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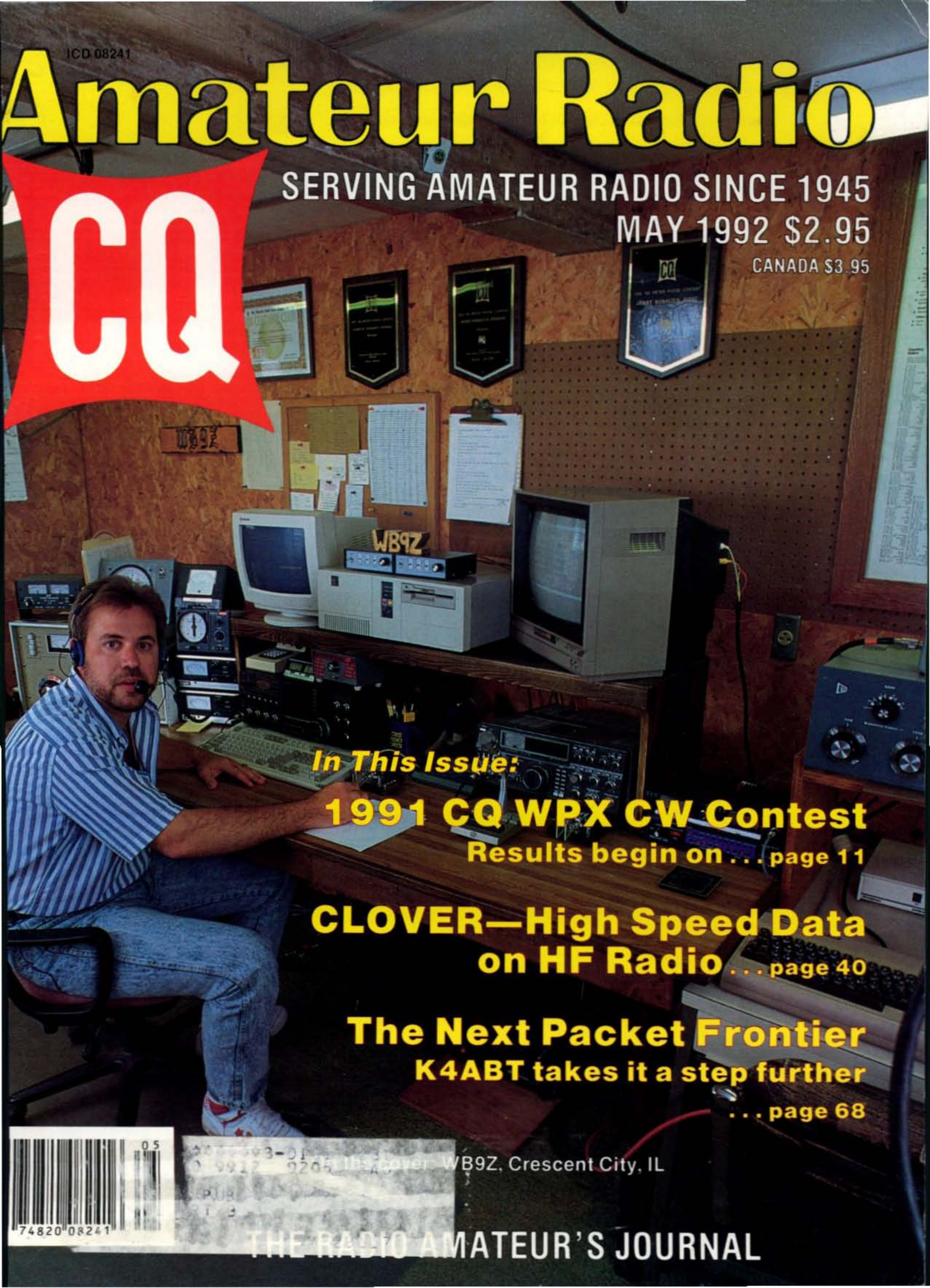
Amateur Radio

CQ

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THE RADIO AMATEUR'S JOURNAL

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The Radio Amateur's Journal



ON THE COVER: CW contester Jerry Rosallius, WB9Z, uses this compact but sophisticated setup at his Crescent City, Illinois QTH. Obviously, the rig/operator combo works out just fine as the plaques on the wall attest. (Photo by Larry Mulvehill, WB2ZPI)

MAY 1992

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With the world in a state of flux right now, the busiest people probably are cartographers. Maps—we all love them and want them. I would guess, though, that at the present time it would be pretty hard to come up with an accurate map of the world that reflects all that has happened in the past year. If we could come up with such a map, it probably wouldn't stay accurate for very long.

In the grand scheme of the world right now, with people killing each other over their respective countries' new names and political alliances, it would seem ludicrous and asinine to put amateur radio at the center of that universe. However, a number of readers have taken us to task for using "old" names for countries when presenting our contest results. According to them, not only are we inaccurate, but somehow we are insulting the participants. These erstwhile contesters would have us rewrite history. In short, at the time of the contest an entry from country "X" would be categorized as coming from country "X" no matter what it is called a year later. To have it any other way would invalidate the log as coming from a non-existent country.

Yes, They're Late

Speaking of contests, the certificates for the 1990 CQ World-Wide are in the works and should be out to you in the next few months. We apologize for the lateness this time, but like the best laid plans of mice and men, things sometimes lag behind. With any luck, they should be on time from now on.

It's Back

Carrying on with the contest theme, we're pleased to let you know that our VHF Contest is back this year. Complete rules will be in next month's issue. The contest is scheduled to take place the weekend of July 11, so make your plans accordingly. Check the "VHF Plus" column this month for preliminary details. Joe Lynch, N6CL, will head up the contest, and we're hoping for a big turnout.

Irwin Is Back

During a recent conversation with Irwin Math, WA2NDM, he foolishly admitted to having some spare time now, so he was immediately pounced upon to bring "Math's Notes" back to the pages of CQ. This

month we are pleased and proud to present "Math's Notes" once again to CQ's readers. I'm sure a lot of you remember Irwin's style of bringing us the latest info on solid-state devices in a clear, concise, and easy-to-understand manner, plus his useful tips on how to use them. Welcome back, Irwin.

Things I Probably Won't See This Year At Dayton

I'm writing this several weeks before the Dayton Hamvention, so I'm not setting myself up for disappointment. I'm also trying to empathize with the small group out there who hates contests, DXing, pileups, and most operating events which tend to crowd up the bands with people having fun. Basically, I started to think in terms of how to keep all of this going while at the same time decreasing some of the extraneous RF out there.

I have always marveled at the engineers who come up with all the bells and whistles for today's transceivers. Looking at one of the new rigs being advertised, with 70 or 80 controls plus several hundred memories, one can only wonder what kind of mind could dream up that (and why). I know that at times we amateurs can be a demanding lot, asking for everything under the sun, but I don't remember asking for so much. Sometimes I've thought it was a cruel joke thought up by these engineers just to frustrate the user.

By now I think we have enough control and memories to keep us confused for several more years, so perhaps we should be looking in a slightly different direction for some of the models yet to come. One thought that came to mind that would serve the cause of amateur radio far better than another bank of concentric controls is a built-in dummy load. Simply put, this new rig couldn't be tuned up on the air. The tune position would automatically switch to a low power output feeding the dummy load. I know it's not as dramatic as another bank of controls, but I think that most of us would be willing to forgo the pleasure of listening to the squeals and band-chilling sounds of a station tuning up on a DX frequency for that bank of controls. This would also help alleviate the secondary signals forming an *a cappella* rendition of "No Tuna Here."

Perhaps something a bit more esoteric for the engineers to come up with would be a very conspicuous display that would illuminate or if ignored sound a gong to somehow let some of us internalize the

fact that a signal, albeit even a small one, was using that frequency. This would be a secondary confirmation to our auditory system that the signal we were experiencing was really there.

While I don't expect to see the above features being touted at Dayton this year, I don't think it represents much of a challenge for the engineers. Something really big to shoot for would be a way to put out subliminal signals which would answer the questions "Who's the DX?" (please is optional); "Where's he listening?"; "What's his QSL route?"; and perhaps "What's the national bird?" simultaneously in several languages.

This could reduce the overall RF output by as much as 20%, leaving more space for others to engage in whatever makes them happy. I can't think of anything that can be devised electronically to make all of us happy, especially at the same time, but maybe somebody out there is working on it.

Vrooom, Sputter, Gasp

Several of you have written in to share your concern over the troubles experienced by W8JH as highlighted in *Worldradio*. Apparently John, W8JH, found out the hard way (and the expensive way) that the 1992 Toyota Camry automobile will definitely not support any mobile operation with an output greater than 10 watts. It was confirmed via Toyota's hotline (1-800-331-4331) that anything over 10 watts would in a sense fry the car's onboard computer. In John's case repairs came to \$1115, for which unfortunately he was responsible. What's becoming evident is our electronic marvels are sometimes a two-edged sword. What we like as features in a particular car and what makes us lean towards purchasing that model may also be at great odds with using that vehicle for mobile operation. Obviously, Toyota didn't take into account in their design the numbers of potential sales to amateurs. It's sad to say, though, if you're interested in mobile operation (beyond the occasional use of an HT), scratch the Toyota Camry from your list of options. Use this experience to help you when you select any new car. Specifically ask if there will be a problem if you operate a mobile rig.

We can now add cars to computers and other home entertainment devices as having potential RF susceptibility problems. It does seem odd, though, that we, in a lawful manner, should represent the problem.

73, Alan, K2EEK

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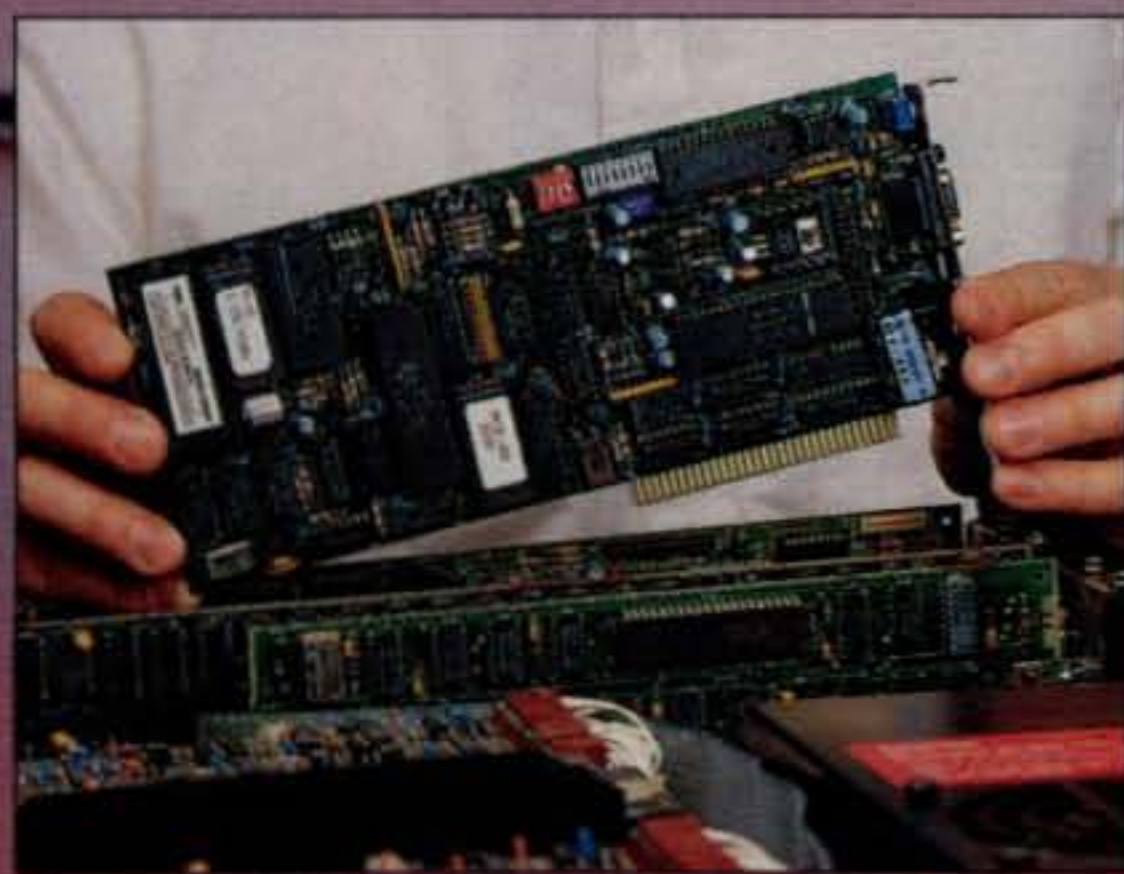
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ANNOUNCEMENTS

• 43rd Annual Armed Forces Day Communications Celebration/Test

- On May 16 the Army, Navy Marine Corps, and Air Force will co-sponsor an amateur radio program featuring the traditional military-to-amateur cross-band communication test and message receiving test. The tests give amateur radio ops and short-wave listeners an opportunity to demonstrate their individual technical skills and to receive recognition from the Secretary of Defense or the appropriate military radio station. Operations will be on CW, SSB, and RTTY. For more information contact Navy-Marine Corps MARS, Naval Communication Unit, Washington, DC 20397-5161.

• **Sumter, SC VE Testing Schedule** - The Sumter ARA reports the following VE testing schedule for 1992—May 16, July 18, Sept. 19, Nov. 21. Preregistration or walk-ins. For more info contact Dan, WB5SGH, 803-773-9106, or write to Sumter ARA, P.O. Box 193, Sumter, SC 29151.

• These special events will be held during May:

WN2K, from solar-electric vehicle during Northeast Sustainable Energy Assn. American Tour de Sol, from Albany, NY to Boston, MA; Unatego High School ARC; May 17-22 (no times or frequencies given). For QSL and certificate send \$1.00 and legal-size SASE to Unatego ARC Solar Event, Unatego High School, RR 1, Otego, NY 13825 by June 15, 1992.

K2BSA, from Dallas, Texas Annual Scout Show, Colinas, Irving, Texas; Circle Ten Council, Boy Scouts of America; 1500-2300Z May 9; on 28350, 21350, 14280, 7260 MHz. QSL with #10 SASE to Dan Dansby, W5URI, 5805 Walla Ave., Fort Worth, TX 76133.

KC2Q, from Marconi's Memorial Tower Radio Site, circa 1914, Wall Township, New Jersey; Ocean-Monmouth ARC; 1600Z May 9 to 1900Z May 10; phone low end of General portion 15-75 meters, plus Novice 10 meters, CW 3545, 7045, 14045, 21045 MHz. For flat certificate send one stamp, or SASE for folded, to OMARC, P.O. Box 75, Bradley Beach, NJ 07720.

K2KN, from Samuel Morse Home, Poughkeepsie, New York; Poughkeepsie ARC; 1200Z May 23 to 0200Z May 24, and 1400-2000Z May 24; CW (listen for "CQ SM") 3545, 7045, 14045, 21045, 29045; SSB 3855, 7255, 14255, 21355, 28455; packet 7090 & 14095; RTTY 7080 & 14085; FM 146.52. QSL or certificate available via K2JMY, 4 Bishop Dr., Poughkeepsie, NY 12603 (SASE).

AA2EN, from 75th anniversary of Arcade & Attica Steam Railroad, Curriers Railroad Station, Arcade, New York; Pioneers Radio Operators Society; May 30-31; General portions of 80, 40, 20, 15 meters, and Novice 10 meters. For certificate send QSL and SASE to AA2EN, c/o James Luscher, 3 Sherman Drive, Arcade, NY 14009.

K2UFM, from 75th anniversary of Camp Merritt, Cresskill, New Jersey; Bergen ARA and Camp Merritt American Legion Post 21; 1300-2100Z May 17; General phone portion of 80, 40, 20, 15 meters and Novice 10 meters. For certificate send QSL and 9 x 12 SASE to Warren P. Hager, K2UFM, 31 Forest Drive, Hillsdale, NJ 07642-1351.

WA3BAT, from 94th anniversary of Battle of Manila Bay, USS Olympia, Philadelphia, Pennsylvania; Olympia RAC; 1400-2200Z May 2-3; CW 7.065 2200-

0200Z), phone 3.895, 7.245, 14.245, 21.365, 28.365 all plus/minus 5 kHz. For certificate send QSL with operator's number and 9 x 12 SASE to Olympia RAC, P.O. Box 928, Philadelphia, PA 19105.

WA3PJO, from submarine USS Torsk, Baltimore, Maryland; Maryland Mobileers ARC; 1400-2100Z May 16; on 7.240, 14.240, 21.340, 28.340, 146.805. For certificate send SASE to MMARC, P.O. Box 935, Severn, MD 21144.

KB3MF, from 148th anniversary of "What Hath God Wrought?" message, Hanover, Maryland; Bay Area ARS; 1300-1900Z May 16; CW 7.11 MHz and 21.035. For certificate send QSL (shortwave listeners details of QSO) and large SASE to Bay Area ARS, P.O. Box 805, Pasadena, MD 21122-0805.

KN4RY, from 5th annual Trail Ride of Florida Cracker Trail Assn., Fort Pierce, Florida; Fort Pierce ARC; 1600-2300Z May 8 and 1400-2100Z May 9; 40, 20, 15 meters and Novice 10 meters. For certificate send QSL and 9 x 12 SASE (2 units postage) to W3DHN, 18 Cordillera, Fort Pierce, FL 34951.

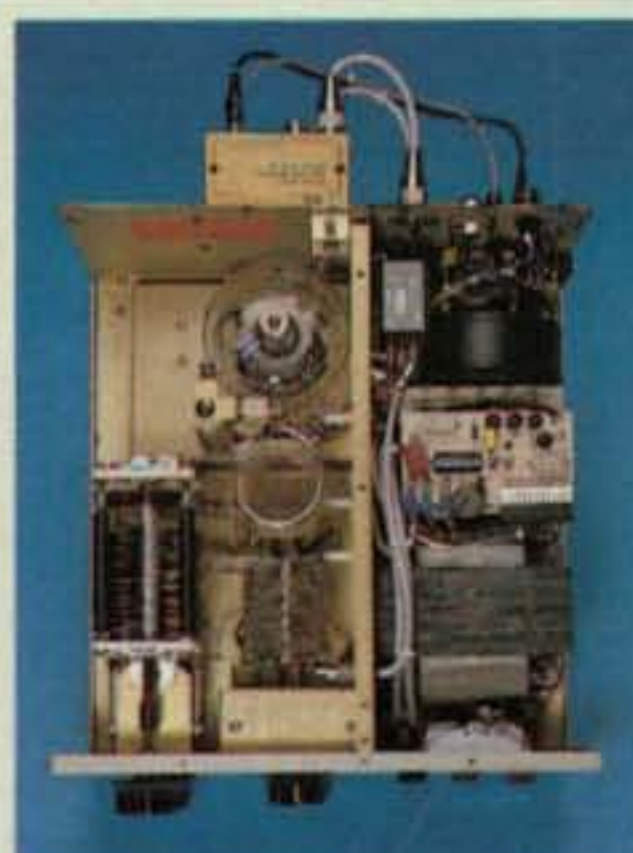
WA4UMU, from Sumter Iris Festival, Swan Lake Gardens, Sumter, South Carolina; Sumter ARA; 2000-2000Z May 23-24; SSB lower 10 kHz of General 10, 15, 20, 40 meters, lower 10 kHz of Novice/Tech 10 meters. For QSL certificates send SASE to Sumter ARA, P.O. Box 193, Sumter, SC 29150-8862.

KD4SS, from Kentucky Bicentennial, Barren River State Park, Glasgow, Kentucky; Mammoth Cave ARC and Kentucky Colonels ARC; 1700Z May 16 to 1700Z

(continued on p. 128)



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Results of the 1991 CQ World-Wide WPX CW Contest

BY STEVE BOLIA*, N8BJQ

To say that my prayers to the "Gods of Propagation" after the 1990 WPX CW Contest were not answered is certainly an understatement. Some improvements were noticed, however. The year 1991 did bring higher scores, six world records, several continental records, and competitive scores from all areas of the world. South America and Africa were the hot spots for high-band entrants, with Europe the place to be on the low bands. An Asian station (4J0Q) made it to the top of the multi-single class. ZD8 was the real hot spot with a first place (and a world record), along with a second and third.



Here is the new 10 meter record holder, Chris, ZS6BCR.

Finishing fourth was 1990 winner KT3Y, with NR1E at number five. Winning the battle of 10 meters was WE3C, followed by K5NA and K8MFO. NE8T operated by K8JM was number one on 21 MHz. NI8L, K2VV, and K4JPD were separated by less than 40K on 14 MHz. NQ2D repeated as 7 MHz champ, K1ZM set a new US record on 3.5 MHz, and W4JVN's 24 points made him number one on 1.8.

N3RS and W2GD were one and two among US QRPers. W0KEA was number one on 21 MHz, N0AX/7 number one on 14, and AA6XX the leader on 7 MHz.

Multis

The multi-single race finished in almost a dead heat with 4J0Q (not MV island) just edging out ZD80V by just under 50K for number one. Third went to AG9A/AH2, with ZB2X fourth. 4J1FS (MV island) finished fifth, with FQ2M, TW1C, VP5W, 5K1R, and GW8GT sixth through tenth.

The gang at HG73DX was tops in the multi-multi class and the new owners of the

DX

The battle for number one among the single-ops was won by 1989 champ YU1RL, who operated 4M2BYT to the top spot. Finishing a very close second was ZP50Y operated by LU8DQ. Jorge had a few more Q's and multipliers, but could not make up the almost 275 QSO advantage enjoyed by 4M2BYT on 40 meters. Third was N6TJ at ZD8Z, followed by CT3M (OH1XM op) and P34A operated by YU400. Sixth and tops in North America was Aki, HI8A (JA5DQH). Seventh went to new European record holder LZ3DX, with RL7A, KM1H, and HC2G finishing eighth through tenth.

Three single-band world records were set in '91. Chris, ZS6BCR, became the new owner of the 10 meter record, followed by LU6EBY and Z21BL. ZD8LII gained the 15 meter record, with LT0A close behind. YW1A edged out 4Z6DX by less than 3000 points for the 20 meter title and a new record. LZ5W edged out YT2R for the top spot on 7 MHz, 4N1A repeated as 3.5 MHz champ, and YL2GVW became the new top-band champion.

KJ4VH at VP2MU was number one among the QRP operators and is the new holder of the QRP record. Tim edged out LZ2BE for the top spot, with N3RS and W2GD third and fourth. JR3RWB became the 28 MHz leader. 4Z7U operated by 4Z4UT turned in a million-point effort to capture the top spot on 21 MHz. OZ3PE was the 14 MHz champ, with YO5BQ,

OK2BQZ, and UB5RIF the leaders on 7, 3.5, and 1.8 MHz.

USA

KQ2M made it a rare double by operating KM1H to number one in both modes. Bob's 4.1M points (a new USA record) edged out Fred, K3ZO, and KE2PF for US honors.



These are the operators at Mongolian multi-single station JU1SU. From left to right are UA4WCW, Mr. Ulzijsajman (president of MRSF), UA4WO, JT1CD, and UA4WA.

*4121 Gardenview, Beavercreek, OH 45431

SSB Results Corrections

The following corrections apply to the WPX SSB Results in the March issue.

KC4TIR/N should be the winner of the Novice/Tech trophy instead of KB9ABI/T. N4KYD should be N4YKD.

In the single-op, 21 MHz, 8th call area, USA category, WZ8T's score should be 333,032.

AA7OD should be AA7DO.

V85HG should be the top multi-single in Oceania.

IJ4R was inadvertently left out. Score was 16,027,956, QSOs 5684, mults 1146, number one in Europe multi-single.

world multi-multi and prefix record. JE2YRD came in second with a new high score for Asia, followed by LZ2ZO and JA3YBF.

In the USA N4WW repeated as the top multi-single station, with WC4E moving up to second and KS9O third. WF1B and AA5B rounded out the top five.

Other Stuff

As in the SSB contest, the "CT bug" bit a few logs again. If you have not upgraded yet, please do so or check your log before you submit it. Computer logs are highly encouraged. A disk and a written summary sheet are all that is required. Please use your call as the file name (N8BJQ.BIN or N8BJQ.DBF). We received almost 150 disks for the CW contest, and 95% of the files were named WPXCW91 (everybody read the CT instructions). **Also, an alpha-numeric multiplier list is required with each log.**

A host of new prefixes were activated for the 1991 contest. 4J0Q, ZD80V, JU1SU, 4Z7U, P34A, RL7A, CS8T, IQ9ITU, LT0A, 6G0V, TI75U, TI73F, YM7A, UL0I/UA9SAW, FI5X, FL8C, D73CW, and UT2L helped out the prefix hunters with a new one. Several expeditions were also active for the contest. ZD8Z, AG9A/AH2, V63BN, PA0GAM/ST2, V31KF, 9W6WPX, VP2VDX, XX9TDM, and T77C were contest expeditions. KB7G operated as VS6BG



Here is Jukka, OH1XM, on his way to 4th in the world as CT3M.

and XX9TDB during the contest, as did I2UIY and OH2BH at T77C and IQ2A. Thanks to Brett, Paolo, and Martti for their unique efforts.

The 1992 contest will be held the 30th and 31st of May 1992. For those in the US, this is not a holiday weekend. Don't forget that single-ops can now operate 36 hours, and there is a low-power category (100 watts output). New summary sheets are in the works. In the meantime, if you enter the 100 watt category, please make it obvious on the summary sheet.

Several new trophies have been added, effective with the 1992 contest. The Oklahoma DX Association has taken over sponsorship of the USA club trophy. A new trophy has been added for the best combined score (SSB & CW) for the USA. This is for the single-op all-band category and will go to the operator. Also a new USA multi-single trophy has been added to the SSB contest. These two trophies will be sponsored by the Oklahoma Comm Center. In addition, D. Craig Boyer, AH9B (ex-WE5I), will sponsor a trophy for the top single-operator single-band entry in Oceania for both the SSB and CW contests.

The contest community was saddened by the recent death of CQ 160 Contest Director N4IN in early February. Don was very active in top-band contests and was responsible for the continued success of the 160 contest. Don will be missed.

Again, I must thank N9AG for his help with the contest. Also, a big thanks to Gail at CQ who puts all this together, catches many of my mistakes, and gets this to press in time, even when I'm not.

Reserve the last weekend in May for the WPX CW and give the contest a try if you have not already. It's fun, a good way to work DX, and who knows? You might win.

73, Steve, N8BJQ

Random Comments

All stn. called me, FB TU ... 4F3BAA. NA on 15m was too far for my GP, which stood only 4 feet tall ... 7M1MCT. Who erected the RF wall between Europe and W0? ... AA0CY. Lots of fun. Wait till next year ... AE2N. I became so enthusiastic that I almost forgot that single ops only may operate 30 hours ... CE5SPR. Propagation was not so good, but it was very nice to make this contest this time outside of home QTH

TROPHY WINNERS

SINGLE OPERATOR—ALL BAND

WORLD: Terry Baxter, N6CW trophy. Won by: **Station 4M2BYT operated by Radivoje Lazarevic, YU1RL.**

USA: Steve Bolia, N8BJQ trophy. Won by: **Station KM1H operated by Robert Shohet, KQ2M.**

***JAPAN:** The DX Family Foundation Trophy. Won by: **Tatsuya Sasaki, JH7WKQ.**

OCEANIA: Tom Morton, KT6V Trophy. Won by: **Shido Takahashi, AH6JF.**

***CANADA:** Canadian Amateur Radio Federation (CARF) Trophy. Won by: **John Sluymer, VE3EJ.**

EUROPE COMBINED SSB & CW: Les Nouvelles DX Group Trophy. Won by: **Tine Brajnik, YT3AA (YZ9A).**

WORLD QRP/p: QRP Amateur Radio Club International Trophy. Won by: **Station VP2MU operated by Tim Totten, KJ4VH.**

SINGLE OPERATOR, SINGLE BAND

WORLD: Pedro Piza, Jr., NP4A (Pedro Piza, Sr., KP4ES Memorial) Trophy. Won by: **Steve Hodgson, ZD8LII (21 MHz).**

WORLD 7 MHz: William D. Johnson, KV0Q Trophy. Won by: **Station LZ5W operated by Alexo Savkov, LZ3ZZ.**

WORLD 3.5 MHz: Lance Johnson Engineering Trophy. Won by: **Station 4N1A operated by Ceha Dusan-Dule, YU1EA.**

USA: Kansas City DX Club Trophy. Won by: **Scott Detloff, NI8L (14 MHz).**

USA 28 MHz: Walt Smith, K1DWQ (Bernie Welch, W8IMZ Memorial) Trophy. Won by: **John Rodgers, WE3C.**

USA 21 MHz: Wayne Carroll, W4MPY Trophy. Won by: **Station NE8T operated by John Millett, K8JM.**

USA 14 MHz: Gene Walsh, N2AA Trophy. Won by: **John Yodis, K2VV.**

USA 7 MHz: Dennis Younker, NE6I Trophy. Won by: **Jim Metcalf, NQ2D.**

MULTI-OPERATOR, SINGLE TRANSMITTER

WORLD: Ron Blake, N4KE Trophy. Won by: **Station 4J0Q operated by YL3CW, UQ2-037-116, UA0QBB, YL2KL, YL2GM, UQ2GID, UA0QDL, UA0QBN, UA0QCA, 3W3RR, UV3GZ, UA0-098-113, UA0QHI.**

USA: Austin Regal, N4WW Trophy. Won by: **Station N4WW operated by K0LUZ & NX4N.**

CONTEST EXPEDITION

WORLD: Kansas City DX Club Trophy. Won by: **Jim Neiger, ZD8Z.**

CLUB (SSB & CW)

WORLD: CQ Magazine Trophy. Won by: **The Northern California Contest Club.**



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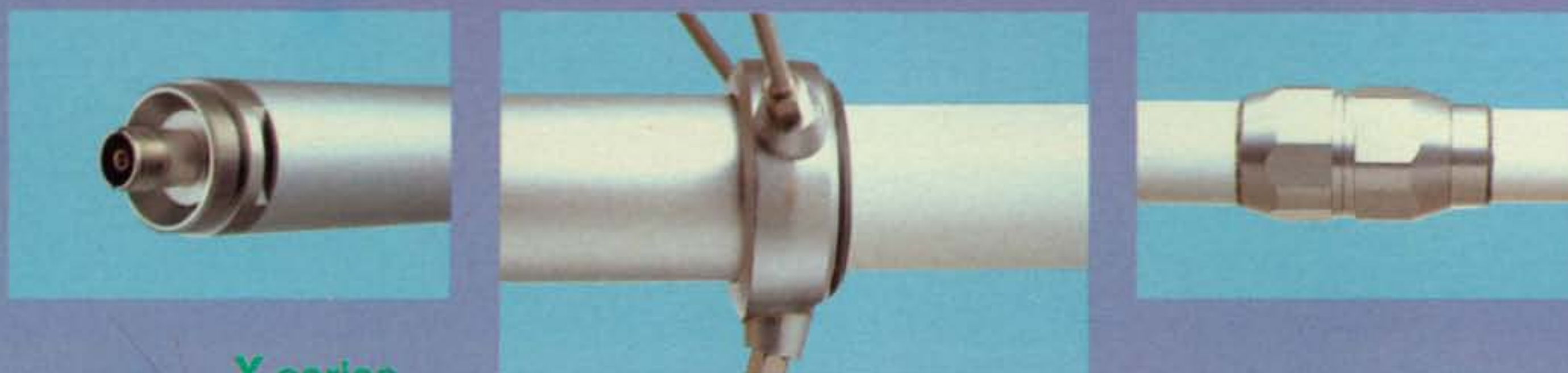
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X-500NA	2m/70cm	8.3/11.7	200	17.2	N	90	2m:3-5/8λ,70cm:8-5/8λ
X-200A	2m/70cm	6.0/8.0	200	8.3	UHF	112.5	2m:2-5/8λ,70cm:4-5/8λ
X-50A	2m/70cm	4.5/7.2	200	5.6	UHF	135	2m:6/8λ,70cm:3-5/8λ

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U-300A	70cm/23cm	8.6/13.2	150	8.3	N	110	70cm:4-5/8λ, 23cm:10-5/8λ
U-5000A	2m/70cm /23cm	4.5/8.3 /11.7	150	6.0	N	135	2m:6/8λ,70cm:3-5/8λ, 23cm:7-5/8λ

F series VHF/UHF MONOBAND

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DP-GH62	6m	6.0	200	21.0	UHF	78	2-5/8λ
F-22A	2m	6.7	200	10.5	UHF	112	2-7/8λ
F-23A	2m	7.8	200	15.0	UHF	90	3-5/8λ
F-142A	1 1/4m	5.5	200	6.0	UHF	110	2-5/8λ
F-718A	70cm	11.5	250	15.0	N	90	18-1/2λ
F-1230A	23cm	13.5	100	10.5	N	90	25-1/2λ

*F-718L:420~430MHz,F-718J:430~440MHz

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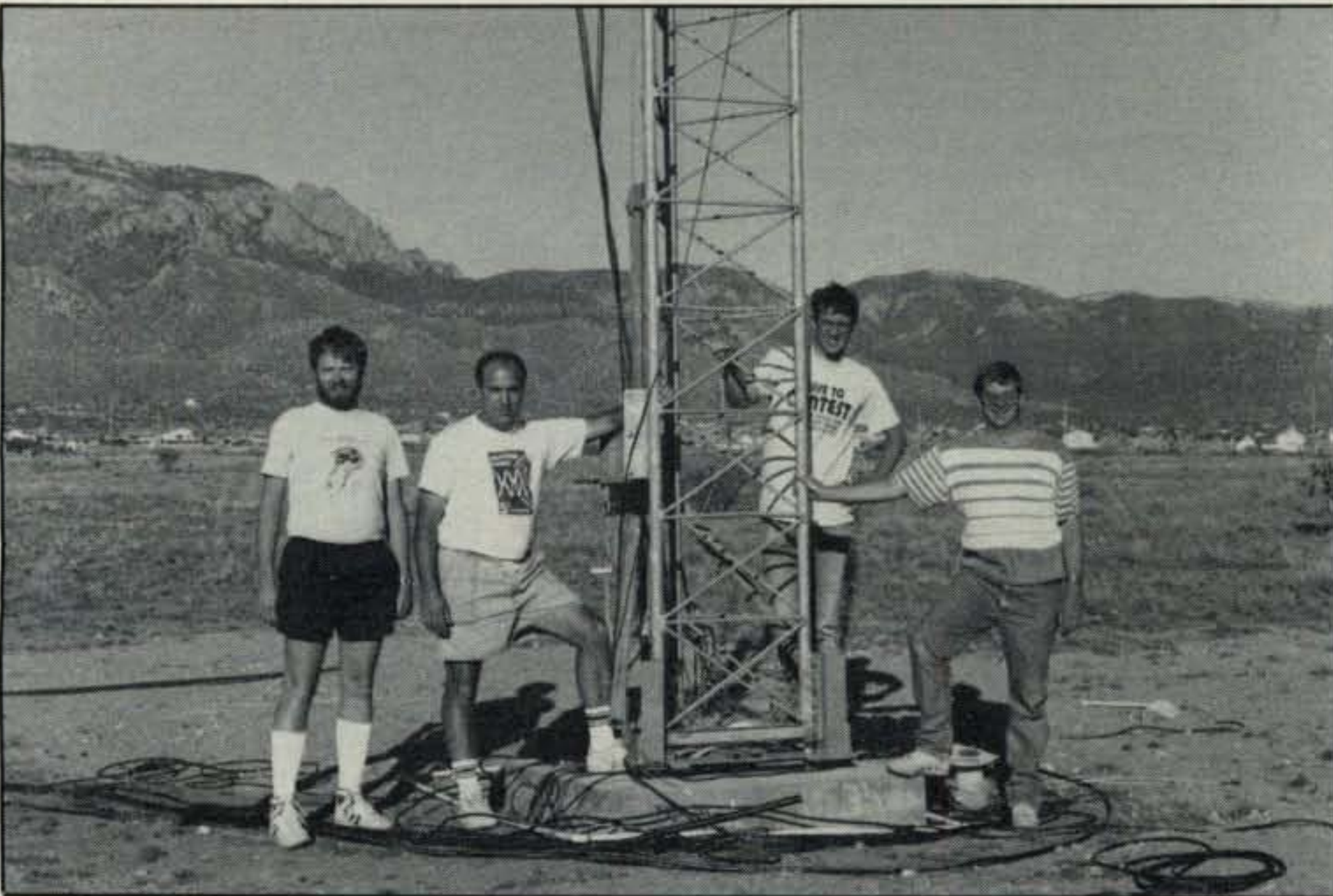
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Here are four of the five ops at USA multi-single station AA5B. From left to right are AI9X, K9RS, AA5B, and N5FA. Missing is K5TA, who had to leave early.

... CT3M. Using the special call—D73CW as extremely impressed for me... D73CW. Operate from Graciosa Island—special call... ED8BIE. Very enjoyable contest but didn't see much activity from N.A. on 40... G4ZOB.

Conditions were so bad that I took time off to drive 40 miles to buy a new car for my son!

... GB0DX. Many thanks to CQ magazine for the great contest. See you next year... H18A. The best contest!... I0ZUT. Through this test! Sleepiness, operating alone, and lonely, but I wished to win. CU next test again... JA0ZRY. Enjoyed contesting very much!... JA8RWU. Pretty fair condx for May contest on 3.5 MHz!... K1ZM.

It really hurt to know there were so many good prefixes out of reach because of the lousy conditions... K2VV. Conditions on day #1 were enough to make anyone quit. Day #2 was better. Not a prayer against the "Big Guns"... K3GWA/0.

Not only is 10 meters loaded with illegal CBers, they are now getting belligerent and make deliberate QRM on hams... K8MFO. Used a beam in contest for the first time!... KA4RRU. First time on CW in WPX. Boy am I slow!... KB2SE. Not a bad score for a 19-year-old college student, huh?... KE2PF. Many thanks to K1EA for the contest program... LU4FD. Tnx to Roberto, LU9DMC, for lending me his linear and to Carlos, LU2DJY, for letting me work with his 8-element Yagi... LU6EBY. Sorry, bad condx—USA stations no open yet! Strongest here was N2AZS. All contest was JA stations... LY2BZ. Great fun. Worked 4J1FS on 5 bands!... LZ3DX.

Last contest from Guam. Next year I will be in KL7 land... N7DF/NH2. I've got to get a computer. XYL doesn't like the paperwork... NJ3K. Bands poor. Solar upsets... NN0M. Station went hot. Had to redo my ground in the middle of the contest!... NV1Q. OY, OY that aurora!... OY/N6HR. The lousy condx can kill you. This was even my best score in this contest. See you next year... OZ8AE. Changed callsign. Much easier to send (ex-PY2RLQ)... PY2ZI. Thanks for very interesting contest... RB5LAV. Was very pleased by WPX contest 1991. Take part in WPX—1988 only 1.8 MHz, first when I was 15 years old... UO5OGB.

My Astro 102BX was destroyed during second night and it was very hard to get here MRF

CW & SSB CLUB COMPETITION

NORTHERN CALIFORNIA CONTEST CLUB	77,268,841	LCRA SECCIONAL BARRANQUILLA.....	6,051,830
LES NOUVELLES DX GROUP.....	54,208,811	ALASKA DX ASSOCIATION.....	5,996,696
FRENCH DX FOUNDATION.....	44,452,369	THE BULLMERTZ.....	5,868,288
YANKEE CLIPPER CONTEST CLUB.....	43,587,547	GRAND MESA CONTESTERS.....	5,336,476
ARAUCARIA DX GROUP.....	40,179,284	CENTRAL ARIZONA DX ASSOCIATION.....	5,266,579
OH-DX-RING.....	27,926,511	KOREAN DX CLUB.....	5,198,050
FRANKFORD RADIO CLUB.....	27,090,135	YU DX CLUB.....	5,009,361
KAUNAS POLYTECHNIC INSTITUTE.....	26,864,347	SAN DIEGO DX CLUB.....	4,918,748
SOCIETY OF MIDWEST CONTESTERS.....	23,635,908	DAUBERVILLE DX ASSOCIATION.....	4,504,226
CHILTERN DX CLUB.....	18,455,888	THE 7 CAMELS CONTEST CLUB.....	4,242,489
FLORIDA WEST COAST DX RING.....	17,807,616	GUAYAQUIL RADIO CLUB.....	4,056,000
BAVARIAN CONTEST CLUB.....	17,105,759	C.R.A.N.T.A.C.....	3,954,598
POTOMAC VALLEY RADIO CLUB.....	15,129,698	ALBANY AMATEUR RADIO ASSN.....	3,899,522
SOUTHERN CALIFORNIA CONTEST CLUB.....	14,306,969	RHINE RUHR DX ASSOCIATION.....	3,809,342
REP-REDE DOS EMISSORES PORTUGUESES.....	13,616,496	ICAE RADIOCLUB.....	3,610,121
NORTH TEXAS CONTEST CLUB.....	13,541,222	OK DX ASSOCIATION.....	3,363,537
CONTESTGROUP OUDE MAAS.....	12,684,526	NIAGARA FRONTIER INTERNATIONAL DX ASSN.....	3,305,308
VARGINHA DX GROUP.....	12,172,875	SP DX CLUB.....	3,286,501
VENEZUELAN DX CLUB.....	12,090,608	DIXIE DX'ERS.....	3,143,936
NORTH COAST CONTESTERS.....	9,297,603	FRASER VALLEY DX CLUB.....	3,099,357
PRESENCE RADIOAMATEUR.....	8,747,725	CHAGOS AMATEUR RADIO CLUB, BIOT.....	3,029,472
WESTERN WASHINGTON DX CLUB.....	8,719,937	CROSSWAYS CONTEST GROUP.....	2,995,312
MAUI A.R.C.....	8,709,200	EAST CORK AMATEUR RADIO CLUB.....	2,947,605
UKRAINIAN CONTEST CLUB.....	8,570,589	SOUTHEASTERN DX CLUB.....	2,772,247
NEW MEXICO BIG RIVER CONTESTERS.....	8,387,244	SCHENECTADY AMATEUR RADIO CLUB.....	2,651,116
RADIO CLUB OF NYIREGHAZA.....	8,262,072	EASTERN CANADIAN DX ASSOCIATION.....	2,375,463
RADIO CLUB OF ST. PAUL.....	8,262,072	GRUPO DX PANAMERICANO.....	2,263,476
URE.....	7,957,948	WESTERN NY DX ASSOCIATION.....	2,177,831
HOOSIER CONTESTERS.....	7,523,062	YV DXPERTS TEAM.....	2,145,629
MAD RIVER RADIO CLUB.....	7,453,782	TOP OF EUROPE CONTEST CLUB.....	2,133,516
TEXAS DX SOCIETY.....	6,939,715	MINNESOTA WIRELESS ASSOCIATION.....	2,067,516
CENTRAL FLORIDA DX ASSOCIATION.....	6,895,109	SOUTHERN PENINSULA AMATEUR RADIO KLUB.....	2,034,473
SOUTHWEST OHIO DX ASSOCIATION.....	6,685,178	TORONTO DX CLUB.....	2,008,738
SPARK OF HAMPTON VA.....	6,245,512	NORTHERN CORRIDOR RADIO GROUP.....	1,973,072
KANSAS CITY DX CLUB.....	6,076,236		

(continued on page 18)

433 analogy, but I did it! . . . **UT2L**. I tried to overcome 2 mil. points level, but bad condx did not help me! I'll try again . . . **UT5UGR**. This operation was a victim of generator/battery problems, bad conditions, and good beer . . . **V3YZ**. I reached Pohnpei on Sunday afternoon so I could join only a quarter part of the contest, but enjoyed it very much! . . . **V63BN**. Over an hour between QSOs on 160 during the "wee hours." Where were all the top banders? . . . **VE3DO**. Ten meters was flat as a pancake on Saturday . . . **VE3HX**. Condx good at start, but towards the end very poor from this location . . . **VK6LW**.

First attempt at all band. A great contest to try it . . . **VO1SF**. My first time in WPX—poor conditions at this end and missed the NA stns. Anyway, was good fun with my homebrew stn . . . **VU2PTT**. Not too bad for an 80 year old and no high tech! . . . **W1CNU**. My first WPX! Twenty meter conditions couldn't be worse, but thanks to CT I stuck with it! . . . **W1WEF**. For all those who asked me to, I said hello to mom . . . **W3DAD**. Enjoyed listening to LU7EE send his call sign! . . . **W7HS**. Ten meters has gone for the summer at the end of May in US NW . . . **W7QN**. Why are some U.S. operators so reluctant to give out their prefix late in the contest? . . . **W8UPH**.

Thanks to W7RM for loaning me his QTH for the weekend . . . **WA0RJY**. Who said lightning (flare) couldn't strike two years in a row? **XYL** got sick and in-laws in town—hard to get much contesting . . . **WC5D**. My first WPX. Three all-time new countries will bring me back next year . . . **WD5JZL**. Condx so poor 1500 watts was like 1.5 watts QRP (on 10 meters)! . . . **WE3C**. Fifteen meters was a bad choice for a mid-west stn . . . **WT8P**. Condx so bad I didn't know the storm

was here until the nearby ground strike . . . **WX9U**. Tnx for FB contest! I am 14. This is my first contest with my personal call. This is the first time, but not the last . . . **YL2GVW**.

My first WPX test. Interesting, but would prefer it if 48 hours long . . . **ZD8Z**. Finished the stack at 5 AM on Saturday. I guess it works okay! . . . **ZS6BCR**. Really punk conditions and yet this is the best I've ever done QRP . . . **N3RS**. Working EU was tough with my QRP—only averaged 2.2 points per QSO! . . . **VP2MU**.

Station Operators Multi-Op Multi-Transmitter

4G1A: 4F1BYN, 4F1FZ, DU1FZE, 4F1ARC, 4F1DMD.
HG73DX: HA1's TJ, TD, DAC, DAE, AH, HA5's GF, IW, AWH, ML, FM, HA6's WX, NF, OQ, NY, ON, ND, PX, HA8's IE, JV, HA7RY, HG5YY, Andras. **JA3YBF**: JE1TND, JO3LDN, JF4FUF, JG4CLV, H. Onishi. **JE2YRD**: JA1KFX, JM2FPO, JI3ERV, JR7OMD, JA9SSY, AH0K, JI2E0C. **KL7RA**: AA6DX, AL7CQ, AL7HC, KL7RA. **LY2Z0**: LY2NK, LY2BFN, LY2BMX, LY2B0A, LY2BRE, LY2BTD, LY3BN, LYR-346, LYR-728, LYR-1751.

Station Operators Multi-Op Single Transmitter

4A1MD: AA6RX & XE1MD. **4J00**: YL3CW, UQ2-037-116, UA0QBB, YL2KL, YL2GM, UQ2GID, UA0QDL, UA0QBN, UA0QCA, 3W3RR, UV3GZ, UA0-098-113, UA0QHI. **4J1FS**: OH6YF, OH2BU, OH6NU, UA3AKR, UV1AA, OH2BR, OH2BVI, UA1ALZ, UA6HZ, UW3AX. **4N2D**: YU2FK, YU2TL, Dado, Vido, Roko, Ante, Renato, Mato, YT2VM. **4U6ITU**: DL80BD, DL20AP, DL90E. **5K1R**: HK3AHM/1 & HK1KXA. **9W6WPX**: 9M6HF, JH0SPE, JR0TUU. **AA5B**: K9RS, AA5B, AI9X, K5TA,



Here are **OH2BH** and **I2UIY** in front of the Government Palace in San Marino. **Martti** and **Paolo** operated as **T77C** during the contest as well as **IQ2A**. By the way, with his visit to San Marino, **Martti** has now visited all countries in Europe.

N5FA. **AG6D**: AG6D, AF6S, N1EE/6, N6IP, N6YK.
AG9A/AH2: AG9A & AA9AK. **DK9IP**: DK9IP & DF2UU.
EA3KU: EA3KU, EA3AIR, EA3AVV, EA3DWW, EA3DXD, EA3FER. **F1MHP**: F1MHP & FB1NTR. **FQ2M**: F5IN, F6ARC, F1LGE, F5QF. **G4BU0**: G4BU0, G4HTD, G4UOL. **GB0WPX**: AA6MC & G3SZA. **GB5AA**: G3JKS, G3OUF, G3UJV, G4DJX, G4JKS. **GW8GT**: G4IFB, G4BKI, GW4TTV, GW4LX0, G3SQX, G30AY, G4JXE. **HB9AB**: HB9BGV, HB9BKT, HB9BOW, HB9BTL, HB9CAT, HB9CIG, HB9DDO, HB9IQI, HB9RMH, ZL1VBP. **IQ2A**: I2UIY & OH2BH. **IS0/DL6RAI**: DL5MAE & DL6RAI.

CW & SSB CLUB COMPETITION (from page 17)

WOODBIDGE WIRELESS INC.	1,800,077	HWRC DX/CONTEST CLUB	331,008
REGINA AMATEUR RADIO ASSOCIATION	1,752,641	WSDXC	330,620
MILE HI DX ASSOCIATION	1,615,582	BERLIN CONTESTERS	270,276
KENTUCKY CONTESTERS	1,554,735	DELAWARE-LEHIGH AMATEUR RADIO CLUB	248,170
RADIO CLUB MAGALLANES	1,460,160	NORTHERN CALIFORNIA DX CLUB	247,596
WINNIPEG DX CLUB	1,352,684	E-SYSTEMS GARLAND DIVISION A.R.C.	245,313
RADIO CLUB CORDOBA	1,305,720	DELTA DX ASSOCIATION	245,311
GREAT DISMAL SWAMP DX ASSN.	1,267,510	UNIVERSITY OF TOKYO CONTEST CLUB	196,724
READING RADIO CLUB	1,260,153	GRUPO ARGENTINO DE RADIOTELEGRAFIA (GACW)	173,446
LITHUANIAN CONTEST GROUP	1,149,795	MVDXCC	147,465
CANADIAN INTERNATIONAL DX CLUB	1,129,961	LACROSSE DX CLUB	139,755
ARCTIC AMATEUR RADIO CLUB	1,065,382	ARROWHEAD RADIO AMATEUR CLUB	118,728
OREGON NOCTURNAL CHORDAL CORPS	1,015,784	BINGHAMTON ARA	111,180
UTAH CONTEST CLUB	985,446	DADE RADIO CLUB	93,784
SARA	854,217	NAKED CHICKEN CONTEST CLUB	90,226
OWLS	800,262	LONE STAR DX ASSOCIATION	88,910
S.D.X.G.	784,485	SOUTHERN CALIFORNIA DX CLUB	71,280
NORTHERN LITHUANIA DX GROUP	746,175	EAST LANSING DX CLUB	64,610
DURANGO AMATEUR RADIO CLUB	720,297	SOUTH JERSEY RADIO ASSOCIATION	61,866
CAROLINA DX ASSOCIATION	696,464	SUMMIT DX CLUB	53,376
MAXWELLTOWN AMATEUR RADIO CLUB	683,862	ALFORD MEMORIAL RADIO CLUB	52,688
HARVARD WIRELESS CLUB	679,588	STERLING PARK ARC	49,792
RADIOTEAM FINLAND	650,767	NEWARK AMATEUR RADIO ASSOCIATION	37,113
REDWOOD EMPIRE DX ASSOCIATION	557,728	MERIDEN ARC	34,230
SCDXA	537,570	WEST PARK RADIOPS	28,567
FALMOUTH AMATEUR RADIO ASSN.	497,394	MIDDLE TENN. DX CLUB	19,173
SALT CITY DX ASSOCIATION	476,307	LANCASTER & FAIRFIELD CO. ARC	17,952
ST. CATARINA IS. DX GROUP	470,275	TEBY SAENDARAMATOERER	17,340
WILLAMETTE VALLEY DX CLUB	443,829	GARLAND AMATEUR RADIO CLUB	16,632
KINGSPORT AMATEUR RADIO CLUB	406,029	GREATER MILWAUKEE DX ASSN.	12,328
ROCHESTER DX ASSOCIATION	382,377	G.A.D.X.	4,644
SAO PAULO CW GROUP	364,700	GREAT SOUTH BAY A.R.C.	2,176
AMARILLO DX ASSOCIATION	361,956	SHREVEPORT AMATEUR RADIO ASSOCIATION	1,624
OVERLOOK MOUNTAIN ARC	356,580	POWAY ARS	270

WORLD TOP SCORES

SINGLE OPERATOR ALL BAND

4M2BYT	8,656,120
ZP50Y	8,240,575
ZD8Z	7,783,200
CT3M	7,628,335
P34A	7,001,834
HI8A	6,652,828
LZ3DX	4,713,706
RL7A	4,674,336
KM1H	4,143,744
HC2G	4,056,000
VP2VDX	4,024,298
K3ZO	3,712,500
CS8T	3,706,252
UA9SA	3,658,428
KE2PF	3,537,675
KT3Y	3,492,378
VE3EJ	3,305,308
CK7C	3,099,357
IK1GPG	3,085,264
OK1ALW	3,006,633

28 MHz

ZS6BCR	3,621,173
LU6EBY	2,164,398
Z21BL	1,482,435
LU4FD	791,800
ZS4NS	669,879
IQ9ITU	579,477
4M7A	312,132
RB5IM	300,966
UB7VA	287,756
VK4XA	239,655

21 MHz

ZD8LII	5,118,527
LT0A	4,290,988
PY4OD	3,753,792
7L1GVE	2,811,478
N7DF/NH2	2,788,193
LU1ICX	2,002,385
YV4ABR	1,854,168
YT2E	1,762,375
LZ2VP	1,427,635
OH1AU	1,018,350

14 MHz

YW1A	4,617,456
4Z6DX	4,614,030
VK6LW	2,454,732
GB8FX	2,293,530
UT5UGR	1,702,197
N18L	1,647,232
K2VV	1,628,832
K4JPD	1,606,826
SV1RP/SV2	1,517,082
UL8LWF	1,475,082

7 MHz

LZ5W	1,754,220
YT2R	1,676,160
6G0V	1,149,234
NQ2D	1,026,324
4N4T	926,688
RV6AGG	752,488
UF6QR	648,704
W3BGN	618,192
DL1IAO	575,604
IK1CBG	543,286

3.5 MHz

4N1A	436,200
G4FAM	352,618
LZ2WF	347,472
LY1BY	318,240
OK3CBU	304,470
ES5RY	298,764
RB5DX	279,168
UA9CBM	255,972
K1ZM	247,744
LZ1ZX	229,368

1.8 MHz

YL2GVW	72,864
UB5FAN	53,738
Y21PO	51,216
OK1DRU	35,490
Y26AD	15,476
UQ2GTF	12,714
YO8BPY	12,200
UB5ZKE	10,692
VE3DO	10,248
RB8SM	9,450

QRP/p

VP2MU	A	1,554,735
LZ2BE	A	1,137,488
N3RS	A	828,808
W2GD	A	701,055
YU4EBL	A	629,770
JR3RWB	28	14,525
RB5FO	28	11,880
4Z7U	21	1,031,400
ES1CR	21	80,337
OZ3PE	14	172,085
N0AX/7	14	141,000
YO5BQ	7	83,130
AA6XX	7	75,048
OK2BQZ	3.5	53,040
UB5RIF	1.8	7,526

MULTI-OPERATOR

SINGLE TRANSMITTER

4J0Q	10,987,836
ZD80V	10,938,352
AG9A/AH2	9,005,641
ZB2X	8,618,823
4J1FS	7,123,800
FQ2M	6,395,128
TW1C	6,302,670
VP5W	6,245,512
5K1R	6,051,830
GW8GT	5,927,582
R6L	5,528,354
CZ7Z	5,474,007
JU1SU	5,419,375
RZ1A	5,417,163

MULTI-OPERATOR

MULTI-TRANSMITTER

HG73DX	16,468,480
JE2YRD	8,388,942
LY2ZO	6,971,510
JA3YBF	3,427,614
4G1A	1,654,163
KL7RA	1,354,000

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1096	Radio Mods 1 - complete listing of several modifications to many popular scanners, HT's and other radios.
1110	K1EA's CT Contest Logging - the most talked about contest logger around! Does CQWW, ARRL DX and more contests (version 4.25)
1132	Packet Radio Tutorial - a very detailed tutorial and introduction to the world of packet radio. 18 chapters of text. Easy reading.
1144	LanLink - terminal program that is taking the packet world by storm! Works on AEA, Kantronics, MFJ and other TNCs. Features galore!!!
1167-1170	Night Sky - (4 disks) - A very detailed planetarium system that has over 24,000 star database. Easy to use. (Hard drive/graphics monitor req'd)
1319	PC-Breeze II - Design printed circuit boards, one or two layers, up to 300 square inches. Built in autorouter with editable output.
1332	PC-Schematics - A high quality system for drawing schematics, printed circuit board art, timing diagrams and much more. Many features.
1350-1351	Electronics Tutorial - (2 disks) a complete AC and DC electronics tutorial. Similar to upper level high school / intro college courses in terms of content.
1402	Windows Tools 2 - tools for the Windows desktop. Datebook with calendar, ZIP file manager, HP calculator emulator and much more.
1413-1414	Metz Window's Tools - (2 disks) - Highly rated collection. Autodialer, app runner, keyboard lock, as well as desktop navigators and file manager.
1417	Command Post - Top notch menuing system for Windows. Customize your setup to do exactly what you want. Has file manager/browser w/ blanker.
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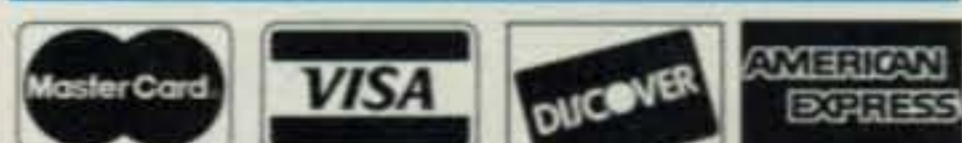
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- UT-30 Tone encoder 18.67



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 - SM-8 Desk mic; two cables, scan 89.00
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 - IC-1201** 10w 1.2GHz FM/SSB/CW 831.00 719⁹⁵

- Dual band FM Transceivers** Regular **SALE**
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 - IC-2410H** 45w 2m/35w 440 FM/TTP mic 932.00 789⁹⁵
 - IC-3220A** 25w 2m/440 FM/TTP mic 685.00 579⁹⁵
 - IC-3220H** 45w 2m/ 35w 440 FM/TTP mic 727.00 599⁹⁵
 - IC-2500A** 35w 440/10w 1.2GHz FM 1039.00 869⁹⁵

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 - UX-R91A** Broad band receiver unit 405.00 359⁹⁵
 - UX-19A** 10w 10m unit 311.00 279⁹⁵
 - UX-59A** 10w 6m unit 363.00 329⁹⁵
 - UX-S92A** 2m SSB/CW module 623.00 549⁹⁵
 - UX-39A** 25w 220MHz unit 363.00 329⁹⁵
 - UX-129A** 10w 1.2GHz unit 571.00 509⁹⁵
 - UX-49A** 440MHz module for IC-900 363.00 319⁹⁵

- IC-970A** 25w 2m/430MHz xcvt/ps 2409.00 1999
- IC-970H** 45w 2m/430 MHz transceiver . 2567.00 2159
- UX-R96** 50-905 MHz receive unit 405.00 349⁹⁵
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 - IC-2SAT** 2m/TTP 372.00 319⁹⁵
 - IC-2SRA** 2m/25-905MHz rx 600.00 509⁹⁵
 - IC-24AT** 2m/440MHz/TTP 492.00 419⁹⁵
 - IC-3SAT** 220MHz HT/TTP 351.00 299⁹⁵
 - IC-4SAT** 440MHz HT/TTP 351.00 299⁹⁵
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 - IC-4GAT** 440MHz/TTP 372.00 319⁹⁵
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 - FL-44A** SSB filter (2nd IF) 178.00 169⁹⁵
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 - EX-310** Voice synthesizer 59.00
 - CR-64** High stability oscillator xtal 79.00
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HC2G A	4,056,000 1792 624	4M28YT A	8,656,120 3065 764	NØFMR	110,004 265 206	SØ6R	1,468,656 1433 496	JA3YBF	3,427,614 1945 654														
(Op. HC2SL)		(Op. YU1RL)		KF4CI	76,818 203 177	SV4AAQ	1,146,366 1455 426	4G1A	1,654,163 1204 469														
		(Op. YV5CLM)		KG5VK	1,624 30 28	SI6SM	1,128,417 1361 489	KL7RA	1,354,000 1294 400														
ARGENTINA				PARAGUAY				EUROPE				MULTI-OPERATOR SINGLE TRANSMITTER UNITED STATES				EUROPE							
K3JXQ/LU	A 2,246,232 1409 541	ZP5ØY A	8,240,575 3115 775																				
LU1EWL	" 173,446 320 182	(Op. LU8ØQ)																					
LU6EBY	28 2,164,398 1350 543																						
LU4FD	" 795,500 733 370																						
LTØA	21 4,290,988 2170 716																						
(Op. LU5UL)																							
LU1ICX	21 2,002,385 1251 539																						
LU7EE	14 830,154 749 377																						
LU5EW	" 408,465 539 261																						
LU5ER	7 1,700 19 17																						
PERU																							
ØA4ZV	A 511,731 583 297																						
NETHERLANDS ANTILLES																							
PJ2	/PAØVDV	21	516,516 571 308																				
BRAZIL																							
ZY2NY	A	364,700	536 315																				
ZW1J	A	320,736	410 257																				
ZY2KXI	"	301,600	393 260																				
PY2ZJ	"	120,060	243 174																				
ZW4WAS	"	97,680	205 165																				
(Op. PY4WAS)																							
ZW2YN	"	90,275	198 157																				
PY1LJA	"	60,914	169 133																				
PY4WS	"	6,576	49 48																				
PY1CE	28	234,232	297 168																				
PY2FRW	"	45,784	161 97																				
PY2UJJ	"	34,196	120 103																				
PY4ØD	21	3,753,792	1840 686																				
ZZ2YY	"	286,533	410 239																				
PY2CZL	"	69,136	164 149																				
PY2NX	"	28,518	104 97																				
PY1ØL	"	1,742	26 26																				
PY4ZØ	"	1,026	19 18																				
PP2WV	14	497,280	575 296																				
PY2AØQ	"	7,000	54 50																				
PU2ØIH	3.5	24	6 6																				



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CQ REVIEWS:

The Kenwood TS-450S HF Transceiver

BY JOHN J. SCHULTZ*, W4FA

It has been obvious for some time that Kenwood has been methodically revamping its line of HF transceivers from top to bottom. First came the TS-950S, then the TS-850S, and now the TS-450S. One can almost see the flow of features from one model to the next, modified, of course, for the price range targeted for each transceiver and to accommodate circuit improvements as the designs evolved. However, it isn't fair to say that each transceiver is a simplified clone of a preceding model. Each model stands alone and so far each has represented excellent value.

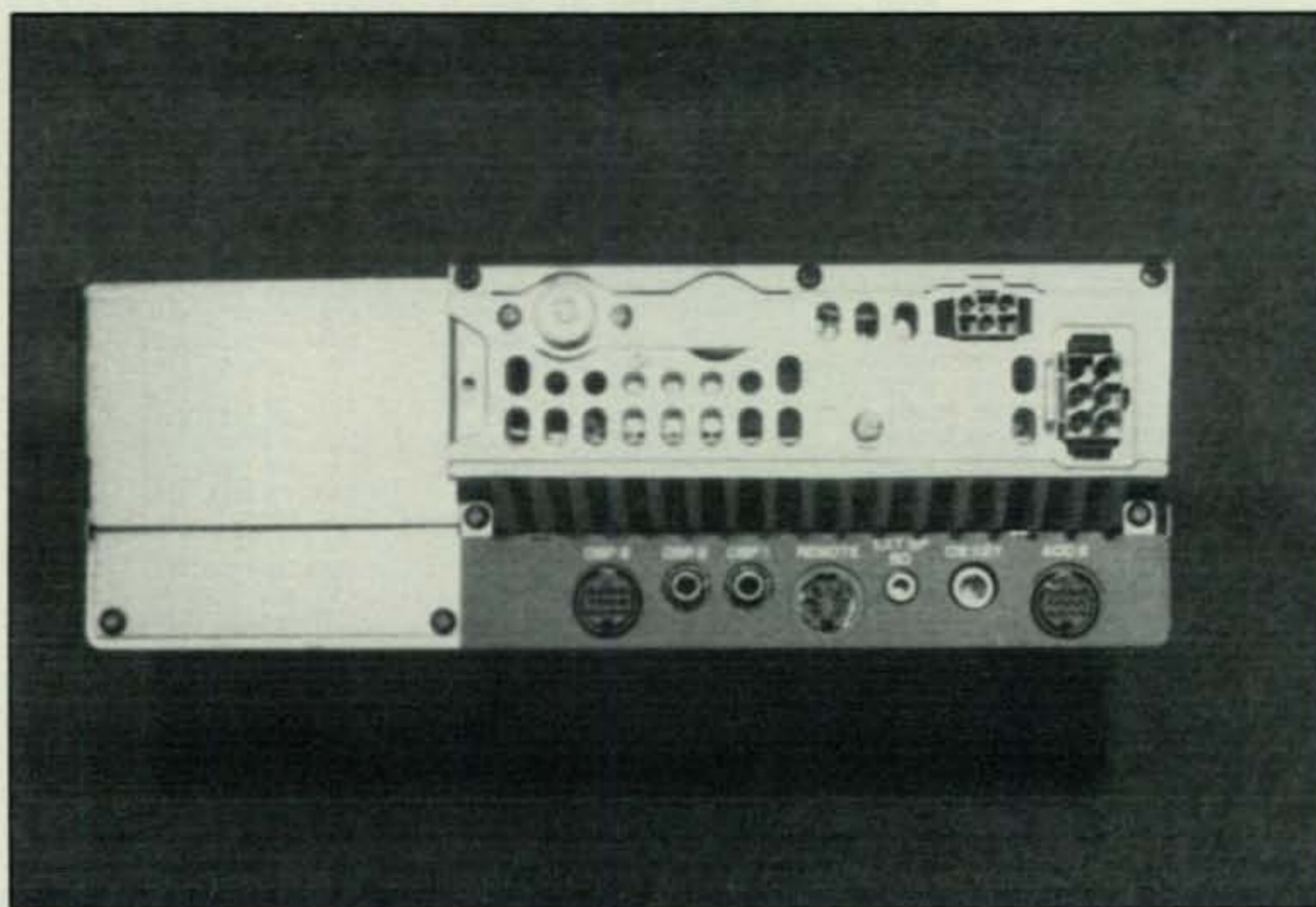
According to Kenwood, the TS-450S replaces their best selling TS-440S. If one does look at the front panels of the two transceivers, it can be seen that they are not very similar except for a few very standard controls such as AF/RF Gain. The TS-450S is obviously a new generation transceiver that doesn't borrow very much from the older TS-440S. So rather than trying to go back and forth comparing the TS-450S to the TS-440S, it would probably be more useful to consider the TS-450S alone. References should be made, however, to some features of the TS-850S which obviously flowed over to the TS-450S.

Size-wise the TS-450S has about 40% less volume than the TS-850S. Weight-wise it is about 30% lighter. Cost-wise it is only 23% "lighter" but the 23% can represent up to \$450.00! Unlike the TS-850S, which is just a bit too large for comfortable mobile operation unless you have a rather large automobile or van, the TS-450S is very suited for mobile operation. Kenwood does not provide any mobile mounting bracket for the TS-850S, but there is a dedicated one for the TS-450S (optional accessory item MB-430).

Specifications

Table I lists the specifications for the TS-450S to include the physical aspects as well as the minimum electrical performance. It should be noted that there is a sister model, the TS-690S, which also includes coverage of 50.0 to 54.0 MHz. Its

*302 Glasgow Lane, Greenville, NC 27858



The TS-450S and PS-53 power supply. The little fellow from XE land is exactly 5 inches high so one can obtain some idea as to the size of the equipment. The photograph is a bit dim but you might be able to see the transceiver saying HELLO to you.

specifications are almost exactly the same as those for the TS-450S except that the housing for the units is about 1" deeper and it weights slightly over a pound more. It's not available with an automatic antenna tuner but its price without the automatic tuner is the same as that for a TS-450S with an automatic tuner, so it might be of considerable interest to 6 meter buffs.

Returning to the TS-450S and Table I, one can see that the transceiver can develop 100 watts output on any mode, except AM where it is limited to 40 watts, on any band from 160 to 10 meters. All modes are standard. General coverage receive is from 500 kHz to 30 MHz. The transceiver utilizes a standard VFO A/B scheme and has 100 memory channels. The IF frequencies, 8.83 MHz and 455 kHz, are the standard ones that Kenwood has used for years. The selectivity figures shown in Table I are those for the standard filters that come with the TS-450S. Various optional filters are available. No keyer is built-in and none is available as an option. VOX is standard and can be adjusted on CW to provide semi

to full break-in. Both RIT and XIT in two selectable ranges are available.

The Unpublished Specifications

I think a specification table such as that shown in Table I is useful simply because it provides basic facts and figures, many of which are not available from advertisements or catalogs. A very simple example is the physical dimensions of a transceiver. It's great if you live in a large city and can visit a local radio emporium to see the new transceivers. But if you don't, you can be amazingly surprised at the very different features found on many transceivers. The TS-450S with a carrying handle on one side almost invites you to pick it up and take it along for a bit of mobile or portable operation. The advertising photographs make it appear more like a large base-station-only transceiver.

Anyway, if all the specifications for a transceiver like the TS-450S were to be tabulated, the specifications would be-

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- FT-767GX 160-10m HF transceiver \$2068.00
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- 6M/767 6m module 196.00
- 430/767 430-440MHz module 296.00
- 440/767 440-450MHz module 296.00
- SP-767 Speaker w/audio filters 99.00
- SP-767P Speaker/phone patch 136.00
- FIF-232C Computer Interface 95.00



- FT-757GX MkII HF transceiver w/mic \$1089.00
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- FC-757AT Automatic ant. tuner w/memory 429.00
- FAS-1-4R Remote antenna selector 120.00
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- SP-767P Speaker/patch 136.00
- FRB-757 External relay box 14.00
- MMB-20 Mobile mount 26.00



- FT-747GX HF transceiver (left) \$833.00
- FP-757HD Heavy duty power supply w/fan 309.00
- FP-700 Power supply 244.00
- SP-767 Speaker w/audio filters 99.00
- MD-1C8 Desk microphone 115.00
- FM-747 FM unit 47.00
- MMB-38 Mobile bracket 14.00
- TCX0-747 Increased freq. stability unit 42.00



FL-7000 1KW
Solid state amplifier
\$2279.00

Other HF accessories

- List**
- MD-1C8 Desk microphone..... \$115.00
 - MH-1B8 Mobile microphone 29.00
 - YS-60 1.8-60 MHz 2KW PEP wattmeter 127.00
 - YS-500 140-520 MHz 200w PEP wattmeter 99.00
 - YH-55 Lo-Z headphones 28.00
 - YH-77 Lightweight headphones 26.00



- VHF/UHF Base** **List**
- FT-736R 25W 2m/430MHz transceiver..... \$1922.00
 - AD-3 50w 2m/440 duplexer 48.00
 - FEX-736-50 6m module 294.00
 - FEX-736-220 220MHz module 322.00
 - FEX-736-1.2 1.2GHz module 589.00
 - FIF-232C Interface; VIC-20/most RS-232 95.00
 - TV-736 1.2 GHz ATV converter 163.00
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 - FTS-8 Encoder/decoder 55.00
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 - FT-712RHT/C8 35w 440 FM w/TTPmic 497.00
 - FT-912RH 10w 1.2GHz FM transceiver 581.00
 - FT-290R MKII 25w 2m FM/SSB transceiver 610.00
 - FT-690R MKII 10w 6m FM/SSB transceiver 752.00
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FT-5200/6200 FT-2400H



- FT-5200 50/35w 2m/440MHz FM xcvr/TTP \$769.00
- FT-6200 35/10w 440MHz/1.2GHz FM xcvr/TTP ... 899.00
- FT-2400H 50w 2m FM transceiver/TTP 429.00



FT-411E/811



FT-470



FT-23R/33R/73R

- VHF/UHF Handhelds** **List**
- FT-411E 2.5w 2m FM HT/TTP \$355.00
 - FT-811 2w 440MHz FM HT/TTP 394.00
 - FT-911 1w 1.2GHz FM HT/TTP 489.00
 - FT-470 2.3w 2m/440 FM HT 499.00
 - FT-23R-12 2m 5W HT 309.00
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FT-73R/TTP 2w 440MHz HT • Closeout \$259⁹⁵



- SWL Receiver** **List**
- FRG-8800 150 KHz-30 MHz Shortwave \$784.00
 - FRA-7700 Indoor active receive antenna 58.00
 - FRT-7700 Antenna tuner 77.00
 - FRV-8800 118-174 MHz VHF converter 107.00
 - Other accessories for FRG-8800 CALL

- Antenna Rotors** **List**
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CIRCLE 32 ON READER SERVICE CARD

		Specifications				
General	Mode	J3E(LSB, USB), A1A(CW), A3E(AM), F3E(FM), F1A(FSK)				
	Memory Channels	100				
	Antenna impedance	50 ohms With AT-450 Antenna Tuner 20~150 ohms				
	Power requirement	12 to 16 VDC (13.8 VDC reference)				
	Grounding	Negative				
	Current drain	Receive mode with no input signal	2A			
		Transmit mode	20.5A			
	Operating temperature	-10°C to +50°C (+14°F to +122°F)				
	Frequency stability	Less than ±10 PPM				
	Frequency accuracy	Less than ±10 PPM				
	Dimensions [W×H×D] (Projections included)	270×96×305mm(10-5/8"×3-25/32"×12-1/64") (280×107×340mm)(11-1/32"×4-1/4"×13-25/64")				
	Weight	With AT unit	7.5kg (16.5lbs)			
Without AT unit		6.3kg (13.9lbs)				
Frequency range	160m band	1.8	to	2.0	MHz	
	80m band	3.5	to	4.0	MHz	
	40m band	7.0	to	7.3	MHz	
	30m band	10.1	to	10.15	MHz	
	20m band	14.0	to	14.35	MHz	
	17m band	18.068	to	18.168	MHz	
	15m band	21.0	to	21.45	MHz	
	12m band	24.89	to	24.99	MHz	
	10m band	28.0	to	29.7	MHz	
Transmitter	Output power (Without AT)	1.9~28MHz	SSB, CW, FSK, FM	MAX	100W	
				MIN	Less than 20W	
				AM	MAX	40W
					MIN	Less than 10W
Modulation			SSB	Balanced modulation		
			FM	Reactance modulation		
			AM	Low level modulation		
Spurious radiation				Less than -50dB		
Carrier suppression (with 1.5kHz reference)				More than 40dB		

Table I- Basic specifications for the TS-450S.

come a document in itself. A quicker way to gain at least a bit of insight into the versatility built into the transceiver is to take a look at what Kenwood calls the "power

on function selections," Table II. These are function options which the user can select by pressing down some front panel key while the power switch is toggled from off



On the rear panel there are dedicated connectors for Kenwood accessories plus general-purpose accessory connectors.

Transmitter	Unwanted sideband suppression (with 1.5kHz reference)		More than 40dB	
	Maximum frequency deviation (FM)		Less than ± 5 kHz	
	Frequency response (-6dB)		400 to 2600Hz	
	XIT variable range	10 Hz step	More than ± 1.1 kHz	
		20 Hz step	More than ± 2.2 kHz	
Microphone impedance		600 Ω		
Receiver	Circuitry		Triple conversion superheterodyne	
	Frequency range		500kHz to 30MHz	
	Intermediate frequency		1st : 73.05MHz, 2nd : 8.83MHz, 3rd : 455kHz	
	Sensitivity	SSB, CW, FSK (at 10dB (S+N)/N)	500kHz~1.62MHz*	Less than 4 μ V
			*1.62MHz ~21.5MHz	Less than 0.2 μ V
			21.5MHz~30MHz	Less than 0.13 μ V
		AM (at 10dB (S+N)/N)	500kHz~1.62MHz*	Less than 32 μ V
			*1.62MHz ~21.5MHz	Less than 2 μ V
			21.5MHz~30MHz	Less than 1.3 μ V
	FM (at 12dB SINAD)	28MHz~30MHz	Less than 0.25 μ V	
	Selectivity	SSB, CW, FSK	-6dB:More than 2.2kHz, -60dB:Less than 4.4kHz	
		AM	-6dB:More than 5kHz, -50dB:Less than 18kHz	
		FM	-6dB:More than 12kHz, -50dB:Less than 25kHz	
	Image ratio		More than 70dB	
	1st IF rejection		More than 70dB	
Notch filter attenuation		More than 20dB		
RIT variable range	10 Hz step	More than ± 1.1 kHz		
	20 Hz step	More than ± 2.2 kHz		
Squelch sensitivity	SSB, CW, FSK, AM	500kHz~1.62MHz*	Less than 20 μ V	
		*1.62MHz~30MHz	Less than 2 μ V	
	FM	28MHz~30MHz	Less than 0.25 μ V	
Output		1.5W across 8 ohms load (10% distortion)		
Output load impedance		8 ohms		

to on. The "menu" consists of some 42 items and ranges all the way from the "useful" to the "amusing." Take a look at the list. Most of them are self-explanatory. The "useful" functions predominate and include turning on/off the 10 Hz resolution digit on the frequency display, turning the bargraph meter on/off for peak or average readings, inhibiting memory channel erase, turning all memory channels into tunable VFOs, varying the main tuning knob tuning rate, changing FSK shift width, changing the receive CW pitch, changing the RIT/XIT tuning range, etc. The "amusing" functions, at least to me, include things like enable/disable the linear keying relay and enable/disable the transmit function. I can't quite imagine why one would want to disable those functions unless one loaned the transceiver to an unlicensed friend. But I suspect our JA engineer friends were just trying to demonstrate their electronic agility. For instance, menu

item 42 makes the transceiver display HELLO when it is turned on. I did activate that function and I can't deny that it was fun to see the transceiver "greet" me. The HELLO display disappears immediately when one even slightly rotates the main tuning knob.

