

FREE
Pull-out
Frequency Chart
Bound Into This Issue

ICD 08241

Amateur Radio

SERVING AMATEUR RADIO SINCE 1945

JULY 1989 \$2.50

CANADA \$3.50

CQ

Coast-To-Coast Mobile Packet

... page 24

The Dezi Dipole For 10 Meters

... page 18

Packet Video: The Race Is On!

... page 102

Electric Shock: How Much Kills?

... page 50

On The Cover: Chet Lambert, W4WDR



THE RADIO AMATEUR'S JOURNAL

KENWOOD

...pacesetter in Amateur Radio

All New
Compact HF

“DX-citing!”

TS-440S Compact high performance HF transceiver with general coverage receiver

Kenwood's advanced digital know-how brings Amateurs world-wide “big-rig” performance in a compact package. We call it “Digital DX-citement”—that special feeling you get every time you turn the power on!

• Covers All Amateur bands

General coverage receiver tunes from 100 kHz—30 MHz. Easily modified for HF MARS operation.

• Direct keyboard entry of frequency

• All modes built-in

USB, LSB, CW, AM, FM, and AFSK. Mode selection is verified in Morse Code.

• VS-1 voice synthesizer (optional)

• Superior receiver dynamic range

Kenwood DynaMix™ high sensitivity direct mixing system ensures true 102 dB receiver dynamic range. (500 Hz bandwidth on 20 m)

• 100% duty cycle transmitter

Super efficient cooling permits continuous key-down for periods exceeding one hour. RF input power is rated at 200 W PEP on SSB, 200 W DC on CW, AFSK, FM, and 110 W DC AM. (The PS-50 power supply is needed for continuous duty.)

• Built-in automatic antenna tuner (optional). Covers 80–10 meters.

• 5 IF filter functions

• VOX, full or semi break-in CW

• Dual SSB IF filtering

A built-in SSB filter is standard. When an optional SSB filter (YK-88S or YK-88SN) is installed, dual filtering is provided.

• AMTOR compatible

• Adjustable dial torque

• 100 memory channels

Frequency and mode may be stored in 10 groups of 10 channels each. Split frequencies may be stored in 10 channels for repeater operation.

• TU-8 CTCSS unit (optional)

• Superb interference reduction

IF shift, tuneable notch filter, noise blanker, all-mode squelch, RF attenuator, RIT/XIT, and optional filters fight QRM.

• MC-43S UP/DOWN mic. included

• Computer Interface port



Optional accessories:

- AT-440 internal auto. antenna tuner (80 m – 10 m)
- AT-250 external auto. tuner (160 – 10 m)
- AT-130 compact mobile antenna tuner (160 m –

- 88SN 2.4 kHz/1.8 kHz SSB filters • MC-60A/80/85 desk microphones • MC-55 (8P) mobile microphone • HS-4/5/6/7 headphones • SP-41/50/50

Kenwood
takes you from
HF to OSCAR!



- 10 m) • IF-232C/IC-10 level translator and modem IC kit • PS-50 heavy duty power supply • PS-430/PS-3D DC power supply • SP-430 external speaker • MB-430 mobile mounting bracket • YK-88C/88CN 500 Hz/270 Hz CW filters • YK-88S-

- mobile speakers • MA-5/VP-1 HF 5 band mobile helical antenna and bumper mount • TL-922A 2 kw PEP linear amplifier • SM-220 station monitor (no pan display) • VS-1 voice synthesizer • TU-8 CTCSS tone unit • PG-2C extra DC cable.

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

KENWOOD

KENWOOD U.S.A. CORPORATION
COMMUNICATIONS & TEST EQUIPMENT GROUP
P.O. BOX 22745, 2201 E. Dominguez Street
Long Beach, CA 90801-5745
KENWOOD ELECTRONICS CANADA INC.
P.O. BOX 1075, 959 Gana Court
Mississauga, Ontario, Canada L4T 4C2

KENWOOD

...pacesetter in Amateur Radio

All New!

Stacked in Your Favor!

TM-231A/431A/531A

FM Mobile Transceiver

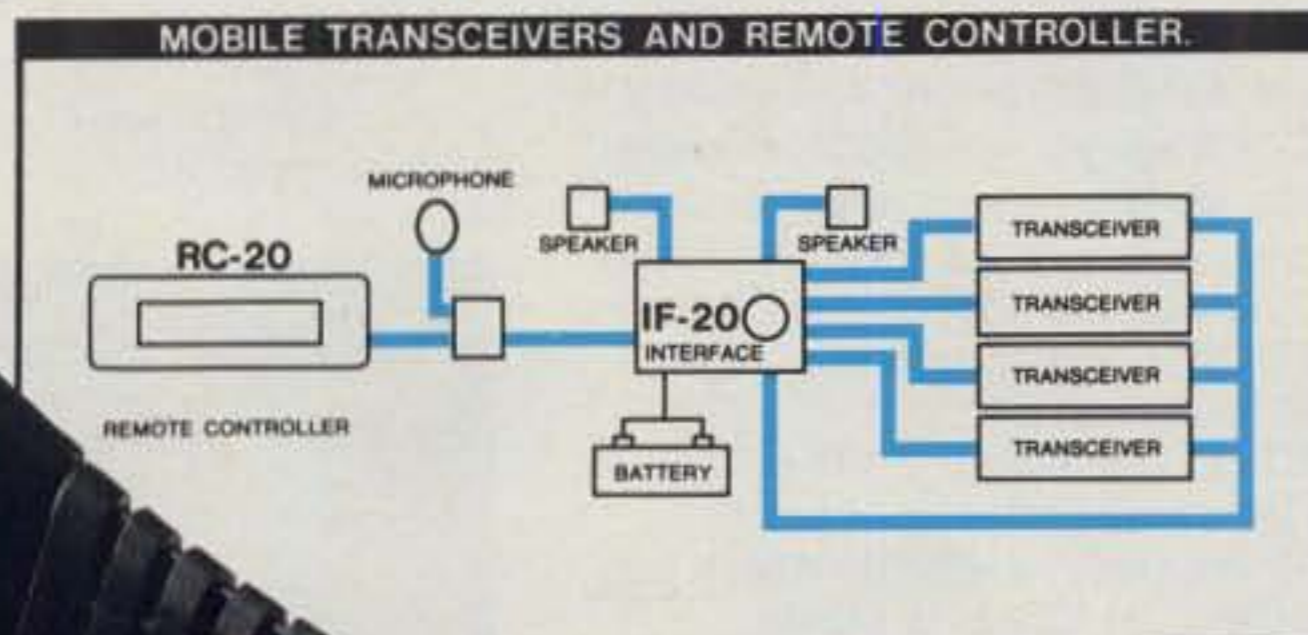
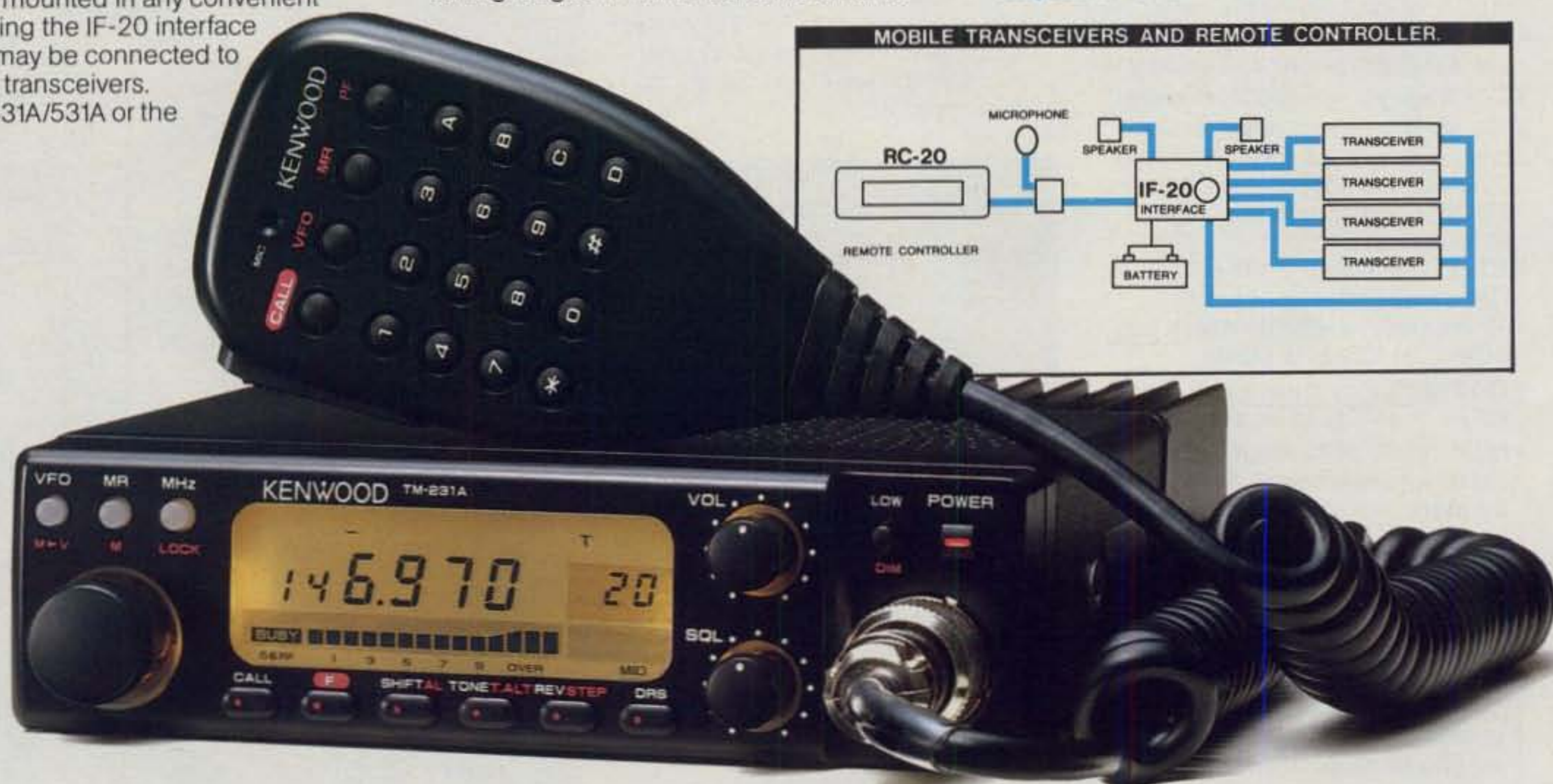
Looking for a compact transceiver for your mobile VHF and UHF operations? KENWOOD has a compact rig for each of the most popular VHF/UHF bands.

- **20 multi-function memory channels.** 20 memory channels allow storage of frequency, repeater offset, CTCSS frequency, frequency step, Tone On/Off status, CTCSS and REV.
- **High performance—high power!** 50W (TM-231A), 35W (TM-431A) with a 3 position power switch (high, medium, low).
- **Optional full-function remote controller (RC-20).**

A full-function remote controller using the Kenwood bus line, model RC-20, may be easily connected to the TM-231A/431A/531A and can be mounted in any convenient location. Using the IF-20 interface the RC-20 may be connected to four mobile transceivers. (TM-231A/431A/531A or the TM-701A)

- **Multi-function DTMF mic. supplied.** Controls are provided on the microphone for CALL (Call Channel), VFO, MR (Memory Call or to change the memory channel) and a programmable function key. The programmable key can be used to control one of the following on the radio: MHz, T.ALT. TONE, REV, DRS, LOW or MONITOR.
- **Easy-to-operate illuminated keys.** A functionally designed control panel with backlit keys increases the convenience and ease of operation during night-time use.
- **Auto repeater offset on 144 and 220 MHz.**
- **Built-in digital VFO.**
 - a) **Selection of the frequency step (5, 10, 15, 20, 12.5, 25kHz)**
*TM-531A: 10, 20, 12.5 25kHz
 - b) **Programmable VFO**
The user friendly programmable VFO allows the operator to select and program variable tuning ranges in 1 MHz band increments.

- **Programmable call channel function.** The call channel key allows instant recall of your most commonly used frequency data.
- **Selectable CTCSS tone built-in.**
- **Tone alert system—for true "quiet monitoring"!** When activated this function will cause a distinct beeper tone to be emitted from the transceiver for approximately 10 seconds to signal the presence of an incoming signal.
- **Easy-to-operate multi-mode scanning.** Band scan, Program band scan, Memory scan plus programmable memory channel lock-out, with time operated or carrier operated stop.
- **Priority alert.**
- **DRS (Digital recording system).** The optional DRU-1 can store received and transmitted messages for up to 32 seconds, allowing the operator to quickly check or return any call using the tone alert system.
- **Automatic lock tuning function (TM-531A).**
- **Repeater reverse switch.**



Optional Accessories

- RC-20 Full-function remote controller
- RC-10 Multi-function remote controller
- IF-20 Interface unit handset
- DRU-1 Digital recording unit
- MC-44 Multi-function hand mic.
- MC-44DM Multi-function hand mic. with auto-patch
- MC-48B 16-key DTMF hand mic.
- MC-55 8-pin mobile mic.
- MC-60A/80/85 Desk-top mics.
- MA-700

Dual band (2m/70cm) mobile antenna (mount not supplied) • SP-41 Compact mobile speaker • SP-50B Mobile speaker • PS-430 Power supply • PS-50 Heavy-duty power supply • MB-201 Mobile mount • PG-2N Power cable • PG-3B DC line noise filter • PG-4H Interface connecting cable • PG-4J Extension cable kit • TSU-6 CTCSS unit

KENWOOD

KENWOOD U.S.A. CORPORATION
COMMUNICATIONS & TEST EQUIPMENT GROUP
P.O. BOX 22745, 2201 E. Dominguez Street
Long Beach, CA 90801-5745
KENWOOD ELECTRONICS CANADA INC.
P.O. BOX 1075, 959 Gana Court
Mississauga, Ontario, Canada L4T 4C2

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

KENWOOD

...pacesetter in Amateur Radio

220 MHz
TH-315A
Here Now!

This HT Has it All!

TH-215A/315A/415A

Full-featured Hand-held Transceivers

Kenwood brings you the greatest hand-held transceiver ever! More than just "big rig performance," the new TH-215A for 2 m, TH-315A for 220 MHz, and TH-415A for 70 cm pack the most features and the best performance in a handy size. And our full line of accessories will let you go from hamshack to portable to mobile with the greatest of ease!

- **Wide receiver frequency range.** Receives from 141-163 MHz. Includes the weather channels! Transmit from 144-148 MHz. Modifiable to cover 141-151 MHz (MARS or CAP permit required).
- **TH-315A covers 220-225 MHz, TH-415A covers 440-449.995 MHz.**
- **5, 2.5, or 1.5 W output, depending on the power source.** Supplied battery pack (PB-2) provides 2.5 W output. Optional NiCd packs for extended operation or higher RF output available.
- **CTCSS encoder built-in.** TSU-4 CTCSS decoder optional.
- **10 memory channels store any offset, in 100-kHz steps.**
- **Odd split, any frequency TX or RX, in memory channel "0"**
- **Nine types of scanning!** Including new "seek scan" and priority alert. Also memory channel lock-out.
- **Intelligent 2-way battery saver circuit extends battery life.** Two battery-saver modes to choose, with power saver ratio selection.
- **Easy memory recall.** Simply press the channel number!
- **12 VDC input terminal for direct mobile or base station supply operation.** When 12 volts applied, RF output is 5 W! (Cable supplied!)
- **New Twist-Lok Positive-Connect™ locking battery case.**
- **Priority alert function.**
- **Monitor switch to defeat squelch.** Used to check the frequency when CTCSS encode/decode is used or when squelch is on.



- **Large, easy-to-read multi-function LCD display with night light.**
- **Audible beeper to confirm keypad operation.** The beeper has a unique tone for each key. DTMF monitor also included.
- **Supplied accessories:** Belt hook, rubber flex antenna, PB-2 standard NiCd battery pack (for 2.5 W operation), wall charger, DC cable, dust caps.



Optional Accessories:

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



KENWOOD

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 and prices are subject to change without notice or obligation.

MASTHEAD

EDITORIAL STAFF

Alan M. Dorhoffer, K2EEK, Editor
 Gail M. Schieber, Associate Editor
 Lew McCoy, W1ICP, Technical Representative
 Peter O'Dell, WB2D, Special Projects Editor

CONTRIBUTING STAFF

John Dorr, K1AR, Contest Calendar
 Chod Harris, VP2ML, DX
 Dave Ingram, K4TWJ, OSCAR & Antiques
 George Jacobs, W3ASK, Propagation
 Dorothy Johnson, WB9RCY, Awards & USA-CA
 Steve Katz, WB2WIK, VHF/UHF
 Frederick O. Maia, W5YI, FCC Correspondent
 Buck Rogers, K4ABT, Packet Radio
 Karl T. Thurber, Jr., W8FX, Antennas & Software
 Adrian Weiss, K8EEG/0, QRPp
 Bill Welsh, W6DDB, Novice

AWARD MANAGEMENT

Leo Haijsman, W4KA, WAZ Award
 Dorothy H. Johnson, WB9RCY, USA-CA Award
 Norman Koch, K6ZDL, WPX Award
 Billy Williams, N4UF, CQ DX Award

CONTEST MANAGEMENT

Frank Anzalone, W1WY, Contest Advisor
 Steve Bolia, N8BJQ, WPX Contest Director
 Larry Brockman, N6AR, WW DX Contest Director
 Robert Cox, K3EST, WW DX Contest Director
 John Dorr, K1AR, WW DX Trophies & Certificates
 Roy Gould, KT1N, RTTY Contest Director
 Steve Katz, WB2WIK, VHF WPX Contest Director
 Donald McClenon, N4IN, 160 M Contest Director
 Bernie Welch, W8IMZ, WPX Contest Advisor

BUSINESS STAFF

Richard A. Ross, K2MGA, Publisher
 Dorothy Kehrwieler, General Manager
 Arnie Sposato, N2IQO, Advertising Manager
 Emily Kreutz, Sales Assistant
 Frank V. Fuzia, Controller
 Arlene Caggiano, Accounting
 Catherine Ross, Circulation Director
 Melissa Kehrwieler, Data Processing
 Kathleen Bell, Customer Service

PRODUCTION STAFF

Dorothy Kehrwieler, Production Manager
 Elizabeth Ryan, Art Director
 Barbara Terzo, Artist
 Pat Le Blanc, Phototypographer
 Florence V. Martin, Phototypographer
 Hal Keith, Illustrator
 Larry Mulvehill, WB2ZPI/VK5AAY, Photographer

A publication of



CQ Communications, Inc.
 76 North Broadway
 Hicksville, NY 11801-2953 USA.

Offices: 76 North Broadway, Hicksville, NY 11801. Telephone: 516 681-2922. FAX (516) 681-2926. CQ (ISSN 0007-893X) is published monthly by CQ Communications Inc. Second Class postage paid at Hicksville, NY and additional offices. Subscription prices: Domestic—one year \$19.95, two years \$38.00, three years \$57.00; Canada/Mexico—one year \$22.00, two years \$42.00, three years \$63.00; Foreign—one year \$24.00, two years \$46.00, three years \$69.00; Foreign Air Mail—one year \$77.00, two years \$152.00, three years \$228.00. Entire contents copyrighted CQ Communications Inc. 1989. CQ does not assume responsibility for unsolicited manuscripts. Allow six weeks for change of address. Printed in the United States of America. Postmaster: Please send change of address to CQ Magazine, 76 North Broadway, Hicksville, NY 11801.



The Radio Amateur's Journal

ON THE COVER: If the face seems vaguely familiar, it certainly should. Chet Lambert, W4WDR has shown his friendly, smiling face at scores of Ham-fests over the past seven years as Publisher of the recently closed CTM magazine. The amateur community appreciates your efforts, Chet! Photo by Larry Mulvehill, WB2ZPI.



JULY 1989

VOL. 45, NO. 7

FEATURES

UNIQUE MINIATURES	Eric Stofer	13
THE DEZI DIPOLE ANTENNA FOR 10 METERS	John J. Schultz, W4FA	18
CQ REVIEWS: THE ICOM IC-32AT TWO-BAND VHF/UHF HT	Lew McCoy, W1ICP	22
A COAST-TO-COAST PACKET RADIO MOBILE OPERATION	Dave Bushong, KZ1O	24
A SIMPLE WIRE VERTICAL ANTENNA FOR 40 METERS	Robert A. Lehning, WA2YSG	30
NEW LIFE FOR PJ8DFS	Barbara Gunderson	32
1988 CQ WW DX CONTEST CW HIGH-CLAIMED SCORES		38
CQ VISITS WWVH	Lew McCoy, W1ICP	40
AMATEUR RADIO CAN MAKE A DIFFERENCE	Carol Perry, WB2MGP	44
ELECTRIC SHOCK: HOW MUCH KILLS?	Michael Simmons, WB9CWE	50
THE RIGHT PLACE AT THE RIGHT TIME	Dr. Ronald S. Levy, DDS, K2AIO	52
ARKANSAS AMATEURS HELP TEACH NYC KIDS	Joe Fairclough, WB2JKJ	54
CQ SHOWCASE: NEW AMATEUR PRODUCTS		58
BILL'S BASICS: ANTENNAS, PART I	Bill Welsh, W6DDB	60
WASHINGTON READOUT: PART 15—THE REVOLUTION IN NONLICENSED RADIO	Fredrick O. Maia, W5YI	78
ANTENNAS AND ACCESSORIES: ANTENNAS AND HAMSHACK SOFTWARE	Karl T. Thurber, Jr., W8FX	84
PACKET USER'S NOTEBOOK: THE PACKET VIDEO EXPLOSION	Buck Rogers, K4ABT	102

DEPARTMENTS

AWARDS: STORY OF THE MONTH—F. GENE HARRELSON, KB5KM	Dorothy Johnson, WB9RCY	66	
CONTEST CALENDAR: MEET NEW COLUMN EDITOR JOHN DORR, K1AR, CONTESTS FOR JULY AND EARLY AUG.	John Dorr, K1AR	70	
DX: MEET NEW DX EDITOR CHOD HARRIS, VP2ML, NEW DXCC COUNTRIES	Chod Harris, VP2ML	92	
PROPAGATION: SUNSPOT NUMBERS CONTINUE TO RISE TOWARDS ALL-TIME HIGH	George Jacobs, W3ASK	98	
ZERO BIAS	4	OUR READERS SAY	8
ANNOUNCEMENTS	6	HAM SHOP	108

Zero Bias

AN EDITORIAL

If you didn't get buzzed out from all the stuff to see at this year's Dayton, then you really weren't trying. The weather this year included some very heavy dew and some periods of bright, beautiful sunshine. The roof on the new building succumbed to the "heavy dew," some of which did drop gently on the exhibits. There was additional parking this year, which was a plus. However, it was in freshly plowed fields, which helped to create "Mud World." All in all, there will be a million "war stories" about this one, and the trials and tribulations of getting there, staying dry, and bringing all that stuff home.

About a week after Dayton I did get a phone call from an attendee who said that he wouldn't go back because of how he was treated, the food, the mud, and so on. Truthfully, and from the vantage point of attending hundreds of hamfests over the years, Dayton is fairly typical. Normally, you don't go to the Dayton Hamfest for either the ambience or their noted haute cuisine. This could be said for just about every hamfest. You go to one of these events for the experience of total immersion in our favorite hobby. You go to have fun, see your friends, look at great stuff, learn something new, and possibly bring home some great stuff. Speaking about great stuff, check out the picture I took at the Orlando Hamfest earlier this year.

One interesting thing on display at Dayton this year was a book. Put out by Walt Stinson, W0CP, it's called the *Radio Operator's World Atlas*. It's roughly 5½" x 7½", harbored, and is a very informative full-color world atlas for quick desk-top reference. It's a nifty operating aid for finding those countries you've been working. Walt was selling them for \$14.95 (plus \$2.00 postage and handling, if you'd like one). Walt's QTH is 4150 E. Quincy Ave., Englewood, CO 80110.

It's hard to picture anyone leaving the Dayton Hamfest empty-handed, but I guess there are a few who are bound and determined to be grumpy and unhappy. Amateur radio is a hobby of possibilities sprinkled with a measure of actualities. The possibilities are the things that we can or could do or even the things we'd like to do. These can be restricted by time and either financial or physical limitations. We can't always afford what we'd like to have, and we don't always have the room (or finances) to put up the monster tower and array. The possibilities, however, always exist and continue to feed the imagination.



A large sign at the Orlando Hamfest fleamarket guaranteed to bring a tear to any ham's eye.

When things do work out and become reality, that inner satisfaction of accomplishment is sometimes called fun. The process is still very visible on the faces of newcomers who come up to the CQ booth at hamfests to talk about licensing material. It's the look of the wonderful world ahead and what they're going to be able to do. It's the putting aside of reality for a while and letting the imagination take hold. It's the anticipation of enjoyment we all experienced when we started in amateur radio. A lot of us are still having a good time, even after all these years, but some of us have forgotten what it was like to dream.

VHF Contest and Column Update

In the latter part of last year Steve Katz, WB2WIK, made a job shift and a QTH shift from New Jersey to California, and things haven't been the same since. Living in temporary quarters with most of his stuff in storage, Steve has been leading his typically frenetic lifestyle at work to the exclusion of amateur radio. Reaching Steve at work is a study in persistence and determination, as most of his friends will attest to.

However, there is some light at the end of the tunnel. We're about to catch up on the CQ VHF WPX Contest certificates and trophies. Gail has "volunteered" to do the catch up work, and by the time you read this, the 1987 awards should be in the mail. The 1988 VHF Contest results should be in CQ shortly—perhaps next month (we hope)—with those certificates and trophies to follow.

The 1989 VHF event takes place this month, and we are working on a more expeditious manner of handling the logs,

plaques, and certificates for this one. The VHF Column itself is still up in the air at this writing. Although we'd like Steve to continue doing it, a lot depends on his busy schedule.

More Changes

After many lengthy conversations with Frank, W1WY, he has decided to step down as Editor of the Contest Calendar column. For almost four decades Frank has been the backbone and standard bearer for CQ contests and a leading exponent of all amateur radio contests. Frank's health is forcing a slowdown in activity, and rather than see the column slow down as well, he sees this time as opportune for passing it on to younger hands. With Frank's input, advice, and most of all wisdom, the transition period has been smooth.

The new Editor of the Contest Calendar column is John Dorr, K1AR. John has been a hard-working member of our CQ Contest Committee for years, and in recent years he has included the WW DX Contest certificates and trophies in his list of contest chores. For a young man, John has racked up quite a few accomplishments in the world of contesting, DXing, and electronics. For those of you who may not be familiar with John, check out his bio in his column this month.

Still More Changes

Years ago John Attaway, K4IIF, then CQ's DX Editor, brought Hugh Cassidy, WA6AUD, onboard to guest write several columns each year. As time went by, Hugh (most folks call him Cass) wrote more and more of the column and eventually took it over despite his protestations of wanting to get away from schedules and deadlines. His "Old Timer" stories have become legend in the annals of DX, as has his book *DX Is*, which is now out of print (although some copies are still available according to the bulletins). Hugh has been going along on a month-to-month basis waiting for us to find a replacement.

This month I'm pleased to announce that Chod Harris, VP2ML, has joined our staff as DX Editor. Chod, as many of you know, publishes his own DX bulletin as well as a specialized publication called *The DX Magazine*. He brings his DX expertise to CQ, as well as his experience from many DXpeditions. We've included a bio on Chod in this month's DX column for those of you who are new to the exciting world of DX and who have not read his work.

73, Alan, K2EEK

The Morse Machine™

The Ultimate Keyer from AEA



The Morse Machine has all the features you've been asking for in a high performance keyer like 2-99 WPM speed selection and over 8,000 characters of memory that can be stored in 20 memories. The 20 memories are soft partitioned so that your stored messages may be as short or long as you like. Memory can be expanded to hold up to 36,000 characters. Of course, all memory is backed up by an internal lithium battery so that once a message is loaded, it will stay there until you write over it.

Whether you're an expert or a novice, The Morse Machine has three ways to help you improve your code:

- A proficiency trainer, the same as the one used in the MorseMatic, allows random code group practice with steadily increasing speed.
- A random word generator that randomly generates 4-letter words for a more realistic practice session.
- Dr. QSO (tm) QSO simulator based on our program for the Commodore 64 computer. You can call other stations, answer a CQ, or just sit back and listen to realistic QSOs very much like those you would hear on-the-air.

The Morse Machine is a full featured keyer for the serious contester, with automatic serial

number insertion and incrementing in any memory message. You can use the front panel knob to adjust your sending speed or enter a precise speed with the keypad, toggling between the two at any time. Exchanges can be speeded up by having parts of your message sent at a higher speed. You can also add remote switches for 4 of the memories so that you can instantly send your responses or call CQ.

A computer can be interfaced to The Morse Machine through its RS-232 compatible I/O. Any front panel function may be programmed by the computer. This makes loading memories as simple as typing them in from your keyboard. The Morse Machine can display your random code, or Dr. QSO practice sessions on the computer screen.

The Morse Machine can be programmed to be an automatic beacon. This can be used to automatically repeat a Morse (or RS-232 ASCII) message at a programmed interval of 1 to 999 seconds.

See your AEA dealer today for a demonstration of The Morse Machine or contact:

Advanced Electronic Applications, Inc.

P.O. Box C-2160 Lynnwood, WA 98036
206-775-7373

Announcing

•**Russian Phrases for Amateur Radio** - A 20-page syllabus to help amateurs better communicate with their Soviet colleagues has been compiled by W6HJK. You need not be an expert in Russian, only interested in trying. The booklet provides English words and phrases for QSOs, accompanied by the Russian translation and the English transliteration to assist you in pronouncing the Russian. There are additional sections on the Russian alphabet, phonetics, CW characters, numerals, and given names. The booklet is provided free, with the first printing and mailing funded by Beyond War, an educational foundation to build global dialogue and cooperation. Requests for the booklet should be sent to: Russian Phrases for Amateur Radio, Len Traubman, W6HJK, 1448 Cedarwood Drive, San Mateo, CA 94403.

•**The following Special Events will take place during July:**

KA1BB, from Flat Hammock Island, Fishers Island Sound, NY; Tri-City ARC; 1300-2000Z July 16; lower 20 kHz of the General phone and CW bands—10, 15, 20, and 40 meters—the center of the 10 meter Novice band, and the 2 meter SSB band. QSL with letter-size SASE via Tri-City ARC, Box 686, Groton, CT 06340.

KU1Q, from Goshen Fairgrounds, Goshen, CT; Goshen Quadrimillennium Committee; 1300Z July 15 to 1300Z July 16; SSB on the low end of the Novice portion of 10 meters and the low end of the General portion of 15, 20, 40, and 80 meters. For certificate send QSL and 9 x 12 SASE (for unfolded) or number 10 SASE for folded to 250th, P.O. Box 65, Goshen, CT 06756.

W1TLC, from Union Hamfest, Union, ME; from 1200-1800Z July 15; SSB 7.275, 14.275, 21.375, 28.475, 28.575; CW 7.075, 14.075, 21.175, 28.175. QSL with SASE to W1TLC Callbook address.

KY2F, from Central New York International Air Show, Fulton, NY; Oswego County Amateur Radio Emergency Service; 1500-2300Z July 8 and 9; middle portion of the General 40, 20, 15, 10, and 2 meter bands and the Novice portion of 10 meters. For certificate send your QSL and SASE to Fred Swiatlowski, KY2F, P.O. Box 5227, Oswego, NY 13126.

N4ICT, from Staunton, VA; Valley ARA; 1200Z July 4 to 0030Z July 5; General phone band on 80, 40, 20, and 15 meters, and General CW bands on 40 and 20 meters, plus Novice phone band on 10 meters. For certificate send QSL, contact number, and 9 x 12 SASE to Valley ARA, P.O. Box 666, Staunton, VA 24401.

KD5RZ, from Hobbs, NM; New Mexico Dist. Royal Rangers; from 1300-0100Z July 8; 3.870, 7.250, 14.250, 21.320, and 28.520/28.380. For certificate send QSL and large SASE to KD5RZ (NRRSE), 1420 N. Tasker, Hobbs, NM 88240.

WB5I, from Lake Jackson, TX; Contest Club of Brazosport; July 29; SSB 14.235, 21.335, 28.335. For QSL send SASE to WB5I, 305 Rabbit Trail, Lake Jackson, TX 77566.

K6MF, from Moffett Field, CA; NAS Moffett Field with the NASA Ames Research Center ARC and Navy Moffett Field ARC; 1600-0100Z July 1 and 2; 14.280 and 21.380 MHz, voice (A3) only. For QSL send SASE to AARC, P.O. Box 73, Moffett Field, CA 94035.

KG6GF, from Gilroy, CA; 1600-2300Z July 28-30; 3.875, 7.275, 14.250, 21.350, 28.350 MHz. For certificate and QSL send QSL and no. 10 SASE to Don Brice, W6ONO, 1378 Gloria, Hollister, CA 95023, or KG6GF via the Bureau.

KZ6N, from Hollywood, CA; CBS ARC; 1600-0400Z July 17-23; 7.235, 14.030, 14.280, 21.310, 28.475-

28.550. For QSL send large SASE to KZ6N, CBS TV City, Room 50, 7800 Beverly Blvd., Los Angeles, CA 90036.

WA6OPZ, from Emerald Bay, Catalina Island, CA; 1500-0700Z July 9-15; SSB 28.45 and lower 25 kHz of the 15, 20, and 40 meter General phone bands; CW around 7125 and 21150 kHz. For certificate send QSL and 9 x 12 SASE to Marshall Jacobson, 16441 Gilmore St., Van Nuys, CA 91406.

KL7KC, from Fairbanks, AK; Arctic ARC; 0000Z July 15 to 0900Z July 24; SSB 7.290, 14.240, 21.340, 28.350, CW 7.030, 14.030, 21.030, 28.005. For QSL send SASE to the Arctic ARC, P.O. Box 81389, Fairbanks, AK 99708.

KT7V, from Fort Laramie, WY; High Plains ARC; 0000Z July 4 to 0000Z July 5; SSB 3.850, 7.250, 14.250, 21.360, 28.550, CW 50 kHz up from the lower edge of the band. For QSL send business-size SASE to KT7V, 111 Camino Del Rey, Torrington, WY 82240.

W7PXL, from Eugene, OR; Valley ARC; 0100Z July 29 to 0100Z Aug. 7; SSB 3.850, 21.300, 14.250, 28.500, CW 14.060, 21.060, 28.060. For QSL or certificate send SASE to Valley ARC, P.O. Box 70314, Eugene, OR 97401.

KD8FJ, from Thompson, OH; beginning at 1400Z, July 4; lower portion of the 40 meter General phone band and 10 meter phone at 28.453 if conditions allow. QSL with large SASE to KD8FJ, 386 Cedarbrook Dr., Painedville, OH 44077.

WB8ZVS, from Clarkeburg, WV; Stonewall Jackson ARA; 1400Z July 4 to 0100Z July 5; lower 20 kHz of the 40 meter General phone band. For certificate send SASE to SJARA, WB8ZVS, P.O. Box 752, Clarksburg, WV 26302.

(continued on page 106)

PLUG INTO PACKET!

Simple and Easy.

Here's the easiest packet radio yet, you don't even have to buy a TNC to join the digital revolution. Just let your PC do the work. Plug a PC Packet Adapter into any expansion slot and get on the air in minutes, just like an expert. And you'll still be able to use the PC for other work! The complete VHF system is only \$139.95!

Sophisticated, Too.

When you've mastered the basics, use the PC*Packet Adapter for simultaneous dual-band HF/VHF, multiconnect, BBS, TCP/IP, DXer's PacketCluster, 2400 baud (and higher). Even use the Developer's Package to write your own packet application.

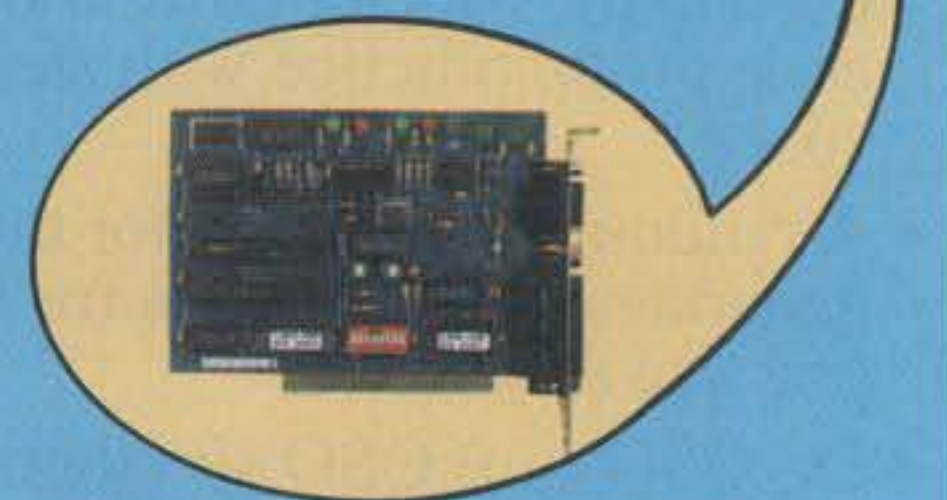
Software Included.

Unlike others, DRSI includes all the software you need. The THS terminal package has split screen, file save/send, binary file transfer, print, scroll, review and more.

2400 BAUD

Many areas are upgrading their packet nets to this higher speed. DRSI's M-24 modem for 2400 baud connects simply with no modifications to your rig and lets you operate both 1200 and 2400 simultaneously with your present radio. Step up to this new speed for just \$79.95, today!

Call or Write
for complete
Product Catalog



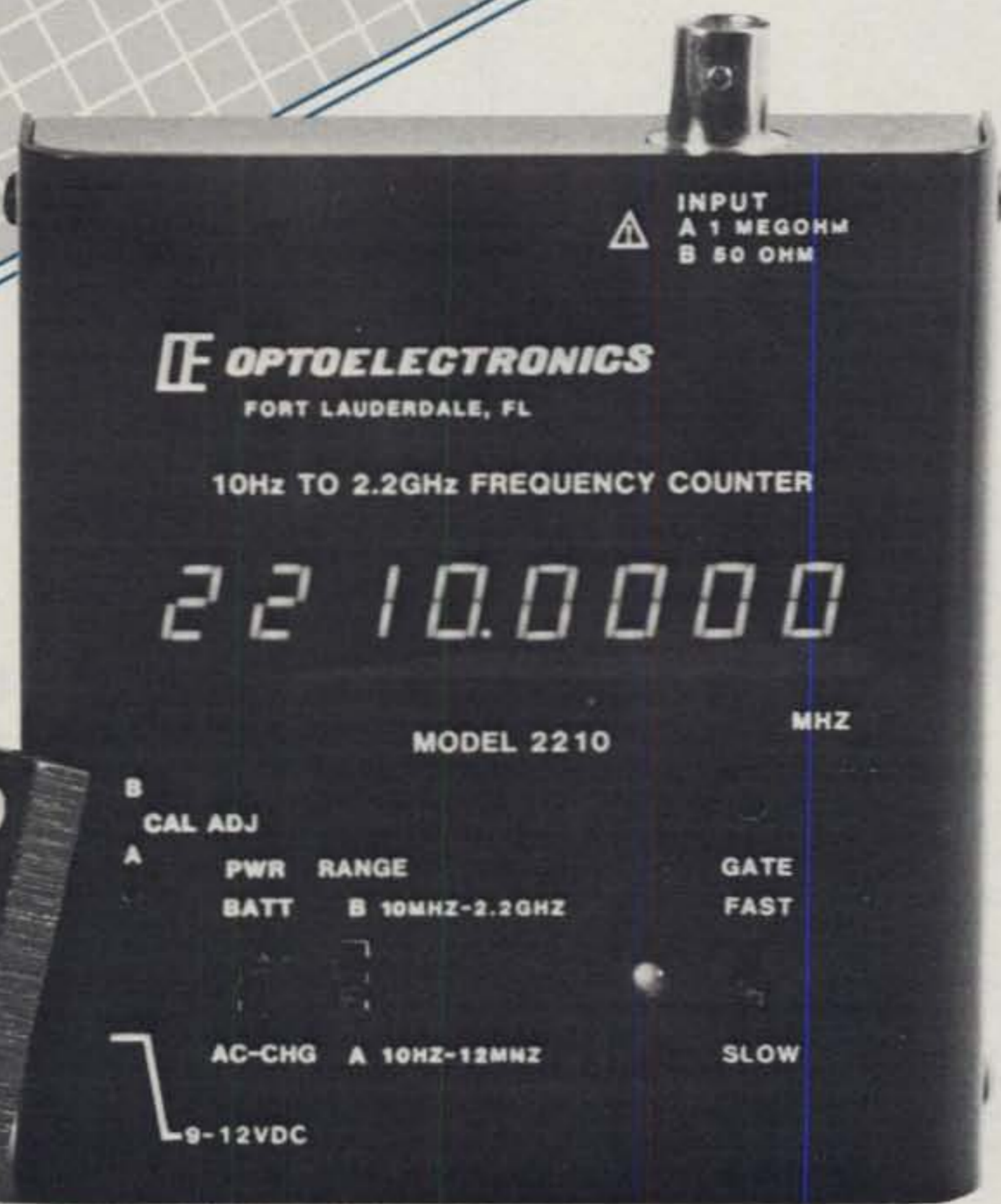
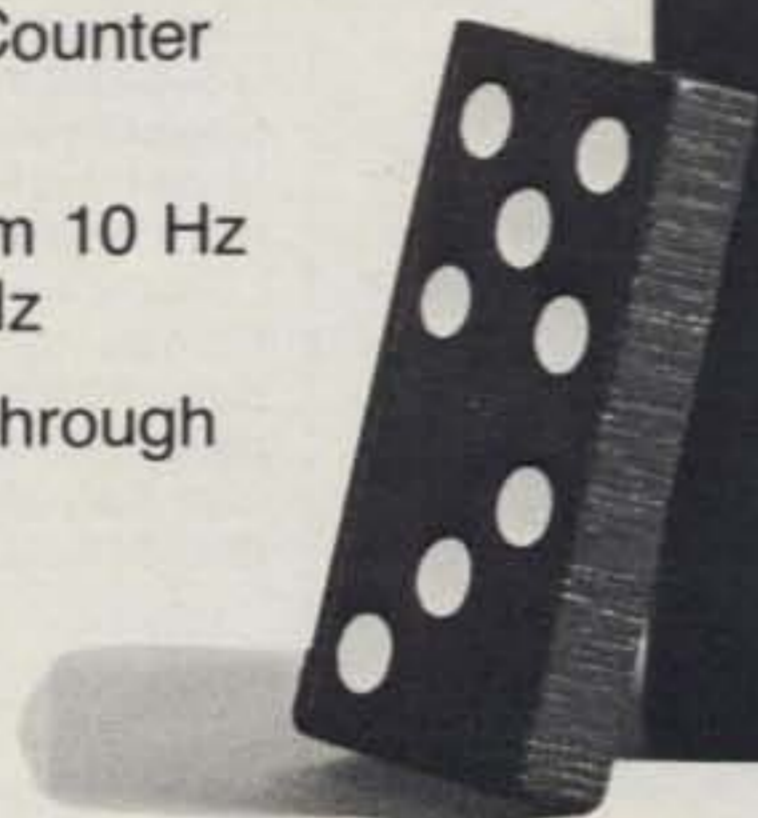
DRSI

2065 Range Road
Clearwater, FL 34625
ORDERS: 1-800-999-0204

**STOP
LOOKING**
The Frequency Counter
You Need Is Here Now!

OPTOELECTRONICS
Model 2210 Hand Held
Frequency Counter
does it all:

- Frequency from 10 Hz to over 2.2 GHz
- Covers audio through microwave
- Sensitive and accurate



Actual Size

OPTOELECTRONICS

The 2210 is now in demand by technicians, engineers, law enforcement officers, private investigators, two-way radio operators, scanner hobbyists, and amateur radio operators. We manufacture the 2210 in the U.S. and have over 15 years of service, quality, experience and dedication that you can count on. Call us today to order yours.

Separate high impedance and 50 ohm amplifier circuits, two ranges, two gate times, dual crystal oscillator design. 8 LED digits, aluminum case, internal Ni-Cad batteries, 1 ppm accuracy, AC-DC portable operation, AC adapter-charger included. Full line of probes, antennas, and carry case is available. Orders to U.S. and Canada add 5% to total (\$2 min, \$10 max). Florida residents add 6% sales tax. COD fee \$3. Foreign orders add 15%. VISA and MasterCard available.

SENSITIVITY

1 KHz	< 5 mv	850 MHz	< 3 mv
100 MHz	< 3 mv	1.3 GHz	< 7 mv
450 MHz	< 3 mv	2.2 GHz	< 30 mv

PRICE _____ \$219.00

OPTOELECTRONICS INC.
5821 N.E. 14th Avenue
Fort Lauderdale, Florida 33334

1-800-327-5912 FL (305) 771-2050
FAX (305) 771-2052



World's Most Powerful 10 Meter Amateur Mobile Antenna*

**Lockheed Corp. Test Shows
Wilson 1000 Antenna Has
58% More Gain Than The
K40 Antenna.**

In tests conducted by Lockheed Corporation, one of the world's largest Aerospace Companies, at their Rye Canyon Laboratory and Antenna Test Range, the Wilson 1000 was found to have 58% more power gain than the K40 Electronics Company, K40 Antenna. This means that the Wilson 1000 gives you 58% more gain on both transmit and receive. Now you can instantly increase your operating range by using a Wilson 1000.

**Guaranteed To Transmit and Receive
Farther Than Any Other 10-Meter
Mobile Antenna or Your Money Back**
New Design**

The Wilson 1000 higher gain performance is a result of new design developments that bring you the most effective 10-meter base loaded antenna available.

Why Wilson 1000 Performs Better

Many 10 meter antennas lose more than 50% of the power put into them. The power is wasted as heat (dielectric) loss in the plastic coil form and is not radiated as signal.

We have designed a new coil form which suspends the coil in air and still retains the rigidity needed for support. This new design eliminates 95% of the dielectric losses. We feel that this new design is so unique that we have filed a patent application on it.

In addition, we use 10 Ga. silver plated wire to reduce resistive losses to a minimum.

In order to handle the high power common for amateur use, we used the more efficient direct coupling method of matching, rather than the lossy capacitor coupling. The Wilson 1000 will handle 2000 watts of power.

The Best You Can Buy

So far you have read about why the Wilson 1000 performs better, but it is also one of the most rugged antennas you can buy. It is made from high impact thermoplastics with ultraviolet protection. The threaded body mount and coil threads are stainless steel; the whip is tapered 17-7 ph. stainless steel. All of these reasons are why it is the best 10 meter mobile antenna on the market today, and we guarantee to you that it will outperform any antenna or your money back!

*Inductively base loaded antennas

**Call for details.

Lockheed - California Company

Plant 2 Bldg. 250 Dept. 74-78
A Division of Lockheed Corporation
Burbank, California 91520

Aug. 21, 1987

Wilson Antenna Company Inc.
3 Sunset Way Unit A-10
Green Valley Commerce Center
Henderson, Nevada 89015

Subject: Comparative Gain Testing of Citizen's Band Antennas

Ref: Rye Canyon Antenna Lab File #870529

We have completed relative gain measurements of your model 1000 antenna using the K-40 antenna as the reference. The test was conducted with the antennas mounted on a 16' ground plane with a separation of greater than 300' between the transmit and test antennas. The antennas were tuned by the standard VSWR method. The results of the test are tabulated below:

FREQUENCY (MHZ)	RELATIVE GAIN (dB)	RELATIVE POWER GAIN (%)
26.965	1.30	35
27.015	1.30	35
27.065	1.45	40
27.115	1.60	45
27.165	1.50	41
27.215	1.60	45
27.265	1.75	50
27.315	1.95	57
27.365	2.00	58
27.405	2.00	58

**OPERATES FROM
26-29 MHz
2 MHz BANDWIDTH AT
LESS THAN 2:1
IDEAL WITH HR-2510,
HTX-100 AND RANGER 3500
10 M TRANSCEIVERS**

**58%
MORE
POWER GAIN
THAN THE
K40**

A complete description of this test is contained in file #870529. Excerpts of this report are enclosed.

Lowell Wilson, Antenna Engineer
Electromagnetics Laboratory

Approved:
W. C. Weikel, Group Engineer
Antenna/ATS Support Laboratory

CALL TODAY
TOLL FREE: 1-800-541-6116
FOR YOUR NEAREST DEALER
Wilson 1000
Available in Black or White

Trunk & Roof Mount 79⁹⁵
Magnetic Mount 89⁹⁵
Wilson 1000 Truckster ... 59⁹⁵
DEALERS Exclusive dealer areas still open

Wilson
ANTENNA INC.
#2 COMMERCE CENTER
HENDERSON, NV 89015

Our Readers Say

Attention Hams on MARS

Editor, CQ:

I am a Vietnam veteran (101st Airborne Division, 1969-70) and state officer (NJ) of Vietnam Veterans of America (WVA). I write several feature articles each year for our national monthly magazine, *The Veteran*. I would appreciate your help on an article that salutes the hams who helped us communicate with our families via the MARS (Military Affiliated Radio) system.

I have been able to interview a number of fellow Nam vets who were able to talk with friends and relatives back in "the world" via MARS (including myself, since I was able to call home on MARS five or six times—but one call to my wife was jammed by the North Vietnamese!), but haven't been able to locate and interview any of the hams who manned the U.S. end of the MARS net. I am also looking for fellow GIs who manned the Nam end of the net. Since the article will be mainly a salute to these hams, your help would be invaluable.

Hams who worked the MARS stations from Nam during 1965-73 can reach me at my address listed below or by calling me at my residence (201-548-8096), campus office at Montclair State (201-893-4254), or private practice (201-548-2266).

Paul A. Scipione, Ph.D.
5 Burr Drive
Metuchen, NJ 08840

Noise Suppression Circuits

Editor, CQ:

As a former design engineer for Hallicrafters back in the 40s and 50s, I thought it appropriate to discuss with you a problem I find in today's modern transceivers which we solved years ago, and that is the inclusion of a *real* noise suppression circuit within said transceiver. I own and operate a Kenwood TS430. I formerly had the Yaesu FT757GX, and both units have the same problem: the noise blanker (limiter-clipper, etc.) or whatever they wish to call it doesn't do much to eliminate line noise. I'm talking about the noise generated from very high tension lines (220,000 to 440,000 volts). I am located 250 feet away from such a tower and lines and my line noise is a steady 30 dB over S9, all bands. Only loud signals make it.

We perfected a noise limiter years ago, in use in the old SX101, which practically blanked out such noise, yet S2 CW signals were readable. That was a series, shunt circuit. Surely these hot-shot modern engineers could put on a chip the equivalent of a Lamb noise silencer or a circuit similar to the one in the SX101. I'm out of contact now with engineers in foreign companies, but perhaps you could get a message through to them to worry less about memories, etc., and to put in a circuit that will help the ham in a noisy location.

Your consideration is appreciated. I really enjoy the magazine and wish it continued success.

Clarence N. Zornes, W9TAL
Orland Park, IL

(continued on page 114)

CIRCLE 76 ON READER SERVICE CARD

DX-ing, contests, pile-ups, traffic handling. When you need to command attention, you will with the SB-1000 Linear Amplifier from Heath. And you'll do it for a cost that no one else can match.

From our recent DX-pedition to Taiwan, operators easily controlled pileups with the SB-1000 and nothing more than a dipole antenna. This means that when conditions are tough, you know you can depend on your SB-1000 to lift your signal above the rest. Whether you're using a dipole or stacked monoband beams.

Proven output power

We don't play games by using old rating methods to make you pay for input power you don't get at the antenna. What you do get is 1000 watt output of peak

envelope power on SSB and 850 watts on CW. Even 500 watt output on RTTY.

On the chance that someone might doubt our claims, at hamfests we demonstrate that with only 80 to 100 watts of drive, our SB-1000 develops more output than even the world-famous Heath SB-220!

Designed for today, the SB-1000 offers quiet, compact tabletop operation at rated output. That's only 1.7dB (or about $\frac{1}{3}$ of an S-unit) below

the maximum legal power limit.

"I built it myself!"

Because you build the Heathkit SB-1000 Linear Amplifier yourself, you not only enjoy cost savings, you have the unique opportunity of knowing your equipment inside and out.

A top quality amplifier, cost savings, bragging rights, plus industry-recognized Heathkit manuals and technical assistance from our licensed ham consultants, should you ever need it. An offer that's hard to pass up.

See the SB-1000 and our complete line of amateur radio products in the Spring Heathkit Catalog. Call today for your free copy.

1-800-44-HEATH
(1-800-444-3284)

Best to start with.
Best to stay with.

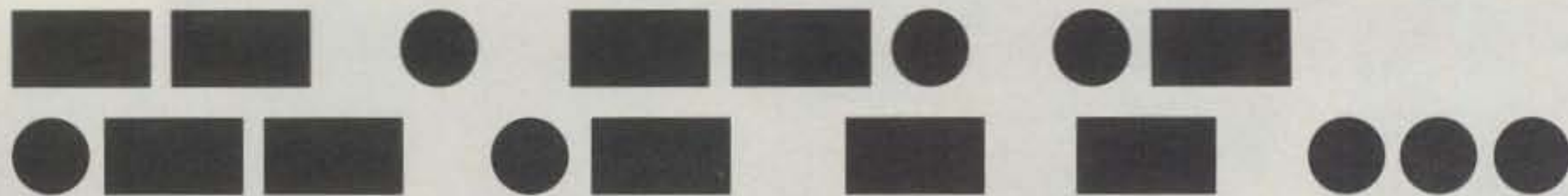
Heath Company
Benton Harbor, Michigan 49022

Top
performance
for less than
80 cents
a watt



CIRCLE 178 ON READER SERVICE CARD

© 1989, Heath Company.
Heathkit is a registered
trademark of Heath Company.
A subsidiary of Zenith
Electronics Corporation.



MEGA WATTS.

Alinco's new DJ-500T hand held dual bander really puts out.

Like 6.5 watts with the optional 12 volt battery. Or our standard 3.5 watts VHF and 3 watts UHF with a local power setting of .5 watts. No other HT delivers such power.

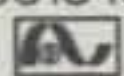
The DJ-500T also comes with mega features.

It's the only HT with a 37 tone encoder/decoder as standard equipment. You get cross band/full duplex operation. Twenty memory channels (10 apiece on VHF and UHF). Programmable offsets. A single memory 16 digit auto dialer and modifiable CAP/MARS capabilities*.

In short, the DJ-500T comes without any high priced add ons

because everything is standard. That includes our exclusive two year limited warranty.

Alinco's new DJ-500T hand held dual bander. Mega power. Mega performance.

Call (213) 618-8616 for your nearest local dealer. 

*Permit required.

ALINCO

20705 South Western Ave., Ste. 104, Torrance, CA 90501

CIRCLE 70 ON READER SERVICE CARD

WANTED

\$100.⁰⁰ REWARD



\$50.⁰⁰ REWARD



For a limited time Alinco Electronics will give a \$100.00 "Reward" for your working, 2 meter or 70 centimeter Mobile Transceiver, or \$50.00 for your working 2 meter or 70 centimeter Hand-Held Transceiver.

The way it works is really quite simple. Just take or send your old, but working, transceiver to your favorite dealer for **TRADE-IN**. Whatever the dealer offers for Trade-In allowance, Alinco will increase the amount by either \$50.00 or \$100.00, depending on whether it's a Hand-Held or Mobile, **ON THE SPOT!** There are only two requirements:

- 1) The Trade-In "Reward" can only be used towards an Alinco DR-510T Dual Band Mobile or an Alinco DJ-500T Dual Band Hand-Held, on a Mobile for Mobile and Hand-Held for Hand-Held basis.
- 2) The Trade-In unit must be in good working order and salable.

Remember, the company that already gives you the best value for your dollar, and a two year factory warranty, now gives you something else that no other company does – A substantial Trade-In "Reward" for using our products!

ALINCO ELECTRONICS INC.

CIRCLE 79 ON READER SERVICE CARD

WORLDWIDE DISTRIBUTION

Ham Radio Outlet has joined the Nationwide Team

EA • ICOM • CLUSHCRAFT • BIRD • BUTTERNUT • TEC • AIR •



HAM RADIO OUTLET

LARGEST HAM OUTLET IN THE WORLD

NOW
9

STORE BUYING POWER

ICOM IC-765



100W, 100kHz to 30MHz
HF ALL BAND TRANSCEIVER
Dual VFO system

SALE! CALL FOR PRICE

ICOM IC-781



THE ULTIMATE
150 W, ALL BAND
HF TRANSCEIVER

GREAT PRICE!

ICOM IC-900
MULTI-BAND
MOBILE



YOU CAN OPERATE SIX BANDS
WITH ONE CONTROLLER!
2 MTR 25/45W, 440 MHz 10 MTR, 6 MTR,
220 MHz & 1.2 GHz 10 MEMORIES

**ARE YOU READY FOR
1.2 GHz OPERATION?**

ICOM A Models 25W,
H Models 100 W

IC-275A/275H, 138-174 MHz
IC-375A **SALE \$799⁹⁵**
IC-475A/475H, 430-450 MHz



LOW PRICE!

BULLETIN **Ham Radio Outlet** has
joined the
**HAM RADIO OUTLET
NATIONWIDE TEAM**



NOW LOCATED IN
SALEM, NH
WOODBRIDGE, VA

**THIS GIVES YOU EVEN
BETTER RESPONSE WITH
LOW-LOW OUTLET PRICES
& RAPID DELIVERIES
COAST TO COAST.**

ICOM HAND-HELD
VHF/UHF



IC-02AT IC-2AT 2MTR
IC-3AT 220 MHz
IC-04AT IC-4AT 440 MHz

ICOM IC-735



100 W, 100 KHz-30 MHz
Dual VFO Receiver

CALL FOR LOW, LOW PRICE

ICOM IC-725



100W, 30kHz to 33MHz
HF ALL BAND TRANSCEIVER

GREAT PRICE



All Major Brands in Stock Now!

FREE SHIPMENT
Most items over \$100
UPS surface

<p>Bob Ferrero W6RJ President/Owner</p> <p>Jim Rafferty N6RJ VP-National Sales Manager</p>	<p>ANAHEIM, CA 92801 2620 W. La Palma (714) 761-3033, (213) 860-2040 Between Disneyland & Knotts Berry Farm</p> <p>ATLANTA, GA 30340 6071 Buford Hwy. (404) 263-0700 Larry, Mgr. WD4AGW Doraville, 1 mi. north of I-285</p>	<p>BURLINGAME, CA 94010 999 Howard Ave. (415) 342-5757 George, Mgr. WB6DSV 5 miles south on 101 from SFO</p> <p>OAKLAND, CA 94606 2210 Livingston St. (415) 534-5757 Rich, Mgr. WA9WYB IS-880 at 23rd Ave. Ramp</p>	<p>PHOENIX, AZ 85015 1702 W. Camelback Rd. (602) 242-3515 Bob K7RDH, Gary WB7SLY, Mgr. East of Hwy. 17</p> <p>SALEM, NH 03079 224 N. Broadway (603) 898-3750 1-800-444-0047 Curtis, Mgr. WB4KZL 28 miles north of Boston exit 1 I-93</p>	<p>SAN DIEGO, CA 92123 5375 Kearny Villa Rd. (619) 560-4900 Tom, Mgr. KM6K Hwy. 163 & Claremont Mesa Blvd.</p> <p>WOODBRIDGE, VA 22191 14803 Build America Drive (703) 643-1063 1-800-444-4799 John, Mgr. WB4GJZ Exit 54, I-95 South to US RT 1</p>	<p>STORE HOURS 10 AM-5:30 PM CLOSED SUNDAYS</p> <p>VAN NUYS, CA 91411 6265 Sepulveda Blvd. (818) 988-2212 Al, Mgr. K6YRA San Diego Fwy. at Victory Blvd.</p>
--	---	---	--	---	---

Call any of our 800 numbers coast to coast from most parts of the country.

CALL TOLL FREE
IN CALIFORNIA CALL STORE NEAREST YOU

MID-WEST/WEST ANAHEIM, 9 to 5:30 PST **1-800-854-6046**

SOUTHEAST ATLANTA, 9 to 5:30 EST **1-800-444-7927**

MID-ATLANTIC WOODBRIDGE, 9 to 5:30 EST **1-800-444-4799**

NEW ENGLAND SALEM, 9 to 5:30 EST **1-800-444-0047**



Toll free including Hawaii. Phone Hrs: 7:00 am to 5:30 p.m. Pacific Time, California, Arizona and Georgia customers call or visit nearest store. California, Arizona, Georgia and Virginia residents please add sales tax. Prices, specifications, descriptions subject to change without notice.

High-density packaging, printed circuits, and micro-miniaturization are things we take for granted as modern technology. "Think small" is not a new idea, as we can see when we look back on what was being built in 1925.

Unique Miniatures

BY ERIC STOFER*

I queried the author as to whether his father ever became a licensed amateur, and the reply was no. He said that his father maintained his passion for radio and electronics throughout his life and that he was also an avid gardener. —K2EEK

Housed in a thimble, the radio my father built in 1925 may well have been the world's smallest receiver at the time, had he not then built one half its size before the year ended. Unique then.

Reg Stofer built several miniature radios that year. One was a novelty item on the edge of a lady's fan, another inside a peanut shell.

Radio was in its infancy in 1925. Everyone had become enthusiastic about the new phenomenon, and no one more than my father. He had been keenly interested in "wireless" as a young railway employee in England long before emigrating to Canada in 1912.

*712 Oliver St., Victoria B.C., V8S 4W4
Canada

One day while working for the *Times* of Victoria, B.C., Reg spotted a picture in an Australian newspaper that intrigued him. It depicted a tiny radio built by a man from down under named Jack Duffy. The caption beneath the picture claimed Duffy's radio to be the first thimble radio in the world—and the smallest.

"But it isn't even inside the thimble," my father said. Then, eyeing the tiny silver thimble on my mother's finger, he added, "I'll bet I could build one completely inside yours."

"Not this one you won't, Marconi!" mother cried. "It's an heirloom."

Then everybody laughed and we kidded poor old Dad something awful.

Mom softened her attitude a little, though, and said, "Well, Dad, if you think you can, go ahead for heaven's sake! Buy yourself a thimble and do it!" She'd known how interested he was in radio before they left for Canada. He hadn't let up in this new country. He was always fiddling with wires and stuff at her kitchen table.

My father drove my mother to distraction at times, I know, as he sat there winding coil after coil on empty salt and oat-

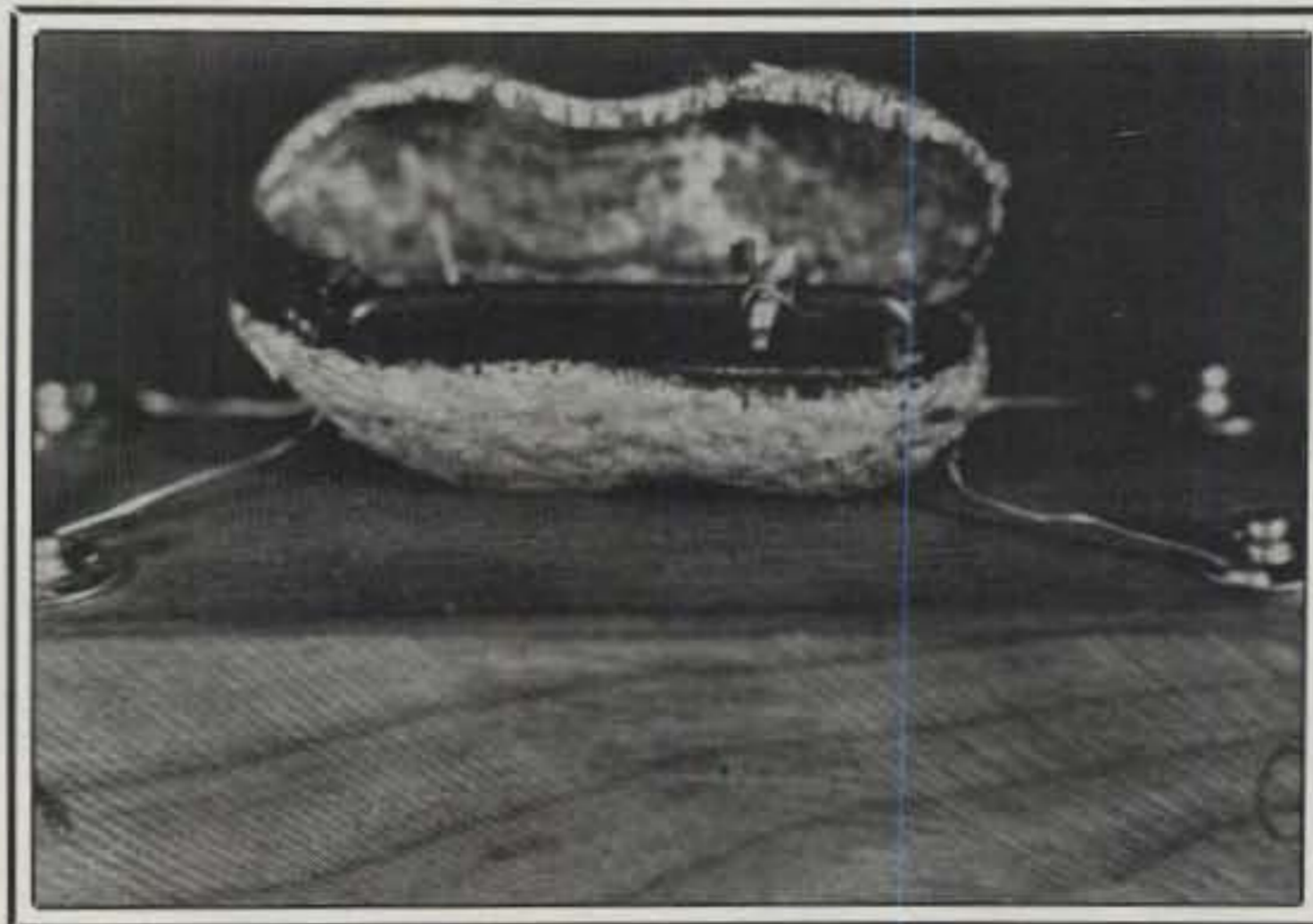
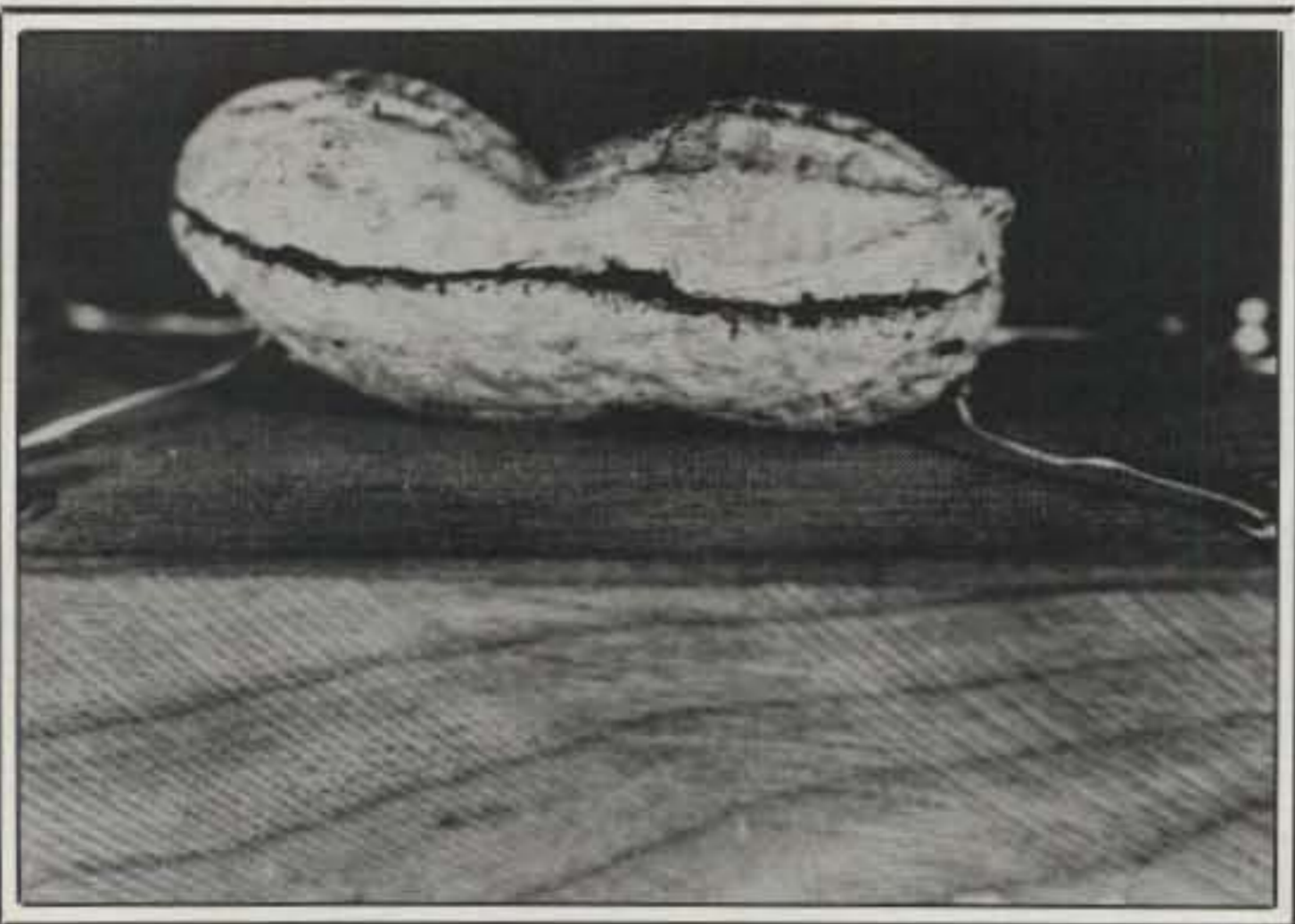


Reg Stofer of Victoria B.C. (Photo by Strickland taken in 1947)

meal boxes, and then soldering the connections.

I recall vividly the smell of hot metal and seared flux wafting through our kitchen as he put together one after another of those old crystal sets everybody was making those days. I often think of the countless times when as kids we sat waiting, wondering when on earth he'd finish one so we could listen to it.

Eventually he would don those awkward-looking earphones (I have them yet),



Radio receiver built in a peanut in 1925 by Reg Stofer of Victoria B.C. and mounted on a wooden block. Snap-fasteners on corners of block were used as connectors for earphones, antenna, and ground wire.



Drive A Winner

The performance of your system depends upon the antenna it drives.

Drive A Winner - Hustler.



Yes, please send information on your line of amateur antennas to:

NAME _____

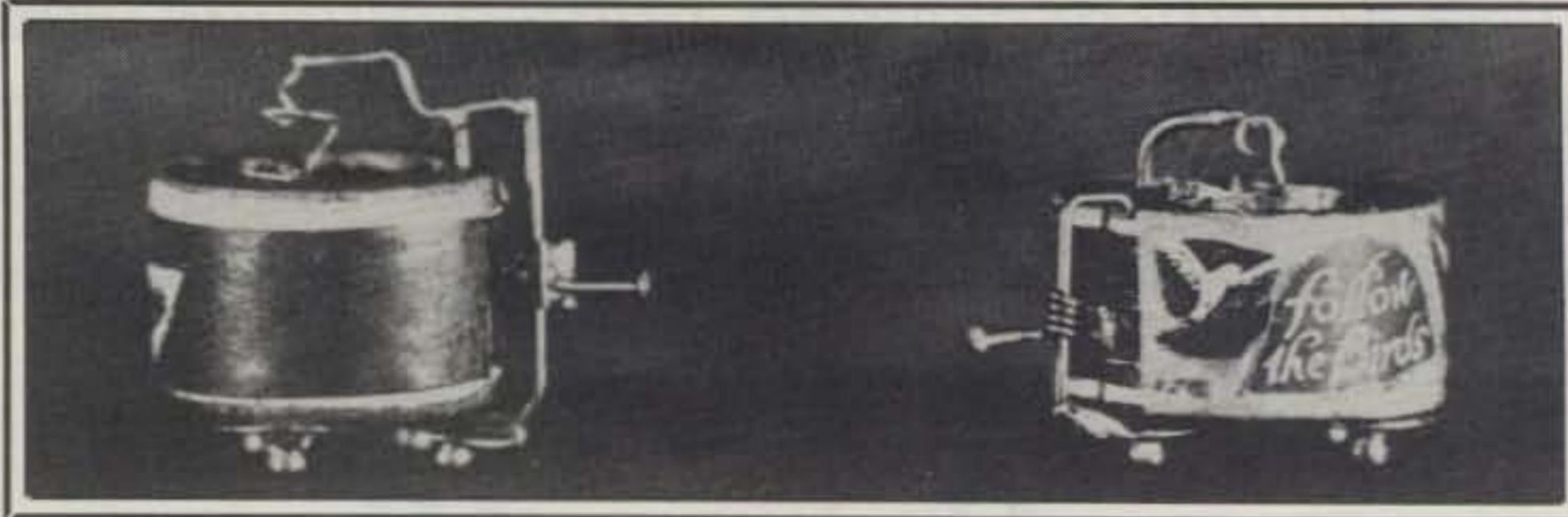
ADDRESS _____

CITY _____ STATE _____ ZIP _____



One Newtronics Place
Mineral Wells, Texas 76067
(817) 325-1386

CIRCLE 158 ON READER SERVICE CARD



Two even smaller radio receivers, each built inside a box in which crystals were sold. Built in 1925 by Reg Stofer.

their adjustable shafts sticking up like horns on either side of his balding head. He'd connect them up and then listen, frowning attentively as he fiddled with the dials.

Then suddenly he'd excitedly wave one hand to "shoosh" us quiet, saying he had picked up some distant station—CJOR in Vancouver, perhaps, or CFRC in Calgary. Sometimes, if he was lucky he would pick up KFRC in distant San Francisco. Yet always, it seemed, whenever he offered one of us an earpiece to listen in, there was nothing—total silence. We'd shake our heads. He'd frown and start fiddling again. Something had moved, or one of us had knocked the ground wire off the kitchen tap.

Radios were really only a hobby with old Dad. They were available in stores in 1925, but he enjoyed making and repairing them. I recall there being no fewer than a dozen radios in our living room at a time: Erlas, Crossleys, Rogers, Vikings, Atwater-Kents. Mantel models to consoles, you name it, we had it.

One monstrosity, some 5 feet long, Dad called his superheterodyne. Mother

dubbed it *H.M.S. Hood* for a British battleship of the day. She swore it gathered more dust, as it hung around so long awaiting repair.

Dad rarely charged more than the cost of parts when he made repairs, so people didn't seem to mind the wait. The price was right.

Lacking expensive testing equipment, which somehow he never seemed to afford, Dad worked by instinct mostly. He enjoyed the challenge.

Succumbing to an ad one day, however, Dad enrolled in The National Radio Institute of America. I can see him still, poring over those meaningless (to me) diagrams in the papers that came each week. He graduated with honors in 1926. Boy was he proud!

Long before that he'd kept his vow to build a thimble radio. He had bought a dozen thimbles and a 5 pound bag of peanuts. His active mind was already conceiving a way to build a set inside a peanut shell. Hearing praises of the then popular "peanut" tube, Dad saw a radio in a peanut shell as a great novelty item to enter in Victoria's first radio exposition that was to open on February 27, 1925.

That pleased us kids. We got to help paw through that 5 pound bag dumped on the kitchen table in search of a perfectly shaped peanut shell. No eating, any of you, until we find one!

By the time we had found the perfect peanut, however, Dad already had another idea. Regular listeners to radio had become known as radio fans. Dad decided to mount a tiny radio on the edge of a lady's Japanese fan, a popular item then. He felt such an item would also make an excellent entry in the novelty class of the forthcoming radio show.

Thus began the building of Dad's miniatures, though problems beset him at once. He had the strong hands of a laborer. Those inch-long thimbles disappeared in his grasp, as time after time he tried to insert a fragment of crystal and the miniature coil he had so painstakingly wound on a half-inch cylinder less than half the diameter of a pencil.

Coil wire salvaged from discarded ear-



Reg Stofer's thimble radio receiver built in 1925. The white knob on top is a map pin used for tuning the coil inside. Snap fasteners on the sides were used as connectors for earphones, antenna, and ground wire.

HOW TO TURN YOUR AMATEUR OPERATION AROUND.

Simply choose an antenna rotator/controller combination from Yaesu.

Each is built tough with rugged, melamine-coated, die-cast casings and heavy-duty components. Permanently lubricated for long life and low maintenance.

Plus, Yaesu antenna rotator/controllers offer something the rest seem to neglect: a high-tech approach to design and tower mounting compatibility.

AZ-EL ROTATORS FOR SPACE APPLICATIONS.

