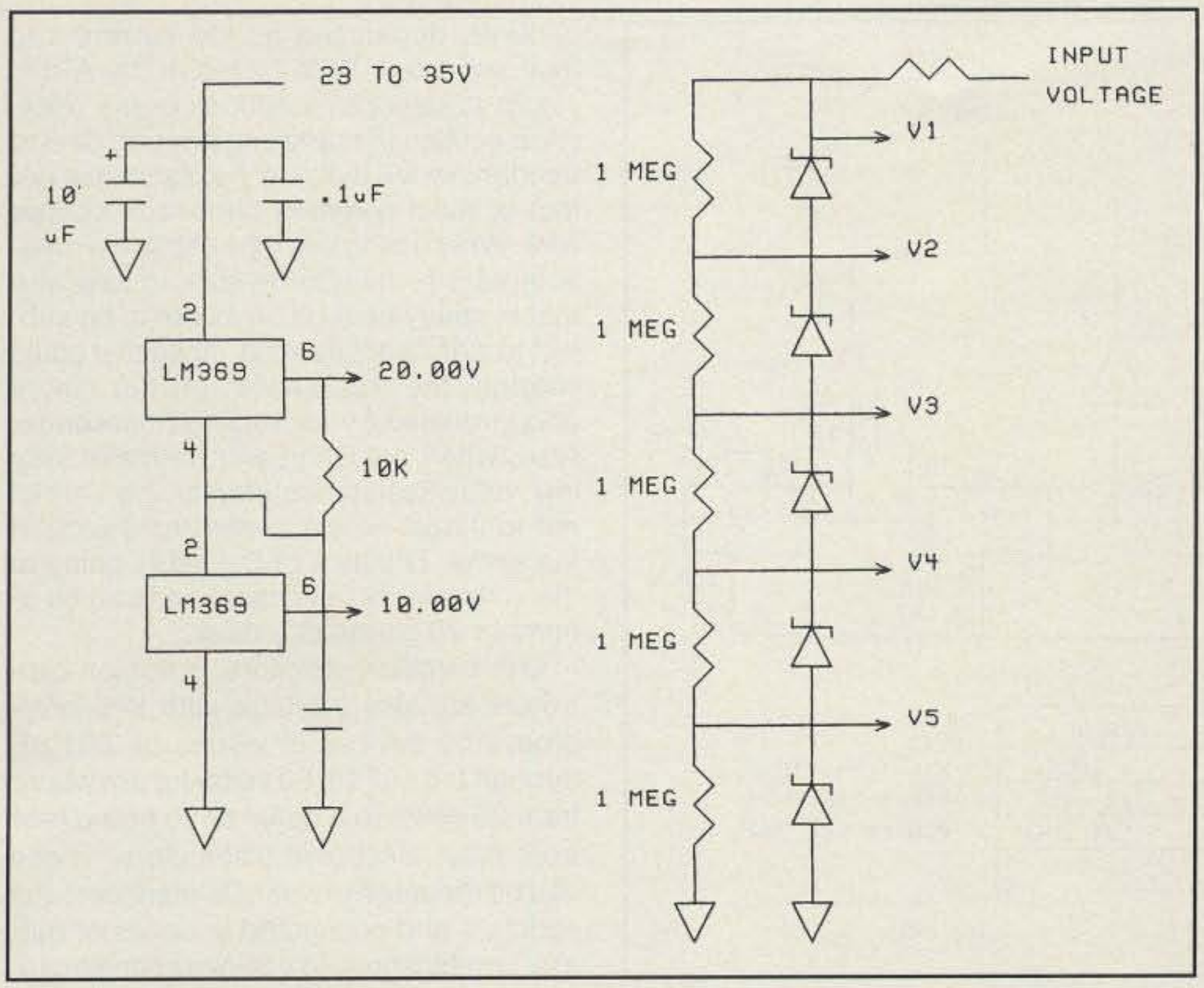


Fig. 3– Stacking references for higher voltage.

complex, as "standard" current sources are not easy to fabricate. What you can do is build a set of precision shunts out of heavy copper wire and then use your calibrated voltmeter, along with Ohm's Law, to determine the current flowing through the shunt. Fig. 4 shows this technique along with details on how to build a suitable shunt. The core around which the shunt wire is wound can be of plastic or

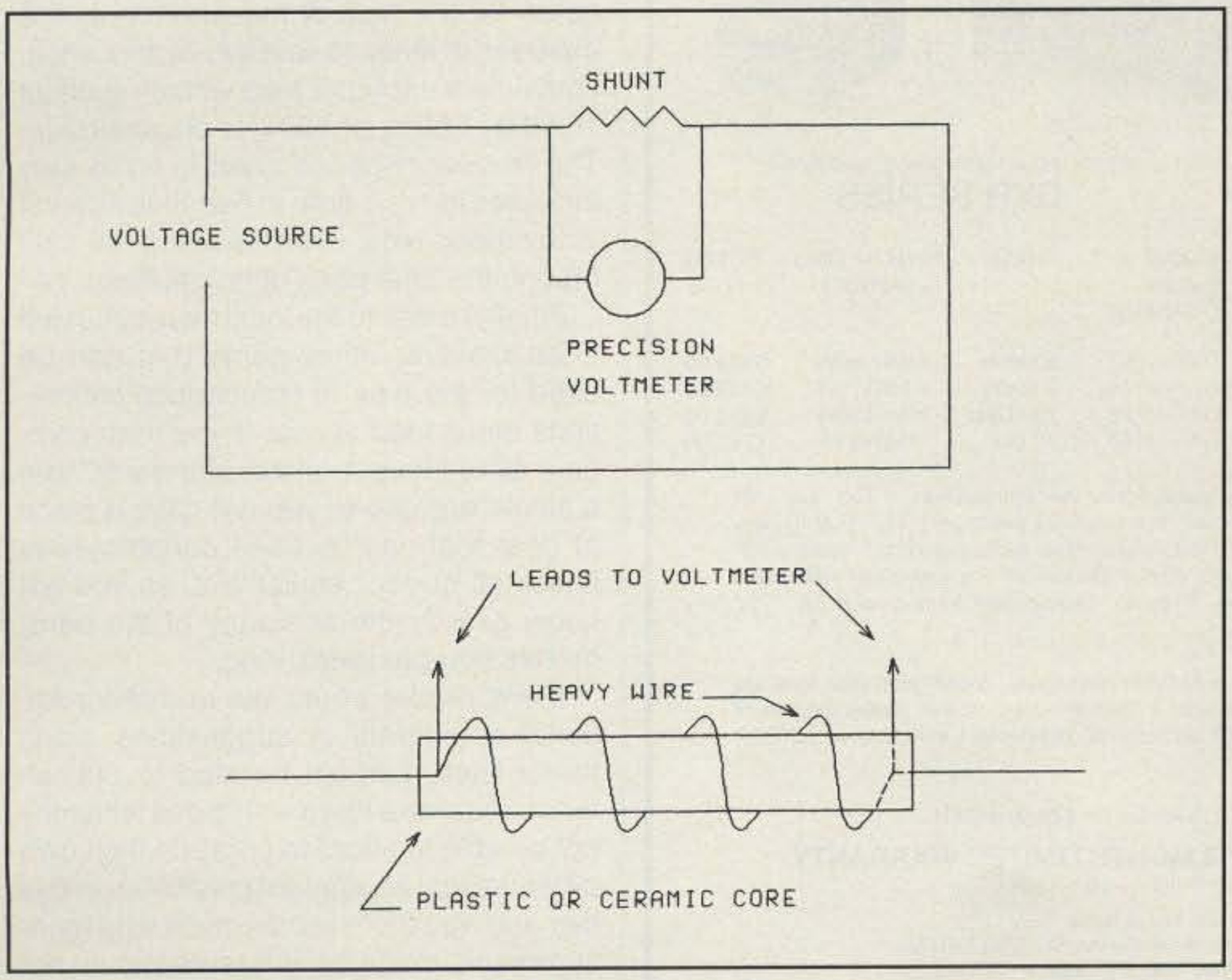
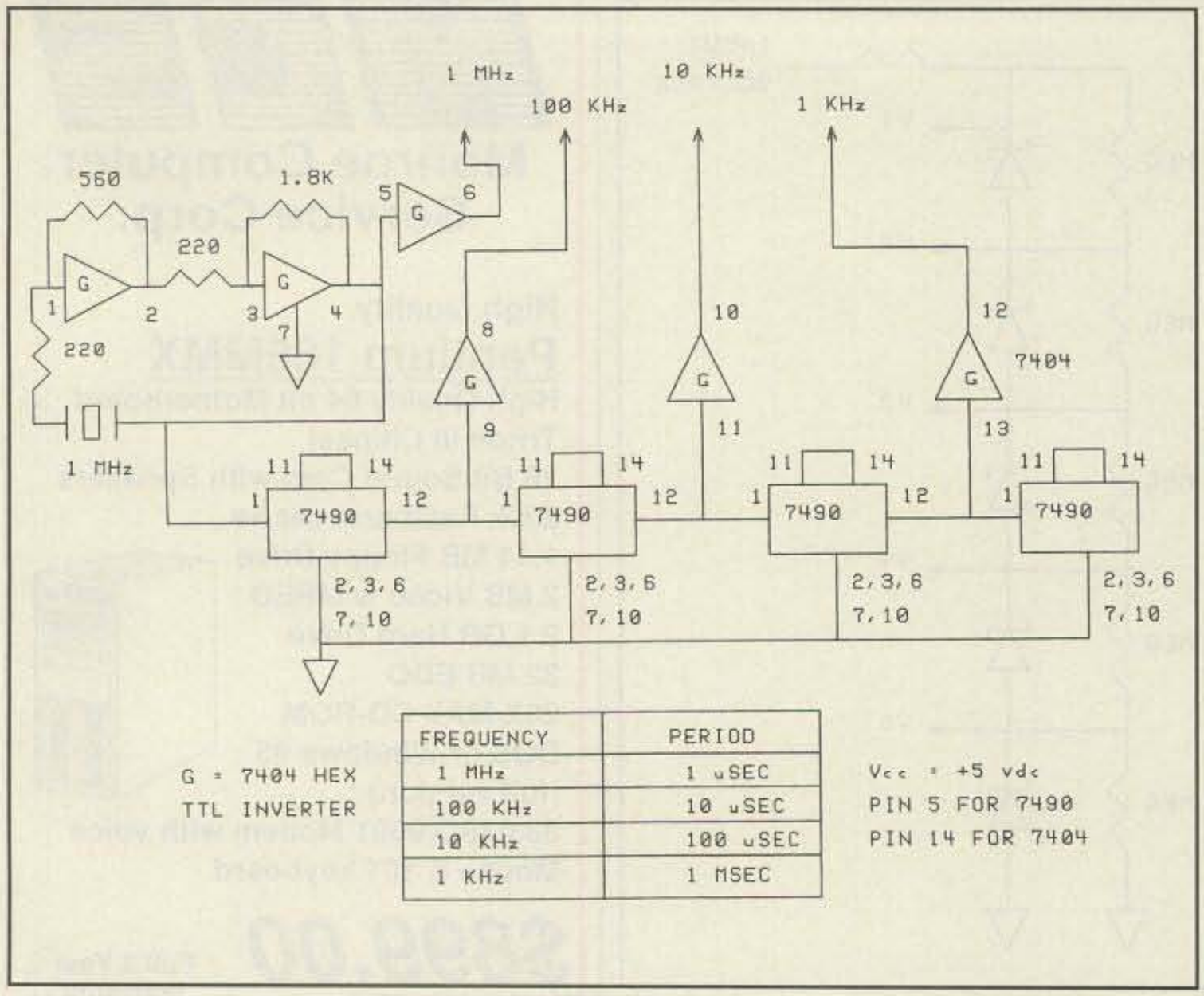


Fig. 4– Shunt current measurements and shunt fabrication.



FREQUENCY	PERIOD
1 MHz	1 uSEC
100 KHz	10 uSEC
10 KHz	100 uSEC
1 KHz	1 MSEC

Fig. 5– Simple frequency/time base oscillator standard.

ceramic, depending on the current and heat expected. Wire tables in the ARRL *Radio Amateur's Handbook* or the reference section of many engineering design handbooks will indicate the resistance per foot of most common gauges of copper wire. When using this type of current measurement technique be sure to use wire that is heavy enough so as not to be subject to significant heating, since that could change the resistance of the shunt enough to make your readings inaccurate. Also, when soldering wire to make very low value resistance shunts, be careful not to introduce excessive resistance at the joints. The size of the leads going to the voltmeter is not critical and can be of number 20 gauge or similar.

Like precision resistors, precision capacitors are also available with ±2% polypropylene devices in values of .001 µF through 0.47 µF (at 50 volts) for anywhere from 25 cents to a dollar or so brand new from most electronic distributors. These can be mounted in a similar manner to the resistors and connected in series or parallel combinations to achieve specific capacitances.

Purchasing an inexpensive 1 MHz crystal (or entire crystal oscillator subassembly for that matter) and connecting it to a divider chain such as shown in fig. 5 will result in a frequency standard that can be used to check a frequency counter, the calibration of a receiver dial (by using harmonics), or the time base of an oscilloscope. The accuracy of even a low-end oscillator usually will be more than adequate for the type of measurements the amateur is likely to require. In this case, convenient oscillator frequencies such as 10 MHz, 1 MHz, or 100 kHz are desirable. The frequency/period chart in fig. 5 also indicates the rise-time to rise-time interval in microseconds, which is useful for calibrating the time base of an oscilloscope.

Finally, a visit to the local fleamarket will often uncover other gems that can be used for the type of comparison calibrations mentioned above. If you then combine all of these "transfer standards" into a single enclosure, you will have a piece of gear that can be used periodically to check all of your equipment, so you will know exactly the accuracy of the parameters you are measuring.

If any reader would like to make additional comments or suggestions along these lines, I would be glad to publish them and share them with those who may not be able to afford to upgrade their own personal test equipment collection. In this day and age there is no reason why measurements made by amateurs should not be reasonably accurate.

73, Irwin, WA2NDM

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CIRCLE 149 ON READER SERVICE CARD

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BY BILL ORR, W6SAI

RADIO FUNdamentals

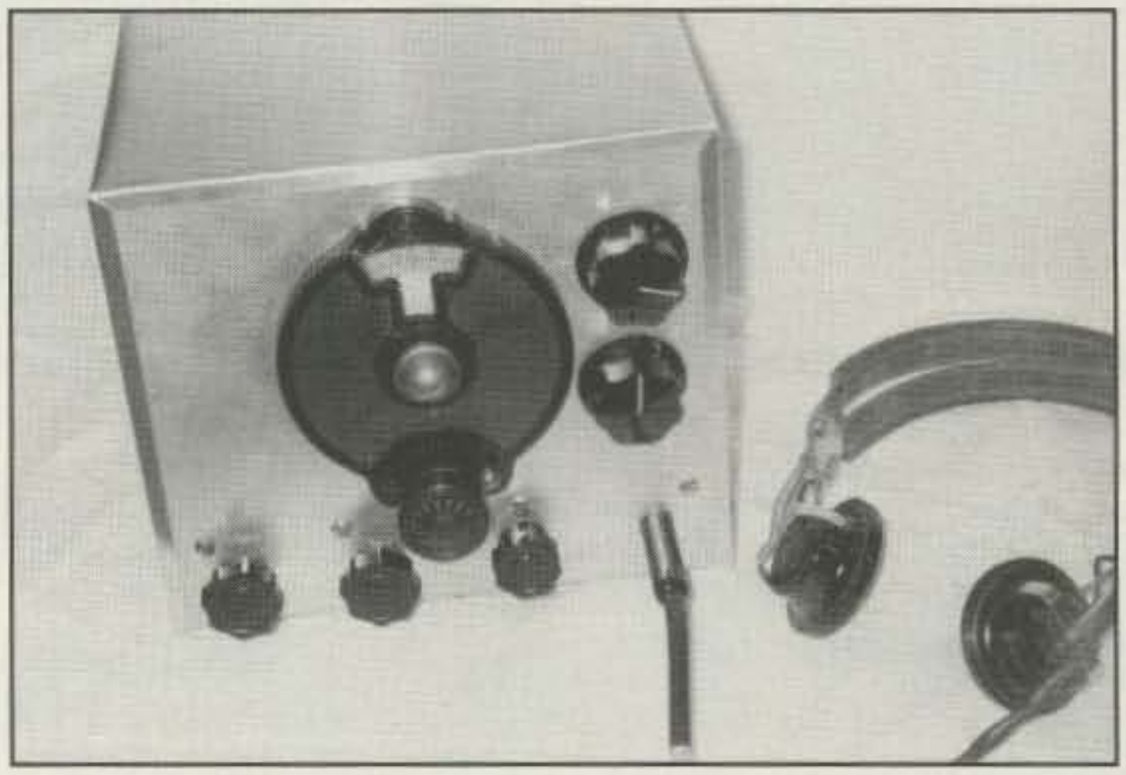
THINGS TO LEARN, PROJECTS TO BUILD, AND GEAR TO USE

Well, It's About Time!

At long last, it seems that the new sunspot cycle is taking hold! All summer long it stalled out, but this fall brings hope of better DX days ahead. Keep an eye on W3ASK's "Propagation" column for the latest information.

Amazingly, fully half of today's licensed amateurs have never operated near the peak of a sunspot cycle! Fellows, you have something wonderful in store for you! Specifically, the 15 and 10 meter bands will finally open up for reliable, long-distance communication. The signal strengths will astound you. I remember near the peak of the last cycle I worked a 4X4 mobile in Tel Aviv on 10 meters. He was running 10 watts into a whip mounted on a Volkswagen "bug." His signal into the San Francisco area ran from S-9 to S-9 plus during a half-hour QSO.

I also recall many times checking into a 10 meter DX net run by a UA9 in Siberia who provided a mouth-watering line-up of stations in Central Asia for eager DXers. Believe me, good times are a-coming!



Front view of the old-time receiver built by John Stonitsch, W2KXG.

15 Meter Antennas

The 15 meter band will come alive before the 10 meter band as the MUF rises and conditions improve. You'll need a dedicated 15 meter antenna for best results. That's no problem. The easiest and quickest way to put out a good signal on 15 meters is to put up the popular dipole antenna (fig. 1). Part of the RG-58 coax feedline is wound into a simple choke placed at the antenna feedpoint. This helps to prevent the line from becoming part of the antenna, radiating high angle, which is useless for communication. For amateurs in North America, run the antenna in a north-south direction for optimum coverage at home and abroad. Dipole kits are available from several manufacturers. The Van Gorden D-15 kit is one which comes to mind.

A Small 15 Meter Beam

A three-element Yagi for 15 meters commonly is built on a 12 to 14 foot boom. Fifteen meter beams are light and don't have much wind resistance. They can be turned with a heavy-duty TV rotor; one with a brake is best.

For those amateurs who wish to build their own antenna from scratch, I refer you to my *Beam Antenna Handbook*, available through most of the large amateur radio distributors. That text will provide you with plenty of info on how to build and check out your antenna, plus helpful hints on getting it up in the air and feeding it.

A 10–15 Meter Trap Dipole

You can build a two-band dipole for 10 and 15 meters using simple traps, one in each half of the antenna (fig. 2). The traps act as electric switches, resonating the center section of the antenna for 10 meters and allowing the full antenna to be used on 15 meters.

Each trap is a parallel-tuned circuit made up of a 20 pF silver mica capacitor shunted with a small coil. It is wired to an egg insulator, which acts as a support.

You'll have to resonate each trap to 28.6 MHz with a dip oscillator. The trap is assembled and attached to the supporting egg insulator (which has about 2 pF capacitance), and the assembly is dipped. The trap coil is originally cut to 9 turns, and one end turn is trimmed gradually to bring the trap to resonance. You do this before you place the trap in the antenna. All you need is a dip oscillator and a clear space on your bench. Keep large metallic objects away when you measure the traps, or you'll get a false indication.

Antenna resonance at 10 meters is set by adjusting the length of the center sections; 15 meter resonance is established by trimming the tip wires. I set my lengths for 28.6 MHz (SWR = 1.25) and 21.22 MHz (SWR = 1.8). Your actual SWR may vary from these figures depending upon antenna placement and height above ground. I used RG-58 for the feedline, with the line wound into a small RF choke at the antenna feedpoint.

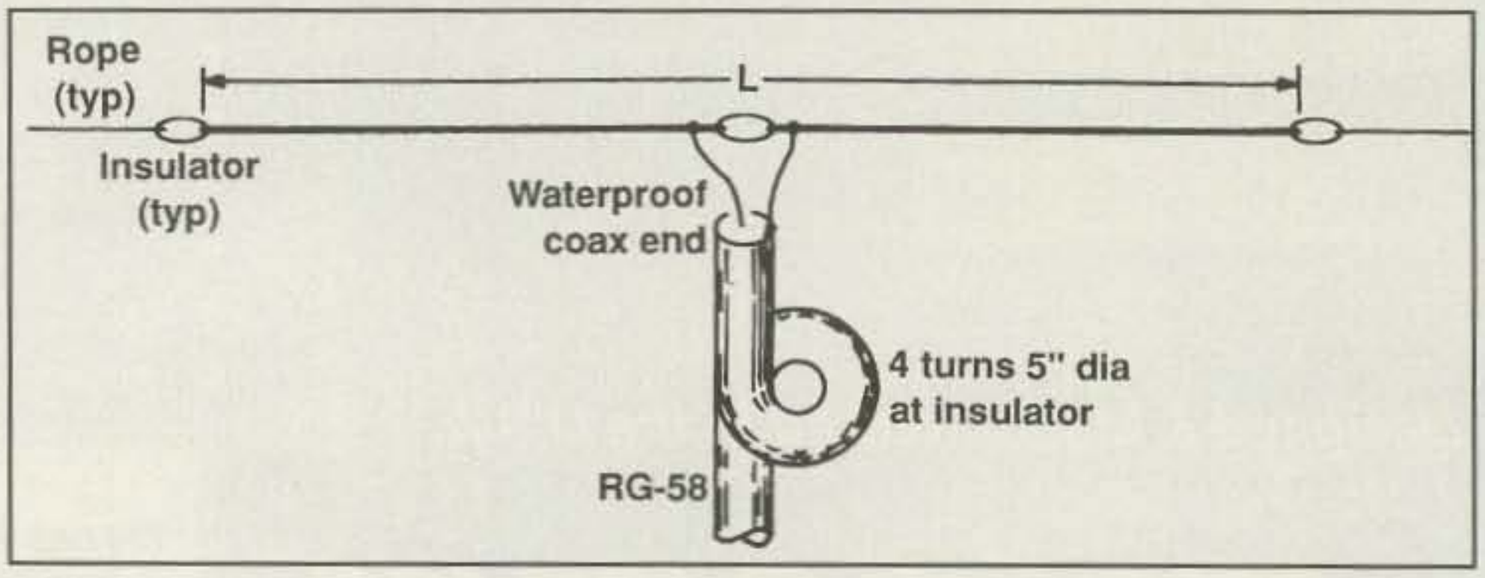


Fig. 1– A dipole antenna for 15 or 10 meters. For 15 meters overall length, L, is 22 feet. For 10 meters the overall length is 16 feet 6 inches.

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Parallel-Connected Dipoles

You can parallel a 10 and a 15 meter dipole at the feedpoint and feed both of them with a single coax line (fig. 3). The two dipoles are separated at the ends for best performance. Two or three feet will do the job. There's a bit of detuning, and you may have to trim each dipole a bit for best SWR. If you have an antenna tuner in your transceiver, or an external one at your operating position, you'll have no problem at all. I used this double-dipole arrangement with a TS-450S for many years.

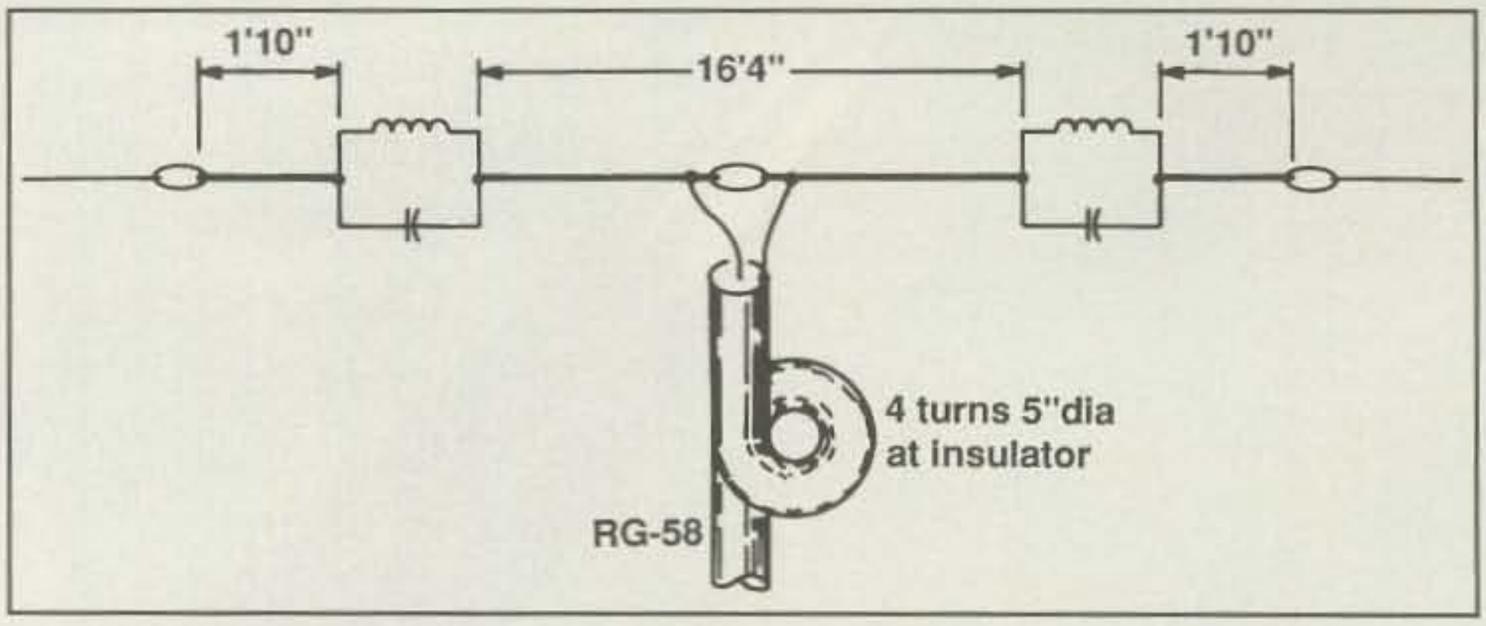


Fig. 2– A dipole for 15 and 10 meters. Each trap is composed of a 20 pF, 1 kV silver mica capacitor and an 8-turn coil, 1 inch diameter, 8 turns per inch (see text).

Fuses

Ah, this is a gray area. Each transceiver comes complete with a little plastic bag containing one or two spare fuses. Upon examination, the spare fuse often has no identification, other than an obscure reference in the manual to a Japanese type. Therefore, when a fuse blows for one reason or another, you plug in an equivalent rated fuse and hope for the best.

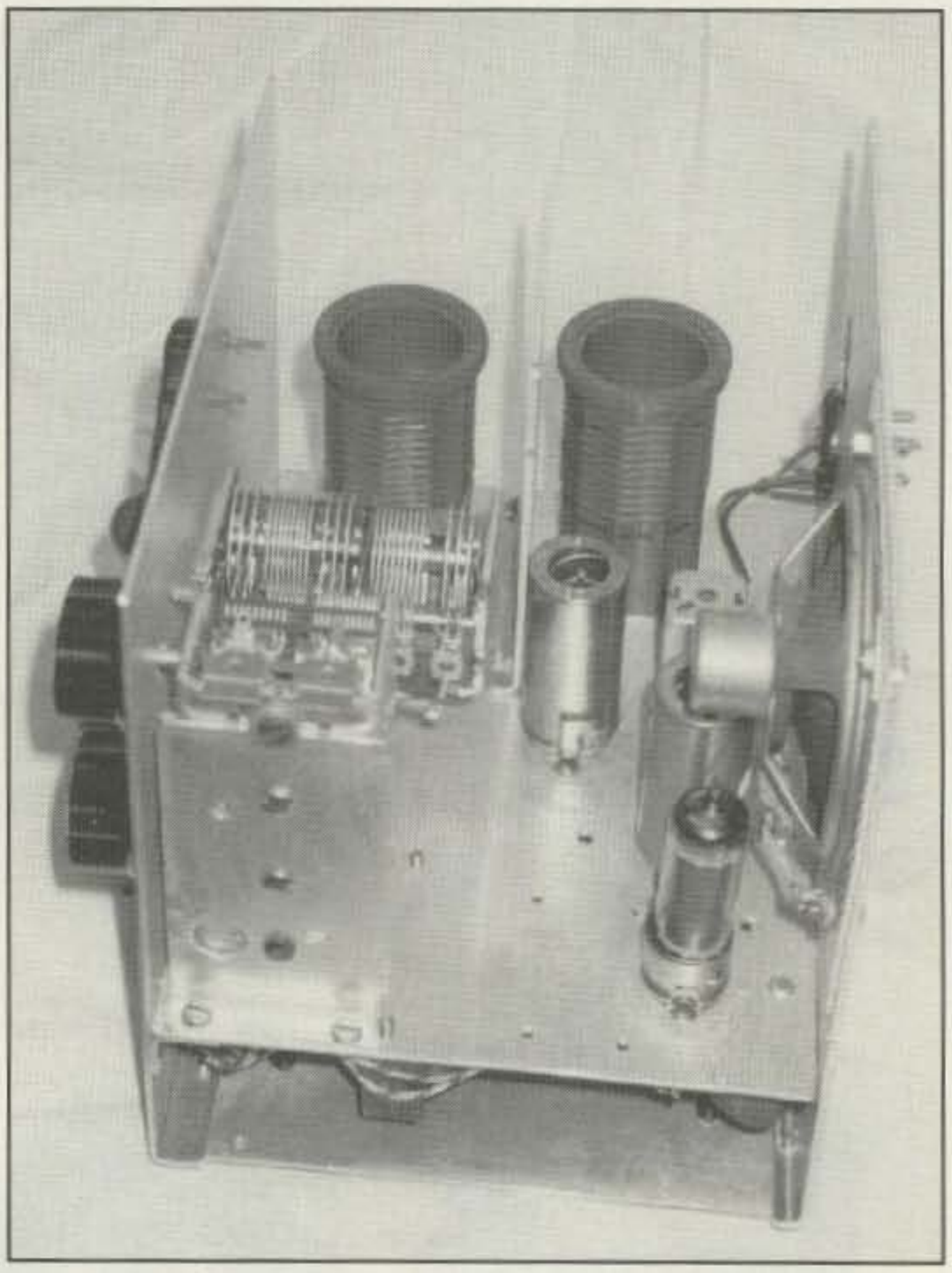
A fuse is a low-value resistor that fails "open" when it is fed too much current. However, they don't always blow when we think they should. And sometimes they blow when unprovoked. Fatigue failure, I suppose.

Most common equipment fuses are rated for 115 or 230 volts AC, but not more than 32 volts DC. This is because alternating current flow gives time for an arc in the fuse to be extinguished, which does not happen with DC. The fuse, therefore, has to be derated voltagewise for DC. High-voltage DC fuses are expensive animals, so if you need protection on a HV supply, put the fuse in the primary circuit where it sees AC, rather than DC, current flow and voltage.

Fuse ratings are confusing. If you think a one amp fuse would blow when the current exceeds one amp, you haven't been around fuses very much. Fuses generally are rated to carry 100 percent overload indefinitely, and most will carry 120 percent for several hours.

Many amateur rigs use the so-called fast-acting fuse (3AG or 3AB). The blow time of this device is 4 hours at 135% load and 1 hour maximum at 200% load. Beware! The 3AG also comes in a slow-blow type for use with electric motors having a high starting current surge. You don't want this type in amateur radio gear.

My solution is to use a fuse that is slightly underrated for my equipment. My transceiver manual calls for a 6 ampere fuse. I replaced it with a 4 ampere fast-acting fuse, and it hasn't blown yet. Maybe I'm



The interior view of W2KXG's receiver shows some nifty metal work and neat construction.

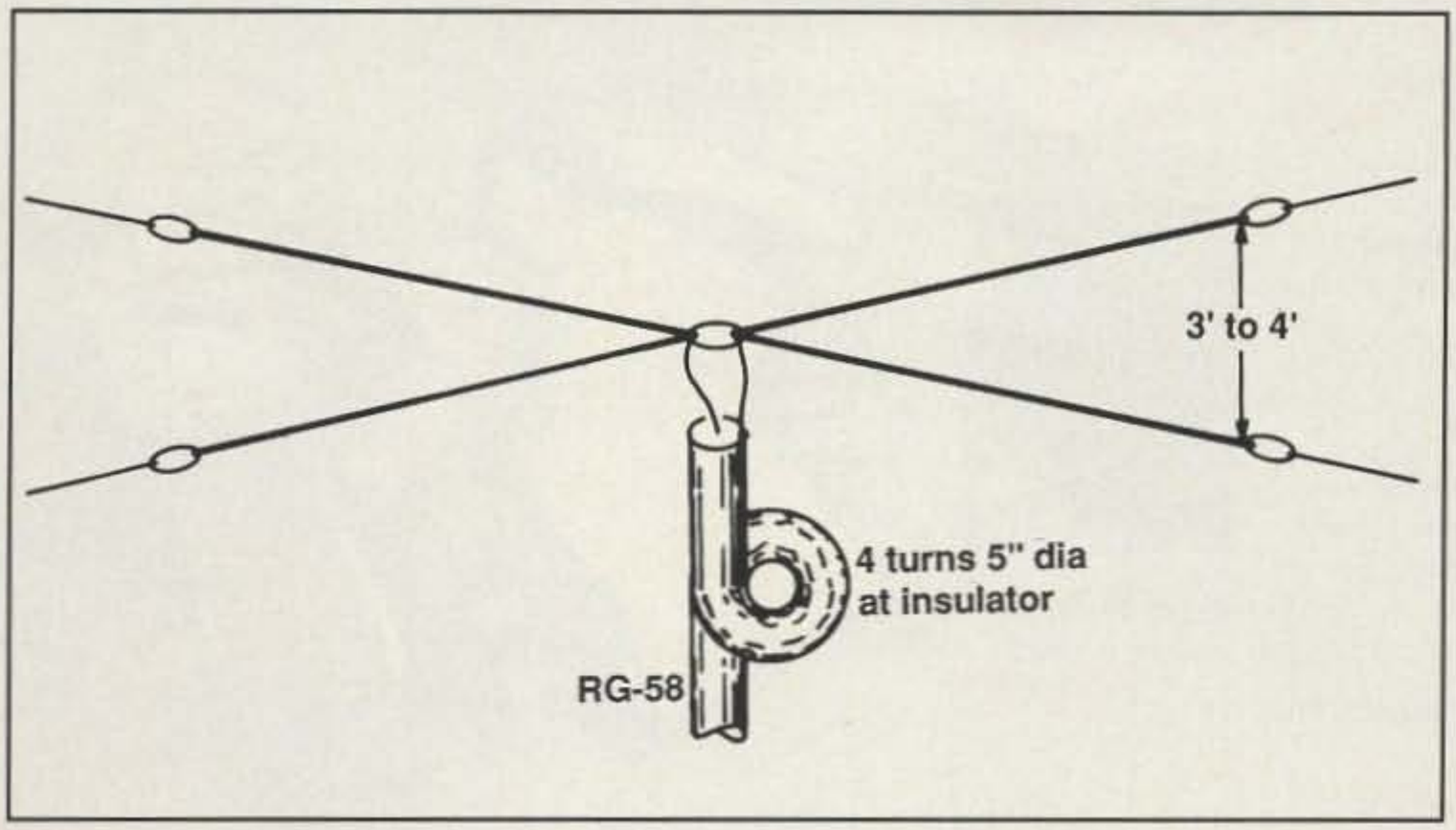


Fig. 3– Parallel-connected 15 and 10 meter dipoles. Wires may lie in any plane Separation of the wires is the key to successful operation. Two or three feet will do the job. There is a bit of detuning, and you may have to trim each dipole a bit for best SWR. If you have an antenna tuner in your transceiver, or an external one at your operating position, you'l have no problem.

