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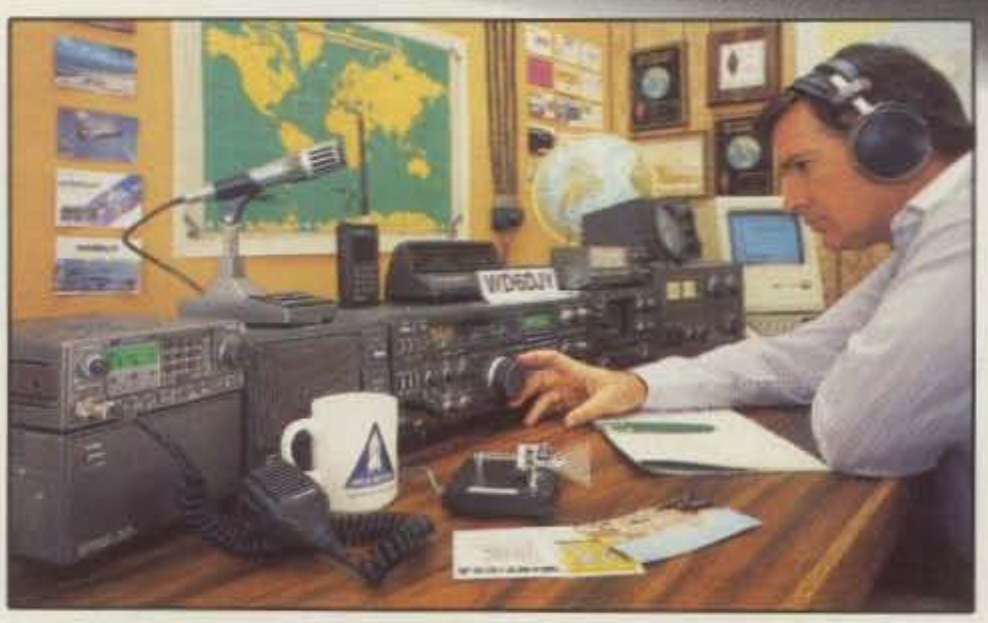

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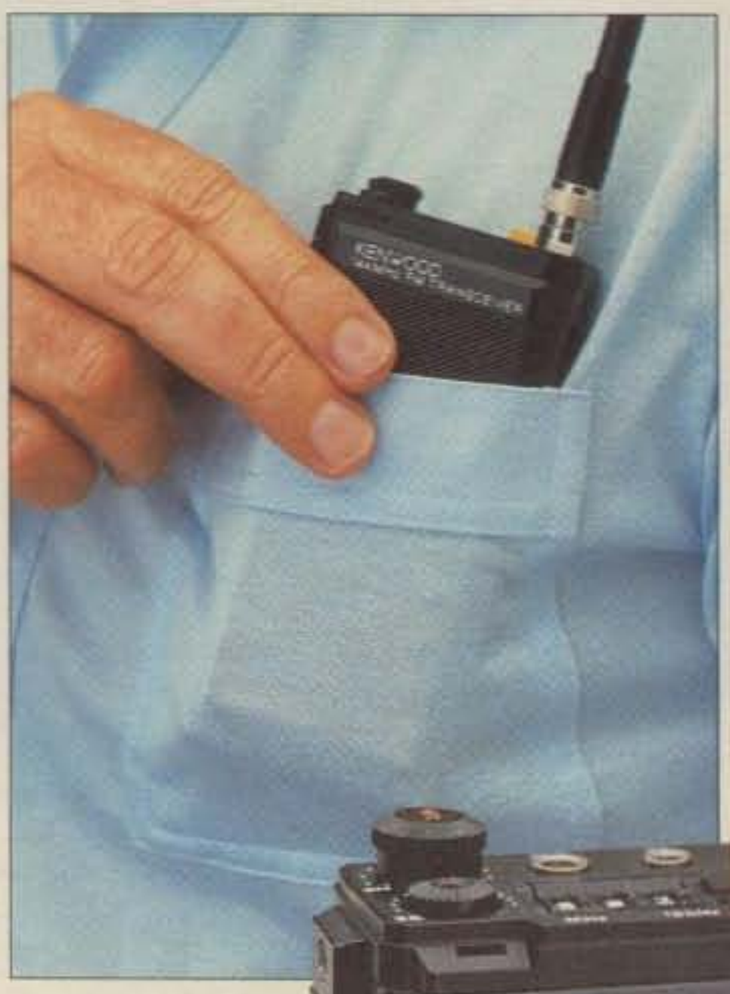

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The Radio Amateur's Journal

ON THE COVER: Swollen, blistered fingertips mark the end of another CQ WW WPX CW Contest for this stalwart operator. You bet it was worth it! Photo by Larry Mulvehill, WB2ZPI.

MAY 1985 **VOL. 41, NO. 5**

FEATURES

DEPARTMENTS

Zero Bias AN EDITORIAL

One of the most frequently asked questions around these days is "What are the chances of bringing back the No-Code License proposal?" It's being asked at almost every hamfest we attend, and it's a popular question in the amateur radio industry itself. Inferred in the question is the need for infusion of new blood into the hobby—new (and younger) amateurs.

Well, the No-Code defeat is a part of history now, and the frontal attack on it by certain powers that be has mandated that CW is an integral part of amateur radio and by extension a vital link in the defense of this country. On the surface that sounds terrific and very patriotic. Here we are waiting to be tapped in the event of national emergency. In the early 1940s amateurs came forward to provide the bulwark of wartime communications, and I'm sure we can take heart-felt pride in the fact that we are ready to do it again.

Warmed by that altruistic thought and noble purpose, we should maintain our code skills and requirements. We may be needed, God forbid, for the big one. But hold it a moment. There may be a slight flaw in the logic. Statistics tell us that the median age for amateurs is rising, and although we don't admit it, many more amateurs are eligible for QCWA than belong. A great preponderance of the anti-No-Code commandos help to skew that median age higher. So in truth, what do we really have ready for the big one?

I for one ran up to the attic and tried on my old uniform. It's only been 25 years, and so what if it's a little snug. Fort Dix (you can freely substitute wherever you took basic training) is probably just as I remember it—after all it isn't that long ago. Then my mind conjured up thousands of middle-aged amateurs rushing to enlist, waving their J-38s proudly as if to say, "Lafayette, we are here!" Basic training this time would be a snap. It's like riding a bike; once you've learned you never forget. Oh, we'd probably lose a bunch to coronaries, and the food might get a few more, but what the heck, you have to expect casualties.

You'll have to pardon my musings, but today the mental picture of thousands of 50ish-year-old amateurs double-timing down a road with full field packs crossed my mind, and the whole thing seemed a bit silly.

Now if you really believe the national resource theory, then some of us older guys will have to push even harder for a No-Code license to get younger amateurs into the hobby. We owe it to the country to give it a fighting chance.

Travels With CQ

The Orlando Hamcation and Computer Show was quite a break for us Yankees. Not only was it a good show, but the weather was beautiful, too. Dick, Arnie, and I flew down to Orlando to man the *CQ* booth. The show is held at the Expo Centre, which is a great spot for a hamfest. There I saw Don McClenon, N1IN, our 160 Meter Contest Director, and *CQ*'s DX Award Manager, Billy Williams, N4UF, was working very hard giving license exams for most of the weekend. There was a pretty good size crowd thanks to Al Huber, KC4CT, and his crew. The flea-market was bigger this year than last, and although there was more to pick and choose from, I came home empty-handed. Not so for Dick and Arnie. Dick found what he had been looking for in a clean 62S-1, and Arnie bundled up some treasures for his workshop.

A few weeks before, the big local event, the LIMARC Fleamarket, took place. Arnie, Dick, and Dick's wife, Cathy, took in the event. When Dick asked one of the people at the door why they didn't have special free tickets for nonamateurs and young people, he was told that it would make the place too crowded and that someone could actually bring nine kids into the show. When Dick replied that perhaps one of these kids might become an amateur after seeing some of the stuff, he was told that the bands were too crowded now and we didn't need anymore amateurs. (Perhaps that fellow is ready to take basic training again.) I'd like to believe that he doesn't actually speak for the organization.

When I mentioned the idea of special free tickets for nonamateurs and students to Mayer Zimmerman, W3GXK, who puts on the Maryland Hamfest, he thought it was a great idea and said he would try to implement it for this year's event in July. The free-ticket holders could have a special prize drawing of a license manual or code tape set—something helpful for a beginner. The regular prizes, major and minor, could be reserved for full-price admissions. It really wouldn't cost anything extra to extend a helping hand of welcome.

The Charlotte Hamfest and Computerfair was bigger and better than last year and perhaps the most exuberant show of the year so far. One very good sign (sort of) was that the dealers seemed to run out of license manuals and code tapes early on. The demand for instructional material was very high, but I fear that the supply was too short. These days the Computer Fair aspect of many of the hamfests has been bringing in new people to see amateur radio firsthand. It has been the area of greatest interest for young people in that this equipment not only is on display but is working, too. It's not unusual to see a table with folding chairs filled with youngsters having a good time with the computers. Now if we can get more hamfests to have operating stations (not just talk-in stations) for visitors to look at and perhaps sit at, then we might spark their imagination to go further. There's a bit of "Walter Mitty" in everyone; all it needs is a bit of encouragement to come out.

Dayton is like the Ground-Hog Day for amateur radio. Instead of "Punxsutawney Phil," it's John Q. Amateur who comes out of his cave and checks out what's happening. For those of us who have been going there for years and for those for whom this will be their first Dayton, it's the golden opportunity to see and experience not just part of what's happening, but *everything* that's happening. It's the latest and best of everything. It's over 400 commercial exhibits and almost 1500 fleamarket tables. It's forums and talks by leading amateurs from all over the world. It's pure amateur radio excitement guaranteed to regenerate your amateur radio batteries from the dull winter doldrums. Most of all, it's a great feeling to be there and be a part of it.

Obviously, we all can't take the trek to amateur radio Mecca, but we can experience some of the excitement closer to home. Drive that extra hour, or better yet, form a car pool to get to a local or regional hamfest. Make a party of it, and invite your neighbor, too. Excitement and enthusiasm are infectious, but so is apathy. Make it a point to check out the announcements columns in the amateur radio press to see what's happening nearby. If you feel insecure about leaving the safe confines of your shack and relinquishing a bit of spectrum for a few hours, you can always strap on four or five HTs to keep in touch with the outside world.

There's a lot more happening out there than we or anyone else has room to print. The way to find out is by doing . . . by making an effort and becoming informed. Believe me, when you are having a good time you'll know it.

73, Alan, K2EEK

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Our Readers Say:

Corrections For Quad Article

Editor, *CQ:*

There are some errors in my article "How To Build A 3 Element Quad" in the February issue, page 29. The dimensions of the cross supports are in error. They should be director 20¼ inches, driven 21¼ inches, and reflector 22½ inches. I have had numerous calls and letters about this and believe a correction is in order. This has been the most popular article I have written, and the wrong dimensions have confused the builders.

Russ Rennaker, W9CRC
Kokomo, IN

Good, Better, Best

Editor, *CQ:*

I just wanted to say that I found the article in December *CQ* of 1983 on the W6PU quad very interesting. The minute I saw the article, I said to myself, "I have to have that antenna." It is now up, and has come through the *CQ* WW Contest, both phone and CW, with flying colors. Incidentally, DB+ Enterprises provided all the hardware and even made a boom especially for the antenna.

The antenna has worked like a bomb on 20 when assembled just as shown in the article. However, on 10 meters the antenna worked very poorly when using the dimensions for the phasing line shown in the article, and on 15 it was a so-so performer with the dimensions as shown. W6PU could not be reached by phone (unlisted number) and did not answer his mail.

Therefore, it was necessary to pick the brains of W3GRF, K4FJ, K4VX, and K3TW and use my own a bit, too, to find out what might be wrong. The first thing which was done to 10 meters was to change the phasing line from RG-8U to RG-11U (the velocity factor does not change with impedance) and that made the SWR acceptable, but performance changed little.

The article says that on 20 meters the phasing line is 135 degrees long, which is great for one-eighth wave spacing, which is the distance between the two driven elements on 20 meters. However, on 10 meters the spacing is a quarter wave, and on 15 it is .18 wave. Nowhere in the article does it state how W6PU arrived at the phasing line dimensions for those two bands. Clearly, 135 degrees is not a proper phase angle to use with the electrical separation on those two bands.

On 10 meters it was decided to feed the two driven elements 180 degrees out of phase, which turns out to be, for the purposes of the phasing line, 5'4" each side of the "T" connector, for a total length of 10'8". Also, any time the phase angle of the phasing line is 180 degrees or greater, I am told, the feed must be reversed one element from what it is on the other. So, contrary to the instructions in the article, on 10 meters the feed was inverted on one element. (Note: RG-11-U used on this band.) Immediately the antenna became a world-beater! The S-meter showed about 4 S-units improvement over the original design!

On 15 meters the antenna was used as shown in the article for the *CQ* WW Phone, and the results were only fair. So the following line of reasoning was followed to figure out what to do on that band. First, .18 wave spacing equals 65 degrees. According to the experts, the proper way to figure out what the phasing line should be, therefore, is to subtract 65 from 180, which gives you 115 degrees. That translates into a phasing line length of 9 feet 9½ inches. Therefore, the "T" connector was removed and that length was substituted, and immediately an improvement on the order of 6 dB was noted on the S-meter.

Following the *CQ* WW CW, I can say that the antenna is now performing like a long-john Yagi on all three bands, with a height of 75 feet above ground, using an SB-220 as the linear amplifier—no superpower here. Seldom did I have to call any station twice in any pile-up, no matter how large.

Thanks once again for putting that article in *CQ*, which started a train of events that caused me to have a lot of fun learning all about antenna phasing and to end up with a top-notch radiating system for those three bands.

Fred Laun, K3ZO
Temple Hills, MD

0000Z? No Problem!

Editor, *CQ:*

I would like to take Richard Hoyt, W5RIT's letter in the February issue re "does 0000Z exist?" one step further. In the Canadian Navy, 2400 hours did not exist either. The time was either 2359 (old day) or 0001 (new day). See, no problem!

Larry Thivierge, VE3GT
Section Manager, Ontario. CRRL, ARRL
Renfrew, Ontario, Canada

Let's Hear It For VHF!

Editor, *CQ:*

Am very pleased with your new VHF section and the down-to-earth info being given by Steve, WB2WIK. Hope you will follow with some not too technical construction projects. VHF has a lot of little-used spectrum (particularly 50 and 144 MHz CW sections). Am looking forward to the July contest.

Max Carlton, K2GK
Prattsburg, NY

Please send all reader inquiries directly.

Announcing

• **Mason County ARC Commemorative Stations** -KB7MJ and W7KTI will be on the air on May 4–5 from Shelton, WA on SSB 3900, 7230, 14270, 21350, 28600. KN7D will be operating RTTY on 14090; K7UAR will be on 145.01 packet. Send QSL and 9" × 12" SASE for certificate to Loren Mercer, KA7GSV, 2213 Olympic Hwy North, Shelton, WA 98584.

• **Ole Virginia Hams ARC Special Event** - This Special Event will take place at the Manassas, VA Battlefield Park on May 18 from 0800Z to 2000Z on Novice bands 3.725, 7.125, 21.050; General CW 3.650, 7.050, 14.050, 21.050; and General phone 3.950, 7.290, 14.290, 21.390. QSL to Ole Virginia Hams ARC, P.O. Box 1255, Manassas, VA 22110 (no call given).

• **KZ8M From Moscow, KS** - The Sand Hills ARC will operate KZ0M during a DXpedition to Moscow, KS from 1800Z May 4th until 1800Z May 5th on 10–80 meters phone and CW, up 10 kHz from the lower edge of the General frequencies. Special QSL for SASE via Box 88, Moscow, KS 67952.

• **Special Event From Lima and Allen County, OH** -These amateurs will commemorate the discovery of oil in Lima on May 18–19. Participating stations will sign /OIL, and operate in the Novice/Technician or General portions of the bands. For a certificate send an SASE to Northwest Ohio ARC, P.O. Box 211, Lima, OH 45801.

• **Pasadena, Maryland** - The Bay Area ARS will commemorate "Samuel F.B. Morse Day" on May 25. Calls and CW frequencies will be: KM3I—35 kHz up from the low end of the General bands on 15, 20, and 40 meters; and KA3HKB—35 kHz up from the low end of the Novice Bands on 15 and 40 meters. For a certificate, send QSL and large SASE to: BAARS, P.O. Box 805, Pasadena, MD 21122-0805.

• **The UN AT 40 Award** - To celebrate the 40th anniversary of the United Nations Charter, the United Nations Staff Recreation Council ARC is sponsoring the UN AT 40 Award, available to any amateur (or SWL) who has contacted two of the three amateur radio stations operating with the United Nations prefix from 1 January to 31 December 1985. Contacts can be made on any band or mode. The three stations are 4U1UN, 4U1ITU, and 4U1VIC. Send list of the stations worked, including date, time, mode, report, and band, plus signed statement vouching for the validity of application. Cost of the award is US $5.00 or 15 IRCs. Application must be sent before 1 February 1986 to: UN Staff Recreation Council, Amateur Radio Club, United Nations, Room DC1-0724, Box 20, New York, NY 10017.

• **Spartanburg, SC Station** - The Spartenburg ARC will sponsor special events station K4JLA from 1500Z to 2200Z May 4 and 5 on 40 through 15 meters phone up 10 kHz from the edge of the General portion of the band and CW in the 40 meter Novice band on 7115 kHz. Send certificate requests with large SASE to Spartanburg ARC, 104 Garner Rd., Spartanburg, SC 29303.

• **W3SK From Langhorne, PA** - Penn Wireless Assoc. will operate W3SK from 1400Z May 18 to 0200Z May 19. (Intermittent operation will be conducted during the week preceding this date.) Frequencies: phone—3.98, 7.28, 14.28, 21.38, 28.58, 146.52 FM, and 144.12 SSB; CW—3.54, 3.745, 7.04, 7.145, 14.04, 21.04, 21.195, 28.04, and 28.195. Certificate for QSL and a 9" × 12" SASE to P.O. Box 734, Langhorne, PA 19047.

• **KF6XX From Van Nuys, CA** - Special-Event station KF6XX will be on May 11 from 1700 to 2200 UTC from Los Angeles City's Fire Station 88, in Van Nuys, CA on 15 and 20 meters SSB. QSO confirmation certificates will be mailed for a QSL sent to KF6XX, P.O. Box 939, Camarillo, CA 93010.

• **Gillette, WY Special Event** - The Campbell County ARC members will be active from 2400 UTC May 17 until 2400 UTC May 19 on phone and CW, all bands, operating in lower 40 kHz of the General class and Novice bands. For a certificate send SASE to Campbell County ARC, P.O. Box 3842, Gillette, WY 82716

• **WB9PZH From Delavan, WI** - The Lakes Area ARC will operate WB9PZH/9 from 1700Z to 2400Z on May 18 25 kHz up from the low end of the General phone bands on 15, 20, 40 meters. For QSL and certificate send large SASE or two 22¢ stamps to Pete Vogt, WB9PZH, Rt. 2 Box 253, Elkhorn, WI 53121.

• **Old Timers Day** - On May 4 the Volunteer ARC of Dickson, TN will operate Special-Event station NY4N. Times 1200–1400 on 3980 kHz, 1400–1800 on 14.275 kHz, and 1200–1800 on 146.520, 145.11. QSL to P.O. Box 74, Burns, TN 37029 for certificate.

• **Indiana Month of May Contest** - Objective: Be the first non-Indiana station to work 500 Indiana contacts or the Indiana station reporting the most contacts. Exchange: RST; State, province, or country; name and county (Indiana stations). Time: 0000Z May 1 to 2400Z May 31. Single operators; no cross mode, 30 meter, or repeaters. Stations may be worked once per band per mode. Send copy of log, dupe sheet (200 or more QSOs), and score sheet. Business size SASE for return mailing of results/certificates appreciated. Logs must be received by June 30, 1985. Official score sheet (optional) and Indiana county award checklist available for SASE. Send all logs and inquiries to: Russ Ryle, N9DHX, Southern Indiana QRP Group, P.O. Box 2466, Bloomington, IN 47402.

• **K4HY From Owensboro, KY** - The Owensboro ARC will operate K4HY from 0000Z May 10 to 0530Z May 11 on 28815, 28540, 7245 phone, and 7125 CW. Certificate for SASE to N4EKG, 1615 East 23 St., Owensboro, KY 42301.

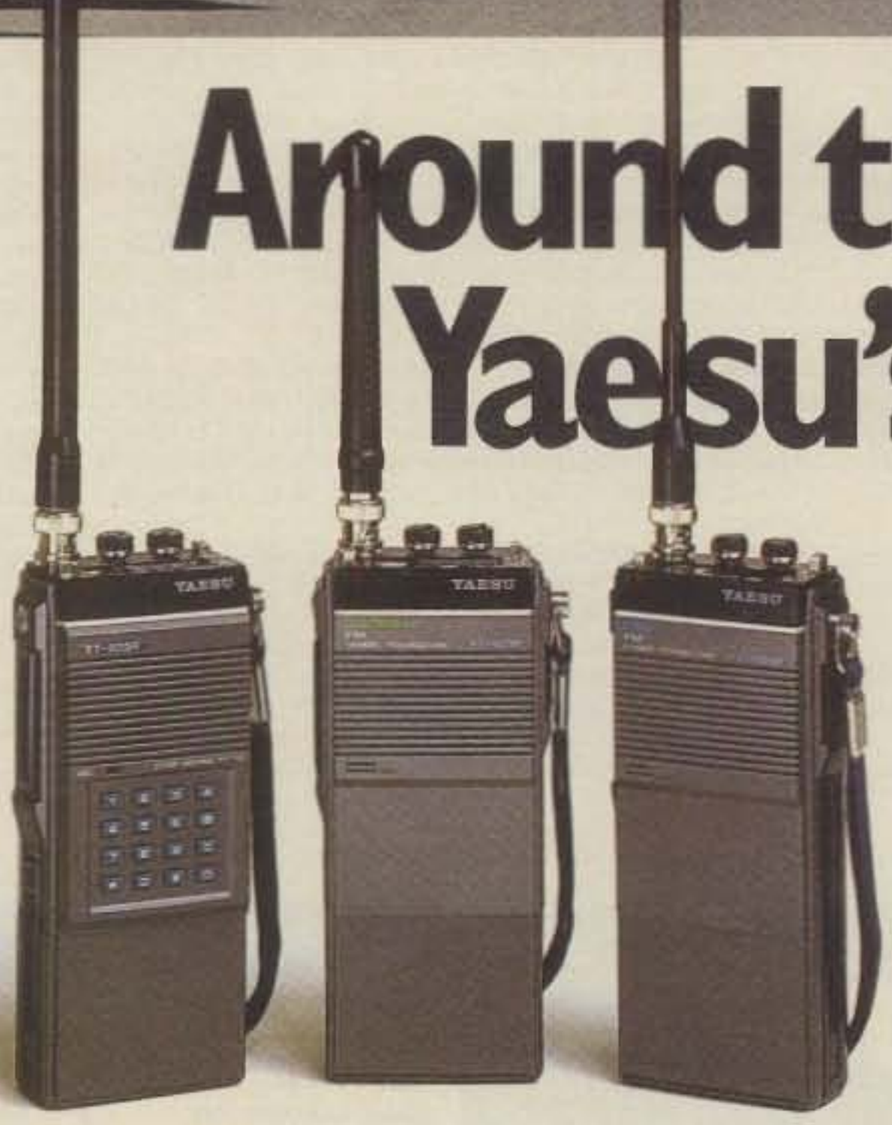
• **Detroit, MI Special Event** - L'Anse Creuse ARC will operate W8PBO on 7.240 SSB from 1300–2300Z May 4 and 1300–2300Z May 5. For a certificate send large SASE to L'Anse Creuse ARC, P.O. Box 72, Utica, MI 48087. QSL for contacts only.

• **WD9FTR From Centralia, IL** - The Centralia Wireless Assn. will operate WD9FTR from 1700–2400Z May 4 in the General class portions of the 80–15 meter phone bands and 2 meter FM, and CW operation in the Novice bands. For a certificate send QSL with large SASE to Centralia Wireless Assn., P.O. Box 1166, Centralia, IL 62801.

• **W4ODR For Armed Forces Day** - W4ODR, located Northside aboard Naval Air Station Memphis, Millington, TN, will be operated by sailors and Marines on May 18 from 1400–2200Z. Frequencies will be SSB 7.230, 14.280, 21.370 MHz (± 10 kHz); CW 21.145 and 28.145 MHz; 2 meter frequency 146.52 simplex. Certificates will be available (no SASE required).

(continued on p. 63)

Around the corner. Yaesu's VHF/UHF



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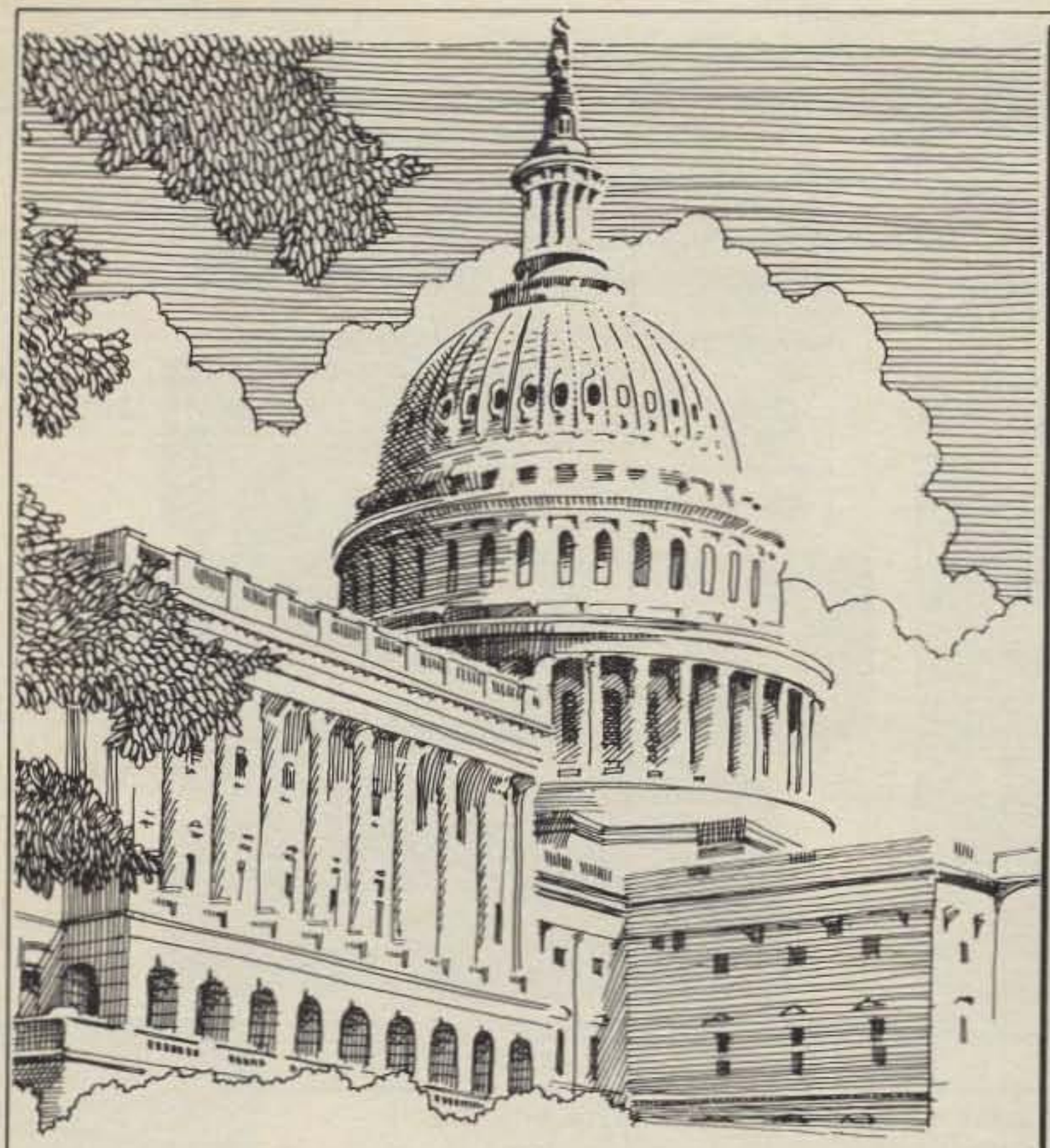

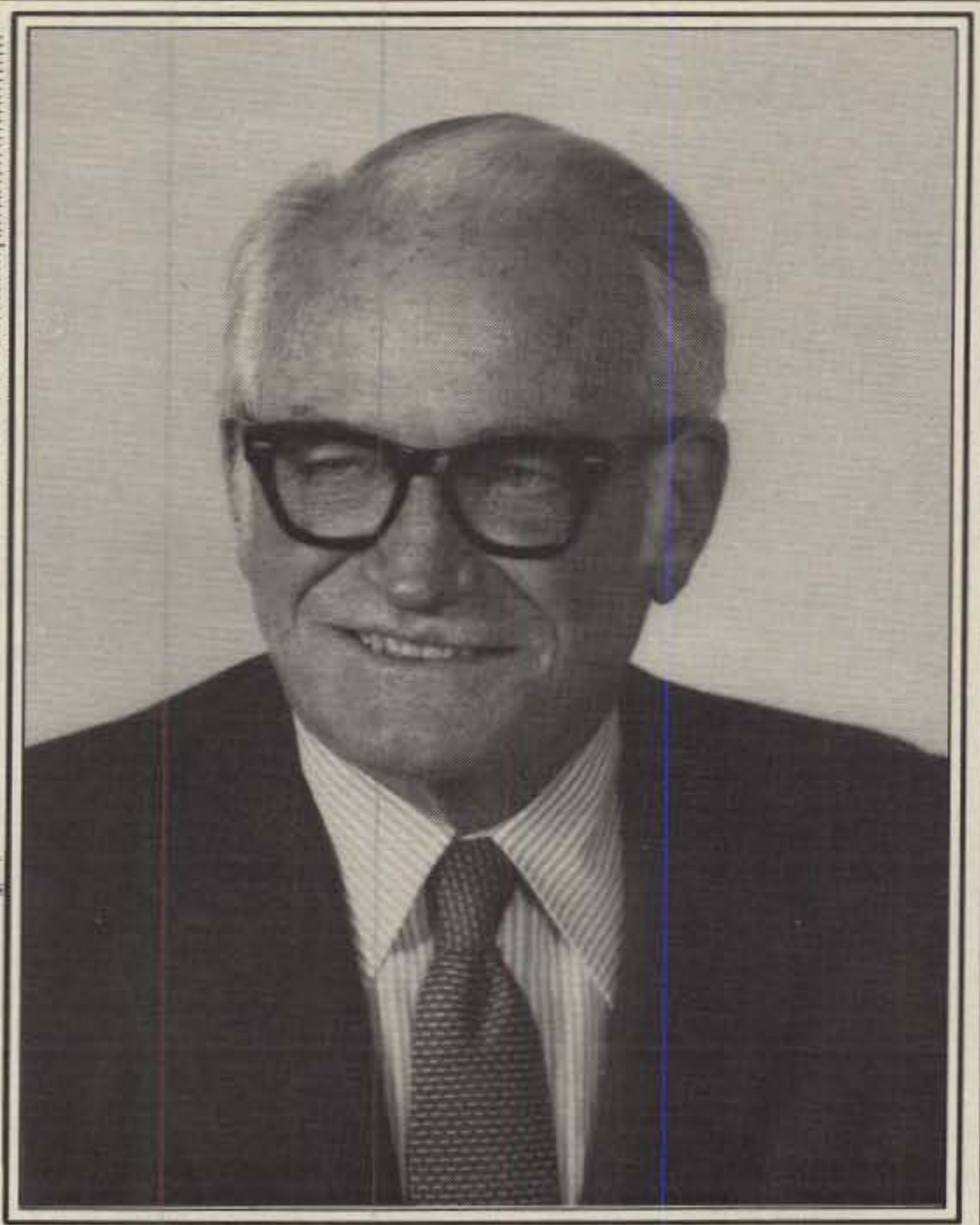

A CQ Exclusive Interview With:

Sen. Barry Goldwater, K7UGA

BY THEODORE J. COHEN*, N4XX

Barry M. Goldwater was born in Phoenix, AZ, on January 1, 1909. He was educated in the public schools of Phoenix and at the Staunton Military Academy in Virginia. He also attended the University of Arizona for one year. The Senator, a retired Major General in the U.S. Air Force Reserve, is a World War II veteran who flew in both the European and Asiatic-Pacific theaters.

Sen. Goldwater's political career began in 1949, when he was elected to the City Council of Phoenix. In 1952 he was elected to his first term in the United States Senate. The Senator was reelected to the Senate in 1958, but did not seek reelection there in 1964, as he was chosen as the Republican Presidential nominee. He was again elected to the Senate in 1968, where he continues to serve with distinction. He has served as Chairman of the Senate Select Committee on Intelligence, and as a member of the Armed Services Committee; Commerce, Science, and Transportation Committee; and the Senate Select Committee on Indian Affairs. Since 1981 Senator Goldwater has been Chairman of the Senate Communications Subcommittee. In 1985 Senator Goldwater became Chairman of the Armed Services Committee. An author of numerous books, his most recent include: The Conscience of a Majority, The Coming Breakpoint, *and his autobiography,* With No Apologies.

Senator Goldwater was first licensed as 6BPI in 1922. For many years his amateur MARS station, K7UGA/AFA6BG, was manned daily by volunteers to pass traffic for U.S. military personnel overseas. Senator Goldwater has served as national President of the Quarter Century Wireless Association (QCWA) and received numerous amateur radio awards, including the coveted "Amateur of the Year" award at the Dayton amateur radio convention.

Over the past 20 years Senator Goldwater has been the principal sponsor of every piece of legislation that has been enacted by the Congress concerning amateur radio. The first such legislation was passed in 1964, when the Senator pushed through the statutory changes necessary to permit the granting of reciprocal licenses. As a result of these efforts, U.S. amateurs today can obtain permits to operate in 65 countries. In 1982 the Senator took the lead in proposing legislative amendments that led to the creation of the Volunteer Examination and Volunteer Enforcement Programs, and to the enabling legislation that gives the FCC the right to set RFI susceptibility standards for electronic equipment.

Senator Goldwater married Margaret Johnson in 1934. They have four children—Joanne, Margaret, Barry, Jr., and Michael—and ten grandchildren.

It is with great pleasure that CQ now presents this exclusive interview with Senator Barry Goldwater . . . an interview that not only delves into the early years of the Senator's amateur radio work, but into his more recent efforts to safeguard the Amateur service's very existence.

*8603 Conover Place, Alexandria, VA 22308

CQ: For background, Barry, what was it that caught your interest in amateur radio and led to your lifelong involvement in this hobby?
Goldwater: It's very difficult for me to remember the precise reason I became interested in radio. But I have a strong feeling it was because of a visit in the early 1920s to the home of Earl Neilson, 6BBH, now deceased. He let me listen to a crystal set, and the music I heard was coming from Los Angeles. Earl was not very active in radio at that time . . . he was basically a Chevrolet mechanic. Regardless, he sold me the wireless parts needed for the makings of a crystal outfit, and I put it together. I guess you might say I was hooked from there on in.

CQ: What kind of equipment did you use in your first station?
Goldwater: My first station was the crystal set I just mentioned. I think it was in 1922, or along in there, that my father gave me a Westinghouse Aereola Sr., with a vacuum tube. I never will forget that little set. It pulled in stations pretty well. Unfortunately, there weren't a lot of stations to pull in at that time.

CQ: And your first transmitter?
Goldwater: My first transmitter was a spark coil that I took out of a Ford automobile. Of course, there was no reliability to the thing at all. It made a lot of noise, and gave me quite a few shocks. Later in 1922, I built a quarter-kilowatt spark transmitter. Originally it had a fixed gap, but then I put a rotary gap together and used that equipment for about a year. Then, when vacuum tubes became available, I made a 5

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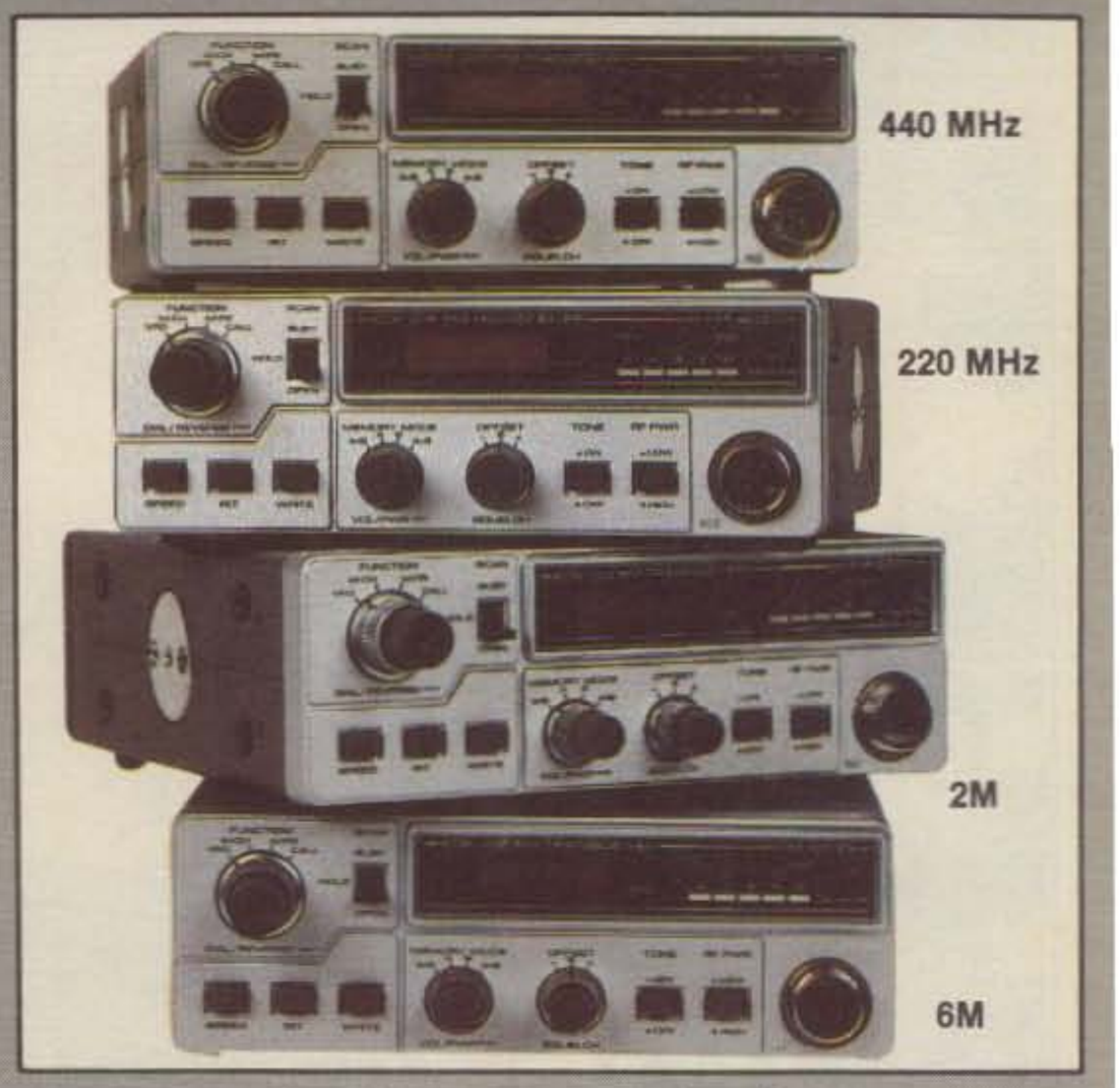

MAXPAC STACK

SPECIFICATION	FM-2033 144 MHZ	FM-4033 220 MHZ	FM-7033 440 MHZ	FM-6033 50 MHZ
NUMBER OF MEMORIES	10 Memories + CALL CHANNEL organized as two banks of 5 channels each. (CH 1-5, CH 6-10, CALL.)			
MEMORY SCANNING	Memories may be scanned A(1-5), B(6-10), A+B(1-10) or A×B(1-5)			
BAND SCANNING	Programmable band scan between values loaded into memories 5 and 10, step size set in INIT module.			
FREQUENCY RANGE	142.000-149.995 MHZ	220-224.995 MHZ	440-449.975 MHZ	50.00-53.995 MHZ
OUTPUT POWER HI/LO	25/2.5 Watts	25/2.5 Watts	10/2 Watts	10/2 Watts
REPEATER OFFSET	600 kHZ UP or Down	1.6 MHZ UP or Down	5 MHZ UP or Down	600 kHZ UP or Down
SUB AUDIBLE TONE	103.5 @ 500 Hz Dev	103.5 @ 500 Hz Dev	Dipswitch Select	103.5 @ 500 Hz
SENSITIVITY	0.2 uV @ 12dB SINAD	0.35 uV @ 12 dB SINAD	0.4 dB @ 12 dB SINAD	0.2 uV @ 12 dB SINAD
BANDWIDTH	±5 kHZ @ −6 dB	±5 kHZ @ −6 dB	±5 kHZ @ −6 dB	±5 kHZ @ −6 dB
SELECTIVITY	±12.5 kHZ @ −60 dB	±12.5 kHZ @ −60 dB	±12.5 kHZ @ −60 dB	±12.5 kHZ @ −60 dB

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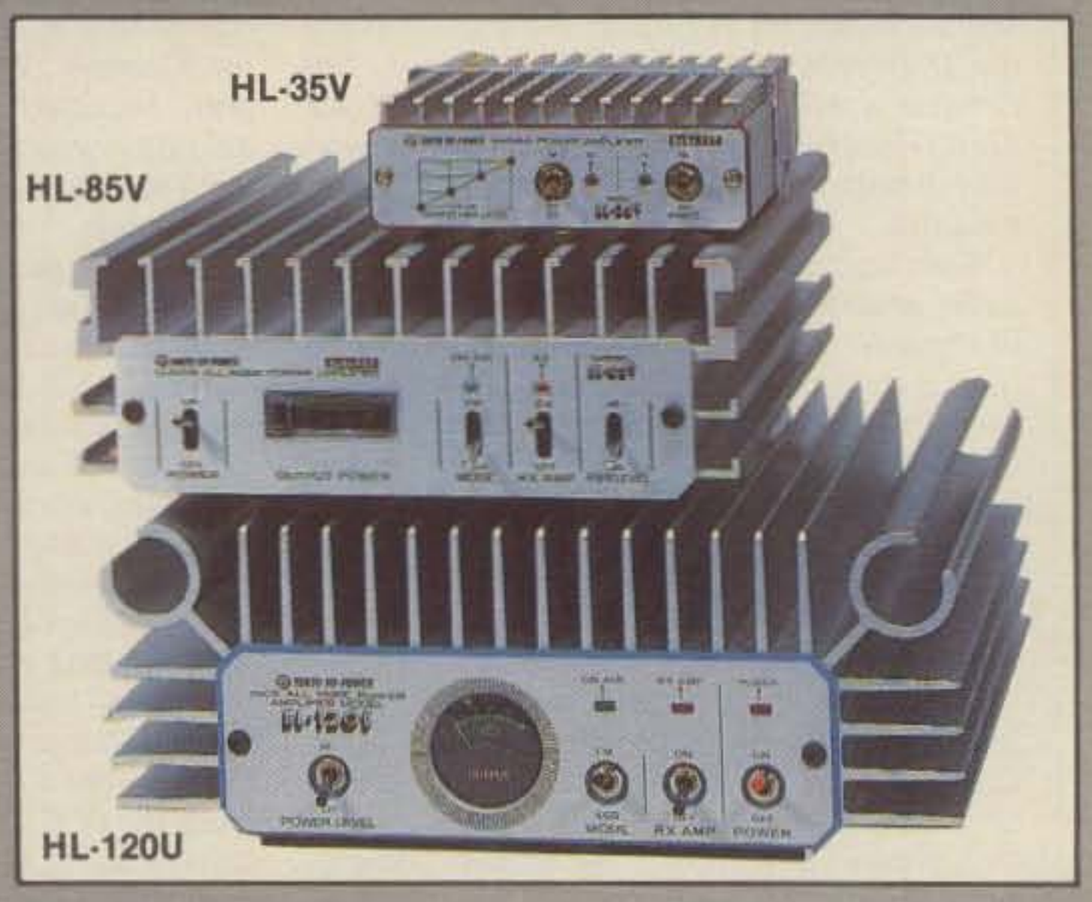

Specifications	HL-30V	HL-35V	HL-35VL	HL-85V	HL-110V	HL-160V	HL-160V25	HL-20U	HL-30U	HL-60U	HL-120U
Pre-Amp Type	N/A	Gaas-FET	Gaas-FET	Gaas-FET	Gaas-FET	MOS-FET	MOS-FET	N/A	Gaas-FET	Gaas-FET	Gaas-FET
Power Metering	N/A	LED	LED	Meter	Meter	Meter	Meter	N/A	LED	Meter	Meter
Input (Watts)	.25-5	.25-5	.25-5	10-14	3-14	3-14	20-30	.1-4	1-4	8-14	8-14
Output (Watts)	2.5-30	2.5-30	2.5-30	70-90	90-110	140-160	140-160	18-22	25-30	45-60	90-110
SSB Mode	NO	NO	YES	YES	YES	YES	YES	YES	NO	YES	YES
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These units are made in Japan and sold by SANTEC and backed by the famous Encomm **TWO YEAR EXTENDED SERVICE PLAN** and Encomm service facilities located in Plano, Texas. Priced at $199.95 for the ST-200ET (VHF) and $249.95 for the ST-400ET (UHF). No it's not a misprint, Those are the Suggested retail prices. Now smile. Please see your favorite SANTEC dealer for his best price.

SPECIFICATION	ST-200ET	ST-400ET
GENERAL		
Frequency Range	144-147.995	440-449.995
Battery Pack (V/mAHr)	8.4/250	8.4/250
Receive Squelched Norm	18 mA	22 mA
RX At Full Volume	130 mA	130 mA
Transmit (Low Power)	220 mA	300 mA
Transmit (High Power)	550 mA	700 mA
Dimensions mm	60 × 170 × 40	60 × 170 × 40
Weight (with Battery)	490 gms	490 gms
TRANSMITTER		
Output Pwr. (Hi, Lo)	1.5W, 0.15W	1.5W, 0.15W
Spurious Transmitted	< −60dBc	< −60dBc
Deviation Limit	5 kHz	5 kHz
Pickup Device	Condenser Mic	Condenser Mic
RECEIVER		
Receiving System	Dbl. Superhet.	Dbl. Superhet.
I.F. Frequencies	10.695 1st 455 kHz 2nd	21.6 1st 455 kHz 2nd
Receive Sensitivity	< 0.25 uV @ 12dB	< 0.35 uV @12 dB
I.F. Bandwidth	30 kHz @ −60dB	30 kHz @ −60 dB
Operating Temp	−10-+60 C	−10-+60 C

ACCESSORIES

SKT-BA Battery Case	HSA-1/HBM-1 Headset/Mic
SKT-PA DC/DC Conv.	STK-BP Battery Pack
ST-MC Mobile Charger	STK-BC Battery Charger
SKT-LC Leatherette Case	

NOTICE: These specifications are typical unless stated otherwise. They may be changed in the future without notice or obligation. Conditions of measurement may be obtained from Encomm, Inc.

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SP-420 VHF/UHF PEP MONITOR

These new compact HF/VHF/UHF meters from WELZ provide multi-mode operation in auto or home station. Utilizing the WELZ toroidial core based wide-band sensor technology, these VSWR/POWER meters are the next generation of accuracy and reliability. Pictured here is the model SP-420 covering the VHF/UHF band from 140-525 MHz. In addition there is the SP-220 covering 1.8 to 200 MHz and the SP-122 covering 1.6-60 MHz with PEP peak hold mode. All three of these new models are ready for PEP output measurement with either the "PEP Monitor" function or the "Instantaneous PEP HOLD" function, back-lighted easy-to-read meters, high sensitivity and very attractive styling. Check your favorite dealer and check out the new WELZ COMPACT VSWR/POWER meters.

MODEL	SP-122	SP-220	SP-420	SP-230	SP-430
Freq. Range	1.6-60MHZ	1.8 ~ 200MHZ	140 ~ 525MHZ	6-1400MHZ	1.8 ~ 150MHZ
Sensor Mnt.	FIXED	FIXED	FIXED	DETACHABLE	DETACHABLE
Pwr Ranges	20/200/2KW	2/20/200	2/20/200	15W/150W	5W/60W
No. Meters	1	1	1	1	1
Peak Mode?	YES + HOLD	YES	YES	NO	NO
Impedance	50 OHMS	50 OHMS	50 OHMS	50 OHMS	50 OHMS
Functions	PWR/VSWR PEP + HOLD	PWR/VSWR PEP	PWR/VSWR PEP	PWR/VSWR CAR VOLTS	PWR/VSWR CAR VOLTS
Accuracy	10% READING	10% READING	5% READING	5% F.S.	5% F.S.

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watt transmitter with an old Hartley circuit. For Christmas the next year, my father gave me a 600 volt generator. Now I was in business, and I expanded to 20 watts by rebuilding the Hartley circuit with four tubes instead of one.

CQ: Wasn't that a little expensive to do for a young boy?
Goldwater: You bet! I remember the tubes cost about $1.00 a watt back then, and I'd go out and pick cotton to augment what other little income I had at that time just to keep the darn thing going. The antenna, by the way, grew to be a four-wire, suspended array about 60 feet long and 4 feet wide. It used plain ground . . . no counterpoise.

CQ: And what kind of station do you have today?
Goldwater: In Washington, I use a Heathkit rig with a Henry 1000 watt amplifier, all into a vertical antenna on top of my apartment house. I do get very pleasant and surprising results, not only with the amplifier, but also working "barefoot" on about 80 watts. I have a 2 meter rig in my car, but I'm not able to use it as much as I'd like to. As for the station in my office, I keep an Atlas 210 on the air there. It's connected to a TH6DXX beam mounted on the roof. An ingenious system in the Senate attic switches both the beam and the rotor control between my office and the W3USS shack, so both stations can use the same antenna.

CQ: What about the station back home in Arizona?
Goldwater: At my home station I use a Kenwood TS-930S with an antenna tuner and amplifier. On the other side of the operating table I have three pieces of gear: a Collins 51S1, a Collins Navy receiver, and a Swan SS-200 transceiver. I have just installed a switching system that allows me to use either side of the shack with either a vertical antenna or stacked Hy-Gain monobanders.

CQ: In the early years, what aspect of amateur radio interested you the most?
Goldwater: I was mostly interested in merely having QSOs with other amateurs. At that time, in 1922 or '23, it was really a rare occasion to connect with somebody and to have a little ragchew. I experimented a little bit with voice, but had no luck. All I was using was loop modulation, and I just never had the time to experiment enough with it. So, I relied on straight CW. I think my best DX was Hawaii to the west, and one station in Iowa to the east. I joined the ARRL sometime in those years, but I don't remember the exact date.

CQ: What about today . . . what are your major interests?
Goldwater: I guess I'd have to say that my major interests today remain pretty much the same as back in the '20s. Of course, equipment has been so modernized that it would be impossible for me to start out with a schematic diagram, put together a transceiver, and expect it to work. I have made a lot of gear using Heathkits. I've enjoyed putting them together, and have found the equipment to be very reliable . . . they practically never wear out! Being in politics, I have virtually no time at all to set up schedules for regular QSOs, but I do participate as much as I can with the YL Net on 14,332 kHz, and I really enjoy that.

CQ: Barry, you've always been very active—and, I might add, quite vocal—on matters of interest to amateurs. Let's talk about a few of the more important issues facing us today.

Nothing is probably more important than achieving growth in our ranks. The League has even set a goal of licensing 50,000 new amateurs per year through the end of the decade. Is this goal realistic, and how would you suggest we go about achieving it?
Goldwater: Well, I don't have any basis upon which to judge whether it's realistic or not. Only time will answer that question. But the concept behind what they are doing . . . of telling non-hams what amateur radio is all about, of explaining the service, and of looking for recruits—will benefit the service whether or not they meet some specific goal for growth. Telling others who we are and what we do is important.

CQ: Amateur radio achieved its greatest rate of growth in the mid to late '70s, when tens of thousands of CBers, look for a more satisfying involvement in communications, moved up to amateur radio. In effect, a "no code" license —albeit CB—provided them an entry point, and once hooked, they moved up the ladder. Is there a lesson to be learned here?
Goldwater: There was a pretty good rate of growth in the early '60s, too, before CB really caught on, so I'm not sure it's all as simple as that. The CB situation certainly demonstrated that an open "public" communications system is useful to a lot of people and that a lot of good—such as public service communications concerned with highway accidents—can come of it. But CB should have been placed higher in the frequency spectrum, where worldwide communications via skip aren't possible. One more comment . . . what's happening in CB today regarding interference is relevant to what we see in amateur radio. It only takes a relatively few persons to cause enough malicious interference for the whole system to get screwed up. Everyone gets a bad reputation based on the actions of a few! That's why I introduced my bill on malicious interference into the Senate.

CQ: You opposed the creation of a "no code" license last year. Why? And do you still feel the same way today?
Goldwater: There's certainly been a lot said on this subject! As we've just discussed, CW was the only mode when I began operating back about '22. I am still a great believer in it, and while not as good at Morse as I once was, I keep trying. I have a Commodore 64 computer, and AEA's Doctor DX gadget, and I have a ball playing with it. In fact, I'm using that a lot because it gives me good practice on CW. Things certainly have changed since I taught the code to Chinese pilots during WW II.

CQ: But what about the "no code" decision?
Goldwater: Quite frankly, Ted, it was conclusively demonstrated that the vast majority of amateurs don't want the current requirements changed. So, I don't think the government should force a change. But in their rejection of the "no code" proposal, the FCC did leave the door open to proposals for some type of new, public communications service. General Electric had proposed something along that line . . . something which resembled both CB and cellular radio, with operations to be in the 900 MHz range. The Japanese have such a service, although with theirs, you can't connect into the 'phone lines. I thought the idea of such a service warranted looking into, but as you know, GE withdrew its support last November, and at least for the time being, that ended the issue. But if there is demand and need, I expect the idea will come up again.

"It was conclusively demonstrated that the vast majority of amateurs don't want the present (code) requirements changed, and so, I don't think the government should force it."

CQ: The average age of an amateur today is 49, and it's increasing each year. If we are to survive as a service, "new blood" must enter our ranks. What is it, do you think, that will attract the youth of this country to amateur radio?

Senator Goldwater operating W3USS, club station of the Capitol Hill Amateur Radio Society (CHARS) located in the Russell Senate Office Building.

Goldwater: The variety and sophistication of electronic equipment is increasing every day. Today's youth are just as interested in computers as youth previously were in radio phenomena. A lot of hams are communicating over the airwaves using computers, and this should certainly be of interest. It also seems to me that the allure of interesting, personal, worldwide communications would also attract many youths, as it always has, if more could only learn about the possibilities open to them through amateur radio.

"I've always considered amateur radio to be more of a public service than a mere hobby. Many aspects of it contribute to the welfare of the general community."

CQ: Do you see some problem with increasing the number of hams in this country?
Goldwater: Increasing the number of hams is a good thing for us and a good thing for our country. I don't think we'll ever have "too many" hams. I've always considered amateur radio to be more a public service than a mere hobby. Many aspects of it contribute to the welfare of the general community. But we need to set our house in order, and set an example for the newcomers. There is too much wanton interference on our bands. And the hardest thing to get across to some of our fellow hams is that first and foremost, the problem is our own. We have to kick our habit of running to the federal government every time someone throws a carrier on the frequency. Otherwise, we're going to see some regulations that we don't like! We have a long history of self-regulation, and I think that's preferable.

"We have to kick our habit of running to the federal government every time someone throws a carrier on the frequency. Otherwise, we're going to see some regulation that we don't like."

CQ: What about the legislation you sponsored on enforcement in the Amateur service? Hasn't that helped?
Goldwater: In 1982 I sponsored legislation that permits the amateurs themselves to take a more active role in enforcement. Yet, the problems have increased. So, now I'm sponsoring legislation (*S. 66—ed.*) to increase the penalties for malicious, intentional interference, and to make such activities a federal crime.

CQ: Let's talk a minute about S. 66. You recently reintroduced this bill in the Senate, and if it's passed it would make deliberate and malicious interference a statutory crime. Why do we need such legislation when the Commission's rules and regulations already cover such problems?
Goldwater: The Commission tells me that recently there has been a significant increase in the number of complaints alleging willful or malicious interference in a number of radio services, including the Amateur service. This seems to be borne out by the mail I get and by what I myself hear on the air. Of course, the *Amateur* rules prohibit intentionally interfering with another's transmissions, but this isn't true in all of the radio services. And the rules apply only to licensees. The bill I introduced would clear this up for all services, on all frequencies.

CQ: How would it do this?
Goldwater: Basically, the bill, if passed into law, wold accomplish three things. First, it would elevate any offense to a federal crime carrying very still penalties . . . much stiffer than for violating a mere regulation. Second, the bill would apply to all instances of malicious interference, in all of the various services, regardless of whether the perpetrator is licensed or not. And third, by making the bill part of the Communications Act, everyone will know about it. This should have a deterrent effect on some of those who cause the problems. If it doesn't, I've already told the FCC to throw the book at them.

Let me add one more thing . . . first and foremost, we—the hams—must accept the responsibility for our service. We need to clean up the abuses ourselves before the FCC steps in. The earlier law I sponsored authorizes cooperation between the hams and the FCC with regard to enforcement. We need to use this law if the problems can't informally be resolved at the local level.

CQ: What about the recent FCC inquiry on repeaters, and the interference problems associated with these machines?
Goldwater: The FCC's look at repeater interference may be just the tip of the iceberg unless we solve these problems ourselves. Our increased freedom from the regulations we dislike is accompanied by increased responsibility to keep our house in order. If we don't do that, bear in mind that the FCC can, and has the responsibility to, come down on us. And the way they must do it—that is, on a uniform, national basis—restricts our flexibility and imposes rules that can only be changed with great effort. It's up to us. And we'd better get going because I hear things on the bands that shouldn't be there. After all, if I hear it in the limited time I spend on the air, there must be a lot of it going on.

CQ: When you became a member of the Senate Communications Subcommittee, you sponsored the legislation to give the FCC authority to set RFI susceptibility standards for electronic home-entertainment equipment. This legislation, now PL 97-259, was signed into law by President Reagan in late 1982. Why did you, as an advocate of the free market system, fight to secure legislation that could eventually be used to impose susceptibility standards on manufacturers by the federal government?
Goldwater: Ted, the free market system didn't seem to work in this instance, and I thought that a kick in the pants might help. It's almost impossible to explain to neighbors that their

"(I introduced RFI legislation because) the free market system didn't seem to work in this instance, and I thought that a kick in the pants might help."

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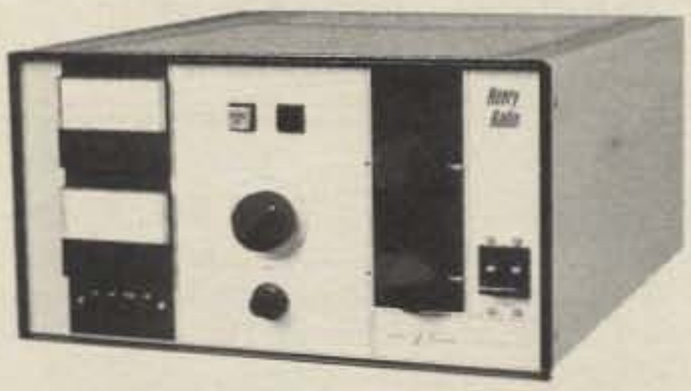

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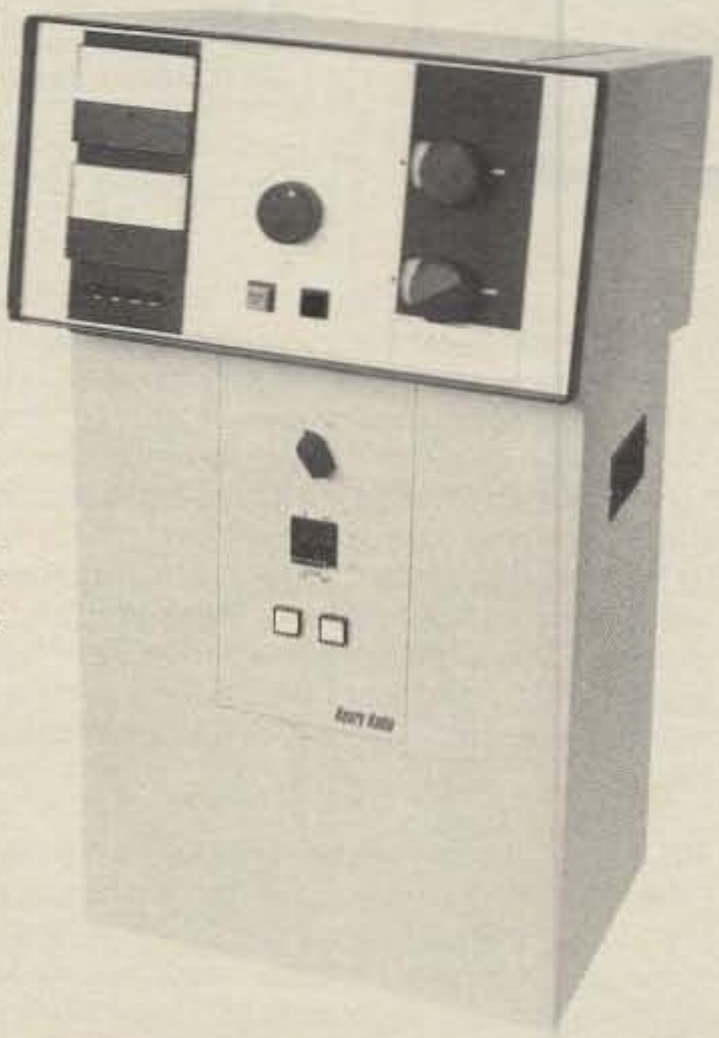

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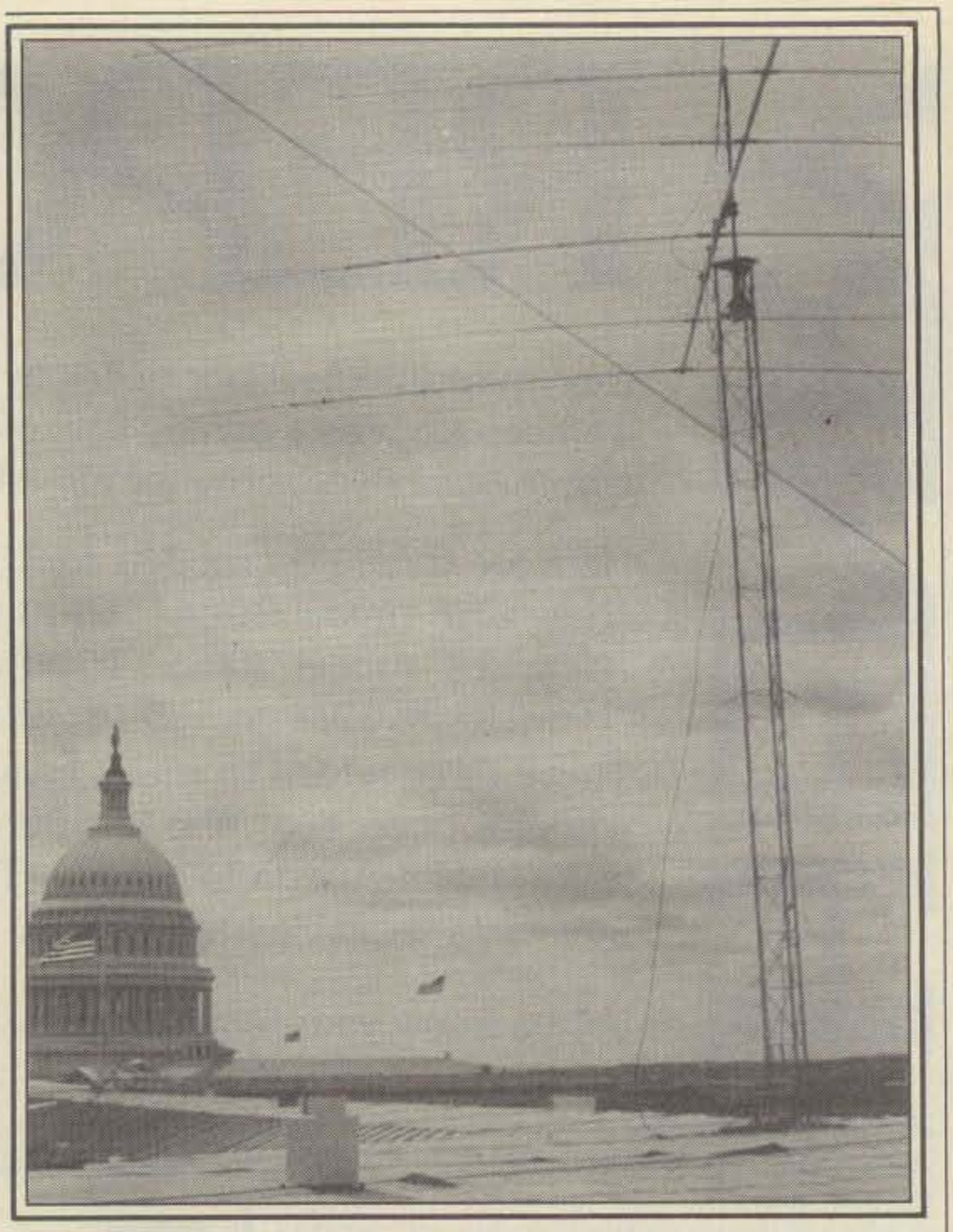

TH6DXX Hy-Gain on the roof of the Russell Senate Office Building. Antenna is used by both K7UGA/3 and W3USS by means of a remote switching system in the attic.

problem with the TV or stereo is their equipment's fault, not the ham's. You and I both know that! And RFI studies proved that in the majority of cases not only wasn't it the ham's fault, but there wasn't anything the ham could do short of closing down completely, and that really wouldn't be a solution.

CQ: Barry, over two years have passed since PL 97-259 was signed into law. What progress has the Commission and the electronics industry made in developing RFI susceptibility standards for home entertainment equipment?
Goldwater: There's been an effort by the manufacturers to develop standards, now that they know the Commission can step in. I can't say I see much difference yet in device susceptibility, but I hope some improvement is on the way. There's still too much equipment out there that is highly susceptible to our transmissions. Some of the new consumer telephones and video cassette recorders really present us with problems.

"If the hams, the League, or whoever else is interested believe that government (RFI) standards are necessary, they should take it up with the Commission. The hams haven't done this since the law (authorizing the Commission to set standards) was passed."

CQ: Where do we go from here, then?
Goldwater: I've done everything I can do. The FCC now has clear authority to act. If the hams, the League, or anyone else who is interested believes that government standards are necessary, they should take it up with the Commission and make their case. The hams haven't done this since the law was passed, so I think the Commission believes that generally, hams see progress. Personally, I think there's a lot of problems out there, though. Basically, I expected that when I pushed the new RFI legislation, if the problems persisted, the hams would go in and tell the Commission about them.

CQ: Earlier this year you introduced Senate Resolution 36. In it you support a balanced approach to federal preemption of local ordinances as they pertain to amateur antennas and their supporting structures. Could you explain the philosophy behind this resolution?
Goldwater: Well, I've gone into this in some detail twice already on the Senate floor. The resolution seeks to strike a balance between the interests of individual citizens who desire to install personal communications antennas, and the legitimate interests of local governments in regulating local matters. There is a middle ground between prohibiting all outside antennas everywhere and allowing any kind or size of antenna anywhere. Between the extremes we must define an area of reasonableness. I don't think that we here in Washington are capable of dictating standards to be followed everywhere in the nation. There must be a reasonable accommodation of both our own interests and those of our neighbors, and the best place for this is at the local level.

CQ: What prompted you to introduce the resolution?

"The resolution (I introduced on antennas) seeks to strike a balance between the interests of individual citizens who desire to install personal communications antennas and the legitimate interests of local governments in regulating local matters."

Goldwater: I introduce the resolution after listening to ham, CB, MARS, and CAP *(Civil Air Patrol—ed.)* operators from across the country and after reading their letters. The told me that in some cases antenna restrictions really amounted to a local ban on any operating. Furthermore, in many cases there weren't any places nearby to which the operators could move in order to escape the restrictions. New satellite earth station antennas are aggravating our antenna installation problems by stimulating even more restrictions. And while the new restrictions are aimed at satellite dishes, they often address all antenna installations. This isn't true in most places yet, but the trend seems to be rapidly increasing. So, I think that to start, a statement from the FCC, setting forth the federal interest in communications, can be used effectively at the local level. And if the federal concern is simply ignored after that, with no reasonable accommodation made, something more will have to be done.

CQ: Of the many purposes served by the Ama-

teur service, what aspects do you consider most vital, and why?

Goldwater: That's a tough one, because there are so many benefits that I don't want to leave out. Let me just say that overall, I think amateur radio is of tremendous benefit to us individually and to our nation as a whole. There's the education value, emergency communications, message handling, phone patches, and international goodwill. We all have our interests, and they're beneficial to us, to our government, and to the people of our nation. This was well put by the Department of Defense in something I was just reading . . . they support the concept behind Senate Resolution 36. Now, they wouldn't be doing that if amateurs hadn't proven their usefulness to this nation.

CQ: We are now responsible for administering amateur exams and for assisting the Commission in the enforcement of the rules and regulations pertaining to the Amateur service. And the League is currently studying the feasibility "... of offering its assistance to the FCC in the area of maintaining amateur licensing records in general, but especially in the administration of special call sign requests of clubs and individuals." *(Minute 100, 1984 ARRL Board of Directors Meeting—ed.)* Do you think these moves to less administrative involvement with our service on the part of the Commission are good?

Goldwater: There are limits, but overall, yes . . . I think we can and should be as responsible as possible for our own service. During my experience in government, I have seen time and time again where a regulation, though perfectly reasonable when passed, later restricts actions in unforeseen ways when circumstances change. But all too often it takes years to make the necessary changes. To the extent that we accept responsibility, we gain the flexibility to keep up with changes. And there are so many changes occurring in communications—and occurring so fast—that government regulations just can't keep up with them. Finally, Ted, let's face it . . . amateur radio is not a high priority item down at the FCC. They have many more pressing problems to deal with in regulating telephones, broadcasting, and cable operations, so we can't expect them to spend much time and money considering the size of the 40 meter amateur phone band. We should be taking care of most things ourselves, as long as we stay within our allocations.

"Let's face it, amateur radio is not a high priority item down at the FCC. They have more pressing problems to deal with. We should be taking care of our problems ourselves."

CQ: But how far should the process of deregulation go, Barry? That is, isn't there a danger that if the Commission steps out of the administrative picture vis-a-vis the Amateur service, we'll lose our mantle of credibility? And if that happens, could we not fall prey to other services that seek out frequencies and that have a higher level of formal recognition with the telecommunications community, in general, and the Commission, in particular?

Goldwater: Well, I don't think the FCC is about to completely get out of the amateur regulation business. But there's little danger to us if we continue to increase our public service commitments and actions, if we continue to use those scarce frequencies to serve the public interest, and if we continue our tradition of pioneering new communications technologies. These activities, and the fact that hams are involved in many other aspects of communications—many of which involve other radio services—are great "protectors." And our accomplishments are well known!

Senator Goldwater at home in the shack.

CQ: During the Vietnam conflict, the Military Affiliate Radio System (MARS) provided tens of thousands of phone patches for our service personnel overseas. In fact, your station, K7UGA, was one of the major "gateways" for this type of traffic. Why is your MARS station no longer so active?

Goldwater: I deactivated the MARS setup two years ago, mostly because I was running out of money to keep it going. At about the same time, all of my old, surplus equipment donated by the Air Force was wearing out and parts were unobtainable. We had completed close to 300,000 contacts on MARS using voice, CW, and radio teletype. I would have liked to have stayed with this work, but it was just beginning to take too much time and money. Besides, the gang who ran the shack was getting tired, too.

CQ: Barry, what do you see as the major challenges facing amateurs over the next five years?