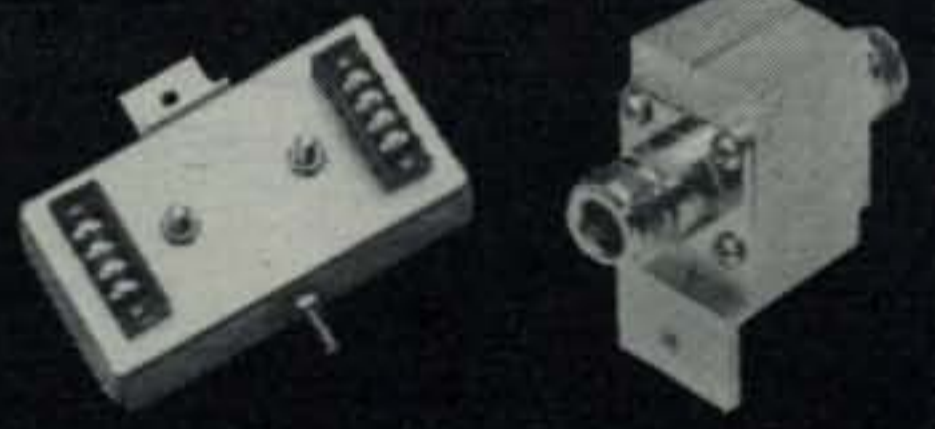
Controls/Indicators

Fig. 1 shows the front panel layout. Keep in mind that it measure only about 10% by 3 7/8 inches. There are lots of indicators and controls but they are fairly simple to break down into simple groupings and, in fact, most of their functions are obvious without even using the instruction manual that comes with the transceiver. There are, by the way, absolutely no rear panel controls although a few one-time adjustments can only be made by removing the top cover (e.g., sidetone level and FM microphone

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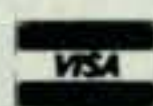
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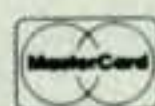
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Menu No.	Function Description	Initial state
01	Enables (ON) or disables (OFF) the main tuning control.	ON
02	Enables or disables the round off function of the M.CH/VFO CH control.	ON
03	Enables or disables the numeric keypad.	ON
04	Enables or disables the BEEP function.	ON
05	Determines how depression of a mode key is announced ON=Morse Code OFF=BEEP	ON
06	Determines how errors are announced ON=Morse Code OFF=BEEP.	ON
07	Turns the 10Hz resolution function of the display ON or OFF.	ON
08	Turn the meter peak hold function ON or OFF.	OFF
09	Storing the band frequency before the UP/DOWN switch is pressed: Required (ON) / Not required (OFF)	ON
10	SSB Auto Mode selection ON or OFF.	ON
11	Enables (ON) disables (OFF) NB2	ON
12	Enables (ON) disables (OFF) Split Frequency operation with a Memory channel.	OFF
13	Automatic Memory Channel Increment during memory entry.	OFF
14	Determines if memory channels acts like fixed channel crystals (OFF), or allows tuning with the VFO control (ON).	OFF
15	Enables (ON) disables (OFF) Program scan hold.	OFF
16	Enables (ON) disables (OFF) the linear keying relay.	OFF
17	Enables (ON) disables (OFF) data transfer function between radios.	OFF
18	Data from any other transceiver can be received and written to either the VFO or memory channel 00.(on:VFO; off: Memory channel 00)	OFF
19	Enables (ON) disables (OFF) transmit.	OFF
20	Enables (ON) disables (OFF) Memory channel erase inhibit.	OFF
21	Enables (ON) disables (OFF) Memory channel write protection (cannot write over a memory channel that contains information).	OFF
31	The built-in antenna tuner can be switched between automatic tune (on) or manual tune(off).	ON
32	Automatic return to receive mode after completion of antenna tuner tuning	ON
33	The frequency step when the tuning knob is turned one turn can be set to 5 kHz or 10 kHz.	10kHz
34	The frequency step of the M.CH/VFO CH control can be changed to 10 kHz, 5 kHz, 2 kHz, or 1 kHz.	10kHz
35	The frequency step of the M.CH/VFO CH control can be changed to 10 kHz or 9 kHz in the BC band only (only in AM mode in the BC band).	10kHz
36	When the 1MHz key is pressed, the step of the UP/DOWN key can be changed to 1 MHz or 500 kHz.	1000kHz
37	The shift width in FSK mode can be selected from 170, 200, 425, and 850 Hz.	170
38	When the FSK transmission key is shorted, you can change between space transmission (off) and mark transmission (on).	ON
39	The receive tone can be set to either high (2125 Hz) or low (1275 Hz).	2125
40	The pitch during CW reception can be set anywhere in the range of 400 to 800 Hz in 50Hz steps.	800
41	The RIT/XIT variable range can be changed to ± 1.1 kHz or ± 2.2 kHz or more.	1.1kHz
42	Display HELLO when the power is turned on.	OFF

Table II- "Power On Function Selections" (Note: Menu items 22-30 are not specified).

gain). An unfortunate arrangement is that the VOX sensitivity and Anti-VOX controls can only be adjusted via access holes on the left side of the transceiver. The top cover does not have to be removed for these adjustments. Their placement is not ideal but also not a major problem. Kenwood supplies with the transceiver a con-

rol knob which can be inserted into the access holes.

Referring again to fig. 1, all of the analog controls are on the right side of the front panel. They are all clearly labeled and easy to use. The four small controls at the bottom adjust the VOX delay (fully CCW for full CW break-in), carrier level (CW, AM, FM,



IC-W2A



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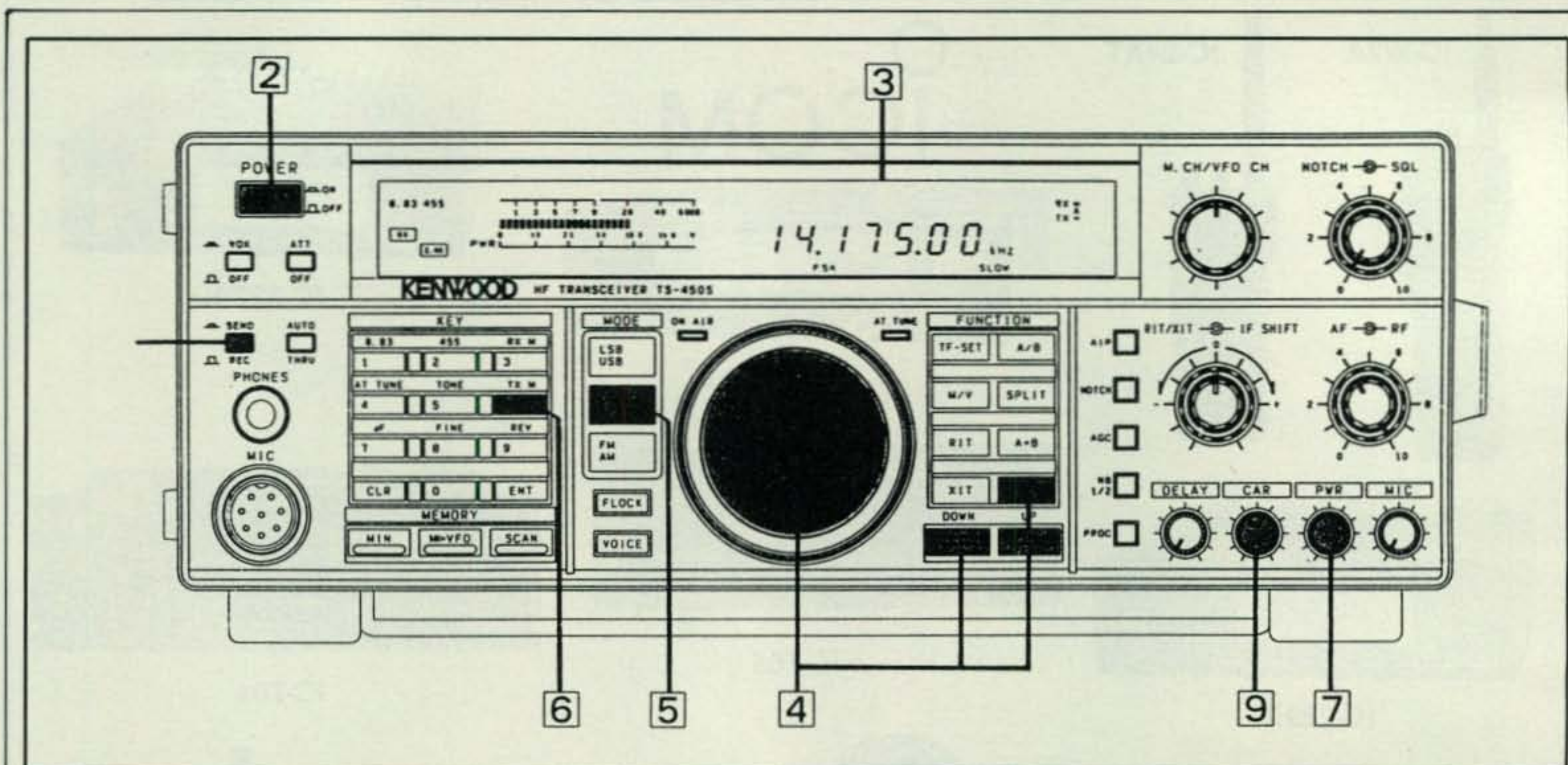


Fig. 1—Front panel layout of the TS-450S.

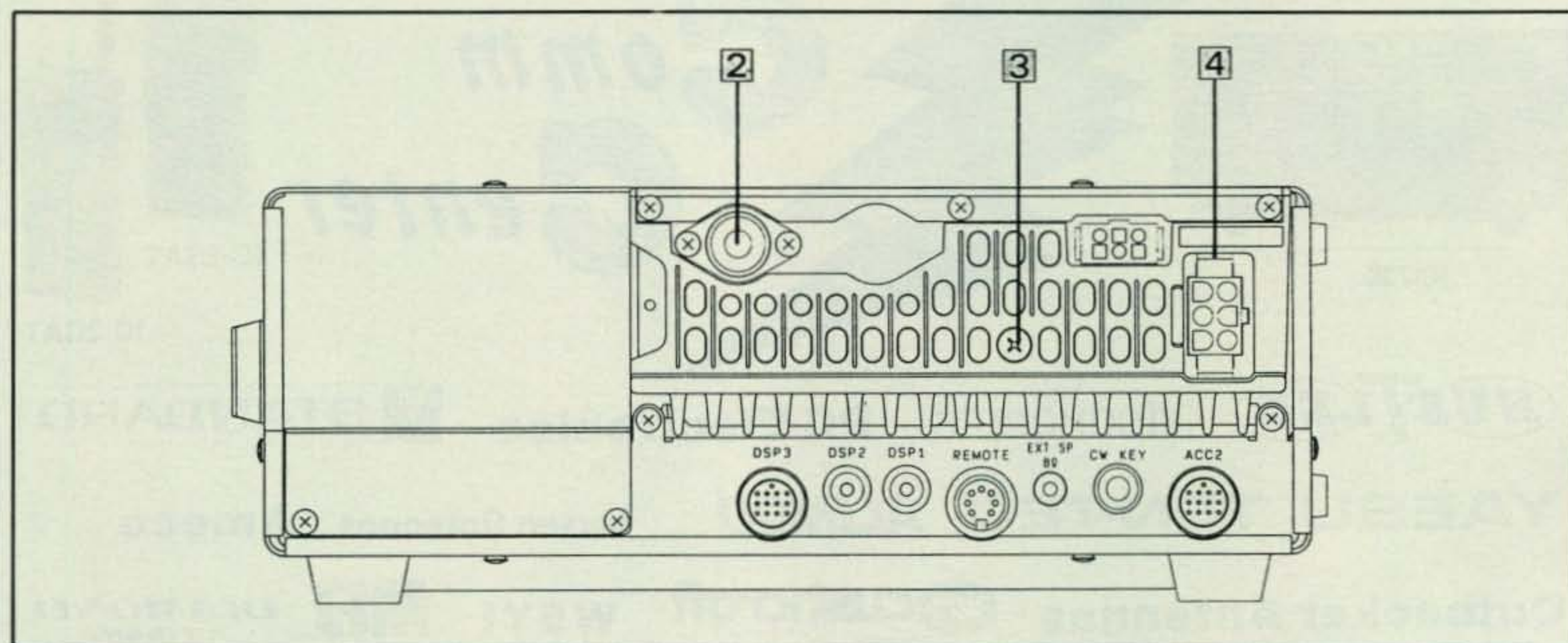


Fig. 2—Rear panel external connectors.

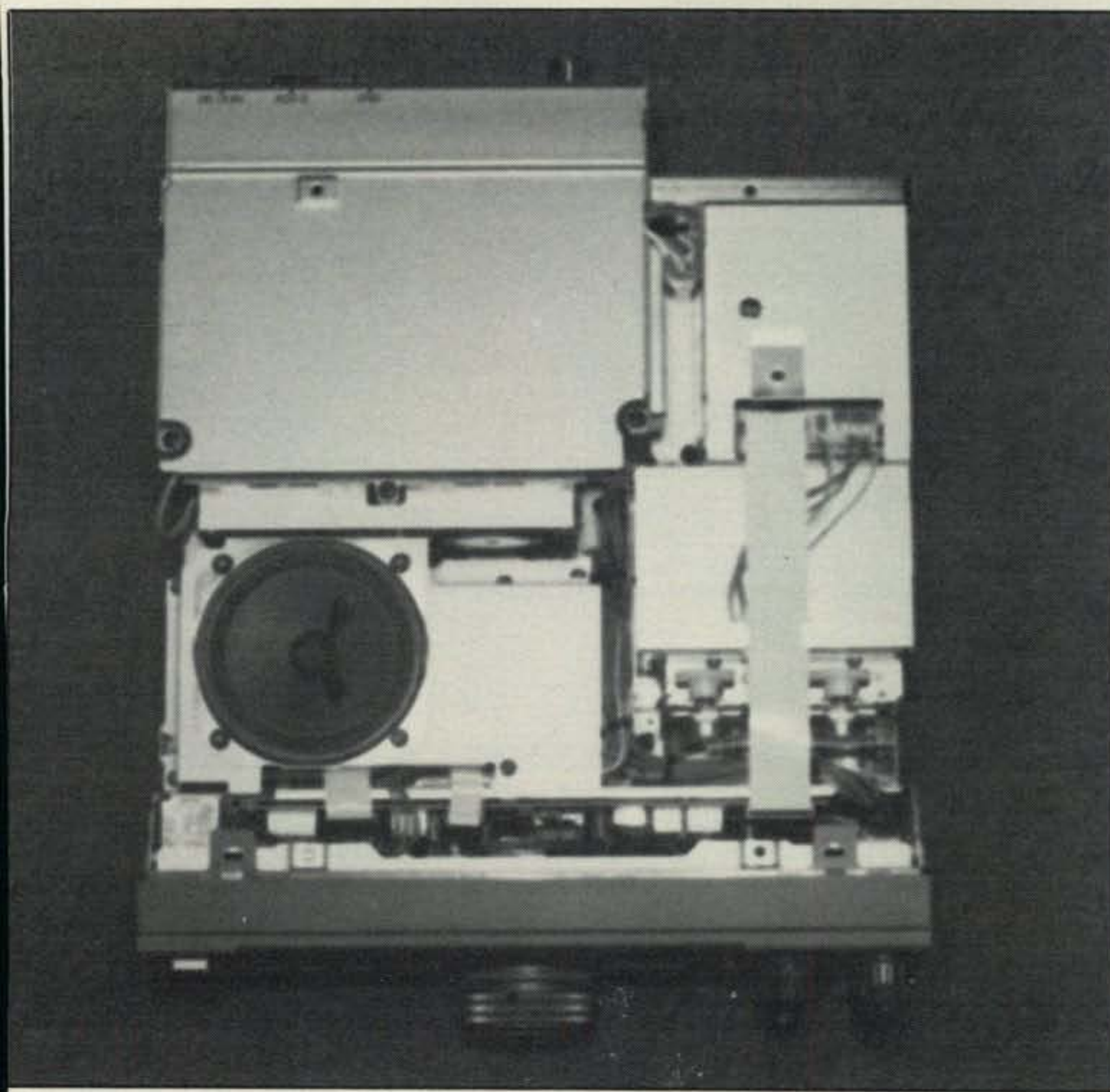
and FSK), power level, and microphone gain (SSB and AM). The four larger controls are pretty much self-explanatory. The M. CH/VFO CH control selects memory channels or it can be used to step the VFO (see menu item 34 in Table II). The 5 kHz step is particularly useful for SWL purposes or the usual "let's try 5 kHz up or down" in the case of QRM. The keypad field to the right of the main tuning knob controls VFO A/B selection, setting up VFO A/B split operation, changing bands (the up/down keys), and various other functions which are quite clear when using the transceiver. The M/V key, for instance, simply changes operation from memory channels to VFO operation—a rather simple key operation

which is made overly complicated in some other transceiver designs.

The keypad field to the left of the main tuning knob contains keys for mode selection and a numeric keypad for direct frequency entry. The numeric keypad serves a dual purpose, however. If the "ENT" key is depressed first, it serves as a very straightforward direct entry frequency keypad. If the "ENT" key is not depressed first, the alternate functions above the key are effective. In such a case, the #1 and #2 keys control the filters selected for the 8.83 MHz and 455 kHz IF's, respectively. The #4 key activates the automatic antenna tuner, if installed. The #8 key changes the tuning rate of the main tuning knob

(SSB, CW, and FSK modes) back and forth from either 10 kHz per knob revolution to a very slow 1 kHz per knob revolution.

The alternate labeling on the #3 key (RX M) and #8 key (TX M) sort of confused me at first. I thought they had something to do with receive or transmit memories. In fact, they have to do with the bargraph metering function. The bargraph meter normally indicates "S" units on receive and power output (0–150 watt scale) on transmit. If the "RX M" key is activated, a separate scale appears which displays the AF output level in dB. If the "TX-M" key is depressed an ALC scale appears and if it is depressed again, a SWR scale appears. The latter had me a bit confused at



Taking off the top cover, one doesn't see too much except a good-sized loudspeaker and shielded compartments for the final amplifier (lower right) and the automatic antenna tuner (middle left). The overall construction is very rugged as one would expect for a transceiver that might be used for portable/mobile applications.

Each Memory Channel is capable of storing the following information:

	00~89	90~99
Frequency	○	○
Mode	○	○
Filter	○	○
Tone ON/OFF	○(※)	NA
Highest/Lowest operating frequency	NA	○
AIP ON/OFF	○	○
Memory Channel lockout	○	○
AGC	○	○

※ When the memory is used as a split memory in FM mode for both transmission and reception.

Table III—Memory channel storage data.

first. The advertising photographs for the TS-450S would seem to indicate that the metering only covered "S" units, power output, and ALC. In fact, the metering possibilities are far more extensive and definitely include direct, automatic SWR readout.

The tricolor display field is very well balanced and very complete. Besides the bargraph and frequency displays, there are displays for the IF filters in use, mode, memory channel number, split on/off,

processor on/off, AGC slow/fast, scan mode, notch on/off, etc. I can't quite imagine any confusion in using any of the controls if one observes the indicators in the display field.

External Connections

Fig. 2 shows the rear panel connectors. Some of them are dedicated connectors for Kenwood accessories. However, the "Remote" and "ACC 2" connectors can



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FT-5200 2M		Call \$
FT-2400		Call \$
FT-212RH 2M F		Call \$
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IC-R7000 25MHz		Call \$
IC-R71A		Call \$
IC-275A 2M		Call \$
IC-475A 70C		Call \$
IC-241		Call \$
IC-3220		Call \$
IC-229H 2M		Call \$
IC-229A 2M		Call \$
IC-228H		Call \$
IC-W2A 2M/70C		Call \$
IC-24AT 2M/70CM w/THH		Call \$
IC-2SAT 2M w/TTTHH		Call \$
IC-2SA 2M mini HH	419.00	Call \$
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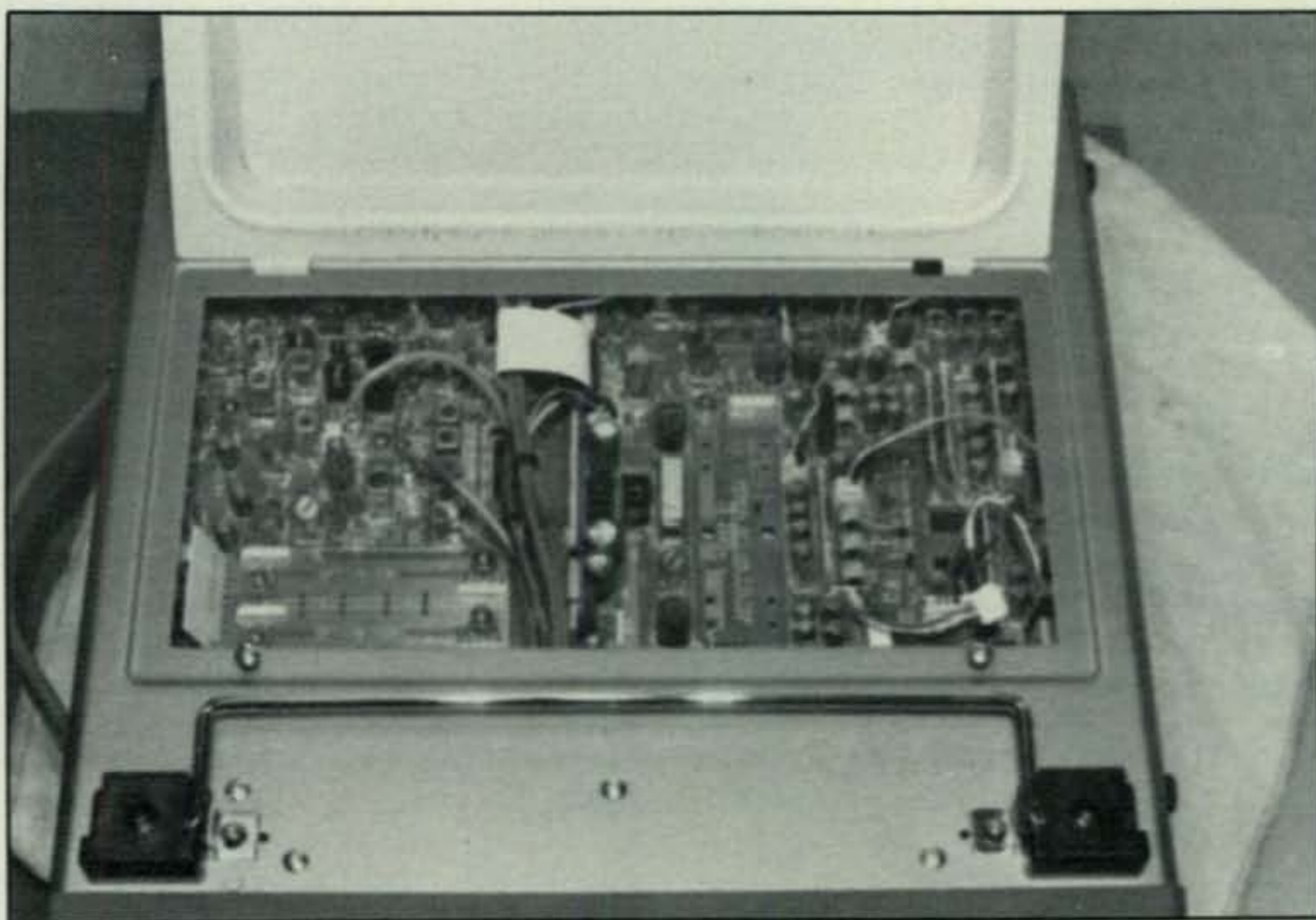
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Installing any of the optional IF filters is simplicity itself. A tilt-up panel (secured by two screws) on the underside of the transceiver allows one to directly plug in any of the optional filters.

be used for general purpose interfaces. There is also an "ACC 1" connector on the side of the transceiver which can be used for computer interface via an optional IF 232C unit. The ACC 2 connector is used to connect a TNC for packet. I can't imagine any common interface that could not be accommodated.

Kenwood supplies a separate instruction manual with the TS-450S which goes into detail on computer external control of the unit.

Memories/Scanning

There are 100 memory channels. Ninety can be used for standard and split frequency information while 10 can store low and high frequencies for scanning. Each memory channel can store the data shown in Table III, which is, in fact, a bit more data than can be stored in the TS-850S's memory system. Almost all of the memory features (entry, recall, scroll, channel selection, data transfer to VFO, channel lockout, etc.) are exactly the same as in the TS-850S. The same is true of the scanning modes (all memories, group scan and band scan). The scanning speed is also adjustable using front panel controls. The only thing the TS-450S doesn't have is the extra five "quick" memories found in the TS-850S.

Operating the TS-450S

Now here's where the fun starts. After I basically got to learn how to use the transceiver, I worked a bit of moderate DX very easily—TI, PS, GD, EA, JA, etc. The con-

tacts were mainly on 10 and 15 meters and running the TS-450S "barefoot." There is no particular "big deal" about those contacts, but it was interesting that most of them were in response to my short CQ calls and that most of the stations gave me very good signal reports and most commented on the good audio quality of the TS-450S (shades of the famous TS-440S!). Now if you'll pardon my sort of "shotgun" approach, here are a few succinct comments as based upon hours of enjoying the TS-450S:

Tuning: The tuning "feel" is excellent and the switchable 1 kHz tuning rate extremely handy. Why Kenwood doesn't put a finger hole in their main tuning knobs still baffles me. It popped up once on their TS-711A so they know about them.

Display: Extremely well balanced and easy on the eyes even after hours of operation.

Metering: Excellent. The bargraph display, if one sets it up for peak hold, is not only useful but fun to watch. If a signal peaks at S9, for instance, and then rapidly fades, the S9 segment will stay illuminated for a second or two while the rest of the display follows the fading signal.

Processor: Although an audio type, it does increase signal punch under weak signal conditions. Very easy to adjust since, in fact, there are no separate adjustments except on/off. The microphone gain only may have to be slightly readjusted to keep the ALC reading on the bargraph meter within limit. There is no "High Boost" switch on the TS-450S as in the TS-850S. I suspect Kenwood tailored the transmit audio a bit in the TS-450S to

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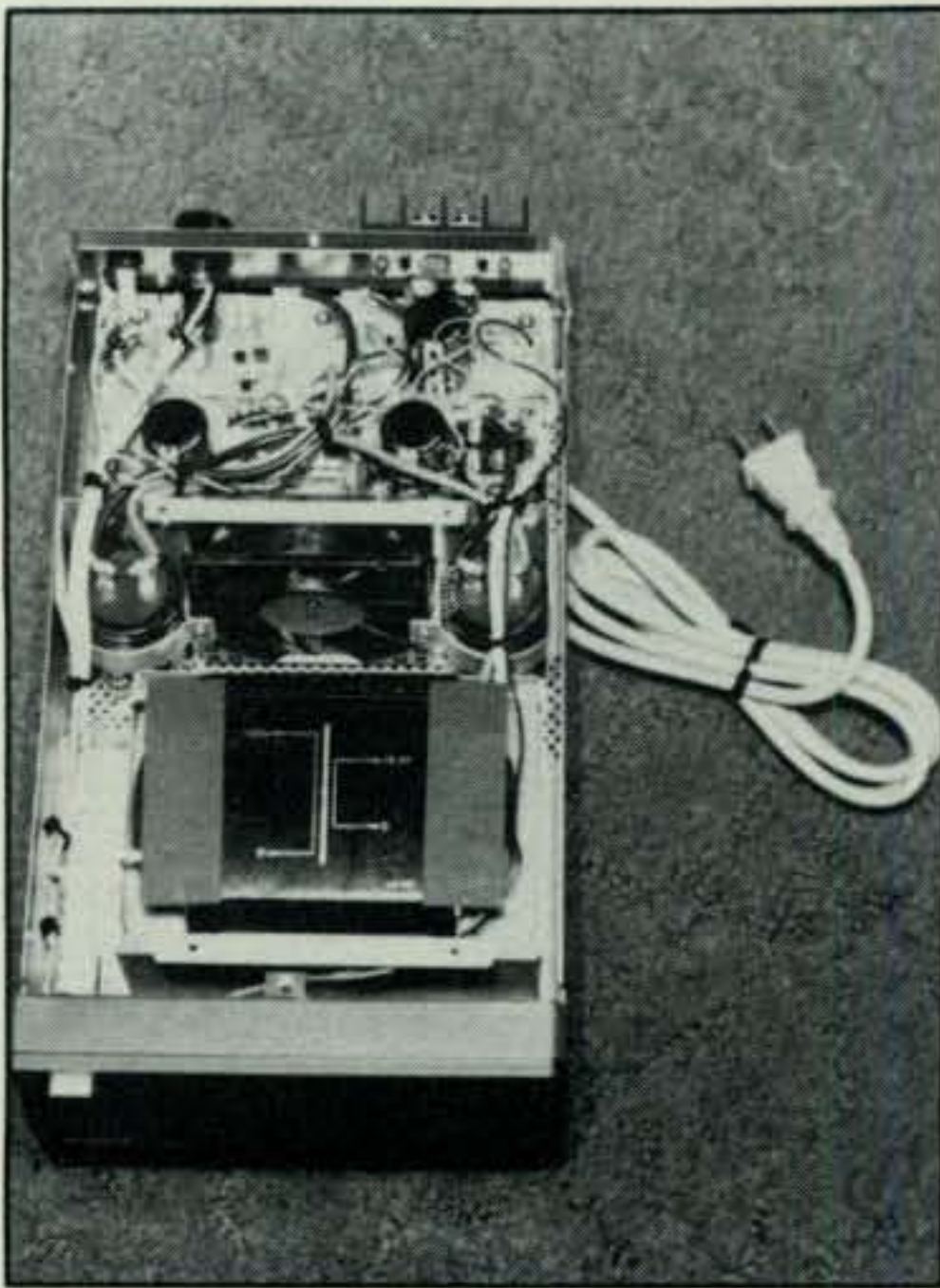
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Function	Freq, Period Ratio, Interval	Freq, Period Ratio, Interval	Frequency	Frequency	Frequency	Frequency	Frequency
Range	10Hz-3.0GHz	10Hz-3.0GHz	1MHz-3.0GHz	10Hz-3.0GHz	1MHz-3.0GHz	10Hz-2.4GHz	1MHz-2.4GHz
Display	10 Digit LCD w/Function Annunciators	10 Digit LCD w/Function Annunciators	10 Digit LCD	10 Digit LCD	10 Digit LCD	8 Digit LED	8 Digit LED
RF Signal Strength Indicator	16 Segment Adjustable Bargraph	16 Segment Adjustable Bargraph	16 Segment Adjustable Bargraph	•	•	•	•
Hold Switch	Yes	Yes	Yes	Yes	Yes	No	Yes
Price	\$579.	\$375.	\$325.	\$259.	\$225.	\$179.	*\$99.

Sensitivity: <1 to <10mV typical. Time Base: ± 1 ppm; ± 2ppm add \$100. - LCD Models only. Nicads & AC charger/adaptor included except for 2300. *For 2300, available with NiCad installed & AC charger/adaptor, complete package \$128. A full line of Antennas, Probes & Carry case are sold separately. (One year parts & labor warranty.)



The interior of the PS-53 power supply is strictly heavy-duty as one readily notes when the top cover is removed. Note the cooling fan in the middle of the unit.

favor the higher "presence" frequency range.

Automatic Tuner: Very fast and quiet. Manual override allows one to adjust the two variable capacitors in the tuner using the main tuning and RIT/XIT knobs. The display even shows the relative rotational setting of the capacitors for resetability. I never had need to use the manual mode but it is an interesting feature.

Selectivity: The ability to independently select any 8.83 MHz or 455 kHz IF filter provides great versatility. One can even try for quasi hi-fi on SSB receive by going to the 12 kHz 455 kHz IF position. More seriously, SSB operators should consider the optional 1.8 kHz filter. Dedicated CW operators will probably appreciate a narrow CW filter, although the IF shift and notch features suffice for casual CW operation.

Sensitivity: More than sufficient for any application, and I never encountered any overload problems. Phase noise is no problem. Signals appear to pop out of an almost totally quiet background.

Memories: The 100 memory channels which can be turned into 100 VFOs are quite versatile. One can transmit immediately on any memory channel frequency within an amateur band. One cannot "bandswitch" when a memory channel is in use. The transceiver has to be in the VFO A/B mode to switch bands.

The Bottom Line

I've heard and worked many stations using the TS-440S. It is an excellent transceiver. But there is no doubt in my mind

VERSIONS	PS-33		
	U.S.A. and Canada	Europe and General markets	U.K. and Oceania
Power requirements	120 VAC±10%, 60Hz	*120/220~230 VAC±10%, 50/60Hz	240 VAC±10%, 50/60Hz
Output voltage	13.8 VDC (Reference)		
Rated output current	20.5 A (25% duty cycle) 15 A (50% duty cycle)		
Output voltage regulation	Within ±0.7 V (at 120/220~230/240 VAC±10% variation with 15A) Within 0.7 V (at load current variation from 2 to 15A)		
Ripple voltage	Less than 20 mVrms (at 13.8 VDC/15A)		
Power consumption	Approx. 500 W (at 13.8 VDC/20.5A)		
Dimensions (W×H×D) Dimensions in [] include projections.	173×96×296 mm [173×107×322 mm] 6-13/16"×3-25/32"×11-21/32" [6-13/16"×4-7/32"×12-11/16"]		
Weight	Approx. 7.0 kg (15.4 lbs)		

VERSIONS	PS-53		
	U.S.A. and Canada	Europe and General markets	U.K. and Oceania
Power requirements	120 VAC±10%, 60Hz	*120/220~230 VAC±10%, 50/60Hz	240 VAC±10%, 50/60Hz
Output voltage	13.8 VDC (Reference)		
Rated output current	22.5 A (25% duty cycle) 16 A (50% duty cycle) 20.5 A max. (Continuous operation for 1 hour)		
Output voltage regulation	Within ±0.7 V (at 120/220~230/240 VAC±10% variation with 16A) Within 0.7 V (at load current variation from 2 to 16A)		
Ripple voltage	Less than 20 mVrms (at 13.8 VDC/16A)		
Power consumption	Approx. 550 W (at 13.8 VDC/22.5A)		
Dimensions (W×H×D) Dimensions in [] include projections.	173×96×296 mm [173×107×322 mm] 6-13/16"×3-25/32"×11-21/32" [6-13/16"×4-7/32"×12-11/16"]		
Weight	Approx. 6.9 kg (15.2 lbs)		

Table IV—Specifications for the PS-33 and PS-53 Power Supplies.

that the TS-450S is a worthy successor with improved and expanded performance in every respect. Many amateurs write me to ask "Is the radio I really want on the market yet?" Well, I can never really answer such a question since so many variables are involved, not the least of which is price. If the price range of the TS-450S suits your budget and you like its features, I'd give it serious consideration. It augurs to be a good solid radio that should be very reliable and on the market for many years. Now if Kenwood had only provided a finger hole on the main tuning knob I could really get enthusiastic about the radio!

Power Supplies

Two AC power supplies are available for the TS-450S—the PS-33 and PS-53. Both supplies have the same size and the same weight (within less than 1 lb.). The PS-53 costs only about \$20.00 more than the PS-33 and yet it has a continuous (1 hour) output rating of 20.5 amperes while the PS-33 has no continuous one hour rating. The circuitry for both models appears to be similar except that the PS-53 has a built-in cooling fan. Table IV presents the

specifications for both units. I used the PS-53 when testing out the TS-450S and I would recommend it.

Other Accessories

The TS-450S has dedicated connectors so one can directly plug in the DSP-100 Digital Signal Processor unit and the AT-300 Remote Automatic Tuner unit. The DSP-100 provides digital processing for both the transmit and receive chain. The AT-300 provides for the remote coupling into a variety of antenna forms from short mobile whips to unbalanced wire antennas.

There is, of course, also the enormous line of other accessory items from Kenwood ranging from microphones to a voice synthesizer to a TCXO unit to six optional IF filters that will interface with the TS-450S.

Basic Prices

TS-450S, \$1,350. TS-450S/AT, \$1,550. TS-690S, \$1,550. PS-33, \$230. PS-53, \$250. Brochures are available from Kenwood, U.S.A., P.O. Box 22745, Long Beach, CA 90801-5745.

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TOUGH TALK!



HF mobiling can be a lot of fun as K4WKZ found out. Here's his simple approach to a "no holes" mobile antenna installation.

Minivan Mobile

How To Mount An Antenna and Achieve an Acceptable Ground

BY DANNY A. SHIVE*, K4WKZ

Operating HF mobile is no doubt a lot of fun for many amateurs. I had made only one attempt several years ago, and it did not turn out to be very productive or rewarding. The itch recently hit me again, and I set out to try it once more in the family minivan.

I realized that although mounting the antenna on the bumper could be acceptable, mounting it on the top of the van would be superior from a performance perspective. There is a lot of ground plane available to be taken advantage of, and the height would aid performance as well.

The First Challenge: Mounting The Antenna

The obvious factory-given spot for an antenna on a minivan is the luggage rack. Scouring hamfest fleamarkets and dealer tables for brackets which would fit the luggage rack components yielded nothing usable. I thought that as many of these vehicles as there are on the road, somebody would have marketed a clamp mount for the luggage rack similar to the mirror mounts designed to hold CB antennas on tractor-trailer rigs. If a luggage rack mount exists, I could not find one.

A friend, Bernie, WA4MOK, gave me the idea for mounting a quarter-inch thick aluminum plate to the rack by moving the cross members about 10 inches apart and spanning between them. Since the cross members have an open slot in the top running the full length, I dropped "nuts" made of drilled and tapped pieces of $\frac{3}{16}$ inch thick steel into the slots and used quarter-inch hex-head screws to bolt the plate into place (fig. 1). The "nuts" were painted with rust-resistant paint.

The mounting ball was bolted to the

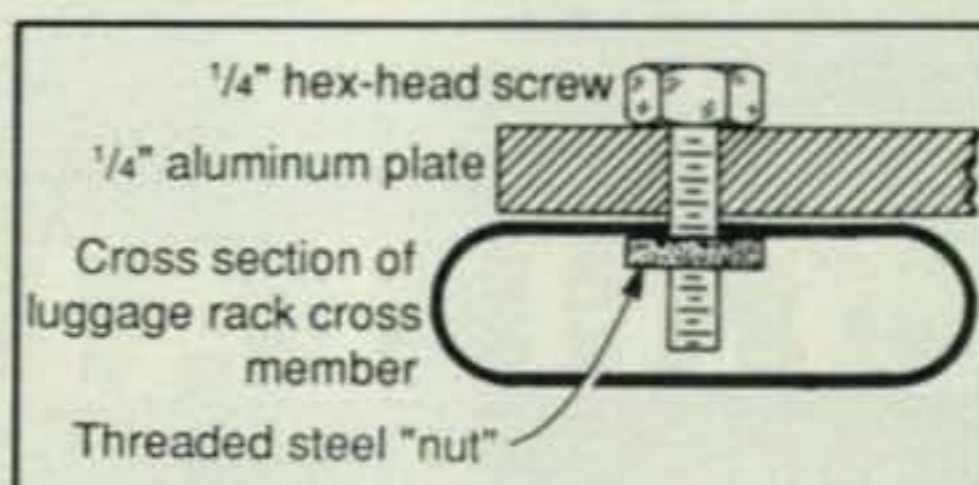


Fig. 1—Simple mechanical requirements. Make sure that the hex-head screw is long enough to reach the captive nut resting on the bottom of the channel so that it can begin threading.

plate, which was about 3 inches above the vehicle roof. It was now time to connect the coax and try it out.

The Big Challenge: An Effective Ground

I suspected that the luggage rack would be electrically isolated from the vehicle body, and a quick check with an ohmmeter confirmed that. Therefore, I connected a braided strap between the aluminum plate and a convenient screw in the liftgate jamb near the tail light. The excitement of being nearly finished with the project soon faded when the SWR on 15 and 20 meters showed no sign of a resonant dip.

I then tried another ground connection at the top of the sliding door jamb so that the ground strap was considerably shorter. I was then able to achieve a very low (near 1:1) SWR on 20 meters at resonance, and the antenna system seemed to be working well. There was success on 40 meters as well as 20, but disappointment came once again when 15 and 10 meters showed the same problem as before.

On my first trip out of town, I had to settle for a less than optimum arrangement without 10 and 15 meters. I reasoned that the ground lead was too long for the higher

frequencies, and I began searching for a way to reduce that length without drilling a hole in the van roof for a sheet metal screw.

One of the pleasures of this hobby is the willingness of amateurs to share knowledge and ideas. While operating 20 meters on that first trip, I happened across another mobile operator, Sy, N4KEL, in Kansas. Sy described his arrangement of two phased mobile antennas, each mounted on a frame held by four 5 inch magnets (see CQ, January 1991). I figured out very early in the QSO that Sy knew a lot more about this business than I did, so I asked him how he achieved an acceptable ground connection on the top of his van.

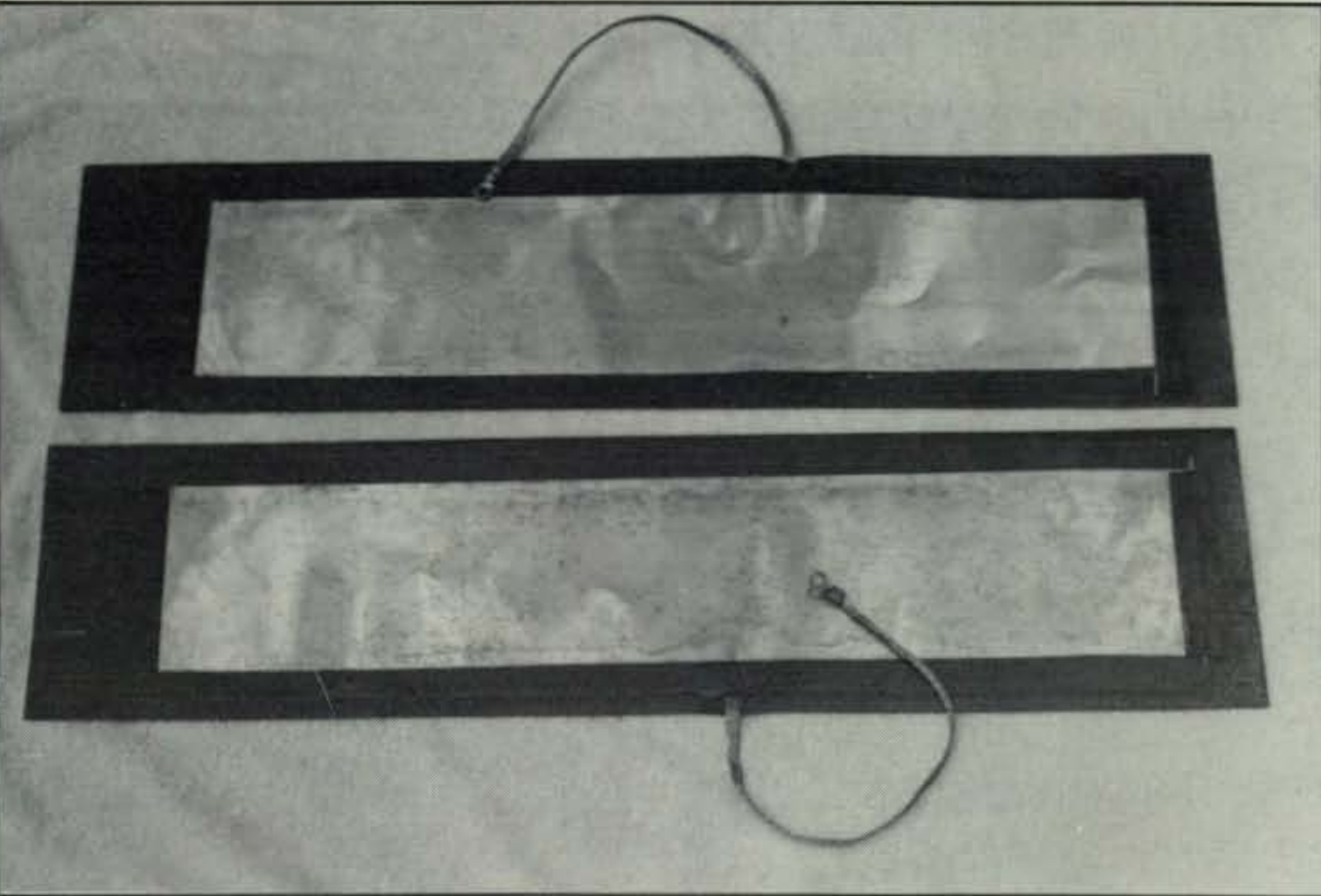
Sy explained that with a total of eight 5 inch magnets he had achieved enough capacitive coupling to the van body to give him an effective RF short through the paint to the metal. How could I achieve the same thing without the expense of all those magnets, since I didn't really need them to mount the antenna?

The Answer: A Removable Ground Connection

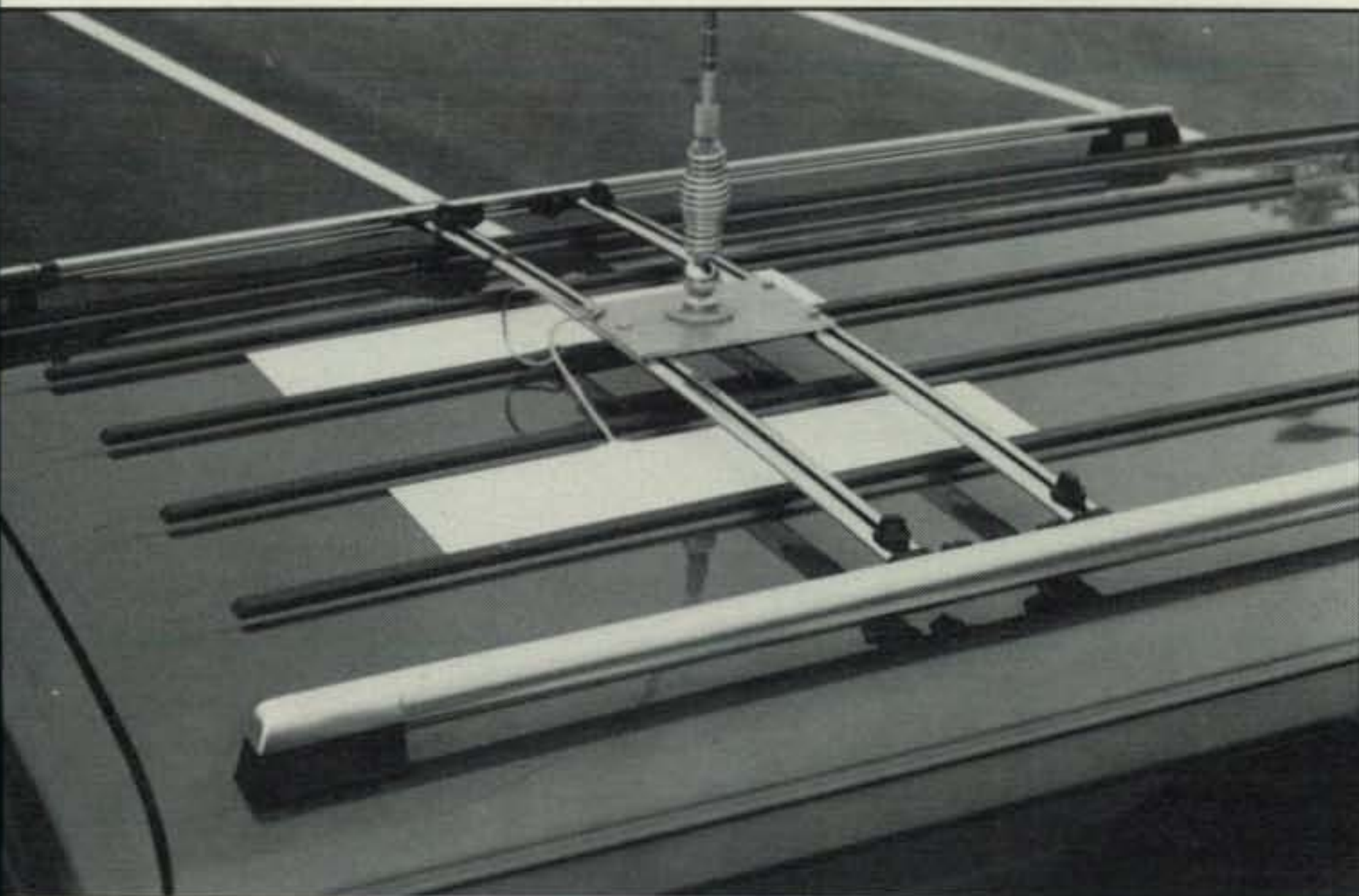
I decided to try some of the flexible magnetic sheet material used for removable signs on the sides of vehicles. I realized that some type of thin metal between the magnetic sheet and the vehicle roof would likely be needed. Another friend, Chuck, WA4YUB, heard me discussing it on 2 meters and offered some thin copper. I obtained two 6" x 24" pieces of magnetic sheet from a sign shop and lined the bottom sides with 5 1/2" x 20" pieces of 0.005 inch thick copper. A short ground braid was soldered to each piece of copper, and the copper was taped to the magnetic sheet with vinyl electrical tape.

The ground leads were connected to the aluminum plate with a sheet metal screw,

*392 Claredon Drive, Greenville, NC 27858



The copper sheet is held in place on the magnetic material by electrical tape taped to the edges. The ground strap is also held by the tape as shown. The panels are mounted by inverting them on the minivan roof so that the copper is in contact with the roof.



The magnetic sheets and copper linings are sized to fit between the ribs of the van roof. The braided leads are connected to the aluminum mounting plate to which the coax braid is grounded.

and the two magnetic sheets were placed between the ribs on the van roof. The copper contacted the painted surface of the roof directly beneath the antenna. (The copper was sprayed with clear acrylic to prevent corrosion.) A quick calculation confirmed that I had about the same surface area contacting the van roof as Sy did with his magnets. This time the excitement did not fade. The antenna system worked perfectly on 30, 20, 15, and 10 meters with an SWR at resonance of less than 1.3:1.

Operating Mobile

The performance of the antenna and ground system has been anything but disappointing. I continue to get complements on signal strength for a mobile station. I am amazed at how easy it has been to make contacts, including breaking a few DX pileups. Although the height of the antenna (approximately 12 feet to the top of the whip on 20 meters) is an advantage for operat-

ing, one does have to be careful driving under low tree limbs and service-station canopies. A quick-disconnect coupling at the base of the mast is a necessity. I also mounted a heavy-duty spring at the base, and I guyed the mast with 20 lb. test fishing line to the front ends of the luggage-rack rails. If I do hit something, the worst that can happen is that the guys break, and the spring allows the antenna to flex out of the way.

Summary

Just as I anticipated, HF mobile is a lot of fun. If you are contemplating mobile operating in a van, consider the luggage rack for mounting the antenna. A good ground is possible even without drilling holes by using a large surface area magnetic device. I did not experiment to determine the minimum surface area required for an effective ground on any given band, but this could easily be done, and experimenting is half the fun. With a setup such as I have described, the antenna mount and ground connections can be installed and removed quickly and easily for maximum flexibility in using the vehicle, and you won't be disappointed with the performance.

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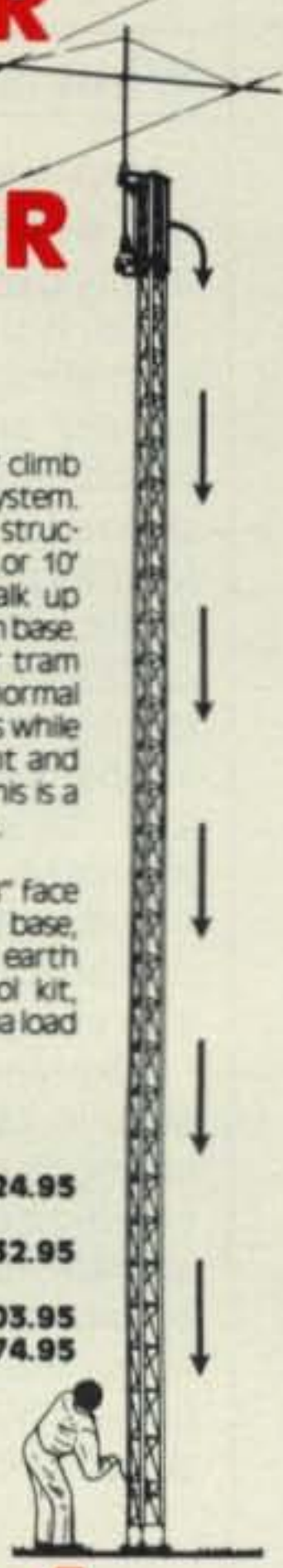
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CLOVER is a term you might have heard about in the past. If not, you certainly will be hearing about it in the future. K9GWT and W7GHM give us a rundown on this new form of HF data transmission.

CLOVER

Fast Data on HF Radio

BY BILL HENRY**, K9GWT, AND RAY PETIT*, W7GHM

If you operate RTTY, AMTOR, or packet, you've probably seen a few references on your screen to something called "CLOVER." "What is it and why do I need it?" is the usual reaction. Yes, "clover" (little letters) is a plant, sometimes "wished over" (and sung about by Arthur Godfrey). But "CLOVER" (big letters) is a new way to send data on HF radio that Ray Petit, W7GHM, has invented. This is the story of CLOVER, a project that continues to this date.

What is CLOVER?

CLOVER had its beginnings about 15 years ago when Ray and others were experimenting with very narrow bandwidth Morse code. It's called "Coherent CW." When packet radio came along, Ray tried packet on VHF and then HF. As most of us have found, HF packet radio leaves a lot to be desired. The ionosphere is just not very kind to packet data, and often many repeats are required to pass any data at all on 20 meters. Unlike the rest of us, Ray quickly realized that putting "bandaids" on HF packet or AMTOR was just not going to do the trick; what was needed was a new approach. The new approach must be based on a thorough analysis of the real HF signal conditions and on techniques that can compensate for these conditions.

Ray started by just listening to real radio signals, observing their fades and phase changes on typical HF paths and under varying conditions; shortwave broadcast signals made great "test signals." Combining information from signal observations, reading, and previous work on Coherent CW, Ray devised a new way to send data on HF radio which he called "Clover-

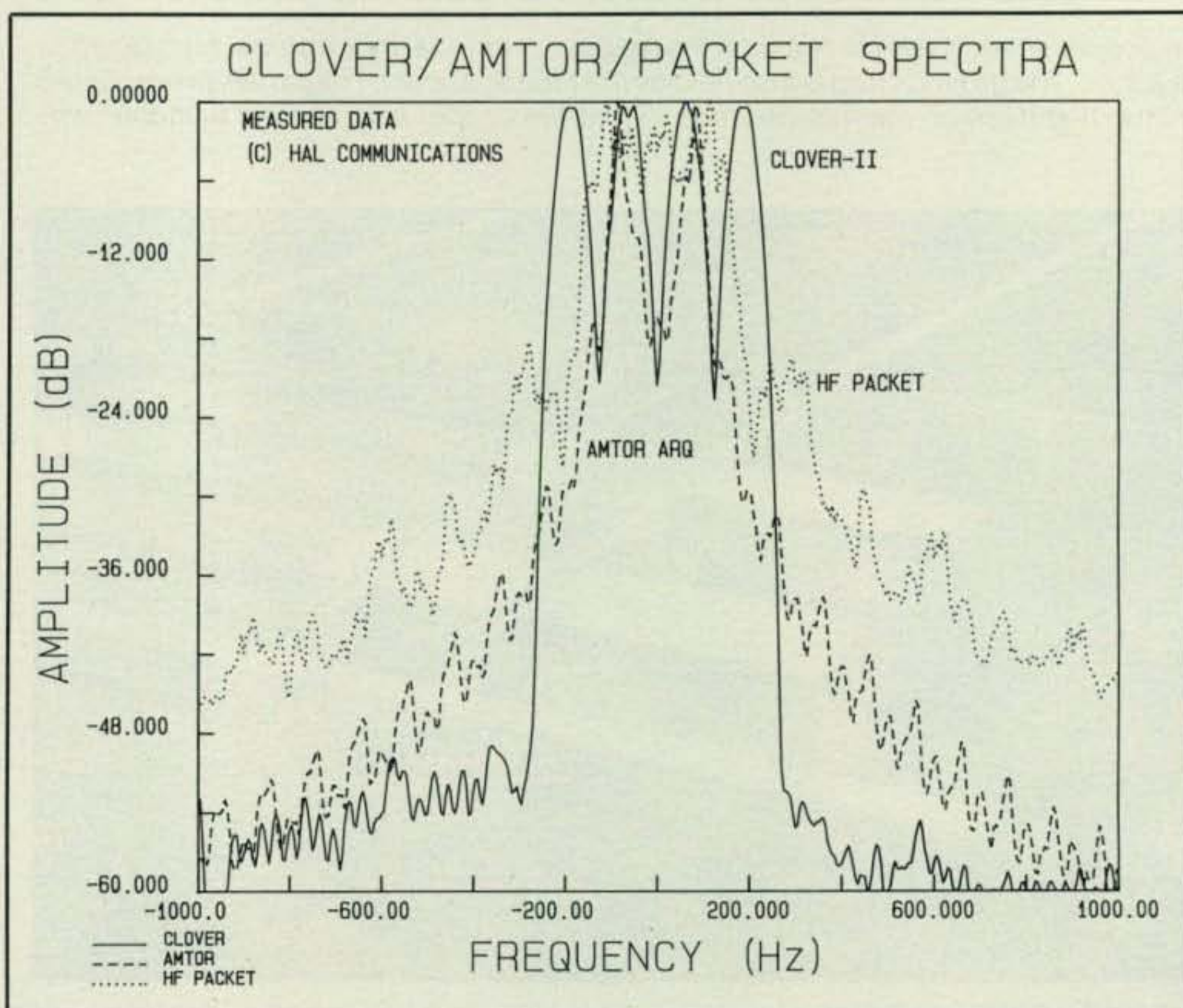


Fig. 1- Comparison of AMTOR, HF Packet, and CLOVER-II spectra.

leaf." In July 1990 Ray published the first paper describing the mode in *QEX*.² The name "Cloverleaf" came from the observation of a scope pattern while watching the data; it was a perfect four-leaf clover. As Ray's work continued, the pretty scope pattern was lost to technology, but the shortened name "CLOVER" remains.

Other amateurs had also been searching for a way to cure the problems we were having with sending data on HF. Bill Henry, K9GWT, and Jim Tolar, W8KOB, of HAL had also been working on the problem for several years. Ray's paper was like a

breath of fresh air to us. *Finally* someone had taken the pains to start at ground zero and devise a modulation format that would work on HF. Very quickly Ray and HAL teamed up to continue work on his new "CLOVER Modulation."

Unique features of Cloverleaf include (1) multi-level phase modulation, not FSK; (2) use of sequential pulses whose state changed only between pulses (not when a carrier is on the air); (3) very low base data rates (25 bps); and (4) very tightly controlled frequency spectra with *no* sidebands (100 Hz total bandwidth to -60 dB).

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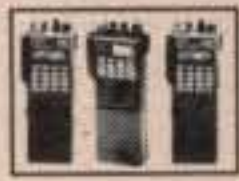
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Cloverleaf could pass error-corrected data over a typical HF path about two to three times faster than AMTOR or HF packet radio. Unfortunately, Cloverleaf also made extreme demands on the HF radio equipment. Radio frequency accuracy and stability had to be of the order of ± 0.1 Hz! This is way beyond the capabilities of any currently available commercial radio equipment. Ray also designed a complete transceiver to use Cloverleaf modulation.³

At the time when Ray and HAL first teamed up, Ray had already started work to include new DSP (Digital Signal Processing) technology in his Cloverleaf modem. DSP offered many advantages over the basically analog Cloverleaf circuitry, the major ones being (1) greatly reduced radio stability and accuracy requirements (to ± 10 Hz), and (2) faster data throughput (to 750 bps). Ray and I soon decided to put "all our eggs in the DSP basket." The original "Cloverleaf" modem was renamed "CLOVER-I" and the new DSP version dubbed "CLOVER-II."

Ray and HAL worked on development of CLOVER-II all through the fall of 1990 and spring of 1991.⁴ The first working CLOVER-II modems were demonstrated at the Dayton Hamvention in April 1991. The new modem had a bandwidth of 500 Hz (to -60 dB), passed error-corrected data at rates up to 750 bps, and would work with "normal" HF transmitters and receivers. The Dayton demonstration equipment was admittedly "primitive" and there were many details yet to be worked out. However, Ray and I wanted to show it and see if there were any other amateurs who were interested. We were convinced that we had a marvelous machine, but the inventor can easily fall in love with his gadget, even if there is no market.

The results of the Dayton showing were beyond our wildest dreams. Everyone who saw CLOVER-II work was impressed—and wanted one or two!

As a result of comments from those at Dayton and from new ideas that developed as CLOVER-II was prepared for the show, we decided to build a new "universal" hardware base for development work, quickly dubbed "SUMMER CLOVER." HAL built a total of eight such units. Like Ray's original DSP design, SUMMER CLOVER units used Motorola DSP56001 and 68B09 processors. We had hoped that SUMMER CLOVER would meet all of our requirements and that we could build many of these units for use in "beta-testing" of the new mode.

Enter Murphy and his infamous law! First, SUMMER CLOVER hardware was extremely expensive—about \$3000 each. We could not afford to build a lot of them to be loaned out for "beta-testing." Second, our "bright ideas" for features soon out-grew the capabilities of our hardware! Ray's software soon consumed the entire capacity of the 6809. DSP performance

was also limited, since several "routine" processes had to be moved from the 6809 to the DSP56001.

In spite of these limitations, CLOVER-II in SUMMER CLOVER hardware worked very well. Ray devised an adaptive ARQ mode in which the modulation parameters are automatically adjusted to fit ionosphere conditions. We were able to put CLOVER on the air and run several tests. We also ran extensive laboratory tests under a number of different simulated conditions. Our avowed goal of increasing data speed to ten times faster than HF packet or AMTOR was easily met. As always happens in an R&D project, we also found a number of new areas to consider—and some features that needed improvement.

In November and December 1991 we went back to the drawing board. Ray and I both knew that we needed more microprocessor horsepower to do all that we wanted. We also realized that CLOVER would never be a success if each unit had to sell for \$3000! What has evolved is still another hardware and software version which we call "PC-CLOVER." As the name implies, PC-CLOVER is a plug-in card for IBM-compatible personal computers. While we can't do much about the present high cost of DSP technology, PC-CLOVER does not need expensive cabinetry, power supply, and front-panel hardware, but does include the much needed additional processing power, primarily a 68000 IC instead of the 6809. These changes have reduced the price dramatically.

As this article is being written (early February 1992) PC-CLOVER development is well underway. A number of very thorny problems have already been licked. The first public exhibition of PC-CLOVER will be at the 1992 Dayton Hamvention.

How CLOVER Works

To adequately explain why we feel CLOVER is such a breakthrough, we must first briefly review the pluses and minuses of existing HF data modes—RTTY, AMTOR, and HF packet radio.

RTTY of course led the way for "automatic" reception of characters or data via HF radio. RTTY has been around since the 1940s and is very reliable. The techniques we use today to send and receive RTTY are much the same as those first used. We have better equipment, but use the same FSK modulation and Baudot or ASCII code. RTTY is slow and does not offer error correction. RTTY speeds of 60 WPM (45 baud) to 100 WPM (75 baud) are common. Increasing the RTTY speed increases the probability of errors; we generally use 45 baud.

AMTOR evolved from an existing ship-to-shore "radio telex" mode, often called "TOR" or "SITOR" (CCIR 476 and CCIR 625). AMTOR introduced us to a new type

of data link—"ARQ mode" (ARQ stands for Automatic Repeat Request).

AMTOR characters are coded so that the receiving station can detect an error in each character sent. The sending station sends three characters, turns his transmitter OFF, and listens for a one-character response from the receiving station. The response is either "all OK, send next three," or "repeat last three characters." By this means AMTOR offers error correction. However, like RTTY, it is also "slow." Under the best of conditions AMTOR can pass data at an equivalent RTTY rate of 50 baud (6.67 characters per second). AMTOR is also limited to the same character set as Baudot—all capital letters and no ASCII control characters.

Because of the efforts of Vic Poor, W5SMM, and his APLink network program AMTOR has seen a resurgence of interest over the past three years. AMTOR nets have also pioneered the use of frequency scanning radios to allow a bulletin board station (BBS) to serve many users at varying distances on different bands and frequencies.

HF packet radio is an out-growth of VHF packet radio, pioneered by the Tucson Amateur Packet Radio Corp. (TAPR). Like AMTOR, packet radio (AX.25) uses an ARQ-type of format to automatically sense errors and request repeats. However, packet radio supports the full 7-bit ASCII character set, including upper/lower-case letters and control codes. VHF packet radio works very well and has become the defacto VHF mode for data transmission.

Many aspects of packet radio, however, conspire to make its performance on HF very disappointing. The major problems with HF packet radio are (1) the modulation format (300 baud, 200 Hz shift FSK), (2) the AX.25 protocol (long blocks with only CRC error detection and large amount of overhead), and (3) the wide bandwidth required in today's crowded HF bands (2 kHz). Under perfect ionospheric conditions HF packet radio could send data at up to 20 ASCII characters-per-second. However, what happens in fact is that typical HF packet data is passed at only a rate of 4 to 6 characters-per-second (about the same speed as AMTOR), and a HF packet signal requires twice the bandwidth of an AMTOR signal.

Since all VHF traffic networks now use packet radio, HF packet radio networks have evolved to provide long-distance support. Pioneering work has been done by HF packet stations participating in the ARRL-sponsored "HF Packet STA" program. These fellows have invested a lot of time, money, and persistence in making HF packet work.

CLOVER intends to support the many advantages of AMTOR and HF packet radio and "fix" the major problems of these modes. The most serious limitation of RTTY, AMTOR, and HF packet is data

throughput and how the data is used to modulate the radio signal. The ionosphere is not a "friendly" medium for data signals. HF signals often arrive at the receiving antenna by many different propagation paths; two or more paths are common. Each signal path has its own time delay, amplitude, and even different center frequency. The receiving antenna does not discriminate; it adds all signals and passes the composite on to the receiver. The amplitudes and phases of the separate AC signals combine algebraically to produce a widely varying receiver input. Deep selective fades and time-smearing of data pulse transitions are the usual result.

Once combined at the antenna, the individual path signals are not easily separated. It is usually impossible to compensate for all of these "multipath" effects in the demodulator. A good example of multipath ionosphere distortion is the "selective fading" we hear when listening to music from a shortwave radio station. While annoying when listening to music, this distortion can be totally destructive to data transmissions.

A major nonrecoverable parameter of HF data is the time at which the data state changes from MARK to SPACE, the data transition time. If we lose this information, the modem can no longer tell when one data pulse ends and the next begins or if the logic state should be a "1" or a "0." When two signals arrive with different propagation time delays, the composite antenna output signal is "smeared" and the transition times overlap. Measurements by Ray and many others show that we can expect this time overlap from different paths to be as much as 3 to 5 milliseconds (ms). Typical demodulators (and UARTs) must receive at least one half of each data pulse without distortion to determine the MARK or SPACE data state. Therefore, the narrowest data pulse which can be reliably demodulated is on the order of 6 to 10 ms, corresponding to maximum data rates in the range of 100 to 167 baud. Observation shows that the 100 baud limit is more realistic and even it can be too high for satisfactory data transmission at times.

HF packet radio uses a 300 baud data rate, a pulse width of 3.3 ms. Successful HF packet transmissions are therefore very unlikely if the signal is propagated by multiple paths. HF packet works well only when the operating frequency is close to the Maximum Usable Frequency (MUF)—when there is only one propagation path. Since this is the exception and not the rule, long-term packet performance on a single fixed frequency is pretty poor, and many repeats may be required to pass any data at all.

HF packet radio, AMTOR, and RTTY all use FSK modulation. One radio frequency is sent for the "1" or MARK pulse state and another for the "0" or SPACE state. The transmitter carrier frequency is shifted back and forth at the same rate as the data.

CLOVER uses different modulation techniques. First, CLOVER shifts the *phase* and not the frequency of the carrier. Second, more than one bit of data can be sent per phase state. For example, BPSK (binary phase shift keying) has two phase states (0 or 180 degrees) which can be used to represent MARK and SPACE. QPSK (Quadrature PSK) has four phase states (0, 90, 180, and 270 degrees). A single phase change in QPSK represents the state of two binary bits of data. Similarly, 8PSK can send the state of 3 bits per phase change and 16PSK can send 4 bit states per phase change.

CLOVER also allows use of Amplitude Shift Keying (ASK) in the 8PSK and 16PSK modes. We call these modes "8P2A" (4 data bits per phase/amplitude change) and "16P4A" (6 bits per phase/amplitude change). Since all changes in phase or amplitude occur at the fixed base rate of 31.25 bps (an equivalent pulse width of 32 ms), data errors due to multipath time smearing of data transitions are minimized.

The CLOVER modulation "strategy" is to always send data at a very slow base modulation rate and to use multi-level changes in phase or amplitude to speed-up data flow. One final twist to CLOVER-II is that there are *four* separate transmitted pulses, each separated by 125 Hz. Each of the four pulses may be modulated by BPSK through 16PSK plus 8P2A or 16P4A modulation. This further multiplies the effective data throughput by a factor of four. Putting it all together, CLOVER can send data at rates from its base data rate (31.25 bps) to 24 times its base data rate (750 bps). Wow! It's almost like something for nothing! Not so by a long shot. There are still problems to be solved!

PSK modulation itself poses some pretty serious problems. If we modulate a *continuous* carrier using PSK, the frequency spectrum we get is *very* bad for HF use, as sidebands are strong and extend over a wide spectra. CLOVER avoids this problem by two techniques: (1) each of the four tones is an ON/OFF amplitude pulse and the phase is changed only when the pulse is OFF; (2) the amplitude waveform of each ON/OFF pulse is carefully shaped to minimize the resulting frequency spectra. Combined, these techniques produce a composite CLOVER spectra that is only 500 Hz wide down to -60 dB. This is one half the radio bandwidth required for AMTOR and one quarter that for HF packet radio. A comparison of AMTOR, HF packet, and CLOVER spectra is shown in fig. 1.

Detecting PSK is a lot more difficult than detecting FSK. We need a very accurate phase reference to determine which phase state is being received. Analog phase detection and PSK recovery circuits can be *very* complicated and expensive. Fortunately, the microprocessor and now DSP have greatly simplified the task.

DSP is the key to making CLOVER mod-

ulation practical. Phase reference determination, phase detection, and pulse amplitude shaping are all tasks performed very rapidly by the DSP. However, CLOVER modulation is sensitive to phase inaccuracy (or "dispersion"). To sense 16PSK levels, we must be able to detect phase changes of ± 22.5 degrees and be synchronized to the transmitted signal to within ± 12.25 degrees. Since the ionosphere adds phase "dispersion," a good stable signal—and lots of DSP processing—is required to make this measurement. As CLOVER progresses from BPSK to 16PSK to increase data throughput, increasingly better signals are required. However, when signals are good, CLOVER takes full advantage and really "moves the bits."

CLOVER also takes a different approach to error correction. AMTOR and packet radio both correct errors by sensing errors at the receiver and then requesting repeat transmissions. When there are errors to be fixed, data throughput is slowed by the time it takes to send the repeats. When conditions are poor, packet radio often bogs down, sending only repeats and no data; AMTOR will slow-down considerably under the same conditions.

CLOVER uses a Reed-Solomon error-correction code⁵ which allows the receiver to actually fix a limited number of errors *without* requiring repeat transmissions. For a moderate number of errors, CLOVER does not require repeats and data continues flowing at the no-error rate. To distinguish between the two schemes, we classify AMTOR and packet radio as "error-detection" protocols and CLOVER as an "error-correction" protocol. In addition, like packet radio, CLOVER includes a CRC (Cyclic Redundancy Check sum) which is used when conditions are very bad and the number of errors exceeds the capacity of the Reed-Solomon error corrector.

CLOVER ARQ mode is also adaptive. As a result of the DSP calculations necessary to detect multi-level PSK and ASK, the CLOVER receiver already has information which can be used to determine the signal-to-noise ratio (S/N), phase dispersion, and time dispersion of the received signal. CLOVER has 8 different modulation modes, 4 different error correction settings, and 4 different data block lengths which can be used—a total of 128 different modulation/code/block combinations.

Using real-time signal analysis, the CLOVER receiver will automatically signal the transmitting station to change modes to match existing ionosphere conditions. When propagation is very good, CLOVER can set itself to the highest speed and data literally "screams" down the path. When conditions are not so great, the data speed is slowed. As noted earlier, the CLOVER character throughput rate under typical HF conditions is about ten times faster than AMTOR or HF packet. However,

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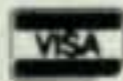
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when we get one of those "perfect ionosphere" conditions, CLOVER will "shift gears" and pass data at 50 to 100 times the speed of AMTOR or HF packet radio. In all cases, CLOVER automatically changes speeds to give the maximum speed that the ionosphere will allow.

Is CLOVER Legal For Amateur Use?

We hear this question often. The short answer is yes. The reason lies in the definition of the CCIR Emission Designator⁶ and how that matches our FCC Part 97 Rules and Regulations. As can be seen in fig. 1, CLOVER bandwidth is 500 Hz—no doubt about it! Since the CLOVER modulator generates tones which drive an LSB transmitter, the modulation mode is "J2." One possible point of confusion: While CLOVER does use multiple tones and multiple modulation levels, CLOVER is *not* a multiplex emission; we are sending only one data stream over the air. The full CCIR emission designator for CLOVER is "500HJ2DEN." This all agrees with FCC Part 97 Rules and Regulations.

Summary

This is the "promise" of CLOVER. The

mode has evolved from the need to pass data via HF radio at a faster rate and from an observation of the real-world propagation conditions. It answers a pressing need to send data more reliably and faster than can be done using AMTOR or HF packet radio. CLOVER is admittedly a very complicated mode that has only recently become practical due to the advent of relatively low-cost DSP devices. CLOVER is also very bandwidth efficient, requiring a small fraction of the spectra of AMTOR (one half) or HF packet radio (one quarter).

Although bandwidth efficiency may not at present be high on the amateur's list of "must haves," we must realize that while amateur radio itself is growing, our HF frequency allocations are likely to remain fixed. In the future, we must find ways to cram more signals into our available HF spectrum. Like SSB versus AM, CLOVER's bandwidth reduction allows us to make more efficient use of the limited HF bands we have. CLOVER is still evolving as this article is being written.

Footnotes

1. For more information about Coherent CW, see "Coherent CW—Amateur Radio's New State of the Art?", Ray Petit, W7GDM, *QST*, September 1975, pp. 26-27. "Coherent CW—The CW of the Future," Adrian Weiss, K8EEG/0, *CQ*, June 1977, pp. 24-30; July 1977, pp. 48-54. "Coherent CW," Charles Woodson, W6NEY, *QST*, May 1981, pp. 11-14; June 1981, pp. 18-23.

2. "The CLOVERLEAF Performance-Oriented HF Data Communication System," Ray Petit, W7GDM, *QEX*, July 1990, pp. 9-12; reprinted in *ARRL/CRRL 9th Computer Networking Conference Proceedings (1990)*, pp. 191-194.

3. "Frequency-Stable Narrowband Transceiver for 10100.5 kHz," Ray Petit, W7GDM, *ARRL/CRRL 9th Computer Networking Conference Proceedings (1990)*, pp. 191-194.

4. "CLOVER-II: A Technical Overview," Ray Petit, W7GDM, *ARRL Amateur Radio 10th Computer Networking Conference Proceedings (1991)*, pp. 125-129.

5. Reed-Solomon encoding modifies transmitted data in a pattern that the receive modem uses to detect and correct errors caused by ionospheric distortion. Transmitting and receiving CLOVER modems are synchronized so that original bit patterns are restored when receive data is processed and passed to the data terminal. This type of "Forward Error Correction" (FEC) allows correction of errors without requiring repeat transmissions.

6. For more information about CCIR Emission Designators, see *The ARRL Handbook* (recent edition), Chapter 9, "Modulation and Demodulation." □

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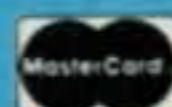
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CQ REVIEWS:

The Quantum Ham Battery

BY DAVE INGRAM*, K4TWJ

Heads up FM handheld transceiver lovers and portable QRP enthusiasts everywhere! This review describes a high-capacity, rechargeable battery pack that clips on a belt and keeps you talking at full power for hours (days!) on end. Indeed, its life between recharges is several times longer than regular nickel-cadmium batteries. This Quantum Ham Battery has top-mounted LEDs that continuously show its state of charge/discharge (a built-in fuel gauge!), and its charge can be "topped up" anytime without the traditional nickel-cadmium "memory syndrome." Short-circuit protection plus dual outputs for powering two handhelds simultaneously are also included in this gem. Full weekend operation at 5 watts is easy with this portable power pack, and worries about "surprise dead batteries" are no longer a problem because you always know how much charge remains in the Quantum battery.

Visualize gearing up with a Quantum Ham Battery on one hip, handheld on the other hip, and lapel speaker mike clipped to your collar for hamfests or public-event assistance—a full "walking portable" communications center! Afterwards, you unplug the Quantum battery and speaker mike, and the handheld is ready for normal operation with its previously charged and unused internal battery. Nice! While the Quantum is also great for portable packing, I think it is perfect for operating HF QRP right on a coastal beach.

Overview

Basically stated, the Quantum is a 12 volt, 2.1 amp hour, sealed, lead acid battery with charge monitoring circuitry plus short and overcharge protection in a sturdy leather case approximately 7"H x 3"W x 2"D. It weighs approximately 2 pounds, has a back belt clip, and is supplied with a hefty wall charger. Ten hours are required for charging the battery from "empty," but fully recharging it from "partially used" takes only a few hours. Life expectancy of the battery is between 250 and 1000 recharge cycles. If you are still living

*4941 Scenic View Drive, Birmingham, AL 35210



The Quantum Ham Battery. This 12 volt, 2.1 amp power pack is better than the classic all-day sucker/lollipop!

after that time, Quantum will replace them at a very reasonable cost (usually less than a handheld's standard nickel-cadmium battery pack).

Quantum has a variety of optional adapters/cable sets for connecting the Ham Battery to your transceiver. Their HB3 slides on the bottom of ICOM's S series and 24AT, and the HB4 fits the ICOM A and G series. Use the HB5 with Kenwood's 205, 215, 225, 315, and 415, or the HB6 with Kenwood's TH-25AT, 26AT, 45AT, 46AT, 75A, and 77A. The Quantum HB7 works with Yaesu's FT-103R, 109, 203, 209, 703, 709, and 727. The HB9 fits Yaesu's FT-23, 33, 411, 470, 73, 811, and 911. The HB-11 fits Alinco DJ-160, 460, and 560T. An HB0 cable consisting of a coiled power cord with plug for the Ham Battery on one end and leads you wire to plugs to fit other equipment is also available. In other words, you can use this 25 watt hour battery to power almost any amateur rig that does not draw over 3.0 amps continuous/key down.

Although Quantum is a relatively new name in amateur radio, they have been in the battery business for a long time. Eight

years ago they introduced the personal battery packs used by many professional photographers today. The company seems to really know its business, and use of lead acid cells for long-term heavy-duty operation is hard to beat. Technically, you can think of the Quantum Ham Battery as a miniature equivalent to your car's battery (except the Quantum is fully sealed and safe). Unlike nickel-cadmium cells, lead acid batteries thrive on (and give longest life with) daily recharges rather than requiring periodic full discharge cycles to prevent memory buildup. Also like a car, a regulator is included with the Quantum Ham Battery to prevent overcharging.

Using the Quantum

My first, and continuing, single-sentence description of the Quantum Ham Battery is "Will this thing ever run down?" I thought the charge monitoring LEDs were stuck on "full" after leisurely listening to a local repeater all day with my handheld, so I connected it to MFJ's new 5 watt 20 meter transceiver and delved into some heavy-duty DXing at night. Finally, there it was!

An LED extinguished! But wait . . . there were more LEDs to go! If I waited for all the LEDs to extinguish, this review would never have been written! Oh, well . . . I'll just let the rig play while I write.

