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Amateur Radio

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CQ

**Results of the 1987
CQ WW WPX SSB Contest**



**Husband and Wife Team KA2ZSN and KA2YOR
Tackle the Novice CW Bands**



THE RADIO AMATEUR'S JOURNAL

KENWOOD

...pacesetter in Amateur Radio

NEW!

Compact Breakthrough!



TH-25AT/45AT

New Pocket Portable Transceivers

The all-new TH-25 Series of pocket transceivers is here! Wide-band frequency coverage, LCD display, 5 watt option, plus...

- Frequency coverage: **TH-25AT:** 141-163 MHz (Rx); 144-148 MHz (Tx). (Modifiable for MARS/CAP. Permits required.)
TH-45AT: 438-450 MHz.
- Automatic Power Control (APC) circuit for reliable RF output and final protection.
- 14 memories; two for **any** "odd split" (5 kHz steps).
- Automatic offset selection (TH-25AT).
- 5 Watts from 12 VDC or PB-8 battery pack.
- Large multi-function LCD display.
- Rotary dial selects memory, frequency, CTCSS and scan direction.
- T-ALERT for quiet monitoring. Tone Alert beeps when squelch is opened.
- Band scan and memory scan.
- Automatic "power off" circuit.
- Water resistant.
- CTCSS encoder / decoder optional (TSU-6).
- **Supplied accessories:** StubbyDuk, PB-6 battery pack for 2.5 watts output, wall charger, belt hook, wrist strap, water resistant dust caps.



Optional accessories:

- PB-5 7.2 V, 200 mAh NiCd pack for 2.5 W output
- PB-6 7.2 V, 600 mAh NiCd pack
- PB-7 7.2 V, 1100 mAh NiCd pack
- PB-8 12 V, 600 mAh NiCd for 5 W output
- PB-9 7.2 V, 600 mAh NiCd with built-in charger
- BC-10 Compact charger
- BC-11 Rapid charger
- BT-6 AAA battery case
- DC-1/PG-2V DC adapter
- HMC-2 Headset with VOX and PTT
- SC-14, 15, 16 Soft cases
- SMC-30/31 Speaker mics.
- TSU-6 CTCSS decode unit
- WR-1 Water resistant bag

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KENWOOD U.S.A. CORPORATION
2201E. Dominguez St., Long Beach, CA 90810
P.O. Box 22745, Long Beach, CA 90801-5745

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

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DX-cellence!

#1 Rated HF!



TS-940S Competition class HF transceiver

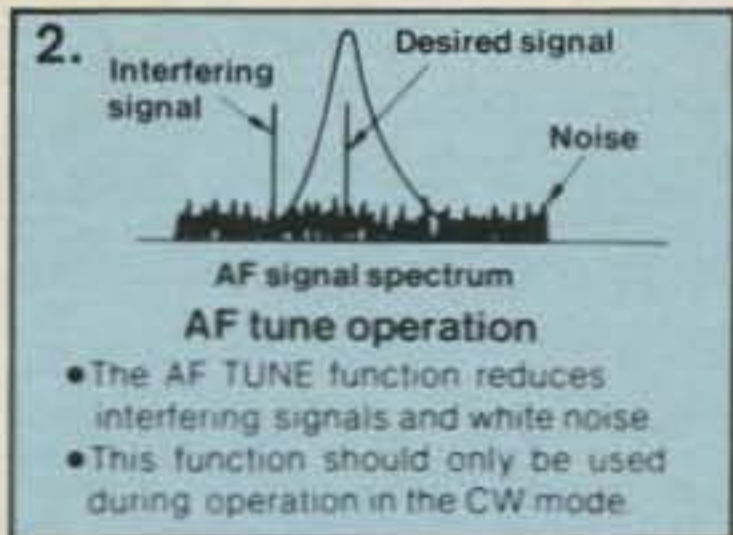
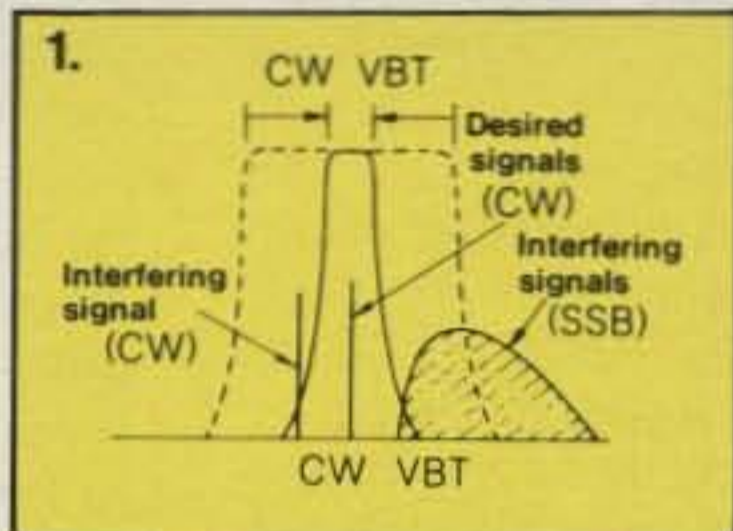
TS-940S—the standard of performance by which all other transceivers are judged. Pushing the state-of-the-art in HF transceiver design and construction, no one has been able to match the TS-940S in performance, value and reliability. The product reviews glow with superlatives, and the field-proven performance shows that the TS-940S is "The Number One Rated HF Transceiver!"

- **100% duty cycle transmitter.** Kenwood specifies transmit duty cycle **time**. The TS-940S is guaranteed to operate at full power output for periods **exceeding one hour**. (14.250 MHz, CW, 110 watts.) Perfect for RTTY, SSTV, and other long-duration modes.
- **First with a full one-year limited warranty.**
- **Extremely stable phase locked loop (PLL) VFO.** Reference frequency accuracy is measured in **parts per million!**

Optional accessories:

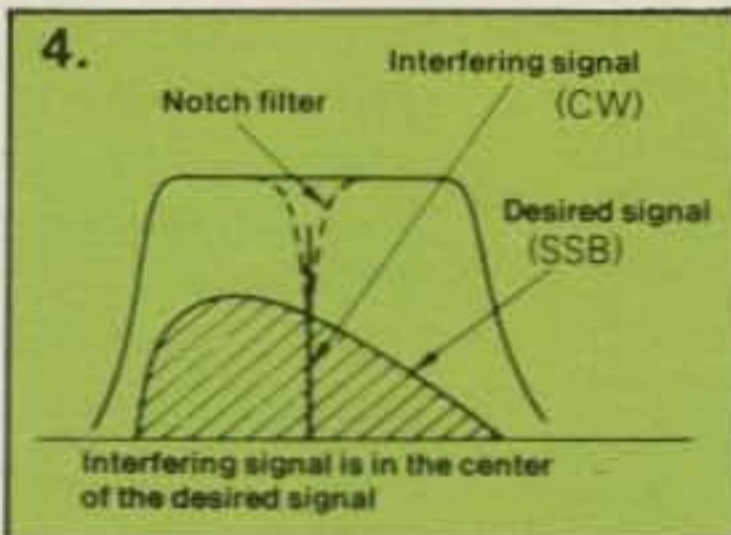
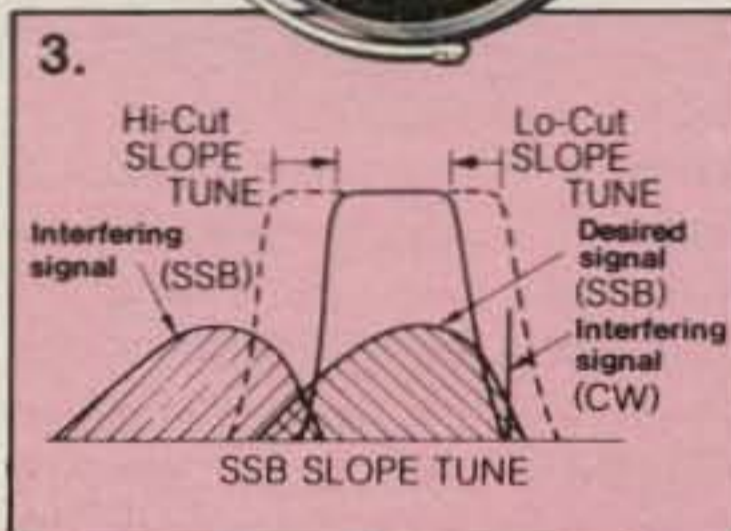
- AT-940 full range (160-10m) automatic antenna tuner
- SP-940 external speaker with audio filtering
- YG-455C-1 (500 Hz), YG-455CN-1 (250 Hz), YK-88C-1 (500 Hz) CW filters; YK-88A-1 (6 kHz) AM filter
- VS-1 voice synthesizer
- SO-1 temperature compensated

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



1) **CW Variable Bandwidth Tuning.** Vary the passband width continuously in the CW, FSK, and AM modes, without affecting the center frequency. This effectively minimizes QRM from nearby SSB and CW signals.

2) **AF Tune.** Enabled with the push of a button, this CW interference fighter inserts a tunable, three pole active filter between the SSB/CW demodulator and the audio amplifier. During CW QSOs, this control can be used to reduce interfering signals and noise, and peaks audio frequency response for optimum CW performance.



3) **SSB Slope Tuning.** Operating in the LSB and USB modes, this front panel control allows independent, continuously variable adjustment of the high or low frequency slopes of the IF passband. The LCD sub display illustrates the filtering position.

4) **IF Notch Filter.** The tunable notch filter sharply attenuates interfering signals by as much as 40 dB. As shown here, the interfering signal is reduced, while the desired signal remains unaffected. The notch filter works in all modes except FM.

- **Complete all band, all mode transceiver with general coverage receiver.** Receiver covers 150 kHz-30 MHz. All modes built-in: AM, FM, CW, FSK, LSB, USB.
- **Superb, human engineered front panel layout for the DX-minded or contesting ham.** Large fluorescent tube main display with dimmer; direct keyboard input of frequency; flywheel type main tuning knob with optical encoder mechanism all combine to make the TS-940S a joy to operate.
- **One-touch frequency check (T-F SET) during split operations.**
- **Unique LCD sub display indicates VFO, graphic indication of VBT and SSB Slope tuning, and time.**
- **Simple one step mode changing with CW announcement.**
- **Other vital operating functions.** Selectable semi or full break-in CW (QSK), RIT/XIT, all mode squelch, RF attenuator, filter select switch, selectable AGC, CW variable pitch control, speech processor, and RF power output control, programmable band scan or 40 channel memory scan.

- crystal oscillator
- MC-43S UP/DOWN hand mic.
- MC-60A, MC-80, MC-85 deluxe base station mics.
- PC-1A phone patch
- TL-922A linear amplifier
- SM-220 station monitor
- BS-8 pan display
- SW-200A and SW-2000 SWR and power meters
- IF-232C/IF-10B computer interface.

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ALL NEW!

Double Vision



ACTUAL SIZE FRONT PANEL

TM-721A Deluxe FM dual bander

The Kenwood TM-721A re-defines the original Kenwood "Dual Bander" concept. The wide range of innovative features includes a dual channel watch function, selectable full duplex operation, 30 memory channels, extended frequency coverage, large multi-color dual digital LCD displays, programmable scanning, and more with 45 watts of output on VHF and 35 watts on UHF. TM-721A—Truly the finest full-featured FM Dual Band mobile transceiver!

- **Extended receiver range** (138.000-173.995 MHz) on 2 meters; 70 cm coverage is 438.000-449.995 MHz. (Specifications guaranteed on Amateur bands only. Two meter transmit range is 144-148 MHz. Modifiable for MARS/CAP. Permits required.)
- **30 multi-function memory channels.** 14 memory channels and one call channel for each band store frequency, repeater offset, CTCSS, and reverse. Channels "A" and "b" establish upper and lower limits for programmable band scan. Channels "C" and "d" store transmit and receive frequencies independently for "odd splits."

Optional Accessories:

- **RC-10** Multi-function handset/remote controller • **PS-430** Power supply • **TSU-6** CTCSS decode unit • **SW-100B** Compact SWR/power/volt meter • **SW-200B** Deluxe SWR/power meter • **SWT-1** 2m antenna tuner • **SWT-2** 70 cm antenna tuner • **SP-40**

- **Separate frequency display for "main" and "sub-band."**
- **45 Watts on 2 meters, 35 watts on 70 cm.** Approx. 5 watts low power.
- **Call channel function.** A special memory channel for each band stores frequency, offset, and sub-tone of your favorite channel. Simply press the CALL key, and your favorite channel is selected!
- **Automatic Band Change (A.B.C.)** Automatically changes between main and sub-band when a signal is present.
- **Dual watch function allows VHF and UHF receive simultaneously.**
- **CTCSS encode/decode selectable from front panel** or UP/DWN keys on microphone. (Encode built-in, optional TSU-6 needed for decode.)
- **Balance control and separate squelch controls for each band.**

- **Dual antenna ports.**
- **Full duplex operation.**
- **Programmable memory and band scanning, with memory channel lock-out and priority watch function.**
- **Each function key has a unique tone for positive feedback.**
- **Illuminated front panel controls and keys.**
- **Dimmer control.**
- **16 key DTMF mic. included.**
- **Handset/remote control option (RC-10).**
- **Frequency (dial) lock.**
- **Supplied accessories:** 16-key DTMF hand mic., mounting bracket, DC cable.

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



TM-721A shown with optional RC-10.

- Compact mobile speaker • **SP-50B** Deluxe mobile speaker • **PG-2N** DC cable • **PG-3B** DC line noise filter • **MC-60A, MC-80, MC-85** Base station mics. • **MA-4000** Dual band mobile antenna (mount not supplied) • **MB-11** Mobile bracket • **MC-43S** UP/DWN hand mic. • **MC-48B** 16-key DTMF hand mic.

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P.O. Box 22745, Long Beach, CA 90801-5745

MASTHEAD

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Gail M. Schieber

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Peter O'Dell, WB2D

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Artist

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Florence V. Martin

Phototypographers

Hal Keith

Illustrator

Larry Mulvehill, WB2ZPI

Contributing Photographer

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The Radio Amateur's Journal



ON THE COVER: Virginia Cavanagh, KA2YOR, listens in as her husband, Richard, KA2ZSN, sends CQ. Photo by Larry Mulvehill, WB2ZPI.

MARCH 1988

VOL. 44, NO. 3

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It was just a year ago on March 21st that we hung up our *CQ* banner at the Charlotte Hamfest proclaiming "Happy Novice Enhancement." Novice Enhancement went into effect on 3/21/87 and today, one year later, thousands upon thousands of Novices and Technicians are finding out about DXing firsthand on 10 meters. Are folks getting on the air and having a good time with amateur radio these days? Judging from my mail and other comments, you bet they are.

Again, judging from my mail and from personal comments, the fastest growing topic among newly licensed or enhanced amateurs is the subject of interference. Necessity does make experts of us all. I've received several articles recently from amateurs who have run into the problem discussing how they've worked through the problem. We're also putting the finishing touches on a multi-part series on RFI and what to do about it.

If we stop to think of all the home entertainment devices, and all of the items digitally controlled in our homes, cars, and work places that can either generate and/or are susceptible to RFI, the numbers are astounding. It's been many, many years since all we thought in terms of was the "old Dumont" or the family "Hi-Fi" as the only recipients of our transmissions. There was hardly anything besides a faulty pole transformer that could cause us the same degree of woe. Now-a-days there's hardly a thing out there that sucks up a volt or two that can't cause or receive RFI.

While amateur radio gear as a whole is designed theoretically to be less susceptible to receiving and generating RFI when used properly, there is a wide latitude in the term properly. Most of the other home entertainment devices will receive and generate just about everything, including RFI, from other household toys. There really is no standard for rejection qualities or shielding properties for these fun things we *all* buy, not just our irate neighbors. There's hardly a thing in the average house these days that isn't interfering with another thing. The ultimate fun is when all of the family members start using their favorite electronic device at the same time.

While there are a number of things that you should know in order to clean up your own act, be mindful of the magnitude of the situation. Your neighbors could be blaming you for something generated in their own home. Of primary concern however is that your equipment be operated and maintained properly. In the coming months we'll deal with identifying problems and coming up with solutions. This month W4UVS relates a long standing

problem of interference he was experiencing and how it was finally resolved.

Travels With CQ

This month, March, will find us attending the Orlando Hamcation, the Charlotte Hamfest and Computerfair, and The Greater Baltimore Hamboree and Computerfest. It's going to be a busy month and we hope to see many of you out there. It's a little too early to give you the first food report, as this is being written before the onset of the Hamfest season. I did, however, get a great invitation to attend a Hamfest in Batavia, NY that promised the best Hamfest food east of Dayton. Stephen Licht, WB2CZC, painted a wonderful picture of both the Hamfest and the epicurian feast that awaited not only me but the several thousand people who regularly attend the event. It sounds terrific, but unfortunately I'm scheduled to be somewhere else on that weekend. Thanks for the invitation. If things do change, I certainly will wend my way up to Batavia.

New Private Radio Bureau Chief At FCC

While he is not new to the FCC, Ralph Haller, N4RH, is the new Chief of the FCC's PRB. Recently he has been acting Bureau Chief, replacing Robert Fitch, who was promoted. Mr. Haller comes to the job with unique qualifications of interest to amateurs. He has a Bachelor of Science degree in electrical engineering and holds an Extra class license. Mr. Haller's background, therefore, includes an intimate knowledge of amateur radio and technology. We wish Mr. Haller good luck and continued success in his new position.

Please Mark The Envelope

One of the many glamorous and enviable jobs at the *CQ* offices is the Contest Committee. No, I'm not talking about those hard working individuals who pour over each entry and check each log sheet for the slightest irregularity. The Contest Committee at *CQ* (Gail, Peter, and I) does not get to score logs; we get to sort them. As logs come in, we sort them as to mode and contest. Usually it's written on the envelope; sometimes you have to guess. A small percentage of you really make it a challenge or a sub-contest of its own, trying to figure out where the entry belongs. On rare occasions, it's not even one of our contests. You would be surprised at just how many people here want to take part in sorting these logs (actually, none). Please help us make this glamorous and enviable job dull and boring by marking



A future member of the Feline Operators Club (bad pun intended). The next time you work KA7DJR, ask for the operator's name. It might not be Ray.

your envelopes clearly as to contest and mode.

The above also holds true for requests. If you want certain logs, award information, writers' guidelines, etc. please mark the envelope with your request. Also include an SASE for quick return.

Equal Time

We've had numerous photos sent in by readers of our January issue, showing that their dogs are cuter than our cover pooch. Well, that calls for a subjective response as to cuteness. But, Ray Carini, KA7DJR, does one better and asks for equal time for his cat (actually demanded equal time). His contention is that "anybody can put a set of headphones on a dumb dog and sit him in front of the rig. The enclosed photos prove that cats are much smarter than dogs." Those are his inflammatory words of challenge. Ray did send in 3 shots of his cat—one shot at the mike, another watching the monitor as he operates the computer, and the third one, which we reproduce here. This one shows just how agile the cat is. I wonder who logs, Ray or the cat?

It's March

It's March and the weather is just right for taking a look at the lawn, the antenna farm, and for getting out of the house after the long winter. I'll bet there's a Hamfest or electronic fleamarket somewhere near you this month. Check it out, and while you're there, check out the local club. You might be surprised to find out that a few new amateurs moved into the area during the winter and that one or two could use your help. Get involved, and most of all have some fun.

73, Alan, K2EEK

New PK-232 Breakthrough

Six Digital Modes - Including Weather FAX

1900 25FE87 38A-4 01052 17831 SC24N112W-2



A new software enhancement makes the AEA PK-232 the only amateur data controller to offer six transmit/receive modes in a single unit.

- * Morse Code
- * Baudot (RTTY)
- * ASCII
- * AMTOR
- * Packet
- * Weather FAX



\$319⁹⁵ AMATEUR NET
\$379.95 AEA RETAIL

Your home computer (or even a simple terminal) can be used for radio data communication in six different modes. Any RS-232 compatible computer or terminal can be connected directly to the PK-232, which interfaces with your transceiver. The only program needed is a simple terminal program, like those used with telephone modems, allowing the computer to be used as a data terminal. All signal processing, protocol, and decoding software is in ROM in the PK-232.

The PK-232 also includes a no compromise VHF/HF/CW modem with an eight pole bandpass filter, four pole discriminator, and 5 pole post detection low pass filter. Experienced HF Packeteers are reporting the PK-232 to have the best Packet modem available.

Operation of the PK-232 is a breeze, with twenty-one front panel indicators for constant

status and mode indication. The 240 page manual includes a "quick start" section for easy connection and complete documentation including schematics. Two identical back panel radio ports mean either your VHF or HF radio can be selected with a front panel switch. Other back panel connections include external modem disconnect, FSK and Scope Outputs, CW keying jacks, and RS-232 terminal interface.

The RS-232 connector is also used for attaching any Epson graphics compatible parallel printer for printing Weather Fax. Weather maps and satellite photos, like the one in this ad, can be printed in your shack.

Contact your local AEA dealer today for more information about the one unit that gives you six modes for one low price, the PK-232.



Brings you the Breakthrough

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(206) 775-7373

Announcing

- **Augusta, ME** - The Augusta Emergency Amateur Radio Unit will operate using the special Bicentennial call sign W200TLC from 0001Z March 12 until 2359Z March 18. Operation will be on all bands and modes 160 meters through 70 cm. For a special QSL card, send QSL and SASE to W1TLC, Augusta Emergency Amateur Radio Unit, c/o K1NIT, William Crowley, Box 1589, Hallowell, ME 04347.
- **Piscataway, NJ** - The Piscataway ARC will

operate a special event station on March 19-20 from 0000Z to 2400Z each day to commemorate the WW II operations of the Voice of America Relay station, WRCA. Members will operate using their own call signs and sign /VOA. Suggested frequencies: CW, Novice portions of the bands; phone, lower third of the general portion of the bands on 75, 40, 20, and 15 meters and the Novice portion of the 10 meter band. For a certificate send #10, or for

unfolded a 9 x 12 SASE, with your QSL to the KO2K Callbook address.

- **The following hamfests, etc., are slated for March and late February:**

Feb. 27-8, **Ohio State ARRL Convention**, Cincinnati Gardens Exhibition Center, Cincinnati, OH. Contact Stan Cohen, WD8QDQ, 2301 Royal Oak Court, Cincinnati, OH 45237 (513-531-1011).

(continued on page 86)

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THL THE INDUSTRY LEADER IN DESIGN AND PERFORMANCE add-on accessory VHF/UHF amplifiers, antenna couplers and now HF LINEARS too. When power out is your problem, stop in for the THL brand solution.

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The right features and the right stuff formulate the features everyone asks to have. Add quality, parts and construction, stir up a great price and you've got SANTEC's formula for customer satisfaction. See one at your dealer TODAY!

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ST-20T
KT-220M

2-Meter Mobiles
2-Meter Portable
Marine Band Portable

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EGE, Inc	NH	603-898-3750	Universal Amateur Radio	OH	614-866-4267	Stephens Electronics	TX	512-991-6789
Rogus Electronics, Inc	CT	203-621-2252	A.E.S. Ohio	OH	216-585-7388	Austin Amateur Radio	TX	512-454-2994
KJI Electronics	NJ	201-239-4389	Kenmar Industries	OH	216-499-7388	CW Electronics	CO	303-832-1111
Barry Electronics	NY	212-925-7000	R & L Electronics	OH	513-868-6399	Colorado Radio Center	CO	303-288-7373
Hamtronics	PA	215-357-1400	Electrocom Industries	IN	219-232-2743	Miley's Radio	CO	303-784-3040
Ham Buerger, Inc	PA	215-659-5900	The Ham Station	IN	812-422-0231	Ross Distributing Co	ID	208-852-0830
Delaware Amateur Supply	DE	302-328-7728	Ferris Radio	MI	313-398-6645	Ham Radio Outlet	AZ	602-242-3515
Amateur Radio Center	MD	301-889-5214	Michigan Radio	MI	313-469-4656	Pace Engineering	AZ	602-888-3333
Electronic Equipment Bank	VA	703-938-3350	Purchase Radio Supply	MI	313-668-8696	Roberts Electronics, Inc	AZ	602-367-2346
EGE, Inc	VA	703-643-1063	H.R. Electronics	MI	616-722-2246	A.E.S. Las Vegas	NV	702-647-3114
Williams Radio Sales	NC	919-993-5881	A.E.S. Milwaukee	WI	414-442-4200	Reno Radio	NV	702-331-7373
Ham Radio Outlet	GA	404-263-0700	TNT Radio	MN	612-535-5050	Henry Radio, Inc	CA	213-820-1234
Quad Electronics	FL	904-438-3319	R.F. Enterprises North	MN	218-765-3254	Jun's Electronics	CA	213-390-8003
A.E.S. Orlando	FL	305-894-3238	Burghardt Amateur Cntr	SD	605-886-7314	Ham Radio Outlet	CA	213-988-2212
N & G Dist. Corp	FL	305-592-9685	H.C. Van Vaizah, Co	IL	312-852-0472	Ham Radio Outlet	CA	714-560-4900
Miami Radio Center	FL	305-264-8406	Erickson Communications	IL	312-631-5181	Ham Radio Outlet	CA	714-761-3033
International Radio Sys	FL	305-594-4313	Floyd Electronics	IL	618-345-6448	Ham Radio Outlet	CA	415-342-5757
Mike's Electronic Dist. Co	FL	305-491-7110	Missouri Radio Center	MO	816-741-8118	Base Station	CA	415-685-7388
Eli's Amateur Radio	FL	305-525-0103	Dandy's	KS	316-326-6314	Ham Radio Outlet	CA	415-534-5757
A.E.S. Clearwater	FL	813-461-4267	Moory Electronics	AR	501-946-2820	Shaver Radio, Inc	CA	408-370-6665
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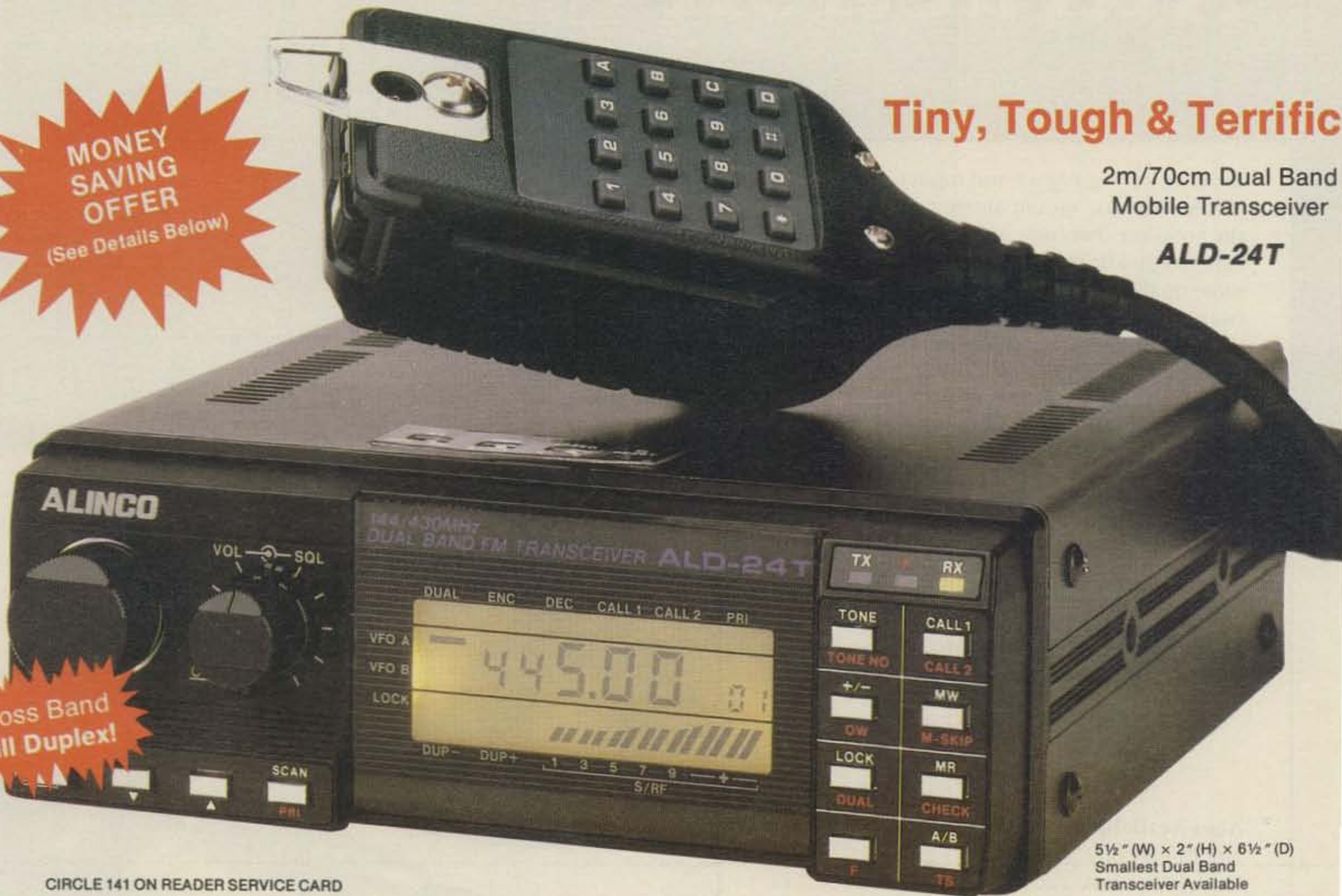
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Rivendell Associates - Derry, NH
Rogus Electronics - Southington, CT
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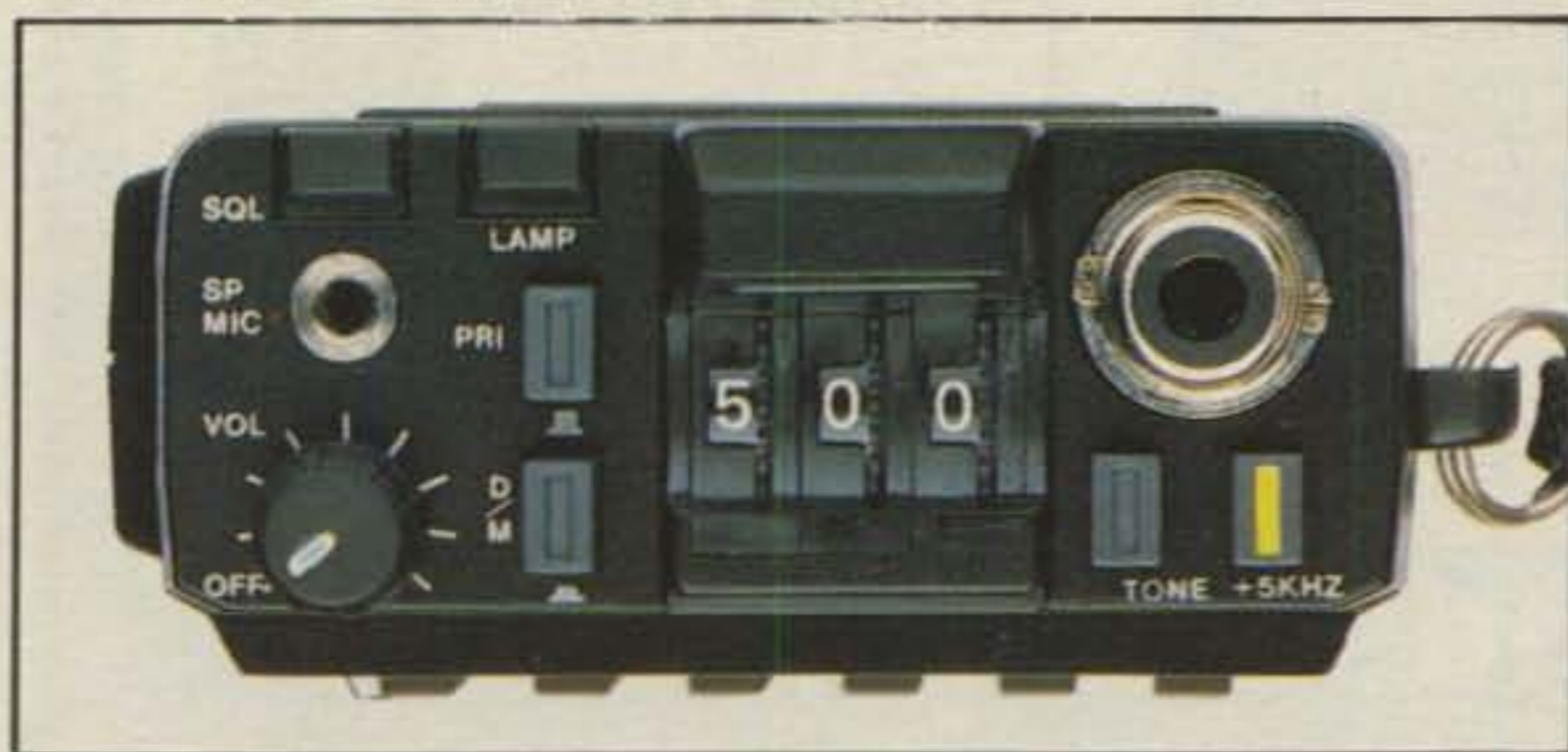
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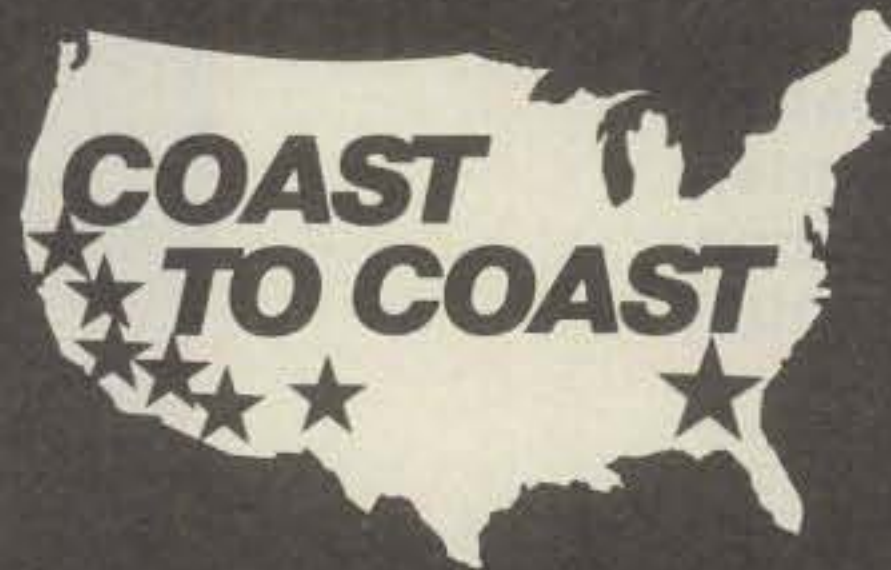
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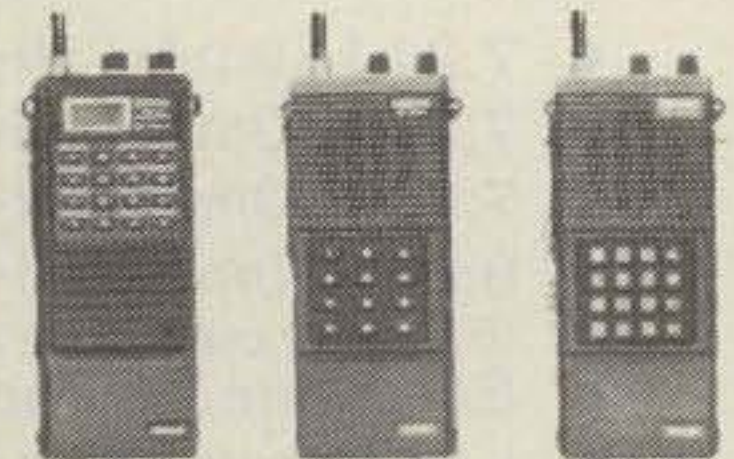
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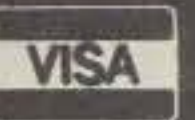


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Luis, ZP5JCY, the new 20 meter world record holder.



The ops at ZS3WPX, African M/S champion. L-R ZS3HL, ZS3IL, ZS6BRZ & ZS3N.

Results of the 1987 CQ World-Wide WPX SSB Contest

BY STEVE BOLIA*, N8BJQ

Thirty-eight million points, 10,000 plus QSOs and 1250 prefixes were but a few of the highlights of the 31st CQ WPX SSB Contest. Scores that only a few years ago seemed unreachable have been passed, and who knows what cycle 22 will bring us.

The multi-multi category provided the biggest increase in scoring with the top three easily outscoring last year's champ. ZZ5EG and VP2EC both shattered the old world record, with the South Americans emerging as the victors with a new record 38,096,250 points to go along with a record 1250 prefix multipliers. The gang at VP2EC won the QSO battle, but came up short in the hunt for multipliers. Third place goes to last year's champ, KH6XX, with the top European multi-multi, UP7A, in fourth. The battle for the USA multi-multi championship was just as close, with N5AU edging out KW8N for the top spot. Number three in the US goes to K0RF in their first multi-multi from the new QTH. Look out next year!

The multi-single title goes to PJ2FR (PJ2FR and N6KT) with a record 18,493,730 points. Last year's winner, NP4CC, finished second, with FM0A and IO5NPH right behind. Proving that you can win (at least in the WPX) from the west coast, KI6P operated by N6RO, WA6VEF and K3EST topped the USA multi-single list. N4WW and KI1G battled it out for second, with less than 9000 points separating them.

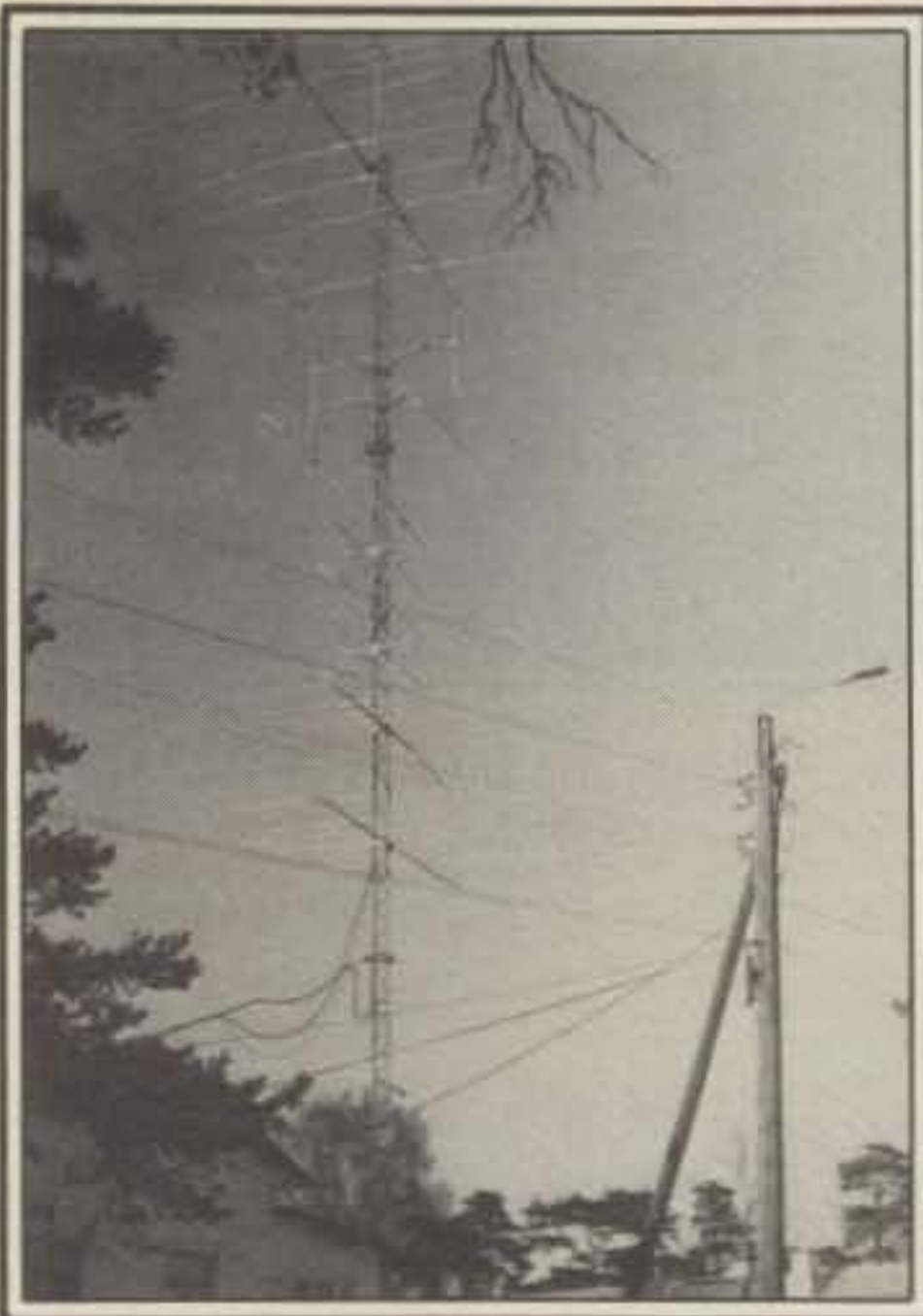
Number one in the single-op category was EA9AM operated by 1985 champ, EA9IE, with a new African record. Second place (for what may be a record third consecutive time) goes to Carl, AI6V, with his special call, 6Y4V. Carl's 6,373,230 points is a North American record. Chuck, VP2MBA (W7FP), grabbed third, with Helen, AH6GQ, number four. 4X7DX operated by 4X6DX owns the new Asian record to go along with his fifth-place finish. Bob, KQ2M, piloted KM1H to a USA record 4,547,067 points and the number one spot. Number two goes to K5ZD/1, with NS0Z third and KC8C/3 fourth.

Luis, ZP5JCY, was the big gun among the single-band entries. His 6,184,732 points was good for number one on 20

meters and a world record. Leading a strong contingent from Costa Rica, TI2CC fell a little short of Luis, but did come up with a North American record for his efforts. Rolf, CE6EZ, led the way on 21 MHz, with NE8Z making the best use of his "unique" call (TI1T) to set a new North American 21 MHz record. Scores on 28 MHz were up, with Bob, LU3AJW, at LU1E breaking a million, and TI2US sneaking in among the South American stations for second. The big signal on 40 was Andreas, H24LP/5B4LP, whose 5,348,975 points is a new Asian record, followed by OH2KI/CT3 and TE2Y. Africa was the place to be on the low bands, with CT3DL squeaking by EA8AFS for the top spot on 3.7 MHz and OH1RY/CT3 just missing a world record on 160.

Leading the way among USA single band entries were K2VV and KM6B, with USA records on 14 and 7 MHz respectively. Both John and Jim also ranked high in the world standings. K5MK took advantage of the increased activity on 10 meters to capture the USA title, with K6SVL getting a title on 15. KN8R owns the 3.7 MHz title, with K5UR repeating on top band.

* 4121 Gardenview, Beavercreek, OH 45431



For the antenna buffs, there is one of almost everything on OH1ZAA's 100 foot rotary tower.

QRP activity was down some, but outstanding scores were still turned in, led by TR8SA with 1,041,112 points. JH9HXF/1 put in quite an effort on 28 MHz, with JK1JQQ, W5FO, SM5ARR, OK1JF, and RB5J capturing world championships on 21 MHz through 1.8 MHz.

Multi-single station ZF2KT operated by members of the North Florida DX Association is the winner of the contest expedition trophy which is sponsored by the Kansas City DX Club.

When planning your strategy for the 1988 contest, don't forget the new USA Novice/Technician subband on 10 meters. With 10 on the upswing, a whole new pool of potential contest QSOs and operators has been opened up. Starting with the 1988 contest, there will be a trophy strictly for USA Novice/Technician operators. There are no special rules, except that the station must be operated by a Novice or Technician and operate only in the subband. To be eligible for the trophy, you must put in 12 hours of operating, and also put your license class on the summary sheet. The donor of this new trophy is Jon, KA0ZFX. Check out the new rules and updated trophy list in the January issue, or get them from CQ.

There still seems to be some difficulty with stations signing portable for the contest. The rules require that you sign portable if outside of your call area or DXCC country. The portable prefix must correctly show the DXCC country of operation, and be an authorized prefix for that country. This rule will continue to be enforced. If you have a question about what to sign, feel free to contact me before the contest.

Thanks to the many who went on an expedition or used a special prefix for the contest. Among them were 6Y4V, K4YT/4F (who is attempting to use all possible Philippine prefixes before he leaves), TI1T, 3G3Z, CS0NH, H24LP, TE2Y, TW0A, TW0B, TW7C, GB8DX, OH1RY/CT3, OH2KI/CT3, VP2EC, ZZ5EG, CS9CU, DJ6QT/9L, HB9KC/S2, H24SA, 4X9A, 4X/K6KLY, JA2NQG/JD1, OH0/G4JVG, FV7NDX, FM0A, SO7TN, KC6IF, YE0X, C21NI, 3G4B, 3G2Z, YS0YS, and YW5M. These are but a few who went out of their way to provide a new multiplier or a much needed country for the rest of us. Thanks to the members of the Les Nouvelles DX Group for their effort in activating TW0A, TW0B, TW7C, and FV7NDX. Also thanks to HB9KC, who made a very brief stop at the Swiss embassy in Bangladesh and made it on the air to pass out a few S2 multipliers.

A generous offer was received from Bill, KV0I. He has offered to share his fine WPX Contest software for the Commodore C64. Send along a blank disk and return postage to Bill's CBA for a copy of his

latest version. This software along with a C64 should take some of the work out of WPX logging and scoring. While I don't endorse anybody's software, I will be glad to pass along other such offers for free software. Should anyone desire to send in a log on disk, I'll am willing to give it a try. I am using a Tandy® 1000 with 2 drives, 1.6M RAM, a hard drive, and some homebrew software written in Turbo Pascal. Please get with me ahead of time to work out the details on the format to use. No surprises, please.

Many thanks to N9AG and W8IMZ for their help with the almost 1600 logs submitted. Scott and Bernie put in many long nights checking, duping, and rescoring your logs. Our biggest problems come from incorrectly scored logs, and those who insist on taking credit for prefixes on all bands. Please take a minute to read the rules.

That about wraps up the 1987 contest. Thanks to all who took part and hope to see you the 26th and 27th of March 1988.

73, Steve, N8BJQ/J6LRW

TROPHY WINNERS SINGLE OPERATOR - ALL BAND

WORLD: Stanley Cohen, WD8QDQ Trophy. Won by: Station EA9AM operated by Juan Jose Rosales, EA9IE.

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

AFRICA: Southeastern DX Club Trophy. Won by: Ezio D'Andrea, 9J2EZ.

CANADA: Ed Sleight, K4SB Trophy. Won by: Garry V. Hammond, VE3XN.

CARIB./C.A.: Arturo Gigante, Jr., HI8GB Trophy. Won by: Carl Cook, 6Y4V (AI6V).

EUROPE: Bernie Welch, W8IMZ Trophy. Won by: Jiri Sanda, OK1RI.

JAPAN: The DX Family Foundation Trophy. Won by: Takenobu Yokoyama, JL1BLW.

OCEANIA: Down Under DX'ers Trophy. Won by: Helen Nielsen, AH6GQ.

SOUTH AMERICA: Ron Moorefield, W8ILC Trophy. Won by: Ernesto W. Quincke, CX9CO.

WORLD QRPp: Dayton Amateur Radio Association Trophy. Won by: Saint Arroman Ch., TR8SA.

SINGLE OPERATOR SINGLE BAND

WORLD: John N. Reichert, N4RV Trophy. Won by: Luis N. Kemper P., ZP5JCY (14 MHz)

U.S.A. 7 MHz: William Diggins, WA8LXJ Trophy. Won by: Jim Stevenson, KM6B

WORLD 7 MHz: William Diggins, WA8LXJ Trophy. Won by: Andreas Mavrides, H24LP (5B4LP)

CANADA: Gene Krehbiel, VE7KB Trophy. Won by: Marcel Gervais, VE3CPA (14 MHz)

EUROPE: Myron Crofoot, WB4VQO Trophy. Won by: Tine Brajnik, YT3AA (14 MHz)

JAPAN: Ken Ruddock, K6HNZ Trophy. Won by: Station JA1YCL operated by E. Kawaguchi, JL1QOC (14 MHz)

JAPAN 28 MHz: Joe Arcure, W3HNC and Toshi Kusano, JA1ELY (Terry Appleton, W4GSM Memorial Trophy). Won by: Takaki Okuno, JO1NZT

WORLD 21 MHz: Lee Wical, KH6BZF Trophy. Won by: Ralf Hucke, CE6EZ

U.S.A. 14 MHz: Doug Zwiebel, KR2Q Trophy. Won by: John C. Yodis, K2VV

WORLD 28 MHz: Jim Hoffman, N5FA Trophy. Won by: Station LU1E operated by Roberto Gonzalez Gavio, LU3AJW.

MULTI-OPERATOR SINGLE TRANSMITTER

WORLD: Mike Badolato, W5MAY Trophy. Won by: Station PJ2FR operated by PJ2FR and N6KT.

MULTI-OPERATOR MULTI-TRANSMITTER

WORLD: Henry Thel, VE7WJ Trophy. Won by: Station ZZ5EG operated by PY5EG, N5FA, PY5CA, PY5ALP, PY5IW, PY5VM, PY5TT, PY5ZBU.

U.S.A.: CQ Magazine Trophy. Won by: Station N5AU operated by N5RZ, K5MR, KM5X, WB5VZL, KY5N, KE5CV, KJ9I, N5TR.

CONTEST EXPEDITON

WORLD: Kansas City DX Club Trophy. Won by: Station ZF2KT operated by N4KE, NU4Y, WA4DRU, WA4ECA, NX4Y, WT4A, KB4SZS.

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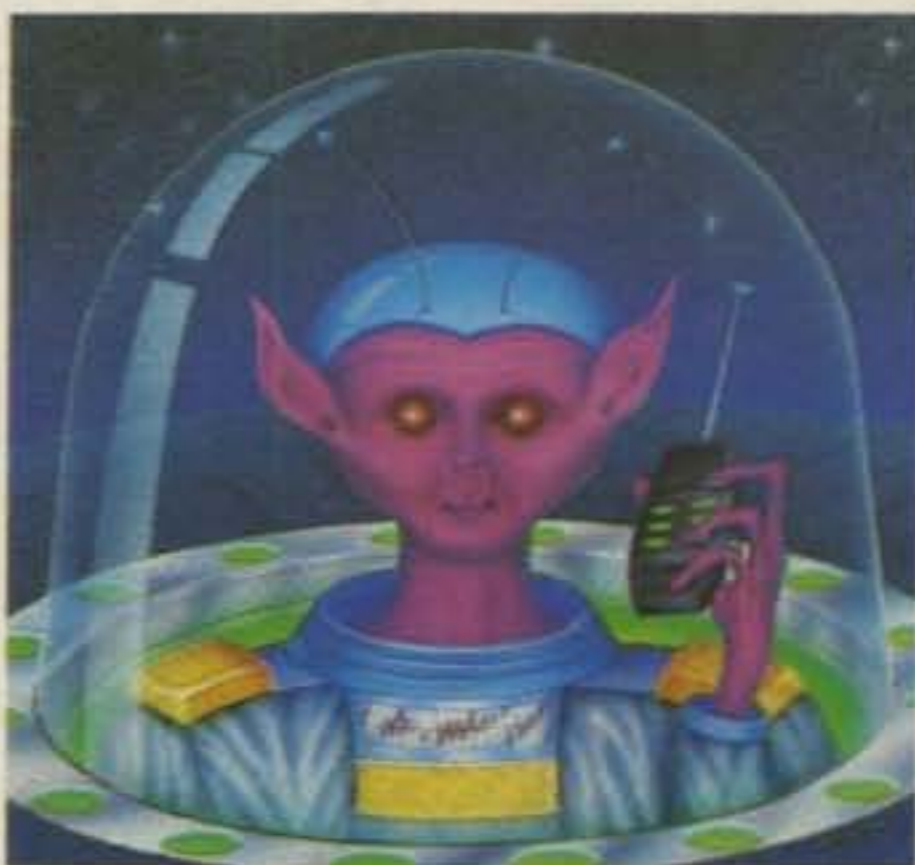
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lite tracking function (normal and reverse modes) keeps you on target through a transponder.

The FT-736R delivers 25 watts RF output on 2 meters, 220 MHz, and 70 cm. And 10 watts on 6 meters and 1.2 GHz. Store frequency, mode, PL frequency, and repeater shift in each of the 100 memories.

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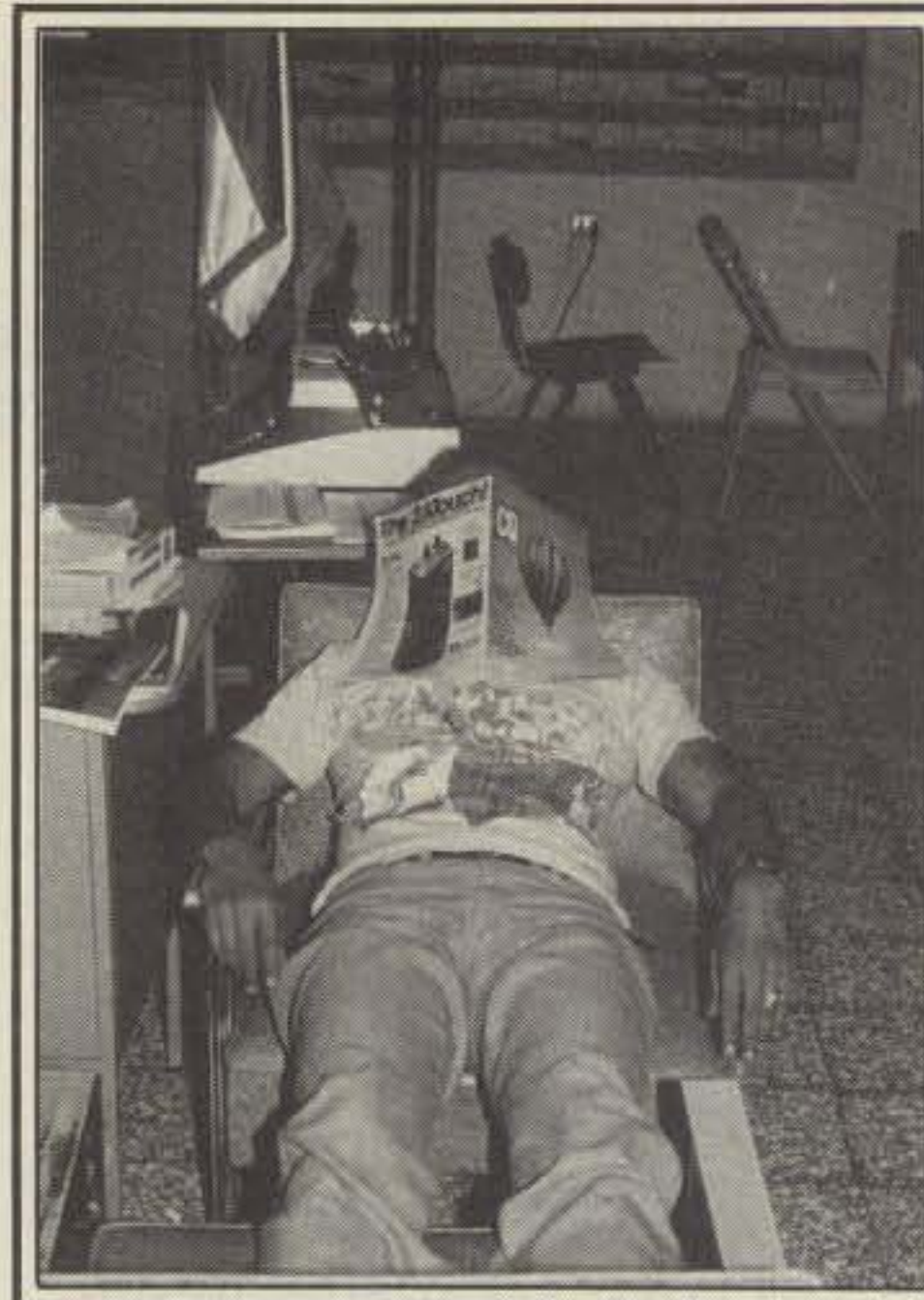
VE1UA casting for snow perch during a break at VE1CIT. Must be some new kind of contest food.

Random Comments

It sure was nice to find YB1BI and HS0A high in the band with no pile-up . . . WB3JRU. Great openings on 15 meters. Worked 7P8BT Saturday afternoon and then he faded away into the noise . . . NT0P. Nice to get a good EU and deep Asia opening. 40 SSB drives you crazy! . . . KC7V. We made new antennas, but our new antennas don't work. We were disappointed . . . JA6YCU. Final 4 weekend—east coast may have the advantage to Europe but we have the finest basketball . . . KJ9D. This call is the special call of "Les Nouvelles DX," the French DX bulletin. QSL via F6AJA . . . TW7C. Thanks to

the people who stopped by and gave us a break! . . . N5JXF. Thanks U.S. boys for 243 prefixes! . . . JA1YWX. The delta loop crashed 2 times, one week before contest and 2 days after the contest . . . IO4WZT. One of the worst rainy (static) weekends in years for us and our score shows it . . . N4WW. Thanks to NV4G's XYL Sherry for putting up with us, and for all that great food . . . NV4G. Thanks CQ for the best in contesting . . . VE6OU/3. Why otherwise rational people would play radio in this location may define a new illness . . . FO0SSJ. First contest for me. Lots of fun. Made mistakes but will do better next time . . . NQ8V. "Never a dull moment contest . . ." . . . K11G. Great fun contest. We had a continuous run all weekend long . . . NJ1F. We enjoyed many EU's on 40M! . . . JA3YKC. New club site on Solway Firth. Next year watch out! Big antennas big signals! . . . GB8PX. Stateside pile-up was magnificent—first time we worked split on 40 meters, great . . . PI5EHV. We have had a strong storm, with strength 13—very bad for antennas. One of them was broken down . . . PA0KHS. Good for working rare DX we've never heard before—also good to hear well organized pile-ups . . . G4CVK. Great problem to work all time. Only 41 hours but good score . . . 5J4R. European openings were great. All this fun at the bottom of the cycle . . . K7LXC. Great way to celebrate 60 years of radio at U. of Toronto . . . VA3T. Not condx on 21 MHz the first day . . . LZ9A.

Rig broke every time NE6I operated. Next time, I'll let the others do it without me . . . NE6I. The only OK8 stn. active in the contest . . . OK8AFM. Greatest contest ever! . . . UT4UXW. QRM was the worst I've seen in a contest . . . AA4MM. Four new countries, beat my best previous score: mission accom-



Here's YS1CZ, one of the ops at YS0YS, demonstrating another use for his copy of CQ magazine.

plished . . . AA4MN. The dynamics of cycle 22 start up got us—no 15 meters . . . AI2C/4. Great contest again. It's fun seeing what the new batch of crazy multipliers is every year . . . AI8S. Ant. broke 4 days before contest . . . K1KJT. Poor groundwave, poor scatter, sum skip . . . K2OLG. Condx Sunday anything but

To transform your shack into a DX powerhouse, combine the intelligence of Yaesu's FT-767GX HF/VHF/UHF base station and the muscle of our powerful FL-7000 HF amplifier.

You'll be amazed at how you can cut through pile-ups. Be heard anywhere in the world. And wake up otherwise inactive bands.

The brains of the operation: The FT-767GX. This intelligent HF/VHF/UHF base station includes four microprocessors for unparalleled flexibility and ease of operation.

Features include 160 to 10 meter transmit, including WARC bands. Optional plug-in modules for 6-meter, 2-meter and 70-cm operation. Receiver coverage from 100 kHz to 30 MHz. AM, FM, SSB, CW, AFSK modes built in. Ten memories that store frequency, mode, and CTCSS information (optional CTCSS unit for controlled-access repeaters). Memory check feature for checking memory status without affecting operating frequency. Dual VFOs with one-touch split frequency capability. VFO tracking for slaved VFO-A/VFO-B operation at a constant offset. Digital display in



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10 Hz steps. Slow/fast main dial tuning. Synthesizer step programming at up to 99.99 kHz per step. Digital SWR meter. Digital RF power meter. Built-in RF preamplifier. Adjustable drive level from 0 to 100 watts. Blue fluorescent display. Built-in AC power supply.

Up to 30 minutes continuous transmit (100% duty cycle). Full CW break-in. Built-in CW electronic keyer. Audio peak filter for CW (Yaesu patent). CW and AM wide/narrow filters. Woodpecker noise blanker.

RF clipping speech processor. IF shift for both receive and transmit (TX side allows you to adjust voice frequency response pattern). IF monitor. IF notch filter. Audio low-pass filter.

Built-in antenna tuner with memory of settings on each band. Separate antenna connectors for each VHF or UHF optional unit. Separate beverage antenna receive input on rear panel. Quick turnaround time from TX to RX for AMTOR, Packet, and QSK CW. AGC slow/medium/fast/off selection. Push-pull MRF422 transistors

record breaking. Lots of gud prefixes buried under nets and phone patches . . . K2VV. Finding rare ones all alone calling CQ and getting them on 1st call . . . K5DB. Too much static and then local thunder storms Sat. nite . . . K5WXZ. 40M was superb! Great DX catches on 20M included 4S7, 9K2, Y11, 9J2, TZ6, A92, VK9, etc. . . . K5ZD/1. First logs ever submitted for WPX contest. It's great! . . . K6JG. Getting called by Africans—5T5CJ, 5H3RB & 9J2EZ. Too many US prefixes - not a DX contest anymore . . . K6SVL. I hope 15 meters gets back soon so I can get some scores . . . K7LZJ. Surprised by how easy it was to work HS0A . . . K9JS. My first contest—loved it. Lots of first contacts with UA, G, KH6, KL7 & KC4 . . . KA0WMZ. Hopefully better next year for novices & techs . . . KA6ING. No rare DX in this contest so 20 meter pile-ups were not too bad . . . KB0U. Had a great time. Can't wait till next year . . . KC9EW. No out of state contacts except KS3F . . . KD1U/4. Having T52JL call me . . . KD2EU/1. Worked 80% of contest with tape loop calling CQ due to laryngitis . . . KE8AZ. Like the new 1 hr. off period rule. Got to see NCAA basketball semi-finals . . . KF2O. First WPX in years. New JA check sheet really helped during the last hours of contest . . . KM6B. QRN, QRN, QRN on 15 meters . . . KN8D. I realized it would be tough with my water-pistol antennas, but didn't realize how tough it could be . . . KQ3V. Rotor got stuck due South on Sat. nite. Planned to climb tower on Sunday but it snowed in Dallas . . . KR0Y/5. XYL coming down to shack at 3:00AM with coffee instead of complaints, bless her heart . . . KS2M.

Working TR8JLD when propagation was generally to South America . . . KS6H. It's



John, K2VV, USA 14 MHz champ and fourth world high.

amazing. I have over 2200 prefixes worked and can still find new ones to work in the WPX test . . . KS7T. All those long gaps where it looks like I was not there. I was but the band wasn't . . . KS9U. Biggest thrill: Europe on 80 meters with a dipole at 17 ft . . . KT2D. Having so many ops call me by name. Thought they all forgot me . . . KT7G. 10 meters is a masochists delight . . . KU2Q. African prefixes seem to be missing on 20 . . . N3EMD. Very crowded band. Impressed with patience of DX to get calls correct . . . N4EUK. Only had a little time to get on. Looked for a new px for my over all total . . . N4MM. Phone contests are tough when your hearing impairment requires 2 aids and ops give calls at 60 WPM . . . N8BC. Many loud Europeans transmitting out of band never did work in American band . . . NB1B. Overall a great test. Alpha 78 quit during best European run. Got the 76 going in 3 minutes flat from the

shelf . . . ND1X. Great contest but never again without computer checking. Poor memory . . . NE9I. 40 was really hot. I hope condx are as good for the CW weekend . . . NJ2L/1. I have so much to learn. Tnx to K4VX's station . . . NS0Z. HS0A where were you? . . . NS7Z. Beat my last year's score by 695 points. Everyone in the contest was just great. Tnx . . . NU8V. New countries!! . . . NY7T. When it was all over, I had a bowl of alphabet soup . . . W2PHW. Big thrill working new 160 country—DJ6QT/9L . . . W3BGN. First time I entered this contest. Really liked it . . . W3FGS. Excellent DX available, such as TZ6VV, 5T5NU, 6T2MG, T52JL . . . W3USS. Best conditions for a long time and I got laryngitis - kept losing my voice . . . W4WKQ. Convalescing from surgery so this was minimal effort . . . W5OB. This should be a new 80 meter record for W5 land on 80 meters/topping K5UR in 1981. Enjoyed it . . . W5WMU. Did not get started in time, therefore QRTed QRP to wk Europe opening to finish my Golden Jubilee!! . . . W6CN. 28 MHz complete washout, 21 MHz only open to southerly routes . . . W7GUR. Too bad the flux wasn't in the 100 range like the next weekend. No Europeans on 15 meters . . . WA5IYX.

Big fun. Tnx to all for new prefixes . . . WA8YTM. First time I ever followed the contest for the full weekend. Lots of fun . . . WB4FOT. The local power authority did it again by producing an S7 noise source for the entire weekend . . . WB7CLU. 80 mph winds bent ant. over 3 days before contest. Got back up 2 hrs. after contest started . . . WF5E. Having a JD1 call me . . . WX6M. Lost both slopers to high winds right after test . . . WZ6Z. We are very glad we could make many contact on 7 MHz SSB with W's . . . JR1ZTT. Great fun—first



AND THE BRAWN.

(rated dissipation 290 watts each) operated at 24 volts for excellent intermodulation rejection in transmitter.

Enhanced C.A.T. system for external control of transceiver from personal computer. (Software for Apple IIe/MAC, Commodore C-64, and IBM-PC is available through your Yaesu dealer.) There's also data communication with the FL-7000 linear amplifier for hands-free amplifier operation.

The muscle to get you out: The FL-7000. This solid-state amplifier covers 160 to 15 meters, and includes

a built-in power supply, automatic tuner and lots of powerful operating features.