Our G-5400B and heavy-duty G-5600B are the industry standard for satellite and moonbounce work. For maximum turning torque, each mounts separately with the azimuth rotator inside the tower. And if you're using computer control, you'll find our external computer control facility is supported by readily-available software.

Plus for adding elevation control to an existing system, our G-500A elevation rotator is the perfect choice. It's a great way to add satellite capability to your HF system.

ANTENNA ROTATORS FOR YOUR APPLICATION.

Our G-1000SDX, G-800SDX/S, and G-400RC models are popular for heavy to light-duty applications. Each features a 360° "radio compass" control head with illuminated display. Our 1000SDX and 800SDX also offer 450° range, presets, and variable speed control. Disc brakes, smooth and quiet, eliminate the neighbor-disturbing "thunk!" of traditional wedge brakes. And accessories include thrust bearings and lower mast brackets, each in two sizes.

Want more information? Call (800) 999-2070 toll-free.

Or ask your dealer about Yaesu Az-EL rotators and antenna rotators today. They'll turn your operation around.

YAESU USA 17210 Edwards Road, Cerritos, California 90701, (213) 404-2700.
REPAIR SERVICE: (213) 404-4884. **PARTS:** (213) 404-4847.

YAESU

Prices and specifications subject to change without notice.



As space applications become more popular, so does our versatile G-5400B Az-El rotator/controller



Many world-class operators choose the performance of our heavy-duty G-1000SDX rotator/controller



phones was hair thin. Dad's rough fingers often broke it at the critical point of completion. This meant starting all over again. He managed several on his own, but later he reluctantly gave that job to my mother. Her nimble sewing fingers were better suited to the task.

Then came the soldering. In those days a soldering iron was just what the name implied, a whopping great chunk of iron at the end of a rod with a heavy wooden handle. No delicate, fine-point pistol grip in our house. The iron was heated in the cradle of a blow torch and often got too hot, melting both wire and solder.

Connecting an aerial, a ground wire, and earphones posed problems, too. A speaker was out of the question for such a tiny radio then.

Dad solved the problems by using small dress snap-fasteners and brass clips. The male halves were snapped to the females, and the other ends were then clipped to the earphone terminals. Antenna and ground wire were connected in a similar manner.

An adjustable "cat's whisker," a piece of fine brass wire twisted into a small corkscrew, made it possible to select a sensitive spot on the tiny segment of crystal used. Tuning was accomplished by means of a long map pin which was operated push-pull fashion on the coil. Inserted earlier through a tiny hole in the closed end of the thimble, the pin had a tiny foot soldered to its tip, which slid along the coil inside the thimble whenever the pin was moved.

Crystals could be purchased in any radio shop. They came individually packaged in a sturdy little cylindrical cardboard box not much larger than the crys-

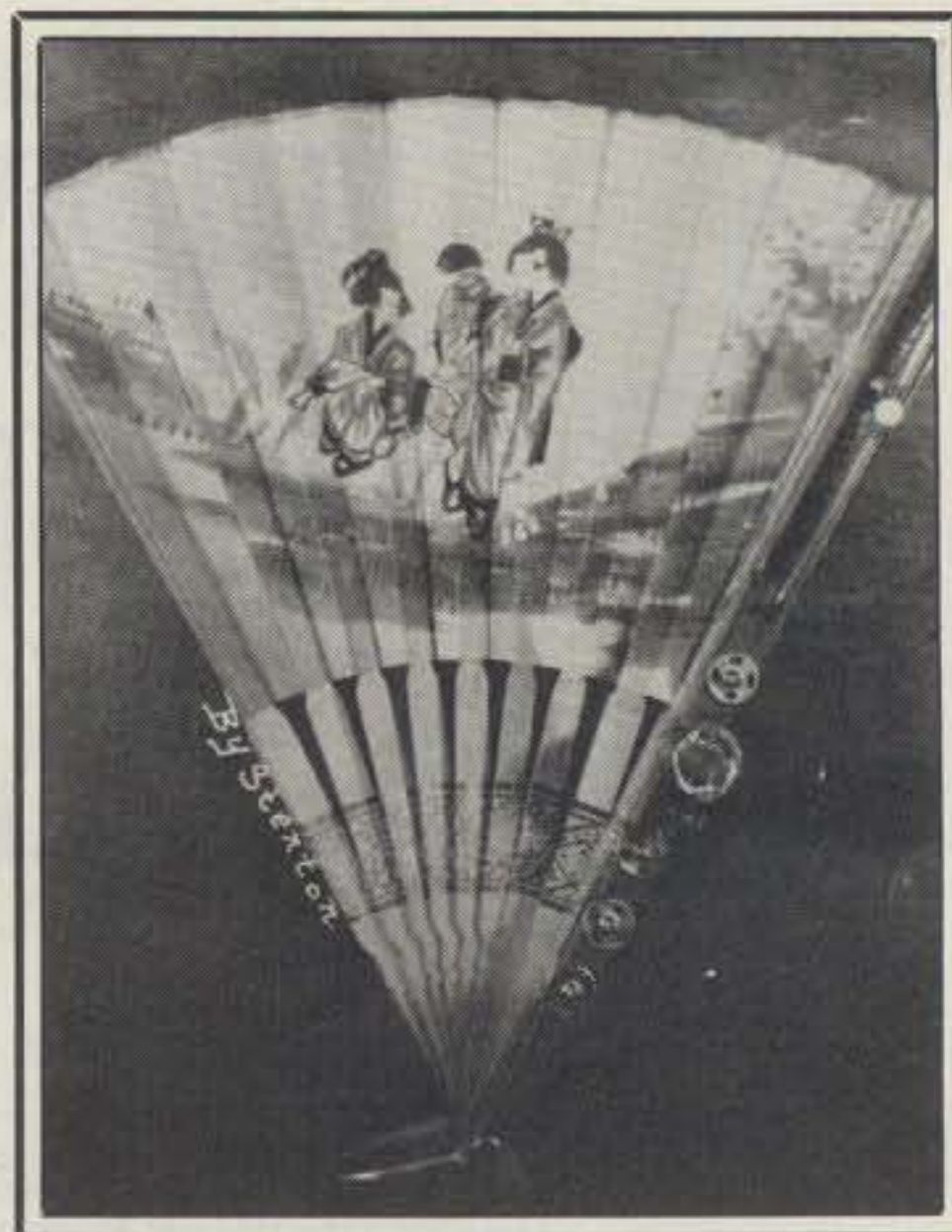
tal itself. These boxes were about the diameter of a dime and less than half an inch deep. Tiny as they were, empty they somehow looked useful.

A bit of a pack rat, Dad could never discard anything that looked useful, so he hit upon the idea of building a crystal radio receiver inside one of these tiny boxes. He wound up building several, in fact. Each one was half the size of his thimble set. He then cut from a magazine several tiny tourist publicity ads which read "Follow The Birds To Victoria B.C.," a slogan in vogue at the time. The ads pictured wheeling seagulls. Dad carefully glued one ad to the side of each of his creations.

The *Victoria Daily Times* recorded that Victoria's first radio exposition was also the first of its kind to be organized by any group of radio fans in Canada. Sponsored by The Victoria Radio Club, the show was officially opened by Mayor Carl Pendray. Most of the leading firms and radio shops had booths. There was a wide range of prizes and exhibits.

Special prizes were offered in an open class for the smallest practical radio receiver. There was also a single prize for a novelty radio. The latter attracted many small entries: radios built in match boxes, birds' nests, pocket-books, and ordinary books. And, of course, there were Reg Stofer's entries.

At the judging there was some speculation that perhaps Reg Stofer's thimble radio didn't actually work. Dad challenged the judges to try it. But since Victoria's only radio station, CFCT, wasn't on the air at that particular time, a special short broadcast of recorded music was arranged. To everyone's surprise and Dad's delight, his tiny thimble radio re-



Reg's novel radio receiver built on a lady's fan in 1926. Note on the right-hand edge of the fan is a coil made of fine wire taken from an old headset and rewound on a cardboard tube the thickness of a pencil. The map pin soldered to the copper foot slides on a bar to provide tuning. Below the coil are the crystal, with "cat's whisker" and snap-fasteners used as connectors for earphones, antenna, and ground.

ceived the broadcast loud and clear.


When the list of prize winners was announced, Dad won first prize for the smallest practical receiver and two prizes in the novelty class.

One day a year later a fellow worker showed Dad a picture on the radio page of *The Chicago Sunday Tribune*, dated October 10, 1926.

"Here's a radio as small as yours, Reg," he said.

My father studied the picture closely for several seconds, then smiled and said, "Well, it should be. It is mine. It's one of several I sent to the Radio World's Fair in the States three weeks ago."

The caption beneath the picture read: "The radio set which Miss Betty Ward is seen holding is said to be the world's smallest receiver. It is built in a thimble and the little tags hanging down show where to attach the wires. In her other hand is a radio set built in the form of a peanut. Both sets will be displayed at the radio show which opens at the Coliseum tomorrow."

No wonder my father smiled that day. He'd also received a certificate from G. Clayton Irwin, Jr., General Manager of the Radio Manufacturer's Association of New York, which read: "A Special Award For Merit in Design and Construction Of A Miniature Receiving Set Entered At The Radio World's Fair of 1926, to Reginald G. Stofer of Victoria B.C., Canada." 

NEMAL ELECTRONICS

- * Complete Cable Assembly facilities MIL-STD-45208
- * Commercial Accounts welcome - Quantity pricing * Same day shipping most orders
- * Factory authorized distributor for Alpha, Amphenol, Belden, Kings, Times Fiber

Call NEMAL for computer cable, CATV cable, Flat cable, semi-rigid cable, telephone cable, crimping tools, D-sub connectors, heat shrink, cable ties, high voltage connectors.

HARDLINE 50 OHM

FXA12 1/2" Aluminum Black Jacket.....	.89/ft
FLC12 1/2" Cablewave corr. copper blk jkt.....	1.69/ft
FLC78 7/8" Cablewave corr. copper blk jkt.....	4.35/ft
NM12CC N conn 1/2" corr. copper m/f.....	25.00
NM78CC N conn 7/8" corr. copper m/f.....	54.00

COAXIAL CABLES (per ft)

1180 BELDEN 9913 very low loss.....	.55
1102 RG8/U 95% shield low loss foam 11ga.....	.36
1110 RG8X 95% shield (mini 8).....	.19
1130 RG213/U 95% shield mil spec NCV jkt.....	.39
1140 RG214/U dbl silver shld mil spec.....	1.85
1705 RG142B/U dbl silver shld, teflon ins.....	1.50
1310 RG217/U 50 ohm 5000 watt dbl shld.....	1.05
1450 RG174/U 50 ohm .100" od mil spec.....	.14

ROTOR CABLE-8 CONDUCTOR

8C1822 2-18ga and 6-22ga.....	.24/ft
8C1620 2-16ga and 6-20ga.....	.39/ft

CONNECTORS-MADE IN USA

NE720 Type N plug for Belden 9913.....	\$3.95
NE723 Type N Jack for Belden 9913.....	4.95
PL259AM Amphenol PL259.....	.89
PL259TS PL259 teflon ins/silver plated.....	1.59
PL258AM Amphenol female-female (barrel).....	1.65
UG175/UG176 reducer for RG58/59 (specify).....	.22
UG21DS N plug for RG8,213,214 Silver.....	3.35
UG83B N jack to PL259 adapter, teflon.....	6.50
UG146A SO239 to N plug adapter, teflon.....	6.50
UG255 SO239 to BNC plug adapter, Amphenol.....	3.55
SO239AM UHF chassis mt receptacle, Amphenol.....	.89
UG175S/UG176S reducer (silver) specify.....	.45
UG88C BNC plug RG58,223,142.....	1.45

GROUND STRAP-GROUND WIRE

GS38 3/8" tinned copper braid.....	.35/ft
GS12 1/2" tinned copper braid.....	.50/ft
HW06 6ga insulated stranded wire.....	.35/ft
AW14 14ga stranded Antenna wire CCS.....	.14/ft

* Prices do not include shipping. Visa/Mastercard \$30 min., COD add \$3 (min. ship. charge \$3)
Call or write for complete price list. NEMAL's new 40 page CABLE AND CONNECTOR SELECTION GUIDE is available at no charge with orders of \$50 or more, or at a cost of \$4 with credit against next qualifying order.

NEMAL ELECTRONICS, INC., 12240 NE 14th Ave. N., Miami, FL 33161
(305) 893-3924 Telex 6975377 24 hr. FAX (305) 895-8178

Please send all reader inquiries directly.

HF Equipment Regular SALE
 IC-765 Xcvt/ps/keyer/auto tuner 3149.00 2789
 IC-781 Xcvt/Rcvt/ps/tuner/scope ... 6149.00 Call



IC-761 Xcvt/Rcvt/ps/tuner 2699.00 2369
 HM-36 Scanning hand microphone 47.00
 SP-20 Ext. speaker w/audio filter .. 149.00 139⁹⁵
 FL-101 250 Hz 1st IF CW filter 73.50
 FL-53A 250 Hz 2nd IF CW filter 115.00 109⁹⁵
 FL-102 6 kHz AM filter 59.00
 EX-310 Voice synthesizer..... 59.00



IC-751A 9-band xcvt/1-30 MHz rcvt 1699.00 1469
 PS-35 Internal power supply 219.00 199⁹⁵
 FL-63A 250 Hz CW filter (1st IF).... 59.00
 FL-52A 500 Hz CW filter (2nd IF) ... 115.00 109⁹⁵
 FL-53A 250 Hz CW filter (2nd IF) ... 115.00 109⁹⁵
 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 rcvt/mic 1149.00 989⁹⁵
 PS-55 External power supply 219.00 199⁹⁵
 AT-150 Automatic antenna tuner ... 445.00 369⁹⁵
 FL-32A 500 Hz CW filter 69.00
 EX-243 Electronic keyer unit 64.50
 UT-30 Tone encoder 18.50
 IC-725 Ultra compact HF xcvt/SW rcvt 949.00 849⁹⁵

Other Accessories Regular SALE
 IC-2KL 160-15m solid state amp w/ps 1999.00 1699
 EX-627 HF automatic antenna selector 315.00 279⁹⁵
 PS-15 20A external power supply..... 175.00 159⁹⁵
 PS-30 Systems p/s w/cord, 6-pin plug 349.00 319⁹⁵
 MB Mobile mount, 735/751A/761A... 25.99
 SP-3 External speaker 65.00
 SP-7 Small external speaker 51.99
 CR-64 High stab. ref. xtal for 751A... 79.00
 PP-1 Speaker/patch..... 179.00 164⁹⁵
 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 139⁹⁵
 AT-100 100W 8-band auto. ant. tuner... 445.00 389⁹⁵
 AT-500 500W 9-band auto. ant. tuner ... 589.00 519⁹⁵
 AH-2 8-band tuner w/mount & whip.... 758.00 689⁹⁵
 AH-2A Antenna tuner system, only..... 559.00 499⁹⁵
 GC-5 World clock 91.95 79⁹⁵

ICOM

★ Large Stocks
 ★ Fast Service
 ★ Top Trades
 at AES®

VHF/UHF base multi-modes Regular SALE
 IC-275A 25W 2m FM/SSB/CW w/ps 1299.00 1099
 IC-275H 100W 2m FM/SSB/CW 1399.00 1199
 IC-375A 25W 220 FM/SSB/CW (Close.) 1399.00 799⁹⁵
 IC-475A 25W 440 FM/SSB/CW w/ps 1399.00 1199
 IC-475H 75W 440 FM/SSB/CW..... 1599.00 1369
 IC-575A 25W 6/10m xcvt w/ps 1399.00 1129
 IC-575H 100W 6/10m xcvt..... 1699.00 1499

VHF/UHF/1.2 GHz Mobiles Regular SALE
 IC-47A 25w 440 FM/TTP mic (Closeout) 549.00 369⁹⁵
 PS-45 Compact 8A power supply ... 145.00 134⁹⁵
 UT-16/EX-388 Voice synthesizer ... 34.99
 SP-10 Slim-line external speaker ... 35.99

IC-28A 25W 2m FM, TTP mic (Special) 469.00 379⁹⁵
 IC-28H 45W 2m FM, TTP mic 499.00 439⁹⁵
 IC-38A 25W 220 FM, TTP mic 489.00 349⁹⁵
 IC-48A 25W 440-450 FM, TTP mic 509.00 449⁹⁵
 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-228A 25W 2m FM/TTP mic (Special) 509.00 429⁹⁵
 IC-228H 45W 2m FM/TTP scan mic... 539.00 479⁹⁵
 IC-448A 25W 440 FM/TTP mic 509.00 449⁹⁵
 UT-40 Pocket beep function 45.00
 IC-900A Transceiver controller..... 639.00 569⁹⁵

★ Package Special ...

IC-900A Transceiver controller with UX-29H
 2m/45W and UX-39A 220/25W band units.
\$969⁹⁵

UX-19A 10m 10W band unit 299.00 269⁹⁵
 UX-29A 2m 25W band unit..... 299.00 269⁹⁵
 UX-29H 2m 45W band unit..... 349.00 319⁹⁵
 UX-39A 220MHz 25W band unit.... 349.00 299⁹⁵
 UX-49A 440MHz 25W band unit.... 349.00 319⁹⁵
 UX-59A 6m 10W unit 349.00 319⁹⁵
 UX-129A 1.2GHz 10W band unit ... 549.00 499⁹⁵

IC-1200A 10W 1.2GHz FM mobile..... 699.00 599⁹⁵
 IC-2500A 440/1200MHz FM mobile 999.00 899⁹⁵
 IC-3210A 25w 2m/440 FM/TTP 739.00 649⁹⁵
 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
 RP-1210 1.2GHz 10W 99 ch FM xcvt 1529.00 1349
 RP-2210 220MHz 25W repeater 1649.00 1399

Due to the size of the ICOM product line, some accessory items are not listed. If you have a question, please call. All prices shown are subject to change without notice.

Top Trades ! • We'll take your Clean Late Model gear in trade towards New ICOM Equipment.
 Write or Call for our Quote Today!
AES® ★ Over 30 Years in Amateur Radio



Hand-helds Regular SALE
 IC-2A 2-meters..... 289.00 259⁹⁵
 IC-2AT with TTP..... 319.00 279⁹⁵
 IC-02AT/High Power 409.00 349⁹⁵
 IC-04AT for 440 MHz 449.00 389⁹⁵
 IC-u2AT for 2m w/TTP 329.00 279⁹⁵
 IC-u4AT 440 MHz, TTP 369.00 289⁹⁵

FREE Battery! . . .

BP-23 600ma/8.4V • No Charge with purchase of IC-u2AT or IC-u4AT

IC-2GAT for 2m, TTP 429.00 379⁹⁵
 IC-4GAT 440MHz, TTP 449.00 399⁹⁵
 IC-32AT 2m/440MHz 629.00 559⁹⁵

Aircraft band handhelds Regular SALE
 IC-12AT 1W 1.2GHz FM HT/batt/cgr/TTP 473.00 369⁹⁵
 IC-12GAT 1W 1.2GHz HT/batt/cgr/TTP 529.00 469⁹⁵
 A-2 5W PEP synth. aircraft HT..... 525.00 479⁹⁵
 A-20 Synth. aircraft HT w/VOR..... 625.00 569⁹⁵

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
 CP-1 Cig. lighter plug/cord for BP3 or Dlx 13.65
 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..... 35.95
 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
 SS-32SMP Commspec 32-tone encoder 27.95

For other HT Accessories not listed please CALL

Receivers Regular SALE
 R-71A 100kHz to 30MHz receiver..... \$999.00 869⁹⁵
 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 159⁹⁵
 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 rcvt 1199.00 1029
 RC-12 Infrared remote controller.... 70.99
 EX-310 Voice synthesizer 59.00
 TV-R7000 ATV unit..... 139.00 129⁹⁵
 AH-7000 Radiating antenna 99.00
 R-9000 100kHz-2GHz all-mode rcvt... 5459.00 4899

HOURS • Mon. thru Fri. 9-5:30; Sat. 9-3
WATS lines are for Quotes & Ordering only, use Regular line for other Info & Service dept.

Order Toll Free: 1-800-558-0411 In Wisconsin (outside Milwaukee Metro Area) 1-800-242-5195

AMATEUR ELECTRONIC SUPPLY® Inc.

4828 W. Fond du Lac Avenue; Milwaukee, WI 53216 • Phone (414) 442-4200

AES® BRANCH STORES

Associate Store

WICKLIFFE, Ohio 44092
 28940 Euclid Avenue
 Phone (216) 585-7388
 Ohio WATS 1-800-362-0290
 Outside Ohio 1-800-321-3594

ORLANDO, Fla. 32803
 621 Commonwealth Ave.
 Phone (407) 894-3238
 Fla. WATS 1-800-432-9424
 Outside Florida 1-800-327-1917

CLEARWATER, Fla. 34625
 1898 Drew Street
 Phone (813) 461-4267
 No In-State WATS
 No Nationwide WATS

LAS VEGAS, Nev. 89106
 1072 N. Rancho Drive
 Phone (702) 647-3114
 No In-State WATS
 Outside Nevada 1-800-634-6227

CHICAGO, Illinois 60630
 ERICKSON COMMUNICATIONS
 5456 N. Milwaukee Avenue
 Phone (312) 631-5181
 Outside Illinois 1-800-621-5802

W4FA is having a bit of fun with acronyms. But the "DEZI" antenna he describes is really a quite simple, one-band, gain antenna. It's based on a classic 1930s antenna design.

The DEZI Dipole Antenna For 10 Meters

BY JOHN J. SCHULTZ*, W4FA/J40DX

Almost any book on HF antennas mentions the extended double-Zepp antenna in a cursory fashion. However, few books go into any detail on the practical use and installation of such an antenna. The double-Zepp dipole, as shown in fig. 1, was patented in Europe in 1931. It's an extended form of dipole antenna where each dipole leg measures 0.64λ . The radiation produced by the antenna is shown in fig. 2. Radiation is bidirectional and at right angles to the line of the antenna. It has a gain of about 3 dB over a regular $\frac{1}{2}\lambda$ long dipole. The "magic" in the 0.64λ dimension for the double-Zepp is that it is the maximum leg length for a dipole-type antenna that will still produce the radiation pattern shown in fig. 2. If the leg lengths are made longer, the main lobe shown in fig. 2 will rapidly disappear and the four minor lobes shown will rapidly gain in intensity such that a cloverleaf radiation pattern develops. In fact, a dipole with leg lengths of 0.75λ each is commonly used when one deliberately wishes to develop a cloverleaf radiation pattern.

The DEZI term (double extended Zepp inverted) is just my playful designation for the antenna form of fig. 1 erected in the form of an inverted-Vee dipole such that only a single, elevated center support is required. Some special considerations are involved when the antenna is used in this form, and these details are covered as well as various practical considerations involved in erecting the antenna. A DEZI is described for 10 meters, but of course the dimensions for the antenna may be linearly scaled up for any lower frequency HF band.

The dimensions for the 10 meter DEZI are shown in fig. 3. The dimensions deserve a bit of explanation. The 20'6" dipole leg dimensions would normally be

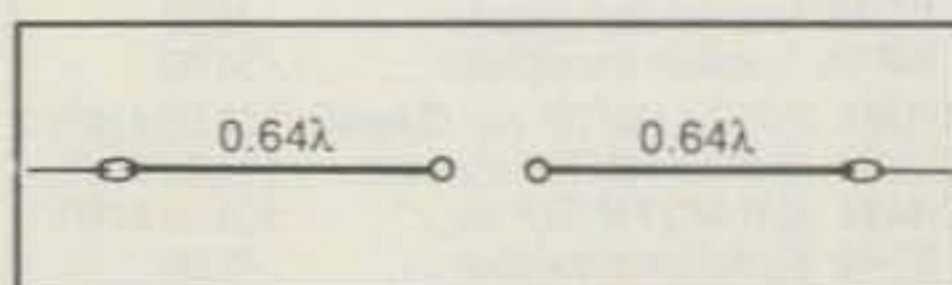
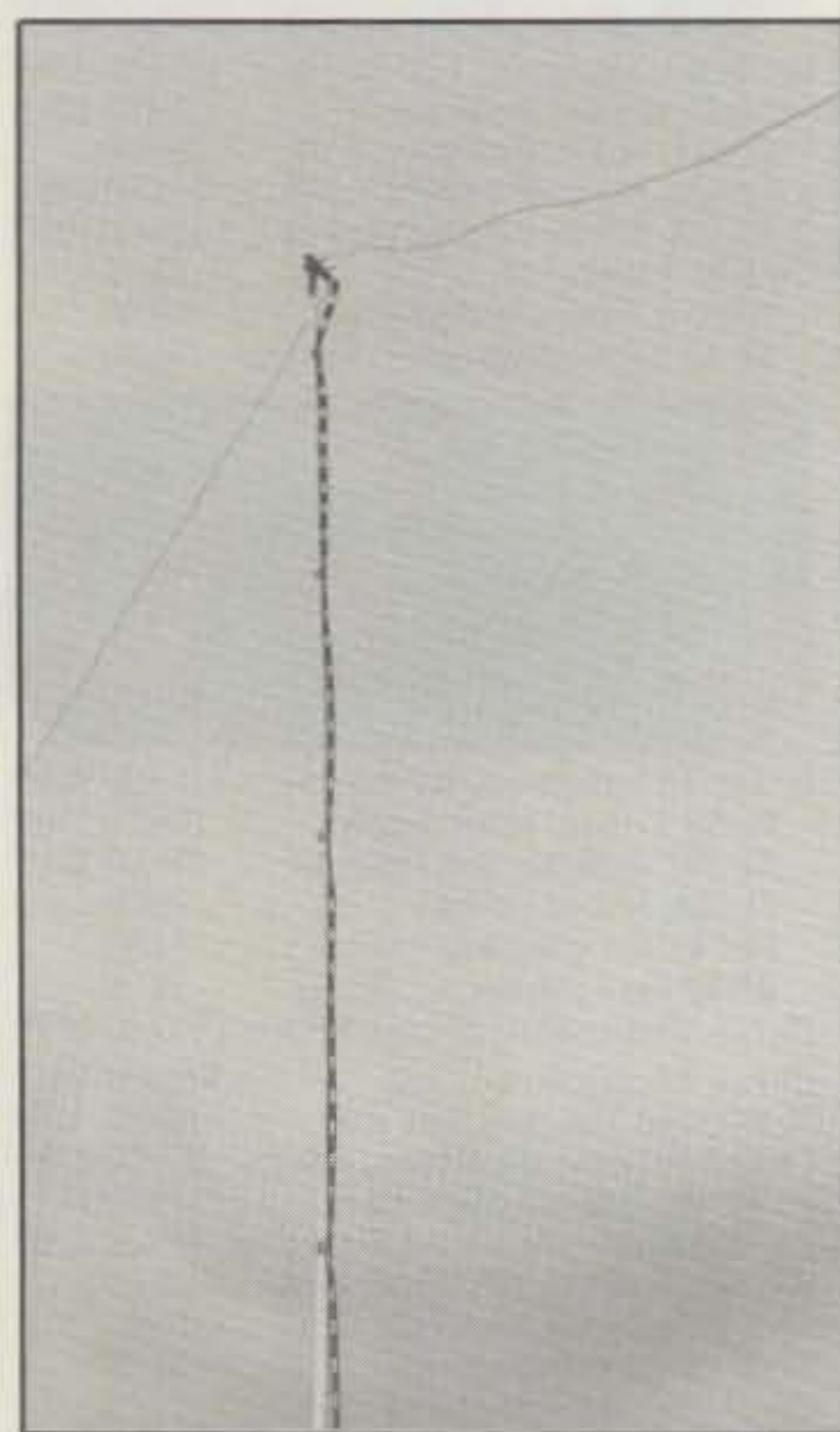


Fig. 1— The extended double Zepp is just a dipole form of antenna but with leg lengths of 0.64λ instead of 0.25λ . As with a $\frac{1}{2}\lambda$ dipole, radiation is at right angles to the wire. However, the feedpoint presents a complex impedance and a coaxial line cannot be directly connected to it.

about 22 feet (28.5 MHz) calculated on the basis of each leg length being 0.64λ in free space. However, erecting the antenna in inverted-Vee fashion increases the capacitive effect between the legs and slightly lowers the resonant frequency of the antenna. The lowered resonant frequency is not quite so important. What is important is that the effective electrical length of each antenna leg can be seen to increase and the "magic" 0.64λ length might be exceeded. So, as a safety factor the leg lengths were empirically shortened to 20'6". The "missing" 1'6" is made up in the 450 ohm transmission line section. The slightly shortened leg length ensures that the radiation pattern of fig. 2 is retained while there is no significant reduction in the gain provided by the antenna.

The 24 foot length of 450 ohm transmission line is physically just that. Electrically, however, it really consists of three sections. One section is the "missing" 1'6" just described. Another section, 16'5", is a $\frac{1}{2}\lambda$ transformer that simply moves the impedance point after the 1'6" extension down the line by $\frac{1}{2}\lambda$. Finally a 6 foot section represents a matching length that, by pruning, allows you to precisely match the antenna to a 50 ohm coaxial cable, which may of course be any desired length.



The DEZI on top of a fiberglass support mast. The 450 ohm ladder line can be seen running down the mast. It's tied to the mast every few feet with plastic cable ties.

The 16'5" length was introduced to simplify construction of the antenna. Because of it, the 1:1 balun or choke shown in fig. 3 can be located at any convenient point. Also, because of this, the junction of the 450 line with the antenna legs can be made in an extremely secure manner when harsh environmental conditions are present, since you don't have to worry about securing a balun or a matching device at that point. The 450 line does operate at a moderate SWR, but the loss in-

*c/o CQ magazine

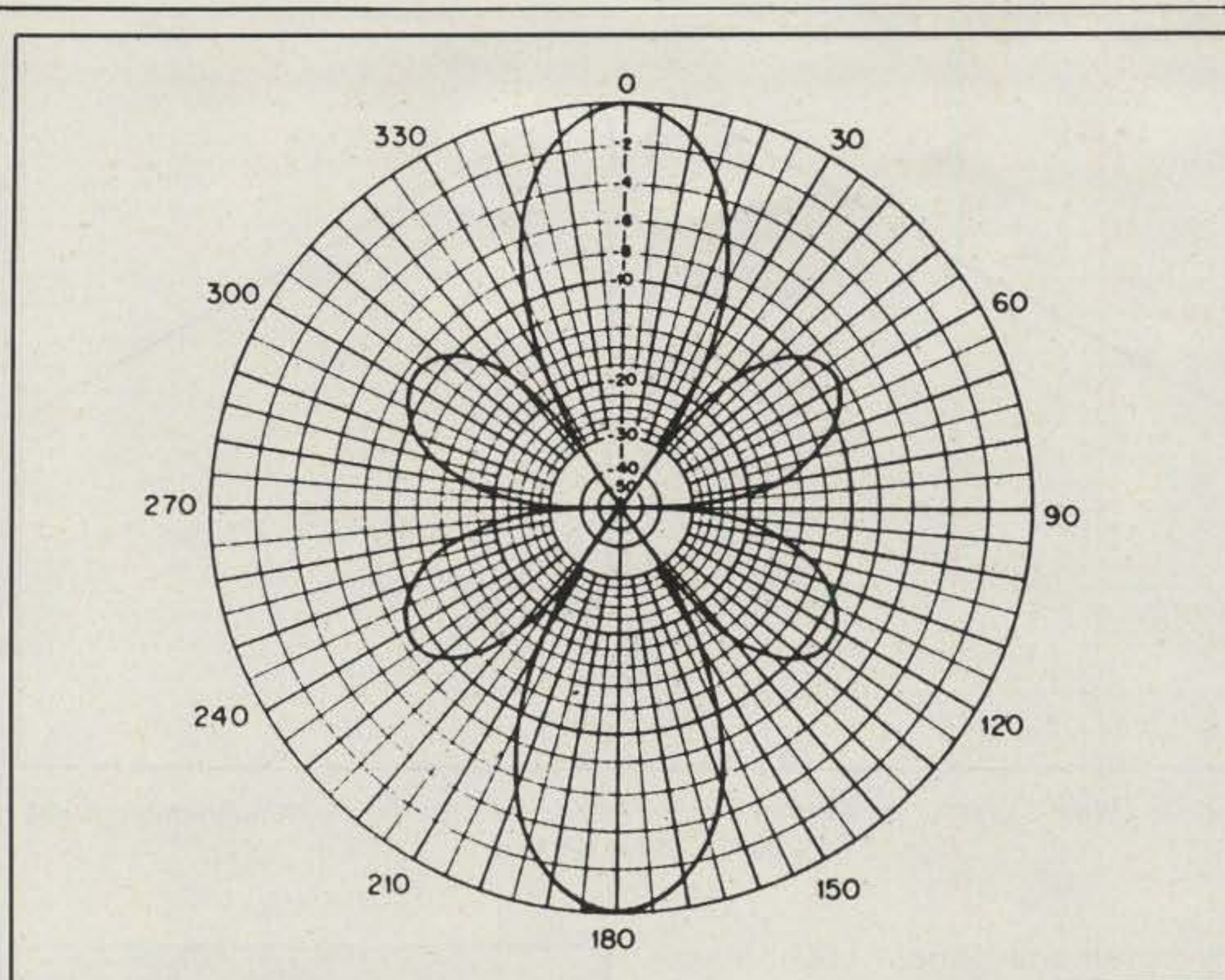


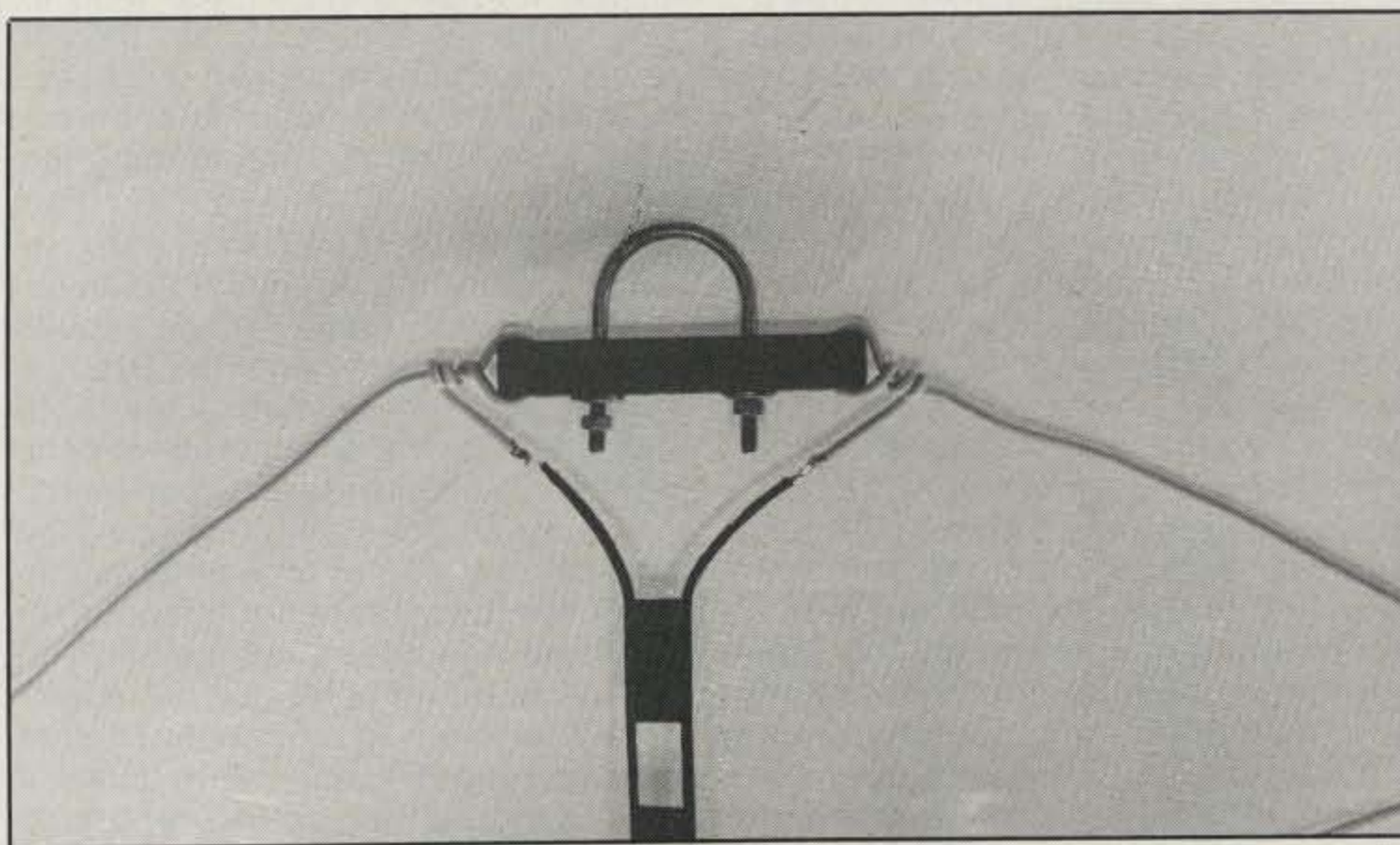
Fig. 2— Ideal radiation pattern for an extended double Zepp. The main lobes provide about 3 dB gain over a dipole. The minor lobes fill in the overall radiation pattern a bit in other directions.

involved is totally insignificant because of the low loss inherent in 450 ohm line at HF frequencies. Depending upon specific installation requirements, the 16'5" length may be eliminated or any multiple 16'5" length may be used.

If you can extend the 450 ohm line length to such a degree that it reaches to an "in shack" antenna tuner designed for a balanced antenna transmission line, the 10 meter DEZI will function quite ef-

fectively down to 40 meters. It will, of course, have no gain on any band below 15 meters, but it will be as effective as a $\frac{1}{2}\lambda$ dipole on 20 meters, and it will be only a few dB down from a full-size dipole on 40 meters. The radiation pattern on all of the lower frequency bands remains expandingly broadside to the line of the antenna, reaching an almost omnidirectional pattern on 40 meters.

The 1:1 balun indicated in fig. 3 can be



Center support for the antenna centered around a $\frac{3}{4}$ inch square by 4 inch long piece of scrap plastic. Holes are drilled in the plastic for a "U" bolt, which fastens to the support mast, and for the #14 antenna wire which forms the legs of the antenna.



FACTORY AUTHORIZED DEALER
PLEASE CALL OR WRITE FOR THE
LATEST AND GREATEST FROM ICOM

ICOM

- IC-725 HF Xcvr./Gen. Cov. Rcvr. \$819.00
- IC-735 HF Xcvr./Gen. Cov. Rcvr. 979.00
- AH-2A HF Automatic Antenna Tuner 479.00
- AT-150 HF Automatic Antenna Tuner 369.00
- IC-PS55 AC Power Supply 192.72
- IC-765 HF Xcvr./Gen. Cov. Rcvr. 2689.00
- IC-SM8 Desk Microphone 89.00
- IC-R7000 General Coverage Receiver 1019.00
- AH-7000 Omnidirectional Ant. For IC-R7000... 99.00
- TV-R7000 TV/FM Rcv. Adapt. For IC-R7000... 139.00
- IC-28A 2-Meter, FM, 25 Watt Xcvr. 399.00
- IC-28H 2-Meter, FM, 45 Watt Xcvr. 424.00
- IC-228A 2-Meter, FM, 25 Watt Xcvr. 434.00
- IC-228H 2-Meter, FM, 45 Watt Xcvr. 459.00
- IC-3210A 2-Mtr./440-MHz, FM, 25 Watt Xcvr... 629.00
- IC-2AT 2-Mtr., FM, Handheld With T-T.... 269.50
- IC-02AT/HP 2-Mtr., FM, Handheld With T-T ... 339.50
- IC-u2AT 2-Mtr., FM, Handheld With T-T.... 279.50
- IC-2GAT 2-Mtr., FM, Handheld With T-T.... 364.50
- IC-32AT 2-Mtr./440-MHz, FM, Handheld W/T-T ... 534.50
- IC-BP3 8.4 VDC, 250 mA., Ni-Cad Batt. Pack... 39.50
- IC-BP4 Battery Case 16.00
- IC-BP5 10.8 VDC, 425 mA., Ni-Cad Batt. Pack... 65.00
- IC-BP7 13.2 VDC, 425 mA., Ni-Cad Batt. Pack... 79.00
- IC-BP8 8.4 VDC, 800 mA., Ni-Cad Batt. Pack... 79.00
- IC-BP20 Battery Case 16.00
- IC-BP21 7.2 VDC, 120 mA., Ni-Cad Batt. Pack... 35.99
- IC-BP22 8.4 VDC, 270 mA., Ni-Cad Batt. Pack... 39.50
- IC-BP23 8.4 VDC, 600 mA., Ni-Cad Batt. Pack... 49.00
- IC-BP24 10.8 VDC, 600 mA., Ni-Cad Batt. Pack... 51.50
- BC-16U AC Wall Charger For IC-BP7, 8, 23, 24 ... 21.25
- BC-25U AC Wall Charger For IC-BP3, 21, 22 ... 16.99
- BC-35 Drop-In Rapid Charger; IC-BP2, 5, 7, 8 ... 79.00
- BC-50 Drop-In Rapid Charger; IC-BP21, 22, 23, 24 ... 79.00
- IC-CP1 Mobile Charging Cord 13.65
- IC-DC1 DC Converter For IC-2AT, 3AT, 4AT.... 24.50
- IC-DC25 DC Converter For IC-u2AT 24.50
- IC-HM46 Speaker/Microphone 31.99
- HS-10 Headset For Handhelds 24.50
- HS-10SA VOX Unit For HS-10 24.50
- HS-10SB PTT Unit For HS-10 24.50

CUSHCRAFT

- A3 14, 21, 28-MHz, 3-Element Beam \$274.00
- AP8 3.5, 7, 10, 14, 18, 21, 24, 28-MHz Vertical... 162.00
- R5 14, 18, 21, 24, 28-MHz Vertical 234.00
- ARX-2B 2-Meter, Ringo Ranger II Vertical... 42.00
- ARX-450B 450-MHz, Ringo Ranger II Vertical... 42.00
- 124WB 144 to 148-MHz, 4-Element Beam ... 42.00
- 215WB 144 to 148-MHz, 15-Element Beam... 90.00
- A147-11 146 to 148-MHz, 11-Element Beam... 52.00
- A449-11 440 to 450-MHz, 11-Element Beam... 46.00

ASTRON

- RS-7A 13.8 VDC, 7 Amp Int., 5 Amp Cont. \$49.54
- RS-12A 13.8 VDC, 12 Amp Int., 9 Amp Cont. ... 71.86
- RS-20A 13.8 VDC, 20 Amp Int., 16 Amp Cont. ... 87.98
- RS-35A 13.8 VDC, 35 Amp Int., 25 Amp Cont. ... 142.54
- RS-12M Same As RS-12A, With Meter. 83.02
- RS-20M Same As RS-20A, With Meter. 107.82
- RS-35M Same As RS-35A, With Meter. 161.14
- RM-35M Rack Mount Version Of RS-35M. ... 229.34
- RM-50M Rack Mount Version Of RS-50M. ... 255.38
- VS-20M Same As RS-20M, Adj. Volt/Curr. ... 123.94
- VS-35M Same As RS-35M, Adj. Volt/Curr. ... 172.30
- VS-50M 13.8 VDC, 50A Int., 37A Cont., Adj. ... 238.02

UPS/Insurance Charges Are Additional
MC, VISA, C.O.D. Orders Are Accepted
Prices Subject To Change Without Notice

LaRue Electronics

1112 GRANDVIEW STREET
SCRANTON, PENNSYLVANIA 18509
PHONE (717)343-2124

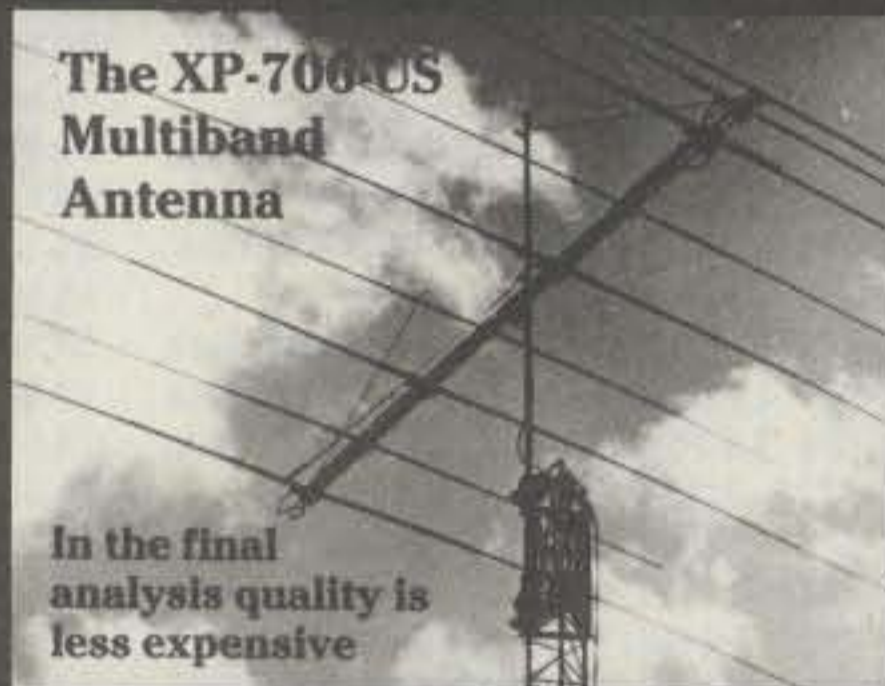
CIRCLE 129 ON READER SERVICE CARD



DJ 2 UT
has developed the world's most
advanced antenna system!

**WITH NOT A SINGLE WATT WASTED
IN LOSSY TRAPS! (There aren't any!)**

(see W1ICP's CQ-Review 4/86 and
N1EJF's 73-Review 4/87) or ask for
your personal copy



**The XP-700 US
Multiband
Antenna**

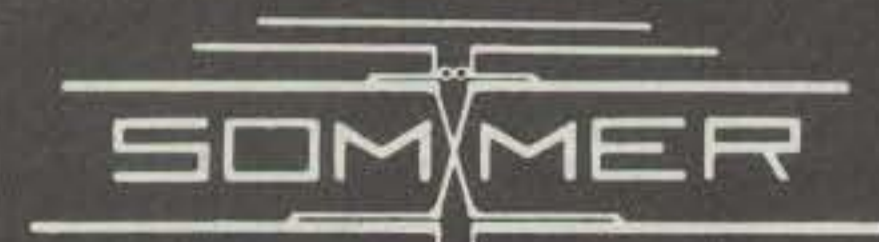
In the final
analysis quality is
less expensive

**10-12-15-17-20-30-40 m
in one antenna!**

- 4-band base kit 10-12-15-20 m
- Extendable to 17, 30 and 40 m
- Monoband performance on 10-12-15-20 m (30 + 40 m equal or better rotary dipole)
- Full half-wave elements on 20 m 1λ on 10/12 m $5/8\lambda$ on 15/17 m
- Air core Teflon-coax-balun
- Double rectangular boom
- All stainless hardware
- Cast aluminum element mounting brackets

Beam Series Available:

- XP 40 8 ft. boom 4-6 bands
- XP 50 14 ft. boom 4-7 bands
- XP 70 20 ft. boom 4-7 bands
- XP 80 26 ft. boom 4-7 bands



Sommer-Antennas

W4/DJ2UT
P.O. Box 847
Cowpens, SC 29330
(803) 463-9514

Please send all reader inquiries directly.

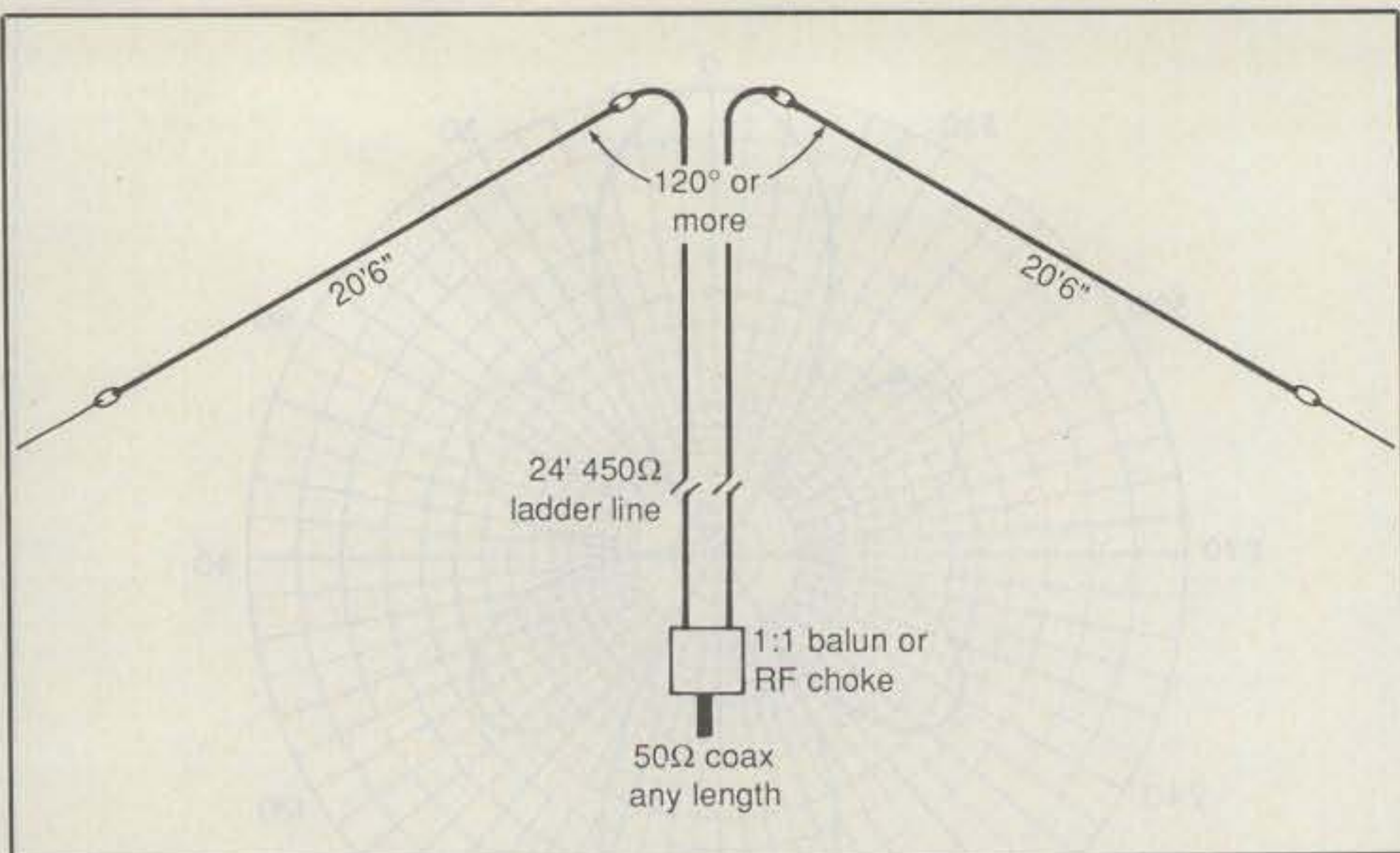


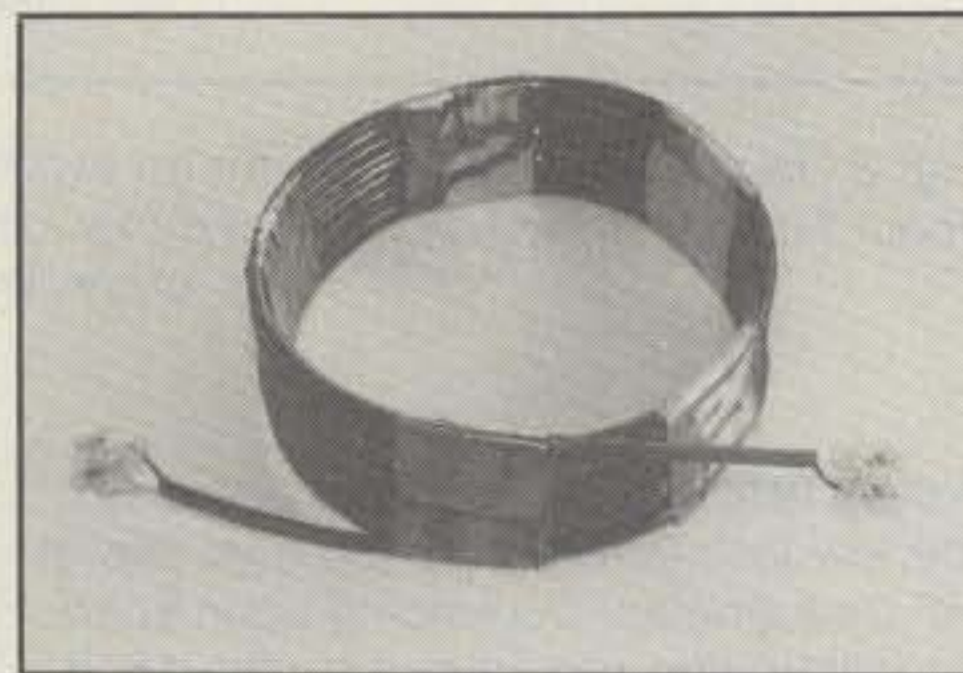
Fig. 3— Dimensions for a 10 meter DEZI. The reasons for the various dimensions are explained in the text.

any conventional form of 1:1 balun (transmission-line type, ferrite-core type, etc.). However, you can also use a simple RF choke which consists of about 10 turns of the coaxial line feeding the antenna formed into a coil having a diameter of about 6 to 7 inches. A photograph shows how such a choke can be formed from coaxial line. There is nothing critical about the dimensions of such a choke, and a bit of variation in the diameter of the choke coil, or the turns being plus or minus a turn or so, will not significantly alter its electrical performance. It's not a pretty-looking item, but it's effective and inexpensive (about \$3.00 worth of cable).

Adjustment of the antenna requires pruning the 6 foot section of the 450 ohm transmission line, which represents the matching length, such that the SWR is as flat as possible across 10 meters. The 6 foot section was deliberately made quite long since something on the order of 4'10" sufficed in actual practice. You could actually cut the matching length to 4'10" and come reasonably close to a good match. However, pruning the 450 ohm line a few inches at a time is really quite easy and will give the best results. One should start pruning the line 3 to 4 inches at a time until you notice that the SWR at the lower end of 10 meters starts to fall. Then you can trim the line 1 to 2 inches at a time to move the SWR minimum to any desired portion of the 10 meter band. I found the antenna to be reasonably broadband in nature. The SWR results I obtained after pruning the antenna for roughly 28.5 MHz were as follows:


Frequency (MHz)	SWR
28.0	1.6:1
28.5	1.2:1
29.0	1.9:1
29.5	2.0:1

The power-handling capability of the



The "ugly" RF choke formed from RG-8X coaxial line. Dimensions are given in the text. The turns were first tied together with filament tape and then coated with epoxy floor paint for stiffness.

antenna can be whatever you wish to make it. The power-handling capability of the 1:1 balun (if used instead of a transmission-line RF choke) and that of the coaxial transmission line are normally the limiting factors.

I used a 10 meter DEZI in a rooftop installation with the high point of the antenna on top of an 18 foot high mast. Results were definitely better with the DEZI (in the two directions favored by the DEZI) than when using a simple, two-element, close-spaced beam at the 10 foot level on the same roof. The slightly more elevated height of the DEZI, as allowed by its simple construction, apparently more than compensated for the additional 2 odd dB of gain the beam theoretically should produce. I hardly would suggest the DEZI as a rock-crusher DX antenna. However, if you can erect a DEZI as high as possible such that its radiation lobes favor the DX directions you desire, I suggest that the DEZI deserves real consideration as a DX antenna until you can get up a beam at the same center height as a DEZI. 

Radio Shack The Technology Store™

HAMS! SHOP THE SHACK® FOR THE BEST VALUES

10-Meter SSB/CW 12VDC Transceiver*



259⁹⁵

Acclaimed
By Hams
Nationwide

The Realistic® HTX-100 gets you into the 10-meter fun! Memory stores 10 favorite frequencies and mike-mounted pushbuttons permit safe and easy frequency selection while you drive. RIT ± 1.5 kHz fine-tuning control. Front-panel switchable 25-watt/5-watt power output. Full 10-meter coverage, USB or CW. #19-1101

*Must have a Ham license to transmit.

Deluxe Magnet-Mount Antenna



37⁹⁵

- Stores in Trunk—Out of Sight Of Thieves and Vandals
- No Damaging Holes to Drill
- Easily Moves From One Vehicle To Another

Real performer! Excellent antenna for use with your 10-meter rig. Super-strong magnet for insta-mounting on roof or rear deck of your auto. With base-loaded, low-loss coil, and 54" steel whip. Prewired 16-foot cable with PL-259 connector. Great for removable sets! #21-960

Cellular "Look-Alike" Antenna

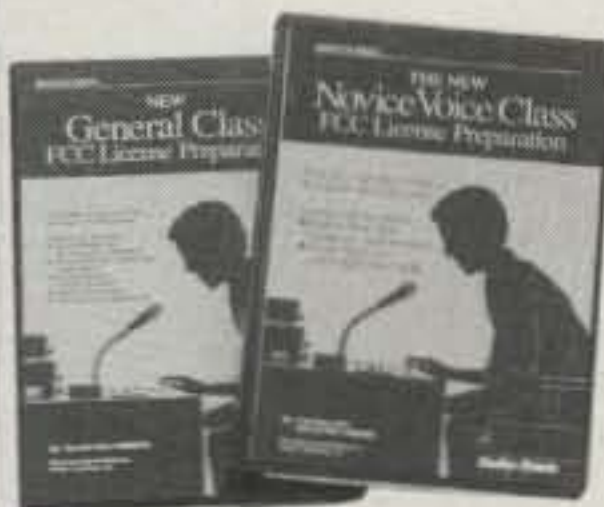
29⁹⁵

- Mounts On Trunk Lid Edge So There Are No Holes to Drill
- Sleek, Black Attractive Design
- Short Length—Excellent for Low-Clearance Applications

The mobile antenna that looks like a cellular telephone antenna! With preassembled 16-foot cable and PL-259 for fast, easy installation. Come in today and see our complete line of communications equipment and accessories. #21-991

Novice/General Exam Study Guides

19⁹⁵ Each



- Complete! Prepared by Gordon West, WB6NOA
- Two Self-Paced Code Cassettes Included
- Sample Test Questions And Answers
- Durable Molded Binders
- FCC Form 610 Included

Novice Class Exam Study Package. #62-2402
General Class Exam Study Package. #62-2404

IMPROVE YOUR STATION WITH THESE ACCESSORIES

Antenna Values



- (1) Antenna Wire. 70-ft., 14-gauge stranded copper wire. #278-1329 4.99
(2) Insulators. Strong, low loss. #278-1333 Pkg. of 2/69¢
(3) Magnet Wire. For "hidden" antennas! #278-1345 4.79

Computer Hookups

For computers, modems and packet-radio controllers.

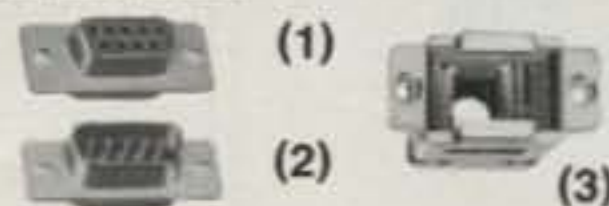
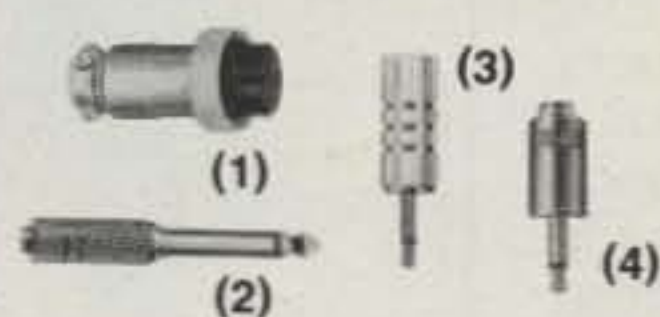


Fig	Description	Pos.	Cat. No.	Each
1	D-Sub Male	9	276-1537	1.49
2	D-Sub Female	9	276-1538	2.49
-	D-Sub Male	25	276-1547	1.99
-	D-Sub Female	25	276-1548	2.99
3	Shielded Hood	9	276-1513	1.49
-	Shielded Hood	25	276-1536	1.99

Audio Connectors



- (1) 8-Pin Mike Plug. #274-025, 2.19
(2) Phone Adapter. 1/8" stereo jack, 1/4" mono plug. #274-348 1.99
(3) H-T Adapter. 1/8" stereo jack, 3/32" mono plug. #274-381 1.99
(4) H-T Mono Adapter. 3/32" jack, 1/8" plug. #274-328 1.79

Extension Speaker



13⁹⁵

Really improves audio from mobiles, HTs and compact rigs. Rated 5 watts, 8 ohms. 10-ft. cord, 1/8" plug. Adjustable metal bracket. #21-549

Connectors, Sealer

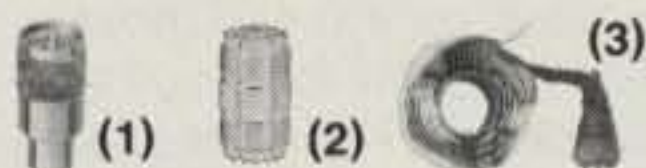


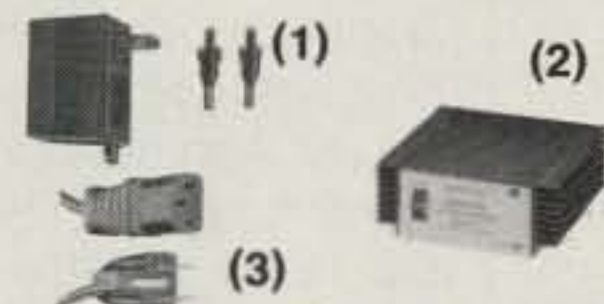
Fig.	Item	Cat. No.	Price
1	PL-259	278-205	2/1.99
-	UG176/U	278-204	2/.99
-	UG175/U	278-206	2/.99
2	PL-258	278-1369	1.69
3	Seal Tape	278-1645	2.49

High-Grade Coax



Type	Cat. No.	Per Foot
RG8	278-1323	.40
RG8/M	278-1328	.25
RG58	278-1326	.20
RG59	278-1327	.18

Power Accessories



- (1) 9V DC Adapter. #273-1652, 10.95
(2) 12V Regulated Power Supply. #22-120 39.95
(3) AC Line Cord. #278-1257 ... 3.99

WWV/WX Radio



39⁹⁵

Receives WWV time signals and propagation forecasts on 5, 10 or 15 MHz and local VHF NOAA weather stations. Battery extra. #12-148

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

Prices apply at participating Radio Shack stores and dealers

Radio Shack
The Technology Store™

A DIVISION OF TANDY CORPORATION

CQ REVIEWS:

The ICOM IC-32AT

BY LEW McCOY*, W1ICP

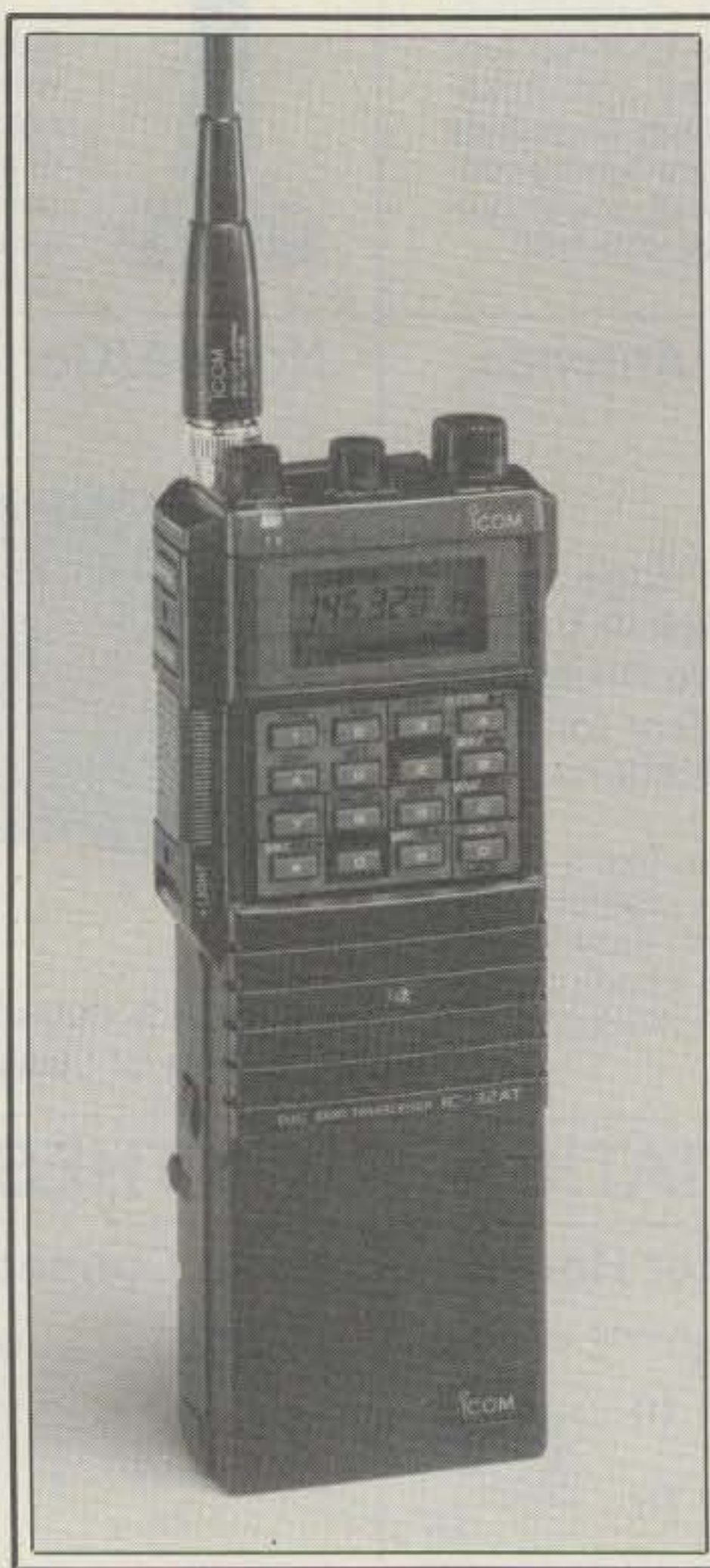
The latest of the handheld transceivers from ICOM is their Model 32AT. This is a two-band VHF/UHF radio covering 144.00 to 148.00 MHz and 440.00 to 450.00 MHz. I have been testing and using the transceiver for several months and have been very impressed by it.

I happen to be a member of a remote base group, which in turn is a member of The Cactus Intertie System, a network covering many of the western states. Primary operation of the system is on 450, with outlets onto other bands, mostly 144 MHz. A radio that covers both these bands, particularly a well-designed handheld such as the IC-32AT, is a real advantage to any operator on this type of network, or for that matter to anyone who likes to work both 144 and 450 MHz.

The transceiver measures 65 mm wide, 180 mm high, and 35 mm deep. This is with the largest battery pack (optional pack). It is 159 mm high with the supplied pack. This makes for a very compact unit. Power capabilities are 5 watts (high) or 1 watt (low) on each band. Actually, in my tests I found that I had slightly over 6 watts out on 2 meters.

In these days of so many features being provided in handheld transceivers, the IC-32AT is no exception. It is literally loaded with goodies—and useful goodies, I might add. For example, the transceiver is equipped with 20 memory channels and two CALL channels. This is a lot of channels in anyone's book. Each of these memory channels can be programmed for repeater or special frequencies, tone access information, and so forth. Also, the unit is capable of simultaneous receive and transmit operation on both bands, VHF and UHF.

There are many SCAN functions. Full band scan, programmed scan, selected band memory scan, and priority watch function are provided. Frequency selection is provided via a 16-key keyboard or by the main dial tuning, a knob mounted on the top of the unit.



The ICOM IC-32AT handheld transceiver.

Also, the handheld has a pocket-beep function. This lets you know when sub-audible tones, identical to your own pre-programmed ones, arrive at the transceiver. Another feature I like is the power-saver function. The POWER FUNCTION can be turned on or off and operates on a 30 second basis. This is particularly useful if you are using the transceiver for packet or AMTOR operation. The power saver operates on both VHF and UHF.

The ICOM IC-32AT has four different modes available, which makes possible multi-function operations. The first is the VFO mode, the second is MEMORY

mode, the third is CALL channel mode, and the fourth is SET mode.

In the VFO mode the mode is set by pushing the VFO key (A key) and then adjusting the main tuning knob or entering frequencies via the keyboard. Frequencies can be set for semi-duplex or full duplex.

MEMORY and CALL operations are very extensive. For example, each of the 20 memory channels actually has two memories, one for the operating frequency and another for the offset. In fact, if you were going to operate only simplex, there are 40 memories available. I might add at this point that the instruction manual is very, very good. In any of the functions, such as setting in frequencies to be stored and recalled, the manual shows it all in a clear step-by-step manner (with plenty of illustrations). Once I had studied the manual, I quickly programmed all 20 memories with my most-used channels.

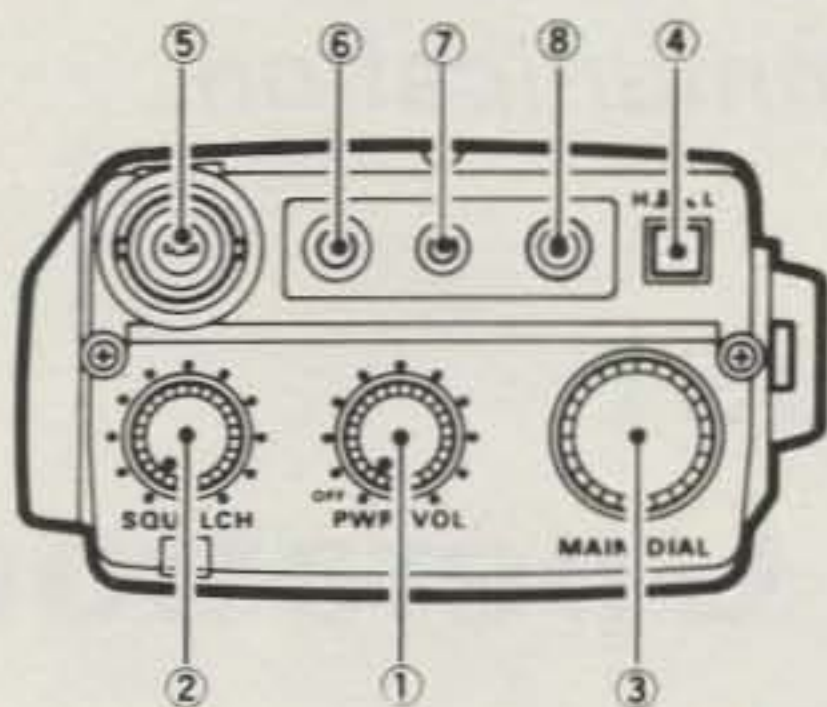
Of course, I have been talking about memory operation. Modern equipment can sometimes drive a person up the wall, so to speak, when just simple operation is required. Not so with this transceiver. For basic operation you simply set the desired repeater output frequency either via the main tuning dial or by the keypad, push the function switch, push + semi duplex or - semi duplex switch (for high or low input/output repeater operation) and you are ready for push-to-talk. If desired, you can push the monitor switch, which permits you to listen on the transmit frequency.

Fig. 1 shows the top panel (from the manual). From the left top are the antenna jack, external speaker jack, external microphone jack, external DC power jack (accepts 12 to 15 volts DC), and last, the HI/LO power switch. The three lower controls are SQUELCH, PWR/VOLUME, and MAIN DIAL tuning.

Fig. 2 shows the side panel which contains the MONITOR, FUNCTION, PUSH TO TALK, and LIGHT switches, and the BATTERY release button. The front panel contains the LED display, which shows frequency, and all the indicators showing the various setups in operation. These include memory channels in use; memory

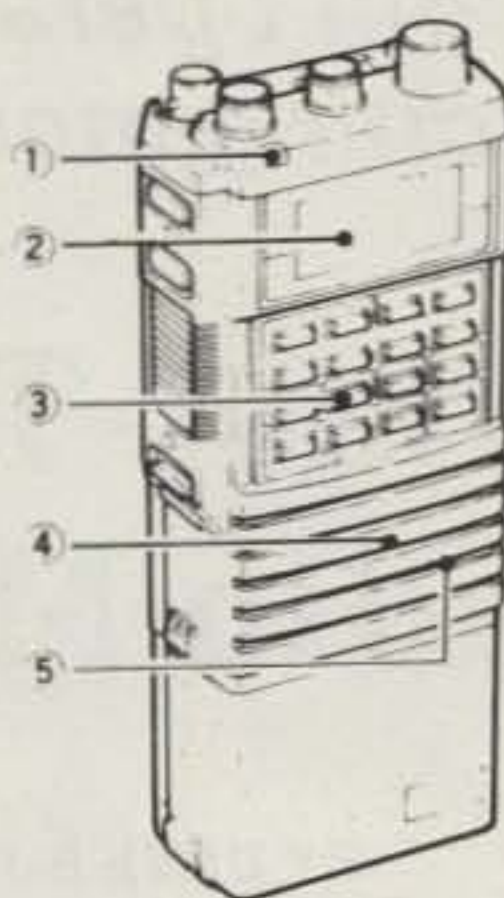
*Technical Editor, CQ, 200 Idaho St., Silver City, NM 88061

TOP PANEL



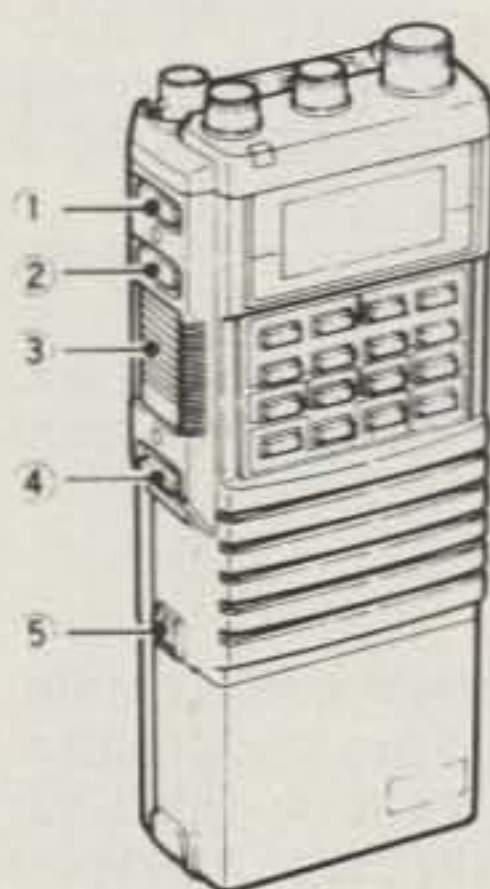
- ① **POWER/VOLUME CONTROL [PWR/VOL]** Turns ON and OFF the power and varies the audio level.
- ② **SQUELCH CONTROL [SQUELCH] (IC-32A/AT)** Sets the squelch threshold point.
- SQUELCH CONTROL AND TONE CALL SWITCH [SQL/PUSH T.CALL] (IC-32E)** Sets the squelch threshold point. Transmits a 1750Hz tone for repeater operation.
- ③ **MAIN DIAL [MAIN DIAL]** Changes the frequency and memory channel.
- ④ **RF OUTPUT POWER SWITCH [H/L]** Selects RF output power.
- ⑤ **ANTENNA CONNECTOR** Connect an antenna here.
- ⑥ **EXTERNAL SPEAKER JACK [EXT SP]** Accepts an optional HM-46 SPEAKER-MICROPHONE or earphone.
- ⑦ **EXTERNAL MICROPHONE JACK [MIC]** Accepts an optional HM-46 SPEAKER-MICROPHONE.
- ⑧ **EXTERNAL DC POWER JACK [DC IN 13.8V]** Accepts to connect external 12 ~ 15V DC power source.

FRONT PANEL



- ① **TRANSMIT INDICATOR [TX]** Lights when transmitting.
- ② **FUNCTION DISPLAY** See Section 4 - 4 FUNCTION DISPLAY.
- ③ **KEYBOARD** See Section 4 - 5 KEYBOARD.
- ④ **SPEAKER**
- ⑤ **MICROPHONE**

SIDE PANEL



- ① **MONITOR SWITCH [MONITOR]** Opens the squelch; and also the tone squelch (when UT-40 is installed).

The transmit frequency can be monitored during semi or full duplex operation.
- ② **FUNCTION SWITCH [FUNCTION]** When pushed and held, selects the secondary function of the KEYBOARD or dial select function.
- ③ **PTT SWITCH** Selects transmitting.
- ④ **LIGHT SWITCH [LIGHT]** Lights the FUNCTION DISPLAY. The backlight goes out after 5sec. if the KEYBOARD or MAIN DIAL are not operated.
- ⑤ **BATTERY PACK RELEASE BUTTON [RELEASE]** Release the battery pack from the transceiver while pushed upwards.