Conclusion

All aspects considered, the Quantum Ham Battery is terrific. Size and weight are comparable to older full-size handhelds (clip it to the back of your belt for easy carrying or add Quantum's optional shoulder strap). The battery is perfect for emergency preparedness and extended portable operations, and it is a sheer blessing during those long power outages synonymous with winter ice storms or coastal area hurricanes. Remember to order Quantum's optional slide-on adapter for your handheld when purchasing the battery. Alternately, include the optional HB0 cable and various plugs and adapters for your rigs so the Ham Battery can serve double or triple duty. Switching to a new handheld at a later date will also be easy. Just change rig plugs, and you are still Quantumized!

List price of the Quantum Ham Battery is \$145. Additional adapters range in price from \$19 to \$42, with more adapters planned for the future. For more information on the Quantum Ham Battery, contact Quantum Instruments, Inc., 1075 Stewart Avenue, Garden City, NY 11530 (1-800-989-0505).



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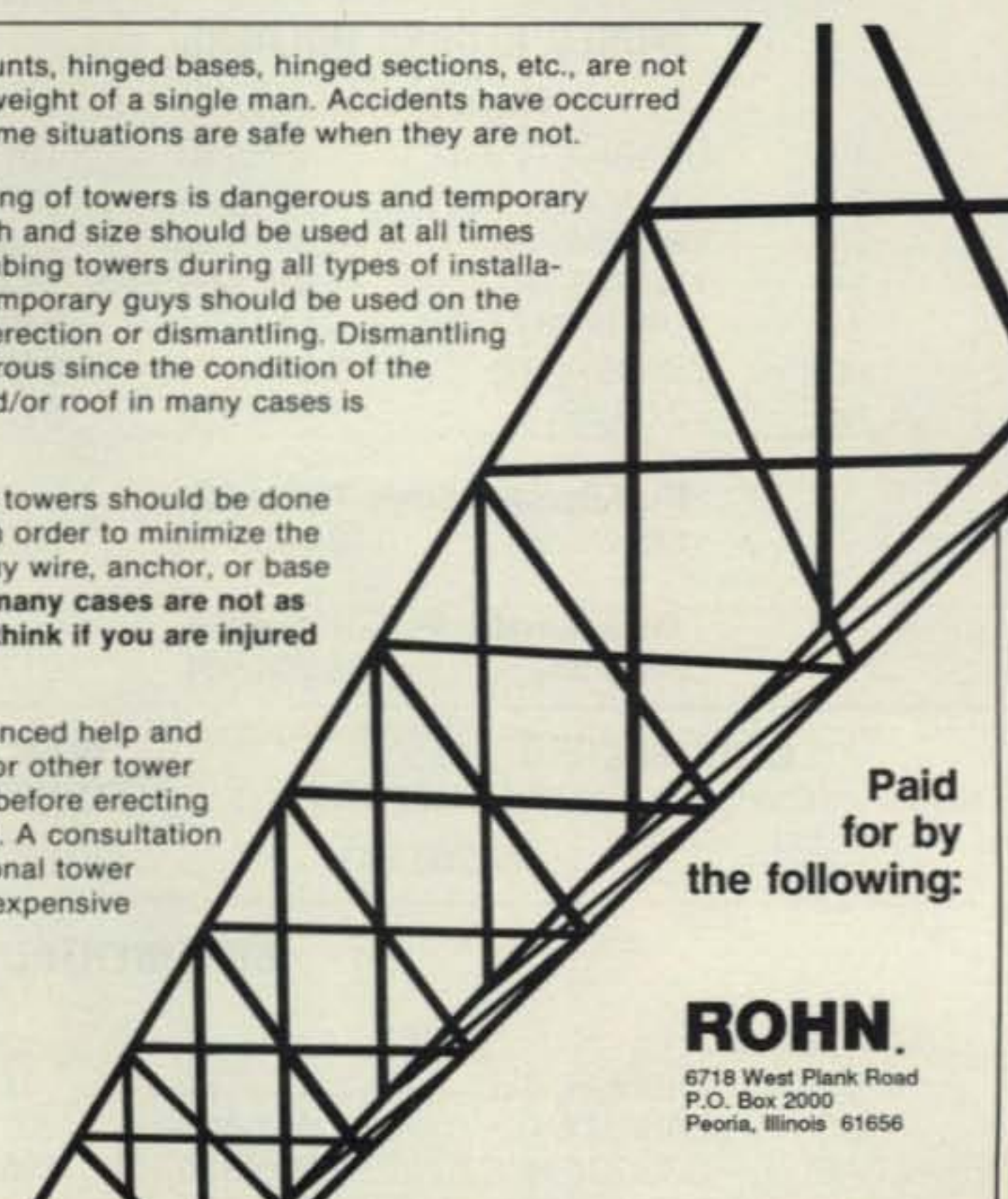
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	P.P. V Multi-Mode Interconnect	479.95



COMET	CA-2x4MAX 2M/440 4.5/11.9 18'4"	\$169.95
	CA-2x4FX 2M/440 4.5/2.2 5'11"	94.95
CUSHCRAFT	A4S HF Tribander	\$379.95
	A3S 10, 15, 20M Tribander	319.95
	R7 Seven Band Vertical	369.95
DIAMOND	X-200 6/8 db 8.3' 2M/440	\$134.95
	X-500NA 8.3/11.7db 17.2' 2M/440	179.95
HEIL	Boom MIC Set (Wired)	\$77.95
ICOM	IC-765 Gen. Cov. Xcvr/PS/Tuner	CALL
	IC-751A Gen. Cov. Xcvr	CALL
	IC-735 Gen. Cov. Xcvr	CALL
	IC-725 Gen. Cov. Xcvr	CALL
	IC-2410 VHF/UHF 45W/35W	CALL
	IC-229H 50W FM	CALL
	IC-901 Fiber Optic	CALL
	IC-W2A 2M/440 Handheld Xcvr	CALL
	IC-P2AT 2.5W 2M Handheld Xcvr	CALL
	IC-2GAT 7W 2M Handheld Rec.	CALL
	IC-2SRA 2M, HT w/50kHz-905MHz Xcvr	CALL
KANTRONICS	KAM All Mode	\$279.95
	Host Master II (PC)	59.95
	KPC-2 Packet Controller	159.95
KENWOOD	TS-950SDX Delux Digital Xcvr	CALL
	TS-850SAT Xcvr w/Receiver, Tuner	CALL
	TS-450SAT Compact Xcvr	CALL
	TM-741A 50W, 2M/440MHz	CALL
	TM-641A 2M/220MHz, FM Xcvr	CALL
	TM-241A 50W, 2M, FM, HT	CALL
LARSEN	2M, 440 MHz Mag Mount Antenna	\$62.95

MFJ	989C 3KW PEP Antenna Tuner	\$299.95
	986 3KW PEP Antenna Tuner	254.95
	949D 300W Mtr/DL/Switch/Bln	134.95
	207 HF SWR Analyzer	89.95
	422B Keyer/Paddle Combination	124.95
	815B 1.8-30 MHz RMS/PEP	59.95
	1214 Color Fax, RTTY, CW, ASCII	149.95
	1278T Turbo Multi-Mode Cntr	309.95
	1278 Multi-Mode Controller	244.95
	1274 Packet Controller	143.95
	1270B TAPR TNC-2 Clone	124.95
	247 SWR Analyzer W/Freq. Counter	169.95
RF Concepts	2-23 2/30W 2M Amp w/Pre-amp	\$119.95
	2-317 30/170W 2M Amp	244.95
	4-110 10/100W 440MHz Amp	324.95
	2/70G 3/30-5/20W 2M/440 Amp	234.95
STANDARD	C228A 2M/220 MHz HT w/CTCSS	\$544.95
	C528A 2M/440MHz HT w/CTCSS	524.95
	C168A 2M Sub-Mini Deluxe HT	345.95
TEN-TEC	Omni-VI New HF w/DSP	CALL
YAESU (LARGE STOCK—PLEASE CALL)	FT-1000D 200W Deluxe HF Xcvr	CALL
	FT-1000 200W HF Xcvr	CALL
	FT-990 100W HF Xcvr	CALL
	FT-890 High Performance HF Xcvr	CALL
	FT-767 Gen. Cov. Xcvr/PS/Tuner	CALL
	FT-757GX-II Gen. Cov. Xcvr	CALL
	FT-747GX HF Xcvr	CALL
	FT-736R Xcvr 144-148, 430-450	CALL
	FT-5200 2M/440 50/35W	CALL
	FT-2400H 2M 50W	CALL
	FT-415 Delux 2M, HT	CALL

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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.

WORLD RECORD HOLDERS

Single Operator

1.8	UP3BP/UF('85)	125,240	101
3.5	YX3A('89)	1,004,060	305
7.0	VP2VCW('86)	4,641,120	586
14	YW1A('91)	4,617,456	732
21	ZD8LII('91)	5,118,527	743
28	ZS6BCR('91)	3,621,173	617
AB	V27T('89)	9,408,672	819

Multi-Operator Single Transmitter

YM5KA('90)	13,098,790	839
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Multi-Operator Multi-Transmitter

UP4A('88)	16,204,961	1013
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U.S.A. RECORD HOLDERS

Single Operator

1.8	K5UR('85)	13,668	102
3.5	K1ZM('91)	247,744	224
7.0	N5RZ('85)	1,754,664	452
14	K2VV('86)	2,525,880	582
21	K6LL/7('88)	2,163,388	557
28	N5RZ('89)	162,134	259
AB	KM1H('91)	4,143,744	704

Multi-Operator Single Transmitter

N4WW('88)	5,593,772	698
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Multi-Operator Multi-Transmitter

NS0Z('88)	10,870,380	922
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CLUB RECORD

Northern California Contest Club('91)	77,268,841
---------------------------------------	------------

WPX (Prefix) RECORD

HG73DX('91)	1,120
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QRPP RECORD

VP2MU('91)	1,554,735
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CONTINENTAL RECORD HOLDERS

AFRICA

1.8	ZS6BCR('85)	20	5
3.5	EA8RL('84)	453,456	201
7.0	G3GJQ/5N('89)	813,610	295
14	9J2AL('90)	1,333,724	436
21	ZD8LII('91)	5,118,527	743
28	ZS6BCR('91)	3,621,173	617
AB	5L7T('87)	8,619,225	679

ASIA

1.8	UP3BP/UF('85)	125,240	101
3.5	UP2NK/UF('85)	701,012	221
7.0	UP2NK/UF('86)	2,084,880	365
14	4Z6DX('91)	4,614,030	743
21	7L1GVE('91)	2,811,478	601
28	4X4UH('81)	1,081,262	338
AB	P3AA('89)	8,951,600	695

EUROPE

1.8	UA2FF('87)	117,424	134
3.5	CT5AT('86)	697,248	324
7.0	DF9ZP('85)	1,998,372	482
14	LZ5A('89)	3,066,120	680
21	4N3E('90)	3,239,453	721
28	9H1EL('88)	805,552	398
AB	LZ3DX('91)	4,713,706	863

Multi-Operator Single Transmitter

AF	ZD80V('91)	10,938,352	848
AS	YM5KA('90)	13,098,790	839
EU	ZB2X('91)	8,618,823	881
NA	KP2A('89)	12,843,135	835
OC	AG9A/AH2('91)	9,005,641	787
SA	P43GR('90)	10,990,482	790

NORTH AMERICA

1.8	VE3BMV('86)	43,428	77
3.5	HK3MAE/HK0('87)	456,280	187
7.0	VP2VCW('86)	4,641,120	586
14	WC4E/KP4('86)	3,613,248	656
21	FS5T('89)	4,552,470	702
28	HI8JKA('89)	891,242	374
AB	V27T('89)	9,408,672	819

OCEANIA

1.8	KX6DC('88)	12,240	45
3.5	KX6DC('89)	258,258	143
7.0	V73AS('90)	1,793,840	340
14	ZL3GQ('89)	2,775,744	576
21	N7DF/WH2('89)	3,243,450	525
28	KG6DX('81)	1,238,806	334
AB	NH6J/NH0('88)	4,484,760	532

SOUTH AMERICA

1.8	YV1OB('86)	11,550	35
3.5	YX3A('89)	1,004,060	305
7.0	YX5A('87)	2,999,977	479
14	YW1A('91)	4,617,456	732
21	LT0A('91)	4,290,988	686
28	CE3DNP('89)	2,857,038	582
AB	4M2BYT('91)	8,656,120	766

Multi-Operator Multi-Transmitter

AF	EA9CE('84)	4,383,308	482
AS	JE2YRD('91)	8,388,942	866
EU	HG73DX('91)	16,468,480	1120
NA	WL7E('88)	12,826,296	952
OC	KH6XX('85)	8,551,399	647
SA	LQ5A('89)	8,290,016	784

QRPP

AF	5Y4FO('91)	498,960	313	NA	VP2MU('91)	1,554,735	469
AS	4X4UH('82)	1,028,904	344	OC	FO8JP('86)	572,131	259
EU	LZ2BE('91)	1,137,488	506	SA	OA8V('81)	444,768	246

ASTRON POWER SUPPLIES

• HEAVY DUTY • HIGH QUALITY • RUGGED • RELIABLE •



MODEL VS-50M

SPECIAL FEATURES

- SOLID STATE ELECTRONICALLY REGULATED
- FOLD-BACK CURRENT LIMITING Protects Power Supply from excessive current & continuous shorted output
- CROWBAR OVER VOLTAGE PROTECTION on all Models except RS-3A, RS-4A, RS-5A, RS-4L, RS-5L
- MAINTAIN REGULATION & LOW RIPPLE at low line input Voltage
- HEAVY DUTY HEAT SINK • CHASSIS MOUNT FUSE
- THREE CONDUCTOR POWER CORD except for RS-3A
- ONE YEAR WARRANTY • MADE IN U.S.A.

PERFORMANCE SPECIFICATIONS

- INPUT VOLTAGE: 105-125 VAC
- OUTPUT VOLTAGE: 13.8 VDC \pm 0.05 volts (Internally Adjustable: 11-15 VDC)
- RIPPLE Less than 5mv peak to peak (full load & low line)
- All units available in 220 VAC input voltage (except for SL-11A)

SL SERIES



MODEL	Colors Gray Black	Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H x W x D	Shipping Wt. (lbs.)
SL-11A	• •	7	11	2 3/4 x 7 1/2 x 9 3/4	11

- LOW PROFILE POWER SUPPLY

RS-L SERIES



MODEL	Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H x W x D	Shipping Wt. (lbs.)
RS-4L	3	4	3 1/2 x 6 1/2 x 7 1/4	6
RS-5L	4	5	3 1/2 x 6 1/2 x 7 1/4	7

- POWER SUPPLIES WITH BUILT IN CIGARETTE LIGHTER RECEPTACLE



RM SERIES

MODEL RM-35M

MODEL	Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H x W x D	Shipping Wt. (lbs.)
RM-12A	9	12	5 1/4 x 19 x 8 1/4	16
RM-35A	25	35	5 1/4 x 19 x 12 1/2	38
RM-50A	37	50	5 1/4 x 19 x 12 1/2	50
RM-60A	50	55	7 x 19 x 12 1/2	60
RM-12M	9	12	5 1/4 x 19 x 8 1/4	16
RM-35M	25	35	5 1/4 x 19 x 12 1/2	38
RM-50M	37	50	5 1/4 x 19 x 12 1/2	50
RM-60M	50	55	7 x 19 x 12 1/2	60

- 19" RACK MOUNT POWER SUPPLIES

- Separate Volt and Amp Meters

RS-A SERIES



MODEL RS-7A

MODEL	Colors Gray Black	Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H x W x D	Shipping Wt. (lbs.)
RS-3A	• •	2.5	3	3 x 4 1/4 x 5 1/4	4
RS-4A	• •	3	4	3 3/4 x 6 1/2 x 9	5
RS-5A	• •	4	5	3 1/2 x 6 1/2 x 7 1/4	7
RS-7A	• •	5	7	3 3/4 x 6 1/2 x 9	9
RS-7B	• •	5	7	4 x 7 1/2 x 10 3/4	10
RS-10A	• •	7.5	10	4 x 7 1/2 x 10 3/4	11
RS-12A	• •	9	12	4 1/2 x 8 x 9	13
RS-12B	• •	9	12	4 x 7 1/2 x 10 3/4	13
RS-20A	• •	16	20	5 x 9 x 10 1/2	18
RS-35A	• •	25	35	5 x 11 x 11	27
RS-50A	• •	37	50	6 x 13 3/4 x 11	46

RS-M SERIES



MODEL RS-35M

MODEL	Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H x W x D	Shipping Wt. (lbs.)
RS-12M	9	12	4 1/2 x 8 x 9	13
RS-20M	16	20	5 x 9 x 10 1/2	18
RS-35M	25	35	5 x 11 x 11	27
RS-50M	37	50	6 x 13 3/4 x 11	46

- Switchable volt and Amp meter

- Separate volt and Amp meters

VS-M AND VRM-M SERIES



MODEL VS-35M

- Separate Volt and Amp Meters • Output Voltage adjustable from 2-15 volts • Current limit adjustable from 1.5 amps to Full Load

MODEL	Continuous Duty (Amps)			ICS* (Amps)	Size (IN) H x W x D	Shipping Wt. (lbs.)
	@13.8VDC	@10VDC	@5VDC	@13.8V		
VS-12M	9	5	2	12	4 1/2 x 8 x 9	13
VS-20M	16	9	4	20	5 x 9 x 10 1/2	20
VS-35M	25	15	7	35	5 x 11 x 11	29
VS-50M	37	22	10	50	6 x 13 3/4 x 11	46
VRM-35M	25	15	7	35	5 1/4 x 19 x 12 1/2	38
VRM-50M	37	22	10	50	5 1/4 x 19 x 12 1/2	50

- Variable rack mount power supplies

RS-S SERIES



MODEL RS-12S

MODEL	Colors Gray Black	Continuous Duty (Amps)	ICS* Amps	Size (IN) H x W x D	Shipping Wt. (lbs.)
RS-7S	• •	5	7	4 x 7 1/2 x 10 3/4	10
RS-10S	• •	7.5	10	4 x 7 1/2 x 10 3/4	12
RS-12S	• •	9	12	4 1/2 x 8 x 9	13
RS-20S	• •	16	20	5 x 9 x 10 1/2	18

- Built in speaker

CQ REVIEWS:

The SGC SG-303 HF Mobile Antenna And QMS Mount System

BY JOHN J. SCHULTZ*, W4FA

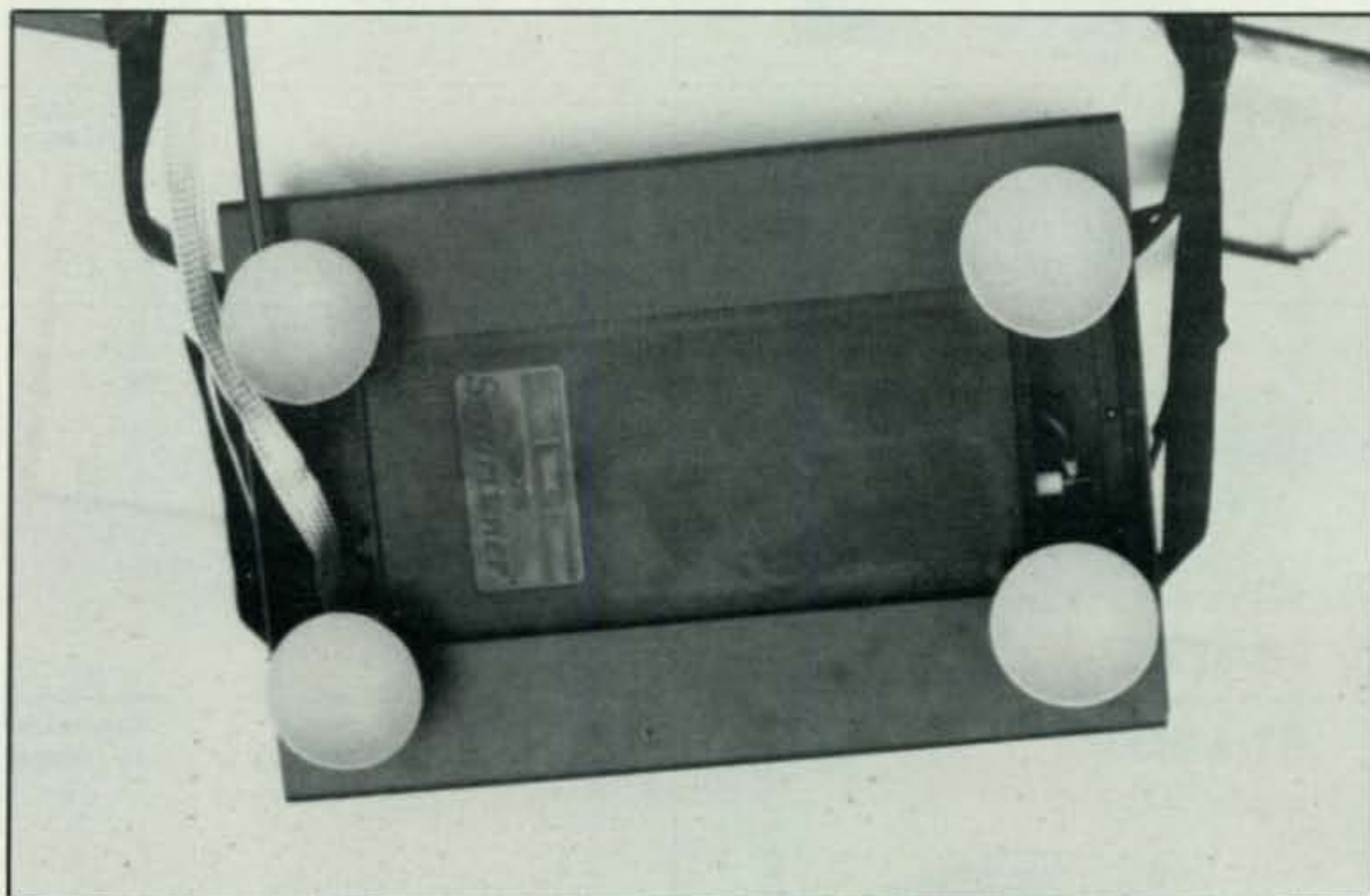
SGC has frequently advertised its SG-230 HF "Smartuner" in *CQ*, but not its QMS (Quick Mount System). In fact, what caught my attention once was a rather small advertisement in *CQ* for SGC's 9 foot HF mobile antenna, the SG-303. The advertisement for the SG-303 specified in rather small print that the whip required the use of their SG-230 "Smartuner," or a similar antenna coupler. The advertisement was a bit unclear to me, so I contacted SGC about their products. Well, that contact proved rather fruitful. Now it turns out that the SG-303 antenna is a part of SGC's rather sophisticated QMS portable/mobile/maritime HF antenna system.

Confused? Take a look at some of the photographs. The QMS is an integrated coupler/antenna package that can be used for fixed or portable operation over the *continuous* range of 1.8 to 29.9 MHz with *any* transceiver. It consists basically of a special helically loaded whip, the SG-303, and the SG-230 coupler placed in a special "quick-mount" housing which can be temporarily or permanently secured in place on a car, boat, etc. Interconnections to a transceiver are extremely simple, requiring only an RF input and 12 VDC. The SG-230 tuner within the unit senses the transmit input frequency and sets the tuner LC values to memorized values for a given input frequency or establishes new settings within 2 to 5 seconds for any random frequency not already in one of its 500 memories.

The SG-303 Antenna

The specifications for the antenna are shown in Table I. It is quite different from any other mobile antenna. The antenna is split into two 4½ foot sections which screw together, so it is very portable. Both sections are continuously helically loaded by what I would guess is flat copper strapping which is entirely covered by polyolefin heat-shrink tubing. The bottom 4½ foot section has a slim, encapsulated loading

*302 Glasgow Lane, Greenville, NC 27858



A look at the underside of the QMS enclosure.

coil at its base which measures about 1⅛" diameter by 9" long. The actual whip itself tapers very little from about a 7/16" diameter as it emerges from the 9" base section to slightly less than 3/8" diameter at the top. It is extremely rugged in its construction.

Although the idea behind the helical loading of the antenna was to improve its efficiency on the lower frequencies, the inductive/capacitive nature of the loading means that the antenna itself, when used against ground, will have some natural resonances. That's the reason for the 13.5 and 22.0 MHz figures shown in Table I. I hardly think they were meant to be near the 20/15 meter bands, but it does open up some interesting possibilities to use the antenna on those bands with perhaps very simple matching at the base of the antenna.

The ratchet mount shown on top of the QMS enclosure as seen in one of the photographs is actually part of the SG-303 antenna and comes with the antenna if just the SG-303 is purchased. The ratchet mount is a massive unit made out of stainless steel and is meant to be bolt mounted to a flat surface. It's hardly your common

mobile mount. A Delrin section provides insulation when high voltages might develop at the base of the antenna on some frequencies. The large covered tubular section on the top of the mount, which might appear to be a loading coil, is actually a weatherproofed heavy-duty base spring. The ratchet mount provides 180° placement of the antenna in either of two planes. The positioning in one plane is set by a bolt arrangement, and the positioning in the other plane is set as desired by using the hand grip shown on the side of the mount. The latter of course allows the user to rapidly lower the antenna temporarily to clear an obstacle when the antenna is mounted on a car or boat.

The QMS System

As was mentioned, the QMS system consists of the SG-230 coupler, the SG-303 antenna, and a heavy-gauge aluminum enclosure which "pulls" the system together. The enclosure measures 18" x 12" x 4" and houses the SG-230 coupler. Long

Specifications

Maximum input power	150 watts PEP or CW
Operating range	2-30 MHz
Primary loading resonance	13.5 MHz
Secondary loading resonance	22.0 MHz
Mounting	High voltage, 4-way ratchet
Ratchet mount material	Stainless steel
Maximum vehicle or boat speed	60 MPH/100 KPH when antenna is erected
Radiation	Omnidirectional
Total maximum weight	6 pounds
Maximum total height	9 feet
Maximum shipping length	4.5 feet

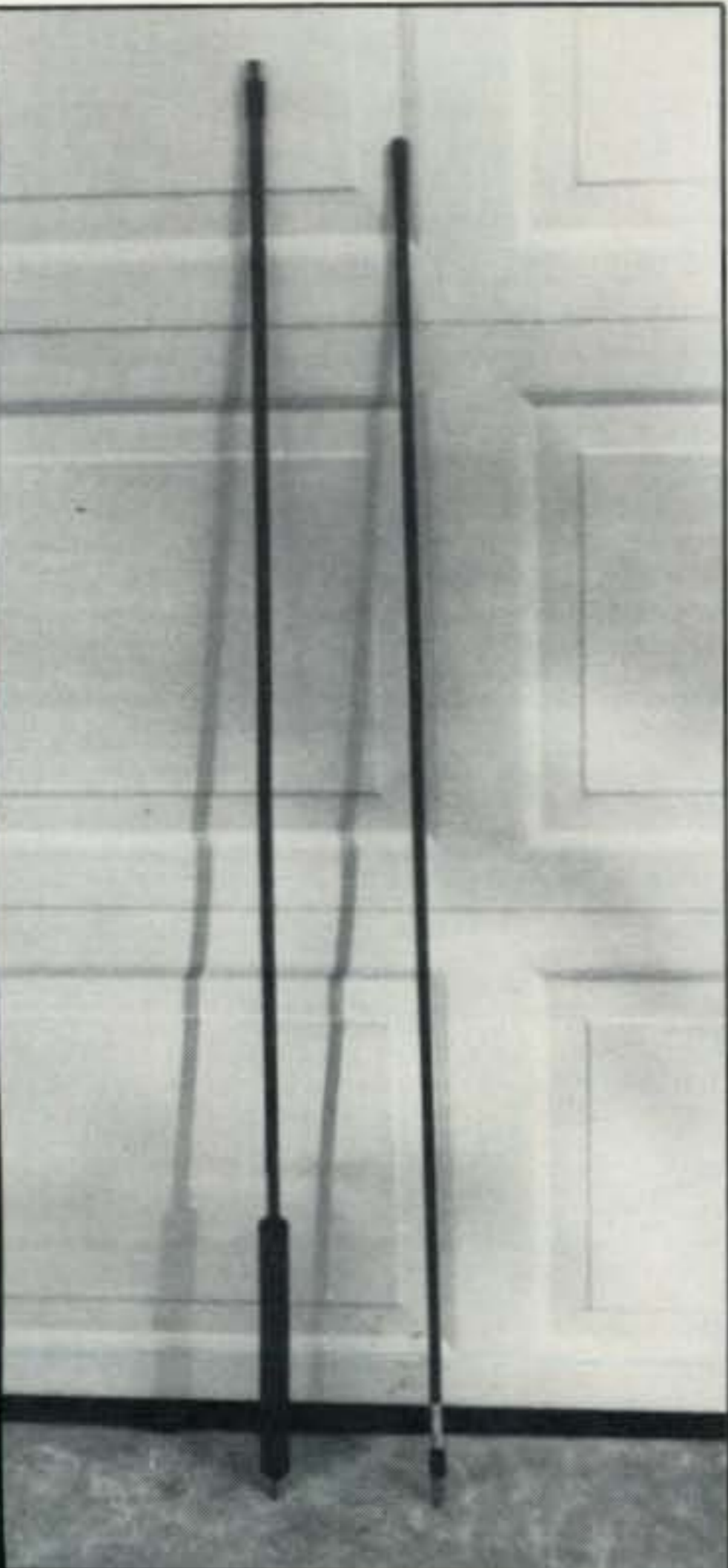
Items Supplied

Loaded 8 ft. whip antenna (in two sections of 4 ft.)
High-voltage insulated 4-way ratchet mount
Special SGC heavy-duty base spring
3 ft. high voltage wire, one end terminated by a round lug
High-voltage wall feed-thru bushing (hole $\varnothing = .890$ inch)
3 ft. $\frac{3}{4}$ inch wide ground strap for coupler grounding
Antenna tip hook
Lug to connect high-voltage wire to coupler
Manual

Table 1— Specifications for the SG-303 antenna. If purchased alone, it includes all of the parts listed under "Items Supplied." Otherwise, those parts become part of the QMS "package."



The ratchet-mount base for the SG-303 is massive. A hand grip allows for quick lowering of the antenna.



Two approximately 4½ foot long each whip sections screw together to form the whip section of the SG-303 antenna.

nylon straps with adjustable edge clamps can be placed on either the two short or two long sides of the enclosure. Fig. 1 provides an overall view of the enclosure.

Taking a look at the underside of the enclosure, as shown in one of the photographs, is sort of like turning over a horseshoe crab. The enclosure forms a shell which protects the SG-230 coupler inside. The protection is basically physical, since the SG-230 is weatherproof by itself. From the underside view, you can also see the four large suction cups, in addition to the nylon straps, which hold down the QMS on any flat or somewhat curved surface.

Usage and Results

Since my yacht was not available at the moment (it rarely is), I tried out the QMS in my 1979 car. I did prepare in advance a good ground connection to the car for the "ground braid coming from the SG-230. The first surprise was how easy it really was to mount the QMS enclosure on the trunk lid. The clamps on the nylon straps were placed around the edges of the trunk, the enclosure pressed down to allow the

suction cups to adhere and then the four straps tightened up. Ground, RF input, and power connections were then made (a connector had been prepared for the 12 VDC battery connection). SGC claims the QMS can be set up in a matter of minutes. If some basic connections are prepared in advance, that is absolutely true. Even if some of the connections are not prepared in advance, the only real complication I can see for an unknown mounting of the unit is getting to a good RF ground.

Once the QMS is in place, the SG-230 is set into operation by applying RF power. The coupler will sense the frequency of the RF input and either use coupler settings from its memory or find (and memorize, if desired) new coupler settings. I tried the QMS at several frequencies within each amateur radio band, and it never failed to find a "match" (SWR of less than 1:1.5) within the time limits mentioned. It's almost an eerie sensation to be able to use a mobile antenna, especially on the lower frequency

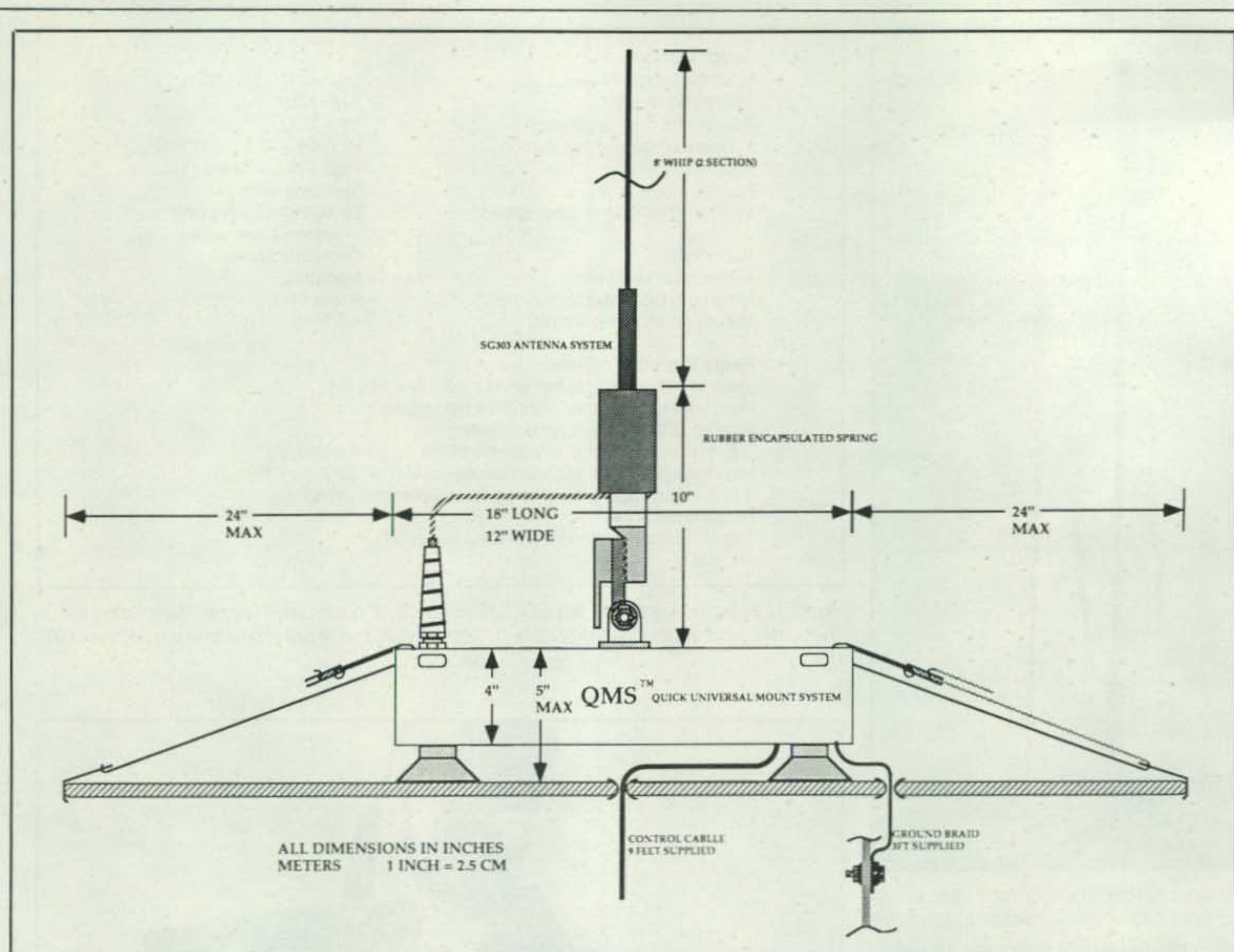


Fig. 1- A detailed look at the dimensions of the QMS enclosure and how the SG-303 antenna mounts on the enclosure.

bands, that provides absolutely continuous band coverage instead of the very restricted frequency coverage common to inductively loaded mobile antennas.

The only caution I would strongly note is that the SG-230 coupler nominally requires 10 watts of RF input for tune-up purposes, although an internal sensitivity adjustment in the SG-230 can reduce the tune-up power required to a few watts. Almost any amateur band 100 output class transceiver would seem to work fine with the QMS once the RF sensitivity of the SG-230 has been increased. However, there is no way the SG-230 will work using extreme QRP transceiver power levels.

I didn't drive around at 60 MPH with the QMS on the trunk lid. I have no doubt, though, it would hold in place at that speed. Dismounting the QMS is simple enough, since the hold-down straps have a quick-release action, but at times I just couldn't get those suction cups to come loose! I finally caught on to the trick of putting a piece of paper under each suction cup as I got it loose before proceeding on to tackling the next cup.

On-the-air results were excellent. SGC

claims the SG-303 antenna has a 4 to 12 dB advantage over a plain 9 foot whip. I can't verify those numbers, but I had the impression they are conservatively correct, and they would seem logical considering the helical loading arrangement used in the SG-303. My sort of own crude estimate would be that the SG-303 starts providing a noticeable advantage from 15 meters on down, ranging from one-half to three "S" units. The power radiated advantage on the lower frequency bands, particularly, is very noticeable and is definitely helpful. But to be clear, neither a 9 foot plain whip nor a 9 foot helically loaded whip is going to work wonders on, say, 75 meters, if all other factors are equal (coupler loss, ground loss, etc.). What will work wonders in combination with a radiated power boost on the lower frequency bands is the complete frequency agility provided by the QMS.

The super advantage of the QMS for mobile use on any amateur band is, of course, that you do not have to change loading coils, coil tap positions, etc., as you go from band to band. I can't imagine it any longer, but I'm sure I would have more than ap-

preciated that feature as I operated years ago as W1DCG/mobile in Connecticut on very cold winter days!

Manual

The manual for the QMS is very complete with numerous illustrations on how the system can be installed on various vehicles. It also includes many good hints on how a mobile radio should be installed. Between the QMS manual and the separate manuals for the SG-230 and SG-303 is supplied a wealth of data on how the system can be used and mounted in practically any situation.

Quality

You have to remember when looking at a system like the QMS that you are dealing with commercial-grade equipment that is several quantum steps beyond the sort of mobile antenna components with which radio amateurs are generally familiar. The hardware associated with the SG-303, for instance, is designed to withstand even a harsh maritime environment. One illustra-

MFJ 20 Meter CW Transceiver

... throw this *tiny* CW rig in a corner of your briefcase and enjoy DXing and ragchewing wherever you go ... you get a high performance superhet receiver, crystal filter, RIT, AGC, vernier tuning, sidetone, speaker, 5 watt transmitter, semi-break-in, more ...

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- 15 Meter and other bauds available soon
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- Unconditional Guarantee for one full year



nuts are used — not sheet metal screws.

Has power-on LED, transmit LED and SO-239 coax connector for antenna.

Designed by Rick Littlefield, K1BQT

The MFJ-9020 was designed by Rick Littlefield, K1BQT. He's known worldwide for his reliable high-performance transceiver designs and

Throw this tiny CW rig in a corner of your briefcase and enjoy DXing and ragchewing wherever you go.

You'll turn lonely nights into exciting adventures as you contact fellow amateurs around the world.

20 Meters is open day and night so you can operate whenever you have a free moment.

With 5 watts you'll have plenty of power to work the world even with a makeshift antenna.

At home with a good dipole, vertical or beam, you'll be able to work almost anyone you hear — can you imagine earning DXCC with 5 watts?

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It's good enough to be your only rig — you get a high performance superhet receiver, razor sharp 8-pole crystal filter, RIT, AGC, vernier tuning, sinewave sidetone, built-in speaker, headphone jack, adjustable semi-break-in, up to 5 watts output plus much more.

Covers lower 20 Meter CW band, 14.000 to 14.075 MHz. 6x6½x2¼ inches. Weighs 1-¾ lb. Uses 12-15 VDC. Optional plug-in Curtis chip keyer, narrow audio filter, antenna tuner, power pack and antenna.

High Performance Superhet Receiver

You get a high performance superhet receiver with a selective double tuned front end and double-balance mixer. It's sensitive enough to copy weak DX signals down to the noise floor yet resist overload when a strong local comes on.

What you hear is what you get — images and birdies are eliminated with this single conversion design and a high 10 MHz IF.

A ball bearing reduction drive and linear frequency readout gives you smooth precise tuning.

Half watt of audio gives you plenty of volume from headphones and built-in speaker.

Razor Sharp Selectivity

You'll slice through QRM and pull weak ones out of the mud with an 8-pole crystal filter that gives you razor sharp selectivity with steep sided skirts.

Automatic Gain Control (AGC)

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True Receiver Incremental Tuning (RIT) lets you dodge QRM and compensate for drift without moving your transmit frequency.

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Transceiver, tuner, power pack fastens together to form tiny 6x6½x6¾ inch integrated CW station.

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With 5 watts you'll have plenty of power to work the world even with a makeshift antenna.

You can use any antenna with an SWR up to 3:1. The MFJ-9020 is rugged enough to withstand momentary antenna opens or shorts without damage.

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A pleasing *sinewave* sidetone lets you monitor your sending.

You also get quiet adjustable semi-break-in and adjustable automatic transmit offset.

You'll get hours of battery operation — draws only 50 ma. receive, 1 amp transmit.

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The MFJ-9020 is housed in an attractive matte-black aluminum enclosure with a deluxe brushed-aluminum front panel and matched knob set. Machine screws and pressed-in PEM

numerous papers.

K1BQT has given careful attention to board layout, heatsinking, mechanical rigidity, voltage regulation and component selection to ensure stable operation and long-term reliability.

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Free MFJ-9020 Manual

Manual includes operating instructions, setting up your station, DX techniques, antenna suggestions, trouble shooting guide, theory of operation, alignment procedures, parts placement, schematic, parts list and more.

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MFJ Portable Antenna Tuner



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MFJ Portable Power Pack



MFJ-4112 **Portable** Battery/AC Power Pack for MFJ-9020 or other low power transceiver. Provides 12 VDC from eight D cells (not included) or from 110 VAC. 6x6½x2¼ inches matches MFJ-9020. Fastens to MFJ-9020 and/or MFJ-971 Portable Antenna Tuner to form single unit.

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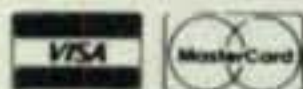
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The dual suction-cup/strap-down mounting for the QMS allows it to be placed on any flat or even somewhat curved surface.

tion in its manual even shows it being mounted on the tower of a sport fishing boat. You certainly don't suggest that type of mounting unless you have a lot of faith in your product.

Of course, the price of the QMS reflects the foregoing. Many products designed specifically for the amateur radio market are well made and reasonably priced. However, I think it is useful at times to take a look at HF gear designed for commercial use. If nothing else, it can be educational in many ways.

Price Class

For simplicity I've been referring to the QMS as a system. It can be purchased that way or any one of the three major components can be purchased separately. The price of the complete system (QMS-2) is \$1435.00. The prices of the individual components are QMS (enclosure only) \$490.00; SG-230 coupler \$595.00; SG-303 antenna \$350.00. Information on the above-mentioned system and on a 24 VDC version of the system is available from SGC, Inc., SGC Building, 13737 SE 26th Street, Bellevue, WA 98009.



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Ball bearings on both the front and back shafts give you a velvet smooth vernier feel. Steel end plates and steel shafts give you lifetime durability.

You won't have arcing problems with this roller inductor. That's



MFJ-989C \$349⁹⁵

because firm springs put considerable pressure on a plated contact wheel for excellent electrical contact.

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MFJ's New 300 Watt Tuner



MFJ-948 **\$129⁹⁵** If you don't need a dummy load but want all the other features of the MFJ-949D, choose the MFJ-948 for \$129.95.

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Antenna switch selects 2 coax lines (direct or through tuner), random wire, balanced line or external dummy load. 4:1 balun. 1000 volt capacitors. Measures 10-5/8" x 2-7/8" x 7".

2-Knob Differential-T™ Tuner



MFJ-986 **\$289⁹⁵** The new MFJ-986 Differential-T™ 2-knob tuner uses a differential capacitor to make tuning foolproof and easier than ever. It ends constant re-tuning with broadband coverage and gives you minimum SWR at only one best setting. Handles 3 KW PEP.

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

MFJ's peak and average reading cross-needle meter reads forward/reflected power in 200/50 and 2000/500 watt ranges. Meter lamp uses 12 VDC or 110 VAC with MFJ-1312, \$12.95. Current balun reduces feedline radiation and forces equal currents into antenna halves that are not perfectly balanced. It covers 1.8-30 MHz. Get yours today! Add \$10 s/h.

MFJ's Random Wire Tuner

MFJ-16010 **\$39⁹⁵**

Operate all bands anywhere with any transceiver with the MFJ-16010. It lets you turn a random wire into a transmitting antenna. 1.8-30 MHz. 200 watts PEP. Ultra small 2"x3"x4".



MFJ's Mobile Tuner

MFJ-945D **\$89⁹⁵**

Don't leave home without this mobile

tuner! Have an uninterrupted trip as the MFJ-945D extends your antenna bandwidth so you don't have to stop, go outside and adjust your mobile whip.

Small 8 x 2 x 6 inches uses little room. Lighted Cross-Needle SWR/Wattmeter makes tuning easy while in motion. Has lamp switch. 1.8-30 MHz. 300 watts PEP. Mobile mount, MFJ-20, \$4.95.

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CQ REVIEWS:

The Forbes Group Ventenna

BY DAVE INGRAM*, K4TWJ

Living in a condo or environmentally-conscious area has become quite common today, but it has few advantages for enjoying amateur radio. We can occasionally opt for indoor antennas for operating under such restricted conditions, but that leaves much to be desired in the area of performance. Simply stated, there is no substitute for a good outdoor antenna! What's the solution? An antenna that looks like it is a natural part of the environment, naturally! Does such an animal really exist? Yes indeed, and it is the subject of this review.

The Forbes Group of Rocklin, California recently introduced their Ventenna(s) for 2 meters, 1.25 meters/222 MHz, and 70 cm/440 MHz, and they work like a champ while averting the "no outdoor antennas" restrictions. The Ventennas are completely unobtrusive, and in most cases they can even be installed atop apartment buildings with the management's consent. Typical installation time is less than 15 minutes, and the antenna actually has a respectable amount of (unadvertised) gain. The 2 meter and 70 cm versions were received here for review, and I was very impressed with their performance.

Overview

Simply described, the Ventenna is a half-wave radiator enclosed between two concentric pieces of ABS plastic pipe. An approximate 1 foot length of RG-58 terminating in an SO-239 connector emerges from its lower end. Approximate length/height of the Ventenna is 36 inches for 2 meters and 22 inches for 70 cm. There is a radial/counterpoise system in the Ventenna's lower section, so no ground is necessary for operation. The Ventenna fits pipes of 1 1/2 to 2 3/8 inches in diameter, and it is open in the center so it does not interfere with normal vent-pipe operation. Although this high-performance antenna looks totally natural on a home's roof, it does not have to be installed on a vent pipe; that is simply a convenient mount already in place and ready to use.

*4941 Scenic View Drive, Birmingham, AL 35210



The Forbes Group Ventenna, a very low-profile high-performance 2 meter or 70 cm antenna. It will fit on a home's vent pipe.

If your home's vent pipe is not at an optimum place, dummy vent pipes are available at hardware stores nationwide. These inexpensive units can usually be installed in a few minutes. You do not have to connect them to an indoor vent pipe; simply nail them in place. If desired, the Ventenna can be painted with nonmetallic paint (Krylon is a good choice) to match your vent pipe or roof. If you prefer to mount it on a TV mast, the Ventenna will work very well there also.

A couple of suggestions are worthy of mention at this time. First, strive to mount any outdoor antenna away from power lines and TV antennas. This precaution is for safety. Also, use only top-grade coax of the shortest possible length between your VHF antenna and indoor transceiver to minimize signal loss. The best bet here is marine-grade RG-8X, as it is small and low-loss and weathers extremely slowly.

The Ventenna is quite broadbanded and requires no measuring or tuning before installation. Just slip it over the vent pipe, run

coax to your transceiver, and enjoy. The SWR is typically below 1.7:1 from 144-148 MHz on the 2 meter version and 1.7:1 from 440-450 MHz on the 70 cm version. I did not check the 222 MHz version, but suspect its SWR is equally low at resonance and quite broadbanded. Power rating of all model Ventennas is 1500 watts.

On The Air

Before installing the Ventenna on the roof, I made a couple of interesting comparisons. First, I substituted it for a 3/8-wave gain antenna used with my handheld transceiver. Positioned in exactly the same spot as the trusty little gain antenna, the Ventenna "brought up" several previously inaccessible repeaters. Signal-strength readings on the handheld were also significantly better when using the Ventenna. Moving outdoors, I substituted the Ventenna for my truly 1/2-wave 2 meter vertical. The Ventenna was mounted in exactly the same place, and I used the same coax cable to my rig inside. Once again, the Ventenna performed even better! This was definitely an unexpected and pleasant surprise. The Ventenna is advertised as a unity gain radiator. Similar high-performance results were also noted with the 70 cm version Ventenna.

Conclusion

All aspects considered, the Ventenna, which is priced at \$49.95, is quite impressive. It is easy to install, great for packeting and FM operations alike, and seems to be almost indestructible. Obviously, it will last many years. Moving it from one location to another should be no problem. It even makes a good portable antenna capable of surviving abuse that would bend regular aluminum antennas double.

You do not need to live in an antenna-restricted area to use the Ventenna. It is terrific as a main/home antenna. It is also a good choice if you want to keep a clean appearance with only one (HF) antenna showing. We also understand the Forbes Group will produce a dual-band version of the Ventenna for 2 meters and 70 cm.

For more information on the Ventenna(s), contact The Forbes Group, P.O. Box 445, Rocklin, CA 95677 (916-624-7069).

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MFJ's unequalled tuning indicator makes it really easy to work HF packet. Just tune your radio to center a single LED and you're precisely tuned in to within 10 Hz -- and you use it the same for all modes.

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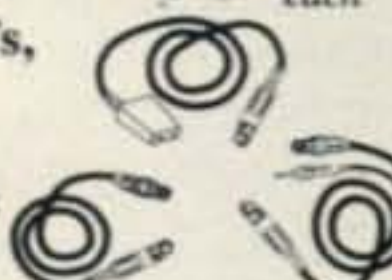
MFJ-5024, Icom, Yaesu HTs, Alinco DJ-560

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MFJ-5084, Icom 8 pin rigs

MFJ-5086, Kenwood and Alinco 8 pin rigs



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MFJ-9600 G3RUH compatible 9600 baud modem.

\$109⁹⁵ Specially designed for the MFJ-1278 and other MFJ TNCs. Plugs right in to MFJ-1278 for very easy installation. Screws, cable and LED included. Not all radios compatible with 9600 baud.



New MFJ-1278T Turbo with fast 2400 baud modem

MFJ-1278T
\$359⁹⁵

The new MFJ-1278T Turbo gives you *fast* 2400 baud packet -- *twice* the baud rate of any competitive multi-mode. By communicating faster you'll reduce chances for error, lessen congestion and more efficiently utilize our ham frequencies. You'll also get 1200/300 baud for compatibility with older TNCs.

2400 modem available separately, MFJ-2400, \$69.95. **New!** G3RUH compatible 9600 Baud modem, MFJ-9600, \$109.95.

quick "OK" command selects the mode!

One FREE Upgrade!

When you buy your MFJ-1278 *today*, you don't have to miss new modes and features that come out *tommorow*. **Why?** Because your 1278 comes with a coupon good for one *free* eeprom upgrade exchange that'll add new features.

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MFJ-1289 MultiCom™ . . . exciting MFJ-1278 software

High resolution AP news photo received on 20.738 MHz using MFJ MultiCom and MFJ-1278 with multi-gray modem.



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Multi-Gray WeFAX weather map received on 16.410 MHz using MFJ MultiCom and MFJ-1278 with multi-gray modem.



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"HOW TO" FOR THE NEWCOMER TO AMATEUR RADIO

Potpourri

Following is an assortment of items and equipment that should be of interest to amateur radio operators. More information on the items may be obtained from the individual suppliers.

Amateur Radio Software Programs

Jim Hammer, KO9T, has written a pair of amateur radio related software programs for use with IBM-compatible computers. He invites other people to copy this software for free distribution to amateurs and prospective amateurs.

One program helps students learn the International Morse Code. It can also be used to increase receiving proficiency. It lets you send code characters using a keyboard. Random characters can be selected for code receiving practice. Simulated FCC-style tests provide easy checks of your progress.

Jim's other program provides short- and long-path true headings, plus distances, when a DX callsign prefix is entered.

If you are interested in obtaining either (or both) of these programs, you should contact Jim Hammer, KO9T, 622 N. Illinois Street, Monticello, IN 47960. This is not a sales program; Jim simply wants to get help to people who need it.

Belt Buckles and Calendars

Henry Hornsby, N6MRG, has long been a source of good brass belt buckles that show callsign and/or name. Each callsign (only) buckle sells at \$15.99, which includes shipping and handling costs. A name can be added below the callsign for the extra fee of \$1.00. California residents must also pay the state tax.

Henry intends to publish a cartoon-type amateur radio calendar for 1993. He expects to sell it in the \$5.00 to \$6.00 range.

If you want additional information about these products, mail your request to Special Services, P.O. Box 125, Orland, CA 95963. His telephone number is 916-865-7318.

45527 Third Street East, Lancaster, CA 93535-1802



Brass belt buckles personalized with your callsign and/or name are available from Henry Hornsby, N6MRG. (See text for more information.)

Contest Calendar Card

Mike Kravitz, K2MK, has a postcard-size 1992 major contest calendar which is free to anyone who requests one. His address is 551 Norwood Road, Mt. Laurel, NJ 08054. Remember to include a self-addressed stamped envelope with any request for a card.

Fill-In-The-Blanks QSL Cards

New amateurs usually delay purchasing QSL cards until they have upgraded, if they intend to change callsigns. However, they normally need a few cards to confirm their most important contacts. Brian Treadwell, WV4V, offers a solution to this problem. He sells fill-in-the-blanks QSL cards at 10¢ each. Any quantity of cards may be ordered. A pack of 100 cards costs \$8.00, which also pays shipping and handling charges.

These fill-in-the-blanks cards are not intended to compete with cards from a QSL printer; they simply provide a source of small quantities of cards at a reasonable price.

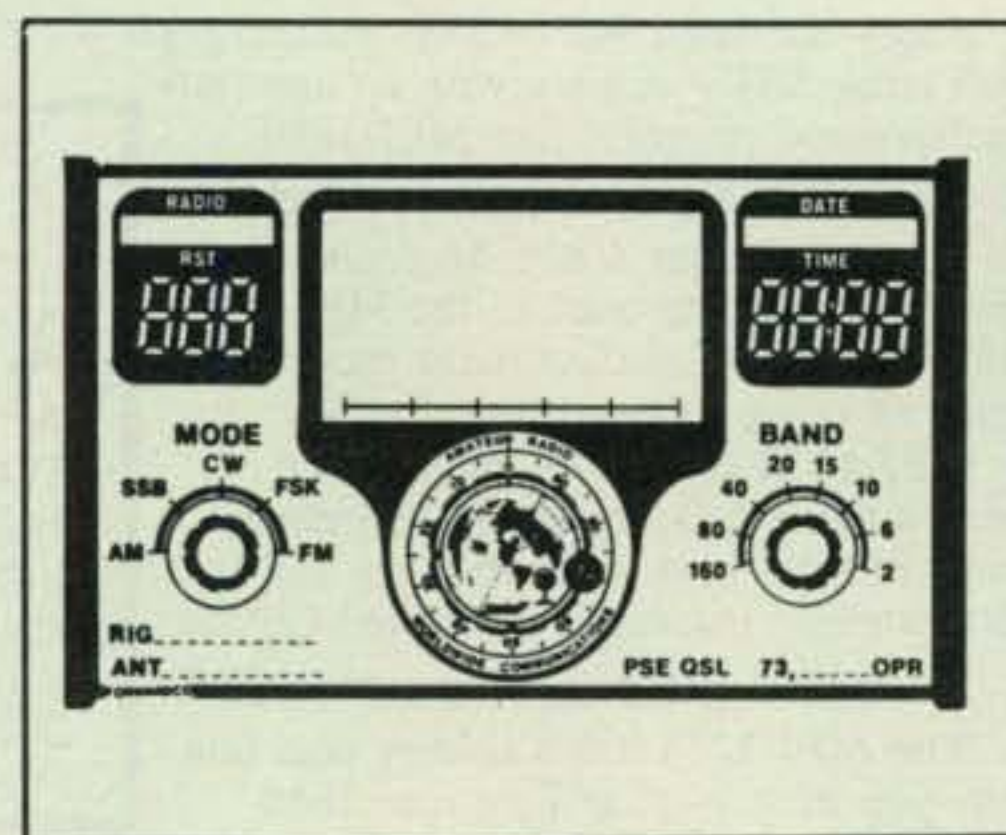
Cards can be ordered from DX QSL Associates, 434 Blair Road NW, Vienna, VA 22180.

KH6BZF Reports

Lee Wical, KH6BZF, publishes the "KH6BZF Reports," which are weekly



N6MRG plans to publish a cartoon-type amateur radio calendar for 1993.



These fill-in-the-blanks QSLs can be used as an interim card if you are planning on changing your callsign, etc. They are available from DX QSL Associates.



The Ameritron QSK-5 linear amplifier transmit-receive switch.

propagation bulletins. If you would like to receive details about these reports, address your requests to Lee using his *Callbook* listed address, or send your request to him at 45-601 Luluku Road, CRT 44-25, Kaneohe, Oahu, Hawaii 96744-1854. Include a business-size (#10) SASE or an SAE with sufficient postage/IRCs.

Model	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	Totals
Viking I	156	547	1436	1244															3,383
Viking II				1900	4156	2100	997	500	218	72	71	56	48						10,118
Mobile					817	228	250	192	127	78	52	73	20						1,837
Ranger						2800	2301	1070	1035	876	671	552	748	750	372	156	98	52	11,481
Adventurer						935	1969	1042	647	550	281	278	212	164	51	13			6,142
Desk Kilowatt							258	92	52										402
Pacemaker								501	404	217	114								1,236
Valiant								1175	1518	206	1259	1003	816	634	292	165	75	35	7,178
6N2									587	285	189	241	262	305	154	82	37	18	2,160
Five Hundred									452	134	126	78	43	24	5	3			865
Navigator									356	214	130	67	73						840
Courier									39	185	108	94	39						465
Challenger										653	1085	554	437	458	355	154	86	54	3,836
Thunderbolt										346	237	103	90	48	60	13			897
6N2 Thunderbolt											64	45	51	44	52	29			285
10 M Messenger												166	123	119	85	44	32	16	585
Invader												215	363	221	88	36			923
Invader 2000												79	175	78	34	20			386
Totals	156	547	1436	3144	4973	6063	5775	4572	5435	3816	4387	3604	3500	2845	1548	715	328	175	53,019

Bill Marvin, KB9IV, provided the above E. F. Johnson Company amateur radio equipment production figures for the years 1949 through 1966. Note that their peak production occurred from 1953 through 1961.



The Ameritron in-rush current protector.



The MFJ-1730 2 meter Roll-Up "J" antenna.

MFJ and Ameritron New Products

MFJ and Ameritron have released an interesting group of items. The following paragraphs provide brief introductions to a few of these products. If you want additional information, you may request it from the manufacturer. The address of Ameritron is 921 Louisville Road, Starkville, MS 39759. The MFJ Enterprises address is P.O. Box 494, Mississippi State, MS 39762.

The Ameritron QSK-5 T/R switch is for linear amplifiers. It adds full break-in operation to an amplifier. This enables operation of full break-in AMTOR, A1A Code, packet, and all other modes that require high-speed transmit/receive switching of an RF linear amplifier. It is silent and it operates about six times faster than a mechanical vacuum relay. This unit plugs in; no internal wiring is involved. The QSK-5 is rated at 2500 watts PEP, and 2000 watts in normal service with an SWR below 1.5:1. When operating continuous-duty modes (FM, RTTY, SSTV), it handles 750 watts. An optional cooling fan is available to amateurs who want to use sustained operation at 1500 watts in any mode.

The Ameritron IC-120 and IC-240 provide in-rush current protection for linear amplifiers powered from 120 and 240 VAC lines, respectively. This protects the power-supply components and vacuum tubes against damage. The unit is inserted between the AC power source and the linear amplifier's power supply.

The MFJ-346 Frequency Counter has a ten-digit LCD readout of frequencies up to 600 megaHertz. The display can even be

read in direct sunlight. The accuracy of this counter is one part per million.

The MFJ-1730 is a pocket-sized roll-up "J" 2 meter half-wave antenna. It includes a BNC connector.

Radio Shack WP-2 Word Processor

Phil Isenberg, KB4CPB, encountered a problem wherein his WP-2 word processor did not "talk" to his TNC. The problem was determined to be an RS-232 level that was too low. He added a battery-powered RS-232 amplifier, which corrected the problem.

Phil recommends the WP-2 word processor to amateurs who want to use packet radio. It has a built-in terminal program, and it runs about 20 hours on a set of batteries. Its LCD screen displays 80 columns by 8 lines, and the WP-2 weighs just 3 pounds.

Used Equipment

By the mid-1970s Barker and Williamson, Gonset, Hallicrafters, Hammarlund, Harvey-Wells, Johnson, National, Stancor, and several other manufacturers stopped building amateur radio equipment. Atlas, Collins, Dentron, Drake, and Swan stopped manufacturing amateur gear during the 1980s. Many other companies went in and out of the amateur radio business very quickly. Ten-Tec is the only American company building high-frequency gear.

If you have limited funds available for use in purchasing accessories and/or equipment, you should consider buying used gear. This approach can help you put



The MFJ-346 frequency counter.

a satisfactory station on the air at a reasonably low cost.

A good source for second-hand amateur radio accessories and equipment is the bulletin of a local club. Your fellow club members are not likely to stick you with a piece of junk when they know they are going to have to face you at club meetings!

The amateur radio national publications contain many advertisements each month. (Check CQ's advertisers for those companies which sell used gear.)

There are some amateurs who market used items, and they frequently run advertisements in CQ. If possible, respond to ads submitted by people who live near your home. In that way it is possible to check each item at the seller's home before you make a decision to buy it.

Tony Musero, K3UKW, is one of the peo-



Cornelius M. Booker, KC6RZW, is a captain in the U.S. Army in Fort Irwin, California, where many troops trained before they participated in the Desert Storm operation. He is active on the Novice bands and he intends to upgrade soon. Cornelius is also active in MARS. He plans to try packet and radioteletype.

ple who sell used gear. He classifies amateur radio equipment in the following five categories:

1. pre-1975
2. 1975-1982 (pre-World Amateur Radio Conference)
3. 1982-1986 (post-World Amateur Radio Conference)
4. 1986-1990
5. 1990-up (state-of-the-art)

If you want a copy of K3UKW's current used gear list, you can request it by writing to him at 1609 S. Iseminger Street, Philadelphia, PA 19148-1010. Enclose your #10 SASE, of course. If you have a question about a used item, you are wel-

come to call Tony at 215-271-8898. He is glad to help anyone.

DX QSL Manager Available

James E. Mackey has offered to serve as the QSL manager for any DXpedition or DX amateur. He makes this offer as a way to track changes in foreign airmail postage rates. Anyone who may be interested in taking advantage of his offer may request a copy of his QSL manager request form. His address is P.O. Box 270569, West Hartford, CT 06127-0569 (telephone 203-521-7254).

73, Bill, W6DDB

Printed Aids

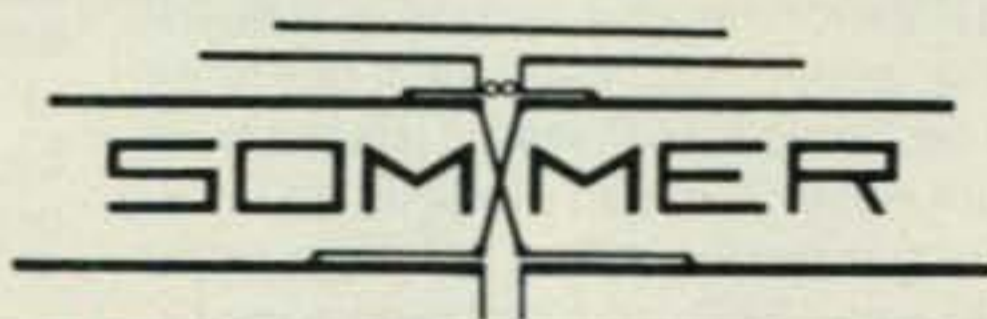
My previous columns contain information that is useful to new and aspiring amateurs. Many of these items have been reprinted for distribution to students of licensing courses I instruct. For ease of use, these printed aids have been separated into six categories. These categories are introduction, code, theory, station, operating, and miscellaneous. Outdated items are continually replaced with newer material. Fifteen dollars brings a complete set of current printed aids, including shipping costs. A list of these printed aids will be sent to anyone who requests it and sends a business-size SASE to my California address. Any single item is available at no charge to anyone who supplies an SASE. When a single item is being requested, it is advisable to supply a large (at least 9 by 12 inch) envelope and to include a couple of extra stamps (loose in your envelope) in case extra postage is required. Some items are long. Licensing-course instructors are welcome to revise and/or duplicate these items to suit their requirements.

Photographs Wanted

Photographs of new amateurs in their shacks provide introductions to a few of the newer licensees. Photograph size is unimportant, but good definition, contrast, and subject matter are important. Color pictures can be used, but black-and-white photographs are preferred. Operating activities and achievements, plus a self-introduction, are needed with each picture. Send an SASE if a picture must be returned. A free one-year CQ subscription (or renewal) is awarded to the one amateur whose picture I select as the winner for the month. If you are a subscriber, please enclose the mailing label (or copy) from your latest CQ issue. One award is made each month, no matter how many photographs are printed. DX amateurs, who frequently work the American Novice bands, are also urged to submit photographs.

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- HF log periodic arrays, broad-banded and DX/contest-worthy.
- Full range of 6 meter Yagis (the world's largest 6 meter amateur array - at AA6TT - uses eight DX Engineering 10 element Yagis).
- Heavy-duty phasing boxes for low-band vertical arrays and stacked Yagi systems, including the new Universal Phase Box for stacking and phasing tribanders and log periodic arrays.
- High-power remote coax switches.
- All DX Engineering products are optimized for DX and contest performance and built for the most demanding environments. Give us a call and we'll recommend a system to replace the Brand X antennas which came apart in your last blizzard.
- The DX Engineering staff are all active DXers and contesters. Day in, day out, we use the products we sell!

FRANK W. COOPER W3NV

October 15, 1991

Mr. Bill Sattler
 DX Engineering, Inc.
 618 Spaulding Ave.
 Brownsville, Oregon 97327

Dear Bill:

I thought you might like to hear about the results I have been having with your two super beams! As your records will show I have your 20 meter six element beam on the 58' boom and the 24 foot boom 11 element log periodic for 10,12,15 and 17 meters.

The performance has been nothing but spectacular. Words cannot describe the super results I have had with these two beams. I have heard and worked everything on the bands with only my exciter running 100 watts! Have no need for my linears even when the pile-ups for the ZA's and 3B7's were unbelievable the beams put me right through with the usual 5/9 plus reports!

I know location is important and most Florida spots are good but believe me the beams are doing a super job and it would be remiss not to write and tell you how pleased I am with my choice of antennas! Keep up the good work!

I might mention that I am quite surprised and pleased with the performance of the Log Periodic antenna. Never was too keen on that type of antenna but it sure does a super job and makes operating four bands just great. Your new 5 band log sounds great and I might have chosen that if it was available at the time of my purchases.

I am enclosing some better photos of the beams which I thought you might enjoy seeing. Thanks again for doing such a super engineering job on the antennas and it has made my dxing a real fun part of the hobby.

73 de W3NV
Frank
 Frank W. Cooper

fwc/c
 enc: photos
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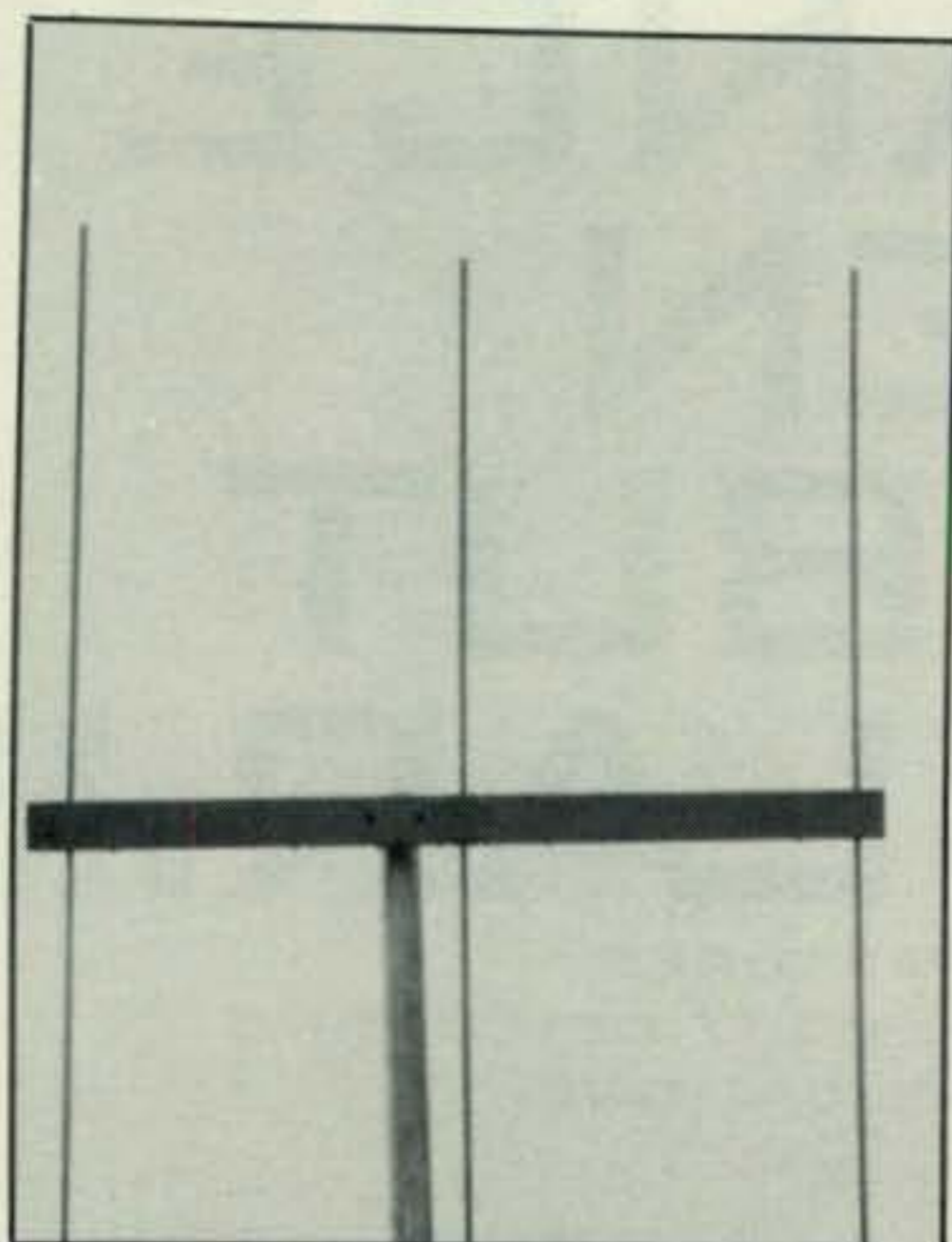
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FAX NOTE: our old fax number is out-of-order. If you sent us a fax and did not receive a reply, please resend the fax to our new number above. DXE apologizes for any inconvenience.

CQ SHOWCASE



Portable 3-Element Beam For 2 Meters From MFJ

The MFJ-1763 is a portable 3-element beam for 2 meters. Its 2 3/4 foot boom gives a calculated gain within 1 dB of a 4-element Yagi. The beam's threaded elements screw into the boom, and it can be mounted vertically for use on FM or horizontally for SSB. It can also be mounted

on the leg/side of a tower. It utilizes extra thick elements to maintain high gain and directivity plus low SWR over the 2 meter band. Elements and boom are made from strong, lightweight aluminum. A U-bolt for mounting is included. The MFJ-1763 is priced at \$39.95

For more information, contact any MFJ dealer, or MFJ Enterprises, Inc., P.O. Box 494, Mississippi State, MS 39762 (601-323-5869), or circle number 103 on the reader service card.



Amateur Radio Items From H&M Jewelry

H&M Jewelry, supplier of amateur radio jewelry and gifts, has announced a new line of amateur radio items which includes plaques, trophies, desksets, and combination alarm clock/flashlights, all with amateur radio insignia and organization or event personalization. Any

person or organization desiring further information or a current catalog should call Harold, KB2MB, at H&M Jewelry, 1-800-285-8587, or write to him at 26 Edgecomb Road, Binghamton, NY 13905 (or circle number 101 on the reader service card).



Optoelectronics R-10 Communications Test Receiver

The Model R-10 is used to test the modulation quality of mobile voice transmitters and to verify the accuracy of audio signaling tones such as DTMF and CTCSS. It features 30 to 1000 MHz carrier; 50 to 5000 Hz demodulation; search, lock-on modes; AFC lock and indicator; and built-in speaker, BNC out.

For lab use the R-10 is available as a benchtop model, 3.5"H x 7.3"W x 6.8"D, and is priced at \$359. A belt-worn instrument with integral ear-

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446MHz 11.9dB
5/8 wave x 8
Max Power: 200 watts
Length: 17' 8"
Connector:
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CA-2x4WX
Gain & Wave:
146MHz 6.5dB
5/8 wave x 2
446 MHz 9.0dB
5/8 wave x 5
Max Power: 200 watts
Length: 10' 2"
Connector:
UHF (SO-239)



CA-2x4FX
Gain & Wave:
146MHz 4.5dB
7/8 wave
446MHz 7.2dB
5/8 wave x 3
Max Power: 200 watts
Length: 5' 11"
Connector:
UHF (SO-239)

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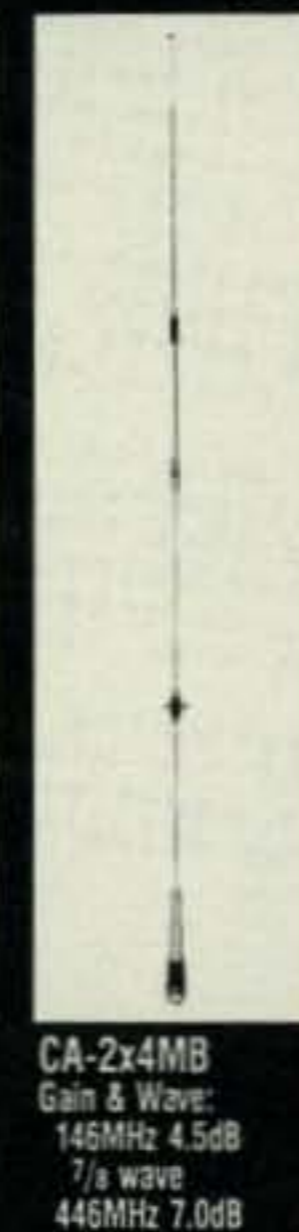


CPR-5800
Gain & Wave:
146MHz 5.0dB
7/8 wave
446MHz 7.6dB
5/8 wave x 3
Max Power: 120 watts
Length: 5'
Connector:
UHF (PL-259)



CPR-5400
Gain & Wave:
146MHz 3.5dB
1/2 wave
446MHz 6.0dB
5/8 wave x 2
Max Power: 120 watts
Length: 3' 2"
Connector:
UHF (PL-259)

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7/8 wave
446MHz 7.0dB
5/8 wave x 3
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Connector:
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CA-2x4SR
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5/8 wave
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NMO (B-20 NMO)



B-10
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146MHz 0dB
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plug will also be available. For more information, contact Optoelectronics Inc., 5821 NE 14th Ave., Ft. Lauderdale, FL 33334 (305-771-2050, FAX 305-771-2052), or circle number 104 on the reader service card.

support most diameters from 1/8 through 2 inches. All mounting hardware is supplied. For extra-sturdy installation a Support Bearing (TB-105) is optionally available.

Philips ECG is part of Philips Components Discrete Products Division, a North American Philips Company. To locate a Philips ECG distributor, call 1-800-526-9354, or for more information circle number 106 on the reader service card.

A & A Engineering ViewPort VGA

ViewPort VGA (part #189) is a Color SSTV system for the PC/clones. This interface, together with the KA2PYJ software supplied, enables a PC/clone to send and receive most of the popular SSTV formats. Program updates will add new

formats in the future. The software requires an interface between the transceiver and the computer parallel port, LPT1 or LPT2. The A & A interface connects to a standard 25-pin parallel port. A triple output power supply kit is included with every SSTV kit. Each kit or assembly includes a free copy of ViewPort VGA software.

Price for board level kits, both SSTV and power supply kits (no enclosure), is \$129.95 (#189-KIT). Price for full kit including enclosure is \$169.95 (#189-ENC). A fully assembled and tested unit (#189-ASY) is \$229.95. For more information, contact A & A Engineering, 2521 W. LaPalma #K, Anaheim, CA 92801 (714-952-2114; FAX 714-952-3280), or circle number 107 on the reader service card.

(continued on p. 151)



Amateur Radio Engineering's "The Silencer"

Amateur Radio Engineering has introduced an external speaker plus a 2- to 4-digit DTMF decoder for use with VHF/UHF radios. "The Silencer" (model ARE-10) is user-programmable for a 2- to 4-digit DTMF code which enables (opens) the speaker for approximately 10 seconds when the proper tone is received. When the correct user-programmable DTMF code is received, an LED lights on the ARE-10 to tell the user that a call has been received.

The compact-size AR-10 is priced at \$99.95 and is available from amateur radio dealers. For more information, contact Amateur Radio Engineering, P.O. Box 169, Redmond, WA 98073 (206-882-2837), or circle number 108 on the reader service card.



Philips ECG Antenna Rotator

The Philips ECG U-105 antenna rotator is designed to turn and accurately position even the largest TV/FM antenna array, maker says. Featured by the drive unit are a durable, one-piece, cast-aluminum housing; large bearing surfaces; reinforced mast support for lateral loads; and a ball bearing for thrust load. A water-tight seal and fully lubricated drive train further equip the unit for operation in high winds and harsh weather conditions. Rotation of the drive unit is synchronized with the position of the moving dot of the automatic control unit.

Three-conductor cable is used for the control-to-drive unit connections. The rotator accepts



Kantronics KPC-2

Packet Made Simple

The Kantronics KPC-2 provides up-to-date basic packet capability and a lot more. Designed to be upgraded through its field replaceable EPROM, the KPC-2 keeps you compatible with existing standards including terminal, HOST, KISS, WEFAX and TCP-IP modes and current with the latest advances in communications technology including Kantronics Personal Packet Mailbox.

When used with Kantronics' Hostmaster II software, the KPC-2 allows you to operate split-screen VHF or UHF packet with monitored, connected and transmit buffer windows.

The Kantronics KPC-2, easy to use and fully featured, is packet made simple.