There's fast turnaround time for break-in (QSK) CW, HF packet radio, and AMTOR. Only 70 watts excitation for full output, and 1200 watts PEP input power. Fully protected push-pull parallel wideband "no-tune" amplifier circuit powered by 47V, 25A DC power supply. Yaesu's exclusive "DVC" (Direct Vertical Cooling Heatsink System) with bottom-mounted fan. Automatic antenna matching sensor

turns off amplifier and rematches tuner circuitry if SWR rises above 2:1. Hands-free automatic band change when used with FT-767GX, FT-757GX or FT-980. Lithium battery backup remembers antenna selection and tuner settings. Dual 2-speed fans with independent thermal sensors. Connection to up to four antennas, including automatic selection via optional unit. Eight front panel LED status indicators. And more.

Get the DX advantage. Just combine the FT-767GX's brains, the FL-7000's brawn, and your special operating knowledge. What an impact you'll make on the world!

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CIRCLE 45 ON READER SERVICE CARD

NEW

ICOM IC-900

Six Bands in One Mobile!

ICOM IC-900 FIBER OPTIC FM MOBILE

ICOM introduces the revolutionary IC-900 multi-band FM mobile transceiver. ICOM, first in utilizing fiber optic technology in amateur radio, enables you to create your own mobile communications system. Six band combinations... 10M FM, 6M, 2M, 220MHz, 440MHz, and 1.2GHz. It's the most advanced, versatile, compact, and easy-to-use mobile available.

Features Galore. The IC-900 is an operator's dream... Listen on two bands simultaneously or transmit on one band and receive on a different band when using a second speaker (**true full duplex crossband operation**), 10 memories per band, independent PL tones and

Remote Controller



Speaker

Interface Unit A is installed in a location near the driver's seat.

Interface Unit B controls

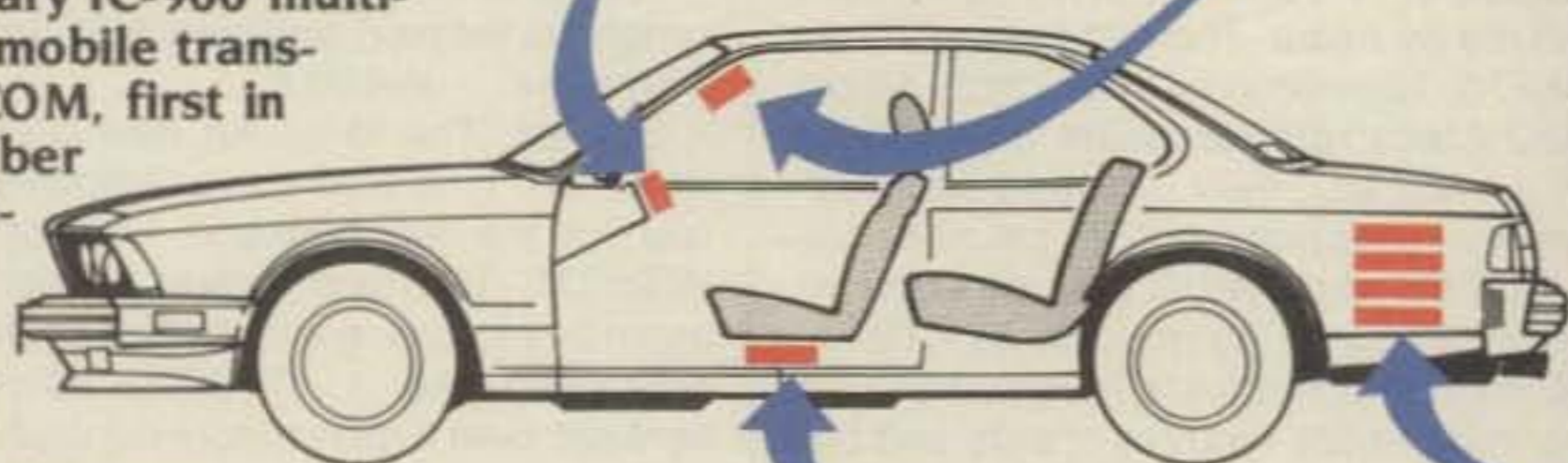
the six band units and can be installed in your car's trunk. A fiber optic cable runs from Interface A to Interface B, which transports an abundance of information

through a 3/16" cable and eliminates RF feedback.

Band Units are "stacked" onto the Interface B Unit via the supplied mounting bracket. Optional band units available are:

Band Unit	Power Output	Frequency
UX-19A	10W/1W	28-30MHz
UX-29A	25W/5W	138-174MHz Rx; 140.1-150MHz Tx
UX-29H	45W/5W	138-174MHz Rx; 140.1-150MHz Tx
UX-39A	25W/5W	216-236MHz Rx; 220-225MHz Tx
UX-49A	25W/5W	440-450MHz
UX-59A	10W/1W	50-54MHz
UX-129A	10W/1W	1240-1300MHz

CIRCLE 46 ON READER SERVICE CARD



Interface Unit A



Band Units/Interface Unit B



Remote Controller

Measuring only 2 inches high by 5.7 inches wide by 1 inch deep, the remote controller can be installed on your car's dash or sun visor with the supplied velcro. And, if you want, take the controller with you when you leave your car. The controller features a super large, highly visible LCD.

offset into each memory, memory and programmable band scan, and all subaudible tones in actual Hz readout.

The IC-900 includes an ultra compact remote controller, an Interface A unit, Interface B unit, SP-8 speaker, HM-14 up/down DTMF mic, fiber optic and controller cables.



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WORLD TOP SCORES

SINGLE OPERATOR ALL BAND

EA9AM	12,712,460	OK1RI	4,074,423
6Y4V	6,373,230	K4YT/4F	3,950,277
VP2MBA	5,294,805	9J2EZ	3,773,490
AH6GQ	5,038,000	UA9CI	3,479,216
4X7DX	4,932,744	VE3XN	3,446,839
KM1H	4,547,067	WL7E	3,227,880
VP2ML	4,428,950	K5ZD/1	3,130,900

28 MHz

LU1E	1,114,776
TI2US	441,884
LU5UL	428,576
CX2AAL	364,896
LU6EJP	218,064
CE6DAQ	211,140
CE3GWO	182,250

21 MHz

CE6EZ	5,157,546
TI1T	4,218,904
CE4FX	3,860,970
LU4LAV	3,841,740
PJ9J	3,694,884
ZS6CDJ	3,129,950
3G3Z	1,829,790

14 MHz

ZP5JCY	6,184,732
TI2CC	5,491,290
YT3AA	3,928,015
K2VV	3,546,294
CS0NH	3,351,330
OA4ZV	3,255,840
GW4BLE	3,229,446

7 MHz

H24LP	5,348,975
OH2KI/CT3	3,729,834
TE2Y	3,138,216
I5FCK	1,336,448
KM6B	1,164,800
TW0A	1,107,581
SM5AQD	868,322

3.5 MHz

CT3DL	1,196,210
EA8AFS	1,169,304
PA2TMS	892,738
DF8XC	627,792
HA1XR	534,600
HA5MY	503,992
RO5OO	432,920

1.8 MHz

OH1RY/CT3	290,140
CT1AOZ	92,480
K5UR	64,848
GB8DX	64,256
K5NA/2	46,746
OE1DH	37,714
OK3CQR	21,250

QRP/p

TR8SA	A	1,041,112	JK1JQQ	21	52,624
HA9RT	A	378,882	W5FO	14	144,425
4X6IF	A	317,148	SM5ARR	7	11,088
LZ2QV	A	268,974	OK1JJF	3.7	54,136
JH9HXF/1	28	13,026	RB5IJ	1.8	7,300

MULTI-OPERATOR SINGLE TRANSMITTER

PJ2FR	18,493,730	LZ9A	7,332,576
NP4CC	13,299,624	HG7B	7,047,900
FM0A	12,850,963	HG6N	7,012,830
IO5NPH	12,054,784	LU2E	7,018,400
TW7C	10,574,600	ZF2KT	6,848,130
VE6OU/3	7,974,737	RL8PYL	6,421,105
IO4WZT	7,517,895	5J4R	6,401,066

MULTI-OPERATOR MULTI-TRANSMITTER

ZZ5EG	38,096,250	K0RF	6,385,402
VP2EC	37,446,109	JA9YBA	4,680,600
UP7A	13,096,626	ED4UPM	4,375,623
YT2R	9,348,864	KC3EK	3,088,994
N5AU	8,240,755	WV5K	1,740,535
KW8N	7,720,371	JA7YFJ	1,392,768

U.S.A. TOP SCORES

SINGLE OPERATOR ALL BAND

KM1H	4,547,067	WS4Q/5	1,653,012
K5ZD/1	3,130,900	AI2C/4	1,197,533
NS0Z	2,852,748	KR0Y/5	1,135,750
KC8C/3	2,401,734	KE5FI	1,009,942
KY2J	1,843,728	KB0G	987,987
K6HNZ	1,839,939	KG5U	928,710
NJ2L/1	1,661,039	KF2O	899,811

28 MHz

K5MK	13,500
WB7FDQ	10,143
K2OLG	8,496
KD1U/4	4,480
N7RP/5	3,990
KU2Q	3,636
WB4VQO	3,074

21 MHz

K6SVL	397,800
KS9U	104,643
K8HVT/1	56,052
W2IQL	36,478
NJ9Q	27,136
KD0FW	12,416
WA6VNR	11,880

14 MHz

K2VV	3,546,294
K1VUT	1,988,560
W3USS	1,957,725
ND1X	1,574,034
N7TT	1,479,075
KQ9L	865,319
K1KJT	834,150

7 MHz

KM6B	1,164,800
WO5G	677,236
WC4E	581,640
KQ3V	101,640
AG9S	56,430
KR9G	29,700
KA5EJX	21,716

3.7 MHz

KW8R	357,952
NB1B	222,272
W5WMU	203,322
NI1N	95,410
KE8AZ	79,500
W6AXX/W3	18,020
K8DD	17,472

1.8 MHz

K5UR	64,848
K5NA/2	46,746
W3BGN	16,660
K7IDX	11,900
AA4MM	10,920
K5WXZ	2,024

QRP/p

N8CQA	A	57,456	W5FO	14	144,425
WA0VBW	A	47,250	W6YVK	14	18,792
KS9J/0	21	2,759	NZ5A	7	4,104

MULTI-OPERATOR SINGLE TRANSMITTER

KI6P	5,825,328	NE8T	2,511,987
N4WW	4,079,160	KJ9D	2,470,338
KI1G	4,075,086	NI2T	2,249,270
NJ1F	3,895,756	NE6I	2,042,528
NR5M	3,723,384	KI6CG	1,958,880
KM9L	2,743,155	K7LXC	1,771,478
KC7V	2,557,872	WC6H	1,622,869

MULTI-OPERATOR MULTI-TRANSMITTER

N5AU	8,240,755	KC3EK	3,088,994
KW8N	7,720,371	WV5K	1,740,535
K0RF	6,385,402	KV5F	57,148

multi/multi from new QTH... *K0RF*. Best score and qso rate ever. Neighborhood HV feed blew at 3:30 AM and again at 6:30 AM... *KC3EK*. Nothing like having to turn the antenna by hand when it's 55 feet up!!... *KV5F*. New prefix record for USA... *N5AU*. A pleasure to operate with so nice people... *ZZ5EG*. Conditions were simply awful... *4X6IF*. No good condition W to JA! I could not hear W's signal... *JE7DOT*. QRP operation is very difficult. I tried

calling so many times, but could only work 6 stations... *JH4UYB*. 4 watts was enough to enjoy this contest in spite of conditions... *JR3RWB*. QRP power plus QRP antenna minus sunspots still = QRO fun and excitement... *KA5PVB*. Frustrating on low bands with low power... *N6OJ*. Was nice seeing pix in CQ of people you're working... *NZ5A*. Heard several QRPp stations that sounded like QRO in spite of poor conditions... *W6YVK*. Limited

operating time and rotator problems held my score down, but I had a blast anyway... *WA0VBW*. Working LA5QFA on 20 meters. My first QSO with Norway and doing it QRP... *WA7TUX*. Tnx to all the stations that dug my QRP sigs out of the mud. They ought to get extra credit... *WB6JMS*. Please QSL 3G3Z via CE3ZI... *3G3Z*. First time operating in Israel - quite different from Cal... *4X/K6KLY*. I broke my old Asian record from '82 by 1 million

points. I hope to do it again next time . . . 4X7DX. It was my first single operator in SSB and it was a very nice contest . . . 4X9A.

Nice to put lots of Q's in log even with low ant, low voltage and poor condx . . . 6Y4V. I had to repair the rotor one time and the microphone 5 times . . . AZ6ETB. Did not have much time available due to work commitment as new director of Telecom . . . C21NI. Improved my score 11% and ZZ5EG was multi-multi this time, so chances are good for top score . . . CE6EZ. Being called by HS1ALP (really I was not expecting)! Congratulations for one of the best contests . . . CS0NH. Where were the US operators? . . . CT1AOZ. First time I'm doing the contest paperwork with a computer—makes contesting more fun . . . DF2RG. Terrific QRM on 80 meters, difficult to hear DX calls . . . DF8XC. Computer disk fall out made me typing the log three times . . . DK8AX. Would like to have all those funny prefixes confirmed . . . DL6RAI. It is very difficult to work with a vertical ground plane antenna . . . EA1BFZ. My first HF contest . . . EA3BTZ. I was accompanied by Radio Tirana's splatters during all the contest . . . EA3DXD. Very bad propagation and poor antennas. See you again next year . . . EA6GP. Bad conditions on 10 meter band, but I've enjoyed working the contest . . . EA7FUN. I wish to thank my XYL for her support during the contest and allowing me to operate with her callsign . . . EA9AM. For my first participation, it was quite exciting to hear so many US stations . . . F6DYK. 80 mph winds—had to crank the tower down. Winds calm after the contest . . . G3VOF. An excellent contest with great DX openings on 20m . . . GB6AR. First contest in approximately 10 years that I haven't worked one station on 28 MHz . . . GM4GPN. Didn't hear anything on 21 MHz . . . GM4WEN. First WPX for the new QTH. I hope it's a winner! . . . GW4BLE. Conditions were unfortunately very poor on 15 meters . . . H24SA. Over 1 million points or my 10,000. The most important result—a lot of fun and one new friend . . . HB9DAM. Short visit at the Swiss Embassy in Dhaka, Bangladesh . . . HB9KC/S2. Excellent contest with lots of people operating, and very good propagation . . . H18LC. Why Murphy decided to take a happy weekend with me? . . . HK3IXJ/7.

The special prefix (IL3) as I have conducted my operations from the Lido Island, near Venice City . . . I3BQC/IL3. Very good propagation Sunday with beam to nord pole, particularly with W6 & W7 . . . I6FLD. New licence + old gear + small antenna = exciting first contest experience . . . IK1IYU. Big fun, good countries, many prefixes . . . IK2DZN. Surprised for the three contacts with VK6 Australia . . . IK4GNH. Past year conditions were better on 21 MHz between EU and USA . . . IO0KHP. Is ever the beautiful contest . . . IO1ZEU. Very bad propagation to the US, but the biggest always came strong . . . IO4LEC. It's funny to participate in your contest even if I cannot compete any more! . . . IV3PRK. My location is on top of the mountain which is 810m high above the sea level . . . JA3XGF. At same time QSO's OH & VK long path and short path . . . JA4PA/1. Supply of electricity in Nigeria is very bad. I was obliged to stop operate . . . JG1FVZ/5N1. I was very happy because many stations picked me up . . . JG7HYF. It's big opening to EU on 15m, it's great . . . JL1BLW. I participated this contest for the first time . . . JN3RBV. Excellent opening into Europe this way. Enjoyed it very much. CU in CW part . . . JP1PUH. I can't heard



Carl, AI6V, seems pleased with his world second-place finish at 6Y4V.

Africa and first try . . . JR2RJI. Did not have much time for contest as we were leaving on Sunday morning . . . KC6IF. 121 QSO's non-stop within a little more than an hour on 15 meters . . . KP4CZ. Condx vy crazy! (Hi) . . . LU5UL. Not very good conditions, also heavy QRM made listening very difficult . . . OH1RY/CT3. Friday's aurora pushed the 50 MHz OX3VHF beacon over 2200 miles just two hours before the contest . . . OH1ZAA. Only 150 W's this time. The same applied to JA's. Only 5 got thru QRM/QRM. Sorry boys! . . . OH2KI/CT3. CQ tape didn't work so I shouted for 30 hrs. and used all my voice. Monday I could hardly speak . . . OH6EI. Thank you for nice contest. I am quite satisfied for my first WPX contest . . . OH6NEQ. I decided to work 160m but after 3 QSO's my rig broke down . . . OH6YF. Thanks for the nice contest. I am looking for better conds on 10 mtrs. See you next year! . . . OK3LZ.

Thanks for the test! See you again next year . . . OZ6PI. The storm during the contest was my biggest enemy . . . PA2JJB/A. Meeting old friends again . . . PA2TMS. Very nice contest. I will try to break some records in the future . . . T12CC. Had a hard time working Novices, but it was lots of fun . . . T12US. How to lose the power of speech for 2 days after . . . TR8LD. Very nice contest. Many new prefix . . . UA9MA. Excellent openings to US/VE, but almost no EU short-skip. A lot of multipliers lost . . . UB5WE. Poor conditions first day . . . UP2OU. 1st WPX. Lots of fun! . . . VE1BDK. Lots of noise on 1.8 MHz, but still lots of fun . . . VE1BNN. Heavy QRM and lack of participation by many stations Stateside and DX made for a long weekend . . . VE1GB. Biggest thrill would be when I have a linear . . . VE3CXN. Worked ST2TK and TL8HZ, but they weren't in the contest . . . VE3NBE. My



4X6DX with his special call 4X7DX set a new Asian AB record with 4.9M points.

greatest thrill was working ZK3PM, which was a new country for me . . . VE3NXQ. 9 hours—hard work! . . . VE3OMU. Each QSO cost \$1.25 . . . trouble with TS930 so bought the 440 . . . VE3XN. I was QRV during my staying in VK. I couldn't have any more QSO because of my poor ant . . . VK2FFI/4. Conditions were not all that good in VK land for the contest . . . VK2PWS. Stateside doesn't seem to listen to VK as hear loud sigs but not able to break . . . VK3SM. Sure miss VE3BMV's great competition . . . VO1CV. 23 more prefixes and 59 more QSOs than last year for 15,117 less points but no less fun . . . VP2MBA. I slept both nights and went out to dinner with my wife Sat. Probably the first contest VP2ML loses . . . VP2ML. I did not hear any BY's on SSB . . . WL7E. Lost my temper in a EU pileup trying to put them in a row. Sorry guys. Had a late dinner . . . YB0DPZ. Very hard to work with low power but enjoyable . . . YC0EMJ. Oh my God, television interference on second day of the contest . . . YC4GAP. First CQ WW WPX contest for me. 73! . . . YO7AOZ. Very good contest—very poor propagation . . . YT3AA. Had 3 good openings to stateside and 2 to JA. Here's hoping for cycle 22! . . . ZL1ANJ. First big contest. Really enjoyed it. Thank goodness for JA land . . . ZL1BWM. Conditions dropped on Sunday . . . ZL1IM. Happy to know that I'm more than million points over world record . . . ZP5JCY. 15 meter band went very well . . . ZS4AAR. Superb band opening on 21 MHz! . . . ZV2BW.

Station Operators Multi-Operator Single Transmitter

4U1TU: DL1SBR, DL1SBF, DL2DN, DG7SAX, DL2SAX, DK2ZO, DL4SBF. **4U1UN:** HB9RS, N2ATT, N2GKL, NH6GB, JS1DLC, JG3QZN, JH4NMT. **C30BBE:** OH3TY, OH4UI, OH6XY, C31LK, C31ON, Anu. **DL0WPX:** DK1DU, DK2XX, DL2ZBN, DL3ZBA, DL4ZBK, DL5ZBI, SWL's Achim & Dieter. **DL0OV:** DJ7KB & DL2KCD. **DK0IN:** Club group. **EA3EBN & EA3EZO, EA3FBJ, ED4GCR:** EA4XA, EA4UA, EA4BCR, EA4BIN. **ED3MM:** EA3FUM, EA3FJM, EA3CAC, EA3FWE. **ED3QD:** EA3BOW, EA3BOX, EA3CVA, EA3DDU, EA3DEQ, EA3EIO. **EA8RCT:** EA8's ACH, AGF, AKN, AKQ, ARA, BJ, RA, RI, VV, ZS. **TW7C:** F9IE, F6FYA, F6CTT, F6GLH. **FM0A:** FM5CD, FM5WD, F6GIF, F6GWV, F6HLC, F6HMQ. **F08SSJ:** F05JP, F00WLV, F08SSJ. **GB8AU:** G4WMH, G4JYE, G4NCJ, G0AAF, G4DSK, G6VWA, G6HXS, G1MLK, G1MOP, G8ZJP, G4IWA, G4SMA, G1XKJ, G4YZO. **G4CVK:** G4IEB, G0AGH, G4YBT, G8ZMP. **GB8PX:** GM4NNC, GM4TNJ, GM0EAS, GM6HWZ, GM6YQZ, GM1EOA, GM1OXQ. **HABKAX:** Janos & Istvan. **HG6N:** HA6ND, HA6ON, HA6OQ, HA6YG, HA6NQ, HA6NF. **HG5A:** HA5LN, HA5WE, HA5UA, HA5GF, HA7RY, HA7SU, HA5MK, HA5ML, HA5OM, HA5FM. **HG6V:** Laszlo, Jozsef, Zoltan, Peter, Laszlo, Jeno. **HA3KNA:** HA3OV, HA3OU, HA3NS, HA3NU. **HG9R:** HA9OA, HA9RP, HA9RX, HA9PP, HA9RU, HA9SU. **HG7B:** HA5WA, HA0DU, HA5DW, HA7UG, HA8FM, HA8IE. **HA4KYN:** HA4XA, HA4YF, HA4XH, HA4ZC, HA4XT, Jozsef. **HA5KTZ:** HA5ATT, HA5ALI, HA5AND. **HA2KMR:** C. Kiss, J. Kiss, Pell, Ivan, Horvath, Kunkli. **HA5KDX:** HA5OM, HA5YLN, HA5FM, Szabo. **HG1S:** Gyula, Lazslo, Pol, Zoltan, Tibor, Karoly. **HB9CXZ & HB9CIP, HB9BLQ, HB9SFD, HB9STL, HB9AUS, HB9AGC, HE9AUM. HB4FE:** HB9APJ, HB9BEY, HB9CHY, HB9MPU, HB9PJM. **5J4R:** HK4FZ & HK4DUM. **HL90B & HL9YG, HL9RAT. HS0A:** HS1AOR, HS1AMH, HS1ALP, ON5OS. **IK4BWC:** I4VOS, IW4BLG, IW4APP, I4FGR, IW4AJP. **IO4WZT:** I4's WZT, ZHU, JHY, YSS, OUT, UFH, KDJ, USC, MES, IK4CFV, IK4ALV. **IK2G0Z & IK2ALV, IK2FIL, IK2GZE. IO5NPH:** I5NPH, I5SDG, I5MPN, IK5BAF, IK5BCU, I8MPO. **I3EKK & I3GJZ, I3LDS, I3PAT, I3VZF, IK3FHO, IK3FHP, IK3DNX. IM0WON:** IS0WON, IS0BWR, IS0CPU, IS0AEQ, IS0J00, IS0QDU, IS0XDB. **JA1YWX:** JJ1HJR, JO1BMV, JI2GUT, JH7PKU, JA6-9330. **JA6YCU:** JE6UWK, JE6UWU, JF6BRL, JG1IZL, JF6MND, JF4QPU. **JR7YCM/7:** JH7NPF, JR7WFC, JE7WQR. **JA3YKC:** JG3HLV, HG3MRT, JG3WDN, JI3ERV, JH4RHF, JR4PMX, JR5WLA. **JABZAV:** JA0VHI, JA0RUG, JA0DSV, JR00XE, Manabu. **JA9YAV:** JH9AGV, JH9EBH, JH9ETC.



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CIRCLE 93 ON READER SERVICE CARD



Guest ops at United Nations station 4U1UN were (L-R) JG3QZN, JS1DLC, JH4NMT, N2GKL, N2ATT, NH6GB.

JH9HWY, JT1KAI: Chulunbat, Cuhe. KL7CQ & AL7IR, NL7JT AL7FQ & AL7IF, NL7HI, WB2IKA/KL7. NP4CC & KP4BZ, WP4K, NP4Z. LA1B: LA1QDA, LA5EBA, LA5RBA. LU1VZ: LU1VK, LU9VAB, LU3DXL, LU1VJR, LU7VCA, LU1VPI, LU1VNJ, LU1. JAY6D: LU1DUU, LU1NCO, LU3EZA, LU7DEE, LU7EMZ, LU7EMP, LU8EWD. LU2E: LU2DKT, LU6FEC, LU8DPM, LU8FEU, LU9FFA. LX58RL: LX1RQ & LX1EA. LZ9A: LZ2CC, LZ2PO, LZ2HE, LZ2D, LZ2PZ. LZ1KZM: LZ1GD & LZ1UF. LZ1KVF: Krasimir, Stanislav, Svetozar. OH7AI: OH7BY, OH7EU, OH7KR, OH7SQ. OH9AR: Club Group. ON6AH & ON400, ON7PC, ON6QR, ON6MH. OH6AC: OH6WZ & OH6CS. OH3AA/OH8: OH3BVE, OH3RF, OH3TQ. OK2KMR: CLUB GROUP. OK2KVI: CLUB GROUP. OK1KUZ: OK1FLT & OK1DSS. OK8AFM: IK2DUU, I2UIY, OK2DB. OK1KCP: CLUB GROUP. OK5SSM: CLUB GROUP. OK3KRN: OK3CAY & OK3-27546. OK3KYH: CLUB GROUP. OK1KAK: CLUB GROUP. OK1KLV: CLUB GROUP. OK3KFF: OK3CEI, OK3CWZ, OK3CDV, OK3CSW, OL8CPS, OK3-27537. OZ5DD: OZ6KH, OZ3HI, OZ1BJT, OZ1KWG, OZ1FMB. OZ4HOB: OZ1ATQ, OZ6UT, OZ4NA, OZ4HAM: OZ8IE, OZ1DGP, OZ1BJF. PI4TTC: PA0GSN, PA2JMK, PA3's CKY, DLO, DDX, DZP, EEX, EFL, EPA, P's LSJ & LTC, PD00PC, PD00XM. PI5EHV: PA3ENM, PA3EQV, PE1K00, ON8KD, PA0SHY, Diego, Erik-Jan, John. PA0KHS & PA0ERA, PA0NZH, PA3ADJ, PA3AIR, PA3AWN, PA3ENJ,

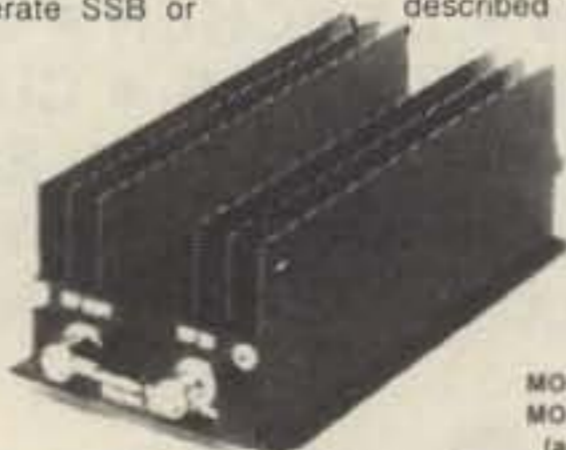
PE1LBX, PA3DQW. PA3CEF & PA0ZH, PA3DWD. PJ2FR & N6KT. PY3BD & PY2FR, PY2FZ, PY3FG, PY5DA. SP9PRO: CLUB GROUP. SP5PBE: SP5ELA, SP5FKW, SP5JTF, SP5LCT. UZ0QWM: UA0-098-167, UA0-098-181, UA0-098-168, UA0-098-174, UA00EZ. UZ0QWA: UA0QBB, UA0QAS, UA0QDL, UA0-098-113. UZ0QWT: Sergej, Vitali, Vladimir. UZ2FWA: UA2FF, UA2FJ, UA2FM, UA2FX, UA2FZ, UA2FGA, RA2FA. UZ3QYD: Glushchenko, Rwmlyantsev, Grachyov. UZ4AWB: UA4-156-986, RA4AK, UA4APS, UA4-156-875. UZ3DXW: UA3DDB, UA3DFO, UA3-142-1771, UA3-142-1926. UZ6LWZ: UA6-150-693, UA6-150-1350, UA6-150-692, UA6-150-140. UZ4PZP: Titkov, Volkov, Djamin, Mangytov, Abylhanov. UZ4LWZ: UA4LCQ, UA4LBO, RA4LAG. UZ3QYA: Gene, Alex, Sergey. UZ4AXM: Lobachev, Anufriev, Mishin. UZ6XWC: UA6XT, UA6-087-314, UA6-087-315, UA6-087-316. UZ4CXL: Re-petun, Orlov, Gladkov. UZ10WZ: Minaev, Danilov, Kopylov. UZ1TWC: UA1-144-458, UA1-144-327, UA1-144-47. UZ9XWH: UA9XBV, UA9XBQ, UA9-090-964, UA9-090-968. UZ9FWR: Igor, Alex, Serge. UZ9JWF: RA9JB, UA9JFR, UA9JFD. UZ9SWY: UA9TS, UA9SHO, RA9SM, UA9SGW, RA9SVT. UZ9CWW: UA9CIU, UA9CJL, UA9CDT, UA9CTI, UA9CPB. UZ9XXM: Muravjew, Bogdanov, Pzocopendo. UZ9AWZ: UA9AKI, UW9AG, UM8NR,

UA9-084-422. UZ9MWF: UA9MEG, UA9MRC, RA9MA, UA9MDP, UA9MRR, UA9MRV, UA914674. UZ9X UA9-090-601, UA9-090-623, UA9-090-622. UZ9CYP: UA9CUA, UA9-154-2105, UA9-154-2103. UZ9SWR: Porubaimekh, Timirbulatov, Umanskiy, Blinov, Lisovoj. UB4CWW: RB5CB, UB5-080-70, UT5-186-2. UB4IZA: Larry, Alec, Serge. UB4MZL: UB5MTV, UB5-059-12, UB5-059-11. UB4VWA: Ovcharenko, Bessarab. UB4QWW: RB5QW, UB4QD, UB5-064866. UB4TWL: UB5TBN, UB5TBS, UB5-079-2481. UT4UXW: UT4UZ, UT4UX, UY5JW, UB5CGN. UC1AWZ: UC2-188-148, UC2-188-45, UC2-188-172. UC1AWE: Rodionov, Ivlev, Kosarev. UG7GWO: Karapetyan, Puluzyan, Albert. UI9BWF: UI8-053-2001, RI8BQ, UI8BGG. UL8LYA: UL7LO, UL7LR, UL7LW, UL7LDK, UL7LEG, UL7LER, UL7LEZ, UL7LEN. RL8PYL: UL7PAE, UL7PCZ, RL8PA, RL8PY, UB5JRM, RL7PKO, UL7-023-500. UL8CWW: Victor, Sergej, Alex. UL8LWZ: RL7LAH, UL7-026-177, UL7LGA. UM9MWE: Alex Lavrenchenko, Minin, Fynko, Yuri Lavrenchenko. UO4OWR: Serge, Oleg, Igor. UP1BWW: UP2PX, UP2BKW, UP2BIJ, UP2BMW, UC2WAO. UP1BZA: UP2BLW, UP2OX, UP2BLR, Andy. UP1BZQ: Club Station. UP1BZO: UC2IAP, UP2BKP, UP2BMT, UP2BMO, UP2BNC, UP2BQN, UP2-038-1751, UP2-038-1787. UR1RWX: UR2RRR, UR2RJ, UR2RDJ, UR2RHF, UR2RNA, UR2-083-165, UR2-083-1005. UR1RYO: UR2RPZ, UR2RDM, UR2-093-1709. UR1RWW: UR2RKM, UR2RMZ, UR2-083-1016. UR1RYA: Ots, Sadrak. KJ9D & KK9V, WA8YVR, WB9POH. NQ9M & AG9E, N9BNJ, KM9L & WB9JKI, K9ZO, KA9TNZ, KG9Z, Max. KZ8E/8 & KA3NTX, WD8LCD, N8HWV, NT8H. NE8T & N8CXX, N8BTU, K8JM, KA8MNV. NQ8V & KB8IZ, KE8CF, N8DPD, W8CY. K7LXC & K7HBN, K7SS. KC7V & KY7M, NK7U. W7MR & N7IDG, N7IEM. KE7V & KA2KRA/7. WV6N & W6UQF. WC6H & W6REC. KI6P: K3EST, N6RO, WA6VEF. KI6CG & WA6AZP, NU6S. NE6I & W8AKS, KB6ATI, AB6Z, N6GTS, WD6BQI, WA6R, W9NQ, K6GXO, Ski. N6CCL & N6IYI. AG6D & K6XO, N1EE, K6WJ. WW5H & AB5G, N5JWA. NR5M: KN5H, K5GN, W9AGH, KE5IV, NM5M, NT5D, WB5N. N5JXF & N5KDA, N5JWO, N5AVN, WA5CAM. NV4G & NU4B. N4WW & NX4N, K0LUZ. KS3F & NE3F. WB3JRU & KC3AJ. NI2T & KI2P, NK2H, NE2W, N6IN, KD2PC, N2CIC, N2GSS, N2GTV, NN2K, NS2J, KA2NRP. KA2RGI & N2GXY, KB2CLI, KI1G & K1NG, KZ1A. KF1C: K1ZZJ, KB1KA, KG1K, KA1UE, N1EHX, KC1BJ. NJ1F & K1RQ, KB1W, WA1ZAM. AA0A & W0HBH, W0FPY, NI0G, KA0DQI, KB0KK, KC0LY, N0IS. NT0P & K0UAA, KM0E, KM0L, N0CDH, NV0U, NW0F, WA0NXD, W00OIZ, KM0L's XYL. VE7UBC: VE2BWK, VE7DLM, JM1CAX, VE7MT, VE7BCU, VE7CMK. VE5FX & VE5GF, VE5RC, VE5GHC, VE5ELJ, Bernie, Leah, David. VA3T: VE1BLG, VE1BHA, VE3SMA, VE3HTT, VE3AER, VE3LCC, VE3NGT, VE3CKR. VE6OU/3 & VE3BVD. VE3UOW: VE3NPB, VE3OIL, VE3TBC. VE1CIT & VE1BIG, VE1BII, VE1UA, VE1BUN, VE1AQR, VE1DX, VE1BZX. 4C2C: XE2GDD & XE2PQ. Y32ZK: Y32BK, Y32YK. Y57ZA & Y31PA. Y39ZF: Y39RF, Y39TF, Y49RF. Y38I: Y21JI, Y23WI, Y24RK, Y26DI, Y44UI, Y44XI. Y41ZA: Y36SG, Y36RG. Y06KBM: Y06CRP & Y06DDF. YS0YS: YS1RRD, YS1MAE, YS1FAF, YS4V0, YS1AG, YS1GMV, HC2DZ/YS1. YU3MM & YU3AI, YU3EO. 4N2M: YU2WF, YU2WM, YU2RO, YU2CG. YT3T: YU3BQ, YU3HR, YU3IW, YU3EJ, YT3EW. YT2B: YU2NK, YU2VR, YU2RS805, YU2RS801. ZF2KT: N4KE, NU4Y, WA4DRU, WA4ECA, NX4Y, WT4A, KB4SZS. ZS3WPX: ZS6BRZ, ZS3N, ZS3IL, ZS3HL.

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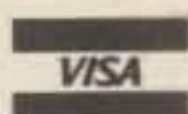
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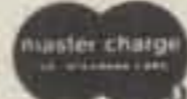


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CONTINENTAL LEADERS

ASIA			AFRICA		
1.8	UA9AKO	6,944	1.8	OH1RY/CT3	290,140
3.5	RF6FHA	54,300	3.5	CT3DL	1,196,210
7	H24LP	5,348,975	7	OH2KI/CT3	3,729,834
14	UG6LQ	2,236,562	14	EA9NN	144,144
21	H24SA	1,051,230	21	ZS6CDJ	3,129,950
28	JO1NZT	72,240	28	ZS6P	61,488
AB	4X7DX	4,932,744	AB	EA9AM	12,712,460

NORTH AMERICA			SOUTH AMERICA		
1.8	K5UR	64,848	1.8	HC1HC	2
3.5	KN8R	357,952	3.5	PY2DP	25,872
7	TE2Y	3,138,216	7	HK1LDG	504,888
14	TI2CC	5,491,290	14	ZP5JCY	6,184,732
21	TI1T	4,218,904	21	CE6EZ	5,157,546
28	TI2US	441,884	28	LU1E	1,114,776
AB	6Y4V	6,373,230	AB	CX9CO	2,485,798

EUROPE			OCEANIA		
1.8	CT1AOZ	92,480	1.8	No Entrant	
3.5	PA2TMS	892,738	3.5	No Entrant	
7	I5FCK	1,336,448	7	VK3IO	218,466
14	YT3AA	3,928,015	14	YB0DPZ	1,424,640
21	IO4LEC	294,768	21	YC2CTW	1,577,583
28	EA6VQ	11,312	28	ZL1BWN	153,328
AB	OK1RI	4,074,423	AB	AH6GQ	5,038,000

MULTI-SINGLE			MULTI-MULTI		
AS	RL8PYL	6,421,105	AS	JA9YBA	4,680,600
AF	ZS3WPX	5,412,095	AF	No Entrant	
NA	NP4CC	13,299,624	NA	VP2EC	37,446,109
SA	PJ2FR	18,493,730	SA	ZZ5EG	38,096,250
EU	IO5NPH	12,054,784	EU	UP7A	13,096,626
OC	FO0SSJ	3,779,545	OC	KH6XX	21,564,490

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

QRP/p SECTION WORLDWIDE

TR8SA	A	1,041,112	978	362
HA9RT	A	378,882	650	291
4X6IF	A	317,148	462	247
LZ2QV	A	268,974	407	306
UA9WV	A	135,493	270	137
YU1LM	A	108,040	296	185
FD1BEG	A	92,184	261	167
RW6AC	A	62,060	206	145
JA2JSF	A	61,978	202	133
ON8WN	A	57,961	185	149
N8CQA	A	57,456	196	144
EA6SK	A	56,471	201	149
OK3TEI	A	54,136	201	134
W4BVBW	A	47,250	181	135
WB6JMS	A	42,957	176	129
OH5NHI	A	40,356	191	114
N60J	A	37,113	171	139
JH8DEH	A	30,943	128	97
VE3NVP	A	28,551	102	93
Y05BLA	A	23,959	129	97
PA8IA	A	18,400	105	80
Y04DEO	A	15,504	98	76
WA7TUX	A	9,088	87	71
Y25MO	A	6,254	61	53
HK7IMB	A	6,174	46	42
OH3GD	A	5,376	57	48
UA3DPX	A	4,712	48	38
JH9HXF/1	28	13,026	106	78
JR3RWB	A	11,448	105	72
EA4CFN	A	1,197	24	19
EA7DZL	A	396	12	11
JK1JQQ	21	52,624	180	143
UA8SG	21	40,777	241	121
IK6ATS	21	40,530	156	105
LZ2EW	21	22,099	106	77
JE8FOU	A	22,092	124	84
JR3EZH	A	17,238	107	78
HK3MAE/7	21	15,900	82	75
KS9J/B	21	2,759	35	31
JE7DOT	A	1,656	32	23
W5FO	14	144,425	353	265
UA900	14	99,330	241	154

GM4ELV	14	59,330	282	170
UB5FDM	14	48,735	235	135
EA1CJJ	14	46,599	233	147
RB5GD	A	33,695	180	115
W6YVK	14	18,792	134	108
PA8NRD	14	5,712	79	56
EA4DNR	A	4,368	76	52
KA5PVB	A	1,800	52	45
JR7JLU	14	1,475	27	25
SM5ARR	7	11,088	80	63
UY5VA	7	5,440	55	40
NZ5A	7	4,104	62	57
UC2WBP	7	4,080	41	40
OK1JFF	3.7	54,136	218	134
Y03FGG	3.7	31,616	147	104
SP6LUV	3.7	25,542	140	99
Y22AN	3.7	11,040	95	69
Y06LA	A	10,492	92	61
SP9EOG	A	10,112	85	64
Y25KA	A	5,618	61	53
Y24SB	A	3,698	51	43
SP5NHV	A	1,736	32	28
JH4UYB	3.7	120	6	6
Y05AVN/3	A	112	8	8
RB5IJ	1.8	7,300	61	50
UA9MS	1.8	1,024	19	16

SINGLE OPERATOR NORTH AMERICA

UNITED STATES

KM1H	A	4,547,067	2427	739
			(Op. KQ2M)	
K5ZD/1	A	3,130,900	1707	655
NJ2L/1	A	1,661,039	1548	571
K1CLN	A	199,410	335	230
KZ1K	A	180,750	419	250
			(Op. K1PLX)	
W1YU	A	46,170	158	135
			(Op. KA3LUD)	
KZ1D	A	34,510	145	119
AA2Z/1	A	3,724	42	38
K8HVT/1	21	56,052	217	162
K1VUT	14	1,988,560	1455	536
ND1X	14	1,574,034	1357	462
K1KJT	A	834,150	900	402
KD2EU/1	A	159,930	338	205
KU1X	A	101,728	252	176
KC1BS	A	57,456	194	144
NB1B	3.7	222,272	554	302
NI1N	A	95,410	349	203

KY2J	A	1,843,728	1415	568
KF2O	A	899,811	820	447
KS2M	A	363,248	474	311
KD2SX	A	143,868	295	228
W2PHW	A	117,211	262	199
KB2SE	A	82,482	214	177
W2FUI	A	77,400	199	150
KT2D	A	72,760	220	170
WA2CWX	A	35,964	138	111
NA2Q	A	9,476	123	116
WB2OVU	A	1,890	29	27
K20LG	28	8,496	86	59
KU2Q	28	3,636	44	36
KE2N	A	1,113	24	21
W2IQL	21	36,478	150	122
K2VV	14	3,546,294	2062	687
K2PS	A	75,525	205	159
K5NA/2	1.8	46,746	386	147
KC8C/3	A	2,401,734	1568	613
W3ARK	A	253,275	397	275
K3FNW	A	79,424	186	136
W3FOE	A	31,800	114	100
KA3AVB	A	5,172	137	97
WA3VPL	21	1,620	29	27
W3USS	14	1,957,725	1605	565
			(Op. K3ZJ)	
W3UM	14	432,000	530	320
N3EMD	A	120,176	250	203
W3FGS	A	60,800	177	152
K3ZPG	A	27,160	100	97
KQ3V	7	101,640	332	210
W6AXX	A			
/W3	3.7	18,020	155	106
W3BGN	1.8	16,660	131	85
A12C/4	A	1,197,533	1012	487
AA4MN	A	308,700	431	294
W60KX/4	A	240,846	349	274
KB4I	A	201,940	454	270
			(Op. WD4RC0)	
KF4CI	A	149,035	287	205
W4WJJ	A	126,801	277	193
W4WKQ	A	109,682	254	173
K4GKV	A	106,176	228	168
WB4FOT	A	103,212	238	188
W4UYC	A	100,513	225	173
KE9A/4	A	82,867	221	173
WK4F	A	75,198	176	151
N4MM	A	42,120	140	117
N4UH	A	37,230	103	102
KJ4TI	A	34,715	153	131
K4OD	A	34,338	119	97

W4KMS	A	33,264	134	112
KO4J	A	22,900	110	100
WA4SSB	A	9,408	84	84
KD1U/4	28	4,480	51	32
WB4VQD	A	3,074	39	29
N4DGN	21	3,589	47	37
W4ZTW	14	65,469	193	139
HK3GZB	A			
/W4	A	25,956	327	103
K4PI	A	25,908	110	102
N4EUK	A	6,882	65	62
WC4E	7	581,640	636	370
			(Op. K4XS)	
AA4MM	1.8	10,920	172	84
WS4Q/5	A	1,653,012	1711	629
KR8Y/5	A	1,135,750	1019	550
KE5FI	A	1,009,942	1234	554
K6SU	A	928,710	1058	510
KA5W	A	498,126	644	366
WB5SSD	A	452,144	766	367
WQ5C	A	386,254	603	362
N5UA	A	176,137	316	221
W5LMG	A	112,112	278	196
K5DB	A	107,160	285	228
W5IYX	A	68,510	226	155
KF5UN	A	61,408	186	152
W5EIJ	A	23,326	134	109
W5ASP	A	16,530	102	58
KE5LO	A	8,976	78	66
W5OB	A	6,042	55	53
K5MK	28	13,500	87	60
N7RP/5	A	3,990	53	35
WF5E	14	377,388	752	395
NX5H	A	85,075	257	205
W05G	7	677,236	668	361
			(Op. K5GA)	
KA5EJX	A	21,716	101	89
W5WUM	3.7	203,322	591	309
K5UR	1.8	64,848	490	193
K5WXZ	A	2,024	56	46
K6HNZ	A	1,839,939	1366	431
WR6R	A	400,860	548	262
K6EID	A	392,150	619	341
KS6H	A	258,024	530	312
K6JG	A	189,054	286	243
WW60	A	172,592	400	268
N6JV	A	97,812	266	198
W6GUFY	A	65,570	208	158
WE6G	A	56,615	229	169
WZ6Z	A	38,592	219	192
KV6H	A	30,282	199	147

N6JM	A	29,064	124	84
N6NF	A	14,985	105	81
AJ6V	A	4,032	45	42
K6XO	A	2,520	41	36
AA6EE	A	720	21	18
KA6ING	28	117	23	13
K6SVL	21	397,800	752	325
WA6VNR	A	11,880	88	72
WX6M	14	769,860	920	468
NM6L	A	54,495	201	173
W6CN	A	30,381	138	123
KS6Q	A	1,972	40	34
KM6B	7	1,164,800	939	320
K6SIK	A	2,646	25	21
KS7T	A	429,183	777	387
KA7EQS	A	157,986	407	262
W7GUR	A	99,528	253	174
KC7UP	A	75,050	225	158
KX7J	A	69,400		

NI8L	**	33,864	163	136	HP2BPI	**	36,951	155	113	JF3CCN	**	179,861	339	197	OGASAWARA	OK3CTX	**	93,939	291	173						
NU8V	**	29,884	132	124	HP8RHT	14	227,032	427	236	JR7OMD	**	173,850	317	183	JA2NQG/ JD1	A	15,477	112	67	OK1EP	**	80,136	227	168		
W8NDE	**	19,760	104	95	PUERTO RICO					JH3DEJ	**	119,964	269	156						OK1AZI	**	79,800	254	140		
KN8R	3.7	357,952	854	329						JA8SW	**	103,648	233	164	U.S.S.R.					OK2OX	**	24,096	110	96		
KE8AZ	**	79,500	467	250						JH8NOS	**	98,394	260	138	ARMENIA					OK2PCF	**	23,085	127	95		
K8DD	**	17,472	171	112						JA1ALX	**	67,284	211	126						OK2PBG	**	20,111	116	91		
KC9EW	A	161,898	311	223	AFRICA					JJ2LCE	**	55,200	193	120						OK3EO	**	14,308	78	73		
NASJ	A	155,589	313	239	CANARY ISLANDS					JH2BCN	**	42,951	161	103	UG6LQ	14	2,236,562	1662	478	OK1MSP	**	6,992	51	46		
K9JS	**	142,911	286	201						JH6TYD	**	42,539	182	103						OK3KV	**	6,270	83	38		
NE9I	**	127,078	258	203						JA1AAT	**	39,160	120	110						OK2BSQ	**	4,995	52	45		
K9BG	**	105,820	230	185	EA8AFS	3.7	1,169,304	593	332	JP1SRG	**	27,540	129	85						OK1OPT	**	189	9	9		
NG9L	**	37,120	144	116						JH8SPE	**	21,328	125	86	ASIATIC					OK3LZ	21	255,088	451	214		
W9KHH	**	6,489	65	63						JA8SWT	**	16,200	106	60	UA9CI	A	3,479,216	2011	559	OK2PAY	14	352,758	426	220		
N9EQA	**	2,881	50	43						JA1IT	**	15,040	76	64	RW9AW	A	435,940	540	284	OK2PZW	14	152,250	354	210		
KS9U	21	104,643	354	231	EA9AM	A	12,712,460	4061	838	JJ6HTJ	**	8,364	79	51	UW9AG	**	242,310	362	205	OK1JCH	**	83,855	279	155		
NJ9Q	**	27,136	131	106						JR2RJI	**	4,066	45	38	UA9XAB	**	225,910	360	205	OK1PFJ	**	76,152	236	152		
KQ9L	14	865,319	995	481	EC9JM	21	41,919	167	89	JJ2MBQ	**	2,940	46	35	UZ9XWV	**	102,942	190	129	OK3YCZ	**	47,970	207	117		
K9BOL	**	66,780	187	159	EA9NN	14	144,144	267	182	JA1AAV	**	2,275	28	25						OK1JJB	**	42,074	192	109		
W9REC	**	2,405	40	37						JN3RBV	**	1,656	33	24	UA9CE	**	54,432	124	108	OK2BQL	**	25,662	125	91		
AG9S	7	56,430	283	165	DJIBOUTI					JJ6HCM	**	1,365	25	21	UA9SG	**	30,875	140	95	OK2PKS	**	7,152	64	48		
KR9G	**	29,700	143	110	J28EO	A	194,220	417	249	JO1MCC	**	1,239	25	21	UA9XDG	**	126	7	6	OK3CGT	**	6,272	63	56		
NS8Z	A	2,852,748	1630	727						JA1BNW	**	1,140	22	20	UA9YX	21	419,730	901	255	OK1JST	7	26,410	126	95		
KB8G	A	987,987	1054	517	GABON					JJ2SHW	**	960	20	16	RA9CVC	**	41,772	179	118	OK2HI	3.7	150,776	396	188		
KV8I	A	449,236	913	437						JR4ISK	**	512	17	16	UW9CVR	**	2,244	34	33	OK2BHJ	3.7	54,626	192	143		
KE8DV	**	191,590	719	322						JO1NZT	28	72,240	324	129	UA9MA	14	1,885,632	1448	488	OK1DFP	**	49,104	191	132		
NS8B	**	189,504	372	252	LESOTHO					JJ2ZIVY	28	38,088	224	92	UA9YI	14	1,858,808	1342	532	OK1TD	**	27,324	132	99		
K8MVL	**	131,835	260	187						JE1VGE	**	29,149	244	103	UW9YM	**	189,952	357	224	OK1MIZ	**	14,040	96	78		
KK8L	**	113,490	322	234	7P8DP	21	1,499,520	1153	440	JH5GHM	**	27,918	191	94	UA9XR	**	166,060	333	190	OK1MHI	**	10,660	83	65		
WB8ISW	**	85,410	268	195						JR8BQT	**	7,684	99	68	UZ9XWA	**	21,663	95	83	OK1DWU	**	6,018	63	51		
KE8KX	**	61,659	171	153	MADEIRA ISLANDS					JJ3AUD	**	7,257	83	59	UA9XF	**	816	17	16	OK3CQR	1.8	21,250	124	85		
WA8DCB	**	23,424	121	96						JH1UUT	**	4,116	61	49	UA9AKO	1.8	6,944	50	31	OK1KPU	1.8	13,728	93	66		
KA8WMZ	**	21,867	129	111	CS9CU	A	436,050	620	225	JA20DS	**	3,534	48	38	UA8ZDD	A	412,080	622	303							
NW8F	**	7,504	77	67						JR7CDL	**	3,053	56	43	UW8CM	**	23,560	176	76	DENMARK						
N8HPU	**	7,296	83	76	CT3DJ	A	52,122	153	119	JA1FO	**	280	11	10	UW8CW	**	1,242	20	18	OZ5EV	A	243,380	358	283		
WB8GFV	28	132	8	6	CT3DZ	28	5,106	53	37	JF2KUU	**	200	10	8	UW8MM	21	186,992	612	208	OZ1DPW	A	78,884	187	148		
K88FW	21	12,416	79	64	CT9BM	21	972,780	899	372	JR1OYL	**	108	7	6	UA8ZZ	**	15,372	247	61	OZ1LTB	**	51,660	198	123		
K9MWM	14	698,473	927	419	OH2KI	7	3,729,834	1359	459	JR10XG	21	589,616	811	344	UW8CF	14	266,364	486	252	OZ1HVE	**	34,969	151	121		
/B	14	292,462	473	349	CS3RTP	7	635,030	421	253	JR7QKR	21	247,665	472	237	UA8FDX	7	250,002	699	153	OZ5PZ	**	27,573	172	101		
KB8U	14	75,952	247	188						JR4IVR	21	238,596	452	236	UA8SR	**	36,288	127	84	OZ4VW	**	3,045	38	35		
N7DF/B	**	6,439	50	47	CT3DL	3.7	1,196,210	668	305	JP1PUH	**	215,298	415	243	UA8FF	3.5	5,684	38	29	OZ1AXG	14	686,134	806	349		
W8PPF	**	6,439	50	47	OH1RY	1.8	290,140	305	163	JO1TMU	**	169,608	369	222						OZ6PI	7	74,460	235	146		
					/CT3	1.8	290,140	305	163	JH1MOC	**	166,536	360	215	AZERBAIJAN					OZ8T	**	13,192	88	68		
										JO1XOK	**	160,446	360	221	UD6DR	A	68,997	141	109	OZ1APA	**	924	23	21		
					NAMIBIA					JP1NWZ	**	99,007	253	181	RD6DJ	21	5,628	51	42	OZ4MD	3.7	276,048	521	243		
					ZS3BI	A	425,272	611	236	JM3GEJ	**	95,790	306	155	UD6OFF	3.7	5,100	40	30	ENGLAND						
										JE1DXC	**	79,950	231	150						G3VOF	21	42,228	147	102		
					NIGERIA					JA1KTR	**	72,912	215	147	GEORGIA					GB6AR	14	401,580	589	291		
					JG1FVZ	A	347,720	464	264	JE1YUR	**	68,730	235	145	UF6FAL	A	94,620	209	114	GB8DX	1.8	64,256	204	128		
					/5NB	A	347,720	464	264	JA3YDS	**	64,437	238	141	RF6FHA	3.7	54,300	146	75	G3XWZ	**	3,182	46	37		
					SIERRA LEONE					JE7SLC	**	50,520	200	120						FINLAND						
					DJ6QT	A	2,587,739	1590	539	JH8XUP	**	32,883	159	97	UI8ZAA	A	142,308	279	134	OH6EI	A	1,447,624	1249	472		
					/9L	A	2,587,739	1590	539	JA5EO	**	27,232	142	92	RI8BL	3.7	51,354	123	81	OH4RH	A	492,898	716	323		
					SOUTH AFRICA					JA8UJY	**	22,875	125	75						OH1BV	**	386,206	726	307		
					ZS4NS	A	382,536	486	253	JA6EFT	**	22,800	125	76	KAZACH					OH6NEV	**	150,282	331	198		
					ZS4AAR	A	169,168	300	194	JF2JNU/B	**	20,817	121	81	UL7OB	A	1,933,533	1479	329	OH1HD	**	58,290	206	134		
					ZS6P	28	61,488	182	122	JH7KTI	**	18,720	104	80	RL7AB											



HF Equipment	Regular	SALE
IC-761 HF xcvr/SW rcvr/ps/AT	2499.00	2149
HM-36 Scanning hand microphone	47.00	
SP-20 Ext. speaker w/audio filter	149.00	139 ⁹⁵
FL-101 250 Hz 1st IF CW filter	73.50	
FL-53A 250 Hz 2nd IF CW filter	115.00	109 ⁹⁵
FL-102 6 kHz AM filter	59.00	
EX-310 Voice synthesizer	59.00	



IC-751A 9-band xcvr/.1-30 MHz rcvr	1699.00	1449
PS-35 Internal power supply	219.00	199 ⁹⁵
FL-32A 500 Hz CW filter (1st IF)	69.00	
FL-63A 250 Hz CW filter (1st IF)	59.00	
FL-52A 500 Hz CW filter (2nd IF)	115.00	109 ⁹⁵
FL-53A 250 Hz CW filter (2nd IF)	115.00	109 ⁹⁵
FL-33 AM filter	49.00	
FL-70 2.8 kHz wide SSB filter	59.00	
RC-10 External frequency controller	49.00	



IC-735 HF transceiver/SW rcvr/mic	999.00	869 ⁹⁵
PS-55 External power supply	219.00	199 ⁹⁵
AT-150 Automatic antenna tuner	445.00	389 ⁹⁵
FL-32A 500 Hz CW filter	69.00	
EX-243 Electronic keyer unit	64.50	
UT-30 Tone encoder	18.50	

Other Accessories	Regular	SALE
IC-2KL 160-15m solid state amp w/ps	1999.00	1699
PS-15 20A external power supply	175.00	159 ⁹⁵
PS-30 Systems p/s w/cord, 6-pin plug	319.00	289 ⁹⁵
MB Mobile mount, 735/751A/761A	25.99	
SP-3 External speaker	65.00	
SP-7 Small external speaker	49.00	
CR-64 High stab. ref. xtal for 751A	79.00	
PP-1 Speaker/patch	179.00	164 ⁹⁵
SM-6 Desk microphone	47.95	
SM-8 Desk mic - two cables, Scan	89.00	
SM-10 Compressor/graph EQ, 8 pin mic	149.00	139 ⁹⁵
AT-100 100W 8-band auto. antenna tuner	445.00	389 ⁹⁵
AT-500 500W 9-band auto. antenna tuner	589.00	519 ⁹⁵
AH-2 8-band tuner w/mount & whip	659.00	589 ⁹⁵
AH-2A Antenna tuner system, only	519.00	449 ⁹⁵
GC-5 World clock	91.95	89 ⁹⁵

VHF/UHF base multi-modes	Regular	SALE
IC-275A 25W 2m FM/SSB/CW w/ps	1235.00	1079
IC-275H 100W 2m FM/SSB/CW	1389.00	1229
IC-375A 25W 220 FM/SSB/CW	1399.00	1249
IC-475A 25W 440 FM/SSB/CW w/ps	1399.00	1249



ICOM

IC-475H 75W 440 FM/SSB/CW	1599.00	1429
IC-575A 25W 6/10m xcvr w/ps	1399.00	1249



IC-471A* 25W 430-450	CLOSEOUT	979.00	749 ⁹⁵
PS-25 Internal power supply		125.00	114 ⁹⁵
AG-1* Mast mounted preamplifier		99.50	
IC-471H* 75W 430-450	CLOSEOUT	1399.00	989 ⁹⁵
PS-35 Internal power supply		219.00	199 ⁹⁵
AG-35* Mast mounted preamplifier		99.75	

*Preamp \$9⁹⁵ with 471A or 471H Purchase

Accessories common to 271A/H and 471A/H

SM-6 Desk microphone	47.95	
EX-310 Voice synthesizer	59.00	
TS-32 CommSpec encode/decoder	59.95	
UT-15 Encoder/decoder interface	33.95	
UT-15S UT-15S w/TS-32 installed	96.00	

VHF/UHF mobile multi-modes Regular SALE

IC-290H 25W 2m SSB/FM	CLOSEOUT	639.00	549 ⁹⁵
IC-490A 10W 430-440	CLOSEOUT	699.00	399 ⁹⁵
VHF/UHF/1.2 GHz FM	Regular SALE		
IC-27A Compact 25W 2m FM w/TTP mic	429.00	379 ⁹⁵	
IC-27H Compact 45W 2m FM w/TTP mic	459.00	399 ⁹⁵	
IC-37A Compact 25W 220 FM, TTP mic	499.00	439 ⁹⁵	
IC-47A Compact 25W 440 FM, TTP mic	549.00	489 ⁹⁵	
PS-45 Compact 8A power supply	145.00	134 ⁹⁵	
UT-16/EX-388 Voice synthesizer	34.99		
SP-10 Slim-line external speaker	35.99		

IC-28A 25W 2m FM, TTP mic	469.00	409 ⁹⁵
IC-28H 45W 2m FM, TTP mic	499.00	439 ⁹⁵
IC-38A 25W 220 FM, TTP mic	489.00	429 ⁹⁵
IC-48A 25W 440-450 FM, TTP mic	509.00	449 ⁹⁵
HM-14 Extra TTP microphone	59.00	
UT-28 Digital code squelch	39.50	
UT-29 Tone squelch decoder	46.00	
HM-16 Speaker/microphone	34.00	

IC-900A Transceiver controller	589.00	529 ⁹⁵
UX-29A 2m 25W unit	295.00	269 ⁹⁵
UX-29H 2m 45W unit	339.00	309 ⁹⁵
UX-39A 220MHz 25W unit	349.00	319 ⁹⁵
UX-49A 440MHz 25W unit	339.00	309 ⁹⁵
UX-59A 6m 10W unit	339.00	309 ⁹⁵

IC-3200A 25W 2m/440 FM w/TTP	649.00	579 ⁹⁵
UT-23 Voice synthesizer	34.99	
AH-32 2m/440 Dual Band antenna	39.00	
AHB-32 Trunk-lip mount	35.00	
Larsen PO-K Roof mount	20.00	
Larsen PO-TLM Trunk-lip mount	22.00	
Larsen PO-MM Magnetic mount	22.00	

IC-1200A 10W 1.2GHz FM Mobile	699.00	629 ⁹⁵
IC-1271A 10W 1.2GHz SSB/CW Base	1269.00	1129
AG-1200 Mast mounted preamplifier	105.00	
PS-25 Internal power supply	125.00	114 ⁹⁵
EX-310 Voice synthesizer	59.00	
TV-1200 ATV interface unit	139.00	129 ⁹⁵
UT-15S CTCSS encoder/decoder	96.00	
RP-1210 1.2GHz 10W 99 ch FM xcvr	1529.00	1349
RP-2210 220MHz 25W repeater	1499.00	1329
RP-3010 440MHz 10W FM repeater	1299.00	1149



Hand-helds	Regular	SALE
IC-2A 2-meters	289.00	259 ⁹⁵
IC-2AT with TTP	319.00	279 ⁹⁵
IC-3AT 220 MHz, TTP	349.00	299 ⁹⁵
IC-4AT 440 MHz, TTP	349.00	299 ⁹⁵
IC-02AT/High Power	409.00	349 ⁹⁵
IC-03AT for 220 MHz	449.00	389 ⁹⁵
IC-04AT for 440 MHz	449.00	389 ⁹⁵
IC-u2AT with TTP	329.00	289 ⁹⁵
IC-u4AT 440 MHz, TTP	369.00	329 ⁹⁵

Accessories for micros - CALL \$

IC-12AT 1W 1.2GHz FM HT/batt/cgr/TTP	473.00	419 ⁹⁵
A-2 5W PEP synth. aircraft HT	499.00	449 ⁹⁵
A-20 Synth. aircraft HT w/VOR	599.00	529 ⁹⁵

Accessories for all except micros Regular

BP-7 425mah/13.2V Nicad Pak - use BC-35	79.00
BP-8 800mah/8.4V Nicad Pak - use BC-35	79.00
BC-35 Drop in desk charger for all batteries	79.00
BC-16U Wall charger for BP7/BP8	21.25
LC-11 Vinyl case for Dlx using BP-3	20.50
LC-14 Vinyl case for Dlx using BP-7/8	20.50
LC-02AT Leather case for Dlx models w/BP-7/8	54.50

Accessories for IC and IC-O series Regular

BP-2 425mah/7.2V Nicad Pak - use BC35	49.00
BP-3 Extra Std. 250 mah/8.4V Nicad Pak	39.50
BP-4 Alkaline battery case	16.00
BP-5 425mah/10.8V Nicad Pak - use BC35	65.00
CA-5 5/8-wave telescoping 2m antenna	19.95
FA-2 Extra 2m flexible antenna	12.00
CP-1 Cig. lighter plug/cord for BP3 or Dlx	13.50
CP-10 Battery separation cable w/clip	22.50
DC-1 DC operation pak for standard models	24.50
MB-16D Mobile mtg. bkt for all HTs	25.99
LC-2AT Leather case for standard models	54.50
RB-1 Vinyl waterproof radio bag	34.95
HH-SS Handheld shoulder strap	16.95
HM-9 Speaker microphone	47.00
HS-10 Boom microphone/headset	24.50
HS-10SA Vox unit for HS-10 & Deluxe only	24.50
HS-10SB PTT unit for HS-10	24.50
ML-1 2m 2.3w in/10w out amplifier	SALE 99.95
SS-32M Commspec 32-tone encoder	29.95

Receivers Regular SALE

R-71A 100kHz to 30MHz receiver	\$979.00	849 ⁹⁵
RC-11 Infrared remote controller	70.99	
FL-32A 500 Hz CW filter	69.00	
FL-63A 250 Hz CW filter (1st IF)	59.00	
FL-44A SSB filter (2nd IF)	178.00	159 ⁹⁵
EX-257 FM unit	49.00	
EX-310 Voice synthesizer	59.00	
CR-64 High stability oscillator xtal	79.00	
SP-3 External speaker	65.00	
CK-70 (EX-299) 12V DC option	12.99	
MB-12 Mobile mount	25.99	
R-7000 25MHz to 2GHz scan rcvr	1139.00	999 ⁹⁵
RC-12 Infrared remote controller	70.99	
EX-310 Voice synthesizer	59.00	
TV-R7000 ATV unit	139.00	129 ⁹⁵
AH-7000 Radiating antenna	99.00	(8)