Fig. 1—Top panel of the IC-32AT (from instruction manual).

Fig. 2—Front and side panels of the IC-32AT and their controls.

mode indicator; TS, or tuning step indicator, which blinks when tuning in the SET mode; duplex + or - indicators; PROG indicator, which blinks while in programmed scan; and PRIO indicator, which appears in priority watch mode and blinks when a station comes onto the priority channel. Also, there is the TONE setting indicator, "TO", which blinks when in the tone setting SET. There is also a pocket BEEP indicator which operates when the BEEP function is activated. Along the bottom of the LED display is the S/RF indicator, which shows the strength of the received signal or the indication of HI or LO power in use when transmitting.

As I mentioned earlier, there is a 16-key keypad which is numbered 1 through 0, also * and #, plus A, B, C, D.

Nearly all the keys have multifunctions which are activated by using the FUNCTION key at the side panel.

There are 38 different subaudible tone frequencies available which can be programmed into use. These are, of course, a "must" here in the western U.S.A. where so many remotes—and many repeaters—use tone access.

I found the IC-32AT to be an outstanding performer. I go back to the inception of FM operation on VHF, and I have seen the gradual development of equipment. Many of the earlier pieces of equipment were real dogs when it came to operating the receivers in high RF environments. Intermodulation of received signals rendered many of the early transceivers practically useless in some areas of large

cities. I still check equipment, as a matter of course, for such problems. In the case of the IC-32AT, I used and checked the receiver in several places old timers refer to as "Intermodulation Alleys," and I have nothing but praise for the unit. As to audio quality, it is excellent, both on receive and transmit.

The transceiver is supplied with a battery pack, flexible antenna, handstrap, handstrap clip, belt clip, earphone, and wall charger. Also available as separate accessories are larger battery packs, a remote mike/speaker, and a plug-in automobile charger cord.

The IC-32AT is listed at \$629.00 and is manufactured by ICOM Inc. and distributed by ICOM America, Inc., 2380 116 Ave. NE, Bellevue, WA 98004.



A lot of amateurs operate their packet stations from portable locations, but operating packet mobile is a new twist in this exciting mode of communication.

Coast-To-Coast Packet Radio Mobile Operation

BY DAVE BUSHONG*, KZ1O

Last year we planned a vacation by car from our home in New Hampshire to see my mom in Los Angeles. It takes almost five days to drive out there. We planned on spending a week or so there and then driving back. I have taken mobile rigs on various journeys, both short and long. I usually have a problem co-existing with other people's comfort, though. Typically, the rig makes it difficult for others to hear the stereo or nap, the static is disturbing, and so on.

It seemed to me that mobile packet radio would eliminate those problems quite naturally. You don't need to use the speaker (in fact, you usually don't want to use the speaker), and it works just fine no matter how loudly (or quietly) the stereo needs to be played.

Preparation

We had just purchased the van a couple of weeks before, and I hadn't yet had the opportunity to install any kind of antenna mounting hardware on it. Technically, it was my wife's car and although licensed (KA1QBE), she usually uses a hand-held radio without an external antenna.

There were only a few days left to make all the arrangements for "radio-activity." I had to decide how much space I could devote to radios and which radios to bring. My Kantronics KAM works well on VHF and on HF. At home it's connected to both bands all the time and is used as a gateway station by my friends. Ideally, I would have the same functional setup in the car as I have at home.

I had my friend Kevin weld an aluminum block to the underside of the van's chassis so that a short mast could attach and protrude up the side of the van. This provided an anchor for the mirror-mount bracket which, in turn, held the $\frac{5}{8}$ -wave 2 meter antenna.

As I started to plan more of the details, I found that I didn't have room for an HF rig. We had to bring a week's worth of clothes and other necessary things and I just couldn't justify the space on the floor, so I settled on VHF-only operation. I didn't have a portable terminal which would work in the car, but I was able to borrow a Tandy Model 102 from my friend Dave, KA1SYE, at work.

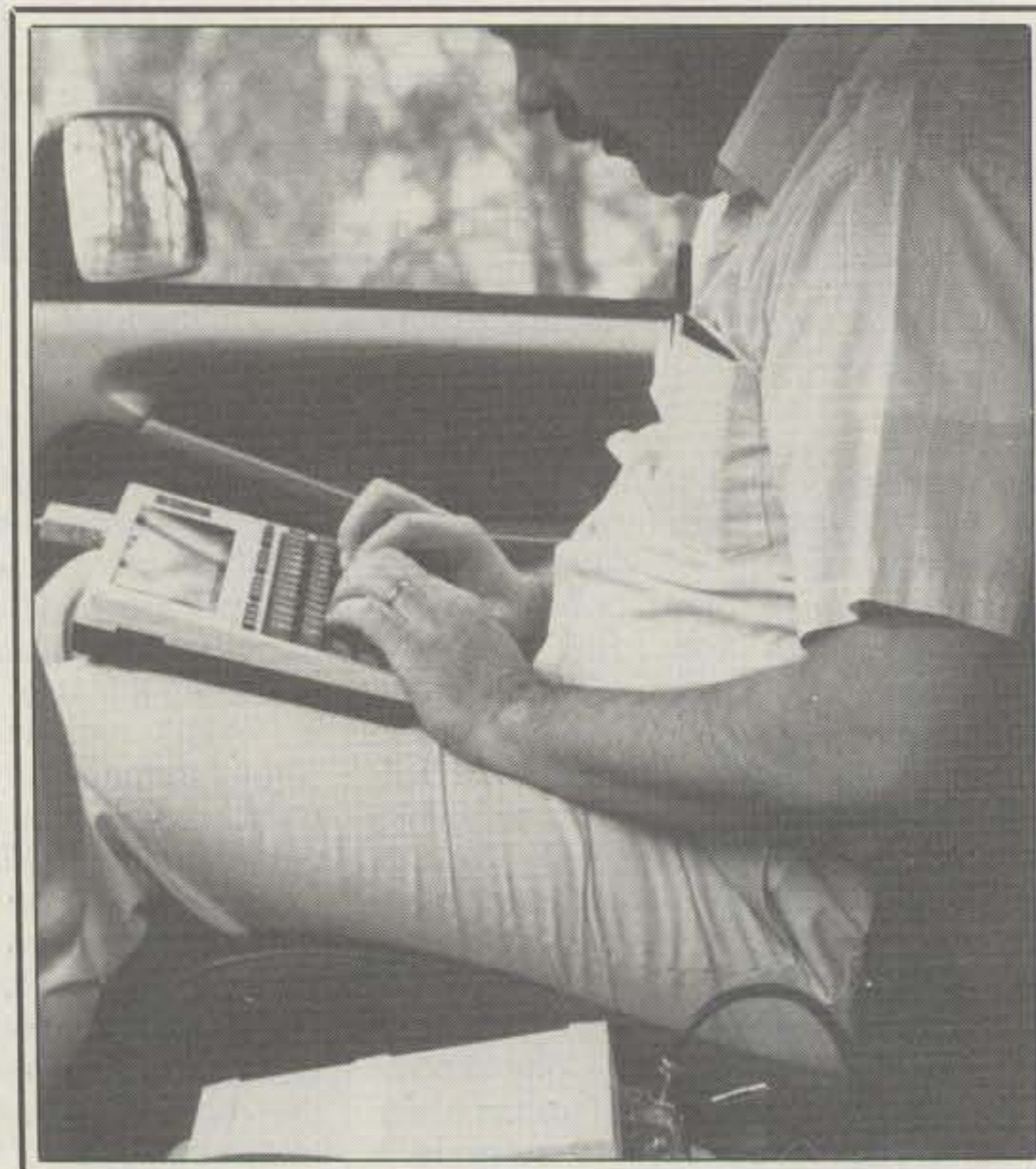
This was all done in time for the trip—just barely in time. It was getting close to departure time and I couldn't make a trial run. It just had to work!

Disappointment

The first time I tried to transmit it didn't work. My 2 meter radio, a KDK FM-240, has always been sensitive to high VSWR

and other RF problems. Whenever the KAM said "transmit," the microprocessor in the 2 meter rig reset and the display went blank! What a disappointment!

The antenna bracket had a poor VHF ground to the chassis. The vehicle ground was about a half-wavelength away from the feed point. This was originally designed to be an HF antenna mount, and a 3 foot mast wouldn't have been a problem. But at VHF it was a problem. After some logical deduction (and guessing), I was able to temporarily solve the problem by the time we got into New York. First, I put a couple of turns in the coax cable and taped up the loop. This make-shift RF choke seemed to work better, but there were times when it still blanked the display. I soon realized that the metal suitcase next to the cable was helping to decouple the RF from the transceiver chassis. Whenever the cable ran under that suitcase, there was no problem. If I moved the cable or the suitcase, things stopped working. We went all the way to California with that metal case in one (touchy) location.



This is the simple packet mobile setup installed in the van.

*7 Fremont St., Concord, NH 03301

MIRAGE/KLM Announces The Next Generation

The **10** amplifiers you have been waiting for!

Designed For Quality And Value!

Every effort has been made in the design of these amplifiers to offer the highest specifications possible, provide the ultimate in reliability, and still keep prices affordable. Compare these amps with all others on the market! You'll be glad you waited for the N E X T generation of solid-state amplifiers from MIRAGE/KLM!

144 MHz Amplifiers
B-1016-G 10W in = 160W out
B-3016-G 30W in = 160W out
B-215-G 2W in = 150W out

1-6

220 MHz Amplifiers
C-1012-G 10W in = 120W out
C-3012-G 30W in = 120W out
C-211-G 2W in = 110W out

13.8 vDC

New protection circuitry automatically reduces the output power to prevent damage to output transistors and even returns the amplifier to full power automatically when problem is cleared!

New GaAs-FET pre-amp designs provide gain of over 25 dB and a noise figure of less than .6 dB!

Picture this . . . You know your station . . . You are at home with your gear . . . all the knobs, switches, meters . . . QSY's are no big deal, you could do them in your sleep (and you probably have!).

Now picture this . . . It's contest time, multi-op . . . do you worry about your gear? . . . NO! At least not your amps . . . your station amps are bullet-proof. Point and shoot, no tune, no touch. From 160 meters to 70 cm . . .

Your Amps Are Mirage!

Each of the four following amplifiers provide . . .

Bullet-proof, thermal shutdown . . . VSWR shutdown . . . over-current shutdown . . .

120% ICAS duty cycle . . . air-cooled . . . fan hood available . . .

Active cooling kit available for 100% key-down duty cycle

TWO 144-MHz Amplifiers

Finally, a ruggedized high-speed RF switching relay that takes the punishment SSB-op's demand . . . 5mS or less typical switch-time . . . Dual-gate GaAs MES-FET pre-amp . . . 22 dB typical gain . . . Wide, dynamic range for overload protection . . . 1 dB compression > +4 dBm

7

30W in - 300W out

(Linear curve: 1W - 30W, 45W max.)
 13.8 vDC 32 amps max.
 440 watts (DC) 68% efficiency

8

30W in - 600W out

24v DC

TWO H-F Amplifiers All Solid State (Waiting FCC Type-Acceptance)

The Band-Pass filter allows wideband performance while meeting FCC specifications . . . 1.8 - 4.0 MHz, 4.0 - 9.0 MHz, 9 - 15 MHz, 15-30 MHz . . . Typical harmonic - 50 dB

9

50W in - 800W out

13.8 vDC
 1,215 watts (DC)
 88 amps
 Available with power supply

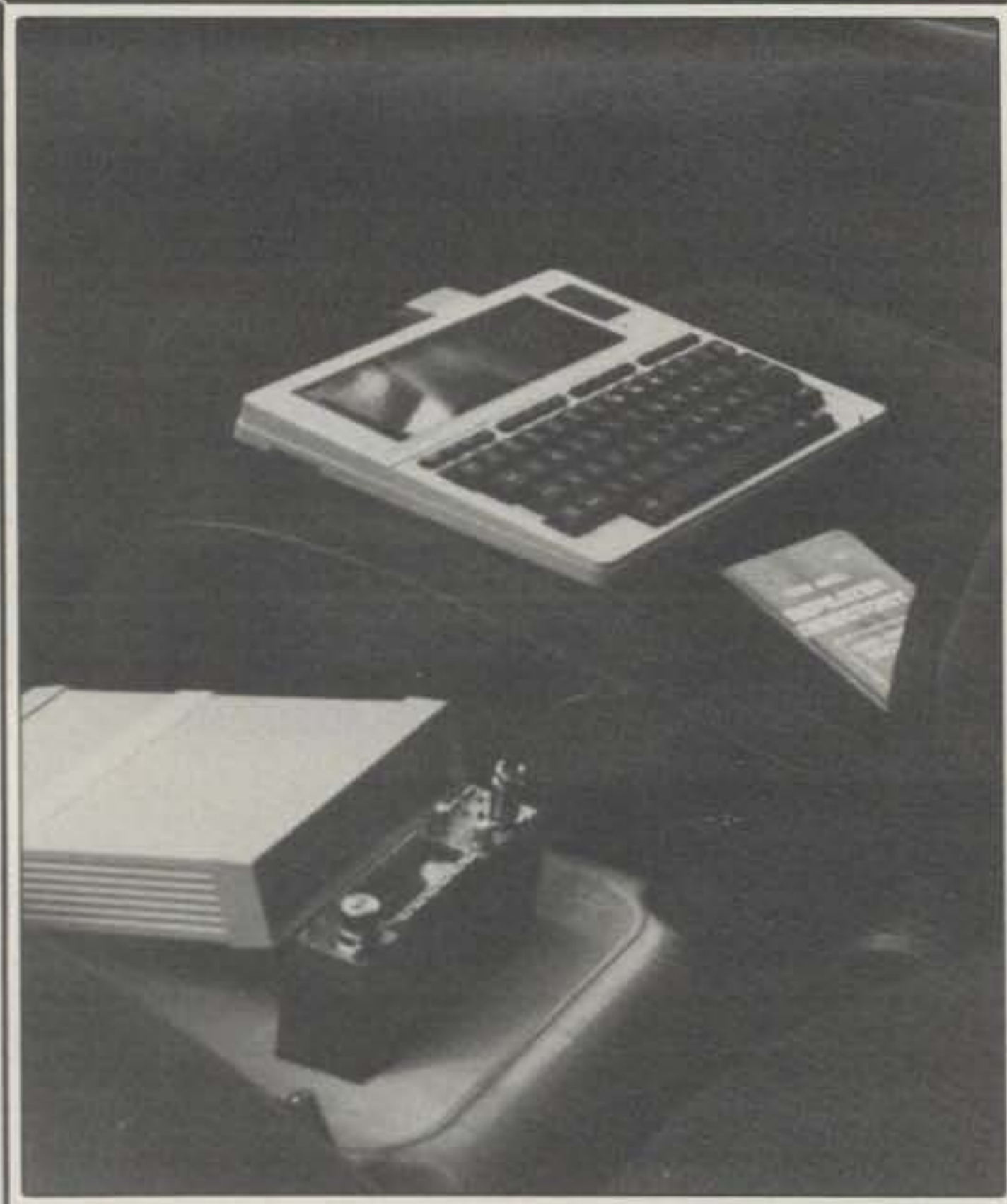
10

50W in - 1,500W out

48.0 vDC
 110/220 - 50/60 cycles
 Auto-Band switch Vacuum Relay
 Full QSK 100% key-down forever
 Power Supply included

MIRAGE/KLM

P.O. BOX 1000 MORGAN HILL, CA 95037
 (408) 779-7363 • (800) 538-2140 (outside CA)



Dave, KZ1O, passes the time at the keyboard making packet contacts on the coast-to-coast trip.



The Bushong family of mobile packeteers. The author is on the left with his XYL, Debbie, KA1QBE, on the right. In the middle are the oldest son, Brent, KA1NHG, and his brother, Billy.

Finding the Way

We used a AAA trip guide for our route. This "Triptik," as they call it, helped me more than I would have thought. Imagine taking a big map of the US—say, 50 miles to the inch—and then plotting out the route from here to there with a green marker. Next, cut the map into 4 inch by 9 inch pieces. Bind each piece, in order, so that you can flip from one map to the next in the order you will need it. That's a "Triptik."

As I went from map to map and discovered BBS stations and NET-ROMs on 145.01, I wrote down the information next to the city where I found the station. The "Triptik" has a lot of white space along the side of the outlined highway for notes and things. I presumed that this information would be valuable on the way back (it was). Also, whenever I talked to someone along the way (not a BBS, but a live person-to-person QSO), I wrote down his call, name, date, and time on the map for QSL purposes.

For several reasons (in large part due to poor planning) I didn't have a list ahead of time with the names and frequencies of the local facilities that I would be using. This meant that I had to "listen" (actually, to read the screen) to see who was on frequency. Once I found a station transmitting, I connected and pumped him for all the information I could get.

No Long Ragchews!

The first half of the trip was probably the most fun. We went through many densely populated areas, and there was nearly always someone to talk to. With my beacon going, announcing what I was up to, I had many curious people connect for a quick chat. I ran into a couple of guys whom I had worked on HF packet in the past. They were wondering how I was getting to them all the way from New Hampshire on VHF!

Quick chats were about the only thing that I could do on this trip. The typical range of a low-power VHF simplex conversation is 5 to 25 miles. In a car that takes from 5 to 25 minutes. And

then the conversation is over, ready or not. Since you can't hear the signal quality without the speaker connected, you don't know if it's deteriorating unless you happen to see the S-meter as you receive his signal. My transmitter has 30 watts output and I was using a 3 dB gain ($\frac{5}{8}$ wave) antenna, although it was not a "perfect" antenna, as mentioned before. To do it right 100 watts output would be about the right power level. I was hearing most stations long before I could connect to them.

In contrast to the first half of the trip the second half was spent talking to my wife and kids! There were long stretches through Arkansas, Texas, and New Mexico where there was no one on 145.01 or anywhere else in the packet subband. Part of the reason was that we were driving on a weekday, when most people are at work. It was also because there was nothing out there but a road and some tumbleweeds.

As we were coming over the (last?) mountain range in California before Los Angeles, I got on a voice repeater on 2 meters. A local amateur, Ernie, WB6YEH, called my mom for me and told her that we were on the way. We were actually a couple of hours ahead of schedule! I asked Ernie if there was a "best" packet frequency in southern California. He confirmed what I had suspected before: there was a lot of activity, and any of the "main" packet frequencies would be fruitful.

We Made It!

After getting settled down and recovering from the trip, I thought I'd see what the local amateurs were like. When I went out to the van, I realized that the KAM had been beaconing every 5 minutes since we arrived there, as it had on the trip. Every 5 minutes is okay if you are moving a mile per minute, but not if you are sitting still. I expected to have some angry comments on the KAM's built-in "answering machine." Several local amateurs had left me nice messages welcoming me to the area. It was a pleasant greeting.

On one of the 220 MHz repeaters I met someone who was

familiar with the local packet activity, and he told me that besides the normal frequencies in the 145 MHz area, there was a voice-grade duplex repeater which was used for packet on 146.745 MHz. I hadn't heard of anyone doing that since we first started using packet in the early 1980s. This repeater had good coverage throughout the hills in the L.A. area.

I found an HF gateway station in the L.A. area, AA6TN, which enabled me to look around 20 meters and say hi to some of my friends on a VHF rig while sitting in my car in the driveway!

One of the highlights of my amateur activity out there was bumping into Mike, WD6EHR, who was a member of the Rendezvous Net, of which I am a member. Although Mike and I had never talked before that (or at least we didn't remember if we had), we got to know each other quickly. Mike also was the SYSOP of a BBS there, which was useful information to me. I entered some packet mail to several people in New Hampshire saying that we had made the trip okay and that we were having fun, and asking, "How cold is it out there?" I also took the opportunity to send some packet mail to a few of the people I had met along the way, since they had given me the callsign of the BBS where they usually receive mail.

Antenna Adjustments

I thought that it would be a good idea to change from the $\frac{5}{8}$ -wave to a roof-mounted, quarter-wave, magnetic-mount antenna to help the grounding problem. It completely solved the problem and reminded me that for VHF antennas, grounding is a critically important issue. I decided to use the side mount for any 220 MHz voice activity that my son Brent, KA1NHG, might be interested in doing. The feed line and antenna were fine with the ICOM IC-3AT.

Because the $\frac{1}{4}$ -wave antenna has a smaller capture area than the $\frac{5}{8}$, there is more of a tendency for what we call "picket-fencing" of the signal while you are moving. When you listen to a voice repeater, your ear/brain can sort of filter out this problem if it's not too severe. However, the packet modem doesn't have this ability, and it made many connections harder to maintain than they were with the $\frac{5}{8}$ -wave antenna. I had to be much closer to the station if I was moving before a reliable connection could be made. However, when stationary the $\frac{1}{4}$ -wave outperformed the other antenna because it was up higher, it had a better ground, and it was free and clear of the vehicle body.

Going Home

A week and a half went by and it was time to go home. The planning was already done, since I merely had to turn the pages in the "Triptik" backwards. But this time I had all the node names and BBS names ready so that I could start trying for them when I knew I would be close. This worked out a lot better, since I had at least 10 minutes more time to connect than I did before. The farthest station to which I was able to connect was at a distance of 150 miles, near Las Vegas, Nevada. That lasted for a couple of minutes, until a hill got in the way.

I sent periodic messages to my mom via my new friend Mike. Whenever we crossed a state line or something of interest, I connected to a local BBS, entered the message, and relied on the BBS to know how to route it to Los Angeles. Most, if not all, of the messages made the trip! Neither of us counted how many there were, so we can't be sure. But he got a lot of them, and I sent a lot, so that sounds like about 100%. By using node stations I was able to connect directly to Mike from as far away as Albuquerque, New Mexico—on VHF! I could have made it from Amarillo, Texas directly, but the link from there to New Mexico was not operative for some reason.

We traveled the same route as we had gone out, and this made it easy to know what to expect as far as packet activity goes. Whenever I had the opportunity I tried to connect with the

guys I had met on the trip out, and I was able to a few times. The information that I had scribbled on the "Triptik" was much more useful than I had imagined. I found that I should have written more than I did. At the time I wrote it, I assumed that I would remember the details on the return trip. In reality, my memory for details was hopelessly overloaded after 60-plus hours of driving.

Bummer!

When we finally arrived home, it really felt good. We slept for a day (or so it seems), and then I started to put things in the house back where they belonged. I hooked up the KAM and the 2 meter rig where they belonged, and checked into the local BBS to see if there was any mail. There were a half-dozen messages to me from all over the country. I had left my "home" BBS with the people I met, and they had used that to send me mail. I enjoyed it as much as, if not more than, the greetings I got while in Los Angeles! When putting things away, however, I realized that the IC-3AT was missing. After a week of looking through everything we decided that it was left somewhere along the way. The 220 MHz band was the one band that all three of us could operate (my son, a Technician class; my wife, a Novice; and myself). We used this band if one of us had to go into a store, go for a walk when we stopped at a hotel, or whatever.

Losing the radio was the only sad part, and although it was unfortunate, we were happy that nothing worse had happened on such a long trip.

Next Time . . .

After mulling over the entire adventure, I came up with a list of what I would do differently and what I would do the same way if I took a trip with mobile packet again. Here is that list.

1. I would have brought a list with me that contains the frequencies and callsigns of all the BBSs and nodes that I would encounter along the way. It turns out that I already had such a list that I had picked up from a phone bulletin board a few weeks before. I hadn't looked at it yet, and didn't even think of it when I was getting ready.

This list is enthusiastically maintained by a guy in Woodbridge, Virginia named Don Bennett, K4NGC. I spoke to Don on the phone while preparing this article and asked if I could mention his list so that others could use it. He encouraged me to do so. The details of his list are at the end of this article.

2. As I stated earlier, I would have added more detail to my notes taken on the way out there. They proved invaluable for the return trip and as memorabilia for the years to come. It sure was nice to be able to say "Hi, Wayne" when he connected to me again on the way back through Arkansas!

3. Before we left I made a spreadsheet estimation of how far we were going to go each day based on the AAA mileage between each major city. This itinerary was quite accurate, it worked out, and it made it easy to predict when the best time was to drive and when the best time was to play radio. I shouldn't admit it, but there were times when I did both—typing and driving. It's not safe, and my typing speed was really low, too.

4. I should have prepared ahead of time for people at both ends of the path (NH and CA) to get ready to receive traffic that I originated en route. I didn't think of to whom I should address messages for New Hampshire. I remembered that Ron, K1PDY, lived close by, and I was able to use him to deliver a message to our "house-sitters." Unfortunately, though, Ron hadn't been checking his mail every day, and it took a few days before the message was delivered. Nevertheless, our house-sitters enjoyed getting the message and thought it was exciting that amateur radio could do that! And at the other end, it would have been nice to know to whom to send the progress reports.

Since there was no way for someone to answer my packet messages until I arrived out there, I couldn't be sure whether or not they were getting through.

5. Probably most importantly I should have made a "dry run" after installation to ensure that everything was going to work. Even though it was a (supposedly) simple setup, there were little things that caused problems. These problems could have been avoided with a little more planning and testing.

6. I should have had equipment on 2 meters allowing for both voice and packet operation, or at least for 220 voice and 2 meter packet. Several times I would have liked to ask for information, but it was too much trouble to disconnect the cabling from the packet setup and connect the microphone, the speaker, etc. Because the packet station required little or no adjustment, the whole thing could have been put under a seat in the rear, and I could have brought out a cable to the portable terminal. This would have made it possible to bring the HF gear after all!

7. About that terminal: The ideal one should be 80 columns wide, not 40, and it should have built-in illumination. The 102 operated two full days on one set of batteries (and I brought enough for the trip, fortunately). I suppose if the display had backlighting, a cigarette-lighter adapter would be required.

In conclusion, I'll say yes, I would do it again, and yes, we really had a ball. The packet people all the way across country were friendly and helpful. Most of them said that I was the first packet mobile station that they had ever worked. And with the experience I've gained from this first exposure to mobile packet, I look forward to many more such exciting avenues from this unique hobby, amateur radio.

Packet Lists

Don Bennett, K4NGC, maintains a large list of digipeaters,

bulletin board systems (BBS), and node stations all over the world. I received a copy of his list for free from his landline BBS at (703) 680-5970. The full list is about 120 pages long and contains a wealth of information for packet enthusiasts.


For most people, having a list of all the packet stations in the world is interesting but not necessary. Therefore, Don also has the list broken down by state. For example, someone around here would just need to download the VT, NH, ME, and MA listings. This would save a lot on your long-distance bill, too.

I called Don and told him about my trip and how much I could have used his information then. We both agree that it would be a good idea to make it known that the information is available for free.

Here is the information that is at the bottom of his listing. Don verified that it is still correct and current:

Don Bennett, K4NGC
15016 Carlsbad Road
Woodbridge, VA 22193 USA
(Home) 703-670-4773
(Office) 703-274-9355/56/63/64
(K4NGC LLBBS) 703-680-5970
(ARPANET) dbennett@amc-hq

I laser-printed his long list so that I could fit two pages worth onto each side of a page. I have made a dozen two-sided copies of the list, which now takes 30 pages. A limited number of copies are available from me for the cost of printing and mailing. For a hard copy printout send \$5.00 and for an IBM-compatible diskette send \$3.00 to Dave Bushong, KZ1O, 7 Fremont Street, Concord, NH 03301.

Don encourages everyone with information about the existence of a station not on his list to contact him either via packet mail (K4NGC @ K4NGC) or by one of the means above. 



CALL US NOW!

YOUR HAM DOLLAR GOES FURTHER AT...

CALL OR WRITE FOR SPECIAL QUOTE

When it comes to FAST DELIVERY, HONEST DEALING and PROMPT/DEPENDABLE S-E-R-V-I-C-E back-up We don't just advertise it — WE GIVE IT!

we'll treat you

SELECTION

SERVICE

and

SATISFACTION!

STORE HOURS:
9-5 P.M. (CST)
MONDAY thru FRIDAY
OPEN SATURDAYS
from 9-1 P.M. (CST)
CLOSED
SUNDAYS/HOLIDAYS



182 N. Maple
P.O. Box 73
Watertown, SD 57201



"AMERICA'S MOST RELIABLE AMATEUR RADIO DEALER"

SELL-TRADE

New & Reconditioned

HAM EQUIPMENT

Call or Write Us Today For a Quote!
You'll Find Us to be Courteous, Knowledgeable and Honest

PHONE (605) 886-7314

FAX (605) 886-3444

In 1937, Stan Burghardt (WØIT), because of his intense interest in amateur radio, began selling and servicing amateur radio equipment in conjunction with his radio parts business. We stand proud of this long-lasting tradition of *Honest Dealing, Quality Products and Dependable "S-E-R-V-I-C-E"!*

Above all, we fully intend to carry on this proud tradition with even more new product lines plus the same "fair" treatment you've come to rely on. Our reconditioned equipment is of the finest quality with 30, 60 and even 90-day parts and labor warranties on selected pieces. *And always remember:*

— WE SERVICE WHAT WE SELL —

AEA	B & W	Daiwa	Palomar
Alinco	Belden	Hustler	Radio Callbook
Ameritron	Bencher	Kantronics	Ritron
Amphenol	Bird	Kenwood	Rohn
Ampire	Butternut	Larsen	Telex/Hygain
Antenna Specialists	Centurion	MFJ	Ten-Tec
Astron	CES	Mirage/KLM	Unadilla/Reyco
	Cushcraft	Mosley	Yaesu

Write today for our latest Bulletin/Used Equipment List.

CIRCLE 151 ON READER SERVICE CARD



Get the most of HF Mobiling

Yaesu FT-747GX

SPECIAL OFFER!

CALL TODAY FOR SPECIAL QUOTE

Tuned To The New World Of Amateur Radio

From Novice to Extra Class
Cushcraft has the antenna
you need.

Cushcraft offers high performance antennas to make every phase of your ham radio activity more satisfying. We have been creating innovative and exciting new products for more than 35 years. Call or write for a free copy of our full line antenna and accessory catalog or see your local dealer.

BOOMERS. The contest winners and distance record holders. Computer enhanced design for better gain, pattern and strength. VHF and UHF models for SSB, FM and other activities.

RINGO RANGER II. Still the world's favorite 2 meter, 70 cm or 220 MHz omni antenna, with more gain. A must for your FM or packet station.

FAST ACTION GAS TUBE LIGHTNING ARRESTERS. Protect your valuable radio equipment. High and low power models with SO-239 or N connectors.

NEW 10, 18, 24 MHz ROTATABLE DIPOLE. Mounts easily on the same mast as your tribander or other antennas. Bi-directional pattern gives excellent performance. Model D3W.



HF TRIBAND BEAM A3. The most popular compact 10, 15, 20 meter beam. A4S. A high performance 18' long wide-band beam with all stainless steel hardware. 40 meter add on kits for each

NEW CUSHCRAFT/SIGNALS magnetic mount mobile for 10 meters. An ideal companion to the new 10 meter multi mode rigs. Model CS28M.

AP8 VERTICAL. Covering 10, 12, 15, 17, 20, 30, 40, 80 Meters. Great choice for Novice to Extra class.

NEW 10 METER 3 ELEMENT for the novice, technician or any ham who wants more gain with a good front to back ratio. Model TEN-3

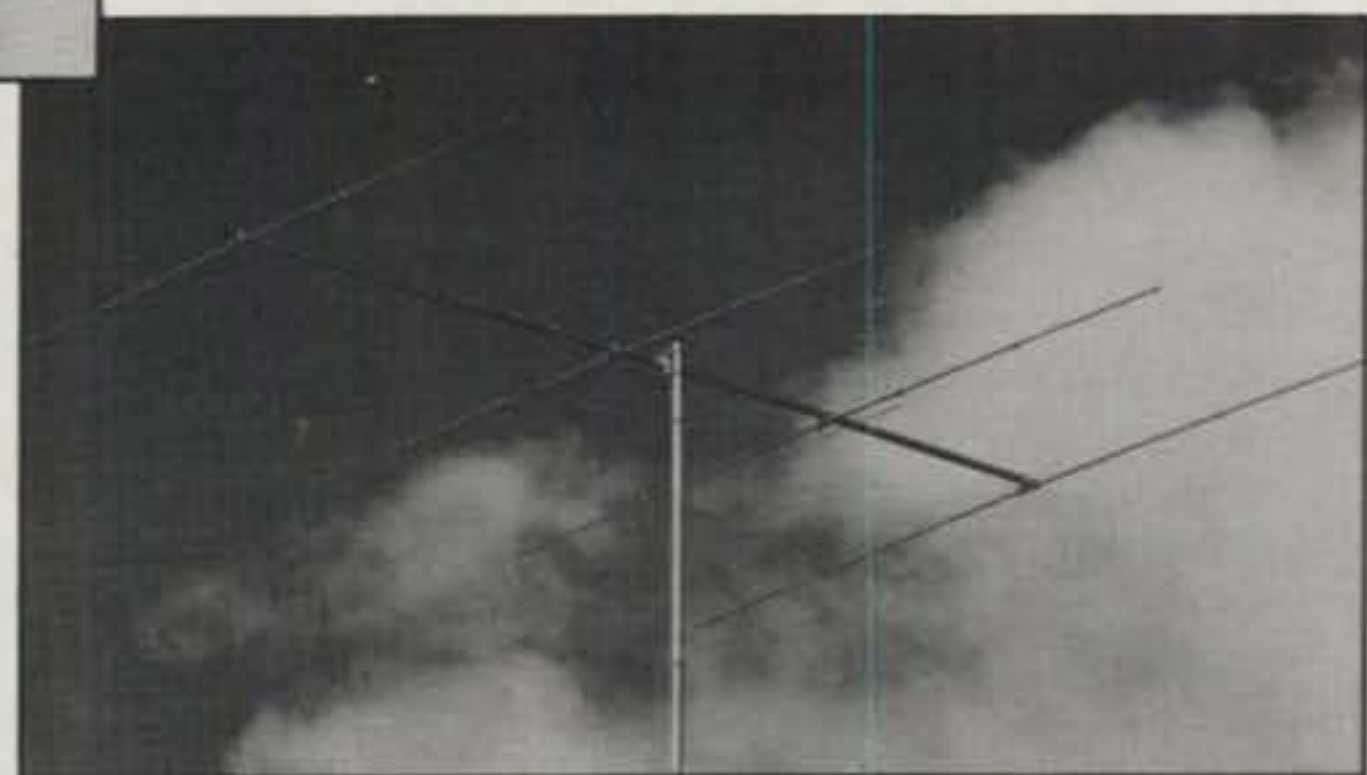
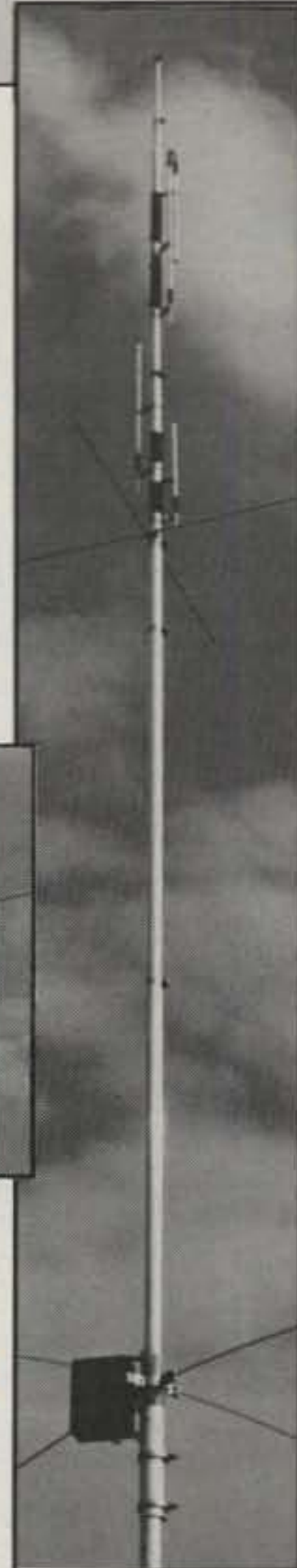
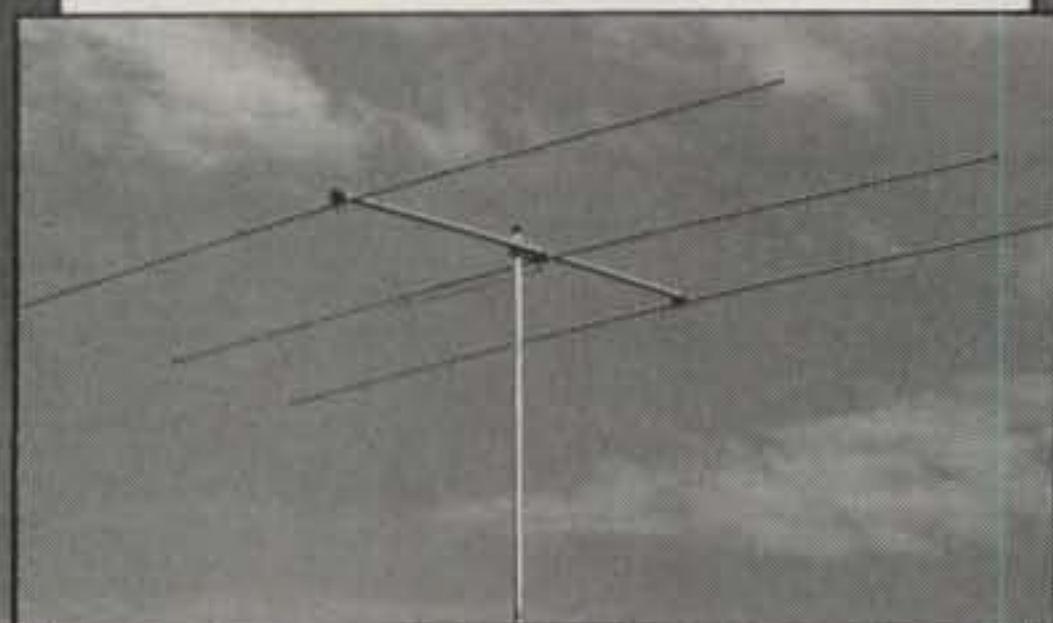
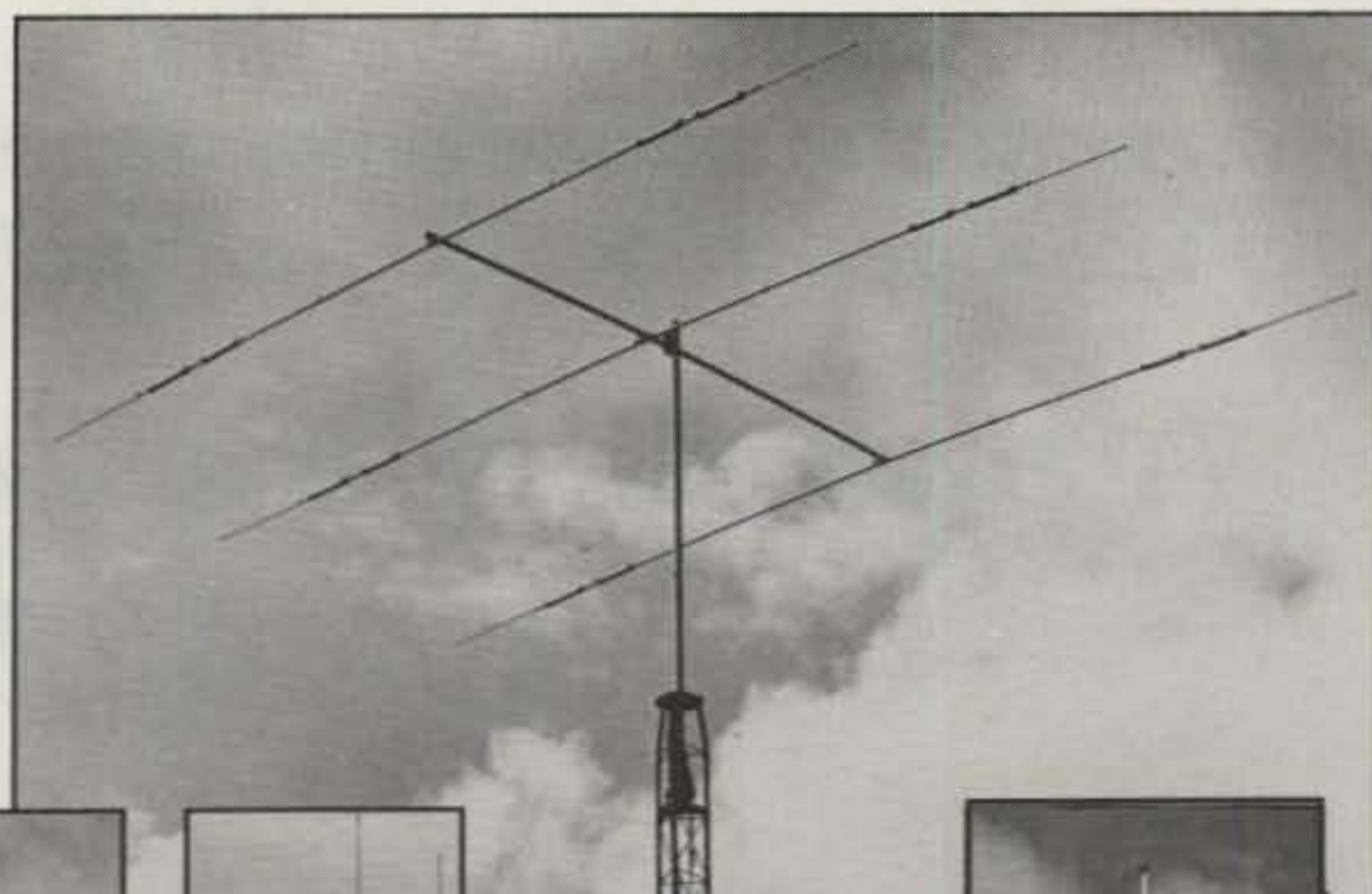
NEW R5 HALFWAVE 10, 12, 15, 17, 20 METER VERTICAL. Amazing DX performance in a small space without ground radials. Includes a solid state broadband impedance matching network. Model R5.

SKYWALKER MONOBAND. 10, 12, 15 and 20 meter Yagis for more contacts, less waiting and a better signal. Preferred by contesters and DX-Peditions.

 **cushcraft**
CORPORATION
THE ANTENNA COMPANY

P.O. Box 4680, 48 Perimeter Road, Manchester, NH 03108 USA
Telephone: 603-627-7877 / Telex: 4949472 / FAX 603-627-1764

AVAILABLE THROUGH DEALERS WORLDWIDE
CIRCLE 150 ON READER SERVICE CARD



Here's a simple wire vertical antenna that you can build with ease. An added advantage to this one is that it gets a bit higher off the ground each year.

A Simple Wire Vertical Antenna For 40 Meters

BY ROBERT A. LEHNING*, WA2YSG

Many of us in the ranks of amateur radio have relatively modest stations. After plunking down all that hard-earned cash for a fancy transceiver, there sometimes isn't much left for a huge and expensive, commercially-made antenna. Simple antennas are a basic part of amateur radio, and at one time or another we all have constructed and used one.

This article describes a simple wire vertical which I have built and used with fair success on 40 meters. The beauty of this antenna is that it is made from readily available materials, the cost of which can be reasonable, and the method of support just needs water to get taller. In fact, I found most of the needed material in my junk box. All I had to purchase was some good coaxial cable to use as the feedline to the vertical.

There are several factors to consider when thinking of an antenna of this size. Cost, of course, is one. Another is the weather. Antennas in western New York can take a real beating during the winter months, and antenna design must take into consideration the weather factor. I chose to use wire for this antenna rather than aluminum tubing. I had enough #12 solid copper wire on hand and a large red oak tree for support, allowing me to avoid aluminum tubing and hardware, which would have cost a fortune, and the job of getting it upright into the air in one piece, which would have been a major undertaking.

For this kind of installation some thought also had to be given to the type of rope that was to be used to support the antenna from the tree. A good quality, woven, nylon rope wears well and withstands a lot of weather without having to be replaced every year or two. In the past I have purchased quantities of nylon rope in several diameters and lengths at the Dayton Hamvention at very reasonable

prices. Rope usually is also available at local hamfests and hardware or marine stores.

Over the years I have become adept at getting a line over a tree branch to support an antenna. Using a light $\frac{1}{8}$ inch nylon line with a 1 inch pipe fitting tied to it, I managed to get a line over a branch in a small fork in the red oak about 40 feet up. Once this was accomplished, I bent a $\frac{1}{4}$ inch woven nylon rope to it and hauled it up over the branch. This $\frac{1}{4}$ inch woven nylon rope supports the vertical very nicely. This particular tree has supported several different antennas over the years.

There are many sources for vertical antenna theory and design information. The design information for this antenna was found in *The ARRL Antenna Book*. I used the formula:

$$L \text{ (in feet)} = 234/f \text{ (in MHz)}$$

for the vertical radiator, and

$$L \text{ (in feet)} = 240/f \text{ (in MHz)}$$

for the radials. The radials are 2.5% longer than the vertical radiator. Using the information tabulated in Table I, I cut the radiator and radials for an operating frequency of 7.05 MHz. The radiator and three radials used all the wire I had on hand, but a fourth radial could be added to make a "classic" ground plane.

I allowed about 6 inches extra on the vertical radiator and 3 inches extra on each radial for the installation of the ceramic insulators. If a ceramic insulator were to be used on the ends of the radials, another 3 inches would have to be added per radial. These measurements don't have to be exact. A little less or a little more won't affect the operation of the antenna greatly. These extra dimensions also depend on the size and type of insulators to be used.

The insulators were installed on each end of the vertical radiator after the wire was cut to length and the appropriate amount of insulation was stripped off the wire. The bare wire was fed through one

f (in MHz)	L (in feet)	
	Radiator	Radials
7.0	33.42	34.28
7.05	33.19	34.04
7.1	32.95	33.80
7.15	32.73	33.56
7.2	32.5	33.33
7.25	32.27	33.10

Table I—Dimensions for a 40 meter vertical antenna.

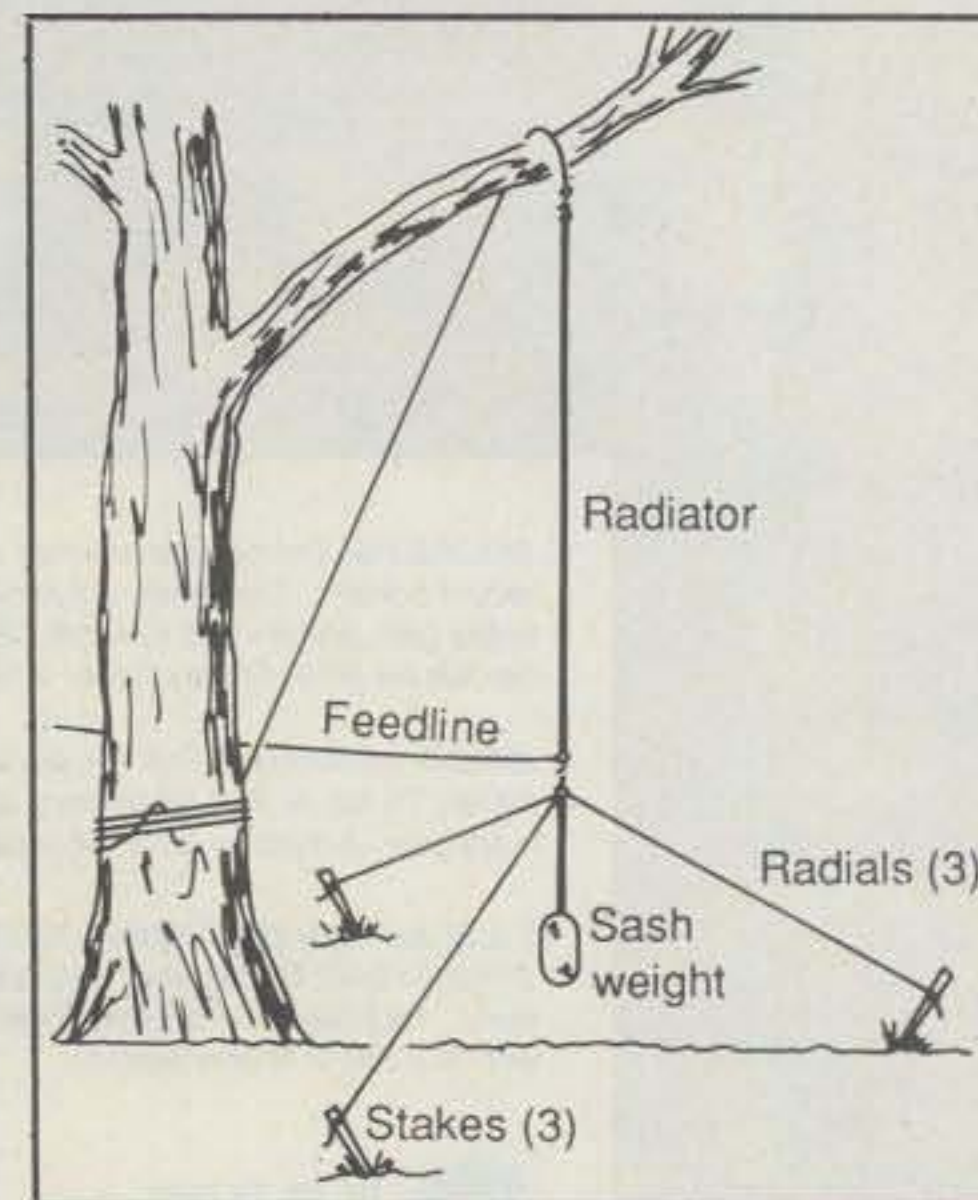


Fig. 1—The tree-mounted 40 meter vertical antenna. The sash weight keeps enough tension on the vertical to keep it straight even in winds.

end of each insulator, bent around and wrapped back upon itself, and soldered together. The radials were fed through the remaining hole of the insulator that was to be at the bottom of the antenna and likewise bent and soldered together. When everything was assembled, the rope that I had over the branch was attached to the top insulator, and I hauled

*1295 Wisconsin Rd., Derby, NY 14047

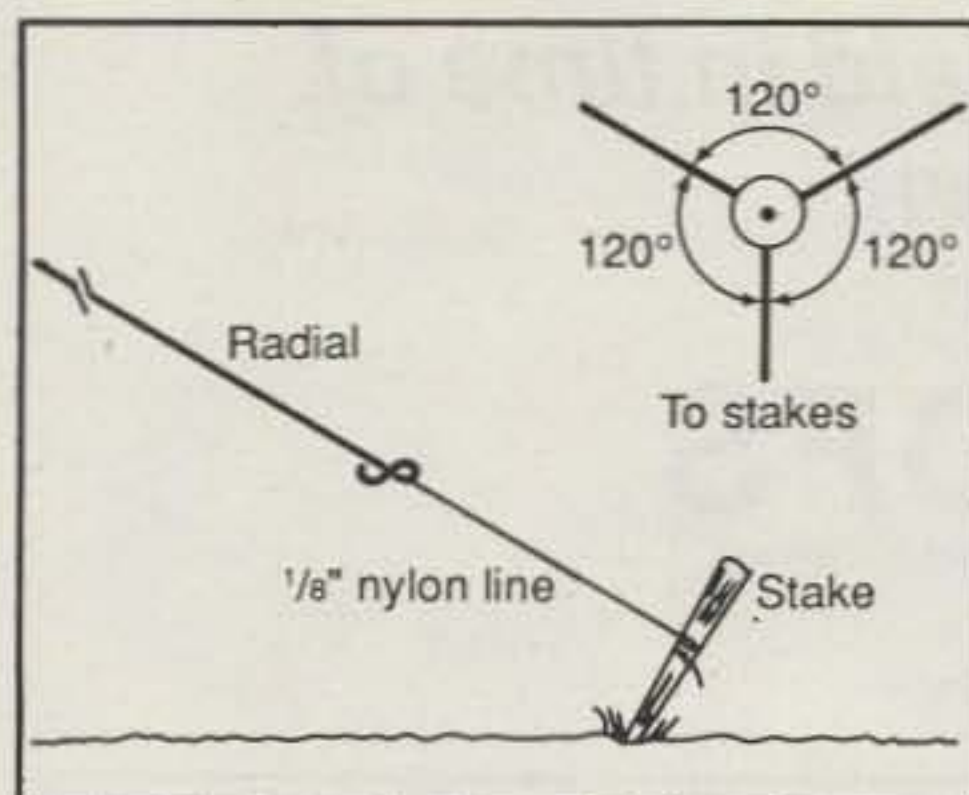


Fig. 2— The method for securing the antenna's radials.

the antenna up into a vertical position. The top insulator was about 40 feet in the air, not quite up to the branch. The bottom insulator was about 7 feet off the ground. I stretched the radials out to stakes which I had already placed in the ground. Using the configuration shown in fig. 2, the radials were tied off to their respective stakes with $\frac{1}{8}$ inch nylon line. I bent a loop in the end of each radial to attach the line. I also left some "sag" in each radial.

I then attached a short length of $\frac{1}{8}$ inch line to the bottom insulator and hung a small sash weight to keep the antenna straight and taut. Copper wire stretches under stress of this kind, but I have not noticed any change in the operation of the antenna. This weight, coupled with the sag in the radials, allows the antenna to move up and down with the motion of the tree branch when the wind blows. Tying the radials to the stakes keeps the sideways motion to a minimum. I have seen that sash weight move up and down 8 to 10 inches when the wind really gets to howling in off Lake Erie. This antenna has ridden out many storms in this fashion.

When the antenna was up in place, it was time to attach the feedline. I used

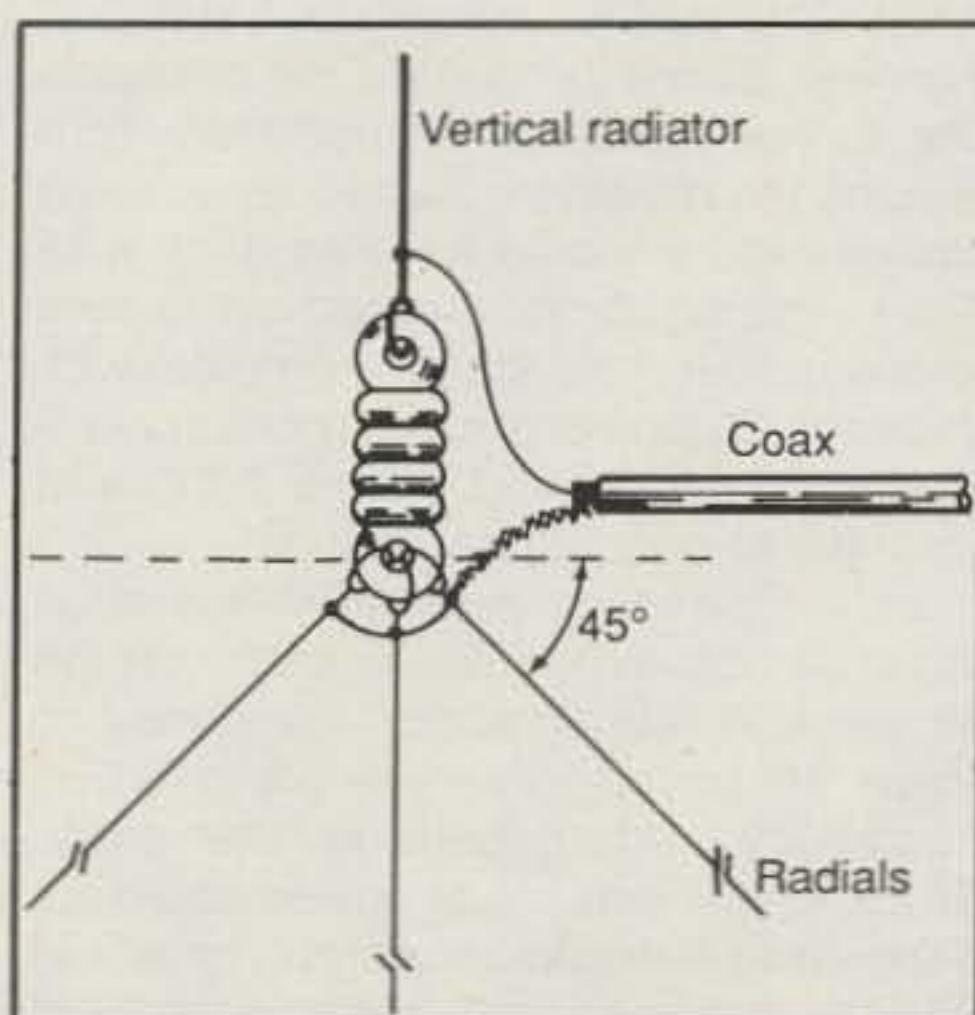


Fig. 3— The simple connections for the 40 meter vertical antenna.

about 30 feet of RG55 B/U coaxial cable. This cable has a solid center conductor, polyethylene dielectric, and a double braid. It was readily available locally. The specified impedance of this type of cable is 53.5 ohms. This must be considered when the antenna and feedline must show a 50 ohm input impedance to the transmitter or transceiver. Other types of cable can be used depending on the availability and requirements of the particular station. Poly cable is not too difficult to work with when installing connectors or attaching to an antenna. You have to remember that the poly dielectric gets soft and runs when you heat it. I stripped the coax as shown in fig. 3 and soldered the center conductor to the vertical radiator and the braid to the radials.

After all the soldered connections were cool, I sprayed a coating of clear acrylic to weatherproof all the exposed metal. I also wrapped a few layers of plastic electrician's tape around the open end of the jacket on the coax. The feedline runs into the house and my shack in a fairly straight line 7 to 8 feet off the ground. It is supported by a line from another tree branch and a line from the gutter on the corner of the porch. Once the cable was into the shack and the entrance weatherproofed with some exterior caulk, I installed a coaxial connector on the end to attach the antenna/feedline to my transceiver.

Initial tests indicated a VSWR of about 1.15 to 1. As my transceiver has a built-in power reduction circuit to protect the finals from high VSWR, this was acceptable. Over the last two years I have no-

ticed very little change in the VSWR and antenna performance.

While vertical antennas have several advantages over other types of antennas, they also have several disadvantages. The most notable is the reception of signals from all directions. The noise and QRM at times can be quite overwhelming. However, at the same time there can be a signal in this noise from a station in some faraway place just begging for an answer to his call. Sometimes you just have to contend and cope with noise and QRM.

You must remember that while you are receiving from all directions, when you are transmitting you are also transmitting in all directions. A little discretion is required when the band is crowded with local communications and the station you want to contact is not too strong. This precept applies to all amateur activities on any band. Common sense and courtesy should prevail. You must take into consideration that patience, good listening habits, and determination usually get results.

In the two years that this antenna has been in operation at my QTH, I have managed to work and confirm some 60-odd countries on 40 meters. It has been my experience that if I can hear them, I can usually work them, band conditions and level of activity notwithstanding. I can see no reason why an antenna like this couldn't be used on any of the other amateur bands, including the new WARC bands, with similar results. Who knows? I just might try it. Working DX with a modest station and simple antenna can be very gratifying.

CQ

GET THOSE RARE DX's . . .



... with the help of an azimuth map from the Great Circle Map Company. An azimuth map will help you get the most from your beam antenna. Each map is special made for your QTH and features your station's call sign on the lower right corner (SWLs may use their initials or name up to 7 characters). The map measures 23" x 35", is brightly colored and is

printed on 80 pound poster stock. To order, send \$39.00 (plus \$2.00 S&H) and your station's call sign and location to:

The Great Circle Map Co.
P.O. Box 691401
San Antonio, TX 78269 USA

Yes! We accept foreign orders at no extra charge! (U.S. funds only).

CIRCLE 134 ON READER SERVICE CARD

Once again amateurs came to someone's aid in time of disaster. This time it was for one of our own.

New Life For PJ8DFS

BY BARBARA GUNDERSON*

The flash fire raged for three-quarters of an hour. Helpless, the man watched 45 years of his life turn to smoke, disappearing in a blue Caribbean sky.

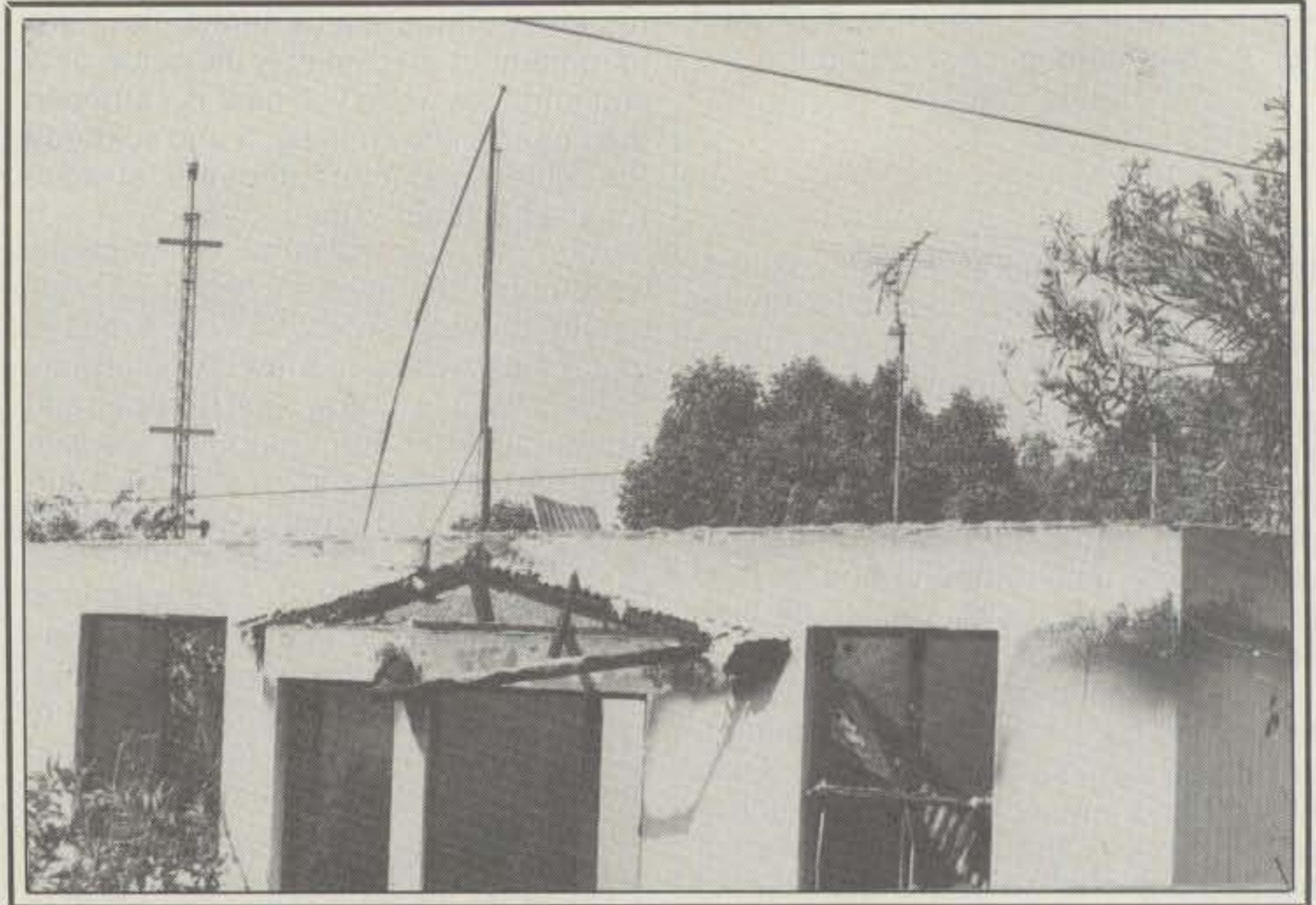
It was mid-morning, December 12, 1987. Another perfect day had begun on the tiny, tranquil island of Sint Eustatius. Dave Shaw was operating his amateur radio station, PJ8DFS, chatting with an acquaintance in Mexico. Should he read this, the Mexican amateur, XE2PG, will understand why his friend suddenly vanished from the airwaves in the middle of a transmission. The day would be far from perfect for Shaw.

David F. Shaw first came to this little known island in the early 1970s. Finding it much to his liking, he decided to settle there. He married a local lady, bought a comfortable house on a cliff overlooking the sea, and became part of the island itself. Soon the hectic days and nights of a jazz musician and composer faded into the past. Now much of his time was spent at the controls of his radio station.

Soon thousands of amateur radio operators around the world came to know PJ8DFS as an opportunity to contact this small Dutch outpost in the Netherlands Antilles. More important, Shaw's station provided emergency communications should a hurricane or other disaster strike Sint Eustatius, rendering regular channels useless.

Prevailing southeasterly breezes blew early puffs of smoke away from where Shaw sat. He had no inkling the fire had begun. A neighbor saw it first and yelled to warn him. Unsuccessful in attracting his attention, she dashed to another neighbor. Together they alerted him and then notified the fire department. Fanned by 15 knot winds, flames raced through the house, and choking, blinding smoke engulfed the radio room in seconds. Shaw's only choice was to drop to his knees and crawl to the street and safety. His wife was at work three blocks away. They had their lives, the clothes they wore, and little else.

In a comedy of errors, firemen were unable to do more than watch. Days later Shaw, shuffling through charred rubble,



The Shaws' home after the fire.

came across his beloved fluglehorn, now a molten blob, twisted almost beyond recognition. His shortwave radio gear and all other electronic equipment had disintegrated. Practically no evidence remained of the computer terminal. Where the floor had fallen in, he found a page or two from hundreds of books destroyed as a collapsed library roof set them ablaze.

Each morning at 8 AM Shaw met on the 20 meter band with a group of friends primarily in Rhode Island and Florida. He talked with them on December 12th; they wondered where he was on the 13th. Waiting also was an amateur operator near Stuart, Florida, who was considering a trip to the Caribbean with a stop in Sint Eustatius. He wanted details about accommodations on the island. They all waited, puzzled, on the 14th, and on the 15th and the 16th. Finally, toward the end of the month word came. Shaw had telephoned an amateur in nearby Sint Maarten. Mort, PJ8UQ, tuned his radio station to the usual morning frequency and found the group discussing PJ8DFS's absence. He told them of the disaster.

One of Shaw's closest friends, Bill, a dentist in DeLand, Florida, was at his station, NK4B, when the news came. He was

startled by the news. What could they do to help?

Generous, warm-hearted island residents already had opened their hearts and pocketbooks to the Shaws. Food, clothing, and living quarters were donated spontaneously. It didn't take long for the amateur radio operators to follow.

Two hours after Bill, whom Shaw's wife came to call The Coordinator, heard of the fire, he told his secretary. Later that morning, Bunny recounted the catastrophe to her husband. Immediately Tom telephoned Bill saying he had some radio equipment he would be glad to give to Shaw. The equipment turned out to be a total amateur radio station complete with transceiver, power supply, monitor, various accessories, and even a 2000-watt amplifier to boost Shaw's signal.

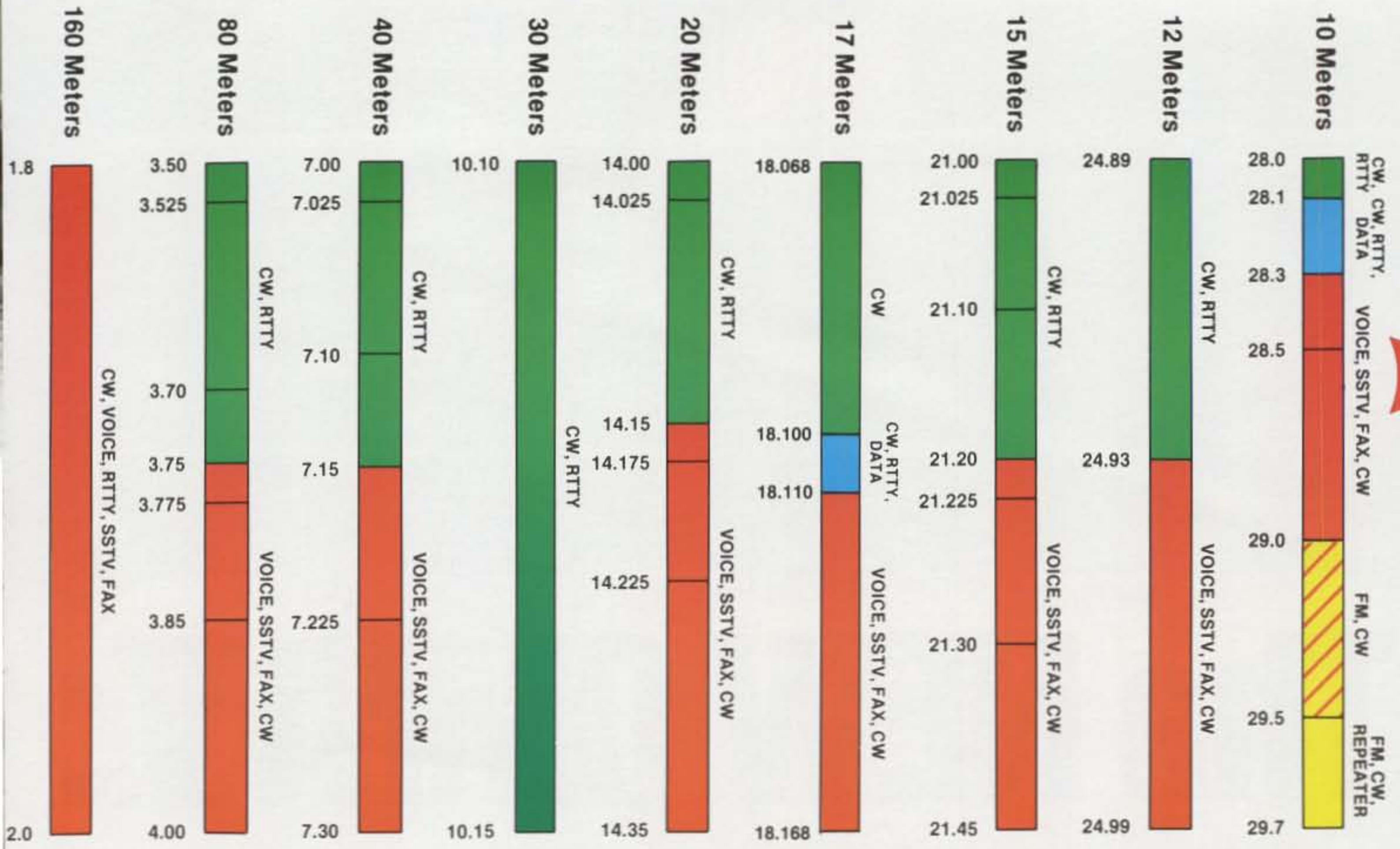
Early Thursday morning Bill was at his radio station. When Bruce came on the air, he told him what had happened to Shaw. He asked, "Are you going to Sint Eustatius?" After hearing the story, Bruce's mind was made up. He would go. If the airlines would cooperate, he would take the radio gear with him on each flight and see it was transferred properly—far easier said than done.

*1701 SE Jackson St., Stuart, FL 34997

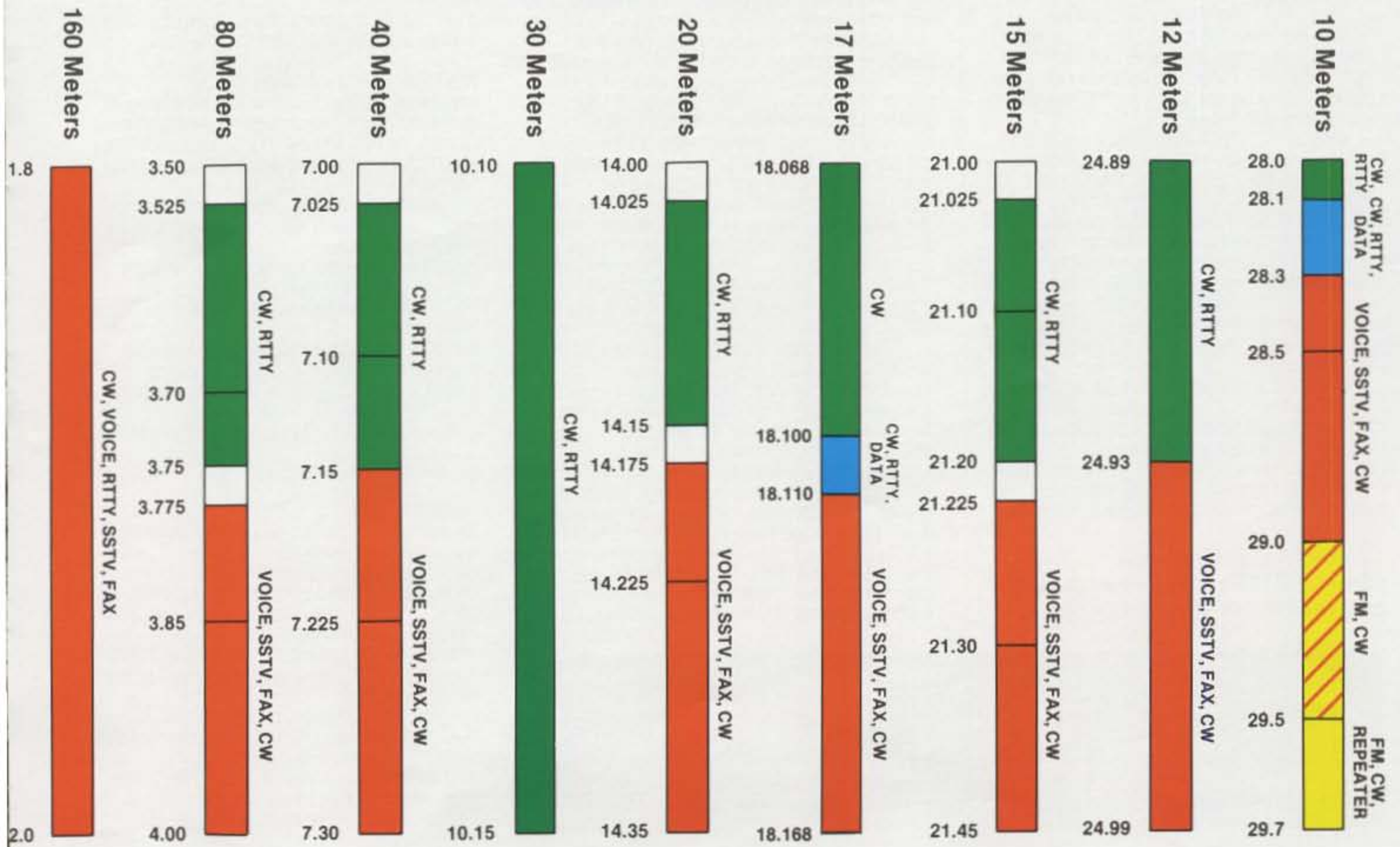


H.F. Amateur Radio Frequency Chart

Extra Class Privileges



Advanced Class Privileges





The NEW OMNI V:

The OMNI V is a Paragon with a 12 band crystal mixed local oscillator in place of the general coverage synthesized oscillator. The result is receiver cleanliness like the legendary Corsair and Omni series. The OMNI V local oscillator is a new ultra low noise 5.0 to 5.5 MHz PLL design. Phase noise is simply eliminated as a significant variable. Dynamic range is maintained right up to the edges of the crystal filters, even under the most adverse conditions.

Many of the nifty features made possible by digital technology are included. Dual VFO's with A-B-split select, the frequency stability of a PLL, 25 tuneable memories, VFO to MEM, MEM to VFO and the SCRATCHPAD feature. RS-232 interface is standard and includes remote band switching for the HERCULES II amplifier. The memories are nonvolatile RAM and are retained until you change them. The status registers and clock are backed with a lithium battery (2 year life) so that when the rig is powered up, the status is the same as when you turned it off.

The OMNI V operates USB, LSB, fast or slow QSK CW and real FSK. FM is optional. All bands from 160 through 10 meters are push button selectable. Each band position covers 500 kHz plus 30 kHz over-shoot at the band edges. The four 500 kHz segments of the 10 meter band are switched automatically as you tune through the

The OMNI V Station with Model 961 Matching Power Supply, and the Mighty Titan Amplifier.

segment limits. Tuning is in your choice of 10 Hz or 50 Hz increments on SSB, CW and FSK. With the FM option, tuning is in 100 Hz or 500 Hz increments. Up/Down buttons tune in 10 kHz or 50 kHz increments.

An auxiliary frequency tuning system is available and plugs into the rear panel. This allows you to remotely tune the frequency from the most convenient and comfortable position. It takes about 10 ms to fall in love with this option.

A noise blanker and audio speech processor are standard equipment as is the cw sidetone and speech monitor. The rear panel has a full complement of inputs, outputs and controls for the convenience of the all-mode operator, including an auxiliary RX antenna input. High speed key lines are provided for QSK control of a fast switching amplifier, such as the TITAN or HERCULES II. Changeover in fast QSK is less than 30 ms, great for CW and the digital modes.