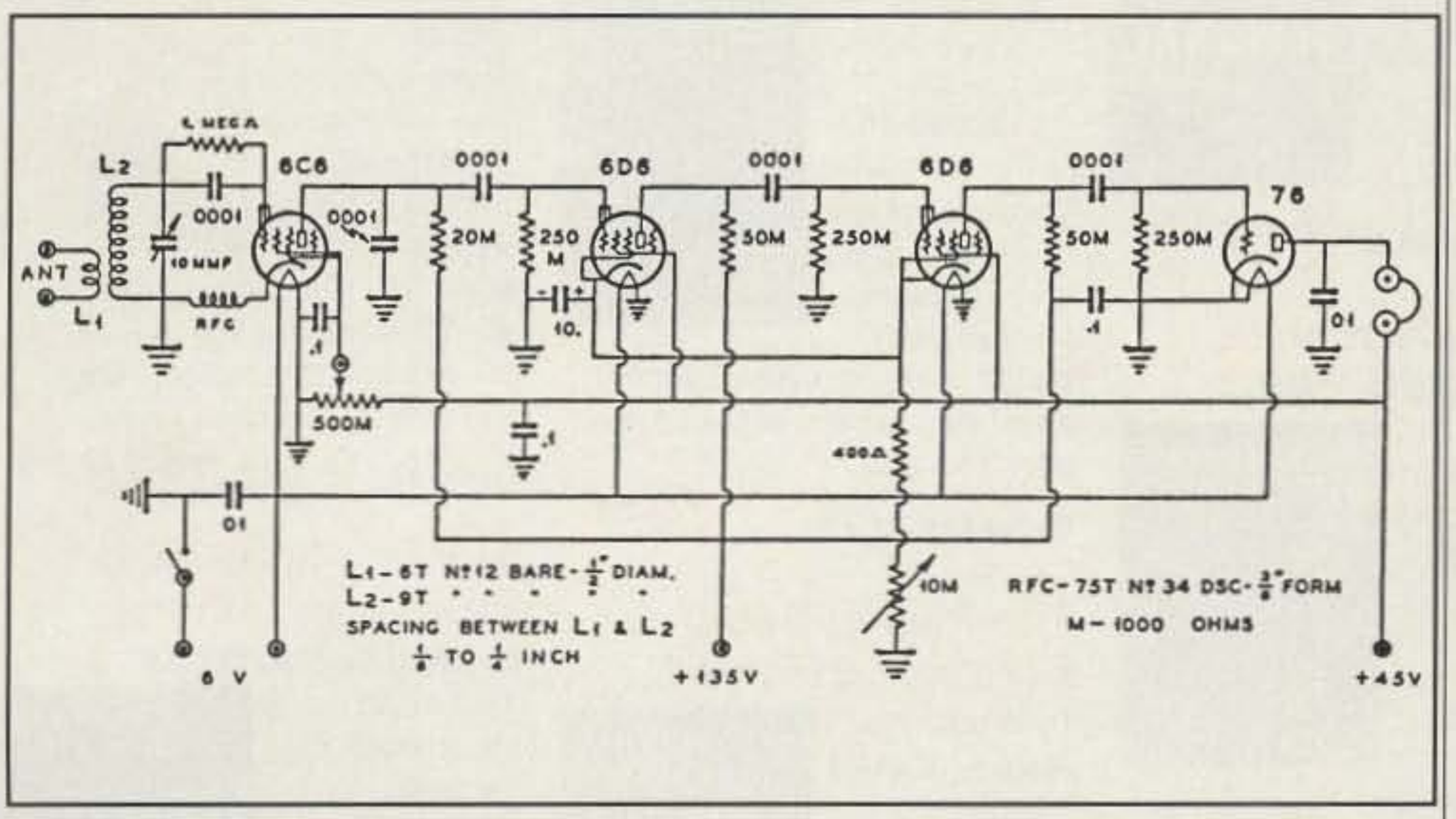


Fig. 4– The "UHF" superheterodyne of 1938. Build one for 6 meters!

fussy about such a small matter, but I like to fuse below the maximum limit of the circuit current. It's a nice feeling.

This idea doesn't work as well when the power supply inrush current is high. You'll have to experiment a bit with your gear. Fuse as low as possible is my motto.

The Old-Time "UHF" Receiver

I've heard from several readers who have successfully built old-time receivers. In my last column I discussed the receiver of Bob Dennison, W2HBE, and here are photos of a little receiver built by John Stonitsch, W2KXG. It is all shielded nicely in a homemade aluminum box-chassis. Congratulations, John.

Shown in fig. 4 is the circuit of a resistance-coupled 5 meter superhet taken from the 1938 edition of the *Radio Handbook*. It uses an autodyne oscillating detector-converter, two stages of broadly tuned resistance coupled IF amplification (at about 35 kHz), and a triode second detector. No doubt it would work on today's 6 meter band. Each signal is heard at two closely located points on the tuning dial (the signal and the image, 50 kHz away). This was a popular circuit before the war and is easy to reproduce today. Not very many critical parts, are there? The gain control is adjusted to a point just below oscillation for greatest sensitivity to AM signals. Will it receive SSB when the detector is oscillating? A good question. I'd like to hear from someone out there who has built this gem!

73 until next time . . .

73, Bill, W6SAI

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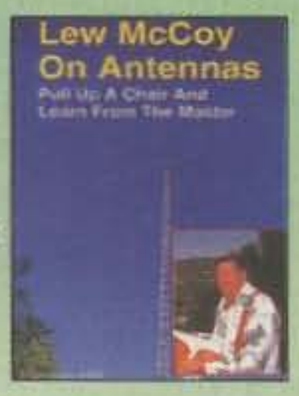

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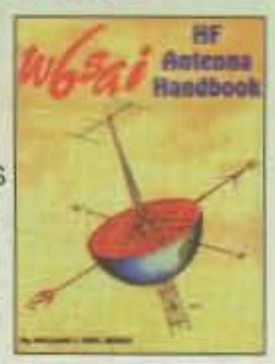

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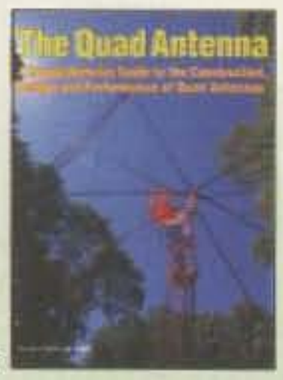

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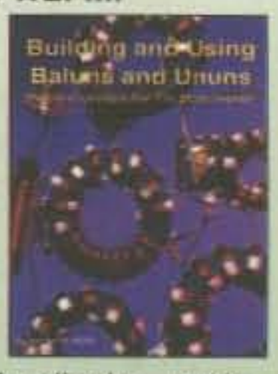

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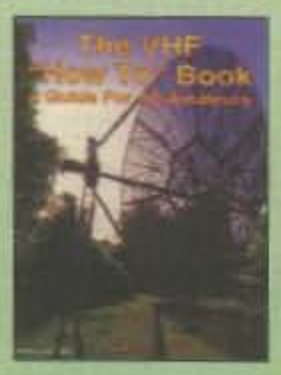

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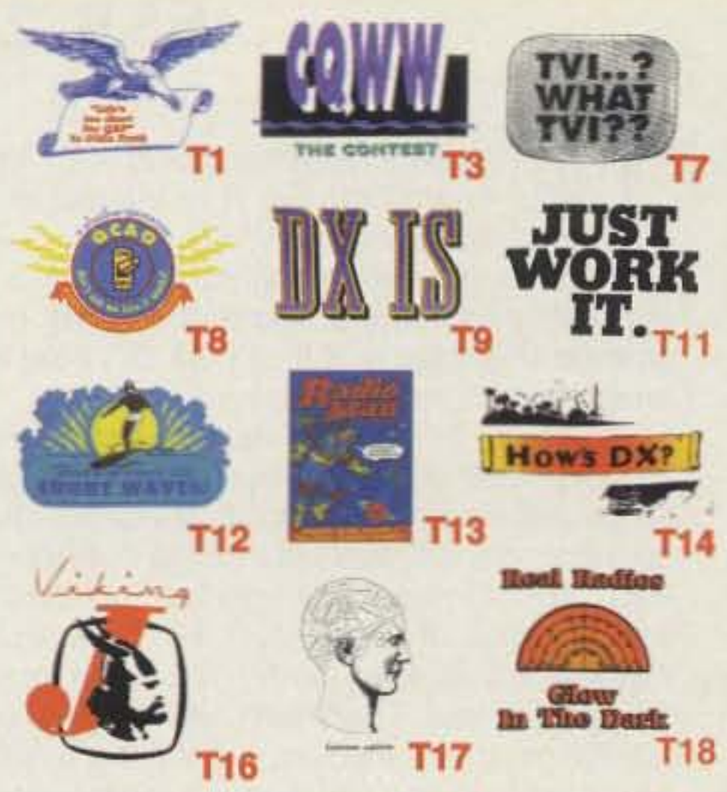

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Announcing:

The 1998 CQ World-Wide 160 Meter DX Contest

CW: 2200Z January 23 to 1600Z January 25
SSB: 2200Z February 27 to 1600Z March 1

The objective of these contests is for amateurs around the world to contact other amateurs in as many U.S. states, Canadian provinces, and countries as possible on the 160 meter band. **Note the SSB date change this year and that USA DC now is a multiplier (same as a state).**

Classes: Single and multi-operator only. Use of packet, a spotting net, or logging assistance makes an entry multi-operator. Multi-operators should show the actual operator for each QSO. Under single operator there will be a designation of power level: H = power over 150 watts, L = power under 150 watts, and Q = 5 watts or less. There will continue to be only listings per state or country, but if there is sufficient activity or if a high enough score is made, then a separate certificate will be issued. Minimum score for the separate certificate is 5,000 points! Multi-operators will all be considered high power.

Exchange: RS(T) and state for USA, province for Canada, and either prefix or country abbreviation for DX. Contacts without some location indicator will be ruled invalid.

Scoring: Contacts with stations in own country, 2 points. Contacts with other countries on same continent, 5 points. Contacts with other continents, 10 points. *Maritime mobile contacts count 5 points. There is no longer any multiplier value for a maritime mobile contact.*

Multiplier: Each continental U.S. State (48), USA District of Columbia (DC), Canadian area (13), and DX country. KL7 and KH6 are considered DX and not states for this contest. DX countries are DXCC plus WAE (IT, GM Shetland Islands, et al). Canadian areas include VO1, VO2, NB, NS, PEI, VE2, VE3, VE4, VE5, VE6, VE7, NWT, and Yukon. Do not count States and Canada as separate countries. Remember that maritime mobiles no longer count as a multiplier.

Final Score: Total QSO points times the sum of all multipliers (states, VE, DX countries).

Penalties: Three additional contacts may be deleted for each unacknowledged duplicate or unverified contact removed from the log.

Disqualification: A log may be disqualified for violation of amateur radio regulations, unsportsmanlike conduct, or claiming excessive duplicate/unverified contacts or false multipliers.Logs that shrink more than 5% are subject to disqualification or warning. The calls of those warned or disqualified may be printed with the results.

Awards: Certificates will be awarded to the top scorers in each class by state, Canadian area, and DX country. Runners-up with high scores over 100,000 may also receive certificates. Low power or QRP entries may also receive certificates if there is sufficient activity or the score is outstanding. The following plaques, with donating sponsors as indicated, will be awarded for exceptional efforts.

1998 PLAQUES

	SINGLE OPERATOR CW	SSB
World	K5AAD	K5AAD
(W5MBB Memorial Plaques)		
USA	K4TEA	K4JRB
Canada	K2UFT	WAØETC
Zone 3 USA	(TBA)	N4TMW
Zone 4 USA	K4WA	N4UCK
Zone 5 USA	WA4CUG	K4ODL
Europe	K9UWA	N4NX
Africa	K4MZW	WB4ZNH
Oceania	(TBA)	K4IS
Asia	K4SX	AH2BE
Japan*	W4ZV	—
S. America	K4JAG†	AE6E
N. America**	CQ	CQ
(N4IN Memorial Plaques)		

MULTI-OPERATOR		
World	N4RJ	SE DX Club
USA	W8UVZ, WØCD, K8GG	WB9Z
Zone 3	4X4NJ	4X4NJ

[1]No SSB operation is allowed in Japan at present.
[2]North America outside USA and Canada.
[3]Roy V. Brewer, W4UUH Memorial Plaque.

The plaque procedure is the top scorer in the indicated area wins the plaque. However, a station can only win one plaque per contest section. The plaque is then awarded to the next highest scoring station. For example, WX8ZZZ wins top World multi-operator. Then the next station in the U.S.A. wins the U.S.A. plaque.

Intercontinental DX Window: 1830 to 1835 kHz should be left clear for DX stations for intercontinental QSOs in both contests. This is still voluntary but essential if the contest is to continue to attract rare DX as entries. **USA, Canadian, and European stations should refrain from using the window for local contacts.** Please stay away from the window edges, too. This is a gentleman's contest and band, so let's help make intercontinental contacts happen.

Computer Logging: Please send us your computer disk. IBM, MS-DOS compatible disks are encouraged. The format we prefer is your CT.Bin or NA.Bin file. If you use a program different from the one mentioned above, the generic format should contain a vertical single column of calls in chronological order. The committee will require, on request, a disk for any possible high score, provided that the paper log or dupe checking material as originally submitted was a computer printout. The outside of the disk should be clearly labeled with the call of the entrant, the files included, the mode (SSB or CW), and the category. Disks **must** be accompanied by a paper summary and dupe sheet, or are subject to **penalties or disqualification**.

Manual Logs: Sample log and summary sheets may be obtained from *CQ* by sending a large SASE with sufficient postage to cover your request. You can make your own with 40 contacts per page with columns for GMT, exchanges, multiplier, and points.

Dupe/Check Sheets: All logs over 200 contacts must provide a check sheet or dupe list. A check sheet or dupe list is a list of all calls in alpha sorted order.

For All Logs: Show the multiplier only the first time it is worked. Each page must have sub-totals for multipliers, contacts, and points. A running total below the sub-total on each page is recommended. Dupe or check sheets with every entry are requested and are required with over 200 QSOs. Include a summary sheet with your entry showing the scoring and other essential information. Include a printed name/mailing address and a signed declaration that all rules have been observed. Please put the summary sheet at the front of the log. All logs should clearly indicate total multiplier, W/VE multiplier, and DX multiplier.

Club Competition: Any club that submits at least three logs can enter the Club Competition. The name of the club must be clearly identified under club competition on the summary sheet. Club competition is a "for fun" competition to foster more activity. There is a separate listing for the club scores.

Log Submissions: Mailing deadline for CW entries is Feb. 28, 1998; for SSB entries the deadline is Mar. 31, 1998. *Exception:* You may send both logs in one package as long as the CW log is received by Mar. 31, 1998. Try to mail early to assure receipt. For a return receipt enclose an SASE or SAE with postage or 1 IRC. Avoid the registered postal route, as this delays getting the log until someone can sign the receipt! Finally, proofread your log before submission. Each year many errors are corrected that you should catch! Logs or sections of a log that are unreadable will be disqualified.

Send all logs to 160 Meter Contest Director David L. Thompson, K4JRB, 4166 Mill Stone Court, Norcross, GA 30092 USA. **Please indicate CW or SSB on the envelope.**

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CIRCLE 137 ON READER SERVICE CARD

BY DOUG DeMAW, W1FB

DOUG'S DESK

CONSTRUCTION PROJECTS, TECHNIQUES, AND THEORY

A Catalog of Practical Circuits—Part I

Among the many interesting letters I receive from readers are those which contain questions about basic, practical transistor circuits. Some who write want to know the correct values for resistors and capacitors, depending upon the frequency of operation, for bipolar transistors, FETs, and ICs. The best I can offer are workable ball-park values that guarantee good performance, but not necessarily peak performance.

Some years ago I wrote *The ARRL Electronics Data Book*, in which I added several pages of practical single-stage circuits with assigned component values. That portion of the book was popular among those who tinkered and built equipment, but who lacked design expertise and experience. Some of the circuits presented in the book could be combined to provide complex circuits, such as receivers and transmitters, or portions thereof. This short series of articles presents a collection of individual and combined circuits that may be photocopied and kept in a notebook for future use by those who are learning electronics, or by those experimenters who wish to build circuits. In subsequent columns I will present small-signal and power RF amplifiers, IF amplifiers, oscillators, VFOs, mixers, balanced modulators, AGC circuits, and more. Each installment will contain a description of the performance characteristics of the particular circuit.

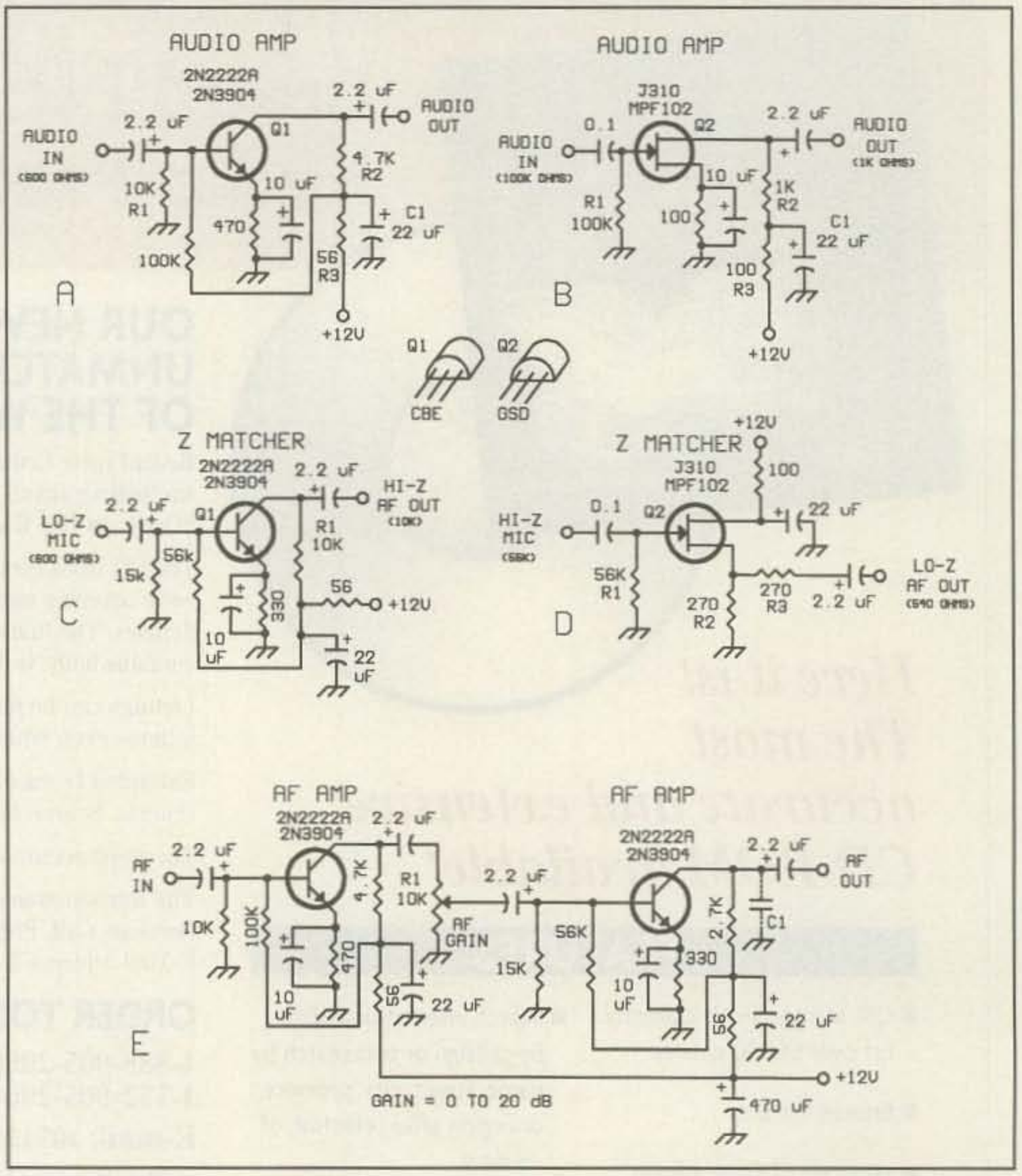


Fig. 1— Basic circuits for audio stages with assigned practical component values. Each circuit is discussed in the text. Capacitors without polarity marked are disc ceramic. Polarized capacitors are electrolytic or tantalum, 16 VDC or greater. Resistors are 1/4 watt carbon or carbon film.

Some Useful Audio Circuits

Fig. 1 represents the first of the circuit catalog series. Single-stage audio amplifiers using a bipolar transistor and an FET are seen at *A* and *B*. The input and output impedances listed in fig. 1 are approximate. Actually, the fig. 1(A) circuit input impedance (Z) may be as great as 1000 ohms, but is typically in the 600 ohm range. The stage output Z is determined somewhat by the value of R2, which is actually in parallel with the unloaded characteristic output impedance of Q1. Therefore, the true output Z is slightly less than 4.7K ohms in this example. C1 and R3 form a decoupling network that helps prevent audio energy from migrating along the +12 volt line to any succeeding stage that may be used. Unwanted audio current migration from stage to stage can cause audio self-oscillations (motorboating or squealing) as a result of unwanted feedback.

An FET audio amplifier is shown at *B* of fig. 1. It has a high input Z because the gate of an FET typically exhibits a Z of 1 megohm or greater. R1 sets the Z level by virtue of its selected value (100K ohms in this case). R2 establishes the output Z. Again, C1 and R3 comprise a decoupling network. The effective gain of each of these stages is between 10 and 15 dB.

Fig. 1(E) illustrates how two audio amplifier stages may be combined to obtain variable audio gain from zero to approximately 20 dB. The input stage has lower bias than the output stage. This is to reduce current within the first transistor, which in turn decreases the internal noise generated by the flow of junction current. This helps ensure quieter operation (reduced white noise). Potentiometer R1 sets the gain level. In the vacuum-tube radio days this potentiometer was known as the "volume control." Both fig. 1(E) stages are decoupled from one another by means of 56 ohm resistors and 22 µF capacitors.

C1 at *E* of fig. 1 is optional. It may be

P.O. Box 250, Luther, MI 49656

QRN Squasher Correction

An error in the PC board pattern for the W1FB MK-III QRN Squasher (July 1997 *CQ*, page 66) was introduced by FAR Circuits and not noticed until a reader called it to my attention. The problem is at Q2, where C3 and R4 are joined, then mistakenly routed to the Q2 collector. Cut the PC conductor at the pad where C3 and R4 are joined, thereby divorcing them from the Q2 collector. Add a short jumper wire from the C3/R4 pad to the Q2 base. Q2 will have no gain until this error is corrected. The fig. 1 schematic diagram is correct.

added to restrict the high-frequency response of the amplifier. Typical values for C1 range from 0.005 to 0.1 µF. The larger the capacitor value the more bassy the audio appears. The absence of "highs" causes this effect. Minimizing the high-frequency response is especially beneficial in receiver audio systems. This method minimizes high-frequency hiss (which can mask a weak signal) and greatly reduces the annoying effects of high-pitched heterodynes from nearby CW signals. An amplifier of this type may be used to drive an audio IC such as an LM386 for speaker operation. High-Z headphones of the 2000 ohm or greater type can be used with this circuit, as shown. However, if you wish to use 8 ohm earphones, it will be necessary to include a miniature audio transformer (1K to 8 ohms suitable) between the second transistor output port and the phones. A reasonable impedance match is necessary in order to ensure maximum audio power transfer.

Microphone Z Matchers

Fig. 1(C) and 1(D) show methods for using transistors to match unlike impedances. This may be necessary when interfacing a low-Z microphone with a high-Z audio circuit, or vice versa. Fig. 1(C) provides a reasonable Z match between a modern 600 ohm microphone and a high-Z microphone input stage, such as that of a tube type of transmitter. Most of these older transmitters were designed for microphones with a 50K ohm impedance.

An FET is used at fig. 1(D) to match a high-Z microphone to a modern low-Z transmitter microphone input circuit. A D-104 microphone is typical of the high-Z types that require a circuit of this variety. Some amateurs insert a 47K or 100K ohm resistor in series with the microphone audio lead where it enters the transmitter. This allows the microphone to be used with a 600 ohm input port. The "bandaid" helps to improve the overall audio response, but causes some loss of audio energy in the process. If no corrective measures are taken, the transmitted signal usually has high-pitched, unpleasant audio quality because of the mismatch.

Transistor Selection And Availability

One of the most common complaints I receive from readers is "I can't locate the parts for your circuit. Where can I get the transistors, relays, (or whatever)?" Countless electronics catalogs are available for the asking. Nearly any ordinary component can be found by browsing the catalogs. However, certain types of transistors and ICs are somewhat elusive for those who are not familiar with the process of scrounging parts.

Substitution of transistors is usually acceptable at audio frequencies. This is because noise figure (NF) and f_T (upper frequency limit where the device gain is one or unity) are not limiting factors for performance. The fig. 1 circuits specify 2N2222A or 2N3904 transistors because they are inexpensive and easy to obtain as surplus. However, a 2N2222, 2N4400, 2N4401, and a host of similar small-signal audio or RF NPN transistors may be used in the fig. 1 circuits without changing the parts values listed. Don't be afraid to experiment. The same rule may be applied in the case of JFETs. There are many types of JFETs other than the J310 and MPF102 devices specified in fig. 1. Some have 2N prefixes. In fact, a dual-gate MOSFET may be used as a JFET by tying gates 1 and 2 together and treating the device as a single-gate FET, as shown in fig. 1(B).

The NTE brand of transistors and ICs is perhaps the best source for devices that seem hard to find. Mouser Electronics (981 N. Main Street, Mansfield, TX 76063-4827 [for orders or a catalog call 800-346-6873]) markets NTE semiconductors. For example, the high-performance 2N4416 and Motorola MPF107 JFETs are available as NTE452 and NTE132, respectively. A 2N2222A is an NTE123A, a 2N3904 equates to NTE123AP, and an MPF102 is an NTE451. An NTE cross-reference manual is available from Mouser (no. 526-NTEDAD-3) for $4.95. The book is a worthwhile addition to any experimenter's library.

In Summary

This series is intended to impart information that is not generally available from any single source. Please send your suggestions to W1FB if there are catalog circuits you would like to have included in subsequent parts of this series.

73, Doug, W1FB

2m/70cm Mobiles **FT-2500M/FT-7400H**

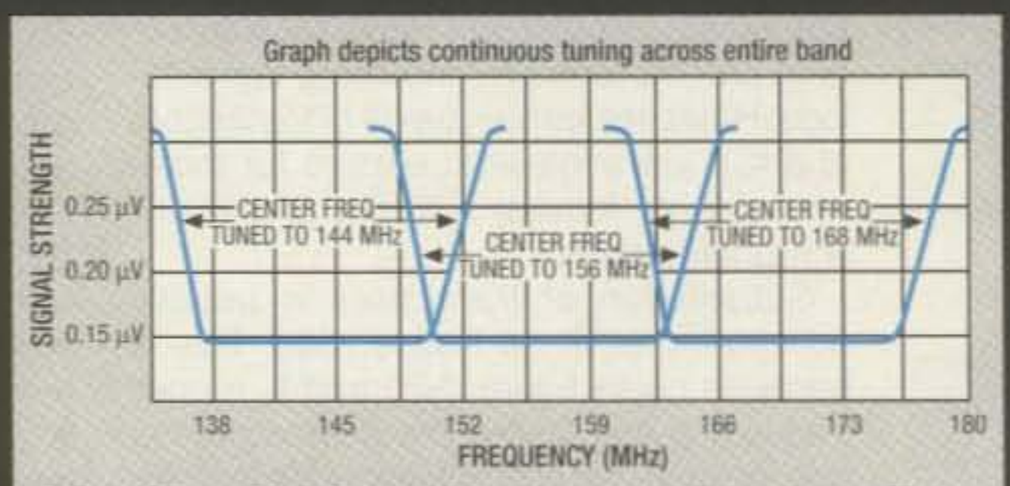
Advanced Track Tuning, Mil Spec, true FM. All in one radio!

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.

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Specifications

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  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)*
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FP-800	20 Amp HD Power Supply w/ Front Mounted Speaker
FRC-6	DTMF Paging Unit
FTS-17A	CTCSS Decode Unit
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*FT-2500M

"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!' "

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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
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Ultra Compact Dual Band Handheld **FT-50RD**

One tough little dual bander!

Features

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  TX: 144-148 MHz, 430-450 MHz
- AM Aircraft Receive
- MIL-STD 810 Rating
- Digital Coded Squelch (DCS)
- 112 Memory Channels
- 12V DC Direct Input
- High Speed Scanning
- Alphanumeric Display
- CTCSS Encode/Decode
- Auto Range Transpond System™ (ARTS™)
- Dual Watch
- Direct FM
- High Audio Output
- ADMS-1C Windows™ PC Programmable
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  Receive Battery Saver (RBS)
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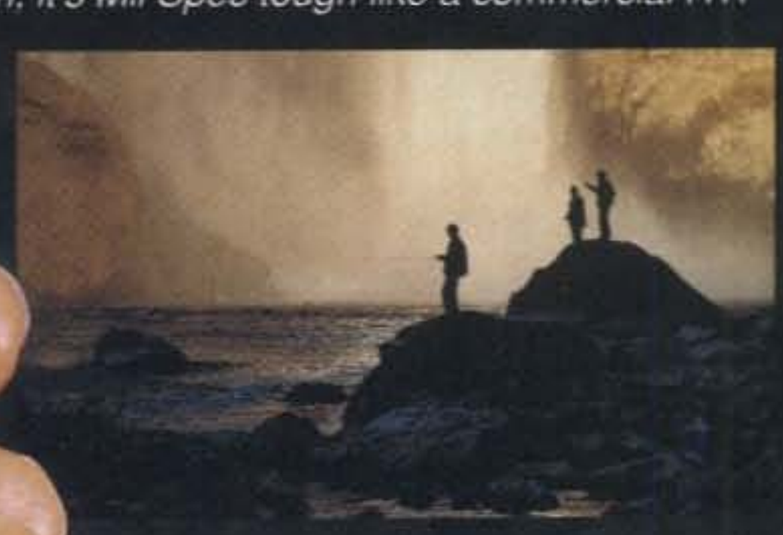

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The foremost in top-performing, durable, dual band handhelds now includes the FTT-12 DTMF keypad with CTCSS enc/dec, DCS enc/dec, DVRS and paging/coded squelch. Manufactured to rigid commercial grade standards, the FT-50RD is the only amateur dual band HT to achieve a MIL-STD 810 rating. Already a winner; the deluxe keypad makes this stand-out HT even better! Water-resistant construction uses weather-proof gaskets to seal major internal components against the corrosive action of dust and moisture. And, the rugged FT-50RD withstands shock and vibration, so throw it in with your gear!

Exclusive features set the FT-50RD apart, too. Wide Band Receive includes 76-200 MHz (VHF), 300-540 (UHF), and 590-999 MHz*. Dual Watch checks sub-band activity while receiving on another frequency, then when a signal is detected, shifts operation to that frequency. Digital Battery Voltage displays current operating battery voltage. Digital Coded Squelch (DCS) silently monitors busy channels. Auto Range Transpond System™ (ARTS™) uses DCS to allow two radios to track one another. And, the FT-50RD is ADMS-1C Windows™ PC programming compatible, too. To round out the FT-50RD, it has four battery savers, and super loud audio—remarkable in an HT this size.

A reliable companion where ever you go, the FT-50RD is one tough little dual bander with all the features you want!

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FT-10/40R
Ultra Compact Handhelds
VHF or UHF. Similar to FT-50RD including MIL-STD 810, and other exclusive features.

BY KARL T. THURBER, JR., W8FX

THE DIGITAL DIPOLE

FROM SOFTWARE THROUGH ANTENNAS FOR THE SHACK

November Nocturne '97

This month we open with some antenna notes that should be of interest, move our way to software available to amateurs, and finish up with a potpourri of antenna and filter notes. We'll start with antenna products from several manufacturers.

Antenna Notes

C3I Antennas. Previously, most recently in January 1994, we highlighted the VHF and UHF antennas and accessories offered by Rutland Arrays. That firm was, of course, well-known for its high-performance K1FO Yagis. The designs offered featured high gain, wide gain bandwidth, clean patterns, a good impedance match, and a high F/B (front-to-back) ratio. Specialized interests served by the antennas included tropo, meteor scatter, EME, ATV, and weak-signal DXing.

According to C3I's Terry Price, WD8ISK, many of the antennas offered by Rutland Arrays now are offered by Command and Control Consulting, Inc. (C3I) of Haymarket, Virginia. The firm's primary business is that of providing professional consulting services in telecommunications management, but it also is into producing amateur radio and commercial antennas with the acquisition of Rutland Arrays. Presently, VHF and UHF Yagis, stacking frames, power dividers, and antenna parts are offered. Most of the rugged and dependable Yagis, considered by many to be among the best-performing of their class, are designed by Steve Powlishen, K1FO, and Terry Price, WD8ISK; a few antennas in the product lineup are by Clarke Greene, K1JX, and Thomas Rutland, K3IPW.

One of the newest C3I antennas is the C5-50, a rugged, 5-element, 6 meter array with a claimed gain of 8.0 dBd, priced at $159.95. By the time this appears in print, two new Yagis, the C7-50 and the C12-50, also should be available. Other new C3Iantenna designs include the FO18-144, FO22-222, FO15-432, FO39-432, FO33-902, FO45-1296, and the cross-polarized FO12-SAT for 144 MHz and FO11-SAT for 432 MHz.

For further information, contact C3I Antennas, 2702 Rodgers Terrace, Haymarket, VA 20169-1628 (phone 1-800-445-7747; Internet <info@c3iusa.com>). Data sheets for most antennas are on the C3I antennas page at <http://www.c3iusa.com>.

WBØW Antenna Accessories. WBØW, Inc., offers a catalog depicting a variety of antenna accessories. The WBØW catalog shows ginpoles for practically any application; several types of tower jacks and plates, antenna and guy wire; various types and styles of coax; rotor cable; ladderline, nylon, and UV-resistant rope, oil-and-gas resistant DC Zip wire; coax and other connectors; a selection of Larsen antennas; and more. Also available is the 24-page catalog of the affiliated Global Connections, which features RF, audio, and other connectors of practically any description.

Several varieties of cold galvanized ginpoles are offered by WBØW, including models that fit most popular towers for amateur and commercial use, including BX type towers; towers with close-spaced W-brackets, such as Hy-Gain® and Tri-X® crank-ups; and most towers with round legs from 1 inch to 2 inch O.D. Ginpole prices, with mast, are $260–265. Also offered are accessories such as masts, heads, bases, pulleys, and the like.

For further information, contact Gaylen Pearson at WBØW, Inc., P.O. Box 8547, St. Joseph, MO 64508 (816-364-2691).

New from Dunestar. In several previous columns we profiled Dunestar products, from Ron Crouse, AA7EA. We described Ron's several multi- and single-band transceiver RF bandpass filters; the WXØB Stack Match, now also available in a new SM-03/V version for vertical antennas; and various antenna stacking and steering systems and switches, including the Model 834 HF Directional Control System, an antenna switching system used to create an electronically steerable parasitic HF array.

Dunestar now also offers the Model 808 Remote HF Antenna Selector, a sophisticated HF remote antenna selector for 12 VDC operation. The $299 switch has eight ports for greater flexibility than previous models, allowing you to select additional antennas with the flick of a switch. Features include safety grounding of all unused antennas, 3 KW power-handling capability, sealed 12 VDC relays, and single U-bolt mounting. Only six wires are needed to control all eight antenna selections.

For further information and for a flyer, contact Dunestar Systems, P.O. Box 37, St. Helens, OR 97051 (telephone 1-800-457-1690; Internet <dunestar@columbia-center.org> or <http://www.qth.com/dunestar>).

Lynics International Surge Protectors Update. Originally profiled by us in August 1996, Lynics International continues to offer commercial-grade, Underwriters Laboratories (UL)-listed lightning surge protectors that incorporate an easily replaceable, tube-type arrester element. The company says the element can protect equipment from surges up to 2,500 volts induced by nearby lightning strikes, for up to 600 times, reportedly equivalent to 30 years of usage. You can mount outdoor versions of the arresters at the base of an antenna tower after weatherproofing with heat-shrink tubing or vinyl electrical tape.

The devices are available in four combinations. These include male/female (indoor) and female/female (outdoor) configurations with either UHF or N connectors (see photo). Each protector handles up to 2 KW on HF, 800 watts on VHF, and 320 watts on UHF. Insertion loss is 0.4 dB maximum at 1.5 GHz, and nominal impedance is 50 ohms. Prices are $39.95 to $42.95, depending on configuration; spare gas tube elements are $9.

Lynics International offers commercial grade, UL-listed lightning protectors that incorporate an easily replaceable, tube-type arrester element. The devices are available four types. These include models in male/female (indoor) and female/female (outdoor) configurations, with either UHF or N connectors. Shown here is the No. 20206 female/female protector which uses N connectors. (Photo courtesy Lynics International, Inc.)

The company's flyer is instructive in that it includes application notes showing specifications, recommended configurations, mounting information, ground-wire requirements and details, weatherproofing instructions, and a number of photos showing the protectors alone and when installed.

For more information, a flyer, and pricing, contact Lynics International Corporation, 8 Amlajack Blvd., Suite 362, Newnan, GA 30265 (phone 770-251-2235; Internet <103222.760 @compuserve.com>).

Bencher and Butternut Update. In May 1996 we noted that the Butternut Electronics antenna product line had been acquired by Bencher, Inc. As a result of the deal, both Bencher and Butternut products now are available from a single source or through dealers.

The Bencher product line is wide-ranging, presently focusing on keyer paddles, hand keys, a lowpass filter (the Model YA-1), and the ZA-1A 1:1 balun. The Butternut line, on the other hand, is antenna-oriented and features the HF9V-X nine-band vertical antenna, HF2V vertical antenna for 80 and 40 meters, HF6V-X six-band HF vertical antenna, and the HF5B compact butterfly beam. The products are offered through a network of about 50 dealers.