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DJ9ZB	A	1,052,100	852	501	Y66QL	**	4,606	62	49	SP9DWT	14	53,250	189	125	EA3ELM	21	31,482	131	99	UKRAINE				
DF1SD	**	258,680	395	290	Y24ZM	**	2,496	40	29	SP6QJJ	**	38,539	169	97	EA7ELR	**	30,400	114	95	UB5MNO	A	391,741	621	293
DK5WQ	**	153,397	299	211	Y64UF	**	946	25	22	SP4HKN	**	30,900	160	100	EA1CON	**	1,071	21	17	UB5IAL	A	349,401	595	289
DF2RG	**	137,610	257	198	Y210L	**	529	23	23	SP5ALV	**	15,407	101	71	EA3BTZ	14	1,219,800	1260	456	UT5RY	**	177,422	386	203
DF7WJ	**	61,070	227	155	Y25DF/A	**	48	6	4	SP3LPR	**	5,368	65	44	EA3AAY	14	770,625	942	375	UY5TE	**	137,214	372	198
DJ4AZ	**	51,060	202	138	Y22JJ	7	232,260	418	210	SP9IWO	**	3,584	44	32	EA3EGB	**	226,540	406	235	RT5UO	**	82,732	200	148
DK8AX	**	36,134	127	89	Y66ZF	**	10,854	86	62	SP9FKQ	**	2,025	33	27	EA4EDI	**	104,832	304	208	UB5AFI	**	37,290	143	113
DL7YS	**	32,718	160	114	Y68SF	3.7	26,264	172	98	SP9BRP	**	162	10	9	EA5ETM	**	29,264	167	118	RB5RA	**	33,915	149	119
DK5KJ	**	15,066	92	81	Y48YN	**	7,128	66	54	SP9CTW	7	165,568	311	208	EA3ESZ	**	20,394	120	99	RB5AE	**	20,960	113	80
DL4LAX	**	7,139	64	59	Y25PE	**	3,870	50	43	SP9BMO	**	110,864	253	164	EA1AXF	**	18,117	129	99	RB5HT	**	5,480	44	40
DJ10J	**	1,180	24	20	Y21YO	1.8	544	17	16	SP9MZU	**	13,184	77	64	EA3DXD	7	200,880	387	216	UT5HP	**	4,972	49	44
DA2ER	14	1,162,290	1110	430	HUNGARY					SP9KAO	**	7,332	64	47	EA5AEN	**	28,122	97	86	UB5HT	**	4,800	44	40
DL6RAI	14	1,077,872	1007	464	HA8MM	A	1,101,221	1036	479	SP90DY	3.7	108,768	298	176	EA1SQ	3.7	37,368	135	108	RB5TW	28	114	7	6
DL6LAG	**	96,264	273	168	HA8XX	A	755,200	812	400	SP4MPO	**	41,760	191	116	SWEDEN					RB5CCO	**	48	4	4
DF7YN	**	47,560	189	116	HA7UI	A	416,480	667	304	SP9RTF	**	18,450	122	75	SM8DJZ	A	257,964	462	259	UT5DK	21	262,676	514	194
DL3ME	**	29,472	130	96	HA4XX	**	175,926	404	218	SP9MZP	**	10,428	84	66	SM6BGG	A	92,296	237	166	UB5IUH	21	246,822	473	186
DJ8BX	**	9,617	83	59	HA5AGP	**	56,942	208	142	SP5INO	1.8	19,434	113	79	SM8BDS	**	43,173	162	123	UB5ITW	**	87,604	253	121
DJ8MW	**	2,790	31	31	HA4YO	**	18,356	131	102	SP6CZ	**	14,832	105	72	SM7ITZ	**	23,408	114	112	UT5UIW	**	22,578	112	71
DK8FD	**	1,638	43	26	HA9RG	14	844,515	1043	383	PORTUGAL					SK4EA	14	676,488	881	397	UB5EJB	**	18,292	96	68
DF6IT	**	36	4	4	HA8LC	**	84,957	249	163	CR7AHU	A	160,420	348	260	(Op SM40GQ/4)					RB5EG	**	4,752	50	36
DL8AAE	7	62,510	171	133	HA3HV	7	180,500	402	190	CS4CQK	A	87,538	243	173	SM6LIF	14	84,409	213	151	UB5WE	14	2,064,309	1544	533
DK6BT	**	504	14	14	HA1XR	3.7	534,600	832	300	CT5QF	**	64,796	204	167	SM8DQE	**	51,375	229	137	UB5IRM	**	882,674	1284	442
DF8XC	3.7	627,792	867	348	HA5MY	3.7	503,992	841	292	CT5TM	**	45,124	148	116	SM7TV	**	24,099	145	87	UT4UO	**	214,586	430	261
DJ2YE	**	15,252	83	82	HA6NL	**	263,652	501	254	CO1BY	**	19,465	101	85	SM5CSS	**	5,390	50	49	RB5IU	7	126,480	264	170
GERMANY (GDR)					HA6PX	**	122,144	339	176	ITALY					SM3LIV	**	1,128	29	24	UB5HEX	7	121,590	318	193
Y22YO	A	603,500	862	355	HA5WU	**	100,890	312	171	I6FLD	A	2,352,588	1660	588	SM5AQD	7	868,322	1026	367	UB5QMA	**	91,688	221	146
Y53DD	A	497,292	800	348	LUXEMBOURG					CT4UE	**	7,200	51	45	SK7CE	**	215,816	464	212	UB5QJI	**	38,800	151	97
Y28AL	A	497,119	750	329	LX2QR	14	93,420	291	173	CS8NH	14	3,351,330	2500	690	(Op SM7PKK)					UB5MMP	**	23,562	106	77
Y78UL	**	331,188	534	286	THE NETHERLANDS					CT4NH	**	7,738	78	73	UB5DX	3.7	280,908	532	243	RB5TDZ	**	106,500	307	150
Y28XL/A	**	322,982	550	277	PABIJM	A	329,472	613	256	CT1DJE	**	11,328	70	59	UB5TOZ	**	106,500	307	150	UB5TCN	**	22,100	138	85
Y38YK	**	302,572	548	268	PA2JJB	/A	65,790	235	153	CO1DIZ	3.7	33,384	131	107	UB5IOV	1.8	14,500	105	58	BYELORUSSIA				
Y36UE	**	293,090	543	265	PA8KDM	**	31,916	133	101	CT1CIR	**	10,720	77	67	WALES			UC2WBM	A	186,303	482	221		
Y58WA	**	291,282	474	258	PA3CAU	**	16,090	101	70	CT1AOZ	1.8	92,480	219	136	GW4BLE	14	3,229,446	2143	586	UC2AAD	A	175,674	400	201
Y32GD	**	288,774	647	262	PA8YDZ	**	3,320	42	40	CT1FL	**	12,768	65	56	YUGOSLAVIA			UC2AIU	**	170,940	402	222		
Y44PF	**	278,506	612	262	PA2SWL	7	81,840	222	155	ROMANIA					YT3M	A	2,822,883	1651	587	UC2LJK	**	65,411	228	149
Y32KI/P	**	225,944	500	244	PA2TMS	3.7	892,738	1237	341	Y08KOA	A	633,180	907	346	YT5JA	A	112,832	269	172	UC2OT	**	6,900	62	46
Y33UJ/P	**	195,567	435	219	NORWAY					Y09DIA	A	105,444	306	174	YU5JA	A	112,832	269	172	UC2BA	**	3,800	41	38
Y43EO	**	163,737	362	207	LA1XDA	A	371,727	801	309	Y04US	**	77,280	243	140	YU7SF	**	95,460	262	172	UC2AHY	**	800	21	20
Y63VN	**	137,793	343	197	LA9DI	A	81,312	199	154	Y06MD	**	66,914	225	147	YU7KM	**	19,360	102	88	UC2AA	14	91,485	244	171
Y54IL	**	128,838	335	197	LA2AD	**	27,270	158	101	Y078W	14	1,172,064	1139	464	YU20M	21	60,134	191	107	UC2ACT	**	9,920	92	62
Y49LF	**	118,404	303	198	LA26N	14	9,165	91	65	Y07FT	**	31,518	147	103	YT3AA	14	3,928,015	2324	679	UC2A	14	91,485	244	171
Y23RJ/A	**	108,138	309	201	LA9HW	7	291,288	564	229	4N7ZZ	7	293,014	499	239	YU7BW	14	1,172,064	1139	464	UC2A	14	91,485	244	171
Y46IF	**	99,104	260	163	LA2IZ	**	53,816	189	124	Y22S	**	139,472	311	184	YU78W	14	1,172,064	1139	464	UC2ACT	**	9,920	92	62
Y24MB	**	95,076	245	171	LA1BFA	3.7	336	14	12	Y09AHX	**	40,002	168	118	YU7FT	**	31,518	147	103	MOLDAVIA				
Y460I	**	92,990	249	170	POLAND					Y08AI	**	15,022	102	74	4N7ZZ	7	293,014	499	239	U050DA	A	38,390	151	110
Y46PH	**	80,396	399	101	S07TN	A	1,197,864	1055	524	Y07AOZ	**	12,852	100	68	YU2CAH	**	138,168	281	152	RO40Z	14	41,234	259	106
Y42ZA	**	79,128	241	168	SP9PDF	A	701,597	726	377	Y09BXE	**	8,990	79	62	YU2CAH	**	138,168	281	152	U05GR	**	8,100	68	60
Y35RB	**	77,220	250	156	SP3BYZ	**	529,317	648	309	Y03HL	**	8,280	70	60	YU2CAH	**	138,168	281	152	RO500	3.7	432,920	724	274
Y49MF	**	67,497	280	151	SP2ZFJ	**	450,208	601	352	Y03BDP	**	5,040	56	45	YU2CAH	**	138,168	281	152	RO40A	**	254,190	497	229
Y56VF	**	63,973	222	133	GERMANY (FRG)					Y05ANN	**	3,800	100	76	YU2CAH	**	138,168	281	152	U050V	1.8	640	18	16
Y22VI	**	63,504	232	147	Y54TA	**	54,168	161	122	Y03YC	21	22,849	108	73	YU2CAH	**	138,168	281	152	LITHUANIA				
Y24SK/A	**	60,912	199	144	Y43VL	**	52,600	203	140	Y04AYE	14	5,616	60	54	YU2CAH	**	138,168	281	152	UP2CY	A	1,281,291	1092	451
Y58ZA	**	55,328	163	133	Y43RK	**	50,500	209	125	Y02DFA	3.7	69,678	240	147	YU2CAH	**	138,168	281	152	UP3BH	A	616,980	701	364
(Op Y56WG)					Y32HK	**	46,976	200	128	Y03FGP	**	14,896	107	76	YU2CAH	**	138,168	281	152	UP2BGB	**	103,362	261	161
Y54TA	**	54,168	161	122	Y24NG	**	39,776	141	113	Y08CMB	/8	8,524	82	56	YU2CAH	**	138,168	281	152	UP2AV	**	90,244	265	154
Y43VL	**	52,600	203	140	Y43LN	**	33,575	244	85	SARDINIA					YU2CAH	**	138,168	281	152	UP2DM	**	74,520	227	135
Y43RK	**	50,500	209	125	Y34SG	**	32,868	129	99	IS8UWS	A	16,910	106	89	UW6LC	A	295,514	522	278	UP20U	21	8,280	68	45
Y32HK	**	46,976	200	128	Y22HF	**	30,396	128	102	SICILY					UA4NC	A	259,740	512	222	UP2PCK	14	9,920	87	62
Y24NG	**	39,776	141	113	Y26WM	**	30,135	146	105	IO9MBL	21	47,380	157	115	UV6AY	A	205,751	426	221	UP2BQ	1.8	646	19	17
Y43LN	**	33,575	244	85	Y390H	**	27,930	131	95	SCOTLAND					UA3DRB	**	193,494	320	271	LATVIA				
Y34SG	**	32,868	129	99	Y37XJ	**	25,256	100	77	GM4WEN	A	177,000	353	236	UA3TN	**	190,744	364	226	UQ2GN	3.7	85,554	256	147
Y67UL	**	32,120	264	166	Y24GB/A	**	24,653	121	89	GM4GPN	A	301,924	605	287	UA3PP	**	182,710	441						

YC2CTW	21	1,577,583	1563	357
YC8EAQ	21	1,301,130	1459	305
YC3HCM	21	1,297,890	1424	345
YC8CLQ	"	1,180,885	1344	295
YC8EMJ	"	1,035,504	1085	324
YC4GAP	"	543,168	957	192
YC7DF	"	192,444	424	158
YC7CR	"	66,958	203	117
YC7BS	"	39,338	153	89
YC7FA	"	22,878	101	82
YC78BI	"	14,848	79	64
YC2UDH	"	13,134	73	66
YC7DX	"	9,945	72	51
YC7BO	"	5,985	54	45
YB8DPZ	14	1,424,640	1169	424

JOHNSTON IS.

KL7LF	/KH3	A	1,656,370	1429	365
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NAURU

C21NI	A	288,333	545	181
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NEW ZEALAND

ZL11M	A	137,672	299	158
ZL1BWM	28	153,328	481	112
ZL1ANJ	21	890,001	1085	277

THE PHILIPPINES

K4YT/4F	A	3,950,277	2092	472	
K1BAZ	/DV1	"	966,680	1467	220

SAIPAN

J01CRA	/AHH	A	312,474	905	114
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SOUTH AMERICA

ARGENTINA

LU1E	28	1,114,776	1127	351
(Op LU3AJW)				
LU5UL	"	428,576	637	236
LU6EJP	"	218,064	441	176
LU4LAV	21	3,841,740	2050	630
AZ6ETB	14	3,150,032	1819	592
(Op LU6ETB)				

BRAZIL

ZY40Y	A	673,552	664	344
ZV2BW	A	334,017	432	267
ZY4BA	"	266,787	382	248
PY6AZ	"	263,280	382	240
PY6YZ	"	101,591	232	161
PY4BHB	"	1,501	40	32
PY5NF	28	128,185	294	155
ZV9ZE	21	1,601,297	1158	479
ZY1NEZ	21	994,548	861	402
PY1LI	"	721,179	716	353
PY5CFE	"	29,000	117	100
(Op PY5FB)				
PT2TF	"	25,491	106	87
PY1BKA	14	390	13	13
PT7AU	"	3	1	1
PY2DP	3.7	25,872	109	98

CHILE

3G4B	A	668,610	719	323
(Op CE4ETZ)				
3G2Z	"	144,364	309	193
(Op CE2CQZ)				
CE6DAQ	28	211,140	408	180
CE3GWO	"	182,250	394	162
CE6EZ	21	5,157,546	2580	678
CE4FX	21	3,860,970	2121	615
3G3Z	21	1,829,790	1298	486
(Op CE3ZI)				
XQ4EM	"	268,233	392	241
CE5BSS	14	1,127	24	23
CE6MFU	7	24,240	81	60

COLOMBIA

HK3IXJ	/7	28	76,167	291	91
HK3JJH	21	423,780	687	210	
HK1LDG	7	504,888	403	218	

ECUADOR

HC2IA	7	5,412	38	33
HC1HC	1.8	2	1	1

NETHERLANDS ANTILLES

PJ9J	21	3,694,884	2570	489
(Op W1BIH)				

PARAGUAY

ZP5LOB	A	840,180	788	380
ZP5JCY	14	6,184,732	2824	743

PERU

OA4ZV	14	3,255,840	1939	570
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URUGUAY

CX9CO	A	2,485,798	1525	554
CX2AAL	28	364,896	586	224
CX8CG	14	518,880	385	235

VENEZUELA

YV3BKC	A	552,440	517	280
YV7QP	28	2,884	36	28
YW5M	7	119,448	172	126
(Op YV5VN)				

MULTI-OPERATOR SINGLE TRANSMITTER UNITED STATES

KI6P	5,825,328	2571	773
N4WW	4,079,160	2186	810
KI1G	4,075,086	2293	787
NJ1F	3,895,756	2317	716
NR5M	3,723,384	2330	777
KM9L	2,743,155	1814	705
KC7V	2,557,872	1909	573
NE8T	2,511,987	1891	709
KJ9D	2,470,338	1559	663
NI2T	2,249,270	1757	655
NE6I	2,042,528	1467	496
KI6CG	1,958,880	1405	526
K7LXC	1,771,478	1480	586
WC6H	1,622,869	1307	523
AG6D	1,129,536	1252	444
NQ8V	1,120,660	1162	548
AABA	974,550	1201	534
NT0P	953,920	1471	542
N6CCL	610,155	694	447
KS3F	597,780	745	410
W7MR	465,902	914	386
NQ9M	331,240	494	338
NV4G	247,340	450	298
KF1C	224,647	390	277
WV6N	165,529	350	221
N5JXF	130,900	360	238
KZ8E/8	100,798	314	202
KE7V	55,125	174	147
WW5H	48,972	206	154
WB3JRU	47,056	159	136
KA2RGI	39,330	157	138

NORTH AMERICA

NP4CC	13,299,624	4863	936
FM8A	12,850,963	4721	901
VE6OU/3	7,974,737	2777	817
ZF2KT	6,848,130	3747	730
YS8YS	5,208,324	2853	726
VA3T	4,252,915	2084	655
VE7UBC	3,613,974	2011	546
VE5FX	1,970,550	1537	522
AL7FQ	1,579,050	1216	495
4C2C	954,110	1120	365
VE1CIT	697,470	613	347
KL7CQ	535,080	751	245
4U1UN	516,344	652	316
VE3UOW	231,867	461	228

AFRICA

ZS3WPX	5,412,095	2712	689
EABRCT	3,836,924	1771	581

ASIA

JA3YKC	3,787,300	1799	626	
JA1YWX	2,990,327	1594	571	
HS8A	2,448,696	2708	514	
JA6YCU	1,049,600	976	410	
HL90B	533,634	859	302	
JA8ZAV	227,454	368	227	
JA9YAV	145,266	330	186	
JT1KAI	127,864	541	158	
JR7YCM	/7	70,016	236	128

EUROPE

IO5NPH	12,054,784	4216	961
TW7C	10,574,600	4396	925
IO4WZT	7,517,895	2945	849
LZ9A	7,332,576	3539	816
HG7B	7,047,900	3380	820
HG6N	7,012,830	3296	790
HG5A	6,362,496	3088	789
HG9R	6,158,925	3226	775
YU3MM	4,816,524	2587	708
HG1S	4,727,480	2622	730
Y38I	4,699,112	2691	737
OK3KFF	4,038,186	2419	687
HA4KYN	3,852,618	2131	651
H89CXZ	3,317,376	1889	636
GB8AU	3,080,525	2140	607
ED3QD	2,803,045	1840	595
4U1ITU	2,629,262	2022	593
SP5PBE	2,554,356	1747	564
HA2KMR	2,342,592	1787	576
OH3AA/OHB	2,282,520	1715	552
YT3T	2,281,864	1538	593
PA3CEF	2,277,018	1696	566
DL8WPX	2,052,176	1649	584
IM8WON	2,047,421	1664	547
ON6AH	1,904,826	1519	539

YT2B	1,670,340	1452	492
OK8AFM	1,530,354	1285	498
C38BBE	1,448,991	1256	393
HG6V	1,410,500	1259	500
PI5EHV	1,327,424	1180	448
DK0IN	1,317,789	1145	493
OH6AC	1,271,516	1107	482
HA3KNA	1,154,335	1135	455
PA8KHS	982,574	1057	443
EA3EBN	952,315	844	455
LX58RL	943,008	1038	418
4N2M	889,686	956	414
Y39ZF	824,985	1012	405
I3EKK	653,602	786	382
ED3MM	570,843	1166	357
OH7AI	483,865	698	355
HABKAX	467,870	656	305
OK1KLV	433,466	558	323
IK4BWC	428,350	620	325
OH9AR	403,472	722	302
4N3G	353,894	567	278
LA1B	309,132	532	279
ED4GCR	293,568	552	278
GB8PX	261,392	551	248
OK5SSM	217,648	456	244
LZ1KVF	216,200	385	235
HB4FE	171,000	383	225
LZ1KZM	130,240	315	185
Y57ZA	113,883	286	187
SP9PRO	86,565	387	199
G4CVK	85,782	246	174
Y06KBM	81,028	379	188
OZ4HAM	76,504	256	146
OK1KAK	71,100	230	150
OK2KVI	62,780	225	146
Y41ZA	49,068	154	116
DL8OV	45,752	168	133
IK2GOZ	42,790	168	110
OZ5DD	36,480	179	114
PI4TTC	36,340	154	115
OZ4HOB	34,117	154	109
HA5KDX	13,824	78	72
OK3KYH	13,390	108	65
OK1KCP	13,332	68	66
HA5KTZ	10,919	83	71
OK1KUZ	4,816	68	43
Y32ZK	4,592	56	41
OK2KMR	3,706	39	34
Y41ZJ/P	2,464	32	32
OK3KRN	462	15	14

OCEANIA

F08SSJ	3,779,545	2817	385
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SOUTH AMERICA

PJ2FR	18,493,730	5563	907
LU2E	7,018,400	2748	800
SJ4R	6,401,066	2624	686
LU1VZ	4,495,572	2437	604
AY6D	3,583,632	1981	624
PY3BD	3,036,140	1758	590

U.S.S.R. CLUB STATIONS ASIA

RL8PYL	6,421,105	3330	695
UL8LYA	4,796,670	2440	569
UZ9FWR	3,355,960	1935	530
UZ9AWZ	2,979,972	1763	531
UZ9CWW	2,735,208	1709	486
UZ9SWY	1,917,344	1291	416
UZ8QWA	1,631,569	1654	443
UZ9MWF	1,315,062	1114	378
UL8LWZ	1,209,762	1121	387
UL8CWW	756,349	732	319
UZ9CYP	698,775	789	275
UZ8QWT	674,047	1118	319
UI9BWF	532,818	785	286
UG7GWO	527,325	660	267
UZ9SWR	525,360	627	264
UZ9XXM	212,570	322	145
UZ9JWF	197,200	364	200
UZ9XWH	167,986	332	182
UZ8QWM	130,682	322	181
UZ9XWW	64,233	206	117
UM9MWE	14,700	71	47

EUROPE

UZ2FWA	5,028,891	2656	707
UB4CWW	3,285,170	2284	661
UP1BWW	2,979,627	1918	597
UR1RWX	2,278,821	1679	573
UB4QWW	2,175,082	1903	518
UZ6LWZ	2,085,720	1831	546
UP1BZO	2,004,975	1550	525
UT4UXW	1,489,477	1526	473
UP1BZA	1,042,440	1004	438
UZ10WZ	1,034,358	1017	447
UB4MZL	989,350	1177	421
UZ3QYA	800,020	950	362
UZ4CYL	747,826	833	334
UZ3DXW	733,425	964	385
UZ4PZP	688,662	895	351
UR1RWW	635,878	965	349
UZ4AWB	322,196	546	259
UB4IZA	273,655	531	239



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MFJ's Complete Line of Accessory Audio Filters

BY JOHN J. SCHULTZ*, W4FA/SV0DX

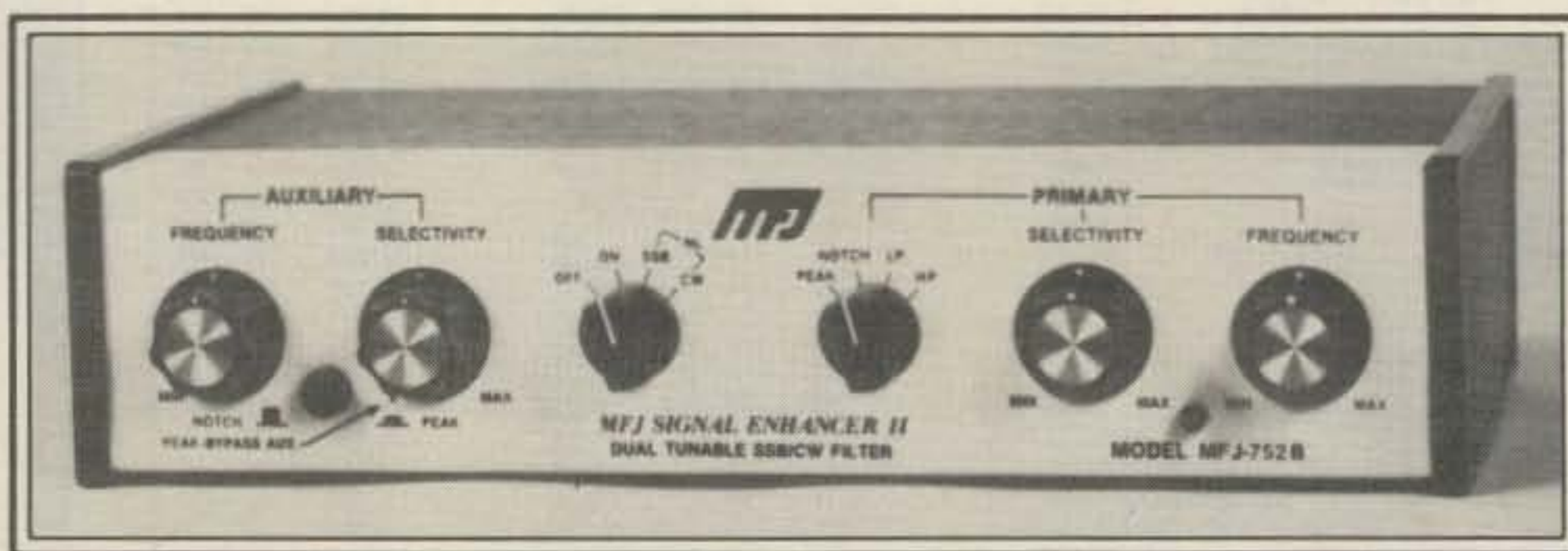
No matter how old or modern a transceiver may be, it seems that some sort of accessory, outboard AF filter can still be useful to enhance CW and/or SSB reception. In the case of older transceivers, the use of outboard AF filtering can provide almost the equivalent of narrow band-pass IF filtering and the quasi-equivalent of features such as IF shift tuning. Even in the case of the most modern transceivers, outboard AF filters can still provide an extra touch of selectivity and audio response tailoring. The latter idea is supported by the fact that several major transceiver manufacturers offer loud-speaker accessories which include selectable AF filters even though their transceivers themselves incorporate a wide array of selectivity features.

MFJ has developed many accessory AF filters over the years. Their present product line encompasses four filter units ranging from a sort of super filter which has two completely independently tunable filters in series, to a no-tune, pushbutton filter unit. Three units were tested and will be reviewed in some detail; the fourth unit in the MFJ line is a variation of one of the units to be described.

The MFJ-752C, Signal Enhancer II

This is MFJ's top-of-the-line unit and incorporates an independent primary and auxiliary filter plus noise limiters and a 2 watt audio amplifier. As one can see from the front-panel-layout photograph, the controls for the primary filter are to the right, and the controls for the auxiliary filter to the left. A switch to the left of center functions as an on/off switch and also selects the CW or SSB noise limiters. The primary filter can be switch selected to function either as a peaking, notching, low-pass, or high-pass filter.

The two controls (selectivity and frequency) allow for adjustment of the filter's response. If the peak or notch mode

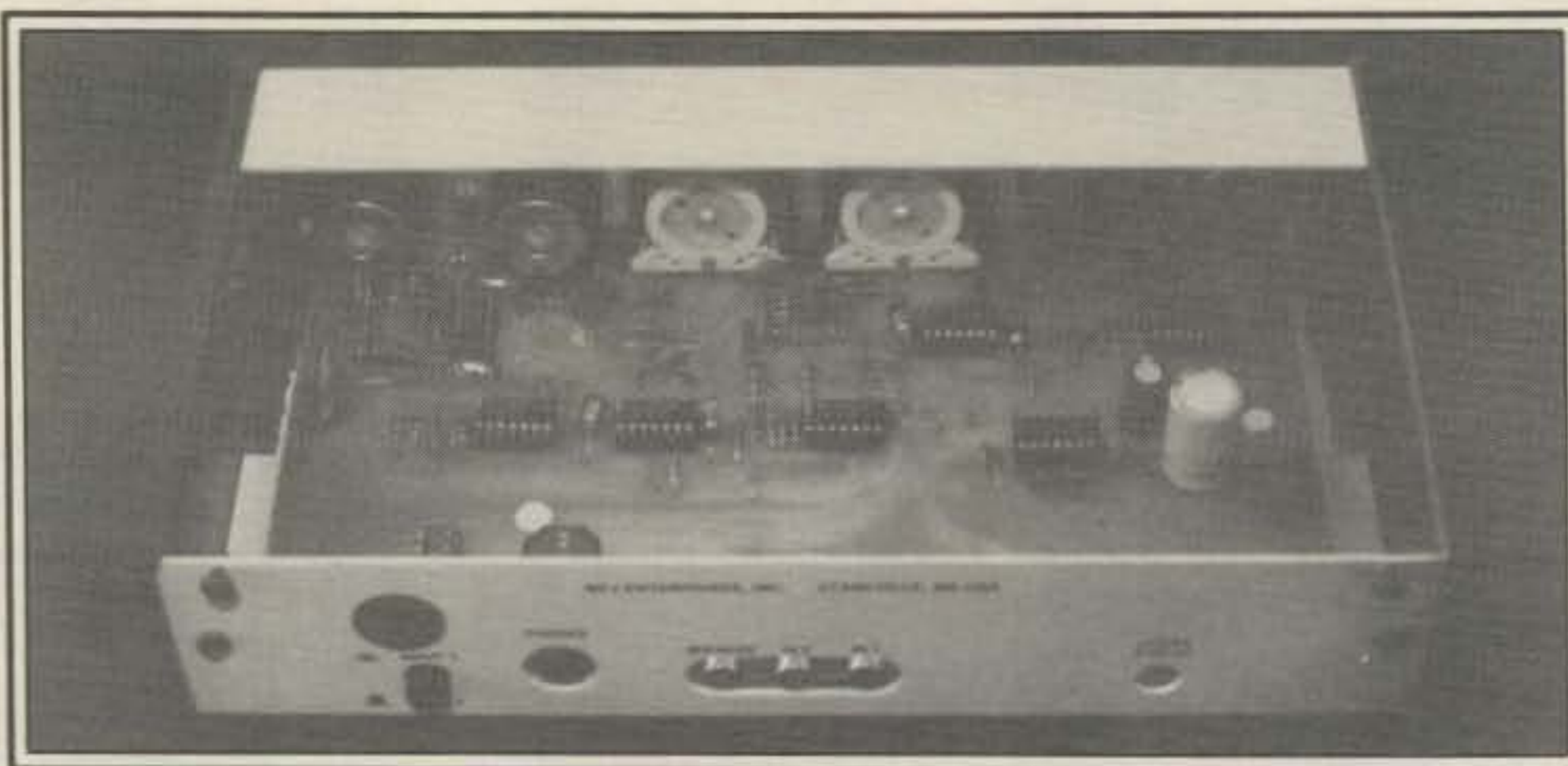


The MFJ-752C (it's marked MFJ-752B, but the C version is externally the same). The unit features a very full range of control capabilities.

is selected, the frequency control sets the peak or notch frequency at any point from about 300 to 3000 Hz. The selectivity control varies the width of the peak or notch from a minimum of 40 Hz out to an almost flat response. If the low-pass or high-pass mode is selected, the frequency control sets the cut-off frequency, from 300 to 3000 Hz, and the selectivity control determines the steepness of the filter rolloff. The auxiliary filter functions

basically the same as the primary filter except that it has only a peak and notch mode as chosen by a pushbutton switch between its frequency and selectivity controls.

The MFJ-752C provides a powerful array of selectivity features due to the two filter sections. One frequency can be peaked while another is being notched to enhance signal intelligibility. Noise, splatter, or hiss can be dramatically reduced



A look inside the MFJ-752C. The construction is typical of all of the MFJ units—large, neatly laid out PC boards with all ICs socketed. The various connectors for speaker, headphones, etc., are on the back panel.

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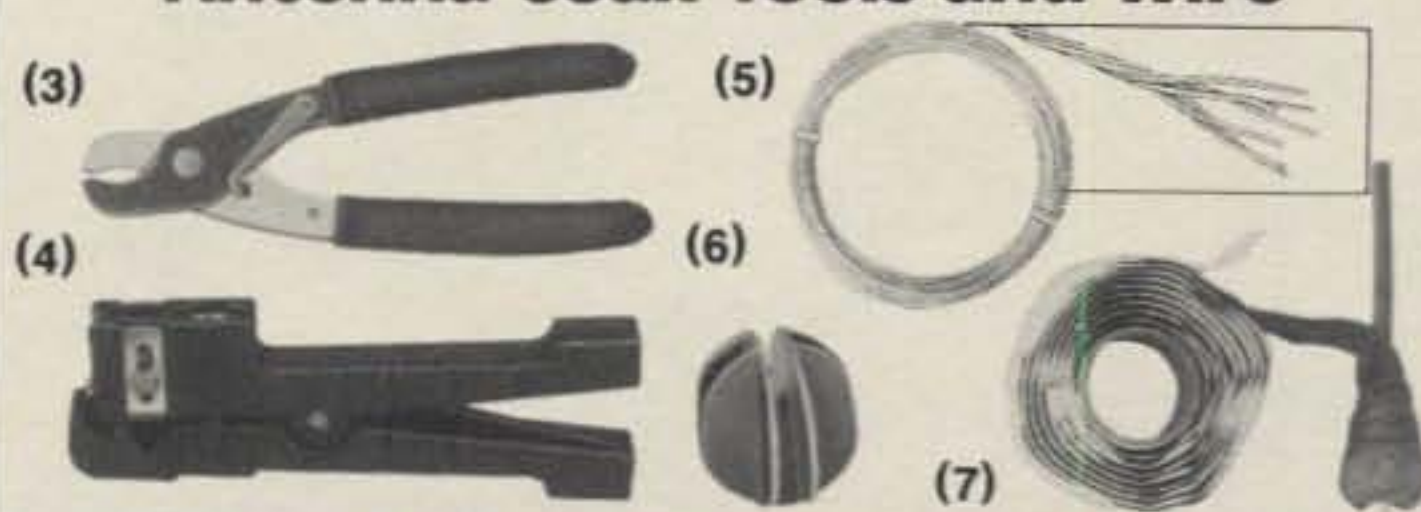
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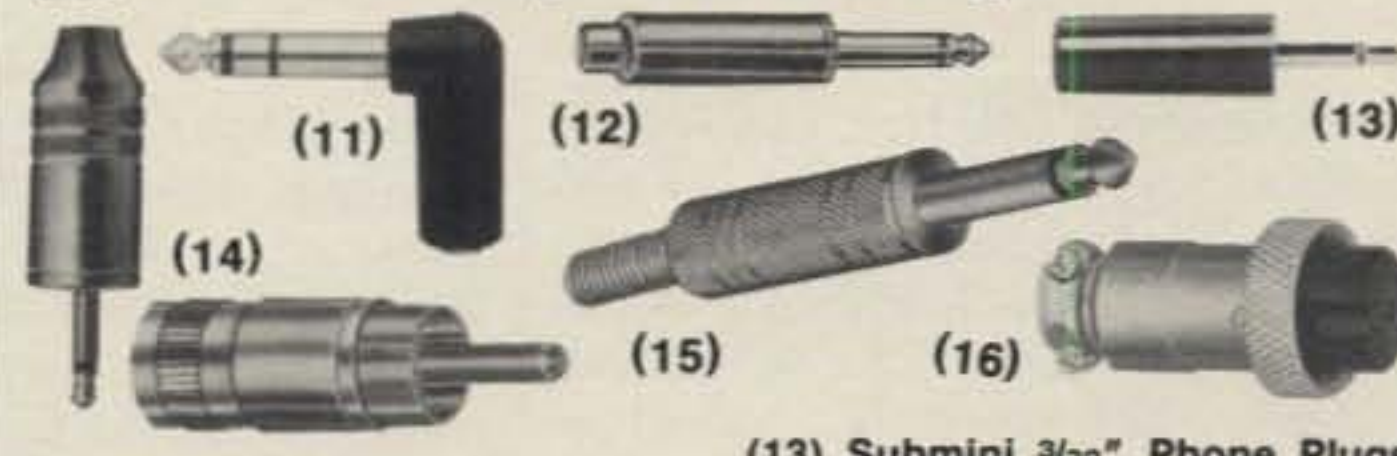
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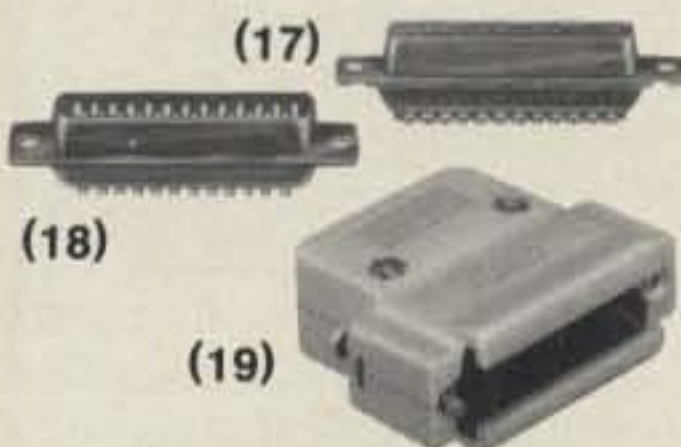
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The MFJ-722. It features simplified controls along with a notch-only filter capability.

or low frequency rumble from QRM eliminated. Heterodynes or tune-up QRM can be notched out. Dull-sounding audio can be brightened for more intelligible reception. The "bag of tricks" one can achieve with the MFJ-752C to enhance reception is almost endless. However, to get the maximum benefit from the unit, regardless of whether one is a Novice or old-timer, one has to have clearly in mind what the terms *peaking*, *notching*, *low-pass*, *high-pass*, *cut-off frequency*, etc., really mean. Otherwise, one will just fumble around with the controls in the hope of finding a setting that is effective.

All of the controls on the MFJ-752C functioned very smoothly. The range of 300 to 3000 Hz is fully covered, and the notch/peak response is 65-70 dB. There are some control settings which may cause the unit to "ring" or even oscillate. These are all mentioned in the instruction manual which comes with the unit. The manual also very thoroughly covers the operation of all of the controls.

Looking at the photograph of the interior view of the MFJ-752C one can see that the unit is very neatly constructed with all of the circuitry on a large PC board. All of the ICs are socketed. The same quality construction is typical of the other filters in the MFJ line. The MFJ-752C is priced at \$99.95.

The MFJ-722, Optimizer CW/SSB Filter

This filter unit does not provide all of the versatility of the MFJ-752C, but it does pack a lot of performance into a small package. It features a tunable notch filter combined with switch-selectable, fixed-frequency high-pass and low-pass filters for SSB and fixed-frequency bandwidth filters for CW. The features are probably best appreciated by taking a look at the front-panel photograph. The selectivity switch selects fixed bandwidth responses of 80, 110, 150, or 180 Hz for CW, or low-pass cut-offs of 1.5, 2.0,

or 2.5 kHz for SSB. In the HP (high-pass) position a 375 Hz high-pass filter is used for SSB. The notch control varies the notch frequency from about 300 to 3000 Hz. The depth of the notch is set by a rear-panel control. The notch filter is active in all settings of the selectivity control except "bypass." The "notch" setting on the selectivity control provides for the notch filter to be used alone. The headphone jack provides for the use of stereo headphones, if desired, so one simultaneously hear the original input signal and the output of the filter.

The MFJ-722 is, of course, simple to use. One just sets the CW or SSB selectivity for best reception, and the notch filter is used to tune out an interference tone. It can also be used to further roll-off the SSB response on either the low- or high-frequency side when not needed for its primary function. The MFJ-722 is priced at \$79.95.

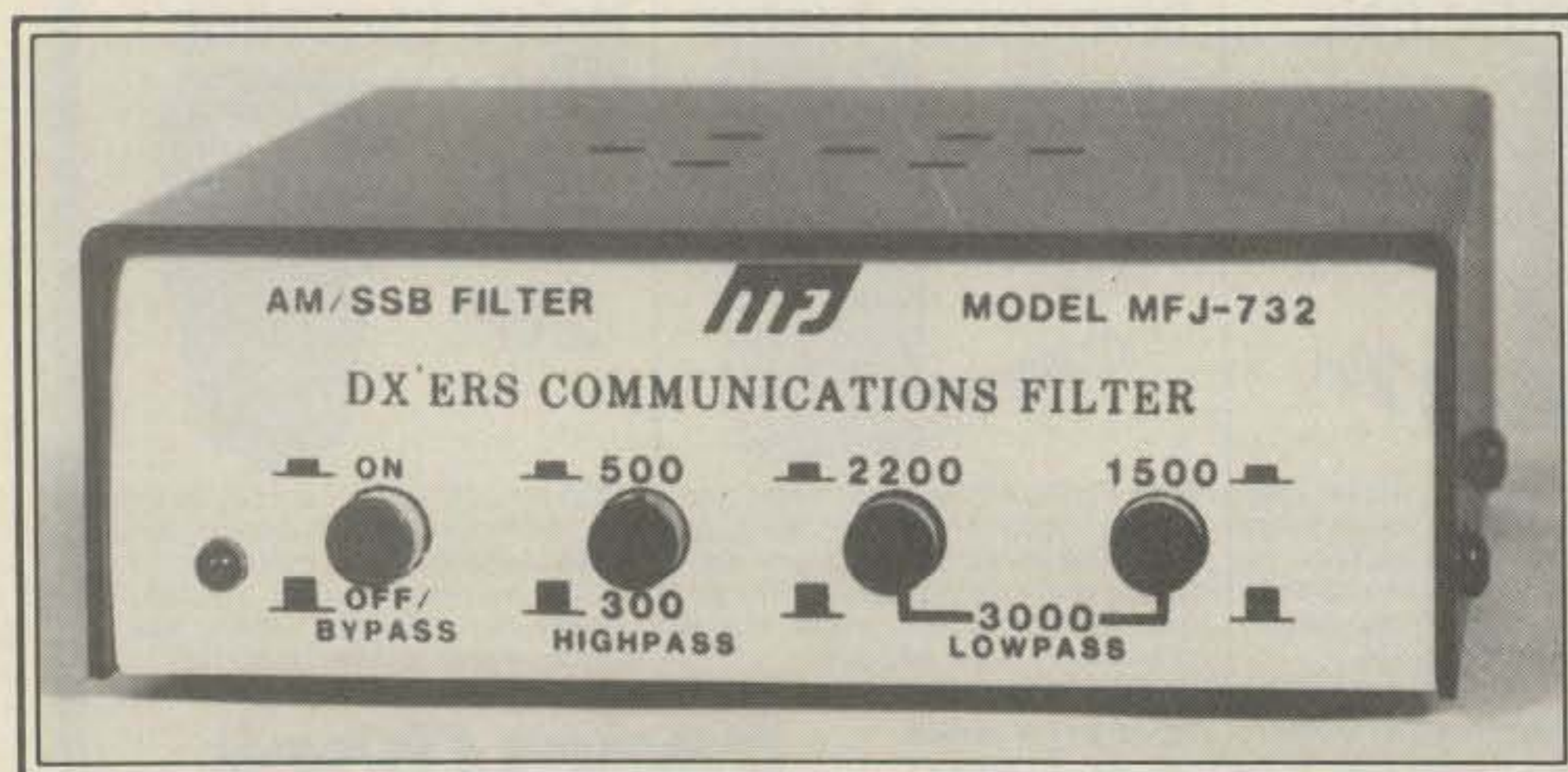
The MFJ-723 (not shown) is a version of the MFJ-722 designed for CW-only operators. It has basically all of the features of the MFJ-722 except for the SSB filter section. However, it does include a CW noise limiter and a passive circuit for notch tuning which covers from 450 to 1800 Hz. The MFJ-723 is priced at \$49.95.

The MFJ-732, DXer's Communications Filter

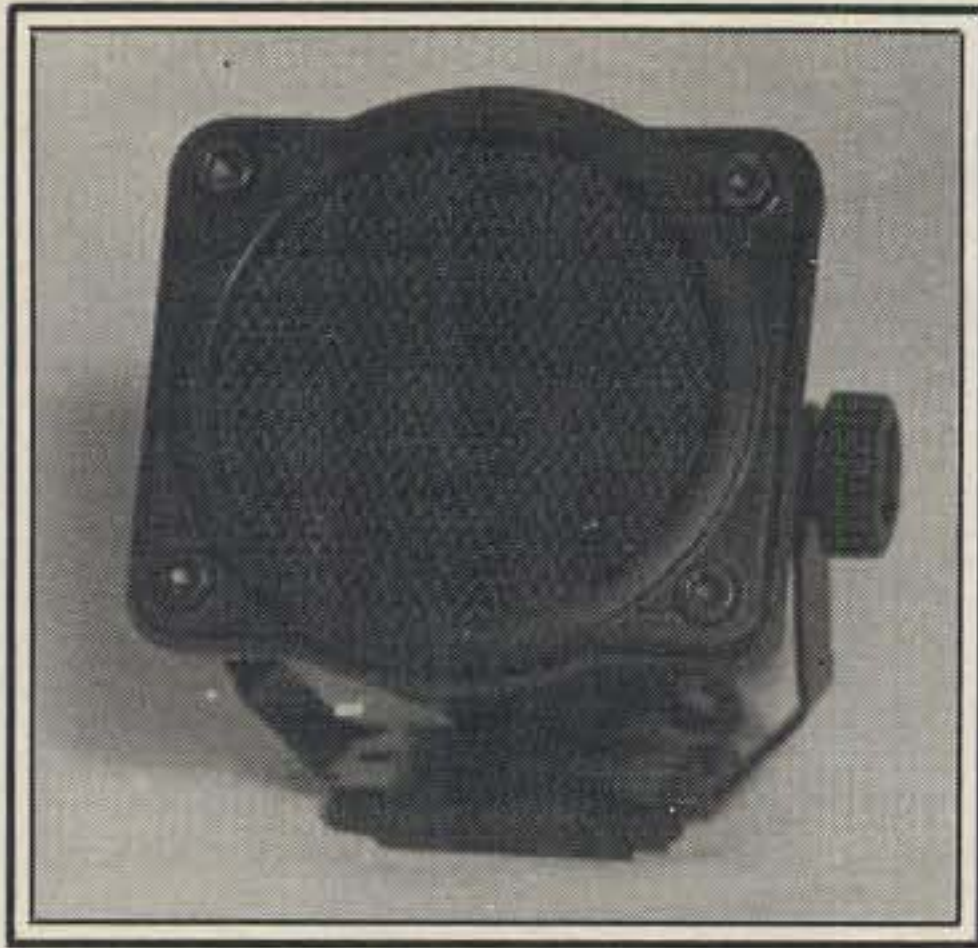
This filter is designed for voice (AM/SSB/FM) reception. It's complete in itself, except for a power supply, in the sense that it includes a 2 watt audio amplifier and a built-in loudspeaker. Being designed solely for voice reception, the filter has separate high-pass and low-pass filter sections with the emphasis being on very fast roll-off skirts (up to 58 dB/octave). The filter selection is extremely straightforward, using only three push-button switches while another pushbutton switch controls on/off/bypass functions. The high-pass switch selects the lower cut-off frequency of the high-pass filter. When the switch is out, the cut-off frequency is 300 Hz, and it changes to 500 Hz when the switch is depressed. There are two low-pass switches labeled 1500 and 2200. When both switches are out, the upper cut-off frequency is 3000 Hz. Depressing the 2200 switch lowers the cut-off to 2200 Hz, and depressing the 1500 switch further lowers the cut-off to 1500 Hz. Using the switches in their various combinations, one can form a voice bandpass of any of the following combinations:

- 300 to 3000 Hz
- 300 to 2200 Hz
- 300 to 1500 Hz
- 500 to 3000 Hz
- 500 to 2200 Hz
- 500 to 1500 Hz

The 500 to 1500 Hz combination is quite restrictive, but it will still allow an SSB sig-



The MFJ-732. Adjustment cannot be made any simpler; just set the pushbuttons. It has a built-in loudspeaker and 2 watt audio amplifier.



The MFJ-280 speaker.

nal to be read intelligibly under severe QRM conditions.

All of the MFJ filters, except the MFJ-732, are housed in quite attractive Ten-Tec enclosures. The MFJ-732 is housed in a slightly plainer but heavier-duty aluminum enclosure, which makes it particularly interesting for mobile or portable applications. It is priced at \$69.95.

Which Filter To Choose?

The question can be a bit of a teaser. All three of the filters described were tried and performed extremely well. On the one hand, it was very satisfying at times to have complete control of the situation by exercising all of the filter combinations possible with the MFJ-752C. However, when additional selectivity was needed for voice communications quickly, it was hard to beat the MFJ-732, since one really didn't have to think very much—press the 500 Hz pushbutton if low-frequency-sounding QRM was present, and either the 2200 or 1500 Hz pushbuttons if high-frequency-sounding QRM was present. Of course, the only thing the MFJ-732 cannot do is notch out an interference tone in the 500 to 1500 Hz range. That, more or less, brings us around full circle to the MFJ-722.

In general, for base-station use and for the more experienced operator, I would suggest the MFJ-752C. The average operator would find the MFJ-722 an excellent choice. It has a reasonable number of filtering possibilities and is very easy to adjust. The MFJ-732 seems to me to be the ideal candidate for SSB or FM mobile or portable work. In fact, I use the unit with my IC-735 mobile setup. The built-in speaker in the unit allows me to direct the boosted audio where I want it, and I can react to QRM far quicker using the pushbuttons on the unit rather than the controls on the transceiver.

All of the MFJ filters come with detailed instruction sheets and schematic diagrams. All of the units have a full 12-month warranty and are available under

the MFJ 30-day "money back if not satisfied" arrangement.


A Footnote: The MFJ-280 Speaker

MFJ recently introduced this little speaker unit, citing it as specifically designed for mobile installations. Its small size certainly makes it very useful for such applications, but it is equally as useful for regular station usage.

Basically, it's a loaded enclosure speaker with a shaped 400 to 5000 Hz response for voice communications. The roll-off below 400 Hz and above 5000 Hz is gradual, however. Therefore, it is not a replacement for an AF filter unit, but can be a useful adjunct to such a filter. The speaker swivels in its mounting bracket, which has a magnetic base, so it can be secured immediately to many surfaces, such as the top cover of a transceiver. It is supplied with a steel mounting plate if the speaker is to be used somewhere where the magnetic base will not work. The steel mounting plate can be secured

to any desired surface using the supplied self-tapping screws or double-face tape. For mobile applications this would mean that the speaker could easily be taken along when an HT is removed from a vehicle.

I experimented with two of the speakers, and they are dandy little units. Their tailored frequency response enhances speech intelligibility compared to using the built-in speaker in the average transceiver. Their mounting flexibility allows one to position them in locations that would be too space-restrictive or awkward for conventional speakers. Presently I'm using them as "rabbit ears" magnetically mounted on the side panels of a transceiver to simulate very loose-fitting headphones. The audio they produce sure sounds good to me. The MFJ-280 is priced at \$18.95.

For more information on these and other MFJ products, write to MFJ Enterprises, Inc., Box 494, Mississippi State, MS 39762. 

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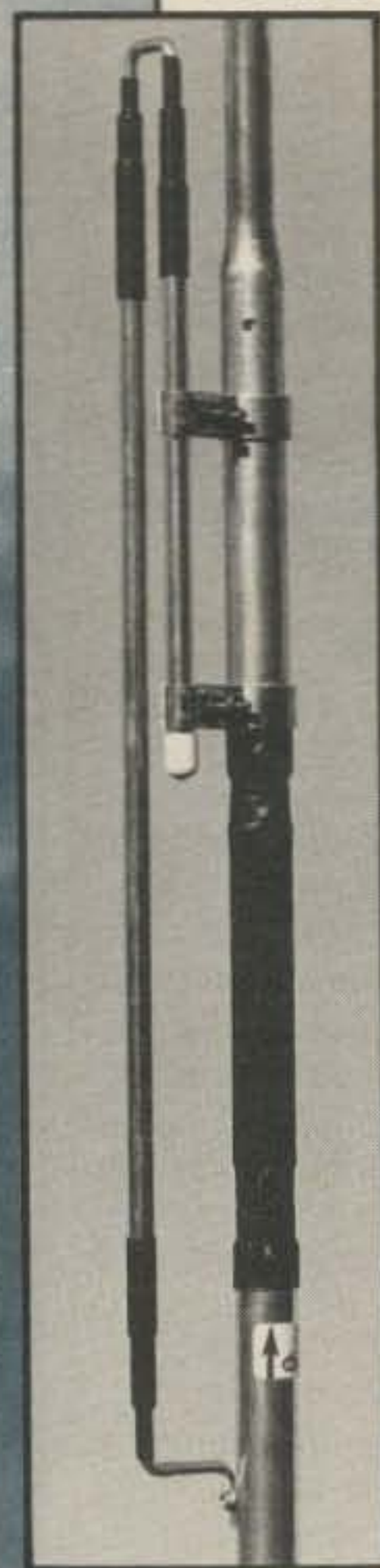
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Sometimes the answer to a problem is simple. Often all it takes is a little ingenuity and a diversified junkbox to come up with a new antenna system.

Designing an Antenna By the Seat of Your Pants

BY WARREN E. BERBIT*, K2UVV

The intent of this article is to encourage creative thinking and experimentation in the construction of simple wire antennas. It is my hope that the average amateur will recognize that he has this capability in spite of feelings of technical inadequacy. Hence, although what I have done can be reproduced exactly, I have emphasized the step-by-step construction details.

A few years back my priorities momentarily skewed in favor of family lifestyle and environment to the detriment of amateur radio. This shocking lapse of good sense caused me to give up an elevation 200 feet higher with good falloff in all directions. In return, I designed and built my dream home on a 3 acre site hard against a woods of 250 acres. The view of mountains all around is magnificent and somewhat hard to achieve in down-state New York.

Unfortunately, RF tends to take a jaundiced view of things appealing to human aesthetics. Quick tests revealed a loss of about 5 dB on 20, 15, and 10 meters as compared to my prior location. However, 160, 80, and 40 meters seemed improved. I assumed this latter phenomenon to be a function of better ground conductivity and a more noise-free environment. Circumstantially, given the state of the sunspot cycle, this led to a decision to emphasize the lower bands.

I installed a 2-element 40 meter beam at 105 feet and a wire antenna for 160 and 80 meters. After about 2 years I decided it was time to reintroduce 20, 15, and 10 meters into the equation. As the tower would take one more good-size antenna, I settled on a 5-element beam on 20 meters at 92 feet. This left 15 and 10 meters still to be addressed.

Another tower was out of the question. The XYL agreed to carte blanche on antennas as long as they were not visible

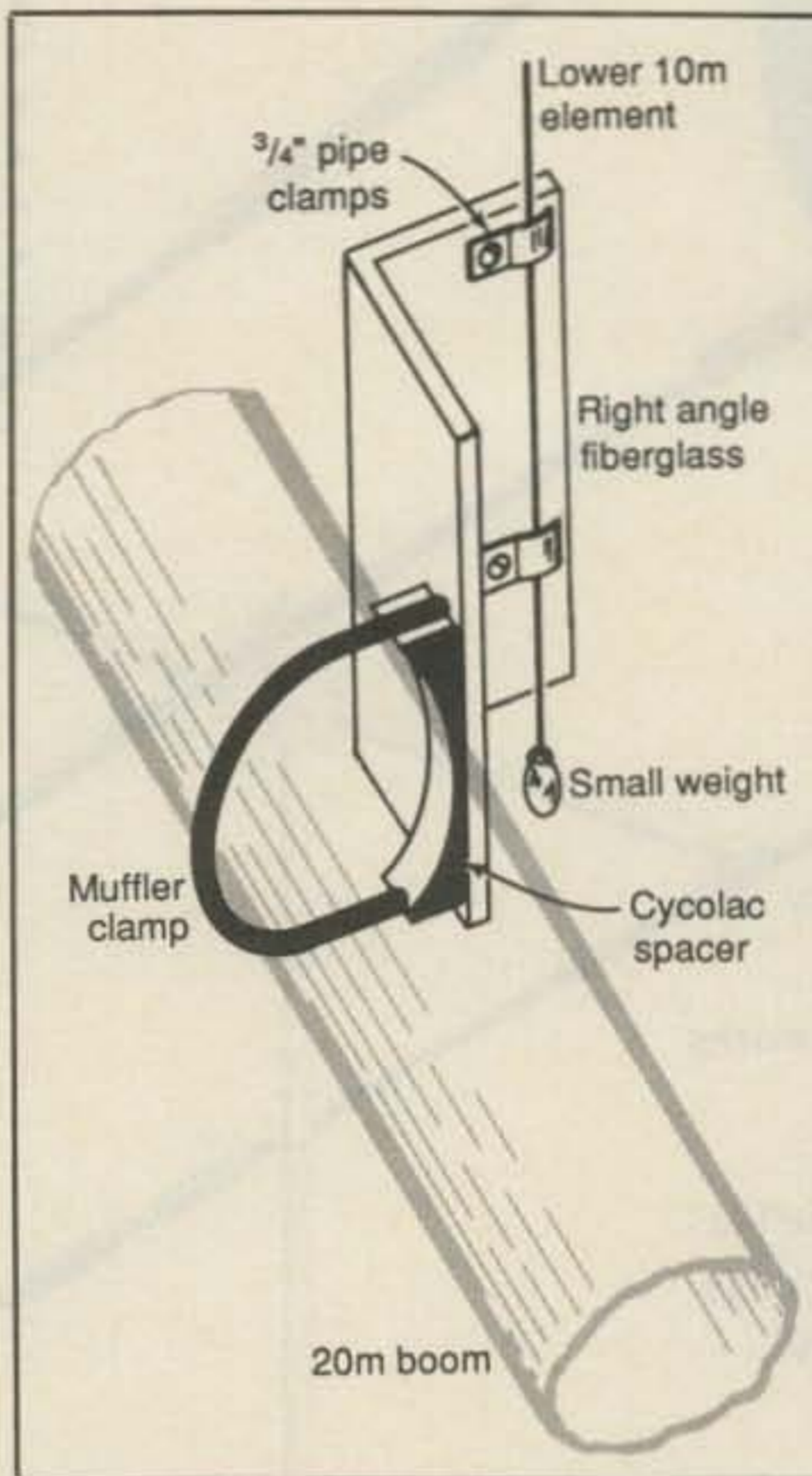


Fig. 1—A simple stand-off system for the lower boom.

from inside the house. Luckily, she mentioned windows and not skylights in announcing her edict. The one invisible location was already occupied by the existing tower. Also, as Village Attorney, I wished to set no worse of an example than I was already setting. Quite frankly, and I know this admission will forever remove me from the ranks of serious hamdom, another metal structure even disturbed my sensibilities.

Armed with an active imagination and a sheet of graph paper, I pondered the situation. I scaled out the half boom lengths of the two beams separated by the actual vertical spacing of 13 feet. My objective was to take advantage of the booms, tow-

er, and mast as a supporting structure. I hoped to come up with an antenna for both bands fed with one coaxial line. The hypothetical antenna would be at the enviable average height of about 100 feet and would rotate with the beams. I also wished to construct it out of wire placed only in the plane of the booms and mast to minimize interaction with the beams. If I could achieve some directivity in the forward direction of the beams, the result, to my way of thinking, would be ideal.

I calculated a half wave on each band and determined I could just fit in a sloping dipole on 15 meters between the boom/mast intersection of the 40 meter beam above and the forward end of the 20 meter boom below. After drawing this out on the graph paper I determined that a 10 meter sloping dipole parallel to the 15 meter antenna could be fit in a maximum of 18 inches away. Hmmm! Sloper aficionados claim gain in the down-sloping direction. Both antennas would be a very desirable, for reflectivity purposes, average distance of about a quarter wave from the mast. Perhaps the solution was at hand.

Given my uncertainty regarding the interaction of the two slopers with each other and all the surrounding metal, I decided a full-scale mock-up at ground level was in order. This also seemed a prudent approach considering the hourly rate charged for bucket trucks waiting while tedious antenna adjustments are being made.

I constructed the combined antenna by formula (one-half wavelength equals 465 divided by frequency in MHz). I then tied it off to the tower and an adjoining fence, reproducing the same slope as my scaled drawing showed would be achieved between the beams. I ran into the shack with great anticipation to check SWR and resonance.

On 10 meters the antenna exhibited classic performance as per formula. Resonance was at the design frequency with a low SWR which rose gently and symmetrically in both directions. On 15

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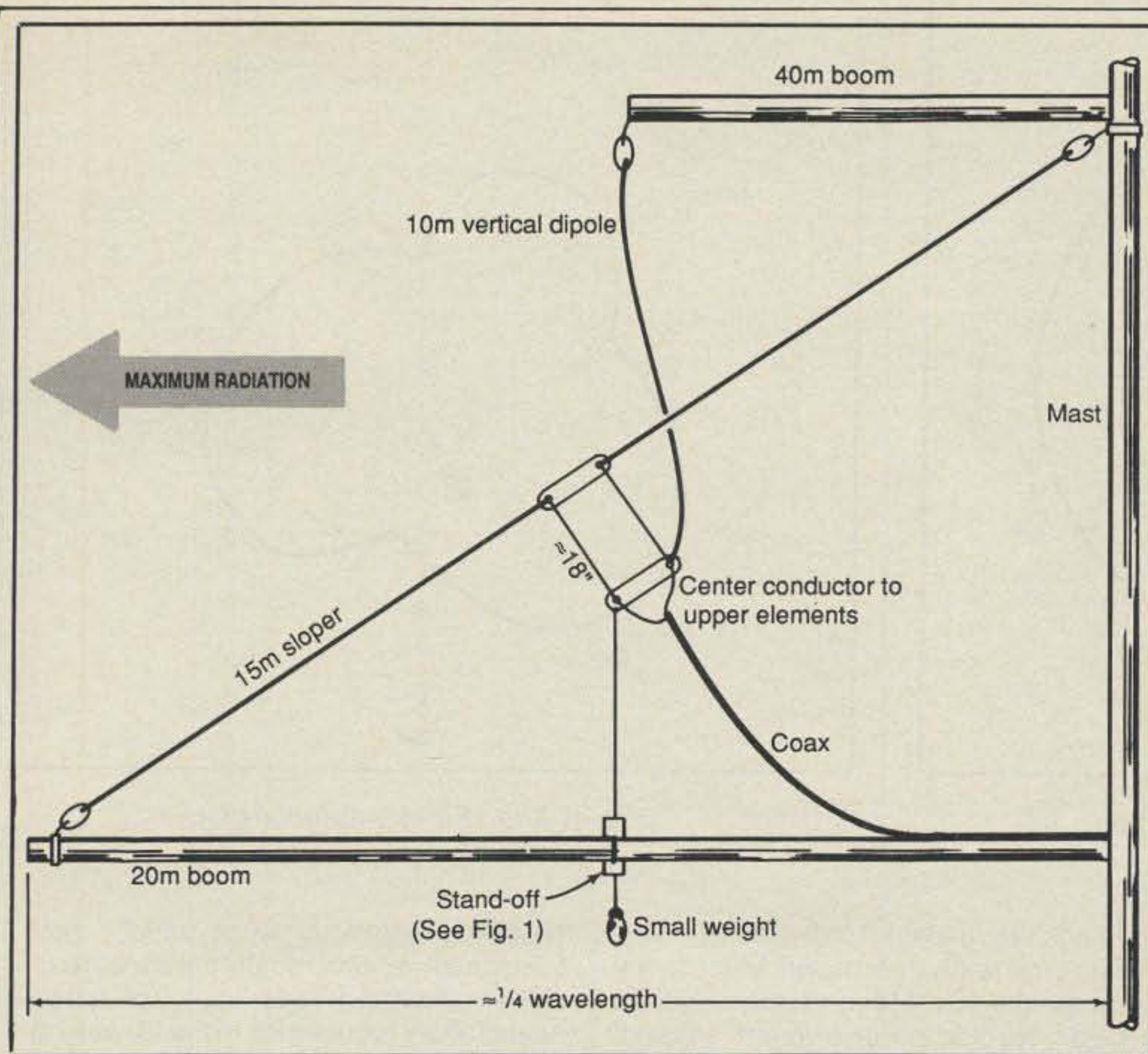


Fig. 2—The final antenna configuration.

meters the antenna looked like a band-pass filter. SWR was almost flat across the entire band at about 2.5:1 with the high end slightly worse.

Impedance measurements with a noise bridge (an easy to use, inexpensive, and quite useful device) appeared to indicate that the antenna was electrically short on 15 meters. The reactive component was capacitive and about twice the resistive component. (Remember: the input impedance of an antenna is equal to the square root of the sum of the squares of the reactive and resistive components; it is a rare antenna, indeed, which is purely resistive except at the natural resonance point.) By accident, the antenna was tried on 24 MHz and exhibited an SWR below 1.5:1. Lengthening the 15 meter section appeared necessary.

Before making any changes, I listened on both bands. The mock-up, even at ground level, out-heard both the 40 meter beam and my low-band wire antenna. Using the automatic antenna tuner in my TS-940S, I was able to match the antenna and work DX stations on both bands running barefoot. Clearly, it seemed, I was on the right track.

I lengthened the 15 meter section and expected it to fall right into place. It didn't. SWR remained high and flat with no apparent direction for natural resonance. Ten meters was unaffected. This led me to conclude that on 15 meters the anten-

na was quite sensitive to the proximity of the 10 meter element, the tower, or both. I let the 10 meter elements fall straight down and tested 15 meters again. Eureka! Resonance was achieved within the band at a lower SWR and with a classic SWR pattern versus frequency. I then moved the high end 2 feet from the tower. Eureka again! Things improved further.

Okay, back to the drawing board. Somehow I had to move the 10 meter elements away from the 15 meter elements while remaining in the same plane. Remembering good success with vertical dipoles as a Novice in 1958, I started thinking along those lines for the 10 meter portion. This was also an intriguing possibility since, as mentioned, the mast was a quarter wavelength away and might, heavens be praised, act as a reflector.

This approach raised two physical problems to be overcome. The center of the wire antenna fell directly under the end of the 40 meter boom, which was more than 8 feet above—hence, a perfect tie-off point for the upper 10 meter vertical dipole element. Unfortunately, the 20 meter boom was 4 feet below, and the guy cable supporting the boom was also in the way. I decided to let the lower portion of the 10 meter vertical hang straight down with a small weight attached (in my case, a ceramic insulator and a large nut of the kind associated with

bolts rather than squirrels). I still needed to stand the element away from the boom/guy cable without restricting its freedom to move because of expected relative motion between all supporting structures.

