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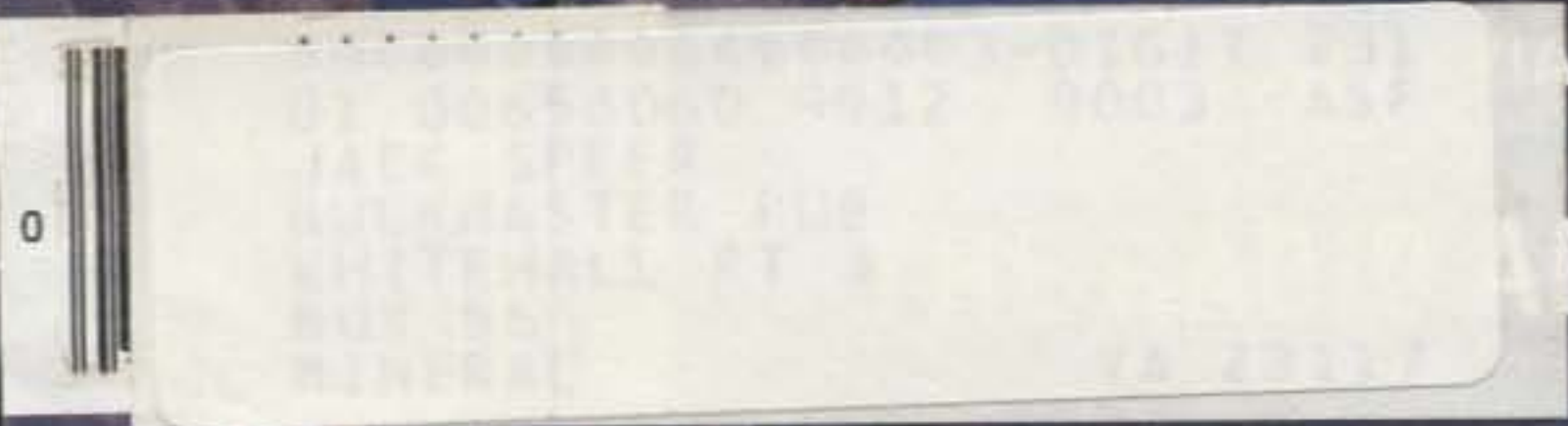
CQ

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AMATEUR'S JOURNAL



KENWOOD

The HT with More!

- **Nine types of scanning!** Including new "seek scan" and priority alert. Also memory channel lock-out.

- **Intelligent 2-way battery saver circuit extends battery life.**

- **10 memory channels.**

- **Priority alert function.**

- **Easy memory recall.** Simply press the channel number!

- **12 VDC input terminal for direct mobile or base station supply operation.** When 12 volts applied, RF output is 5W! (Cable supplied!)

- **New Twist-Lok Positive-Connect locking battery case.**

- **Monitor switch to defeat squelch.** Used to check the frequency when CTCSS encode/decode is used.

- **Large, easy-to-read multi-function LCD display with night light.**

- **Audible beeper to confirm keypad operation.** DTMF monitor also included.

- **Supplied accessories:**

Belt hook, rubber flex antenna, PB-2 standard NiCd battery pack (for 2.5 W operation), wall charger, DC cable, dust caps.

TH-225A TH-315A/TH-415A

The all new TH-225A brings you all the convenience of a mobile rig, with the portability of an HT. The TH-225A has all of the features as the TH-315A and TH-415A, along with these BONUS features!

- **Five watt output battery pack supplied**
- **Odd split on all ten memory channels**
- **Six watts with 13.8 VDC input**
- **Wide band frequency coverage:** RX from 141-163 MHz, includes weather channels! TX on Amateur band only. (Modifiable for MARS/CAP, permits required.)

TH-315A and TH-415A Features:

- **Wide receiver frequency range.** Receivers from 141-163 MHz. Includes the weather channels! Transmit from 144-148 MHz. Modifiable to cover 141-151 MHz (MARS or CAP permit required).
- **TH-315A covers 220-225 MHz, TH-415A covers 440-449.995 MHz.**
- **5, 2.5, or 1.5 W output, depending on the power source.** Supplied battery pack (PB-2) provides 2.5 W output. Optional NiCd packs for extended operation or higher RF output available.
- **CTCSS encoder built-in, TSU-4 CTCSS decoder optional.**



Optional Accessories:

- **PB-1:** 12 V, 800 mAh NiCd pack for 5 W
- **PB-2:** 8.4 V, 500 mAh NiCd pack (2.5 W)
- **PB-3:** 7.2 V, 800 mAh NiCd pack (1.5 W)
- **PB-4:** 7.2 V, 1600 mAh NiCd pack (1.5 W)
- **BT-5:** AA cell manganese/alkaline battery case
- **PB-12:** 12 V, 500 mAh NiCd pack
- **BC-7:** rapid charger for PB-1, 2, 3, or 4
- **BC-8:** compact battery charger
- **SMC-30:** speaker microphone
- **SC-12, 13, 27:** soft cases
- **RA-3, 5:** telescoping antennas
- **RA-8B:** StubbyDuk antenna
- **TSU-4:** CTCSS decode unit
- **VB-2530:** 2m, 25 W amplifier (1-4 W input)
- **LH-4, 5:** leather cases
- **BH-5:** swivel mount
- **MB-4:** mobile bracket
- **PG-2V:** extra DC cable
- **PG-3D:** cigarette lighter cord with filter

Complete service manuals are available for all Kenwood transceivers and most accessories. Specifications, features, and prices are subject to change without notice or obligation.

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TM-731A/631A 144/450 and 144/220 MHz FM Dual Banders

- **Extended receiver range** (136.000 – 173.995 MHz) on 2 m; 70 cm coverage is 438.000 – 449.995 MHz; 1-1/4 m coverage is 215 – 229.995 MHz. (Specifications guaranteed on Amateur bands only. Two meter transmit range is 144 – 148 MHz. Modifiable for MARS/CAP. Permits required.)
- **Separate frequency display** for "main" and "sub-band."
- **Versatile scanning functions.** Dual scan, and carrier and time operated scan stop.
- **30 memory channels.** Stores everything you need to make operating easier. Two channels for "odd splits."
- **50 Watts on 2 m, 35 watts on 70 cm, 25 watts on 1-1/4 m.** Approx. 5 watts low power.
- **Automatic offset selection.**
- **Dual antenna ports.**
- **Automatic Band Change (A.B.C.)** Automatically changes between main and sub-band when a signal is present.
- **Dual watch function** allows VHF and UHF receive simultaneously.
- **CTCSS encode/decode** selectable from front panel or UP/DWN keys on microphone. (Encode built-in, optional TSU-6 needed for decode.)
- **Balance control and separate squelch controls** for each band.

- **Full duplex operation.**
- **Dimmer switch.**
- **16 key DTMF/control mic.** included.
- **Frequency (dial) lock.**

Optional Accessories:

- **PG-4H** Extra interface cable for IF-20 (for three to four radios)
- **PG-4J** Extension cable kit for IF-20 DC and audio
- **PS-430** Power supply
- **TSU-6** CTCSS decode unit
- **SWT-1** 2 m antenna tuner
- **SWT-2** 70 cm antenna tuner
- **SP-41** Compact mobile speaker
- **SP-50B** Deluxe mobile speaker
- **PG-2N** DC cable
- **PG-3B** DC line noise filter
- **MC-60A, MC-80, MC-85** Base station mics
- **MA-700** Dual band 2 m/70 cm mobile antenna (mount not supplied)
- **MB-11** Mobile bracket
- **MC-43S** UP/DWN hand mic.
- **MC-48B** 16-key DTMF hand mic.

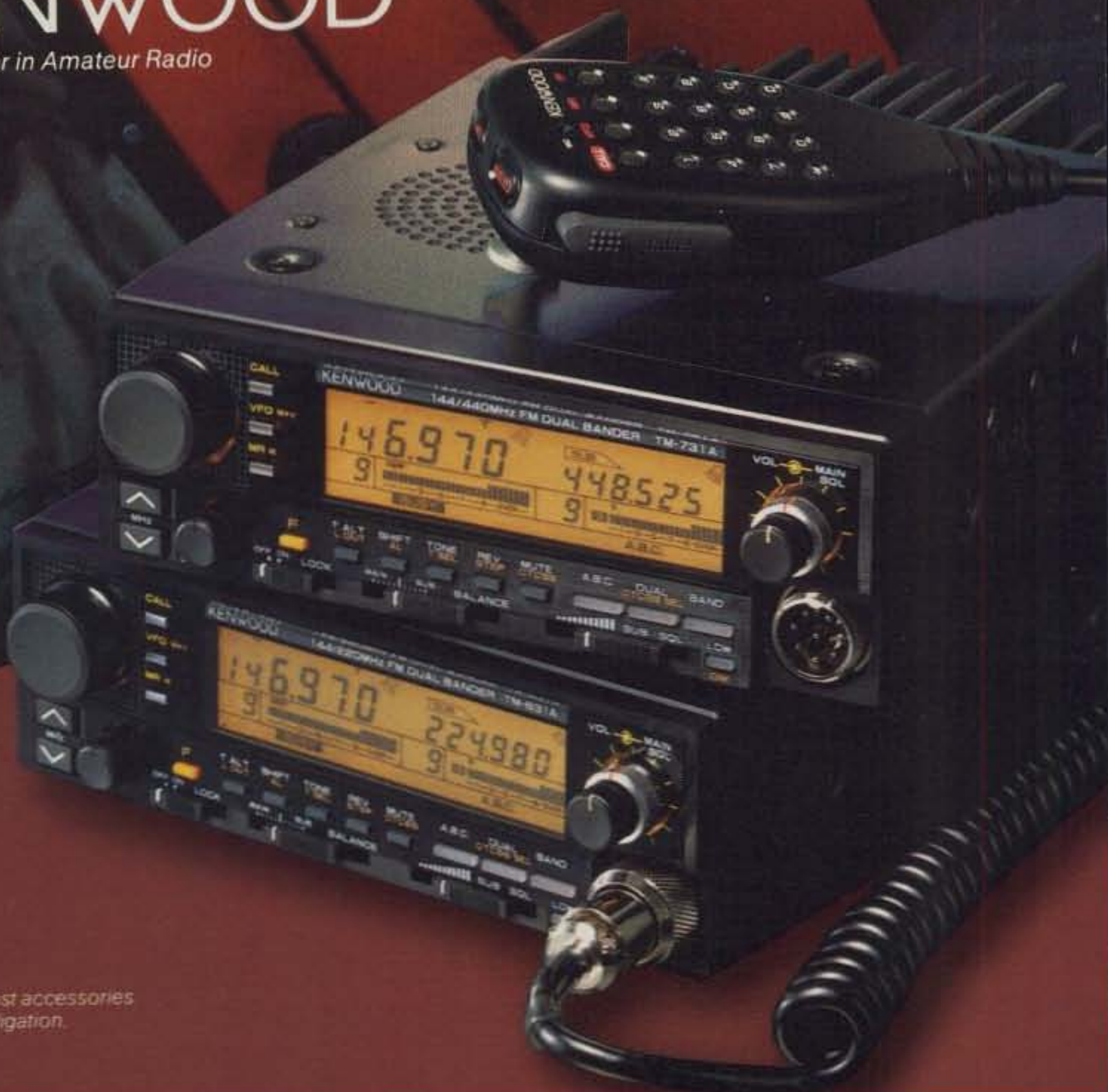
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"Dynamic Duals"

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The DXpeditioner!

TS-440S

Compact high performance HF transceiver with general coverage receiver

Portable reliable performance and ease of use makes the TS-440S your obvious "low bands" choice. It is "Every Ham's" rig to go – ham shack, portable or mobile. But don't let the small size fool you – there's lots of "big rig" performance packed into this package. Built-in antenna tuner option. Continuous duty transmitter. Super DynaMix™ front end. Five filter functions. The TS-440S is at your service wherever you wish to operate.

- **Covers all Amateur bands**
General coverage receiver tunes from 100 kHz–30 MHz. Easily modified for HF MARS operation.
- **Direct keyboard entry of frequency**
- **All modes built-in**
USB, LSB, CW, AM, FM, and AFSK. Mode selection is verified in Morse Code.
- **VS-1 voice synthesizer (optional)**
- **Built-in automatic antenna tuner (optional).** Covers 80–10 meters.
- **5 IF filter functions**
- **Superior receiver dynamic range**
Kenwood DynaMix™ high sensitivity direct mixing system ensures true 102 dB receiver dynamic range. (500 Hz bandwidth on 20 m.)
- **100% duty cycle transmitter**
Super efficient cooling permits continuous key-down for periods exceeding one hour. RF input power is rated at 200 W PEP on SSB. 200 W DC on CW, AFSK, FM, and 110 W DC AM. (The PS-50 power supply is needed for continuous duty.)
- **Computer interface port**
- **Adjustable dial torque**
- **100 memory channels**
Frequency and mode may be stored in 10 groups of 10 channels each. Split frequencies may be stored in 10 channels for repeater operation.
- **TU-8 CTCSS unit (optional)**



- **MC-43S UP/DOWN mic. included**
- **Superb interference reduction**
IF shift, tuneable notch filter, noise blanker, all-mode squelch, RF attenuator, RIT/XIT, and opt. filters fight QRM.
- **Dual SSB IF filtering**
A built-in SSB filter is standard. When an optional SSB filter (YK-88S or YK-88SN) is installed, dual filtering is provided.
- **VOX, full or semi break-in CW**
- **AMTOR compatible**



Optional accessories:

- **AT-440** internal auto. antenna tuner (80 m – 10 m)
- **AT-250** external auto. tuner (160 m – 10 m)
- **AT-130** compact mobile antenna tuner (160 m – 10 m)
- **IF-232C/IC-10** level translator and modem IC kit
- **PS-50** heavy duty power supply
- **PS-430** DC power supply
- **SP-430** external speaker
- **MB-430** mobile mounting bracket
- **YK-88C/88CN** 500 Hz/270 Hz CW filters
- **YK-88S-88SN** 2.4 kHz/1.8 kHz SSB filters
- **MC-60A/80/85** desk microphones
- **MC-55** (8P) mobile microphone
- **HS-4/5/6/7** headphones
- **SP-41/50B** mobile speakers
- **MA-5/VP-1** HF 5 band mobile helical antenna and bumper mount
- **TL-922A** 2 kw PEP linear amplifier
- **SM-220** station monitor (no pan display)
- **VS-1** voice synthesizer
- **TU-8** CTCSS tone unit
- **PG-2C** extra DC cable.

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ON THE COVER: Steve Fingerhut, WB9WIA operates 10 meter mobile from his pickup truck at a roadside QTH in Texas. (Photo by Larry Mulvehill, WB2ZPI)

MARCH 1990

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"What's His Hat Size?"

If the gross national product recently fell in most countries, it could only be attributed to the Bouvet operation. It would seem that most amateurs took the time off from work (real work as opposed to amateur radio work) and spent the time collectively adding to our appreciation of each other. I'm sure many amateurs taped various aspects of this event and that these tapes will be played in the years to come not only to amuse, but to inform and educate the new amateur on how it should be done.

A side benefit to the Bouvet operation would be the chance to do a mass screening of amateurs with regard to their health. As it turned out, most amateurs were suffering from an otological disorder. Though not painful, it does cause the victim to repeat questions without hearing the answers. Since very little, if anything, is heard, more questions are asked, which then prompts more questions from other people. The technical term is *mass-auto-otosis*. Fortunately, there is a cure, which presumably took effect after the 3Y5X party sailed for home. It's called listening, and if you listen a lot and speak only when absolutely necessary, the disease will abate.

However, while in the throes of this disease, certain primal urges are enhanced to the point where our natural safeguards are of no use, frustration levels are at an all-time high, and the symptoms of the dreaded General Haig syndrome appear. People take to the airwaves in droves compelled to "take charge" of the situation and issue orders and directives. The Bouvet "Police Action" especially on 28.395 is clearly textbook in character. Moving up to DEFCON 2, certain of our brethren had envisioned multiple-head, RF-seeking missiles poised and ready to launch.

Others in the first wave to make the assault on 3Y made a flanking maneuver and approached the target from the foreign phone bands feigning a slight accent. Still others in amateur radio's rapid deployment forces changed their portable designator every few minutes in order to confuse the objective. The fleet of foot and deftly able moved in and out of the mine field almost at will, creating a veritable ballet of swiftness, agility, and grace as they twirled through 87 "insurance" contacts on all bands, modes, and mobile, too.

What is the lesson to be learned from this operation, or more appropriately, what are the lessons involved? The first lesson is to always wear earphones so that your children or any visitors to the shack will not be subjected to strong language. In addition, the replicated sounds of various bodily functions are only amusing to a select few. Visitors or your children can, of course, still hear what *you* say. They also are the only ones who can accurately tell you the call, split, and QSL route of the station in question, for they are the only ones listening and not talking.

An interesting lesson can be learned by checking some of the calls heard. We can immediately show our visitors, children, or just prospective amateurs what it means to make the ultimate upgrade and that higher classes of license come with penultimate powers, not only RF. You can take charge of frequencies, demand information at the drop of a call, or even call on the listening frequency. With these seigneurial benefits comes the ability to castigate others, grumble about CB bands, and predict what this would be like with millions of "no-coders" added in. From these exalted ranks, you don't have to explain or admit to the fact that everyone involved in this mess passed a technical and Morse code test.

On the other hand, phone does have its advantages over CW in letting out those aggressive feelings, another important lesson. You can throw out a signal using every known expletive, sound, and combination thereof, which in turn will bring responses from another corner of the world. What can you do on CW except send a series of dots and dashes? It's not quite the same thing, is it?

It's hard to believe that we're all having fun in this chase scene, but we are or else why would we do it? It's hard sometimes to remember what it's all about and why we speak so fondly about amateur radio, especially when we try to introduce someone to the hobby. If they could experience a real cut-throat operation like Bouvet or listen to what passes for fun, might they think we are a bit strange? How can you put into words that two numbers and three letters can make the whole thing worthwhile, 59 QSL? This worthwhile feeling of accomplishment, however, came after days and hours of yelling and screaming.

In a time when the United States and the Soviets are exploring peace, international borders are coming down, and a feeling of tranquility is spreading over the globe, amateurs turn chauvenistic over a scrimpet of rock. We've done some silly things, some abusive things, and even some illegal things just to hear those two numbers and three letters emanate from a place that most of us can't pinpoint on the map. Can you imagine the bedlam if someone stopped the avalanche (it was too wide to be called a pileup) to ask some questions about Bouvet? Booom! You could hear the sound of that RF-seeking missile leave the launch pad. Who cares what it looks like? Who cares what kind of equipment the group brought down? What really matters is the contact and the two numbers and three letters. After all, you can read all about mundane stuff in one of the magazines later on during the year.

Have we learned anything about tolerance, forbearance, and cooperation, let alone good operating? Have we learned where the phone band begins or how to listen for instructions? Have we learned that the old adage of self-po-

licing really means being armed with a semi-automatic mouth and foot switch? Is this how and what we teach new amateurs about the wonderful world of DXing?

I'm also glad to say that many amateurs didn't get caught up in the melee and simply waited it out, worked Bouvet, and moved on. There were even some who had the audacity to ignore the whole thing as if who cares? Some amateurs, if you can believe, really don't care about a country total or doing combat to prove they can "work" a desolate rock. Imagine that.

Let us not forget to mention those who took air time to warn us with great foreboding about FCC intervention or those who were taping "evidence" to present (as I heard) to the DX Editor of *QST*. I guess the latter was to strike fear in the hearts of the listeners who weren't listening to that either. I did try to imagine how awesome it must have sounded at the other end, though.

At Dayton and Visalia we may be treated to a presentation on Bouvet that may make it seem better than it was. Such is life. It's not one of our proudest moments nor a prime example of how it should have been done. Perhaps it was too much hype and we all expected something else. The mail has started to arrive here as of this writing. The trouble is that there is no single focus for the blame, if you can call it that, and so it remains a paramount study in everyone's frustration. Maybe our egos are stretched a bit thin, and having to work Bouvet at any cost is what we need to feel better about ourselves or to get on some hallowed list. Or maybe it takes a tremendous amount of PR and an assault on an obscure rock to make a group feel worthwhile.

At least some of us (including me) progressed beyond theory and basic training to get some practice in VFO switch manipulation. This eye-hand coordination is very important and avoids lengthy discourses from people who have never done this capital crime. What will be interesting to see are the final stats and breakdowns of the contacts. It may be some time before Bouvet is occupied again, so several generations of amateurs will have to wait it out. For now we may just have to be satisfied with planning something really horrendous for the day when the ZAs come on.

Travels With CQ

As this is being written, we are preparing for our first trip in the 1990 hamfest season. The Miami Hamfest is the season's opener, and after a cold winter in New York, it's beginning to look really good. I've been clearing out and throwing out stuff from my basement recently to make room for the 1990 "good stuff" I expect to be bringing home from hamfests during

AEA's TUNING PERFECTION 300W AND 3kW TUNERS

For tuning perfection, choose AEA's AT-300 300 watt or AT-3000 3 kW antenna tuners. Quality and exceptional engineering are built-in for maximum performance.

Easy Operation. The built-in front panel antenna switch allows you to easily select two unbalanced (coax-fed) antennas, a dummy load or a balanced antenna. Both the AT-300 and AT-3000 are easy to use.

Peak Reading Meter. The AT-3000 features a peak and average reading cross-needle meter which shows forward power, reflected power and SWR. High and low power is selected from the front panel to select the proper range for the SWR meter. Minimal SWR is achieved by inductors with 18 (AT-300) and 20 (AT-3000) taps created by AEA's exclusive patent pending CAM switch design for accurate tuning. AEA's tuners also tune a wider range of antenna impedances. There are limitless possibilities to create the best match.

Larger Size. Why are the AT-300 and AT-3000 so large? Because it improves the inductors' Q (quality) factor for high efficiency. High Q means low insertion loss which guarantees that maximum power is delivered to the antenna. Tests with some roller coil antenna tuners show insertion loss as high as 20dB on some amateur frequencies. Don't be fooled into believing that a low SWR is the key reason for using an antenna tuner! The primary reason is for maximum power transfer from the transmitter to the antenna. An SWR of 1.5 to 1 or better is usually all that is necessary to

"make the transmitter happy." Remember that you can get 1 to 1 SWR with just a dummy load. AEA's two coil design also provides harmonic reduction, maximum power transfer and a wider range of impedance matches.

300 or 3,000 Watts.

The AT-300 watt continuous duty cycle tuner has been tested at 1 kW with a 50 ohm load, so you can rest assured that there's no problem operating the AT-300 at 300 watts. And the AT-3000 is rated at 3 kW. AEA stands behind its specifications.

See the AT-300 and AT-3000 antenna tuners at your local AEA dealer. Get the most from your transceiver and antenna, and tune into top performance and reliability.

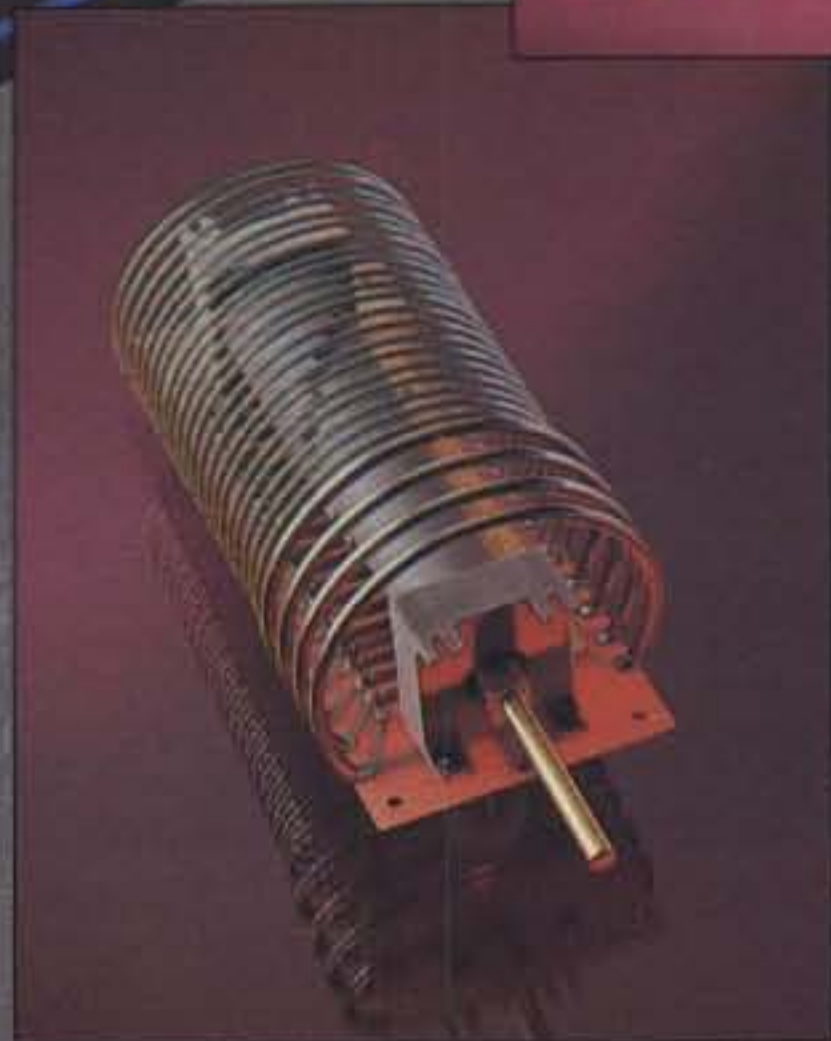
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AT-3000 Antenna Tuner



Cam Switch. Patent Pending.

the year. We will be at the Cincinnati Hamfest at the end of February, and you can look for us at both the Charlotte and Orlando Hamfests in March.

As you can tell from reading our Announcements section, there are a lot of activities going on all around the country—many more than we can attend. However, this doesn't mean that you can't attend a few. It's always interesting and fun to put a face behind the call letters of old friends, look at some new equipment, shop in the flea market, and sample the local haute cuisine (grease dogs and chips).

It's Hard To Believe

It's hard to believe that with this issue George Jacobs, W3ASK, begins his 40th year as Propagation Editor. Starting in March 1951 when most of us median-age amateurs were finishing grade school or starting high school, George was telling the amateur world what to expect. Spanning five sunspot cycles, George has kept us abreast of what band conditions will be like, and his batting average is mighty high. We all congratulate you, George, on a job well done.

Transitions

For the past eleven years Leo Haijsman, W4KA, has gone beyond the call of duty and done an outstanding job heading up our WAZ Program. You couldn't ask for a better administrator, one with patience, dedication, and a personal love for the award and program. Well, Leo has decided to step down and take a very well-deserved rest. Starting at the beginning of

1990, the new WAZ Award Director is Jim Dionne, K1MEM. Jim is no stranger to most of you who chase zones and DX or who participate in any other competitive part of our hobby.

Leo has turned over his records to Jim and helped him get off on the right foot. You can now send your applications to or conduct any other WAZ business with Jim. His QTH is 31 De Marco Road, Sudbury, Massachusetts 01776.

Thank you very much, Leo, for all of your work, help, and advice. Welcome aboard Jim, the newest member of the CQ Team.

The End of An Era

Frank Anzalone, W1WY, former Editor of the Contest Calendar column, passed away on December 30, 1989 at the age of 87. To me Frank has always been associated with two other CQ staffers, Ed Hopper, W2GT, and Bernie Welch, W8IMZ. Now they are all gone, but certainly not forgotten. Almost 30 years ago when I joined CQ Frank was the bulwark of our contests, of the Contest Calendar column, and of almost everything competitive associated with CQ. It almost seemed as if on the day CQ was started in 1945, when they turned on the lights in the office that first day, they found Frank hard at work on his column and organizing some sort of contest.

In many ways Frank was very private about his personal life and his early amateur radio career. It really wasn't deliberate. It was that Frank simply lived in today, each day. I met his son Joe, and I knew vaguely about his wireless operator days aboard produce ships in the Caribbean. When I met Frank he was working as an engineer for radio station WHN. It was

Frank who tapped co-worker Ed Hopper, W2GT, to take over our USA-CA column and head up our USA-CA Award Program. When Frank wanted to keep in touch with his son Joe when Joe was in the service, he enlisted a young serviceman at the base who was a ham to keep skeds with him. That was Bernie Welch's introduction to Frank and eventually to CQ.

I remember being with Frank at Dayton where he'd be mobbed by amateurs from around the world and by world-class contesters just wanting to be around him. I remember the years I played practical jokes on him every April by changing his picture on the column head or something equally as silly. I remember the favors he did not only for CQ, but for anyone in need. I remember how obstinate he could be when he believed he was right.

When Frank decided to pass along the banner of Contest Calendar Editor you can bet it was no small decision. To this day I'm not sure if John knows that Frank scrutinized him closer than a Congressional Committee. Frank was not about to let go of his baby lightly without being assured that the next editor could not only do the job, but carry on his traditions and improve the column wherever possible. Yes, John, Frank was pleased and assured that the column was in good hands.

Those of us who had the very good fortune to know him and to work with him will miss him. He was truly a good man in every sense of the word. He was also a truly religious man who lived his faith every day. I'm sure that right now he's organizing some sort of activity up there and trying to get a column going on what's happening.

73, Alan, K2EEK

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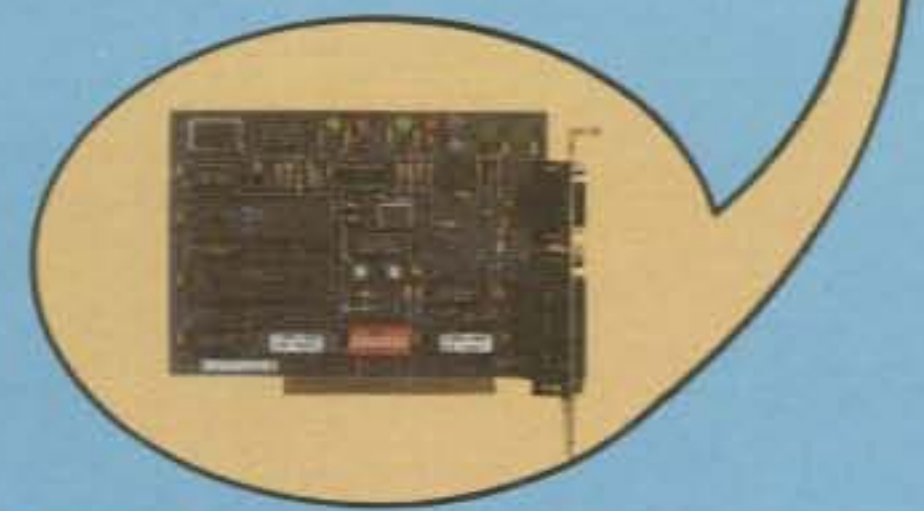
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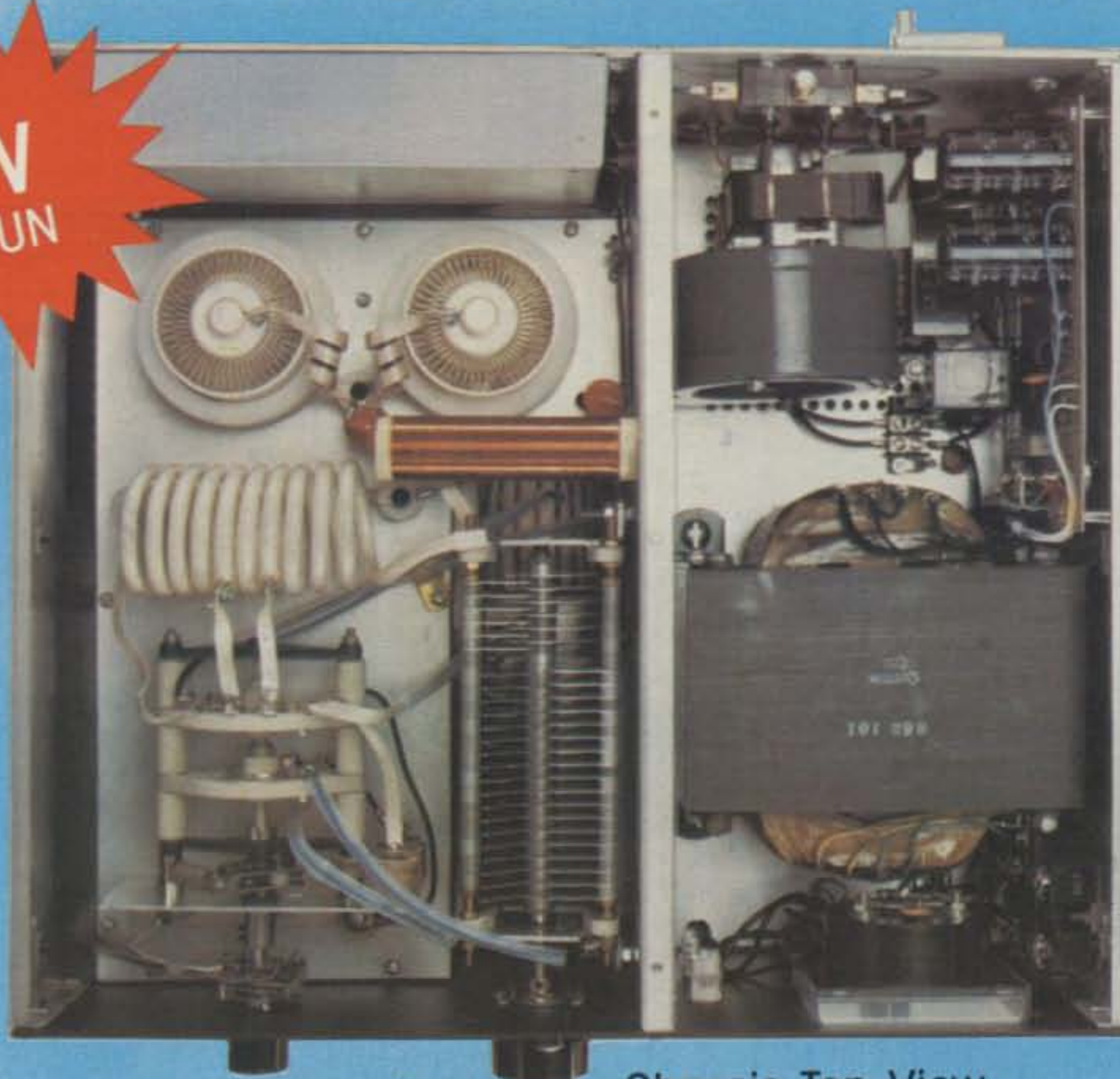
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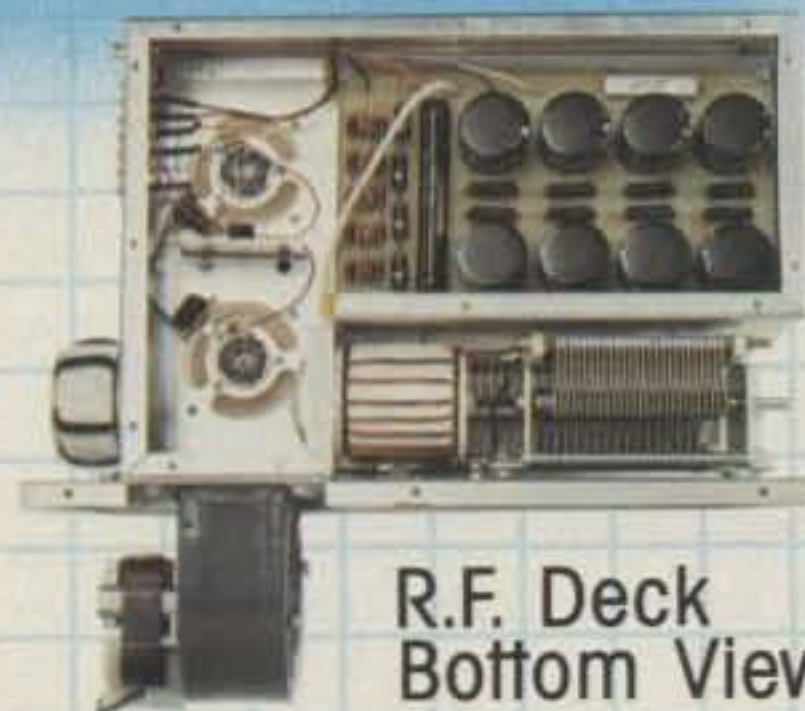
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Another Titan difference is the power supply. The power supply capacity required to maximize the performance of a pair of 3CX800 tubes, in our judgement, dictates a transformer size that will not fit into a RF deck of reasonable proportions. We also like the idea of not compromising the cooling of the tubes by adding the heat from the power supply. The Titan power supply is housed in a separate utility enclosure and remote controlled.

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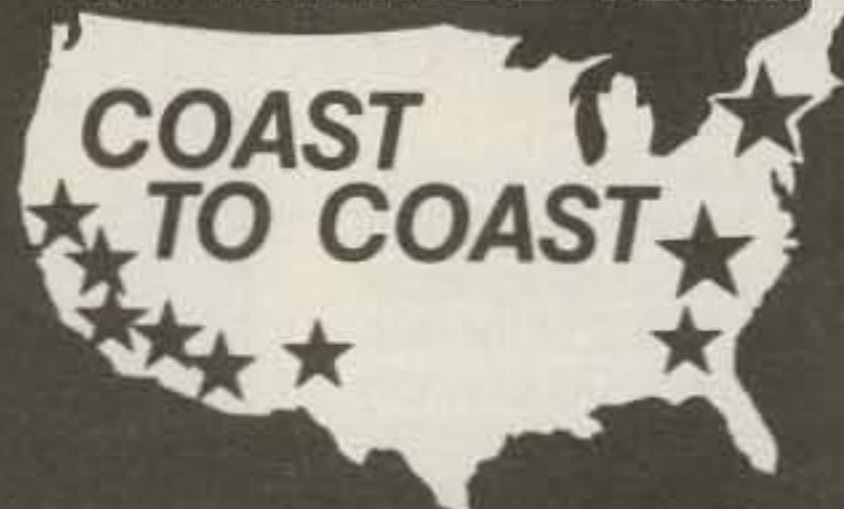
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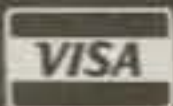
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Bob, KW8N, who operated KP2A to a world championship.



One of the ops at Turkish multi-single station TA1AZ.

Results of the 1989 CQ World-Wide WPX SSB Contest

BY STEVE BOLIA*, N8BJQ

Twenty six records broken, a record number of entries, and the long awaited return of 10 meters were just a few of the highlights of the 33rd CQ WPX SSB Contest. The last weekend of March 1989 produced some of the best 10 meter conditions of the current solar cycle, which resulted in a dramatic rise in scores and participation. Despite the fact that the contest fell on Easter weekend, over 1750 entries were received, a new WPX SSB record.

DX

The 1989 All Band champion is KP2A, operated by Bob Hayes, KW8N. Bob edged out 1988 champ P40V by less than 200K for the title. Bob's multiplier advantage (965 to 872) coupled with 500 more Q's just made up for the QSO point advantage held by Carl. The difference between first and second works out to be about 14 additional multipliers, or 75 more QSOs. Bob's score is also a new world record, erasing the 1986 standard set by PJ2FR.

Third in the world and tops in Africa is 5H0T, the special call used by 5H3TW for both modes. Number four is GB8FX, with Hall of Famer G3FXB at the mike. Al's 7 million points is a new European record and puts him in the lead for the new European combined SSB/CW trophy sponsored by the Les Nouvelles DX Group. Al reports that getting special contest calls may become tougher in the UK. Let's hope that the authorities will continue to issue special contest calls, as they are most welcome by contesters as well as prefix hunters.

Number five in the world is Joel, KG6DX, with a new Oceania record. Rounding out the top ten are LU6ETB, VO1MP, KM1H, N7NR/NH6, and HK1LDG. Nice going, guys. As an indication of how much scores rose, last year's tenth place finisher (VK2KL) would have just barely made the top twenty in 1989. What a difference 10 meters makes.

Speaking of 10 meters, the top single band score for the contest, as well as the top single band score ever in the WPX Contest, belongs to 10 meter champ ZP0Y, the special call of Luis, ZP5JCY. Luis's 10 million points shattered ZY5EG's 1988 record. Second on 10 was 9H1EL with a new European record, followed by JH1AJT with a new Asiatic 10 meter record. A North American record propelled WM5G to fourth place, with 4Z8UX close behind.

On 15 meters Jim, FG5R (W7EJ), turned in the second highest single band score ever on his way to a new 15 meter record. Pedro, HD1OT, was second, followed by FM5DN and XL7SV with Gary, NY6M/KH2, setting a new 15 meter Oceania record with his fifth-place finish.

On 20 things were a little quieter. CQ1BOP emerged as the top gun on 20, followed by 4X5L (op. 4X6UL), L2M, VE1CYL, and CE6EZ. Forty meter honors go to TE1L (op. TI2LTA), who just edged out Craig, WB7RFA, at FG9DX. CQ3DL finished third, with IO5MXX and YU4CC completing the top five. On 75 meters TI2CC was the big news, with FP5DX and K1ZM battling for second and third.

The top-gun title goes to VP9AD, who must have spent a lonely weekend listening to static crashes. His 223 Q's and his patience netted him a world championship. The number two spot belongs to YU3MM, with LZ1KOZ third. Danny, 4X6IF, is the QRP champ, with ZL1AXB

leading the pack on 10 meters and OK1JCH doing likewise on 15 meters. 4N4AE was the top QRP/p station on 20 meters, with UB5IRN the 40 meter champ and OK3TEI the 75 meter champ.

USA

Repeating as all band champ is KM1H operated by KQ2M. Bob seems firmly entrenched as the man to beat in the SSB contest. Bob's 6.69M points is a new USA record, and put him in the top ten worldwide.

Second place goes to W9RE operated by WA8YVR. Third goes to W4NT, with Bill, KM9P, operating. Moving up from sixth to fourth is Fred, K3ZO, with Ken, K6HNZ, in fifth.

USA scores were also up overall, with the top three breaking the 1987 US record. In 1988 it took 460K to break the top 20. In '89 you needed 1.06M to make it. WM5G tops the 10 meter list with a North American high 4.2M points, followed by N5RZ, NA7P, WO5G, and K5ZD/3. The top Novice/Technician entrant was KA1JJR/T with an outstanding 1,162,096 points, good for 12th overall on 10 meters. Nice going, Kathleen. WB5VZL heads the 15 meter single ops. with K2VV and K5RX challenging. N4ZZ and N9AG/8 round out the top 5.

With all the action on 10 and 15 meters, 20 was kind of the forgotten band. The top scorer on 20 meters was N8BJQ (no fooling), followed by WB1DXD and WF5E. WQ5W is the 40 meter champ, with K1ZM taking the honors on 75 and WA2IUO edging out AA4MM for top-band honors.

In the low-power category N1AFC emerged as the top all band entrant, with WA2UUK turn-

*4121 Gardenview, Beavercreek, OH 45431



NM9H, N9HXG, and NO9Z seem satisfied with their 3.8M point effort and the top multi-single score from the 9th district.

ing in a fine 10 meter entry, W4DEC topping the 15 meter list, and K9OSH the 20 meter QRP/p champ.

Multis

The gang at ZX5C (PY5EB, PY5ZBA, and PY5CC) established a new world mark in the multi-single class with 22.4M points. Bulgarian super station LZ9A captured second place with a new European record, with IR4VEQ third. The top multi-multi station was FK0AW with a new Oceania record. KL7RA edged out European record setter YT2R for second spot, with WZ6Z and expedition trophy winner S79T rounding out the top five.

The USA multi-single crown goes to WC4E for the second year in a row, with an outstanding 10.7M points. Second goes to WO0G, with KI1G taking third. WZ6Z's 18.7M points was good for a new USA multi-multi record as well as a fine world fourth high.

Other Stuff

Many stations are now using computer logging, either in real time or post contest. Several stations elected to submit a disk with their logs, which was greatly appreciated. The 1990 rules allow for submission of logs on disk, providing that you use the correct format. Logs must be in pure ASCII, with the same information that is required on the log sheets. Non-ASCII output from some contest software as well as some database and spreadsheet files may also be acceptable, but please check with me before you send it in. It won't do either of us much good if I can't read your files. Also, you must send along a written summary sheet showing all scoring information as well as the normal signed declaration and your name and address. I would also appreciate an ASCII file of calls worked from those who only use the computer for duping. This information will be used solely by the WPX Contest Committee for log-checking purposes and will not be released to anyone not connected with the WPX Contest.

Regarding computer duping software, please make sure that you check your log after the computer does. Most of the software is excellent, but with all the exotic calls that show up for the WPX, almost everybody's software will miss something. Also, most of the software will count G3XXX and G3XXX/a as both good,

when in effect the second contact is most likely a dupe.

As most of you know by now, Bernie Welch, W8IMZ, passed away this past fall. Bernie was the previous director of the WPX Contests and was in a large part responsible for its growth. Bernie had retired from contest administration several years ago, but was still active in contesting and served as an advisor up to his death. Contesting has lost a good promoter and I have lost a good friend. In his memory we will continue the USA 21 MHz SSB trophy as the Bernie Welch memorial, and we have added a USA 28 MHz CW trophy which will be sponsored by Walt Smith, K1DWQ, in honor of Bernie.

If you check out the disqualified section at the end of the listing, you will notice three stations listed. There are still those who choose not to dupe their logs for one reason or another. If you are serious enough to make several thousand contacts in a contest, you should be aware of the rules.

There have been a couple of minor changes to the WPX rules for the 1990 contest. Rule VII (A) has been changed so that you are now only

required to sign portable if you are outside of your DXCC country, or if required by your country's regulations. Also the two-year time limit on trophies has been eliminated. Please check out the 1990 rules for a current trophy list. A copy of the 1990 rules can be obtained from CQ or can be found in the January issue of CQ.

In the trivia department, the 1750 participants logged close to a million QSOs during the contest. The total number of Q's made during the contest would be staggering if everyone sent in a log. At least 18,000 calls appeared in more than one log, and over 1400 prefixes were found.

Thanks again go to those who help to make the contest a success—the expeditions and stations who go out of their way to use a new prefix. Among them are S79T, FK0AW, FG9DX, FG5R, J80B, OX10, TE0UP, 6J2T, 5H0T, JY9LC, AT0T, 3A9F, 9H3AM, GB8FX, GB5DU, IL3/I3BQC, IA5PLB, DK6AS/J45, KC6VW, LV3F, CF1DX, 5H1HK, C53FV, BY4WNG, BY1CKJ, OR0TT, 4G1A/3, and a multitude of others. Thanks from all of us.

Thanks also to Scott, N9AG, who has been a

TROPHY WINNERS

SINGLE OPERATOR-ALL BAND

WORLD: Stanley Cohen, WD8QDQ Trophy. Won by: **Station KP2A operated by Robert Hayes, KW8N.**

U.S.A.: Atilano de Oms, PY5EG Trophy. Won by: **Station KM1H operated by Robert Shohet, KQ2M.**

CARIB./C.A.: Arturo Gigante, Jr., HI8GB Trophy. Won by: **Dominique Douge, FM4EB.**

EUROPE: Jim Hoffman, N5FA Trophy. Won by: **Al Slater, GB8FX (G3FXB).**

SOUTH AMERICA: Ron Moorefield, W8ILC Trophy. Won by: **Carl Cook, P40V (A16V).**

JAPAN: The DX Family Foundation Trophy. Won by: **Akira Minagawa, JA0JHA.**

WORLD QRP/p: The Dayton Amateur Radio Association Trophy. Won by: **Danny Rosenbaum, 4X6IF.**

SINGLE OPERATOR-SINGLE BAND

WORLD: John Reichert, N4RV Trophy. Won by: **Jim Sullivan, FG5R (W7EJ).**

EUROPE: Myron Crofoot, WB4VQO Trophy. Won by: **Jeff Morris, 9H1EL.**

JAPAN: Ken Ruddock, K6HNZ Trophy. Won by: **Yasuo Zorro Miyazawa, JH1AJT.**

WORLD 21 MHz: Lee Wical, KH6BZF Trophy. Won by: **Pedro Katz, HD10T (HC10T).**

WORLD 7 MHz: William Diggins, WA8LXJ Trophy. Won by: **Luis R. Tinoco, TE1L (T12LTA).**

U.S.A. 3.7 MHz: Lance Johnson Engineering Trophy. Won by: **Jeffrey T. Briggs, K1ZM.**

U.S.A. 7 MHz: William Diggins, WA8LXJ Trophy. Won by: **Alan Benoit, WQ5W.**

U.S.A. 14 MHz: Doug Zwiebel, KR2Q Trophy. Won by: **Steve Bolia, N8BJQ.**

U.S.A. 21 MHz: Bernie Welch, W8IMZ Memorial Trophy. Won by: **George Fremin III, WB5VZL.**

U.S.A. 28 MHz (Novice/Technician): Jon Engelhardt, KA0ZFX Trophy. Won by: **Kathleen L. Georgens, KA1JJR/T.**

JAPAN 28 MHz: Joe Arcure, W3HNC & Toshi Kusano, JA1ELY (Terry Appleton, W4GSM Memorial Award). Won by: **Hitoshi Miura, JE8XRF.**

CQ SPECIAL AWARD. Won by: **Luis Kemper, ZP0Y (28 MHz).**

MULTI-OPERATOR, SINGLE TRANSMITTER

WORLD: Mike Badolato, W5MYA Trophy. Won by: **Station ZX5C operated by PY5EG, PY5ZBA & PY5CC.**

MULTI-OPERATOR, MULTI TRANSMITTER

WORLD: Henry Thel, VE7WJ Trophy. Won by: **Station FK0AW operated by JM1LTA, JH0LFE, JH0MGW, JH0NZN, JH0SPE, FK1SU, FK8FI, FK8FU & FK0AW.**

NORTH AMERICA: James P. Dixon, NL7HI (Burt Curwen, KL7IRT Memorial Award). Won by: **Station KL7RA operated by KL7RA & AL7CQ, AL7AC, AL7IF, AL7AF, NL7U, NL7PH, N4BIX.**

U.S.A.: Glenn Tracey, KC3EK Trophy. Won by: **Station WZ6Z operated by WZ6Z & N6IG, K3EST, WA6VEF, K6TMB, N6RO, VE7NKI.**

CONTEST EXPEDITION

WORLD: Kansas City DX Club Trophy. Won by: **Station S79T operated by JI3ERV, JG3MRT, JG3WDN, JR4PMX, Mato.**



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DJ-460T 2.5 Watts
with standard 700mAH Battery
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137.0 Mhz - 173.995 Mhz (RX)
DJ-460T
440.0Mhz - 450.0Mhz (TX)
410.0Mhz - 470.0Mhz (RX)
Specification guaranteed on amateur band only (Modifiable for mars / Cap-permits required)
- **Easy to Enter Frequency Selection**
Direct Frequency entry from keyboard, UP/DOWN Buttons or Dial
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Memory Scan, Band Scan or Program Scan
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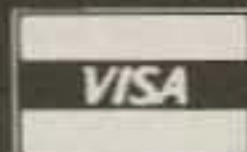
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45 watts on 2M and 35 watts on 70 cm. Approximately 5 watts low power.

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(130-169.995 MHz) on 2M, 144-147.995 MHz transmit. 440-449.995 MHz on 70 cm. (transmit and receive)

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- **SIMULTANEOUS**

Receiving on both bands at the same time
Scanning: intermix scan modes on both bands at the same time

- **INDEPENDENT**

The volume, squelch and control dial are independently adjustable on both bands. You can store the following information on both bands at the same time. Priority function, choice of 37 encoding/decoding sub-tone frequencies, call channel, scan function (program, memory channel, VFO or unique open channel scan), memory skip, bell function, + or - repeater shift.

FULL FEATURES

- **FULL DUPLEX CROSS BAND OPERATION**
Transmit on one band while receiving on the other band -- telephone style.

- **AUTOMATIC BAND EXCHANGE (A.B.X.)**

When in the ABX function is active, an incoming signal on the sub-band will activate an automatic exchange between the main band and the sub-band.

- **PRIORITY**

The VFO frequency is monitored for 5 seconds and then shifts for one second to the selected priority channel (In both bands at the same time).

- **DUAL SPLIT SHIFT OPERATION**

Operates odd offset operation

- **BELL FUNCTION**

- **REPEATER REVERSE FUNCTION**

- **CALL CHANNEL FUNCTION**

- **BEEP FUNCTION**

- **20 MEMORIES (10 FOR EACH BAND)**

Each memory channel can store frequency, repeater offset, encode/decode frequency.

- **4 SCANNING MODES**

Program scan, memory scan, band scan and unique open channel scan (opposite to normal busy scan). Scan stops on a busy (or open channel) channel and then resumes approximately 5 seconds after stopping even if the signal is still present.

- **REPEATER OPERATION**

The DR-570T can be used as a cross band repeater.

EASY TO OPERATE FUNCTION

- **LARGE AMBER MULTI-FUNCTION LCD DISPLAY**

Visible in all conditions, it indicates main and sub-band frequencies, frequency step, "on air", "call", "CTCSS", "PRI", "REV", "-", "+", "*", "T" (tone), tone frequency, "MUTE", "LOCK", "ABX", "BUSY", "F", "S/RF meter", "REV"

- **MHz FUNCTION FOR BOTH BANDS**

One MHz is increased or decreased per touch

- **SELECTABLE DUAL AND SINGLE BAND OPERATIONS**

One touch selection with pressing of twin key

- **SELECTABLE BAND MODE (MAIN/SUB)**

One touch selection with pressing of band key

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- **16-KEY DTMF MICROPHONE**

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W9RE 5,057,994	K2VV 3,388,802	AA4MM 21,184
W4NT 4,867,629	K5RX 3,149,458	N6LL 0
K3ZO 3,659,862	N4ZZ 2,230,452	
K6HNZ 3,057,270	N9AG/8 1,740,480	QRP/p
KY2J 3,036,591	KH6DW/KS6 1,368,054	N1AFC A 332,605
NN7L 2,812,518	W7FP 1,254,693	KD8JN A 227,592
WG5J 2,678,830	AG9S 862,290	KB4GID A 163,296
AI2C/4 2,428,884	WB2YQH 408,289	WB6JMS A 153,780
WE0A 2,096,468	K1TR 384,215	WA2UUK 28 248,792
KA5W 1,745,199		W6CN 28 140,384
KI6CG 1,675,493	14 MHz	W4DEC 21 81,900
K0CS 1,658,503	N8BJQ 1,064,244	KH6CP
K1AR 1,561,230	WB1DXD 948,002	WW1 21 16,610
WW2/JA2EZD 1,443,651	WF5E 744,765	K9OSH 14 3,042
KF2O 1,385,769	NI7T 684,760	WB2OHD/614 1,408
K6EID 1,373,669	N4MO 522,588	
N2AA 1,253,466	W1BWS 498,048	MULTI-OPERATOR SINGLE TRANSMITTER
KB0C/9 1,097,996	W4CYC 174,632	WC4E 10,748,673
N0ZA 1,060,697	KD2TT 112,931	WO0G 7,900,395
	WB8FVB 83,655	KI1G 6,644,360
	K8KUH 32,508	NA6A 4,684,057
		KI6VC 4,307,949
	7 MHz	NM9H 3,800,608
	WQ5W 537,200	N7TT 3,336,432
	KC7KU/2 99,246	AB4CQ 3,096,555
	W3BGN 88,486	KS3F 3,073,329
	KD8B 67,728	N4WW 3,047,176
	WD8PAQ 35,464	KA9TNZ 2,915,545
	KK4RV 34,596	WC5C 2,387,028
		NN5W 1,982,001
	3.7 MHz	KE0YO 1,937,616
	K1ZM 495,624	
	NJ1F 318,860	MULTI-OPERATOR MULTI-TRANSMITTER
	KM2P 229,688	WZ6Z 18,737,170
	KQ3V 204,568	NB1H 7,751,043
	NQ2D 118,146	WR6R 3,605,825
	KM5R 94,432	N4WW 3,047,176
	KC3EK 94,080	
	KN5/JA1XAF 65,816	
	WB1EAZ 3,040	

Many US stations worked me thinking I was on Johnston Island... *KJ6AW*. Was a real thrill to work Greenland YL—first Greenland contact!... *KK4RV*. Operated from a portable location on Amchitka Island in the western part of the Aleutian Island chain... *KL7Y*. My first WPX contest. Was lots of fun but it got boring for long periods because the higher bands were so good... *KM2P*. Enjoyed little time I was in... *KM4GW*. Enjoyed very much, and I had many my friends from Japan... *KN5/JA1XAF*. After all of the flares, glad to see conditions straighten out for the contest weekend... *KP2A*.

I'm getting too old for this. Too hard to stay up all night and play Easter bunny on Sunday... *KQ3V*. Thanks again to my family and my wife's family for letting me "go play radio" on Easter weekend... *KS2M*. Had a better QSO total running barefoot on 10 than with amp on 20 and 15... *KS7T*. Planned to go all out, but Murphy struck. Oh well, maybe next year. Conditions great—lotsa countries/prefixes... *KT2D*. How did you guys manage to schedule the contest between major solar flares? Who do you know?... *KZ1D*. While on my way to

Turkey, I operated from LZ1KIC for about half an hour. Sorry I couldn't get on air from TA when I arrived... *LZ1KIC*.

I had only been on the air two weeks. It sure was a fast way to learn. Had a ball!... *N3GSC*. Great band conditions... *N4EUK*. Next year we add a computer!... *N4MO*. Had the honor of winning Novice/Tech first place last year under the call of *KA7WPD*... *N4UQD/T*. My first effort in the WPX phone test. Lots of excellent operators, hope to be back next year... *N4ZZ*. The first time to work a contest. Didn't know it was so much fun... *N5IPV*. Excellent condx on 10 meters. My first experience with real-time logging on the PC. I'm hooked... *N5RZ*.

Enjoyed the ragchews!... *N6LL*. Picked up 10 new countries! Poor conditions Sunday morning so I went to church!... *N6SRT*. Picked up 10 new countries!... *N6SRT*. First contest with station. Station up six days when contest started... *N6TPT/T*. This is the second contest I have tried. Sure was fun... *N7LVK/T*. Saturday S9 local QRN! Yeech!... *N8AGU*. Using my mom's tupperware to hold the mic was very interesting. I don't recommend it. Have lots of breath mints handy... *NL7GP*. My

mild sore throat at 0000Z Friday became severe laryngitis by EU opening on 20 at 0640 Saturday... *NN7L*.

VE8 on 80. How about SS guys!... *NQ2D*. The EA6 was a new one for me and I had a nice chat with *KJ6AW*... *NQ7Q*. Glad to put *NX9* prefix out. I improved on last year's score, had a lot of fun, and still spent many hours outside in the sun... *NX9T*. I find all friends on one day in contest... *OA4ZV*. Twenty meters had only rotatable antenna and stateside openings were very short, but 679 pxs and 626 Asians helped me break OH record... *OH1AF*. Hope to arrange enthusiastic operator for CW part... *OH1ZAA*. Trx for nice test again and welcome to SAC in autumn... *OH3OJ*. First international contest using a linear. Great fun!... *OH6NTO*.

I made contacts over 400 stations! First time. I was happy!... *JE7DOT*. Conditions of 10 meters is very good in this contest... *JF1SEK*. Looks like 1990 might be the best year, but this year isn't too bad... *K0CS*. 34XA rotor burned out just before the contest... *K0GAS*. Took longer to hand-dupe my log than amount of time I operated; computer next year!... *K1CLN*. Enjoyed operating the contest, and conditions were great, but the paperwork too as long as the operating... *K1JB*.

First 80M effort from summer location on Cape Cod. Did okay with modest antennas... *K1ZM*. Largest number of new prefixes in many years!... *K2VV*. TVI and basketball Friday, Saturday, Sunday plus lovely WX prevented a full effort!... *K5ZD/3*. Biggest thrill was realizing I had made over three million in a WPX SSB. Great conditions!... *K6HNZ*. Too many stations in the contest; the QRM was so bad that everyone was having problems hearing... *K6ICS*.

Great hearing Africa in here so loud... *K6SIK*. Using *K1EA* software and being able to type fast enough to keep up!... *K8DD*. Question: Missing Easter dinner enough for divorce or not? I was lucky, not yet... *KA1NWL/M*. Thank you to those who do all the post contest work... *KA2AWE/T*. Working TA1 and 5H0, and hearing my daughter Niki (*VE7NKI*) operator for *WZ6Z* (her first contest)... *KA6ING/T*.

I started the contest as a Novice Friday nite, took test for Tech, and finished contest as Technician... *KA8VPL/T*. Excellent conditions both days. TVI problem next door prevented me from using amp as much as I wanted... *KB0CWV*. Great conditions, lots of participants, used good software (*W2HPF*), best score ever... *KB2SE*. Everyone should try calling CQ in their first big contest. It will wear you out... *KB5EQL/T*.

Very noisy on 15 and 20... *KC3QS*. Found out my computer contest program could only handle 100 multipliers. Had to take time out to modify program... *KC7KU/2*. Had a great time even though I had to leave town on Saturday. Great contest!... *KC9EW*. Worked *FK0AW* on 15 meters for my fist contact and on 10 meters for my last contact... *KD2YP*. Best 10 meter show in 27 years of contesting... *KE7EQ*. The best and strangest propagation ever since 1987 in a contest... *KE8NH*. When spouse says quit, you should quit... *KE9NB*.

Easter weekend is not a choice time for a contest, but at least 10 meters is back!... *KF2O*. Laryngitis and Easter cut down on op. time... *KF4CI*. Enjoyed the conditions on 10 and 15... *KG6DX*. Murphy showed up with 3 hours of rain static Saturday morning with best EU opening since 1980, then destroyed my printer... *KH6DW/KS6*. Aloha and Mahalo to all and especially to those non-contestants

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who just called to give a contact . . . KH6FKG. WPX is great! First time California is a good multiplier! What hath FCC wrought? . . . KH6WZ/KZ6. Easter cut out most of Sunday, but still a great contest . . . KJ4TI.

Fifteen meters was in good shape during the contest, so it was a real pleasure to work CQ WPX . . . OH6YF. Antenna broken! QSOs worked by 50 meter long coaxial cable! Changing QTH and station next day (hi) . . . OH7UV. OX10 equals special call only to be used in 1989 by our local club station to celebrate the 10 years of home rule in Greenland . . . OX10. I am not a winner, but I have enjoyed the test . . . OZ1KHF. Wanted to make a few QSOs just for fun, but it took me almost two days to get rid of the pile-up . . . PA2REH. I picked up VK/ZL with S9 signals independent of beam direction. Could there be something wrong with the F/B ratio? . . . SK5EU.

Two new countries, FK0AW and KC6VW . . . SM0JOQ. This is my first big contest after my father, SP2UU (silent key), and I so very happy worked with more stations . . . SP2UUU. Tnx for vy nice game. Good luck! . . . SP7MUZ. Great contest! The special TE0UP call is that of the UN affiliated University for Peace club stn. located in Colon Costa Rica . . . TE0UP. The propagation was right. Quite a challenge to work this band . . . TE1L. Nice to be back in WPX; see you next year for sure . . . TF3CW. Very good contest! I wish CQ magazine good luck . . . UA6YJA. Thanks for the good contest! I'm sorry but conditions was very bad! . . . UA9ND.

WPX is a great contest! Ten meters is a great band! CU on ten! . . . UC2AB. It was my first serious contest in single/single category. Thanks and hope CU AGN soon! . . . UP1BWW. Thanks for nice contest QSOs . . . UQ2PP. Thrill to process the log with duping program made by my XYL. Will be back next year, probably with spl prefix . . . UR2RE. Very nice propagation to US and Japan on 10! . . . UT4UX. First WPX all-band effort. Sure a lot more paperwork than single band! . . . VE1GJ. Thanks to all who persevered to complete a QSO when signals were down. Enjoyed the contest . . . VE3SDX.

Working Australia, USSR—almost all continents on 10! . . . VE3ZCO. Nice to see 10 open. S79 also a nice treat . . . VE4GV. Amp broke during the second hour! 28 MHz condx only fair at this latitude with the geomagnetic activity . . . VE5UF. Great fun despite the "Grem-lins." Can only do better next year! . . . VK1RJ. Ten meters is becoming the band that never closes! Sure wish more stations would listen for Pacific! . . . VK8XX. Great contest, great conditions, lots of prefixes makes for enjoyable weekend . . . VO1MP. Great fun, but wish that more people would check 160 . . . VP9AD.

Conditions were good Friday and Saturday. Sunday was not so good for those of us in the far northern reaches of the "Black Hole" . . . W0AIH/9. My first try and it was a ball . . . W0SEI. Fabulous propagation to Africa and Indian Ocean on 10 and 15 . . . W1KRS. Think it was a mistake to have contest on Easter weekend . . . W2FGY. First time out with computer logging. Tough to teach an old dog new tricks . . . W3BGN. You know where you stand in a pileup (way down) when the DX always calls CQ after working you. It happened to me a lot . . . W3FTG. Not one QSO on 40, 80, or 160. Did I miss anything? . . . W4NT.