Kantronics 1202 E. 23rd St., Lawrence, KS 66046
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WHAT'S NEW AND HOW TO USE IT

I'd like to take this opportunity to welcome Irwin Math, WA2NDM, back to the pages of CQ. For many years Irwin has enjoyed an innovative career at the leading edge of technology. One of his varied interests has always been practical uses for new semiconductor devices, and so the idea for his column was born. We are pleased to see it return to these pages. —K2EEK

After an absence of more time than I would like to remember, I'm very pleased to be back in the CQ family once again.

Those of you who faithfully read "Math's Notes" in the past will remember that I was, and still am, a firm believer in "homebrewing" and experimentation. After all, the contribution to communications technology by amateur radio operators in the 20th century is probably unparalleled by the contributions of any other non-professional group to any other technology in the same time frame, and there is no good reason why it should not continue.

The new "Math's Notes" will continue to provide various tips and techniques for the experimenter as in the past. It will also try to acquaint the homebrewer with the availability of the wide variety of semiconductor devices that are suitable for amateur radio applications. We are, don't forget, in the '90s, and the amount of complex (and subtle) technology that is accessible to the experimenter is greater than it has ever been before.

As an example, consider the power supply—particularly in the case of battery-powered applications. We all are familiar with the 7800 series of voltage regulators and their application as shown in fig. 1. These devices have been around for years, are simple to employ, and provide most of the more common voltages needed. They do have a drawback, however, and that is the need for an unregulated input that is at least 2 to 3 volts higher than the regulated output needed. This means that you cannot power 5 volt logic from a 6 volt battery using these regulators. It also means that for high-current applications the power dissipated by the regulator can be almost as much as the load. A 1 amp 5 volt supply using a 7805 will provide 5 watts to the load ($5V \times 1A$), but will also dissipate as much as 3 watts ($3V \times 1A$) in the regula-

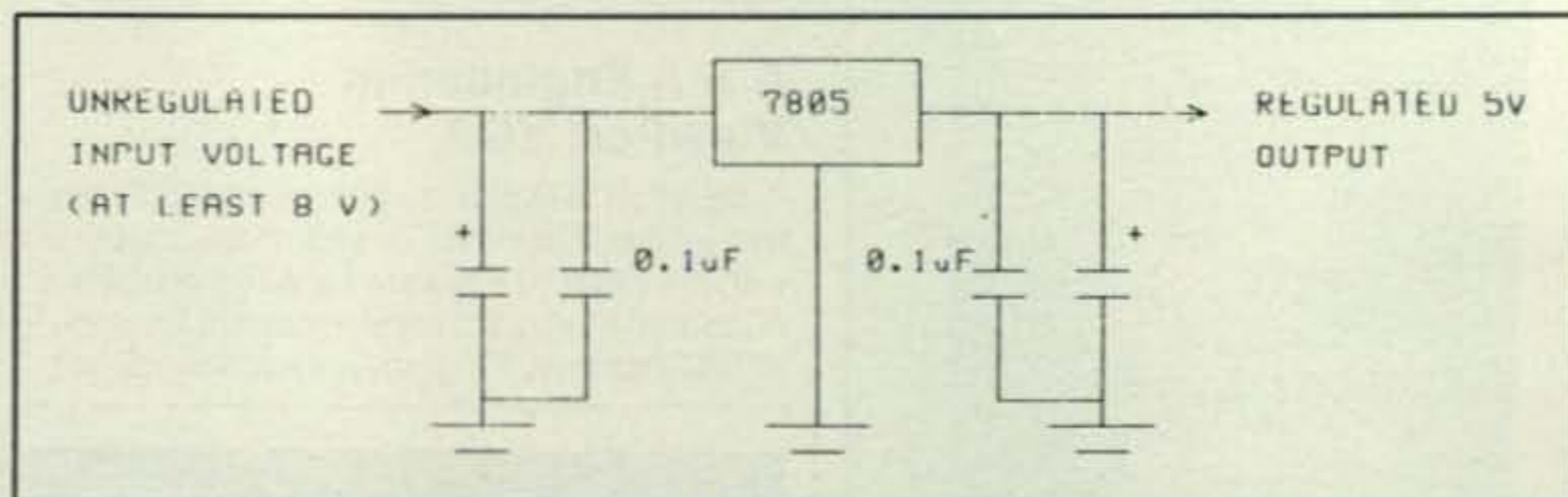


Fig. 1- The 7800 based regulator circuit (5 volt).

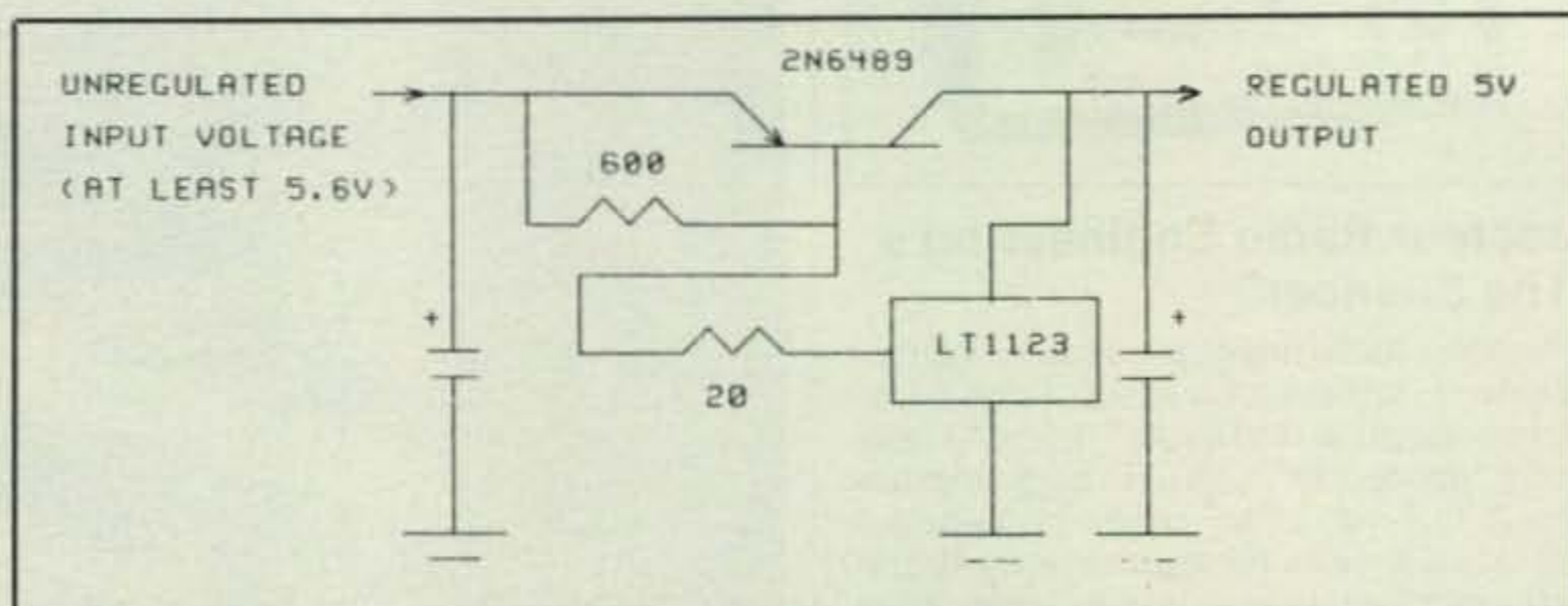


Fig. 2- The LT1123 based regulator circuit (5 volt).

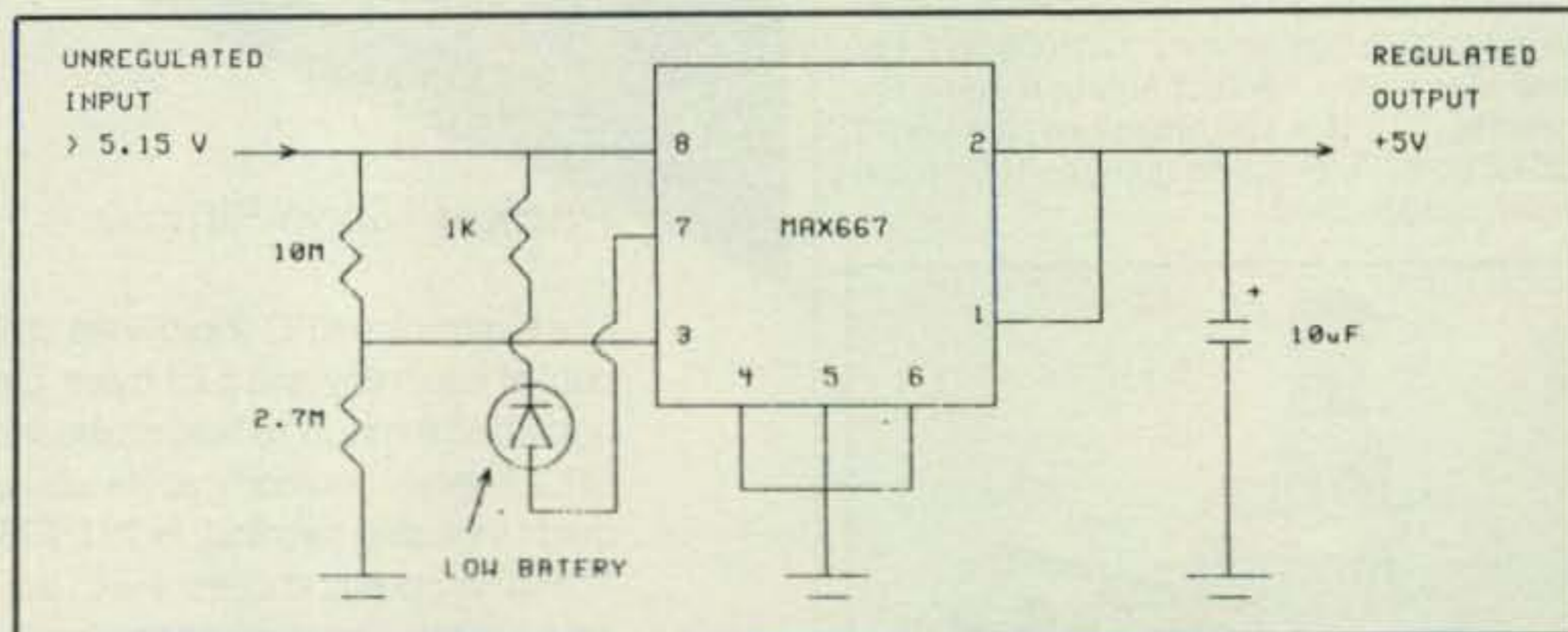


Fig. 3- The MAX667 low input/output differential 5 volt regulator. All components except for the output capacitor may be omitted for simplicity if desired.

tor! Truly wasteful, especially with batteries!

Now consider the circuit shown in fig. 2. True, it is slightly more complex than the 7800 circuit, but the unregulated input voltage required for a 1 amp 5 volt supply is only 5.6 volts. A 6 volt battery here is just fine. Furthermore, the dissipation of the entire regulator is only 0.6 watts ($0.6V \times 1A$). The LT1123, manufactured by Linear Technology Corp. in Milpitas California, also provides current limiting as well as ther-

mal overload protection. The PNP transistor should be one optimized for low dropout applications, such as the 2N6489 or equivalent. Motorola has designed a special device, their MJE1123, which is made expressly for use with the LT1123. Best of all, cost of the LT1123 and the MJE1123 is only a few dollars. The savings in batteries alone, for portable and emergency equipment, will easily offset the small additional cost of this regulator.

In applications where high currents are

not required, there are even more enticing devices available. The MAX667, manufactured by Maxim Integrated Products of Sunnyvale California, for example, has an input-to-output differential of only 0.15 volts at 200 milliamperes. This means even longer life for battery-operated devices. In addition, the MAX667 has an on-chip battery-condition monitor that can be used to indicate a low battery. Fig. 3 is the schematic of the regulator. The 2.7 and 10 megohm resistor set the trigger point of the internal battery comparator, and the 1K resistor limits the current through the indicator LED to approximately 5 milliamperes or so.

Other features not shown in fig. 3 include a shut-down input, pin 5, which turns off the regulator when it is driven at a level greater than 0.3 volts; a current limiting input, pin 2, which can be used to control the maximum current the MAX667 will allow to pass; and a set input, pin 6, which allows the device to produce regulated outputs anywhere in the range of 1.3 to 16 volts.

In the months to come I will try to follow this type of format and cover as wide a range of applications as possible. I would, as always, love to hear from you and will try to orient future columns toward specific chips or components in which you might have an interest, so please do not hesitate to write to me c/o CQ magazine.

Again, I am very happy to be back!

73, Irwin, WA2NDM

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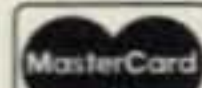
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The Next Frontier Is Here

June Packet Events

K4ABT will be presenting a Packet Forum on Saturday, June 6 from 10 AM to 12 noon at the Knoxville Hamfest & Computer Fair to be held at The Jacobs Building, Tennessee Valley Fairgrounds. In addition to the presentation and discussion, K4ABT will be handing out free general-information and introduction to packet radio handbooks. For more information about either the forum or the hamfest's other activities, contact Hamfest Chairman Ron Russell, KA4AZQ, 2919 Denson Ave., Knoxville, TN 37921.

Also, The SouthNet Packet Conference and Hamfest will be held in Albany, Georgia on June 19-20. More info on this one next month.

I'm home and relaxing after the trip to the Jackson, Mississippi hamfest. No question about it, the Jackson hamfest was a success. The hamfest committee had their act together because both Saturday and Sunday seemed to run without a hitch, except for a brief moment when I was almost evicted for not wearing (or having) an exhibitor badge. That problem was soon resolved, and I was permitted to stay.

I was the guest of the Jackson, Mississippi Packeteers and Jim Porter, W5HTV, who is the administrator of many of the ROSE switches in Mississippi. I was there to conduct the packet forum and SYSOP seminar. For a packet forum that was not highly publicized, I was impressed by the crowd that gathered for the Saturday morning session.

Evidence that a packet session is or has been a good one is shown when those in attendance continue to stay beyond the termination of the session, and while doing so they eagerly ask questions. It gives me pleasure in knowing that interest in packet is increasing, and it is a built-in "poll" of what topics are on the minds of packeteers and which issues need to be addressed in upcoming columns. In general, I get an overall feel for the information needs of the packeteer.

1584 Oxford Court, Gallatin, TN 37066

As the first session came to a close, I was notified that it was time to begin the afternoon session. What had happened? We were scheduled for a lunch break, and a few moments to make a quick tour of the main floor where the exhibits were. Somehow the morning session had overlapped into the afternoon SYSOP forum, and I had yet to leave the room. Without making any great to-do about it, I made a dash for the fountain for a soda, then back to the SYSOP packet forum and the afternoon session.

Good ole Jim Porter, W5HTV, had been looking out for me since I got off the plane at the Jackson, Mississippi airport, and he didn't stop there. When I entered the forum area, there was a burger and a soft drink on the table waiting for me. He made some gesture, and told me I could eat and conduct the SYSOP forum at the same time.

There is a limit to what can be said while devouring a chunk of Mississippi beef on a loaf of bread and consuming a much-needed liquid refreshment. However, as any *packeteer* knows, we do have the advantage when it comes to carrying on a QSO and having lunch, dinner, or a snack—sort of a "type and chew" at the same time scenario. So in a short order, I took a byte (sorry, corny as it was, I couldn't let that pun get away) and typed to the screen the answers to the onslaught of questions.

The afternoon session was as productive as the morning session had been. I later overheard two officials of the hamfest say there was a record crowd at this year's show.

The Next (9600 Baud) Frontier Is Here

The 9600 baud modems are being implemented in TNCs across the world. Thus far, its implementation has been demonstrated with great success. The most popular modem at present is the G3RUH 9600 baud modem.

Note: When building the 9600 baud ROSE switches or nodes, when used in the backbone configuration it may be necessary to use faster EPROMS and RAM. This application may call for EPROM with a speed of 150 ns. The RAM should be 100 ns.

Where's The Bauds?

The James Miller, G3RUH, design marketed by MFJ Enterprises, Inc. is the MFJ-9600. It is easily installed into the MFJ-1270B, MFJ-1274, and the MFJ-1278 Turbo Multi-Mode Controller. Likewise, PacComm manufacturers the NB96 to fit into the PacComm TNC line. The MFJ-9600 modem is compatible with the internal disconnect headers in the MFJ TNCs and other TNC2 clones.

Kantronics has put together a 9600 baud RF modem and transceiver combination. Aside from this combo from Kantronics, there's not much to try for except to join the hackers who are making do with the available choices that can be found in the commercial transceivers.

To make this effort work, we must modify the varactor DIRECT FM modulated stages for data input, and connect the receive AF output at the quadrature detector outputs.

Some transceiver manufacturers are planning in the near future to introduce radios that are configured and wired with the tie-points that I mentioned above brought out to an accessory connector. This kind of support is what we packeteers are looking for. These connections are for the varactor data (FSK) input and the quadrature detector outputs (before the diodes, please). This is something that will allow the SYSOPs among us to make the needed connections without tearing the guts out of a good transceiver.

Several SYSOPs with whom I'm acquainted are using the MFJ version of the G3RUH modems in the MFJ-1270B TNCs, and attaching them to radios with wide receive and transmit bandpass characteristics. It is preferred that a transceiver to be used with 9600 baud have a 16.5 kHz bandpass, since this is the amount of spectrum that is occupied by the Direct Frequency-Shift Keyed (DFSK) transceiver.

The MFJ-9600 modem design is licensed from James Miller, G3RUH, and is in use worldwide. This modem design gives the packeteer a means of creating a flexible transmit wave-form filter design that can compensate for audio differences in some of the transceivers that we will discuss in this month's column.

One important feature that stands out in the G3RUH modem and that is incorpo-

rated into these TNCs is the digital generation of the transmit audio wave-form. The precise shaping limits of the signal bandwidth can be made to tidy up the amplitude and phase response in the receiver dedicated circuits. The result is a compatible filter system within the data detection circuits for optimum data recovery and minimum errors.

We Have Arrived

We have one of two ways to go with packet radio. Either we make our bands more diverse by adding more spectrum (and we know that will *not* happen), or we get off our duffs now and increase the amount of data that can be transferred in a given time period.

My statement has a simple solution: Let's increase the baud rates.

With the files that are being exchanged by packeteers across the country, and the spectrum load that has occurred, the need for a common-sense approach to data handling has arrived.

We are passing everything from 256 color, high-resolution pictures and video to digitized voice that is sampled up to 22,000 times per second. Digital audio requires a large amount of storage space, but even more demanding is the requirement for transmission speed.

Soon we will have the capability to pass both digital audio and digital video at the same time. It does not take a prophet to predict that we will need the increased speed capability so we can take part in the transmission and reception of these powerful mediums.

Twelve-hundred bauds was good, but there *is* a limit to the number of calls and QSO that can take place on one frequency. Twelve-hundred bauds and 2400 bps have long since been outgrown. The same frequency that is now carrying five QSOs (ten target stations) operating at 1200 bauds can carry eight or ten times that many QSOs at 9600 bauds.

Have I Convinced You Yet?

Alright, here's more. There was a time when Bob Slomka, WD4MNT, and I would use MULTICOM.EXE to pass binary files at 1200 bauds on 145.61 MHz in central Georgia. Many times these files would be over half a million bytes in length. The time to pass that size file was counted in hours. With 9600 bauds we can now pass the same half megabyte of data in less than 15 minutes.

If you plan to implement the MFJ-9600 modem in your TNC/radio combination, it would be advisable to first determine if the transceiver that you hope to use has TRUE or DIRECT FM, and *not* PHASE modulation

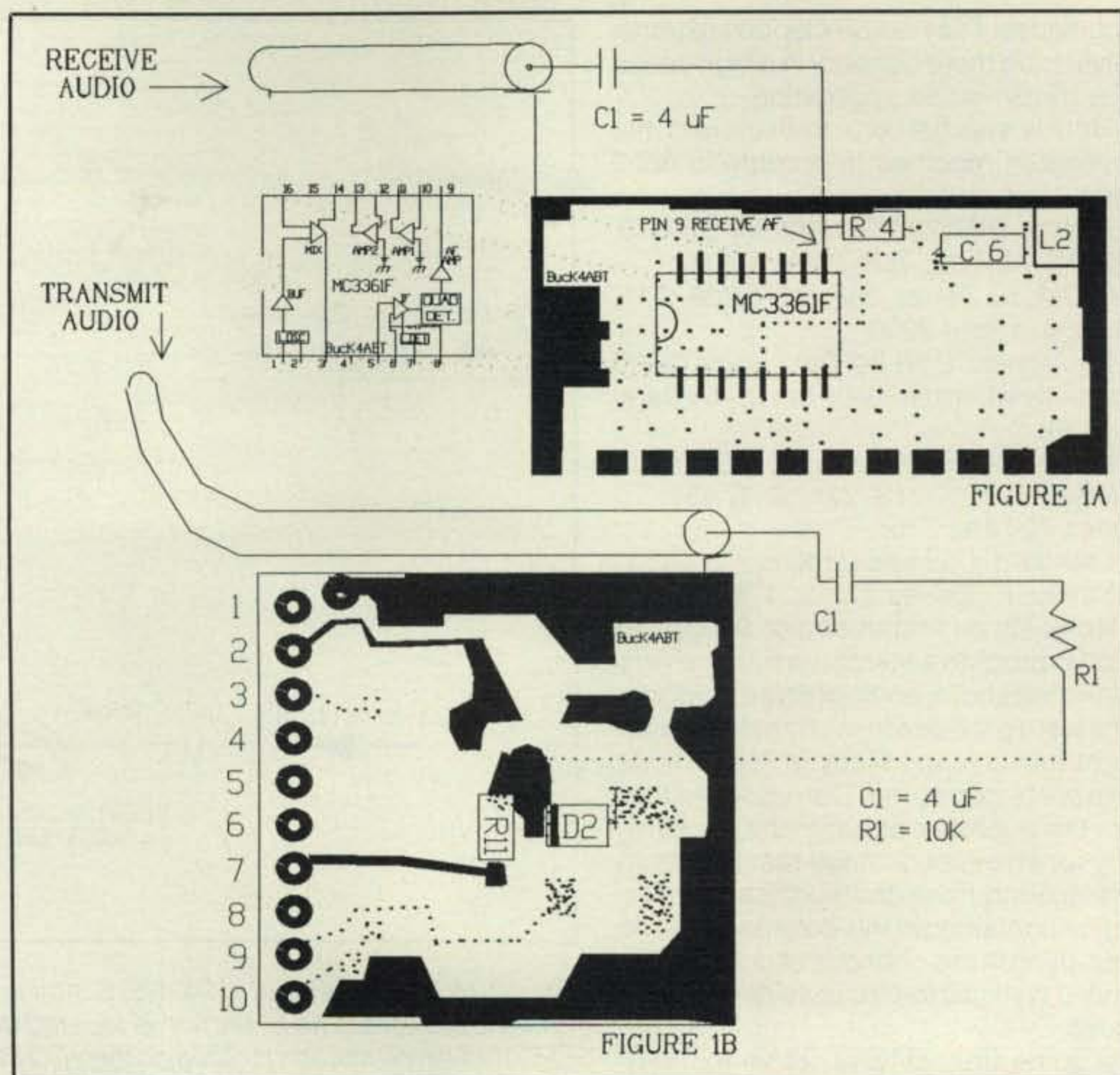


Fig. 1(A) & (B)- Fig. 1(A) is the receive IF PC board of the Alinco DR-110. Note: Receive AF is extracted at pin 9 of the MC3361F. Fig. 1(B) shows the solder side of the VCO PC board. Transmit audio is injected at the junction of resistor R11 and varactor diode D2.

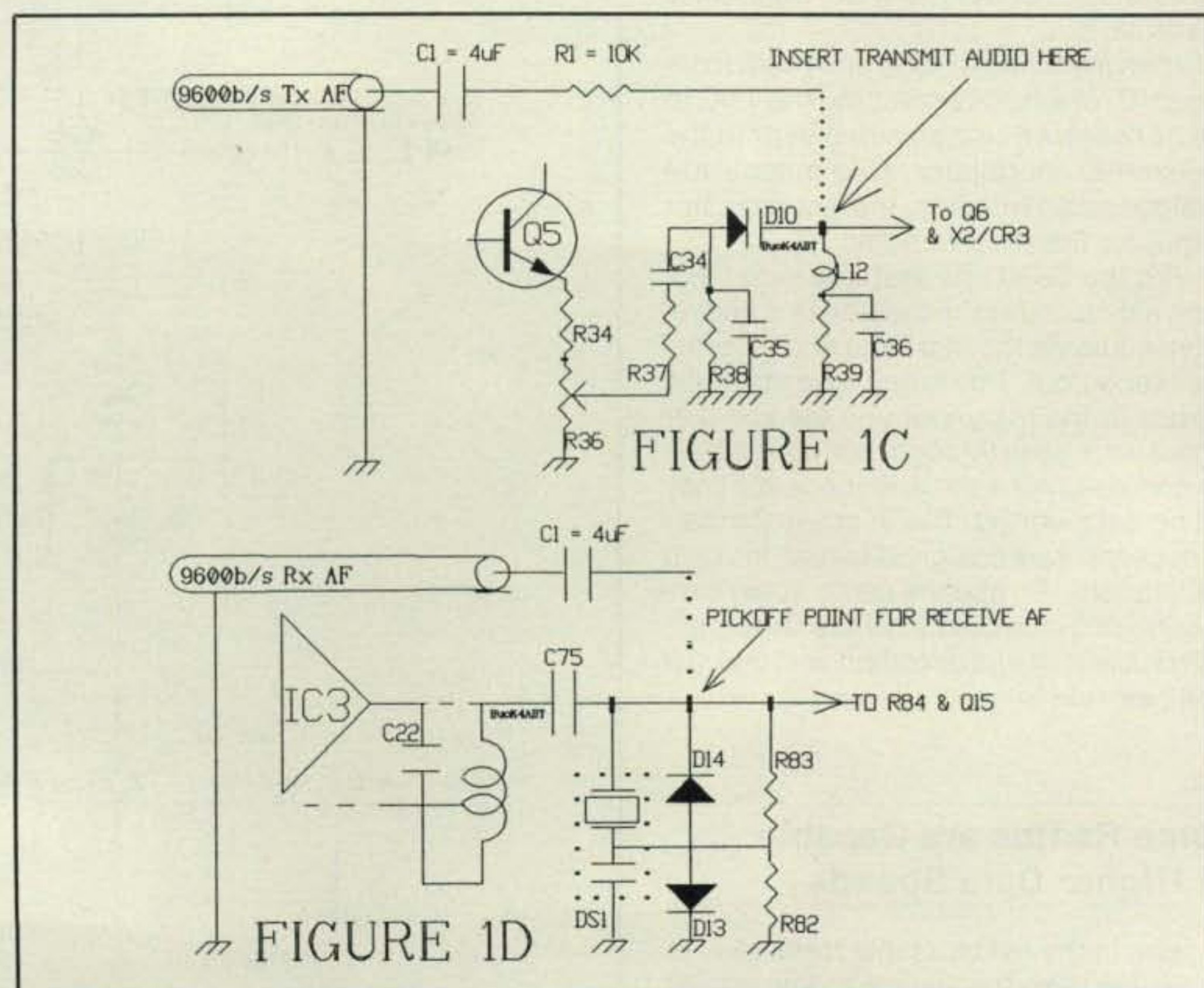


Fig. 1(C) & (D)- The 9600 baud connections for the ICOM IC-25A. Fig. 1(C) is the 9600 baud input. Fig. 1(D) identifies the receive audio pickup point. Both circuits are located on the "Main" PC board. User-supplied C1 is of nonpolarized type. See text for values.

techniques. The PHASE modulated transceivers are more contrary in a high-speed data transmission application.

Here is a partial list of transceivers that have been modified to operate at 9600 bauds.

Alinco: DR-1200 DataRadio, DR-110, DR-112, ALR-22, ALR-72, ALR-709.

ICOM: IC Series 28A, 38A, 228, 271, 290H, 471, and 3200.

Kantronics: DVR 2-2 Data Radio (9600 bps ready when used with the DE-56 Data-Engine).

Kenwood: TR Series 751A, 7500, 7700; TM Series 211, 212, 221, 231, 431; TS Series 700 and 770.

Standard: C58 and C140.

Yaesu: FT Series 212, 221, 230.

Note: Although I have made 9600 baud modifications to a few of the transceivers mentioned above, some of these modifications were provided to me by helpful readers of this column. Many of these mods were *not* tested by me. Therefore, neither I nor the publisher assume any responsibility for errors or damage resulting from the use of interface and modification information contained in this column. Persons attempting these changes should also be familiar with micro-circuit soldering techniques.

In some transceivers we've found IF pass-band limiting caused by the 455 kHz ceramic IF filter. An R/C network may be needed to broaden or bypass this filter so the 9600 bps data can reach the discriminator. An alternative would be to exchange the filter(s) for one with a wider band-pass characteristic.

When installing a 9600 bps modem into a TNC, or when connecting the TNC to the transmitter modulator, use *shielded* wire to the transmitter modulator. Use a separate shielded audio wire from the discriminator output for the receive audio.

With the 9600 bps systems we've not been able to interface the transmit and receive audio via the mic input and external speaker output. This is because the audio signals at the mic input and the speaker output have gone through both pre-emphasis and de-emphasis, and the audio may not be data worthy. The average 2 meter transceiver was designed for use in voice applications. To use the same audio connecting points would load the data path with phase shift and distortion, and that *just won't work!*

Some Radios are Capable Of Higher Data Speeds

As seen in the list of usable transceivers above, we have the vehicle to implement these data rates now. So what do we have to do to get a 9600 bps system into operation? We can start by obtaining the MFJ-9600 modem or the PacComm NB96. Ei-

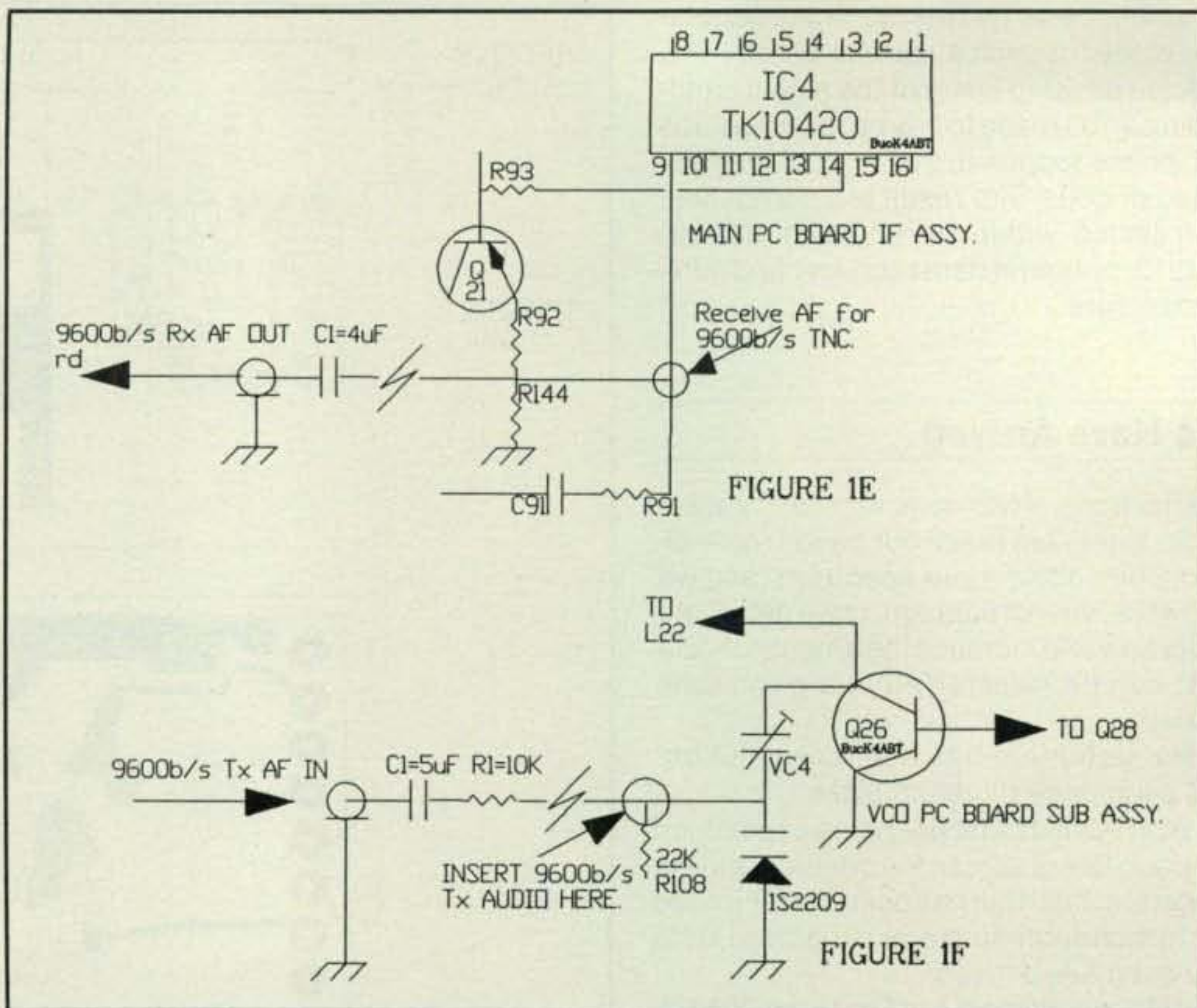


Fig. 1(E) & (F)– The circuit at fig. 1(E) is similar in both the Alinco ALR-22 and the ALR-72 receive sections. The IF portion is located on the "main" PC board. Fig. 1(F) is in the FM (modulator) section located on the VCO PCB. Circuitry may vary in some early units.

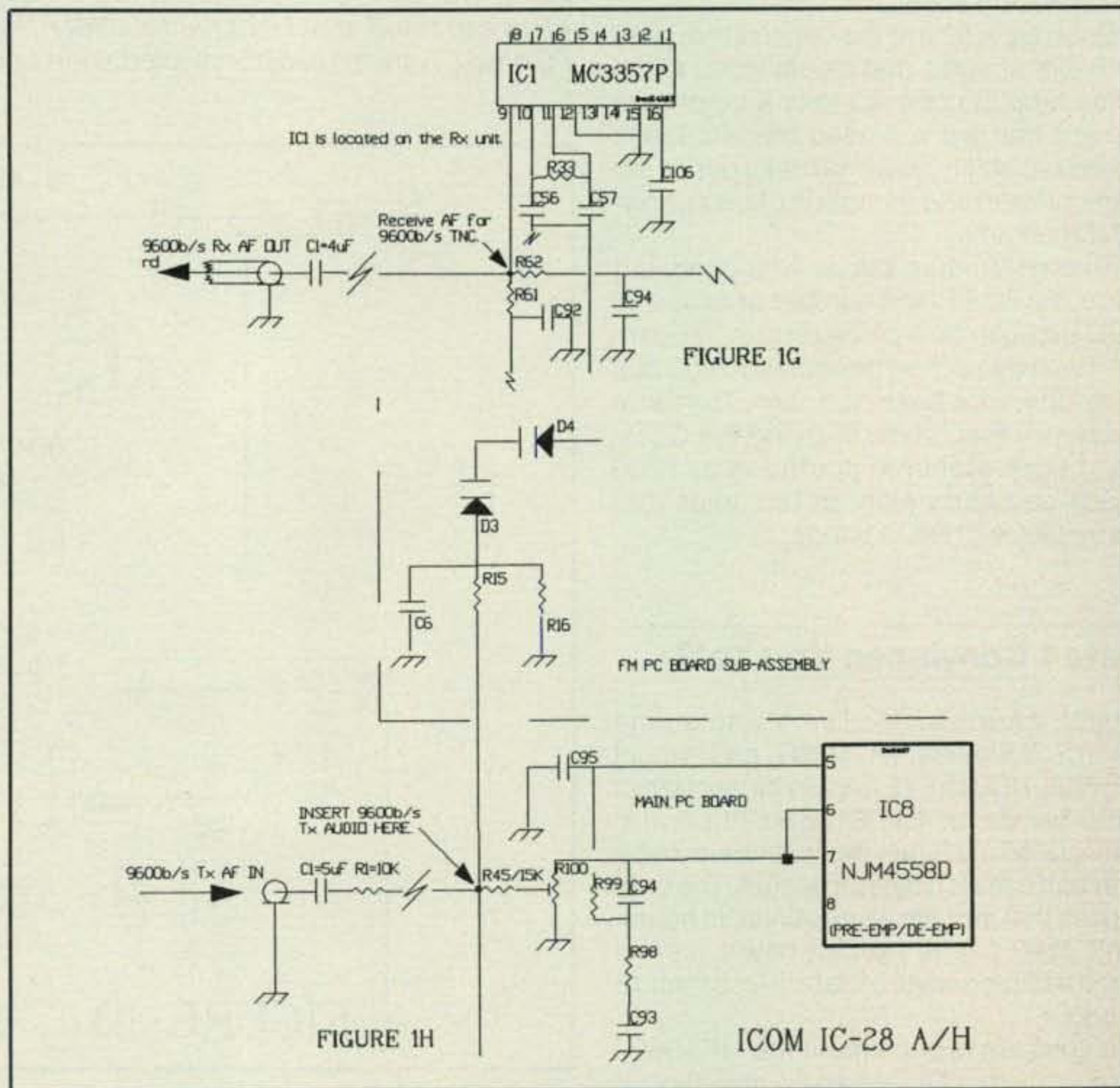
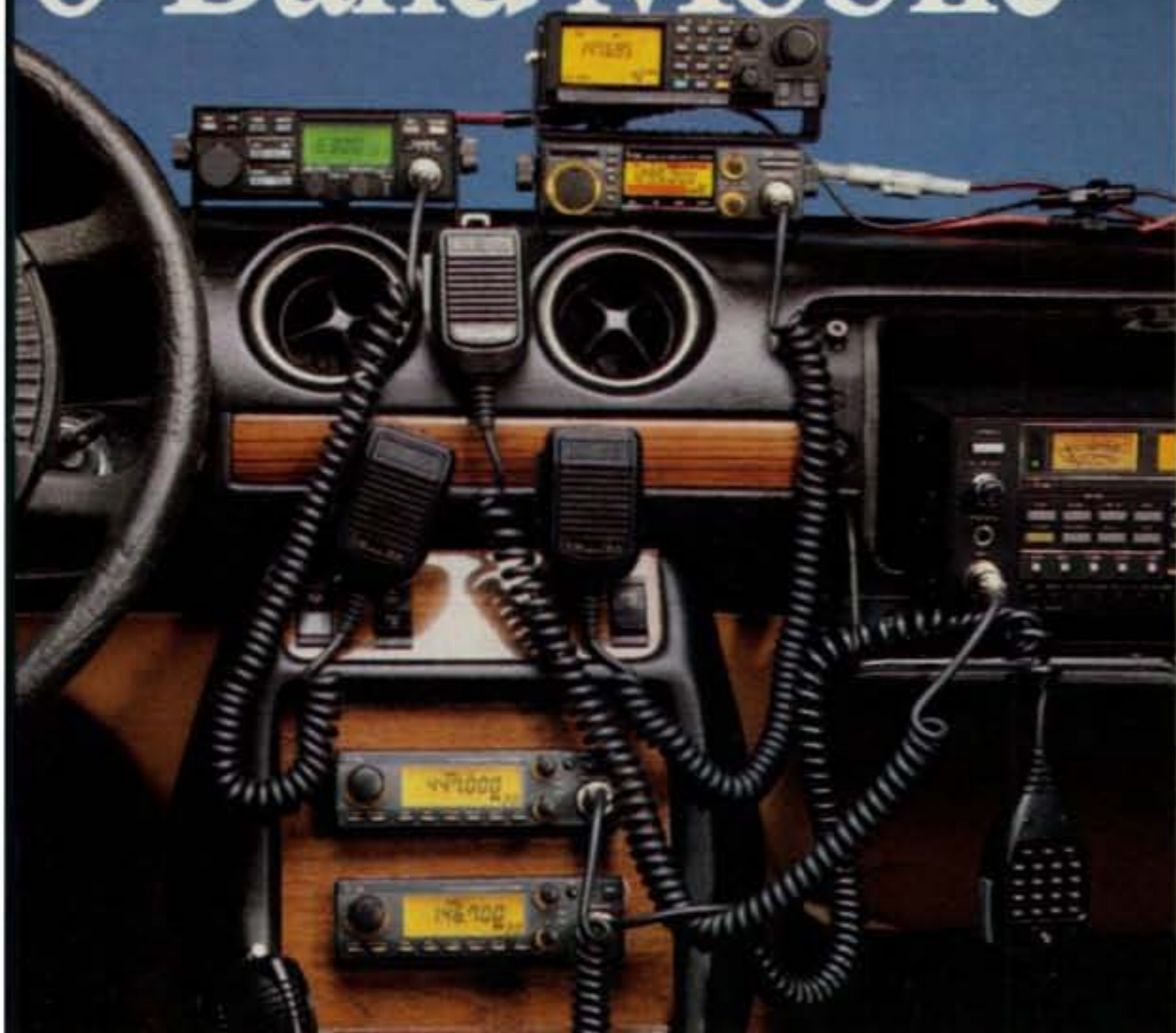


Fig. 1(G) & (H)– Fig. 1(G) illustrates the location to extract 9600 baud data. In Fig. 1(H) audio is injected at R45. Make certain the connection is made at the point shown and not to the wiper of R100.

Yesterday's 6-Band Mobile



Today's 6-Band Mobile



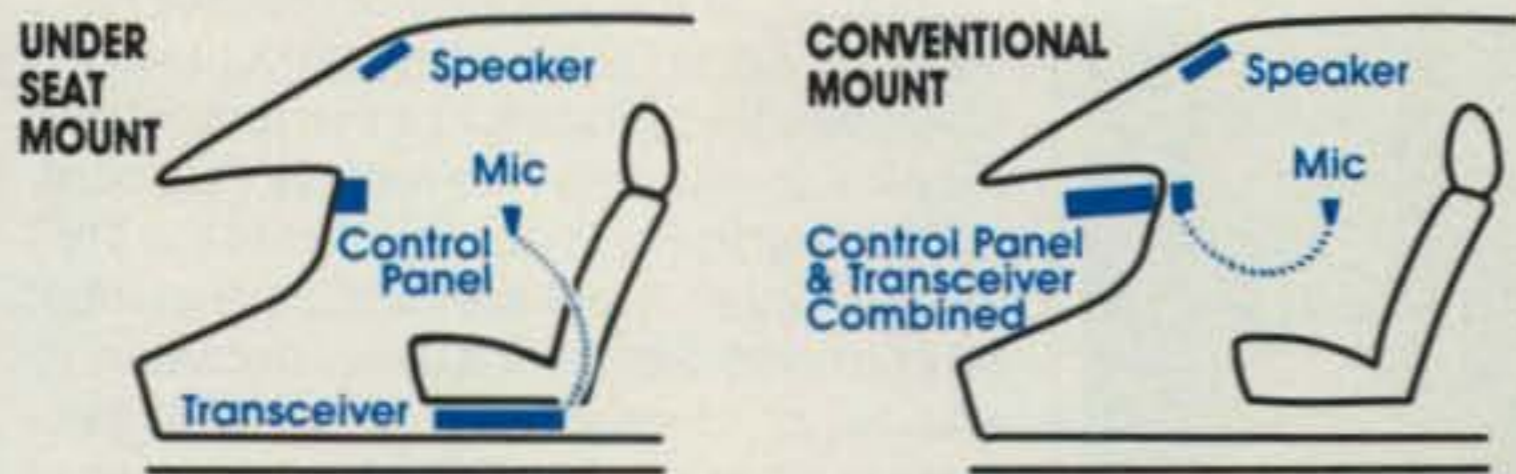
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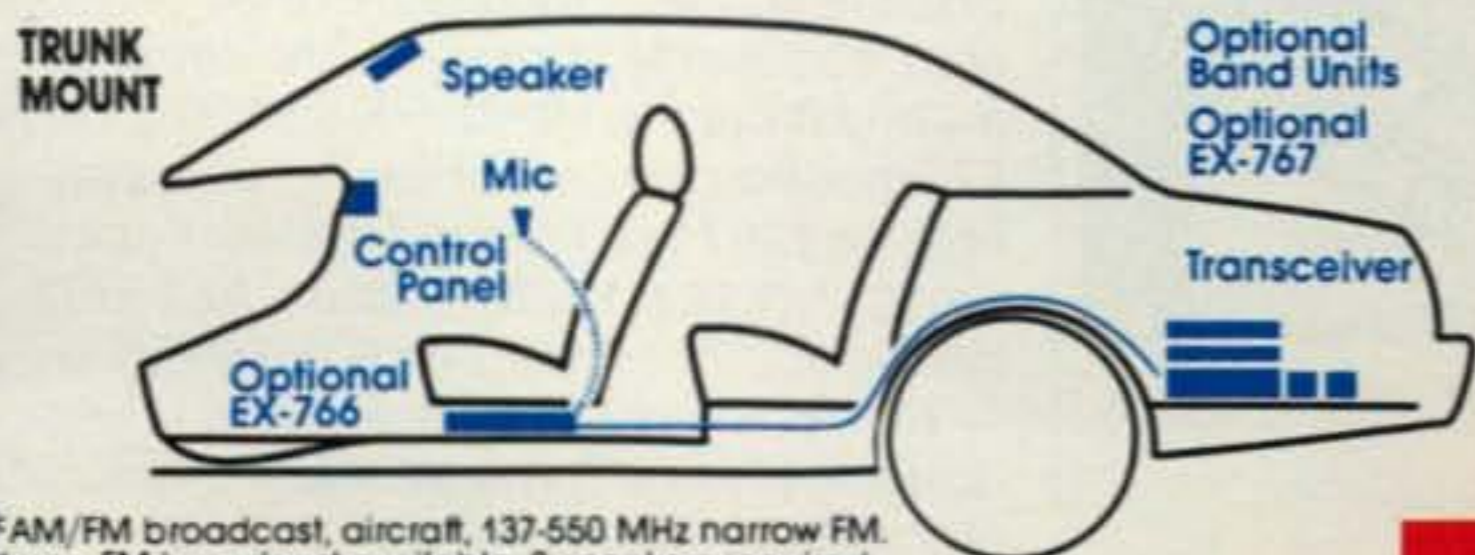
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ther of these 9600 baud modems will fit inside the MFJ-1270B, MFJ-1274, or PacComm TNC with the correct disconnect header. There is another 9600 baud modem called the K9NG modem, but the receiver passband requirements at present are very close. To use this modem a broad receive passband is needed.

Making The Mods

Remember the statement I made earlier: *Use shielded audio wire for the cables to and from the 9600 baud modem/TNC into the transceiver*—one for the transmit and another for the receive, and keep them as short as possible. Don't try to make it work

without the shielded cable. It won't!

Because many of you will be using the readily available transceivers for 2 meters and above, try to obtain one with "True FM." These are usually the transceivers that are crystal-controlled, synthesized, and use a varactor modulator. Some are off the shelf and ready to purchase, such as the Alinco DR-1200 and the Radio Shack HTX-202, etc.

We will be connecting our transmit audio from the 9600 baud TNC/modem to the FM-modulated stage of the transceiver. When making this transmit audio connection, it is necessary to use a decoupling capacitor and resistor in series with the audio line.

In the illustrations I've drawn some of the circuits that will help you locate the correct interface points. I've used an R/C network in the interface line of both the receive and transmit audio connections. The components in the R/C network are identified in the drawings simply as C1, C2, R1, and R2.

For clarification, the capacitor (C1) value is in the range of 4 to 8 μF and of the non-polarized type. Resistor (R1) value can range from 8200 ohms to 15K ohms. The role of the resistor is very important, as it serves to prevent extreme detuning of the varactor modulated stage.

If "padding" of the transmit audio is needed (unlikely), add C2 and R2 from the transmit audio line to ground (see figs. 1[A] through [H]).

Some Kenwood VHF and UHF transceivers are also being successfully used at 9600 bps.

TR-751 receive audio connections are made to pin 9 of the TA7761P, or IC2 on the receive unit PC board. Use the 4 μF capacitor and the shielded audio cable we discussed earlier.

Transmit audio is injected to the FM modulator at the junction of resistor R81, varactor diode D21, and crystal X1 (10.695 MHz). Modifications for both transmit and receive are made on the receive PC board.

Although default parameters in the TNC will work okay, there are a couple that *must* be changed. Set the **TXDelay** between 10 and 14, or to no more than 150 milliseconds maximum. The **FRack** can be set at 4 to 7 seconds, depending on channel congestion, seven being heavy traffic and 4 being clear, or little use.

For the PK-232 owner there is a modem disconnect header upgrade available from TAPR which enables the addition of the modems we've discussed. This header also allows the installation of the PSK modem for satellite operation. The same upgrade kit fits the Heath HK-232. The PK-232 modem disconnect header kit is available for \$20 from Tucson Amateur Packet Radio, P.O. Box 12925, Tucson, AZ 85732 (phone 602-749-9479, FAX 602-749-5636).

Thanks to the TAPR Packet Status Register and to Mike Curtis, WD6EHR, for supplying information.

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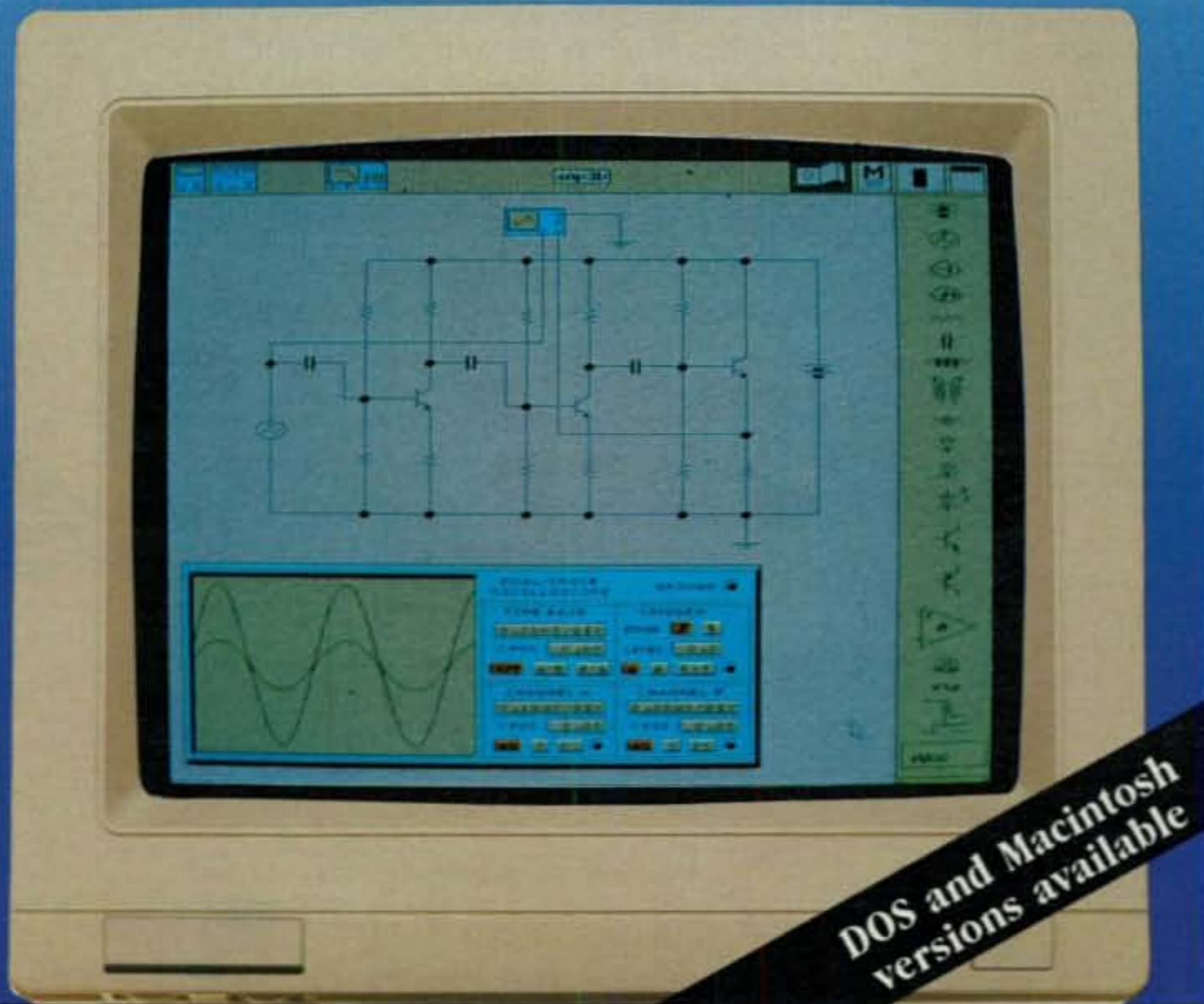
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REGULATORY HAPPENINGS FROM THE WORLD OF AMATEUR RADIO

Bringing The Novice Class Under The VEC System

The American Radio Relay League and the W5YI-VEC have each filed separate Petitions for Rulemaking with the Federal Communications Commission requesting that all future Novice class amateur radio license examinations be administered under the current volunteer examiner program. The W5YI-VEC and the American Radio Relay League VEC together account for approximately 80% of all operator license examinations administered in the VEC System.

The privatization of the amateur operator license examination function from the government to the VEC System has turned out to be a success story, of which the FCC and the amateur community can rightfully be proud. In 1991, according to FCC statistics, 103,251 applicants were served at 8118 test sessions, an increase of 62% over the previous year.

W5YI-VEC pointed out that "Newcomers have flocked to the service via the Technician class license, despite the fact that the examination setting is less formal than the Novice class setting and despite the fact that they may be charged a modest fee to defray the cost of the examination."

Background of Volunteer Exams

For 70 years the U.S. government prepared and administered amateur radio operator examinations with the Radio Act of 1912 providing the basis for the first tests. Since the early days of radio, amateur testing has been in a constant state of evolution and change.

Primarily due to budgetary constraints and personnel cutbacks, the government decided to remove itself from administration of most license examinations. At the time it was costing the U.S. taxpayer \$7.26 to have the FCC administer amateur radio operator tests above the Novice level. Entry-level Novice examinations already were handled by volunteer examiners holding at least a General class amateur operator license.

On September 13, 1982 Public Law 97-259—the "Communications Amendments Act of 1982"—authorized the pri-

vatization of all amateur examinations. The legislation enabled the Commission "... to accept the voluntary and uncompensated services of certain Amateur Radio Service licensees to prepare and administer examinations for applicants in the Amateur Radio Services."

The three primary reasons for the legislation were to make amateur radio examination opportunities more available, to improve the integrity of the examination process, and to clarify the legal status of the volunteer examination program for the Novice class license. While the Novice class had always been administered by volunteer examiners, the law previously prohibited the government from accepting unpaid labor. Now it would be legal.

The following year, 1983, the FCC created a program using volunteers to handle all examinations in the Amateur Radio Service above the Novice level. The approach would be to release all possible questions that might appear in the various amateur radio operator written examinations. A bank of test questions would be submitted from the amateur community, initially based on the current FCC study guides. Volunteer examiners would select a certain number of questions from each of the nine question pool topics.

The FCC specified that approximately ten times as many questions as would appear in any one examination would be developed and released to the public. Only the questions were circulated by the Commission, however. The FCC left it up to the volunteer examiner to verify that the applicant had supplied the correct answer. It was not until 1986 that all VECs agreed to use the same multiple-choice answers, which were also placed in the public domain.

Beginning of the VEC System

To get the new amateur examination program going, in early 1984 the FCC established two amateur managerial levels—one being a Volunteer Examiner Coordinator (VEC), the other a Volunteer Examiner (VE). The VEC would act as the administrative liaison (or coordinator) between the FCC's Gettysburg, Pennsylvania licensing facility and the VEs who would give the amateur tests.

Duties of Volunteer Examiner Coordina-

tors and Volunteer Examiners are as follows:

- Recruit Advanced and Extra class examiners;
- Provide them with necessary testing material;
- Inform VEs of testing program revisions;
- Screen, approve, and forward successful Form 610 applications for amateur radio operator licenses to the FCC;
- Resolve defects in applications;
- Maintain records of all examination sessions; and
- Assist in the development and/or revision of test pool questions.

Volunteer Examiners in the VEC System must have the following qualifications:

- Must be 18 years of age or older;
- Cannot administer amateur radio operator examinations to relatives;
- May not be commercially involved in the amateur radio business;
- Cannot accept compensation for examination services, but may be reimbursed for out-of-pocket expenses;
- Must be accredited by a VEC; and
- Must never have had their amateur radio station or operator's license revoked or suspended.

The VECs also must cooperate in maintaining one question pool for each written examination element—including the Element 2 Novice pool. This is handled by the VEC's internal Question Pool Committee (QPC), a three-person panel which periodically revises the various question pools. Your author, Fred Maia, is Vice-Chairman of this committee.

On September 22, 1983 the FCC implemented the new Volunteer Examiner Coordinator System. Accredited Advanced and Amateur Extra class level Volunteer Examiners would administer the written examinations. FCC rules permit only Extra class amateurs to administer code tests above the Novice level. VEC-accredited Advanced class amateurs could act as VEs for the Technician level only. 1984 was the last year that the government administered amateur radio operator license examinations of any type, and even then only on a quarterly basis.

The FCC began accepting applications for Volunteer Examiner Coordinators on a regional basis in early 1984. Tests above the Novice level would be administered by teams of three VEs who would forward the

*National Volunteer Examiner Coordinator,
P.O. Box 565101, Dallas, TX 75356-5101
(817-461-6443)*

results (along with appropriate application forms, amateur license photocopies, and attachments) to the VEC, who would screen them for completeness and authenticity. The W5YI-VEC was the first VEC to be accepted in all callsign regions.

Once Barry Goldwater, K7UGA, introduced and Congress passed enabling legislation, the Commission authorized a reimbursement program to help defray the cost of conducting the VEC System. The initial amateur test fee had a \$4.00 limit with a provision for increases based on inflation. The first volunteer amateur examinations with accompanying test fees began in September 1984. Once a provision for expense reimbursement was in place, the American Radio Relay League also applied to be the second national-in-scope VEC. The Novice examination program was not affected and continued to remain "free" of test fees.

The VEC program has been very successful— even more so than the FCC and amateur community had anticipated. It is estimated that there are some 30,000 accredited volunteer examiners who are organized into some 2000 testing teams. There are now countless opportunities for applicants to be administered amateur radio operator examinations at convenient times and locations. Most VEC System test sessions also provide an opportunity for newcomers to take Novice examinations without charge.

The Novice Exam Program

The FCC elected to leave the Novice testing program out of the VEC System, since it was already a proven entry-level testing program administered by volunteers. One General class or higher class amateur could still administer the Novice 25 question written and the 5 words-per-minute telegraphy test. This was increased to 30 questions administered by two examiners in 1987, when Novice privileges were enhanced. Many commenters at that time thought that the entire Novice program should have been brought within the VEC System.

At the time this was resisted by the ARRL, as it believed that such would create a burden on the VEC program. There was also a fear that bringing the Novice examining program into the VEC program would result in a decrease in the overall availability of examinations for Novices, then the only entry-level license class. The Commission decided to leave Novice class testing outside the VEC program.

The removal of the telegraphy requirement from the Technician class license has had a profound effect on the Novice class. There are now two entry points into amateur radio. Although there is still a significant interest in the Novice class license, most newcomers are electing to enter the Amateur Radio Service through

the code-free Technician license. The increased number of newcomers to amateur radio has been handled capably and apparently without significant strain by the VECs and their VE teams.

The ARRL, in their petition, agrees that the number of Novice examinations has decreased significantly, that the VEC System is capable of handling the additional Novice testing workload, and that Novice examinations will be sufficiently available from local VE teams.

"The reasons that the Commission advanced for leaving the Novice examination program out of the VEC program were, but are no longer, valid. . . . It is no longer the only entry class of license, and has been somewhat de-emphasized since the establishment of the codeless Technician Class license. The VEC program is a resounding success, and can apparently accommodate the increase in examinations without undue burden. Examination opportunities are widespread, as is evidenced by the large number of new Technician licensees added recently to the rolls," the League said.

Advantages of the VEC System

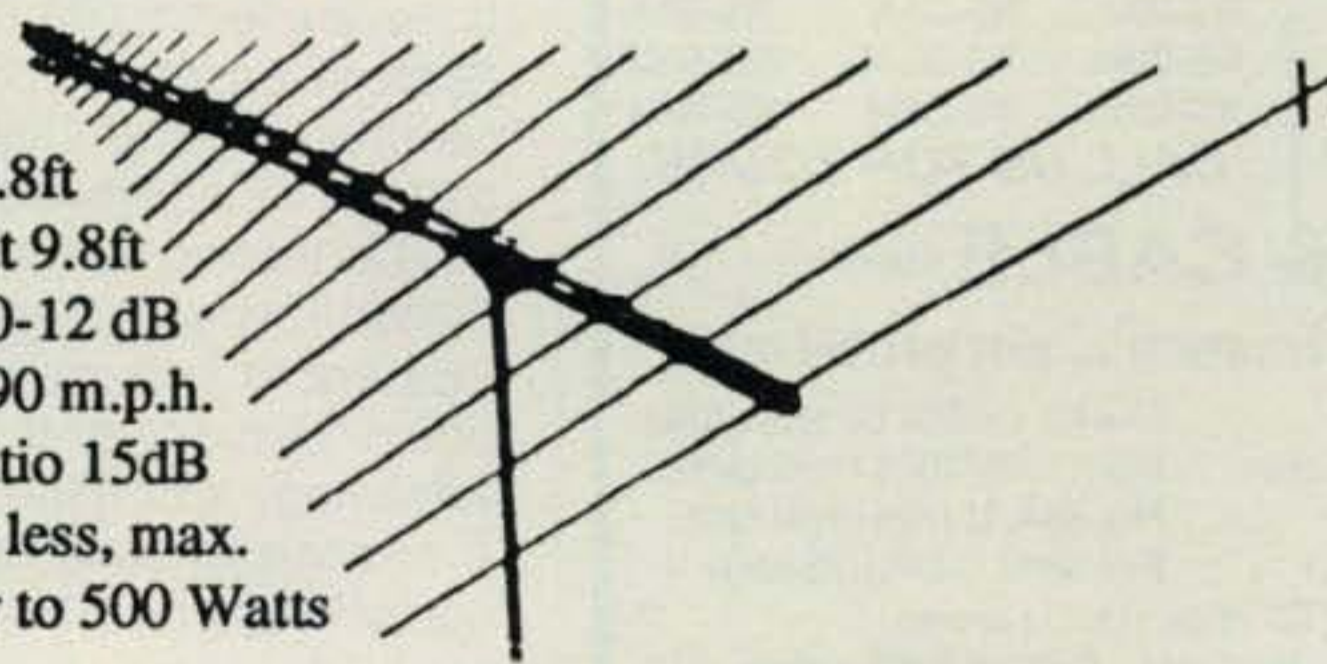
The W5YI-VEC believes that "The Novice Class volunteer examination program . . . is now badly out of step with the mainstream of amateur operator testing. While the VEC System has grown into an effi-

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cient, smoothly functioning operation, the Novice program is now inefficient and susceptible to various irregularities. For instance, there is no formal line of communications between the VECs (or the FCC, for that matter) and the volunteers who administer Novice Class operator examinations. If an FCC rule change requires deletion of a question from the Element 2

question pool, there is no established channel to communicate this fact to Novice Class operator examiners."

"The VEC System employs processes to accredit each volunteer examiner, to coordinate test sessions, to screen applications for errors, and to keep records of test sessions. The Novice system has none of these safeguards."

The League concludes that numerous advantages would accrue to both the Amateur Radio Service and to the Commission from the consolidation of all examinations under the VEC System. Screening of Form 610 applications by VEC organizations will result in a better "product" being delivered to the FCC and the Commission will be able to process new Novice licenses faster and at less cost.

"Should any question arise about a particular application, the Commission Gettysburg staff need communicate with only one of less than 20 experienced VECs, rather than the thousands of licensed amateurs who may administer a Novice examination. The efficiency and integrity of the Novice licensing process would increase as a result . . .," the ARRL said.

Expense Reimbursement

The W5YI-VEC requested the FCC to allow, but not require, reimbursement of expenses for administration of the Novice class. They pointed out that "... the present modest fees that may be charged for VEC System examinations have not deterred entry-level applicants from the codeless Technician class license. . . . Expense reimbursement is also a way to assure the continued viability of the VEC System." There is also the possibility that a VEC might waive Novice test fees for youngsters under the age of 18 years.

The W5YI-VEC made it clear, however, "... that it believes the Novice examination program should be incorporated into the VEC System regardless of whether or not reimbursement is allowed." The ARRL's petition did not address the issue of expense reimbursement at all.

New Novice Questions Coming

If Novice testing is brought under the VEC System, basically the only change would be that General class examiners would have to be approved by a VEC to participate in testing for the Novice amateur operator license. General class accredited VEs could join an existing VE team, or could form one of their own. The biggest advantage is that these teams would have a mechanism by which they could be notified of changes in the Novice examination program.

The VEC's Question Pool Committee (QPC) is presently working on extensive Novice question revisions. The new questions will be released at year end and must be used in all Novice/Element 2 examinations administered after July 1, 1993. Hopefully, Novice testing will be under the VEC program by then. This will provide the QPC with a line of communication that ensures all General class volunteer examiners are aware of and using the new test questions.

73, Fred, W5YI

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CIRCLE 178 ON READER SERVICE CARD

ALL ABOUT THE WORLD ABOVE HF

'Tis The Season For Sporadic-E

Around the middle of this month through the end of July sporadic-E propagation will make its presence known on the VHF frequencies in the Northern Hemisphere. Sporadic-E occurs when there is a sporadic ionization of the E layer (the layer that is between 60 and 70 miles or 100 and 120 km above the earth). The ionization takes the shape of clouds of ionized gases that move, grow larger, grow more intense, shrink, and dissipate. These ionized clouds appear in late morning and late afternoon local time. The late afternoon ionization can last well after sundown. For example, one evening a couple of summers ago I was listening to a local net being held on a 2 meter repeater. One new amateur checked in at nearly 2300 local time to exclaim that 10 meters was "just hopping with signals." I picked up the clue and immediately turned on the 6 meter radio. The last of the signals on that band faded around 0100 local time. A switch to 10 meters indicated that propagation existed for another hour or so.

Sporadic-E ionization propagation has properties similar to other E-layer propagation. Depending on the density of the ionization, there is a critical frequency (CF), a lowest optimum frequency (LOF), and a maximum usable frequency (MUF) whereby signals will be reflected back to earth. The CF is the frequency whereby signals sent straight up will be reflected straight back down. The LOF is the frequency that is the lowest that will sustain propagation. The MUF is the maximum usable frequency at which propagation will be sustained. The MUF is usually about five times the CF. While the LOF of a sporadic-E propagation has been detected as low as 14 MHz, the interest in the low end has not been as strong as has been the interest in the MUF of a particular opening, partially because it is very difficult to distinguish the sporadic-E propagation from other forms of propagation that are happening simultaneously.

As VHF operators, we are interested in knowing how high in frequency we are able to use this mode of propagation. Obviously, the VHF band to benefit the most from sporadic-E is 50 MHz. However, 144 MHz and, on very rare occasions, 222 MHz have experienced propagation from sporadic-E. The historic 220 MHz contact between Bill Duval, K5UGM (in Irving, Texas), and John Moore, W5HUQ/4 (near Jacksonville, Florida), that took place on June 14, 1987 at 1544 UTC is the only known documented sporadic-E contact ever made on that band.

Sometimes clouds of ionization may be in just the right places to cause double-hop sporadic-E propagation. Rarely, clouds can be in enough of the right places to cause triple-hop or more sporadic-E propagation. An example of that occurred during the 1987 ARRL June VHF QSO Party. Stations in Europe were copying stations in the midwest and southwest parts of the U.S. via a multiple-hop sporadic-E route.

Sporadic-E has been known to contribute to the lengthening of a path for an F2 propagated

signal. Twice in January of this year DX contacts appeared to have been assisted by sporadic-E. Stations in New Zealand were working stations in Arizona when a path opened to Oklahoma for the ZLs. At the same time a sporadic-E path existed between Arizona and Oklahoma. It appeared that the signal took a ride on F2 to Arizona then hopped a ride the rest of the way via sporadic-E. Within a few days of that opening Dave, N5JHV, experienced an unusual opening to central Europe. On both ends (stateside and Europe) of the circuit sporadic-E propagation was being reported (in the U.S. between the northeast and the southwest parts of the country and in Europe between England and central Europe).

What causes sporadic-E? Well, no one seems to know, exactly. However, wind shear seems to get the most blame because it seems to be a source of bunching up of the ions to create a cloud of ionization. However, even that theory has problems when sporadic-E is present without wind shear. Nevertheless, "old wives' tales" of amateur radio have also associated sporadic-E propagation with thunder storms, aurora, and meteor showers. While there is some association of E-layer propagation with the latter two, the jury is still out when it comes to the thunder storms.

Will sporadic-E occur in your neck of the woods? It depends on where you live. Sporadic-E seems to occur more often in the southwest part of the U.S. than in the northeast part of the U.S.

How can one depend on sporadic-E propagation? You should start by listening to 10 meters. If you hear exceptionally loud signals from an

area that is not too far from you geographically, then you might want to turn on your 6 meter radio, especially if the "skip" starts to shorten considerably. Once on 6 meters, you can also begin the listening game of seeing when the skip shortens on that band. Chances are you might find some propagation on 2 meters. However, such propagation does not always occur. In fact, it only occurs about ten percent (or less) of the time it occurs on 6 meters.

One other method of detecting propagation on 2 meters is put forth by Doug Allen, W2CRS. Doug is an active commercial FM DXer. He says that he keeps an ear on a clear frequency near the highest frequency on the commercial FM spectrum (108 MHz). When he hears signals coming in from a distance, he immediately turns on the 2 meter radio and starts transmitting. Often he "creates" his own opening. He says that he can detect all sorts of propagation, from sporadic-E to tropo to meteor showers, by listening to a clear frequency on that band.

One other thing: Emil Pocock, W3EP, and Pat Dyer, WA5IYX, wrote a very interesting article that appeared in this past March issue of *QST*. Their article is based on Pat's eleven years of gathering data on sporadic-E propagation by listening to that same commercial FM spectrum. In the article they promote two theories. One theory suggests that there seems to be a five day valley between peak days of propagation. Another theory they examine relates to a possible five to six year period of rise and fall of sporadic-E activity. While the data are insufficient to really support the latter theory, it does remain to be seen. Incidentally, this is the fifth year after

VHF Calendar

May 1	ARRL Sprint, 903 MHz, 7-11 PM, local time
May 2	New moon, noisy
May 3	Moderate EME conditions
May 5	VK5MC NA: 0008 UTC 144.012 (Call 144.010-) ETA Aquarids Meteor Shower Peak 2055 UTC
May 6	VK5MC NA: 0104 UTC
May 7	VK5MC NA: 0200 UTC ARRL Sprint, 1296 MHz, 7-11 PM, local time
May 8	Perigee
May 9	First quarter moon
May 10	Very good EME conditions
May 14	ARRL Sprint, 2304 MHz, 7-11 PM, local time Your editor's birthday, 2345 UTC
May 15-17	West Coast VHF/UHF Conference, Holiday Inn of Ventura, Ventura, California
May 16	Full moon
May 17	Very poor EME conditions
May 19	Noisy-Sagittarius A
May 22	Apogee
May 23-24	ARRL Sprint, 50 MHz, 2300 UTC May 23 to 0300 UTC May 24
May 24	Poor EME conditions, last quarter moon
May 25	VK5MC Europe: 0230 UTC
May 31	New moon, noisy

ne spectacular summer of 1987. Maybe they
re right.

Sporadic-E propagation presents the opportu-
nity to communicate with stations at distant
points while running marginally equipped sta-
tions with very low power. Generally, the signal
strength of the station you are working is so in-
tense you would think the station is a local. Nev-
ertheless, often as soon as the opening is there
is also over. Such is the nature of the clouds
that make up sporadic-E propagation. It remains
for you to get in on the fun during these next three
months.

CQ WW VHF WPX Contest

As mentioned last month, there will be a CQ WW
VHF WPX Contest this year. The date for the con-
test is the weekend of July 11. Rules for the con-
test will appear in next month's CQ. Based on
the survey results tentative rules have been de-
veloped. As this column is being prepared cop-
ies of the rules are being examined and critiqued
by top VHF contest operators around the coun-
try and in some foreign countries. From their cri-
ticisms the final rules will be developed. Along
with publication in this magazine, copies of the
rules will be made available to VHF-oriented
magazines around the world.

I have lined up two contest plaque sponsors,
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I have lined up volunteers to help me with log
checking. Therefore, I make a promise to you,
readers of this column, that I will make the re-
sults available for publication in the shortest pos-
sible time. I am really excited about this contest!
I am looking forward to a first-class worldwide
VHF contest. With your help, I know it will be so.

At WARC 92 We Lost Nothing; We Gained Nothing

Thanks in large part to the lobbying effort of the
International Amateur Radio Union, backed by
the ARRL, the amateur radio spectrum remained
untouched at the WARC 92 conference.

Citing the lack of any consensus on any of the
topics, the conference closed on March 4 with-
out hardly deciding any issue. Citing no clear agen-
da for the international broadcast community,
nothing was decided that would affect the 40
meter amateur radio band. And citing no clear
plans or proposals for the 2.3-2.4 GHz frequen-
cy spectrum, nothing was decided that would
have any impact on the amateur radio service's
use of that band.

The U.S. government, however, made several
amendments to the final report, one of them be-
ing that it reserves the right to set up satellite
ground broadcasting on a national basis at the
210-2360 MHz range. Since there are so many
different interest groups within the U.S. that
could be concerned with this service, it is antici-
pated that there will be a long domestic battle
over it before the service is implemented in
North America. Accordingly, there appears to
be no immediate threat to that portion of that am-
ateur radio band.

Those of us who attended the North Texas Mi-
crowave Update banquet in October of 1991
received a somewhat reserved speech from
Paul Rinaldo, W4RI. He made us feel that we

were in for quite a battle. However, thanks to the
"behind the scenes" work of Paul and others
at the League, the U.S. position put forward at
the WARC protected the interests of the
Amateur Radio Service very well. Additionally,
thanks to the representation of the IARU, which
was granted observer status at the conference,
and its president Dick Baldwin, W1RU, the
Amateur Radio Service was presented in a
strong and positive light.

The amateur radio community owes a deep
expression of appreciation to Paul; Dick; ARRL
Executive Vice-President Dave Sumner, K1ZZ;
ARRL Special Assistant Dan Bergeron, KB4IYK;
IARU Region 3 Chairman David H. Rankin,
9V1RH; IARU Region 1 Secretary John Allaway,
G3FKM; and other members of IARU who
worked so very hard to protect the interest of
amateur radio operators worldwide.

My appreciation goes to the League and to
"Newsline" Editor Bill Pasternak, WA6ITF, for
supplying information pertaining to this topic. A
full report of the WARC 92 conference appears
in this month's QST.

Something New This Month

You will notice a sidebar calendar accompany-
ing this column. This will be a regular feature.
It is an attempt to list the important events affect-
ing VHF and above operation during the current
month. Most of the information is supplied by
Bev Cavender, W4ZD, with some minor addi-
tions by your editor and from you as you notify
me of significant items.

By way of explanation, the listing of VK5MC
is special because he has a rhombic antenna
for 2 meters that he uses on EME. The statement
of "NA: 0008 UTC 144.012 (CALL .010-)" indi-
cates the following: VK5MC has a window to
North America beginning at 0008 UTC on that
date. He will begin calling on 144.012 MHz and
will listen on 144.010 MHz or lower for answers.

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2. Two Meter EME Directory Printout of all
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and \$15.00, respectively.
3. Customized Monthly Moon AZ-EL Printout
based on your QTH. Send your six-character grid
locator or coordinates and the month or time pe-
riod with a check for \$5.00 or \$6.00, respectively.
4. Your Moonrise and Moonset times per cal-
endar month with moon and sun AZ and EL for
\$1.00.
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6. Monthly EME calendar. Specify month and
send \$1.00.
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Bev also indicates that the EME directory is
available on IBM compatible diskettes from Bob
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Rouge, LA 70815. Contact Bob for pricing and
shipping information.

One other item about Bev: He holds the Costa
Rican callsign of TI2BEV. Bev indicates that he
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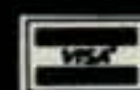


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Notable Contacts From February and Early March

In early February Herman, WD4DBB, and Costa, CU1EZ, got bored, so they went up to 51.110 and fired up on FM. Not content with that, Herman hauled out his old Gonset Communicator II, and they worked each other on AM! And some of us wait just to work Costa on any mode!

If you think Herman accomplished something with his old Gooney Bird, consider this: Stan, W3TFA, has worked 49 states and his share of DX with a Heath Sixer! He only needs Alaska to complete his WAS!

Around 1600 UTC on February 9 a number of stations in Malawi reported hearing Larry Lambert, N0LL's beacon. Following that report, many of the 7Q7's made contact with stations in the midwest. Larry had an excellent shot at making a contact with a new country—except he was in church. As dismayed as he was, he realized that he had done the right thing when on February 23, the heavens once again blessed his area of the country with propagation. Larry reported working 7Q7JL and 7Q7LA, for a double blessing. His blessing was again doubled when Larry worked the same stations on the 3rd of March. Larry has learned to keep his beam pointed to the heavens and to be listening on the right days.

On February 10 your editor and a number of others had reception of the V51VHF beacon for over two hours. I fired up the Titan and called for any African station listening on the 10 meter liaison frequency to go up to 6 meters. Finally, at around 1610, Ian, ZS9A, showed up to announce that he had just worked Len, W5AL. *Everyone* on frequency told Ian to get back to 6 meters immediately! In the course of 10 minutes Ian worked stations in Oklahoma, the midwest, and Carl, KM1H, in New England.

Later in the evening of February 10, 9H5EE was sending code practice on 50.101 MHz to a fellow 9H5 operator on the other end of the island. When he stopped transmitting, he heard Dave, N5JHV, calling him. They completed a very rare side scatter QSO at 1836 UTC. Both of them, being "doubting Thomases," checked with other stations to verify the other was real, with 9H5EE checking with G4UPS and N5JHV checking with PY5CC. After each was satisfied with the other's veracity, QSLs were exchanged.

Eric Roy, TI2NA, completed the first Costa Rica to Greece QSO during February. Recently he discovered that he has worked over 200 grid squares on 6 meters, with almost all of them in North America (he sent me a map with hugh portions of the U.S. and Canada blocked out). Accordingly, he decided to go all out to get his VUCC award. To his dismay, he discovered that he has only 50 or so confirmed. So, tsk, tsk, if you owe a card to Eric, mail one to him today. He will really appreciate it.

Andy, YS1AG, completed the first YS to Europe QSO on 6 meters when he worked OZ4VV on the 11th of February at 1450 UTC. On the following two days he worked several dozen more stations, thereby making many in Europe happy with their first El Salvador QSO.