Goldwater: I think that generally we, as hams, must always be open to sensible changes. Communications is a very dynamic field, and while changing the traditional way of doing things sometimes upsets people, we must be open to the changes that progress permits and that other factors require. This includes using some of the newer technologies on crowded bands, such as ACSB *(amplitude compandered sideband—ed.)* on 2 meters. By the way, if we used ACSB here, it would relieve the constraints on repeater operations for years to come, and might make unnecessary the new rules that the Commission has under consideration to solve the congestion problem.

"Communications is a very dynamic field, and while changing the traditional way of doing things sometimes upsets people, we must be open to changes that progress permits and that other factors require."

CQ: But switching to new technologies is easier said than done.

Goldwater: Of course it is! But we've done it before. We led the way with sideband, and as we accept increased responsibility for our own activities, we achieve increased flexibility to pursue our various goals. We don't have to worry that progress is being held up by some regulation that doesn't allow this or that mode, for example, just because the mode didn't exist when the regulation was written. From my perspective, I think that the biggest challenge will be for us to accept more responsibility for ourselves, and to accommodate newer technologies as they become more available . . . technologies such as packet radio, spread spectrum modulation, and ACSB are but a few that come to mind.

CQ: One area where amateurs have certainly taken on more responsibility for themselves is in the area of the Volunteer Examination Program. Could you comment on this?

Goldwater: Well, the Volunteer Examination Program is still pretty new, and the immediate problem we have is effectively implementing the program. I think that this process will be straightened out, and that exams will be much more readily available in the smaller commun-

ities and at more convenient times than when the FCC administered them. Had we stayed with the FCC on examinations, the budget deficit problem would have resulted in so few examination opportunities that the Amateur service would have had real problems. I recognize that there are bound to be some problems in starting up an ambitious program like this, but I'm confident that they'll be corrected soon and that the Amateur service will be better off for it. The bottom line is simply this: either we do it pretty much ourselves, or exams just won't be given!

CQ: We may have touched on some obvious problem areas before, but just to tie things together, what aspects of amateur operations concern you the most today?

Goldwater: I think that the malicious interference problem needs to be cleaned up. And getting back to volunteer exams, the Commission is going to have to make some adjustments to the procedures we use. I don't know, but it seems to me that exam integrity is breached when the exact answer and the three wrong choices to each question that actually appear on the real exam are published. Not only did no one ever intend for this to happen, but it would seem to encourage memorization rather than actually learning the material . . . and that was the precise problem we were trying to fix. Take the math questions, for example. It would seem that examiners could at least vary the figures so that the person taking the exam has to be able to use the equation and solve the problem.

There also seems to be a lack of information about how to find out where exams are being given. And in some areas of the country it isn't easy to get three Extra class licensees together. I think these, and perhaps some additional problems, will have to be addressed by the Commission. I don't have any preconceived notion at this point as to what is the best solution.

CQ: Would the law implementing the Volunteer Examination Program allow for the type of changes you have in mind?

Goldwater: Insofar as the authorizing law itself goes, it's quite general and broad, so the Commission has a lot of room to make the adjustments that may be needed. For example, the statute itself requires only that one amateur holding a higher class of license be responsible, so one Advanced class amateur may give General class exams, both code and theory. I think that there's merit in having more than one examiner responsible, but I'm not sure it need take three Extra class amateurs to give a General class test. Don't misconstrue what I'm saying. Hams need to sit down, think this through, and advise the Commission on what needs to be done. I haven't thought it through myself, but I do know, from talking with others and from reading the mail I get, that problems exist.

CQ: We all know that letters to our congressmen and senators are an effective way to convey our positions on various issues. From your experience, what are the things that go into writing a good letter? Put another way, what are the kinds of things you look for in a letter from a constituent in considering his or her opinion on a vital issue?

Goldwater: The most important things are to provide a brief explanation of what the problem is, what resolution is desired, and why. Send a three-paragraph letter that says: "This is the issue . . .; This is what I think should be done . . .; and This is why I think it should be done." This is much more effective than a one-sentence note to the effect that I should ". . . support amateur radio!" or a ten-page letter that at the end leaves one wondering what the issue is and what, if anything, might be done about it.

CQ: What aspects of the hobby please you the most, Barry?

Goldwater: I think amateur radio is a very beneficial service. So while we have discussed some of its problems, focusing on them is misleading. People don't contact me when everything's going fine; by the nature of the business, I tend to only hear about the problems for which resolution is needed. And I'm aware of that.

But amateur radio provides all sorts of benefits, and 99 percent of the hams are well-behaved on the air and are a real credit to the service. We can't overreact to one or two bad apples.

I think it's especially important that our youth appreciate the benefits of learning the fundamentals of electronics and how to be useful participants in public service activities. For some amateurs this leads to rewarding careers. For others it may lead to regularly providing help with passing messages, or even to helping pass emergency, or health and welfare, traffic, after a disaster. Still others learn more about our world and make friends all over the place. Others, of course, experiment with space communications and new technologies.

Each person has the opportunity to learn from any one of the many things available through amateur radio. And as long as these opportunities exist, I think that amateur radio will retain its magical allure and will attract some of the best people out there. You know, most hams are truly tolerant of others on the bands who pursue interests that might be somewhat different from their own. Today we have amateurs who principally use SSB, CW, SSTV, FM, AMTOR, RTTY, packet radio, satellites, repeaters, computers, or whatever . . . but as long as amateur radio has such variety and its operators respect the activities of others, I think that we're in good shape.

"I feel it has been a privilege to use my station for the benefit of others."

CQ: Given all of the things that you've accomplished as an amateur operator, of what are you the proudest?

Goldwater: I don't know that "proud" is the right word. I truly feel that it has been a privilege to use my station for the benefit of others. I'd especially like to think that during the Vietnam years, the thousands of phone patches we made to places all over the country, and even into South America and Europe, were, in some small way, of help.

CQ: We're just about to wrap this up, Barry, but I would like to ask one more question. It may seem a bit strange to ask this, but given your many years of distinguished service in the Congress, what contribution has amateur radio made to your career?

Goldwater: Well, Ted, I've served as Chairman of the Senate Communications Subcommittee for four years now, and I certainly owe a lot of my understanding of the technology to ham radio.

On a different plane, there are times when I just spend a couple of minutes in QSO on the rig in my office. I find that a very relaxing way to pass a couple of minutes during an otherwise hectic day . . . a day, that at its worse, can stretch to 18 to 20 hours in length, especially near the end of a session. And I've learned a lot by building various pieces of equipment, especially the Heathkits . . . it's quite a relaxing thing to do.

So, ham radio has benefited me over the years. And in return, I've tried to help amateurs when I could.

CQ: Barry, thank you very much for taking the time to discuss amateur radio with us.

Goldwater: The pleasure was mine! CQ

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CQ REVIEWS:

The Ten-Tec Century 22 Transceiver

BY DAVE INGRAM*, K4TWJ

Scanning advertisement pages in various amateur radio magazines can give one the impression that all new-model HF transceivers are essentially deluxe units with similar range price tags. While that array of gear is ideal for financially capable devotees, it doesn't offer much encouragement to traveling amateurs looking for an inexpensive second rig, the CW enthused retiree, or the newcomer faced with a limited budget. Surely there's a new-model solid-state transceiver somewhere that's in the general price bracket of used tube-type gear. Realizing that situation, Ten-Tec recently introduced their Century 22 six-band CW-only transceiver. Considering our world's perpetual interest in CW, the enjoyment of using iambic and memory equipped keyers or classic bugs, or the growing attraction of computerized CW setups, I personally feel that a CW-only rig is a clever idea.

The compact Century 22 is a U.S. manufactured unit that offers respectable "no frills" performance at a fair price. The tan front and dark-brown cabineted transceiver covers 500 kHz spreads in the 80 through 10 meter bands (28.0 to 28.5 MHz on 10), including the new 30 meter band at 10.1 MHz. The rig measures 4" × 10" × 10.5" (height, width, depth) and weighs 6 pounds. Power input is 50 watts, with normal output on each band between 20 and 25 watts. The drive control is easily adjusted to provide 5 watts output for QRP operation, and numerous DX contacts at that power level are daily occurrences on 30 meters. The Century 22 features a built-in SWR bridge, an adjustable 4-pole audio filter with 750 kHz center frequency and 200 Hz minimum obtainable bandwidth, receiver offset tuning with ±2 kHz range, 25 kHz crystal calibrator, front tilt bail, bottom-mounted speaker, plus adjustable CW sidetone and the smoothest full break-in operation (QSK) you'll find anywhere. The rig's power requirements of 13.5 volts DC at 5 amperes maximum can be obtained from various sources such as Ten-Tec's optional 979 AC supply, a solar charged motorcycle or auto battery, or a "shoulder portable" 4 to 6 ampere NiCad battery pack. Low-power rigs have some nifty advantages, eh?

Eastwood Village No. 1201 So., Rt. 11, Box 499, Birmingham, AL 35210

The Ten-Tec Century 22 six-band CW-only transceiver. The unit sports full break-in and double-direct conversion receiver.

General Overviews

Basically, the Century 22 strikes me as a "go anywhere rig" designed for casual enjoyment without excessive concern over financial investment. It's easy to use and understand, and its fully closed cabinet will keep "innards" clean regardless of surroundings. Since the transceiver is completely broadbanded, you simply switch it on, dial a frequency, and start operating. There are parallel connected key jacks on the front and rear panels, so you can mix and match bugs or keyers as desired.

Inside the unit is comprised of five basic printed circuit boards and a shielded VFO unit. Everything is easily accessible, and there's more than enough room for homebrew "extras" or an optional internal electronic keyer. Circuit-wise, the Century 22 uses a double-direct conversion receiver and a basic three-stage

Fig. 1– Technical specifications of the Ten-Tec Century 22 CW transceiver.

Frequency Coverage: 3.5–4.0, 7.0–7.5, 10.0–10.5, 14.0–14.5, 21.0–21.5, 28.0–28.5. (VFO provides approximately 40 kHz overrun on each band edge.)
Stability: Less than 20 Hz change/°F from 70° to 110° after 30-minute warm-up.
Tuning Rate: Approximately 17 kHz/revolution.
Power Requirements: 5 amps maximum transmit at 13.5 VDC, 500 ma receive.
Frequency Tolerance: ±5 kHz of dial reading (±2 kHz when using optional calibrator).
Antenna Impedance: Unbalanced (coaxial), 50–75 ohms.
Receiver Sensitivity: 0.5 uV for 10 dB (S + N)/N, typical.
Receiver Selectivity: 6-pole variable low-pass audio filter, adjustable cutoff frequency from 3 kHz to 300 Hz.
Receiver Offset: Adjustable ±2 kHz, zero offset at center detent.
Audio Output: 1 watt, less than 2% THD.
Transmitter Input Power: 50 watts maximum.
RF Output: 20 watts all bands for SWR less than 3:1, ALC limited.
Semiconductors: 28 transistors, 24 diodes, 7 IC's.
Construction: Rigid metal chassis; molded front panel; aluminum back, top, and bottom; stainless steel tilt-up bail.
Dimensions (HWD): 4" × 10" × 10.5" (25 × 101 × 29 cm).
Weight: 6 lbs. (2.7 kg).

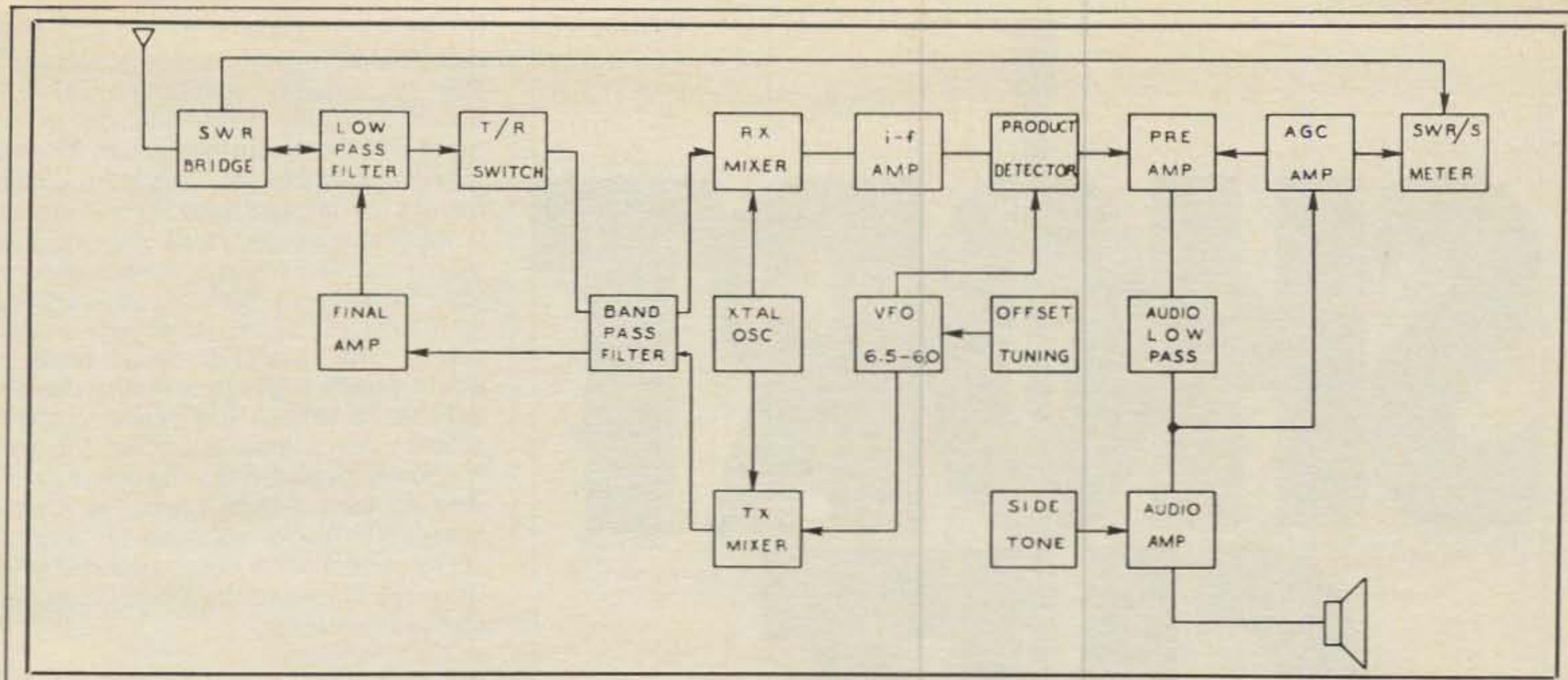

Fig. 2– Block diagram of the "no frills" Century 22 transceiver.

transmitter. Refer to the rig's block diagram (fig. 2), and I'll explain the concept. Let's assume the unit is tuned for 30 meter operation. During receive, incoming signals between 10.0 and 10.5 MHz pass through the T/R switch, the (switch selected) 30 meter bandpass filter, and into the (RX) mixer. The crystal oscillator's signal of 4.0 MHz beats with those 10.0 to 10.5 MHz range signals, broadband converting them to the IF amplifier's range of 6 to 6.5 MHz. IF amplifier and VFO signals are then mixed in the product detector, producing an audio signal which is next filtered and amplified.

During transmit, the same VFO and crystal oscillators are (TX) mixed, bandpass filtered, and applied to the final amplifier. Interesting, eh? Notice this approach permits easy transmitter and receiver tracking while taking advantage of mixer conversion gains. Although the IF amplifier's bandwidth is somewhat broad, the bandpass filter does a good job of reducing out-of-range signals (such as foreign broadcast between 6.0 and 6.5 MHz). Notice also the use of audio-derived AGC and S-meter voltages—basic, yet effective. Since a single-sideband-type crystal filter isn't included, both CW sidebands (or lower/upper SSB signals) are received. The unit's tunable audio filter is useful here. Overall, the receiver's performance is comparable to that of a conventional superheterodyne unit.

On the Air

The Century 22 proved to be an enjoyable rig to operate and a pleasant little traveling companion. It isn't in the "deluxe rig" category, but then neither is its price. Maybe that contributes to its relaxed enjoyment. I often experiment with various wire antennas (mainly on 30 meters), and the flexibility of a separate HF rig which can occasionally be moved into a bedroom or den for these tests is also appreciated.

Ten-Tec transceivers are well known for their smooth full break-in operation (QSK), and the Century 22 is no exception. Its noiseless "no relay action" is superb. The Century 22's RF output is somewhat low compared to many transceivers (22 watts versus 100 watts maximum output), but that doesn't stop one from enjoying many pleasant QSOs, especially on 30 meters. The unit's drive control can also be adjusted to 5 watts output for devoted QRP activities. Too low you say? Hardly. My first "22 QSO" (5 watt level) was a VE7. Later I raised the output to 20 watts and easily worked a couple of JAs. The rig runs cold as a stone regardless of output. Incidentally, the Century 22 isn't switchable to semi-break-in operation, and external keying for a linear amplifier isn't provided. One could rig a separate circuit for that, if desired, however.

Although the rig's receiver will copy either CW sideband, the situation really isn't objectionable. I merely set the offset tuning on the "minus 1 kHz side" and remember to tune signals accordingly. The tuning knob's skirt is calibrated in kHz,

while the front dial is calibrated each 100 kHz. That arrangement is quite satisfactory for casually operating most HF bands. The only operational disadvantage I've noticed with the Century 22 is its lack of a noise blanker. During the winter months my neighborhood is infested with power-line garbage. Hopefully, you are more fortunate. A slight problem was initially noticed with operating the unit with its mating Ten-Tec 979 "economy" AC supply. The (supply's) circuit breaker would trip when RF output was increased beyond 22 watts. That easily rectified problem was pointed out to Ten-Tec and will surely be cleared by the time this review appears in print. As you've surely heard, Ten-Tec's outstanding service policy is second to none. Likewise, the Century 22 is backed by an unconditional one-year warranty.

Summary

All aspects considered, the Century 22 is a simple and easy to operate CW transceiver with an attractive price tag. It fills a rather obvious vacancy in the marketplace, and it appears to have a promising future, especially among newcomers and QRPers anxious to join 30 meter action. The ever-classic Argonaut, you may recall, doesn't include 30 meters on its bandswitch. I also visualize the Century 22 as a "calm operator" type rig—a single VFO, no memories, yet instant on and no tuneup operation. Assuming one uses an all-band wire antenna (such as the 102 foot G5RV "dipole"), band and frequency selection become mere front-panel choices. The unit's built-in SWR bridge is great for out-of-shack operations, and its optional internal electronic keyer is quite handy for mobile or portable excursions. Overall sensitivity and selectivity are quite ample for casual operations, and the rig's variable filter does a respectable job of reducing adjacent channel interference.

You know, there are two more ways to look at a transceiver of this nature. One is the refreshing air of enjoying a "tag-along rig" without extreme concern over its high cost. The other is rediscovering the sheer joy of CW. Today's electronic keyers really sing beautiful Morse. Miniature hand keys are always fun to use. Ditto to computerized CW systems. There's also a special treat in using a classic model bug that has to be experienced to be fully appreciated. Those mechanical marvels are a blast of pleasure: the Go Devil, Blue Racer, the Champion (still available new from Vibroplex) etc.

The Ten-Tec Century 22/579 transceiver is supported by a number accessories, including the 979 13 volt/5 amp AC supply, the 225 13 volt/9 amp supply, an internal keyer, or two styles of external keyers. For more information, contact Ten-Tec, Inc., Highway 411 East, Sevierville, Tennessee 37862. CQ

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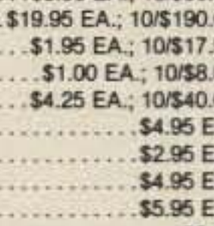

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The new Soviet callsigns are a year old this month. Much has been written about them (including in CQ) and the bulletins are still publishing updated information. To facilitate an easy understanding of what they are and what they mean, UV3GM has supplied us with the following material.

Understanding Soviet Callsigns

BY VALERY GROMOV*, UV3GM

On May 1, 1984 changes were made in the amateur call-sign system used in the USSR, which drew the attention of amateurs worldwide. A couple of articles appeared in the amateur press explaining this modified system, yet no one did it quite correctly. This article contains full and accurate information on changes made along with some ideas of what prefix hunters might expect to hear in the coming months.

What strikes one first is probably the multitude of new exotic prefixes such as UC1, RV4, or UM9, which have been in regular use since the 1st of May. Maybe it looks a bit like US call-sign restructuring of the late 1970s when so many new prefixes showed up. And indeed, the principal aim of both events was to increase call-sign capacity.

However, our modification also pursued another object—that of providing better identification of the administrative units of which the union republics of the USSR consist. These units are the autonomous republic (ASSR), autonomous oblast, autonomous okrug, kray, and oblast. Most of them have their local offices which issue amateur licenses on behalf of the Ministry of Communications, so separate call-sign identification of each unit is necessary.

The administrative units in question are listed in an official publication of the Supreme Soviet of the USSR, which is also a standard reference for the popular R-100-0 award. In the R-100-0 program all administrative units are called "oblasts" (abbreviated OBL on QSL cards) and have their unique 3-digit numbers. Because the official list also contains the names of eight big cities such as Moscow, Leningrad, Kiev, etc., all these cities are now given their own identifiers and "oblast numbers" (see Table II).

It is apparent, however, that the most needed call-sign information for any DXer is the country from which the station operates, or, in our case, the union republic of the USSR. As shown in Table I, the modified call-sign system provides simple identification of union republics by the second prefix letter. All you have to keep in mind is that regular USSR call signs begin with either R or U, and memorize or have at hand the republic identifying letters listed in the second column of Table I.

To understand new Soviet call signs must be quite easy for every DXer, for there is nothing new in the modified prefix system. If you compare the left- and right-hand columns of Table I, you will find that

Prefix	Identifying Letter	Union Republic of the USSR	Former Prefixes
RA, UA	A-(N)-V-W-Z	Russian SFSR (RSFSR)	RA1-4, 6, 9, Ø UA1-4, 6, 9, Ø UK1-4, 6, 9, Ø
RB, UB	B-T-(Y)	Ukraine	RB5, UB5, UK5
RC, UC	C	Byelorussia	RC2, UC2, UK2
RD, UD	D	Azerbaijan	RD6, UD6, UK6
RF, UF	F	Georgia	RF6, UF6, UK6
RG, UG	G	Armenia	RG6, UG6, UK6
RH, UH	H	Turkmenia	RH8, UH8, UK8
RI, UI	I	Uzbekistan	RI8, UI8, UK8
RJ, UJ	J	Tadzhikistan	RJ8, UJ8, UK8
RL, UL	L	Kazakhstan	RL7, UL7, UK7
RM, UM	M	Kirghizia	RM8, UM8, UK8
UN	see above	RSFSR	UN1
RO, UO	O	Moldavia	RO5, UO5, UK5
RP, UP	P	Lithuania	RP2, UP2, UK2
RQ, UQ	Q	Latvia	RQ2, UQ2, UK2
RR, UR	R	Estonia	RR2, UR2, UK2
RT, UT	see above	Ukraine	UT5
RV, UV	see above	RSFSR	UV3, 4, 6, 9, Ø
RW, UW	see above	RSFSR	UW1, 3, 4, 6, 9, Ø
UY	see above	Ukraine	UY5
RZ, UZ	see above	RSFSR	UZ3, 9

Table I– Prefixes of Union Republics of the USSR. All 10 figures from 1 to Ø may be used in each republic. In RSFSR, stations with 1–6 in the call signs are located in the European part, while those with 7–Ø are in the Asiatic part of the republic. In other republics the figure in the call sign does not mean anything geographically. The UN and UY prefixes are only used in old UN1 and UY5 call signs. There will be no new licenses issued with these two prefixes.

*P.O. Box 88, Moscow, USSR

Oblast Number	Oblast Indentifier	Possible Prefixes	Oblast Name	Former Identifier
002	D-N	RD1...Ø, UD1...Ø	Nakhichevanskaya ASSR	6C
009	C-C	RC1...Ø, UC1...Ø	Minskaya	2A, 2C
018	L-Q	RL1...Ø, UL1...Ø	Alma-Atinskaya	7G
053	I-B	RI1...Ø, UI1...Ø	Tashkentskaya	8A
065	B-U	RB1...Ø, UB1...Ø	Kievskaya	5U
067	B-J	RB1...Ø, UB1...Ø	Krymskaya	5J
174	8T	RA8, RV8, RW8, RZ8 UA8, UV8, UW8, UZ8	Ust-Ordynsky Buryatsky autonomous okrug	ØT
175	8V	RA8, RV8, RW8, RZ8 UA8, UV8, UW8, UZ8	Agynsky Buryatsky autonomous okrug	ØV
184	I-Q	RI1...Ø, UI1...Ø	Navoiyskaya	-
185	M-T	RM1...Ø, UM1...Ø	Talasskaya	-
186	T-U	RT1...Ø, UT1...Ø	Kiev city	5U
187	T-J	RT1...Ø, UT1...Ø	Sevastopol city	5J
188	C-A	RC1...Ø, UC1...Ø	Minsk city	2A
189	I-A	RI1...Ø, UI1...Ø	Tashkent city	8A
190	L-G	RL1...Ø, UL1...Ø	Alma-Ata city	7G
191	H-A	RH1...Ø, UH1...Ø	Ashkhabad city	8H

Table II– Changes in oblast list of the R-100-0 Award. Six new oblasts have been created (OBL 186–191), all being big cities included in the official list of administrative units of the USSR. Deleted from the list are the Arctic area (OBL 171) and Antarctica (OBL 172). Franz Josef Land, formerly OBL 171 and "1P," is now OBL 113 and "10." Note two different ways of identifying oblasts in the RSFSR (see OBL 174 and 175) and in other union republics.

all republic identifying letters have already been in use for years. It is actually the same old system extended in two ways: (A) all prefixes shown in Table I—either RA, RB or UA, UB, etc.—will now be used equally by all classes of stations, including club stations; and (B) any figure from 1 to Ø is permitted now in the call signs of each union republic.

The Novices (formerly EZ and EY) have been given their new regular 2 × 3 call signs, which they can now keep when upgrading. In Moscow, for example, some of the former EZ3s became UA3s, some RA3s, and a few even UV3s (e.g., UV3AAD). When former VHFers are upgraded, they retain their old call signs, too. Therefore, don't be surprised if you hear RA9XXX or RB5YYY operating on 14.030 CW. Also, the 2 × 2 call signs are now available to the first-class individual stations, and each first-class operator may change his 2 × 3 call to a new 2 × 2 one of he so wishes.

One of the traditions of our call-sign system is special indication of club stations. In the modified system, to keep uniformity of republic identification and avoid ambiguity of UK prefixes, there was a new indication method introduced. Now all the club stations are given 2 × 3 call signs ending with letters from WA to ZZ, while individual 2 × 3 call signs will end only with AA to VZ. It may sound complicated, but you really needn't keep this information in mind when hunting for countries or oblasts!

Club stations will now use exactly the same prefixes as individual stations. The fact that former UKs in Russia (the RSFSR) changed their prefixes to UZ doesn't mean that it is the new "club station" prefix. Gradually, club stations will be given all other RSFSR prefixes (RZ, UW, RW, etc.).

The RSFSR is now the only republic where the call-sign figure still plays an important geographical role. Figures 1 through 6 denote the European part of the republic, while 7 through Ø denote its Asiatic part. At present there are no UA5 or RA7 call signs in use, but you have a chance to work some UA8s or UZ8s from one of the rare oblasts 174 or 175.

In all other union republics different figures are used just to increase call-sign capacity. It is recommended to use the figures in certain patterns, all starting with the "habitual" call-area number. For union republics located in Europe the pattern is "down to 1 then up to Ø." For union republics of Asia it is "up to Ø then down to 1." The new club station prefixes (UP1, UB4, UD7, UL8, UM9, etc.) illustrate how those patterns work.

The call-sign figure in the RSFSR is also an element of the two-character oblast identifier, the other element being the first suffix letter. There was no change in the oblast indentifiers of the RSFSR except for OBL 174 and OBL 175 mentioned above (see Table II). In all other republics the two-character oblast identifier now consists of two letters: the second prefix letter and the first suffix letter. If you are interested in the R-100-0 award, you can easily convert your Oblast List to the new identification system using the examples in Table II and the republic identifying letters in Table I. Say, instead of the former

"2B" (OBL 038) write down "P-B"; instead of "6Q" (OBL 014) put down "F-Q"; etc.

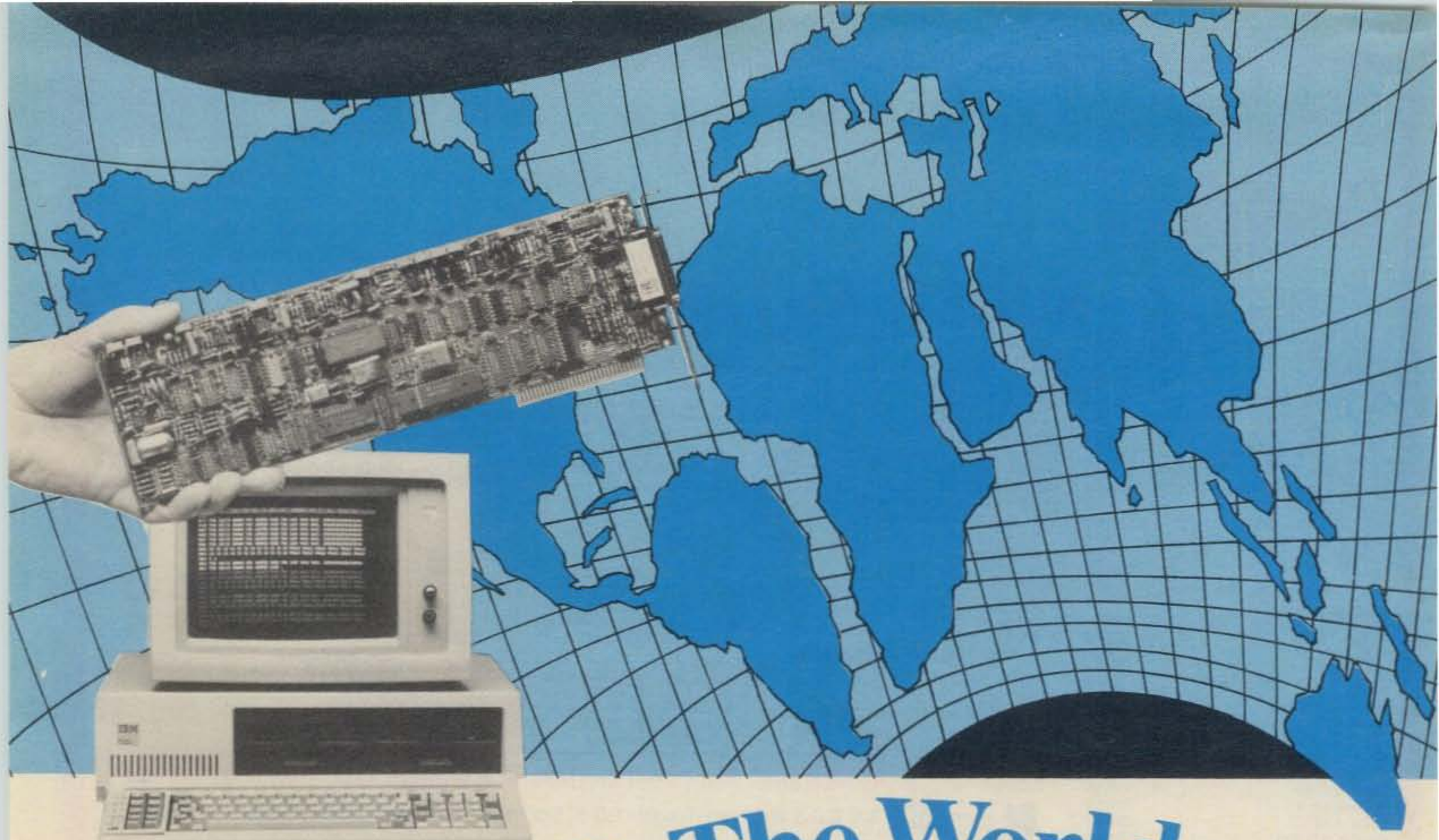
The dash between the two letters of the oblast identifier means that the call-sign figure might be anything from 1 to Ø. When you hear UB4MWF or RB5MA, it is the "B-M" combination which identifies the oblast (OBL 059), not the figure. In the modified call-sign system we now have a chance to identify oblasts 184 and 185 (see Table II), which formerly had no separate identifiers. Also, in the Ukraine, where all the combinations from "B-A" to "B-Z" have been in use since 1970, it is now possible to identify more new oblasts. The cities of Kiev and Sevastopol got their separate call-sign blocks marked "T-U" and "T-J," respectively, and out of these cities you are now going to hear RT5's, UT4's, and other RT and UT prefixes. Having a large reserve of potential oblast identifiers ("T-A" through "T-Z"), there is no need to use UY or RY prefixes in the Ukraine, and after existing UY5 stations cease operation, the Ukraine will be identified by "B" and "T" letters only.

All the 2 × 3 call signs, whether individual or club, fully comply with the modified oblast identification, and so do the 2 × 2 calls issued after May 1, 1984. Yet there was no change in the old 2 × 2 call signs issued before 1970. Unfortunately, for some of them, the oblast either couldn't be identified from the standard list (e.g., UA3CR, UW4IF) or the identification would be wrong. For example, UA1NA is in OBL 136, not in OBL 088, as arises from the "1N" oblast identifier, while UN1CC *is* in OBL 088, not in OBL 136 as "1C" shows. Don't be upset, however. There is a simple cure: the Callbook, where all the old USSR 2 × 2 call-signs are listed along with their locations.

Now a couple of words about "permanent" special call signs. In fact, the UK prefix was not completely abolished. It is still in use by the Central Radio Club stations UK3A, B and F, the "Radio" Magazine, UK3R, and "Komsomolskaya Pravda" youth newspaper, UK3KP. To complete the list we should mention RS3A, the RS-Satellite Command Center in Moscow which occasionally operates DX, and U5A, the "Artek" young pioneer camp in Crimea (OBL 067), formerly U5ARTEK.

In addition to so many new regular prefixes, the prefix hunters have a good chance to work almost 50 more special prefixes in 1985, beginning with EM, EO, ER, EU, EV, and EW. There is a full-scale special operation planned in our country to celebrate the 40th anniversary of the victory over fascist Germany. This operation will take place from January 1 until May 9, 1985, with more than 100 special stations on. But that is a separate story.

CQ



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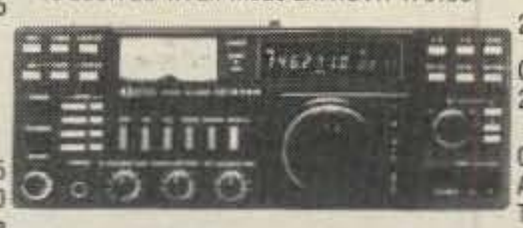

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No -33-34

RESULTS OF THE 1984 CQ WORLD-WIDE WPX CW CONTEST

BY BERNIE WELCH*, W8IMZ

This was another fun contest weekend with DX and prefixes plentiful. Record participation and number of logs received made this the best since the CW section was established in 1979—all of this while other contest sponsors are bemoaning a decrease in activity and logs due to the current sunspot problems.

We have a total of 27 new all-time records. Five of the six continents changed ownership in the multi-single category. The North Texas Contest Club established a fantastic world club record of over 53 million. Major contributors to this record were NTCC contest expedition stations VP2EC, operated by N5AU and KC5EA; and ZF2HF, operated by K5RX and KM5R. Also, each won a trophy—the World Multi-Op, Single Xmitter by VP2EC, while the World-Contest Expedition Trophy went to ZF2HF. The U.S.A. Club Trophy also goes to the southwest, as it is now owned by the Texas DX Society. Seems as though all the Texans do things in a big way. Very FB!

Unique expeditioner K2KTT shuttled between FG0 and PJ7 to give two countries, and he won two certificate awards for his efforts. Station YZ1EXY, the high-scoring multi-multi group, was ineligible for the world trophy under the two-year rule. However, *CQ* is awarding them a special achievement plaque. The multi-multi trophy goes to Lithuanian station RP3P and the 17 UP2 ops. All single-op single-band trophies, with the exception of 3.5 MHz, were won by stations utilizing the 20 meter band. Puerto Rican station KP4BZ was world tops. The EA9CE multi-multi station filled a big empty space in the All Time Records as a first for Africa in that category. Mucho Gracias!

In 1978 we initiated the Club Competition and the QRPp section, receiving 28 and 29 logs, respectively. In just six short years the numbers jumped to 71 total clubs and in this CW section alone, 85

The second world high all-band QRPp score was by Dave, 4T8CP, in the jungle of Peru.

N7DF/0 burning the midnight oil on 80 meters.

QRPers. NY4D is the world top QRPp station, followed by 4T8CP in the all-band category. 4Z4NUT was the leader on 21 MHz. A new (not published in the rules) CW QRPp Trophy, sponsored by the QRP Amateur Radio Club International for world all-band QRPp, is available with the '85 contest coming up on May 25 and 26.

You ask, was anyone on 10 meters? Well, we didn't receive a S/O log from a U.S. station. However, in other parts of the world there was activity. OK3LZ was tops with almost 51 thousand points. In Asia it was UM8MDE, 18,980 and JH1RNZ, 11,234. The number one band was 20 meters, followed by 40 and 15, with some action on 80 and 160. Speaking of 80 meters, EA8RL came through with an all-time record for Africa, while RB5IM did the same for Europe.

A reminder that official log forms, summary sheets, and copy of the '85 rules are available from the *CQ* office by sending SASE and/or IRCs. The '85 rules were published in the January *CQ* and should be reviewed, especially if you are new to WPX contesting. Some special items: "A 'PREFIX' is counted once during the entire contest regardless of how many times the same prefix is worked." A few multi-band stations still try to take them on each band. "A station in a call area different from that indicated by its call sign is required to sign portable." If you are a W8 operating in the 6th U.S. District, you must sign portable "/6" in this contest, and the portable prefix is the multiplier. When changing bands, multi-op, single transmitter stations must spend at least 10 minutes on the band before transmitting on another band. Also, may I remind you of the points advantage by contesting on the 40, 80, and 160 bands. Read the contest rules!

We cannot begin to acknowledge each individual, group, club, and agency responsible for making this an outstanding event. We assure you that your efforts are truly appreciated, and please continue to support the contest by sending in your log, regardless of the number of contacts or score.

I was happy to help Steve, N8BJQ/6, with these CW results. The work load would not have been finalized this year to meet our extended deadline without the help of my XYL, Eleanor, who clerically assists. Thanks to my number one log-checking assistant, Ron, W8ILC. We also appreciate the sporadic help from Ray, KR8B, and Mike, WB8MRU. Myron, WB4VQO, and his XYL, Mil, spent part of their Christmas vacation with us checking logs—that's friendship, hi, hi. Thanks also to Contest Chairman, Frank, W1WY, for his outstanding support.

Queries pertaining to this contest and

*CQ Contest Advisor, c/o CQ magazine

all previous WPX contests should be directed to the WPX Contest Director, Steve Bolia, N8BJQ/6, c/o *CQ* magazine. That's it for this one. I hope to see you at the Dayton Hamvention. If not, then CU in the pile-ups. Hope to work ya in the next one.

73, Bernie, W8IMZ

Random Comments

Amazing how runs can be developed by QRPp and a CQ . . . *NY4D (Op. K4XS).* I think I know now how Cinderella must have felt at midnight; my special prefix disappeared at 2400 and I discovered I was still in the jungle of Peru . . . *4T8CP.* Only four days to put up antennas . . . *KH6CP.* Hoped to make a winning score in the QRP section while running only 250 milliwatts output. However, violent thunderstorms and other pressing activities limited my available operating time . . . *W9PNE.* Very poor conditions in 10 meters . . . *YO6DDF.* Never have I worked so hard for such a small score (21 MHz QRPp) . . . *W6YMH.* Condx were poor, but it was possible to work many DX even with QRP . . . *OK2BMA.* QRP!! Small is beautiful . . . *JH2WIC.* QRP can go long—but was JA2, Hi. Less power = more fun . . . *OZ9MM.* Same QRP rig as last year, but doubled my score . . . *KB1DH.* Rig home made, output 5 watts . . . *UB5KAG.* FB contest for QRPers! CUAGN 1985 . . . *HA7ZX.*

Where was South America? . . . *KT10.* Worked TR8 for DXCC #276. Had fun. CU next year . . . *W1CNU.* Worked HZ1HZ out in the clear—no pileup! . . . *W1BK.* Sure wish other DX would listen for USA on 80—propagation is there . . . *KQ2M.* First use of computer. Program bombed . . . *W2FTY.* It's amazing what you can do without ever sending QRZ or CQ . . . *KW2J.* After checking the log and doing the paperwork, I'm sure glad I'm a "Little Pistol" . . . *W2DW.* This contest is always fun no matter how long or short you operate . . . *K3WGR.* This is my favorite contest . . . *WB3JRU.* End of test like a feeding frenzy of sharks . . . *AI3Q.* Does getting sick after only 2 hours on count as Murphy's flu? . . . *WA3VPL.* Great condx here in FLA . . . *WC4E.* This is fact becoming my favorite contest. Great contest and condx! . . . *K4PQL.* Hard to get started when your high school graduation is first 2 hours of test . . . *WD4PZN.* Lots of fun—good signals from Europe from HG6N, HG5A . . . *K4RDU.*

Forty meters was tremendous, as was the 15 meter opening on Sunday morning . . . *N5AU (Op. N5RZ).* My first Meg. in a contest—sure had a lot of fun! . . . *K5RX (Op. KM5X).* 39 new US and 28 new DX prefixes . . . *W5PWG.* My first WPX contest. Surprised at how easy it was for us "little guys" to work DX . . . *KA5KWX.* Say goodbye to 15M. Very little Europe and no JA's on Saturday . . . *NI6W.* I lost all of Saturday morning to a neighbor's vacuum cleaner . . . *K6CSL.* Working the WPX is nice and easy on a single band for a senior citizen over 70. Hi! At the end of the contest my non-exotic call (W6) had a pile-up. I couldn't believe it . . . *W6BIP.* Don't like it when eastern block stations are QRM'd by westerners deliberately. Goodwill counts . . . *KA7FEF.* Thanks to all for QSO's . . . *WB7FDQ.* Contest propagation lives again. How about policing bottom of band and disqualifying those operators below the band . . . *W7FGT.*

DX stations take note, only 9% of U.S. amateurs can operate in the lower 25 kHz of 80 thru 15 meters . . . *N8II.* Wish I would have had

Corrections For The WPX SSB Contest

The following errors were found in the results of the 1984 WPX SSB Contest published in the March '85 issue:

USA 6th District Single Op K6HZZ should read K6HNZ (p. 28).

On the first page of the results (p. 22), the caption for the photo on the top in the center has an error. The callsign of the second op from the left should be LZ2CC.

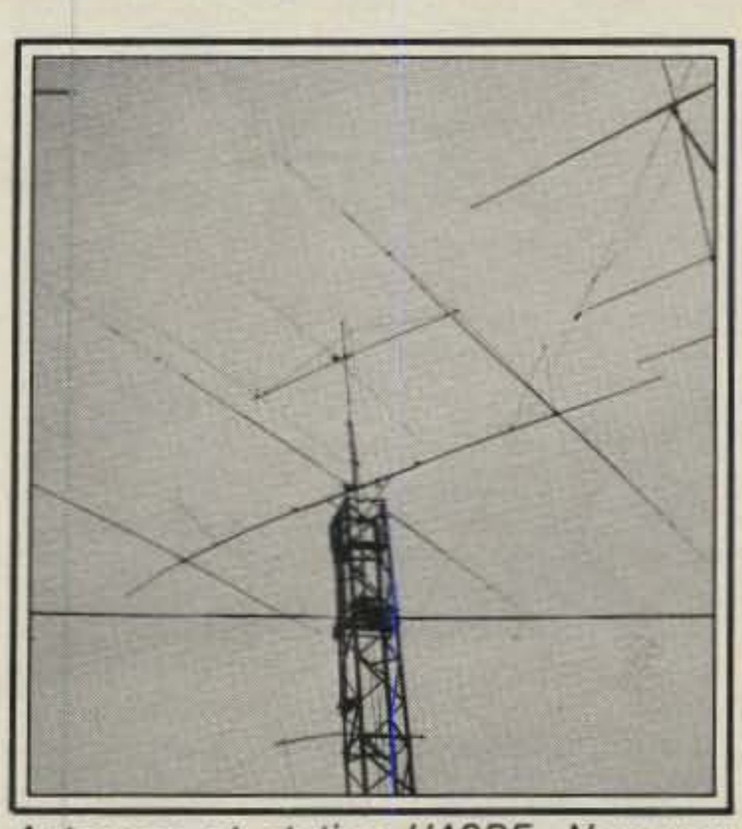
Mike, WB8MRU, started his WPX-DX contesting career as a guest op at W8IMZ and won a certificate award for his efforts.

JA opening on Saturday nite. Might have cracked 1 Meg. in points . . . *KW8N (Op. WD8LLD).* Three aluminum elements in Yagi much better than four wire elements in Zepp. See you all next year on 7 MHz . . . *KV8Q.* Asked Mr. Murphy to op with me this year, but he declined, stating I have enough problems without him, Hi Hi . . . *KS9S.* No 28 mcs activity possible here . . . *W9TNZ.* New Russian prefixes sure messed up my dupe sheet . . . *W9RE.* Two new countries on 80 . . . *KG9N.* Thunderstorms Fri., Indy 500 on Sunday. That left me with only Sat. night to contest—good conditions . . . *KJ9D.* BY4AA came on my frequency on 7 MHz and started calling CQ . . . *W0ZV.* This contest is the most fun of all . . . *KM0L.* I sure miss 10 meters . . . *KS0T.* You know things are slow when one of your better hours is spent on the Novice band getting KA prefixes! (80 meters) . . . *N7DF/0.* Condx continue to decline with cycle—high QRN levels —5-9 at times . . . *W0JU.*

Eighty and ten were not of much help . . . *5Z4MX.* Enjoyed my first WPX contest. Could only start late on Saturday, because was busy in the morning constructing my new foldover tower. Hi Hi! . . . *ZS6ME.* At least 50 stns at S9+, but could not get thru European QRM. Heard GU4DFN, N7DF/0, NP4P, VP9LB, W8IMZ, UJ8JMM, UA0AHZ, UP1BZZ, etc.—frustration (80 meters) . . . *ZS6BVR.* Conditions were generally poorer than the 1983 edition. Some 40 meter openings made the contest interesting . . . *VE3IY.* Intermittent power leak, so many breaks in operation . . . *VO1AW.* Where were the Yanks on 15? . . . *VE3OCU (Op. VE2ZP).* This is my fourth CW WPX. It just keeps on getting better. Made more QSO's first night this year than entire contest first year. Hi! . . . *VO1QU.* My sincere thanks to VE6OU for the loan of the KW linear . . . *VE6CB.* I hope that the BY8 was *the* BY8. Thanks again *CQ*, enjoyed it . . . *6Y6A (Op. 6Y5HN).* Very nice contest . . . *JA6BIF.* Flash! I got BY4AA on 28 MHz during WPX contest . . . *JH1RNZ.* I think my signal is weaker than QRPers'. I didn't reach ZS nor 9H nor G land . . . *JN1WFF.*

Thanks to *CQ* for this nice contest. I hope to be here for next one with new callsign . . . *UA9AAP.* Fine contest, good propagation, but where were all the JA's on 160 meters? . . . *UA9ADY.* Age 42, in ham radio from 1963 with LZ2PG from 1967 . . . *LZ2PG.* Good condx in last part of contest (28 MHz)! CUAGN in WPX 1985 . . . *OK3LZ.* Had a minor accident with my left hand Sunday morning, so was not able to use the keyer. Hi! . . . *OZ7JZ.* Enjoyable contest. Nice to meet so many old friends. I used to be ZD8TC . . . *G4UPS.* Rarest QSO CE on 3.5 MHz, now 92 wrkd on CW . . . *OH3RF.* My first *CQ* WPX on 160 meters . . . *DL2SAX.* Biggest thrill was working several new USA prefixes during the last hours of the test . . . *HA0DU.* Licensed on 21 Jan. 1984. This is my first "BIG" test after 3 years SWL in CW . . . *IK2DVG.* Big fun working K9UIY! . . . *I2UIY.* Couldn't get an antenna up for 80 and 160 despite many QSO requests. Pls QSL to LA2TO . . . *9H1EL.* Always fun in *CQ* WPX . . . *PA0DIN.*

Worked 6 new countries and many new prefixes . . . *PA3BNT.* Best wishes to WPX Contest Committee . . . *SP5JTR.* My first WPX test. My objective, to reach 1,000,000, was almost obtained. Next year I'll do it. Age 18 . . . *CR7BOH (Op. CT1BOH).* A fun test. Three new countries . . . *SM7ERC.* Again too many USA dupes. I was calling all the time . . . *4N2CQ (Op. YU2CQ).* Thanks for the contest, dear friends . . . *UZ3TG.* TR8JL was new country for me . . . *UR2RHF.* Thunderstorms destroyed all my plans with DX propagation. Murphy's Law. (80 meters) . . . *UB5XCM.* An award(s) for the "70's and over" would be most interesting. Will be "training" for next year—Hi! . . . *VK5AGX.* Thanks for another fun contest. Hope to be in it again next year. How about from VK9K Christmas Island? Not that far away . . . *YB2ARH.* 61% of my QSO's were with JA's, 18% U.S., and 7% USSR. Got to improve on the U.S. percent. That's where the multipliers are located . . . *K1BAZ/DU1.* About 10 to 15 years ago I was always among the highest scores. Remember PU7APS, ZV7APS, PV7APS, etc.? Now my twins Natasha and Tatiana of 3½ years didn't give too much free time . . . *PY1APS.*



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TROPHY WINNERS
SINGLE OPERATOR - ALL BAND

WORLD - Canadian DX Assn. Trophy. Won by: **Karamian Alexander Nicolaevich, UF6CR.**
U.S.A. - Steve Bolia, N8BJQ Trophy. Won by: **Station N5AU, Opr. Ralph E. Bowen, N5RZ.**
CANADA - Canadian A.R.F. Trophy. Won by: **Jim Roberts, VE3IY.**
EUROPE - Sig. Jakobsson, TF3CW Trophy. Won by: **Jeff Morris, 9H1EL.**
JAPAN - Palm Gardens Contest Club Trophy. Won by: **Tatsuro Yamasaki, JA5BJC.**
WORLD QRPp - Nevada ARA Trophy. Won by: **Station NY4D. Opr. Bill Kollenbaum, K4XS.**

SINGLE OPERATOR - SINGLE BAND

WORLD - Pedro Piza, Jr. NP4A Trophy (Pedro Piza, Sr., KP4ES Memorial). Won by: **Station KP4BZ; Opr. Felipe J. Hernandez, NP4Z** (14 MHz).
U.S.A. - Kansas City DX Club Trophy. Won by: **Station NA8V; Opr. Patrick Barkey, WA8YVR** (14 MHz).
ASIA - Bruce Frahm, K@BJ Trophy. Won by: **Sergej S. Savkin, UA9YAN** (14 MHz).
WORLD - 3.5 MHz - Lance Johnson Eng. Trophy. Won by: **Juan Socorro, EA8RL.**

MULTI-OPERATOR SINGLE TRANSMITTER

WORLD - Ron Blake, N4KE Trophy. Won by: **Station VP2EC; Oprs. KC5EA & N5AU.**
U.S.A. - Austin Regal, N4WW Trophy. Won by: **Station N4WW; Oprs: N4SA, N4WW & NX4N.**
CANADA - Tehrahedral Contest Circle Trophy. Won by: **Station VE7ZZZ; Oprs. VE7ENF, VE7EPN, VE7DSM, VE7ENS.**
EUROPE - Jonas Bjarnason, TF3JB Trophy. Won by: **Station LZ2KTS; Oprs. LZ1NG, LZ2CC, LZ2DF, LZ2HE, LZ2PO, LZ1A-310/2.**

MULTI-OPERATOR MULTI-TRANSMITTER

WORLD - North Florida DX Assn. Trophy. Won by: **Station RP3P; Oprs. UP2OO, UP2OU, UP2BBT, UP2BCR, UP2BCT, UP2BDF, UP2BFI, UP2BFN, UP2BFL, UP2BGF, UP2BIO, UP2BMW, UP2BNY, UP2BOA, UP2PAV, UP2PCI, RP2BHN.**
NORTH AMERICA - Dick Weber, K5IU Trophy. Won by: **Station KL7RA. Oprs. AL7CQ, KL7RA, NL7G, WL7E.**

CONTEST EXPEDITION

WORLD - Ed Roller, K4IA Trophy. Won by: **Station ZF2HF; Oprs. K5RX & KM5R.**

SPECIAL ACHIEVEMENT

WORLD - CQ Magazine Trophy. Won by: **Station YZ1EXY.**

CLUB COMPETITION

WORLD - Canadian DX Assn. Trophy. Won by: **North Texas Contest Club.**
U.S.A. - Northern Ohio Amateur Radio Society Trophy. Won by: **Texas DX Society.**

This was my Swan Song from Colombia. Thanks to Batty, HK3AXT, for the use of her station. My station had already been torn down . . . *K3ZO/HK3*. The propagation in 28 MHz was so bad that I did not copy my tone in my key monitor, Hi Hi . . . *4M7QP (Op. YV7QP)*. CW really saves the lungs. Good 20 meter openings, and 10 and 80 stunk . . . *AK6A*. Local competition extremely high. When smoke cleared, N7TT pulled through by a few 40 meter QSO's . . . *KG7D*. These Russian prefixes sure made life interesting . . . *NI8V*. The rainy season started one day before the contest—so much for the low bands . . . *ZF2HF (Op. KM5R)*. 80 meter condix were great, but Europeans were too busy with themselves . . . *ZS1CT (Op. DK3GI)*. Wish I was called like L8DQ. Hi! . . . *LZ2KTS*. GRRRRRRRR for VP2EC. Hi! . . . *L8DQ (Op. LU8DQ)*. PU1YOC is a Novice station and PU1 is the new prefix for Novices. Maximum input = 100 watts . . . *PU1YOC*. Good USA opening brought 224 USA prefixes . . . *UZ2FWA*. Glad to give a new UR1 prefix for everybody . . . *UR1RWX*.

Station Operators
Multi-Operator, Single-Transmitter

N4WW & N4SA, NX4N. **KR8Y** & K4VX, KM9P. **K1VR** & K1EA. **K1XA** & AA2Z. **N7TT** & KE7V. **AK6A** & N6ADI, N6CQ, N6MA, N6VR, WA6FGV, KA6VGP. **KG7D** & KB7G, KT7G, W7WA. **AC8W** & K8DD, KZ8K, N8CJX, NA8I, WA8BSF, WB8ITB, WA@ZYW. **KY2P** & KY2O. **NI8V** & K3JT, K8EM, KD8NS, WD8IXE, WD8LXX. **KQ1F** & K1XM. **KD8KA** & KA8LAR, KA8NCR, W8UE. **VP2EC:** KC5EA, N5AU. **ZF2HF:** K5RX, KM5R. **ZS1CT:** ZS1VP, DK3GI/ZS. **JA2YKA:** JJ1BTA, JJ1BTC, JE2VYM, JF2DQJ, JG2MTC, JG2VTD, JI2NPL, JI2JXR, JR2GMC, JG3OET, JL3LDL, JA9SSY, JA9XXS. **JA9YBA:** JH7UJR, JA9LNJ, JA9QCE, JA9QWJ, JA9UAD, JA9VBW, JA9VDA, JA9NFO. **JA8YAU:** JF2EKC, JR7COO, JH8DXI, JH8LEF, JH8MQZ, JH8NFQ. **JA7YAA:** JE7HLZ, JE7QCQ, JG3JRM, JH7CUO, JH7WTC, JH9DLW, JJ1MVV.

JA7YFH: JE7HXC, JE7HMC, JE7WQH, JR7ECK, JR7MPT, JR7MRQ, JR7UOL. **JA3YDS:** Club Group. **JA7YFB:** JN1RON, JE7JWB, JE7MLJ, JH7XMO, JH0QNT, JR7GYC, JR7JLU, JR7JVO, JR7LCI, JR7OEF. **JA6YAI:** JE6MQW, JE6UWI, JH6VLF, JH0FKC, JR6EZE. **JA7YCQ:** JN1LIG, JN1RPG, JE7WVX, JR7MZC, JR7NTP. **LZ2KTS:** LZ1NG, LZ2CC, LZ2DF, LZ2HE, LZ2PO, LZ1A-310/2. **OK7MM:** OK3CAW, OK3CQA, OK3CQW, OK3CZM, OL8CIR, OL8CNT. **EA3VY:** & EA3AIR, EA3AVV, EA3EEE, EA3KU, EA3LL, EC3BPD, EC2BPS. **SL8ZG:** SM0AJU, SM0DJZ. **OH2AQ/OH8:** OH2BCI, OH2BFP, OH2BUQ, OH5BQ. **HA7KSR:** HA7SH, HA7SQ, HA7UG, HA7UO, + 2 Ops.

GU3HFN: GU3MBS, GU4EON, GU4IUW, GU4WTN, GU4/N5RM. **HA5KKG:** 6 Ops. **4N7W:** YU7MDY, YU7MDZ, YU7MHI, YU7NXG, Zoly, Csaba, Ati, Gyuszi. **LZ2KRU:** 3 Ops. **YT3T:** YU3BQ, YU3DE, YU3JT, YU3W. **DK8TU:** DK5XF, DL4EBY, DL7AEN. **HA3KNA:** HA3NS, HA3NU, HA3OU, HA3OV. **Y33ZL:** & Y26IL, Y33VL. **HA7KLG:** HA7LC, HA7LD, HA7MQ, HA7MY, Aniko. **SP5KVW:** SP5LGT, SP5MXZ, SP0140OS. **I1WTM** & I1XPQ, I2VXJ. **DL8IU:** DK7AH, DK8AG, DL4AAE. **HA8KAX:** HA8BT, HA8LKB, HA8LKC, Zoli. **OK1KRQ:** OK1DLF, OK1DRQ, OK1-23139. **SK6AW:** SM6DED, SM6DER, SM6DOS, SM6EHY. **HA2KMR/p:** 6 Ops. **HA6KNX:** HA6NW,

HA6OD. **OE3GBB** & OE3GEA. **DL8EJ:** DJ8VG, DL2FBF, DL5FBD. **OH9AB:** OH9NV, OH9PH, OH9UW. **OH5TR** & OH5MQ, OH7YN.

OK2KYC: Club Group. **HA5KFZ:** 4 Ops. **YU2AKL:** 3 Ops. **OK3CMF:** Club Group. **OK3KEX:** OK3-17780, OK3-26928. **PA3CEF** & PA3CQN. **YU7AJD:** YU7ORS, Mica, Sale. **OK2KQO:** OK2BVI, OK2BWB, OK2PAA. **OK1KZW:** OK1DGE, OK1DQW, OK1-21999. **OK3KIC:** OK3COO + Club Group. **OK1ORA:** OK1AYD, OK1DHL, OK1-22310, OK1-22661. **OK3RDM:** OK3CRW, OK3-26701. **YU1RA** & YU1OWW. **PI4ETL/A:** PA3BDK, PA3BJP, PA3BLZ, PA3CCR, PA3CNH, PA@ATG. **LZ1KZK:** 2 Ops. **OK3RMW:** OK3YCN + Club Group. **LZ1KKR:** LZ1BE, LZ1OF. **SP9ZHR:** SP9EMI, SP9LDE, SP9-3738KA. **YU7AOP:** Club Group. **OK1KYS:** OK1DEY, OK1FRF. **OK3KSQ:** OK3ZWX + Club Group. **YU7DVW:** Club Group. **HA5KDW:** 3 Ops. **HA5KHS:** 3 Ops. **KH6XX** & KH6ND, KH6SC, WH6ABM. **KD7P/NH2** & K0AX, KJ9W, KH6AR, KG6DX.

L8DQ: LU2DPW, LU6ETB, LU8DQ. **PU1YOC** & PU1DFF. **UZ9AYA:** UM8NKW, UA9AKI, UW9AR. **RL8PYL:** UL7PAE, UL7PAO, UL7PAZ, UL7PBY, UL7-023434. **UH8EWW:** UH8EAA, UH8EAC, UH8-04418. **UZ9SWY:** UA9SGT, UA9SGW, UA9SHS, UA9TS. **UL8BWW:** UL7BAG, UL7BAU, UL7BAY, UL7BBB. **UI9AWX:** UI8ACI, UI8AFA, UI8BI. **UZ9OWE:** UA9OGF, UA9-099234, UA9-145792. **UZ9FWR:** UA9FAL, UA9FAR, UV9FJ. **UZ9XWW:** UA9XBD, UA9XDG, UA9XM, UA9XV, UA9-090601. **UL8OWA:** UL7OAF, UL7OB, UL7OE, **UZ0LWX:** UA0LCW, UA0LFD, UA0-112109. **UZ0AWB:** UA0AGI, UA0AKE, UA0-103712. **UZ0QWE:** UA0QAA, UA0QJ, UA0-098107. **UL8CWW:** UL7CAZ, UL7CBP. **UZ0CWO:** UA0CDG, UA0CHD, UA0GGL.

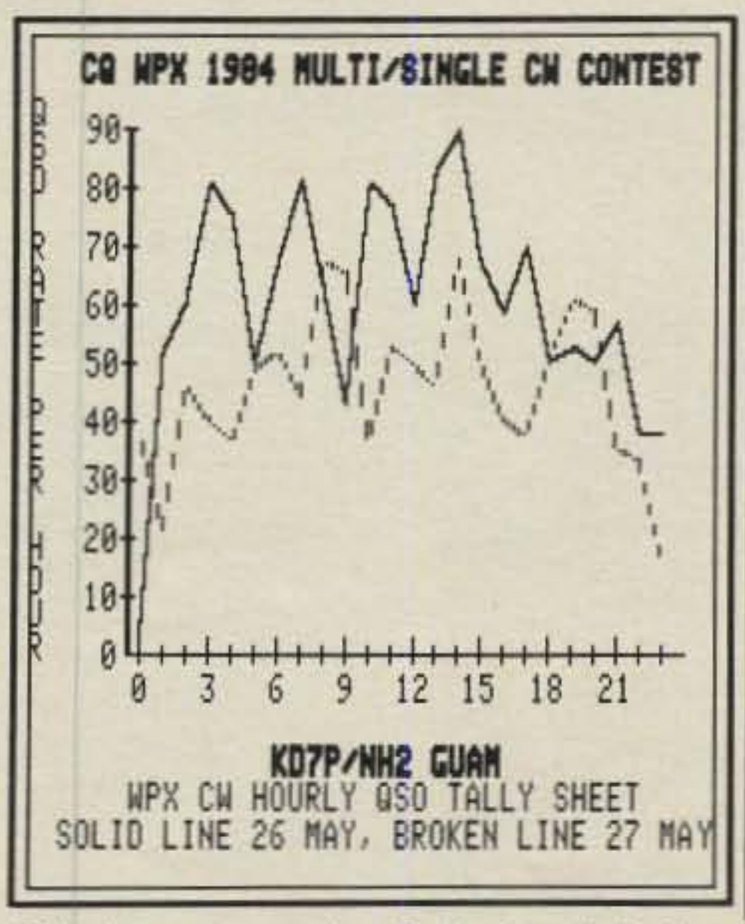
UZ9XWA: Club Group. **UZ2FWA:** UA2FEM, UA2FEW, UA2FJ. **UR1RWX:** UR2RNA, UR2RNJ, UR2RNX, UR2RRJ, UR2RRR, UR2QD, UR2-083186. **UZ6LWZ:** UA6BEN, UA6-1501060, UA6-1501070, UA6-1501103, UA6-1501135. **UP1BZA:** UP2BLW, UP2OX. **UB4IXB:** RB5II, UB5IOK, UB5-0732077. **UC1AWB:** 5 Ops. **UQ1GWB:** 3 Ops. **UZ6LWT:** UA6LAM, UA6LZQ, UA6-150688, UA6-150697. **UZ3AZW:** 2 Ops. **UP1BZI:** UP2BDW, UP2BDV, UP2BJK, UP2-038346, UP2-038728, UP2-0381656. **UP1BZG:** UP2BCO, UP2BCW, UP2BOC, UP2-038439. **RB4MWA:** UB5MDA, UB5MDD, UB5MMR. **UZ1AWO:** UA1AAF, UA1ARL, UA1-1692026, UA1-1692028. **UQ1GXB:** UQ2GDL, UQ2-03796.

Top Norwegian all-bander Ole, LA6ZA.

UP1BZQ: RP2BHR, UP2BAT, UP2-0381682. **UZ4WWA:** 3 Ops. **UZ6HWA:** 3 Ops. **UZ1AWW:** UA3VIM, UA4NBJ. **UC1WWY:** 2 Ops. **UB4ZWW:** UB5ZCW, UB5-069524, UB5-069550. **UB4FWC:** UB5FBV, UB5FDF, UB5BZ. **UB4HWH:** UB5HAC, UB5-07173. **UZ2FWF:** UA2FFL, UA3-137542. **UZ3WWW:** 5 Ops. **UB4ZWZ:** UB5ZCG, UB5ZFO, UB5-069560. **UQ1GXW:** UQ2GNI, UQ2-0373381. **UZ3DZF:** UA3DNZ, UA3-142259, UA3-142809. **UB4WWS:** 3 Ops. **UB4WYA:** 3 Ops. **UZ3DWR:** 3 Ops. **UC1CWC:** UC2CAF, UC2CET. **UZ3TWT:** 2 Ops. **UC1AWC:** 3 Ops. **RZ6AWH:** RA6AMM + Club Group. **VE7ZZZ:** VE7ENF, VE7EPN, VE7DSM, VE7ENS. **VK3ZH:** VK3DMU, VK3DXI, VK3FY.

MULTI-OPERATOR MULTI-TRANSMITTER

RP3P: UP2OO, UP2OU, UP2BBT, UP2BCR, UP2BCT, UP2BDF, UP2BFI, UP2BFN, UP2BFL, UP2BGF, UP2BIO, UP2BMW, UP2BNY, UP2BOA, UP2PAV, UP2PCI, RP2BHN. **KL7RA** & AL7CQ, NL7G, WL7E. **NM5M** & K5LZO, K5TU, KA5SBS, K5GN, KE5IV, N5AF, N5DU, NM5L, W5ASP, K2TNO. **EA9CE:** EA7TL, EA7ALG, EA9EU, EA9GK, EA9HG, EA9JG, EA9KD, EA9FY, EA9IU, EA9KE, EA9PJ, **JA3YBF:** JF3GYI, JF3KKO, JF3PGA, JG3WCU, JI3DSY, JI3KWZ, JI3XBE, JJ3PYI, JR4AGT, JR4IZK, JH5IZW, JE6BXJ, JA9TOZ, JA9UXW, JA9VIZ, JH9GRM. **JY1YXP:** JL1ROT, JF2QLY, JJ1OHJ, JM1AQU, JF2PAA, JI2DLF, JN1OTG, JR4HCV, JO1BKL, JN1SBT. **JR1ZTT:** JF2NXS, JR4WKV, JH6NBW. **JA7YWD:** JP1GDV, JE7FPT, JE7JVZ, JE7LMP, JE7XEH, JR8GKE. **JA6YGV:** JH6QCQ, JR6JHE, JR6LDI, JR4CJI/6.



This is an example of charts, statistics, and other data received along with WPX Contest logs. QSO rate per hour is very popular, especially among multi-op stations like KD7P/NH2 on Guam.