The question is: When will CQ have enough logs to build a log cabin? . . . W4TMN. Worked everything I heard, just not as fast as I used to

. . . W4WJJ. Well, a lot of fun once again in my favorite contest. Worked two new countries within 25 minutes of each other (C31 and S79) . . . W6LC. First contest to work JT1 land, so worked two of them. Also nice to work W1FP, W3FP, and W8FP from W7FP . . . W7FP. Lots of QRM this time due to better band conditions. Good contest . . . W7QN. First time in WPX as single op. Next year will make a full effort. Great time! . . . W7XN. Worked 4Z8UX. This is a good contest. I enjoyed it . . . W8WEJ.

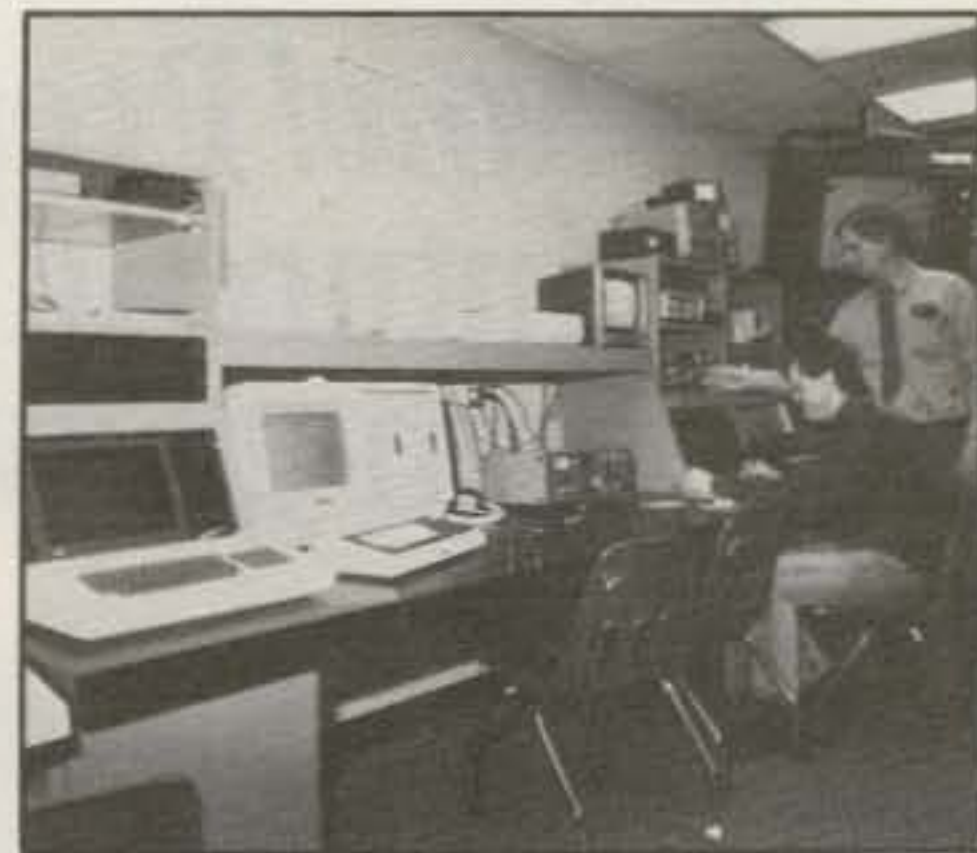
You know you're having fun when you don't need the amp . . . W8YTM. This is one of the greatest contests ever! Nice to work the regulars . . . WB0GFV. Great conditions, especially 10 meters early in the morning. VK6 long path 59+ was louder than the Europeans . . . WB2DND/1. Great to work so many Soviets . . . WB2JTE. Band wide open. Ear trouble, otherwise would have had the best ever. A lot of big scores . . . WB4VQO. Conditions were too good. Everyone seemed to be on 10 meters and not on 15 meters. Such is the life of a single band op . . . WB5VZL. What would a contest be without "P40V"? . . . WB5YIWT.

Best score in my contest history, even with a six-month-old son at home. Thanks, Mom . . . WB8TLI. Great conditions, just couldn't get motivated. Hope to do better on CW . . . WD2AHD. Love this contest! My new beam just punched right thru every time. Will try for more certificates for the wall . . . WD8PAQ. Rotor was bad. Ant. north—could only rotate 30 degrees. Still great fun . . . WF5E. Conditions were awesome. See ya next year . . . WG5J. Real good band conditions this year. Had lots of fun. Can't wait until next year . . . WJ7S. This is my first contest ever. Managed to work 65 new countries and 258 prefixes in 24 hours! . . . WM0G.

Great European opening Saturday morning. Unfortunately, electricity failed with 2½ hours remaining Sunday . . . WM5G. Lost voice half way through. Another physician, N5AN, made house call to give me cortisone injection. Able to finish tnx to him . . . WO5G. First attempt—hooked! . . . WO8V. Condx very poor on 40! . . . WQ5W. Must get beam up in time for CQ WW . . . XE1THR. Noise level S-7 always . . . XE2HWH. The band was pretty quiet for 6 hours before it started to roar at 0700 giving no space to put my CQ . . . YB2FRR. My first contest in short waves . . . YO3CVF.

Must be better next year . . . YT3AA. Did anyone saw Mr. Murphy? Everything worked perfectly (in spite of his laws) . . . YZ1EXY. Very heavy storm during Saturday evening. Had to cut transmission during one hour for that reason . . . ZP0Y. Strong short skip in US, EU, and JA makes it very hard from out here . . . ZS6BCR. After killing myself for two days, I don't think I will operate any nearby contest (at least QRP) . . . 4X6IF. Ten meter loop was only 2 feet off the ground . . . AB4LX. Very bad management of my rest periods! The 10 meter band was fantastic, a chance for the QRP'er . . . F1BEG. This test is very good condx! But QRP is no good . . . JF2GYH.

This contest is a great test of QRP capabilities . . . K9OSH. QRP delight—A2, 5H, S7 on 10! . . . KA1UJ. I have never had this much fun! . . . KD8JN. Tnx to EA8, ZS6, 3DA0, and JY9, who heard my 4 watt QRP signal . . . KH6VP. I've been a ham for 24 years and this was my first WPX contest. Boy have I missed a lot of fun. See you next year . . . N5US. I would see what I could do with this very low power and I was satisfied, but it was sometime difficult . . .



Here are KF5FM and John Coggins at the controls of WC5C, the Oklahoma State University Tech Branch club station, and top scoring 5th district multi-single entry.

PA0NRD. Not many QSOs or big score, but got 5H1HK and T77C for new countries . . . W2JEK. Worked FO0BEF and FK0AW . . . W4DEC.

Wish they all could be this good! . . . W6CN. Got one new SSB QRPp country (about 175 total) . . . W6YVK. Discovering that one can be competitive QRP . . . W9NUB. Where can you have more fun with 5 watts? . . . WB6JMS. Hard work on 21 MHz. Doing pile-ups was like picking up pistol-sound stations among bomb explosions of kilowatt stations . . . YC2OK. It was great fun chasing DX with only 5 watts . . . YO3JF. Condx were far better than expected; good openings to Europe on both days . . . ZL1AXB. Running barefoot throughout the contest. Never realized it was that hard . . . 4G1A/3.

Shutdown Saturday nite after amp bit the dust and the shack filled with smoke! Better luck next year—we hope . . . AA6BB/7. Incredible condx on 15 meters first nite! And thanks to KB4SRJ for bringing Easter dinner out to the site . . . AB4CQ. Melissa was only 10 at the time of the contest. I guess that this was a family affair . . . AL7FQ. Total of 790 QSOs, plus or minus dupes, and one eyeball QSO with a donkey from Aran Islands! . . . EJ8GT. Tnx for another WPX. Radio and WX conditions were great in the UK. More like a DXpedition south than early British spring . . . GB2SH. Biggest thrill—at last over 2000 QSOs . . . HA3KNA.

Very hard for just two operators, but enjoyed every minute of it . . . HC2G. Many thanks to all for making the 1989 WPX our best effort ever . . . KI1G. The number of worked US-Px in-



This is Kevin, 9M2ZZ, a welcome addition to the WPX contest.

creased markedly from 260 to 440 in '89. Does anybody know how many really there are? ... LZ9A. HG1S gets the most "duped" award. Great to have ZC4AB call me ... NM9H. Bands sounded like old times—wide open! ... NN5W. Our best effort yet. Hurray for sunspots! Worked lots of good ones. DXCC in a weekend is fun ... NT0P.

Excellent contest! We nine high-school students have beaten the school's record by only five times. See u next year ... P33ES. We glad to active first contest when we back to home from our expedition to 3W0A. Three months we was busy ... RL8PYL. Set a new Estonia record! ... UR1RWX. It was our biggest score ever! Condition was very fine, but during the nice condition on 28 MHz our amplifier brake! ... UT4UXW. I just love this contest. Everybody is a multiplier ... VE3BXY. Need some good low-band antenna for next year's contest! ... VE5GF. Enjoyed working the pileups and look forward to next year ... VE6AO.

Very good condx in the midst of a series of solar flares. Seems there is a fairy godmother for testers ... VE6WP. Many thanks to W2HPF (Jeff) for his excellent computer programs. They save many hours of work ... VE7ON. I thought N5CG was going to have the big one when the computer quit and we lost 286 contacts! ... WC5C. The black hole is starting to get a little grey! Congrats to the WC4E boys, and thank you Japan! ... WO0G. Operated by some Novice. Got many new experience. Very exciting ... YB4ZBY. Fantastic conditions and very hard competition from C45A ... ZX5C.

Thanks to excellent condition, especially on high bands, we could mark a remarkable record ... FK0AW. Many tnx to the stns who put rare prefixes on for the contest ... KL7RA. M/M operation from Africa was very exciting and we've made good score!! ... S79T. Computer post entry logging big disaster! ... WZ6Z.

Station Operators Multi-Operator Single Transmitter

4G1A/3: DY3MJJ, DY3RBS, 4F3BAA, 4F3AAL, DU3GDX, DU3HAM, DU3CWF, DU3CWM. 5H1HK: & JE3MAS. 5W1HT: & 5W1HQ, 5W1HS, 5W1HV, 5W1HW. 7S3HK: SM3CER, SM3IEK, SM3HLL, SM3EVR, SM3SGP. AA6BB/7 & WJ7R, KF7RU, KA6V/7. AB4CQ & KW4T. AL7FQ &

NL7DW, NL7QV. AZ4F: LU2FFD, LU7H00, LU6FEC, LU1FOW, LU9FFU, LU4FDV, LU9FBL, LU2FYA. AZ5D: LU6DH, LU7DID, LU6DTS, LW1EMY, LU8EGO, LU9DVV, LU9EUS, LU5DU, LU7DDC, LU9DXM, LW1ENM. BY1CKJ: Zhang Chong Hua, Zhou Shu. BY4WNG: Cheng, Guo, Jenny, Mary. C53FV & C53FW.

CF1IDX: VE1CIT, VE1BII, VE1BZO, VE1UA, VE1OFR, Linda Hunter (chief cook and bottle washer). DK2XX: CLUB GROUP. ED1ETN & EA1CUN, EA1CUX, EC1CVD. EJ8GT: W2ORA & N2BSA. FF1LFG: F6GWV, F6HMQ, F6IFR, F6CWN, F6GDK. FF6KAW: F6DZS, FD1MAY, FD1JDS, FA10GV, F11IBT, F11FFB, F11DAK. F05IW & F05DB. FV9NDX: F6BBJ, F6CTT, F6HSV, FD1HQY. GB2SH: G4WMH, G0AAF, G0JZM, G0JFX, G4JYE, G1MLK, G7DDD. GM0AEE: GM4TNJ, GM4W0Q, GM4NNC, GM0EAS, GM0AVB, GM10XQ, GM6HWZ. HA3KNA: HA3FO, HA3OV, HA3NS, HA3NU.

HA5KKC: HA8UB, HA5LV, HA5M0, HA50G, HA5WU, HA5MA. HA6KNX: HA60D, Zsolt, Nandor. HA6KVB: Jozsef, Zoltan, Imre, Ferenc, Tamas, Peter. HA7KNT: HA7BP & HA7ZT. HA8KCK: HA8FW, HA8KH, HA8DZ, HA8FT, HA8EK, HA8DT. HC2G: HC2CG & HC2DZ. HG0D: HA0DR, HA0NAR, HA0ER, HA0HV, HA0NAE, HA0HG. HG1S: HA1TD, HA1AH, HA1DAC, HA1TJ, HA1DAE, HA1AG, HA1SV, Sbabolcs. HG5A: HA5ML, HA7RY, HA5GF, HA5WE, HA5IW, HG5BNL, HA5MK, HA5LN, HA5OM, HA5FM, HA5AWH. HG7B: HA5DW, HA7UG, HA8FM, HA5WA, HA7JAO, HA0DU. HL90B & HL9JZ, HL90MT. IK2BTI & I2UIY.

IR4VEQ & I4RYC, I4LEC, I4TJE, I4EAT, I4IKW, I4EWK, I4CZF. JA0ZRY: JP1QGO & JR0BQD. JA1YXP: JO1JOZ, JH9CAU, JF1UTP. JA3YDS: Club Group. JA4YAV: JG4JLA & JI4ARB. JA4YJA: JJ3LJU, JM3ILK, JF4BVU, Giichi. JA7YRR: JF6NKV, JH7MEV, JA7OZW, JA7JUD, JA1SKY. JE6ZIH: JR6GKT, JF6DEA, JF6TMH, JJ6BRB, JG6GNN, JH6QFJ, JF1DHS/6, Kawagee family. JG3ZDK: JL3WLC, JF4FUF, JR3AJZ, JA3-30356. JH2UVL: Club Group. JT1KAI: Club Group. K5LZO & K5GA. KA9TNZ & KA9SGZ, KD9UL, KB9AAW, KB9AAX, Lee.

KE0SC/DU3 & N7JJQ/DU3, K4SXT/DU3, KC6BJF, KB6BJF/DU3. KE0YO & AA0A, NI0G, KB0KK, WD0FPY, W0HBH. KE8NW/4 & KA30YY. K1IG & K1NG, KB1EM. K16VC & K6GX0, W9NQ, WB6RXE, KB6ZBI, AA6MZ, N6RNX, KG6VI, N6PQB. KL7CQ: KL7SK, KL7LO, NL7PX, NL7PT, NL7NB, NL7NY, NL7PV, AL7JZ, KL7HFQ. KS3F & NE3F. LA1T: LA3CX, LA4BQ, LA60V. LZ1KEZ: Nicolaj & Hukonau. LZ1KNP: Ilija & Vlado. LZ9A: LZ2CC, LZ2PO, LZ2DF, LZ2HE, LZ2UA, LZ2WM, LZ2-E-71, LZ2-E-72, LZ1-P-54. N1AU & KC1F. N7TT & Cheryl. NA6A: N6TIB & W6REC. NL7DU & NL7FL.

NM2Y/3 & N3BNA. NM9H & N09Z, N9HXG. NN5W & WB5N, NT5D. NT0P & K0UAA, KA0REN, KM0L, KU0G, NV0U, NW0F. NV4G & NU4B. OG3AA: OH3NJZ, OH3BVF, OH3UW, OH3JR, OH3XZ, OH3NSF. OH6AC: OH6WZ & OH6CS. OH6AP: OH6NIO & OH6XA. OH9KK & OH9RJ. OK1KCF: Club Group. OK1KLX: Club Group. OK1KNC: Club Group. OK1KPU: OK1VQ, OK1AOZ, OK1DOY, OK1JDX, OK1JPH, OK1JOE. OK1KSZ: Club Group. OK1OFM: Club Group.

OK2KDS: Club Group. OK2KLI: Club Group. OK2KVI: Club Group. OK2KYC: Club Group. OK3KYH: OK3CVI & OL9CSW.

ON6AH & ON6VL, ON6MH, ON4GO, ON6QR. OR0TT: ON7LX & ON7TK. OZ/DL0PE: DL8AAE, DK8KW, DL00BF, DF30E, DK6KQ. P33ES: 5B4VH, 5B4WM, 5B4WN, 5B4WS, 5B4XF, 5B4XN, Costas, Georgiou, Adonis, Yiannos. R0C: UW0CW, UW0CA, UW0CN, RW0CA, UA0CDX, UA0CDI, UA0CDG, UW0CJ, UA0CCD. RB4EXN: Diana, Jane, Evgenij. RL8PYL: UL7PAE, UL7PCZ, UL7PL, RL8PY. RW9HY: RW9IM, UA9HEC, UA0-103-803.

RZ6LYL: UA6-150-693, UA6-150-694, UA6-150-1400, UA6-150-1352. RZ9MYA: UA9MAA, UA9MHX, UA9MRC, UA9MEG, UA9-146-79, UA9-146-146. SK5DB: SM5CXN, SM5GSH, SM5LRM, SM5PEY, SM5PMR, SM5SYO. SP1PBW: Club Group. SP3PMA: SP3RNZ, SP012KN, SP017KN. SP5ZCC: SP5HGR, SP5TAT, SP0283-WA, SP0315-WA. SP9PEY: SP9FKQ & SP9HMF. SP9ZHR: SP9-4315KA & SP9EMI. TA1AZ: & TA1AO. UB3IWA: UB5IFZ, RB5II, UB5I0K. UB4FWH: RB5FH, UB5-070-265. UB4IZA: Art, Andy, Dmitry. UB4QWW: Club Group. UB4QYA: Club Group. UB4TWL: Club Group.

UB4TXG: UB5TEC, RB5TR, UB5-079-393. UB4UWD: RB5UE, UB4UFI, UB4UFR, UB5-065-1390, UB5-065-1408. UB4WZA: UB5-068-995, UB5-068-996, UB5-068-997. UC1AWK: UC2AUZ, UC2-188-101, Andrew. UC1AWP: Jim, Alex, Andrew. UC1IWW: UC2IDC & UC2IDR. UF7FWM: UF6AW, UF6FM, RF6FHQ. UI9BWE: Alexandr, Ernst, Igor. UL8CWW: UL7-028-283, UL7-028-291, UL7-028-270, UL7CC. UL8DZZ: UL7DDJ, UL7DL, UL7-029-106. UL8LYA: UL7LEG, UL7LER, UL7LEZ, UL7-026-177, RA6XA. UM9MZC: Club Group.

UP1BXT: UP2-038-1842, UP2-038-2326. UP1BYC: Andy, Jurgis, Vita. UP1BYT: Club Group. UP1BZG: UP2BCO, UP2BCW, UP2BOC, UP2-038-439. UQ1GWW: UQ2-037-83, UQ2-037-116, UQ2GAG, UQ2GZR. UQ1GWY: UQ2BQN, UQ2BQB, UQ2-037-5581, UQ2-037-5601. UQ1GXJ: UQ2-037-221, UQ2-037-458, UQ2GTF. UQ1GYQ: UQ2-037-306, UQ2GGK, UQ2GKT. UR1RWQ: UR2-083-1082, UR2-083-1081, UR2-083-1080. UR1RWX: UR2RRR, UR2RJ, UR2RHF, UR2RDJ, UR2RMC, UR2RME, UR2RNX. UT4UWG: Club Group. UT4UXW: UT5UGR, UT3UA, UT5-186-152. UZ0IWE: UA0-138-106, UA0IAU, UA0-138-198.

UZ0XU: UA0QFZ, UA0-098-206, UA0-098-220, UA0-098-210, UA0-098-236, UA0-098-168. UZ0SWU: Club Group. UZ1AWQ: Alexandr, Eugeny, Peter. UZ1QXC: Alexander, Vitaly, Alexey. UZ3RXX: UA3-157-609, UA3-157-4, UA3-157-611, UA3-157-148, Dim. UZ3YWM: Kurkowsky, Burnyakow, Machehin. UZ4PWY: UA4-094-705, UA4-094-152, UA4-094-201. UZ4PZD: Titkov & Volkov. UZ4WWA: Igor, Vlad, Dave, Oleg. UZ4WWB: Alex, Andy, Nick. UZ4WWD: Dmitry & Igor. UZ4WWF: Alex, Otto, Dima. UZ6HXK: UA6-108-1838, UA6-108-1872, UA6-108-1874.

UZ9CWW: UA9CJ, UA9CIR, UW9CW, RV9CBW, UA9CDC. UZ9CZM: RA9CPQ, RA9CFB, UW9CY, UA9COW, RA9CAR. UZ9UZL: UW9UD, RV9UER, RA9UCK. UZ9WWM: UA9-084-1535, UA9WQK, UA9WPI, UA9-084-1441. VE3BXY & VE3EPM. VE5GF & VE5AGA, VE5ELJ. VE6AO: VE6AMR, VE6CPO, VE6SH, VE6LES, VE6PY, VE6JO, VE6CIZ, VE6KC, VE6CJZ. VE6WP & VE6BBP, VE6SF, VE6EZ, VE6JY, VE6BRE. VE7ON & VE7SZ. VK6ANC: VK6ATA, VK6JIP, VK6KMJ. VK6LW & VK6PDL, VK6PGT.



Here are the ops at world multi-multi champ FK0AW. From left to right (standing) are: JH0NZN, Alain, FK8FU, FK8FI, FK1SU, and JM1LTA. In the front row are JH0SPE, FK0AW, JH0MGW, and JH0LFE. Nice going, guys.

QSOs/BAND

	160	80	40	20	15	10	Mults
KP2A	0	106	419	609	1518	2429	965
P40V	0	186	141	846	1151	2438	872
5H0T	0	0	0	270	1107	1877	761
GB8FX	0	58	288	1174	923	646	824
KG6DX	0	0	4	270	1484	1653	700
LU6ETB	0	0	0	98	976	1947	779
VO1MP	4	100	95	998	1350	587	789
KM1H	0	179	7	871	1120	887	817
N7NR/NH6	0	13	294	419	111	2387	595
HK1LDG	0	2	12	844	683	1296	706
GW4BLE	0	25	71	368	1568	973	733
D44BC	0	18	234	434	327	1474	721
JA0JHA	0	0	0	845	215	1833	699
FH5EF	0	0	21	214	979	840	904
OK1ALW	0	73	72	352	670	1704	658
W9RE	0	8	25	583	1091	852	734
W4NT	0	0	0	821	808	913	741

WA8LLY/6 & PACKET. WB0MHU & WA00UI. WB3JRU & KC3AJ, Packet.

WB3KKX/8 & N8EKE, N8IKX. WB8PHI & W8SJU. WC4E & K4XS. WC5C & N5CG, KF5FM, NW5H. WE5P & N5JJB. WF2G/4 & N4QWL, WD4BHM. W00G & K9FD, N9IDV, K4VX. Y52CE: Y52GE & Y56TE. Y54CO: Y54NL & Y54ML. Y61CA: Roland & Christian. YB4ZBY: YC4FRX, YD4FQB, YD4NCS, YG4GDZ. YT3T: YU3BQ, YT3EW, YU3HP, YU3XU, YT3VE. YU2CCJ: YT2JB, YU2JM, Pero, Zlatko, Max, Denis, Sasha, Kresho, Sale. YU4AVW: Club Group. YU7GST: Club Group. ZL2AH: & Peter Lapslie. ZX5C: PY5EG, PY5ZBA, PY5CC.

Station Operators Multi-Operator Multi-Transmitter

ED3MM: EA3CAC, EA3FWE, EA3FJM. FK0AW & JM1LTA, JH0LFE, JH0MGW, JH0NZN, JH0SPE, FK1SU, FK8FI, FK8FU. JA1YFG: JL1BLW, JO1RUR, JP1JFG, JP1OGL, JO1BRW, JS1MJE, JJ30LZ, JE7WBI, JG7QQA, R. Hosokawa. JA2YEC: JM2MQR, JL2XGX, JM2VYI, JJ2QEH, Horofumi, Shigenori, Yasuaki. JA9YBA: JA9's LNJ, NFO, RNR, VDA, JH9's KIF, VSH, JR8GOU. KL7RA & AL7CQ, AL7AC, AL7IF, AL7AF, NL7U, NL7PH, N4BIX. N4WW & K0LUZ. PA4DEC: PA0LEG, PA0BOE, PA0TUK, PA3ENO, PA3DEW, PA3ATA.

S79T: JI3ERV, JG3MRT, JG3WDN, JR4PMX, Mato. UJ9JWI: Valery, Sergey, Artem. UP1BZO: UP2NK, UP2-038-346, UP2BMX, UP2-038-1751, UP3BQ, UP2BKZ, UP2BOA, UP2BDW, UC2IO, UP2BQN, RP2BIV. WR6R & K6ZM, B6L, K16EZ, NP4IW, K4UVT. WZ6Z & N6IG, K3EST, WA6VEF, K6TMB, N6RO, VE7NKI. YT2R: YU2OG, YU2IQ, YU2DQ, YU2QS, YU2MY, YU2MM, YU2LJ, YU2HO, YU2MP, YU2OH, YT2FI, YT2AA.



These are the ops of 4G1A/3, one of the more unusual prefixes in the '89 contest. (Left to right, front row) DY3MJJ, DY3RBS, and 4F3BAA. In the back row are (left to right) 4F3AAL, DU3GDJ, DU3HAM, and DY3VDC.

Number groups after call letters denote following: Band (A=all), Final Score, Number of QSOs, and Prefixes. Certificate winners are listed in boldface.

QRP/p SECTION WORLDWIDE

4X6IF	A	889,287	859	371
YU2TY	A	768,660	738	460
F1BEG	A	499,728	613	359
UB7QA	A	392,256	564	454
N1AFC	A	332,605	466	301
UA900	A	302,771	460	259
J11DQS	A	287,742	429	273
YU4YA	"	265,016	420	326
KD8JN	A	227,592	382	232
CF1DX	A	175,770	364	210
(Op. VE1DX)				
KB4GID	A	163,296	343	243
WB6JMS	A	153,780	338	220
JR3RWB/2	"	152,609	296	191
EA1GT	A	144,304	387	232
IO8KHP	A	139,230	311	221
LZ2QV	A	134,442	356	198
LA9VDA	A	114,774	329	222
Y09CBZ	A	110,298	299	186
YT1T	"	104,424	356	228
KB3TS	A	81,174	203	163
N8CQA	"	79,365	226	165
UB5YDX	"	73,698	220	163
OK2BAT	A	49,776	200	136
W4/HK3GZB	"	40,656	206	154
LA9DL	"	35,778	215	134
RB5WO	"	17,763	100	93
W6YVK	"	12,900	106	100
Y05CUU	"	12,384	129	48
UQ2GHB	A	7,239	66	57
YV5LEZ	A	7,182	58	54
Y25NA	A	6,440	50	46
EA1DVB	"	4,550	60	50
OZ7DX	A	4,329	41	39
Y23TL	"	2,812	41	37
ON8WN	A	2,610	30	29
OK2BBQ	"	2,400	50	48
VK6JIP/6	A	2,079	27	27
W2JEK	A	1,197	23	21
JO1MCC	"	300	10	10
ZL1AXB	28	522,664	589	316
WA2UUK	28	248,792	377	274
JH8DEH	28	210,600	343	216
J11JVG	"	208,886	323	239
JA6WJL	"	153,912	273	212
W6CN	28	140,384	286	214
LZ1V	28	131,726	311	194
KH6VP	28	111,342	242	154
GM4ELV	28	82,536	221	152
KB4IDS	28	79,001	193	153

KA1UJ	28	75,492	192	162
JF2GYH	"	69,750	176	150
VE3HX	28	67,044	176	148
N1EFE	28	62,646	173	159
ZF2KN	28	27,911	123	113
Y26JD	28	26,936	111	91
KA1CZF	"	15,136	96	88
IK7GAJ	28	14,440	90	76
W9NUB	28	12,028	70	62
UA00GQ	28	9,035	89	65
DH8LAW	28	8,949	67	57
VE7EKS	28	8,736	66	56
AB4LX	"	6,720	78	64
UB5FJA	28	5,460	57	52
N5US	28	4,756	41	41
UY5UP	"	1,872	28	26
OK1JCH	21	441,945	670	315
JA8RJE	21	215,208	327	252
YC2OK	21	135,744	254	202
W4DEC	21	81,900	214	182
KH6CP/WW1	21	16,610	113	110
UA3DPX	21	13,311	101	87
JF8NRC	"	2,436	31	29
4N4AE	14	86,724	300	219
JA2JSF	14	84,162	204	169
Y28UN	14	56,416	243	164
UB4AR	14	48,195	189	153
Y02CMI	14	33,796	137	119
Y03JF	"	24,416	130	109
PA0NRD	14	10,384	118	88
SP4GFG	14	3,354	40	39
K9OSH	14	3,042	40	39
UP2BB	14	1,855	35	35
WB20HD/6	14	1,408	40	32
UB5IRN	7	35,568	137	104
Y23FI	7	14,896	87	76
Y24EE	"	3,762	60	33
JG7LBN	"	2	1	1
OK3TEI	3.7	23,800	149	85
Y25JA	3.7	17,280	116	80
Y03FOP	3.7	2,590	40	35
Y48ZB/P	"	1,900	39	33
OK2SMO	"	1,800	33	30
UA4HVV	1.8	12,690	99	47
RB5EKI	1.8	9,690	87	57
UB5ZHQ	"	4,800	56	48
RA3RQG	"	1,100	27	25
UQ2GSC	1.8	720	23	18

SINGLE OPERATOR NORTH AMERICA UNITED STATES

KM1H	A	6,669,171	3061	817
(Op. KQ2M)				
K1AR	A	1,561,230	1186	495
K1CLN	"	669,473	739	413
KZ1K	"	383,748	536	339
(Op. K1PLX)				

W1KRS	"	311,264	388	274
NF1J	"	102,209	234	179
KD2SX/1	"	32,964	155	134
KZ1L	"	7,050	56	47
AA1M	"	1,008	24	24
KA1JJR/T	28	1,162,096	1190	481
K1JB	28	649,500	685	375
NO1Y	"	153,813	312	237
KZ1D	"	147,849	285	223
WB2DND/1	"	65,191	167	139
KA1RRX/N	"	34,384	131	112
KA10EO	"	24,570	113	105
KA1TIY	"	18,612	112	99
KA1NWL/M	"	4,066	43	38
K1TR	21	384,215	500	299
W1/CE2FYX	"	30,940	145	119
WB1DXD	14	948,002	931	451
W1BWS	"	498,048	686	384
K1VSJ	"	2,002	26	26
K1ZM	3.7	495,624	769	321
NJ1F	3.7	318,860	612	298
WB1EAZ	"	3,040	44	40
KY2J	A	3,036,591	1861	669
WW2	"	"	"	"
/JA2EZD	A	1,443,651	1574	363
KF2O	A	1,385,769	1061	539
N2AA	"	1,253,466	1008	498
KB2SE	"	1,013,688	853	468
KS2M	"	959,610	821	435
WA2IKL	"	758,183	854	433
K2PS	"	640,896	638	384
KD2YP	"	344,400	457	287
K2BRF	"	257,286	338	274
KT2D	"	193,094	350	262
WA2VQW	"	165,796	321	229
WJ2X	"	159,712	362	248
W2FGY	"	124,620	240	186
W2PHW	"	47,460	129	113
KD2BW	"	46,500	147	124
W2FUI	"	26,964	112	84
WB2JTE	"	5,152	62	58
NA2Q	"	312	13	13
W2HG	28	361,767	501	321
W2KZE	28	112,600	635	200
KU2Q	"	103,000	260	200
KA2AWE/T	28	91,111	225	179
K2KTT	"	27,454	120	106
W2QKJ	"	23,970	113	94
WD2AHD	"	119	7	7
K2VV	21	3,388,802	2083	694
WB2YQH	"	408,289	477	329
W2IQI	"	233,802	354	279
KD2TT	14	112,931	280	221
KC7KU/2	7	99,246	168	139
KM2P	3.7	229,688	539	268
NQ2D	3.7	118,146	352	203
WA2IUO	1.8	22,220	258	101
K3ZO	A	3,659,862	2021	677
NM3E	A	756,650	721	426

NM3U	"	578,348	634	382
K2DOX/3	"	282,037	428	301
K3WW	"	254,930	412	265
K3FNW	"	141,764	281	244
AC3T	"	140,976	264	264
(Op. KA3B)				
KA3AVB	"	106,372	259	209
W3FTG	"	60,207	177	141
NQ3S	"	16,544	100	88
KC3QS	"	15,372	95	84
W3DHN	"	14,946	108	94
KA3QER	"	7,696	58	52
K5ZD/3	28	2,066,540	1378	580
WA3LFY	28	1,528,604	1210	539
W3KHQ	"	318,852	410	306
N3GSC	"	4,558	49	43
WA3DMH	21	78,030	181	153
K3IPK	"	36,300	142	110
W3BGN	7	88,486	187	151
KQ3V	3.7	204,568	535	281
KC3EK	"	94,080	354	210
W4NT	A	4,867,629	2530	741
(Op. KM9P)				
A12C/4	A	2,428,884	1592	603
K04J	"	607,944	797	438
W4WKQ	"	369,184	528	332
W4TMN	"	325,312	443	299
KJ4TI	"	318,200	448	296
W4WJJ	"	299,112	410	264
WB4FTI	"	210,156	365	249
AA4XU	"	203,049	332	231
WB4FOT	"	144,105	270	195
WK4F	"	112,179	225	183
KF4CI	"	52,197	169	137
W4KMS	"	40,003	116	109
KM4GW	"	21,528	113	104
W4UYC	"	18,744	108	88
AA4XM	"	16,236	85	82
N4EUK	"	1,092	27	26
WA4QMQ	28	1,419,360	1110	480
KC2KU/4	28	318,900	422	300
N4UOD/T	28	128,238	332	201
KC4GFW	"	92,332	217	164
WB4VQO	"	55,183	155	139
KB4YJG	"	24,166	104	86
WA4IOB	"	21,312	130	111
AB4HQ	"	20,832	89	84
WD4BHM	"	16,320	94	60
KJ4FW	"	6,716	50	46
KB4BBC/T	"	6,072	51	46
NA4Z	21	2,230,452	1758	668
AA4NC	"	7,526	80	71
N4MO	14	522,588	742	407
W4CYC	"	174,632	439	263
KB4HZ	"	2,686	35	34
KK4RV	7	34,596	104	93
AA4MM	1.8	22,184	243	118
WG5J	A	2,678,830	2143	710
KA5W	A	1,745,199	1270	593

KC5TA	"	863,148	832	429
NJ1V/5	"	564,480	1106	480
N5JKN	"	560,976	672	377
NT5V	"	554,592	922	436
KD5GD	"	496,440	625	360
KE5HB	"	162,259	302	211
AA5IE	"	114,192	268	208
W9AGH/5	"	94,560	235	197
AA5CO	"	54,444	185	156
KG5NE	"	22,246	107	98
W5FO	"	19,500	121	100
N5LXD	"	17,248	103	98

CUETA				JH2WHS	"	324	18	18	UL70BH	"	195,144	399	188	EA5DIT	"	10,208	64	58	SARDINIA				
EA9NN	28	3,888	36	JI2KKY	21	1,548,800	1169	484	UL7CQ	21	40,293	162	111	EA1CYG	"	1,066	26	26	IS8LLJ	A	39,720	146	120
MAYOTTE				JA3YKC	21	1,009,557	835	417	EUROPE				EC3CPT	21	391,170	776	295	SICILY					
SOUTH AFRICA				(Op. JK3GAD)					MONACO				EC4CPW	21	359,904	794	326	NORWAY					
FH5EF	A	5,522,536	2076	JH0USD	"	744,192	701	408	MALTA				EC1GSO	"	115,210	430	205	NORWAY					
ZS4WD	A	204,282	299	JA3SSW	"	658,154	656	371	PORTUGAL				EA7CD	"	84,412	251	188	NORWAY					
ZS6AXF	28	537,096	561	JA2BNN	"	642,176	686	346	CR5CQK				EC5CHV	"	43,355	223	145	NORWAY					
ZS6P	"	162,070	291	JG1DDF	"	464,288	518	352	CT1QF				EC3CRE	"	10,260	99	76	NORWAY					
ZS6BCR	14	259,793	370	JH0OBD	"	163,718	299	218	CT1BWU				EC7DMQ	"	2,660	44	38	NORWAY					
ASIA				JE7SLC	"	134,592	268	192	CR0CIR				EC7DMU	"	740	23	20	NORWAY					
ISRAEL				JE7JZT	"	115,290	218	210	CR5CQK				EA3AAV	14	1,164,328	1211	524	NORWAY					
4Z8UX	28	4,006,891	2296	JH7KTI	"	103,194	209	182	CT18BJ				EA3DVJ	"	37,084	174	146	NORWAY					
4X6DE	21	227,227	375	JI2LCE	"	58,692	162	134	CT1DVD				EA3CUQ	7	180,400	328	200	NORWAY					
4X5L	14	3,564,912	2083	JR5FHC	"	57,509	176	131	CT4HA				BALEARIC IS.										
WEST MALAYSIA				JA3BBG	"	23,736	102	86	CO0TM				IRELAND										
9M2ZZ	A	403,560	602	JF2PXB	"	18,225	101	75	CO1BOP				FRANCE										
KOREA				JI1LAI	"	10,800	73	60	CT1DIZ				FRANCE										
HL9FN	A	153,429	321	JQ1QCC	"	10,266	70	59	CU3AC				FRANCE										
HL1LW	28	367,092	469	JG7BCD	"	7,590	63	46	FED. REPUBLIC OF GERMANY				FRANCE										
JAPAN				JL2RQH	"	6,435	53	45	DA2JV				FRANCE										
JA8JHA	A	5,830,359	2893	JR3KAH	"	3,922	44	37	DA3HJ				FRANCE										
JG3KIV	A	1,839,862	1251	JP3SOU	"	3,210	64	30	DF1IK/P				FRANCE										
JH4NMT	A	1,750,494	1205	JM2BHI	"	560	16	14	DL3NBL				FRANCE										
JR3BOT	"	1,499,588	1155	JN10TG	"	192	8	8	DL5YCO				FRANCE										
JR1GSE	"	858,420	777	JA1JLP	"	112	8	7	DJ8UV/p				FRANCE										
JE7DOT	"	290,664	410	JA2THS	14	1,387,663	1025	479	DL6LAG				FRANCE										
JA3UWB	"	178,416	320	JA7YAB	14	1,079,036	900	433	DL1EK				FRANCE										
JA1BUI	"	156,959	288	(Op. JA1-36363)					DL9OE				FRANCE										
JH8DNX	"	156,024	319	JH7QXJ	"	851,787	786	387	DL5ZBA				FRANCE										
JE1UFF	"	153,608	287	JE3ZFS	"	633,960	630	360	DF1DV				FRANCE										
JL1MWI	"	136,400	261	(Op. JK3HZH)					DF5WV				FRANCE										
JE8MHS	"	123,046	240	JA6AQV	"	9,240	60	55	DK4IO				FRANCE										
JA5IP	"	110,410	246	JG7JBZ	"	1,482	28	26	DF0TVI				FRANCE										
JF6JOM	"	107,880	226	JA2BAY	7	278,202	423	233	DL4OK				FRANCE										
JR4ISF/3	"	68,876	183	JA1YAD	"	90,852	171	134	DL3XAE				FRANCE										
JA3LDH	"	54,684	153	(Op. JH9AMJ)					DL4EJ				FRANCE										
JG3NKP	"	53,632	145	JA0UMV	"	85,674	194	131	DJ1ZU				FRANCE										
JA5EO	"	50,820	164	JA1GO	"	1,200	16	15	DJ4AX				FRANCE										
JH8BLI	"	43,875	133	MONGOLIA				DJ1QH				FRANCE											
JA6AKV	"	34,782	123	JT1BQ	28	28,812	185	98	DK1FW				FRANCE										
JR4ISK	"	33,390	130	JORDAN				DL8NCG				FRANCE											
JA2DN	"	32,946	117	JY9LC	A	876,600	930	360	DF5WV				FRANCE										
JA7FKF	"	31,400	121	INDIA				DK4IO				FRANCE											
JA6QDU	"	24,087	101	AT0T	A	678,834	727	351	DL8QS				FRANCE										
JA6JXO	"	23,460	102	VU2CC	"	24,310	111	85	DL40K				FRANCE										
J16OWY	"	19,680	98	U.S.S.R.				DL3XAE				FRANCE											
JA6BWH	"	16,165	88	ASIATIC				DL4EJ				FRANCE											
JH0XUP	"	15,622	77	UA0ABK	A	2,114,064	1481	554	DJ1ZU				FRANCE										
JA1BNW	"	14,144	73	UA0BSR	A	1,948,972	1475	554	DJ4AX				FRANCE										
JH6IOM	"	13,464	72	UA0SNT	"	147,630	367	210	DK1QH				FRANCE										
JA0BPY	"	12,045	80	UA0FS	"	39,768	212	172	DK1FW				FRANCE										
/JR6	"	11,820	76	UA0SU	28	751,394	814	382	DL8NCG				FRANCE										
JR1TFR	"	6,075	47	UA0OGK	28	641,712	687	348	DF5WV				FRANCE										
JG1RDV	"	4,134	47	UA0UAG	"	18,961	180	67	DJ6TK				FRANCE										
JH9CAV	"	2,378	30	UA0TO	21	3,558,400	2262	695	DJ9ZB				FRANCE										
JH3TXP	"	2,231	25	UW0LT	21	2,552,504	1725	604	DH40AA				FRANCE										
JR9GQP/3	"	2,212	29	UA0QF	"	477,456	534	348	DL3ME				FRANCE										
JH1PXY	"	1,696	36	UA0KCI	"	384,670	535	286	DL1YAW				FRANCE										
JH1RMH	"	644	18	UA0FZ	"	145,390	316	217	DL4YBM				FRANCE										
JF4VZI	"	348	13	UA0SME	"	110,352	283	209	DJ0BX/P				FRANCE										
JS1NXR	"	324	9	UA0SOM	"	105,560	296	182	DL2ZA				FRANCE										
JR9HNJ	"	324	9	UW0CM	"	94,920	358	168	DK5KJ				FRANCE										
JH1AJT	28	4,815,648	2512	UW0CQ	"	25,470	100	90	DL8QS				FRANCE										
JEBXRF	28	2,277,719	1557	RA0SK	7	924	14	14	SPAIN				FRANCE										
JF1SEK	28	2,130,557	1504	UA9MR	A	1,920,736	1317	522	EA1CON				FRANCE										
JH1YDT	"	1,389,435	1185	UA9WNR	A	167,706	315	198	EA4BT				FRANCE										
GEORGIA				UA9CCJ	"	54,389	161	137	EA5D0				FRANCE										
JA6BIF	"	1,265,382	1012	UA9URF	"	23,460	103	85	EA5BD				FRANCE										
JA4VAD	"	717,924	712	UA9YNC	28	954,585	961	405	EA7GFG				FRANCE										
JA7LMZ	"	605,360	643	UA9QCP	"	6,624	52	48	EA4EER				FRANCE										
JA7JPK	"	396,048	501	UW9CD	21	695,020	704	380	EA5EFV				FRANCE										
JR70MD/2	"	376,584	434	RW9AB	21	377,970	495	293	EA2CR				FRANCE										
JA1QZC	"	312,660	413	RA9WKG	"	149,796	272	228	EA5AEN				FRANCE										
JF3BFS	"	223,377	348	RA9CVC	"	100,144	286	176	EA3EXW				FRANCE										
JG2TSL	"	196,027	322	UA9XEN	"	31,110	115	102	EA7DXR				FRANCE										
JR0BQT	"	174,590	303	UA9SN	14	137,052	270	188	EA3FHT				FRANCE										
JA1KFX	"	154,850	293	UA9ND	7	521,371	479	223	EA7EBH				FRANCE										
JR2IGV	"	95,088	206	UA9YIH	"	98,762	165	113	EA5BK				FRANCE										
JF2KUU	"	55,424	156	ARMENIA				EA3D0B				FRANCE											
JE2IFM/2	"	49,288	142	UG6JJ	28	280	10	10	EA3NA				FRANCE										
JA9DVE	"	34,711	119	UZBEKISTAN				EA3ESZ				FRANCE											
JA2DHL	"	31,244	108	UI8ZAA	A	1,107,400	992	350	EA5DIJ				FRANCE										
JR7LVK	"	30,800	110	TADZHIKISTAN				EA4CPD				FRANCE											
JH8DHV	"	29,973	116	UJ8XOH	A	228,800	312	286	EA5DSG				FRANCE										
JA3CXN	"	27,438	192	UJ8JCM	28	1,223,035	1320	407	EA380X				FRANCE										
JA4KWU	"	24,742	98	KAZAKHSTAN				EA1CVY				FRANCE											
JH2KGZ	"	22,360	96	UL7ACI	28	2,919,910	1689	590	EA7FUR				FRANCE										
JR10YL	"	13,325	73	UL7JV	28	445,760	698	292	ED3DZ				FRANCE										
JH1NHY	"	8,635	58	UL7DBD	"	346,380	567	276	EA3ELZ				FRANCE										
JA1AAT	"	5,808	46	RL7RL	"	11,832	72	68	EA3FBP				FRANCE										
JK6QJH	"	5,289	45					EA3FRJ				FRANCE											
JA0GZ	"	4,392	42					EA1BFZ				FRANCE											
JE4ETG	"	4,329	41					EA3EJ				FRANCE											
JA3RBC	"	2,025	28					EA7AVU				FRANCE											
JA3FZI	"	1,092	22					EA5CPH				FRANCE											
JH8RGO	"	816	17					EA5ETP				FRANCE											

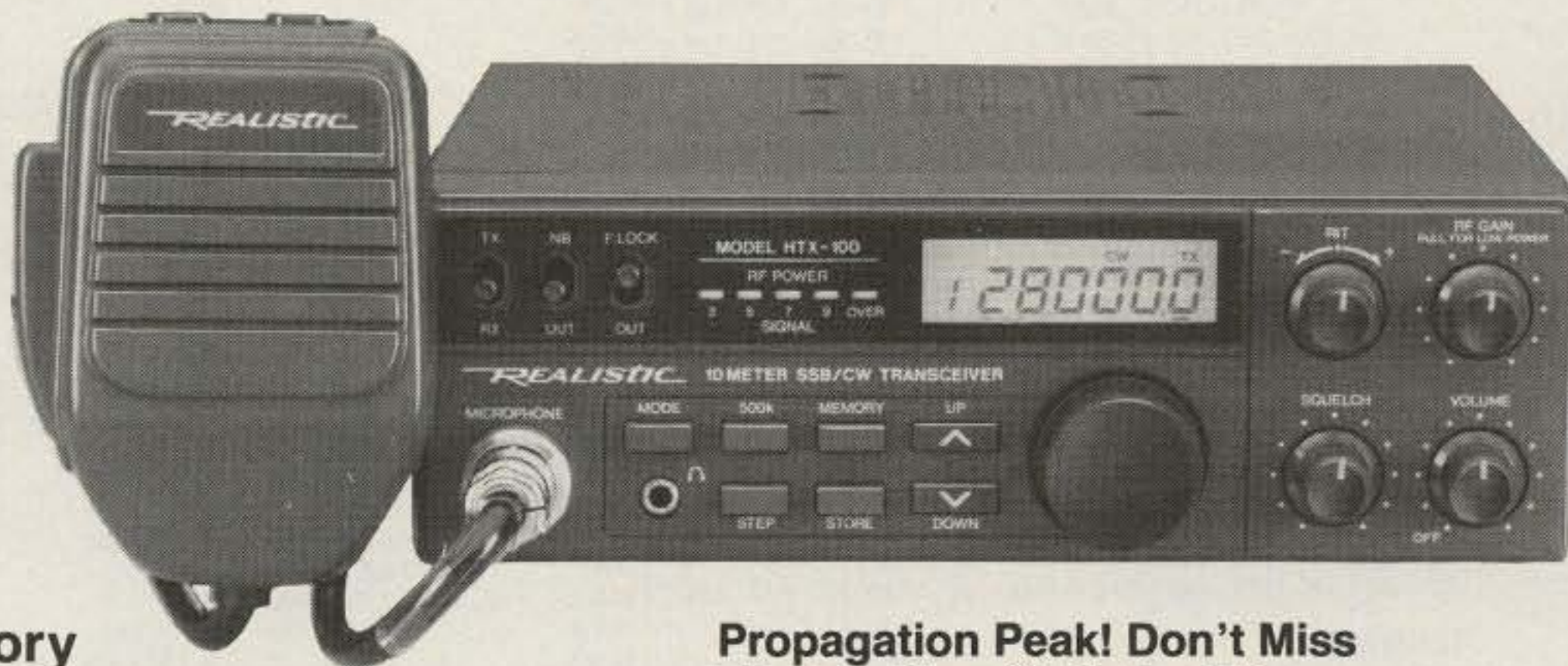
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Work the World With This Affordable Realistic® Transceiver

259⁹⁵

- Digital VFO, Full 10-Meter Coverage
- Selectable 25 or 5-Watt Output
- 10-Frequency Memory



**Propagation Peak! Don't Miss
The Exciting 10-Meter DX**

Hams are working the world with this top-value rig and here's what they're saying about it: "Great audio . . . Sounds like a much bigger radio . . . Best mobile I've ever owned . . . Easy to install." Realistic HTX-100 is a compact SSB/CW transceiver featuring handy pushbutton QSY from the mike, RIT and an effective noise blanker. It operates USB or semi break-in CW with sidetone.

Packet compatible? You bet, with a 40 ms rx/tx turnaround and standard 8-pin connector. HTX-100 requires 12VDC at 7 amps. Includes bracket, fused DC cord and 1-Year Limited Warranty. The Tandy® Service Plan extends warranty to five years for only \$39.95—pennies a month!

NOTE: You must have a valid FCC Amateur Radio License to legally transmit with this transceiver.

4" Speaker



Instant RX audio improvement for HTs and mobiles. Includes mounting bracket, 10-foot cord, 1/8" plug. #21-549 **13.95**

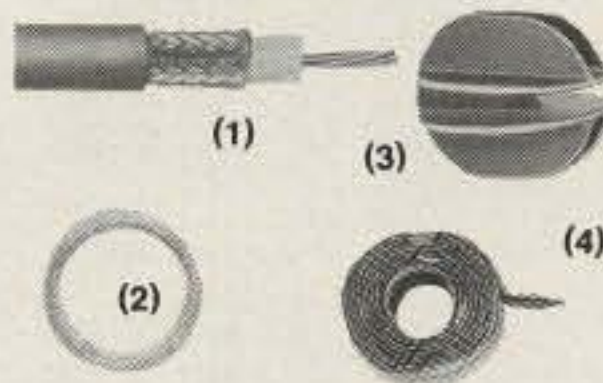
SWR/FS Meter



19⁹⁵

Combination SWR/field strength meter by Micronta®. Handles a kW, 3 to 30 MHz. #21-525
5-Ft. RG-8 Patch Cable. #278-969, 6.19

Antenna Buys



(1) RG-8. #278-1323 Per Ft. 42¢
(2) Antenna Wire. 70 ft. of 14-gauge stranded. #278-1329 5.79
(3) Insulators. High strength, low loss. #278-1333 2/69¢
(4) Outdoor RF Connector Sealant Tape. 60" roll. #278-1645 2.49

RFI-Busters



(1) Toroid Choke Cores. No-cut installation. Just wind and snap together. #273-104 Set of 2/7.95
(1) 75-Ohm High-Pass Filter. Effective! Installs inline at input of TV, VCR, stereo FM receiver. #15-579 3.95
(2) 300-Ohm High-Pass Filter. For TV or FM input. #15-581 5.95

WWV and WX Receiver

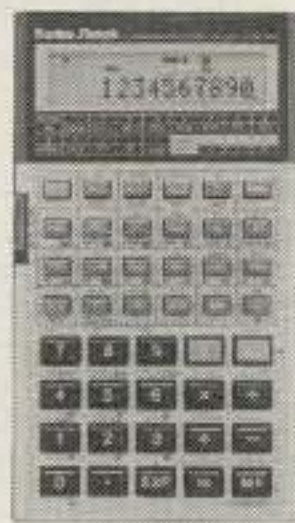


Crystal controlled. Receives WWV time and propagation reports on 5, 10 or 15 MHz, VHF weather up to 50 miles away. Battery extra. #12-148 **39.95**

Ham Calculator

39⁹⁵

Built-In Electronic Engineering Functions



Makes upgrade math easy! Computes and displays in V, A, mA, mW and Ω units. #65-983

Hookup Helpers



(1) 8-Pin Mike Plug. For TNC, mike, phone patch. #274-025 2.19
(2) Adapter. Use mini phones with Ham equipment. #274-348 1.99
(3) Shielded Adapter. 1/8" jack to 1/4" plug. #274-325 1.59
(4) Headphone Adapter. Adapts mini stereo phones to 3/32" earphone jack on HTs, scanners. #274-381 1.99

Mini Audio Amp

11⁹⁵

- Built-In Speaker
- High-Gain IC Design



Ideal for testing, signal tracing. Also great for computer voice/music synthesis. 1/8" headphone jack, 1/8" input jack, volume control. Battery extra. #277-1008

Over 1000 items in stock! Binding Posts, Books, Breadboards, Buzzers, Capacitors, Chokes, Clips, Coax, Connectors, Fuses, Hardware, ICs, Jacks, Knobs, Lamps, Multitesters, PC Boards, Plugs, Rectifiers, Resistors, Switches, Tools, Transformers, Transistors, Wire, Zeners, More!

Prices apply at participating Radio Shack stores and dealers. See store for warranty details.

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BRAZIL			
PP2ZDD	A	1,797,095	1136 532
ZY1NEZ	A	1,150,788	795 492
ZZ8WHL	"	129,580	243 190
PY3BD	21	185,097	301 213
PY2MPK	"	34,578	123 102
PY2APQ	14	86,142	217 147
ZY2ELZ	7	25,160	76 68

VENEZUELA			
YV7QP	A	291,550	332 245
4M1G	28	262,812	373 242
		(Op. YV1CLM)	
YV5EW	"	28,119	103 103
YV1CP	21	5,867,185	2424 815
YV5LAS	14	730,674	655 378
4M3B	"	338,046	551 309
		(Op. YV3BKC)	
4M5T	7	81,988	139 103
		(Op. YV5JBI)	
YV1QEW	1.8	1,620	18 15

PARAGUAY			
ZPBY		28,10,518,343	4162 853
		(Op. ZP5JCY)	

TRINIDAD			
9Y4VU	21	4,731,226	2284 697

MULTI-OPERATOR SINGLE TRANSMITTER UNITED STATES

WC4E	10,748,673	4286	1017
W0BG	7,900,395	3671	885
K11G	6,644,360	3240	860
NA6A	4,684,057	2377	763
K16VC	4,307,949	2403	747
NM9H	3,800,608	2340	722
N7TT	3,336,432	2137	712
AB4CQ	3,096,555	1844	735
KS3F	3,073,329	1859	707
KA9TNZ	2,915,545	1969	719
WC5C	2,387,028	1872	724
NW5W	1,982,001	1665	679
KE0YO	1,937,616	1559	592
NM2Y/3	1,775,873	1259	551
NT0P	1,766,187	1393	626
WB3KX/8	1,378,120	1152	526
AA6BB/7	1,308,391	1116	457
NV4G	935,008	935	488
K5LZD	863,300	911	485
WE5P	692,478	782	438
WB8PHI	490,050	506	363
WF2G/4	427,085	611	373
N1AU	300,810	464	271
KE8NW/4	230,886	385	254
WB0MHU	99,876	231	174
WA8LLY/6	36,464	121	106
WB3JRU	18,720	87	78

NORTH AMERICA

VE70N	7,800,594	3670	762
CF1DX	6,942,950	3543	830
VE5GF	4,811,324	2808	713
AL7FQ	4,199,130	2421	666
VE6WP	4,198,944	2570	687
VE6AO	3,609,802	2479	643
KL7CQ	3,535,740	2255	585
NL7DU	1,350,440	1170	490
VE3BXY	747,492	637	373

AFRICA

5H1HK	11,262,108	4399	858
C53FV	729,917	783	311

ASIA

P33ES	8,355,312	4568	648
JA1YXP	4,786,518	2427	694
JG3ZDK	4,685,712	2204	752
HL90B	4,440,576	2504	672
JE6ZIH	4,089,306	2385	618
JA3YDS	2,523,717	1609	567
JA4YJA	1,988,084	1423	518
BY4WNG	856,596	1672	323
JH2UVL	675,188	664	358
JT1KAI	508,464	1029	321
JA7YRR	475,551	542	309
BY1CKJ	126,150	533	174
JA4YAV	40,208	153	112
JA0ZRY	2,574	24	22

EUROPE

LZ9A	14,399,625	4949	1075
IR4VED	13,110,822	4786	1018
HG5A	11,575,360	4532	976
HG1S	11,551,071	4616	977
FV9NDX	11,425,011	4629	949
ED3MM	9,263,826	4096	858
HG7B	8,528,100	3804	917
YT3T	7,730,055	3414	855
HASKKC	5,695,960	3043	735
OG3AA	5,597,652	2952	762
HG0D	5,381,838	2969	726
ON6AH	4,636,958	2540	733

OR0TT	4,616,075	2857	725
FF1LFG	4,474,451	2698	731
GB2SH	4,304,592	2359	716
OH6AC	4,021,416	2203	707
FF6KAW	3,933,750	3100	750
DK2XX	3,569,229	1975	721
HA6KVB	3,482,700	2123	741
IK2BTI	3,330,402	2260	618
7S3HK	2,967,000	2264	645
OH9KK	2,743,710	1933	645
TA1AZ	2,684,640	2646	595
HA3KNA	2,610,792	2028	612
YU2CCJ	2,606,682	1711	598
HABCKJ	2,381,376	1606	628
OK1KPU	2,199,111	1659	591
OH6AP	994,672	1027	428
YU4AVW	938,384	1024	446
SP1PBW	657,965	710	385
OZ/DL0PE	592,267	816	377
SK5DB	589,402	820	367
LZ1KNP	569,244	797	356
OK1KNS	520,533	714	351
EJ8GT	502,495	747	343
GM0AEE	467,820	666	345
Y54CO	460,586	768	334
LA1T	385,521	525	321
ED1ETN	316,512	623	314
Y52CE	311,508	667	306
OK2KYC	295,236	551	278
OK1OFM	273,632	519	272
SP5ZCC	230,450	531	275
OK1KNC	221,859	450	243
Y61CA	188,612	393	244
SP9ZHR	187,822	390	229
SP3PMA	179,200	410	224
HA7KNT	94,644	315	198
OK2KVI	86,394	260	187
SP9PEY	64,464	250	158
HA6KNX	60,755	205	145
OK3KYH	53,223	260	157
OK2KLI	44,649	186	121
OK1KLX	25,199	164	113
YU7GST	15,980	148	94
OK1KCF	10,725	71	65
LZ1KEZ	6,916	104	52
OK2KDS	2,170	37	31

OCEANIA

F05IW	7,102,860	3660	690
5W1HT	4,531,730	2719	574
5K6LW	4,513,605	2387	655
4G1A/3	2,275,400	2050	367
YB4ZBY	2,103,054	1449	498
ZL2AH	1,564,110	1328	405
KEBSC/DU3	728,284	757	326
VK6ANC	439,856	518	296

SOUTH AMERICA

ZX5C	22,400,980	6903	1060
AZ4F	12,199,680	4243	960
HC2G	11,719,347	4369	907
AZ5D	4,060,696	2245	761

U.S.S.R.

CLUB STATIONS

ASIA

UL8LYA	11,480,422	4133	911
RL8PYL	11,155,725	4059	945
R0C	9,258,540	4500	870
UZ9CWW	7,265,960	3034	785
RZ9MYA	2,318,000	1617	488
UZ9CZM	1,600,660	1078	491
RW9HYH	1,160,568	1288	398
UZ0SWU	900,360	926	410
UZ0QXU	822,648	751	454
UL8DZZ	794,820	889	390
UI9BWE	677,409	712	349
UZ9WWB	389,412	870	373
UL8CWW	354,542	485	269
UF7FWM	331,446	480	222
UZ0IWE	167,776	348	224
UZ9UZL	75,692	130	127
UM9MZC	40,014	159	144

EUROPE

UQ1GWW	9,217,204	3943	874
UR1RWX	6,220,032	2996	832
UT4UWX	5,700,642	3124	818
UB3IWA	5,487,496	3115	763
UP1BYC	5,256,621	2815	799
UP1BZG	4,416,288	2417	771
UZ4WWF	1,989,000	1752	600
UZ6HXK	1,832,540	1936	590
UZ3RXX	1,824,030	1623	585
UB4WZA	1,759,530	1308	534
UZ4WWA	1,215,760	1380	520
RZ6LYL	1,112,865	1352	507
UZ1AWD	902,672	1063	462
UQ1GXJ	827,576	920	376
UZ4WWB	695,520	873	460
UZ4PZD	575,640	652	390
UB4TWL	446,420	640	340
UQ1GWY	429,072	729	336
UZ4RWD	382,858	708	322
UZ1PWW	320,450	740	325
UB4QYA	319,319	548	319
UZ4PWW	300,960	602	285
UB4QWY	281,790	518	303

UC1IWW	192,282	441	219
UT4UWG	115,575	347	201
UQ1GYQ	107,047	308	167
UB4UWD	98,176	345	203
UZ3YWM	70,493	192	157
UB4IZA	67,124	270	173
UP1BXT	56,304	200	136
RB4EXN	53,010	234	155
UC1AWK	38,913	139	119
UB4FWH	37,942	175	122
UZ1QXC	30,940	130	36
UB4TXG	27,306	150	111
UC1AWP	16,652	119	92
UP1BYT	12,070	85	71

MULTI-OPERATOR MULTI-TRANSMITTER WORLD

FK0AW	26,538,972	8661	1002
KL7RA	23,629,565	7813	1135
YT2R	22,324,200	7594	1160
WZ6Z	18,737,170	7125	1138
S79T	15,479,240	5538	937
JA9YBA	13,579,072	4852	988
JA1YFG	10,428,459	4175	887
UP1BZD	8,607,190	4109	890
NB1H	7,751,043	3551	909
WR6R	3,605,825	2142	715
N4WW	3,047,176	1749	682
PI4DEC	2,666,169	4653	573
UJ9JWI	65,780	184	130
JA2YEC	52,151	169	121

CHECK LOGS: The following logs were used for cross-checking. Check logs and SWL logs are always appreciated. Thank you.

4N1N, CE58PE, CQ4BY, CS0DJE, CT1AHC, CT1YH, DJ3VC, DK3MW, EA1AW, EA1EMO, EA3CZM, EA3ERT, EA4EBE, EA4EDU, EA5JC, EA6GP, EA7AL, EA7FTR, EA7GBD, EA8AKN, EA8AVV, ED4KK, F11EUC, F6GOS, HL3NU, HA5FA, HK3MAH, HK3NTI, HL9BK, IK8JMS, IK7BPV, IV3ZCS, JA8TDJ, JW6WDA, K6FM, K8RSH, KA7FEF, LA0EW, LA3JT, LA3WBA, LA4GY, LA5JX, LA60V, LU2KV, LU1YU/D, LA3DK, LZ1PV, LZ1VV, N6RUV, NL-7320, R-28, NS3S, OH0RJ, OH1PU, OH1RY, OH1YM, OH1YM, OH2BYS, OH2MCX, OH3HS, OH5NR, OH6GZ, OH6NEQ, OH6NEV, OH6OP, OK2BGN, OK2PAY, ON5FV, OZ10PW, OZ1DYI, PP5XX, PY1AJK, PY1BJN, PY2SZA, PY5AAT, RA0SU, RA1AI, RA3AGF, RA3APO, RA3ATM, RA3DAD, RA3DDH, RA3DDU, RA3DEJ, RA3DKE, RA3DR, RA3VR, RA4PKL, RA6AF, RA9AE, RB5CL, RB5GW, RB5IA, RB5ICY, RB5IGV, RB5RA, RB5WG, R040A, R040W, RS3X, RW3DD, RW3QA, RZ10A, SK7UO, SM0CSX, SM2NTU, SM3CVM, SM30SM, SM4JUW, SM4SET, SM5BBS, SM5EMR, SM5FBL, SM6BWQ, SM6CDN, SM6KMD, SM6RCE, SM6ZN, SP1EYI, SP1JRF, SP2FAP, SP2LQP, SP2ZFJ, SP3BVI, SP3GVX, SP3KPO, SP3PLD, SP4BY, SP4ETO, SP4TBY, SP5ENA, SP5KVV, SP6FAF, SP6IUV, SP6MLT, SP6TGA, SP70GK, SP8HXN, SP8JMA/A, SP8LZG, SP9BRP, SP9CYY, SP9ENR, SP9ODY, U0GA, UA0KD, UA0XAK, UA1ADR, UA10T, UA3AAB, UA3ACJ, UA3NDR, UA3DAT, UA3DL0, UA3DLU, UA3DUA, UA3DUM, UA3EAT, UA3EDH, UA3EDP, UA3GDJ, UA3LAR, UA3PB, UA3RE, UA3RJJ, UA3RNI, UA3TAM, UA3TRG, UA3THQ, UA4CDL, UA4NC, UA4NCI, UA4PKN, UA4PKV, UA4PMO, UA6HQH, UA6LF, UA6PCH, UA6YFW, UA9-140-1138, UA9UDX, UA9XJV, UB3GWG, UB4JWF, UB50FJ, UB5VBK, UB5XBV, UL7CC, UL7JC, UL7PT, UL8BWW, UL8MWF, U050DA, UR2RMC, UT4UN, UT5UCK, UV0EX, UV1AT, UV3ACQ, UV3DF, UV4HD, UV6HLC, UV6HSU, UV9CAF, UV9CO, UW1AX, UW3AD, UW30D, UW3RR, UW4NN, UW6MS, UW9SG, UW9UE, UW9YM, UY5GG, UZ1NWO, UZ3DXF, UZ3DYK, UZ3TWR, UZ4AXQ, UZ4FWX, UZ4HYK, UZ4PXJ, UZ4PZZ, UZ4WWE, UZ4WWY, UZ6LWA, UZ9AZB, UZ9CXA, UZ9SWI, UZ9SWR, UZ9UWN, UZ9XXM, VK3CIS, XE1YO, Y2200, Y22T0, Y22YD, Y23HJ, Y23KI, Y23LI, Y24VF, Y24YH, Y25BL, Y25JA/A, Y25TO, Y25YD, Y26NL, Y27GL, Y28TO, Y31WI, Y36XC, Y38YE, Y39ZC/Y56ZC, Y41SN, Y44WB, Y46KA, Y47XF, Y49RF, Y49RO, Y49ZD, Y53SF, Y54XD, Y61XM, Y63QI, Y78PL/P, Y78SL, Y88VM, Y05BLA, Y05KLE, Y06CTB, ZS6BRZ, ZY1IH.