The front panel is spacious and friendly. The vacuum fluorescent display uses large, bright, easy to read elements. The frequency display doubles as the 24 hour clock display when the CLOCK button is pressed. Other elements indicate VFO status and warn when the memories are full.

All four of the 6.3 MHz I-F crystal filter positions are push-button selectable, independent of mode. A second filter socket is also provided, in series, behind the standard 2.4 kHz filter in the 9 MHz I-F. This may be used for an optional 2.4 kHz, 1.8 kHz, 500 Hz or 250 Hz filter which is selected with the "NARROW" button. This adds six or eight poles into the crystal filter network and

even further reduces the impact of adjacent strong signals. Most impressive!

If you do not need a general coverage receiver in your HF rig, the elegant OMNI V is a great choice. If you are also a serious DX'er and/or contester, the OMNI V is the best choice.

GENERAL SPECIFICATIONS

Frequency Range: Transmit and receive on all ham bands from 160 through 10 meters in their entirety. Twelve 500 kHz segments plus 30 kHz over-shoot at the upper and lower edges of the segments.

Frequency Control: LO generated from a crystal oscillator mixed with a low noise 5.0 - 5.5 MHz phase locked loop.

Frequency Stability: Worst case, 1 PPM per degree C at 29.999 MHz.

Frequency Accuracy: + -100 Hz @ 25 degrees C.

Antenna Impedance: 50 Ohms, unbalanced.

Printed Circuit Boards: G-10 epoxy glass.

Power Required: Receive = 1.5 A. Transmit = 20 A. 12-14 Vdc.

Dimensions: HWD 5³/₄" x 14³/₄" x 17". 14.6 x 27.3 x 43.2 cm.

Net Weight: 16 lbs. 7.25 kg.

TRANSMITTER

Modes: USB and LSB (J3E), CW (A1A), FSK (F1A). Optional FM (F3E).

DC Power Input: 200 watts maximum.

RF Power Output: ALC stabilized, adjustable from 20 watts to 100 watts (50 Ohm load) with front panel RF OUT control.

Microphone Impedance: 200 Ohms to 50k Ohms. Bias voltage for electret mic is provided in front panel connector.

CW Sidetone: Internally generated with rear panel level and tone adjustments, independent of front panel audio level control.

SSB Generation: 9 MHz, 8 pole crystal ladder filter, balanced modulator.

Carrier Suppression: Greater than 60 dB.





Impressive from either end... but it's how we make ends meet that really delivers the difference.

Unwanted Sideband Suppression: Greater than 60 dB at 1.5 kHz AF input.
Harmonic Emissions: Greater than 45 dB below peak power output.
Third Order Intermod Products: -30 dB from two tone at 100 watts PEP.
Metering: Switchable forward power, SWR, collector current or audio processing level on SSB.
CW Offset: 600 Hz.
FSK Shift: 170 Hz.

RECEIVER

Modes: LSB, USB, CW and FSK. FM with optional board.

Sensitivity: .15 uV for 10 dB signal to noise ratio at 1.8 kHz bandwidth. With FM option, .3 uV for 12 dB SINAD at 15 kHz bandwidth.

Selectivity:

	-6 dB BW	-60 dB	Shape Factor
Standard 2.4 kHz	2.4 kHz	3.36 kHz	1.87:1
Opt. 1.8 kHz	1.8 kHz	2.90 kHz	1.60:1
Opt. 500 Hz	500 Hz	1.40 kHz	2.80:1
Opt. 250 Hz	250 Hz	.85 kHz	3.40:1
Opt. FM	15 kHz	30.00 kHz	2.00:1

Attenuator: -20 dB.

I-F Frequencies: 1st I-F 9 MHz, passband tuning I-F 6.3 MHz.

Image Rejection: > 100 dB.

I-F Rejection: > 60 dB average.

Noise Blanker: Switchable on/off with width adjustment.

Dynamic Range: 97 dB, measured with standard 2.4 kHz filter at 20 kHz spacing. 100 dB + with cw filters.

Third Order Intercept: + 10 dBm.

Noise Floor: -133 dBm @ 2.4 kHz bandwidth.

Squelch Sensitivity: Less than .6 uV.

Receiver Recovery Time: Less than 30 ms.

Pass Band Tuning I-F Shift: + -2.3 kHz.

Audio Output: Speaker, 1.5 watts @ 8 Ohms.

Fixed level 1 mw @ 600 Ohms.

Notch Filter: 250 Hz to 2.2 kHz, greater than 50 dB notch depth.

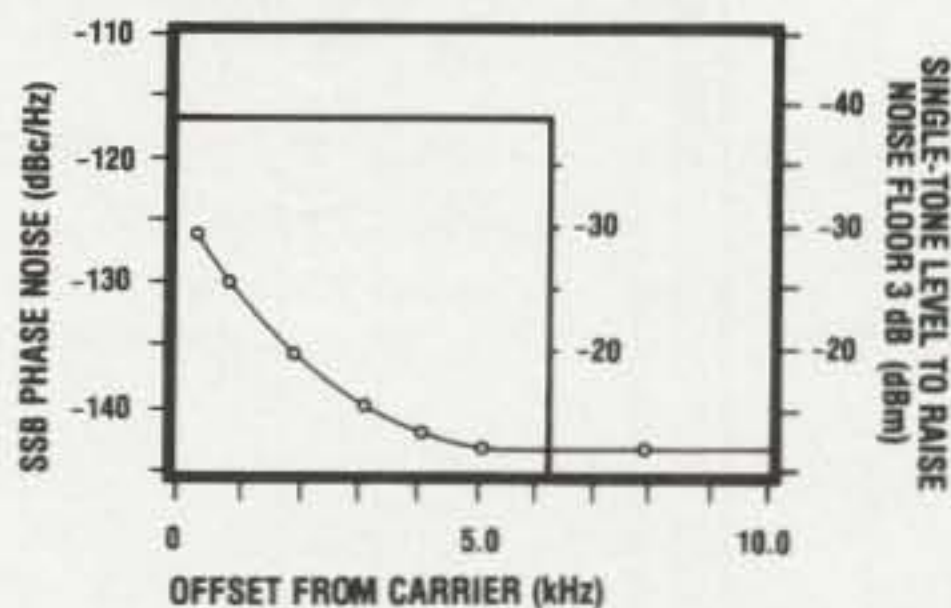
Audio Bandpass Filter: 4 pole, variable center frequency 220 Hz to 1.7 kHz, 35% band width @ -6 dB.

Tone Control: Variable 15 dB roll-off @ 5 kHz.

PHASE NOISE PERFORMANCE OF THE OMNI V

-127 dBc/Hz @ 250 Hz offset from carrier.

-146 dBc/Hz @ 5 kHz offset from carrier.



Here is a graph of the phase noise performance of the OMNI V receiver. These measurements can only be made under laboratory conditions and, even then, our test equipment is at the limit of its ability to measure the noise at the narrow offsets. The significant measurements are those close-in. Note that this graph does not even go out to 25 kHz offset where many of the published measurements are made. Certainly, we invite comparison.

A WORD ABOUT COST

The OMNI V and the Paragon are the same price. Our 12 band crystal mixed oscillator is the same cost to manufacture as our general coverage synthesized oscillator. The choice between these two transceivers is based on general coverage vs. the best possible receiver performance in the ham bands.

...America's Best!

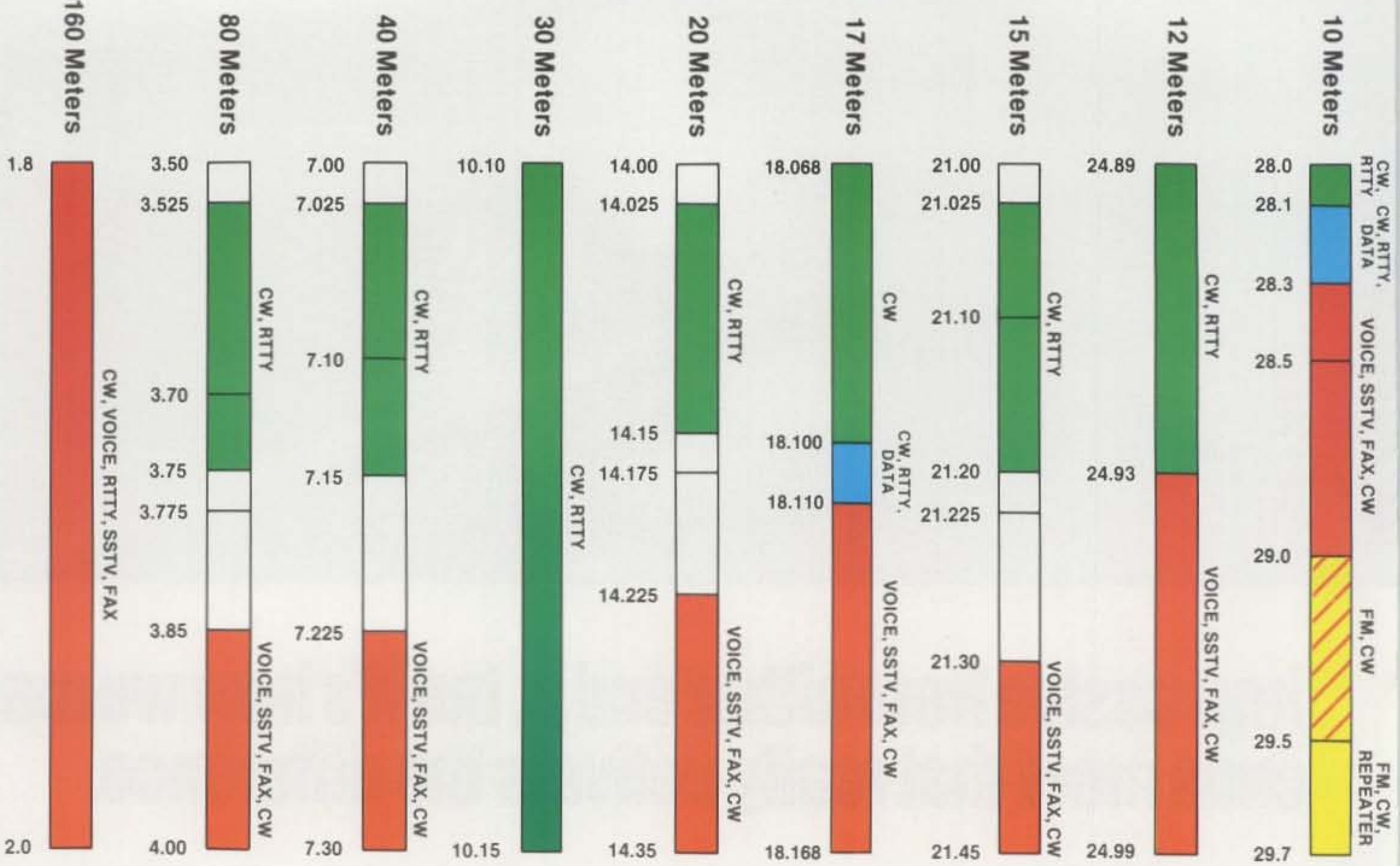
TEN-TEC

Highway 411 East
 Sevierville, Tennessee 37862
 615/453-7172

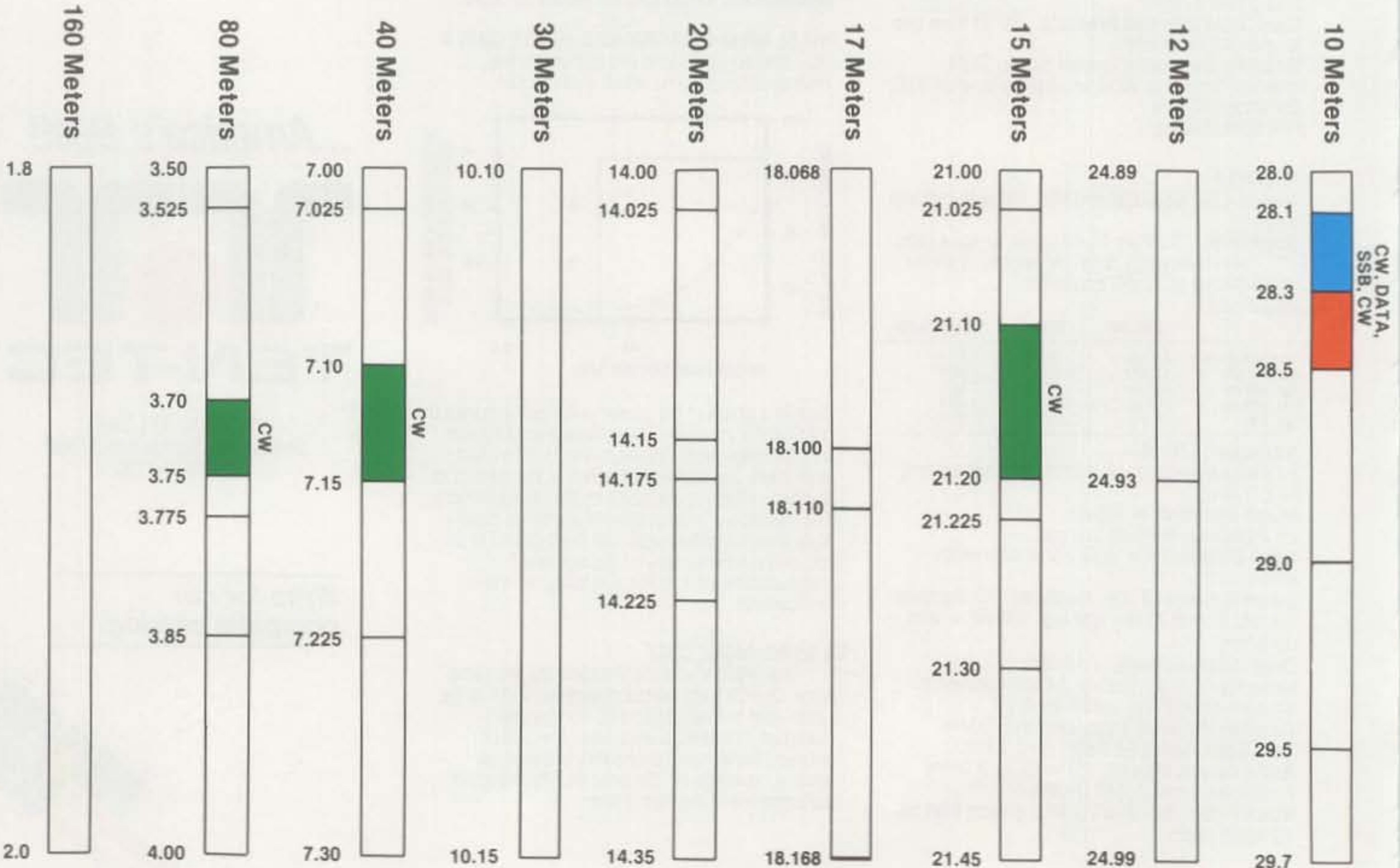
*Write for our
 complete catalog.*

**MADE IN
 USA**

General Class Privileges



Novice & Technician Class Privileges



NOTES: (1) These charts are intended for general reference by Amateurs and can in no way include full details of every aspect of frequency, license and mode privileges for all Amateurs. Such details are best determined from the most current FCC Rules. (2) 160 Meter DX windows 1.825-1.830 MHz and 1.850-1.855 by gentleman's agreement. (3) 75 Meter DX window 3.790-3.800 MHz. (4) 30 Meters is shared with fixed services outside the U.S. Use caution to avoid interference with these services. Power limit on this band is 200 watts PEP output. (5) 12 Meters is

shared with fixed service outside the U.S. Use caution to avoid interference with these services. (6) Novices are also permitted voice operation from 222.1 to 223.91 MHz with 25 watts PEP output and 1270.0-1295.0 MHz with 5 watts PEP output. On HF, Novices are restricted to 200 watts PEP output. (7) Technician, General, Advanced and Extra class licenses are also entitled to all Amateur privileges above 50.0 MHz.

Bill set about getting Tom's equipment packed. At the same time others made arrangements to ship various items to Shaw by air freight—an antenna from another DeLand amateur, another from a Dutch amateur in the Netherlands, test equipment from Orangevale, California. It was December 31st.

At 4 PM The Coordinator arrived at DeLand's bus terminal with nearly 100 pounds of electronics packed in four large cartons. He almost didn't have to bother.

During a radio contact at noon Bill was informed that new airline regulations limited passengers' excess luggage to just that—luggage. Cartons are not considered luggage and would not be permitted on the same flight. They asked the American Airlines International Division supervisor if the boxes were covered with a heavy plastic wrapper and a handle attached would they qualify as baggage? Of course, all overweight charges would be paid at the airport by the passenger. She laughed and said she'd call back. Thirty minutes later it still was no. There was nothing she could do. Now she was told the entire story. Would American Airlines refuse to expeditiously handle vital communications equipment and thereby deprive the 1800 island residents of a fast, sure way of getting radio apparatus to Sint Eustatius's only amateur radio operator? I'll check again, she said.

Though a letter of commendation has gone to American Airlines president Bob Crandall, I hope he reads this. In mid-afternoon Bill was told the American Airlines supervisor had arranged for the cartons to be handled as luggage. The airlines' manager in Miami would be expecting them; the traffic supervisor in San Juan, Puerto Rico would transfer them expeditiously to the Sint Maarten flight. There would be no charge whatsoever. She accomplished wonders.

As the DeLand Greyhound clerk took the cartons, telling Bill they'd easily make the 130 mile trip by the next day, she didn't realize the Stuart terminal would be closed for the holiday.

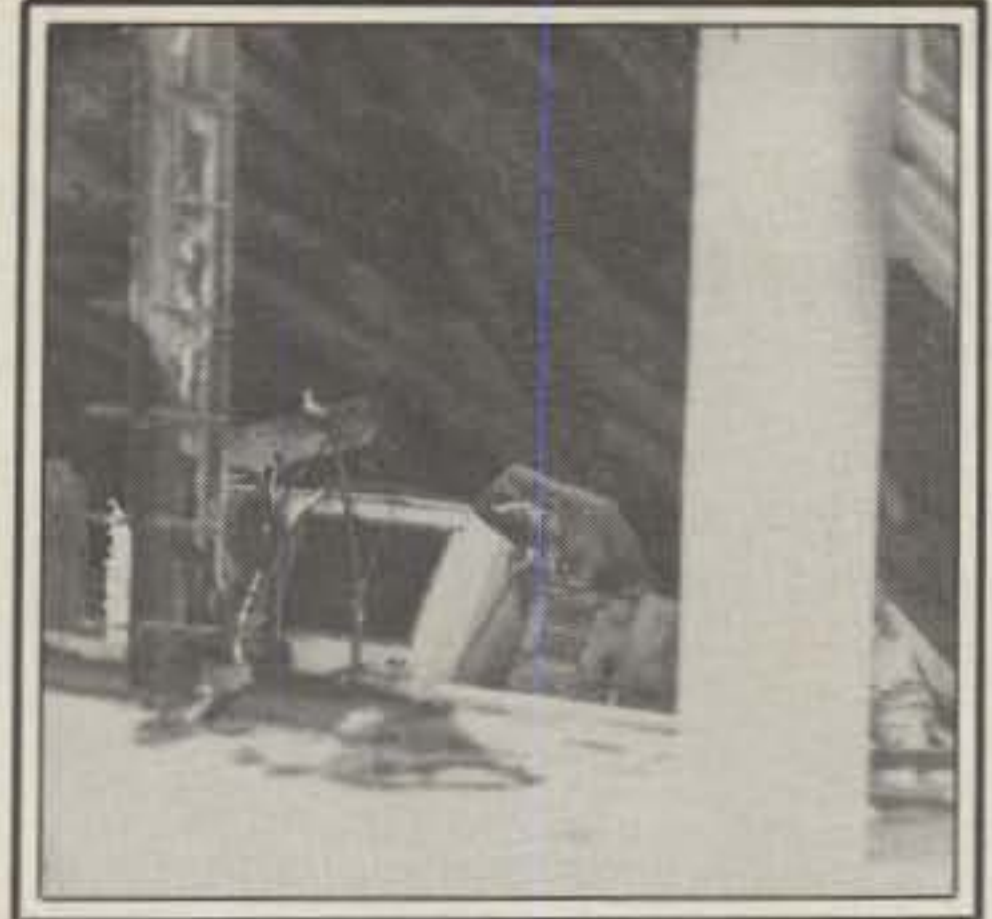
"Where are the cartons?" Bruce asked when he arrived Saturday to pick them up. Frantic telephone calls to Ft. Pierce, Orlando, West Palm Beach, even San Antonio and Dallas provided no clues. All were missing. The next package delivery wouldn't be until Monday. A weekend of worried waiting followed.

By noon Monday three buses arrived, unloaded, and departed, but no radio equipment.

At 2 PM a phone call went to Greyhound's president. Someone had to find the cartons—now! He'll call you back shortly, the pleasant voice said. Twenty minutes later the phone rang. Not the president, but the Stuart depot manager said the cartons were there.

As promised, the American Airlines manager in Miami was expecting the radio equipment. Shortly after noon Wednesday leg two of the journey was completed as the boxes were loaded aboard flight 917 destined for San Juan. The Sint Maarten flight was scheduled out of San Juan at 8:27 PM—just the right amount of time to make connection. Leg three would end Wednesday evening. After spending that night securely in a Philipsburg hotel, all that remained was a brief flight to Sint Eustatius.

While the Miami-San Juan flight sped south, the San Juan-Sint Maarten connection lay on the ground in Dallas, its wings covered with ice. By the time the aircraft was readied and made its way to Puerto Rico, it nearly was midnight. Regulations prevented the crew from continuing, as they had spent too many hours on the plane already. It would depart at 7:30 the next morning. Shaw's radio station must spend the night unattended




Charred remains of PJ8DFS's amateur radio equipment.

somewhere in San Juan's airport. Baggage-handling personnel were certain the boxes would be safe. It was not necessary to have them brought up with passengers' luggage. Yes, absolutely, all would be loaded on the morning flight. Tomorrow would tell.

At 8:45 AM, nearly 12 hours late, the San Juan connection touched down at Sint Maarten's Princess Juliana airport in Philipsburg. The baggage carrier threaded its way slowly. Bit by bit various duffel bags and suitcases appeared. One of the cartons came through, then a second, and finally all four. They were somewhat the worse for wear, but at least they were intact. As it turned out, the transceiver didn't function at first. However, pressing a few circuit boards back in place brought it to life.

A friendly counter attendant listened, surprised, as the contents of the cartons were described to her. Windward Island Airways was understanding and cooperative. Without a moment's delay the large boxes were on their way to the tiny aircraft taking them to one of the tiniest of the Netherlands Antilles. As added insurance the pilot, Captain Henkie Rivers, was a close friend of Mort and Shaw. Twenty minutes later, at Sint Eustatius' airport the Twin Otter came to a stop less than 500 feet from Shaw's temporary residence in the Airport View Apartments. Nine days had passed since the Florida amateurs first learned of Shaw's plight.

Covering the news story, *The Chronicle*, a daily for the northeastern Caribbean, put it mildly in attempting to describe the Shaws' gratitude, writing, "Naturally they are very happy with the spontaneous assistance received from friends on Statia and the Florida radio amateurs."

It will still be some months before Shaw gets his life back into a semblance of order, but a portion has already been restored. Once again, the signal from PJ8DFS is heard around the world. 



The radio room and all its contents were completely destroyed.

More QSO's More QSL's More Fun



when you speak their language.

- Add extra spice to your DX QSO's
- Let your DX friends know you care enough about them to learn their language. (After all, they've gone out of their way to learn English!)
- Break the phone pile-up with a few carefully chosen words in the DX station's own language. You'll be amazed at the difference, it's like adding 3 dB to your signal.

The Radio Amateur's Conversation Guide by OH1BR and OH3BAD gives you the 147 most often used phrases in eight languages: English, German, French, Italian, Spanish, Portuguese, Cyrillic Russian, Phonetic Russian, Phonetic Japanese. Phonetic alphabets and eight-language dictionary included in this rugged spiral-bound manual a MUST for any serious DXer or Contestor. Beat the competition. Order yours today. Only \$10.00 plus \$2.00 per order shipping.

Supplements available in less-used languages: Dutch/Flemish, Danish, Finnish, Swedish, Serbocroatian. \$4.00 per supplement. Be sure to state which language supplement you need.



New cassette tapes in eight languages

Now you can hear the exact pronunciation of the sentences, phrases and words covered in *The Radio Amateur's Conversation Guide*. Each high quality language tape is recorded with proper dialect and usage in one of the languages in the Conversation Guide.

Tapes available in each of these languages:

- German
- French
- Spanish
- Finnish
- Portuguese
- Russian
- Japanese
- Swedish



CQ Book Shop
76 North Broadway
Hicksville, NY 11801

Please send the following:

Conversation Guide Book \$10

Language Tapes

@ \$10 each

- German
- French
- Spanish
- Finnish
- Portuguese
- Russian
- Japanese
- Swedish

Supplements

@ \$4 each

- Dutch/Flemish
- Danish
- Finnish
- Serbocroatian
- Swedish

Add \$2 for postage and handling in North America

Total _____

Name _____

Address _____

City _____ State _____ Zip _____

1988 CQ WW DX CW Contest High-Claimed Scores

The following are CW high-claimed scores. These are raw scores only, subject to verification.

DX Single Operator All Band

FY5YE	9,582,856
HC5M	8,862,000
D44BC	7,407,750
8P9HT	7,323,030
EL7U	6,723,360
P40GO	6,569,485
SU1ER	6,134,568
PZ/N3JT	6,013,985
CT3BZ	5,495,616
KC6CS	4,906,470
CT2NH	4,683,500
VP5U	4,509,262
6V6A	4,259,325
KG6DX	3,719,500
5H1HK	3,627,686
TF3WW	3,606,304
KH0	
/JE1CKA	3,581,912
F6BEE	3,312,240
GW4BLE	2,788,668
VO1MP	2,737,327
VE6OU/3	2,726,946
UP3BP	2,702,048
G3MXJ	2,513,302
YU3BO	2,491,129
OZ1LO	2,412,775
JH7WKQ	2,398,674
G4BUO	2,348,919
RL7AB	2,333,658
ZL3GQ	2,286,384
UA3RAR	2,222,353
YU3EA	2,205,198
SM5GMG	2,106,270
HZ1HZ	1,917,938
UA3RAR	1,886,624
9Q5DX	1,853,697
VE3IY	1,833,920
OH6YF	1,775,900
UC2OT	1,720,706
UA4WI	1,676,840
JA8RWU	1,666,800
AH6AZ	1,655,970
EL2FY	1,639,840
DK6NP	1,621,710
OK1VD	1,528,320
Y21RM/A	1,502,148
OH2PM	1,494,951
JR1IJV	1,476,110
UB4MM	1,440,576
OA4ZV	1,414,446
OK3CDX	1,357,185
PP1RR	1,349,000
UA4WA	1,328,805
JF1SEK	1,297,433
RO4OA	1,260,430
CE1IDM	1,232,064
OK2BFN	1,226,668
VE3KP	1,190,884
VP2MDC	1,163,160
UM8MBA	1,154,712
6Y5JH	1,133,320

PA0GAM	
/ST2	1,131,840
UP2BSP	1,123,005
UA9XR	1,115,118
JR3BOT	1,105,920
JA7YAB	1,076,620
YC3HCM	1,064,350
EA1AU	1,054,386
UP3BU	1,044,100
EA5YU	1,043,874
HB9AGA	1,042,173
FH5WF	1,012,813
G3NKS	1,001,700

1.8 MHz

TA2BK	166,320
HB9AMO	111,245
VO1NA	103,320
SP3BQ	89,712
IK2DVG	76,788
CT1AOZ	66,439
UF6VBC	60,591
UR2RGN	59,454
OK1FCW	55,809
UA9AQN	54,960
OH1AF	54,642
UW9CO	50,058
UF6DA	43,316
KX6DC	42,723
YU3MM	42,075
RB5BA	41,317
I3VHO	36,400
YV1OB	34,959
VE3DO	31,146

3.5 MHz

NP4A	819,678
EA8XS	531,792
4N1A	247,020
YT3AW	121,595
YT3FO	118,940
DL3HAH	118,243
OH7UE	116,919
UA9CBM	105,999
YU3OJ	105,340
UA0OD	100,347
JA0DXG	94,116
YU5RU	92,316
UA9QA	91,656
F5MF	87,120
UA9SGN	85,775
UB7VA	80,688
OK1MAW	79,210
UB5IFN	79,121
OK1OPT	74,970
RB5NC	70,520
OZ7HT	69,696
RA9AE	66,072
OK1JFJ	62,848
YT2ER	59,080
JH1OGC	56,146
UA6ED	52,920
UA6HPW	51,600
OZ1HZI	50,325

7 MHz

YX5A	1,001,578
------	-----------

OH7JT/CT9	912,674
P40R	874,240
YT0A	606,300
I3JSS	582,250
LZ1V	509,472
RU1DZ	502,758
YT7A	410,256
DL0DL	330,310
OE3GSA	319,000
LA8XM	308,850
ZY5EG	197,088
G3KDB	196,440
RB5MA	186,182
UA4RC	180,564
YO3FBE	180,144
JH1RFM	173,030
SM6EAN	146,280
UA6LTI	133,630
G3IGW	130,074
K4SXT/DU3	123,487
G4ODV	121,220
UO5ONV	112,385
SM2EKM	108,120
RA4PC	102,943
OZ1FYE	101,848
YU3JZ	100,100
OK1DFF	98,307
JA0KAZ	95,076
OH4NSG	94,653
JA0UMV	91,040
YB3ASQ	90,058
YO8AXP	86,112
YU5FU	86,104
UA2CM	79,261

14 MHz

ZS6BCR	832,524
NY6M/KH2	770,944
G3FXB	708,724
PY5ZBA	573,144
OH7MA	534,691
VE2ZP	532,740
UR2RDO	510,416
YU7AV	496,987
CX8CG	487,426
IT9GSF	484,846
VK2APK	452,228
G3TXF	422,408
JA7FTR	386,100
UM8DX	355,580
JA2JW	351,422
SM0AJU	325,180
EA8/DJ4SO	309,912
SV1RP/2	279,433
VE7BC	268,500
UF6QAC	263,128
JE3ZFS	261,720
RF6FKG	259,653
JR1XFS	248,859
JH8JPK	243,672
UW1BI	232,587
UA1OIL	220,900
6H8AAX	195,672

28 MHz

4M7A	1,145,375
ZY5EG	1,041,054
KD7P/NH2	1,037,608
VS6UP	712,597
CE3DNP	671,574
RB5VK	490,184
EA7TH	455,259
CN8FC	433,818
AY4F	431,664
AT0Z	425,024
YT7WW	412,596
YT3T	401,898
YU2NW	396,620
YT2O	395,136
OK1GS	382,876
G3LNS	375,777
F6AUS	364,715
JG3ZDK	339,600
4N4C	311,190
OE1JNB/3	311,148

UL70B	293,710
YU3BU	271,054
OE5KE	259,749
AX4XA	254,196
UB5ZAL	253,400
UC2OCH	237,762
YU3M	232,050
DK5WL	230,879
JA1KFX	228,241
PY2RLQ	225,256
OK2PAY	218,377
JH1XYR	217,810
DJ8FR	215,040

HD8EX	27,931,888
OL8A	18,821,460
LX8A	18,692,646
PA6DX	10,870,720
Y34K	9,862,128
YT2R	8,964,388
JA6YCU	8,752,654
JA1YAD	8,065,811
OH1AA	7,000,425
JA2YKA	6,827,626
JA9YBA	6,730,800
DF0DX	6,008,346
UP1BZO	5,849,613

W1WAI	1,446,192
KF0H	1,389,968
N4XR/1	1,375,565
W1FJ	1,331,512
AA4U	1,294,472
W1GD	1,262,800
WB3KKX/8	1,259,902
W2GGE	1,219,509
NT5G	1,107,108
W3UJ	1,104,100
N5AW	1,101,312
K4GKD	1,069,665
AA3B	1,048,730
K2SX/1	1,037,700
AB2E	1,033,728
K4AMC	1,027,356
W3GU	1,006,206

K1EFI	215,560
KK9V	208,978

28 MHz

K1ZZ	541,336
W4XJ	340,445
W0ZV	331,976
W6YA	293,591
W1WEF	277,815
W6QHS	268,125
KX4R	241,957
N2KW	227,304
K1UO	219,252
N4BP	195,728
K4JYS	189,312
K7QQ	188,032
K5KLA	183,164
KI3L/5	181,684
K6PU	171,955
N9RD	165,750
WB7FDQ	149,800
NC7K	147,368
K5NW	146,370
W3AZ	140,970
WA3LFY	132,594
WD5JZL	130,593
K4TKM/6	130,391
K2MFY	128,904
WM4Z/5	127,000
K8IKE	124,762
W5LTR	111,870

SINCE
1965

**THE ONLY SOURCE
YOU'LL EVER NEED!**

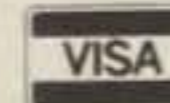
SATISFACTION GUARANTEED

- QUICK SHIPMENT
- LOW COST
- RELIABILITY

FOR FREE CATALOG, CALL OR WRITE:

JAN CRYSTALS

P.O. BOX 06017
FORT MYERS, FL 33906
(813) 936-2397



**TOLL-FREE:
1-800-237-3063**

IN FLORIDA: 1-800-226-XTAL
FAX ORDERS: 1-813-936-3750

CIRCLE 90 ON READER SERVICE CARD

**COMMODORE
ACCESSORIES**

PRINTER INTERFACES, RS232
INTERFACE, USER PORT PROTECTORS,
EXPANSION BOARDS, HEAVY DUTY
POWER SUPPLIES, CABLES, ETC.

COMMODORE CHIPS

WE CARRY THE COMPLETE LINE OF
COMMODORE CHIPS FOR THOSE
WISHING TO REPAIR THEIR OWN
COMPUTERS AND DISK DRIVES.

PRINTERS

LOW COST PRINTERS AVAILABLE AT
UP TO 50 % OFF LIST PRICE.

100 CPS	\$ 125.00
140 CPS	\$ 145.00
160 CPS	\$ 165.00

90 DAY FACTORY WARRANTY

**COMMODORE SOFTWARE
NEW ONLY \$3.00 EACH**

**1-800-227-4051
CALL FOR FREE CATALOG**

DELTA COMPUTING TECH. CORP.
292 NORTH PLANK RD.
NEWBURGH NY 12550

CIRCLE 89 ON READER SERVICE CARD

**Multi-Operator
Single Transmitter**

VP2MW	9,046,080
PJ2X	9,003,508
RL1P	8,518,924
UL8LYA	7,849,798
HG5A	7,813,905
LZ9A	7,474,770
3W8CW	7,140,601
IO4IND	6,739,200
HG1S	6,708,247
OK5R	6,481,785
UQ1GWW	6,434,300
HG6N	6,205,170
UZ9SWY	6,107,033
F5IN	5,686,684
HA0KLE	5,613,840
OL4A	5,532,480
XE0DX	5,428,410
HG8Q	5,105,793
SP3GEM	4,961,582
4N1W	4,877,257
UR1RWX	4,565,016
JE2YRD	4,355,448
UZ9CWW	4,341,190

QRP

YU3BC	1,251,032
VP2EQ	823,410
J11CBF	549,917
G4ELZ	466,272
UD6DFF	421,553
HB9ADD	408,444
YU2TY	390,111
UB5WAB	348,986
SM5CCT	316,848
I4KRF	254,462
UA6LIG	252,237
4X1IF	236,028
UP2BFE	234,972
SM0DJZ	218,784
VE7CKF	202,280
JA7AS	170,918
CX7CO	153,825
IS0LYN	130,491
PA3ELD	116,023
Y21NE	112,216
Y54WM/P	110,589
YO5BQ	109,068
YO2AQB	106,774
Y23TL	101,970

1.8 MHz

K5UR	13,568
KG4W	12,213
K4TEA	10,266
N4MPO	9,842
KD9SV	6,800
NA2M	5,520
N6LL	5,430
N8EA	4,796
N4SU	4,158
N2KA	3,256

3.5 MHz

W3FV	226,518
K1NA	140,192
W0GD/8	90,748
W4NL	45,982
W5WMU	39,250
W9WAO	25,200
W2FR	23,146
W0UO	22,466
W7IVX	18,920

**Multi-Operator
Single Transmitter**

K1AR	7,370,285
N3RS	5,648,296
N4WW	5,277,350
K8AZ	5,063,990
K5NA/2	5,013,162
WM5G	4,341,104
K1DG	3,499,624
KO7N	3,405,324
K3WW	3,193,697
W3GG	2,591,372
K3PA	2,546,171
N6VV	2,090,000
W6BA	1,937,430
K2SG	1,905,080
WA4CTC	1,851,568
W8ZF/4	1,783,520
K4PI	1,649,700
W5ASP	1,617,084
N6IC	1,560,075
W7TJ	1,557,936
K1IU	1,525,510
KB3MM	1,520,694
N4VZ	1,515,000
W3MA	1,502,961

7 MHz

K2EK	548,751
N2DT	399,765
WB8JBM	306,372
KD2RD	282,535
W6PU	190,060
KB0G	176,624
W8FJ/3	173,799
KM2P	162,722
WA9EKA	100,182
K9AY/0	67,816
KA0CGI	63,684
N6OC	60,282

14 MHz

N5CR	474,084
K2HFX	411,300
N4MO	254,475
N6GG	243,036
W1RR	203,635
WA1FCN	186,538
K9CLO	140,000
W1YN	107,210
W1UA/4	85,239
KK9A	80,190
KC2FD	74,592

21 MHz

K3RV/4	682,362
WC4E	615,884
W1RM	591,038
KW8N	509,878
N2PP	470,304
W1NG	449,526
AA4NC	440,706
K1XA	417,745
N4RR/9	389,002
WB4TDH	359,196
K2WK	315,792
KM1X	312,928
KC9T	306,084
K9QVB	296,259
K4LTA	259,090
W8QID	222,176
N4IR	220,545

**USA
Single Operator
All Band**

W1KM	4,488,483
K3TUP	4,319,028
K1CC	3,928,258
K1TO	3,870,319
N2LT	3,825,028
K3ZO	3,731,904
W9RE	3,487,232
N5AU	3,323,400
N6BV/1	3,254,656
K3OO	3,237,344
K1RU	3,231,676
N6AR/4	3,106,488
N3AD	3,050,415
WZ4F	3,043,194
KM9P/4	2,952,100
K4PQL	2,920,133
W4RX	2,687,208
WX4G	2,613,475
K1VR	2,564,992
K8CC	2,476,544
AA1K	2,422,224
NY2L	2,358,240
K3UA	2,276,274
K5MM/7	2,160,000
KZ2S	2,140,000
W3VT/4	2,077,400
W9SU	2,036,619
N3CXV	2,033,848
WD8LLD	1,991,979
NM2Y	1,879,080
K7GM	1,870,015
A17B	1,759,160
K8MR	1,758,271
K2LE	1,752,661
W2REH	1,658,853
K3ZZ	1,653,771
KA5W	1,616,309
AA4S	1,602,888
AD5Q	1,584,356
W3GRF	1,571,724
N7TT	1,561,971
W0WP	1,527,110
KG1D	1,483,299

**Multi-Operator
Multi-Transmitter**

PJ1B	41,206,564
P40V	39,643,761
KP2A	32,845,476
EA9EA	31,968,498

Next time you want to go somewhere warm and scenic, try Kauai in the Hawaiian Islands, where you can also visit WWVH.

CQ Visits WWVH

BY LEW McCOY*, W1ICP

The occasion for my wife and myself was a twofold one—a celebration of our 50th wedding anniversary and a visit to WWVH in the Hawaiian Islands.

At one of the ship's stops, Kauai, we rented a car to do some sightseeing. I had thought much about a visit to WWVH, because when WWV at Fort Collins, Colora-

do went on the air, they sponsored a contest for the first person to copy their very first transmission. I was the lucky winner and received a beautiful painting of the station, which still hangs in my shack. Also, I had visited Ft. Collins, so you can understand my eagerness to see WWVH.

Shortly after we arrived on Kauai, we rented a car and headed out along the ocean toward the station location. Suddenly, there by the roadside was the sign "WWVH." As it turns out, WWVH is on a

naval satellite base, so you have to go through a security check at the gate (which only takes seconds). The security guard gave the directions, and it turned out to be less than a mile to the station.

I guess I expected a real antenna farm, but the antennas used by WWVH were simply phased half-wave dipoles for 5.0, 10.0, and 15.0 MHz. These are directional arrays aimed primarily to the west and north. The 2.5 MHz antenna is an omni-directional unit mostly for local coverage.

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



This is the array of control panels for time standards, frequency standards, and so on—lots and lots of buttons and controls.



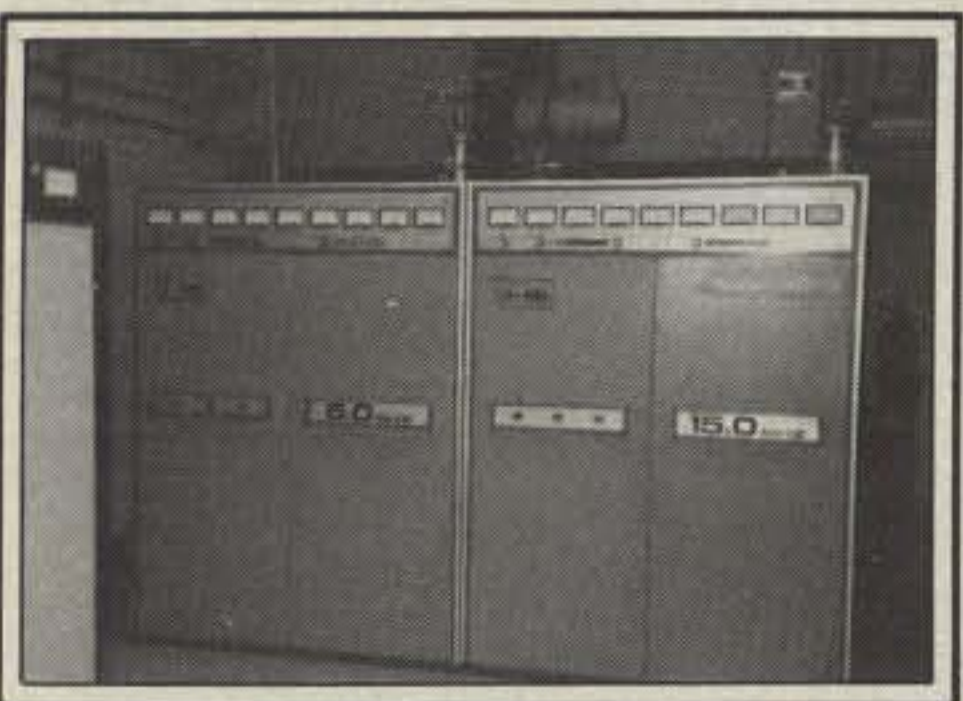
This is a close-up of two of the five channel RF amplifier and driver monitoring units.



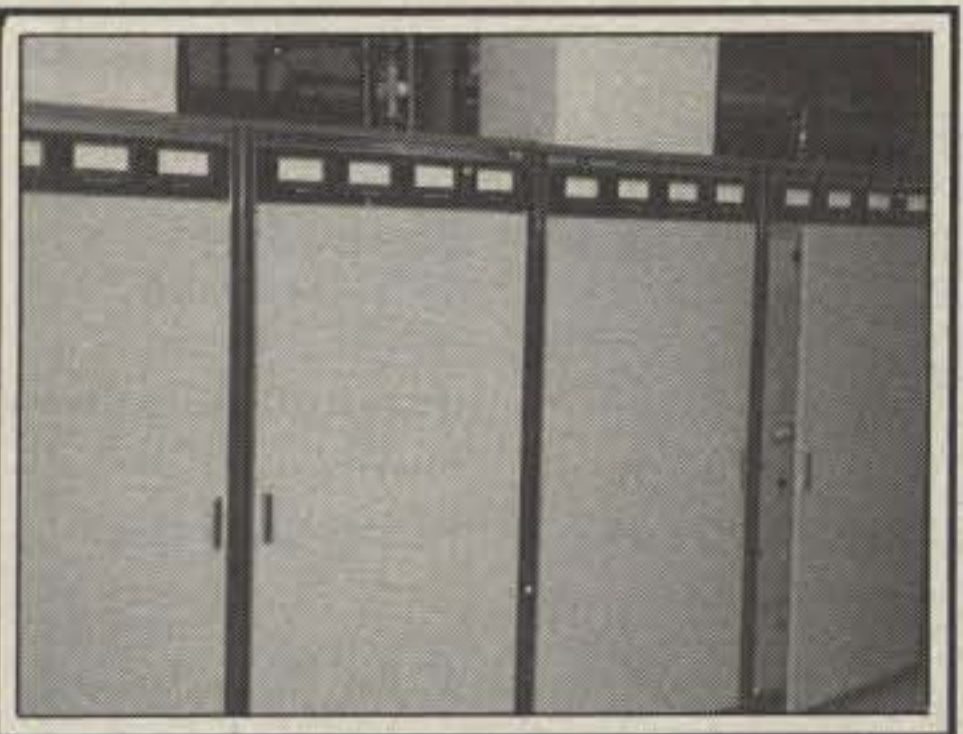
Chief Engineer Hironaka is explaining some of the functions of the various units.



This tape deck at the end of the control panels is used for weather and Pacific storm-warning announcements.



The drivers for 5 and 15 MHz—yes, the drivers!

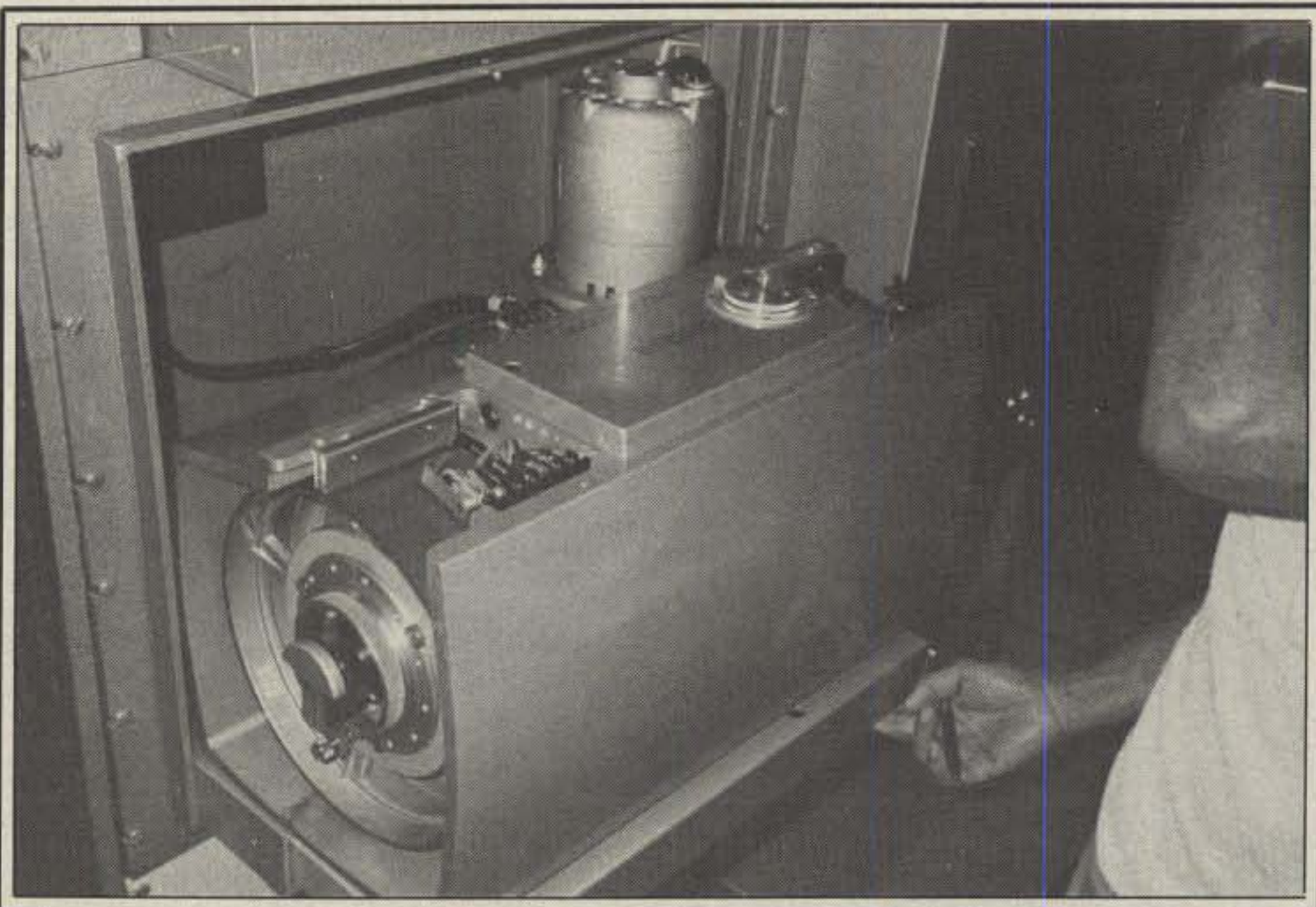


These are the amplifiers that house the 4CV50,000s.

The historical chronology of WWVH is rather simple. They started operation in November 1948 but did not begin voice transmissions until 1964. This was on the island of Maui. In 1971 operation was transferred to their present location on Kauai, and at the same time, Pacific Weather Warnings were instituted. For those interested, the new UTC time scale began in January 1972, and in January 1974 the voice announcements were changed from Greenwich Mean Time to Coordinated Universal Time.



An audio monitor used to check voice transmission.



"At the tone it will be—." This is the audio drum voice player heard on all announcements.

The Chief Engineer, Nobu Hironaka, was kind enough to take us on a guided tour through the station, and it is impressive! For some more technical information, the radiated power from the 5, 10, and 15 MHz transmitters is 10 KW. This is achieved by using 4CV50,000s. Now that's what I call a cool 10 KW. I have always been a believer in using tubes that have much more plate dissipation than needed just so the amplifiers are not "pushed." This is certainly the case here, with 50 KW of plate dissipation for

10 KW output. I was impressed. I might add that these amplifiers and tubes should literally last for eternity. A station, or stations, such as WWV and WWVH must be designed for 24 hour a day operation, day in and day out, without failure. Everything I have seen at both stations is a credit to good design.

Some more statistics: Three atomic frequency standards provide optimum timekeeping stability. The atomic clocks are accurate to one millionth of a second per month, and variations are held to



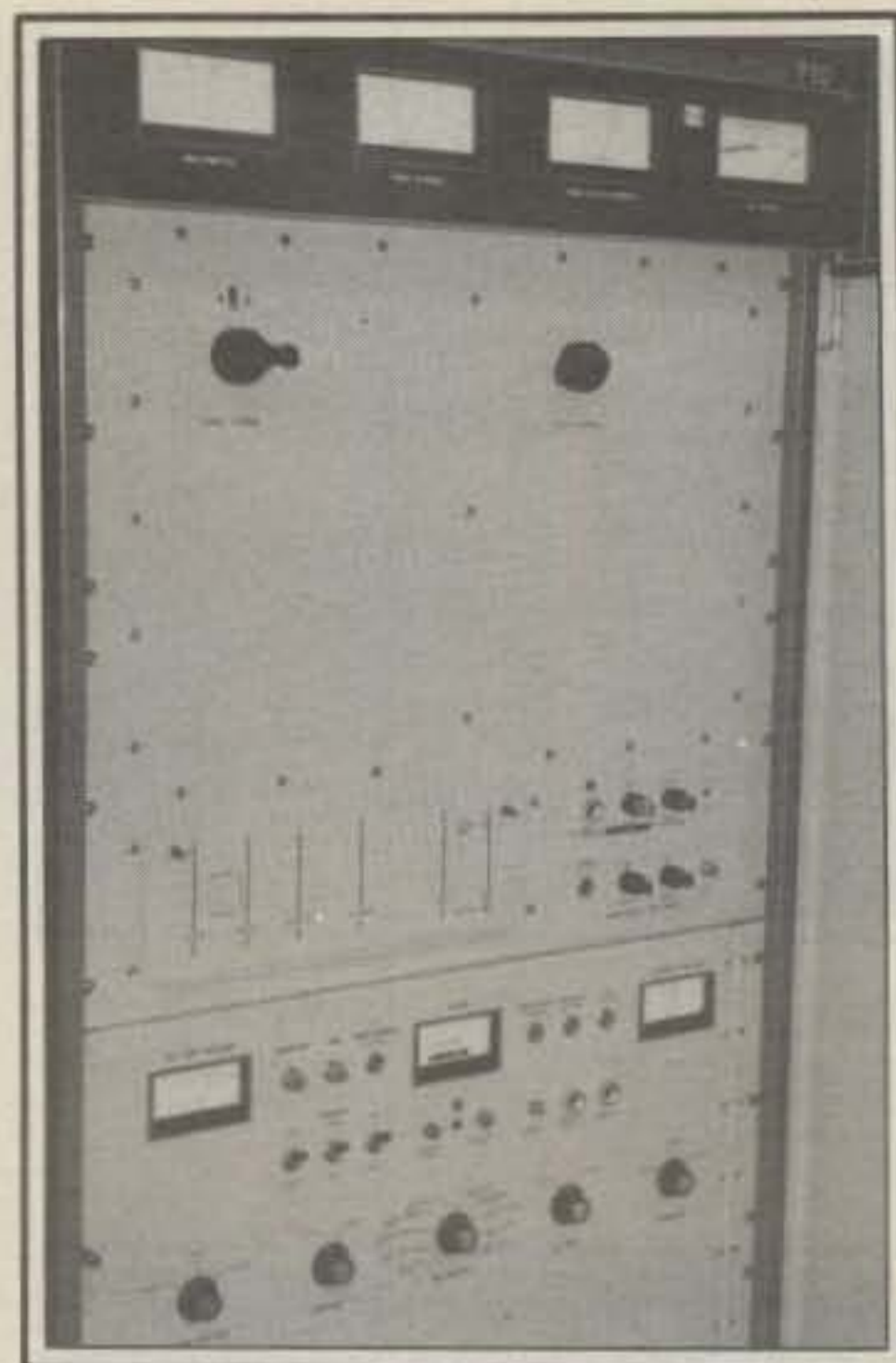
This is a frequency divider and digital clock. I should mention that there is much redundancy in the station to provide backups, including an elaborate power generator in case of power failure.

within 5 microseconds on the National Bureau of Standards and the UTC time scale. The primary standard is maintained by the Time and Frequency Division, National Bureau of Standards, Dept. of Commerce Laboratories, Boulder, Colorado. Several synchronization methods are used to keep WWVH clocks in step with NBS/Boulder.

A time code generator allows recorded voices and special announcements to be programmed automatically into the

broadcast format. This information provides modulation through a synthesizer for four standard broadcast frequencies which are accurate to a few parts in one million million. A female voice is used on WWVH time announcements, thus distinguishing it from WWV's male voice.

I might add that visitors are welcome, so if you get to Kauai make the trip out to the station. I made liberal use of my camera so you can get a good idea of what is what.



This is one of the final amplifiers. The two small black knobs at the top are (left) "Final Tuning" and (right) "Final Loading." At the top, from the left the first meter is a multimeter, then Final Screen, next Final Plate and Screen, and last RF Output.

WORK THE WORLD, QRP MOBILE!

With a 15 Meter Mobile you will amaze your contacts on USB or CW.

NCG 15 m - Mobile - 2/10 Watts



Amateur
Special \$295.00

CW Side Tune - ALC - Precision Ball Drive VFO, Top Mounted Speaker

RIT/Fine Tune Offset + 4KHZ

Dynamic Microphone 13.8VDC, 5 AMPS

Available from appointed dealers or direct.

NOTE: Prices and specifications subject to change without notice or obligations.



1275 N. Grove St.
Anaheim, Calif. 92806
(714) 630-4541

AMATEUR TELEVISION

SMILE! YOU'RE ON TV



Only
\$329

Designed and built in the USA
Value + Quality from over 25 years in ATV...W6ORG

With our all in one box TC70-1, 70cm ATV Transceiver, you can easily transmit and receive live action color and sound video just like broadcast TV. Use any home TV camera or VCR by plugging the composite video and audio into the front VHS 10 pin or rear phono jacks. Add 70cm antenna, coax, 13.8 Vdc and TV set and you are on the air...it's that easy! TC70-1 has >1 watt p.e.p. with one xtal on 439.25, 434.0 or 426.25 MHz & properly matches Mirage D15, D24, D100 amps for 15, 50, or 70 watts. Hot GaAsfet downconverter varicap tunes whole 420-450 MHz band to your TV ch3. Shielded cabinet 7x7x2.5". Req. 13.8 VDC @ .5A Transmitters sold only to licensed amateurs, for legal purposes, verified in the latest Callbook or send copy of new license. Call or write now for our complete ATV catalog including downconverters, transmitters, linear amps, and antennas for the 70, 33, & 23cm bands.

(818) 447-4565 m-f 8am-5:30pm pst.

Visa, MC, COD

P.C. ELECTRONICS

Tom (W6ORG)
Maryann (WB6YSS)

2522 Paxson Ln Arcadia CA 91006

CIRCLE 130 ON READER SERVICE CARD

CIRCLE 128 ON READER SERVICE CARD

R&L ELECTRONICS HAMILTON! OHIO

1315 MAPLE AVENUE HAMILTON, OHIO 45011

1-800 • 221 • 7735

TECHNICAL OR IN OHIO CALL (513) 868-6399

WE STOCK ALL MAJOR LINES OF
AMATEUR RADIO EQUIPMENT



FT-411-811

Full-Feature VHF & UHF FM Handhelds



FT-470

Compact Dual Band 2m/70cm FM Handheld

CALL OR WRITE FOR OUR
FREE CATALOGUE



FT-212RH/712RH

Compact VHF/UHF FM Mobile



**FT-736R All Mode Multi-Band
VHF/UHF Full Duplex Base**

**Y
A
E
S
U**



FT-4700RH Dual-Band (VHF/UHF)



FT-767GX HF/VHF/UHF All Mode Base



FT-757GXII HF All Mode Base/Mobile



FT-747GX Lightweight HF All Mode Mobile/Base

Does your local grade school offer a course in amateur radio? If the answer is no, ask yourself why not. Here's a story about one school in New York that does offer such a course and what it has meant to these kids.

Amateur Radio Can Make A Difference

BY CAROL PERRY*, WB2MGP

Eight years ago I began teaching a course called "Introduction To Amateur Radio" at Intermediate School 72 in Staten Island, New York. What began as a pilot program is now taught to 11 classes every term, which amounts to 700 students. Sixth, seventh, and eighth graders participate in a program which uses amateur radio to motivate youngsters in different areas of the school's curriculum.

Social studies, science, math, and language-arts skills are all built into this unique curriculum offering. The course has been so successful with our students that the school offers night classes for upgrading and amateur radio courses for parents and other members of the community. These night courses are taught by members of local amateur radio clubs.

I maintain a station at the school which the students can use under my supervision. It is a great teaching aid and occasionally can lead to something that has a long-lasting, meaningful effect. For example, on March 14, 1988 we were fortunate enough to make contact with Father Mike Cronin, EL2BX/9L1, a missionary in Sierra Leone, Africa. Not only did Father Mike describe the area where he lived, but it turned out that he was also the principal of a local high school. The kids were spellbound by Father Mike's conversation.

As a follow-up lesson the children wrote letters and sent pictures to Father Mike and his students and invited him to visit us whenever he returned to the United States. Recently, and much to everyone's delight, Father Mike remembered the wonderful contact with my kids, and through the good efforts of a local amateur friend from IMRA, Brother Joe, AC1U, he got in touch with me during a brief visit to the New York area. He said he would come and visit our school.



The author with a few of her amateur radio students as they prepare for their visit with Father Mike. Students spent weeks learning about the QTH of one of their favorite DX contacts, EL2BX/9L1, Sierra Leone. His visit provided the spark for a highly motivated interest in geography.

In anticipation of Father Mike's visit the different sixth, seventh, and eighth graders in my program did reports on Sierra Leone and made maps, charts, and flags of the African continent. They learned a great deal about the climate and geography of Father Mike's country.

On December 2, 1988 Father Mike got to speak with several hundred students from our school, including those youngsters who had heard him months earlier on the radio. His eloquence and obvious love of children made him an instant success. The children were absolutely captivated by his stories of what a typical school day is like in Sierra Leone.

The youngsters were amazed to learn that there is no electricity, that there are very few cars, and that the students in his school must walk at least three miles to

get there every day.

It was an incredible treat for all of us to learn about the cultural differences and similarities between our two countries. There's really nothing that can top the experience of speaking directly to a citizen from another country to be able to appreciate and respect how people lead different types of lives all over the world.

I had invited some local amateurs to share the wonderful visit with us at school that day. A great supporter and friend of our school's amateur radio program, Ed La Tour, KA2TXL, was as impressed as I was with the way the youngsters responded with wonder and enthusiasm to our new friend, who had only been a voice over the radio a few months ago.

We were especially pleased to hear Father Mike explain how different his life would be if it weren't for amateur radio.

*10 Bergound Ave., Staten Island, NY 10314



Two seventh graders, Erica Johnson and Marie Sfinarolakis, display a map of Africa they made for the occasion.



The big day arrives—Father Mike visits the school. From left to right: Father Mike, EL2BX/9L1, Carol Perry, WB2GMP, Brother Joe, AC1U, and Ed La Tour, KA2TXL.

Through amateur radio he is able to maintain contact with his family in the U.S. and let them know that he is well. Since he is away for years at a time, this is obviously very important to him. His family lives in this country, and they welcome his messages via phone patches and other amateur radio relays. Amateur radio is the only reliable means of communications that he has, and it provides a vital link to the rest of the world.

After he spoke with each class, Father Mike invited questions from the children. The kind of questions and the interchange that followed made it obvious to all of us that these young people were privileged to be the recipients of the "humanity" side of our hobby, the part of amateur radio which lets people connect as individuals and be better off for the experience.

No one who was in my room that day

will ever forget what we were part of or will ever wonder why we who love amateur radio so much want more children to share it with us.

For those of you who would like more information about our amateur radio curriculum, or details on our 10 meter national school net, please contact me at the school: Carol Perry, WB2GMP, Intermediate School 72, 33 Ferndale Ave., Staten Island, NY 10314.

BATTERIES "R" US...

You've bought our replacement batteries before...
NOW YOU CAN BUY DIRECT FROM US, THE MANUFACTURER!



ICOM
CM2, PB2 7.2v @ 500MAH
CM5, PB5 10.8v @ 500MAH
SUPER 7S & 8S
 13.2v @ 1100MAH
 9.6v @ 1200MAH
 (base charge only-1" longer)
Introductory Offer!
SUPER 7S & 8S - \$64.95 each

JULY SPECIAL!
 Yaesu Replacement
 Batteries For
 FNB-12 and FNB-12(S)
 An Additional 10% Off
 Orders Received
 in the Month of July

Look For
 Next Month's
AUGUST Special!

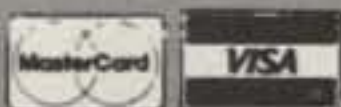


YAESU/MAXON
FNB-10 7.2v @ 600MAH
FNB-12 12v @ 500MAH
FNB-10(S) 7.2v @ 1000MAH
 * same size case as FNB-12
Introductory Offer!
P4W 11v @ 500MAH - \$22.63
FNB-2 11v @ 500MAH - \$22.63



**CUSTOM MADE BATTERY
 PACKS & INSERTS**
 Made to your specifications.
Introductory Offer!
KENWOOD INSERTS
 PB-25—\$20.00; PB-21—\$13.75
 PB-26—\$20.00
ICOM INSERTS
 BP-5—\$23.00; BP-3—\$18.95
 BP-7, BP-8

Prices subject to change without notice.



MasterCard and Visa
 cards accepted. NYS
 residents add 8 1/4 %
 sales tax. Add \$3.50
 for postage and
 handling.



**1 SOURCE FOR ALL YOUR COMMUNICATION
 BATTERY REPLACEMENT NEEDS.**

W & W ASSOCIATES

29-11 Parsons Boulevard, Flushing, N.Y. 11354

WORLD WIDE DISTRIBUTORSHIPS AVAILABLE. PLEASE INQUIRE.

**MADE IN
 THE U.S.A.**
**SEND FOR
 FREE CATALOG
 AND PRICE LIST**

In U.S. & Canada Call Toll Free (800) 221-0732 • IN NYS (718) 961-2103 • Telex: 51060 16795 • FAX: (718) 461-1978

No-45-46

They're here . . .
CQ Amateur Radio
1989 Equipment Buyer's Guide
and
1989 Antenna Buyer's Guide

Which one is right for you? The **Equipment Buyer's Guide** gives you the edge in selecting just the right equipment for the shack—HF and VHF rigs of all kinds, accessories, packet controllers and so much more. All the information is here in one handy, concise directory with descriptions, technical specifications, model numbers, retail prices and photographs. Buy with confidence when you make your decisions based on **all** the facts.

The bands are hotter than ever. Now's the time! Make those improvements to the antenna farm. You'll need the **Antenna Buyer's Guide** to squeeze every single dB out of those dollars you invest. In depth coverage of directional and omnidirectional antennas for all frequencies! Tuners, watt meters, cable—and more. You'll find detailed charts and specifications, retail prices and photographs. Get **all** the facts before you pick up the phone!

Both guides are filled with the kind of **support information you've always needed**, but couldn't easily get: Dealer listings including branches, names and calls for key personnel, top lines carried, whether or not trade-ins are accepted or on-site repairs are made . . . and so on.

Both guides have **buying tips from the experts**. How do you select the right H.F. antenna? Who do you talk to and what do you say to get that power permit? You'll find those questions answered in the **Antenna Buyer's Guide**. What are all those "bells and whistles" on the new rigs for? Which computer is best for the shack? The **Equipment Buyer's Guide** answers these questions and many, many more.

Which one is right for you? Do yourself a big favor—**Buy both!** It'll be the best investment you've made this season.

USA: \$3.95 each (includes postage).

Foreign: \$5.00 U.S. each (includes postage). Foreign orders are payable in U.S. funds only by check drawn on a U.S. bank, or by U.S. Postal Service Money Order.

Yes, please send me _____
 Both _____
 the **Equipment Buyer's Guide** _____
 the **Antenna Buyer's Guide** _____
 Date _____
 Name _____ Call _____
 Address _____
 City _____ State _____ Zip _____
 _____ check _____ Visa _____ MC _____
 Card number _____ Expires _____
 Signature _____
 (Signature required on all charges.)

Mail to: CQ Communications, Inc.
 76 North Broadway, Hicksville, NY 11801

CQ BOOK SHOP

Vertical Antenna Handbook, 2nd ed.

by Paul H. Lee, N6PL

Out of print for several years, this classic has been reprinted with updates, including an addendum on antenna design for 160 meters. Other sections include feeding and matching, short verticals, ground effects, and much more. 139 pages, paperback, \$9.95. Order #H208.

The Radio Publications Group—The "Bill Orr Series"

These easy reading classics belong in the library of any active ham. Loaded with practical how-to information, with tables, charts, and formulas arranged for handy reference.

Beam Antenna Handbook, 200 pages, paperback, \$11.95. Order #H143.

Wire Antennas, 192 pp., paperback, \$11.95. Order #H144.

Antenna Handbook, 192 pp. paperback, \$11.95. Order #H145.

Cubical Quad Antennas, 112 pages, paperback, \$9.95. Order #R146.

Vertical Antennas, 192 pages, paperback, \$10.95. Order #H303.

Interference Handbook, 247 pages, paperback, \$11.95. Order #H172.

The Shortwave Propagation Handbook, 2nd ed.

by George Jacobs, W3ASK, and Theodore J. Cohen, N4XX
 A new, revised edition of the popular guide to all your propagation needs. Contains up-to-the-minute information and charts, and guides you through producing your own propagation data. 154 pages, paperback, \$9.95. Order #H137.

Ameco Novice Code and Theory Package

A complete training package containing the 128-page Novice theory course and a 60-minute code cassette. \$9.95. Order #H024.

Ameco Amateur Radio FCC Test Manuals

Each book contains the latest FCC VEC test questions, plus ARRL multiple-choice answers followed by a complete, simplified discussion of each question written in an easy-to-understand style.

Novice Class, 96 pages, paperback, \$4.95. Order #H221.

General Class, 128 pages, paperback, \$4.95. Order #H034.

Advanced Class, 128 pp., paperback, \$4.95. Order #H035.

Extra Class, 128 pages, paperback, \$4.95. Order #H220.

Packet User's Notebook

By Buck Rogers, K4ABT

Available Now!



This brand new book is your one source of essential information for the newcomer or oldtimer. Tips, tricks and techniques from a real insider. Over 90 diagrams showing the tried and true connections for popular TNCs, transceivers and computers. Why chance destroying hundreds or thousands of dollars of equipment with risky connections? This is a genuine nuts-and-bolts how-to-do-it manual that every packet operator should have on the bookshelf. Packet is not only the fastest growing segment of amateur radio, it is the fastest changing, too! Why rely on information that may be a year or more out of date when **Packet User's Notebook** is hot off the press with the latest essential information? Don't "connect" without it. It is only **\$9.95**, and that's a small price to pay for peace of mind. Order today.

CQ BOOK SHOP 76 North Broadway, Hicksville, NY 11801

QTY.	ORDER#	TITLE	PRICE	TOTAL
Shipping charges \$2.00 per order. Shipping charges waived on orders of \$50.00 or more. Books shipped best way. All orders are processed the day they are received, but please allow 30 days for delivery within North America.			Book Total	
			Shipping Charge	
			Grand Total	

Name _____

Address _____

City _____

State _____ Zip _____

Check MasterCard VISA

Card No. _____ Expires _____

X _____

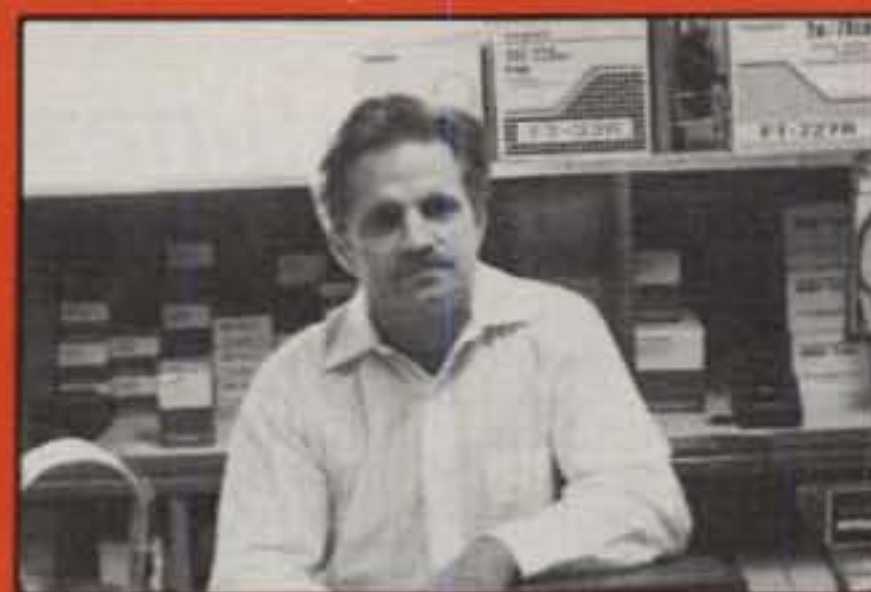
Signature required on all charge orders



Rob, WA3QLS



Kurt, KA3OQR



Paul, WA3QPX

Delaware Amateur Supply

71 Meadow Road, New Castle, Del. 19720 9-5 Daily, 9-8 Friday, 9-3 Saturday

Factory Authorized Dealer!

AEA • ALINCO • AMERITRON • CUSHCRAFT • ICOM
• KANTRONICS • KENWOOD • MFJ • MOSLEY
• TELEX HY-GAIN • TENTEC • YAESU • AND MORE!

Celebrating our
11th Anniversary!

Gail, KA3ITN

Katherine, KA3IYO



800-441-7008

New Equipment Order & Pricing

302-328-7728

SERVICE, USED GEAR INFO

NO Sales Tax in Delaware! one mile off I-95

Prices are subject to change without notice or obligation. Products are not sold for evaluation.



Please send all reader inquiries directly.

NOW HEAR THIS

FINALLY!
High-Powered
Sound from
your HT.

- 10 DB of Audio Gain
- 3.5 inch Oval Speaker
- Automatic Shut-OFF
- Internal NiCad Charger
- External Power 5-15 VDC



Model HTS-1

\$29.95

Naval ELECTRONICS INC.

5417 Jet View Circle, Tampa, Florida 33634
Phone: (813) 885-6091 Telex: 289-237 (NAVL UR) Fax: (813) 885-3789

CIRCLE 155 ON READER SERVICE CARD

Say You Saw It In CQ

PERFORMANCE
AND VALUE
WITHOUT COMPROMISE

KRP-5000 REPEATER

2 Meters-220-440

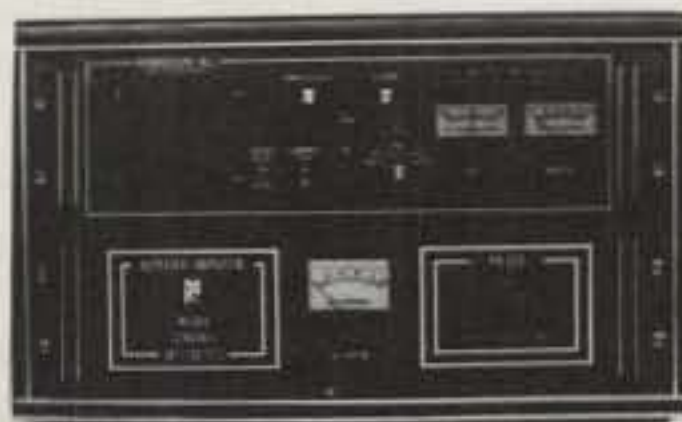
Word is spreading fast-
"Nothing matches the KRP-5000
for total performance and value. Not GE, not even Motorola."

RF performance really counts in tough repeater environments, so the KRP-5000 receiver gives you 7 helical resonators, 12-poles of IF filtering, and a precise Schmitt trigger squelch with automatic threshold switching. The transmitter gives you clean TMOS FET power.

Enjoy high performance operation with: remote programmability, sequential tone paging, autopatch, reverse autopatch, 200-number autodial, remote squelch setting, status inputs, control outputs, and field-programmable Morse messages

Call or write for the full performance story . . . and the super value price!

Micro Control Specialties
23 Elm Park, Groveland, MA 01834
(508) 372-3442
Telex: 4932256 KENDECOM
Fax: (508) 373-7304



KRP-5000 Repeater shown
with PA-100 Amplifier

The first choice in
Transmitters - Receivers
Repeaters
Repeater Controllers
Power Amplifiers
Voice Mail Systems

CIRCLE 156 ON READER SERVICE CARD

WB9CWE outlines some basic information on electricity and what it can do besides power our rigs. It is important to remember that even low voltage can cause serious injury.

Electric Shock: How Much Kills?

BY MICHAEL SIMMONS*, WB9CWE

When coming upon any injured person or victim of electrical shock, it is vital to be careful that you do not become the second victim. Always check to see that the electricity is turned off and that the victim is not in contact with live wires. Be sure that the injured person and the immediate area are safe for you to approach.

Amateur radio notwithstanding, you owe it to yourself, your family, and your community to spend a few hours in a Red Cross CPR course and basic first-aid course. It's easy to learn and can be extremely useful. —K2EEK

With the widespread use of modern low-voltage, solid-state rigs, it is easy to become inattentive to potentially dangerous voltages still existing within the hamshack. High voltages in CRTs, on the plate caps of finals in linear amplifiers and older rigs, and the exposed terminals in power supplies carrying 120 VAC are still to be reckoned with.

It is easy to think that lethal shocks only occur with hundreds or thousands of volts and anything less than 70 volts is okay. However, since electrocutions have taken place at as little as 42 volts DC, the 47 volts present in certain solid-state linears should be respected.

Remember, it is not the voltage that actually does the damage. It is the current. Fifty volts can kill as well as 5000 volts under the right conditions. A chart is given here to show what physical effects take place at given amounts of current. These amounts will differ for larger or smaller body masses.

The amount of current will, of course, be determined by the applied voltage and skin resistance which may vary from a few hundred ohms when the skin is wet to over half a megohm when dry. The body's

Current	Effect
200 ma	Burns occur Death can occur without first aid Breathing stops Cardiac fibrillation occurs
100 ma	Breathing is labored Considerable pain Muscles are temporarily paralyzed
15 ma	Pain can just be felt
10 ma	
1 ma	Current can just be sensed

Table 1—Chart of biological effects for given amounts of current.

electrical resistance *drops* rapidly while current is flowing through it, making it critically important to remove a victim from a power source as rapidly as possible before the current rises to a fatal amount.