On Sunday, February 16, George, P43FM, experienced an incredible European opening. When the dust settled he had worked over 200 stations. Then the band opened to the midwest part of the U.S. He logged another 60 stations before losing propagation for the rest of the day. Then on March 4, with less than two weeks left before his departure, at around 1330 UTC

George went to a late breakfast, wondering if he would ever get his WAC (he needed Asia). At the same time Peter, PY5CC, was reporting that Japan was hearing the YV4 beacon long path. George finally returned from breakfast and turned the radio back on. He was greeted with not one, but 12 contacts with Japan before the band folded 20 minutes later. The next day he decided to eat at home. Good thing! Because in so doing, he worked an additional 67 Japanese stations.

On February 22 a number of stations in the southwest were treated with propagation to Malawi. Among the stations on were 7Q7's JL, LA, RM, and XX. Among the stateside stations to work them were 6 meter senior statesmen W5MJD, and W5SFW in the Amarillo area. Both reported never having worked such a distance in all their 30-plus years on the band. The opening was so widespread that Richard, WA5QCP, in El Paso also got in on the action.

On Saturday night, February 29 John, KB5IUA, became aware of a tropo opening between south Texas and Florida. Immediately John put into action a plan he had developed over two years. John has a pickup with a tripod mounted in the back. On the mast is a 4-element 2 meter beam and an 11-element beam for 70 cm. John loaded up the cab with a TR-751 and a brick for 2 meters and a 490 plus a brick for 70 cm. From his truck parked in the driveway of his home QTH he checked out his equipment, and sure enough he was copying the stations in Florida. Armed with that encouragement, he was off to a tour of three different grid squares, although without his watch. This inconvenience presented the biggest problem of his trip because he had to ask every third or fourth contact for the correct time and then guess as to what the time was for the previous two or three contacts. Nevertheless, he made many contacts. From his starting point in EL28 he had seven QSOs in six grids with one each in EL06, EL16, EL49, EL97, and EL98 and two in EL88 on 2 meters; and seven QSOs with three QSOs in EL88 and one each in EL16, EL89, EL97, and EL98 on 70 cm. From EL18 he had five QSOs on 2 meters with one each in EL16, EL49, EL87, EL88, and EL98; and on 70 cm he had seven QSOs with three in EL88 and one each in EL16, EL89, EL97, and EL98. From EL19 on 2 meters he had six QSOs, with two each in EL49 and EL88, and one each in EL87 and EL98; while on 70 cm he had one QSO in EL16 and EL98 and two in EL88. One curious observation John made was that some of the stations he worked on 432 MHz were unworkable on 144 MHz.

John complained that he developed carpal tunnel syndrome from filling out all of the QSL cards. Not bad for a Saturday night drive, John.

John also reported that the band was open to Florida at various times of the day through the following Monday evening. He further stated that the band reopened later in the week (the following Friday and Saturday night), this time to Alabama, Louisiana, and Mississippi.

On March 3, Doug, ZP6CW, made a number of North American stations happy while rewarding himself with his 89th country when he worked three Canadians among his 45 QSOs. You may QSL him direct at: Douglas J. Woolley, ZP6CW, P.O. Box 73, Caacupe, Paraguay. He advises that no IRCs or green stamps are necessary. He would, however, like a self-addressed envelope or an address label from you because his hand gets tired addressing all those envelopes he gets.

On March 4, Ian, 3D2PO, set out to work Char-

lie, KC6/W0RRY, for a new one on 6 meters. Instead, with the assistance of VS6BN he worked XX9JN for a new one. Ian has since learned that it is better to go hunting with a shotgun.

On March 5, Jan, PJ2/OH1ZAA, wanted to get in on the Japanese fun. However, all he had up was a triband beam. Nevertheless, he was able to make eight contacts with Japan.

Jan was not the only one using a tribander. Three days before, HC8K, using his HF beam worked a number of stations in the U.S.

After nine years in Hawaii, Shel, NI6E, completed his 6 meter DXCC, when Bobby Martin, VP2MO, called him. Shel has since added country number 101 when he worked Peter, V85PB, who plans a two year stay on Brunei.

Some of us sweat working West Virginia, sometimes for years. However, on March 8, Kay, 7Q7XX, worked Dick, N8KNA, and Gary, WA8CXI, for two WV contacts in less than 10 minutes. Among the three operators they were trying to figure out who was the most astonished. Dick seems to be in the lead, since he uses only a modest station and rarely works DX on 6 meters.

Also on March 8, Jan, PJ2/OH1ZAA, and George, P43FM, worked Charlie, KC6RR, for DXpeditions to DXpeditions QSOs. During that same time Jan reported working in excess of a hundred Japanese stations.

ARRL 222 MHz Petition RM-7869 Update

While the petition requesting a protected segment for weak-signal activity lies dormant at the FCC, work behind the scenes continues. Mark Gilmore, WB6RHQ, reports that committee members for the SMA spectrum study committee have been selected by their peers. They are as follows: Weak signal, Chip Angle, N6CA, and Jim Stephan, KC6A; Packet (digital), Bob Teeter, N6XJJ, and Jeff Angus, WA6FWI; Repeaters, Frosty Oden, N6ENV, and Alan Sanders, WB6TPG.

Last month's column reported that the committee meeting was to have taken place in February. However, at the request of the weak-signal group the meeting was postponed. The committee is now scheduled to develop a band plan at the SMA board meeting of June 7. Also invited to the board meeting (as observers) are the ARRL director and vice-director, as well as the VRAC and VUAC committee members. Following the board meeting the band plan will be presented to the SMA members at large. Thus, the SMA representatives will be responsible for being sure the new bandplan is well received and passed by the general membership as well as its eventual implementation.

Curiously, this proposal for regulation of a portion of the band for weak-signal work has elicited questions as to why not regulate the whole band. For example, Mark pointed out to your editor that within southern California for years the 222 MHz band has experienced operations that are not in compliance with that portion of the band. He feels that not only weak-signal operations should have protection but all other services as well. By doing so Mark feels that FCC regulation would present the teeth necessary for solving coordination problems within the band.

Mark also pointed out another area of concern he has for his area (and, indeed, for all amateur radio). Mark stated that by far the majority of out of compliance operations have occurred due to lack of education. Often when an offend-

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ing station owner is notified of the problem compliance is almost immediate. Usually, the response was that of ignorance of the band plan or regulations. Considering the FCC's very strong reluctance to get into the enforcement business, education may be the only way to make our fellow amateur aware of the "rules of the road."

Hamfests Important To The VHF Operator

West Coast VHF/UHF Conference. This conference was written up in the March column. It is scheduled for May 15-17 at the Ventura Holiday Inn. Speakers signed up to date include Joe

Cadwallader, K6ZMQ, Noise Figure Measurement; Wayne Overbeck, N6NB, 222 MHz, Past, Present, and Future; Joe Moell, K0OV, Transmitter Hunting; Gordon West, WB6NOA, Tropo Ducting; Cliff Butschardt, W6HDO, Amateur Satellites; Ron Hammel, KC6WLC, VHF Contest Roving; and Fried Heyn, WA6WZO, ARRL Forum. For conference registration information, contact Steve Noll, WA6EJO, 1288 Winford Ave., Ventura, CA 93004 (805-647-4294).

18th Annual Eastern VHF/UHF/SHF Conference. This conference will be held the following weekend (May 22-24) on the campus of the University of Hartford. Friday night will feature an informal social gathering at a location to be announced. All day Saturday there will be technical talks by well-known VHFers and "rap ses-



Bernardo Maldonado, XE2HWB, in front of the XE2HWB/B shack. Notice the loop on the tower. (Photo courtesy Jack Henry, N6XQ)

sions" for each of the VHF/UHF bands. A noise-figure clinic and contest will be held that afternoon. In the evening there will be a catered banquet, followed by the popular "VHF Trivia" quiz and additional informal social activities. Sunday morning there will be antenna gain measurements for antennas from 222 MHz through 2304 MHz, weather permitting, and an informal swap meet.

Conference registration is \$24.00, prior to May 15, which includes annual membership in the Eastern VHF Society and a copy of the Proceedings. Registration at the door will be \$30.00. The Saturday night banquet will cost \$22.00 also payable in advance. If you have not previously attended, you can request a registration packet from registration chairman David Knight, KA1DT, 15 Oakdale Ave., Nashua, NH 03062. An SASE would be appreciated when you request your packet. If you have attended previous conferences in recent years a packet will auto-

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The Conference Chairman is Tom Kirby, W1EJ, who is ably assisted by volunteers from the New England VHF community and the Hamden County Radio Association. Thanks to Lewis Collins, W1GXT, for the information on this conference.

CSVHF Conference. The CSVHF Conference is shaping up quite well. In February, Speaker Chairman Derwin King, W5LUU, issued a call for papers. If you have procrastinated this long, you may still be able to get yours published. Contact Derwin immediately at home, 512-695-3701, or work 512-522-2740 (FAX 512-647-4325). No word to date on speakers already lined up. However, the parallel VHF Ionospheric Propagation Symposium has already lined up four speakers, including: from SESC, Norm Cohen, Solar Influences; also from SESC Frank Stewart, Sporadic-E; Steve Wagner, W7CI, F-layer propagation forecasting; and Steve Gregory, VK3OT, 50 MHz propagation from down under.

Current Contests

ARRL VHF/UHF Sprints. The continuation of the ARRL VHF Sprint Contests is scheduled for this month during 7 PM to 11 PM local time (except 50 MHzZ) as follows: 902 MHz, May 1; 1296 MHz, May 7; 2304 MHz, May 14; 50 MHz, 2300 UTC May 23 to 0300 May 24. Exchange is grid square. Each contest is separate and will be scored separately. Each QSO is worth one point. For final score multiply number of QSOs by number of grid squares worked. Send an SASE with two units of first-class postage (U.S. \$0.52) to the ARRL for logs and score sheets and send logs to the ARRL by one month following the last contest (by June 24). Results are to be published late fall in *NCJ*.

XE2HWB Beacon

In the September column I reported on the possibility of a beacon being established at Bernardo Maldonado, XE2HWB's QTH. Since that issue many of you have reported hearing it on the air. Now the behind the scenes story.

The beacon was built by Chip Angle, N6CA, and Jack Henry, N6XQ. Originally it was set up to run 1 watt on 50.008 MHz and was located at the university in La Paz. Subsequent to that installation, the trans-peninsula microwave relay site on Mexican Highway 1 (grid square DL44) became available. Accordingly, the beacon was moved to that location and the power of the beacon was raised to 10 watts. A single loop horizontally polarized antenna was constructed and mounted at the 30 foot level of the microwave relay tower. The loop has a pattern that is directional in the 60 and 240 degree directions. The power is supplied from the relay site which has a redundant diesel generator. Therefore, the beacon should be on 24 hours daily.

For those of you who have worked Bernardo, you might be interested to know that he has a tremendous TVI problem. So when he becomes aware of a band opening, he lugs a 12 volt car battery, his FT-690, TE Systems amp, and a three-element Yagi into a canyon away from the

neighbors. Talk about dedication!

My thanks go to Jack for supplying this information and the accompanying pictures.

Al Minke, K8AXU, Silent Key

Al Minke, K8AXU, a very active weak-signal operator, became a silent key in February. Al was on 144, 220, and 432 MHz. For a time he held both the 220 and 432 MHz terrestrial records. He was always there to provide a contact to someone looking for EM99.

Some QSL Routes

FO0CI (and N7QQ/MM) via N7QQ
S01A via EA2JG
WD5URO/OX via WA5JCI
YX0AI via YV5ARV
ZD8Z via W6QF
5H3RA via JA3PAU
7Q7RM via G4UPS (for 6 meter contacts during Oct./Nov. 1991 only)
7Q7RM via G0IAS
7Q7CM via N2AVR
7Q7XX via JH3RRA
ES5MC and ES5PC: Arvo Pihl, P.O. Box 301, EE2400 Tartu, Estonia
ES6QB: Tonu Taimsaar, P.O. Box 31, EE2710 Voru, Estonia
G0IAS: Mr. A. R. Hickman, The Conifers, High St. Elkesley, Retford, Nottingham, England DN22 8AJ United Kingdom
GW0GEI (ex-GM0GEI): Mr. Steve Jones, Llainwen, LLansair n.b., Near Caergeillog, Holyhead, North Wales LL65 3HL United Kingdom
HI8A: Akito Nagi, JA5DQH, P.O. Box 73, Ishii, Tokushima 779-32 Japan
RA3TES: Andy Kamaev, Box 13-A, Arzamas 607220, Russia
V85PB: Peter Bacon, P.O. Box 715, Seria, Brunei
ZD8LII: Steve Hodgson, Box 2, Ascension Island, South Atlantic Ocean

Miscellaneous

In the March issue on page 70 we mentioned *Six News: The UK Six Metre Group Newsletter*. WA2LPG called to let us know that he is the U.S. contact for the newsletter. Those in the U.S. who want a subscription may order it from Charles Ruhlmann, WA2LPG, Box 152, Wassaic, NY 12592. Cost is \$22 (make check out to Charles Ruhlmann).

Dick Wilson, N8KNA, plans to operate the ARRL 50 MHz Sprint from the relatively rare EM98 grid square. He will set up portable power and an ICOM 575H.

The *ETA Aquarids* meteor shower is scheduled to show up between April 21 and May 12 with the peak day to be around May 5. The best path for this shower is NE-SW and SE-NW. Fair conditions will exist for E-W paths and poor conditions will exist for N-S paths.

This is all the room for your news this month. Thank you for your kind words and contributions to this, your column. Please continue to let me know how you are having fun with your hobby. My special appreciation goes to Ted, G4UPS for much of the news and many of the QSL routes. As always, you can call me at 1-405-528-6625 and keep me informed on the late-breaking news.
73, Joe, N6CI

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ANTENNAS & ACCESSORIES

A LOOK AT THE SHACK FROM BOTH ENDS OF THE COAX

BY KARL T. THURBER, JR., W8FX

Antennas, Software, and More

Last month we opened up the mailbag to respond to reader letters and inquiries. This month we'll shift from letters to our regular mix of antenna and software topics which reflect a look at the hamshack from both ends of the coax. Let's turn to antennas first.

Antenna Notes

Ramblings from W9RE. We received a long note from antenna connoisseur and DXer Mike Wetzel, W9RE, along with a detailed description of his impressive Indianapolis antenna farm; we've included some of his photos here. One of the interesting points in Mike's letter is that his XYL has set up a bed-and-breakfast for hams, appropriately dubbed "Ham and Eggs."

I suspect that Mike's antenna farm had something to do with the bed-and-breakfast setup. Mike has an 8 acre spread which includes numerous niceties such as 160 and 80 meter verticals that include some 2 miles of radials; a full-size, 3-element, 40 meter Yagi on a 42 ft. boom; 20 meter phased 7 element log-Yagis on 52 ft. booms; 15 and 10 meter phased "Razors," consisting of 3 quad elements and 2 Yagi elements; and an assortment of W2PVs and DL1BU/N4AR fixed Yagis for 10 and 15 meters. All this is in addition to several wire antennas, including 500-1000 ft. Beverages, Vee-beams, slopers, extended double Zepps, and more.

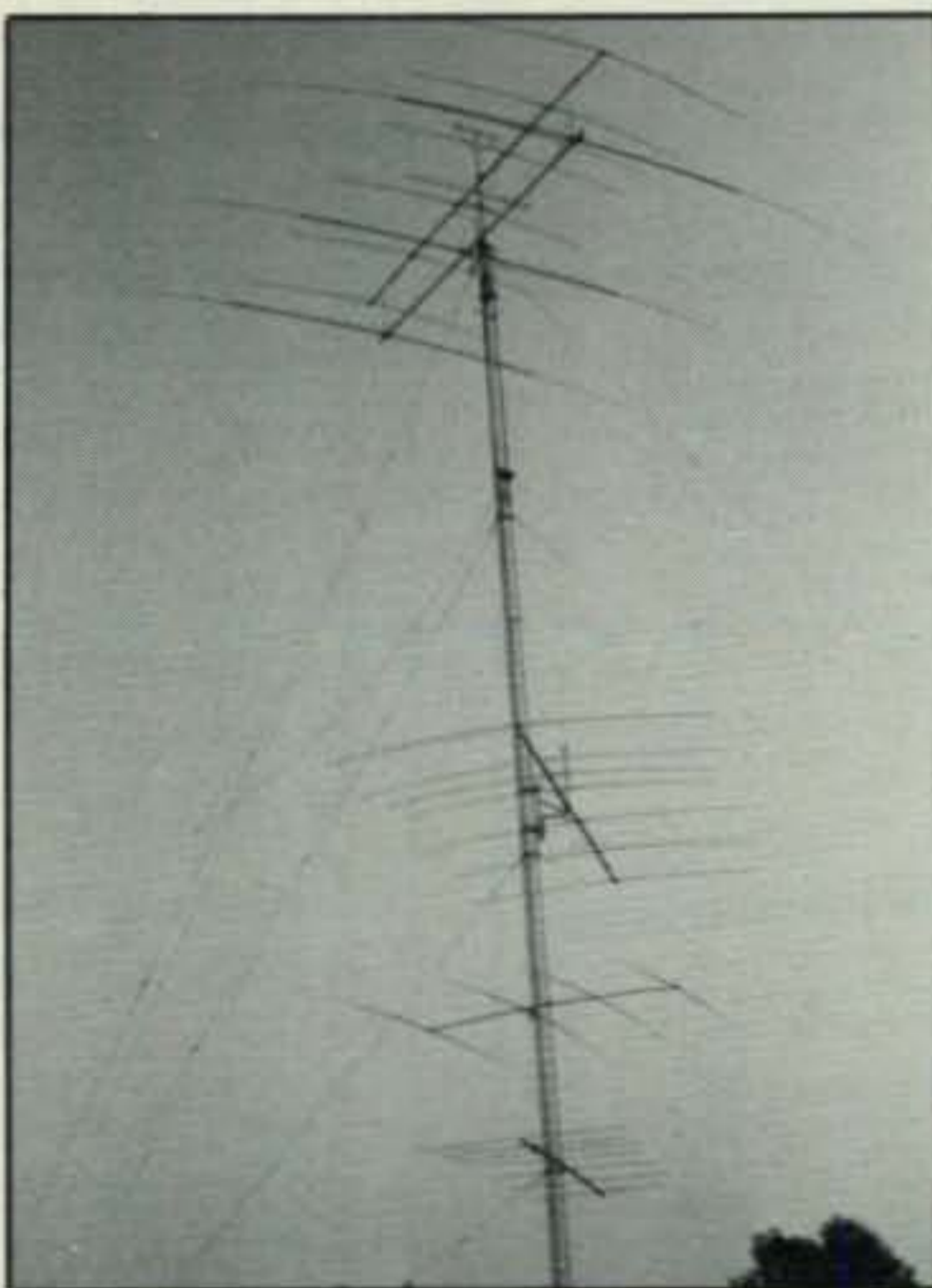
Mike wrote that over the last 15 years or more he has built several Yagis and has become involved in buying raw aluminum parts—tubing, pipe, angle, plate, and the like—in addition to all the other necessary parts needed for Yagi construction, such as turnbuckles, muffler and hose clamps, stainless steel bolts, and so forth. He's always tried to buy in bulk to take advantage of price breaks. Recently he decided to offer parts for sale at a small profit.

Mike also offers a nice sidearm assembly for side mounting an antenna and achieving 270-degree rotation around the tower. He's had the sidearms in the air for 10 years and has found them to be quite durable. Two different designs, priced at around \$300, are available for Rohn 25 and 45 towers. The sidearm assemblies include all stainless steel hardware, wood bearing, bearing plate, and rotator plate, drilled for the Tailtwister rotator.

Mike offers a three-page listing of his aluminum tubing and associated parts that is available for a business-size SASE. Included are various types and sizes of aluminum tubing, angle, plate, pipe, and holobar stock; he also sells stainless-steel screws, nuts, washers, hose clamps, and other miscellaneous items, in addition to the tower sidemounts. Mike says he's found his



Here's Mike Wetzel, W9RE, at the controls of his spiffy station, which commands his 8-acre Indianapolis antenna farm. Mike started assembling his DX and contest station at this QTH in 1975. (Photo courtesy W9RE)



Here's a small portion of Mike Wetzel, W9RE's 8-acre antenna farm in Indianapolis. While only a few of his many antennas are visible in this photo, they include 160 and 80 meter verticals having some 2 miles of radials; a full-size, 3-element 40 meter Yagi on a 42 ft. boom; 20 meter phased 7-element log-Yagis on 52 ft. booms; 15 and 10 meter phased "Razors" (consisting of 3 quad elements and 2 Yagi elements); and an assortment of W2PVs and DL1BU/N4AR fixed Yagis for 10 and 15 meters. All this is in addition to a number of wire antennas, including several 500-1000 ft. receiving Beverages, Vee-beams, slopers, extended double Zepps, and others. (Photo courtesy W9RE)

niche by being able to offer single pieces of aluminum stock at affordable prices, where it can be difficult to purchase very small quantities from supply houses at reasonable prices.

Contact Mike Wetzel, W9RE, at Wetzel Radio, 7880 Shelbyville Rd., Indianapolis, IN 46259.

Coax Notes from the Wireman. At last year's Atlanta Ham Festival we had the pleasure of sitting in on a very educational presentation on the ins-and-outs of coaxial cable and antenna wire, baluns, RF connectors, openwire and ladder line, and the like, by "The Wireman," Pres Jones, N8UG.

We have covered The Wireman's extensive coax and antennas accessories product line several times in the past, when the business was called Certified Communications; it's time to note some changes. For one thing, Pres has changed the name of his enterprise to "The Wireman, Inc.," so that the term "Certified" now refers strictly to his custom quality-certified line of coax cables and accessories. Also, the business has moved from Michigan to Dixie and now is located in Landrum, SC. Finally, The Wireman also has teamed up The Van Valzah Company and The R.F. Connection to be able to offer specialized antenna and connector expertise.

Pres's Atlanta presentation provided a good, common-sense overview of coax and related components, and I took some notes. A few of the points Pres made are worth repeating here.

1. "If a little is good, a lot must be a whole lot better." Not necessarily so: Use high-quality cable, but don't go overboard; you don't necessarily need expensive RG-8 foam cable or hardline at HF frequencies.

2. "My Elmer says I need to get it." Maybe so, maybe not: Your Elmer, however well-intentioned, may be thinking of what was best in the 1930s or 1940s rather than in the 1990s. So value his comments but place them into perspective.

3. Expensive silver-plated Teflon PL-259's help to some extent with soldering and weathering, but the electrical advantages are marginal at least at HF. Also, many of these highly touted connectors are of poor basic quality.

4. All cables can be buried, but they are all born to die, and this includes cables with non-contaminating jackets. Cables designed specifically to be buried need various expensive protections such as armoring and special jacketing. Class I vinyl cables having contaminating jackets typically last 5-10 years, while Class IIA cables with their noncontaminating jackets can survive up to 10 or 15 years under the same conditions. However, remember that like humans, they all die eventually.

5. It's difficult to buy high-quality openwire transmission line anywhere today. Most of what is available is of cheap construction that is mechanically inferior. Unless you want to custom-make your own openwire line, consider ladder-line as a good alternative. Just be sure to twist

317 Poplar Drive, Millbrook, AL 36054

it every few feet to keep it from blowing in the wind, and look for it to have stranded wire to keep it from breaking.

6. Copperweld or copper-clad steel wire, solid or stranded, is very strong and is probably your best bet for wire flattops. Beware of cheapies, such as electric fence wire, which has inadequate copper content.

7. Oh, yes—don't walk around with a VHF/UHF handie-talkie antenna tied to your head (like on a hardhat). While all the evidence isn't in, it appears that there can be some nasty biological consequences from doing this.

Pres offers straight talk and an excellent tutorial on all types of radio wire and cable in "The Wirebook." This is a pamphlet of about 30 pages that contains a wealth of information on coaxial cable, control and antenna wire, balanced line, RF connectors and accessories, station grounding, lightning protection, and related topics. It is \$1 by mail, or free with an order, from The Wireman, Inc., 261 Pittman Road, Landrum, SC 29356.

Using CATV Hardline. Some amateurs have found a low-cost, or even no-cost, source of hardline to be cable TV companies who, in upgrading their systems, often have available for the asking so-called "short ends" (less than 500 ft. or so) of 75 ohm hardline, typically 1/2, 3/4, or 1 inch in diameter. Apparently, it has become increasingly difficult for cable operators to salvage excess or used cable because of environmental disposal problems caused by the cable jacket, which emits toxic gases when burned.

If you can afford the high cost of good-quality hardline, which can be several dollars or more per foot, and need the under 1 dB/100 ft. attenuation that's typical at 2 meter frequencies, fine and good. Otherwise, surplus cable TV hardline bears looking into, despite the fact that the cables usually have a 75 ohm impedance, rather than the familiar 50 ohms, and there are some mechanical connection problems involved.

Paul H. Darwactor, W8ZD, has made it fairly simple to make use of such cables by offering quarterwave matching transformers to provide an accurate and broadband impedance match between the 75 ohm hardline and a 50 ohm load. In addition, the transformers provide a convenient, reliable, and inexpensive method of attaching type N or SO-239 connectors to the hardline.

The transformers are standard, linear quarterwave matching transformers using 62 ohm air dielectric line. Stock models are available for 144, 222, 440, 903, and 1296 MHz, while custom models are available for any frequency from 100 MHz to 1.3 GHz. Units designed for use below 200 MHz are built with type N or SO-239 type connectors, while those for higher frequencies are furnished with type N connectors only. Prices range from about \$28 to \$30 per pair, depending on frequency.

For more information, contact ZD Engineering, 605 Balsley Avenue, Findlay, OH 45840.

Myers Engineering Antennas. Steven L. Meyers, President of Myers Engineering International, several months ago began offering two VHF Yagis that feature high gain and sturdy construction.

The YL-143-AM is a 3-element, 2 meter Yagi designed for horizontal, vertical, or oblique polarization; a gain of 8 dBi is claimed along with a front-to-back (F/B) ratio of 16 dB and a beamwidth of 64 degrees. The YL-224-AM is for 3/4 meters and has 4 elements; it has a claimed gain of 9 dBi and F/B of 20 dB, with a beamwidth of 52 degrees. Both antennas are rated at 500



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For more information, contact Myers Engineering International, Inc., P.O. Box 15908, Ft. Lauderdale, FL 33318-5908.

New Catalog from Diamond Antennas. Diamond Antenna Corporation has issued a new catalog of their imported VHF/UHF antennas and accessories. The new 26-page illustrated catalog offers a variety of base-station and repeater antennas covering 6 meters and up, numerous mobile antennas including both monoband and multiband types, mobile antenna mounts and mounting kits, diplexers and triplexers, and handie-talkie antennas (including dual- and tri-band types). Also found in the catalog are mobile receiving and scanner antennas, power and SWR meters, and various accessories. In addition, 4-, 5-, and 6-band HF trap verticals are offered.

A catalog, dealer list, and product guide are available from the distributor, RF Parts, 1320-16 Grand Avenue, San Marcos, CA 92069.

New Universal Radio Catalog. I was impressed with Universal Radio's new and greatly expanded catalog 92-01, which is exactly 100 pages in length. The new, illustrated catalog is considerably thicker than any of its predecessors and covers a wide variety of equipment for the amateur as well as the shortwave and scanner enthusiast. An impressive selection of amateur and shortwave antennas, headphones, books, and accessories is featured. As such, the catalog makes an excellent buyer's guide, sourcebook, and desk reference, even if you never order anything from it.

The catalog is available free on request by fourth-class mail, or for \$1 by first-class mail. It also is available outside North America for four IRCs. For a copy, contact Universal Radio, Inc., 6830 Americana Parkway, Reynoldsburg, OH 43068.

Soft Topix

Online Amateur Software for the Mac. We're not equipped with an Apple Macintosh PC ourselves, so our reporting on Mac amateur software is limited. However, we'd like to pass along that in the May-June 1991 issue of *Digital Digest*, Stan Horzepa, WA1LOU, pointed out that while inexpensive amateur software can be hard to find for Macs, it's available if you know where to look. Stan noted that there is a consistently good supply of Mac software for amateur applications on the CompuServe™ online service. Most of this software is public domain or shareware, so the only up-front costs to you are CompuServe's online charges, which are moderate. Most of this software is found in HamNet, CompuServe's amateur radio section; the rest is in the various Mac-oriented CompuServe sections and libraries.

In addition to applications and utility software of general interest, you'll likely find amateur-oriented programs on antenna analysis, logging, FAX, Morse Code instruction, packet radio, transceiver remote control, satellites, and much more. Of course, you must be a CompuServe

member to access all of these online goodies; for more information on CompuServe membership, contact them at 1-800-848-8199. A membership kit is \$39.95; it includes a user's guide, a quick reference booklet, a monthly member magazine, and a \$25 usage credit. How can you go wrong?

AMSAT Tracking Programs. As we've mentioned before, the Radio Amateur Satellite Corporation (AMSAT) offers a variety of tracking software programs, and their list of programs continues to grow. Let's briefly review what they offer.

For the IBM PC, ORBITS II and ORBITS III are quite popular, as are QUIKTRAK 4.0 and INSTANTTRACK. For Commodores, there's C-64 SUPERTRAC, C-128 ORBITS, and COMMODORE AMIGA. If you have an Apple, you might be interested in APPLE QUIKTRAK, while if you're into the Mac there's the SATELLITE HELPER tracking program. Tandy Color Computers are supported by C-TRACK 1 and C-TRACK 2, and there's also the TRS-80 MODEL 4 QUIKTRAK. ORBIT 1 is designed for the HP-41 programmable calculator.

AMSAT also offers IBM PC and Mac software to access the bulletin-board capabilities of the Microsats, as well as several IBM PC and Mac telemetry decoding programs that allow observation of telemetry frames from these satellites. Other programs offered include the UoSAT DATA CAPTURE AND DISPLAY PROGRAM for the C-64, WEBERWARE for the IBM PC to process and display pictures from WEBERSAT (WO-18), and KEP/LOADER V2.5 for the Mac; the latter program automatically updates Keplerian elements for use with the SATELLITE HELPER tracking program.

AMSAT also offers a small library of publications for the satellite enthusiast. These include *A Beginner's Guide to OSCAR-13*, *The Satellite Experimenter's Handbook*, *The PACSAT Beginner's Guide*, *Decoding Telemetry from the Amateur Satellites*, and the *Weather Satellite Handbook*. AMSAT software and books are available to members and nonmembers alike. Annual AMSAT domestic membership is \$30.

For a list of available books and software, contact AMSAT, 850 Sligo Ave., Silver Spring, MD 20910 (301-589-6062).

TS Mouse for Kenwoods. A new transceiver remote-control software package is TS Mouse, designed for use with several Kenwood transceivers, such as the TS440, TS850, TS940, and TS950.

The new program is designed to minimize the need to memorize function keys, command strings, and complicated procedures, often required in many shareware, public domain, and commercial transceiver control programs. The TS Mouse concept of operation is based on the assumption that the very simplest form of communication with a computer is with a mouse. Consequently, TS Mouse never asks you to use a function key or a control sequence; the only time you have to touch the keyboard is to add text to an entry, enter a filename, or respond to a program prompt. If you like, you can use the keyboard or numeric keypad to rapidly enter a new frequency or channel by simply punching in the frequency and hitting the ENTER key.

The software package includes all of the programs necessary to install and run TS Mouse, a setup and user's manual with glossary, and an initial disk log file containing frequency setup information. To use the program you need an IBM PC or compatible computer with a mouse and an RS-232 interface. For TS440s and



The Norton Backup is Symantec's definitive answer to the threat of lost PC data. The program easily and reliably backs up your data with minimal interruption to your work or operating schedule. Both regular DOS and Windows-compatible versions are bundled in the same package. (Photo courtesy Symantec Corp.)

TS940s an internal RS-232 adapter also is required.

TS Mouse is available for \$39.95 postpaid from LinearLogic, 2634 West Naranja Ave., Mesa, AZ 85202.

PC Shortwave Monitor. This is an inexpensive frequency management program for SWLs who are trying to bring some semblance of order to the multitude of available international shortwave broadcasts. The program is designed to enable you to create a variety of customized listening schedules based on information you input into a master file containing logging records.

The program provides several functions. One is to generate printed "logsheets," blank forms that are identical in format to the program's data-entry screen. The program also will produce a "master shortwave log" that contains every logging entry arranged in a standardized sequence, including start and end times, country, language, broadcast directionality, signal strength, program description, and frequency. You also can print out customized listening schedules containing only those records which match a particular country or station, or schedules for a unique combination of language, program, and "broadcasting to" (directionality) codes.

PC Shortwave Monitor is priced at \$19.95 plus shipping for a fully functional copy; a demo version is \$3.50. Contact Scott Gitlin, 86-29 155th Ave., Suite 5N, Howard Beach, NY 11414.

HAM-SOFT Public Domain Software. HAM-SOFT offers a 60-page catalog of amateur radio public-domain and shareware software that includes hundreds of programs designed for the IBM PC and compatibles. In addition to the IBM PC offerings, there also are four pages of increasingly hard-to-find Commodore 64 software and two pages of Mac programs.

Disk pricing is modest, and all software is certified to be virus-free. Catalogs are available for \$1 from HAM-SOFT, P.O. Box 2525, Morgan City, LA 70381-2525.

The Norton Backup™. PC users often neglect data backup because it's too time-consum-

ing or complicated, but Symantec has added a number of features to its top-selling backup utility that make backup operations simple and convenient, whether you're running under PC/MS-DOS or are using Windows. The title "The Norton Backup for Windows and DOS" may be a mouthful, but the features of this dual-capable product from Symantec certainly are impressive. Above all, it's highly reliable and very fast, boasting data transfer speeds as high as 3.5 MB per minute.

Some of the main features of The Norton Backup are easy selection of any disk drive, directory, or individual file for backup; use of up to five different backup types (including full and incremental); three levels of data compression to reduce the number of backup disks; easy restore of a single file without shuffling through multiple backup disks; the ability to restore to different drives or directories; and optional selection of files by date range or other criteria. You also can back up multiple hard disks in a single session.

What you receive when you purchase The Norton Backup are two distinct products bundled together in a single package; there are separate disks and user's manuals for the DOS and Windows versions. The Windows version has all of the features of the DOS version, plus much more. Some of these extras include the ability to schedule automatic backups that can run "in the background" while you do something else; launch of customized backups with a double click of your mouse; and the ability to view files prior to backup and delete files from the hard disk following backup. You can exchange backup disks and setup files between the DOS and Windows versions, although you can't exchange macros you may have created.

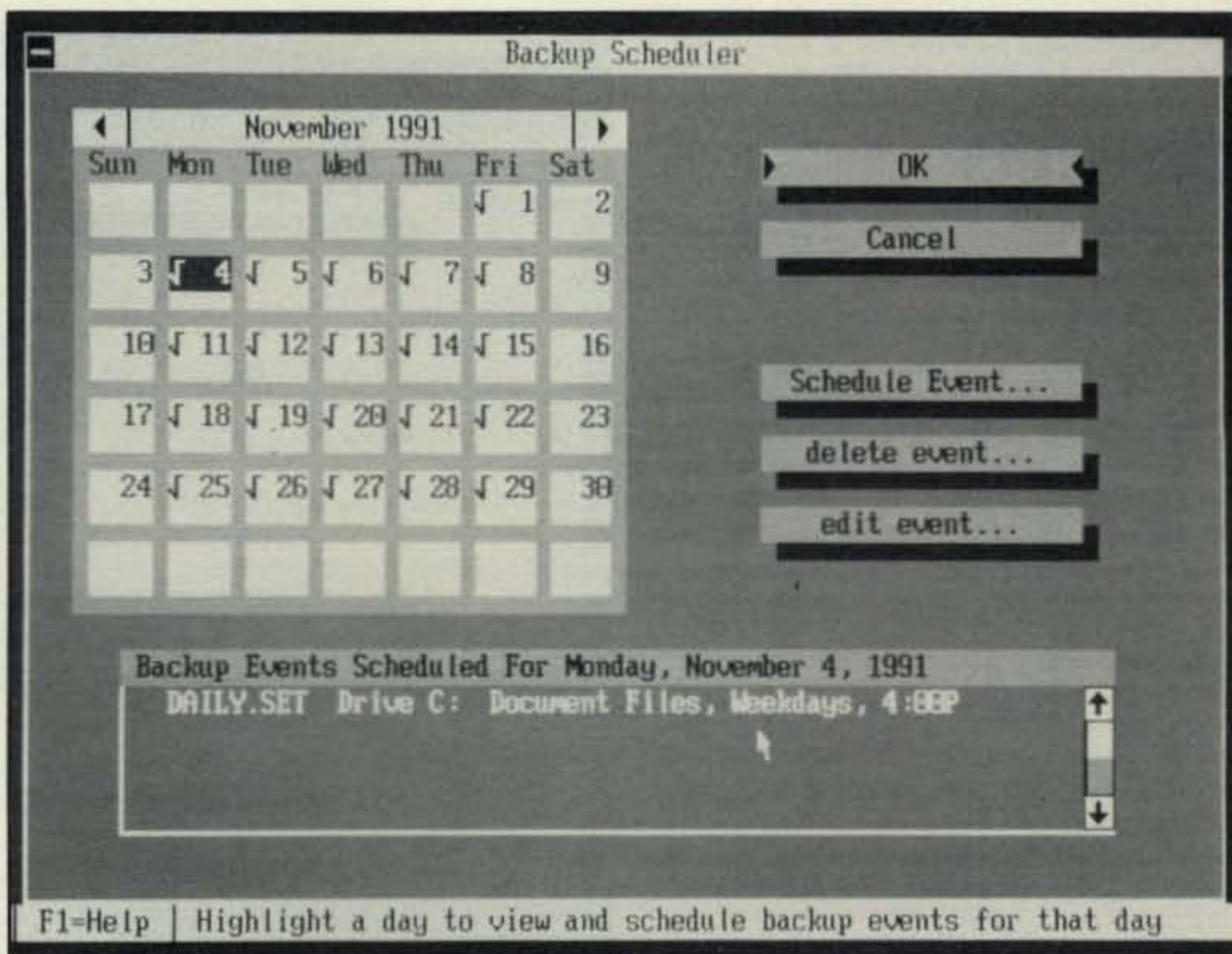
Suggested retail price is \$129, but street prices are considerably lower. For more infor-

mation, contact Symantec Corporation, 100 Wilshire Blvd., Santa Monica, CA 90401-1104.

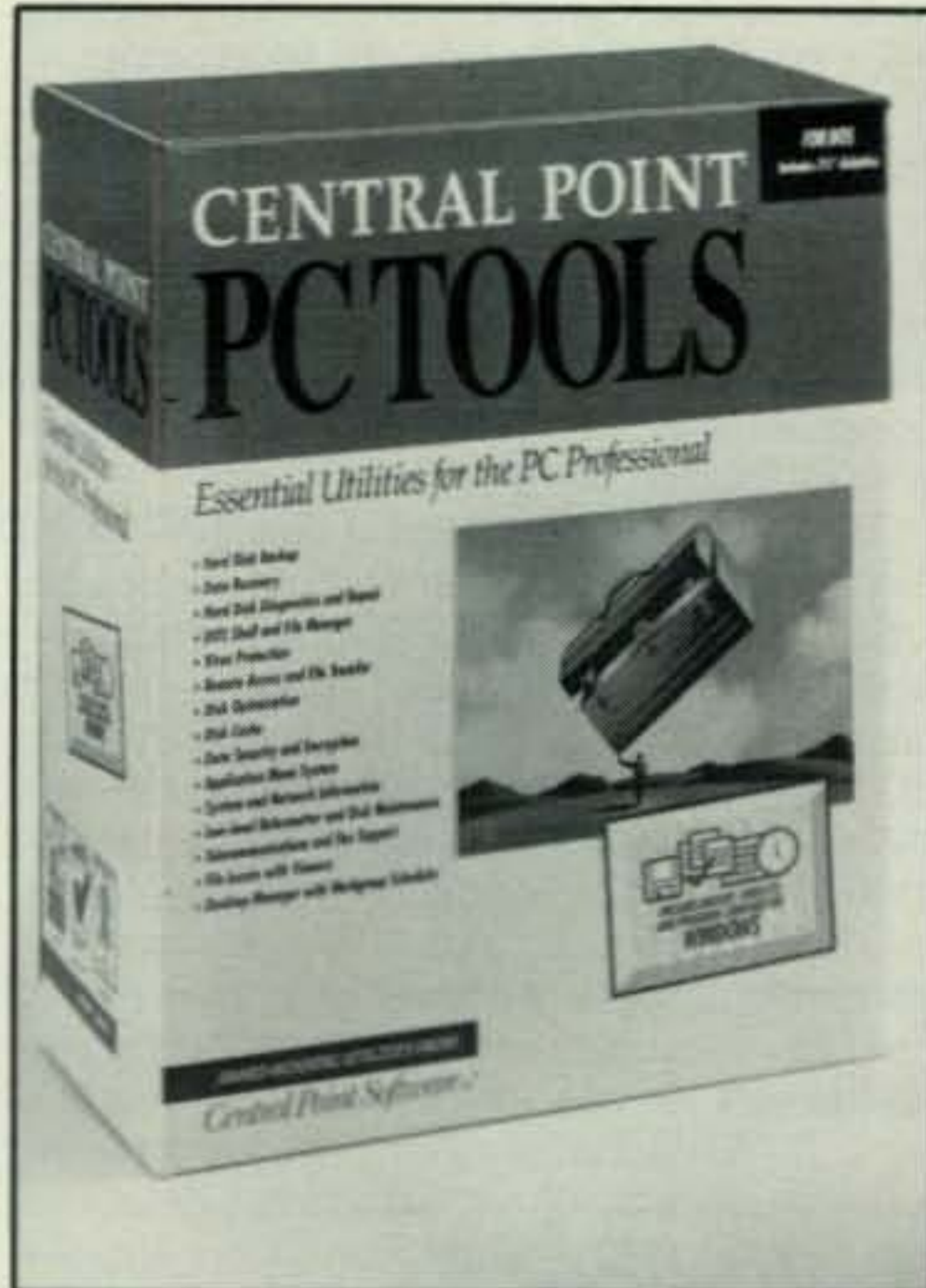
PC Tools™ V7.1. In the November 1990 column we did a brief review of PC Tools Version 6, a very comprehensive hard disk utility program, one of the "big three" (the others are The Norton Utilities and Mace Utilities). Obviously, the folks at Central Point Software must have done something right, since they sold more than 890,000 copies of V6!

To sum up the many capabilities of PC Tools, it is a powerful group of integrated utilities designed to make computing simpler and faster—and above all, to provide good insurance against devastating data loss. Like The Norton Utilities, PC Tools boasts simple, intuitive interfaces that make routine maintenance easy for beginners, and it also offers several Windows-style utilities and Novell Network support. PC Tools includes various tools for data protection and recovery, hard disk backup, file management, desktop organization, and performance enhancement. Version 7.1 boasts more than a dozen major new functions (since V6), including virus detection and remote-computing functions; there also are over 100 enhancements to V6.

There isn't room for us to detail all of the features of V7.1. Suffice it to say that PC Tools has 10 major areas in which its features lie. These are: (1) hard disk backup with very fast, separate DOS and Windows program versions; (2) data recovery, which includes capabilities to repair hard disks, recover corrupted files, and rebuild inadvertently formatted drives; (3) data protection and maintenance, to safeguard data against accidental format, virus infection, and CMOS memory loss; (4) desktop organization, which includes a scheduler, notepads, database, calculators, etc.; (5) disk and file management that includes a DOS shell, a file finder with viewers, and an application menuing system; (6) system



The Norton Backup for Windows (a separate program, but included in the same package) has some special additional features. These include the ability to schedule attended or unattended backups as well as back up your hard disk while the program runs in the background. (Photo courtesy Symantec Corp.)



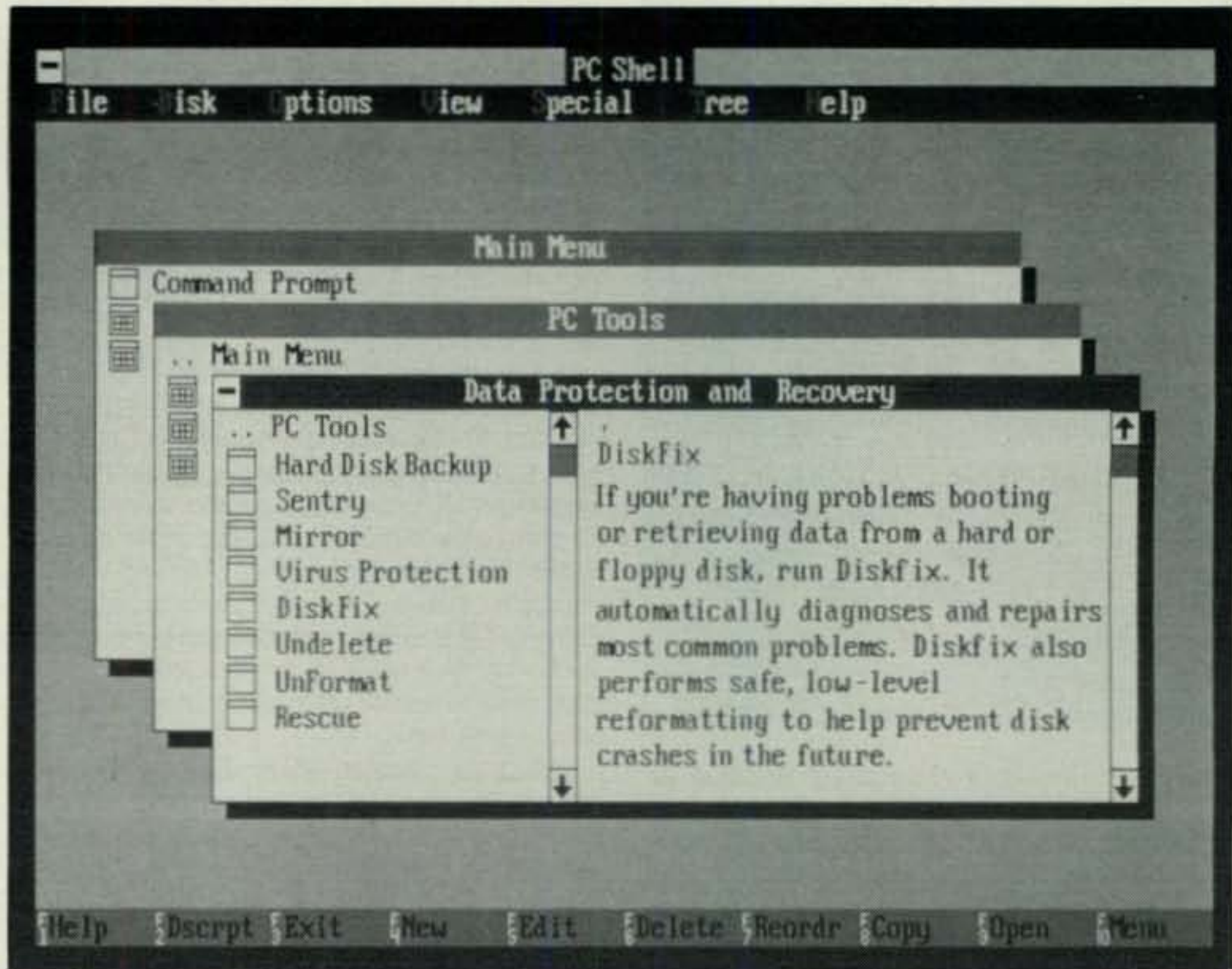
PC Tools Version 7 is the latest incarnation of Central Point Software's comprehensive utility package. It includes a wide variety of tools for data protection and recovery, hard disk backup, file management, desktop organization, and performance enhancement. (Photo courtesy Central Point Software, Inc.)

and network information that provides extensive reporting of over 160 system and network parameters; (7) a remote computing feature that lets you run applications on one PC from another; (8) performance optimization that improves hard disk performance by defragmenting files, adjusting sector interleave, and caching disk "reads" and "writes"; (9) telecommunications, which offers modem communications, including E-mail and fax-board support; and (10) data security and encryption, which includes a selection of file and screen security measures to give you control over who has access to your data.

The new version also has done a good job of "putting it all together"; there now are global features to make operation smooth and easy, including a Windows-like DOS user interface, context sensitive hypertext help, and a master color menu.

Frankly, I installed and checked out V7.1 with some trepidation, since many users had experienced serious "glitches" with the original V7 (issued in March 1991 and since fixed with a maintenance release); I even wondered whether the PC gurus at Central Point Software finally had offered a product with too many diverse capabilities and features to properly organize and support. These fears were quickly allayed when V7.1 installed without a hitch and a quick check of the program's many features did not disclose any serious problems on my 386SX or an old XT.

Some of the features offered in V7.1 that I was most impressed with included an upgraded and very thorough DiskFix™ disk diagnostic and repair program, which compared favorably with those offered in The Norton Utilities; an ability to do a nondestructive low-level hard disk reformat; an outstanding system information utility that tells you just about everything you might want to know about your PC; a slick and easy-to-use file undelete feature; and a very fast and sophisticated file-finding applica-

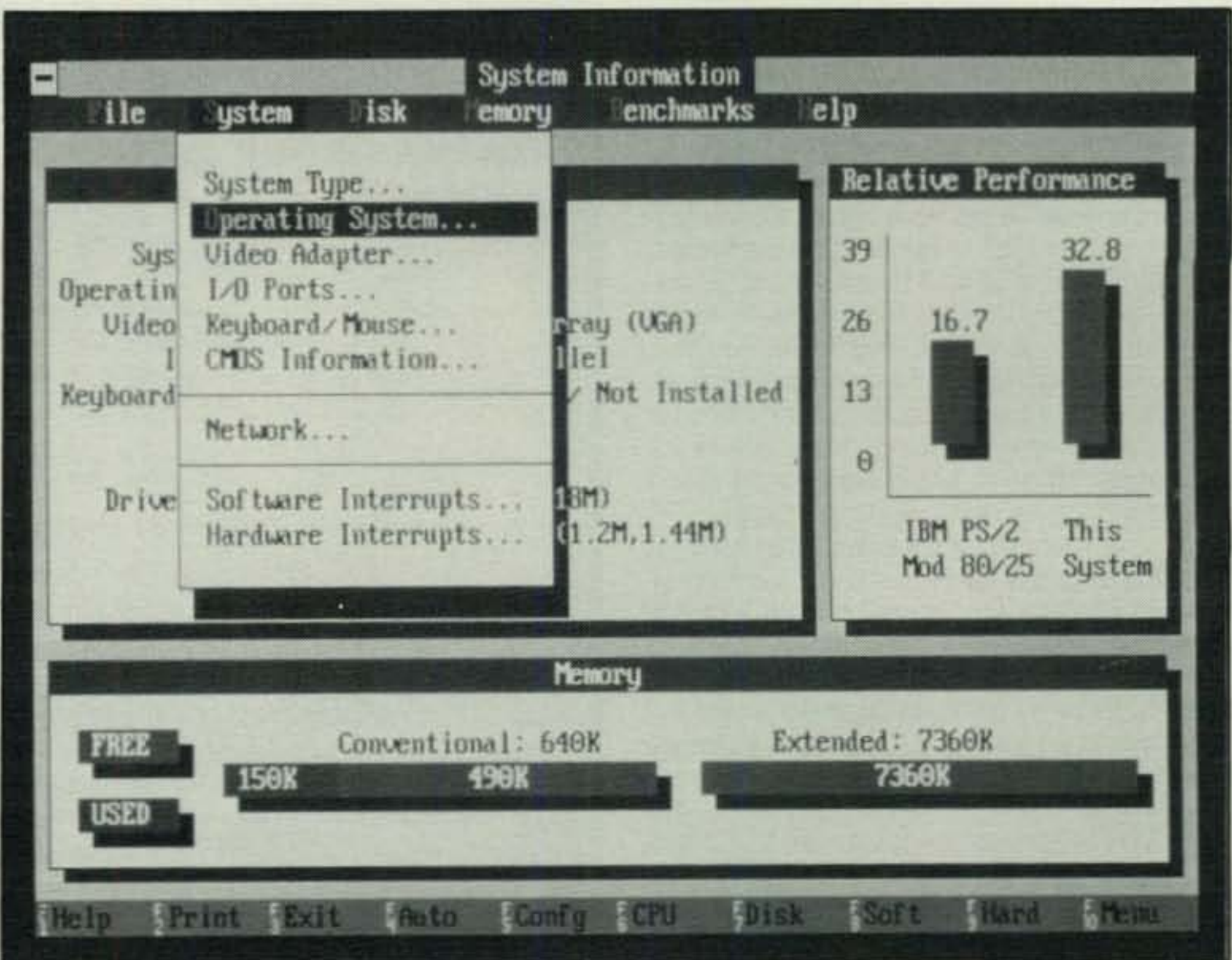


One of PC Tools Version 7's many features is a customizable application menu system that allows you to set up application groups for quick, intuitive access of your software programs. (Photo courtesy Central Point Software, Inc.)

tion. Some of V7.1's features were not particularly interesting or useful to me, so it's difficult to comment on them. These included the telecommunications, data security and encryption, remote computing, and various Windows-based

modules, where I either preferred other programs or had no use for the particular capability.

While PC Tools can't be "all things to all people," it certainly makes a good effort toward becoming the "Swiss army knife" of IBM PC



One of PC Tools Version 7's strongest features is a powerful system and network information utility that provides you with a complete rundown on what it finds in terms of your PC's hardware, software, operating system, memory, and network information. The utility also allows you to do benchmark testing of your PC's installed equipment (Photo courtesy Central Point Software, Inc.)

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utilities. All things considered, at \$179 retail (with a street price slightly over \$100), PC Tools V7.1 is a good value. It's an even better value if you own an earlier version, in which case the upgrade is only \$49. For more information, contact Central Point Software, 15220 NW Greenbrier Parkway, #200, Beaverton, OR 97006.

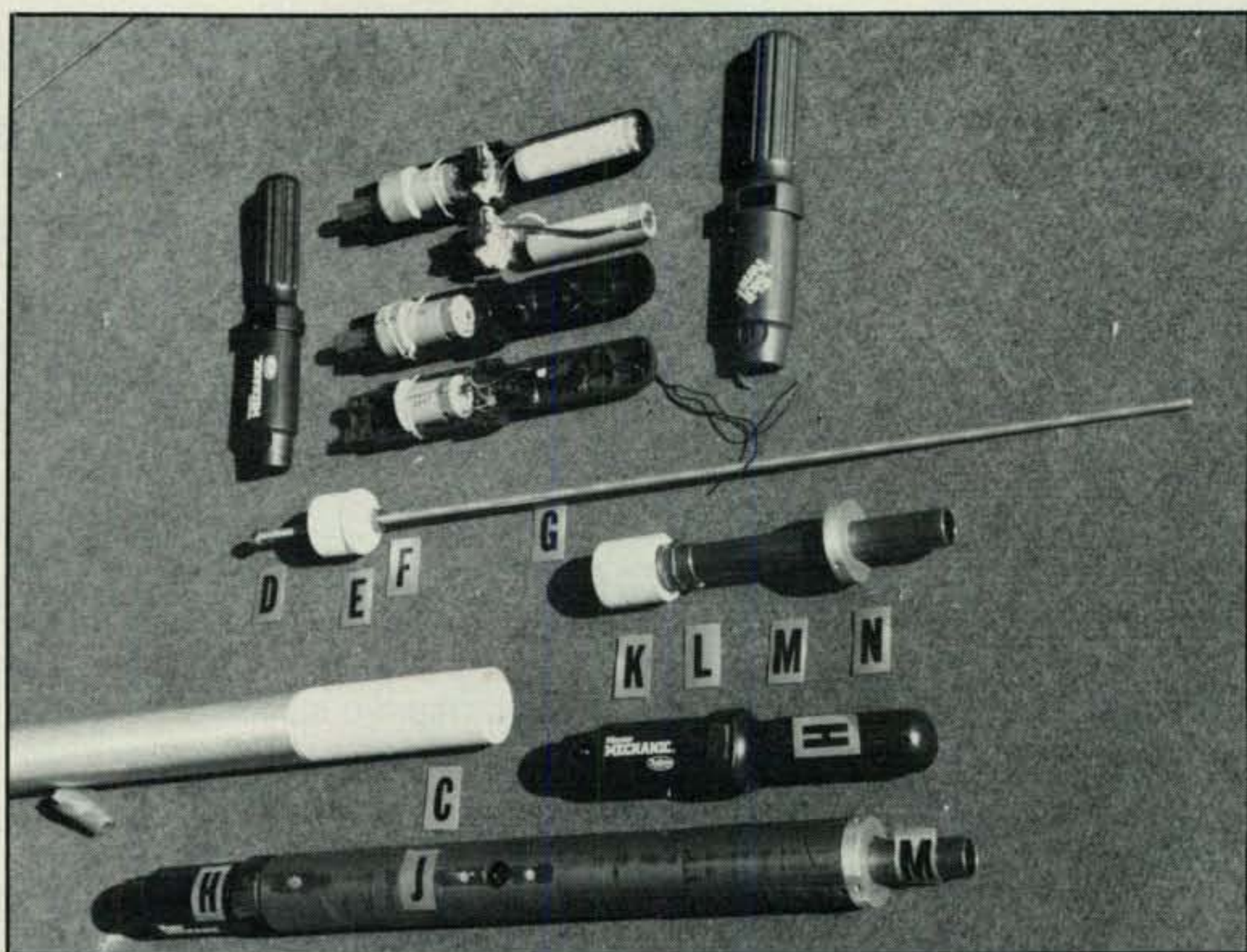
Short Bursts

The Sounds of Natural Radio? It's well-known that parts of the Extremely Low Frequency (ELF) and Very Low Frequency (VLF) spectra—from about 100 to 10,000 Hz (0.1 to 10 kHz)—are replete with so-called "natural radio emissions," most of which are created by the interaction of lightning storms (always present somewhere in the world) with the Earth's ionosphere and magnetic field. Theory has it that the lightning discharges disturb the earth's magnetic field and result in the generation of some rather mysterious electromagnetic signals.

"Whistlers" sound like falling musical notes and result when lightning-bolt electromagnetic impulses travel within ducts along the Earth's magnetic field lines. There is also the "dawn chorus" which resembles a flock of birds chirping or frogs croaking; the chorus emanates from lightning stroke impulses interacting with the Earth's magnetic field. There also are hissing, rushing, and blowing sounds which also have their origins in electrical emissions from the Earth's magnetosphere, and then there's the familiar crackling and popping sounds from ongoing electrical storms. Too, there are the "tweaks" which have a ringing and tripping sound effect that's noticeable at night, made by lightning impulses that travel and disperse in a resonant "pipeline" formed by the Earth's surface and ionosphere.

Does all this QRN sound interesting? Conversion Research offers a novel portable, the WR-3 VLF Receiver, designed specifically for the reception of naturally occurring low-frequency radio emissions. The 8 oz., battery-operated receiver contains a proprietary circuit that receives these emissions using a 33 inch telescoping whip. The unit delivers 500 MW audio output into 8 ohm stereo headphones (not supplied). Price is \$48 postpaid and includes a five-page listening guide.

For more information, contact Conversion Research, P.O. Box 535, Descanso, CA 91616.
National Computer Security Association.



Here are some of the main components of the W6AAQ Model DK3 mobile antenna, which he considers to be competitive with any of the HF mobile antennas on the market. Don Johnson, W6AAQ, offers the plans for \$5 postpaid. See the text of this month's column for the details. (Photo courtesy Don Johnson, W6AAQ)

Not long ago we discussed The Norton Anti-Virus™ utility, one of a new breed of programs designed to provide complete virus protection, detection, and elimination for the IBM PC and compatibles. While the real impact of computer viruses on most computer users probably is somewhat overblown and hyped, viruses *do* exist and can wreak havoc when they strike.

Recently we received an interesting membership solicitation from the National Computer Security Association (NCSA). Its goals are to help users to improve the security of their computer systems, reduce the threat of computer viruses, and ensure the integrity of their systems. To these ends, NCSA conducts research on computer security, virus, and data integrity problems, and also evaluates virus detection and removal programs. The association operates a support bulletin board (open to nonmembers), publishes a six-times-a-year newsletter, offers a virus self-defense kit, publishes books on com-

puter security topics, issues research reports and a computer virus "survival guide," and conducts computer security seminars. Personal memberships are \$45 per year.

For membership information contact NCSA at 227 W. Main St., Mechanicsburg, PA 17055.

Update: 40 Years of HF Mobileeering. In the April 1990 column we took note of the interesting historical scrapbook and technical compendium of this name, written by Don Johnson, W6AAQ. As we noted then, the focus was strongly on mobile antennas, including those suitable for homebrewing. In his book Don described and thoroughly critiqued several commercial designs and included a wealth of additional information on antenna tuners, fusing, cables, grounding, coax, antenna mounting, and more.

However, a note from Don late last year advised that the 10,000-copy press run had been exhausted, so the \$10 book is now officially "out-of-print." However, he indicated that the book is being rewritten and updated and the new edition should be available before you read this.

In the meantime Don also tells me that if you're into "rolling your own" HF mobile antennas, he's come up with an automatic, no-relays HF bandswitching design, the DK3, to cover 10, 20, 40, and 75 meters. A copy of the 17-page design manuscript is available for \$5 postpaid from Don Johnson, W6AAQ, 26659 Capay St., Box 595, Esparto, CA 95627-0595.

Wrapping It Up

That's about it for this time, gang. Next month, more Antennas & Accessories topics of current topical interest. See you then.

Overheard: Unfortunately, it's often true that if an experiment works, something most definitely has gone wrong!

73, Karl, W8FX

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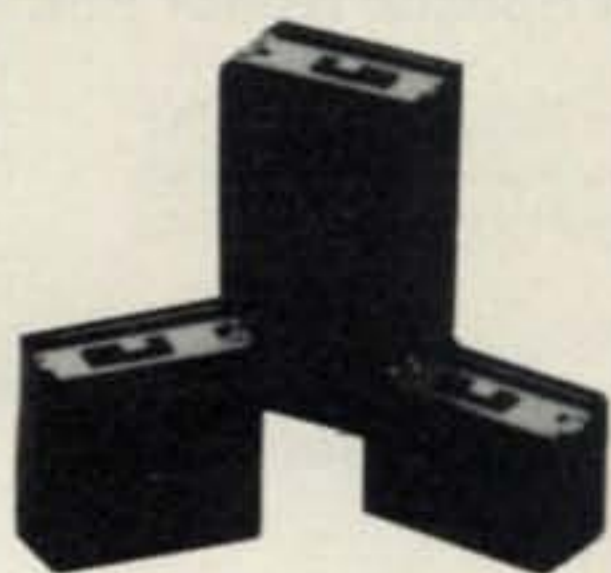
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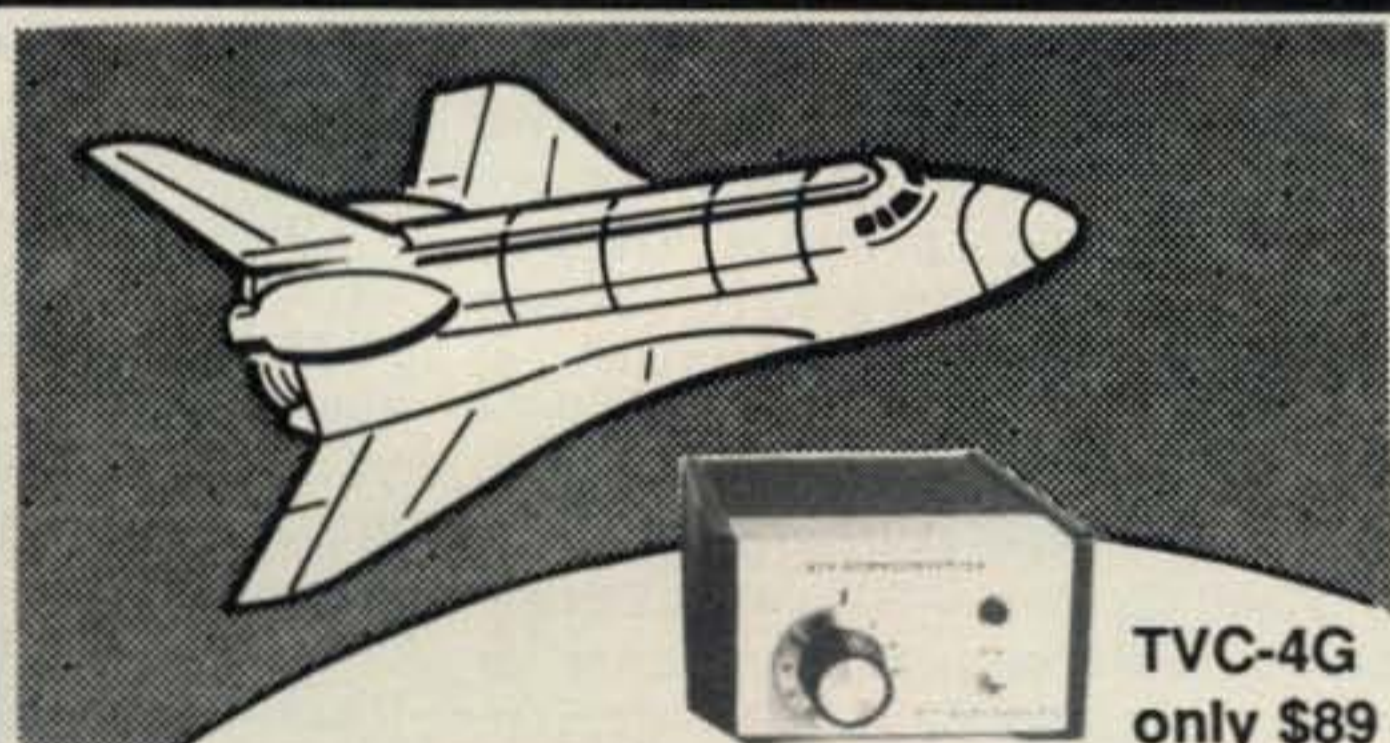


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NEWS OF CERTIFICATE AND AWARD COLLECTING

The Story of the Month for May is:

**Ronald B. Rosenwald, KA3DRO
USA-CA All Counties #713
Mixed, 6-4-91**

"I was born in Connecticut in 1939 and was promptly moved to the Philadelphia/Wilmington area prior to the war. As a youngster growing up I was always interested in science and soon constructed my first radio receiver based upon a Quaker Oats box. Radio never became important until college, when a fraternity brother named Jim displayed his mobile gear on a trip to Pittsburg in his '53 Chevy. This attracted my attention, and I knew that someday I would also be able to cruise the roads and talk to people hundreds of miles away.

"After I graduated from the University of Delaware in the early '60s, I taught science and coached football/basketball in a private school and decided to earn an advanced degree. A choice soon developed to join the Peace Corps and go South America or to get married and move to Arizona. True love won the tug-of-war, and I married Chari. We soon moved to Phoenix, where I entered the graduate program at Arizona State University for a Masters degree. Working two or three jobs at a time and attending graduate school left little time for fun such as radio, but after two hard years I had the sought-after degree, and we moved east to get out of the desert oven and back to where green grass was not a novelty and the rivers flowed with real water.

"A change in employment somehow found me in the retail clothing trade, where I remained for almost 20 years as President and 'chief cook and bottle washer' for a small retail corporation. In the late '70s, remembering the radio, I decided to make good on my promise and contacted some local hams who helped me earn my Novice ticket, encouraged me to push for General, and then Advanced class. Our friendship continues to this day. WB3ISS and K3UAV made sure I learned it all the right way.

"My immediate attention was for DX, and as my totals ran past the 100 and then 150 mark, I felt that something was missing from the chase. DXing seemed to become less appealing as lists became prevalent, and it seemed that multi-kilowatt stations practiced discourtesy to our barefoot signals.



Ronald B. Rosenwald, KA3DRO, USA-CA All Counties #713 (right) with Bernie, WB3DWH, at Bernie's QTH in Pennsylvania.

"I was involved with a local club as activities chairman, then as secretary, then two terms as president. At the same time I was involved with the ARRL as ACC for MD/DC under Karl Medrow. This all interfered with my air time, and I backed out of some of these activities and got involved in 2 meter SSB, then 6 meter work, and some years in 160 meter contests. All were fun, but not long lived, and the DXing bug seemed to falter after the 200 mark and a rash of being witness to some very poor conduct by others.

"In a cruise over the 20 meter band one day in 1985, I bumped into a net that sounded small and friendly where people were actually helping others get contacts instead of interfering with them! I listened to these County Hunters, wondering why anyone would chase counties with all those far-away places yet to be heard, but the net sounded like fun, and I made a few contacts and was welcomed as a newcomer. It soon dawned on me that most all of these people were mobile—yes, actually talking from their cars—and the image of Jim (I wish his name would come to me) and the green '53 Chevy came back. This was for me! About a year and a half later I broke down and bought a demo TS-430 from my friends at Delaware Amateur Supply and soon was KA3DRO/M.

"By now I was deep in the real-estate business as a broker, sales manager, training director, and sales agent for a national chain. It was hard to find the time to get on the air as often as I wanted, but the mobile helped me get many counties that would have been missed otherwise. About three years ago two other agents, my wife and most dependable navigator, and I opened Sellers Connection, our own real-estate of-

USA-CA Special Honor Roll

Bruce Resseguie, KA6ZXF
USA-CA All Counties #738
All 20M SSB Mobile, 1-7-92

W. Doug Sweeney, N8AJC
USA-CA All Counties #739
Mixed, 1-9-92

James A. McClary, Jr., KC4SF
USA-CA All Counties #740
Mixed, 1-14-92

G.L. "Lin" Titus, VE1AIT
USA-CA All Counties #741,
Mixed, 1-15-92

Alfred B. Watson, K4BBF
USA-CA All Counties #742,
All 20M SSB Mobile, 1-27-92

USA-CA Honor Roll

3000		1500	
W3DYA	764	KA6ZXF	1012
KA6ZXF	765	N8AJC	1013
N8AJC	766	KC4SF	1014
KC4SF	767	K4BBF	1015
VE1AIT	768		
WA1FNS	769	1000	
K4BBF	770	KA6ZXF	1212
		N8AJC	1213
		KV5F	1214
		K4BBF	1215
		Y24GE	1216
2500			
KA6ZXF	847		
N8AJC	848		
KC4SF	849	500	
K4BBF	850	AL7HS	2561
		YU1AB	2562
		KA6ZXF	2563
		N8AJC	2564
2000			
KA6ZXF	924	KE9OI	2565
N8AJC	925	N6NF	2566
KC4SF	926	K4BBF	2567
K4BBF	927	Y24GE	2568
		HA7XL	2569

The total number of counties for credit for the United States of America county Award is 3076. The basic award fee for subscribers to CQ is \$4.00. For nonsubscribers it is \$10.00. Initial application must be submitted in the USA-CA Record Book, which may be obtained from CQ Communications, 76 North Broadway, Hicksville, NY 11801, U.S.A. for \$2.00. To qualify for the special subscriber rate please send a recent CQ mailing label with your application. To be eligible for the USA-CA applicants must comply with the rules of the program as set forth in the revised USA-CA Rules and Program dated April 2, 1985. A complete copy of the rules may be obtained by sending an SASE to Dorothy Johnson, WB9RCY, USA-CA Custodian, 333 South Lincoln Avenue, Mundelein, IL 60060 USA. DX stations must include extra postage for airmail reply.

... I dedicated my work interest to appraisal, and my partners specialized in commercial and residential areas while Chari handled the books. This gave me the opportunity to get into black-and-white photography, and I took the classes and built my own real darkroom. Many evenings to relax

333 South Lincoln Ave., Mundelein, IL 60060

I would be working on prints while listening to the net from my basement hideaway.

"There were several trips made, including two to the west coast to Seattle to see my daughter and two grandsons. The first was in January 1988. We were warned about the route through Wyoming and finally hit bad weather at Elk Mountain. With a temperature of about 10° below zero and winds gusting to 50+ MPH, they closed the interstates right behind us. We made it to Laramie, however, where we were forced to stay over. It took two more days to get to the coast due to storms, and we were never so happy to hear the voices coming from the TS-430 as people watched the reports and advised us which routes to take to avoid the storms. (Thanks again, guys!)

"All in all we have put out about 835 counties, with more planned. Along the way we have enjoyed 'eyeball QSOs,' with so many County Hunters—KB7QO, N9DEH, WB4FFV, W7GVF, W5ILR, W6PXE, W1WLW, N0COL, K8DTO, and many others.

"A special thanks goes to WA3TUC and KC3YT for all their able assistance and their many important entries in my logs, to K5VYT who ran northern Colorado to get my next to last at Jackson, and to my cousin WA2AKB (and Carol, who may never forgive me for introducing him to county hunting) for giving me my last of all, Franklin, New York on May 25, 1991. He had fun

and is now on his way to USA-CA All Counties with the friendliest bunch on the air, The County Hunters at 14.336.

"We kept on planning trips after completing all counties, including one to Alaska, putting out the northern tier of counties through Montana, the districts of Alaska, down to Seattle to see our daughter and grandchildren, and back home via Colorado, Kansas, and Missouri, three states we had not been in before. We also continue to enjoy reunions with so many friends at the MMM convention in Tennessee. This is when the hobby really glows as we meet new people and renew old friendships during the 'eyeball QSOs.'

"As I go the 'Second Time Around,' we enjoy giving out the counties, love to give out 'last counties,' and hope someday to give a last to complete All Counties for someone for their first time around. What a thrill! BCNU down the log".

—Ronald B. Rosenwald, KA3DRO."

Awards Issued

Bruce Resseguie, KA6ZXF, filed his application with a complete collection of county confirmations and received USA-CA All Counties #738, USA-CA 3000 #765, USA-CA 2500 #847, USA-CA 2000 #924, USA-CA 1500 #1012, USA-CA 1000 #1212, and USA-CA 500 #2563, All 20M SSB Mobile, dated 1-7-92.

W. Doug Sweeney, N8AJC, made a clean sweep of it by claiming USA-CA All Counties #739, USA-CA 3000 #766, USA-CA 2500 #848, USA-CA 2000 #925, USA-CA 1500 #1013, USA-CA 1000 #1213, and USA-CA 500 #2564, Mixed, dated 1-9-92.

James A. McClary, Jr., KC4SF, completed his quest by filing his good application for USA-CA All Counties #740, USA-CA 3000 #767, USA-CA 2500 #849, USA-CA 2000 #926, and USA-CA 1500 #1014, Mixed, dated 1-14-92.

G.L. "Lin" Titus, VE1AIT, finished all of his paperwork and claimed USA-CA All Counties #741, and USA-CA 3000 #768, Mixed, dated 1-15-92.

Alfred B. Watson, K4BBF, filed his completely filled and certified record book and received USA-CA All Counties #742, USA-CA 3000 #770, USA-CA 2500 #850, USA-CA 2000 #927, USA-CA 1500 #1015, USA-CA 1000 #1215, and USA-CA 500 #2567, All 20M SSB Mobile, dated 1-27-92.

Norm Beavers, W3DYA, added an endorsement seal to his good record by claiming USA-CA 3000 #764, All CW, dated 1-7-92.

Ira G. Deutsch, WA1FNS, took the penultimate step in his quest by claiming USA-CA 3000 #769, All 20M SSB Mobile, dated 1-15-92.

Leon Bishop, KV5F, filed his good application for USA-CA 1000 #1214, Mixed, dated 1-9-92.

Wolfgang Profert, Y24GE, got off to a

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good start by filing his application for USA-CA 1000 #1216 and USA-CA 500 #2568, All 10M SSB, dated 1-27-92.

Franz Kurth, WA6ALC, received an All 17 Meter endorsement to his USA-CA 500 #1729, dated 1-30-92. This is the #1 All 17M endorsement.

USA-CA 500 certificates went to:

Jerry R. Swanson, AL7HS, USA-CA 500 #2561, All SSB, 1-4-92.

Toma Petrovic, YU1AB, USA-CA 500 #2562, Mixed, 1-6-92.

Bruce Resseguie, KA6ZXF, USA-CA 500 #2563, All 20M SSB Mobile, 1-7-92.

W. Doug Sweeney, N8AJC, USA-CA 500 #2564, Mixed, 1-9-92.

David L. Czerniak, KE9OI, USA-CA 500 #2565, All SSB, 1-11-92.

Thomas E. Gehman, N6NF, USA-CA 500 #2566, Mixed, 1-17-92.

Alfred B. Watson, K4BBF, USA-CA 500 #2567, All 20M SSB Mobile, 1-27-92.

Wolfgang Prufert, Y24GE, USA-CA 500 #2568, All 10M SSB, 1-27-92.

Illes Laszlo, HA7XL, USA-CA 500 #2569, All CW, 1-30-92.

Awards Available

OG Prefix Activity—Finland. In order to celebrate the 75th anniversary of Finnish independence, the Telecommunication Administration Center of Finland has given all Finnish amateur radio operators the right to use the OG prefix instead of the

usual OH prefix. This right has been given for the period of January 1, 1992 to December 31, 1992.

The Finnish Amateur Radio League (SRAL) has issued an award for the 75th anniversary. To obtain the "Suomi 75 vuotta" award you have to have a contact with 75 Finnish amateur radio stations. More details on this and other awards may be obtained from the Awards Manager, Mr. Jukka Kovanen, Varuskunta Rak 47 as 11, SF-11310 Riihimäki, Suomi, Finland.

Activity frequencies for the Finnish county award are 3515, 3525, 7025, 14045, 21045, and 28045 kHz on CW, and 3675, 7060, 14273, 21273, and 28573 kHz on SSB.

This information comes courtesy of Norbert Kelzenberg, OH2AUM, Assistant Secretary, The Finnish Amateur Radio League.

The VHF/UHF County Award (VUCA). The VUCA award is sponsored by the Side Winders on Two (SWOT) radio club. The stated purpose is to encourage VHF/UHF activity and to recognize operating achievements on the frequencies above 50 MHz. The rules are as follows:

VUCA certificates for each VHF/UHF band are awarded by SWOT for two-way contacts with the minimum number of counties per band, and endorsement increments, as indicated below.

50 MHz: Init. Award 100 counties; increment 50 counties.

144 MHz: Init. Award 100 counties; in-

crement 50 counties.