DISQUALIFIED: RB8M—excessive duplicates; LZ1KBG—excessive duplicates; UB2JWS—excessive duplicates.

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Here's a one-evening project that will come in handy if and when you operate QRP. The parts are simple to get (you might even already have some), and it's a lot of fun to build.

Build Your Own QRP Dummy Load/Wattmeter

BY J. FRANK BRUMBAUGH*, KB4ZGC

Here is a junk-box project which will be of interest to QRP enthusiasts. It provides a 50 ohm dummy load and a meter to indicate when the calibrated potentiometer is set to the RF power applied to the input SO-239 or RCA jack. Because you can calibrate it with DC voltages, it is extremely accurate.

Fig. 1 is the schematic of this device. Both an SO-239 and RCA phono jack are connected in parallel for RF input, because both are used by different QRPers in their equipment. R1 through R12 are 150 ohm, 2 watt, 5% non-inductive resistors connected in a series-parallel arrangement to provide 50 ohms at a nominal 24 watts rated dissipation. Under "brick on the key" conditions **no more than 10 watts should be applied.**

A linear 10,000 ohm potentiometer is connected directly across the 50 ohm dummy load. The variable connection to this pot taps off RF voltage, and this is rectified by diode D1, filtered by R13 and C1 and C2. The resulting DC voltage is applied to meter M1.

The entire instrument is constructed in a 2" x 2" x 4" mini-box that once held a homebrew FET dip meter. Any small case can be used, or you can construct one from circuit-board material. The meter can be any sensitive movement, such as the many 100 and 200 microampere tuning meters available on the surplus market. You probably have a few in your junk box right now that are begging to be used. Any combination of carbon-composition or film resistors which will result in 50 ohms at 10 to 20 watts can be used for the dummy-load resistor. The 10K pot should have a linear taper if you wish the low-power (under 5 watts) portion of the scale expanded. An audio taper pot would provide a more linear scale. Microwatt/milliwatt QRPers will want to use a linear pot.

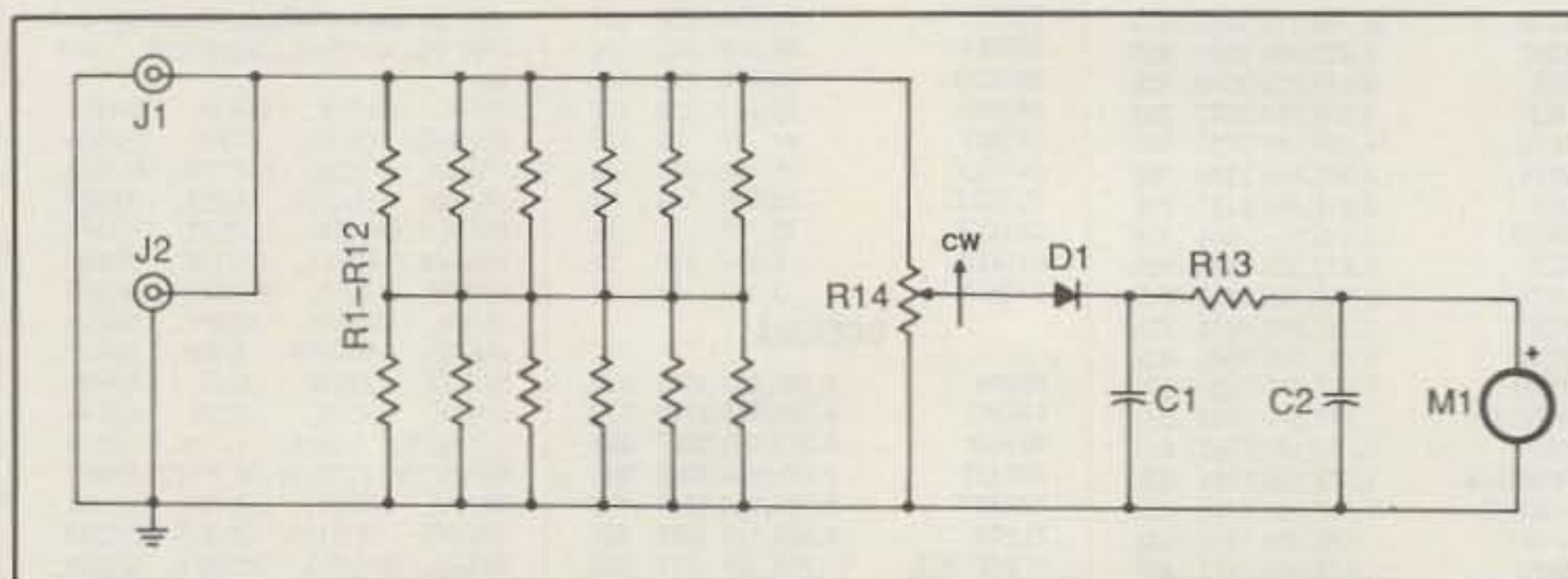


Fig. 1—Schematic diagram for the QRP dummy load/wattmeter.

Calibration is simple and results in greater accuracy of power output measurement than the usual inexpensive power meters which usually remain in the line between the rig and the antenna. You will need a source of variable DC voltage ranging from approximately 2 to 25 volts. If you don't already have a variable supply, an LM317, a 5K pot, and a 220 ohm resistor fed from a DC source a bit greater than 25 volts can be whipped up in a few minutes. To accurately measure the DC calibration voltage, a digital voltmeter should be used, but a good analog meter will suffice if you do not have a DMM.

Table I gives DC voltage equivalents to RMS RF power from 100 mw to 25 watts. For other powers use the formula $E = \sqrt{PR}$.

Calibration is simple. With the 10K sensitivity pot set fully counterclockwise, apply the DC voltage equivalent to the amount of RF power for which you wish a calibration mark on the dial—3.16 VDC for 200 mw, for instance. Then rotate the pot until the meter indicates a specific value you have chosen as a reference point for all calibration. I use a center-scale reading because it is easy to "eyeball" on the surplus meter I use, but any recognizable point on the meter scale can be used. The lower the meter reading

you choose, the lower the power level which can accurately be measured.

When the measured DC voltage input is equivalent to the RF power at the desired point on the pot dial, and the meter indicates the reference point you have chosen, mark the dial at that point. Repeat this calibration procedure for each RF power level/DC voltage point you wish up to at least 10 watts. You will note that the scale becomes compressed above 5 watts. Actually, I calibrated only each



Interior view showing the resistor bank. The rectangular object to the right is the back of the meter case.

*82 Liddell St., Buffalo, NY 14212-1824



View of the completed unit. The large dial makes it easier to calibrate, as explained in the text. You can dress it up any way you want.

the meter. I tried values between 4700 and 100K ohms before deciding on 47K. Too, the pot used could be anything between about 5000 ohms and 25K, although 10K is a value practically every QRP'er has in his junk box. A germanium point contact diode (1N34A) is preferred, although any diode which will withstand the peak inverse voltage of the maximum RF applied to the dummy load can be used, germanium or silicon. I simply used what was in the junk box. Also, because DC voltage is used for calibration, diode characteristics have no effect on accuracy.

The larger the diameter of the dial used on the potentiometer, the greater the accuracy of measurement. I used a circle of aluminum which was a meter cutout about 2 inches in diameter, glued a piece of card stock to it to accept the markings for calibration, and super-glued it to a knob. As I have set my instrument up, the lowest calibration point is 200 milliwatts, and there is nearly 75 degrees of arc on the dial to the 1 watt calibration, allowing for very accurate milliwatt measurement. The 2 watt calibration mark is 90 degrees of arc from 200 mw. From there to the 10 watt calibration point is about $\frac{5}{8}$

inch around the dial edge. This will suggest the amount of compression in dial markings as power is increased, and the meter is set each time to the preselected reference point before a power reading is made.

One caution is in order: *Always set the pot fully counterclockwise before feeding an unknown level of RF into the instrument.* This will prevent blowing the diode or curling up the meter needle around its stop.

As mentioned, this is primarily a junk-box project, and thus the cost should be very close to zero. I did not have the resistors for the dummy load in my junk box, so I spent \$2.00 for twelve 150 ohm, 2 watt, 5% resistors from Small Parts Center¹ (Cat. No. R3-150; QRP Dummy Load, 3 each 150 ohm resistors, 50¢). Excluding the case, the total cost using all new parts should not exceed about \$7.00, a very low cost for such a versatile and handy instrument. All parts are available from the Small Parts Center. CQ

watt between 1 and 5 watts, with an additional mark at the 10 watt level. I did not have the 31.62 VDC readily available to make a 20 watt calibration, but since QRP is generally considered to be 5 watts or less, this is not a problem for me.

The reason DC voltages are used to calibrate this instrument for RF power is that RMS AC is equivalent to a DC voltage of the same level. Thus, calibration is simple and easy for any level of RF or any other AC voltage. Depending upon the sensitivity of the meter movement you use, you may wish to increase or decrease the value of R13, the resistor in series with

Watts RF	DC Volts
01.00	2.23
0.200	3.16
0.300	3.87
0.400	4.47
0.500	5.00
0.600	5.47
0.700	5.91
0.800	6.32
0.900	6.70
1.000	7.07
2.000	10.00
3.000	12.25
4.000	14.14
5.000	15.81
6.000	17.32
7.000	18.70
8.000	20.00
9.000	21.21
10.000	22.36
15.000	27.39
20.000	31.32
25.000	35.36

Table 1— DC voltage equivalents to RMS RF power from 100 mv to 25 watts.

¹ Small Parts Center, 6818 Meese Drive, Lansing, MI 48911 (free catalog)



PacComm

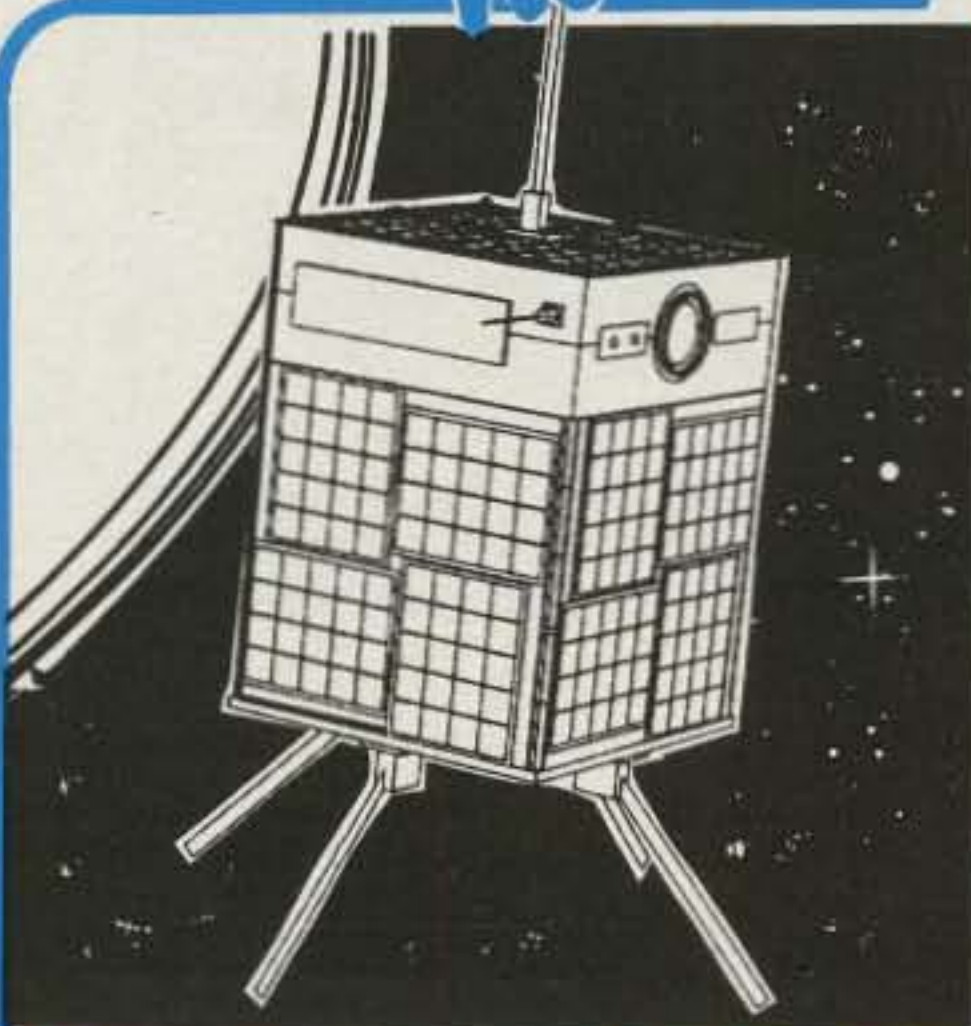
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CQ REVIEWS:

The GAP Challenger DX-VI Vertical Antenna

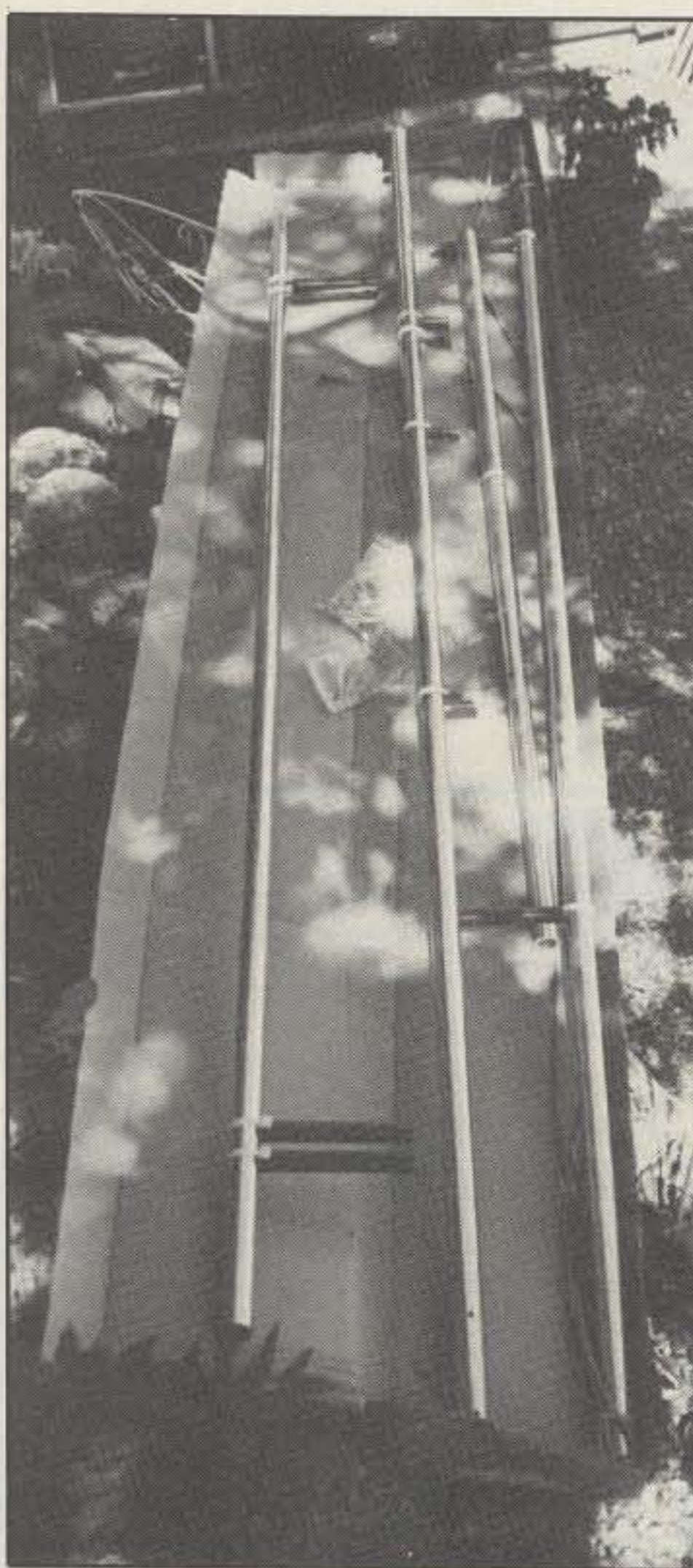
BY LEW McCOY*, W1ICP

It isn't often that an entirely new concept in antenna design shows up in amateur radio. At the Atlanta Convention I had a chance to see the new GAP vertical antenna and talk with its manufacturers. George Henf, KK4CN, the designer of the antenna, is a holder of patents on vertically polarized arrays and did considerable antenna design for aircraft-carrier antennas. There is no doubt he brings expertise to the amateur field.

GAP makes some strong claims for the antenna, and naturally I was curious as to how well the vertical would perform. I was sent one of the GAP verticals for review, and I didn't waste any time putting it up and testing it. I'll give the results of those tests in a moment, but first let me describe the antenna.

The GAP model I tested is called The Challenger DX-VI, and it covers six bands—80, 40, 20, 15, 12, and 10 meters (a surprise; see near the end of the review). There are no traps in the antenna, which has an overall height of 31.5 feet. Technically, the vertical could be described as a double-sleeve, asymmetrical radiator. More simply, the coax feed (50 ohms) is brought into the base and then up the lower sleeve to a gap (hence the name GAP), where the feed is brought out through another hole. This point is the 50 ohm impedance point. At the gap point, the vertical is separated by an insulator into an upper and lower section. The gap feed point is approximately half way up the vertical, 16 feet from the base. The coax continues up the vertical (inside the upper sleeve), where it is terminated on the outside of the vertical at the top.

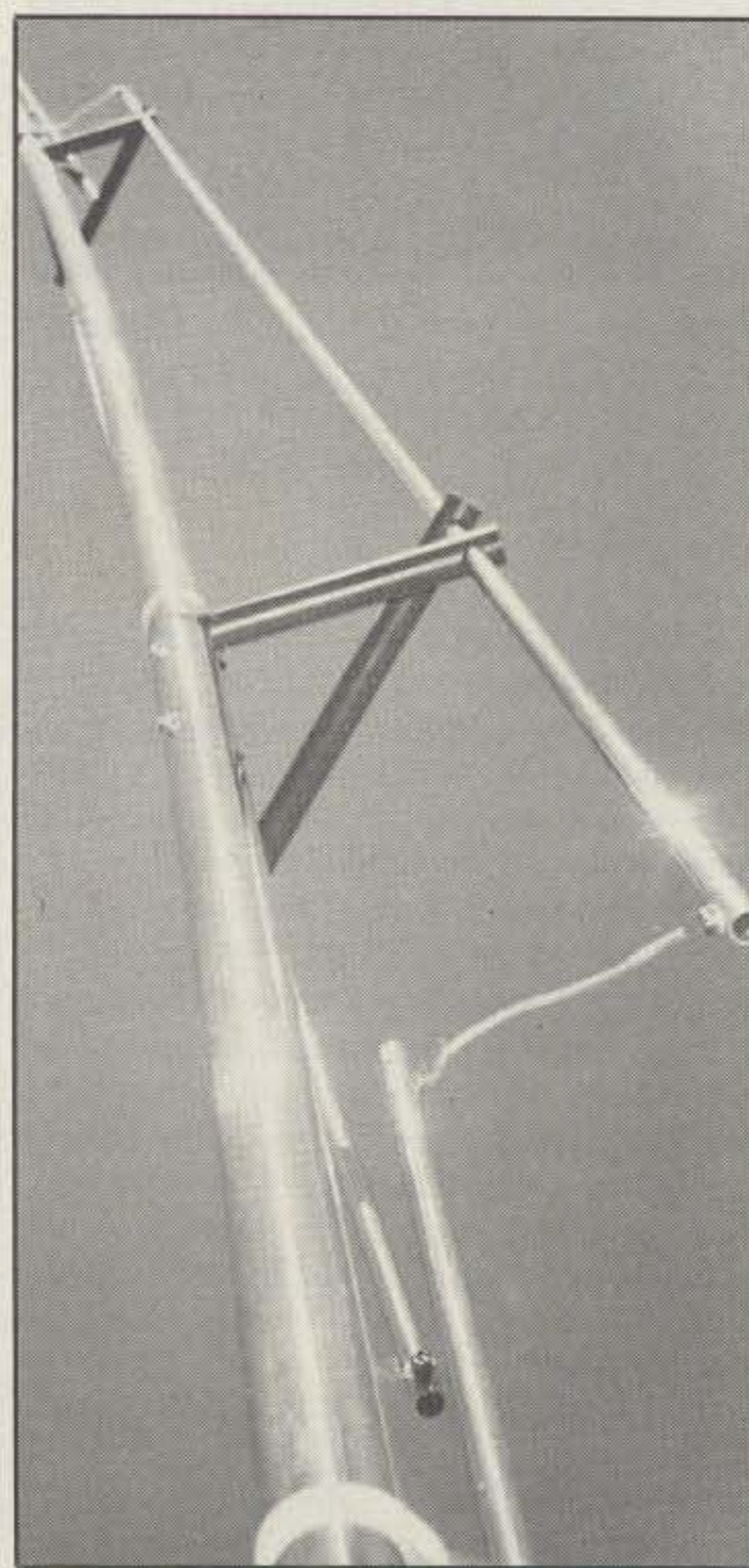
If you look at the photos, you will note that there are smaller diameter rods extending up and down the antenna from the gap point. The manufacturer explains the purpose of these rods, and I quote, "Some puzzle over the role of the small diameter rods. Very briefly, they assist in multiband operation. Linear loaders they are not! Each is deployed in directions opposite to linear tuners. The lower two



This is the GAP Challenger DX-VI vertical antenna as it comes.

rods interact with the main mast to influence the match on 80 and 40 and form the lower half of a vertical dipole on 20 and 12. The upper rod acts in a similar fashion with the main mast to couple RF to the antenna on 15 and 10 meters."

The manufacturer recommends three radials, each insulated, strung out 25 feet from the base of the antenna. Incidentally, the vertical is furnished with a 3 foot aluminum base pipe. The base pipe is buried to a point where 2 inches remain above the ground level. The vertical proper slides down into this base. The antenna



Looking up the antenna from near the base. The bow in the vertical is from my guy line being tight. The smaller rods are described in the text.

is self-supporting in winds up to 60 miles an hour. In my case, living here on the Continental Divide where the wind blows most of the time, I guyed the antenna with 50 pound test nylon fishing line. I tried the antenna both with and without the three radials. I only noted minimum difference in the SWR curves with and without the radials. I might add that I have very good ground conductivity by itself.

In the GAP literature, they emphasize the advantage of feeding a vertical at the 50 ohm point, which in this case is 16 feet up.

*Technical Editor, CQ, 200 Idaho St., Silver City, NM 88061



At the top the aluminum has high reflectivity as noted by the two "sunspots."

For my tests I constructed both a 20 and 40 meter ground plane vertical fed and matched at the bottom with 50 ohm line. I also have a very good beam antenna I used in switching tests, and I did lots of testing.

When I got everything hooked up, the first thing I did was run SWR curves. The GAP people state a bandwidth of 130 kHz for an SWR of 2 to 1 or less for 80 meters. I found that the SWR was much better than that in my installation, running well over 200 kHz. I might add that the match was 1 to 1 at the bottom of the curve—in other words, a perfect match on 80. I could have drawn the curves for all the bands, but it would be pointless simply because the bandwidth on all the bands was 2 to 1 or less except on the very high end of 10 meters.

From the start the GAP appeared to be a good listener. I would have expected the GAP to be down 8 to 10 dB from the beam, which has an honest 7 dB gain over a dipole. However, while the beam was the better performer, it truly was not that much hotter an antenna. In fact, I received many reports in which the GAP outperformed the beam.

Keep in mind that the GAP produces a lower angle of radiation, and this showed up on many of my long DX contacts. In a few instances I could actually hear signals on the vertical that were in the noise and unreadable on the beam. In my com-

parisons between the base-fed vertical and the GAP, the GAP consistently outperformed the base-fed antenna. It is hard to say to what exact degree, but most of my received and transmitted reports were approximately one S-unit better with the GAP. I realize these are strictly empirical tests, not scientific, but I did hundreds of them, and I know I can get a good idea of performance between the antennas. One other surprise was that the GAP vertical was quieter (less noise) than the two base-fed verticals. GAP claims this and I verified it.

This brings up another point which is a little more complicated. If RF is coupled to the outside of the coax line, parallel standing waves will be on the line. Parallel standing waves on a transmission line are undesired because the feed line radiates. In the case of the GAP antenna the feed line is brought *inside* the vertical up to the feed point, providing, in essence, doubly shielded coax and hence fewer chances for feed-line radiation, and consequently less RFI and TVI. I count this as a plus for the antenna.

Construction and Details

GAP literature says 30 minutes construction time. I would say this is a little optimistic. It took me about an hour and a half. They recommend cementing in the base pipe, but I used the old trick of running a garden hose down the pipe, running the water through, and making the hole in that manner. After it dried out (by the next day), I packed down the earth and rocks, making the base very secure.

Incidentally, I was asked by several amateurs if this antenna could be portable enough for DXpeditions. I definitely would say yes. It was shipped via UPS in a box that was about 8 feet long, total antenna weight 16 pounds. If you can visualize traveling with a pair of skis, you would have the same thing.


More Construction Details

The antenna is made from telescoping aluminum tubing, 6061-T832, and all hardware is stainless steel. GAP even provides a nut driver for constructing the antenna. There are no clamps used; the antenna is put together with heavy-duty self-tapping screws. In fact, I would rate the GAP as a quality product, but even more important a good performer.

One last word about the "radials." GAP recommends three 25 foot insulated wires strung out in practically any fashion from the base. They don't call them radials, but rather a counterpoise, this primarily for 80 and 40 meter operation.

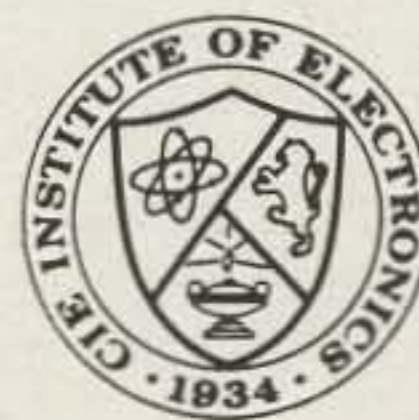
The instruction manual is more than adequate. Everything is done in numbered steps. I found it easy to follow once I had identified all the parts.

After I wrote the above, a friend who has a GAP vertical suggested I check out the antenna on 2 and 6 meters. I thought he was pulling my leg, but on the other hand nothing ventured nothing gained. I connected up a 2 meter rig and fired it up into the GAP. The local repeater popped right back, full quieting. I then rigged up a switch so I could go between an 8 dB gain beam and the GAP. I almost hate to say this, but the GAP *appeared to do as well* as the beam on 2 meters, at least that was so for repeater operation. I had several amateurs check my signal, and believe it or not they could detect little difference. The SWR on 2 meters ranged from 1.4 to 1.7. Likewise on 6 meters where the SWR was higher but still below 2 to 1 across the range. Don't ask me how it works on 2 and 6 because I still haven't figured it out, but there can be no doubt that it is resonant on those two bands and has a respectable radiation pattern. Keep in mind that the manufacturer, at least at this time of writing, only lists the antenna for the bands I mentioned earlier, but I feel I would be remiss if I didn't mention the 2 and 6 meter bonus.

It is my understanding that the company is working on a 160/80 meter GAP which I am anxious to test. The GAP model in this review lists for \$219.00 and is manufactured by GAP Antenna Products, 6010-Bldg J, N. Old Dixie Highway, Vero Beach, FL 32967 (407-388-2905). 

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ACQ 13

It's much easier to say XF4 than to try to pronounce Revillagigedo. OH2BH shares some other trials and tribulations he encountered while putting this rare one on the air.

The XF4 Story

BY MARTTI LAINE*, OH2BH/W6

“What is that glaring beam of light? What is this place anyway? This is not home turf. Where's Mom? Where are the kids?” Well, one of the ultimate realities of life is that every once in a while even the most knowledgeable and seasoned DXpeditioners, those who are considered the anointed gurus of the world of DX, find themselves asking questions. When a true-blue DXer, long in years of active traveling to rare DX spots around the world, persevering in the quest to satisfy public demand for New Ones, starts asking questions, something unusual must have happened that should alert everyone toiling in the DX vineyards.

Well, in the present case it turned out that this traveler had ended up in a George Washington Hospital emergency room in Washington, D.C. It was spring, the nation's capital was buzzing with life, and the world was waiting—waiting patiently to hear the year's premiere DXpedition blasting the bands with full-bore signals from the Revillagigedo islands off the coast of Mexico, XF4, high on the Most Wanted Lists in many corners of the world.

In Europe, where Revilla was a particularly coveted piece of property, Big Gun DXers and QRPers alike were honing their skills, tuning their amplifiers, checking their antennas to be ready for the Big Bang! There was even word of an anxious, ancient QRP type in the north of Europe signing up for a week-long sick leave, telling the boss that the trembling fingers of his right hand needed an urgent dose of radioactivity—or was it radiotherapy?

“Oh, my. What am I doing here?” was the first thought that crossed my mind, lying there surrounded by hospital nurses and doctors talking in subdued tones. It gradually dawned on me that having suddenly collapsed on a Washington, D.C. walkway, I was now waiting to be put into casting. With a broken ankle, I had passed out while lying on the sidewalk. “Two more people and then it's my turn,” I figured. “Hopefully they'll put a cast on one



XF4L operators and their chartered KingAir Beechcraft out of Mexico City. Flying time to XF4 was just 4 hours. Fasten your seatbelts!

leg only. Don't tell me it's going to be a full-length job from top to toe.” I was told that the x-rays would be processed shortly, and one of the nurses helped me adjust a pair of crutches to fit. “Oh, no. The show is over even before it has gotten started,” I thought. Two years of planning and hard work to activate XF4 seemed to be going down the drain.

But I was carrying a lot of equipment and the rest of the group was already down in Mexico City waiting for me. “Maybe it's time to call up the substitutes and let them continue,” a voice of doubt deep inside kept telling me. “Let me try the emergency room telephone and call my buddies N6AA, K6NA, and others,” I thought. Meanwhile, the x-rays proved that mine was an extremely bad case of a sprained ankle, but maybe I could manage with a tight bandage and a cane. According to the doctor, I would be allowed to go on my island vacation, provided the leg was not subjected to strain. She told me to lift it up most of the time. “No action. Just keep the leg up,” the doctor advised. “Maybe up 5!” I mumbled to my-

self. The fact of the matter is that even in the midst of great adversity, a DXer always sees things in a proper perspective, never losing sight of the Noble Objectives of DX.

Mexico City

The proposed roster of participants for this operation was international in character. It included people such as XE1L and XE1XA, who represented Mexico; N7NG and W6RGG, two cowboy types from across the border; JH4RHF, who passed a Japanese language test; OH1NW (also signing XEOH), OH2BU, and OH2BH, who were there to wave the banner of suffering Europeans—layers upon layers of needy DXers who had never had a real chance to work XF4. Our specific goal was simply to wipe out Revillagigedo from all Most Wanted Lists, to work the pile-ups down to the last caller firing up his maximum Novice power into a curtain rod—with the coax hanging loose.

*P.O. Box 3901, Madera, CA 93639



Having landed and taxied to the end of the runway, it was time to get operational. XF4L was the first DXpedition to deliver weather and propagation reports to the operating sites "by plane."

Lauri, XE1OH, being a senior diplomatic official at the Finnish Embassy in Mexico City, had acted as our coordinator to make sure all the necessary permissions were on hand. He had signed up a charter airplane and had consolidated and tested some 6400 pounds of equipment and supplies all bought in Mexico for this outing. Some of the really heavy items, including 260 gallons of gasoline and three 3500 watt Honda generators, were shipped to XF4 by supply boat well in ad-

vance because of limited cargo allowance on our chartered twin-engine King-Air plane.

Pre-assembling the beams and checking the material lists as well as planning the strategy were the only things that needed to be completed before our departure. The spirits were high, the mood was optimistic, the conditions were right, the sun was shining, the DXCC types were waiting . . . one of the Mysteries of the Ages was about to be unraveled.



OH2BU made a major effort to ensure that all operating sites were fully equipped. Assembling beams on the runway in scorching heat required a good deal of dedication. No, I did not forget the instruction manual.

It was exactly two years earlier that the plan for this adventure had been established.

Off We Go

When all the eight eager team members, the captain, and his co-pilot were aboard, with the gear and miscellaneous supplies piled up in the passenger compartment, there was no room for kidding around. We were sitting absolutely tight in this wonderful flying machine which resembled a can of herring with wings. We took off for a 4 hour flight to Revillagigedo with a refueling stop scheduled in the city of Mananillo on the coast.

DXers always appreciate good food and drink. They spend their rare idle moments reading poetry and literature, while also relishing classical music and a bit of modern jazz. Our plane was fully equipped, and it was all a smooth ride with drinks served and the upper-echelon DXpeditioners engaging in spirited conversation. For this exercise, though, we had left our scratchy old 78 RPM jazz records and favorite poetry books to collect dust at home. The only pieces of literature we carried included a few ICOM manuals and "the bible" of every serious, believing DXer—that blue-covered book featuring a collection of Hugh Cassidy's priceless literary masterpieces.

The DX gods were smiling on us, as we flew high above the clouds toward our destination sipping our drinks. "Is this the way to go on a DXpedition? Where's the adventure?" some of us were probably wondering. But the mystique of DX was there with us. Looming somewhere over the horizon was the mysterious island group of Revillagigedo dreamed of by countless DX brothers in their DX salons, but worked only by a few of the Deserving.

There was an airstrip on the island built on the slopes of a volcano some years back in time for the Mexican president's visit to his island. A solid 3,000 feet of paved runway was clearly visible as we approached the northern end of the island. Despite the undeniable expertise of our pilot, he landed on a heavy tailwind, using up every bit of braking power on the wheels and every inch of the short runway. Well, he made it, though, leaving us standing at the far end of the airstrip in scorching heat to rest and stretch our legs. There was not too much time to marvel at our new surroundings, however. The plan was to get all the stations operational before dusk. Much to our relief, we found a truck and a jeep waiting for us at the runway. This was a sure sign that we were indeed expected.

Getting Operational

One of the targets set for this operation was to give every needy DXer, regardless

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Consisting of two tents, the SSB and low-band site was located at the northern end of the island and featured a Cushcraft A3, a Butternut HF6V, and a special 80/160 meter ground plane. It was like a lunar landscape with the suffering EUs booming in from over the horizon.

of the size of his amplifier tubes or the number of beam elements on his 100 foot rotatable tower, a good shot at XF4. The other aim was, of course, to obliterate Revillagigedo from all Most Wanted Lists—

particularly the European list, where it ranked among the top 9-20 most needed countries. It was not surprising that hordes of Europeans still waited to work XF4 for a new one, since all but one of the

past expeditions had occupied an operating site in an army garrison at the south end of the island, with the result that the peak of the mountain effectively blocked the path to Europe.

Our idea was to challenge that basic setup and not go down to the garrison. Instead it was decided to put up two completely independent and functional camps providing clean CW and SSB operating on the same band simultaneously. Setting up the camps more than a mile apart and placing the beams accordingly added another element of inter-station attenuation and made it possible for us to fire up two signals on the same band during critical band openings.

As planned, both sites were on before dusk—CW at the southern end of the runway, with SSB and most of the low bands handled from the northernmost tip of the island with a clear shot at the Northern Hemisphere. It was therefore no surprise that Europeans reported hearing us all the time with S9+ signals from 40 through 10 meters.

With the aim of providing full-board service, we established another two sites to run two SSB signals on 20 meters, catering to U.S. and European audiences. In addition, to make RTTY, Oscar, and 50 MHz available, it was decided to occupy a radar station and the garrison commandant's guest room. Given these circumstances, XF4L indeed put the entire spectrum into action for that week, and the Hondas were busy generating power without a single interruption.

In the end, when the final tally was taken, we recorded a total of 47,943 QSOs in the logbooks, including 15,000-plus Europeans, another 525 on Oscar, and 167 on 50 MHz. Looking at the pile of logs which kept growing taller and taller as the days wore on, we were reminded of some words of wisdom uttered by DX Professor Cass in those other years: "The DX you work is the DX that is. DX is! Enjoy the good days of DXing while you can."

Having set up the radio tents high up on the volcano, the operators found themselves perched quite a long way from the military base and civilized accommodations. However, every operator had a day off for his shower and nourishment. With no on-site shower and with volcanic dust penetrating our tents and nostrils, the operating conditions seemed little short of hazardous. However, we managed. Where this DXpedition failed miserably was in the supply of food, since much to our surprise, two wooden containers stocking our daily chow only treated us to Corn Flakes, crackers, and Coca-Cola. Thus, the cuisine was pretty monotonous, with these three items served day in and day out. But it is a truism of DXing that DXers, although attuned to the finer things, understand that in certain circum-



This was the home for our CW crew, who racked up some 13,000 QSOs. The masts were Radio Shack 40 foot rotatables.

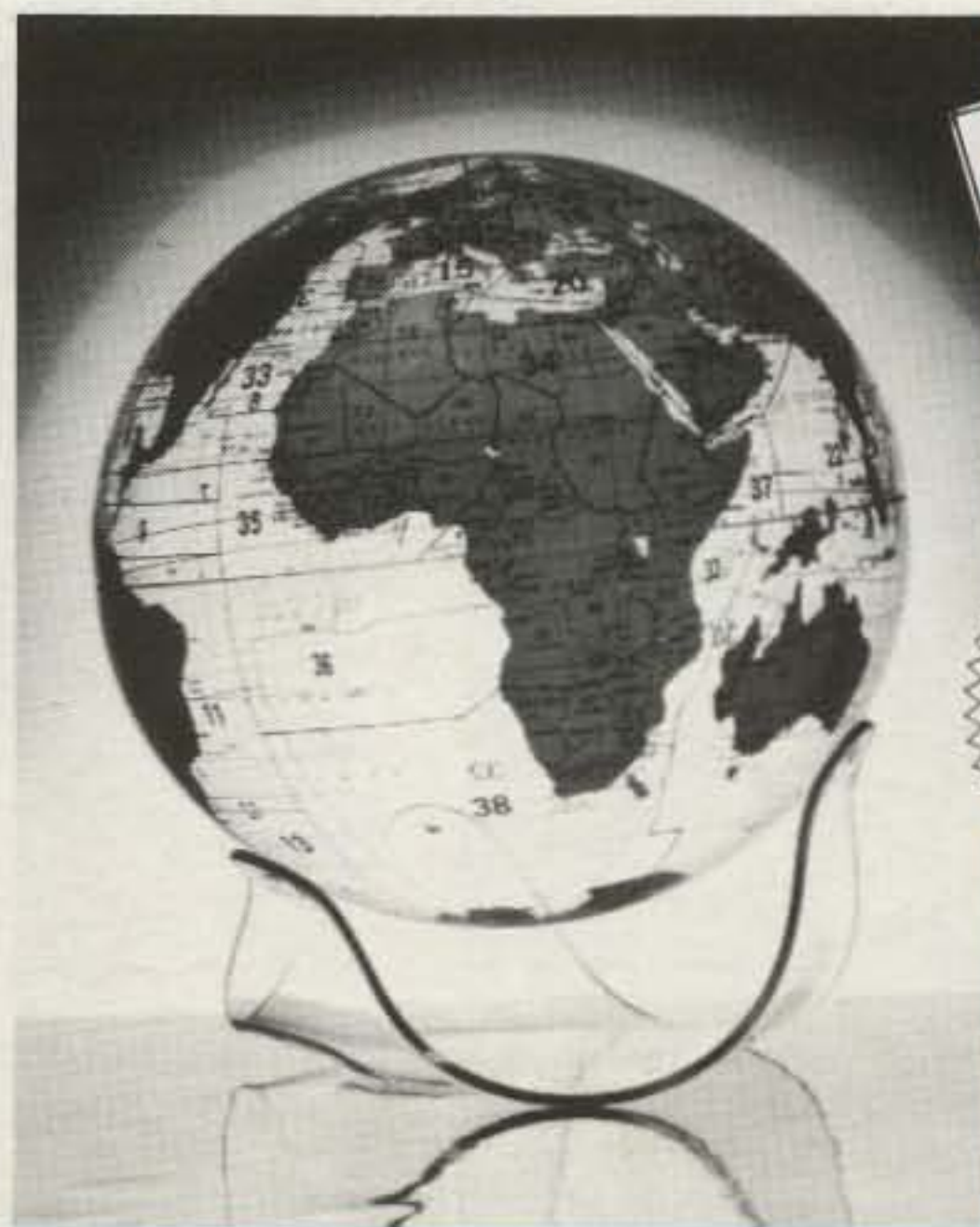
stances they must settle for less. That's the way it has always been. Always!

My day off came first, since my leg and swollen ankle displayed all the colors of a rainbow even though I went out of my way to keep it lifted up alongside the keyer at the operating table. So, once again this Old Timer ended up in an emergency room, but now in XF4 and at the hands of two doctors. Their prescription was for me to stay in the commandant's house with no trotting around in the volcano.

Gaining Another Victory

It was kind of lonely in the military commander's quarters, but fortunately I had one spare IC-735 and a tiny tape dipole which allowed me to monitor all the action at the other end of the island. Also, this gave me an opportunity to cause total chaos on RTTY when I showed up there unexpectedly. Commandant Fernando offered true friendship when things were down for me. But even more important, he expressed a genuine interest in the mission of this DXpedition. Although not yet a true believer, he began to understand one of the Eternal Enigmas of DXing—that DXers are the true internationalists of amateur radio, offering what is closer to true friendship than any other activity.

As I watched this commanding officer and noticed his curiosity, a great idea was born. Why couldn't we make him the first ever resident ham operator on XF4? Well, it was decided to get down to business, and a licensing class with a single



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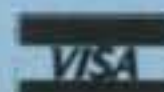
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CIRCLE 82 ON READER SERVICE CARD



Training sessions for Rear-Admiral Fernando Quijano Garrido, Commander of Revillagigedo, were conducted on 14 MHz during late evening hours, causing total chaos on the DXpedition frequency. OH2BH supervised Fernando's radio hour.



N7NG is a very skillful CW operator, who is shown here running the pile-ups for hours on end. He had the responsibility of being fair to all parts of the world.

"student" was opened. It was all rather easy, since Fernando knew the phonetics, and given his outgoing "commandant-style" on-the-air behavior, he was an ideal choice for 20 meter SSB to keep the folks in order. Fernando was taught the basics of operating from his "rare country," and he was ready for action.

Soon the commandant's jeep was heading up the volcano to one of the operating sites for a live training session which then developed into a daily routine for the balance of our stay on the island. The pile-ups were stunned as we hauled this newly minted DX type onto the DX scene. When we hauled Fernando up the volcano to the DX tent, we impressed on him one of the Unshakable Truths: There are two kinds of amateurs—those who are DXers and those who wish they were.

As everyone is aware by now, Fernando was licensed shortly after this DXpedition, and XF4F has been rendering reliable service on the bands ever since. The Northern California DX Foundation picked up the tab for an ICOM 735 and a Cushcraft HF6V vertical mounted on top of the commandant's residence on the morning of our departure. If you have been around the track a couple of times, you will know that NCDXF was organized in 1972 by K6KQN and a few other DX brothers dedicated to the belief that the only thing better than DX is more DX, and the rarer the better. Always!

Touring the Island

The Revillagigedo archipelago is located some 450 miles off the coast of Mexico, and it consists of three small islands plus two adjacent rocks. The island of Socorro, where our QTH was located, is 24 miles long and 9 miles wide, and its smoky volcanic peak rises over 3700 feet. The island is manned by a small mili-



Conquering the top of the mountain was another target for the XF4L group. Surely we made it up to 3700 feet.

tary garrison, extending Mexican fishing rights way out to the Pacific Ocean.

The population numbers around 150, and the community is quite self-sufficient, including schools, sports fields, an army canteen, a two-bed emergency room (!), and many other facilities. Apart from military personnel, many entire families reside on XF4. The outlying island group is served by a supply boat at least once a month. A harbor is situated next to the garrison.

The rugged shoreline is dotted with the remains of a wrecked ship, and the over-

all character of Socorro Island is barren and lifeless. Only thorny cacti and thistly shrubbery add color to an otherwise brown landscape of volcanic sand. The island's mountain peak is the only tourist attraction, and obviously the XF4L group members headed by N7NG under the guidance of XF4F consumed what was left of the juice climbing right up to the very top to see the best location on the island.

There is one road going from the village, passing the airstrip and continuing to the radar station and on to the northern



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The distinctive QSL of the XF4L DXpedition group.

tip of the island. And there is only one intersection; there you can go either to the airport or to the harbor. Traffic jams seem pretty unlikely because the island depends on just two trucks and two jeeps for its transportation needs. I'm sorry—only one jeep, since these vehicles will cooperate only if you remember to fill up the radiator, which runs dry on every trip. We did not, and thus reduced XF4 transportation capacity by 25 percent. Poor OH2BU, who had to walk quite a distance to report the jeep damage.

Sad To Say Good-Bye

A farewell party thrown by the commandant left everyone immersed in a bit of nostalgia, but all the fun was well-earned. Such parties are indeed one of the rituals of DXing, as only the Deserving are found in attendance. These are the occasions on which you hear DXers talk of those happy memories of other days.

Each of us had taken a shower, and, wearing clean clothes, we were ready for a multi-course dinner prepared by Fernando's staff. Ice-cold soft drinks surely tasted better than the lukewarm soda used up on the volcano during the week. Dr. Leon Chincoya entertained the group by singing beautiful songs to guitar accompaniment. The dinner was capped off with an XF4L pie especially designed for this DXpedition.

It was sad to leave this island, the dream of many Locals chasing new DXCC country counters, and to say good-bye to all the wonderful people whom we had met, in particular the Commandant of Revillagigedo, Rear-Admiral Fernando Quijano Garrido (now known as XF4F), who had looked after us and ensured the total success of this DXpedition.

Thanks Are Due

These DXpeditions would not be possible without major assistance from the DX community. The DX audience is always there ready to provide the leverage to get some really notable DX actions going. It is necessary to list them again, if you have not been DXing long enough to know these stalwarts.

ICOM America supplied five complete stations that served without a hitch. NCDXF, EUDXF, and YASME provided much of the funding for the airplane charter and the XF4F equipment. Many individual amateurs and DX groups participated to offset the cost of the overall operation.

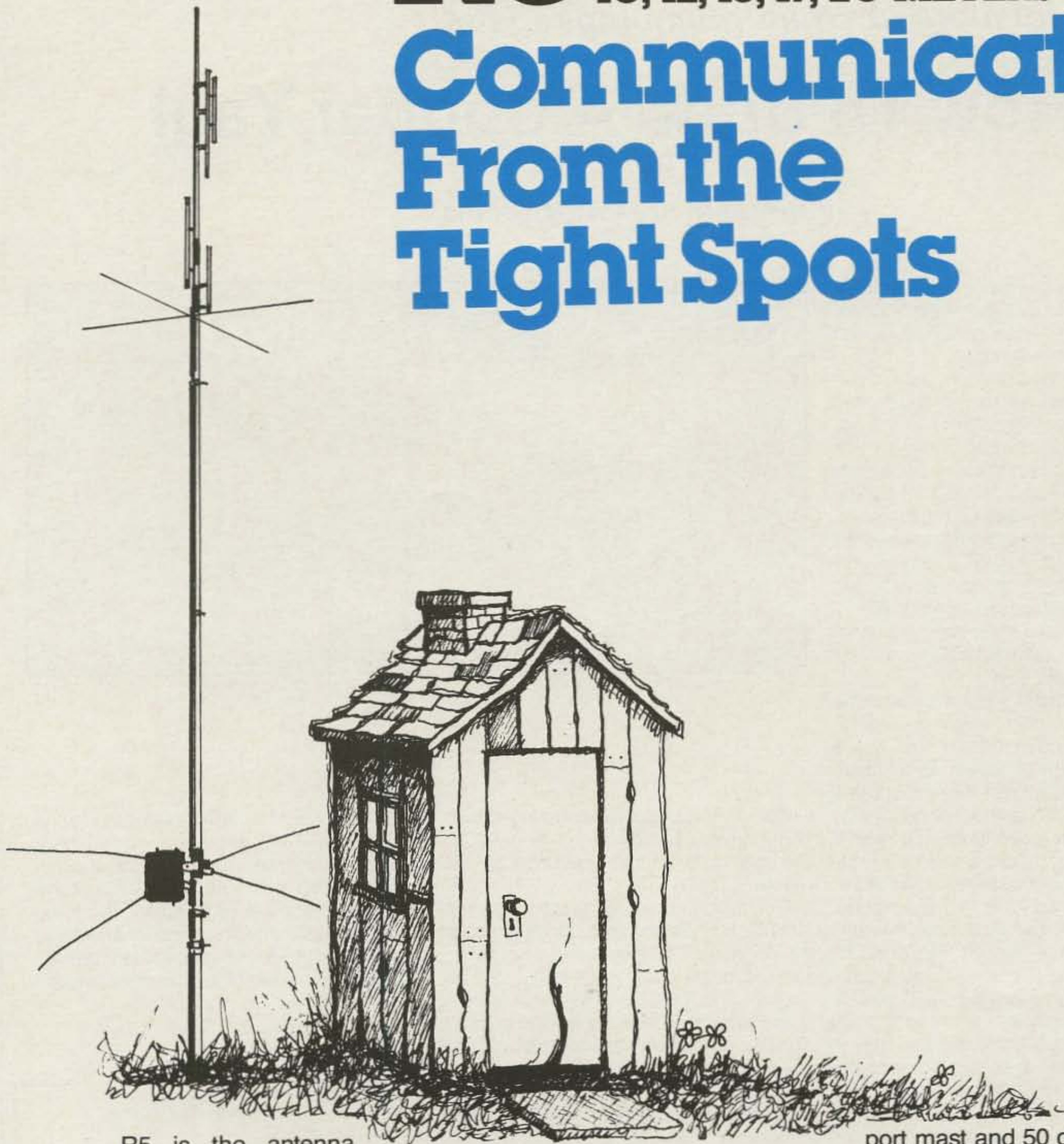
Last but not least, we wish to give credit to the Mexican authorities who issued all the necessary permission allowing us to undertake this multi-national operation from Revillagigedo. We also want to recognize the efforts of XE1NJ and his brothers, who faced up to the challenge, proving that this DXpedition was well worth the commitment and that it met the DXCC accreditation criteria. Thank you Luis, XE1L, and the entire XF4L team for a great week and a lot of excitement. Thanks to OH2BN and his XYL Tini for being in charge of QSLing, financial coordination, and public relations.

And finally a word of thanks to my family, who realized only afterward what poor Dad had gone through with what must by now be the best-known sprained ankle in the world. But then again, DXers are not like other amateurs. The first thing you must believe is that DXers are different. They think differently, operate differently, and even look different. Be a believer and you will begin to understand. Meanwhile, just hang in there and never stop working DX. See you from the next one!

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If you can remember where you put the propane torch kit—you know, the one you got in order to do the plumbing repair jobs around the house—dig it out as N7DF presents a project that is a lot more fun than plumbing repairs.

How To Build A Copper Yagi

BY LARRY STRAIN*, N7DF/NH2

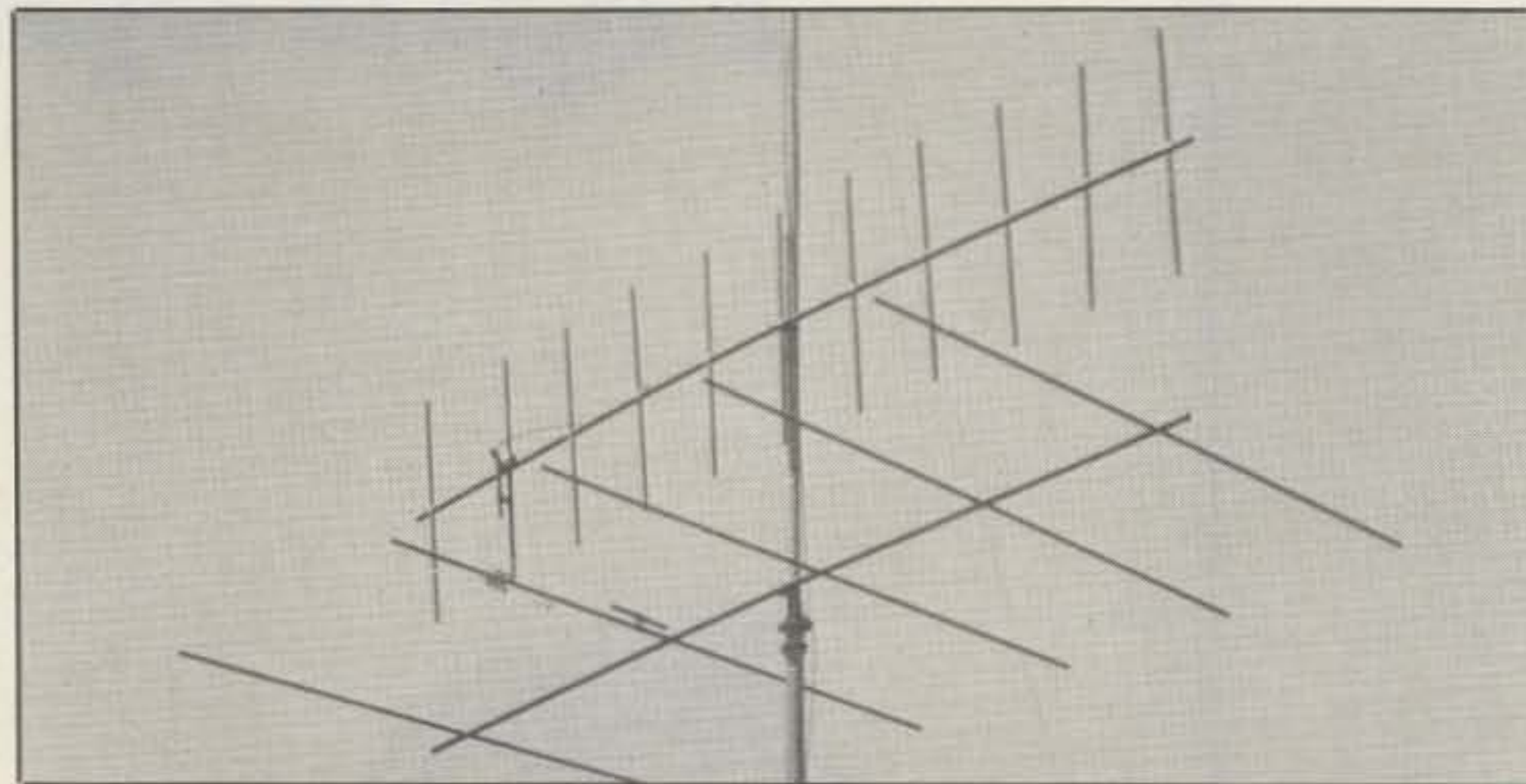
Building Yagi beams out of aluminum has become so routine that the thought of an alternative material for construction never enters one's mind.

The choice of aluminum has been based on its light weight, strength, and electrical conductivity. There are drawbacks to it, though. It is not always easy to get in small quantities in the various sizes and wall thicknesses needed for antennas. Also, it is difficult to fasten together, requiring elaborate clamping devices. Although self-protecting on exposed surfaces due to its oxidizing characteristics, it is subject to corrosion at points of contact due to electro-chemical reactions. Some of these drawbacks become very critical at VHF and UHF.

Fortunately, the size of antennas in the VHF/UHF range make weight considerations relatively unimportant. This allows the consideration of copper as a substitute building material for Yagis. Copper's advantages lie in better conductivity, ability to be soldered at joints, and ease of availability. Also, it can be surface-stabilized with common household chemicals.

Copper tubing comes in three grades: **K**, **L**, and **M**. These designate the wall thickness, with K having the greatest thickness. This is the type of pipe usually used for water pipes in houses. Type M is considerably thinner and lighter in weight. It is supposed to be used only in hot-water heating systems, but it is frequently used in cut-rate plumbing due to its low price. Fortunately, this has made it readily available. It is commonly referred to as "utility grade."

The common sizes of pipe available at nearly every hardware store and building-material supply house in the country are $\frac{1}{2}$ and $\frac{3}{4}$ inch. Both K and M grades are usually stocked in straight lengths up to 10 feet. The diameter of copper pipe is actually the outside measurement. This makes it especially convenient for antenna construction as explained below.



Copper Yagis are not only easy to make, they look good, too!

For VHF beams at 6 meters and above, $\frac{3}{4}$ inch type K material can be used for the boom and $\frac{1}{2}$ inch type M for the elements.

Construction is extremely simple. Holes for the elements are drilled through the boom with a $\frac{1}{2}$ inch drill bit at the locations indicated by the antenna design. These holes must be carefully aligned to make sure that the elements are parallel. The use of a dowelling jig is the best way to assure this. These tools can be bought at most hardware stores or building material suppliers as well as through many mail-order sources.

Another way to get the holes straight is to clamp the pipe to a wooden 1 x 2 with hose clamps and drill it with a drill press or a hand drill, with the drill bit carefully aligned to the vertical (see fig. 1).

Since the pipe is normally sold in 10 foot lengths, a 5-element 6 meter beam or a 10-element 2 meter beam can be constructed with a single pipe for the boom. Using solder-on fittings will permit the extension of the boom, but much more than 3 or 4 feet on each end is not recommended because the copper will bend rather easily if you make the boom too long.

Elements can be cut to full length from

$\frac{1}{2}$ inch type M material (selected for its lightness). The center of each element must be marked and then a shallow groove filed $\frac{3}{8}$ inch to either side of the center. These are required for centering the elements when they are inserted into the boom. Also, the grooves will remain visible after polishing the pipes before soldering.

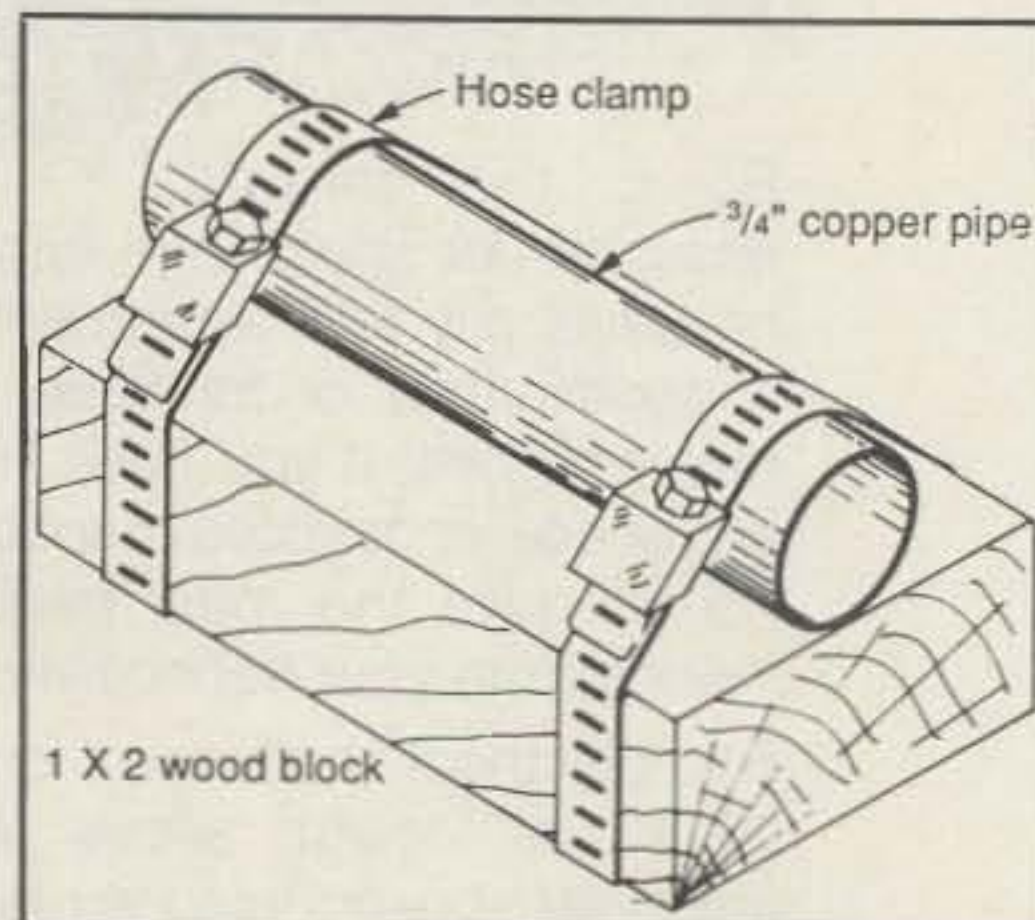
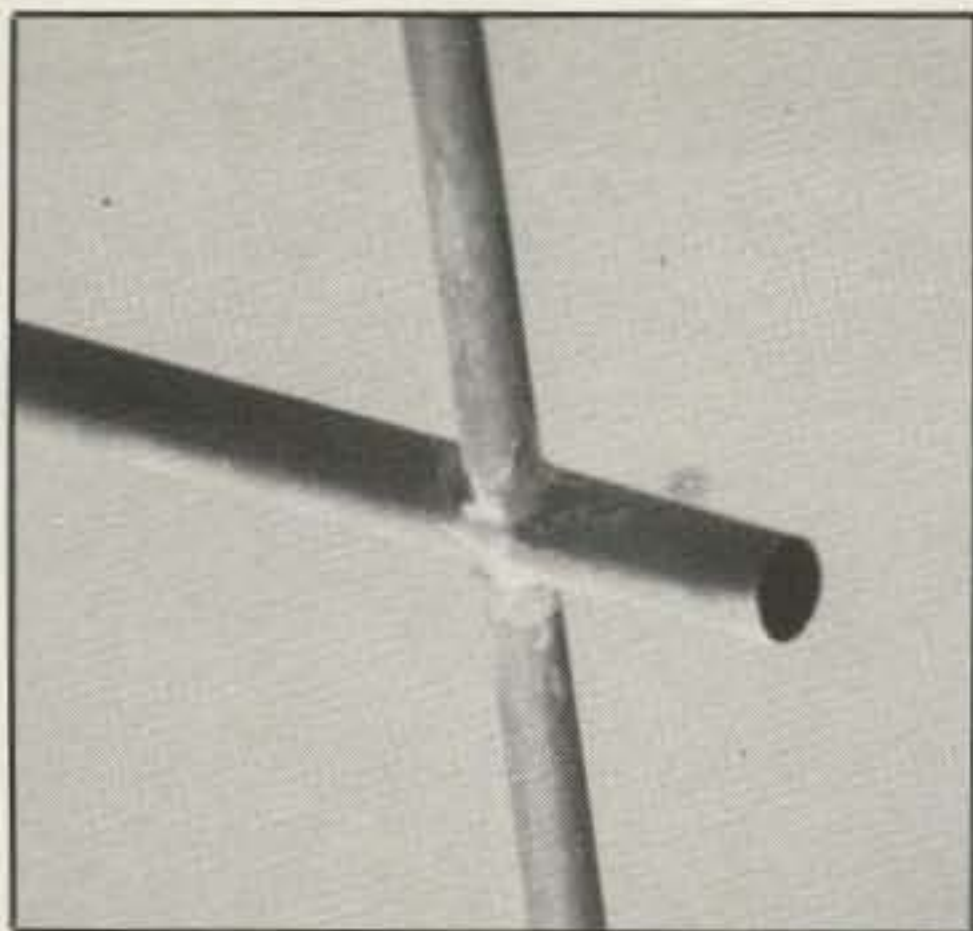


Fig. 1—The boom can be clamped to a wooden 1 x 2 to hold it for precise drilling.

*Box 25399, GMF, Guam 96921



The soldered element-to-boom connection is both mechanically and electrically better than a clamped aluminum joint.

Each point on the boom where an element is to be inserted needs to be cleaned with a wire brush and/or steel wool until it is bright and shiny. This should extend for about 1 inch either side of the hole for the element. Likewise, the center of each element must be brushed clean for about an inch either side of the centerline.

With the boom lying on a hard, flat surface, insert and center each element. Slight filing or reaming of the holes in the boom may be necessary to get the element to slide through, but the fit should be as tight as possible.