Rummaging through the proverbial junk pile, I found a U-bolt large enough to go around the boom, a Cylolac (type of plastic) insulator flat on one side with the correct half circle cut out of the other side, a piece of right-angle fiberglass, and two one-sided metal clamps of the type used to hold 3/4 inch copper plumbing pipe in place. I mounted one side of the right-angle fiberglass to the U-bolt/insulator combination, and attached the two pipe clamps to the other side (fig. 1). This affair was installed on the 20 meter boom directly in line with the end of the 40 meter boom and the wire antenna center insulator. The 10 meter element was enclosed in the pipe clamps and allowed to hang straight down. Clearance between the clamps and the wire allows free movement, but the bracket system keeps the element clear of the boom and cable.

The upper 10 meter element and the 15 meter sloper were attached with a little slack to permit the beams to move with the wind without overstressing the wire. I actually had to tie off the upper 10 meter element about 2 feet out from the 40 meter boom to a plastic spacer holding the linear loading tubing to the driven element. This was necessary to clear the 15 meter sloper. The coax was tied off to the 20 meter boom approximately perpendicular to the sloper to minimize weight on the sloper and to avoid distorting its shape (see fig. 2 for sketch of the complete antenna).

The hours spent at ground level proved quite fruitful. On 15 meters SWR was below 2:1 across the entire band. On 10 meters it was below 2:1 for 500 kHz centered about the desired frequency. At full height DX signals were quite strong on both bands; several S-units better than on my other antennas. Rotating the array seemed to produce quite discernable peaks and nulls. Before the sun set DX contacts were made on both bands with good reports without an amplifier in line. In fact, since the CQ World-Wide SSB Contest was in progress, I was encouraged by responses in spite of many stations calling.

I spent the next few nights running pattern checks with stations at a distance of 3 to 50 miles (thank you, W2PN, WA2NQL, WA2IZN, WA2JWJ, and others). (I use my 20 beam to establish exact bearing on my rotator to the testing station. I trust that the beam has a clean and symmetrical pattern. I use that direction as the zero degree radius on polar graph paper [forward direction]. This paper is easily obtainable. Used for antenna patterns, the radii represent compass direction and the concentric circles signal strength.

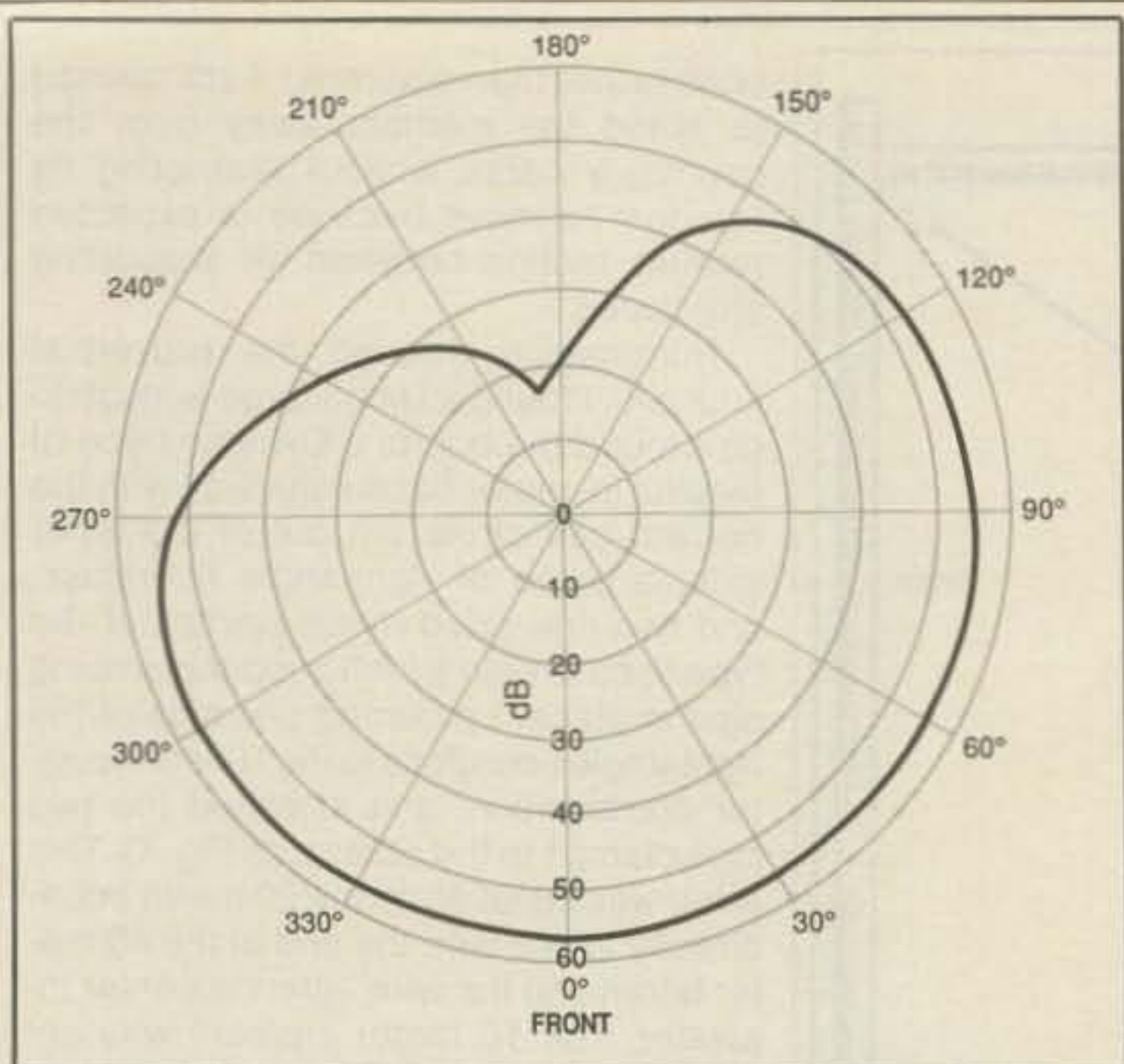


Fig. 3—The 10 meter antenna plot.

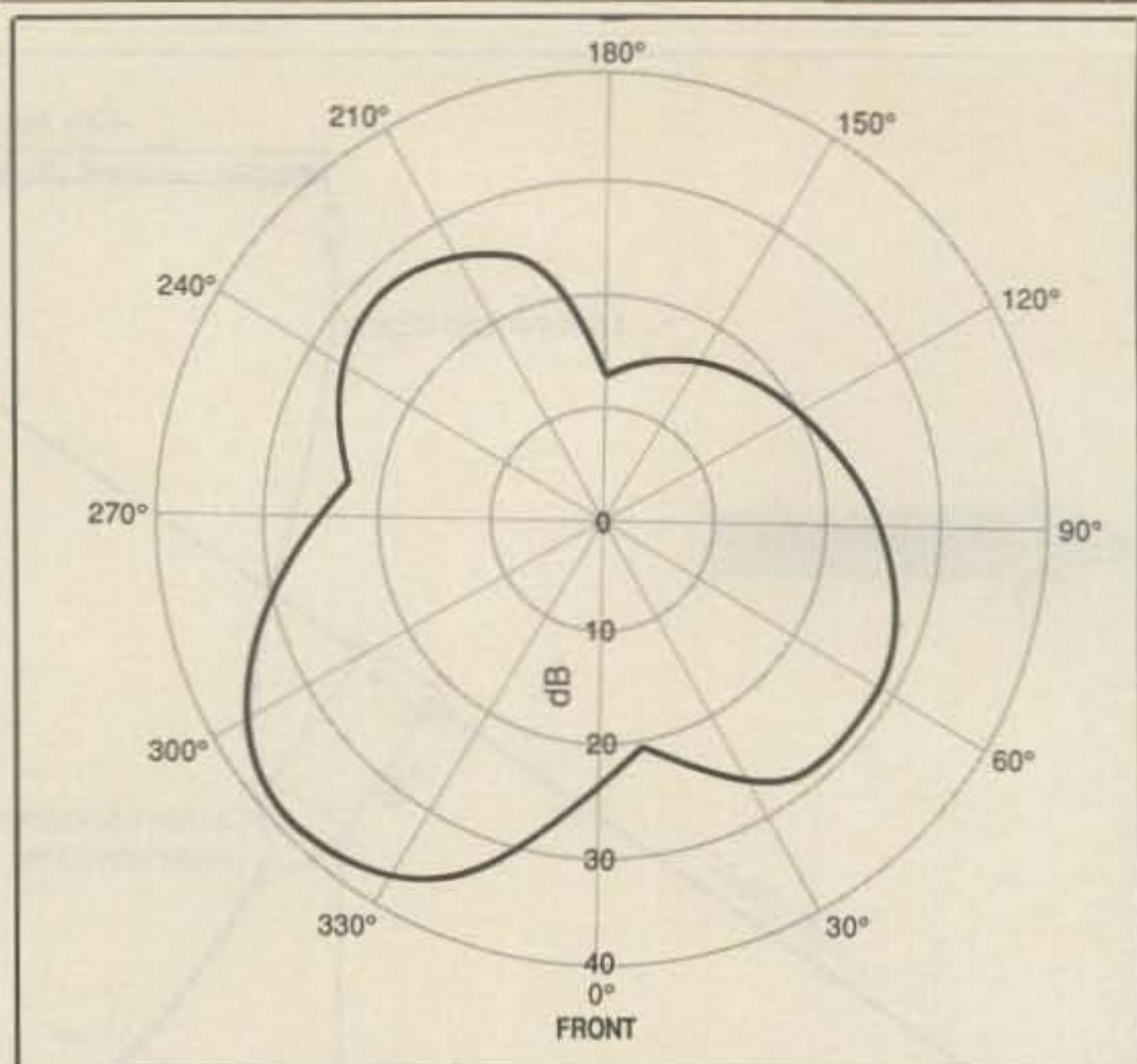


Fig. 4—The 15 meter antenna plot.

Assuming 6 dB per S-unit, I establish a scale for the concentric circles so that the pattern is as large as possible while still fitting on the graph. This is an interesting exercise which anyone can do. The results might be quite an eye opener even with commercially available "tried and true" antennas. I have signal strength

readings taken every 15 degrees.)

First, the really good news. Much to my surprise, the 10 meter antenna exhibited a clean cardioid pattern (heart shaped) with the maximum signal off the front. Believe it or not, the signal off the back was at least 30 dB weaker (I am still in shock). This result may be distorted because the

receiving antennas were usually both horizontally and vertically polarized (e.g., slopers, inverted Vees, etc.). The antenna definitely focuses RF in the forward direction on 10 meters, although the 3 dB beam width appears quite broad (approximately 170 degrees). The pattern obtained is shown in fig. 3.

On 15 meters the antenna pattern is complex, but with definite nulls and peaks. All stations observed approximately a 3 S-unit difference (18 dB) between the maximum signal, which seemed offset about 40 degrees from the plane of the antenna, and the minimum readings. Several pattern checks were combined on one graph to average out anomalies. As can be seen in fig. 4, the pattern looks like a three-sided clover. Perhaps this is a combination of a major lobe off the front, minor lobe off the back, and figure-eight pattern off the sides—in other words, kind of a cross between a dipole and a sloper as might be expected. More testing is obviously needed, and I would welcome technical reactions.

I am satisfied that my design criteria have been met. For virtually no cost I have added two bands and have taken advantage of the height and rotating capability of my existing tower and beams. In addition, admittedly without strong statistical evidence, it is my impression that these antennas easily outperform simple antennas at lesser heights. While any kind of front-to-back ratio usually indicates gain, at least some real-world data will be compiled by comparison tests with other stations.

I wish to thank W2ZUP for the many hours he spent working on this installation. And humor aside, my XYL, Sherry, was quite supportive and understanding.

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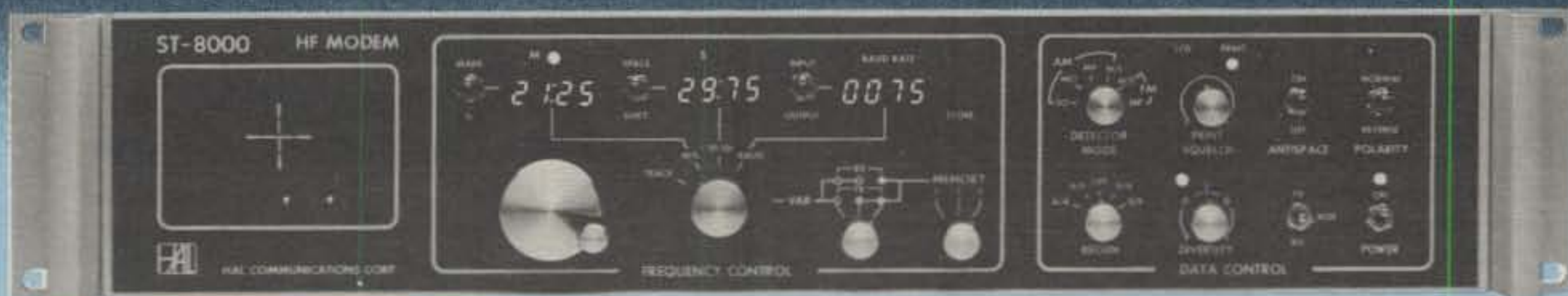
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Testimony Of A Ham-Oholic

BY WAYNE B. DITSWORTH*, N0BGI

My name is Wayne B. Ditsworth, and I am a ham-oholic. It all began on that fateful day just three years ago when a guy at work talked me into attending the local radio club's Novice class. When I heard that first demonstration contact on the club station with an XE2 in Tijuana, I knew I was hooked. From then on it was downhill.

The signs had always been there, I suppose, like the strange, tingling sensation that would develop when, while driving along the highway late at night, I would suddenly tune across some station 2,000 miles away whose signal had inexplicably bounced out of the sky into my car radio. But one can never really know, of course—until it's too late.

I breezed through the Novice exam, and by the time my ticket arrived in the mail I could already copy 20 words per minute. The beautifully rhythmic beatings of the pure, clean, crisp CW notes on the code tapes had a near-hypnotic effect on me; I could listen to them for hours. And just sending into my code practice oscillator was sheer joy. The incredible exhilaration I experienced after that first shaky QSO with WB9TOA in Milwaukee was such that even then I knew amateur radio was more to me than just a mere hobby.

After only a week as a Novice, I emerged from almost total seclusion in my shack in the garage to go for and pass my Extra exam (I cancelled a vacation outing with my family to go to Chicago for the test). I soon replaced my old, tube-type Novice rig with a gleaming, new digital transceiver, and went immediately to work on erecting a tower and beam.

I kept spending almost all my free time in the shack, honing my operating skills, tuning and refining my equipment, gloriously awash in a sea of pulsating, beckon-

ing signals from around the globe. At first my XYL tolerated it as a mere passing fancy of mine, but it only got worse—much worse!

I got hooked on certificates and contests. I had to work them *all*. After three months I had all the big ones: WAS, WAC, WPX, DXCC. After I got WAZ, I started going after lesser-known stuff: foreign awards, like Worked All Australia, Japan, Colombia—even Tanzania. Eventually I worked my way down to things like the Pottawattamie County Certificate and the Worked 10 Eskimo Dog-sled Mobiles Award.

Meanwhile, I worked every contest that was scheduled anywhere in the world. Not just ones like Sweepstakes and CQ World-Wide, but *all* of them; the ZA QSO Party, the All-Antarctica DX Contest, even Silent Key Night. After a year, I had every certificate and had received top scores in every contest in existence.

I had, of course, been improving my station all through this. I quickly exhausted our savings account to satisfy my overpowering desire to own *the* ultimate station. The tower got higher and higher—60, 75, 100 feet. First a 5-element tribander, then stacked 3-element monobanders, then 5, 6, 8 elements each. I went from top-of-the-line regular amateur gear to the best in gear designed for military and commercial use. I got ultra-matic 65 function keyers and remote computer control and elaborate super-filters, pre-amps, and test gear. To pay for it all, I secretly took out loans, mortgaged the house, and even dipped into our children's college fund. I couldn't help myself. I *had* to get the money. I was possessed.

It all began to put a strain on my family life. Elizabeth (the XYL) started calling the radio my "mistress." The harmonics (kids, I mean) sometimes failed to recognize me on the rare occasions when I emerged from the shack to see them (I had given up shaving because it took up

valuable operating time, and started taking my meals in the garage).

I never left the shack except to go to work—until I lost my job. I had taken too many leaves of absence for contests. I didn't mind being fired; it gave me more time to operate, and the welfare checks would feed the wife and kids.

Even that wasn't too much for Elizabeth, though. Thinking back, I'm amazed at how patient she was. I think what finally got to her was when I started sleeping out in the garage so I could catch late-night 80-meter band openings. I found a note saying she'd taken the kids and was going to stay with her mother until I "came to my senses." Since she left right at the start of the CQ WPX CW Contest, I didn't notice until two days later.

I was depressed, sure, but that only threw me even more heavily into my hamming. I started getting bored with contests, and in order to satisfy my cravings, I went into more and more exotic modes of operation with bigger and better equipment. I had to sell the car and some furniture to finance it all, but I didn't care. RTTY, slow scan and fast scan television, computer-generated c.w.—I tried it all. The neighbors turned on me after I fired up my new 6-meter KW and blew the front ends out of television sets in a 3-block radius. How was I supposed to know everyone was watching the Super Bowl on channel 2?

After I paid off the 65 television repair bills, I sold the 6-meter gear and went into the ultimate—moonbounce. But the neighbors still held a grudge. After I put up a huge EME array, the Neighborhood Improvement Association tried to sic the City Council on me. They wanted to ban my antenna farm because it was "unsightly"! Can you believe it? A beautiful antenna system like that "unsightly"? How narrow-minded can you get?

I managed to hold them off until . . . well, it was the last straw. A motorized

*ON-725 Barry Ave., Wheaton, IL 60187

hang-glider crashed into my new 200 foot tower. It wasn't my fault the flashing red light on top burned out at a bad moment. But they banned all towers higher than 10 feet as a safety hazard anyway. It didn't help any that the hang-glider pilot was the mayor's nephew.

When I lost the civil suit the pilot laid on me (he's slid down on a guy wire), I had to sell everything—the house, the gear, everything—and declare bankruptcy to pay the damages. I was left out on the street, cold, a derelict, with no family to turn to.

But still I didn't see the error of my ways. I had to get on the air again. My head pounded. I had bad dreams. My entire body shook. I was going into withdrawal.

Destitute and desperate, I made it to the house of my old ham buddy, Jan, KF0Z. I begged him to loan me a piece of gear—an old receiver, anything. He just looked at me, there on my knees, and with deep pity in his eyes he said, "Wayne, I can't do it. You've got to face it. You're a HAM-OHOLIC!"

"No!" I cried. "That's not true! I can stop hamming anytime I want to!"

Jan merely shook his head and sighed. "I'm not going to give you any gear, and neither is any other ham in town. There's only one thing for you to do: go cold turkey. Stay away from ham radio—forever!"

"No!" I exclaimed. "I have to operate I just have to!"

I pushed him away roughly, and stormed out the door. I'd get on the air again—somehow. I ran through the streets, banging on the door of every ham in town. But whenever I tried to beg for a code oscillator, anything, I was turned away. I tried to get into the club station, but they'd revoked my membership—"for my own good," they said. They were sore at me anyway because they'd all had to resort to low-strung wire antennas as a result of the tower ordinance. I was alone.

I found a place to sleep at a 50¢ a night flophouse. I started searching through the garbage bins behind radio repair shops looking for discarded parts and bits of wire. I even went through the city dump looking for old TVs and radios to pilfer tubes from. I had to put together some gear, no matter how crude.

One day I hit the jackpot. I found an old Knight-kit receiver under a pile of rotting fruit. I had already scraped together enough parts to build a little one-tube transmitter, with one crystal, in the 40 meter Novice band. Now all I needed was an antenna. I tried to steal some wire from a clothesline in someone's backyard, but a dog chased me off. I finally ended up loading my sorry excuse for a rig into the bedsprings of my bunk in the flophouse.

After a few hours of desperate CQ calls, I finally managed to snap a contact with a Novice six blocks away. He only gave me an RST of 221, but it was a QSO! I was overjoyed.

My happiness was short-lived, however. I was just thanking the Novice for saving my life by working me when some wino staggered in and mistakenly crashed down on my bunk. A jolt from the transmitter abruptly shocked him into sobriety, and he angrily reached over and smashed the whole works with his fist. The subsequent brawl resulted in my being evicted and thrown out into the street.

It was there, lying in the gutter, that I finally admitted it to myself. I was a hamoholic, and I needed help. I found my way to the hospital and told them my story. One of the doctors was a ham, and he understood. They locked me in a lead-lined RF-proof room and made me dry out for a month.

Now, I'm okay. I'm back with my wife and kids, and I'm working again. Still, not a day goes by when I don't think of getting back on the air. I tore up my license to make sure I'd stay off, but I still have dreams about those pulsing, rhythmic notes of Morse pounding in from the four corners of the earth. However, I think I've found a safe alternative. It takes no license, and I couldn't transmit, so I'm sure it would be okay. I think I'm going to try... shortwave listening!

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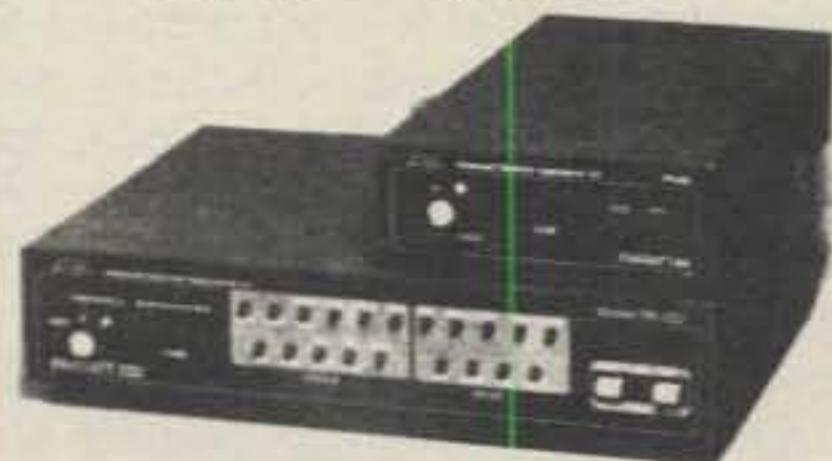
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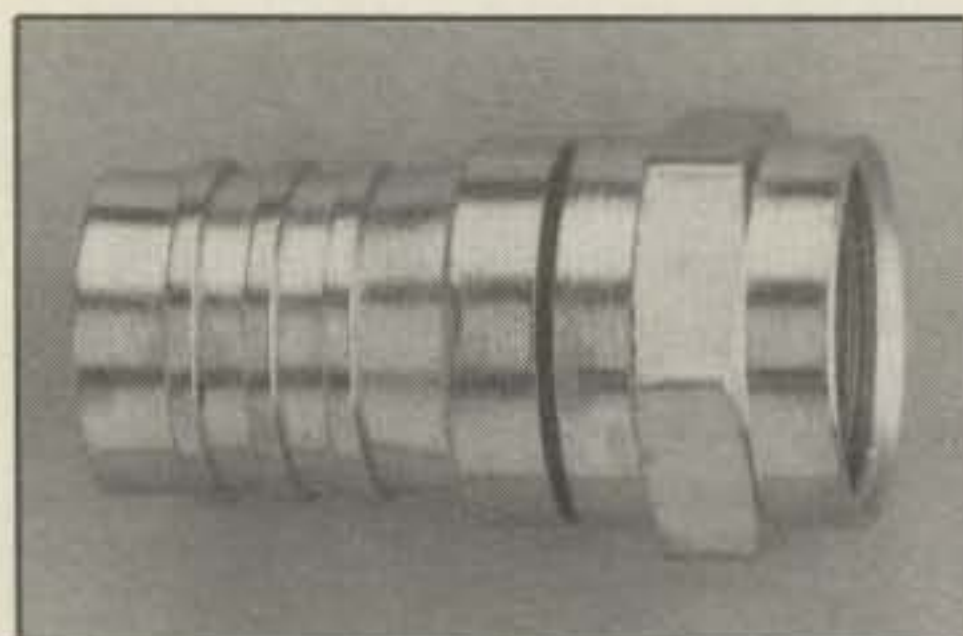
Using CATV Cable Coax For Amateur Antennas

BY CARL HUETHER*, KM1H

The standard coax cable attenuation chart that has been in many issues of the *Radio Amateur's Handbook* and the *ARRL Antenna Manual* over the years undoubtedly has been used by countless thousands of amateurs. However, I recently had a need to refer to that chart and discovered to my dismay that it did not cover the type of cable in which I was interested. This article provides expanded information on 75 ohm CATV cable.

In my estimation, the communications world appears to be overly biased toward traditional 50 ohm cable. One seldom finds mention of 75 ohm cables in amateur radio magazine articles. Yet most if not all current solid-state HF and VHF rigs will operate into 75 ohm loads without power degradation according to the manufacturers who were contacted. A little-publicized fact is that coaxial cable is most efficient at 75 ohms. The maximum power-handling capability for coax is at 35 ohms impedance. A compromise between the two ideals resulted in 50 ohm cable. At legal amateur power levels power-handling capacity is not an issue.

In on-the-air conversations with other amateurs, I have found tribanders such as the TH6DXX, A4, KT34XA, and others all successfully operating unmodified with CATV hardline. In addition, mono-band beams can easily be adjusted to 75 ohm feedlines, if that is even necessary. One major antenna manufacturer privately recommends CATV hardline for their VHF/UHF antennas in those instances in which every tenth of a dB counts. Note that Bird makes a 75 ohm version of their famous model 43 wattmeter. The "word" is slowly getting out about CATV cable, but there is still too much misunderstanding among the amateur ranks.



A typical F connector. (Photo courtesy Radio Shack.)

Why all the fuss? The issue comes up because CATV coax is available in any community that is wired for cable. Scrap lengths of CATV cable, called reel ends, typically are in the 100 to 300 foot range; longer lengths are often obtainable. In many areas an enterprising amateur will purchase large quantities of reel ends and make them available at a nominal cost. The scrap-metal dealer is another source of the aluminum-jacketed hardline. It is produced in such large quantities that even when purchased new the costs are less than similar 50 ohm cables. Quality control is excellent, and the inferior brands have fallen by the wayside. One caution, however: Although all modern CATV cables have the dielectric bonded to the conductors to prevent longitudinal moisture travel, it is good practice to cut off a foot from each end for each year the cable has been stored outside.

Contrary to popular misinformation, CATV cable and connectors will handle amateur-level transmitter power. I have used a 100 foot run of RG-6 to feed a 10 meter beam for over two years with up to 1300 watts of RF and a VSWR not exceeding 2:1. Using crimp-type "F" connectors and UHF adaptors from Radio Shack, I never experienced flash-over or intermittent grounding. Of course, the use of pro-

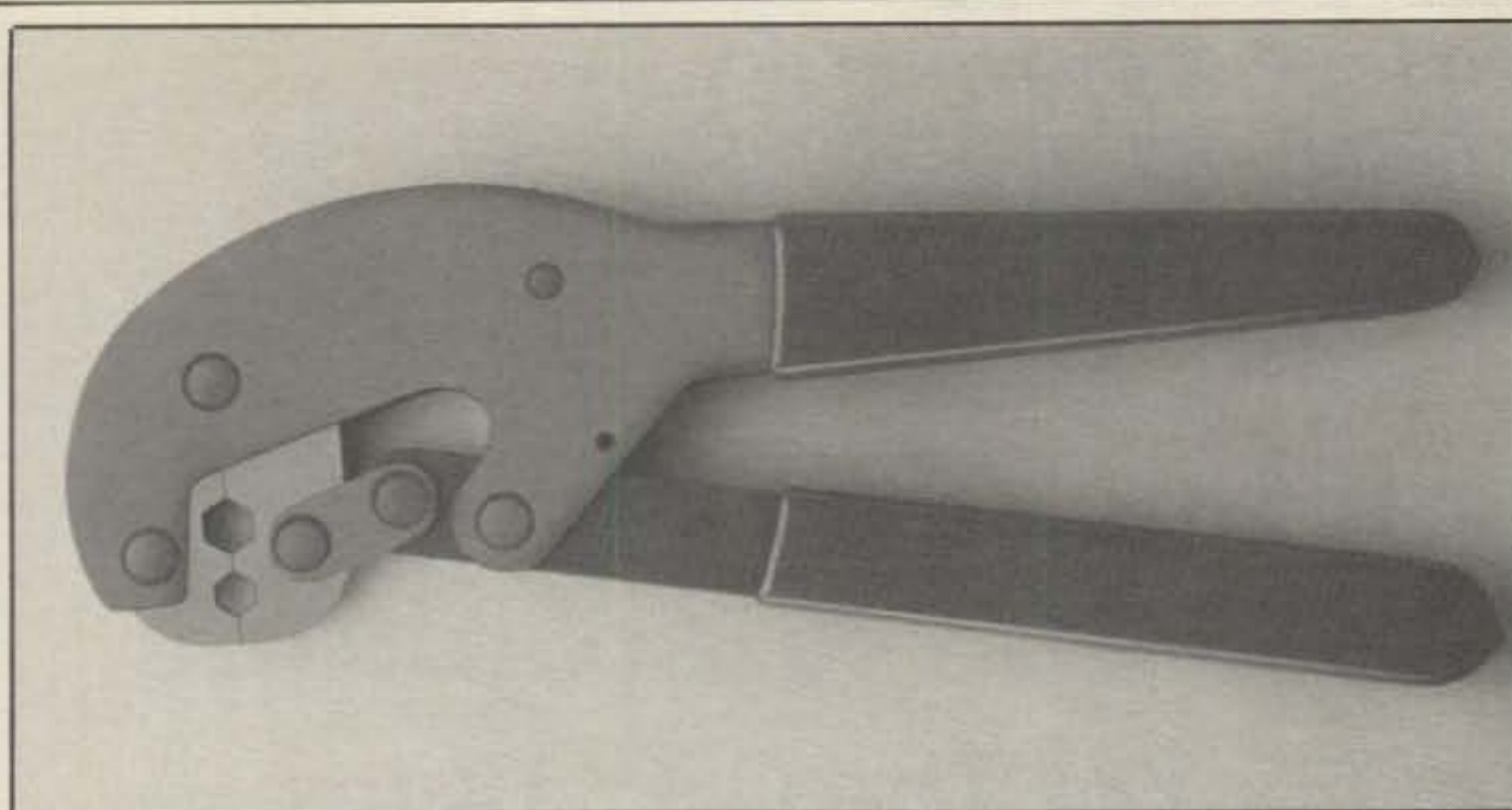
per weatherproofing procedures is assumed. The loss specifications for RG-6 are virtually identical to RG-213, and the cable was a gift, a discarded reel end. At 432 MHz, .500 inch diameter hardline will handle 1500 watts PEP CW/SSB with ease, although the serious weak-signal operators usually use the larger diameter cables to keep loss to an absolute minimum.

CATV cables come in two major varieties—flexible and semi-rigid. The flexible cables are usually called *drop cables*. These typically are run between the signal splitter on the telephone pole and the subscriber's TV set. RG-59, RG-6, and RG-11 types are considered drop cables and are designed for outdoor use with noncontaminating jackets. There are a tremendous number of subvarieties available for each type of cable, dependent upon the environment in which they are to be operated. It is beyond the scope of this article to explore those varieties in depth. A safe rule of thumb is if it is being used by your local CATV company, it will be fine for you.

Do not confuse outdoor CATV cable with the cable that is used in MATV distribution systems in apartment houses and motels. Those cables are inferior. The shielding is minimal, and impedance characteristics are far from constant. Minimal shield cable should not be used for amateur use.

Drop cables may be purchased inexpensively in reel lengths of 500, 1000, and 2500 feet from a CATV distributor. An added plus is the cable's superior shielding, virtually eliminating noise pickup. This certainly makes feeding those reversible 1000 foot Beverages a lot more attractive. Speaking of Beverages, here is an interesting test you can run. Terminate the far end of the feedline with the proper resistance and turn on your receiver. If you can hear any signal or atmospheric noise, that cable should be converted to use as a clothesline. One final

*54 Hobbs Rd., Pelham, NH 03076



The Radio Shack (278-243) crimping tool. This one features compound jaws for equal concerted pressure. (Photo courtesy Radio Shack.)


suggestion: If the cable is to be run in a damp environment, specify a bonded foil variety. This will preclude moisture seepage through the vinyl jacket from contaminating the foam dielectric.

Semi-rigid cable, also known as "hardline," is used in the trunking and distribution legs of a CATV network. Hardline has a soft aluminum outer conductor, a dielectric of either foamed polyethylene or solid-plastic spacers, and a copper-clad aluminum center conductor. The most commonly available variety of hardline does not have any protective covering over the aluminum sheath. Other varieties include jacketed for use in salt-spray or industrial-pollution areas; jacketed with a flooding compound for direct burial; and armored for underwater use. Attenuation of hardline cables will not increase with time as is the case with flexible cables. It must be handled with care as it is quite easy to collapse the soft aluminum if bending radius specifications are not adhered to. Practice with scrap lengths until you get the knack. It will not take long. For amateur use bare cable may be buried if it is given a protective coating. Automotive undercoating works quite well for this application.

Cable connectors could be the subject of a complete article. Here I will try to hit the highlights along with some do's and don'ts. Drop cable "F" connectors should be the one-piece type with the long crimp ferrule. If only a small number of connectors need to be crimped, the local CATV technician can probably help. If you find, like myself, that "F" connectors can be used everywhere in the house (TV, satellite TV, VCR, test cables, etc.), you probably will wish to invest in a professional crimping tool and buy the connectors in bags of one hundred. Please do not try to crimp with anything but the proper tool, as a reliable ground will not result. Also note that there is a difference between RG-6 and RG-59 connectors al-

though the same crimping tool is used for both. Radio Shack offers one (278-243) for \$11.95 that has compound jaws.

Homebrew hardline connectors may be used for frequencies up to about 150 MHz before VSWR and insertion losses become a problem. Since most homebrew connectors are made from brass or copper, it is mandatory that all mating surfaces that make contact with the hardline be coated with an anti-oxidant. Failure to do so can create a galvanic action that will destroy the cable. Penetrox is one brand name that comes to mind and may be obtained at electrical supply companies. (This stuff is also great when assembling telescoping beam elements.) Commercial CATV hardline connectors are available at reasonable cost, particularly when compared to their 50 ohm counterparts, and should always be used on the UHF frequencies. Adaptors are also available for type N and UHF fittings.

A recent setup at KM1H may be considered an extreme example of squeezing the last watt out of a rig. It uses 250 feet of 1 inch Fused Disc¹ hardline to feed 10, 15, and 20 meter homebrew 4-element monoband Yagis. Loss on 10 meters is a paltry 0.4 dB compared to 3 dB for a similar length of RG-213. Even 0.500 inch foam hardline would save 2 dB! Various 160, 80, and 40 meter antennas are fed with RG-6 or RG-11. One great thing about "F" connectors is that they are so easy to assemble. This makes experimenting with phasing lines and matching sections a cinch. I may be wrong, but I believe the lack of TVI in my neighborhood is partially due to the use of CATV cable. Also, all baluns are coaxial rather than ferrite, but that is another subject altogether. 

¹Fused Disc is the registered trademark of General Cable Company.



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Elements, Table 1, 25 to 1000 MHz	50.00
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RS-35A 13.8 VDC, 35 Amp Int., 25 Amp Cont.	127.60
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RS-20M Same As RS-20A, With Meter	100.76
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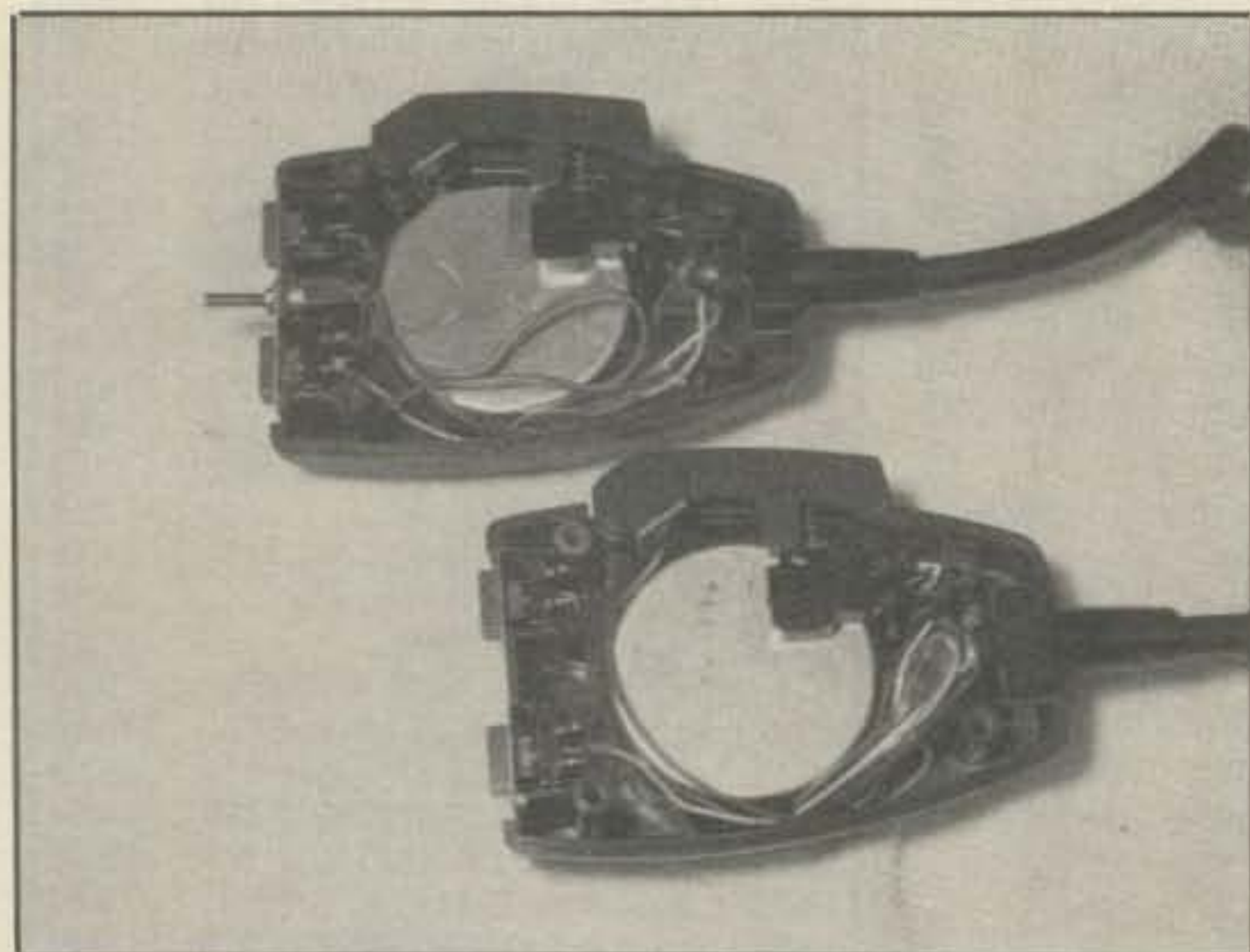
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It almost takes longer to read about than do. N4NIA comes up with a handy little modification to add a lockout switch to the Azden mobile microphones.

Add Your Own Lockout Switch To The Azden PCM-463 Microphone

A Dollar Fifty Fix For The QSY Blues

BY SPYROS KOSMETATOS*, N4NIA



The lockout switch is seen in the modified top microphone. The mic case has adequate space between the UP/DOWN function keys in the lower, unmodified version.



A view of the unmodified and modified microphones. The micro switch is conveniently located and accessible, yet does not interfere with mic usage.

The Azden 4000 and 5000 series mobiles are versatile transceivers. Both in 2 meter and 70 cm, their features and ability to handle odd offsets have made them popular with amateurs and CAP or MARS communicators.

One of the drawbacks of the unit is the PCM-463 Palm Control Microphone. This mic has a memory channel one call button, as well as an up/down function for moving through the memory channels or frequencies. These are handy features on any microphone. However, the lack of a lockout switch can be a real nuisance.

The problem is particularly bothersome when mobile. While driving along, reaching for the mic to answer a call, and watching the road, I invariably grab the mic and

end up hitting the up or down button. This results in an unintentional QSY that requires either going back to memory mode and stepping through the memories, or reprogramming the frequency and offset.

By entering the microphone and putting a switch between the up/down buttons and the radio's microprocessor, we can effectively lockout the buttons and prevent unintentional QSY's. By flipping the switch back on, we restore these features and the mic operates normally.

Installing The Switch

After removing the back cover to the microphone, identify the blue wire coming out of the coiled microphone cord connected to the down button on top of the mic. Disregard the shorter blue wire connecting the down button to the up button. Unsolder the wire from the switch and

PIN	COLOR	CONNECTION
1	YELLOW	MIC AUDIO
2	SHIELD	MIC GROUND
3	RED	LINE TO CPU
4	ORANGE	LINE TO CPU
5	BROWN	LINE TO CPU
6	BLUE	LINE TO CPU
7	GREEN	PTT
8	BLACK	PTT GROUND (4000) 13.8 VDC (5000)

Table 1- Microphone pin numbers and connections.

solder it to a SPST micro toggle switch. The Radio Shack SPST micro miniature toggle switch (cat 275-624, \$1.49) is ideal in size. Solder a wire from the other switch terminal to the terminal of the down button in the mic.

By drilling a 13/64 diameter hole in the top of the mic between the up and down

*12233 SW 262 St., Miami, FL 33032-7031

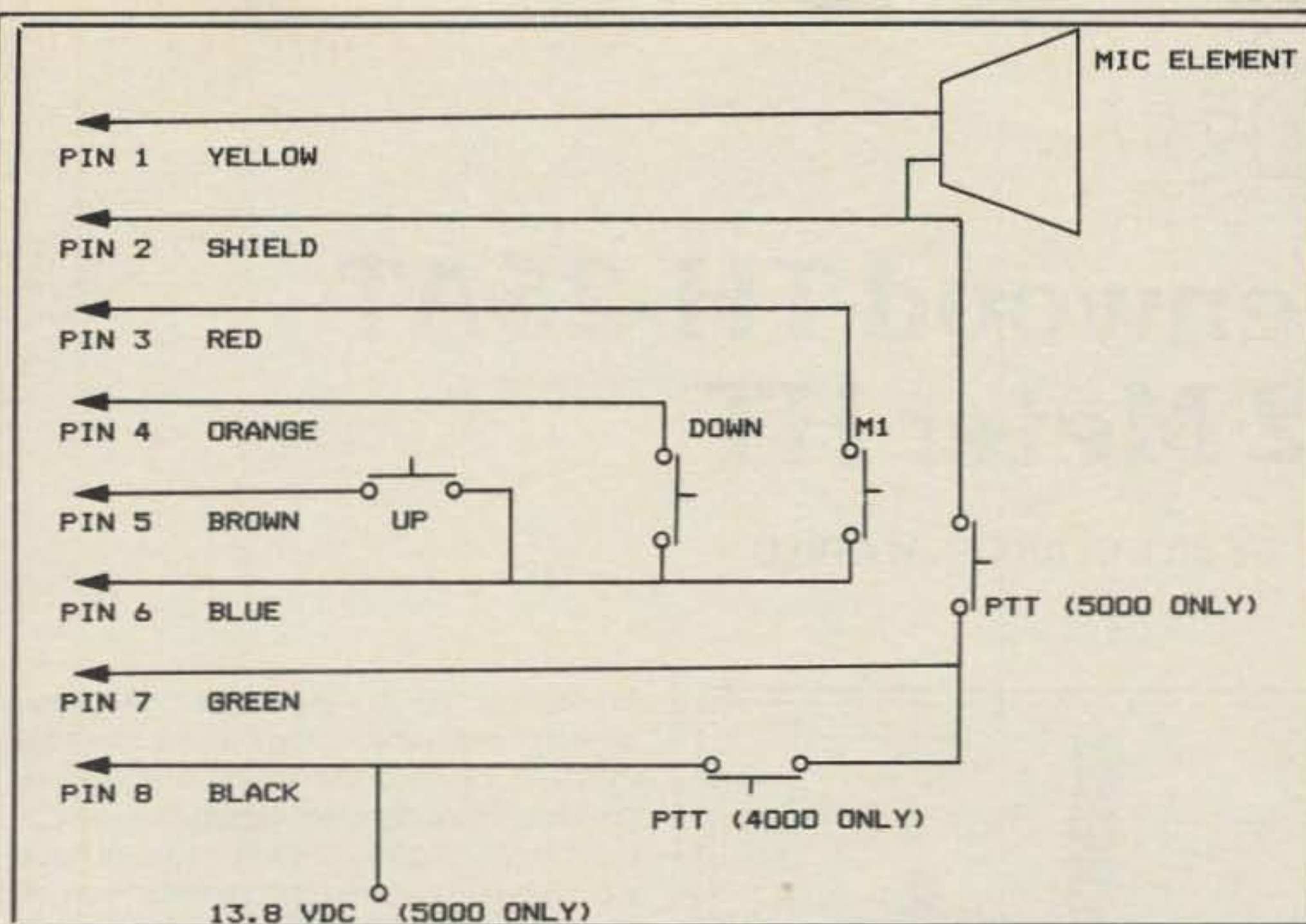


Fig. 1-PCM-463 mic wiring diagram.

function switches, the lockout toggle switch can be mounted inside the mic. This provides a clean installation, and puts the switch in a handy location next to the other controls.

After mounting the switch, be sure the terminal lugs or wire leads don't make contact with the metal microphone element in-

side the case. A short here will cause the microprocessor to do all sorts of strange things.

As you can see, the installation is easy and inexpensive. It should take 15 minutes if you take your time, and it can prevent a lot of aggravation when operating in the future.



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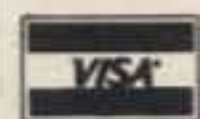
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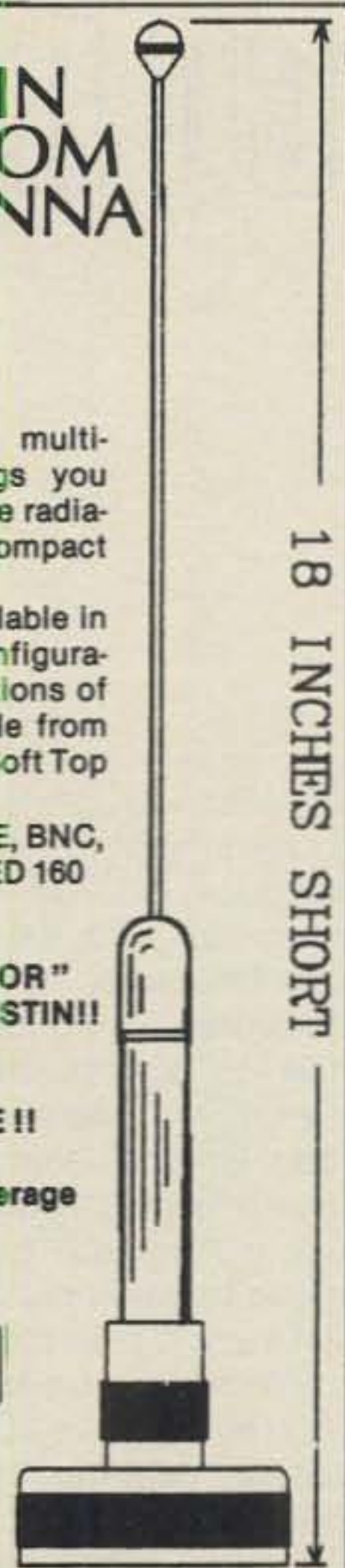
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The Kenwood TH-25AT 2 Meter HT

BY BILL CLARKE*, WA4BLC

It wasn't so very long ago when I thought I was king of the 2 meter circuit with my Motorola HT-200. For your folks new to amateur radio, the HT-200 was a one- or two-frequency hand-held radio built by Motorola during the 1960s. It was about the size of a brick and weighed about the same. It featured an on/off switch, squelch and volume controls, and a PTT (push to talk) switch. A very few offered more than one frequency. There have been major improvements in the field of HTs (hand-held radios) since that time.

With only a couple of exceptions, all current 2 meter HTs offer full microprocessor control. This means the operator enjoys features such as digital readout, memories, scan, and more. The operator also enjoys the reduced weight of modern HTs.

In recent years amateur equipment manufacturers have been engaged in a race to fit the most radio into the smallest usable package. Of the three big manufacturers, Kenwood was the last to introduce a really small full-feature HT.

The Kenwood TH-25AT is the smallest full-feature HT manufactured by Kenwood. It has a multipurpose LCD readout, VFO, 14 memories, 16-button DTMF pad, and short duck antenna.

Impressions

I liked the TH-25 from the first time I set eyes on it. I found everything operated as expected. It has all the standard features expected, and a few that I found particularly suitable:

Tone Alert—provides 5 seconds of beeping when a signal is received. Similar to a pager.

VFO—is a real knob that changes the frequency when turned.

Reverse—allows you to listen to the transmitting station on his frequency.

Auto-Offset—provides the proper 600 kHz offset when using the VFO.

Battery Saver—is activated after 10 seconds of inactivity. It reduces battery drain by about 80%.

Battery Level Meter—is a portion of the LCD display indicating voltage.

Batteries—are available from 200 mAh to 1100 mAh. I prefer the smaller size, to



The Kenwood TH-25AT 2 meter HT.

keep the HT package small.

Extended Receiving—frequency coverage of the TH-25's receiver is 141.000 MHz to 162.995 MHz. This includes the NOAA weather frequencies.

Problems

The first point I wish to make is that the only problems I encountered in the operation of the TH-25AT were "head space." That means a failure to understand what I was telling the radio to do, and the radio doing as instructed. This compact unit is not that simple to operate. The new user is well cautioned that it is necessary to be completely familiar with the instruction manual *before* attempting use. After reading all the how-to-do stuff, I had no further problems in telling the radio what to do.

The second point involves the layout of the switches on the TH-25. There are 34 controls on this midget-size radio. That's more controls than are found on many

full-feature HF transceivers. Naturally, physical placement of all these controls was a problem for Kenwood's design engineers. They did well. However, the operator with large hands will no doubt have a problem in operating some of the small push-activated switches.

Programming the memories requires operating several switches during a limited time span. The routine takes a little getting used to and may be hampered by the diminutive size of the switches.

Bench Check

The TH-25 was bench-checked and found to meet, or exceed, all the published specifications. This is not something spectacular. With today's modern CPU-based communications devices I seldom find equipment that does not at least come up to spec. Many exceed their published specifications.

Bench checks were made using the following equipment: Leader LDC 8243 Frequency Counter, Marconi Instruments 2022 Signal Generator, Bird 43 Wattmeter, Hewlett Packard Spectrum Analyzer, and Cushman CE-5 Monitor.

Specifications

General

Frequency range: 144.000 to 147.995

Mode: FM (F3E)

Memory channels: 14

Frequency step: 5 or 10 kHz

Antenna impedance: 50 ohms

Power requirement: 5.8 to 16 VDC

Current drain:

Transmit—800 to 1200 ma (HI), 400 ma max (LO)

Receive—55 ma (no signal), 16 ma (battery saver)

Dimensions: 58 × 137.5 × 29.5 mm (2.3 × 5.4 × 1.2 in.)

Weight: 400 g (14 oz.)

Transmitter

Output power: 5.0 W (PB-8 battery) HI, 3.5 W (PB-5,6,7,9 battery) HI, 0.5 W LO

Deviation: ± 5 kHz

Spurious radiation: less than -60 dB

Receiver

Circuitry: double conversion super-heterodyne

IF: 16.9 MHz (1st IF), 455 kHz (2nd IF)

Sensitivity: less than .16 uV (12 dB SINAD)

Squelch sensitivity: less than .1 uV.

Selectivity: more than 12 kHz (-6 dB), less than 28 kHz (-40 dB)

Audio output: more than 200 mw (10% distortion)

Accessories

Kenwood provides a complete line of accessories for the TH-25. They include:

PB-5 NiCd Battery Pack: 7.2 V at 200 maH

PB-6 NiCd Battery Pack: 7.2 V at 600 maH (standard)

PB-7 NiCd Battery Pack: 7.2 V at 1100 maH

PB-8 NiCd Battery Pack: 12 V at 600 maH

PB-9 NiCd Battery Pack: 7.2 V at 600 maH with built-in charger

BT-6 Battery Case

BC-9 Wall Charger (standard)

BC-10 Compact Charger

BC-11 Rapid Charger

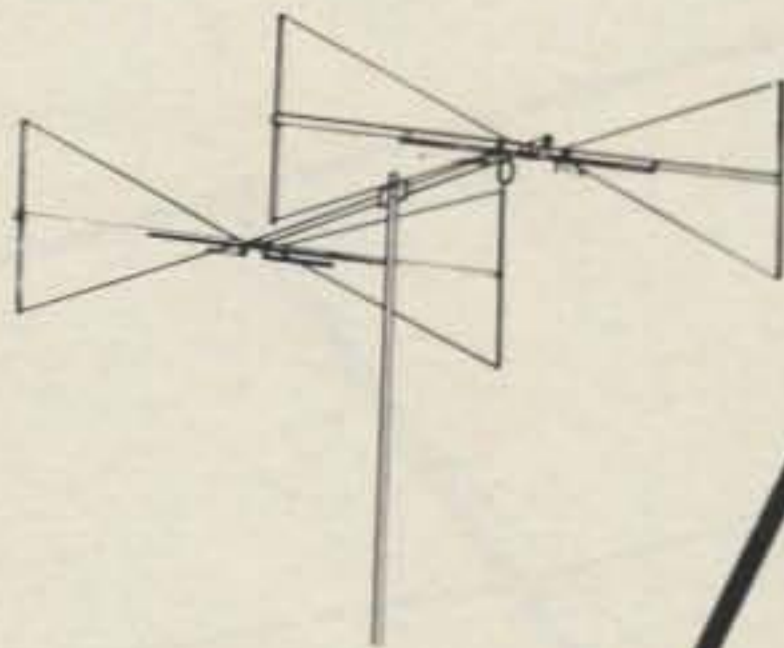
TSU-6 CTCSS tone board

Also offered are two types of DC adapters and various soft cases. CQ is preparing a review of these accessory products which will appear shortly.

Thanks to the Electronic Equipment Bank (516 Mill Street, Vienna, VA 22180 [1-800-368-3270]) for the use of their test facility and for providing a new-in-the-box TH-25AT for this product review.



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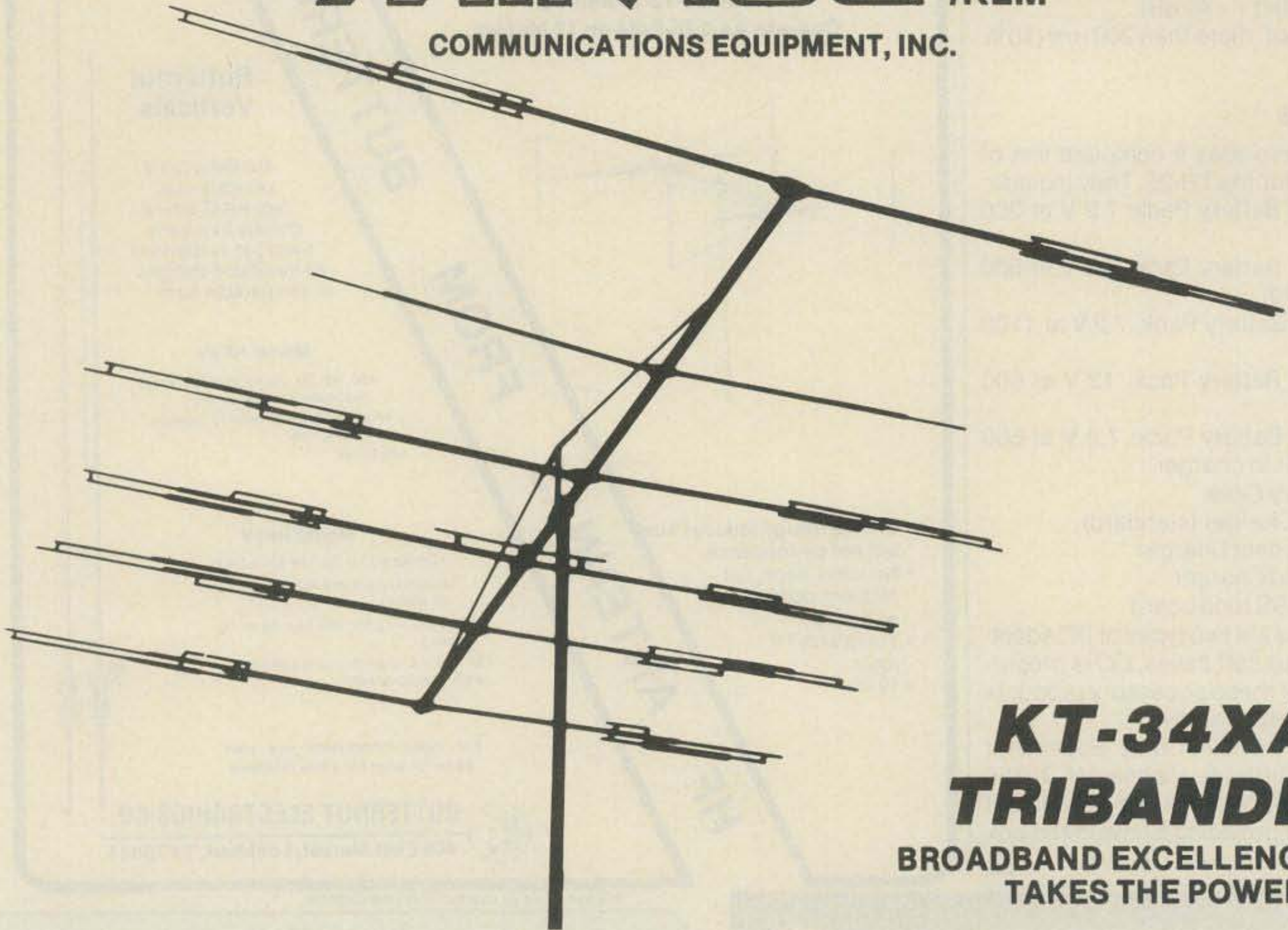


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KLM's KT-34XA TRIBANDER is the 2nd generation of a unique new series of antennas designed to provide superior **broadband** coverage on 20, 15, and 10 meters. The combination of lossless linear loading and hi-Q air capacitors enables the KT-34XA to outperform **all** commercial available tribanders and meet or exceed the performance of a conventional stacked monoband system. The lower weight and windload of a single antenna mean reduced tower and rotator requirements. Thus, overall system costs can be kept to a minimum while enjoying the best of monobander-type performance.

KLM's field proven KT-34A is the heart of the "XA" model. The boom length of the "XA", however, has been doubled, and one tri-resonant and one full size 10 meter element have been added. These changes increase the gain to **11-11.3 dBd** on 10M, **9-9.5 dBd** on 15M, and **8.5-9 dBd** on 20M. Two driven elements are used to make the KT-34XA unusually broadbanded (a concept applied to many KLM antennas). Gain is virtually flat across each band except for 10 meters which has been optimized for the DX'er, 28-29 MHz. The chart shows the remarkable performance qualities of the KT-34XA.

The KT-34XA's design represents the first major advancement in tribander technology in over 20 years! The conventional traps, coils, and capacitors have been discarded in favor of integral linear loading and hi-Q air capacitors, all composed of aluminum tubing. These give the KT-34XA a conservative power handling capability of 4 KW PEP and an unusually high level of operating **efficiency**. Linear loading also makes full $\frac{1}{4}$ -wave elements possible on 15 and 10 meters, and brings 20 meters much closer to the desirable $\frac{1}{4}$ -wave than any conventional tribander.

BANDWIDTHS: ...	14.0-14.350 MHz	GAIN:	8.5-9dB
	21.0-21.50 MHz		9-9.5dB
	28-29 MHz		11-11.3dB
VSWR:	1.5:1	BOOM LENGTH:	32 ft. x 3" O.D.
FB/FS:	20dB/40dB	TURN RADIUS:	21.5 ft.
FEED IMP.:	50 ohms w/balun	WINDLOAD:	9 sq. ft.
BALUN:	3-60-4:1 5KW PEP	WT. (LBS.):	75 lbs.
ELEMENT LENGTH:	24 ft.	MAST:	2" O.D. (standard)

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DAYTON Hamvention

April 29, 30, May 1, 1988

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- License exams • Free bus service
- CW proficiency test • Door prizes

Flea market tickets and grand banquet tickets are limited. Place your reservations early, please.

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A maximum of 3 spaces per person (non-transferable). Tickets (valid all 3 days) will be sold IN ADVANCE ONLY. No spaces sold at gate. Vendors MUST order registration ticket when ordering flea market spaces.

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Nominations are requested for "Radio Amateur of the Year", "Special Achievement" and "Technical Achievement" awards. Contact; Hamvention Awards Chairman, Box 964, Dayton, OH 45401.

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Novice thru Extra exams scheduled Saturday and Sunday by appointment only. Send FCC form 610 (Aug. 1985 or later) - with requested elements indicated at top of form, copy of present license and check for \$4.35 (payable to ARRL/VEC) to: Exam Registration, 8830 Windbluff Point, Dayton, OH 45458

Hamvention Video

VHS video presentation about the HAMVENTION is available for loan. Contact Dick Miller, 2853 La Cresta, Beavercreek, OH 45324

1988 Deadlines

- Award Nominations: March 15
- Lodging: April 2
- License Exams: March 26
- Advance Registration and banquet:
 - USA - April 4
 - Canada - March 31
- Flea Market Space:
 - Orders will not be processed before January 1

Information

- General Information: (513) 433-7720 or, Box 2205, Dayton, OH 45401
- Flea Market Information: (513) 898-8871
- Lodging Information: (513) 223-2612
- (No Reservations By Phone)

Lodging

Reservations received after Housing Bureau room blocks are filled will be returned along with a list of hotel/motels located in the surrounding areas of Dayton. The reservation will then become the responsibility of the individual.

HAMVENTION is sponsored by the Dayton Amateur Radio Association Inc.

Lodging Reservation Form

Dayton Hamvention - April 29, 30, May 1, 1988
Reservation Deadline - April 2, 1988

Name _____
Address _____
City _____ State _____ Zip _____
Phone _____
Arrival Date _____
() Before 6 pm () After 6 pm
Departure Date _____
Rooms: () Single () Double (1 bed, 2 persons)
() Double Double (2 beds, 2 persons)

Deposit required - Room deposit must be paid directly to the hotel or motel by date shown on the confirmation form sent to you. Use canceled check for confirmation.

Mail to - Lodging, Dayton Hamvention, 1880 Kettering Tower, Dayton, OH 45423-1880

Advance Registration Form

Dayton Hamvention 1988
Reservation Deadline - USA-April 4, Canada-March 31

Name _____
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City _____ State _____ Zip _____

	How Many		
Admission (valid all 3 days)	_____	@ \$8.00*	\$ _____
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Women's Luncheon (Saturday)	_____	@ \$6.75	\$ _____
(Sunday)	_____	@ \$6.75	\$ _____
Flea Market (Max. 3 spaces)	_____	\$23/1 space	
		\$50/2 adjacent	
Admission ticket must		\$150/3 adjacent	\$ _____
be ordered with flea market tickets		Total	\$ _____

* \$10.00 at door ** \$18.00 at door, if available

Make checks payable and mail S.A.S.E. to - Dayton Hamvention, Box 2205, Dayton, OH 45401

PLEASE SEPARATE

The next time you pack for a mini- DXpedition/vacation, leave some room in the suitcase for your computer. N3JT explains how you can put it to good use.

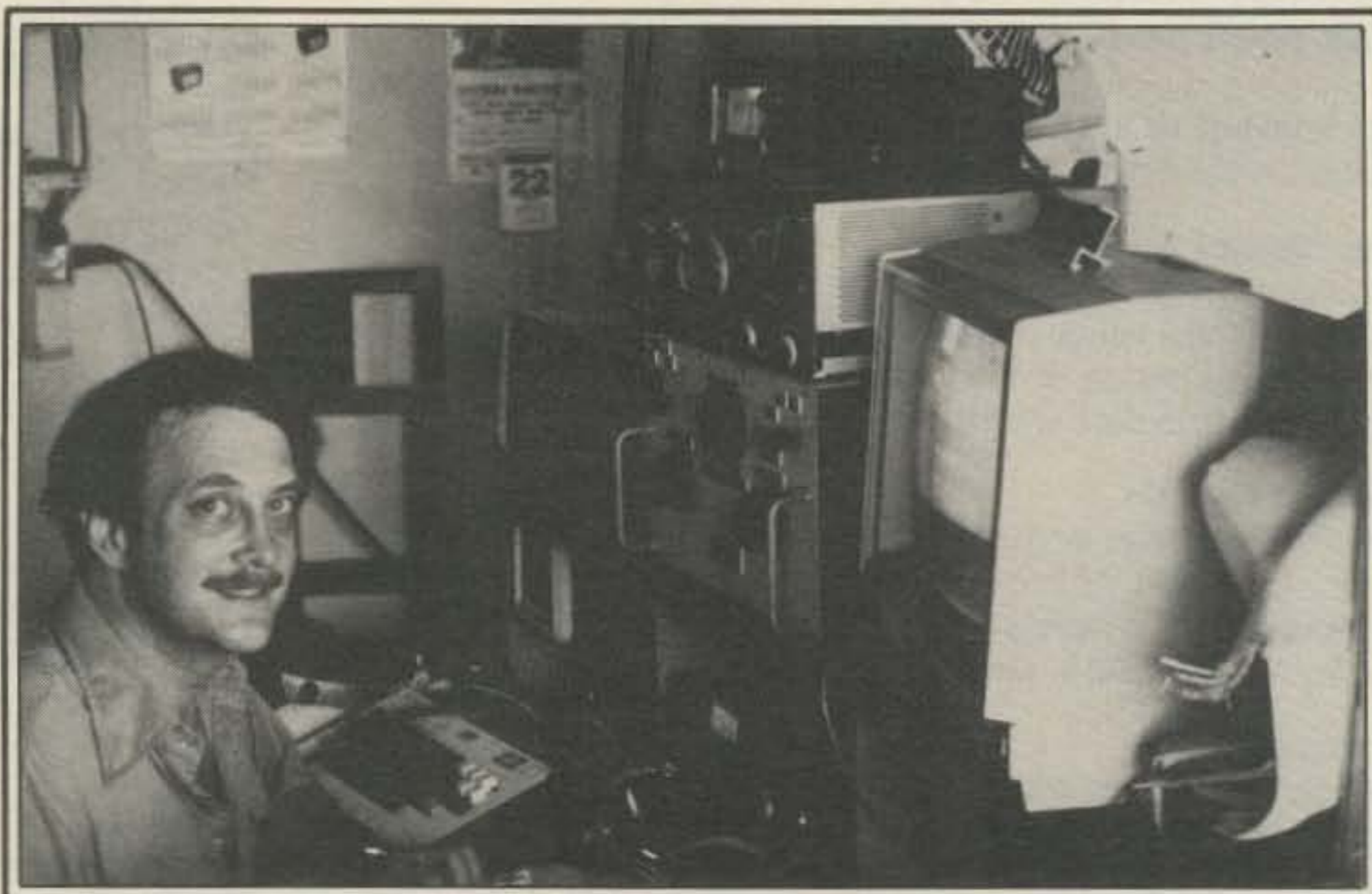
Operating the CQ WW Contest From HKØ With A Computer

BY JIM TALENS*, N3JT

Why would I use a computer during a contest operation from San Andres Island? Why would I dehumanize a contest with automation or computerization? And what fun could there be when the computer makes all the contacts? The single answer is that there is a range of useful jobs a computer can perform during and after a contest to reduce drudgery and fatigue—without removing any of the fun, without dehumanizing the experience, and without removing any of the skill involved or needed. The purpose of this article is to share my experience using a computer during my DXpedition to San Andres Island last November.