CW & SSB CLUB COMPETITION

North Texas Contest Club	**53,012,561**	Dayton Amateur Radio Assn.	732,337
YU DX Club (Yugoslavia)	18,635,099	SP DX Club (Poland)	728,188
Down Under DXers Contest Club	17,751,515	Southeastern DX Club	657,730
Texas DX Society	**16,224,644**	Calgary Amateur Radio Association (Canada)	580,108
Yankee Clipper Contest Club	14,658,117	Mayland and District ARS (England)	503,644
Alaska DX Association	14,274,884	Northern California DX Club	458,106
Kaunas Polytechnic Institute Radio Club (Lithuania)	12,317,216	Danish DX Group	452,304
Ontario Contest Club (Canada)	10,657,168	Morton Area DX Association	446,715
Northern California Contest Club	10,632,175	Eastern Iowa DX Association	429,693
Northern Ohio Amateur Radio Society	8,253,903	West Texas DX Association	425,880
Chelyabinsk Radio Club (USSR)	8,168,656	Pitkin County Contest Club	414,852
Lithuanian Contest Group	7,900,748	Fraser Valley DX Club	387,376
Southern California Contest Club	7,112,585	Steel City Amateur Radio Club	387,374
University of Tokyo Contest Club (Japan)	6,985,138	River City Contesters	299,082
The Bullmertz (Sweden)	5,427,851	Group Argentino de CW	287,227
Rubber Circle Contest Club	5,347,789	Central Indiana Contesters	271,605
Frankford Radio Club	3,901,032	Kyustendil Amateur Radio Club (Bulgaria)	224,408
North Florida Amateur Radio Society	3,350,016	East Bavarian DX Association (FRG)	202,672
Lichfield ARS (England)	3,103,912	Rhine Rhur DX Association (FRG)	200,594
Potomac Valley Radio Club	2,865,383	Wernesville Area Contest Organization	184,492
San Diego DX Club	2,827,715	Red Stick DX Association	178,808
Kansas City DX Club	2,608,214	Rip Van Winkle ARS	145,332
Dixie DXers	2,537,682	North Lithuania DX Group (USSR)	143,644
Mississippi Valley DX Contest Club	2,200,494	Quannapowitt Radio Association	101,000
Moscow University Radio Club (USSR)	2,123,914	Southern California DX Club	84,105
Grand Mesa Contesters	2,037,434	Eastern Michigan ARC	76,964
Mad River Radio Club	1,439,128	Rochester DX Association	70,035
Northern Illinois DX Assn	1,434,308	Tallinn Radio Club (USSR)	58,464
Halifax ARC (Canada)	1,154,360	W/K ARC of Greater Milwaukee	43,408
Israeli Contest Club	1,055,574	Poway ARC	34,728
Willamette Valley DX Club	1,052,056	Western PA DX Association	30,300
Ill Wind Contesters	957,456	Hoodview Amateur Radio Club	29,505
Lincoln Amateur Radio Club	859,202	Northern Ohio DX Association	28,397
Central Arizona DX Association	827,615	Southwest Ohio DX Association	14,348
LVOV Radio Club (USSR)	804,676	Armavia Radio Club (USSR)	11,323
		Michigan DX Association	5,772

WORLD TOP SCORES

SINGLE OPERATOR

ALL BAND

UF6CR	**3,084,480**	**5Z4MX**	**2,264,342**
N5AU	2,659,590	N8II	2,104,240
KC1F	2,552,261	W@ZV	2,085,390
9H1EL	2,550,384	OK1DWA	2,029,188
UP2NK	2,464,944	K3ZJ	2,028,940
K3ZO/HK3	2,450,160	6Y6A	1,997,593
KQ2M	2,388,558	KI6P	1,977,760

SINGLE BAND

28 MHz

OK3LZ	50,908
4M7QP	46,134
YO3KWJ	21,402
UM8MDE	18,980
JH1RNZ	11,234
UP2BJM	10,656
JO1NZT	7,392

21 MHz

4N2CQ	1,300,075
G4CNY	1,111,800
LU4FDM	1,004,250
KW8N	889,296
I2UIY	876,300
HG9R	814,968
VE3OCU	809,100

14 MHz

KP4BZ	2,148,108
YU4GD	**2,147,148**
CX7BY	**1,832,850**
YV1TO	1,814,472
YT3M	1,564,477
UA9YAN	**1,511,146**
NA8V	1,478,456

7 MHz

VE3BMV	**1,489,950**
OK1KSO	**1,110,330**
I4IND	1,094,500
IO3JSS	1,062,864
YU7AD	1,036,672
YU3EY	1,010,840
N6CW	960,300

3.5 MHz

EA8RL	**453,456**
RB5IM	**383,608**
LZ1KVV	382,360
YU3MM	245,496
YZ4Z	200,984
RB5BA	176,040
RW3DX	171,072

1.8 MHz

LZ2CJ	**89,872**
YU3EF	69,596
UA9ADY	**39,996**
RA9AKM	26,416
UA3PFN	26,080
DL2SAX	23,936
OK2PLH	23,074

QRPp

NY4D	A	484,575	UP2BIM	14	274,274
4T8CP	A	377,364	RA3DUU	7	157,430
UB5KCW	28	2,074	UB5INO	3.5	95,616
4Z4NUT	21	432,003	UA9MS	1.8	17,340

MULTI-OPERATOR SINGLE TRANSMITTER

VP2EC	**7,599,480**	**OK7MM**	**4,096,614**
ZF2HF	6,445,685	EA3VY	3,945,678
L8DQ	**5,952,111**	N4WW	3,769,800
LZ2KTS	**5,444,916**	HG5A	3,762,135
KH6XX	**4,646,859**	HG6N	3,616,509
UZ9AYA	4,380,880	KR@Y	3,581,359
KD7P/NH2	4,229,355	RL8PYL	3,400,680

MULTI-OPERATOR MULTI-TRANSMITTER

YZ1EXY	8,282,127	**EA9CE**	**4,383,308**
RP3P	7,978,625	JA3YBF	2,690,800
KL7RA	4,653,283	JA1YXP	1,516,396
NM5M	4,432,883	JA6YDH	1,071,372

QRPp SECTION WORLDWIDE

NY4D	**A**	**484,575**	**591**	**325**
		(Opr. K4XS)		
4T8CP	**A**	**377,364**	**502**	**246**
YU3BC	**A**	**345,950**	**577**	**275**
RA3PA	**A**	**339,824**	**617**	**268**
UB5MLP	**A**	**335,544**	**593**	**264**
DL6FBL	**A**	**276,338**	**708**	**233**
4X6IF	**A**	**211,328**	**396**	**208**
AC5K	**A**	**180,469**	**382**	**251**
JA6VZB	**A**	**148,848**	**300**	**208**
KH6CP	**A**	**125,820**	**275**	**135**
PA@PUR	**A**	**94,905**	**275**	**171**
UA9CCJ	**A**	**86,652**	**181**	**87**
I4KRF	**A**	**82,656**	**276**	**164**
OK1DZD	**A**	**49,020**	**191**	**129**
W8VSK	**A**	**32,830**	**130**	**98**
N8CQA	"	31,208	126	94
W9PNE	**A**	**26,162**	**124**	**103**
RB5AL	"	19,712	141	112
UT5EM	"	14,110	111	83
UB5YDX	"	12,330	120	90
KW9N	"	11,869	102	83
Y24TG	**A**	**7,080**	**72**	**60**
OK2BTI	"	4,590	62	45
SM7CZC	**A**	**3,572**	**48**	**47**
PA@LKR	"	2,542	46	41
PA3DGW	"	1,566	32	29
UB5KCW	**28**	**2,074**	**42**	**34**
YO6DDF	**28**	**936**	**24**	**24**
4Z4NUT	**21**	**432,003**	**590**	**247**
RB5GD	**21**	**128,304**	**310**	**216**
RB5WW	"	114,063	281	197
UR2CR	**21**	**47,376**	**202**	**141**
JA2KPV	**21**	**23,048**	**107**	**86**
W6YMH	**21**	**6,270**	**65**	**57**
N1AFC	**21**	**5,656**	**58**	**56**
AH6EK	**21**	**5,640**	**49**	**40**
G3CWL/A	**21**	**3,094**	**37**	**34**
JA2IIT	"	1,032	25	24
JE7AWN	"	294	16	14
UP2BIM	**14**	**274,274**	**548**	**274**
JA3PXH	**14**	**192,226**	**340**	**223**
NN4Q	**14**	**133,042**	**300**	**221**
JA2DN	"	84,597	215	163
OK2BMA	**14**	**57,486**	**222**	**143**
JA1NLX	"	50,430	166	123
G3VMY	**14**	**33,759**	**209**	**121**
KN1H	**14**	**22,220**	**120**	**110**
JA1KFX	"	15,928	96	88
OK1DMP	"	13,041	118	81
UB5VAA	**14**	**11,026**	**107**	**74**
G3DOP	"	9,682	69	47
JH2WIC	"	7,350	55	50
OZ9MM	14	7,260	87	66
SM7KWE	**14**	**6,200**	**79**	**62**
AL7EN	**14**	**5,538**	**55**	**39**
YO4BQV	"	684	21	19
RA3DUU	**7**	**157,430**	**367**	**173**
SM5CCT	**7**	**87,552**	**262**	**152**
OK1DCP	**7**	**76,422**	**249**	**141**
AA2U	**7**	**46,816**	**189**	**154**
KB1DH	**7**	**17,664**	**97**	**92**
UB5KAG	"	12,896	105	62
UV3AAC	"	7,752	75	51
UB5CGN	"	6,016	70	47
KV7X	**7**	**5,244**	**62**	**57**
OZ1ZH	**7**	**2,852**	**47**	**31**
JR6QFV	"	840	14	14
UB5INO	**3.5**	**95,616**	**294**	**144**
HA3PT	**3.5**	**57,730**	**260**	**115**
UW3PZ	**3.5**	**52,488**	**205**	**108**
UB5MPD	"	49,932	188	114
Y25MG	**3.5**	**11,968**	**96**	**68**
OK1DIQ	**3.5**	**9,540**	**97**	**53**
HA7ZX	"	7,742	89	49
KS9U	**3.5**	**2,600**	**54**	**50**
UA9YHU	"	1,196	29	23
LZ1IF	"	672	21	16
UA9MS	**1.8**	**17,340**	**69**	**51**
OL1BIP	**1.8**	**12,432**	**109**	**74**
OK1MP	"	8,040	80	60
UO5OLW	**1.8**	**6,636**	**68**	**42**
UA9AQN	"	6,270	47	30
Y27KL	"	4,560	58	40
OK1KAK	"	4,324	60	47
		(Opr. Lomnice)		
UW9SW	"	1,938	29	17

SINGLE OPERATOR NORTH AMERICA

UNITED STATES

KC1F	**A**	**2,552,261**	**1732**	**493**
K5MA/1	**A**	**337,110**	**497**	**255**
KT1O	"	106,834	256	182
W1CNU	"	92,442	240	142
WA2CNF/1	"	34,417	183	127
KA1CLV	"	13,464	76	66
W1BET	"	5,376	61	56
W1OPJ	"	2,910	36	30
K1TR	**21**	**33,109**	**139**	**113**
W1BK	"	17,064	87	79
KA1SR	1.8	108	12	9
KQ2M	**A**	**2,388,558**	**1633**	**514**
W2FTY	**A**	**233,946**	**387**	**246**
KW2J	"	130,482	280	198
W2FUI	"	95,580	230	177
W2DW	"	83,160	209	135
K2VV	"	63,048	189	111
AA2Y	"	62,172	193	132
KC2QR	"	46,000	160	125
NE2W	"	34,584	173	131
NB2T	"	31,416	140	119
KT2D	"	18,312	95	84
W2LPV	"	16,380	80	70
N2BCF	"	6,400	51	50
W2KTF	"	3,185	35	35
KF2O	**21**	**77,973**	**205**	**141**
KC2X	**14**	**1,074,528**	**1076**	**416**
NF2K	"	10,720	76	67
KZ2S	**7**	**716,870**	**644**	**343**
N2AU	**3.5**	**21,018**	**114**	**93**
W2XL	"	5,612	50	46
K3ZJ	**A**	**2,028,940**	**1420**	**458**
		(Opr. WB4SGV)		
KB3TN	**A**	**1,298,220**	**1209**	**420**
WB3CAC	"	98,404	270	146
K3WGR	"	86,088	207	136
W3FQE	"	49,955	165	97
WA3DMH	"	25,912	107	82
WB3JRU	"	22,672	130	109
N3RC	"	22,161	104	83
AI3Q	**21**	**361,449**	**519**	**297**
NN3SI	"	1,276	22	22
		(Opr. W4KM)		
W3BGN	**14**	**34,368**	**133**	**96**
WA3VPL	7	2,408	28	28
WC4E	**A**	**1,610,360**	**1303**	**508**
K4PQL	**A**	**1,602,445**	**1197**	**445**
K4BAI	"	574,285	701	331
NQ4I	"	480,455	514	307
K4SB	"	226,709	379	233
W4BV	"	170,376	342	229
WD4PZN	"	127,544	296	214
W9TS/4	"	91,927	219	137
K4OD	"	49,476	157	114
K4FPF	"	11,016	72	54
W4DGJ	"	5,040	39	36
K4RDU	**21**	**113,472**	**257**	**192**
WB4TDH	**14**	**600,568**	**755**	**328**
WD4DII	**7**	**70,656**	**338**	**192**
W4MGX	3.5	2,720	43	40
N5AU	**A**	**2,659,590**	**1668**	**522**
		(Opr. N5RZ)		
K5MR	**A**	**1,510,132**	**1156**	**452**
K5RX	"	1,184,500	1076	412
KA5W	"	1,020,565	1043	455
W5ZR	"	862,792	850	392
W5PWG	"	76,590	268	185
K5ZD	"	73,538	218	166
KA5KWX	"	65,520	210	168
W5OB	"	8,680	66	62
W5EIJ	"	6,208	70	64
KY5N	**21**	**119,706**	**305**	**213**
W5FO	**14**	**814,944**	**1006**	**416**
AF5M	**7**	**96,384**	**278**	**192**
KI6P	**A**	**1,977,760**	**1420**	**470**
		(Op. WA6VEF)		
NI6W	**A**	**1,442,396**	**1172**	**422**
NE6I	"	946,220	936	391
AI6V	"	452,620	627	265
		(Opr. N6TV)		
KE6PQ	"	157,528	319	194
K6SG	"	106,260	247	154
AA6DP	"	32,747	198	143
K6CSL	"	15,438	103	83
KV6H	"	1,554	49	42
WA6DBC	**21**	**479,682**	**678**	**329**
W6BIP	"	216,810	396	270
W6DN	"	54,108	204	162
N6CW	**7**	**960,300**	**782**	**330**
AG6D	**7**	**658,840**	**688**	**260**
W6TMD	"	562,788	546	243
VE2AQS/W6	"	387,660	501	213
KC7V	**A**	**170,147**	**345**	**229**
WA7NXL	"	27,600	124	115
KA7FEF	"	10,836	96	86
WB7FDQ	**14**	**427,986**	**694**	**354**
W7FGT	**14**	**136,350**	**334**	**225**
W7AYY	"	82,764	224	171
N8II	**A**	**2,104,240**	**1521**	**464**
KO8T	**A**	**1,014,714**	**1007**	**414**
N8BJQ	"	631,332	738	342
KU8E	"	573,756	735	349
W8QID	"	223,421	385	209
W8UPH	"	128,068	285	202
K8MR	"	28,998	112	81
N8EKS	"	4,387	45	41
KW8N	**21**	**889,296**	**921**	**388**
		(Opr. WD8LLD)		
NA8V	**14**	**1,478,456**	**1291**	**476**
		(Opr. WA8YVR)		
NE8V	"	22,790	128	106
K8HF	"	6,681	56	51
KV8Q	**7**	**127,440**	**349**	**216**
W8IMZ	**3.5**	**5,040**	**107**	**72**
		(Opr. WB8MRU)		
KM9L	**A**	**1,508,712**	**1326**	**444**
		(Opr. WB9JKI)		
W9XT	**A**	**777,920**	**858**	**374**
K9BG	"	746,112	751	384
K9YAX	"	541,671	640	323
NA9J	"	169,792	354	224
KS9S	"	149,375	388	239
KD9M	"	61,019	197	161
W9GMV	"	30,709	132	107
W9TNZ	"	23,316	108	87
KY9P	"	11,610	100	86
K9BGL	"	10,944	69	57
KS9J	**21**	**65,120**	**202**	**160**
KC9XF	"	18,618	100	87
K9QVB	**14**	**685,596**	**782**	**388**
W9RE	**14**	**127,281**	**300**	**203**
KK9G	"	109,056	315	213
N9NB	"	27,417	122	111
W9MP	"	23,085	100	81
AJ9U	"	1,600	25	25
KG9N	**7**	**15,660**	**106**	**87**
KJ9D	**3.5**	**21,816**	**157**	**108**
W@ZV	**A**	**2,085,390**	**1454**	**470**
KM@L	**A**	**841,317**	**931**	**411**
W@HBH	"	715,488	776	348
KB@G	"	380,066	559	307
KM@R	"	250,884	444	276
KS@T	"	163,200	335	240
W@RXL	"	86,984	218	166
WD@AVV	"	52,599	310	197
KF@T	"	36,450	178	150
NF@M	"	8,383	96	83
K@RWL	**14**	**707,535**	**882**	**405**
KV@I	**14**	**426,924**	**743**	**354**
K@BJ	"	67,971	248	163
N7DF/@	**3.5**	**21,000**	**142**	**105**
W@JU	"	4,896	57	51

ALASKA

KL7Y	**A**	**1,010,793**	**981**	**379**
KL7AF	**3.5**	**25,080**	**86**	**55**

BERMUDA

VP9LB	**A**	**517,450**	**542**	**262**

CANADA

VE3IY	**A**	**1,707,040**	**1242**	**470**
VE6OU	**A**	**1,319,136**	**1069**	**416**

CONTINENTAL LEADERS

ASIA				**AFRICA**			
AB	UF6CR	3,084,480		AB	5Z4MX	2,264,342	
28	UM8MDE	18,980		28	No Entry		
21	UJ8JA	763,686		21	J28DM	131,058	
14	UA9YAN	1,511,146		14	ZS6ME	148,599	
7	UA0ZBP	114,080		7	No Entry		
3.5	UA9FGJ	137,280		3.5	EA8RL	453,456	
1.8	UA9ADY	39,996		1.8	No Entry		
EUROPE				**NORTH AMERICA**			
AB	9H1EL	2,550,384		AB	N5AU	2,659,590	
28	OK3LZ	50,908		28	VE2AEJ/3	1,960	
21	4N2CQ	1,300,075		21	KW8N	889,296	
14	YU4GD	2,147,148		14	KP4BZ	2,148,108	
7	OK1KSO	1,110,330		7	VE3BMV	1,489,950	
3.5	RB5IM	383,608		3.5	VE1AIH	101,008	
1.8	LZ2CJ	89,872		1.8	VE3MFA	6,552	
SOUTH AMERICA				**OCEANIA**			
AB	K3ZO/HK3	2,450,160		AB	VK2APK	1,042,956	
28	4M7QP	46,134		28	No Entry		
21	LU4FDM	1,004,250		21	N8CWX/DU2	83,662	
14	CX7BY	1,832,850		14	VK4ANY	51,504	
7	CE3DNP	323,172		7	VK2CIA	624,672	
3.5	No Entry			3.5	No Entry		
1.8	No Entry			1.8	No Entry		
MULTI-SINGLE				**MULTI-MULTI**			
AS	UZ9AYA	4,380,880		AS	JA3YBF	2,690,800	
AF	ZS1CT	3,129,216		AF	EA9CE	4,383,308	
EU	LZ2KTS	5,444,916		EU	YZ1EXY	8,282,127	
NA	VP2EC	7,599,480		NA	KL7RA	4,653,283	
SA	L8DQ	5,952,111		SA	No Entry		
OC	KH6XX	4,646,859		OC	No Entry		

VE6CHW	"	638,000	651	319	
VE3DZV	"	531,566	586	301	
VO1AW	**A**	**375,480**	**449**	**252**	
VE4AEX	**A**	**168,272**	**302**	**208**	
VE3FEA	"	9,984	60	52	
VE1CJK	**A**	**8,904**	**61**	**56**	
VE2AEJ/3	**28**	**1,960**	**30**	**28**	
VE3OCU	**21**	**809,100**	**779**	**372**	
		(Opr. VE2ZP)			
VO1QU	**14**	**403,326**	**563**	**297**	
VE6CB	**14**	**294,224**	**449**	**259**	
VE3NBE	**14**	**44,500**	**144**	**125**	
VE7AV	**14**	**15,194**	**79**	**71**	
VE3BMV	**7**	**1,489,950**	**797**	**385**	
VE1AIH	**3.5**	**101,008**	**162**	**118**	
VE3MFA	**1.8**	**6,552**	**50**	**36**	
VE3INQ	"	1,258	21	17	

DOMINICAN REPUBLIC

HI8LC	**3.5**	**28,152**	**87**	**69**

JAMAICA

6Y6A	**A**	**1,997,593**	**1500**	**481**
		(Opr. 6Y5HN)		

PANAMA

HP1AC	**A**	**255,154**	**417**	**226**

PUERTO RICO

KP4BZ	**14**	**2,148,108**	**1595**	**516**
		(Opr. NP4Z)		
WP4B	**7**	**30,084**	**85**	**69**

SINT MAARTEN

K2KTT/PJ7	**21**	**29,500**	**131**	**100**

ST. MARTIN

FG8IIK	**21**	**48,734**	**166**	**118**
		(Opr. K2KTT)		

AFRICA

CANARY ISLANDS

EA8AGF	**A**	**159,543**	**299**	**157**
EA8RL	**3.5**	**453,456**	**379**	**201**

DJIBOUTI

J28DM	**21**	**131,058**	**271**	**162**

KENYA

5Z4MX	**A**	**2,264,342**	**1525**	**446**

SOUTH AFRICA

ZS6ME	**14**	**148,599**	**289**	**171**
ZS6BCR	**3.5**	**2,640**	**24**	**23**

ASIA

CYPRUS

ZC4CZ	**A**	**781,138**	**961**	**293**

JAPAN

JA5BJC	**A**	**1,659,339**	**1321**	**407**
JH7DNO	**A**	**909,896**	**912**	**338**
JA1DDH	**A**	**779,154**	**790**	**354**
JA1YCX	"	536,190	652	305
		(Opr. JK1KNB)		
JF3CCN	"	450,864	601	279
JA6BIF	"	286,056	472	232
JE3VXD	"	257,090	402	121
JF1SEK	"	211,600	400	200
JA2FXV	"	150,255	310	189
JO1ITV	"	147,250	330	190
JR3XEX	"	124,962	307	177
JA8AQ	"	86,597	206	139
JE6JVJ	"	77,121	224	123
JA1BSU	"	72,280	199	139
JH3JYS	"	70,560	203	140
JH8NVX	"	61,366	174	122
JA1BNW	"	59,730	178	110
JE1ARQ	"	59,236	163	118
JA2EVO	"	50,924	147	116
JA5FMT	"	50,874	181	122
JA9FT	"	35,690	122	83
JG3NKP	"	34,711	124	103
JA7BE	"	29,052	120	93
JA7EDZ	"	24,666	116	92
JH7XGN	"	24,225	117	85
JA2XI	"	24,208	96	89
JA2EJI	"	21,888	95	76
JA8CJY	"	16,244	68	62
JA8SW	"	11,430	112	90
JA6AKV	"	7,200	57	50
JJ3JJL	"	4,403	49	37
JF7BZY	"	4,165	49	35
JN1ENK/3	"	3,256	59	44
JI2NOS	"	2,691	46	39
JA1AAV	"	440	10	10
JH1CNN	"	220	11	11
JH1RNZ	**28**	**11,234**	**120**	**82**
JO1NZT	**28**	**7,392**	**91**	**66**
JE2SOY	"	930	38	31
JA1GO	"	220	10	10
JM1MGP	**21**	**353,871**	**565**	**287**
JF3HKY/9	**21**	**316,672**	**487**	**256**
JE3ZFS	"	89,324	239	163
		(Opr. JI3JGJ)		
JE1GPX	"	74,980	206	163
JL1CWS	"	48,922	157	122
JA2DHL	"	48,117	168	129
JI1QLB	"	41,880	139	120
JA1JGP	"	37,407	131	111
JF6DRR	"	25,721	115	89
JN1WFF	"	6,517	51	49
JA3HTK	"	6,419	50	49
JR4ISK	"	5,452	48	47
JH2XTV	"	1,007	20	19
JA1AAT	"	680	20	17
JA1AJA	"	243	27	9
JA8LN	"	170	10	10
JR3KQJ	"	36	4	4
JR1RNC	**14**	**676,347**	**764**	**321**
JH4UYB	**14**	**462,400**	**623**	**289**
JM1LRQ	**14**	**457,995**	**663**	**285**
JA4CUU	"	275,418	445	234
JE1AYU	"	182,784	351	204
JH1APK	"	157,692	303	204
JH2JUK	"	37,600	153	94
JG1QGQ	"	37,584	132	108
JA7BAL	"	31,815	113	101
JH1MTR	"	26,829	121	99
JE4CIL	"	7,021	71	59
JR2AQP	"	3,584	42	32
JA3NMV/6	"	2,250	30	25
JA7KM	"	2,080	28	26
JR2HAR/3	"	615	15	15
JA6ABG	"	555	15	15
JA1OYB	"	160	12	10
JH7LVK	**7**	**108,504**	**198**	**137**
JH7WKQ	**7**	**31,680**	**101**	**80**
JA8EJO	"	9,600	63	48
JA1QZC	"	8,816	47	38
JG2LGM	"	6,624	45	36
JA8TGF	"	6,464	38	32
JA2SAP/1	"	6,400	38	32
JRØGFM	"	4,556	40	34
JF6NBB	"	288	9	8
JH9CAV	"	168	7	7
JA6AZH	3.5	720	21	18

KOREA

HL0CBD	**14**	**67,250**	**324**	**125**
		(Opr. Yu, Young-Guen)		

SAUDI ARABIA

HZ1HZ	**A**	**1,187,641**	**999**	**403**

U.S.S.R.

ASIATIC

UA9SH	**A**	**1,631,935**	**1328**	**355**
UV9AX	**A**	**968,184**	**819**	**339**
RA9UN	"	634,804	877	302
RV9FF	"	168,264	389	164
UA9URF	"	91,486	208	149
UA9AFG	"	17,424	87	72
UA9WDM	"	2,080	29	26
UA9MC	**21**	**301,953**	**568**	**251**
UA9YAN	**14**	**1,511,146**	**1277**	**437**
UA9AAP	**14**	**335,104**	**475**	**256**
UA9AJM	"	186,249	383	181
UA9CUP	"	134,602	302	167
UV9DO	"	100,172	236	158
UA9NP	"	67,541	186	137
UA9CAX	"	59,928	180	132
UA9COG	"	49,368	152	121
RV9UV	"	31,600	125	100
UA9KA	"	26,144	123	86
UV9FB	"	6,120	52	45
UA9UPT	"	5,382	62	46
UA9UFW	"	2,739	39	33
UA9FKM	**7**	**87,300**	**290**	**100**
UA9MDV	"	69,768	179	114
UA9FGJ	**3.5**	**137,280**	**220**	**110**
UA9CQS	"	69,222	152	83
UA9ADY	**1.8**	**39,996**	**116**	**66**
RA9AKM	**1.8**	**26,416**	**119**	**52**
UA9CBO	"	8,991	50	37
UA9SJL	"	4,968	40	27
RAØJD	**A**	**75,350**	**298**	**137**
UAØLJ	**A**	**55,818**	**224**	**126**
UWØCM	"	29,952	150	104
UAØCS	"	11,696	104	68
UAØSGJ	"	8,215	57	53
UAØAG	**21**	**80,931**	**258**	**159**
UAØCFF	"	34,020	144	105
UAØQDC	**14**	**715,680**	**889**	**315**
RAØBN	**14**	**620,736**	**692**	**318**
UAØZBF	"	463,570	593	307
UAØBCK	"	292,105	486	235
UAØXAJ	"	4,716	77	36
UAØZCK	"	260	10	10
UAØZBP	**7**	**114,080**	**265**	**124**
UAØSR	"	9,792	83	48
UAØLFN	"	3,618	30	27

ARMENIA

UG7GWA	**A**	**194,878**	**386**	**139**
UG6JJ	**21**	**34,848**	**122**	**96**

AZERBAIJAN

UD6DEY	**A**	**61,230**	**395**	**130**
UD6DFY	**21**	**212,212**	**389**	**212**
UD6DKW	"	2,325	31	25
UD6CN	**7**	**65,424**	**130**	**94**

GEORGIA

UF6CR	**A**	**3,084,480**	**1716**	**540**
UF6FFF	**14**	**1,235,004**	**1218**	**388**
UF6DA	**3.5**	**24,416**	**80**	**56**
RF6FBB	1.8	80	6	5

KAZAKH

UL7PFH	**A**	**65,817**	**182**	**103**
UL7AAS	28	1,380	25	23
UL7TT	**21**	**58,344**	**180**	**143**
UL7PEI	**14**	**434,255**	**600**	**275**
UL7FCG	**14**	**225,568**	**446**	**212**
UL7LDR	"	89,794	230	139
UL7IBZ	"	75,920	218	130
UL8CWT	"	67,509	210	117
UL7FFD	"	54,172	195	116
UL7CBP	"	396	12	11

KIRGHIZ

UM8MCY	**A**	**74,816**	**171**	**112**
UM8MP	"	7,840	64	49
UM8MDE	**28**	**18,980**	**123**	**73**
UM8MU	**21**	**247,648**	**503**	**218**
UM8MAH	**14**	**38,160**	**166**	**106**

TADJIK

UJ8JA	**21**	**763,686**	**912**	**342**
UJ8JMM	**7**	**50,215**	**140**	**83**

UZBEK

UI8TAA	**14**	**76,608**	**227**	**133**

EUROPE

AUSTRIA

OE1TKW	1.8	448	16	14

AZORES

CT2CQ	**7**	**955,632**	**723**	**344**

U.S.A. TOP SCORES SINGLE OPERATOR

ALL BAND

N5AU	2,659,590	K3ZJ	2,028,940
KC1F	2,552,261	KI6P	1,977,760
KQ2M	2,388,558	WC4E	1,610,360
N8II	2,104,240	K4PQL	1,602,445
W0ZV	2,085,390	K5MR	1,510,132

SINGLE BAND

21 MHz		7 MHz	
KW8N	889,296	N6CW	960,300
WA6DBC	479,682	KZ2S	716,870
AI3Q	361,449	AG6D	658,840
W6BIP	216,810	W6TMD	562,788
KY5N	119,706	VE2AQS/W6	387,660
K4RDU	113,472	KV8Q	127,440

14 MHz		3.5 MHz	
NA8V	1,478,456	KJ9D	21,816
KC2X	1,074,528	N2AU	21,018
W5FO	814,944	N7DF/0	21,000
K0RWL	707,535	W2XL	5,612
K9QVB	685,596	W8IMZ	5,040
WB4TDH	600,568	W0JU	4,896

1.8 MHz	
KA1SR	108

QRPp

NY4D	A	484,575	NN4Q	14	133,043
AC5K	A	180,469	AA2U	7	46,816
W6YMH	21	6,270	KS9U	3.5	2,600

MULTI-OPERATOR SINGLE TRANSMITTER

N4WW	3,769,800	N7TT	2,004,480
KR0Y	3,581,359	AK6A	1,952,160
K1VR	2,677,950	KG7D	1,855,282
K1XA	2,513,974	AC8W	1,545,650

MULTI-TRANSMITTER

NM5M	4,432,883

BELGIUM

ON4XG	**A**	**198,924**	**461**	**242**

BULGARIA

LZ1KAU	**A**	**454,938**	**667**	**339**
		(Opr. Ivatio)		
LZ1BJ	"	54,322	169	157
LZ1YG	"	52,820	214	139
LZ1HY	"	42,592	168	121
LZ1KKA	"	48	4	4
		(Opr. LZ1BG)		
LZ1YE	**14**	**426,272**	**660**	**346**
LZ2VP	**14**	**267,267**	**547**	**273**
LZ1LW	"	62,250	200	150
LZ1WY	"	14,344	99	88
LZ2PG	**7**	**226,730**	**380**	**205**
LZ1KVV	**3.5**	**382,360**	**675**	**242**
		(Opr. LZ1A-1326)		
LZ2CJ	**1.8**	**89,872**	**259**	**137**
		(Opr. LZ2SC)		

CZECHOSLOVAKIA

OK1DWA	**A**	**2,029,188**	**1527**	**493**
OK3OM	**A**	**1,080,492**	**1092**	**399**
OK1AVD	**A**	**865,050**	**1022**	**365**
OK3CNP	"	458,865	565	297
OK1ARI	"	385,565	568	295
OK3CFP	"	383,084	630	278
OK3PQ	"	336,408	600	262
OK3FON	"	317,395	487	247
OK3IF	"	278,859	430	271
OK2PCF	"	246,616	477	232
OK1KZ	"	224,448	451	224
OK1DVK	"	153,266	308	197
OK1AXB	"	123,120	302	190
OK1AJY	"	115,404	344	163
OK1MZO	"	58,435	220	145
OK3YCA	"	47,553	171	121
OK1MHI	"	39,000	171	125
OK2LN	"	38,985	193	113
OK3EA	"	38,400	147	120
OK1ARD	"	36,400	140	112
OK3BA	"	33,561	183	113
OK2PBG	"	25,758	113	81
OK1MSP	"	23,715	105	85
OK1DOZ	"	18,870	115	85
OK2BHQ	"	17,313	100	87
OK1DWC	"	13,160	68	56
OK2BFX	"	6,627	55	47
OK1AEH	"	2,960	48	40
OK2BCI	"	2,739	34	33
OK2BWJ	"	2,418	49	31
OK3LZ	**28**	**50,908**	**197**	**143**
OK3ZAF	"	2,520	39	36
OK1FBH	"	72	6	6
OK2BYW	**21**	**22,506**	**95**	**93**
OK1ONI	"	510	20	17
OK3CDX	**14**	**361,188**	**703**	**316**
OK6WW	**14**	**217,490**	**502**	**239**
		(Opr. OK1AD)		
OK2BGR	"	196,101	389	243
OK2SGW	"	116,736	316	192
OK3TAY	"	91,000	328	182
OK3CQD	"	66,732	209	166
OK3CAB	"	42,780	244	115
OK3ZWX	"	39,894	152	122
OK1MKI	"	39,720	174	120
OK2BBQ	"	19,448	124	68
OK1JDJ	"	18,468	105	81
OK2SKJ	"	6,642	72	54
OK2SPB	"	5,967	91	51
OK1AOR	"	2,852	32	31
OK3TFY	"	555	15	15
OK1KSO	**7**	**1,110,330**	**718**	**338**
		(Opr. OK1JCW)		
OK8ACW	**7**	**290,000**	**463**	**232**
		(Opr. UA9WDP)		
OK1XJ	"	149,800	314	175
OK1AZI	"	130,986	308	171
OK2SPS	"	39,936	151	104
OK2ABU	"	39,700	149	100
OK2TED	"	10,248	78	61
OK3CEL	**3.5**	**90,144**	**290**	**144**
OK2HI	"	21,952	236	121
OK1MNV	"	576	18	18
OK2PLH	**1.8**	**23,074**	**137**	**83**

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$106.50 Post Paid (U.S.)

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- **Heavy wall** tubing.
- **Stainless Steel** electrical hardware.
- **Exceptional** Gain and F/B ratio.

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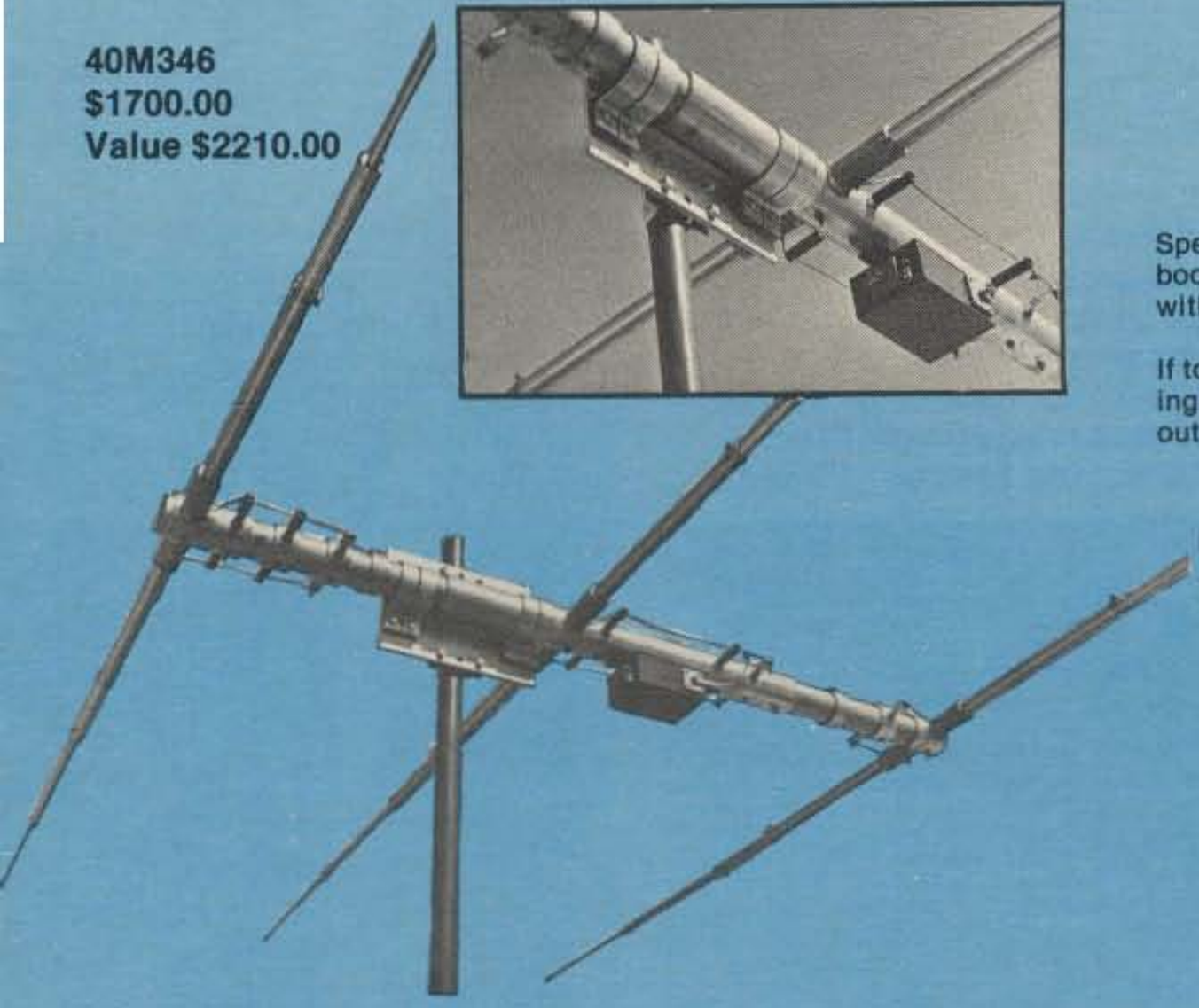
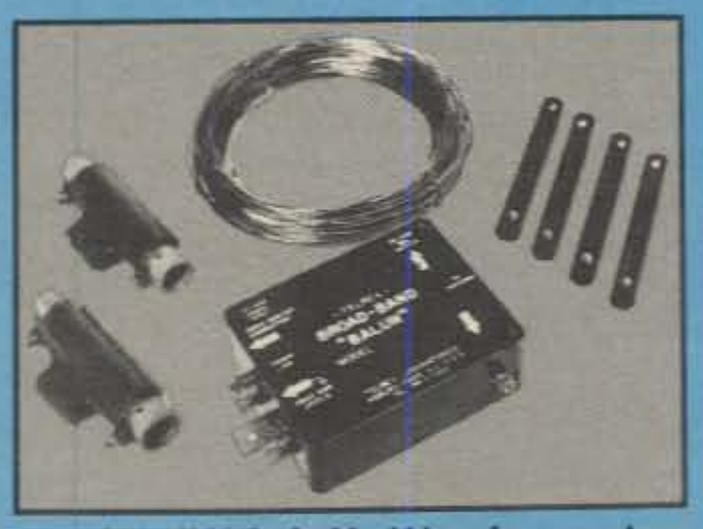
By the only test that means anything . . . on the air comparison . . . Telrex Tri-Bands continue to support the fact that they are designed to out-perform all competition . . . as they have for over 3 decades. Here's why . . . Telrex uses a unique trap design employing Hi-Q 7500 V ceramic condensers, 3 optimum-tuned reflectors to provide maximum gain and true F/B Tri-Band performance.

40M346
$1700.00
Value $2210.00





A Telrex "Balun" fed "Inverted-Vee" kit is the ideal hi-performance inexpensive and practical to install low-frequency mono or multiple band, 52 ohm antenna system.

Better than optimum full sized Dipole performance in an antenna which can be set up within the hour, needing a minimal support structure (existing tower, house, tree, etc.). The "Inverted-Vee" produces a low-angle "Balanced" Omni-Directional pattern, which increases the signal to noise, and signal to interference ratios. Complete simplified instructions are provided. NO TUNERS NEEDED!

2MVS814 kit
$225.00

Special N-type coaxial connectors, solid rod elements (driven thru the boom), tinned connecting lugs, and s/s electrical hardware provide you with peace of mind for many years!

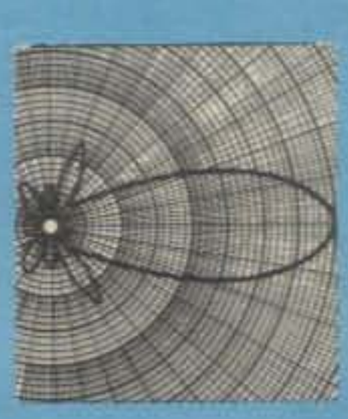
If top 2 Meter performance is your requirement, the 2MVS814 kit consisting of 2 ea. phased 2 Meter "Balun" fed precision tuned 8 element Arrays outperform even quad stacked antennas of other makes.

A FEW OF THE WORLD'S FINEST!

MODEL	Description	GAIN	Value	PRICE
2M1528C	2 Meter 15 element	(17 DBD)	215.00	165.00
10M523	10 Meter 5 element	(13 DBD)	410.00	315.00
10M636	10 Meter 6 element	(14.6 DBD)	878.00	675.00
15M532	15 Meter 5 element	(13 DBD)	631.00	485.00
15M845	15 Meter 8 element	(15 DBD)	1268.00	975.00
20M536	20 Meter 5 element	(12 DBD)	760.00	585.00
20M646	20 Meter 6 element	(14 DBD)	1294.00	995.00
40M214	40 Meter 2 element	(5.6 DBD)	865.00	665.00
40M329	40 Meter 3 element	(8.3 DBD)	1294.00	995.00
40M346	40 Meter 3 element	(9 DBD)	2210.00	1700.00
TB4EC	10, 15, 20M Tri-Band	(5.5 DBD)	318.00	245.00
TB5ES	10, 15, 20M Tri-Band	(8.5 DBD)	468.00	359.00
TB6EM	10, 15, 20M Tri-Band	(10 DBD)	774.00	595.00

Phone . . . 201-775-7252 (nights, weekends, holidays and leave your address) or write Telrex - P.O. Box 879, Asbury Park, N.J. 07712, for your free copy of the latest Telrex UHF, VHF, HF Antenna, and Rotator Catalog.

TLI



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MasterCard VISA

CIRCLE 139 ON READER SERVICE CARD

OK1DTM	**1.8**	**20,960**	**150**	**80**
OK1DRU	"	17,700	135	75
OK2PGT	"	6,844	85	59
OL9CPG	"	6,148	78	53
OLØCOB	"	5,400	76	45
OL6BFB/p	"	2,574	56	39
OL4BHI	"	2,146	56	37
OK2BWM	"	684	20	19
OK2BCZ	"	494	24	19
OL5BIW	"	208	20	13

DENMARK

OZ5KU	**A**	**390,257**	**693**	**283**
OZ7HT	**A**	**310,080**	**646**	**255**
OZ1III	A	195,621	540	197
OZ4RT	"	168,000	280	280
OZ7JZ	"	77,380	256	146
OZ7BG	"	45,738	159	126
OZ3Q	"	7,738	54	53
OZ7BW	"	6,672	55	48
OZ1FAO	**21**	**11,780**	**74**	**62**
OZ8CT	**14**	**170,595**	**459**	**223**
OZ1BMA	"	6,800	82	68
OZ8E	"	3,696	70	42
OZ1AXG	"	2,184	40	39
OZ6XR	**7**	**71,820**	**232**	**135**
OZ5PA	**3.5**	**35,404**	**153**	**106**

ENGLAND

G4UPS	**A**	**539,448**	**703**	**364**
G3ESF	**A**	**343,728**	**667**	**264**
G2AJB	"	143,130	333	195
G4OKN	"	98,527	325	169
G3TXF	"	39,872	169	112
G4CNY	**21**	**1,111,800**	**1092**	**425**
G3XTT	**1.8**	**9,638**	**75**	**61**
G4OBK	"	6,300	66	50

FINLAND

OH8PF	**A**	**1,739,496**	**1652**	**484**
OH3RF	**A**	**1,026,000**	**1091**	**400**
OH2BJG	"	472,013	863	317
OH6XN	"	194,568	534	264
OH3RU	"	136,517	338	211
OH7NW	"	89,612	268	172
OH2VZ	"	77,629	212	149
OH7YG	"	10,988	83	67
OH7YF	"	9,882	73	61
OH9OD	"	6,527	64	61
OH2EJ	**21**	**72,756**	**210**	**172**
OH7EU	**21**	**47,235**	**170**	**141**
OH8OB	"	3,655	43	43
OH5MX	"	513	20	19
OH2BVI	**14**	**500,832**	**860**	**333**
OH3BU	**14**	**190,684**	**508**	**247**
OH2BVE	"	88,068	351	179
OH3NM	"	87,033	233	201
OH6CD	"	73,698	314	173
OH3BAZ	**7**	**211,200**	**387**	**200**
OH6RC	"	17,550	118	75
OH2KI	"	7,326	80	66

FRANCE

F6ENV	**A**	**34,034**	**166**	**119**
F6EQV	"	20,340	134	90
F6HNX	**21**	**54,627**	**211**	**139**
F6KSO/p	**14**	**31,204**	**223**	**116**
		(Opr. F6EPO)		

GERMANY (FRG)

DJ8YI	**A**	**209,888**	**433**	**224**
DK7QB	**A**	**171,965**	**499**	**211**
DJ7IK	"	151,710	392	195
DJ1YH	"	145,400	340	200
DK5AD	"	141,459	305	183
DL1AM/A	"	135,228	204	236
DF3QN	"	100,386	290	169
DK3XB	"	90,574	264	179
DL1QT	"	63,492	176	143
DL1SBF	"	26,220	150	114
DL2MDB	"	25,110	127	90
DL6RAI	"	15,225	100	75
DL3EBX	"	9,030	90	70
DL4BBO	"	4,508	59	46
DF2RG	"	1,225	26	25
DL1RB	**21**	**156,088**	**326**	**218**
DL8KJ	**21**	**133,133**	**278**	**209**
DL1HBT	"	113,322	287	202
DJ9ZB	"	1,271	35	31
DL2JX	**14**	**148,894**	**361**	**218**
DL1TH	"	86,154	285	173
DL3HAH	"	55,739	237	139
DF3AX	**7**	**18,542**	**122**	**73**
DJ2YE	**3.5**	**13,392**	**100**	**62**
DL2SAX	**1.8**	**23,936**	**171**	**88**

GERMANY (GDR)

Y23EK	**A**	**1,108,402**	**1210**	**383**
Y24RL/A	**A**	**581,400**	**841**	**285**
Y47YN	**A**	**528,860**	**818**	**310**
Y25TG	"	410,410	793	287
Y54XO	"	397,375	625	289
Y37UF	"	334,250	716	250
Y53TA	"	319,198	696	242
Y36UE	"	274,815	570	279
Y26BH	"	175,200	428	219
Y53UN	"	148,302	392	198
Y23RJ	"	131,136	395	192
Y51XG	"	117,000	301	195
Y44WF	"	116,564	301	181
Y22DK/A	"	109,564	328	172
Y25JA/A	"	86,428	278	164
Y24SK/A	"	81,065	237	155
Y22RK	"	49,896	207	126
Y31TT	"	33,222	163	113
Y37TM	"	23,766	163	102
Y23CM	"	22,356	112	108
Y36ZG	"	21,614	111	101
Y36VM	"	20,700	111	90
Y31ON	"	14,245	88	77
Y24LA/A	"	13,937	101	77
Y31MB	"	11,664	80	72
Y35UB	"	10,584	75	63
Y58ZA	"	10,452	77	67
Y21NE	"	7,546	60	49
Y27BN	"	7,139	75	59
Y24EA	"	6,040	49	40
Y27IL	"	5,828	53	47
Y54UA	"	5,032	47	37
Y49RF	"	3,990	41	38
Y59QA	"	3,840	41	40
Y64YG	"	1,118	36	26
Y38ZB	"	988	20	20
Y21UD	"	798	23	19
Y33TB	"	702	27	26
Y64ZF	"	396	18	18
Y31WI	**21**	**166,656**	**341**	**224**
Y78VL	**21**	**129,503**	**315**	**193**
Y37ZE	"	42,212	163	122
Y22UB	"	39,237	146	123
Y51XH	"	38,416	152	112
Y42YG	"	24,376	127	88
Y26TL	"	23,908	107	86
Y26ML	"	16,200	101	75
Y21DC	"	7,482	67	58
Y21UL/A	"	2,268	40	36
Y57RH	"	2,265	40	35
Y21YH/A	"	12	2	2
Y21XC	**14**	**71,916**	**270**	**156**
Y22BK	**14**	**45,895**	**171**	**137**
Y21WI	"	13,680	87	72
Y44WA	"	4,650	75	50
Y21CF	"	3,780	39	36
Y23JA	"	2,808	40	36
Y51QL	"	1,426	40	31
Y62ZI/p	**7**	**509,656**	**724**	**266**
Y51XE	**7**	**142,800**	**342**	**170**
Y27QO	"	135,324	321	179
Y49RF	"	11,950	62	50
Y32KE	**3.5**	**163,658**	**446**	**173**
Y22UO	"	570	17	15
Y22TO	**1.8**	**17,182**	**114**	**71**

GREECE

SV1RP	**A**	**741,760**	**929**	**488**
J48AA	**1.8**	**4,104**	**52**	**38**

HUNGARY

HA8UB	**A**	**1,069,660**	**1133**	**395**
HA8EK	**A**	**704,544**	**1000**	**328**
HA3NU	"	250,182	461	246
HAØDU	"	248,114	475	262
HA8KCK	"	225,320	506	215
		(Opr. Gracin)		
HA4XX	"	60,582	237	138
HA1ZG	"	57,368	201	142
HAØLG	"	2,880	50	32
HG9R	**21**	**814,968**	**1015**	**378**
		(Opr. Istvan)		
HA7RB	**21**	**251,433**	**440**	**273**
HA2MJ	"	63,474	235	149
HA8ZC	"	49,096	170	136
HA8VK	**14**	**529,416**	**762**	**344**
HA2MV	**14**	**295,076**	**601**	**284**
HA8IH	"	229,419	513	261
HA2MI	"	106,869	430	147
HA8DT	"	84,000	309	175
HA8AT	"	63,910	210	154
HA3MU	"	22,568	150	62
HA9RE	**7**	**526,400**	**715**	**300**
HA1XY	**7**	**517,636**	**631**	**278**
HA7RO	"	204,750	409	195
HA7KPW	"	125,598	292	173
		(Opr. Laszlo)		
HA5UA	"	119,064	300	164
HA6NL	**3.5**	**141,950**	**398**	**167**
HA8CQ	"	8,000	81	50
HA3JB	"	4,320	64	36

ITALY

IK2DVG	**A**	**1,869,600**	**1496**	**480**
I2UIY	**21**	**876,300**	**936**	**381**
I2RLX	**14**	**539,414**	**790**	**346**
I2JIN	"	50,490	183	135
I4IND	**7**	**1,094,500**	**853**	**398**
IO3JSS	**7**	**1,062,864**	**888**	**363**
		(Opr. I3JSS)		

I.T.U.

4U9ITU	21	207	9	9

MALTA

9H1EL	**A**	**2,550,384**	**2314**	**534**

NETHERLANDS

PA3BAS	**A**	**115,260**	**373**	**170**
PAØDIN	**A**	**76,622**	**228**	**182**
PA3BTH	"	64,922	277	143
PAØUV	"	39,942	157	122
PA3BFH	"	30,104	174	106
PAØINA	"	24,024	116	91
PA3BDK	"	7,695	68	57
PA3DBS	"	7,424	79	64
PA3BNT	"	6,897	60	57
PA3DCS	"	4,784	68	52
PAØLRK	"	1,932	29	28
PA3ACC	"	372	13	12
PI1PT	**7**	**82,082**	**293**	**143**
PA3AAV	1.8	646	19	17

NORWAY

LA6ZV	**A**	**274,824**	**642**	**264**
LA1VL	28	221	15	13
LA5XDA	**14**	**56,536**	**353**	**148**
LA4O	**3.5**	**107,596**	**335**	**148**
		(Opr. LA9HW)		
LA7SI	**1.8**	**3,478**	**46**	**37**

POLAND

SP3HLM	**A**	**605,880**	**800**	**340**
SP5BR	**A**	**289,296**	**551**	**246**
SP3BYZ	"	236,900	487	230
SO5DCA	"	227,220	638	210
		(Opr. LA4DCA)		
SP9BBH	"	152,308	320	202
SP2JGK	"	135,036	401	186
SP6CDP	"	98,072	245	164
SP3LPR	"	62,054	198	142
SP3IOE/3	"	34,314	184	114
SP2BMX	"	14,910	83	71
SP6EQZ	"	615	15	15
SP3AOT	**28**	**912**	**20**	**19**
SP6BVR	"	612	18	17
SP6BFK	"	65	7	5
SP6PST	**21**	**286,216**	**526**	**269**
SP5AD	**21**	**158,457**	**333**	**221**
SP9DWT	"	16,560	86	80
SP7DTP	"	3,589	39	37
SP4JWR	**14**	**301,052**	**502**	**292**
SP5CJQ/5	**14**	**290,232**	**546**	**278**
SP9CTW	**14**	**263,266**	**492**	**278**
SP9DLY	"	82,362	343	159
SP7MGD	"	73,800	297	164
SP9BRP	"	48,576	200	138
SP4BEU	"	37,269	147	123
SP9EML	"	7,074	58	54
SP2JXK	"	2,508	38	33
SP5CBA	"	1,232	22	22
SP5JTR	**7**	**87,984**	**210**	**141**
SP9CVY	"	74,254	212	137
SP2HFL	"	9,612	59	54
SP5GIQ	**3.5**	**121,716**	**378**	**147**
SP2FWC	"	61,000	242	122
SP9GKM	"	19,950	140	75
SP9EMI	"	19,812	127	78
SP3IBS	**1.8**	**22,400**	**139**	**80**
SP4EEZ	"	10,962	88	63
SP6CZ	"	2,146	40	29

PORTUGAL

CR7BOH	**A**	**951,000**	**1217**	**375**
CT1CBW	**A**	**364,426**	**669**	**257**

ROMANIA

YO3CO	**A**	**844,875**	**1036**	**375**
YO6KNT	**A**	**272,930**	**541**	**245**
		(Opr. YO6AFP)		
YO6KAF	"	190,128	504	204
		(Opr. Sandu)		
YO5AVP	"	118,849	385	157
YO2ARV	"	51,012	160	117
YO5ALH	"	18,392	94	76
YO6AVB	"	10,796	71	64
YO3KWJ	**28**	**21,402**	**117**	**87**
		(Opr. YO3JW)		
YO2GZ	**21**	**75,816**	**240**	**156**
YO6EZ/6	**14**	**44,516**	**233**	**124**
YO8BDQ	"	15,120	120	84
YO2CMI	"	12,672	80	66
YO3BWK	"	12,580	75	68
YO4CAH	**7**	**87,910**	**243**	**149**
YO9YE	"	12,840	68	60
YO2CJX	"	9,288	80	54
YO6ADW	"	3,128	40	34
YO2ADQ	"	1,320	22	22
YO8DDP	**3.5**	**79,440**	**329**	**120**
YO5CYH	"	22,752	159	72
YO2DFA	"	19,008	200	96
YO4DCF	"	3,078	31	27
YO6DBA	"	2,368	40	32
YO6BTY	"	1,276	33	22

SARDINIA

IS0MVE	**A**	**220,575**	**589**	**255**

SPAIN

EA3BOW	**A**	**149,526**	**394**	**213**
EA7CIX	**A**	**87,048**	**265**	**156**
EA1AHF	"	77,500	255	155
EA2CR	"	62,342	219	146
EA7CQF	"	18,144	120	84
EA7AZA	"	2,448	37	34
EC3BXS	**21**	**100,045**	**329**	**187**
EA1CIM	"	22,563	132	109
EA7LM	"	13,148	79	76
EA2IA	**14**	**184,800**	**454**	**220**
EA1ASI	"	23,856	159	112
EA4AYD	"	16,478	100	77
EA3GF	"	11,850	100	75
EA2OP	**7**	**920,530**	**748**	**365**

SVALBARD

JW6MY	**14**	**8,253**	**71**	**63**

SWEDEN

SM5RE	**A**	**92,650**	**283**	**170**
SM7ERC	**A**	**77,665**	**266**	**167**
SMØCGO	"	33,640	144	116
SM5DAC	"	28,615	129	97
SKØRQ/5	"	23,664	130	87
		(Opr. SM5DAC)		
SM5AOG	"	17,472	119	78
SM7LAZ	"	1,265	25	23
SM5DUT	"	336	12	12
SM7KNW	28	377	21	13
SM6CVT	**21**	**354,090**	**523**	**298**
SM7TV	"	26,596	132	109
SM6FKF	"	15,036	84	84
SMØKV/Ø	"	11,745	87	81
SKØEL/Ø	"	8,576	73	64
		(Opr. SMØBVQ)		
SMØBVQ	"	7,192	66	58
SM4ASI	"	2,079	31	27
SMØMML	**14**	**60,676**	**270**	**154**
SM2LCI	"	25,536	178	112
SMØIFX	"	3,264	64	48
SM2NTU	**7**	**3,760**	**48**	**40**
SM4ATE	3.5	288	12	12

SWITZERLAND

HB9BOW	**A**	**6,552**	**66**	**56**

WALES

GW4HBK	**7**	**36,464**	**142**	**106**

YUGOSLAVIA

YU2OB	**A**	**1,264,630**	**1221**	**430**
YU7PXT	**A**	**156,613**	**390**	**199**
YU3SB	"	119,314	302	169
YU7ORQ	"	103,113	300	171
YU1PJQ/4	"	52,992	210	138
YU2GF	"	38,988	134	114
YU1NZW	"	4,884	50	44
YU7QDY/M	"	3,588	42	39
YU4EZC	"	1,764	30	28
4N2CQ	**21**	**1,300,075**	**1258**	**437**
		(Opr. YU2CQ)		
YU7AF	"	129,596	352	179
YU3C	"	84,995	285	191
		(Opr. YU3GO)		
YU4GD	**14**	**2,147,148**	**1599**	**564**
YT3M	**14**	**1,564,477**	**1405**	**463**
		(Opr. YU3EW)		
YU3PR	**14**	**1,291,500**	**1401**	**420**
YZ2CRU	"	1,186,185	1143	455
		(Opr. YU2PA)		
YZ2OG	"	1,185,510	1355	430
YU4WSO	"	313,877	580	281
YZ2WJ	"	15,725	106	85
YU7AD	**7**	**1,036,672**	**806**	**364**
YU3EY	**7**	**1,010,840**	**782**	**370**
4N3E	"	928,188	908	342
		(Opr. YU3HAM)		
YZ2AW	"	777,360	765	316
YU4WRS	"	401,320	562	254
YU7ORN	"	206,752	403	208
YU4GYZ	"	177,633	536	243
		(Opr. Kosmajac)		
YU3MM	**3.5**	**245,496**	**470**	**212**
YZ4Z	**3.5**	**200,984**	**512**	**194**
		(Opr. YU4WIA)		
YU7SF	"	137,274	384	167
YU3EF	**1.8**	**69,596**	**248**	**127**

U.S.S.R.

EUROPEAN

UW3HV	**A**	**1,594,880**	**1570**	**448**
RA3AF	**A**	**647,155**	**1006**	**347**
RW3AU	**A**	**562,104**	**970**	**333**
UA1ZDW	"	336,600	618	275
RW3DW	"	314,712	601	282
UA4CDL	"	310,990	577	274
UA3AFQ	"	282,308	549	244
UA1OGA	"	282,172	650	242
UA3DRT	"	271,962	476	261
UA3DIW	"	177,546	367	233
UA4CK	"	170,430	499	195
UZ3DWX	"	144,752	301	218
		(Opr. UA3-170998)		
RA3EF	"	137,965	385	205
UA3VKH	"	133,660	333	205
UA3DQZ	"	114,631	329	187
UA3PBY	"	62,660	207	130
UA6AKT	"	55,183	170	139
UA3AJK	"	52,960	186	160
UA4ANZ	"	36,400	146	112
UA6APP	"	21,436	107	92
UA6LFQ	"	21,294	117	91
UA1CE	"	20,520	148	95
UA6AJG	"	18,160	107	80
UA3LCC	"	6,672	55	48
UZ3DX	"	5,292	64	49
UA3DIN	"	4,662	49	42
UA3TAG	"	1,896	43	24
UV3TQ	"	850	18	17
UV6AY	**28**	**6,664**	**81**	**56**
UW3UO	**21**	**442,734**	**700**	**339**
UA3PDW	**21**	**371,070**	**599**	**315**
OK3IA/UA3	"	221,791	450	257
UA6ADU	"	148,500	352	225
UA4QK	"	44,020	179	124
UA3QBX	"	31,058	147	106
UA1QBE	"	14,112	98	84
UA3FK	"	7,194	73	66
UZ1AWT	**14**	**964,004**	**1000**	**401**
RZ3DX	**14**	**758,940**	**995**	**390**
UA3VAQ	**14**	**681,375**	**931**	**375**
UA6AUT	"	179,564	455	242
UA6HQV	"	175,644	640	252
UA6ECS	"	165,120	430	256
UA1QBV	"	143,664	420	219
UA1ANA	"	129,792	350	208
UA3RDH	"	124,032	309	228
UA3SCM	"	66,528	185	144
RW3DA	"	65,340	246	165
UZ3TG	"	62,592	226	163
UW4CC	"	39,600	256	120
UA3TDR	"	23,040	180	128
UA4ACA	"	19,513	100	79
UZ3TWJ	"	17,472	133	96
UA6HRZ	"	15,939	81	69
UA3DNV	"	14,110	100	83
UA3XN	"	12,191	94	73
UZ3TXU	"	11,534	94	73
UA1ZFB	"	10,950	111	73
UW3WZ	"	10,270	114	65
UA1AJ	"	6,960	104	60
UA3DFM	"	4,074	53	42
UA1AUA	"	3,675	55	49
UA3XDF	"	3,572	40	38
UA1DF	"	1,930	33	30
UA6HQF	"	874	21	19
UA6LCN	**7**	**189,748**	**395**	**178**
UA6LUE	**7**	**143,916**	**314**	**179**
UA3AGX	"	118,332	290	171
UA3AO	"	73,584	260	126
UA3AQW	"	63,750	200	125
UA6ADH	"	52,452	213	141
UA6BPM	"	20,148	106	73
UA4AGP	"	10,788	66	62
RW3DX	**3.5**	**171,072**	**443**	**176**
UA4HNP	**3.5**	**81,396**	**280**	**126**
UA3TFZ	"	10,200	80	51
UA3TBM	"	3,472	42	31
UA3PFN	**1.8**	**26,080**	**138**	**80**
RA6ATL	**1.8**	**19,832**	**118**	**74**
UA6BJF	"	16,125	113	75
UA4PO	"	16,002	112	63
UA3XDS	"	15,904	100	71
UA3ARI	"	5,986	67	41
UA3DQH	"	2,400	32	25
RA6AJQ	"	1,224	36	17

BYELORUSSIA

UC2WO	**21**	**8,418**	**102**	**69**
UC2ACZ	**14**	**45,370**	**152**	**130**
UC2WM	"	8,844	80	67
UC2BA	"	2,432	36	32
UC2OBB	**7**	**133,764**	**352**	**157**
RC2AB	**3.5**	**170,624**	**444**	**173**
UC2WAZ	**1.8**	**16,714**	**104**	**61**
UC2AAN	"	8,586	80	53

ESTONIA

UR2OI	**21**	**42,350**	**162**	**121**
UR2RHF	"	14,013	99	81
UR1RXF	**14**	**15,747**	**117**	**87**
UR2RND	**7**	**77,792**	**200**	**136**
UR2RNG	"	33,600	144	100
UR2RLR	"	1,480	20	20
UR2RIC	**3.5**	**2,904**	**64**	**44**
UR2RNJ	**1.8**	**1,564**	**34**	**23**

KALININGRAD

UA2EC	**21**	**176,955**	**352**	**235**

LATVIA

UQ2PQ	**A**	**763,620**	**1108**	**356**
UQ2GO	**A**	**486,843**	**700**	**291**
UQ2GBR	"	93,280	278	160
UQ2GLW	"	58,896	220	144
UQ2GCV	"	30,816	129	107
UQ2GLK	"	6,840	76	45
UQ2GMR	**14**	**306,571**	**678**	**281**
UQ2OI	**7**	**251,732**	**492**	**206**
UQ2GMB	**3.5**	**30,420**	**297**	**90**
UQ2PG	"	3,534	43	31
UQ2GNL	**1.8**	**3,500**	**50**	**35**

LITHUANIA

UP2NK	**A**	**2,464,944**	**1828**	**534**

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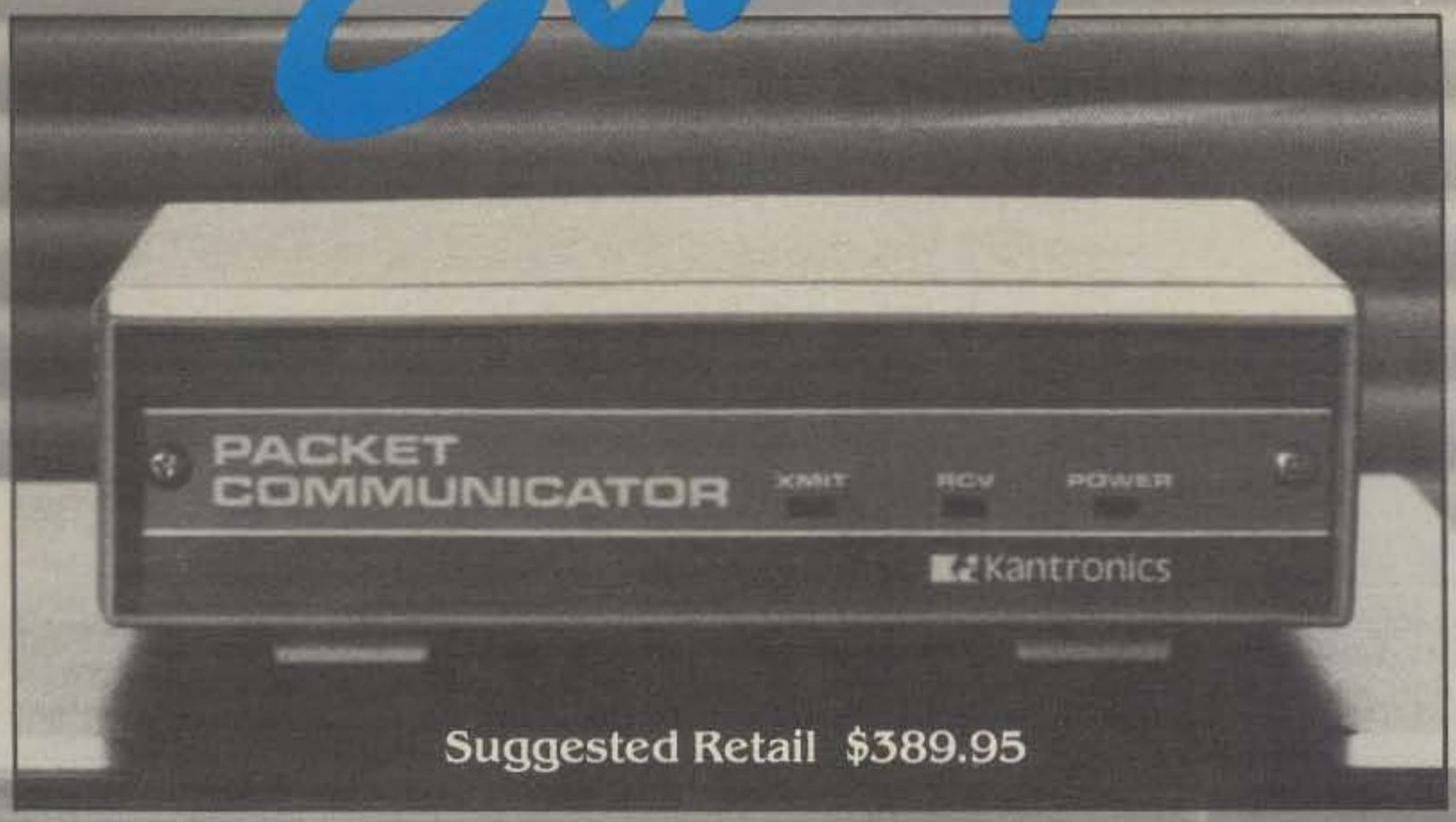

Suggested Retail $389.95

Kantronics Packet Communicator™

Kantronics wants you to join one of the fastest growing segments of Amateur Radio today . . . Packet Radio. With the Kantronics Packet Communicator we've made getting on Packet as easy as getting on RTTY.

1 Ready to Use

The Kantronics Packet Communicator is a fully assembled and programmed terminal node controller ready for operation. Simply connect the Packet Communicator to the Serial TTL or RS232 port of your computer, and the microphone and external speaker jacks of your transceiver. The power supply, cables, and most connectors are included.

2 Easy to Operate

Because the Kantronics Packet Communicator uses internal microprocessors for protocol and signal processing, the operator simply follows procedures and commands outlined in the operators manual.

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3 Compatibility Plus

The Kantronics Packet Communicator has both the AX.25 and Vancouver protocols, making it compatible with most existing Packet terminal node controllers. Added features include both Bell 103 and 202 tones, and the ability to use the unit as a 1200 baud radio modem without special protocols.

Error free data communication via computer makes Packet Radio technology exciting, and the Kantronics Packet Communicator lets you get in on the action.

For more information contact your local Kantronics dealer, or write Kantronics.

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Lawrence, Kansas 66046

Looks like the 10 meter position was a very lonely place for op Lloyd, AL7CQ, during the multi-multi at KL7AR.

N4RM and GU4WTN, a couple of the ops at the Guernsey Island GU3HFM multi- single get-together. The GU3 prefix is always in demand in the WPX Contests.

UP2BAO	**A**	**779,712**	**1032**	**372**
UP2OQ	"	219,438	461	219
UP2PAQ	"	129,352	361	184
UP2BEG	"	116,325	322	165
UP2BNC	"	116,156	373	142
UP2PBM	"	98,783	330	173
UP2BIP	"	84,500	255	169
UP2PCX	"	46,875	215	125
UP2BDX	"	35,952	181	107
UP2BBF	"	13,530	105	82
UP2BIJ	"	9,150	81	61
UP2BFU	"	6,890	63	53
UP2BJM	**28**	**10,656**	**110**	**72**
UP2BAR	**21**	**46,800**	**159**	**117**
UP2BB	"	10,608	77	68
UP2BAE	**14**	**401,292**	**735**	**284**
UP2BJQ	**14**	**276,395**	**517**	**265**
UP2DL	"	82,472	266	169
UP2BC	"	44,714	159	158
UP2BMQ	**7**	**85,848**	**264**	**146**
UP2BEX	**3.5**	**136,512**	**383**	**158**
UP2BZ	**3.5**	**109,740**	**333**	**155**
UP2BMX	"	53,312	230	112
UP2BEN	**1.8**	**12,992**	**104**	**58**

MOLDAVIA

UO5OA	**A**	**306,432**	**582**	**266**
UO4OWR	**A**	**114,918**	**404**	**179**
UO5OBD	"	36,600	153	122
UO5OJM	"	2,160	38	30
UO5OB	**7**	**52,704**	**197**	**108**

UKRAINE

RT5UO	**A**	**792,200**	**1067**	**350**
UT5UBF	**A**	**463,760**	**733**	**310**
UY5TE	**A**	**287,755**	**594**	**247**
RB5QZ	"	180,840	452	220
UB5ALI	"	142,662	382	186
UBØKA	"	129,355	312	205
RB5NT	"	116,382	270	163
RB5DC	"	113,364	324	201
UB5VK	"	105,840	335	180
UB5ENI	"	88,025	311	175
RB5QL	"	77,275	272	162
UB5IIQ	"	51,300	166	150
UB5KBV	"	26,900	117	100
RB5JJ	"	9,504	91	72
UB5JLJ	"	3,900	41	39
UB5FBN	"	32,016	185	92
UY5WA	"	19,000	125	76
UB5FAN	**1.8**	**14,280**	**124**	**70**
UY5XE	**1.8**	**11,904**	**90**	**64**
UB5IMR	"	5,760	66	40
RT5UY	"	1,248	29	24

OCEANIA

AUSTRALIA

VK2APK	**A**	**1,042,956**	**878**	**348**
VK2BQQ	"	478,250	569	250
VK4XA	**A**	**312,440**	**499**	**214**
VK3CWB	**A**	**278,719**	**420**	**203**
VK6DU	**A**	**216,138**	**360**	**163**
VK1XX	**A**	**212,072**	**358**	**196**
VK5AGX	**A**	**111,000**	**258**	**150**
VK5GZ	"	64,745	181	115
VK4ANY	**14**	**51,504**	**155**	**116**
VK2CIA	**7**	**624,672**	**500**	**216**
VK2KM	"	287,240	284	172

HAWAII

KH6WT	**21**	**23,808**	**110**	**93**

INDONESIA

YB2ARH	**A**	**285,964**	**498**	**196**

NEW ZEALAND

ZL1AIZ	**A**	**68,250**	**132**	**105**

PHILIPPINES

K1BAZ/DU1	**A**	**231,628**	**471**	**158**
N8CWX/DU2	**21**	**83,662**	**249**	**118**
DU1TV	"	47,100	159	100

SOUTH AMERICA

ARGENTINA

LU1EWL	**A**	**225,559**	**352**	**211**
LU5WP	"	61,668	213	108
LU4FDM	**21**	**1,004,250**	**874**	**390**

BRAZIL

PY1ZFO	**A**	**514,579**	**548**	**299**
PY2DLK	**A**	**328,844**	**454**	**229**
PY1BVY	"	282,750	407	195
PY2RLQ	"	98,124	218	156
PR7CM	"	93,294	219	146
ZY5CIG	"	43,491	136	109
PY3CNW	"	20,358	90	78
PY3BC	"	10,340	64	55
PY1APS	**21**	**114,192**	**273**	**144**
PY5YFF	**21**	**104,988**	**239**	**156**
PY3CJI	"	10,010	62	55
ZY4OD	**14**	**1,005,894**	**935**	**369**
PT2ACZ	"	17,017	80	77

CHILE

CE1DOF	**14**	**13,860**	**76**	**63**
CE3DNP	**7**	**323,172**	**297**	**191**

COLOMBIA

K3ZO/HK3	**A**	**2,450,160**	**1650**	**492**

PERU

WB2MOQ/OA4	**A**	**251,664**	**373**	**214**

URUGUAY

CX7BY	**14**	**1,832,850**	**1372**	**450**

VENEZUELA

4M7QP	**28**	**46,134**	**158**	**99**
4M7PF	**21**	**581,250**	**635**	**310**
YV4ABR	"	10,368	70	54
YV1TO	**14**	**1,814,472**	**1385**	**474**
		(Opr. YV1DIG)		
YV4DBM	"	12,383	69	61

MULTI-OPERATOR SINGLE TRANSMITTER

UNITED STATES

N4WW	**3,769,800**	**2111**	**600**
KR8Y	**3,581,359**	**2156**	**601**
K1VR	**2,677,950**	**1726**	**495**
K1XA	2,513,974	1676	514
N7TT	**2,004,480**	**1400**	**464**
AK6A	**1,952,160**	**1440**	**480**
KG7D	1,855,282	1439	499
AC8W	**1,545,650**	**1311**	**475**
KY2P	**1,514,436**	**1305**	**484**
NI8V	1,439,128	1280	472
KQ1F	109,552	227	164
KD8KA	31,185	183	135

NORTH AMERICA

VP2EC	**7,599,480**	**3588**	**664**
ZF2HF	**6,445,685**	**3312**	**663**
VE7ZZZ	**694,941**	**763**	**309**

AFRICA

ZS1CT	**3,129,216**	**1983**	**464**

ASIA

JA2YKA	**2,580,893**	**1869**	**503**
JA9YBA	**2,459,156**	**1748**	**497**
JA8YAU	932,750	1019	350
JA7YAA	887,089	889	359
JA7YFH	831,600	926	336
JA3YDS	672,312	772	327
JA7YFB	638,172	774	311
JA6YAI	576,114	756	301
JA7YCQ	500,786	606	286

EUROPE

LZ2KTS	**5,444,916**	**3221**	**673**
OK7MM	**4,096,614**	**2748**	**597**
EA3VY	**3,945,678**	**2679**	**626**
HG5A	**3,762,135**	**2679**	**585**
HG6N	3,616,509	2521	611
OK6DX	3,011,619	2058	611
GB2MM	**2,712,892**	**2093**	**514**
SL8ZG	**2,684,535**	**2246**	**555**
OH2AQ/OH8	**2,215,000**	**2043**	**500**
OH7AB	**2,163,284**	**2259**	**493**
HA7KSR	2,143,278	2142	501
GU3HFN	**2,128,734**	**1805**	**499**
HG6V	1,906,102	1761	506
HA5KKG	1,872,052	1665	481
4N7W	**1,824,511**	**1772**	**479**
LZ2KRU	**1,679,930**	**1500**	**466**
YT3T	1,636,180	1593	455
DKØTU	**1,602,906**	**1525**	**463**
HA3KNA	1,574,926	1622	454
Y33ZL	**1,524,717**	**1595**	**447**
HA7KLG	1,459,416	1464	438
SP5KVW	**1,170,029**	**1411**	**413**
I1WTM	**1,157,879**	**1335**	**409**
DLØIU	1,021,020	1120	390
HA8KAX	914,400	1156	381
OK1KRQ	892,584	1008	414
SK6AW	812,472	1168	349
HA2KMR/p	799,227	1163	351
HA6KNX	685,990	950	362
OE3GBB	**503,283**	**756**	**303**
DLØEJ	479,400	695	300
OH9AB	445,795	733	329
OH5TR	445,060	876	308
OK2KYC	394,500	654	263
HA5KFZ	375,200	680	280
YU2AKL	349,162	688	269
OK3CMF	319,968	550	264
OK3KEX	319,304	611	239
PA3CEF	**252,416**	**559**	**232**
YU7AJD	210,710	414	190
OK2KQO	169,945	397	205
OK1KZW	105,624	359	163
OK3KIC	98,968	315	178
OK1ORA	73,255	284	161
OK3RDM	69,580	245	140
YU1RA	68,552	184	164
PI4ETL/A	59,153	268	149
LZ1KZK	58,904	232	148
OK3RMW	40,300	170	124
LZ1KKR	34,540	173	110
SP9ZHR	31,004	133	92
YU7AOP	8,568	68	63
OK1KYS	8,085	67	55
OK3KSQ	7,936	82	62
YU7DVW	1,782	40	33
HA5KDW	1,400	30	25
HA5KHS	1,368	30	24

OCEANIA

KH6XX	**4,646,859**	**2431**	**553**
KD7P/NH2	**4,229,355**	**2458**	**529**
VK3ZH	**350,696**	**610**	**236**

SOUTH AMERICA

L8DQ	**5,952,111**	**2892**	**627**
PU1YOC	**229,110**	**346**	**210**

U.S.S.R. CLUB STATIONS

ASIA

UZ9AYA	**4,380,880**	**2390**	**560**
RL8PYL	**3,400,680**	**2265**	**510**
UH8EWW	**2,822,184**	**1969**	**456**
UZ9SWY	2,464,985	1801	439
UL8BWW	1,492,644	1346	346
UI9AWX	**1,000,513**	**1181**	**307**
UZ9OWE	993,662	1043	331
UZ9FWR	929,266	1126	347
UZ9XWW	798,342	862	298
UL8OWA	540,432	1008	216
UL8LWX	**441,452**	**820**	**316**
UZØAWB	401,736	630	228
UZØQWE	236,958	426	219
UL8CWN	179,504	360	208
UZØCWO	155,056	467	176
UZ9XWA	2,460	47	41

EUROPE

UZ2FWA	**3,341,648**	**2415**	**584**
UR1RWX	**3,199,570**	**2551**	**590**
UZ6LWZ	**2,631,906**	**2146**	**549**
UP1BZA	**2,540,307**	**1984**	**539**
UB4IXB	**2,032,146**	**1933**	**493**
UC1AWB	**1,838,284**	**1831**	**452**
UQ1GWB	**1,752,366**	**1693**	**462**
UZ6LWT	1,628,802	1887	434
UZ3AZW	1,599,942	1662	467
UP1BZI	1,448,261	1567	439
UP1BZG	1,428,284	1432	454
RB4MWA	1,194,800	1420	400
UZ1AWO	1,048,152	1299	408
UQ1GXB	880,384	1270	362
UP1BZQ	830,270	1012	409
UZ4WWA	636,846	1013	354
UZ6HWA	416,472	808	268
UZ1AWW	386,698	755	278
UC1WWY	350,129	743	299
UB4ZWW	321,468	634	267
UB4FWC	308,805	726	351
UB4HWH	140,970	295	185
UZ2FWF	112,008	434	156
UZ3WWW	73,315	270	155
UB4ZWZ	64,600	338	152
UQ1GXW	59,776	236	128
UZ3DZF	48,510	207	147
UB4WWS	35,512	217	92
UC1AWG	33,998	189	89
UB4WYA	26,789	130	89
UZ3DWR	21,746	101	83
UC1CWC	19,580	121	89
UZ3TWT	2,080	43	40
UC1AWC	1,890	34	21
RZ6AWH	1,050	31	25

MULTI-OPERATOR MULTI-TRANSMITTER WORLD WIDE

YZ1EXY	**8,282,127**	**4711**	**721**
RP3P	**7,978,625**	**4859**	**725**
KL7RA	**4,653,283**	**2668**	**613**
NM5M	**4,432,883**	**3058**	**637**
EA9CE	**4,383,308**	**2439**	**482**
JA3YBF	**2,690,800**	**1719**	**560**
JA1YXP	1,516,396	1366	434
JA6YDH	1,071,372	1125	381
JR1ZTT	424,960	528	332
JA7YWD	240,840	423	223
JA6YGV	240,408	441	212

CHECK LOGS: The following logs were used for cross-checking. Check logs & SWL logs are appreciated.