Despite what your plumber wants you to believe, soldering copper pipe is quite easy. The only tool you need is a propane torch.

Non-acidic soldering paste or flux is used on copper pipe to prevent oxidation of the surface when it is heated. All of the polished area of the boom and the elements needs to be coated. Only the upper sides will be fluxed and soldered in the first step, and then the antenna will have

to be turned over to get the other side. It will be necessary to rebrush the shiny places before fluxing, since the heat from soldering the top will have oxidized the metal slightly as will be evident from the change in color.

Common plumber's solder is quite good enough for this soldering. The electrical contacts of the joints are far better with this method than could ever be achieved with aluminum, so expensive silver solder is a waste of money for this purpose.

Soldering itself is accomplished as follows. Begin by heating the boom on either side of the element. Direct the flame as shown in fig. 2. Alternate between points A and B, slowly moving the flame towards the center for six or eight passes. This will require about one minute. Do the same for the element and then direct the flame to the boom over the joint and apply solder to the element where it enters the boom. If the solder does not immediately melt and flow into the joint, repeat the

pre-heating step until it does. Be sparing with the solder. Use only enough to fill in the area between the boom hole and the element as needed.

Once both sides of the joint have been soldered, remove the heat and immediately wipe the joint with a clean, wet cotton cloth. Do not use anything but 100% cotton, as synthetics will melt and stick to the solder. This step should leave a nearly mirror-like finish on the solder. The solder will remain molten for a minute or more, so be careful not to move the antenna until it has fully hardened.

Continue soldering the elements until they have all been soldered on the top side. Then turn the entire antenna over and repeat the process on the other side. If after cooling there are cracks in the solder or it is not smooth, simply reheat and add more solder or wipe off the excess, as needed.

Probably some of the element will not line up perfectly. This can be corrected by gently twisting the offending elements

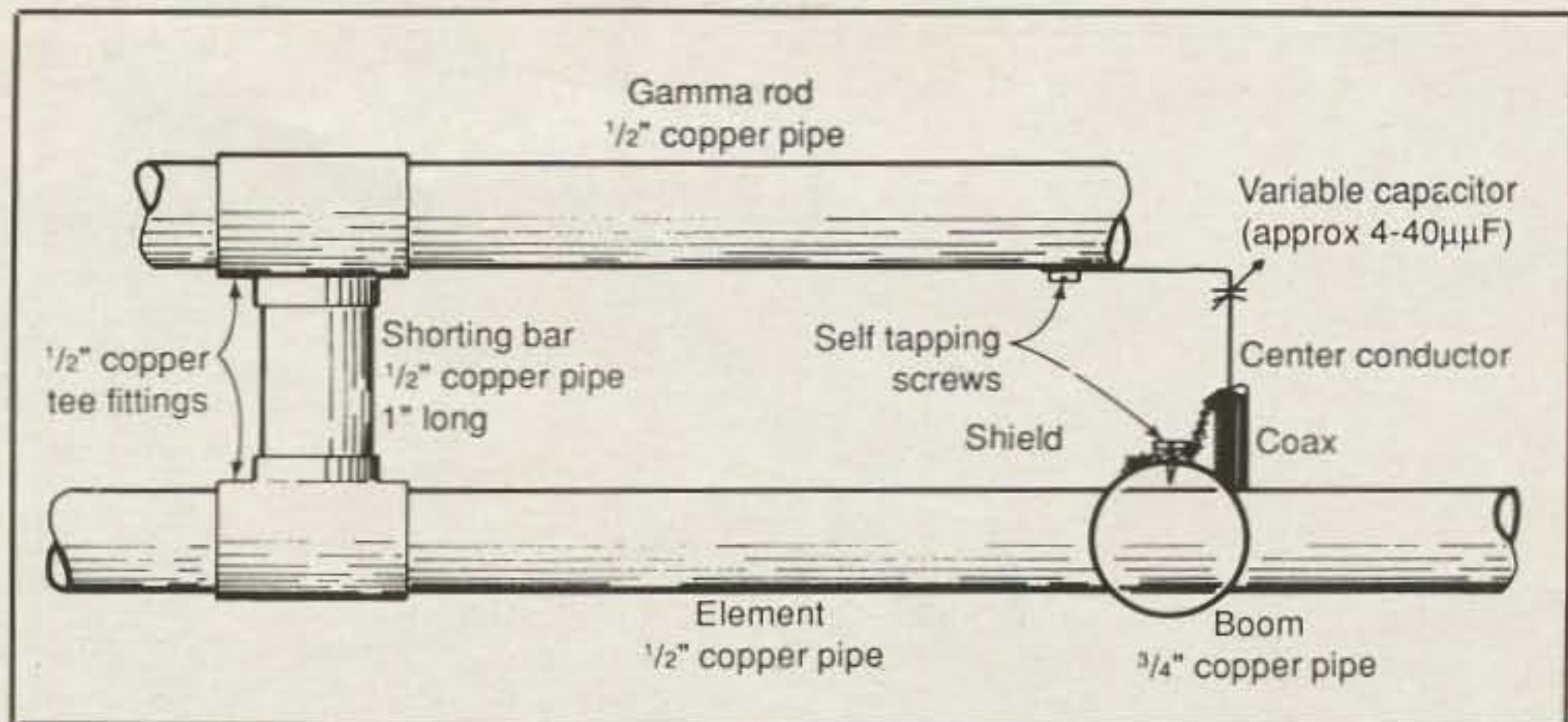


Fig. 3— The gamma match is assembled from copper TEE fittings and a short length of 1/2 inch pipe.

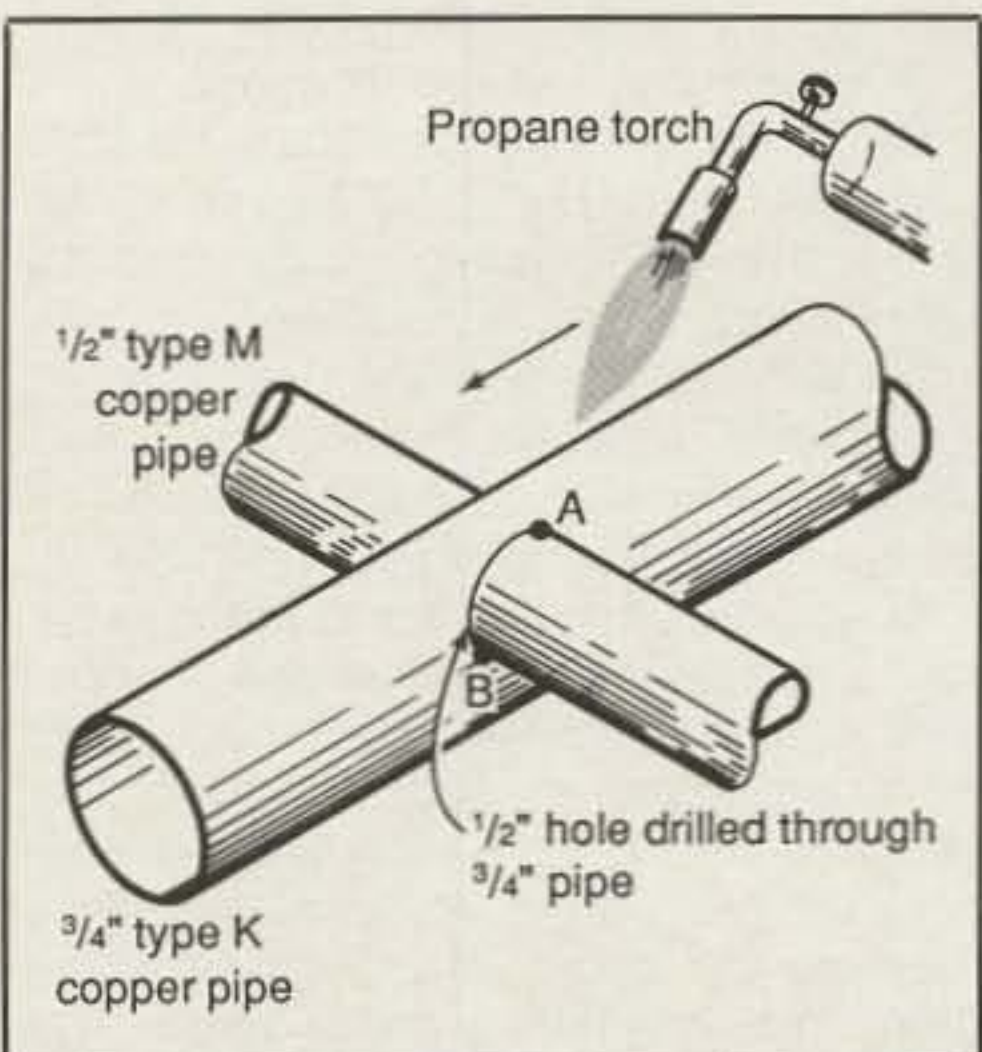
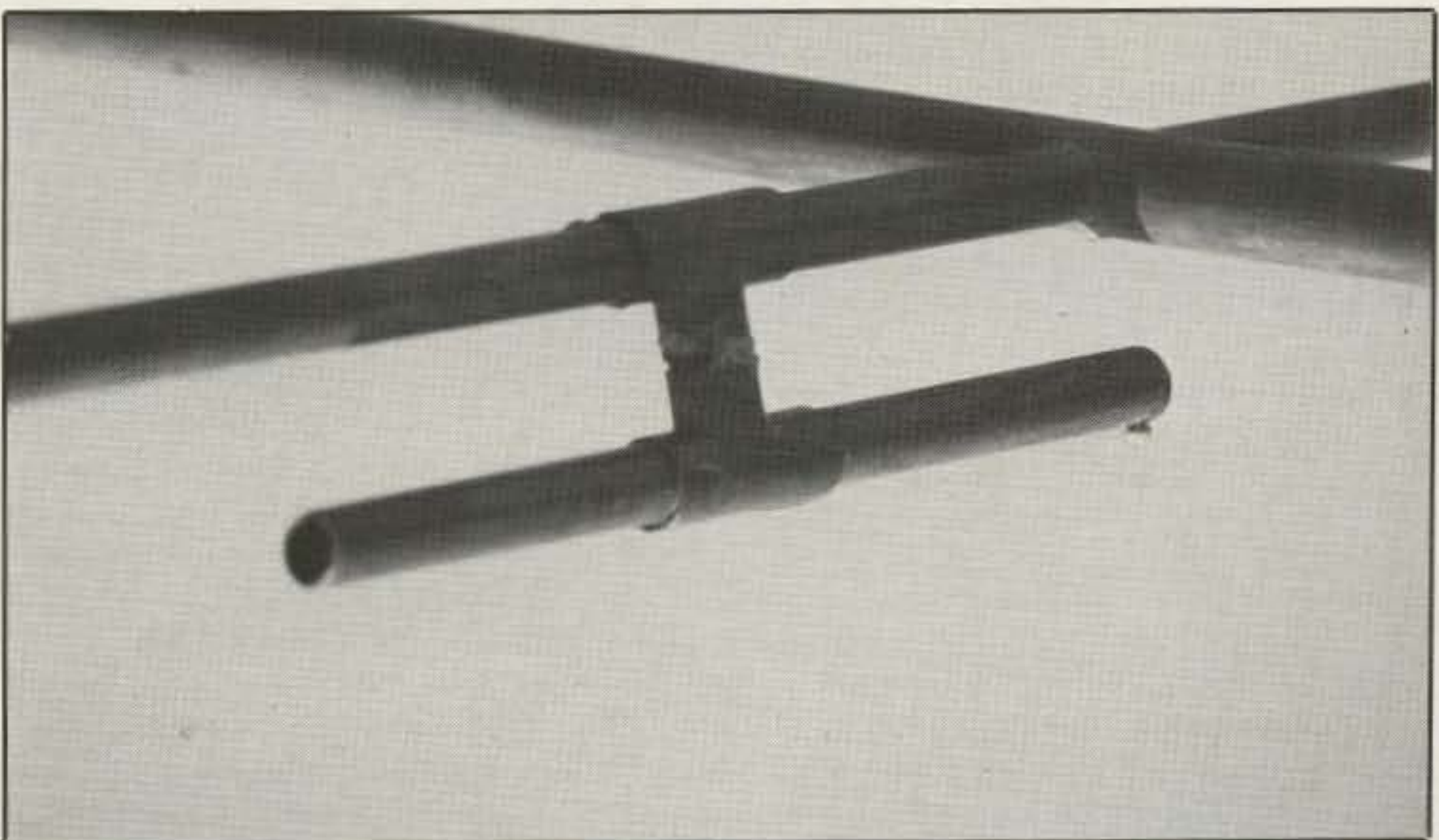
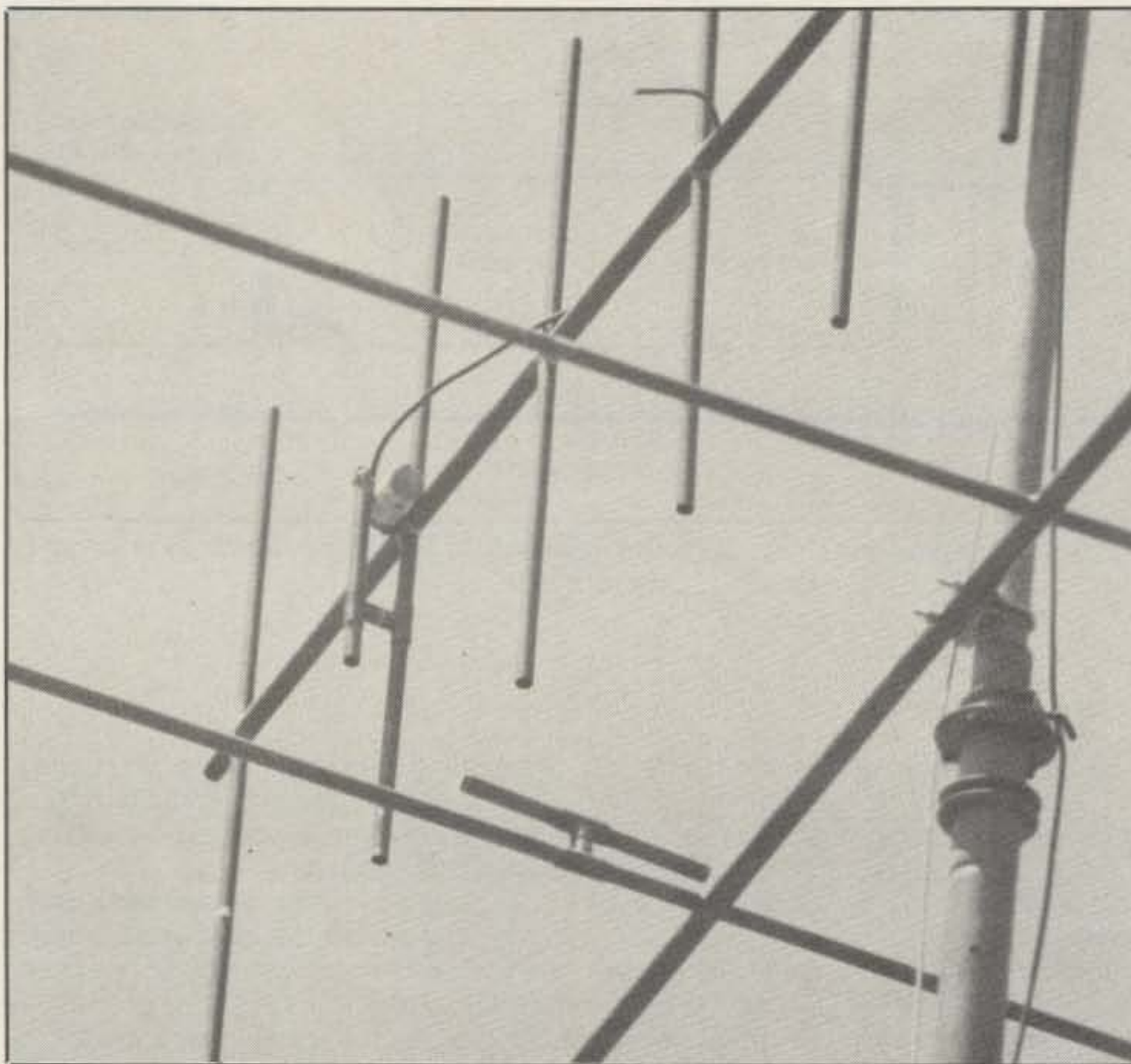


Fig. 2— Apply the heat to the boom and the element, moving it toward the joint from about 1 inch to either side.



The gamma match assembly is made with 1/2 inch fittings and soldered after final tuning.



A plastic pill bottle makes a convenient cover for the gamma-match capacitor.

around the boom until they are all nice and straight.

A gamma-match is the easiest match to use for this type of antenna, since it permits all joints to be fully conductive. Construction details are shown in fig. 3.

The two 1/2 inch copper "TEE" fittings are connected to each other by a short piece of 1/2 inch tubing. The TEES must be split along their long side, and if there is an internal ridge molded into the fitting, it must be filed out. The modified fittings should be able to slide easily over the 1/2 inch driven element for tuning of the gamma-match.

By adjusting the series capacitor and the shorting bar while monitoring the SWR, a match to either 50 or 72 ohm coax can easily be accomplished.

Once the proper location for the shorting bar has been determined, it can be soldered in place using a procedure similar to that used for the elements.

The lead from the gamma match capacitor should be soldered fast to the resonator bar, while the shield of the coax needs to be bonded to the boom at a point directly over the center of the element. A good contact can be made by fastening the conductors down with small self-tapping metal screws prior to soldering. Make sure the screw heads are fully encased in the solder to prevent corrosion.

At VHF, the capacitors are small enough to be comfortably housed in plastic pill bottles, which can be sealed shut with glue after final adjustments are made.

The boom can be mounted to the mast with a common TV antenna boom-to-mast bracket.

The final step is to chemically stabilize the surface of the copper boom and elements.

Wash the copper thoroughly with a "cloudy ammonia" solution (available in most supermarkets in the household cleaner section). The metal should turn a bright green except where it is covered by solder. Any places that remain brown should be wire brushed until bright and then washed with ammonia again.

Once the surface has dried, wash it again with petroleum distillate paint thinner. The metal should turn a dark bronze color. The antenna is now almost totally impervious to all environmental factors.

For UHF antennas the 1/2 inch pipe is obviously too large. There are smaller diameter rigid tubing sizes available on special order or you can straighten out rolled tubing. Large-diameter copper wire, brazing rods, and various other alternatives can be found. One possibility includes cutting the elements out of copper-clad printed circuit board, screwing them to the boom, and then soldering them. The possibilities are endless.

With the really bargain-basement prices that can be found on copper tubing, the total cost of building a 10-element 2 meter copper Yagi is less than \$20!

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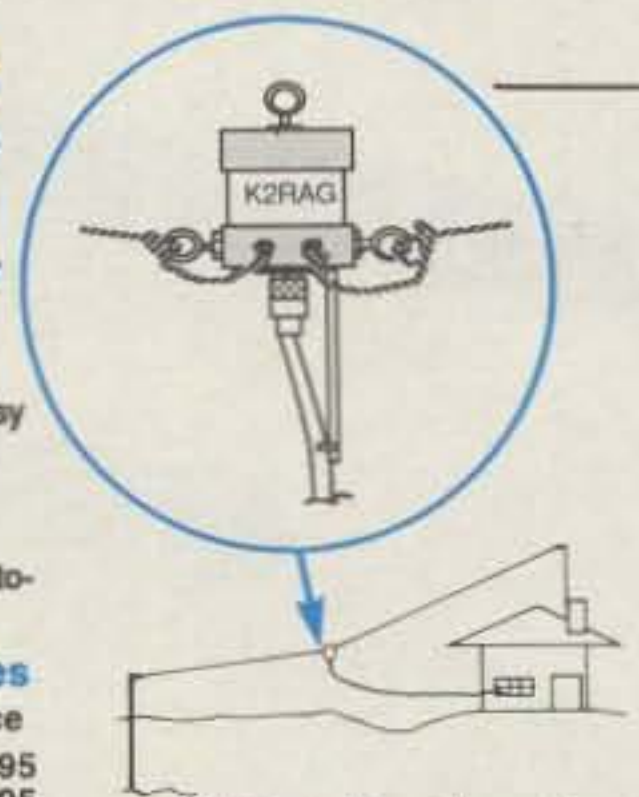
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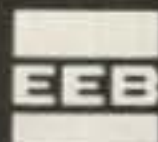
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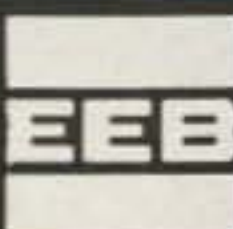


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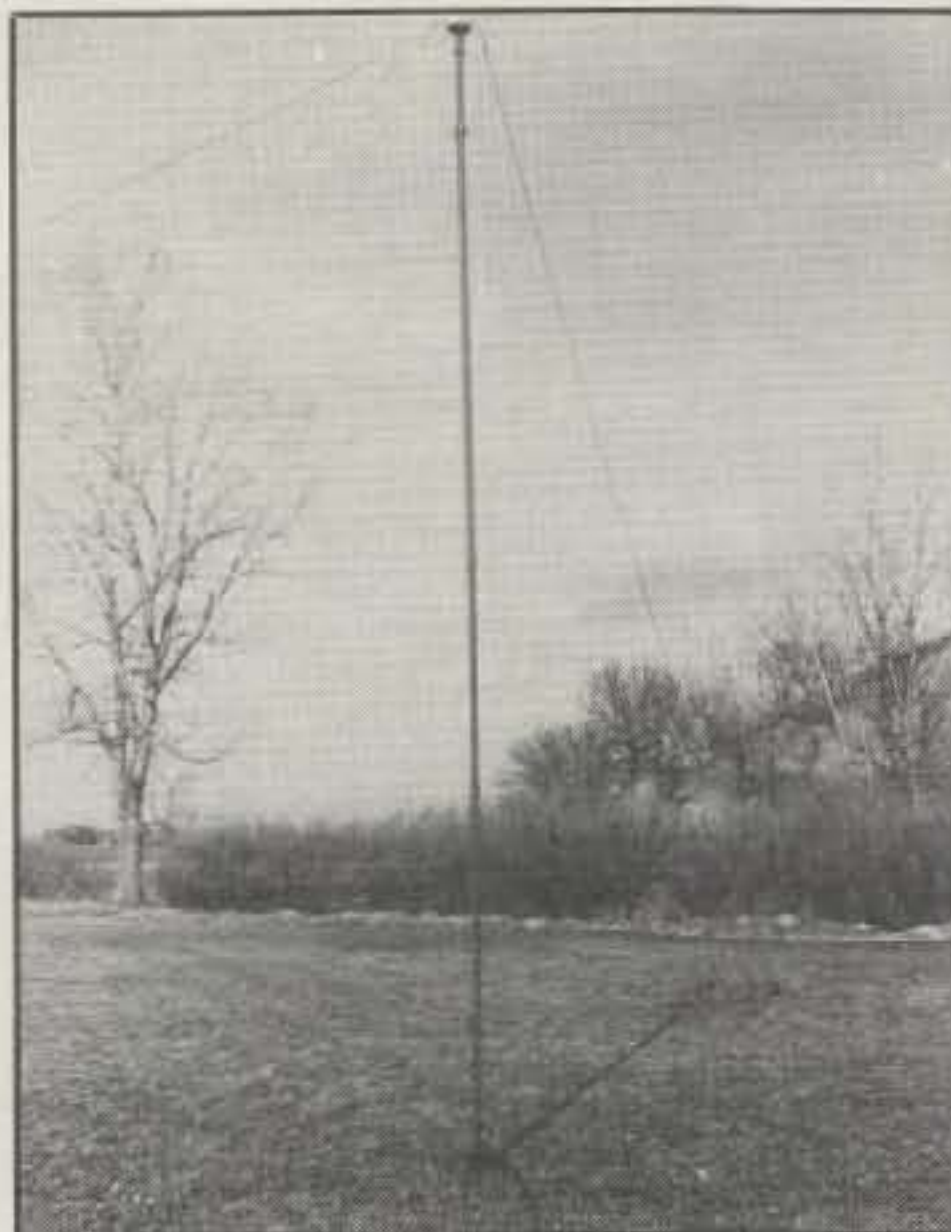
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The antenna assembly is shipped in a re-usable metal container for ease of rapid deployment and transport. The Model 800-T-T-1 can be assembled and raised to a vertical position by two men in approximately ten minutes, maker says. For more information on Sabre's Model 800-T-T-1, contact Sabre Communications Corporation, 3400 Highway 75 North, P.O. Box 536, Sioux City, IA 51102, or circle number 101 on the reader service card.

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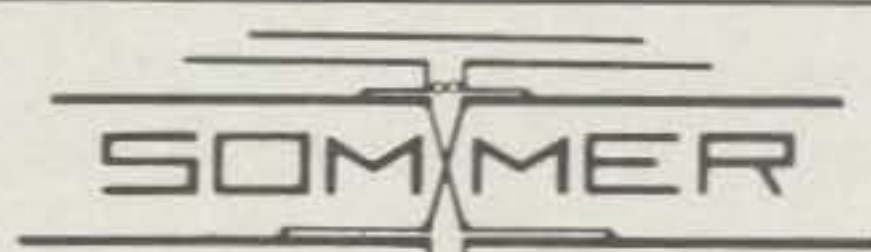
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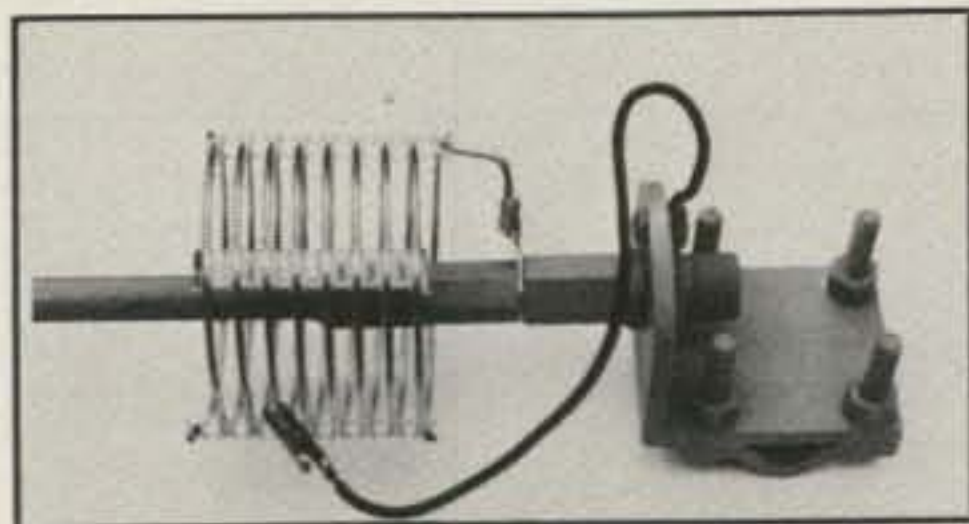
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The MFJ Theory Tutor is available for each license class. The model numbers are: MFJ-1610 Novice; MFJ-1611 Technician; MFJ-1612 General; MFJ-1613 Advanced; and MFJ-1614 Extra. The retail price is \$29.95 per class. For more information contact MFJ Enterprises, Inc., P.O. Box 494, Mississippi State, MS 39762, or circle number 104 on the reader service card.



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NEWS/VIEWS OF ON-THE-AIR COMPETITION

W1WY—A Final Tribute

Contesting in the 1980s was unlike that of any other decade. Not only did we see year after year of record-breaking scores, but we also saw the emergence of technology. It was the decade of rotating towers, 4-stacks on 20 meters, and 80 meter beams. We all became computer technicians in our own way as keyboards took the place of the paddle for many. The 1980s was truly a decade of triumph for contesting. Unfortunately, with triumph comes disappointment, as I report to you the loss of one of contesting's founding fathers, Frank Anzalone, W1WY.

On December 30, 1989 Frank, who had just turned 87, lost his struggle with cancer after a long and arduous battle. There were a select few who knew Frank and many more who never will. I have the special honor of following in his footsteps, and I want you to know the person I grew to respect and admire over the years.

Frank Anzalone loved amateur radio, although he would be the first to admit that contesting was his special passion. Frank was originally licensed in 1922 as W2WC in Brooklyn, New York. Professionally, Frank enjoyed a 43-year career as Chief Radio Engineer for WHN Radio in New York City. Frank had many accomplishments, which included leading his industry in the implementation of remote locations for sporting events and other activities.

Although Frank retired in 1970, he never showed any desire to slow his pace. Frank was a classic "Type A" personality with spunk and vigor right to the end. Bob Entwistle, N1XX, recalls with amazement when Frank complained from the hospital that he had to get home to work 3D2XR in Rotuma for a new country before they went QRT.

Although Frank never enjoyed the limelight, he was truly a man of accomplishments. In 1972 Frank was the proud recipient of his 50-year Amateur Radio pin, which he accepted in the company of Barry Goldwater, K7UGA. Frank was also a charter member of the OZONE club, an elite group of amateur radio operators who were licensed in the active days of spark gap transmissions. And of course, there's the matter of editing this column

2 Baldwin Street, Windham, NH 03087

Calendar of Events

Feb.	23-25	CQ WW 160 M SSB Contest
Feb.	24-25	UBA SSB Contest
Feb.	24-26	Maine QSO Party
Feb.	24-26	YL/OM CW Contest
Mar.	3-4	ARRL DX SSB Contest
Mar.	9-11	Japan Int. CW DX Contest
Mar.	10	County Hunters 10M CW QSO
Mar.	10-11	QCWA SSB Party
Mar.	10-11	Commonwealth Contest
Mar.	10-11	Wisconsin QSO Party
Mar.	17	YLRL East Meets West SSB
Mar.	17	County Hunters 10M SSB QSO
Mar.	17-18	Bermuda Contest
Mar.	17-19	BARTG Spring RTTY Contest
Mar.	17-19	Virginia QSO Party
Mar.	20-21	AC-DC CLARA CW Contest
Mar.	24-25	CQ WW WPX SSB Contest
Mar.	27-28	AC-DC CLARA SSB Contest
Apr.	11-13	YLRL DX-YL to NA-YL CW
Apr.	18-20	YLRL DX-YL to NA-YL SSB
Apr.	21-22	MARAC County Hunters SSB
Apr.	28-29	Swiss Helvetia Contest
May	19-21	Michigan QSO Party
May	26-27	CQ WW WPX CW Contest

for over 30 years. With each successive month of slaving over my keyboard, I have grown to appreciate the contribution to contesting that Frank made through this column.

Frank's greatest contribution to the contest community was through his role as Director of the CQ World-Wide DX Contest. Frank is widely credited with keeping the contest alive in the mid-1950s amidst waning support from official sponsors. Even more impressive was his untiring dedication to the contest for over 25 years. Working alongside a small group of assistants, Frank would pour over 4-foot high stacks of logs year after year, compiling final results and providing engaging commentary. My relatively short tenure in the CQ WW Contest Committee has again proven to me how much Frank loved the contest.

Anyone who worked with Frank over the years knew that he had a frugal streak in his personality. In the 1960s CQ magazine used to distribute CQ WW certificates in cardboard mailing tubes. Unfortunately, the weight of the tubes forced the committee to use two units of postage to cover the mailing costs. Working under a tight budget, Frank discovered that by

baking one of the mailing tubes in his oven, he could reduce its water content to the point where the package fell just below the weight requirement of a single unit of postage. The U.S. Post Office always weighed a sample from the committee before accepting the entire lot of 900 tubes, and you can't miss assuming which one Frank asked them to measure.

Although many of us rarely worked Frank on the air, he was an active amateur with his special fancy being 160 meters. Rarely a day would pass without Frank meeting his friends on 14270. While Frank was intrigued by modern technology in contests (he personally supported the creation of the packet radio spotting category in the CQ WW), he held to the old school for his station. To Frank a straight key was heaven and a bug was high technology.

Frank Anzalone's life can be described with simplicity. He was someone who was always in there and never quit. Just a few years back one of Frank's friends was installing a tri-bander at his QTH. Much to his surprise, there was an 82-year-old fellow climbing the ladder behind him trying to help out.

There was a part of Frank that felt he would never pass from us. And as we think about Frank from time to time in upcoming weeks and years, I think he may have been right. Thank you for all your contributions, Frank. We will miss you.

73's, John, K1AR

Donations in Frank Anzalone's memory can be made to: St. Bridget's Church Building Fund, 278 Strawberry Hill Ave., Stamford, CT 06902.

RSGB Commonwealth CW Contest

1200Z Sat. to 1200Z Sun., March 10-11

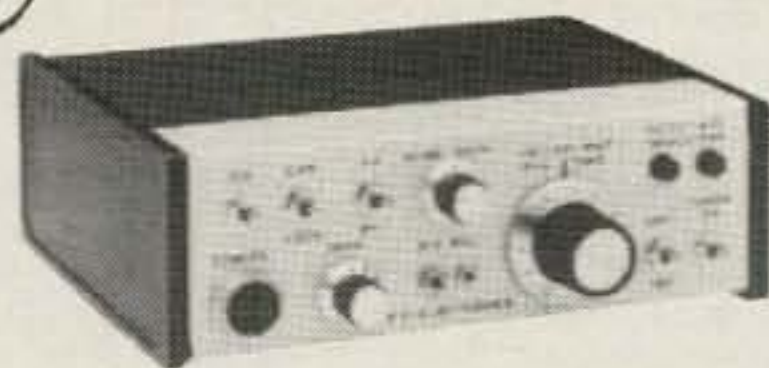
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March 1990 • CQ • 49

28 MHz, within the lower 30 kHz of each band (except Novice contacts).

Exchange: RST plus a QSO number starting with 001.

Scoring: Each contact is worth 5 points. In addition, a bonus of 20 points may be claimed for the first 3 contacts with the same call area on each band.

Each band is scored separately and totaled. Just add the total QSO and bonus points for your final score. There is no multiplier. You can request a single band be judged for awards. Only single operator entries will be accepted.

Unmarked duplicate contacts for which points have been claimed will be penalized ten times the number of points claimed, with possible disqualification if in excess of 5 duplicates.

Use a separate log sheet for each band, and include a summary sheet showing the scoring and a signed declaration that all rules and regulations have been observed.

Awards: Certificates to the first-, second-, and third-place winners in each call area, both single and multi-band. There are three Rose Bowl Trophies for overall winners.

There is also an SWL section with rules and scoring the same as above. If both stations in contact are heard, they can be reported as separate entries for credit on each band.

Logs must be received by April 9th and go to: HF Contests Committee, Att: Alan Gray, G4DJX, P.O. Box 73, Lichfield, Staffs. WS13 6UJ England.

Iowa QSO Party

1800Z Sat. to 0600Z Sun., March 10-11

This is the fifth annual Iowa QSO Party. Work stations once per band and mode. No repeater or net QSOs.

Exchange: RS(T) and QTH. County for Iowa stations; ARRL section or country for DX.

Scoring: Count 1 point for phone contacts, 1.5 for CW, 3 for Oscar, and 5 points if with a Novice/Tech.

Iowa stations multiply total QSO points by total sections/countries worked.

Others multiply total QSO points by the number of Iowa counties worked (maximum of 99).

In addition, there is a bonus multiplier for each Iowa Section Official worked (maximum of 8).

Frequencies: CW—1810, 3550, 7050, 14060, 21050, 28050. Phone—3875, 7230, 14280, 21325, 28600, 50120, 144.200, 146.520. Novice—10 kHz from low edge of Novice bands.

Awards: For Iowa stations, mobiles, and clubs, and also for out-of-state winners.

Mailing deadline for logs is April 1st to: Bob McCaffrey, K0CY, RR#4, Box 228C, Boone, IA 50036.

Wisconsin QSO Party

1800Z Sun. to 0100Z Mon., March 10-11

This one is a shorty, only 7 hours, and it is again sponsored by the West Allis Radio Amateur Club.

The same station may be worked on each band and mode, and mobiles in each county change. Wisconsin stations may contact other in-state stations for QSO and multiplier credit. Only one transmitter on the air at the same time.

Classes: Single operator and multi-operator and transmitter, both fixed and mobile. And Novice/Tech, both single and multi-operator.

Exchange: QTH only. County for Wisc.; state or province for others.

Scoring: Phone QSOs count 1 point, 2 points if on CW.

Wisc. stations multiply total QSO points by (U.S. states + VE provinces + Wisc. counties) worked for their final score. DX contacts count for QSO points only.

Others use total Wisc. QSO points by the number of Wisc. counties worked (maximum of 72).

Wisc. mobiles can add a bonus of 500 points to their final score for each county outside their own from which they operate (minimum of 15 QSOs from each county).

Frequencies: CW—3550, 3725, 7050, 7125, 14050, 21150. SSB—3890, 7290, 14290, 28400. Other bands may be used.

Awards: To highest scoring single operator in each class in each state and province. Plaque to the top-scoring station in the party.

Wisconsin: To 10 top single operator scorers in each class. Highest multi-operator in each class. Highest aggregate club score.

Logs with more than 100 QSOs must include a separate dupe sheet for each mode with their entry.

Complete rules and entry forms are available from address below. Include a large SASE.

Mailing deadline for logs is April 15th to: West Allis RAC, P.O. Box 1072, Milwaukee, WI 53201.

MARAC County Hunter's 10 Meter QSO Party

CW: 1200Z Sat. - 2400Z Sun., Mar. 10-11
SSB: 1200Z Sat. - 2400Z Sun., Mar. 17-18

This is a new event sponsored by the Mobile Amateur Radio Awards Club. The object is to work as many U.S. counties, U.S. mobile stations, and fixed stations worldwide as possible.

Exchange: RS(T), Station Designator (F—Fixed, M—Mobile), and QTH (County for mobile stations; state, province, or country for others).

Scoring: All fixed station QSOs credit 1 point, 3 points for each new U.S. State/Canadian province, 5 points for each DX QSO, and 15 points for each U.S. mobile contact. Final score is total number of U.S. counties times QSO points.

Frequencies: CW—28.150-28.200; SSB—28.330-28.380. Mobile window frequencies are 28.155-28.165 on CW and 28.340-28.355 on SSB.

Awards: Plaques will be awarded to the highest scoring U.S. mobile, fixed U.S., fixed Canadian, and fixed DX station. In addition, a variety of certificates are available.

Mobile stations may be worked each time they change counties. Pre-arranged QSOs are not permitted and there is no multi-operator/transmitter operating allowed. Final results must be received by April 23, 1990. Be sure to include a #10 SASE for final results. Send logs and comments to: E.R. "Skip" Gee, N4FSZ, Rt. 1 Box 297, Bassett, VA 24055.

East Meets West SSB Contest

1800Z to 2200Z Sat., March 17

This one is sponsored by the YLRL and is open to YLs only. East works West, and vice versa. The same station may be worked once on each band. No cross band, net, or repeater contacts allowed.

Those considered "East" are 1st, 2nd, 3rd, 4th, 8th, and 9th call areas; VE1-3; Europe; Africa; South America; Caribbean; and Central America (except Mexico). "West" are 5th, 6th, 7th, 10th, KL7, and KH6; VE4-0; Asia; Oceania; Australia; New Zealand; and Mexico.

The maximum power output that may be used at any time during the contest is 1500 watts PEP.

Exchange: RS, QSO number, name, and state, province, or country.

Scoring: One point for each different YL contacted on each band (no multiplier).

Frequencies: 3955, 7255, 14265, 21395, and 28395. Plus or minus 15 kHz.

Awards: Winners will receive YLRL postcards.

Print or type original log and check for duplicate contacts. The operator's signature is required.

Logs must be received by April 17th and go to: Dana Tramba, c/o Dandy's, 120 No. Washington, Wellington, KS 67152.

Bermuda Contest

0001Z Sat. to 2400Z Sun., March 17-18

This is the 32nd year for this popular contest open to amateurs in the United States, Canada, the United Kingdom, West Germany, and Bermuda.

Stations in the U.S. and Canada may work the U.K., West Germany, and Bermuda. The U.K. and West Germany may

work the U.S., Canada, and Bermuda. Activity will be on the 3.5, 7, 14, 21, and 28 MHz bands. Cross-band or cross-mode contacts are not permitted. The same station may be worked on each band, phone and again on CW, providing there is a 60-minute separation between contacts on the same band.

You are limited to 36 hours out of the 48-hour contest period. Off times of no less than three consecutive hours must be clearly indicated on the log. Participation is for single operator stations only and must be from their own residence.

Exchange: RS(T) and QTH. Parish for VP9, state for the U.S., province for Canada, county for the U.K., and DOC number for West Germany.

Scoring: Five points for each QSO. Multiply total by number of different VP9 stations worked on all bands. (Note: It's each VP9 station, not each parish.) Counted once only per band regardless of mode used. VP9 Novices count as double multipliers.

Awards: Certificates to top scoring stations in each U.S. state, VE province, U.K. county, and DL DOK (minimum of 100 QSOs). The overall winner in each of the above countries, however, will receive something more substantial—a trophy to be presented at the Society's Annual Dinner in Bermuda in October. Round-trip transportation and hotel ac-

commodations will be provided for the winners. (Note: Winners in '85, '86, '87, '88 and in '89 are not eligible.)

Use a separate log sheet for each band and a dupe sheet for logs with 200 or more contacts. A penalty of three contacts will be deducted for each duplicate contact for which points are claimed. An excessive number of claimed duplicates means disqualification. The usual signed declaration is also required.

Entries must be received no later than June 1st by the Radio Society of Bermuda, Box HM275, Hamilton HM AX, Bermuda. Enclose 4 IRCs for acknowledgments.

Trophy winners in the 1989 contest were N2NT, VE3XN, G4OSY, and DK8FD.

Virginia QSO Party

1800Z Sat. to 0200Z Mon., March 17-19

This is the 15th year the Sterling Park ARC has sponsored this party. The same station may be worked on each band and each mode for QSO credit. VA stations may work other in-state stations for QSO and multiplier credit. And VA mobiles in each county change.

Exchange: QSO number starting with 001 and QTH. County for VA; state, province, or DX country for others.

Scoring: One point for each contact.

VA stations multiply total QSO points by sum of US states, VE provinces, DX countries, and VA counties.

Others multiply total VA QSO points by the number of VA counties worked (maximum of 95).

Mobiles receive special 100 bonus points for each different VA county.

Frequencies: CW—60 kHz up from low end of 10, 15, 20, 40, and 80 meter bands. SSB—3930, 7230, 14285, 21375, 28375, 28575. Also Novice CW bands, and both modes on 160.

Awards: Certificates to top scorers in each state, province, DX country, and VA county. There are five plaques as follows: top VA multi-mode, VA CW only, VA mobile, VA Novice/Tech, and top out-of-state station.

Logs: Indicate each new multiplier in a separate column as it is worked. Include a summary sheet showing the scoring and other pertinent information.

Mailing deadline for all entries is April 25th to: Virginia QSO Party, c/o George Foy, N4DLR, 413 No. Argonne Ave., Sterling, VA 22170.

BARTG Spring RTTY Contest

0200Z Sat. to 0200Z Mon., March 17-19

This contest is sponsored by the British Amateur Radio Teleprinter Group and is



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being administrated by Peter Adams, G6LZB. The contest is open to all amateurs in three classes—single operator, multi-operator, and SWL.

Activity will be on all bands 3.5–28 MHz, but no 10 MHz. Operation is limited to 30 hours out of the 48-hour contest period. The 18 hours off may be taken at any time, but not less than 3-hour periods.

Exchange: RST plus a three-figure contact number and time in GMT (full four figures).

Points: Contacts with stations within own country 2 points. With stations in other countries 10 points. And a bonus of 200 points for each country worked on each band including your own. The same station may be worked on each band for QSO and multiplier credit.

Multiplier: Total number of countries worked on each band and number of continents worked (continents are counted once only). W/K, VE/VO, and VK call areas will be counted as separate multipliers.

Final Score: (a) Total QSO points × country multiplier. (b) Country multiplier × bonus points × continents worked. Add sum of (a) and (b) for your final score.

Shortwave listeners must show call of station being heard, report of message

being sent, and call of station being worked.

Awards: Certificates to the top-scoring stations in each class and to the continental leaders. Also in each W/K, VE/VO, and VK call area.

Use a separate log sheet for each band and a summary sheet showing the scoring, etc. Log forms are available from G6LZB; include 6 IRCs to cover postage.

Logs must be received by May 27th and go to: Peter Adams, G6LZB, 464 Whippendell Road, Watford, Herts. England WD1 7PT.

AC-DC CLARA Contest

CW: 1700Z Tues. to 0500Z Wed.
Mar. 20–21

SSB: 1700Z Tue. to 0500Z Wed.
Mar. 27–28

This contest sponsored by CLARA members is open to amateurs worldwide. Stations may be worked once on each HF band during each contest period.

Exchange: Name, serial number, RST, QTH, and indication if CLARA/family member.

Scoring: SSB QSOs with members—2 points; CW QSOs with members—5 points, all others are 1 point on SSB and 2

points on CW. Include 10 bonus points for first QSO with CLARA member. Final score is total QSO points times number of Canadian provinces/territories. VE0 and one Armed Forces base abroad can count for an additional two multipliers.

Frequencies: CW: 3690, 7035, 14035, 21035, 28035. SSB: 7070, 14120, 21300, 28488.

Awards: Two trophies will be awarded to the highest scoring member and non-member. Certificates will be sent to highest scoring entry from each DX country and SWL. A special prize will be awarded to the CLARA member most often appearing in submitted logs. Logs must be received by April 20, 1990. Send your results to: Jeanne Gordon, VE2JZ, Net Manager, 5 Wood Crescent, Beaconsfield, Quebec, H9W 1C5.

CQ World-Wide WPX Contest

SSB: March 24–25 CW: May 26–27
Starts: 0000Z Sat. Ends: 2400Z Sun.

Complete rules were published in the January issue. Following are a few points to keep in mind.

Only 30 hours out of the 48-hour contest period may be used by single operator stations. Off times can be taken in up to five periods, but off periods must be a minimum of 60 minutes in length. Multi stations can operate the full 48 hours.

The QRP section has become very popular and is worth your attention.

The definition of the prefix multiplier is spelled out in detail and is now also being used for the CQ WPX Award program.

A prefix is the letter/number combination which forms the first part of a call.

The multiplier is determined by the number of different prefixes worked and is counted *once* only, regardless of how many times it is worked on other bands.

Another point to keep in mind is that in the multi-operator, single transmitter category only one transmitter and only one band may be used during the same 10-minute period. Picking up a new multiplier on another band during the same time period is definitely prohibited.

An alphabetical/numerical check list of claimed prefixes is a requirement and must be included with your log.

An updated trophy and plaque awards list now shows over 40 awards. Be sure to check the awards that are available.

Deadline for submitting your SSB entry is May 10th, and July 10th for the CW section. Be sure to indicate SSB or CW on the envelope.

All logs go to: CQ Magazine, WPX Contest, 76 North Broadway, Hicksville, NY 11801 U.S.A.

Questions pertaining to the WPX Contest can be sent to the WPX Contest Director, Steve Bolia, N8BJQ, 4121 Gardenview Dr., Beavercreek, OH 45431 U.S.A.

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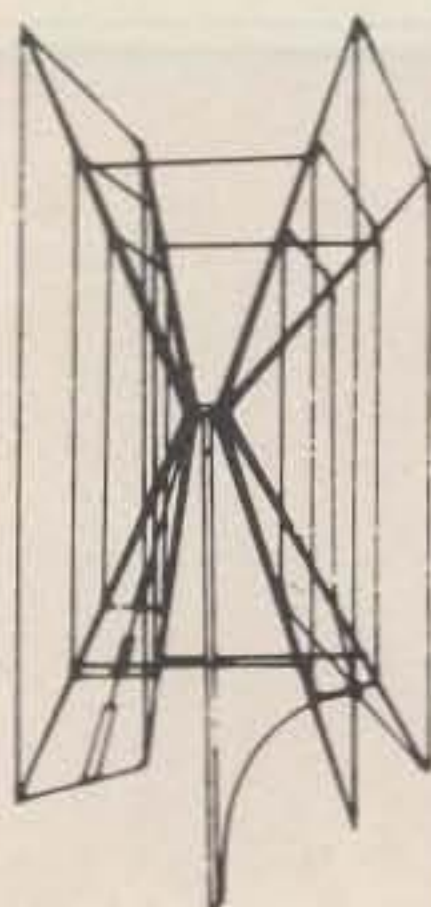
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 R2066-T Regency 60 channel scanner \$149.95
 R1099-T Regency 45 channel scanner \$109.95
 TS2-T Regency 75 channel scanner \$269.95
 UC102-T Regency VHF 2 ch. 1 Watt transceiver \$114.95
 BPS5-T Regency 16 amp reg. power supply \$179.95
 BP205-T1 Ni-Cad batt. pack for BC200/BC100XLT \$39.95
 B8-T 1.2 V AA Ni-Cad batteries (set of eight) \$17.95
 FBE-T Frequency Directory for Eastern U.S.A. \$14.95
 FBW-T Frequency Directory for Western U.S.A. \$14.95
 RFD1-T Great Lakes Frequency Directory \$14.95
 RFD2-T New England Frequency Directory \$14.95
 RFD3-T Mid Atlantic Frequency Directory \$14.95
 RFD4-T Southeast Frequency Directory \$14.95
 RFD5-T N.W. & Northern Plains Frequency Dir. \$14.95
 ASD-T Airplane Scanner Directory \$14.95
 SRF-T Survival Radio Frequency Directory \$14.95
 TSG-T "Top Secret" Registry of U.S. Govt. Freq. ... \$14.95
 TTC-T Tune in on telephone calls \$14.95
 CBH-T Big CB Handbook/AM/FM/Freeband \$14.95
 TIC-T Techniques for Intercepting Communications ... \$14.95
 RRF-T Railroad frequency directory \$14.95
 EEC-T Embassy & Espionage Communications \$14.95
 CIE-T Covert Intelligence, Elect. Eavesdropping ... \$14.95
 MFF-T Midwest Federal Frequency directory \$14.95
 A60-T Magnet mount mobile scanner antenna \$35.95
 A70-T Base station scanner antenna \$35.95
 A1300-T 25 MHz.-1.3 GHz Discose antenna \$109.95
 USAMM-T Mag mount VHF ant. w/ 12' cable \$39.95
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CQ World-Wide WPX SSB Contest All-Time Records

BY STEVE BOLIA, N8BJQ, DIRECTOR, CQ WPX CONTEST

The contest is held each year on the last full weekend of March. The All-Time Records will be updated and published annually. Data following the calls are year of operation, total score, and number of prefix multipliers.

WORLD RECORD HOLDERS

Single Operator			
1.8	CG3MFA('85)	319,140	162
3.5	OH1RY/CT3('85)	2,816,754	453
7.0	NP4A('86)	6,668,184	654
14	ZZ5EG('88)	8,219,627	871
21	FG5R('89)	9,936,240	912
28	ZP0Y('89)	10,518,343	853
AB	KP2A('89)	13,172,250	965
QRP/p	K7SS/WH6('86)	2,078,490	395
Multi-Operator Single Xmtr.			
	ZX5C('89)	22,400,980	1060
Multi-Operator Multi-Xmtr.			
	ZZ5EG('87)	38,096,250	1250

U.S.A. RECORD HOLDERS

Single Operator			
1.8	K5UR('85)	122,664	228
3.5	KQ2M('85)	1,247,906	433
7.0	KM6B('87)	1,164,800	320
14	K2VV('87)	3,546,294	687
21	AI7B('82)	4,151,232	576
28	WM5G('89)	4,213,127	799
AB	KM1H('89)	6,669,171	817
QRPp	W8ILC('82)	1,044,012	459
Multi-Operator Single Xmtr.			
	WC4E('89)	10,748,673	1017
Multi-Operator Multi-Xmtr.			
	WZ6Z('89)	18,737,170	1138

CLUB RECORD

North Texas Contest Club('84) 53,012,561

QRPp RECORD

K7SS/WH6('86) 2,078,490

WPX (Prefix) RECORD

ZZ5EG('87) 1,250

CONTINENTAL RECORD HOLDERS

AFRICA

1.8	OH1RY/CT3('87)	290,140	163
3.5	OH1RY/CT3('85)	2,816,754	453
7.0	OH2KI/CT3('87)	3,729,834	409
14	TU4BR('86)	3,483,480	637
21	EL2AV('81)	4,617,530	557
28	CN8CY('82)	2,947,811	487
AB	EA9AM('87)	12,712,460	838

ASIA

1.8	5B4LP('86)	142,272	117
3.5	5B4LP('84)	763,458	222
7.0	H24LP('87)	5,348,975	503
14	4X5L('89)	3,564,912	624
21	UA0TO('89)	3,563,520	696
28	JH1AJT('89)	4,848,480	740
AB	JA0JHA('89)	5,830,359	699

EUROPE

1.8	LZ2BE('84)	261,504	144
3.5	PA2TMS('87)	892,738	341
7.0	OH2KI/ZB2('85)	1,954,210	365
14	YT3AA('87)	3,928,015	679
21	YZ1EXY('89)	4,733,904	772
28	9H1EL('89)	5,882,825	787
AB	GB8FX('89)	7,049,694	824

Multi-Operator Single Xmtr.

AF	5H1HK('89)	11,262,108	858
AS	UL8LYA('89)	11,480,422	911
EU	LZ9A('89)	14,399,625	1075
NA	VP2EC('83)	15,238,880	820
OC	KD7P/NH4('85)	10,484,712	568
SA	PJ2FR('87)	18,493,730	907

NORTH AMERICA

1.8	CG3MFA('85)	319,140	162
3.5	VE3BMV('86)	1,928,720	388
7.0	NP4A('86)	6,668,184	654
14	TI2CC('87)	5,491,290	790
21	FG5R('89)	9,936,240	912
28	WM5G('89)	4,213,127	799
AB	KP2A('89)	13,172,250	965

OCEANIA

1.8	T32AF('83)	16,872	37
3.5	AH6AZ('88)	492,030	231
7.0	T32AF('84)	2,991,352	364
14	VR3AH('79)	3,526,153	437
21	NY6M/KH2('89)	6,122,620	707
28	KB7IJ/KH2('82)	4,743,144	504
AB	KG6DX('89)	7,018,200	700

SOUTH AMERICA

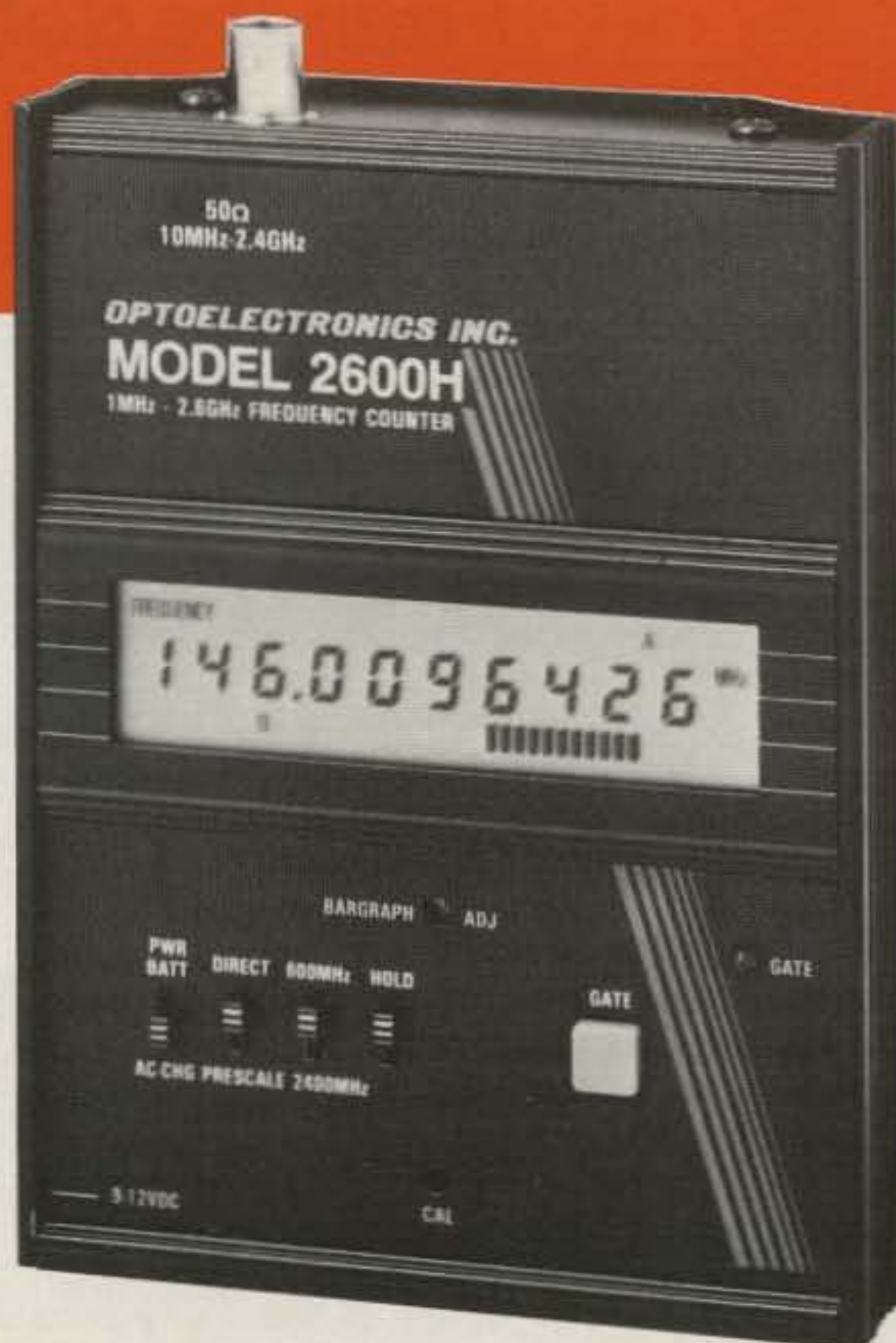
1.8	YV5JEA('84)	40,320	63
3.5	4M3AZC('84)	1,158,132	309
7.0	YV6CAX('86)	2,062,800	382
14	ZZ5EG('88)	8,219,627	871
21	ZZ5EG('86)	9,794,448	816
28	ZP0Y('89)	10,518,343	853
AB	PJ2FR('86)	13,040,435	823

Multi-Operator Multi-Xmtr.

AF	S79T('89)	15,479,240	937
AS	JA9YBA('89)	13,579,072	988
EU	YT2R('89)	22,324,200	1160
NA	VP2EC('87)	37,446,109	1147
OC	FK0AW('89)	26,538,972	1002
SA	ZZ5EG('87)	38,096,250	1250

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New from OPTOELECTRONICS



Introducing two advanced hand held frequency counters incorporating many unique features usually found only on laboratory bench counters.

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- 16 Segment Bargraph displays Input Signal Level. Ensures reliable counting, proven effective in locating concealed transmitters.
- High Accuracy, 1 ppm 10 MHz Crystal Time Base is standard with optional 0.2 ppm TCXO available.
- More usable Sensitivity than in any other counter for efficient antenna pick up measurements.
- Four push button selectable Gate times.
- Ni-Cad battery pack and AC adapter-charger included.

In addition, The Model UTC3000 features:

- In addition to Frequency, additional Functions Include: Period, Ratio, and Time Interval and Average.
- Single Shot Time Interval 100 ns, .1 ns averaged.
- Two input channels with High Impedance and 50 ohm input



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 Model 2210 10 Hz - 2.2 GHz General Purpose Audio to Microwave . . . \$219
 Model 1300H/A 1 MHz - 1.3 GHz RF Counter . . . \$169
 Model CCB Relative RF Signal Strength Bar Graph Meter With 10 Segment LED Display . . . \$99

Model 2600H . . . \$325
 Model UTC 3000 . . . \$375
 Model TCXO-30 . . . \$ 80
 Model TA100S Telescoping Whip Antenna . . . \$ 12

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ANTENNAS & ACCESSORIES

A LOOK AT THE SHACK FROM BOTH ENDS OF THE COAX

BY KARL T. THURBER, JR., W8FX

From the Notebook—Part II

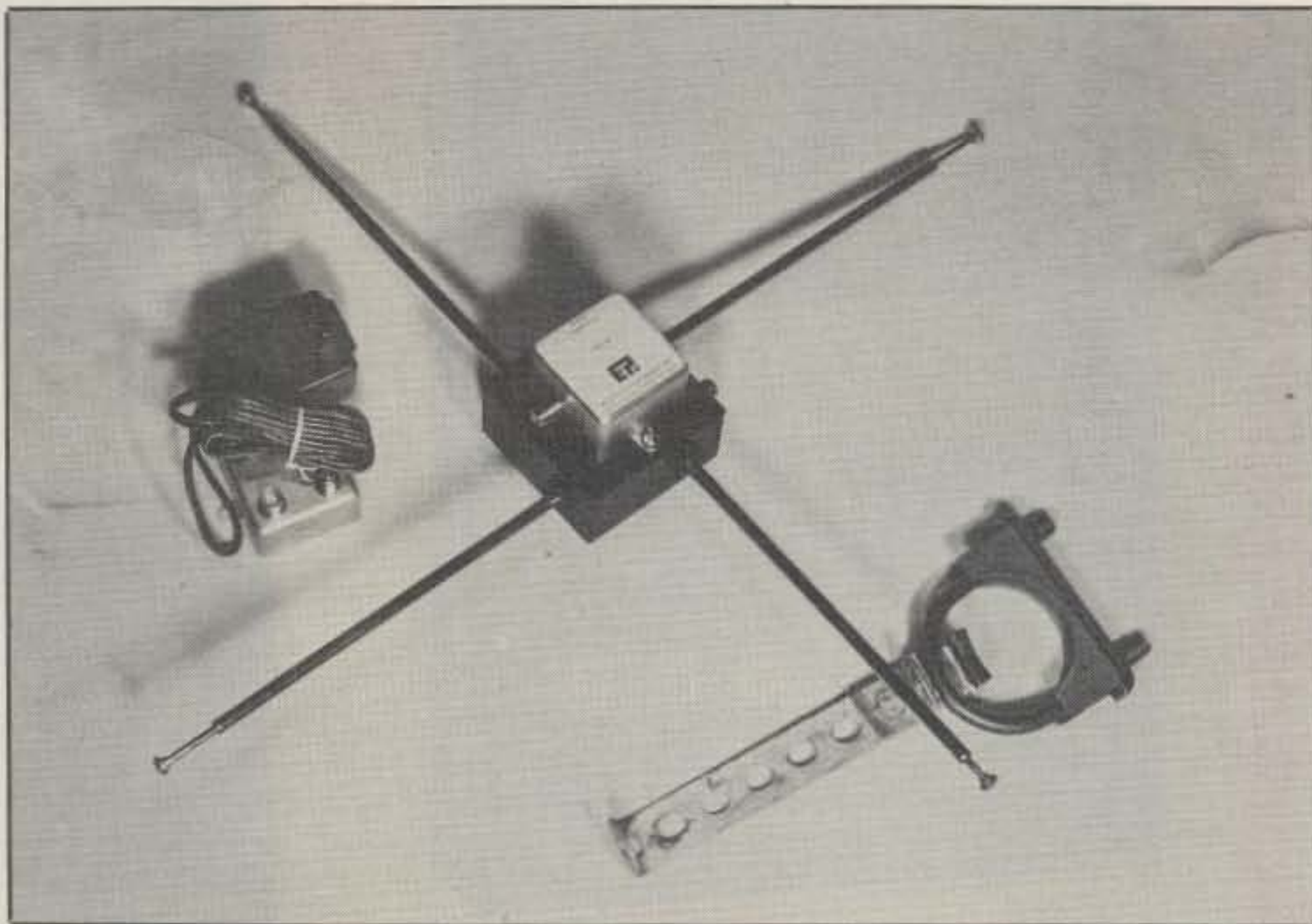
Last time we got together we flipped open the Antennas & Accessories notebook for a peek at several interesting antennas and software products. This time we'll again flip through the notebook for some topical antenna and software ideas. First let's turn to antennas.