A brochure with specs on all Bencher and Butternut products is available from the company. You might also want to ask for an interesting little four-page handout the firm offered in the past (and which was included in the most recent mailing I received), creatively entitled "Dirty Little Secrets from the Antenna Designer's Notebook." The handout takes a hard-nosed, critical look at some of the wild performance claims advanced for some widely-

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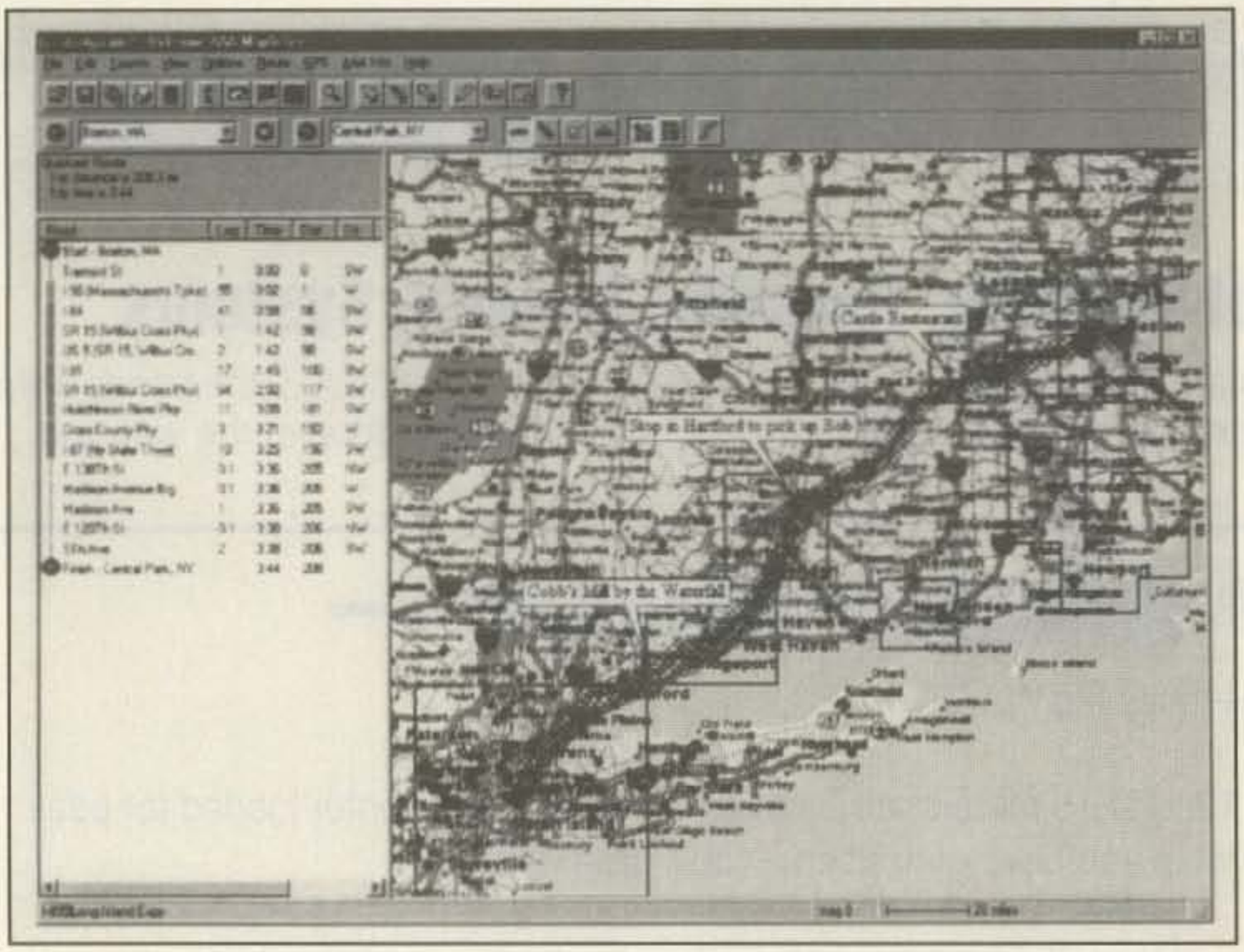


Like its predecessor versions, DeLorme's AAA Map'n'Go 3.0 imparts point-and click ease of planning to your trip. Here we show a typical screen. With the program you can get the best route for the way you like to travel, choosing the fastest, shortest, scenic, or a custom route from over 1,000,000 miles of roads, even avoiding specific geographical areas. (Photo courtesy DeLorme)

advertised, competing antennas, bouncing the claims made against back-to-basics, common-sense antenna theory.

For more information, contact Bencher, Inc., 831 N. Central Ave., Wood Dale, IL 60191-1219 (630-238-1183).

Soft Stuff

RITTY 2.0 de K6STI. In May 1996 we also highlighted the RITTY 1.0 DSP Radioteletype System. Its author, Brian Beezley, K6STI, is familiar to many readers as the publisher of a respected line of antenna-modeling software. What is less well-known is that Brian also cranks out a variety of non-antenna related software, such as RITTY. RITTY, a DSP (digital signal processing) data communications system, combines a high-performance FSK modem with a terminal program to let you transmit RTTY and PACTOR on your PC. What's unique is that its DSP algorithms don't require DSP hardware. Instead, RITTY uses your sound card to work its magic.

Now Brian has upgraded the program to RITTY 2.0. The revised program provides state-of-the-art RTTY and PACTOR transmission and reception using DSP techniques. The program's RTTY demodulator uses a limiterless front-end and optimal channel filters to maximize receive sensitivity. Features include filters that automatically tune to the incoming mark and space tones, a sophisticated automatic threshold correction algorithm, a wideband detector to minimize polar flutter, and more. The program's PACTOR implementation features a host of sophisticated features, and offers remarkably fast and robust text throughput under some very difficult conditions.

RITTY 2.0 has a spectral tuning indicator that's easier to use and provides more informative details than does a scope; a demodulated-waveform display provides detailed signal and propagation analysis. RITTY features both AFSK and FSK transmit output, adjustable mark/space frequencies, selectable Baudot punctuation, and fine control of protocol timing and detail. The program is $150; it requires a 486DX/33 or better PC, math coprocessor, and VGA display. PACTOR requires a 16-bit Creative Labs sound card, while RTTY works well with most 8-bit cards.

For further details, contact Brian Beezley at 3532 Linda Vista, San Marcos, CA 92069 (telephone 760-599-4962; or Internet <k6sti@n2.net>). (A demo is available for download on the Internet on Jim's Gazette page at <http://www.megalink.net/~n1rct/rit2/rit2.html>.)

DeLorme AAA Map'n'Go 3.0 and Phone Search USA 3.0. In several previous columns we highlighted various DeLorme CD-ROM based mapping software. These included 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 Map'n'Go®, which brings all kinds of North American travel planning information to your PC. We profiled AAA Map'n'Go 2.0 in January. Now DeLorme has a much-revised AAA Map'n'Go 3.0® for Windows®, which again bears the American Automobile Association's logo and includes a massive amount of *AAA TourBook®* data.

We won't replay our previous review, other than to note that AAA Map'n'Go is a very comprehensive travel planner. It lets you plan a custom route from over 1,000,000 miles of routable roads, including in its listings some 22,000 hotels and motels, 10,000 campgrounds, 12,000 attractions, and 20,000 fairs and festivals—in all, some 64,000 entries. About all its database *doesn't* contain are VHF/UHF amateur repeater site listings, which would be of great benefit to traveling amateurs—although the new version does contain info on some 6,762 commercial radio stations enroute. (For the record, I've already made the suggestion that repeater sites be included in the future.)

The new version (estimated street price $39) includes several brand-new features, such as an updated 1997 *AAA TourBook* database, with its more than 64,000 entries; highway exit services information at some 8,000 Interstate exits; weather almanac data for all of North America; some 80 recommended scenic drives; the ability to avoid specific geographic areas when routing a trip; and much more.

Internet capabilities also have been enhanced by linking to DeLorme's dedicated Map'n'Go web site at <http://www.mapngo.com>. Here you can obtain updated information on weather conditions, road construction, special events, direct access to Web pages for some 250 cities using the site's "Online Gazetteer," and more. (This Web site is in addition to the main DeLorme site at <http://www.delorme.com>. Check out both of them.)

Included with the travel package we reviewed was a separate program, DeLorme Phone Search USA™ 3.0 for Windows® and Macintosh®; we reviewed the previous version in December 1996. Using it, you can access over 96 million business and residential listings—16 million more than in the previous version. The program's estimated street price is $29, a bargain considering the tremendous quantity of telephone data you're furnished. You can, of course, use the program with AAA Map'n'Go or Street Atlas USA to map the listings on detailed maps.

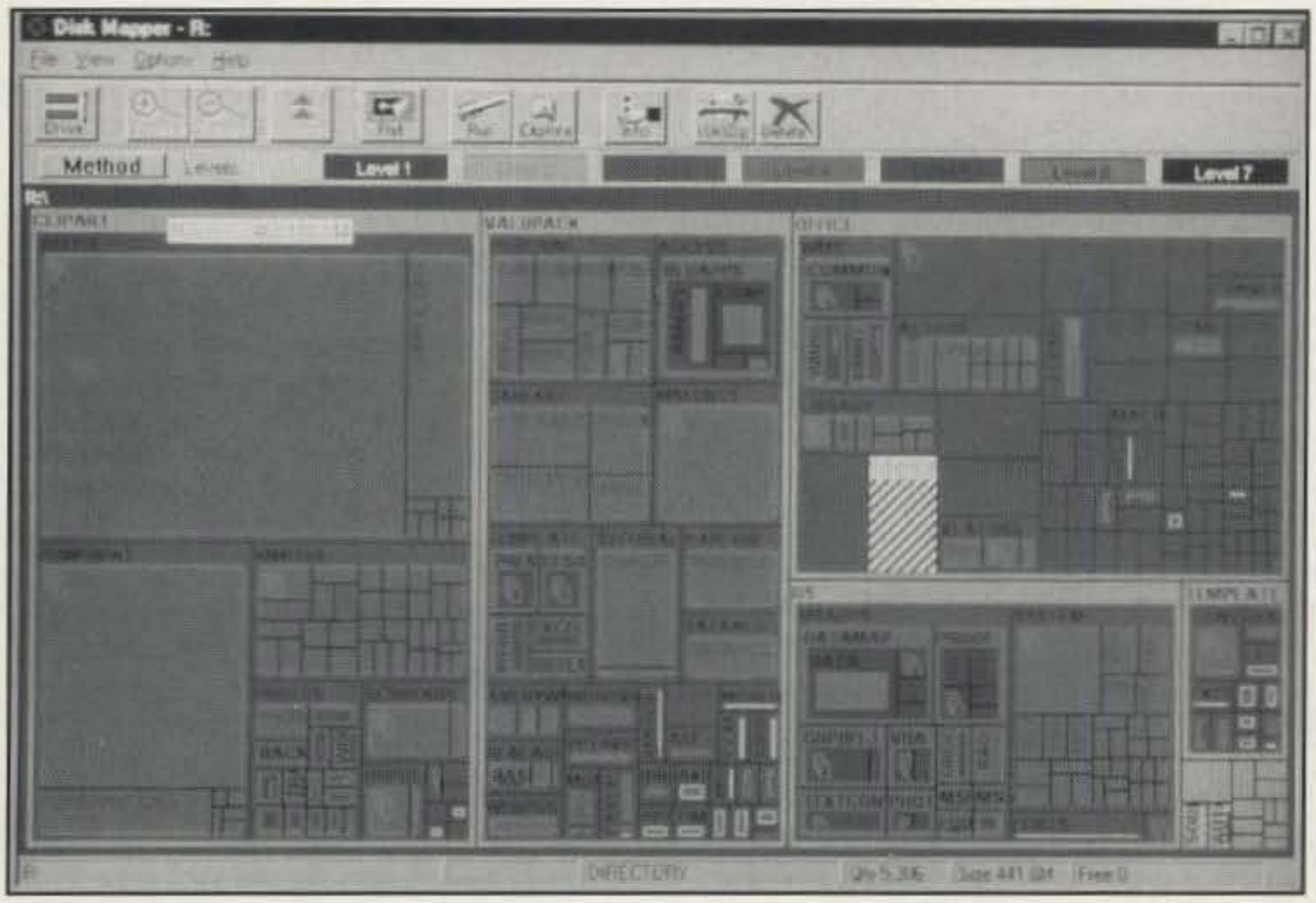
With Phone Search USA, which is furnished on seven (!) CD-ROMs, you can quickly look up listings nationwide by name, phone number, address, or business type; filter searches in various ways; and print out search results as text listings or on standard Avery® labels.

A particularly neat "find your neighbors" feature has been added. With this new reverse search function you can search the Phone Search USA database using street addresses. When provided with a specific street address, the program finds the name and phone number of the business(es) or resident(s) who are there. When provided with just a street name, the program finds the listings for all of the listed telephone numbers on the street. (This feature works quite well; it marks the first time I had a handy printout of all my neighbors' phone numbers. Now there's no excuse to not know who your neighbors are!)

For additional information contact DeLorme, 2 DeLorme Drive, P.O. Box 298, Yarmouth, ME 04096 (1-800-452-5931). (This is their new world headquarters.)

DiskMapper™ with Office 97 Zoom. In last January's column we also profiled DiskMapper. To recall, DiskMapper is a PC utility that *visually* shows you what's on your hard disk so you can delete or compress files you don't need or rarely use. Billed by the publisher as "the road map for more hard disk space," it's intended to help you get the most out of available space. The goal is to avoid or delay having to buy a much larger hard disk.

Instead of presenting disk occupancy information in simple file tree listings, the program uses a patent pending "nested rectangle" technique to give you comprehensive information in an intuitive format that visually shows you what's taking up space. DiskMapper presents



Micro Logic DiskMapper with Office 97 Zoom is a special version of their hard disk space saver, profiled in January 1997. The new version is tailored to view the hard disk space requirements of Microsoft Office 97, a large "mega app" that gobbles up hard disk space. Like the original DiskMapper, DiskMapper with Office 97 Zoom uses a "nested rectangle" graphical display method to help you get the most out of available disk space. (Photo courtesy Micro Logic Corp.)

an overview map of the entire hard disk, letting you see how much space directories take up. Recently, Micro Logic released DiskMapper with Office 97 Zoom, a special Windows 95-optimized version of the program.

Why the special version, you may ask? Well, if you recently purchased a new PC with Microsoft Office preinstalled, you know how much of your drive is already gobbled up, right out of the box, by this "mega app." Office 97 is so big, according to Micro Logic, that you need a utility like DiskMapper just to clearly see how much hard drive space is used and how much is wasted. With it, you can launch programs or datafiles right from the map to evaluate them. You also can customize the level of detail you want to see and whether or not to view available free space.

DiskMapper with Office 97 Zoom uses the nested rectangle technique to give you a comprehensive overview of what's on your drive. By visually showing what's taking up space, you can make room for new data and programs by easily deleting or Zipping much of Office 97—at least the parts you're likely not to need.

DiskMapper is $49.95 and requires Windows 95. It's from Micro Logic Corp., P.O. Box 70, Hackensack, NJ 07602 (phone 201-342-6518; Internet <info@miclog.com> or <http://www.miclog.com>). Information on a number of other new products is available on the Micro Logic Web site.

Short Bursts

Tower Tech Potpourri. As we noted last January, Steve Morris, K7LXC, is the "Up the Tower" contributing editor for sister publication *CQ Contest*. His monthly column covers all aspects of tower safety and construction, while offering some excellent tips. Steve also operates Tower Tech, a firm that focuses specifically on towers and all that they entail. Items offered for sale encompass a wide variety of rigging gear, including custom "buckets," tool bags, safety belts and harnesses, weatherproofing materials, and many other tower-related parts and accessories.

Steve tells us that he has introduced a computer software program, Mast, Antenna and Rotor Calculator (MARC). The program, which runs under DOS, Windows 3.1, or Windows 95, determines the total bending moment, mast material yield strength, and wall thickness of two or three inch masts for various antenna configurations. The program also gives you the recommended antenna rotor torque and provides a list of several commercial antenna rotors that should handle the required load, as calculated by the program.

MAST allows for more than one tower-mounted antenna to rotate with the mast. The program determines the total wind loading and the stress at the point where the mast exits the rotor, the point most likely to fail. It's on a 3.5 inch diskette and is $9.95 plus $2.55 s/h from Tower Tech (address below).

Also, in January we mentioned Steve's "Internet mail reflector" mailing list, TowerTalk, which is devoted to tower and antenna topics, and to which you can subscribe free of charge. Recently, Steve asked us to mention TowerTalk again, since there have been some important changes of which you should be aware.

Since our writeup, the reflector has changed domain names, and the original info no longer is accurate. To subscribe, send an e-mail message to <towertalk-request@contesting.com> with the word "subscribe" in the message. That, along with a simple authentication procedure, is all you need do to sign up.

Contact Tower Tech, Box 572, Woodinville, WA 98072 (phone 1-800-TOWERS8; Internet <UpTheTower@aol.com>).

Postscript: Steve's upcoming *Up The Tower* construction book that we mentioned in January has been delayed, although it hopefully should be available by the time you read this.

Tytewadd Power Filters. Have you ever suffered major electrical damage to your home or its contents—such as to your amateur radio gear or PC? I have, and I am now a believer in good lightning protection. But the fact is, even with a good ground at the electrical service entrance, and surge protectors on individual equipment, you also should have a secondary suppression system—*a secondary surge arrester.* Installed at the electrical panel, such a "whole-house" device may well end up "sacrificing itself" rather than let a damaging surge get past it and flow into your valuable radio equipment or PC.

The current trend is toward use of whole-house secondary surge arresters that can protect all of the secondary AC wiring circuits from electrical surges. While even whole-house protectors can't save you from a direct hit by lightning, they can and do protect your equipment and appliances against lesser perils. These devices effectively divert excess energy to ground, reducing voltage surges to a level your electrical system and conventional, point-of-use surge suppressors can absorb.

What's a good whole-house protector? Secondary surge arrester performance is determined by two factors. First is the *clamping capability,* the level at which a unit begins to suppress and dissipate surges; the second is the *response time,* or how fast it can respond to the surge and clamp it off. A "good" unit has a response time of under about 2 nanoseconds, clamping to within 20 percent of the rated current. Such units should meet ANSI/IEEE C62.1 standards, which include the unit withstanding a very heavy-duty surge current of some 15,000 amperes.

Tytewadd manufactures eight models of Underwriters Laboratories (UL)-listed devices, power filters that protect all circuits on your electrical panel. They are for installation directly inside main service entrance or branch electrical panels, or they can be installed on single circuits.

The Tytewadd devices help protect the premises from spikes, surges, and transients, from moderate overvoltages to heavy, lightning-induced surges. They clamp in 1.5 nanoseconds at less than 10 percent above the rated voltage performance parameters, which lets them continuously dissipate lesser but more prevalent surges and spikes often responsible for damage to PC and electronic equipment. The devices carry a warranty for one year, with half-retail-cost replacement thereafter.

For more details and useful background information on lightning protection, contact Tytewadd Power Filters, 704 West Battlefield Rd., Springfield, MO 65807 (417-887-3770).

Wrap-Up

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

Overheard: One thing I've come to realize is that you're never actually defeated when you fail at something; rather, you're defeated *only* if you quit. 73, Karl, W8FX

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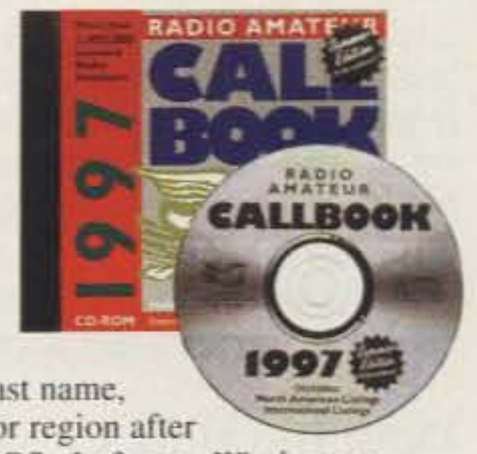

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BY DAVE INGRAM, K4TWJ

WORLD OF IDEAS

A LOOK AT THE WORLD AROUND US

Nonstop Fun: More Notes, News, Goodies, and Ideas

Smoking soldering irons, gang. It happened again! We began this month's column as a double feature with more notes in the first part and an introduction to Survival Communications planned for the second part. Then things mushroomed. Additional news and goodies demanding immediate recognition poured in almost faster than we could keep up with them. When the smoke cleared, resultant "what's hot today" details once again filled all available space. Unbelievable! These are indeed exciting times, particularly in the world of QRP. A fascinating mix of information is lined up to share with you, including a close-up look at the increasingly popular Rainbow Tuner Kit, so let's get started!

More Rig Notes

While recently walking through an office supply store, I noticed an electric pencil sharpener in a display case. The item was approximately 3"H x 4"W x 4"D with one end rounded and the other end squared off. The more I studied the sharpener, the more its shape reminded me of a miniature classic AM kitchen radio, which inspired ideas of a unique case for a small transceiver (fig. 1). Then, too, I began pondering why everything today must be enclosed in a drab black or gray enclosure rather than looking cheerful and upbeat. Life needs more color!

Visions began formulating in rapid succession: Size up the case slightly, place a transceiver's PC board near its bottom, and mount a large knob in the right/curved area for easy tuning. Install an audio amplifier module and speaker on the left side, and mount a small power supply behind it. Space behind the tuning pot or capacitor would leave room for a small antenna tuner, and an LED SWR monitor/display could be viewed through part of the speaker grill. Infrequently used controls and sockets easily could be mounted on a rear panel. Top off that vision with a pastel-yellow powder coating on the metal cabinet, and complement it with red knobs and a red dial. Now that's a rig case with real class, flash, and nostalgic glamour! Too much color or too much of a Dick Tracy look, you say? How about a cream-colored rectangular cabinet with cream knobs and styled like those dear little Emersons and Arvins of the fabulous

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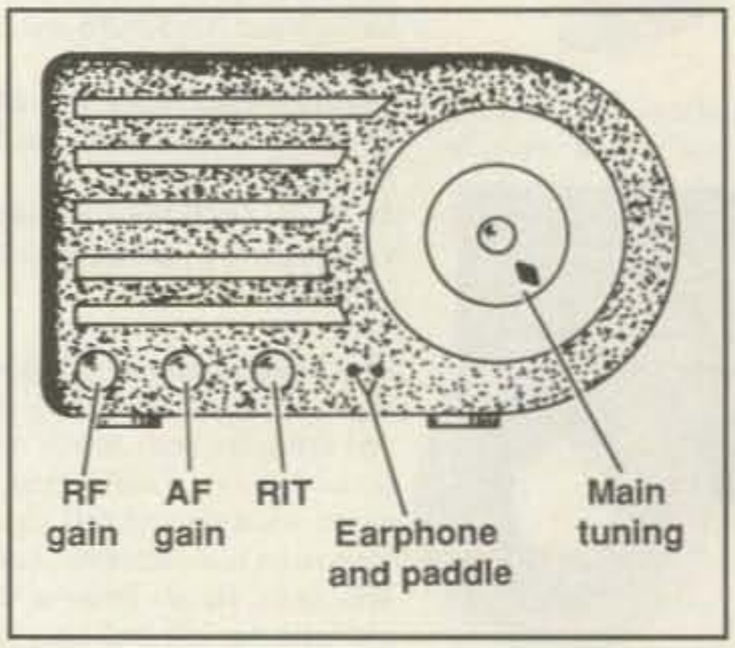

Fig. 1– A sketch of the classic kitchen-radio-case idea discussed in the text. The enclosure can house a small QRP transceiver, power supply, antenna tuner, SWR monitor, audio amplifier, and front-firing 4 inch speaker. A single-box station such as this can add true nostalgic glamour anywhere it is placed!

'50s? A good friend and I have discussed making such enclosures—probably in a 3"H × 6"W × 4"D size. They probably can be produced for $25 or $30 each if interest warrants. I can't wait to get one (or two!) of them. How about you? Drop me a brief note or card if you are also interested, and maybe we can make the enclosure idea a reality.

Mobile News

Do you remember the big all-band Fortex "Stealth" antenna featured in last year's mobile column? Designer Jim Blankenship, KN4TV, reports he is now producing a completely silver version of the Stealth's massive 5 1/2 inch diameter center-loading coil, and the new-style antenna has beat all challengers in both on-the-air tests and mobile "shootouts." That makes sense: A solid-silver loading coil of that size could blow away the tank circuit in most legal-limit amplifiers! Initial tests indicate the new super-conductive coil has a "Q" of over 500 on 75 meters (unreal!), and the feedpoint impedance of a "silver coiled" Stealth is 3.6 ohms, which is superb for a mobile antenna. That's right: The actual base/feedpoint impedance of a good mobile antenna should be very low. A matching coil/network (or system losses!) then raises the impedance so the mating transceiver "sees" an approximate 50 ohm load.

Fig. 2– Here is a trucker's-eye-view of the all-silver coiled, capacity-hatted Stealth antenna arrangement of Bill Becks, KE8KB. The setup pumps out a hefty signal and won first place in the 1997 Wisconsin Mobile Shootout.

Bill Becks, KE8KB, checked out one of the all-silver super coils on his Stealth-equipped Mercedes (fig. 2), and folks thought he was joking about being mobile. His only recourse was to enter the '97 mobile "shootout" in Rhinelander, Wisconsin in July. This is a big-time competition among serious mobileers. The output power of each contestant's rig is set at 50 watts, using a Bird Wattmeter for reference. Then a professional field strength meter and vertically polarized dipole positioned 1/4 mile across the test range measure signal strength. Measurements are taken with the vehicle pointing in all four directions, and final scores show all four measurements. KE8KB's silver-coiled Stealth beat the two closest challengers (who were using large, homebrewed, center-loaded antennas) by 3.9 dB. A quick glimpse of the new all-silver coil is shown in fig. 3, and more information on the new "Silver Stealth" is available from Fortex Enterprises, 7712-B Timberlake Road, Lynchburg, VA 24502 (804-239-6524). Check it out! After reading our previous discussion, maybe you will be inspired to

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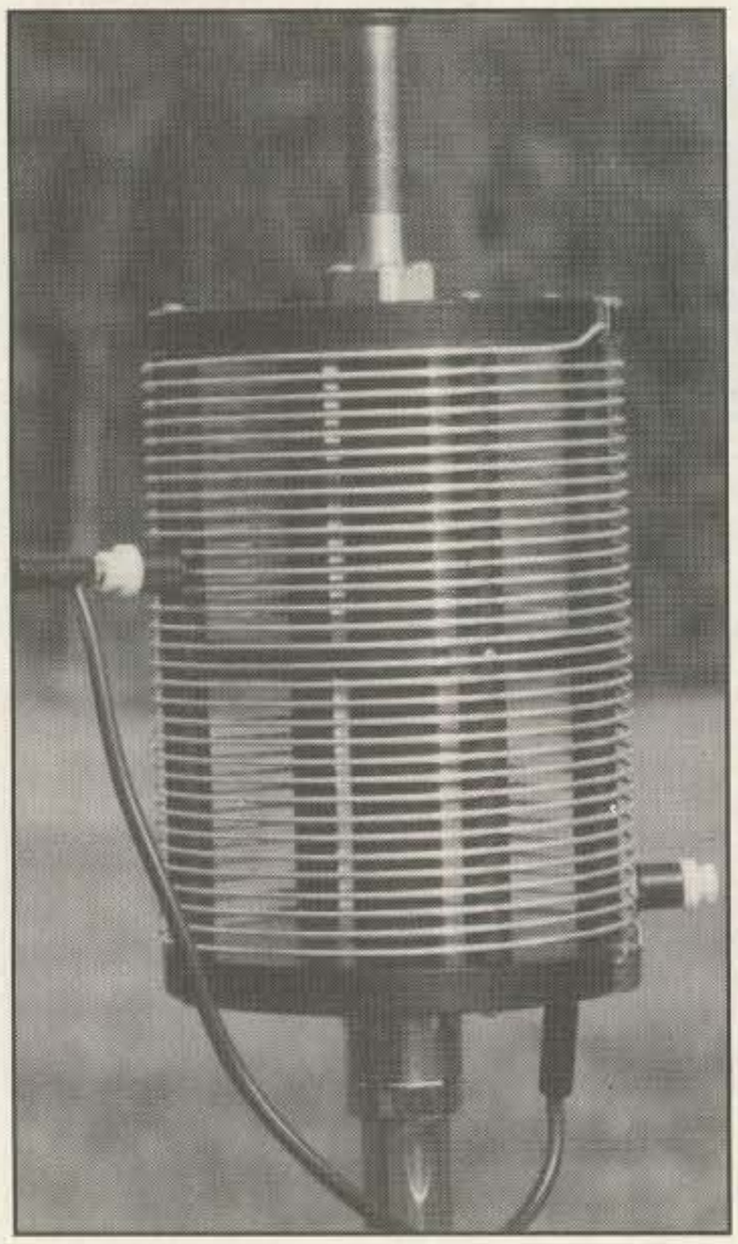

Fig. 3– A close-up view of the new all-silver 5 1/2 inch loading coil on the Fortex Stealth antenna. Now this, friends, is the mark of a serious mobileer!

Fig. 4– The Tape Tenna made by Hamco makes an invisible stick-on antenna for low-profile hamming. Its adhesive copper strips also work great as a ground plane for modern composite-body cars as discussed in the text.

try your own setup in a big-time mobile shootout soon. They are a blast of fun!

While on the subject of mobiling, several readers have asked us for a quick and easy grounding solution when mounting an HF antenna on today's modern composite-body cars. Their needs are well justified, as fewer and fewer vehicles are being made "all metal style." Fortunately, I discovered an ideal "30 minute solution" in a super-handy item called the "Tape Tenna" designed by Larry Feich, NFØZ, and available from Hamco, P.O. Box 25, Woodland Park, CO 80866 (fig. 4). As I will discuss in an upcoming column, the Tape Tenna's basic/original purpose or application is producing an invisible antenna for home or portable use. You just cut it to a desired length; stick it on a wooden rafter, overhang, etc.; paint it gone; and enjoy successful low-profile hamming. For mobile grounding we simply stick several strips of the adhesive-backed half-inch wide copper foil to the vehicle's underbody to produce a metal ground plane and then route all the strips to the mobile antenna's base mount/ground terminal. Exact positioning of strips will depend on your vehicle, but long lengths under the bumper, rear quarter section, and inside fender wells (plus trunk) produce noticeable improvements. Remember to interconnect the strips "grid style" to simulate the maximum amount of metal. You will know when Tape Tenna strips are "doing their duty," as SWR will drop from a minimum of 2.5 or 3:1 (because the antenna lacked a ground) to 1.5:1 or less. Try the Tape Tenna idea. It really works! You can also use some of its leftover strips for making a hidden antenna to mate with our next featured goodie. That's really getting your money's worth!

The Rainbow Tuner

And now, sports fans, we have a first-hand report on a unique new item generating widespread excitement in the world of homebrew QRP: the Rainbow Tuner (figs. 5, 6, and 7). This combination antenna tuner and SWR monitor was designed by Joe Everhart, N2CX, and kits are being produced by the New Jersey QRP Club. It was also co-winner of the '97 QRP FDIM homebrewing contest at Dayton, and shared first-place honors with the 38 Special transceiver featured in our September column. Folks are going bonkers over this kit. It is low priced ($25 plus shipping),

Fig. 5– The Rainbow Tuner kit as received and laid out ready for construction. The manual's step-by-step instructions plus silk-screened component layout on the board make assembly a snap.

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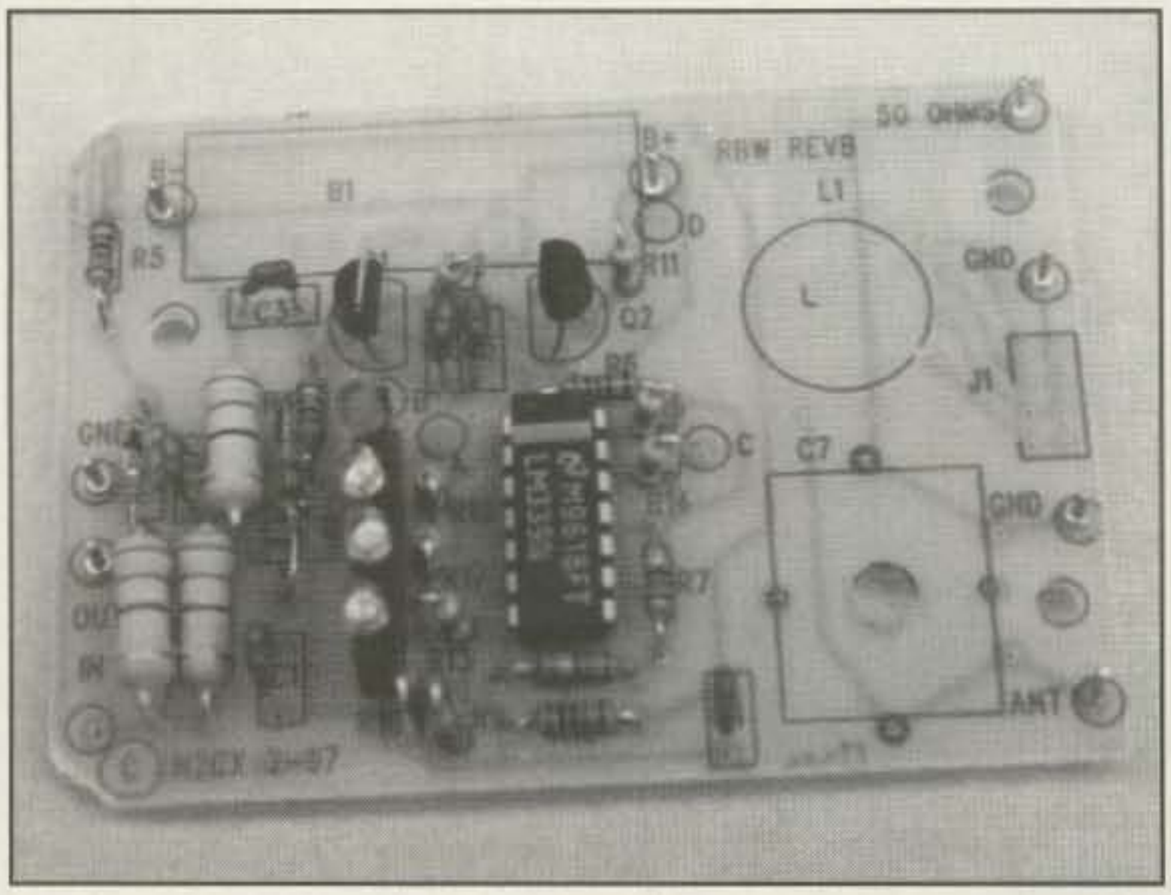

Fig. 6– I almost forgot to shoot this midway-through-construction photo. A couple more components complete the SWR section. Then the coil is wound and mounted along with the trimmer, and checkout begins. Assembly is easy enough that anyone can do it!

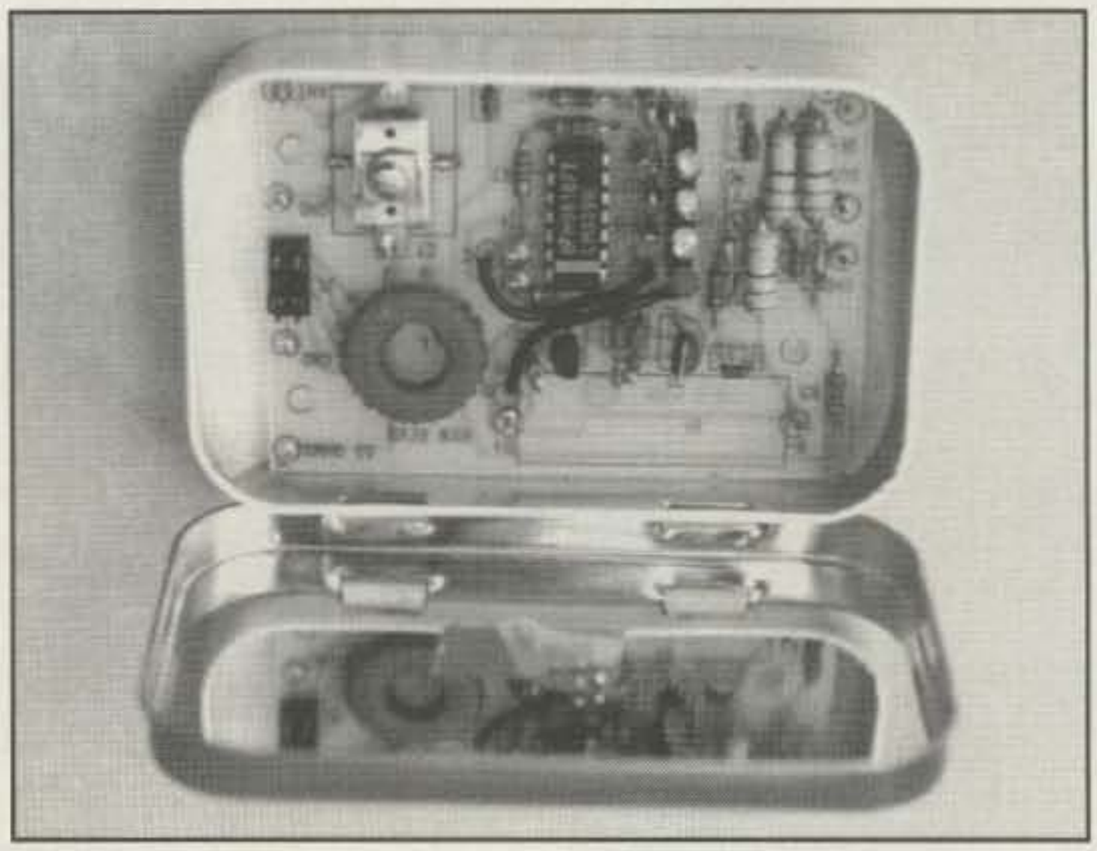

Fig. 7– The completed Rainbow Tuner nestled in an Altoids mint tin, ready for travel. Some folks punch holes for connectors, viewing the LEDs, and adjusting the trimmer. I settle for using short jumpers and operate it with the lid open until KE6RIE's custom enclosure is available.

small (2" × 3"; it fits in an Altoids mint tin!), and ideal for impromptu or portable operation with a quickly installed end-fed antenna.