AGØI, AK2H, EA1CPS, EA5TX, EA7ATE, HA2NI, HA6KNK, HA7KLJ, HA7PW, HA8GZ, HA8ZO, KA8UOC, KO9V, KR8B, KX7J, LAØEH, LA1H, LA7XB, LZ1IA, LZ1KHY, LZ1RW, LZ1WZ, LZ2KKK, LZ2KSU, LZ2SL, N2EKL, NC5K, OH2BYS, OH5FA, OH6XA, OK1FAI, OK1IAR, OK1MWN, OK1TJ, OK1US, OZ4XX, PI1PT, PT2KT, RA1AI, RA3AB, RA4PAW, RB5SA, RL7GC, RT5UE, SMØBFJ, SM2OTU, SM5BVD, SM6AYM, SP2BLC, SP2GUV, SP5LM, SP6BEN, SP6LK, SP8FNA, SP8GSC, SP8JMA, UAØWAE, UA1OK, UA3AGL, UA3AGW, UA3DB, UA3DQS, UA3EZ, UA3ICF, UA3IDX, UA3PFB, UA3QES, UA3TAM, UA3XDC, UA4HLX, UA4HMH, UA4LBE, UA4PML, UA4YA, UA4YZ, UA6AJO, UA6ARP, UA6AVZ, UA6HAQ, UA6HKN, UA6HO, UA6PCH, UA6PZ, UA6WBZ, UA6YCI, UA6YCK, UA9OFE, UB4AWW, UB4RWW, UB4SWM, UB4UME, UB4WZA, UB4XWB, UB5CDH, UB5EF, UB5EM, UB5FDG, UB5IBV, UB5IMD, UB5KW, UB5LAL, UB5NBO, UB5QBC, UB5UHE, UC2AIH, UC2LB, UL7FCW, UP2BCS, UT4UB, UT4UH, UT4UWC, UT5RW, UT5UBW, UT5UCK, UV3DN, UV3HD, UZ3EWA, UZ3MWS, UZ3WWA, UZ4AWE, UZ9AWH, UZ9UZT, VE2WA/3, W1PM, W1WY, W6BYH, WA8YTM, WB2KEL, WB4VQO, Y22XO, Y22YN, Y23BF, Y23DO, Y23FK, Y24DG, Y24HJ, Y24WJ, Y24ZH, Y25IJ/A, Y25QE, Y25TO, Y26BL, Y26IL/A, Y26MM/A, Y26SO, Y26WM/A, Y27HL, Y33VL, Y33XB, Y38ZM, Y41WM, Y42YF, Y47VN, Y47YM, Y48ZF, Y52TL, Y54XL, Y66ZN, Y75ZH/P, Y82ZL/P, YO8BSE, YU7FN, YZ2AYZ, ZY200 & French SWL Station FE 9780.

Disqualifications: HA2KSD: Rule XIV—Took credit for excessive duplicate contacts. **UZ4WWB:** Rule IV—Major violation of the multi-operator, single transmitter 10-minute requirement. **UZ8FWD:** Rule XIV—Took credit for excessive duplicate contacts & multipliers. **WA8TOD:** Rule VIIA—Did not sign portable as required in the WPX Contest. CQ

When you need one, an antenna is an antenna is an antenna. How efficient, how close to optimum, how much RF is actually radiated are the correct questions to ask . . . but not always.

The "DLA" Dummy Load Antennas Some Food For Thought

BY LEW MCCOY*, W1ICP

I was invited to give a lecture on the subject of 25 years of antennas and Transmatches at the Miami Convention this year, and an unusual thing happened to me during the course of that lecture. Towards the end of the talk I opened the meeting to questions and answers, and I was immediately hit with a rather sticky question: "What did I personally think of the currently advertised 'dummy' type antennas?" As one who has worked in the field of antennas for years, I would have to admit that I had (have) a great deal of prejudice against any antenna that actually wastes power. When I was pressed by my audience for an opinion, I had to admit that I didn't think very much of such a device.

As it turned out, it was almost as though the whole scenario was staged. I know it wasn't, but it sure seemed that way, and in the final outcome, it made me rethink my thinking! After I said I didn't think much of such an antenna, K3FGB, who was in the audience, stood up and tossed me a small plastic container which was sealed, but not for long. Being that I only have one eye, I am not very good at catching things, so the plastic butter-type container hit the floor, whereupon the lid became loose. K3FGB told me to open the box, although he had previously sealed it with a compound around the lid. Mounted on the outside lid of the box was an SO-239 coax fitting and eyelet for holding the box to a support, plus two terminals, which were internally connected to resistors.

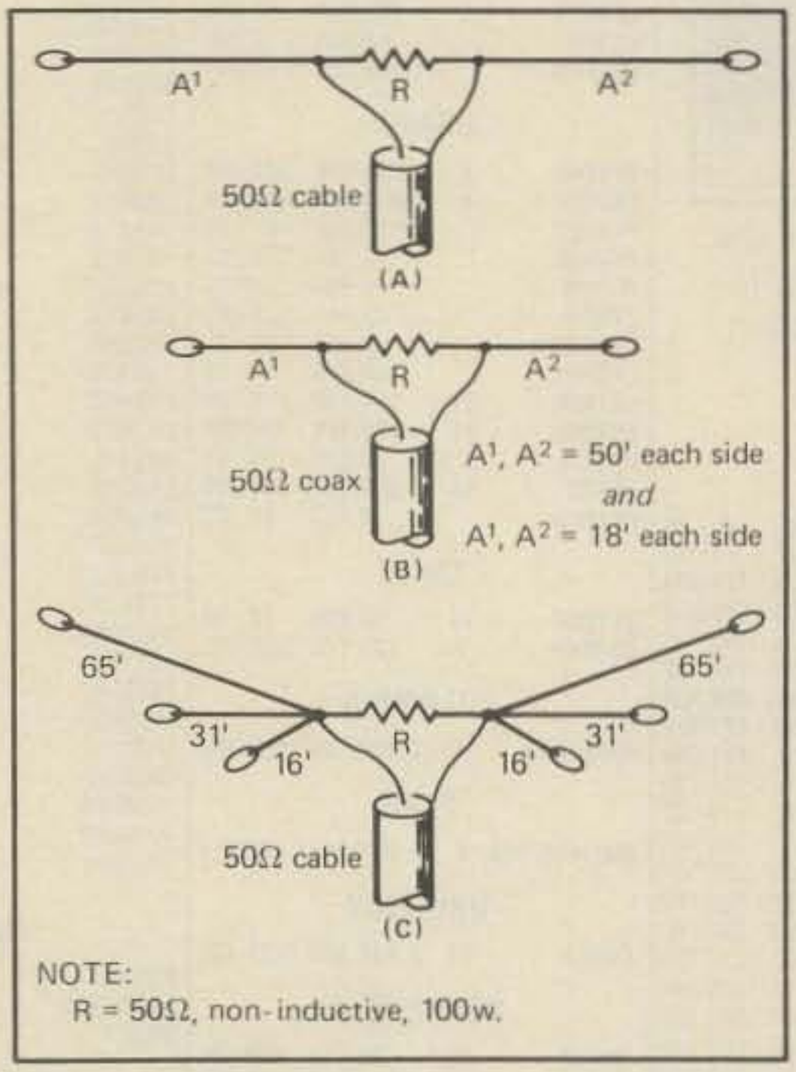

Fig. 1– At (A) is an electrical drawing of the dummy antenna. At (B) are the lengths of wire I used for the dipoles. Shown at (C) is a multiband system that would probably provide the best performance.

Before I opened the box, he informed me and the audience that he had put two wires on the terminal and strung up the assembly as a dipole. He also said that when he checked into one of the 80 meter nets he used, the other amateurs on the net could tell very little difference from this new antenna and his regular 80 meter half-wave antenna. He said that with other tests he got similar results—S9 reports all over! And *most* important, using the box he had an SWR of almost 1 to 1 no matter where he tuned up, including 20 meters. Fig. 1 shows exactly what this dummy dipole looks like electrically.

So how could a dummy load produce reports similar to a regular dipole? If one analyzes it, it quickly would become apparent that some of the power has to be radiated by the wires attached to the resistors. It really doesn't take a great deal of mathematics to figure out what is happening. You connect a dipole across the 50 ohm dummy load. In fact, if you knew the exact impedance of the dipole, it would be easy to calculate the amount of power being fed to the antenna and also that to the dummy load. It is as simple as Ohm's Law. For example, suppose a half-wavelength dipole with a 70 ohm impedance was connected across the 50 ohm dummy. You would have a 70 ohm resistor connected across a 50 ohm resistor. The SWR would no longer be unity, or 1 to 1, but something slightly higher than unity. Also, the majority of the power would still go to the 50 ohm dummy simply because 50 ohms is lower than 70 ohms; that's Ohm's Law at work.

I don't want this to sound like an April Fool's article, but the fact that most of the power fed to the system is consumed as heat makes for some very peculiar discussions and reading. Not only that, it gets us into the subject of "What do we really want when it comes to antennas?"

Let's get some modern-day ground rules out of the way first.

Fact: All the solid-state transceivers these days are designed to work into a very low SWR. If the antenna system load is not 1.5 to 1 or less, the doggone transmitter will shut down. (This is done in order to protect the final stage transistors.) That is a solid fact (if there is such a thing).

Fact: Every amateur, and I do mean

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every, wants an antenna system that is always 1 to 1 for SWR no matter what band or frequency he or she goes on. That is a "true" fact. (And, there are true facts; just listen to people talk.)

Fact: Decibel gain is only important when you think you need it; dBs are a fact of life we read about and antenna manufacturers brag about. (And we all know what facts of life are, and I assume we are not talking about the birds and the bees.)

So, if the reader starts thinking about justifying an antenna that dissipates most of the power as heat, but still gets out—and can accept that premise—maybe we can make some headway. In this case, we have essentially a dummy load, but it still will produce contacts, some better than others (but that is true of all antennas). But better than most antennas, this one will always provide us with that much desired feature—a very low SWR.

Simply put, are you happy with a very simple multiband antenna that is guaranteed to have a low SWR and will produce some fair contacts? Or are you one of those selfish amateurs who wants to take out everyone on the frequency? You can see the dilemma the author is in. From a sound engineering standpoint the dummy load antenna really smells. However, it does do what most amateurs want it to do—low SWR, simple to use, no Transmatch adjustments, no matching device (that is inherent in the design), and the ultimate test—produces contacts.

Referring to fig. 1(A), how long should the dipole wires be? I would have guessed the answer is simply as long as possible. However, while it is easy to write an article without actually testing the circuit, that has never been my way of doing things. To find out how good or bad this system would be, I put up several antennas with different dipole lengths, as shown in fig. 1(B).

The first one consisted of 50 feet of wire on either side of the resistor. As expected, the measured SWR was very low on all of the amateur bands. My regular antenna system consists of the Sommer, DJ2UT, 7-band beam and a broad-band 80 meter dipole. I also installed a coax switch so I could switch the transceiver, an ICOM 745, to any of the antennas.

I made scores of contacts on 80 meters, and almost without fail the dummy load antenna yielded reports of two S-units lower, or on the order of 10 dB. I have calibrated the S-meter on the 745, and each S-unit works out to slightly more than 5 dB up to S9. The receiving differences were the same as the transmitting. I noted that the signals were down by slightly more than two S-units. I realize, of course, that this is not a very scientific test, but for all practical purposes it is what I call "real world." My results on 40 meters showed slightly more differences in that the dummy was down about three S-units. I feel in all fairness that was because I was comparing a rotatable dipole on top of my tower to the dummy antenna. And, I should add that dummy was in a "sloper" configuration, not nearly as high as the dipole. On 20 meters, with the 100 foot overall length, the dummy really was terrible. I was comparing it to a full-gain, three-element beam (no traps). Signals that were S9 or so dropped to an S1—or less on the dummy—but here again I did make the contacts, many more on CW than on phone. (I think amateurs who operate CW love to call weak signals!)

As my second test I changed the wire lengths so that it approximated a resonant 20 meter dipole, 18 feet each side of the resistor load. This was rather interesting to me because the difference on 20 was very marked. I was now running (S-meter readings) just about 18 dB between the beam and the dummy, which goes to prove Ohm's Law and sound antenna theory work. Meanwhile, back on 80, using the short dummy, things got stinky with the dummy. I still made contacts, but the differences were more pronounced. At all times when I was conducting these tests and working amateurs, I kept thinking of the guy who played the German solider on Rowan and Martin's Laugh In—"*very, very interesting . . .*" I tried a few other lengths, enough to satisfy myself and to write this article. The various dipole lengths tried also proved that a resonant system is the best performer. In other words, as long as the wire lengths came out half-wavelengths, the antenna was a better performer. I didn't try a multiple resonant system as shown in fig. 1(C), but I have no doubt it would have been the best dummy performer.

Suffice it to say, the whole discussion of such antennas really boils down to a decision you must make: like I said, a very low SWR but only fair contacts.

In closing, keep in mind that 90 percent or so of your power will be dissipated as heat. But in case you don't know it, that also is very true when you operate 80 meter mobile. Nearly all 80 meter mobile antennas are not even good dummy loads. An 80 meter mobile whip has an ohmic resistance of about 2 to 3 ohms, and its radiation resistance is only a small fraction of an ohm. Therefore, much more than 90 percent of your power is consumed as heat. In all my thinking I am really relating to 100 watt or so transceivers. The resistors for the dummy antenna are easier to come by. However, K3FGB said he found some resistors that will handle 1500 watts PEP. Of course, a Cantenna will just about do that, and all one needs are a couple of coax T's at the Cantenna. Gosh, there are scores of possibilities with such a system: phased verticals, short feed lines, etc. I could really conjure up some antennas. Anyone out there have ideas? Let's have a contest for dummy antennas. After all, it is really QRP in a different fashion. As an amateur friend of mine says, "How about a DLCC?" But he's a real dummy—excuse the pun.

Conclusion

Obviously, the most ideal situation is what is normally called an optimum antenna system. Optimum is defined as the amount or degree of something that is most favorable to some end. I'm from the old school, and the most *favorable end* to me is all of the watts possible going into the antenna. However, when it is impossible to get tuned antennas for each band up on your postage-stamp-size lot, or you're mobile, or on your boat, and your 100 watt solid-state transceiver threatens to hold its breath and turn blue, then you have to think about compromise. How far you want to, or have to, compromise is up to you and your wallet. While I am not an advocate of this system, reality says that you have to weigh the desired end result with the available choices. In some situations is getting a signal on the air preferable to talking into a cooling-down, self-protected paperweight? CQ

Here are some kids who got a lasting positive impression of amateur radio and a unique "QSL" from New York's colorful Mayor.

"How Am I Doing?" "5/9 Your Honor" Mayor Ed Koch Meets Amateur Radio

BY JOSEPH J. FAIRCLOUGH*, WB2JKJ

On February 8, 1985 some of my students at Junior High School 22M on Manhattan's lower east side were calling CQ on their favorite frequency—21.395 MHz. Amateur radio is used for a segment of an instructional period I teach in learning English (via amateur radio) for 7th graders.

John Miller, WA9YHW/HR, off the coast of Honduras, returned the call, and after the usual exchange of information he asked for a special favor from the students. "If you can call up my friend Ed—that's right, the Mayor—and tell him his friend, and your friend, John from Westhampton Beach wishes him the best of luck for eight more years in office."

Immediately after the contact the crew went to the phone and called City Hall and naturally asked for "Ed." The secretary on the other end did not quite know what to think. However, after an explanation of amateur radio, she did promise to get the message through.

Well, she did, and the result is shown here—recognition of our marvelous hobby and teaching tool, amateur radio. CQ

Here's the crew that helped receive the message and pass it on.

A letter sent by the Mayor to WB2JKJ for the entire class.

THE CITY OF NEW YORK
OFFICE OF THE MAYOR
NEW YORK, N.Y. 10007

February 26, 1985

Mr. Joseph J. Fairclough
WB2JKJ
J.H.S. 22M
111 Columbia Street
New York, NY 10002

Dear Mr. Fairclough:

Thank you for your passing along Mr. Miller's message.

I am delighted to learn about your HAM radio program, and I wish you continuing success in communicating with people around the world.

I appreciate your taking the time to write and invite me to your classroom. I hope someday to have an apportunity to visit.

All the best.

Sincerely,

Ed Koch

Edward I. Koch
MAYOR

*Junior High School 22M, 111 Columbia St., New York, NY 10002

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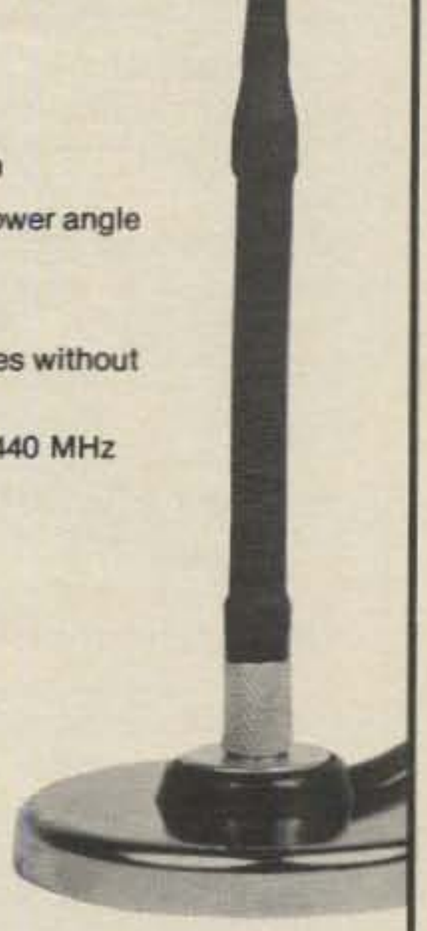

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CIRCLE 150 ON READER SERVICE CARD

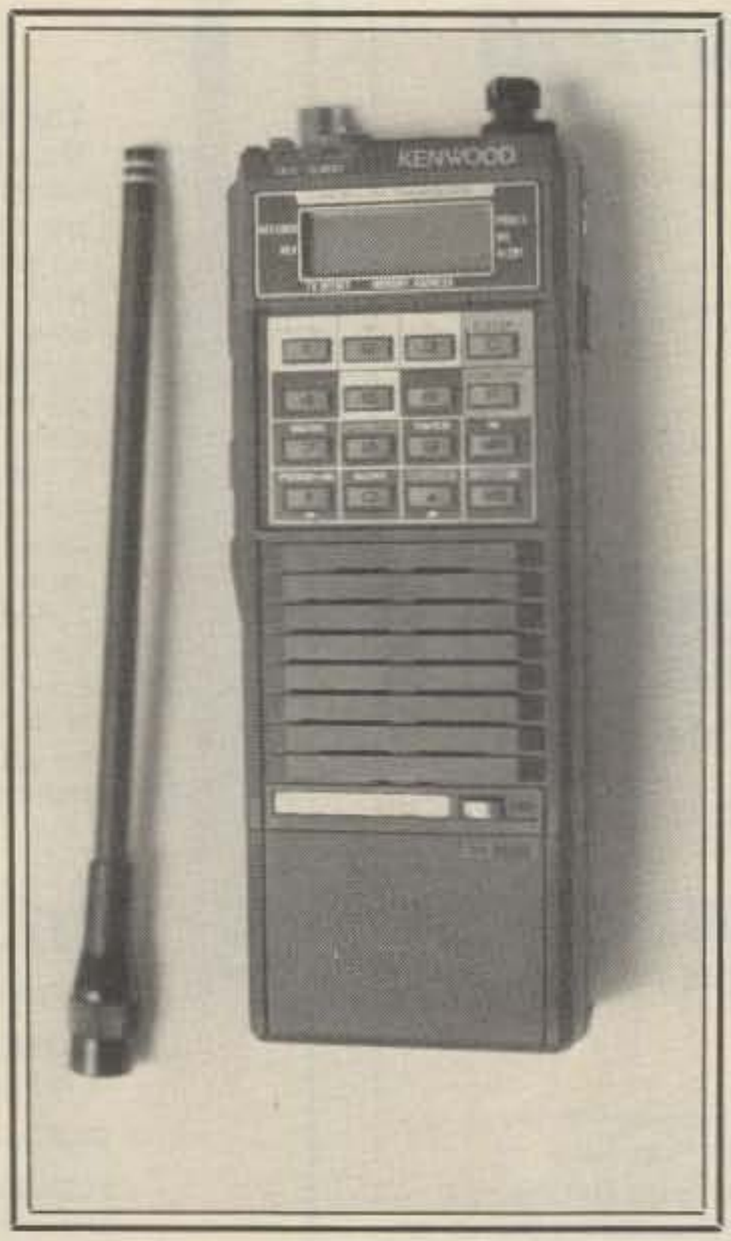
CQ REVIEWS:

The Kenwood TR-2600 Two Meter Handheld Talkie

BY DAVE INGRAM*, K4TWJ

Evolution in 2 meter talkies has become a natural part of our modern lifestyle, and each new unit appears to be the epitome of sophistication. One of the more recent examples of that situation is Kenwood's TR-2600 with digital code squelch capability. When activated, that "don't squawk until addressed" feature you to silently monitor a busy frequency or repeater until a predetermined burst of digital code is received. The talkie then responds with two operator-alerting beeps and an opened squelch to accept incoming calls. This arrangement is quite similar to tone-activated private-line concepts; however, the TR-2600 is the first amateur talkie with built-in selective calling capabilities. The feature could prove particularly attractive during emergencies, weather watches, or various group coordinated activities.

Checking in with measurements 6.7"H × 2.6"W × 1.6"D (168 × 66 × 40 mm), Kenwood's talkie is identical in size and case style to its TR-2500 predecessor. The case is darker in color (grey-brown), however, and a top-mounted meter indicates received signal strength or transmit battery condition. Looking closer, there are several other interesting features in the 2600. The unit's front keypad is used for entering frequency information, scanning functions, and digital code data. During transmit, the keypad is used for dual tone autopatch operations, while transmitted tones can be monitored through the talkie's speaker. Frequency coverage is 144.000 to 147.995 MHz on *transmit* and 140.000 to 159.995 MHz during *receive*. That range brings in the capability of monitoring many public services such as suburban police, fire, ambulance, and wrecker services (most metropolitan areas have switched their primary operations to the 460 MHz



The Kenwood TR-2600 two meter handheld talkie with digital code squelch capability.

range). Ten memory channels are included in the talkie, along with memory scanning and lockout of undesired channels during periods of high activity. Memory information is retained by a five-year lithium cell.

Technically speaking, the TR-2600 is "conventional" in RF design: a dual conversion receiver with 10.7 MHz and 455 kHz IFS and transmitter with 2.5 watts high/0.3 watts low power RF output. The TR-2600's circuitry is broken down into four sections or boards: receiver, transmitter, frequency control microprocessor, and DCS microprocessor. The latter section includes a minimodem chip for handling digital codes. The talkie is powered via an 8.4 volt, 450 ma battery pack (PB26) which can be fully charged in 15 hours via the included wall charger. I found TR-2500 battery packs (PB25, PB25H, and BT1) could be used with the TR-2600; however, their case color differences are not very attractive. Kenwood's ST2 and MS1 home/auto quick-charger/power supplies can also be used with the TR-2500 or TR-2600 talkie.

Features and Frills

The TR-2600 is truly a deluxe talkie, mixing features included in its TR-2500 predecessor with several new frills of interest. Both operating frequencies and repeater offsets are entered/stored in memory via the unit's front keypad. The usual simplex or ±600 kHz offsets are provided, while memory Ø is used for "odd splits." Scanning may be within the full receive range of 140.000 to 159.995 MHz, or confined to the limits established between memory 8 and memory 9. There are also two scanning speeds: slow on "automatic" mode or fast when the up or down buttons are held depressed. Memory scanning is also included, plus various memory channels can be locked out or recalled through separate one-two punches on the keypad. This feature is useful when visiting cities using some, but not all, of the preprogrammed frequencies. Merely lock out undesired frequencies until the visit's end. Then reactivate "normally used" frequencies and continue usual operations.

There are two types and two modes of scanning in the TR-2600. First, the talkie can be programmed to stop on a busy channel (**Busy Stop**) or on an open/unoccupied channel (**Open Stop**). Toggled selection is via the keypad's **F** and **7** buttons. Scanning modes can also be programmed for **Time Operation** (resumes scan in 5 seconds regardless of on-frequency activity) or **Carrier Operation** (resumes scan only after carrier dropout). Toggled selection here is via the **F** and **9** buttons. Another

*Eastwood Village No. 1201 So., Rt. 11, Box 499, Birmingham, AL 35210

[GENERAL]

Frequency Range .....144.000 ~ 147.995 MHz
Memory Channels .....10 CH
Mode .....FM (F3), (F2 in DCS mode)
Operating voltage .....8.4 V DC ±25%
Power Requirement .....8.4 V, 450 mAH (Ni-Cd battery pack)
9 V manganese or alkaline (not Ni-Cd)
6 pcs. battery case (option)
Back-up Power Requirement ...CR-2032 Lithium battery
Current Drain .....Approx. 35mA in receive mode with no input signal
Less than 800mA in HI transmit mode (at 8.4 V)
Less than 400 mA in Low transmit mode (at 8.4 V)
Less than 1μA for memory back-up
Grounding .....Negative
Operating Temperature .....−20°C to +50°C
Antenna Impedance .....50 Ω
Dimensions.....With Ni-Cd battery: 66(2.6)W × 168(6.7)H × 40(1.6)D mm(inch)
With manganese battery: 66(2.6)W × 176(7.0)H × 40(1.6)D mm(inch)
Weight .....With Ni-Cd battery: 520 g (1.2 lbs.)
With manganese battery: 510 g (1.2 lbs.)

[TRANSMITTER]

RF Output Power .....HI = 2.5 W
LOW = 0.3 W approx.
Modulation .....Variable reactance direct shift
Frequency Tolerance .....Less than ±20 × 10^{-6} (−10°C ~ +50°C)
Maximum Frequency Deviation .....±5 kHz
Spurious Radiation .....Less than −60 dB

[RECEIVER]

Circuitry.....Double conversion superheterodyne
Intermediate Frequency.....1st IF = 10.7 MHz
2nd IF = 455 kHz
Sensitivity .....Better than 1μV for S/N 30 dB
Less than 0.2μV for 12 dB SINAD
Pass-Band Width .....More than 12 kHz (−6 dB)
Selectivity .....Less than 24 kHz (−40 dB)
Spurious Response.....Better than 50 dB
Squelch Sensitivity.....Less than 0.25μV (threshold)
Audio Output Power.....More than 400 mW (at 10% distortion and 8 Ω load)

Table I– Kenwood TR-2600 manufacturer specifications.

very useful feature of the TR-2600 is **memory 1 Priority Channel** alert (which is toggled on/off via the **F** and **0** keys). The feature lets you monitor some repeater actions while keeping an ear for calls on another frequency (such as chatting on '76 while listening for calls from home on '52, etc.).

Finally, there's the talkie's top-mounted meter, which is great for locating "strong spots" when portable, the front multi-function display, and a bipolar transmit/receive LED. The LCD panel shows operating frequency, transmitter offset, memories in use, plus "arrow indicators" for key lock, repeater reverse operation, programmable scan operation, memory scan, and priority alert modes. The front-mounted LED lights green during receive and red during transmit. An adjacent orange LED functions with the **DCS** system.

Fig. 1– Keyboard operations and functions of the TR-2600.

Operation	Key(s) used	Manipulation
Freqency setting	[4] or [5], [1] ~ [0]	Press 4 or 5 key, and 1 ~ 0 keys.
5 kHz step frequency shift	[▲] or [▼]	Press required key momentarily.
5 kHz step scan initiation	[▲] or [▼]	Keep required key pressed for more than one second.
5 kHz step quick frequency shift	[▲] or [▼]	Keep required key pressed.
Storing displayed frequency	[F], [MR], [1] ~ [0]	Press F and MR keys, then specify memory channel by 1 ~ 0 keys.
Memory CH recall	[MR], [1] ~ [0]	Press MR key and specify CH by 1 ~ 0 keys.
Memory CH erasure	[F], [MR], [F], [1] ~ [0]	Press F, MR and F keys and specify CH by 1 ~ 0 keys.
Locking out memory CH from scan	[MS] + [1] ~ [0]	Specify memory CH by 1 ~ 0 keys with MS key kept pressed.
Releasing locked out memory CH	[MS] + [1] ~ [0]	Specify locked out CH by 1 ~ 0 keys with MS key kept pressed.
Memory scan initiation	[MS]	Press MS key (DCS switch OFF).
Busy/Open CH scan setting	[F], [7] (Display ~ ◎)	Press F and 7 keys. Repeated alternately operation switches the setting.
Time/Carrier scan setting	[F], [9] (Display ~ Ⓒ)	Press F and 9 keys. Repeated alternately operation switches the setting.
Programmable scan step frequency setting	[MR] [8] [▲] [F] [▼]	Press the MR and 8 keys to recall the frequency stored in M8 and press ▲ key to set to the first step frequency. Then press F and ▲ keys.
Programmable scan initiation	[F], [▼]	Press F and ▼ keys.
Stop scan operation	[C]	Press C key.
Storing digital code	[DCS] ON, [MS], [1] ~ [0]	Set DCS switch to ON. Press MS key and make 5-digit code by 1 ~ 0 keys.
Recalling digital code	[DCS] ON, [MS]	Set DCS switch to ON. Press MS key periodically until desired code is displayed.
Switching display from digital code to frequency	[C] or press PTT	Press C key, or key transmit.
Recalling stored call sign	[DCS] ON, [F], [8], [▲]	Set DCS switch to ON. Repeat press F, 8 and ▲ keys 12 times.
Setting alert function	[F], [0]	Press F and 0 keys.
Releasing alert function setting	[F], [0]	Press F and 0 keys.
TX OFFSET setting	[F] ([1], [2], [3], [5])	Press F and the desired TX OFFSET key.

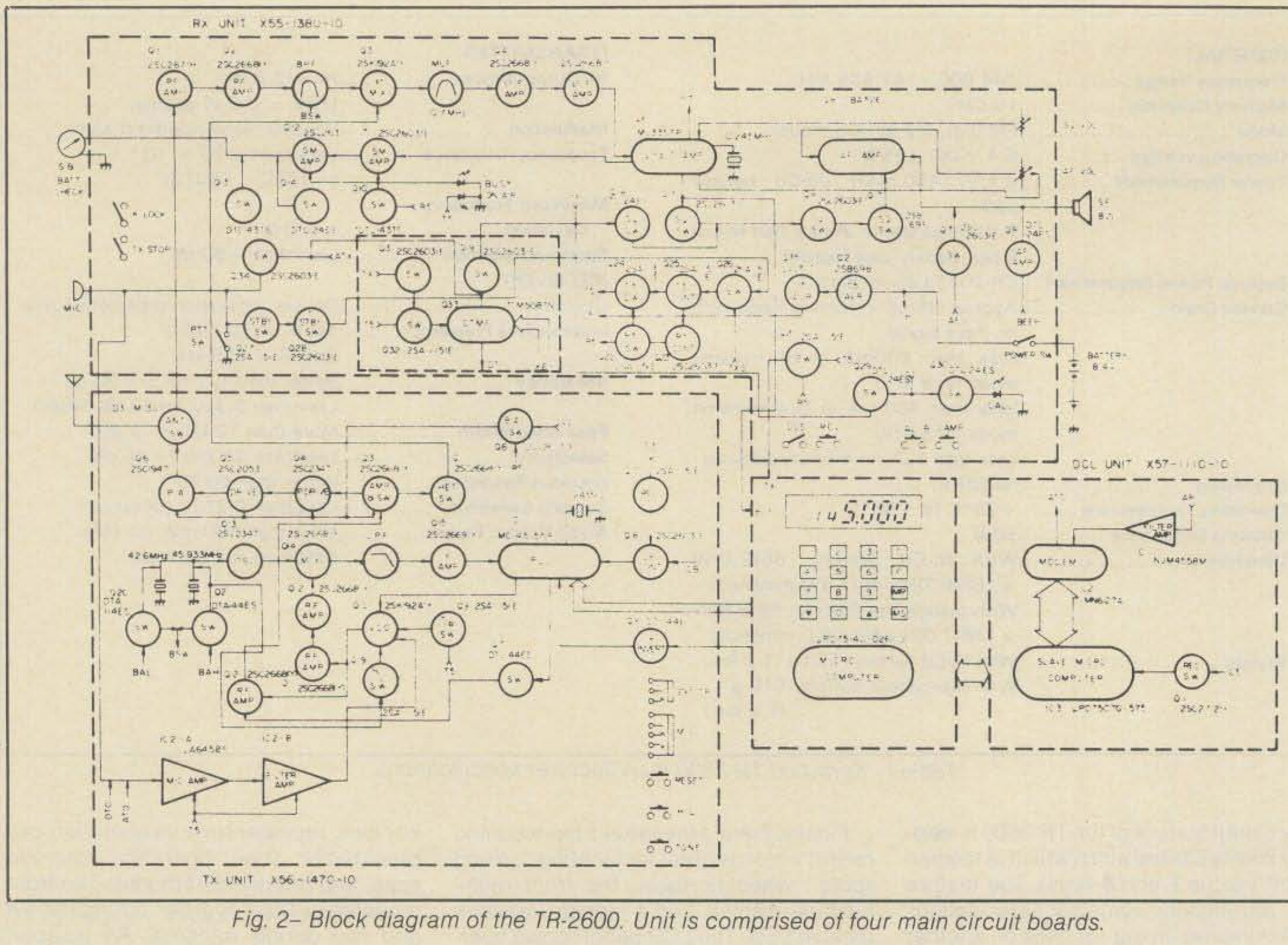


Fig. 2– Block diagram of the TR-2600. Unit is comprised of four main circuit boards.

The DCS System

The TR-2600's DCS system will store one digital coded call sign and three separate access codes in its lithium-battery-retained memory. Once programmed via the talkie's keypad, DCS transmit and receive operations are activated by a top-mounted pushbutton. Assuming three amateurs are using DCS-type transceivers, a "common call sign" should first be selected by the group (likewise, separate groups could select different "common call signs" or everyone could use the same digital coded call sign). Next, individual access codes should be selected by each operator in the group (unless a common access code will be used for calling all three operators). Following code coordinations, the system is ready for action. If operator *A* wants to call operator *C*, that access code is "called up" via keypad, and the DCS function is enabled.

At the transmission's beginning, a brief *Brrapp Brrapp* opens the squelch on operator *C*'s rig. Communications may then proceed as usual. A few minutes of study reveals that DCS is expandable up to 100,000 operators or codes. Beyond the count of three, however, TR-2600 users must enter codes via keypad (no, the pads don't carry a lifetime warranty).

Operating the Talkie

The TR-2600 is a very enjoyable unit to operate, and its special features are quite beneficial. Popularly used frequencies and repeater offsets can be stored in memories, or entered directly via keypad. A friendly "beep" confirms entries. Since the talkie covers 140 and 150 MHz ranges, the first entered digit must be a **4** or **5** (Example: enter 46760 = 146.760). The programmable scan is grand for monitoring 146.500 to 147.400 MHz ranges or for listening to public service activities between

Digital Coded Squelch: What It Is and How It Works

Digital code squelch (DCS) is a selective calling system similar in concept to (but not directly compatible with) private line (PL) tone setups used in both commercial and amateur circles. The squelch of a PL-equipped transceiver is opened when a pre-established tone or sequence of tones is received. As an example, PL-coordinated amateurs can continuously and silently monitor a busy repeater for emergency alerts. Assuming such an alert arises, transmitted tones activate PL-equipped transceivers. Two items are required for those functions: an encoder at the transmitter and a decoder at the receiver.

Digital coded squelch employs a short burst of 300 baud-sounding ASCII code rather than PL tones at the beginning of a transmission. Contained in that code is a user-programmed four- to six-digit call sign, plus a five-digit access code. Each transceiver using a DCS system must have a DCS encoder and DCS decoder, and preprogrammed codes between stations must be identical. Transceivers using DCS functions can silently monitor any selected frequency, responding only when their preprogrammed data codes are received. The system's main attraction is monitoring a busy frequency for a specific call while in a sound-conscious environment.

When using DCS operation, the "calling" station tunes to a prearranged frequency, switches on the DCS function, and transmits a half-second "burst" or signal. Non-DCS amateurs listening on frequency hear a quick *Brrapp-Brrapp*, while DCS-equipped amateurs hear a buzzer-generated beep-beep from their rigs. The squelch also opens at that time, permitting normal reception of all on-frequency activity.

As of this writing, the only amateur gear employing DCS is Kenwood's models TR-2600, TM211A, and TS711A (2 meter units), and TS811A or TM411A (70 cm units). The future of DCS is thus unknown. Could DCS signals be generated using home computers and/or could such capabilities be added to other 2 meter rigs? That depends on how much information Kenwood releases concerning DCS data formats. Their present operating manuals merely describe code entries via their rig's keypads, and that doesn't look like any ASCII code I've seen or taught (65 = A, 66 = B, 67 = C, etc.).

Codes, encoders, and decoders confusing to you? Here's a brief explanation of their use. **Tone Burst**, or "whistle up," was one of the first concepts used in tone-access repeaters. Each operator's rig included a tone generator or encoder (usually tuned to 1800 Hz) which sent a half-second "burst" at the beginning of a transmission. A tone decoder at the repeater then "opened" the machine for normal operation. **Subaudible tones** within the 67 to 200 Hz range next became popular for limited access of busy repeaters. A single tone of 67.0 Hz, 97.0 Hz, etc., is *continuously transmitted* via a rig's encoder, and is used to access repeaters with similar decoders. **Private Line** concepts also enjoy amateur popularity in two ways: accessing "closed repeaters" (which used PL decoders), and calling other private-line-equipped amateurs through various pre-established repeaters. Subaudible frequencies are normally used for private-line communications. *A recent variation of PL activity* is touch-tone® encoding and decoding among individual amateur groups. You've probably seen circuit diagrams for such NE555 decoder setups in amateur magazines. During use, an amateur punches 55 on his keypad and the decoder in Fred's rig trips a beeper. Some amateurs connect several decoders to home rigs: 34 for outdoor lights, 36 for garage-door raising, 88 for rig activation, 89 for rotor movement to west, etc. As previously mentioned, *DCS* concepts employ digital codes rather than discrete tones for activating other DCS-squelched rigs. The internal structure of those codes isn't directly known as of this writing. Hopefully, additional information will soon be available to all. DCS signals are transmitted as a *brief burst* of toned information in the 2000 Hz range.

—*K4TWJ*

151.000 and 156.000 MHz. As mentioned earlier, the memory lockout feature is handy when out of town or when long-winded QSOs inhibit repeater scanning. I especially appreciate the priority alert feature in talkies, as it permits chatting on one frequency while monitoring another. Other times it provides quiet "frequency watching" while I'm busy. Beeps aren't as distracting as QSOs which catch ones ear!

During use, the talkie's meter is grand for locating "good transmission spots." When the TR-2600 is positioned for use, the top-mounted "transmit LED" gives a red glint into the eye—a reassuring light, I might add. Both transmit and receive audio are in the "typically good" category. The switch-selectable DCS feature performs like a champ; you can monitor any busy frequency and never hear a "peep" until called by another unit. An orange LED alerts you to missed DCS calls.

On the negative side, the TR-2600's speaker can be seen through (and beside) its thin grill cloth. It's definitely not waterproof! The unit's plastic case doesn't include any visible metal frame, and that lack of antenna counterpose seems to slightly reduce range. Few amateurs "push" their fringe communications as I, however.

Conclusion

All aspects considered, the TR-2600 is an impressive 2 meter talkie that's full of with exciting features. It's a good mix of public-service monitor (no transmit there!), 2 meter communications, and selective calling capabilities. Whether DCS is a "goodie" or a "gimmick" depends on your interest and needs.

The TR-2600 is complimented by several accessories, including the ST2 and MS1 stand/chargers, SMC-30 speaker/mike, HMC-1 headset/boom mike, TU35B tone encoder, and VB2530 mobile RF amplifier. For more information, contact Trio-Kenwood Communications, 1111 West Walnut Street, Compton, CA 90220.

CQ World-Wide WPX CW Contest All-Time Records

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

BY STEVE BOLIA, N8BJQ/6 & BERNIE WELCH, W8IMZ

WORLD RECORD HOLDERS

Single Operator

1.8	LZ2CJ('84)	89,872	137
3.5	EA8RL('84)	453,456	201
7.0	OA4AWD('82)	1,752,254	329
14	CY3BMV('83)	2,341,680	528
21	HD0E('80)	3,544,416	496
28	LU8DQ('80)	1,627,660	388
AB	L8DQ('83)	4,128,084	548

Multi-Operator Single Xmtr.

	VP2EC('84)	7,599,480	664

Multi-Operator Multi-Xmtr.

	YZ1EXY('83)	9,858,240	756

U.S.A. RECORD HOLDERS

Single Operator

1.8	AE6U('80)	3,444	42
3.5	NE6W('83)	105,672	148
7.0	N6CW('84)	960,300	330
14	N8II('83)	1,542,060	468
21	K6LL/7('81)	1,433,457	459
28	N4ZC('81)	136,086	222
AB	KC1F('83)	2,927,400	510

Multi-Op Single Xmtr.

	NA5R('83)	3,986,592	634

Multi-Op Multi-Xmtr.

	NM5M('84)	4,432,883	637

CLUB RECORD

N. Texas Contest Club('84) 53,012,561

WPX (Prefix) RECORD

YT4I('83) 760

QRPp RECORD

4Z4UH('82) 1,028,904

CONTINENTAL RECORD HOLDERS

AFRICA

1.8	No Entrant		
3.5	EA8RL('84)	453,456	201
7.0	EA9GT('81)	579,824	217
14	EL2AV('82)	906,840	330
21	5Z4CS('82)	2,104,245	429
28	ZS6BUX('81)	8,850	50
AB	5Z4MX('84)	2,264,342	446

ASIA

1.8	UA9ADY('84)	39,996	66
3.5	4Z4DX('81)	379,652	182
7.0	4Z4DX('80)	717,336	243
14	UA9YAN('84)	1,511,146	437
21	UL7QF('83)	1,220,083	373
28	4X4UH('81)	1,081,262	338
AB	UF6CR('84)	3,084,480	540

EUROPE

1.8	LZ2CJ('84)	89,872	137
3.5	RB5IM('84)	383,608	202
7.0	OK1KSO('84)	1,110,338	338
14	YU4GD('84)	2,147,148	564
21	YU3BO('81)	1,550,390	394
28	9H1CH('81)	307,433	259
AB	YT2D('81)	2,826,075	525

Multi-Op Single Xmtr.

AF	ZS6CT('84)	3,129,216	464
AS	UZ9A('80)	5,500,135	511
EU	LZ2KTS('84)	5,444,916	673
NA	VP2EC('84)	7,599,480	664
OC	KH6XX('84)	4,646,859	553
SA	L8DQ('84)	5,952,111	627

NORTH AMERICA

1.8	VE3MFA('84)	6,552	36
3.5	NE6W('83)	105,672	148
7.0	VE3BMV('84)	1,489,950	385
14	CY3BMV('83)	2,341,680	528
21	KP4EQF('83)	1,816,416	476
28	KP4EQF('81)	577,500	300
AB	KP2A('80)	3,463,593	483

OCEANIA

1.8	No Entrant		
3.5	T32AF('83)	93,480	95
7.0	VK2CIA('84)	624,672	216
14	VK4QK('80)	1,276,584	344
21	N6HR/NH6('83)	1,203,552	378
28	KG6DX('81)	1,238,806	334
AB	KG6SW('79)	2,848,320	345

SOUTH AMERICA

1.8	PY5AAX('81)	96	6
3.5	4M3AZC('83)	142,780	121
7.0	OA4AWD('82)	1,752,254	329
14	CX7BY('84)	1,832,850	450
21	HD0E('80)	3,544,416	496
28	LU8DQ('80)	1,627,660	388
AB	L8DQ('83)	4,128,084	548

Multi-Op Multi-Xmtr.

AF	EA9CE('84)	4,383,308	482
AS	JA2YKA('83)	5,895,628	614
EU	YZ1EXY('83)	9,858,240	756
NA	CY3PCA('83)	4,977,817	611
OC	KH6XX('81)	7,424,460	540
SA	HD1A('79)	6,052,032	474

QRPp

AF	EA8ACL('82)	139,965	155
AS	4X4UH('82)	1,028,904	344
EU	YU3BC('84)	345,950	275
NA	N3RS('83)	494,884	307
OC	KH6CP('84)	125,820	135
SA	OA8V('81)	444,768	246

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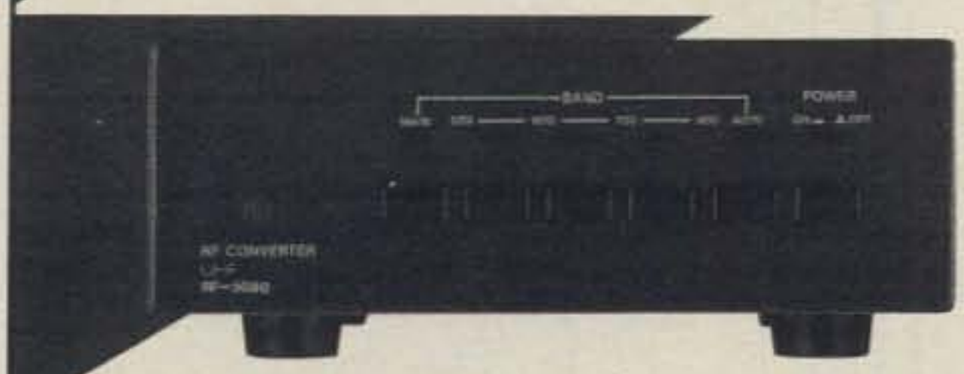
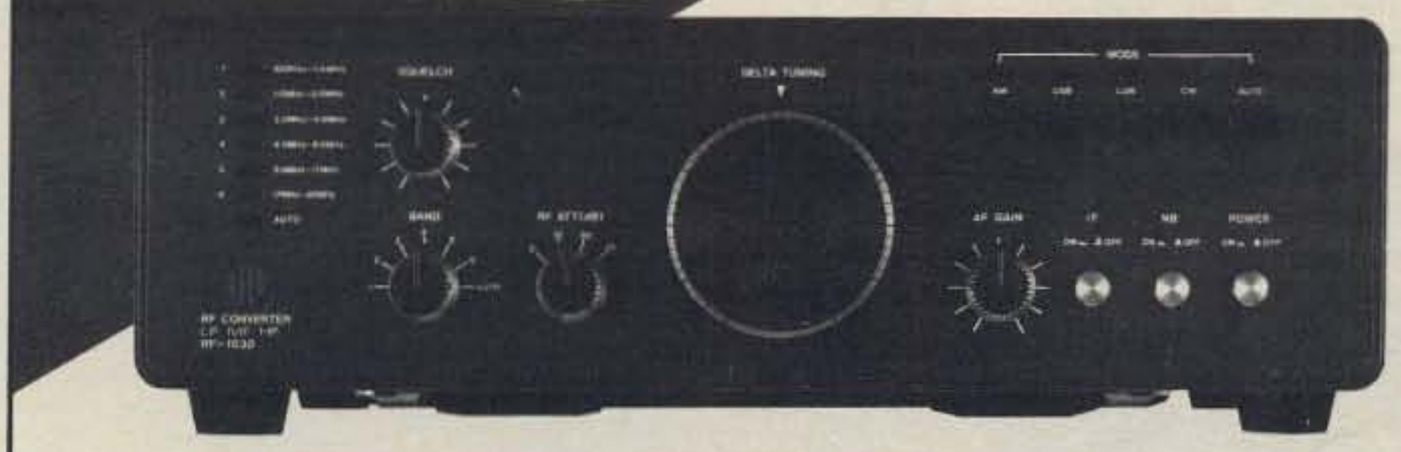


RF-5080 DOWN CONVERTER

500~800MHz RF converter for SX-400

●Bands: •MAIN (to cover 26-520MHz with SX-400) •500~600MHz •600~700MHz •700~800MHz •AUTO (Automatic control of RF-5080 with an external computer, etc.) ●Frequencies shown in SX-400 display: 300MHz lower between 500~600MHz, 400MHz lower between 600~700MHz, 500MHz lower between 700~800MHz. ●Individual Band Switches and LED Indicaters. ●Current Drain: 250mA (approx.) ●Accessories: 1 BNC/M-adapter, 1 Cable with BNC terminals, ●Dimensions: W.148×H.51×D.225(mm)



RF-1030 UP CONVERTER

100KHz~30MHz RF converter for SX-400

●Bands: (1) 100KHz~1MHz, (2) 1~2MHz, (3) 2~4MHz, (4) 4~8MHz, (5) 8~17MHz, (6) 17~30MHz •AUTO (Automatic conrol of 6 bands of RF-1030 with an external computer, etc.) ●Frequencies shown in SX-400 display: 50MHz higher on all bands than the frequencies received. ●Individual Mode Switches and LED Indicaters: AM, USB, LSB, CW, AUTO •CW filter (optional) required for CW reception •AUTO—Automatic Control of modes of RF-1030 with an external computer, etc. ●Band Switch and LED Band Indicaters, Squelch Control, RF Att., AF Gain Control, Delta Tuning, IF ON/OFF Switch, NB (Noise Blanker) Switch. ●Current Drain: 1A (approx.) *Power Supply Unit P-1A (optional) required for RF-1030. ●Accessories: 1 BNC-M-adapter, 2 Cable with BNC terminals ●Dimensions: W.300×H.90×D.233(mm)

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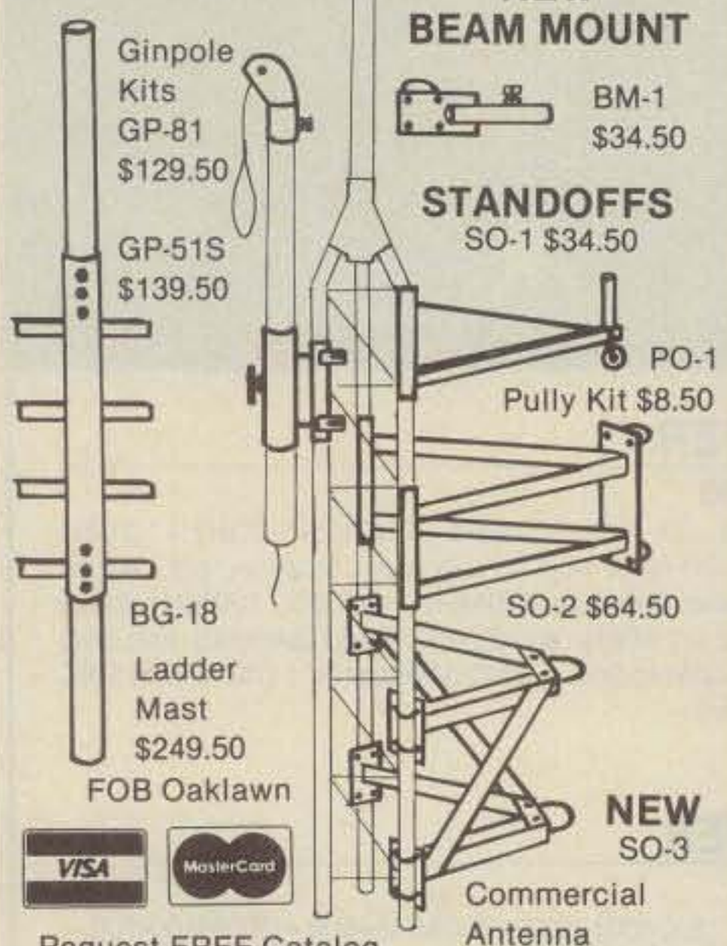

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CQ REVIEWS:

The AEA MAP-64/2 Micropatch and TI-1 Tuning Indicator

BY BILL GODE*, KB9IY

The AEA MAP-64/2 is a plug-in interface/software package designed to permit CW, RTTY, ASCII, and AMTOR operation with the popular Commodore 64 computer. Both the Terminal Unit and EPROM software are contained in a single 6″ × 6″ × 1″ package, which plugs into the C-64 cartridge slot. A second connection is made via cable and plug at the User Port. That's all there is! Connect audio input and output cables, key line, and 12 VDC power, and you're on the air.

With the exception of CW and RTTY filter switches at the rear of the unit, all mode controls and commands are made via the Commodore 64 keyboard. Several small cardboard overlays are provided to help remind the operator of many of the key functions, although additional control commands must be referred to in the manual—or memorized!

A complete 50-page operating manual is included which describes the diverse (and sometimes unique) features of the MAP-64/2. You can be on the air with this system in less than an hour, but several hours spent in learning the system will pay big dividends in using the variety and power of the built-in MBA-TOR software.

When powering-up the system, a main menu appears and directs the operator to select one of the following: Morse, ASCII, RTTY, AMTOR, AUTO AMTOR, AUTO-CALL, a "Commands" Menu, or an "Options" Menu. The Commands Menu contains storage and editing features, plus screen-color selection and time-setting of the built-in digital clock. The Options Menu includes callsign and AMTOR SEL-CALL programming, plus commands for ARQ timeout, Unshift-on-space, Morse-Fill (BT), RTTY Sync (diddle), Auto Carriage Return, Auto Line Feed, Word Wrap-Around, CW Break-in, Beacon Record, Word or Character output mode, and even an audio feedback "beep" whenever a key is pressed. All of the necessary prompts appear on the screen so that the above commands and options can be selected in a matter of a minute or two.

*1540 Kaywood Lane, Glenview, IL 60025

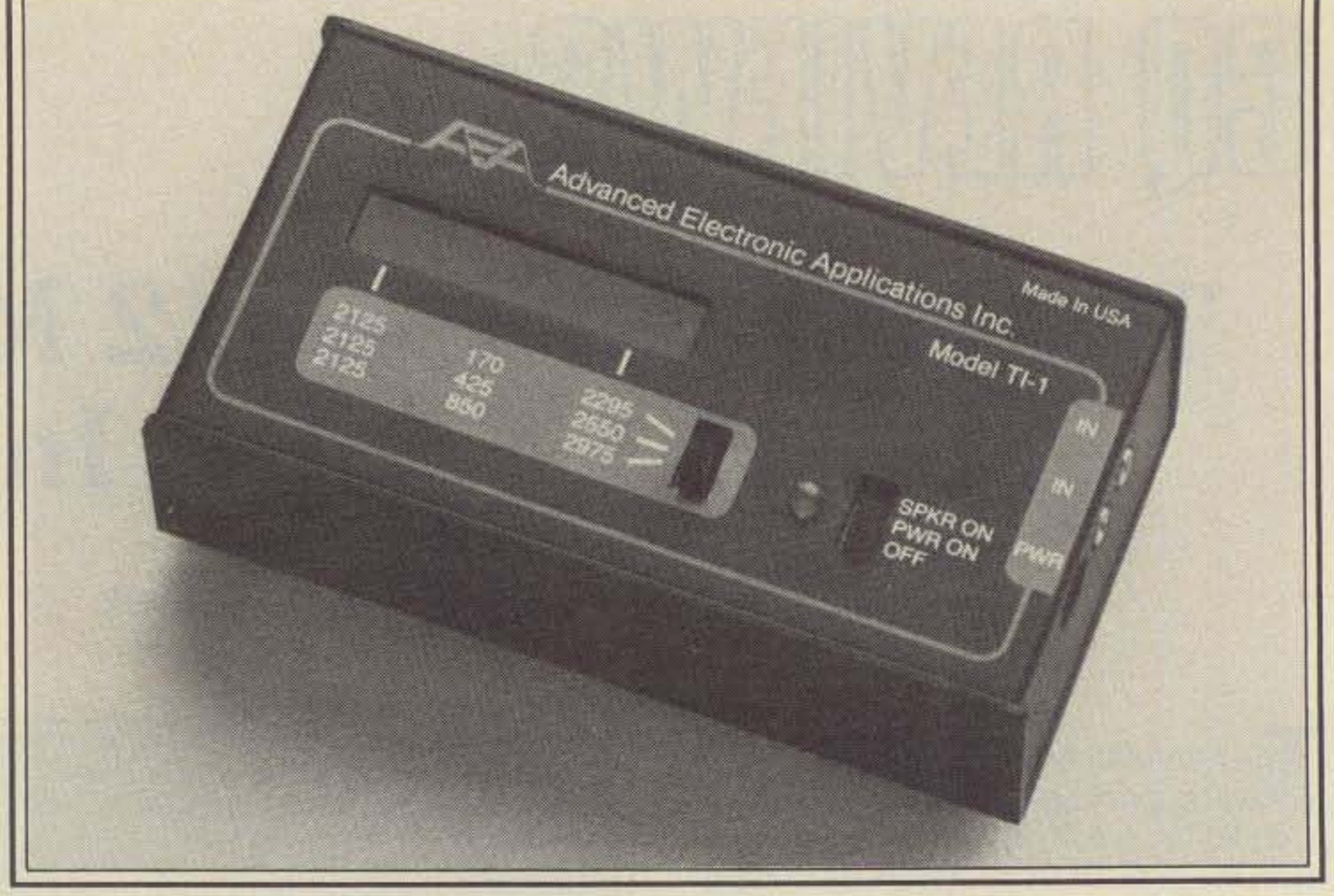
The AEA MAP-64/2 Micropatch for the Commodore 64 computer.

A distinct advantage in the MAP-64/2 is that the computing power of the Commodore 64 is put to excellent use via the MBA-TOR software. This synergistic system results in a "smart" terminal/modem that can receive and store messages into a 29.5K QSO Buffer, Disk or Tape, edit messages prior to storage, transmit data from storage, transmit data from a variable-size Transmit Buffer, output data to a printer, store data in 10 different message buffers, move data from one buffer to any other buffer, and even operate as an unattended AMTOR/ASCII/RTTY "mail-drop," complete with autotransmit acknowledgement and remote printer control by the sending station!

One unique and helpful feature of the MAP-64/2 is the way that the CRT display is partitioned into four sections. Mode and operating status, plus time and buffer sizes, are shown at the top of the screen. The large center area of the screen is for received text, followed by one line showing the text being transmitted. The last five lines display the latest information entered into the variable-size transmit buffer.

RTTY and ASCII can be operated with either 170 or 850 Hertz shifts. RTTY speeds include 60, 67, 75, 100, and 132 wpm. ASCII is possible at 110, 150, and 300 baud speeds. Speeds are selected by pressing the f5 key on the C64. All FSK modes are transmitted by feeding standard "high" tones (2125 Hz Mark) into the rig's microphone jack. This AFSK is adjustable in level to suit any transmitter or transceiver.

When operating RTTY or ASCII with the MAP-64/2, reception is very good, although not quite as error-free in heavy QRM or QSB as that found in the more expensive terminals designed specifically for RTTY. Although separate Mark and Space filters are employed, they are fairly broad, allowing heavy QRM to intrude and making accurate tuning somewhat



The AEA TI-1 RTTY/AMTOR tuning indicator.

difficult. No 'scope outputs are available, and the optional TI-1 Tuning Indicator must be considered a necessity if accurate tuning is to be realized, especially with AMTOR. The dual-filter system in the MAP-64/2 is much better than single-filter or phase-locked loop detectors used in other one-piece computer interfaces.

The MAP-64/2's CW receive algorithm is excellent! The AEA is more tolerant of poor fists, QRM, and QSB than any other unit tried to date. Once the unit has determined the proper receiving speed, the operator can press a function key and LOCK that speed so that the computer will not try to read the noise bursts as higher-speed CW. Transmit speed is selected by pressing the f5 key and then entering 2 digits between 5 and 99 wpm. Speeds below 15 wpm are sent with Farnsworth spacing—i.e., the characters are sent at 15 wpm while the spaces between characters are lengthened to yield an overall rate of 5 to 14 wpm. Weighting is not adjustable. Separate digital readouts are shown for both receive and transmit CW speeds. The MAP-64/2 is set up at the factory to key rigs with positive voltages on the key jack. Polarity-reversal is possible by moving a jumper inside the case. Going from receive to transmit can be accomplished by either pressing the proper function key, or by placing the unit in the CW BREAK-IN mode. This option causes the program to go into the transmit mode as soon as a character is entered into the XMIT Buffer. The operator can then type ahead, if desired, editing as necessary. Whenever the XMIT Buffer becomes empty, the program automatically goes back into the Receive mode. One wonders why AEA did not implement this "Keyboard VOX" idea with the other available modes as well.

One of the important functions of the MAP-64/2 is its AMTOR capability. Having spent some 18 years operating RTTY, here was my first chance to try AMTOR. All functions worked flawlessly, but the special commands and new operating style really keep you thinking! If all the other AMTOR terminals were as powerful and convenient as this unit from AEA, there would be much more AMTOR activity on the bands today. The MAP-64/2 provided errorless AMTOR communications with all stations contacted. Standard, relay-switched transceivers were used in the AMTOR tests with no difficulties. (See comments, later.) Both ARQ (Mode A) and FEC (Mode B) are provided in the MAP-64/2. Additionally, an ARQ-Listen mode is provided in order to monitor two other stations operating in Mode A.

An AUTO AMTOR mode is also available which can be used as a "maildrop" for incoming messages from other AMTOR operators. The system transmits a beacon, advertising the presence of the maildrop together with the correct Selcall. When a message has been received, the unit transmits an acknowledgement message and closes with a CW ID. All QSO information is stored in the buffer as well as printer, if desired. Also available is AUTO CALL, which sends out an ARQ message to a specific Selcall at predetermined times. Similar maildrop programs are included for RTTY and ASCII.

The only function which failed to operate was the Print Command, when using an Okidata printer connected to the Commodore 64 through a Tymac Connection interface. Although the Tymac/Okidata combination has worked with all other hardware and software to date, a timing error exists between the AEA and Tymac print commands, precluding the use of this otherwise fine printer/interface. AEA

and Tymac are aware of this problem and both firms are working on a cure. Without a Commodore printer available, we were unable to verify the various printer functions and commands.

The optional TI-1 Tuning Indicator proved to be a necessity when operating AMTOR and RTTY, if true zero-beat tuning was to be realized. Although the two tuning LED's on the MAP-64/2 permit tuning for acceptable received copy, a more precise indicator is needed for AMTOR and exact tuning of RTTY signals. The TI-1, with its 20 LED's, can be set to 850, 425, or 170 Hz shifts (standard "high" tones only) and will provide 12 Hz resolution when tuning 170 Hz shifts. The unit contains a small monitor speaker and is very easy to set up and use. The owner must fabricate his own audio patch cable and furnish 12 VDC at 55 ma. Both audio connectors and a DC cord are furnished. The TI-1 does not augment the MAP-64/2 on CW, since the latter has its own CW tune LED, combined with a broad, noncritical CW receive filter. The TI-1 is a convenient accessory to have for any RTTY/AMTOR station when cost or lack of connections precludes the use of a tuning oscilloscope.

Comments

There has been some confusion concerning the switching time required for a transceiver to go from receive to transmit and back again when working AMTOR. For optimum results and greatest range, a rig working in AMTOR needs to switch from transmit to receive in 20 ms. If this changeover time is longer, the minimum working distance between two stations will increase. Some AMTOR units, including the MAP-64/2, can be made to compensate for this longer delay by varying the time delay between PTT-closure and "data-send." The AEA unit can vary its delay from 10 to 90 ms, as needed. However, increasing this delay will also reduce the maximum working distance, since only 170 ms are allowed for the signal's "round trip" to and from the station being worked. Using up 85 of the available 170 ms in additional delay would, for example, halve the maximum working distance from 25,500 km to 12,700 km. (We are dealing with the propagation-path distance and not the actual geographical distance between two stations.) Thus, it can be seen that a slower-than-optimum transceiver causes a loss in both minimum and maximum operating range.

Hopefully, the future will see the various equipment manufacturers agreeing to furnish AMTOR-compatibility data. As it stands now, the amateur should question both the terminal and transceiver manufacturers to ensure compatibility before spending money for a combination that might not function properly. AEA has compiled an extensive listing of amateur transceivers and their abilities to work AMTOR. Many rigs have been found to function on AMTOR, without modification, at distances ranging from across town to around the world. The fact that a rig uses relay-switching need not be of concern. Well-designed terminals such as the MAP-64/2 cold-switch the rig's relays, then apply the tones. The problems of compatibility, if any, usually lie in the areas of AGC time-constants and receiver audio recovery, and a simple capacitor or two might be all that's required to clear things up! The MAP-64/2 was used with both ICOM 730 and 745 transceivers on AMTOR. No problems were encountered with either rig. Both transceivers are relay-switched and neither required any modifications.

In conclusion, the AEA MAP-64/2 provides both interface and excellent software in one neat, cost-effective package. When combined with an existing Commodore 64, the result is a very flexible all-mode terminal, rivaled only by the $1000-plus dedicated communications terminals.

The MAP-64/2 retails for $239.95 and the TI-1 for $119.95. For more information on these products write to AEA Inc., P.O. Box C-2160, Lynnwood, WA 98036.

CQ SHOWCASE

Cushcraft Antenna and Accessory Catalog

Cuscraft has just released their latest full-line amateur antenna and accessory catalog. The 16-page, two-color booklet contains complete specifications on antennas in the frequency range from 3 to 450 MHz. There are three new Boomer 2 meter antennas, a two-element 40 meter beam, Cushcraft/Signals VHF mobile antennas, and a through-the-wall lightning arrestor. To receive your free copy write to Cushcraft Ham Catalog, P.O. Box 4680, Manchester, NH 03108, or circle number 101 on the reader service card.

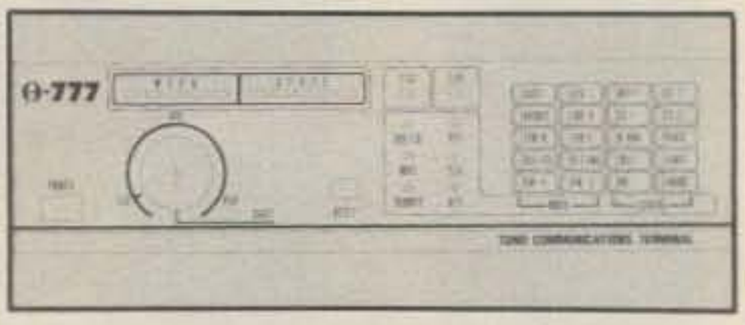
HAL SPT-1 "Spectra-Tune" Multi-Mode Tuning Indicator

The HAL SPT-1 "Spectra-Tune" multi-mode tuning indicator may be used in the following modes of operation: RTTY high tones, RTTY low tones, facsimile (FAX), slow-scan television (SSTV), and Morse Code (CW). The frequency spectra of the received signal are displayed on a calibrated, linear, 40-segment, red LED bar graph. The front-panel calibration control allows the selection of which 1000 Hz range from 300 Hz to 3000 Hz is to be displayed. For hook-up, an audio input line from the receiver/transceiver and a +12 VDC line are all that's required.