Antenna Notes

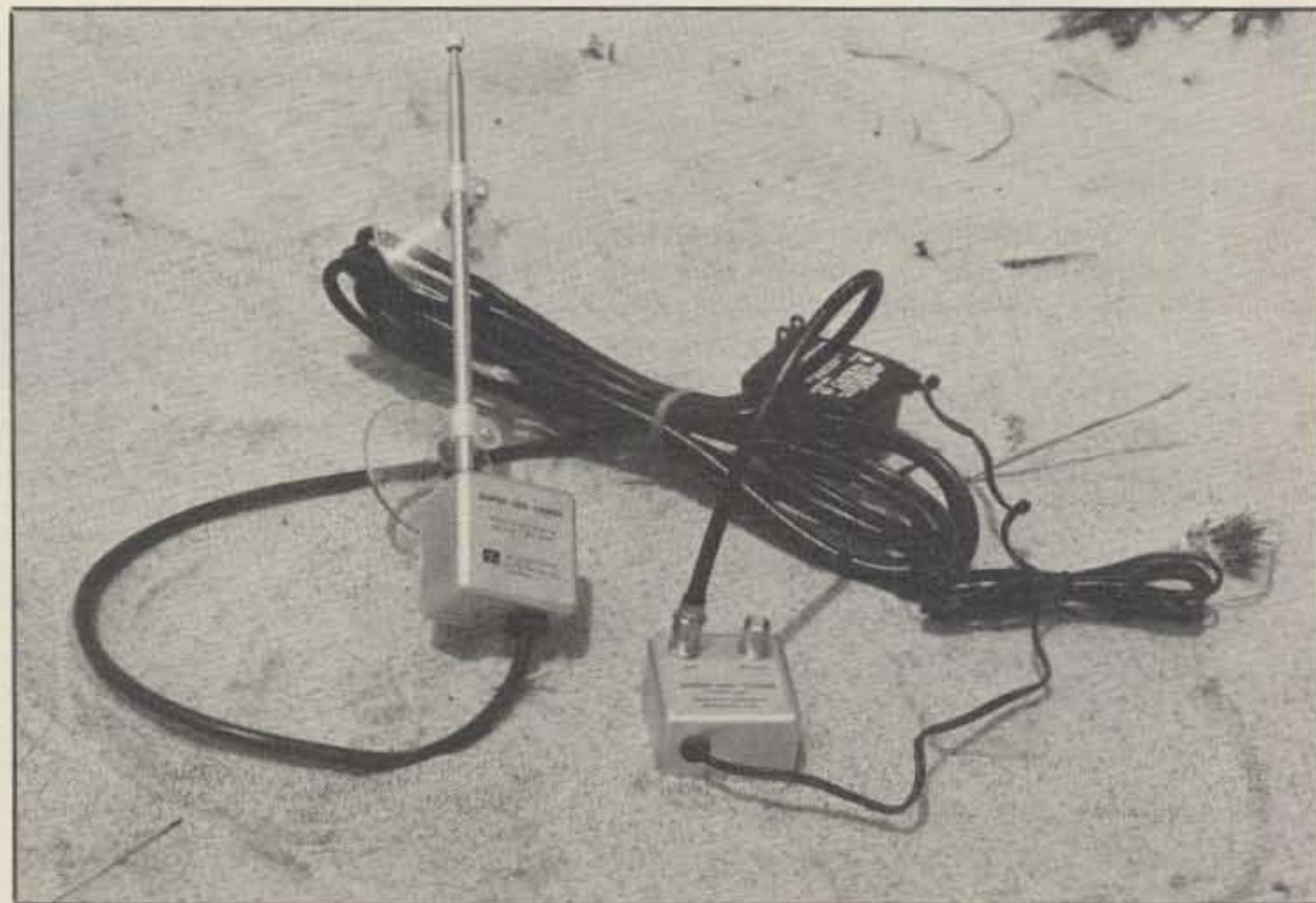
Electron Processing Products. John Martin, WB2VTN, EP's president, sent me his latest flyer, which contains a number of items of interest. His product line includes several active (amplified) vertical receiving antennas (the "Vak-Tennas"), a multiple receiver adapter, through-the-window couplers for mobile use, preamplifiers, and other products. Many of these are designed specifically for the burgeoning wireless microphone market: an unusual turnstile-type antenna for expanding the range of wireless microphones, a field intensity meter, and a VHF/UHF wireless system dipole. John indicates that he has had little feedback from amateurs on most of these products. But some of them could easily see amateur application on VHF and UHF frequencies—perhaps in satellite, mobile, and portable work.

One of the more unusual antennas he sells is the Super Turnstile, designed to improve operation over that of most standard whip-type wireless microphone receiving antennas. The antenna's cross polarized sections help to eliminate signal fading when the transmitting antenna is not oriented properly to the receive antenna. The Super Turnstile has an internal 15 dB amplifier, and it covers 25-1200 MHz. It is powered by means of a remote 115 VAC power unit and comes with 25 feet of coax. Standard mounting is by a supplied pipe/pole clamp; optional suction cup, Velcro strap, magnetic, and other mounting kits are also available. The standard unit is priced at \$244.95.

Also offered are several VAK-Tennas. Two new models are the Super Vak-Tenna and the Super Vak-Tenna-MM, both amplified antennas primarily for use with wireless microphone systems. Both cover 0.5 to 800 MHz and have an internal 14 dB gain preamp. The standard Super Vak-Tenna mounts to glass by means of two heavy-duty suction cups. For those wishing a more permanent installation, the Super Vak-Tenna-MM has a mounting bracket that allows you to attach it to any mast up to 1.75 inches in diameter. Prices start at \$149.95 for these antennas, the wideband coverage of which also makes them suitable for shortwave and scanner use.



Shown here is the Super Turnstile cross polarized receiving antenna for 25-1200 MHz coverage. The antenna assembly includes an internal amplifier which provides 15 dB gain. While designed primarily for commercial wireless microphone applications, it should be useful anywhere a turnstile antenna could be used. (Photo courtesy Electron Processing, Inc.)



The Super VAK-Tenna is suitable for vacationers and apartment dwellers. It's designed for reception over the range 500 kHz to 800 MHz and has an internal amplifier providing a minimum of 14 dB gain. A similar antenna without suction cups is available for mast mounting. (Photo courtesy Electron Processing, Inc.)

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144 MHz 30W in - 300W out



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Dynamic wide-range overload protection Over-temp and high VSWR shut-down

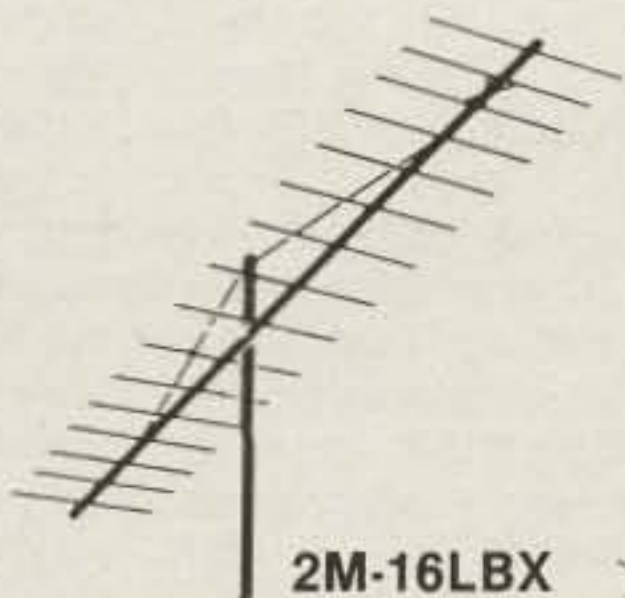
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Anything from short-range YAGI's or verticals to long-range satellite circulars.

2M-16LBX

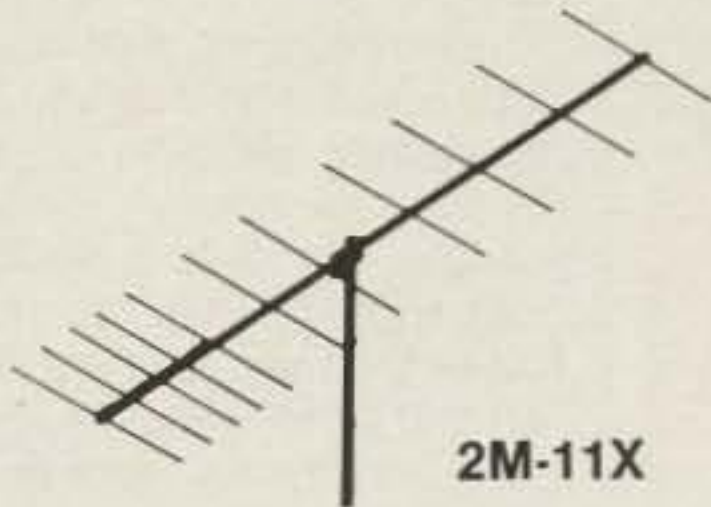
Bandwidth.....144-148 MHz
Gain.....13.2-14.5 dBd
VSWR.....1.2:1
F/B.....20 dB min.
Element Length...40 1/2" max.
Boom Length.....28 ft.
Windload.....2.44 sq. ft.
Turn Radius.....15 ft., 5 in.
Weight.....10 lbs.



2M-16LBX

2M-11X

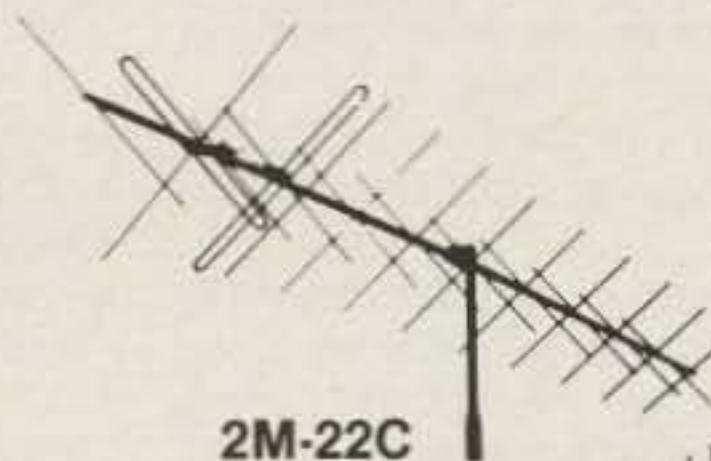
Bandwidth.....144-148 MHz
Gain.....12.5 dBd
VSWR.....1.2:1
F/B.....20 dB min.
Element Length...40 1/2" max.
Boom Length.....15 ft., 4 in.
Windload.....1.38 sq. ft.
Turn Radius.....15 ft., 4 in.
Weight.....5.5 lbs.



2M-11X

2M-22C

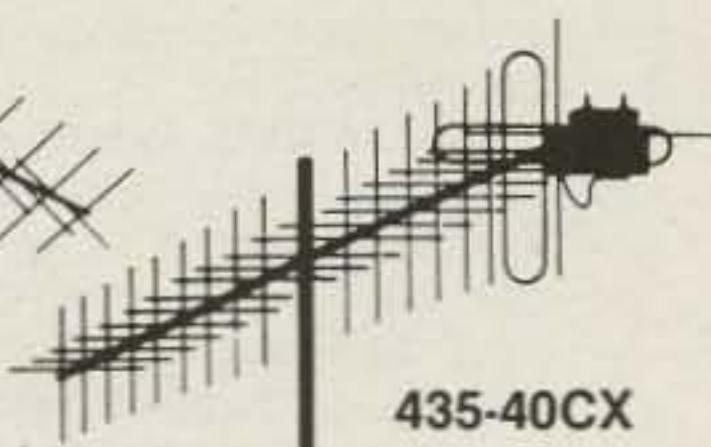
Bandwidth.....144-148 MHz
Gain.....13 dBc
VSWR.....better than 1.5:1
F/B.....20 dB min.
Element Length....41" max.
Boom Length.....19 ft., 1 in.
Windload.....1.85 sq. ft.
Turn Radius.....13 ft.
Weight.....11 lbs.



2M-22C

435-40CX

Bandwidth.....410-450 MHz
Gain.....15.2 dBc
VSWR.....1.5:1
F/B.....20 dB min.
Element Length.13.625" max.
Boom Length.....175.5 in.
Windload.....1.16 sq. ft.
Turn Radius.....105 in.
Weight.....10 lbs.



435-40CX

Antenna gain figures used by MIRAGE/klm are measured according to the National Bureau of Standards. These figures are actual gain listed in dB at free space measured over a dipole. Some manufacturers do not choose to use this standard and therefore indicate gain figures that appear to be higher.

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#09 ADV. THEORY COURSE \$32.95

4 tapes and 1 illustrated textbook

#10 COMPLETE EXTRA. . . \$62.95

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#11 EXTRA CODE COURSE \$32.95

6 tapes for speed building from 13 to 22 wpm for the Extra code exam.

#13 BRASS KEY & OSC. . . . \$25.95

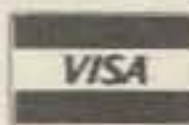
#15 PLASTIC KEY & OSC. . . \$21.95

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- #20 5 wpm Random Code
- #21 5-7 wpm Speed Builder
- #22 7-10 wpm Speed Builder
- #23 10 wpm Plateau Breaker
- #24 10-12 wpm Speed Builder
- #25 12-15 wpm Calls & Numbers
- #26 13 wpm Random Code
- #27 13 wpm Test Preparation
- #28 13 wpm Car Code
- #29 13-15 wpm Speed Builder
- #30 15-17 wpm Speed Builder
- #31 17-19 wpm Speed Builder
- #32 20 wpm Random Code
- #33 20 wpm Test Preparation
- #34 20 wpm Car Code
- #43 3-15 wpm Code Review
- #40 12-21 wpm Code Review

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N6RJ 2ND OP - 09/08/89 - 05:08 UTC

UNITED STATES AND TERRITORIES VERSION

DATE: 09/08/89 TIME: 05:08 UTC

HOME WORKING PROGRAM

F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
DETAIL	QUICK	PRINT	INSTALL	SR/SS		SUMMARY		HELP	EXIT

Fig. 1- Main menu, N6RJ Electronic Second Op. The N6RJ Electronic Second Op is a computerized version of the original slide-rule DX aid (which is still available for \$8.95). The menu-driven system provides a wealth of DX information that is instantly available from your computer. It's also a specialized DXCC and WAZ awards tracker and logger.

An interesting accessory is the WPO window coupler, which is designed to bring coax through a window without holes. It mounts on both sides of the window to effectively connect the outside coax with that on the inside; the two coupler sections each attach to the glass by means of double-faced tape. While primarily for receiving use, the window couplers are usable for both transmit and receive with up to 25 watts over a 10 MHz band with 2 dB or less loss. Two models, one covering 140-160 MHz and the other 440-460 MHz, plus a receive-only 60-800 MHz unit, are available for \$49.95 up.

John indicates that while the couplers do exhibit some loss, they can solve an often insurmountable problem of making coax pass through a window. The loss introduced by the coupler probably is less than that incurred when running a significant length of very small diameter coax, such as RG-174, through and around narrow window seals. He also expects to announce an increase in power-handling capability of the couplers in the near future.

For specs, contact John Martin, WB2VTN, at Electron Processing, Inc., P.O. Box 68, Cedar, MI 49621.

Mobile NVIS Antennas and the Marines.

We all are familiar with what happens when operating HF mobile, where we can work fixed stations out to a certain distance but rapidly enter a dead zone until skywave restores our signal. Don Hamilton, KA9SEY, sent me an interesting news clipping from the Chicago *Tribune* about the Marine Corps developing an antenna to fill in HF radio "dead zones" between groundwave's maximum range and skywave's minimum range. The design principle isn't really new. It's the Near Vertical Incidence Skywave (NVIS) antenna, in which the antenna transmits straight up, its signal to be reflected back to earth at much shorter distances than conventional skywave propagation would dictate.

While the newspaper article was decidedly nontechnical, it seems that an enterprising noncommissioned officer at Camp Pendleton adapted the fixed station NVIS antenna idea for mobile use: the Marines used a large transmitting loop using a frame of tent poles and PVC pipe. The result was a mobile antenna that looks like a large bed frame mounted on top of a standard radio truck. Metal stakes at the assembly's four corners hold it up; 1 foot lengths of PVC pipe stick down from the horizontal frame, and they support a wire antenna looped three times around the perimeter of the frame.

The mobile NVIS loop, which is said to cost around \$125 from available materials, took about two days to build. But it worked well in the Marines' desert training area at Twenty-Nine Palms, California, and in the Sequoia National Forest, where it was taken for field evaluation. The NVIS lashup allowed the mobile units to go places where they couldn't normally communicate, such as behind ridgelines, in deep ravines and canyons, and in heavy vegetation, thereby overcoming both the problems of difficult terrain and dead zones.

Diamond Receiving Antennas. The Diamond Antenna Corp. of Japan has introduced two vertically polarized, wideband amplified receiving antennas. These are the "Super Wideband" D-505 for mobile work and the D-707 for fixed station use. Each antenna features a low-noise hybrid IC preamplifier (built into the antenna itself) to provide up to 20 dB gain. Each antenna covers the range 500 kHz to 1500 MHz and is designed to work with 50 ohm coaxial cable. The mobile D-505 is but 29.1 inches long and weighs only 0.35 pound; it is furnished with a 12 volt DC cigarette-lighter power adapter. The D-707 is 37.4 inches long and weighs 2.2 pounds; it is furnished with an AC power adapter, Fiberglass housing, and mounting bracket.

For price and additional details, contact RF Limited, P.O. Box 1124, Issaquah, WA 98027.

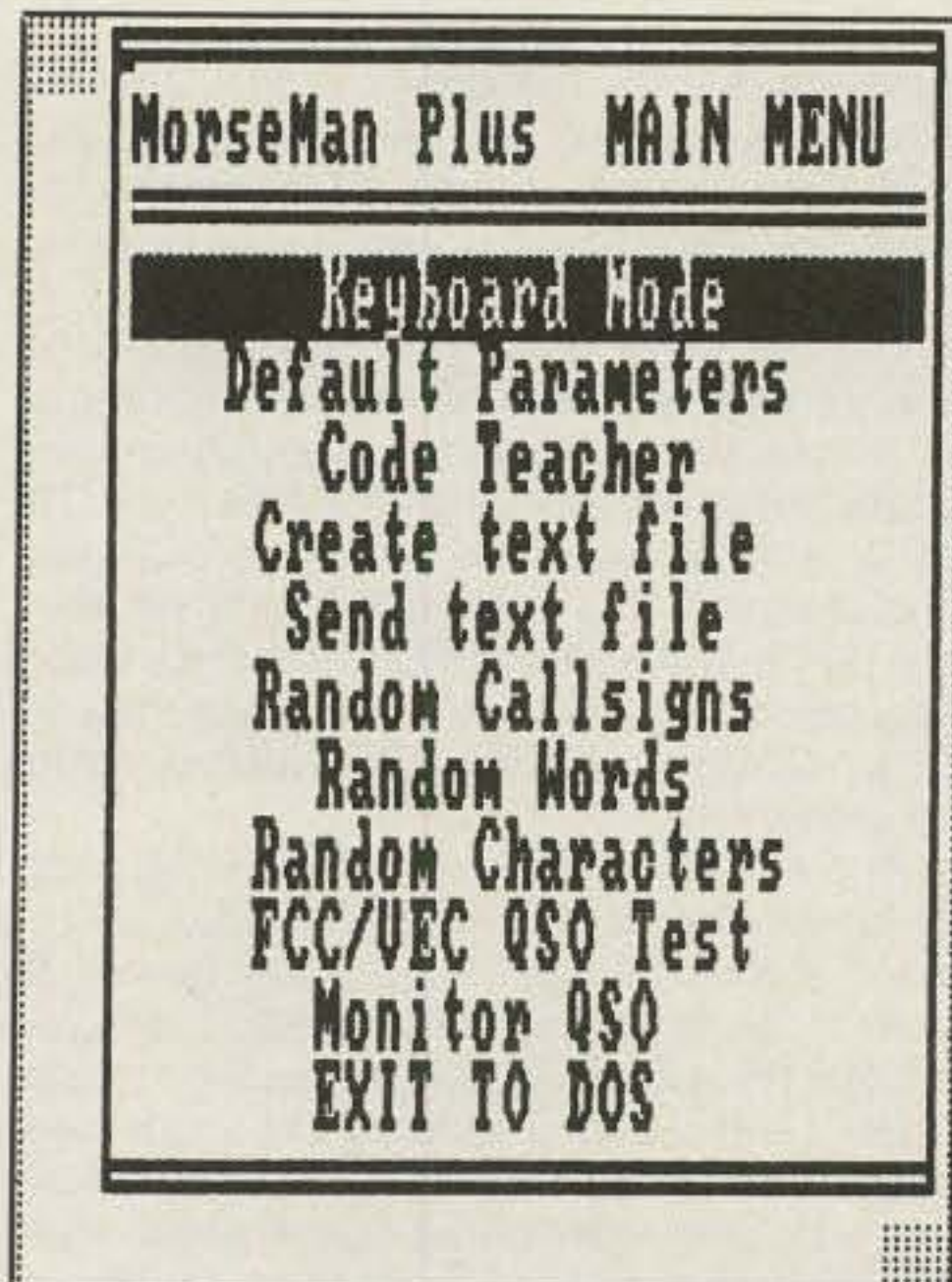


Fig. 2- The main menu from MorseMan Plus, offered by Robin Gist, NE4L. Robin's program is a slick, full-featured Morse Code trainer designed for an IBM PC or compatible with 512K or more memory. Many sophisticated options are available (see the text for details).

Great Circle Maps. Haven't gotten around to calculating great-circle bearings for your QTH and transferring them to a custom wall map for easy reference? Matthew Lewis, KB5IVO, has done that many times over. He offers an "azimuth map" centered on your station's location to help ensure that your beam is lined up on target. On his maps you're at the exact center of the world, with the rest of the world spread around you in such a way that true headings are preserved. The distance from your station to any location on earth may conveniently be found by counting the number of rings from the center; each ring is spaced 1,000 miles apart.

According to Matthew, the map is detailed with political boundaries and has all the major continents and island groups labeled, with major cities added to help you find your way around. The maps are printed on 80 pound poster stock and may be lettered with your callsign or initials.

As Matthew notes, the standard wall map, typically a Mercator projection, distorts the true heading from one point to another in order to preserve the placement of the continents. As a result, true heading can be off by a considerable amount. On the other hand, the azimuth map distorts continental placement and shape, a tradeoff made in order to show the world as radio waves see it. This type of map can be used to find both the short and long path to the destination area, though it does take a few minutes to get used to. This is especially true if you're not used to seeing your QTH as the "center of the universe."

The maps are priced at \$39 plus \$2 shipping and handling. Contact Matthew Lewis, KB5IVO, at the Great Circle Map Co., P.O. Box 691401, San Antonio, TX 78269.

Omega Electronics Update. Bill Edwards, K4BWC, sent me a note describing his new

firm, formed when AMP Supply, where he was employed, closed down its manufacturing operation. Bill was the service manager there.

Bill's primary objective in forming the new company is to provide owners of most amplifiers good-quality repair service and parts for do-it-yourself amplifier builders. Bill included his parts catalog, which includes most of the parts—capacitors, coils, chokes, fans, relays, switches, tubes, and even complete subassemblies—needed for amplifier construction. Omega Electronics also offers several antenna assemblies and accessories, including a \$39.95 G5RV multiband HF antenna.

For more information, contact Bill Edwards, K4BWC, at Omega Electronics, 4209 Live Oak Road, Raleigh, NC 27604.

Amidon Associates Parts. A large, 24-page foldout catalog is offered by this supplier of various and sundry iron-powder and ferrite coil forms, balun and wideband cores, toroids, ferrite beads, rods, and bobbins, magnet wire, and other related RF parts.

With its considerable application notes, the catalog provides a mini-education on the use of these materials. Especially useful are the notes on using ferrites for RFI suppression, AC line filter construction, and power considerations in using iron powder and ferrite materials.

The catalog is available from Amidon Associates, 12033 Otsego St., North Hollywood, CA 91607.

Software Notes

N6RJ Electronic Second Op V2.0. In last May's issue we took note of Jim Rafferty, N6RJ's bits-and-bytes version of the popular slide-rule Second Op. At that time, however, we hadn't laid our hands on the software. Recently we received an updated (Version 2.0) review copy through CQ's offices and so can report on the program in somewhat more detail.

To recall, the menu-driven program is a computerized version of the DX-oriented, slide-rule-style N6RJ Second Op, which, incidentally, is still available for \$8.95. The electronic version includes a great deal of DX information that you can instantly access using your computer. It's also a specialized logging system designed for DXCC and WAZ awards tracking.

Some of the most important features include high-speed location of DXCC/WAZ/country/continent data; bearing and distance information; on-screen DXCC and WAZ summary displays; Soviet oblast information; sunrise and sunset calculations (for all countries and 195 additional locations); a complete ITU callsign allocation listing; instant conversion of callsign prefixes to DXCC countries; and help screens for all functions offered by the program.

Some other features include high-speed, on-screen summary displays of DXCC and WAZ information; tracking satellite DXCC totals by individual or all satellites; a real-time UTC date/time clock; and a "WWV timer" feature that reminds you (in Morse code) when WWV broadcasts propagation information. There also is a broad array of custom printing features. These include, among others, DXCC countries worked and confirmed, WAZ worked and confirmed, a DXCC "need list," countries worked but not confirmed, etc. The list goes on.

I was surprised at the comprehensive users

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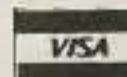
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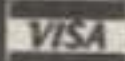
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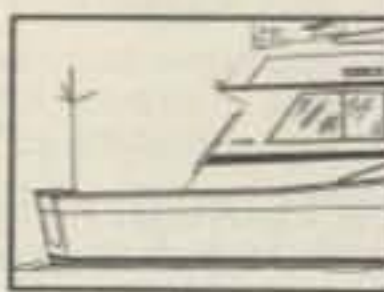
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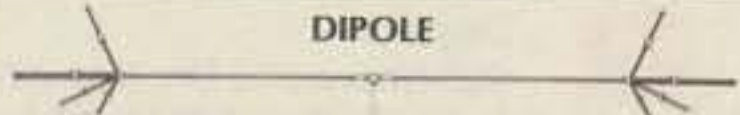


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manual that was furnished with the program. Something of a departure from the docs that are typically furnished with amateur radio software, it clocks in at 63 pages in V2.0. The well-indexed manual provides detailed instructions on installation, operation, displays, functions, and printing options. Appendices cover data backup, error messages, oblast information, and upgrading to a new Second Op data disk as well as upgrading from floppy to hard disk. Information is also given on recovering your data should you have a computer or disk malfunction.

The program is intended for use on an IBM PC/XT/AT or true compatible computer with 640K memory and DOS 3.0 or greater. An 80- or 132-column printer is also required (a Laser Jet II compatible laser printer may also be used). A hard disk drive is highly recommended. The program is \$59.95 for either 5.25 or 3.5 inch diskettes and is available from any Ham Radio Outlet store.

I should point out that N6RJ's handy program is really designed for the awards-oriented DXer. While the log could conceivably be used as a regular station log, it's really intended for DXCC and WAZ use. Also, before purchasing the program, make sure that you have a full 640K of user memory; my old 512K Cor-data PC barely held the program and didn't have adequate elbow room left to properly use it. Also, while the program isn't copy protected, during the installation routine your master floppy disk is imprinted with your name, call-sign, and other personal information to discourage your passing the program around.

Fig. 1 shows the N6RJ Electronic Second Op main menu. For more information, contact Jim Rafferty, N6RJ, at Ham Radio Outlet, 2620 W. La Palma, Anaheim, CA 92801.

MorseMan Plus. Robin Gist, NE4L, sent me a copy of his new MorseMan Plus V2.5, which he bills as "the premier Morse trainer for IBM PCs." It's designed to work with any IBM PC or compatible computer that has 512K or more user memory.

Seems Robin is a 1989 Auburn University grad, and just happened to see our ol' 1982 Honda with its W8FX call sign plate scooting around Montgomery. This chance encounter gave him the idea of sending us a copy to examine. I'm glad he did, since it's clear that he has one heck of a competitive product.

In developing MorseMan Plus, Robin tried to get out of the "same old code tape" rut with a program that could be varied greatly in presentation style. His program is different from other trainers in that while most of them tend to put you on your own after they teach you the code, his program is just getting warmed up at that point.

MorseMan Plus lets you choose your own method of instruction. You can choose between random characters, random words, or random call signs. Some rather sophisticated options are possible, too (more on these later).

Some of the program's key features include true random characters and words variable from 5 to 99 WPM; a realistic call sign generator; a keyboard code-sending mode; an ability to create ASCII text files; a tutor mode for beginners; an ability to save everything sent to disk; FCC/VEC type QSOs and exams (with a built-in recordkeeper); step-by-step character instruction for teaching the code; and an easy-to-use windowing environment.

A particularly nice feature is the random call sign generator. This allows the program to

generate realistic random call signs. User-adjustable options let you vary the speed and even the frequency with each call, making the Morse you hear sound uncannily like listening to a pileup.

The QSO/FCC test feature provides a good deal of help for those going for FCC exams. When you select this option, the program randomly builds one side of an FCC/VEC-type CW QSO, with abbreviations, prosigns, call signs, and Q-signals. It's unlikely that you will ever see precisely the same QSO twice, since Robin has calculated that there are more than 20 trillion QSO possibilities with which you might be presented.

Another nice feature is the QSO Monitor, which lets you listen in on a simulated QSO at a speed you can copy. The program generates both sides of the conversation but lets you choose the speed and frequency range to use. It starts with a station sending CQ. From there it generates full QSOs with all of the formalities and with both sides of the conversation audible. You have several options to further increase this mode's realism.

At the bottom line, Robin has a slick commercial program that clearly ranks among the top Morse trainer programs I've laid hands on. List price is \$24.95 plus shipping, with the next major update furnished free of charge. For more information, contact Robin Gist, NE4L, at Renaissance Development, Box 640, Killen, AL 35645. (Fig. 2 shows the MorseMan Plus main menu.)

LOG-EQF Update. In mid-1989 Tom Dandrea, N3EQF, sent us a copy of his LOG-EQF program, which we described in a recent column. Tom recently advised us that he's updated LOG-EQF to Version 1.2 and added several features to the program.

To recall, LOG-EQF is shareware logging program designed to work with the IBM PC and compatibles running DOS 2.2 or higher. The program is especially intended to work with a Kenwood transceiver equipped with an IF-232C interface connecting the radio to a serial port on the computer. With this hardware configuration, the program displays and automatically logs the frequency and mode currently set on the radio. A large array of custom logging features is offered.

Tom told us that one major complaint he had about earlier versions of the program was that the display colors were not too well-chosen. This was because he originally developed the program using a monochrome monitor, which may explain why the program's colors looked "so horrible" (Tom's words!) on a color screen. In this revision he's reworked the program to include user-definable background colors.

Another improvement is the ability to use the computer's edit keys (INSERT, DELETE, END, and BACKSPACE) from the log entry and edit pages. The program's input routines, which allow keyboard inputs to be read while the on-screen clock and Kenwood radio functions are continuously updated, were not equipped to handle these keystrokes in earlier versions. Other improvements include more consistent key commands (depressing the ESCape key always brings up the main menu, for example) and coding optimization to keep the program size under 100K.

Although LOG-EQF is a shareware program, and there is a \$10 registration fee if you use the program regularly, there's no "purchase price." All that is required to receive the

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Novice thru Extra exams scheduled Saturday and Sunday by appointment only. Send FCC form 610 (Aug. 1985 or later) - with requested elements shown at top of form, copy of present license and check for prevailing ARRL rates (payable to ARRL/VEC) to: Exam Registration, 8830 Windbluff Point, Dayton, OH 45458

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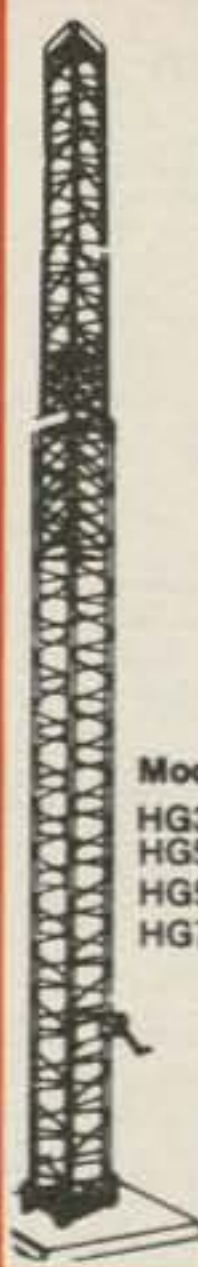
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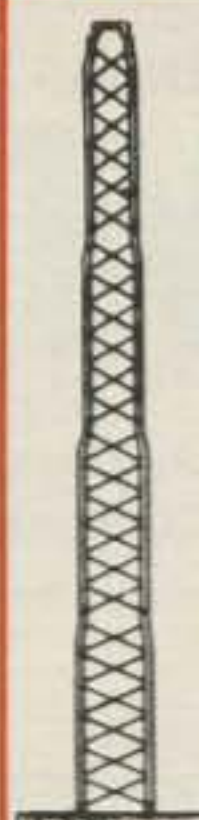
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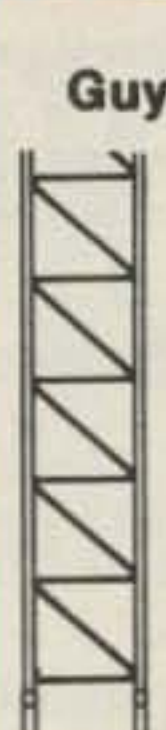
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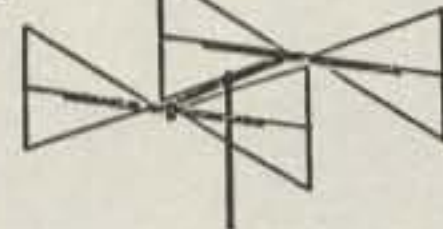
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program is a self-addressed, stamped disk mailer sent to Tom. If you'd like a copy of the program, send the disk and mailer to Tom Dandrea, N3EQF, 396 Sautter Drive, Coraopolis, PA 15108.

PC Tools Deluxe 5.5. We've mentioned this outstanding IBM PC based comprehensive data recovery, DOS utility, desktop manager, and hard disk backup combo package three times before in the column. Central Point Software has a good thing going with PC Tools, which has progressed far beyond the point where it was simply a direct competitor to powerful disk utility programs such as The Norton Utilities. In fact, PC Tools is now one of the top-selling utility products in the IBM-PC software market.

In last October's column we summarized some of the features of Version 5.0 (which shortly thereafter evolved into V5.1), which is divided into three main subpackages: utilities, desktop, and hard disk backup. We described each of these in detail in that column, so we won't repeat ourselves here.

In the meantime to correct some minor problems with the original package, and to offer some new enhancements (especially to the program's powerful DOS Shell), they've come out in rapid-fire order with Version 5.5. The new version includes over 90 enhancements, largely derived from user-suggested changes.

One is the addition of a built-in text viewer that allows you to view Lotus 1-2-3® and dBase® files directly by pressing a single key. You now also have an application/data file launch capability that lets you automatically load and run an application program simply by accessing the associated data file. There's a

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Fig. 3- CQ's new red-and-blue QSL cards for its regular columnists and writers are handy for us to have and use. They were printed by Wayne Carroll, W4MPY, better known as "the QSL man."

faster, improved file finder that lets you rapidly locate a file or group of files, regardless of which subdirectory they are in. There's also a new status line in the DOS Shell that displays important file information as well as a line with "shortcut key" reminders that enable you to reduce the number of keystrokes required for the most commonly used commands.

Other nice-to-haves include an enhanced hard disk backup module with polished-up

menus and performance, improved mouse support, and a flexible setup program to simplify installation on your hard disk. Another handy feature is the appointment scheduler, which you can set to come up automatically when you boot your PC. This feature could be used, for example, to log net start times and other operating schedule information, presenting you with this information as "appointments" when you open up the hamshack for the day. If you



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choose, you can have the "appointments" set off warning alarms at the appropriate times.

Other nifty features include improved calculators (scientific and algebraic), a global auto-dialer that can even dial any telephone number it sees on the screen, a menu for switching windows in the desktop module, and much more.

The price of the new version has escalated to a hefty \$129, taking it out of the bargain-basement range in which it once resided; PC Tools is now big-time software. Happily, though, PC Tools is widely offered at deep discount by mail-order firms, and registered PC Tools Deluxe owners can upgrade very reasonably for \$20 for either 5.25 or 3.5 inch disk formats, or for \$25 to receive both formats.

A rather novel way current PC Tools Deluxe users can obtain the new version is by downloading it from Central Point Software's own bulletin board system (BBS) at 503-690-6650. How can they do this, when anyone, including software pirates, can download from the BBS? Easy: by storing the new version in an encrypted form that can only be unscrambled by PC Tools' own proprietary file encryption programs!

The program requires 512K RAM and DOS 3.0 or later; a hard disk and 320K EMS are recommended. For further information on PC Tools Deluxe, contact Central Point Software, 15220 N.W. Greenbrier Pkwy. #200, Beaverton, OR 97006.

Short Bursts

Ten-Ten International. If you've been on 10 meters recently, you probably know who the "Ten-Ten'ers" are. While there's plenty of activity on 10 now that the sunspot cycle is close to its peak, it wasn't always that way. In the valley years of the sunspot cycle there tends to be little activity on ten—so little that the band developed a "use it or lose it" character back in the early 1960s, a character like some of our VHF and UHF bands today.

The Ten-Ten International Net, Inc., was formed in 1962; its original name was the Ten-Ten Net of Southern California. Its founding purpose was to promote both activity and good operating practices on the band. During its first few years, it grew very slowly, but by 1975 there were some 10,000 members. It has more than 50,000 members now.

Ten-Ten has local chapters worldwide; these operate independently, though all chapter members must be Ten-Ten members. Many chapters issue certificates and other awards under rules which they establish themselves.

New members pay annual fees of \$4, and new members also pay a \$1 registration fee. Each member is assigned a unique "Ten-Ten number" which he keeps for life; it's retained even if his callsign changes. Membership includes a subscription to the *10-10 International News* and makes the member eligible to participate in various 10-10 activities, including contests and award programs.

The organization is also sort of a certificate-hunter's paradise. Many awards are issued by the net, including "bars" (for contacting ten other net members) and the International 500 Club. There are also the Worked All States, Countries, and Continents awards for 10 meter contact with members. Contests are scheduled regularly.

Membership has an unusual requirement. To join you first must contact 10 Ten-Ten members over the air, obtaining certain information from them (their Ten-Ten number, callsign, operator's name, date worked, city, and state or country). You then send in a \$4 check for first year dues and the \$1 registration fee (payable to the Ten-Ten International Net, Inc.).

The organization's structure is highly decentralized, with various U.S. call area and DX area managers (too many to list here), so it's best to ask a Ten-Ten member over the air to which area manager you should send your membership request. The newsletter all members receive lists the managers and their addresses in each issue.

Murphy's Law—Yet Another Version. We all know about Murphy's Law: whatever can go wrong, will go wrong—or something like that. Apparently, Murphy's Law has become so widely accepted in the scientific community that it has evolved into a complex system of concepts, hypotheses, theoretical frameworks, paradigms, theorems, and axioms that attest to its rigor and vitality.

Well, it's *almost* April, so now might be a good time to contribute some 15 observations to help further the development of Murphy's Law as one of the overarching paradigms of scientific thought.

1. Early to bed and early to rise is fine, except that one will never find out where the action is.
2. Go ahead and tell a lie, but be ready to come up with ten more fibs and prevarications to cover up Lie Number One.
3. If you go far out of your way to save a paltry couple of bucks, you'll likely end up spending *more* by the time it's all said and done.
4. Then, too, after all is said and done, a lot more is said than done.
5. Each and every project you undertake takes longer (sometimes a *lot* longer) than you expect it to take.

6. If you mess with something long enough, it'll break.

7. If there is any possibility of something going wrong, bet your last dollar that it will be the thing that costs the *most* to fix.

8. If you work too long to improve something, you're on the high road to tossing it out and starting over from scratch.

9. Be careful about papers you're thinking about throwing out. If it isn't in the computer, then it doesn't exist.

10. To err is human, but to *really* mess up with class and flair requires a computer.

11. If you're certain that everything is okay, you're dead wrong. You have undoubtedly overlooked something.

12. Cheer up! It's always the darkest just before it becomes totally black.

13. If you leave things alone, they just go from bad to worse.

14. If it ain't broke, don't fix it (unless, of course, you might make it *better* . . .).

15. The one time of the day when you lean back and relax is the one time when the boss walks through the office.

Nice Gesture. Last year *CQ* decided to outfit its regular columnists and writers with a distinctive QSL card that identifies us as members of the *CQ* gang. The cards are something like the classic old-time cards the ARRL uses, but are really quite different from them. The cards are handy not only for their intended QSL purpose, but also to use like "eyeball QSO" and business cards. My card, which I'm quite proud of, is shown in fig. 3.

Wrapping It Up

That's about it for this time, guys and gals. Join us next time for more Antennas & Accessories topics of current interest. See you then.

Overhead. Don't lend anyone money. Doing so tends to give them amnesia.

73, Karl, W8FX

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•**Scholarship To Be Awarded** - The Chaverim of Delaware Valley, Inc. will award a \$500 post-secondary education scholarship to a licensed Jewish amateur radio op who is in need of financial assistance. Applications may be obtained by writing to Jay Kuperman, WA3IFY, 1934 Devereaux Ave., Philadelphia, PA 19149. Completed applications must be received by May 15.

•**Boulder, Colorado VE Test Schedule** - The Boulder VE Team will hold amateur radio tests on the second Monday of most months (exception July none, Sept. 23, Oct. 15) at the American Legion, Boulder, CO. For information and to preregister, call Barbara McClune, N0BWS, at 303-530-1872. Preregistration is preferred, but walk-ins are welcome.

•**Pitcairn Island** - Beginning March 1 through 2359Z March 31, Kari Young, VR6KY, will continue the VR200PI/KY callsign in celebration of Pitcairn's bicentennial year. Operation will be in the 10 meter SSB Novice portion and 15 and 20 meter SSB, General portions of the bands. All VR200PI QSLs are direct only and should be sent to the award manager, Dr. G. O'Toole, KB6ISL, 9605 San Gabriel Ave., So. Gate, CA 90280-4725 with No. 10 SASE for confirmation.

•**Grand Island, Nebraska** - The Grand Island ARS will operate W0CUO from 0000Z March 2 to 2400Z March 4 on SSB, CW, packet, AMTOR, and RTTY in all lower portions of the General and Novice bands. For certificate send QSL, contact number, and SASE to W0CUO, P.O. Box 642, Grand Island, NE 68802.

•**United States Naval Reserve** - KE8OJ will operate a special events station to commemorate the 75th birthday of the USNR on March 10-11 from 0800-1600Z both days. Suggested frequencies: 3.875, 7.250, 14.250, and Novice portion of 10 meters. For a certificate send QSL and SASE to Eric Knapp, KE8OJ, 917 Glen Way, So. Charleston, WV 25309.

•**DeVry VEC Testing** - VEC tests will be available on the following dates: March 10, May 19, July 14, Sept. 8, and Nov. 17 from 12 noon to 2 PM at St. Mary Medical Center, Galesburg, Illinois. For more information, contact Larry Heller, KA9PCU, 1436 Brown Ave., Galesburg, IL 61401 (309-342-5977).

•**PARC/VOA Special Event** - From 0000Z March 17 through 2400Z March 18 the Piscataway ARC will operate their annual special event commemorating the Voice of America Relay station, WBOU, which operated during WW II in the Bound Brook section of Piscataway, New Jersey. Members of the PARC will operate using their own callsigns signing /VOA. Suggested frequencies: CW—Novice portions of the bands; SSB lower third of the General portion of the bands on 75, 40, 20, and 15 meters, and the Novice portion of the 10 meter band. For certificate send No. 10 SASE (for unfolded 9 x 12 SASE) with your QSL to PARC, Attn. KB2UV, P.O. Box 1233, Piscataway, NJ 08854.

•**St. Patrick, Ohio** - The Farout ARC of Dayton, Ohio will operate WB8SMC/8 from St. Patrick, Ohio from 1700Z March 17 to 1700Z March 18. Frequencies (plus or minus 5 kHz): SSB 3870, 7270, 14270, 21370, 28370; CW 3735, 7135, 14135, 21135, 28135; RTTY 3620, 7090, 14090, 21090, 28090. To QSL send SASE to Farout ARC, P.O. Box 9181, Dayton, OH 45409-9181. (SWLs must indicate who WB8SMC/8 was in contact with at the time of monitoring.)

•**Macon, Georgia** - The Macon ARC will operate W4BKM from 1400-2300Z March 23 and 24 for the Macon Cherry Blossom Festival. Suggested frequencies (plus or minus QRM): CW 7130, 14030, 21130,

28130; SSB 7250, 14250, 21320, 28320. For certificate send QSL and 9 x 12 SASE to W4BKM, Macon ARC, P.O. Box 4862, Macon, GA 31208.

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

Mar. 3, **Peel ARC Fleamarket**, North Peel Secondary School, Bramalea, Ontario, Canada. Contact PARC Fleamarket, 20 Hillbank Trail, Bramalea, Ontario, L6S 1P6 Canada, or call James L. McMurray, VE3BDI, 416-458-0505.

Mar. 3, **North Jersey Hamfest**, Dover Armory, Dover, NJ. Contact Harvey Klein, WS2Q, 201-538-1768 (before 9 PM). (VE exams.)

Mar. 3-4, **Starfest International '90**, Jacob Brown Auditorium, Brownsville, TX. Contact James Parrott, K5EHY, Starfest '90, 2210 S. 77 Sunshine, Harlingen, TX 78550.

Mar. 3, **Glasgow Swapfest**, Cave City Convention Center, Cave City, KY. Contact Mike Goad, N4HCO, 1379 Whites Chapel Road, Glasgow, KY 42141. (VE exams.)

Mar. 3, **State Technical Institute Hamfest**, Delton Middle School, Delton, MI. Contact Harold Blamer, Amateur Radio Club, State Technical Institute, 33 Alber Drive, Plainwell, MI 49080 (616-664-4461).

Mar. 4, **Two Rivers ARC Swap & Shop**, Rostraver Volunteer Fire Hall, Rostraver Township, PA. Contact Jim Lundberg, KC3HJ, 412-672-0915.

Mar. 4, **Mt. Tom ARA Amateur Radio and Electronic Fleamarket**, Smith Vocational High School, Northampton, MA. Contact Marvin Yale, N1CDR, 6 Laurel Terrace, Westfield, MA 01085, or call 413-562-1027. (ARRL/VEC exams.)

Mar. 4, **York Ham & Computer Springfest**, Dover Firehall, York, PA. Contact York Springfest, P.O. Box 316, New Freedom, PA 17349-0316, or call 301-239-3878.

Mar. 9, **Jefferson Barracks ARC Auction**, Concordia Turner's Hall, St. Louis City, MO. Contact Jefferson Barracks Bugle, K0ZFK, 1624 Union Road, St. Louis, MO 63125.

Mar. 10, **Barnstable Radio Club Hamfest**, Oak Ridge School, Sandwich, MA. Contact Don, WA1AIC, 508-778-5673. (VE exams.)

Mar. 10, **Shore Points ARC Springfest '90**, Holy Spirit High School, Absecon, NJ. Contact SPARC, P.O. Box 142, Absecon, NJ 08201.

Mar. 11, **Sterling-Rock Falls ARS Hamfest**, Sterling High School Fieldhouse, Sterling, IL. Contact Sue Peters, Sterling-Rock Falls ARS, P.O. Box 521, Sterling, IL 61081, or call 815-625-9262.

Mar. 11, **Indiana Hamfest**, Indiana State Fairgrounds Pavilion, Indianapolis, IN. Contact KC9YA at 812-339-4446.

Mar. 17, **Interstate Repeater Society Hamfest**, Lion's Club, Hudson, NH. Contact IRS, P.O. Box 693, Derry, NH 03038. (Wheelchair accessible.)

Mar. 17-18, **North Florida Ham/Swapfest**, Shrine Fairgrounds, Ft. Walton Beach, FL. Contact Playground ARC, P.O. Box 873, Ft. Walton Beach, FL 32549.

Mar. 17, **St. Patrick's Day Swapfest**, Midland County Exhibit Building, east of Midland, TX. Contact Midland ARC, P.O. Box 4401, Midland, TX 79704. (VE exams.)

Mar. 17-18, **Charlotte Hamfest & Computerfair**, Charlotte Convention Center, Charlotte, NC. Contact Charlotte Hamfest, P.O. Box 221136, Charlotte, NC 28222-1136, or call 704-536-7373. (VE exams.)

Mar. 18, **Toledo Mobile Radio Assn. Hamfest**, Lucas County Recreation Center, Maumee, OH. Contact Ron Morris, WB8ZIM, 28141 Glenwood Rd., Perrysburg, OH 43551 (419-666-8063).

Mar. 24, **Radio Amateur Society of Norwich Auction**, Uncasville VFW, Uncasville, CT. Contact KA1BB at 203-739-8016. (Wheelchair accessible.)

Mar. 24, **Lincoln Trail ARC Hamfest**, Pritchard Community Center, Elizabethtown, KY. Contact Chuck Strain, AA4ZD, P.O. Box 342, Vine Grove, KY 40175 (502-351-1715). (VE exams.)

Mar. 25, **Lake County Hamfest**, Madison High School, Madison, OH. Contact LCARA Hamfest, 5777 Fenwood Ct., Mentor-on-Lake, OH 44060 (216-257-2036). (VE exams.)

Mar. 25, **HAMCOMP '90**, New Jersey National Guard 112th Field Artillery Armory, Lawrence Township, NJ. Contact HAMCOMP '90, c/o KB2ZY, RD 1 Box 259, Stockton, NJ 08559 (SASE). (Handicap parking available, wheelchair accessible.)

Mar. 25, **LAMARSFEST 1990**, Lake County Fairgrounds, Routes 120 and 45, IL. Contact LAMARS, P.O. Box 751, Libertyville, IL 60048 (SASE), or call Bob Dick, NY9E, 708-362-9634 after 7 PM.

Mar. 25, **South Shore ARC Indoor Fleamarket**, Viking Club, Braintree, MA. Contact Hal, 617-335-5777 evenings.

Mar. 31, **Charleston Area Hamfest and Computer Show (ARRL)**, Charleston Civic Center, Charleston, WV. Contact Betty Palmer, WC8S, P.O. Box 8400, South Charleston, WV 25303 (304-346-1348). (VE exams.)

Mar. 31, **Scottsdale ARC & ARCA Hamfest**, Scottsdale Community College, Scottsdale, AZ. Contact Scottsdale ARC, 2009 N. Scottsdale Rd. #4, Scottsdale, AZ 85257. (VE exams.)

Mar. 31, **Rockford Hamfest '90**, Teamsters' Hall, Rockford, IL. Contact Joe Rolling, N9HEZ, 815-399-6995, or send SASE to P.O. Box 10003, Rockford, IL 61131.

Mar. 31, **Flemington Hamfest**, Hunterdon Central High School Field House, Flemington, NJ. Contact Marty Grozinski, NS2K, 6 Kirkbride Rd., Flemington, NJ 08822 (201-788-4080 between 5 and 11 PM EST).

Apr. 1, **South Eastern Michigan ARA Hamfest (ARRL), Swap-n-Shop**, Grosse Pointe North High School, Grosse Pointe Woods, MI. Contact SEMARA Swap, P.O. Box 646, St. Clair Shores, MI 48080-0646 (SASE), or call 313-323-4099. (VE exams.)

Apr. 6-8, **1990 International DX Convention**, Holiday Inn, Visalia, CA. Contact Don Bostron, N6IC, 4447 Atol Ave., Sherman Oaks, CA 91423.

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REGULATORY HAPPENINGS FROM THE WORLD OF AMATEUR RADIO

Sorting Out Amateur Radio Licensing

Being as deeply involved in the amateur operator examining function as we are, a day never goes by when we do not get an inquiry from someone concerning amateur radio operator licensing.

Most of the licensing questions we get seem to fall under three general categories. They come from newcomers getting started in amateur radio, from licensed amateurs who wish to upgrade their current ticket, and from those who want to conduct testing under one of the two volunteer amateur examination programs.

The testing rules have changed dramatically over the last five years, so we can certainly understand the confusion. It used to be that the Federal Communications Commission developed and administered most of the Morse code tests and all of the written exams. The only examination left to amateur discretion was the Novice 5 wpm code. Novice-level VEs (volunteer examiners) used to even obtain the written test from the FCC.

Today the amateur community handles everything—test development, administration, grading, . . . even authorizing amateur operator licenses to be issued. FCC computers in Gettysburg still generate the actual license, however. There is no telling just how long that will last. I personally believe that eventually that function will be taken over by the service, too. It is only a matter of time.

This month let's cover most of the frequently asked questions about what to expect at a testing session. Chances are we will cover an issue about which you have been curious or weren't aware. Since we could almost write an entire column on most of the questions we get, we won't go into a lot of detail.

What we will do is give you an overview of amateur testing and who does what and why. Hopefully, by the end of this discourse you will have a better understanding of operator licensing in the Amateur Service.

International Amateur Radio Law

The Amateur Service and the Amateur-Satellite Service are both internationally recognized hobby (non-commercial) activities.

*National Volunteer Examiner Coordinator,
P.O. Box 565101, Dallas, TX 75356-5101*

Topics	Element: 2	3(A)	3(B)	4(A)	4(B)
FCC Rules for the Amateur Service	10	5	4	6	8
Amateur station operating procedures	2	3	3	1	4
Radio wave propagation characteristics of Amateur bands	1	3	3	2	2
Amateur radio practices	4	4	5	4	4
Electrical principles as applied to amateur station equipment	4	2	2	10	6
Amateur station equipment circuit components	2	2	1	6	4
Practical circuits employed in amateur station equipment	2	1	1	10	4
Signals and emissions transmitted by amateur stations	2	2	2	6	4
Amateur station antennas and feed lines	3	3	4	5	4
Total questions to be asked	30	25	25	50	40
Passing mark:	22	19	19	37	30

Table 1—Topics and number of questions required in each question set. Written test Element 2 is required for the Novice class; Element 3(A) for Technician; Element 3(B) for General; Element 4(A) for Advanced; and Element 4(B) for Extra class.

Citizens band (CB) radio is not so identified. International Telecommunication Union (ITU) treaties, of which the U.S. is a participant, require that:

1. . . . ITU countries shall take steps to verify that amateur operators are technically and operationally qualified to operate their equipment;
2. . . . Amateurs must be proficient in Morse code signals when operating in the high-frequency (below 30 MHz) bands;
3. . . . there should be a relationship between privileges (such as power levels, frequencies, etc.) and operator proficiency, primarily to reduce unwanted interference.

Communications Act of 1934

1. . . . holds the FCC responsible for regulating all interstate and foreign communications.
2. . . . allows the FCC to utilize amateurs holding higher class amateur operator licenses to act as volunteer amateur service examiners. VEs may develop, administer, and process all Amateur Service examinations.
3. . . . allows the cost of the volunteer examining system to be reimbursed based on inflation.
4. . . . allows the FCC to license use of all interstate and foreign radio channels. Also to suspend or revoke these privileges and to impose other noncompliance penalties.

5. . . . requires the FCC to assign bands of frequencies and regulate radio apparatus;

6. . . . and prescribe qualifications of station operators.

FCC

1. . . . currently does not allow expenses associated with the entry-level Novice license to be reimbursed. (This could change, however.)
2. . . . determines the maximum amount to be reimbursed to examiners who administer the higher class amateur operator licenses. This is based on changes in the Dept. of Labor's *Consumer Price Index*. The maximum figure for 1990 is \$4.96, although \$4.95 is charged at most test sessions regardless of the number of examinations passed.
3. . . . has determined that 5 wpm Morse code proficiency is required of Novice and Technician class licensees; 13 wpm for the General and Advanced Class; and 20 wpm for the top-of-the-line Extra class.
4. . . . has determined nine topics and the number of written questions within each topic which must be asked of each operator class (see Table 1).
5. . . . has established two volunteer examining programs. The informal Novice program requires two General class VEs. The so-called VEC System tests the Tech-

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nician and higher license classes and requires three accredited examiners. They are certified by a Volunteer Examiner Coordinator. A VEC acts as the intermediary between the FCC and the testing team.

6. . . . requires VEs to give examination credit for new Element 3(B) if applicant passed the old Element 3 (Technician) examination before March 21, 1987. (This was the date when the old 50-question Element 3 Technician examination was split into two 25-question tests—Element 3(A) and 3(B).)

7. . . . requires VEs to allow credit for one year for any successfully passed examination which does not result in an upgrade. Novice applications are returned to the applicant showing partial credit, or Certificates of Successful Completion of Examination (CSCE) are issued to applicants tested under the VE/VEC System.

8. . . . delegates all test question set development to the collective VEC organizations who must agree on and maintain one question pool for each written examination element. The actual test questions are selected according to a formula (see Table I). There are approximately ten times as many questions in each question set as will appear on any one examination. The questions, multiple choices, and answers are used verbatim. They are all known and widely published with explanations.

9. . . . authorizes Novice-level examinations to be prepared by the administering VE team or obtained from a supplier.

Telegraphy and written examinations for the Technician and higher classes must be prepared or obtained from a supplier according to instructions from the coordinating VEC. Examinations may only be prepared by amateur operators who have already passed that particular test element. Telegraphy test messages must be at least five minutes in length and contain all alphabet/numerical characters and certain punctuation and operating prosigns.

The W5YI-VEC permits its examiners to (a) use VEC-prepared examinations, (b) prepare their own examinations, or (c) obtain examinations from an outside supplier if the VE team is convinced that the examinations have been held in confidence by a qualified test development source.

10. The FCC reserves the right to readminister to any examinee any examination element or have an element readministered under the supervision of another VEC.

11. Anyone may become a U.S. licensed amateur radio operator, including foreign nationals, by passing the required examinations. Canadian amateurs are automatically licensed in the U.S. and vice-versa without further testing.

The Volunteer Examiner Coordinator

1. . . . coordinates Technician through Extra class Amateur Service examinations for the government. There are 18 different VEC organizations (see Table II).

The VEC coordination process involves:

a. Recruiting and accrediting volunteer examiners to conduct examinations under their program. No VEC is under any obligation to accredit anyone into their program as long as the denial is not based on race, sex, religion, national origin, or membership (or lack thereof) in any amateur service organization.

b. Providing sources of amateur operator license testing materials for its VEs.

c. Providing needed test session forms such as applications, test session reports, Certificates of Successful Completion (CSCE), etc.

d. Publishing detailed instructions to examiners on the proper procedures to follow when conducting a test session.

e. Collecting and processing successful candidates' application forms, license copies, answer sheets, CSCEs, and test results.

f. Screening, approving, and forwarding to the FCC successful Form 610 applications for amateur operator licenses.

g. Preparing and maintaining records of all test sessions.

h. Resolving defects in applications made by applicants and/or VEs.

2. VEC procedures may differ somewhat administratively, but all must conform to the broad guidelines in Subelement F, §Part 97 of the Commission's Rules.

3. VEs and VECs may be reimbursed by examinees for out-of-pocket expenses. Some VECs require VEs to submit expense lists, while others share expense reimbursement with their examiners. The W5YI-VEC program divides these fees with its examining teams. There are no expense lists to submit. Records of expenditures must be kept by VEs and VECs for three years.

4. . . . usually publishes a manual of instructions for their examiners to follow. A copy of the *W5YI-VEC Program Manual* is available at no cost. A large 9" x 12" envelope with 90 cents postage is required, however, or \$1.00, and we will handle the request. Unlike other VECs, we also publish a VE manual for examiners of the Novice class as a public service. The booklet "How to Administer Novice Examinations" is available at no cost also, but please enclose a large 9" x 12" self-addressed stamped envelope with 45 cents postage. (We also offer premade Novice written examinations at no cost, except for a large SASE and a copy of your General or higher class operator license.)

5. A VEC has the authority to invalidate

Anchorage Amateur Radio Club, 2628 Turnagain Parkway, Anchorage, AK 99503 (907-243-2221, 344-5401).

ARRL/VEC, 225 Main Street, Newington, CT 06111 (203-666-1541).

Central Alabama VEC, Inc., 606 Tremont Street, Selma, AL 36701 (205-872-1166, 875-7419, 872-5450).

Charlotte VEC, 227 Bennett Lane, Charlotte, NC 28213 (704-596-2168).

DeVry Amateur Radio Society, 3300 North Campbell Avenue, Chicago, IL 60618 (312-929-8500).

Golden Empire Amateur Radio Society, P.O. Box 508, Chico, CA 95927.

Greater Los Angeles Amateur Radio Group, 9737 Noble Avenue, Sepulveda, CA 91343 (818-762-5095, 892-2068).

Jefferson Amateur Radio Club, P.O. Box 73665, Metairie, LA 70033.

Koolau Amateur Radio Club, 45-529 Nakulua Street, Kaneohe, HI 96744 (808-235-4132).

Laurel Amateur Radio Club, Inc., P.O. Box 3039, Laurel, MD 21502.

Mountain Amateur Radio Club, P.O. Box 234, Cumberland, MD 21502 (304-289-3576).

PHD Amateur Radio Association, Inc., P.O. Box 11, Liberty, MO 64068 (816-781-7313).

Triad Emergency Amateur Radio Club, 3504 Stonehurst Place, High Point, NC 27260 (919-841-7576).

SANDARC-VEC, P.O. Box 2456, La Mesa, CA 92044 (619-465-3926).

Sunnyvale VEC Amateur Radio Club, P.O. Box 60142, Sunnyvale, CA 94088-0142 (408-255-9000, 253-8688).

The Milwaukee Radio Amateurs Club, Inc., 1737 N. 116th Street, Wauwatosa, WI 53226 (414-774-6999).

Western Carolina Amateur Radio Society, 5833 Clinton Hwy., Suite 203, Knoxville, TN 37912-2545 (615-688-7771, 687-5410).

W5YI-VEC, P.O. Box 565101, Dallas, TX 75356-5101 (817-461-6443).

Table II- Volunteer Examiner Coordinator organizations. Any person desiring to be administered an examination for an amateur operator license should contact amateur operators in their community who are accredited as volunteer examiners (VEs) by one or more of these volunteer examiner coordinators. The two largest VEC groups, by far, are the ARRL and W5YI-VEC. Together they coordinate nearly 80 percent of all amateur testing above the Novice level. No other VEC has more than a 7 percent share of the testing "market."

a VEC System testing session if the circumstances warrant.

6. Representatives from each VEC organization meet each summer to map out the future path of amateur radio testing. Representatives of the Federal Communications Commission also attend these annual conferences.

7. The VEC's Question Pool Committee (of which your author, Fred Maia, W5YI, is Vice-Chairman) revises all question pools on a three-year cycle. New questions start appearing in written tests about six months after they are released into the public domain. This allows time for publishers to distribute license preparation material into the marketplace.

Administering Volunteer Examiners

1. . . . determine the test site location and time of each examination. One of the VE team members acts as the team leader and submits the completed paperwork to the VEC or FCC.

2. . . . must be present and observe the examinee throughout the entire examination. VEs are responsible for session supervision and proper conduct. Two VEs may conduct a Novice test. It takes three accredited examiners to administer higher class examinations.

3. . . . have the option to administer a

telegraphy hand sending test, although passing a Morse receiving examination is adequate proof of an examinee's ability to both send and receive. Most examiners do not require a sending test.

4. . . . determine the correctness of the written test answers. Their decision is final.

5. . . . determine the format of the telegraphy examination and whether an examinee passes. The format may be one minute solid copy, fill-in-the-blank, true-false, or answer seven out of ten questions. The VE team must be convinced that the applicant can copy the appropriate speed.

6. . . . may readminister a telegraphy or written examination element, but not the same one as previously failed by the examinee. Immediate retesting is considered a different test session and is at the option of the VE team.

7. . . . administer the written examinations in order—that is, Element 2 must be first, then 3(A), 3(B), 4(A), and 4(B). Once a written test is failed, the next higher written element may not be administered until the failed element is passed. Morse code tests, however, may be taken in any order. Examinees may try the 20 wpm speed first if they wish. If they fail, then they may attempt a slower speed.

8. . . . must take physical disabilities of examinees into consideration. Special

testing procedures may be employed, but examiners may not dispense with or reduce any regular passing parameters. For example, a deaf examinee could be administered the telegraphy examination with blinking lights or vibrating surfaces, but he or she would still be required to pass the same speed as everyone else. A blind applicant could be read the questions by a reader. Handicapped applicants must supply any needed special equipment. The VE team may require a physician's certification indicating the scope of the disability.

9. . . . Novice-level examiners will mail the successful amateur operator application (Form 610) directly to the FCC in Gettysburg, Pennsylvania for license issuance. The VE team will forward successful applications to their VEC on examinations for higher class operator licenses. Attached will be the applicant's answer sheets, present license copy, and CSCEs, if any.

10. Examiners for both the Novice and VEC System must:

- a. be at least 18 years of age.
- b. not be commercially involved in the amateur radio equipment or license preparation publication business.
- c. have never had their amateur operator license suspended or revoked.
- d. not be related by blood or marriage to examinees.

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- 50 page comprehensive user manual.
- Optional radio direction finder allows bearing information to be logged automatically.

CURRENT MENU		----- MAIN MENU -----		VERSION 9.1	
MEM 394 K STACK 1 K				LOCAL : 16:54:00	
DATE: 10-24-1989		SELECT FUNCTION	MODE= USB	U.T.C.: 20:54:00	
1. READ MEMORY CHANNELS		7. MEMORY CHANNEL	DIAL		
2. INPUT DESIRED FREQUENCY		8. WRITE MEMORY TO VFO	VFO A		
3. 500 KHZ. UP		9. UTILITY MENU			
4. 500 KHZ DOWN		ALT-P. CHANGE MENU PAGE			
5. ACTIVATE/DEACTIVATE CLARIFIER		ALT-Z. DISPLAY OR PRINT LOG			
6. SWEEP BETWEEN 2 LIMITS		ALT-Q. END			
A. AVIATION (VHF) COMMUNICATION		D. F.M. BROADCASTING			
B. TELEVISION BROADCASTING		E. AMATEUR FREQUENCIES (VHF)			
C. COASTAL MARINE FREQUENCIES		F. MISCELLANEOUS FREQUENCIES (VHF)			
PORT= COM2	BAUD= 9600	CURRENT PARAMETERS		RDLY= 0.138	
UPPER - BAND LIMIT - LOWER		FREQUENCY	MODE	FILTER	SQ. ACTIV. ADDR
30.000 MHZ	0.100 MHZ	17.44300 MHZ	USB	WIDE	38

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11. VEs and VECs have no licensing or enforcement authority and are not considered employees or agents of the government. You do not have to be a U.S. citizen to be a volunteer examiner. You must, of course, meet all other VE eligibility requirements.