The Rainbow Tuner Kit consists of all board-mounted parts, a silk-screened board, and a well-detailed 20-page instruction manual that covers step-by-step assembly, troubleshooting, use, and antenna plans. You just add an enclosure and preferred antenna connectors to make a "finished product." Approximately 40 parts are included in the kit, placing it midway in what I call the "quick brew" category. Built piecemeal during occasional spare moments, I would estimate total assembly time to be two or three hours.

The Rainbow's tuner section consists of a basic parallel L/C circuit with a tapped toroidal coil and a trimmer capacitor. A board-mounted plug-in jumper is used to select coil taps, and an insulated screwdriver is used for trimmer adjustment. An off-board variable capacitor and multiposition switch can be substituted, if desired (not included in the kit). The tuner is designed specifically to match a high-impedance, halfwave, end-fed, single-wire antenna for 40 or 30 meters (66 or 46 feet long, respectively). A second wire one quarterwave long is also placed below the antenna wire and connected to the tuner's ground post to act as a counterpoise (Tape Tenna time!). This tuner matches a high impedance (500 to 5000 ohms) to a low impedance (50 ohms). It does not work with dipoles, verticals, and beams (which are low impedance). On the "up side," however, a long vertical wire with a tuning section at its base and a shorter wire as a radial is comparable to a full-size halfwave vertical and should "outwork" some popular ready-made equivalents.

The SWR monitor section (which can be used stand-alone style with any type of antenna) is an absorptive-type resistive bridge. It uses two transistors and one IC, is self-referencing, works with power levels from 200 MW to 5 watts, and has an auto on/off function. No switches or adjustments (or initial alignment) are required: The monitor is fully automatic. The display consists of red, orange, yellow, and green LEDs (hence inspiring the "Rainbow" designation). Illumination of different-colored LEDs indicates SWRs of above 5:1, between 5:1 and 3:1, between 3:1 and 2:1, between 2:1 and 1.5:1, and below 1.5:1. Being resistive, the bridge section works on any HF band. It is also a blessing for rigs without SWR protection. Even when a connected antenna is unexpectedly shorted or its feedline is broken, the rig never "sees" an SWR above 2:1. Part of the rig's output is absorbed by the bridge, so you only use it to check SWR or guide tuner adjustment and then switch it out of the line or disconnect it for normal operation. The LED metering circuit can be powered from the same 12 volt supply used with your rig, or via an N-size 12 volt cell mounted in a small holder (both available from Radio Shack) and glued to a board-allocated space for independent operation.

The Rainbow Tuner is the flagship project for The New Jersey QRP Club, and they are doing a top-notch job of producing kits while developing several more projects. The club is very enthusiastic, and we are sure you will be hearing more about them in the future. Rainbow Tuner Kits are available for $25 plus shipping ($3 U.S., $5 DX). Orders go to (and checks are payable to) George Heron, N2APB, 45 Fieldstone Trail, Sparta, NJ 07871.

Hot News Flash

I just received a quick note from Doug Hauff, KE6RIE, relating he is starting to

produce a custom enclosure for the Rainbow Tuner. No views are available yet, but judging by his incredible workmanship on the 38 Special's bullet-proof case (see September and October columns), this one must be another beyond-comparison winner. Enclosures probably will be available by the time this column appears in print, so check with Doug at the San Luis Machine Company, 200 Suburban Road, F2, San Luis Obispo, CA 93401 (805-549-8065) for more details and prices.

Final Notes

I almost forgot to share my operating results using the Rainbow Tuner. Quite honestly, I was so engrossed in completing this month's column before deadline time that on-the-air time was limited. I have been testing the Rainbow SWR monitor with various rigs and antennas, however, and it works like a champ. Everyone needs a small SWR monitor like this. You can carry it anywhere in a coat pocket and check antennas in a flash.

I quickly strung up a halfwave wire, used the Rainbow to match it to the rig, and was surprised with the good results. I worked stations around the country and in the Caribbean with no problems. My previous experience using longwires as a budding novice was never so successful. Maybe I should have used a tuner. Maybe that's why my transmitter's output was always low.

After all this kit building and column writing calms down in a couple of weeks, I plan to try an interesting antenna idea with the Rainbow. I visualize extending the counterpoise to a halfwave length like the main radiator, positioning both wires horizontally as illustrated in fig. 8, and then routing both wires to the tuner to make a modified, no-feedline-type Double Zepp. Hypothetically, the critter could produce 2 to 3 dB gain. Maybe you too would like to give the idea a shot. Go for it and let's compare notes in a few months. Meanwhile, I look forward to QSOing all of you on 30 meters one evening between 0230 and 0300 GMT.

73, Dave, K4TWJ

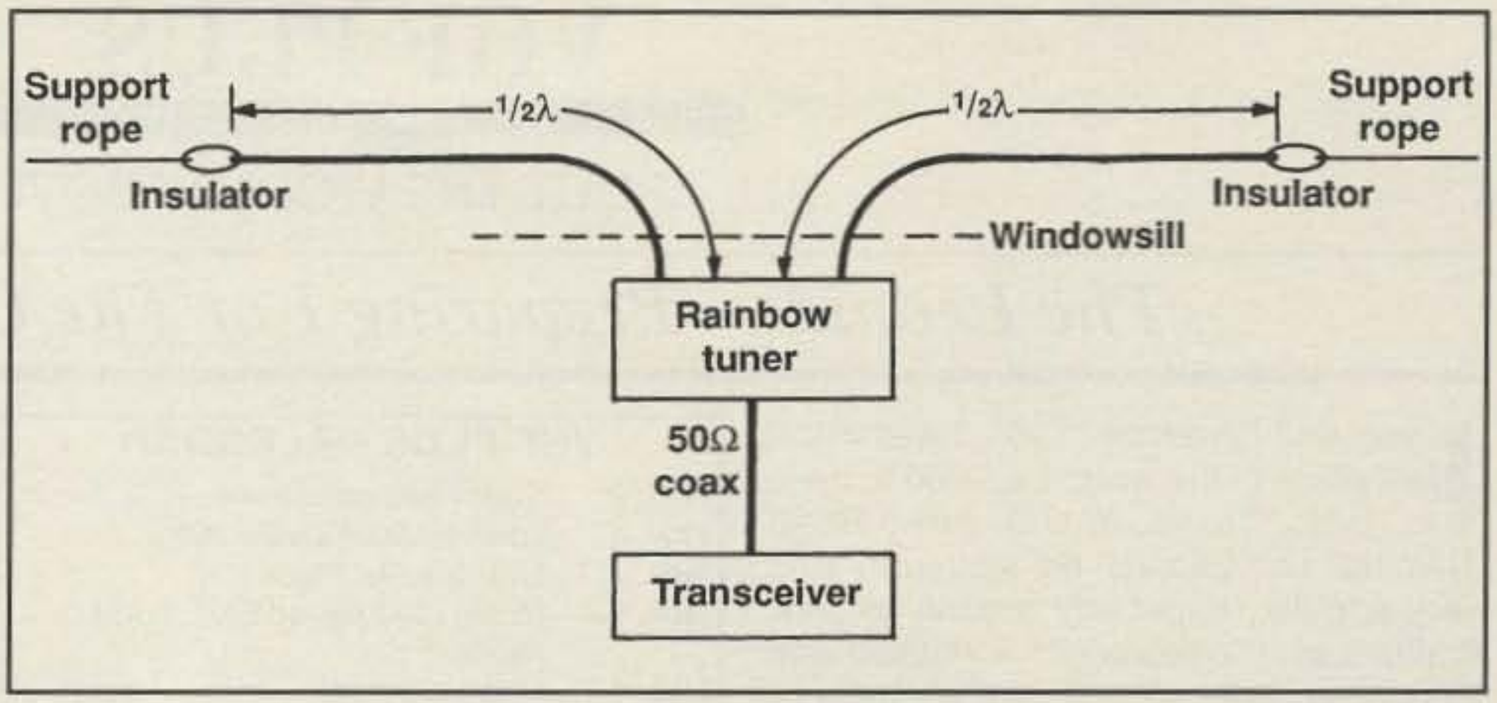

Fig. 8– Outline of "Doctor Dave's" modified Double Zepp antenna idea. The skywire has good potential for portable and on-the-spot operating stints with the Rainbow Tuner.

BY JOE LYNCH, N6CL

VHF PLUS

ALL ABOUT THE WORLD ABOVE HF

The Leonids—Preparing For The Coming Storm

It was mid-November 1966. I was in the last place in the world I wanted to be—Ft. Bliss, Texas, in U.S. Army Basic Training. The Beatles' hit *Yesterday* was very popular, especially among us new draftees who so thoroughly identified with its opening lyrics: "Yesterday, all my troubles seemed so far away." All of us wanted to be anywhere else but where we were. We even hoped that something magical would happen to take us away from there.

Early in the morning on November 17 it seemed that our wishes might be answered, for as we looked skyward from our position in military formation, we were amazed to see that the sky was falling! Unfortunately for me, reality overtook any fantasy thoughts of deliverance because I had read *QST*'s account of the forthcoming *Leonids* meteor storm in the November issue.

It was because of that article that I knew what was happening. I also knew that it was not a sign of some sort of apocalyptic event. Rather, I knew it was yet another reason I had for not wanting to be there—wanting to be home in front of my radio working all of that DX on the VHF+ frequencies.

The memory of that meteor storm is now 31 years old, yet the excitement of seeing all those meteors falling at once is as vivid as if it was yesterday. It was one of those once-in-a-lifetime events. Even so, this month may give us a taste of next year's chance at one of those events.

The *Leonids* meteor showers are unique in that they have a peak in activity every 33 years. (The *Leonids* meteor shower gets its name because it appears to be falling from within the constellation *Leo*.) The meteor showers are a result of the Earth traveling through streams of debris from the Tempel-Tuttle comet, which makes its appearance every 33 or so years. This is one of those 33 years.

History

In the August column I discussed several aspects of meteor showers in general and related them to the *Perseids* meteor shower. This month I will cover the *Leonids* meteor shower because its peak is around November 17–18 and because of the potentiality of a major shower this year and a storm next year. A shower is considered a storm when the estimated zenith hourly rate (EZHR) is in excess of 1000.

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VHF PLUS CALENDAR

Nov. 2	Poor EME conditions.
Nov. 4	Lowest Moon declination.
Nov. 7	First quarter Moon.
Nov. 9	Moderate to good EME conditions.
Nov. 13	Moon perigee.
Nov. 14	Full moon.
Nv. 15-16	Second weekend of ARRL EME contest.
Nov. 16	Moderate to poor EME conditions.
Nov. 17	*Leonids* meteor shower predicted peak. Highest Moon declination.
Nov. 21	Last quarter Moon.
Nov. 23	Moderate to poor EME conditions.
Nov. 24	Moon apogee.
Nov. 29	New Moon.

As it turns out from history, the *Leonids* meteor shower seems to have been the *Rosetta Stone*, or the key to understanding how meteor showers occur. Because of its relatively predictable reoccurrence (every 33 or so years), astronomers have been able to study it and thereby make the tie-in with a particular comet.

Late in the ninth century is when we have the first recorded evidence of the Earth passing through the debris of a comet. In 868 A.D. the Earth passed through the path of the then unknown comet Tempel-Tuttle. It was another 34 years before the Earth again passed through the comet's orbit. Debris from this comet caused a meteor storm which the Chinese recorded.

It would be another almost 900 years before any other major meteor storms would be observed by someone connected with the western world. Germans Humboldt and Bompland, then living in Venezuela, observed the meteor storm of 1799 and wrote about it. From their investigation, they heard of contemporary reports of a similar meteor storm occurring 33 years earlier.

During the ensuing 34 years enough international investigation was done so that there was an anticipation of some sort of storm. Those observing were not disappointed when in 1833 a major storm occurred which was observed in widespread locations throughout North America. A well-known quote by Agnes Clerke aptly describes what happened the night of November 12–13:

"[A] tempest of falling stars broke over the Earth. The sky was scored on every direction with shining tracks and illuminated with majestic fireballs. At Boston, the frequency of meteors was estimated to be about half that of flakes of snow in an average snowstorm." Clerke estimated that in excess of 240,000 meteors fell during the nine hour storm.

In 1866 two important events occurred. Ernst Tempel in France and Horace Tuttle in the U.S. independently discovered a comet (thereby getting it named after both of them, although Tuttle's discovery occurred several months after that of Tempel). The calculated orbit of the comet was slightly greater than 33 years. It also was that year, based on the previous 33-year interval, that another storm was anticipated. Eventually, the coincidental relationship of the orbit of the Tempel-Tuttle comet and the reoccurrence of the *Leonids* meteor storm were compared by Schiaparelli, his conclusion being that the two were related. His conclusion led to the establishment of the connection between meteor showers and comets.

It is important to note here that two other comet sightings presumably have ties to the Tempel-Tuttle comet. The first of these occurred in 1366. This observation was made by both Chinese and Japanese observers. In 1699 a G. Kirch in Germany observed a comet on October 26. However, there seems to be no other observations of that comet sighting left from historical records. Even so, some of the predictors believe that these two sightings (1366 and 1699) were prior observations of the Tempel-Tuttle comet.

In 1899 another storm was anticipated and an increase in *Leonids* activity did occur. The rates for the showers continued to increase to storm levels in 1901.

In 1932 yet another storm was anticipated. However, this time weather obscured the viewing of the storm. It was thought that because no observations were made, a storm did not occur. Even so, predictors looked forward to 1965–66.

In 1965 the *Leonids* count increased dramatically over the previous year. It was from this observation that predictors were fairly confident of storm level activities the following year. They were not disappointed. Visual observations compared the count to that of the 1833 storm. However, there really was no way to tie the levels of the two together because of the lack of comparable data. Even so, a number of amateur radio operators got excellent results from the *Leonids* shower of 1965.

Continued good press prompted more interest. Encouraged by predictions in the November 1966 issues of both *Sky and Telescope* and *Natural History* magazines, amateur radio operators stood by for what they thought might be a better than average night for the 1966 *Leonids* shower. Indeed, it was far more than "better than average"! The headline for Sam Harris, W1FZJ's "World Above 50 Mc." column in the January 1967 *QST* was "November Leonids—Shower of a Lifetime." Sam recounted, "Hundreds of contacts were made by calling CQ, or by breaking stations when their skeds were completed, as most were in the first minute or two of prearranged calls."

Reports of visual observations were sent to *Sky and Telescope* from all over the country. One report came from Shelby Ennis, W4WNH (now W8WN). Shelby wrote, "For us in Kentucky, the 1966 *Leonids* will be rated much better as a 'radio' shower than as a 'visual' shower due at least in part to the very sharp peak coming after dawn." However, in areas where dawn hadn't come, particularly in the west, the display was awesome. Reports of 2000 meteors per minute weren't uncommon. It was a night (or an early morning) to remember for amateur radio operators and for amateur astronomers alike.

Now, 31 years later, we have already entered the next cycle of the *Leonids* storm. Reports of the 1994 *Leonids* meteor shower indicated a dramatic increase over the previous year. Some reports compared the rates to the *Perseids* shower earlier that year. Reports of both 1995 and 1996 showers indicated continued increased activity. Additionally, the Dutch Meteor Society reported that a team of its observers recorded a period of an increase in faint meteors riding on top of the shower during the overall peak for a period of between one and two hours. These observations put the EZHR at about twice the number as the rest of the shower overall. Based on these observations, and the recovery of the Tempel-Tuttle comet on March 10, 1997, predictors have indicated that a storm is coming in 1998 and probably in 1999. Further, some have indicated a dramatic rise in meteoric activities this month!

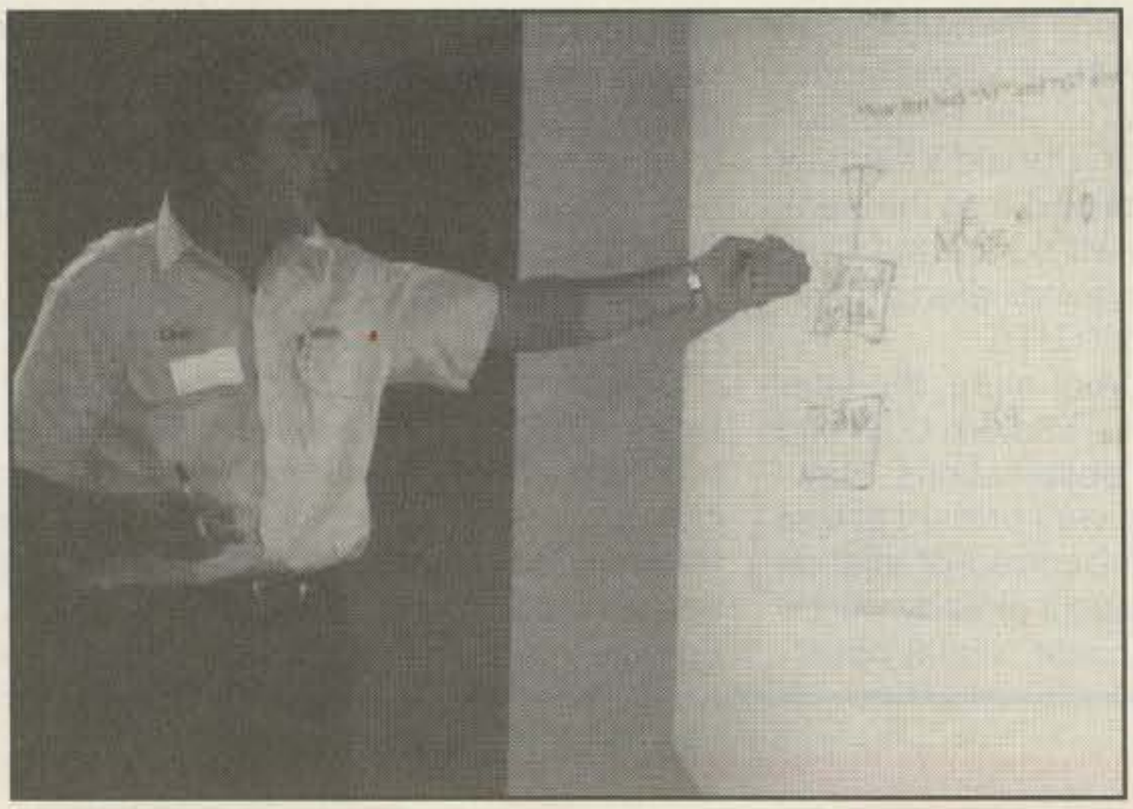
lar, moonrise will occur in the central part of the U.S. at about 0145 UTC and moonset at about 1600 UTC. Jet Propulsion Laboratory scientist Dr. Donald Yeomans and others have predicted that the peak for this year's shower will be around 1330 UTC, while others have indicated an earlier time of around 1000 UTC.

Because of the time of night, the later prediction will favor the western U.S. and the Pacific for visual observations. However, the Moon will be very brilliant at that time. Furthermore, if the correct prediction is the later one, because it already will be daylight on the east coast, visual observations will be next to impossible. Here is where our radio reports will be very valuable to the astronomy world. In particular, they will be looking for evidence of that faint stream which appeared in 1994. Such evidence will help with adjusting predictions for the 1998 storm and subsequent years following the potential storm.

So how can we best work the shower? By spreading out! There have been innumerable postings on the VHF reflector concerning not operating on the calling frequencies, setting up separate calling frequencies, and a host of other ideas. Frankly, none of these ideas will work dur-

Amateur Radio To Play Critical Role

As the above report by Shelby to *S&T* indicated, amateur radio operators have served to complement visual observations of many different meteor showers over the many years that a radio tie-in has been identified with them. This year is especially important for such reports complementary to the visual observations because the visual show will be obscured by a nearly full Moon, the full Moon having occurred on the November 14. In particu-



Chris Fagas, WB2VVV, discusses the importance of noise figure vs. gain in receiver design at the 1997 Eastern VHF/UHF Conference in Enfield, Connecticut. (W2VU photo)

Dave Olean, K1WHS (right), accepts the Eastern VUF/UHF Society's first Tom Kirby, W1EJ, Memorial Award on behalf of winner Bill Olson, K1DY (ex-W3HQT), founder of Down East Microwave. On the left is Fred Stefanik, N1DPM, who presented the award. (W2VU photo)

ing a very short-lived meteor shower, as this one is predicted to be. This is not the *Perseids* meteor shower where the Earth takes several days to traverse the stream of debris from its parent comet. It is a very short-lived event because the Earth takes less than a day to traverse the stream. In fact, the major stream is predicted to be only about one to two hours across.

Because of this short duration, schedules of one half hour in length are useless, unless you are only interested in making a couple of QSOs. I believe that random contacts are the best way to go for working a large number of stations. And the only way that random QSOs will take place is for all of us to *spread out*! By spreading out, I mean for us to get off and stay off the traditional calling frequency of 144.200 MHz. Frankly, we have an area of spectrum as wide as the 20 meter band (144.100–144.300 MHz) in which to play. There is no reason why we all have to stay bunched up on top of each other on one frequency. Furthermore, if this is a precursor of next year's storm, then we can get used to operating in a storm. As the quote from Sam Harris above indicated, contacts came fast and easy. Being spread out will only serve to enhance the probability of completing QSOs.

For Further Information

There are a couple of web pages you might want to check for up-to-date information. *Sky and Telescope* maintains a fairly frequently updated news page at <www.skypub.com/ news>. Much of the information I gleaned for this article came from NASA's web page or links from it. It can be found at <www-space.arc.nasa.gov/~leonid>.

Additionally, I received the following e-mail after publication of my August column from Len, WF2V: "Hello, Joe. I read your August 97 *CQ* column with interest. It is a good discussion about meteor scatter. I wish to point out to you some interesting work by a colleague of mine, Mr. Dan Warren. He has performed some amazing things using meteor burst communications. You may want to take a look at his web page at <http://www.borg.com/~warrend/metburdu.html>. He is not an amateur (but I keep trying to talk him into it). 73, Len, WF2V."

Current Contest

The second half of the ARRL EME contest is scheduled for November 15–16. See last month's column for more information. Because of the short-lived nature of the *Leonids* meteor shower, it is unlikely that EME communications during the contest period will be affected by it.

Remembering CO2PL

The following is from Wyatt E. Propst, K4PTU: "I was reading your article VHF Plus in the September issue of *CQ*, when I noticed the headline 'Piro Pirole, CO2PL, SK.' I was bemused by this information and stunned. I had gotten a letter from Pirole in December, mailed in the States by his mother, who had been to Cuba for a visit. He was thanking me for sending him my last year issues of the *Callbook*.

"My first CW QSO with Pirole was on the 25th of November 1991. Priole had joined our ranks just four months earlier. He was 39 years old. He told me he was a photographer in a press agency, and sent me a postcard bearing a picture he had taken and was obviously very proud of. He also sent me a complete set of stamps commemorating the Pan American Games. With this set of stamps he asked me to send him a DX world map. I sent him a nice large map of the world. It did not takeme long to learn that packages en route to Cuba take seven months.

"I continued to mail him my old *Callbooks* up through last year. I have QSL cards from him with the callsigns CM2PL, CL2PL, and CO2PL. He upgraded quickly and, to my imagination, was a ham's ham. His code improved in rhythm, accuracy, and speed with each contact. He was an A-1 CW operator. I know he is very proud of the solid gold Vibroplex he received from Saint Peter as he entered Heaven. He will always be remembered as a great friend in Cuba.—73, Wyatt 'Pete' Propst, K4PTU"

Highlights of Eastern VHF/UHF Conference

Down East Microwave founder Bill Olson, K1DY (ex-W3HQT), was the winner of the Eastern VHF/UHF Society's first Tom Kirby, W1EJ, Memorial Award, presented at the 1997 Eastern VHF/UHF Conference August 23 in Enfield, Connecticut. Kirby, one of the founders of the conference, died in 1996, and the group established the award last year to honor an amateur for outstanding work in promoting the use of VHF/UHF frequencies. Olson's award was accepted on his behalf at the banquet by Dave Olean, K1WHS.

Another award presented at the Eastern conference was the Central States VHF Society's 1997 Chambers award, for outstanding contributions to VHF operating. It was presented to Paul Wade, N1BWT (who wasn't there) by Steve Kostro, N2CEI (who was, and who brought the plaque back from Arkansas).

The conference itself was in a new location this year, Enfield, Connecticut, right on the Massachusetts border, and featured an all-day "Lab room," in which var-

ious experts set up all sorts of test equipment to check out, troubleshoot, and even make repairs on weak-signal gear, along with demonstrating a variety of construction techniques. The lab room replaced the band-by-band "bandsessions" that traditionally ran parallel to the main technical presentations. There was a single bandsession at the end of Saturday, hosted by *CQ Contest* VHF columnist Gene Zimmerman, W3ZZ, and devoted to unusual propagation experiences. Other speakers included *CQ VHF* editor Rich Moseson, W2VU; Chris Fagas, WB2VVV; Jeff Kruth, WA3ZKR; Tom Williams, WA1MBA; and Dick Frey, WA2AAU.

At a brief NEWS (North East Weak Signal) Group meeting after the main conference sessions, the members gave provisional approval to a proposed 2 meter bandplan to be used in working with spectrum coordinators in the northeast to assure that weak-signal interests are protected in any new bandplan developments. The NEWS Group proposal will be posted on the group's web page at <http://www.connix.com/~wz1v/newsvhf.html> after members have additional opportunity for input.

Corrections

After publication of my September column, I received the following corrections from Roy Neal, K6DUE: "You quoted me as saying that the first ham/astronaut on board a space shuttle was Ron Parise. Owen Garriott, W5LFL, and Tony England, WØORE, both flew on shuttles! Indeed the SAREX program was an offspring of shuttle . . . we never flew manned amateur equipment until we got permission to put it on the Shuttles. Informatively, Owen flew STS-9, the ninth shuttle flight. Most recently [NASA] flew STS-85. You identified our SAREX pioneers correctly in the story . . . it's just that they were shuttle astronauts!

"The International Space Station program is under a full head of steam. We hope to have an announcement about progress in the near future and will make sure you hear about it from your new vantage point on the campus at Texas Wesleyan University.—73 de Roy, K6DUE."

My apologies go to Roy for my misquoting him. Incidentally, Roy also advised me that the 70 cm repeater is in the Spektr module and is operational. Indeed, in early September the MIR occupants performed experimental use of the 70 cm equipment, operating on a simplex frequency of 437.650 MHz. The experiment was to last until September 29, at which time an evaluation of the operations would be made. As this is written in mid-September, no word is available as to the success of the experiment.

And Finally . . .

I am now in my new (temporary) QTH—the guest room in the women's dorm at Texas Wesleyan University! I do have my FT-706 on the air from the room, but only on 2 meters. How did I end up in the women's dorm? The apartment building in which I was to move was condemned by the City of Ft. Worth and this was the only place left on campus. In my initial conversation with the head resident of the dorm, I said that I must be rather unique, being the only male in the dorm. She said that was officially so because in the past some of the gals had a hard time getting their fellows out of the room by curfew. I said that perhaps having the chaplain intern living there would help the situation. She replied that I could set the example!

Well, I am trying to set the example in this fishbowl existence. However, one thing I must work on is getting whichever gal decided it would be a neat prank to pull the fire alarm at 3 AM to not do that any more. Even so, I did use the time after my rude awakening to finish this column. If you find any glaring errors, please forgive me. Blame it on my loss of sleep!

For as long as I am in this room, I do have an on-campus phone number (817-531-7532) and I do have my fax machine hooked to it. Incidentally, you may still e-mail me at my SMU address, as I check that almost daily. Unfortunately, I may not get back to you as quickly as you may like, because I am so very busy these days.

At the end of this month we in the U.S. should remember to be thankful for all that we have. Please take time out to help someone who may not be as fortunate as you. You can do that simply by being a friend and visiting someone who isn't as active as he or she used to be. I'm sure that person will be thankful to you for caring.

Thanks to you for your continuing input for this, your column. Until next month . . .

73, Joe, N6CL

BY JOHN DORR, K1AR

CONTEST CALENDAR

NEWS/VIEWS OF ON-THE-AIR COMPETITION

Opening The Log Checking Covers—A Commentary

November's Contest Tip Of The Month

This month I offer more of a safety tip than operating advice for contesters, but take a minute to read on. Contest season creates situations that make contesters do crazy things. I've spent more time on icy towers or climbing in treacherous winds than I'd care to recall. Do yourself a favor and remember that a key to doing well at contesting is to stay safe and alive. Be enthusiastic, but also smart this contest season. We'd like to work you next year, too!

CALENDAR OF EVENTS

Oct. 25-26	Ten-Ten Fall CW QSO Party
Oct. 25-26	**CQ WW SSB DX Contest**
Nov. 1-2	Ukrainian DX Contest
Nov. 1-3	ARRL CW Sweepstakes
Nov. 7-9	Japan Int'l SSB DX Contest
Nov. 8-9	Worked All Europe RTTY Contest
Nov. 8-9	CQ-WE (Western Electric) Contest
Nov. 9-14	Peace Country ARC QRS Contest
Nov. 15-16	IARU Reg. 1, 160 M CW Contest
Nov. 15-17	ARRL SSB Sweepstakes
Nov. 29-30	**CQ WW CW DX Contest**
Dec. 5-7	ARRL 160 Meter Contest
Dec. 6-7	FAIRS HF DX Data Contest
Dec. 13-14	ARRL 10 Meter Contest
Dec. 13-14	TARA RTTY Sprint
Dec. 28	RAC Canada Winter Contest

The task of contest administrivia is tedious at best. Often a thankless job, individuals spend endless hours pouring over log submissions in an attempt to adjudicate logs fairly and accurately. In some limited cases this is actually a paid position (i.e., the ARRL's contest department). The vast majority of contest sponsors, however, depend on teams of volunteers to "make it happen."

The intent of this month's commentary is to offer some thoughts on what we could be doing with the results of their work, not necessarily to provide details of log checking science per se. That's a good subject for a future column.

Despite the obvious temptation to take sides, I'm going to avoid the task of articulating an opinion of which contest sponsor does a better job of checking. The reality is that all contest sponsors do a reasonable job, more or less, and some teams truly stand out.

Let me begin by sharing some personal experience. As many of you know, my contesting background began around 1970. At that time there were no computers. The concept of cross-checking logs was a tedious and manual effort. I can vividly recall one individual's contributions to the "sport" of log checking, those of Tom Frenaye, K1KI (more from Tom later). When Tom arrived on the scene at the ARRL contest desk, it seemed that the skill of log checking stepped up to a new level. Although most competitors had maintained a high degree of integrity in their contesting efforts, Tom's commitment to accurate logging demanded a higher attention level to the subject by competitors around the world. That intimidation factor (if I can be so bold) was a major turning point in contest log checking.

I believe there is a basic fact in contest operating. For most operators, attention to detail is directly related to their knowledge of the level of scrutiny that will be placed on the log they're about to submit. To be clear, I believe we tend naturally to dig a little deeper when operating under those conditions. As competitors, we probably assume less information and confirm more data while operating. The WRTC '96 competition is a good example. One of the checking techniques was the requirement to record the entire contest for committee review. I found virtually no team members who claimed that they operated the same as they normally do, knowing that someone could listen to each and every QSO after the contest for accuracy; it's just human nature.

So where am I going with all of this? In recent years contest log checking has produced volumes of information about a given log's accuracy. The CQ WW Contest Committee, for example, essentially invented the term "uniques" (callsigns that appear uniquely in only one log submission) as one metric for checking. The questions to ponder this month are: Should contest committees include any of their data in contest results, and how aggressively should this information be protected? For good reasons, most contest committees have been very protective of the results of log checking data. For starters, availability of certain types of information can be misinterpreted. The potential to erroneously damage an operator's valuable reputation is very real and of great concern to the log checking world.

However, there is probably a minimum set of information that should be included in contest results, and that is the theme of my commentary this month. In my opinion, an obvious metric would be the inclusion of score reduction percentages in contest reports. This already can be viewed as publicly available information (especially for contests that publish high-claimed scores). However, at the same time it also adds more work to the already daunting task of contest reporting and potentially exposes weak log checking techniques—especially if most scores are not reduced. Nevertheless, we should publish this information.

A more controversial debate centers on the publishing of more proprietary data—specifically, items such as unique rates, "not in log" totals, confirmed busted call counts, etc. Whatever data becomes included in future contest results must be information that cannot be misinterpreted or challenged. While there is compelling evidence, for example, that unique QSOs are actually bad callsigns in most cases, the debate is not absolute. And perhaps we need to visit the reason why a contest sponsor would want to publish this information in the first place. I believe it has to do with peer pressure. Despite the seemingly endless work that contest committees have done to improve log accuracy, the ultimate contributor to log perfection comes from an operator's peer group. That's why we should begin to include more information about log submissions in the results—not to embarrass individuals, but to create an environment of excellence on which all of us need to focus.

If this strikes a cord with you, I suggest you make your opinions known to contest organizers. There's not a sponsor of a major contest event anywhere that does not want to make their event better. Better in this context means more accurate participation and checking. That's a metric we all want to strive for and achieve. What do you think?

A Constructive Approach

In the course of conversation (via e-mail) with Tom Frenaye, K1KI, I learned about several techniques that he uses to improve his logging accuracy and knowl-

2 Mitchell Pond Road, Windham, NH 03087
e-mail K1AR@contesting.com
Compuserve ID: 71301,424

edge through post-contest log analysis. Here's a snapshot of some of his thoughts:

Now that September *CQ* and *QST* have arrived, I've had a chance to see how well my scores held up under the log checking for the CQ WW SSB and ARRL DX CW. For those of you who are relatively new to contesting or have just started making big scores, you can learn a lot from some simple post-contest reviewing.

Two things I do:

1. Check incoming QSLs against the log. QSLs via the bureau take a minimum of six months and often several years, but the bulk of them arrive within a year or two. You'll be surprised (won't you?) that some of the calls in the log are wrong, and you may also be surprised to get a couple of cards from different people for the same QSO. Isn't it funny how QRM works sometimes?

2. Ask the contest sponsors for a list of QSOs or multipliers that were deducted from your score. The bigger your score is in your category, the more likely it is that the checking will be more rigorous. For ARRL contests, send the request to <contest@arrl.org>. Inquiries to *CQ* can be sent to <k3est@netcom.com>.

Finally, I just compared the K1KI claimed versus actual scores for CQ WW 1995 and 1996. Our accuracy was good compared to the competition, but not perfect. However, it did get better in 1996 compared to the year before. *CQ* does a great job of cross-checking logs, and the effort seems to get better each year. In 1995 about 20% of our QSOs were cross-checked, meaning that they received (or typed them in) electronic logs from 20% of the callsigns in my log. In 1996 the total went up to 31%. They're going to find most of your mistakes, so be careful to get the callsign right and make sure the other station has yours as well!

Final Comments

That's it for this month. You may recall that this year's CQ Contest Survey was published in last month's issue. I urge you to take a few minutes to complete the survey and provide your input. Each year I receive more and more input from many of you, and it proves to be interesting reading when tabulated later in the year. Given that the subject of this year's survey is rather controversial, I'm sure you'll want to play your part in the process.

As always, please remember that the deadline for the February issue is December 1st, and note my new mailing address at the beginning of this column.

73, John, K1AR

Ukrainian DX Contest

1200Z Sat. to 1200Z Sun., Nov. 1–2

Sponsored by the Ukrainian Amateur Radio League and the Ukrainian Contest Club, amateur radio operators around the world are invited to participate in the annual Ukrainian DX Contest on CW and SSB.

Classes: The operating categories include Single Op. All Band, Single Op. Single Band, Multi-Op. Multi-Band Single Transmitter, Multi-Op. Multi-Band Multi-Transmitter, Single Op. All Band QRP (5 watts output), and SWL. A multi-single station can change bands after 10 minutes of operation. At the same time it is possible to make QSOs on another band, provided they are new multipliers. All categories may work stations on both modes, provided it is not within a 10-minute period.

Frequencies: 160–10 meters (no WARC band activity).

Exchange: RS(T) and serial number starting with 001. Ukrainian stations will send their region after the signal report.

Scoring: QSOs within own country count as 1 point; within own continent 2 points; with another continent 3 points; with Ukraine 10 points. Multipliers are the sum of worked (heard) DXCC and WAE countries and Ukrainian regions per band. Final score is the total QSO points times the total number of multipliers.

Awards: First-place certificates will be awarded in each category for top-scoring stations in each country.

All entries must be postmarked not later than 30 days after the contest. Send your logs to: Ukrainian Contest Club HQ, P.O. Box 4850, Zaporozhye, 330118 Ukraine. Complete rules for next year's contest and a summary of results can be requested from the club for SAE and two IRCs.

ARRL Sweepstakes

CW: Nov. 1–3 Phone: Nov. 15–17
2100Z Sat., to 0300Z Mon.

This is the 64th running of the Sweepstakes, making it the oldest domestic competition

going. It stirs up a lot of activity. Operation is limited to stations in ARRL sections. Operating periods are restricted to a maximum of 24 out of the 30 hour contest period. Times off may not be less than 30 minutes and must be clearly indicated in your log.

In order to minimize QRM to non-contesters, it is recommended that operation be confirmed to certain portions of the bands. Check out the complete rules on the ARRL web site.

There are several other regulations, including a cross-check sheet if you make 200 or more contacts. A large SASE (45 cents in postage) will get you the "SS Package" and Operating Aid #6 with enough log and summary sheets for an average outing.

Exchange: QSO number, power class, call, last two digits of year first licensed, and your ARRL section. Stations using 150 watts or less are classed "A," over 150 watts "B," and QRP "Q." The same station may be worked only once regardless of the band.

Scoring: Each completed QSO is worth 2 points. The multiplier is derived from the number of ARRL sections.