At about 1 milliamperes a person is just aware of electrical current. At about 10 to 15 milliamperes the sensation becomes painful and the muscles are involuntarily paralyzed; the person may not be able to let go. If somehow that current is flowing through the respiratory muscles, breathing will be stopped instead of at the usual 100 ma level.

From 15 to 100 ma a normal healthy adult will experience considerable pain and shock, but can usually recover on his or her own within 5 minutes if removed from the voltage source within a short period of time (don't assume that during an actual emergency; call for help!). Above 100 ma the person is in grave dan-

ger of respiratory failure and cardiac fibrillation (erratic and accelerated operation of the heart). If the person is not removed from the voltage source and given first aid immediately, death will almost assuredly follow. Interestingly, if currents above about 200 milliamperes flow through the heart, the heart muscles can clamp, which may actually help protect it and facilitate recovery. It must be noted, though, that any currents of that magnitude can start to burn tissue.

The path the current takes will make considerable difference in the danger created. For instance, if the current flows only through the arm (e.g., finger to elbow), the cardiac and respiratory muscles are at minimum risk even when the current is in amperes. However, should the current be flowing from, say, one hand to the other, or to one or both legs, the body's midsection is, of course, carrying current and putting the heart and respiratory muscles in danger.

When working on or with electrical equipment, kill the power if possible, never standing on damp ground or basement floors. If you must work on something with the power on, such as during the neutralization of an amplifier, keep one hand in a back pocket and use non-conductive or well-insulated tools if possible. If you are wet or sweaty, towel off! Fatigued? Do the job tomorrow after a good night's rest. Above all else, don't work alone.

The hamshack should be safety oriented not only where you are concerned, but for others (visitors, children) who may not know anything about electricity and what things need to be avoided.

Nothing can take the place of a good grounding system. That means large conductors such as copper braid bonding all your equipment to an excellent earth ground. Don't trust your three-prong AC outlet for your grounding needs; there's no guarantee etched in granite that it is wired correctly. Try to borrow (or buy) a grounded outlet tester to check out your

*101 Harrison Ave., Charleston, IL 61920

outlets just to be sure. If your outlets are the two-prong variety, definitely use an earth ground. If you have no access to one, connecting to water pipes can do the trick, although the joints could be corroded and resistive, thereby reducing their effectiveness.

Ground-fault current-interrupting circuit breakers which trip out when one or two milliamperes of current are flowing out of the circuit to ground are excellent additions for ham shacks. Although they can nuisance trip once in a great while when transmitting, they will open in milliseconds if current begins to flow where it shouldn't. Just don't become overly reliant on them, as they can and *do* fail.

A master power switch for the entire station should be wired in a prominent position. Explain it to your family, and have a sign next to it to remind anyone what it's for in case of panic-induced forgetfulness during an emergency. You should go over first-aid techniques for electric shock as well. Time is extremely critical during such crises. Seconds count; minutes kill. Make sure everyone knows what to do before an accident happens.

Victims should be removed **after** the power is turned off or removed. If that is impossible, **move the victim only with insulative material**, or you could be zapped as well. Apply resuscitation until help arrives. Even if the victim is breathing and has an audible pulse, cardiac fibrillation cannot be detected aurally and could be taking place. Call for help immediately no matter what!

All in all, working with moderate to high voltages essentially requires common sense and a healthy respect for the dangers involved. Employment of good safety practices will help ensure you of many years of hamming!



IRON POWDER and FERRITE PRODUCTS

AMIDON
Associates

Fast, Reliable Service Since 1963

Small Orders Welcome

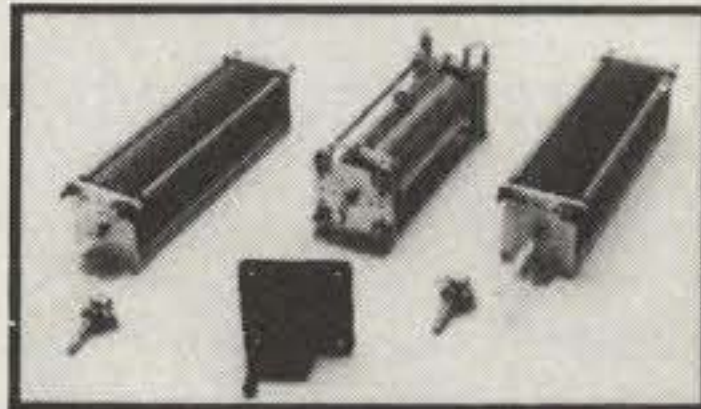
Free 'Tech-Data' Flyer

Toroidal Cores, Shielding Beads, Shielded Coil Forms
Ferrite Rods, Pot Cores, Baluns, Etc.

CIRCLE 170 ON READER SERVICE CARD

12033 OTSEGO STREET, NORTH HOLLYWOOD, CALIFORNIA 91607

1500+ WATT TRANSMATCH KIT \$169.95



BASIC KIT—INDIVIDUAL ITEMS

- 1 - rotary inductor 28μh.....\$59.00
- 2 - 6:1 ball drives.....\$9.00 ea.
- 1 - 0-100 turns counter.....\$65.75
- 1 - turns counter, economy (Groth)...\$19.95
- 2 - variable capacitors
- 25-245 pf 4500 v.....\$44.00 ea.

OPTIONS—

- enclosure (pictured in Sept. 86 CQ).\$64.00
- 4:1 balun kit.....\$22.50

dials, terminals, chassis, ceramic standoffs, hardware, toroids, amp components, B&W coil stock, etc.

OTHER KITS

- G3RUH, PSK Packet Modem, Satellite and Terrestrial.....\$111.00
- G3RUH, OSCAR 13 Telemetry Demodulator.....\$144.95
- QRP 20, 5w, 20 meter Transceiver (HR 1/89).\$124.95
- W1FB 160/80 Pre Amp (QST 8/88).....\$19.95
- K9CW Memory Contest Keyer.....\$109.00
- Yaesu FRG-9600, .1 to 60 MHz Converter...\$94.95
- 20m CW, 15w Transceiver (H.R. 6/87).....\$159.95
- 50W 75M SSB SCVR.....\$199.95
- Factory Wired**
- Ameritron/Ten Tec Products.....CALL
- B&W PT-2500A Amp.....\$1,670.00
- B&W VS 1500A Tuner.....\$388.00
- Nel-Tech DVK-100A (Free Repeat Option)...\$240.00
- Ten-Tec Complete Product Line.....CALL

RADIOKIT • P.O. Box 973-C Pelham, NH 03076 • (603) 437-2722
Shipping Extra Catalog \$1.00 VISA/MasterCard

CIRCLE 164 ON READER SERVICE CARD



JOIN ARRL

BENEFITS FOR YOU

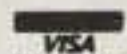
QST, QSL Bureau, Awards, Low Cost Insurance, Operating Aids, Government Liaison and More—Much More!

MEMBERSHIP APPLICATION

Name _____ Call _____
Street _____
City _____ Prov./State _____ PC/ZIP _____

\$25 in U.S. \$36 elsewhere (U.S. funds) Licensed amateurs, or age 65 or over, upon submitting proof of age, may request special dues rate of \$20 in the U.S. \$31 elsewhere, in U.S. funds. Persons age 17 and younger may qualify for special rates, write for application.

For postal purposes, fifty percent of dues is allocated to QST, the balance for membership.



Expires _____

Bank No. _____ Expires _____

The American Radio Relay League
225 Main St. Newington, CT. 06111 USA

NEVER PANIC AGAIN...

after missing a few Morse code letters.
Start copying words instead of letter-by-letter.
Time-proven, easy-to-learn methods.
Money-back guaranteed! Order today!

QSO-TRAINER™ Code Course. Copy words the very first day! Ideal, moderate speed. \$14.95

QSO-MASTER™ Practice Tapes. The "plateau" buster! 8, 10, 12, 14 wpm. \$12.95

QSO-PRO™ Practice Tapes. Go all the way to EXTRA! 16, 18, 20, 22 wpm. \$12.95

Each set contains two, high-quality 60-min. tapes and complete written instructions.

Shipping & Handling (S&H): All orders \$3.00 US and CAN; \$4.00 elsewhere, IL, IN, MI, MN, OH, WI add sales tax. Send Check, Money Order, Visa, or Master Card to:

AVC INNOVATIONS, INC. Dept. CP
P.O. Box 20491 • Indianapolis, IN 46220-0491

BUSINESS SIZE SASE GETS DETAILS
CIRCLE 171 ON READER SERVICE CARD

Say You Saw It In CQ

Sometimes the best thing you can do for amateur radio and your local club is to shut down your station and take your wife out to dinner. K2AIO tells us how that worked for him.

The Right Place At The Right Time

BY DR. RONALD S. LEVY, DDS*, K2AIO

It was February 1986, and a DX contest was in full swing. I don't usually enter contests, but I enjoy working as many DX stations as I can. It was cold and raw outside, and I had planned on spending most of the weekend chasing DX. Conditions were good, and I was working stations as fast as I could log them.

Suddenly the intercom buzzed. It was my "W" on the other end. (My wife refuses to be called XYL. She claims that she is not an ex anything. She is a woman and a wife, thus the "W.") "How about Chinese food for dinner?" she asked. I thought for a minute and said, "Okay, I'll be right up." The thought of going out in the cold was unappealing, but Chinese food is one of my favorites, and I knew it wouldn't be long before I was back comfortably ensconced in front of the rig.

Ten minutes later we entered the August Moon Restaurant. All I could think of was how fast we could be served so I could get back to building up my countries total. As we were escorted to our table, we happily noticed that we were seated next to three other couples whom we knew. The conversation ranged from the weather to the children, and we shared a wide variety of well-prepared Hunan and Sechuan delicacies.

After about an hour I started to feel the need to get my fingers going on the BENCHER paddles. "C'mon, Honey," I said. "I'd like to get back to my radio." My "W," Joyce, was engaged in conversation with one of our gentleman friends who just happens to be a judge. My plea being ignored, I heard her say something about my amateur radio activities, so I joined their conversation.

Joyce quickly brought me up to date and told me that Ken seemed quite interested in whether or not I belonged to a ra-

dio club. "Why, of course," I replied. "I am a member of a few clubs. Why do you ask?" Ken explained that he had been retained to represent the estate of a woman who had left a substantial sum to a radio club. "Just any radio club?" I asked. "Well," Ken replied, "the choice of club is mine to make as I am the executor of the estate."

Joyce then asked what we would have to do to qualify the Morris Radio Club for the bequest. It's a good thing my "W" can think clearly under such circumstances. I was dizzy with visions of 3-500Zs dancing around in my head. Not only was I unable to think, but my speech was somehow affected as well. "Uh, but, wha', who, how," was all I could mutter. I was flabbergasted.

"Tell me about this contest Joyce mentioned. It sounds interesting," Ken said. "Oh, that," I answered. "Well, the idea is to try to make as many contacts with stations in foreign countries as possible in a given period of time." By this time the importance of the contest had waned in view of the potential bonanza my "W" had struck for the Morris Radio Club. "Go on," said Ken. "Tell me more."

I continued by explaining what amateur radio is all about and that I had gotten involved over 35 years ago as a kid in high school. The various aspects of the hobby were mentioned, and the conversation began to appear like an advertising blitz for amateur radio. I glanced at my watch. Dinner and the gabfest had taken over two hours. I was eager to get home, but even more eager to learn about the bequest.

"Ken," I queried, "how much money is involved in the bequest from the estate you represent?" "About \$10,000," he replied without flinching. He didn't have to flinch. I gulped and tried to appear calm. I couldn't believe my ears. At the last meeting of the Morris Radio Club we had to take up a collection so we could pay

the premium on our insurance policy.

"What do I have to do to get this bequest for the MRC?" I asked. Ken said, "All you have to do is provide me with proof that the Morris Radio Club has been granted tax-exempt status by the IRS." "This should be easy," I thought. "Piece of cake," I said. "Please give our club your primary consideration and I'll get the necessary papers to you as soon as I can."

Little did I know then that the entire process would take two years. The conversation lapsed into dull small talk about fortune cookies and leechie nuts. It didn't take too much effort to convince my "W" that we should go home.

Almost three hours had elapsed since my last contact, and I looked forward to getting back on the air. By the time we got home 20 meters had closed up, 40 was not too good, and I had an S-9 noise level on 80. I gave up and joined the "W" in front of the warm blaze she had going in the fireplace.

On Monday morning I called the judge to make sure our conversation wasn't a dream. He assured me that if I sent him the certificate of exemption from the IRS, the Morris Radio Club would indeed be the beneficiary of the bequest.

Next I called all of the trustees of the club and told them the story. Shock gave way to questions as to where and how we would get this exemption. I found out that the club was so poor most of the time that no one had ever filed a request for tax-exempt status. Thus began a long struggle to complete all of the necessary forms, amend our articles of incorporation, amend our constitution and by-laws, and wait and wait and wait for a determination from the IRS. It struck me as funny that if we were to owe them tax money, they would penalize us for being even one day late. Now, when the tables were turned, they were in no hurry to respond to our request.

*1 Wyndwood Rd., Morris Plains, NJ 07950

Finally, on April 1, 1988, I received a phone call from Ed Weed, K2BO, our treasurer and a trustee of the club. Ed informed me that he had received a letter from the IRS. Our status as a tax-exempt organization had been granted. "Wow!" I thought. "We made it! Please bring that letter to my office on Monday, Ed. I want to make a few copies, and I will hand-deliver the proof of our victorious effort to the attorney." "I'll be glad to do that," replied Ed. "I never thought we could get through all this red tape on this thing. Congratulations!" "Let's not throw a party just yet," I cautioned. "Once we have the money safely deposited in the MRC account, we can celebrate."

On the following Monday Ed came to my office as he had promised. I called the attorney and told him that I would bring the document to his office within the hour. "Great," he said, "and I'll file it with the Estate Tax Division in Trenton." "What does that mean?" I asked. "Well, you know," he continued, "I can't release the money until I get the appropriate waivers from the tax people." "Wonderful," I thought. "Here we go again. How long will I have to wait?" I asked. "I really don't know. It could take several weeks," Ken said. "Do the best you can," I admonished, and I hung up the phone.

The documents had been on file with the state for three months when Ken finally called me. "Hi, Ken, what's up?" I asked, fully expecting "His Honor" to tell me that the whole thing was a joke. "I just wanted to let you know that the final waivers and figures are here from the state. I have a document for you to sign, and then I can disburse the funds." "That's great," I said, "but you never told me the exact amount we are to receive. I think I should have that information so our trustees can meet and make some important decisions."

"Oh," Ken said, "I meant to tell you. The amount I mentioned to you was wrong." I immediately broke out in a cold sweat. "Here comes the bad news," I thought. "Okay, Ken. I'm listening." Well," he continued, "after all the taxes have been paid and all the other distributions have been made, you will be left with \$21,000."

Dead silence! I was in a state of shock. I was also in my office with people all over the place. "Holy—," I blurted out as my hand quickly came to cover my mouth. "But, but, but..." "I'll forward the document to you," Ken added, "and you should have a check by next week."

I sat down and caught my breath for a few minutes. Then I called the other trustees, who had reactions similar to mine and which might be best not to describe in detail. Who would have ever believed that the goose that lays the golden eggs was flying over our heads and landed in

our own backyard? This kind of thing only happens on TV or in fairy tales.


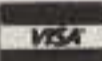

That evening I again called the other trustees of the club, Bill Rawson, K2AX, and Reed Fisher, W2CQH. Together with Ed, K2BO, and myself we had to discuss how we would handle the money and what we felt should be done with the income. We already knew that we would keep the principal intact and utilize the interest for some worthwhile project or program. Whether or not this fund existed, the Morris Radio Club would continue to provide public service assistance.

Therefore, a careful evaluation of our

options was in order. Certainly, some much-needed publicity for our club and for amateur radio could be generated. If we played our cards right, this could become an annual event. If nothing else, we could sponsor a contest with the grand prize being an all-expense-paid weekend in beautiful downtown Newark. Or maybe we could add some frequent-flyer bonus points and have a party in Afghanistan.

At this time I don't know exactly what the disposition will be. Suffice it to say that every once in a while the Almighty smiles upon us, especially if we happen to be in the right place at the right time.

COLORADO COMM CENTER

MasterCard  VISA  Discover 

BUTTERNUT • BENCHER • B & W • ASTRON • ALINCO

CUSHCRAFT • HUSTLER • ICOM • KENWOOD • LARSEN • MFJ • RFC • YAESU

KENWOOD



TS-440

- Compact HF Transceiver with General Coverage Receiver
- All Band, All Mode
- Built-in Automatic Antenna Tuner

YAESU

FT-411

Next Generation
2 Meter Handheld

- Receive 140-174 MHz
- 49 Memories
- Built-in CTCSS Encode/Decode
- From 2.5 W Output to as High as 6W
- Sized Small and Loaded with Features

ORDER YOURS TODAY!



KENWOOD



TH-75A

- 2m/70cm Dual Band HT
- One Watt (Optional 5 Watts With PB-8)
- 10 Memory Channels
- Multiple Scan Functions
- CTCSS Encode/Decode Built-In

YAESU



FT-470


- 2 Meter/430-450 MHz Dual Band
- 2.3 To 5 Watts Battery Packs Available
- Simultaneous Receive On Both Bands
- DTMF Auto Dialer
- Battery Saver

ASTRON

• RS7A \$50.00	• RS35M . . \$165.00
• RS12A . . . \$76.00	• VS35M . . \$179.00
• RS20A . . . \$92.00	• RS50A . . \$210.00
• RS20M . . \$113.00	• RS50M . . \$232.00
• VS20M . . \$129.00	• RM50M . . \$249.00
• RS35A . . \$147.00	• VS50M . . \$239.00

uniden®

SCANNERS



BC-210 XLT	\$179.00
BC-100 XLT, R4020	\$185.00
BC-590 XLT	\$199.00
BC-760 XLT	\$269.00
BC-200 XLT, R4030	\$259.00

**WE
TRADE**

800-227-7373

**WE
TRADE**

525 E. 70th Unit IW • Denver, CO 80229
303 • 288 • 7373
Mon. - Fri. 9-5 M.S.T. Saturdays 9-3

A little imagination, a lot of hard work and perseverance, and presto . . . amateur radio becomes a motivational tool for teaching.

Arkansas Amateurs Help Teach NYC Kids

BY JOE FAIRCLOUGH*, WB2JKJ



Joe Fairclough, WB2JKJ, the older kid in the back with the moustache, is surrounded by his "crew," the members of The Radio Club at Junior High School 22 in New York City.

With well over 200 teenagers operating on 15 and 40 meters every school day for at least 8 hours a day, there are bound to be some interesting contacts. This certainly was the case for the "Crew" at The Radio Club of Junior High 22 in New York City, a unique, nonprofit organization that uses the theme of amateur radio to motivate young people in the pursuit of education.

Thanks to Bill McClintock, K5SGG, Governor Bill Clinton of Arkansas can be added to the long list of supporters who believe in the use of amateur radio as a theme and tool to teach. Bill, K5SGG, started working with the kids at the beginning of the fall 1988 term. He introduced the students to the great state of Arkansas via countless QSOs on their morning and afternoon operating frequency of 21.395 MHz. As the term progressed, more and more Arkansas amateurs joined in, bringing with them their own views of life in a state many kids had barely heard of before September.

As the fall term approached its midpoint, with ever-increasing numbers of check-ins from newly admitted Arkansas operators, Bill, K5SGG, decided to go to the top. After all, he felt that Governor Clinton should know just what a tremendous educational service his fellow resident amateurs were providing to the children living on the lower east side of Manhattan in New York City.

Governor Clinton certainly was impressed. For starters, a full-size state flag which flew over the capitol building in Little Rock was delivered to the offices of The Radio Club of JHS 22.

In turn, the flag was taken and permanently put on display in the classroom used to house the club's main station and to promote the unique program "Education Thru Communication."

Along with the flag was a letter of support from Governor Clinton. As you read this, K5SGG is continuing to work with the Crew, enlightening them on the wonderful world west of the Hudson, with a special focus on Arkansas.

Arkansas amateurs involved in education have been in contact with Joe Fairclough, WB2JKJ, the executive director of the organization. Since the program works so well in New York City and other sites around the country supported by The Radio Club of JHS 22, perhaps the children of Arkansas will be the next to reap the benefits of "Education Thru Communication." And all of this comes from a simple classroom QSO on 21.395.



STATE OF ARKANSAS
BILL CLINTON
GOVERNOR

November 14, 1988

Joe Fairclough
Junior High School 22, ARC
111 Columbia Street
New York, New York 10002

Dear Mr. Fairclough:

It has come to my attention through fellow Arkansan Bill McClintock of your use of the ham radio in teaching your students.

I am always interested in new and innovative ideas to motivate the learning of students in the classroom. I commend you on your imagination and dedication to the teaching profession and to the students that are benefitting from your ideas.

Sincerely,

Bill Clinton
Bill Clinton

BC:kv1:11

cc: Doug Wood, Arkansas State Representative
Bill McClintock

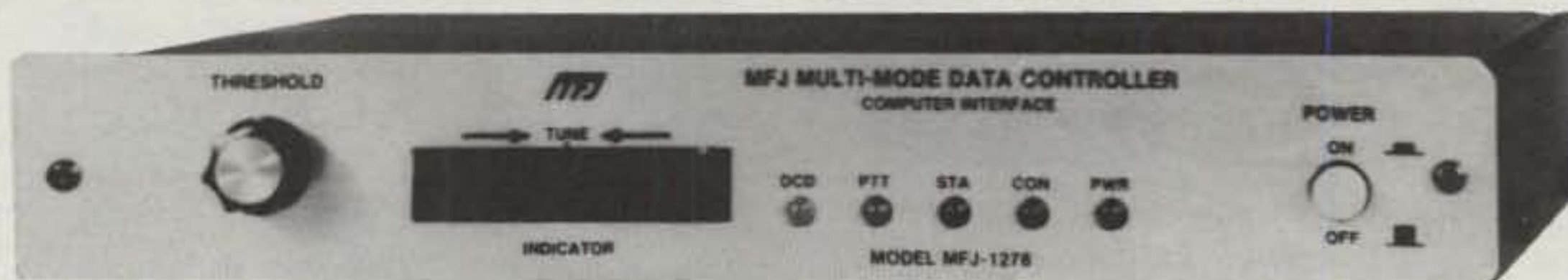
Office of the Governor • State Capitol • Little Rock, Arkansas 72201 • 501-371-2345

*The Radio Club of JHS 22, 111 Columbia St., New York, NY 10002

Governor Bill Clinton's letter to The Radio Club of Junior High School 22 in New York City.

While others offer you some digital modes using 3 year old technology, only MFJ gives you all 9 digital modes and keeps on bringing you state-of-the-art advances

MFJ-1278
\$279⁹⁵



No three year old technology at MFJ!
Using the latest advances, MFJ brings you 9 exciting digital modes and keeps on bringing you state-of-the-art advances.
You get tons of features other multi-modes just don't have.

Only MFJ gives you all 9 modes

Count 'em -- you get 9 fun modes -- Packet, AMTOR, RTTY, ASCII, CW, WeFAX, SSTV, Navtex and full featured Contest Memory Keyer.

You can't get all 9 modes in any other multi-mode at any price. And nobody gives you modes the MFJ-1278 doesn't have.

The best modem you can get

Extensive tests in *Packet Radio Magazine* prove the MFJ-1278 modems gives better copy with proper DCD operation than all other modems tested.

New Easy Mail™ Personal Mailbox

You get MFJ's new Easy Mail™ Personal Mailbox with soft-partitioned memory so you and your ham buddies can leave messages for each other 24 hours a day.

20 LED Precision Tuning Indicator

MFJ's unequalled tuning indicator makes it really easy to work HF packet stations.

And unlike others, you use it exactly the same way for all modes -- not differently for each mode.

Just tune your radio to center a single LED and you're precisely tuned in to within

10 Hz - and it shows you which way to tune!

New MFJ technology prevents collisions: gets packets through faster

MFJ's new Anti-Collision technology gets packets through faster, more reliably.

How? Automatic random transmit delays prevent packet collisions.

An MFJ exclusive: MFJ-1278 is the only multi-mode to have this new technology.

Multi-Gray Level FAX/SSTV Modem

You'll enjoy natural looking pictures that only multiple gray levels can give you.

MFJ's exclusive new built-in modem lets you transmit and receive up to 16 gray levels.

Only MFJ can transmit FAX

Most packet stations can receive FAX. But only the MFJ-1278 lets you transmit FAX without internal modifications that disable other modes.

So now you can send your own high resolution pictures, maps and diagrams by FAX to stations throughout the world.

Too bad they can't send theirs to you... unless they have the MFJ-1278.

One FREE Upgrade!

When you buy your MFJ-1278 today, you don't have to worry about missing new modes and features that come out tomorrow.

Why? Because your MFJ-1278 comes with a coupon good for one free eeprom upgrade exchange that'll add new features.

Plus more...

Plus you get... 32K RAM, free AC power supply, KISS, true DCD, random code generator, independent printer port, lithium battery backup, RS-232 and TTL serial ports, standard 850 Hz RTTY shift, socketed ICs, tune up command, automatic serial numbering, programmable message memories, software selectable dual radio ports and tons more -- all in a sleek 9 1/2 x 9 1/2 x 1 1/2 inch cabinet.

Get on the air instantly Just plug it all in

All you need is an MFJ-1278, your rig, any computer and a terminal program.

With an MFJ Starter Pack, \$24.95, you just plug it all in, wire up your mic connector and you're on the air.

Order MFJ-1282 (disk)/MFJ-1283 (tape) for C-64/128/VIC-20; MFJ-1284 for IBM compatibles; MFJ-1287 for Macintosh.

Unconditional Guarantee

You get the best guarantee in ham radio -- a full one year unconditional guarantee.

That means we will repair or replace your MFJ multi-mode (at our option) no matter what for a full year.

Get 9 new ways of having fun

Don't settle for 3 year old technology.

Choose the only multi-mode that gives you the latest advances and all 9 modes.

Get 9 new ways of having fun -- get yours today!

MFJ Packet Radio



MFJ-1274
\$159⁹⁵

MFJ-1270B
\$139⁹⁵

MFJ-1270B super clone of TAPR's TNC-2 gives you more features than any other packet controller -- for \$139.95.

You can double your fun by operating VHF and HF packet because you get high performance switchable VHF/HF modems.

You get the Easy Mail™ Personal Mailbox with soft-partitioned memory so you and your ham buddies can leave messages for each other 24 hours a day.

In MFJ's new WeFAX mode you can print full fledged weather maps to screen or printer and save to disk using an IBM compatible or Macintosh computer with an MFJ Starter Pack.

A new KISS interface lets you run TCP/IP. They also come NET ROM compatible -- no modification needed!

You also get 32K RAM, one year unconditional guarantee and a free 110 VAC power supply (or use 12 VDC).

For dependable HF packet tuning, the

Copyright © 1989 by MFJ Enterprises, Inc.

MFJ Video Digitizer

Here's an actual print-out of Aimee from the MFJ Order Desk. She was digitized with the MFJ-1292 and the result was printed on a 9-pin Epson compatible printer. We reduced the size to fit the ad.



Create fascinating digitized snapshots you can transmit with your MFJ-1278 of anything you can point your camcorder at!

The MFJ-1292 "Picture Perfect" Video Digitizer connects your video camera to your IBM compatible computer so you can capture digitized video snapshots on disks.

Your MFJ-1292 package includes a plug-in card for your computer, software and complete instructions for... \$199.95.

As an added bonus you get a handy Contrast and Brightness Control unit that you can conveniently place near your keyboard for fine tuning your pictures.

MFJ-1274 gives you a high resolution tuning indicator that's accurate to within 10 Hz -- and it's only \$20.00 more.

Packet Pictures

Transmit and receive high resolution VGA, EGA and CGA color pictures via packet with MFJ picture passing software.

Beautiful color pictures are automatically received, saved to disk and "painted" to screen.

Pictures are compressed as they are transmitted - so you get true high speed picture passing.

You can save to disk any CGA picture you can see on your screen.

You can set up your own picture bulletin board and exchange pictures with others - even if you're not there.

Let's help spread picture passing throughout the world and create a new world standard. Get this powerful new software for only... \$9.95.

MFJ-1288 works with virtually any packet radio controller and IBM compatible computer. It's included free in the MFJ-1284 IBM Starter Pack.

MFJ

MFJ ENTERPRISES, INC.
P.O. Box 494, Mississippi State MS 39762
601-323-5869; TELEX: 534590 MFJSTKV
Nearest Dealer/Orders: 800-847-1800
Include shipping and handling

MFJ... making quality affordable

MFJ TUNERS

Here is the finest 3 KW PEP Tuner money can buy with roller inductor, dummy load, new peak reading meter, antenna switch, balun and more ...

The MFJ-989C is not for everyone. However, if you do make the investment you get the finest 3 KW PEP tuner money can buy - one that will give you a lifetime of use, one that takes the fear out of high power operation and one that lets you get your SWR down to absolute minimum.

The MFJ-989C is a compact 3 KW PEP roller inductor tuner with a new peak reading Cross-Needle SWR/Wattmeter. The roller inductor lets you get your SWR down to absolute minimum.

With three continuously variable components - two massive 6 KV capacitors and a high inductance roller inductor - you get precise control over



MFJ-989C \$349⁹⁵

SWR and the widest matching range possible from 1.8-30 MHz.

You get a new lighted peak and average reading Cross-Needle SWR/Wattmeter with a new more accurate directional coupler.

You get a giant two core balun wound with teflon wire for balanced lines and a 6-position antenna switch with extra heavy switch contacts.

Its compact 10³/₄x4¹/₂x15 inch cabinet fits right into your station.

You get a 50 ohm 300 watt dummy load for tuning your exciter, a tilt stand for easy viewing and a 3-digit turns counter plus a spinner knob for exact inductance control. Add \$10 s/h.

2-knob Differential-T™ Tuner



MFJ-986 The new MFJ-986 Differential-T™ 3 KW PEP 2-knob Tuner has a differential capacitor to make tuning foolproof and easier than ever. It ends constant retuning with broadband coverage and gives you minimum SWR at only one best setting. Covers 1.8-30 MHz.

The roller inductor lets you tune your SWR down to absolute minimum. A 3-digits turns counter lets you quickly return to your favorite frequency.

You get MFJ's new peak and average reading Cross-Needle SWR/Wattmeter with a new directional coupler for more accurate readings over a wider frequency range. It reads forward/reflected power in 200/50 and 2000/500 watt ranges. Meter lamp is front panel switched and requires MFJ-1312, \$9.95.

A new current balun for balanced lines reduces feedline radiation and forces equal currents into antenna halves that are not perfectly balanced for a more concentrated, stronger signal. Add \$10.00 s/h.

MFJ's Fastest Selling Tuner



MFJ-941D 300 watt PEP antenna tuner. Why? Because it has more features than tuners costing much more and it matches everything continuously from 1.8-30 MHz.

It matches dipoles, vees, verticals, mobile whips, random wires, balanced and coax lines.

SWR/Wattmeter reads forward/reflected power in 30 and 300 watt ranges. Antenna switch selects 2 coax lines, direct or through tuner, random wire, balanced line or tuner bypass. Efficient airwound inductor gives lower losses and more watts out. Has 4:1 balun. 1000 V capacitors. 10x3x7 inches.

MFJ's Random Wire Tuner

MFJ-16010 \$39⁹⁵



You can operate all bands anywhere with any transceiver when you let the MFJ-16010 turn any random wire into a transmitting antenna. Great for apartment, motel, camping operation. Install a wire anywhere! Tunes 1.8-30 MHz. 200 watts PEP. Ultra small 2x3x4 in.

MFJ's Best 300 Watt Tuner



MFJ-949C The MFJ-949C gives you more precise matches than any tuner that uses two tapped inductors. Why? Because you get two continuously variable capacitors that give you infinitely more positions than the limited number on switched coils.

This gives you the precise control you need to get your SWR down to a minimum. After all, isn't that why you need a tuner? Covers 1.8-30 MHz.

You also get MFJ's lighted 2-color Cross-Needle SWR/Wattmeter, 6-position antenna switch, 50 ohm 300 watt dummy load and a built-in balun - all in a compact 10x3x7 inch cabinet that fits right into your station. Meter light requires MFJ-1312, \$9.95.

With MFJ's best 300 watt PEP tuner you get an MFJ tuner that has earned a reputation for being able to match just about anything - one that is highly perfected and has years of proven reliability.

MFJ's Mobile Tuner **MFJ-945C** \$89⁹⁵

Don't leave home without this mobile tuner! Have an uninterrupted trip as the MFJ-945C extends your antenna bandwidth and eliminates the need to stop, go out and adjust your mobile whip.

You can operate anywhere in a band and get low SWR. You'll get maximum power out of your solid state or tube rig and it'll run cooler and last longer.

Small 8x2x6 inches uses little room. SWR/Wattmeter and convenient placement of controls make tuning fast and easy while in motion. 300 watts PEP output, efficient airwound inductor, 1000 volt capacitors. Mobile mount, MFJ-20, \$3.00.

144/220 MHz VHF Tuners

MFJ-921 \$69⁹⁵

MFJ's new VHF tuners cover both 2 Meters and the 220 MHz bands. They handle 300 watts PEP and match a wide range of impedances for coax fed antennas. SWR/Wattmeter. 8x2¹/₂x3 in. **MFJ-920**, \$49.95. No meter. 4¹/₂x2¹/₂x3 inches.



MFJ

MFJ ENTERPRISES, INC.
Box 494, Miss. State, MS 39762
(601) 323-5869; TELEX: 53 4590 MFJSTKV

MFJ's Artificial RF Ground

\$79⁹⁵ MFJ-931

You can create an artificial RF ground and eliminate RF "bites",

feedback, TVI and RFI when you let the MFJ-931 resonate a random length of wire and turn it into a tuned counterpoise. The MFJ-931 also lets you electrically place a far away RF ground directly at your rig - no matter how far away it is - by tuning out the reactance of your ground connection wire.

Barefoot/1.5 KW Linear Tuner



MFJ-962C For a few extra dollars, the MFJ-962C lets you use your barefoot rig now and have the capacity to add a 1.5 KW PEP linear amplifier later. Covers 1.8-30 MHz.

You get two husky continuously variable capacitors for maximum power and minimum SWR. And lots of inductance gives you a wide matching range.

You get MFJ's new peak and average reading Cross-Needle SWR/Wattmeter with a new directional coupler for more accurate readings over a wider frequency range. It reads forward/reflected power in 200/50 and 2000/500 watt ranges. Meter lamp is front panel switched and requires MFJ-1312, \$9.95.

Has 6-position antenna switch and a teflon wound balun with ceramic feedthru insulators for balanced lines. 10³/₄x4¹/₂x14 7/8 inches. Add \$10.00 s/h.

MFJ's smallest Versa Tuner

MFJ-901B \$59⁹⁵

The MFJ-901B is our smallest -- 5x2x6 inches -- (and most affordable) 200 watt PEP tuner -- when both space and your budget is limited. Good for matching solid state rigs to linears.

It matches whips, dipoles, vees, random wires, verticals, beams, balanced and coax lines from 1.8-30 MHz. Efficient airwound inductor. 4:1 balun.

FOR YOUR NEAREST DEALER OR TO ORDER

800-647-1800

• 1 year unconditional guarantee • 30 day money back guarantee (less s/h) on orders from MFJ • Free catalog • Add \$5.00 s/h (except as noted)

MFJ . . . making quality affordable

MFJ's Deluxe 300 Watt Tuner

... gives you **full** 1.8-30 MHz coverage, a **peak reading** (and average) Cross-Needle meter, built-in **dummy load**, antenna switch and balun ... all covered by a **full one year unconditional guarantee** ... for only \$149.95

MFJ-949D

\$149⁹⁵

Made in U.S.A.

- **Peak reading meter**
- **Built-in dummy load**
- **Covers 1.8 to 30 MHz**
- **1 full year guarantee**



You won't find all these useful features in any other 300 watt tuner -- not even at twice the price.

New peak reading meter

The new **peak** and average reading Cross-Needle meter in the MFJ-949D shows you SWR, forward and reflected power -- all in a single glance.

Without a **peak reading** wattmeter you just won't be able to tell if your rig is putting out all the peak SSB power it's designed for. Don't be without one if you want top performance.

Built-in dummy load

A built-in 300 watt 50 ohm dummy load makes tuning up your rig sooooo easy. How do you tune up your rig without one?

An external dummy load will cost you about \$30 more -- plus it takes up valuable space at your operating position and requires another cable.

Full 1.8 to 30 MHz coverage

The MFJ-949D gives you **full** 1.8-30 MHz coverage.

Make sure the tuner you're considering covers **all** the HF bands.

Don't get a tuner that keeps you from operating all the frequencies you've worked for -- now or in the future.

Plus more ...

You get a versatile 6-position antenna switch and a 4:1 balun for balanced lines.

You can run up to 300 watts PEP and tune out SWR on coax, balanced lines or random wires.

Unconditional Guarantee

You get a **full one year unconditional guarantee**. That means we will repair or replace your MFJ tuner (at our option) **no matter what** for a full year.

Others give you a 90 day **limited** warranty. What do you do **after** 90 days? Or **before** 90 days when they say, "Sorry, it's your fault"?

What's really important? precise control for minimum SWR

What's really important is your tuner's ability to get your SWR down to a minimum -- and the MFJ-949D gives you more precise control over SWR than **any** tuner that uses two tapped inductors.

Why? Because the two **continuously** variable capacitors in the MFJ-949D give you **infinitely** more positions than the **limited** number on two switched coils.

This gives you the precise control you need to get minimum SWR and maximum

power into your antenna.

After all, isn't that why you need a tuner?

High efficiency and a compact size: performance is most important

The MFJ-949D uses a **single** airwound coil. Using only one inductor takes up a minimum of space and there's no mutual coupling problems.

The excellent form factor of the short fat coil gives you highest Q. Plus you get plenty of inductance that gives you a much wider matching range than other designs.

This results in a highly efficient tuner that puts maximum power into your antenna **and** a compact 10 x 3 x 7 inch size that complements your rig and fits right into your station.

Competing tuners using **two** tapped coils require a large cabinet -- not just to house the coils but also to help reduce detrimental coupling between the inductors. The result? A tuner that's **bigger** than your radio.

Your very best value

The MFJ-949D gives you your very best value, first-rate performance, proven reliability and the best guarantee in ham radio ... all from the **most trusted** name in antenna tuners. Don't settle for less. Get yours today!

MFJ's 1500 Watt Tuner

MFJ-962C
\$229⁹⁵



For a few extra dollars the MFJ-962C lets you use your barefoot rig now and have the capacity to add a 1.5 KW PEP linear amplifier later. It covers 1.8 to 30 MHz.

You get MFJ's new **peak** and average reading Cross-Needle SWR/Wattmeter.

You also get a 6-position antenna switch and a teflon wound balun with ceramic feed-thru insulators for balanced lines. Measures just 10³/₄x4¹/₂x14 7/8 inches.

How can an American manufacturer like MFJ give you more tuner for your money than clearing houses for foreign competition?

MFJ tuners are made in America.

Here's how MFJ gives you more tuner for your money than **any** clearing house for foreign competition.

MFJ builds every tuner cabinet from scratch using the latest high-speed

computer controlled punch presses.

MFJ manufactures, assembles and tests every PC board that goes into MFJ tuners.

Instruction manuals and other materials are printed in MFJ's print shop.

MFJ tuners go directly from our factory to your dealer. We're not just an importer adding profits, tariffs and import charges.

With MFJ's efficient in-house manufacturing and straight to your dealer distribution you get the most tuner for your money.

WHY CHOOSE AN MFJ TUNER?

Hard-earned Reputation: There's just no shortcut. **MFJ** is a name you can trust -- more hams trust MFJ tuners throughout the world than all other tuners combined.

Proven Reliability: MFJ has made more tuners for more years than anyone else -- with MFJ tuners you get a highly-developed product with proven reliability.

First-rate Performance: MFJ tuners have earned their reputation for being able to match just about anything -- **anywhere**.

One full year unconditional guarantee: That means we will repair or replace your tuner (at our option) **no matter what** for a full year.

Continuing Service: MFJ Customer Service Technicians are available to help you keep your MFJ tuner performing flawlessly -- no matter how long you have it -- just call 601-323-5869.

Your very best value: MFJ tuners give you the most for your money. Not only do you get a **proven** tuner at the lowest cost -- you also get a one year **unconditional** guarantee and **continuing** service. That's how MFJ became the world's leading tuner manufacturer -- by giving you your very best value.

Choose your MFJ tuner with confidence! You're getting proven performance and reliability from the most trusted name in antenna tuners. Don't settle for less.

Call or write for a **free** full-line MFJ catalog with all 10 of our tuners and tons of ham radio accessories!

Copyright © 1989 by MFJ Enterprises, Inc.

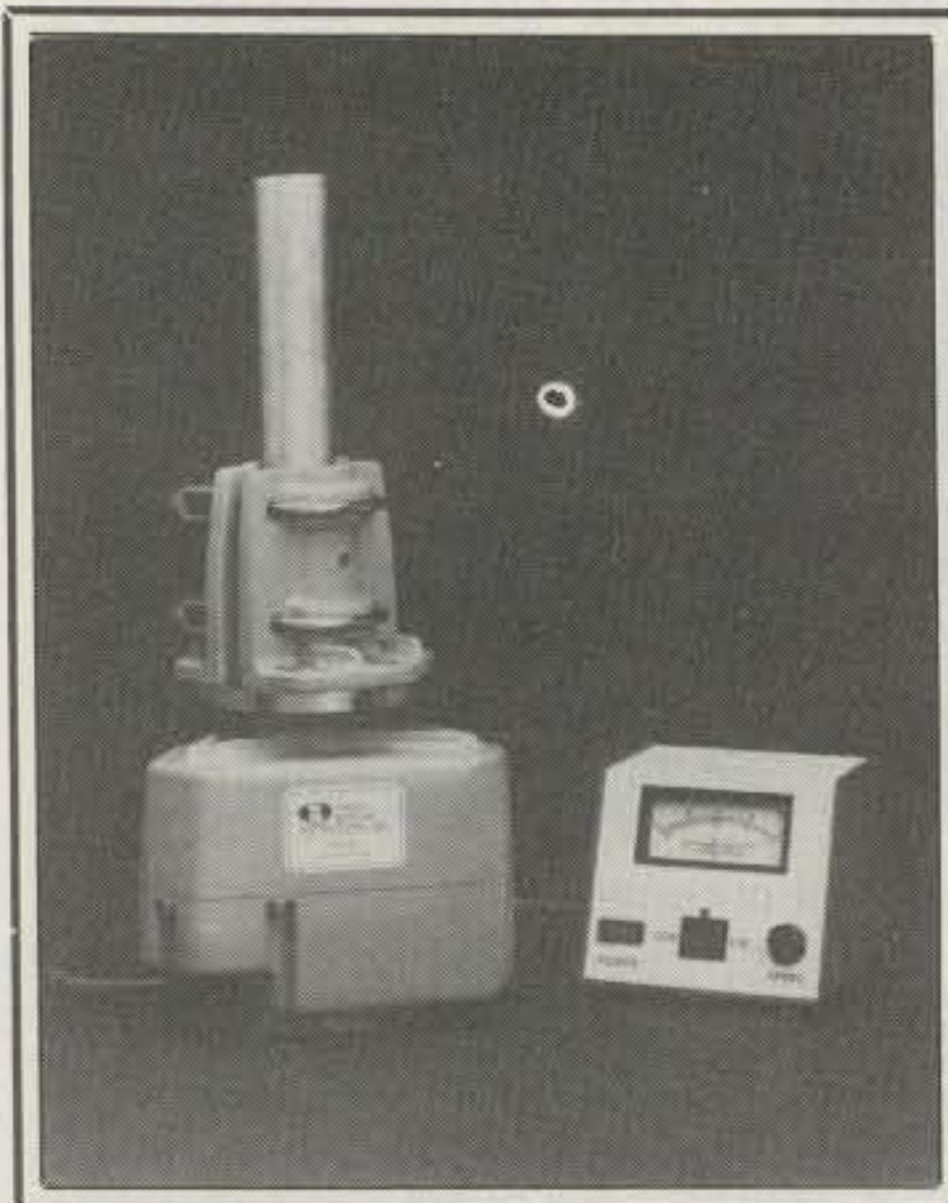
MFJ

MFJ ENTERPRISES, INC.
P.O. Box 494, Mississippi State MS 39762
601-323-5869; TELEX: 534590 MFJSTKV
Nearest Dealer/Orders: 800-647-1800
Include shipping and handling

MFJ ... making quality affordable

CIRCLE 50 ON READER SERVICE CARD

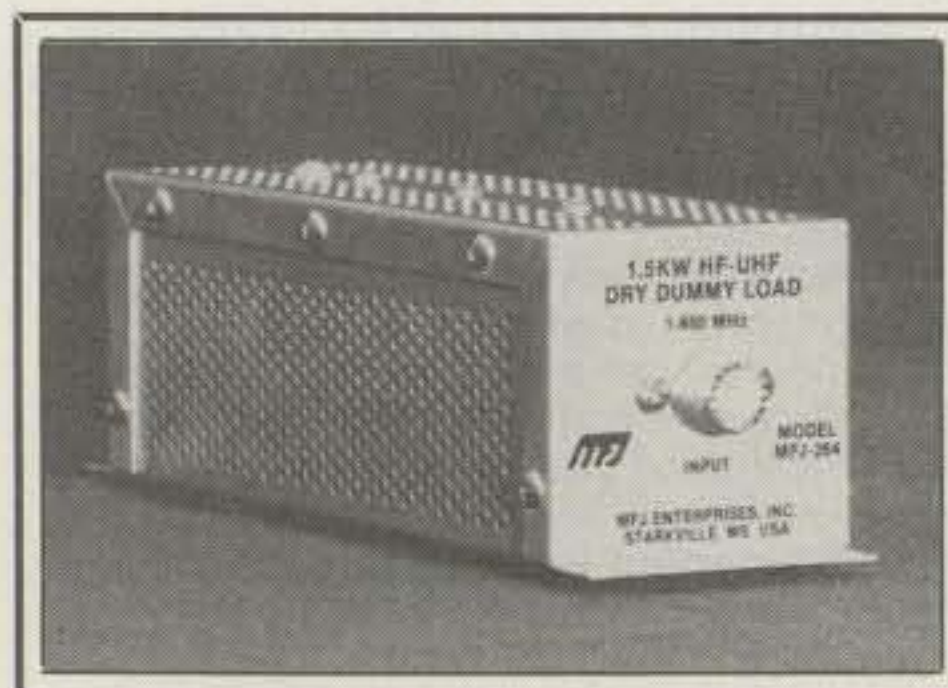
CQ Showcase



Orion's OR-2300 Rotator

The new Orion OR-2300 antenna rotator using a worm-gear drive method is rated at 35 square feet. Its compact size fits most popular crank-up and stacked towers. The control box has a large, easy-to-read direction indicator with variable speed. Rugged mast clamps accept mast diameters from 1 3/4 to 3 1/8 inches. The flex-mount clamping method self-corrects for misaligned masts and also absorbs windload. Built-in thrust bearing and double bronze bearing decrease friction and load transfer to gear set.

The USA-made rotator sells for \$859 and carries a one-year warranty. For more information, contact Orion Business International, Inc., P.O. Box 9577, Canoga Park, CA 91309.



The MFJ-264 Dummy Load

MFJ Enterprises, Inc. has announced a new 1.5 kw UHF/VHF/HF "dry" dummy load for \$109.95. This new dummy load lets you tune up to 650 MHz and get extremely low SWR. It handles 100 watts for 10 minutes, and 1500 watts for 10 seconds. The voltage gradient is 10 kv/inch. SWR is 1.1:1 at 30 MHz, and below 1.3:1 to 650 MHz. The MFJ-264 is usable to 750 MHz. It measures 3" x 3" x 7" and

comes with MFJ's one-year unconditional guarantee. For more information contact MFJ Enterprises, Inc., P.O. Box 494, Mississippi State, MS 39762, or circle number 104 on the reader service card.

C.A.T.S. Brak-D-Lay

The Brak-D-Lay provides a 7 second delay time for brake engagement on the CDE/Hy-Gain series of ham rotors. The board is designed especially for the old Ham "M" control box and actually fits inside. Instructions are included for mounting the unit in models Ham "M", 2, 3, 4, and T²X. Price class is \$25.00. They are available from C.A.T.S., 7368 S.R. 105, Pemberville, OH 43450, or for more information, circle number 107 on the reader service card.

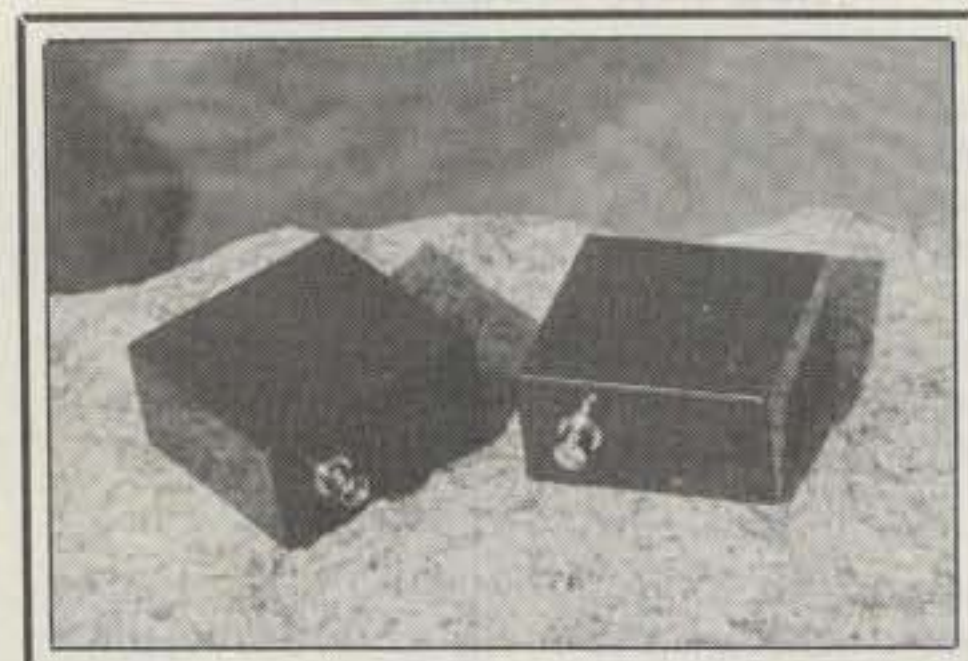


Bird Peak-Reading Wattmeter

Bird Electronic Corporation has announced Model 4314B portable peak-reading wattmeter designed specifically for measurement of air navigational aids and other pulsed RF systems—such as telemetry, radar, television, and command and control—as well as PEP measurement of SSB and AM signals. The instrument measures practically any type of 50 ohm coaxial transmission: pulsed, AM, FM, or CW. A CW/Peak switch on the front of the unit allows quick selection of operational mode. When in PEAK, the electronics are turned on for peak measurement. An LED indicates PEAK operation. In the CW mode the meter works like a standard Bird Model 43 Wattmeter. An improved power system using two internal 9 volt alkaline batteries provides 20 hours of battery life. The wattmeter can

also be powered by a supplied AC power adaptor.

The Model 4314B is equipped with two Bird QC "Quick Change" female "N" connectors and is available with any other Bird type QC connectors. Power and frequency range are 100 mw to 10 kw and 0.45 MHz to 2300 MHz using Bird Plug-in Elements. The unit is rated at a maximum insertion VSWR of 1.05 to 1000 MHz, 1.1 to 2300 MHz. Accuracy is ±5% of full scale CW, ±8% of full scale peak. The wattmeter weighs just 3 pounds and is 25% lighter than the previous model. For further information, contact Bird Electronic Corporation, 30303 Aurora Rd., Cleveland, OH 44139 or circle number 101 on the reader service card.



Electron Processing Window Coupler

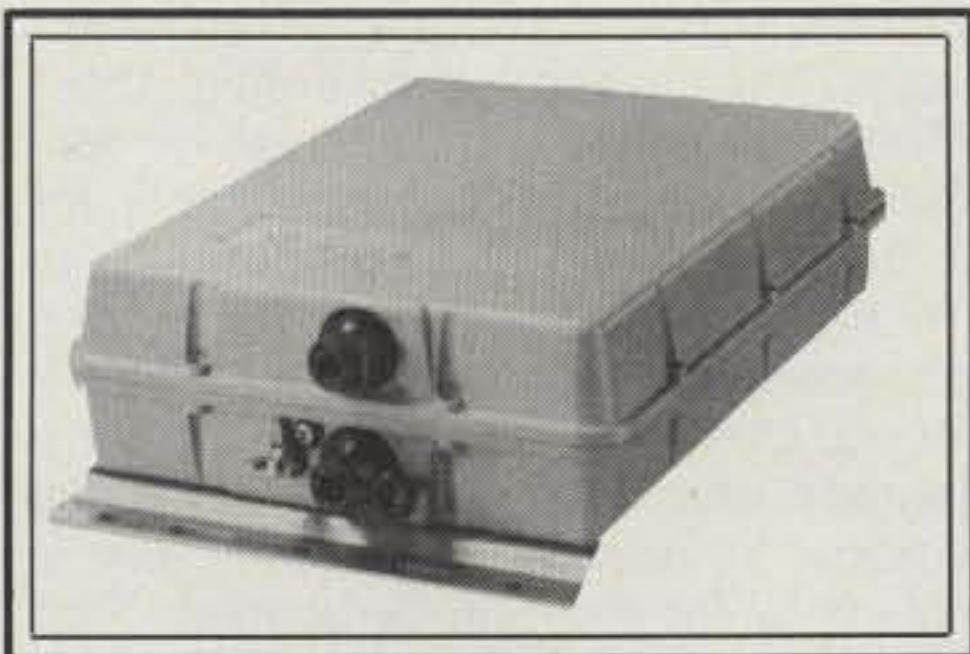
Electron Processing, Inc. has announced the WPO Window Coupler, a means of connecting your outside antenna to your inside TV, scanner, or VHF/UHF transceiver. It mounts on the window and eliminates the need to drill holes in the window frame to route the antenna line. The WPO Window Coupler consists of two 3" x 3" x 1.5" weatherproof boxes that mount on your window by means of double-faced tape. Each box contains either a BNC, UHF (PL-259 mate), or type-F connector for connection to your antenna and receiver or transmitter. Three models are available. WPO-VHF is for use in the 140–160 MHz range, while the WPO-UHF is for 440–460 MHz. Both the VHF and UHF models are rated for 25 watts and provide a 1.5:1 VSWR across a 10 MHz section of their bands with a loss of 2 dB or less on most windows. The WPO-TV covers the entire 60–800 MHz band with only 8 dB loss and is for receive use only (TV, FM, scanners).

Prices for the WPO Window Coupler are \$59.95 for either the WPO-VHF or WPO-UHF models and \$49.95 for the WPO-TV. An optional suction cup mounting bracket, SC-4, is available for \$20. For additional information, contact Electron Processing, Inc., P.O. Box 708, Medford, NY 11763, or circle number 110 on the reader service card.

Engineering Consulting's "Packet Talker"

Engineering Consulting has announced the "Packet Talker" model PKTA for the Commodore 64 and compatible computers. The "Packet Talker" gives your packet terminal a voice by converting ASCII messages into speech through software. The stored messages can be stored like a bulletin board for up to 300 users. They can be retrieved by sending preassigned touchtone access commands. The computer will respond by selecting the messages for the particular user. Each message requested is spoken over the air from the computer's voice synthesizer. The "Packet Talker" can be combined with conventional repeater controllers to add a talking packet bulletin board to the repeater, or it can be used by individual users wishing to hear messages from a personal packet terminal from a mobile or HT in the field. It is capable of linking a packet TNC with any voice repeater. The model PKTA provides hardware and software interface for the C64. The audio from the TNC and PTT circuits of the transceiver are combined with the computer's voice to allow conventional packet communications and voice retrieval of messages on request.

A similar option (PK8 & PK1) is available for the Ultra Com Shack 64 repeater controllers. When used with the Ultra, the "Packet Talker" is much more powerful, allowing complete control of the repeater, remote screen transfer of all active parameters, voice messages, and remote programming of all parameters from any remote TNC terminal. The model PKTA "Packet Talker" for the C64 sells for \$189.95 and is available from Engineering Consulting, 583 Candlewood St., Brea, CA 92621, or for more information, circle number 109 on the reader service card.



ICOM AH-3 HF Automatic Antenna Tuner

ICOM has introduced the fully automatic AH-3 HF antenna tuner. The AH-3 is designed for use with ICOM HF transceivers. Just push the tuner switch on the IC-725 transceiver and the AH-3 adjusts immediately to the minimum SWR. Average tune-up time is less than 2.5 seconds. Eight convenient memories store settings for minimum SWR. Retuning to

memorized frequency takes one second. The AH-3 is housed in a durable weather-resistant acrylic case and sealed with rubber gaskets. The AH-3 emits 300 mw power output during tune-up, eliminating interference to other stations.

The AH-3 installs easily in the car trunk and because it tunes automatically, it doesn't impair driving. The optional AH-2b antenna element is available for

mobile operation. The AH-2b includes a sturdy bumper mount system for holding an 8.2 foot stainless steel antenna element. The AH-3 and AH-2b system allows you 3.5 to 28 MHz mobile operation. Suggested retail price of the AH-3 is \$489.00. For more information, contact ICOM America, Inc., 2380 116th Ave. N.E., Bellevue, WA 98009-9029, or circle number 103 on the reader service card.

RENO RADIO

1-800-345-5686

AE A • ALINCO • AMERITRON • ASTRON • B & W • BENCHER • BUTTERNUT

CUSHCRAFT • HUSTLER • ICOM • KENWOOD • LARSEN • MFJ • RFC • WELZ • YAESU

ICOM

NEW!

IC-725



SMALL SIZE, BIG HF PERFORMANCE

- 160-10 Meter Operation
- 100 Watts Output
- Receive 100 kHz to 33 MHz
- SSB, CW, AM (FM Optional)
- 26 Memories with Band Stacking Registers

CALL TODAY

YAESU



FT-4700RH

DUAL BAND MOBILE

- 50W on 2 Meters
- 40W on 70 cm
- Receive 140-174 MHz
- 430-450 MHz

CALL NOW!

ICOM



IC-3210

DUAL BAND MOBILE

- Receive 138-174 MHz
- Full Duplex Operation
- 440-450 MHz
- 20 Memories
- 25W on Both Bands
- Double Your Bands

YAESU



FT-212 RH 2 METER MOBILE

- Optional Internal Digital Voice Recorder Acts As "Answering Machine"
- Receive 140-174 MHz
- 45 Watts Output
- 18 Memories, Compact Design

ICOM



IC-32AT

SUPER DUAL BAND FM HT

- 5 Watts on Both Bands
- Receive 138-174 MHz
- 440-450 MHz
- Stores Standard and Odd Offsets

CALL TODAY

YAESU

NEW!

FT-470

COMPACT 2M/70CM
DUAL BAND FM

- Simultaneous Reception on Both Bands
- Up to 5 Watts Output
- 21 Memories on Each Band
- Built-in 10 Memory DTMF Auto Dialer
- Built-in CTCSS

PLUS MORE!

12 Glen Carran Circle • Sparks, NV 89431
(702) 331-7373

MasterCard • VISA • Discover • COD

Please send all reader inquiries directly.

"HOW TO" FOR THE NEWCOMER TO AMATEUR RADIO

Antennas—Part I of II

CQ magazine features a continuing series of articles about antennas. That excellent series contains information that is useful to amateurs at all levels of knowledge. This month's article is just a simple introduction to antennas; it is directed to new amateurs, plus potential amateurs. Previous columns are referenced for the benefit of readers who have access to old issues, or who may decide to purchase them (\$2.50 each) from *CQ*. This article is useful by itself, but it is advisable for new amateurs to also read the referenced articles.

Previous Novice Column Coverage. The November 1977 through March 1978 Novice columns provide amateur radio station installation tips, including useful coverage of antennas and their associated feedlines. The December 1982 Novice column includes an abbreviated version of the same basic information. Military radio frequency transmission lines are covered in the August 1983 Novice column. The March and April 1980 Novice columns provide a simple introduction to high-frequency (3 to 30 MHz) radio-wave propagation, which explains relationships between antennas and radio-wave propagation. The September through November 1978 Novice columns are devoted to amateur radio station grounding, including its importance in regard to optimum antenna performance. The May through July 1977 Novice columns tell you things you need to know about dipole antennas, including exact dimensions and construction details. Most of these previous articles are currently used as handouts to students. A free copy of any desired handout is available to anyone who provides a self-addressed large (10 by 12 inch) envelope with triple first-class postage (65¢). Remember to state which item you want me to mail to you. The December 1982 abbreviated article is not available.

Fundamentals

It must be confusing for a new amateur who is trying to select and erect her/his antenna system. There is a bewildering assortment of antennas from which you must make a selection, or selections.

45527 Third Street East, Lancaster, CA
93535-1802



This is nine-year-old Scott Affens, KA3TUE, of Olney, Maryland. He shares this station with his father (Steven, K3SA). Scott has worked several states, plus the Galapagos Islands, Turks and Caicos Islands, and other DX. He operates code on the Novice HF bands, and he chases DX on the 10 meter Novice voice band. Scott is also interested in drawing, gardening, insects, photography, reading, and rock collecting. He plays the flute and the piano.

This article provides simple explanations of basic facts that apply to many types of antennas. An understanding of antenna fundamentals should enable you to select a good antenna system for your station.

Bandwidth and Conductor Size. When large-diameter conductors (wire or tubing) are used to make antennas, such antennas can be used over a wider portion of the band than if they were constructed using thinner conductors. This is true because large conductors have more capacitance (C) and less inductance (L) than small conductors. This lower L-to-C ratio lowers the Q (resonance sharpness) of the antenna, making it useful over a wider segment of the band. It is more difficult to achieve desired bandwidth on 80 and 40 meters (3700–3750 and 7100–7150 kHz) than on 15 and 10 meters (21.1–21.2 and 28.1–28.5 MHz). Bandwidth doubles each time frequency doubles, and vice-versa. Consequently, assuming the same Q, a 10 meter antenna with a 400 kHz bandwidth will have 50 kHz bandwidth if it is made for 80 meters. Use the largest conductors that are within reason. As examples, I have found that 16- and 18-gauge wire are suitable for 10, 15, 20, and 30 meter antennas, whereas 12- and 14-gauge wire are better suited to 40 and 80 meter antennas. The conductor size

also affects antenna input impedance, but this factor is not of major importance below the very-high frequency (30–300 MHz) range. Novices can ignore this consideration.

Ground. The RF (radio frequency) is any frequency above 20 kHz) ground, with which most antennas work, is usually several inches to many feet below the surface you walk on. It is very important to establish an excellent RF ground at your station. A good ground enhances equipment performance, and it enables your antenna to do a better job in both transmit and receive modes.

Height. Erect every antenna as high as possible, and put them where they cannot contact power lines if either should break loose and fall. Antenna height directly affects radiation angle, which is the angle (relative to the surface of the earth) at which RF signals are transmitted from (and received by) an antenna. This angle is often called the *fire angle*. Each antenna should be at least one-half wavelength above RF earth ground (below the walking surface), and antenna performance improves as height is increased.

These examples may help you appreciate the benefit of getting antennas as high as possible. If a dipole is lying on an RF ground surface, it is omnidirectional (nondirectional) and it has a nearly vertical fire angle, making it useless for long-range (DX) communications. If the dipole is erected one-half wavelength above RF ground, the fire angle is lowered to about 37 degrees, which is still too high for optimum DX operation, but is suitable for contacts with amateurs about 500 to 1000 miles distant. Raising the dipole one full wavelength above ground creates a second lobe with a fire angle at about 15 degrees, and moves the original lobe up to about 50 degrees. The higher lobe is still useful for short-range contacts. The new lower lobe provides better DX contact possibilities. These performance characteristics also apply to other antennas, including the highly popular Yagi-Uda. Antenna height is of prime importance in regard to good operating results.

Impedance. Impedance (Z) is the vector sum of resistance (R) and reactance (X). Do not let that opening line scare you. It just means that a known relationship exists between the opposition (reactance) an inductor and/or capacitor offers to RF

and the opposition of a resistor. All three are measured in ohms. Modern transceivers are designed with a nominal impedance of approximately 50 ohms at the antenna connection. Popular RF transmission lines, used to interconnect transceivers to antennas, commonly have an impedance of about 50 ohms. RG-213/U coaxial cable is an example of such a feedline. The input impedance of many popular antennas is usually in the 50 to 75 ohm range. Maximum undistorted power transfer, between a transceiver and its associated antenna, occurs when the impedances of the antenna, feedline, and transceiver are the same.

SWR. Any mismatch between the antenna and feedline causes some RF energy to be reflected back down the feedline to the transceiver. This reflected energy develops sine waves of low and high voltage (and current) points along the feedline. The ratio between these high and low voltage points is called the voltage standing wave ratio (VSWR), and it is commonly referred to as the SWR. SWR/power meters are built into the transmitter output section of most modern transceivers. Combination SWR and power meters are commonly available as a station accessory item. Do not go to a lot of trouble trying to obtain an SWR that is close to the perfect 1:1 ratio. An SWR of up to 3:1 is acceptable. If you achieve an SWR that is less than 2:1, leave things as they are.

Antenna impedance can be resistive (only), or a combination of resistance and reactance. Antenna input impedance is the voltage divided by the RF current at the point where the feedline connects to the antenna. The feedline attachment point can be varied to provide a desired antenna input impedance, which is what antenna designers do.

The radiation resistance of an antenna equals the resistance that would dissipate the same amount of power as the antenna radiates, with the same current flowing through the resistor that is flowing in the antenna at the maximum current point. The maximum current flow point of a center-fed antenna (such as a dipole) is at its middle. The conductor (wire or tubing) also has resistance to the RF current flow, but this ohmic resistance is normally insignificant compared to radiation resistance.

Polarization. Most high-frequency (3-30 MHz) amateur antennas are erected parallel to the ground because they are commonly too long to be positioned vertically. This is particularly true in regard to Yagi-Uda (directional) antennas. If the wire/tubing is parallel to the ground, the antenna is horizontally polarized. If the wire/tubing is at a right angle to the ground, the antenna is vertically polarized. Most HF antennas are horizontally polarized. It is theoretically best to work contacts between stations using the same antenna

polarization. However, it is common to experience good contacts despite two stations using antennas with opposite polarization.

Traps. Traps are used to electrically cut off sections of overall antennas at specific desired resonant lengths. The impedance across a parallel resonant circuit is maximum, and traps are parallel resonant circuits. The major advantage of a trap antenna (dipole, vertical, Yagi-Uda, etc.) is that it enables you to operate on two (or more) bands using a single antenna with just one feedline. The major disadvantage associated with using a trap antenna is that it will accept and radiate harmonic energy (multiples of the fundamental intended frequency); consequently, care must be taken to minimize harmonic output. This usually amounts to operating the transmitter well below its maximum power rating.

Dipole. The most popular first antenna is the dipole. It is easy to construct and erect. A popular installation configuration of the dipole has the center (RF feed-point) at the highest point, with the two ends attached to convenient lower points. This is often called an inverted Vee. The sloper performs better than an inverted Vee. The sloper configuration has one end of the dipole attached to the highest point, and the other end of the dipole is attached to a convenient lower point. If the high point is attached to a quarter-wave-long metal support mast, it provides additional directivity away from the mast and toward the dipole, which improves DX performance. If lack of sufficient horizontal space is a major problem, the legs (sides) of the dipole can be wound around suitable insulation rods. Such an antenna (helical) is not as good as a conventional dipole, but it may be the only way you can get on 80 or 40 meters.

Random/Long Wire. The random-wire antenna provides a simple installation that enables you to operate all bands with one antenna and no feedline. A separate random-wire (not balanced) antenna tuner is used in conjunction with an SWR meter to resonate such an antenna system to any desired operating frequency. A true long-wire antenna is at least 2.5 wavelengths long at the lowest operating frequency. The ultimate wire antenna is the rhombic, but very few amateurs have enough room to install one.

Vertical Ground Plane. The quarter-wave (Marconi) vertical is a good DX antenna when it is used in conjunction with a suitable station ground. However, vertical antennas are highly susceptible to automobile ignition interference; consequently, they are a poor choice if your station is close to a busy street.

A version of the vertical that has better DX capability is the ground plane. The ground plane uses radials (dipole antenna legs) at its base to provide a reference RF ground. No part of a ground-plane an-

1989 CALLBOOKS



THE QSL BOOK!

Continuing a 68 year tradition, we bring you three new Callbooks for 1989, bigger and better than ever!

The North American Callbook lists the calls, names, and address information for 495,000 licensed radio amateurs in all countries of North America, from Canada to Panama including Greenland, Bermuda, and the Caribbean islands plus Hawaii and the U.S. possessions.

The International Callbook lists 500,000 licensed radio amateurs in countries outside North America. Its coverage includes South America, Europe, Africa, Asia, and the Pacific area (exclusive of Hawaii and the U.S. possessions).

The 1989 Callbook Supplement is a new idea in Callbook updates, listing the activity in both the North American and International Callbooks. Published June 1, 1989, this combined Supplement will include thousands of new licenses, address changes, and call sign changes for the preceding 6 months.

Every active amateur needs the Callbook! The 1989 Callbooks will be published December 1, 1988. Order early to avoid disappointment (last year's Callbooks sold out). See your dealer now or order directly from the publisher.

- North American Callbook
incl. shipping within USA \$29.00
incl. shipping to foreign countries 35.00
- International Callbook
incl. shipping within USA \$32.00
incl. shipping to foreign countries 38.00
- Callbook Supplement, published June 1st
incl. shipping within USA \$13.00
incl. shipping to foreign countries 14.00

SPECIAL OFFER

- Both N.A. & International Callbooks
incl. shipping within USA \$58.00
incl. shipping to foreign countries 68.00

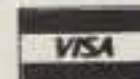
Illinois residents please add 6 1/2% tax.
All payments must be in U.S. funds.

RADIO AMATEUR
callbook INC.



Dept. Q
925 Sherwood Dr., Box 247
Lake Bluff, IL 60044, USA

Tel: (312) 234-6600



CIRCLE 133 ON READER SERVICE CARD

July 1989 • CQ • 61

KENWOOD



NEW Top-of-the-Line TS-940S HF Transceiver
 • 100% Duty Cycle
 • 40 Memory Channels
CALL FOR SPECIAL PRICES!!



TS-440S NEW!
CALL FOR SPECIAL SALE PRICE



TS-140S
CALL FOR SPECIAL SALE PRICE



TS-711A TS-811A
CALL FOR SPECIAL PRICE



TM-721A
CALL FOR SPECIAL PRICE



TR-751A
All Mode 2m Mobile



COMPACT 2M FM Mobile

TM 2570A (70W) TM3530A (25W)
TM 2550A (45W) TM231A (50W)
TM 2530A (25W)

CALL FOR SPECIAL PRICE



TH-75A
 2m/70cm
 Dual Band
 HT

TH215A
 2m HT XCVR
 TH-25AT, TH-45AT,
 TH-205AT
ALSO IN STOCK
CALL FOR SALE PRICES!

ICOM



IC-781
HF "PERFORMANCE" RIG
 • 160-10M/General Coverage Receiver
 • Built-in Power Supply and Automatic Antenna Tuner
 • SSB, CW, FM, AM, RTTY • QSK to 60 wpm
CALL FOR SPECIAL PACKAGE PRICES!



IC-765 New HF XCVR
 • Built-In Automatic Antenna Tuner & Power Supply
 • 99 Memories • 100W Output
 • General Coverage Receiver
 • Band Stacking Registers
CALL FOR SPECIAL PRICE



IC-735 Ultra Compact XCVR
With General Coverage Receiver
CALL FOR SPECIAL PRICE!



IC-725 Ultra Compact HF XCVR
 • 26 Memories w/Band Stacking Registers
 • USB/LSB/CW, AM Receive Optional Module for AM Transmit and FM TX/RX
 • 160-10M Operation • 100W Output
 • Receive 30 kHz-33 MHz
CALL FOR SPECIAL PRICE



IC-2GAT
 2 meter HT
 RX 138-174 MHz
 TX 140-150 MHz
 7 Watts



IC-32AT Super Dualband FM HT
 • 5 Watts on Both Bands
 • RX 138-174 MHz
 440-450 MHz
 • Stores Standard & Odd Offsets
CALL FOR SALE PRICE

ASTRON POWER SUPPLIES

Heavy Duty-High Quality-Rugged-Reliable

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

Model	Cont. Amps	ICS Amps	Price
RS4A	3	4	\$49
RS7A	5	7	59
RS12A	9	12	79
RS20A	16	20	99
RS20M	16	20	119
RS35A	25	35	159
RS35M	25	35	179
RS50A	37	50	229
RS50M	37	50	249

YAESU



FT 767 GX HF/VHF/UHF
CALL FOR SALE PRICE



FT-757GX/II
CALL FOR SPECIAL SALE PRICE!



FT-736R
New All Mode Base Transceiver
CALL FOR SPECIAL PRICE—
SAVE \$\$\$!



FT-411 NEW
 2 meter HT
 • 49 Memories
 • 2.3 to 5 Watts
 • Extended Rec.



FT-470
 2m/70cm
 Dual Band
 • 42 Memories
 • DTMF Autodialer
 • 2.3 - 5 Watts
CALL FOR SPECIAL PRICES



FT 23R 2m HT
FT 73R 70 cm HT
 • compact size
 • 10 memories
 • up to 5W output W/FNB 11
CALL FOR SALE PRICES!

AMERITRON



AL80A

Model	LIST	Model	LIST
AL80A	\$985.00	ATR15	380.00
AL84	479.00	RCS4	134.50
AL1200	1825.00	RCS8V	134.50
AL1500	2370.00		

CALL FOR SPECIAL SALE PRICES!

concept

r/c 2-317 2M
 30W in = 170W out
LIST \$299.00

Model	Band	In-Out	List Price
2-23	2M	2-30W	\$112.00
2-217	2M	2-170W	\$299.00
2-117	2M	10-170W	\$299.00
2-417	2M	45-170W	\$299.00
3-22	220	2-20W	\$112.00
3-211	220	2-110W	\$299.00
3-312	220	30-120W	\$264.00

CALL FOR SALE PRICES

TOT



PARAGON

General Coverage HF Transceiver
 Microprocessor Controlled Multi-Scan
 62 Memories

List \$2,245.
CALL FOR SPECIAL SALE PRICE

OMNIV

New HF Transceiver, Ham Band Optimized for Reduced Phase Noise and Dynamic Range, Dual VFO's, Scannable Memories & More.

List Price \$2,245.
CALL FOR SALE PRICE



TITAN

HF Linear Amplifier
 1500 Watts Output Full QSK
 160-15 Meters Pair of EIMAC 3CX800A7
List \$2,685 CALL FOR SPECIAL PRICE

AEA



PK-232 Packet Controller CALL
144 MHz Isopole CALL
440 MHz Isopole CALL
 Other AEA products also in stock call!!!

Kantronics



KAM All Mode Terminal Unit \$289.95
KPC II Packet Controller \$159.90
KPC 4 Node Controller \$299.90

MFJ



NEW Model MFJ-986 3KW Tuner
 Only \$239.95

1278 Multi Mode TNC \$219.95
1270B TNC Unit \$129.95
202/204 Antenna Bridges \$59.95/\$79.95
250 Oil Load \$39.95
260/262 Dry Loads \$29.95/\$59.95
407/422 Elect. Keyers \$69.95/\$119.95
901/941D Tuners \$59.95/\$99.95
949C/989 Tuners \$139.95/\$299.95

NYE VIKING

MBV-A 3KW Tuner



• Low Pass Pi-Network Tuning
 • Built-in Antenna Switch/Balun
List Price \$675 CALL TODAY TO SAVE \$

NEL TECH LABS

DVK-100 Digital Voice Keyer



• Built-in Auto Repeat Function
 • Fully Compatible With All Xcvrs
CALL FOR SPECIAL PRICE

FREE SHIPPING-UPS SURFACE ORDER 1-800-272-3467

(Continental USA) (most items, except towers/antennas)

TOLL FREE Texas, Alaska & for information call 1-(214)-422-7306



(Prices & Availability Subject To Change Without Notice)

TEXAS TOWERS

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

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

ANTENNA/TOWER SALE!

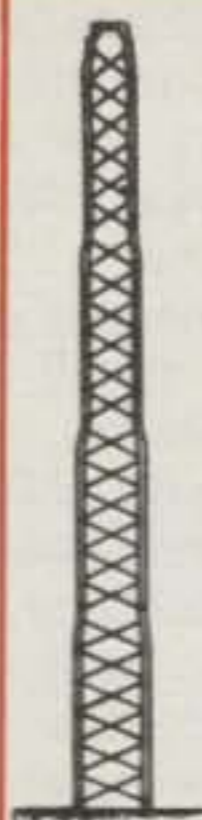


hy-gain CRANKUP SALE!