The Examinee

1. . . . must submit to the VE team a completed Form 610, Application for Amateur

Radio Station and/or Operator License. These forms are available at no cost from the FCC, P.O. Box 1020, Gettysburg, PA 17326.

2. . . . must comply with instructions given by the administering VE team.

3. . . . need not wait to retake a failed examination. They may not, however, be able to be retested at the same examination session since immediate retesting is at the option of the VE team.

4. . . . should bring the original and a

copy of their amateur operator license and Certificates of Successful Completion of Examinations (CSCE) with them to the test session. The VE team will want to append the license *copy* to the successful application Form 610. No application form may be submitted to the FCC unless a copy of the previous license is attached.

5. . . . may be examined for a higher class upgrade, even if he or she has submitted an application which has not yet been acted on by the FCC. The new application will be held by the VEC, however, until the applicant provides the VEC with the previously passed license copy.

6. . . . will be issued a Certificate of Successful Completion (CSCE) when they pass some or all of the requirements for an amateur operator license class. The CSCE fulfills two purposes:

a. Provides "temporary operating authority" so that presently licensed applicants may use their new privileges on the air immediately, and

b. Serves as evidence at a subsequent test session that a required examination has already been successfully passed during the prior year.

7. There is no requirement that amateur service licensees operate their equipment from their station location or that they live at their mailing address. Applicants must show an actual physical location, however, as their station location. It must not be a post office box number, RFD number, or a General Delivery address.

So There You Have It!

The above answers the majority of the questions we get on amateur operator licensing. The fact is, however, the licensing/testing function can be a little complex at times. We try to simplify it as much as possible in our 265-page *Radio Amateur's Licensing Handbook*. This publication is meant for everyone—from individuals who would like to become ham operators or upgrade their present license, to senior-level amateurs interested in administering all levels of amateur examinations. In short, the handbook covers everything involved with the licensing/testing function.

In addition, the handbook lists every one of the current 1,932 test questions appearing in examinations for every license class from the beginning Novice to the top-of-the-line Amateur Extra and how to select them for a test if you are a VE. All questions are listed complete with exact word-for-word multiple choices. The correct answer is identified. The handbook is sold with a moneyback guarantee at \$9.95 plus \$2.00 shipping/handling by: W5YI Publishing, P.O. Box 565101, Dallas, TX 75356.

See you next month.

73, Fred, W5YI

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A LOOK AT THE WORLD AROUND US

Budget Nostalgia: Cheap Thrills From the '40s and '50s

Our previous columns featuring classic rigs of yesteryear have been unbelievably popular among readers worldwide, and requests for more views continue to arrive daily. Such enthusiastic interest is greatly appreciated, and with all due respect to Bartles and Jaymes, thanks for your support!

A significant number of followers also encouraged us to step forward one or two decades so equipment views would coincide more closely with the time they too started in amateur radio. That is a very good idea for several reasons. An increasing number of amateurs are becoming interested in assembling and occasionally using simple old-time rigs, but self-excited transmitters and regenerative receivers of the 1920s and '30s can prove tricky to handle without prior experience. Setups of the '40s and '50s, however, typically consisted of a "store-bought" superhet receiver and a little one- or two-tube crystal-controlled transmitter. Restoring or assembling those units today is an easier feat that brings

everyone into the picture, yet it still proves the operator rather than the rig makes the difference.

This month's column thus features two easy-to-duplicate transmitters right out of the 1940s and early 1950s. They are basic one-day projects built on wood frames with high-tech items such as doorbell wire, kite cord, penny sucker sticks, and old tube sockets. If you started out with more elaborate gear, you were blessed with understanding parents or you were old enough to work part-time for the big bucks. If you were a grade-school squirt with a two-bit allowance, however, our featured gems (and/or variations thereof) will surely bring back memories. Working DX today with the same gear you considered snakebite many moons ago is a cheap thrill that also reveals how your expertise has expanded with time—a genuine self-compliment to your ability!

Right now is the perfect time to start homebrewing your transmitter and get it perking before hamfest season booms. You can then comb the fleamarkets for a mating Sky Buddy, S-40, or S-38 receiver and return to eras past in high style. Maybe we should even offer a nice plaque or

unusual trophy for accomplishing some admirable on-the-air feats with vintage rigs. Does the idea of a 30-30 award for working 30 countries on 30 meters using less than 30 watts and gear over 30 years old sound appealing? Let's hear your opinion. I will study your response, check on cost of trophies, and report the results here in a few months. Meanwhile, start digging in your old tube collection and gathering all the 9 volt batteries you can find on sale. We are going for the gusto one more time!

The John Ruskin Special

One of the most undeniably popular homebrew rigs of post war years was the famous 6L6 transmitter depicted in fig. 1. This no-nonsense gem was assembled dozens of ways ranging from inexpensive versions direct-wired on dime-store breadboards to fancy jobs enclosed in walnut clock cabinets. If you went first class in construction, you used an aluminum chassis plus all new parts and added a meter for big-time clout. If you were 3 dB below the poverty level like me, however, you built the little critter on a dis-

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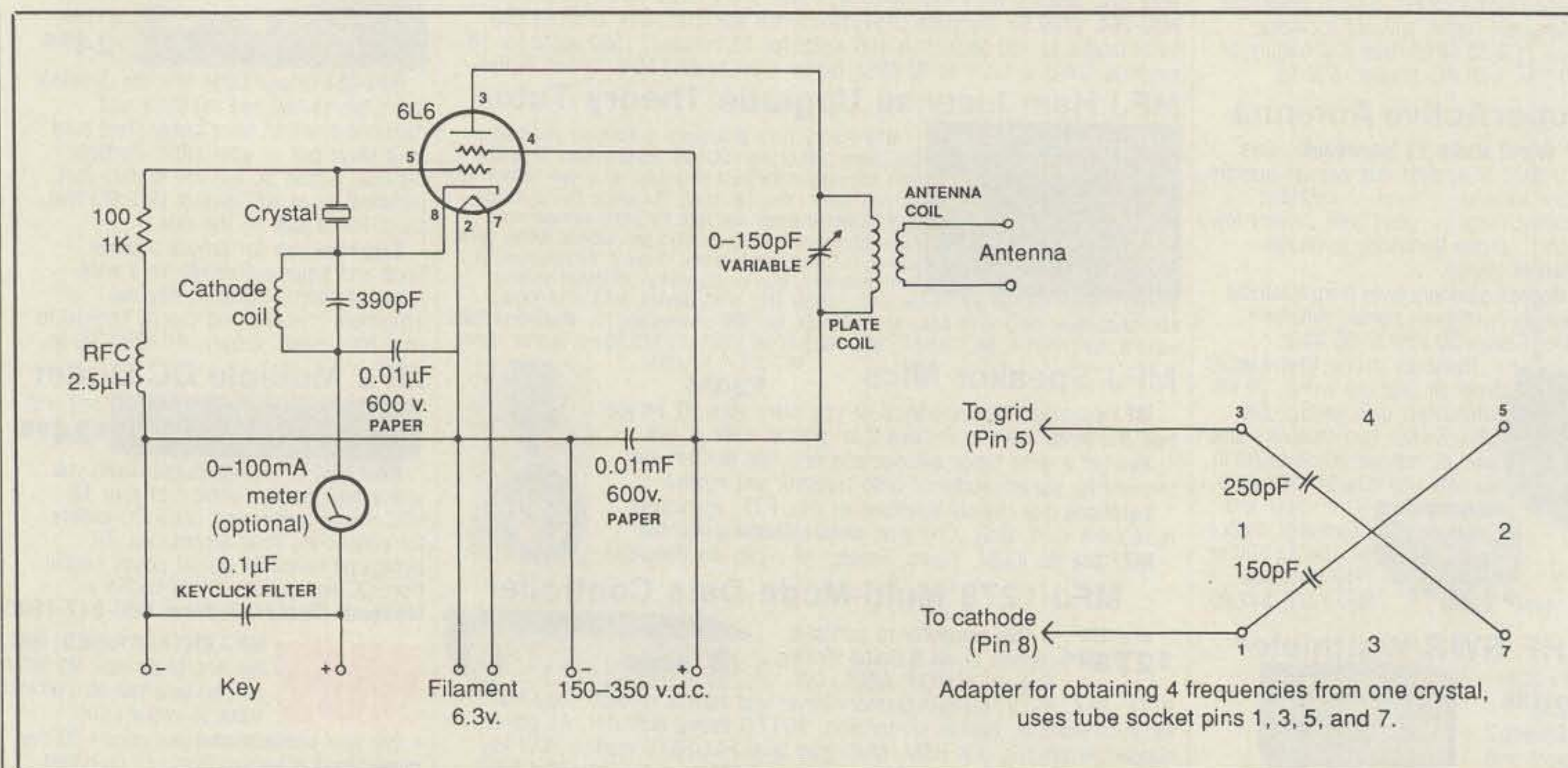


Fig. 1 - Schematic diagram of the John Ruskin Special. Is there a QCWA member who never used a famous 6L6 rig?

carded cigar box and borrowed its tube from the family radio. In fact, my first half-dozen setups were 6L6 transmitters on cigar boxes and \$2.00 army surplus receivers. That requires further explanation.

My folks appreciated amateur radio like a dog appreciates fleas. They would confiscate my gear while I was at school (selling homebrewed crystal sets to buy a surplus receiver with profits), so I learned the art of improvising before "entrepreneur" was even in our vocabulary. A quick jaunt to the drug store, hardware store, and adjacent radio shop produced two cigar boxes, a handful of nails, a roll of bell wire, some defunct tubes, and a few parts clipped from a trash-canned radio. Coils were then wound around a nailed-up form, tube bases were salvaged as power plugs, an open-air switch was devised for powering the transmitter and receiver, and a wooden clothespin was converted to a key. A large floor radio outside my room used a 6L6 in its output stage. A quick swap moved the tube into my setup and my homebrew plug for voltage into the radio's socket. After operating like crazy, I removed the tell-tale plug and replaced the 6L6. Rig confiscation thus equated to another jaunt to the drug store, hardware store, radio shop, and army surplus store to build another setup. Meanwhile, my father would complain that the family radio sounded distorted. "Needs another 6L6," I would snap. . . . "and this time get the BIG one plus a 5Y3 rectifier!" They never learned.

This month's main feature is yet another copy of the 6L6 cigar-box transmitter, but it has been cleaned up with a nice pine frame for eye appeal. Yes indeed! Gaze at this delight with soft glowing vacuum tube and fully exposed tuning condenser (it was still condenser and not capacitor in those days) in fig. 2. Now this is a rig that really lights up and does something. Allow five minutes to resume normal breathing, and we will continue.

Quick assembly of the John Ruskin Special begins by securing a wooden rack like radio stations use to hold 45 RPM records. Cut the rack to half size, add another coat of varnish, reassemble with genuine-era brass screws, and you have two chassis ready to use. Give one to a friend, who will love it. Alternately, you can assemble a 3 by 9 by 4½ inch frame from pine wood. Use ¼ inch wood for the top pieces and space them roughly 1 ¼ inch apart so tube sockets will fit in the middle and bolt to each side. Mount the 6L6 socket with its key toward the front for easy wiring, and add two Fahnestock clips under right-side screws for antenna connections. Add two more clips or screws with thumbnuts on the left side for key connections, then proceed to under-frame wiring (extra bell wire works fine here, and it is a sheer joy to use. Doorbell wire is still available from hard-

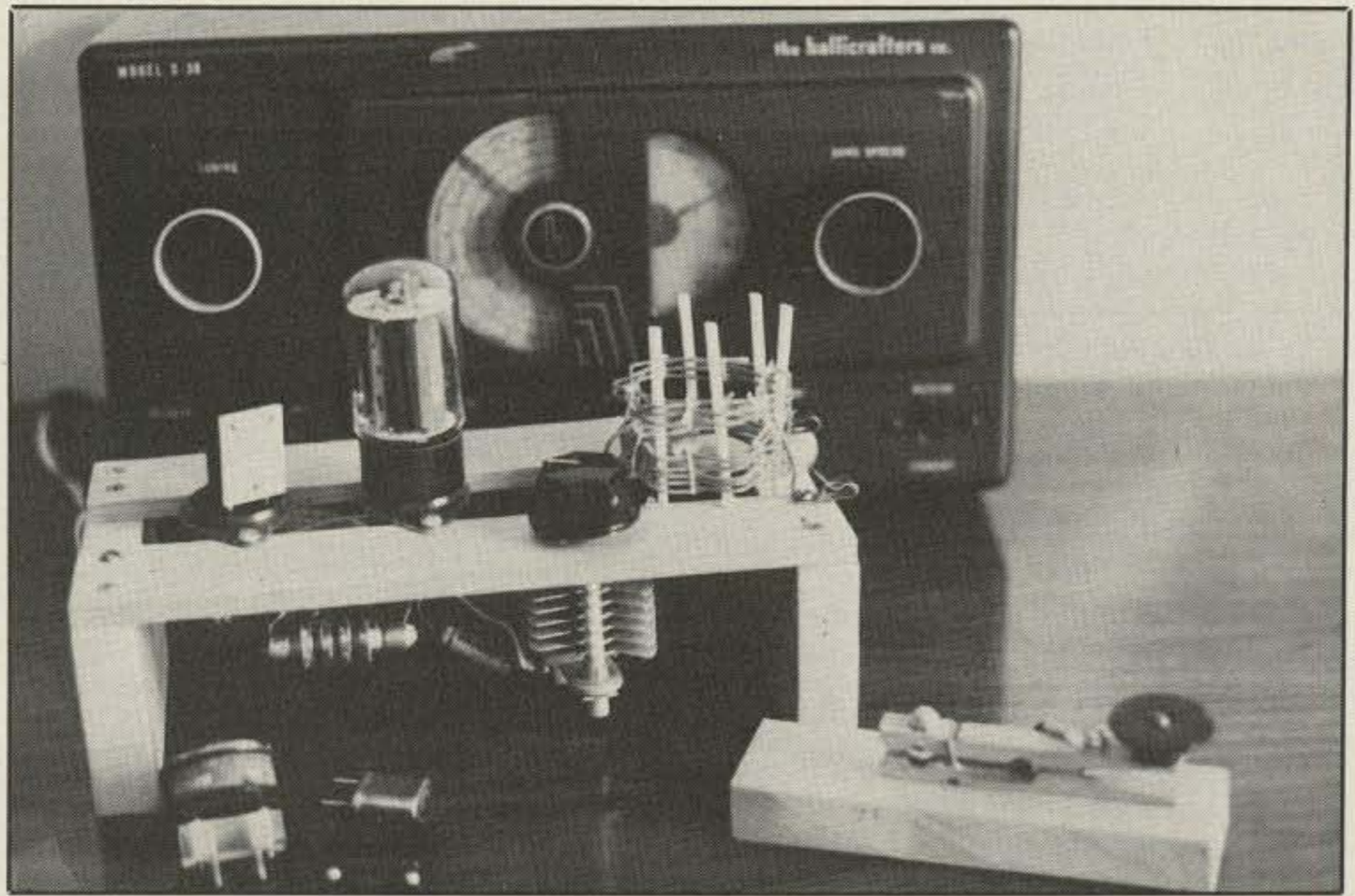


Fig. 2- The John Ruskin Special cleaned up for 1990 action and mated with its clothespin key and S-38 receiver. Sweet nothing for sure!

ware stores and it is still number 18 solid, but cotton insulation is now replaced by plastic). Look closely at the 'Ruskin's schematic diagram in fig. 1, and you will notice I added a modern modification of two capacitors to the tube/crystal socket. The crystal can thus be shifted between positions to obtain four slightly different frequencies. If I had only realized that fact 30 years ago!

Plate and antenna coils are wound on a 2 inch diameter jig made by first drawing a circle and then driving seven "7 penny" nails through a thin board (see fig. 3). The wire is woven around alternate nails so every other turn repeats itself. Keep everything symmetrical during winding, and then secure the seven crossover points with kite cord before removing a

completed coil from the form. Additional coil data is shown in fig. 4. Use Elmer's glue for mounting four penny sucker sticks on the wooden frame to hold the coils. Carefully slip the coils in place, wire their connections, and then use more bell wire to wind the cathode coil on any convenient 1 ¼ inch diameter *round* form. (I used a 35mm film canister and wrapped Scotch-brand™ tape around the coil before removing it.) Since this coil is small and light, its pigtail ends are adequate mounting supports.

Several options are possible for powering this little transmitter. If a 150 to 300 volt secondary transformer is available, you are in ham heaven. Otherwise, you can wire two Radio Shack 6 volt transformers "back to back" to acquire both 6

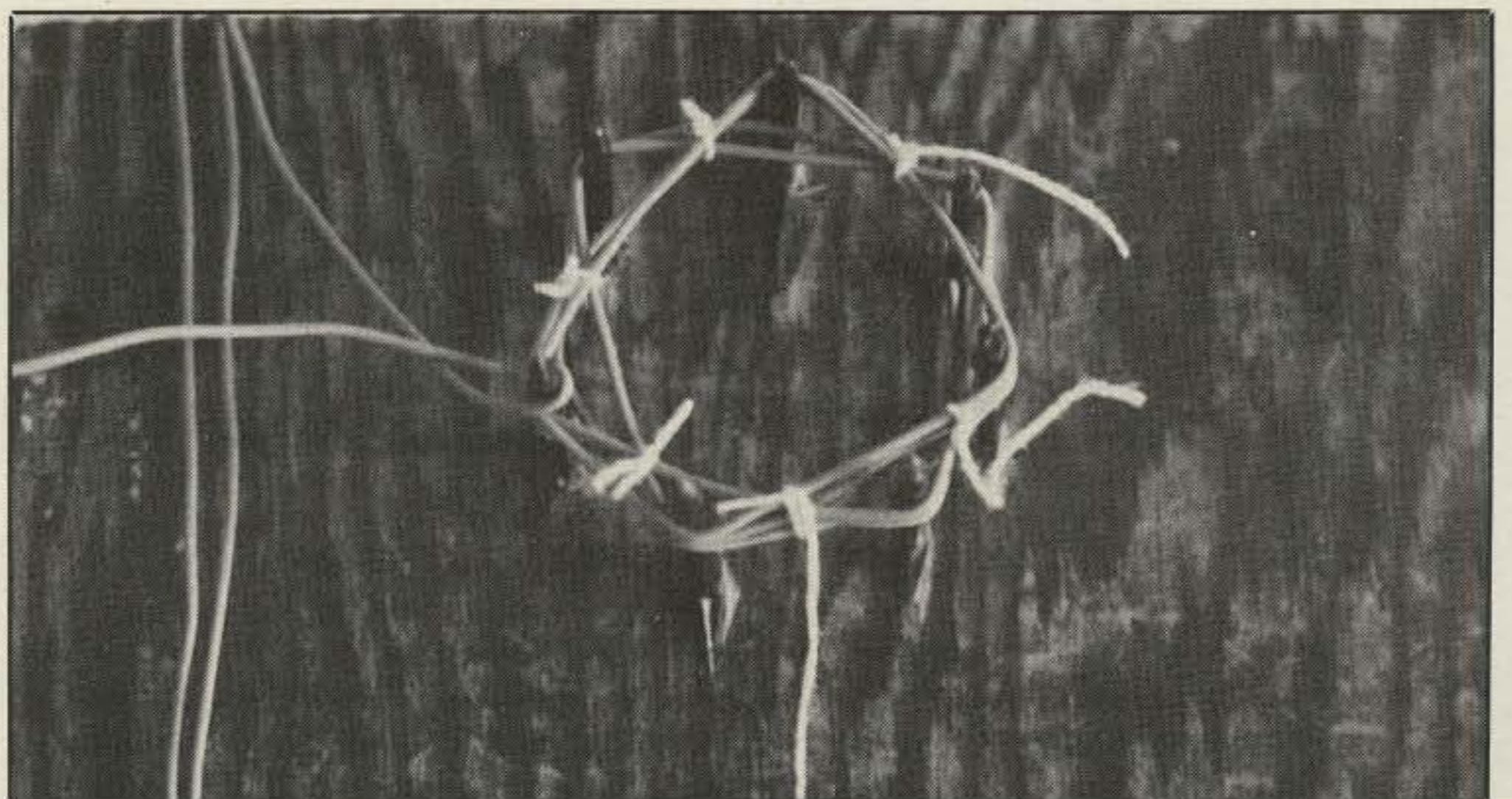


Fig. 3- Coil winding jig made by driving seven nails through a board. Secure coil with kite cord before removing. Cut cord excess for neatness.

Band	Plate Coil	Ant. Coil
80 m.	20 turns	12 turns
40 m.	12 turns	6 turns
30 m.	10 turns	5 turns

Cathode coil: 5 turns 1 1/4 inch diameter for all three bands.

Note: Doorbell wire used for all coils.

Fig. 4- Coil data for the Ruskin Special.

volts for the filament and 135 volts for the plate. Hearty souls might consider direct-rectifying and filtering the 110 volt AC line for plate voltage, but this approach definitely lacks *Good Housekeeping's* seal of approval. Indeed, 115 volts may be present between your AC/DC receiver's metal cabinet and the transmitter's key if an AC plug is inserted "upside down" in an outlet. Alternately, you can power the transmitter directly from a series string of twenty 9 volt batteries and a 6 volt lantern battery (borrow all your friends' Radio Shack free battery cards). Don't laugh: batteries are a great source of pure DC, and their life is good because this fun rig is not intended for main/daily station use. If you cannot find a 6L6 before hamfest time, a 6V6 can be substituted. It is smaller and has less glamor, but it works fine.

Tune up and operation of the 'Ruskin is a snap: apply voltage to the filament; connect a 10 watt house light, large flashlight bulb, or your wattmeter and antenna to the antenna coil; and then apply plate voltage and close the key. Quickly tune the plate condenser for maximum output. If that output seems exceptionally low, try moving and/or turning over the antenna coil on its sucker stick form. Do not over-couple, ere the transmitter's fine quality be sacrificed.

Next check keying on your modern transceiver and squeeze or warp the cathode coil out of round as necessary to reduce chirps. Tuning the condenser slightly away from maximum output also minimizes chirps, and a milliamp meter in series with the key will indicate input power. Add a .1 mFd condenser at the key's terminals if key clicks are noticeable. Harmonic suppression with this rig is not outstanding, and output power is only 10 watts, so use a single-band dipole for best results. Fire up this gem on 30 meters and have a ball. Anyone can work DX with a fancy sideband transceiver connected to a big antenna, but doing it with a bare-bones rig built on a wood frame separates the smooth ops from the rough 'gators!

Li'l Buddy

This little 1 watt transmitter is a real conversation piece guaranteed to amaze your on-the-air contacts and in-shack vis-

Band	Plate Coil	Ant. Coil
80 m.	30 turns	8 turns
40 m.	20 turns	6 turns
30 m.	16 turns	6 turns

Fig. 5- Coil data for Li'l Buddy. All coils are wound with #18 wire on a 1 inch diameter form.

itors. It uses one or two of the new style 955 acorn tubes advertised by RCA in *Radio News* during 1945. The 955, complete with its mating tube socket and a few parts, is available today in an inexpensive BC-1253 surplus aircraft transmitter available from Fair Radio Company, Box 1105, Lima, Ohio 45802. Get two of them and wire the 955s in parallel for a 1 watt rig, or use only one 955 for a 1/2 watt rig. Stripping a cardboard-cased BC-1253 for its tube and socket takes only 5 minutes, and you are well on your way to QRP "classic rig style."

The crystal socket for Li'l Buddy is two RCA phono sockets on a phenolic strip obtained at a Radio Shack. The tuning condenser is a midget variable from a hamfest fleamarket, and the plate coil came from a friend's junkbox. Its full length was perfect for 40 meters, and its tap was just right for 30 meters. You can homebrew a similar coil by winding 16 turns of #18 enamel-coated wire on a 1 inch diameter form, or you can make your own winding jig with very small nails driven through a board in a 1 inch circle. Coil data for other bands, incidentally, is included in fig. 5. Mount the coils on Li'l Buddy with five matchsticks. The antenna coil consists of six or eight turns of bell wire wound in the same direction and placed on top of the plate coil. (Once you use bell wire, you will forget that other stuff.)

The wood frame for this half-size de-

light was assembled from extra pieces of the record rack used in the 'Ruskin. Its schematic diagram is shown in fig. 6, and my first assembled version is shown in fig. 7. Do not look closely, however, as my woodworking in this first version is not good (my second and final version looks much better). The transmitter is powered by a small 6 volt battery for the filament(s) and 6 to 15 series snapped-together 9 volt batteries for the plate. An equivalent AC supply can also be homebrewed if desired. In fact, you can even build the transmitter on a larger wooden frame and include its power supply underneath for a completely self-contained mini-rig. Use your creative ingenuity!

Tune up and operation of Li'l Buddy follows the same general procedure used in the 'Ruskin, except a small flashlight bulb or QRP wattmeter is connected to the antenna coil. Cathode current, incidentally, can run up to 5 ma for one 955 or 10 ma for two 955s. You can also add warping condensers in series with the crystal to slightly change frequency. This little transmitter may not be a band blaster, but it is capable of some good milliwatt QSOs. After working a few states (or countries!) with it, Li'l Buddy and its QSLs also make a neat addition to your shack's windowsill.

Completing The Setup

Our featured transmitters are a true blast to use on the air today, and mating them with similar era receivers really makes them shine. Since this hearty approach challenges your abilities, I compiled some notes to help you along the way.

First, try to test-tune an old-time receiver before purchasing it at a hamfest. Pay a few extra dollars for one in better condition, and ask for its manual. Move to a quiet corner and make a list of its tubes and filter condensers. Return to the flea-market and purchase a full round of new tubes and a new filter condenser. After

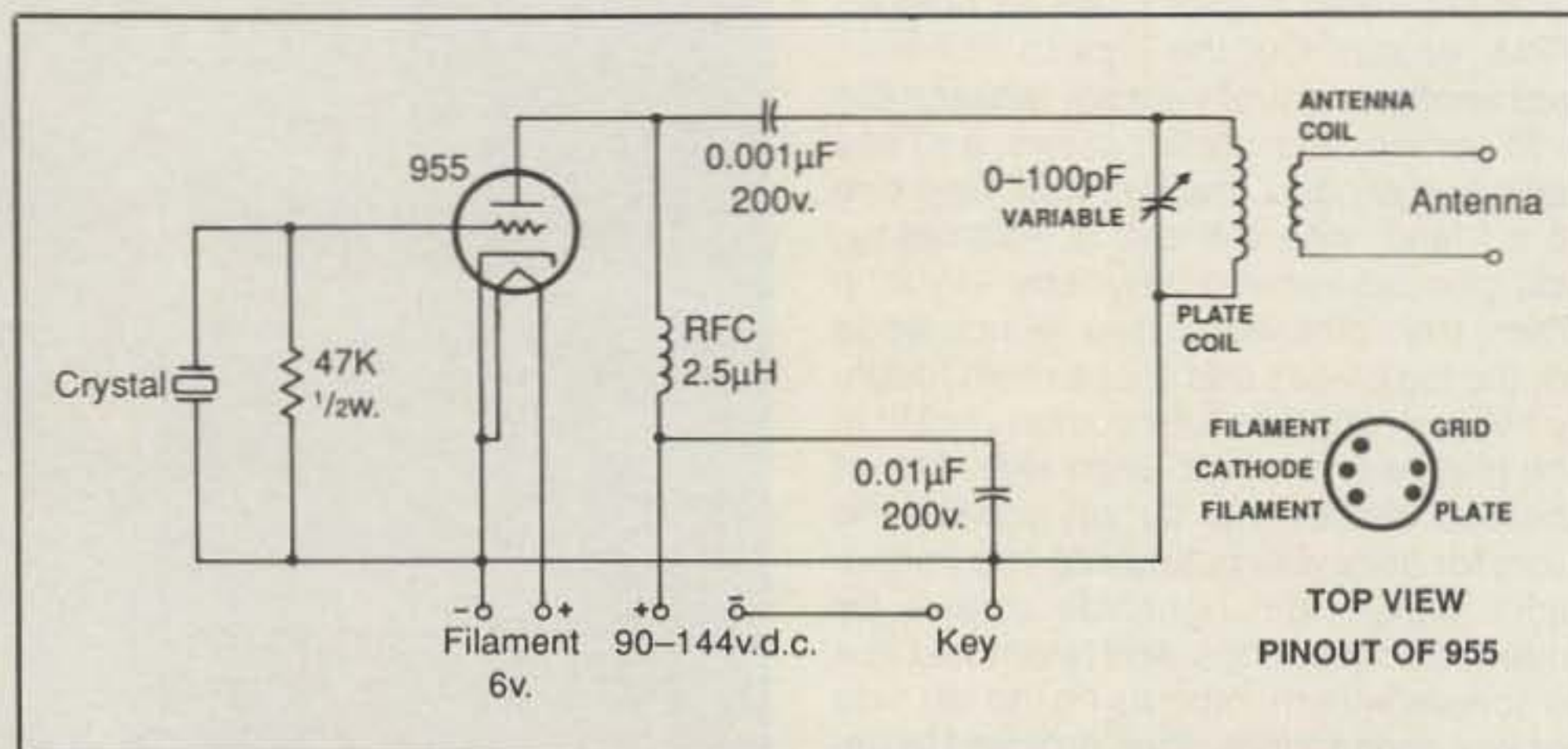


Fig. 6- Schematic of Li'l Buddy QRP transmitter. Notice this rig uses a shunt-fed tank circuit, whereas the John Ruskin used series-feed. Remember the difference?

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Ball bearing vernier reductions drives on both the plate and load control makes tuning precise and easy.

3-500Z Tube in shielded RF compartment gives you nearly 70% efficiency

You get the rugged time proven 3-500Z tube with an estimated life of 20,000 hours ICAS. That's nearly 20 years operating 20 hours a week -- you may never have to replace your tube.

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

A superb RF design and layout, a Hi-Q tank circuit and commercially rated RF power components give you nearly 70% plate efficiency over the entire operating range. This puts maximum power into your antenna instead of heating up your amplifier.

A whisper quiet internal computer style fan draws in cool air over the power supply components and blows it around the 3-500Z tube. This removes excessive heat and gives you reliable performance.

Built-in adjustable ALC circuit keeps your exciter from overdriving your AL-80A. The result? A clean signal without flat-topping.

A standby switch prevents harmful thermal shock to your 3-500Z filaments by keeping them lighted when you're operating barefoot.

Gutsy Heavy Duty Power Supply

The guts of the AL-80A is its heavy

heavy duty power supply.

A husky 22 pound power transformer using a high silicon steel core, computer grade filter capacitors totaling 26 ufd, heavy duty bleeders and ten 3 amp, 1000 V power rectifiers give a stiff 2700 volts fully loaded.

Some competing high priced amplifiers using *two* 3-500Zs *can't* give you much more power output than the AL-80A. Why? Because their lightweight power supplies can't deliver enough high voltage for the tubes.

Step-Start Inrush Protection™

When you first turn on your amplifier, a massive inrush current flows.

Your house lights flicker as you hear a loud "thump" from your amplifier. This terrible inrush current stresses *all* your power supply components to their limits. Your cold tube filament suffers abusive thermal shock.

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You also get a multi-meter that measures plate voltage, plate current, *peak* RF watts output and drive power/ALC detector voltage.

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returning home, clean the receiver and install its new goodies.

I heartily suggest using separate antennas for transmitting and receiving to eliminate T/R switching entanglements. Older receivers (especially those lacking an RF gain control like the S-38, NC-58, etc.) work fine with a single 35 or 40 foot wire laid on the ground outside of your shack. Position the wire at a 90 degree angle to your transmitting dipole for minimum RF induction. Modify the receiver's "RCV/Standby" switch so it adds a high resistance or reduces voltage to the "front end" RF stage rather than disconnecting its high voltage. Reduced gain then lets you spot and monitor your transmitted signal. Forget high selectivity with old receivers, as they copy half the band at one time—without tuning. Learn to concentrate on one signal/CW note and ignore the rest. This is best accomplished by tuning a desired signal for a very low tone. Listen on your (crystals) transmit frequencies at various times to catch DX and CQers. Answering others rather than calling your own CQ is vital to success. One final hint: Your low-power signal will "get out" best on 30 meters. Crystals for 10.103, .106, and .109 cover the action fine, and the band is open almost around the clock.

In conclusion, we have a nice view of a

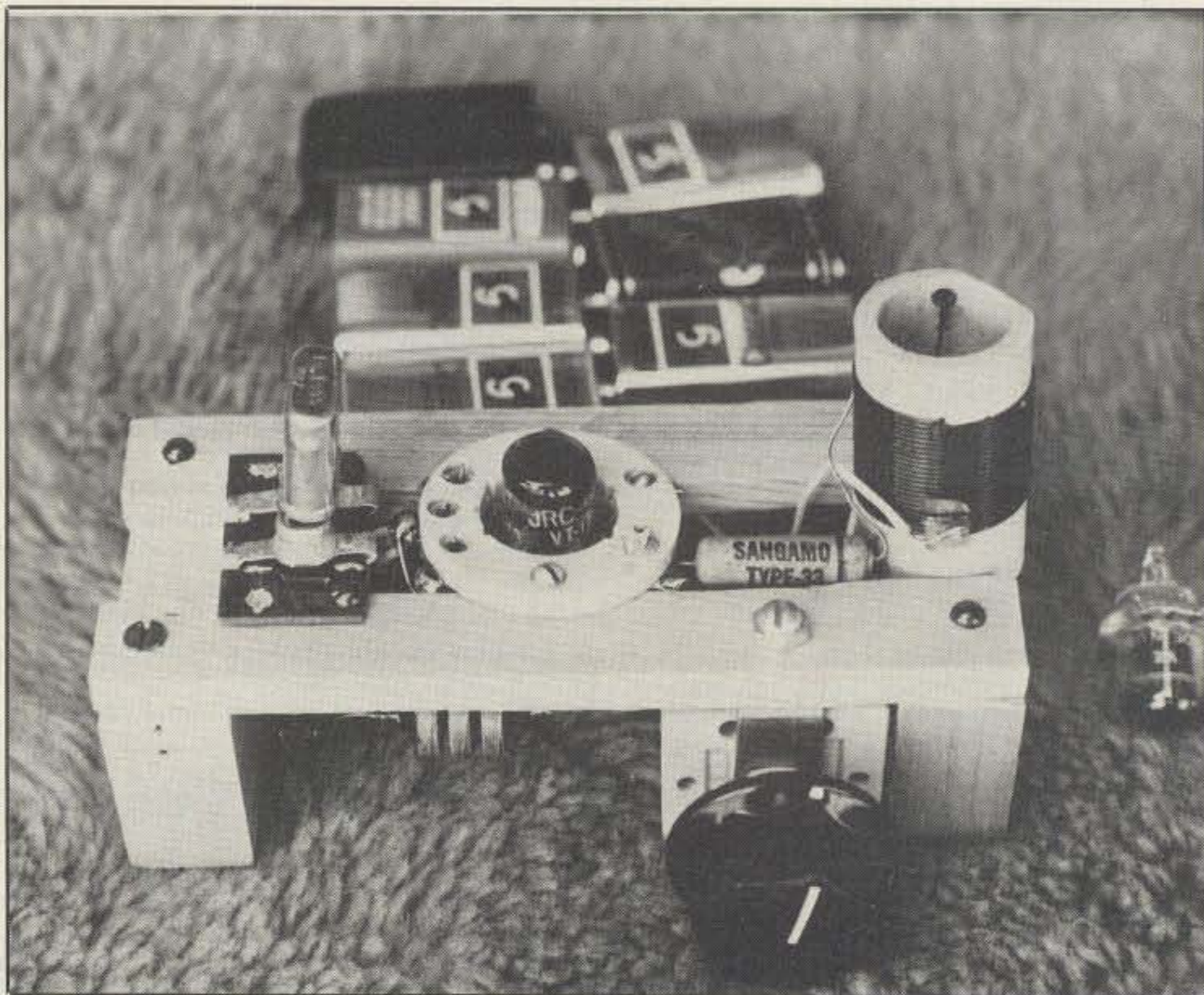


Fig. 7- Li'l Buddy—a neat little QRP rig with a unique 955 acorn tube. Transmitter works as well as it looks . . . err, better!

true dream receiver to go with our wood-frame transmitters. Fig. 8 shows yet another product of John Leary, W9WHM's handiwork. John built this 21-tube NC-800 from two junked NC-400s in a quite dilligent and radical restoration. The front panel was replaced with one cut from scratch, and the dials were moved

from the left to the center. It has double-tuned IFs, Q multiplier, 100 kc calibrator, and reflects a full winter's effort in restoration. Beautiful!

That's it for this month, gang. Next time we plan to highlight more keys. Stay with us!

73, Dave, K4TWJ

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Fig. 8- W9WHM's winter restoration project would truly make a dream receiver for this month's classic rigs. See text for details on this NC-800.

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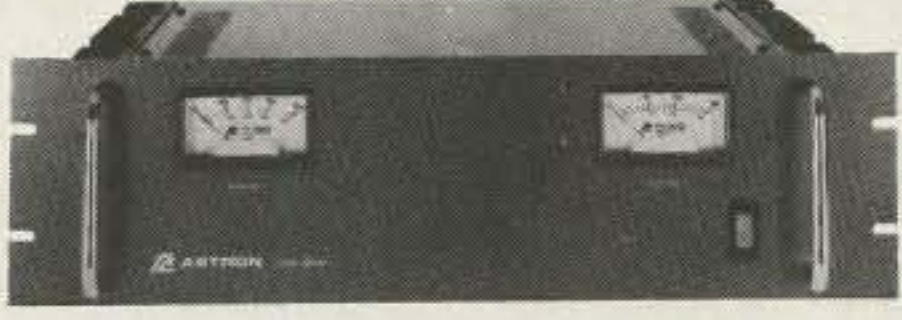




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CIRCLE 128 ON READER SERVICE CARD

ASTRON CORPORATION

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Irvine, CA 92718
(714) 458-7277

ASTRON POWER SUPPLIES

 <p>MODEL VS-50M</p>	<p>• HEAVY DUTY • HIGH QUALITY • RUGGED • RELIABLE •</p> <p>RS, RM and VS SERIES</p> <p>SPECIAL FEATURES</p> <ul style="list-style-type: none"> SOLID STATE ELECTRONICALLY REGULATED FOLD-BACK CURRENT LIMITING Protects Power Supply from excessive current & continuous shorted output. CROWBAR OVER VOLTAGE PROTECTION on all Models except RS-4A, RS-5A. MAINTAIN REGULATION & LOW RIPPLE at low line input Voltage. HEAVY DUTY HEAT SINK • CHASSIS MOUNT FUSE <ul style="list-style-type: none"> THREE CONDUCTOR POWER CORD ONE YEAR WARRANTY • MADE IN U.S.A. <p>PERFORMANCE SPECIFICATIONS</p> <ul style="list-style-type: none"> INPUT VOLTAGE: 105 - 125 VAC OUTPUT VOLTAGE: 13.8 VDC ± 0.05 volts (Internally Adjustable: 11-15 VDC) RIPPLE: Less than 5mv peak to peak (full load & low line) Also available with 220 VAC Input Voltage 																																															
<p>RM-A SERIES</p>  <p>MODEL RM-35M</p>	<p>19" X 5 1/4" RACK MOUNT POWER SUPPLIES</p> <table border="1"> <thead> <tr> <th>MODEL</th> <th>Continuous Duty (Amps)</th> <th>ICS* (Amps)</th> <th>Size (IN) H x W x D</th> <th>Shipping Wt. (lbs.)</th> </tr> </thead> <tbody> <tr> <td>RM12A</td> <td>9</td> <td>12</td> <td>5 1/4 x 19 x 8 1/4</td> <td>16</td> </tr> <tr> <td>RM-35A</td> <td>25</td> <td>35</td> <td>5 1/4 x 19 x 12 1/2</td> <td>38</td> </tr> <tr> <td>RM-50A</td> <td>37</td> <td>50</td> <td>5 1/4 x 19 x 12 1/2</td> <td>50</td> </tr> <tr> <td colspan="5">• Separate Volt and Amp Meters</td> </tr> <tr> <td>RM-35 M</td> <td>25</td> <td>35</td> <td>5 1/4 x 19 x 12 1/2</td> <td>38</td> </tr> <tr> <td>RM-50 M</td> <td>37</td> <td>50</td> <td>5 1/4 x 19 x 12 1/2</td> <td>50</td> </tr> </tbody> </table>	MODEL	Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H x W x D	Shipping Wt. (lbs.)	RM12A	9	12	5 1/4 x 19 x 8 1/4	16	RM-35A	25	35	5 1/4 x 19 x 12 1/2	38	RM-50A	37	50	5 1/4 x 19 x 12 1/2	50	• Separate Volt and Amp Meters					RM-35 M	25	35	5 1/4 x 19 x 12 1/2	38	RM-50 M	37	50	5 1/4 x 19 x 12 1/2	50												
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*ICS—Intermittent Communication Service (50% Duty Cycle 5 min. on 5 min. off)

CIRCLE 130 ON READER SERVICE CARD

NEWS OF CERTIFICATE AND AWARD COLLECTING

The Story of the Month for March is:

Adam Quandt, WA6OCI
USA-CA All Counties #598,
20M SSB Mobile
12-12-88



Adam Quandt, WA6OCI, USA-CA All Counties #598 at the ready, microphone in hand.

"For those who haven't finished all counties yet, keep working. It will be one of your biggest thrills to have about a hundred hams giving you congratulations for finishing. It will probably be a weepy time for you, as it was for me.

"I can still remember vividly my first experiences with amateur radio when I was a little tot. My dad had built a child-proof shack in the basement by putting up studs and wrapping chicken wire around them. It worked; at least none of us nosey kids got zapped!

"The memory stayed with me, but there was no desire to do it myself. Even learning code at 8 wpm while I was an Aviation Cadet didn't move me. A good friend finally got me off dead center and I got my Novice ticket in 1973. I stayed with that until 1985 when I read about county hunting in *CQ* magazine. That article really struck a nerve. The first thing I did was buy an expensive radio so I couldn't sit back and say the heck with it. It worked, and at last I could talk like a human being.

"My first contact was with KB7QO in Asotin, Washington. That was almost as much fun as stealing from the cookie jar.

"After a whole bunch of people went out of their way to get last or next to last counties, guess who, KB7QO traveled about 150 miles on a special trip just to help me get my last one of all—Humboldt, Nevada—on December 4, 1988.

"I am still thrilled with the whole thing, and I am particularly happy to know so many *super* people. My XYL, Dorothy, and I both look forward to continuing to renew acquaintances and to meeting those we have not yet seen.—73, and best wishes, Adam."

Awards Issued

Mary Carter, NV4Z, filed her neatly filled record book and qualified for USA-CA All Counties #639, USA-CA 3000 #668, USA-CA 2500 #742, USA-CA 2000 #810, USA-CA 1500 #898, USA-CA 1000 #1089, and USA-CA 500 #2370, Mixed, dated 11-8-89.

333 South Lincoln Ave., Mundelein, IL 60060

Bernard Leblanc, VE2MS, also submitted a neatly filled record book and received USA-CA All Counties #640, USA-CA 3000 #669, USA-CA 2500 #743, USA-CA 2000 #811, USA-CA 1500 #899, USA-CA 1000 #1091, and USA-CA 500 #2372, All SSB, dated 11-13-89.

Michael J. Sheehan, KB1GN, completed his paperwork and claimed USA-CA All Counties #641, USA-CA 3000 #670, and USA-CA 2500 #744, Mixed, dated 11-16-89.

Thomas L. Work, KD9KK, claimed a fully endorsed certificate and received USA-CA All Counties #642, USA-CA 3000 #671, USA-CA 2500 #745, USA-CA 2000 #813, USA-CA 1500 #900, USA-CA 1000 #1092, and USA-CA 500 #2378, Mixed, dated 11-24-89.

Vessen Magee, Jr., KF5DE, took a big step toward his goal by claiming USA-CA 2500 #746, USA-CA 2000 #814, USA-CA 1500 #901, USA-CA 1000 #1093, and USA-CA 500 #2379, All SSB, dated 11-27-89.

Hank Petersen, KJ4LG, updated his record and received USA-CA 2000 #812, Mixed, dated 11-18-89.

John L. Biester, KB9YY, filed his good application and received USA-CA 1000 #1088, All SSB, dated 11-2-89.

L. Wayne Burr, AA4HD, got off to a good start by claiming USA-CA 1000 #1090, and USA-CA 500 #2371, All 20M SSB Mobile, dated 11-9-89.

USA-CA 500 certificates went to:

John K. Wood, Jr., K6IIS, USA-CA 500 #2369, All SSB, 11-6-89.

Mary Carter, NV4Z, USA-CA 500 #2370, Mixed, 11-8-89.

L. Wayne Burr, AA4HD, USA-CA 500 #2371, All 20M SSB Mobile, 11-9-89.

Bernard Leblanc, VE2MS, USA-CA 500 #2372, All SSB, 11-13-89.

Freiherr von Sobek-Werder, DL3GK, USA-CA 500 #2373, All CW, 11-13-89.

USA-CA Special Honor Roll

Mary Carter, NV4Z
 USA-CA All Counties #639, Mixed, 11-8-89

Bernard Leblanc, VE2MS
 USA-CA All Counties #640, All SSB, 11-13-89

Michael J. Sheehan, KB1GN
 USA-CA All Counties #641, Mixed, 11-16-89

Thomas L. Work, KD9KK
 USA-CA All Counties #642, Mixed, 11-24-89

USA-CA Honor Roll

3000		1000	
NV4Z	668	KD9KK	900
VE2MS	669	KF5DE	901
KB1GN	670		
KD9KK	671	KB9YY	1088
		NV4Z	1089
2500		AA4HD	1090
NV4Z	742	VE2MS	1091
VE2MS	743	KD9KK	1092
KB1GN	744	KF5DE	1093
KD9KK	745		
KF5DE	746	500	
		K6IIS	2369
2000		NV4Z	2370
NV4Z	810	AA4HD	2371
VE2MS	811	VE2MS	2372
KJ4LG	812	DL3GK	2373
KD9KK	813	KB5GEO	2374
KF5DE	814	YB2BNJ	2375
		JP1BJR	2376
1500		KA0QCK	2377
NV4Z	898	KD9KK	2378
VE2MS	899	KF5DE	2379

The total number of counties for credit for the United States of America County Award is 3076. The basic award fee for subscribers to *CQ* 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* Communications, 76 North Broadway, Hicksville, NY 11801, U.S.A. for \$1.25. To qualify for the special subscriber rate please send a recent *CQ* mailing label with your application. To be eligible for the USA-CA applicants must comply with the rules of the program as set forth in the revised USA-CA Rules and Program dated April 2, 1985. A complete copy of the rules may be obtained by sending an SASE to Dorothy Johnson, WB9RCY, USA-CA Custodian, 333 South Lincoln Avenue, Mundelein, IL 60060, U.S.A. DX stations must include extra postage for airmail reply.

Scott Travis, KB5GEO, USA-CA 500 #2374, Mixed, 11-13-89.

Hamdani, YB2BNJ, USA-CA 500 #2375, All CW, 11-16-89.

Prof. J. A. Masaharu Okochi, JP1BJR, USA-CA 500 #2376, All CW, 11-16-89.

James "Bob" Seabaugh, KA0QCK, USA-CA 500 #2377, Mixed, 11-22-89.

Thomas L. Work, KD9KK, USA-CA 500 #2378, Mixed, 11-24-89.

Vessen Magee, Jr., KF5DE, USA-CA 500 #2379, All SSB, 11-27-89.

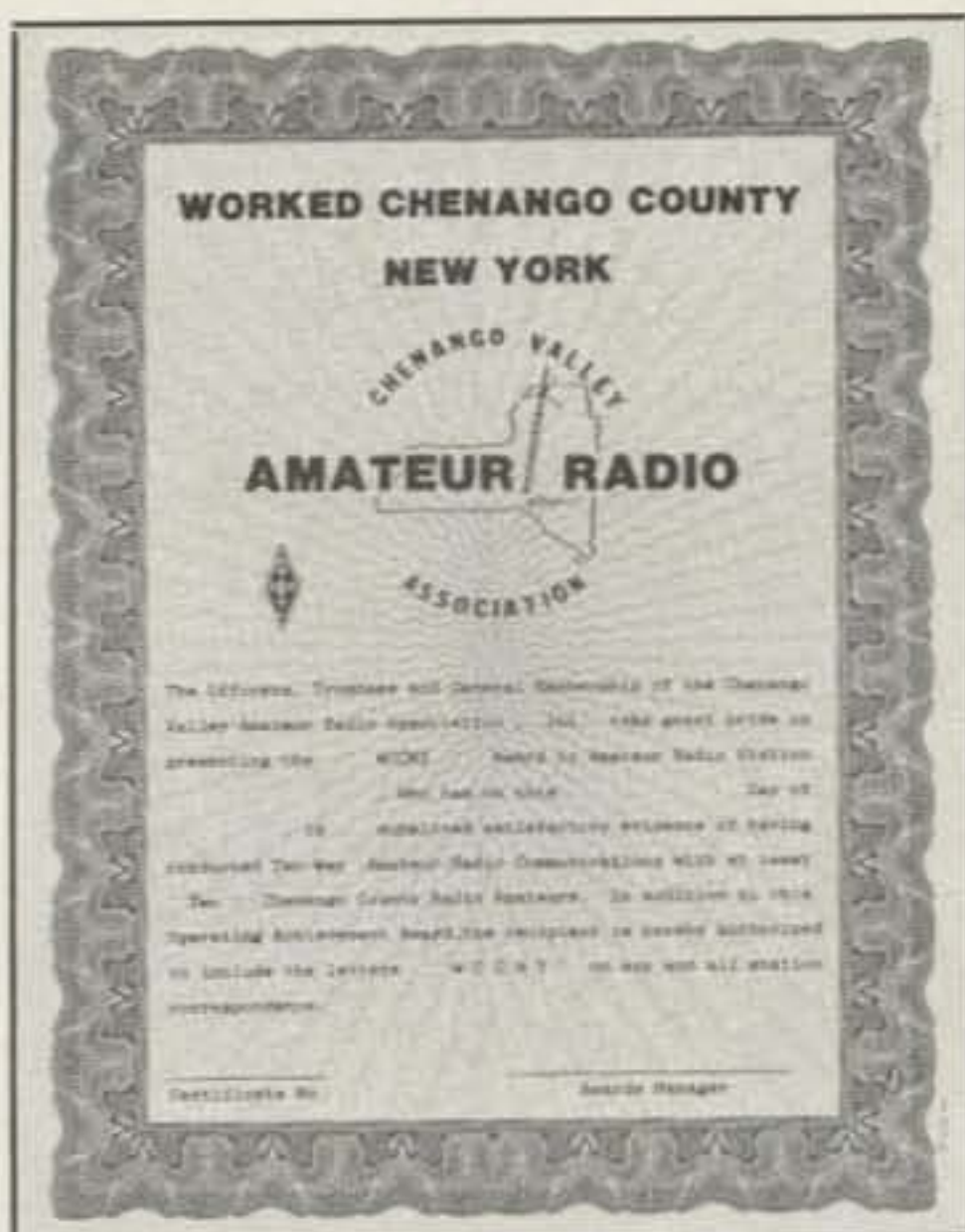
Awards Available

Worked Chenango County, New York Award. The year 1990 marks the 25th anniversary of the Chenango Valley Amateur Radio Association, Inc., based in Chenango County, New York. In celebration of this special event, CVARA, Inc. has announced a new operating achievement award available to amateur opera-

having been made during the anniversary month of February 1990.

In addition to the distinctive certificate award designed by Tony Masi, N2GVB, and printed by Jim Leahy, KA2AOT, each qualifier will receive a small booklet entitled "A Walk Through Historic Chenango County" compliments of the association.

ZC4 Award. The ZC4 Award, The Sovereign Base of Cyprus, is available from Awards Manager ZC4BS, Stephen B. Bowden, ZC4 Bureau, JSB, BFPO 53. The award is open to both TX operators and SWLs for contacts with ZC4 stations after 1980.



Worked Chenango County, New York Award by the Chenango Valley Amateur Radio Association.



ZC4 Award offered by the ZC4 Bureau, Cyprus.

Enclose only a list of QSOs with your application together with a signed declaration that the credits necessary for this award and the licensing conditions of your country have been adhered to. Do not forward your QSL cards, as they are not needed to confirm this award. The award comes in three classes with various band and mode endorsements.

	Class 1	Class 2	Class 3
Europe	15 pts	10 pts	5 pts
Asia	15 pts	10 pts	5 pts
Americas	10 pts	5 pts	3 pts
Oceania	10 pts	5 pts	3 pts
Africa	10 pts	5 pts	3 pts

Each contact with a ZC4 station counts one point; the same station may be worked on different bands for additional points. Contacts with the two club stations, ZC4ESB and ZC4EPI, count double points, as do any special event callsigns (ZX4JAM or similar, having three letters after the prefix).

Contacts on 50 MHz or on 7 MHz and below count two points. So a contact with ZC4ESB on 3.5 MHz, for example, would count four points.

The cost of this award is 10 IRCs or \$3.00 (U.S.). Additional information can be obtained by contacting the awards manager at the above address. This is the first ZC4 award and should issue a fair challenge to TX operator and SWL alike. At present there are 16 ZC4 stations active.

tors worldwide! According to Ray Darling, WA2EYH, Trustee and Project Coordinator, those operators seeking the attractive WCCNY (Worked Chenango County, NY) Award must comply with the following:

1. Each station seeking this award must submit satisfactory evidence of two-way amateur communication with at least two Chenango County amateur operators on or after 00:01:00 UTC December 1, 1989.

2. All contacts must be made on the 160-10 meter amateur bands. All modes/frequencies currently allocated within the respective Novice-Extra class licenses are acceptable and encouraged. Those stations wishing to make both contacts with the same Chenango County operator *must* do so on two different bands!

3. Each qualifying station is required to send an extract of his/her log showing date(s), time(s), band(s), mode(s), and callsign(s) worked, along with an SASE (9 x 12 preferred) to CVARA, Inc., P.O. Box 196, Bainbridge, NY 13733. Include appropriate postage (U.S.) to return a 2 ounce parcel by first-class mail (state-side) or airmail (DX stations).

4. An embossed commemorative seal will be attached to all WCCNY Awards issued with log extracts showing contacts

TGE

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RS-35M,35A,13.6Vdc, + Meters	\$173.50
RS-50M,50A,13.6Vdc+ Meters	265.65

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MHB-5820,220 Mhz. 3dB 5/8	29.00
MHB-5802, 2 meter non-radial 3dB	29.00
MHB-2002,220 non-radial,3dB	29.00
BMFT-120,1/4wave,black,118-512	21.00
MUF-4505,430-450 MHz.	29.00
MUF-4505NGP,430-450 non-radial	38.00
MAX-9053,902 MHz.	31.00
MAX-SCAN 1000,Scanner Antenna	19.95

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MBX-150,144MHz Omni Base	69.00
MBX-250,220 MHz Omni Base	59.50
MBX-430,430-450 Omni Base	54.50

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4381,portable digital BIRD	690.00

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W520 200W 1.8-200 MHz
W510 5kW 1.8-200 MHz
W540 200W 140-525 MHz

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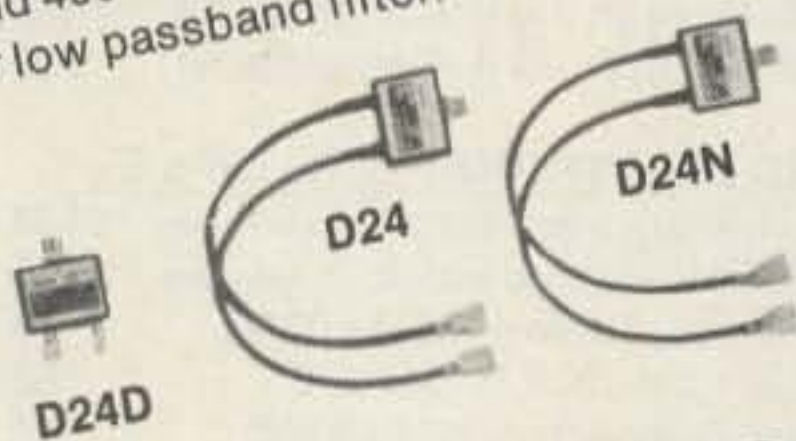
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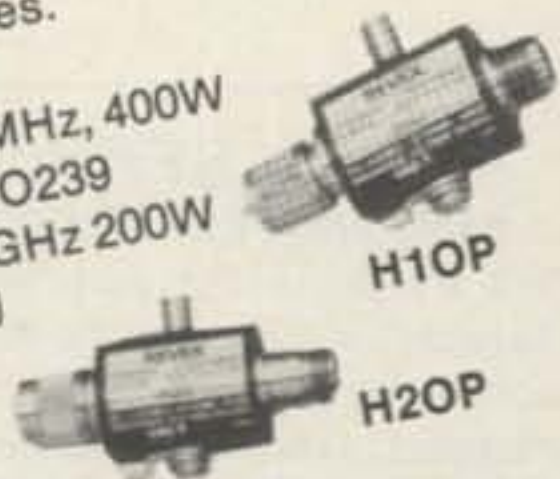
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Worked Connecticut DX Association Award. The Connecticut DX Association (CTDXA) is offering a new Worked CTDXA Award. This certificate is available to all licensed radio amateurs and shortwave listeners worldwide. DX operators (non-Americans) are eligible for this certificate by contacting at least three CTDXA members. US amateurs are eligible by contacting a minimum of five mem-



Worked Connecticut DX Assn. Award.

bers. SWLs need only provide callsign, time, date, mode, and frequency of five CTDXA QSOs heard.

"Our club is well recognized in the United States and in many countries worldwide," said Frank Cooper, W3NV, charter member of CTDXA and ARRL DXCC Honor Roll member currently with 313 countries confirmed. "We want to encourage working DX and share the fun of our hobby to all interested hams." Another CTDXA member, Don Search, W3AZD, and ARRL DXCC Administrator adds, "The growing enjoyment of achieving DXCC is apparent. I process more DXCC certificates today than ever before. The Connecticut DX Award is a natural addition to the avid DX chaser's shack."

To apply for the Worked CTDXA Award, send a log extract to Richard Moris, KB1LE, 46 Collins Road, Bristol, CT 06010. The award is \$1.00 stateside and 3 IRCs DX. Send an SASE to KB1LE for a complete members list. All modes are accepted. Repeater contacts are not valid. There is no time restriction on when QSOs are/were made.



Basic CECW Award by Clube de CW do Ceara, Brazil.

CECW Awards Program. The following are two awards available from the Clube de CW do Ceara, Brazil.

Basic CECW Award. Work five PT7 stations including three members (non-PT7 members count as PT7 stations) after September 3, 1983. Two endorsements are available. Fee is 10 IRCs.

BRIO Award (Brazil: Geographic Regions and Islands). Work the following



BRIO Award offered by Clube de CW do Ceara, Fortaleza, Ceara, Brazil.

prefixes: PP6, PY6, PP7, PR7, PS7, PT7, PY7, PR8, PS8 (one of each). PT7 must be a CECW member. Contacts after September 3, 1986 are valid. Five endorsements are available.

Log: Call (in alphabetical order), date, band, RST—only CW. Fee is 10 IRCs. Send no QSLs, only GCR to Award Manager, Box 339, CEP 60001 Fortaleza, Ceara, Brazil.

Four Corners Award. Word has been received as follows from Van, WB7UZO, Four Corners Award Gold Seal Manager. "We now have a problem with the SE Corner (K4VGD). Jean has been having health problems, as well as antenna problems due to hurricanes. We need a volunteer station to relieve K4VGD. If any station in the area of Key Largo to Key West would care to apply, please contact Van, WB7UZO, or Tom, N7QJM. Any contact with Jean, K4VGD, will be valid until we establish a new permanent call."

Information on the Four Corners Award, for working stations in the four geographical corners of the continental U.S.A., was published in this column in the September 1988 issue of CQ.

Think Spring (Northern Hemisphere)!
73, Dorothy, WB9RCY

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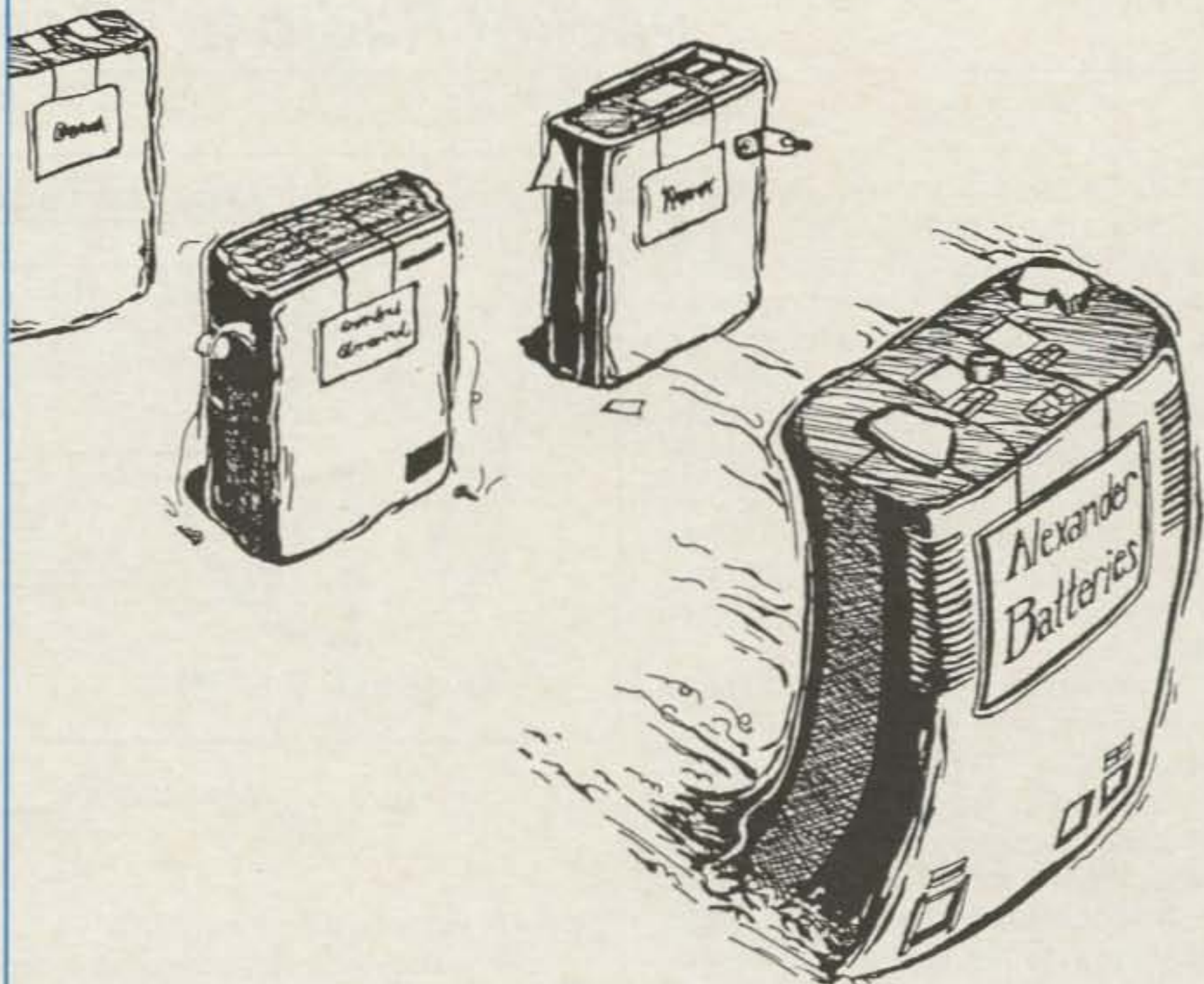
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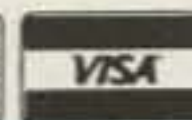
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CONNECTING YOU AND PACKET RADIO IN THE REAL WORLD

Packet Radio is "Cool"

Even when packet is "cool," it has a "warm" side. In my packet QSOs on the various packet frequencies and bands I come across some very interesting packeteers. This month's featured packeteer is that I felt would be of interest to many of us who are complaining about the cold weather conditions that we have been experiencing.

I think it may be best to relate how we came to know one another, and then I will let him tell you about his little corner of the world.

A few years back I wrote about the fun we were having with packet on HF, and especially with 1200 BPS on 10 meters. Glynn, WB4RHO, and I would enlist the help of some packeteers in the Midwest, and have them move their packet stations to frequencies above 28 MHz. Most of the packeteers we asked were the adventuresome types who enjoyed exploring new ways of communicating via packet. It wasn't long before we had a lot of activity stirring around 28.200 MHz. As the weeks and months went by, there were more digis and nodes appearing on 10 meters.