Awards: The usual certificates will be given in each class and mode for single operator stations in each section and multi-operator stations in each division. Trophies will also be awarded. In addition, the ARRL offers SS pins to participants with 100 QSOs or more (check with the ARRL for current charges). In addition, SS coffee mugs will be made available to participants achieving a "clean sweep" (again, check with the ARRL for current charges).

Logs must be postmarked no later than 30 days after the contest and go to: ARRL Communications Dept., 225 Main Street, Newington, CT 06111.

Japan Int'l DX SSB Contest

2300Z Fri. to 2300Z Sun., Nov. 7–9

The object is for amateurs around the world to work as many JA stations in as many JA prefectures as possible. It 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 all-band edition (others follow in subsequent months).

Classes: Single Operator—High Power, Low Power, All Band, Single Band; Multi-Operator; Marine Mobile.

Exchange: JA—RST and prefecture number (1-50). Others—RST and CQ Zone.

Scoring: 40, 20, and 15 meters—1 point per QSO; 10 and 80 meters—2 points. 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 December 31st and should be sent to: JIDX LFCW Contest, c/o *Five-Nine* magazine, P.O. Box 59, Kamata, Tokyo, 144 Japan. Contest results will be sent to anyone who includes one IRC and an SAE.

European RTTY Contest

0000Z Sat. to 2400Z Sun., Nov. 8–9

Rules for the WAEDC RTTY Contest are for the most part the same as for the CW and Phone sections held in August and September. There is one main difference, however. To generate more activity and increase the QSO points, contacts with stations worldwide are permitted. QTC traffic, however, is not permitted within your own continent. Only 36 hours of operating time (out of 48 possible hours) are permitted for single operator stations. Off times must be at least one hour in duration.

Exchange: RST plus a progressive QSO number.

Points: Each QSO and each QTC exchanged are worth one point. QTCs may be sent/received worldwide between continents (limit 10).

Multiplier: Multipliers are determined by the DXCC list.

Bonus Multiplier: Multiply your multiplier on 80 meters by 4, on 40 meters by 3, and on 10/15/20 meters by 2.

Awards: Certificates will be awarded to the highest scorers with a reasonable score in each country. Continental leaders will receive a plaque. Certificates will also be awarded to stations with at least half the score of the continental leader.

It is suggested that you use the official DARC log forms. A large SASE (IRCs) to the address below will get you a supply.

Mailing deadline for all contest entries is December 15th and they go to: WAEDC Contest Committee, Durerring 7, Postbox 1126, D-74370 Sersheim, Germany, or via e-mail to <100712.2226@compuserve.com>.

CQ WW DX CW Contest

0000Z Sat. to 2400Z Sun., Nov. 29–30

Just a reminder that the CW section of the CQ WW DX Contest is coming up the last weekend of this month. The SSB section, of course, is history. Complete rules were published in the September issue. The contest trophies list has been updated and is covered in the rules.

All logs, both SSB and CW, must be sent to the *CQ* office: CQ World-Wide DX Contest, 76 North Broadway, Hicksville, NY 11801 USA.

Deadline for logs for the SSB section is December 1, 1997, and January 15, 1998 for the CW section. **Be sure to indicate SSB or CW on your envelope.** This will avoid your log from being entered in the wrong section.

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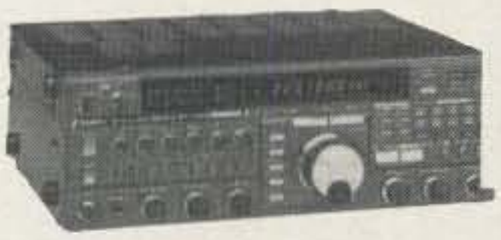

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BY BUCK ROGERS, K4ABT

PACKET USER'S NOTEBOOK

CONNECTING YOU AND PACKET RADIO IN THE REAL WORLD

YOU Are About To Make Packet Radio Fun Again!

Packet Radio has begun to show an upswing in use. The reason why quickly became clear when I began to receive a lot of mail at my packet (K4ABT-1) mailbox in Evington, Virginia. Most users expressed how much more fun it is to keyboard across long distances and how fast they are able to connect. Another indication that packet radio is beginning to expand is confirmed by the increase in the number of requests for new X-1J4 node EPROMs from across the United States. For a while EPROM burning had fallen off, and I assumed that a lot of system node operators were burning them, or perhaps node building was reaching a plateau. Not any longer.

Then came the answer. It seems the Internet *novelty* has run its course and now the trend is to get back to not BBS'n, but "keyboarding." Among the messages I've received, I particularly enjoyed reading the ones from Willis, AD4DX (in Asher, Kentucky), and John, WR8D, and Bruce, KM4QY. (John and Bruce live on the West Virginia and Kentucky line at Williamson—Kentucky or Virginia?) As did several others, Willis, John, and Bruce related to me how some of the packet users were digging their old "tinks" (TNCs) out of mothballs or buying new ones so they could join the fun on the packet networks. The messages I'm receiving in my packet mailbox (and some via e-mail) from packet users are expressing how great it is to again enjoy the experience of long-haul keyboarding, not just on the Southeastern Emergency Digital Association Networks (SEDAN), but on networks all over the nation.

In At 1200 Baud, Out At 9600

Some of the more visionary system node operators (SNOs) took the initiative to construct 9.6 Kb backbones for their networks. Aside from building the 9600 baud backbones, there are other ideals that must be considered, such as making the backbone sterile to unnecessary loading by services that are not part of the backbones' intended use.

For this reason I'm about to revisit a column that I did about three years ago. This time I will go into greater detail as to how we complete the backbone node construction. I feel that since we have had so many new SNOs entering the packet ranks lately, it deserves a fresh look.

We're about to modify a radio that has the robust punch (60 watts of power) that makes building a 9600 baud backbone worthwhile. In this column we're going to build and interface this node to make the combo into a finished "plug-n-play" gateway that will provide user access and high-speed backbone trunking across your network or packet system. In addition, we will address how the new 9600 baud backbone node is introduced to the network.

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

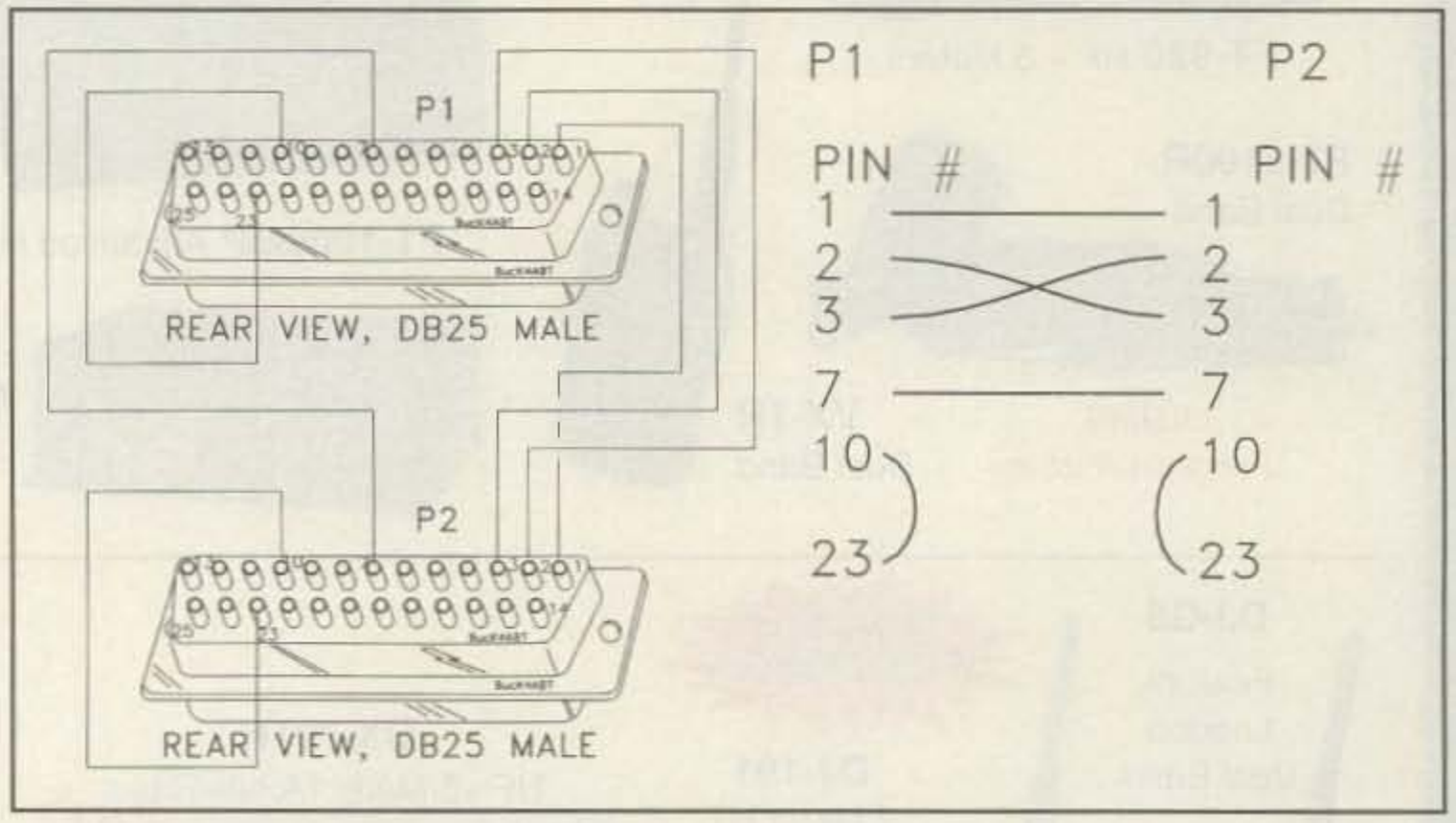

Fig. 1– A DB25 interface cable must be made to interface/gateway the two nodes (TNCs) together. Shown here is the drawing for this interface.

We like to use the SEDAN to gauge the performance of a network that enables 1200 baud user access at a 2 meter frequency (145.770 MHz) and the resulting throughput time after it travels across the network 6 meter backbone at 9600 baud to the destination station.

On To Bigger, Better Networks

Our networks are coming to life with new nodes being introduced to both the user side and the backbone. The SNO is now charged with making the network more efficient, and most of all more contiguous. The purpose of the network is to provide packet communications throughout a large geographic area. An example is seen in the map at fig. 2. The SEDAN is now into eleven states of the southeastern US, where it provides a very strong keyboard-to-keyboard and emergency communications network. Looking at our network, we can watch it expand almost on a weekly basis.

The SEDAN operates as a keyboard-to-keyboard system and in concert with ARES, SkyWarn, Weather-Watch, RACES, and the Red Cross. We do not use the SEDAN as a BBS forwarding system or for DX spotting, because when the network is being used for emergency traffic handling, these kinds of activities would impugn the purpose of the SEDAN. There are already many other frequencies set aside for BBS forwarding and DX spotting. Without going into a lot of dialog, saving lives is reason enough for the SEDAN. We do provide for keyboard-to-keyboard connects because keyboard contacts factor in a mechanism that enables us to locate possible breaks in our network. If we discover a break in the network, we can administer repairs so we know the network is fully operative when it is called into emergency service.

Doomsday Prophets Are Defeatists

Even before the "doomsday prophet" tosses in his towel and says goodbye, he has already submitted to defeat. On the other hand, the winners of this world don't see defeat. They are positive, dedicated, and successful. I've read dialog written by some doomsday prophets about how slow their network is at 1200 baud and how user interest has fallen due to the slow pace of their system. Sure, it's slow at 1200 baud, but the network backbone is not—and should not be—at 1200 baud. *Only the local user access port is at 1200 baud.* If these doomsday naysayers would get their heads out of the sand and look around, they would find that 1200 baud packet is alive and well when used at the local level, or for local linking to the nearest 1200 to 9600 baud gateway. Packet at 1200 baud should not be employed as an instrument for long-haul networking and traffic movement. The best part of the picture is that once the local user's packet text hits the local port, it is then sent to the backbone node at *eight times* the speed that it was at the user end. Eight times the speed! *Yes, 9600 baud is eight times faster than 1200 baud!*

The SEDAN has nearly fifty 6 meter, 9600 baud backbone nodes that enable very fast communications across the SEDAN. Sure, I recognize that it is not 38,400 baud, or 56 kilobit, but it is fast enough to enable me to connect from central Virginia into Atlanta, Georgia (600 miles) in less than 5 seconds.

Now That I've Made My Point . . .

Now that we've established that 9600 baud is fast—actually eight times faster than 1200

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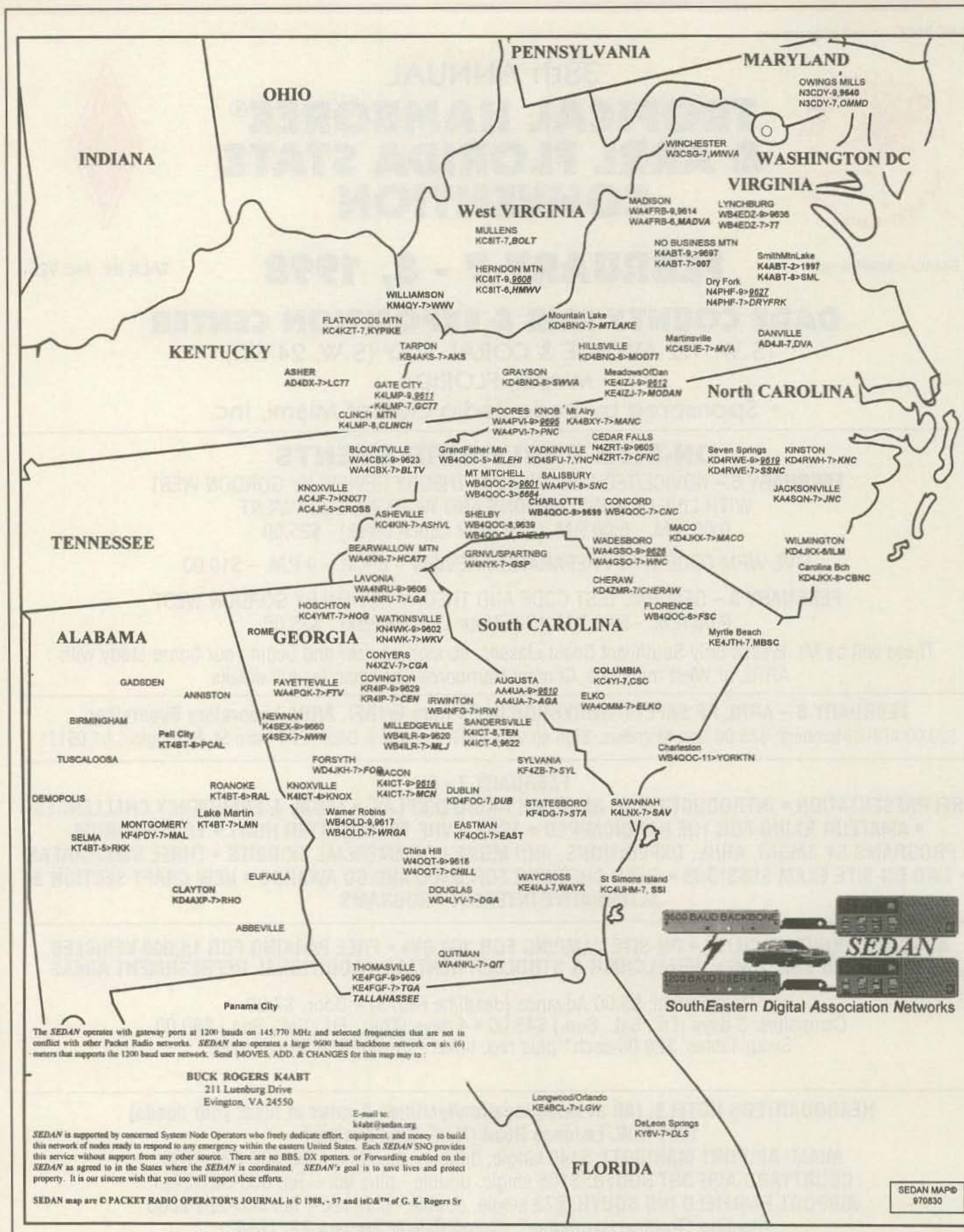


The *SEDAN* operates with gateway ports at 1200 bauds on 145.770 MHz and selected frequencies that are not in conflict with other Packet Radio networks. *SEDAN* also operates a large 9600 baud backbone network on six (6) meters that supports the 1200 baud user network. Send MOVES, ADD, & CHANGES for this map may to :

BUCK ROGERS K4ABT
211 Luenburg Drive
Evington, VA 24550

E-mail to:
k4abt@sedan.org

SEDAN is supported by concerned System Node Operators who freely dedicate effort, equipment, and money to build this network of nodes ready to respond to any emergency within the eastern United States. Each *SEDAN* SNO provides this service without support from any other source. There are no BBS, DX spotters, or Forwarding enabled on the *SEDAN* as agreed to in the States where the *SEDAN* is coordinated. *SEDAN's* goal is to save lives and protect property. It is our sincere wish that you too will support these efforts.

Moves, Additions & Changes, *E-Mail* **k4abt@sedan.org**

VISIT THE SEDAN WEB PAGES AT: **http://www.sedan.org**

Fig. 2– The Southeastern Emergency Digital Association Networks (SEDAN) is now into eleven states in the southeastern US, where it provides a very strong keyboard-to-keyboard and emergency communications network.

baud—let's go on to the point of this month's "Packet User's Notebook."

Most systems already have 1200 baud nodes at 145.010, 05, 07, 09, 51, 53, 57, 59, 61, 63, 67, 69, 70, etc. Why not go a step further and add a 6 meter (or 220 or 440), 9600 baud backbone to your network?

We (by chance) acquired a few Mitreks that were traded in on a new commercial radio system. The low-band trade-ins were about to be sent to the "heap," but Fred, WB4QOC, and I found a better use for them. You can do the same thing in your area, as there are many of these "old timers" being put out to pasture. Check around the boneyard of the next hamfest you attend and join the fun. I've already converted and modified enough of the units to have a good feel for what the modification is and how it should be made.

An Overview

Here is an overview of what goes into building the 9600 baud backbone node and how we modify the low-band VHF Mitrek as a 9600 baud, 60 watt transceiver.

To round out the duo we add an MFJ-1270CQ Turbo TNC, and then add the X-1J4 EPROM to place the TNC into "node" service. I prefer the MFJ-1270CQ Turbo with the latest (Rev. 1.4) 9600 baud modem already installed. When you complete the node, you will *not* have a volume or squelch control to contend with. You will have a transceiver and node that has all levels preset, and all you will have to do is:

1. Connect the antenna.
2. Connect the transceiver to a 15 ampere, 13 volt DC power source.
3. Plug the pre-wired radio/TNC interface cable to the TNC.
4. Attach the RS232 port of the 9600 baud node to the RS232 port of your existing 1200 baud node.

Configure the 1200 baud node to talk with the 9600 baud node and vice versa. This may be done by allowing the two nodes to recognize one another after about 10 minutes, or by actually connecting to the node(s) and setting (locking) them to each other using the route locking procedure.

Configuration Examples

So that we understand what is involved in locking the 1200 and 9600 baud nodes as a gateway, let's call the 1200 baud K4ABT-7 (alias SEVEN) and the 9600 baud node K4ABT-9 (alias 9600).

Once you have the nodes interfaced via the RS232 ports (using the umbilical shown at fig. 1), connect to node "SEVEN" (using the password), enter the sysop command mode, and configure it as follows:

R 1 K4ABT-9 + 255

Node "SEVEN" is the 1200 baud node. Notice that we locked the ROUTE via port "1" (RS232 port) of node K4ABT-9 (9600).

Next we connect to node "9600" (the 9600 baud node, K4ABT-9), and using the password, we enter the sysop command mode and lock the path via the RS232 port to the 1200 baud port:

R 1 K4ABT-7 + 255

For neighbor nodes that are heard via the radio port of the 9600 baud nodes, we lock as follows:

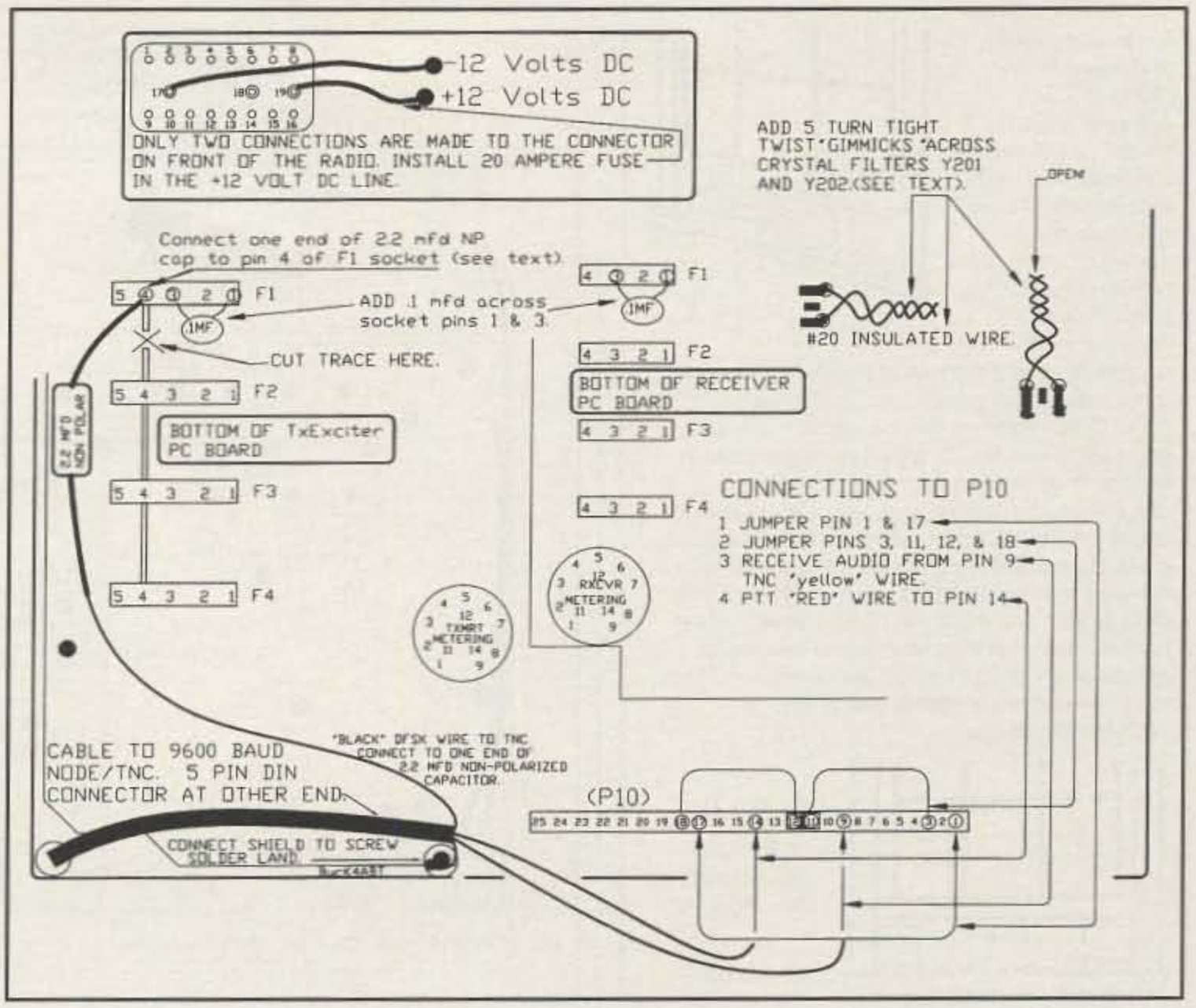


Fig. 3– The trace line going to pin 4 of element F1 from the collector of Q504 is no longer used. Pin 4 of crystal element F1 becomes the direct FM modulator input. Cut the trace at the channel element so that all other elements and Q504 are no longer attached.

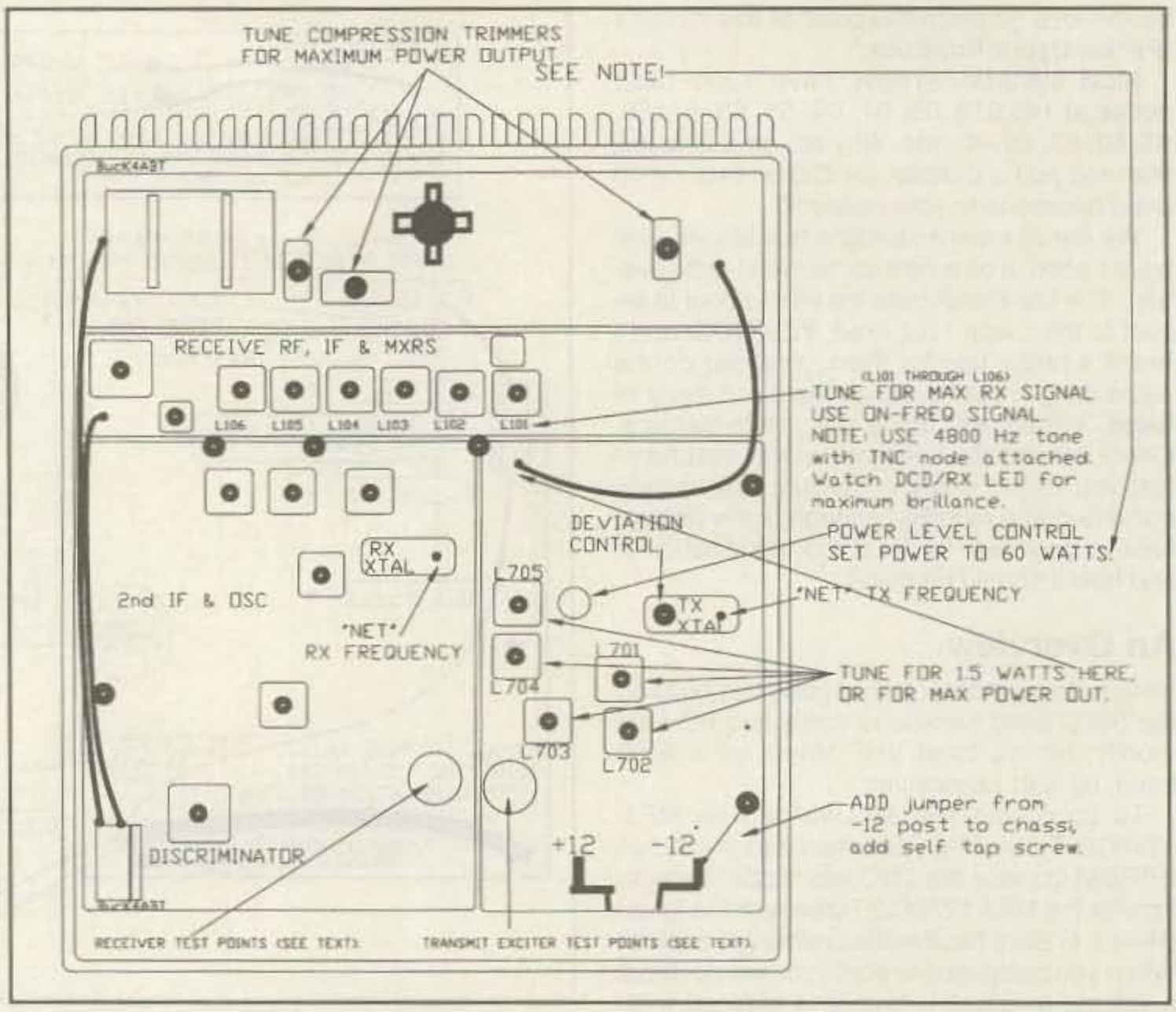


Fig. 4– If your Mitrek has the "tone board," remove it and toss it away! The tone board is a piggy-back PC board about 3 by 5 inches found in the near-left corner as shown here.

R 0 (neighbornode) + 224

Here we used R **0** (zero) to designate the "radio port" for the node. It is always good if the SNOs of neighbor nodes cooperate to lock paths to each other at the same number. This establishes consistency in the network continuity.

The Umbilical

The cable that I use to interface the transceiver(s) and the TNC is supplied in the box with the MFJ-1270CQ Turbo TNC. It is already equipped with a 5-pin DIN connector that mates with the 5-pin DIN *female* connector on the TNC. I am using the MFJ-1270CQ Turbo TNC on the 51 MHz backbone nodes (fig. 5) and the results are absolutely great!

A DB25 interface cable must be made to interface/gateway the two nodes (TNC) together. The schematic/drawing for this interface is shown in fig. 1.

Let's Get Busy

With your Mitrek manual handy, pop both the top and bottom covers off the Mitrek. First locate the transmit audio amp/splatter section on the transmitter section similar to the circuit board bottom view, upper left. Notice the last transistor—**Q504** on the 39–50 MHz version. There is a trace that connects all crystal-element pin 4's together. This trace is attached to the collector of Q504 via a small RF choke.

Next locate the *transmit channel* element (**F1**). Locate *pin 4* on channel element F1. **Note:** On the drawing, the trace going to pin 4 of element F1 from the collector of Q504 is no longer used. Pin 4 of crystal element F1 becomes the *direct FM modulator input*. Cut the trace at the channel element so that all other elements and Q504 are no longer attached (fig. 3).

Solder one side of a 1 to 2.2 µFd electrolytic cap to pin 4 of the channel element F1 (see note on fig. 3). The opposite end of the 2.2 µFd capacitor is now your modulation input from the TNC. The FSK line in the MFJ cable is *black*. Attach (solder) shield wire to the ground screw nearby (see fig. 3).

Notes: If your Mitrek has the "tone-board," remove it and *toss it away!* The tone board is a piggy-back PC board about 3 by 5 inches found in the near-left corner area (viewed front of radio facing you), top of the unit (the component side).

This "Gimmick" is For Real

The following step is not required, but the addition of it will render an improvement to the band-pass of the Mitrek IF at 9600 baud. If you are familiar with the term "gimmick," then you should include this step.

Cut a 2 inch piece of number 20 or 22 insulated, solid tinned wire. Strip the insulation from each end about 1/32 of an inch. Fold the wire in the middle so the loop is now 1 inch long. Twist the wire together into 5 turns. Cut the point where the fold was made. You should now have two 1 inch pieces of wire twisted together and open at each end. One end has the insulation removed enough to solder to the PC board and the other end is fully insulated, but not connected. You have just made a "gimmick" capacitor. You will need two of these gimmicks, so fabricate the second one identical to the first.

Locate the two pole crystal filters, **Y201** and **Y202**. They are clearly marked on the component side of the PC board. On the solder side (underside) of the PC board solder a gimmick across each of these filters. Each of the crystal filters will have three pins. Be sure you solder the gimmick to the two outside pins of the filter. Make no connection to the center pin of the filter.

On The Rocks

Whoops! Speaking of crystals, we must have the crystals on hand to make this combo work. For a source of crystals you can try BOMAR Crystals, 201 Blackford Avenue, Middlesex, NJ 08846 (phone 732-356-7787; fax 732-356-7362; toll-free phone 800-526-3935; toll-free fax 800-777-2197; ask for Audrey Heyder).

I checked the cost of each crystal, and Ms. Heyder stated they were $10 per crystal, or $20 per set. Be sure to specify that the crystals are for the Motorola *low-band* (47 to 50 MHz) Mitrek. Audrey will have the information in the BOMAR data base for the low-band Mitrek. BOMAR can supply the crystals already installed into the crystal element for $50 each, or if you supply the element(s), they will provide the crystal and install for $25 each. You can e-mail BOMAR at <sales@bomarcrystal.com> or you can visit their web site at <http://www.bomarcrystal.com>.

When installing the crystals into the element, note that the transmit and receive elements are different. **Do not** interchange them in the radio (it's kind of hard to do, but given a big enough hammer . . .). It is also important that you install the *transmit* crystal into the *transmit* element and the *receive* crystal into the *receive* element. Weird things happen if you make the mistake of switching the rocks!

When soldering the crystals into the element, **do not** overheat the wire leads of the crystal(s). Bend the crystal leads and seat the crystal into position before finally soldering the leads in place.

Using the frequency counter and/or the centering meter, set (net) the radio to the center of your transmit frequency (see fig. 4).

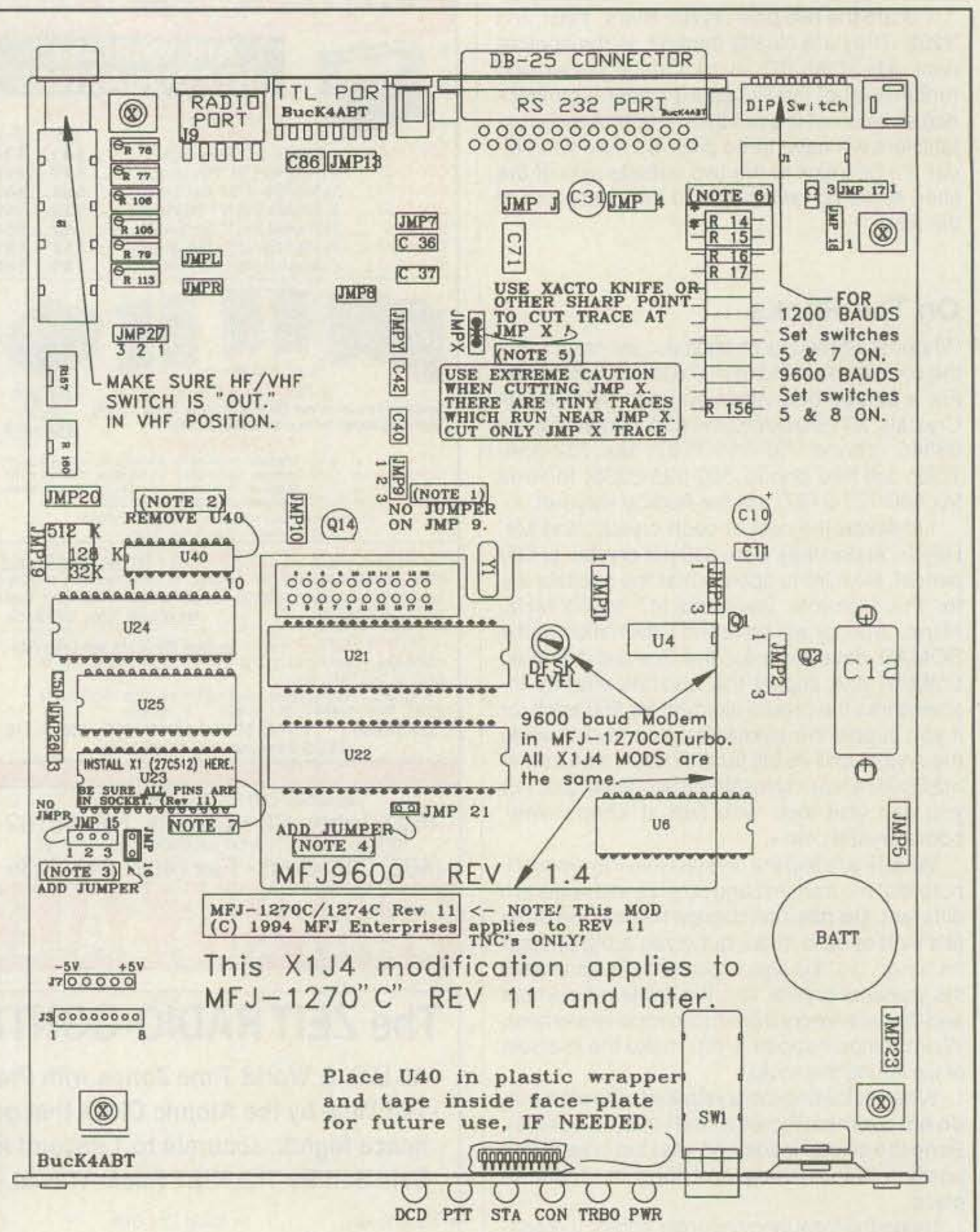
In all the (46 to 50 MHz) Mitreks that I've converted (well over 50), I've found that very little alignment of the RF and IF stages is required. If you are uneasy as to how to align the RF stages, then apply an on-frequency signal to the coax connector (input) and send enough signal into the radio to detect your (modulated tone) signal. I modulate the signal with a 4800 Hz tone at 3 kHz deviation. It's hard to hear, but when a 9600 baud TNC is attached, the TNC thinks it is receiving 9600 baud. This helps me when I align and watch the DCD LED of the TNC/node.

If you get lost, move the large hex ferrite slugs to the top of the RF stage coils and begin again. In any case, use caution and the correct tuning tools to prevent breaking the "slug" inside the coils. Been there, done that, enough said!

If you have not done so already, be sure to "net" (peak) the receive crystal to frequency as soon as you have signal through the radio. A meter set to read AF level helps, or you can use the test points (J 1001 appears similar to a 9-pin tube socket) provided in the receive section of the radio.

Pin 1 is from the detector (R222). "A point to read signal level (output)."

Pin 2 is from the audio pre-amp (R234).



The following steps outline the procedures to transform the MFJ-1270C, Rev. 11, into a TheNet X-1J4 node.

1. Remove jumper from all pins of JMP 9. Jumper will be used later in this modification at JMP 21.

2. Remove IC U40. After the modification is complete, place U40 into a plastic wrapper and tape inside the front face-plate for later use if the node is ever returned to normal TNC service.

3. Remove jumper from JMP 15.

4. Add a jumper at JMP 16 (use jumper from JMP15).

5. Add a jumper at JMP 21 (use jumper from JMP 9).

6. Remove the TNC (stock) EPROM at IC location U23. *Carefully* install your new X-1J4 EPROM into socket at U23. *Be sure all pins are inserted into the socket* (be sure there are no bent pins). Pin number 1 is *not* left out of socket as it was with earlier revisions of this TNC. This modification applies only to MFJ-1270C "Rev. 11."