A problem I have always had in contests is fitting call signs in the molecule-size spaces provided on log sheets. I found this an especially serious problem in October 1986 when I operated the CQ WW SSB Contest from San Andres (see CQ magazine, April 1987, for a description of that DXpedition). With my "pharmaceutical" handwriting, meaning that only a pharmacist can read it, I couldn't even tell for sure what countries I had worked. (Quite a problem for those who review contest logs, too!—ed.) It was no easy matter for my QSL manager to decipher call signs either, which in some cases delayed response to QSL requests. The solution to this problem is to use some method of logging that does not require handwriting. That means using a computer!

In recent years a number of software packages have been developed for just this purpose. It happens that a close friend, N4ZR, has prepared universal software with contest-specific capability. It was his "Winner's Edge Software" for CQ WW that I chose to take with me to San Andres in an attempt to solve my logging problem. As you will soon learn, it did more than solve just this problem. In addition to N4ZR's program disks I took my



Here's the author operating RTTY from HKØ in November 1987. The keyboard visible in the background is for CW. Not visible here is the family of mosquitoes that shared the shack with Jim for a whole week.

Commodore 64C and the disk drive. Packing the computer and disk drive was quite easy. They fit nicely in my suitcase, sandwiched between wads of bubble plastic and clothing.

The N4ZR software normally includes duping capability. This means that upon entering the call sign of the station to be worked, the computer scans the list of call signs already worked and instantly notifies you of the prior QSO by three audible "bongs." For a DXpedition operation, dupe checking is not necessarily desirable. The time required to communicate "already worked" to the calling station is greater than the time consumed logging the duplicate contact and purging it later. Attending to dupes also tends to be distracting and can reduce the contact rate until you get back "into the groove." I was also interested in maximizing the diskette's QSO capacity, which is reduced somewhat because the duping function consumes additional

computer memory. For these reasons, a special version of the software was prepared that eliminated this function. I therefore had a program that could log and send tailored, pre-programmed messages from a monitor menu. A list of messages appears on the monitor screen. Adjacent to each message is a letter. Depressing that letter on the keyboard causes that message to be transmitted.

None of the contest programs I know of can copy CW off the air. The possibility of an algorithm that can pick one call sign out of hundreds under marginal conditions with rapid QSB and QRM is not likely soon! Using a computer for contest logging and message dispatch, then, does not reduce in any way the skill needed to operate a contest or the fun and satisfaction derived from it. The message menu includes all the reports and queries normally expected to be needed during a contest, some 23 of them. The program also permits CW direct from the key-

*P.O. Box 19436, Washington, D.C. 20036

board. I have designed and built a computer-to-transmitter interface that can be used with any transmitter. It includes adjustable weight to compensate for fast-acting QSK circuits, certain propagation conditions, and keying taste. (Write to N3JT for details.)

Using a computer during a contest requires some adjustment. No longer do you dive to the keyer when a station calls you. Instead, you simply type the call sign as it is received. The computer does the rest, including transmitting the other station's call and his contest exchange. This software requires entry of the other station's call sign just once. The received exchange is entered the same way. At the end of the contact the enter key is depressed and the QSO data are transferred to computer memory. You can also correct a call sign any time prior to final entry. The disk receives data on every third contact, so if electrical power is lost or the computer goes down, the maximum number of contacts lost will be three. This is one of the reasons why I was not afraid to use the program. As long as the disk drive on-light is glowing, the system is working. You can continually be assured by the whir of the disk drive on every third contact!

I found that during the contest it was sometimes necessary to interject, independent of the built-in keyboard, a comment or short message that was not on the menu. Therefore, I connected my old faithful keyer in parallel with the keyed output of the computer interface. This provided greater flexibility during critical moments of the contest. It did not in any way reduce the integrity or utility of the computer system. In the frenetic activity of the contest when the QSO rate exceeded 125 per hour, the computer proved to be an excellent assistant. So far, no contest committees have ruled that computer logging constitutes multi-op! I never used a pen or pencil! At the beginning of the contest I had a pen and scrap of paper ready for jotting down call signs and occasional notes. Just as the contest began, I dropped the pen. It rolled under the operating table but I never needed to find it! By the end of the contest I had made some 4,000 QSOs (in about 40 hours). All I had to show were two diskettes! It was definitely an uncomfortable feeling, but I was optimistic.

I took particular care with the diskettes going home, avoiding airport x-ray machines and magnetic security devices. Within a few hours of my arrival at home, I had all the logs and dupe sheets printed and ready to mail! Not a single call sign was illegible, there were no ambiguous letters in call signs, and the logs were by far neater than any logs I had ever prepared before. I also discovered that, unlike after most other contests, I was not fatigued. Apparently typing call signs onto a keyboard is considerably less tiring

than manually printing each call sign onto a logsheet. Even my eyes were in good shape, because once I became accustomed to using the computer, I only had to glance at the monitor to confirm that I had typed the correct call sign.

In sum, I found the computer for contest logging and operation to be a very practical alternative to hand logging, and far less tiring. There are several software packages available in the marketplace to compare. If you don't already own a computer and you participate in contests, this may be just the additional reason you need to buy one! See you in the pileups!

San Andres is a Colombian island 11 km wide and 27 km long located 275 km northeast of the Nicaragua/Costa Rica border in the Caribbean Sea. It serves as a free port and resort for Colombians, though English is spoken widely, and has a rustic ambiance, tropical weather patterns, and attractive white sand beaches. During my quasi-DXpedition of 4 days, I managed 6,000 QSOs, 4 phone patches, one dose of sunburn, and 11,000 mosquito bites. Of greatest significance, I maintained the friendship of my host, HK0BKX, whose rig and fans lured me from palm trees, gentle breezes, and beautiful temptation. Special thanks are extended to the Colombian Radio League and Ministry of Communications for their grant of licensure.



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This MFJ Keyer is small in size but big in features. It features iambic keying, adjustable weight and tone and has front panel volume and speed controls (8-50 WPM), dot-dash memories, speaker, sidetone and push button selection of semi-automatic/tune or automatic modes. It's also totally RF proof and has ultra-reliable solid state outputs that key both tube and solid state rigs. Uses 9 V battery or 110 VAC with MFJ-1305, \$9.95.

The keyer mounts on a Bencher paddle to form a small (4 1/8 x 2 5/8 x 5 1/2 inches) attractive combination that is a pleasure to look at and use.

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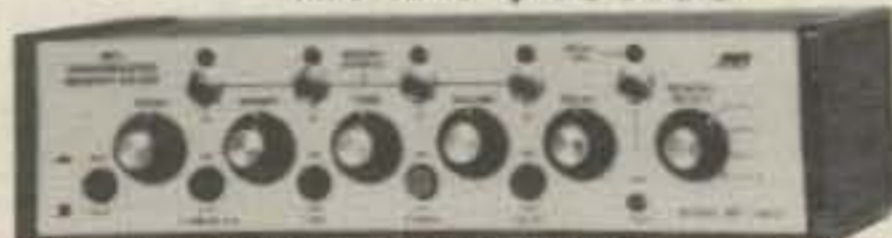
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You get a Super Morse Keyboard mode that lets you send perfect CW effortlessly from 5 to 99 WPM, including all prosigns -- it's tailor-made for traffic handlers.

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You can save slow scan pictures on disk from over-the-air QSOs if your terminal program lets you save ASCII files.

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Nothing beats the quick response of a memory keyer during a heated contest.

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You get iambic operation with dot-dash memories, self-completing dots and dashes and jamproof spacing.

Message memories let you store contest RST, QTH, call, rig info -- everything you used to repeat over and over. You'll save precious time and work more QSOs.

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MRF422*	150W	36.00	78.00
MRF454/A	Q 80W	14.50	32.00
MRF455/A	Q 60W	11.75	26.50
MRF485*	15W	6.00	16.00
MRF492	Q 90W	16.00	35.00
SRF2072	Q 65W	12.75	28.50
SRF3662	Q 110W	24.00	53.00
SRF3775	Q 75W	13.00	29.00
SRF3795	Q 90W	15.50	34.00
SRF3800	Q 100W	17.50	38.00
2SC2290	Q 80W	16.75	39.50
2SC2879	Q 100W	22.00	48.00

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MRF248	80W 136-174	33.00	71.00
MRF641	15W 407-512	18.00	42.00
MRF644	25W 407-512	21.00	46.00
MRF646	40W 407-512	25.00	54.00
MRF648	60W 407-512	31.00	66.00
2N6080	4W 136-174	6.25	—
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Interference in a neighborhood draws people to amateurs like a magnet. What happens when the situation is reversed and the amateur is being interfered with?

A Case of Mysterious Interference Solved

BY J. E. WESTCOTT*, W4UVS

For almost two years all frequencies on the 2 meter amateur band at my home were constantly interfered with by a strong pulsing signal. The intervals of the pulses varied from two per second to six, then as fast as a jack hammer (too fast to count). These speed variations would last from weeks to months without changing. The pulses were stronger than most incoming amateur signals and would chop them up badly.

Portable and mobile receivers indicated that the signals appeared to come from a utility pole 75 feet from my home in the yard of my next-door neighbor. The pole held electrical transmission lines, two large telephone cables and splice boxes, cable TV lines, and a large booster amplifier. The signal was heard over 5,000 feet in four directions from the area of the pole.

Those using the pole were notified of the problem. The city electrical department sent a contract communication company with two men and a spectrum analyzer to inspect their system. They verified my findings and determined that the signal had many spikes all over the amateur band and well into the 150 MHz band. They could not find the source of the signal, but determined that it was not coming from the electric distribution system. After several trips by the cable TV company and cutting off all services in the area, we both agreed they were not at fault. A bucket truck from the telephone company came one Saturday and found no problem with their system.

My neighbors were aware of my interference problem, and all denied having digital electronic devices such as a timing circuit, alarm system, computer, or scanning receiving device that might radiate such a signal.

After exhausting all attempts to solve the problem on the local level, a package was sent to the FCC in Atlanta, Georgia. It contained tape recordings of the various

intervals of the pulses, photographs of the services on the pole, and a complete, detailed report on what had been done locally to find the source of interference.

Donald E. Taylor, Engineer in Charge of FCC Field Operation Bureau, Powder Springs, Georgia, responded to my letter, saying in part, "Due to very stringent budgetary restraints on travel, an immediate trip to your area to locate the source of your interference is not possible at this time. However, since this type of interference must be located by direction-finding techniques, we will attempt to investigate your complaint the first time an FCC unit is scheduled for the Oak Ridge area either from this office or the Atlanta office."

In September of 1987 Richard D. Breen, Electronic Engineer of the Enforcement Division from the FCC Powder Springs Monitoring Station, came to this area on other business. He had my file and arrived at my home after dark. Breen verified my findings with his mobile equipment. Arriving back near the pole, he used a hand-held direction finder which led him to the center of my neighbor's house—the same person who had known of my problem for more than a year. The direction finder led Breen inside the house to a device about the size of a package of cigarettes. It was plugged into the wall through a 9 VDC converter. The trade name was "Bug Away," an ultrasonic device to repel insects that is sold on cable TV for around \$30. Mr. Breen stated that the device was in violation of Part 15 of the FCC regulations, but he did not feel that a citation to my neighbor was in order. Breen said that the only other printing on the device said that it was made in Taiwan. He hopes to trace down the importer through the TV station that carries the advertisement and stop the units from entering the country in the future.

The neighbor agreed to stop using the "Bug Away." He said it didn't work anyway, even when they changed the adjustment on it. That was what caused the pulses to vary.

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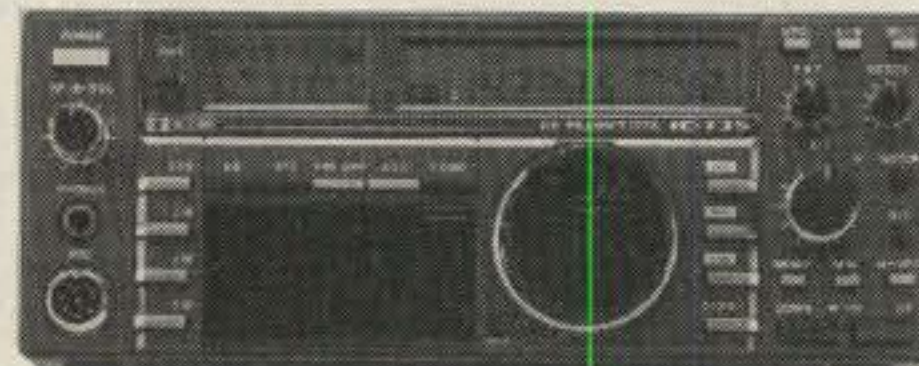
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CQ Showcase



Electron Processing Suction Cup Antenna

People who live in glass houses should not drill holes, but they can still operate VHF, thanks to Electron Processing's novel VAK-TENNA. The mounting base consists of two powerful suction cups capable of holding the antenna firmly in place. Two telescoping elements in a standard dipole configuration provide a transmit operating range of 50-250 MHz. Available with most standard connectors, the unit comes with 15 feet of RG-58 feedline. Prices start at \$29.95. For more information contact Electron Processing, PO Box 708, Medford, NY 11763 or circle number 102 on the reader service card.

New HF Mobile Resonators

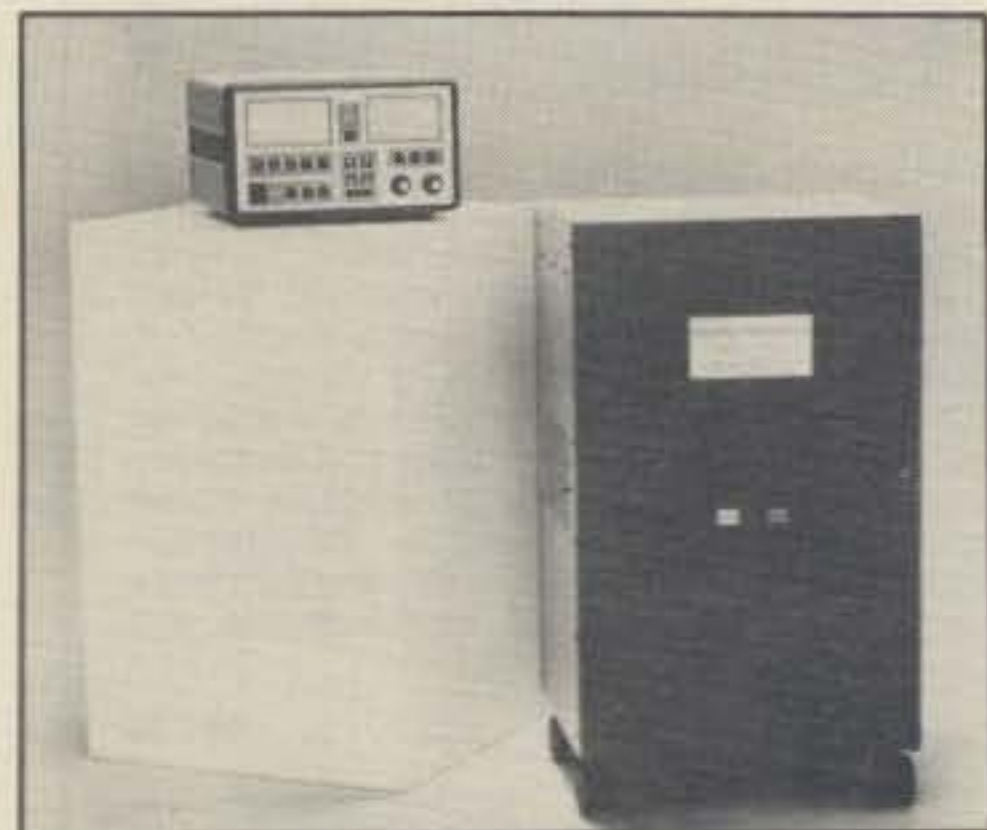
Hustler now offers resonators for the 12- and 17-Meter bands to complement their line of HF resonators. The RM-12 offers approximately 100-kHz coverage of the 12-Meter band with a rating of 400 W. The RM-17 has a bandwidth of approximately 150 kHz and a 400 W rating, also. Both resonators are compatible with the Hustler Mobile HF System. Hustler has also announced an upgraded version of its 10-Meter antenna, the RMX-10. The RMX sports a bandwidth of 350 kHz and a power rating of 1 kW. For more information, contact Newtronics Antenna Corp., One Newtronics Place, Mineral Wells, TX 76067 or check number 109 on the reader service card.



Super ICOM Replacement Batteries

Periphex has introduced two heavy-duty replacement batteries for the ICOM series of HTs. The BP-7S has a capacity of 900 mah at 13.2 V. The BP-8S offers

1200 mah at 9.6 V. Both are base charge only and come with a 1 year guarantee. For more information, contact Periphex, 149 Palmer Road, Southbury, CT 06488 or check number 103 on the reader service card.



Full Legal Limit HF Amplifier

Advanced Radio Devices now offers a top-of-the-line HF amplifier built around the 3CX800A7. A built-in microprocessor allows total automatic control of the amplifier through an RS-232 port. The control head can be located remotely from the RF deck. Only 50 - 70 W of drive will produce an output of 1500 W PEP. For more information, contact Advanced Radio Devices, 103 Carpenter Dr., Sterling, VA 22170 or check number 104 on the reader service card.



New 900 MHz Antennas

NCG is now offering base and mobile antennas for the 900 MHz band. The CMW-202N magnetic mobile mount antenna is a gain design with a power rating of 30 W. The CFC7-71 is a base/repeater antenna with a power rating of 50 W. The collinear antenna is protected in a Fiberglass housing. For more information, contact NCG, 1275 North Grove St., Anaheim, CA 92806 or check number 108 on the reader service card.

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—Fred Blechman, K6UGT

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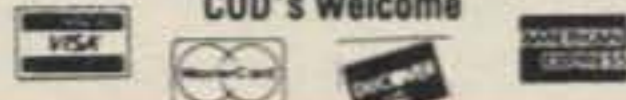
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NEWS OF CERTIFICATE AND AWARD COLLECTING

The Story of the Month for March is:

**Daniel G. Hammell, WA9EZT
USA-CA All Counties #467, Mixed,
2-25-84**

"Two of the highlights of my life were working my last county on 20 meter SSB—Coleman, Texas—with Mel, W5AWT/M, on February 7, 1984, and working my last county on 75 meter SSB—Glenn, California—with Sam, K6EW/M, on April 28, 1987.

"At this writing I need eight more confirmations to reach my goal of confirmed contacts with 75 meter SSB mobile stations in all counties.

"My amateur radio career began in 1962 when I received a Technician class license. I received General and Advanced class in 1965.

"My first county worked was Dunn, Wisconsin, with WA9SXJ during the Wisconsin QSO party on February 11, 1967. The first time I checked into the old CHC (Certificate Hunters Club) net was on September 6, 1968.

"I served with the U.S. Navy as an Aviation Electronic Technician during World War II, and continued in the Naval Reserve for several years after the war.

"Much of my working career was spent as a Fluid Power Engineer. I retired in 1984 after spending 26 years in that capacity in the Engineering Department of a machine tool company. I am now working on the VHF amateur bands toward a VUCC.

"I wish to personally thank each and every person who has helped me to reach my goal of USA-CA #467, especially the mobile operators, as it would have been a truly impossible task without all of them. See you around the ham bands!

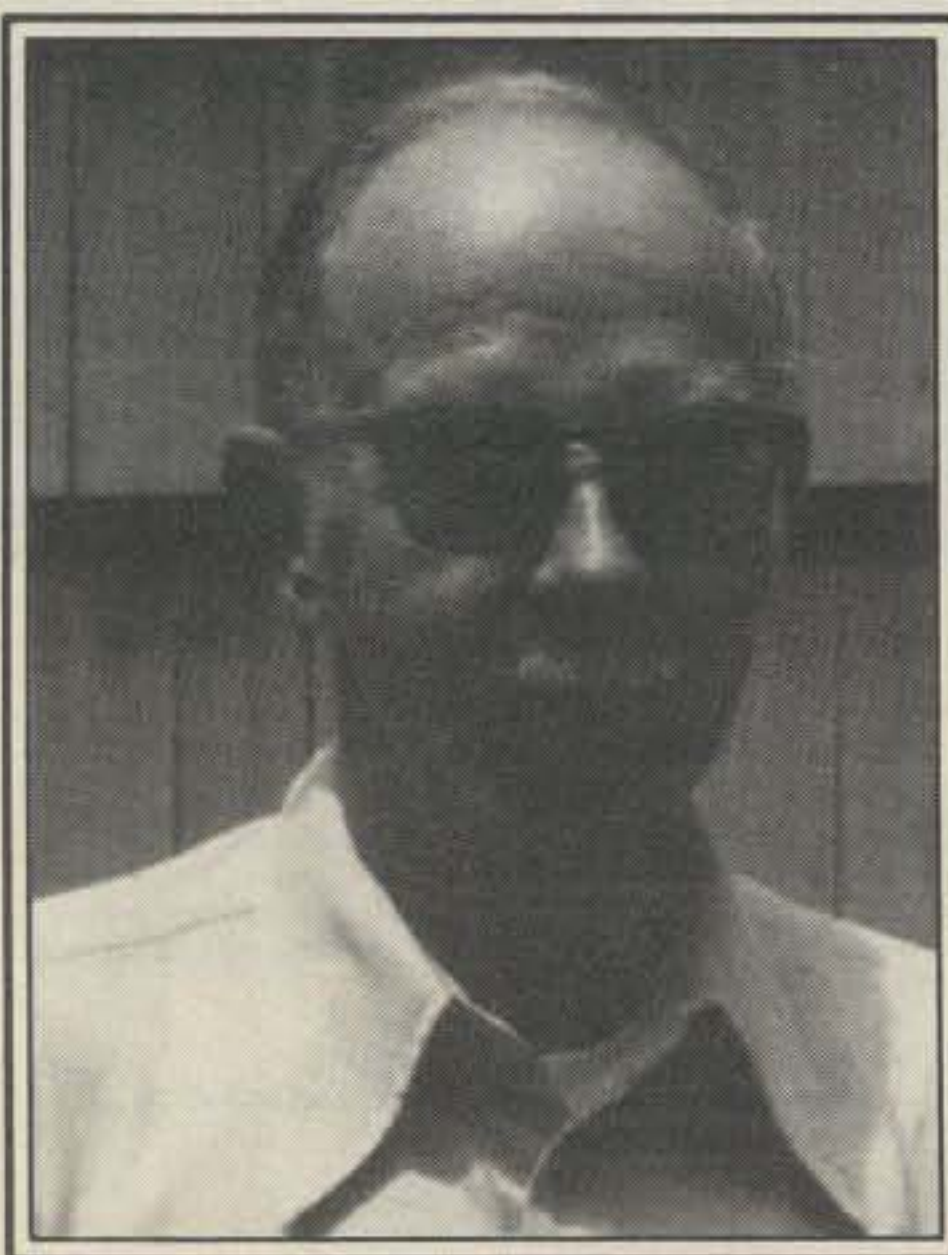
. 73, Dan"

Awards Issued

Joe Parsons, W5UJO, did it all in one jump by filing his good application for All Counties #553, USA-CA 3000 #584, USA-CA 2500 #659, USA-CA 2000 #725, USA-CA 1500 #813, USA-CA 1000 #996, and USA-CA 500 #2207, all 20M SSB Mobiles, dated 11-9-87.

Eugene "Gene" Kowalewski, W1TEE, finished collecting his confirmations and applied for All Counties #554, Mixed, dated 11-27-87.

Roger La Mothe, K8MDU, qualified for



Daniel G. "Dan" Hammell, WA9EZT, holder of USA-CA All Counties #467, February 25, 1984.

USA-CA Special Honor Roll

Joe Parsons, W5UJO
All Counties #553, 20M/SSB/Mobiles,
11-9-87

Eugene "Gene" Kowalewski, W1TEE
All Counties #554, Mixed, 11-27-87

USA-CA 2000 #723, All SSB, and USA-CA 1500 #811, All Mobile SSB, both dated 11-2-87. Roger also qualified for a 20 meter endorsement to his USA-CA 500 Award, and a 75 meter endorsement to his USA-CA Class 1000, these also being dated 11-2-87.

Kenneth G. Hanson, NC2O, made a good move toward the all counties achievement by claiming USA-CA 2000 #724, USA-CA 1500 #812, USA-CA 1000 #995, and USA-CA 500 #2206, All Mobile to Mobile, dated 11-2-87.

O. Brian Schreen, NT7R, updated his good record and received USA-CA 2000 #726, Mixed, dated 11-12-87.

Len Moncaleri, AC3T, received USA-CA 1000, #994, All SSB, dated 11-2-87.

USA-CA 500 certificates went to:

Kenneth G. Hanson, NC2O, USA-CA 500 #2206, All Mobile to Mobile, dated 11-2-87.

Joe Parsons, W5UJO, USA-CA 500 #2207, All 20 Meter SSB Mobiles, dated 11-9-87.

Hugh C. "Bud" Webb, N6OQZ, USA-CA 500 #2208, Mixed, dated 11-16-87.

USA-CA Honor Roll

W5UJO	3000	584	NC2O	812
			W5UJO	813
W5UJO	2500	659	AC3T	1000
			NC2O	994
			W5UJO	995
K8MDU	2000	723		996
NC2O		724		
W5UJO		725	500	
NT7R		726	NC2O	2206
			W5UJO	2207
			N6OQZ	2208
			N2CIC	2209
K8MDU	1500	811	WB4VBL	2210
			KJ4LG	2211

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 non-subscribers, it is \$10.00. Initial application must be submitted in the USA-CA record book which may be obtained from CQ Publishing Company, 76 North Broadway, Hicksville, NY 11801, U.S.A. for \$1.25. To qualify for the special subscriber rate please send a recent CQ mailing label with your application. To be eligible for the USA-CA, applicants must comply with the rules of the program as set forth in the revised USA-CA Rules and Program dated April 2, 1985. A complete copy of the rules may be obtained by sending a SASE to the USA-CA Custodian, 333 South Lincoln Avenue, Mundelein, IL 60060, U.S.A. DX stations must include extra postage for air mail reply.

David J. Barry, N2CIC, USA-CA 500 #2209, Mixed, dated 11-20-87.

Roy W. Pearce, WB4VBL, USA-CA 500 #2210, Mixed, dated 11-20-87.

Henry Petersen, KJ4LG, USA-CA 500 #2211, Mixed, dated 11-23-87.

Awards Available

RTTY Worked All Zones. CQ magazine, through its WAZ manager, W4KA, announces that as of October 1, 1987 RTTY applications for the WAZ award are being processed as follows:

1. RTTY, Mixed Frequencies—QSL cards must show a date of November 15, 1945 or later for this award.

II. RTTY, Single Band—For a single band award for the 80, 40, 20, 15, or 10 meter band, QSL cards must show a date of January 1, 1973 or later.

Applicants, if they wish, may secure verification of their QSL cards through CQ authorized check points. The processing fee is \$10.00 for nonsubscribers and \$4.00 for CQ subscribers. IRCs are accepted for the processing fee and return postage at 37 cents each.

Canadian Provincial Capitals Award. Work and confirm an amateur radio station in each of the ten provincial capital cities of Canada: Edmonton (Alberta), Victoria (British Columbia), Fredericton (New Brunswick), St. John's (Newfoundland), Halifax (Nova Scotia), Winnipeg (Manitoba), Toronto (Ontario), Quebec City (Que-

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Canadian Provincial Capitals Award offered by the Ontario, Canada, DX Assn.

bec), Charlottetown (Prince Edward Island), and Regina (Saskatchewan).

Send certified log data (signed by one executive of your radio club or two fellow hams) with \$2.00 or 10 IRCs to Ron N. Nickle, VE3SF, Awards Manager, 286 Burnett Avenue, Willowdale, Ontario, Canada M2N 1W1.

Seaway Award. The Seaway Award is offered by the Ontario DX Association, Canada. To qualify, work ten different amateur stations along the route of the St. Lawrence Seaway. Of the ten contacts required, one must be in each of the following areas: Thunder Bay, Greater Toronto, Greater Montreal, and Greater Quebec City. The remaining six may be from any municipality located along the route.



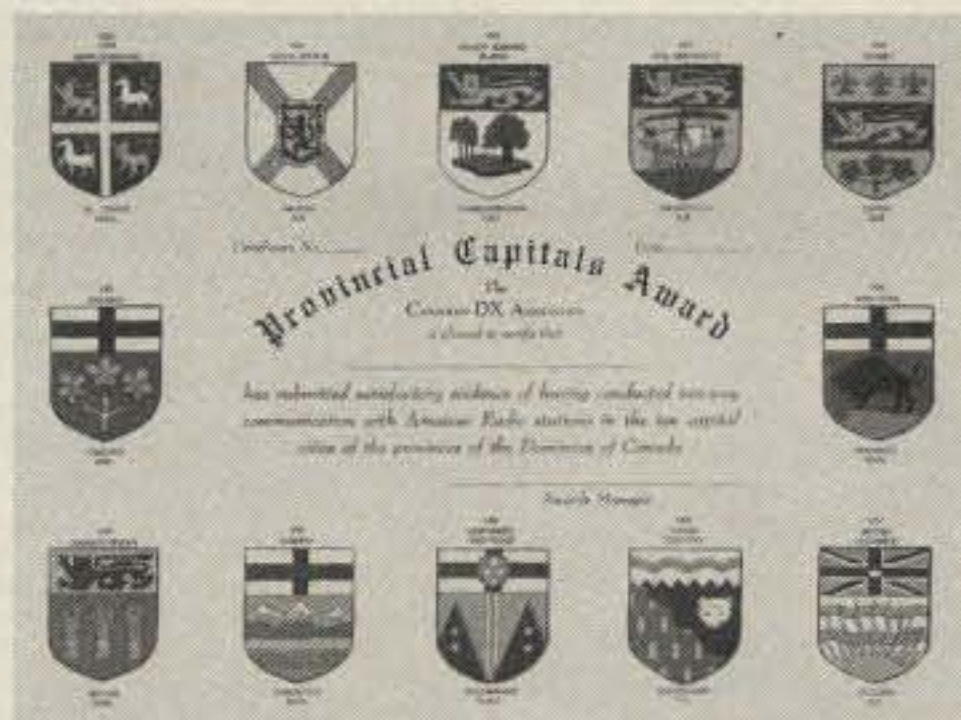
St. Lawrence Seaway Award available from the Ontario DX Assn., in Canada.

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contact must be with a Yukon station (VE8 or VY1), and one must be with an off-shore island of the Northwest Territories. Total contacts to confirm are 46.

Send certified log data (signed by one executive of your radio club or two fellow hams) with \$2.00 or 10 IRCs to Ron N. Nickle, VE3SF, Awards Manager, 286 Burnett Avenue, Willowdale, Ontario, Canada M2N 1W1.



Provincial Capitals Award offered by the Canadian DX Association.

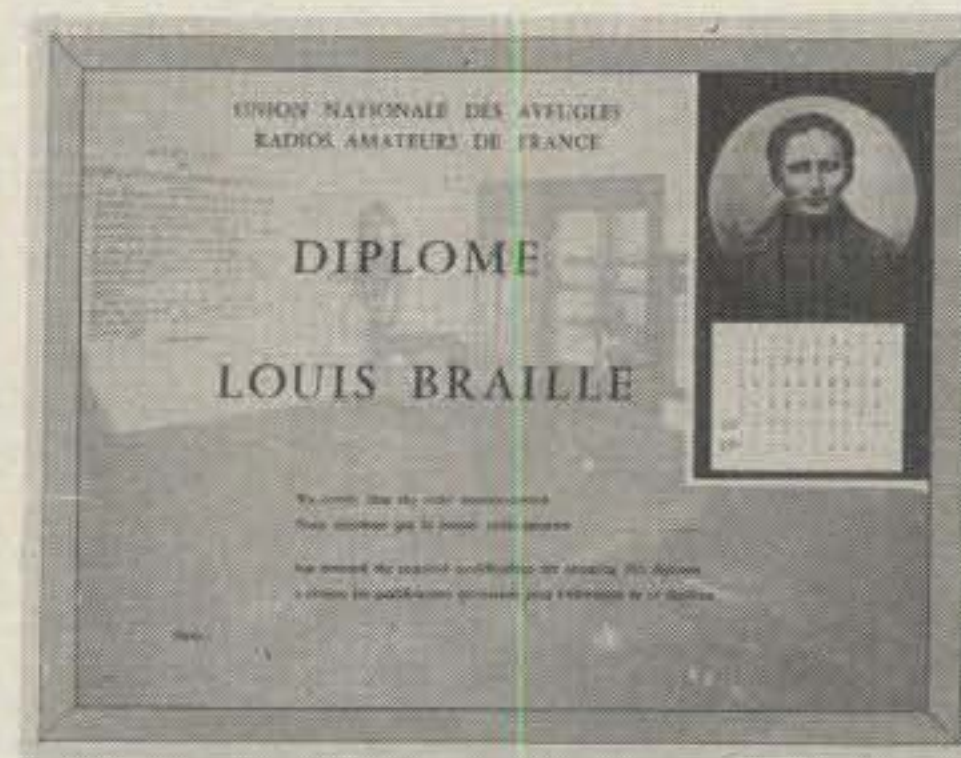
Louis Braille Award (D.L.B.). The Louis Braille Award, issued by the French Blind Amateurs Union (UNARAF), is available to licensed amateur stations (or SWLs) who have had QSOs with (or heard) specified numbers of member stations of UNARAF as follows: French stations—10 UNARAF stations; European stations—5 UNARAF stations; other continents—2 UNARAF stations.

The UNARAF stations are worth one point only, on any band or mode. Relay

and satellite modes are not valid. Other authorized bands or modes are valid. Contacts must be after December 1, 1965.

To apply for the Louis Braille Award, send your QSL card along with a GCR list to the awards manager. Do not send QSL cards. The price is 30 F.F. (or 10 D.M. or \$6.00 U.S. or 12 IRCs). The awards manager is Michel Roussey, F5ZI, 65 rue du Javelot, F.—75013 Paris, France.

To obtain a list of calls of UNARAF stations, send an SASE and one IRC to the awards manager.



Louis Braille Award from the French Blind Amateurs Union is available to amateurs and SWLs.

Notes

Here in midwest America we are beginning to look forward to springtime once again with its renewal and promise. I hope all is well with you. Good Hunting!
73, Dorothy, WB9RCY

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HGT	28938 km	DOP	-697 Hz	ORBIT	1562
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HOUSTON OSCAR 11 → 1985 JUL 11 03:44:33

LAT	38.2° n	ECHO	8 ms	ELEV	29.5°
LOX	93.5° u	FRQ	145.8228	AZIM	9.9°
HGT	691 km	DOP	-2628 Hz	ORBIT	7253
RNG	1245 km	DRFT	-528 Hz/m		27

LONDON OSCAR 9 → 1985 JUL 11 04:41:24

LAT	49.2° n	ECHO	6 ms	ELEV	28.9°
LOX	10.0° e	FRQ	145.8246	AZIM	182.4°
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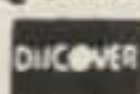
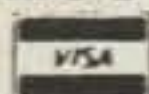
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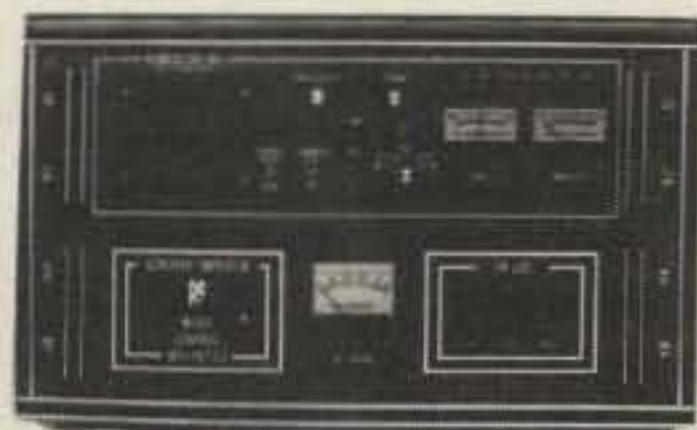
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"HOW TO" FOR THE NEWCOMER TO AMATEUR RADIO

Emission Classifications

Last month's Novice column covered the Novice operating privileges that took effect 21 March 1987. That column includes a brief introduction to emission classifications. This article provides a better explanation of the emission classifications that were adopted during the 1979 World Administrative Radio Conference (WARC) and became effective with the Federal Communications Commission (FCC) 3 January 1985.

First Symbol

The first symbol indicates the type of modulation applied to the main radio frequency carrier output of the transmitter.

N indicates that no type of modulation is applied to the main carrier.

There are six first symbols indicating emissions wherein the main carrier is amplitude modulated.

A indicates double sideband with identical information in both sidebands.

B indicates independent sidebands, wherein each sideband can contain different information.

C indicates vestigial sideband, wherein one sideband is transmitted, but the other sideband is suppressed. TV is an example of a vestigial emission; the upper sideband is transmitted intact, whereas the lower sideband is almost completely suppressed.

H indicates a single sideband with a full carrier.

J indicates a single sideband with a suppressed carrier.

R indicates a single sideband with a reduced (possibly variable level) carrier.

There are two first symbols indicating emissions wherein the main carrier is angle modulated. Both are similar.

F indicates frequency modulation.

G indicates phase modulation.

If the main carrier is both amplitude and angle modulated (either sequentially or simultaneously), the first symbol is **D**.

There are six first symbols indicating emissions wherein the main carrier is pulse modulated.

K indicates a sequence of amplitude modulated pulses.

L indicates pulses modulated (changed) in width/duration.

M indicates pulses modulated in position/phase.



Here is Ken Jones, KA9VNH, of Muncie, Indiana. He thanks Larry Vrooman, WB9DFD, and Rick Dubbs, WD9EPI, for helping him get started in amateur radio. His station includes a Ten-Tec Omni transceiver with matching remote frequency control, an MFJ antenna tuner, and a Butternut vertical antenna. Ken has been on the air since June 1986 and has contacted amateurs in 38 states. He plans to upgrade after he earns the Worked All States (WAS) award. Note that he has the Ten American Districts (TAD) award framed and hanging on the wall. I sign and issue TAD awards.

P indicates a sequence of unmodulated pulses.

Q indicates pulses in which the carrier is angle modulated during the period of the pulse.

V indicates any combination of the previously described pulse modulations.

W is the first symbol in cases not covered by the previously described 16 first symbols. It is used where an emission consists of a main carrier being modulated (sequentially or simultaneously), in any combination (two or three modes) of amplitude, angle, or pulse.

X is the first symbol in cases not covered by the previously described 17 first symbols.

Some first symbols are of very little interest to most amateurs; these include B, C, D, H, K, L, M, P, Q, R, V, W, and X. Other first symbols are of greater interest to most amateurs; these include **A, F, G, J, and N**.

Second Symbol

The second symbol indicates the type of signal (or signals) modulating the main radio frequency carrier.



Rachel Wilken, KB5BDU, is a high school English teacher who lives in Portland, Texas. Rachel is a "Distinguished Fellow" of the American Board of Master Educators. She shares a station with her husband (Jim, N5AXZ), who is the news director at KOUL-FM/103 in Corpus Christi. Their shack includes a Kenwood TS-180S transceiver, Heath keyer, Dentron antenna tuner, and Kenwood TR-7625 2 meter FM transceiver that Rachel looks forward to using after upgrading. Their antenna system includes a tri-band Yagi-Uda, 80/40 meter dipole, random wire, and 2 meter ground plane. Their 7-year-old daughter (Leah) is studying to pass the Novice test. Rachel participated in the last two ARRL Field Day Contests. She is a member of the Corpus Christi Amateur Radio Club and the South Texas Amateur Repeater Club. Rachel is introducing her students to amateur radio.

0 (zero) indicates no modulating signal.

1 indicates a single channel containing quantized (or digital) information, without using a modulating subcarrier (excluding time-division multiplex).

2 indicates a single channel containing quantized (or digital) information, using a modulating subcarrier (again, excluding the division multiplex).

3 indicates a single channel containing analog information.

7 indicates two (or more) channels containing quantized (or digital) information.



Larry Hill, AA4DJ, provided this picture of the other amateurs in his family. From left to right, they are his daughter (Katie, KB4WLO), son (Tim, KB4WLP), and wife (Betsy, KB4WLN). All three of these Novices are active in a local Novice net which starts at 2300 UTC Fridays, using 28.4 MHz. The Hill family lives in Huntsville, Alabama, which is the location of Redstone Arsenal.

8 indicates two (or more) channels containing analog information.

9 indicates some type of a composite system with one (or more) of the channels containing quantized (or digital) information, and with one (or more) of the channels containing analog information.

X indicates anything not specifically covered by the preceding seven types.

Third Symbol

The third symbol indicates the type of information transmitted.

A indicates telegraphy for aural (ear) reception.

B indicates telegraphy for automatic (machine) reception.

C indicates facsimile, which is fixed (permanent) pictures with no sound.

D indicates telemetry, telecommand, data transmission.

E indicates telephony (voice).

F indicates television video (temporary/changing pictures).

N indicates no information transmitted.

W indicates any combination of the preceding types.

X indicates anything not otherwise covered.

Fourth and fifth symbols exist, but they are not important to most amateurs. However, their meanings are included in this article to complete the coverage.

Fourth Symbol

The fourth symbol provides additional signal(s) details.

A indicates a two-condition code with elements of differing numbers and/or durations.

B indicates a two-condition code with elements of the same number and duration, without error correction.

C indicates a two-condition code with

elements of the same number and duration, with error correction.

D indicates a four-condition code wherein each condition represents a signal element, which consists of one (or more) bits.

E indicates a multi-condition code wherein each condition represents a signal element, which consists of one (or more) bits.

F indicates a multi-condition code wherein each condition (or combination of conditions) represents a character.

G indicates monophonic broadcast-quality sound.

H indicates stereophonic or quadraphonic broadcast-quality sound.

J indicates commercial-quality sound, excluding the following **K** and **L** categories.

K indicates commercial-quality sound using frequency inversion or band-splitting.

L indicates commercial-quality sound using separate frequency-modulated signals to control the level of the demodulated signal.

M indicates monochrome (such as black-and-white TV).

N indicates color.

W indicates any combination of the preceding types.

X indicates anything not otherwise covered.

Fifth Symbol

The fifth symbol indicates the type of multiplexing. Multiplexing is the use of a single carrier to simultaneously transmit two (or more) separate sets of information.

C indicates code-division.

F indicates frequency-division.

N indicates no multiplexing.

T indicates time-division.

W indicates any combination of the preceding types.

X indicates anything not otherwise covered.

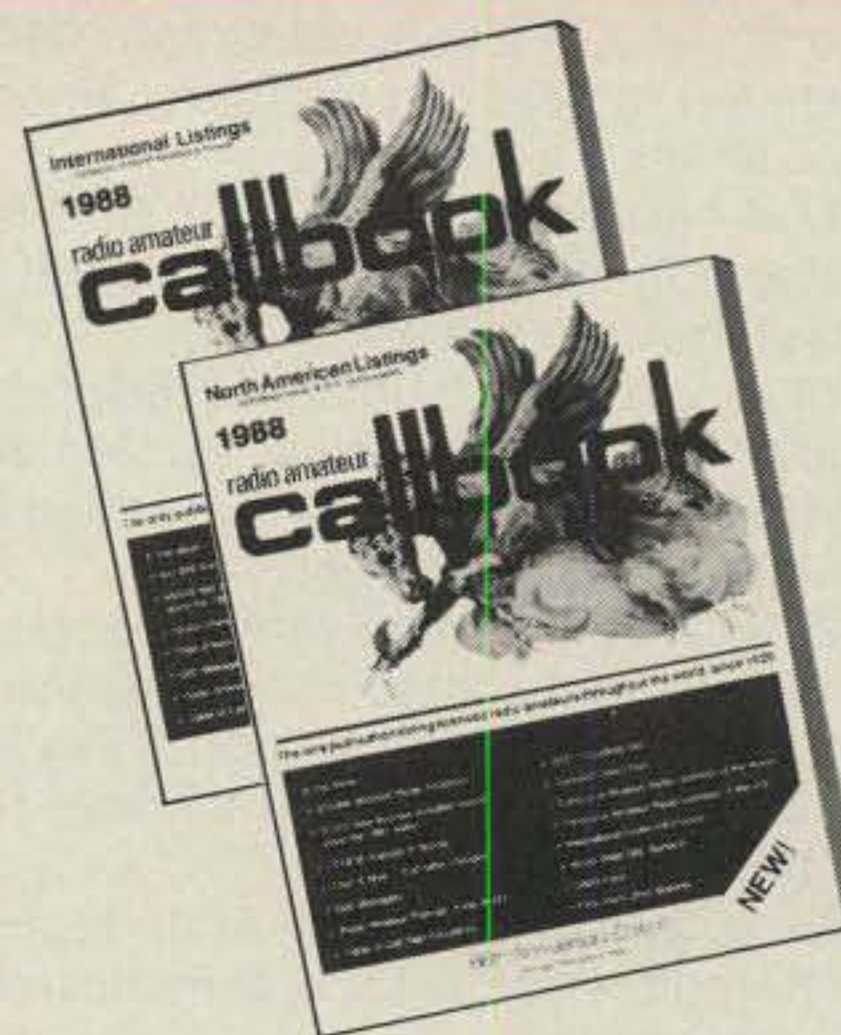
Comments Regarding Five-Symbol Emission Designations

As you probably know, amateurs normally use the first three symbols of the overall five-symbol system. The remaining two symbols may be of interest to some amateurs, but the rest of us have little desire or need to define emissions as precisely as the fourth and fifth symbols enable them to be defined. Similarly, the **W** and **X** designations (in all but the second symbol) are only of interest to amateurs involved in unique communications experimentation. In summary, most amateurs have little (or no) interest in 39 of the 54 emission designation symbols.

Commonly Used Three-Symbol Emission Designations

Now that the meaning of each emission designation has been covered, we

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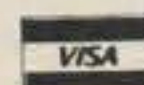
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March 1988 • CQ • 63

will cover plain-language meanings of the most commonly used three-symbol emission designations.

N0N is continuous wave (CW). It is not modulated (changed) in any manner. As an example, it is the emission that occurs when the key of a radiotelegraph (A1A) transmitter is held closed during an on-the-air antenna system test.

A1A is carrier on-off keying. This is radiotelegraphy with the receiving operator hearing the transmission.

A2A is amplitude-modulated radiotelegraphy for aural reception. An audible tone (800 Hertz, for example) is added to the radio frequency carrier.

A2B is amplitude-modulated radioteletype for automatic (machine) reception.

F1B is frequency shift keying (FSK) radioteletype, for automatic (machine) reception. Also packet.

F2B is audio frequency shift keying (AFSK) radioteletype, for automatic (machine) reception.

A3E is amplitude-modulated (AM) radiotelephony (voice).

F3E is frequency-modulated (FM) radiotelephony (voice).

G3E is phase-modulated (PM) radiotelephony (voice).

J3E is single sideband (SSB) suppressed carrier radiotelephony (voice).

A3C is amplitude-modulated (AM) facsimile (FAX). Fixed pictures with no sound.

Similar to newspaper wirephotos, but sent by radio.

F3C is frequency-modulated (FM) facsimile (FAX). Fixed pictures with no sound.

A3F is amplitude-modulated (AM) television (TV). Momentary pictures with sound.

F3F is frequency-modulated (FM) television (TV). Momentary pictures with sound.

Summary

Today's Novice is allowed to use code, facsimile, packet, radioteletype, television, and voice emissions. Phone patch and repeater privileges have been added to the Novice's wide range of operating privileges. Previous operating opportunities remain available to Novices; these include awards chasing, contesting, DX-ing, ragchewing, traffic handling, etc. It is advisable to try as many modes and bands as possible. You may be surprised to learn that you like some facet of amateur radio that you have yet to try.

Photographs Wanted

Photographs of Novices in their shacks provide introductions to a few of the newer amateurs. Photograph size is unimportant, but good definition, contrast, and subject matter are important. Color pictures can be used, but black-and-white

photographs are preferred. Operating activities and achievements, plus a self-introduction, are needed with each picture. Send an SASE if a picture must be returned. A free one-year CQ subscription (or renewal) is awarded to the one amateur whose picture I select as the winner for the month. If you are a subscriber, please enclose the mailing label (or copy) from your latest CQ issue. One award is made each month, no matter how many photographs are printed. DX amateurs, who frequently work the American Novice bands, are also urged to submit photographs.

Printed Aids

Previous Novice columns contain information that is useful to new and aspiring amateurs. Many of these items have been reprinted for distribution to students of licensing courses I instruct. For ease of use, these printed aids have been separated into six categories. These categories are introduction, code, theory, station, operating, and miscellaneous. Outdated items are continually replaced with newer material. Fifteen dollars brings a complete set of current printed aids, including shipping costs. A list of these printed aids will be sent to anyone who requests it and sends a business-size (#10) self-addressed and stamped envelope to my California address.

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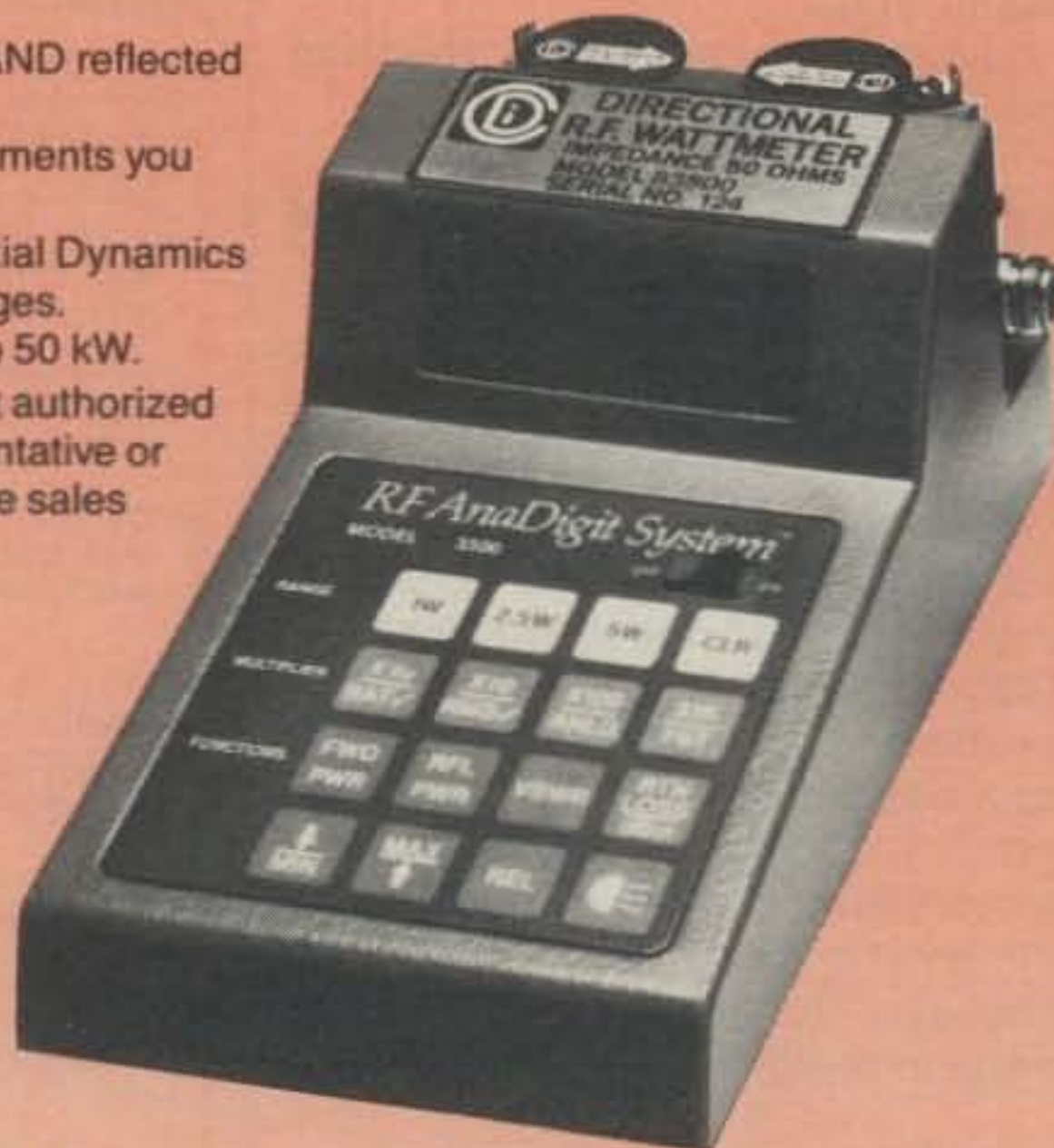
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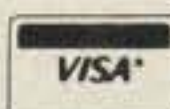
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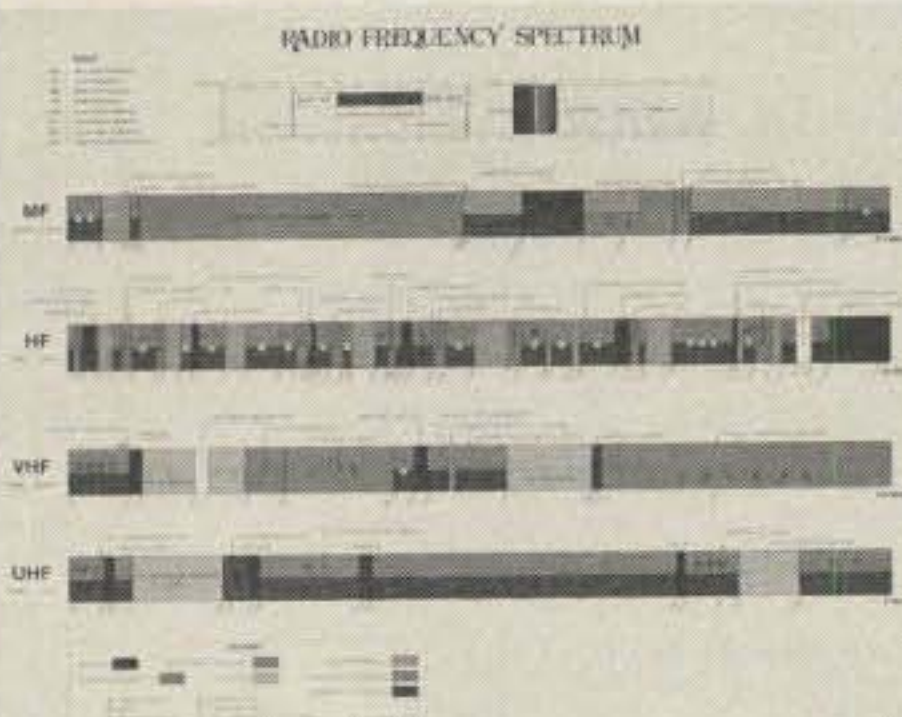


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March 1988 • CQ • 65

CQ World-Wide WPX SSB Contest All-Time Records

BY STEVE BOLIA, N8BJQ, DIRECTOR, CQ WPX CONTEST

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

WORLD RECORD HOLDERS

Single Operator

1.8	CG3MFA('85)	319,140	162
3.5	OH1RY/CT3('85)	2,816,754	453
7.0	NP4A('86)	6,668,184	654
14	ZP5JCY('87)	6,184,732	743
21	ZZ5EG('86)	9,794,448	816
28	CE6EZ('84)	5,437,936	644
AB	PJ2FR('86)	13,040,435	823
QRP/p	K7SS/WH6('86)	2,078,490	395

Multi-Operator Single Xmtr.

PJ2FR('87)	18,493,730	907
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Multi-Operator Multi-Xmtr.

ZZ5EG('87)	38,096,250	1250
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U.S.A. RECORD HOLDERS

Single Operator

1.8	K5UR('85)	122,664	228
3.5	KQ2M('85)	1,247,906	433
7.0	KM6B('87)	1,164,800	320
14	K2VV('87)	3,546,294	687
21	AI7B('82)	4,151,232	576
28	N5AU('82)	3,094,249	571
AB	KM1H('87)	4,547,067	739
QRPp	W8ILC('82)	1,044,012	459

Multi-Operator Single Xmtr.

N5AU('84)	6,301,977	759
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Multi-Operator Multi-Xmtr.

AI6V('81)	12,529,608	728
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CLUB RECORD

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

H44R('84)	1,575,904
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WPX (Prefix) RECORD

ZZ5EG('87)	1,250
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CONTINENTAL RECORD HOLDERS

AFRICA

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

ASIA

1.8	5B4LP('86)	142,272	117
3.5	5B4LP('84)	763,458	222
7.0	H24LP('87)	5,348,975	503
14	C44LP('85)	2,467,900	460
21	4X0U('81)	2,823,916	514
28	4X4UH('80)	2,718,760	440
AB	4X7DX('87)	4,932,744	564

EUROPE

1.8	LZ2BE('84)	261,504	144
3.5	PA2TMS('87)	892,738	341
7.0	OH2KI/ZB2('85)	1,954,210	365
14	YT3AA('87)	3,928,015	679
21	OH0BH('83)	3,977,685	501
28	YU3MY('80)	3,530,016	412
AB	Y24UK('82)	6,285,436	586

Multi-Operator Single Xmtr.

AF	OH8PF/EA8('86)	9,898,245	735
AS	UK9AAN('80)	11,152,020	660
EU	9A1ONU('80)	13,362,486	723
NA	VP2EC('83)	15,238,880	820
OC	KD7P/NH4('85)	10,484,712	568
SA	PJ2FR('87)	18,493,730	907

NORTH AMERICA

1.8	CG3MFA('85)	319,140	162
3.5	VE3BMV('86)	1,928,720	388
7.0	NP4A('86)	6,668,184	654
14	TI2CC('87)	5,491,290	790
21	TI1T('87)	4,218,904	628
28	FG0DYM/FS7('80)	3,304,752	484
AB	6Y4V('87)	6,373,230	654

OCEANIA

1.8	T32AF('83)	16,872	37
3.5	KG6DX('86)	350,014	161
7.0	T32AF('84)	2,991,352	364
14	VR3AH('79)	3,526,153	437
21	VK4QK('80)	2,592,216	396
28	KB7IJ/KH2('82)	4,743,144	504
AB	AI6V/NH6('85)	6,677,500	500

SOUTH AMERICA

1.8	YV5JEA('84)	40,320	63
3.5	4M3AZC('84)	1,158,132	309
7.0	YV6CAX('86)	2,062,800	382
14	ZP5JCY('87)	6,184,732	743
21	ZZ5EG('86)	9,794,448	816
28	CE6EZ('84)	5,437,936	644
AB	PJ2FR('86)	13,040,435	823

Multi-Operator Multi-Xmtr.

AF	9E3USA('69)	2,398,192	296
AS	UK9AAN('78)	10,702,776	532
EU	YZ1EXY('84)	14,503,141	881
NA	VP2EC('87)	37,446,109	1147
OC	KH6XX('85)	24,898,239	837
SA	ZZ5EG('87)	38,096,250	1250

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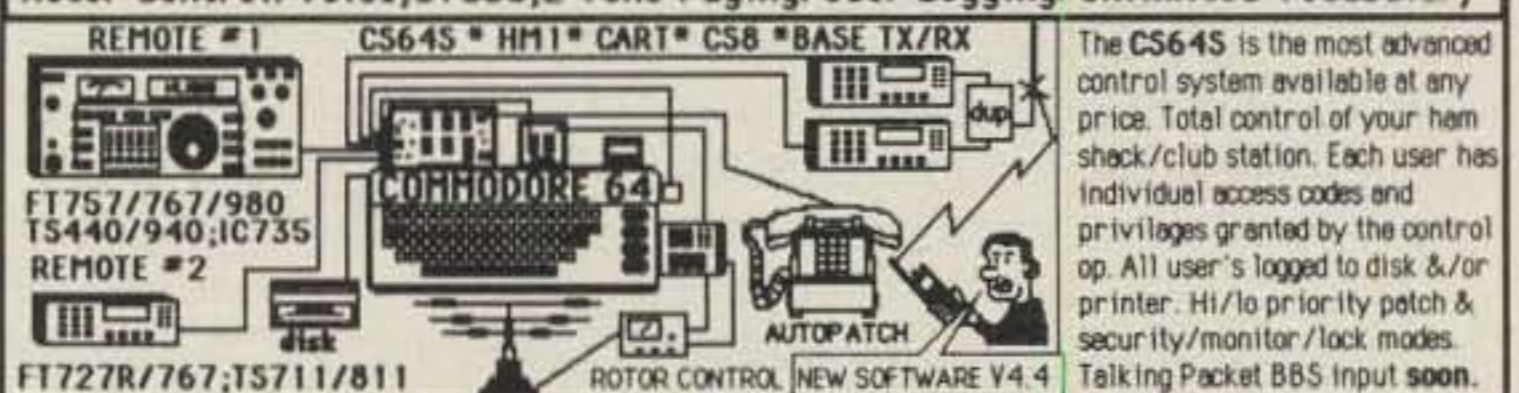
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INFO ON AMATEUR RADIO LICENSING

Radio Broadcasting Begun By A Ham: The History of Communications—Part V

During the first World War, radio technology developed very fast. In this period the supremacy of the DeForest *valve* (triode tube) amplifier was fully established. Large numbers of radio operators were trained by the armed forces of many countries, and at the end of the war surplus military equipment became available for them to pursue their radio hobby. The era of the *amateur* began anew.

There was a headlong rush for amateurs to get back on the air. Manufacturers were hard put to supply the spark-gap radio gear fast enough! One such amateur, who was also a Westinghouse engineer, started station 8XK in Pittsburgh in 1919. Frank Conrad began a series of broadcasts aimed at the general public from his garage. His transmissions were music rather than dots and dashes. A ham had become the world's first disc jockey. His popular broadcasts commanded a rapidly growing audience. In September 1920 a Pittsburgh, Pennsylvania department store mentioned Conrad's broadcasts in an advertisement for some primitive radio receivers. The store's receivers were quickly sold out.

Harry P. Davis, a Westinghouse vice-president, saw the ad and suddenly had the idea that his company might be able to use his then idle World War I production capability to manufacture radio receiving sets. The next day he proposed to give Conrad a transmitter, erect a station at the Westinghouse plant in Pittsburgh, and set up regular broadcast schedules listed in advance. A government license for creation of a public broadcast network was applied for and granted.

Station KDKA of the Westinghouse Broadcasting System under the direction of amateur Frank Conrad began the new service in November 1920, working on a wavelength of 360 meters. With a 100 watt transmitter, Conrad and his assistant, Donald Little, relayed the Harding-Cox presidential election returns from 8 p.m. until after midnight to an audience of nearly a thousand receivers. The event was given widespread publicity. This

started the rush to build broadcasting stations and for the public to buy receivers. Westinghouse quickly set up stations WJZ, KYW, and WBZ at its plants in Newark, New Jersey, Chicago, Illinois, and Springfield, Massachusetts. Before 1922 Westinghouse and other groups had at least six stations broadcasting on announced schedules. The age of broadcasting had arrived.

Broadcasting stations increased from 3 to nearly 600 between January 1922 and January 1923. All transmitted on the same wavelength. Department stores, realizing the advertising value of radio, even put stations on the air. Bedlam resulted! Hundreds of other commercial stations were on the way. Radio, it was declared, had passed from a toy to a national joy! Broadcasters were no longer in radio for fun, novelty, and romance. They had to make money to survive; their philanthropic days were over. Advertising was their salvation, and they welcomed commercial sponsors that flocked to and unlocked the economic door of broadcasting.

In the 1920s the rapid increase of broadcast stations led to a need for new legislation. The Radio Act of 1927 established the Federal Radio Commission, superseded by the Federal Communications Commission (FCC) which was created by the Communications Act of 1934.

Hams Discover The Shortwaves

As commercial activity expanded, amateurs were assigned the 200 meter shortwave band, which broadcasters found ineffective and condemned as the *graveyard of wireless*. Confident, however, that there must be a more fertile place for them in the radio spectrum, amateurs began to investigate the 200 meter and shorter radio waves.

In the early 1920s, amateur operators made a discovery which brought governments and communications firms back into the shortwave field in a hurry. The early tests on these waves had shown that their range was extremely limited. What no one dreamed was that these useless waves often came back loud and clear again thousands of miles away after being reflected from the skies.

It is not surprising that it took some

time to discover this. After all, if one was carrying out tests between, say, New York and Washington, one would hardly bother to place additional receivers in Greenland or Peru on the off chance that signals could be picked up there. Not until the world was well covered with enthusiastic amateur operators busily searching the radio spectrum and trying to beat each other's distance records did the unexpected pattern of international long-range shortwave reception come to light.