Our first nodes were near 28.205 MHz LSB (now moved to 28.195 MHz LSB). The nodes that are easier to hit from here in the southeast are the nodes in the western and mid-western states. From there we can hit other nodes such as "AKROH" or "OHIO" in Ohio, "NATCAP" in Washington, DC, "COLO" in Colorado, and "MPK" near San Diego. Many of these nodes shown in the node lists of other nodes were from nodes accessible via gateways. I've named only a few of the hundreds of nodes that are around 28.195 MHz LSB or accessible via node gateways. As a matter of interest, you will find some very well organized BBSes on 28.190 MHz and some interesting 2400 BPS QSOs on 28.125 MHz. Keep a lookout on 28.130 for a 2400 BPS BBS that may soon begin operating there. There may even be two or three.

In addition to the nodes on or around 28.195 MHz LSB there are a lot of DX stations. Just about any time you wish, when propagation is right, you can find "ZIP" OA4BR in Lima, Peru, or Ted, HC5K, in Ecuador and VE8DX at the North Pole.

506 Pheasant Ridge Drive, Warner Robins, GA 31088

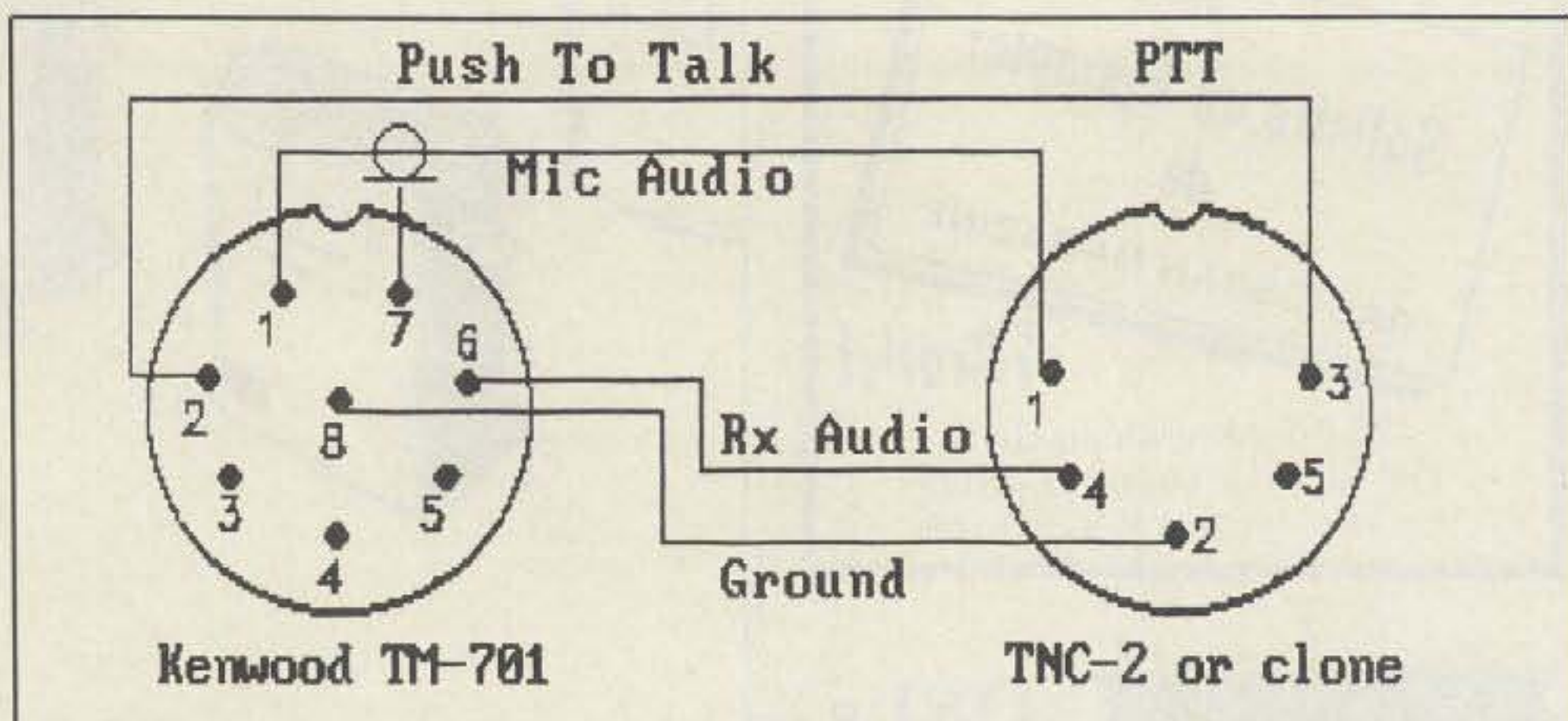


Fig. 1— For the notebook. Kenwood TM-701 to TNC-2 or clone.

These DX stations are on here to have fun on packet. They just like to have a good ragchew, and many times they will get on the Conference node "CONF" that "was" connected to AZSE for just that—a good old round-table session. They are not looking for a "pile-up" or DX chasing, but rather they are ready to give you a long and interesting QSO.

Did I Say North Pole?

Well, in any case, as you will soon read, VE8DX is close enough to the NP to be affected by its proximity. It seems that Bob had read about the "CONF" node in one of my articles and sent me a message via AMTOR and packet BBSes.

One evening last year Bob and I got together via a once active node near Sierra Vista, Arizona. We began talking about the weather, and as it turned out Bob's weather seemed to be more interesting than mine. I became interested in the en-

vironment and living conditions at his QTH (Pond Inlet, North West Territories).

"Exactly where is your QTH?" I asked. That was the beginning of a very long and interesting QSO. As a matter of interest, that QSO hasn't ended.

Some of the high points of our packet QSOs were so interesting that I asked Bob if he would put together some of these points of interest so that I could pass them on to the readers of CQ. He went a step further and made some pictures to go along with his letter about his "cool" lifestyle.

This "warm" and interesting letter from Bob, VE8DX, is a bit of information about another part of the world that many of us never think about, even when we are in QSO with one of the stations near the "Top of the World." Here is Bob's letter.

Hi, Buck:

TNX a million for all your help to get started and your informative packet articles that I read

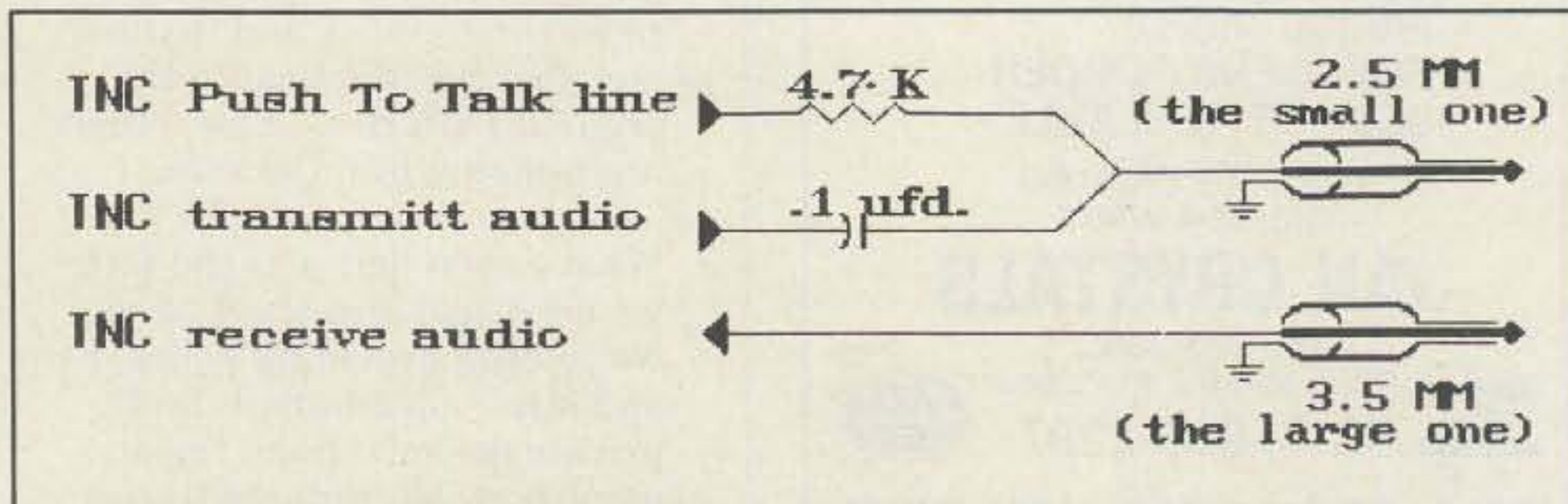


Fig. 2— For the notebook. ICOM IC 02AT or IC 2AT to TNC. Note the MIC and Receive AF connector sizes.



Bob James, VE8DX, operating Field Day from an igloo!

in CQ—late. (Regular mail to NWT is a month or two behind.) We really enjoy the links on 28.195. I have all this gear around, and I was getting frustrated with it because of the little we knew about setting it up, until we got together. We still have a little problem with the Polar Flutter, but that is to be expected here in the NWT.

I was first licensed in May 1952, and I lived in VE7 land until 1973. Since then I've lived here in the North West Territories. Our geographic location is 421 miles due north of the Arctic Circle, 511 miles east of the Magnetic Pole, 312 miles southwest of Thule, Greenland, and 2018 miles north of the United States border. The town of Pond Inlet is located at the extreme northeast tip of Baffin Island, near Greenland.

One setup here is an IC-735 and a PK-232, and the other setup in a FT-101-ZD and the MFJ-1274. The antenna(s) are a Cushcraft A4 tribander and a 6-element KLM monobander on 20 meters. The coordinates here are 73 degrees north and 78 degrees west.

The amateur bands as well as the living conditions here are very different than in the south. (Bob's reference to the "south" is anything outside the Arctic Circle, Hi!—ed.) For instance, we are in constant 24 hour darkness from November 11th until February 7th. I can make contacts into Europe on 75 (meters) at 1500Z, which is 11 AM local time (EST). Even

Jordan or I can run a sked with ZS4PB at noon local time.

The temperatures here in winter are -40 to -63°C. True it is cold, but there is no humidity, so you dress accordingly. Summer is May 2nd through August 17th, when we have 24 hours of daylight. The temperature ranges from -28 in May and to 50°F toward the first of June. In June it will rise to 65°F, and by the second week of July it is up into the low seventies. By the end of August it's freezing again. As a matter of fact, the ocean freezes solid (over) for 10 months of the year.

The NWT (North West Territories) covers a land mass of 1.3 million square miles and is composed mostly of tundra. The animal life around here consists of arctic fox, arctic wolves, arctic hares, polar bear, musk-ox, and caribou. The birds are arctic tern, paraquin falcons, geese, and jaggars.

A spectacular sight during the summer is the migration of the narwhals. They are a mam-

mal with ivory tusk anywhere from 2 to 10 feet in length. The narwhal itself is about 14 feet in length. The greatest enemy of the narwhal is the killer whale. They both pass by here around the third week in August.

The population here is about 1000, and about 975 of the inhabitants are Eskimo. There are two doctors and two lawyers here. The main occupation of the Eskimo is "soapstone carving," and many are also heavy-duty diesel mechanics and heavy-equipment operators.

Myself? Well, I am an agent for Telesat Satellite Company, CBC, Canadian Broadcasting Corporation, Airline First Air, and I also distribute seven channels of TV—four channels of Canadian television and three channels of U.S. television. It keeps me busy and puts bread and butter on the table. And speaking of bread. A loaf of bread costs \$3.75, a dozen eggs costs \$3.85, a quart of milk is \$3.60, a head of lettuce is \$7.25, and a pack of cigarettes is \$5.50. The offset to that is that the wages here are good. There are two grocery stores, and one service station where we buy gas for \$2.97 a gallon.

I run an AMTOR BBS and mailbox system on scan/marked frequencies of 7.0735, 7.0770, 14.0715, 14.0725, 14.735, 21.0715, 21.0750, and 21.0798 MHz. My SelCal is VEDX.

The other system number 2 is an MFJ-1274 with MailBox on 28.195 MHz. The MailBox is on, and ready to up load and down load mail when I'm not operating in person.

Unlike the way it is in the south, Buck, I cannot run down to the local radio parts house and buy components or gear. I have to keep some spare or backup equipment, and that is not a lot, mainly because the freight cost to get it here is \$3.10 per pound. So you can quickly see that the cost to get a unit here could easily cost more than the device itself.

Out of all this comes some consolation. Crime up here is virtually nonexistent (we never lock our doors). Many times I have left several hundred bucks lying on the kitchen table and come back two days later and it is still where I left it. Some silver may be missing, but the bills will still be there.

Up here everyone helps everyone, and you



High noon at VE8DX. It has been high noon for almost six months. So that's how he "beams" those packet signals to me!



Bob at the operating position of VE8DX. Somehow he seems so cozy and "cool" at the "Top of the World"!

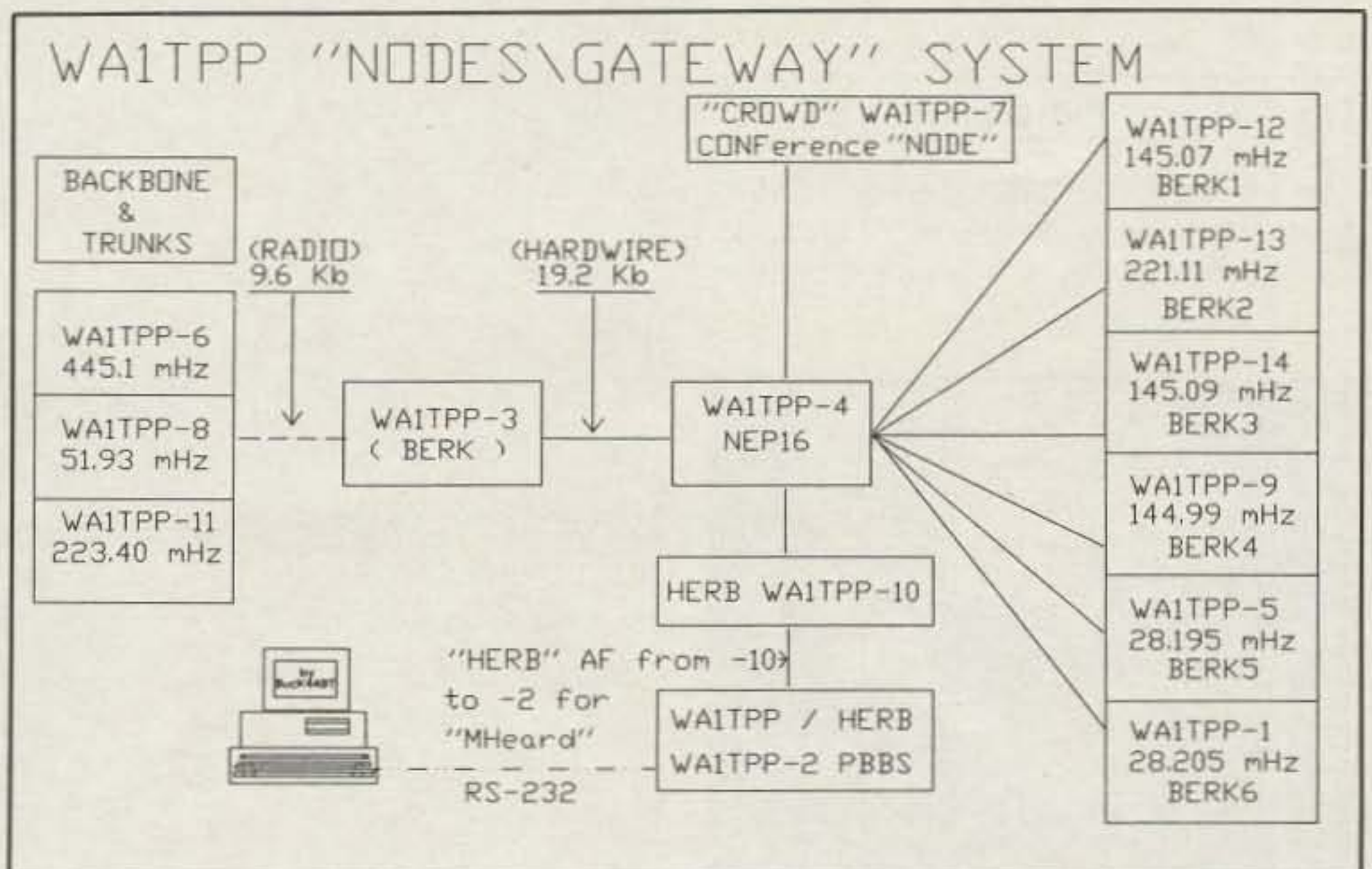
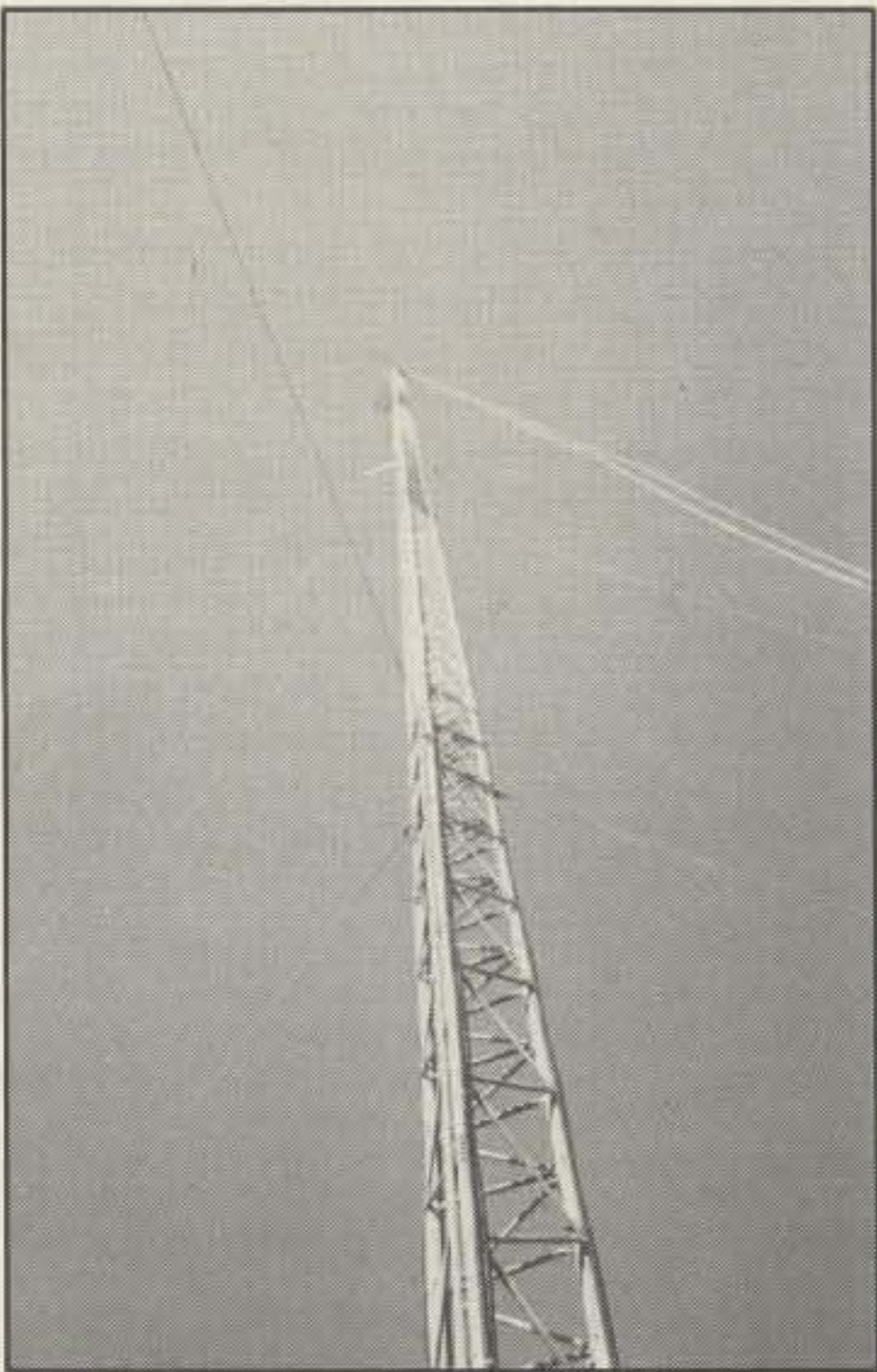


Fig. 3—The last time I counted, there were 14. Herb, it appears that you suffer from the same problem I do—Not enough SSIDS!



Yes, that's Mike, N4NAU, tugging the (top) end of a heavy grass rope that is being wind-dragged to right of this 450 footer.



Rick, KK4DM, putting the coax to the new node transceiver at ABT10.

Rick, KK4DM, and I were about to begin a day of fun and, well, I won't go so far as to say frolic. The task was to raise a new and better node at McRae, Georgia, about 80 miles southeast of Macon. The course of events that led up to the antenna raising was no "piece of cake" either, but what followed the gathering of parts and equipment was the real test of true (for the lack of a better word) "packeteerism"!

This small group of packeteers composed the crew that would be climbing, installing, and tweaking the new antenna system at China Hill, near McRae. The reason I'm giving you the details of this endeavor is because there may someday be a similar task of this nature with which you could be confronted. In that case, please learn from our shortcomings. Before you go to the site, try to have a minimum of 5 persons to handle the ground work, especially if the tower is over 150 feet in height.

The ground crew should do as much of the work as can be done ahead of the actual erection of the feedline and antenna. Consider the tower climber, since he is going to have enough to do handling the mounting brackets and getting the antenna into place. Don't overwork the climber, because it is a tough climb just carrying himself up that "stick" with a small line tied to the safety belt. After the climber gets up there, the rest of the heavier rope must be pulled up. Until the end of the small line reaches the ground again, the person on the tower has to do all the pulling. Let me tell you, or better yet, let Mike, N4NAU, tell you (that tiny dot in the photo about 500 feet up the tower) about

soon learn to be resourceful, and you do a lot of improvising.

Finally, Buck, I know you are in an area of the world that has a lot of rush-hour traffic. That, too, does not exist here at "The Top of the World."

My "warmest" regards to you and the wonderful folks at *CQ* magazine, and I'll CU again soon on packet.

de Bob, VE8 Dog Xray

Bob sent along some photos which I have included here. These pictures will give you some idea of the environment that is referenced in his letter.

The "Movers and Shakers"

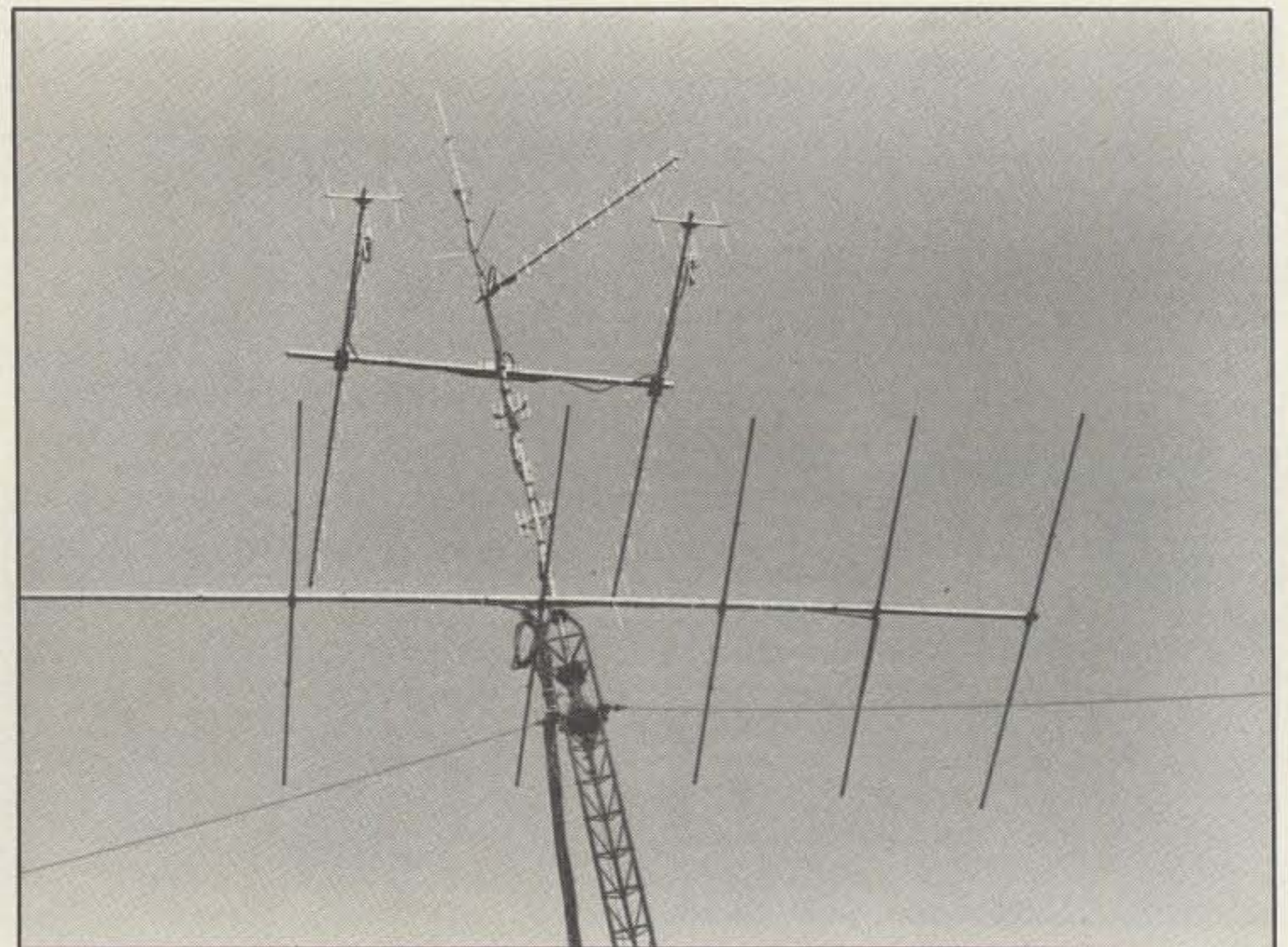
When it comes to getting up early Saturday morning, meeting the rest of the crew at the coffee shop, and mapping out the



Frank, K4ICT, putting the finishing touches (tweaking) on the ABT10 node.

plans of who is going to climb, who is going to pull the "tag-line," and who is going to do the connecting and final tune-up, you soon begin to understand what I mean by the "movers and shakers."

It was early Saturday morning, November 11th, and daylight was just beginning to appear. Frank, K4ICT, Mike, N4NAU,



Just "one" of the antenna systems at the WA1TPP node complex located in Granville, Massachusetts.

how heavy that large "grass rope" gets on a 600 foot pull.

The final "tug" is the easiest. Everything had been talked through some weeks before. Frank and I decided to find a good antenna for the McRae, Georgia site. The reason we are placing so much emphasis on this site is because we plan to do some beta-testing of one end of our high-speed link/trunk (yet to be determined—Pete, help!). At this writing, it appears that 9600 BPS will be our choice.

The antenna would need to be of good quality and built to withstand some rough weather conditions. Frank and I attended a very good hamfest at Chattanooga, and while we were there we talked with Howard of the H.C. Van Zalzah Co. of Downers Grove, Illinois. Howard stocks almost as many antennas as Lew McCoy has tested or written about. He gave us a lot of information about many good antennas.

We selected the G7/144 for its gain, durability, and economy. Fed with 7/8 inch hard line, the node (ABT10) is hooting a packet across many miles to the nodes at Jesup, Georgia (JES5), and the 80 miles north to ABT8 located north of Macon, Georgia.

NEDA makes node stacking easier.

And speaking of making node building easier, NEDA, the North East Digital Association, has an OCTOPUS card for the node SYSOPS that can make your life easier when you begin assembling a cluster of nodes and gateways. This PC board will allow from three to eight nodes to be ganged into your node or gateway clusters. A three-port adapter will require twelve diodes on the PCB, and a five-port adapter will have forty 1N4148s on the PCB floor.

Once you have the PC board from NEDA you can begin populating it with the number of diodes that are needed in the matrix to suit your system. If more nodes are to be added later, the traces are there on the PCB to allow that addition at another time.

The photo illustrates a cluster of nodes managed by Herb Belin, QTH Granville, Massachusetts (WA1TPP, dash 1 through "umpteen" and BERK5). Herb is one of our 2400 BPS supporters on 10 meters. Herb also supports many 1200 BPS nodes on 28.195 LSB and other HF and VHF frequencies. Many of the nodes on the BBS frequency at 28.190 MHz LSB (1200 BPS) and the 2400 BPS nodes on 28.125 MHz are also using the cluster "OCTOPUS" PCB.

To obtain more information about the OCTOPUS PCB, contact a member of NEDA, or John Painter, 7 Jefferson Street, Nashua, NH 03060. Price is \$15.00 plus \$2.00 postage and handling (U.S. funds only).

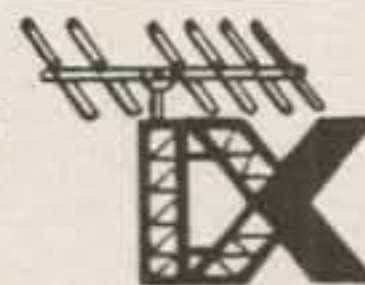
Until next month, have fun packeting.

73, de Buck4ABT



Count them. There are 12 TNC/NODES in this photo. Herb assures me, "There is an OCTOPUS PCB under there somewhere." Next time you connect to "BERK5" you will know what is behind that power-house packet complex at WA1TPP.

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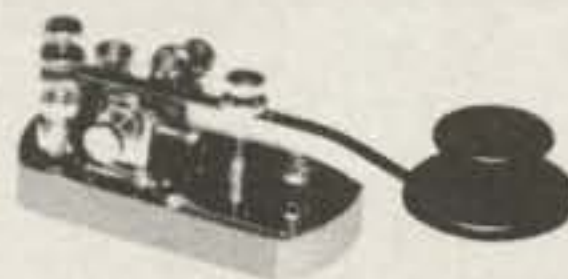


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International Agreements Applicable To Amateurs

Our government has two sets of international agreements which are particularly important in regard to operation by United States amateur radio operators. The current reciprocal operating and third-party traffic agreement lists were updated to 7 September 1989 and 20 October 1989 by the FCC (Public Notices 3175 and 4338, respectively). We have reciprocal operating agreements with 72 countries. We have third-party traffic agreements with 42 countries. We have both reciprocal operating and third-party traffic agreements with 35 countries.

One set of agreements (reciprocal operating) permits USA amateurs to operate in foreign countries, and it permits amateurs of those countries to operate in this country. This is called *reciprocal operating*. In neither case are amateurs required to pass tests to operate in the other country; all nations' licenses are accepted as proof of operating qualification. This reciprocal operating system is greatly appreciated by active amateurs who visit other countries.

The other set of agreements (third-party traffic) concerns the exchange of noncommercial (personal) traffic between people in different countries (via amateur radio), which is greatly appreciated as a person-to-person service.

Table I shows the countries with which we have reciprocal operating (R) and/or third-party traffic (T) agreements. The most commonly used callsign prefixes are included, but many other callsign prefixes are used on the air.

Reciprocal Operating And Licensing

The FCC only issues reciprocal operating permits to visiting alien amateur radio operators who are licensed by (and are citizens of) the indicated countries. Alien amateurs may apply for a permit to operate from any area where amateur radio is controlled by the FCC. USA citizens are not eligible to receive an FCC-issued reciprocal operating permit. Similarly, an alien holding a USA amateur radio license is not eligible to receive an FCC-issued reciprocal operating permit. If an alien amateur holds an FCC-issued reciprocal op-



This is Marvin Miller, VE5ADO, of Regina, Saskatchewan. This Canadian has been an amateur radio operator for ten years and he holds the Advanced class license. Marvin is active on the U.S.A. Novice code bands.

erating permit, it is superseded by whatever FCC-issued USA amateur radio license she/he obtains. In this case, the alien's operating privileges are no longer related to her/his home country's privileges; they are the privileges which are related to the class of FCC-issued amateur license she/he earned. Foreign amateurs are encouraged to obtain USA licenses, if they are going to be in this country a long time. Except for representatives of foreign governments, anyone may apply for a USA amateur radio license, as issued by the FCC. Such applicants simply have to pass the same examination elements that are administered to Americans.

Alien amateurs may apply for a permit by completing an FCC form 610-A, attaching a copy of her/his (foreign) valid amateur license, and mailing these items to the Federal Communications Commission, P.O. Box 1020, Gettysburg, Pennsylvania 17326, USA. Some USA missions (in foreign countries) have the FCC form 610-A, and it can be obtained by writing to the FCC, 1919 M Street NW, Washington, DC 20554, USA. An FCC-issued permit is valid for one year, until the alien's home country amateur license expires, or until the alien obtains a USA am-

ateur license, depending on which occurs first.

Operating privileges of a permit holder are detailed in 97.107 of the FCC Rules and Regulations. Part 97 governs the USA Amateur Radio Service. Basically, the permit holder is limited to the operating privileges that apply to her/his class of license in her/his home country. However, FCC regulations must be obeyed and USA Extra class operating privileges may not be exceeded by reciprocal licensees, regardless of the privileges existing in their home countries. As an example of this, reciprocal licensees are not allowed to transmit (on voice) in the 14,100 to 14,150 kHz portion of the 20 meter DX voice segment. Reciprocal permit holders do not all have Extra class privileges. As an example, a permit holder who has a home country license equivalent to the USA General class license is restricted to the operating privileges of a USA General class licensee. Violations should be reported to the FCC.

The exact callsign shown on the permit must be used by the reciprocal licensee when identifying her/his station. The appropriate USA letter-numeral prefix precedes the reciprocal licensee's home callsign. As an example, if CP5WDX is op-

45527 Third Street East, Lancaster, CA 93535-1802

Country	Prefix	R	T	Country	Prefix	R	T
Antigua and Barbuda	VP2A	*	*	Mexico	XE		*
Argentina	LU	*	*	Monaco	3A	*	
Australia	VK	*	*	Netherlands	PA	*	
Austria	OE	*		Netherlands Antilles	PJ2-9	*	
The Bahamas	C5A	*		New Zealand	ZL	*	
Barbados	8P5	*		Nicaragua	YN	*	*
Belgium	ON	*		Norway	LA	*	
Belize	VP1	*	*	Panama	HP	*	*
Bolivia	CP	*	*	Paraguay	ZP	*	*
Botswana	A22	*		Peru	OA	*	*
Brazil	PY	*	*	Philippines	DU	*	
Canada	VE	(1)	*	Portugal	CT1/CT4	*	
Chile	CE	*	*	St. Kitts & Nevis Islands	VP2K		*
Colombia	HK	*	*	St. Lucia	J6	*	*
Costa Rica	TI	*	*	St. Vincent & The Grenadines	VP2S	*	*
Cuba	CO		*	Rep. of Seychelles	S79	*	
Cyprus	5B	*		Sierra Leone	9L1	*	*
Denmark	OZ	(2)		Solomon Islands	H44	*	
Dominica	J73	*	*	Republic of South Africa	ZS	*	
Dominican Republic	HI	*	*	Spain	EA1-EA5/EA7	*	
Ecuador	HC	*	*	Suriname	PZ	*	
El Salvador	YS	*	*	Swaziland	3D5		*
Federated States of Micronesia	V63		*	Sweden	SM	*	
Fiji Islands	3D2	*		Switzerland	HB9	*	(4)
Finland	OH	*		Trinidad & Tobago	9Y4	*	*
France	F	(3)		Tuvalu Islands	T2	*	
The Gambia	C53		*	United Kingdom	G/GA/GI/GM/GW	(5)	(6)
W. German Federal Republic	DL	*		Uruguay	CX	*	*
Ghana	9G1	*	*	Venezuela	YV	*	*
Greece	SV	*	*	Yugoslavia	YU	*	
Grenada & Dependencies	J3	*	*				
Guatemala	TG	*	*				
Guyana	8R1	*	*				
Haiti	HH	*	*				
Honduras	HR	*	*				
Hong Kong	VS6	*					
Iceland	TF	*					
India	VU	*					
Indonesia	YB	*					
Republic of Ireland	EI	*					
Israel	4X	*	*				
Italy	I	*					
Jamaica	6Y5	*	*				
Japan	JA	*	*				
Jordan	JY	*	*				
Kiribati	T3	*					
Kuwait	9K2	*					
Liberia	EL	*	*				
Luxembourg	LX	*					

Notes

(1) No reciprocal operating permits are required between Canada and the United States.

(2) Also applies to Greenland.

(3) Also applies to French Guiana, French Polynesia (Gambier, Marquesas, Society, and Tubal Islands, plus Tuamotu Archipelago), Guadeloupe, Ile Amsterdam, Ile Saint-Paul, Iles Crozet, Iles Kerguelan, Martinique, New Caledonia, Reunion, Saint Pierre and Miquelon, plus Wallis and Futuna Islands.

(4) USA/ITU agreement authorizes third-party traffic to be exchanged between the USA and 4U1ITU (Geneva, Switzerland) and 4U1VIC (Vienna, Austria).

(5) Reciprocal licensing also applies to Bermuda, British Virgin Islands, Cayman Islands, Falkland Islands, Gibraltar, Montserrat, Saint Helena, plus Turks and Caicos Islands.

(6) Third-party traffic may be exchanged with United Kingdom special events stations (GB prefixes), except stations with the GB3 prefix.

Table 1- Countries with which we have reciprocal operating (R) and/or third-party traffic (T) agreements.

erating in California, his identification is W6/CP5WDX (code) or W6-stroke (or slash) -CP5WDX (voice). The entire call-sign must be used when identifying a station. In this example, do not shorten it to W6/CP5ED. The reciprocal licensee is required to indicate (in English) the approximate geographic location (city and state, etc.) from which she/he is operating. This information is required at least one time during each contact. Canadian amateurs still identify the original way with the American indicator following their call-sign, such as VE7SR/W6.

USA amateurs who want to obtain reciprocal operating permits from the countries with which we have such agreements should request the appropriate forms from officials of those coun-

tries. USA-based foreign embassies and legations may have the required forms; if not, they should be able to provide information about where such forms can be obtained. Forms may also be obtained by requesting them from the amateur radio licensing authority of the country you intend to visit. Information on this subject is available from the FCC, Personal Radio Branch SSD/PRB, Room 5322, 1919 M Street NW, Washington, DC 20554 (telephone 202-632-4964). The ARRL has a reciprocal licensing expert who provides names, call-signs, addresses, telephone numbers, and related data in response to requests for reciprocal licensing information received from American amateurs. The ARRL's address is 225 Main Street, Newington, CT 06111.

When USA amateurs operate (as reciprocal licensees) in other countries, they must abide by the regulations which apply to those countries. ITU Region II (North, Central, and South Americas) regulations do not go with you when operating in ITU Region I (Europe and Africa) or ITU Region III (Australasia and the rest of the Southern Hemisphere). All licensees must abide by the radio regulations of the International Telecommunications Union (ITU).

Third-Party Traffic

Third-party traffic involves at least one person in addition to the operators who are handling the traffic. Third-party traffic includes message traffic handled directly

between amateurs, plus telephone (fone) patch traffic, in which people (not just amateurs) speak to each other directly (normally using the telephones in their homes) via amateur radio. International third-party traffic must be in English (voice), or using the International Morse code for code traffic. Third-party traffic must be of a personal nature. Business messages are prohibited, except during emergencies. Amateurs are not allowed to accept money, services, or goods in exchange for handling third-party traffic.

Only personal messages may be handled by amateur radio operators under normal circumstances. These messages must be such that they would not normally be sent by any existing means of electrical communications, or would not be sent except for an amateur radio station being available.

The call signs of both (foreign and American) stations must be transmitted to identify stations handling third-party traffic. Your own call sign (alone) does not suffice in this case.

Expanding The Opportunities

The US Government is willing to establish reciprocal operating and/or third-party traffic agreements with other countries. Such agreements are negotiated through

the U.S. Department of State. The support of the other country's amateurs is necessary to initiate meaningful negotiations. It is best to have action initiated by the country seeking to reach an agreement with the U.S.A., since their cooperation is essential in getting the task completed. Our government is receptive to providing draft notes, which could form the basis of such agreements, to any interested country. Notes can be requested from the U.S. Department of State or from the Federal Communications Commission. The FCC address is Washington, DC 20554, and requests should be directed to the Chief of the Spectrum Engineering Division. DX amateurs are urged to initiate appropriate action in their countries, if they do not presently have both agreements with the USA. American amateurs could help expand these lists by discussing these agreements with foreign amateurs, particularly when visiting their countries.

Photographs Wanted

Photographs of new amateurs in their shacks provide introductions to a few of the newer amateurs. Photograph size is unimportant, but good definition, contrast, and subject matter are important.



Fourteen-year-old Darren Higgins, KB2HNY, of Lake Carmel, New York has worked amateurs in 49 states (no Vermont) and 62 countries. He is an honor student at Carmel High School, where he intends to have a Novice licensing course started soon. He shares a station with his brother (Ray, N2IWE). Their station includes Kenwood 140 and 940 transceivers, a 4-element triband Yagi-Uda, a G5RV, and a Butternut HV-6. Darren is getting ready to take the General test.

Color pictures can be used, but black-and-white photographs are preferred. Operating activities and achievements, plus a self-introduction, are needed with each picture. Send an SASE if a picture must be returned. A free one-year CQ subscription (or renewal) is awarded to the one amateur whose picture I select as the winner for the month. If you are a subscriber, please enclose the mailing label (or copy) from your latest CQ issue. One award is made each month, no matter how many photographs are printed. DX amateurs, who frequently work the American Novice bands, are also urged to submit photographs.

Printed Aids

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

73, Bill, W6DDB

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	70-MBM48	95.00
	70-MBM88	135.00
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1268 MHz	1268-LY	65.00
1296 MHz	1296-LY	65.00
1691 MHz	1691-LY	75.00

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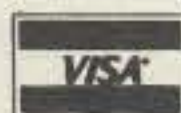
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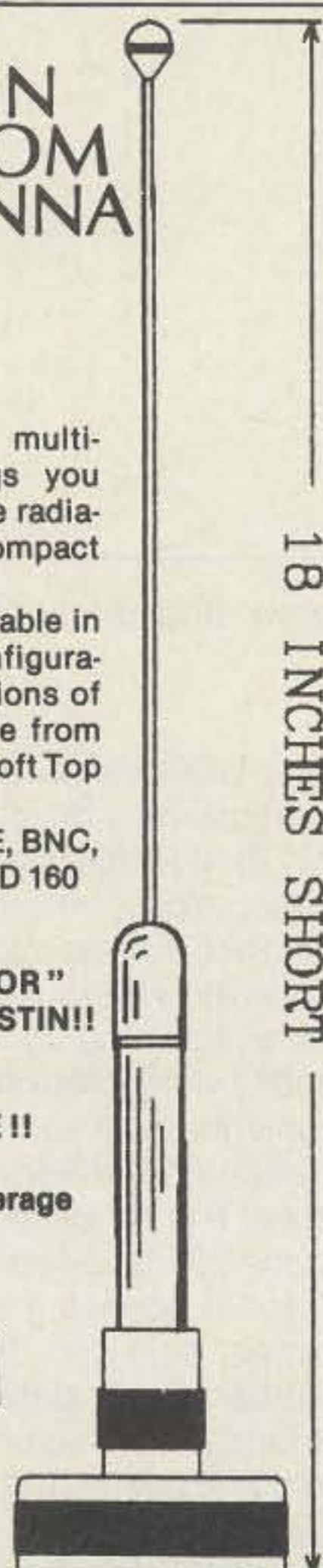
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CIRCLE 73 ON READER SERVICE CARD

NEWS OF COMMUNICATION AROUND THE WORLD

Two New Countries

In November the DX Advisory Committee (DXAC) recommended that two countries be added to the DXCC country list: Conway Reef 3D and Banaba Island T33. In December the ARRL Awards Committee at ARRL Headquarters voted unanimously to accept that recommendation. QSL cards for Conway Reef and Banaba Island may be submitted for DXCC credit on or after March 1, 1990.

With these two additions the DXCC country count stands at 323. The minimum number of countries a DXCC must have confirmed to be on the DXCC Honor Roll is 314. (For CW DXCC, the top of the Honor Roll now stands at 319, with a minimum of 310 countries confirmed to get on the CW Honor Roll. Four DXCC countries have not had an accredited CW operation since the start of CW DXCC on January 1, 1975 and thus are not yet included in the Honor Roll determination. These four countries are Albania ZA, Burma XZ, South Yemen 7O, and Yemen 4W. When a CW operation from one of these countries is accredited by the DXCC desk, the top of the CW Honor Roll and the minimum number to get on will both increase.)

At the same time as the DXAC voted to add Conway and Banaba to the DXCC list, they voted against adding several other islands to the list. The DXAC members voted overwhelmingly against new DXCC country status for Frederick Reef off of Australia, and Guemes and Tatoosh Islands off of Washington state. The committee also declined to accept the new country petitions for the Austral and Marquesas island groups of French Polynesia. The latter vote was six in favor and ten against. The majority of the committee apparently did not feel that French Polynesia was a DXCC country by reason of government, and thus Austral and Marquesas did not fall under the DXCC country criterion point 2.

The DXAC vote lays to rest the fear among some DXers that dozens of new countries would be added to the DXCC list, by virtue of the changes in the DXCC rules in January 1988. The new rules did produce a flood of new country applications, but these have produced only three new DXCC countries in the past two years—hardly a flood.

The DXAC's review of new country ap-



Jon, K7ZA (left), and Len, KH0AC, at John's shack during Len's visit to the States last year. John handles Len's QSLs.

plications is far from over. As 1989 drew to a close, the DXAC was still considering adding Walvis Bay ZS9 to the list, and the committee had received a petition for new country status for the Puyallup Tribe of Indians, near Tacoma, Washington. Two previous petitions—one for an Amazon, Brazil state, and one for the Basilica del Santo in Italy—were put on the back burner pending receipt of some information requested by the DXAC.

Puyallup Tribe of Indians

At first glance the petition for separate DXCC country status for an American Indian tribe seems ridiculous. After all, American Indians are US citizens, and Indian tribes have few of the attributes of sovereignty that we associate with separate countries.

Such was not always the case, however. In the eighteenth century the British treated the American Indian tribes as sovereign nations and negotiated treaties with several of them. After the American Revolution led to the establishment of the United States, the US continued this practice and signed its first treaty with the Delaware tribe in 1778. Unfortunately for the Indians, the United States didn't live up to its obligations under those treaties. The relationship between the US and the Indian tribes continued to become more and more one-sided in favor of the US, until the US Supreme Court in 1831 ruled that Indians were no longer to be treated as independent nations, but rather as 'dependent domestic nations,' subject to regulation by the US

government. In 1871 the US Congress terminated the use of treaties with the Indians and assumed direct control over the tribes. If there had been no changes in the relationship between the Indian tribe and US government since that time, there would be no question that an Indian tribe could not possibly be a separate country for DXCC purposes.

However, in the 1970s some Indian tribes began a campaign to recover some of their lost sovereignty. A more sympathetic US Supreme Court reversed some earlier decisions, and upheld some Indian claims for payment for lost land, favorable fishing rights, and water and mineral rights. The Puyallup Tribe was among the first to successfully negotiate a land settlement with the US government (1989).

In October 1989 a group of Washington state amateurs received permission to operate from the Puyallup Tribe of Indians' land outside of Tacoma. They ran a Field Day type of operation as K7SS/PTI. One month later they submitted a petition for new DXCC country status to the DXAC based on the sovereignty of the tribe. A detailed analysis of the petition and the appropriate DXCC country criteria appears in the January 1990 issue of *The DX Magazine*. In brief, the analysis suggests that the DXAC will not recommend new country status for the tribe. If the DXAC didn't feel that French Polynesia had enough sovereignty to qualify as a separate DXCC country by reason of government, the committee will probably not feel that the Puyallup Tribe is a country by reason of government. (For the copy of *The DX Magazine's* analysis of the PTI petition, send a self-addressed, stamped envelope and 25¢ to P.O. Box 50, Fulton, CA 95439.)

ARRL Awards Committee

There was one fly in the ointment of the two new DXCC countries. For the second time, the ARRL Awards Committee erred in the effective date for a new DXCC entity. When Rotuma was added to the DXCC list, the Awards Committee wouldn't go along with the DXAC recommendation for a start date concurrent with the 3D2XX DXpedition. Without looking at the DXCC country criteria, the Awards Committee wanted a November 15, 1945 start date, when most DXCC credits begin. Out-going DXAC chairman John Parrott,

The WPX Program

Mixed

1420 JF1CPH 1422 JA4XZR
1421 YU2CUV 1423 WA2YEX

SSB

2105 K9LJN 2111 K2YOF
2106 DU1JZ 2112 I8RFD
2107 VK4AI 2113 KW0U
2108 N1GRM 2114 5Z4BH
2109 EA7HO 2115 KF7RU
2110 EA7DHF 2116 N7JXS

CW

2608 KH6IHY 2610 CT1CWT
2609 I8RFD

VPX

261 KCA6RC

WPX

253 KA1RJI

Endorsements

Mixed: 450 YU2CUV, WA2YEX, 500 WA2YEX, 550 WA2YEX, 600 WA2YEX, 650 DE0DAQ, 700 DE0DAQ, 750 NX9H, DE0DAQ, IK2ILH, 800 NX9H, 850 NX9H, 900 NX9H, 1000 I5AFC, 1350 K4RDU, 1400 K4RDU, 1550 WE2L, 1650 W4UW, 1900 I1EEW.

SSB: 350 K9LJN, VK4AI, EA7DHF, EA4DKZ, EA3FHT, I8RFD, K4RDU, KW0U, 5Z4BH, KF7RU, 400 K9LJN, VK4AI, EA7DHF, EA4DKZ, EA3FHT, I8RFD, 5Z4BH, 450 K9LJN, VK4AI, EA7DHF, EA4DKZ, EA3FHT, I8RFD, 500 K9LJN, VK4AI, EA4DKZ, EA3FHT, I8RFD, 550 K9LJN, VK4AI, EA4DKZ, EA3FHT, I8RFD, 600 K9LJN, KA9MOM, VK4AI, EA4DKZ, EA3FHT, I8RFD, 650 K9LJN, VK4AI, EA3FHT, I8RFD, 700 K9LJN, VE7AVC, EA3FHT, I8RFD, IK2AEQ, 750 K9LJN, VE7AVC, W0CON, EA3FHT, I8RFD, KF4FP, 800 K9LJN, VE7AVC, EA5FCO, I8RFD, 850 K9LJN, VE7AVC, KC9DS, I8RFD, 900 K9LJN, VE7AVC, I8RFD, G3YBH, 950 K9LJN, I8RFD, K3IXD, 1000 K9LJN, I8RFD, 1050 K9LJN, I8RFD, 1100 K9LJN, I8RFD, 1150 K9LJN, I8RFD, 1200 K9LJN, I8RFD, 1250 I8RFD, 1300 KD9OT, I8RFD, 1350 I8RFD, 1400 I8RFD, 1450 EA8AKN, I8RFD, 1500 EA8AKN, I8RFD, WE2L, 1550 EA8AKN, I8RFD, 1600 EA8AKN, I8RFD, 1650 I8RFD, I1EEW, 1700 I1EEW, 3000 ZL3NS.

CW: 350 DL1FU, OZ1JNR, I8RFD, CT1CWT, HB9ARF, 400 OZ1JNR, I8RFD, CT1CWT, HB9ARF, W4UW, 450 OZ1JNR, I8RFD, CT1CWT, HB9ARF, W4UN, 500 OZ1JNR, I8RFD, CT1CWT, 550 OZ1JNR, YV5BHI, I8RFD, CT1CWT, 600 OZ1JNR, YV5BHI, I8RFD, CT1CWT, 650 YV5BHI, I8RFD, CT1CWT, 700 I8RFD, CT1CWT, W9IAL, I1EEW, 750 I8RFD, CT1CWT, 800 I8RFD, CT1CWT, KS3F, 850 I8RFD, CT1CWT, IK3GER, 900 I8RFD, 950 I8RFD, OZ4RS, 1000 K9UQN, 1050 AK9Z, 1150 K4RDU, 1200 K4RDU.

10 Meters: K9LJN, KD9OT, K2YOF, OZ4RS, 5Z4BH
15 Meters: K9LJN, IK2ILH, DE0DAQ, 5Z4BH
20 Meters: K9LJN, KH6IHY, KW0U
40 Meters: K9LJN
80 Meters: K9LJN, DL8AAV, G3YBH

Asia: K9LJN, DU1JZ
Africa: K9LJN, I5AFC
No. America: K9LJN, KW0U
So. America: K9LJN
Europe: K9LJN, DL8AAV
Oceania: K9LJN

Award of Excellence Plaque Holders: VE7WJ, VE7IG, N2AC, W9NUF, N4NX, SM0DJZ, DK5AD, WD9IIC, W3ARK, LA7JO, VK4SS, K6JG, N4MM, I8YRK, W4CRW, SM0AJU, K5UR, K6XP, N5TV, K2VV, VE3XN, W6OUL, DL1MD, DJ7CX, DL3RK, WB4SIJ, SM6DHU, N4KE, I2UIY, DL7AA, ON4QX, W8YTM, YU2DX, OK3EA, I4EAT, OK1MP, N4NO, ZL3GO, VK9NS, DE0DXM, DK4SY, UR2**, AB90, FM5WD, I2DMK, W4BOY, I0JX, SM6CST, VE1NG, I1JQJ, WA1JMP, PY2DBU, H18LC, KA5W, K0JN, W4VQ, KF20, K3UA, HA8XX, HA8UB, W8CNL, K7LJ, W1JR, F9RM, W5UR, WB8ZRL, SM3EVR, CT1FL, K2SHZ, UP1BZZ, W8RSW, WA4QMO, EA7OH, K2POF, DJ4XA, IT9TQH, W8ILC, K2POA, N6JV, W2HG, ONL-4003, VE7DP, K9BG, W5AWT, KB0G, HB9CSA, F6BVB, W1BWS, YU7SF, G4BUE, N3ED, DF1SD, K7CU, I1POR, LU3YLW4, NN4Q, KA3A.

Award of Excellence Plaque Holders with 160 Meter Endorsement: W8ILC, W1BWS, NN4Q, G4BUE, LU3YLW4, I4EAT, VE7WJ, W9NUF, N4NX, VK9NS, DE0DXM, VE7IG, K9BG, AB90, FM5UD, SM0DJZ, DK5AD, SM6CST, I1JQJ, W3ARK, H18LC, KA5W, UR2**, VE3XN, K6XP, LA7JO, W4VQ, K6JG, K3UA, HA8UB, W4CRW, N4MM, K7LJ, SM0AJU, KF20, SM3EVR, K5UR, UP1BZZ, OK1MP, N5TV, K2POF, W8CNL, DJ4XA, IT9TQH, DL9RK, N6JV, ONL-4003, W1JR, W6OUL, W5AWT, KB0G, F6BVB, W4BOY, YU7SF, W5UR, N4NO, DF1SD, K7CU, I1POR, W8RSW, N4KE, I2UIY.

Complete rules and application forms may be obtained by sending a business-size, self-addressed, stamped envelope (foreign stations send extra postage if air-mail desired) to CQ WPX Awards, P.O. Box 1351, Torrance, CA 90505-0351 U.S.A.

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|----------------|-----------------|
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| 2. UQ1GXX, 199 | 14. AA4V, 199 |
| 3. W7OM, 199 | 15. K2UU, 199 |
| 4. W0JLC, 199 | 16. YU2CBM, 199 |
| 5. N2MF, 199 | 17. HA8XX, 198 |
| 6. SP9PT, 199 | 18. NA0Y, 198 |
| 7. NY2E, 199 | 19. K7UR, 198 |
| 8. K9YRA, 199 | 20. PY7ZZ, 198 |
| 9. K5UC, 199 | 21. K6SIK, 198 |
| 10. K8EJ, 199 | 22. I8IGS, 198 |
| 11. N2MF, 199 | 22. VE7DX, 198 |
| 12. K9TSQ, 199 | 23. W0PGI, 198 |

623 Stations have attained the 150 Zone level, as of December 1, 1989.

Applications and reprints of the latest rules may be obtained by sending a self-addressed stamped envelope (65 cents) size 4 1/2 x 9 1/2 to the WAZ Manager, Jim Dionne, K1MEM, 31 De Marco Rd., Sudbury, MA 01776. Applicants should include sufficient postage for safe return of their QSL cards. The processing fee for all CQ awards is \$4.00 for subscribers and \$10 for non-subscribers. In order to qualify for the subscriber rate, please enclose your latest CQ mailing label with your application.

W4FRU, went along with the Awards Committee's request, despite the protestations of several DXAC members that the start date was not compatible with the DXCC rules.

Rotuma became a DXCC country by virtue of DXCC country criteria Point 2, in which an island 225 miles or more off shore of a DXCC country established by reason of Government. (This is the same rule under which the Australs and Marquesas did not qualify, as the DXAC felt that French Polynesia was not a DXCC country by reason of government.) Fiji, the parent country of Rotuma, became independent in 1970. Before that time it was a British territory and was not a DXCC country by reason of government. Under the current DXCC country criteria Rotuma could not possibly qualify as a Point 2 country prior to 1970, as Fiji was not a DXCC country by reason of government. The Awards Committee simply

missed this important fact, and insisted on the 1945 start date.

Making a mistake such as this is bad enough, but to repeat it is pure stupidity. The uproar that ensued around the wrong start date for Rotuma should have convinced the ARRL Awards Committee members to pay closer attention to the rules they are getting paid to administer. Instead, they repeated their blunder with Banaba Island.

The Awards Committee once again ignored the DXCC country criteria, and voted to accept for Banaba credit contacts made prior to the independence of Kiribati, the parent country of Banaba. When Banaba, then called Ocean Island, was an important phosphate mining center, several amateurs operated from the island using VR1 callsigns, issued by the British government. Exactly as with Fiji, Kiribati didn't become a DXCC country by reason of government until it became in-

dependent of England in 1979. Before that time it was a DXCC country by reason of separation from the parent country of England. Thus, under the current DXCC rules, contacts with Ocean Island should count for Western Kiribati and not for Banaba.

The chairman of the Awards Committee, John Lindholm, W1XX, was unable to provide any reason for this flaunting of the DXCC rules. When asked if he wasn't repeating the same mistake that the Awards Committee made with Rotuma, Mr. Lindholm replied, "It could be interpreted that way."

It is unfortunate that the paid staff members at ARRL Headquarters don't do their homework as well as the volunteers who serve on the DX Advisory Committee. However, it is worse than unfortunate that those same well-paid staffers repeat stupid mistakes in the administration of the DXCC rules. These errors cheapen the DXCC program, and reduce respect for the award around the world. DXers and the worldwide DX community deserve better treatment.

DX Aids

The fantastic band conditions of sunspot Cycle 22 have attracted many inactive DXers back to the bands. Some of these DXers, who have not been chasing new countries for some years, have worked



Ken Miller, K6IR (left), discusses DX with Bouvet DXpeditioner Jacky Calvo, F2CW. (K6IR photo)

some choice DX in the past, but failed to follow up those contacts with QSLs. Likewise, some DXers didn't bother with cards in the past but are now looking to confirm contacts from ten or more years ago. Several countries such as South Yemen, Iran, Libya, Afghanistan, and many more countries that are extremely rare today were once garden-variety DX.

There are two major problems with trying to confirm these long-ago contacts. First, the DXers in question may have died, and old logs and QSL cards are seldom passed on to someone who can confirm the contacts. Also, finding QSL routes for old contacts can be very frustrating. While there is not much the DXer can do about the first problem (except make a resolution to be more timely with the QSL chores), there is something that can be done about the second problem.

Lars Bohm, SM5CAK, and Osten Magnusson, SM5DQC, have compiled "The Most Complete QSL Manager List Ever Printed." This 200-page list gives QSL managers, changes in callsigns (many ex-Mozambique stations are now in Portugal, for example), and often the call of the operator of a DX station. The information goes back more than 20 years and is extremely accurate. As editor of *The DX Bulletin*, this writer offers a free service to *The DX Bulletin* subscribers to search our records for QSL routes of old contacts. "The Most Complete QSL Manager List Ever Printer" is our most valuable reference by far. DXers can get a copy of the list for their own use from Bill Early, WA9AEA, P.O. Box 401, McHenry, IL 60050 for US \$25 postpaid. Also, subscriptions to SM5CAK's monthly QSL information sheets are available directly from Lars at the address of Stora Angesby, S-59196 Motala, Sweden.

Another interesting addition to the DXer's reference library is a copy of Rich Rosen, K2RR's article reference guide

The WAZ Program

10 Meter Phone

346 TI2KD 348 WB8FIW
347 EA8AKN

15 Meter Phone

311 EA8AKN 315 K4PR
312 W6PGK 316 KA0NNF
313 WA8SXM 317 JA4XZR
314 NY6M/KH2 318 JK3DGX

20 Meter Phone

778 HB9CZW 780 SP9EES
779 I0KDF 781 XE1ILI

10 Meter CW

72 DF3FJ

15 Meter CW

165 WB4TDH

20 Meter CW

348 KK6P 350 WB8FIW
349 N1CYA 351 JA1XFE

ALL BAND WAZ SSB

3443	KE6KT	3458	K7TCL
3444	W6ZZB	3459	HK1LAQ
3445	VK4AI	3460	TI2CC
3446	WA8SXM	3461	DJ9JM
3447	IK2LEY	3462	KJ6GC
3448	KF5YZ	3463	N4QYX
3449	IK1DEA	3464	AA4QE
3450	N6JQL	3465	OA4AV
3451	EA5KB	3466	KJ4WU
3452	EA3DUU	3467	PA3ABH
3453	JR3TOE	3468	KB6KTV
3454	DJ2UP	3469	WA5HWB
3455	9K2AN	3470	F6ELE
3456	IK5DNE	3471	KC6AWX
3457	KB4SSS	3472	I1GJC

Phone/CW

6685	KE6KT	6698	WA4YLD
6686	HK1MY	6699	N4LZL
6687	VE1BN	6700	K4IQJ
6688	JK1UNZ	6701	W7RH
6689	ON5GL	6702	WD9GGY
6690	OH1EB	6703	PA3ABH
6691	EA8BCJ	6704	N7HUS
6692	WB6WXS	6705	VK4DA
6693	SM3KTF	6706	5T5NU
6694	K7TCL	6707	AA4XR
6695	SM0LH	6708	WB5NAA
6696	DJ4GJ	6709	T77C
6697	OE5NNN		

Applications and reprints of the latest rules may be obtained by sending a self-addressed stamped envelope (65 cents) size 4 1/2 x 9 1/2 to the WAZ Manager, Jim Dionne, K1MEM, 31 De Marco Rd., Sudbury, MA 01776. Applicants forwarding QSL cards either direct to the WAZ manager or to a check point should include sufficient postage for safe return of their QSL cards. The processing fee for all CQ awards is \$4.00 for subscribers and \$10 for non-subscribers. In order to qualify for the subscriber rate, please enclose your latest CQ mailing label with your application.

for hams. "From Beverages Thru OSCAR—A Bibliography 1090-1988" lists 80 years of references to articles from almost 300 magazines and publications, including *CQ*, *QST*, *Ham Radio*, 73, and more. The reference guide is on 1200 pages(!) and has more than 52,000 individual references. The guide is on microfiche, which can be read at many libraries. List price is \$75, but for a limited time amateurs can order the microfiche from Chaya Rosen, Didah Publishing, P.O. Box 7368-CQ, Nashua, NH 03060.



Dr. Michel Christ, XE1MD, has more than 300 countries confirmed and has earned the WAZ award on 20 meter CW. He is the author of *The Art of DX*, which is published in Spanish and French. Mic says, "One gets the DX he deserves. The more you learn, the more your score will go up. Make DX with what you have. Skill and knowledge are worth a lot more than brute power. DX would be a very sterile game indeed, if not for the opportunity to make friends on the air."

QSL Notes

Sam, UP2BIM, says his Kaunas DX QSL Service can help with many UP, UQ, UR, and UA2 cards. Contact Sam at Box 787, Kaunas 233041, Lithuania, Europe.

UZ4FWD says the cards from the Ob- last 174 DXpedition (UA8T) won't be out until November 1990, as the cards are being printed in Moscow.

Duane Heise, AA6EE, will confirm direct QSL requests for his **XE2GCK** operation in the CQ WW SSB. No bureau cards.

Larry Brockman, N6AR, operated **HV3SJ** in the CQ WW CW. QSL via the normal route for HV3SJ: I0DUD.

The Callbook address for **VU2SU** is incorrect. Send cards to P.M. Subramaniam, No. 5 Vayu Nagar, Bowebpally, Secundrabad, 500011, India. VU2SU was one of the **VU7NRO** operators, whose cards are finally arriving.

KF3A receives many cards that should be going to QSL manager KE3A. Double-check addresses copied out of the Callbook.