The SPT-1 measures 6.125"W × 6.250"D × 2.500"H and comes with a one-year limited warranty. The unit sells for $169.00. For more information, contact HAL Communications Corp., P.O. Box 365, Urbana, IL 61801, or circle number 108 on the reader service card.

Kenpro Rotator Products From ENCOMM, Inc.

The Kenpro brand line of rotators and accessories is available from ENCOMM, Inc. The KR-400 and KR-500 pair of rotators are popular for satellite and space communications, while the KR-600RC medium-duty and the KR-2000RC heavy-duty units are now available for use on the U.S.A. voltage system and incorporate the easy-reading 360-degree controller units. For further information and specifications, contact ENCOMM, Inc., 2000 Avenue "G" Suite 800, Plano, TX 75074, or circle number 103 on the reader service card.



Amateur-Wholesale Electronics Computer Interface Terminal

Amateur-Wholesale Electronics has announced the new *θ*-777 computer-interface terminal, featuring RTTY, bit inversion, AMTOR modes ARQ, FEC, and SELFEC, ASCII, and CW, any speed any shift (ASCII and BAUDOT). The *θ*-777 is a self-contained unit including software that allows reception and transmission with any computer or terminal that has RS232 or TTL I/O. It automatically decodes signals

and displays mode, speed, and polarity on the CRT. Operation is made by the use of 28 Bar-LEDS and LEDS including a bar-graph tuning indicator that allows precise centering of received signals. Features of the θ-777 include 15 channels of message memory plus a 768 character input or type-ahead buffer, manual/automatic PTT switching, selective calling, provision for tape-recorder backup memory, automatic carriage return and line feed, preloading function, error correction (rub-out), CW random generator for code practice, and more.

The θ-777 operates from a power supply of 11 to 14 volts DC and measures approximately 2.5"H × 9"W × 10"D. For more information, contact Amateur-Wholesale Electronics, Inc., 8817 S.W. 129 Terrace, Miami, FL 33176, or circle number 104 on the reader service card.

P.C. Electronics TC70-1 ATV Transceiver

P.C. Electronics has introduced a new small 1 watt 70 cm ATV transceiver. The TC70-1 accepts standard composite video input from any source. Video and audio input RCA jacks on the rear panel are provided for connection to black-and-white or color cameras, computers, VCRs, TVROs, etc. A front-panel switch selects video and audio input from these jacks or from the 10-pin connector, which is provided for direct connection to many of the color cameras made for portable VCRs. Audio input is selected from the color camera mic or line level from the rear panel jack.

The unit is 7" × 7" × 2½" for portable use, but either a 20 watt or 50 watt video compensated RF linear amplifier is available. A video monitor output is provided. The unit is priced at under $300. For more information, contact P.C. Electronics, 2522 Paxson Lane, Arcadia, CA 91006, or circle number 109 on the reader service card.

Kantronics Packet Communicator

To utilize the new Packet technology, Kantronics has designed a new hardware format for processing the Packet protocol. By using an internal microprocessor to handle the protocol, and integrated circuits for signal processing, the Kantronic's Packet Communicator becomes a compact, inexpensive Packet unit. Data is transmitted between the Packet Communicator and the computer using a

Serial RS232 or TTL port. Baud rates of 300, 1200, and 9600 can be used. Any terminal or communications software program can be used to set up the computer to communicate with the Packet Communicator. Special Packet Terminal (Pac-Term™) programs for many popular personal computers will be available soon from Kantronics.

The Packet Communicator supports baud rates of 300, 400, 600, and 1200, but does not support full duplex operation. An added feature of the unit is the ability to select either Bell 103 or 202 tones for 300 baud operation, allowing the operator to switch to the lower tone set, improving performance at slower speeds on the HF bands. The unit is housed in an extruded aluminum case measuring 1.9"H × 5.9"W × 8"D. An external power supply and cables for connection to the transceiver and computer are included. Suggested retail price is $389.95. For more information, contact Kantronics, 1202 E. 23rd St., Lawrence, KS 66046, or circle number 106 on the reader service card.

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- ☐ OSCARLOCATOR $8.50 U.S., $9.50 elsewhere
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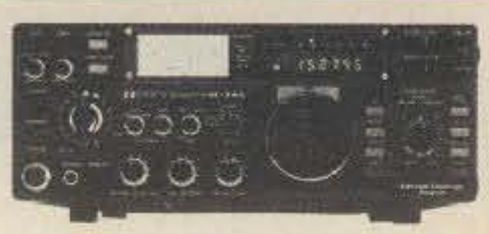

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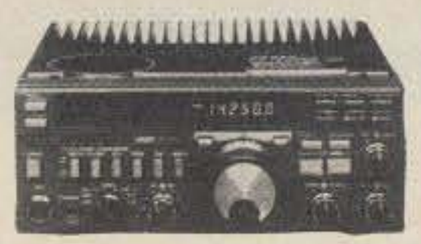

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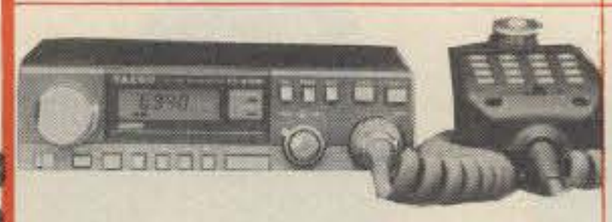

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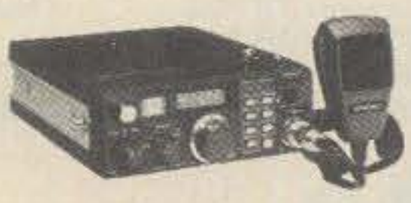

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FT-209RH
NEW High Tech 2mtr HT
5 Watt Output
NOW IN STOCK
CALL FOR YOUR SPECIAL PRICE

FT-203R/TT
NEW 2mtr HT w/VOX* & Touch-Tone Pad
CALL FOR YOUR SPECIAL PRICE

YH-2 headset required for VOX operation.....$19.95

TEXAS TOWERS

Div. of Texas RF Distributors Inc.
1108 Summit Ave., Suite 4 • Plano, Texas 75074

Telephone
(214) 422-7306

Store Hours: Mon-Fri: 9am - 5pm
Sat: 9am - 1pm
(Prices & Availability Subject To Change Without Notice)

CIRCLE 15 ON READER SERVICE CARD

OTHER SPECIALS

MIRAGE AMPLIFIER SALE!

B1016
$249

Model	Band	Pre-amp	Input	Output	DC Pwr	Sale Price
A1015	6M	Yes	10W	150W	20A	$249
B23	2M	No	2W	30W	5A	$ 79
B215	2M	Yes	2W	150W	22A	$259
B108	2M	Yes	10W	80W	10A	$159
B1016	2M	Yes	10W	160W	20A	$249
B3016	2M	Yes	30W	160W	17A	$199
C22	220	No	2W	20W	5A	$ 79
C106	220	Yes	10W	60W	10A	$179
C1012	220	Yes	10W	120W	20A	$259
D24	440	No	2W	40W	8A	$179
D1010N	440	No	10W	100W	20A	$289

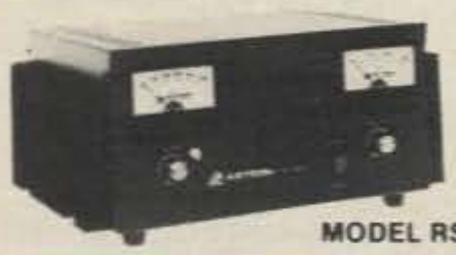
RC-1 Remote Control for Mirage Amplifiers $24
MP-1 and MP-2 Peak-Reading Wattmeter $99

ASTRON POWER SUPPLIES

Heavy Duty · High Quality · Rugged · Reliable

- Input Voltage: 105-125 VAC Output: 13.8 VDC ± 05V
- Fully Electronically Regulated—5mV Maximum Ripple
- Current Limiting & Crowbar Protection Circuits
- M Series With Meter—A Series Without Meter

Model	Cont. Amps	ICS Amps	Price
RS4A	3	4	$ 39
RS7A	5	7	49
RS12A	9	12	69
RS20A	16	20	89
RS20M	16	20	109
RS35A	25	35	135
RS35M	25	35	149
RS50A	37	50	199
RS50M	37	50	229



MODEL RS-50A

AEA

CP-1 COMPUTER PATCH
List $239.95 SALE $189.95!

CP1-20 ..... $219 CP1-64 ..... $219
MP-20 ..... $129.95 MP-64 ..... $129.95
VIC-20 MBAText . $79 C-64 MBAText . . $79

All AEA Keyers, Antennas & Accessories In Stock!

KANTRONICS

The Interface Reg. $169.95 Sale $129.95
The Interface II Reg. $269.95 Sale $239.95

CHALLENGER $89.95 UNIVERSAL TU $189.95

Apple Amtor Soft/Hamtext	$139	VIC-20 Hamsoft	49
Vic-20 Amtor Soft	89	Hamtext VIC-20	99
Model 64 Amtor Soft	89	Hamtext Model-64	99
Apple Hamsoft	29	Atari Hamsoft	49
		TRS-80C Hamsoft	59

AMERITRON AL-80 SALE $599!

AL-80 1000W Output (single 3-500Z)	$589
AL-84 600W PEP Output (4-6MJ6 Tubes)	$379
AL-1200 1500W Output (3CX-1200 tube)	$1399
RCS-8 5 Pos Remote Antenna Switch	$119
ATR-15 1500W Antenna Tuner	$289

HAL SALE!

NEW RTTY/CW COMPUTER INTERFACES

CRI-100 List $249 SALE $229.95!
CRI-200 List $299 SALE $269.95!

TEN-TEC SALE!

CORSAIR List $1169
Deluxe AC Supply List $199
Both Items—Yours for $1169!

425 Titan New 3KW amplifier in stock-only $2195!

TEN-TEC
New 2M HT
Full Featured!
List $319 Sale $279.95!

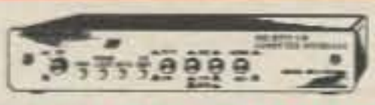
4229 2KW Tuner Kit $189.95!

SANTEC

ST142 $249
ST222 $279
ST442 $289
LS202 $229

KDK FM2033

List $339 Sale $259



MFJ 1224 COMPUTER INTERFACE $89.95

202B Noise Bridge	$59.95
250 2KW Oil Load	$35.95
422 Keyer/Paddle	$89.95
901 300W Tuner	$59.95
941D 300 W Tuner	$99.95
989 Deluxe 2KW	$299.95

OSCAR/VHF DX EQUIPMENT

TRANSCEIVERS

KENWOOD

TR9130 2m All Mode 25W	$CALL
TR711A 2m Base 25W	$CALL
TR9500 70cm All Mode	$CALL
TR811A 70cm Base 25W	$CALL

ICOM

IC290H 2m All Mode 25W	$469
IC271A 2m Base 25W	$599
IC271H 2m Base 100W	$789
IC490A 70cm All Mode 10W	$579
IC471A 70cm Base 25W	$689
IC471H 70cm Base 75W	$949

YAESU

FT290R 2m All Mode 2W	$349
FT726R Triband All Mode	$779
726/70 70cm module	$269
726/SU Duplex Module	$95
FT790R 70cm All Mode 1W	$349

TEN-TEC

2510 Satellite Station	$439

ROTORS

Ken Pro KR500 Elev Rotor	$189
Ken Pro KR400 Azim Rotor	$149
Alliance HD73 Azim Rotor	$99
Hy-Gain Ham 4 Azim Rotor	$219

AMPLIFIERS

MIRAGE

B108 2m 80W out/10W in	$159
B1016 2m 160W out/10W in	$249
B3016 2m 160W out/30W in	$199
D24 70cm 40W out/2W in	$179
D1010N 70cm 100W out/10W in	$289

THL CORP.

HL110V 2m 100W out/3-10W in	$219
HL160/25 2m 160W out 25W in	$269
HL160V 2m 160W out/3-10W in	$289
HL45U 70cm 45W out/10W in	$179
HL90U 70cm 90W out/10W in	$319

ANTENNAS

CUSHCRAFT

A144-20T 2m 20el cir pol	$75
416TB 70cm cir pol	$59
PS4 70cm Circularity Switch	$69
AOP1 2m/70cm Oscar Pack	$149

KLM

2m-14c 14el 2m w/cir switch	$89
2m-22C 22el 2m w/cir switch	$119
435-18C 70cm w/cir switch	$119

HARDLINE & HELIAX

½" Aluminum Hardline	$.79/ft
½" LDF-50 Heliax	$1.69/ft

OSCAR PACKAGE DEALS

PACKAGE #1

Ten-Tec 2510 Satellite Station	List $489
THL HL45U 70cm 45W Amplifier	List $199
THL HRA-2 2m Mast Mount Preamp	List $159
Cushcraft AOP-1 Antenna Package	List $219
Ken-Pro KR500 Elevation Rotor	List $189
Alliance HD73 Azimuth Rotor	List $219
South River 10ft Roof Tripod	List $59
TOTAL LIST PRICE	**$1533**

PACKAGE PRICE—ONLY $1249 DELIVERED!
SAVE OVER $300!!

PACKAGE #2

Yaesu FT290R 2m Transceiver	List $399
Yaesu FT790R 70cm Transceiver	List $399
Mirage D24 70cm 40W Amplifier	List $210
THL HRA-2 2m Mast Mount Preamp	List $159
Cushcraft AOP-1 Antenna Package	List $219
Ken-Pro KR500 Elevation Rotor	List $189
Alliance HD73 Azimuth Rotor	List $219
South River 10ft Roof Tripod	List $59
TOTAL LIST PRICE	**$1853**

PACKAGE PRICE—ONLY $1499 DELIVERED!
SAVE OVER $375!!

PACKAGE #3

Kenwood TR9130 or Icom IC290H	List $549
Kenwood TR9500 or Icom IC490A	List $649
Mirage D1010N 70cm 100W Amplifier	List $347
THL HRA-2 2m Mast Mount Preamp	List $159
KLM 2M-14C 14el 2m Satellite Ant	List $112
KLM 435-18C 70cm Satellite Ant	List $145
Ken-Pro KR500 Elevation Rotor	List $189
Alliance HD73 Azimuth Rotor	List $219
South River 10ft Roof Tripod	List $59
TOTAL LIST PRICE	**$2428**

PACKAGE PRICE—ONLY $1999 DELIVERED!
SAVE OVER $450!!

PACKAGE #4

Yaesu FT726R VHF/UHF Duplex Xcvr	List $899
430/726 70cm Module	List $289
SU/726 Sat Duplex Unit	List $109
Mirage D1010N 70cm 100W Amplifier	List $347
THL HRA-2 2m Mast Mount Preamp	List $159
KLM 2M-14C 14el 2m Satellite Ant	List $112
KLM 435-18C 70cm Satellite Ant	List $145
Ken-Pro KR500 Elevation Rotor	List $189
Alliance HD73 Azimuth Rotor	List $219
South River 10ft Roof Tripod	List $59
TOTAL LIST PRICE	**$2527**

PACKAGE PRICE—ONLY $2125 DELIVERED!
SAVE OVER $425!!

Select Low Loss Transmission Line, Coax, Rotor Cable and Power Supplies from Listing in our other advertisements.

We can substitute items and make any changes needed to fit your requirements. Please call for our Special Sale Prices and SAVE $$$.

TEXAS TOWERS

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VISA MasterCard

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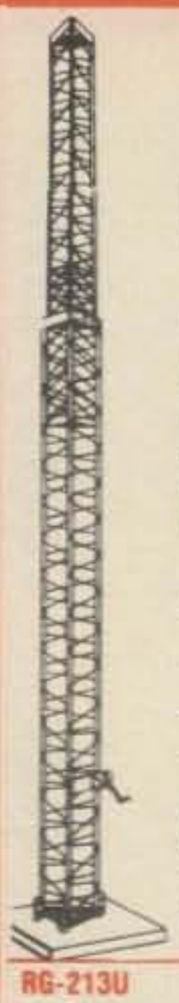
CIRCLE 138 ON READER SERVICE CARD

ANTENNA/TOWER SALE!



hy-gain

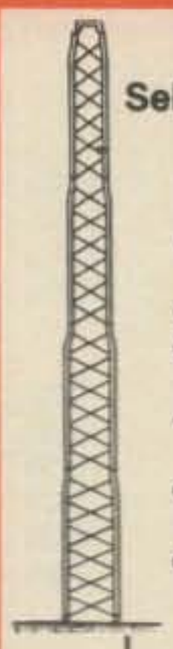
CRANKUP SALE!

All Models Shipped Factory Direct—Freight Paid*!

Check these features:
- All steel construction
- Hot dip galvanized after fabrication
- Complete with base and rotor plate
- Totally self-supporting—no guys needed

Model	Height	Load	Sale Price
HG37SS	37 ft.	9 sq. ft.	$749
HG52SS	52 ft.	9 sq. ft.	$1099
HG54HD	54 ft.	16 sq. ft.	$1699
HG70HD	70 ft.	16 sq. ft.	$2699

Masts—Thrust Bearings—Other Accessories Available—Call! Prices Shown Are Your Total Delivered Price In Continental U.S.A.!



ROHN

Self Supporting Towers On SALE!

FREIGHT PREPAID

- All Steel Construction—Rugged
- Galvanized Finish—Long Life
- Totally Free Standing—No Guy Wires
- America's Best Tower Buy—Compare Save $
- Complete With Base and Rotor Plate
- In Stock Now—Fast Delivery

Model	Height	Ant. Load*	Weight	Delivered Price*
HBX40	40 ft	10 sq ft	164	$329
HBX48	48 ft	10 sq ft	303	$429
HBX56	56 ft	10 sq ft	385	$499
HDBX40	40 ft	18 sq ft	281	$399
HDBX48	48 ft	18 sq ft	363	$489

*Your Total Delivered Price Anywhere in Continental 48 States. Antenna Load Based on 70 MPH Wind.

Tri-Ex®

These rugged crankup towers now available from Texas Towers! All models available On Sale for tremendous savings to you!

To save on freight costs, all towers are shipped directly from the Tri-Ex factory to you!

Check these features:
- **All steel construction**
- **Hot dip galvanized after fabrication**
- **Complete with base and rotor plate**
- **Totally self-supporting—no guys needed**

Model	Height Up	Down	Wind Load	List	Sale
W36	36.0 ft	20.5 ft	9.0 sq ft	$694	$579
WT51	51.0 ft	20.5 ft	9.0 sq ft	$1154	$899
LM354	54.0 ft	21.0 ft	16 sq ft	$2010	$1599
LM470D (Motorized)	70.0 ft	22.0 ft	16 sq ft	$4195	$3199
DX86 (Motorized)	86.0 ft	23.0 ft	25 sq ft	$7200	Call

BUTTERNUT ELECTRONICS CO.

HF6V $129 Delivered (Cont. USA)

- Full Legal Power 80/10 Meters
- Optional Stub Tuned Radial Kit Model STR II $29
- Optional Roof Mounting Kit Model RMK II $49 (includes STR II)
- Optional 160 Meter Resonator Kit Model TBR 160HD $49

New 80/40 Meter Vertical Antenna HF2V $129 Delivered (Continental USA)

- Optional 160 Meter Resonator Kit Model TBR 160S $49

Delivery Anywhere In The Continental USA At No Additional Cost. (Free Shipping On Butternut Accessories Also When Purchased With Antenna.)

RG-213U

$.29/ft $279/1000 ft Up to 600 ft via UPS

- RG-213/U—95% Bare Copper Shield
- Mil-Spec Non-contaminating Jacket for longer life than RG8 cables.
- Our RG-213/U uses virgin materials.
- Guaranteed Highest Quality!

RG-8X

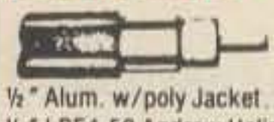
$.19/ft $179/1000 ft

- RG8X—95% Bare Copper Shield
- Low Loss Foam Dielectric
- Non-contaminating Vinyl Jacket

Coaxial Cable Loss Characteristics (DB/100 ft)

Cable Type	Imped.	10MHz	30MHz	150MHz	450MHz
RG-213/U	50	.6	.9	2.3	5.2
RG8X	52	.8	1.2	3.5	6.8
RG-58/U	52	1.4	1.9	6.0	12.5
½" Alum	50	.3	.5	1.2	2.2
½" Heliax	50	.2	.4	.9	1.6
⅞" Heliax	50	.1	.2	.5	.9

HARDLINE/HELIAX™



Lowest Loss for VHF/UHF!

½" Alum. w/poly Jacket	$.79/ft
½" LDF4-50 Andrew Heliax™	$1.69/ft
⅞" LDF5-50 Andrew Heliax™	$3.99/ft

select connectors below.

HARDLINE & HELIAX™ CONNECTORS

Cable Type	UHF FML	UHF MALE	N FML	N MALE
½" Alum	$19	$19	$19	$25
½" Heliax™	$22	$22	$22	$22
⅞" Heliax™	$49	$49	$49	$49

AMPHENOL CONNECTORS

Silver PL259	$1.25	UG23D N Female	$2.95
UG21B N Male	$2.95		

ANTENNA WIRE & ACCESSORIES

14 Ga. Stranded Copperweld	$.10/ft
450 Ohm H.D. Line	$.16/ft
18 Ga. Copper coated steel wire ¼ mile long	$30
H.D. End Insulators	$2/ea
Van Gorden 1:1 Balun	$11
Van Gorden Center Insulator	$6

HUSTLER

6BTV 80-10 mtr Vert	$129		
4BTV 40-10 mtr Vert	$89	5BTV 80-10 mtr Vert	$109
G6-144B 2-mtr Base	$89	G7-144 2-mtr Base	$119

Mobile Resonators	10m	15m	20m	40m	75m
400W Standard	$16	$17	$19	$22	$26
2KW Super	$20	$22	$25	$29	$39

Bumper Mounts - Springs - Folding Masts in Stock!

CUSHCRAFT

MULTI-BAND HF ANTENNAS

A3 3-el Tribander	$219	A4 4-el Tribander	$289
R3 20/15/10mtr Vert	$279	A743/A744 40mtr Kit	$75

HF MONO-BAND ANTENNAS

10-3CD	$ 95	10-4CD	$109
15-3CD	$119	15-4CD	$129
20-3CD	$199	20-4CD	$279
40-2CD	$289	D40	$149

VHF/UHF BEAMS

A50-5	$ 79	617B	$199
214B	$ 79	3219	$ 95
220B	$ 95	424B	$ 79

OSCAR/TWIST ANTENNAS

A144-10T	$ 52	A144-20T	$ 75
A147-20T	$ 63	416TB	$ 59
A14TMB	$ 29	PS4	$ 69

VHF/UHF FM ANTENNAS

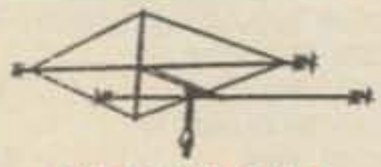
A147-4	$ 29	A147-11	$ 49
214FB	$ 79	228FB	$219
A449-6	$ 29	ARX2B	$ 39

HY-GAIN

Discoverer 2-el 40-mtr Beam	**$319**
Discoverer 3-el Conversion Kit	**$199**
EXPLORER-14 SUPER SPECIAL	**$309**
QK710 30/40 mtr. Add-On-Kit	$79
V2S 2-mtr Base Vertical	$49
TH5MK2S Broad Band 5-el Triband Beam	$389
TH7DXS 7-el Triband Beam	$439
TH3JRS 3-el Triband Beam	$189
TH2MK3S 2-el Triband Beam	$179
205BAS 5-el 20-mtr Beam	$349
155BAS 5-el 15-mtr Beam	$199
105BAS 5-el 10-mtr Beam	$129
204BAS 4-el 20-mtr Beam	$259
64BS 4-el 6-mtr Beam	$69
66BS 6-el 6-mtr Beam	$139
18HTS 80-10 mtr Hy-Tower Vertical	$439
LC-160 160-mtr Coil Kit for 18HTS	$49
214BS 14-el 2-mtr Beam	$49
2BDQ 80/40 mtr Trap Dipole	$69
5BDQ 80-10 mtr Trap Dipole	$129
BN86 80-10 mtr KW Balun W/Coax Seal	$22

MOSLEY

Pro37 7-el Triband Beam	$469
CL-33 e-el Triband Beam	$279
TA-33 3-el Triband Beam	$249
TA-33JR 3-el Triband Beam	$189
TA40KR 40 mtr Kit for TA33	$119



MINI-PRODUCTS HQ-1

LIST $182.50 SALE $159

- Wing Span - 11 ft
- Wind Area - 1.5 sq ft
- Boom - 54 in. long
- 1200W P.E.P. Input

ALPHA DELTA COMMUNICATIONS

Transi-Trap™ Surge Protectors—In Stock Now!

Model LT 200W UHF Type	$19
Model HT 2KW UHF Type	$29
RT 200W Deluxe UHF Type	$29
RT/N 200W Deluxe N Type	$32
HV 2KW Deluxe UHF Type	$32
HV/N 2KW Deluxe N Type	$35

KLM

KT34A 4-el Broad Band Triband Beam	$339
KT34XA 6-el Broad Band Triband Beam	$489
40m-1 40-mtr Rotatable Dipole	$179
40m-2 2-el 40-mtr Beam	$309
40m-3 3-el 40-mtr Beam	$459
40m-4 4-el 40-mtr Beam	$649
2m-13LBA 13-el 2-mtr Beam	$79
2m-14C 14-el 2-mtr Satellite Antenna	$89
2m-16LBX NEW-16-el 2-mtr Beam	$99
2m-22C NEW-22-el 2-mtr Satellite Antenna	$119
432-30LBX NEW-30-el-432 MHz Antenna	$99
435-18C 435 MHz Satellite Antenna W/CS-2	$119
432-16LB 16-el 432 MHz Beam	$69
435-40CX 435 MHz Satellite Antenna w/CS-2	$159

ROTORS & CABLES

Alliance HD73 (10.7 sq ft rating)	$109
Alliance U110 (3 sq ft rating)	$49
Telex HAM 4 (15 sq ft rating)	$219
Telex Tailtwister (20 sq ft rating)	$269
Telex HDR300 Heavy Duty (25 sq ft rating)	$519
Kenpro KR-500 Heavy duty elevation rotor	$189
KLM EL-3000 Moon Tracker Elevation Rotator	$369

Standard 8 cond cable $.19/ft (vinyl jacket 2-#18 & 6-#22 ga)
Heavy Duty 8 Cond cable $.36/ft (vinyl jacket 2-#16 & 6-#18 ga)

SOUTH RIVER ROOF TRIPODS

HDT-3 3 ft Tripod	$19	HDT-5 5 ft Tripod	$29
HDT-10 10 ft Tripod	$49	HDT-15 15 ft Tripod	$69

Heavy Duty Tripods include mtg hdw-UPS Shippable

ROHN GUYED TOWERS

10 ft Stack Sections

20G	$39.50	25G	$49.50
45G	$112.50	55G	$134.50

All 20G, 25G, 45G and 55G Accessories In Stock at Discount Prices - CALL!

Foldover Towers

Model	Height	Ant Load*	Price
FK2548	48 ft	15.4 sq ft	$899
FK2558	58 ft	13.3 sq ft	$949
FK2568	68 ft	11.7 sq ft	$999
FK4544	44 ft	34.8 sq ft	$1199
FK4554	54 ft	29.1 sq ft	$1299
FK4564	64 ft	28.4 sq ft	$1399
25G Foldover Double Guy Kit			$219
45G Foldover Double Guy Kit			$249

*Above antenna loads for 70 MPH winds and Guys at Hinge & Apex.

TOWER/GUY HARDWARE

3/16" EHS Guywire (3990 lb rating)	$.15/ft
1/4" EHS Guywire (6000 lb rating)	$.18/ft
5/32" 7 × 7 Aircraft Cable (2700 lb rating)	$.15/ft
3/16" CCM Cable Clamp (3/16" or 5/32" Cable)	$.45
1/4" CCM Cable Clamp (1/4" Cable)	$.55
1/4" TH Thimble (fits all sizes)	$.45
3/8EE (3/8" Eye & Eye Turnbuckle)	$6.95
3/8" EJ (3/8" Eye & Jaw Turnbuckle)	$7.95
1/2" EE (1/2" Eye & Eye Turnbuckle)	$9.95
1/2" EJ (1/2" Eye & Jaw Turnbuckle)	$10.95
3/16" Preformed Guy Grip	$2.49
1/4" Preformed Guy Grip	$2.99
6" Diam - 4 ft Long Earth Screw Anchor	$14.95
500D Guy Insulator (5/32" or 3/16" Cable)	$1.69
502 Guy Insulator (1/4" Cable)	$2.99
5/8" Diam - 8 ft Copper Clad Ground Rod	$12.95

PHILLYSTRAN GUY CABLE

HPTG2100 Guy Cable (2100 lb rating)	$.29/ft
HPTG4000 Guy Cable (4000 lb rating)	$.49/ft
HPTG6700 Guy Cable (6700 lb rating)	$.69/ft
9901LD Cable End (for 2100/4000 cable)	$7.95
9902LD Cable End (for 6700 cable)	$8.95
Socketfast Potting Compound	$14.95

GALVANIZED STEEL MASTS

Heavy Duty Steel Masts 2 in OD - Galvanized Finish

Length	5 FT	10 FT	15 FT	20 FT
.12 in Wall	$29	$49	$59	$79
.18 in Wall	$39	$69	$99	$129
.25 in Wall	$69	$129	$189	$249

TEXAS TOWERS

Telephone (214) 422-7306

VISA MasterCard

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1108 Summit Ave., Suite 4 • Plano, Texas 75074

Store Hours: Mon-Fri: 9am - 5pm
Sat: 9am - 1pm

(Prices & Availability Subject To Change Without Notice)

CIRCLE 88 ON READER SERVICE CARD

Announcing

(from p. 9)

Calls not in Callbook should QSL to Military Club Station W4ODR, P.O. Box 54278, Naval Air Station Memphis, Millington, TN 38054.

• **Armed Forces Day Communication Test** - The Armed Forces Day Communication Test will be May 18. The traditional military-to-amateur cross-band operation and broadcast of the Secretary of Defense message are the featured highlights and include operations in CW, SSB, RTTY, and SSTV. These tests give both amateur radio operators and SWLs the opportunity to demonstrate their individual technical skills. Special commemorative acknowledgement (QSL) cards will be awarded to those operators achieving a verified two-way radio contact with any of the participating military radio stations. For detailed information, contact U.S. Navy-Marine Corps. MARS, 4401 Massachusetts Ave. NW, Washington, DC 20390.

•The following hamfests, fleamarkets, VEC exams, etc. are slated for May:

May 3–5, **43rd Annual Fresno Hamfest,** Fresno, CA. Contact Jane Price, WA6HSW, 2353 W. Simpson, Fresno, CA 93705.

May 4, **Northwest Arkansas ARC Hamfest,** Rogers, AR. Contact Ray Watson, N5HAP, 714 Maple Dr., Springdale, AR 72764.

May 4, **Southern Tier ARC's Hamfest,** Oswego, NY. Contact KF2X, RD 1 Box 144, Vestal, NY 13850 (SASE).

May 4, **Bemidji ARC Hamfest,** Bemidji, MN. Contact Jerry Pottratz, Bemidji ARC, P.O. Box 524, Bemidji, MN 56601 (218-751-7502).

May 4, **Ozaukee Radio Club Swapfest,** Cedarburg, WI. Contact 1985 ORC Swapfest, 101 E. Clay St., Saukville, WI 53080 (SASE).

May 4–5, **Greenville, SC Hamfest & ARRL South Carolina Convention,** Greenville, SC. Contact John E. Chism, ND4N, Rt. 6, 203 Lanewood Dr., Greenville, SC 29607; or Randy Rice, WD4ADK, 1401 W. Parker Rd., Greenville, SC 29611.

May 4–5, **CARA Training Facility & Range Inauguration,** Sierra Vista, AZ. Contact The Cochise ARA, P.O. Box 1855, Sierra Vista, AZ 85636, Att: KB7HB.

May 5, **Sacramento Valley Hamswap,** Roseville, CA. Contact Carl Schultz, KA6KWB, 2942 Gwendolyn Way, Rancho Cordova, CA 95670 (916-366-9111).

May 5, **Columbia Hamfest,** Columbia, MO. Contact Columbia Hamfest '85, P.O. Box 283, Columbia, MO 65205.

May 5, **Kishwaukee ARC Hamfest,** Sandwich, IL. Contact Arnold K. Johnson, W9DNV, Box 21, Genoa, IL 60135.

May 5, **Centralia Wireless Assoc. Hamfest,** Centralia, IL. Contact David Conder, KA9QPC, at 618-532-2772.

May 5, **Hampden County RA Fleamarket,** West Springfield, MA. Contact Paul Kress, WA1ZKT, at 413-568-8291.

May 5, **Suffolk County, NY Radio Club Electronic Fleamarket,** Melville, NY. Contact Richard Tygar, AC2P, at 516-643-5956 (evenings).

May 11, **Arrowhead ARC Swapfest '85,** Duluth, MN. Contact Bill Cossette, N@BKL, 15 Manitou St., Duluth, MN 55808.

May 11, **Wexaukee ARA Swap Shop & Computer Fair,** Cadillac, MI. Contact Wexaukee ARA, Box 163, Cadillac, MI 49601.

May 11, **Eagle Rock Radio Club Swapmeet,** Idaho Falls, ID. Contact Fonya Byerly, KA7SQX, Rt. 2 Box 411, Idaho Falls, ID 83401.

May 11–12, **BRARC Hamfest,** Baton Rouge, LA. Contact Rick Pourciau, N5HHF, 879 Castle Kirk, Baton Rouge, LA 70808.

May 12, **Medina County Hamfest,** Medina, OH. Contact Medina Two Meter Group, P.O. Box 452, Medina, OH 44258 (216-725-5021).

May 15, **Chicago ARC Mini Hamfest,** Chicago, IL. Call 312-545-3622.

May 17–19, **11th Annual Eastern VHF/UHF Conference,** Nashua, NH. Contact Lewis D. Collins, W1GXT, 10 Marshall Terrace, Wayland, MA 01778 (617-358-2854, 6–10 pm).

May 18, **ARRL/VEC License Exam,** Mansfield, OH. Send SASE, completed Form 610, and $4.00 check payable to "ARRL/VEC" to Peggy Boyle, KC8NH, 1464 Marion Ave. Rd., Mansfield, OH 44906.

May 19, **Northern Berkshire ARC Fleamarket,** Dalton, MA. Contact not given.

May 19, **TCRA Hamfest,** Stirling, NJ. Contact Tri-County Radio Assoc., P.O. Box 412, Scotch Plains, NJ 07076.

May 19, **Warminster ARC Hamfest,** Wrightstown, PA. Contact Bill Cusik, W3GJC, Apt. 706 Garner House, Hatboro, PA 19040 (215-441-8048).

May 19, **Sandusky & Ottawa Counties Hamfest,** Oak Harbor, OH. Contact Raymond Kruse, K8IDA, 18980 West S.R. 51, Elmore, OH 43416.

May 25–27, **Reseau des Emetteurs Francais National Meeting,** Chateauroux, France. Contact FE 1335, Raymond Aupetit, 14 Residence Bois Boutin, 16340 L'Isle d'Espagnac, France.

May 26, **Maryland FM Assoc. Hamfest,** West Friendship, MD. Contact Craig Rockenbauch, WA3TID, 429 Severnside Dr., Severna Park, MD 21146 (301-987-6042, 6–10 pm).

May 26, **Quebec Provincial Hamfest,** Quebec, Canada. Contact Sorel-Tracy ARC, P.O. Box 533, Sorel QC, Canada J3P 2L5.

May 31–June 2, **Oregon State Ham Convention,** Seaside, OR. Contact Oregon State Ham Convention, P.O. Box 5132, Beaverton, OR 97006.

Update On The First CQ World-Wide VHF WPX Contest

BY STEVE KATZ*, WB2WIK

Our exciting new VHF contest, first announced in February *CQ*[1], is creating quite a stir. We've received a number of inquiries from readers and hope to answer most of them in this update. People are asking about trophy sponsorship. Trophy sponsors are individuals or clubs who are sincerely interested in promoting VHF/UHF activity and contesting and who are willing to help pay for the cost of engraved trophies to be awarded to contest high-scorers. The sponsor receives recognition in *CQ* both prior to the award and again when the contest results are published. Needless to say, those people who receive the trophies are the most thankful of all, but we all appreciate the sponsors' fine efforts. Trophies cost about $65 or so each and are engraved and shipped by *CQ* to the top-scoring stations in categories in which competition was noteworthy.

Since this is a VHF contest and the 1985 event scheduled for July 20–22 will be our first, we cannot foretell what categories of competition and geographic areas will be represented. We'd like this contest to evolve into a true worldwide event with thousands of entrants representing all continents and zones, but we're realistic enough to know that all zones will *not* be represented, and many countries may have little or no activity, especially the first year. This is the nature of VHF operations; it tends to be very popular in areas of great population density and essentially nonexistent in many areas in between population centers. To compound this unique problem, there are many countries where 50 MHz and 220 MHz are not available to amateurs, and some countries (unfortunately, not the U.S.) offer 70 MHz to amateurs in lieu of the 50 MHz band.

We'd therefore like to hold in abeyance the trophy/sponsor assignments until we see who participates in our first contest this July. We hope we're flooded with logs from all points of the globe, but we won't know until about October 1 (to allow time for transmittal of overseas logs). At that time we'll personally contact each sponsor with information to allow him or her (or them, in the case of a club) to decide which competitive category's trophy he or she (or they) would like to sponsor.

As of this writing (early March) we wish to gratefully acknowledge the following trophy sponsors for the *CQ* World-Wide VHF WPX Contest:

CQ Magazine
SCORE (NJ)
The Rochester VHF Group (NY)
The Mt. Airy VHF Club (PA)
The West Gulf Amateur Radio Club (TX)
The South Pickering (Ontario) ARC
Don Busick, K5AAD
Michael Crawford, WA2VUN
Steve Katz, WB2WIK
David Penttila, K1COW
Peter Putman, KT2B
Warren Whelan, WB2ONA

Letters are coming in from new prospective trophy sponsors every week, and we couldn't be happier! We'd really like to have about 40 sponsors for this contest—40 trophies—allowing for several categories of competition on each continent and Oceania. However, we do not expect all this marvelous participation for the very first contest. If you or anyone you know is interested in sponsoring a trophy, please write to SCORE, P.O. Box 1161, Denville, NJ 07834 for further information.

We've also received inquiries about a *CQ* VHF WPX award with endorsements for prefixes. This is a great idea, of course, and we're working on a new awards program. A VHF WPX could be as challenging as a WAS. The only bounds are the callsign allocations issued by local licensing authorities in your country and surrounding countries, and at the rate we're all going, the number of possible prefixes workable on a VHF band could well be in the hundreds for many of us. Look to future issues of *CQ* for the announcement of an awards program for VHFers.

At least one reader has inquired, "Why must 100% commercially-made equipment be used in this contest? Isn't this unfair?" Our reply is, oops! Reread the rules announcement in the February issue of *CQ* (page 42); it doesn't say 100% commercially-made equipment must be used. It says, "50 through 1296 MHz bands only, *to allow use of 100% commercially-made and readily available gear.*" In other words, any contest entrant can use whatever kind of equipment he or she wishes. We selected the *bands* for the contest based on equipment which is readily available on the market to avoid scaring off those who are not avid homebrewers. Obviously, many VHF/UHFers homebrew all or part of their stations, and this is fine with us!

Also, there seems to be a bit of confusion regarding the addition of prefix multipliers. Unlike the 25-year-old *CQ* World-Wide WPX Contest (the HF/DX version) where prefixes are counted as multipliers just once regardless of band, our new VHF WPX Contest allows the addition of prefix multipliers worked on the various bands. That is, you may work the same prefix on as many as five bands and it will count as five multipliers. This rule applies *only* to multi-band operators, of course.

Some folks have asked about who will administrate the new VHF WPX Contest. We have a VHF WPX Contest Committee and at this writing we have seven committee members: Ron Lawson, NA2O (Rochester, NY area); Sid Lieberman, WA2FXB (New York City area); Wayne McKenzie, W9OEH (Cincinnati, OH area); Wayne Overbeck, N6NB (Los Angeles area); Pete Putman, KT2B (Morristown, NJ area); Steve Katz, WB2WIK (Stroudsburg, PA area); and Rich Whiten, WB2OTK/4 (Greenville, SC area). We are looking for two more members, preferably from the first, fifth, seventh, tenth, or VE call areas. If you are an active VHFer and contester and would like to join our VHF WPX Contest Committee, please let us know: Write to SCORE (address shown earlier) or to *CQ*.

CQ has VHF WPX Contest log sheets and entry forms available for mailing. If you intend to participate in this contest, please request logs by sending an SASE to *CQ*. We'll have information on the new contest at our booth at the Dayton Hamvention, and the fellows from SCORE will be giving a slide show to help introduce the contest to those attending the Contest Forum and the VHF Forum.

So come on and join the fun! The time is 0000 UTC July 20 to 0000 UTC July 22, 1985. The place is 50 through 1296 MHz. The bands should be "hot" as the weather, and we'll be looking for *you*!

*24 Louis Dr., Budd Lake, NJ 07828

[1]*Pages 42–43, February 1985 CQ. Reprints available on request. For a reprint of the contest announcement, write to SCORE, P.O. Box 1161, Denville, NJ 07834, or to CQ.*

NEW FROM MFJ

MFJ'S MOST ADVANCED RTTY/ASCII/AMTOR/CW COMPUTER INTERFACE HAS FM, AM MODES, LED TUNING ARRAY, RS-232 INTERFACE, VARIABLE SHIFT TUNING, 170/850 Hz TRANSMIT, MARK-SPACE DETECTION.

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FM (limiting) mode gives easy, trouble-free operation. Best for general use, off-shift copy, drifting signals, and moderate signal and QRM levels.

AM (non-limiting) mode gives superior performance under weak signal conditions or when there are strong nearby stations.

Crosshair mark-space LED tuning array simulates scope ellipse for easy, accurate tuning even under poor signal-to-noise conditions. Mark and space outputs for true scope tuning.

Transmits on both 170 Hz and 850 Hz shift.

Built-in RS-232 interface, no extra cost.

Variable shift tuning lets you copy any shift between 100 and 1000 Hz and any speed (5-100 WPM RTTY/CW and up to 300 baud ASCII). Push button for 170 Hz shift.

Sharp multi-pole mark and space filters give true mark-space detection. Ganged pots give space passband tuning with constant bandwidth. Factory adjusted trim pots for optimum filter performance.

Multi-pole active filters are used for pre-limiter, mark, space and post detection filtering. Has automatic threshold correction. This advanced design gives good copy under QRM, weak signals and selective fading.

Has front panel sensitivity control.

Normal/Reverse switch eliminates retuning while checking for inverted RTTY. Speaker jack. +250 VDC loop output.

Exar 2206 sine wave generator gives phase continuous AFSK tones. Standard 2125 Hz mark and 2295/2975 Hz space. Microphone lines: AFSK out, AFSK ground, PTT out and PTT ground.

FSK keying for transceivers with FSK input.

Has sharp 800 Hz CW filter, plus and minus CW keying and external CW key jack.

Kantronics software compatible socket.

Exclusive TTL/RS-232 general purpose socket allows interfacing to nearly any personal computer with most appropriate software. Available TTL/RS-232 lines: RTTY demod out, CW demod out (TTL only), CW-ID in, RTTY in, PTT in, key in. All signal lines are buffered and can be inverted using an internal DIP switch.

Metal cabinet. Brushed aluminum front. 12½x2½x6 inches. 18 VDC or 110 VAC with optional AC adapter, MFJ-1312, $9.95.

Plugs between rig and C-64, VIC-20, Apple, TRS-80C, Atari, TI-99 and other personal computers. Use MFJ, Kantronics, AEA and other RTTY/ASCII/AMTOR/CW software.

MFJ MULTI-FUNCTION TUNING INDICATOR

MFJ-1221
$79.95

Greatly improve your RTTY copying capabilities. Add a crosshair LED Tuning Indicator that makes tuning quick, easy with pin-point accuracy. **Add** mark and space outputs for scope tuning. **Add** LEDs that indicate 170, 425, 850 Hz shifts. Great for copying RTTY outside ham bands. **Add** sharp mark and space filters to improve copy under crowded/weak conditions. 170, 425, 850 Hz shifts. **Add** Normal/Reverse switch to check for inverted RTTY without retuning. **Add** output level control to adjust signal into your terminal unit. **Add** a limiter to even out signal variation for smoother copy.

Unit plugs between your tuner and receiver. Mark is 2125 Hz, space is 2295, 2550 or 2975 Hz. Measures 10x2x6 in. and uses floating 18 VDC or 110 VAC with AC adapter, MFJ-1312, $9.95.

24/12 HOUR CLOCK/ID TIMER

MFJ-106
$19.95

Switch to 24 hour UTC or 12 hour format! Battery backup. ID timer alerts every 9 minutes after reset. Red .6 in. LEDs. Synchronizable to WWV. Alarm, Snooze function. PM, alarm on indicators. Gray/Black cabinet. 110 VAC, 60 Hz.

MFJ ELECTRONIC KEYER

MFJ-407
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MFJ-407 Deluxe Electronic Keyer sends iambic, automatic, semi-auto or manual. Use squeeze, single lever or straight key. Plus/minus keying. 8 to 50 WPM. Speed, weight, tone, volume controls. On/Off, Tune, Semi-auto switches. Speaker. RF proof. 7x2x6 inches. Uses 9 V battery, 6-9 VDC or 110 VAC with AC adapter, MFJ-1305, $9.95.

MICROPHONE EQUALIZER

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Greatly improves transmitted SSB speech for maximum talk power. Evens out speech peaks and valleys due to voice, microphone and room characteristics that make speech hard to understand. Produces cleaner, more intelligible speech on receiving end. Improves mobile operation by reducing bassy peaks due to acoustic resonances. Plugs between mic and rig. 4 pin mic jack, shielded output cable. High, mid, low controls provide ±12 db boost or cut at 490, 1170, 2800 Hz. Mic gain, on/off/bypass switch. "On" LED. 7x2x6 inches. 9 V battery, 12 VDC or 110 VAC with adapter, MFJ-1312, $9.95.

MFJ ANTENNA BRIDGE

MFJ-204
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Trim your antenna for optimum performance quickly and easily. Read antenna resistance up to 500 ohms. Covers all ham bands below 30 MHz. Measure resonant frequency of antenna. Easy to use, connect antenna, set frequency, adjust bridge for meter null and read antenna resistance. Has frequency counter jack. Use as signal generator. Portable, self-contained. 4x2x2 in. 9 V battery or 110 VAC with adapter, MFJ-1312, $9.95.

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MFJ's Portable Antenna lets you operate 40, 30, 20, 15, 10 meters from apartments, motels, camp sites, vacation spots, nearly any electrically clear location where space for a full size antenna is a problem.

A telescoping whip (extends to 54 in.) is mounted on self-standing 5½x6¾x2¼ inch Phenolic case. Built-in antenna tuner, field strenght meter, 50 feet RG-58 coax. Complete multi-band portable antenna system that you can use nearly anywhere. Up to 300 watts PEP.

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Huge 5/8 inch bold black LCD numerals make these two 24 Hour clocks a must for your shack. Choose from a dual clock that features seperate UTC and local time display or a single clock that displays 24 Hour time. **Mounted in a brushed aluminum frame,** these clocks feature huge 5/8 inch LCD numerals and a sloped face for across the room viewing. Easy set month, day, hour, minute and second function. Clocks can be operated in an alternating time-date display mode. MFJ-108, 4½x1x2 inches; MFJ-107, 2¼x1x2 inches. Battery included.

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CIRCLE 59 ON READER SERVICE CARD

Awards

a monthly feature by
DOROTHY H. JOHNSON, WB9RCY

NEWS OF CERTIFICATE AND AWARD COLLECTING

The story of the month as told by Jim is:

James Grandinetti, KZ2P
All Counties #482, 8-25-84

"Although my interest in amateur radio dates back to the early 1950s, I did not finally get my license until 1977. I was forced to temporarily abandon my license studies due to the demands associated with both my educational pursuits and my vocation.

"I received a B.A. in Economics from Rutgers University in 1964 and an M.A. in Economics and Finance from Fairleigh Dickinson University in 1969. Upon graduating from Rutgers, I started working for the People's National Bank in Lakewood as a teller. After several years, I assumed the duties of President and Chief Executive Officer of the bank. I held this position until we sold the organization in December 1982. To facilitate an orderly transition, I agreed to remain with the new bank for a short period of time. Once the transition is completed, I hope to have more time to pursue my hobbies—amateur radio and golf.

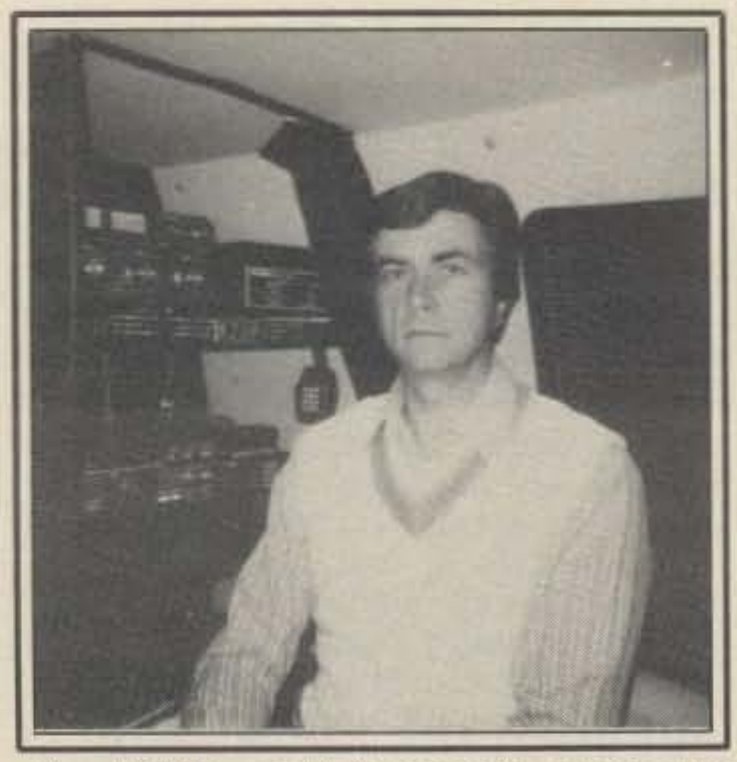
"Along with various civic and charitable organizations that I am associated with, my 'idle' time is presently occupied by my serving as a director and past president of the Ocean County Bankers Association and my duties in the local volunteer fire company. I am also a past president and past captain of the Lakewood Hook and Ladder Fire Company. Being a member of the fire company has its advantages; that 75 foot ladder truck has seen many hours of antenna installation duty.

"My involvement in county hunting began in 1979. As time permitted, I became more and more involved in net activities. Although, as I have indicated, being an active volunteer fireman has its advantages, there were times when the alarm created a problem with my acting as a net control or an assistant net control.

"When I first began collecting counties, I only planned to qualify for the basic award and then to return to DXing. This less than enthusiastic attitude soon developed into an obsession, and I devoted more and more time to listening and participating in the net. Although it was quite a relief to finally work the last one—Stephens County, Georgia—I have already begun to miss the anticipation of

333 South Lincoln Ave., Mundelein, IL 60060

James Grandinetti, KZ2P, All Counties #481.



Jim, KZ2P, and his "mobile station" in the Chevrolet van.

working new counties. It looks like I will be back on 14.336 for my second time around.

"Along with the USA-CA Awards Program, I also have qualified for 5-Band WAS, 5-Band WAC, DXCC with 298 countries confirmed (10 countries needed for 5-band DXCC), and WAZ.

"Both my wife, Patricia, and my daughter, Christine, have given me invaluable support in my amateur radio endeavors. Pat and Christine have helped me in erecting antennas as well as in logging and listening for new contacts and counties. Christine has enrolled in a Novice class, and she should have her license within the next couple of months.

"I want to give special recognition and thanks to Hank Kahrs, K2UVG, for the extra effort and the trip to get me my last county. It is this kind of camaraderie that makes amateur radio and County Hunting the very special hobby that it is. 73's to all, and see you on the bands.—Jim, KZ2P."

Special Honor Roll
All Counties
#491 David B. Popkin, W2CC, 1-23-85

USA-CA Honor Roll

2000		1000		500	
HH2WL	636	KC7JC	869	WB4VQO	1998
		HH2WL	870	KC7JC	1999
1500		JA2VUP	871	HH2WL	2000
HH2WL	705			JA2VUP	2001
JA8ZO	706				

Awards Issued

David B. Popkin, W2CC, finished his last few counties and claimed All Counties #491, 1-23-85, Mixed.

Larry Wilson, HH2WL, sent for USA-CA 500 #2000, All 20 M/M/SSB, USA-CA 1000 #870, All 20 M/M/SSB, USA-CA 1500 #705, All 20 M/M/SSB, and USA-CA 2000 #636, Mixed, 1-12-85, all #1 to Haiti.

Sadatoshi Shishido, JA8ZO, continues to increase his count and sent for USA-CA 1500 #706, 1-12-85, Mixed.

Osamu Uchida, JA2VUP, won USA-CA 500 #2001, Mixed, and USA-CA 1000 #871, Mixed, 1-14-85.

Joel Dennis, KS3F, added another endorsement to his USA-CA 500 certificate—All SSB, 12-24-84.

USA-CA 500 certificates went to:

Myron C. Crofoot, WB4VQO, #1998, All SSB, 1-8-85.

Douglas J. Rider, KC7JC, #1999, All 20 M, 1-10-85.

Larry Wilson, HH2WL, #2000, All 20 M/M/SSB, 1-12-85.

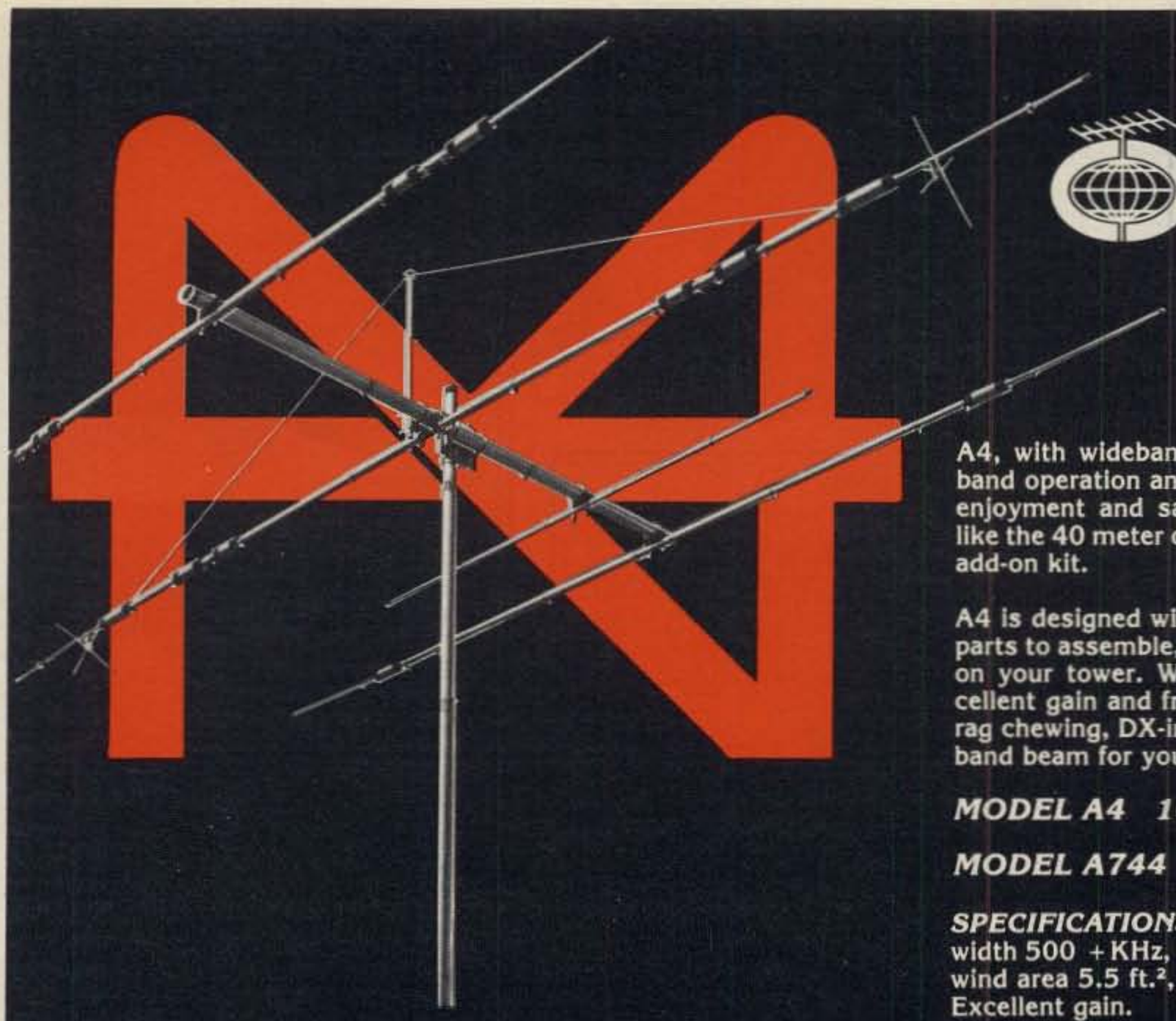
Osamu Uchida, JA2VUP, #2001, Mixed, 1-14-85.

Awards Available

The Gdynia Award. This award is available to any licensed amateur and SWL who can prove contacts with stations from Gdynia City in Poland. Contacts must be dated after February 10, 1976. The following points are required: European stations 6 points; stations outside Europe 3 points. Any band or mode may be used. The cost is 10 IRC's.

Contacts with the following stations count for 2 points: SP2PGU/mm—S/Y Dar Pomorza or S/Y Dar Mlodziezy; SP2ZFK/mm—S/Y Zawisza Czarny; SP2ZCD—Scout club. Any special stations which worked in Gdynia such as: SP0ZCD—Working Sea Days; SP2ZCD

A4



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MODEL A744 40 METER ADD ON KIT

SPECIFICATIONS F/B ratio 25 dB, SWR 1.2-1 bandwidth 500 +KHz, boom 18 ft., longest element 32 ft., wind area 5.5 ft.², turn radius 18.4 ft., weight 37 lbs. Excellent gain.

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More contacts, less interference and a better signal at the receiving end are yours with this 2 element 40 meter Skywalker Yagi. The computer design maximizes gain and reduces side lobes. The design also gives low SWR with excellent bandwidth.

Holder of the North American contact record. This compact two element antenna has quickly become "the most wanted" 40 meter beam. Make it your first choice.

MODEL 40-2CD 40 METERS

SPECIFICATIONS F/B ratio 20 dB, boom 23 ft., longest element 42 ft., beamwidth 70°, 1.5-1 bandwidth 180 KHz, turn radius 24 ft., windload 6.3 ft.², 1.5-1 bandwidth 180 KHz, turn radius 24 ft., windload 6.3 ft.², weight 40.7 lbs. Excellent gain.

P.O. BOX 4680 48 PERIMETER ROAD
MANCHESTER, NH 03108 USA/603-627-7877
TELEX 953-059 CUSHSIG MAN

Barbara, SP2FF, busy at her station in Gdynia, Poland.

The Gdynia Award, offered by radio amateurs in Gdynia, Poland.

—Working in Young People Palace; and SP2WCY—Worked in 1983. All other stations are given 1 point.

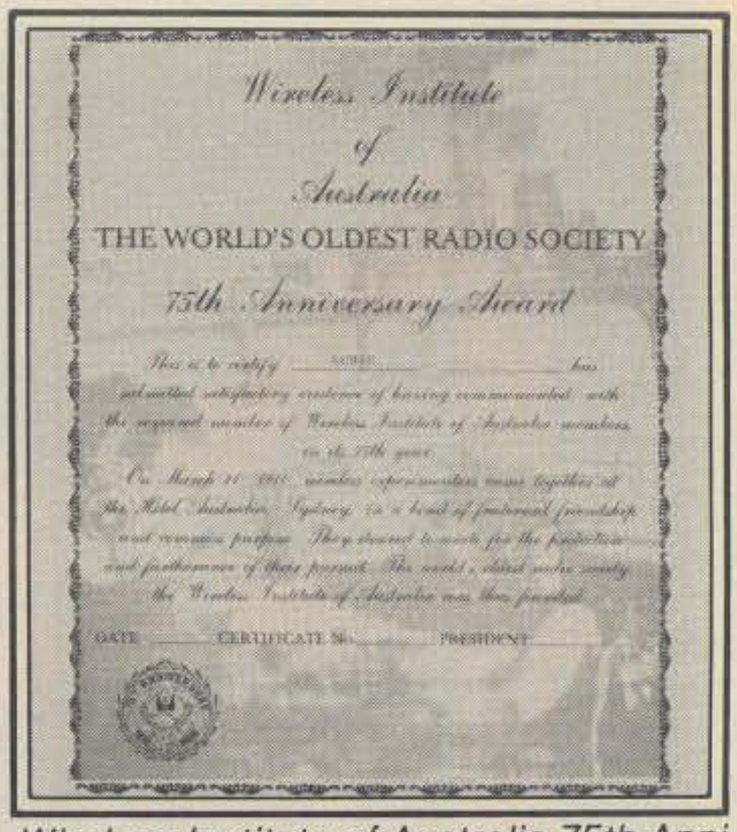
Do not send QSL's. Applications should be sent to Andrzej Ulatawski, SP2UU, P.O. Box 253, PL 81-963, Gdynia 1, Poland, Europe.

Stations QRV after April 1983: SP2ADY, AX, DVH, FF, FUA, GAJ, GCE, GRC, HFL, IQT, JGK, JGZ, LLY, MHB, MHN, RQ, UU, UUU, WI, ZT. Stations QRV before December 1981: SP2AVE, AWB, BF, BLW, BAD, DFK, EFG, FLU, FNR, FOG, FPM, FVK, GOV, GNB, GOF, GSF, HEA, HTI, HJN, ISU, IST, IQW, JGJ, JHA, JKL, LOA, WA, WB, SP2KDS, KFF, KIS, ZCE, plus stations mentioned as QRV after April 1983.

WASM—60. This award is offered by Sveriges Sandareamatorer (SSA) to celebrate its 60th anniversary in 1985. The award is available to all licensed radio amateurs and SWLs. All contacts between 1985-01-01 and 1985-12-31 are valid.

Requirements are as follows. HF: European applicants should work one station in each of the 25 Swedish lan (counties). Non-European applicants should work one station in each of the eight Swedish call areas (SK/SL/SM: 1, 2, 3, 4, 5, 6, 7, 8, 9, 0). VHF: Applicants should work one station in each of the eight Swedish call areas. Contacts via satellite are valid, but not contacts via active repeaters. Endorsements are available for single band and single mode. Special Event stations count as Jokers, and each one may replace one missing lan or call area.

The award is free of charge. Verified log entry should be sent to WASM-60 Award Manager, Bengt Hogkvist, SM6DEC, Blabarstigen 11B, S-546 00 Karlsborg, Sweden.

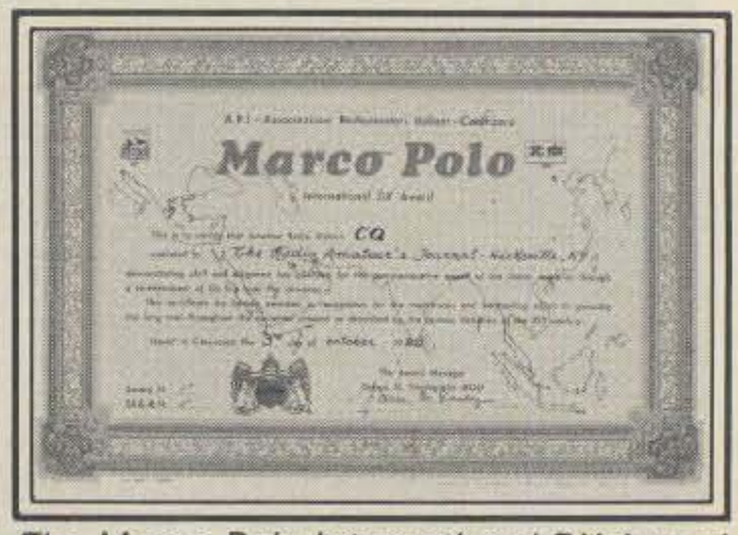


Wireless Institute of Australia 75th Anniversary Award.

Swedish lan (counties): Lan A (SM0, SM5), B (SM0, SM5), C (SM5), D (SM5), E (SM5), F (SM7), G (SM7), H (SM7), I (SM1), K (SM7), L (SM7), M (SM7), N (SM6), O (SM6), P (SM6), R (SM6), S (SM4), T (SM4), U (SM5), W (SM4), X (SM3), Y (SM3), Z (SM3), AC (SM2), BD (SM2).

WIA 75 Award. The world's first and oldest radio society, the Wireless Institute of Australia, celebrates its 75th anniversary during 1985. One of the many planned activities is the WIA 75 Award, which will be available during the period March 1 to December 31, 1985. To qualify, radio amateurs (and shortwave listeners) need to contact (log) 75 members of the Wireless Institute of Australia. A contact will only be valid if the WIA member's individual membership number is logged. No more than 30 WIA members may be logged in any one callsign area.

Claims should include a log extract of the WIA members contacted, $2 (Aust.) or equivalent, to cover certificate, and handling, and postage costs, and should be sent to WIA 75 Award Manager, Wireless Institute of Australia, 412 Brunswick Street, Fitzroy, 3065, Victoria, Australia.



The Marco Polo International DX Award.

Marco Polo DX Award. This award is available to any OM/SWL of an IARU chapter. The contacts must be established with countries described by the Venetian explorer Marco Polo in the book *Il Milione (The Million)*, as listed below. All modes

Awards Manager for the Marco Polo DX Award, John, I8QLI, in Catanzaro, Italy.

are valid, except cross-band. Only one QSO will be considered for each country; the operations must be valid for DXCC, in accordance with the rules of ARRL. Various scores are attributed to different countries, in order to remark the skill or the interest; countries referred to the same geographical area are scored only once (see list). Contacts are valid starting from January 1, 1978.

The award is issued in five classes:

1. Base award, at least 60 points—3-color diploma.

2. Silver award, at least 80 points—3-color diploma and shield.

3. Gold award, at least 95 points—3-color diploma and shield.

4. Honor roll, at least 110 points—3-color diploma and medal.

5. Top honor roll, at least 125 points—3-color diploma and medal, cockade.

Endorsements are available each year for class endorsement.

QSO listed with band, mode, date, GMT, and signed by at least two amateurs who are members of DXCC or WAZ must be sent to Award Manager I8QLI, Gianni Verdegiglio, P.O. Box 19, 88100 Catanzaro, Italy. QSL front/back photocopies are accepted in substitution for signatures; however, a list MUST be provided.

The cost of each class of diploma is $5.00 US ($4 plus $1 mail coverage). Any endorsement must be accompanied by a new general list, number of diploma, and $1 plus SAE. The award manager may request original material or photocopies to confirm validity. Alterations, false declarations, or other irregular operations will be considered cause for disqualification.

Inquiries should be addressed to ARI, Council of Chapter, Box 200, 88100 Catazaro, Italy. No other judgment will be considered.

(*Note:* This award was started January 1, 1984. Up to this date it is shown in the shacks of more than 100 DXers in 16 countries. Those in the U.S.A. who have qualified for the award are: WB4UED/131 points, W7ULC/129, WA3HUP/148, WB3CQN/151, N3KR/87 CW, NE4R/143.)

Notes

A reminder: If you want information to appear in this column, it is necessary to send it to me at least 10 weeks before you want it published.

After an unusually severe winter, May brings springtime, finally, to northern Illinois. I hope things are going well where you are.

73, Dorothy, WB9RCY

List of Countries For Marco Polo Award

Area or Countries	Prefixes	Points
Central Greece	SV4	4
Kuangtung	CH9 or VS6	6
Israel	4X, 4Z	1
South Korea	HL	2
Syria	YK	4
Japan	JA	1
Iraq	YI	4
Malaya	9M2 or 9V1	5
Iran	EP	4
Bay of Bengal	XZ or S2	10
Turkey	TA	3
Siam Gulf	HS or XU	5
Armenia	UG6	3
Tibet & Himalaya	9N or A51	10
Azerbaijan	UD6	1
India (less Gujarat)	VU	2
Georgia	UF6	1
Gujarat (West India)	VU	8
Turkoman	UH8	2
Sri Lanka	4S7	2
Uzbekh	UI8	2
Sumatra	YB4, 5, 6	2
Tadzhik	UJ8	2
Borneo	YB7, VS5 or 9M6, 8	6
Kirghiz	UM8	3
Java	YB0, 1, 2, 3	2
Alma Ata, obl. 018	UL7G-	3
Yemen area	4W or 70	8
Mongolia	JT	7
Oman	A4X	3
China	BY	15
Persian Gulf	A6, A7, A9, 9K or HZ	4
Taiwan	BV	10
Ethiopia	ET	10
Djibouti	J2	2
Somalia	T5, 60	7
Masai	5H3 or 5Z4	3
Zanzibar, Pemba	5H1	7
Madagascar	5R	8

Antennas & Accessories

a monthly feature by
KARL T. THURBER, JR., W8FX

A LOOK AT THE SHACK FROM BOTH ENDS OF THE COAX

Antennas: From the Notebook—Part II

For the past year or so, W8FX has done some peripatetic wandering off the beaten path of antennas. Mainly he has followed his developing interest in computers and available software to other areas that have helped satisfy an inate curiosity in our world of amateur radio. Rather than miss out on the benefit of Karl's expertise and enthusiasm, we intend to capitalize on it by broadening the scope of his column. We'll be changing the name of his column (with this issue) to Antennas and Accessories *to encompass more editorial material of interest to all of us.*

This month columnist W8FX presents another set of antenna jottings from the notebook. Featured this time is an interesting discussion of power concepts and relationships, as well as a look at some important computer software applications. —K2EEK

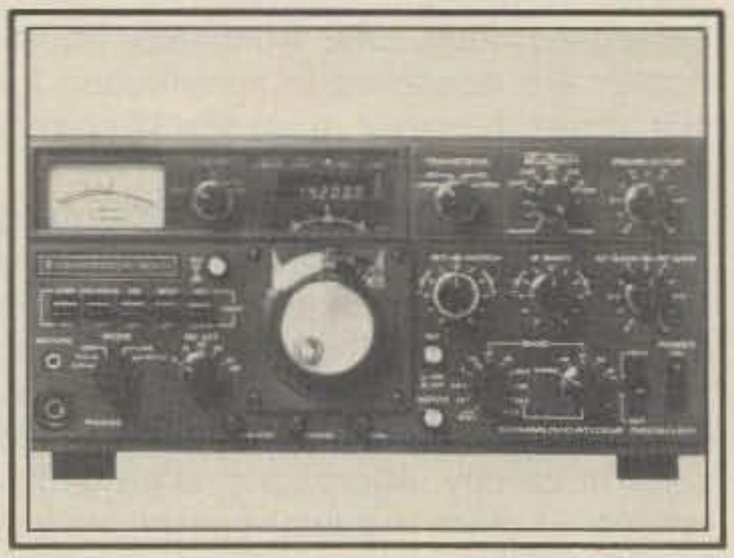
Last time we got together we opened the notebook for a discussion of several antenna-based topics. We examined the merits of another cheap-and-easy multiband antenna, the centerfed Zepp. We looked at three popular types of HF verticals, and we dug into the mailbag after reviewing our software notes on several new hamshack products.

This time we'll examine some important points concerning hamshack power relationships. Following that, we'll highlight some interesting antenna-related products, and again dig into the mailbag. Not to worry—we'll open up for some software notes before closing down the column for the month, highlighting WA9GFR's Smith Chart computer program, described in another publication. Let's begin with power and S-units.

Power and S-Units

Is a dime spent on the antenna worth a dollar spent on the transmitter? This is a good question, and many antenna enthusiasts (not to mention manufacturers) would reply with a most resounding "yes," at least from a "signal effectiveness per dollar" standpoint. While the radio may not be quite dimes to dollars, there is considerable merit in focusing first and foremost on the antenna installation—where the "signal meets the ether," so to speak.