From The Mailbag

How come Advanced class VEs can administer the Technician class written Element 3(A) examination but not the General Element 3(B)? Haven't they passed both of them? Seemingly, FCC regulations sometimes conflict with Congressional legislation or international law. Actually, procedures and rules that are adopted by the Commission do not always extend to the full limit allowed by the law. Laws have to be implemented, and the FCC is bound by the checks and balances afforded by the Administrative Procedures Act, which details how agencies should go about enacting new rules. Basically, the Administrative Procedures Act seeks to bring the public into the rule-making process.

There are many privileges which international and federal guidelines might allow, but for one reason or another, a federal agency has not seen fit to adopt them. For example, telegraphy knowledge is not a requirement for amateur radio operation above 30 MHz. Our FCC requires code proficiency for any amateur band operation because that is the way most amateurs seemed to want it when they were considering abolishing the code requirements for VHF and higher operation. The requirement that three VEs conduct testing sessions (two in the case of the Novice level) was not addressed by the 1982 enabling legislation, Public Law 97-259. The FCC required it, however, when implementing the law.

The legislation signed by President Reagan on September 13, 1982 provided for the volunteer amateur radio operator testing program. That law allows the government to accept the volunteer services of amateurs to prepare or administer amateur radio examinations of a higher

National Volunteer Examiner Coordinator, P.O. Box 10101, Dallas, TX 75207

class than the class license for which the examination is prepared or administered.

When the FCC carried out the law the following year via the Administrative Procedures Act, the Commission decreed that while General class and higher class amateurs could administer any of the Novice examinations, teams of three Advanced class (or higher level) VEs would be required to administer the Technician level requirements, which consisted of a single Element 3 written examination.

Only Extra class examiners were permitted above the Technician class level, which meant that the 13 and 20 words-per-minute code test and written Elements 4(A) and 4(B) (required for the Advanced and Extra class) had to be handled by Extra class VEs. When Element 3 was separated into Element 3(A) and 3(B) a year ago, the FCC continued to require Extra class level volunteer examiners above the Technician class.

The FCC ruled last fall that "... Amateur Extra operators have demonstrated the greatest degree of experience in amateur radio and therefore are the most qualified to administer examinations. With over 41,000 Amateur Extra operators eligible to be volunteer examiners, there is apparently no shortage of VEs."

Although Advanced class VEs can be used to administer the Technician class (Element 3A) written examination, our W5YI-VEC program only accredits Extra class VEs to conduct amateur radio operator examinations above the Novice level. We do this to streamline the testing process, since four out of the five upgrade examination elements require amateur Extra VEs.

I live on Grand Cayman Island and hold the call sign ZF2JU in addition to WBØLQC. Can I serve as one of the two VEs required for a U.S. FCC Novice test administered to an alien here who has a U.S. address which is actually his son's boarding school? Yes, you can. This is kind of a tricky area. There is no requirement that an amateur actually live at or operate from his American mailing or station location. As long as the applicant has a U.S. mailing and station address, he can be administered the FCC Novice (or any other) examinations by appropriately licensed and/or accredited examiners. Keep in mind, however, that there should be a reasonable expectation that the applicant will actually operate amateur radio from the United States and is not just trying to obtain another call sign. Even though the examinations are administered by volunteers, it costs the U.S. taxpayer to issue FCC licenses.

My license expired some time ago. Can I get my license and call sign reinstated without further examination? Much confusion understandably surrounds license "grace periods." It all depends on how long ago your operator license expired. Theoretically, the grace period is two years (Part 97.47.b), but the FCC allows your ama-

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CIRCLE 39 ON READER SERVICE CARD

March 1988 • CQ • 69

teur operator license to be reinstated if it expired less than five years ago. This is because when the FCC adopted a new ten year license term in 1984, they also went to a two year grace period on both the license and call sign. The grace period had been five years previous to 1984. We assume that the grace period will be two years for both the license and call sign after 1989. Your station license (and call sign) cannot be renewed, however, if it expired over 24 months ago under any circumstances. Between two and five years you will be assigned a new call sign appropriate for your previous license class. You are not permitted to operate your amateur radio until you receive your reinstated license when you fail to renew your operator license before the expiration date.

I don't know why they need VECs. Why can't VE teams just submit the certified appli-

cations to the FCC? There are many reasons why volunteer examiner coordinators (VECs) are needed, not the least of which is that the VE/VEC system exists to privatize amateur testing, conserve dwindling FCC resources, and ultimately to save U.S. taxpayer dollars. It takes a long time to properly train a VEC in all of the rules surrounding amateur licensing and testing. VECs have attended training and strategy conferences at both the FCC licensing facility in Gettysburg, Pennsylvania, and the FCC staff offices in Washington, DC. Initially, the VEC more or less supervised the volunteer examiner.

Further deregulation of amateur testing, however, has placed the VEC in the position of not only acting as the liaison between the license testing and issuing function, but VECs now actually revise the amateur radio test questions and entirely determine the course of amateur

testing. The FCC is now completely out of the amateur testing business. VECs recently decided on their own to revise test question pools every three years. The FCC changed them annually when they maintained the question pools.

Do I have to wait until my Novice license arrives to upgrade to Technician? As a general rule you do not, but it is really up to the individual VE/VEC operation. The ARRL and W5YI-VEC testing programs, the two largest operations accounting for nearly 80% of all U.S. amateur testing, allow applicants to continue to upgrade even though they have not yet received their most recent license from the FCC.

Applicants who have passed the Novice requirements are either supplied by the VE team with a photocopy of their successful Novice Form 610 application or (if the Novice was passed during a regular three VE team test session) presented with a Certificate of Successful Completion of Examination (CSCE). Either is used as evidence by the applicant that he has passed the previous license requirements when applying to take a higher class license examination.

When an applicant passes a lower class amateur radio operator examination but has not yet received that license from the FCC, the VE team will instruct the applicant to forward a copy of the license when received to the VEC office coordinating the examination. The VEC office should also write the applicant notifying him that they are holding the upgrade application in a pending file until the previous license photocopy is received. The FCC does not permit VECs to forward to them upgrade applications without the most previous amateur operator license attached.

Can I get a specific amateur radio station call sign? Sorry, but the rules (Part 97.51.b) do not permit the issuance of unique amateur call signs—at least not yet. Many years ago the FCC issued special and secondary call signs, but they had to discontinue the program when it got too costly and time-consuming.

The Commission is considering a program, however, in which nongovernment Special Call Sign Coordinator(s) (SCSC) may develop and implement a system whereby special event and call signs of choice can be issued by the private sector in the future. The SCSC will be required to provide the FCC with an on-line list cross-referencing the privately issued secondary amateur call sign to the primary call sign issued by the FCC.

The Commission staff has completed their work on the rulemaking, and it is currently awaiting its turn for Commission action. The specific call signs of choice rulemaking, called PRB-3, is very controversial, and not everyone agrees that it should be adopted. Several private entities have applied to issue the call signs.

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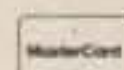
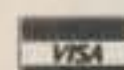
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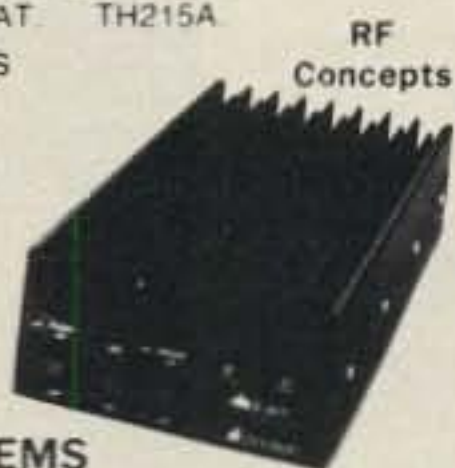


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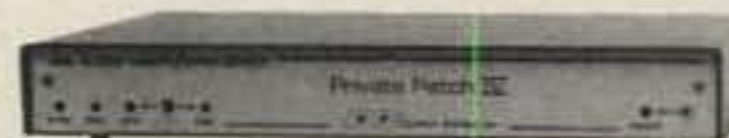
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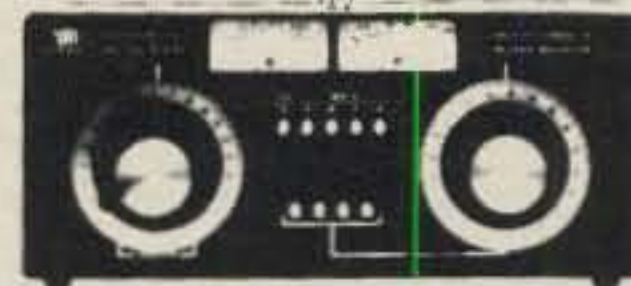


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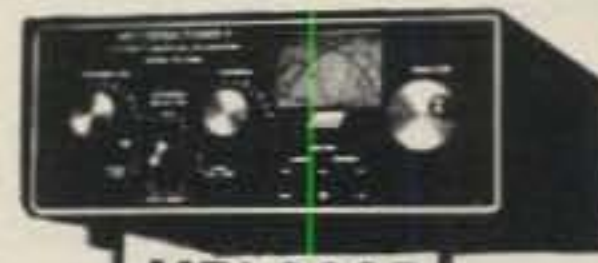


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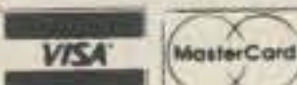
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Our Readers Say:

Correction

There is an error in fig. 3 of "Conquering Front-End Overload in the TS-940S," p. 43 of the January issue. The drawing shows pins 3, 5, and 8 shorted together. The line connecting the top with the bottom of L1/C1/C2 should be removed. Pin 8 is connected to the top of L1/C1/C2. Pin 5 is connected to the bottom of L1/C1/C2. Both connections should be made with coaxial cable. The braid of the two cables should be connected to pin 3, which is ground.

Seeking Swan Info

Editor, CQ:

I am one of the (hi-hi) millions of new Novice operators. So recently (actually last night) I purchased a 1966 Swan 350 HF transmitter. I am in heaven. With a few exceptions.

First, let me say how impressed I have been with the amateur radio community. I cannot believe how nice these people are. I participated last field day with the Venango Mike and Key Club (Oil City, Pennsylvania) and enjoyed myself a great deal. I purchased my Swan through the yellow sheets, and the owner drove 3 hours out of his way to deliver and set up the radio for me (thanks, N8FOY!). But there are some things I need to chase down about the Swan radios.

The radio does not generate a sidetone when in CW mode. However, on page 11 of the manual under CW Operations, #5 states, "5. Information on a sidetone modification circuit for the 350 will be furnished upon written request." I would assume that Swan is no longer in business. Do you know where I might be able to get the modification information? I am also interested in locating any of the optional equipment that went with the 350, such as the power supply/speaker unit, the Swan 350 Sideband Selector Kit, the Model 410, 406, or 405 VFO unit, or the Swan Mark I Linear Amplifier.

HELP! Anything your readers can do would be greatly appreciated.

James Brown, KA3SDS
P.O. Box 460
Clarion, PA 16214

The "Sneaky Snake"

Editor, CQ:

Received my January 1988 issue of CQ, and on page 26 noted the paragraph heading "Sneaky Snake" in the article by Mike Crab-

tree, AB0X, relative to 160 meter antenna systems for city lots.

It may be of interest to your readers that the Snake antenna was developed by Herbert Schmah, W2AHZ, of Wantagh, Long Island, New York. It is also known as Herbie's Snake antenna. He dreamed it up about two years after his antenna had come down, and wanting to get back on the air quickly, he devised the antenna as described by AB0X.

W2AHZ may be found on the 12 meter band operating SSB almost any day, and at night on 160 meters operating SSB.

Herbie is an old timer first licensed in 1924 and a good friend since 1930, when he joined the Sunrise Radio Club of Long Island. We have kept in touch over the air as the years have gone by.

George Rulffs, Jr., AA4GR (ex-W2CJY)
Chelmsford, MA



Canine Coincidence

Editor, CQ:

The cover of your January 1988 issue invoked a good deal of surprise and concern in my QTH. Last April I received word from the ARRL that my entry in their Youth Art Contest had been awarded second prize in the 12-year-old category. I had submitted a photograph of my yellow labrador, Taffy, posed in our shack in front of a microphone and wearing a set of earphones! I am enclosing a print for comparison with your cover picture. Is it possible that the similarities can be attributed to two great artistic talents coming up with the same idea?!

Andrew I. Schein, N3FGU
Bryn Mawr, PA

RTTYers, Where Are You?

Editor, CQ:

Being a reader of your magazine for six years, I've enjoyed countless articles and projects. It got me interested in ham radio, and July last year I got my ticket in the mail. I now hold a Technician license and work a lot of 10 meter phone now that Novice enhancement is in effect. The only problem is that I cannot find any RTTY or AMTOR on the band. I'm beginning to think I wasted the money on my interface. Where is everybody?

I hope I'm not the only person on RTTY on the whole band. So come on, Novices and Techs. RTTY is fun. Do not be scared of it. Get on it and have a ball! Try 28.170-28.210, and let's have some FUN!

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TM-721A FM DUAL BANDER
TW-4100A DUAL BANDER

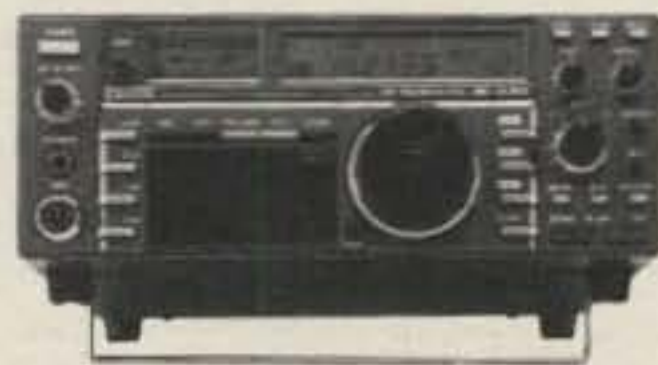


TH-215AT, 315A,
415A, TH-205AT



TH-25AT, 45AT

ICOM



IC-735, 761, 751A, 781



IC-02AT, 03AT, 04AT, IC- μ 2,



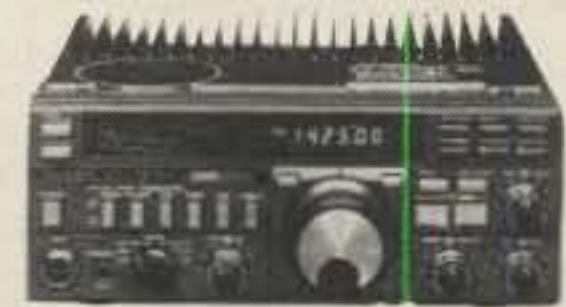
IC-28H, 38A, 48A



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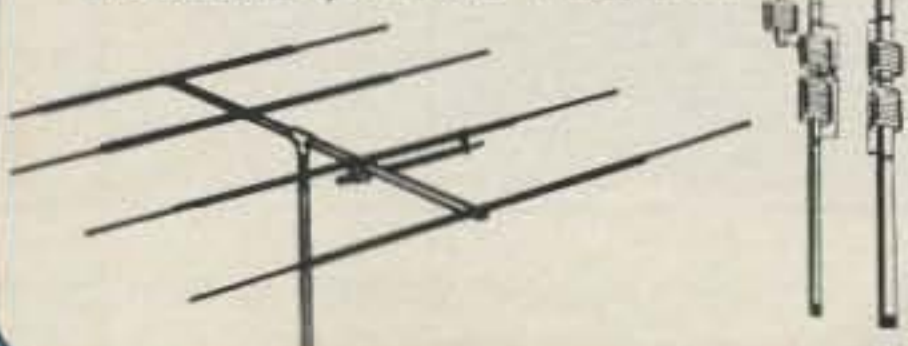
PUBLICATIONS

- ARRL
- AMECO
- Radio Amateur Callbook
- World Radio TV Handbook
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1278

MFJ 1270B, 1274, 1278

PRINCIPLES, PRACTICES, AND PROJECTS FOR THE VHFER

Foam Foils

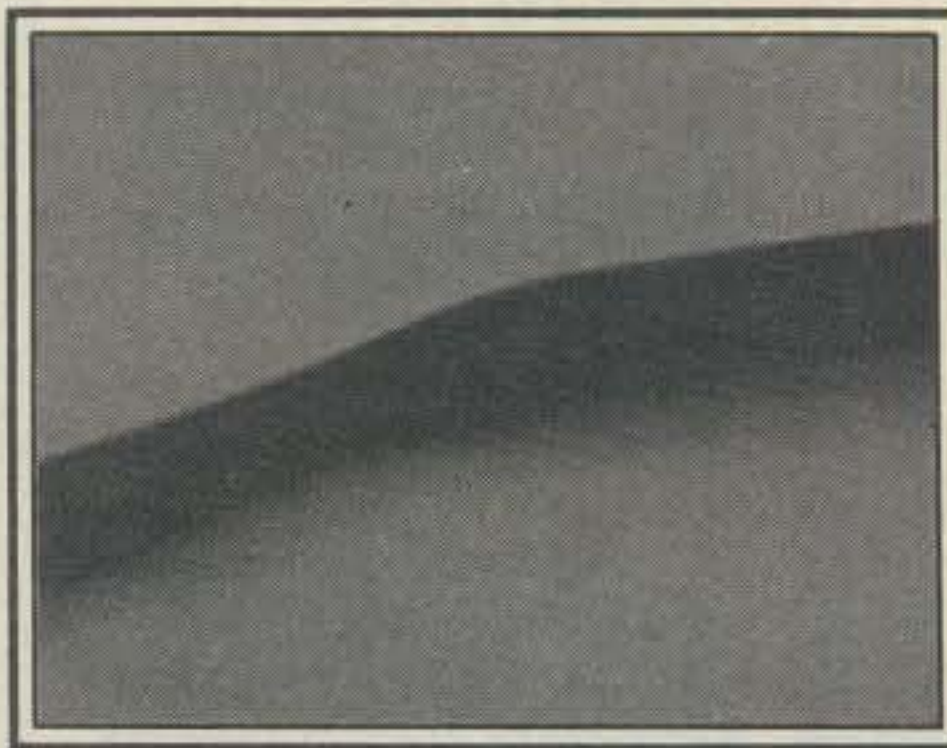
Regular readers may recall the product review we ran in the December issue on the F9FT Tonna 5-element 6 meter Yagis. I had installed a pair of them with $\frac{5}{8}$ -wave vertical spacing and proclaimed excellent performance.

Well, the excellent performance lasted about one month, when suddenly the system stopped hearing stations and VSWR climbed to nearly infinity. I had horrible visions of having to repair the uppermost antenna (that is the one which, in any stacked array, always fails), which is well beyond reach even from the top tower plate, and having to do so in the subfreezing and windy weather sure to close in on us any day.

Thankfully, neither antenna had failed, nor had the resonant phasing harness (much of which was also beyond reach). The feedline itself had failed, pinched to a direct short circuit just below the "tee" connection to the coaxial power divider. I should mention my 6 meter feedline was cellular polyethylene dielectric "RG8/U type" cable, generally called "foam" coax and sold by a variety of manufacturers. This cable offers slightly lower loss than mil-spec RG8A/U or RG213/U and is somewhat more flexible, but is not mil grade product. At first the problem was not obvious, for the failure occurred exactly where the transmission line was well-taped to the support mast. So I said, "Self, why would this have happened?"

Normally, I'd expect dielectric punch-through as the result of running excessive power with a high VSWR. In my case, however, the VSWR had been almost perfect and power not particularly high (about 600 watts), so these should not have been the cause for failure. Upon inspecting the cable more closely, the cause of failure became obvious: I had taped it too tightly to the support mast, and had placed undue mechanical stresses on the feedline.

We normally don't think of flexible coaxial cables as especially fragile, but they can be. When you consider that several overlapping layers of strong vinyl tape pulled to its stretch point can account for hundreds of pounds per square inch of sum pressure against the item being taped, it becomes clear that some cables, especially flexible types with cellular (foam) dielectrics, may well fail from



Section of RG8/U "foam" coaxial cable that was pinched to destruction by the application of too many layers of stretched vinyl tape.

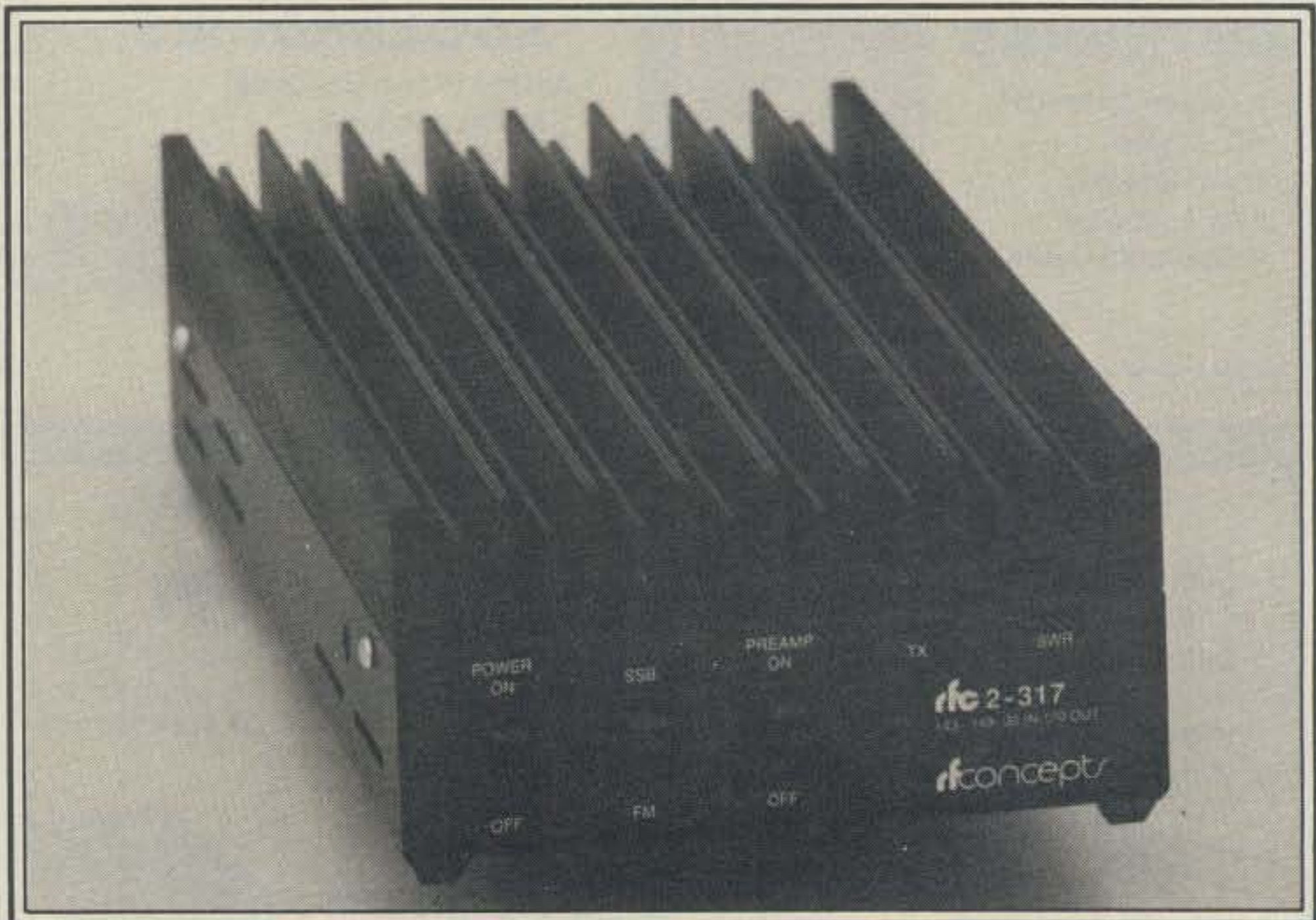
this kind of severe installation. The accompanying photograph hopefully depicts the result of such rough treatment: the section of cable in the center of the photo is pinched in to about half its original diameter. I was able to destroy this particular section of RG8/U "foam" (Belden 8214) by taping it to a 2 inch diameter steep pipe with 20 overlapping layers of "Scotch" type 88 electrical tape pulled to its stretch point.

I imagine that Belden 9913 and its clones, although of quite different construction, might be similarly damaged by such an overkill taping job. In my case, I replaced the foam cable with mil-spec RG213/U (solid polyethylene dielectric) for the 6 meter run. But I don't recommend .405 inch diameter mil-spec cables for higher frequency work because of their high losses. What I do recommend is to use 9913 and larger grade cables, but install them wisely without putting undue stresses at the support points. Food for thought.

Product Review: RF Concepts Model RFC 2-317 Two Meter Power Amplifier

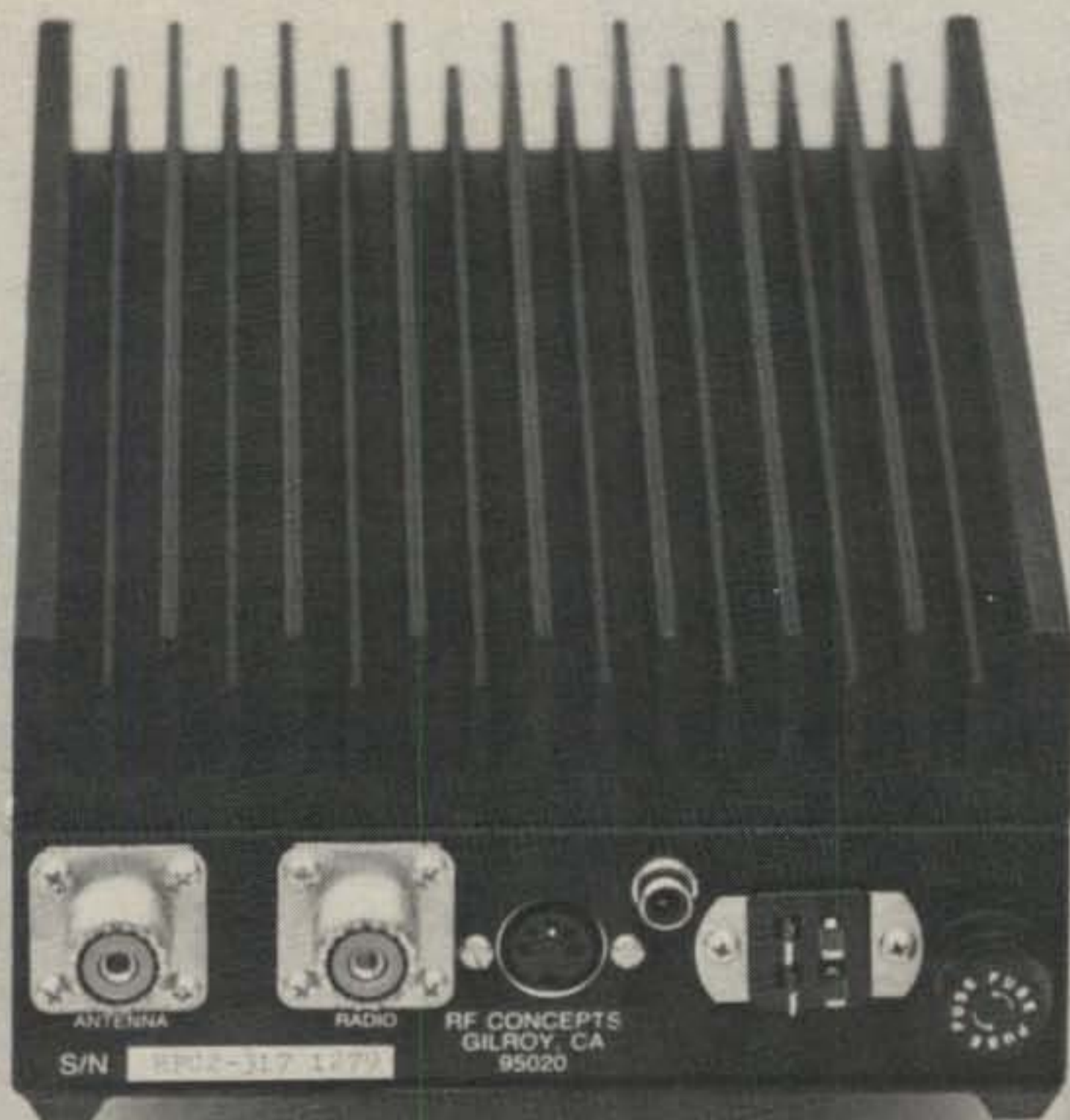
I've had this unit four months now. Having given it ample opportunity to fail (it hasn't), I figured it's about time for a write-up. If you've read my other product reviews, you know that I concentrate on unique features and real product performance more than specifications and glitter, and this review will be no exception.

The RFC 2-317 has been on the market for about a year now and I'm certain thousands have been sold. In general, the reports I've been hearing are good and



The RF Concepts RFC 2-317 two meter power amplifier has an attractive front panel with three rocker switches and four status indicator LEDs.

153 Rodman Court, Eatontown, NJ 07724



Rear view of the RFC 2-317 amplifier reveals two SO-239 "UHF" receptacles, fuse holder, 4-pin "Jones"-type power connector, phono key line jack, and 5-pin DIN receptacle for remote-control operation.

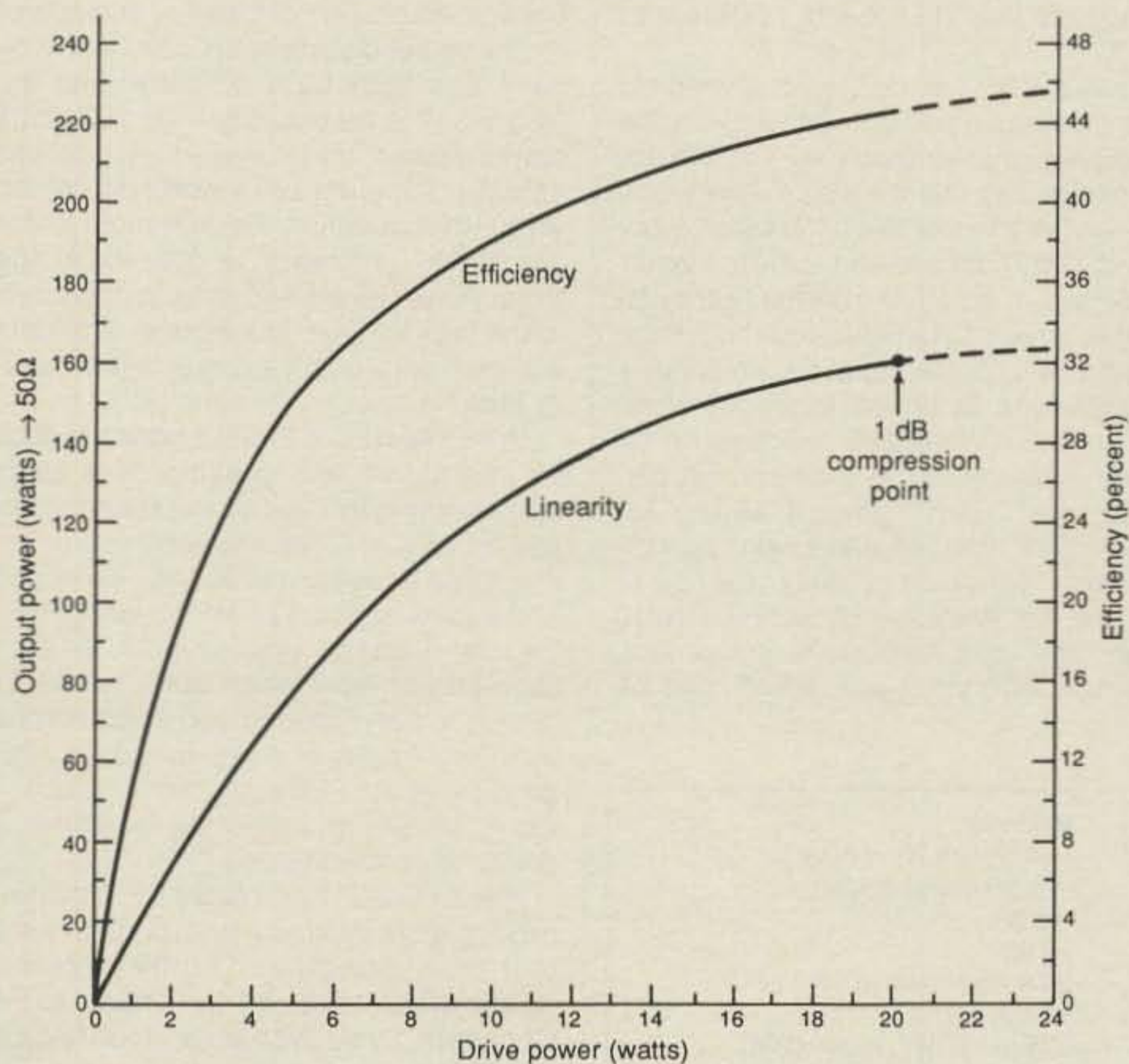


Fig. 1—RF Concepts RFC 2-317, S/N 1279, linearity and efficiency plots.

users are satisfied. One user I know has lost a couple of GaAsFETs, which were cheerfully replaced free of charge by RF Concepts. The cause of these failures has not been fully resolved.

My amplifier, serial number 1279, is a standard production unit and should be representative. Unique features of the RFC 2-317 include:

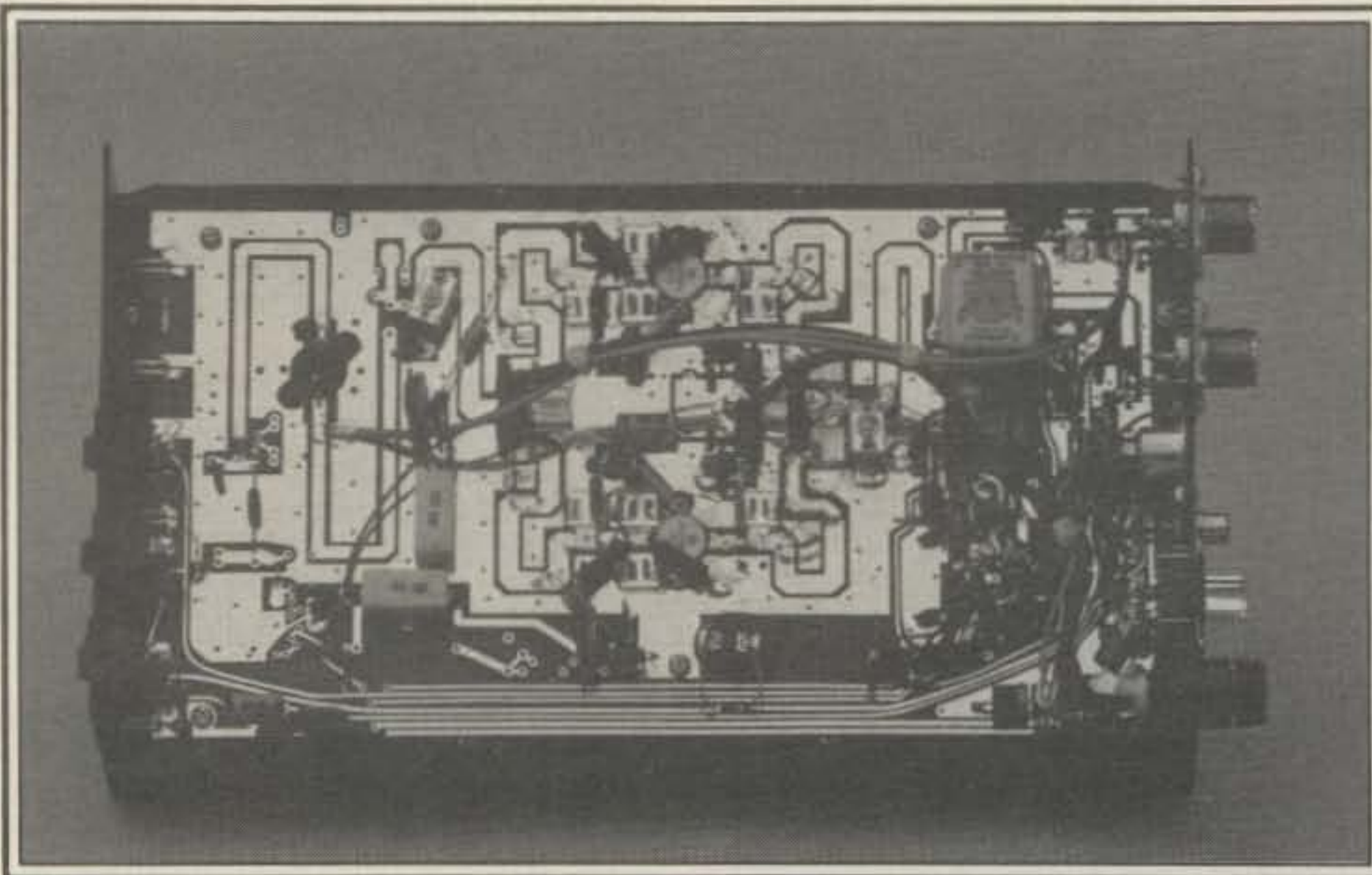
- Internal RX GaAsFET preamplifier which can be switched in whether or not the TX power amplifier is being used.
- 5-pin DIN socket which allows one to remote all control functions.
- 4-pin "Jones" connector for DC mains power—allows easier transport between sites for multi-use applications.
- 5-year warranty (except PA transistors, which are warranted for 6 months).
- VSWR protection.
- Overtemperature protection.
- Direct keying by either + voltage or ground on XMIT (user choice).

Like most similar products, the 2-317 operates as a linear amplifier regardless of the setting of the front-panel "FM/SSB" mode switch, which changes only the drop-out delay of the internal RF transfer relay(s). Linearity is a relative term, and the test unit, rated for 170 watts maximum output power, was reasonably linear to about 150 watts—about par for amateur products of this type. Complete data on this parameter is listed elsewhere and shown graphically for easier comprehension.

The 2-317's internal receive preamp works about as well as most, but I must question its necessity in this age of state-of-the-art equipment. The claimed noise figure of 1.0 dB "nominal" was not met, and the 1 dB compression point (not rated by the manufacturer) was measured to be -22 dBm (18 mv) input signal, a rather common level for 2 meter mobile encounters. In response to such criticism, most designers would reply, "That's why we include an 'off' switch. You don't have to use the preamp," to which I say, "Then leave it out altogether!"

I suppose it is true that some older 2 meter rigs have rather sorry receivers which will be spruced up nicely by a 22 dB gain, low-noise preamp, but these rigs are being replaced by more modern units featuring highly sensitive receivers the performance of which will only be degraded by the addition of more front-end gain. As such, I'd like to see manufacturers delete the preamps and offer better transmit performance or reliability instead. I guess this is another case of "what sells," and amateurs are attracted to printed specifications and quantity of switches and knobs more than they are to actual performance.

On the bright side, the RFC 2-317 is quite a joy to use and should benefit many a 2 meter operator. Weighing just 5 pounds and occupying only 207 cubic inches of space, it boasts a power density



Inside the RFC 2-317 is neat and clean. Teflon coaxial cables and brightly plated circuit board reflect high-quality materials and workmanship. Unused printed microstrip lines and holes at the left side of the board are used in the lower-drive models which require additional components.

of .82 w/cu. inch. Its circuitry includes 9 transistors, 1 SCR, 1 IC, 19 diodes (4 LEDs), 1 thermostat, and 3 relays, plus a host of passive components, all of which are neatly laid out on an epoxy-fibreglas printed circuit board. Of the transistors, only four are in the RF path. The other five are used in switching, control, and protection circuits.

Output devices in the 2-317 are a pair of Motorola SRF3897s driving a 50 ohm printed microstrip power combiner. Each output device has negative feedback for enhanced low-frequency stability, plus its own bias adjust control to help effect optimum balance and linearity. Average power gain is 11 dB. The receive preamp uses a CF300 GaAsFET, protected by a pair of back-to-back 1N6263 clamp diodes, driving a grounded-gate U309 JFET buffer, which is terminated by a 50 ohm voltage divider. The RF drive signal is rectified by a 1N6263 voltage doubler, which in turn drives a high-gain MPSA13 bipolar relay driver. Rated sensitivity of this RF "sniffer" circuit is 200 mw, and I could confirm that it worked reliably at 150 mw.

As mentioned earlier, three relays are

used: one main RF transfer (TX/RX) switch, another RF transfer (RX Preamp IN/OUT) switch, and one to terminate the PA stage with a 22 ohm resistor while in the RX (standby) mode, presumably for improved stability. The main TX/RX transfer relay is not of coaxial design, but appears to perform fairly well, showing just perceptible loss on RX with the preamp "off."

While the RF "sniffer" circuit which is used to key the amplifier upon application of a drive signal worked well, I would not recommend its use for SSB or CW work. The "sniffer" works like a VOX (voice-operated XMIT) circuit, and suffers similar problems—e.g., cutting off the first syllable of each word in a new sequence. Plus, the constant chattering of the amplifier's relays, which is bound to occur when used in SSB/CW service, will take its toll on both operator and equipment. Far better to use "hard" (direct) keying for modes other than FM, and it won't hurt for FM work, either. Thankfully, the 2-317 provides for easy keying connection to nearly any type multimode equipment, via an RCA phono jack which can be

wired for either "ground on xmit" or "+ voltage on xmit" activation. The amplifier comes factory prewired for positive-line keying, but is easily changed for ground-line keying.

Amplifier shutdown (bypass, actually) occurs at approximately a 3:1 VSWR, according to the manufacturer. I could not easily simulate this kind of mismatch, so I did not evaluate this feature. The protection circuit uses a 1N6263 reverse voltage detector in a microstrip coupler. When reverse voltage is excessive, silicon-controlled rectifier Q3 (2N5062) "fires" and causes relays RY1 and RY2 (both RF transfer switches) to drop out, thus bypassing the amplifier (and the preamp, if it was switched in). A front panel "SWR" indicator also illuminates to indicate the presence of a problem. The power ON/OFF switch must be switched to "OFF" and then returned to "ON" to reset the VSWR protection circuit and allow continued operation of the amplifier.

The overtemperature protection mechanism is a 175 degree Fahrenheit normally-closed thermostat wired in series with the main RF transfer relay coil. This circuit resets itself when heatsink temperature drops to a safe level. In four months of casual and almost daily FM operation at 150 watts output power, the overtemperature mechanism has not tripped, although the heatsink has become uncomfortably warm to the touch on several occasions.

Where does all that heat come from? Dissipated power, of course, and lots of it. These solid-state amplifiers are typically less than 50% efficient, and the RFC 2-317 is no exception. At 160 watts output power, measured efficiency was 44.6%, indicating 198.8 watts dissipated within the amplifier. As with most linear amplifiers, efficiency is poorest at the lower power levels and rises to maximum at the highest level achievable. This data is shown graphically along with the linearity plot.

In all, the RFC 2-317 is a good product. Its internal receive preamp does absolutely nothing to improve the sensitivity of the ICOM IC-275 with which I use it, but the ICOM's receiver is already excellent. The added transmit power is very helpful for long-distance simplex work, or even for repeater work when used mobile. Linearity is very good to 150 watts output, but I would not attempt to exceed this power level for SSB work. (For FM work, it won't matter whether the amplifier is driven to compression.)

The RFC 2-317 and other RF Concepts products are available from popular amateur radio distributors. Further information may be obtained by writing to RF Concepts, 2140 Jeanie Lane, Gilroy, CA 95020.

I had lots more to write this month, but we're out of space. See you in April!

73, Steve, WB2WIK

Manufacturer's Specifications

Output power = 170 W with 30 W drive
 RX preamp noise figure = 1 dB nominal
 RX preamp gain = 20 dB nominal
 Power consumption = 22 A at 13.8 VDC

RF VOX sensitivity = 200 mW minimum

Measured

160 W with 20 W drive for
 1 dB compression
 1.5 dB
 22 dB
 26 A maximum at 13.8 VDC
 32 mA STBY
 135 mA STBY, preamp ON
 150 mW

Table 1 - Tabulated test data for the RF Concepts RFC 2-317.

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IC-751A Gen. Cvg. Xcvr	1649.00	Call \$
IC-575A 10m/6m Xcvr	1399.00	Call \$
Receivers		
IC-R7000 25-1300 + MHz Rcvr	1099.00	Call \$
IC-R71A 100 kHz-30 MHz Rcvr	949.00	Call \$
VHF		
IC-275A All Mode Base w/PS	1199.00	Call \$
IC-275H All Mode Base 100w	1389.00	Call \$
IC-27A FM Mobile 25w	429.00	Call \$
IC-27H FM Mobile 45w	459.00	Call \$
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IC-28H FM Mobile 45w	459.00	Call \$
IC-2AT FM HT	299.00	Call \$
IC-02AT FM HT	399.00	Call \$
IC-μ2AT Micro HT	329.00	Call \$
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IC-47A FM Mobile 25w	549.00	Call \$
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IC-μ4AT 440 FM HT	369.00	Call \$
IC-3200A FM 2m/70cm 25w	599.00	Call \$
220 MHz		
IC-375A All-Mode, 25w, Base Sta.	1399.00	Call \$
IC-38A 25w FM Xcvr	459.00	Call \$
IC-37A FM Mobile 25w	499.00	Call \$
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FL-7000 15m-160m Solid State Amp	1895.00	Call \$
Receivers		
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FRG-9600 60-905 MHz	699.95	Call \$
VHF		
FT-212RH NEW 2m, 45w mobile	459.95	Call \$
FT-211RH FM Mobile 45w	459.95	Call \$
FT-290R All Mode Portable	599.95	Call \$
FT-23 R/TT Mini HT	334.95	Call \$
FT-209RH FM Handheld 5w	359.95	Call \$
UHF		
FT-712RH, 70cm, 35w mobile	499.95	Call \$
FT-711RH FM Mobile 35w	479.00	Call \$
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A LOOK AT THE SHACK FROM BOTH ENDS OF THE COAX

More Utilities for the IBM PC

In last month's column, we rounded up several of the best of the IBM PC utility programs—programs that we have found to be quite useful in general purpose and hamshack computing. These programs were ones we particularly liked for initially setting up and customizing our system, installing and working with a hard disk (HD) drive, backing up programs and files on the HD, and the like.

This time, we continue on the same track with a review of several other useful utilities, including *PC Tools*, *Copy II PC*, *Referee*, and *Pizazz*. Following that, we'll again turn to the bookshelf for a look at some interesting reading matter, and we'll also open the mailbox for a peek. Let's look at the four IBM-PC utilities first.

PC Tools

This integrated package of disk and file management tools is, without doubt, one of the best values available in a PC toolkit—actually an indispensable one, for the file recovery capabilities and protection *PC Tools*® can provide for your software and data files. In addition to over 20 built-in utilities, the most recent versions of the program include fast, safe hard disk backup and restore routines and an excellent hard disk optimizer.

Most of the toolkit's functions are grouped among two major menus, "File Functions" and "Disk and Special Functions." Some of the major functions offered include the ability to copy and move separate or grouped files; maintain directories; locate particular files; format disks; rename, delete, undelete, and verify files; view and edit files in either ASCII or Hex mode; change file attributes; sort files; map disk usage; graphically display the subdirectory "tree"; copy files; report system information; and print directly from DOS.

Separate but included in the *PC Tools* package are programs which provide "disk services" such as hard disk compression (sometimes known as disk optimization and defragmentation) to speed up file access; PCBackup and PCRestor, which are fast HD backup and restore utilities; and Mirror and Rebuild, a pair of utilities used to recover a HD from an inadvertent reformat.

The version which I reviewed also supports IBM's new PS/2 series, and can, if desired, be operated in a memory-resident mode. This feature allows the utility to reside "behind" any applications program you're working with, to be invoked when you desire to use any of its capabilities. This feature is particularly handy should your application program or PC experience some malfunction that might cause you to lose data should you exit the program; with *PC Tools* in residence, you don't have to exit. Of course, you can operate the program in the customary nonresident mode as well.

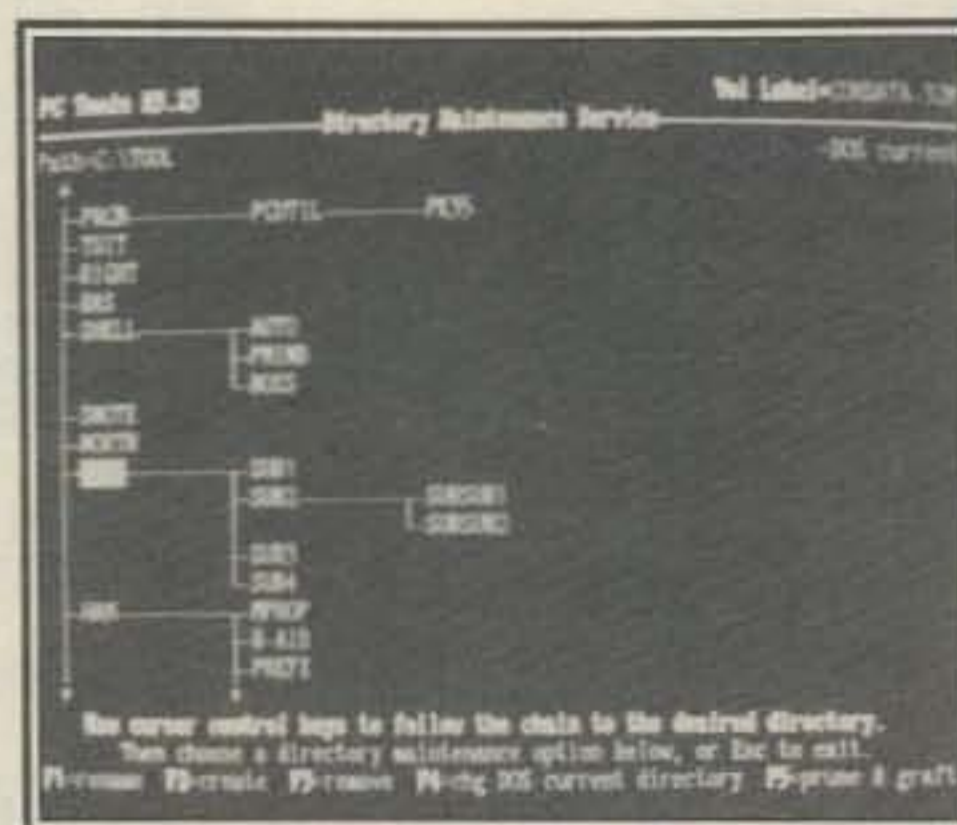
317 Poplar Drive, Millbrook, AL 36054

Name	Ext	Size	Date	Time	Attributes
PORTAL	COM	10887	7/18/87	1:22	Normal
PCBACKUP	COM	18284	7/18/87	8:11	Normal
PCRESTOR	COM	55476	7/18/87	8:11	Normal
MIRROR	COM	1861	7/18/87	3:07	Normal
REBUILD	COM	3348	7/18/87	9:51	Normal
COMPRESS	COM	36444	7/18/87	5:51	Normal
VERIFY	COM	2548	7/18/87	9:54	Normal
PCTOOLS	OWL	12362	7/25/87	12:02	Normal
DISKCOMP	COM	423	8/17/87	12:39	Normal
PCBACKUP	COM	54	8/18/87	12:04	Normal
PCBACKUP	COM	734	8/18/87	12:18	Normal, Archive

The *PC Tools* File Functions menu offers a wide array of sophisticated file manipulation features. (W8FX photo)

While I have made good use of most of the program's numerous features, my favorite is the Compression Utility. This little gem allows you to keep a running tab on a temperamental HD's performance. It has options to analyze the HD and its files, check the disk's magnetic surface status, ascertain the disk's organization, and perform a compression if needed. Another very handy feature is the Directory Maintenance Service, which presents you with a visual display of your disk's directory structure, and also allows you to easily rename, create, and remove directories, and even "prune and graft" subdirectories should you wish to reorganize your HD's structure.

This \$39.95 program has been selected as a *PC Magazine* "Editor's Choice," and for good reason. It does most or all of what much more costly multipurpose toolkit programs do at a very attractive price that can be as little as \$20



The *PC Tools* integrated hard disk management tool package offers a number of features to help you recover from potentially serious disk malfunctions. The program also includes a handy "Directory Maintenance Service" which includes a graphic display of your disk's directory tree. (W8FX photo)

if one shops the mail-order houses carefully. My only reservation is the documentation; while most features of the package are self-instructing and easy to use, some of the more complex features could benefit from more detail in the user's manual. For more details, write Central Point Software, Inc., 9700 S. W. Capitol Hwy. #100, Portland OR 97219.

Central Point has just announced a greatly enhanced version of this program called *PC Tools Deluxe* with a list price of \$79. Extras in the upgrade include safe disk formatting and unformatting programs; a fast and reliable disk caching program; a new file recovery feature; and a memory resident wordprocessor. The upgrade's additional features allow it to go head-to-head with programs such as Fastback®, Norton®, Xtree®, Mace®, and most of the other "do it all" utilities. By all means, check it out.

Fig. 1 shows a representative *PC Tools* File Functions screen, while fig. 2 displays the results of a disk analysis performed by the Compression Utility.

Copy II PC

A second program from Central Point Software that we would like to direct your attention to is the very capable floppy disk backup utility, *Copy II PC*®. Normally, backup programs are fairly ho-hum stuff, but *Copy II PC*'s multiple capabilities have made it standard equipment in many computer setups. With it, you're able to protect your software, particularly the more expensive copy-protected types, should misfortune befall your original disks.

Copy II PC allows you to make fast backups of standard, non-copy protected software with verification—the equivalent of running the two DOS utilities, DISKCOPY and DISKCOMP. The program also allows you to make quick and easy archival backups of most protected software, check your floppy drive speed, and even bulk erase disks.

Perhaps the most important feature of *Copy II PC* is the NOKEY program, which allows you to get around the annoying copy protection scheme which requires you to have the manufacturer's original as a "key disk" in your floppy drive—a procedure that many HD users find downright annoying in addition to being inconvenient. Another handy feature is the NOGUARD program, also in the *Copy II PC* package. This program allows you to make fully functional backups of some otherwise uncopiable programs, and to install and run those programs on your HD without fussing with complicated install/uninstall procedures.

Central Point includes a list of about 200 commercial programs that users have reported as "back-up-able," along with some special procedures that certain programs require for backup. However, they also allow that products such as theirs have the potential to be used as software pirating devices. Thus, they've also included a packet of educational information stressing the need for legitimate

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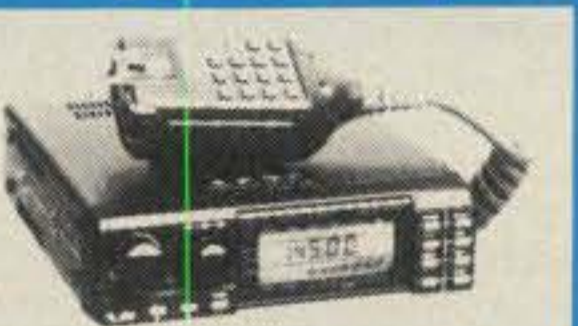
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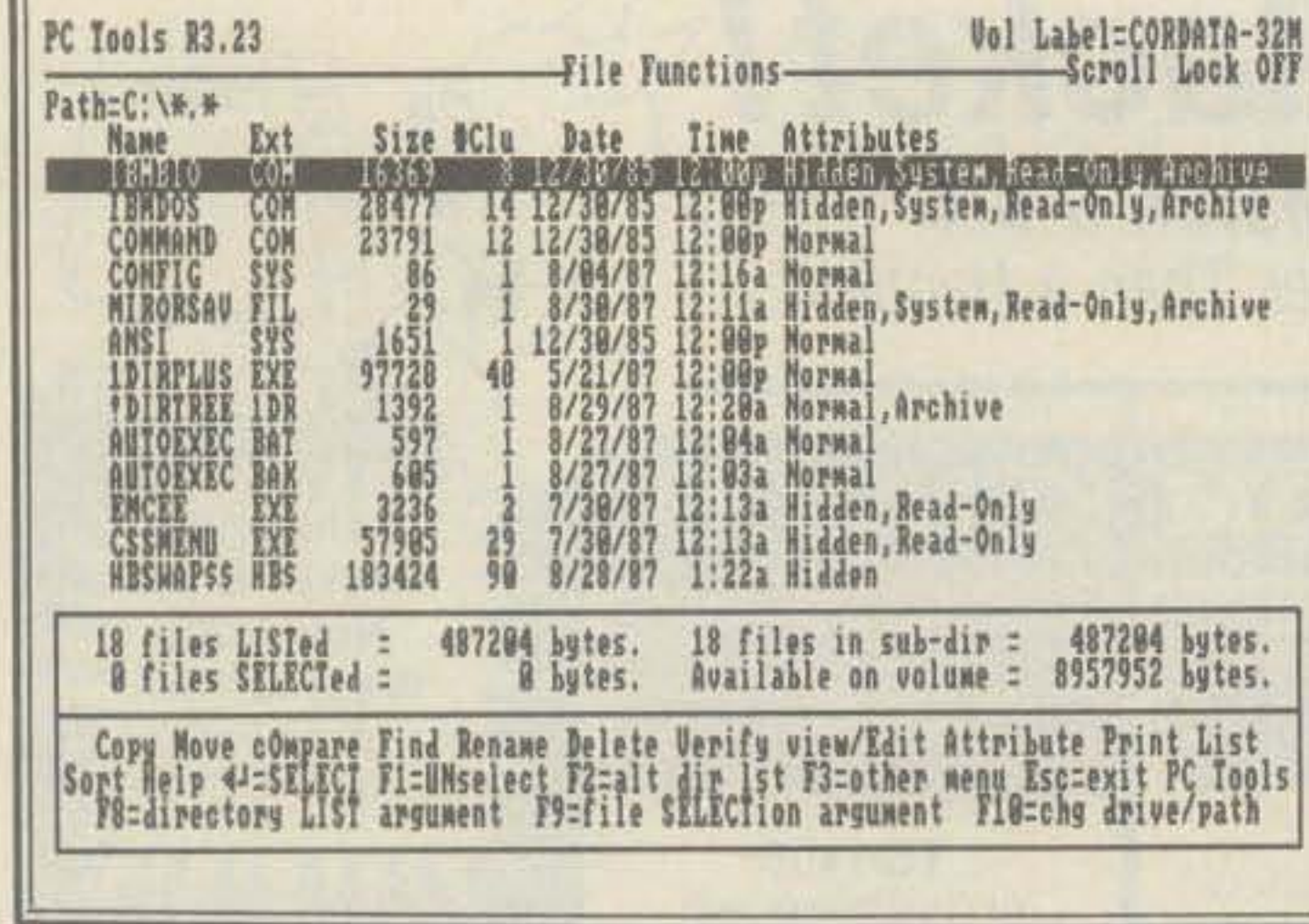


Fig. 1—Displayed here is the File Functions Menu from the PC Tools disk toolkit offered by Central Point Software. The files shown are from the author's hard disk root directory.

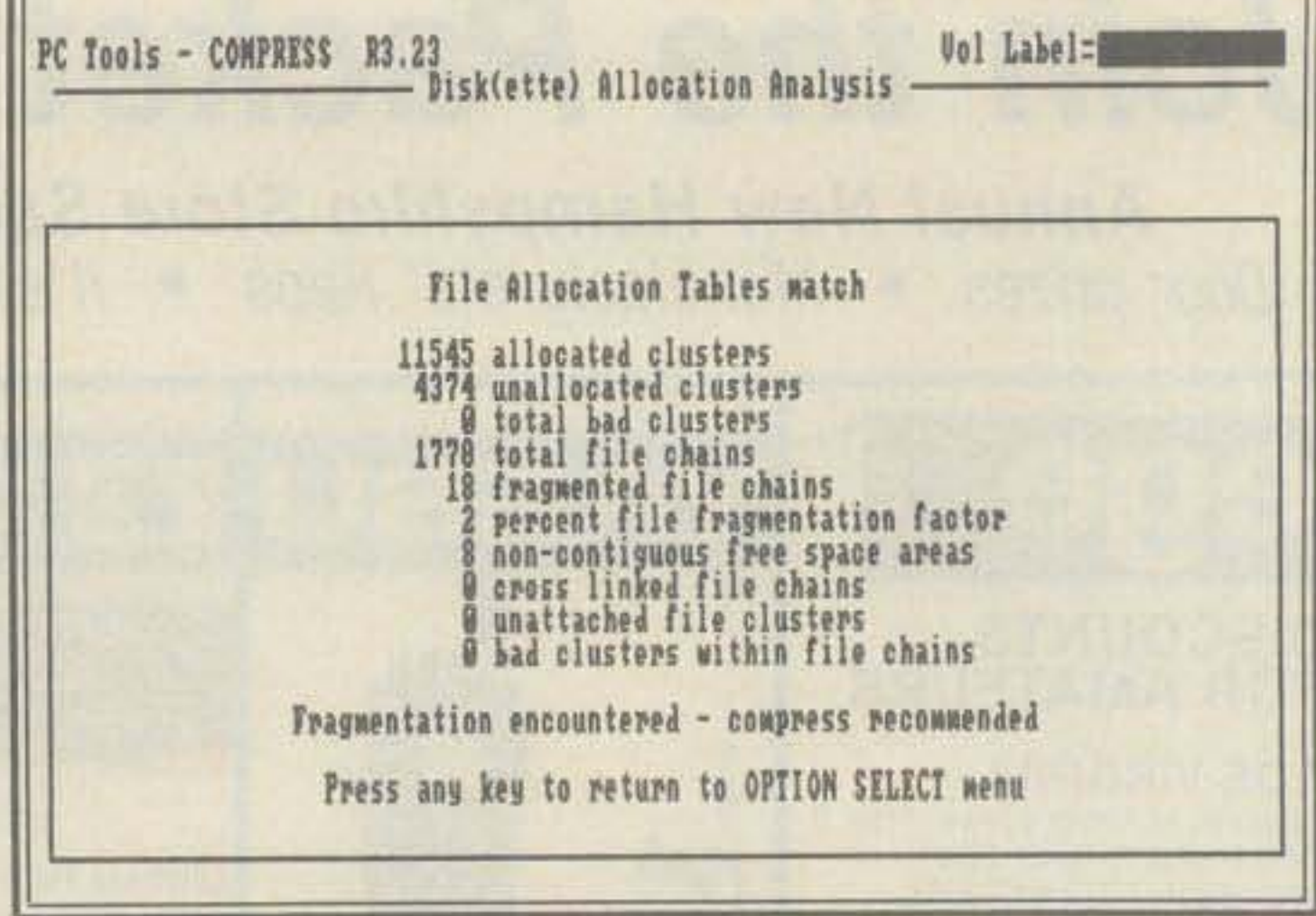


Fig. 2—The screen dump, above, shows a typical hard disk allocation analysis performed by the PC Tools Compress program. The display indicates that the disk is in good shape, but it would be a good idea to have the program run a compression to defragment the disk files for slightly improved access time.



PC Tools Disk Compression Utility represents an excellent hard disk drive analysis and optimization utility. It's menu driven and easy to use. (W8FX photo)

archival use of their product—they even include a copy of ADAPSO's "Thou Shalt Not Dupe" booklet.

The *Copy II PC* program is priced at \$39.95 from Central Point Software, address shown above. They also market comparable Copy II backup programs for the Apple Macintosh, C-64/C-128, and Atari ST, along with *Copy II Plus* for the Apple II series.

Referee

This utility is a rather difficult to describe, but it's one that I've found indispensable as one who likes to use a variety of memory-resident software on my PC. If you use desktop organizers, like *SideKick*® or *Partner PC*®, spell checkers, keyboard enhancers, print spoolers, macro generators, and other RAM-resident programs, you may have already discovered the problems which ensue when these programs compete with one another and with your applications program for control of your computer and its keyboard; this situation is popularly known as "RAM cram." *Referee*® is a utility program designed to manage memory-resident software—to act as sort of a traffic cop to avoid the kind of program conflicts which can send your PC crashing fast.

Referee provides the mechanism for activating and deactivating RAM-resident programs. With it, you can temporarily disable any program which conflicts with your current activity. You also can set up what Persoft calls "RAM Teams®," in which you can establish in advance which memory-resident programs you want to activate or deactivate with a particular applications program. For example, you can tell *Referee* to activate a desktop program like *SideKick*® in your logging program but deactivate it when you return to DOS, or activate a spelling checker only when you're using your wordprocessor.

The *Referee* system is made up of three modules. These are the core program, Ref-watch, that monitors your computer's RAM activity; the main *Referee* module which allows you to set up the RAM Teams; and the *Sideline*® *Referee* RAM resident option that allows you to pop up into *Referee* to make changes from within your applications program. *Referee* also provides you with useful information about your computer's status at a given time. It tells you how many programs are loaded into memory, and whether they are active or inactive; how much memory is used by each; and how much memory is still available to you. You

can also use *Referee* to selectively unload programs from memory, or to unload all your RAM-resident programs at once to free up all of your computer's memory for a large applications program.

I haven't begun to use all the capabilities that *Referee* offers. I've mostly used it in a rather unsophisticated manner, to ensure that all memory resident programs are unloaded before starting up a new applications program. I then "call" a new applications program and the RAM-resident programs I want to use with it through a menu of batch files, also automatically loading the *Sideline* module which lets me deactivate RAM-resident programs within my applications program. When I'm done with the applications program, the batch file returns me to DOS and has *Referee* unload all the RAM-resident programs. This returns the computer to a fresh state with the maximum RAM available for the next task. If I wanted to be more elegant in my approach, I could use the RAM Team concept that Persoft suggests, doing away with the Batch files.

Referee retails at \$69.95 from Persoft, Inc., 465 Science Drive, Madison, WI 53711. Figure 3 shows the *Referee* Main Menu, while fig. 4 is *Sideline Referee*'s display of the status of currently loaded RAM-resident programs.

Pizazz

Pizazz needs some explanation. It is a very flexible program that lets you take just about any image which you can display on your computer, from virtually any application program, and print it out better than you might think possible. Basically, if you can put something on the computer's screen, you can capture it with *Pizazz*, where the image can be manipulated as you desire.

Pizazz essentially takes the place of the plain-vanilla screen print program you got with DOS, acting as a sort of "turbocharger" for the computer's PrtSc (print screen) key, allowing you to give your screen image some flair. It is a RAM-resident printing utility that lets you capture color and monochrome graphics, manipulate the images in various ways, and send them to a disk file or print them on a printer.