Luis Caamano, HI8LC, will handle QSLs for many of the Dominican Republic Radio Club's special event stations, including **HI1UD**, **HI2UD**, **HI3UD**, **HI3UD/4**, **HI500D**, and **HI7UD**. An exception is **HI9UD**, which can be confirmed via

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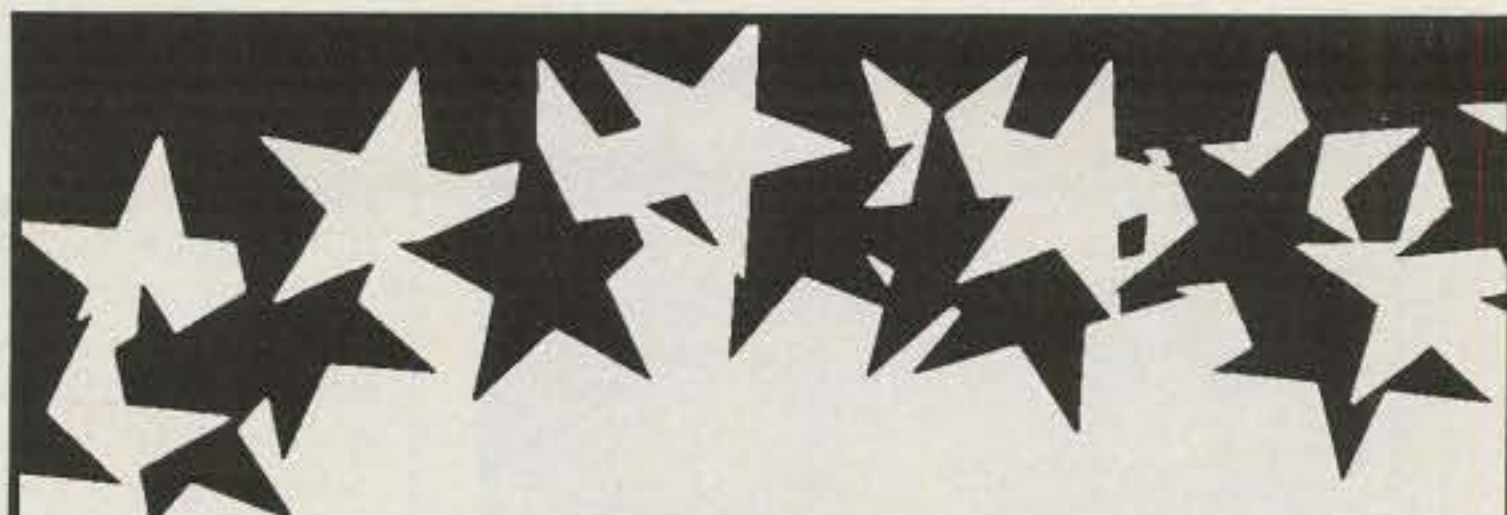
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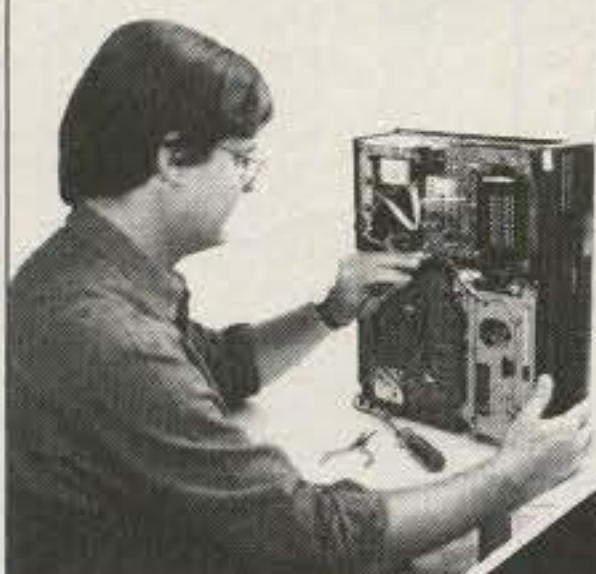
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Alex, 14YNO, was the 233rd DXer to earn the difficult 5 Band WAZ award. Alex has been licensed for 10 years and runs a Kenwood TS-830S into a homebrew 3-500Z amplifier. On DX nets Alex says, "At the beginning of my ham radio career, I thought DX nets were a great idea, but after a while I realized that they only made to boost the enormous ego of the net controller. Therefore I have avoided DX nets ever since."

HI3AMF. Luis will forward QSLs to any HI station. His address is Box 88, Santo Domingo, Dominican Republic.

QSL the **ZS3UN/OH7NRW** Namibia operation via OH7XE, Box 183, SF-70101 Kuopio, Finland.

Dave Burstein, QSL manager for **ZS8MI**, keeps up to date on QSL requests. However, he maintains a duplicate QSL file separate from the original log, and deletes contacts from this QSL file once they are confirmed. This means that you should alert him about any second requests or follow-ups, or your card will come back marked, "not in log."

QSL to **XW8KPL** operation via Mr. Inh Siphachanh, Deputy General Director, Khao Pathel Lao, P.O. Box 310, Vientiane, PDR Laos. No US \$1; use IRCs.

The Botswana QSL bureau is not working. QSL direct. QSL A22AA via Private Bag 38, Selebi-Phikwe, Botswana, for example.

The call **HL9HH** has been re-assigned. QSL contacts after June 1, 1898 via Harry Herr, PSC Box 3695, APO San Francisco, CA 96366, or via Harry's home call: KJ6YR.

Carlos Vega, N4THW, handles QSLs for **D2/LU6ELF**, **T19M**, **T18CBT**, **T18M**, and **TE88M**. His address is P.O. Box 22541, Fort Lauderdale, FL 33335.

The QSL route for the **4U0ITU** operation in the CQ WW CW is via KC7V.

When QSLing any of Mauri Lehtosaari, OH4ML's numerous Pacific operations (**OH4ML/H44**, **3D2ML**, etc.), put the call-sign worked and the mode on the outer envelope. This will speed processing.

Ross Forbes, WB6GFJ, who handles cards for the **3D2XX** Rotuma operation as well as his own **FO0FB** contacts, suffered considerable damage in the October San Francisco earthquake, and will be delayed in answering requests.

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. Total countries are now 321. 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

W9DWQ	321	N4PN	315	N2KW	311	K2OWE	302	N5DX	291	I2QMU	281
K2FL	321	DL7AA	315	OK1MP	311	YU2TW	301	KB0G	291	K7ZR	280
K4CEB	321	N6AV	315	K8PYD	310	I3OBO	301	I8WY	291	I5XIM	280
K2TQC	321	W1NG	315	AA6AA	309	WB4RUA	300	W6YQ	291	G3KMQ	280
SM6CST	321	N4KG	315	K9IW	309	DL6QW	300	WA4JTI	290	W2LZX	280
N4JF	320	W8KPL	314	W9RY	308	NN4Q	300	IT9QDS	290	KB9XG	280
ON4QX	320	K9AB	314	IT9ZGY	308	K3FN	298	N4AH	290	W9NUF	280
K9MM	320	DL8CM	314	W4OEL	307	DJ7CX	297	W1WLW	289	K9TI	280
K6JG	320	N6CW	313	W6SN	307	K8LJG	297	W4BV	289	WA4IUM	280
DL1PM	320	W2FXA	312	KQ9W	307	N8MC	297	K1VHS	289	K9TI	280
K6LEB	319	K6EC	312	SM6CTO	306	WD9IIX	296	G2GM	289	WA4IUM	280
W4BOY	318	YU1HA	312	W9WAQ	305	KD8V	296	K8NA	288	HB9AFI	279
SM3EVR	317	W0IZ	312	W2UE	305	KZ4V	296	G2FFO	287	KA2DIV	279
N6AR	317	K3UA	312	K9BWO	305	W1WAI	295	W9SC	287	W8YTM	278
W6PT	316	DJ1XP	311	AB4H	304	W6DN	295	W8YTM	287	DL1OT	277
K4XO	316	W6ID	311	WD9IIC	303	N5FW	294	DJ2PJ	286	K4JLD	277
N4MM	316	K9QVB	311	W0HZ	303	IT9TQH	294	K2JF	283	KA3R	276
DL3RK	316	W0SR	311	WA8DXA	302	WA4DAN	294	JH1VRO	282	NS7Z	276
K1MEM	316	EA2IA	311	W7CNL	302	K4CXY	292	W3BBL	282	K4SE	275
										F3TH	275

SSB

K2FL	321	I0AMU	316	9H4G	312	K4RIG	305	K9SM	298	AB9E	287
W6EUF	321	I8ACB	316	W4UNP	312	K8ZZU	305	I8LEL	298	W9SC	287
W4UG	321	K8PYD	316	KC8EU	312	I4WZK	305	JH4PRU	298	PA0XPQ	287
VE1YX	321	K4XO	316	NA5W	312	SM6CST	305	EA9IE	298	I2EOW	287
K6WR	321	OA4OS	316	W8ILC/QRp	312	KD8V	304	XE1HI	298	N8BJQ	286
EA4DO	321	W8JXM	316	I2MQP	312	KC8YM	304	K5DUT	297	N3ARK	286
VE3MR	321	N4KG	316	NN4Q	312	I1POR	304	HP1JC	297	N9CPW	286
DL9OH	321	A18S	316	KR9O	312	W6MFC	304	YU7KV	297	K9MNT	286
I8AA	321	N6AHU	316	W4SSU	311	KB0SY	304	XE1OW	297	T12JJP	286
YU1HA	321	W0SR	316	K6EC	311	XE1KS	303	WD9GOV	297	IK7DBB	286
I0ZV	321	VE3MRS	316	K8NA	311	W2LZX	303	KB1JU	297	KB5RF	285
OZ3SK	321	WB1DQC	316	NJ0C	311	KB0U	303	WB3GPR	296	KF5AR	285
N4JF	320	VK4LC	316	W2CC	311	K0GT	303	KB3KV	296	KC7EM	284
F9RM	320	T12CC	316	I8XTX	311	G4ADD	303	I0SGV	296	KR9F	284
W9DWQ	320	G4CHP	316	WA4DAN	311	W0ULU	303	K8NWD	296	WB3HAZ	283
T12HP	320	KZ2P	316	K9HQM	311	W4BOY	303	KB0G	296	VE3MV	283
W4DPS	320	XE1AE	315	AG9S	311	K1MEM	302	W0IYR	295	ZP5JCY	283
W0YDB	320	I8YRK	315	KB4HU	311	N5FG	302	KK0C	295	I4CSP	283
K6YRA	320	I8KDB	315	DK2BL	310	W6FET	302	G3XTT	295	I8DVJ	283
I4LCK	320	K9LKA	315	AA6AA	310	I3OBO	302	VE3XO	295	YB3CEV	283
ZL3NS	320	ON5KL	315	WA4JTI	310	K9UAA	302	K13L	295	AE2B	282
4Z4DX	320	OZ8BZ	315	AB9O	310	KP4EQF	302	I3ANE	295	A19R	282
OK1MP	320	K9AB	315	W4UW	310	N5FW	302	I7UNX	295	TG9EP	282
DJ9ZB	320	K1UO	315	KU9I	310	I5EFO	302	VE3DLR	295	VE3NUP	282
KS2I	320	W7OM	315	N6AHV	310	XE1MDX	302	K4JLD	295	N1ALR	282
YU1AB	320	YV5DFI	315	KB9OC	310	WB4PUD	302	W00BNC	294	PY2DBU	281
VE3GMT	320	KB8DB	315	W8IMZ	310	VE2PJ	302	I5BDE	294	NP4CC	281
PY1APS	320	VE7DX	315	K1MIZ	310	WA3HUP	301	WB3CQN	294	NX0I	281
W3GG	320	W9RY	315	I2QMU	310	VE3FJE	301	KB8O	294	G4FAM	280
W4EEE	320	I4EAT	315	NY5L	310	WB4NDX	301	K4SE	293	KU9Z	280
I4ZSQ	320	NJ2C	315	IV3YRN	310	YU2TW	301	KC8JH	293	XE1XM	280
YV1KZ	320	VE3XN	314	I8KCI	310	N4CRU	301	A15I	293	W9VA	280
ZS6LW	319	YS1RRD	314	XE1OX	310	KZ0C	301	W9NUF	293	KB5DN	279
W3AZD	319	K8LJG	314	N4PN	309	N8BKF	301	KD5ZM	293	EA6DE	279
N4MM	319	K3UA	314	WD9IIX	309	WT4T	301	WB6OKK	293	JH8NYK	279
ZL1AGO	319	I2LLD	314	K9QVB	309	KB2HK	301	W5LLU	293	KX5V	279
K9MM	319	W1NG	314	K4CXY	309	K7LAY	301	VE6PW	293	WN5K	279
N7RO	319	W1LOQ	314	W6NLG	309	KB9KD	301	T12LA	293	K4BYK	278
W0SFU	319	SM4CTT	314	VK4VC	308	K2JF	301	WA4LOF	292	VE3IUE	278
K6JG	319	W6SN	314	YV5AIP	308	WE2L	301	AC0A	292	DF6EX	278
OZ5EV	319	WB4UBD	314	N6AV	308	KE4VU	301	VE3FEA	292	KG9N	278
IT9ZGY	319	K9IW	314	A18M	308	VE4AT	300	VP9CP	292	I8WYD	278
W2SUA	319	N2KW	314	NS7Z	308	SV8CS	300	W8LKG	292	WB0UFL	277
VE2WY	319	W7FP	313	YV1AJ	308	G4GED	300	SV1JG	292	W4PTT	277
W9JT	318	EA4LH	313	K8CMO	308	WB5TED	300	W8YTM	292	W00DMN	277
W9SS	318	W8PCA	313	KS0Z	308	I2ZGC	300	VE3IPR	291	K8YVI	277
W4NKI	318	N2SS	313	I0MBX	307	NW5K	300	W4JFE	291	HK6BER	277
DL6KG	318	OE2EGL	313	KV2S	307	WB6GFJ	300	DU9RG	291	N0AMI	276
OE3WWB	318	ZL1BIL	313	VK3JF	307	JH1VRO	300	XE1CI	291	N7ASL	276
K5OVC	318	K2JLA	313	VE4SK	307	WB6PSY	300	KB2MY	291	WA4OPW	276
YS1GMV	318	WZ4I	313	KB3OQ	307	IT9TQH	300	ZL1BOQ	291	KC2RS	276
W8ILC	318	IT9TGO	313	KA9ABC	307	K4LR	300	KB7VD	291	WA9IVU	276
N6AR	318	K0GT	313	W4UNP	307	KA3HXO	300	K9TI	291	K0HOW	276
KM2P	318	W2FGY	313	WA2MID	307	IK8BQE	300	KF5DX	291	I2WZX	276
EA2IA	318	G3VOF	313	WA4ECA	307	WA2FKF	300	VE3CKP	290	KC4MJ	276
K9BWO	318	WB3DNA	313	N4KE	306	K1VHS	300	F6BFI	290	KA5YCM	276
DJ1XP	317	WA4WTG	313	KB5FU	306	IK8CNT	300	I4UFH	290	KI4FW	276
KD8VM	317	KQ9W	313	KE3A	306	WA9RCQ	300	W9TA	289	WB1EAZ	275
CT1FL	317	F2MO	312	K3LUE	306	WA4IUM	300	JA5PUL	289	NX4Y	275
N4WF	317	W0SD	312	W6BCQ	306	I8IGS	300	A19U	289	VE7BSM	275
K4PQV	317	K9RF	312	CX4HS	306	WA0TKJ	299	WD9IIC	289	VE5FX	275
WD8MGQ	317	K4MOG	312	WD8PUG	306	I6PLN	299	OK1AWZ	288	W0FF	275
W6DN	317	K9HDZ	312	KE4HX	306	KA8T	299	WA6DTG	288	I8INW	275
VE7WJ	317	LA7JO	312	KZ8Y	305	KB2FC	299	KA9TNZ	288	WB8TLI	275
SV1ADG	317	LU3YL	312	K8VJV	305	KZ4V	299	N6CGB	288		
W9OKL	317	N6OC	312	EA1QF	305	DJ7CX	298	EA3KW	287		

QSL the **R0Y/UA9YX** and **R0Y/RA9YZ** operations from October 9-19 via Oleg Novichkov, Box 1371, Barnaul 656014, USSR, with 2 IRCs or US \$1.

QSL the **ZV7A CQ WW** CW operation via PT7AQ, Box 257, Fortaleza 60001, Ceara, Brazil.

QSL **PJ2U, PJ2/W4JVN, PJ2/WA6VNR, PJ2/WR4S, and PJ2/K4EIH** via Nancy Draheim, NK4U, 3513 Old Post Road, Fairfax, VA 22030, or via the two-letter prefix fourth call area bureau, in Sterling Park, Virginia.

W3ULI says **VS6AAA** can be confirmed

via John Hern, G3NAC, 180 Nuns Way, Cambridge CB4 2NS, England.

KT2D says the QSL manager for **KC4AAA** in 1983 was K9AUB. Maybe he has other logs.

KT2D also found that **KZ5MD** was Les D. King. The latest Callbook shows WD5JDT as Les D. King, with an address of Box 787, Krebs, OK 74554.

W1BWS says that **LX2FT** from 1979 was confirmed by OZ4FT. He also reports that **TF3GN**'s QSL card reads Hall-dor Christensen Alheimem 21, Box 1058, Reyjavik.

QSL Routes

88DB to NA5U
3C8GD to SM9AGD
3C1AE to EA4CJA
3D2ER to FO4LZ
3D2GC to W6GC
3D2KH to K6KH
3D2MI to W6MI
3D2PL to OH4ML
3D2PL to N6DMV
3D2VB to OH3GZ
3D2XV to VK2BCH
3X1SG to ON7GV
4K1F to UA1DJ
4M2BYT to YV2BYT
4N8R to YU1AJI
4S7R0 to DJ9ZB
4U1UN to NA2K
5H3TW to K3ZO
5T5CK to DL7HM
5U7QL to YASME
5V7DP to KA1DE
5W1HK to SM7PKK
5W1HM to JH4IFF
5W1VK to AA4VK
5Z4BH to KE3A
5Z4BI to W4FRU
5Z4FO to KB4EKY
6W1QB to DK3NP
6Y5JH to WA4GAB
7J7AAS to KQ1F
7P8EG to K0JZM
7P8FC to DF3EC
7S4BX to SK4BX
7X4AN to DJ2BW
8P6JW to K2QIE
8P9HT to K4BAI
9H3LP to N6LL
9K2KS to K2LCC
9L1/F6GQN to F6GZA
9M2AX to JA5DQH
9M600 to N2OO
9M62R to WA2HZR
9N1NFO to WB4NFO
9Q5DX to KQ3S
9Q5XX to KC4NC
9X5KP to W4IEN
9X5NH to DJ6EA
A22EC to DF3EC
A35HM to JA1FYS
A35ML to OH4ML
A61AC to N4DW
A61AD to WB2DND
AH6HQ/TJ to AH6HQ
AP2JZB to G9DOO
AZ5D to LUBDZE
BV2A to K2CM
BV2DA to DL7FT
C56/G30XC to G3OXC
C56/OH7XM to OH7XM
C6A/W8LU to W8LU
CE8MYT to CE8ICD
CN2CW to F2CW
CN2DX to F6EEM
CN8FC to WA4QMQ
CT3/D5AL to DF5AL
CT3M to CT3EE
CT3MAW to CT3EE
CT500CQ to CT1REP
D2/LU6ELF to N4TNC
DF3EC/ZS9 to DF3EC
DF5UL/CT3 to DF5UL
DU3/KE9A to WB9YXY
EA9EA to EA7LQ
EK9AYW to UA9YAB
EL2CX to N2AU

EL2FO to KN4F
EL2WK to G0OCA
EU9AYW to UA9YAB
FG5R to W7EJ
F05BI/P to FD6HSI
FR4FD to F6FYA
FR5QT to F5QT
FY5EW to F6BFH
GD4UOL to G4UOL
CWBL to CX4CA
HC2G to HC2SL
HCS/W2JGR to W2JGR
HC8JG to WA6ZEF
HC8U to W6UE
HDSZ to W2JGR
HJ7QMF to HK7DPE
HK8BKX to WB9NUL
HL5BDS to HL1ASS
HL9TG to WA9NTE
HV3SJ to I0DUD
HX8URA to F1KWB
HZ1AB to K8PYD
IV3A to I3MAU
IY4FGM to I4IKW
J6DX to W8UMD
J6L/W8NJR to W8NJR
J6LRT to NC8Q
J6LRU to W8ILC
J6LRV to K6GXX
J6LSC to N9AG
J73Z to J73MH
J79DX to AA5DX
JD1/JA70WD to JH1AJT
JD1YAA to JA1ZTF
JH1MAO/JD1 to JH1MAO
JT/RABAD to RA9YD
JW5NM to LA5NM
JW5QFA to LA1MFA
JW8XM to LA8XM
JW9XG to LA9XG
JY9SR to W3FYT
K4YT/DU1 to K4YT
K9BQL/J6L to K9BQL
KC6AA to KQ1F
KC6IF to KQ1F
KC6MX to KQ1F
KC6X0 to KC1F
KD7P/KH4 to NY6M
KE2AA/KH3 to KE2AA
KE9A/DU3 to WB9YXY
KG4SG to K8BX
KH8AC to K7ZA
KH3/KH8E to K9UIY
KH7/KH6JEB to KH6JEB
KP2A to N6CW
KX6OI to KX6BU
LU1ZL to LU2CN
LX/DL6RAI to DL6RAI
LY2BR to UP2BR
N9AG/J6L to W8UMD
NR3J/HR3 to K9APW
NY6M/KH4 to NY6M
OD5MM to HB9CYH
OD5VT to HB9CRV
OH1EH/CT3 to OH1EH
OH1NOA/CT3 to OH1NOA
ON7YD to WA4DMY
P29KK to VK4AH
P29PL to VK9NS
P29SC to WB9GWB
P40GD to N2MM
P43TH to PA3AVE
PJ4/K3IPK to K3IPK
PJ9W to OH6NU
PY8FC to PY7XC

PY1DFF/PY8F to PY1DFF
PZ29RE to KE0KR
RB5EU/UA8X, RD8D/UZ3QWX to LZ1DVZ
SB1MZ to EA2VG
S92AG to SM9AGD
SN3A to SP3GEM
ST2/G4WYG to G4OHX
SV8MY/8 to K7MO
T28RW to ZL1AMO
T30AC to AA6BB/7
T32BE to WC5P
T32B0 to WD5F
TA3F to DL5CYQ
TI1J to K1AR
TJ1MW to N4MUJ
TJ1RP to VE1CH
TK5E to F6FNU
TK9A to F6FNU
TL8CK to F6EWM
TL8CM to DL8CM
TR8CJ to G3ORC
TR8CR to F6FA
TT8GA to FDXF
TU4DT to K6VNX
TX9LEP to HB9CUY
TZ6PD to KB6ORK
TZ6VV to N0BCD
UBK/UV1POL to UA0KCL
UA10/UAB8DU to RA3SD
UA10T to UB5KW
UA2A0 to UA2FM
UF6FJ to UF6FFF
UF7VWA to RB5IJ
UI9AWX to UA0WW
UJ9JWC to UJ8JMM
US1GB to UK3A
V290A to W7KNT
V31BB to ON4QM
V31MZ to K1MZB
V31TP to WC0W
V47K to W2BP
V47SIX to N4HSM
V63DX to JA7HMZ
V63JC to KC6JC
V63YP to K1XM
V01MQ to V01BS
VP2EM to KV4AM
VP2EXX to KC8JH
VP2V/KG6NI to KV9A
VP5P to WN5A
VP9AD to W3HNK
VP980 to N1AFK
VQ9DM to N5DM
VQ9PN to N4DQY
VS6/K9EL to K9EL
VU2TTC to W8XM
WA3ZXX/KP4 to KP4GY
XE2JZJ to K5SUL
XE2UZL to W6UZL
XF4T to XE2TCQ
XT2KG to YASME
XX9AF to K8CW
XX9JG to KB2XS
XX9KA to KC9V
XX900 to K8CW
YJ8AR to VE7TG
YJ8MDX to KC4PYD
YB1GMV to W3HNK
ZS2/0H2BVI to OH2BVI
ZD7KM to G3JKB
ZD7VC to WT8S
ZF20A to KD6WW
ZF8/ZF2AG to W8AG
ZF8AA to N8AG

ZK1TB to W7TB
ZK2VB to OH3GZ
ZS3/DF3EC to DF3EC
ZS3BI to DF2AL
ZS3UN/OH7NRW to OH7XE
ZS500A to WA3HVP
ZWB to PY7ZZ

Direct QSL addresses (add country name, if not here).
3DABAH to P.O. Box 2726, Mbabane, Swaziland
3DABBK to Box 122, Eveni, Swaziland
5Z4BP to P.O. Box 73-29 Nairobi, Kenya
7X5RK to Asadean, P.O. Box 190, Nbousada, Algeria
9L1CB to Route 11A, Eastburke, VT 05832
9L1DG to Masanga Leprosy Hospital, PMB 814, Freetown, Sierra Leone
BY1QH to P.O. Box 2654, Beijing
BY4CPA to Box 082/013 Shanghai
BY4RB to Box 413, Zhenjiang
BY5RA to Box 730, Fuzhou
BZ1DX to Box 2654 Beijing
BZ10K to Box 2916, Beijing
BZ4RA to P.O. Box 538, Nanjing PRC
CE8OGZ to Juan Galvez, P.O. Box 4178, Valparaiso, Chile
CT500B to P.O. Box 2483, Lisbon, Portugal
FH5EJ to Box 161, Dzauzdi 97710 Mayotte, France
HI8LC to Box 88, Santo Domingo, Dominican Republic
HK8NZI to Box 1019, San Andres, Columbia
HL9HH to APO 3695, San Francisco, CA 96366
HP4/TI2LAC to Luis, Rica 71690, San Jose, Costa Rica
JT1KAI to Box 676, Ulan Bator, Mongolia
KC4USX to Box 700, McMurdo, SF CA 96601
TA3D to Box 863, Izmir
TA5C to Box 210, Garadana City, Turkey
TF6MM to Iansson, P.O. Box 24-IS-780 Hoen
UJ9KWC to Leo, Box 33, Nurek 735300
UL7GD/RZ8F to Box 73, Oskaa 604458
UMBMAA to Box 1100, Frunze, 720020
UMBHW to P.O. Box 947, Frunze 720005
UM8MZ to P.O. Box 1, Suzak 715650, Kirghiz, SSR
UQ1GWW to Box 418, Rica 226001
YJ8NMV to P.O. Box 217, Port Vila Efate Island, Vanuatu
YS3FN to Box 142, San Miguel, El Salvador
Z23PQ to Box 37, Windhoek, Saffin
ZS9A to P.O. Box 2327, Walvis Bay, via South Africa

CQ DX Awards Program

SSB

1733	EA8BLP	1737	VK4LC
1734	TI2CC	1738	I4UFH
1735	WB3KTX	1739	G3VOF
1736	KB0G	1740	WB4UHN

CW

769	YC3KDL	771	K1HDO
770	VE6BML	772	KB0G

SSB Endorsements

320	W4EEE/320	300	WA4IUM/300
320	I4ZSQ/320	275	KB2FC/299
310	YV1KZ/320	275	KB1JU/297
310	EA2IA/318	275	KB0G/296
310	K9BWQ/318	275	W8YTM/292
310	TI2CC/316	275	I4UFH/290
310	VK4LC/316	275	IK7DBB/286
310	G4CHP/316	275	KR9F/284
310	G3VOF/313	275	VE2NU/282
310	WB3DNA/313	275	NX4Y/275
300	KS0Z/308	200	I3ZSX/221
300	KE4HX/306	28 MHz	IK7DBB

CW Endorsements

320	W9DWQ/321	275	W8YTM/287
310	EA2IA/311	275	W3BBL/282
300	K9BWQ/305	200	K1HDO/135
275	W6YQ/291	150	YU3KDL/155
275	KB0G/291		

Total number of active countries is 321. 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 air-mail reply. Please make all checks payable to the awards manager.

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9130	30 meters	9110	10 meters
9120	20 meters	9106	6 meters
9117	17 meters		

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CIRCLE 44 ON READER SERVICE CARD

THE SCIENCE OF PREDICTING RADIO CONDITIONS

Solar Cycle Progress

The Royal Observatory of Belgium, the world's official keeper of sunspot records, reports a monthly mean sunspot number of 173 for November 1989. Daily values ranged from a low of 124 on November 16, 17, and 18 to a high of 236 on November 6th. The median value for November results in a 12-month running smoothed sunspot number of 157 centered on May 1989. The smoothed number is an average of the median values for the past twelve months, and is the basis for measuring the solar cycle.

The Algonquin Radio Observatory at Ottawa, Ontario reports a median level of 231 for the 10.7 solar flux values measured during November. This results in a 12-month running smoothed solar flux number of 209 centered on May 1989.

Cycle 22's Peak?

According to the latest 12-month running smoothed sunspot number reported above, Cycle 22 continues towards a near record level of intensity. Having already reached the 157 mark, it has surpassed in intensity all other recorded solar cycles except Cycles 3, 19, and 21. Cycle 3 reached a peak of 159 in 1778 and Cycle 21 reached its peak of 165 in 1980. Cycle 19 holds the present record as the most intense solar cycle, reaching a peak level of 201 during 1957.

There is, however, a difference of views among the experts as to when the peak of Cycle 22 has occurred or will occur. For examples, according to Dr. A. Koeckelenbergh, the Director of the Royal Observatory of Belgium, the peak may have already taken place! According to his calculations, Cycle 22 reached maximum intensity during September 1989 with an index of 173, and is now declining. He predicts a 12-month smoothed sunspot number of 155 for March 1990.

On the other hand, according to the experts at the National Geophysical Data Center, Boulder, Colorado, the peak occurred during February 1990 with a count of 189 and is now declining. They are predicting a level of 187 for March 1990.

Based upon sunspot number data there appears to be agreement between

LAST MINUTE FORECAST

Day-to-Day Conditions Expected for March 1990

Propagation Index	Expected Signal Quality			
	(4)	(3)	(2)	(1)
Above Normal: 1, 10-11, 24, 26-27, 31	A	A	B	C
High Normal: 2-4, 8-9, 17, 21-23, 25, 29	A	B	C	C-D
Low Normal: 7, 12, 15-16, 20, 28, 30	B	C	D	D-E
Below Normal: 5, 13, 18-19	C	C-D	D-E	E
Disturbed: 6, 14	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 S6, with some fading and noise.

D—Poor opening, with weak signals varying between S0 and S3, and with considerable fading and noise.

E—No opening expected.
3 dB per S-Unit.

HOW TO USE THIS FORECAST

1. Find *propagation index* associated with particular band opening from Propagation Charts appearing on the following pages.
2. With the *propagation index*, use the above table to find the expected signal quality associated with the band opening for any day of the month. For example, an opening shown in the charts with a *propagation index* of 3 will be excellent (A) on the 1st, good (B) from the 2nd to the 4th, fair-to-poor (C-D) on the 5th, and poor (D-E) on the 6th, etc.

Brussels and Boulder that the peak of Cycle 22 has already taken place, even though they do not agree on the date that this may have occurred. Still, scientists at observatories in other parts of the world, basing their findings on solar flux and ionospheric measurements, do not agree.

According to 10.7 cm solar flux data compiled by the National Research Council of Canada at Ottawa, Ontario, peak intensity for Cycle 22 is expected to occur during March or April of 1990 with a 12-month smoothed flux value of 244.

At the Rutherford Appleton Laboratory in Chilton, Didcot, UK, progress of the solar cycle is based upon actual measurements of ionospheric intensity and other parameters. According to a monthly ionospheric derived solar index, the Laboratory forecasts peak intensity for Cycle 22 to occur during April 1990 with a solar index of 168.

While there are some differences of opinion among the experts, all are in

agreement that the peak level of Cycle 22 has either very recently occurred or will do so in a month or so, and that it was the second highest solar cycle in recorded history. Because of the known relationship between sunspot numbers, solar radiation, and the strength of the ionosphere, radio amateurs on the air now are experiencing propagation conditions on the HF bands and on 6 meters better than they have ever been during the history of radio except for year 1957!

March Conditions

During March, it should be a toss-up between 10, 12, and 15 meters for the best DX band during the daylight hours from sunrise to sunset, with 20 and 17 meters not far behind. Unusually good DX conditions are also expected on 6 meters during the daylight hours (see *VHF Ionospheric Openings* section of this column for more details). From sundown to midnight DX honors will likely be shared between 20, 30, and 40 meters, with good openings towards the west and the south also possible on 17 and 15 meters. On days when conditions are High Normal or better, the 12 and 10 meter bands may also remain open towards the south and the west well past sundown. Some fairly good 80 meters openings are also expected during this period, with some 160 meters DX openings also possible. It looks as if DX openings should be possible on all HF amateur bands 10 through 160 meters on many days during March between sundown and midnight!

From midnight to sunrise, best DX bands should be 30, 40, and 80 meters, with openings to many parts of the world also possible on 20 meters. The 160 meter band should also open for DX to many areas of the world during this period.

All in all March looks like a great month for world-wide DX propagation conditions on all amateur HF bands. For more detailed information, refer to the DX Propagation Charts for March, which appeared in last month's column. This month's column contains Short-Skip Propagation Charts which are valid for both March and April 1990, including data centered on Alaska and Hawaii. The Short-Skip charts contain band opening predictions for predominantly one-hop paths, ranging in distance from between

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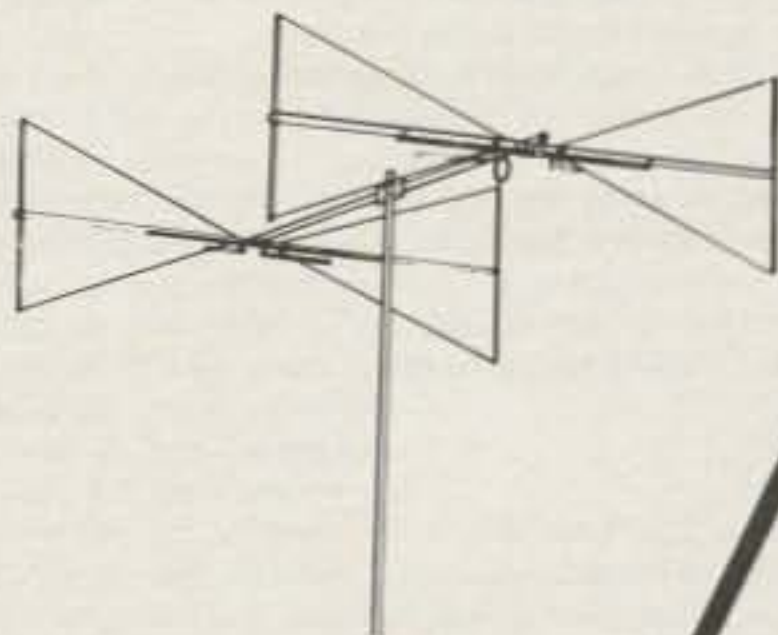
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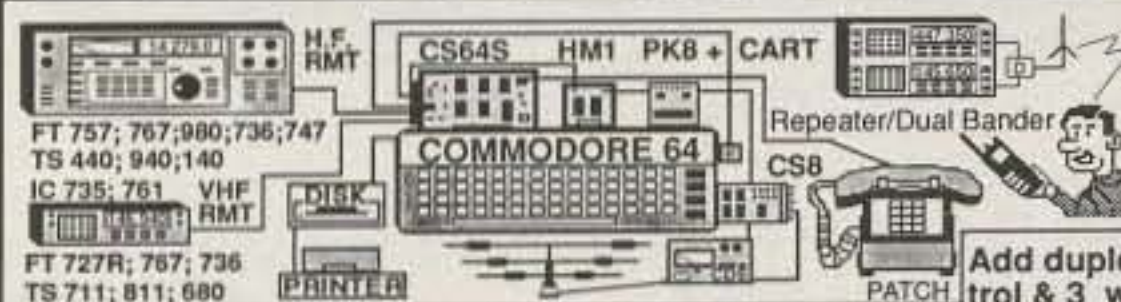


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approximately 50 and 2300 miles. For day-to-day changes in HF propagation conditions expected during March, see the Last Minute Forecast, which appears at the beginning of this column.

Equinoctial Propagation

During most of March and continuing well into April, relatively similar HF propagation conditions exist in the temperate regions of the northern hemisphere (where it is spring) and in the southern hemisphere (where it is fall), as compared to the more extreme conditions that exist when it is summer in one hemisphere and winter in the other. This widespread equalization of ionospheric conditions results from the equinoctial effect, as the sun crosses the equator in its apparent travels into northern skies. Similar conditions occur during September and early October as the sun travels into southern skies. During equinoctial periods DX conditions *between* the northern and southern hemispheres are usually at their best. Exceptionally good inter-continental DX conditions, therefore, are expected this month on all amateur bands from 6 to 160 meters, at appropriate times. Typical of these openings are the paths between the United States and South America, Australasia, and the central and southern regions of Africa, Asia, and Antarctica.

Inter-continental openings on 30, 40, 80, and 160 meters should peak shortly before local sunrise and again at local sunset. Openings on 20 meters should peak twice, first for a period of an hour or two after sunrise and again for an hour or so after sunset. On 6, 10, 12, 15, and 17 meters inter-continental openings should peak during the daylight hours, with signals from an easterly direction strongest an hour or two before noon; openings towards the south are optimum an hour or two after sunrise and again late in the afternoon; and openings towards the west are strongest for an hour before to a few hours after local sunset. During the equinoctial period long-path openings may often be as strong as, if not stronger than, short-path openings, particularly during the sunrise and sunset periods.

VHF Ionospheric Openings

World-wide 6 meter F-layer openings are expected to continue during March.

Openings should be possible from the USA to almost all areas of the world, particularly when conditions are High Normal or better. Signals arriving in the quadrant between northeast and southeast should peak by mid-morning. Noontime should be best for openings towards the Caribbean, Central America, and the northern countries of South America, although the 6 meter band may open in this

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 (10 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 parenthesis, 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) " " " between 14 and 22 days
- (2) " " " between 7 and 13 days
- (1) " " " 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 A.M.; 13 is 1 P.M., etc. On 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 N.Y. 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; 4 hours in the MST zone; 3 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 P.M. in Los Angeles; 17 or 5 P.M. 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 P.M. in N.Y.C.

4. The Short-Skip Chart is based upon a transmitted power of 75 watts c.w. or 300 wattsp.e.p. on sideband; the Alaska and Hawaii Charts are based upon a transmitter power of 250 watts c.w. or 1 kw p.e.p. 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 10dB 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.

direction as early as an hour or two after sunrise. During the afternoon hours expect 6 meter skip to extend deeper into South America and to shift towards the west and northwest. Exceptionally strong signals will be possible at times. Trans-continental openings on 6 meters should be possible from about noon through the late afternoon hours.

Some 6 meter DX openings between southern tier states and countries deep in South America may also be possible as a result of *transequatorial scatter propagation*. Unlike F-layer reflected signals, TE propagation results from scatter between ionospheric layers and signals are usually weak, with flutter fading often severe. TE openings must cross the magnetic equator at or near a right angle, and the best time for such openings during March would be between 8 and 11 PM local time. Experimental transmissions conducted over the past year indicate that TE propagation may also take place for 2 meter signals.

Auroral activity tends to peak during

CQ Short-Skip Propagation Chart March & April 1990 Local Standard Time at Path Mid-Point (24-Hour Time System)

Band (Meters)	Distance From Transmitter (Miles)			
	50-250	250-750	750-1300	1300-2300
10	Nil	09-18 (0-1)	07-09 (1) 09-12 (1-2) 12-13 (1-3) 13-16 (1-3) 16-18 (1-2) 18-21 (0-1)	07-08 (1) 08-09 (1-2) 09-12 (2-4) 12-16 (3-4) 16-18 (2-3) 18-20 (1-2) 20-21 (1)
15	Nil	07-09 (0-1) 09-13 (0-2) 13-14 (0-3) 14-16 (0-2) 16-20 (0-1)	07-09 (1-2) 09-13 (2-4) 13-14 (3-4) 14-16 (2-4) 16-19 (1-3) 19-20 (1-2) 20-21 (0-2) 21-23 (0-1)	07-08 (2) 08-09 (2-3) 09-16 (4) 16-19 (3) 19-21 (2-3) 21-23 (1-2) 23-01 (0-1)
20	11-13 (0-1) 13-16 (0-2) 16-21 (0-1)	08-09 (0-3) 09-11 (0-4) 11-13 (1-4) 13-16 (2-4) 16-18 (1-4) 18-21 (1-3) 21-02 (0-2) 02-08 (0-1)	06-07 (1-2) 07-08 (3) 08-09 (3-4) 09-18 (4) 18-22 (3-4) 22-00 (2-3) 00-02 (2) 02-06 (1)	06-07 (2) 07-08 (3) 08-10 (4) 10-15 (4-3) 15-22 (4) 22-23 (3-4) 23-00 (3) 00-02 (2) 02-04 (1-2) 04-06 (1)
40	06-07 (1-2) 07-09 (2-3) 09-18 (4) 18-20 (3-4) 20-22 (2-3) 22-00 (1-2) 00-06 (1)	06-07 (2-3) 07-09 (3-4) 09-11 (4-3) 11-13 (4-2) 13-15 (4-3) 15-20 (4) 20-22 (3-4) 22-00 (2-4) 00-03 (1-3) 03-06 (1-2)	06-07 (3-2) 07-08 (4-2) 08-09 (4-1) 09-13 (2-1) 13-15 (3-1) 15-17 (4-2) 17-19 (4-3) 19-00 (4) 00-03 (3-4) 03-06 (2-3)	06-08 (2-1) 08-15 (1-0) 15-16 (2-0) 16-17 (2-1) 17-19 (3-2) 19-03 (4) 03-04 (3-4) 04-06 (3)
80	07-11 (4) 11-18 (4-3) 18-22 (4) 22-00 (3-4) 00-07 (2-3)	07-08 (4-2) 08-11 (4-1) 11-16 (3-0) 16-18 (3-2) 18-20 (4-3) 20-00 (4) 00-05 (3-4) 05-07 (3)	07-08 (2-1) 08-11 (1-0) 11-16 (0) 16-18 (2-1) 18-20 (3-2) 20-03 (4) 03-05 (4-3) 05-07 (3-2)	07-08 (1-0) 08-16 (0) 16-18 (1-0) 18-20 (2-1) 20-22 (4-2) 22-03 (4-3) 03-05 (3-2) 05-07 (2-1)
160	05-07 (4-2) 07-09 (3-1) 09-17 (2-0) 17-19 (3-1) 19-20 (4-2) 20-05 (4)	05-06 (2-1) 06-07 (2-0) 07-09 (1-0) 09-17 (0) 17-19 (1-0) 19-20 (2) 20-22 (4-3) 22-03 (4) 03-05 (4-3)	05-06 (1) 06-19 (0) 19-20 (2-1) 20-22 (3-2) 22-03 (4-3) 03-05 (3-2)	05-06 (1-0) 06-19 (0) 19-20 (1-0) 20-22 (2) 22-03 (3-2) 03-05 (2-1)

HAWAII March & April 1990 Openings Given in Hawaiian Standard Time

TO:	10 Meters	15 Meters	20 Meters	40/80 Meters
Eastern USA	08-09 (1) 09-14 (2) 14-16 (3) 16-17 (2) 17-18 (1)	06-07 (1) 07-08 (2) 08-11 (1) 11-13 (2) 13-15 (3) 15-17 (4) 17-18 (3) 18-20 (2) 20-22 (1)	12-14 (1) 14-16 (2) 16-18 (3) 18-21 (4) 21-00 (3) 00-04 (2) 04-06 (3) 06-07 (2) 07-08 (1)	18-20 (1) 20-22 (2) 22-01 (3) 01-02 (2) 02-03 (1) 21-22 (1)* 22-01 (2)* 01-02 (1)*
Central USA	08-09 (1) 09-11 (2) 11-15 (3) 15-17 (4) 17-19 (2) 19-20 (1)	06-07 (1) 07-08 (2) 08-09 (3) 09-14 (2) 14-16 (3) 16-18 (4) 18-19 (3) 19-20 (2) 20-22 (1)	09-14 (1) 14-16 (2) 16-19 (3) 19-23 (4) 23-03 (3) 03-06 (2) 06-08 (3) 08-09 (2)	19-20 (1) 20-22 (2) 22-02 (3) 02-04 (4) 04-05 (2) 05-06 (1) 22-23 (1)* 23-02 (2)* 02-03 (3)* 03-04 (2)* 04-05 (1)*
Western USA	08-09 (1) 09-11 (2) 11-12 (3) 12-16 (4) 16-17 (3) 17-19 (2) 19-20 (1)	06-07 (1) 07-09 (2) 09-11 (4) 11-15 (3) 15-18 (4) 18-20 (3) 19-22 (2) 22-00 (1)	15-17 (3) 17-21 (4) 21-00 (3) 00-02 (2) 02-04 (1) 04-06 (2) 06-08 (4) 08-10 (3) 10-15 (2)	18-19 (1) 19-21 (2) 21-22 (3) 22-04 (4) 04-05 (3) 05-06 (1)* 21-22 (1)* 22-23 (2)* 23-04 (3)* 04-05 (2)* 05-06 (1)*

ALASKA
March & April 1990
Openings Given in GMT #

TO:	10 Meters	15 Meters	20 Meters	40/80 Meters
Eastern USA	18-20 (1) 20-00 (2) 00-01 (1)	16-18 (1) 18-22 (2) 22-01 (3) 01-02 (2) 02-03 (1)	13-15 (1) 20-22 (1) 22-01 (2) 01-03 (3) 03-05 (2) 05-06 (1)	06-13 (1) 07-12 (1)*
Central USA	19-21 (1) 21-00 (2) 00-02 (1)	17-19 (1) 19-22 (2) 22-00 (3) 00-02 (4) 02-03 (2) 03-04 (1)	14-16 (1) 20-23 (1) 23-02 (2) 02-04 (3) 02-03 (2) 04-05 (2) 05-07 (1)	07-14 (1) 08-12 (1)*
Western USA	20-23 (1) 23-00 (2) 00-02 (3) 02-03 (2) 03-04 (1)	18-20 (1) 20-22 (2) 22-23 (3) 23-02 (4) 02-04 (3) 04-05 (2) 05-06 (1)	16-18 (1) 18-20 (3) 20-00 (2) 00-02 (3) 02-04 (4) 04-05 (3) 05-06 (2) 06-10 (1)	07-09 (1) 09-12 (2) 12-14 (1) 09-10 (1)* 10-12 (2)* 12-13 (1)*

#See explanation in "How To Use Short-Skip Charts" in box at the beginning of this column.

*Indicates best time 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.

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.

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.

equinoctial periods, and there is a good chance that some widespread auroral activity will occur during March, accompanied by auroral-scatter openings on the VHF bands and sporadic-E short-skip openings, up to distances of approximately 1200 miles on 6 and 2 meters. Check the Last Minute Forecast at the beginning of this column for those days during March that are expected to be Below Normal or Disturbed, since these are the days on which auroral activity is most likely to occur.

Except for some minor meteor showers during March 14-15 and 24-25, not much meteor activity is expected during the month.

Fortieth Year!

This month's column marks the beginning of my 40th year as Propagation Editor for *CQ*. It was in the March 1951 issue that I wrote my first column. It was the continuation of an innovation begun in *CQ* with the June 1946 issue, when *CQ* was hardly a year old, by my good friend the late Perry Ferrell. To Perry and to the publishers of the then new journal go the credit for bringing to radio amateurs for the first time monthly propagation forecasts for each of the HF bands. And they have been doing it ever since.

During my 39 years as Propagation Editor I have prepared 468 monthly col-

umns. These have been written in more than a dozen different countries from the Andes of Peru to the Arctic of Scandinavia, from Moscow in the east to Thailand in the west, and within the range of gunfire in the Middle East and in Vietnam. *Yet a deadline has never been missed!*

This column has traveled to *CQ* in the postal system by air, train, and ship; by HF radio, telephone, and satellite; by telex, RTTY, CW, telefax, and computer modem; in the diplomatic pouch and through the APO; and by courier. And it has always arrived on time!

My editorship has spanned five sunspot cycles. I reported the decline of Cycle 16 and the record-breaking Cycle 19. I rode up and down the peaks and valleys of Cycles 20 and 21, and I have just reported on the upcoming peak of Cycle 22.

On the beginning of my 40th year as Propagation Editor I want to take this op-

portunity to again salute the editors and publishers of *CQ*, who had the foresight to introduce propagation predictions and forecasts for radio amateurs from almost the initial issue, and for continuing it on a regular basis since then.

But most important of all, I want to thank all of you, who over four decades have taken the time to drop me a line expressing an interest in radio propagation and this column in particular. This is the most meaningful reward an author can receive.

I have found conducting this column for the past 39 years a very stimulating and interesting sideline to my deep interest in amateur radio in particular and to communications in general. I look forward to continue to report propagation events on these pages of *CQ* during the years ahead.

73, George, W3ASK

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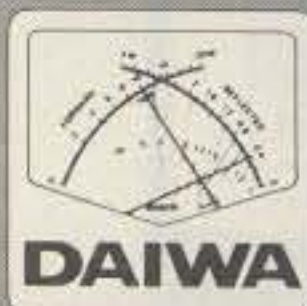
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DP-810	1.8-150 MHz	0-1.5 kW	SO-239
DP-820/N	140-525 MHz	0-150 W	SO-239/N type
CN-101	1.8-150 MHz	15/150 W/1.5 kW	SO-239

All models back lit

*Average Power Reading Only

CN-460M



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SWR/POWER
METERS



CN-520

Model	Freq. Range Int. Sensor	Forward Power	Connectors
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CN-460M*	140-450 MHz	15/150 W	SO-239
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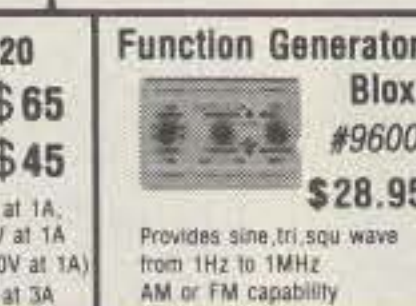
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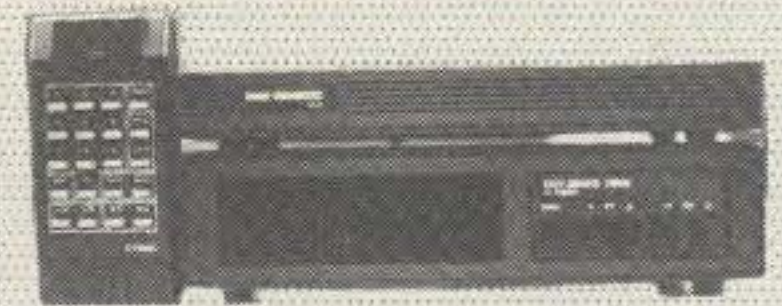
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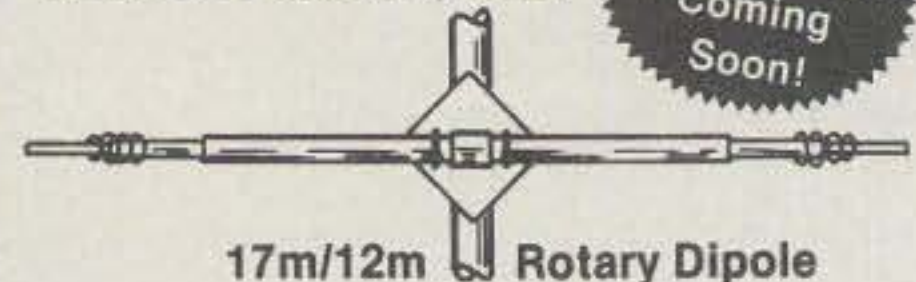
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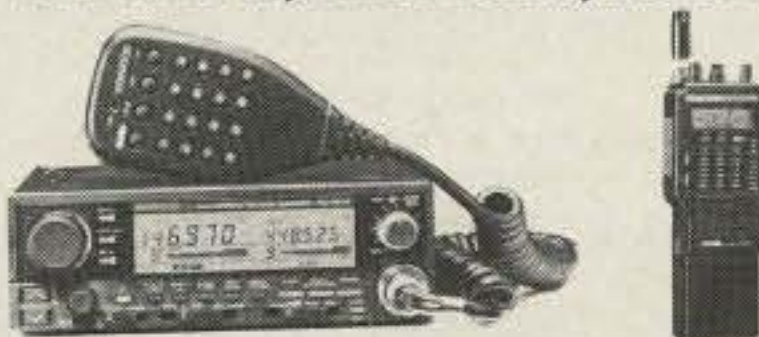


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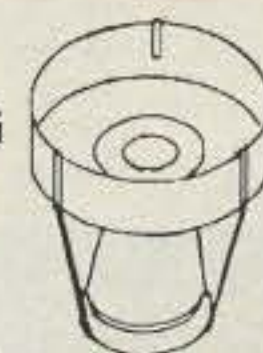
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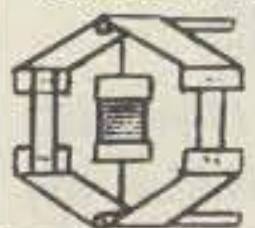
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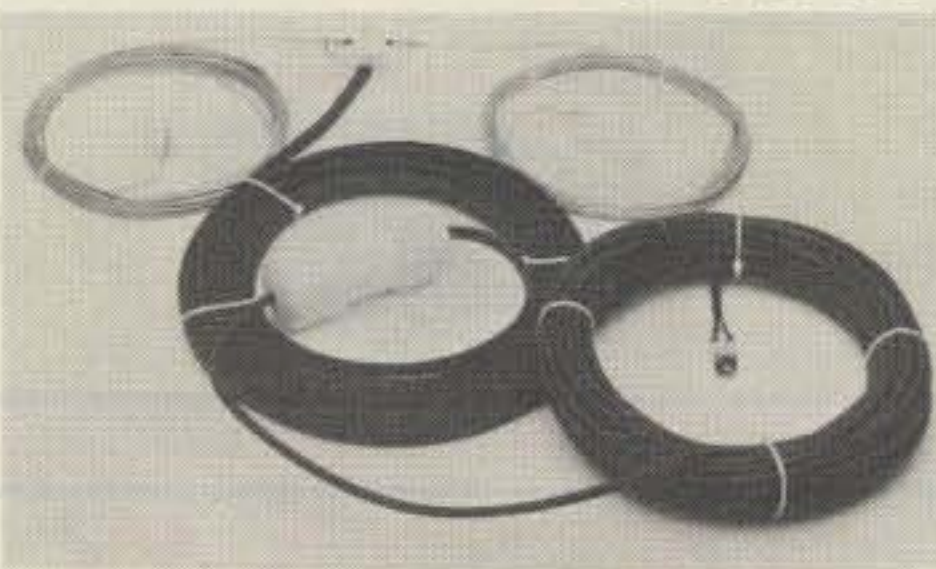
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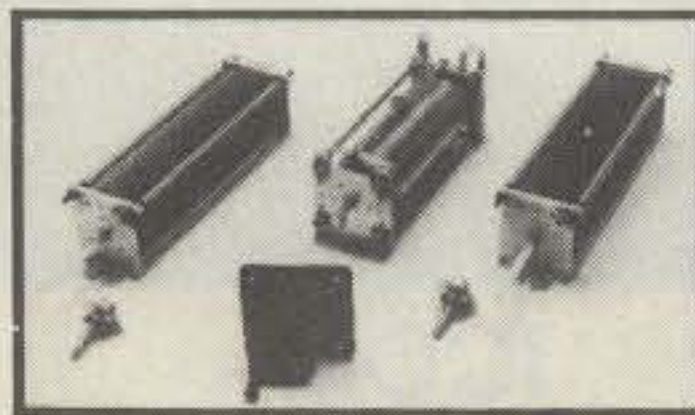
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HY-GAIN 2BDQ \$50, 18AVT \$65, Kenwood VFO 820 \$95, Heathkit VHF1 Seneca \$50, Drake 2C + SP \$95, HP Distortion Analyzer Mod 330B. HP UHF power meter Mod 430C for \$75, Telonic Sweep Generator T900 \$50, Microwave Science Power Meter \$50, 162 to 174 MC FM RF AMP 4X150 75 watts \$50, 25 Ft. tower with base and top sections \$50, Rohn 10 ft. top section \$40, Hy-Gain TH2 triband beam \$50, Hy-Gain TH6 \$100, Eico 147A Sig. Tracer \$25, SB34 80-15 Trcvr \$175, SB34 no TX \$75, Swan 350 \$175, Hallicrafters FPM 300 needs belt \$200. Varoujan Kalinian, N6DBH, 750 N. Garden, Fresno, CA 93727.

FOR SALE: Xerox Diablo Systems Hy-Term Printer Model AG 1640. Pick up only. W3CJL, (215) 433-4485.

PARTS CLEAN OUT. SASE for list. WA4BNO, Richard Bell, 3900 Colebrook Rd., Charlotte, NC 28215.

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MILLEN 90605-7 wave meter, 4 units in wood chest \$50, B & L M-32 R.F. voltmeter 0-300V very old, other ham items. K6KZT, 2255 Alexander, Los Osos, CA 93402 (805-528-3181).

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WANTED: Kenwood TS520S power supply. Need one bad. Whole or part rig. Phone or write. WD4NEG, Bob, P.O. Box 238, Tullahoma, TN 37388 (615-455-0091).

FOR SALE: TH3MK3 Tri-band beam, \$150. Four-band Trap Vertical \$75. 5-band Vertical (Trap) \$50. Please call 314-772-1089, David, KA0JXM, St. Louis, MO.

SELL: Service manuals for TS-430S and TS-930S, \$12 each, postage paid. Ralph Cabanillas, Jr., W6IL, 2359 Creston Drive, Hollywood, CA 90068 (213-469-7831).

TWO METER, 35 watt REGENCY HB312. All popular crystals. GLB 300A Channelizer. All mint condition and with manuals. All \$150. Louis Craycraft, K8NUJ, 2701 Oxford Dr. W., Bradenton, FL 34205.

VERTICAL VIBROPLEX WANTED. Dick Randall, K6ARE, 1263 Lakehurst Rd., Livermore, CA 94550.

IBM XT COMPATIBLE 512K, 2FD, serial, parallel, mono, very good condx, never used. \$495 FOB. Mike Bae, Box 4808, Santa Clara, CA 95054, (408-739-1833).

WANTED: Howard W. Sams communications receiver manual CR-1; also "junkie" Viking Ranger and Knight Span Master for parts. AJ Bernard, NI4Q, P.O. Box 690098, Orlando, FL 32819 (407-351-5536).

NOTICE: Look for 7J6CAT on 10-15 and 20 meter bands at 0000Z daily, SSB and CW. North American stations will have priority. Greetings to 9M2ZZ 73.

TELETYPE CORP TTY-43AAK printer, absolutely mint. Original packing and manuals, \$400 or HF transceiver. Paul Reeves, W7CHG, 2526 E La Cienega, Tucson, AZ 85716 (602-795-3917).

FOR SALE: Heathkit SB-104, excellent working and cosmetic condition, \$150. Chris Peters, KB4MRH, HCR 04, Box 78A, Millboro, VA 24460 or 703-863-5186.

HAS ANYONE CONVERTED a Kenwood TK-200 to operate on 2 meters? Contact Q.R. Galbraith, 4303 Kingsway, Farmington, NM 87401.

WANTED: Mint Collins Round or Winged Emblem 75S3-B or C, 32S-3, 516F-2, 30L-1, 312B-4, SM-3, F455FA-40 or F455FA-60. Greg Brunk, 1322 Treasch Drive, Cuyahoga Falls, OH 44221 (216-923-1548).

WANTED: Bearcat BC-590XLT, Bird 43, Hy-Gain 155BAS, Kenwood DM-81, YK-88SN. Sell: Kenwood YK-88C \$50; new RCA/JAN 811A's \$20 ea. K0MK 218-865-6541.

FOR SALE: Kenwood SMC-30 Speaker Mic, like new in box, \$40. D. Paschal, 108 Shannon Rd., Asheboro, NC 27203. Send M.O. or bank check.

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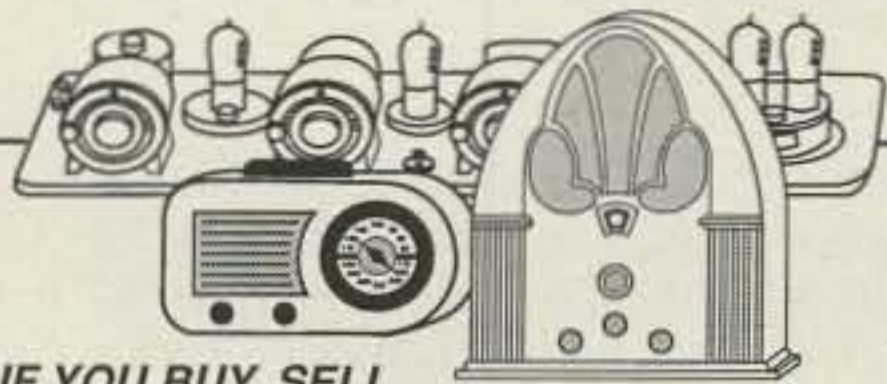
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F718A	70cm	11.5	15'
F1230A	23cm	13.5	10'

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Model	Band	Gain dB	Lth
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X-200A	2M&70cm	6.0/8.0	8'
X-500NA	2M&70cm	8.3/11.7	17'
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U-300A	70&23cm	8.6/13.2	8'

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- Save that rig!

Do you use an antenna tuner? Then you need the new Palomar Tuner-Tuner to tune it to your operating frequency without transmitting. Just listen to the Tuner-Tuner's noise with your receiver. Adjust your tuner for a null and presto, you have 1:1 SWR! It's as simple as that.

Easy to install. Works with all rigs. Eliminates tuneup damage. Your rig will love it!

Model PT-340 \$99.95 + \$4 shipping/handling in U.S. & Canada. California residents add sales tax.



Send for FREE catalog that shows our complete line of noise bridges, SWR meters, preamplifiers, loop antennas, VLF converters, baluns, SWL equipment, toroids and more.

PALOMAR ENGINEERS

BOX 455, ESCONDIDO, CA 92025
Phone: (619) 747-3343

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We'd like to see your company listed here too. Contact Arnie Sposato, N2IQO, at 516-681-2922 or FAX 516-681-2926 to work out an advertising program tailored to suit your needs.

R-X NOISE BRIDGE



- Learn the truth about your antenna.
- Find its resonant frequency.
- Adjust it to your operating frequency quickly and easily.

If there is one place in your station where you cannot risk uncertain results it is in your antenna.

The Palomar Engineers R-X Noise Bridge tells you if your antenna is resonant or not and, if it is not, whether it is too long or too short. All this in one measurement reading. And it works just as well with ham-band-only receivers as with general coverage equipment because it gives perfect null readings even when the antenna is not resonant. It gives resistance and reactance readings on dipoles, inverted Vees, quads, beams, multiband trap dipoles and verticals. No station is complete without this up-to-date instrument.

Why work in the dark? Your SWR meter or your resistance noise bridge tells only half the story. Get the instrument that really works, the Palomar Engineers R-X Noise Bridge. Use it to check your antennas from 1 to 100 Mhz. And use it in your shack to adjust resonant frequencies of both series and parallel tuned circuits. Works better than a dip meter and costs a lot less.

Order yours today! Model RX-100 \$69.95 + \$4.00 shipping/handling in U.S. and Canada. California residents add sales tax.



Send for FREE catalog that shows our complete line of noise bridges, SWR meters, preamplifiers, loop antennas, VLF converters, baluns, toroids and more.

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ICOM

IC-24AT
IC-32AT

WE CHALLENGE YOU TO A DUAL.

ICOM'S DUAL BAND HANDHELDS

ICOM's IC-24AT and IC-32AT call you to action with the most feature packed, power packed dual band handhelds available. Whether you prefer the convenience of a mini-handheld or the grasp of a full-size handheld, ICOM has the dual-bander fit for you.

The IC-24AT mini-handheld and the IC-32AT give you full operation on the 2-meter and 440MHz amateur bands. Outstanding Performance!

POWER PACKED HANDHELDS.

The IC-24AT provides up to 5 watts on 2-meters and 440MHz with a 12V battery while the IC-32AT is 5 1/2 watts on 2-meters and 5 watts on 440MHz.

PLENTY OF MEMORIES. Store any frequency, Tx offset and subaudible tone in any memory. Total flexibility to meet your needs.

PROGRAMMABLE SCANNING. Both units scan band and memories plus offer easy memory lockout and instant memory recall.

PRIORITY WATCH. Monitor the call channel, a memory channel or all memory channels every five seconds while operating!

ADDITIONAL FEATURES INCLUDE: Battery saver, all subaudible tones, multi-function LCD readout,

dial selectability and DTMF pad for memory channel auto-patching. The compact light-weight IC-24AT also features a 24 hour clock with timer, and an autodialer. Access to multi-digit phone numbers at the touch of a button.

ACCESSORIES: The IC-24AT uses accessories from the "S" Series handhelds while the IC-32AT is compatible with all IC-2AT/02AT accessories. An optional UT-40 beeper silently monitors a busy channel for your calls. When the preprogrammed subaudible tone is received, the unit beeps and the LCD flashes.

The dual is over, ICOM's IC-24AT mini-dual bander and IC-32AT full-size dual bander give you maximum performance in the package best suited for your needs. Check you local ICOM dealer for the finest dual banders available today. The ICOM IC-24AT and IC-32AT.



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First in Communications.