All Models Shipped Factory Direct—Freight Paid*!
Check these features:
• All steel construction
• Hot dip galvanized after fabrication
• Complete with base and rotor plate
• Totally self-supporting—no guys needed

Model	Height	Load	Sale Price
HG37SS	37 ft	9 sq ft	\$CALL
HG52SS	52 ft	9 sq ft	\$CALL
HG54HD	54 ft	16 sq ft	\$CALL
HG70HD	70 ft	16 sq ft	\$CALL

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



ROHN Self Supporting Towers On SALE! FREIGHT PREPAID

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

Model	Height	Ant Load*	Weight	Delivered Price*
HBX40	40 ft	10 sq ft	228	\$449
HBX48	48 ft	10 sq ft	303	\$589
HBX56	56 ft	10 sq ft	385	\$699
HDBX40	40 ft	18 sq ft	281	\$569
HDBX48	48 ft	18 sq ft	363	\$689

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

ROHN Guyed Tower Packages

- World Famous Rohn Quality and Dependability
 - Rugged high wind survival provides safe installation
 - Multi purpose towers satisfy a wide range of needs
 - Complete packages include: guy hardware, turnbuckles, guy assemblies, concrete base, rotor plate and top section per manufacturers specs.
- Packages shown below are rated for 70 mph wind zone. 90 mph wind zone packages slightly higher. All tower packages shipped freight collect from our Plano, TX warehouse, in stock for prompt delivery.

Model	25G	Model 45G	Model 55G
50'	\$839	\$1499	\$1939
60'	929	1679	2169
70'	1129	1879	2399
80'	1199	2199	2799
90'	1279	2369	2999
100'	1529	2569	3239
110'	1629	2979	3449
120'	1699	3149	3699



These rugged crankup towers and masts now available from Texas Towers! Check these features:
✓ All steel construction
✓ Hot dipped galvanized
✓ Totally self-supporting—no guys needed

Coax arms, Thrustbearings Masts, Motor drives, Remote controls, Hinged bases, Rotor bases, & Raising fixtures also in stock.

CALL FOR SALE PRICES!

Model	Min.Ht.	Max.Ht.	Ant Load*	Sale price
MA40 mast	21'	40'	10 sq ft	\$629
MA550 mast	22'	50'	10 sq ft	999
TX438	22'	38'	18 sq ft	919
TX455	22'	55'	18 sq ft	1385
TX472	23'	72'	18 sq ft	2279
HDX555	22'	55'	30 sq ft	2079
HDX572	23'	72'	30 sq ft	3559

Note-US Towers Shipped Freight Collect From Visalia, CA Factory

*Note-towers rated at 50 mph to EIA specifications

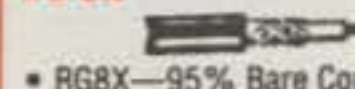
RG-213U



\$.39/ft \$379/1000 ft. Up to 600 ft via UPS

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

RG-8X



\$.22/ft \$209/1000 ft.

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

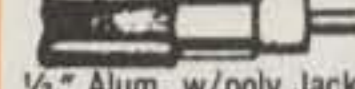
9086



\$.45/ft \$439/1000 ft.

- Same Specs as Belden 9913
- Lower loss than RG8U
- 100% shielded-braid & foil

HARDLINE/HELIX®



Lowest Loss for VHF/UHF!

- 1/2" Alum. w/poly Jacket.....\$.79/ft.
- 1/2" LDF4-50 Andrew Helix®.....\$1.99/ft.
- 3/4" LDF5-50 Andrew Helix®.....\$4.99/ft.

select connectors below Helix® is a Registered Trademark of the Andrew Corp.

Coaxial Cable Loss Characteristics (DB/100 ft)

Cable Type	Imped.	10MHz	30MHz	150MHz	450MHz
RG-213/U	50	.6	.9	2.3	5.2
RG8X	52	.8	1.2	3.5	5.8
9086	50	.4	.64	1.7	3.1
1/2" Alum	50	.3	.5	1.2	2.2
1/2" Helix	50	.2	.4	.9	1.6
3/4" Helix	50	.1	.2	.5	.9

HELIX® CONNECTORS

Cable Type	UHF	FML	UHF MALE	N FML	N MALE
1/2" Helix®	\$29	\$29	\$29	\$29	\$29
3/4" Helix®	\$55	\$55	\$55	\$55	\$55

COAX CONNECTORS

Amphenol Silver PL259	\$1.50
UG218 N Male	\$3.50
9086/9913 N Male Connector	\$4.95

ANTENNA WIRE & ACCESSORIES

Stranded Copper 14ga.	\$.10/ft.
1/4 mile 18ga copper-clad steel wire	\$.30
Dog bone end insulator	\$.79 ea.

Van Gorden

1:1 Balun	\$15	Center Insulator	\$8
Dipole Kits	D80 \$31.95/D40 \$28.95		
Short Dipole Kits	SD80 \$35.95/SD40 \$33.95		
All-band Dipole w/ladder line	\$29.95		
G5RV all band antenna	\$49.95		

ALPHA DELTA

DX-A 160-80-40 Sloper.....\$49

CUSHCRAFT

A3 3-el Tribander	
A4S 4-el Tribander Beam w/S.S. Hdwr.	
A743 & A744, 30/40 mtr KIT for the A3 & A4.	
R4 20-10 mtr Vertical	
AP8 80-10 mtr Vertical	
AV5 80-10 mtr Vertical	
D40 40 mtr Dipole	
40-2CD 2-el 40 mtr Beam	
A50-5 5-el 6 mtr Beam	
215 WB NEW 15-el 2 mtr Beam	
230 WB NEW 30-el 2 mtr Beam	
4218 XL 18-el 2 mtr Beam	
3219 19-el 2 mtr Beam	
424B 24-el 432 MHz Beam	
ARX2B 2 mtr Vertical	

hy-gain

Discoverer 2-el 40-mtr Beam	
Discoverer 3-el Conversion Kit	
EXPLORER-14 SUPER-SPECIAL	
QK710 30/40 mtr. Add-On-Kit	
V2S 2-mtr Base Vertical	
V4S 440MHz Base Vertical	
TH5MK2S Broad Band 5-el Triband Beam	
TH7DXS 7-el Triband Beam	
TH3JRS 3-el Triband Beam	
205BAS 5-el 20-mtr Beam	
155BAS 5-el 15-mtr Beam	
105BAS 5-el 10-mtr Beam	
204BAS 4-el 20-mtr Beam	
64BS 4-el 6-mtr Beam	
12 AVQ 20-10 mtr vertical	
14 AVQ 40-10 mtr vertical	
18 AVT/WB 80-10mtr Vertical	
18HTS 80-10 mtr Hy-Tower Vertical	
23BS 3-el 2 mtr Beam	
25BS 5-el 2 mtr Beam	
28BS 8-el 2 mtr Beam	
214BS 14-el 2-mtr Beam	
2BDQ 80/40 mtr Trap Dipole	
5BDQ 80-10 mtr Trap Dipole	
BN86 80-10 mtr KW Balun W/Coax Seal	

HUSTLER

68TV 80-10 mtr Vert	\$149	58TV 80-10 mtr Vert	\$129		
48TV 40-10 mtr Vert	\$99	G7-144 2-mtr Base	\$129		
G6-144B 2-mtr Base	\$89				
Mobile Resonators	10m	15m	20m	40m	75m
400W Standard	\$16	\$17	\$19	\$22	\$26
2KW Super	\$20	\$22	\$25	\$29	\$39
Bumper Mounts - Springs - Folding Masts in Stock!					

BUTTERNUT ELECTRONICS CO

HF6VX 80-10m Vertical \$149 Delivered

- Full Legal Power
- Highest Q Tuning Circuits

HF2V 80-40m Vertical \$139 Delivered

- Full Legal Power
- Automatic Band Switching

Accessories:

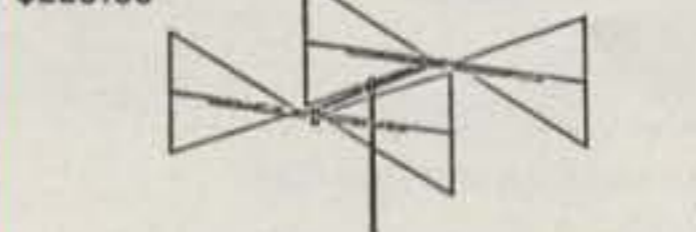
RMK II Roof Mtg. Kit	\$55
STR II Stub-Tuned Radials	\$35
TBR160 160m Coil Kit	\$55
30m Add-on Kit	\$35
17/12m Add-on Kit	\$35

FREE UPS on ACCESSORIES when purchased with antenna

HF6V

HF2V

HF5B "Butterfly" 20-10m Compact Beam \$229.95



- Unique Design Reduces Size
- No Lossy Traps
- Turns w/TV Rotor
- Boom Length 6 Feet
- Element Length 12.5 Feet

FREE UPS Shipping in Continental USA

MIRAGE/KLM

KT34A 4-el Broad Band Triband Beam	\$419
KT34XA 6-el Broad Band Triband Beam	\$619

ROTORS

Alliance HD73 (10.7 sq. ft. rating)	\$129.95
Alliance U110 (3 sq. ft. rating)	\$49
Telex CD 4511 (8.5 sq. ft. rating)	\$Call
Telex HAM 4 (15 sq. ft. rating)	\$Call
Telex Tailtwister (20 sq. ft. rating)	\$Call
Telex HDR300 Heavy Duty (25 sq. ft. rating)	\$Call

ROTOR CABLE

Standard 8 cord cables \$.25/ft. (vinyl jacket 2-#18 & 6-#22 ga)	
Heavy Duty 8 Cond cable \$.45/ft (vinyl jacket 2-#16 & 6-#18 ga)	

ROHN GUYED TOWER SECTIONS

10 FT. STACKED SECTIONS	
20G.....\$54.50	45G.....\$153.50
25G.....\$65.50	55G.....\$197.50

ALL ACCESSORIES IN STOCK—CALL

ROHN FOLDOVER TOWERS

Model	Height	Ant. Load*	Price
FK2548	48 ft.	15.4 sq. ft.	
FK2558	58 ft.	13.3 sq. ft.	
FK2568	68 ft.	11.7 sq. ft.	
FK4544	44 ft.	34.8 sq. ft.	
FK4554	54 ft.	29.1 sq. ft.	
FK4564	64 ft.	28.4 sq. ft.	

25G Double Guy Kit	\$299.
45G Double Guy Kit	\$319.

*Above antenna loads for 70 mph winds w/guys at hinge and apex. All foldover towers shipped freight prepaid in 48 states. Prices 10% higher west of Rockies.

TOWER/GUY HARDWARE

3/16 EHS Guywire (3990 lb rating)	\$.15/ft
1/4 EHS Guywire (6650 lb rating)	\$.18/ft
5/16 EHS Guywire (11,200 lb rating)	\$.29/ft
5/32 7x7 Aircraft Cable (2700 lb rating)	\$.15/ft
3/16 CCM Cable Clamp (3/16" or 5/32")	\$.45
1/4 CCM Cable Clamp (1/4" Cable)	\$.55
1/4 TH Thimble (fits all sizes)	\$.45
3/8EE (3/8" Eye & Eye Turnbuckle)	\$.69.95
3/8EJ (3/8" Eye & Jaw Turnbuckle)	\$.79.95
1/2 x 9EE (1/2" x 9" Eye to Eye Turnbuckle)	\$.99.95
1/2 x 9EJ (1/2" x 9" Eye & Jaw Turnbuckle)	\$10.95
1/2 x 12EE (1/2" x 12" Eye & Eye Turnbuckle)	\$12.95
1/2 x 12EJ (1/2" x 12" Eye & Jaw Turnbuckle)	\$13.95
5/8 x 12EJ (5/8" x 12" Eye & Jaw Turnbuckle)	\$16.95
3/16" Preformed Guy Grip	\$2.49
1/4" Preformed Guy Grip	\$2.99
6" Diam - 4 ft Long Earth Screw Anchor	\$19.95
500 D Guy Insulator (5/32" or 3/16" Cable)	\$1.69
502 Guy Insulator (1/4" Cable)	\$2.99
5/8" Diam - 8 ft Copper Clad Ground Rod	\$12.95

PHILLYSTRAN GUY CABLE

HPTG2100 Guy Cable (2100 lb rating)	\$.32/ft
HPTG4000 Guy Cable (4000 lb rating)	\$.52/ft
HPTG6700 Guy Cable (6700 lb rating)	\$.72/ft
9901LD Cable End (for 2100/4000 cable)	\$9.95
9902LD Cable End (for 6700 cable)	\$11.95
Socketfast Potting Compound (does 6-8 ends)	\$16.95

GALVANIZED STEEL MASTS

Length	5 FT	10 FT	15 FT	20 FT
12 in Wall	\$29	\$49	\$69	\$89
18 in Wall	\$49	\$89	\$129	\$149
25 in Wall	\$69	\$129	\$189	\$249

ORDER TOLL FREE 1-800-272-3467

Texas, Alaska & for information 1 (214) 422-7306



TEXAS TOWERS

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

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

(Prices & Availability Subject To Change Without Notice)

(Antenna/tower product prices do not include shipping unless noted otherwise)

CIRCLE 122 ON READER SERVICE CARD

tenna should be attached to a ground. Ground-plane antenna operation is independent of the station's RF ground.

Directional Antennas. The Yagi-Uda (commonly called the Yagi) antenna is popular because it is easy to assemble and it seldom requires maintenance. A two-element quad antenna provides the same DX capability as a three-element Yagi-Uda. A ruggedized variation of the quad is the delta loop. Both the quad and the delta loop provide excellent DX performance at a lower height than is required by a Yagi-Uda. However, the Yagi-Uda is less likely to sustain wind damage.

Antenna Fundamentals

There are many good books about antennas, but most of them are too complicated to be easily understood by amateurs. However, I know two books that contain simple explanations which provide pertinent facts in a manner that is easy to comprehend.

Doug DeMaw, W1FB, has produced another excellent soft-cover notebook. The 139-page *Novice Antenna Notebook* has eight chapters filled with easily understood essential information. This book is primarily intended to help Novices, but it contains tips that can benefit even the most experienced amateurs. Your local amateur radio supply store should have this publication in stock, if they sell ARRL publications. If it is not available locally, it can be ordered directly from the American Radio Relay League, 225 Main Street, Newington, CT 06111. The book number is 2073 and the price is \$8.00, plus \$2.50 shipping and handling.

Ted Hart, W5QJR, has published a 41-page introduction to antenna fundamentals. The name of his excellent book is *The Rules of the Antenna Game—Alias, What Every Ham Must Know About HF Antennas*. Ted's book sells for \$6.95, which includes shipping charges. The address is W5QJR Antenna Products, POB 334, Melbourne, FL 32902-0334.

High-Performance Low-Band Antennas

If you have enough room to erect full-length antennas on 40, 80, and 160 meters, you should consider the bobtail antenna. Kent Svensson, SM4CAN, publishes a 28-page book about this type of antenna. It can be ordered by writing to Kent at Bruksgatan 18 B, S-69502, Laxa, Sweden. The price (including shipping) is \$5.00 (U.S.), or 12 IRCs. This type of antenna was originally described by its originator, Woodrow Wilson, W6BCX, in the April 1948 issue of *CQ*. Those of us who hear Kent's booming signals on the low bands know the bobtail antenna is superb.

This concludes the first segment of this two-part article. The second segment covers baluns, antenna-support rope, and high-performance off-the-shelf wire antennas.

Photographs Wanted

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

Printed Aids

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

73, Bill, W6DDB

Tired of Being the Channel Master?

We Help Keep You QRV

YA-1 LOW PASS FILTER \$49.95



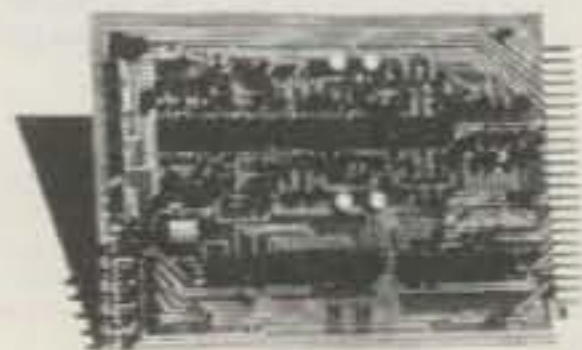
Working Range: 1.8 to 29.7 MHz
Impedance: 50 ohms
Power Rating: 15kw continuous, 5kw peak
Attenuation: ≥ 80db @ 54 MHz

BENCHER, INC.

333 W. Lake St. Chicago, IL 60606 312-263-1808

CIRCLE 123 ON READER SERVICE CARD

THE MULTIPLE RECEIVER SOLUTION



4 Channel Signal-to-Noise Voter

- Expandable to 32 Channel by Just Adding Cards
- Continuous Voting
- LED Indicators of COR and Voted Signals
- Built-in Calibrator
- Remote Voted Indicators Pinned Out
- 4 1/2 x 6 Double Sided Gold Plated 44 Pin Card
- Remote Disable Inputs
- MORE

Built, tested and calibrated with manual

\$350.00

Telephone interface now available
For more information call or write:

DOUG HALL ELECTRONICS
Voter Department
815 E. Hudson Street
Columbus, Ohio 43211
(614) 261-8871

CIRCLE 124 ON READER SERVICE CARD

ALINCO The Best Is Affordable



Call Today

DR-110T 2 Meter FM Mobile
DR-510T Mobile Dual Bander
DJ-100T 2 Meter Hand Held
DJ-500T Dual Band Hand Held

WILLIAMS RADIO SALES

600 LAKEDALE ROAD
COLFAX, N.C. 27235

Call (919) 993-5881
NOON to 10:00 PM EST

Please send all reader inquiries directly.

COMPUTERIZE YOUR SHACK

Control up to eight digital radios simultaneously from your MS-DOS microcomputer! We offer a series of software/hardware packages that interface with most current synthesized rigs.

ICOM: IC-781, 765, 761, 751A, 735, 725, R71A, R7000, 271, 371, 471, 1271, 275, 375, 475, 575, CI-V

KENWOOD: TS-940, 440, 140, R-5000, 680, 711, 811

YAESU: FT-767, 757 GXII, 757 GX, 747, 9600, 736

JRC: NRD 525

COLLINS: 651 S1

Datacom couldn't be simpler. Knowledge of MS-DOS is not necessary—the installation program does it all! Datacom allows complete control of your rig from the keyboard.

A few of its many features:

- Adds scan function to radios that don't allow this from front panel.
- Adds frequency and associated info memory limited only by disk storage.
- Tabular screen display of all the channels stored in memory, along with a full description of each including: mode (LSB, USB, FM, etc.), eight character alphanumeric description, signal bandwidth.
- Full featured logging utility.
- Able to automatically log hits while sweeping.
- Color coded program for ease of use (will run on a monochrome system).
- Menus for amateur, AM-FM broadcast, television broadcast, S/W, aviation, marine, with most popular frequencies stored.

Call or Write today for more information

AVAILABLE FOR IBM PC, XT, AT, 80386 256K RAM
1 SERIAL PORT AND 1 FLOPPY MINIMUM

PROGRAM WITH INITIAL LIBRARIES.....99.95

RS-232 TO TTL INTERFACE ONLY (NEEDED IF DON'T HAVE
MANUFACTURERS INTERFACE)

EXTERNAL INTERFACE ALLOWS 4 RADIOS (NOW WITH
SQUELCH DETECT CIRCUITRY).....129.95

INTERNAL PC INTERFACE W/1 SERIAL & 1 RADIO PORT.....129.95

SPECTRUM ANALYZER MODULE.....(CALL FOR PRICE)

COMPLETE SYSTEMS INCL. RADIO, INTERFACE, COMPUTER,
AVAILABLE.....(CALL FOR PRICE)

DATACOM, INT. 8081 W. 21ST LANE • HIALEAH, FL 33016
AREA CODE (305) 822-6028

CIRCLE 147 ON READER SERVICE CARD

JANUARY 4, 1983

A CURE WAS FOUND FOR THESE DISEASES :

1. REFLECTED POWER-ITCH
2. KNOB-ITUS
3. QRM-DEAFNESS
4. BUTTON-PHOBIA
5. SWITCH-CANKER
6. SUPER TUNER-BLUES
7. CROSS NEEDLE-EYES



THE CURE IS:



MAXCOM



AUTOMATIC ANTENNA MATCHER ®
FOR ALL S.S.B. RADIOS

* ONE SHOT GUARANTEED TO LAST
AT LEAST FIVE YEARS!

SONNY IRONS, BOX 502, FT. LAUD., FL 33302
305-523-6369

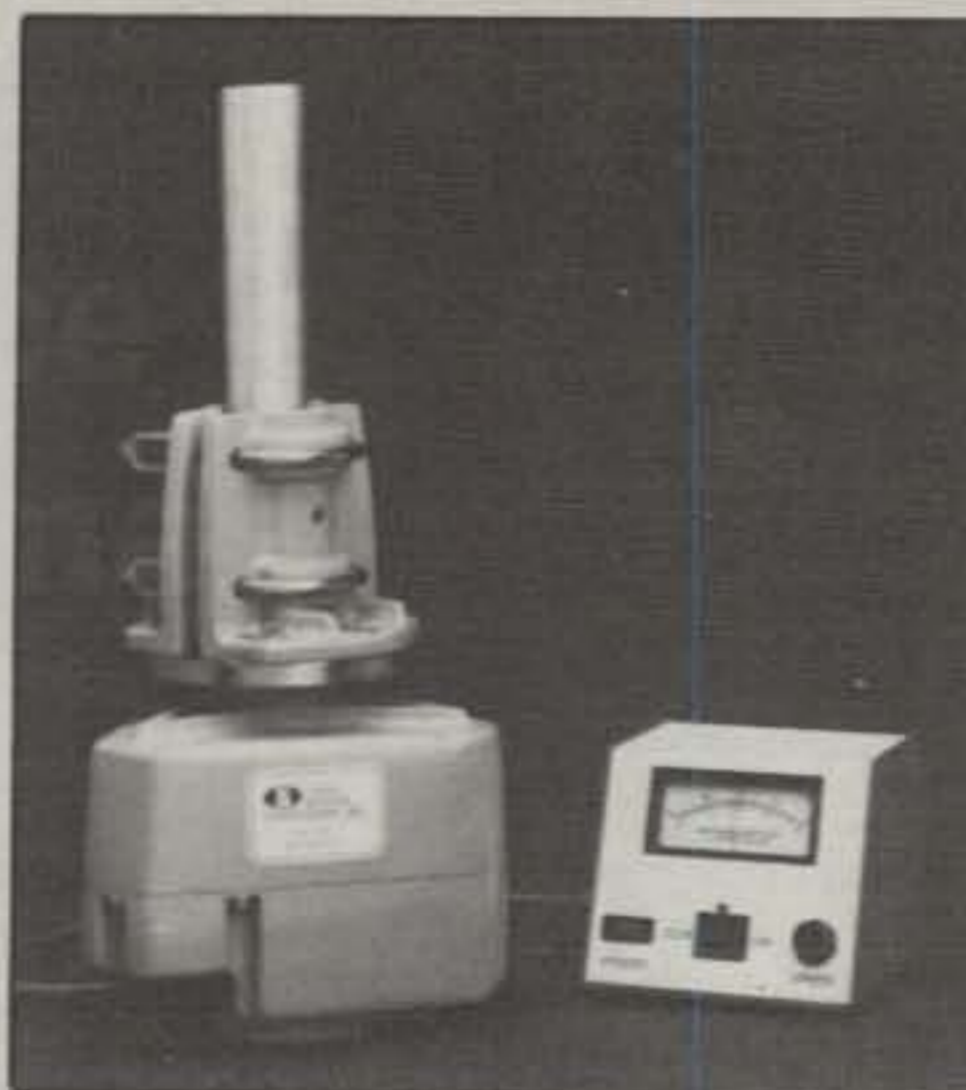
* MAXCOM is a registered trademark and is owned by Maxcom electronics, Inc.

THE BOTTOM LINE: "MAXCOM WORKS"

CIRCLE 146 ON READER SERVICE CARD

New From

ORION



THE ROTATOR!

OR-2300 (Prototype shown)

Introducing a new generation in rotators! Orion's intense research and development has produced a rotator for today and into the Twenty First Century.

HIGH PERFORMANCE FEATURES

- Proven Worm Gear Drive
- Compact—Fits Popular Towers
- Flex-Mount
- Built-In Thrust Bearing
- Massive Mast Clamps
- Standard Hole Pattern
- Self-Centering Guide
- Stainless Steel Hardware
- Made In U.S.A.
- 1 Year Warranty
- 35 Square Feet
- Easy Reading Control Box
AND MORE!

For More Details Contact Your
Local Dealer Or Orion
(Available Mid Summer)

ORION
BUSINESS
INTERNATIONAL, INC.
TM

P.O. Box 9577 Canoga Park, CA 91309 U.S.A.
Tel: (818) 888-4927 Fax: (818) 888-5112 Telex: 697-4899

NEWS OF CERTIFICATE AND AWARD COLLECTING

The Story of the Month for July is:

F. Gene Harrelson, KB5KM
USA-CA All Counties #234, Mixed
8-2-79

"As a young lad in the early 1930s, I heard a rumor that there was a man in our small town who had built a radio and was able to talk to as far away as Chicago. This fascinated me to the point of walking across town to see if this was really true. When I found him, he gladly invited me into his shack and gave a demonstration to prove that the rumor was in fact true. I was so intrigued that I made a vow to myself: 'Someday I will do this.'

"In 1944 as a young army officer in the jungles of New Guinea I could not receive anything on a portable AM broadcast radio that I had with me. I was discussing this with a soldier whom I had met and he said, 'I am a ham radio operator; maybe I can fix this for you.' He made a coil by winding a length of scrap wire around a small joint of bamboo, changing the radio from a broadcast to a shortwave radio. With this modified radio, homebrew coil hanging from the back, I was able to receive stations from Australia, broadcasting some news from the outside world, and of course Tokyo Rose on the pro-Japanese propaganda station, with her soft sweet voice, playing American music, hoping to make us homesick for the days back home. I was so impressed with this ham radio operator that I said again, 'Someday I will do this.'

"As a newly licensed amateur in 1972, I happened to run across the County Hunters net on 20 meters and was amazed that some people were ambitious enough to take on the challenge of contacting every county in the United States. The more I listened, the more interested I became, and finally I said, 'Someday I will do this.'

"Fortunately, I was able to accomplish the three goals of which I had once dreamed. I built my first radio (CW) to get on the air. Through much experimenting and trial and error, I learned to wind coils, and finally I did work all the counties in the USA. On August 2, 1979 I was awarded USA-CA All Counties #234.

"I was born in Cleveland County, Arkansas, later moving to Arkadelphia, Arkansas, where I attended high school and



Gene Harrelson, KB5KM, at home in his well-equipped shack in Arkansas.



Gene, KB5KM, USA-CA All Counties #234, out to make a contribution from his FB mobile station.

college, and where I currently reside. I was away for four years serving in the army in both the European and Pacific theaters. I completed 20 years of service in the Air National Guard and retired as a major. I worked 33 years for the US Postal Service, retiring as Assistant Postmaster in 1972. My wife, Jeannette, WB5KUE, and I have been married 47 years and have two children and five grandchildren.

"My amateur radio activities in addition to County Hunting are traffic nets, packet, and DX, having confirmed over 200 DX stations. Other hobbies include flying and sports officiating. I have been an FAA licensed pilot for over 40 years and have flown many search-and-rescue missions with the Civil Air Patrol. I officiated both high school and college football and basketball for over 25 years.

"Without reservation I would like to

say that people on the County Hunters nets have been the most courteous, helpful, friendly, and enjoyable of all people I have met in ham radio. I would like to thank all those who gave me a county for their participation, all net controls for their patience, all the one ringers for their cooperation, and especially Nell, NB6A, who made a wide detour while traveling from the east coast to the west coast to give me Jefferson Davis County, Miss. for the last one. Most especially, thanks to my wife, WB5KUE, who is the best logger in all ham radio.

"I still enjoy listening to the County Hunters Net, and I run some counties while traveling. I ran all 75 counties in Arkansas a few years ago, and am planning to do this again soon. I will try to make a special trip in or near my area (Clark, Arkansas) for last counties.—73, Gene."

USA-CA Special Honor Roll

Dave Batema, N8ESR All Counties #610,
All SSB, 3-1-89

Harold C. Griffin, N4OA
All Counties #611, Mixed, 3-6-89

O. Brian Schreen, NT7R
All Counties #612, Mixed, 3-24-89

Robert A. Yoder, Jr., WD9GSU
All Counties #613, Mixed, 3-31-89

USA-CA Honor Roll

3000		1500	
N8ESR	641	N8ESR	871
N4OA	642	N4OA	872
WA6MUK	643	KJ4LJ	873
WD9GSU	644	KE9FG	874
		WD9GSU	875
2500		1000	
N8ESR	716	N8ESR	1060
KA00NVT	717	WD9GSU	1061
N4OA	718		
WD9GSU	719	500	
2000		N8ESR	2319
N8ESR	783	Y78XL	2320
N4OA	784	TI2LC	2321
N2GOI	785	WD9GSU	2322
WD9GSU	786		

The total number of counties for credit for the United States of America County Award is 3076. The basic award fee for subscribers to CQ is \$4.00. For nonsubscribers it is \$10.00. Initial application must be submitted in the USA-CA Record Book, which may be obtained from CQ Publishing Company, 76 North Broadway, Hicksville, NY 11801, USA for \$1.25. To qualify for the special subscriber rate please send a recent CQ mailing label with your application. To be eligible for the USA-CA, applicants must comply with the rules of the program as set forth in the revised USA-CA Rules and Program dated April 2, 1985. A complete copy of the rules may be obtained by sending an SASE to Dorothy Johnson, WB9RCY, USA-CA Custodian, 333 South Lincoln Avenue, Mundelein, IL 60060, USA. DX stations must include extra postage for airmail reply.

333 South Lincoln Ave., Mundelein, IL
60060

Awards Issued

Dave Batema, N8ESR, qualified for a fully endorsed certificate by claiming USA-CA All Counties #610, USA-CA 3000 #641, USA-CA 2500 #716, USA-CA 2000 #783, USA-CA 1500 #871, USA-CA 1000 #1060, and USA-CA 500 #2319, all dated 3-1-89. USA-CA 500 through USA-CA 3000 carried an All SSB Mobiles endorsement, and USA-CA All Counties carried an All SSB endorsement.

Harold C. Griffin, N4OA, completed all of his paperwork and received USA-CA All Counties #611, USA-CA 3000 #642, USA-CA 2500 #718, USA-CA 2000 #784, and USA-CA 1500 #872, Mixed, dated 3-6-89.

O. Brian Schreen, NT7R, completed his quest and claimed USA-CA All Counties #612, Mixed, dated 3-24-89.

Robert A. Yoder, Jr., WD9GSU, took one giant leap and received USA-CA All Countiesw #613, USA-CA 3000 #644, USA-CA 2500 #719, USA-CA 2000 #786, USA-CA 1500 #875, USA-CA 1000 #1061, and USA-CA 500 #2322, Mixed, dated 3-31-89.

Dr. Theodore Palmer, WA6MUK, took the next to last step by claiming USA-CA 3000 #643, Mixed, dated 3-18-89.

Clyde E. Kane, KA0NVT, received USA-CA 2500 #717, Mixed, dated 3-1-89.

William B. "Bill" Kelly, N2GOI, filed his good application and received USA-CA 2000 #785, All 20M SSB, dated 3-24-89.

Henry "Hank" Petersen, KJ4LG, received USA-CA 1500 #873, Mixed, dated 3-11-89.

Robert Tirk, KE9FG, received USA-CA 1500 #874, Mixed, dated 3-14-89.

USA-CA 500 certificates went to:

Dave Batema, N8ESR, USA-CA 500 #2319, All SSB Mobiles, 3-1-89.

Manfred Grimm, Y78XL, USA-CA 500 #2320, All SSB, 3-9-89.

Luis Retana, TI2LC, USA-CA 500 #2321, Mixed, 3-30-89.

Robert A. Yoder, Jr., WD9GSU, USA-CA 500 #2322, Mixed, 3-31-89.

Awards Available

Scottish Tourist Board Awards. Two awards will be issued by the Scottish Tourist Board (Radio Amateur) Expedition Group, both in color.

The first, the Thistle Award, is for contacting four separate S.T.B. events. To claim this award, forward QSL cards or log extracts to Awards Manager, GM4UQG, Robbie, P.O. Box 59, Hamilton, Scotland ML3 6QB, enclosing \$2.00, one pound, or the equivalent. This award must be claimed separately prior to applying for the Supreme Tartan Banner Award as another claim.

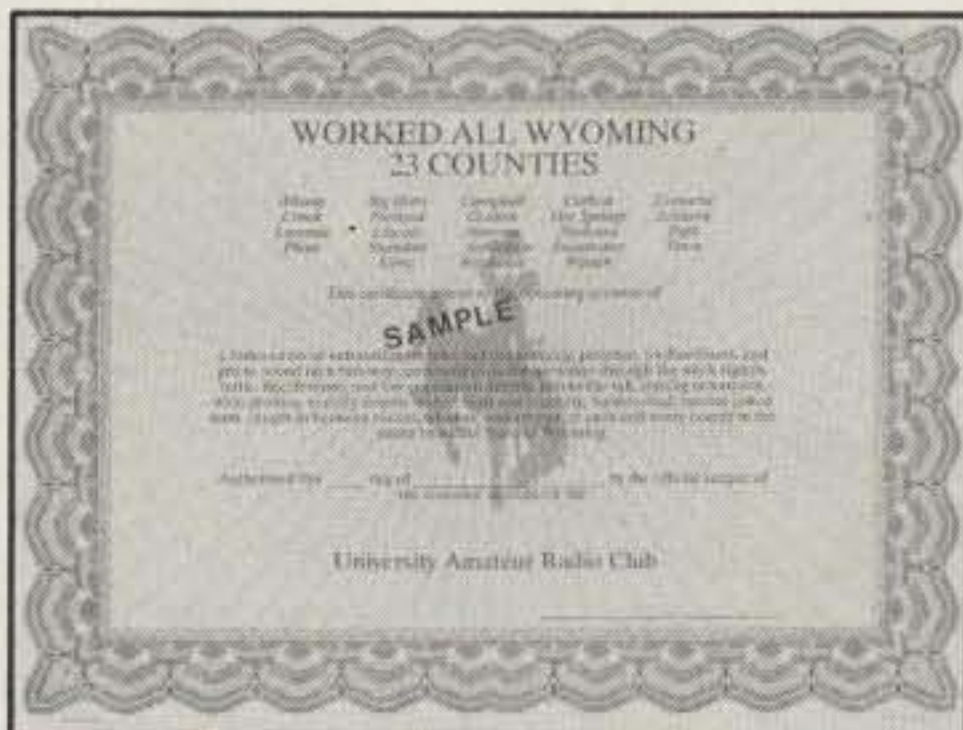
The second, the Supreme Tartan Banner Award, is for contacting two more stations, making a total of six S.T.B. events. To claim this award, send QSL cards or log extract to GM4UQG, Robbie, address

as above, enclosing \$3.00, one pound 50 pence, or the equivalent.

Annotations will be awarded free for contacting a further 2/4/6 events, etc.

These awards are available to SWLs on a heard basis.

GM4UQG, Robbie, is the awards manager for all S.T.B. awards.



Worked All Wyoming, 23 Counties, Award offered by the University ARC.

W.A.C. of Wyoming Award. The Worked All Counties of Wyoming award, sponsored by the University of Wyoming Amateur Radio Club, is bestowed on any licensed radio amateur who has contacted one licensed radio amateur in each of Wyoming's 23 counties on any band/mode combination. The applicant certifies on the official application the authenticity of log extract information for contact with all 23 counties. No QSL cards are required. No mode/band/power endorsements are available for this award. General rules governing good sportsmanship, fair play, and clean signals are applicable. All decisions of the UARC awards committee are final. A fee of \$2.00 US, payable to the University Amateur Radio Club, must accompany each application. Non-USA amateurs may send 9 IRCs. All applications must be sent to UARC, Wyoming Counties Award, P.O. Box 3625 Univ. Sta., Laramie, WY 82071 USA.

The application form carries the above qualifying criteria followed by a list of the 23 counties with spaces for Call, Town/Location, Date, Band/Mode, and closes with the following certification to be signed and dated by the applicant: "I hereby AFFIRM that I have read, understood and abided by all the rules of the "Worked All Wyoming" award as detailed above. I further CERTIFY that the log extract information contained in this application is correct and true in every respect as copied from my station log and that I have established two-way communications with all 23 Wyoming counties."

Guernsey Bailiwick Award. The Guernsey Bailiwick Award is organized by the Guernsey Amateur Radio Society. It is open to all licensed amateurs and SWLs.

MADISON SHOPPER

CALL FOR ORDERS

1 (800) 231-3057

1 (713) 520-7300 OR 1 (713) 520-0550

TEXAS ORDERS CALL COLLECT

FAX 1 (713) 771-7759

ALL ITEMS ARE GUARANTEED OR SALES PRICE REFUNDED



New Icom IC 781 Trades wanted
Kenwood TH215A, TH25AT Trade in your old HT
TS440 S/AT Call



Kenwood TS 140S Call for trade
New Kenwood TM-721A, mobile Call
ICOM 228H/TTM 449.00



TS 790A Superior 2 Meter 70 cm Rig,
1.2 GHz Option Available Call
Icom 765 2695.00
Kenwood MC-60A + Heil HC-5 cartridge 150.00
Icom IC-725 799.00
NYE MB5A Tuner 569.00
Alpha Delta Transitrapp HV 33.00
CSI Private Patch V 489.00
Ameco PT 3 Pre Amp 99.00
Larsen 2-meter on glass 49.95
Anteco 2M, 5/8, Mag. Mount, Comp 25.00
Van Gordon Windom WA2 44.00
Bird 43, elements/stock Call
Thousands of panel meters 3.95 up CALL
Belden 9913, 8267, 8214 Stock Call
MICA Capacitors Call
Arista SWR Bridge 3-30 MHz 19.95
831SP-PL259 Silverplate (Amphenol) 1.50
82-61 N Male (Amphenol) 3.50
82-202-1006 N Male (9913) 3.50
Double Female UHF 1.00
UG176 RG8X each .40
Surplus Elbow PL259-SO239 each \$1
Receiving tubes 50-90% off list price Call
Santec Boom Mike/Headset (fits ICOM) 20.00
STUPH
RF Amp Meters \$15 to \$30 each
25 pF/10KV Doorknob Cap 5.00
Throat Mike (new mil. surplus) 5.00
ANBH-1 600 Ω Headphones (new mil. surplus) 5.00
New Demo Units for Sale
Kenwood R-5000 849.00

USED EQUIPMENT

All equipment, used, clean, with 90 day warranty and 30 day trial. Six months full trade against new equipment. Sale price refunded if not satisfied.

(800) 231-3057

POLICIES

Minimum order \$10.00. Mastercard, VISA, or C.O.D. All prices FOB Houston, except as noted. Prices subject to change without notice. Items subject to prior sale. Call anytime to check the status of your order. Texas residents add sales tax. All items full factory warranty plus Madison warranty.

Bird and Belden products in stock. Call today.

MADISON Electronics Supply

FAMILY OWNED SINCE 1956

3621 FANNIN
HOUSTON, TEXAS 77004



CIRCLE 127 ON READER SERVICE CARD

July 1989 • CQ • 67

All modes and bands are eligible.

The Bailiwick of Guernsey is made up of the islands of Guernsey (consisting of ten small parishes), Alderney, Sark, and Herm. This award is given for working various islands and parishes, as described below.

The *Bronze Award* is for contacts with GU stations in six of the Guernsey parishes, plus contact with GU3HFN or GU8NIS (club stations)—total of 7 QSOs.

The *Silver Award* is for contacts with GU stations in eight of the Guernsey parishes, plus one contact with either Alderney or Sark, and contact with GU3HFN or GU8NIS—total of 10 QSOs.

The *Gold Award* is for contacts with GU stations in all ten of the Guernsey parishes, plus one contact with Alderney and one with Sark, and contact with GU3HFN or GU8NIS—total of 13 QSOs.

Contact with /M and /P stations do count as long as the QSL card states which parish was activated. All contacts with Guernsey stations must be with GARS members.

Endorsements are available for single

band and/or single mode.

A *Five Band Award*, available for claiming the Gold standard on five separate bands, is eligible for an engraved copper Guernsey can (cost on request).

Cost of the award is 8 IRCs, 2 pounds sterling, or \$4.00 US. Send list of QSLs certified by two amateurs or a national society.

Full details and a list of GARS members is available from: Awards Manager, Phil Horsepool (GU0JCI), P.O. Box 100, Guernsey, Channel Islands.

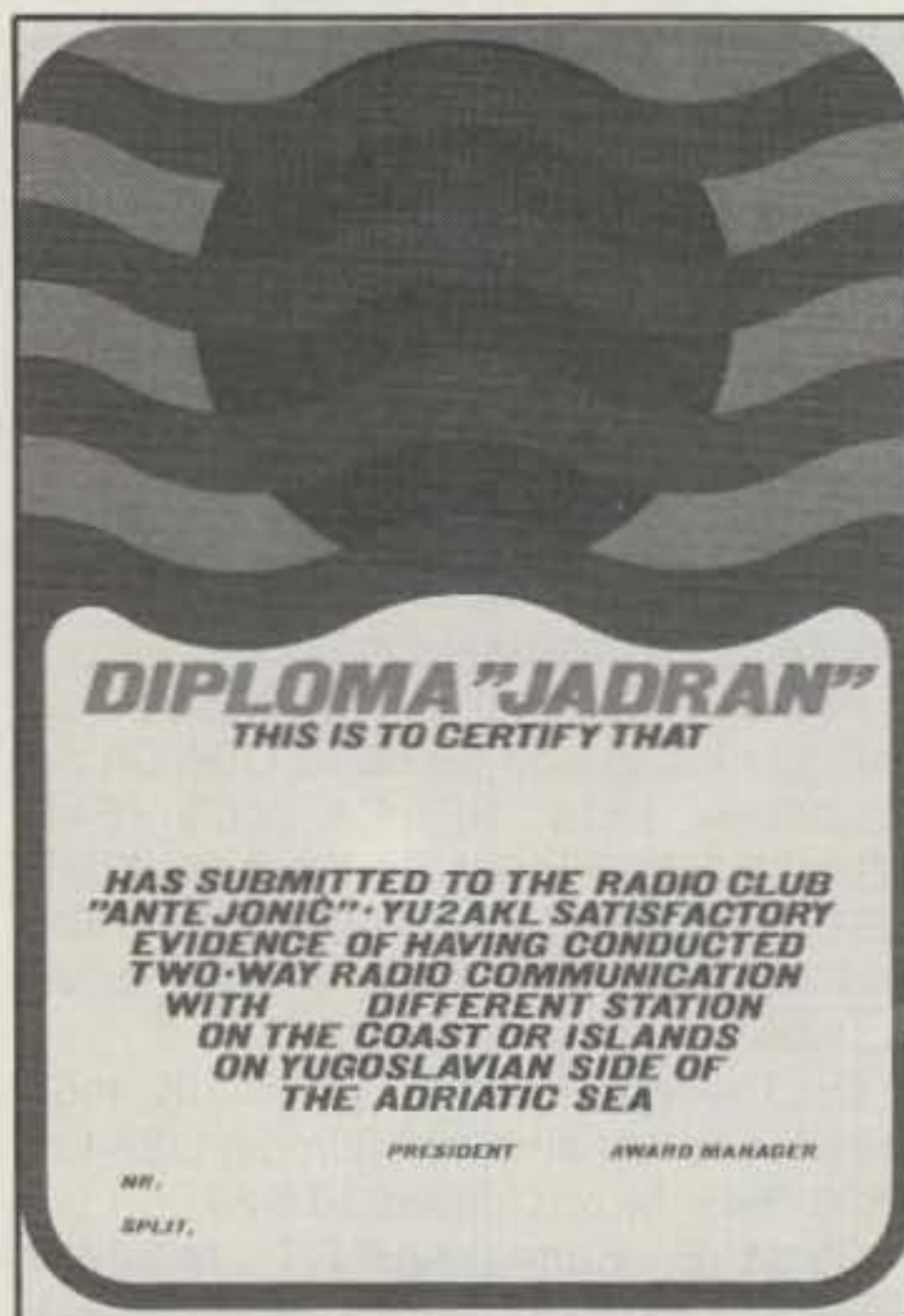
Armavir City Award. The Armavir City Award commemorates the 150th anniversary of Armavir City. All QSOs after January 1, 1989 are valid for the award. The following rules apply:

1. USA stations and all other DX, except Europeans, need 5 QSOs with stations in Armavir. Europeans need 10 QSOs with stations in Armavir.

2. All bands, all modes may be used.

3. DO NOT submit QSL cards. Forward information as taken from your log, along with 10 IRCs to Awards Manager, P.O. Box 16, Armavir 352900, USSR.

In addition to the above award, you may receive a special "Armavir" badge by making one QSO with RW6AC (RW6 Armavir City). For the special badge, enclose 7 IRCs with your QSL and send to Jack Tatashvil, RW6AC, P.O. Box 16, Armavir 352900, USSR.



Jordan Award available from Radio Club "Ante Jonic," Split, Yugoslavia.

Jadran Award. The diploma "Jadran" is offered by the amateur radio club "Ante Jonic" of Split, Yugoslavia for confirmed QSOs with Yugoslav amateur stations located on the coast or islands of the Adriatic Sea. The following conditions apply:

1. EU stations must have 10 QSOs with 5 places.
2. DX stations must have 5 QSOs with 3 places.
3. Only contacts after January 1, 1970 are valid.

This award is also available to SWLs.

To apply for the diploma "Jadran," send QSO list and YU QSLs with \$3.00 US to: Award Manager, P.O. Box 89, 58000 Split, Yugoslavia.

Notes

The AGCW-DL announces that in January 1989 their award manager moved to a new address: AGCW-DL Award Manager, Heinz Muller, DK4LP, Husumer Str. 2 B, D-2251 Rantrum, West Germany. Please forward all applications for AGCW-DL awards (CW-QRP-100, CW-QRP-250/500, CW-500, CW-1000, CW-2000, W-AGCW-M [Members]) to the new address. The fees remain unchanged: DM 5 or equivalent for CW-QRP-100; DM7 or equivalent for all other awards.

That's all for this month.

73, Dorothy, WB9RCY

IRON SLEEVE Only \$19.95

Place a hot soldering iron in your toolkit without having to wait for it to cool! Saves wasted time!
Insulated carrier protects while it absorbs the iron heat. Fits most popular soldering irons. 11" long tube 1.5" in diameter.



WINDOW COUPLER

Run your coax from inside to outside through the glass! No Holes! No Pinched Coax! No Drafts! 2MTR & 440 1.5:1 SWR with less than 2db loss. 10MHz bandwidth and rated for 25 watts. Boxes mount to window with tape. Specify BNC or UHF/50239 cone. WPO-VHF (140-160MHz) \$19.95 WPO-UHF (440-460MHz) \$19.95
SCANNER/TV version 80-800MHz RX only, 8db loss, "F" connectors. WPO-TV \$40.95

NEW PRODUCTS!

VAK-TENNA

IDEAL FOR APARTMENTS!
For 2mtr & 230 or Scanners. Mounts to glass with suction cups. Collapsible dipole extends to 7'. With 11' coax and choice of BNC, PL259 and other connectors. \$29.95 MORE MODELS AVAILABLE!



SIGNAL INTENSIFIER Receiver Preamplifiers

Assure the best reception. MANY MODELS AVAILABLE, including the following:
RFP-40 1-1300MHz 15db gain 2.9db ref. 115VAC powered (DC avail +\$4) receive use only. \$69.95 (BNC/50239)
RFTR-SSB 10mtr & CB 13db gain. 13VDC powered (AC avail) for use with transceivers under 50 watts. \$64.95
RFTR-M for VHF MARINE \$69.95



TAPE SAVER

Scanner Recording Interface switches your remote controlled cassette recorder on and off to record during activity only. \$49.95



ELECTRON PROCESSING, INC.
P.O. BOX 708
MEDFORD, NY 11763
(516) 764-9798

When Ordering please add \$4 continental US, \$7 AK, HI, PR, Canada Shipping/Handling. NYS address add sales tax.

SATISFACTION GUARANTEED! SEND FOR MORE DETAILS!

CIRCLE 117 ON READER SERVICE CARD

Electronic Repair Center Servicing

Amateur Commercial Radio

The most complete repair facility on the East Coast.

Large parts inventory and factory authorized warranty service for Kenwood, Icom and Yaesu.

SEND US YOUR PROBLEMS

Servicing "Hams" for 30 years, no rig too old or new for us.

HAMTRONICS, INC.

4033 Brownsville Road

Treose, Pa. 19047

215-357-1400



CIRCLE 116 ON READER SERVICE CARD

CATALOGS

HAM

- Transceivers
 - HF-VHF-UHF
 - Antennas
 - RTTY-Packet
 - Receivers
 - Books & Accs.
- HUGE 48 page 8½ by 11" format. With prices!
ONLY \$1 Postpaid

SWL

- Receivers
 - Antennas
 - Tuners
 - Headphones
 - RTTY-FAX
 - Books & Accs.
- HUGE 52 page 8½ by 11" format. With prices!
ONLY \$1 Postpaid

Send to:

Universal Radio
1280 Alda Drive Dept. CQ
Reynoldsburg, OH 43068

Serving Amateur Radio Since 1942

Please send all reader inquiries directly.

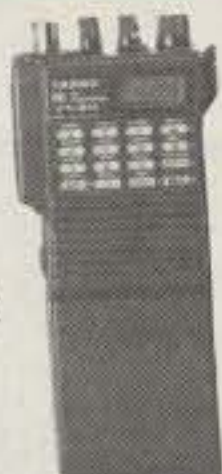
YAESU

FT-470

Dual-Band

Operation Perfected

- 2 Meter/430-450 MHz
- 42 Memories
- 2.3 - 5 Watts Output



YAESU

FT-757 GX Mark II

HF Field-Day Favorite

- 100W Output
- 10-160 Meters
- 10 Memories Transmit
- Dual VFO's
- 500 kHz to 29.99 MHz



ICOM IC-765

Feature Packed HF Performer

- Band Stacking Registers
- 99 Memories—100W Output
- Built-in Tuner and Power Supply
- SSB, CW, AM, FM, RTTY

CALL FOR SPECIAL PRICING



ICOM IC-3210

Dual Band FM Transceiver

- 2m/70cm
- Full Duplex Crossband Operation
- 20 Memory Channels
- 25W & 5W Output

CALL FOR SPECIAL PRICING!



FSTV-430

Fastscan TV Transceiver

Connect to your camcorder or video camera, add a 430 MHz antenna and your on the air. Standard television for displaying received signal

CALL FOR SPECIAL PRICING!



Power Supplies

Heavy Duty, High Quality, Rugged, Reliable Wide Selection of ALL Popular Models

CALL FOR SPECIAL PRICING!

ARRL • ADVANCED RADIO DEVICES • AMERITRON • B&W • BELDEN • BUTTERNUT • CALLBOOK
• CUSHCRAFT • HUSTLER • KANTRONICS • LARSEN • MFJ • RF CONCEPTS • TEN-TEC • VIBROPLEX

**NEW Location
Special Grand
Re-Opening Prices
Ask For Dave**

Texas Comm Center

Div. of Texstar Systems, Inc.

9886 Westpark Drive • Houston, TX 77063

Hours

M-Sat 9-9

Sunday 12-6

CALL: 800-227-8011 (Continental USA-Inc. TX.)

Info & Tech: 713-977-0777 FAX: 713-974-1177

MC/VISA Financing Available

CIRCLE 177 ON READER SERVICE CARD

NextDay	QSLs			
	Two-Color Rainbow Assortment			
Baraboo, Wisconsin Sauk County	Call Today & We Ship			
K9ZZ	NextDay	2nd Day	ASAP	
100	\$29.95	\$24.95	\$19.95	
200	\$39.95	\$34.95	\$29.95	
400	\$49.95	\$44.95	\$39.95	
500	\$54.95	\$49.95	\$44.95	
1000	\$99.95	\$89.95	\$79.95	
Info \$1	All orders ppd 2nd day air / priority mail. For overnight air delivery add \$10. Box 50062-C, Provo UT 84605			
AntennasWest				
(801) 373-8425				

CIRCLE 13 ON READER SERVICE CARD

R	C.A.T.S.	P
	Rotor Parts and Repair Service Reconditioning Large or Small American Made Rotors Repairs - \$15.00* Rebuilds - \$35.00* All parts in stock for immediate delivery. Reconditioned units for sale.	
O	C.A.T.S.	A
T	7368 S.R. 105 Pemberville, OH 43450	R
R	Call N8DJB at (419) 352-4465 11:00-7:00	T
O	*LABOR ONLY - PARTS & SHIPPING ADDITIONAL	R

THE WIREMAN

1-800-727-WIRE

FOR ALL AMATEUR WIRE & CABLE
"CERTIFIED QUALITY"

1-803-895-4195 (Tech Help & Ragchew)

CERTIFIED COMMUNICATIONS
261 PITTMAN ROAD, LANDRUM SC 29356

COMMANDER II VHF Linear Power Amplifier



Up to 1,000 Watts SSB!

SPECIFICATIONS

- Frequency Range: 144-148 MHz
- Modes: USB, LSB, RTTY, FM, CW
- Power Requirements: 117/234 VAC with 234 VAC recommended
- RF Drive Power: 10-15 Watts Nominal 25 Watts Maximum
- RF Output: Up to 1000 Watts SSB
- Input Impedance: 50 OHMS
- Output Impedance: 50 OHMS Nominal
- Antenna Load: 2:1 Maximum
- Harmonic Suppression Down 60DB @ Rated Output
- Intermodulation Distortion Down 30 DB Minimum
- Weight: 56 lbs.
- Cabinet Size: 14 3/4" x 14 3/4" x 6"
- Tube: 3CX800A7 Ceramic/Metal Triode
- Pressurized Chassis Forced Air Cooling
- Dow Key® Model 260B, DPDT, Antenna Relay

MADE IN U.S.A. BY HAMS FOR HAMS

UPS Shippable!

Direct from Manufacturer

Prices or specifications subject to change without notice.

\$1,488.00

Price includes UPS surface charges, insurance, and sales tax in the Continental U.S.A.

COMMAND TECHNOLOGIES, INC.

1117 West High St. Bryan, Ohio 43506 (419) 636-0443

Order Toll Free 1-800-736-0443



Contest Calendar

a monthly feature by
JOHN DORR, K1AR

NEWS/VIEWS OF ON-THE-AIR COMPETITION

This month's column begins with tremendous anticipation as the authorship of the *CQ* Contest Calendar permanently changes hands. Over the years I have had the utmost respect for Frank, W1WY's efforts and dedication. However, it wasn't until I visited the Dayton Hamvention this past April that my appreciation grew even larger for the contribution Frank has made to our hobby, and contesting in particular.

This new-found respect began as I was wandering around, of all places, the flea-market. As I was moving from row to row, I found a fellow selling a complete set of 1957 *CQ* magazines for \$1.00 (a steal, in my opinion). As any fellow contester might be inclined to do, I immediately searched for the 1956 *CQ* WW results. It was interesting to see those "massive" multi-operator scores of K2GL (251,008) and W6AM (209,412), just to name a few. This is a far cry from the 17 million claimed by W3LPL in last year's *CQ* World-Wide. What struck me, though, was the author, W1WY. To put things in perspective, Frank was the driving force behind the *CQ* WW in those days, while I was still trying to master the taking of a few steps across the room. All testers around the world should be indebted to Frank for his being the primary reason we still have the world's best contest—the *CQ* World-Wide.

While Frank's credentials stand on their own with respect to the *CQ* WW, there was one more aspect of those early issues that I found even more impressive. Frank has been writing this column for over 30 years, month after month, dedicating his insight to testers around the world. Contesting has certainly changed since the years of 11 Meter QSO Parties (see December 1957 *CQ*). And, so changes the authorship of this column. To state the obvious, the job is both intimidating and exciting as I step into some pretty big shoes. One final point is that Frank will continue to be an advisor to this column and aid me when questions arise.

Frank, testers from around the world, starting with myself, thank you for all the years!

1989 Dayton Hamvention A Contest Commentary

As I alluded to earlier, contesting has significantly changed in recent years. One missing factor is the infusion of young, motivated operators into the

2 Baldwin Street, Windham, NH 03087

Calendar of Events

July	1	Canada Day Contest
July	1-2	Colorado 6 Meter Net
July	1-2	Venezuela Phone Contest
July	8-9	IARU HF World Champ.
July	9	ARCI QRP CW Sprint
July	15-16	CQ WW WPX VHF Contest
July	15-16	AGCW-DL QRP CW Contest
July	15-16	SEANET 1989 CW Contest
July	15-16	Colombian Indep. Contest
July	19-22	La Blanquilla Is. Expedition
July	29-30	Florida QSO Party
July	29-30	Venezuela CW Contest
July	29-31	County Hunters CW Contest
Aug.	5	YLRL YL/OM SSB Sprint
Aug.	5-6	ARRL UHF Contest
Aug.	12-13	European CW Contest
Aug.	13	ARCI QRP SSB Sprint
Aug.	19-20	SEANET 1989 SSB Contest
Aug.	19-20	New Jersey QSO Party
Aug.	19-21	Missouri QSO Party
Aug.	26-27	All Asian CW Contest
Sept.	6-8	YLRL "Howdy" Days
Sept.	9-10	European SSB Contest
Sept.	16-17	Scandinavian CW Contest
Sept.	23-24	Scandinavian SSB Contest
Sept.	23-24	CQ WW DX RTTY Contest
Sept.	23-24	Classic Homebrew Exchange
Oct.	7-8	Pennsylvania QSO Party
Oct.	28-29	CQ WW DX Phone Contest
Nov.	25-26	CQ WW DX CW Contest

ranks. By a show of hands, this year's Contest Forum had only one attendee under the age of 20, perhaps a reflection of the hobby as a whole. While the usual crowd was there, as well as a good number of new and interesting participants, there seemed to be a striking difference in the traditional "hospitality suite" conversations. I found relatively little discussion about the past year's contests. Years back we seemingly spent hours bragging about our ability to hold sacred band edge frequencies despite all adversity. There was always at least one wild story of working ST2SA on 10 meters and passing Doctor Sid to three other bands for double multipliers.

Instead, this year we spent a significant amount of time discussing packet radio networks, contest logging programs, and log-checking techniques. We spoke at length about the accuracy of logs with 300-plus rates versus those in the 200 QSO/hour range. And yes, we still stayed up until 4 AM, proving once again that old experienced contest operators won't be outdone when it comes to operating "the full 48."

Speaking of the Contest Forum, Steve Bolia, N8BJQ, and myself were able to

JOHN DORR, K1AR

CQ magazine is pleased to announce that John Dorr, K1AR, has accepted the permanent position of Contest Calendar editor. To his new responsibilities, John brings over 20 years of amateur radio experience. First licensed in 1969 as WN2LQZ, John earned his license the "old-fashioned way" by studying the ARRL License Manual and learning Morse code from W1AW (without the aid of a BFO). John's interest in contesting began at an early stage in his amateur career by operating in the ARRL Novice Roundup. Although he only made 200 contacts in over 25 hours of operating, John quickly learned about the thrill of contests.

Since that time John has earned the respect of testers worldwide, as he has amassed an impressive array of winning scores. His accomplishments include first-place scores in a variety of contests such as the *CQ* WW, *CQ* WPX, ARRL DX, WAE, and numerous multi-operator operations. While much of John's operating has originated from his own station, he gives credit to the generous host operations from W2PV, K1GQ, and K1EA, among others. John says, "I have been fortunate to have the opportunity to share my contest experience with some of the finest operators and stations in the world." The operating and technical skills of his fellow testers is one of the many motivations for John's continued enthusiasm.

John is an active member of New England's Yankee Clipper Contest Club and a past dual-term president. John's current interests in contesting are focused on the use of packet radio and computer contest logging. His most recent accomplishments include active participation in the winning USA Multi-Single dual-mode efforts from K1GQ in the 1987 *CQ* WW and leading multi-operator claimed scores in 1988/89 from K1EA.

A member of the *CQ* WW Contest Committee since 1982, John has performed a variety of tasks such as USSR log checking. Today he currently manages the *CQ* WW Contest Awards Program. Despite his on-going commitments, John manages to make time for amateur radio operating on nearly a daily basis with 75% of his QSOs on CW. A recent addition to the ARRL Honor Roll, K1AR is an avid DXer and QSL manager for several DX stations.

At the ripe age of 33, John has worked hard to excel at his primary passion in amateur radio—contests. John is a graduate BSEE/MSEE from the University of Lowell, and is currently employed as a Marketing Manager by Wang Laboratories. He and his wife, Barbara, have 3 children, Timothy, age 6, Katelyn, 4, and Kendra, 17 months.

ENSURE SUCCESS

Complete Study Guide and Code Program
(C-64/128 and IBM/Compatibles)

Includes

- Updated FCC Questions
- Multiple Choice Answers
- Simulated (VE) Sample Test
- Formulas
- Schematic Symbols
- Diagrams

5 1/4" Disc (3 1/2" Disc, Add \$2.00)

Novice	\$14.95
Tech	\$14.95
General	\$14.95
Advance	\$19.95
Extra (New Pool)	\$19.95
Set (All Classes) 5 1/4" Disc	\$75.00
Set (All Classes) 3 1/2" Disc	\$85.00
VCR/VHS Tapes-No Code	Add \$5.00

KY RESIDENTS ADD 5% TAX

M/O, COD, CHECKS

Dealers Invited

THE LANZ COMPANY

3523 DAYTON AVE. • LOUISVILLE, KY 40207
(502) 895-1377

CIRCLE 81 ON READER SERVICE CARD

RFI KIT

Use ferrite beads and toroids
to keep RF out of your
TV, stereo,
telephone,
etc.



Free catalog and interference tip sheet on request.

PALOMAR ENGINEERS

Box 455, Escondido, CA 92025
Phone: (619) 747-3343

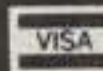
Please send all reader inquiries directly.

*****PRESENTING*****
**CABLE TV
DESCRAMBLERS**
*****STARRING*****
JERROLD, HAMLIN, OAK
AND OTHER FAMOUS MANUFACTURERS

- FINEST WARRANTY PROGRAM AVAILABLE
- LOWEST RETAIL/WHOLESALE PRICES IN U.S.
- ORDERS SHIPPED FROM STOCK WITHIN 24 HOURS

FOR FREE CATALOG ONLY 1-800-345-8927
FOR ALL INFORMATION 1-818-716-5914

PACIFIC CABLE CO. INC.
7325 1/2 RESEDA BLVD., DEPT. 950
RESEDA, CA 91335



CIRCLE 77 ON READER SERVICE CARD

ICOM

KENWOOD

YAESU



IC-781

HF Equipment

	List	Juns
IC-781 Super Deluxe HF Rig	\$5995.00	Call \$
IC-765 New, Loaded with Features	3,149.00	Call \$
IC-735 Gen. Cvg Xcvr	1099.00	Call \$
IC-751A Gen. Cvg. Xcvr	1699.00	Call \$
IC-725 New Ultra-Compact Xcvr	949.00	Call \$
IC-575A 10m/6m Xcvr	1399.00	Call \$

Receivers

IC-R7000 25-1300+ MHz Rcvr	1199.00	Call \$
IC-R71A 100 kHz-30 MHz Rcvr	999.00	Call \$

VHF

IC-228A/H New 25/45w Mobiles	509./539.	Call \$
IC-275A/H 50/100w All Mode Base	1299./1399.	Call \$
IC-28A/H 25/45w, FM Mobiles	469./499.	Call \$
IC-2GAT, New 7w HT	429.95	Call \$
IC-2SA New Micro Sized HT	419.00	Call \$
IC-900 Six Band Mobile	639.00	Call \$
IC-901 New Remote Mount Mobile	TBA	Call \$

UHF

IC-475A/H 25/75w All Modes	1399./1599.	Call \$
IC-48A FM Mobile 25w	509.00	Call \$
IC-4GAT, New 6w HT	449.95	Call \$
IC-04AT FM HT	449.00	Call \$
IC-32AT Dual Band Handheld	629.95	Call \$
IC-3210 Dual Band Mobile	739.00	Call \$
IC-2500A FM, 440/1.2 GHz Mobile	999.00	Call \$

220 MHz

IC-375A All-Mode, 25w, Base Sta.	1399.00	Call \$
IC-38A 25w FM Xcvr	489.00	Call \$
IC-37A FM Mobile 25w	499.00	Call \$

1.2 GHz

IC-12GAT Super HT	529.95	Call \$
-------------------	--------	---------



TS-940S

HF Equipment

	List	Juns
TS-940S/AT Gen. Cvg Xcvr	\$2499.95	Call \$
TS-440S/AT Gen. Cvg Xcvr	1449.95	Call \$
TS-140S Compact, Gen. Cvg Xcvr	949.95	Call \$
TS-680S HF Plus 6m Xcvr	1149.95	Call \$
TL-922A HF Amp	1749.95	Call \$

Receivers

R-5000 100 kHz-30 MHz	1049.95	Call \$
R-2000 150 kHz-30 MHz	799.95	Call \$
RZ-1 Compact Scanning Recv.	599.95	Call \$

VHF

TS-711A All Mode Base 25w	1059.95	Call \$
TR-751A All Mode Mobile 25w	669.95	Call \$
TM-231A Mobile 50w FM	459.95	Call \$
TH-215A, 2m HT Has It All	399.95	Call \$
TH-25AT 5w Pocket HT NEW	369.95	Call \$
TM-721A 2m/70cm, FM, Mobile	729.95	Call \$
TM-621 2m/220, FM, Mobile	729.95	Call \$
TM-701A 25w, 2m/440 Mobile	599.95	Call \$
TH-75A 2m/70cm HT	TBA	Call \$

UHF

TS-811A All Mode Base 25w	1,265.95	Call \$
TR-851A 25w SSB/FM	771.95	Call \$
TM-431A Compact FM 35w Mobile	469.95	Call \$
TH-45AT 5w Pocket HT NEW	389.95	Call \$
TH-55 AT 1.2 GHz HT	524.95	Call \$
TM-531A Compact 1.2 GHz Mobile	569.95	Call \$

220 MHz

TM-3530A FM 220 MHz 25w	519.95	Call \$
TM-321A Compact 25w Mobile	469.95	Call \$
TH-315A Full Featured 2.5w HT	419.95	Call \$



FT-767GX

HF Equipment

	List	Juns
FT-747 GX New Economical Performer	\$889.95	Call \$
FT-757 GX II Gen. Cvg Xcvr	1129.95	Call \$
FT-767 4 Band New	1929.00	Call \$
FL-7000 15m-160m Solid State Amp	1995.00	Call \$

Receivers

FRG-8800 150 kHz - 30 MHz	759.95	Call \$
FRG-9600 60-905 MHz	699.95	Call \$

VHF

FT-411 New 2m "Loaded" HT	399.95	Call \$
FT-212RH New 2m, 45w mobile	459.95	Call \$
FT-290R All Mode Portable	599.95	Call \$
FT-23 R/TT Mini HT	344.95	Call \$

UHF

FT-712RH, 70cm, 35w mobile	499.95	Call \$
----------------------------	--------	---------

VHF/UHF Full Duplex

FT-736R, New All Mode, 2m/70cm	1749.95	Call \$
FEX-736-50 6m, 10w Module	259.95	Call \$
FEX-736-220 220 MHz, 25w Module	279.95	Call \$
FEX-736-1.2 1.2 GHz, 10w Module	539.95	Call \$
FT-690R MKII, 6m, All Mode, port.	569.95	Call \$

Dual Bander

FT-4700RH, 2m/440 Mobile	889.00	Call \$
FT-470 Compact 2m/70cm Mobile	559.95	Call \$

220 MHz

FT-312 RM, Mobile	TBA	Call \$
-------------------	-----	---------

Repeaters

FTR-2410 2m Repeaters	1269.95	Call \$
FTR-5410 70cm Repeaters	1289.95	Call \$

Call For These Quality Brand Names

ALINCO ASTRON Kantronics MFJ concepts MIRAGE/KLM TE SYSTEMS

INSTANT CREDIT WITH ICOM PREFERRED
CUSTOMER CARD

JUN'S
ELECTRONICS
800-882-1343

FAX 213-390-4393

JUN'S BARGAIN BOX

LIMITED QUANTITIES

ICOM IC-47A 440 MHz, 25W, Mobile NOW \$279. List \$549.00	ICOM IC-12AT 1.2 GHz FM, HT SALE \$339.95 LIST \$473.95
---	---

KENWOOD

TM-621A	CALL
TH-315A	FOR
TM-321A	SPECIAL
TM-3530A	PRICE



YAESU FT-311 RM

220 MHz FM Transceiver 25W/5W
List \$439.95 **NOW \$259.95**

SE HABLA ESPANOL
FREE U.P.S. CASH ORDER
(MOST ITEMS, MOST PLACES)

(213)390-8003

3919 Sepulveda Blvd.
Culver City, CA 90230



AUSTIN CUSTOM ANTENNA

MODEL 500-C

AUSTIN, the leader in multi-band technology brings you state of the art low angle radiation performance in a compact design.

The Model 500-C is available in single or dual band configurations. Various combinations of frequencies are available from 100 Mhz to 2 Ghz. and a Soft Top model for HT's.

MOUNTS: LOW PROFILE, BNC, TNC, UHF POWER RATED 160 WATTS ICAS

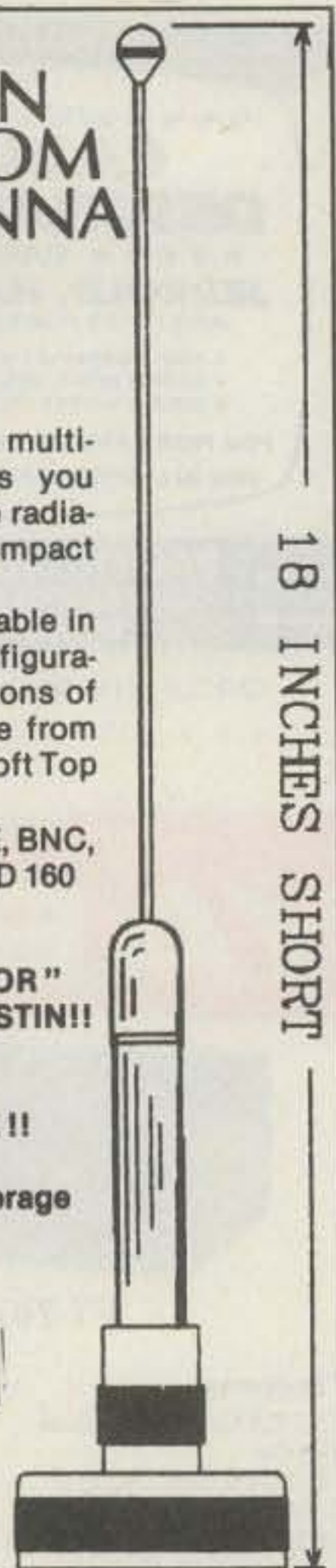
\$29.95

**"PATENT APPLIED FOR"
!! A Better Idea From AUSTIN!!**

**!! NEW !!
!! NOW AVAILABLE !!
"The Ferret"
Super Broadband Coverage
25 to 1300 Mhz**



**P.O. Box 357
Sandown, N.H. 03873
(603) 887-2926**



18 INCHES SHORT

CIRCLE 126 ON READER SERVICE CARD

WRIGHTAPES: (Since 1976) Unconditionally guaranteed Morse Code Practice on 60 min. cassette tapes. Beginners 2-tape set 5 WPM \$7.90. Also 3, 4, 5, 6-8, 10, 9-11, 12-14, 14, 16-20, 22, 24-28 WPM. Specify Plain Language or Code Groups. Also plain lang. only 30-35, 35-40, 45-60. FCC type tests: 5-6, 11-12, 11-17, 13-14, 20-24. Call signs: 12-15, 20-24. Nos.: 5-22, 13-18, 18-24. Check, M/C, Visa \$3.95 ea. PPD 1st class USA, Can. Printed texts add \$.50 per tape. Call anytime.

Instant Service

**PH: 517-484-9794 WRIGHTAPES
235 E. Jackson C-3 • Lansing, MI 48906**

9.95

WBBVAS

W80N

Discover

CAROLINA WINDOM

WARC 30 17 12
plus 80 to 10 M

Use Transmatch

1 or 2 S-Units over

dipoles & verticals

Complete reviews in

73 Magazine 12 68

WorldRadio 7 68

THREE NEW MODELS

160-10M

80-10M

40-10M

from

\$69.95



NEW BALUNS

Laboratory developed
Superior construction
Unequaled specifications
10 types, 2KW and 4KW

Max
Performance
Current-type(s)

**The BEST
BALUNS MADE**

804-484-0140

SEE WHAT WE'RE DOING NOW!

WARC 'BigSig(c)' Loops & 'InTreeVert(s)'

Lowest prices on wire, coax, connectors, mobile HF and VHF antennas, mounts, trap antennas, discount books, SWL, Dacron(r) line, Keys. Free 56 page discount catalog (\$1 for 1st class postage)

Box 6159 Portsmouth, VA 23703

CIRCLE 149 ON READER SERVICE CARD

personally award nearly 20 CQ WW/CQ WPX trophies. If all goes well, most of the 1988 CQ WW trophies will be produced and distributed before next year's Hamvention. By the way, if you would like your trophy to be presented in person next year, be sure to drop me a note in advance and bring your award to the convention.

Finally, the CQ WW Contest Committee was well represented at Dayton, with nearly all of our members present. In between all the festivities, we were able to spend a few hours discussing pressing business. As always, it was extremely useful to get together in person. I'll be reporting the results of our work in this column over the next few months.

July Contest Calendar

The month of July generally lacks major operating events, as many of us would rather spend the time at the beach or erecting even bigger antennas for the fall contest season. Actually, July contests offer quite a bit of excitement with impressive awards in some cases. The IARU HF Championship and HK/YV Contests are especially popular in Europe and offer good CW rates for Stateside entrants.

Next Month's Column

Next month's Contest Calendar promises to provide some thought-provoking ideas focusing on the topic of contest operating ethics. Come prepared with your sharpened pencils and opinions as we begin to learn about the operating practices of our fellow contesters.

Beginning with next month's column, I am requesting that all contest rule submissions and other correspondence for the column be sent directly to my home address. The deadline for the October column is August 1, 1989.

73, John, K1AR

Venezuelan Contest

SSB: July 1-2 CW: July 29-30

This is the 28th annual contest celebrating Venezuela's independence. It's a world-wide-type contest. Therefore, do not confine your activity to working YVs only. Working other DX is encouraged.

Use all bands, 80-10 meters (no WARC bands).

There are four classes: single operator, single and all band, and multi-operator, single and multi-transmitter. (No limit to transmitters, but only one signal per band.)

Exchange: RS(T) and QSO number (i.e., 59-035).

Points: Contacts between stations in the same country, 1 point. Between stations in different countries but the same continent, 3 points. Between stations on different continents, 5 points.

Multiplier: One for each YV call area,

and one for each different country worked on each band (including own).

Final Score: Total QSO points from all bands multiplied by the sum of the multiplier from each band.

Awards: A plaque to the highest scorer in each class and certificates to stations making more than 10% of the next highest score.

Use a separate log sheet for each band. Each YV call area (9) and each country (DXCC list) should be indicated in a separate column only the first time they are worked on each band.

Include a summary sheet showing the scoring, your name and address in block letters, and the usual signed declaration that all contest rules and regulations for amateur radio in the country of the contestant have been observed.

Include 2 IRCs or the equivalent to cover cost of mailing and processing of any awards.

Mailing deadline is September 30th for SSB entries and October 30th for CW. They go to: Radio Club Venezolano, Concurso Independencia, P.O. Box 2285, Caracas 1010-A, Venezuela.

IARU HF Championship

1200Z Sat. to 1200Z Sun., July 8-9

This is the fourth annual IARU World HF Championship. All six bands, 10 through 160 meters, and the full 24 hours may be used by both single and multi-operator stations. (No WARC bands.)

Categories: Single operator, CW only, phone only and mixed modes. Multi-operator, single transmitter, mixed mode only. Must remain on a band for at least 10 minutes at a time. (Exception: Only IARU member-society HQ stations may operate simultaneously on more than one band with one transmitter on each band/mode.)

Exchange: RS(T) and ITU zone. HQ stations: RS(T), and official society abbreviation.

Points: Contacts within own zone or with an HQ station, 1 point. Contacts within own continent but different zone, 3 points. Contacts with different continents, 5 points.

Multiplier: Total number of ITU zones plus IARU HQ stations worked on each band. (Note: HQ stations do not also count for zone multipliers.)

Final Score: Total QSO points from all bands times the sum of the multiplier from each band.

Awards: Certificates to the top scorers in each category, in each state, each ITU zone, and each DXCC country. In addition, achievement awards will be issued to those making at least 250 QSOs or having a multiplier of 50 or more.