317 Poplar Drive, Millbrook, AL 36054



S-unit confusion is underscored by different manufacturers' approaches to the calibration of their receivers' "signal strength" meters. This venerable R-820 receiver, for example, would appear to be calibrated in dB and microvolts. (Photo courtesy Kenwood)

What really counts, of course, is Effective Radiated Power (ERP). From a practical standpoint, the elements of ERP that one should be concerned with in maximizing effectiveness are, primarily, transmitter output power, type of transmission line (with its related loss characteristic), transmission line length, and antenna specifications (particularly the gain figure). However, the fact is that receiver sensitivity and noise figure, station location, mode of operation, receiving antenna used, and other factors also all affect net over-the-air results. On HF it's often a "guessing game" to decide how important each factor is. However, on the higher bands (VHF and UHF), with their essentially line-of-sight characteristics, it is much easier to predict the results of increasing power, raising the antenna, changing transmission line, etc.

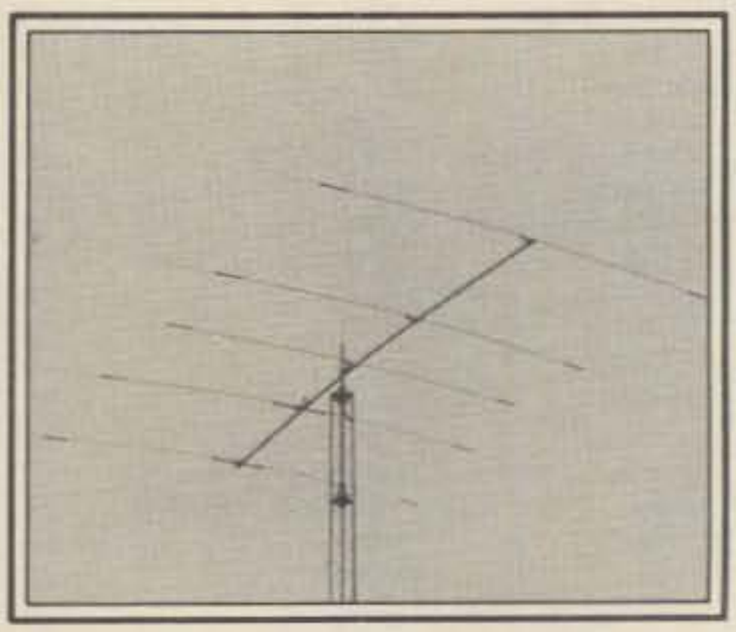
Focusing our attention on HF operation, high power is not necessary for successful operation; naturally, it's helpful when conditions are poor and competition is stiff. When signals are down near the noise level, doubling power (which gives you 3 dB, or half an S-unit) of signal strength can make the difference between no contact and a successful one. But when signals are strong, a power increase of, say, 10 times (10 dB) may be of little significance if QRM and conditions aren't factors.

How to radiate the best signal per dollar? Assuming you start with a moderate power level (say 100 watts, a typical "barefoot" output level for most present-day HF transceivers), it's probably more effective, from a dollar cost standpoint, to obtain those first extra dBs by careful consideration of transmission line loss and antenna type and placement. It's hardly worth the effort to increase transmitter power unless you at least double the power output, meaning that you now need an RF power amplifier, for starters. On the other hand, the "first increment" of antenna gain is usually achieved via the installation of a moderate-size rotary beam, where a typical 3-element array may yield a power gain of 8 dB, or a 6.25 times increase in power. This six-fold increase in station power is usually achieved at much less cost via the antenna than by adding a linear amplifier.

In assessing the results of your "dB quest," keep in mind a few things: (1) whenever you double the power ratio, you add 3 dB on the decibel scale (6 dB if you're working in terms of voltage); and (2) each 10 dB represents a power-of-ten change in the power ratio—stated another way, for each zero in the power ratio add 10 dB. This calculation shortcut is sometimes known as the "rule of ten."

To see how all of this meshes, take a look at the decibel relationships shown in Table I. For simplicity, the values in the chart have been rounded off and some values deleted when "odd" ratios would show up. Using this chart you can mentally visualize dB signal changes rather than manually work out the exact mathematical relationships involved.

You may be convinced that for a given



HF beam antennas of 4 or 5 elements may offer gains of 10 dB or more, referenced against the ordinary dipole. From Table I we can see that such a dB gain represents a power ratio of 10:1 (the "rule of 10"). Thus, if your final amp sports a 1 kw output, using such a beam would be roughly equivalent to boosting your output to 10 kw. (Photo courtesy TET Antenna Systems)

dB Power	Ratio	dB Voltage
1	1.25	2
2	1.56	4
3	2.0	6
4	2.5	8
5	3.125	10
6	4.0	12
7	5.0	14
8	6.25	16
9	8.0	18
10	10.0	20
11	12.5	22
12	16	24
13	20	26
14	25	28
15	32	30
16	40	32
17	50	34
18	63	36
19	80	38
20	100	40
21	125	42
22	156	44
24	250	48
25	312	50
27	500	54
28	625	56
30	1,000	60
31	1,250	62
33	2,000	66
34	2,500	68
35	3,125	70
36	4,000	72
37	5,000	74
38	6,250	76
39	8,000	78
40	10,000	80
41	12,500	82
44	25,000	88
47	50,000	94
50	100,000	100

Table I– The chart above depicts important dB relationships. For convenience, some vaiues have been rounded off, and other values deleted when "odd" ratios would show up. You can use the chart to visualize dB signal changes rather than to work out the actual mathematical relationships.

dollar budget, expenditure first on the antenna is warranted. Some amateurs are so convinced that they would, perhaps, increase the dimes-to-dollars ratio to something like pennies-to-dollars; these are the QRP (low power) enthusiasts, who favor operation using extremely low power levels, often under 5 watts. Skillful operating techniques have proven that high power is not an absolute necessity to "work the world," and QRPers have confirmed DXCC using 5 watts or less.

Mathematically, what does low power mean in terms of received signal strength, when compared with higher power operation? Table II gives us some clues. A glance at the chart shows, for example, that if you assume that a 100 watt output signal is received at a given location as an S-9 signal, and all other factors are held constant, lowering the output power to but 100 milliwatts still produces an S-4 signal on the receiving end! Note, too, the converse, when high power (QRO) is employed, as shown in the chart.

Naturally, actual results depend on many factors, and your receiver S-meter's calibration accuracy may be akin to that of a "rubber ruler." But next time you receive a particularly good signal report, try reducing power from, say, 300 watts to 75 watts, or from 100 watts to 1 watt, to see how you stack up on the other end. You may be quite pleasantly surprised by the results of this check!

Product Scan

In the May 1984 column we described the "DX Edge," a slide-rule-like DXers' aid. As you recall, the operating aid is used to determine quickly those areas of the world that are in darkness, and those which are in daylight. It is also possible to determine sunrise and sunset times throughout the world, the location of the so-called "gray line" propagation indicator, and local times worldwide.

However, one important "output," if you would, was missing: beam heading. That has been fixed now with an add-on great-circle slide. The new slide, used in conjunction with the "DX Edge," allows you to determine beam (great circle) headings to any location in the world, and it also shows the beam heading to use to point an antenna along the "gray line" (itself a great circle).

According to information received from Tony Japha, N2UN, of Xantek, Inc., the manufacturer, slides are available for 60, 50, 40, 30, 20, and 10 degrees north/south latitudes; the slide for the latitude nearest your station should be purchased. Using one of these six slides, your QTH will not be more than 5 degrees away from the location for which the slide was made, unless you are located north or south of 65 degrees.

Each of the 6 slides shows 16 true, computer-generated great circles spaced every 22.5 degrees. Both short and long path are shown. The great-circle slides may be used at southern latitudes, but the printed headings on the slides must be changed by the user.

For more information, contact Xantek, Inc., P.O. Box 834, Madison Square Station, New York, NY 10159.

Signal Strength (S-units)	Transmitter power
S1	1.56 milliwatts
S2	6.25 milliwatts
S3	25.00 milliwatts
S4	100.00 milliwatts
S5	390.00 milliwatts
S6	1.56 watts
S7	6.25 watts
S8	25.00 watts
S9	100.00 watts
S9 + 6 dB	400.00 watts
S9 + 12 dB	1600.00 watts
S9 + 18 dB	6400.00 watts
S9 + 24 dB	25600.00 watts
S9 + 30 dB	102.40 kilowatts
S9 + 36 dB	409.60 kilowatts
S9 + 42 dB	1638.40 kilowatts

Table II– The relationship among dBs, power, and s-units. Having examined the dB relationships of Table I, and knowing that a one S-unit change in received signal strength equates to a 6 dB (four times) change in power, we can see what happens if we raise or lower our power by various amounts. If our baseline 100 watt signal is received S9, we see that varying our output power results in these signal levels, all other factors remaining the same. (Some of the transmitter power figures are rounded off for convenience.)

Add a linear amplifier or go for a larger, higher gain antenna? The choice is yours, but be sure you understand the dB relationships involved in either selection. Use the chart in Table I to help you visualize these relationships. (Photo courtesy Yaesu Electronics Corp.)

From Jack Sobel, W0SVM, comes news of a small-size, limited space 40 meter dipole, the "Shorty-Forty™ " This is a 38 foot long dipole, just a bit longer than one-half the length of a full-size antenna for that band. At the heart of the antenna is a hi-Q, air-wound center loading coil which enables the antenna to resonate as a 40 meter half-wavelength dipole. The antenna may be fed directly by 50–75 ohm coaxial without using an antenna tuner, or it may be fed using openwire line with a tuner. Exact frequency of resonance (7.000 to 7.400 MHz amateur or MARS) may be specified when ordering.

Not a kit, the $34.95 antenna is furnished ready to use and is constructed of #12 AWG copper wire. A feedline cable clamp is provided, but the feedline is user-supplied. A half-size 80 meter dipole is also in the works. For more details, contact Jack at SVM Electronics, 64 Burning Tree, Chesterfield, MO 63017.

Reader Notes

Occasionally we receive reader correspondence that does not precisely fit in with the primary antenna-related orientation of the column. Often the correspondence relates to computers and software, and the column nevertheless seems to be a good place to share a particular item with readers. Such is the nature of correspondence we received from Mel

```
0 REM  "TRANSFER P-S"
5 :
10 OPEN8,8,8,"@0:TEST FILE,S,W"
20 PRINT"ENTER PROGRAM NAME"
30 INPUT NM$
40 IF LEN(NM$)>16 GOTO20
50 NM$=NM$+",P,R"
60 OPEN7,8,7,NM$
70 PRINT"<CLR>"
80 PRINT"<HOM><DWN><LFT><LFT><LFT><LFT><LFT><LFT>
   <LFT><LFT><LFT><LFT><LFT><LFT><LFT><LFT>**********"
90 PRINT"<HOM><DWN><DWN><LFT><LFT><LFT><LFT><LFT>
   <LFT><LFT><LFT><LFT><LFT><LFT><LFT><LFT>* CHR
   CT *"
100 PRINT"<HOM><DWN><DWN><DWN><LFT><LFT><LFT><LFT>
   <LFT><LFT><LFT><LFT><LFT><LFT><LFT><LFT><LFT>*
          *"
110 PRINT"<HOM><DWN><DWN><DWN><DWN><LFT><LFT><LFT>
   <LFT><LFT><LFT><LFT><LFT><LFT><LFT><LFT><LFT><LFT>
   **********"
120 GET#7,A$:SS=ST
130 IF A$=""THENA$=CHR$(0)
140 PRINT#8,A$;
150 PRINT"<HOM><DWN><DWN><DWN><LFT><LFT><LFT><LFT>
   <LFT><LFT><LFT><LFT><LFT><LFT><LFT><LFT><LFT><LFT>
   <LFT>":X:X=X+1
160 IF SS=0 GOTO120
170 CLOSE7:CLOSE8

READY.
```

Fig. 1–Transfer P-S utility program. Submitted by WB7PGA, this program is used to convert program files to sequential files for over-the-air transmission. Note that the Commodore graphics and cursor control keys have been "translated" in the listing above, for clarity. For example, "HOM" is the home key, and "LFT" is the cursor-left key.

```
0 REM  "TRANSFER S-P"
5.:
10 OPEN8,8,8,"TEST FILE,S,R"
20 PRINT"ENTER PROGRAM NAME"
30 INPUT NM$
40 IF LEN(NM$)>16 GOTO20
50 NM$=NM$+",P,W"
60 OPEN7,8,7,NM$
70 PRINT"<CLR>"
80 PRINT"<HOM><DWN><LFT><LFT><LFT><LFT><LFT><LFT>
   <LFT><LFT><LFT><LFT><LFT><LFT><LFT><LFT>**********"
90 PRINT"<HOM><DWN><DWN><LFT><LFT><LFT><LFT><LFT>
   <LFT><LFT><LFT><LFT><LFT><LFT><LFT><LFT>* CHR
   CT *"
100 PRINT"<HOM><DWN><DWN><DWN><LFT><LFT><LFT><LFT>
   <LFT><LFT><LFT><LFT><LFT><LFT><LFT><LFT><LFT>*
          *"
110 PRINT"<HOM><DWN><DWN><DWN><DWN><LFT><LFT><LFT>
   <LFT><LFT><LFT><LFT><LFT><LFT><LFT><LFT><LFT><LFT>
   **********"
120 GET#8,A$:SS=ST
130 IF A$=""THENA$=CHR$(0)
140 PRINT#7,A$;
150 PRINT"<HOM><DWN><DWN><DWN><LFT><LFT><LFT><LFT>
   <LFT><LFT><LFT><LFT><LFT><LFT><LFT><LFT><LFT><LFT>
   <LFT>":X:X=X+1
160 IF SS=0 GOTO120
170 CLOSE7:CLOSE8

READY.
```

Fig. 2– Transfer S-P utility program. WB7PGA's utility program, shown above, complements the program shown in fig. 1. This program converts sequential files back into usable program files. Note that the Commodore graphics and cursor control keys have been translated in this listing, also. See the text of this column for a description of how to use these two programs.

Cook, WB7PGA. Combining two of Mel's letters here, he wrote:

"I have been following your articles and others that have been presented in *CQ* for the Commodore 64. Robert Peterson and I have developed a program you might be interest in sharing with your readers .... The program is actually two separate programs that will change a program file to a sequential file, which can be sent to another ham via RTTY, AMTOR, ASCII, etc., then change it back to a program file. We have done this quite successfully in our area via VHF. Of course, HF is subject to interference unless you're using AMTOR.

"First, the program 'Trans P-S' must be LOADed and RUN *[see fig. 1]*. As it starts, it will ask for a program name. Type in the name of the program that you want changed to a sequential file. The screen will go blank and the characters will start counting. When the numbers stop, the program will be SAVEd to your disk as 'Test File' and will be a sequential file. This 'Test File' can now be called up and sent via radio by following the directions on your communications software program.

"If you are testing these programs, the next stop is to LOAD and RUN the program 'Trans S-P' *[see fig. 2]*. As the program starts, it will ask for a program name. At this point you could type in your own name, or you could type in something else. It makes no difference as long as the file name is not already on the disk. If you use the original name, your disk will say that it already has that program and will quit running, with the red error light blinking.

"If you are the receiving station, it is very important that you save the program as 'Test File,' as the program is looking for this file name to read. When it asks for a program name, follow the directions in the above paragraph and type in your name *[or another unused file name—ed.]*. The numbers will begin rolling, and when they stop the program will be on your disk (with the file name you just gave it), and it will once again be a usable program file. This can now be LOADed and SAVEd to another disk under the original file name."

Mel adds that in both programs lines 80–110 are just "window dressing" and are not really needed. The Commodore graphics (which may not be readily apparent in the two program listings) are as follows on the indicated lines of both programs:

80 Home; 1 cursor down; 13 cursor lefts
90 Home; 2 cursor downs; 13 cursor lefts
100 Home; 3 cursor downs; 13 cursor lefts
110 Home; 4 cursor downs; 13 cursor lefts
150 Home; 3 cursor downs; 15 cursor lefts

While WB7PGA's utility programs have nothing to do with antennas, their ability to convert between program and sequential files has widespread application—not just in sending and receiving programs over the air.

In last September's column we described Bearcat's new CompuScan™ 2100 scanner radio. This scanner was intended to "marry" the personal computer with the scanner to add a good deal of flexibility and sophistication to VHF/UHF monitoring. The new Bearcat was designed to be used at first with the Commodore 64, but other PCs are planned for interfacing.

An interesting series of correspondence ensued with one reader regarding the 2100. He had earlier bought a Commodore 64, and when he saw the ads for the new Bearcat, he ordered the 2100 from a dealer. What he received was the basic radio, an antenna cable, power supply, connectors, etc., but no clues as to how to hook the 2100 to the C-64.

As it turns out, a $50 Bearcat/64 interface kit, which includes software and cabling unique to the C-64, is required to complete the package. This fact apparently didn't surface very well when ordering the unit. However, after we pointed out to the reader what was required for proper interfacing, and after more correspondence with the dealer, he was able to successfully hook up the scanner to his computer.

The moral: Read the fine print, especially when dealing with devices that attempt to marry your computer to your radio gear. Ask yourself, is the device really designed for my computer, is it complete, and does it include all necessary connectors, cables, and software/hardware? If I hook up the device to my computer, is my micro now "captive" to the amateur rig, or may I conveniently run other (non-amateur) applications on the computer? And are the add-ons likely to overload or damage the computer in any way?

Shifting gears now, just a couple of months ago we took note of the G5RV, a multiband HF antenna which is increasing in popularity. The G5RV is a 102 foot flattop fed in the center with a pre-cut length of twinlead or openwire line. As such, it operates much like a shortened dipole on 75 and 80 meters, and as a sort of extended centerfed Zepp on 40–10.

Earlier we had sent Bill Cunningham, W4SSV, the construction details outlined in our column. He chose to construct the version that uses a length of coax from the rig to a connector plate, which in turn feeds a length of openwire line to the antenna flattop. Bill used 34 feet of 450 ohm ladder line to feed the flattop. He made the center connector plate of a clear plastic material and installed a female coax fitting on it. The RG-8 coax line from the transmitter to the connector plate is about 180 feet, required because the antenna is out in the woods, far from the shack. Bill reports excellent results and feeding characteristics, especially on 40 meters.

Bill further inquired as to whether a similar, but longer, antenna could be used to cover 160 meters, as he prefers not having openwire line coming into the hamshack.

Perhaps, but when used on 160, the G5RV is usually fed as a top-loaded vertical against ground, tying the ends of the openwire line (or coax, if used) together and treating the antenna as a singlewire. This requires the use of an antenna tuner, and may result in unwanted "RF in the hamshack" problems.

If, however, one favors 160 and would like a better arrangement on that band, along with some opportunity to work on higher bands, a solution may lie in a 160 meter Windom. Most Windoms are designed with 80 meters as the lowest band to be used, but there is no reason why you could not cut one for 160. This antenna would have a flattop length of about 250 feet, depending on where in the band you wanted to operate, fed about 81 feet in from one end with a parallel feedline (openwire line or transmitting-type twinlead). The parallel line feeder may be of any convenient length. Where the line enters the house, or at a point closer to the antenna, you could use a 4:1 or 6:1 balun for a coax run the rest of the way. This would keep the parallel feedline out of the house.

This antenna should be a good performer on even harmonics (80, 40, 20,

and 10 meters), though the harmonic relationships on the higher bands may not work out to just what you want, and you will likely have to put up with a less than ideal SWR on some bands. We would welcome reports of results using a 160 meter Windom.

Software Notes

An interesting engineering software catalog came our way not long ago. It's the BV Engineering "Software Catalog #3," and it describes dozens of technical programs of interest to the electronic engineer and technician. The programs are mostly written in a CP/M-80 format, and as such, support several dozen different computer systems including various Apples, Radio Shacks, Heaths, IBMs, etc.

Titles offered include programs for electronic circuit and DC network analysis, signal processing, and scientific graph printing, to name just a few. For information on these offerings, contact BV Engineering Professional Software, 200 Business Way, Suite 207, Riverside, CA 92501.

While I'm not sure that struggling with Smith Chart impedance matching represents anyone's favorite way to while away a lazy Sunday afternoon, our hats nevertheless are off to *Ham Radio* magazine for running a landmark Smith Chart number-crunching computer program for the Commodore 64.

For those readers not familiar with the Smith Chart, it's a special polar diagram used in the solution of a wide range of waveguide and transmission-line matching problems—problems that go to the heart of what's really happening at the antenna. Named after its inventor, Phillip H. Smith, his chart was first described in *Electronics* for January 1939. Although its appearance may seem formidable on first sight, it is really just a specialized form of graph with curved lines rather than more conventional rectangular lines. Details on using the Smith Chart are found in *The ARRL Antenna Handbook,* 14th edition, chapters 3 and 5.

The *H-R* article, "Smith Chart Impedance Matching on your Commodore 64," was by Lynn Gerig, WA9GFR, and it appeared in the October 1984 issue. His original program was for an HP9830, with a related article which appeared in the January 1982 *R. F. Design.* When Lynn bought his 64, he set out to convert the HP program, using an extended Commodore BASIC known as "Simons' Basic" (for efficient utilization of graphics commands), into a more user-friendly, menu-driven program.

In the meantime, friend and co-worker Jim Weigand, N9BW, converted the first program to his VIC-20 (without printer dump), and subsequently to his C-64 (with a dump to printer). This latter program is a non-Simons' BASIC version that is some 650 lines long; though quite lengthy, it does enable one who has a Commodore 64 but does not own the Simons' BASIC utility cartridge to use the program.

The C-64 Simons' BASIC version was the one published in the *H-R* article. Readers of the article may obtain already typed-in copies of the program listing, and the two other versions (VIC-20 and C-64 non-Simons' BASIC) are available from Lynn, too. As for the copy/handling fee, it's $5.00 for one version, $7.50 for two, or $10.00 for all three, on disk. For tapes, it's $5.00 per version, with separate tapes provided for each program. Contact Lynn Gerig, WA9GFR, RR #1, Morgan Road, Monroeville, IN 46773.

Lynn reiterates that he's doing the program copying as a service, and is not trying to get rich off of other amateurs by doing so. But it's too tiresome to get "postage due" disk and cassette mailers, no return postage, and requests for multiple program copies on too-short tapes, etc., to work on an SASE basis. We share these concerns. Almost every day we, too, receive letters from stateside and overseas with inquiries about material published in the column, often requesting whole *CQ* issues, multiple article reprints, complete antenna drawings, computer programs, and the like, often without an SASE. We do try to keep up with the mail, and generally we do, thereby keeping the backlog from becoming insurmountable. But please keep your requests within reason, include an SASE, and write directly to our home QTH (in preference to the magazine's New York editorial offices, which just have to forward your letter on to me).

Before we leave Smith Charts, for those who don't own a Commodore 64 but are nevertheless interested in computerized impedance matching, Crawford MacKeand, WA3ZKZ's article should be of interest. It is "The Smith Chart in BASIC," which appeared in the November 1984 *QST.* In his article he described MULTIVEC, written in a widely used BASIC dialect, Microsoft™ *MBASIC.* Though designed to use graphics routines available on the Heath H19, the program can be converted for other computers, as it is written in an essentially generic version of BASIC.

Wrap-Up

This time we have covered some "power points" of interest, taken a look at two interesting products, and again opened the reader mailbag. We've also reviewed our software notes, with special focus on Smith Chart antenna and feedline matching. Next month we will open the notebook again, with Part III of the series. See you then.

73, Karl, W8FX

World of Ideas

a monthly feature by
DAVE INGRAM, K4TWJ

A LOOK AT THE WORLD AROUND US

A Tour of the K5RW Key Collection/Museum

One of the special attractions of this "World of Ideas" column is our flexibility to move around and highlight various areas of interest to all. We strive to feature both new and old-time favorite pursuits while keeping technical discussions understandable, and we occasionally include some unique topic to exemplify the pleasurable returns of being a radio amateur. This freedom to cover a wide variety of interesting aspects is once again being utilized to bring you a special two-month treat: a mini tour of the continuously expanding K5RW key collection/museum. Both this and next month's column are full of exciting stories and key views, so settle back with a good shoulder light or pocket magnifier and enjoy a classic jaunt through the Golden Ages of Amateur Radio!

The K5RW collection is a privately owned museum of wire and wireless telegraph instruments. The collection presently consists of 240 pieces, including an assortment of spark, wireless, landline Morse, and submarine cable instruments. There are approximately 110 different semi-automatic keys or "bugs" in the museum, thus categorizing this superb collection as one of the largest in the world. The museum is maintained in Neal's home in Richardson, Texas. It can be seen by appointment, and visitors are always welcome for a personal tour. Thanks to tape recordings, Neal's patience, and the ever active camera of photographer Joe Veras, N4QB, however, we will enjoy a mini-tour of the K5RW collection via photos and printed words. Let's begin with some background on K5RW himself.

B. Neal McEwen is 39 years old, married, and a research computer programmer for an energy company in Texas. He has been a radio amateur for 25 years, irregularly chases DX (mainly on 20 CW), and has worked 303 countries. Neal was first "bug bitten" at age 14 by a Speed-X Model 515, which he purchased for $12. His fascination for keys grew, and a small collection of bugs soon began. As the collection grew, Neal's enthusiasm expanded, and a lifelong pursuit to perpetuate one of every manufactured key and bug was initiated.

Each key in the K5RW collection is displayed with an ID card that shows the date that key was made, the manufacturer and model number, the original owner, and any interesting historical notes. Some of the more interesting keys include a 1904 Vibroplex (first model), a Marconi key that uses ball bearings at the fulcrum, a rare Australian vertical broadside bug, a 50 amp spark key, an early model Omnigraph, and a Bunnell key that was used on the "pony wire" at the big RCA Rocky Point/Riverhead long-wave wireless station.

Other interesting pieces include several miniature "spy keys," a bug that makes automatic dashes as well as dots (the Melehan Valiant), a spark key sold by Sears and Roebuck in 1919, a Nazi "mouse" key, a homemade spark key that uses silver coins for the contacts, and a bug small enough to fit into your pocket (the "73 Ultimate"). The museum also contains a large collection of resource material pertaining to keys, manufacturers, and the people who used them. The largest assembly of information and memorabilia concerns Ted R. McElroy, the world's champion telegrapher and radiotelegrapher (McElroy's 1939 record of 77 words per minute remains unbeaten to this day). The McElroy keys, incidentally, were among the finest made, and even after 50 years many are still in service. Resource material is also being put together on the Martin, Vibroplex, and United Electric keys (the Martin-Vibroplex operation in Norcross, Georgia before WW I). A comprehensive list of major models has been compiled, and a list of pre-1926 wireless keys is continually being updated.

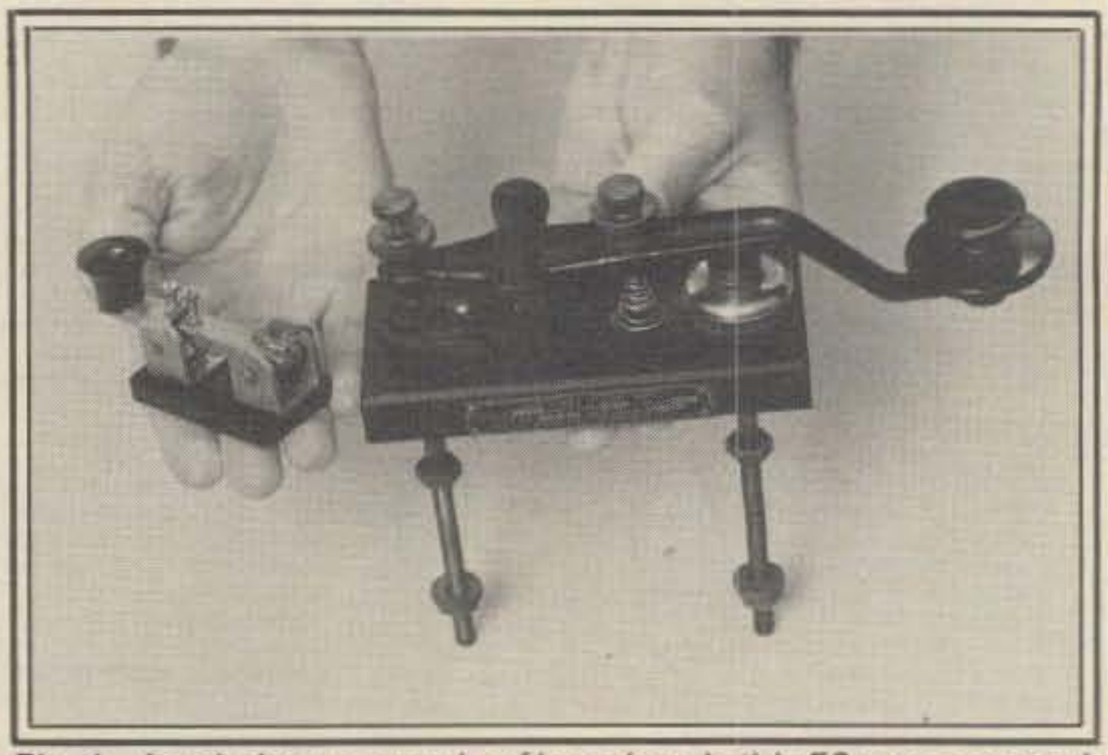


Fig. 1– An obvious example of key sizes is this 50 ampere spark key and miniature "Spy Key."

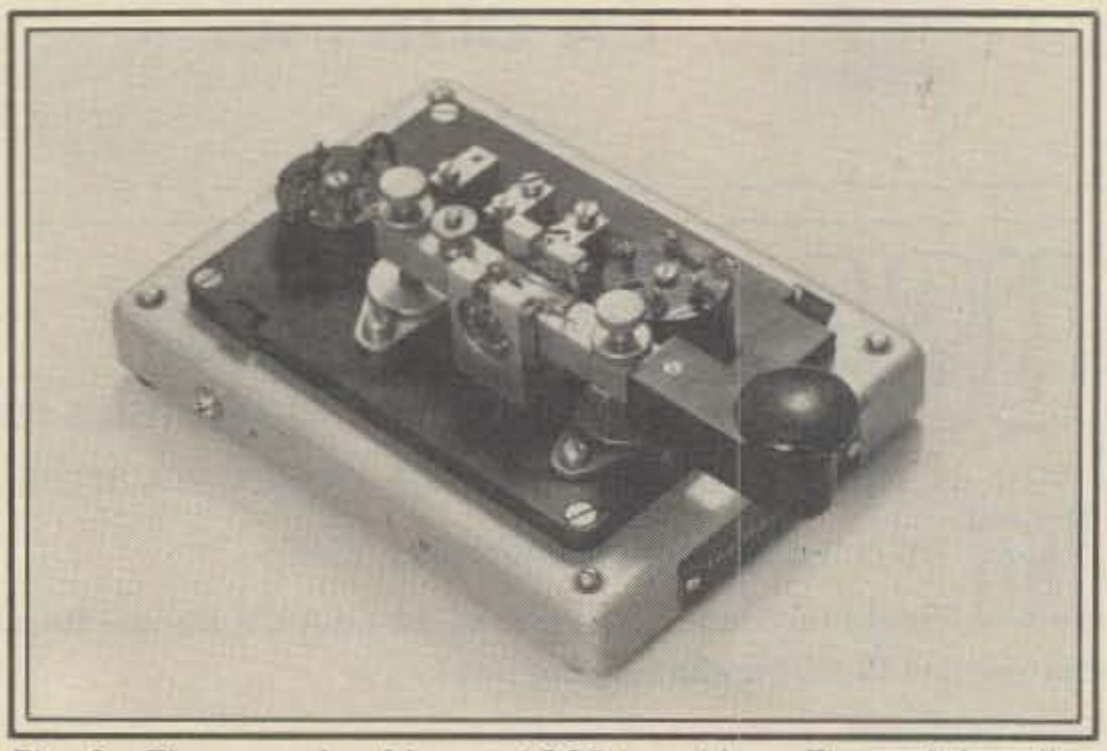


Fig. 2– The massive Marconi 365 hand key. The unit handles surprisingly well.

Comparing the large number of items in K5RW's collection to the somewhat limited space of this *CQ* column dictates either condensing views or running key photos for the next 12 or 15 months. We're thus pursuing a mini tour featuring pieces which seem to captivate most visitors' attention. Following the tour, we'll show you the overall museum and the workshop/refurbishing area, plus add some interesting thoughts about keys and bugs in general. Now let's pull some keys off the shelf and take a closer view.

Figure 1. These first two items are an interesting contrast in hand-key sizes and applications. The 50 ampere spark key in Neal's left hand was made by the U.S. Navy in the Boston Ship-

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yard during World War I. Notice the key's massive contacts and genuine "Navy Knob." The key was designed for fixed mounting typical of shipboard use. The smaller item is a British Secret Service suitcase radio key. Keys of this nature work surprisingly well, and they were used in English or Canadian field sets. Their designation of "Spy Key" evolved from their major use with small communications sets.

Figure 2. Marconi model 365 hand keys such as this saw use primarily aboard British ships during World War II and on until the 1960s. The British were true brass pounders capable of really "hammering out" Morse, and many of their keys reflect that fact with heavy-duty construction and even shock absorbers on some pieces. Although this particular key is rather massive in size, it's quite agile in use and exhibits an excellent "feel." The contributing factors to that situation are highlighted in the side view of the key shown in fig. 3.

Figure 3. Side view of the Marconi 365 key reveals ball-bearing assembly at the fulcrum. This unique feature, along with the key's large size and small knob, produce an exceptionally smooth overall action. The perfect "topping" for a mobile set-up in one of today's compact autos, eh?

Figure 4. Shifting toward the category of semi-automatic keys, we see three very early Vibroplex bugs which were manufactured under the Martin label and called "The Vibroplex by Horace G. Martin." The bug at the top of the photo bears serial number 796, and was one of the first ever made (1904 vintage). This particular bug saw quite a bit of use until it was retired from the Lehigh Valley Railroad in 1972 (now that's quality production—1904 to 1972 and still going!). Neal purchased the bug from the fellow who retired it. The middle bug is an "X" model which was introduced in 1912. Notice there is only one set of contacts. These lone contacts make both dots and dashes.

The lower-left bug in fig. 4 is a Vibroplex dual lever model which came out during 1911. There are independent levers for dots and dashes, but there's still only one pendulum (wouldn't you like to tie one of these gems to your modern rig?). All of these bugs were quite popular, and they enjoyed many years of production. Incidentally, the 1904 "Vibroplex" by Martin was the very first bug ever made. Several other manufacturers noticed its resounding success and joined the action soon thereafter. Since Martin had patented his design, it was protected until the early 1920s. Any bug manufactured before that time thus had to be different enough to be legally patented. (There were, however, an interesting variety of bugs illegaliy manufactured using the Martin design.) After the Martin patents expired, anyone could join the bug action using Martin's design. Most of the later manufactured items reflected special features, improvements of sorts, or special sales attractions. The classic bug enjoyed mass popularity for roughly 40 years, and then electronic keyers began to outmode their use for many "modern amateurs." Most bug manufacturers faded into the

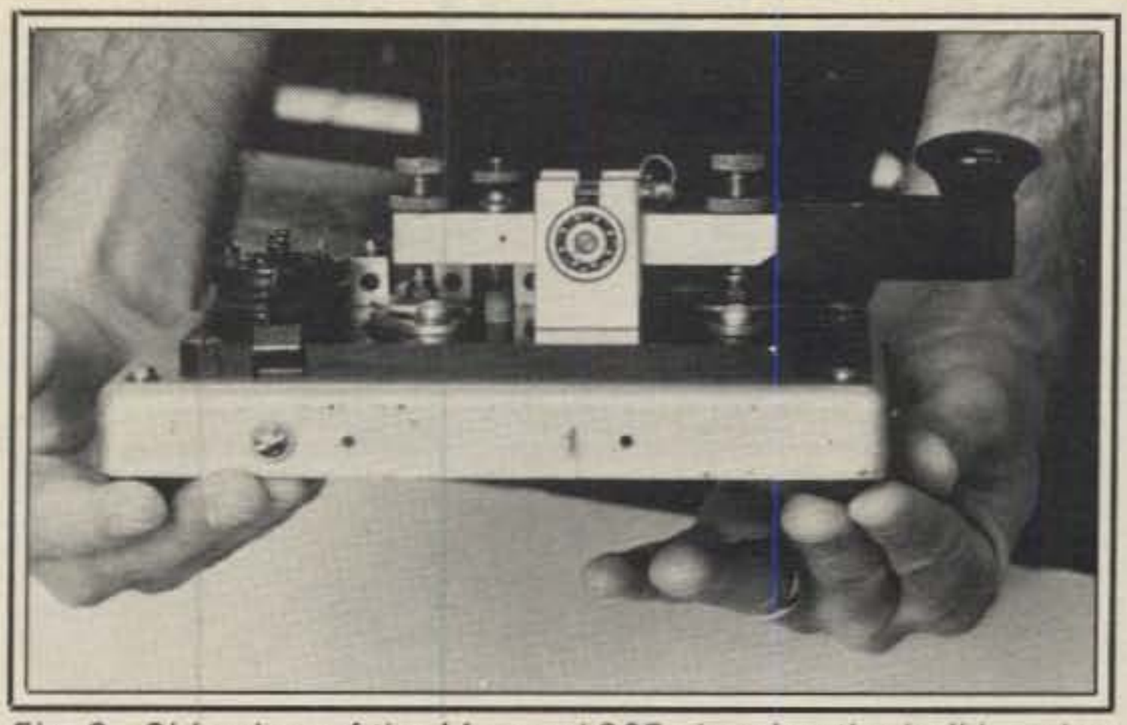


Fig. 3– Side view of the Marconi 365 showing the ball-bearing assembly at the fulcrum.

golden annals of time after World War II. The only company still in business today is good old Vibroplex. (Their slogan is "Old because we're good, not good because we're old.") Vibroplex still manufactures the same classic model that started it all in 1904—the "Original," in standard (gray base) or deluxe style (chrome, jewel movement, and red knob, a true beauty surpassed only by their gold-base and adjustable-mainspring "Presentation"). Another attractive bug with slightly slower semi-automatic speed capability that's still in production is the "Champion" model. May all of these beautiful and classic gems live forever!

Figure 5. Shown here are three rather unusual bugs which challenged the original Vibroplex concept during its heydays. The key in the upper part of the photograph appears to be the first to beat Martin's patents (item with right-angle mechanism). This bug was manufactured by the Mecograph Company of Cleveland, Ohio and generates dots by releasing tension on the pendulum's spring). It's interesting to note that the Mecograph's weights are fixed, and dot speed is controlled by adjusting the pendulum spring's fulcrum point. Vibroplex bought out Mecograph during 1913.

The R.L. Boulter Company of Los Angeles, California was issued a patent for their bug during 1914 (key on right side of fig. 5). This operation was also bought out by Vibroplex a few years later. It's interesting to note that Boulter features such as the yoke and flat pendulum were later included in the design of Vibroplex's Lightning Bug (model six, introduced during 1926).

The key at the left in fig. 5 was manufactured by the Ultimate Transmitter Company of Los Angeles, California and nicknamed the 73 bug because of the number on its nameplate. The little key was popular among journeymen telegraphers because it was easily carried between jobs or field assignments

Fig. 4– Three very early Vibroplex bugs which were manufactured under the Martin label.

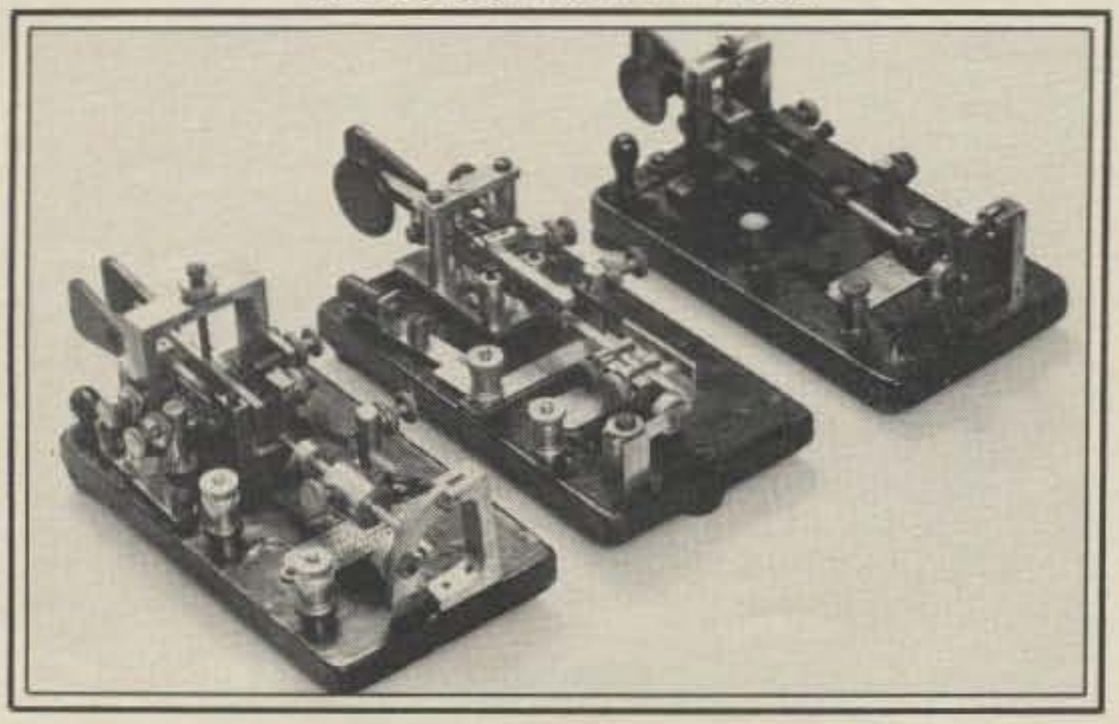
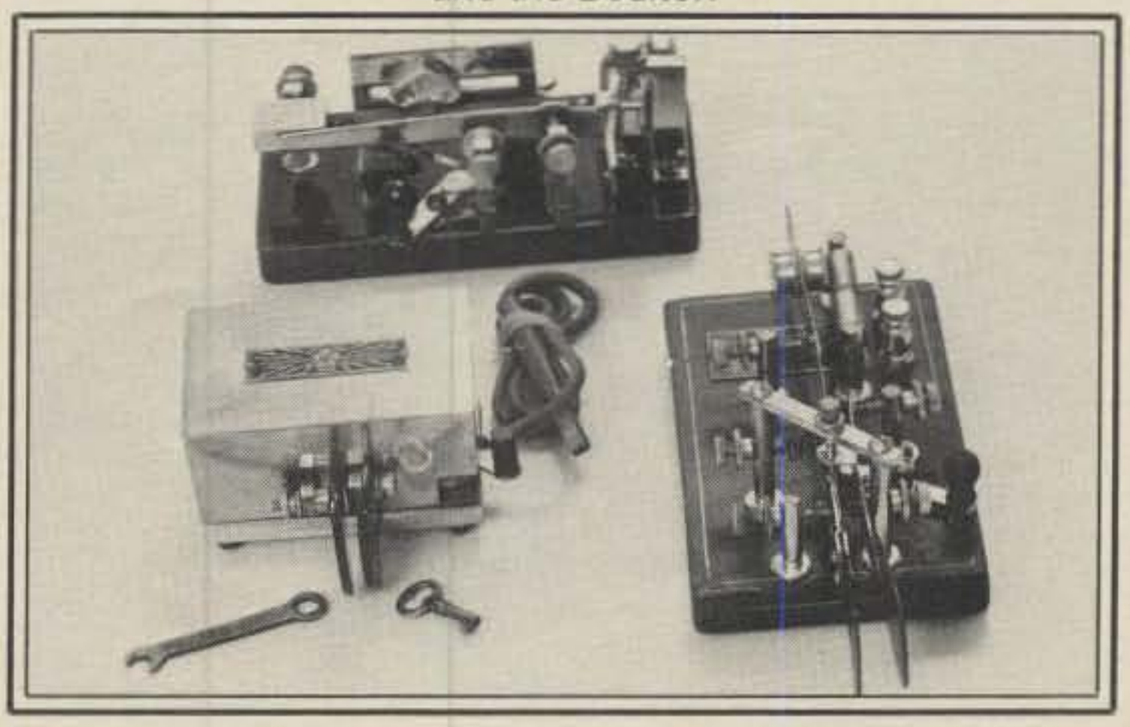


Fig. 5– Three unusual bugs with quite interesting histories. The items are (clockwise from left) the 73 Ultimate, the Mecograph, and the Boulter.



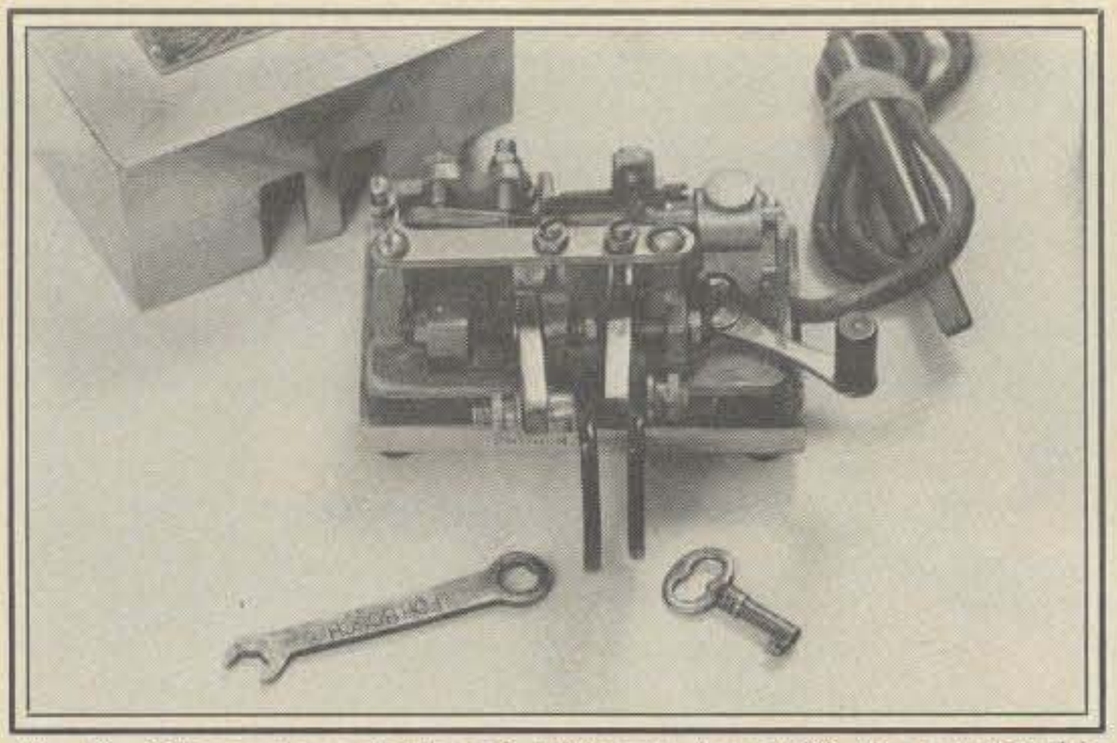


Fig. 6– Close view of the 73 Ultimate key with the protective cover removed. Notice that this is a bug with everything "wrapped around itself."

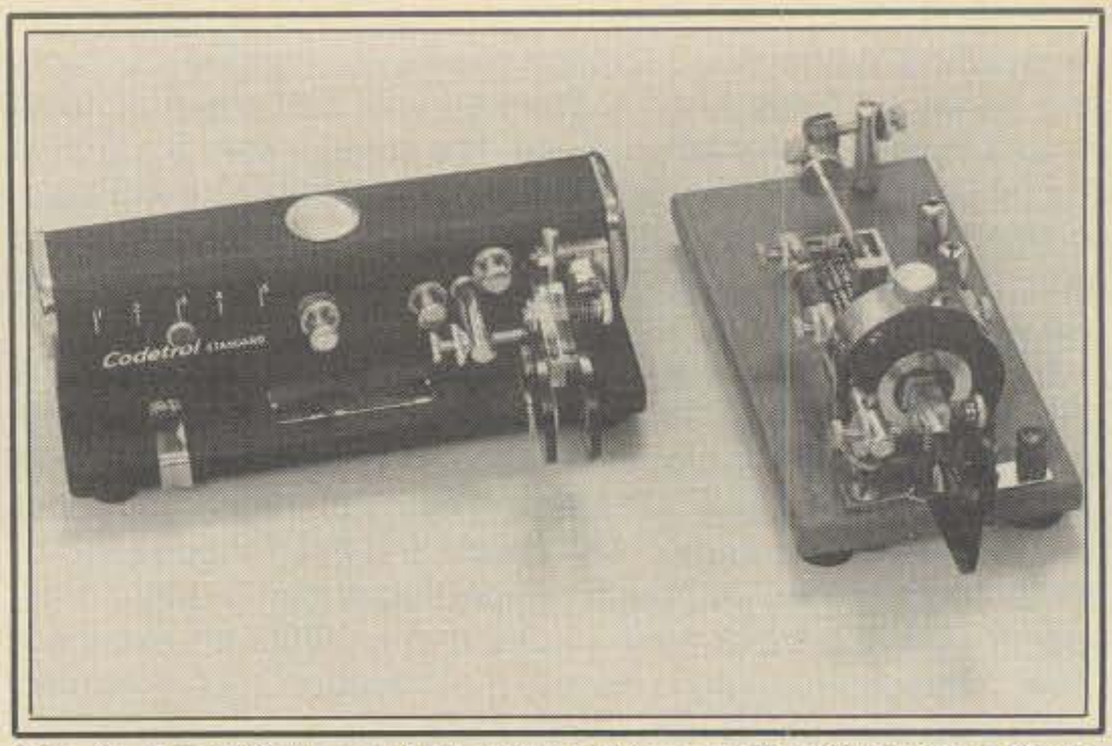


Fig. 7– Beautiful bugs indeed are these collectibles from Codetrol (only 20 were ever made) and Dow Key (rotatable paddle).

such as ball games or prizefights (size is 3½" × 2¼"). All of the moving parts are protected by a lockable cover which can be removed for adjustment.

Figure 6. A closer view of the pocket-size 73 bug with its cover removed. Close inspection reveals that this is a conventional-style bug with everything "wrapped around itself" for compactness. Unit was supplied with its own adjusting tools. This bug was also designed by a railroad wirechief in Los Angeles, and manufactured during the mid 1920s (quite an exciting era).

Figure 7. Here are a couple of really beautiful bugs that would truly glamorize any amateur's setup. The item on the left is a very rare "Codetrol" which was made by B.H. Breedlove in Atlanta, Georgia and advertised in *QST* during 1950. This finely crafted and superb action bug could have been a top contender, but it was introduced to the market after electronic keyers began vying for popularity. This is one of twenty Codetrols ever made. Neal acquired it brand new—in the original box—from a fellow who overheard him discussing bugs during a QSO (talk about good luck!). The right-angle mechanism is fully enclosed, and all adjustments can be made from the front.

The item at the right in fig. 7 is a 1950s vintage Dow Key, which can be rotated for right- or left-hand operation. Its mechanism is canted at a 30-degree angle to show how an operator can adjust it to personal preference. Magnificent, eh?

Figure 8. Here's a phenomenal 8 pounds of fully automatic key that will capture any radio amateur's envy: the Melehan Valiant introduced by Melvin E. Hansen, W6MFY, in 1939. Two models of this classic monster were manufactured: a standard (black base) model and a deluxe (all chrome) model. These keys can be "tweaked" to send beautiful CW almost by themselves, but I hear they still have a tendency occasionally to spout those DX calls of the late 30s—XU, FI, ZC6, etc. The key features two different-speed pendulums, one for dots and one for dashes. Approximately 500 of these "super keys" were made by either Hansen himself or an assistant—the Schultz Tool and Machine Manufacturing Company in Anaheim, California—between 1939 and 1950. Most of the Melehan Valiants were made for amateurs desiring a "fist" such as W6MFY's (his antenna was strung between a couple of oil derricks near his home, producing a quite noticeable signal).

Figure 9. Illustrating a truly sporting way of joining the *CQ* WW DX Contest action, Neal gets behind his finely tuned, fully automatic Melehan Valiant bug. Setting the 17 adjustments on this beast can add true meaning to the phrase "tuning up for the contest." I'll bet that actually using it, however, is more fun than driving a 1929 Bugatti auto (is there anyone out there willing to sell a classic model bug to this nostalgia-struck author?).

That wraps up the first part of our K5RW key collection/museum tour, gang, and your comments are always welcome. Here's hoping we inspired you to shine up that prized old key or bug and give it some well-deserved action. Maybe some of you will even exchange a few words with us some weeknight evening on the low end of 30 meters. We'll look forward to that and meet you again here next month for the last part of this fantastic tour.

73, Dave, K4TWJ

Fig. 8– Here are two models of the classic Melehan Valiant—a fully automatic bug with dual pendulums!

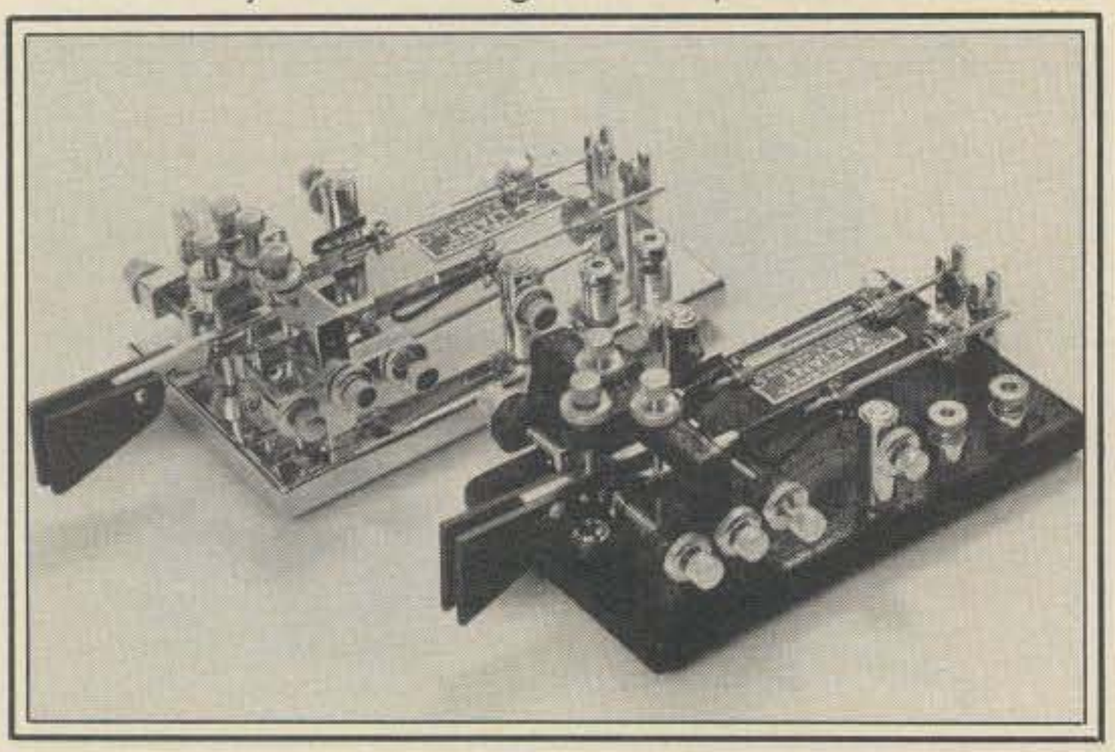
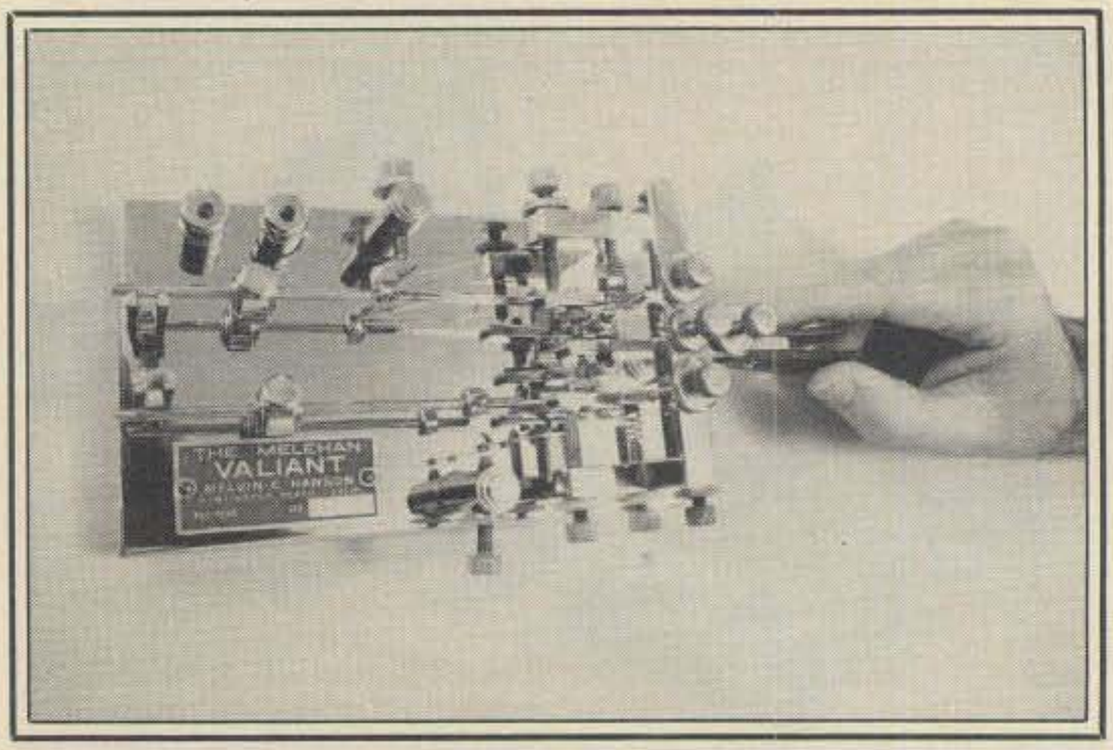


Fig. 9– Top view of the deluxe model Melehan Valiant in action. What a way to enter the CQ World-Wide DX CW Contest!



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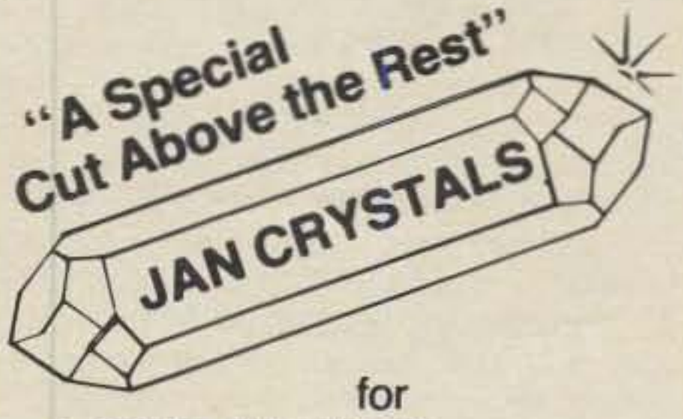

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QRP

a monthly feature by
ADRIAN WEISS, K8EEG

THE ART OF VERY LOW POWER OPERATING

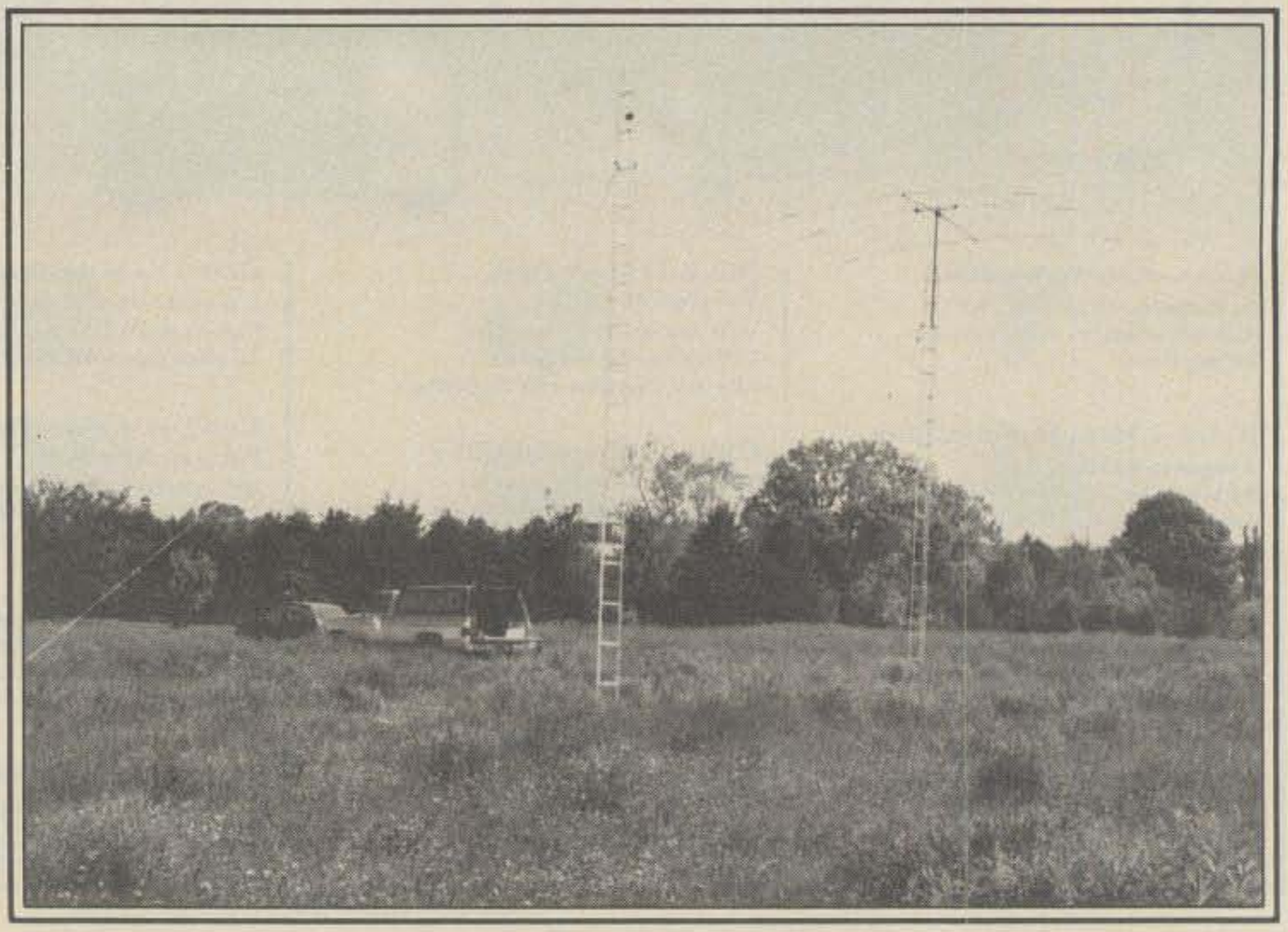
QRP Field Day 1984 Results

Well, lads, another year gone by and time to prepare for the 1985 Field Day outing. Activity was down for the 1984 event, at least in regard to entries to our "piggyback" ride on the ARRL Field Day. How many of you operated but didn't send in your results? I always wonder about that when *QST* shows 60–70 entries, and our combined *Milliwatt*-QRP-ARCI Program turns up less than half that number. Remember that your results in *QST* are buried under pages of listings. Who reads 'em? Worse yet, who cares there? Here, your results join those of other QRP operators and contribute to the kind of sharing that QRP is all about. We QRPers are a special group in as much as we all are quite interested in how QRP is working for the other guys. It is the overall picture that counts. It offers a realistic and personal perspective on QRP to the fellows who might want to give QRP a try. It lets them know about the fun as well as the tears which periodically stain the pages of this column. Quite a few converts owe their QRPing to the entries and stories published in *CQ*.

Unfortunately, I haven't had a FD story to tell for several years (do I hear a chorus of "Thank God" out there?) because I've been spending summers doing research. Well, this year I *do* have a FD story and I'll keep it short.

FD 1984 found me in a London in Sussex Gardens, an ocean away from the activity. Luckily, I tossed my little "+3dBw" 20 meter transceiver into my suitcase as a last-minute act of defiance before I jumped on my Honda 550 to head across the country last May, heading ultimately for England. A story about the summer should end up in this column sooner or later, but to the point. I was very curious about the behavior of propagation on the U.S. to U.K. path on 20 meters, and did a lot of monitoring. Not many U.S. stations were heard—until FD. Then it was a fascinating experience. By the time FD was underway, I was able to hear two or three east coast FDers way down in the noise. However, by 2230 UTC I was hearing a layer of FDers down around the noise level, with a few rising to 559 peaks. The path gradually improved until about 0200 UTC when all the locals had QRTed. Twenty meters was blanketed with FDers, some putting in 579 signals. However, and this was what I had been wondering about, it was all east coast stuff—W1, W2, W3, W4, W8. I heard only one W5 and one W0 during FD!

Generally, FD antennas are low-altitude affairs with moderate to high angles of radiation (say, 18–40 degrees). During the late evening and night periods when FDers were heard, the *F2*-layer was going through its nocturnal rise in virtual altitudes so that moderate- to high-angle signals could cover rather long distances via the high *F2* virtual altitudes. Two-hop propagation was in effect out to 8-land. However, for the mid-western and western U.S. to make the trip, low-radiation angles would have been a must. Given *foF2* contours for summer, they could have made it if the W8's were getting through. It was weird sitting there in London and hearing 20 meters packed with FD stations. Made me homesick just a bit!



The VE1ABU antenna setup. A 30 foot tower supports the TA-33jr Yagi, while inverted Vees for 80 and 40 meters are hung from the other tower. Site was Southport, Prince Edward Island. Operating position was inside the pick-up.

Let's run through the reports from the guys who got to operate instead of merely listen. The 1 watt class is still in good shape with 7 entries this year, along with one 1 watt club entry —K9NG. Note than the scoring for the 1 watt class uses a ×8 power multiplier (twice that for 5 watt operation) so that an equal number of QSO's at the 1 watt level will produce roughly twice the score as for a 5 watt entry. It is always interesting to compare relative scores and see how the "milliwatters" actually did. Highest score posted this year was by "big gun" N4BP and accomplice N4UM, both incorrigible contesters and super operators who know the meaning of the QRP virtue of persistence. They turned in an incredible 1046 contacts for a total score of 6426. In terms of total score, the ×8 power multiplier helped W8ILC to the second best total score of 5250 for an impressive 425 QSO's at the 1 watt level. Note, however, that this QSO total is second only to N4BP in the one transmitter/two operator classes. Four clubs did better in total QSO's. But K9NG worked 418 as a 1 watt club, posting the third highest score overall. This makes me wonder if 400+ represents some ceiling on 1 watt possibilities. Maybe in several years there will be an answer to that question. Maybe we'll have it next year if N4BP/N4UM decide to quite running QRO (5 watts) and fly "milliwatt airways." We'll see! Overall, four 1 watt stations worked over 200 QSO's. Not bad! Let's look at the individual results.

Ron Moorefield, W8ILC, who has earned the incredible *DXCC 300 Milliwatt Trophy* for confirming 300 countries on less than 1 watt SSB output, decided to go it alone: "This year was a FD solo for me. I have always been a part of the Telephone Radio Club in past years, but this year's club effort fell through because of lack of operators. Since I've always wanted to take my QRPp Argonaut out and see what could be done on FD, this was the year to do it. I operated from a picnic table at a local park with trees available to string my 150 foot long-wire and hang a 20 meter phased wire array. I was able to get both antennas up about 50 feet. A fully charged auto battery provided power for the entire weekend without needing recharging. The park rangers were really wondering about what I was up to, but realized that it was on the up-and-up and granted me permission to operate all night at the park which normally closes after dark. At about 0300 a storm with winds and heavy rain drove me back into the auto. I continued to operate from there when the lightning was not nearby. The storm lasted a short while, and then I was back outside on the picnic table. The rest of FD was great—conditions good and weather excellent. Do not sell QRP operation short; operating near band edges and high up in the band can provide lots of contacts. Eighty through 40 meters was very noisy, but during early evening or morning the noise was not bad. The 20 meter wire beam netted me over

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200 contacts with only 1 watt output. My operation was strictly CW, although SSB does equally well, as indicated by my 300 countries confirmed with 1 watt SSB. See you all next year!" Ron's outstanding performance nets him the One-Watt Trophy for 1984, but he won't be eligible for the next two years.

John T. Collins, KN1H, had a pleasant surprise that backs up W8ILC's closing comment: "Here are the results of my 1984 FD effort. I set up at the same site I used last year on the summit of Mt. Ascutney in Windsor, VT. With last year's experience in mind, I hung up a 110 foot center-fed dipole and ran open-wire feedline to the antenna tuner. It worked quite well on all bands. A last-minute thought prompted me to quickly solder a phone plug onto an old CB microphone and bring it along. I was quite sure it wouldn't amount to anything in the final score, but maybe it would help pass the time during those slow moments to operate a little SSB. After all, 750 mw of SSB couldn't possibly compete with all the QRO stations out there. This unfounded assumption was cast aside when I answered VO1AA's 'CQ' and he responded: 'KN1H, nice signal, you're 5 × 9.' I jumped in with both feet after that and eventually the SSB QSO's accounted for a full one-third of my final score. I never cease to be amazed at what can be done with small amounts of power. Next year: less power and more QSO's!" That's the attitude, John! Now that you'll receive a Milliwatt Achievement Certificate for second place in the 1 watt class, maybe you'll get serious about "less power" and shoot for another certificate by racking up 60 QSO's with 100 mw or less (see announcement at the end of the next QRP column for details).

Last year **Leo Delaney, KC5EV**, and cohort **WA5BUC** misinterpreted the rules and ran under 1 watt with two rigs, thereby putting themselves into the club category. Their results continue the "SSB works" motif, working 171 SSB QSO's to 31 CW QSO's on 40 and 20 meters, a great showing that breaks the 200 QSO barrier. What else would you expect from a pair who calls themselves the "Won Watters"? Murphy struck the "Won Watters" in a new incarnation this year—Leo's XYL, who walked in front of the solar panel and killed the rig during a QSO!

Barry Strickland, KA4LKH, went it alone on Sand Mountain in northeast Alabama: "This is my first QRP operation on FD. It was late Saturday before I could start setting up and didn't get on the air until about 0100 UTC Sunday. Already tired when I started, even the XYL's thermos of coffee, which she packed for me, couldn't keep me from catnapping for short periods during the night. Tired and sleepy, I stopped operations early Sunday afternoon when I reached my goal of 80 QSO's. Perhaps I can start up earlier next year and talk myself into going for the full 24 hours—or get another operator to help! Some observations. I never did get an answer to my 900 mw 'CQ's.' I had my best luck 'tail-ending' before the other operator could read his S-meter. The biggest problem was the operator who had diligently worked his code speed up to 35 wpm. I appreciate his effort, but that speed is beyond my capabilities at this time. Normally I'll skip over a high-speed 'CQ' and look for another station. If I do manage to copy his call, after a while I go back to him at 20 wpm, hoping he'll slow down. He does—to 27 wpm, and then omits spacing between letters and the like. Of course, there aren't many operators like that, but enough to cause me to have a pet peeve. There are a far greater number of operators out there who are a genuine pleasure to work and really have their act together. All in all, it was a great FD and I am looking forward to a little more elaborate setup next year!" Keep at it, Barry!

Charles W. Kuhn, WD9EGW, reports: "This year I decided to strike out on my own for FD. After an early morning drive to my father-in-law's farm, I set up a doublet fed with twin-lead 25 feet up among the trees. Not exactly in the clear, but I figured the shade would be welcome. After a few trial QSO's, I began FD in earnest. I had decided to try 1 watt out and then QRO to 2.5 watts if my luck was bad. With the Argonaut cranked down, I waded in. Never did raise the power, as contacts seemed to keep coming at a reasonable rate—not great, but reasonable. I was sure surprised at what 1 watt will do amidst the QRM. Many thanks to all the operators who dug my signal out of the contest clamor. After 5.5 hours, I'd made 54 contacts. At this point a storm blew in so I quit and packed up. I'll be out next year with a better wire and hope to spend more hours operating."

Jim Kluetz, NK5V, didn't make it out into the field, but put in about 4.5 hours with 1 watt to a Butternut vertical at the home QTH with a 10-per-hour QSO rate.

Jim Stevens, KK7C, operated from sand dunes on the Kitty Hawk, NC beach, with assistance in logging and set-up from **Ben Stevens, KA7GIO**, and **Andrew Stevens**, since licensed as **KA7TJD**. Jim described his operating class as "full portable, away from home (by 2400 miles)." No question about it! We're saving Jim's "reflections" for the wrap-up at the end of this FD column. Overall, the one-watters had a good time of it.