222 MHz: Init. Award 50 counties; increment 10 counties.

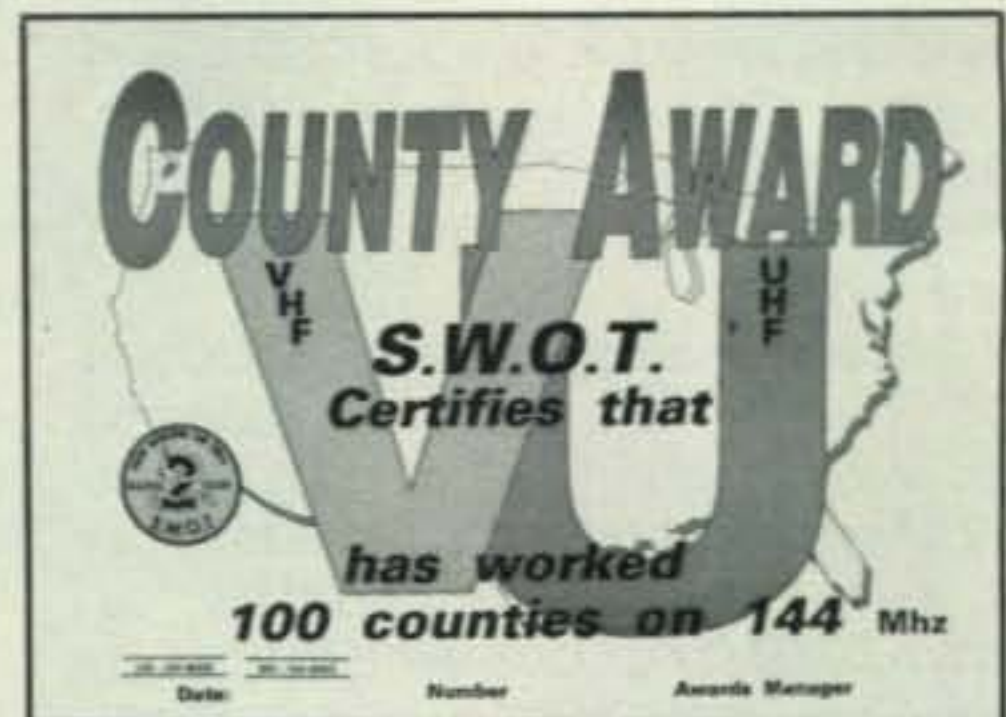
432 MHz: Init. Award 50 counties; increment 10 counties.

903 MHz: Init. Award 25 counties; increment 5 counties.

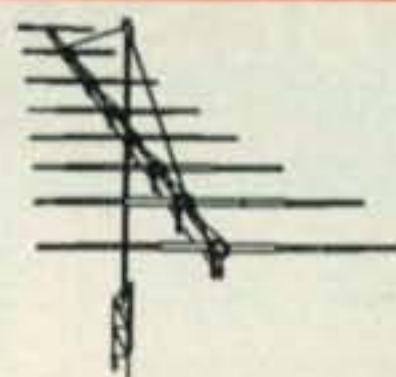
1296 MHz: Init. Award 25 counties; increment 5 counties.

2.4 GHz & up: Init. Award 5 counties; increment 5 counties.

The CQ USA-CA listing of counties and independent cities in the CQ counties award Record Book is the official county list for this award. The award is available to all licensed amateurs. Awards are numbered sequentially for each band and may be endorsed for all: CW, SSB, EME, OSCAR, ATV, Packet, FM Simplex, Mobile, or QRP upon submission of appropriate appli-

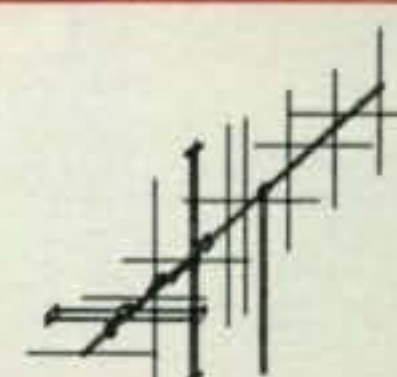


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222-7EZ	\$ 79.00
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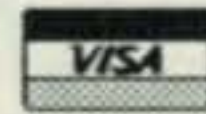
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THINGS TO LEARN, PROJECTS TO BUILD, AND GEAR TO USE

Telephone Interference—A Continuing Story

I hate to be a pest about this sort of thing, but my mail indicates telephone interference is an ongoing problem, and a bad one. In past columns I have discussed various types of simple filters that can be placed directly in the telephone line at the affected instrument. In most cases they do the job, but in some cases they seem to be ineffective. Why is this? I have received some useful information on this puzzling problem and here it is. I hope it is helpful.

First, a friend engaged in telephone installation and the accompanying problems tells me that in general he has found that phones marketed by AT&T, Panasonic, and Sony seem to be, with few exceptions, very much prone to RFI. On the other hand, the cheaper Radio Shack phones seem to be more RFI-proof. (I can't verify any of this. I just pass along his information.)

Second, I have received a catalog from TCE Laboratories (RR 9, Box 243D, New Braunfels, TX 78133; phone 1-512-899-4575) that features RF-filtered telephones. In addition to line filters, TCE sells wall- or desk-type phones that are internally modified to reduce RFI susceptibility. These are available on a money-back guarantee. Simply junk the affected phone and replace it with one of the TCE telephones. It's much simpler than digging into the phone innards trying to clean up the RFI-sensitive circuits yourself!

Finally, it may require both a modified instrument plus a telephone line filter to clean up a severe case of interference. A cordless phone may also require an additional toroid filter on the power cord. Residences having knob-and-tube electrical wiring or those having the telephone wires run in the attic area (or both) are particularly susceptible to telephone interference. Combine this type of residence wiring with an RF-prone phone and you have a real problem!

The "Rubber Glove" Solution

I received an interesting letter from Sol Mansbach, N4IXO, telling me of his unique solution to telephone RFI. While watching the boob tube Sol had an inspiration concerning his neighbor's telephone interfer-

48 Campbell Lane, Menlo Park, CA 94025

ence. He bought a small carton of steel wool and a box of disposable rubber gloves. He had a desk-type phone with a base mount that sat on a table for a test unit. Before modification, his 100 watt rig completely obliterated the dial tone. A line filter didn't help, as the signal pickup seemed to be internal to the phone.

Well, Sol opened up the phone case to expose the innards. He then cut the fingers off a rubber glove and stuffed two or three of them with steel wool. He used rubber bands to close the open ends of the fingers. The wool was packed in loosely so that the fingers were flexible enough to lay around the components in the phone.

Sol placed the fingers around the wires to the earpiece and components such as diodes and capacitors. He then held the fingers in place with small pieces of duct tape.

Placing the phone back in the circuit, Sol discovered that the signal from his transmitter was almost inaudible in the earpiece. His last step was to get an old high-voltage TV flyback transformer from a local TV repair shop. He removed the wire from the yoke and wound the telephone line on it—five turns on one arm and five on the other, in opposite directions. He placed this filter at the wall terminal of the phone. This completely removed the final vestige of his signal. A clever idea that may work for some of you! Congratulations, Sol, on a novel RFI solution!

A Cheap and Dirty Line Filter

Bert, VE3OBU/SM7BUR, points out that you can build up a power line filter almost for free. Visit the local TV repair shop and ask if they can spare a deflection coil from a defunct TV set. Remove all wires and you will have a big toroid, consisting of two halves. Use two plastic cable ties to hold the halves together. Because the toroid is large, it will have many uses—wrap a line cord around it, or a RG-58/U coax feedline, or whatever. Best of all, the price is right!

A Good High-Pass Filter

It is a wise idea to protect the TV receiver or VCR with a high-pass filter that will attenuate all signals below the TV channels.

More and more receivers are equipped with a 75 ohm coax input to match the cable system, so a good 75 ohm coax filter is called for. Radio Shack sells an inexpensive in-line filter that will do the job (part number 15-579). This provides at least 40 dB signal attenuation from 1.8 to 32 MHz, with less than 1 dB attenuation above 50 MHz. Attenuation in the CB range and 10 meter band is particularly good, running about 50 dB. Just the thing to present to your neighbor, good buddy!

"Matched Pairs"

What's this I hear on the air and read in advertisements about matched pairs of transmitting tubes? I read ads that feature 6146s, 572Bs, 3-500Zs, and other bottles in "matched pairs."

Back in the good old days when stereo was called "hi-fi" and the Williamson audio amplifier was in vogue, it was common practice to purchase some audio tubes in matched pairs. This was done to reduce harmonic distortion in a push-pull Class AB amplifier circuit. The great majority of hi-fi amplifiers didn't provide a bias control that could allow the user to match plate currents of the output tubes. This was necessary to balance the current flowing in the halves of the output transformer. Unbalanced currents could lead to audio distortion. In order for matching to really work, the currents had to be equalized at the maximum output level of the amplifier. Some tubes that were manufactured to close tolerances, such as the KT-66, did not require matching. Mass-produced tubes such as the 6L6 and 6V6 usually required matching to satisfy the requirements of the "golden ear" enthusiast.

The "Sweep Tube" Enters Amateur Radio

The idea of matching tubes entered the realm of amateur radio when it was discovered that a lot of sideband power could be obtained from inexpensive TV-type sweep tubes, such as the 6DQ5 and the 6LQ6. One such tube could put out over 150 watts of SSB power, and the cost was right! For a short period the transmitting-type 6146B tetrode was pushed into the background because of the brute-force

cation/certification. No contacts via terrestrial repeaters are creditable.

The CQ USA County Record Book shall be used as the initial application form for awards on the bands below 900 MHz. The certification form in the record book must be completed and signed by two licensed amateurs who have checked the QSL cards. Application for 903 MHz and higher bands may be submitted as above or as a list showing QSO information and county/state location and certified by two licensed amateurs who have checked the QSLs. Record books and lists become SWOT-VUCA records and will not be returned.

Contacts dated January 1, 1983 or later are creditable. All contacts must be made from one county or any county immediately adjoining it. All contacts must be verified by QSL cards which show the county or other identifiable location for positive county determination. QSLs must be in possession of the applicant and made available to SWOT if requested. Mobiles operating on a county line may be credited for no more than two counties at a time.

Disqualification: Applicants may be disqualified for altering or falsifying QSLs, certifications, etc.

Fees: \$4 for SWOT members, \$5 for nonmembers for each certificate. Endorsements, \$1 plus SASE.

Send applications and make checks payable to L. G. Parsons, W5AL, SWOT VUCA Awards Manager, 3316 Edenburg Dr., Amarillo, TX 79106 (806-352-0835).

WAWA—Worked All Wertz's Award. The Worked All Wertz's Award is offered by the radio amateur members of the Wertz family: KA9ACS, Spike, QTH Antioch, Illinois; NF7E, Bob, QTH Flagstaff, Arizona; N4GQQ, Don, QTH Ft. Lauderdale, Florida.

Brother Bob relates how their sharing the amateur radio hobby developed over the past 15 years and culminated in his computer design of WAWA. Dad, KA9ACS, was first licensed before World War II and re-entered the hobby when son Bob became a ham. Soon brother Don heard of the great times Bob and Dad were having on the air and got his ticket in Florida.

Bob reports that about ten of their awards have been issued thus far, and they hope that is just the beginning. They can be found on 20 meters about 14295 plus or minus 10, and on 160 at times also. This award "is available for those discretionary award hunters from the Wertz's."

Notes

Ted Melinowsky, who publishes the K1BV Directory of DX Awards, has sent word that the 1992 edition is available at a specially

reduced price. This edition contains 1980 different awards from 119 DXCC countries, an increase of over 250 new awards, and several hundred address and rules and/or requirements changes. The special reduced prices are: USA/Canada, \$17.00; DX—air Europe/SA/CA, \$22.00; DX surface mail, \$16.00; DX air all others, \$25.00. Ted says you can send good IRCs at 50¢ each. Ted's address is P.O. Box 960, Keene, NH 03431-0960 USA.

Good hunting, everyone!

73, Dorothy, WB9RCY

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output of the cheaper sweep tube.

So why not put two sweep tubes in parallel for a higher power linear amplifier? Or perhaps four tubes in parallel? (Some illegal CB linears used as many as ten [!] sweep tubes in parallel to run over a kilowatt PEP.)

Alas, it was quickly found that parallel-connected sweep tubes had to be hand-selected to equalize the load. More often than not, one would run red hot while the other one ran cool. By hit or miss, two tubes that would share the load equally could be picked out of a bunch. Such "matched pairs" were often daubed with a spot of paint to identify them. ("Always use yellow-mark tubes in your amplifier.") These matched pairs were sold at premium prices. That was the penalty paid for using tubes in a service for which they were not intended.

In addition, sweep tubes made by one manufacturer often could not be swapped for those made by another, even if they seemed to be matched. Different manufacturing techniques led to structural differences that didn't hurt performance in sweep circuits, but led to serious problems when the tubes were used in RF service. As a result, tubes had to be selected by manufacturer and then individually matched. And to top it off, sometimes tubes made by one outfit were branded with the name of another manufacturer who needed extra tubes to fill a large contract! It soon became painfully obvious to all but the most obtuse that parallel-connected sweep tubes were a royal pain in the neck.

That's the price to be paid when a receiving tube designed for TV service is used as an RF amplifier—service for which it was not intended!

The 6146B Transmitting Tube

When the sweep tubes were gradually phased out of amateur equipment, the popular 6146B tube took its rightful place as a linear amplifier for SSB service. Designed from the start as a transmitting tube, it was not necessary to match them, as manufacturing tolerances were held tight enough so that all tubes worked equally well in RF service—true enough when the tubes were made by reputable manufacturers (RCA, General Electric, Sylvania, *et al*)!

Those days seem to have gone forever, however! Everybody is making tubes that are branded 6146Bs. Some are good and some are bad, but they all sport the 6146B label. The mavericks of the bunch seem to be those imported from the People's Republic of China. At last count there were over a dozen companies in China making transmitting tubes. One or two of the companies produced rather good products. (The chief engineer at one Chinese tube

company spent several years working at the RCA tube manufacturing plant before he returned to China.) Products from some of the other Chinese manufacturers vary in quality and operating characteristics to a marked degree. They do not seem to have the quality control and knowledge necessary to produce world-class products.

Regardless of the quality, transmitting tubes are being imported in large numbers into the United States and other western countries from China and sold under recognizable brand names the copyrights of which have expired.

I recently examined a bunch (perhaps 20) 6146Bs from China that were made by various manufacturers and all imported by one distributor. The height of the glass envelope varied from one bunch of tubes to the next; some of the worst examples would not fit into the amplifier compartment of a Kenwood TS-830, for example, as the tubes were too tall.

Mechanical assembly varied. Just by eyeballing the tubes it was easy to tell which ones were poorly made. Testing them at maximum plate current rating revealed that the operating characteristics varied widely. Such tubes have to be sorted out as to manufacturer and then separated into "matched pairs" by testing under full load in order to make sure they functioned properly! I wonder how many importers of overseas products have the desire, the test equipment, and the knowledge to do this.

The bottom line is properly made transmitting tubes do not have to be matched for amateur service. The fact that many of the imported tubes sold today have to be matched is a sad commentary on overseas techniques and also on the U.S. tube manufacturers who have deemed it not cost-effective to remain in the business. Transmitting tubes are now imported from several European and South American countries, the ex-Soviet Union, and China.

And so it goes. The old days when you could buy a transmitting tube based upon the reputation of its manufacturer have, with one or two exceptions, gone the way of the mustache cup and the buggy whip. Some overseas tubes are fine products. Some are not. How do you separate the sheep from the goats? If you want an answer to this problem, press "one" on your touchtone phone.

A Guy-Wire Modeling Program

Do tower guy wires affect the performance of a beam? Conventional wisdom says yes, and therefore it is good common sense to break up the guy wires into nonresonant sections with strain insulators. Guy wires can devastate the performance of an optimized beam antenna if they are installed at random. The operator has no means of determining this until the tower guys are

in place, the array is up in the air, and operational checks are run.

Detuning guy wires has been a hit-or-miss affair with no hard knowledge about their effect on an antenna.

Recently a guy-wire modeler has been placed on the market (from Brian Beezley, K6STI, 507 1/2 Taylor, Vista, CA 92084, phone 1-619-945-9824). This computer program makes it easy to investigate the electrical effect of guy wires on antenna systems.

A good example is the optimized 4-element, 21 MHz array the pattern of which is shown in fig. 1. That's what a computer optimization program predicts. When the beam is modeled atop a tower with guy wires attached, antenna gain drops and the front-to-back ratio is lost (fig. 2). These plots were taken from an actual antenna and tower installation of a prominent DXer who wondered why his beam wasn't performing as he thought it should.

The GUY utility program tells the story. The program works with the K6STI MN (Mininec) Antenna Analysis software. The investigator tells GUY where guy wires are attached and anchored, and how they're broken up. GUY computes the coordinates of the guy-wire sections and combines them with a selected antenna file to generate a complete system model. GUY handles multiple guy levels and nonuniform insulated section lengths. The investigator

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can rotate the antenna with respect to the guy wires to determine worst-case interaction. The three-dimensional display of guy currents shows exactly which guy sections are causing problems. This information can save a tremendous amount of time and effort when installing or reworking a guy-wire system.

Conventional wisdom does not always work to your advantage when installing guy wires on a tower. Up until now it has been done by guesswork. The GUY program brings this problem to an advantageous solution.

The PS Plot Program

Paul, NX1H, has devised a printer utility for the MN and YO antenna analysis programs developed by K6STI. Paul's program, PSPLOT, converts the aforementioned programs to commands that run a PostScript-compatible laser printer. PSPLOT will print up to 18 plots on one page, overlay four plots on one coordinate chart, use polar or rectangular coordinates, and lots more. Contact Paul Terwilliger, NX1H, 11 North Shore Rd., Chester, NH 03036 for more information.

Sealing Coax Connectors

Here are two novel ideas from Paul Langendorfer, N8CKV, on the problem of waterproofing PL-259 style coax connectors and cable splices. The ideas dispense with electrical tape, heat-shrink tubing, and all that jazz in favor of sealing compounds. Paul has used these for many years with good success.

The first product is auto spray undercoating. It is a black liquid which dries flexible. Spray it liberally on the connectors. The second is a putty-like seal (similar to coax-seal). It is used in the space program by NASA to seal plugs and wiring harnesses. One brand name is Dux-seal[®] made by General Electric and others. The compound comes in a 5 pound can and will last a lifetime!

Paul had some underground "Romex" wiring that was damaged by digging. He sprayed the damaged section with undercoating and wrapped it with 6 mil plastic sheeting. He sprayed again and then buried the cable. That was eight years ago, and no trouble has been experienced since then.

Two good ideas for you to consider!

The Dead Band Quiz

I can't seem to get ahead of my smart readers. Additional puzzle enthusiasts who solved the *High Road to China* movie quiz include: NH6ZF, KA3PGT, AD0V, and KD0YZ. Good going, gang.

And concerning "Arnold," only a few sharp-eyed TV viewers who watch *Murder*

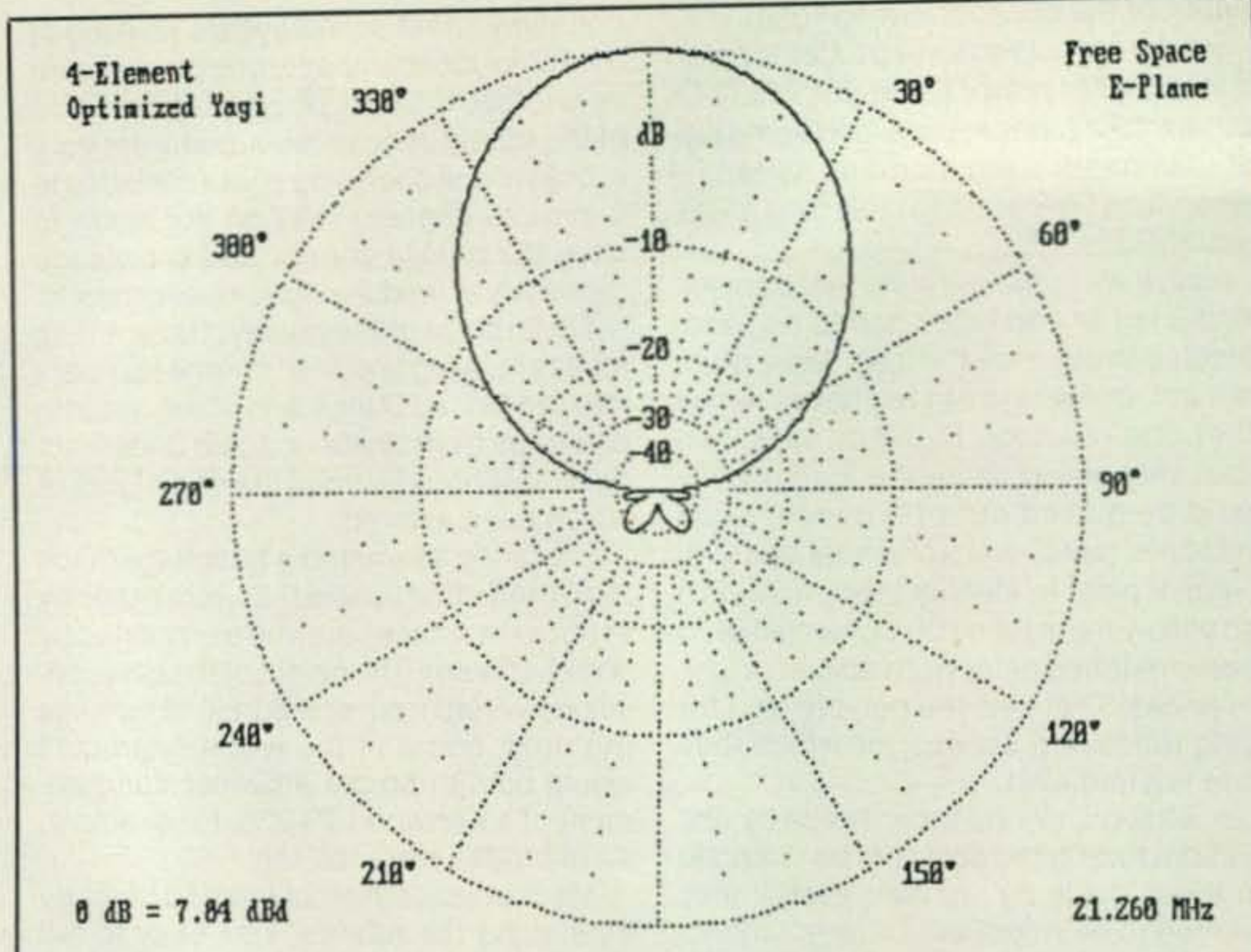


Fig. 1- Optimized pattern of 4-element Yagi in free space.

She Wrote recognized the typewritten story that appears in every introduction. Only a few readers got this one: KA1LJO, N4JMP, KI4FD, N4VPN, and Abe Magni, Jr. And thanks to WA7DPN, N0PWT, and VE3OBU for their personal notes.

So here's a new Dead Band Quiz. It concerns a popular fiction book and a made-for-TV mini-series derived from the book.

Can you identify this quote?

"A meeting or nothing. Tonight or nothing. Moscow rules. I insist on Moscow rules. Tell this to Max." Who says this and to whom? What does it mean? Who is Max? (Gotcha on this one!)

See you next month. Until then, press "two" on your touchtone phone.

73, Bill, W6SAI

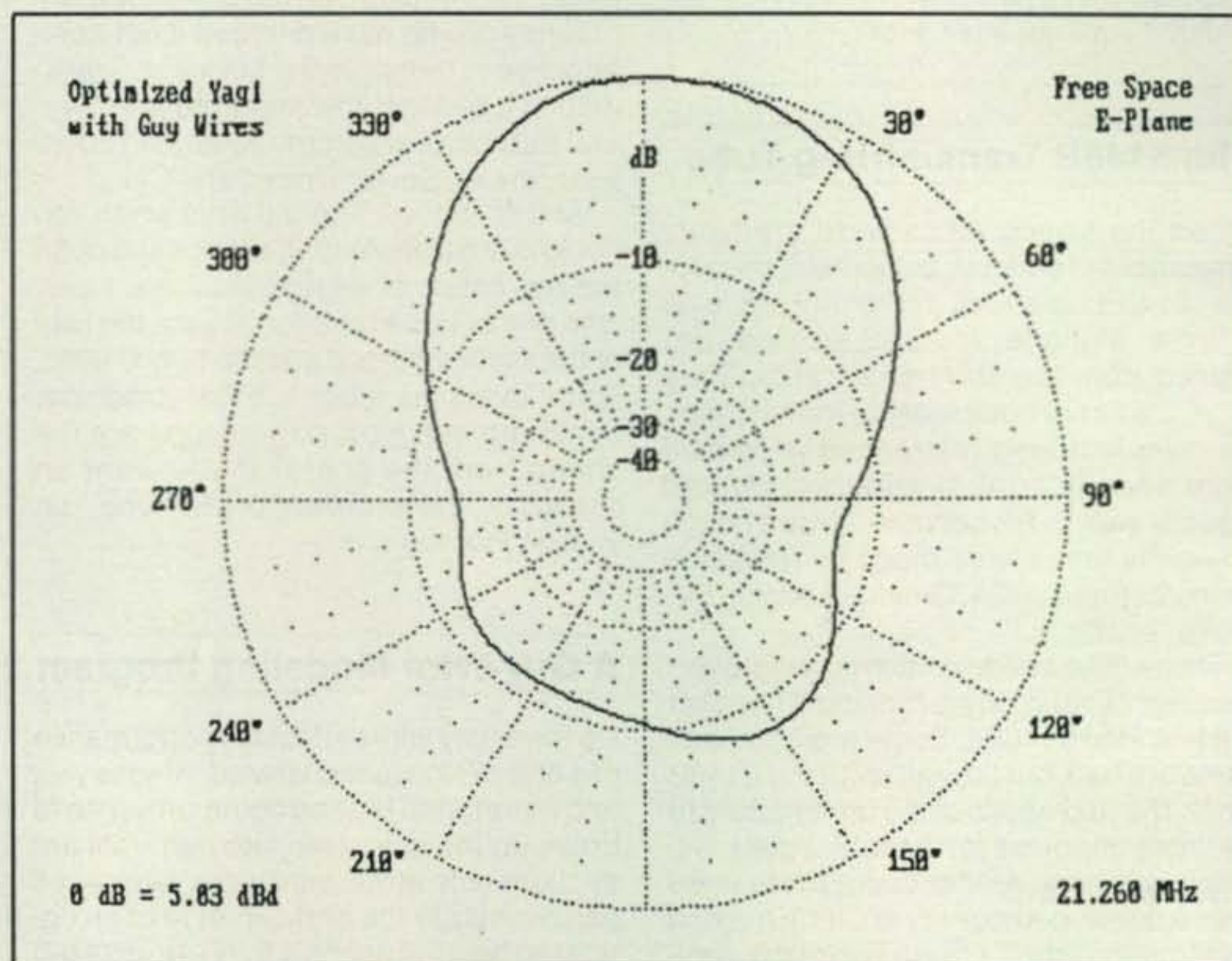


Fig. 2- Guy wires distort pattern of 4-element beam shown in fig. 1.

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NEWS/VIEWS OF ON-THE-AIR COMPETITION

Contesters' Women Speak Out

I truly had my doubts this month. Would the XYLs of the world unite? As I dropped my pile of friendly "solicitation for input" letters in the mailbox, I really didn't know what would come back in return. As it turned out, I received responses from about half of my requests. Fellow contesters, let's all have a moment of silence for the other six who did not respond.

It only seemed fitting that I would submit myself to this experiment. And to be perfectly honest, my wife's response is completely unedited. Here I sit at my keyboard watching my ham career potentially crumbling before my eyes. Will I ever be able to appear at Dayton again? Operate in a contest? Be one of the guys? Well, you be the judge of the likes of myself, W0AIH, W9RE, N2IC/Ø, K4XS, K3LR, and N2NT. Wives, now it's your turn!

Barbara J. Dorr, XYL K1AR

Dear John:

Wow! I get to write you a "dear john" letter. Well, here goes nothing except that I don't mean that. This letter certainly better mean something.

My personal experience as first a YL and then as an XYL is filled with many memorable moments, some of which I would like to forget. John's hobby is not just a passing interest or fancy. To sum it up succinctly, it is an OBSESSION!!! I don't know any other males who enter their homes and immediately ask, "Where's my mail?" Do non-ham families plan their vacations around Dad's hobby (e.g., vacation time used for contests including sleeping after the fact, DAYTON, hams visiting from other states or countries, DAYTON, antenna work, DAYTON!!!)? I guess I should have tuned into John's "hobby" when one of our dates included the college ham shack to work JAs or on our honeymoon in Bermuda when we "stumbled" on the Bermuda radio club. (I still thank God that no one was there and the door was sealed shut as tight as a drum!)

You know, there is a rather confused real-estate agent in southern New Hampshire who to this day probably doesn't understand why we didn't buy one of the twenty or so homes he showed us over the

Calendar of Events

Apr.	25-26	Swiss Helvetia Contest
Apr.	25-26	Georgia QSO Party
May	2-3	MARAC County Hunters CW
May	2-3	ARI International DX Contest
May	2-3	Texas QSO Party
May	2-3	Oregon QSO Party
May	9-10	Nevada QSO Party
May	9-10	CQ-M DX Contest
May	16-18	Michigan QSO Party
May	30-31	CQ WW WPX CW Contest
June	13-15	ARRL June VHF QSO Party
June	27-28	ARRL Field Day
July	1	Canada Day Contest
July	4-5	Venezuela SSB DX Contest
July	11-12	IARU HF World Championship
July	18-19	Barcelona '92 Olympics HF
July	25-26	Venezuela CW DX Contest
Aug.	1-2	YO DX Contest
Aug.	8-9	Maryland-D.C. QSO Party
Aug.	8-9	Worked All Europe CW Contest

course of three months! I'm sure many other XYLs understand why you never enter your potential "dream house" if the land is totally wrong! All for the sake of a 90 foot silver tree in the backyard.

John taught me Morse code in college. Maybe it was a fantasy of his that I would become "one of them" back then, but somehow I recognized that this was not an interest that I wanted to share that intimately with him. Maybe it's his competitiveness or the male ego thing, but I prefer that John be the "ham" in the family for the time being. (Unfortunately, we have three family members who already know how to turn on, tune in, and listen for various calls). It's enough now that I seem to always read call license plates or check house tops for antennas. I guess that through osmosis I'm more involved than I ever thought!

How would I, Barbara Dorr, the XYL of K1AR, world-famous amateur, Good Will Games gold medal winner, change contesting?! Oh what a loaded question! Actually, I can see some value (don't get too excited JD) to contesting. A little healthy competition never hurt anyone. What bugs me is the amount of time needed to prepare for a contest weekend and then the inevitable aftermath of rehashing each and every vivid detail of the 48 hours! Just makes a girl want to scream to some contesters: "GET A LIFE!" I think some of us contest widows would appreciate abbre-

viated versions of contests as well as an understanding (or written rule) that once you've won the darn thing you sit it out for a year or two.

For me personally, the positive aspect of contesting means that John leaves the house for a weekend and I, ALL ALONE, can have complete control. For me personally, the negative aspect of contesting means that John leaves the house for a weekend and I, all alone, MUST maintain complete control.

Amateur radio is a worthwhile hobby that presents the ham with many opportunities to develop relationships with people from around the world as well as serving those in need. Contesting is only one aspect of many offered by this hobby. As with any part of life a hobby or hobbies must be kept in balance. Since the growth of our family from a couple to three children and one mischievous beagle, John has managed to prioritize those things important in his life. Thank goodness that most of the time his list and mine coincide.—73s (and 88s to you, JD)

Mary Bittner, XYL of W0AIH

Twas the night of "the Contest" and all through the house . . .

ALL the creatures were stirring, including the mouse . . .

The children were whimpering in their beds as the light build above them glowed dull red . . .

The rest of the parody, written many years ago in the pre-photo copy era, has mercifully been lost. It was the attempt of a young mother of three very little girls to have a little fun during those grim contest weekends that threatened to destroy a fairly happy little household. Why would a normally nice, considerate husband and father turn into an egomaniacal monster? How does one explain to little girls that Daddy has tuned EVERYONE out; he is going to sit in his hot, stuffy little room; NO ONE is going to get any sleep because there is going to be either steady talking or steady chirping for 48 hours; and the light bulbs are going to flicker on and off all night long? And then we moved.

We now live in a valley. We are back in the good old USA where people watch TV—a lot. They especially love football games on Thanksgiving weekend. They do not like TVI.

2 Baldwin Street, Windham, NH 03087

Now there are four little girls. Though they all agree that contest weekends really tarnish the "perfect father" image, they stoutly defend him. We all take our turns fielding the telephone complaints and compare notes on the color and clarity of the messages.

As the years go by the towers grow taller, the beams bigger, more feedlines, more patch cords. A new buzz word enters the household. The frantic, frenzied, pre-contest focus earns their father his title "Hernando Wolfmueller." Stay close to the wall, folks, Hernando is in the gazelle mode again!

Yes, W0AIH had gone multi-op. It started out with just a "couple of guys." Then, like a modern-day Trojan horse, there were 14 of them in that little basement! We "gender challenged" ones carried on. The TVI was lessened now, but we still had to make peace with the 48 hours of non-stop talking, chirping, toilet flushing, showering, and the cigarette smell that wafted through the heat vents.

Once in a while a bleary-eyed male, usually a father type, would crawl out and honor us with a visit, but not often. Our hearts softened a little when we peeked into the battle zone and saw one poor fellow sleeping on the floor, nose to nose with our cat who was using his litter box!

And then we moved.

Now we live on a corner lot surrounded by power lines. Two girls stayed in Minnesota and mother went to work in the hospital. No towers, no TVI, no chirping. For over three years Hernando Wolfmueller was not seen.

And then we moved.

A beautiful hilltop location was purchased. Tower seeds were planted. They sprouted! Feedlines, beams, beverages like tendrils now cross over the land. Hernando Wolfmueller was back! Only one girl remained at home. New contesters came to try all the "hardware in the sky." Even some of the "Minnesota Contingent" came back. Several even talked quite freely with the mother, and one seemed to be quite interested in the daughter. He even took time out from an "all out, beat 'em or bust" contest to play a piano duet with her. And on a non-contest weekend they were married.

And the years pass. The many voices of W0AIH arch the globe. Computers move in. Logs spew out—neat, precise, regimented. Familiar "dit-dahs" become friendly faces and open doors when we visit the states and abroad! The dream of being capable of "tearing a big hole in the air" is being realized.

And the mother says, "GO FOR IT, Hernando Wolfmueller. Your joys have become mine!"

Ann Wetzel, XYL of W9RE

My mother-in-law used to defend Michael's participation in contesting by saying

that at least he was home and not out at a bar. But a contest (in my opinion) is basically just a 48-hour bender, and after it's over, Mike spends another 24 hours sleeping it off; it's like that old Ray Milland movie *The Lost Weekend*.

We were married on Field Day and our son was born during the CQ WW CW Contest, so I guess I've been waging my own anti-contest campaign. Except for those two battles, however, I seem to be losing the war!

Bonnie L. Blank, XYL of N2NT

I happen to like ham radio. I think that all the hams, and their spouses/girlfriends/boyfriends are extremely friendly and very "down to earth." In fact, hams have turned out to be the nicest and most enjoyable people as well as good friends.

When an individual is compelled to put nearly everything aside in order to pursue a hobby, therein lies the problem. I'm not saying that my husband puts all things last . . . he does find time to come home and eat dinner with his family and to read a bedtime story to his son. He is, in fact, a wonderful father. But a lot of his time is spent splicing, dicing, soldering, and wiring, as well as talking to his "buddies" for a good portion of the evening. On weekends (especially before a contest) he is either out in the woods rehangng wires, or out on a mission to repair someone else's equipment. When this turns out to be one of life's highlights, then there is a problem.

Contesting is a compulsion. Sometimes I feel that I am a doctor's wife, except I don't reap the financial benefits of such an elite status. In fact, my husband is more like a surgeon—a highly competitive, but world-renowned, top-notch surgeon. He spends many long hours in his "operating room" doing his surgery and will not come out or give up until he is completely satisfied with a perfect job.

I think contesting is fun and exciting. The one thing I don't approve of is that my husband always has to travel to someone else's station in order to win.

For me ham radio is a good hobby. It keeps my man off the street. I always know where he is and with whom. I consider myself lucky to have such a devoted husband—devoted to his family AND his hobby.

Kathy London, XYL of N2IC/0

I knew what I was getting into when I married Steve; that's probably the most important factor in a mixed marriage (ham and non-ham). When we were dating in college, if Steve asked me out to a 7:30 movie, I'd always bring my homework with me. "Why do you do that?" he'd ask, as we signed out the radio club key. We'd actually make the 10:00 show, and I'd get my homework done! Steve's radio has always fit into my life.

I've met a lot of weird and wonderful people because of radio. What a great ex-

perience to meet people who expect to like you right from the beginning, just because you're involved in radio.

The radio is fairly close to our bedroom, so I prefer CW contests; they're quieter. Code makes it easier to get to sleep, though the occasional sudden expletives can be disconcerting in the middle of the night.

I rather like antenna work, although the worst part is standing around waiting for something to do. I like being up high on the tower building things. Steve used to get mad at me when I would point out mistakes in mechanics.

The worst part of Steve's hamming is being in charge of the telephone and the doorbell on contest weekends. Usually I save up all my personal shopping and dinner-dates with friends for the contest season, and escape for most of the time. Fortunately, Steve doesn't have much trouble and does his best to help the neighbors. Only once did I interrupt a contest. Steve was using a long wire tied to a tree in the front yard. It was after dark when some kids rang the doorbell and said: "Lady, your tree is on fire!" "We'll fix it," Steve instructed. And, always the thoughtful spouse, he added, "Don't touch the wire."

Lately Steve has become interesting in contesting from other stations. It figures—just about the time we have antennas jammed into every corner of our own yard, he wants to try other stations. So, I may be the only lady on our street whose husband, when he goes out of town, invites two or three other men over to stay while he's gone! With a hobby that builds that kind of trust, how can you go wrong?

Crystal Kollenbaum, XYL of K4XS

I don't know what Bill would do without ham radio. When Bill and I were married, he only had a 90 something foot tower, which he was afraid to climb. In fact, it was a crank-over tower so he didn't have to climb it at all! After it crashed twice, Bill decided on a new tower. He was so excited because it was 120 feet tall. One day when I was especially bored, I decided to climb the new tower for fun. Well, Bill's being a man and competitive, you might expect that now he climbs his towers without any fear!

I would like ham radio more if it didn't need towers and more so—guy wires. I used to tell Bill that he was stingy to himself and that I was going to spend his money one day when he died. The man obviously took me seriously, because he now has five towers (BIG UGLY ONES) and a room full of equipment. But you know that this hobby does prove truth to the saying that beauty is in the eye of the beholder as exclaimed by the hams who visit our house.

The way I see it, I know where my husband is when he is having fun. If I don't want to hear him, I just shut the door. When

Bill is in a contest, I get time to visit with family or friends, go to a movie Bill wouldn't like, spend time with my son, or just read a good book. I have to admit that I really do enjoy the time.

So this hobby does suit me as well as Bill. In fact, how about more weekend-long contests?

Sandra Duffy, XYL of K3LR

A contesteer's dream is to be married to someone who fully understands and appreciates his endeavors on the air. However, this is only a dream, and like most wives of heavy-duty contesters, I still wonder why the likes of K3LR must so diligently strive for a top place in one of the contests. It certainly seems like a major accomplishment to get notoriety among his fellow hams; to get a callsign published in six-point type in one of the radio publications; to be called "LR" by the elite of the group.

I don't fully understand the magnitude of this hobby. I always assumed amateur radio was the casual way for hams to talk on the air and become acquainted. But after 7½ years of marriage to Tim, I realize now that it is much more than one radio hooked up to one tower. It is many radios and many towers and many trips up and down those towers (by him, not me!).

I believe that contesters are a special breed of people and that this undying passion has to be intrinsic. I have never met anyone else in my life who indulges in this type of hobby. It always requires an exact explanation to someone when they wonder what my husband does with all these radios and towers that overwhelm our house and land.

The best explanation I can give of a 48-hour contest is to compare it to an Olympic event on the radio. Each of the competitors gears up for a marathon. They don't eat or sleep, and they are glued to a computer terminal filled with callsigns and numbers. It's the "best of the best" competing. "But for what?" I ask.

I never knew to what extent Tim was involved in this hobby until we moved into our home and suddenly the towers began to spring up all over the yard! I knew they couldn't be silver trees! Well, at least I know where he is. All I have to do is ask a neighbor to look towards the top of the towers. He's always on one of them, or so they tell me. I personally don't have the nerve to look up that high and see him. Why must he do this?

I realize that this hobby is very important to Tim and that it has enabled him to meet many interesting people over the years. I also know that amateur radio communications are very important, especially when I've seen Tim use his radio in emergency situations. With that goodwill, he has finally vindicated himself by putting all those radios and antennas to good use!

As long as Tim (LR) is alive, he will live and breathe contesting. I have thrown in

the white towel from October through March of each year. But then there's Dayton . . . and Field Day . . . and . . .

Dayton Hamvention Forum

Tim Duffy, K3LR, has been kind enough to provide me with an early view of this year's antenna and contest forums at the Dayton Hamvention. Without a doubt, this year's lineup is top notch and should not be missed. So forum fans, here's the itinerary.

Antenna Forum

WA3FET—Computer Modeling of Side by Side Yagis

W3LPL—Beverage Antennas and Yagi Stacking

W6QHS—More Mechanics of Antennas

K9LA—Yagis vs. Quads, The Final Chapter

Contest Forum

AA6TT—The AA6TT Contest Station

KR0Y—This is How You Do Two Radios

N2AA—Russian Contest Station Review

K1AR—The Evolution of the Radio Contesting Sport

K2NA—Field Day Operating in Colorado

K5NA—Fiberoptics and Linking Contest Computers

KR1R—ARRL Contest Branch Report

K1TO—PJ7A, CQ WW CW 1991 Story

UW9AR—The UZ9AYA Story, Contesting According to Willy

Can you afford to miss out on this agenda? If I were you, I'd get there early unless you like to stand!

Final Words

This month's column has been a lot of fun. And in case you have lost sight of this fact, so is contesting. I look forward (as with every year—just ask my wife) to seeing all of you at Dayton. Until then, remember the deadline for the August issue is June 1st.

73, John, K1AR

Oregon QSO Party

0000Z Sat., to 0000Z Sun., May 2-3

This one is jointly sponsored by the Central Oregon Radio Amateurs ARC and the Central Oregon DX Club. Stations may be contacted once per band and mobiles multiple times as they cross county lines. The sponsors will be activating the real rare ones in Oregon (e.g., Wheeler, Gilliam, Sherman counties).

Exchange: Oregon stations send serial number and county. Other stations exchange serial number and state/province/DXCC country.

Frequencies: CW—1810, 3540, 7040,

14040, 21040, 28040. SSB—1860, 3850, 7230, 14250, 21300, 28400.

Scoring: Score 2 points per phone QSO and 4 points for CW contacts. For final score, Oregon stations multiply QSO points by states/provinces/DX countries worked. Others multiply QSO points by total number of Oregon counties worked (maximum 36).

Send your SSB entries to: Bill Sawders, K7ZM, 19821 Ponderosa St., Bend, OR 97702. CW entries go to: Mahlon Hale, WA7ZBL, 22840 Tumbleweed Ct., Bend, OR 97701. All logs must be postmarked no later than August 1st. Include an SASE for final results.

MARAC County Hunters CW Contest

0000Z Sat., May 2 to 2400Z Sun., May 3

The Mobile Amateur Radio Awards Club is pleased to sponsor the 24th annual County Hunters CW Contest. Mobile and fixed stations from every county in the U.S. are invited to participate. Mobiles may be worked each time they change counties and must identify by signing /M after their callsign.

Exchange: QSO number, category (mobiles), RST, county, and state for US (Province/DXCC country for others).

Scoring: Fixed station QSOs are worth 1 point. Mobiles and DX QSOs are worth 3 points. Final score is total QSO points times the total number of U.S. counties worked.

Frequencies: 3575, 7055, 14060, 21060, 28060.

Awards: Certificates will be awarded to the winning fixed stations in each state, province, and DXCC country (1000 points minimum). Other certificates are available to the winning mobile in each state operating from 3 or more counties (10 QSOs/county minimum). Plaques will be awarded to the top 2 scoring mobile and North American fixed stations, and DX station.

Completed logs, summary sheets, and county lists (required for entries with over 100 counties) must be received by June 3, 1992. Send your logs to: Jerry Burkhead, N6QA, 7525 Baltic Street, San Diego, CA 92111. Include a #10 SASE for contest results.

ARI International Contest

2000Z Sat. May 2 to 2000Z Sun., May 3

This is the annual operating event sponsored by the Associazione Radioamatori Italiani. The ARI DX Contest is managed by veteran contesteer I2UIY and should offer a significant amount of activity. Stations are allowed to work each other worldwide.

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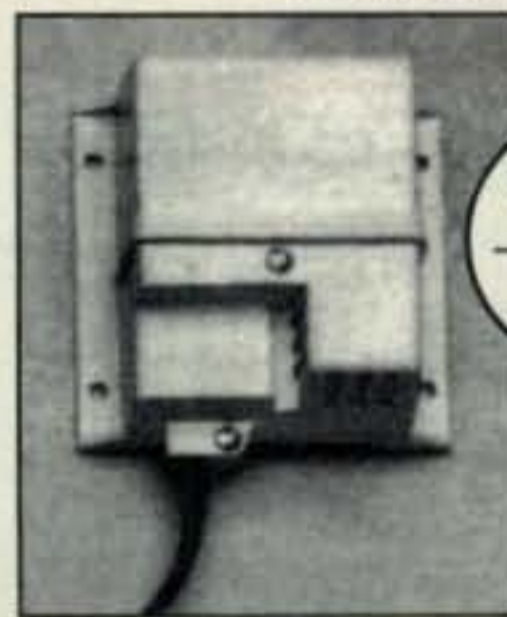
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Exchange: Italians send RS(T) and province; all others send RS(T) and serial number.

Points: QSOs within your own country count only for multiplier credit. Count 1 point for QSOs within your own continent, 3 points for QSOs outside your continent, and 10 points for Italian QSOs. Stations can be worked once per band and mode (e.g., 15 CW and SSB).

Multiplier: Italian provinces (95) and DXCC countries (not I or IS0). Credit multipliers once per band.

Scoring: Final score is sum of QSO points times sum of multipliers.

Awards: A plaque will be offered to the highest scoring station in each class. In addition, a certificate will be awarded to the top two to five placing stations as well as the leading scorers in each DXCC country. QSOs made during the contest are eligible for other existing Italian awards (CdM, WAIP, ITA, etc.). A free T-shirt will be provided to any entry working 250 Italian (for Europe) or 100 Italian (non-Europe) stations. Be sure to include your size on the summary sheet.

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Free logging software is available for the ARI Contest. You may obtain your copy directly from the contest manager (\$7 or 10 IRCs for expenses) or via Roger Burt, N4ZC, Rt. 1, Box 246, Mount Holly, NC 28120.

Logs must be mailed 30 days from the end of the contest and addressed to ARI Contest, I2UIY, P.O. Box 14, 27043 Broni (PV) Italy.

Michigan QSO Party

1800Z Sat., May 16 to 0300Z Sun., May 17
1100Z Sun., May 17 to 0200Z Mon., May 18

This year's Michigan QSO Party will be sponsored by the Oak Park Amateur Radio Club. As usual, stations are allowed to be worked once on each band/mode. Portables and mobiles may be counted as new contacts each time they operate from a new county.

Exchange: RS(T), QSO number, QTH (county for Michigan stations, state/country for others).

Scoring: Michigan stations—1 point/QSO times (states + countries + Michigan counties). Each CW contact is 2 points/QSO. KL7/KH6 count as states and VE is considered a country. Credit 5 bonus points for each contact with the W8MB club station. Non-Michigan stations use similar scoring except multipliers/QSOs are limited to Michigan counties. Maximum multiplier is 85.

Frequencies: CW—1810, 3540, 3725, 7035, 7125, 14035, 21035, 21125, 28035, 28125, SSB/VHF—1855, 3905, 7280, 14280, 21380, 28580, 50125, 144025, 146520.

Awards: Michigan—plaques are available to the high multi-operator/single transmitter score, high Michigan (Upper Peninsula), high Michigan, high aggregate club score, high Michigan mobile, and high VHF entry (minimum 100 QSOs). Certificates will be awarded to the high score in each Michigan county. Non-Michigan—high out-of-state plaques will be awarded and certificates for the high score in each state and country.

Mailing deadline for logs is July 1, 1992. Send your logs to: Mark Shaw, K8ED, 27600 Franklin Road, Apartment 816, Southfield, MI 48034. Members of the Michigan QSO Party committee are not eligible for awards. Include an SASE for a copy of the final results.

CQ WPX CW Contest

0000Z May 30 to 2400Z May 31

Complete rules were in the January issue of CQ. Rules and summary/log sheets can be obtained from CQ Magazine, 76 N. Broadway, Hicksville, NY 11801. Check the current rules for the current trophy list. Results of the 1991 contest can be found elsewhere in this issue.



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CW Forever: More Keys, Keys, Keys!

Rejoice dear friends and CW aficionados! We are back with yet another "Keys Special," and it is a blowout double feature guaranteed to boost your CW interest at least 10 dB.

This month we highlight more beautiful bugs and paddles from eras past plus two new gems you can mail order and enjoy using today. Next month we feature a variety of hand/pump keys dating from 1860 to 1992. The latter item is a dazzling all-gold model also available today. Several of the keys in upcoming photos are true classics, so whip out your magnifying glass and get ready for another whirlwind tour of amateur radio's all-time favorite accessory: keys, keys, keys!

Before delving into the views, I wish to thank everyone for your continuing support, letters, photos, and favorable on-the-air comments. Thanks also for your compliments on my new book, *Keys, Keys, Keys*. Your appreciation is our greatest reward! *QST*'s review remarks were a mite snide (sic!), but that is par for the course when a reviewer does not really appreciate the subject as you and I do.

A number of friends have asked, incidentally, if *Keys, Keys, Keys* has sold out or been discontinued. *Indeed not!* The book is not heavily advertised and distribution is a bit slow, but that's all. If a local amateur dealer has sold out, simply call the CQ Book Shop (516-681-2922) with your charge card in hand (\$9.95 plus shipping) and it will be delivered to your doorstep. While you are on a roll, call MFJ (1-800-647-1800) and order a copy of my new "Classics" 1992 calendar featuring both keys and homebrew rigs of yesteryear and today (\$5.95 plus shipping). The calendar was briefly shown in my December column and the supply may now be low, so hustle on this one.

Since the plastic is handy, you might as well go for the gusto and order a copy of *The Vibroplex Company* book by this month's guest key collector, Bill Holly, K1BH. The book is superb in every respect, and available from Vibroplex Company (1-800-AMATEUR). My calendar, *Keys, Keys, Keys* book, and Holly's *Vibroplex* book, incidentally, compliment rather than compete with each other. My book spotlights keys of all brands and types while Holly's book focuses on precise (and very complete) details regarding Vibroplex Company and Horace G. Martin.

The Vibroplex book is as impressive as Holly's key and classic rig collection. It covers everything from the company's beginning and progress, through Martin's life and history. It describes Martin's innovations from the Autoplex and original bugs through flash keys and much more, and it is loaded with great photos. We congratulate K1BH on producing a masterpiece!

This introduction has become a bit long (so much to share, so little time), and we still need to "slap some wrists" on price-gouging old keys, remind friends that contest-style DXing is not encouraged on 30 meters, and tell you more QRP columns are planned. We will thus cover those points next month. Now, let's get to the key views!

Photo 1

This unusual and exceptionally clean semi-automatic key is a Mecograph. It was designed by William Coffe, manufactured

4941 Scenic View Drive, Birmingham, AL 35210

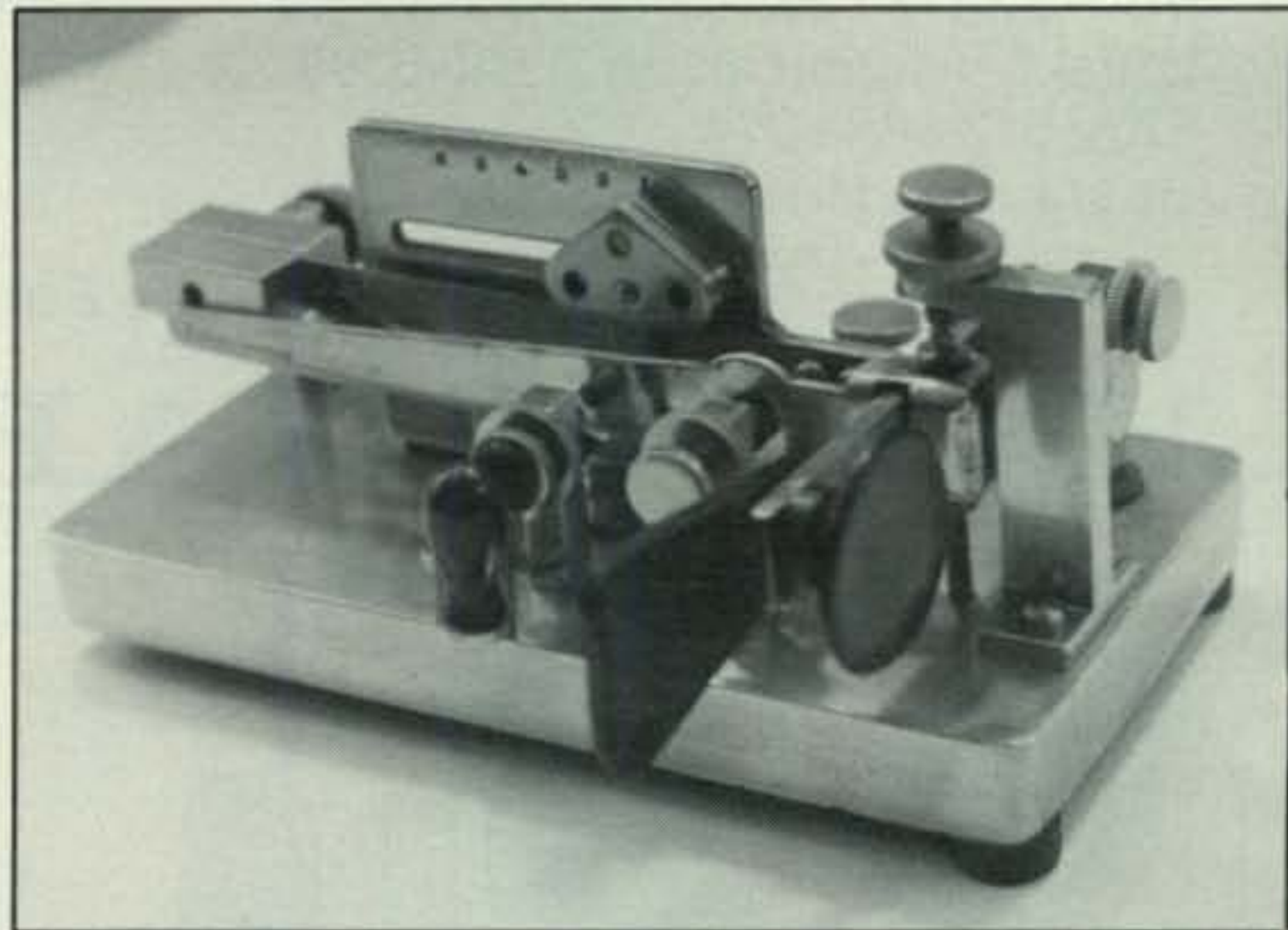


Photo 1—Unique all-brass version of the classic Mecograph bug manufactured from approximately 1905 to 1910. This exceptionally clean item has a right-angle mechanism and calibrated rear speed adjustment. (Photo courtesy this month's "mystery guest collector.")

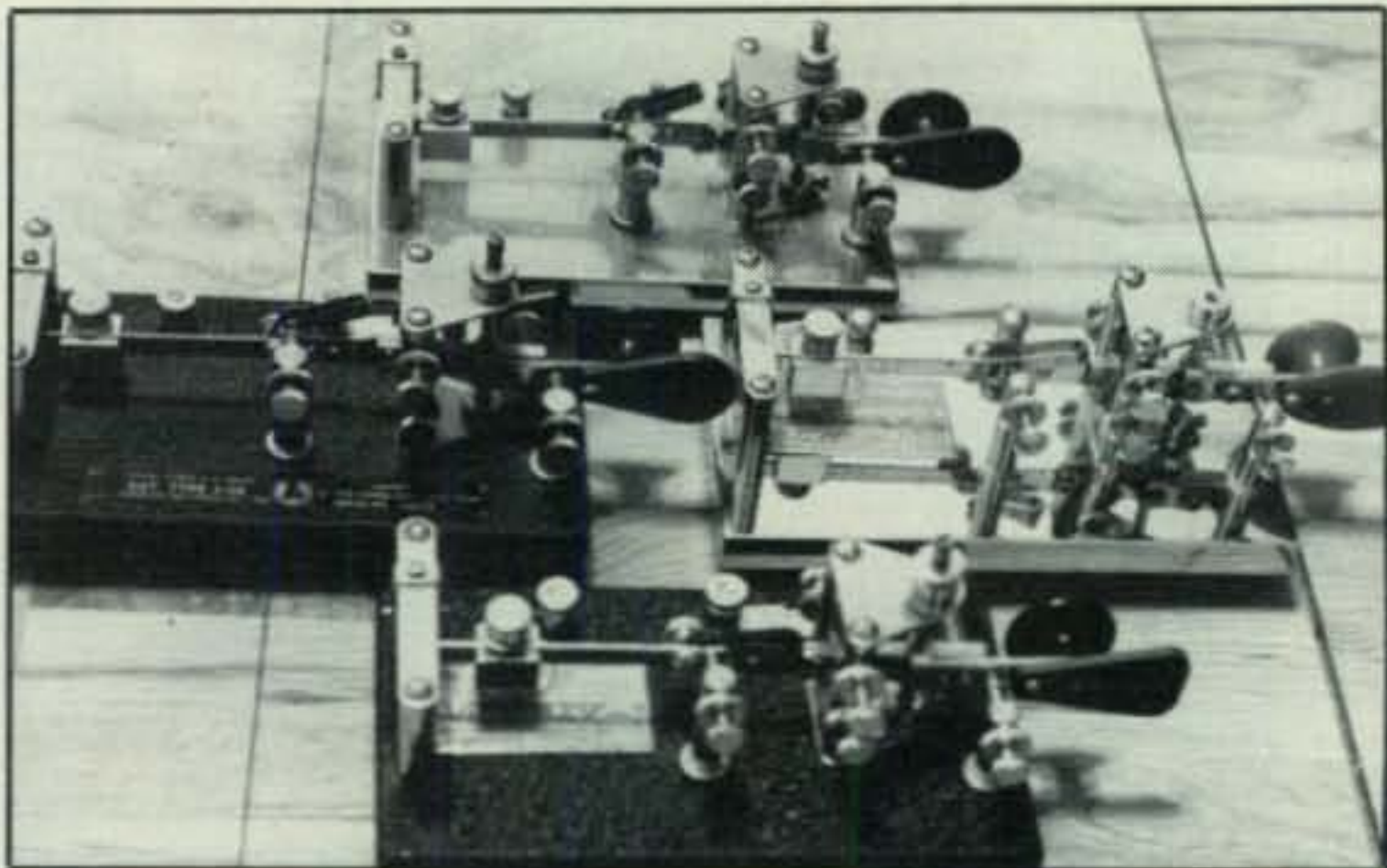


Photo 2—Amateurs interested in getting started with a classic bug are encouraged to select a flat pendulum model such as the Lightning Bug or its Lionel "look alike" shown here. Speed of the dots made by these keys can be slowed to 6 or 7 wpm.

from 1905 until approximately 1910, and it almost captured Martin's thunder as being the first commercially produced bug. Vibroplex apparently bought out the Mecograph operation around 1913. Old-timers tell me Vibroplex also made a clever agreement with Western Union to use only Vibroplex bugs, and non-conforming operators were fired right on the spot. Since the Mecograph never sported a Vibroplex nameplate, it was obviously best known among railroad telegraphers.

The Mecograph shown in photo 1 is unique because it is all brass with a superb lustre. Notice the key's right-angle design and rear speed adjustment with calibrations 1 through 6. The

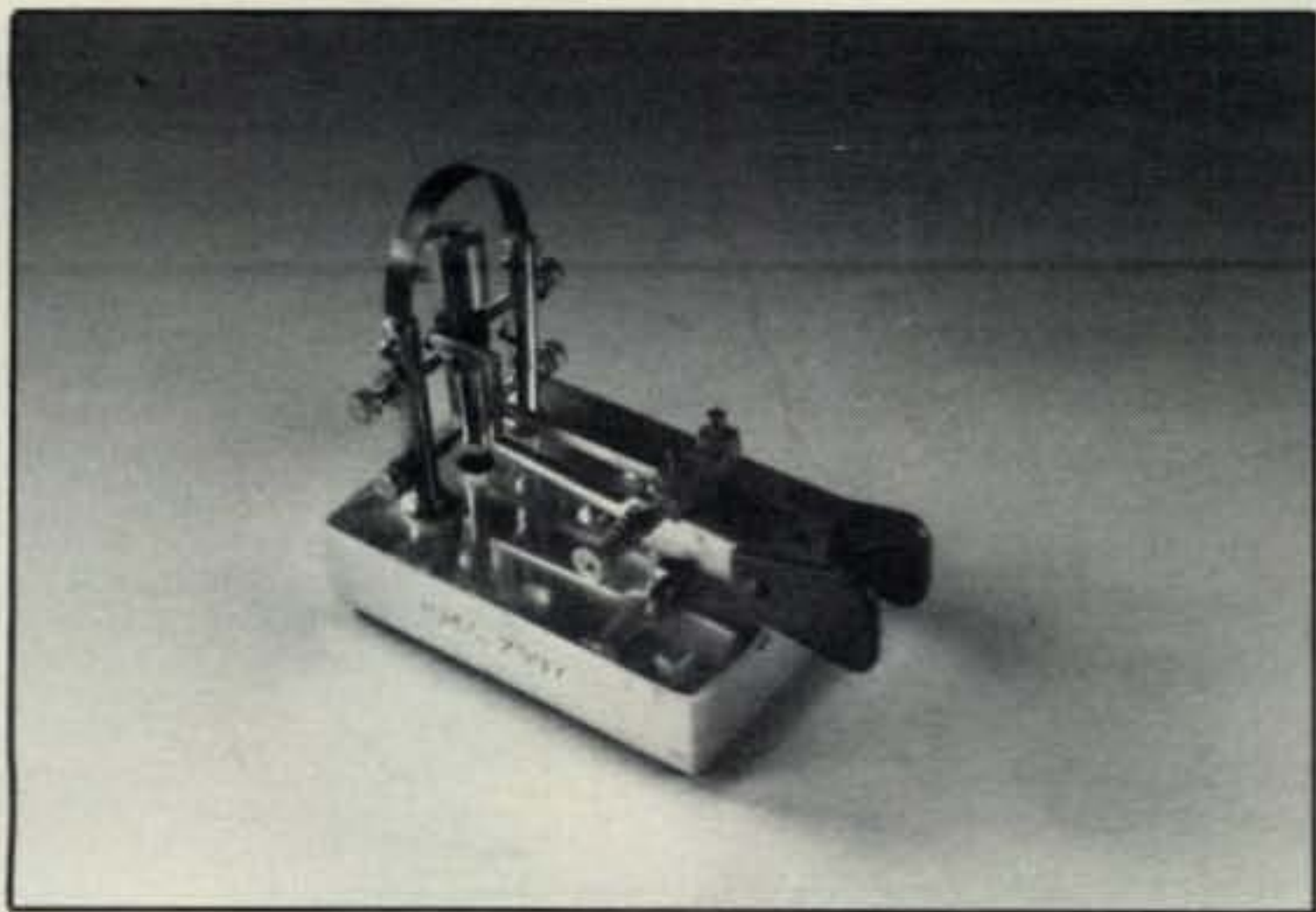


Photo 3- This breathtaking marvel is an original Australian PMG (Post Master General) Vertical bug made during the 1930s, and its beauty is beyond description! Visualize using this captivating key on the air today. A midsummer night's dream for sure! (Photo courtesy K1BH)

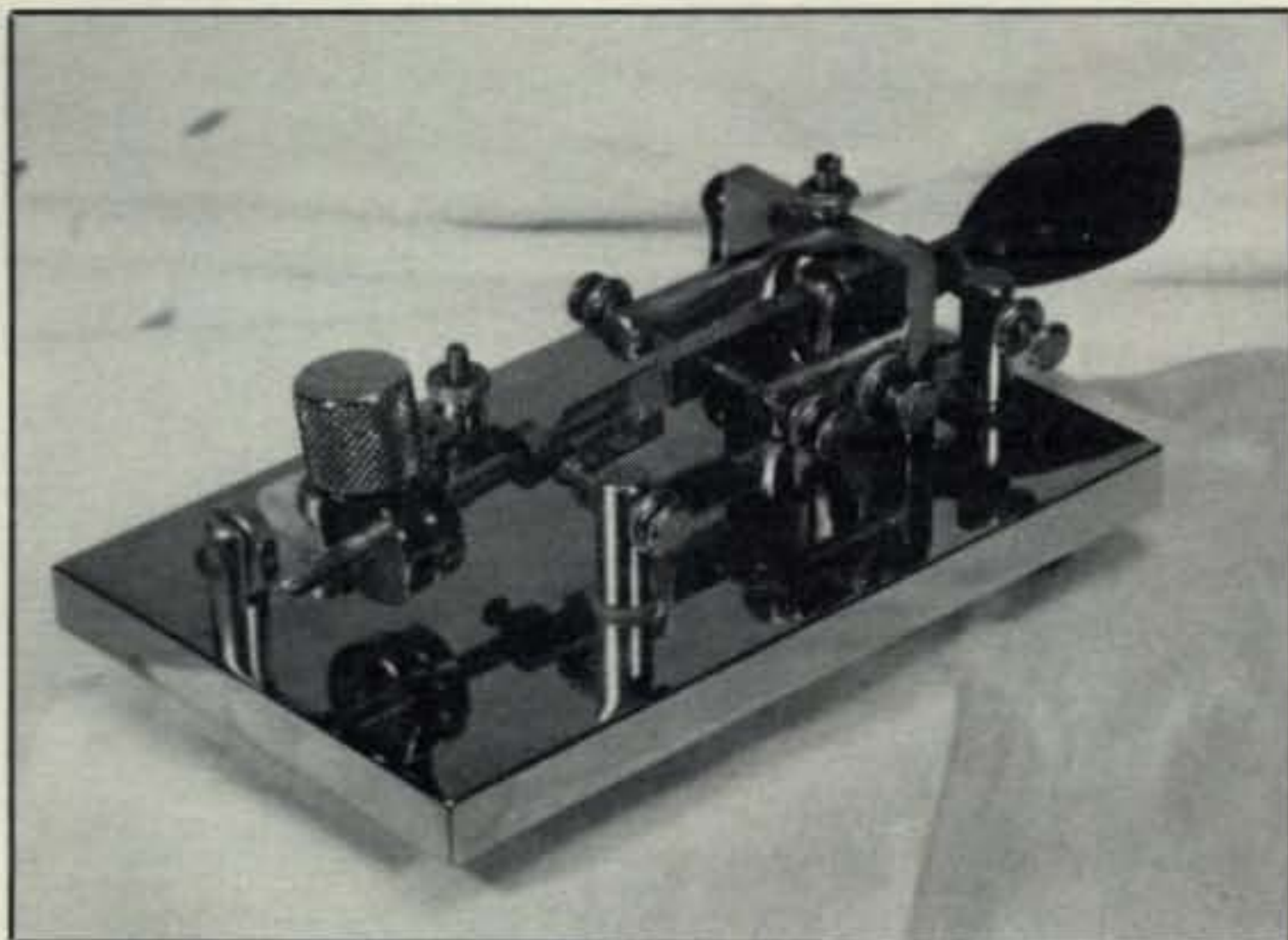


Photo 4- Do you recognize this impressive-looking bug? If so, WB0AUQ would like to hear your comments. The bug is brilliantly chrome-plated, has a rather "low boy" design, and its yoke is slightly thinner than those used on Vibroplexes.

owner of the gem wishes to remain anonymous, but we must say thanks for the view.

Photo 2

Here is another interesting study of Vibroplex courtesy of our "mystery collector." These four semi-automatic keys exhibit the famous Lightning Bug design of a flat pendulum with square weight, tripod-type yoke, and rear damper swung from a flat bar. Clockwise, beginning from the bottom, is a standard black-base Vibroplex, a Lionel J-36 look alike (9 o'clock), Lionel on nickel base (noon), and deluxe/all-chrome Vibroplex (3 o'clock). Lionel, along with Vibroplex, made a large number of these bugs during WW II, but finding one today is quite challenging.

The Lightning Bug's flat pendulum produces beautiful sounding dots, and they can be slowed to a very comfortable speed. This bug is thus perfect for getting started with (or returning to) a semi-automatic key. Two other flat pendulum bugs are the Vibroplex Champion and Zephyr, and they too handle better than round pendulum bugs.

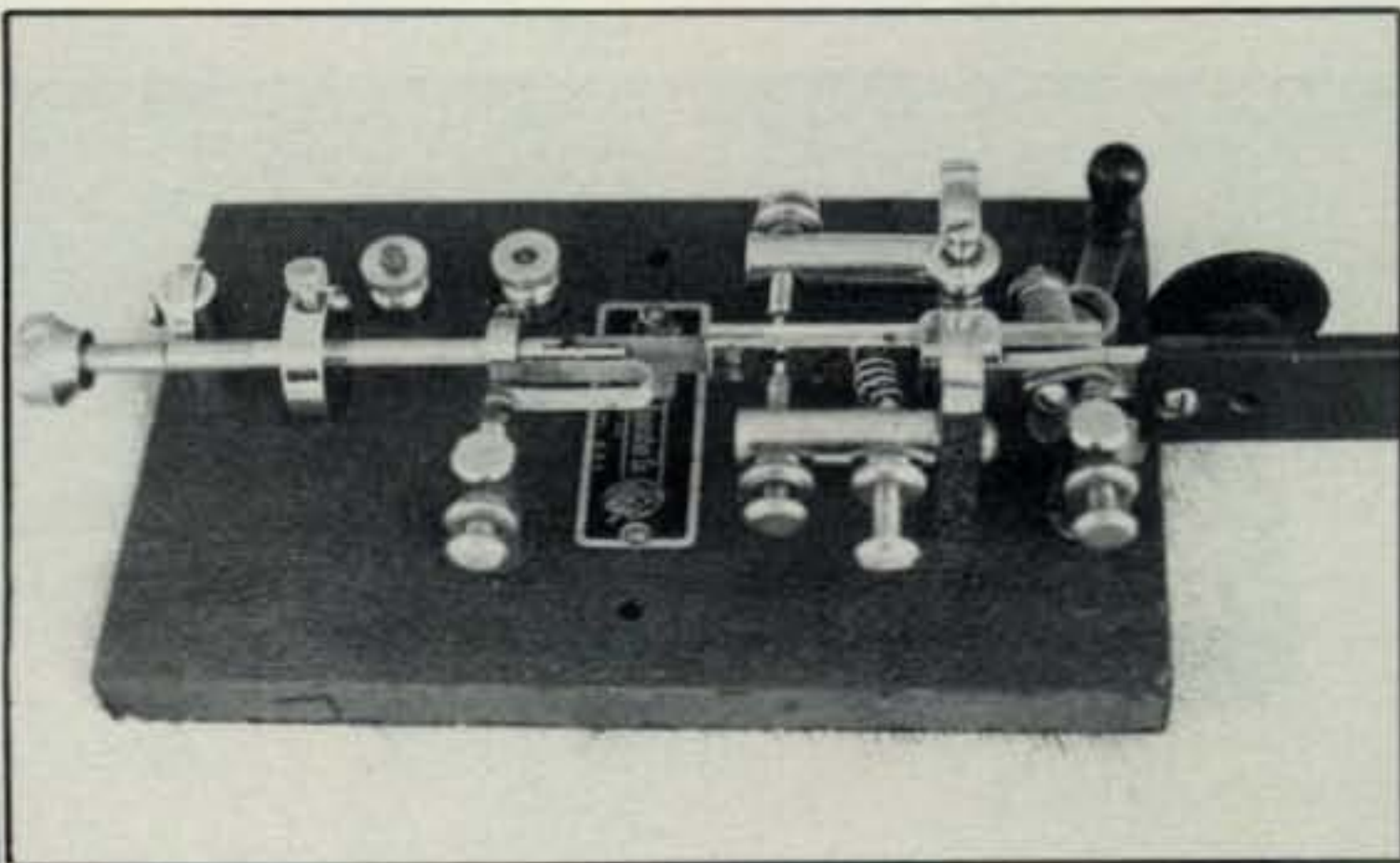


Photo 5- Bearing a striking resemblance to the previously highlighted "unknown bug" is my own recently acquired Telegraph Apparatus Company semi-automatic key. Although the base is painted rather than chrome, upper mechanisms are almost identical. I added a slide-on damper to the pendulum's front to slow its speed, and the key is quite enjoyable to use.

Photo 3

This little delight from "down under" is an Australian PMG vertical bug. What a fabulous item! The key was made during the 1930s, but I have no idea of the quantity produced. Apparently, the number was reasonable because the bug is not valued as high as a Martin Vertical. None are available for sale or trade, however, unless you have some rare item such as a Novaplex—heartbreaking, as this is truly my dream bug.

Look at those alluring dual levers and temptuous rear mechanism. Imagine using this marvelous key with a modern transceiver on 30 meters today. Ham heaven for sure! The Vertical shown belongs to Bill Holly, K1BH. Does anyone else have an Australian Vertical your nostalgia-struck author (K4TWJ) can buy, swap, borrow, or steal? Help!

Photo 4

This sharp-looking bug belongs to Bob Rainbolt, WBAUQ (Rt. 2, Box 250A, Lawrence, KS 66046), and he asks if anyone can identify its manufacturer. The key is all chrome, including the plate on its brass base, which measures 4 by 6½ inches. The weight's large nut was probably added by a previous owner. The yoke's main part is rather thin, and it has a round hole in the center on which the arm pivots. Round posts attached to the yoke support adjustment screws. Any ideas on the good-looking little orphan?

Photo 5

As a thought-whetter on the previous key, I will suggest it is a "deluxe" version of the Telegraph Apparatus Company bug shown here. Notice the similarity in yoke design, single post damper, position of terminal post, and width of base. The chrome plate/base could have been added, which thus covered screw holes plus nameplate. This key was made by Telegraph Apparatus Company of Chicago, Illinois (date unknown), and I received it from Terry French, VE3OB (thank you, Terry!). I refurbished it, replaced a bent spring, added new fingerpieces, and enjoy using it on the air occasionally.

Photo 6

I recently acquired this Speed-X bug bearing E.F. Johnson's name from Bill Shanney, KJ6GR, and it is the best handling round

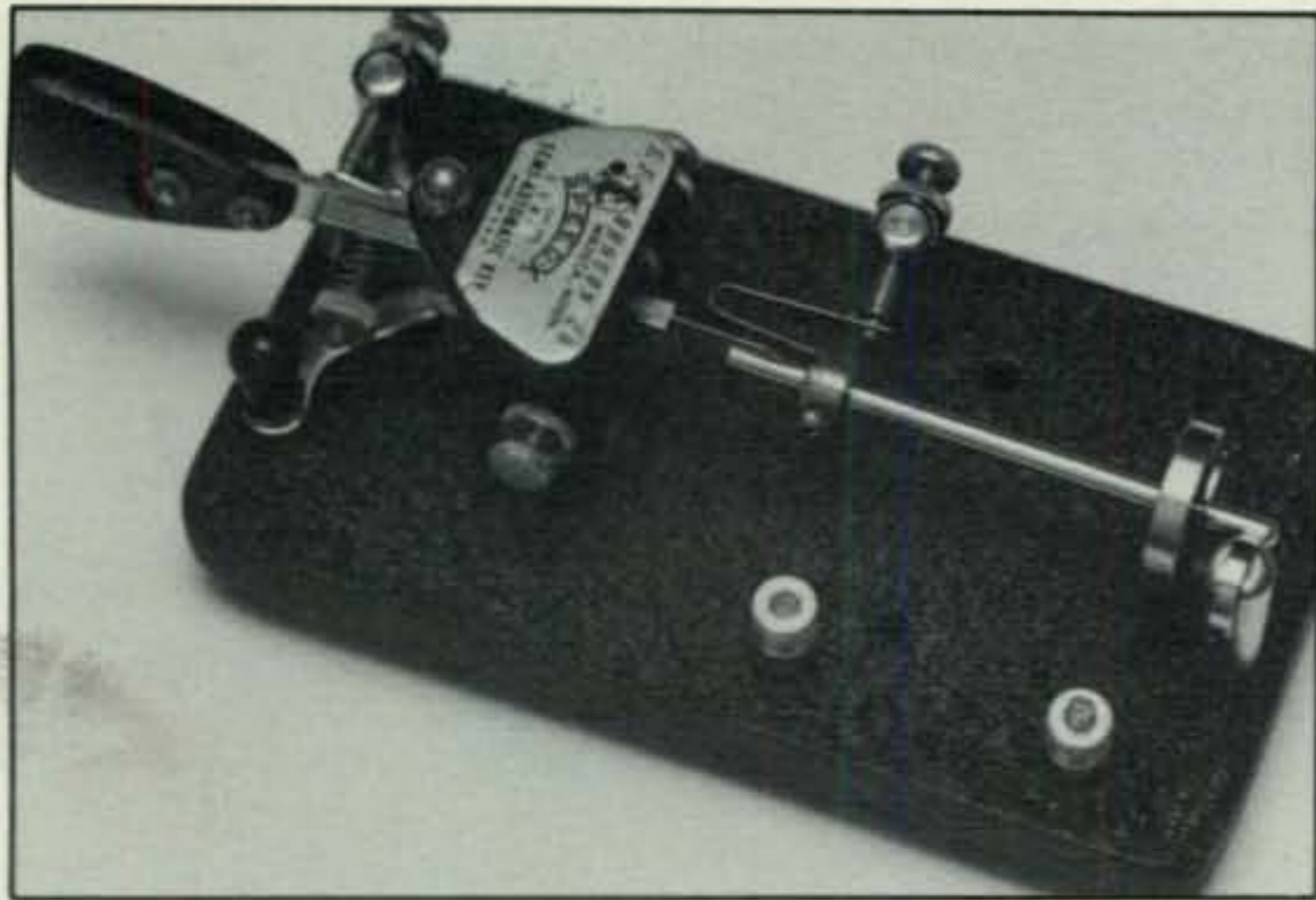


Photo 6— Another recently acquired bug I thoroughly enjoy using is this streamlined Speed-X bearing the E. J. Johnson name. The pendulum's weight has a little spring you squeeze to move the weight and vary dot speed.

pendulum key I have found. The design is clean, speed control is quite wide, and I use it on 30 meters almost daily. Personally speaking, I think Speed-X bugs are all great! Viva la Speed-X!

Photos 7, 8, 9, and 10

Remember those toy radio telegraph sets you played with as a kid? Did you remember to pack them up and save them for tomorrow? Ah... What fun it was visualizing becoming a big-time telegrapher! The Western Union set is circa 1930. The Brumberger set is 1960 vintage. They buzz, click, and flash. Super Christmas gifts indeed! Congratulations to K1BH for saving these goodies from extinction.

Photo 11

Another well-known name of eras past that readers have asked us to resurrect is Brown Brothers, so this photo's item will initiate that pursuit. This combination paddle and hand key was spotted and purchased at a hamfest fleamarket by our guest mystery collector. Notice dot/dash contacts are built into the yoke's rear assembly, and a single tensioning spring is used for both levers. Top pinion adjustments help vary individual lever tension or



Photo 8— Items inside the Western Union telegraph set include two keys with buzzers and flashers plus neat instructions. (Photo via K1BH)



Photo 7— Ah... those fabulous days of yesteryear when we received real goodies for Christmas! This Western Union telegraph set is 1930 vintage and belongs to K1BH.