7. Cut trace at JMP "X." Notice that tiny traces are close to JMP X. *Do not cut* any other trace. Cut *only* the trace between pads of JMP X. *Use extreme caution when cutting.*

Note A: The photo shown above is an MFJ-1270C Rev. 11, and has the MFJ-9600 (9600 baud) internal modem installed. The same mods apply to both 1200 and 9600 baud MFJ-1270 "C."

Note B: Cutting JMP "X" is optional. If you are concerned with the node hearing itself and listing its own call and alias in its own node list, then *cut* JMP "X." A problem occurs when JMP "X" is *not* cut and the node lists itself in its own node list. A user might inadvertently issue a connect request to the same node and find that they are connected again (locked) into the node. They may be required to issue the "BYE" command two times to be released.

Note C: All MFJ-1270C Rev. 11 built after July 1996 have R14 & R15 installed. If they are not installed in your MFJ-1270C Rev. 11, they will not cause a problem unless you plan to use the TNC in a node gateway, between two frequencies, or in a node stack with a diode matrix. If R14 & R15 are missing and your node is to be used between two frequencies or in a node stack with a diode matrix, then you should continue to steps 8 and 9.

8. If the TNC is to be used as a gateway between two frequencies or baud rates, ensure that R14 & R15 are installed. If they are not, remove the PC board and add R14 & R15. R14 & R15 are 100 ohms at 1/4 watt each.

9. To remove the PC board, remove the front face-plate (two screws), and then remove the screw that attaches Q3 (regulator) heat sink to the front of the TNC. Next remove the four screws that hold the PC board in place. The locations of the screws are shown in the drawing as a circled "X" symbol.

← *Fig. 5– The MFJ-1270C, Rev. 11, TNC with all modification notations and pointers to locations. (See steps under figure.)*

"This could be a point to look at the discriminator output."

Pin 3 is from the "extender" if your Mitrek is equipped.

Now! If all else fails, use the alignment procedure from the Mitrek manual.

Tuning The Transmitter And Setting The Levels

After you tune the five coils in the transmitter exciter section—L701, L702, L703, L704, and L705— be sure to go back and set (net) the crystal to center the operating frequency—again. If you are as picky as I am, you may want to measure the exciter power output. Try to maintain the power at or below 1.5 watts into the RF PA section (see test point in transmitter exciter at fig. 4).

A meter set to read RF level helps, or you may use your VOM to read the test points at J1002 (appears similar to a 9-pin tube socket) provided in the transmit section of the radio.

Pins 1 & 2 are GROUND.

Pin 3 is from the "exciter" buffer output.

Pin 9 is the Push-to-Talk line.

Again, when all else fails, use the alignment procedure in the Mitrek manual.

Using an in-line wattmeter that reads above 100 watts, tune C804, C810, and C811 for maximum output. Of course, you are tuning it into a 50 ohm "dummy load." Remember—or keep in mind—the power level that the radio was designed to deliver, and maintain the power at or below this level.

When you set the 9600 baud deviation, use a 4800 Hz tone from your IFR (or whatever you are using as a signal source). Make sure the tone deviation is set to 3 kHz—no more, no less. If you don't have a 4800 Hz tone, then use the TNC set for 9600 baud DFSK out. Set the TNC (node) TXD to 120 and issue a bogus connect. This will key and modulate the radio with the 9600 baud signal.

There are two ways to adjust the transmit deviation (frequency modulation). One way is to use the small nylon-capped potentiometer (pot) on the 9600 baud modem board inside the MFJ-1270CQ Turbo. I've shown the approximate position of this pot with the arrow atop the pot on the modem PC board in fig. 5.

The second way is to use the pot via the large hole in the top of the transmit crystal element. To make your life simpler, set the pot on the modem to three-quarters open (clockwise) and set the pot on the crystal element for the same, three-quarters full open (clockwise). Then use the pot on the crystal element to make the final adjustment for 3 kHz deviation.

Oh, BTW

If you have already installed the X-1J4 EPROM, then set MODE number 6 to 120 for the TXDelay period. After you have the transmit deviation set to 3 kHz, reset MODE number 6 back to 25 (or for 250 milliseconds).

One other note: In some older Mitreks spurious emissions (RF) may be detected. To reduce RF leakage from the local oscillators in the Mitrek (on the PC board solder-side), add a .1 μFd ceramic cap from pin 1 to pin 3 of the transmit crystal element. Do the same to the receive crystal socket.

You are about to make packet radio *fun* again! Visit the SEDAN Internet WebSite at <http://www.sedan.org>.

73 es Happy Packeting, BucK4ABT

DX

BY CHOD HARRIS, VP2ML

NEWS OF COMMUNICATION AROUND THE WORLD

Montserrat

It is very rare for news about the island of Montserrat to rise above the noise level of international events, but such was the case this past summer. Unfortunately, the reason for what turned into extensive media coverage of my favorite island was an escalation of the magnitude of the eruption of the volcano that dominates the southern half of Montserrat.

With live news reports from Montserrat showing the towering ash clouds and cascades of hot volcanic rock raining down the sides of the volcano, I received dozens of inquiries about the status of my property on the island. Here's an update on the island, as of the first week in September.

First, a little background. Following a 48 inch snowfall in Newington, Connecticut, where I was working for the American Radio Relay League, I decided to move to a good radio location where ice was something you could get in a drink, not drive on. An extensive search through the Caribbean narrowed the investigation to a handful of islands that were politically stable, English-speaking, with adequate water. One of these islands was Montserrat.

Dr. Beverstein of Canada was renting a two-bedroom home on the eastern side of Montserrat, complete with rig and antenna. I booked the week of the Worked All Europe SSB contest. I was soon on the air as VP2MAY, and finished second in the world in the contest. That result, combined with very friendly natives, sold me. As soon as I returned to the states, I put in an offer to buy the "Beverstein house." A few months later, I moved to Montserrat with my family and renamed the house The Last Resort, as it was the most easterly house on Montserrat.

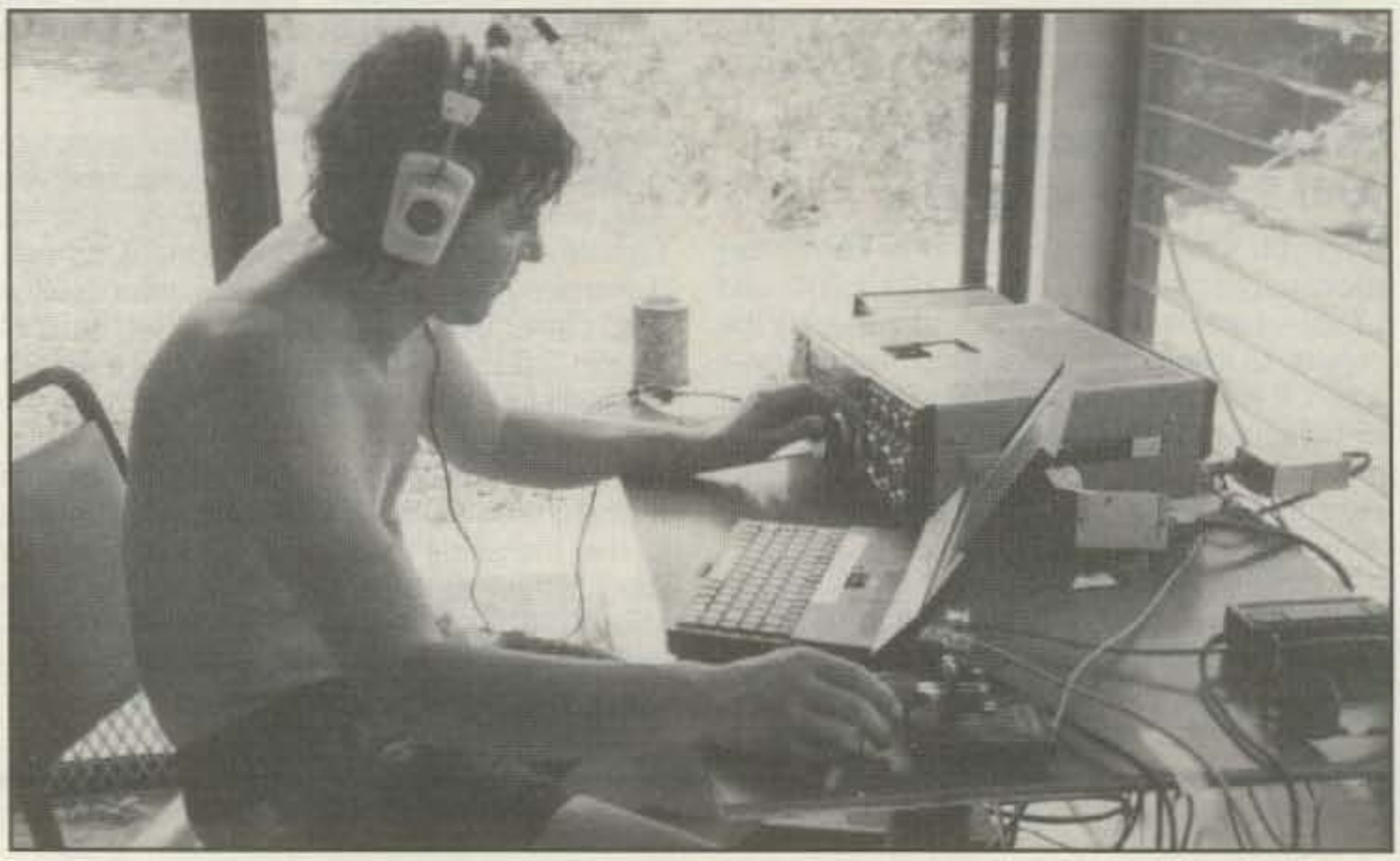
Our move to the island was interrupted by Hurricane David, which closed the airport in Antigua, the jumping-off spot for the only flights to Montserrat. We sat out David in Puerto Rico, and barely got to Montserrat before Hurricane Frederick again closed the Antigua airport. My research on Montserrat showed that the island hadn't been directly hit by a hurricane in 67 years. Now it had two close calls. Little did I know then how important a role a hurricane was to play in my Montserrat experience.

As a Montserrat land owner I was entitled to a two-letter suffix callsign. VP2ML was the best of the few available two-letter calls, a callsign I have maintained for the past 20 years. I immediately set about building a world-class contest station. Seventeen antennas and six months later, I had assembled what may have been the first two-radio contest station. With the touch of a single foot switch, I could instantly shift to another band. This arrangement let me maintain a pile-up on one band while searching for multipliers on another. The station worked well enough to win the ARRL SSB DX Contest by a margin of about 50% over the second-place contester. (Using the same station and callsign, K1ZZ won by the same margin in the CW part of the contest.)

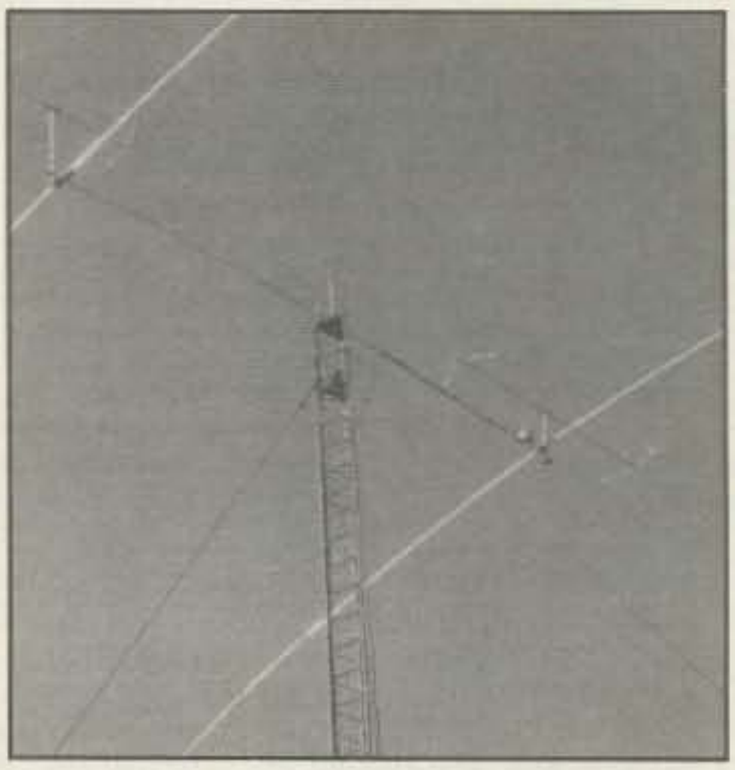
Soon after my return to the states so that my daughter could continue her education, I began to rent out my house to DXpeditioners and contesters. The Last Resort was a popular destination for beginning DXpeditioners, as it offered a good radio location complete with rig and antennas, with no neighbors to complain about RFI. Many of today's active DXpeditioners cut their teeth at The Last Resort.

The Last Resort continued to host DXpeditioners and contesters for many years. Bobbie Martin, VP2MO, and his wife Mae, VP2MN, provided invaluable assistance to the numerous visitors, arranging for customs clearance, licenses, and additional antennas. Bobbie arranged for the club station license of VP2MU to be assigned to The Last Resort, providing an easy callsign for visiting contesters. (VP2MW was another club license assigned to a rental QTH on the western side of Montserrat.) Montserrat was an easy, certain multiplier in most contests. The high iron content of the volcano that rose out of my backyard provided an excellent RF reflector, enhancing signals to the east (Africa), northeast (Europe), and north (USA and Japan).

Then, in 1989, Montserrat had a most unwelcome visitor named Hugo. Hurricane Hugo made up for the almost 80 years without significant hurricane damage. With winds exceeding 200 miles an hour (the last reading at the airport anemometer before it disintegrated was 178



Dan Flaig, K8RF, recently earned 5 Band WAZ. Here he operates as part of the VP5VW CQ WW Contest team.



Dan, K8RF, used this half-sized 80 meter Yagi to work his last three zones for 5 Band WAZ.

P.O. Box 50, Fulton, CA 95439

miles per hour, an hour before the hurricane reached Montserrat), Hugo set its sights on Montserrat. Hurricane tracks in the Caribbean are notoriously fickle, taking strange turns and directions. Hugo moved up to the east side of Montserrat and stopped. It slid slowly up the eastern side of the island, stopped, and then moved slowly down the western side. After battering the island with the highest winds of this century for eight hours, Hugo finally moved on only to then cause even more damage to the US Virgin Islands and the US mainland.

Montserrat was devastated. The once green island was completely mud-brown with every leaf blown off every tree. Ninety percent of the buildings on the island were damaged, with ten percent of them completely destroyed. The Last Resort was one of these. With its exposed location on a peninsula surrounded by the Atlantic Ocean, The Last Resort had wave damage, 300 feet above the ocean. Hugo took the front wall and roof with it, as well as all the furniture.

Thanks to modern hurricane tracking methods, only ten people were killed on Montserrat during Hugo, mostly people who refused to move to the shelters. However, this spelled the end of The Last Resort as a rental QTH. The Montserrat government had been trying for 20 years to extend the airport runway to allow larger jets to land, and The Last Resort had already been condemned before Hugo, as it sat at the end of the proposed runway. This made rebuilding the QTH problematical, as the government had already said it would bulldoze the building as soon as it started the new runway. In typical Montserrat fashion, this stalemate ground on for many years.

Then, two years ago, the long dormant volcano that grew out of my backyard began to rumble and spit steam and ash.

Montserrat, in common with all the islands of the eastern Caribbean, sits atop the junction of two tectonic plates. As the Atlantic ocean grows from its mid-ocean ridge, the earth's crust collides with another tectonic plate along a long arc from South America to Cuba. The collision fractures and splinters the crust, creating weak spots that allow the underlying magma to break through to the surface. This volcanic action is what created the islands in the first place. Numerous earthquakes and very rare, mostly mild, volcanic eruptions serve as a reminder to inhabitants of the Caribbean islands that they live in a geologically active region. There have been more than a dozen instances of volcanic activity in the region in the past 300 years, including devastating eruptions on Martinique and St. Vincent early this century.

The beginning of the eruption on Montserrat in 1995 was at first a matter of cur-

The WPX Program

SSB

2652.....EA1DFP 2653.....EA1EB

CW

2966.....I4VJC 2967.....AC6DD

Mixed

1788.....S52QM 1789.....F5XX

VPX

284.....JA2-3803

CW: JA2-3803, I4VJC, AC6DD. 400 JA2-3803, I4VJC, AC6DD. 450 JA2-3803, AC6DD. 500 JA2-3803, AC6DD. 550 JA2-3803, AC6DD. 600 AC6DD. 1900 SM6CST, VR2UW. 1950 SM6CST, VR2UW. 2000 VR2UW.
SSB: 350 EA1EB. 400 EA1EB. 650 AA1KS. 700 AA1KS. 750 AA1KS. 800 AA1KS. 850 AA1KS. 1050 IKØAPR. 1850 LU8DY. 1900 LU8DY.
Mixed: 450 F5XX, EA1DFP. 500 F5XX, EA1DFP. 550 F5XX, EA1DFP. 600 F5XX, EA1DFP. 650 F5XX, EA1DFP. 700 WA2FKF, F5XX, EA1DFP. 750
F5XX, EA1DFP. 800 F5XX, EA1DFP. 850 F5XX, EA1DFP. 900 F5XX, EA1DFP. 950 WA3FNA, F5XX, EA1DFP. 1000 WA3FNA, F5XX, EA1DFP. 1850 LU8DY. 1900 LU8DY. 2050 SM6CST. 2100 SM6CST. 4150 W2FXA.

20 meters: JA2-3803
80 meters: HP2CWB

Asia: JA2-3803
Africa: VR2UW, HP2CWB
So. America: VR2UW
Oceania: SM5DAC, JA2-3803

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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.

iosity, not concern. However, a team of volcanologists advised the government that a Martinique-type explosion, technically called a *pyroclastic flow*, was not out of the question. The government ordered the evacuation of the towns on the immediate slopes of the volcano, including Spanish Pointe, where the remains of The Last Resort rest.

During this initial evacuation Sir Errol Martin (aka Bobbie, VP2MO) and his pregnant wife Mae got permission to briefly visit their home to retrieve some radio gear. A British soldier was timing how fast he could get out of town if an eruption occurred, and didn't know that there might be other traffic on the road. The only two vehicles in the southern part

Johan, YCØLOW, operates from this well-equipped (i.e., a copy of CQ magazine) shack in Cinere, Indonesia.

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5 Band WAZ

As of July 31, 1997, 466 stations have attained the 200 Zone level.

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

FM5DN TI2KD K8RF

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)
W1JR, 199 (23)
VE7AHA, 199 (34)
W1FZ, 199 (26)
W9CH, 199 (26)
ACØM, 199 (34)
IK8BQE, 199 (31)
JA2IVK,199 (34,40m)
K1ST, 199 (26)
ABØP, 199 (23)
KL7Y, 199 (34)
UY5XE, 199 (27)
NN7X, 199 (34)
DL3ZA, 199 (31)
OE6MKG, 199 (31)
HA8IB, 199 (2 on 15)
OH2DW, 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 (22, 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:

K8RF, 200 Zones

Endorsements:

FM5DN, 200 zones
W2YC, 196 zones
KE9A, 198 Zones
K6RO, 190 zones
GM3YOR, 199 zones
KZ4V, 199 zones
TI2KD, 200 zones
SV8ZC, 183 zones

1056 Stations have attained the 150 Zone level as of July 31, 1997.

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

The WAZ Program

Single Band WAZ

10 Meter SSB

488.....DF4ZL

20 Meter SSB

1011.....DF4ZL

20 Meter CW

476.....JA8IYI

40 Meter CW

192.....K6RO 194.....K8RF
193.....JA8IYI

160 Meter WAZ

114.....SV8ZC, 32 Zones New
115.....K8RF, 31 Zones New
116.....W2UE/7, 31 Zones New
117.....GM3YOR, 30 Zones New
98.....KE9A, 33 Zones Addition

All Band WAZ

SSB

4392.....JA8IYI 4394.....CP6EB
4393.....HL5NBM 4395.....VK4EFX

CW/Phone

7754.....UW9SG

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.

of Montserrat tragically collided, killing Mae and gravely injuring Sir Errol. (Bobbie received the British Empire Medal, the UK's highest civilian honor, for his role in providing vital communications following Hugo.) Mae was thus the first casualty of the volcano.

The volcano refused to go away. What used to be a mile-wide crater at the top of Chances Peak gradually filled in. Today it is a 1000 foot high dome towering over southern Montserrat, where eighty percent of the people and ninety percent of the agriculture once thrived. The crater wall was lowest on the eastern side, and a series of pyroclastic flows on that side (The Last Resort side) have created a large delta of new land only a mile south of the airport.

For the past two years Montserratians have lived under the shadow of the ever-growing volcanic dome, listening to the volcanologists daily reports on ZJB, Radio Montserrat. Not all residents believed the worst-case scenarios produced by the Montserrat Volcano Observatory (MVO). Some snuck by the barriers to tend to their crops and animals remaining in the exclusion zone. This practice turned fatal in late June, when a major pyroclastic flow obliterated several villages on the eastern side of the island, almost reaching the airport (surrounding The Last Resort). Some 20 people were killed and several were injured in this flow.

The deaths put Montserrat into the international news and served as a wake-up call to those who put little stock in forecasts of major pyroclastic flows. In the next few weeks a series of major flows destroyed most of the buildings on the southern half of Montserrat, including Plymouth, the capital and only real town. Plymouth now lies burned and buried under many tons of still-hot volcanic ash. The courthouse where I married my wife is an empty shell. The never-occupied $30 million hospital, which was built after Hugo damaged the existing hospital, is completely demolished.

The MVO, having already seen what scientists considered to be the worst-case pyroclastic flow, have upped the ante and forced further evacuation to the so-called

safe areas in the north of the island.

As I write this column, this is where the island of Montserrat sits: crowded into inadequate shelters and overcrowded housing in the north of the island. On a population and resource level, this is similar to having the people of California evacuated into North Dakota. The MVO puts out daily reports warning of another major pyroclastic flow. The dome towering over the southern half of Montserrat continues to grow, and in fact seems to be growing faster all the time, suggesting that the peak of the eruption is still to come.

It is still possible to travel to Montserrat, even though the only airport has been closed since the June 25th event. A ferry runs between nearby Antigua and Montserrat every day, ready to evacuate Montserratians should the volcanic activity increase to an even more dangerous level. However, tourism is light, with media representatives comprising most of those who voluntarily travel to be under an active and dangerous volcano. Also, there is no place to stay on Montserrat, since the Vue Pointe hotel is now in the exclusion zone.

For DXers, all this means is that VP2M contacts are rare, as most of the HF-active amateurs have left the island for safer locations. For the few thousand Montserratians who have not yet left the island, the volcanic eruption continues to be a disaster-in-progress. They are living in barely tolerable conditions, waiting for the unknown—a major escalation of the eruption, or the long-awaited end to this two-year nightmare.

5 Band Worked All Zones

Dan Flaig, K8RF, recently picked up his last three zones on 80 meters to earn DX's most difficult award—5 Band WAZ. Here's Dan's story:

"I was first licensed in December 1969 as WN8FOS when I was 12 years old. The Elmer who got me interested in ham radio, DXing, and CW was Gene Liggett, W8ON (then W8ZCT), now a Silent Key. Gene was one of the members of the first CEØXA San Felix operation in 1965. At the age of 14 I was helping Gene put up a full-sized 80 meter rotary dipole at 140 feet. I remember looking through his logbook at all the DX on 40 and 80 meters. I was bitten by the low-band DX bug. After waiting the then-mandatory two years, I passed the Extra class exam and started to do some real DXing. Gene advised me that if I wanted to get the new 5BDXCC, I'd better get 10 meters in the bag before the sunspot cycle dropped too low. I finally finished, with 80 meters the last band, and got 5BDXCC #508 in 1976.

"I got my current call of K8RF in the late 1970s, but lost it through some bumbling by the FCC in Gettysburg, which contributed to my losing interest in radio for a few

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	W4QB 328	AA4KT 326	W8XD 325	K2JLA 322	VE7DX 318	N6AW 311	W7IIT 302	KB8O 292
K1MEM 328	W6DN 327	K9IW 326	K8LJG 325	KA5TQF 322	I4LCK 317	N5HB 311	K8JJC 302	IKØADY 290
K2FL 328	K3UA 327	YU1HA 326	IT9QDS 324	AA5NK 321	N6CW 316	I1EEW 311	WA4DAN 301	DJ1YH 288
K9BWQ 328	N7FU 327	I5XIM 326	WØJLC 324	ON4QX 321	N4CH 316	OH3NM 310	HA5NK 301	YU7FW 286
K2ENT 328	N4MM 327	PAØXPQ 326	W7CNL 324	K9QVB 321	W3BBL 315	LA7JO 310	WG5G/QRPp 301	F6HMJ 284
DL8CM 328	K6LEB 327	WA8DXA 326	KB4HU 324	HA5DA 321	N4AH 315	OZ5UR 310	W6YQ 301	KF5PE 282
N7RO 328	IT9TQH 327	N5FW 326	N5FG 324	WB5MTV 321	NØFW 315	K4CXY 309	N4OT 301	LU3DSI 282
WØIZ 328	K4CEB 327	EA2IA 326	DJ2PJ 324	IK2ILH 321	K2JF 314	K4JLD 309	YU1TR 300	W4UW 279
G4BWP 328	WA4IUM 327	W7OM 326	W7ULC 323	K1HDO 321	AA2X 314	VE9RJ 309	YU2TW 300	WG7A 276
K6JG 328	K4IQJ 327	WØHZ 326	WA4JTI 323	IT9ZGY 320	W5OG 313	9A2AJ 309	KE5PO 300	
I4EAT 328	K9MM 326	F3TH 326	W4OEL 323	VE7CNE 320	WB4UBD 313	W3II 308	YV5ANT 299	
SM6CST 328	K2OWE 326	N6AR 325	KUØS 323	W6SR 320	G3KMQ 313	N1HN 308	KØHQW 296	
W2UE 328	9A2AA 326	K8NA 325	W1WAI 323	KA7T 319	K9DDO 312	HB9DDZ 305	KH6CF 294	
W2FXA 328	OK1MP 326	KZ4V 325	AG9S 322	4N7ZZ 319	WB4DBB 312	CT1YH 305	YU1AB 294	
N4KG 328	N4JF 326	I1JQJ 325	NC9T 322	K6CU 319	K1VHS 311	G2FFO 303	G4MVA 294	
K8PV 328	W9WAQ 326	IT9VDQ 325	DL3DXX 322	N6AV 318	WA8YTM 311	K7EHI 302	I2EOW 294	

SSB

K4MZU 328	IT9TGO 328	KØKG 326	N6AR 325	WDØGML 323	EA3EQT 320	K7TCL 315	EA5OL 305	KF7VC 288
K2TQC 328	WD8MGQ 328	OK1MP 326	K8NA 325	WW1N 323	WS9V 320	I4CSP 315	G4NXG/M 304	OK1AWZ 287
K2FL 328	I1EEW 328	WB3CQN 326	AI8M 325	K4SBH 323	KØFP 320	NØAMI 314	KJ6HO 304	IK2DUW 287
DJ9ZB 328	IØZV 328	I2QMU 326	W4UW 325	WB2JZK 323	KE3A 320	W5RUK 314	VE3CKP 304	EA5GMB 287
EA2IA 328	VE3MR 328	PAØXPQ 326	VE2PJ 325	CE7ZK 323	N4CSF 320	DL3DXX 314	WB2NQT 303	IK8BMW 286
K2ENT 328	K3UA 327	N4JF 326	I8LEL 325	K2ARO 323	W8AXI 320	N6RJY 314	EA3CWK 303	YC2OK 286
OZ5EV 328	K9BWQ 327	KB4HU 326	IT9ZGY 325	LU7HJM 323	W6SHY 320	OH5KL 313	EA3BT 303	TU2QW 286
VE1YX 328	WØYDB 327	KC4MJ 326	K6LEB 325	VE4ACY 323	ON5KL 319	WDØDMN 313	WA9BDX 302	NM5O 285
W6EUF 328	W4QB 327	CX2CB 326	IK1GPG 325	KB8O 323	WA4DAN 319	KD9CN 313	WA8MEM 302	EA1AYN 285
K2JLA 328	VE3MRS 327	TI2CC 326	I1JQJ 325	VE2GHZ 323	KI3L 319	K1VHS 313	KD4YT 302	KQ4WD 284
N7RO 328	OE2EGL 327	IKØIOL 326	VE7WJ 325	KD8IW 323	VE3HO 319	EA1JG 313	CT1YH 302	IK2HBX 284
K6YRA 328	K8CSG 327	ZL1HY 326	AI8S 325	WN5IJZ 322	XE1MD 319	W1LQQ 313	RA2YA 301	KE6CF 283
W6BCQ 328	K1UO 327	YU1HA 326	K1HDO 325	XE1CI 322	KB1JU 319	K4LR 312	W2LZX 301	WZ3E 283
K5OVC 328	DL9OH 327	W4NKI 326	K9PP 325	WB4PUD 322	YV1JV 319	WA9IVU 312	XE2DU 301	YC3OSE 282
KZ2P 328	WB4UBD 327	KZ4V 326	W7FP 325	LZ1HA 322	PY2DBU 319	KD5ZD 312	AB4NS 301	VE7HAM 282
VE7DX 328	K7LAY 327	VE3GMT 326	N5FG 325	ZS6AOO 322	IØSGF 319	WA2FKF 312	WP4AFA 300	WN6J 281
AA6BB 328	W2FXA 327	W4EEE 326	AC7DX 325	WA5HWB 322	K9QVB 318	ZS6BBY 311	YU2TW 300	KK4TR 281
EA4DO 328	IK8CNT 327	KE4VU 326	KC8EU 324	TI2JJP 322	KB5FU 318	IN3ANE 311	AB4UF 300	YU1TR 280
ZL3NS 328	N4KG 327	AG9S 326	N4KEL/M 324	OE7SEL 322	AA4AH 318	F1OZF 311	WB4UHN 300	KN4RI 280
K6JG 328	K8PV 327	WA4WTG 326	IK8BQE 324	W5XQ 321	G4GED 318	EI6FR 311	KB8NTY 300	WD9ACQ 280
WA6OET 328	SV1ADG 327	WD8PUG 326	AA5NK 324	KA5TQF 321	IK8GCS 318	WT4K 311	YT7TY 300	WØIKD 279
SM6CST 328	LA7JO 327	W2CC 326	K2JF 324	TI2HP 321	W6MFC 318	YZ7AA 311	WB6GFJ 299	EA3CWT 278
W3GG 328	W9SS 326	VE2WY 326	WB5TED 324	I8XTX 321	KF5AR 318	WA5SUE 311	VE3CKP 299	WN5MBS 277
I4EAT 328	WA4IUM 326	AA4KT 326	W2FGY 324	I8YRK 321	I8IYW 318	GM4XLU 311	YV4VN 299	VE2DRN 277
W4UNP 328	WB1DQC 326	PT2TF 326	YV5CWO 324	K4PQV 321	NI5D 318	KA5RNH 310	KJ9N 298	GØLRX 277
YU1AB 328	XE1AE 326	KM2P 326	W5LLU 324	KS2I 321	WA8YTM 318	I2MQP 310	KB5WQ 294	9A9R 277
F9RM 328	KA3HXO 326	N5FW 326	I8KCI 324	OA4OS 321	F6BFI 318	HA6NF 310	IT9VDQ 293	K3LC 277
PY4OY 328	VE3XN 326	K9HDZ 326	I1POR 324	W7ULC 321	KX5V 318	KF7RU 310	KJ5LJ 293	KC6AWX 276
OZ3SK 328	YS1GMV 326	WA3HUP 326	VE4AT 324	W3AZD 321	WB6PSY 317	K4JDJ 310	TI2LTA 292	OA4EI 276
XE1L 328	K9MM 326	YV1CLM 326	KD5ZM 324	WØULU 321	9H4G 317	AB4IQ 310	W5OXA 292	NC3C 275
4Z4DX 328	ZL1AGO 326	N6AW 326	KØHQW 324	WDØBNC 321	WA6DTG 317	EA5RJ 309	K2EEK 291	F5NBX 275
CX4HS 328	KF7SH 326	ZP5JCY 326	KA5TTC 324	CT1EEB 321	XE1XM 317	CT1AHU 308	W6WL 291	VE2AJT 275
N4MM 328	ZS6LW 326	K5TVC 326	K4JLD 324	OA4QV 321	ZL1BOQ 317	EA5KY 308	YB1RED 291	US1IDX 275
OE3WWB 328	VK4LC 326	KB7VD 326	KB2MY 324	OE6CLD 321	KF8UN 317	EA3CB 308	DJ2UU 291	Z31JA 275
IK1GPG 328	YV5AIP 326	N4CH 326	EA3BKI 324	LU1JDL 320	N5HSF 316	W9IL 307	4X6DK 291	
W7OM 328	K9IW 326	WB3DNA 326	4N7ZZ 324	KF8VW 320	KB1HC 316	N6AV 306	WA3KKO 290	
K4MQG 328	WA4JTI 326	I2EOW 326	YV5IVB 324	IØAMU 320	W6NW 315	TI2TEB 306	N5QDE 290	
K7EHI 328	YV1AJ 326	KE5PO 326	N2VW 324	K4CXY 320	KV2S 315	VE3DLR 306	OE7KWT 290	
DU9RG 328	YV1KZ 326	XE1VIC 326	K8YVI 323	G4ADD 320	WA9RCQ 315	W3YEY 306	N6CFQ 290	
W6DN 328	W9OKL 326	W6SR 326	NC9T 323	I4WZK 320	N3ARK 315	K6BZ 306	IK2PZG 289	
I4LCK 328	9A2AA 326	N4CH 326	K9HQM 323	I4SAT 320	N4HK 315	XE1MDX 305	LU3HBO 289	
IT9TQH 328	DL6KG 326	I8ACB 325	KC5P 323	WE2L 320	K2AJY 315	DK5WQ 305	VK3IR 289	

RTTY

K2ENT 324	WB4UBD 304	K3UA 287	EA5FKI 284	I1JQJ 273	W4QB 273	W4EEU 269	KE5PO 268	G4BWP 267
NI4H 320								

years, but I got back on the air as NV0T, and then as WT8N, which I held until getting K8RF back again last year.

"My interest in the 5 Band WAZ award began seriously in 1990 when I put up a decent full-sized vertical for 80 with a mile of radials, and worked 3W3RR on 80 for Zone 26. VU2TEC, Fred Laun, HSØZAR, and RVØYF helped finish the tough ones on 40. I switched to a delta loop for 80 meters and got VS6WO in 1992 for Zone 24, but those last ones on 80—22, 23, and 34—eluded me until last year.

"Since hearing through the QRN seemed to be the biggest obstacle, I decided to get serious about getting those last three zones, so I took down my 20 meter beam and built up a half-sized, linear-loaded, two-element Yagi for 80/75 meters. (I didn't have room for beverages.) The antenna is two 62 foot elements on a 28 foot boom, with linear loading wires acting as supports.

"With this antenna I could hear stations Q5 that were completely lost in the QRN on the delta loop. Usually I continued to use the delta loop for transmitting, since the Yagi is up only 75 feet. The beam has almost no front-to-back ratio, but you could really null out the QRM and QRN. I managed to work 4S7EA, JT1BG, and SU1SK to finish up Zones 22, 23, and 34 on 80 meters!

"So now I'll be trying to work new countries and zones on 160 meters, where I have 139 countries and 31 zones. I'm just a novice on 160, having just gotten on the band in 1993."