Bob Patten, N4BP, and **Tim Cotton, N4UM**, who call themselves "The Bashful Perverts" when operating in the club category, returned to the 5 watt, one transmitter/two operator class after their mandatory two-year wait and worked a stunning 1046 stations! They used a TS-130V at 5 watts to a homebrew 4-band vertical mounted on their camper. Solar power charged an RV battery, and they handled the monstrous dupe-checking task with a Radio Shack PC-2 pocket computer—"very effective" says Tim of the PC-2. "So what *wasn't* effective in your setup?" asks I.

David Blanchard, KA0HIB, went it alone without his usual sidekick, WA0VBW, for a respectable showing of 232 QSO's.

Tom Lappin, W0UY, was attracted to QRP by *CQ* and the occasion presented by family camping activites, and he talked **Kent Hoskinson, K0WRY**, into going FD QRP with him: "My FD partner for several years has been K0WRY. This was our first attempt at QRP FD, though, and it was a real experience. I am not sure if he just accommodated me on the QRP idea or was really interested, but now we're both looking forward to another QRP FD! Having 20 acres available for antennas was a help, and a 206 foot longwire worked very well on all bands. The rig was a TS-130V. Caught KH6AH on 15 meters—what a thrill that was! We used a single-element loop on 40 for 52 contacts. I've been in ham radio since 1957, and QRP seems similar to the ham radio of the 50's and 60's to me. It is a chance to build rigs, experiment with wire antennas, and hone one's operating skills, instead of just pumping up the watts. We'll be back next year with a better antenna and more knowledge of what to expect!"

Jim Ewing, VE1ABU, and **Ron Murphy, VE1CIX**, took their first try at QRP FD also, and Jim notes: "I have been going to FD's for about ten

1984 QRP Field Day Results

	Call	QSO's CW	SSB	Total	Score
		One-Watt Class (2op/1tx)			
1*	W8ILC	425	0	425	5250
2	KN1H	191	90	281	3522
3	KC5EV	31	171	202	2574
4	KA4LKH	80	0	80	1110
5	KK7C/4	50	22	72	1014
6	WD9EGW	54	0	54	798
7	NK5V	38	8	46	552
		Five-Watt Class (2op/1tx)			
1*	N4BP	759	287	1046	6426
2	K4OCE	140	211	351	2106
3	KA0HIB	56	176	232	1542
4	VE1ABU	137	56	193	1308
5	W0UY	144	10	154	1074
6	N5AE	74	73	147	1032
7	KA0JXD	134	0	134	804
8	N9DHX	0	129	129	774
9	KT1H	0	116	116	696
10	K6TG	98	0	98	588
11	WD9AEU	3	88	91	546
		Club Class (multi-op/2tx)			
1*	K9NG	327	91	418	5166
2	N6UU	404	327	731	4535
3	W3TS	597	0	597	3732
4	K8IF	568	0	568	3558
5	N2RI	458	85	543	3408
6	W2LZ	512	0	512	3222
7	KX4G	271	79	350	2250
8	WA6POC	192	87	279	1824
9	W6SKQ	106	155	261	1716
10	N8CGY	98	103	201	1356
11	K2NH	158	5	163	1128

**Award winners.*

Scoring: QSO's × Power Multiplier (1–5 watts output, × 4; less than 1 watt, × 8) × Battery/Natural Power Multiplier (× 1.5) + 150 Full Portable Bonus. Awards only to full portable stations operating away from home shack and independent of permanent antennas and AC mains.

Second operator Ron Murphy, VE1CIX, at the operating position of VE1ABU. Looks quite comfortable, but how did these guys keep operting through the wee hours? They're already most of the way to bed! VE1ABU comments on his selection of second op.: "Some people would be a bit hesitant about inviting Murphy along on Field Day, but I encountered no problems this year!" Maybe that's the trick—invite Ron Murphy along and the Real Murphy will figure he's not needed there.

years now, and I must admit that I found this the best so far. One of the main reasons I went QRP FD this year was to demonstrate to other locals how well QRP could do. As it turned out, our 1B station gathered over 100 more points (ARRL scoring) than did their 3A station, and that was done with only approximately 13–14 hours operating time at VE1ABU. So I feel we proved our point. Also, we're now hooked on QRP FD, but it remains to be seen what the rest of the locals will do next year. I was familiar with the capabilities of QRP, as I have WAS-QRP and over 105 countries with 2 watts or less output. I don't have the DXCC-QRPp Trophy yet, as I don't enjoy the expensive hobby of chasing QSL cards (another beef I have, but won't get into now). Ron really got his feet wet in ham radio fast, as he had only obtained his license three days before FD on June 20. *(That's the best way to get converts—nab 'em as they come out of the exam center—ed.)* We used the back of his half-ton truck for the station and set up with my Ten-Tec Argosy and auto battery. I feel that the Argosy in the low-power position is the ideal rig for this event. We mounted my TA-33jr atop a 30 foot TV tower and pointed it southwest; that's the advantage of this location. We can get good coverage to almost all of North America with one beam heading! The disadvantage is the longer haul to W6. We intended to run a 3-element 40 meter wire beam between the TA-33 tower and a second one, but due to inclement weather, we settled for inverted Vees on 40 and 80. We thought we'd reached our goal of 200 contacts, but dupes dropped us back to 193. We extend special thanks to my grandfather for permission to use his field and his help in erecting our two 30 foot towers. He really is spry at 91 years!"

Dick Reimund, N5AE, and son **John, WD5FLU,** were out again with an Argosy, a multiband inverted Vee at 15 feet, and a solar panel for charging the battery: "Enjoyed FD as always, with the exception of one pet peeve—operators who call 'CQ' and do not pause long enough to let you send the first two characters of your call. They should be lowered into boiling oil!"

Several operators accepted our last year's invitation to operate Class 1E—home station—and submit results, even though they wouldn't qualify for a trophy. One of the entries almost knocked me off the chair. Out of the blue after about a dozen years absence from the QRP scene came **Bob Rosier, K4OCE,** who holds the unique distinction of **DXCC-QRPp Trophy #1,** the very first operator to work and confirm over 100! Most of us were just beginning to realize that we could work DX! Working with a 4-element tribander and a trap-vertical on 40, Bob racked up 351 contacts.

Ben Saylor, K6TG, who has submitted FD results longer than anyone else, didn't make it into the field, but operated 1E with a Century 21: "Last year the FT-7 at 1 watt CW did a good job, but this time the more challenging task of using the double-sideband receiver of the Century 21 was undertaken. Three panel lights were removed to save on battery drain; the dial is easy to read anyhow. The rig delivered 5 watts output when the drive knob was adjusted for about 2 amps from the battery. It was nearly the same setting on all bands. Used a 140 foot inverted Vee and tuner, but conditions were very poor—only 98 contacts. Never heard a signal on 10, and made only 4 contacts on 15 meters. But no matter how it goes, FD is always the big event of the year!" Ben informs us that **John, W6JTH,** and friend Bob, the "Peerless Mountainer QRPers," didn't make it up some mountain this year. House-painting and leading a five-day hike took available time. Well, those two guys can use some rest after all the mountain climbing they've done on FD!

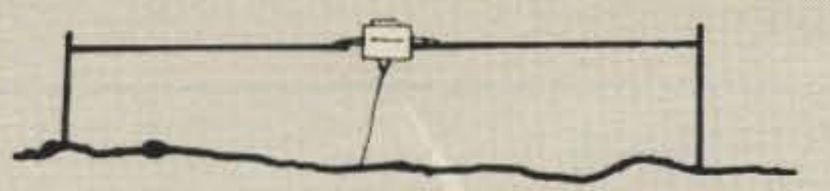
Several other fellows operated from the home TH because of time problems. **Brad Hutton, KT1H,** reports: "Because of my busy schedule I was unable to get out into the field. I do enjoy QRP, and it is fun just to see how many QSO's can be made during a contest without busting my tail! I guess I spent about 19 hours, never calling 'CQ' but always answering. Worked all that I called except for an 'alligator' here and there. Antennas were a 40 meter dipole at 60 feet (9 QSO's), an 80 meter inverted Vee at 60 feet (24 QSO's), and a 3-element tribander at 70 feet (83 QSO's), all fed with 170 feet of RG8-U. Went SSB this time exclusively."

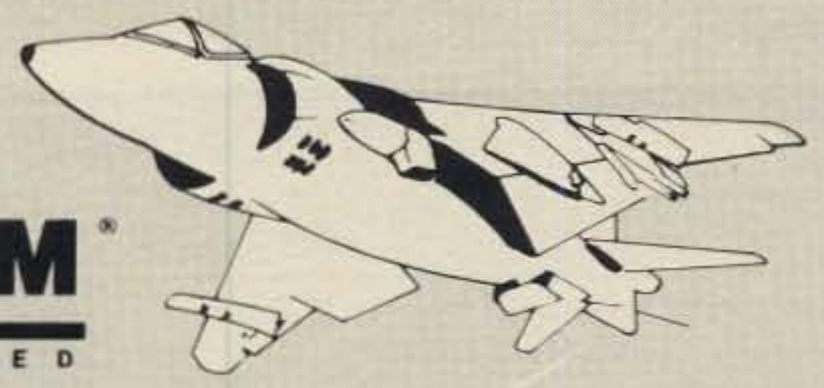
James R. Jones, WD9AEU, notes: "Enjoyed QRP FD. Score was not much, but the Argo 509 and Mosley CL-33 did very well. Only had two stations tell me my signal was too weak to copy. Will look to next year for more good times."

And finally, **Russell Ryle, N9DHX,** and **Keith Cook, KA0JXD,** tried out QRP FD from their respective home locations.

Thanks for submitting your 1E results, fellas. Next time we'll have a look at the club reports. Till then . . .

73, Ade, W0RSP





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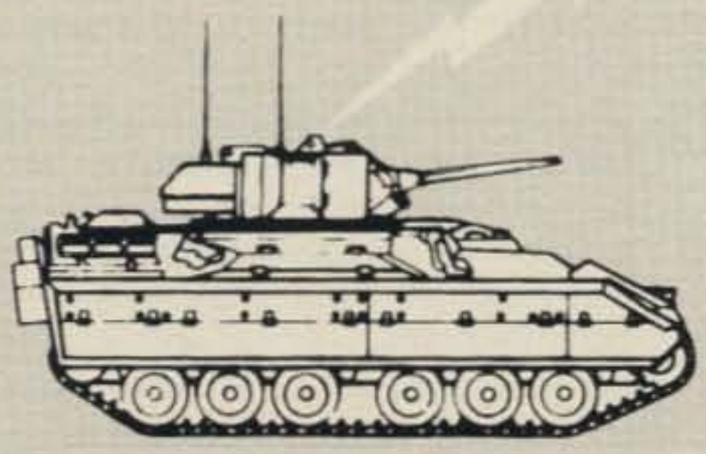

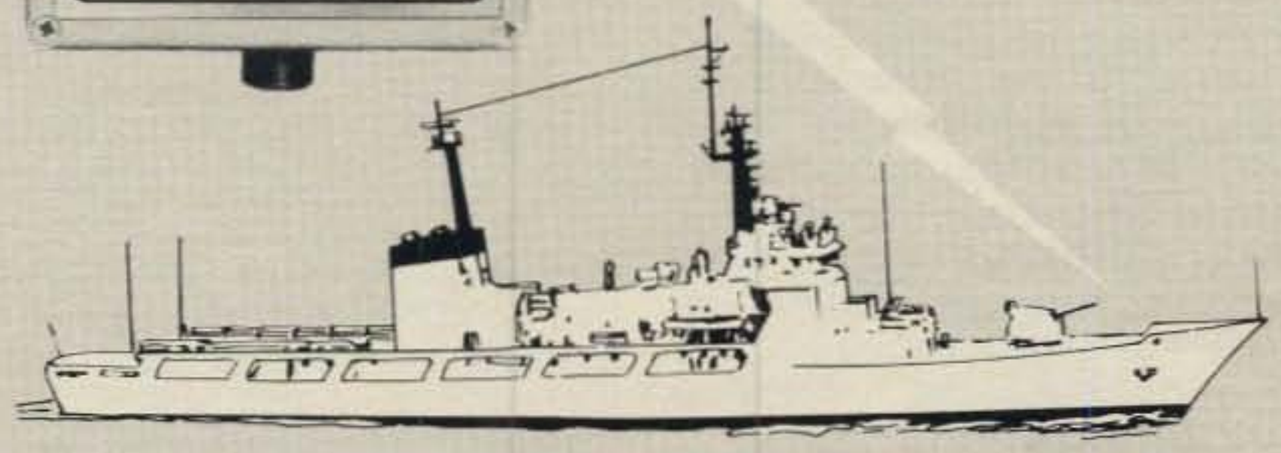

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CIRCLE 22 ON READER SERVICE CARD

DX

a monthly feature by
HUGH CASSIDY, WA6AUD

NEWS OF COMMUNICATIONS AROUND THE WORLD

I sometimes wish that Bob were back
In this dark world and wide,
For though sometimes a smile he'd lack
He had his pleasant side . . . .

Here it is May and there are DXers capering in the meadows everywhere. The DXers are warmer, the nights free from frost, and life is good. If only the sunspot cycle could find the bottom. With things hardly likely to encourage one to spend the warm days in a deep shack, the Old Timer came down the hill to sit with us on the hillside under the oaks and enjoy the view down the bay. With the wind out of the north, the mountains 50 miles south were sharp against the sky. It was good just to sit and enjoy the warm day. Then the Old Timer spoke. "Here comes that child, born of DX," he said, and there he was, coming around the curve of the hill. Spring thus ended that day, for no Local has ever been known to come up the hill but to ask questions.

"I need some meaningful DX answers," this one greeted us, getting right to the point. "I come seeking to learn more of the deeper sensitivities of DXing. Can you help me?"

We stood to clasp the hand of the Local, our grip strong, our left hands bracing his elbow, his eyes held in strong contact. "Of course we can," we assured him. "We are here to help you." His grip was as firm, his eye contact as strong. This one had the real stuff. He was a DXer! One day he would be one of us—an Old DXer.

"I need it," the Local continued. We would shortly understand why he did.

"It's this 1AICU I worked last year," the Local said. "How do I get a QSL out of that one? He's not listed in the Callbook, any QSL list I've looked at, or anyplace at all. Is there someplace like Box 88 that these QSLs go to?"

We looked sideways at the Old Timer, but suddenly he was studying something down the bay, possibly one of the Japanese vehicle carriers that looks like a big box floating on the water. From the intentness of his study he obviously did not intend to be of any help on this one.

"Where did this station say he was?" we asked for openers, and the Local shook his head. "He said that he was in a restricted area, that he was not allowed to say where, so don't ask him, but that the ARRL DXCC Desk would understand." It was hard not to feel the anguish showing in the Local's eyes. "I asked the DXCC Desk, and they said that they didn't know anything. Do you think that's right? That they don't know anything?"

77 Coleman Dr., San Rafael, CA 94901

For the 1984 CQ WW DX SSB Contest CQ's DX Award's Committee Chairman, John Attaway, K4IIF, made his expedition to Mexico, where he logged over 2600 contacts as XE1IF. (Photo via XE1X)

Heck! That was what we planned to say for ourselves, and we were already cut off at the pass. This one was not going to be easy, but we had to try something.

"You know, of course," we said, "that the '1' prefix is not an authorized ITU prefix. And though it does show up at times, such as 1S1A on Spratly or from 1A0KM, the Knights of Malta station, it is still unofficial." The Local was nodding his head.

"Of course I know that," he said. "I worked both those places, got the QSLs for them, and the ARRL took them for country credits. What I want to know is how do I get credit for 1AICU!"

We had been pussyfooting around this one. So far the Local had done all the possible right things, but he was still looking for answers. Always there is a strong faith and trust in the validity of a QSO when it means a new country. Obviously this one was long in faith though possibly a bit short in future hope. We recalled years back when there had been others who wondered what might be a good prefix, this when VS6DR and the SEAsia crew were all packed for Spratly but developed some last-minute doubts on the planned callsign, 1S1A. An overseas telephone call one morning brought a request that an attempt be made to determine whether or not the DXCC Desk would accept 1S1A QSL cards for DXCC credit.

A phone call to Bob White at the DXCC Desk brought a short and pithy answer. "I don't give a damn what callsign they use," Bob White roared, "just as long as they can proved that they were there!" One did not have to talk long with Bob White to get needed DX information. One would learn rather quickly—perhaps even quicker than this Local was going to be told that he probably had worked a klunker, old Slim himself. But then, in an inspired moment, we said to the Old Timer, "What do you think about all of this?" and we heard a small groan from somewhere. But it was our turn to listen and perhaps learn something.

"DX used to be simpler back in the good old days," the Old Timer started out, and we were quickly nodding our heads. Everyone knows that the good old days were the best, DXers especially. "But things change," the Old Timer continued, "and where once it was somewhat easy to spot a Slim, all the changes in callsign assignments, the special prefixes, the commemorative prefixes, some of which seem to be issued to commemorate commemorative prefixes issued last year, the changes made to departmentalize prefixes within a country so you could tell what region you were working, as well as those changes made in other places so you can no longer recognize what area you are working—all of these changes can bring doubts when you hear a strange prefix. Checking a DXCC country list sometimes helps to identify from where a prefix should be heard; other times the ITU prefix authorization helps." At this point we were beginning to suspect that the Old Timer was going to take longer than Bob White to answer the question. And the Local was holding up his hand.

"Who's this Slim?" he asked. "Was he the fellow I worked? That doesn't seem to be the handle he gave me."

That stopped the Old Timer for a moment. "I thought that maybe I'd told you about Slim before," he said. "Slim showed back in the sixties, saying that he was on Cray Island and was signing 8X8AA. When asked for his location, Slim said he was on a new, volcanic island just south of Iceland. "We were passing by in a boat," Slim explained, "when a lot of smoke and this island came up out of the water. So we landed and set up a station, and it should count as a new country for sure." Questioners were advised to check a recent copy of *National Geographic* which had an article on Icelandic volcanism. This was solid proof to a lot of DXers who worked 8X8AA. This one has to be good, and Slim was not reluctant at all to assure everyone that it was. Many expected that the DXCC could not dodge on this one, but they did.

The Local was holding up a hand again. "Are you trying to tell me," he demanded, "that I worked a phoney?" Re-

The WPX Program

Mixed

1143	I1ZXT	1145	IK1AAW
1144	JH4UVU	1146	EA8NI

S.S.B.

1703	W6YLJ	1708	HH2WL
1704	IK1AOD	1709	K8KUH
1705	DJ7MD	1710	DL1EY
1706	W9ROK	1711	CP8IH
1707	K7DXJ	1712	YB0BZZ

C.W.

2308	I5JRR	2310	N9CVO
2309	I1WFB	2311	JA3ULU

VPX

237	HE9DSQ	240	WDX1AM

Endorsements

Mixed: 450 JH4UVU, IK1AAW. 500 JH4UVU, WD4PVI, IK1AAW. 550 ZS6BCR, JH4UVU, JA4JBZ, IK1AAW. 600 ZS6BCR, JH4UVU, JA4JBZ, IK1AAW. 650 JH4UVU. 700 JH4UVU. 750 JH4UVU. 900 JA6GWU. 1200 W1NG. 1250 W1NG. 1300 WA0TKJ, W1NG. 1350 WA0TKJ, W1NG. 1400 W1NG. 1450 W1NG. 1500 W1NG. 1550 W1NG. 1800 N2AC.

S.S.B.: 350 ZS6BDR, HH2WL, LU8DPM, EA8NI, DL1EWY, YB0BZZ. 400 HH2WL, LU8DPM, EA8NI, DL1EY. 450 N4DRC, HH2WL, LU8DPM, EA8NI, DL1EY. 500 NE6I, KZ2W, HH2WL, W8DPM, EA8NI, DL1EY, I2EOW. 550 KU9C, HH2WL, LU8DPM, DL1EY. 600 WD9FOE, HH2WL, LU8DPM, DL1EY. 650 HH2WL, EA3BOX, DL1EY, W7KWI. 700 EA3BOX, DL1EY. 750 EA7AZJ, DL1EY. 800 EA7AZJ. 850 EA7AZJ. 900 K5RPC, EA7AZJ, XE1XF, W1NG. 950 WA0DCQ, K5RPC, W1NG, EA7AZJ, AC2J. 1000 EA7AZJ, W1NG. 1050 OE1PC, W1NG. 1100 W1NG. 1150 W1NG.

C.W.: 350 I5JRR, VE4AEX. 400 I5JRR, VE4AEX. 450 I5JRR, VE4AEX, KA9GZM. 500 I5JRR, ZS6BCR, NE6I, WD9IIC, VE4AEX. 550 VE4AEX, WD9IIC. 600 WD9IIC, VE4AEX. 650 OH2BSA, WD9IIC, W9PWM. 700 OH2BSA, WD9IIC. 750 WD9IIC. 900 W1DMD, W1NG. 950 W1DMD, K9WA, W1NG. 1000 K9WA, W1NG. 1050 SM6AYM, K9WA. 1600 N2AC. 1700 G2GM.

10 meters:	W0ULU, XE1XF.
15 meters:	HH2WL, WA2CNF/1.
20 meters:	HH2WL.
40 meters:	JA4JBZ.
80 meters:	OK3TAY.
160 meters:	OK3TAY, W3ARK.
Africa:	I2DMK.
No. America:	W6YLJ, HH2WL, CT4UW.
Europe:	DJ7MD, HH2WL.
Oceania:	I5AFC, SM6AYM.

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.

luctantly we told him that we suspected he had. "But how can you be sure?" he said sternly, and we had to admit that we could not be sure—not sure, but certain that 1AICU would never enhance his DXCC totals.

One should never take from a man his dream, and no DXer ever likes to see his dream of a DXCC counter fade. One needs to believe, but as long as we could remember there has always been a Slim to stir hopes that were never realized.

Slim has shown in many forms, in many countries, and with many callsigns. Sometimes it has been a properly appearing call from the middle of the needed-countries list. At times it has been the call of someone with whom Slim is irked; a lot of contacts are worked, and a lot of QSLs are dumped on an unspecting holder of the call Slim used. PH0NY shows

A well-deserved victory dinner in honor of the San Felix DXpedition team. From left to right Fernando, CE2GXY (CE0AA), Max, CE3ESS, and Max, CE9DVN (CE0AA). (Photo via Jack, W2LZX)

regularly; AP1RIL is heard every spring for those who long for Pakistan; UF0OL caused some uproar some years back when Franz Josef Land was near the top of every needed list. He was operating not from Franz Josef Land, but ". . . from another island in the group about 20 miles to the south." You might think this one a bit obvious, but some needy big-gun DXers were slow in losing their faith. KL8AA showed from the Pribilofs in the late 70s and guaranteed a new country for those who worked the operation. Later a letter was sent out purporting to be from the Navy unit that included KL8AA, the letter signed by a Lieutenant Commander. Details of the operation were given, number of QSOs, the QSL Manager, and the FPO address of the unit. The only thing that probably killed the faith of the believers in this one was one bulletin editor who noted that the FPO zip code was incorrect, not being in the Seattle FPO segment, but rather was that of Tacoma, Washington. Down on the southeastern edge it is not unusual for some of the Slims to slip in /C6A after their callsigns when things are slow or they want to create hope and some action.

Years back a young DXer down in the Texas territory worked a station signing 1ZN4. The station said he was in a U.S. Army base in Europe, would appreciate the services of a QSL Manager, and would forward the logs, QSL cards, and all the information needed, this including names and calls of operators and the location of the operation.

Several weeks later a bundle arrived, this mailed at an Army APO in Europe. It had the logs, printed QSLs for 1ZN4, and nothing else. The QSL Manager filled out the cards and put them in the mail. Some were submitted to the DXCC Desk and were promptly bounced. The QSL Manager never did learn more about 1ZN4. Possibly some DXers are still hopefully holding on to their 1ZN4 QSL. Some are even saying, ". . . now that ZC4s are good, maybe that 1ZN4 . . ."

All of this may be interesting to DXers passing the happy hours between sunspot cycles, but we still had a questioning Local on our hands, perhaps a bit unhappier than when he had come up the hill. In fact, he was irate.

"That's the last time you'll catch me biting on something like 1AICU," he stormed. "DXing is hard enough without dancing with those clowns to the music of their phoney callsigns." The Old Timer looked sideways at us and we raised our shoulders. We could understand the hurt, but knew that it would run its course. There was still more to tell the Local, and one need was to ensure that he lost neither his faith in DXing nor his interest in working new countries. So we let him run down, and finally the Old Timer spoke again.

"Be careful in going too far in the other direction," the Old Timer said, trying to calm the Local. "If you think it over, at least you did get the pleasure of working what you thought was a new one. While you know now that you may not have gotten it, you have not lost much. Maybe a bit of your time and some of your innocence, but hardly more than that." It was apparent that while the Local was starting to listen, he was not yet ready to buy.

"That may be easy for you to say," the Local protested, "but how would you feel if you bit on something like that?" The Old Timer had to think this over. "I have," he said, "and maybe more times that you would want to look forward to doing."

The WAZ Program

10 Meter Phone

295	N4PB

15 Meter Phone

212	KL7Y

20 Meter Phone

521	ON7TN	523	EA8AKN
522	WA1ZAM	524	EA5AD

80 Meter Phone

27	W3AP

20 Meter CW

227	N9JL

All Band WAZ

S.S.B.

2927	GM3WIL	2932	W6FCF
2928	WA9MAG	2933	CE0AE
2929	SM3BSF	2934	I2HLY
2930	NE6I	2935	K5IID
2931	WB9RAD	2936	N6HK

C.W. and Phone

5846	K4PR	5850	NE6I
5847	PY4ZU	5851	F6ACV
5848	JA0SOD	5852	DF2PI
5849	N2AIF	5853	4U1UN

Applications and reprints of the latest rules may be obtained by sending a self addressed stamped envelope (37 cents) size 4½ × 9½ to the WAZ Manager, Leo Haijsman, W4KA, 1044 S.E. 43 Street, Cape Coral, Florida 33904. 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 C.Q. 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.

5 Band WAZ

Standings as of February 1, 1985

All 200 zones worked:

1. ON4UN
2. K4MQG
3. SM4CAN
4. AA6AA
5. W8AH
6. W6KUT
7. EA8AK
8. LA7JO
9. EA3SF
10. OH1XX
11. EA8OZ
12. W0SD
13. K0ZZ
14. ON6OS
15. OK3TCA
16. K6SSS
17. ZL3GQ
18. OK3CGP
19. SM0AJU
20. OZ3PZ
21. I3MAU
22. I2ZGC
23. 4Z4DX
24. N4KE
25. K5UR
26. K9AJ
27. SM3EVR
28. LA5YJ
29. DL3RK
30. N4WJ
31. G3MCS
32. SM5AQD
33. W0MLY
34. I0RIZ
35. ON5NT
36. OH6JW
37. OK1AWZ
38. IV3PRK
39. DJ6RX
40. OH3YI
41. I4RYC
42. ZL1BIL
43. I4EAT
44. ZL1BQD
45. TG9NX
46. XE1J
47. F5VU
48. W3AP
49. YO3AC
50. K3TW
51. XE1OX
52. VE7IG
53. OK1ADM
54. CT1FL
55. WA1AER
56. N4RR
57. UW0MF
58. W4DR
59. OK1MP
60. W1NW
61. OE1ZJ
62. HB9AHL
63. HB9AMO
64. LA6OT
65. UR2QD
66. UK2RDX
67. ZS5LB
68. F6DZU
69. DL4YAH
70. LA7ZO
71. W9ZR
72. W1NG
73. VK9NS
74. N4KG
75. YU7DX
76. DL8MAG
77. OK3DG
78. ZL1BOQ
79. EA9IE
80. DL7HZ
81. DJ9RQ
82. EA5SP
83. EA2IA
84. SP3BQD
85. LZ1NG
86. N4JF
87. CT2AK
88. HB9CIP

The top 13 contenders for 5 Band WAZ:

1. DK5AD, 199
2. JA3EMU, 199
3. N4WW, 199
4. EA8XS, 199
5. K6YRA, 199
6. W8VUZ, 198
7. LA9GV, 198
8. W6GO, 198
9. K4CEB, 198
10. OK1MG, 198
11. W2YY, 198
12. SM5AKT, 198
13. G3GIQ, 198

302 Stations have attained the 150 zone level

This slowed the Local. Perhaps he even felt a bit better for finding some company in his misery. "You have?" he asked, the disbelief in his voice hardly masking the glee that was starting to show. "You? Certainly not you!"

The day was bright again and the Local was smiling. "You have helped me to look at things a bit better," he said, "but I still don't like being caught up in a snare, and I wonder if I will ever again jump in to work a strange prefix." We did not push any argument with him on this one. With all the strange callsigns coming down the pike these days, he would soon learn that he could hardly afford not to. But we did recall others in the past who, once stung, had refused to work wide-open DX stations with strange prefixes.

"No, sir! You're not going to see me caught by one of those again," would be the heated response. When a fat signal showed up from C31-Andorra right after the prefix had been changed from PX1, this one was mad enough to not even turn on his rig, even though he needed the country. In reply to telephone calls to get on the air he would say, "I checked my DXCC country list and there is no C31 listed. No way will you find me calling that one!" Months later we met the operator, and he told how when they signed C31 they were deluged with stations jumping on top of them to tell them what they thought of such shameful operations.

By this time it was obvious that the Local was thinking of leaving, but he still wanted some answers. He put his questioning directly to the Old Timer. "If you've been around the track so many times and have seen all of these things, just what is a helpless DXer like me supposed to do? Can you tell me that?"

Of course he could. The Old Timer knows just about everything about DX. "I can tell you what to do," the Old Timer said, "but first I'd like to point out that wise and old DXers did not necessarily acquire some of their qualities overnight. Eventually you will learn to hear a distant bell ring when some of these stations show. The more you hear them, the louder the bell will ring. If you are not hearing it yet, just keep DXing. You will."

The Local understood that. "But what about now? What do I do now when I hear a strange prefix?"

Of course the Old Timer could tell him. He leaned close to get the Local's attention. "Work them now," he said, "and worry later!"

West Malaysia on 40/80 Meters

Ismail Bin Abdul Razak, 9M2FK, in downtown Penang is heard regularly on a number of bands, but often on 40 and 80 meters. Look for Ismail just above the bottom edge, maybe 5 kaycees or so, on 40 from 1900 to 2300Z. Often after 2300Z Ismail will move to 80 meters and you will find him around 3505 kHz. He may move a bit if there is QRM.

QSLs for 9M2FK from January 1972 can go via Gorsek Ivan, YU1HA, Trg Narodnog Fronta 1/5, 34000 Kragujevac, Yugoslavia. YU1HA has changed QTHs, and should you have another address; it has been changed. Gorsek, YU1HA, is also QSL route for HS9FK.

4U1VIC

This one seemed to be a sure thing a couple of months back. It still does look like a sure thing, but maybe not until later in the year. At the January ARRL Board Meeting the Board of Directors directed the DXAC to reconsider in the matter of country status for 4U1VIC.

There are reports that the U.S. State Department is moving to enter into a third-party agreement with the Vienna International Center. Don't give up hope. 4U1VIC is coming! Just don't ask when, but soon . . . .

Southern California DX Club

New officers for the year at the Southern California DX Club include Mary Woll, N6VI, taking over as President; Dan Davitt, N6CGB, Vice-president; Esther Wolf, KB6HW, Treasurer; and Chris Williams, KG6AR, Secretary. The Board of Directors includes Joe Locascio, K5KT, the outgoing president; Len Gerardi, NC6H; and Tex Myers, N6AHV. Mailing address for the club is Box 812, Temple City, CA 91780.

KX6DX—Marshall Islands

Dave Sublette, KX6DS, has totaled the activity during the last year when he operated DX6DS most days, and reports that he had over 30,000 QSOs during the year (about 70% CW and 30% SSB). Should you wonder what bands Dave was trying to wear out, he was on 80 meters 5% of the time, on 40 meters 29% of the time, 20 meters 25%, 15 meters 35%, and 10 meters 6% of the time. It is interesting to note what Dave was working, the JAs leading the QSO total with 43%; North America had 32% of the QSOs, Europe 14%, and South America 2%. Africa showed in less than 1% of the QSOs. The balance after South America consisted of other parts of Asia, Oceania, etc.

QSLs are still going via the North Alabama DX Club at Box 4563, Huntsville, AL 35815-4563. Actually, this is the only QSL route for KX6DS, Dave noting that because of the volume of QSOs, any other way would only cause confusion.

Dave notes that he does not expect 1985 to be as loaded with QSOs as was 1984. He says it might be something to with the sunspot cycle. But he does note that in 1985 the KX6 amateurs will be allowed to work 160 meters.

ZC4—Cyprus

As expected, the British bases on Cyprus were given the blessing of the DXAC on a not quite unanimous vote, the count going 6–1 in favor. QSLs from August 16, *1960* will be accepted for credit. You cannot submit them until June 1, 1985, however. Actually, there has been no change in the status of the British bases. It just took time to recognize the distinction. The treaty establishing the Republic of Cyprus was signed on August 16, 1960, and the former British possession then became independent. The sovereign bases are considered British territory and are separated from the homeland by foreign land and a couple of thousand miles.

If you have ZC4 in a QSL dated before August 16, 1960, it is good—good for Cyprus only. The 5B4 contacts count for Cyprus. The sovereign bases good for ZC4 counters are Akrotiri and Dhekelia. These are the good ones. If you have more than one ZC4 card and the locale is not indicated or not shown as one of the above, it is understood that the DXCC Desk in downtown Newington will make every effort to determine, if possible, where the British base for which the credit is asked was located. If you have a number of such unidentified ZC4 QSLs, it might be provident to submit more than one. Working things down to a fine point, if you previously submitted a ZC4 card for Cyprus credit, you can have the credit changed so that you get the sovereign base credit and submit another card to maintain your Cyprus credit.

Actually, when you think it over, it is not complicated at all. Just so you have a good understanding of what's going on. And never throw away anything at all, especially old QSLs. Twenty-five years from now they may put you on the Honor Roll. Then there is another aspect to collecting things. We know some DXers who started collecting for their junk box as soon as they got the license. After 25 years they started to realize that much of it was aptly named. It seemed that it took another 25 years to get rid of it. The DXCC Desk will be coming with a list of ZC4 callsigns that will be good for sovereign base credit.

How Close?

Sometimes you will hear a needed DX station right on the band edge, such as an SSB signal at 14150 kHz. What do you do? What will the FCC do? Is it worth it?

W4ZR, who writes letters as often as he is on the air, which means most all the time, notes that he has asked the FCC to comment on this matter. Years back W4ZR had been advised by the Chief Engineer of the FCC that it would be legal to operate within one cycle of the band edge, *provided* that the off sideband was down 40 dB or more . . . at the band edge.

Recently there has been discussion of this matter, some feeling that the off sideband has to be down 65 dB or more. W4ZR asked the FCC whether the information of some decades back is still correct. They said that it is.

The FCC in replying noted that their interest is to prevent interference to operations on frequencies adjacent to the amateur. But before you start squeezing in close to the edges, note that W4ZR is an electrical engineer, and years back, he worked for RCA and in their quartz-crystal division was responsible for calibrating the equipment used in the production calibration of crystals. If you know your off sideband is down 40 dB or more at the band edge, you might squeeze. But if you assume, you might be a lead actor in another drama. Those who know do; those who don't, don't, or something like that.

DX Advisory Committee

Bob Thompson, K6SSJ, is the new chairman of the DXAC, this coming a couple of months back at the time of the January Board meeting. A member of the Northern California DX Club, Bob might be more noted for his handling of the chairman duties for the International DX Convention over a string of successful conventions. Bob holds the Extra class license and is the International Sales Manager for a supplier in the electronic sector.

This is Keo Kimsen, one of the YL operators at XU1SS and the last operator on the air the day the village there was overrun by Vietnamese troops. Keo evacuated the village, but all the amateur gear had to be left behind. Kimpil is expected to be occupied until the dry season ends.
(JA-DX Family photo)

The Usual Windup—DX Notes

The hopes for Bouvet grew and faded in the last couple of months. At times it was but a slim prospect and most DXers are waiting until next year. DXers grow good at that. Bouvet is no garden spot, and difficulties in making a landing or just sticking to the ground once you are there are major problems.

With the latest reorganization at the ARRL in downtown Newington, DXCC is part of the "Membership Communications Service" enclave, and this will be headed by John Lindholm, W1XX, with Bob Halprin, K1XA, his assistant. This section will handle the QSL Bureau, DXCC, reciprocal operating information, contests, and operating awards, among other things.

A month or so back *The DX Bulletin* reported that a "white paper" was going to be issued by the ARRL which would review the processes followed in adding "new countries" to the DXCC Country List, this covering the happenings all the way to WW II. This involved considerable research, and it might be kept in mind that DXCC was started anew after WW II, so such a study goes back just about all the way. Along with the country criteria, such a study should enable a fuller understanding of the DXCC process and how one might understand some of the eternal enigmas of DXing.

Christmas Island in the Indian Ocean is reported as being heard a bit regularly. VK9X is the reported callsign, and he is showing somewhere just above 14110 kHz after 1500Z. *QRZ DX* reports that this operator might be permanent on the island, noting that it is ex-VK6KRD who has retired to Christmas Island.

Elsewhere you should find a photo of Leo Kimsan, who was one of the YL operators at XU1SS. The camp at Ampil was overrun by

CQ DX Awards Program

S.S.B.

1389	I1ZXT	1393	IN3ANE
1390	W9JBR	1394	ON5KL
1391	ZP0MJO	1395	KQ9W
1392	ZP5JAL		

C.W.

627	OZ5UR

S.S.B. Endorsements

310	K6WR/316	275	KQ9W/291
310	K2FL/316	275	IN3ANE/283
310	OZ3SK/314	275	I1POR/281
310	N4WF/314	250	ZP5JAL/254
310	4Z4DX/313	250	VE7AFY/253
310	ON5KL/313	200	I1ZHH/220
310	K4MQG/312	175	I8WYD/193
300	G4CHP/303	28 MHz	W9JBR
300	KB8KW/300	28 MHz	I1ZHH
275	WZ4I/296	28 MHz	ON5KL
275	AI5I/293	3.5/7 MHz	ON5KL

C.W. Endorsements

300	AB4H/304	275	EA2IA/292

Total number of active countries is 315. 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 s.a.s.e. 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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Kenwood TS-711A

Kenwood TR-2600, TR-3600

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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 315. 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 endorsements involving the issuance of a sticker is $1.00.

C.W.

W6PT	315	W6ID	311	AB4H	304	K9IW	292	K7ZR	280
K4CEB	315	K4XO	309	WØIZ	303	EA2IA	292	I5XIM	280
ON4QX	315	W4BQY	309	WA8DXA	302	N5DX	291	W2LZX	280
DL7AA	314	DL3RK	308	YU2TW	301	I3OBO	290	K1VHS	280
W3GRS	314	W4OEL	307	SM3EVR	300	WD9IIX	290	N8MC	277
N4PN	314	AA6AA	307	W6SN	299	W1WLW	289	WB4RUA	277
W9DWQ	314	N4MM	307	WØSR	299	W4BV	289	W6YQ	277
W8KPL	314	W1NG	306	K3FN	298	WA2HZR	286	DL1QT	277
K9MM	314	K1MEM	306	W7CNL	298	K8LJG	284	NN4Q	276
N6AV	313	OK1MP	306	DJ7CX	297	WD9IIC	284	KA3R	276
K6JG	313	K9QVB	306	SM6CST	297	K8PYD	281	K4SE	275
K6EC	312	W9BW	304	K3UA	295	WA4JTI	281	WA4DAN	275
K6LEB	312	N4KG	304	W9RY	293	WØHZ	281	K4CXY	275
N6CW	311								

S.S.B.

K2FL	316	K6EC	311	KM6B	304	W6NLG	297	N8BJQ	284
K6WR	315	W4SSU	311	WD8MGQ	304	NA5W	297	WB3HAZ	283
W6EUF	315	I4LCK	311	VE3MRS	304	K4CXY	296	WD8PUG	283
W3GRS	315	N4MM	311	VE7HP	304	W4UNP	296	XE1OW	283
KD8VM	315	WØYDB	311	XE1KS	303	KE3A	296	VE3CKP	283
DL9OH	315	N7RO	311	W2LZX	303	WZ4I	296	VE3MV	283
W4UG	315	W9SS	311	KU9I	303	I8ACB	295	IN3ANE	283
VE3MR	315	LU3YL	311	IØMBX	303	I3OBO	295	AE5B	282
IØAMU	315	OZ5EV	311	KB8DB	303	K9UAA	295	CT1UA	282
F9RM	315	N2SS	311	G4CHP	303	WA9PWN	295	KC8YM	282
VE3MJ	315	EA4LH	310	K1MEM	302	XE1OX	295	AI9R	282
W4EEE	315	K6XP	310	N5FG	302	WØIYR	295	VE3DLR	282
I8AA	315	OE2EGL	310	W6FET	302	KKØC	295	TG9EP	282
IØZV	315	DK2BL	310	W2FGY	302	I8ZTE	294	K4LR	282
KS2I	315	I3LLD	310	K9HQM	302	NN4Q	294	I1POR	281
W9DWQ	314	K4XO	310	KV2S	302	WDØBNC	294	KD5ZM	281
I8KDB	314	IV3YRN	310	WD9IIX	302	I5BDE	294	K9TI	280
K6YRA	314	W2SUA	310	W6SN	302	K4SE	293	N5FW	280
ZL1AGO	314	YU1DZ	310	VE3FJE	301	WD8MOV	293	ZL1BOQ	280
ZL3NS	314	VE3GCO	309	WB4NDX	301	KC8JH	293	KA8T	279
VE3GMT	314	DL6KG	309	WA3HUP	301	AI5I	293	KB5DN	279
EA2IA	314	N4PN	309	K8CMO	301	WA4LOF	292	EA3KW	279
W4NKI	314	LA7JO	309	W8ILC/QRPp	301	ACØA	292	EA6DE	279
YV1KZ	314	VE7WJ	308	AI8S	301	I2MOP	292	JH8NYK	279
W9JT	314	W1NG	308	K9IW	301	VE3FEA	292	W6MFC	278
DJ9ZB	314	VK4VC	308	W1LQQ	301	VP9CP	292	AI8M	278
N4WF	314	YV5AIP	308	W9RY	301	VE3IPR	291	K4BYK	278
OZ3SK	314	ZL1BIL	308	YU2TW	301	N5AWS	291	I5EFO	278
K9KLA	313	N6AV	308	W4OHZ	300	WB3DNA	291	VE3IUE	278
K9MM	313	AA6AA	308	I5EFO	300	WB6GFJ	291	K3LUE	278
XE1AE	313	K9BWQ	308	W8IMZ	300	W4JFE	291	KB3KV	278
I4ZSQ	313	N6OC	308	K9QVB	300	KB3OQ	291	WA2FKF	278
ZS6LW	313	WA4JTI	308	KB5FU	300	K1VHS	291	KB8O	277
W4DPS	313	VE4SK	307	KB9KD	300	KBØU	291	KP4EQF	277
ON5KL	313	K8PYD	307	K3UA	300	KQ9W	291	WBØUFL	277
K6JG	313	N4KG	307	KB8KW	300	JH4PRU	290	W4PTT	277
OE3WWB	313	IØMBX	307	VE4AT	300	W4BQY	290	KBØSY	277
OK1MP	313	K1UO	307	I8KCI	300	KZ2P	290	I8XTX	277
YV5DFI	313	W8JXM	307	WAØTKJ	299	YU7KV	290	W9NUF	277
W3AZD	313	WØSR	307	I6PLN	299	IØSGF	290	VE6PW	277
VE1YX	313	W7FP	307	KB9OC	299	JA5PUL	289	N7ASL	276
VE2WY	312	W6DN	307	DJ7CX	298	W9TA	289	WA6DTG	276
WØSFU	313	9H4G	307	K9SM	298	K8ZZU	289	WA4OPW	276
4Z4DX	313	N4KE	306	I8LEL	298	KØGT	288	AI9U	276
F2MO	312	W8PCA	306	K8NA	298	OK1AWZ	288	W5LLU	276
N6AW	312	W7OM	306	K8VFV	298	N2ATD	288	I8INW	275
W3GG	312	WAØDCQ	306	WB4UBD	298	WØULU	288	W8LKG	275
W9BW	312	W8ILC	305	EA9IE	298	AB9E	287	WB3CQN	275
I8YRK	312	W2CC	305	XE1NI	298	W6BCQ	286	WB1EAZ	275
CT1FL	312	VK3JF	305	HP1JC	297	N3ARK	286	VE7BSM	275
WØSD	312	EA1QF	305	K5DUT	297	VE3CYX	285	K8NWD	275
K9RF	312	SM4CTT	305	JH1VRQ	297	KC8EU	284	KI3L	275
K5OVC	312	XE1J	304	WA4DAN	297	KB5RF	284	KA9ABC	275
K8LJG	312	WB1DQC	304	KR9O	297	N8BKF	284	G3XTT	275
K4MQG	312								

Vietnamese troops in early January, and things have not been the same since. Kerguelen Island continues to show, usually around 14190 kHz from 1900Z or thereabouts. Some say that the FT8s sometimes show on the net meeting at 14180 kHz about this same time period. They are in the vicinity somewhere. Tune around, and if you hear FT8XA or FT8XB, you are getting close.

The District of Columbia is a multiplier in the ARRL DX tests, this a separation from Maryland. The District has been pushing for recognition as the 51st state, and some may point to the "10-square mile multiplier" as a portent of the future. There was one DXer who noted that under the agreement signed when Texas was admitted to the Union, Texas retained the privilege to divide the territory into five states. "Long ago," he has said at every opportunity, "I concluded that we will never run out of DXCC countries, nor are we likely to run short of new states." One can acknowledge that at least he is batting .500 up to now.

The Canadian license fee for amateur stations went to $20 in March. That's $20 annually. Also note in the *DX Report* is that the HW prefix you might have heard will be used in France as a special prefix for blind members of UNARAF during 1985 (HW3 = FC, HW4 = FD, and HW5 = FE).

The FCC a couple of months back issued a Notice of Proposed Rulemaking concerning repeater coordination. This NPRM 85-22 looks to add the definitions of a coordinated repeater, frequency coordinator, and harmful interference to Part 97. It also seeks to define the responsibility for resolving repeater-to-repeater interference.

The FCC also placed a moratorium on new repeater operations in certain metropolitan areas. In 85-22 the FCC is looking for comments on whether a new repeater should seek frequency coordination in a metropolitan area and also whether the FCC should recognize a single national frequency coordinator for the amateur service. Comments on 85-22 are due by July 1st, the FCC allowing ample time for this one to be mulled over. If you want the full text of 85-22, send large SASE with 60¢ postage affixed to the ARRL in Newington.

In Mauritania 5T5CJ is often heard after 0700Z around 1830 kHz. Now there is some reason to check 160 meters now that the cycle is staggering, maybe even falling flat at times. At the recent ARRL Board meeting it was decided to seek some input for possible modification of the ARRL band plan for 160 meters.

The number of VR6-Pitcairn calls continues to grow. Recently being heard or licensed were Tom, VR6TC, who has been the staple VR6 contact that a couple of DX generations grew up on, and also now there are VR6KB, VR6KY, and VR6YL. Betty Reich was operating as VR6BR, and QSLs for this one go to KA9W. If all the paperwork fell into place, AB4Y should have been heard from Mozambique, possibly as C90A. Early this year efforts were being made to make sure that the operating permit met the DXCC requirements. With some shifting in the political currents in Mozambique during recent years, the potential for continued operating from the former CR7 territory has improved.

Mike Manafo, K3UOC/YV4, showed in the Netherland Antilles and other spots as was planned. Mike started at Saba early in April, then St. Eustatius, St. Maarten, Curacao, and if you listen closely you might still catch him at Aruba and Bonaire. All stops had Mike signing his home call /wherever he might be just then.

If you caught Mike at any of his stops, QSLs go to him at his home QTH: 2419 Willow Street, Wesleyville, PA 16510. This gets the best service, as Mike says this is the best route. His YV QTH is almost as good, this to Mike at Collegio Internacional de Carabobo, Apartado 103, Valencia, Venezuela. The W3 bureau is good if you are not in a hurry. The Netherland Antilles of Verona is good, but sometimes problems are encountered. You might think of abandoning all hope if you want to go via the YV bureau. SASE or SAE/IRC needed.

The Amateur Radio News Service bulletin notes that if you have a cordless telephone you might also have some unexpected problems, such as someone nearby placing long-distance calls on your telephone. Also, others with similar units can listen to your conversations, which may be upsetting but is not illegal according to the article. All this occurs because of the small number of channels available for cordless use. There are now only ten, and it takes two to make the phone work, leaving only a limited number of channels available. There may be more allocations this fall. Meanwhile, some entrepreneurial type will cruise with his unit turned on when he picks up a dial tone of another cordless telephone on the same frequency. Similar cautions have been noted in the Mike and Key of the Cincinnati Radio Club and the Lockheed Radio Club's Bulletin.

Earlier this year the FCC started to indicate increasing impatience with the slow pace of certification for U.S. electronic gear imported into Japan and was looking for ways to stiffen U.S. licensing and registration requirements. Some sources felt that if such action is implemented, the importation of Japanese electronic gear would slow to a trickle.

Meanwhile, trade talks go on, some citing the Japanese requirement that every single piece of gear be certified while the U.S. accepts type certification. This has been a problem in some areas—automobile and telephone gear, for example. The FCC's concern was expressed after the JA government prepared to designate a Japanese telecommunications certification agency, the agency to be dominated by representatives from the ranks of Japanese manufacturers.

73, Cass, WA6AUD

DX Ten Years Back—May 1985

The ARRL annual report noted that in the past year one new DXCC country was added, Kingman Reef, while two were deleted, these being AC4-Tibet and VQ1/5H1-Zanzibar. Also, DX activity was down the previous year with Cycle 20 on the skids. In discussing fees for DXCC, the annual report termed DXCC as: "... an award for individual achievement having little or nothing to do with the value of DX to amateur radio." Chester, who once was rampant in SEAsia, was in Chad with the call TT5AC. Spain was getting ready to relinquish control over Spanish Sahara-EA9, and another country was on the skids. While W7PHZ was planning for Serrana Bank, 3B9DL was aiming for a June operation from Rodriguez. The CW-DXCC was authorized; the rush was on to get CW DXCC #1. Years later they are still bristling over whether SSB to CW really constituted a valid CW counter for the award. It did then. It does not now.

QSL Information

All of this comes with a lot of help from KA6A and W9LNQ, two watchers of the lonely night.

EL7C to DK5VI
FG5DL/FS to F6ARI
FY7BO to '85 CBA
HP1XKR to JA7AGO
J88AG to KA1ILA
K9GL/J8 to K9GL
OK4NW to OK1IBI
PY1BVY/PY0T to PY1BVY
TG9ZG to VE1XG
TI9J to WB4UBD
TI2BEV to W4ZD
W1RAN/C6A to W1RAN
WB9TIY/J8 to WB9TIY
K3WGR/VP2M to K3WGR
W3UM/VP2M to W3UM
XO1XG to VE1XG
ZF2FK to K9QVB
ZK1XS to PA2DXY
4K1F to UQ2ZAG
4U1UN to W2MZV
5N8ALH to G4HVE
6W8EX to F6EYS
9J2JI to KP4CZ
9Y4VU to W3EVW
C21DX to Box 225, Nauru Island, Central Pacific
CO2AG to Box 225, Havana 14, Cuba
EL2AY to POB 3485, Monrovia, Liberia
FO8-Clipperton '85 to YASME, Box 2025, Castro Valley, CA 94546
FT8XA to Y. Delatouche, 17 rue du Nouveau Parc, F-78570, France
FT8XB to M. Monceau, B.P. 83, F-95103, Argenteuil, France
J28EI to POB 2417, Djibouti City, Somalia
K3UOC/PJ to 2419 Willow Street, Wesleyville, PA 16510
KX6DS to No. Alabama DX Club, Box 4563, Huntsville, AL 33815
TU2FI to Box 1745, Abidjan Nr. 1, Ivory Coast
YV1ECX to Calle Acueducto N1102, Caja de Aguapunto Fijo, Falcon, Venezuela
9M2FK to YU1HA Trg Narodnog Fronta 1/5, 3400 Kragujevac, Yugoslavia

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a regular feature by
THEODORE J. COHEN, N4XX

THE INS AND OUTS OF THE WASHINGTON SCENE

CQ Presents Exclusive Interview With Senator Barry Goldwater, K7UGA

Elsewhere in this issue readers will find one of the more interesting exchanges ever published in the pages of *CQ* magazine: an exclusive interview with Barry Goldwater, K7UGA. An avid supporter of the Amateur service, and one of the more active amateurs on the air today, Barry has made significant contributions to many facets of our hobby through his legislative actions on issues such as radio-frequency interference on electronic home-entertainment equipment, malicious interferences to amateur communications, and Federal preemption of local ordinances as they pertain to amateur antennas. For Barry's up-to-the-minute views on some of the most important issues ever to face the amateur community—and for a personal glimpse of the man who rose from the cotton fields of the southwest to the halls of the United States Senate—don't miss this month's exclusive interview with Senator Barry Goldwater.

Commission Releases NPRM Concerning Amateur Repeaters

As anticipated in last month's column, the Commission, on 30 January 1985, released a Notice of Proposed Rule Making (NPRM) concerning frequency coordination of repeaters in the Amateur service (PR Docket 85-22). The action was prompted by the increasing use of repeaters by amateurs, and by the increasing number of reported instances of amateur repeaters causing interference to one another. In FY 84, for example, the number of alleged repeater-to-repeater interference cases was three times the number recorded in FY 83.

The Commission noted that most of the reported cases of amateur repeater-to-repeater interference appear to involve one or more non-coordinated repeaters. And when government intervention was required to resolve these problems, the Commission noted that it had "favored the repeater which has been operating in accordance with the recommendation of a local frequency coordinator." To this end, the ARRL's Repeater Directory was used as the preferred, authoritative source of lists showing repeater coordinators and coordinated repeaters.

With the above as background, the rules proposed in the NPRM would grant preferred status in instances of harmful repeater-to-repeater interference to amateur repeater operators whose repeater input and output frequencies have been recommended by a frequency coordinator. Further, comments were sought with regard to whether the FCC should recognize a single national frequency coordinator for the Amateur service.

Interested persons may file comments on this NPRM on or before 1 July 1985; reply comments are due on or before 30 September 1985. Amateurs are reminded that formal participants must file an original and five copies of their comments and other materials. Participants who wish each Commissioner to have a personal copy of their comments should file an original and eleven copies. Amateurs who wish to participate informally may do so by submitting one copy of their comments. All comments are to be forwarded to: The Secretary, Federal Communications Commission, Washington, DC 20554.

Moratorium Declared on New Repeaters, Then Cancelled

During the pendency of its NPRM on repeater coordination (PR Docket 85-22; see item above), the Commission initially imposed a moratorium on new repeater operation in Central Metropolitan Statistical Areas (CMSAs) and Metropolitan Statistical Areas (MSAs). Basically, these areas are the densest population centers in the United States, and are the areas most likely to suffer repeater-to-repeater interference. Only existing repeater operations in the CMSAs and CMAs would have been permitted, with a listing in the next edition of the ARRL Repeater Directory considered as creating a rebuttable presumption of pre-existing repeater operation.

This unprecedented move by the Commission immediately met with opposition from amateurs. And as the ARRL noted in its petition to lift the moratorium: "A Notice of Proposed Rule Making cannot, in and of itself, modify an existing rule . . ." (The "rule" is Section 97.85 of the Commission's Rules, which permits the operation of repeaters by amateurs.)

It should be noted that the moratorium was not considered an important issue by the Commission. However, it was a distracting factor in the minds of many amateurs as they considered the issues involved in the NPRM on repeater coordination. Accordingly, by order of Robert Foosaner, Chief of the Private Radio Bureau, the moratorium was cancelled in mid-February.

Goldwater Expounds on Reasons For Introducing Senate Resolutions 35 and 36

On 3 January 1985, Sen. Barry Goldwater (R-AZ) introduced two resolutions, Senate Resolutions 35 and 36, pertaining to standards which the senator hoped would be adopted by the FCC concerning local regulation of the installation of home outdoor communication antennas. The intent of the resolution was further amplified by Sen. Goldwater in comments entered into the Congressional Record on 6 February 1985.

In these comments Sen. Goldwater stated that what he had sought was ". . . to strike a balance between the interest of individual citizens who desire to install personal communication antennas and the legitimate interests of local governments in regulating local matters, consistent with Federal policy enunciated in the first amendment and national communications laws." And while he recognized that local communities and States have the right to use their zoning and regulatory powers, the senator nevertheless noted that "there is a middle ground, between prohibiting all outside antennas everywhere in the community and allowing any kind of size of antenna anywhere."

In his comments Sen. Goldwater also addressed pertinent First Amendment interests. Specifically, he stated that ". . . prohibition or impairment of participation by citizens in national communications services directly implicates both the constitutional right of access to information guaranteed by the First Amendment and recent Federal Policies to encourage competition in the electronic delivery of news and entertainment programs to the public." These comments were made out of concern about the effect zoning ordinances could have on antennas used by citizens for the reception of unscrambled satellite signals, amateur radio and MARS communications, and CB transmissions.

In sum, Sen. Goldwater stated that the purpose of the two resolutions is to advocate accommodation of both national communications policies and local zoning ordinances. He called for a reaffirmation of the Federal interests involved in authorized communications services, all of which generally require use of outdoor antennas. And while he expressed confidence that local and State officials will accommodate national concerns vis-a-vis outdoor antennas, he left no doubt that if this was not the case, further action on the part of the Congress might be required.

Commission Proposes To Deregulate CATV Technical Requirements

In an action that is sure to be controversial, the Commission, in late February, issued an NPRM pertaining to the operational requirements for cable television systems (MM Docket No. 85-38). In issuing the Notice, the Com-

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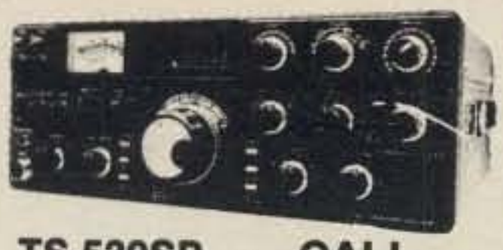

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TH-21AT/
TH-41AT
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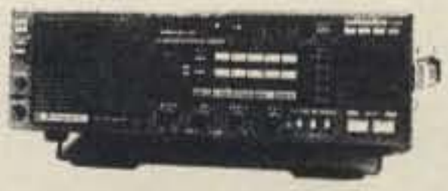
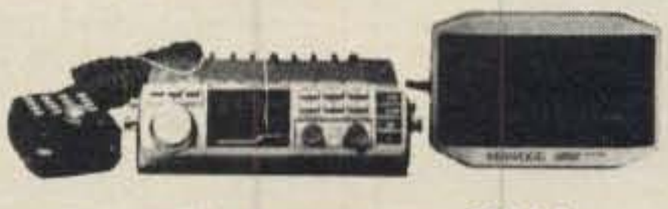


R-600, R-1000, R-2000

TR-7950 . . . CALL



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CIRCLE 41 ON READER SERVICE CARD

mission noted that the original rules for the cable industry were adopted in 1972, and that the industry has matured significantly since that time.

The FCC specifically raised the following questions in the NPRM:

•Should the quality performance standards for cable television systems be modified or removed?

•Should the signal leakage limits for cable television systems be relaxed?

It is the last question that will be of concern to amateurs residing in areas served by CATV systems. Signal leakage, principally on cable channel "E," which lies in the amateur 2 meter band, has been responsible for an increasing number of radio-frequency interference (RFI) complaints to the Commission from amateurs. Similarly, since leakage points on a cable system are also entry points for over-the-air signals, amateurs have occasionally been cited for causing interference to CATV systems. *In both cases, however, the responsibility for correcting the problems lies with the cable operator, since CATV systems operate as "closed systems."* That is, they have no spectrum allocations, and only co-exist with over-the-air services because they (theoretically) do not radiate signals.

The problem of CATVI is being addressed jointly by the ARRL and the National Cable Television Association (NCTA). But in a recent meeting to discuss such complaints, League personnel noted that of the 37 cases filed with the ARRL/NCTA committee since its inception, 29 remain unresolved! (*The ARRL Letter*, 14 February 1985). The NCTA, of course, has no authority to order a cable operator to correct deficiencies in his system. It is up to each cable operator to take such actions as may be required to prevent cable signals from radiating and from interfering with the operations of licensed radio systems. Judging from the lack of response to date, however, it seems apparent that CATVI problems are not to be resolved on a timely basis! And given this situation, raising the limits for signal leakage—especially in the band 54–216 MHz—can only excerbate an already worsening situation.

Re-evaluation of the technical requirements for the various services using the radio spectrum is necessary if we are to take advantage of, and to make allowance for, advances in the state of the radio art. But the urge to ease requirements for CATV signal leakage must be tempered by the recognition that even if today's requirements are overly restrictive, CATVI complaints are still running to too high a level—and are still not being corrected quickly enough—for the government to relax its technical requirements in this area.

Comments on the docket were due by 29 March 1985. Reply comments were due on 15 April 1985.

Amateur Cited For Excessive Power Violation Loses Case in Federal Court

According to Ray Kowalski, Chief, Special Services Division, PRB, FCC, Eugene C. Sykes, W4OO, an amateur Extra class licensee, lost a suit brought against him in Federal court by the U.S. government. Sykes was originally cited in 1982 for using excessive power in a Novice band, and he was sent a Violation Notice by the Commission that same year. A Notice of Apparent Liability was issued in 1983, with the fine set at $550.

Sykes' refusal to pay the fine resulted in the case being referred to the U.S. Attorney for the Southern District of Florida in 1983. The U.S. Government then brought a suit to collect the fine. Despite repeated delays, the case finally went to trial by jury in February 1985. Federal Judge Lenore Nesbitt heard the case, with Assistant U.S. Attorney Jonathan Goodman representing the government. Mr. Goodman was assisted in this effort by Carol Foelak of the PRB, herself a lawyer.

In its deliberations the jury, on 15 February 1985, upheld the government's position against Sykes. Judge Nesbitt, therefore, must now determine Sykes' fine. In cases such as this it is not unusual for the judge to impose court costs as well as a forfeiture.

FCC Acts on Modifications To Volunteer Examination Program

The Commission has taken two actions pertaining to the Amateur service's Volunteer Examination Program:

1. In PR Docket No. 85-21, a Notice of Proposed Rule Making, the Commission proposes to remove the paragraph (h) of Section 97.26 of its rules, thereby eliminating the retest waiting period. Currently, this section requires an applicant to wait 30 days to re-apply for the same or higher examination element when the applicant has failed an element. The FCC reasoned that Volunteer Examination Coordinators (VECs) could have more than one test design available in order to accommodate those retaking an examination element, thereby ensuring that the applicant was not retested on the same material. Comments were due 7 March 1985, with reply comments due 22 March 1985; mention of the NPRM in this column is for information purposes only.

2. The Commission, in late January 1985, issued an Order to the effect that VECs no longer have to notify the Commission's Field Operations Bureau (FOB) 30 days in advance of their registration deadlines. The FCC reasoned that the benefits to having the additional examination opportunities that would result from this action far outweighed any inconveniences that might result.

Department of Defense Supports PRB-1

In a letter to the FCC, the Department of Defense indicated its concern over ". . . the proliferation of 'anti-ham' zoning ordinances which prohibit effective operation of amateur radio stations by limiting antenna heights or restricting accessory uses of residential real property." The comment was made in response to the ARRL's request for preemptive relief in the matter of restrictive antenna ordinances (Private Radio Bureau issue PRB-1).

The DoD cautioned the Commission that the continued success of its plans for amateur participation in its national security, emergency preparedness (NSEP) program would be severely diminished if state and local ordinances prevented amateurs from constructing and using effective transmission facilities. The DoD cited emergencies such as the Grenada rescue operation, the 1983 New Orleans flood, the 1982 hurricane in Hawaii, and the Coalinga earthquake as examples of situations in which amateurs provided needed communications.

Do Incentives Encourage Upgrading? The Answer Appears To Be "Yes!"

The statistics shown in fig. 1, collected by John Johnston, W3BE, of the Special Services

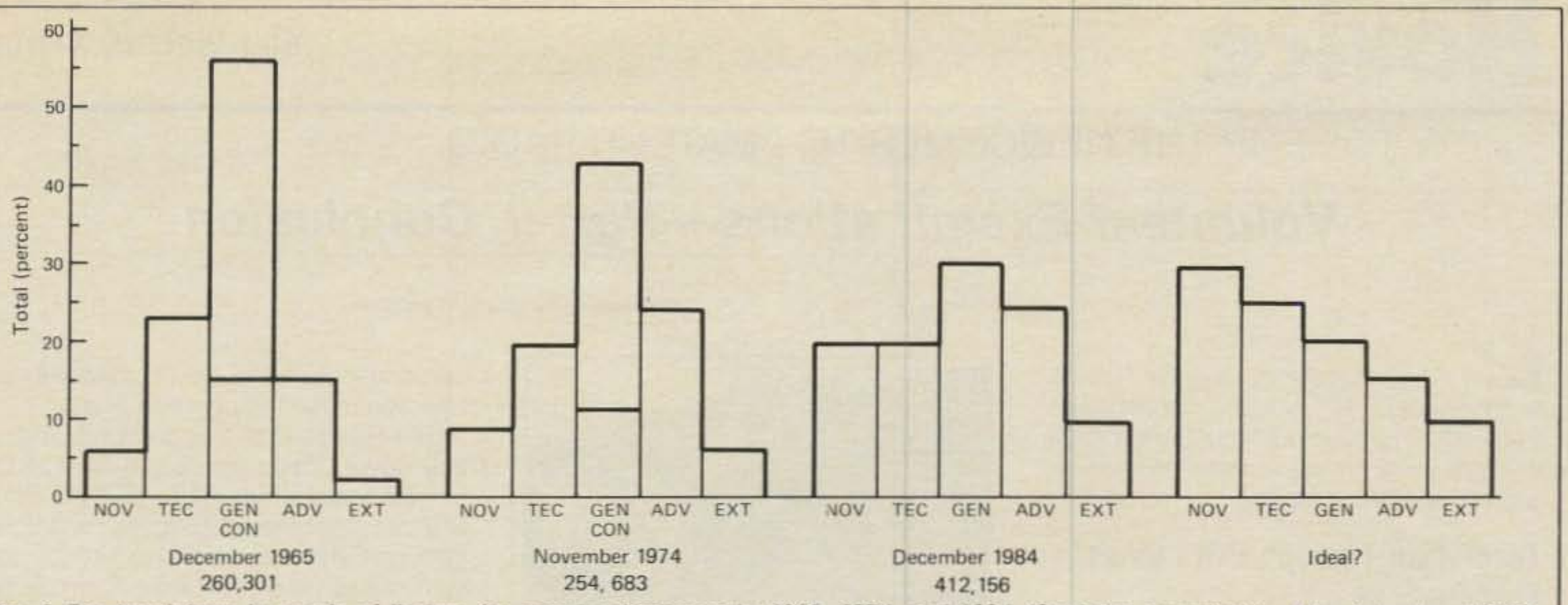


Fig. 1–The breakdown by grade of license for amateur licensees in 1965, 1974, and 1984. (Statistics compiled by John Johnston, W3BE, Special Services Division, PRB, FCC.)

Division, PRB, FCC, show the breakdown by grade of license for amateur licensees in the years 1965, 1974, and 1984. As seen, more than half of all amateurs licensed in 1965 held a General or Conditional class license, with less than 20 percent of the licensees in the Advanced and amateur Extra grades.

A move to incentive licensing based on the availability of exclusive frequency bands in 1967 and 1968, however, apparently had the desired effect. By 1974 General and Conditional class licensees accounted for only 43 percent of all licensees, while Advanced and amateur Extra licensees now represented almost 30 percent of all amateurs.

Three actions in the 1970s were responsible for a further redistribution of licensees among the grades available. First, in 1976 the Commission instituted an incentive program based on the issuance of a two-letter callsign for amateur Extra class licensees. Then, too, operators from the CB service began moving to the Amateur service, something which greatly expanded our ranks in the mid to late 70s. Finally, in 1978 the Commission began issuing callsigns by class of license.

Today over 400,000 amateurs are licensed in this country. And as seen in the chart, almost 20 percent of them are Novices. Almost 35 percent hold Advanced or amateur Extra class licenses, with General class licensees now representing only 30 percent of the amateur population.

Whether the fourth part of the chart represents the "ideal" distribution is only a guess. However, there is every reason to believe that the incentives offered amateurs to upgrade their class of license have had the desired effect.

FCC Issues NPRM on Microwave Frequencies

An NPRM (PR Docket 85-23) has been issued by the Commission in the matter of new microwave frequencies for the Amateur and Amateur-Satellite services. The action is an attempt to bring U.S. Amateur Rules into accord with the microwave allocations designated for these services at the 1979 World Administrative Radio Conference (WARC). Of particular interest, according to the ARRL, is a provision in the Notice to authorize amateur operations (earth-to-space) in the 1260–1270 MHz band. AMSAT-OSCAR 10 occasionally operates in this band, and at such times U.S. amateurs may not use the satellite. (According to *The ARRL Letter*, the League has filed a motion for interim operating authority in this band, pending consideration of the NPRM).

Comments were due to the Commission by 8 April 1985. Reply comments are due 10 May 1985.

Amateur Radio Luncheon Scheduled For AFCEA Exposition

On Wednesday, 5 June 1985, your Washington Editor will once again play host to the Armed Forces Communications and Electronics Association (AFCEA) Amateur Radio Luncheon. Held at the Washington, D.C. Convention Center as part of the world's largest annual military communications convention and exposition, the luncheon draws together a veritable who's who of amateurs and friends from industry, government, and the military. And while no speeches are allowed (sufficient time must be reserved for the drawing of door prizes!), we usually can prevail on some of the attendees from "official Washington" to give us their views as to where amateur radio may be heading in the years ahead.

For ticket information for this year's Amateur Radio Luncheon, write to AFCEA, Attn: Col. Bud Deem (Ret.), Programs Office, 5641 Burke Centre Parkway, Burke, VA 22015-2289; telephone (703) 425-8500.

Oh, yes . . . don't wait until the last minute to buy your ticket. Because of advance ticket sales, the luncheon sold out early in each of the last three years!

Your Washington Editor thanks Mr. David Siddall, K3ZJ, for his contribution to this month's column.

Novice

a monthly feature by
BILL WELSH, W6DDB

"HOW TO" FOR THE NEWCOMER TO AMATEUR RADIO

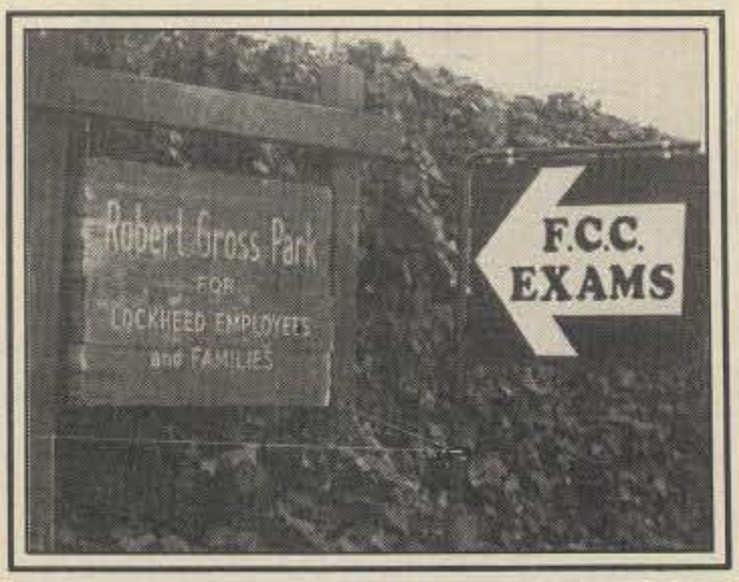
Volunteer Examinations—Part II, Conclusion

Last month's column covered Novice examinations. It includes information that also applies to the Technician through Extra class examinations, which are covered in this issue.