"hardness," however. Workmanship of this item is exceptionally good for its time. The Brown Brothers Machine Company of St. Louis, Missouri also made a similar paddle on separate base, a paddle similar to the new Ditek I featured in the December column, and one or two models of bugs. Our next "Keys Special" will highlight WB9GVO's Brown Brothers paddle. Maybe one of our readers has a Brown Brothers bug/photo to go with it.

Photo 12

Easily mistaken as the "real thing" is this Brown Brothers look-alike made several years ago by Ham Radio Center in St. Louis, Missouri. The Ham Key has a center contact/post for both dots/dashes and lacks separate pinion adjustments. The paddle is not elite, but is a good "starter item" or spare for the shack.

Photo 13

On the scale's opposite end is this new "VHS iambic" paddle with bottom-fitted electronic keyer available today from G4ZPY, 41 Mill Dam Lane, Burscough, Ormskirk, Lancs, England L40 7TG. You have seen G4ZPY's top-line paddle in previous columns and asked for a mating keyer, so here it is. If you presently have a "VHS," G4ZPY has new fingerpieces for the "combo keyer."



Photo 9— Another big-time telegraph treat from the 1960s is this Brumberger radio-telegraph set. It buzzes, it flashes, it clicks. What else could one ask for? (Photo via K1BH)



Photo 10- The Brumberger Code Master Signal Set and instructions ready for use. (Photo courtesy K1BH)

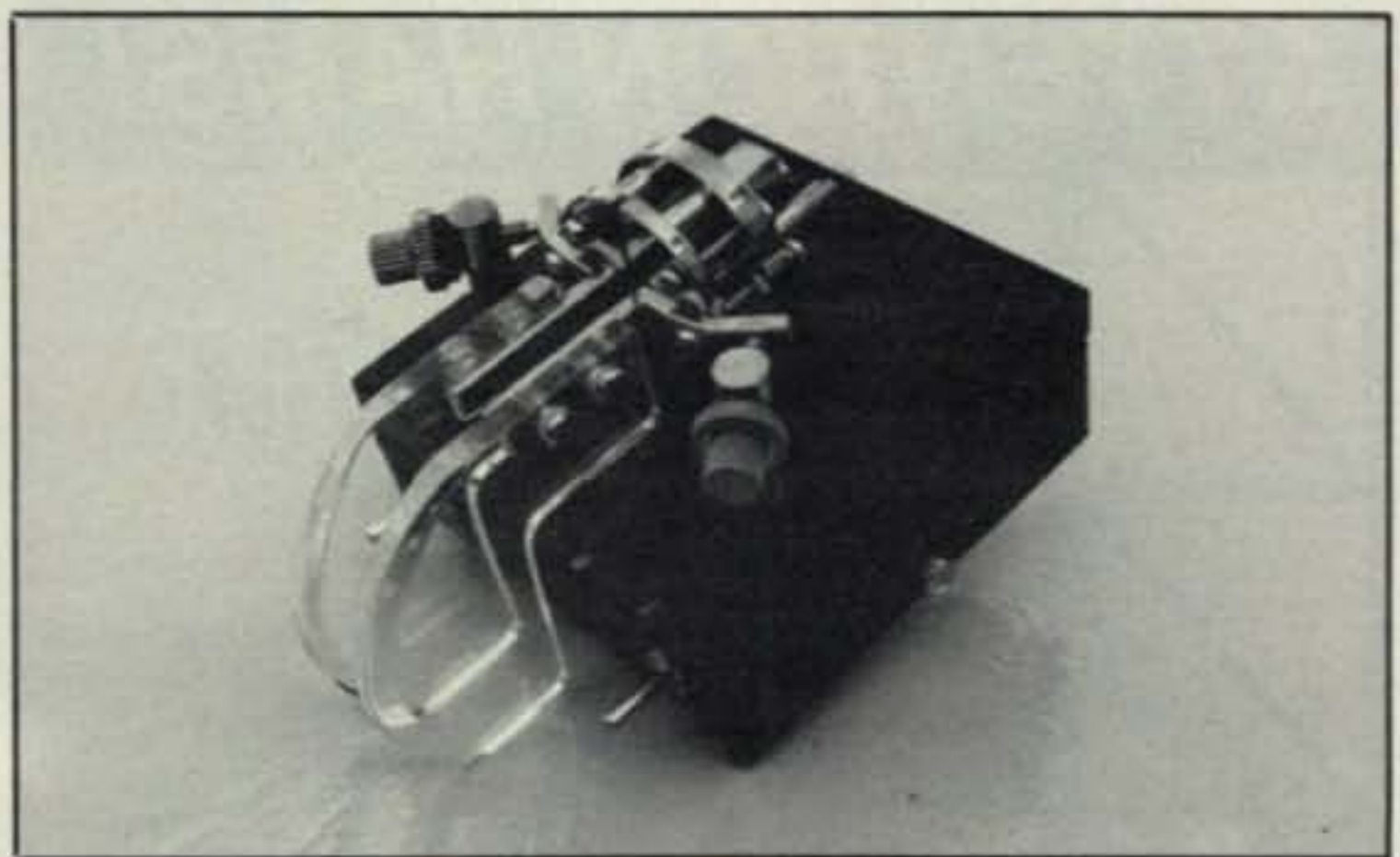


Photo 13- The new G4ZPY "VHS Iambic" paddle and electronic keyer combo. This incredibly beautiful and fantastic-handling item is available today from G4ZPY. It has exceptionally precise adjustments and heavy-duty dot/dash arms that defy abuse.

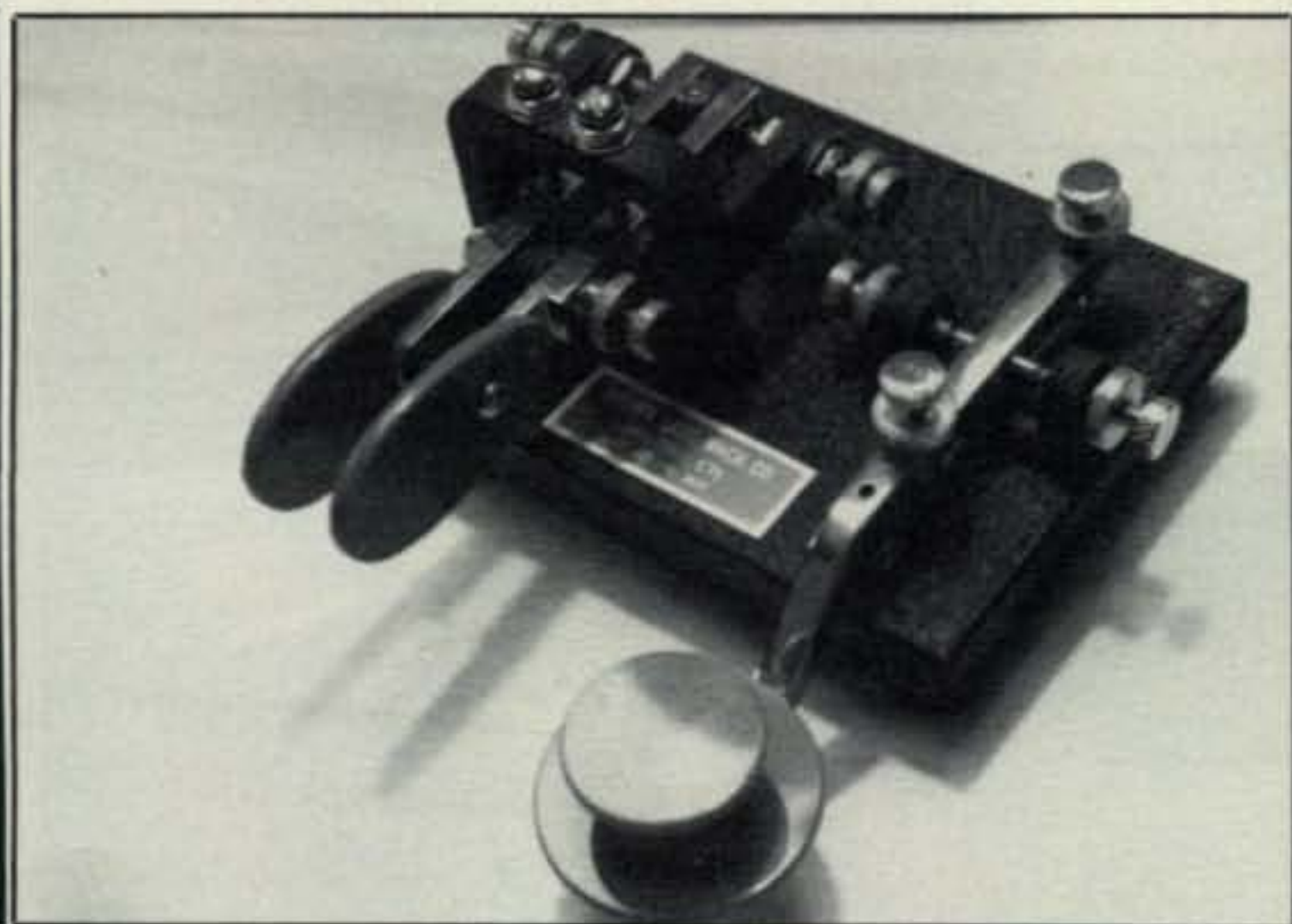


Photo 11- A popular name of eras past (and one that has also faded in the annals of time) is Brown Brothers. Their combination paddle and hand key shown here reflect exceptionally good workmanship and quality for their time. Do any of our readers have a Brown Brothers bug? (Photo courtesy our "mystery guest" collector)

And it is a gem: custom keyer chip with dot/dash memory, on/off selection of intercharacter spacing, and much more. This masterpiece may be the world's smallest self-contained electronic key. Outstanding!

Photo 14

How many readers remember the 1948 classic Mon Key made by the Electric Eye Company of Danville, Illinois? This AC-powered keyer uses three tubes in a twin multi-vibrator setup and has a built-in paddle (cover removed for viewing). The paddle is very unusual; it center-pivots and a bar on one side swings in

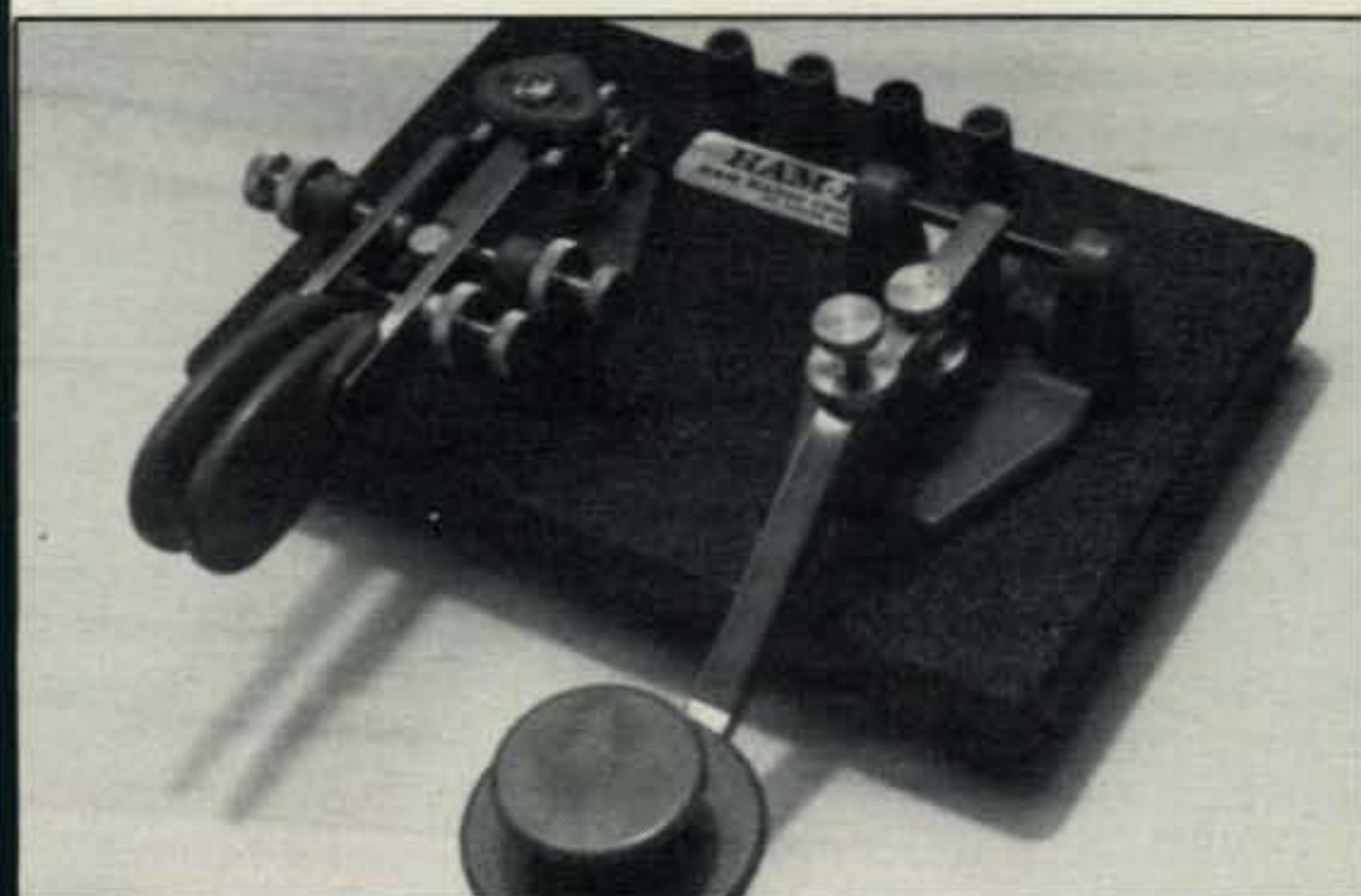


Photo 12- No, this is not a Brown Brothers paddle and key combo, but the often-seen Ham-Key occasionally surfacing at hamfests today. This item usually sports red fingerpieces and does not handle as well as the Brown Brothers key. (Photo courtesy our "mystery guest" collector)

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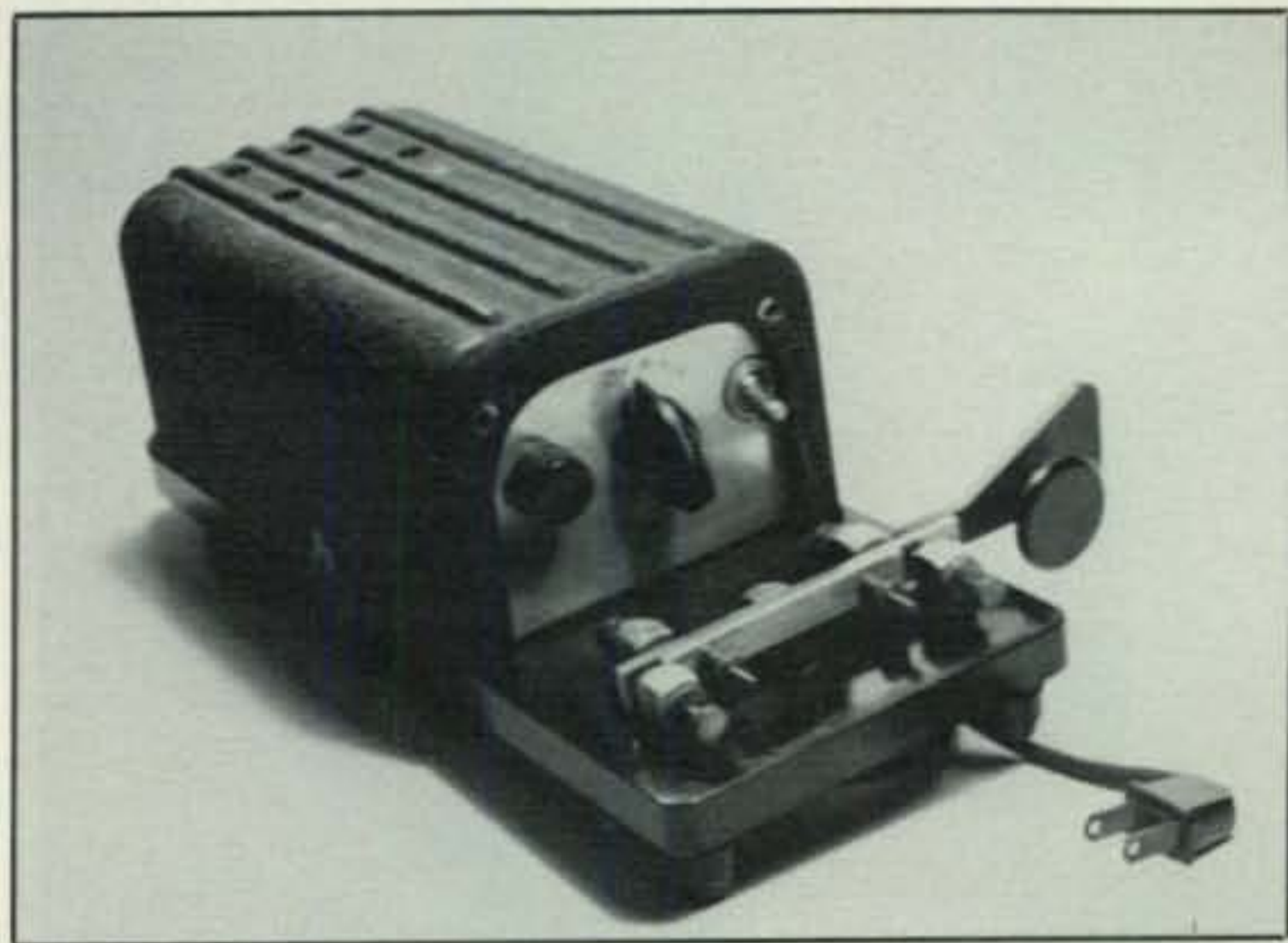


Photo 14- The classic Mon Key made by The Electric Eye Company of Illinois. This heavy-duty unit uses vacuum tubes, and has a built-in power supply and a permanently attached paddle. Mechanics of the paddle are most unusual. (Photo courtesy KA8PJN)

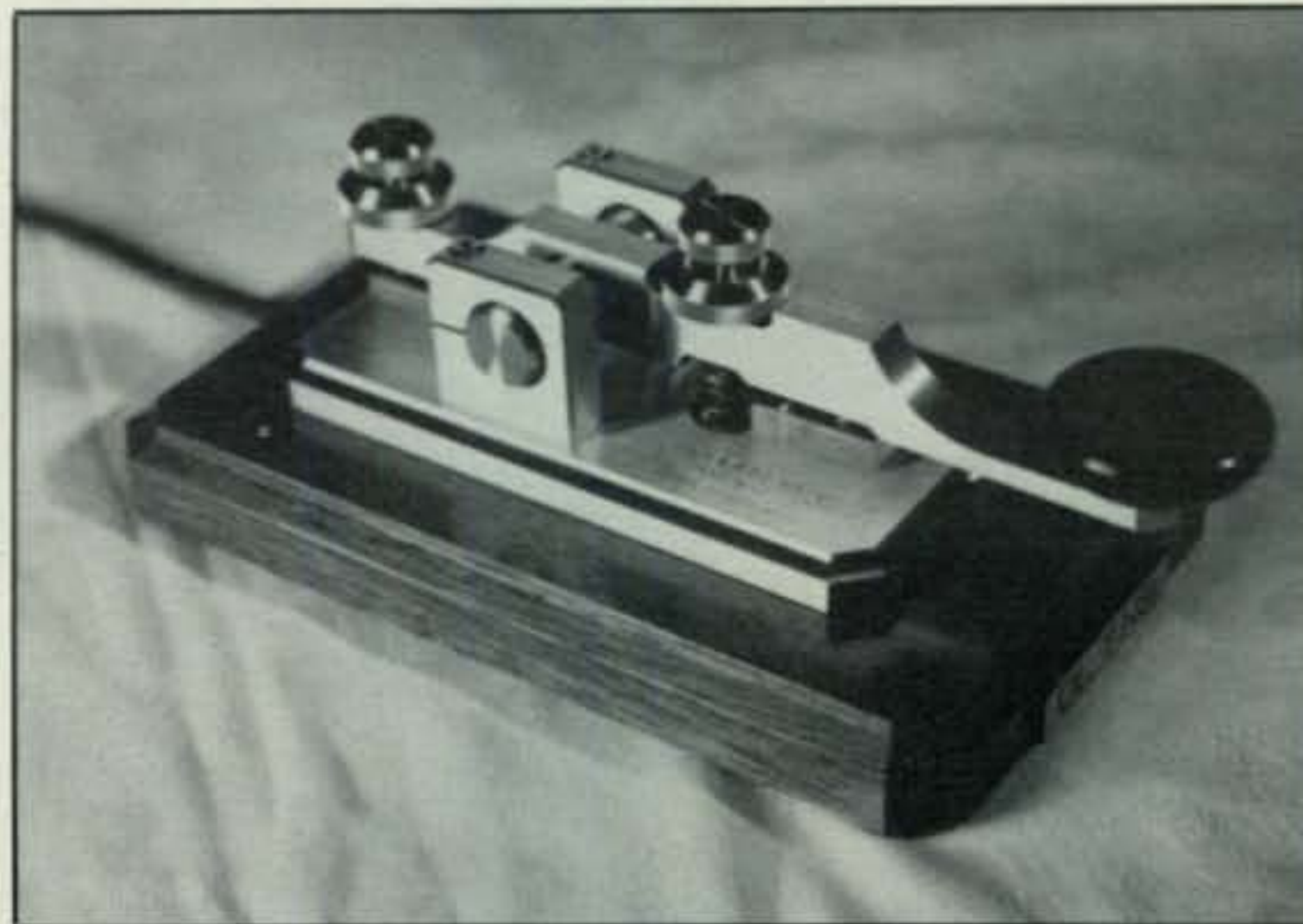


Photo 15- This new "Ultra Champion" hand key is extremely precise and has diamond-polished brass works mounted on a mahogany base. It is available today from DL7NS.

both directions to make dots/dashes. Adjusting this critter should be a real challenge, but Clarence Smith, KA8PJN, mastered it and uses his Mon Key daily. Good show, Clarence! KA8PJN also gave us some fascinating books on old-time radio we will discuss in future columns. Watch for them!

Photo 15

There is barely room to squeeze in one more treat this month, but you surely want to view Schurr's new "Ultra Champion" pump key. This key is a beautiful combination of diamond-polished brass works with mahogany base and knob. It has sealed ball bearings at the fulcrum, precision-threaded adjusting screws, and handles great. You can order this (working) show-piece from Klaus Gramowski, DL7NS, Kaiserin-Augusta-Allee 91, D-1000 Berlin 10, Germany.

Summary

I trust you enjoyed the views. Watch for more next month, and I hope to chat with you on 30 meters tonight.

73, Dave, K4TWJ

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Ameritron's new

AL-811 linear amplifier gives you plenty of power to bust thru QRM.

You get a quiet desktop linear that's so compact it'll slide right into your operating position -- you'll hardly know it's there . . . until QRM sets in. And you can conveniently plug it into your nearest 120 VAC outlet -- no special wiring needed.

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The first 600 watts makes the most difference

The AL-811 gives you 600 watts PEP output -- that's nearly 2 full S-units over your barefoot rig.

That could mean the difference between hearing, "You're Q-5 armchair copy" and, "Sorry can't copy you, too much QRM."

Now you won't have to stand aside while the "big guns" steal your DX. You'll be able to log some of those stations first.

Going from 600 watts to the full legal limit gives you less than one S-unit increase. But is that fraction of an S-unit worth the 3 to 4 times more money it'll cost you?

The AL-811 gives you a powerful punch at a price that's easy on your wallet.

All band, all mode coverage

The AL-811 covers all HF bands (10/12 meters with easy user mod). There's no compromise on WARC and most MARS bands -- you get a 100% rated output.

You can operate the AL-811 on all modes. You get 600 watts output PEP SSB and 500 watts output CW. You even get 400 watts on demanding continuous carrier modes like RTTY, SSTV, FM and AM.

How the low cost 811A tube resists premature failure - even when your amplifier is mistuned

811A tubes resist premature failure in two ways.

First, they're constructed with widely spaced elements that minimize the chance of elements touching and causing a short -- even if the plate gets hot enough to melt.

Second, they use a directly heated toriated tungsten filament cathode that prevents the electron emitting layer from instantly stripping off -- even if mistuning causes a sudden, severe current overload.

Indirectly heated oxide cathode tubes like the \$400 3CX800A7 can be rendered instantly useless if their electron emitting layer is stripped off because of a severe current overload due to mistuning.

The Ameritron AL-811 is excellent for the newcomer because it's tough enough to withstand momentary mistuning. And the tubes are so inexpensive that you can replace one for mere pocket change.

The Ameritron advantage: extra heavy duty power supply that gives you peak performance year after year

The heart of the AL-811 power supply is



its heavy duty power transformer with a high silicone steel core weighing a hefty 17 pounds.

A full wave bridge using 52.5 ufd of total capacitance (four 210 ufd, 470 volt capacitors) produces 1500 volts under full load and 1700 volts no load. That's excellent high voltage regulation!

Full height computer grade filter capacitors with screw terminals are used -- not short stubby, light duty soldered-in "high technology" capacitors that can't dissipate the heat generated by high current.

The rectifier diodes are rated for a massive surge current of 200 amps. They won't blow even if you accidentally short the high voltage supply.

Wire wound, 7 watt, 50 K ohm equalizing resistors safely protect each filter capacitor -- not 2 watt, 100 K ohm carbon composition resistors that can open and cause your filter capacitors to explode or fail.

The Ameritron AL-811 power supply is built tough so you get peak performance year after year.

Tuned input provides excellent load for any rig

A Pi-Network tuned input provides a 50 ohm load for your rig. Even fussy solid state rigs can deliver their full drive to AL-811.

Low loss slug tuned coils -- tunable from the rear panel -- let you optimize performance. High quality low drift silver mica capacitors maintain proper tuning.

Output tank: optimum Q on each band

The low loss pi-network output tank of the AL-811 has been carefully designed for optimum Q on each band and built with quality RF components.

The result is peak performance over each band, wide impedance matching range and exceptionally smooth tuning with efficiencies close to 70%. Even a 3:1 SWR load won't damage the tubes or tank components.

A ball bearing vernier reduction drive makes plate tuning precise and easy.

Quiet pressurized ventilation keeps your tubes safely cooled

A quiet fan pressurizes the cabinet with over 20 cubic feet per minute of cool air.

This large volume of air flow keeps the 811A tube temperature safely below the tube manufacturer's rating -- even with a key down carrier at 500 watts output.

Two illuminated meters

Two illuminated meters give you a clear picture of your AL-811 operating conditions so you can tell right away if something is wrong.

The Grid Current meter continuously checks for improper loading. The other meter switches between high voltage and plate current to warn of abnormal conditions.

Ameritron exclusive Adapt-A-Volt™ power transformer

Too high line voltage stresses components and causes them to wear out and fail. Too low line voltage causes a "soft-tube" effect -- low output and signal distortion.

Ameritron's exclusive Adapt-A-Volt™ power transformer has a special buck-boost winding that lets you compensate for stressful high line voltage and performance robbing low line voltage.

This makes your components last longer and gives you peak performance -- regardless of your line voltage.

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A transmit LED tells you when your rig is keying your AL-811.

A 12 VDC keying relay makes it compatible with all solid state and tube rigs. A built-in back-pulse cancelling diode protects your rig's keying circuit.

Shielded RF compartment. One year limited warranty. Compact 16" D x 13 3/4" W x 8" H. 30 pounds. UPS shippable. Shipped with transformer installed and wired for 120 VAC. Draws 8 amps at 120 VAC. Export model AL-811X wired for 240 VAC and includes 10 and 12 meters.

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NEWS OF COMMUNICATION AROUND THE WORLD

Changes in the (ex-)USSR

The collapse of Communism and the disintegration of the Union of Soviet Socialist Republics (USSR) have had some interesting effects on amateur radio and DX. Look for even more changes in the next few years, as political and economic questions are resolved.

One aspect of the former Soviet Republics probably *won't* change: separate DXCC status of the 15 republics. Each republic has counted as a separate DXCC country, despite rather tenuous claim to "independence." Increasing the degree of independence won't directly affect DXCC country status.

One aspect of the DXCC program that may be affected by the changes in the ex-USSR is New Country applications from that part of the world. Most (but not all) of the 15 republics were classified as "Point 0" DXCC countries. That is, countries that did *not* meet current DXCC country criteria for separate listing. While this Point 0 status does not make any difference to existing countries, Point 0 countries usually cannot be invoked to generate new DXCC countries. However, the current political confusion suggests that any New DXCC Country application will be months or years in the future.

QSLing in the CIS

One important aspect of amateur radio in the CIS has been profoundly, and negatively, affected by the political and economic upheaval in the region: QSLing. In years past, QSLing a contact with a station in the USSR was a straight-forward process. The DXer sent a card to the Central Radio Club, P.O. Box 88, Moscow and waited . . . and waited . . . and waited.

The famed Box 88 was never fast, not always reliable, but for years was the *only* QSL route for all but a handful of USSR stations. The Soviet QSL cards, often crudely printed on low-grade paper stock, would, after a time measured in years, filter back through the ARRL in-coming QSL bureau. When this writer was in charge of the ARRL's bureau program in the mid-1970s, the majority of cards sent to the League for sorting by call districts were from the USSR. A glance through the untidy stacks



The First International Islands On The Air Convention was held in May 1991 in Loano, Italy. From left: JI6KVR, G3ZAY, G3KMA, G3GIQ, I1KFB, VE7IG, and I2YDX. (EA4MY photo via VE3XN)

of cards showed most QSO dates at least two years in the past, and often many more.

Soviet amateurs had a low priority on scarce resources such as paper and printing, and sometimes had to wait months or more for their cards. The flow of cards through Box 88 was often hampered by long delays, some due to lack of personnel and some due to "screening" of incoming cards. Knowledgeable DXers knew that QSL cards that featured religious texts or themes, scantily clad women, etc., would disappear somewhere along the tortuous route between the US and the Soviet amateur. Some DXers kept a small supply of inoffensive, generic QSL cards on hand to send to the USSR.

In recent years glasnost has produced significant improvements in confirming Soviet contacts. Increasing numbers of Soviet amateurs asked for direct QSLs. The *Callbook* listings began to include a handful of direct addresses, in addition to the name and town that previously characterized the R/U listings. Some enterprising Soviets began openly soliciting QSL cards, and IRCs or US\$1, promising "improved" QSLing success within the USSR. For a time DXers enjoyed relatively prompt, direct QSL service. In recent months, however, the system has essentially fallen apart.

The Baltic countries of Estonia, Latvia, and Lithuania represented one aspect of the QSL problem. Rather early in their efforts to regain their independence, the Baltics were cut off from Box 88. Moscow officials simply stopped sending cards to the countries. Some direct mail directed to the Baltics, but retaining "USSR" as part of the address, never made it out of Russia. International Amateur Radio Union (IARU) regulations prohibited member societies, such as the ARRL, from by-passing the "official" QSL bureau of a country. Until the individual countries formed their own radio socie-



Alick, UF6FFF, is the chief operator of the UF7FWW club station. Look for special EO6F/EW6F/EU6F calls this month. (WB2AQC photo)

P.O. Box 50, Fulton, CA 95439



Andy, UA3AB, has a copy of CQ magazine on his operating table. (WB2AQC photo)

ties, and asked to join the IARU, the ARRL couldn't send outgoing QSLs directly to the Baltics. (Nothing prevented individual amateurs or local radio clubs from sending cards to "alternate" QSL bureaus; the IARU rules apply only to exchanges of cards between national societies.)

That problem has since been resolved: there are now legitimate amateur radio societies in each of the three Baltic countries. While these societies have not yet been voted into the IARU, the ARRL (and many other national societies) now sends cards for YL, LY, and ES amateurs to their respective national societies. The Latvian Radio Amateurs Liga (LRAL) of Latvia accepts cards for YL amateurs at Box 164, Riga 226098, Latvia, via Europe. Don't put "USSR" in the address. The Estonia amateurs can receive cards through ERAU, Box 125, Tallinn 200090, Estonia. For LY amateurs, try LRMD, Box 1000, Vilnius 2001, Lithuania.

Other QSLing Problems

While confirming contacts with Baltic stations is now easier and faster than in the



Ken Miller, K6IR (left), receives his 5-Band DXCC plaque from DXCC Specialist Don Search, W3AZD. Ken recently turned in his ZA1A card for his last DXCC country.

past, the same cannot be said for confirming contacts in the rest of what was the USSR. Many Russian stations report that Box 88 has shut down. While this may be an exaggeration, the flow of cards through the Central Radio Club has slowed to a trickle. Handling QSLs appears to be a low priority. (Given the problems in Russia, this is understandable.) Other rumors suggest that Russia and other amateurs will not have to pay for the incoming QSL service.

With the bureau essentially shut down, DXers trying to confirm contacts with CIS stations may try direct mail. This practice has led to even more problems, primarily with pilfered mail. Amateurs in many parts of the ex-USSR say that they don't receive any of the cards or envelopes sent to them. Some report not receiving mail of any kind for months. Their mail is being opened, and the valuable contents removed, long before the QSL request gets to the individual amateur.

It's easy to see why this is happening. Pay rates in Russia run a few hundred rubles a month. The USSR used to pretend that a ruble was equivalent to a US dollar. The black-market exchange rate is actually

5 to 10 rubles to the dollar, making the ruble (theoretically) worth about \$0.10 to \$.20. The political and economic problems in the past year have produced a free-fall in the ruble. In early 1992 the ruble was worth less than one US cent, and its value was dropping rapidly. This means that many Russians, including postal workers, are making an income of only a couple of dollars a month!

Now tempt a small fraction of these postal workers with ten or hundreds of dollars coming into the post office in a package clearly identified with amateur radio call signs, the words "amateur radio" or "amateur operator," a tell-tale bulge of a folded envelope, or other identification as amateur correspondence. By slipping a handful of these envelopes into a pocket, a Russian postal worker can easily double his monthly income. On an organized basis (and there is some evidence of criminal organization in Russian mail theft), there are hundreds and thousands of dollars available. In a country where such basics as bread, milk, meat, and vodka are in short supply to the average citizen but readily available for dollars in free-market stalls,

The WPX Program Mixed

1544	WT3P	1547	JA2NOQ
1545	HB9APJ	1548	IV3JWR
1546	KD3AO		

SSB

2291	N0LYK	2295	DH9OAE
2292	N3DRO	2296	LU1CQ
2293	DU9CO	2297	HP2CWB
2294	EA2BOT		

CW

2721	KB6MIR	2723	EA2CKP
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Endorsements

Mixed: 450 WT3P, HB9APJ, KD3AO, IV3JWR. 500 WT3P, HB9APJ, KD3AO, IV3JWR. 550 HB9APJ, KD3AO, IV3JWR. 600 HB9APJ, KD3AO, IV3JWR. 650 HP9APJ, IV3JWR. 700 HB9APJ, HL5AP, IV3JWR. 750 HB9APJ, HL5AP, IV3JWR. 800 KA1NCN, HB9APJ, HL5AP, IV3JWR. 850 HB9APJ, IN3PEE, IV3JWR. 900 HB9APJ, IV3JWR. 950 HB9APJ, IV3JWR. 1000 HB9APJ, IV3JWR. 1050 HB9APJ, KU0A, AB5C, IV3JWR. 1100 AB5C, IV3JWR. 1150 IV3JWR. 1200 WB2ABD, IV3JWR. 1250 WB3DNA. 1300 WB3DNA. 1500 KS3F. 1550 KS3F, HA5NK. 1600 HA5NK. 1700 WB2YQH. 1800 WE2L.

SSB: 350 DU9CO, EA2BOT, LU1CQ, HP2CWB. 400 DU9CO, EA2BOT, KB5GEO, LU1CQ, N1IBQ, HP2CWB. 450 DU9CO, EA2BOT, LU1CQ, HP2CWB. 500 DU9CO, EA2BOT, LU1CQ. 550 EA2BOT, LU1CQ. 600 LU1CQ. 650 LU1CQ. 700 LU1CQ, N9ICH. 750 LU1CQ, CT1BWW. 800 LU1CQ, CT1BWW. 850 CT1BWW. 900 CT1BWW. 950 NG9L, CT1BWW. 1000 KU0A, NG9L, CT1BWW. 1200 CE1YI, KF7RU. 1250 KA0ZFX. 1700 K4CKS, WE2L, KD9OT. 1850 W3ARK. 1900 W3ARK. 2350 NJ0C. 2650 I0AMU.

CW: 350 HB9APJ, IK2JEX, WE2L. 400 HB9APJ, IK2JEX. 450 HB9APJ, HB9APJ, IK2JEX. 500 HB9APJ, EA6AAK, K1CVF, IK2JEX. 550 HB9APJ, EA6AAK, JI1CQA, N5GFX, JE3CYH. 600 HB9APJ, EA6AAK, JI1CQA, N5GFX. 650 HB9APJ, EA6AAK. 700 W4TYU, HB9APJ, EA6AAK. 750 HB9APJ, EA6AAK, LA3GI. 800 HB9APJ. 950 KS3F. 1400 G3VQO.

10 Meters: EA3AQC
15 Meters: HB9APJ, EA3AQC, AB5C
20 Meters: HB9APJ, EA3AQC
40 Meters: N3DRO
80 Meters: N3DRO
160 Meters: N3DRO

Asia: HB9APJ, EA3AQC, KA1NCN
Africa: EA3AQC
No. Amer.: N0LYK, KB6MIR, HB9APJ, EA3AQC, JI1CQA, KB5GEO
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Complete rules and application forms may be obtained by sending a business-size self-addressed, stamped envelope (foreign stations send extra postage if air-mail desired) to: "CQ WPX Awards," 880, CR13, Clovis, NM 88101-9511 USA.

the prospect of supplementing the meager postal worker's income with some US\$1 from rich Americans is too great a temptation for some Russians.

In fact, a Moscow newspaper specifically blames US amateurs for Russian postal problems. The *Megapolis Express* quotes Russian postal workers blaming "subversive western hams, who put small banknotes in letters to their Soviet counterparts, thus leading postal workers into irresistible temptation." Regardless of who is to blame for mail theft, the fact is that many QSL requests addressed to amateurs in the ex-USSR simply disappear.

A DXer can improve the chances of a card getting through the Soviet postal system by using the usual means of disguising mail. Here are a few suggestions:

- Use a postage meter instead of individual stamps. Most post offices will meter your mail, if you don't have access to a postage machine.

- Don't put anything on the outer envelope that suggests amateur radio. This means avoiding not only call signs (including in the return address) but also words such as amateur radio operator, radio club, radio station, etc. The *Callbook* gives names of many active Soviet amateurs; use the full name whenever possible.

- Use European-style envelopes, which are available from some DX stamp services. Russian-style envelopes are even better, but I don't know of any source for these in the US.

- Seal all edges and the envelope flap with clear tape.

- Don't include US\$1; they are often readily detectable. Wrapping them in carbon paper is a messy possibility, but using IRCs is probably a better solution.

- Don't fold your return envelope; the bulge of the folded envelope is one of the dead give-aways that the envelope contains something of value.

Note that these suggestions are not guarantees. Despite your best efforts, your mail may never reach its destination. However, following this common-sense advice will *improve* the odds that your important QSL request will reach its recipient.

Also note that these ideas are not limited to mail to the ex-Soviet Union. Follow these suggestions *whenever* sending mail to a country in which the contents of your envelope represent a significant sum to postal workers. Some South American countries, and many African and Far Eastern countries, fall into this category.

What about the many enterprising Soviets who are offering QSL services within the former USSR? The problem of mail pilfering has spread to internal mail, too. This means some of these private "QSL bureaus" may be having their own mail problems. And the difficulty of getting mail to the helpful Soviet remains. Some DXers have reported moderate success using some of these QSL routes. However, the

5 Band WAZ

As of Jan. 31, 1992, 335 stations have attained the 200 zone level.

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

None

The top contenders for 5 Band WAZ are:

N4WW, 199	VE7DX, 199
SP9PT, 199	W0PGI, 199
K6YRA, 199	W2YY, 199
PY7ZZ, 199	W9WAQ, 199
DL9WW, 199	K6EID, 199
K0CS, 199	IK8CNT, 199
KB0G, 199	I8IGS, 198
UA4RZ, 199	VE7AHA, 198
AA4KT, 199	SM6AHS, 198
K7UR, 199	K1ST, 198
K9EL, 199	W1JR, 198
NA0Y, 199	4X4DK, 198

770 Stations have attained the 150 zone level as of January 31, 1992.

Applications and reprints of the latest rules may be obtained by sending a self-addressed stamped envelope (75 cents) size 4½ x 9½ to the WAZ Manager, Jim Dionne, K1MEM, 31 De Marco Rd., Sudbury, MA 01776. Applicants should include sufficient postage for safe return of their QSL cards. The processing fee for all CQ awards is \$4.00 for subscribers and \$10 for non-subscribers. Please make all checks payable to the Awards Manager. In order to qualify for the subscriber rate, please enclose your latest CQ mailing label with your application. Send any questions to K1MEM by mail and include an SASE (please do not telephone).

same rules for disguising valuable mail continue to apply.

Other Amateur Radio Changes in the CIS

The breakup of the USSR puts many long-standing amateur radio programs in limbo. For example, what will become of the Worked All Oblasts award? Obviously the three Baltic Oblasts (037, 038, and 083) will be deleted, but what about the other Oblasts? What will happen to the major Soviet contests, including the CQ Mir (Peace) contest traditionally held in May? And what about the many special prefixes on this month? Will they continue? It's probably too early to tell.

For now the individual "independent states" that make up the Commonwealth of Independent States (CIS) continue to use the prefixes and call signs belonging to the old USSR. At some point these new countries will have to apply to the International Telecommunications Union (ITU) for their own prefix allocation. Meanwhile, DXers will have to assume that the previous call sign allocation rules continue to apply. For example, if the World War II Victory call signs are active again this month, you can (usually) tell the DXCC country of the operation from the first letter *after* the number. Thus EU8J, EM8JXD, and EW8J are all in Tajikistan UJ.

The WAZ Program

Single Band WAZ

10 Meter SSB

415 KB8CUS

15 Meter SSB

409 IN3ANE 411 KC9GJ
410 JH6AXY

20 Meter SSB

874 VE7AFI 877 IK2HSW
875 KD9OY 878 KC9GJ
876 OK2BFK

10 Meter CW

126 NQ7M 128 K8LJG
127 JA1MZL

12 Meter CW

4 K1MM

15 Meter CW

226 KX1T 227 JH4VBK

20 Meter CW

414 I2VRF

30 Meter CW

2 K1MM

40 Meter CW

149 K4CIA

12 Meter Mixed

7 4Z4DX

17 Meter Mixed

8 4Z4DX

30 Meter Mixed

1 K1MM

WNZ

44—10M SSB KB8CUS

All Phone

606 W1FYI

All CW

8 N4UU 9 K1MM

All Band WAZ SSB

3891 W6SHY	3898 K7ZM
3892 IK5MEQ	3899 AI6Z
3893 W9PVD	3900 IS0LLJ
3894 IK1JJB	3901 OE7MPH
3895 PT7VBN	3902 W1FYI
3896 DL5NCW	3903 WB6RZK
3897 DL6SDA	

CW/Phone

7154 AA7FL	7163 G0CKP (CW)
7155 K6LU	7164 W9YRZ (CW)
7156 WF1W (CW)	7165 IK2HSW
7157 DL1ZQ (CW)	7166 IT9XND
7158 SP7JLH	7167 HA5WA
7159 EI8EI	7168 WA5CMI
7160 G3IMK (CW)	7169 K8LJQ
7161 W2KKZ	7170 DJ7IN (CW)
7162 WA4VDE (All YL)	

Applications and reprints of the latest rules may be obtained by sending a self-addressed stamped envelope (75 cents) size 4½ x 9½ to the WAZ Manager, Jim Dionne, K1MEM, 31 DeMarco Rd., Sudbury, MA 01776. Applicants forwarding QSL cards either direct to the WAZ manager or to a check point should include sufficient postage for safe return of their QSL cards. The processing fee for all CQ awards is \$4.00 for subscribers and \$10 for non-subscribers. Please make all checks payable to the Awards Manager. In order to qualify for the subscriber rate, please enclose your latest CQ mailing label with your application. Send any questions to K1MEM by mail and include an SASE (please do not telephone).

DSP from JPS

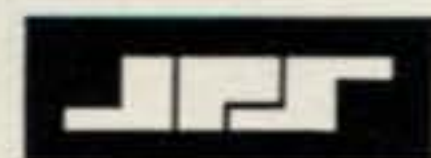
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heterodynes and tune-ups.

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or

Decoder Board & Software
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1691 MHz Loop-Yagi Extension
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CIRCLE 66 ON READER SERVICE CARD

Say You Saw It In CQ

May 1992 • CQ • 121

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 323. To remain on the CQ DX Honor Roll, annual updates are required. Honor Roll updates may be made at any time, in any number. Updates indicating "no change" will be accepted to meet the annual requirement. All updates must be accompanied by an SASE for confirmation. The fee for endorsement involving the issuance of a sticker is \$1.00.

CW

W9DWQ 323 K2FL 323 K2TQC 323 ON4QX 323 K6LEB 323 K9MM 323 YU1HA 323 N4JF 323 N6AR 323 K4CEB 323 N4KG 323 SM6CST 323 AA4KT 323 W2FXA 322 K9QVB 322 K6JG 322 K1MEM 322	N4MM 322 DL1PM 322 W6PT 322 W4BQY 321 K9AB 321 K4XO 321 W2UE 320 K3UA 320 OK1MP 320 W0SR 320 DL8CM 320 N6AV 319 SM3EVR 319 N2KW 319 DL3RK 319 W0IZ 318 W7ULC 318	K2ENT 318 N6CW 318 K9BWQ 318 W9WAQ 317 KD8V 317 EA2IA 316 K2OWE 316 WA4JTI 316 AA5NK 316 K9IW 315 W1WAI 315 W1NG 314 I5XIM 314 KQ9W 314 W0HZ 314 K8NA 314 I8WY 314	IT9ZGY 313 WD9IIC 313 KZ4V 313 WA2HZR 312 W0JLC 312 W4OEL 312 W7CNL 312 K9TI 312 IT9QDS 312 IT9TQH 311 KB8DB 311 N7RO 310 F3TH 310 WA4IUM 310 WB4RUA 309 W6DN 308 W9RY 307	K4CXY 307 N4AH 306 N7MC 306 DJ2PJ 306 SM6CTQ 305 I2QMU 305 N8MC 303 W3BBL 303 KB9XG 303 I4EAT 302 NY5L 302 K9DDO 302 YU2TW 300 WA8YTM 300 NN4Q 299 W6YQ 299 K2JF 298	IT9VDQ 297 OH3NM 297 K8LJG 296 WA4DAN 296 K4JLD 296 W8XD 296 WD9IIX 295 K1VHS 295 VE7DX 295 WB5MTV 294 N5FW 293 PA0XPQ 292 KA7T 290 KU0S 290 K2JLA 290 W1WLW 288 G3KMQ 286	KP4P 283 AG9S 282 KA5TQF 281 W8URM 281 N2DQN 289 W2LZX 279 KB9XG 279 HB9AFI 278 KA2DIV 278 NC9T 278 KA3R 277 WA9RCO 277 YV5ANT 276 DF3FJ 276 K1HDO 276 4N7ZZ 275
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SSB

K2FL 323 VE1YX 323 F9RM 323 DJ9ZB 323 W9DWQ 323 W0YDB 323 K2TQC 323 W4EEE 323 W4DPS 323 W2SUA 323 K9MM 323 YU1HA 323 W2FXA 323 OZ3SK 323 DL9OH 323 VE3MR 323 EA2IA 323 K4MZU 323 KM2P 323 VE3XN 323 K6WR 323 N4JF 323 VE3MRS 323 K6YRA 323 YU1AB 323 K6JG 323 YV1KZ 323 I0ZV 323 N6AR 323 W4JVU 323 KB8DB 323 EA4DO 323 W9SS 323 WB4UBD 323 N4MM 323 WA4JTI 323 W9OKL 323 W6EUF 323 OA4OS 323 OZ5EV 323 W3AZD 323 ZL3NS 323 N7RO 323 K4XO 323 ZL1AGO 323 N4KG 323 W4UW 323 K3UA 323 DL6KG 323 K9BWQ 323 K5OVC 323 K2ENT 323 AA4KT 323 VE3GMT 322	K4MQG 322 I8AA 322 TI2CC 322 I4LCK 322 K8NA 322 VE7WJ 322 VE2WY 322 OK1MP 322 W4NKI 322 WA3HUP 322 YV5AIP 322 W0SFU 322 KS2I 322 OE3WWB 322 4Z4DX 322 I8KCI 322 I0AMU 322 W0SR 322 KD8V 322 I8XTX 322 W7OM 322 VK4LC 322 CT1FL 321 KZ2P 321 K9AB 321 N2KW 321 I8YRK 321 ON5KL 321 TI2HP 321 WB1DQC 321 VE7DX 321 K4CXY 321 WB3DNA 321 KA3HXO 321 WA4ECA 320 SV1ADG 320 WD8MGQ 320 W6DN 320 W3GG 320 I4EAT 320 N6AHU 320 AA5NK 320 NY5L 320 YS1GMV 320 IT9ZGY 320 EA1QF 320 NJ2C 320 KS0Z 320 K2JLA 320 WA4IUM 320 NJ0C 320 K9QVB 320 KR9O 320 IT9TGO 320	VE2PJ 320 CX4HS 320 KB5FU 320 KB4HU 320 I2QMU 320 AA4AH 320 K9HQM 320 XE1C1 320 IT9TQH 319 K1UO 319 W2CC 319 K9IW 319 W7FP 319 KE4VU 319 CX1TE 319 KZ4V 319 WB5TED 319 WB6OKK 319 W9JT 319 IK8CNT 318 I4ZSQ 318 G4CHP 318 W4UNP 318 ZL1BIL 318 KA9ABC 318 KQ9W 318 WB6PSY 318 K2JF 318 ZS6LW 318 OA4ED 318 9H4G 318 I8XTX 317 WA4DAN 317 YV5CWO 317 YV1AJ 317 N4CRU 317 WA4WTG 317 IK8BOE 317 G4ADD 317 W6BCQ 317 W6NLG 317 XE1XM 317 KB3OQ 317 SM6CST 317 N4WF 316 K4POV 316 I8LEL 316 KC8EU 316 W6SN 316 AG9S 316 K8ZZU 316 DU9RG 316 OE2EGL 316	KF7SH 316 WD8PUG 316 YT7DX 316 IK0IOL 316 KV2S 316 KB9OC 316 KE4HX 315 XE1AE 315 KB2HK 315 W0LSD 315 AI8S 315 WZ4I 315 IK7DBB 315 KC2FC 315 YV5DFI 314 W9RY 314 K8CSG 314 KU9Z 314 PY4OY 314 HR1KAS 314 A92BE 314 K7EHI 314 XE1OX 314 K9TI 314 OH5KL 314 WE2L 314 W6MFC 314 I2EOW 313 WB4PUD 313 W1NG 313 KA6V 313 AA6BB 313 W1LQQ 313 W0ULU 313 K0GT 312 W2FGY 312 K8CMO 312 KI3L 312 T12KD 312 K8NWD 312 KV9I 312 KC4MJ 312 K8YVI 312 ZS6BBY 312 W5LLU 312 N6CGB 312 K4JLD 312 WA9IVU 312 LA7JO 311 I2MQP 311 NN4Q 311 IK2GNW 311 K0HQW 311	K1HDO 311 K9BWQ 311 N1ALR 311 XE1OX 310 KA5RNH 310 YV1CLM 310 IK1GPG 310 N6AHV 309 I5EFO 309 I1POR 309 G4GED 309 KP4P 309 WA9RCO 309 XE1MD 309 WA8YTM 309 WD9IIX 308 YV2EJU 308 N3ARK 308 W4BQY 308 K4LR 308 KB7VD 308 W7ULC 308 N6AV 307 AI8M 307 WA2FKF 307 WD5P 307 TI2JJP 307 KA5TQF 307 F6BFI 306 WA2MID 306 XE1MDX 306 N0AMI 306 VK3JF 306 K1VHS 306 N4KEL/M 306 N4KE 305 K3LUE 305 WA6DTG 305 VE3DLR 305 YV5IVB 305 NI5D 305 EA1QF 304 K4RIG 304 KB1JU 304 KD5ZM 304 IN3ANE 304 ZL1BOQ 304 VE2GHZ 304 EA3EQT 304 I8IYW 304 KA9TNZ 303 KB9LN 303 KB0SY 303	W5XQ 303 KE5PO 303 W4BQY 302 W2LZX 302 ZS6A00 302 XE1KS 302 N5FW 301 IK8GCS 301 VE6PW 301 WB4TGB 301 LU7HJM 301 XE1ZLW 301 YU2TW 300 N4CRU 300 WT4T 300 KB2MY 300 WD0BNC 300 WD0DMN 300 W7KSK 300 VE3FJE 300 WB4NDX 300 K3NEE 300 NW5K 299 WB6GFJ 299 I8IGS 299 VE4AT 299 K5DUT 299 RA3YA 299 I2ZGC 299 N1CWA 299 KB2FC 298 4N7ZZ 298 SV8CS 298 WA0TKJ 298 KF5DX 297 NP4CC 297 HP1JC 296 XE1OW 296 NC9T 296 W0IYR 294 VE3XO 294 EA3KW 294 W8URM 294 IT9VDQ 293 WB3CQN 293 WD9IIC 293 VE6PW 292 TI2LTA 292 W3SOH 292 K9EC 292 KE7UL 291 WF9K 291 SV1JG 291	I4CSP 290 I4UFH 289 W9TA 288 YB2OK 288 OK1AWZ 287 EA8TE 287 PA0XPQ 286 N8BJQ 285 KB5RF 284 IK8BMW 284 NZ7D 284 VE3IMO 283 KB9AIT 283 WA9BXB 282 WK3N 282 YB3CEV 282 VE3NUP 281 VU2DVP 281 4X4JO 281 TG9EP 281 NX0I 280 YU1TR 280 PY2DBU 280 W5XO 279 K5AOL 279 WN5K 279 WB8TLI 279 VU2CVP 278 KG9N 277 I8WYD 277 CE7ZK 277 KA9I 277 WA9BDX 277 WP4AFA 277 K4BYK 277 WA5HWB 277 WB0UFL 277 WN5MBS 277 W4PTT 276 I8IYW 276 XE1DU 276 G4NXG/M 276 WB2JZK 276 WA4OPW 275 KA5YCM 275 KI4FW 275 NX4Y 275 WA4PGM 275 NO4J 275 VE7HAM 275 HP6AYV 275 TI2SD 275 KJ6GC 275
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The situation in the ex-USSR remains fluid; expect numerous and potentially far-reaching changes in the future.

DX News

This past spring has been a relatively quiet one for the DX Advisory Committee (DXAC). One pending New Country appli-

cation was turned down unanimously: The Holy House, HV0HH. This operation not only won't be a new One for DXCC, but it also won't count for either The Vatican HV nor Italy I. The HV0HH QSL cards are interesting conversation pieces, but not worth much more.

Despite the DX rumor mill, as of mid-February the DXAC has not received any

New Country applications for Wrangle Island, Snake Island, Pratus Island, nor Bougainville. Of these, only Pratus seems to have much of chance. Work any unusual BV operation you hear.

The DXCC desk is proceeding with putting all active DXCC records onto computer. While this process will eliminate having to submit a card more than once, and

will improve accuracy and efficiency in the long run, the process is time-consuming. This means that amateurs submitting DXCC endorsements may have to wait a few months for their application to be processed. Please be patient. Also, carefully check your own records against the computer printout from the ARRL. The process of entering your old paper record into the computer program is subject to some mistakes. Many DXers have reported minor errors in their new computerized DXCC record. Notify the DXCC desk of any discrepancies, so that they can be corrected quickly.

DX Gatherings

DXers who aren't completely burned out by Visalia and Dayton have a couple of DX gatherings coming this summer. The Radio Club Potosino is hosting the **20th National Conference of the Mexican Amateur Radio League** in San Luis Potosi, Mexico, July 16-18. The convention will feature both amateur radio technical seminars and cultural activities. Information or reservations can be obtained from Sergio Sada, XE2RJ, Calzada del Valle Pte. 499, Colonia del Valle, Garza Garcia, NL 66220 Mexico, or from Frank Smith, AA7FM, Consulate of Finland, 9744 West Bell Road, Sun City, AZ 85351.

The **Northwest DX Convention** will be in the Seattle area this year under the sponsorship of the Western Washington DX Club. The dates are July 24-26. For more information, contact the club at P.O. Box 224, Mercer Island, WA 98040.

A little farther away in time and distance is the Radio Society of Great Britain (RSGB)'s **HF and Islands On The Air Convention**, September 25-27, at the Beaumont Convention Centre, Old Windsor, Berkshire, England. This is only a few kilometers from Heathrow airport. For more information, contact IOTA manager Roger Balistern, G3KMA, La Quinta, Mimbridge, Chobham, Woking, Surrey, England.

DX Club Officers

Local DX clubs provide a wide range of activities and services to beginning and experienced DXers. These clubs depend on the voluntary efforts of club officers. In recognition of this invaluable assistance, we note the following recently elected officers.

The **North Jersey DX Association** has elected the following: President Harry Westervelt, NA2K; Vice-President Mario Karcich, WB2CZB; Secretary Bill Hudzik, WA2UDT; Treasurer Gene Ingraham, N2BIM.

The **Southwest Ohio DX Association**, the group that brings us the Dayton DX Dinner and the DX Forum at Dayton, has elect-



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If you are a user, a Weathernode responds somewhat like a packet BBS. You may connect to the node, get a listing of commands, and then indicate what you would like dumped from the Weathernode's memory. You may also specify a range of time and combination of sensors. The requested information is sent back in tabular form which may be imported into spreadsheet programs for graphing. Users may look at a detailed record, for example, of temperatures taken every five minutes for a day, or they may wish to scan daily weather for over a month.

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Includes theory textbook, 2 stereo code tapes, and a marine radio facsimile broadcast schedule book.

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Includes 6 cassette tapes that make it easy to learn the code from scratch.

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This General course includes 6 tapes for speed building from 5 to 13 wpm.

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This Advanced course includes 4 theory tapes, 1 textbook, 6 code tapes (5 to 13 wpm) and the latest FCC Rule book.

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GW0015 Adv. Theory Course \$29.95

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DRZI 0092

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3D2DS to DL1SDN
3D2HH to DJ1WM
3D2QB to SM3CER
3D2UU to DF2UU
3X0HNU to F6FNU
3Y2GV to LA6ZH
4J4GAY to DL1VJ
4J4GC to UG6GAW
4K2CC to UV3CC
4K2MAL to UA4RC
4K3/UA1ZFQ to UA1ZX
4N3AA to YT3VM
4N4AA to YU4SBH
4U2CC to UV3CC
5H3AS to LA2JX
5H3RA to JA3PAU
5N0CEP to N6QLQ
5R8GW to F6FNU
5R8JS to F5IL
5V7JG to F6AJA
5V7RH to N3FRT
5X5WR/A to DJ5RT
7P8FE to OH3GZ
8Q7DV to DJ0EC
8Q7XX to DJ8MT
9J2HN to JH8BKL
9J2SZ to SP8DIP
9K2RC to OK1FTW
9K2WR to N6UXB
9K2ZZ to W8CNL
9M2NA to VE3CHZ

9X5NH to DJ6EA
A61AC to ON7LX
A61AD to WB2DND
AA4VK/KP1 to N0TG
AP/WA2WYR to KK6TX
AP2JZB to K2EWB
BV2FA to DJ9ZB
C31LL to C31LBB
C56/G3RZ to G3RZ
C6A/G4AML to G4AML
C9RDM to W8GIO
CX9NH to DJ6EA
DJ1WM/KH8 to DJ1WM
DU9AXJ to DU9CO
F65FC to F6DZU
FY8EK to F6FNU
FY5EW to F6BFS
FY5YE to W5JLU
HF8POL to SP9DWT
HK7/SM5HV to SM5HV
HR1LW to JA1LW
HS8ZAA to KM1R
HV3SJ to I0DUU
HZ1AB to K8PYD
J28F0 to F6FNU
J37M to W9VW
KG4DD to N5FTR
N0TG/KP1 to N0TG
OD5SK to KB5RA
OG4YR to OH4YR
OK1IAI/YA to OK1IAI
OX3KM to F6FNU

OY1R to W2KF
OY2H to I0WDX
OY2V0 to OZ9DP
P29DK to N4EOF
P38JE to 5B4JE
PJ5/N4X0 to N4X0
PY8FF to W9VA
RF6FC to UF6FFF
S01A to EA2JG
SV8IG/9 to IK0EFR
T38RE to HA8XX
TA4/DK7PE to DK7PE
TI4SU to SM0RBO
TJ1PD to N5DRV
TL8JL to K4UTE
TZ6NU to F6FNU
TZ6VV to N0BLD
UC1AXI to RC2CB
UD6DUW to Y42DA
UH8EA to W5BWA
UI8ACP to F6FNU
UI9GWA to DL1GWS
UJ8KA to UJ8JMM
UJ8RA to UA9AB
UM8DX to FD1OJO
UZ4WWQ to AA4NU
V63AO to KC6IN
V63NW to DF6FK
V73AZ to KX6DC
V73CT to KC6WHZ
V85KX to G3JKX
VK6UE to VK6ANC

VP2V/W5ZPA to W5ZPA
VP5/WA2BOT to N2KW
VP8CFM to GM4KLU
VR6FM to K16YN
VS6WV to K0TLM
WA4DAN/KP1 to N0TG
WZ6C/S2 to W4FRU
XU8DX to JA1NUT
XW1QL to YASME
XX9AS to N6LVY
Y830SE to W7TSQ
YV25ARV to YV5ARV
ZA1HA to HA6KNB
Z09BV to W4FRU
ZP6CW to ZP6XDW
ZW2W to PY2RRG
9K2TC to Canadian Embassy,
Box 25281, Kuwait City
C21BR to Box 478, Naura Island
HK8NAF to Box 111, San An-
dres Is.
HL8Y to Box 162, Seoul
OD5ZN to P.O. Box 66, Tripoli,
Lebanon
P29DX to Box 1783, Pt.
Moresby, Papua-New Guinea
RJ85KW to P.O. Box 270,
Pavlograd 323000 Tajikistan
UA8CT to Box 1, Garovka 2,
Khabarovsk City
ZA1TAJ to P.O. Box 66, Tirana

ed the following: President Bob Esquire, W9UI; Vice-President Steve Miller, WD8IXE; Secretary Randy Farmer, W8FN; Treasurer Scott Lehman, N9AG.

The **Southern New England DX Association** has the following new officers: President Don Greenbaum, WB2DND; Vice-President Don Haney, KA1T; Treasurer Dave McCurdy, W2GVX; Activities Chair Bill Poellnitz, K1MM; Executive Committee Bill Hassan, WA1IML, Bill Ewing, W1EYT, and Bruce Marshall, WA1G.

The **Twin City DX Association** in Minnesota has elected: President Bill Higgins, W0YDB; Secretary Curt Swenson, K0CVD; Treasurer Vern Veenhuis, KU0S.

The **Southern California DX Club** has elected: President Pete Meyer, N0AFW; Vice-President Rick Samoian, WB6OKK; Secretary/Editor Steve Locks, W6FRZ; Treasurer Charlie Spetnagel, N7QQ; Directors Jeff Geller, N6RVZ, Carl Gardenias, WU6D, and Herb Twitchell, W6BL.

The **West Jersey DX Group** has tapped the following: President Angel Garcia, WA2VUY; Vice-President John Hulst, KF2BH; Secretary Bob Clark, KV2Y; Treasurer Marty Grozinsky, NS2K.

And the **Blackhawk DX and Contest Club** has recently been organized in Rockford, Illinois. Amateurs in northern Illinois and southern Michigan with interest in DX and contesting are invited to attend meetings, which are held on the first Thursday of the month at 7 PM at the Swedish American Health Center, 1358 Fourth Ave., Rockford, IL. For information about the club, contact the secretary: Jim Miller, W4JR, 5581 Einor Ave., Rockford, IL 61108 (phone 815-397-4602).

QSL Notes

Anyone still needing a QSL from Silent Key **ZS5WT**, including the **ZS5WT/7P8** Lesotho operation, should try via ZS5BS.

For **4J6X** QSLs, please send SASE to K3STM.

I1RBJ has a new address: Gian Carlo Bavassano, Via Monti 7, 10126 Torino, Italy. He handles QSLs for a variety of DXpedition and Italian special-events stations.

QSL **GB2DX** via Alan Birch, G4NXG, 17 Elmhow Grove, Hawkley Hall, Wigan, Lancashire WN3 5RQ, England. (Users of the computer logging program CT should note that not all GB stations are in Scotland!)

John Laney, K4BAI, reports receiving some empty envelopes that once held QSLs, including some from the bureau. If you haven't received cards from any of John's numerous Caribbean or other DXpeditions, try again.

Brian Robertson's new call of **KH2T** just missed the deadline for the 1992 *Callbook*; his address is 17 Aldrich Road, Santa Rita, GU 96915. US return stamps are fine.

QSL Portugal special-event stations **CQ0A** and **CQ5EB** to Jose Emanuel Ribeiro de Sa CT1EEB, P.O. Box 79, 3860 Estarreja, Portugal.

QSL the October 1991 **KG4QQ** operation from Guantanamo Bay via W9QQ. QSL the 1982 **KG4QQ** operation via WB1GQQ.

QSL **CU1AC** via Gene Nadolny, W2FXA, Box 421, Elma, NY 14059.

H18A reports that some of his incoming mail has been opened and US\$1 removed. Aki suggests delaying your QSL until his return to Japan at the end of March. Then



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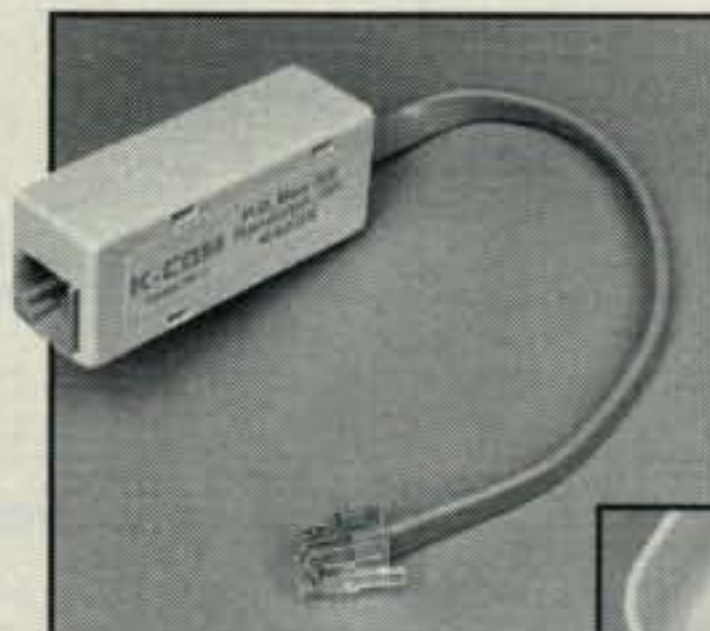
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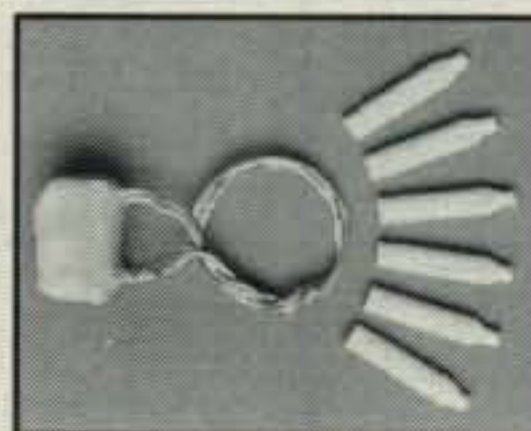
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IC-229H 2-Meter, FM, 50 Watt Xcvr.	359.00
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IC-2GAT 2-Mtr., FM, Handheld With T-T	309.50
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BP-83 7.2 VDC, 600 mAh., Ni-Cad Batt. Pack	49.00
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BP-90 Battery Case	16.00
BC-35 Drop-In Rapid Charger; BP-2, 5, 7, 8	79.00
BC-72A Drop-In Chg.; BP-81, 82, 83, 84, 85, Int.	99.00
CP-11 Cigarette Lighter Cable W/Noise Filter	18.99
CP-12 Cigarette Lighter Cable W/Noise Filter	18.49
CP-13 Cigarette Lighter Cable W/Noise Filter	18.49
AD-12 External Power Adapter For IC-2GAT	24.50
AD-14 Bat. Chg. Adap. BP-81 Thru BP-84, BP-90 ...	16.99
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83-168 UHF, RG-59/U Reducer49
83-185 UHF, RG-58/U Reducer44
82-202 Type-N, Male, For RG-8/U	3.02
82-202-1006 Type-N, Male, For Belden 9913	3.83
31-3202 BNC, Male, For RG-58/U, 142/U, 223/U	2.73
31-4541 BNC, Male, For RG-59/U, 62/U	3.70
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QSL to JA5DQH. You may try via Box 3272, Santo Domingo, Dominican Republic, but use IRCs instead of US\$1.

Jari Jussila, OH2BU, reports that all direct **4J1FS** cards from the 1991 M-V Island operation are in the mail. If you haven't received yours, try again via OH2BU.

The **D2ACA** QSL cards were sent to Toly, UT3UY, Ukraine in early January. Expect these out soon.

The **KB5GL/VP2V** operators say that donations would be appreciated with the QSL requests. At least provide adequate postage for the return mail.

Math Bjerrang, LA5NM, reports that he has the **YI1BGD** logs for 1975-1991. Anyone needing a YI1BGD card from this period should QSL *direct only* via LA5NM. Math reports that some Iraqis now have their own callsigns, but still operate from the YI1BGD club station. Their calls, names, and Baghdad, Iraq P.O. Boxes are: **YI1AB**, Saad Abdul-Kareem Al-Tai, Box 6100.

YI1AFC, Adel Mahmood Aswad, Box 7441.

YI1IY, Emad Mahdi Salih, Box 7482.

YI1MH, Majod Abdul-Hameei Rasheed, Box 5864.

YI1RJ, Raed Abdul-Raczak Al-Jafary, Box 7147.

QSL the February **N5IMW/V47, WA5Y/V47, and V47MO** St. Kitts operations via Scott Noschang, KF8NN, 1300 Jerry Lane, Milford, OH 45150.

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CIRCLE 34 ON READER SERVICE CARD

CQ DX Awards Program

SSB

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1938	DU9CO	1940	4N7ZZ

CW

849	4N7ZZ	850	W8XD
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SSB Endorsements

320	K4XO/323	310	KB3OQ/317
320	ZL3NS/323	310	KC2FC/315
320	OA4OS/323	310	IK7DBB/315
320	W0SR/322	310	W6MFC/314
320	KD8V/322	310	WA9IVU/312
320	I8TX/322	310	N1ALR/311
320	KA3HXO/321	275	4N7ZZ/298
320	AA4AH/320	250	HA5NK/256
320	I2QMU/320	250	K2EEK/251
310	WB6OKK/319	200	5Z4BH/209
310	KZ4V/319	150	W6HBK/164
310	OA4ED/318	150	DU9CO/152
310	9H4G/318	28 MHz	5Z4BH
310	XE1XM/317		

CW Endorsements

320	K4CEB/323	300	I2QMU/305
320	K4XO/321	275	W8XD/296
320	W0SR/320	275	KA7T/290
310	KD8V/317	275	4N7ZZ/275
310	I8WY/314	28 MHz	WA9RCQ
310	KZ4V/313	3.5/7 MHz	WA9RCQ
300	N4AH/306		

Total number of active countries is 323. The basic award fee for subscribers to CQ is \$4. For non-subscribers, it is \$10. In order to qualify for the reduced subscriber rate, please enclose your latest CQ mailing label with your application. Endorsement stickers are \$1.00. Updates not involving the issuance of a sticker are made free when an SASE is enclosed for confirmation of total. Rules and application forms for the CQ DX Awards Program may be obtained by sending a business size, No. 10 envelope, self-addressed and stamped, to CQ DX Awards Manager, Billy Williams, N4UF, Box 9673, Jacksonville, FL 32208 U.S.A. DX stations must include extra postage for air-mail reply. Please make all checks payable to the awards manager.

Karl Mesquita Leite, PS7KM, says he has the original log and cards for the **PY0SR** St. Peter and St. Paul Rocks from May 1991. Anyone still needing a card should contact Karl at Caixa Postal 385, 59001 Natal RN Brazil, with US\$2.

QSL the Clipperton DX Club's **FF0XX** call via the REF bureau, or direct to Clipperton DX Club, Box 4, 28111 Luce Cedex, France. (This station is in France, not Clipperton!)

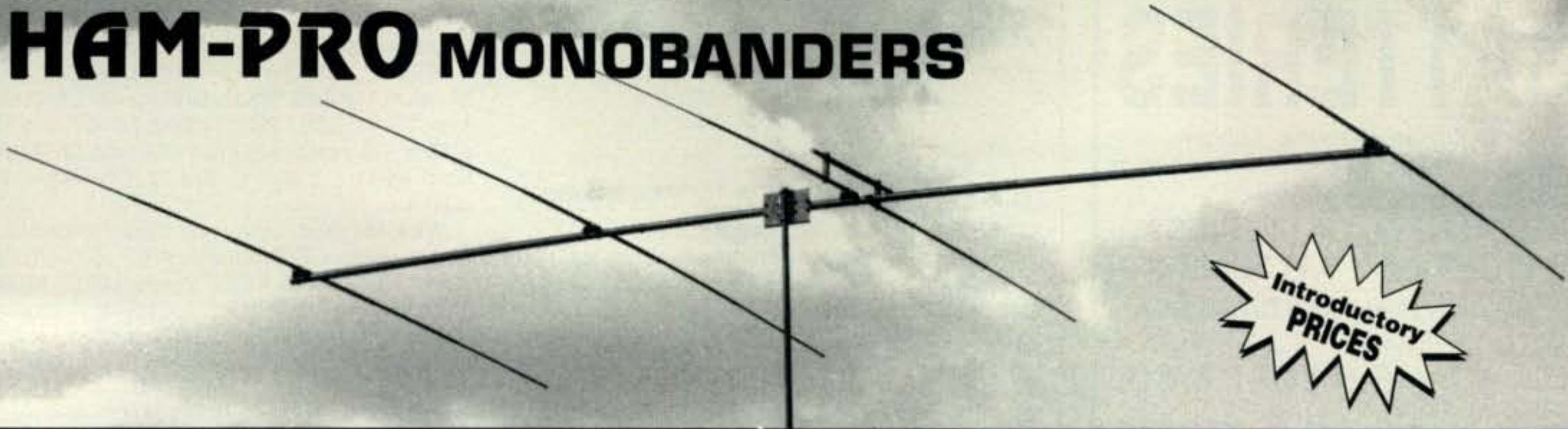
Ivo Pezer, YU400, is now signing **5B4ADA** from Cyprus for the next few years. US DXers *only* may QSL via K2VHW. QSL manager for Ivo's other calls (YU400/4X, YU400/4U, etc.) is YU4YA. In contests he will use a special call, such as **P34A** in WPX CW; QSL to YU4YA.

QSL the Oklahoma DX Association's contest call of **XE2MOO** via KD5RQ.

The **HC8U** operation, with a QSL route via the club station W6UE, has confirmed all DX QSL requests and most stateside ones. KA6SAR may be able to help.

Kappy Kaplan, WA4WTG, handles cards for **4Z2DX, 4Z4DX, 4Z5DX, 4Z6DX, 4Z8DX, 4Z4HF, 4Z4LF, 4X4NJ, 4X4UF, 4X2BYB, 4X6BYB, 6Y5MC, 8P6AH, 8P6IB, 9M8AP, 9M8PV, VK6RG, J6LKO, YU4AX, YZ4Z, 4N4CX, 4N4MX**. His address is 718 SE 3 Lane, Dania, FL 33004.
73, Chod, VP2ML

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H6-6	6m	9.41	1.02	1.91	\$200
H144-5	2m	9.10	1.05	1.39	\$ 69
H144-15	2m	13.73	1.02	1.68	\$145
H220-5	1.25m	9.20	1.02	1.30	\$ 65
H220-17	1.25m	13.53	1.02	1.29	\$150
H432-5	70cm	9.35	1.08	1.28	\$ 65
H432-24	70cm	16.14	1.04	1.83	\$145

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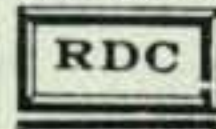
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SSD-6*	160-80-40-20-15-10M space saver dipole 71' long	\$125 ppd
SSD-5*	80-40-20-15-10M space-saver dipole-specify L. 42'-\$105 . 52'-\$108 ppd	
SSD-4*	80-40-20-15M space-saver dipole-specify L. 48'-\$93 . 60'-\$ 98 ppd	

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Announcements

(from p. 6)

May 17; General portions 10-80 meters. QSL to
KD4SS, 309 East Main St., Glasgow, KY 42141 (SASE).

N4MOK, from Golden Anniversary of Women's Ar-
my and Army Auxiliary Corps Reunion, Fort McClellan,
Alabama; Fort McClellan MARS; May 14-15 (no times
given); 28.350, 21.350, 14.285, 7.275, 3.900 MHz,
MARS frequency to be announced. Certificates to all
WACs and WAACs who participate and special event
QSL for radio ops who assist them. Contact WAC Foun-
dation, 205-848-3512, or Fort McClellan Army MARS
station at 205-848-4818.

W4EM, from Memphis in May International Festival,
Memphis, TN; Mid-South ARA; 1300Z May 2 to 0500Z
May 3; lower 50 kHz of SSB General 80-12 meters and
Novice 10 meters. For certificate send QSL and 9 x
12 SASE to MARA-W4EM, 2966 Cordell, Memphis, TN
38118.

5-Land, from Toad Suck Festival, Toad Suck, Arkan-
sas; Faulkner County ARC; 1700-2300Z May 2; on
14.270 and 28.490. For certificate send QSL and 9 x
12 SASE to the operator or to FCARC (W5AUU), P.O.
Box 324, Conway, AR 72032.

N5PKR & N5SAN, for all county hunters, from
Mudd Mountain, Montgomery County, Arkansas; Buz-
zard AR Federation; 1500-2400Z May 15-16; CW
3.680, 7.130, 14.050, 21.124, 28.125; phone 3.870,
7.230, 14.250, 21.240; Novice 28.385. QSL to N5PKR
and N5SAN.

WD5DRB, from B-VARC's 15th anniversary, Hous-
ton, Texas; Brazos Valley ARC; 0000Z May 16 to 0000Z
May 18; lower 25 kHz of General 80, 40, 20, 15 meters
and 28.488 MHz of Novice subband. For certificate
send QSL and SASE to B-VARC, P.O. Box 1630, Mis-
souri City, TX 77459-1630.