The *Referee* main menu is shown here. The program offers a number of RAM resident software management features. (W8FX photo)

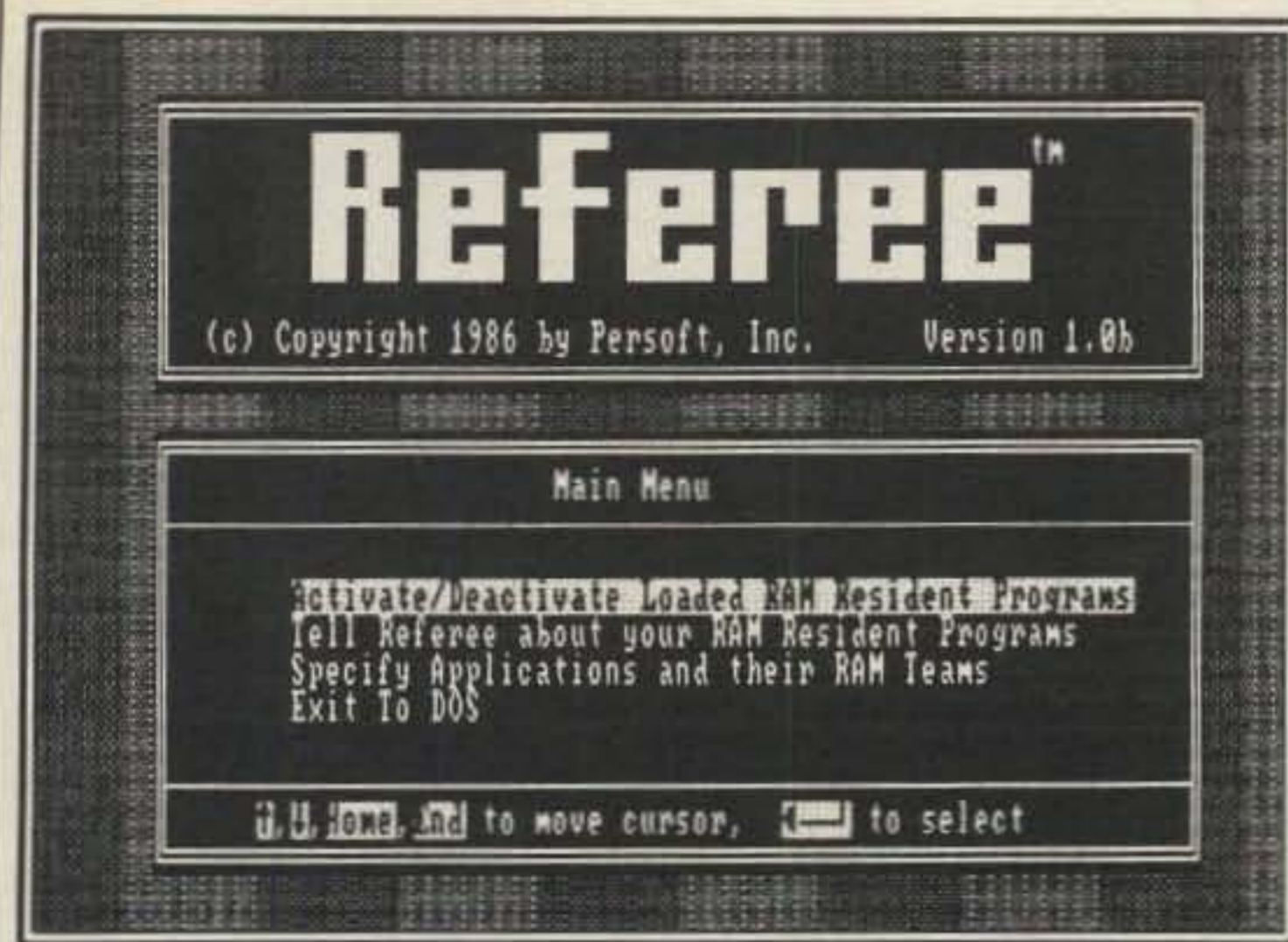


Fig. 3—The Main Menu from Persoft's Referee, a RAM resident program management utility.

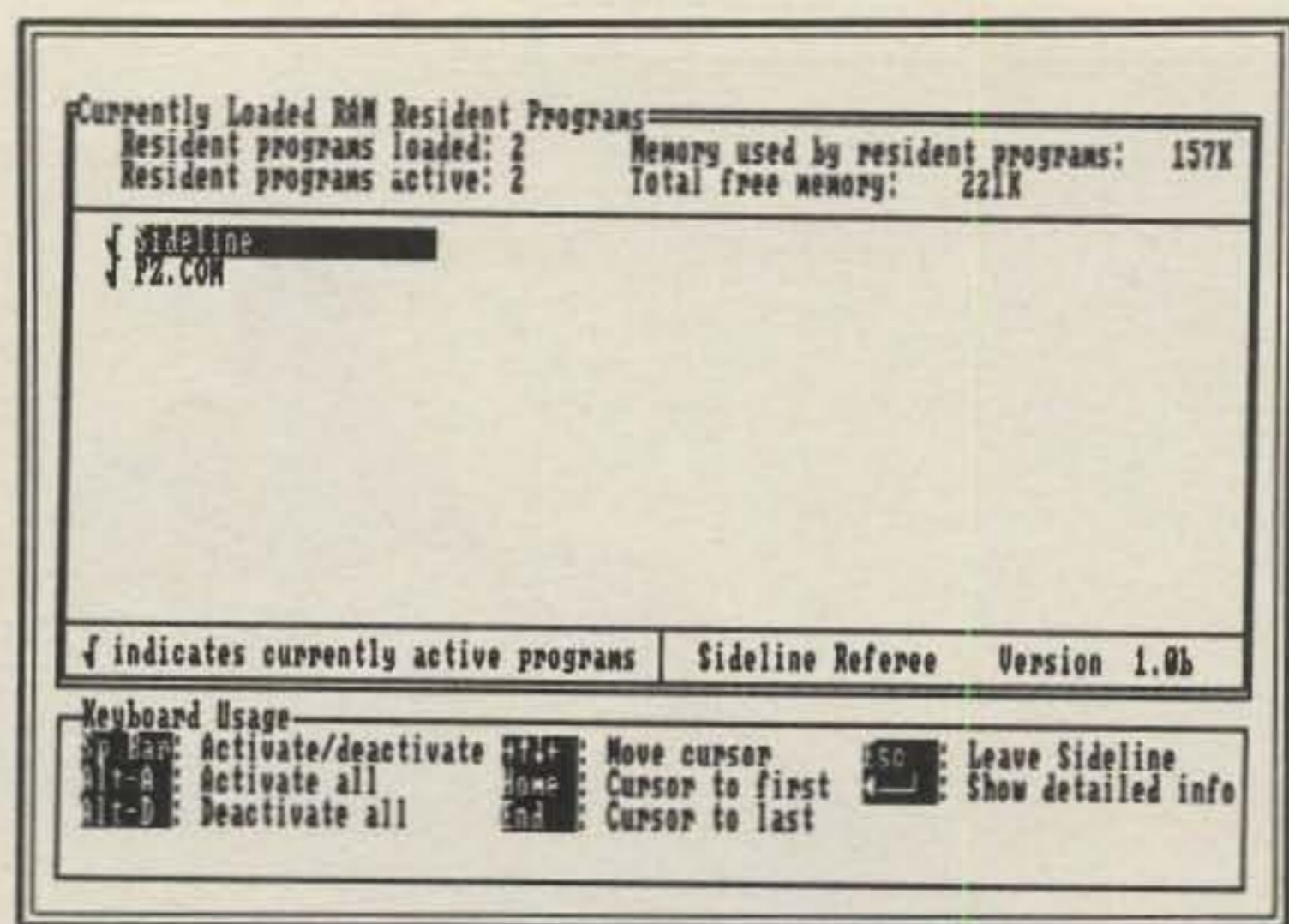
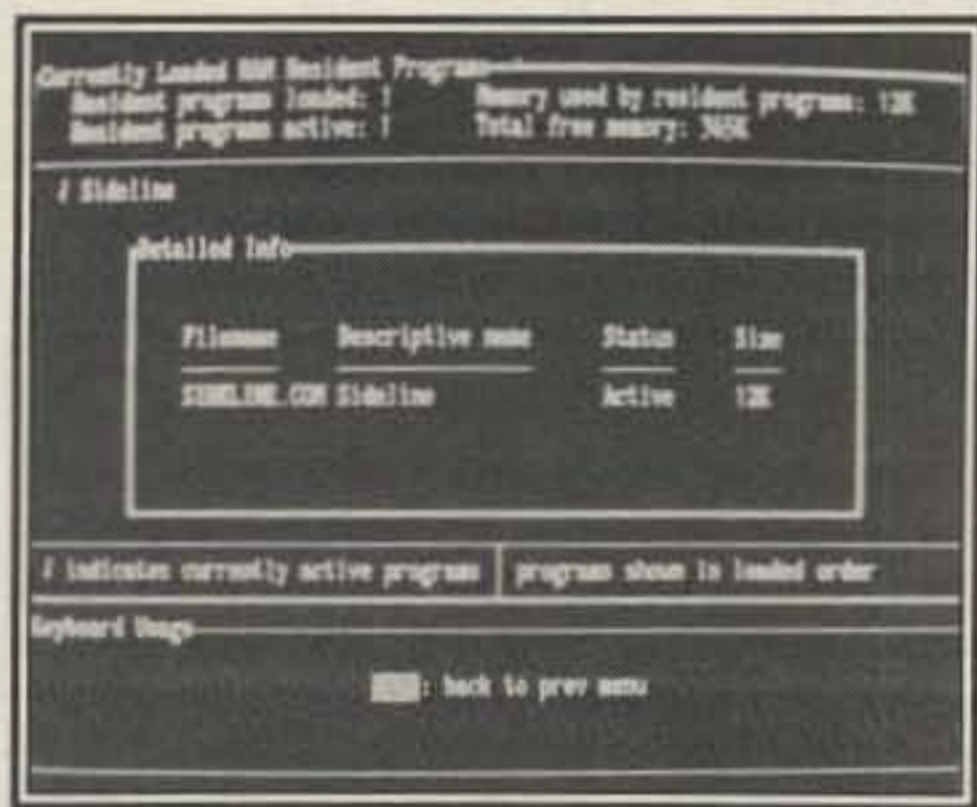


Fig. 4—A typical display from Sideline Referee, one of the programs in the Persoft Referee RAM resident management utility package. This program can be called up within an application program to activate or deactivate particular RAM-resident utilities as desired.



The Referee program, described in this month's column, helps you to manage a bevy of often conflicting memory resident programs. It can provide detailed information on the programs currently installed in your system's RAM. (W8FX photo)

Tapping the Shift-PrntSc keystroke combination pops up *Pizazz* over any screen that you want to print and automatically notes the displayed colors. Each displayed color can be changed or replaced and printed with any of over 200 shades. Of course, this requires a color printer, but with a monochrome printer you have access to some 30 different monochrome tones and fill patterns. You can print images with either standard or reversed black-and-white or color relationships.

You can size (enlarge and reduce) and rotate images, centering or indenting them as desired. You can also smooth out the jagged edges which often appear on circles or diagonals in computer-generated printouts. *Pizazz* also has a windowing capability, in which you can place an adjustable window over a portion of the screen and print out just the contents of the window you created. Another handy feature is that you can store an image in a disk file along with all the customization settings you've chosen, allowing you to later print out the image even on a different computer system. You could conceivably capture a screen image, send it to disk, and transfer it later via landline or even as an over-the-air-file to some-

one else, who would then print out the image using *Pizazz*.

Naturally, you'll get the most use from *Pizazz* if you have a color video display and color printer. I'm stuck with using monochrome, so I don't get the full benefits of the program. But I've nevertheless found using *Pizazz* to be an excellent way to print out the computer "screen dumps" I need when illustrating how certain applications program appear. In fact, all the computer screen displays that you see in this month's column were produced quickly and easily using *Pizazz*.

The program is \$59.95 from Application Techniques, Inc., 10 Lomar Park Drive, Pepperell, MA 01463.

Fig. 5 shows a picture, furnished to me by ATI, of the Space Shuttle which was produced by *Pizazz* using a color printer. Of course, the black-and-white reproduction you see here doesn't do justice to the brilliant color original.

The Beverage Antenna Handbook

While attending last summer's Huntsville, Alabama Hamfest, I spied a copy of Vic Misk, W1WCR's *Beverage Antenna Handbook*, Second Edition. This really caught my eye; although the book was first published in 1977, I had never come across it in my travels. A short note to Vic brought me a copy.

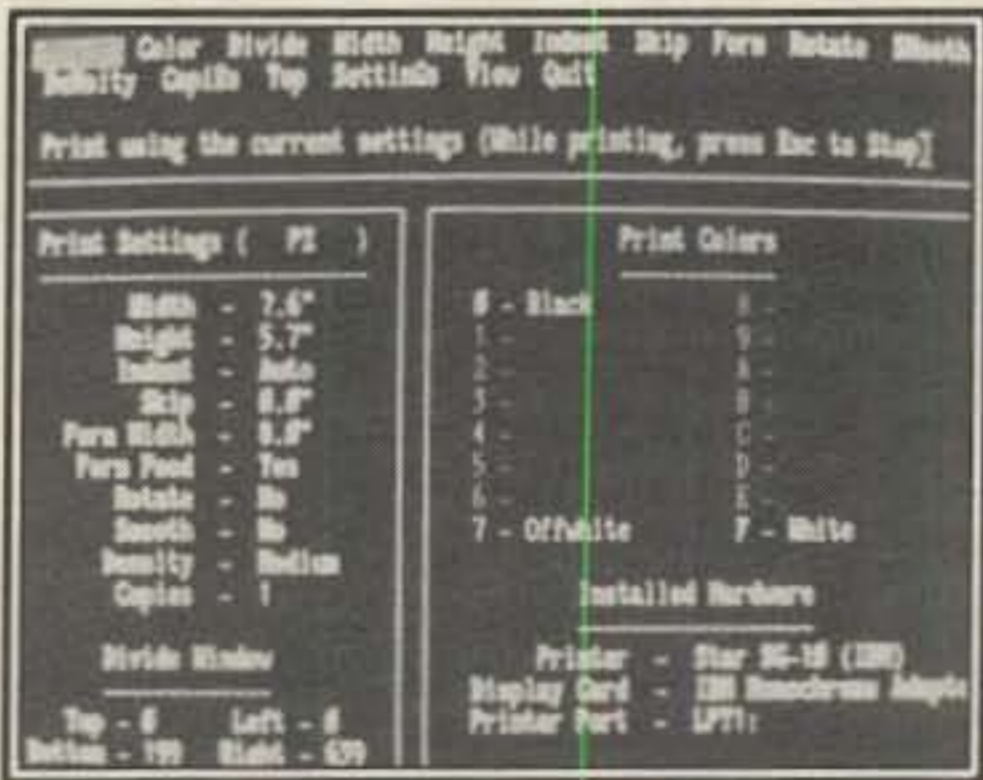
In his 80-page book, Vic updates his earlier edition with some new Beverage concepts and designs. Illustrating the book with some 35 figures (including detailed construction information), Vic covers the two major forms of Beverage, or wave, antenna used in high frequency (HF) communications. The first is the familiar single wire Beverage, noted for its unidirectional properties, widely used for DX reception on 160 meters. The second is the Steerable Wave Antenna (SWA), often referred to as the two-wire beverage.

Before getting into Vic's book, it's useful to review something about Beverages—starting with just what they are. The Beverage is a directional receiving antenna named after Harold H. Beverage, who in the early 1920s first described the directional properties and characteristics of this type of long-wire antenna for long-wave radio reception. In his pioneering work, he called the antenna a "wave" anten-

na, and collaborated with Rice and Kellogg to publish an article entitled "The Wave Antenna" which was published in the February 1923 issue of the *Transactions of the A.I.E.E.*

While the Beverage may superficially seem to be no more than just a very long nonresonant "long-wire," it operates on a different physical principle from more common antennas. The Beverage is most useful on the long- and medium-wave bands, and loses efficiency rapidly with increasing frequency. The Beverage, like the loop, is useful mainly for reception. The ground losses are generally excessive for transmitting applications, though some amateurs have experimented with Beverages for transmitting.

Interestingly, the poorly conducting earth beneath the antenna constitutes a "plus" for this type of receiving antenna. The ground actually enhances the tilting of the approaching wavefront (signal) so that, at any given time, a larger area of the antenna is exposed to the wavefront. In effect, the Beverage is really a long terminated transmission line, an antenna that is terminated at each end in its characteristic impedance. To be effective, the Beverage need be at least one wavelength long, installed at a height of but 10 to 20 feet. Antenna length



Pizazz main menu is shown here. The program is a highly capable print utility that can be used to print almost any screen, whether text or graphics. I use it to print many of the computer display screens in my column, such as the figures in this month's column. (W8FX photo)

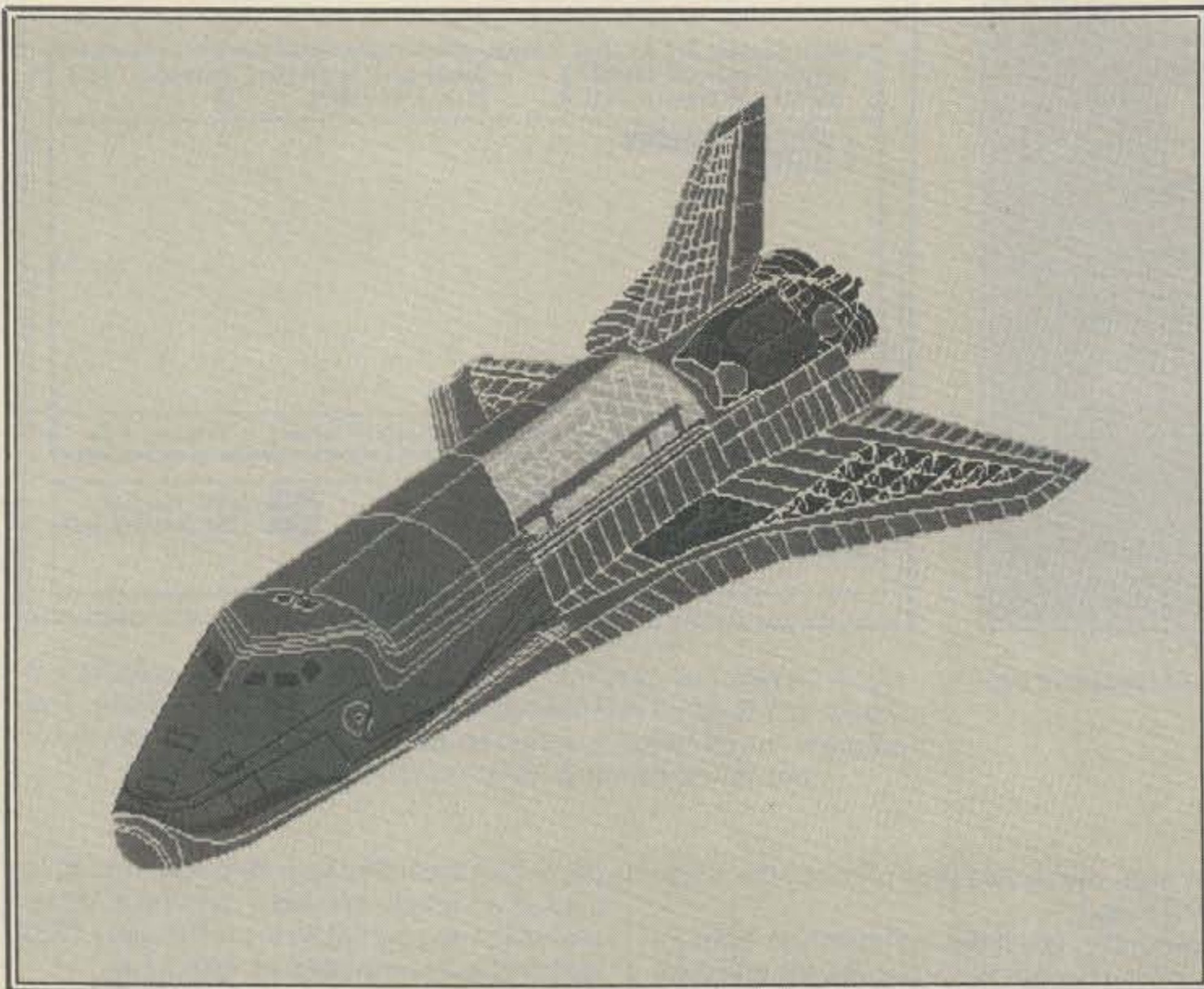


Fig. 5—A reproduction of the Shuttle, as produced from a color screen by the Pizazz print utility. The black-and-white reproduction hardly does justice to the almost fluorescent quality of the printout produced by Pizazz. The program is capable of faithfully reproducing practically any image you can display on your computer screen.

isn't critical; the Beverage is a broadband antenna. However, the longer it is, the "tighter" the pattern becomes.

Depending on the antenna height, condition of the ground over which it is installed, and the number of wires making up the antenna, the characteristic impedance can range from 200 to 500 ohms. As a result, the Beverage is typically fed with openwire or ladder line, though it may be fed with coaxial cable through an impedance matching device.

As Vic points out, some of the reasons folks like the Beverage include improved reception of DX signals on low frequencies, rejection of broadcast stations in the amateur bands, and reduced power line noise and other locally generated QRN. For long- and medium-wave band listeners, the Beverage represents an excellent antenna for DX work.

We've described the classic, single wire Beverage so far. But, the single wire Beverage has some drawbacks, the most serious of which are the inability to switch the antenna's directive pattern, and the fact that the antenna is limited to an end-fed configuration. The other form of Beverage, the two-wire, Steerable Wave Antenna (SWA), is actually the more desirable form, being equivalent to two single wire wave antennas aimed in different directions. The SWA also has an advantage in that it may be centered or off-centered, as circumstances dictate.

The bulk of the Second Edition is devoted to coverage of the SWA. Vic also devotes a chapter to what he calls the Micro-SWA, a scaled-down SWA for use in cramped urban areas. He also describes an interesting double sloper SWA, provides in-depth Beverage construction information, and discusses SWA opera-

tion, including ways to electronically steer the Beverage using "null steering" circuits. All in all, a very interesting book!

The Beverage Antenna Handbook is \$14.95 from Victor A. Mizek, W1WCR, 142 Wason Rd., Hudson, NH 03051.

Morse Tutor (MT)

Jay Duthler, N0IAI, sent us this program, designed to run on most IBM-PCs and compatibles. Jay developed the program after listening to a code practice tape and realizing that the tape (typical of many) did not contain sufficient random practice material for him to learn the code. Other code practice programs he tried he found full of bugs, slow, not self-calibrating, and not representative of the material that might be contained on a real Morse test.

Some of the features of MT include accurate code generation with self-calibration each time the program is run, thus requiring minimal user intervention; a "friendly" user interface with easy-to-use, Lotus-style drop-down menus; an online help system; compact program size; flexibility in setting up group practice sessions; and a virtually crash-proof nature. Most of all, the program is free to all comers (though Jay suggests a small contribution should you make use of the program).

Interestingly, as Jay indicates, he doesn't actually consider this to be a "shareware" program as he doesn't formally request payment from the user. Instead, he indicates, "if you find it useful and want to send me something—a QSL card, some mail, or even better five dollars or whatever you feel it is worth (that's fine too). In any case, it will bring me great joy to know that this program helped you

earn your license. If you think it's not worth your effort to reply, purchase some of the commercial practice programs around and compare them to MT." Indeed, I gave MT a test drive, and was very much surprised by its professional character and high quality. It was certainly comparable, and in many ways superior, to some of the rather expensive commercial code practice programs I've tried. I especially liked the fact that the program was very straightforward, and it made minimum use of variable colors, fancy screens, and cute messages, and it had no built-in commercials proclaiming how great the program was!

The current release of MT is available on the online information utility, GENIE, and can be downloaded from the IBM Roundtable section; it's also on CompuServe's HAMNET. On BBS systems you may find the program listed under the filename "MORSE24C.ARC" or something similar. Or, you can obtain the program directly from the author by sending a new, stamped, self-addressed disk mailer and a DSDD formatted disk to: Jay Duthler, N0IAI, 10702 Haskins Ct., Lenexa, KS 66210.

Commodore Repair Notes

In last September's column we discussed some of the problems in obtaining parts and service information on Commodore computers, and printed a letter from Dennis G. Eksten, W9SS, of Loves Park, IL asking for this type of information. It took us some time, but we may have what amateurs with sick Commodores in their hamshacks need.

We received a rather lengthy letter from Lyle Giese, who operates Lyle's Computer Repair, 913 West Ave., Woodstock, IL 60098. Lyle's letter is a goldmine of good information on Commodore parts and service aids. Excerpting from his letter:

"I am running a part-time business repairing Commodore equipment and can help out with some information for Mr. Eksten. First of all, for parts availability I use Jameco Electronics (1355 Shoreway Road, Belmont, CA 94002, order phone 415-592-8097) for almost all of my parts needs and their service is excellent. (They do have a \$20 minimum order, however.)

"For other suppliers, I checked the latest issue of *Run* magazine (a Commodore-specific computer magazine) and found a couple of suppliers advertised there. Kasara Microsystems, Inc., 22 Murray Hill Drive, Spring Valley, NY 10977, phone 800-642-7634; and Top-Tech International, 2344 Perot St., Philadelphia, PA 19130, phone 215-236-9901 were listed in *Run's* classified ad section."

"Others known to me are Major Computer Services, Route 6, Box 806-M, Midland, TX 79703, phone 915-561-8483; and K. Boufal Consulting Services, 244 Fitzwater St., Philadelphia, PA 19147, phone 215-925-6469. K. Boufal is the oldest of the bunch and has service information on some of the older Commodore PET computers and IEEE disk drives."

In Dennis' letter, he specifically asked about diagnostic service cartridges for the C-64. Lyle covered them, too:

"For testing cartridges there are two different units on the market. Micro R & D, Inc., 3333 S. Wadsworth Blvd, #A-104, Lakewood, CO 80227, phone 303-985-1473 or 303-985-4098, makes a C-64 and C-128 tester. Utilities Unlimited, 12305 N.E. 152nd St., Brush Prairie, WA 98606, phone 206-254-6530, sells both units. I don't have the price for the C-128 unit, but the C-64 version sells for \$149.95. However, I

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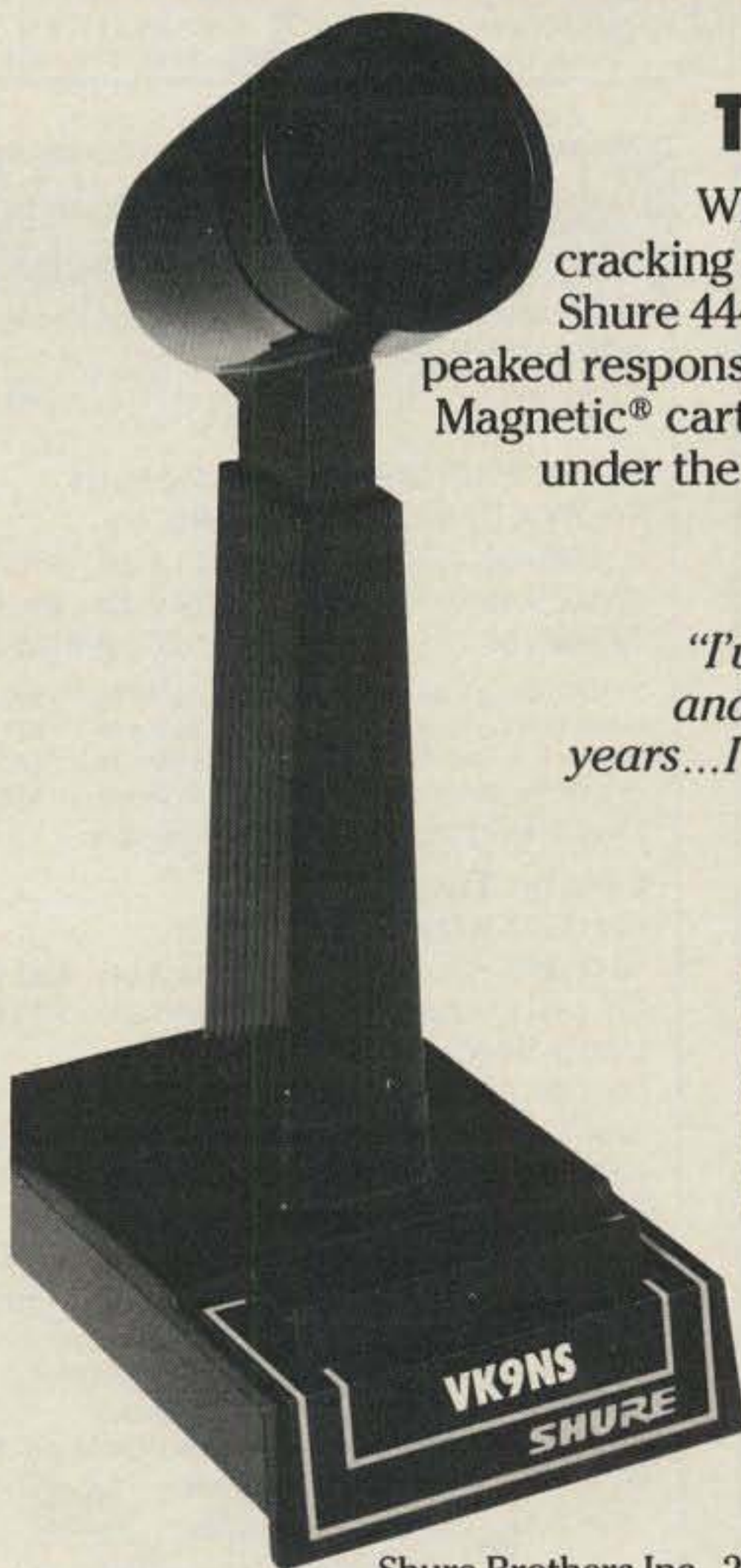
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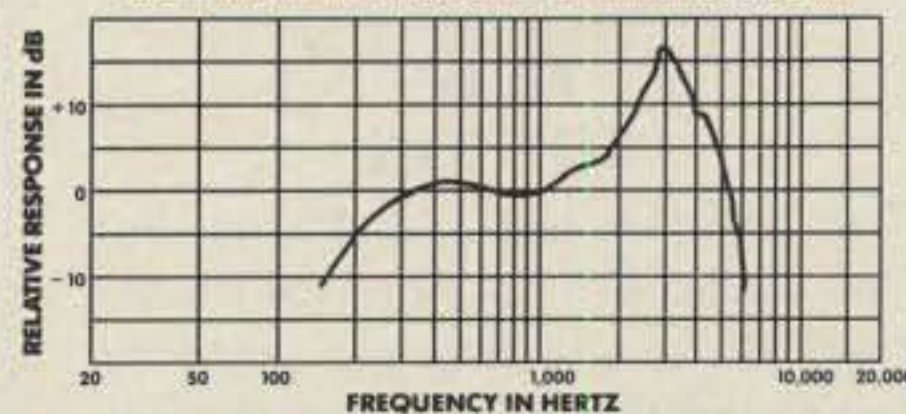
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See You Saw It In CQ

have not used or seen these units. The other model available is the Micro Sleuth from Transactor Publishing, 85 W. Wilmot St., Richmond Hill, Ontario, Canada, L4B 1K7, phone 416-764-5273. It sells for \$99.95. I am currently using this one for my business."

Lyle adds that "these unit don't provide 'printed outputs' for the user. Also, the units cannot test conclusively all problems (based on my observations from using the Micro Sleuth). A cartridge-based unit depends on the CPU (a 6510), PLA (906114-01), and the Vic-II (6567) chips functioning. If you get a dead unit indication from the tester, first check these chips. However, from experience, if one of the eight data lines or sixteen address lines is being held low by a malfunctioning chip elsewhere in the computer, it will prevent the cartridge tester from pinpointing the trouble. For testing the I/O ports (the joystick, user, cartridge, and serial ports), these units work very well."

I'd like to thank Lyle, who presumably is not an amateur radio operator, for taking the time to provide CQ with this detailed information, and also for sending a copy of this material directly to W9SS at the same time he sent it to us.

Free Morse Code Training Program. Another

er Morse program for the IBM-PC and compatibles has been developed by M. Lee Murrah, WD5CID. Lee's program is simply called "CW." He developed the program as a cooperative venture between himself and his users; his objective is to encourage computer hobbyists to become amateur radio operators and to make it as easy as possible to pass the Morse code test.

The CW program is menu-driven. The main menu has five primary functions: Learn, Receive, Send, Test, and Utilities. The screen is provided with a status line at the bottom of the screen which shows character, send, and word speed; license class for each code speed; frequency of the PC speaker tone; and the status of the "text hide" feature. A message line at the top of the screen indicates the current mode and the exit procedure for the mode.

The purpose of the Learn function is to teach the Morse code character sounds. Several subfunctions are used to do this. In several of these, the DIT and DAH components of the character are also printed on the screen for reinforcement. A quiz section is included to further reinforce the characters.

The Receive function has several subfunc-

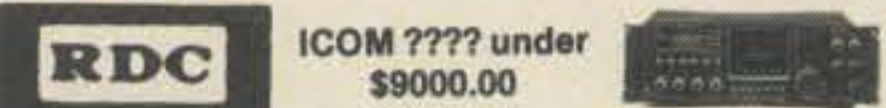
tions. You can receive random five-character code groups, plain English words, a simulated QSO, text entered via the keyboard, and the contents of a disk text file. Also, you can receive random five-character code groups in a zoom mode, which starts sending at a user-specified speed and progresses upward in 1 WPM steps until a second preset speed is reached. The speed increases after a specified number of code groups has been sent.

The Send function allows you to send characters as entered from the keyboard, and to use the computer's ALT key to send code manually as though you were using a straight key. The Test function allows you to test received code speed, including a test based on a simulated QSO. Finally, the Utilities function allows you to calibrate code speed, set screen colors, and select either monochrome or color display. Help screens are available for most menus and submenus, and you can print out the documentation from the program disk.

Lee indicates that there is no charge for the CW program, although small voluntary contributions from satisfied users are welcomed. The program is available for download from CompuServe's HAMNET and from the GENIE IBM Roundtable, both nationwide landline information utilities. Look for the filename "CW312.ARC," although the version number changes from time to time as Lee makes improvements. Lee will also make a copy of the program for anyone who sends him a formatted 360K DSDD disk and a stamped, self-addressed disk mailers. Contact M. Lee Murrah, WD5CID, 10 Cottage Grove Woods S.E., Cedar Rapids, IA 52403.

73, Karl, W8FX

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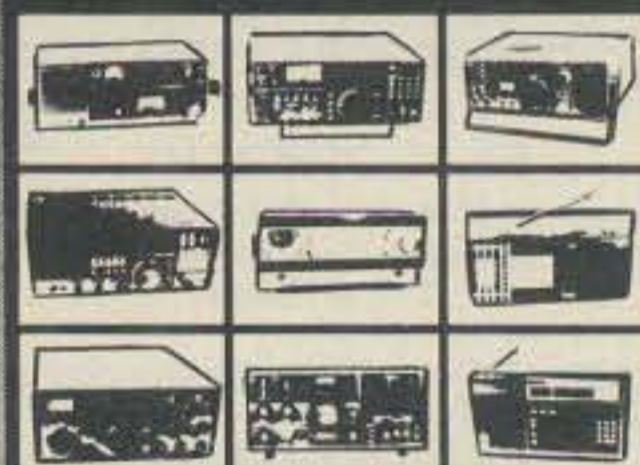
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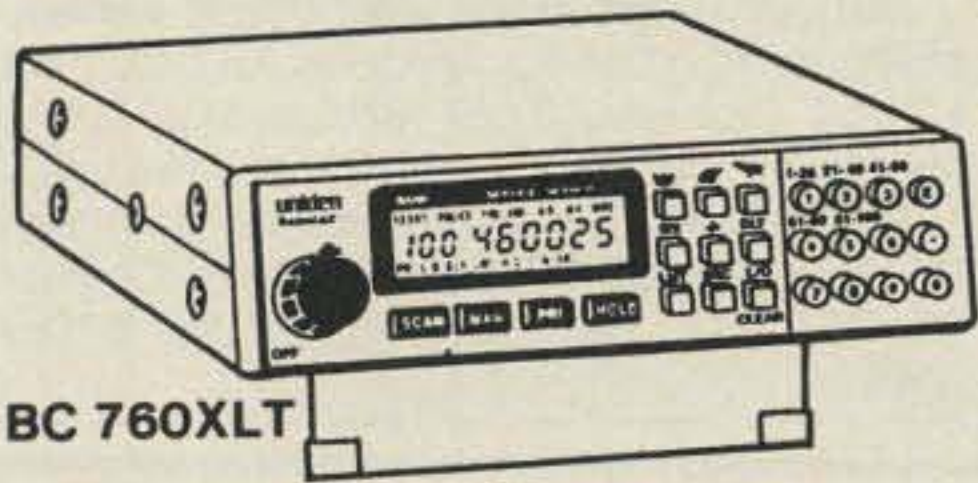
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Announcing (from page 6)

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Mar. 6, **Randolph ARA Hamfest**, Winchester National Guard Armory, Winchester, IN. Contact Kedrick Robbins, W9QUH, RR1 Box 389, Parker City, IN 47368 (317-468-6568).

Mar. 6, **York Winterfest Ham & Computer Show**, Dover Firehall, York, PA. Contact York Winterfest, 2449 Heidlersburg Rd., Gettysburg, PA 17325.

Mar. 6, **Conneaut ARC Hamfest**, Conneaut Human Resource Center, Conneaut, OH. Contact Jack Marttila, KA8TUU, 697 Broad St., Conneaut, OH 44030.

Mar. 6, **Mount Tom Amateur Repeater Assn. Fleamarket**, Knights of Columbus, Council 69, Chicopee, MA. Contact Marvin Yale, N1CDR, 6 Laurel Terrace, Westfield, MA 01085, or call 413-562-1027 evenings, or days 413-532-411.

Mar. 11, **Jefferson Barracks ARC Auction**, Concordia Turners Hall, south St. Louis, MO. Contact Carl H. Hohenberger, WB0BZP, 5266 Parker Ave., St. Louis, MO 63139.

Mar. 12, **Shore Points ARC Springfest 88**, Atlantic County 4-H Center, Egg Harbor City, NJ. Contact SPARC, P.O. Box 142, Absecon, NJ 08201.

Mar. 12, **Glasgow Swapfest**, Cave City Convention Center, Cave City, KY. Contact

N4HCO, 1379 Whites Chapel Rd., Glasgow, KY 42141.

Mar. 12, **Fox Cities ARC Swapfest 88**, Appleton East H.S., Appleton, WI. Contact Don Baker, NB9J, 621 W. 7th St., Kaukauna, WI 54130 (414-766-3886).

Mar. 13, **1988 ARRL Hudson Division Convention/WECAFEST 88 Hamfest**, Westchester Community College, Valhalla, NY. Contact Rich Moseson, NW2L, 19 Linden Ave., Bloomfield, NJ 07003 (201-680-1585).

Mar. 13, **Indiana Hamfest**, Indiana State Fairgrounds Pavilion Building, Indianapolis, IN. Contact Aileen Scales, KC9YA, 3142 Market Place, Bloomington, IN 47401 (812-339-4446).

Mar. 19, **Derry Repeaters Fleamarket**, Hudson, New Hampshire Lion's Club Hall, Hudson, NH. Contact Interstate Repeater Society, P.O. Box 693, Derry, NH 03038 (603-434-4435).

Mar. 19-20, **Charlotte Hamfest & Computerfair**, Charlotte Convention Center, Charlotte, NC. Contact Charlotte Hamfest, P.O. Box 221136, Charlotte, NC 28222-1136.

Mar. 20, **Midland ARC St. Patrick's Day Swapfest**, Midland County Exhibit Building, east of Midland. Contact Midland ARC, P.O. Box 4401, Midland, TX 79704.

Mar. 19, **Playground ARC Ham/Swapfest**, fairgrounds, Fort Walton Beach, FL. Contact Playground ARC, P.O. Box 873, Fort Walton Beach, FL 32549.

Mar. 20, **Sterling-Rock Falls Hamfest**, Sterling High School Fieldhouse, Sterling, IL. Contact Sue Peters, P.O. Box 521, Sterling, IL 61081 (815-625-9262).

Mar. 26, **Hobbie Hi-Tech 1988**, Ramada Inn, Moorhead, MN. Contact Tim Gooding, KD0YX, 1006 Sheyenne St., West Fargo, ND 58078 (701-282-6630).

Mar. 26, **Kentucky ARRL State Convention**, Pritchard Community Center, Elizabethtown, KY. Contact Chuck Strain, AA4ZD, P.O. Box 342, Vine Grove, KY 40175.

Mar. 26, **Drumlins ARC Hamfest**, Marletown Fire Hall, Newark, NY. Contact Jack Slocum, N2CSY, 315-331-1539.

Mar. 26, **Radio Society of Norwich Auction**, VFW Hall, Uncasville, CT. Contact KY1F at 203-536-0187.

Mar. 26-27, **Emergency Response Institute 88**, Apple Computer, Cupertino, CA. Contact SVECS-ERI, c/o Dave Larton, N6JQJ, 766 El Cerrito Way, #D, Gilroy, CA 95020-4149 (408-847-3605).

Mar. 27, **HAMCOMP 88**, New Jersey National Guard 112th Field Artillery Armory, Lawrence Township, NJ. Contact HAMCOMP 88, c/o KB2ZY, Box 441B, RD #1, Stockton, NJ 08559 (SASE).

Mar. 27, **Lamarsfest 1988**, Lake County Fairgrounds, Grayslake, IL. Contact Lamars, c/o Marc Abramson, P.O. Box 751, Libertyville, IL 60048 (312-255-0642 8-10 p.m. CST).

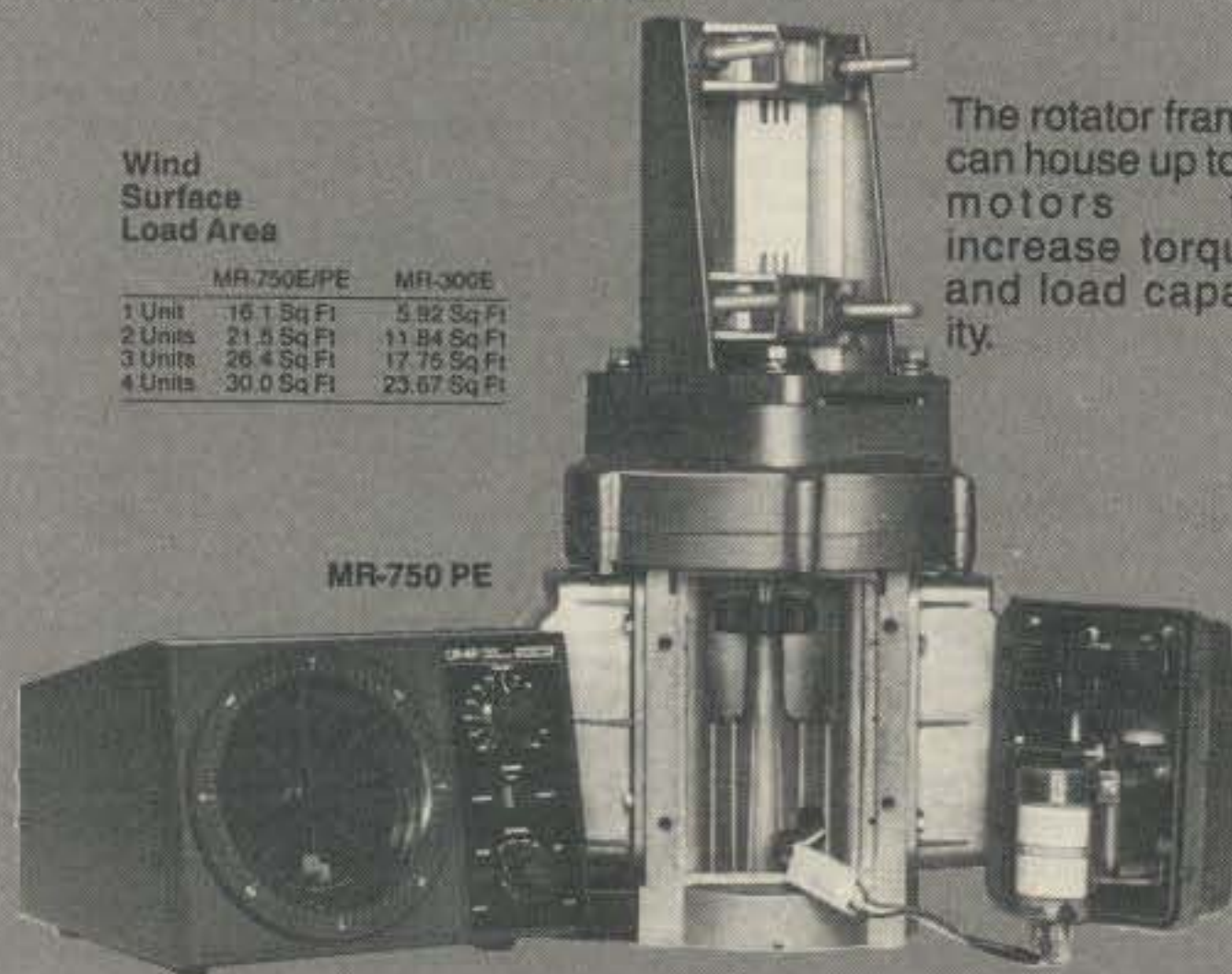
Mar. 27, **Tenth Annual Lake County Hamfest**, Madison High School, Madison, OH. Contact LCARA Hamfest, 7803 Skylineview Drive, Mentor, OH 44060 (216-953-9784 until 9 p.m.).

Mar. 27, **Tri-County ARC Hamfest**, Jefferson County Fairgrounds, Jefferson, WI. Contact TCARC, P.O. Box 321, Milton, WI 53563 (SASE).

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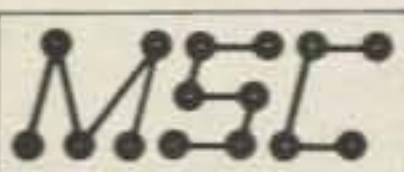
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NEWS OF COMMUNICATION AROUND THE WORLD

*No DXing is in vain,
Its reward is in the doing,
And the rapture of pursuing.
The prize is the country gained. . . .*

When sometimes at club meetings you have to endure listening to how great DXing was 30 or 40 years ago, you can easily believe that those great days may never come again. One suspects that those venerable DXers who so readily recall those great days will never lose any of their steam. Possibly all of this is true. Possibly some of it also depends on one's perspective.

With Spring already at hand and the warm days of summer an anticipation, it is the time to believe the March winds will blow softly on all DXers, especially the old DXers. Last week we ran into one of the elder DXers down in a doughnut shop in the village, and after a bit of talk we had to wonder if the winds were blowing at all.

"Heard you in the 160 Contest last week," we said. "You still catch all of those CW tests, don't you?" The Local acknowledged that he did.

"Guess you will be in the WPX sideband test at the end of the month," we continued, but the Local just shook his head. "Maybe," was his comment. "We'll see."

We were puzzled. This did not sound like the fire-breathing, tireless, and everlasting competing DXer that we had grown to know over the years. Definitely this was not the one who has worked everything a couple of times over and is always up at the head of the howling DX pack in chase of a new country. "Everything okay?" we had to ask, already thinking that perhaps there was something as yet unspoken. We got a smile at that question.

"Something happened to the rotator on the beam during one of those storms a month or so back," the Local advised us. "It is frozen at 30 degrees, and I can't get it to move. Guess I'll have to climb the tower one of these days and check it out."

Maybe our memory is getting a bit long, but this did not seem to be the DXer we knew. We could remember the time when he had climbed to the top of his tower in a southeast gale to tie down the beam when some fitting had come adrift. And how every Spring as soon as the weather improved he would check out the whole assembly from top to bottom, just to make sure that he would be ready for any DX that might come. "Well," we commented, "at least it is pointed in the right direction for Albania should that one show." The Local nodded in agreement.

"It is," he conceded, "but I already have two confirmed Albanian contacts. One is back 30 years or so. I recall it as a Hungarian airline pilot who operated from his plane on the tarmac at the Tirana airport while waiting for the



What do DXers say when they meet? "I've come to talk about DXing!" Naturally. Here is a trio of full-bore DXers checking their WAZ numbers and their WPX standings. On the left is Gus Sandola, K2ARO. That's I1POR, Gianlugi Portinaro, in the center, and Joe Gumino, K2OLG, on the right. All three hold the WAZ on 10 meter SSB. I1POR and K2OLG are on the WPX Honor Roll. DXing comes naturally to I1POR. He lives on Via Guglielmo Marconi.

return flight to Bucharest. I also worked Marty when he was on about 15 years back. So maybe the next time a ZA shows, I'll just sit back and listen."

We could hardly disagree with that, but we could still remember some years back when one could be at the local DX club meeting when word came that Don-You-Know-Who was on the air from a possible new country. The members would rise en masse and rush for the door. Mention Albania in any crowd of needy DXers, and you will draw attention. Intimate that you are the holder of the inside word on a coming ZA operation, and you will be the instant queen of the ball with nothing but anxious suitors about you. But here this one had two confirmed Albanian contacts and was not even sweating for more. Maybe there is something about old DXers, we were thinking, maybe something that brings an appreciation of values other than just working all the countries. That could be the often oblique reference to the Wisdom of the Ages that is evidenced by the seemingly bottomless treasuries of DX memories and a large total of countries. Perhaps all of us will someday be close to that DX Nirvana, qualified to enjoy that final beatitude that transcends contesting, country counting, and other necessary DX tasks. The problem currently is that we have a hard time even visualizing that exalted state. We thought maybe we had better first gather all the available DX insight that we could encounter.

"You feel okay?" we finally had to ask, and the Local admitted that he had never felt better. "Still walking the hills in the morning?" we continued, and the venerable one confirmed that he was, most days. "Weren't you in the last graduating class at the old high school?" we ventured, and the Local corrected us. "You are close," he admitted, "but it was the class before that closing, the Class of '33." Heck,

this one was even older than we had suspected, but he definitely was not showing much damage from the years. There had to be something else, and we had to know. This one was hardly into his seventies, and we were wondering if he was starting to slow down. No real DXer would ever readily admit to that possibility. But we did recall one who gravely advised us that he had made a big mistake by turning 80. "Worst mistake I ever made," he told us, "even worse than getting the 300-country DXCC sticker." A lot of DXers know how that sticker can often bring the bad times.

We were ready to give up. Something was changing, and we could not discern even a hint as to what it might be. "Somehow you don't seem to be your usual self," we finally commented, adding cautiously, "You are not losing interest in DXing, are you? He wasn't."

"No, I'm not losing my interest," the Local told us, "but during the winter months when the beam was stuck, I decided to go through my stacks of QSL cards and really sort them out. Guess what I found?"

We were not even going to guess. Most anything could be in this one's files, possibly things that he had not even suspected. We were right.

"I decided to sort out the cards in a number of ways," the Local continued, "by band, by WAZ zones, and by DXCC counters to really find out what I had. Would you like to know what I found?"

That was hardly a necessary question. Knowing this one, we could expect that just about everything in the way of DX would be there. "Tell us," we suggested.

"Out of the piles of QSLs," the Local started off, "I found over 1600 DXCC counters, which was far more than enough for 5BDXCC and 160 DXCC, call it 6BDXCC if you wish. There were cards to get WAZ on every band, 5BWAZ plus 160." The Local fixed us with a small smile and a gleam in his eye. "I had no idea at all that I had worked so much DX, no idea at all."

Possibly he did not, but for years we had just assumed that this one had worked everything. Everything! "But you are not quitting now, are you?" we asked, perhaps some apprehension showing in our voices. This one was not.

"Years back," the Local continued, "when I was fully employed, I was first in sales and later in management. Each day brought its own struggles. No day was ever complete, as I always had to think and plan for the next day. But I have been gone from that action for years now. I left the competition, but lately I began to suspect and ask if the competition had ever left me. Maybe you can understand what I was thinking and wondering."

Of course we understood. That is, we thought we did. After all, when you have worked everything, what is there left to work? But somehow this did not seem right. Most of us know DXers who have moved out of the mainstream of DXing, sometimes not even bothering with the howling pileups, but who are still interested in DX. It is just that they are a bit more relaxed about it. Possibly that might be

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1312	JA2KFI	1316	VE2DWN
1313	I5ZTC	1317	F6GDK
1314	YB8VM	1318	WA3LJP

SSB

1926	8P6OV	1931	YV1CP
1927	LU8DWN	1932	G0DZS
1928	EA7BUD	1933	WA3LJP
1929	IV3VCG	1934	HC1OT
1930	I4ZOX		

CW

2483	K3UA	2485	JA1SJC
2484	I3JEX	2486	IK5HHB

Endorsements

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S.S.B.: 350 8P6OV, EA1AW, LU8DWN, EA7BUD, IV3ICG, YV1CP, G0DZS. 400 KB5UP, 8P6OV, EA1AW, LU8DWN, EA7BUD, IV3ICG, YV1CP. 450 8P6OV, EA1AW, LU8DWN, EA7BUD, IV3VCG, YV1CP. 500 8P6OV, EA1AW, LU8DWN, EA7BUD, IV3VCG, YV1CP, HA8XX. 550 CE4ETZ, 8P6OV, EA1AW, IV3VCG, YV1CP, HA8XX. 600 CE4ETZ, 8P6OV, EA1AW, HA8XX. 700 KD9OT, CE4ETZ, 8P6OV, EA1AW, IV3MJR, HA8XX. 750 8P6OV, EA1AW, HA8XX. 800 8P6OV, HA8XX. 850 HA8XX. 900 HA8XX. 950 I8WYD, HA8XX. 1000 I1EEW, I8WYD, HA8XX. 1100 EA8AKN. 1150 EA8AKN, N2AC, K5RPC. 1200 W4UW, EA8AKN, G4CPJ. 1250 K4CKS, G4CPJ. 1300 K4CKS, G4CA. 1350 G4CPJ. 1400 G4CPJ. 1450 G4CPJ. 1550 F6BVB. 1600 F6BVB. 1800 9HAG. 1850 9H4G. 1900 9H4G. 1950 9HAG. 2000 WD8MGQ.

CW: 350 HA8XX, K3UA. 400 EA3DBO, HA8XX, K3UA. 450 EA3DBO, HA8XX, K3UA. 500 OZ4RS, HA8XX, W9IAL, K3UA. 550 IK3GER, YU7DR, HA8XX, K3UA. 600 YU7DR, K7DBV, HA8XX, K3UA. 650 YU7DR, HA8XX, K3UA. 700 YU7DR, K3UA. 750 DL7GK, K3UA, I2EAY. 800 DL7GK, K3UA. 850 DL7GK, K3UA. 900 DL7GK, K3UA. 950 DL7GK. 1000 DL7GK. 1050 DL7GK. 1150 W8UMR. 1200 W8UMR. 1250 W8UMR. 1300 W8UMR. 1350 W8UMR. 1400 W8UMR. 1550 W3TVB. 2300 N6JV, WA2HZR.

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 20 Meters: 8P6OV, EA4KK, F6BVB
 40 Meters: 8P6OV, W9IAL, F6BVB
 80 Meters: 8P6OV, EA4KK, F6BVB
 160 Meters: I1JQJ

Asia: 8P6OV, LU8DWN, EA4KK, HA8XX
 Africa: EA4KK, HA8XX
 No. America: KB5UP, 8P6OV, EA4KK, HA8XX
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what this Local meant. We encouraged the Local to continue. Possibly if he did we could learn something. Possibly he even realized and understood what was in our minds.

"No," he continued, "I am not shutting down the station. It just is that during the winter I got to thinking of all those QSL cards and the good times and memories that they represent. Then I got to thinking that I would still have had about as many memories and good times even without the fierce competition to be king of the hill. It might have been about then that I realized that for a number of years now I have been a DXer DXing mainly for the fun of it. I will admit that the competition years along with the intensity of the battles in the pile-ups were fun, but that was another kind of fun. These days I still want to put out a strong signal and put it where I want it to be heard. But I tend to suspect that is not the main reason for my current activity. I know now that often I am in there DXing because I enjoy talking with old friends from around the world. And not all of them are elderly either; some are just as young as you are—maybe even younger. Maybe you don't understand my thinking, but I am sure that you will one of these days. Hopefully, you will learn that while the competition is always exciting, there is a simple joy in DX itself that should never fade. And, putting the question directly, why should it?"

We had to think this over. Often one can easily come up with a good handful, maybe even more, of DXers who will easily fit the category of this Local. Here one has to but remember the Tuesday DX luncheons down the peninsula in HRO country. That one brings the old DXers out of the woodwork, blinking in the sunlight, and loudly hailing their cronies, many of whom they have not seen for a whole week. While one might be reticent to join such an enduring group with the mark of DX all over them, those who try quickly learn that the only difference is that many of them have moved from the competition category to the fun category, possibly not too far but often definitely across the divide.

"Sounds good to us," we had to acknowledge, "but have you completely given up on the full-bore DXing? Maybe it will catch up with all of us eventually." It was not the most diplomatic thing we could have said. We got a quick response.

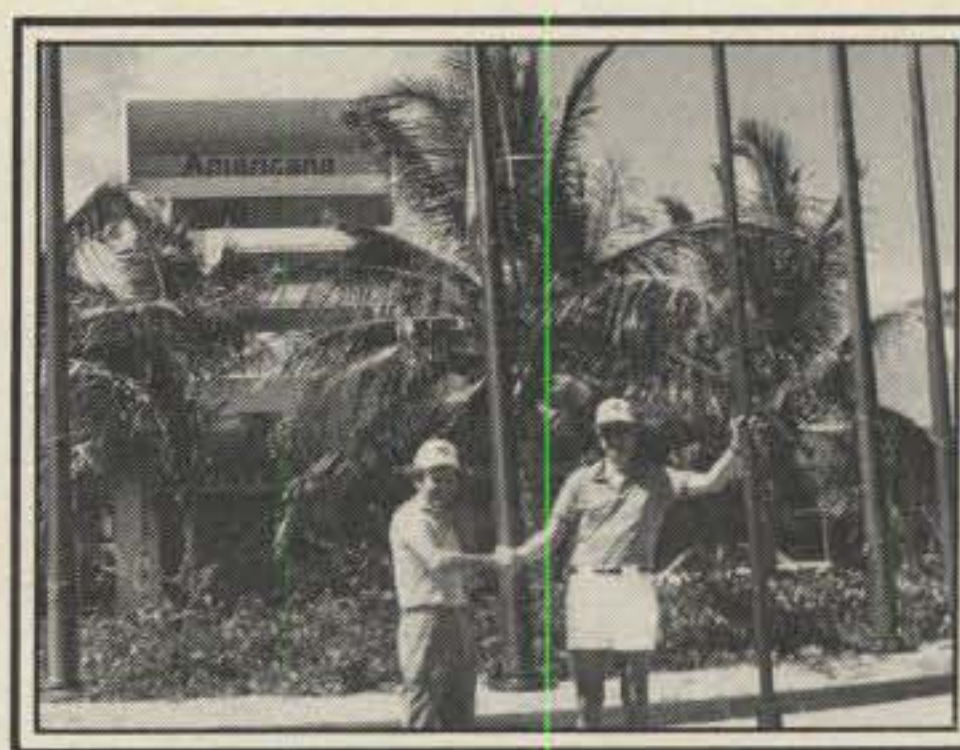
"I don't know what gives you that idea," was his brusque comment, "and certainly not because of the frozen rotator." He was silent for a bit and then continued. "Let's just say that I might be tired from DXing but not of DXing. So maybe I'll just rest awhile and then rise to DX again."

We had to admit that this concept does have merit. "But with your beam aimed at Europe, just what are you working?" Later we had to wonder if the Local might have been waiting for this question. He gave us a quick smile, possibly even a wise smile.

"Well," he started off slowly, "I worked G4RZQ recently. He was mobile." We should have been smart enough to realize that wasn't the whole story, but that the Local was waiting for our reply.

"England?" we remarked. "Isn't that coming down a bit for you? And how can that be any fun after what you've worked?"

We got a good laugh. "But this might not be just any old G contact," the Local chuckled. "You see, Keith is mobile on the Isle of Wight. He is also a back-hoe operator and has a 10 meter rig on the back-hoe. So as he moves from



Aruba? The new one? Well, what do you know. Here are a couple of record setters in the '86 WW Test. Paul, N4PND, on the left signed P40N and set a new 14 MHz CW world record. Bob Allphin, K4UEE, on the right signed P40R and set a new 80 meter CW world record. Here they take a break from operating. You might note the primitive nature of their operating locale. Rough!

job to job on the Isle of Wight, he works 10 meters. He is usually found around 28505 most weekdays and sometimes even on weekends."

The Local was enjoying himself, even leaning closer to make sure that we did not escape. "Now tell me something," he asked pointedly, "how many mobile back-hoes have you ever worked, DX or otherwise? Let us count them together."

We couldn't even start. There are not many back-hoe mobiles anywhere these days. And later we had to think about this. Could there be something to DXing other than just country counters or award counters? As we thought the idea became more interesting. There must be something beyond battling one's way through the pile-ups and there could be DX fun beyond the Honor Roll—maybe even this side of it. For awhile we wondered if there was some reason why it has not already been found. Then the realization came that maybe it has, but only when one is ready to recognize it. Maybe we will find it in a few years, maybe even less.

Western Sahara

There previously has been mention of the Lynx DX Group effort in the Western Sahara a few months back, this being at the end of October. Martin Laine, OH2BH, has filled in all the details. The word on country status for this one should be out by the time you read this. The DXAC was voting on the matter in mid-December.

There were 11,864 QSOs made using a Kenwood TS430S with a TH3 beam and dipoles, 7099 QSOs on phone and 4765 on CW. Europe had the edge in total QSOs with 4764 contacts, followed by the W/Ks with 4554 QSOs. The JAs, being just about halfway around the world, worked with a handicap, but there were 1264 long-path QSOs with the JAs.

Considering that they were running barefoot with less than unlimited or even adequate power supplies, the totals are impressive. Available electricity was limited in the area. During the daylight hours the generator was utilized as necessary. Nighttime operation was from batteries. During the stay it was not possible to establish around-the-clock operations.

The Lynx DX Group, OH2BH, EA2JG, and

EA2ANC, were welcomed by the locals in the western Sahara. They organized a fiesta to honor the visitors and proudly showed them their accomplishments in agriculture and their irrigation system. Things are dry in the area, one report saying that Marty took to swimming in a well looking for relief and a cold soda. A sandstorm blew in during all the festivities which added to the allure of the mystic desert.

Naama Zeine-Eddine, SORASD, is the local director of telecommunications and made a surprise display of his DXing prowess. Fluent in Arabic, French, and Spanish, he also knows enough English to manage some QSOs. Kenwood has donated several complete stations to the Western Saharans and continued activity is anticipated. Naama may have already been heard signing SO1A.

There were others who worked SORASD besides the Europeans and the WIKs. The JA total was that figure given above. South America made 990 QSOs, while "others" only managed 292 contacts. Twenty was the heavy-duty band, 5622 phone and 1840 CW contacts being made on that band. For those who might want all the figures, on 10 meters it was 450 phone, 48 CW; on 15 meters 665 phone and 672 CW; on 40 meters it was 177 phone and 2013 CW; and on 80 meters it was 148 phone and 172 CW. Even 160 meters managed to get into the log books with 37 phone and 19 CW contacts.

The full title of Naama Zeine-Eddine, SO1A, is: Directeur du Departement Technique du Ministère de l'Information de la Republique Arabe Sahaouie Democratique, B.P. 10 El-Mouradia, Algiers, Algeria.

That should give you all the pertinent information on the Western Sahara effort. That address for Naama is the address of the RASD embassy in Algiers. You can also go via his QSL manager, EA2JG. Naama is also responsible for the RASD broadcast station, this being heard at 1355 kHz.

Novice WAZ

Thinking it over, one might lean to the belief that working WAZ on a Novice ticket takes a bit of doing. KA0GZS has done it, and the first application for Novice WAZ has been processed.

While in the House of Leo, it can be noted that up to December 1, 1987, 91 applications had been processed for the WAZ 50th Anniversary Award. If the rate of applications holds up, the total should exceed 100. RTTY applications continue to show in the mail. Five mixed-mode and six single-band 14 MHz RTTY WAZs have been awarded. The early run down is:

Mixed RTTY WAZ

- | | |
|----------|-----------|
| 1. F8XT | 4. JA1ACB |
| 2. TG9VT | 5. JA1JDD |
| 3. DK9CU | |

Single-Band 14 MHz RTTY WAZ

- | | |
|-----------|-----------|
| 1. JR2CFD | 4. JA1ZF |
| 2. I5FLN | 5. I8AA |
| 3. TG9VT | 6. JA1DSI |

Aruba

The DX Advisory Committee voted to recommend that Aruba be added to the DXCC Country list. The next step was consideration by the Awards Committee, and even this hurdle has been cleared. You can submit Aruba for credit, after April 1st.

Canadian Special Prefixes

By now you might be aware that the 1988



Here is a DXer, a DXer and CW only. This is Glarey Luciano Giorgio, I1YRL, in Turin. That CW-only has accounted for 104K QSOs, and it was enough for DXCC, WAZ, EAS, WPX Honor Roll, USA Counties, RAEM Award, Oblast Award, and ASP. Luc is a member of the Italian Navy Old Rhythmers Club and the Torion Northwestern DX Club. He runs a TS830S to an NCL-200 and a TH7DXX beam at 90 feet. Listen for Luc, but only in the CW bands.