Technician Through Extra Class Examinations

There are several Volunteer Examiner Coordinators (VEC's) scattered throughout America, plus its territories and possessions. Each region has at least two VEC's. The VEC program started 1 December 1983. It has assumed the Technician through Extra class licensing examination task that was previously handled by 28 FCC field offices located in 19 states, Puerto Rico, and the District of Columbia. The American Radio Relay League (ARRL) is one of the few organizations that serves all 13 regions. Each VEC accredits its own Volunteer Examiners (VE's) and ascertains that Technician through Extra class licensing is conducted in accordance with FCC requirements. A reimbursement fee is permitted to allow VEC's to recoup expenses involved in conducting their programs. This fee has to be justified at the end of each year, with the following year's fee determined at that time. The rest of the VEC coverage in this article concerns the ARRL/VEC program, because I participate in it and know it.

Each test session's hosting group in the ARRL/VEC program gathers a group of ARRL/VEC accredited Volunteer Examiners (VE's) to supervise Technician through Extra class licensing examinations. Potential VE's are not usually accredited when they are approached initially by a VE Team (VET). In these cases the potential VE submits a VE application to ARRL/VEC and receives a copy of the ARRL/VEC accreditation manual. After reading this manual, the VE applicant completes an enclosed open-book test that is then sent to ARRL/VEC for grading. Each successful VE applicant receives a certificate showing she/he is an ARRL/VEC accredited VE, plus a VE badge that must be worn in plain view during all ARRL/VEC sponsored test sessions. Each group that intends to participate in the ARRL/VEC program forms its own Volunteer Examiner Team (VET) to schedule and conduct tests. Each VET has a contact person who helps applicants complete license examination arrangements. Each VET also has a liaison person who coordinates test session matters with the ARRL/VEC. Any Extra class amateur who wants to become involved in this essential program should become accredited by the ARRL/VEC and offer her/his assitance to a local VET. I am sure such an offer would be gratefully accepted, with no requirements to join the sponsoring organization.



FCC exam signs at the entrance to the Lockheed E.R.C. Amateur Radio Club (W6LSO) in Burbank, California.

ARRL/VEC test session applicants no longer have to apply at least one month before a scheduled test date. However, it is still advisable to preregister, because limited testing space can cause a VET to only guarantee to examine people who have preregistered, which is what our W6LS VET does. We accept as many walk-ins as we can handle, as long as they show up at predetermined test times and they do not overcrowd test areas. No one is allowed to disrupt a test session that is in progress.

Each examination applicant must supply a signed copy of her/his current license (if licensed), a filled-in FCC Form 610 (June 1984 version), and a $4.00 check (or money order) marked payable to ARRL/VEC (not to the VET group). Any applicant who claims a waiver to the code test normally administered as a part of a specific licensing examination must provide a copy of her/his radiotelegraph operator's license or the code credit certificate that exempts the applicant from having to take the code test. If an applicant has recently upgraded, but has not yet received her/his new license from the FCC, a copy of the VET-issued upgrade certificate must also be included with any new application to upgrade again.

The Novice licensing portion of this article covers basic points that must be observed to correctly fill in an FCC Form 610. Most people applying for Technician through Extra class licenses already hold some lower grade of license. Such people should be aware that items 3 (Call Sign) and 4 (Operator Class of the Attached License) must also be filled in on Form 610. If one wants to obtain an "appropriate" new call sign when one upgrades, item 2E (Change Call Sign) should be checked in addition to item 2D (Examination to Upgrade License). If you have a call sign that you want to keep, simply do not check the item 2E box. An applicant without a current amateur license checks the item 2C box (Examination for New License) and does not write anything in items 3 or 4. Whether item 2C (Examination for New License) or item 2D (Examination to Upgrade) is used, the appropriate box (to the right) must be marked to show the class of license for which one is applying.

Each applicant is required to present satisfactory proof of her/his identity to the VET contact person when she/he arrives at the test session site on the day of the scheduled examination. A driver's license with a photograph suffices. If you do not have one, bring two or more other items that identify you beyond a reasonable doubt.

Any problems with Form 610 entries, checks, license copies, and personal identification are resolved between the applicant and the VET contact person before the applicant begins the examination procedure.

The VET splits up into groups of at least three VE's. Each sub-team (three or four VE's) stays with a single group of applicants throughout that specific group's entire examination process. A trio of VE's is required to remain with the group at all times. Consequently, it is helpful to have a fourth VE assigned to act as a runner for each sub-group. The VET in which I work uses three sub-groups of four VE's (each), which requires a minimum of twelve Extra class amateurs who are ARRL/VEC accredited.

Each VET sub-group receives the applicants and all paperwork from the VET contact person. The appropriate code receiving test is administered first, resulting in about one half of the applicants attaining a passing grade and becoming

2814 Empire Ave., Burbank, CA 91504

Bill Darg, VE4ACF, of Winnipeg in the Canadian province of Manitoba earned his first license during October 1983, and he expects to have passed the Advanced examination before this picture is printed. Bill purchased his rig from Jordan Hillrich, VE5AGC, who was featured in the December 1983 Novice column. Bill's station includes a Yaesu FT-102 transceiver, FV-102DM external frequency control, FC-102 antenna tuner, and a Butternut HF6V ground-mounted vertical antenna. He has contacted amateurs in all Canadian provinces, 48 American states, and 25 countries. Listen for Bill on 40 meters. The first DX country contacted by most American Novices is Canada.

eligible to be examined in any required written examinations. ARRL/VEC code cassettes contain a one-minute practice run at the required speed of the test element (5, 13, or 20 wpm). Our VET gives every applicant a special piece of scratch paper for use in copying the one-minute warmup run. This leaves them with the entire official code test paper clear for copying the five-minute code test that follows. Most applicants need all the available space to copy the actual test. Each applicant is then given a ten question fill-in-the-blank test based on the text of the test tape. A minimum of seven correct answers is required to pass the code receiving test.

The examination ends for each applicant who fails the code receiving portion of a test, unless the applicant decides to change her/his application to apply for a lower grade of license (than originally sought) that does not require her/him to pass the failed code test. All others who fall a code test are invited to immediately make application to be re-examined during a future test session. There is presently a 30-day minimum span required before retaking the same test. FCC Form 610 applications are made available to failed applicants before they leave the test session site. All portions of each test session are kept as pleasant as possible for the applicants.

Our VET does not presently conduct a code sending test of applicants because neither the FCC rules, nor the ARRL/VEC instructions, show that it can be required. I hope that this anomaly will be eliminated as the VEC program matures.

The VET sub-group then administers the written portion of the examination to those applicants who passed any required code test, plus any other applicants who were already qualified (due to code test credit, etc.) and did not take the code receiving test at the present test session. Applicants are told that there can be no interruption of the written test. They are given the opportunity to sharpen pencils, get a drink of water, visit the restroom, etc., before the test starts. If a calculator is to be used during a test, it must be approved for use by the VET sub-group prior to the start of the test. All papers and books must be set aside so that no reference material is visible. Any attempt at cheating results in immediate failure of the element being attempted, plus termination of that applicant's examination. The only papers an applicant is allowed to use during any part of the examination procedure are the papers distributed by the VET sub-group. If additional scratch paper is required, it must be obtained from the VET sub-group. If an applicant is taking several written elements at one time, she/he is allowed to take a short break (restroom, water, etc.) after turning in all material related to a completed element, and before accepting the next element from the VET sub-group. When an applicant is finished working on a written test, she/he turns in all material (including scratch sheets) to the VET sub-group.

Completed written tests are graded as quickly as possible, and applicants are told whether they passed or failed their tests. A certificate of successful completion is issued to each applicant who passed a code or theory examination element. Each licensed amateur who passes an upgrading examination receives an appropriate interim permit which allows her/him to immediately use the newly acquired operating privileges. Those people who fail written tests are invited immediately to make application to be reexamined during a future scheduled test session. FCC Form 610 applications are made available to unsuccessful applicants before they leave the test site. It is a simple matter to detach license copies and other required material from the old Form 610 and to attach this material to a new Form 610 filled in for use during a future test session.

FCC Elements

FCC elements that applicants must pass to obtain amateur radio operator licenses are as follows:

Novice—1A and 2
Technician—1A, 2, and 3
General—1B, 2, and 3
Advanced—1B, 2, 3, and 4A
Extra—1C, 2, 3, 4A, and 4B

Applicants are not re-examined for any FCC elements required to obtain the class of license they presently possess. In other words, if a Novice wants to upgrade to Technician, she/he has already passed elements 1A and 2, and now just has to pass element 3 to become a Technician. One just takes those elements which are in addition to the elements which were passed to obtain one's present license. Notice that applicants are not tested at lower code speeds when applying for a license that requires a higher speed code test. As an example, an unlicensed person applying for an Extra class license just has to take the element 1C (20 wpm) code test, and she/he does not take either the element 1A (5 wpm) or element 1B (13 wpm) code test.

Changes

Examination questions and answers are in a continual process of being changed, and it is hoped that the changes result in improved tests. One written element is revised each quarter, resulting in an annual change to each of the four written elements (2, 3, 4A, and 4B). I believe it will just take a few years to develop excellent written examinations.

As previously stated, the FCC Private Radio Bureau PR Bulletin 1035 covers amateur radio operator examinations in detail. PR Bulletin 1035 is the study guide for FCC amateur radio operator license examinations, and it includes the following explanations:

1. Why amateur radio operator examinations are required.
2. Subjects covered in amateur radio examinations.
3. Obtaining study materials.
4. Questions used in an examination.
5. Submitting questions for examinations.
6. Element 2 syllabus—Novice.
7. Element 3 syllabus—Technician/General.
8. Element 4A syllabus—Advanced.
9. Element 4B syllabus—Extra class.

Element 2, 3, 4A, and 4B questions are listed in PR bulletins 1035A, 1035B, 1035C, and 1035D, respectively. Volunteer Examiners must use the exact wording of questions in the bulletins, plus the specified number of questions in each subject category. Bulletin 1035A (Novice) was changed August 1984, and Bulletin 1035B (Technician and General) was changed November 1984. Bulletins 1035C (Advanced) and 1035D (Extra class) should be updated February and May 1985, respectively. Volunteer Examiners are allowed up to six months to phase out older tests and to switch over to new examinations based on revised bulletins.

Volunteer Examiners are in the unique position of having the opportunity to note which questions and/or answers are unusually troublesome to license applicants. Suggested new and revised questions and answers may be submitted to the FCC by amateurs for possible use in

future examinations. The following rules apply in regard to submitting suggested questions:

1. Each question must be suitable for use in all types of examination formats—i.e., essay, fill in the blank, multiple choice, true or false, etc.

2. Each question must be submitted on a separate piece of "A" size (8.5″ × 11″) paper.

3. Show syllabus element, such as element 3/General.

4. Show study guide (PR Bulletin 1035) identification of exact subject the proposed question covers. An example is 2B(3), zero beating received signal.

5. State the suggested question (stem), plus the correct answer. Three incorrect answers (detractors) may also be submitted, taking care that each one is wrong.

6. State at least one reference which validates the correct answer, such as an FCC rule (stated in the latest Part 97) or a textbook (name, publisher, and page/figure/table number).

7. Name, call sign, mailing address, and class of valid amateur license held by person submitting each suggested examination question.

8. Extra class amateurs are allowed to submit suggested questions for all elements. Advanced class amateurs are allowed to submit suggested questions for elements 2 and 3 (Novice and Technician/General) only. General and Technician class amateurs are only allowed to submit suggested questions for element 2 (Novice). Basically, one is not permitted to submit a question that could possibly be included in any subsequent upgrading test one may take.

The FCC syllabus format is identical for each class of amateur radio operator license examination, and I believe it needs to be improved. The present sequence of subjects is not reasonable for use by people using licensing guides. These people tend to study material from cover to cover, and licensing guide publishers usually follow the printed bulletin (1035A through 1035D) exactly as it is printed. Electrical principles and circuit components are the fifth and sixth categories out of the nine subject categories stated in these bulletins. I think it would be an improvement to revise the study guide and each associated syllabus to use the following subject breakdown sequence:

(A) Rules and Regulations
(B) Electric/Electronic Fundamentals
(C) Circuit Components
(D) Circuits
(E) Systems and Emissions
(F) Antennas, Feedlines, and Propagation
(G) Operating

Ben Potter, KA1MDK, of Tolland, Connecticut, is a 54-year-old retread who held a Novice license during 1961, when it was just valid for one year and could not be renewed. He served as a radio operator on C-47 and B-29 aircraft during the Korean War. Ben has a degree in data processing management and he works as a cost analyst. He has worked for Pratt and Whitney Aircraft 28 years. His station includes a Heath DX-60 transmitter, Hallicrafters S-40B receiver, Heath Q-multiplier, Realistic SWR/power meter, and a 10–40 meter Cushcraft vertical antenna nestled among several tall pine trees.

Changing the existing subject sequence as indicated in the previous paragraph would provide two major benefits. It would allow students to study licensing guide material from cover to cover and in a logical study sequence. It would also enable amateurs to more easily recommend new questions.

The subjects shown in each syllabus also need some updating. Amateurs must base suggested questions on existing syllabi subjects, and some of these subjects are not current (such as ladderline). Consequently, amateur examinations cannot be optimized until both the format and the subjects in the existing study guide (Bulletin 1035) have been improved.

The present FCC rules essentially require Extra class licensees to conduct the examinations. This undesirable situation should be corrected as quickly as possible to allow Advanced class VE's to conduct Novice, Technician, General, and Advanced tests. Advanced class licensees cannot gain any unfair advantage in future upgrading tests by conducting tests in elements they have already passed. Advanced class VE's are of limited usefulness under the present rules. The VET sub-group leader could be required to be an Extra class VE, but it should be permissible for the other two sub-group members to be Advanced VE's. Just the Extra class examination should require three Extra class VE's in the VET sub-group. Similarly, I believe the rules should be changed to permit General class licensees to become accredited VE's, and that they should be eligible to conduct Technician and General examinations with an Extra class VE as the sub-group head. I believe that involving General and Advanced class amateurs in the licensing program is in the best interest of our amateur radio service. I also believe it will motivate them to upgrade.

Last, but not least, among change considerations is the matter of proving operating capability to obtain an operator's license. The amateur license is the only operator's license I know which one can obtain without proving any ability to operate. It would make sense to change the code test requirements for the Novice license to an unassisted complete two-way radiotelegraph (code/A1) on-the-air contact using a manual (hand) key and no code visual display equipment. The test could be conducted using the Volunteer Examiner's station. It is unreasonable to license people to operate when they have not proven they can do so. If this Novice operating test proves to be successful, the same approach could be integrated into Technician through Extra class tests. "Hands-on" test requirements should benefit applicants; it surely would produce more operators and less license holders who do not operate.

73, Bill, W6DDB

Propagation

a monthly feature by
GEORGE JACOBS, W3ASK

THE SCIENCE OF PREDICTING RADIO CONDITIONS

The Royal Observatory of Belgium, the world's official keeper of sunspot records, reports a monthly mean count of 16.5 for January 1985. On 12 days during the month the sun's surface was completely devoid of any spots!

January's daily observations, taken with observations made over the previous year, result in a *smoothed sunspot number* of 44 centered on July 1985. The sunspot cycle is measured by the level of smoothed sunspot number. The present cycle continues to decline towards a minimum level. A smoothed sunspot number of approximately 27 is forecast for May 1985. This is approximately the level of solar activity that was last observed during May 1977!

LAST MINUTE FORECAST

Day-to-Day Conditions Expected for May 1985

Propagation Index	Expected Signal Quality (4)	(3)	(2)	(1)
Above Normal: 8, 16, 26	A	A	B	C
High Normal: 5, 7, 9, 12, 15, 17, 24, 27	A	B	C	C-D
Low Normal: 3-4, 6, 10-11, 13-14, 18, 21-23, 25, 30-31	A-B	B-C	C-D	D-E
Below Normal: 2, 19-20, 28-29	B-C	C-D	D-E	E
Disturbed: 1	C-E	D-E	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 S1 and S3, and with considerable fading and noise.

E—No opening expected.

HOW TO USE THIS FORECAST

1. **Find *propagation index* associated with particular band opening from Propagation Charts appearing on the following pages.**
2. **With the *propagation index*, use the above table to find the expected signal quality associated with the band opening for any day of the month. For example, an opening shown in the charts with a *propagation index* of 3 will be poor (D) on the 1st, fair-to-poor (C-D) on the 2nd, good-to-fair (B-C) on the 3rd and 4th, good (B) on the 5th, etc.**

May Propagation

During May optimum frequencies for DX propagation are *lower* during most of the daylight hours—but *higher* during the late afternoon, early evening, and nighttime hours—than were observed during the winter months. A considerable increase is expected in sporadic-*E* ionization during the month, and this should result in more frequent short-skip openings on the HF bands, and on *6 meters* as well. A seasonal *increase* in the static level is also normal for May.

The following is an overall picture of HF amateur band openings expected during May 1985. For specific times of DX openings refer to the DX Propagation Charts which appeared in last month's column. This month's column contains Short-Skip Propagation Charts valid for May and June, as well as charts centered on Alaska and Hawaii. The Short-Skip Charts contain propagation forecasts for openings varying in distance between 50 and 2300 miles. For day-to-day propagation conditions expected during the month, see the Last Minute Forecast, which appears at the beginning of this column.

10 Meters: Except for an occasional daytime opening to some southern or tropical areas, not many DX openings are forecast for this band during May. The afternoon hours are the best time to check for DX openings. Frequent short-skip openings between distances of approximately 750 and 1400 miles, however, should be possible.

15 Meters: A seasonal decrease in DX openings is normal for May. Some fairly good openings are still possible towards the south during the late afternoon and evening. Numerous short-skip openings, between approximately 600 and 2300 miles, should be possible almost daily.

20 Meters: This should be the best band for DX during May. Opening shortly after sunrise, good DX conditions are expected to one area or another through the evening hours. The band may also remain open to southern and tropical areas through much of the nighttime hours as well. DX conditions should peak during the late afternoon and early evening, with openings possible to almost all areas of the world. Very frequent short-skip openings are also forecast for distances between approximately 350 and 2300 miles. Quite often, especially during the late afternoon, optimum conditions may exist for both short and long skip, and stations a few hundred miles away will be heard at the same time as DX stations from several thousand miles away, causing considerable QRM.

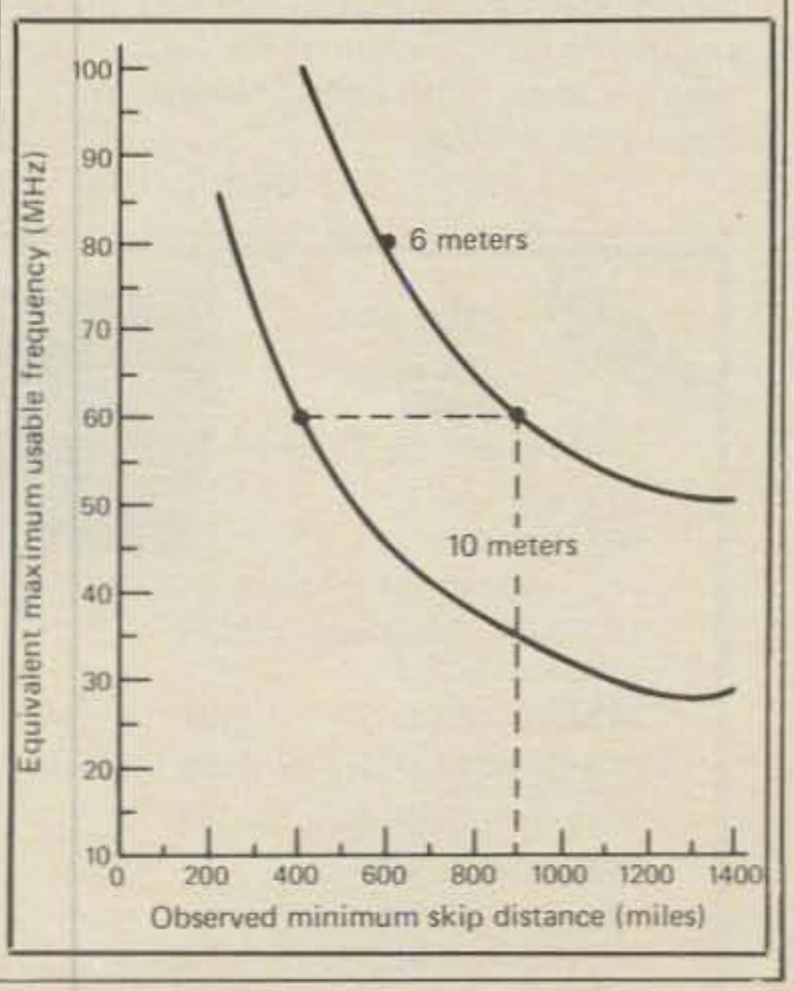
40 Meters: Fewer DX openings are expected because of the shorter hours of darkness and the higher level of static. Fairly good openings should still be possible, however, to several areas of the world from shortly before sunset, through the hours of darkness, until shortly after sunrise. Good daytime short-skip openings can be expected over distances of between approximately 150 and 750 miles, with nighttime openings extending up to the one-hop limit of 2300 miles.

80 Meters: Fewer hours of darkness and higher static levels are also expected to reduce DX openings on this band, but a few fairly good ones should still be possible. Check during the hours of darkness. Excellent short-skip openings are forecast for the daylight hours over distances ranging between 50 and 250 miles. During the hours of darkness, the short-skip range should increase up to approximately 2300 miles.

160 Meters: Propagation conditions on this band have passed their seasonal peak and should decline until the early fall. Openings up to a distance of 1000 miles or so should be possible this month during the hours of darkness. An occasional opening well beyond this range may also be possible when static levels are exceptionally low.

VHF Ionospheric Openings

Sporadic-*E* ionization should increase considerably this month, and some fairly good *6 meter* openings should be possible between approximately 1000 and 1400 miles. These openings are most likely to occur between 10 a.m. and 2 p.m. and between 6 and 10 p.m., local daylight time, although they can also occur at other times. During periods of in-



11307 Clara Street, Silver Spring, MD 20902

tense and widespread sporadic-*E* ionization, two-hop openings considerably beyond 1400 miles may occasionally occur on *6 meters*, and openings between approximately 1200 and 1400 miles may be possible on *2 meters!*

Here's a useful tip for predicting *6 meter* short-skip openings from observations made on *10 meters*. The geometry of propagation is such that as the skip distance *decreases* on *10 meters*, the highest frequency that will be reflected by sporadic-*E* ionization is *increasing*. By observing the *minimum* skip heard on *10 meters*, and using the relationship shown in fig. 1, it should be possible to tell whether or not *6 meters* is open and over what distance.

For example, if the minimum skip heard on *10 meters* in a south-westerly direction is observed to be 400 miles (it's the distance to the *nearest* skip station that counts, not others), from fig. 1 the intersection between 400 miles and the *10 meter* curve corresponds to an MUF of 60 MHz. This means that there is a very good chance that *6 meters* should also open in the same general direction. The minimum skip distance that can be expected on *6 meters* can be found from fig. 1 by locating the intersection between 60 MHz and the *6 meter* curve. The resulting distance is found to be 900 miles. A useful rule of thumb to remember is that when skip stations are heard less than *500 miles* away on *10 meters*, the chances are very good that *6 meters* will also open in the same general direction.

The *Eta Aquarids* meteor shower should intersect the earth's atmosphere between May 4 and 6. This is a major meteor shower, and it should reach maximum intensity during the afternoon of May 5, with a predicted hourly meteor count in excess of 20. Chances are excellent for meteor-burst openings during the period of the shower.

While there is generally little auroral activity during May, some displays could occur during periods of radio storminess. Check the Last Minute Forecast at the beginning of this column for those days that are likely to be Below Normal or Disturbed during May.

73, George, W3ASK

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) Opening should occur between 14 and 22 days
(2) Opening should occur between 7 and 13 days
(1) Opening should occur on less than 7 days

Refer to the "Last Minute Forecast" at the beginning of this column for the actual *dates* on which an opening with a specific *propagation index* is likely to occur, and the signal quality that can be expected.

3. Times shown in the Charts are in the 24-hour system, where 00 is midnight; 12 is noon; 01 is 1 A.M.; 13 is 1 P.M., etc. On the Short-Skip Chart appropriate *daylight* time is used at the *path midpoint*. For example on a circuit between Maine and Florida, the time shown would be EDT, on a circuit between N.Y. and Texas, the time at the midpoint would be CDT, etc. Times shown in the Hawaii Chart are in HST. To convert to daylight time in other USA time zones *add* 3 hours in the PDT zone; 4 hours in the MDT zone; 5 hours in the CDT zone; and 6 hours in the EDT zone. *Add* 10 hours to convert from HST to GMT. For example, when it is 12 noon in Honolulu, it is 15 or 3 P.M. in Los Angeles; 18 or 6 P.M. in Washington, D.C.; and 22 GMT. Time shown in the Alaska Chart is given in GMT. To convert to *daylight* time in other areas of the USA *subtract* 7 hours in the PDT zone; 6 hours in the MDT zone; 5 hours in the CDT zone; and 4 hours in the EDT zone. For example, at 20 GMT it is 16 or 4 P.M. in N.Y.C.

4. The Short-Skip Chart is based upon a transmitted power of 75 watts c.w. or 300 watts p.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 10 dB loss, it will lower by one level.

5. Propagation data contained in the Charts has been prepared from basic data published by the Institute for Telecommunication Sciences of the U.S. Dept. of Commerce, Boulder, Colorado 80302.

CQ Short-Skip Propagation Chart
May & June 1985
Local Daylight Savings Time At Path Mid-Point

Band (Meters)	Distance Between Stations (Miles)			
	50-250	*250-750*	*750-1300*	*1300-2300*
10	Nil	08-09 (0-1) 09-13 (0-2) 13-17 (0-1) 17-21 (0-2) 21-23 (0-1)	08-09 (1) 09-13 (2) 13-17 (1-2) 17-21 (2) 21-23 (1) 23-07 (0-1)	08-09 (1-0) 09-21 (2-0) 21-23 (1-0) 23-07 (1-0)
15	Nil	07-09 (0-1) 09-13 (0-2) 13-17 (0-1) 17-21 (0-2) 21-00 (0-1)	07-09 (1-2) 09-13 (2-3) 13-17 (1-2) 17-19 (2-3) 19-21 (2) 21-00 (1) 00-07 (0-1)	07-09 (2-0) 09-13 (3-1) 13-17 (2-1) 17-19 (3-1) 19-21 (2-0) 21-07 (1-0)
20	Nil	07-09 (0-2) 09-12 (0-3) 12-17 (0-4) 17-19 (0-3) 19-23 (0-2) 23-07 (0-1)	07-08 (2) 08-09 (2-3) 09-12 (3-4) 12-17 (4) 17-19 (3-4) 19-20 (2-4) 20-21 (2-3) 21-23 (2) 23-07 (1)	07-08 (2) 08-09 (3-2) 09-15 (4-2) 15-17 (4-3) 17-20 (4) 20-21 (3) 21-23 (2) 23-07 (1)
40	08-10 (0-2) 10-16 (1-4) 16-18 (2-4) 18-20 (1-3) 20-22 (0-2) 22-08 (0-1)	08-10 (2-4) 10-15 (4-2) 15-16 (4-3) 16-19 (4) 19-20 (3-4) 20-22 (2-3) 22-08 (1-2)	08-09 (4-3) 09-10 (4-2) 10-15 (2-1) 15-16 (3-1) 16-19 (4-2) 19-20 (4) 20-22 (3-4) 22-01 (2-4) 01-03 (2-3) 03-08 (2)	08-09 (3-1) 09-10 (2-1) 10-16 (1-0) 16-19 (2-1) 19-20 (4-3) 20-01 (4) 01-03 (3) 03-06 (2) 06-08 (2-1)
80	08-10 (4) 10-18 (4-3) 18-20 (4) 20-22 (3-4) 22-00 (2-4) 00-06 (2-3) 06-08 (3-4)	08-10 (4-1) 10-16 (3-0) 16-18 (3-1) 18-20 (4-2) 20-00 (4) 00-06 (3-4) 06-08 (4-3)	08-09 (1) 09-10 (1-0) 10-16 (0) 16-18 (1-0) 18-20 (2-1) 20-22 (4-3) 22-02 (4) 02-06 (4-3) 06-08 (3-2)	08-09 (1-0) 09-18 (0) 18-20 (1-0) 20-22 (3-2) 22-02 (4-3) 02-06 (3-2) 06-08 (2-1)
160	06-09 (4-1) 09-10 (2-0) 10-19 (1-0) 19-21 (3-1) 21-23 (4-2) 23-06 (4-3)	06-09 (1) 09-19 (0) 19-21 (1-0) 21-23 (2-1) 23-01 (3-2) 01-04 (3) 04-06 (3-2)	08-09 (1-0) 09-21 (0) 21-23 (1) 23-01 (2-1) 01-04 (3-2) 04-07 (2) 07-08 (1)	08-21 (0) 21-01 (1) 01-04 (2) 04-06 (2-1) 06-07 (1) 07-08 (1-0)

ALASKA
Openings Given in GMT

To:	*15 Meters*	*20 Meters*	*40 Meters*	*80 Meters*
Eastern USA	Nil	00-02 (1) 02-04 (2) 04-05 (1) 12-14 (1)	07-10 (1)	Nil
Central USA	00-02 (1)	01-03 (1) 03-05 (2) 05-06 (1) 13-15 (1)	08-12 (1)	Nil
Western USA	00-03 (1)	00-02 (1) 02-04 (2) 04-06 (3) 06-07 (2) 07-08 (1) 14-15 (1) 15-18 (2) 18-20 (1)	08-09 (1) 09-14 (2) 14-15 (1)	10-14 (1)

HAWAII
Openings Given In Hawaiian Standard Time

To:	15 Meters	20 Meters	40 Meters	80 Meters
Eastern USA	12-15 (1)	06-08 (1) 10-14 (1) 14-16 (2) 16-18 (3) 18-19 (2) 19-20 (1)	19-20 (1) 20-23 (2) 23-00 (3) 00-01 (2) 01-02 (1)	21-00 (1)
Central USA	12-14 (1) 14-16 (2) 16-17 (1)	06-07 (1) 07-09 (2) 09-14 (1) 14-16 (2) 16-17 (3) 17-18 (4) 18-19 (3) 19-21 (2) 21-22 (1)	19-20 (1) 20-21 (2) 21-01 (3) 01-02 (2) 02-04 (1)	20-21 (1) 21-00 (2) 00-02 (1) 22-01 (1)*
Western USA	13-17 (1)** 09-14 (1) 14-17 (2) 17-18 (1)	05-06 (1) 06-07 (2) 07-09 (3) 09-11 (2) 11-16 (3) 16-18 (4) 18-20 (3) 20-21 (2) 21-23 (1)	18-19 (1) 19-20 (2) 20-22 (3) 22-02 (4) 02-04 (3) 04-05 (2) 05-07 (1)	19-20 (1) 20-22 (2) 22-03 (3) 03-04 (2) 04-05 (1) 22-03 (1)*

See explanation in "How To Use Short-Skip Charts" which appears in the box at the beginning of this column.
* Indicates best time for 160 Meter openings.
** Indicates best time for 10 Meter openings.
Note: The Alaska and Hawaii Propagation Charts are intended for distances *greater* than 1300 miles. For shorter distances, use the preceding Short-Skip Propagation Chart.

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Say You Saw It In CQ

Contest Calendar

a monthly feature by
FRANK ANZALONE, W1WY

NEWS/VIEWS OF ON-THE-AIR COMPETITION

We have included the USSR CQ-M Contest in this month's column even though we have not heard from Box 88 as of this writing. I wrote to them over two months ago, but I'm sure most of you fellows have experienced the same frustration trying to get a QSL card from Box 88. I realize that I'm sticking my neck out, but the only real question is the dates, as the rules have been the same for years. You might check for USSR activity a week earlier just in case.

I'm not going to take a chance with the World Telecomm. Contest, however. May 17th is Telecommunication Day, and the contest is normally held the weekend following that day, which would make it May 18–19. Like last year, LABRE has failed to send us any information in time to make the current issue. When we finally received it last year, it was only a month before the contest, and the rules had been changed from those used the previous year. If you are interested in this activity, you could write to: PT2ADA, c/o LABRE, P.O. Box 07-0004, 70000 Brasilia (DF) Brazil for details.

A letter from KD7P/KH2 advised the WW Contest Committee that his CW score in the 1983 contest was a 14 MHz single band entry, not all band as it inadvertently was indicated in the October 1984 issue's results. What makes the correction important is the fact that his 574,332 points is a new Oceania single band record. Okay, Bob, the correction will be made in K6SSS's record book.

That's about it for this month. Deadline for the August issue is May 15th, and June 15th for the September issue. Have you checked the expiration date of your license lately?

73 for this time, Frank, W1WY

Calendar of Events

*	Apr.	27-28	Swiss Helvetia Contest
	May	4-5	County Hunters SSB Contest
	May	4-5	Florida QSO Party
	May	4-5	G-QRP Club Activity
†	May	11-12	USSR CQ-M Contest
	May	18-19	ARI International Contest
	May	18-19	Michigan QSO Party
	May	**25-26**	**CQ WW WPX CW Contest**
	May	28-29	CLARA AC/DC "Mystery"
	Jun.	1-2	New York State QSO Party
	Jun.	8-9	ARRL VHF QSO Party
	Jun.	15-16	All Asian Phone Contest
	Jun.	22-23	ARRL Field Day
	Jun.	28-30	SMIRK QSO Party
	Jul.	13-14	IARU Radiosport Chmpship.
	Jul.	13-14	West Coast 160 SSB Contest
	Aug.	3-4	Wild Bunch 160 SSB Contest
	Aug.	3-4	ARRL UHF Contest
	Aug.	10-11	European CW Contest
	Aug.	17-18	SARTG RTTY Contest
	Aug.	24-25	All Asian CW Contest
	Aug.	24-25	GARTG RTTY Contest
	Sep.	9-15	QCWA Invitational Party
	Sep.	14-15	European Phone Contest

**Covered last month.*
†Not official.

County Hunters SSB Contest

0001Z Sat. to 2400Z Sun., May 4–5
(Off: 0800Z to 1200Z each day)

This is the 14th annual contest sponsored by the Mobile Amateur Radio Awards Club to increase activity for the County Awards program. The two 4-hour rest periods are mandatory.

Emphasis is on mobile operation. Fixed stations may work other fixed stations, but only once regardless of the band. Mobiles may be contacted from each county or band change. Mobiles contacted on a county line count as one QSO but two multipliers. Net QSOs do not count.

Exchange: Signal report, county, state, and country for DX stations. (Mixed-mode contacts are permitted providing one station is on s.s.b.)

Points: Contacts with a fixed W/K or VE count 1 point; 5 points if with a US portable; 5 points if with a DX station (KH6 and KL7 are DX). Mobile contacts are worth 15 points; mobile teams 30 points.

Multiplier: Each U.S. county and each VE station worked.

Final Score: Total QSO points times (U.S. counties + VE stations worked).

Frequencies: Plus or minus 10 kHz, 3930, 7230, 14285, 21375, 28585. There is a "Mobile Window" 5 kHz each side of 3930, 7225, and 14280. Fixed stations are requested to QSY after working a mobile in the "Window."

Awards: Six MARAC plaques to the first- and second-place U.S. mobile, fixed U.S./Canadian, portable operating outside own county, DX station, and mobile team. Certificates to the top 10 mobile, top 10 fixed U.S./Canada, top 5 portables, and highest scorers in each DX country.

It is suggested that you write to WA5DTK for detailed rules and log forms. Send a large SASE with your request.

All entries must be received by June 3rd and go to: Barry Brewer, WA5DTK, P.O. Box 65, Randolph AFB, TX 78148. Winners will be announced at the 1985 Independent County Hunters Convention in July and in the MARAC newsletter.

Florida QSO Party

May 4, 1400Z–1900Z Saturday
May 5, 0001–0500 & 1500–2300 Sunday

This is the 19th annual QSO Party sponsored by *Florida Skip*. The same station may be worked on each band and on each mode. Phone and CW are separate contests and require separate logs. FL stations may work other FL stations, but for QSO points only.

Fla. stations are divided into two classes. Class A—Portables and mobiles operating outside own county using emergency power of 100 watts or less output. Class B—All other single and multi-operator stations.

Exchange: RS(T) and QTH. County for FL; state, VE province, or country for others.

Scoring: *For Florida*—One point per QSO. Multiply total by sum of states (49), VE provinces (12), and DX countries (maximum of 27) worked (maximum multiplier of 88). Class A stations multiply total score by 1.5 factor.

Out-of-state—Two points for each FL contact. Multiply total by FL counties worked (maximum of 67).

Frequencies: C.W.—3555, 7055, 14055, 21055, 28055. S.S.B.—3945, 7279, 14279, 21379, 28579. (Also 160 and 2 meters.)

Awards: Certificates, both phone and CW, to the top single operator score in each state, province, and DX country, and each FL county. There are five plaques as follows: to the top single operator in FL and out-of-state, both on CW and SSB, and to the FL club with the highest aggregate score.

There is the usual disqualification clause for taking credit for excessive duplicate contacts and multipliers and other infractions.

Include a summary sheet showing the scoring and all essential information, include a dupe sheet for entries with 200 or more contacts, and the usual signed declaration.

A large SASE will get you sample log forms. Mailing deadline for all entries is June 3rd to: Florida Skip Contest Committee, c/o North Florida ARA, P.O. Box 9673, Jacksonville, FL 32208.

G-QRP Club SSB Activity

Saturday & Sunday, May 4 & 5

This is not a contest, but as the name implies, it is an event to promote QRP activity. The following times (GMT) and frequencies will be used for this event.

3690 kHz—1200–1300, 1400–1500.

14 Sherwood Road, Stamford, CT 06905

European WAEDC Contest
1984 U.S.A. & Canada Results

W2YV	**936,240**	KV9S	5,148
	(Opr. KQ2M)	W7LNG	4,636
KZ2S	**749,952**	K23EID	3,200
KC1F	**431,935**		(Opr. K6EID)
N84AR/4	**181,584**	KE23PQ	2,952
	(Opr. N6AR/4)		(Opr. KE6PQ)
K2SX	153,955	AA23EE	2,856
K1XM	147,128		(Opr. AA6EE)
K5KLA	**142,206**	W9QWM	2,844
K4YKZ	**113,444**	W5EIJ	1,710
N23AW	96,312	K4FW/8	1,290
	(Opr. N6AW)	W5NR	1,050
K4PQL	**91,466**	KA7FEF	540
K4BAI	**78,680**	WB8HDO	540
W5ZR	65,760	W1OPJ	352
N8BC	**64,654**	NN3SI	120
K9BG	**63,788**		
N5JB	**57,536**	**Canada**	
W3ARK	**55,286**	VE3ST	9,180
W6BIP	49,000	VO1AW	4,920
W2DW	45,780	VE3OMU	780
KQ1F	44,368		
WB3JRU	**40,414**	**Multi-Opr.**	
K2POF	39,672	**KQ3S/8**	**12,768**
KW2J	37,719		
KR2Q	35,112	**Continental Leaders**	
W8UVZ	**34,204**	Europe	YU3EY
K4FPF	20,500	Africa	5Z4MX
K8CW	20,485	Asia	UA9SA
W4KO	18,988	N. Amer.	W2YV
W2UP	16,796	S. Amer.	LU1EWL
W3HDH	14,800	Oceania	VK2APK
W3KV	11,242		
KS7T	**10,992**	**Multi-Opr.**	
W9GXR	**10,746**	Europe	HG5A
W1CNU	8,760	Africa	VQ9CI
W2KTF	8,470	Asia	UZ9CWW
KT1O	8,250	N. Amer.	KQ3S/8
K84XT	6,500		
	(Opr. K6XT)		

**Boldface indicates certificate winners.*

7090 kHz—1100–1200, 2000–2100.

14285 kHz—0900–1000, 1300–1400, 1730–2000, and 2200–2300.

21385/28885 kHz—1000–1100, 1500–1730.

In addition to the above events, members of the group have weekly activity periods on Sundays between 1100Z and 1230Z and again from 1400Z to 1530Z on the above international QRP frequencies.

You are invited to send your reports of participation to: Christopher J. Page, G4BUE, Alamosa, The Paddocks, Upper Beeding, Steyning, West Sussex, BN4 3JW England.

USSR CQ-M Contest

2100Z Sat. to 2100Z Sun., May 11–12

We have not received an official announcement for this year's CQ-M contest. Rules should be the same as last year, but will be repeated for the benefit of those who did not see them.

Keep in mind that this is a world-wide-type contest, so do not limit your operation to the USSR only. Contacts may be made on CW or SSB, 3.5 through 28 MHz. The same station may be worked on each band, but not both modes for QSO and multiplier credit. Contacts via Oscar count as an extra band if made on UHF.

Classes: (A) Single operator, single band. (B) Single operator, all band. (C) Multi-operator, single transmitter, all band only. (D) S.w.l.

Exchange: RS(T) plus a three-figure QSO number. USSR stations add the number of their region (oblast) to their report.

Points: Contacts between stations on the same continent one point; different continents three points. Own country may be worked for multiplier credit but no QSO points.

Multiplier: Is determined by the number of countries worked on each band. The USSR "R-150-S" list is the standard, which essentially is the same as our DXCC, plus the following oblasts: 002, 013, 014, 056, 084-5-6-7-8-9, 090-1-2-3-4-5-6-7-8, 159, and UA1 Novaya Zemlya, UA0 Kuril Is., UA0 New Siberian Is.

Final Score: Total QSO points from all bands times the country/oblast multiplier from each band.

The SWL's get one point for reporting one station in the exchange, and three points if both stations are reported.

Awards: A large selection of trophies, medals, and badges in all classes for overseas winners. Badges to all entries contacting at least 10 USSR stations.

Contest contacts may be credited for USSR awards in lieu of QSL cards if request is made with entry (R-150-S, R-100-0, W-100-U, R-15-R, R-6-K, R-10-R).

Mailing deadline is July 1st to: Krenkel Central Radio Club, CQ-M Contest Committee, P.O. Box 88, Moscow, USSR.

ARI International Contest

1600Z Sat. to 1600Z Sun., May 18–19

It's the world working the Italian stations in this one, including San Marino, Vatican City, and SMOM.

Classes: Single operator, one mode—CW, SSB, or RTTY—or mixed modes. Multi-operator, single transmitter, all modes and SWL.

Bands: All six bands 1.8–28 MHz.

Exchange: RS(T) plus a QSO no. starting with 001. Italian stations will include two letters indentifying their province.

Scoring: Europeans earn 2 points per QSO; others 4 points.

Multiplier: Each province, T7, HV, SMOM, and stations IY1TTM and IY4FGM worked on each band.

Final Score: Total QSO points times the sum of the multipliers from each band. A declared score exceeding more than 5% of the actual score means disqualification.

Awards: Certificates to the top-scoring stations in each country for each category. Special awards to the five leading stations in each class.

Use a separate log sheet for each band, and a summary sheet showing the scoring from each band and other essential information is a must. Include your name and address in block letters.

The Worked All Italian Provinces award is issued to stations working 60 different provinces. Application can be made by including a separate list of provinces worked during the contest with your log. QSL cards are not required.

Mailing deadline for your logs is June 30th to: Contest Manager, c/o A.R.I., via Scarlatti 31, 20124 Milano, Italy; or Giorgio Beretta, I2VXJ, via Sciesa 24, 20135 Milano, Italy.

Michigan QSO Party

1800Z Sat. to 0300Z Sun., May 18–19
1100Z Sun. to 0200Z Mon., May 19–20

This year's party is again being sponsored by the Oak Park ARC. The same station may be worked on each band and mode, portable/mobile in each county change. Contacts between Mich. counties are permitted for multiplier credit.

Exchange: RS(T), QSO no., and QTH. County for Mich.; state or country for all others.

Scoring: *For Mich.*—One point for phone contacts, 2 points if on CW, and 5 points if with W8MB. Multiply total by (states + countries + Mich. counties) worked for final score. KH6 and KL7 count as states, VE as a country (maximum of 85 possible).

Out-of-state—One point for each Mich. phone QSO, 2 points if on CW, and 5 points if it's with club station W8MB. Multiply total by Mich. counties worked (maximum of 83).

VHF scoring same as above except multipliers from each band are added together for total multiplier. Repeater contacts are not permitted.

Frequencies: CW—1810, 3540, 3725, 7035, 7125, 14035, 21035, 21125, 28035, 28125. SSB—1815, 3905, 7280, 14280, 21380, 28580. VHF—50.125, 145.025, 146.52.

Awards: Certificates to winners in each state, country, and Mich. county (minimum of 50 QSO's). Seven plaques to top winners: single operator, upper peninsula, multi-operator, VHF, mobile, and aggregate club score, and out-of-state and Mich.

Party contacts do not count toward the Michigan Achievement Award unless one fact about Mich. is exchanged.

A summary sheet is requested with your entry showing the scoring and other pertinent information, plus a signed declaration that rules and regulations have been observed. Include a large SASE for a copy of the results.

Mailing deadline is June 30th to: Mark Shaw, K8ED, 3810 Woodman, Troy, MI 48084.

Michigan Achievement Week

May 18–25, 1985

All contacts with Michigan stations made during Michigan Week, May 18–25,

as well as Party QSO's, may be used for this award if the following requirements are fulfilled.

1. Mich. stations—Submit a log with information, name and address of station worked if possible, of 15 or more QSO's with out-of-state or DX stations with information about Mich.

2. Out-of-state stations including Canada—Submit a log with information, name and address if possible, of at least 5 Mich. stations worked who related facts about Mich.

3. DX stations—Work at least one Mich. station, with log information, name, and address, and relate fact about Mich. given by the station worked.

4. Only contacts made during Michigan Week, May 18–25, are valid for this award.

Applications for certificates must be postmarked no later than July 1, 1985, and mailed to: Governor James Blanchard, Lansing, MI 48902.

(Facts about Michigan: State Bird, Robin; Fish, Trout; Flower, Apple Blossom; Tree, White Pine; Stone, Petoskey; or any local facts.)

CQ WW WPX CW Contest

0000Z Sat. to 2400Z Sun., May 25–26

This is a reminder of our *CQ* WPX CW Contest coming up at the end of this month. Results of last year's contest in this issue may be used as a guide to choose the best class for your operation.

Rules and scoring are exactly the same as for the s.s.b. section in March, and these rules were given in detail in the January issue, with a follow-up in the March Calendar. A few items to keep in mind are as follows:

Par. I—Only 30 hours out of the 48-hour contest period may be used by single operator stations. The off times may be taken in up to five periods.

Par. IV—Multi-operator, single transmitter. Only one transmitter and one band permitted during the same time period (defined as 10 minutes). No QSYing to another band to pick up a new multiplier.

Par. VI—QSO points on the three lower bands—7, 3.5, and 1.8 MHz—are worth double those for contacts on 28, 21, and 14 MHz. Own country may be worked, but for multiplier credit only (making U.S. QSO's very attractive).

Par. VII—The prefix multiplier is counted once only, not once on each band. Definition of a prefix is clearly spelled out in the rules, and was again reviewed in the March Calendar. The WPX Awards list can no longer be used as a guide for contest operation.

Stations operating in a call area other than that of the call sign are required to indicate the area of operation. The portable prefix is the multiplier (i.e., W8IMZ/4 counts as W4; N8BJQ/KV4 counts as KV4).

Par. IX—There will be 19 plaques awarded in this year's contest. Eligibility remains at 2 years except for areas in categories as indicated.

Mailing deadline is July 10th, but will be extended for rare isolated areas. Be sure to indicate CW on the envelope.

All logs go to: *CQ* Magazine, WPX Contest, 76 N. Broadway, Hicksville, NY 11801 U.S.A. Questions pertaining to the WPX Contest can be sent to: WPX Contest Director, Steve Bolia, N8BJQ, via *CQ*.

CLARA AC/DC "Mystery" Contest

0000Z Tues. to 0000Z Wed., May 28–29

This is a new one organized by the Canadian Ladies ARA. It's open to YL's as well as OM's and to SWL's, too. Each CLARA station may be contacted twice, once on phone and again on CW, or on the same mode on two different bands.

Exchange: Name, QSO no., RS(T), and QTH if a CLARA member. There will be three "mystery" unidentified stations operating.

Scoring: CLARA members score 1 point for each QSO with a non-member (YL or OM), 2 points if it's with another member, and 3 points if it's on CW.

Non-members, 2 points for each CLARA contact, and 3 points if it's on CW.

Multiply above by number of VE provinces/territories worked for the total score.

The contest manager will add 10 points to the base score for each "mystery" station worked.

Frequencies: Phone—3773, 3900, 7150, 14160, 14280, 21300, 28488, 28588. CW—3690, 7035, 14035, 21035, 28035. (No net, list, or 10 or 2 meter repeaters.)

Awards: CLARA members, first-place cup and certificate, second-place certificate. Non-members, first-place plaque, second-place certificate. And a certificate to SWL and DX station winners. All entries are eligible for a mini prize drawing.

All logs must be received no later than July 15th by the Contest Manager, Muriel Foisy, VE7LQH, RR #1, Pender Island, B.C., Canada V0N 2M0.

New York State QSO Party

1600Z Sat. to 0400Z Sun., June 1–2

This is the second year for this party sponsored by the Salt City DX Association. It's a shorty—only 12 hours long, Saturday afternoon and night local EST. It should attract lots of activity.

The same station may be worked on each band and each mode for QSO point credit.

Exchange: RS(T) and QTH. County for New York stations; state, VE provinces, or country for DX stations.

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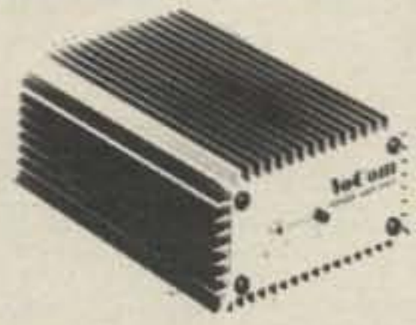

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VHF

a monthly feature by
STEVE KATZ, WB2WIK

PRINCIPLES, PRACTICES, AND PROJECTS FOR THE VHFER

As you read this, it is likely that a number of us will be on our way to the Dayton Hamvention, or it's possible you picked up this issue at Dayton and might be browsing through it while resting up for the next day's activities. For those who have never attended the Dayton Hamvention, please make time to go next year! It's the biggest and the best amateur radio convention in North America, and possibly in the world. There are VHF/UHF forums, noise-figure and antenna gain measurement competitions, discussions on EME and satellite work, excellent presentations by well-known VHFers and pioneers of all kinds, and an unsurpassed fleamarket offering thousands of gadgets and gizmos useful to VHF operators and equipment builders.

If you read this issue before or while visiting Dayton, make it a point to stop by the Contest Forum to see a brief slide show about the new *CQ* VHF WPX Contest. We'll try to give this show twice, during the Contest Forum and the VHF Forum, and there should be information about our new contest available at the *CQ* booth as well. Stop by the *CQ* booth and meet Dick Ross, Alan Dorhoffer, and the gang. You'll enjoy the visit.

There undoubtedly will be all kinds of VHF/UHF goodies on display at Dayton. The three big Japanese manufacturers all have excellent VHF transceivers on the market, and these new rigs are better performers than their older counterparts. The high-powered ICOM IC-551D (50 MHz), IC-271H (144 MHz), and IC-471H (432 MHz) are all excellent buys. The Kenwood TS-670 (50 MHz down), TS-711A (144 MHz), and TS-811A (432 MHz) are neat rigs, too. And the premier VHF multimode rig, the Yaesu FT-726R—with its multiband coverage and full cross-band-duplex capability for OSCAR—is becoming so popular that I'm almost embarrassed not to own one.

Other "new equipment" buys, including some terrific European gear, are sure to be on display and available at Dayton. The Microwave Module equipment from the U.K. is terrific and was discussed in some depth in our March column. Mutek Ltd., SSB Electronics, and Parabolic are three other European manufacturers offering great VHF/UHF equipment, including some very unique accessories such as mast-mounted preamps, 23 cm transverters and amplifiers, and complete low-noise receiver boards to replace those found in the older multi-mode transceivers. Lunar Electronics (San Diego) and Advanced Receiver Research (Bristol, CT) are two American manufacturers of high-quality accessories for VHFers. The "ARR" line of GaAsFET preamplifiers has become so common that may VHFers own several units. I do. Mirage Communications (Morgan Hill, CA) builds some workhorse solid-state power amplifiers for 50 through 432 MHz. Their model D1010 is probably in use by just about every OSCAR 10 enthusiast in the country: It runs over 100 watts output on 70 cm with just 10 watts drive and is a "steal" at about $300 retail. It would be tough to homebrew a similar amplifier for that price.

Tokyo High Power (from guess where?) sells a wide range of VHF power amplifiers including a 70 cm unit with a built-in GaAsFET preamp. It would pay to give these consideration. And Henry Radio (Los Angeles), long known for their "2K" series of legal-limit HF band amplifiers, builds some really excellent power amplifiers for 144, 220, and 432 MHz. The Henry 2002A (144 MHz) and 2004A (432 MHz) are in use by moonbouncers the world over.

Speaking of power, many of us like to know how much of it reaches our feedlines or antennas, and there's no easier way to measure this at VHF than with the famous Bird Electronics series of directional Thruline™ wattmeters. Properly installed, these couplers have no measurable insertion loss (even at 1.2 GHz) and can be permanently installed in your transmission line for continuous power monitoring. And at 23 cm, where most of us are using 7289 (3CX100A5) tube-type power amplifiers which tend to drift in tune as they warm up, it really pays to keep an eye on your transmit power during the course of a QSO.

The Bird is a 5 percent (of full scale) accurate instrument with an insertion VSWR of less than 1.05:1 maximum at 1 GHz, 25 dB minimum directivity[1], and remotable RF coupler for convenience. There isn't anything else on the market for such a low price (about $165) which offers this kind of performance. Although Bird and its distributors do not offer discounts on new equipment, there are good deals available on the used market, and Dayton would be a great place to start looking! I own four of the Bird meters, Thruline model 43, and will always buy another at a fleamarket if I spot a good deal. The beauty of the Thruline is the RF coupler. The meter is nothing very special, just a 30 uAdc meter calibrated to match the non-linear response of the diode detector located in the coupler's sensing element (or "slug," as they have become known). You could build your own meter case and calibrate any very sensitive DC meter (50 uAdc is a standard value) to be reasonably accurate, so don't avoid buying a used Bird just because the meter is cracked. Bird will sell all the component parts of their Thruline instruments separately, and the RF coupler (minus connectors) is P/N 4230-018. The meter is Bird P/N 2080-002. RF connectors of every imaginable sort are available to fit the coupler and can be purchased from any Bird distributor; the connectors aren't expensive.

Bird RF detector elements ("slugs") are available in power ranges from 250 mw to 10,000 watts and in frequency ranges from 450 kHz to 2300 MHz. Versatile enough? Bird Thruline instrument owners need only buy the elements they actually need to make the desired measurements. Although you only need Bird elements for the maximum power levels you'll run on each band, bear in mind that these elements become less critical in terms of operating frequency range as their power ratings are increased; that is, the 1000 watt elements tend to be several octaves[2] "wide" in response, so a 1000 watt element for 200–500 MHz (Bird P/N 1000D) will be quite accurate on 50 through 432 MHz. However, *don't* use 1000 watt elements unless you intend to run at, or nearly at, this power level or your power readings obtained will suffer severe inaccuracy. This is because you'll be reading the meter far downscale, and the instrument's accuracy is expressed as a percentage *of full scale* (not of reading).

For example, say you intend to use a 1000 watt element to measure your power in a line that will normally carry only 100 watts. The accuracy of your reading will be ±5% of 1000 watts, which is ±50 watts. This means your "100 watt" reading could be off by as much as 50 percent—not very accurate. If you used the same element to measure 1000 watts of power, your maximum error would be ±50 watts—*quite* accurate!

When scanning fleamarkets, keep your eyes open for anything that looks like a Bird, even if if doesn't say Bird on it anywhere. If the unit accepts Bird elements, it is likely to be a Bird or a very similar instrument made by another manufacturer who uses a similar design. The Dielectric Communications (General Signal) model 1000 is an example of such a unit. I own

*24 Louis Dr., Budd Lake, NJ 07828

one of these, and it is identical to the Bird 43 except it has a larger meter scale, which is a bit easier to read from a distance. However, beware of Bird meters that are not the replaceable-element, Thruline type. Many were designed for a specific frequency and power level and cannot be readily altered for any different range.

Speaking of switching things, what about antenna relays? Of course, transceivers contain internal relays or solid-state switches to transfer the antenna feedline from receiver to transmitter as the T/R function is selected by the operator, but operators intending the use of high-powered external amplifiers which contain no internal T/R switching function will soon discover they need some sort of coaxial relay. These relays are also required for T/R "antenna changeover" switching in stations not using transceivers, and they are often called on for remote-switching antennas using a single feedline.

One of the most popular coaxial relays in use by amateurs is undoubtedly the Kilovac "Dow Key" (Santa Barbara, CA) variety, which is available in every conceivable switching configuration. The standard coaxial T/R relay is SPDT[3] in configuration, suitable for switching a single feedline to either of two coaxial lines. Usually, the "NC," or normally-closed, connection would drive the receiver and the "NO," or normally-open, connection would be driven by the transmitter. But other common coaxial relay varieties are available, including the popular DPST type used to "bypass" power amplifiers on receive, and the DPDT type which can be used for complex switching functions.

Regardless of your application, for VHF/UHF work I'd recommend the exclusive use of relays having type N connectors, such as the Kilovac 60-220142 for SPDT switching. This relay features (1) type N connectors for constant line impedance, (2) gold-plated contacts for hundreds of thousands of reliable operations, (3) receive-side isolation on transmit[4], and (4) interchangeable relay coils to suit the individual needs of the operator. This relay can also handle the legal amateur power limit of 1.5 kw at 432 MHz.

Beware of coaxial relays, even ones with N connectors, of unknown origin! I've picked up dozens of surplus coax relays, including some very "sexy" looking kinds with gold contacts and N connectors, only to be very disappointed by their performance at VHF. Relays intended for UHF work, such as many items available from Transco Products (Venice, CA), are excellent fleamarket buys. I found a bunch of coaxial relays at a New York City surplus store. These Electronic Specialty Co. type 2SN28, which turned out to be excellent performers up through 432 MHz, were obviously made for a military contract, probably for use in an airborne system. These have three N-connectors in a row on one side of an aluminum housing, and their coil voltage is 26 VDC; I found they'll "pull in" at 18 VDC or so.

The little Amphenol BNC coaxial relays which are sure to show up at every electronics fleamarket are quite useful through 432 MHz as well, but they are only rated at 100 watts RF power, and I would hesitate to use them for any QRO work.

Probably the best "amplifier switching" DPST coaxial relay within an amateur's budget is the Kilovac Dow-Key type 260B-2601. Equipped with N connectors, this relay features nearly zero insertion loss and legal-limit power-handling capability throughout the VHF spectrum.

If you have a coaxial relay about which you'd like some information, let me know and I'll try to get you any details I can. Or, if you send me the relay in question and return postage, I'll measure its loss and VSWR versus frequency using laboratory equipment from 50 through 1296 MHz and send you the data with the returned relay. Be advised, however, that I cannot accurately determine power-handling capability other than as a guess.

Fireworks Department

As an active VHFer I read everything published on the subject, including Joe Reisert's VHF column in *Ham Radio* magazine. In Joe's February column he discussed power supplies for big VHF amplifiers, and I think he's made a terrible mistake in recommending that amateurs derive screen voltage for tetrode amplifiers by dropping down and regulating the plate supply. He wrote, "I believe that the most foolproof screen supply voltage circuit is a shunt-regulator consisting of a dropping resistor and appropriate voltage regulators shunted to ground and supplied from the tube's plate supply voltage."

Well, I sure don't recommend this! In Joe's column, fig. 3, he uses a big (200 watt) dropping resistor off the plate voltage supply to drive some gaseous VR tubes to derive screen voltage. Bad idea, for two reasons. One, it wastes a *lot* of power. With a 2 kv plate supply (typical for 4CX250 series amplifiers), you'd need about a 50K, 100 watt resistor in series with three gaseous VR tubes (say, two OB2's and one OA2 in a series string) to keep the tubes "fired." This resistor would dissipate 45 watts continuously, even in standby. This wastes 45 watts and creates a lot of heat. Second, this system is *dangerous*. If one of the VR tubes were to fail, or if it were removed from its socket for any reason, the full plate voltage would appear at the screen(s) of the power tube(s) in use and instantly vaporize that fragile grid, destroying the tube faster than a fuse could

age *must* appear before screen voltage. And if the screen supply is properly bled, the tubes will not be damaged when both plate and screen potentials are simultaneously removed.

Correspondence Department

I received an interesting letter from Bob Hastings, K6PHE, of Fullerton, CA. Bob is very active on 6 meters and asks that we take a survey to see how many folks are equipped for 50 MHz operation and when they are active. Let's hear from you! Bob also is interested in knowing who is operating beacons on the VHF/UHF bands, and he forwarded a beacon listing generated by Bill Grayson, WB2MAI. Bill's list is beautiful but probably not complete, and he, too, asks that anyone knowing of operational beacons, their frequencies, callsigns, and locations, please let him know. Bill's address is 384 Haring La., Alpine, NJ 07620. If you send Bill a large SASE, I'll bet he'll reciprocate with his updated VHF beacon list.

K6PHE requests that *CQ* start up VHF WAS, WAC, and WAZ awards with honor blow. Joe's circuit shows R2, a screen-load resistor, which would divide the plate voltage in the event described in my last sentence, but this would not be enough to protect the tube(s), as the screen(s) would still see about 1000 volts, enough to cause instant destruction to most popular VHF power tetrodes like 4CX250B's.

I'd strongly recommend that anyone building a tetrode amplifier use a totally separate screen supply, with its own transformer—preferably one in which the rectified and filtered preregulated output voltage is not much higher than the final regulated voltage, so in the event of a VR failure the screens won't be damaged. Joe is correct in stating that it is very important the screen voltage never appear at the tube when full plate voltage is not present. But this won't ever happen if you use the plate supply to key a relay which in turn drives the screen supply. I usually build a screen supply with a keying relay in the ground return and key the screen voltage by a sampled voltage from the plate line. This way, plate voltrolls. I think the ARRL already has WAS and WAC pretty well covered, Bob, but I agree that a *CQ* VHF WAZ and VHF WPX award program is a great idea and hope to get these going. K6PHE also reports he has over 4000 contacts on 6 meters, including 55 countries, all states, and 23 zones. Wow! Bob also worked 95 JA stations on 50 MHz in 1980. Well, I can sure identify with that. In November 1979 I made a special trip to California just to work JA's on 6 meters. Wayne Overbeck, N6NB, and I set up Wayne's "Cabover Kilowatt" on Mt. Pinos, about 8900 feet above sea level, with a kw and a 5-element beam on 6 and spent hours working JA's so fast we could hardly get them in the log. I've received about 300 JA QSL's confirming 50 MHz contacts from that and one subsequent operation from Saddle Peak in Los Angeles County.

Next month we'll run more photographs and reader feedback, and we'll discuss the upcoming *CQ* VHF WPX Contest a bit. Until then . . .

73, Steve, WB2WIK

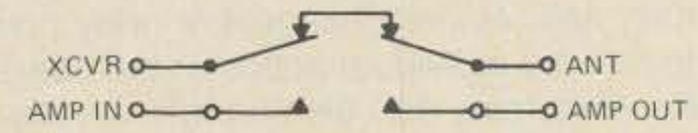
Footnotes

1. Directivity is a figure of merit which describes the RF coupler's ability to accurately measure power in a transmission line regardless of the line-to-load VSWR; that is, the larger the absolute value of directivity, the less sensitive the coupler is to standing waves. A perfect directional coupler would have infinite directivity; most "amateur" grade couplers have less than 20 dB.

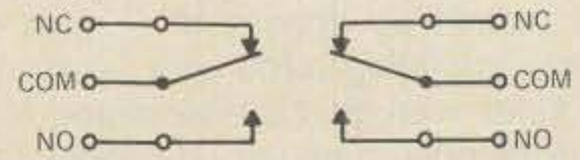
2. In this sense, an RF spectrum the frequency limits of which express a ratio of 2. For example, 50 to 100 MHz, 200 to 400 MHz, 3 to 6 MHz, or 950 to 1900 MHz are all bands that are one octave wide.

3. SPDT = single pole, double-throw. Schematically, this is:

DPST = double-pole, single-throw. Schematically, this is:



DPDT = double-pole, double throw. Schematically, this is:



Note: The DPST schematic is shown as it applies to RF coaxial relays for amplifier "bypassing" operation.

4. A feature of this "Dow Key" design is a spring-loaded "NC" (receive side) contact which breaks the receive connection for added isolation in the transmit mode. Its isolation has been measured at over 100 dB at 432 MHz. This should attenuate even a 1.5 kw signal sufficiently to protect sensitive receive preamps.

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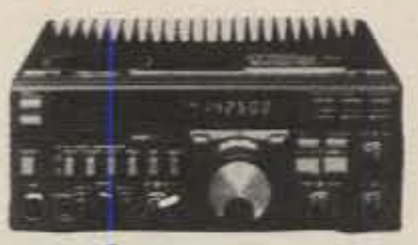

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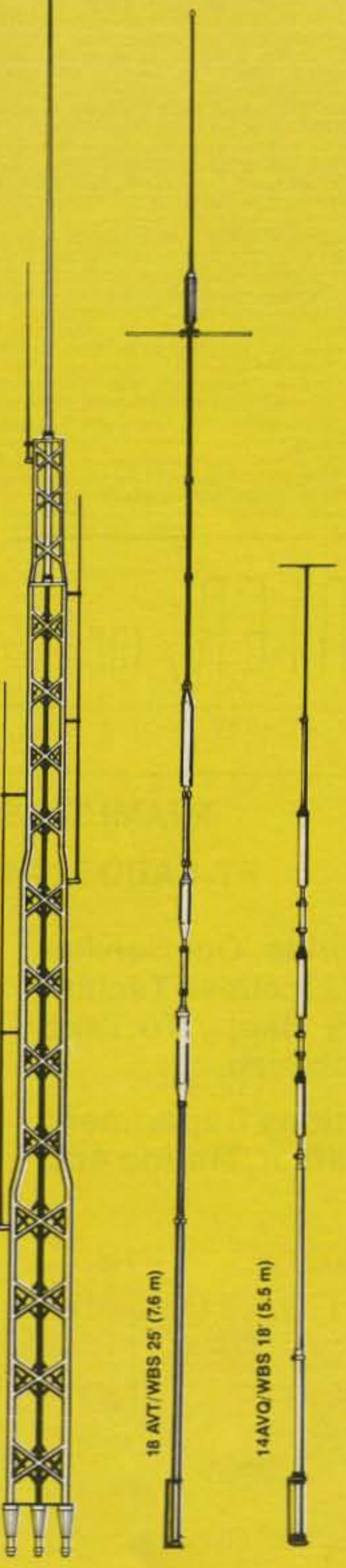

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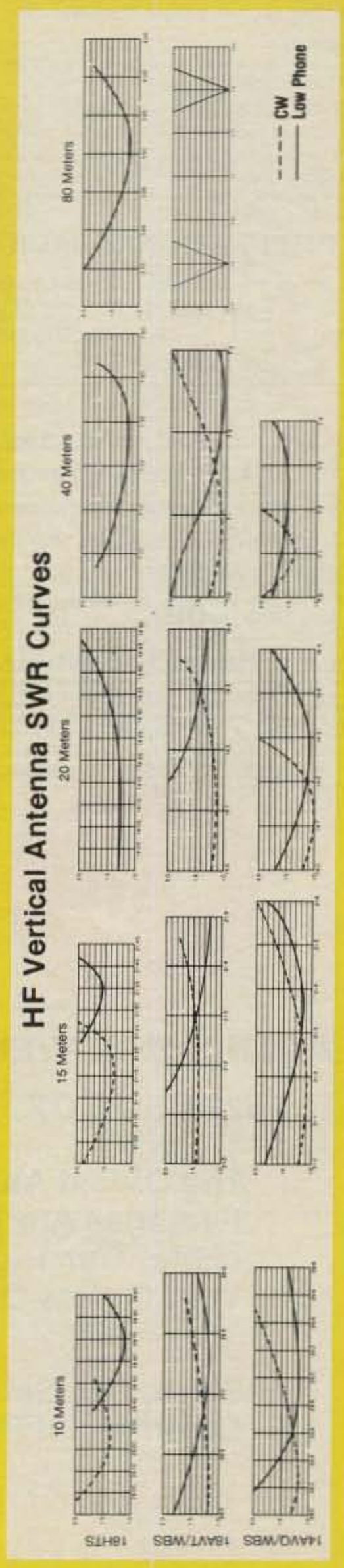

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HAMFEST: The annual Kankakee Hamfest will be held at the Kankakee County Fairgrounds on May 5. FCC booth, large flea market, and many exhibitors. Take exit 308 off I-57 to Rt. 45 South 1 mile. For further info contact Don Kerouac, 1377 Circle Dr., Kankakee, IL 60901.

WANTED: NATIONAL NC101X. Sell or trade nice 1937 HRO. Trade an old Vibroplex for a more modern one or electronic keyer. Horace Goss, Crosstrees Hill, Essex, CT 06426. Tel. 203-767-8485.

SELL: RTTY Freq. Shift Converter. Solid state, all features and manuals inc., mint cond. Make offer. WB8ZIR, 1001 W. Nicholson Hill Rd., Ossineke, MI 49766.

DENTRON CLIPPERTON L, 160–10 meters $425 FOB. MFJ 949B 300 watt Antenna Tuner, $100 FOB. Les Basham, 735 Caves Hwy, Cave Junction, OR 97523.

SAILORS: Modified transceiver Drake TR7 transmitter 1.6–30 MHz, receiver 0–30 MHz continuous, PS7, mobile kit, speech processor, ant. tuner $1280. Phone 817-836-4262, N5DRX.

WANTED: Schematic for Lafayette SW Receiver Kit KT-340. Contact Librarian, Cubic A.R.S., P.O. Box 80787, San Diego, CA 92138.

WANTED: Schematic diagram for a SWAN CYGNET 260 transceiver. Will pay for original or copy. Jack Smith, 3510 W. Elmore St. #1, Seattle, WA 98199.

WANTED: A complete set of traps for a Mosley Classic-33, in good condx. Ron Lanoux, Rt. 2, Box 755, Gonzales, LA 70737.

75S1, 32S1, 516F2, $495. KWM2, 516F2, $395. 30L1 $495. James Craig, WIFBG, 32 Birchwood Drive, Rye, NH 03870, phone 603-964-6658.

WANT TO BUY: Heathkit General Course for 12-year-old interested in Ham Radio. Matt, Box 25004, Lansing, MI 48909.

WANTED: Operating manual for Viking Ranger (Johnson) plus any suggestions. F. Hicks, 683 E. Hillside Oaks, North Salt Lake, UT 84054.

VACUUM CAPACITORS, Vacuum relays, and Eimac power tubes, sockets and chimneys—Wanted. Tektronix oscilloscope probes—New, Transco coax switches, Sell/Trade. A. Emerald, 8956 Swallow, Fountain Vly, CA 92708.

CQ, QST, 73, Ham Radio magazines 1940s to present, also other radio books, publications. Send large SASE for list. Nate Williams, W9GXR, 6915 Prairie Drive, Middleton, WI 53562.

WANTED: HP TEK equipment catalogs. Buy, Sell, Trade. W7KSG, 1876 E. 2990 So., Salt Lake City, UT 84106.

KENWOOD TS-930s, both 500 Hz filters, dust cover, absolutely mint, $1200. Pickup perferred. Phone 216-884-1175.

YAESU FT-901DM, factory overhauled 12/84, 2 CW filters, mike, DC cable, service manual, exc. cond, $550. Free shipping! AA4M/6 619-292-7227.

R.F. SIGNAL GENERATOR FM & AM 80kc to 60 mc $30, RCA Volt Ohmyst VTVM $20, Tube Tester $15. SASE for large list. K6KZT, 2255 Alexander, Los Osos, CA 93402.

NAVY TYPE RCK radio receiver, RCA reconditioned, 115–156 MHz AM, mint condition, best offer. R.W. Boyd, Box 793, STN "A", Montreal, Quebec. Tel: (514) 481-4830 after 18:00 hrs.

FOR SALE: Drake Twins, R4B, T4X, AC4/MS4, manuals, cables & extra xtals. Excellent condition, $325. Mel Toren, W2GMA, 1762 Larkspur Rd., Cherry Hill, NJ 08003, phone (609) 795-3294.

SEVEN YEARS A TECH, now it's time to upgrade. WANTED: HG-10 VFO for DX-60B. N9DWL 414-682-2307.

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