Murphy's DX Laws

The Calling Laws: (1) If you already have the particular country confirmed, you can call him in a world-class pile-up and he'll answer you on your first call. (2) If he's an

QSL INFORMATION

3A/ON6NN to ON5FP
3F1P to HP2CWB
3ZØAIR to SP7LZD
3ZØAN to SP7LZD
4KØJL to KA5GRP
4L4CC to RV1CC
4S7UB to KJ6UB
53HG to N5HG
5R8FJ to NY3N
7J2AZL to OK1FWQ
7P8BO to W4YBO
7S2AT to SK2AT
8P9DS to PAØERA
8P9IV to VE2WYK
8Q7HY to JK1FNN
8Q7PV to RU3FM
9A/HA3JB to HA3JB
9H3XV to DL8GCL
9H3XY to G4ZVJ
9H3ZV to G4ZVJ
9H8CI to 9H1ZE
9K76POW to 9K2RA
9MØC to G3SWH
9M2HIL to N2OO
9M2OM/P to GØCMM
9M6JM to JHØSPE
9M6OO to N2OO
9M6PO to OH2BH
9N1BV to JA1PBV
9N6OO to N2OO
A22EW to ZS6EW
A35DE to KC6RDE
AHØR/VP9 to JH6RTO
AP5ØCM to AP2CM
AP5ØHA to AP2HA
AP5N to pirate
BVØDX to KA6SPQ
BV4FH/1 to KA6SPQ
BXØYL to BV4YB
CI3AAN to VA3AAN
CL8VP to CO8RCG
CN18DKH to CN8MK
CN68NL to CN8NL
CO2JG to HI3JH
CO2OJ to N6CL
CQ1I to CT1FMX
CS5ØØG to CT1REP
CS7UW to CT4UW
CT1ENQ/P to CT1EEB
CU2X to DK4LI
CU8L to CU3EJ
CV1F to CX6FP
CY9SS to VY2SS
CYNCD to VA3NCD
DAØSBB to DL1JGP
DS2AGH to HL1XP
DU3NXE to W4NXE
E22AAA to HS1CHB
EA1ADP/P to EA1AAA
EA1EB/P to EA1BD
EA6/F2YT to F2YT
EA8/OH4NL to OH2BYS
ED5HQ to EA5HQ
ED5RPU to EA5GNW
ED6EIM to EA6VC
ED8BYR to EA8BYR
EI2V/AM to EI1DG
EK8WB to IK2QPR
ESØI to ES7RE
EU93ØEU to LY1BA
EW52OB to EU1FC
EX7WA to IK2QPR
F/ON6NN to ON5FP
F5TBF to F1TBF
FG5EY to F6EYB
FM5FM to F5LNV
FP5BU to F5TJP
FP5KE to FP5CJ
FS5PS to NØJT
G7Q to GØSAH
G7T to G3NYY
GBØNGF to G3PXX
GD6YB/P to G3SWH
GM3PPG to G3PPG
GM3USL to GMØKVI
GS3EEO to G3OCA
H25X to 5B4XF
HB5CC/P to HB9BCK
HO6V to HP2CWB
HP1BXI to F6AJA
HP1XPI to F6AJA
HR6/N7QXQ to W7TSQ
HR6XX to CX3CE
HSØZBS to HB9AMZ
IL3VIA to IK3VIA
J41WCA to SV1BSX
J6/PA3BBP to PA3ERC
JD1/7J1AYK to W5FI
JT1W to JU1OJ
JW5QIA to LA7QIA
JW6PA to LA2PA
JW6VJA to LA6VJA
JW7QAI to LA7QAI
JY8WA to DK3GI
K5MI/P to N1DL
K7CXJ/KH8 to KH6JEB
K7IL/KH6 to JF3PLF
KC9HP to KB9GMN
KHØ/KQ6KY to JR6OCL
KH6/N4BQW to WA4FFW
KH6AW/KH2 to VK4FW
L5ØV to LU5VC
LA/F8UFT to F5YJ
LA2Q to LA7RW
LZ3BQ to LZ1KPE
M7S to MØAGQ
MJØAWR to K2WR
N4BQW/AH6 to WA4FFW
N4BQW/KH6 to WA4FFW
N4BQW/KH7 to WA4FFW
OD5/9K2MU to WA4JTK
OD5/SP3DPR to SP3NYM
OD5PY to KU9C
OG5/9K2MU to WA4JTK
ON4YLC to ON4AMM
PJ7RM to SM7CRW
PJ9G to WA2NHA
RØMIR-1 to N6CO
R3HQ/6 to RN6BN
R3RRC to RW3GW
RIØTA to RA3DEJ
RS9O to RW9OWM
SPØYDV to SP8XGK
SV5/OM3LA to OM1APD
SV8/DK2OC to W4FC
SV8/IK7WPH to IK7XNF
SV9/SV2CWY to SV2CWY
TØØYY to ON5FP
TØ4A to W1CU
T9/YO6DBL to YO9XC
T95A to K2PF
T95LEN to HH2HM
T9DX to T93Y
TA2DS/Ø to WA3HUP
TK5GF to FY5GF
TL8MR to F6FNU
TMØM to ON5FP
TM1OOL to F6KWP
TM5RED to F6KQC
UEØLMF to UAØMF
UV7D to UT7DX
V47KAI to K2SB
V73AR to JA3OIN
V73NH to JA3OIN
V73UB to K1ZUT
VIØANARE to VK4AAR
VI3PES to VK3CRP
VI8NTD to VK8HA
VK9LF to JR4PMX
VP2EXM to DL3XM
VR2MM to JR3JFZ
VR57SAR to VR2XRW
VR97SAR to VR2XRW
VU3RSB to VU2APR
WH6BZF to KH6BZF
WJ2DX/IMD to W2EN
XJ9GM to VE2CWI
XL2MJS to VA2MJS
XL3AEA to VE3AEA
YB52RI to YBØBEH
YI1SK to HAØHW
YM7PA to PAØTLX
YV3ØT to W4SO
ZD8JF to GWØANA
ZD9IL to ZS5BBO
ZF2DE/ZF8 to N4BP
ZF2DN/ZF8 to KP4AM
ZK1AAT to KQ2I
ZP24I to ZP5WYV
ZP592AL to ZP5YAL
ZY2IB to PY2AE
ZY6WL to PY6WL
ZZ2Z to AC7DX
4K9C to Boris G. Gorobec, P.O. Box 594, 370129 Baku, Azerbaijan
9H1DL to Martin, P.O. Box 575, Valletta, Malta
A43XA to The Royal Omani Amateur Radio Society, P.O. Box 981, Muscat 113, Sultanate of Oman
BA1DU to Alan Kung, P.O. Box 8091, Beijing 100088, China
BV6GM to Benny Chen, P.O. Box 1587, Tainan, Taiwan
BV8BC to Chen, P.O. Box 222, Taitung 950, Taiwan
CN8FD to Hussein Tamim, Imm. 4 Apt. 8, Lot Houria, Tabriket, Sale, Morocco
DS5ALT to Mansoo Kim, 1135, Gaya-Ri, Gaya-Eup, Haman-Kun, Kyungnam 637-800, Korea
HJ6UFU to Alexander Bobadilla, A. A. 031, Calarca, Colombia
HLØZ to Gyeongsang National University Marine Science College Amateur Radio Station, 445 Inpung Dong, Tong Yung, Korea
HL2LPT to T. J. Kim, #8-1502 Hanyang APT., Wolpi-dong, Ansan-city, Kyungki-Do 425-070, Korea
HL5AEX to Won Yong Bak, P.O. Box 97, Kyong Ju 780-600, Korea
JY5HL to Mahmoud Wreikat, P.O. Box 960414, Amman 11196, Jordan
KH2JU to Danny Pobre, P.O. Box 22061 GMF, Barrigada, GU 96921
LX1NO to Norbert Oberweis, 5, Cite Oricher-Hoehl, L-8036 Strassan, Luxembourg
SV1CIB to Dimitris, P.O. Box 127, GR-301 00 Agrinion, Greece
VR2JE to John Everist (G4CVC), 15 West Harold, Swanley, Kent BR8 7EJ, England
VR2MM to Masayuki Nakatani, G.P.O. Box 2921, Hong Kong, China
XX9AU to Cheang Va Ip, P.O. Box 6018, Macau
YC2FWQ to Merianto Satyanagara, P.O. Box 277, Magelang 56101, Indonesia
ZK1CC to Dick Best, P.O. Box 719, Rarotonga, Cook Islands

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

all-time New One, you can call forever; he will never hear you.

The Call Area Laws: If the DX is working the USA by call areas, he will: (1) Fade out before he gets to your area. (2) Work ten QSOs in each area, but only two in yours. (3) Become disgusted with the unruly pile-up and quit before he gets to you.

The Middle of the Night Laws: The DX is supposed to show on 75 meters at 3 AM local time. (1) You are there eagerly waiting—nothing! (2) You give up in disgust at 3:30 AM and go back to bed. (3) He shows up at 3:35 AM!

The Policeman Law: The DX is working split. You have carefully been tracking his operating pattern in the pile-up. You know where he's going to listen next. Now is the time. You call! You let up to listen and 12 policemen are busy brutalizing some poor, hapless soul who call him on the transmit frequency. You can't hear any trace of the DX station.

The Casual DXer Laws: The DX station is not an experienced DXer and asks for some unusual things: (1) "Okay, now are there any YLs on frequency? YLs only please." (You hear your arch rival across town calling in falsetto!) (2) "Please, QRP stations only." (You hear Ten-Kilowatt Willie working him, pinning your S meter off the back of your beam.) These cuckoos work him. You don't.

The DX Net Laws: An all-time New One is on, but he is working only the DX nets. You are so desperate that you will work him any old way. You show up at the net start-up time. (1) You hear the DX station S9 but can't copy the list master. (2) You hear the list master S9, but can't copy the DX station. (3) You can copy both the list master and the DX station, but the list master assigns one of his assistants to go up 10 kHz to take the list. You can't hear the assistant.

The QSL Laws: It's an all-time New One for you. You work him and send off for your QSL with SASE and some green stamps. (1) He sends you a nice note: "Sorry, not in log, but thanks for the contribution." (2) You wait and you wait. All

your friends get their cards. Still nothing. A year later his card shows up via the bureau. (3) You send off for a juicy one. Nothing. More mailings. Still nothing. After five or six attempts, you consult your QSL guru. He says, "Oh, yes, that guy is a lousy QSLer. Never send cards. You might as well forget it."

The Antenna Rotor Laws: Your antenna rotor fails. (1) If it is stuck, it will stick in the wrong direction. (2) If it is freewheeling, it will remain stationary until you hear something good; then the wind will come up.

Special thanks to Ted, W6BJH, and "The DXer," newsletter of the Northern California DX Club, Dave Earnest, K7JJ, Editor.

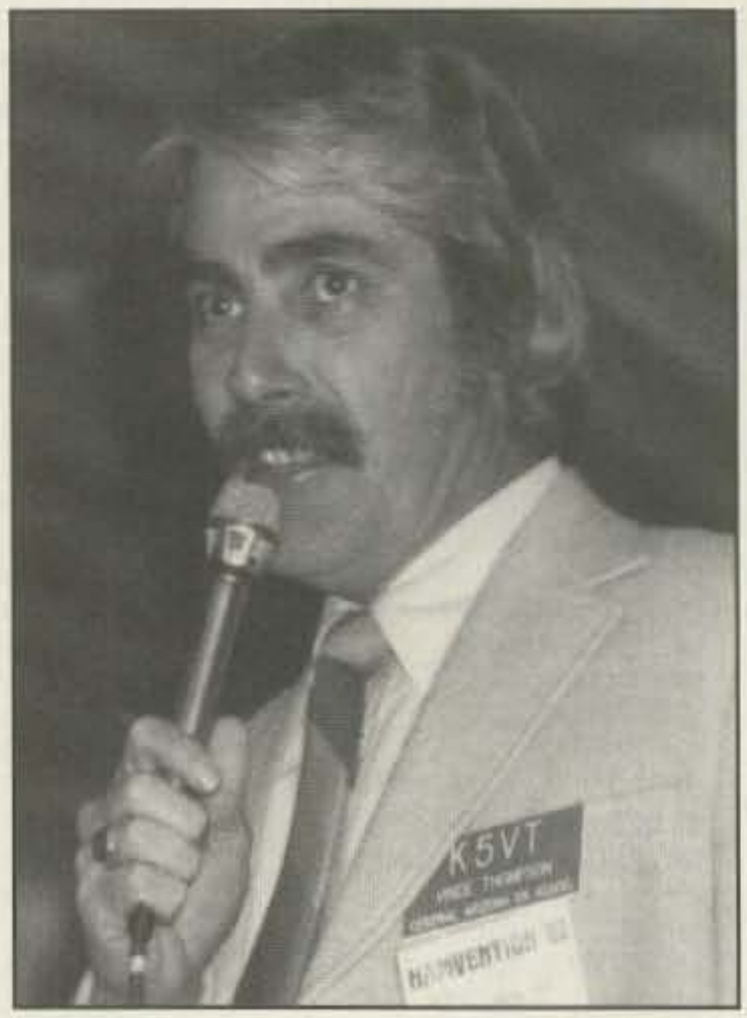
November DX News and Events

The 25 SEANET Convention is November 14–16 in Darwin, Australia. More info is available from the host club, the Darwin Amateur Radio Club, Inc., P.O. Box 41251, Casuarina NT 0811, Australia; web site <www.topend.com.au/~seanet>.

The new officers of the Southern California DX Club are Larry Shapiro, K6RO, President; Will Angenent, KN6DV, Vice-President; Jim Zimmerman, N6KZ, Secretary; Rich Bongeorno, WU6T, Treasurer; Daniel Magro, W7RF, and Harvey Laidman, N6HL, Directors; and Harvey Shore, K6EXO, Membership Chairman.

The Voo-Doo Contest Group will operate as **5V7A** from Togo as a multi-multi in the CQ WW CW Contest. Operators and their individual Togo callsigns are Roger, G3SXW/5V7A; Bob, G3ZEM/5V7ZM; Cris, G4FAM/5V7FA; Vince, K5VT/5V7VT; Jim, K7GE/5V7JL; Bob, W6RGG/5V7BV; Mike, N7MB/5V7MB; Tony, N7BG/5V7BG; Mike, KC7V/5V7MF; and Paul, K7PN/5V7PN. This is a serious operation with eight Kenwood TS-930s and Alpha amplifiers, 18 antennas, and a 132 foot wire vertical. Look for the individual operators using their own callsigns outside the contest; QSL home calls, except QSL 5V7A via GM4AGL. More info is available on their web page <http://www.getnet.com/~k7wx/5v7a.html>.

David Collingham, K3LP (ex-AA6DC), plans to operate the CQ WW CW Contest November 29–30 from the station of Ali Al Futtaim, **A61AJ**, in Dubia of the United Arab Emirates. He'll be on outside the contest November 22 to December 2. QSL this operation of A61AJ only to AA6DC.



Vince, K5VT, will be operating as 5V7VT from Togo at the end of November as part of the 5V7A CQ WW CW Multi-Multi contest team.

Edin, T97M, will operate the CQ WW CW Contest as **9K2/T97M**. Look for him outside the contest November 22–29.

Luis, **EA3ELM/C6A**, and Jon, **EA2KL/C6A**, will operate from Abaco (NA-080) in the Bahamas November 1–8, CW and SSB on all bands. QSL home calls.

DX information thanks to "The Daily DX," a daily e-mail DX newsletter. For more information on "The Daily DX," contact W3UR at <bernie.mcclenny@mail.wdn.com> or fax to 301-854-5105.

73, Chod, VP2ML

CQ DX Awards Program

SSB

2233 ..... YV5NWG 2234 ..... EA1EB

CW

965 ..... K6HMS

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300 ..... 9A2AJ/309

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.

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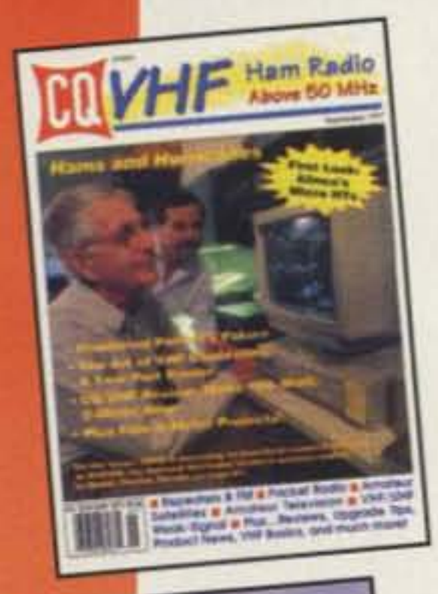

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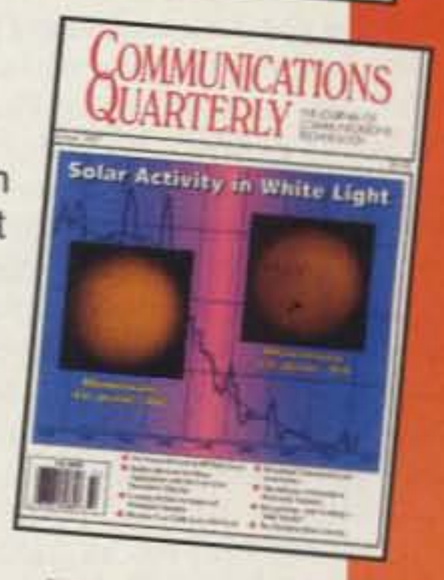

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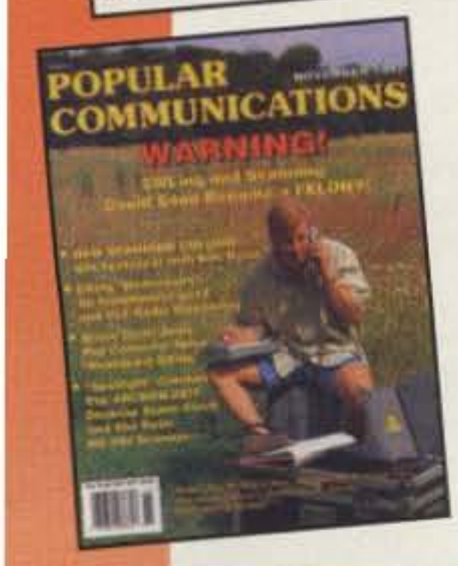

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BY FREDERICK O. MAIA, W5YI

WASHINGTON READOUT

REGULATORY NEWS IN THE WORLD OF AMATEUR RADIO

Morse Controversy at The IARU

The International Amateur Radio Union is a federation of national amateur radio societies from around the world. The IARU claims to represent the amateur community around the world. It is controlled by the American Radio Relay League.

The IARU's Future of the Amateur Service Committee (FASC) was formed to come up with an international position on what amateur radio should be like in the 21st century. The international radio regulations pertaining to the amateur service are scheduled to be considered at WRC-99, which will be convened in Geneva in the fall of 1999.

In April 1996 the FASC released a 20-page discussion paper entitled "The International Regulations Affecting the Amateur Service." Comments were invited from the various amateur radio societies around the world to serve as a basis for an IARU report which would be delivered to the Region 1 Conference (Tel Aviv, Israel, September 1996).

The Amateur Service provisions are contained in Article 32 of the 1994 and earlier editions of the Radio Regulations, which was renumbered Article S25 at WRC-95 last fall. WRCs are convened by the International Telecommunication Union every two years and have the power to revise the Radio Regulations, which have the force and effect of a treaty.

Even though the entire international amateur and amateur-satellite regulations are being looked at, the FASC found that the Morse code issue overshadowed all others. The preliminary view of the FASC was that the code requirement should not be a part of the IARU recommendation. The reason given was that it would be many years before the issue could be considered again. In other words, the IARU would not really support abolition of the manual telegraphy as a licensing mandate. Instead they would support it, since they eventually would have to do so. That fuzzy-thinking view certainly was not popular with much of the international amateur radio community!

Transmitter PEP Threshold Power Limits

Wavelength Band and Frequency	Transmitter Power
Medium Frequency Band	
160 meters (1800–2000 kHz)	500 watts PEP
High Frequency Bands	
80 meters (3.50–3.75 MHz)	500 watts PEP
75 meters (3.75–4.00 MHz)	500 watts PEP
40 meters (7.0–7.3 MHz)	500 watts PEP
30 meters (10.10–10.15 MHz)	425 watts PEP
20 meters (14.00–14.35 MHz)	225 watts PEP
17 meters (18.068–18.168 MHz)	125 watts PEP
15 meters (21.00–21.45 MHz)	100 watts PEP
12 meters (24.89–24.99 MHz)	75 watts PEP
10 meters (28.0–29.7 MHz)	50 watts PEP
Very High Frequency Bands	
6, 2, 1 1/4 meters (all bands)	50 watts PEP
Ultra High Frequency Bands	
70 cm (420–450 MHz)	70 watts PEP
33 cm (902–928 MHz)	150 watts PEP
23 cm (1240–1300 MHz)	200 watts PEP
13 cm (2300–2450 MHz)	250 watts PEP
Super High Frequency Bands	
All 1.2 cm to 9 cm bands	250 watts PEP
Extremely High Frequency Bands	
All 6 mm and shorter bands	250 watts PEP

If the routine environmental evaluation indicates that the RF electromagnetic fields could exceed the limits in accessible areas, the licensee must take action to prevent human exposure to such RF electromagnetic fields.

Table I– Amateur radio operators must now perform the routine RF environmental evaluation if the transmitter PEP exceeds the above limits.

IARU Issues Second Report

After the Region 1 IARU Conference held last fall in Tel Aviv, the International Amateur Radio Union released a "Second Report Following Release of Discussion Paper." It was released to the amateur community this summer. In it was a proposed revised approach to Article S25, which covers the Amateur Services.

The IARU's thinking on the relevance of Morse code as a licensing requirement is contained in this quote from the Report: "S25.5 – Although the debate was lively it was agreed that the requirement for Morse should remain within S25. It was stressed that to enable this to continue FASC would require reasoned arguments for its retention. Member societies were requested to address this issue and submit their proposals to FASC. It was made quite clear to the meeting that it will not be easy to retain the 'status quo' at WRC99, as the ITU tends to reach decisions by consensus rather than simple voting." On the Morse Code issue, the IARU recommendation was: "The existing S25.5 definition should be retained."

The FASC did, however, release an alternative Article S25, which addresses issues that were less controversial. The current definition of the Amateur Service received almost total support. The definition is as follows: "*a . . . service* for the purpose of self-training, intercommunication and technical investigations carried out by amateurs, that is, by duly authorized persons interested in radio technique solely with a personal aim and without pecuniary interest."

Here is a proposed rewrite of S25 that was released after the Tel Aviv Conference. The FASC emphasized that its release was " . . . for discussion only" and could easily be changed after other conferences and comments have been considered.

ARTICLE S25 - Amateur Services

Section 1. Amateur Service

S25.1 Administrations shall verify the technical and operational qualifications of any person wishing to operate an amateur station. A person seeking a licence to operate an amateur station may be required to demonstrate a knowledge of the topics specified in ITU-R Recommendation M-XXX. *[This contains a recommended syllabus which would not be mandatory for a country to follow if it chose not to do so.—ed.]*

S25.2 (1) Transmissions between amateur stations of different countries shall be limited to communications incidental to the purposes of the amateur service or of a personal character. *[This is essentially the same as the current wording.—ed.]*

(2) Except with the authority of the relevant administration granted to meet a particular operational need, transmissions between amateur stations shall not be encoded for the purpose of obscuring their meaning. *[A rewording of the previous international radio regulation which required transmission to be in plain language.—ed.]*

S25.3 Administrations are urged to take the steps necessary to allow amateur stations to prepare for and meet communication needs in the event of a natural disaster. *[Addresses an ITU resolution that urges administrations to deploy effective telecommunications to alleviate disasters and to provide relief operations.—ed.]*

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S25.4 A person who has been granted a license to operate an amateur station by an administration that requires the demonstration of a knowledge of the topics specified in ITU-R Recommendation M-XXX before granting such a license may be permitted by second administration to operate an amateur station in its territory while the person is temporarily in that territory, subject to such conditions or restrictions as it may impose. The administration permitting such operation is not required to issue a license to that person temporarily in its territory. *[Permits, but does not require, a nation to accept the qualifications of an amateur licensed in another country.—ed.]*

Section II. Amateur-Satellite Service

S25.5 The provisions of Section I of this Article shall apply equally, as appropriate, to the amateur-satellite service. *[No change from the present provision.—ed.]*

S25.6 Administrations authorizing space stations in the amateur-satellite service shall ensure that sufficient earth command stations are established before launch to ensure that any harmful interference caused by emissions from a station in the amateur-satellite service can be immediately eliminated. *[The only additional requirement of the Radio Regulations dealing with space services that applies to the amateur-satellite service.—ed.]*

A Word of Warning from The ITU

From what I have read—and I have digested just about everything that the ITU, IARU, and FASC has put out—the only issue that is really controversial is the international manual telegraphy requirement. At this point, it does not look as if the IARU will agree that the manual licensing requirement should be abolished when the operation takes place below 30 MHz.

Interestingly, at the opening of the IARU Region 1 Conference Robert Jones, Director, International Telecommunications Union Radiocommunication Bureau, representing the IARU said, "It is essential for you—meaning the IARU—to speak with one voice even when there are genuine differences of view within the amateur community. Unless you are united, you will be the victims of the 'divide and conquer' approach."

ORACLE Begins WRC-99 Campaign

ORACLE, the New Zealand based **O**rganization **R**equesting **A**lternatives by **C**ode-**L**ess **E**xaminations, Inc., has sent a formal letter to the telecommunications regulatory agencies of 64 different countries. In it they ask support in ending the amateur radio manual telegraphy requirement.

ORACLE was the group that persuaded their government in 1994 to support an end to the international Morse code requirement. ORACLE representatives used to be affiliated with New Zealand's national radio society, New Zealand Amateur Radio Transmitters, Inc. They left NZART to lobby New Zealand's telecommunications regulatory body, the Ministry of Communications. At WRC-95, held October/ November 1995 in Geneva, the New Zealand government proposed (on October 31, 1995) to Working Group 4C to abolish RR2735 (which was renumbered to Article S25-5).

Actually, no amateur radio issue was on the agenda for WRC-95. The proposal was introduced into the ITU conference through an on-going review " . . . to study 'Allocation and improved use of the Radio frequency Spectrum and Simplification of the Radio Regulations.'"

RR2735 (S25-5) is the international regulation that requires amateur radio operators to prove that they are " . . . able to send correctly by hand and to receive correctly by ear, texts in Morse code signals" when the operation takes place below 30 MHz. The New Zealand MOC said that the following Radio Regulation 2736 (renumbered to Article S25-6) was all that is necessary for the ITU countries to require Morse code proficiency if they believed it important.

RR2736 simply reads "Administrations shall take such measures as they judge necessary to verify the operational and technical qualifications of any person wishing to operate the apparatus of an amateur station."

Some administrations (including the United Kingdom) supported the proposal; others (including Germany, Israel, Switzerland, and Canada) wanted to study the matter further. It was agreed to recommend Item 2-2 for inclusion in the WRC-99 agenda. Agenda Item 2-2 simply reads "Consideration of Article S25 concerning the Amateur Service and the Amateur-satellite Service."

The ORACLE letter, dated August 13, 1997, " . . . seeks the support of your administration on preparation for updating international radio reg-

ulations for the amateur service. Our New Zealand based organization formed in 1994 continues to develop international connections with amateur radio operators who seek regulatory changes."

The letter points out that "The WRC-95 Conference agreed on a provisional agenda for WRC-99, which includes 'consideration of Article S25 concerning the amateur and amateur-satellite services' (Resolution PLEN-5)." Article S25 in the simplified regulations was formerly called Article 32. This review of Article S25 was triggered by the New Zealand Administration introducing a proposal at WRC-95 to remove S25.5 (formerly RR2735).

ORACLE included a copy of the WRC-95 input paper entitled "Corrigendum 1 to Document 29-E 27 October 1995" along with their letter. "Our organization supports the New Zealand position described in this WRC-95 paper, and we are advised that the New Zealand administration is continuing to seek removal of S25.5.

"In order to prepare a suitable path to the future for amateur radio, we recommend that your administration should, at the WRC-97 Conference, confirm that review of Article S32 be an agenda item for WRC-99.

"Nearer to the time of the Conference that reviews Article S25, which will hopefully be WRC-99, our organization intends to provide administrations with a prepared package of detailed recommendations for changes. It is also our intention to become an ITU recognized organization and to attend selected Conferences with observer status, especially WRC-99, which is likely to be where administrations make various decisions on amateur radio regulations.

"In summary, we make two points:

"1. Please support the agenda item for timely review of Article S25 at WRC-99.

"2. Note that many operators in the amateur service seek timely changes to international regulations, especially regarding S25.5.

"Attached is a summary of issues on Morse testing in the amateur service."

Restrictive Practice

The letter is signed by Dave Walker, ZL2BHE, ORACLE's Overseas Publicity Officer. Included with the letter was an August 1997 "Summary of Issues Concerning Morse Code Testing in the Amateur Service."

ORACLE suggested that " . . . proficiency in sending and receiving texts in Morse code has not been a genuine international licensing requirement for many years, but instead is a form of *restrictive practice* aimed at limiting participation on frequencies below 30 MHz. We understand that the international regulations are intended to act as guiding principles, thereby retaining flexibility in order to keep pace with telecommunication developments."

ORACLE said that "International regulation S25.6 is broad enough to encompass all forms of technical and operational qualification requirements. In 1997, we therefore question whether or not Morse code proficiency is a genuine international licensing requirement for an amateur operator to access any amateur band. We suggest the way ahead is to allow for individual administrations to introduce suitable alternative ways of qualifying, such as a higher level technical examination."

Discrimination

ORACLE believes that " . . . requiring candidates to demonstrate proficiency in a subject that is not a genuine requirement is a form of *discrimination*. The subject of individual human rights is dealt with in some detail by the United Nations with an internationally agreed document entitled International Covenant of Civil and Political Rights, available from the Internet at <http://www.hrweb.org/legal/cpr.html>. The folly of current Morse testing regulations is easily illustrated by the policy used by some administrations to grant waivers to persons with disabilities, which is in effect 'reverse discrimination.' We suggest this practice of granting waivers to persons who could not undertake a test is proof enough that Morse code proficiency is not a genuine international qualification requirement."

Sovereignty with Respect to National Regulations

"Removal of S25.5 has the outcome that individual Administrations will then have a choice of what each can specify in national regulations regarding amateur radio qualifications. National regulations are a suitable place for specifying such detail. We respect the sovereignty of administrations.

"Removal (suppression) of S25.5 begins the process of Administrations introducing (in national regulations) alternative ways of qualifying, thereby giving candidates a choice that best suits each of their particular circumstances. As it is clear that Morse code currently has a significant interest group following, Morse code tests could therefore continue as one of the alternatives to choose from.

Scrutiny and Contestability of Policies

"There are some strongly held views for and against Morse code testing in the amateur service. We suggest that all amateur radio regulations should be publicly contestable (be debated far wider afield than by the incumbents alone), and that any parts considered to involve discrimination, restrictive practices or technology promotion be consistent with overall economic, social and scientific policies of your administration.

"The amateur radio qualification requirements need to be fit for the purpose of administering the amateur service as part of a range of modern radio services. The self-training aspect of amateur radio is a low cost way of young persons being able to experiment with radio technologies and likely some will be attracted to seek careers in the radio and communications industries. Having successful radio and communications industries adds to national value, and the low cost introductory aspect that amateur radio can provide should not be under-estimated.

"We believe the drop in the number of amateur radio licensees and candidates for amateur radio examinations in recent years in some countries is not a good sign for the future of amateur radio. It is questionable to continue with restrictive international regulations in such a situation. This is where individual sovereignty should decide on appropriate solutions to problems with licensing under national jurisdictions, with guidance for compliance coming from the principles set by international regulation.

Overhaul of International Regulations is Overdue

"International regulations pertaining to the amateur service are in need of overhaul if the amateur service is to survive well into the future. We applaud the administration of New Zealand for introducing the amateur radio Morse code issue to WRC-95, as this is one of the major topics of concern as it needlessly limits the public image of amateur radio.

"We are now aware of consequent developments and growing support by administrations to remove S25.5 from the international radio regulations. There are also several other international improvements that can be made that will help the future of amateur radio.

"In fast moving times, amateur radio needs similar attention as occurs for other radio services in being able to keep up to date. Our organization was formed to provide independent commentary in order to show that amateur radio can do better than continuing to keep falling behind the times.

"We are uncomfortable with an image of amateur radio being the dinosaur of radio services. We are hopeful that amateur radio can have a long future, but for this to be possible we believe that there needs to be timely updating of the international radio regulations at WRC-99."

FCC Adjusts RF Safety Threshold

A year ago (August 6, 1996) the FCC revised the Part 97 Rules to require an RF safety evaluation when the transmitter power exceeds 50 watts PEP regardless of the frequency band on which the operation occurred.

In response to a Petition for Reconsideration filed by the American Radio Relay League, the FCC's Office of Engineering and Technology (OET) has now changed the threshold frequency (when the "routine evaluation" requirement kicks in) to take into consideration the fact that RF exposure safety levels are frequency dependent. The most stringent RF safety standards are needed between 30 and 300 MHz.

The National Environmental Policy Act of 1969 (NEPA) requires agencies of the Federal Government to consider the impact of their actions on the quality of the human environment. Noting that it was widely accepted in the scientific world, the FCC in 1985 adopted the 1982 American National Standards Institute (ANSI) guidelines for use in evaluating the health effects of RF electromagnetic fields.

In 1992 ANSI adopted a new RF exposure standard (ANSI/IEEE C95.1-1992) to replace its 1982 standard. The new standard contained a number of significant differences and was generally more restrictive in the amount of RF exposure permitted in the environment. To meet its responsibilities under NEPA, the FCC last year replaced the 1982 standard with the new ANSI/IEEE guidelines.

The FCC regulations generally require a station owner to determine whether an RF transmitter complies with new maximum permissible exposure (MPE) limits based on criteria published by the American

National Standards Institute and the Institute of Electrical and Electronics Engineers, Inc. (ANSI/IEEE). Applicants must certify at the time a radio license is issued, modified, or renewed that the transmitting facility complies with the new RF safety standards.

The new guidelines incorporate two tiers of exposure limits based on whether exposure occurs in an occupational or "controlled" situation or whether the general population is exposed or exposure is in an "uncontrolled" situation. For the first time, the FCC determined that amateur radio transmitters would also be subject to the "routine evaluation" requirements to ensure that they complied with the guidelines.

On August 6, 1996 a new Part 97 rule (Sec. §97.13(c) was added which required amateurs transmitting more than 50 watts to determine if their radiated signals exceeded the RF safety guidelines. This determination is called a "routine evaluation."

On August 25, 1997 the FCC's Office of Engineering and Technology (OET) released a Second Order in ET Docket 93-62 which responded to various Petitions for Reconsideration and amended certain aspects of the RF guidelines. OET also released an updated Bulletin No. 65, "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields."

In the order the FCC affirmed the RF exposure limits that were previously adopted. Therefore, it is important to know that the RF safety limitations released last year were not changed. However, several technical and legal issues were raised in the petitions and the FCC did make some amendments to the rules.

Of interest to amateur radio operators was a revision to the 50 watt threshold for "routine evaluation" of amateur radio stations so that it reflects the manner in which the RF exposure limits change in the different amateur frequency bands. OET increased the threshold transmitter PEP power levels on bands lower than 10 meters and higher than the 70 centimeter (420–450 MHz) band since they do not fall in the frequency area in which the human body absorbs the most RF energy. The new RF guidelines will be fully implemented in the Amateur Service on January 1, 1998.

In its petition, the ARRL claimed that the 50 watt threshold adopted in the first Report and Order, was " . . . arbitrary and inappropriate." The ARRL said that the " . . . [50 watt] threshold does not consider important factors, such as frequency, antenna height, antenna gain, emission mode, or duty cycle." The League asked that the 50 watt threshold be modified to incorporate power levels which vary by frequency, or else be increased to at least 150 watts transmitter power output if all parts of the antenna are located at least 10 meters from any area of uncontrolled exposure.

In reconsidering the matter, the FCC agreed that a uniform 50 watt categorical exclusion threshold would indeed cause many amateur station licensees to perform unnecessary routine environmental evaluations.

"The ARRL is correct that our MPE limits are frequency dependent. Because amateur stations are permitted to transmit in frequency bands covering a wide range of frequencies, the MPE limits that might apply to any particular amateur station operation can vary dramatically," the FCC said. "The ARRL argues, quite correctly, that by applying a single power threshold above which a routine environmental evaluation must be performed, the variations that occur in the RF exposure limit as the station transmitter frequency changes are disregarded." The League wanted the FCC to scale the power threshold to match the RF exposure limit.

The Commission adopted the ARRL's proposal and the new rules now specify a transmitter power threshold for each individual ARS frequency band. Amateur radio operators must now perform the routine RF environmental evaluation if the transmitter PEP exceeds the limits shown in Table I.

The required RF safety analysis may be performed by applying a mathematical formula to your operating parameters, by measuring the RF energy in the environment with an electronic instrument, or by various computer-modeling procedures.

The University of Texas Amateur Radio Club has placed an easy-to-use RF Safety Calculator on the Internet's World Wide Web at <http://www.cs.utexas.edu/users/kharker/rfsafety>. It simply requires that you enter in certain information: your average power at the antenna, antenna gain in dBi, distance to the environment (such as a neighboring residence), and your operating frequency. The RF Safety Calculator will then return the results and whether you are in compliance with the FCC regulations on RF exposure. The FCC is also expected to shortly release a special RF Safety publication specifically geared to the Amateur Service.

Want to comment on this column? Send e-mail to <W5YI@W5YI.org>.

73, Fred, W5YI

BY NORM VAN RAAY, WA3RTY

AWARDS

NEWS OF CERTIFICATE AND AWARD COLLECTING

This month we salute Roger Purdy, W2NWL, *CQ* USA-CA All Counties #924, May 11, 1997.

"I first started in amateur radio as a Novice, WN2HUV, in 1959. At that time the Novice license was not renewable and could only be held for a year. My Elmer, John Case, W2NWL (the reason for my call change), supplied me with a home-brewed 40 meter CW transmitter, an antenna, and an SX-28 receiver. I was on the air. After about ten months I upgraded to Technician and the call WB2HUV. I stayed at that level for 14 years.

"As I was not interested in contesting or awards, I first found my niche on 2 meter AM, where I built my first Heathkit, a Seneca, two 6146's clamp tube modulated on 2 meters, and also on 6 meters if you had the nerve. I didn't. I operated 2 meter AM and then FM.

"In about 1974 I studied and finally advanced to General. By then incentive licensing had gone into effect, and the General class license wasn't the end-all it had been. About four years later I moved up to Advanced.

"In 1986 the Doctor suggested that I stop working and live a little longer, so I did. Rose, WA2BEG, my XYL, said, 'What are you going to do now, *housework*?!' I liked her second suggestion much better: 'Why don't you get your Extra?'

"I started going to classes. A few months later on a Wednesday at our club's first VE session I took the Extra exam. I failed it. That Saturday I went to another club's VE session and passed the written part. The code test was exactly the same test I had failed the Wednesday before, and Jim, KZ2P, was in charge of the test session. I didn't know Jim well then, but I do know that he failed me for spelling potatoes wrong! The next Wednesday I went to yet another session. I only needed the code for the coveted Extra license. It was the same test again, and I got 100% of the text, including 'potatoes'!