Winter Olympics will be held at Calgary, Canada. To mark the holding of the games there have been special prefixes heard. Most of the changes are simple. All the VEs became VX—VX7 in lieu of VE7 for British Columbia, for example. For Newfoundland and Labrador, the VO1 and VO2 became CJ1 and CJ2, respectively. This only leaves the Yukon, and its regular VY1 became CH1. These calls are good through February 29th. Garry and Janis Cameron, VE7ACM and VE7AAP, pass along this information. They are located at the head of Alberni Inlet in British Columbia. The inlet opens to the Pacific on the west side of Vancouver Island, but Port Alberni is so far inland that it is closer to the east coast of Vancouver Island than it is to the Pacific side where the inlet meets the sea. The WPC Radio Club operates VE7WPC in Port Alberni. We would tell you what WPC means, but we failed in our deduction test. Any right-thinking DXer should plan to make the Northwest DX Convention at the end of July and then head up into British Columbia—a hard combination to beat.

DX—The Movable Feast

Years back we got a call from one of the Locals further down the county who was preparing to head out the Golden Gate in his 36 foot sloop and set a course to the southwest. One of his early stops would be Palmyra, and he wanted to put it on the air. Having but a Novice license, he wondered how to go about it. He wanted advice. What could we say? "Learn to duck!" was our considered advice. We were sure he would learn fast once he was on the air. Possibly he would learn faster if he learned to dodge some of the pile-ups. He went and he survived. He also does not work on the Novice bands these days. One learns.

Being at the far end of a pile-up is not always an endless joy. Recently we had a note from Salah H. Al-Saif, 9K2SH, in Edailiya. Salah has not been licensed long, a little under two years, but he is learning. DX is a joy, but sometimes more so. Salah writes:

"I have been in ham radio for almost two years. I have a one-element Mosley antenna and run a 430S putting out 100 watts. With this I have worked 160 countries and 46 U.S. states. Is it nice to be a DX station, you might ask? No! It is not!

"You know why? Because when you are a DX station, every time you call, even for a specific area and place, other parts of the world jump into action. Certain countries seem to have most of their amateurs afflicted with this problem, and they can create problems. Sometimes it seems sure that you will hear them even with your rig turned off. Perhaps at times it can be a language problem, but it can also be just rudeness.

"Being a DX station can mean that you have something that a lot of others do not have but want. Being a DX station can lead to calls from most everybody and endless piles of friends. But it can also mean that you will receive 250 or more QSL cards a week and tons of QRM when you get on the air.

"But no matter what happens, I am looking forward to getting as much as I can from amateur radio. I really like it very much no matter what happens."—73, Salah H. Al-Saif, 9K2SH.

Unfortunately, there is a lot of truth in what Salah has found. There is also a lot of joy. One has to sort out the aches from the pains.

Rare DX brings common rudeness; there is little doubt about that. To block the report from the station being worked is not uncommon. To break in on top of the station to which the DX station has replied is also another unwelcomed tactic. Putting in one's suffix at every pause is another. Coming back pretending that you understood that the station came back to you is yet another.

Among one of the remembered stories is the fellow with the 30 kw station. You might be a bit amazed to know what he used for an exciter.

The WAZ Program

15 Meter Phone

250 YB0DPO

20 Meter Phone

630	KF5AR	635	KN3P
631	SM5BMB	636	KI4HL
632	IK2FCZ	637	PY2ZJ
633	NY2E	638	K8NA
634	KF5DX		

20 Meter CW

271	VE1ACK	273	KU0S
272	JA1SFL		

All Band WAZ

SSB

3151	WA6UOR	3156	FD1LUB
3152	TR8JLD	3157	I4KMN
3153	K8NA	3158	N8FZI
3154	I1BRB	2159	I3BQC
3155	VE4OP		

Phone/CW

6201	HB9BMU	6212	OZ1JLX
6202	JN1VNW	6213	KZ4V
6203	WD5T	6214	NA1I
6204	DL1OM	6215	WA2UDT
6205	DK6PZ	6216	W6OUL
6206	JJ1FSK	6217	PA3BUD
6207	YU2TY	6218	JA3DM
6208	G4XRX	6219	WT5N
6209	KN8Z	6220	JA1EMO
6210	JF1ERP	6221	IK2DJV
6211	IK6HRB		

Applications and reprints of the latest rules may be obtained by sending a self-addressed stamped envelope (39 cents) size 4½ x 9½ to the WAZ Manager, Leo Haijsman, W4KA, 1044 S.E. 43 Street, Cape Coral, Florida 33904. Applicants forwarding QSL cards either direct to the WAZ manager or to a check point should include sufficient postage for safe return of their QSL cards. The processing fee for all C.Q. awards is \$4.00 for subscribers and \$10 for non-subscribers. In order to qualify for the subscriber rate, please enclose your latest CQ mailing label with your application.

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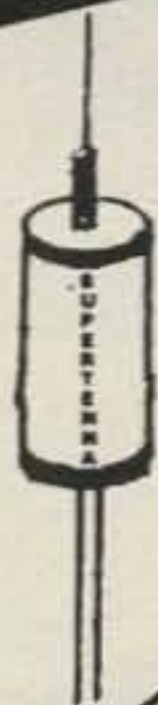
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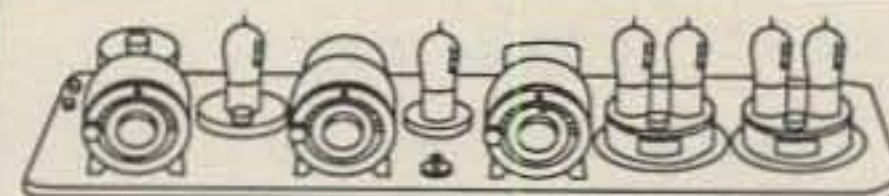
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CIRCLE 166 ON READER SERVICE CARD

CIRCLE 165 ON READER SERVICE CARD

CQ World-Wide WPX Contest


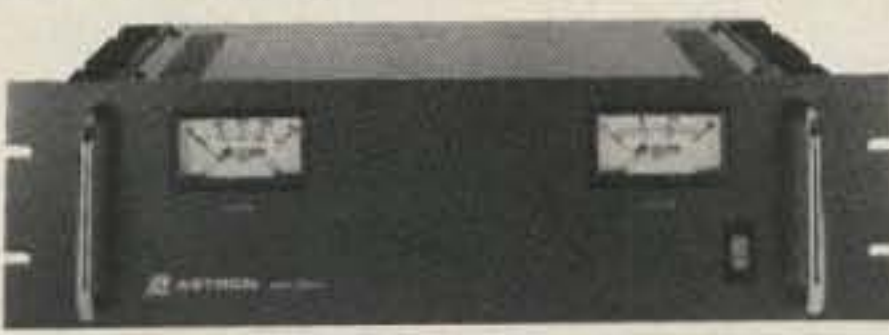



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CW—May 28-29, 1988



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*ICS—Intermittent Communication Service (50% Duty Cycle 5 min. on 5 min. off)

CIRCLE 42 ON READER SERVICE CARD

5 Band WAZ

Standings as of December 1, 1987

New recipients of the 5 band worked All Zones:

DJ9ZB
LZ2JF

The top 10 contenders for 5 Band WAZ are:

- | | |
|----------------|----------------|
| 1. N4WW, 199 | 6. SP6JCY, 199 |
| 2. K6YRA, 199 | 7. W2YY, 198 |
| 3. SM0BZH, 199 | 8. W7UR, 198 |
| 4. W8UVZ, 199 | 9. K9GX, 198 |
| 5. K4CEB, 199 | 10. G4BWP, 198 |

441 Stations have attained the 150 Zone level.

Applications and reprints of the latest rules may be obtained by sending a self-addressed stamped envelope (39 cents) size 4½ x 9½ to the WAZ Manager, Leo Huijsman, W4KA, 1044 S.E. 43 Street, Cape Coral, Florida 33904. Applicants should include sufficient postage for safe return of their QSL cards. The processing fee for all CQ awards is \$4.00 for subscribers and \$10 for non-subscribers. In order to qualify for the subscriber rate, please enclose your latest CQ mailing label with your application.

"But I only use it to call," he would explain. "Once I've made contact I back things off. Just enough power, then, for a QSO." Just enough meant the legal limit. It really is enough if the station is listening for you.

So how or what does one do? Listen around a pile-up and you will find a number of variations. Many are already known, while some you have learned and kept to yourself.

Listen for directions. Do exactly as the DX station says and you will never make him angry. If he says "up 10," then call up 10. And with everybody listening up 10, you can move 1, 2, 3, or 4 kHz either side. Believe them when they tell you later that they have to tune to pull a clear signal out of the pile-up.

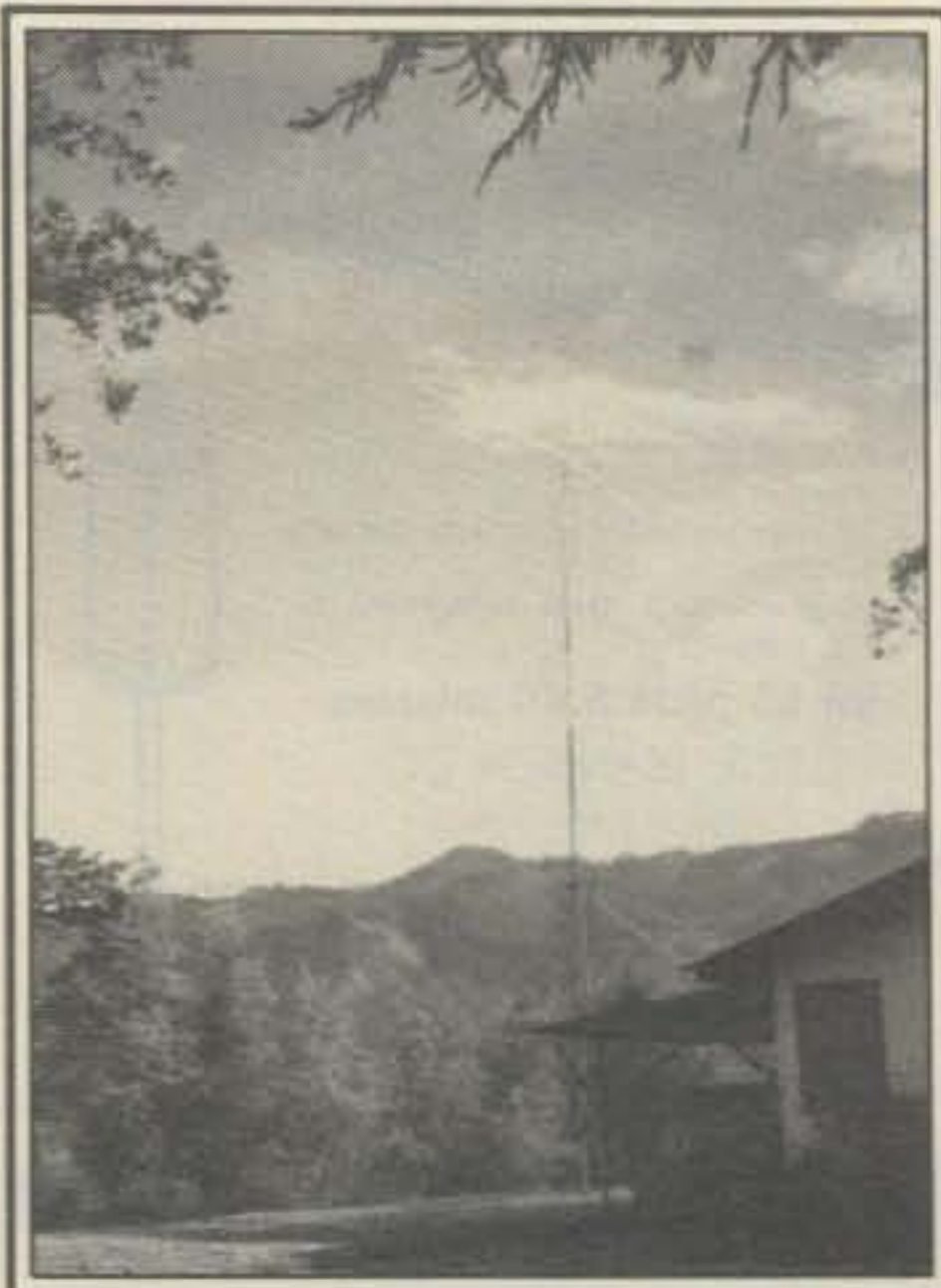
If they are working, say, "... 200 up," listen for the report from the station they are working. If you hear the report being given to the DX station, start your calling as soon as you are sure that the QSO is over. Maybe the DX station will not move his listening point. Maybe others will think of the same idea.

Then again, you can locate what sounds like a clear spot, but sometimes is not, and send your call as soon as the DX station says "QRZ." If he is tuning up and down the announced span of frequencies, he might hear you. Then again, he might not.

All of this should not be startling to an experienced DXer. They have learned all the tricks and undoubtedly have a couple more. It is understandable that many would want to work a 9K2; they are not garden-variety DX. It is also understandable that one can weary of being under an endless pile-up.

There are some, however, who like it. If your memory holds up, eventually you will find therein instances of DX operators who were tireless when at a desired DX stop, but unenthusiastic when back home competing with the Locals. Contesters enjoy the roar of the pile-up when they operate from a DX stop. Some even admit that a weekend or so will hold them for a full year.

DXing will always be a game of guile. One has to plan, and plan cunningly at times, to work the rare ones. And one can. One can approve guile, for it is within all of us. It is rudeness that draws the indignant cries. "You



Where is this QTH? In the highlands of Papua-New Guinea and close to the town of Wabag in Enga Province. It is the site of P29FG, and Don is often active on 20 meters. Equipment includes a Kenwood TS830S and ICOM 735. The beam is homebrew; the rotator is Armstrong. A rope runs through the wall of the shack to aim the 5-element Yagi. QSLs go to WA0GUD.

Lid!!" That is a term that never applies to we right-thinkers—and operators.

Mauritania

There is an IOTA (Islands on the Air) operation planned for early April, possibly the first weekend, and though you may not want the island, you might be interested in Mauritania.

The operation is to be from Tidra Island, which is just north of Cape Timiris, sometimes shown as Cape Timiria. It is just north of the coastal city of Novamhar. Operators will be 5T5PP, 5T5EV, 5T5RA, and 5T5DX. It might show with a special prefix. QSLs will go to F6FNU. Robby, at Kaedi in Mauritania, is often heard around 21265 kHz after 1730Z.

LN DX Bulletin

Many will remember Jacky Billaud, F6BBJ, who over the years has shown from a number of DX spots. Jacky, with F6AJA, is editing the "LN DX Bulletin" in France, this for the LN DX Club. Written in French, the bulletin aims at covering all aspects of DXing, DX contests, and IOTA operations. The club bulletin is available and will be sent airmail to the states for \$35 a year.

F6AJA is the QSL manager for TR8CR and 3C3CR, and also for FJ5BL on St. Barthelemy Island and for the LNDX special operations such as TW0A, TW0B, TW7C, FV6NDX, and FV7NDX.

Jacky himself has done some remarkable DX operations, being in the Clipperton effort back in 1978 that ended the long need for this one. Jacky has signed 3A0GF, C31ED, FG0BKZ, FM0BKZ, FG0BKZ/FS7, FL0BKZ, FR0BKZ, FH0BKZ, D6AC, C31MD, TR8JD, FO0XA, FO0XH, TW0A, FV6NDX, and a handful more. Look at those prefixes and you can realize how far Jacky has roamed from the home QTH in the Paris area.

The "LN DX" stands for Les Nouvelles DX. If you are interested in the information in a DX bulletin in the French language, write to: Jean Michel Duthilleul, 515 Rue du Petit Hem, Boluignies, 59870 Marchiennes, France.

Egypt

There always are better days for DXers. You might even find some sunshine in the knowledge that Egypt has been accepted into the IARU, has a national amateur society (the Egyptian Amateur Radio Society), has a good list of licensees, and things are looking up. We even counted the number of licenses. There were 21—11 OMs and 10 YLs.

Loutfy Moursy El-Mahdy, SU1AL, is the president of EARS. SU1ER, is the vice-president, this being Ezzat Sayed Ramadan. Fathy Anwar A/Fattah, SU1FN, is the secretary. Others on the EARS board include SU1CR, SU1AH, SU1HK, and SU1BA.

Where are all the amateurs located? Cairo, Giza, Heliopolis, and vicinity. The Egyptian national society's mailing address is: P.O. Box 78, Heliopolis, Cairo, 11341 Egypt. SU1AA, SU1IM, SU1KZ, SU1MK, SU1MR, SU1RR, and SU1SR are the stations currently active.

Amateur radio in Egypt appears to be a family affair. Of the 21 callsigns in the Egyptian Amateur Radio Society, the El Mahdy family holds four, the Sayed family three, and the Ahmed family and the Ibrahim Mohamed families two each.

International DX Convention

The 1988 gathering of Deserving DXers will be again at the Grosvenor Holiday Inn in Visalia, California. The dates are April 22, 23, and 24th. The Southern California DX Club is the host for this year's rendezvous. Don Bostrom, N6IC, is handling the registrations. Hotel reservations are best made directly. Call (209) 651-5000. Further information can be obtained from either N6IC or Fried Heyn, WA6WZO. Time is getting short. The DXers are packing, and soon there will be nothing but DXers gathering again to talk of little other than DX.

Barbados

The Boy Scouts in Barbados are making plans to have a station in all the major DX competitions as well as on every weekend to keep up with the demand for 8P6s.

There will be some special callsigns for the Boy Scouts' stations. These will include 8P21BBS and 8P75BBS. You will also find 8P6BBS on the air. These are being operated by the Boy Scout Association of Barbados, 8P6BBS being their club station with Dean St. Hill, 8P6SH, and Glenn Thorpe, 8P6SG, the usual operators.

The station will also be found on the Novice sub-bands, especially on 15 and 40 meters, plus the Novice phone band on 10 meters. You will also find it often on the VK9NS, the IARU, and the European nets, the latter at 0400Z.

Station gear includes an FT101B, a TS820, a TA33 beam at 40 feet, and full-wave loops for the 40 and 80 meter bands. They will be setting up on 6 meters before long. They also plan to be on RTTY and OSCAR 10. Plans for this year include the CQ WPX Tests, the Venezuelan Test, the European Test, and the CQ WW DX Tests. An award for working the Barbados Boy Scouts station is being planned and should be announced soon.

QSLing? 8P6SG, SP6CSJ, 8P21BBS, and

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1575	N7GLT	1581	KB5UP
1576	YC0KM	1582	GM4PVC
1577	K4RIG	1583	VE7CBH
1578	IK8BQE	1584	WB6PSY
1579	KG6LF		

CW

715 WA4IUM

SSB Endorsements

310	KD8VM/317	300	K4RIG/305
310	F9RM/317	300	KQ9W/302
310	ON5KL/315	275	I8IGS/285
310	W7FP/312	275	XE1XM/280
310	NJ0C/311	275	WB6PSY/280
310	EA2IA/314	275	IK8BQE/277
310	K8NA/311	200	KG6LF/209
310	WD8MGQ/310	200	VE7CBH/205
300	W8IMZ/307	150	WA4IUM/193
300	KZ2P/307	150	KB5UP/165
300	W2FGY/307	28 MHz	K4RIG
300	KR9O/307	1.8 MHz	K4RIG
300	PY2DBU/305	28 MHz	WB6PSY

CW Endorsements

300	EA2IA/302	275	KQ9W/290
275	YU1HA/298	200	K9DDO/237

Total number of active countries is 317. The basic award fee for subscribers to CQ is \$4. For non-subscribers, it is \$10. In order to qualify for the reduced subscriber rate, please enclose your latest CQ mailing label with your application. Endorsement stickers are \$1.00. Updates not involving the issuance of a sticker are made free when an s.a.s.e. is enclosed for confirmation of total. Rules and application forms for the CQ DX Awards Program may be obtained by sending a business size, No. 10 envelope, self-addressed and stamped, to CQ DX Awards Manager, Billy Williams, N4UF, Box 9673, Jacksonville, FL 32208 U.S.A. DX stations must include extra postage for air-mail reply. Please make all checks payable to the awards manager.

were some upsets. Leonard Nathanson, W8RC, beat out the incumbent director in the Great Lakes Division by 20 votes, and Joel Harrison, WB5IGF, out-pollied the current vice-director in the Delta Division in a race for the director's post. In the Dakota Division the results were no surprise. There were no candidates; there was no election. They will try again. Other directors or vice-directors whose calls are household words are DXers N6NB, WA6WZO, W4UG, N4MM, W7RM, and K1KI. Among the ARRL officers who are DXers are W6EJJ, W6ZM, K0TO, and probably a couple more we have overlooked. Always remember: "Support Your Local DXer!"

One of the DX bulletin editors was feeling bad a month or so back. Seems that he had information on a DXpedition, was asked to hold it in trust until . . . and the next thing he hears is the station on the air, obviously too late for any alerts to be published. Is this uncommon? Not especially.

The point to be remembered is that much of the work of publishing DX bulletins is done for self-satisfaction and a desire to help. There is hardly ever the expectation of remuneration. And most of them are trustworthy, willing to abide by instructions but devastated when something slips by.

It sometimes appears that those going on DXpeditions consider the bulletins in the same category as daily newspapers—what they miss on Monday, they will usually get into print on Monday, that is, Monday of the following week. And often a week will mean that an operation has come and gone and any reporting is about useless. Magazines have an even longer span (this is being written early in December). A day late in this instance means a month's delay in publishing of the information.

DX editors are firm believers in that maxim laid down by Lord Baden-Powell: "DX editors are trustworthy!" When told to hold for release, they will hold. When not told, they are free to tell anything they hear.

It is reported by "Inside DX" that ZS6RM's request to visit Marion Island in August was turned down. The reason given is that only scientific expeditions are allowed on the island. VE3FXT, who has also been angling for Marion but in March, felt he had a good chance of being sponsored by the South African Parks Service.

VK9NS (Jim Smith, 14220 kHz at 0600Z) says that only permission to land on Baker-Howland Islands is needed for a big-bore DXpedition to complete their planning. Ten operators, March time slot.

John Thompson, W1BIH, will be operating PJ2/W1BIH again this year and will sign PJ9J in the contests. And again, W1AX will have the exclusive franchise for handling the QSLing for these calls. As the QTH was skewed in the 1986 CB, W1AX is Roger Corey, 60 Warwick Drive, Westwood, Massachusetts 02090. He has the logs for all of the PJ efforts by W1BIH, all the way back to 1982. W1BIH will be in Curaçao until mid-April, this being his 22nd tour there. W1RM will join him for the ARRL CW Test, and W1WEF will be there for the ARRL Phone Test. Both of these are multi-single efforts.

Updating K4LTA's Caribbean plans, Bill and his XYL, N4FKO, will be at J3-Grenada until the end of February. On that date he will move to J6L-St. Lucia and be there until March 8th. He will be joined by others for the ARRL CW and SSB tests, these including K4PJ, Mel, and Dave Short, W5PWG. You might watch for J34WG by W5PWG and J6LTA or J6CQ by K4LTA. Emphasizing CW, look for them on 160 meters at 1825-30 kHz or 1823-33 kHz. Phone will center on 14195 kHz and 14257 kHz. Other bands will be used, the frequencies to be announced. At 2230Z on weekdays there is a Novice schedule at 21123 kHz, this including slow-speed operators other than Novices.

A couple of issues back we ran the information on how to QSL 9M8HG. Allen Singer, N2KW, notes that it may be a long wait for a return, 9M8HG having passed away some years back. But possibly VK9NS may have some clues. It is reported that he has the logs for 9M8HG.

QSL Information

All of the following was compiled with a lot of help from W9LNQ.

A22RB to KA3OYY	ZK2JS to WB2JCE
CR9BZ to OH2BH	5L7U to OH2KI
CS68WW to CT1BWW	9H3DX to DF2UU
CU2DR to CU2ARA	9H8HG to VK7NS
EA8XS to CBA	9Q5FF to WA9PC1
FT5ZB to F6EYS	HC2CG to Betty Townsend, Box 644, Spokane, WA 99210
FY7YE to W5JLU	HC2GG to Betty Townsend, Box 644, Spokane, WA 99210
G6ZY/EA6 to G3ZY	H5AQ to P.O. Box 203, Garankuwa, 0208 Republic of Bophuthatswana, So. Africa
HC2CG to KE7PL	KN5X/J3 to Brian Attaway, 12516 A delis #2412, Dallas, TX 75243
HC2GG to KE7PL	PA0GAM/ST2 to Box 3794, Khartoum, Sudan
KN5X/J3 to KN5X	PJ2WOL to Box 3509, Curaçao, Netherland West Indies
J6LRW to W8IMZ	PY0FF to Box 1, Fernando de Noronha, Brasil, 053990
OH0BH to OH2BH	VK0HI to Noel, VK3EVN, 64 Orona Dr., Victoria, Australia 3087
P22DD to W4BAA	YV1AV0, YV1T0, YW1A, YW1D to Box 20, Punta Fijo, Edo Falcon, Venezuela
PJ2X to K1XM	3C3CR to LN DX, 515 Rue du Petit Hem, Bouvignies, 59870 Marchiennes
U4AKD to UZ4AXN	ZS21RSA to Box 2337, Johannesburg, Republic of South Africa
VP8A0B to K0JW	
VP8A0C to K0JW	
VP8A0D to K0JW	
VP8A0E to K0JW	
VP8A0F to K0JW	
VP8A0G to K0JW	
VP8A0H to K0JW	
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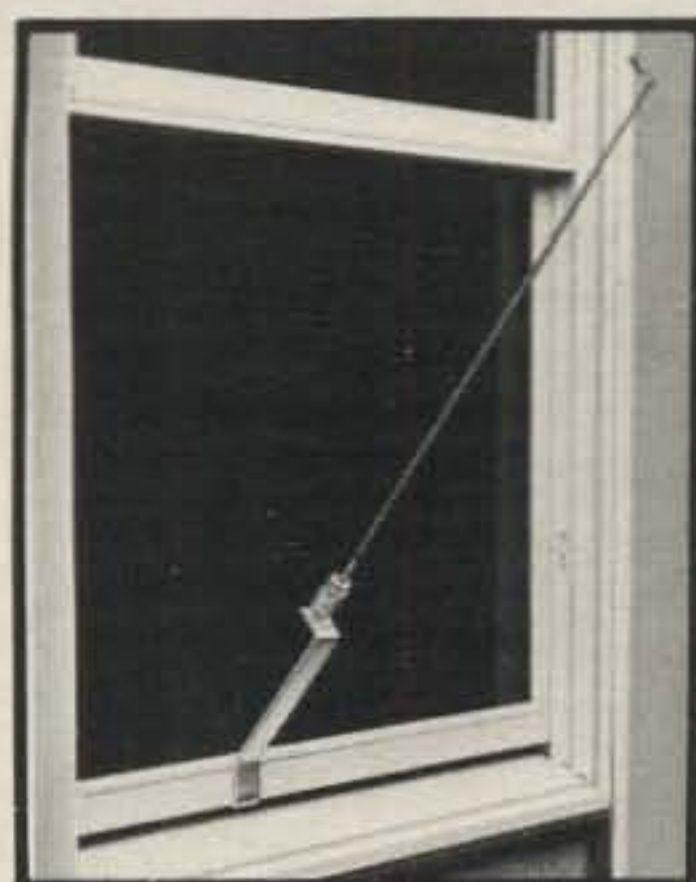
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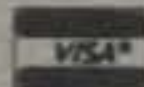
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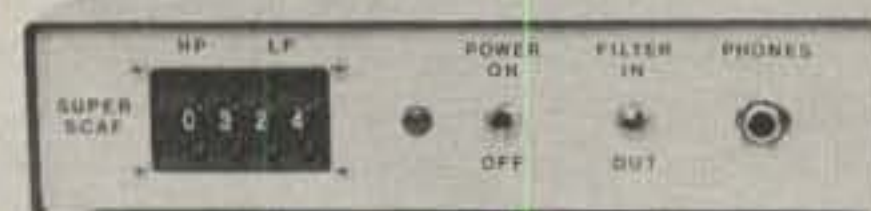
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CIRCLE 174 ON READER SERVICE CARD

Contest Calendar

a monthly feature by
FRANK ANZALONE, W1WY

NEWS/VIEWS OF ON-THE-AIR COMPETITION

Recently I have noticed that the exchange report is being made shorter in contest and QSO party rules. In some cases it seems absurd—especially eliminating the exchange of a signal report. To me that borders on being ridiculous. What do you do when you receive a QSL card for that contact and you do not have a record of a signal report? It is required on cards that are submitted for an award, you know. You probably make it read 59(9), just like some of the meaningless reports exchanged in many contests. If that trend continues, we will have to create a new classification, one which is a little above an SWL report, but certainly cannot be considered a complete contact.

Let's get down to basics and make contest exchanges more realistic.

Another topic—listing an event that has not been officially scheduled. We usually list the announcement anyway using information that was used the previous year, which sometimes is not correct. This is the problem with some of the state QSO parties, generally due to the fact that club officers are changed annually and the outgoing activities manager does not pass the information to the new officer. This may be the reason why you do not see the Tennessee announcement in this month's calendar.

I will no longer list an event unless a written announcement is received before the scheduled deadline for that month. Keeping that in mind, the deadline for the June issue is March 15th, and April 15th for the July issue. Sending information to my home address will give you a few more days leeway.

73 for this time, Frank, W1WY

RSGB Commonwealth CW Contest

1200Z Sat. to 1200Z Sun., March 12-13

Only RSGB members residing in the United Kingdom and radio amateurs licensed to operate within the British Commonwealth and British Mandated Territories are eligible to participate.

Contacts between stations in the same call area are not permitted. All the British Isles count as one call area, except GB5CC, which counts as a separate call area.

Activity will be CW only, 3.5, 7, 14, 21, 28 MHz, within the lower 30 kHz of each band (except Novice contacts).

Exchange: RST plus a QSO number starting with 001.

14 Sherwood Road, Stamford, CT 06905

Calendar of Events

- * Feb. 26-28 CQ WW 160M SSB Contest
- * Feb. 27-28 French DX Phone Contest
- † Feb. 27-28 UBA (Belgium) SSB Contest
- † Feb. 27-28 Land of Legend Contest
- † Feb. 27-29 YLRL YL-OM CW Contest
- † Mar. 5-6 ARRL DX Phone Contest
- Mar. 12-13 Iowa QSO Party
- † Mar. 12-13 QCWA Phone QSO Party
- Mar. 12-13 RSGB Commonwealth Contest
- Mar. 12-13 Maine QSO Party
- Mar. 13 ZERO District QSO Party
- Mar. 19 YLRL East Meets West SSB
- Mar. 19-20 Bermuda Contest
- * Mar. 19-20 YL ISSB Phone QSO Party
- Mar. 19-21 BARTG Spring RTTY Contest
- Mar. 19-21 Virginia QSO Party
- Mar. 20-21 Wisconsin QSO Party
- Mar. 26-27 CQ WW WPX SSB Contest
- Mar. 26-27 UBA SWL Phone Trophy
- Apr. 6-8 DX YL to NA YL CW
- Apr. 9 Israel ARC Contest
- Apr. 9-10 ARCI QRP Spring CW Contest
- Apr. 9-10 Alabama QSO Party
- Apr. 13-15 DX YL to NA YL Phone
- Apr. 16-17 IBM QSO Party
- Apr. 16-17 Georgia QSO Party
- Apr. 23-24 Swiss Helvetia Contest
- May 28 ARCI QRP CW Sprint
- May 28-29 CQ WW WPX CW Contest
- May 28-29 UBA SWL CW Trophy
- July 16-17 CQ WW WPX VHF Contest

* See January issue.

† See February issue.

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

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

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

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

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

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

Logs must be received by April 11th and go to: HF Contests Committee, Att: Alan Gray, G4DJX, P.O. Box 73, Lichfield, Staffs. WS13 6UJ England.

Maine QSO Party

0000Z Sat. to 2359Z Sun., March 12-13

The Portland AWA is again sponsoring this QSO party. The same station can be worked on CW and again on phone on each band. ME stations can contact other ME stations for QSO and multiplier credit.

Exchange: RS(T), QSO serial number, and QTH. County for Maine; state, VE province, or country for others.

Scoring: One point for phone contacts; three points if on CW. ME stations multiply total QSO points by (ME counties + states + provinces + DX countries) worked for their final score. All others use Maine counties for their multiplier (maximum of 15).

This year each W200 anniversary station worked will also count as a multiplier.

Frequencies: CW—1810 and 60 kHz up from low edge on other bands. Phone—1870, 3930, 7280, 14280, 21380, 28580. Novice—3720, 7120, 21120, and 28120.

Awards: None mentioned, but probably there are certificates to the top-scoring stations in each state, province, DX country, and Maine county.

This year logs go to: Bernie Cohen, K1SA, 194 Craigie Street, Portland, ME 04102. (Also send QSLs for W200KVI to K1SA.)

Iowa QSO Party

1800Z Sat. to 0600Z Sun., March 12-13

This is the fourth annual Iowa QSO Party. The same station may be worked on each band and mode for QSO and multiplier credit.

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

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

Iowa stations multiply total QSO points by sum of ARRL sections and Iowa counties worked.

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

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

Frequencies: CW—1810, 3550, 7050, 14060, 21050, 28050. Phone—3875,

7225, 14275, 21325, 28600, 50110, 144.200, 146.520. Novice—10 kHz from low edge of Novice bands.

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

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

Zero District QSO Party

1800Z to 2400Z Sunday, March 13

This year's party is being sponsored by the Davenport RAC of Iowa.

Stations outside the zero district will be contacting zero stations only. Zeros may work anyone. The same station may be worked on each band and mode, mobiles in each county change.

Exchange: RS(T) and state. Zeros will also include their country.

Scoring: Phone QSOs count 1 point, CW contacts are worth 2 points. Zeros multiply total QSO points by (states + VE provinces + DX countries + zero counties) worked for their final score.

All others use zero counties for their multiplier.

Stations making over 100 QSOs must include a dupe sheet with their log.

Frequencies: CW—60 kHz up from low edge of each band. Phone—3900, 7270, 14300, and 146.52. Novice—3730, 7130, 28360.

Awards: Certificates to winners in a variety of categories, depending upon the number of entries received. There is a special award for zero district clubs (minimum of 3 logs from members of the club required).

Mailing deadline for logs is April 30th to: Davenport RAC, W0BXR, 5305 White Post Road, Bettendorf, IA 52722. Include an SASE for a copy of the results.

East Meets West SSB Contest

1800Z to 2200Z Sat., March 19

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

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

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

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

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

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

Awards: Winners will receive YLRL postcards.

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

Logs must be received by April 18th and go to: Carol Shrader, 4744 Thoroughgood Dr., Virginia Beach, VA 23455.

Bermuda Contest

0001Z Sat. to 2400Z Sun., March 19-20

This is the 30th year for this popular contest open to amateurs in the United States, Canada, the United Kingdom, West Germany, and Bermuda.

Stations in the U.S. and Canada may work the U.K., West Germany, and Bermuda. The U.K. and West Germany may work the U.S., Canada, and Bermuda. Activity will be on the 3.5, 7, 14, 21, and 28 MHz bands. Cross-band or cross-mode contacts are not permitted. The same station may be worked on each band, phone and again on CW, providing there is a 30-minute separation between contacts on the same band.

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

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

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

Awards: Certificates to top scoring stations in each U.S. state, VE province, U.K. county, and DL DOK (minimum of 100 QSOs). The overall winner in each of the above countries, however, will receive something more substantial—a trophy to be presented at the Society's Annual Dinner in Bermuda October 16-22. Round-trip transportation and hotel accommodations will be provided for the winners. (Note: Winners in '83, '84, '85, '86, and '87 are not eligible.)

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

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

The Worked All Bermuda Award can

no longer be obtained by contest log information. Proof of contact with all nine parishes is required in the form of QSL cards. Send your application to the above address attention the Awards Manager.

Trophy winners in the 1987 contest were K1ZM, VE3OZB, G4LJF, DK8ZB, and VP9IX.)

BARTG Spring RTTY Contest

0200Z Sat. to 0200Z Mon., March 19-21

This contest is sponsored by the British Amateur Radio Teleprinter Group and is being administrated by Peter Adams, G6LZB. The contest is open to all amateurs in three classes—single operator, multi-operator, and SWL.

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

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

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

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

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

Shortwave listeners must show call of station being heard, report of message being sent, and call of station being worked.

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

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

Logs must be received by May 28th and go to: Peter Adams, G6LZB, 464 Whippendell Road, Watford, Herts. England WD1 7PT.

Virginia QSO Party

1800Z Sat. to 0200Z Mon., March 19-21

This is the 13th year the Sterling Park ARC has sponsored this party. The same station may be worked on each band and each mode for QSO credit. VA stations may work other in-state stations for QSO

and multiplier credit. And VA mobiles in each county change.

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

Scoring: One point for phone contacts; two points if on CW, RTTY, SSTV, or packet.

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

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

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

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

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

and other pertinent information.

Mailing deadline for entries is April 1st to: Virginia QSO Party, c/o Abbey Ray, N4QIV, 1007 Tuscarora Drive, Leesburg, VA 22075.

Wisconsin QSO Party

1800Z Sun. to 0100Z Mon., March 20-21

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

The same station may be worked on each band and mode, and mobiles in each county change. Wisconsin stations may contact other in-state stations for QSO and multiplier credit.

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

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

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

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

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

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

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

Awards: To highest scoring single operator in each class in each state and province.

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

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

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

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

U.B.A. SWL Trophy

Phone: March 26-27 CW: May 28-29
0000Z Saturday to 2400Z Sunday

This SWL activity will be held annually on the last weekends of March and May and replaces the UBA Cup competition held in January and February.

Only 6 hours may be used out of the 48-hour contest period—3 continuous hours on Saturday and the other 3 hours on Sunday.

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		8908	18.00
		8950	14.95
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MMT432/28S	10w W/OSCAR	\$369

CIRCLE 35 ON READER SERVICE CARD

Bands: 1.8–28 MHz (no WARC bands).

Logs: To be columned as follows: Date/time in GMT, "station heard," RS(T) by the SWL, "station worked," points and multiplier. "Station heard" may be logged once only per band. (No CQ, QRZ, etc.) If points are claimed for both stations in QSO, the call of each must appear in the "station heard" column. Call of "station worked" may not appear more than 10 times on each band.

There is a penalty of 3 times the value of the "station heard" for duplicate logging, 1 point for "station worked."

Points: Stations in SWL's own continent 1 point; stations outside own continent 2 points.

Multiplier: Each different prefix heard on each band. (Y21 and Y22 are different prefixes.)

Final Score: Total points from all bands times the total prefixes on all bands.

Awards: Certificates to the top 5, and the first in each country with a reasonable score. Also the top YL and multi station.

Include a summary sheet with your entry showing the scoring, alphabetical list of prefixes on each band, and the usual signed declaration that rules and regulations have been observed.

Entries must be postmarked no later than 4 weeks after the end of each contest.

They go to: Marc Domen, ONL 6945, Gebr. Blommestraat 14, B-2200 Antwerpen (Borgerhout) Belgium.

CQ World-Wide WPX Contest

SSB: March 26–27 CW: May 28–29
Starts: 0000Z Sat. Ends: 2400Z Sun.

Complete rules were published in the January issue. They are the same as those used last year with the same format that has been in use these past many years. Therefore, it would serve little purpose to repeat them again, since they are well established world-wide. Following are a few points to keep in mind.

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

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

The definition of the prefix multiplier is spelled out in detail and is not to be confused with the interpretation used by the CQ WPX Award program.

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

Also bear in mind that stations in call areas different than that indicated by their call signs are required to sign portable.

The multiplier is determined by the

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

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

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

An updated trophy and plaque awards

list now shows over 40 awards. Be sure to check the awards that are available.

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

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

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



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CIRCLE 22 ON READER SERVICE CARD

THE SCIENCE OF PREDICTING RADIO CONDITIONS

Thirty-Eighth Year!

This month's column marks the beginning of my 38th year as Propagation Editor for *CQ*. This period has spanned five solar cycles. When my first column appeared in the March 1951 issue, Cycle 18, the first post-World War II cycle, was at a smoothed sunspot number of 70 and slowly declining towards its minimum.

The once-in-a-lifetime propagation conditions of the record-breaking 19th cycle were reported on these pages. This cycle reached a peak smoothed sunspot number of 201 during March 1958, the highest level recorded in the nearly 200 years that sunspot records had been kept. Cycle 20 was a somewhat average cycle, reaching a peak of 111 during November 1968, and its ups and downs were duly recorded here. The course of the recently completed 21st cycle was a pleasure to report, since its peak of 165 which took place during December 1979 was the second highest ever recorded.

Since September 1986 we are into a new cycle, Cycle 22. We look forward to continuing to report on these pages ionospheric propagation conditions that this new cycle will make possible in the years ahead.

Solar Activity

According to worldwide observations coordinated by the Royal Observatory of Belgium, the world's official keeper of solar records, the mean level of solar activity recorded for November 1987 was 41. Daily counts varied between a high of 89 reported on November 23rd and a low of 15 observed on the 13th of the month. November's mean level results in a 12-month running smoothed sunspot number of 27 centered on May 1987. The intensity of solar activity is measured by the level of the smoothed sunspot number. A smoothed sunspot number of approximately 60 is forecast for March 1988 as the present cycle is expected to continue to rise steadily.

There was a corresponding increase in the 10.7 cm solar flux level as reported by the Algonquin Radio Observatory at Ottawa, Canada. The mean level for November was 101.

11307 Clara Street, Silver Spring, MD 20902

LAST MINUTE FORECAST

Day-to-Day Conditions Expected for March 1988

Propagation Index.....	Expected Signal Quality			
	(4)	(3)	(2)	(1)
Above Normal: 4, 17-18, 25, 30	A	A	B	C
High Normal: 2-3, 9, 15-16, 19, 26, 29	A	B	C	C-D
Low Normal: 1, 5, 8, 12-14, 20-21, 23-24, 31	A-B	B-C	C-D	D-E
Below Normal: 7, 10, 22, 27-28	B-C	C-D	D-E	E
Disturbed: 6, 11	C-E	D-E	E	E

Where expected signal quality is: A—Excellent opening, exceptionally strong, steady signals greater than S9.

B—Good opening, moderately strong signals varying between S6 and S9+, with little fading or noise.

C—Fair opening, signals between moderately strong and weak, varying between S3 and S6, with some fading and noise.

D—Poor opening, with weak signals varying between S0 and S3, and with considerable fading and noise.

E—No opening expected.
3 dB per S-Unit.

HOW TO USE THIS FORECAST

1. Find propagation index associated with particular band opening from Propagation Charts appearing on the following pages.
2. With the propagation index, use the above table to find the expected signal quality associated with the band opening for any day of the month. For example, an opening shown in the charts with a propagation index of 3 will be fair (B) on March 1st, good (B) on the 2nd and 3rd, excellent (A) on the 4th, fair (C) on the 5th, etc.

CQ World-Wide DX CW Contest Critique

The daily sunspot number reported for the CW Contest weekend of November 28-29 was 20. This was an exceptionally low period during November, since one week earlier the count had been up to 89. The reported 10.7 cm solar flux level was 95 on the 28th, dropping to 93 on the 29th. The geomagnetic A index was 8 at both mid and high latitudes on the 28th, dropping to 2 on the 29th at mid-latitudes and to 3 at high latitudes. With these combinations of solar activity and geomagnetic conditions, generally Low to High Normal HF propagation conditions should have occurred, and from early reports received this seems to have been the case. A short period of geomagnetic instability was observed on the 28th, which seems to have adversely affected trans-polar openings and those passing through the higher latitudes for about three hours. All

in all, this seems to have been a good contest period, much as forecast here.

March Conditions

Springtime propagation conditions begin in the northern hemisphere during March. These are typified by fewer east-west openings on 10 and 15 meters; more hours in which DX openings can occur on 15 and 20 meters as the hours of daylight increase; fewer hours for DX openings on 40, 80, and 160 meters as the hours of darkness shorten; improved openings on all bands between the northern and southern hemispheres; and a seasonal increase in the static levels on all bands.

During March and continuing into April, relatively similar HF radio propagation conditions exist in the temperate regions of both the northern hemisphere (where it is spring) and the southern hemisphere (where it is fall), as compared to the more extreme conditions that exist when it is summer in one hemisphere and winter in the other. As a result, DX openings between both hemispheres are usually at their best during March and April, and again during September and October. Good inter-hemisphere openings are forecast this month on all amateur bands between 15 and 40 meters, with some openings possible on 10, 80, and 160 meters as well! Typical of these openings are the paths between the United States and South America, Australasia, and the central and southern regions of Africa.

The best times to look for inter-hemisphere openings are shortly before local sunrise and again shortly after local sunset on the 160, 80, and 40 meter bands; for an hour or two after sunrise; and again for an hour or two before and after sunset on 20 meters. On 15 and 10 meters, check for these openings toward the southeast and south from a few hours before noon through the early afternoon hours. Check later in the afternoon for openings towards the south, southwest, and west.

It should be a toss-up between 15 and 20 meters for the best DX band during the daytime hours of March. Some 10 meter openings should also be possible. From sundown to midnight, honors will likely be shared between 20 and 40 meters, with some fairly good 80 meter openings also possible. From midnight to sunrise best bands should be 40 and 80 meters, with some DX also possible on 160 meters.

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 standard time is used at the path midpoint. For example on a circuit between Maine and Florida, the time shown would be EST, on a circuit between N.Y. and Texas, the time at the midpoint would be CST, etc. Times shown in the Hawaii Chart are in HST. To convert to standard time in other USA time zones add 2 hours in the PST zone; 3 hours in the MST zone; 4 hours in the CST zone; and 5 hours in the EST zone. Add 10 hours to convert from HST to GMT. For example, when it is 12 noon in Honolulu, it is 14 or 2 P.M. in Los Angeles; 17 or 5 P.M. in Washington, D.C.; and 22 GMT. Time shown in the Alaska Chart is given in GMT. To convert to standard time in other areas of the USA subtract 8 hours in the PST zone; 7 hours in the MST zone; 6 hours in the CST zone; and 5 hours in the EST zone. For example, at 20 GMT it is 15 or 3 P.M. in N.Y.C.

4. The Short-Skip Chart is based upon a transmitted power of 75 watts c.w. or 300 watts p.e.p. on sideband; the Alaska and Hawaii Charts are based upon a transmitter power of 250 watts c.w. or 1 kw p.e.p. on sideband. A dipole antenna a quarter-wavelength above ground is assumed for 160 and 80 meters, a half-wave above ground on 40 and 20 meters, and a wavelength above ground on 15 and 10 meters. For each 10 dB gain above these reference levels, the propagation index will increase by one level for each 10 dB loss, it will lower by one level.

5. Propagation data contained in the Charts has been prepared from basic data published by the Institute for Telecommunication Sciences of the U.S. Dept. of Commerce, Boulder, Colorado 80302.

CQ Short-Skip Propagation Chart March & April, 1988 Band Openings Given In Local Standard Time At Path Mid-Point Using 24-Hour Time System

Band (Meters)	Distance From Transmitter (Miles)			
	50-250	250-750	750-1300	1300-2300
10	Nil	Nil	08-09 (0-1) 09-12 (0-2) 12-14 (0-3) 14-16 (0-2) 16-18 (0-1)	08-09 (1-0) 09-12 (2-1) 12-14 (3-2) 14-16 (2-3) 16-17 (1-2) 17-18 (1) 18-20 (0-1)
15	Nil	08-09 (1) 09-15 (0-2) 15-17 (0-1)	07-08 (0-1) 08-09 (1) 09-10 (2) 10-15 (2-4) 15-17 (1-3) 17-18 (0-2) 18-20 (0-1)	07-08 (1-0) 08-09 (1) 09-10 (2-3) 10-15 (4) 15-17 (3) 17-18 (2-3) 18-20 (1-2) 20-21 (0-1)
20	11-13 (0-1) 13-15 (0-2) 15-16 (0-1)	07-10 (0-1) 10-11 (0-2) 11-13 (1-3) 13-15 (2-4) 15-16 (1-3) 16-18 (0-3) 18-20 (0-2) 20-07 (0-1)	06-08 (1-2) 08-10 (1-3) 10-13 (3-4) 13-15 (4) 15-18 (3-4) 18-20 (2-3) 20-22 (1-2) 22-06 (1)	06-07 (2-1) 07-08 (2) 08-10 (3) 10-15 (4-3) 15-18 (4) 18-20 (3-4) 20-22 (2-3) 22-02 (1-2) 02-06 (1)

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80	07-08 (2-3) 08-11 (3-4) 11-18 (4-3) 18-20 (3-4) 20-22 (2-3) 22-02 (1-2) 02-05 (1) 05-07 (1-2)	07-08 (3-2) 08-11 (4-1) 11-16 (3-0) 16-18 (3-2) 18-20 (4-3) 20-22 (3-4) 22-02 (2-4) 02-05 (2) 05-07 (2)	07-08 (2-1) 08-11 (1-0) 11-16 (0) 16-18 (2-1) 18-20 (3-2) 20-02 (4) 02-05 (2-3) 05-07 (2)	07-08 (1-0) 08-16 (0) 11-16 (1-0) 18-20 (2-1) 20-22 (4-2) 22-02 (4-3) 02-05 (3-2) 05-07 (2-1)
160	05-07 (4-2) 07-09 (3-1) 09-17 (2-0) 17-19 (3-1) 19-20 (4-2) 20-05 (4)	05-06 (2-1) 06-07 (2-0) 07-09 (1-0) 09-17 (0) 17-19 (1-0) 19-20 (2) 20-22 (4-3) 22-03 (4) 03-05 (4-3)	05-06 (1) 06-19 (0) 19-20 (2-1) 20-22 (3-2) 22-03 (4-2) 03-05 (3-2)	05-06 (1-) 06-19 (0) 19-20 (1-0) 20-22 (2-1) 22-03 (2) 03-05 (2-1)

Central USA	21-00 (1)	20-22 (1) 22-00 (2) 00-02 (1)	20-00 (1) 00-02 (2) 02-04 (3) 04-05 (2) 05-06 (1)	07-09 (1) 09-12 (2) 12-14 (1) 08-12 (1)*
Western USA	21-01 (1)	20-22 (1) 22-00 (2) 00-02 (3) 02-03 (2) 03-04 (1)	18-21 (1) 21-00 (2) 00-03 (3) 03-05 (2) 05-07 (1)	06-08 (1) 08-09 (2) 09-12 (3) 12-13 (2) 13-15 (1) 09-10 (1)* 10-12 (2)* 12-13 (1)*

See explanation in "How To Use Short-Skip Charts" in box at the beginning of this column.
 * Indicates best time for 80 Meter openings. Openings on 160 Meters are also likely to occur during those times when 80 Meter openings are shown with a propagation index of (2), or higher.
 Note: The Alaska and Hawaii Propagation Charts are intended for distances greater than 1300 miles. For shorter distances, use the preceding Short-Skip Propagation Chart.

Central USA	10-11 (1) 11-14 (2) 14-16 (1)	06-08 (1) 08-13 (2) 13-16 (3) 16-17 (2) 17-18 (1)	08-13 (1) 13-15 (2) 15-17 (3) 17-19 (4) 19-21 (3) 21-23 (2) 23-05 (1) 05-08 (2)	18-19 (1) 19-22 (2) 22-01 (3) 01-04 (2) 04-05 (1) 19-21 (3)* 21-02 (2)* 02-04 (1)*
Western USA	09-11 (1) 11-12 (2) 12-14 (3) 14-15 (2) 15-16 (1)	07-08 (1) 08-09 (2) 09-11 (3) 11-15 (4) 15-17 (3) 17-18 (2) 18-20 (1)	15-18 (4) 18-20 (3) 20-00 (2) 00-04 (1) 04-06 (2) 06-09 (4) 09-11 (3) 11-13 (2) 13-15 (3)	17-19 (1) 19-20 (2) 20-21 (3) 21-23 (4) 23-05 (3) 05-06 (2) 06-07 (1) 19-20 (1)* 20-22 (2)* 22-04 (3)* 04-05 (2)* 05-06 (1)*

ALASKA
March & April, 1988
Openings Given in GMT #

To:	10 Meters	15 Meters	20 Meters	40/80 Meters
Eastern USA	21-23 (1)	20-21 (1) 21-23 (2) 23-01 (1)	20-23 (1) 23-02 (2) 02-05 (1)	06-13 (1) 07-12 (1)*

HAWAII
March & April, 1988
Openings Given in Hawaiian Standard Time #

To:	10 Meters	15 Meters	20 Meters	40/80 Meters
Eastern USA	10-12 (1) 12-14 (2) 14-15 (1)	08-11 (1) 11-13 (2) 13-15 (3) 15-16 (2) 16-17 (1)	07-13 (1) 13-15 (2) 15-19 (3) 19-21 (2) 21-05 (1) 05-07 (2)	18-20 (1) 20-22 (2) 22-00 (3) 00-02 (2) 02-03 (1) 20-22 (1)* 22-01 (2)* 01-02 (1)*

For more detailed information, refer to the DX Propagation Charts which appeared in last month's column. This month's column contains Short-Skip Propagation Charts which are valid throughout March and April, as well as Propagation Charts centered on Alaska and Hawaii. The Short-Skip Charts contain band-opening predictions for predominantly one-hop paths, ranging in distances between approximately 50 and 2300 miles.
 For day-to-day changes in HF propagation conditions expected during March, see the Last Minute Forecast, which appears at the beginning of this column.

VHF Ionospheric Openings

Trans-equatorial scatter propagation (TE) usually improves during March and the spring season, and some 6 and possible 2 meter openings should be possible by way of this mode during the month. TE openings must cross the magnetic equator at or near a right angle, and the best time for such openings is between 8 and 11 p.m., local time. Conditions favor openings between the southern tier states and the southern countries of South America, but some openings may be possible from northern states as well.
 Auroral activity also tends to increase during March, and there is a good chance for a number of VHF ionospheric short-skip openings by means of auroral-scatter propagation. Check the Last Minute Forecast for those days that are expected to be Below Normal or Disturbed, since these are the days on which VHF auroral openings are most likely to occur during March.
 A seasonal increase in short-skip openings due to sporadic-E propagation is also expected during March, and an occasional 6 meter opening should be possible during the month. Short-skip openings due to sporadic-E propagation generally occur during the daylight hours over distances between approximately 1000 and 1300 miles.
 Not much meteor activity is expected during the month, although some VHF meteor-scatter-type openings may be possible when minor meteor showers peak on March 15-16 and March 25-26.
 73, George, W3ASK

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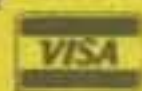
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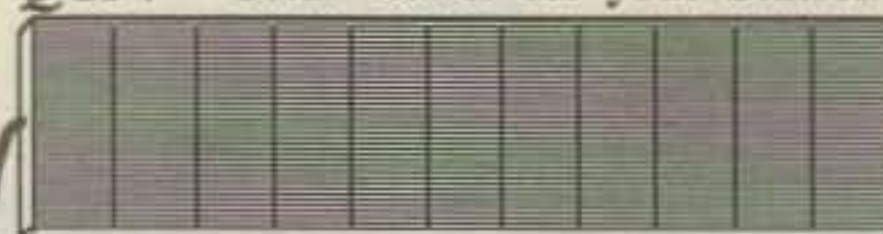
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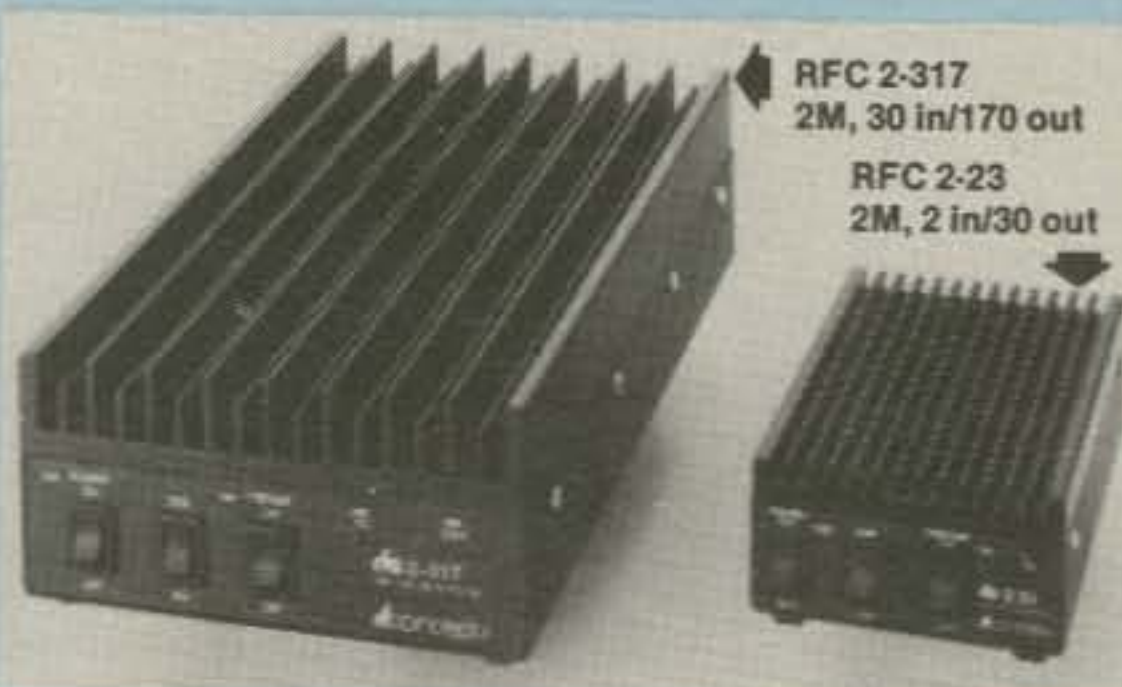
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See Lew McCoy's Review In August 1987 Issue Of CQ.



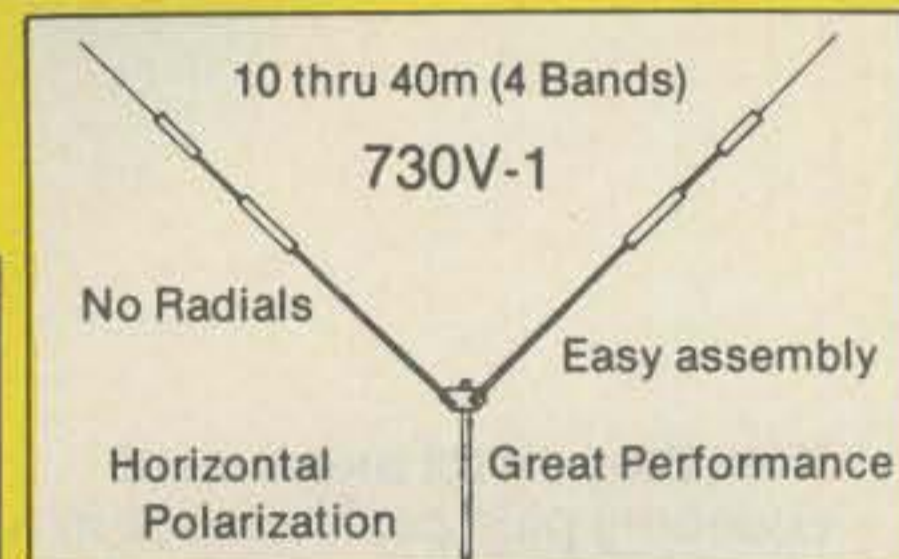
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714 Series Tribanders
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Model	Elements 40-20-15	Boom Length	Longest Element	Turning Radius	Wgt. Lbs.	Power PEP	Price
714T	2/4/4	28'6"	43'	25'3"	71	2 kw	\$574.
714X	3/4/4	32'5"	44'	26'2"	75	2 kw	\$762.
714T-3	2/4/4	28'6"	43'	25'3"	75	3 kw	\$707.
714X-3	3/4/4	32'5"	44'	26'2"	80	3 kw	\$928.

(Prices include balun)



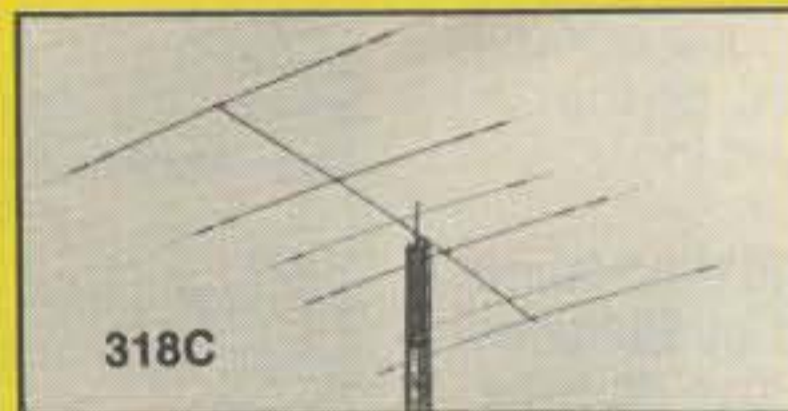
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318 Series Tribanders
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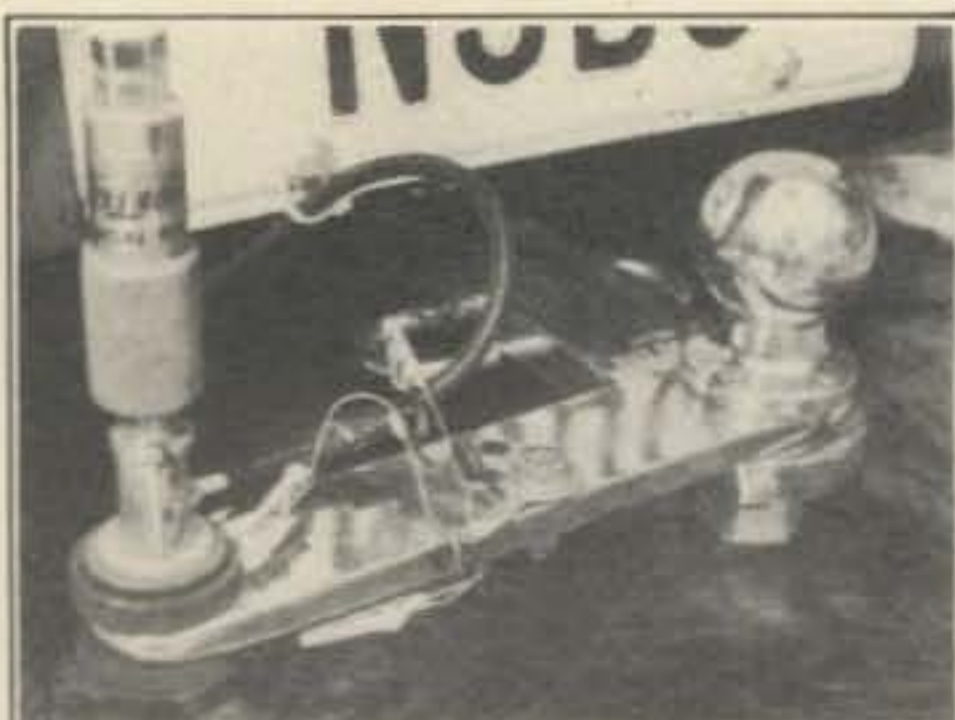
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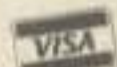
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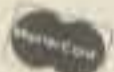
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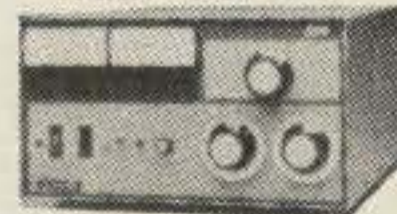


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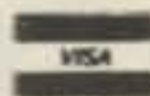
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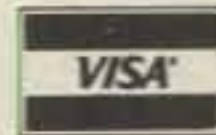
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IC-781 HF Transceiver



THE FUTURE OF AMATEUR COMMUNICATIONS

Once in a lifetime, a transceiver is introduced that's so extraordinary and innovative that it opens a totally new era in HF communications. ICOM's pacesetter IC-781 proudly exhibits that hallmark achievement with futuristic designs and features of true legendary proportions. Whether DX'ing, contesting, pioneering new interests or enjoying unquestionable top-of-the-line performance, the IC-781 is indeed today's standard of excellence!

Multi-Function Five Inch CRT. Displays frequencies, modes, memory contents, operating notes, RIT, two menu screens, plus a panoramic view of all signals in a selected range. A portion of the screen also serves as a display for data modes like RTTY, AMTOR, and PACKET.



Unique Spectrum Scope. Continuously indicates all signal activities and DX pileups with your operating frequency in the center. Selectable horizontal frequency spans of

± 50 , ± 100 , and ± 200 kHz for each side of the frequency you're listening to. Vertical range indicates relative signal strengths. A contesteer's dream!



Dual Width Noise Blanker includes MCF filter plus level and width controls to eliminate pulse and woodpecker noise with minimum adjacent-signal interference.

Incomparable Filter Flexibility. Independent selection of wide and narrow SSB filters plus CW filters. Second and third CW IF filters are independently selectable!

Dual Watch. Simultaneously receives two frequencies in the same band! Balance control adjusts VFO A/B receive strength levels. You can check additional band activity, even tune in your next contact, while in QSO without missing a single word!

DX Rated! 150 watts of exceptionally clean RF output. Easily drives big amplifiers to maximum power.

Twin Passband Tuning with separate controls for second and third IF stages! Increases selectivity and narrows bandwidth, independently varies low and high frequency response, or functions as IF shift. It's DX'ing Dynamite!

A Total Communications System! Includes built-in 100% duty AC supply, high speed automatic antenna tuner, iambic keyer, semi-automatic or full QSK CW break-in to 60 wpm, Audio Peaking Filter (APF), RF speech processor, multiscanning, 105dB dynamic range, all-band/all-mode receiver with general coverage, and much more!

ICOM Dependability. The phenomenal IC-781 is built for action and backed with the most extensive warranty in the industry.

See the IC-781 at your local ICOM dealer.



CIRCLE 55 ON READER SERVICE CARD

ICOM

Icom America, Inc.

2380 116th Avenue N.E., Bellevue, WA 98004
Customer Service Hotline (206) 454-7619
3150 Premier Drive, Suite 126, Irving, TX 75063
1777 Phoenix Parkway, Suite 201, Atlanta, GA 30349
ICOM CANADA, A Division of ICOM America, Inc.,
3071 - #5 Road, Unit 9, Richmond, B.C. V6X 2T4
All stated specifications subject to change without notice or obligation. All ICOM radios significantly exceed FCC regulations limiting spurious emissions. 781187.