Entries with more than 500 QSOs are required to include a dupe sheet with their log. A three QSO reduction will be

assessed for each duplicate QSO for which credit has been taken. Disqualification may occur if the overall score is reduced by 2% or more.

It is recommended that you check QST (April 1989 issue) for more detailed information. A large SASE with 2 units of first-class postage or 2 IRCs will get you official forms and a ITU zone/prefix/continent map.

Mailing deadline for entries is August 10th to: IARU Secretariat, Box AAA, Newington, CT 06111 USA.

ARCI QRP CW Sprint

2000Z to 2400Z Sunday, July 9

This one is entitled the "Summer Homebrew Sprint," and like other ARCI Sprints it is only 4 hours long.

Exchange: RST and state, province, or country. ARCI members will include their membership number; non-members their power output. (Use "HB" or "C" to indicate if gear is homebrew or commercial.)

Points: Contacts with members 5 points, non-members 2 points, 4 points if in a different continent. Add 5 points if station worked is "HB."

Multiplier: State, province, or country worked on each band.

Power Multiplier: 4 to 5 watts output $\times 2$; 3 to 4 watts $\times 4$; 2 to 3 watts $\times 6$; 1 to 2 watts $\times 8$; less than 1 watt $\times 10$. Over 5

watts check log only.

Power Supply Multiplier: Battery power $\times 1.5$. Solar/natural or battery charged by solar/natural $\times 2$.

Homebrew Bonus: If units used are "HB," add following bonus to final score on each band—transmitter 200, receiver 300, and transceiver 500 points.

Final Score: Total QSO points \times QTH multiplier \times power multiplier \times power supplier multiplier + bonus points.

Frequencies: 1810, 3560, 3710, 7040, 7110, 14060, 21060, 21110, 28060, 28110, 50060 kHz.

Awards: Certificates to the top three overall scorers, and to the top scorers in each state, province, and country in each class with two or more entries. (Entries may be single band or all band.)

Include a summary sheet showing the scoring and other essential information with your log. Sample log forms are available from K5VOL. A copy of the results is also available. Include a large SASE for either request.

Mailing deadline is 30 days following the end of the contest to: Red Reynolds, K5VOL, 825 Surryse Road, Lake Zurich, IL 60047.

CQ WW VHF WPX Contest

0000Z Sat. to 2400Z Sun., July 15-16

This is the fifth annual World-Wide WPX VHF Contest. Complete and de-

tailed rules can be found in the May issue, but will be reviewed here briefly. However, I strongly recommend that you refer to the May issue for detailed information.

Bands: All VHF bands, 6 meters through 23 cm, may be used. And 50, 70, 144, 220, 432, 902, and 1296 MHz.

Classes: 1. Single Operator (a) all band, (b) single band, (c) all band low power, (d) single band low power (30 watts PEP). 2. Multi-operator (a) all band, (b) single band. 3. Portable (temporary power source only). 4. FM only.

Exchange: Call sign and grid square (4 digits—e.g., FN20). Signal report optional.

Scoring: One point per QSO on 50, 70, and 144 MHz. Two points on 220 and 432 MHz. Four points on 902 and 1296 MHz. Stations may be worked once per band regardless of mode.

Multiplier: Number of prefixes worked, additive on a band-to-band basis.

Final Score: Total QSO points times the sum of different prefixes worked on each band.

A prefix is considered to be the three letter/number combination which forms the first part of the call sign—i.e., N1, W2, WB3, AA6, 4X4, Y32, etc. A station in a call area different from that indicated in the call is required to sign portable. The location of the portable determines the prefix.

Awards: A large selection of certifi-



the HAM STATION

P.O. Box 6522
220 N. Fulton Ave.
Evansville, IN 47719-0522

Store Hours

MON-FRI: 9AM - 6PM
SAT: 9AM - 3PM
CENTRAL TIME

SEND A SELF ADDRESSED STAMPED (50¢) ENVELOPE (SASE) FOR NEW AND USED EQUIPMENT SHEETS.

WARRANTY SERVICE CENTER FOR:
ICOM, YAESU, TEN-TEC

FOR SERVICE INFORMATION CALL
(812) 422-0252
FAX 812-465-4449
MONDAY - FRIDAY
9:00 AM - 12:00 NOON



- FT-747GX**
- 100 Watts of Economical Performance
 - Dual VFO's, 20 Memories
 - Receives from 100 kHz-30 MHz
 - Built-in CW Filter + More



- IC-32AT**
- New Dual Band HT
 - RX-138-174 MHz
440-450 MHz
 - TX-140-150 MHz
440-450 MHz
 - 5 Watts Output on Both Bands
 - Full Duplex & 20 Memories



- OMNI V**
- New U/LSB, QSK, CW, FSK HF Rig
 - Dual VFO's, 100 W Output
 - Allbands 160-10
 - Superior "Phase Noise"
 - Made in USA



FT-470
COMPACT 2M/70CM
DUAL BAND FM

- Simultaneous Reception on Both Bands
- Up to 5 Watts Output
- 21 Memories on Each Band
- Built-in 10 Memory DTMF Auto Dialer
- Built-in CTCSS PLUS MORE!



- IC-228A**
- 25 Watt, 2 Meter FM Mobile
 - RCV 138-174 MHz
 - TX 140-150 Mhz
 - 20 Memories



VHF/UHF AMPS

- High VSWR and Overdrive Protection
- 5 Year Warranty, 6 Months on RF Transistors
- All Units have GaAsFET Receive Pre-amps

TERMS:

Prices Do Not Include Shipping.
Price and Availability Subject to
Change Without Notice
Most Orders Shipped The Same Day
COD's Welcome (\$3.50 + shipping)



- KAM**
- Packet, WEFAX, ASCII, AMTOR, RTTY, CW
 - Simultaneous Operation on HF and VHF



- DR-110T**
- NEW 2 Meter Mobile
- 45 Watts Output
 - 14 Memories with Standard Encode/Decode Subaudible Tones
 - CAP and MARS Modifiable



- MFJ-1278**
- Multi-Mode Data Controller
 - Packet, RTTY, ASCII, CW, WEFAX, SSTV, Contest Memory Keyer

ORDERS & PRICE CHECKS **800-523-7731**

NEW 800 # STARTING JULY 1
NATIONWIDE (INC. IN & CANADA) **800-729-4373**

LOCAL & TECH INFO
812-422-0231

Please send all reader inquiries directly.

The Pouch

Protection for your ham-held!

If you drop your portable while it's inside **The Pouch**, this bouncy cocoon might save its life!

Developed for cellular phones in resilient neoprene and nylon, the stuff from which scuba-wet suits are made, **The Pouch** is available for most full-size portables, such as all ICOM "AT" series, Kenwood TH-215, Yeasu FT 727,



AEA DX and many more. Accommodates all battery sizes. You can switch from one battery SIZE to another in a microsecond!

\$1495



Hop to it. Call your favorite dealer or **1-800-72-POUCH**

Please send all reader inquiries directly.

K/S Electronics

Linear Power Supplies
Universal Series Open-Frame Linears,
Pull-Outs, Tested Under Load

acdc electronics



ECV5N 5V 2.6A .. \$10.00
4 7/8" x 4" x 1 1/2"

ECV24N 24V 2.4A \$12.00
5 1/2" x 4 7/8" x 2 1/2"

LAMBDA



LOS-Z-5 5V 3A ... \$10.00
4 7/8" x 4" x 1 1/2"

LOS type 12V 2.3A \$12.00
4 7/8" x 4" x 1 1/2"

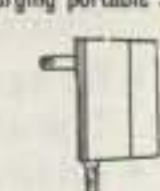
LOS-Y-24 24V 2.4A \$12.00
5 1/2" x 4 7/8" x 2 1/2"

Muffin Fans
Pull-Outs, Tested Under Load



115 VAC \$4.50
3 1/2" x 3 3/4" x 1 1/8"

Wall Plug-In AC Adaptor
NEW
for charging portable screwdrivers



115/220 VAC \$2.00
3 for \$5.00

6VDC 250MA.
2.2mm Jack

K/S Electronics

200 S.W. 20th Street • Ft. Lauderdale, FL 33315
Telephone (305) 522-5811

Hours: 8AM-4PM Monday-Friday

Terms: Check, Money Order or C.O.D. - Minimum Order \$10.00
plus \$3.00 Shipping and Handling
Florida Residents Add 6% Sales Tax - C.O.D. Add \$3.00
Cashier's Check or Money Order for Immediate Delivery

CIRCLE 138 ON READER SERVICE CARD

cates and plaques will be awarded in each class in all major geographic areas, North America, Europe, and Japan. (US states, Canadian provinces, European countries, and Japan call areas.) Additional areas will be considered as returns justify.

Logs must be posted no later than August 30 and this year go to: CQ VHF WPX Contest, CQ Magazine, 76 N. Broadway, Hicksville, NY 11801.

AGCW-DL QRP CW Contest

1500Z Sat. to 1500Z Sun., July 15-16

This is the summer edition of this CW-only contest. The same station may be worked on each of the six bands, 10 through 160 meters.

There are five classes: (A) 3.5 watts or less input; (B) 10 watts or less for single operators; (C) 10 watts or less for multi-operators; (D) QRO stations, over 10 watts input, may work only QRP stations; (E) SWLs. Class C may operate the full 24 hours. Others must take a 9 hour break in two segments.

Exchange: RST, QSO no., and power input (i.e., 559001/5, 579001/QRO). Add "X" if using crystal control.

Scoring: QSO within own country, 1 point. Other stations in own continent, 2 points. DX outside own continent, 3 points. Double points if using crystal control.

Multiplier: One for each DXCC country and one for each DX station worked. Call areas in JA, PY, VE, W, and ZS count as separate multipliers.

Final Score: Total QSO points times the multiplier as indicated. Sum of results from each band.

Awards: Certificates to the first three places in each class and each band.

Use a separate log sheet for each band and include a summary sheet showing the scoring, name and address, and other essential information. Sample log forms are available from DK9FN (1 IRC with your request).

Mail logs within 6 weeks of the end of the contest to: Siegfried Hari, DK9FN, Spessartstrasse 80, D-6453 Seligenstadt, West Germany. (Include 1 IRC for copy of the results).

Colombian Independence Contest

0000Z Sat. to 2400Z Sun., July 15-16

This is a world-wide-type contest. Use all bands, 1.8 through 28 MHz. Phone only or CW only.

Classes: Single operator, single and all band. Multi-operator, single transmitter.

Exchange: RS(T) and 179 for HK stations (179th year of Colombian independence). RS(T) plus a QSO no. starting with 001 for all others.

Scoring: For non-HKs—QSOs with HKs 5 points; with other countries 3 points, with own country 1 point.

For HKs—QSOs with other continents 5 points; 3 points in same continent; HKs 1 point.

Multiplier: Number of different countries and HK call areas worked on each band.

Final Score: Total QSO points times the sum of the multiplier from each band.

Awards: Certificates to each station showing a minimum of 50 contacts, at least 10 of which are HKs on SSB and 5 if on CW. Plaques to the overall winning HK and non-HK in each class and each mode. Also for HKs in each call area.

Use a separate log sheet for each band. Indicate the multiplier in a separate column only the first time it is worked on each band. A summary sheet showing the scoring and other essential information, and the usual signed declaration, is also requested.

Disqualification rules regarding taking credit for duplicate contacts, violation of rules and regulations, etc., will be strictly enforced.

Mailing deadline is August 30th to: LCRA Contest Committee, Apartado 584, Bogota, Colombia.

La Blanquilla Island Expedition

0000Z Wed., Jul. 19 - 2400Z Sat., Jul. 22

The Venezuelan Navy in honor of its 166th anniversary will hold this special event from La Blanquilla Island in the Gulf of Venezuela using the special call YY5LB in collaboration with the Venezuelan Radio Club, Club DX, and the Association of Radioaficionados of Venezuela.

Bands: Six bands from 10 to 160 meters.

Modes: SSB, CW, and RTTY.

Awards: Awards will be presented to those stations who contact YY5LB in three of the six previously mentioned bands, in whichever mode, including mixed. First place receives a bronze relief of the island, second and third receive trophies, fourth and fifth plaques, and diplomas to those others who establish contact on the four bands.

Rules: Contacts will be confirmed through receipt of the QSL cards. To receive the awards, final date of acceptance of the QSL cards is September 29, 1989. Cards should be sent to the IARU Bureau of Venezuela at the following address: Radio Club Venezolano, P.O. Box 2285, Caracas 1010-A, Venezuela.

Florida QSO Party

1400Z Sat. to 2100Z Sun., July 29-30

The 23rd Florida QSO Party is sponsored by the West Palm Beach ARC in conjunction with *Florida Skip*.

UNLEASH THE POWER OF YAESU'S CAT-SYSTEM
WITH
SUPER and CATPACK

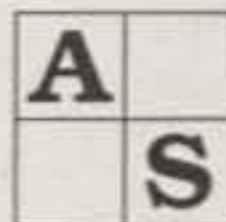
SUPER is a powerful, easy-to-use radio operating system that puts Yaesu CAT-SYSTEM transceiver operation at your fingertips and on your computer screen...with QSO Autolog, 100 Extended Memory Channels and more... \$89.95

CATPACK is a collection of utility programs and software 'building blocks' (device drivers) that allow you to add transceiver and receiver control to your own programs (or use the programs provided on the CATPACK diskette)..... \$69.95

Available for IBM, Commodore and Apple Computers

YAESU FT-767 - FT-980 - FT-757 - FT-757B - FT-747 - FT-727
FRG-9600 - FRG-8800 - FT-212/312/712
(COMPUTER INTERFACE REQUIRED)

Call Or Write For Free Brochure



Professional Software for Amateur Radio

Applied Solutions

P.O. Box 188
Garden Grove, CA 92640
(714) 973-8800

CIRCLE 94 ON READER SERVICE CARD

INTRODUCING...



Special Introductory Offer
Just \$19.95 Per Library

(Reg. Retail Value \$24.95)
PLUS FREE BONUS
(See Details)

THE NEW AZIMUTH AWARDS QSL LIBRARY

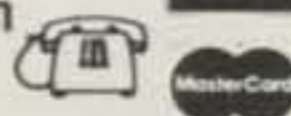
New Handsome Custom Albums To Collect, Protect & Organize Your Hard-Earned QSL Cards... Plus Special Albums for DXCC, WAS/WAC, & WAZ Radio Awards

Throw out the shoe boxes. Get your QSLs organized with the new Azimuth Awards QSL Library. The perfect way to display the cards for your prestigious awards—for easy viewing. Each padded vinyl album comes complete with 20 heavy duty crystal-clear, slip-in pocketed vinyl pages (each holds 6 cards).

Now available for the most prestigious awards in amateur radio... order all and organize your cards for each award. • DX Century Club • Worked All Zones • Worked All States & Continents • & a general QSL Album for any purpose! Looks great in your shack! Need more pages? Order extra pages (20/pack).

Satisfaction Guaranteed! If not completely delighted return your purchase in 10 days for a money-back refund.

Call or Send For Your Azimuth QSL Award Library Today!



SEND TO: Azimuth Awards Library, Dept. CQ7
11845 W. Olympic Bl., Suite 1100, Los Angeles, CA 90064
1-213-473-1332 for Information

FREE BONUS WITH TWO OR MORE ALBUMS!

Get The New Azimuth AwardsBase Tracking Software for the IBM-PC (\$24.95 value) **Free!** Exclusive new program helps you stay on top of contacts by band, cards sent and received and much, much more to monitor your radio award progress.



Azimuth QSL Awards Library—Each just \$19.95 plus \$2.50 shipping & handling.

Specify: 1) DXCC 2) WAZ 3) WAS/WAC 4) Standard Album Extra 20 Page Packs Just \$12.95 (\$2.50 S&H)

Enclose check or money order. (Cal. Res. add 6.5% tax.)

VISA or MasterCard. (Foreign orders triple S&H)

Credit Card Orders Call Today Toll Free

Nationwide **1-800-882-7388**

(9AM to 6PM PST)



Allow 4 to 6 Weeks Delivery

© MCMLXXXIX Azimuth Communications Corporation

CIRCLE 93 ON READER SERVICE CARD

TUBES — 2000 TYPES DISCOUNT PRICES!



Early, hard-to-find, and modern tubes. Also transformers, capacitors and parts for tube equipment. Send \$2.00 for 24 page wholesale catalog.

Antique Electronic Supply
688 W. First St. • Tempe, AZ 85281
602/894-9503

\$59.95!

500 MHZ FREQUENCY COUNTER

- Frequency Coverage: covers 1 to 500 Mhz with 1 Khz resolution
- Number of Displays: 4 digits switchable to 6
- Power Requirements: Uses 1 nine volt battery
- Input Connectors: BNC connector
- Special Features: Small (2.6 x 1.6 x 1.2 inches). Modifiable to 1.3 Gig

DIGITREX ELECTRONICS

1005 BLOOMER ROAD
ROCHESTER, MI 48063 (313) 652-0894
MODEL PFC-4500: \$59.95
PLUS \$3.00 SHIPPING AND HANDLING
Send for FREE catalog!

CIRCLE 95 ON READER SERVICE CARD

WD4BUM'S 1/4 WAVE MAG. MOUNT ANTENNAS ONLY \$13.00

Complete with strong chrome plated magnet & 15' RG58 coax a PL259 is installed.

ORDER- M300 for 2 Meters
- M301 for 220 Mhz
- M302 for 440 Mhz

AT YOUR DEALERS OR SEND CHECK, M.O., VISA OR MC

To: MOBILE ANTENNAS and ACCESSORIES
LAKEVIEW CO.
Route 7, Box 258
Anderson, SC 29624



Catalog available - Dealers welcome

CIRCLE 96 ON READER SERVICE CARD

ASSOCIATED RADIO

8012 CONSER BOX 4327
OVERLAND PARK, KANSAS 66204

VISA-MC
AMEX-DISC.

EVERY DAY A HAMFEST

BUY — SELL — TRADE
ALL BRANDS NEW AND RECONDITIONED



WE'LL BUY YOUR EXTRA RIG STATIONS-ESTATES ETC.

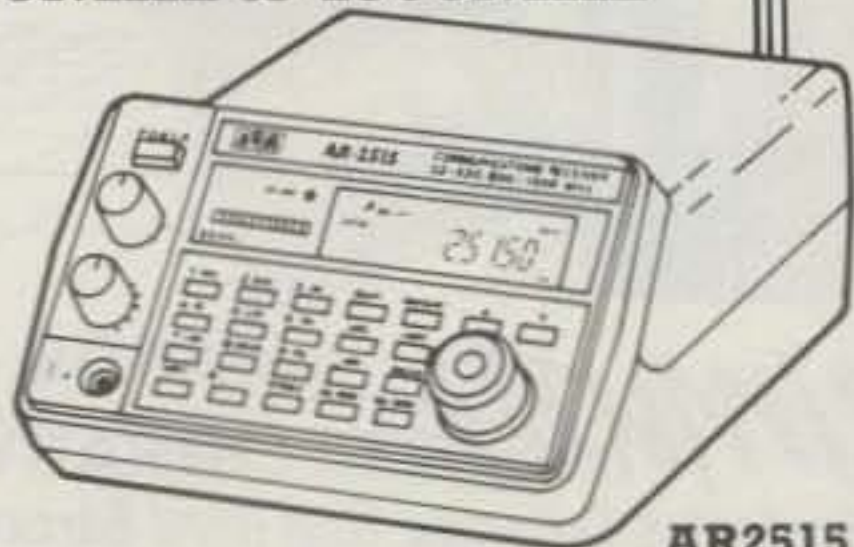
Call **913/381-5900**

FAX 913 648 3020

SEND \$2 FOR CATALOG AND WHOLESALE LIST

New from AOR

2000 Channels 5MHz to 1500MHz



AR2515

- Covers 5MHz to 1500MHz in AM/FM/Wide FM modes. Continuous coverage.
- 2000 Channel Memory. 1984 Scan Frequencies & 16 Search Groups.
- Scan/Search speeds up to 36 channels or increments per second.
- Built in RS 232 computer interface.
- 25 Day Satisfaction Guarantee. Full Refund if not Satisfied.
- Size: 3 1/4" H x 5 3/4" W x 7 1/4" D. Wt.: 2 lb. 10 oz.
- Supplied with AC & DC power cords. Telescopic antenna.

Total Price, Freight Prepaid (Express Shipping Optional)
*Upgrades of AR2002's to AR2515 specs Available

\$695.00

ACE

COMMUNICATIONS

10707 E. 106th St. Indpls., IN 46256

Toll Free 800-445-7717

Visa and MasterCard

(COD slightly higher)

In Indiana 317-849-2570 Collect FAX (317) 849-8794

CIRCLE 161 ON READER SERVICE CARD

Phone and CW are separate contests and require separate logs. The same station may be worked on each band and each mode, and FL stations may contact other FL stations but for QSO points only.

Classes: Florida stations are divided into two classes: A—Portable and mobile operating outside own county using emergency power of 100 watts or less output. B—All other single and multi-operator stations.

Exchange: RS(T) and QTH. County for FL. US state, VE province, or DX country for others.

Scoring: For Florida—One point per QSO. Multiply total by sum of states (49), VE provinces (12), and DX countries (maximum of 47) worked (maximum multiplier of 88). Class A stations multiply total by 1.5 for final score.

Out-of-state—Two points for each FL contact. Multiply total by FL counties worked (maximum of 67).

Frequencies: CW—3725, 7125, 14055, 21150, 28150 kHz. Phone—3945, 7279, 14279, 21379, 28479 kHz.

Awards: Certificates, both phone and CW, to the top single operator score in each state, province, DX country, and FL county. Also to the top Novice CW score in each state. Multi-operator winners will receive certificates as activity justifies. There are three plaques for Florida stations—winning single operator on CW

and on phone, and club with highest aggregate score.

There is the usual disqualification clause for taking credit for excessive duplicate contacts and multipliers and other infractions.

Include a summary sheet with your log showing the scoring and all essential information. Include a dupe sheet for entries with 200 or more contacts, and the usual signed declaration. A large SASE will get you sample log forms.

Mailing deadline for all entries is September 5th to: Florida QSO Party Contest Committee, P.O. Box 8104, West Palm Beach, FL 33407.

County Hunters CW Contest

0000Z Sat. to 0200Z Mon., July 29-31

The MARAC County Hunters Net is again sponsoring this year's contest. Mobile and portable operation from less active counties is welcome and encouraged.

The same station may be worked on each band, and mobile and portables from each county change for QSO credit. Mobiles operating on a county line give and receive one QSO number, but each county is valid as a multiplier. (Mobile and portables must identify by signing M or P after their call.)

Exchange: QSO no., category (M or P), RST, county and state for US, province or country for others.

Scoring: QSOs with fixed stations are worth 1 point, with mobile and portables 3 points. Multiply total QSO points by the sum of US counties worked for final score.

Frequencies: 3575, 7055, 14060, 21060, 28060. On 20 and 40 mobile and portables should call CQ below the suggested frequencies. Fixed stations above the suggested frequencies.

Awards: Certificates to winning stations as follows:

F—Fixed or fixed portable in each state, province, and country with 1000 or more total score.

P—Portables in each state operating from a county other than its normal location with a score of 1000 or more.

M—Mobile in each state operating from 3 or more counties with a minimum of 10 QSOs from each county.

Plaques to the top-scoring mobile, portable, and fixed station in the US meeting the above requirements.

Mobile and portables who change states calculate their score for a state certificate, and total score for a plaque.

A summary sheet showing the scoring is requested and a check sheet of counties worked is a must for entries with 100 or more counties.

Mailing deadline for logs is September 5th to: Jerry Burkhead, N6QA, 7525 Baltic St., San Diego, CA 92111. (Include a large SASE for copy of results.)

THE PSOTRON
COMPACT ANTENNAS FROM 160-10 METERS

NO TUNERS!
NO RADIALS!
NO RESISTORS!
NO COMPROMISE!

FOUR EXCELLENT REVIEWS JUST DON'T HAPPEN BY CHANCE
CALL US FOR A FREE CATALOGUE.

*See review in Oct. 73, 1984 *Sept. 73, 1985 March 73, 1988 CQ, Dec. 1988

BILAL COMPANY
137 Manchester Drive
Florissant, Colorado 80816
(719) 687-0650

CIRCLE 163 ON READER SERVICE CARD

THIS MONTH'S GOODIE FROM THE CANDY STORE

RDC
Kenwood TH-75A
Under \$600.00 (July Only)

Similar savings on Kenwood, ICOM, Yaesu, Hygain, etc. All L.T.O.
AEA DK64/HFM \$149.99

Over 8788 Ham Related items in Stock. All Prices Cash FOB Preston. More specials in Ham-Ads. Looking for something not listed??? Call, write or FAX.

ROSS DISTRIBUTING COMPANY
(P.O. Box 234), 78 South State Street, Preston, Idaho 83263
Telephone (208) 852-0830 FAX (208) 852-0833
Open Mon. 9-2, Tues.-Fri. 9-6, Closed Sat. & Sun.

ATV CONVERTERS • HF LINEAR AMPLIFIERS

DISCOVER THE WORLD OF FAST SCAN TELEVISION

AMATEUR TELEVISION CONVERTERS
ATV2 420-450.....\$44.95 Kit
ATV3 420-450 (GaAs-FET).....\$49.95 Kit
ATV4 902-928 (GaAs-FET).....\$59.95 Kit

AUDIO SQUELCH CONTROL for ATV
SIL.....\$39.95 Kit

2 METER VHF AMPLIFIERS
35 Watt Model 335A.....\$79.95 Kit
75 Watt Model 875A.....\$119.95 Kit
Available in kit or wired and tested

HF AMPLIFIERS per MOTOROLA BULLETINS
Complete Parts List for HF Amplifiers Described in the MOTOROLA Bulletins.
AN758 300W...\$180.70 EB63 140W...\$88.65
AN762 140W...\$93.25 EB27A 300W...\$139.20
AN779 20W...\$83.79 EB104 600W...\$448.15

NEW!! 300 WATT 10-150 MHz Amplifier

POWER SPLITTERS and COMBINERS (2-30 MHz)
600 Watt 2-Port.....\$69.95
1200 Watt 4-Port.....\$89.95

100W 420-450 MHz PUSH-PULL LINEAR AMPLIFIER—SSB—FM-ATV
KEB67-PK (Kit).....\$129.95
KEB67-PCB (PC Board).....\$18.00
KEB67-I (Manual).....\$5.00

For detailed information and prices, call or write for our free catalog.

FERROXCUBE DEVICES
VK200-204B RF Choke.....\$1.20
56-590-65-3B Ferrite Bead.....\$.20

HEAT SINK MATERIAL
Model 99 Heat Sink (6.5x12x1.6).....\$22.00
CHS-6 Copper Spreader (6x6x1/4).....\$18.00
Add \$2.00 additional shipping.

We also stock Hard-to-Find parts
CHIP CAPACITORS
METALCLAD MICA CAPACITORS
RF POWER TRANSISTORS
MRF141G.....\$209.20
MRF151G.....\$186.80
MINI-CIRCUIT MIXERS
SBL-1.....\$6.50
SBL-1X.....\$7.95
ARCO TRIMMER CAPACITORS
Add \$2.00 for shipping and handling.

CCI Communication Concepts Inc.

508 Millstone Dr., Xenia, OH 45385 • (513) 426-8600 (513) 220-9677 FAX 513-429-3811

CIRCLE 162 ON READER SERVICE CARD

For Brands You Can Count On AT PRICES YOU CAN LIVE WITH, CALL TOLL FREE: 1-800-238-6168

Find out why thousands of customers have switched to us.

TRADE?

Yes, if you have clean, saleable gear!

CALL FOR FREE APPRAISAL

In Tennessee, Call 901-683-9125

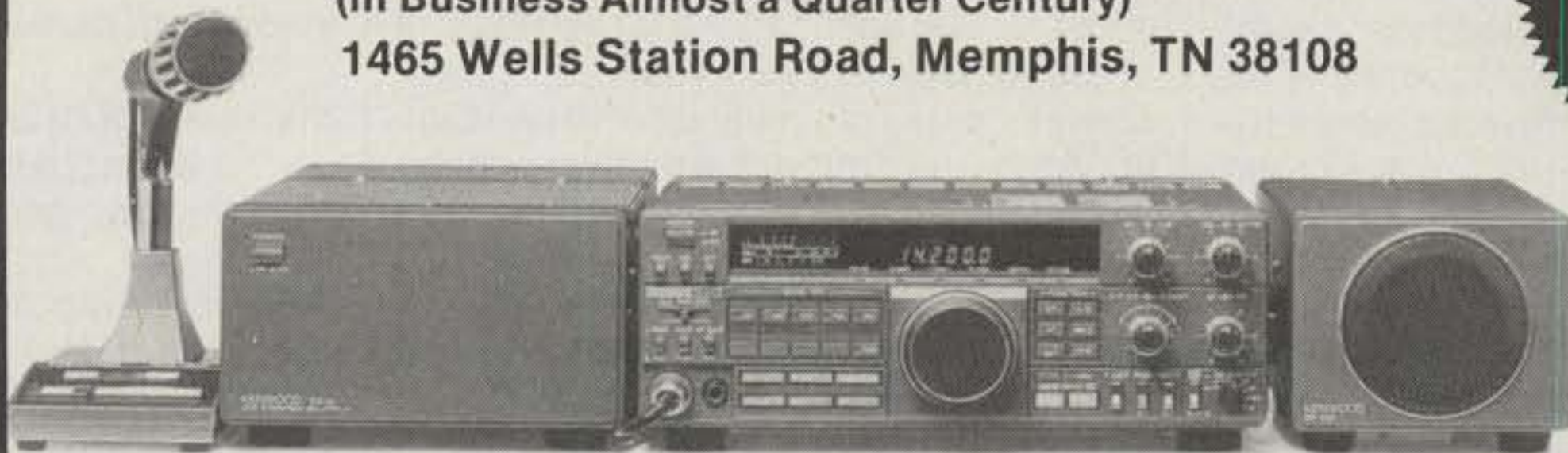
Authorized KENWOOD Servi-Center

KENWOOD, ICOM, TEN-TEC, Astron, Cushcraft, Larsen, MFJ, Butternut, B&W, Hustler, Antenna Specialists, AEA, Ameritron, Van Gorden, ARRL, RF Concepts, Nye Viking, Kantronics, CallBook, Alpha Delta, Heil, Grundig, Uniden, Bearcat, Mirage, Ameco, Alliance, Welz & others

Memphis Amateur Electronics, Inc.

(In Business Almost a Quarter Century)
1465 Wells Station Road, Memphis, TN 38108

Send QSL Card or Write For FREE CATALOG



STORE HOURS:
Mon.-Fri., 9 to 5
Sat., 9 to noon
(Central Time)

CIRCLE 143 ON READER SERVICE CARD

Field Day AntennaPacks

EmergencyPacks contain QRV All Band kink-proof wx-sealed multi-band Dipole-V-Sloper antenna, 70' coax feedline, Quick Launch system, rotproof dacron support braid, 40 p Tech Manual. Complete. Ready for Action. One person installs in 15 minutes. Infopack \$1



Fastest Antennas in the West
Box 50062-C, Provo, UT 84605

AntennasWest
(801) 373-8425

CIRCLE 13 ON READER SERVICE CARD

HI-VOLTAGE RECTIFIERS SUPER FOR HIGH POWER LINEARS REPLACES 866-872-3B28 ETC.

8,000 VOLTS 1 AMPERE 4-\$30.00 POSTPAID U.S. CAN.		14,000 VOLTS 1 AMPERE 4-\$40.00 POSTPAID U.S. CAN.
--	--	---

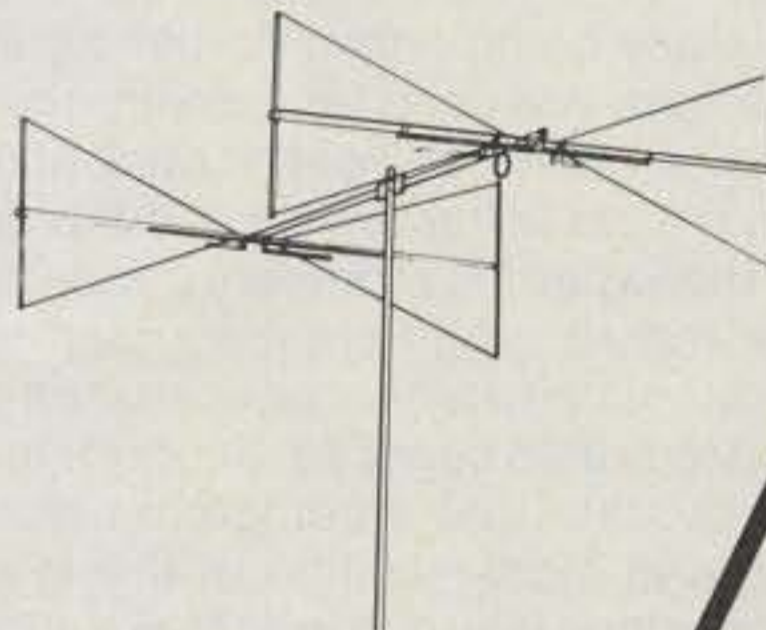
K2AW's "SILICON ALLEY"
175 FRIENDS LANE, WESTBURY, NY 11590 516-334-7024

HAM RADIO Q&A MANUAL

Contains all 1,932 questions, multiple choices and answers used in all FCC Amateur Radio licenses, Novice—Extra Class. \$9.95 postpaid. Money-back guarantee. VISA/MC orders accepted 10:00 a.m.-2:00 p.m. (817) 548-9594...or send check to: W5YI, P. O. Box 565101, Dallas, TX 75356.

Say You Saw It In CQ

The HF5B "Butterfly"TM
A Compact 2 Element Beam
for 20-15-12-10 Meters
Operate As A Di-Pole on 17 Meters



- Unique design reduces size but **not** performance.
- No lossy traps; full element radiates on all bands.
- Turns with TV rotor
- 19 lbs.

BUTTERNUT

Butternut Verticals

Butternut's HF verticals use highest-Q tuning circuits (not lossy traps!) to outperform all multiband designs of comparable size!

Model HF6V

- 80, 40, 30, 20 15 and 10 meters automatic bandswitching.
- Add-on kit for 17 and 12 meters available now.
- 26 ft. tall

Model HF2V

- Designed for the low-band DXer
- Automatic bandswitching on 80 and 40 meters
- Add-on units for 160 and 30 or 20 meters
- 32 feet tall - may be top loaded for additional bandwidth.

For more information see your dealer or write for a free brochure



BUTTERNUT ELECTRONICS CO.
405 East Market, Lockhart, TX 78644



§Part 15: The Revolution in Nonlicensed Radio

The FCC has completed a monumental rewrite of §Part 15 of its rules, which concerns technical standards for nonlicensed RF devices of all kinds. These include so-called "unintentional" emitters such as computer products, video games and VCRs, TV and radio receivers, and other appliances; and "intentional" low-power transmitters such as cordless telephones, garage-door openers, security systems, remote-controlled toys, experimental low-power stations, wireless microphones, anti-theft devices, and intrusion detectors. College campuses broadcast to dorms under §Part 15 rules by feeding low-power programming through a capacitor into the AC power system.

There are tens of millions of low-power §Part 15 devices in operation today by the public. The FCC said, "... a comprehensive revision and modernization of the §Part 15 rules is long overdue in light of the rapidly evolving capabilities of electronic technology."

The changes will introduce new types of RF devices on many frequencies, including amateur frequencies. The FCC also claims it will "clean up" the radio spectrum by tightening the emissions tolerances on receivers over a 10-year period. Many amateur radio operators are very unhappy with the new regulations because they believe they introduce a potential for interference to their operations.

The FCC said its action will "provide major benefits to the manufacturers of §Part 15 devices ... and should also serve the public by enabling new technologies and new equipment categories that satisfy consumer demands to be introduced without the need for Commission rulemaking."

The entire rewrite, which runs to some 64 pages, reduces the bulk of the §Part 15 rules by more than two-thirds. Eliminated are all unnecessary and overly restrictive technical regulations; much of it is not relevant to amateurs per se.

The rules for nonlicensed use of low-power RF devices were established nearly 50 years ago when a manufacturer wanted to sell a "phono oscillator" invention to transmit music from a phonograph

to a radio. Over the years §Part 15 developed a device-specific approach, with the FCC modifying the rules each time a manufacturer successfully petitioned to allow a particular kind of RF device.

This eventually resulted in a patchwork of complex regulations, as well as FCC files bulging with letters from entrepreneurs who want to market gadgets not permitted by the rules. The FCC receives about 10,000 applications for approval of §Part 15 devices every year. Low-power wireless data transceivers and consumer video transmitters are two popular "verboten" categories that will become legal as long as they comply with the new rules. (Some of these devices are available now in the illegal marketplace.)

The video transmitters could be used to transmit from a VCR to TVs elsewhere in the house. They will have to operate on other than standard TV frequencies, using converters to supply final video and audio to the TV set. FCC staff emphasized that manufacturers and consumers will have to recognize the possibility of interference from authorized services to the nonlicensed §Part 15 devices.

FCC on Need to Revise §Part 15

"Many commenting parties agree ... that there is a need for a comprehensive revision of §Part 15 of the rules and support the basic framework of our proposal ... These parties represent a wide field of interests ranging from manufacturers of electronic equipment to licensees of authorized radio services. Supporting comments state that a comprehensive revision and modernization of the §Part 15 rules is long overdue in light of the rapidly evolving capabilities of electronic technology.

"A number of parties representing the interests of authorized radio services and recognized 'passive' radio uses, such as radio astronomy, oppose any restructuring or revision of the §Part 15 rules that would encourage or facilitate the operation of significant numbers of low-power, nonlicensed RF devices or that would allow such devices to operate at higher emissions levels. These parties, who consist primarily of radio astronomers and amateur radio operators, are concerned that the proliferation of low-power RF devices could increase the level of ambient

RF 'noise' and thereby disrupt reception of relatively low-level radio signals or signals transmitted by licensed radio stations.

"We continue to believe it is desirable and appropriate to restore the technical flexibility originally provided for operation of nonlicensed RF devices in the §Part 15 rules. The current system that requires rulemaking for authorization of new §Part 15 devices imposes delays and costs on innovating parties that tend to have a chilling effect on the development and marketing of new products.

"... It is apparent from the record and from our own general observation of the market for electronic equipment that there is strong demand by the public for the types of devices that are typically authorized under §Part 15. It is, therefore, all the more important that we make every effort to remove all regulatory constraints that may unnecessarily impede the market from introducing new RF devices. We believe that with proper technical and operational rules it is possible to provide for expanded operation of nonlicensed RF devices while maintaining a satisfactory RF environment for operation of licensed radio services and recognized passive users of the radio spectrum.

"We have attempted to eliminate all unnecessary and overly restrictive technical regulations. However, in some instances our decision to permit greater technical flexibility has necessitated that we adopt standards that are more restrictive than those of the existing §Part 15 rules. In addition, we have also taken this opportunity to tighten the §Part 15 technical standards to reduce interference to authorized radio services, in particular, the AM broadcast service.

"We proposed to permit §Part 15 intentional radiators to operate without restrictions as to bandwidth, duty cycle, modulation technique or application as long as the equipment does not operate in certain restricted bands and it complies with certain specified general emission limits." (See Table I.)

"The limits proposed were based on our experience as to the level that could be permitted without undue risk of interference to authorized radio services, the limits currently specified for Class B computing devices, and, for frequencies above 960 MHz, the recommendations of NTIA."

Frequency in MHz	Field Strength in $\mu\text{V}/\text{M}$	At Distance in Meters
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Table 1- §Part 15 General Emission Limitations.

The New §Part 15 Rules

Here are highlights of the new §Part 15 Rules:

General Limits: The new rules establish general emission limits for radiation and conduction. New §Part 15 devices may operate on virtually any frequency (including the amateur bands) with any technical parameters, provided they meet these emission limits. No longer will the §Part 15 rules be "device specific." §Part 15 radiators are forbidden to operate on certain "restricted" bands that carry "critical" operations or require "extreme levels of sensitivity."

The restricted bands are mostly government and aviation frequencies; amateur bands were not included in the restricted bands. The FCC also decided to ban new §Part 15 devices from the TV broadcast channels, due to fears of interference to the emerging multibillion-dollar High-Definition Television (HDTV) industry.

Current channelized operations at 27 and 49 MHz would be phased out in favor of the consumer bands (below), and spurious emission limits for cordless phones and for general operation at 27 and 49 MHz would be tightened.

Consumer Bands: The FCC has established additional new general-use Consumer Bands, within which higher emissions—up to 250 millivolts/meter at 3 meters—from §Part 15 devices will be allowed. The new unlicensed Consumer Bands are: 13.553-13.567, 26.96-27.28, 40.66-40.70, 49.82-49.90, 902-928, 2400-2483.5, 5725-5875 MHz, and 24.0-24.25 GHz.

These last four "higher power" §Part 15 Consumer Bands are also amateur bands. The 902-928 MHz band is of particular concern, since the amateur radio band plan provides for repeater inputs between 907 and 910 MHz and weak-signal/experimental work at 902-904. There is concern that an unlicensed §Part 15 device with a maximum range of 1,000 feet could inadvertently become long range by activating a nearby repeater.

A worse scenario would be for the proliferation of 902-928 MHz devices to preclude effective future amateur repeater operation. Also raised is the possibility of

communications by the unlicensed public on the amateur bands or with amateur stations. The new rules provide for an unlicensed field strength in the 902-928 amateur band of 50 millivolts/meter at 3 meters. This is about half a milliwatt into a dipole antenna.

The FCC deferred action on several issues. One of them concerned the use of spread-spectrum emission in the 902-928 MHz band. Spread-spec is now permitted in that band at 1 watt; it has been for about 5 years. But there was concern by commenters about how to do the measurements.

There is a provision that requires §Part 15 devices to accept interference from authorized radio services . . . but any interference caused by these devices must be corrected by the §Part 15 user. Theoretically, if an unlicensed Consumer Band transmitter interferes with amateur radio, its use must be immediately discontinued by the owner. One wonders how this will be received by a shopper who purchased an off-the-shelf consumer electronics contraption without being aware that its use is subject to these restrictions. Hopefully, manufacturers will not be putting baby crib monitors and other such devices on spectrum (especially 907-910 MHz repeater inputs) where they will cause difficulty for all. It may well not be a problem, but the potential is there.

Equipment Authorization: The rules for authorization have been streamlined. Certain devices such as electronic watches, calculators, and low-power PCs are completely exempted from the rules if they do not require AC power. Special temporary authority and experimental licenses will no longer be required for testing devices to determine compliance with the regulations. §Part 15 devices will be limited to antennas that are permanently attached or that use a unique antenna connector.

External Inputs: Rules that allow only microphone input to devices such as wireless mikes and cordless telephones would be deleted.

Interference: FCC Deputy Chief Engineer Bruce Franca said that "there is concern by people who use the radio spectrum in the authorized services, that the services are being cluttered up with radio noise from devices, and so what we tried to do is balance allowing new devices and freedom for manufacturers, and at the same time clean up the radio spectrum. We've done that by imposing stricter standards on receivers and other §Part 15 devices."

The FCC Report and Order discussed the interference potential. "A number of parties representing the interests of authorized radio services and recognized 'passive' radio uses, such as radio astronomy, oppose any restructuring or revision of the §Part 15 rules that would en-

DELTA LOOP ANTENNAS



DL-TRI "Big Horn"

- "Open and Close the Band" with our Delta design, full wave DX performance mono-band, duoband and triband antennas
- High Quality construction using 6061-T6 Aluminum and Stainless Steel hardware
- Heavy duty design • "Quiet" DX reception
- Excellent Gain, FB Ratio and SWR
- 50 ohm gamma feed • 2 kw power
- DL 202: 2 el. 20 meter, 9' boom \$397.
- DL 152: 2 el. 15 meter, 6' boom \$329.
- DL 103: 3 el. 10 meter, 9' boom \$397.
- DL 102: 2 el. 10 meter, 5' boom \$297.
- DL 1015: 4 el. duobander \$489.
- 2 el. 10m.-2 el. 15m. 7' boom
- DL-TRI: 7 el. tribander \$897.
- 3 el. 10m.-2 el. 15m.-2 el. 20m.
- 13.5' boom-wt. 81#-12.7 sq. ft.
- See our Product Review in June 1988 CQ Magazine by Lew McCoy, W1ICP

DELTA LOOP ANTENNAS, INC.
12 BRUSH DR., P.O. BOX 8063
NEW FAIRFIELD, CT 06812
(203) 746-6368

Please send all reader inquiries directly.

QSLs by W4MPY

Wayne Carroll
(The QSL Man)
682 Mt. Pleasant Road
Monetta, SC 29105

THE BIG SIGNAL DANDY DIPOLE™ ANTENNA KIT



Dandy Dipole™ Kit With Insulator
Includes:

- 1—Dandy Dipole™ Book of Instructions
 - 1—Pair Endsulators
 - 135 ft.—#14-7 Strand Copper Wire
 - 1—W2AU Center Insulator
- TOTAL COST: \$26.00 plus \$3.50 UPS

Dandy Dipole™ Kit With W2AU 1:1 Balun

- 1—Dandy Dipole™ Book of Instructions
 - 1—Pair Endsulators
 - 135 ft.—#14-7 Strand Copper Wire
 - 1—W2AU 1:1 Balun
- TOTAL COST: \$38.00 plus \$3.50 UPS

M/C VISA M/O NO COD Please
At Your Local Dealer Soon.
In Hurry? Order Direct for Immediate Delivery

Unadilla Antenna
Manufacturing Co.
P.O. Box 4215 BV • Andover, MA 01810
(508) 475-7831

courage or facilitate the operation of significant numbers of low-power, nonlicensed RF devices or that would allow such devices to operate at higher emissions levels. These parties, who consist primarily of radio astronomers and amateur radio operators, are concerned that the proliferation of low-power RF devices could increase the level of ambient RF 'noise' and thereby disrupt reception of relatively low-level radio signals or signals transmitted by licensed radio stations.

"The ARRL indicates that its engineering analysis found that interference to amateur operations could occur at distances ranging from 78 meters (at 14 MHz) to 102 meters (at 28 MHz) from §Part 15 devices operating at the proposed limits below 30 MHz. Above 30 MHz the League indicates that operation under the general limits could cause interference at distances ranging from 0.56 km (at 420 MHz) to 1.9 km (at 902 MHz). . . . The limits for emissions between 1.705 and 30 MHz will provide es-

entially the same protection to authorized services as the existing rules. We observe that §Part 15 devices already are permitted to operate in the 1.705-10 MHz band at higher limits without known interference problems to the authorized radio services.

"We also believe that interference distances calculated by the League and others for frequencies below 30 MHz are overly optimistic and that the actual potential for interference from §Part 15 devices is significantly less. . . . the risk of interference to shortwave broadcasts and ARS transmissions by §Part 15 devices operating below 30 MHz appears to be very low.

"The proposed general limits in the 30-960 MHz band are the same as the limits currently applied to Class B computing devices. The claims of computer interference from individual amateur radio service operators are not persuasive enough to warrant more stringent limits. For example, they do not indicate if the

reported interference resulted from a computer co-located with the equipment receiving interference, if the source of the interference was a Class B (residential) computer, or if the computer was in compliance with our technical standards."

The ARRL's Perry Williams was skeptical that the new §Part 15 went far enough in reducing susceptibility of consumer products to RFI. He noted that the FCC has not used its legal authority to enforce sufficient RFI standards. "They're ignoring their obligation to protect the public," he said. Williams noted that tougher emissions standards for receivers could reduce RFI susceptibility as well, due to measures such as better shielding. However, he criticized the FCC's decision to allow a lengthy (10 year) grandfathering of existing designs.

In earlier comments to the proposal, the American Radio Relay League argued vigorously against permitting increased usage of §Part 15 devices, including consumer video transmitters, in bands such as 902-928 MHz which amateur radio shares with other services. It called the idea "foolish," and told the FCC that the amateur operator receiving interference "would face the problem of identifying one or multiple interference sources, calling on all neighbors within that range to determine which one(s) had installed such a video transmitter (a continuous duty cycle device when operated); and the difficult or impossible chore of convincing the consumer that the device should not be operated."

Many of those responding to the new proposed §Part 15 rules suggested a label be affixed to the device alerting the consumer that operation of their device must be discontinued if it causes interference to authorized radio services. The FCC responded: "A number of comments request changes to the proposed labelling requirements. The League and a number of individual commenters want the statement that §Part 15 devices must accept interference to be expanded to include a statement referring the user to the manufacturer in the case of received interference. . . . We believe that the addition to the label of a statement referring the user to a manufacturer's contact in case of interference, as requested by the League and others, would be impracticable. We believe that it would be unreasonable to burden manufacturers with the responsibility for addressing individual interference problems experienced by devices that expressly are not protected from interference.

" . . . We do not find it necessary to require information on the label to advise users of the vulnerability of signals of §Part 15 devices to interception by other parties. There is no indication that users are not aware of this potential or that such interception is occurring in a manner that warrants regulatory action."

BATTERIES

Nickel-Cadmium, Alkaline, Lithium, Etc.
INDUSTRIAL QUALITY

**YOU NEED BATTERIES?
WE'VE GOT BATTERIES!**

CALL US FOR FREE CATALOG



E.H. YOST & CO.

EVERETT H. YOST KB9X1
7344 TETIVA RD.
SAUK CITY, WI 53583

ASK FOR FREE CATALOG

(608) 643-3194

CIRCLE 167 ON READER SERVICE CARD

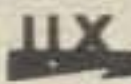
MOBILE RADIO MOUNTS

MM 10013

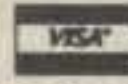
MM 1007

- Government • Industrial
- Commercial • Recreational

All New 1989 Catalog FREE!



ILX Equipment Ltd.



P.O. Box 9 Oaklawn, IL 60454 (312) 423-0605

CIRCLE 165 ON READER SERVICE CARD

ARE YOU ACTIVE IN

PACKET, FAST OR SLOW-SCAN TV, FACSIMILE, OSCAR, RTTY, EME, LASERS OR COMPUTERS?

IF YOU ARE, THEN YOU NEED:

THE SPEC-COM JOURNAL™

PUBLISHED BI-MONTHLY, 6-TIMES PER YEAR

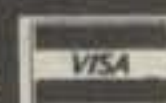
by WB9QCD

SERVING "SPECIALIZED COMMUNICATIONS" AMATEURS SINCE 1967! SAMPLE COPIES \$3.50 PPD. SPECIAL "TRIAL" SUBSCRIPTION (1/2 YEAR) \$10.00 PPD. FULL YEAR USA \$20.00, CANADA/MEXICO \$25.00, FOREIGN SURFACE \$30.00 YEAR. COMPUTER AND VIDEOTAPE CATALOG AVAILABLE (SASE). SEND ORDERS TO:

THE SPEC-COM JOURNAL™

P.O. BOX H

LOWDEN, IOWA 52255



5% ADDED

EASY DXCC!

QSLs still sitting in a shoebox?
Paperwork a hassle for DXCC submission?
Do you need that station on 20 CW, or is it 15 SSB?

No Problem! Let DXLOG do the work for you!

- DXLOG will automatically
- Generate a compact worked/confirmed checklist by country, band, and mode. Keep it by your rig for a handy reference!
 - Inform you when you are eligible for new awards
 - Generate DXCC endorsement forms. It tells you what cards to send. Just sign the form!

- All information from a single logbook entry.
- Full DXCC country list with CQ zones.
- All HF DXCC awards and endorsements supported.
- Prints "QSLs needed" list, QSL labels, and more.
- Efficient, menu-driven program (not in BASIC).
- Professional quality documentation.

DXLOG is available for IBM PC and compatibles. Send check or M.O. for \$39.95 to:

PAYL Software, Dept. C,
P.O. Box 926, Levittown, PA 19058-0926
(215) 945-4404

Include your callsign and specify 3.5" or 5.25" floppy when ordering. Pa. residents add \$2.40 sales tax.

CIRCLE 172 ON READER SERVICE CARD

uniden®

\$12,000,000 Scanner Sale

Uniden Corporation of America has purchased the consumer products line of Regency Electronics Inc. for \$12,000,000. To celebrate this purchase, we're having our largest scanner sale in history! Use the coupon in this ad for big savings. Hurry...offer ends September 30, 1989.

★★★ MONEY SAVING COUPON ★★★

Get special savings on the scanners listed in this coupon. This coupon must be included with your prepaid order. Credit cards, personal checks and quantity discounts are excluded from this offer. Offer valid only on prepaid orders mailed directly to Communications Electronics Inc., P.O. Box 1045 - Dept. UN16, Ann Arbor, Michigan 48106-1045 U.S.A. Coupon expires September 30, 1989. Coupon may not be used in conjunction with any other offer from CEI. Coupon may be photocopied. Add \$11.00 for shipping in the continental U.S.A.

Regency TS2-T \$259.95
 Regency INF5-T \$79.95
 Regency R2060-T1 \$114.95
 Regency UC102-T \$109.95
 Regency RH606B-T \$419.95
 Regency RH256B-T \$294.95
 Bearcat 200XLT-T \$249.95
 Bearcat 100XLT-T \$184.95
 Bearcat 800XLT-T \$249.95
 Uniden HR2510-T \$229.95
 Uniden PRO500D-T1 \$32.95

★★★★ VALUABLE COUPON ★★★★

Bearcat® 760XLT-T

List price \$499.95/CE price \$244.95/SPECIAL 12-Band, 100 Channel • Crystalless • AC/DC Frequency range: 29-54, 118-174, 406-512, 806-956 MHz. Excludes 823.9875-849.0125 and 868.9875-894.0125 MHz. The Bearcat 760XLT has 100 programmable channels organized as five channel banks for easy use, and 12 bands of coverage including the 800 MHz. band. The Bearcat 760XLT mounts neatly under the dash and connects directly to fuse block or battery. The unit also has an AC adaptor, flip down stand and telescopic antenna for desk top use. 6-5/16" W x 1 1/2" H x 7 3/8" D. Model BC 590XLT-T is a similar version without the 800 MHz. band for only \$194.95. Order your scanner from CEI today.

NEW! Regency® Products

R4030-T Regency 200 ch. handheld scanner \$254.95
 R4020-T Regency 100 ch. handheld scanner \$189.95
 R4010-T Regency 10 channel handheld scanner \$114.95
 R1600-T Regency 100 channel mobile scanner \$244.95
 P200-T Regency 40 channel CB Mobile \$38.95
 P210-T Regency 40 channel CB Mobile \$56.95
 P220-T Regency 40 channel CB Mobile \$79.95
 P300-T Regency 40 channel SSB CB Mobile \$137.95
 P400-T Regency 40 channel SSB CB Base \$174.95
 PR100-T Regency visor mount radar detector \$54.95
 PR110-T Regency "Passport" size radar detector \$114.95
 PR120-T Regency "micro" size radar detector \$144.95
 MP5100XL-T Regency 40 Ch. marine transceiver \$139.95
 MP5510XL-T Regency 60 Ch. marine transceiver \$159.95
 MP6000XL-T Regency 60 Ch. marine transceiver \$209.95
 MP2000XL-T Regency handheld marine trans. \$189.95

Regency® RH256B-T

List price \$799.95/CE price \$299.95/SPECIAL 16 Channel • 25 Watt Transceiver • Priority The Regency RH256B is a sixteen-channel VHF land mobile transceiver designed to cover any frequency between 150 to 162 MHz. Since this radio is synthesized, no expensive crystals are needed to store up to 16 frequencies without battery backup. All radios come with CTCSS tone and scanning capabilities. A monitor and night/day switch is also standard. This transceiver even has a priority function. The RH256 makes an ideal radio for any police or fire department volunteer because of its low cost and high performance. A 60 Watt VHF 150-162 MHz. version called the RH606B-T is available for \$429.95. A UHF 15 watt, 16 channel version of this radio called the RU156B-T is also available and covers 450-482 MHz. but the cost is \$454.95.

★★★ Uniden CB Radios ★★★

The Uniden line of Citizens Band Radio transceivers is styled to compliment other mobile audio equipment. Uniden CB radios are so reliable that they have a two year limited warranty. From the feature packed PRO 810E to the 310E handheld, there is no better Citizens Band radio on the market today.

PRO310E-T Uniden 40 Ch. Portable/Mobile CB \$83.95
 PRO330E-T Uniden 40 Ch. Remote mount CB \$104.95
 PRO500D-T Uniden 40 Channel CB Mobile \$38.95
 KARATE-T Uniden 40 channel rescue radio \$53.95
 GRANT-T Uniden 40 channel SSB CB mobile \$166.95
 MADISON-T Uniden 40 channel SSB CB base \$244.95
 PC122-T Uniden 40 channel SSB CB mobile \$119.95
 PRO510XL-T Uniden 40 channel CB Mobile \$38.95
 PRO520XL-T Uniden 40 channel CB Mobile \$56.95
 PRO530XL-T Uniden 40 channel CB Mobile \$79.95
 PRO540E-T Uniden 40 channel CB Mobile \$97.95
 PRO640E-T Uniden 40 channel SSB CB Mobile \$137.95
 PRO710E-T Uniden 40 channel CB Base \$119.95
 PRO810E-T Uniden 40 channel SSB CB Base \$174.95

★★★ Uniden Radar Detectors ★★★

Buy the finest Uniden radar detectors from CEI today. TALKER-T Uniden talking radar detector \$184.95
 RD7-T Uniden visor mount radar detector \$99.95
 RD9-T Uniden "Passport" size radar detector \$114.95
 RD9XL-T Uniden "micro" size radar detector \$144.95
 RD25-T Uniden visor mount radar detector \$54.95
 RD500-T Uniden visor mount radar detector \$74.95

Bearcat® 200XLT-T

List price \$509.95/CE price \$254.95/SPECIAL 12-Band, 200 Channel • 800 MHz. Handheld Search • Limit • Hold • Priority • Lockout Frequency range: 29-54, 118-174, 406-512, 806-956 MHz. Excludes 823.9875-849.0125 and 868.9875-894.0125 MHz. The Bearcat 200XLT sets a new standard for handheld scanners in performance and dependability. This full featured unit has 200 programmable channels with 10 scanning banks and 12 band coverage. If you want a very similar model without the 800 MHz. band and 100 channels, order the BC 100XLT-T for only \$189.95. Includes antenna, carrying case with belt loop, ni-cad battery pack, AC adapter and earphone. Order your scanner now.

Bearcat® 800XLT-T

List price \$549.95/CE price \$259.95/SPECIAL 12-Band, 40 Channel • No-crystal scanner Priority control • Search/Scan • AC/DC Bands: 29-54, 118-174, 406-512, 806-912 MHz. The Uniden 800XLT receives 40 channels in two banks. Scans 15 channels per second. Size 9 1/4" x 4 1/2" x 1 1/2". If you do not need the 800 MHz. band, a similar model called the BC 210XLT-T is available for \$178.95.

Bearcat® 145XL-T

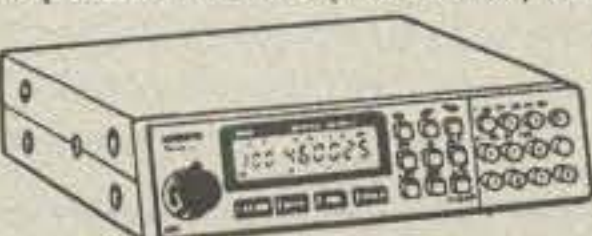
List price \$189.95/CE price \$94.95/SPECIAL 10-Band, 16 Channel • No-crystal scanner Priority control • Weather search • AC/DC Bands: 29-54, 136-174, 406-512 MHz. The Bearcat 145XL is a 16 channel, programmable scanner covering ten frequency bands. The unit features a built-in delay function that adds a three second delay on all channels to prevent missed transmissions. A mobile version called the BC560XLT-T featuring priority, weather search, channel lockout and more is available for \$94.95. CEI's package price includes mobile mounting bracket and mobile power cord.

President® HR2510-T

List price \$499.95/CE price \$239.95/SPECIAL 10 Meter Mobile Transceiver • Digital VFO Full Band Coverage • All-Mode Operation Backlit liquid crystal display • Auto Squelch RIT • Preprogrammed 10 KHz. Channels Frequency Coverage: 28.0000 MHz. to 29.6999 MHz. The President HR2510 Mobile 10 Meter Transceiver made by Uniden, has everything you need for amateur radio communications. Up to 25 Watt PEP USB/LSB and 25 Watt CW mode. Noise Blanker. PA mode. Digital VFO. Built-in S/R/F/Mod/SWR meter. Channel switch on the microphone, and much more! The HR2510 lets you operate AM, FM, USB, LSB or CW. The digitally synthesized frequency control gives you maximum stability and you may choose either pre-programmed 10 KHz. channel steps, or use the built-in VFO for steps down to 100 Hz. There's also RIT (Receiver Incremental Tuning) to give you perfectly tuned signals. With receive scanning, you can scan 50 channels in any one of four band segments to find out where the action is. Order your HR2510 from CEI today.

NEW! President® HR2600-T

List price \$599.95/CE price \$299.95/SPECIAL 10 Meter Mobile Transceiver • New Features Delivery for this new product is scheduled for June, 1989. The new President HR2600 Mobile 10 Meter Transceiver is similar to the Uniden HR2510 but now has repeater offsets (100 KHz.) and CTCSS encode.



BC760XLT
800 MHz.
mobile scanner
SPECIAL!

★★★ Facsimile Machines & Phones ★★★

FAX3300-T Pactel Fax machine with phone \$1,099.95
 XE750-T Uniden Cordless Phone with speaker \$99.95
 XE550-T Uniden Cordless Phone \$79.95
 XE300-T Uniden Cordless Phone \$69.95

★★★ Extended Service Contract ★★★

If you purchase a scanner, CB, radar detector or cordless phone from any store in the U.S. or Canada within the last 30 days, you can get up to three years of extended service contract from Warrantech. This service extension plan begins after the manufacturer's warranty expires. Warrantech will perform all necessary labor and will not charge for return shipping. Extended service contracts are not refundable and apply only to the original purchaser. A two year extended contract on a mobile or base scanner is \$29.99 and three years is \$39.99. For handheld scanners, 2 years is \$59.99 and 3 years is \$79.99. For radar detectors, two years is \$29.99. For CB radios, 2 years is \$39.99. For cordless phones, 3 years is \$34.99. Order your extended service contract today.

OTHER RADIOS AND ACCESSORIES

BC55XLT-T Bearcat 10 channel scanner \$114.95
 BC70XLT-T Bearcat 20 channel scanner \$159.95
 BC175XLT-T Bearcat 16 channel scanner \$158.95
 R2060-T Regency 60 channel scanner \$149.95
 TS2-T Regency 75 channel scanner \$269.95
 UC102-T Regency VHF 2 ch. 1 Watt transceiver \$114.95
 BPS5-T Regency 16 amp reg. power supply \$179.95
 BP205-T Ni-Cad batt. pack for BC200/BC100XLT \$49.95
 B8-T 1.2 V AA Ni-Cad batteries (set of eight) \$17.95
 FBE-T Frequency Directory for Eastern U.S.A. \$14.95
 FBW-T Frequency Directory for Western U.S.A. \$14.95
 RFD1-T Great Lakes Frequency Directory \$14.95
 RFD2-T New England Frequency Directory \$14.95
 RFD3-T Mid Atlantic Frequency Directory \$14.95
 RFD4-T Southeast Frequency Directory \$14.95
 RFD5-T N.W. & Northern Plains Frequency Dir. \$14.95
 ASD-T Airplane Scanner Directory \$14.95
 SRF-T Survival Radio Frequency Directory \$14.95
 TSG-T "Top Secret" Registry of U.S. Govt. Freq. \$14.95
 TTC-T Tune in on telephone calls \$14.95
 CBH-T Big CB Handbook/AM/FM/Freeband \$14.95
 TIC-T Techniques for Intercepting Communications \$14.95
 RRF-T Railroad frequency directory \$14.95
 EEC-T Embassy & Espionage Communications \$14.95
 CIE-T Covert Intelligence, Elect. Eavesdropping \$14.95
 MFF-T Midwest Federal Frequency directory \$14.95
 A60-T Magnet mount mobile scanner antenna \$35.95
 A70-T Base station scanner antenna \$35.95
 A1300-T 25 MHz.-1.3 GHz Discone antenna \$109.95
 USAMM-T Mag mount VHF ant. w/ 12' cable \$39.95
 USAK-T 3/4" hole mount VHF ant. w/ 17' cable \$35.95
 Add \$4.00 shipping for all accessories ordered at the same time.
 Add \$11.00 shipping per radio and \$4.00 per antenna.

BUY WITH CONFIDENCE

To get the fastest delivery from CEI of any scanner, send or phone your order directly to our Scanner Distribution Center. Michigan residents please add 4% sales tax or supply your tax I.D. number. Written purchase orders are accepted from approved government agencies and most well rated firms at a 10% surcharge for net 10 billing. All sales are subject to availability, acceptance and verification. All sales on accessories are final. Prices, terms and specifications are subject to change without notice. All prices are in U.S. dollars. Out of stock items will be placed on backorder automatically unless CEI is instructed differently. A \$5.00 additional handling fee will be charged for all orders with a merchandise total under \$50.00. Shipments are F.O.B. CEI warehouse in Ann Arbor, Michigan. No COD's. Most items listed have a manufacturer's warranty. Free copies of warranties on these products are available by writing to CEI. Non-certified checks require bank clearance. Not responsible for typographical errors.

Mail orders to: Communications Electronics, Box 1045, Ann Arbor, Michigan 48106 U.S.A. Add \$11.00 per scanner for U.P.S. ground shipping and handling in the continental U.S.A. For Canada, Puerto Rico, Hawaii, Alaska, or APO/FPO delivery, shipping charges are three times continental U.S. rates. If you have a Discover, Visa, American Express or Master Card, you may call and place a credit card order. 5% surcharge for billing to American Express. Order toll-free in the U.S. Dial 800-USA-SCAN. In Canada, dial 800-221-3475. FAX anytime, dial 313-971-6000. If you are outside the U.S. or in Michigan dial 313-973-8888. Order today. Scanner Distribution Center™ and CEI logos are trademarks of Communications Electronics Inc. Sale dates 3/8/89 - 9/30/89 AD #030889-T Copyright © 1989 Communications Electronics Inc.

For credit card orders call
1-800-USA-SCAN

COMMUNICATIONS ELECTRONICS INC.

Consumer Products Division
 P.O. Box 1045 □ Ann Arbor, Michigan 48106-1045 U.S.A.
 For orders call 313-973-8888 or FAX 313-971-6000

A LOOK AT THE SHACK FROM BOTH ENDS OF THE COAX

Random Headings—Part II

This month we'll examine some useful antenna products and some new software that has found a place in my hamshack. First, the antenna side of things.

Antenna Notes

New Antenna Magazine. Richard B. Morrow, K5CNF, is off and running with his specialized publication *antenneX*®, which he bills as "the magazine for antenna experimenters."

Adopting the slogan "be informed and get more for your rig," the new publication takes the position that you may have the best rig there is, but if your antenna is mismatched or improperly tuned, you can't get the best performance from the rig (*Amen!*—*ed.*). Some of the subjects covered include mobile antennas, antennas for apartments and other hostile environments, test equipment, antenna design programs, phased arrays, automatic DF systems, radio astronomy, matching, new concepts, and more.

Each issue tries to include something for everyone, from the rank novice to the old timer. The magazine usually includes one or more lead articles on the subject of antenna developments as well as material about the evolution of the various antennas in use today. There's also a question-and-answer section for readers who have a nagging antenna problem.

A 12-month subscription is \$11.97. For more details contact *antenneX*, P.O. Box 8995, Suite 12, Corpus Christi, TX 78412.

Davis RF Antenna Parts Catalog. Full-line suppliers of antenna wire, cable, and parts are fairly few and far between. We were pleasantly surprised to receive the Davis catalog, which features a large selection of goodies such as flat-top and ground radial wire, coaxial cable, insulators, coax relays, remote-control coax switches, openwire feedline and feeder spreaders, ladderline, and aluminum tubing. Prices are very competitive.

A "plus" in the catalog is an interesting two-page primer on vertical phased array antenna systems. As pointed out by Stephen F. Davis, the firm's proprietor, such antennas are increasingly popular on 160, 80, and 40 meters for both long- and short-haul DX, and they can be relatively inexpensive antennas to install. Included is some useful information on phased vertical theory of operation, a brief description of some currently popular designs, and a short list of information sources on vertical phased array design and construction. (Davis RF distributes the ComTek RCB-5 remote coaxial control box, which can take care of the switching chores for most vertical phased array designs.)

For a catalog contact Stephen F. Davis at Davis Associates, P.O. Box 230, Carlisle, MA 01741.

Microwave Filter Company Handbook. Although the company's amateur antenna products have been taken over by another firm, Microwave Filter's core interference filter and TVRO satellite businesses are going strong. Recently I received a copy of their thick filter catalog, "The Commercial Technician's Handbook of RF Filters for Suppressing Off-Air Interference to Communications Systems." Although their filters, traps, and notchers are primarily aimed at commercial high-power transmitting, TVRO, and cable TV systems, there's a good deal of useful heavy-duty RFI-fighting information in the catalog, which lists the most-needed interference filters out of the 1,800 different designs that MFC has made over the past 18 years. The firm also operates the MFC Bookstore and publishes a catalog of MFC-produced and other communications titles that's free for the asking.

For a catalog contact The Microwave Filter Co., Inc., 6743 Kinne St., Syracuse, NY 13057.

C.A.T.S. Update. In last September's column we mentioned the C.A.T.S. ("Craig's Antenna and Tower Service") rotor repair service and parts outlet operated by Craig Henderson, N8DJB.

Since that column appeared we've had several letters from readers who have attested to the prompt service, reasonable prices, and excellent workmanship that Craig provides—not unwelcome in this age of typically slow service, high prices, and second-rate workmanship when it comes time to get anything complicated fixed.

If you need a rotor repaired or reconditioned, you might want to check with C.A.T.S., 7368 S. R. 105, Pemberville, OH 43450.

Rutland Arrays. In the November 1987 column we described some of the 432 MHz Yagis

for EME, tropo, weak signal, and ATV work offered by this New Cumberland, Pennsylvania firm. Featuring designs by K1FO, W2JR, and K2RIW, at least five antenna types with measured gains of up to 17.8 dBd are presently offered by Rutland. In addition to the Yagis, a line of accessory power dividers and stacking frames is also carried.

For a flyer write to Rutland Arrays, 1703 Warren St., New Cumberland, PA 17070.

Synthetic Textiles Antenna Rope. Debbie Livingston was kind enough to send us a description of the firm's black Dacron® polyester double-braided antenna rope, available in 3/32, 3/16, and 5/16 inch diameter sizes.

This specially constructed braid ties and unties easily even after years of use. It also cuts neatly, the ends being sealed with the firm's "electric hot knife." DuPont's colorsealed black Dacron polyester yarn is used in connection with the braided jacket for additional protection from ultraviolet light and resistance to aging and abrasion.

The 3/32 inch rope has a strength of 260+ lbs.; the 3/16 inch rope checks out at 770+ lbs.; and the 5/16 inch rope, at 1790+ lbs. Prices range from \$30 per 1000 ft. spool up to \$100 per 1000 ft., depending on the rope diameter. The accessory 110 volt electric hot knife is \$12.

For a spec sheet contact Synthetic Textiles, Inc., 2472 Eastman Avenue, Bldg. 21-22, Ventura, CA 93003.

Phillystran® Tower Guys. A product introduced to the commercial broadcast industry in 1973 is beginning to catch on with amateurs who are tired of handling metallic guy wires. This product is the Phillystran HPTG tower guying material.

According to United Ropeworks (U.S.A.),

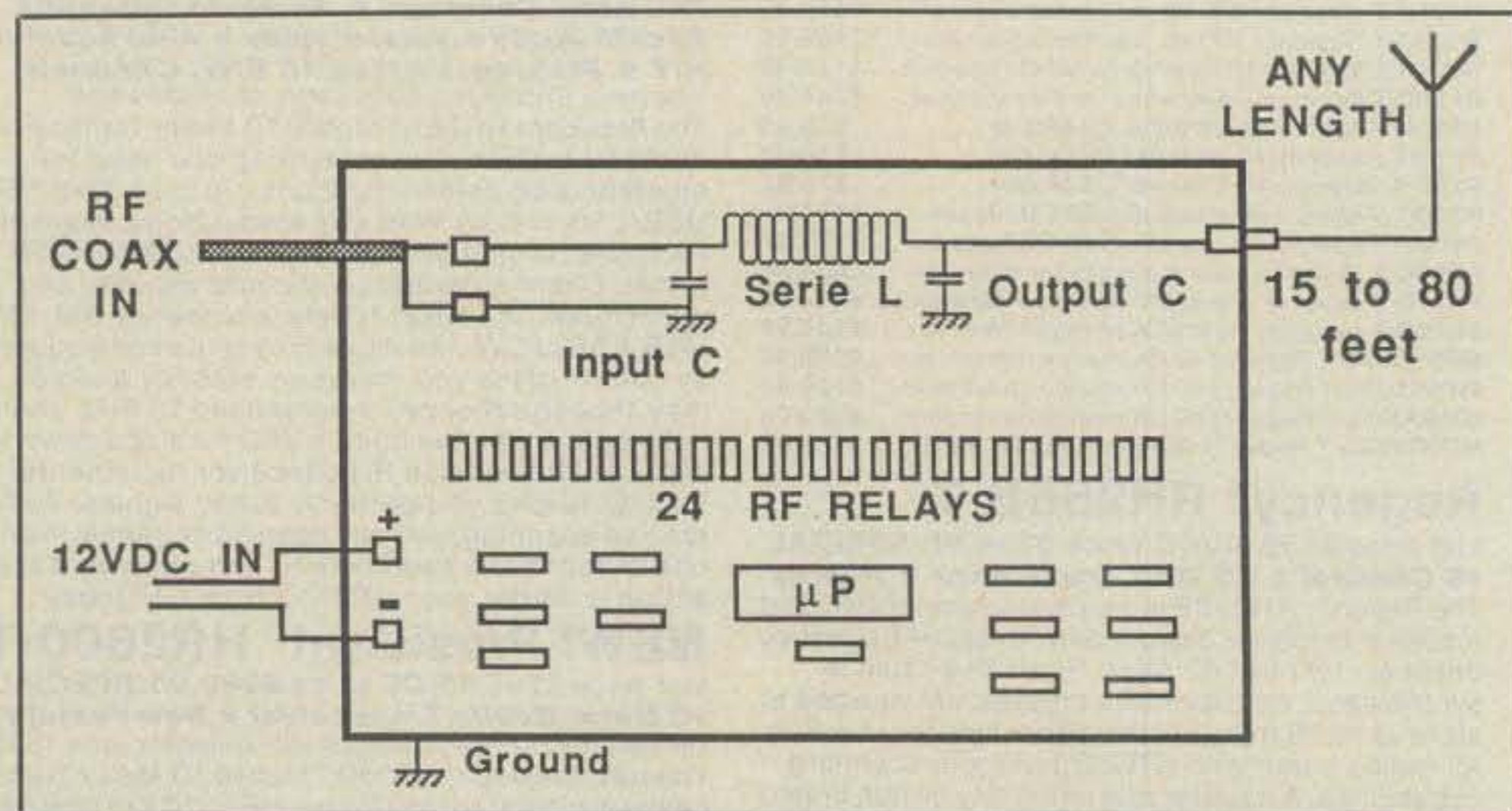


Fig. 1—Shown here is a partial block diagram of the SGC Smartuner™, a fully automatic antenna tuner that reportedly will load the proverbial "wet string." The intelligent unit also remembers the last-used frequency of operation and tuning values.

HI-PERFORMANCE DIPOLES

Antennas that work! Custom assembled to your center freq. ea. band - advise ht. of center and each end - hang as inverted "V" - horizontal, vert dipole, sloping dipole - commercial quality - stainless hardware - legal power - no-trap, high-efficiency design. Personal check, MO or C.O.D. (\$3)

MPD-5*	80-40-20-15-10M max-performance dipole 87' long	\$105ppd
MPD-2	80-40M max-performance dipole, 85' long 382	95'-96ppd
HPD-3*	180-80-40M hi-performance dipole 113' long	\$79ppd
SSD-8*	180-80-40-20-15-10M space saver dipole 71' long	\$125ppd
SSD-5*	80-40-20-15-10M space-saver dipole-specify L. 42'-\$105 . 52'-\$108ppd	
SSD-4*	80-40-20-15M space-saver dipole-specify L. 48'-\$93 . 60'-\$ 96ppd	

*9-bands with wide-matching-range tuner.

SASE for catalogue of 30 dipoles, slopers, and space-saving, unique antennas

W91NH ANTENNAS
312-394-3414 BOX 393 MT. PROSPECT, IL 60056

CB-TO-10 METERS

We specialize in CB radio modification plans and hardware. Frequency and FM conversion kits, repair books, plans, high-performance accessories. Thousands of satisfied customer since 1976! Catalog \$2.