"For three or four years after that Jim and I, along with some others, went to Dayton. Jim would run off to something or another to do with county hunting. I didn't pay much attention. Time passed. I had heart surgery, and then I sold all my HF gear, my tower, and the antennas. Then Jim said in a matter-of-fact way, 'Why don't you try county hunting?'

"What followed was a TS-50 and a dipole, then a Crushcraft R-7, a Kenwood 940, a whole lot of stuff with KZ2P on it. It has been one of the most rewarding experiences in amateur radio I have ever had.

"I have met some of the nicest people, and have enjoyed three national conventions and two southeast minis. So many people went out of their way to help me finish the first time, that I wouldn't even try to list them all here. They know who they are, and I thank them one and all. I hope in some small way I can return some of the enjoyment I have received. And now on to bingo and the second time around!"

73, Roger, W2NWL

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SPECIAL HONOR ROLL

William B. Aab, WY4B
USA-CA All Counties #928
September 2, 1997

Bill Smith, Jr., W4HMV
USA-CA All Counties #929
September 9, 1997

HONOR ROLL

500

WY4B	2979
W4HMV	2980
KD6SV	2981

1000

F5NBX	1445
WY4B	1446
W4HMV	1447
KD6SV	1448

1500

WY4B	1206
W4HMV	1207

2000

WY4B	1109
W4HMV	1110

2500

WY4B	1035
W4HMV	1036

3000

WY4B	945
W4HMV	946

The total number of counties for credit for the United States of America Counties Award is 3076. The basic award fee for subscribers is $4.00. For nonsubscribers it is $10.00. Initial application must be submitted in the USA-CA Record Book, which may be obtained from *CQ* Magazine, 76 North Broadway, Hicksville, NY 11801 USA for $2.50. To qualify for the special subscriber rate, please send a recent *CQ* mailing label with your application. To be eligible for the USA-CA Award, applicants must comply with the rules of the program as set forth in the revised USA-CA Rules and Program dated March 1, 1997. A complete copy of the rules may be obtained by sending an SASE to Norm Van Raay, WA3RTY, USA-CA Award Manager, Box 76, Pleasant Mount, PA 18453-0076 USA. DX stations must include extra postage for airmail reply.

Awards Issued

USA-CA 500: William B. Aab, WY4B, #2979; Bill Smith, Jr., W4HMV, #2980; Raymond W. Petschonek, KD6SV, #2981.

USA-CA 1000: Betrand Thiesson, F5NBX, #1445; William B. Aab, WY4B, #1446; Bill Smith, Jr., W4HMV, #1447; Raymond W. Petschonek, KD6SV, #1448.

USA-CA 1500: William B. Aab, WY4B, #1206; Bill Smith, Jr., W4HMV, #1207.

USA-CA 2000: William B. Aab, WY4B, #1109; Bill Smith, Jr., W4HMV, #1110.

USA-CA 2500: William B. Aab, WY4B, #1035; Bill Smith, Jr., W4HMV, #1036.

USA-CA 3000: William B. Aab, WY4B, #945; Bill Smith, Jr., W4HMV, #946.

73, Norm, WA3RTY

Roger Purdy, W2NWL, CQ USA-CA All Counties #924, May 11, 1997.

BY GEORGE JACOBS, W3ASK

PROPAGATION

THE SCIENCE OF PREDICTING RADIO CONDITIONS

CQ WW CW Contest Weekend Mostly Low Normal

The CW weekend of the 1997 CQ World-Wide DX Contest will take place on November 29–30. Based on a long-range forecast made at the time of this writing, we are expecting mainly Low Normal conditions, with a good chance for High Normal HF propagation to southern and equatorial regions. The possibility of some radio storminess may likely drop conditions to Below Normal at times for paths that cross the auroral zones. We will have a more up-to-date forecast as a bulletin at the beginning of next month's column. Check on-the-air conditions on November 2 and 3, which would be just one 27-day cycle prior to the CW Contest weekend, for a more probable recurrence pattern.

Special DX Propagation Charts for use during the CW weekend appeared last month, along with valuable tips and suggestions for increasing scores. Be sure to refer to last month's column if you plan to participate in the CW Contest weekend. Additional tips are discussed in this month's column.

LAST-MINUTE FORECAST

Day-to-Day Conditions Expected for November 1997

Propagation Index.....	Expected Signal Quality (4)	(3)	(2)	(1)
Above Normal: 8, 12, 15, 20-21	A	A	B	C
High Normal: 1, 9, 14, 16, 22, 24, 28	A	B	C	C-D
Low Normal: 4-7, 10-11, 13, 19, 23, 25-27, 29-30	B	C-B	C-D	D-E
Below Normal: 2-3, 17	C	C-D	D-E	E
Disturbed: 18	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 good (B) on Nov. 1st, fair-to-poor (C-D) on the 2nd and 3rd, fair-to-good (C-B) on the 4th to 7th, excellent (A) on the 8th, etc. Fair-to-good (C-B) conditions are expected for both days of the CQ WW DX CW weekend of Nov. 29–30.

CQ WW DX SSB Contest Bulletin

Since this issue of *CQ* should reach most subscribers prior to the start of the CQ World-Wide DX SSB Contest weekend of October 25–26, here is an updated forecast made at press time for the general propagation conditions expected during the contest weekend.

Based on the 27- and 54-day recurrence tendencies of solar and geomagnetic conditions, we are upgrading our forecast to High Normal HF conditions during most of the SSB Contest weekend, rising at times to Above Normal over paths to lower and equatorial latitudes. There could be periods of minor radio storminess dropping conditions to Low Normal on circuits passing through the auroral and polar regions.

Daily 10.7 cm solar flux levels greater than 90 are expected during the SSB Contest weekend, and the geomagnetic planetary *A*-index is expected to remain below 10 for most of the weekend.

It looks like a very good CQ WW DX SSB Contest period for 1997. During the contest be sure to check with the forecast sources as well as the DX Propagation Charts discussed in last month's column.

Sunspot Cycle Progress

The Royal Observatory of Belgium reports a monthly mean sunspot number of 11 for July 1997. This results in a 12-month running smoothed sunspot number, upon which the cycle is based, of 11 centered on January 1997.

The highest daily value of sunspot count during July was recorded on the 25th with a count of 39. The sun was completely devoid of any spots on ten days during the month.

At the time of this writing, complete data was not yet available for the month of August, but preliminary data indicates that there was a significant increase in sunspot counts, with daily solar flux levels in the 90s recorded during the last week of the month. As a result, the National Geophysical Data Center at Boulder, Colorado has raised its forecast for the November 1997 smoothed sunspot number to 34. The Australian IPS Radio & Space Services is also calling for a smoothed sunspot number in the mid-30s for November 1997. Under normal HF conditions this should result in better DX propagation conditions during the 1997 WW DX Contest periods than was observed during at least the past two years.

A corresponding 10.7 cm solar flux index of 73 was reported for July by the Dominion Radio Astrophysical Observatory at Penticton, B.C. This results in a smoothed solar flux value of 73 centered on January 1997. A smoothed level in the upper 80s or higher is expected for this November.

Updated Propagation Data

Updated propagation data is always useful to HF communicators, but it becomes invaluable during DX contests. I covered the major sources of updated information in last month's column, including a number of web sites that provide real-time ionospheric, solar, and geomagnetic data. With a red face I must report an error in the URL shown in last month's column for the Space Environment Center, NOAA, in Boulder, Colorado. NOAA is a government agency, and the correct address is: <http://www.sel.noaa.gov>. For a single, perhaps more convenient source of updated HF propagation material see my web page at <http://www.gjainc.com>. Links are provided to the NOAA, the Solar Terrestrial Dispatch, and the Australian IPS sites.

Table I is an example of a 20 meter single-band contest plan for a western USA QTH which has been devised from the DX Propagation Charts that appeared in last month's column. For each three hour period throughout the day it shows the areas of the world to which 20 meter propagation is expected to be optimum. Only those openings shown in the charts with a propagation index of (2) or greater were used in compiling this plan. Similar plans can be made for other time zones and for other bands. A typical multi-band plan appeared in last month's column.

Contest Tips

Midnight to Sunrise: Check 20 meters for openings to the South Pacific until midnight, or perhaps as late as 1 AM in the EST and CST time zones, and until 3 AM in MST and PST zones. The band may also remain open for an hour or so after midnight to deep South America and Antarctica. The best band during this time period should be 40 meters. Look for openings towards Europe, the Middle East, and parts of Africa until 3 AM in EST and CST zones and until 1 AM in MST and PST zones. Good openings from all time zones towards South America should be possible, with signals strongest to the Caribbean area, Central America, and the northern countries of South America between midnight and 5 AM in EST and CST zones and to 4 AM in MST and PST zones. The path towards the South Pacific looks good on 40 meters between midnight and sunrise in all continental US time zones. Weakish openings to the Far East and Asia may be possible from the PST zone from midnight to sunrise. There's also the possibility of a 40 meter opening to Antarctica between 2 and 5 AM in MST and PST zones. Eighty meters should open from EST and CST zones to Europe, parts of Africa, and the Middle East until 2 AM, and possibly for an hour or so longer in the EST zone. Eighty also looks good from PST and MST zones to

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Time PST	Areas to which openings should be optimum
00–03	No openings expected with a propagation index of (2) or higher. Some (1) openings should be possible to South America, South Pacific, New Zealand, and Australasia, but this means condtions should be High Normal or better. This is a good time to catch up on some sleep.
03–06	About the same as the previous block.
06–09	Should open in just about every direction: Europe, North Africa, Eastern Mediterranean and Middle East,most of Asia and the Far East, Pacific Islands, New Zealand, Australasia, the Caribbean, Central America, and most of South America. This is the period in which to rack up points.
09–12	About the same as previous period, but signals getting weaker and openings falling off.
12–15	Western and southern Europe, most of Africa, most of the Caribbean, Central America, and the northern countries of South America.
15–18	All of the Caribbean, Central America and South America, most of Africa, the Pacific Islands and New Zealand, the Far East.
18–21	Another peak period, and a good time in which to increase scores. Most of Asia including the Far East; the Pacific Islands, New Zealand, and Australasia; Caribbean,Central and South America, but falling off; Antarctica.
21–00	South Pacific, New Zealand and Australasia, much of South America, Antarctica. A propagation index (1) opening to Europe and Africa.

Table I– Sample 20 meter operating schedule for a western USA QTH.

the South Pacific from midnight almost to sunrise, and from the EST and CST zones from about 3 AM to almost sunrise. Check for good 80 meter openings to the Caribbean, Central America, and the northern countries of South America between midnight and 5 AM, and to 3 AM for deeper openings into South America, in all time zones. There's also a possibility of an opening to the Far East and Asia from the PST zone between 1 and 5 AM. Openings on 160 meters should be possible from the EST and CST zones to Europe between midnight and 2 AM. In the PST zone check for 160 meter openings towards the South Pacific between 2 AM and sunrise. Openings towards the Caribbean, Central America, and the northern countries of South America should be possible from all time zones from about 2 AM to 4 AM.

Sunrise to Sunset: Check for improving 10 meter openings to Europe from EST and CST zones between 9 and 11 AM, and for openings to Africa between 9 AM and noon. Ten meter openings into South America should be possible between 9 AM and 3 PM from all time zones. Check for openings towards the South Pacific between 1 and 5 PM in the PST and MST zones, and possibly in the EST and CST zones as well. Look for openings from the PST zone to the Far East and Asia between 2 and 5 PM. Conditions may have to be at least High Normal for the 10 meter band to open. DX conditions on 15 meters should hold up well during the entire daylight period. Check for openings towards South America as early as 8 AM, with the band peaking in this direction between noon and 4 PM. Good openings are expected towards Africa between 10 AM and 2 PM in EST and CST zones, and until noon in MST and PST zones. The band should open to Europe from EST and CST zones between 8 AM and noon, and until 10 AM in MST and PST zones. Check for openings towards the South Pacific between 2 and 6 PM in all zones, with the band remaining open for an hour or so longer in the PST zone. Fifteen meters may also open towards the Far East and Asia between 4 PM and sunset in the PST and MST zones. Twenty meters should open to almost all areas of the world just after sunrise, and remain open with strong signal levels to at least 10 AM. From 10 AM through the early afternoon, signals will probably weaken, with the band only open towards Europe, northern Africa, the Caribbean, Central America, the northern countries of South America, and short openings towards the South Pacific. After 2 PM signals should begin to peak again on 20 meters towards Africa, and remain strong to 3 PM in the MST and PST zones, and to as late as 5 PM in the CST and EST zones. In the EST and CST zones, check also for long-path openings to Australasia between 3 and 5 PM, and look for short-path openings to Australasia from the PST and MST zones between 4 PM and sunset. Expect strong signal openings to all of Latin America from about 4 PM onward.

Forty meters should begin to open towards Europe and to the Caribbean, Central America, and the northern countries of South America about an hour or so before sunset in all time zones, but signals will be weakish.

Sunset to Midnight: Twenty meters is expected to hang in for an hour or so after sunset to parts of Africa from the EST and CST zones. In the PST zone check for long-path openings to Europe and Africa on 20 meters beginning at about 10 PM. The band looks good to most of Latin America to about 8 PM, and to Antarctica and the deep areas of South America almost to midnight. Twenty meters should

CQ Short-Skip Propagation Chart
November & December 1997
Local Standard Time
At Path Mid-Point
(24-Hour Time)

Band (Meters)	Distance Between Stations (miles)			
	50-250	*250-750*	*750-1300*	*1300-2300*
10	*Nil*	*Nil*	11-16 (0-1)	11-16 (1-0)
15	*Nil*	10-16 (0-1)	09-10 (0-1) 10-12 (1) 12-16 (1-2) 16-17 (0-1)	09-10 (1) 10-12 (1-3) 12-14 (2-4) 14-15 (2-3) 15-16 (2) 16-17 (1) 17-18 (0-1)
20	*Nil*	09-11 (0-1) 11-16 (0-2) 16-19 (0-1)	08-09 (0-1) 09-11 (1-4) 11-16 (2-4) 16-17 (1-3) 17-18 (1-2) 18-19 (1) 19-21 (0-1)	07-08 (0-1) 08-09 (1-3) 09-11 (4) 11-15 (4-3) 15-16 (4) 16-17 (3) 17-18 (2-3) 18-19 (1-2) 19-20 (1)
40	07-09 (0-1) 09-10 (1-3) 10-15 (3-4) 15-16 (2-3) 16-18 (1-2) 18-20 (0-1)	07-09 (1-3) 09-10 (3) 10-15 (4-3) 15-16 (3-4) 16-18 (2-4) 18-20 (1-2) 20-00 (0-2) 00-07 (0-1)	07-09 (3) 09-14 (3-1) 14-15 (3-2) 15-16 (3) 16-18 (4) 18-20 (2-4) 20-22 (2-3) 22-00 (2) 00-04 (1-2) 04-07 (1-3)	07-08 (3-2) 08-09 (3-1) 09-14 (1-0) 14-15 (2-0) 15-16 (3-1) 16-17 (4-2) 17-18 (4-3) 18-20 (4) 20-22 (3-4) 22-00 (2-3) 00-02 (2) 02-04 (2-3) 04-06 (3)
80	08-16 (4) 16-18 (2-4) 18-20 (1-3) 20-06 (1-2) 06-08 (2-3)	08-09 (4-2) 09-16 (4-1) 16-18 (4-2) 18-20 (3-4) 20-06 (2-4) 06-07 (3-4) 07-08 (3)	08-09 (2-1) 09-16 (1-0) 16-18 (2-1) 18-20 (4-3) 20-06 (4) 06-07 (4-2) 07-08 (3-1)	08-09 (1-0) 09-16 (0) 16-18 (1-0) 18-20 (3-2) 20-04 (4-3) 04-06 (4-2) 06-07 (2-1) 07-08 (1)
160	07-09 (3-2) 09-11 (2-0) 11-17 (1-0) 17-19 (3-2) 19-07 (4)	07-09 (2-1) 09-17 (0) 17-19 (2-1) 19-04 (4) 04-06 (4-3) 06-07 (4-2)	06-07 (2-1) 07-09 (1-0) 17-19 (1-0) 19-20 (4-2) 20-21 (4-3) 21-04 (4) 04-06 (3-2)	06-07 (1-0) 07-19 (0) 19-20 (2-1) 20-21 (3-2) 21-04 (4-2) 04-06 (2-1)

HAWAII
Openings Given In
Hawaiian Standard Time#

	10 Meters	*15 Meters*	*20 Meters*	*40/80 Meters*
Eastern USA	09-12 (1)	07-09 (1) 09-10 (2) 10-12 (3) 12-13 (2) 13-14 (1)	06-07 (1) 07-09 (2) 09-12 (1) 12-13 (2) 13-15 (3) 15-16 (2) 16-17 (1)	16-18 (1) 18-21 (2) 21-02 (3) 02-03 (2) 03-04 (1) 18-20 (1)* 20-02 (2)* 02-03 (1)*
Central USA	09-10 (1) 10-12 (2) 12-13 (1)	07-08 (1) 08-09 (2) 09-11 (3) 11-13 (4) 13-14 (3) 14-15 (2) 15-16 (1)	06-07 (1) 07-08 (3) 08-12 (2) 12-13 (3) 13-15 (4) 15-16 (3) 16-17 (2) 17-18 (1)	16-18 (1) 18-20 (2) 20-02 (3) 02-04 (2) 04-05 (1) 18-20 (1)* 20-02 (2)* 02-04 (1)*
Western USA	09-11 (1) 11-13 (2) 13-15 (1)	07-09 (1) 09-10 (2) 10-13 (4) 13-14 (3) 14-15 (2) 15-17 (1)	06-07 (1) 07-08 (2) 08-10 (3) 10-15 (4) 15-16 (3) 16-18 (2) 18-20 (1)	15-17 (1) 17-18 (2) 18-20 (3) 20-02 (4) 02-05 (3) 05-06 (2) 06-07 (1) 17-18 (1)* 18-20 (2)* 20-04 (4)* 04-05 (2)* 05-06 (1)*

ALASKA
Openings Given In GMT

	10 Meters	*15 Meters*	*20 Meters*	*40/80 Meters*
Eastern USA	20-22 (1)	18-20 (1) 20-22 (2) 22-23 (1)	12-14 (1) 17-20 (1) 20-23 (2) 23-01 (1)	00-11 (1) 11-13 (2) 13-14 (1) 07-12 (1)*
Central USA	20-23 (1)	18-20 (1) 20-23 (2) 23-00 (1)	13-15 (1) 18-20 (1) 20-21 (2) 21-23 (3) 23-01 (2) 01-02 (1)	01-12 (1) 12-14 (2) 14-15 (1) 07-13 (1)*
Western USA	21-23 (1)	19-20 (1) 20-21 (2) 21-23 (3) 23-00 (2) 00-01 (1)	17-19 (1) 19-20 (2) 20-21 (3) 21-23 (4) 23-00 (3) 00-02 (2) 02-03 (1)	00-01 (1) 01-02 (2) 02-03 (3) 03-14 (2) 14-16 (3) 16-17 (1) 04-09 (1)* 09-12 (2)* 12-14 (1)*

**Indicates best times 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 Propagation Chart.

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:

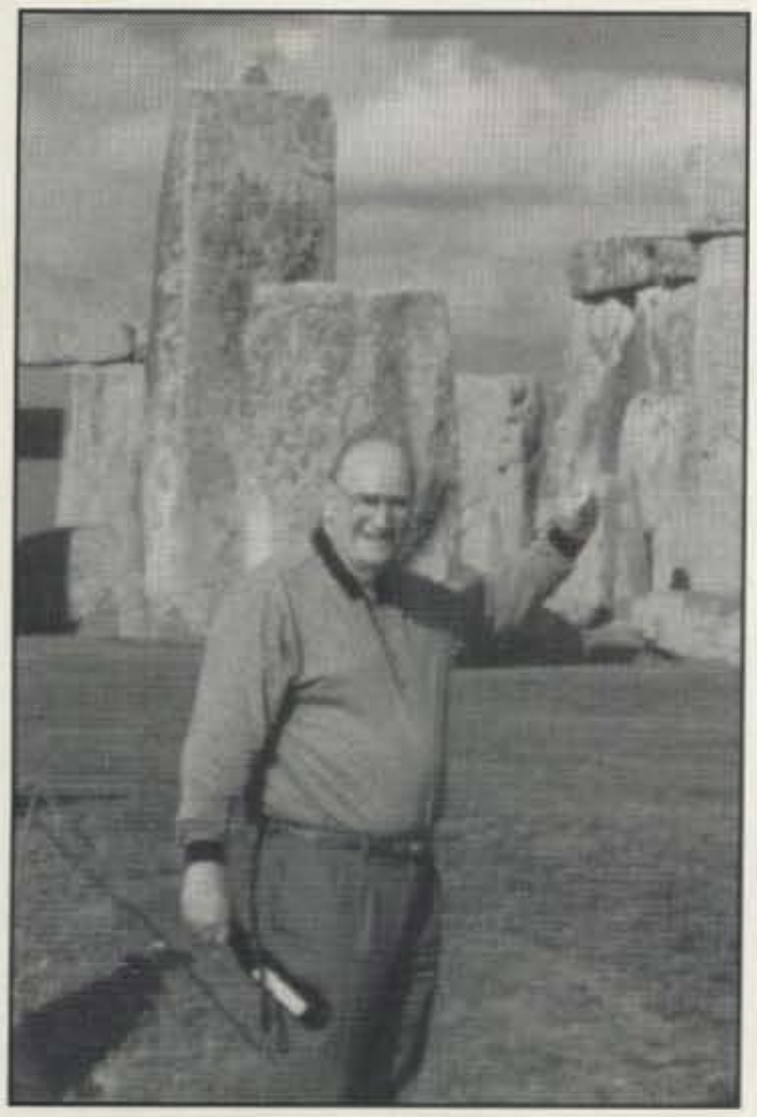
(4) Opening should occur on more than 22 days
(3) Opening should occur between 14 and 22 days
(2) Opening should occur between 7 and 13 days
(1) Opening should occur on less than 7 days

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.



Stonehenge, England was selected by W3ASK for his annual "salting of the ionosphere" in preparation for the 1997 CQ WW DX Contest. The circular arrangement of stones is believed to have been a type of solar and astronomical calendar, as well as a ritual monument for the Druids. (Photo by Bea)

remain open to the South Pacific to midnight, and to the Far East and Asia until 10 PM in all time zones, but openings favor MST and PST locations. Expect some fairly good openings on 40 meters to Europe and parts of Africa throughout this entire time period, and to most of Latin America as well. In the PST zone check 40 meters for openings towards the South Pacific beginning at about 10 PM. Eighty meters should open towards Europe, Africa, the Caribbean, Central America, and the northern countries of South America during most of this time period. Check for possible 160 meter openings toward the Caribbean area and Central America, and possibly into northern South America, between 10 PM and midnight in all time zones. Openings may also be possible on 160 from the EST zone to Europe between 10 PM and midnight.

Remember that the contest period starts at 7 PM EST, Friday night, November 28, so be sure to use the sunset to midnight forecast to get started.

Computer Programs

There are several good computer programs available for supplementing band-opening predictions contained in the CQ DX Propagation Charts appearing this month.

The following is a listing of the more popular programs that have been reviewed by my *CQ* colleague Karl Thurber, W8FX, in his column "The Digital Dipole." Each of them contains worldwide band opening data and most of them also contain grayline data, sunset/sunrise times, great-circle distance and bearings, and other useful information. All of the listed programs are well prepared, menu-driven, rela-

tively easy to use, and well documented. This listing does not necessarily indicate an endorsement by this editor or *CQ* magazine. Additional information can be obtained directly from the programs' producers at the addresses and phone numbers shown.

WinCap Wizard™—Newly released, this is a simple-to-use HF propagation prediction program from Kangaroo Tabor Software, makers of the professional-quality Computer Assisted Prediction Manager (CAPman). Wizard takes an innovative approach to propagation prediction and analysis, being designed to do away with buzzwords and technical jargon. The powerful yet friendly interface and smart reporting features, including an extensive geographical database and "smart maps," should be welcomed by newcomers and old timers alike. Reviewed in *CQ*, July 1997. LUCAS Radio/Kangaroo Tabor Software, Route 2, Box 106, Farwell, TX 79325-9430 (fax 806-225-4006).

Advanced Stand Alone Prediction System for Windows™—ASAPS for Windows is an upgraded version of the very popular DOS program developed by the Australian IPS Radio and Space Services. The program allows for professional prediction for any HF circuit in the world. It includes management databases for antenna types, circuits, frequency sets, station configurations, terminals, and propagation indices. Reviewed in *CQ*, April 1997. Jacques d'Avignon, VE3VIA, 965 Lincoln Drive, Kingston, ON Canada K7M 4Z3 (613-634-1519).

MINIPROP Plus™—For many years this has been a very popular HF propagation program for IBM compatibles (DOS). Predicts received signal levels and all other propagation parameters for any location. Maps display great-circle path and grayline in full color. Also contains comprehensive world atlas with coordinates, and lists beam headings from given QTH. Reviewed in *CQ*, September 1996. For further details contact Sheldon C. Shallon, W6EL, 11058 Queensland Street, Los Angeles, CA 90034-3029.

PROPMAN™—This program was released by Rockwell/Collins as the *Collins HF Propagation Software.* It claims to be an easy-to-use frequency propagation and management tool, supported by the Collins heritage of quality HF development. It utilizes the IONCAP propagation program, and offers customization of station parameters, displays current best frequency and propagating frequency, as well as 24 hour plots. Data can be updated with SESC or WWV geomagnetic and solar data. Reviewed in *CQ*, December 1995. Additional information can be obtained from Rockwell, 350 Collins Rd. NE, Cedar Rapids, IA 52498-0120 (800-321-2223).

HFx™—Developed by Pacific-Sierra Research as an interactive Windows program for meeting HF propagation requirements, the program is said to be based on 25 years of the best available ionospheric propagation and ionospheric moise data for determining global band openings and signal strength. The program also contains antenna patterns, a callsign atlas, and other data. Displays can be presented in vivid color. Reviewed in *CQ*, May 1996. Complete information and pricing can be obtainec from Pacific-Sierra Research Corp., 2901 28th St., Santa Monica, CA 90405 (800-820-4PSR).

SKYCOM™—This is skywave propagation prediction software for Windows 3.1/Windows 95. Tell SKYCOM your location, transmitter power, and antenna gain, and enter either the latest sunspot number or solar flux index and the program should instantly give prediction reports and the best time for band openings. You can also obtain a detailed report that lists MUFs, critical frequencies, signal-to-noise ratio, and other transmission parameters. The program also contains great-circle bearing data and an atlas database. Reviewed in *CQ*, June 1996. Additional information can be obtained from EDCO, 325 Mill St. NE, Vienna, VA 22180 (703-938-8105).

Super DX Edge™—Recently upgraded, it can now be used for automatic MUF displays, real-time grayline and sunrise and sunset data, and automatic antenna directions. A computerized version in color is available for IBM DOS compatibles. If computers intimidate you, the old, reliable plastic slide-rule version is still available. Reviewed in *CQ*, August 1995. For a free flyer, contact Xantek, P.O. Box 834, Madison Square Station, New York, NY 10159 (212-566-8240).

Salting The Ionosphere—1997

Over the past ten years or so I have made it a point to pay homage somewhere in the world

for good propagation conditions during the CQ World-Wide DX Contest. I usually select a place that has some mystique about it and is connected, although possibly only remotely, with science or communications. I symbolically "salt the ionosphere" at such locations as a tribute to those forces which determine HF propagation conditions. I know that this is very unscientific, but it does seem to work!

Take last year, for example. I "salted the ionosphere" at the Alexander Graham Bell memorial museum in Baddeck, Nova Scotia. Despite the fact that we were then at the very bottom of the sunspot cycle, much improved HF conditions were reported during the SSB Contest weekend, and solar activity during the CW weekend was higher than at any other time during 1996!

After consulting with many experts—mythical, mystical, and otherwise—I selected Stonehenge in England as my 1997 choice for "salting the ionosphere." This field of large stones is located on the Salisbury Plain, north of Salisbury, England. The stones are set in concentric ranges and in such a manner that astronomers now believe that they were used to track the sun and other celestial positions and to observe and predict the summer and winter solstices, the vernal and autumnal equinoxes, and eclipses of both the sun and the moon. Stonehenge is also belived to have been used as a ritual monument for the Druids, prehistoric inhabitants of that section of England. This combination of science and ritual fulfilled my requirements for a "salting the ionosphere" location, and I conducted my 1997 annual ritual there (see photo). We shall see what results this will bring to the 1997 CQ World-Wide DX Contest periods!

Short-Skip Charts

This month's column contains Short-Skip propagation data for use between distances of approximately 50 and 2300 miles, and between the states of Alaska and Hawaii and the continental area of the USA. Instructions for using this information are given in this column.

VHF Ionospheric Openings

Two short but significant meteor showers are expected during November, which should make possible some meteor-scatter-type openings on the VHF bands. The *Taurids* shower, occurring during the first week of November, should peak between the 2nd and 4th, with a count of about 15 meteors an hour. A second shower of about the same intensity, called the *Leonids*, should begin on November 14th and peak on the 15th.

Some auroral VHF ionospheric openings should be possible during November, especially when HF conditions are Below Normal or Disturbed as a result of a radio storm. Check the Last-Minute Forecast at the beginning of this column for the days during November that are most likely to be in these categories.

The new solar cycle is on the rise, and this could be a really good contest period. Good luck in the 1997 CQ WW DX CW Contest weekend! Be sure to let me know how these special contest propagation forecasts work out. For the past 46 years the contest forecasts have held up with an accurace better than 90%.

73, George, W3ASK

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(continued on page 115)

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(from page 6)

Ector County Coliseum, Exhibit Building C, Odessa, Texas. For further information, contact Robert Jordan, N5RKN; phone 915-335-7980; e-mail <n5rkn@apex2000.net>; or check out the West Texas ARC Webpage at: <http://www.apex2000.net/personal/wd5cwj/main2.htm>. (Exams.)

Nov. 2, **Mt. Beacon ARC Hamfest**, John Jay High School, Fishkill, New York. For more information, telephone 914-485-9617; fax 914-485-2402; ; e-mail <KL7JCQ@iname.com>, or the web: <http://www.mhv.net/~fritzing>. (Exams.)

Nov. 2, **Fox Cities ARC Annual Hamfest**, Starlite Club, Kaukauna, Wisconsin. For more information, contact Chad Pennings, N9PRC, 414-993-0485. (Exams.)

Nov. 8, **20th Annual Montgomery Hamfest & Computer Show**, Garrett Coliseum, South Alabama State Fairgrounds, Montgomery, Alabama. For more info, write to Hamfest Committee, c/o 2141 Edinburgh Drive, Montgomery, AL 36116-1313; or phone Phil at 334-272-7980 (after 5PM); fax 334-365-0558; or e-mail <WB4OZN@worldnet.att.net>. (Exams.)

Nov. 14, **Fair Lawn ARC Annual Ham Radio, Computer & Electronics Auction**, Fair Lawn Cultural Center, Fair Lawn, New Jersey. Sellers arrive at 6 PM; auction begins at 8 PM. For more information call 201-791-3841; e-mail <jas130@juno.com>.

Nov. 15–16, **Fort Wayne Hamfest & Computer Expo.**, Allen County War Memorial Coliseum and Expo Center, Fort Wayne, Indiana. For more information, contact Doug Jones at 219-484-1314. (Exams.)

Nov. 21–22, **West Jackson County Annual Hamfest & Swapfest**, Latimer Community Center, Ocean Springs, Mississippi. For more information, contact Harry McLemore, KD4AK, 601-872-0732; or Stan Hecker, N5SP, 601-875-0222.

Nov. 29, **Central Illinois/St. Louis Area Amateur Television Club 11th Annual Banquet**, Ariston Restaurant, Litchfield, Illinois. For more information, contact Scott Millick, K9SM, 907 Big Four Avenue, Hillsboro, IL 62049 (217-532-3837; e-mail <smillick@cillnet.com>.

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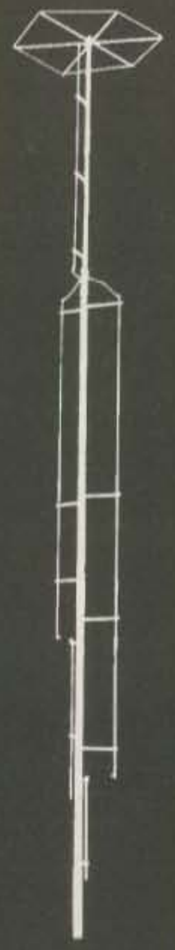
Eagle DX

Challenger DX



Voyager DX

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

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

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

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

The secret is out and people in the know say:

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

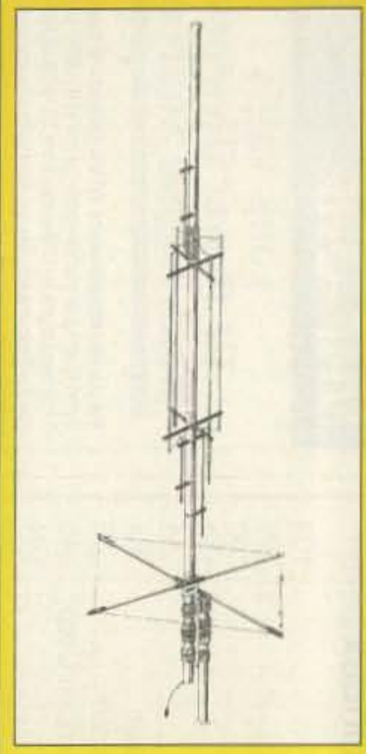
73–"This is a real DX antenna, much quieter than other verticals."

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

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

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

Latest Release: **TITAN DX**



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

MODEL	BANDS OF OPERATION											HT	WT	MOUNT	COUNTER-POISE	COST
	2m	6m	10m	12m	15m	17m	20m	30m	40m	80m	160m					
Challenger DX	■	■	■	■	■		■		■	■		31.5'	21 lbs	Drop In Ground Mount	3 Wires @ 25'	$259
Eagle DX			■	■	■	■	■		■			21.5'	19 lbs	1-1/4" pipe	80" Rigid	$269
Titan DX			■	■	■	■	■	■	■	■		25'	25 lbs	1-1/4" pipe	80" Rigid	$299
Voyager DX							■		■	■	■	45'	39 lbs	Hinged Base	3 Wires @ 57'	$399

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FT-1000/D
Elite-Class All-Mode HF Transceiver

• 200W PO • Dual Receive • 108 dB dynamic range • Cascaded IF Filters • Direct Digital Synthesis (DDS) • IF Width/Shift/Notch • CW Spot • CW Audio Peaking Filter • CW Electronic Keyer with two Key jacks • IF Noise Blanker • Automatic Antenna Tuner • RF Speech Processor • Front panel RX Antenna selector switch • Two large fly-wheel-weighted tuning knobs • 99 Memories.

FT-920
All-Mode HF/6m Transceiver

• High-Performance 33MIPS* DSP • HF + 50 MHz w/100 Watts-all Bands • MOSFET PA Finals • High Speed Auto Antenna Tuner (works on RX & TX) • Omni-Glow™ Dual Display • Twin VFO Knobs • FET RF Amplifier for High & Low Bands • Digital Voice Memory System • Quick Memory Bank (QMB)Frequency System • 127 Memories. *Million Instructions Per Second

FT-900C/AT
Deluxe Compact HF Transceiver

• Detachable Front Panel Design • 100W PO • Built-in Collins® SSB Mechanical Filter • Automatic Antenna Tuner • IF Shift/Notch • Keypad Frequency Entry • Duct Flow Cooling System • Digital Metering • Adjustable CTCSS Tones • 100 Memories.

FT-840
High Performance Compact HF Transceiver

• High Receiver Dynamic Range • Dual Band Stacking VFOs with Direct Digital Synthesis (DDS) • 100W PO • IF Shift • IF Noise Blanker • Digital Mode Interface • CW-Reverse feature • Adjustable Repeater CTCSS Tones • Optional (External) Automatic Antenna Tuner • 100 Memories.

FT-600
Multi-Purpose HF SSB Transceiver

Frequency Range: RX: 50 kHz - 30 MHz; TX: 160-10M • 100W PO • MIL-STD 810 Rating • Alphanumeric Omni-Glow™ LCD Display • Keypad Frequency Entry • Optional CW (500 Hz) and AM (6 kHz) filters available • Dual Watch • Front-mounted Speaker with High Audio Output • PC Programmable • 100 Memories (in 4 banks of 25).

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"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."

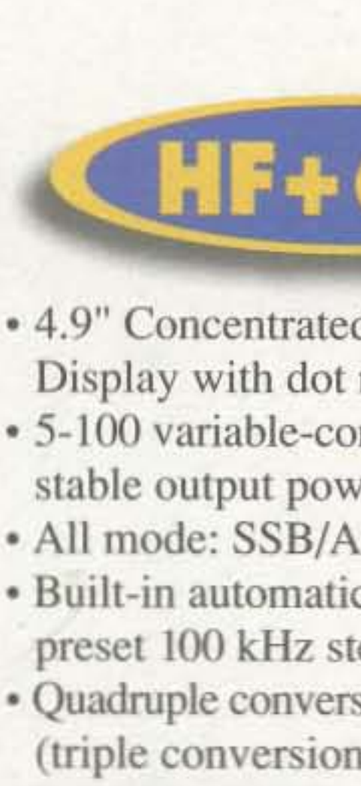
– *QST*, May 1997

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)
- Phase Shift Network (PSN) modulation/demodulation

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

BUILT-IN CI-V INTERFACE
Options required for PC programming:
CT-17 CI-V Level Converter,
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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