KC6LUC, from Historical Chicago to Los Angeles
Route 66, Baker, California; Billy Holcomb Chapter
ARC; 1700-0400Z May 1-2; General 40, 20, 15 meters,
Novice 10 meters. For certificate send QSL and SASE
to ECV ARC, 1458 Albright Ave., Upland, CA 91786.

7-land, from opening of spring paddle fishing sea-
son, Intake, Montana; Lower Yellowstone ARC; 0000Z
May 15 to 2400Z May 16; lower portions of 40, 20, 15
meters and Novice 10 meters. For QSL send SASE to
Wally Braun, KB7AO, P.O. Box 101, Savage, MT
59262.

KE7QV, from driving of Golden Spike, Promontory
Summit, Utah; Ogden ARC; 0001-2100Z May 10; on
one of following—3.970, 7.270, 14.280, 21.375, 28.415
MHz. Send QSL and SASE to Ogden ARC, P.O. Box
3353, Ogden, UT 84409.

W7BU, from USCG Lightship Columbia WLW-604,
Astoria, Oregon; Sunset Empire ARC; 1700-2400Z
May 9-11; General 20, 15, 10 meters phone and Nov-
ice 10 meters. For certificate send QSL and 9 x 12
SASE (39¢ postage) to Lightship Columbia, P.O. Box
264, Astoria, OR 97103.

W7ZA, from 200th anniversary of discovery of
Grays Harbor, Washington; Grays Harbor ARC; 0000Z
May 9 to 2400Z May 10; bottom part General phone
15-80 meters, Novice 10 meters, 40 up from bottom
of CW bands 10-80. For QSL send QSL and SASE to
KA7AIR, Joe Ledesma, 516 Sixth St., Hoquiam, WA
98550.

W8BAP, from Feast of the Flowering Moon Festival,
Chillicothe, Ohio; 1400-2200Z May 23-24, phone 40,
20, 15 General and Phone 10 meter Novice. For cer-
tificate send 9 x 12 SASE to W8BAP, P.O. Box 353,
Chillicothe, OH 45601.

K8DAA, from Tulip Time in Holland, Michigan;
Holland ARC; May 10-16 (no times given); lower por-
tion of General 20 and 15 meters and around 28.400
MHz. For certificate send QSL with call worked and
9 x 12 SASE to KC8KE, Jim Lamberts, 2442 Meadow
Creek Lane, Holland, MI 49424.

W9DK, from car ferry *Badger*, Manitowoc, Wiscon-
sin; Mancorad RC; 1500-0000Z May 16-17; 7.250,
14.250, 21.350, 28.450. For certificate send QSL and
SASE to Mancorad RC, P.O. Box 204, Manitowoc, WI
54221-0204.

9-Land, from Memorial Day Homecoming, Watson,
Effingham County, Illinois; National Trail ARC; May 23-

24 (no times given); 28.4 plus/minus and lower General
phone bands. For QSL send SASE to Callbook K9UXZ.

W9DUP, from Armed Forces Day, Cantigny War
Museum, Winfield, Illinois; DuPage ARC; 1600-2300Z
May 16-17; SSB 7.250, 14.290, 28.400 and 145.25
(-600). For certificate send QSL and SASE to Jack
Carr, NV9S, DARC, P.O. Box 71, Clarendon Hills, IL
60514.

WB0HSI, from Lewis and Clark Rendezvous, St.
Charles, Missouri; St. Charles ARC; 1300-2100Z May
16-17; 7265, 14265, 21365, 28465, 146.67, and AO-13
145.935 (mode B) and 435.970 (mode J) as propaga-
tion and QRM permit. For certificate send 9 x 12 SASE
to St. Charles ARC, P.O. Box 1429, St. Charles, MO
63302-1429.

VE1RCAF, from Reunion 92, 50th anniversary of
Canadian Forces Base Greenwood, Nova Scotia;
Greenwood ARC; May 28-31 and ARRL Field Day (no
times or frequencies given). For QSL (and possible cer-
tificate) send QSL and SASE (CDN) or SA envelope and
IRCs to Greenwood ARC, P.O. Box 63, Greenwood,
Nova Scotia, Canada B0P 1N0.

XJ2CPS, from 350th anniversary of Sorel and 10th
anniversary of Quebec Hamfest, Sorel, Quebec, Ca-
nada; Sorel-Tracy ARC; May 15-30 (no times given);
CW 15 kHz from bottom of 80-10 meters, SSB 3850,
7.250, 14.250, 21.250, 28.450. For certificate send
QSL and 9 x 12 SASE to VE2UL, 265 Ramesay, Sorel,
Quebec, Canada J3P 4A5.

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

May 2, **Southern Tier Hamfest**, Marvin Park Fair-
grounds, Owego, New York. Contact STARC, P.O. Box
7082, Endicott, NY 13760. (VE exams)

May 2, **Triangle ARC Hamfest**, Calcutta Fire Hall,
East Liverpool, Ohio. Contact Dick Sisley, K8JKB, 1218
Northside Ave., East Liverpool, OH 43920.

May 2, **WB6DWY ARRL Hamfest, ATV & Packet
Demonstration**, Sonoma Community Center, Sono-
ma, California. Contact Darrel, WD6BOR, 707-996-
4494. (VE exams 11 AM—walk-in registration begin-
ning at 10 AM)

May 2, **Arrowhead ARC Swapfest '92 & Second
Annual Microwave DX Expo**, First United Methodist
Church, Duluth, Minnesota. Contact Duane Flynn,
KB0LC, 4907 Peabody St., Duluth, MN 55804 (218-
525-4580).

May 2-3, **1992 ARRL West Texas Section Con-
vention & 7th Annual Key City ARC Hamfest**, Abi-
lene Civic Center, Abilene, Texas. Contact Peg Rich-
ard, KA4UPA, 1442 Lakeside Dr., Abilene, TX 79602
(915-672-8889). (VE exams)

May 2-3, **Greenville, South Carolina Hamfest**,
Anderson County Fairgrounds, Anderson, South Car-
olina. Contact Blue Ridge ARS, P.O. Box 6751, Green-
ville, SC 29606. (Exams, walk-in)

May 2-3, **Cochise ARA Hamfest**, Sierra Vista, Ari-
zona. Contact N7INK, 602-378-3155 after 6 PM, or
write to CARA, P.O. Box 1855, Sierra Vista, AZ 85636.

May 3, **Sullivan Hamfest**, Moultrie County 4-H
Fairgrounds, east of Sullivan, Illinois. Contact Ralph
217-543-2178 days, or 217-873-5287 evenings. (Ex-
ams preregistration only; send proper documents and
\$5.40 check made out to ARRL VEC to WC9V, Ralph
Zancha, 502 E. State St., Lovington, IL 61937)

May 3, **Metro 70cm Network Electronic Flea-
market**, Lincoln High School, Yonkers, New York. Con-
tact Otto Supliski, WB2SLQ, 53 Hayward St., Yonkers,
NY 10704 (914-969-1053). (VE exams)

May 3, **Paul Bunyan ARC Hamfest**, Bemidji Moose
Lodge, Bemidji, Minnesota. Contact Vern Skretvedt,
KA0KWM, 218-751-5514. (Exams; to register contact
John Simmons, NI0K, 218-243-2720)

May 3, **PENN-DEL Hamfest**, Nur Temple, New
Castle, Delaware. Call 215-497-2124. (VE exams)

May 3, **DeKalb Hamfest**, Sandwich Fairgrounds,
Sandwich, Illinois. Contact Howard Newquist,
WA9TXW, Box 264, Sycamore, IL 60178 (SASE).

May 3, **Lake Maggiore Park Hamfest**, Lake Mag-
giore Park, Pinellas County, Florida. Contact Robert
Russell, N4ZMQ, 813-896-2518. (No commercial
dealers)

May 9, **Mancorad RC Hamfest**, Manitowoc Coun-
ty Expo Center, Manitowoc, Wisconsin. Contact Man-
corad RC, Box 204, Manitowoc, WI 54221-0204, or call
days John 414-682-9151, evenings Lou 414-682-2557.
(VE exams)

May 10, **Athens County ARA Hamfest**, City Recre-
ation Center, Athens, Ohio. Contact Carl J. Denbow,

KA8JXG, 63 Morris Ave., Athens, OH 45701-1939.

May 10, **GMRS Fest**, DuPage County Fairgrounds, Wheaton, Illinois. Call Bob 708-690-1492.

May 16, **Lancaster County Hamfest**, Ephrata Senior High School, Ephrata, Pennsylvania. Contact Tom Youngberg, K3RZF, 215-267-2514 after 6 PM. (Handicapped accessible; VE exams 9 AM)

May 16, **Pikes Peak RAA Ham-Computer Swap**, Mega-Mart, Colorado Springs, Colorado. Contact Al, N0CMW, or Frances, N0IUT, 719-473-1660. (VE exams)

May 16, **Southern Berkshire ARC Hamfest**, NY Firehouse, Amenia, New York. Contact Ed Wilbur, WB1CEI, P.O. Box 547, Sharon, CT 06069 (SASE), 203-364-5206 evenings.

May 16, **South Central Oregon Hamfest**, Oregon Institute of Technology, Klamath Falls, Oregon. Contact Keno ARC, Box 120, Keno, OR 97627, or call Hollis, W7UFM, 503-882-5129 evenings. (VE exams)

May 16, **Wexauke ARA Swapfest**, Cadillac Middle School, Cadillac, Michigan. Contact Dan Schmidt, KE8KU, 616-775-0998.

May 16, **Rhode Island Amateur FM Repeater Service Spring Auction and Fleamarket**, VFW Post 6342, Forestdale (No. Smithfield), Rhode Island. Contact Rick Fairweather, K1KYI, 106 Chaplin St., Pawtucket, RI 02861, or call 401-725-7507 (7-8 PM).

May 16, **Central Iowa RAS Hamfest**, Marshalltown Community College, Marshalltown, Iowa. Contact Charles Lynk, W0DYS, 2460 Reed Ave., Marshalltown, IA 50158 (515-753-6925). (VE exams sign up 10 AM to 12 PM, start at 11 AM, info call Chuck Dennis, WB0ZKG, 515-484-4837)

May 17, **Hall of Science Radio Club Hamfest**, New York Hall of Science parking lot, Flushing Meadow Park, Queens, New York. Contact Charles Becker, WA2JUU, 516-894-3955 or Arnie Schiffman, WB2YXB, 718-343-0172 (both evenings).

May 17, **TSRAC Wheeling Hamfest/Computer Fair**, Wheeling Park, Wheeling, West Virginia. Contact Triple States Radio Amateur Club, Box 240 Rt. 1, Adena, OH 43901 (614-546-3930).

May 17, **North Hills Radio Club Hamfest '92**, Carmichael Elk's Lodge, Sacramento, California. Contact Carl Schultz, WF6J, 916-366-9111, FAX 916-366-7408.

May 17, **KARS Hamfest**, Will County Fairgrounds, Peotone, Illinois. Contact Kankakee Area Radio Society, 117 Kristina Dr., Bourbonnais, IL 60914, or call Frank, KA9PWW, 815-932-5950 after 7 PM.

May 22-23, **Midwest Division ARRL Convention & Hamboree #14**, Marina Inn, South Sioux City, Nebraska. Contact Dick Pitner, W0FZO, 2931 Pierce St., Sioux City, IA 51104 (712-258-1520). (Exams)

May 22-24, **Green Country Hamfest**, Maxwell Convention Center, Tulsa, Oklahoma. Call 918-272-3081. (VE exams)

May 22-24, **18th Annual Eastern VHF/UHF/SHF Conference**, University of Hartford, west of Hartford, Connecticut. Contact David Knight, KA1DT, 15 Oakdale Ave., Nashua, NH 03062 (SASE).

May 23, **DUR-HAM-FEST '92**, South Square Mall, Durham, North Carolina. Contact Sid Edwards, W4QWM, 1700 High St., Durham, NC 27707 (919-489-2933). (Exam info contact Pete Goolsby, KY4Y, 120 Radcliff Circle, Durham, NC 27713—SASE)

May 23-24, **1992 Washington State Hamfest & First Annual NW Packet Conference**, St. Paul's School Gym, Yakima, Washington. Contact Dick Umberger, N7HHU, W7AQ Yakima ARC, P.O. Box 9211, Yakima, WA 98909 (509-453-8632 days). (VE exams Saturday, May 23, 1:30 PM, walk-ins okay)

May 24, **Maryland FM Assn. Memorial Day Hamfest**, Howard County Fairgrounds, West Friendship, Maryland. Contact Melvin Seyle, WA3KZR, 15809 Pointer Ridge Dr., Bowie, MD 20716 (301-249-6147). (Exams, walk-ins okay, registration 8:30 AM, exams at 9 AM, contact Les McClure, W3GXT, 410-833-8667)

May 24, **Twenty Over Nine RC Hamfest**, Canfield Fairgrounds, Youngstown, Ohio. Contact 20/9 Club, 42 S. Whitney, Youngstown, OH 44509.

May 30, **Independent Repeater Assn. Hamfestival**, National Guard Armory, Grand Rapids, Michigan. Contact Tom, KA8YSM, or Kathy, KB8KZH, 616-698-6627. (VE exams 9:30 AM)

May 31, **Decatur, Illinois Area Hamfest**, Richland Community College, DEcatur, Illinois. Contact Cenois ARC, P.O. Box 4595, Decatur, IL 62521. (VE exams 9 AM, walk-ins okay)

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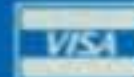
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THE SCIENCE OF PREDICTING RADIO CONDITIONS

Solar Cycle Progress

The good news continues. Cycle 22 remains stalled at an exceptionally high level of solar activity, thus extending the period of exceptionally good propagation conditions on the HF bands.

The Royal Observatory of Belgium, the world's official keeper of sunspot records, reports a monthly mean sunspot number of 149 for January 1992. Daily values ranged from a low of 71 on January 18 to a high of 219 on January 30th. The mean value for January results in a 12-month running smoothed sunspot number of 146 centered on July 1991. The smoothed number is an average of the mean values for the past twelve months, and is the basis for measuring the solar cycle. The cycle has remained in the 140+ range since April 1990, or for more than 16 months! On the assumption that solar activity will begin to decline slowly, a smoothed sunspot number of at least 110 is forecast for May 1992.

The Dominion Radio Astrophysical Observatory of Canada, located at Penticton, B.C., reports an adjusted mean value of 211 for the January 1992 level of 10.7 cm solar flux. This results in a 12-month running smoothed solar flux level of 208 centered on July 1991. A level in excess of 185 is likely for May 1992.

STD Bulletin Board

A bulletin board is now available with loads of solar, geomagnetic, auroral, and ionospheric propagation data for the professional and amateur. It is called the Solar Terrestrial Dispatch (STD) bulletin board. It can be accessed by dialing area code (403) 756-3008. Much of the data is available free to call-ins, and a wealth of additional data is available for an annual registration fee of \$35.

Located in Stirling, Alberta, Canada, the STB BBS is devoted to supplying public information, forecasts, warnings, alerts, and technical solar geophysical data to interested individuals and researchers. All of the reports, forecasts, and warnings available to professionals and academic and other research and operational organizations over the INTERNET and BITNET networks are available on the STD system. Ac-

11307 Clara Street, Silver Spring, MD 20902

LAST MINUTE FORECAST

Day-to-Day Conditions Expected for May 1992

Propagation Index	Expected Signal Quality			
	(4)	(3)	(2)	(1)
Above Normal: 6-7, 23-24, 29	A	A	B	C
High Normal: 3, 5, 9-10, 20, 22, 30	A	B	C	C-D
Low Normal: 1-2, 4, 8, 13-15, 18-19, 21, 27-28, 31	B	C	D	D-E
Below Normal: 11, 16, 25-26	C	C-D	D-E	E
Disturbed: 12, 17	C-D	D	E	E

Where expected signal quality is: A—Excellent opening, exceptionally strong, steady signals greater than S9.
 B—Good opening, moderately strong signals varying between S6 and S9+, with little fading or noise.
 C—Fair opening, signals between moderately strong and weak, varying between S3 and S6, with some fading and noise.
 D—Poor opening, with weak signals varying between S0 and S3, and with considerable fading and noise.
 E—No opening expected.
 3dB per S-Unit.

HOW TO USE THIS FORECAST

1. Find propagation index associated with particular band opening from Propagation Charts appearing on the following pages.
2. With the propagation index, use the above table to find the expected signal quality associated with the band opening for any day of the month. For example, an opening shown in the charts with a propagation index of 3 will be good-to-fair (B-C) on May 1st and 2nd, good (B) on the 3rd, good-to-fair (B-C) on the 4th, good (B) on the 5th, excellent (A) on the 6th and 7th, etc.

cess is free for geomagnetic data, ionospheric data, solar data and forecasts, aurora forecasts, daily summaries, and a number of interesting files which can be downloaded. For registered users there is a large amount of additional information, including:

- 72-hour solar flare forecasts
- 72-hour polar cap absorption (PCA) events
- 72-hour HF and VHF radio propagation forecasts
- 72-hour Short Wave Fade (SWF) forecasts
- 72-hour VHF backscatter and general propagation forecasts
- Graphical geomagnetic data plots
- Graphical charts of observed daily sunspot numbers, the 10.7 cm solar radio flux, and the 90-day average of 10.7 cm solar radio flux
- Graphical polar cap absorption data plots
- 24-hour regional aurora forecasts by latitudes

Much of the data is updated continuously and is often not more than a few minutes old when accessed.

For more information about the Solar Terrestrial Dispatch dial up the bulletin board directly.

May Propagation

During May days continue to grow longer in the northern hemisphere, and the sun is higher in the northern sky. Optimum frequencies for long-distance propagation are expected to be somewhat lower during most of the daylight hours, and somewhat higher during the late afternoon, early evening, and nighttime hours than they were during the winter months. Static levels also increase noticeably during May, and signals may sound weaker on DX openings during the daylight hours.

The 10, 12, 15, 17, and 20 meter bands should provide DX propagation during the hours of daylight. Considerably fewer east-west openings are expected on 10 meters, but conditions should continue to be good to South America, Africa, and other southern areas of the world. Good worldwide DX conditions are expected on 15 and 17 meters, but the bands should peak later during the day.

Peak worldwide conditions are expected on 20 meters for an hour or two after local sunrise and during the afternoon hours. From sundown to midnight excellent DX conditions should exist on 20 meters to many areas of the world. Forty meters should provide good openings towards Europe, Africa, and the east. Good DX openings should also be possible on 15 and 17 meters towards southern and western areas of the world. Some DX should also be possible on the 80 and 160 meter bands, but signals are expected to be mainly weak and noisy. Eighty meters should open towards Europe and the east, while an occasional 160 meter opening may be possible towards the Caribbean. From midnight to sunrise look for openings to most areas of the world on 20, 30, and 40 meters, with some DX possible on 80 and 160 meters as well. All in all, May is expected to be a good month for DX propagation conditions on most of the HF amateur bands.

For specific times of DX openings, refer to the DX Propagation Charts which appeared in last month's column. This

HOW TO USE THE SHORT-SKIP CHARTS

1. In the Short-Skip Chart, the predicted times of openings can be found under the appropriate distance column of a particular meter band (10 through 160 meters) as shown in the left-hand column of the chart. For the Alaska and Hawaii Charts the predicted times of openings are found under the appropriate meter band column (15 through 80 meters) for a particular geographical region of the continental USA as shown in the left-hand column of the charts. An * indicates the best time to listen for 80 meter openings.

2. The propagation index is the number that appears in () after the time of each predicted opening. On the Short-Skip Chart, where two numerals are shown within a single set of parentheses, the first applies to the shorter distance for which the forecast is made, and the second to the greater distance. The index indicates the number of days during the month on which the opening is expected to take place, as follows:

- (4) Opening should occur on more than 22 days
- (3) Opening should occur between 14 and 22 days
- (2) Opening should occur between 7 and 13 days
- (1) Opening should occur on less than 7 days

Refer to the "Last Minute Forecast" at the beginning of this column for the actual dates on which an opening with a specific propagation index is likely to occur, and the signal quality that can be expected.

3. Times shown in the Charts are in the 24-hour system, where 00 is midnight; 12 is noon; 01 is 1 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 standard time in other USA time zones add 2 hours in the PDT zone; 3 hours in the MDT zone; 4 hours in the CDT zone; and 5 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 14 or 2 P.M. in Los Angeles; 17 or 5 P.M. in Washington, D.C.; and 22 GMT. Time shown in the Alaska Chart is given in GMT. To convert to daylight time in other areas of the USA subtract 8 hours in the PDT zone; 7 hours in the MDT zone; 6 hours in the CDT zone; and 5 hours in the EDT zone. For example, at 20 GMT it is 15 or 3 P.M. in N.Y.C.

4. The Short-Skip Chart is based upon a transmitted power of 75 watts c.w. or 300 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.

month's column contains a Short-Skip Propagation Chart valid for both May and June, as well as Short-Skip Charts centered on Hawaii and Alaska. The Short-Skip Chart contains propagation forecasts for openings varying in distance between 50 and 2300 miles. For day-to-day variations expected in propagation conditions during May, see the Last Minute Forecast, which appears at the beginning of this column. Eighty meters is expected to be the best band for short-distance openings between 50 and 250 miles, both night and day. For openings between 250 and 750 miles, 30 and 40 meters should be best during the day and 80 meters at night. Twenty meters should be optimum for daytime openings between 750 and 1300 miles, while 40 meters should be best at night. Try 17 and 20 meters for daytime openings between 1300 and 2300 miles, although 15 meters may be equally as good during most of the daylight hours. At night 20, 30, and 40 meters should be optimum for openings over this distance range. Twenty meters should

**CQ Short-Skip Propagation Chart
May & June 1992
Local Standard Time at Path Mid-Point
(24-Hour Time System)**

Band (Meters)	Distance From Transmitter (Miles)			
	50-250	250-750	750-1300	1300-2300
10	Nil	08-10 (0-1) 10-14 (0-2) 14-18 (0-1) 18-22 (0-2) 22-00 (0-1)	08-10 (1-2) 10-14 (2-3) 14-18 (1-2) 18-22 (2) 22-00 (1) 00-08 (0-1)	08-10 (2-0) 10-14 (3-1) 14-16 (2-1) 16-19 (2) 19-22 (2-0) 22-08 (1-0)
15	Nil	07-10 (0-2) 10-14 (0-3) 14-18 (0-2) 18-20 (0-3) 20-00 (0-2) 00-07 (0-1)	07-10 (2) 10-14 (3) 14-18 (2-4) 18-20 (3-4) 20-22 (2-3) 22-00 (2) 00-07 (0-1)	07-10 (2-1) 10-14 (3-2) 14-16 (4-3) 16-20 (4) 20-22 (3-2) 22-00 (2) 00-07 (1-0)
20	10-13 (0-1) 13-19 (0-2) 19-01 (0-1)	07-10 (0-2) 10-13 (1-3) 13-19 (2-4) 19-21 (1-3) 21-01 (1-2) 01-07 (0-2)	07-10 (2-3) 10-13 (3-4) 13-19 (4) 19-21 (3-4) 21-23 (2-4) 23-01 (2-3) 01-07 (2)	07-10 (3) 10-16 (4-3) 16-23 (4) 23-01 (3-4) 01-03 (2-3) 03-07 (2)
40	07-09 (1-2) 09-12 (2-4) 12-20 (3-4) 20-22 (2-3) 22-01 (1-2) 01-07 (0-1)	07-09 (2-4) 09-10 (4-3) 10-16 (4-2) 16-18 (4-3) 18-22 (4) 22-01 (2-3) 01-07 (1-3)	07-09 (4-3) 09-10 (3) 10-16 (2-1) 16-18 (3-1) 18-20 (4-2) 20-22 (4) 22-07 (3-4)	08-10 (3-1) 10-18 (1-0) 18-20 (2-1) 20-22 (4-3) 22-06 (4) 06-07 (4-3) 07-08 (3)
80	08-11 (4) 11-19 (4-3) 19-23 (4) 23-08 (3-4)	08-11 (4-1) 11-17 (3-0) 17-19 (3-1) 19-21 (4-2) 21-06 (4) 06-08 (4-3)	08-09 (1) 09-11 (1-0) 11-17 (0) 17-19 (1-0) 19-21 (2-1) 21-23 (4-3) 23-06 (4) 06-08 (3-2)	08-09 (1-0) 09-19 (0) 19-21 (1-0) 21-23 (3-2) 23-04 (4-3) 04-06 (4-2) 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) 04-06 (2) 06-08 (1)	08-21 (0) 21-01 (1) 01-04 (2) 04-06 (2-1) 06-07 (1) 07-08 (1-0)

**HAWAII
May & June 1992
Openings Given in Hawaiian
Standard Time #**

TO:	10 Meters	15 Meters	20 Meters	40/80 Meters
Eastern USA	15-17 (1)	07-12 (1) 12-15 (2) 15-17 (3) 17-18 (2) 18-19 (1)	07-15 (1) 15-18 (2) 18-20 (3) 20-22 (4) 22-00 (3) 00-02 (2) 02-04 (3) 04-07 (2)	19-20 (1) 20-23 (3) 23-02 (1) 20-21 (1)* 21-23 (2)* 23-01 (1)*
Central USA	12-15 (1) 15-17 (2) 17-18 (1)	05-07 (1) 07-12 (2) 12-16 (3) 16-18 (4) 18-20 (3) 20-22 (2) 22-00 (1)	08-12 (1) 12-16 (2) 16-18 (2) 18-22 (4) 22-00 (3) 00-02 (2) 02-06 (3) 06-08 (2)	19-20 (1) 20-21 (2) 21-01 (4) 01-02 (2) 02-04 (1) 20-21 (1)* 21-00 (2)* 00-03 (1)*
Western USA	09-12 (1) 12-17 (2) 17-19 (1)	06-08 (1) 08-10 (2) 10-12 (3) 12-17 (4) 17-19 (3) 19-22 (2) 22-00 (1)	06-08 (4) 08-16 (3) 16-22 (4) 22-02 (3) 02-06 (2)	18-19 (1) 19-20 (2) 20-02 (4) 02-04 (3) 04-05 (2) 05-07 (1) 19-20 (1)* 20-21 (2)* 21-03 (3)* 03-04 (2)* 04-05 (1)*

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have the edge until midnight, with 30 and 40 meters best from midnight to sunrise.

VHF Ionospheric Openings

May is generally a good month for VHF ionospheric openings. A sharp seasonal increase in sporadic-E ionization is expected during the month, which should result in

some fairly frequent 6 meter short-skip openings over a range of 1000 to 1400 miles. During periods of widespread sporadic-E ionization, two-hop 6 meter openings occasionally may be possible over longer distances. An occasional 2 meter short-skip opening between approximately 1200 and 1400 miles may also be possible during periods of intense sporadic-E ionization. Openings are most likely to occur

ALASKA May & June 1992 Openings Given in GMT

TO:	10 Meters	15 Meters	20 Meters	40/80 Meters
Eastern USA	Nil	18-20 (1) 20-22 (2) 22-01 (1) 01-03 (2) 03-05 (1)	20-22 (1) 22-02 (2) 02-06 (3) 06-08 (2) 08-10 (1) 10-14 (2) 14-16 (1)	06-11 (1)
Central USA	Nil	18-21 (1) 21-23 (2) 23-01 (1) 01-04 (2) 04-06 (1)	02-08 (3) 08-14 (2) 14-22 (1) 22-02 (2)	06-09 (1) 09-12 (2) 12-13 (1)
Western USA	00-03 (1)	18-20 (1) 20-23 (2) 23-02 (3) 02-05 (2) 05-07 (1)	02-04 (3) 04-08 (4) 08-14 (3) 14-18 (4) 18-20 (3) 20-02 (2)	06-09 (1) 09-11 (2) 11-13 (3) 13-15 (2) 15-16 (1)

*Indicates best times to listen for 80 meter openings. Openings on 160 meters are also likely to occur during those times when 80 meter openings are shown with a Propagation Index of (2) or higher.

**Indicates best times to listen for F-2 layer openings on 6 meters.

For 12 meter openings interpolate between 10 and 15 meter openings.

For 17 meter openings interpolate between 15 and 20 meter openings.

For 30 meter openings interpolate between 40 and 20 meter openings.

between 9 AM and 2 PM, and between 6 and 10 PM, local daylight time, although they may occur at other times as well.

Some fairly good meteor-scatter openings of short duration should be possible on the VHF bands during the *Eta Aquarids* meteor shower, which is expected to take place between May 3-6. This is a major meteor shower, and it is expected to peak with a count of approximately 20 meteors an hour. Intermittent openings over distances between approximately 800 and 1200 miles may be possible on the VHF bands during the shower period.

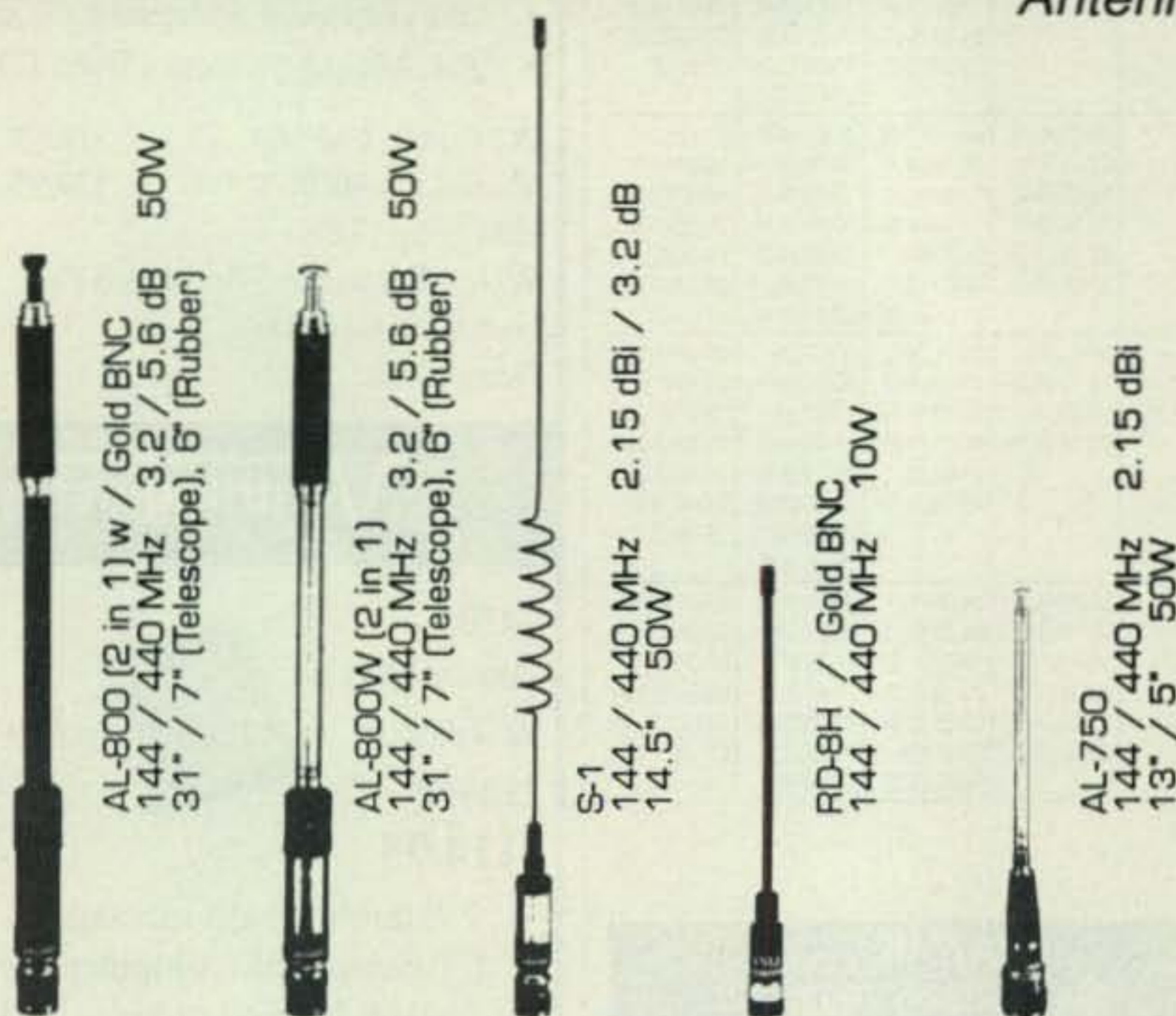
An occasional trans-equatorial scatter (TE) opening may be possible on 6 meters during May between the southern tier states and South America. Openings will be weak, noisy, and fading at best, but may occur between 9 and 11 PM local daylight time.

Auroral activity is generally at a seasonally low level in May, but some displays may occur. The best times to check for auroral activity on the VHF bands are when the HF bands are Below Normal or Disturbed. See the Last Minute Forecast at the beginning of this column for those days during May that are expected to be in these categories. During auroral periods openings are likely to occur on 6 and 2 meters for distances up to approximately 1200 miles as a result of reflection or scatter from ionized patches produced by the auroral display.

73, George, W3ASK

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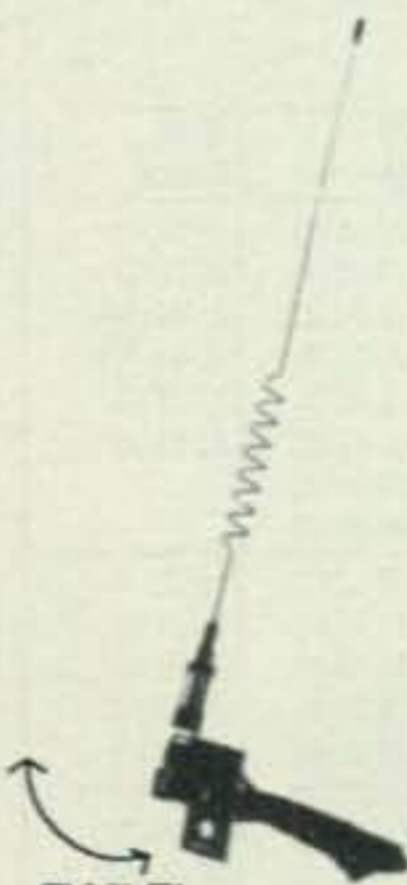
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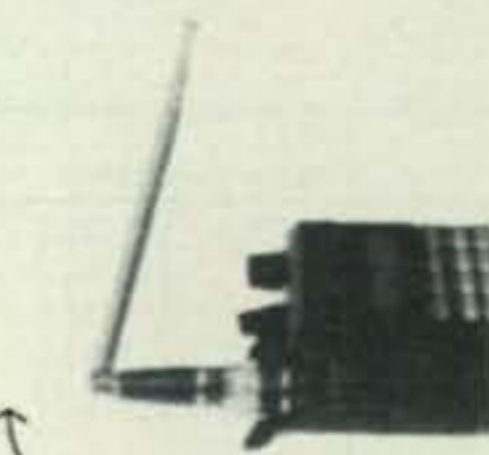
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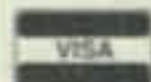
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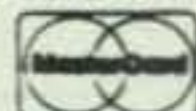
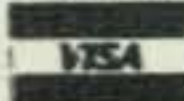
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"Bob" Is A Success

Editor, CQ:

I have a solution to a problem which may bother many of the readers of CQ magazine! A brief description follows.

When I raised my tower height to 90 feet last summer, the antenna immediately became a parking lot for hundreds of small birds as well as crows and seagulls. The problem was that everything in the yard, cars in the drive, etc., were soon whitewashed with droppings. Humans attempting a trip across the yard were subject to the same odious treatment.

In an effort to clear up this situation, I purchased a plastic owl which I affixed to the boom of my tribander. The results were instantaneous, and way beyond expectations. In the six or seven months since, not a single bird has been sighted on the tower or antennas. Seagulls on final approach are seen to veer sharply when still a couple of hundred yards away and find parking elsewhere.

This has been a complete success story for me, and if you deem it to be of sufficient interest to your readers, please use it. Incidentally, I purchased the owl from a hardware and marine store which caters to commercial fishermen. Apparently they use owls to keep the seagulls from fouling the decks and rigging on the fishing boats.

In closing, I should like to say that I have enjoyed CQ for many years, and unlike so many things today, CQ just seems to get better and better. Keep up the good work!

Donald R. Kalman, VE7YR
Surrey, B.C., Canada

QSL Tips Via CU3LF

Editor, CQ:

Since September 1990 I've had the opportunity to be on the "other side" of DX pileups as CU3LF on Terceira Island in the Azores. I

never thought CU was that rare, but evidently it's somewhat scarce, as I find myself giving a "new one" to a lot of stateside (and DX!) ops on the various HF bands. It's fun (most of the time), but I feel I must pass along a few things I've noticed about US hams' QSL habits:

1. **DOUBLE CHECK the date and time** you put on your card! I get a lot of cards that are anywhere from several minutes to a *couple of days* off. I make a lot of contacts (especially during contests), so it's a real pain to have to search through my logs. It's reached the point where I'm not going to search any more; if the QSO isn't in the log where the card says it is, no QSL. Get a good clock and set it to WWV or CHU. Also, UTC ONLY please!

2. **Get the callsign right.** My call is CU3LF, not CU2LF or CU3LS. I'm careful to give the call in the correct phonetics when I operate phone; some of you guys aren't listening! I know it's an easy mistake to make when signals are weak; but this happens too frequently to be blamed on poor propagation. Cards with other calls on them are useless; therefore, if the card isn't right, no QSL.

3. **Return postage is mandatory!** In the last 18 months, I've spent several hundred dollars on QSL printing alone. Some months I receive literally hundreds of cards (especially after the major contests). On an Air Force enlisted man's salary, there's no way I could pay for all that return postage. Cards received without return postage get put in a pile to be answered eventually via the bureau. Since the bureau here mails cards out only twice per year, I'll probably be back in the USA before you get your card (and I'm going to be here for awhile yet). Always include return postage when sending for a card you really want. If you guys also do this to other DX stations or QSL managers, your return rate must be abysmal.

On a happier note, my sincere thanks to all the other hams back home in the USA whom I've had the opportunity to work since being here, and who've helped with antenna comparisons, contest contacts, schedules, etc. See you on the bands!

Mike Lazaroff, KB3RG/CU3LF
Lajes Field, Terceira, Azores

Make Yourselves Known

Editor, CQ:

What's all the hoopla over the new codeless license? I am rather disheartened with the effort of trying to find a local class, much less an authorized examiner. If the ham radio community is trying to entice newcomers via way of the new codeless license, then amateur radio is in jeopardy.

Why? The lack of information available to the general public for a start, and then there are no public announcements of tests for any person who may be interested in taking the test. Unless someone knows a ham or a friend of a ham, any type of information is severely limited.

And just forget about any of the ham radio publications. There are some areas of the country which do not carry this type of publication at all! Sadly, this is the case for my area.

(continued on p. 150)



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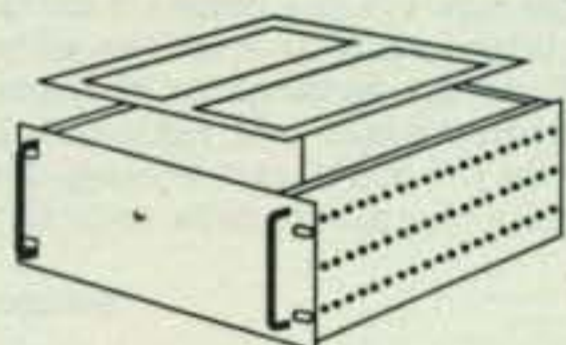
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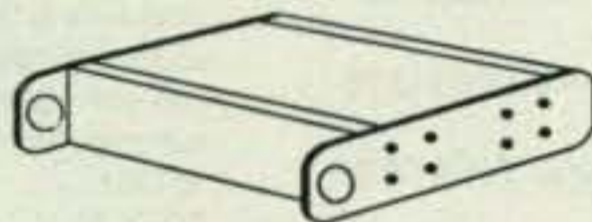
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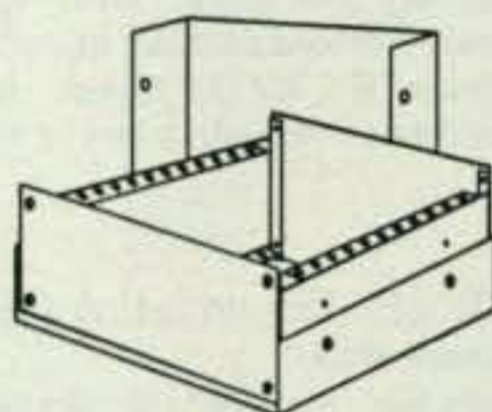
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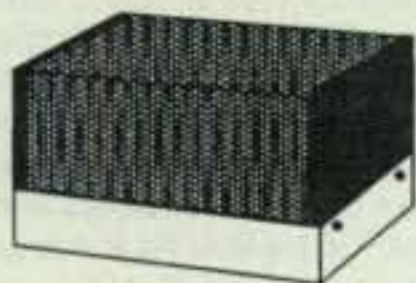


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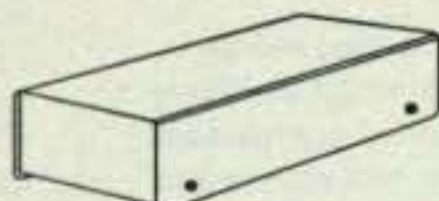


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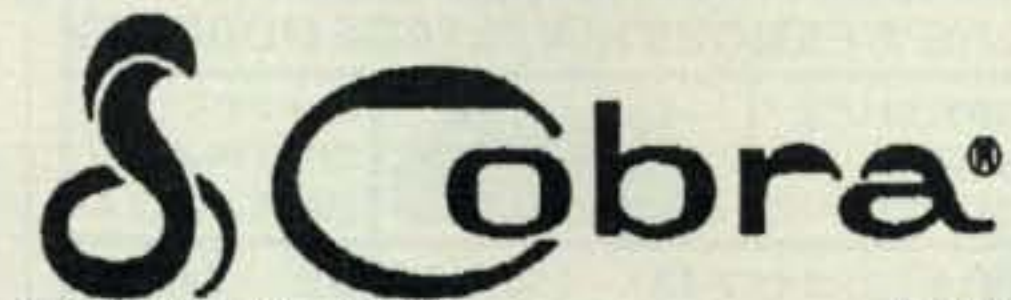
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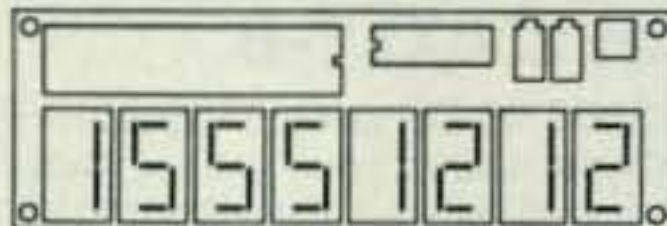
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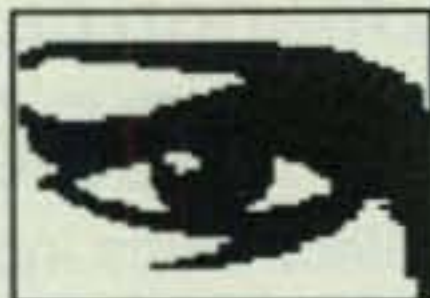
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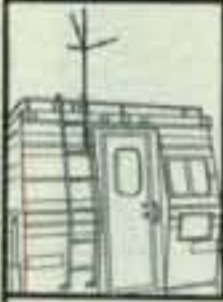
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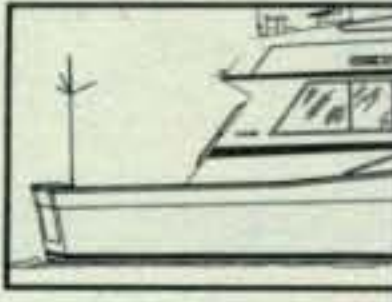
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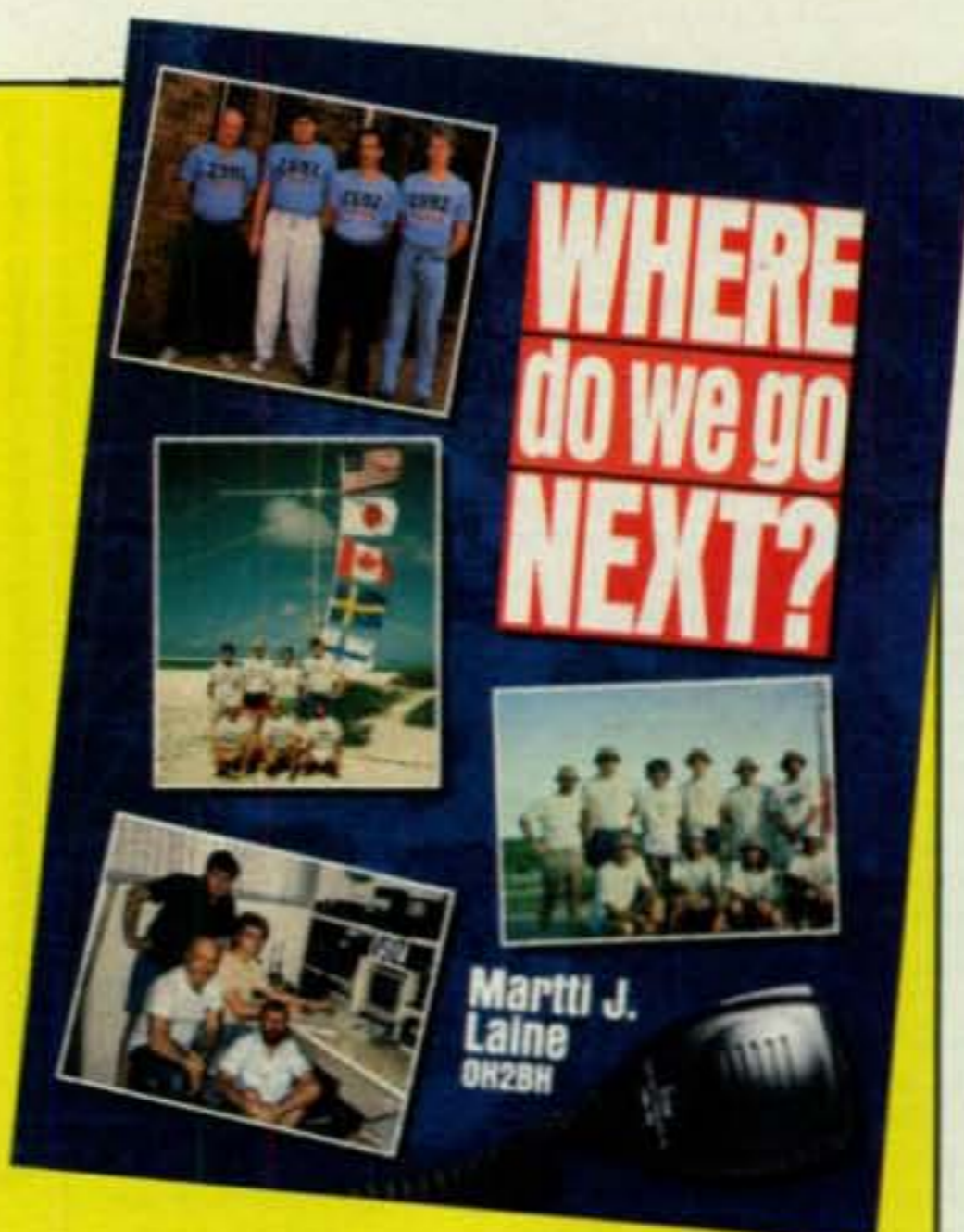
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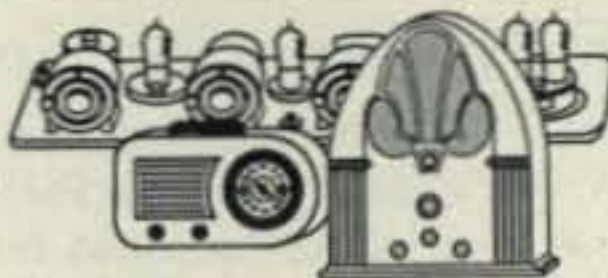
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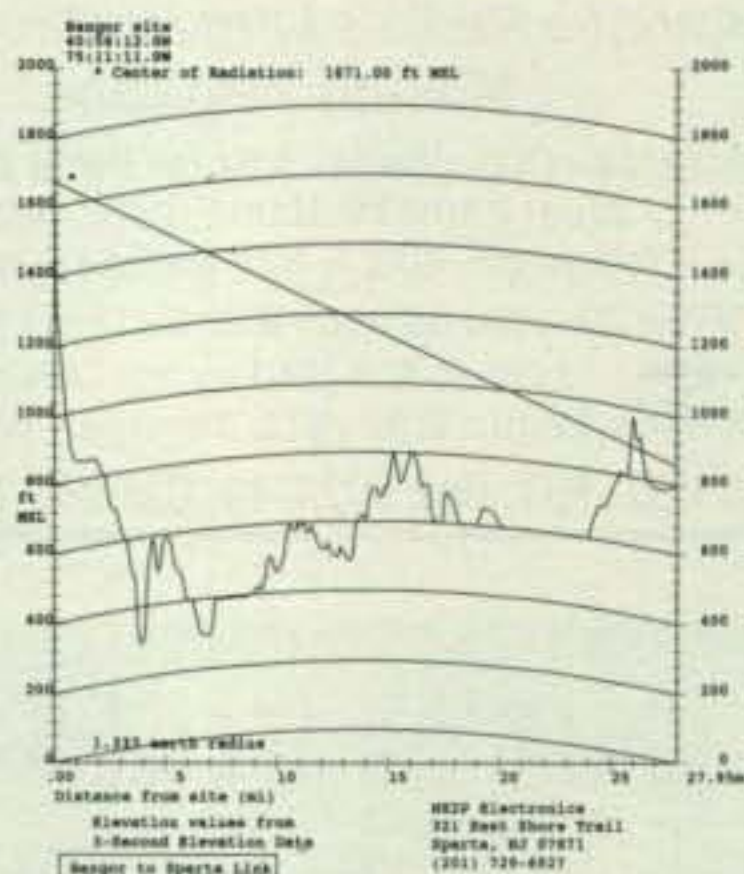
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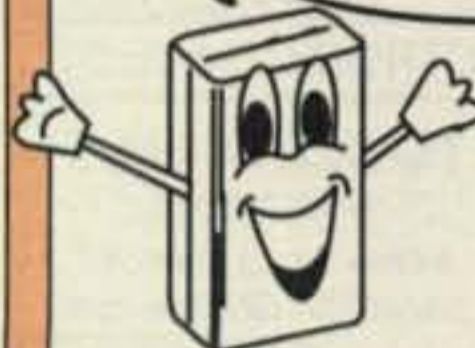
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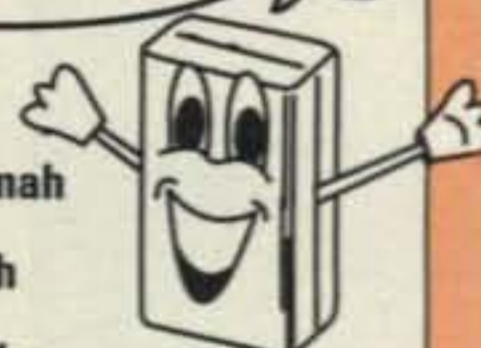
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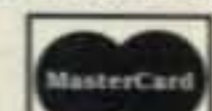
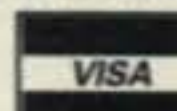
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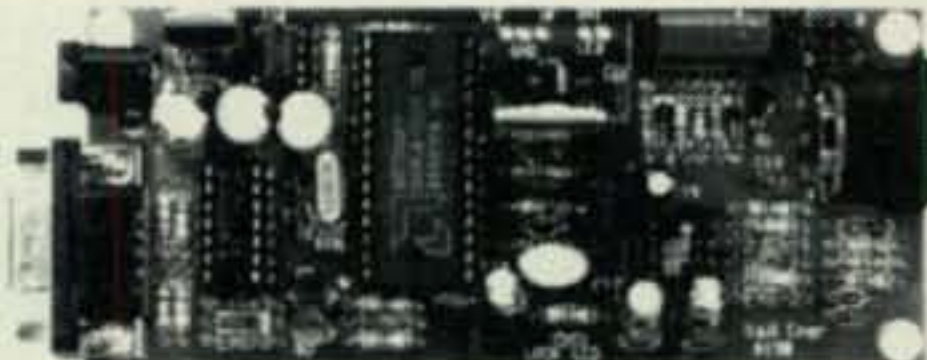
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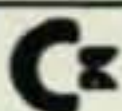
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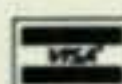
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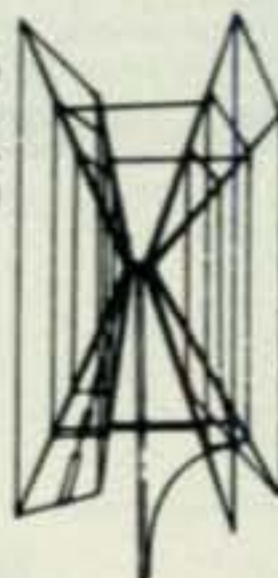
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FOR SALE: Hammarlund general-coverage receiver, HQ-100,
\$100. Johnson Ranger \$125. Johnson Courier Amplifier \$175.
Charlie, KD4AJ, 1968 Huntington Hall Court, Atlanta, GA 30338.

COMPUTERS: Tandy 600 \$345, IBM PCJR C-MON \$275, Kaypro
\$135, Vic-20 TI99 \$60 ea, Cass \$29, disk \$119, list \$1 and SASE.
J. Bedlovies, POB 139, Stratford, CT 06497.

KENOOD TH215A w/charger, used very little, A-1. Call 419-
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cy. Tone or carrier squelch, charger, nicad, \$65 ppd. SASE for
list. Bob, W4GBB, 2708 Old Point Dr., Richmond, VA 23233.

FOR SALE: Mint late DRAKE C-LINE \$525, mint late COLLINS
75S-3C and 32S-3A \$1,550. Call 904-651-8795 after 0000Z.

WANTED: Manual or hook-up data for AN/ARC-116 Radio.
Charlie Smith, WD6BMA, P.O. Box 1413, Bullhead City, AZ
86430 (602-763-3424).

NEED INFORMATION on replacement parts for a Heath IM-28
VTVM that was modified to a TRVM. The Heath part numbers
are: 150-57 TR1002 SS diode which is a replacement for a 6AL5,
and 150-58 TR1119 SS triode which replaces a 12AU7. These
are called FETRONS or HINS. Any help in locating these parts
or specification sheets on any FETRONS would be appreciated.
The other FETRONS I have are TR1006, TR1008, TR1010,
TR1157, and TR1126A. Bob Juraneck, 11469 Haggerty, Ply-
mouth, MI 48170-4455 (313-459-7718).

WANTED: Old QSL cards, Drake equipment, antenna bridge,
General Radio Experimentor, radio books/magazines and cat-
alogs. Joe Holstein, N8EA, 1515 Sashabaw, Ortonville, MI
48462.

WANTED: YAESU TC-2.2M Converter, TC-6.6M Converter, and
FR-101 Receiver. Charles T. Huth, 229 Melmore St., Tiffin, OH
44883 (419-448-0007).

SELL: Hallicrafters HA-1 "T.O." Keyer, mint condx., \$25 plus
shipping. W2FXA, 716-655-4162 or write CB.

SELL: HEATH SB-200 amp, exec. condx., recently overhauled,
new tubes, \$300. W2FXA, P.O. Box 21, Elma, NY 14059 (716-
655-4162).

FT-101E, mint, CW filter, just factory aligned, with 2 sets of finals
and drivers, \$375 plus 1/2 ship. DAVE, WD4NSF, 904-475-5828.

IC-740 ICOM Transceiver with ICOM 20 amp power supply IC-
P515, complete with microphone and manual (new condition),
\$700. James H. Lowe, W6JVK, 1521 Scenic Drive, Pasadena,
CA 91103 (818-793-7374).

WANTED: Two 6 meter AM tube-type transceivers working or
not. N3LGI, Bill Epright, 757 Penna. Ave., Wallingford, PA 19086,
215-876-2334.

5 1/4 inch 360 KB XT floppy drive, perfect condition, upgraded
to 1.2 MB, \$25. Walt Grosch, KZ9F, 1735 Stoneway Ct., Rich-
field, WI 53076.

TEK 7603, three plug-ins \$350. TEK 453 \$245. Ameritron AL 80A
\$650. J.W. Craig, 32 Birchwood Drive, Rye, NH 03870.

SELL: Amateur radio equipment (and bought). List/\$1 and SASE.
Joe Bedlovies, P.O. Box 139, Stratford, CT 06497.

SELL: Hallicrafters HA-1 keyer \$25, Ten Tec Argonaut 509 (clean but no transmit) \$50, both shipped with manuals. Sever, 1701 Harcourt Drive, Leesburg, FL 34748.

LOOKING FOR manufacturer that has available battery pack 12 volts with 1000 MA or more for standard C-528 radio. Gilles Thibodeau, P.O. Box 193, Lac-Megantic, Que. G6B 2S6.

COLLINS 75A1, \$200; HRO50T with matching speaker, \$300; R392 with meters and covers, \$300, all with manuals. Call 203-426-8041.

WANTED: Motorola Minitor audio boards, working or not. Bob, W4GBB, 2708 Old Point Drive, Richmond, VA 23233 (804-360-4928).

FOR SALE: KLM SKY EYE IV Satellite TV receiver with remote down converter. Still in box, never used, \$150. Call Phil, WD5BDI, at 903-592-8200.

WANTED: Screw-Base flashbulbs #22, 50, 2, 7 clear or blue. T.N. Colbert, Burton, OH 44021.

SELL: Amateur radio equipment (and bought), list \$1 and SASE. Joe Bedlovics, P.O. Box 139, Stratford, Ct 06497.

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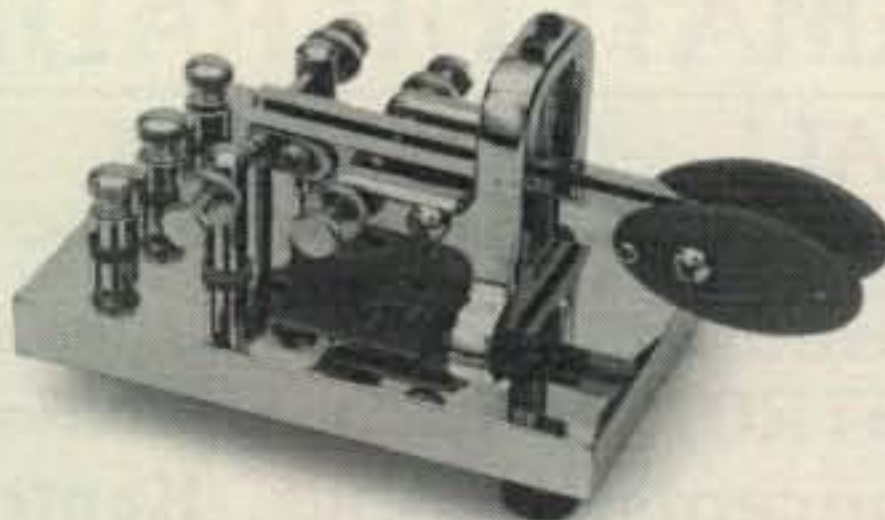
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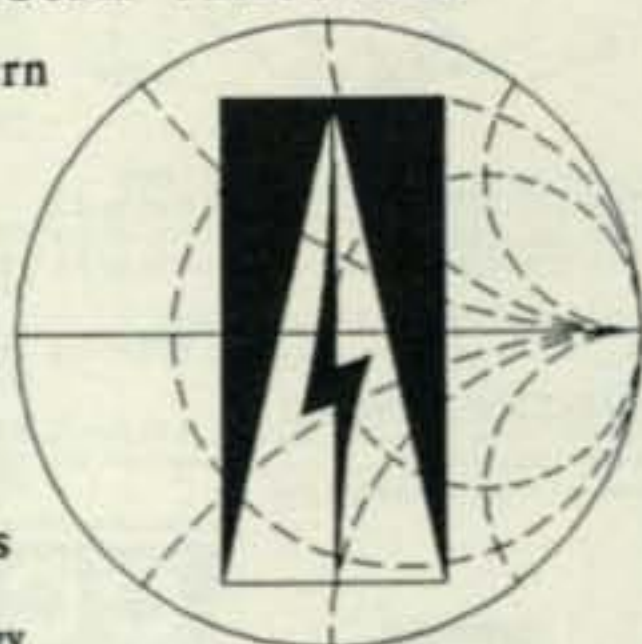
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Our Readers Say (from p. 134)

So get on the ball and make yourselves known to the local public. Quit being so clannish. Instead of a DXpedition to some distant locale, try having one or more at a local mall sometime. Let the public in on the fun instead of hogging it all to yourself. Take out ads in the local newspapers to tell us when and where the tests are to be given. Let outsiders know what they are missing.

Wesley Glenn Johnson
Waycross, GA

Solving Power-Line QRN

Editor, CQ:

I enjoyed reading about KØRF's successful efforts at finding and fixing his power-line noise problem ("Finding That Elusive Power-Line Noise," January 1992). Although I've had some success finding noise sources with my eyes, ears, and a WWV Timecube receiver, at \$800 I'm not about to upgrade to the Super Snoop system he described. However, why couldn't manufacturers include an AM detector in their hand-held radios as a keypad selectable feature? For only a few extra dollars such an HT, plus a small Yagi, would provide all the hardware needed for serious noise chasing. Add the perseverance exhibited by KØRF, and a lot of us could begin enjoying the bands free from the curse of power-line QRN. Jim Stahl, K8MR

Orange Village, OH

To Help Small Business?

Editor, CQ:

As one who has chafed under the restrictions on business calls, I, unlike Ray Kowalski, welcome Ralph Haller's suggestion to loosen these restrictions.

I think Mr. Kowalski's concern about these suggestions is based on some misconceptions. To being with, the no-business-use rule is not part of the amateur radio tradition. For most of its history, ham radio was under the very same rule that Mr. Haller suggests, that operators should not be paid for handling messages. The present restrictive rule was adopted after the Jonestown massacre, in what seemed like a typical bureaucratic over-reaction to the revelation that Jim Jones had used ham communications as an aid to managing his colony.

Furthermore, I can't visualize large numbers of business users jumping into ham radio. We must realize that ham radio is considerably inferior to commercial mobile radio or the cellular phone as a means of communication. HF radio is subject to the vagaries of propagation, and all ham communications are subject to QRM from others. An autopatch caller must wait for other users, including long-winded ragchewers, to finish their communications before he can place his call. (Thus, ham autopatch is like the old pre-cellular IMRS radiotelephone that nobody liked.) I can't see a serious business user, for whom time is money, being content with these limitations. Rather, ham business calls are for the little guy, the casual user who can't afford or justify the cost of commercial communications. (CB is not a substitute—range is limited and autopatches are not permitted!)

Is it really that bad if ham radio is helpful to small business? Improvements in efficiency will improve the national productivity and be good for all of us. Also, isn't it possible that giving ham radio a little utility might make it easier to attract new hams?

Charles E. Cohn, KK4CS
Austell, GA

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(from p. 64)

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04 04 0800:1	14007.3	07100	RTTY
05 04 0800:1	21794.6	30200	RTTY

DX: UBERG DX DE: SH

MSGS: Connect SHWVV SH

Log Entry: 14.215.94

QSO Information: DATE/TIME: 04/11/25 04:11:25 Call: VHRBK Hrg: 59 My: 59 Erc: 750 Pwr: 750 Name: Brian QTH: Brian Young PO 2 Award ID: DXCC/Awards: PREFIX: OC 231 DEG 6057 Mode: 160 80 40 30 20 17 15 12 10 DX: (VHF) # 000 M W M W

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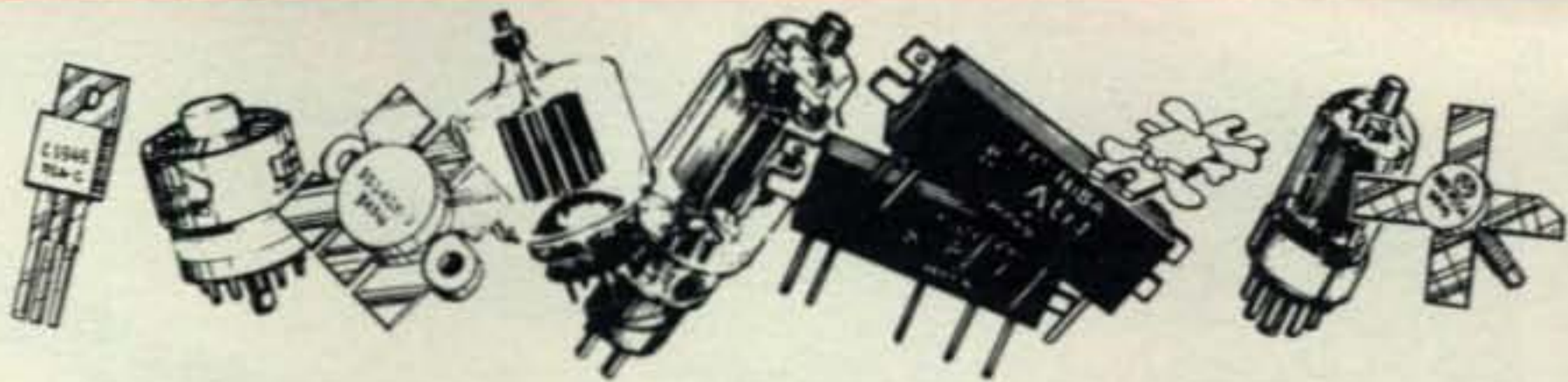
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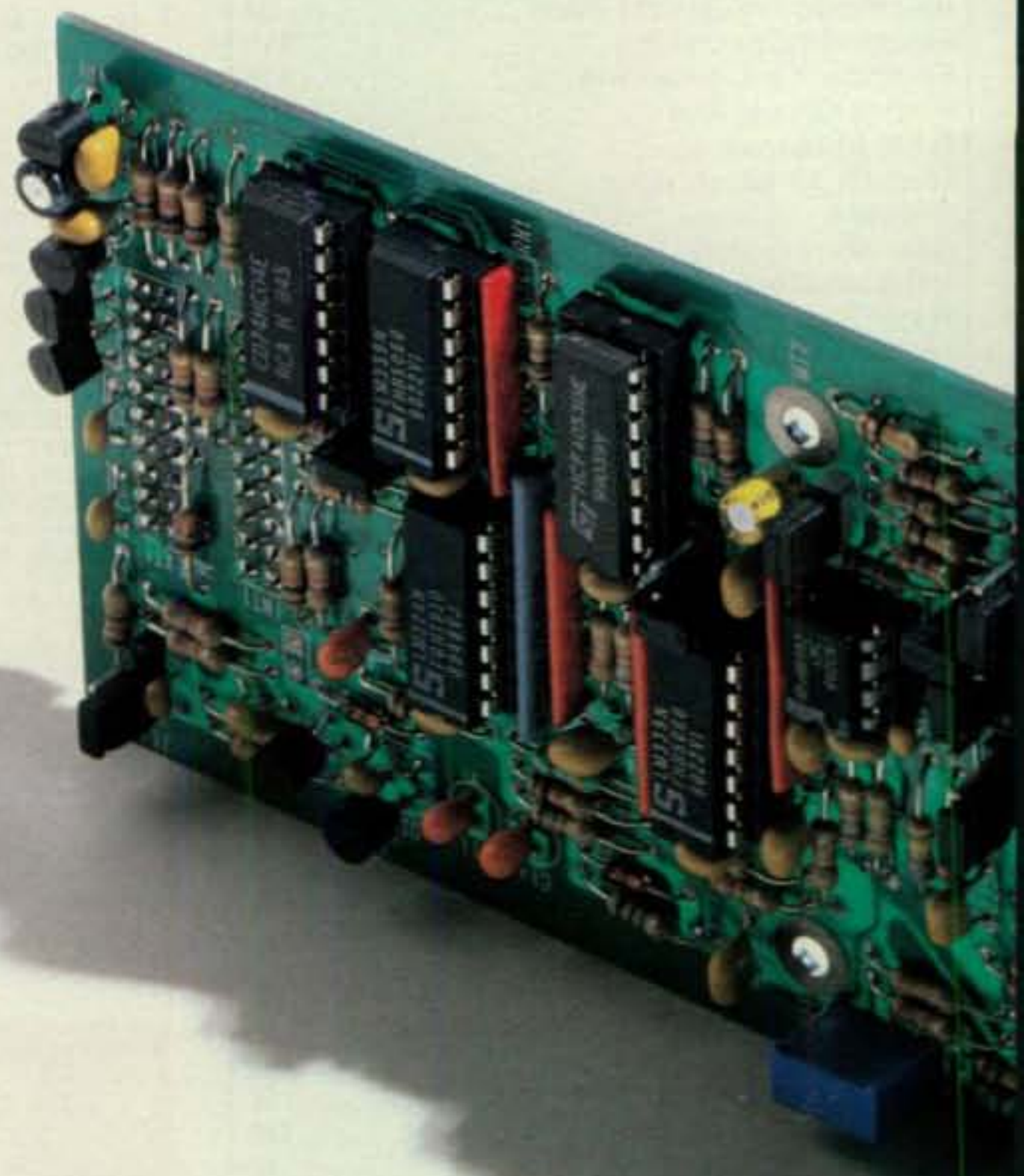
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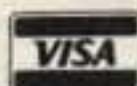


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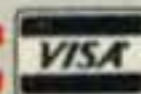
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- ① DTMF Calling and paging built-in
Built-in VOX
- ② Back-lit Keypad and Display (with time delay)
- ③ DC Direct Operation (Automatically Charges Battery with 12 Volts, FNB-25 only)
- ④ Four Power Levels (With FNB-27 Battery)
Direct Keyboard Entry for All Functions
Programmable and Automatic Battery Saver (ABS)
- ⑤ CTCSS Encode/Decode Built-In
5 Watts Output With FNB-27 or DC Direct
- ⑥ Rugged Case Construction

Automatic Power-Off (APO) Turns Radio Off Automatically After 30 Minutes

DTMF 10 Memory Autodialer, Built-In
Selectable Frequency Steps (5, 10, 12.5, 15, 20 or 25 KHz)

Four Ways to Scan (Band Scan, Memory Scan, Memory Skip, Programmable Scan)

Optional Accessories:

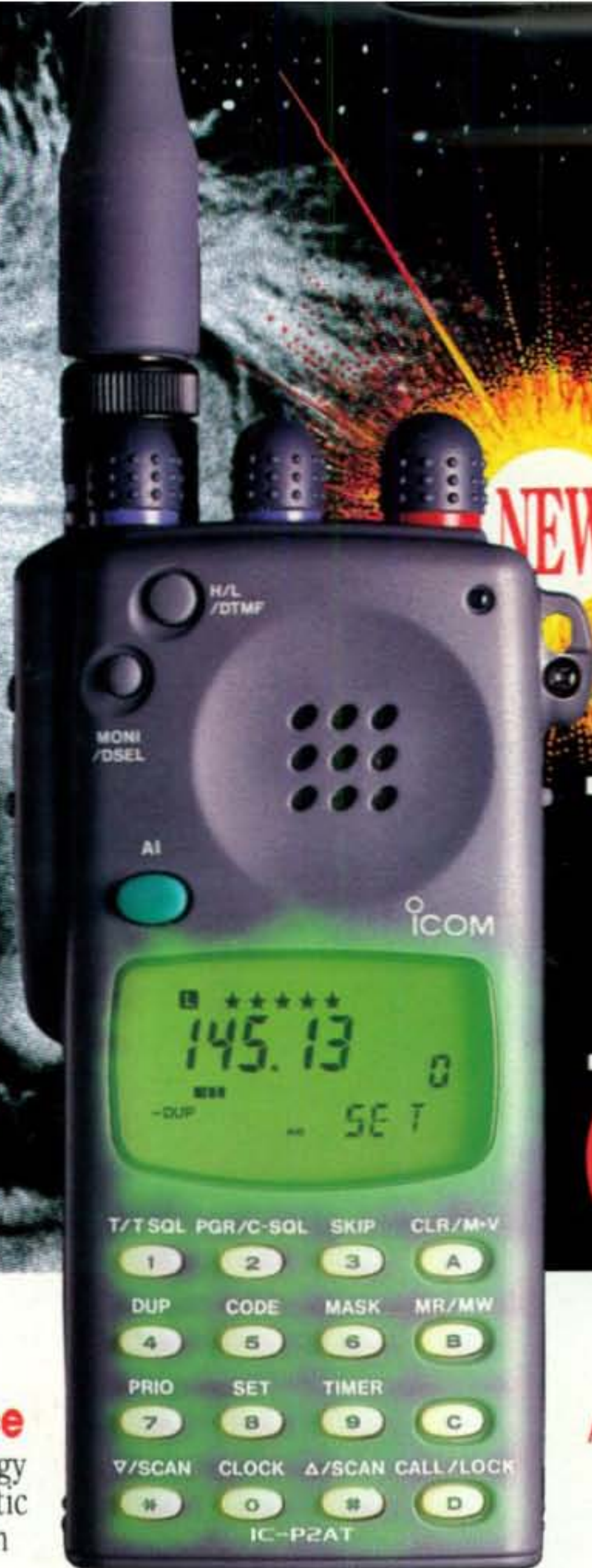
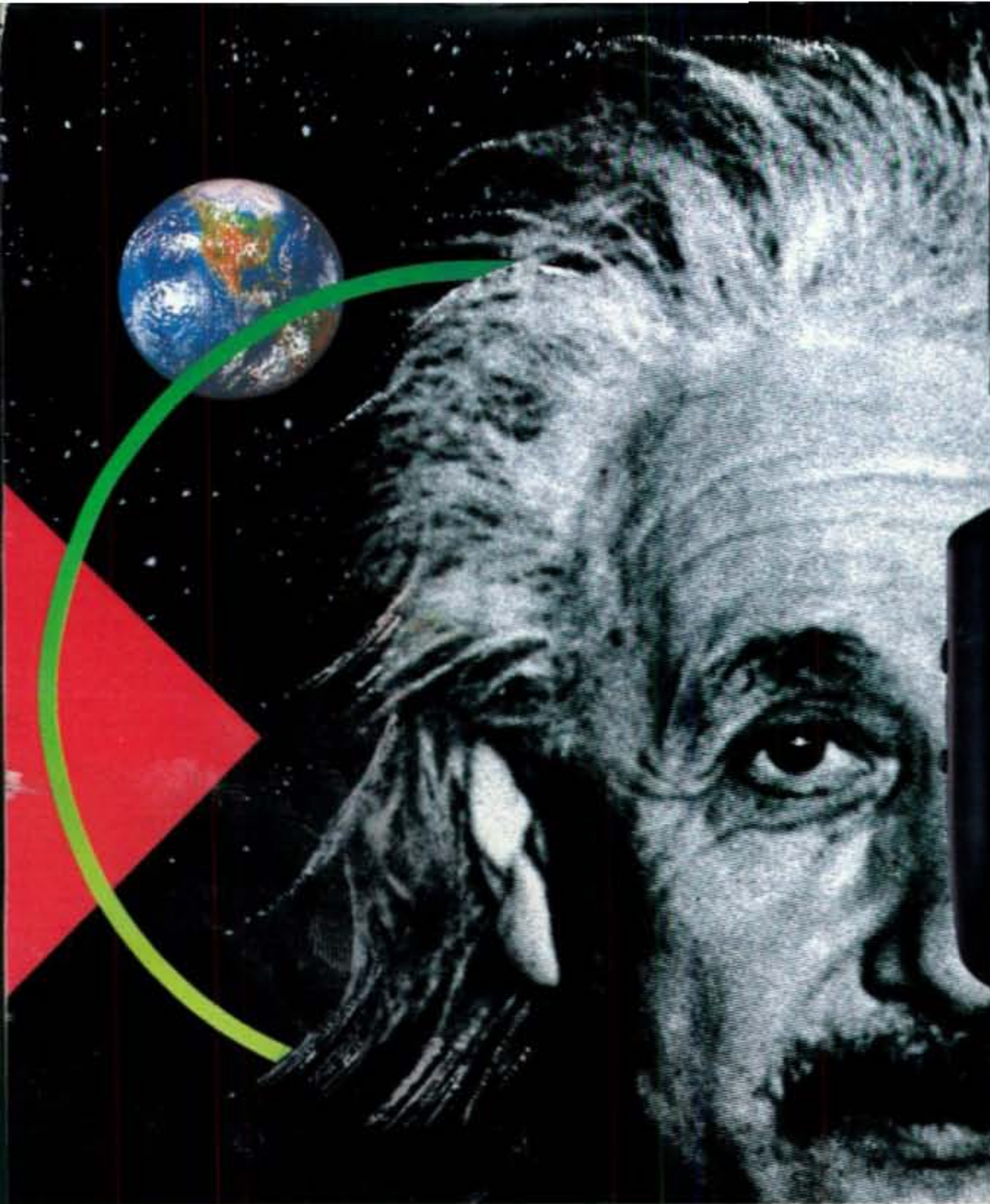
NC-42 1-Hour SMART Desk Charger
E-DC-5 DC Adaptor With Noise Filter
MMB-49 Mobile Mounting Bracket
YH-2 Headset for VOX Operation
FBA-12 AA 6-Cell Holder

Some accessories and options are standard in certain areas. Check with your Yaesu Dealer for details.

YAESU
Performance without compromise.

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NEW

P-Series
**Pocket
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Actual Size

The Only Handheld With Artificial Intelligence

ICOM continues to lead the way in communications technology with the first "Smart Radio." Inside its super compact, futuristic body is a micro brain that offers programming, customizing, fun and games never before enjoyed in amateur radio!

The P-Series Pocket Genius actually asks you questions, determines your abilities and provides only the features you can handle. It is the perfect answer for making amateur radio simple and fun for new hams — yet in the hands of an experienced user, will prove to be the most advanced, full featured handheld in history!

The Most Full Featured Handheld Ever Built

ICOM has been listening to your suggestions and has responded with a handheld featuring everything you've ever wanted...and more: **100 Memories** - more than any other handheld. **16 Autodial Memories** - one touch of a button makes your call. **Illuminated Keypad and Display** allows nighttime use. **Large Display** is easier to read. **DC Socket** for charging at home. **Optional DTMF Pager** lets anyone call your handheld with a 3-digit code. **Memory Skip** and **Mask** allows you to customize memories to be scanned.

P2AT 2 Meters, P3AT 220MHz, P4AT 440MHz.

New Hams in the Family

will appreciate the many easy-to-use features, small size and exciting question-and-answer games. They will have fun learning and advancing with the "Pocket Genius." And with autodial memories, they can have "911" emergency access at the touch of one button!



Be one of the first to experience amateur communications of the 21st century!

The World's Smartest Handheld!

For more information, see your ICOM dealer or call the ICOM Brochure Hotline 1-800-999-9877.

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All stated specifications are subject to change without notice or obligation.
All ICOM radios significantly exceed FCC regulations limiting spurious emissions. P2AT192

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