CBC INTERNATIONAL
LOU FRANKLIN/K6NH - Owner
P.O. BOX 31500CQ, PHOENIX, AZ 85046

HAMRAD

MS-DOS SOFTWARE for the SERIOUS AMATEUR

DSK4 - HAMRAD's all new **QUICKLOG**, is the ultimate **TSR POP-UP** Log Book and Beam Heading System. Duping, Beam Headings, user selected options & more! (Dual FD or HD required) PRICE: \$39.50

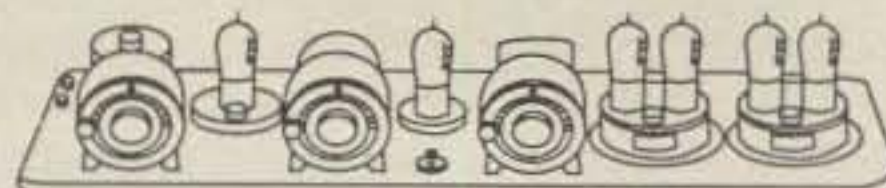
DSK1 - ENHANCED LOG BOOK with Dupe Checking, QSL CARDS & LABELS direct from Logs. BEAM HEADINGS by Prefix, Grid Square or Lat/Lon. DXCC & BEARING LISTS and more. PRICE: \$25.00

DSK3 - All DSK1 programs plus CONTEST LOG with ultra fast Dupe Checking, Auto ITU & CQ Zones, Country, Serial # and SUPER-LOG, a full featured, rapid entry, multiple Dupe checking Log Book. This Disk has it all! (Dual FD or HD recommended) PRICE: \$50.00

5 1/4" 360K standard format. 3 1/2" 720K \$2.00 Additional. Specify disk, format and EXACT Latitude-Longitude and Callsign. VISA/MC inc. # and exp. date. Include P&H: \$2.50 USA - \$4.50 Foreign. SASE for info.

9027 SLEEPING BEAR RD SKOKIE, IL 60076

Please send all reader inquiries directly.



IF YOU BUY, SELL OR COLLECT OLD RADIOS, YOU NEED...

ANTIQUE RADIO CLASSIFIED

Antique Radio's Largest-Circulation Monthly Magazine

Articles - Classifieds - Ads for Parts & Services

Also: Early TV, Ham Equip., Books,

Telegraph, 40's & 50's Radios & more...

Free 20-word ad each month. Don't miss out!

Free Sample. 6-Month Trial - \$11.

1-Year: \$19 (\$28 by 1st Class). Foreign - Write.

A.R.C., P.O. Box 2-C5, Carlisle, MA 01741

CIRCLE 119 ON READER SERVICE CARD

ASTRON CORPORATION

9 Autry
Irvine, CA 92718
(714) 458-7277

ASTRON POWER SUPPLIES

• HEAVY DUTY • HIGH QUALITY • RUGGED • RELIABLE •

RS, RM and VS SERIES

SPECIAL FEATURES

- SOLID STATE ELECTRONICALLY REGULATED
- FOLD-BACK CURRENT LIMITING Protects Power Supply from excessive current & continuous shorted output.
- CROWBAR OVER VOLTAGE PROTECTION on all Models except RS-4A, RS-5A.
- MAINTAIN REGULATION & LOW RIPPLE at low line input Voltage.
- HEAVY DUTY HEAT SINK • CHASSIS MOUNT FUSE

- THREE CONDUCTOR POWER CORD
- ONE YEAR WARRANTY • MADE IN U.S.A.

PERFORMANCE SPECIFICATIONS

- INPUT VOLTAGE: 105 - 125 VAC
- OUTPUT VOLTAGE: 13.8 VDC ± 0.05 volts (Internally Adjustable: 11-15 VDC)
- RIPPLE: Less than 5mv peak to peak (full load & low line)
- Also available with 220 VAC Input Voltage



MODEL VS-50M

RM-A SERIES



MODEL RM-35M

19" X 5 1/4" RACK MOUNT POWER SUPPLIES

MODEL	Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H x W x D	Shipping Wt. (lbs.)
RM12A	9	12	5 1/4 x 19 x 8 1/4	16
RM-35A	25	35	5 1/4 x 19 x 12 1/2	38
RM-50A	37	50	5 1/4 x 19 x 12 1/2	50
• Separate Volt and Amp Meters				
RM-35 M	25	35	5 1/4 x 19 x 12 1/2	38
RM-50 M	37	50	5 1/4 x 19 x 12 1/2	50

RS-A SERIES



MODEL RS-7A

RS-4A	3	4	3 3/4 x 6 1/2 x 9	5
RS-5A	4	5	3 1/2 x 6 1/8 x 7 1/4	7
RS-7A	5	7	3 3/4 x 6 1/2 x 9	9
RS-10A	7.5	10	4 x 7 1/2 x 10 3/4	11
RS-12A	9	12	4 1/2 x 8 x 9	13
RS-20A	16	20	5 x 9 x 10 1/2	18
RS-35A	25	35	5 x 11 x 11	27
RS-50A	37	50	6 x 13 3/4 x 11	46

RS-M SERIES



MODEL RS-35M

• Switchable volt and Amp meter				
RS-12M	9	12	4 1/2 x 8 x 9	13
• Separate volt Amp meters				
RS-20M	16	20	5 x 9 x 10 1/2	18
RS-35M	25	35	5 x 11 x 11	27
RS-50M	37	50	6 x 13 3/4 x 11	46

RS-S SERIES



MODEL RS-12S

• Built in speaker				
RS-7S	5	7	4 x 7 1/2 x 10 3/4	10
RS-10S	7.5	10	4 x 7 1/2 x 10 3/4	12
RS-12S	9	12	4 1/2 x 8 x 9	13
RS-20S	16	20	5 x 9 x 10 1/2	18

VRM/VS-M SERIES



MODEL VS-35M

• Separate Volt and Amp Meters • Output Voltage adjustable from 2-15 volts				
• Current limit adjustable from 1.5 amps to Full Load				
	@ 13.8VDC @ 10VDC @ 5VDC		@ 13.8V	
VS-20M	16	9	4	20
VS-35M	25	15	7	35
VS-50M	37	22	10	50
• Variable rack mount power supplies				
VRM-35M	25	15	7	35
VRM-50M	37	22	10	50

*ICS—Intermittent Communication Service (50% Duty Cycle 5 min. on 5 min. off)

CIRCLE 118 ON READER SERVICE CARD

the manufacturer, Phillystran has been used successfully on more than 1000 commercial broadcast towers. It is preferred over wire stranded materials because of its high strength, light weight, electrical transparency, dielectric properties, and ease of installation.

Phillystran is claimed to be stronger than extra-strength galvanized steel and also is much lighter. It is jacketed with an extruded olefin copolymer selected for its abrasion and weather-resistant qualities.

The main advantages of using such a non-conductive and noncorrosive material derive from the effective isolation of the tower guy system from the antenna field, as well as minimal distortion of signal coverage caused by radiation from the guy wires or absorption by them. As a result, there is no need to use insulators to break up undesirable guy wire resonances. Too, in a residential setting, the product helps assure a neat appearance without steel guys to corrode or ceramic insulators to act up.

These advantages are not without penalty, however, and must be balanced by the high cost of materials (a minimum of 32 cents per foot, depending on diameter), and the requirement for rope ends to be prepared and "socketed" in special end fittings. A potting compound, sold by the firm, is required to seat the cable ends using a special potting procedure. Also, to prevent possible damage by a vandal brandishing a knife, short lengths of steel cable (5-10 ft.) should be used in the very lowest portion of each guy assembly.

The Phillystran HPTG material is available from several of the larger amateur radio distributors. For more information on this unusual product, contact United Ropeworks (U.S.A.), Commerce Drive, P.O. Box 306, Montgomeryville, PA 18936.

Down East Microwave Flyer. "Down East" (which also is slang for a resident of northern New England or parts of Canada's maritime provinces) is a small company in central Maine that manufactures a broad line of products for UHF and SHF amateurs.

A featured product is the loop Yagi, as pioneered by G8AZM, G3JVL, and others for weak signal work at 902 MHz and above. According to the manufacturer, four 23 cm "loopers" compare favorably in gain to a 7 ft. dish, with much less wind resistance. Even at frequencies above 2 GHz, where dishes begin to look attractive, the loop Yagi has gained acceptance largely because of its low wind resistance. The firm offers several loop and "super loop" Yagis ranging from 33 to 55 elements; these claim forward gain of up to 21 dBi and range in cost from about \$67 to \$140. Both kits and assembled beams are available, and customized loop Yagis are available for any frequency between 800 MHz and 3.5 GHz. A line of power dividers, stacking frames, and linear amplifiers also is available.

For a spec sheet contact Down East Microwave, Box 2310, Troy, ME 04987.

SGC Automatic Antenna Tuner. A new microprocessor-controlled "high technology" automatic antenna tuner, the SGC-230 Smartuner™, is offered and it is claimed to intelligently load the proverbial "wet string." It is designed to handle any antenna length from 8 to 80 feet (including a single-wire, whip, or loop) in any HF band from 1.8 to 30 MHz using up to 150 watts PEP. No preliminary tuning or adjustment is required, and the unit will operate with most HF transceivers; 12 VDC is required for operation. The input impedance (from the transceiver)

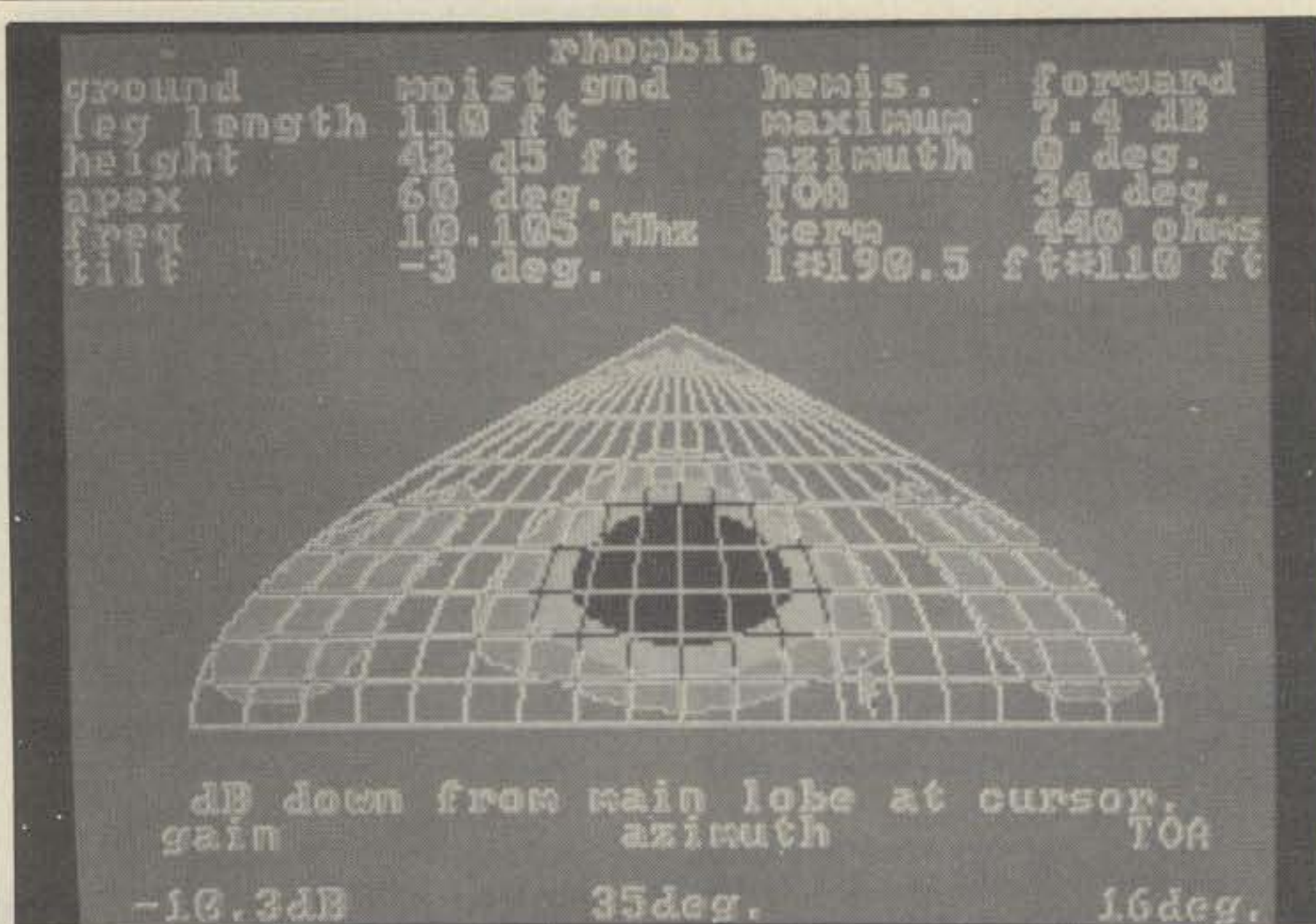


Photo shown here, originally in color, is of a typical screen display produced by KM2R's Long Wire Pro program, which works essentially in the same fashion as the Vertical Pro program described this month. Both programs produce an unusual sinusoidal antenna pattern display. (Photo courtesy Epsilon Company)

ranges from 45-55 ohms, and a typical SWR of 2:1 results.

According to P. J. Cooper of SGC, when the tuner "sees" a new frequency, it takes 2-3 seconds to set to the new frequency. During this time it switches 64 input and 32 output capacitors plus 256 inductance combinations arranged in a pi-network. Interestingly, the unit

remembers the frequency and tuning values when last used. The next time you transmit on the band, the tuner reselects these values in less than 10 milliseconds.

For a spec sheet and pricing information contact SGC, Inc., SGC Bldg., 13737 S. E. 26th St., Bellevue, WA 98005. Fig. 1 shows a partial block diagram of the SGC unit.

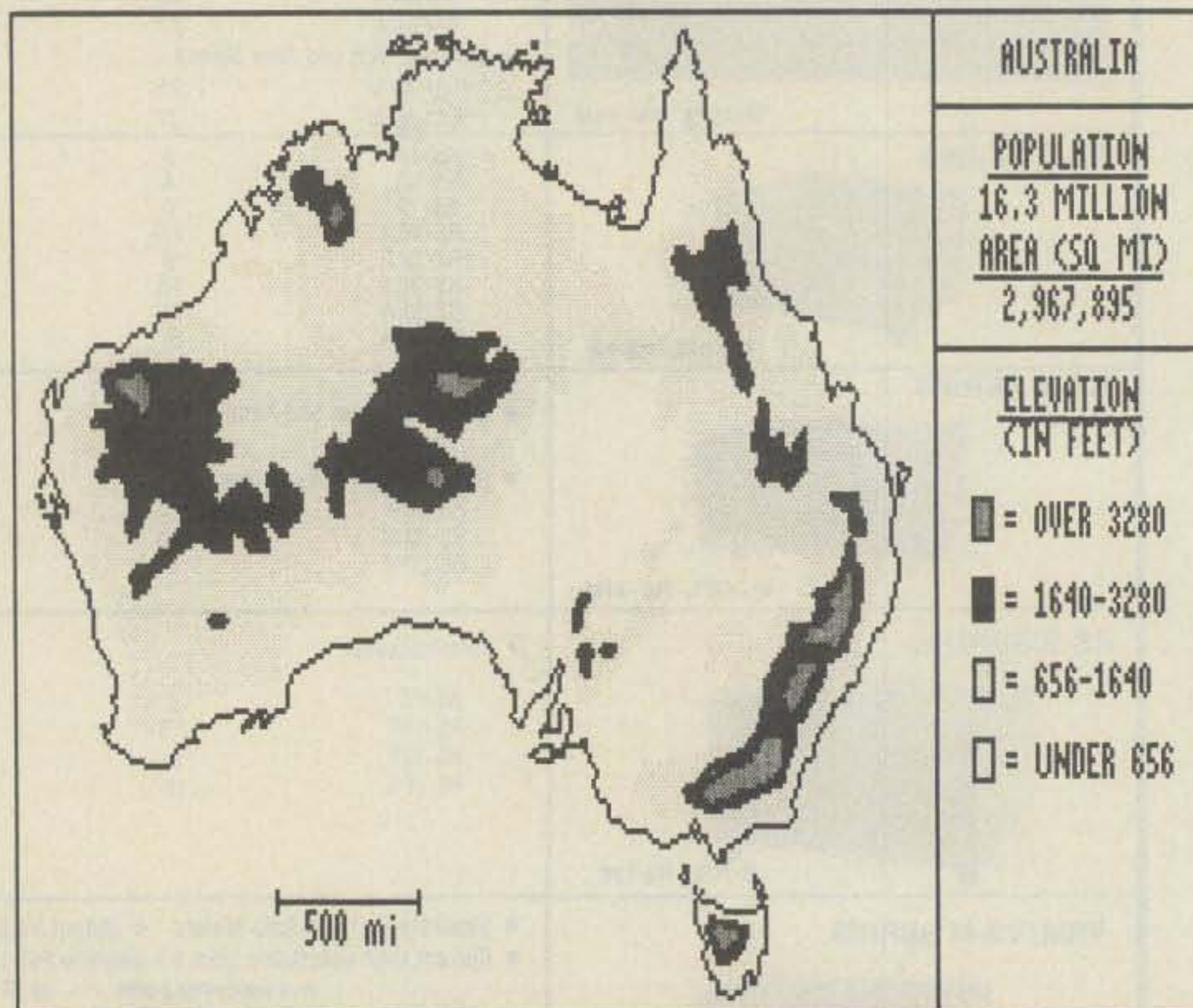


Fig. 2- Elevation map of Australia produced by PC-GLOBE+. PC-GLOBE+, a very competent computer atlas and database, can produce a variety of printed text and graphic outputs. The program includes data-base information of interest to amateurs; the databases can be customized and updated.

T.V.I. problems?

Low pass T.V.I. filters from
Barker & Williamson



FL10/1500 FL6/1500 FL10/100 FL6/100

Model	Power (Watts)	Cut Off Frequency	Frequency of Maximum Attenuation	Minimum Attenuation	Frequency Range	Price
FL10/1500	1000	34 MHz	52 MHz	70 db	1.8 - 30 MHz	\$36.95*
FL10/100	100	44 MHz	57 MHz	60 db	1.8 - 30 MHz	\$29.50*
FL6/1500	1000	55 MHz	63 MHz	70 db	6 meter	\$49.50*
FL6/100	100	55 MHz	63 MHz	50 db	6 meter	\$34.50*

All above to match 50 ohm transmitters and antennas.

*Add \$2 shipping and handling

ALL OUR PRODUCTS MADE IN USA



BARKER & WILLIAMSON

Quality Communication Products Since 1932

At your Distributors write or call

10 Canal Street, Bristol PA 19007

(215) 788-5581



Please send all reader inquiries directly.

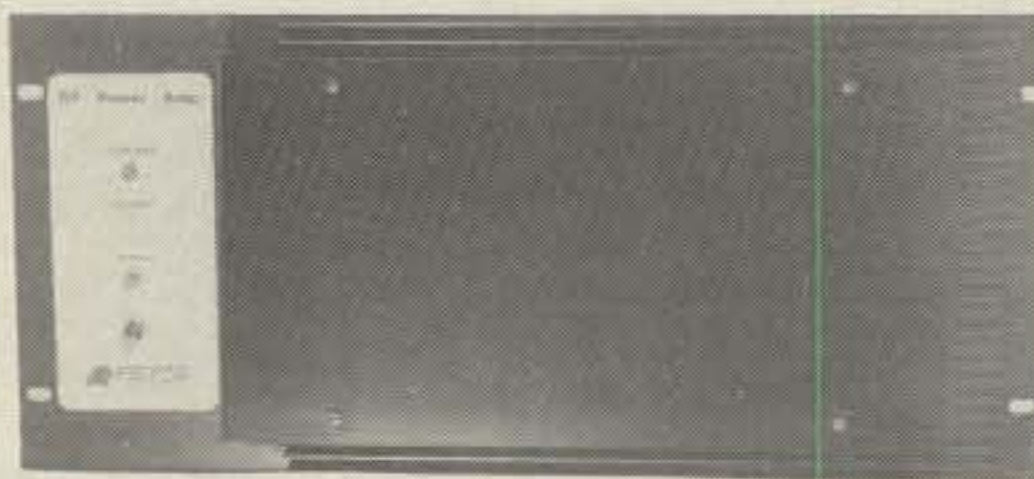
RF POWER AMPLIFIERS BY FALCON

Quality American made amplifiers for
those who demand the best

UTILITY LINE:

Reliable, moderate cost, 100% duty cycle amplifiers

Catalog and custom units in low noise MOSFET and economy bipolar designs. For: FM repeaters, base stations, ACSSB, data links, TV, medical research, broadcast FM, etc.



FEATURES INCLUDE

Maximum power outputs from 50 to 150 Watts
Thermostatically controlled fan on most models
13.8 Volt operation (Other voltages for custom units)
Overtemperature protection
"Straight through" mode when overheated or turned off
Standard 8 3/4" x 19" rack panel mounting
See UTILITY LINE catalog sheet for details



PRESTIGE LINE:

Premium 100% duty cycle amplifiers

MOSFET devices, conservatively used, assure long life and low noise. Use in: FM repeaters, base stations, data links, ACSSB, medical research, TV broadcast FM, satellite uplinks, etc.

Full monitoring of amplifier performance. Amplifier will shut down in the face of certain abuses and status can be determined from front panel LED's and signals at a rear connector.

OTHER FEATURES INCLUDE

Maximum power outputs from 100 to 250 Watts
Forced air cooling for low temperatures and long life
Line voltage operation - Power supply built in
Overtemperature, overdrive, excess power and VSWR protection
"Straight through" mode when shut down or turned off
Standard 3 1/2" x 19" rack or table top mounting
See PRESTIGE LINE catalog sheets for details



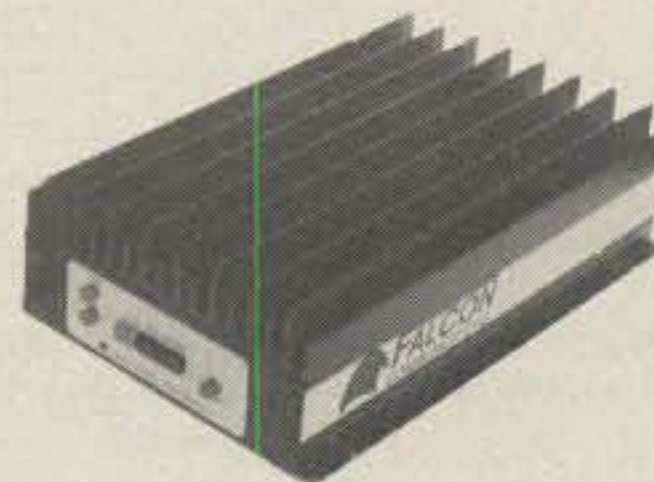
MOBILE LINE:

Reliable, moderate cost, intermittent duty amplifiers

Catalog and custom units in low noise MOSFET and economy bipolar designs available. Use for FM, SSB, CW, etc.

FEATURES INCLUDE

Maximum power output from 50 to 150 Watts
Adjustable delay for SSB
Optional plug-in receive preamplifier
Overtemperature protection



See MOBILE LINE catalog sheet for details



FALCON
COMMUNICATIONS

P.O. Box 8979
Newport Beach, CA 92658
(714) 760-3622

COMING
SOON



\$1.25

That's all it takes to get a copy of the USA-CA Record Book delivered to your door. Order one or two today and start collecting counties for one of amateur radio's most prized awards, USA-CA.

CQ Magazine
76 North Broadway
Hicksville, New York 11801

Software and Hardware Topix

Vertical Pro. In last September's column we discussed the novel approach to antenna modeling software taken by Donald Lamy, KM2R. We described his Long Wire Pro program for the IBM PC, a design program that features a unique sinusoidal projection of the radiation pattern. This approach to showing radiated power is different from the usual azimuthal and elevation projections, and allows you to visualize signal intensity at all angles, horizontal and vertical, of the antenna simultaneously.

The sinusoidal projection is like sitting in a planetarium. At the center of the floor is your antenna, which is the only source of light. The dome or sky is illuminated according to signal intensity at each point. The program's sinusoidal projection is a sophisticated flat projection of the sky, color coded according to signal intensity. You can explore the projection with a mouse or with cursor keys and read in a numeric window the gain at a particular azimuth and elevation.

Donald's at it again, this time with Vertical Pro, which models single-element nondirectional and multi-element directional vertical arrays. Antennas with any practical number of parasitic or driven elements (or both mixed) in the same antenna may be modeled. You simply place each element on a grid on the screen and enter the element's parameters. After menu choices have been made and parameters entered, you can display a sinusoidal or polar projection. In the latter, the projection is displayed in the center of the screen, the original grid is shown in the upper left, and a report is on the upper right. By moving the cursor over an element on the grid, the resistance, reactance, and element parameters are shown at the bottom of the display.

A vertical directional array requires careful and lengthy calculations to operate as expected. As Donald suggests, by modeling several possible antennas before actually building them, you can decide what to build on an objective basis. You'll know the effects of various compromises and trade-offs, and you can select various antenna parameters to maximize gain at a particular take-off angle and azimuth. Too, modeling the antenna first may stimulate your creativity in finding better solutions to antenna problems. As Donald concludes, "the real pleasure comes when you erect an antenna that you've modeled and it works as expected."

Both programs run on IBM PCs and compatibles with at least 256K and DOS 2.0 or higher; a color monitor with a CGA or EGA is required. An 8087/80287 math coprocessor, mouse, and additional RAM are optional. The new program, Vertical Pro, is priced at \$80, while Long Wire Pro version 1.1 is \$40; users of the original Long Wire Pro may upgrade to the new version for \$7. For more details and specs on the two programs contact Epsilon Co., P.O. Box 715, Trumbull, CT 06611.

Morse Tutor. Wayne F. Geer has thrown his hat into the Morse code training derby. His tutorial entry is Morse Tutor 3.1.

The program, designed for an IBM PC or compatible with at least 256K of available memory, makes use of a "multi-sensory" method of learning the code, in which you hear the sound and also see a representation of the Morse letter. By writing the letter you reinforce the other senses and quickly begin to retain the sight and sound pattern for each character.

The program will sound and display the

code as you type; play back a prerecorded text file; generate random letters, words, or sentences; and keep track of how you respond. Part of the output can be printed out, and you can test your progress.

The program can be adjusted for speed, tone, and color. These adjustments can be saved to disk or used only during the current session. Several other features are available that make Morse Tutor suitable both for the total beginner in learning the basics and the experienced amateur to upgrade his or her code speed. A 24-page instruction manual is included.

The Morse Tutor is \$29.95 plus shipping and handling. It is available from Wayne F. Geer at By-Design Software, 2262 Pear St., Canon City, CO 81212.

PC-GLOBE+. In the January issue we briefly reviewed PC-GLOBE, a rather remarkable geography program that can generate "instant profiles" on most major countries. At that time Roy Kessler of Comwell Systems told us that on the near horizon was an upgraded version, PC-GLOBE+. The new version is here, and we'd like to briefly describe it as we promised in January.

The updated PC-GLOBE+ provides maps, a comprehensive database for 177 countries (not the full DXCC list, of course), and the ability to generate "geographic graphics" such as for slide presentations, desktop publishing, or possibly even hamfest DX forums. You can access pull-down menus and full-color maps displaying elevations, cities, rivers, lakes, mountains, and other geographical features by the touch of a key or a computer mouse. Switch to the database and you can instantly access information on a country's population, age distribution, literacy, languages, ethnic groups, religions, health statistics, economic data, political leaders, commodities, exports, tourist at-

tractions, telex and telephone dialing codes, and radio call signs—in other words, just about everything the DXpedition junkie might want to know about Franistan.

There also are built-in utilities that convert foreign currencies, calculate exchange rates, compute point-to-point distances and bearings, and determine time differences between various nations. All data relating to distance and dimensions can be toggled between miles and kilometers, and you're able to compare and display statistical information on up to 10 different countries at a crack.

In addition, PC-GLOBE+ lets you stay current by allowing information and statistics to be appended to the database and on the maps. Graphics and text from PC-GLOBE+ can be exported to various wordprocessing, drawing, spreadsheet, and other programs. You can create, modify, and save screen displays and even build customized menus; a built-in editor lets you add specialized information to the database for each country for custom applications including amateur radio.

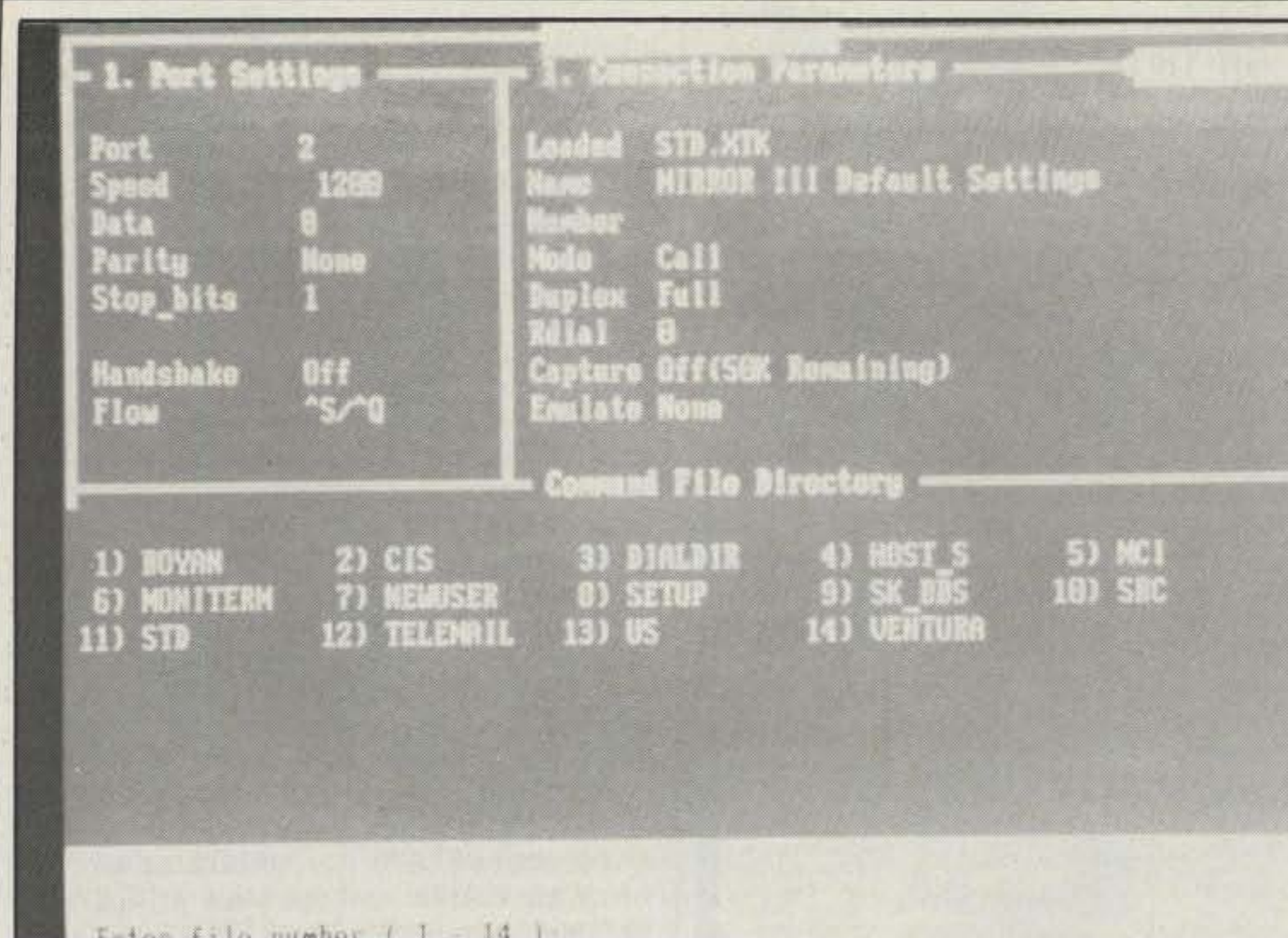
The program supports EGA, CGA, Hercules monochrome, and VGA displays for the IBM PC/XT/AT/PS2 or compatibles having a minimum of 384K RAM. Roy expects to have Macintosh and Apple versions available soon. Fig. 2 is an example PC-GLOBE+ screen print.

PC-GLOBE+ is priced at \$69.95 and is available from Comwell Systems, Inc., 2100 S. Rural Rd., Suite #2, Tempe, AZ 85282. Upgrades for owners of the previous version are \$20.

Mirror III. You may recall our perusal of Mirror II in the April 1988 column. To recall, Mirror II is a high-powered but easy-to-use telecommunications utility for the IBM PC that is compatible with most modems, has a built-in text editor and online help, offers a choice of file transfer protocols and terminal emulations,

MIRROR III Dialing Directory		DIALDIR has 102 entries			
System Name	Phone Number	Speed	Format	Script	
1. The Rose, 44M	1-503-253-9036	1200	8-N-1 F	LOGON	
2. Auto, Cars, 80M	1-503-257-0423	1200	8-N-1 F	QUIKLOG	
3. Pro					
4. Hugg					
5. SCP	Calling: Athens PCUG, 60M				GETMAIL
6. Heat					
7. Fami					
8. Blue Lake, 80M	1-503-682-0635	1200	8-N-1 F	PCL0G	
9. Rich's Oregon Opus	1-503-692-7024	1200	8-N-1 F		
10. PC-Forum	1-404-294-0237	1200	8-N-1 F	LOGRBBS	
11. Centurion, 80M	1-404-296-9681	1200	8-N-1 F		
12. AV-Sync, 500M	1-404-320-6202	1200	8-N-1 F	PCL0G	
13. Atlanta Medical For	1-404-351-9757	1200	8-N-1 F		
14. Athens PCUG, 60M	1-404-354-0817	1200	8-N-1 F		
15. AESC, 100M	1-404-381-1947	1200	8-N-1 F		
Current Selections (18 entries selected)					
14	22	26	33	37	42
56	59	68	71	76	77
86	88	94			
98	101	10			
Alt-Key Commands					
T - Tag Entry	A - Add	Z - Zoom	U - Utilities	H - Help	
M - Multi Tag	D - Delete	P - Print	G - Go (dial)	X - Exit	
R - Remove Tags	F - Find	E - Edit File	C - Mirror Command		
Dialing - 1-404-354-0817 - Waiting ... 43					

Fig. 3- Screen display of a representative dialing directory from the enhanced Mirror III telecommunications terminal program. The Mirror III Dialing Directory is an alternate for the Status Screen/Command Line interface. It supports a virtually unlimited number of dialing directories each with a virtually unlimited number of entries. You may chain-dial up to 30 entries. Directory entries may be added, deleted, printed, searched, or sorted. We reviewed the predecessor Mirror II program in the April 1988 Antennas & Accessories column.



The Mirror III status screen provides an easy-to-read display of all of the program's communications parameters. See the text of this month's column for a description of the program. (Photo courtesy SoftKlone)

and allows automated sign-on procedures.

After selling about 200,000 copies, the manufacturer, SoftKlone, has introduced a successor package, Mirror III, that contains all of the features of Mirror II, but has a number of

enhancements. These include PRISM, a very powerful data communications programming language to automate practically any landline data communications task; an improved dialing directory that can handle an almost un-

limited number of dialing entries; several new terminal emulation formats; a split-window "chat mode"; new DOS commands that can be used without exiting the program; ACT ComPressor™, a new file compression protocol for superfast file transfers; and several other very nice features. The program's documentation includes a 384-page user's manual and a 256-page PRISM programming guide.

One feature common to both Mirror II and Mirror III, and which I particularly liked, is the background/multi-tasking mode. This feature lets you operate the program in the background while you work with another application program. You could, for example, start off by transferring a long file, then loading another application program—say, a logbook, a propagation forecasting program, or whatever. When you're finished with the application program, you can bring Mirror to the foreground and continue with the file transfer. A packet enthusiast might, for example, find this feature useful for "reading the mail" for future reply while temporarily doing something else more productive with the computer. Another Mirror II feature that's been retained and improved is the auto-learn mode for automatic script file generation, very useful in having the program automatically "learn" the correct sign-on procedure for a bulletin board system (BBS) the first time you sign on.

The new product has gone up in price (\$99.95 vs. \$69.95 for Mirror II), but seems to be well worth the price increase; upgrades from Mirror II are available for \$39.95 plus shipping. For more information contact SoftKlone Distributing Corp., 327 Office Plaza Dr., Tallahassee, FL 32301.

Regain Control

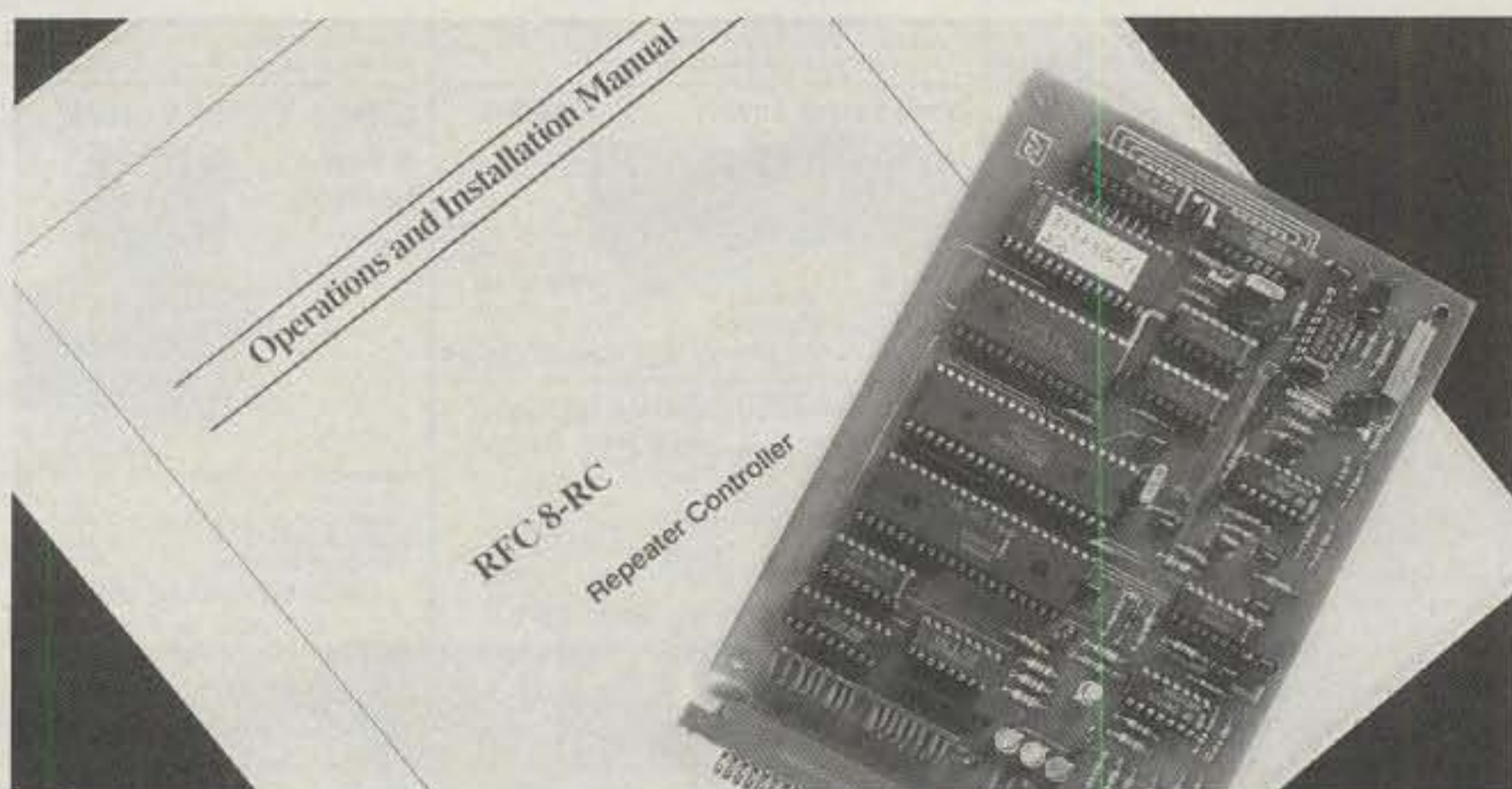
Over Your Repeater!

When your license is on the line, it makes sense to be in control. RF Concepts repeater controller handles large, multiple interconnected systems as well as simple repeater operations.

Command codes are remotely programmed, including timers, tone pitches and ID messages. And, data is stored in non-volatile EPROM, so **battery backup is not required to maintain parameters when power fails!** The RFC 8-RC comes with one repeater port, two auxiliary radio ports and one control-link port at only \$395. Regain control, call today.



Inquiries: 2000 Humbolt Street - Reno, Nevada - 89509
(702) 827-0133
Div. of Kantronics
Factory: 1202 E. 23rd, Lawrence, Kansas 66046
(913) 842-7745



The RFC 8-RC controls even the largest systems at a price you will like.

Please send all reader inquiries directly.

There appear to be quite a few amateurs using ProComm®, a very popular telecommunications program, for packet. Are any packeteers using Mirror II or Mirror III for this purpose?

Fig. 3 is a screen dump showing the Mirror III dialing directory in use.

Winner's Edge: No More. In a note received from Pete Smith, N4ZR, proprietor of Winner's Edge Software, Pete advises that he's had to reassess his Commodore contest software business and has decided to close up shop.

In addition to personal and professional considerations, Pete shared with us some of the technical and business considerations in reaching his decision:

"... I decided that the additional time required to develop a version of the Contester for

the IBM PC had become prohibitive, especially in view of the cheap availability of excellent contest software. I also concluded that the lifespan of the Commodore 64 as anything but maybe a dedicated packet controller is limited, and that convinced me not to continue to develop high-performance contest software for it."

While Pete is going out of the software business, he's made an effort to ensure that users of his software aren't left in the lurch. While he hasn't been accepting new orders for some months now, he'll continue to offer telephone support and a data recovery service (for scrambled disks) through the end of 1989.

Pete also plans to put the source and object code for the latest versions of Contester III, as well as the documentation, into the public do-

main, probably by placing them on various bulletin boards such as CompuServe's Hamnet. Overseas customers who desire source code may send Pete 12 IRCs or \$5 after July 1, 1989; he'll provide the code on a disk in return.

Commodore-owning contesters will miss Pete and his company, and we thank him for "taking care of business" by tying up any loose ends. If you need to contact Pete, write to Winner's Edge Software, 2003 Sarazen Place, Reston, VA 22091.

Modem Interface. Last Christmas I treated myself and the family to an Amiga 500, Commodore's answer to the Atari ST. Arguably, it's perhaps the most capable and powerful home computer yet introduced to the home market. (I'm still hanging onto my trusty Commodore 128, however.)

I found that most of the C-64 and C-128 peripherals (disk drives, modems, etc.) can't be used directly by the Amiga for various technical reasons. One peripheral that may be adapted to the Amiga, however, is the Commodore 1670 modem, a 1200-baud device that many amateurs use with their 64/128.

If you have a 1670, you can obtain a special hardware adapter that powers the 1670 modem and plugs into the Amiga 500's serial port. Lawrence R. Anderson, KA6FQN, of LRA Enterprises, offers the 1670 Stand-Alone Interface which accomplishes that task very nicely, allowing the 1670 to work to its original capacity and respond to the standard Hayes AT command set just as it did with the C-64/128. The interface also enables you to use the 1670 modem with the Amiga 1000 and 2000, IBM PC and clones, Apple IIc and IIe, and the Laser 128 computers. In fact, it can work with any computer that supports the standard RS-232 serial port, including the Apple RS-232 using a DIN 5-pin connector.

The device is priced at \$45.95 and is distributed exclusively through TNL Enterprises, Box 1326, North Massapequa, NY 11758. (CQ readers this month and user groups get a 5% discount.)

Short Bursts de W8FX

Amateur Radio and Electronics-Oriented BBSs. In last November's *Modern Electronics* magazine (a sister publication to *CQ*), the Electronics Omnibus column's editor, Curt Phillips, published an extensive listing of amateur radio and electronics-oriented bulletin boards (BBSs), which I understand originated with Tom Brown, KA2UGQ. These landline BBSs can be excellent places to exchange messages with fellow enthusiasts, or to exchange computer programs of interest to amateurs, SWLs, and other electronics hobbyists. Most of the boards are well-stocked with freeware and shareware programs.

Curt's listing is rather long to reprint it here, but if you can beg, borrow, or steal a copy of last November's *ME* (or order one from *ME*—same address as *CQ*), check out Curt's list. Remember, though, that BBSs come and go, so common courtesy dictates that you *don't* call these numbers late at night until you have confirmed that the numbers are still operating as computer bulletin boards and are not private individuals' homes.

Shareware Distribution Network. Several times in the past we've extolled the virtues of shareware, or "try now, pay later" software. Briefly, under the shareware concept you take a copy of the program (such as downloaded from a computer bulletin board) and try it out. If you

HITACHI SCOPES AT DISCOUNT PRICES

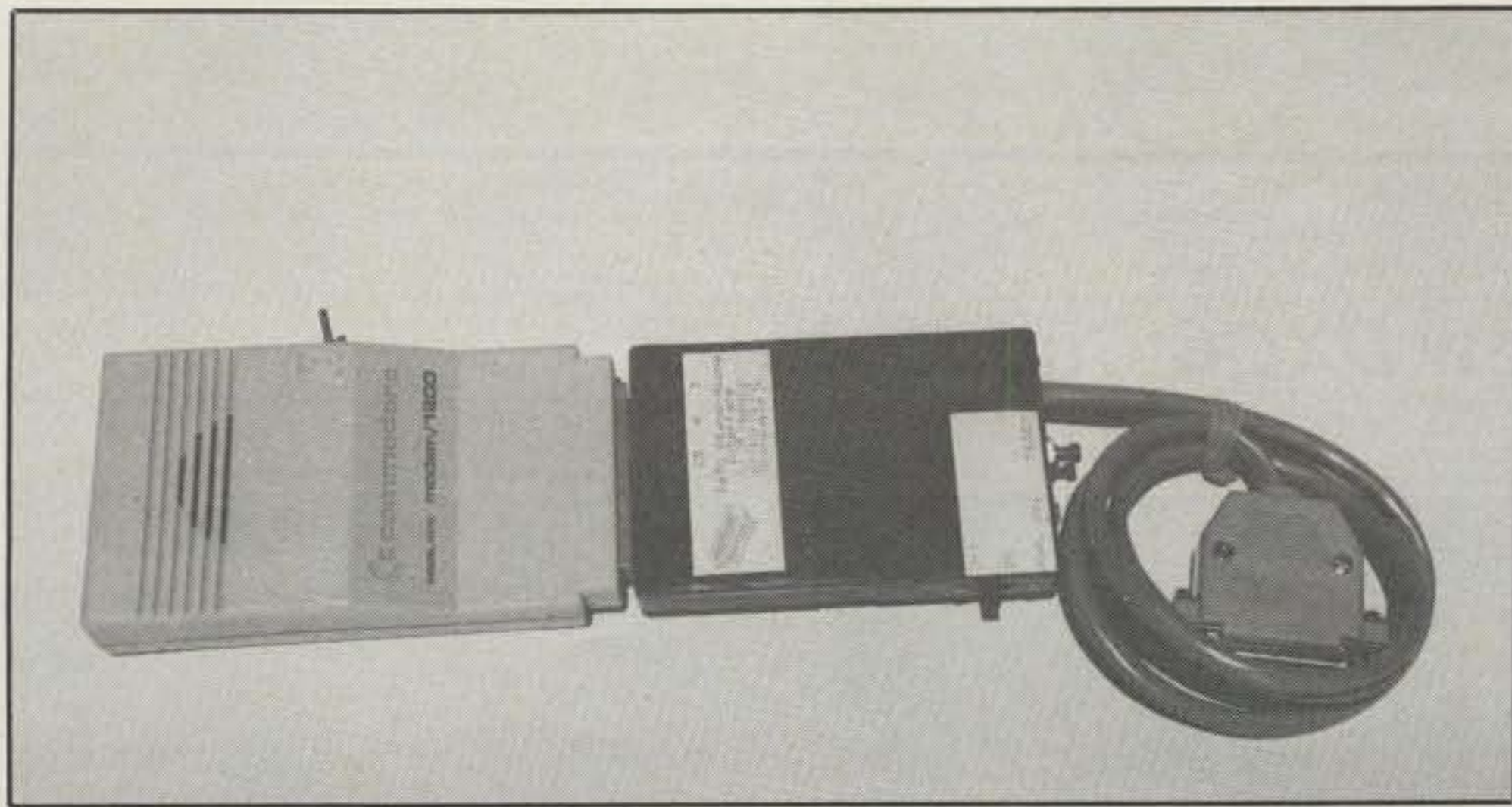
 <p>V-212 \$419 List \$560 Save \$141</p> <p>20MHz Dual Trace Oscilloscope All Hitachi scopes include probes, schematics and Hitachi's 3 year warranty on parts and labor. Many accessories available for all scopes.</p>	 <p>V-425 List \$995 \$835</p> <ul style="list-style-type: none"> • DC to 40MHz • Dual Channel • CRT Readout • Cursor Meas • DC Offset • Alt Magnifier • Compact Size 	 <p>V-1060 List \$1595 \$1,325</p> <ul style="list-style-type: none"> • DC to 100MHz • Dual Channel • Delayed Sweep • CRT Readout • Sweep Time • Autoranging • Trigger Lock • 2mV Sensitivity 																																																
<table border="1"> <thead> <tr> <th>Model</th> <th>Frequency</th> <th>Features</th> <th>List</th> <th>Price</th> <th>Save</th> </tr> </thead> <tbody> <tr> <td>V-223</td> <td>20MHz</td> <td>D.T., 1mV sens, Delayed Sweep, DC Offset, Vert Mode Trigger</td> <td>\$770</td> <td>\$695</td> <td>\$75</td> </tr> <tr> <td>V-422</td> <td>40MHz</td> <td>D.T., 1mV sens, DC Offset Vert Mode Trigger, All Mag</td> <td>\$875</td> <td>\$725</td> <td>\$150</td> </tr> <tr> <td>V-423</td> <td>40MHz</td> <td>D.T., 1mV sens, Delayed Sweep, DC Offset, All Mag</td> <td>\$955</td> <td>\$825</td> <td>\$130</td> </tr> <tr> <td>V-660</td> <td>60MHz</td> <td>D.T., 2mV sens, Delayed Sweep, CRT Readout</td> <td>\$1,195</td> <td>\$1,025</td> <td>\$170</td> </tr> <tr> <td>V-1065</td> <td>100MHz</td> <td>D.T., 2mV sens, Delayed Sweep, CRT Readout, Cursor Meas</td> <td>\$1,895</td> <td>\$1,670</td> <td>\$225</td> </tr> <tr> <td>V-1100A</td> <td>100MHz</td> <td>Q.T., 1mV sens, Delayed Sweep, CRT Readout, DVM, Counter</td> <td>\$2,295</td> <td>\$2,045</td> <td>\$250</td> </tr> <tr> <td>V-1150</td> <td>150MHz</td> <td>Q.T., 1mV sens, Delayed Sweep, Cursor Meas, DVM, Counter</td> <td>\$3,100</td> <td>\$2,565</td> <td>\$535</td> </tr> </tbody> </table>			Model	Frequency	Features	List	Price	Save	V-223	20MHz	D.T., 1mV sens, Delayed Sweep, DC Offset, Vert Mode Trigger	\$770	\$695	\$75	V-422	40MHz	D.T., 1mV sens, DC Offset Vert Mode Trigger, All Mag	\$875	\$725	\$150	V-423	40MHz	D.T., 1mV sens, Delayed Sweep, DC Offset, All Mag	\$955	\$825	\$130	V-660	60MHz	D.T., 2mV sens, Delayed Sweep, CRT Readout	\$1,195	\$1,025	\$170	V-1065	100MHz	D.T., 2mV sens, Delayed Sweep, CRT Readout, Cursor Meas	\$1,895	\$1,670	\$225	V-1100A	100MHz	Q.T., 1mV sens, Delayed Sweep, CRT Readout, DVM, Counter	\$2,295	\$2,045	\$250	V-1150	150MHz	Q.T., 1mV sens, Delayed Sweep, Cursor Meas, DVM, Counter	\$3,100	\$2,565	\$535
Model	Frequency	Features	List	Price	Save																																													
V-223	20MHz	D.T., 1mV sens, Delayed Sweep, DC Offset, Vert Mode Trigger	\$770	\$695	\$75																																													
V-422	40MHz	D.T., 1mV sens, DC Offset Vert Mode Trigger, All Mag	\$875	\$725	\$150																																													
V-423	40MHz	D.T., 1mV sens, Delayed Sweep, DC Offset, All Mag	\$955	\$825	\$130																																													
V-660	60MHz	D.T., 2mV sens, Delayed Sweep, CRT Readout	\$1,195	\$1,025	\$170																																													
V-1065	100MHz	D.T., 2mV sens, Delayed Sweep, CRT Readout, Cursor Meas	\$1,895	\$1,670	\$225																																													
V-1100A	100MHz	Q.T., 1mV sens, Delayed Sweep, CRT Readout, DVM, Counter	\$2,295	\$2,045	\$250																																													
V-1150	150MHz	Q.T., 1mV sens, Delayed Sweep, Cursor Meas, DVM, Counter	\$3,100	\$2,565	\$535																																													

ELENCO PRODUCTS AT DISCOUNT PRICES

 <p>20MHz Dual Trace Oscilloscope \$359 MO-1251</p> <ul style="list-style-type: none"> • 6" CRT • Built in component tester • TV Sync • X-Y Operation 	<p>SCOPE PROBES</p> <p>P-1 65MHz, 1x, 10x \$19.95</p> <p>P-2 100MHz, 1x, 10x \$23.95</p> <p>Fits all scopes with BNC connector</p>	 <p>35MHz Dual Trace Good to 50MHz \$495 MO-1252</p> <ul style="list-style-type: none"> • High luminance 6" CRT • 1mV Sensitivity • 6KV Acceleration Voltage • 10ns Rise Time • X-Y Operation • Z Axis • Delayed Triggering Sweep
<p>Top quality scopes at a very reasonable price. Contains all desired features. Two 1x, 10x probes, diagrams and manual. Two year guarantee.</p>		

<p>Autoranging DMM M-5000 \$45</p> <p>9 Functions Memory and Data hold 1/2% basic acc 3 1/2 digit LCD</p>	<p>True RMS 4 1/2 Digit Multimeter M-7000 \$135</p> <p>0.5% DC Accuracy 1% Resistance with Freq. Counter and deluxe case</p>	<p>Multimeter with Capacitance and Transistor Tester CM-1500 \$55</p> <p>Reads Volts, Ohms, Current, Capacitors, Transistors and Diodes with case</p>	<p>Digital Capacitance Meter CM-1550 \$58.95</p> <p>9 Ranges .1pf-20,000ufd .5% basic acc Zero control with case</p>	<p>Digital LCR Meter LC-1801 \$125</p> <p>Measures Coils 1uH-200H Caps. .1pf-200uf Res. .01-20M</p>
<p>AC Clamp-On Current Adapter ST-265 \$22</p> <p>0-1000A AC Works with most DMM</p>	<p>Bench DMMS M-3500 3 1/2 digit 1% accy</p> <p>M-4500 4 1/2 digit .05% accy</p>	<p>SOLDERING STATION TEMPERATURE CONTROLLED SL-30 \$135</p> <p>Digital display Temp range: 300F-900F Grounded tip Overheat prot</p>	<p>Solderless Breadboards</p> <p>9430 1,100 pins \$15 9434 9434 2,170 pins \$25 9436 2,860 pins \$35 All have color coded posts</p> <p>9436 SHOWN</p>	<p>Low Cost Multimeter M-1600 \$25</p> <p>3 1/2 digit LCD 1% DC Accy 10A Scale Auto zero /polarity</p>
<p>Wide Band Signal Generators SG-9000 \$129</p> <p>RF Freq 100K-450MHz AM Modulation of 1KHz Variable RF output</p> <p>SG-9500 with Digital Display and 150MHz built-in Freq Ctr \$249</p>	<p>3 1/2 Digit Probe Type DMM M-1900 \$39</p> <p>Convenient one hand operation with batteries and case Measures DCV, ACV, Ohms Audible continuity check, Data hold</p>	<p>Function Generator Blox #9600 \$28.95</p> <p>Provides sine, tri, squ wave From 1Hz to 1MHz AM or FM capability</p>	<p>Decade Blox 9610 or 9620 \$18.95</p> <p>#9610 Resistor Blox 47 ohm to 1M & 100K pot #9620 Capacitor Blox 47pf to 10MFD</p>	
<p>Digital Triple Power Supply XP-765 \$249</p> <p>0-20V at 1A 0-20V at 1A 5V at 5A</p> <p>Fully Regulated, Short circuit protected with 2 Limit Cont., 3 Separate supplies XP-660 with Analog Meters \$175</p>	<p>Quad Power Supply XP-580 \$59.95</p> <p>2-20V at 2A 12V at 1A 5V at 3A -5V at 5A</p> <p>Fully regulated and short circuit protected XP-575 without meters \$39.95</p>	<p>10MHz XT 100% IBM® Compatible 5 Year Warranty \$595 MODEL PC-1000</p> <ul style="list-style-type: none"> • 510MHz Motherboard • 8 Expansion Slots • Math Compressor Slots • 360K Floppy Drive • AT Style Keyboard • 150W Power Supply • 256K RAM Expandable to 640K • Monochrome Monitor • Monographic Video Card • Parallel Printer Port <p>FREE spreadsheet and word processor 3.3MS DOS and GW Basic add \$75</p>		
<p>Four-Function Frequency Counters F-1000 1.2GH \$259</p> <p>F-100 120MH \$179</p> <p>Frequency, Period, Totalize, Self Check with High Stabilized Crystal Oven Oscillator, 8 digit LED display</p>	<p>GF-8016 Function Generator with Freq. Counter \$239</p> <p>Sine, Square, Triangle Pulse, Ramp, 2 to 2MHz Freq Counter .1 - 10MHz</p> <p>GF-8015 without Freq. Meter \$179</p>	<p>WE WILL NOT BE UNDERSOLD! UPS Shipping: US 5% (\$10 Max) IL Res., 7% Tax</p> <p>C & S SALES INC. 1245 Rosewood, Deerfield, IL 60015 (800) 292-7711 (312) 541-0710</p> <p>15 Day Money Back Guarantee 2 Year Warranty WRITE FOR FREE CATALOG</p>		

CIRCLE 136 ON READER SERVICE CARD



The 1670 Stand-Alone Adapter from LRA Enterprises. While it was originally designed to allow a Commodore 64/128 owner to use the popular 1670 modem with the Amiga, the adapter allows the 1670 to be used with any computer that supports the standard RS-232 serial port. (Photo courtesy LRA Enterprises)

like and use the program, you're expected to send the author his requested fee. This concept has worked surprisingly well for IBM PC productivity software, and some amateur programs are successfully distributed this way.

There are problems with using shareware (and free public domain) programs downloaded from public BBSs, however. Some re-

leases never seem to get to your favorite board, trojan horses or "computer viruses" have been hacked into the programs, files have been corrupted from many phone-line transfers, and so on.

Recognizing these problems, the Shareware Distribution Network was started in Connecticut with a group of BBS operators who

organized to provide BBS sysops (system operators), users, and shareware authors a timely, safe, and tightly controlled nationwide distribution service.

Under the SDN concept, a participating IBM PC shareware author contacts SDN to let them know he has a program for release. The program comes directly from the author to SDN. They then send it to participating distribution points using special techniques to ensure file integrity. The distribution points can put the software up on their own BBSs or further distribute the software in an unbroken chain.

There is a small fee to the shareware author, but there is no fee to the ultimate user. All you need to do is check to see if your favorite bulletin board has a special SDN file and message base area, then download SDN files as you would other files.

If you're a SYSOP and want to participate and receive SDN files, contact the System Coordinator, Charles R. Smith, Jr.; his data line is 203-628-4644, or FidoNet 1:141/880. If you're a shareware author, contact Sysop Ray Kaliss; his data-line is 203-634-0370, or FidoNet 1:141:840. The SDN mailing address is: Ray Kaliss, The SDN Project, 13 Douglas Drive, Meriden, CT 06450.

Wrapping It Up

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

Overheard: Seems that something not worth doing just isn't worth doing well.

73, Karl, W8FX

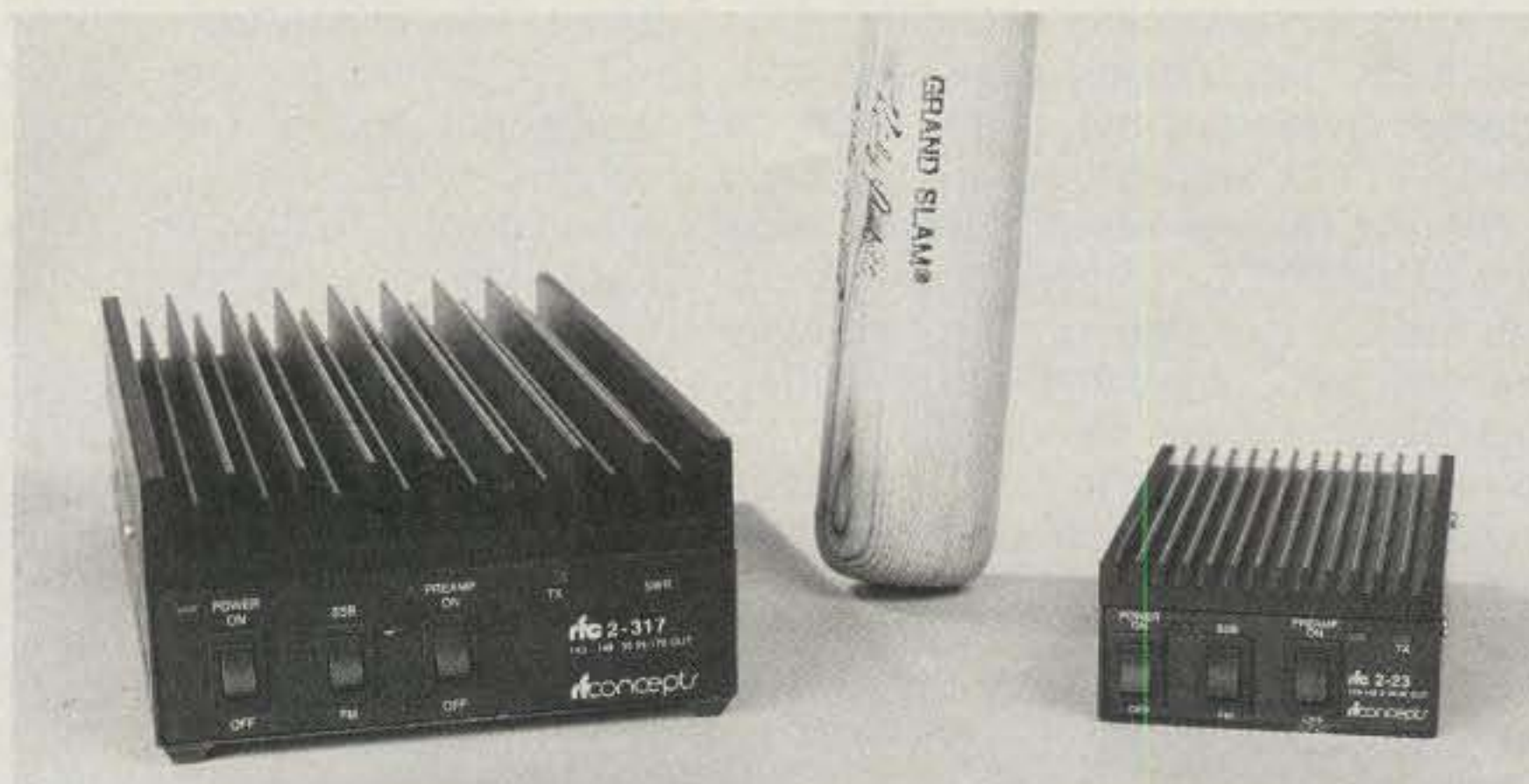
Speak Softly and Carry A Great Amp...

You have to be heard to communicate. When it comes to the best amplifiers for VHF and UHF communication, RF Concepts goes farther to give you the best standards, highest quality and latest technology.

Features like GaAsFET receiver pre-amp and high SWR shutdown. Inputs from 200 mwatts to 50 watts, outputs from 30 to 170 watts. **We back every amp with a 5-year warranty on parts and labor, 6 months on final transistors.** Ask your dealer, or call us for information on any one of our 12 great VHF/UHF amps.



Inquiries: 2000 Humbolt Street - Reno, Nevada - 89509
(702) 827-0133
Div. of Kantronics
Factory: 1202 E. 23rd, Lawrence, Kansas 66046
(913) 842-7745



RF Concepts has rugged VHF/UHF amplifiers for 144, 220 and 440 MHz. operation. Twelve models to choose from!

Please send all reader inquiries directly.

NEWS OF COMMUNICATION AROUND THE WORLD

New DXCC Countries

The life blood of the DXCC program is new "countries" on the DXCC list. Without a new country or two every year, the program quickly stagnates, as active DXers work all the available countries and wait around while courageous (and well-funded) DXpeditioners attempt to activate those countries which haven't been on the air for many years.

Putting a country such as Albania, Burma, or Bouvet on the air can take years of patient negotiations and effort. It is a rare year in which more than one of the Top Ten Most Wanted Countries are on the air. (Fortunately for DXers, 1989 is such a year, with Vietnam and Yemen both available.) But in the absence of these rare countries coming on the air, many of the DXers on the top of the Honor Roll find little enthusiasm for chasing DX, as they have already "worked 'em all."

With nearly 3000 DXers on the Honor Roll, the problem becomes acute. The activation of Peter I Island showed what happens when the DXCC countries list remains unchanged for some time: many of the DXers trying to work Peter I were unfamiliar with their new, computerized rigs and had great difficulty working the New One.

A small number of workable new countries helps keep Honor Rollers and other DXers on their toes and actively participating in the world of DX.

Rule 2(a)

Fortunately for the health of the DXCC program, the DX Advisory Committee changed the DXCC country criteria to permit the addition of several new countries by modifying rule 2(a). The new rule encourages new country applications for islands that never would have been considered under the old rules, such as Ocean Is. T33, and Rotuma 3D.

The old Rule 2, which governs additions to the DXCC country list for islands, was subject to differing interpretations. The most notorious example of this difference of opinion was the long-fought battle between the Alaska DX Association and the ARRL Awards Committee at ARRL Headquarters.

To avoid future controversy and to simplify the rules, Rule 2 was completely rewritten to more closely coincide with the



This is DL1RBW, who holds a Single-Band WAZ for 20 meters. First licensed in 1983 for VHF activity, DL1RBW acquired an HF license seven months later and headed for the DX bands. She holds the Hong Kong Fire Cracker Award at the Nine Dragon level and the DXCC Golden Jubilee Award, among others. DL1RBW works as a secretary, the OM is DL4RGB, and there is one son in the family. She works mostly SSB. Zone 26 was the last and obviously the most difficult zone to acquire for the WAZ Award. The family station has a Yaesu FT-901D with a 4-element 4-band beam flying. If you take a look at the operating spot, it is obvious that there is a bit more than a Yaesu 901D available. That desk is designed for DX-ing. Listen for DL1RBW in the pile-ups.

ARRL Headquarters' interpretation of the rule in recent years. While this met the goal of simplifying and clarifying the rule, it had two probably unintentional effects.

First, several present DXCC countries would not qualify today for separate country status under the changed Rule 2. A half-dozen existing countries such as Fernando de Noronha PY0F, Willis VK9W, Auckland-Campbell ZL9, Mellish Reef VK9M, Chatham ZL7, and St. Peter and Paul Rocks PY0S probably would not be added to the DXCC countries list under the new Rule 2. (They won't be deleted simply because they might not qualify today; the DX Advisory Committee also added deletion criteria to the formal rules, and changes in the DXCC country criteria is not a reason for deletion of an existing country.)

The new Rule 2 had another effect: the

Chod Harris, VP2ML

Since he was first licensed more than 20 years ago, Chod Harris, VP2ML, has worked more than 100 countries from a dozen locations around the world on 4 continents. He holds several world contest records and is a frequent traveller to exotic spots around the globe. He has made more than 300,000 QSOs and sent out more than 100,000 QSL cards.

Chod has been president and advisor of school amateur radio clubs, including W2PU at Princeton University, WA1PHF, and W1BAF. He has been First Regional Net manager for the National Traffic System and one of the pioneers on 220 FM.

While he worked at ARRL headquarters, Chod organized the Club and Training program that recruited almost 100,000 amateurs to the ranks during the late 1970s. During that time Chod authored all or parts of seven amateur radio books, including *Tune in the World with Ham Radio*, *Getting to Know Oscar from the Ground Up*, *The ARRL Code Kit*, and chapters in many other League publications, including the satellite operating section of *The ARRL Handbook*. His articles on a variety of amateur radio subjects have appeared in almost a dozen special- and general-interest magazines around the country. *The ARRL Code Kit* was picked as one of the best children's books of the year by *Scientific American* magazine.

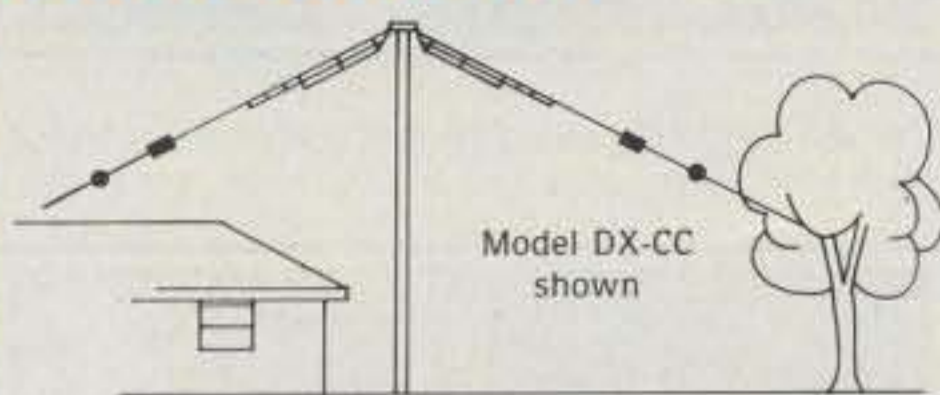
Chod worked DXCC for the first time at the bottom of the last sunspot cycle, running 100 watts into a vertical antenna. All his contacts were on 10 and 15 meters. Since that time he has worked more than 100 countries from numerous other places on the globe during his frequent travels. His operations have included contest operations from Bermuda VP9, Senegal as 6W8MM, The Gambia as C5AAQ, Sierra Leone as an operator at 9L1CA, Galapagos Island HC8, Easter Island CE0A, Christmas Island in the Pacific as T32AW, Chile, Argentina, Ecuador, and many places in the Caribbean, including Cayman Islands as VP5CHX, Barbados as 8P6LJ, St. Vincent Island as VP2SE, and, of course, Montserrat as VP2ML.

As VP2ML, Chod has set world records in the IARU RadioSport single-sideband division, the Worked All Europe single-sideband contest, and the ARRL DX Contest, in 1979, when the League sponsored a worldwide DX contest.

Although he now spends most of his time in California publishing the weekly *The DX Bulletin* newsletter, Chod maintains his home in Montserrat and rents it out to DXpeditioners who want a taste of the fine propagation from *The Last Resort*.

Alpha Delta problem solvers...

Limited Space High Performance Antennas...



- STAINLESS STEEL HARDWARE
- FULLY ASSEMBLED
- SEVERE WEATHER RATED COMPONENTS

- No-trap design. Unlike trap antennas, there are no capacitors to break down under high RF voltages, and a tuner may be safely used for multi-band operation if desired.
- Direct 50 ohm feed. Tuners usually not required when operating in resonant bands.
- Full power operation.
- Uses "ISO-RES" inductors.
- 12 ga. insulated solid copper wire. (Smaller 14 ga. wire not used in any Alpha Delta antenna)

MODEL DX-A

160-80-40 Meter Quarter Wave Twin Sloper —

- The premier low frequency DX antenna.
- Combines the tremendous DX firepower of the quarter wave sloper with the wide bandwidth of the half wave dipole.
- One leg is 67', the other 55'. Installs like an inverted-V. Ground return through tower or down-lead \$49.95 each

MODEL DX-CC

"No-Trap" 80-40-20-15-10 Meter Dipole —

- Can be used as inverted-V.
- Only 82' overall length \$89.95 each

MODEL DX-DD

"No-Trap" 80-40 Meter Dipole —

- Can be used as inverted-V.
- Only 82' overall length \$69.95 each

MODEL DX-EE

"No-Trap" 40-20-15-10 Meter Dipole (30-17-12 meters with tuner)

- Can be used as inverted-V.
- Only 40' overall length \$84.95 each

Transi-Trap® Surge Protectors



A proven record of effective lightning, EMP and static protection for your valuable communications equipments.

- **Quality.** Built of the finest materials, from the heavy cast aluminum housing to the brass constant-impedance element and marine grade brass ground hardware. Only Amphenol connectors are used for best frequency range and VSWR performance. The ceramic gas tube Arc-Plug® cartridge is protected by a unique custom-designed nylon shock absorber for best protection.
- **Reliability.** Original Transi-Trap units are still in daily use after providing years of continuous protection — from mountain top communications sites to ocean-going ships' radio rooms. The Arc-Plug cartridge discharges thousands of surges without needing replacement. If a unit is "hit" with a charge beyond its rating, it is designed to fail "short", giving an instant indication that replacement is needed. Other brands fail "open", leaving your equipment unprotected without you even knowing it.
- **Performance.** Standard "off-the-shelf" Transi-Trap units are used by the U.S. Military, many government agencies and several Western European countries. The design is based on the U.S. NCS TIB85-10 Bulletin covering lightning and EMP protection.

Transi-Trap Protectors are designed for 50 ohms, include a replaceable Arc-Plug cartridge and have UHF connectors (also available with N-type connectors for use through 1 GHz). The low power models are most sensitive, best for RCVRS and XCVRS.

- MODEL R-T,
200 W through 500 MHz \$32.95
- MODEL HV,
2 kW through 500 MHz \$35.95
- MODEL LT, "T-type",
200 W through 30 MHz \$22.95

Model DELTA-4 Lightning Surge Protected 4-Position RF Coax Switch



also available with N-type connectors

NEW

Easy access to Arc-Plug® cartridge through front panel allows permanent switch mounting to any surface.

- Exclusive center "off" (ground) position internally disconnects and grounds all antenna circuits for maximum protection when operator is away from the station — **an Alpha Delta first!**
- Incorporates the famous replaceable Arc-Plug® cartridge for continuous protection of the active antenna circuit. Unused antenna circuits are automatically grounded — **an Alpha Delta first!**
- The Model DELTA-4 Switch features a custom designed cast housing with constant impedance micro-strip cavity construction for outstanding performance through UHF. No lossy wafer switches are used.
- Positive detent roller bearing switch drive tells you which position you're in . . . without guessing . . . without looking.
- DELTA-4 handles full legal power.
- Designed and produced in the U.S.A. by Alpha Delta.

- MODEL DELTA-4
(UHF connectors, 500 MHz) . . . \$74.95
- MODEL DELTA-4/N (N-type
connectors, 1.3 GHz) \$89.95

See Data Sheet for surge limitations.

Available From Your Alpha Delta Dealer Or Add \$4.00 For Direct Orders (USA Orders Only-Exports Quoted)

ALPHA DELTA COMMUNICATIONS, INC.



P.O. Box 571, Centerville, Ohio 45459 • (513) 435-4772

current solutions to current problems

The WPX Program Mixed

1390 FD1LMJ 1392 I7UNX
1391 DL6UO 1393 DL6DBF

SSB

2054 IK0ADY 2057 N6JV
2055 JR3TOE 2058 EA3BMT
2056 HP8BSZ 2059 EA5KB

CW

2570 YV5BHI 2572 HG9R
2571 EA7BL

WPNX

245 KA2TDC

Endorsements

Mixed: 450 W2HG, VE2DWH, FD1LMJ, AA9F, DL6UQ, I7UNX. 500 W2HG, FD1LMJ, AA9F, DL6UQ, I6DQE, I7UNX, IK2ILH. 550 W2HG, FD1LMJ, AA9F, DL6UQ, I6DQE, I7UNX, IK2ILH. 600 W2HG, AA9F, I6DQE, I7UNX, IK2ILH. 650 W2HG, AA9F, I6DQE, I7UNX. 700 W2HG, AA9F, I6DQE, K9EC, I7UNX. 750 W2HG, AA9F, I6DQE, KF4FP. 800 W2HG, I6DQE. 850 W2HG, I6DQE. 900 W2HG, I6DQE. 950 W2HG. 1000 W2HG. 1050 W2HG, JA7FFN, KS3F. 1850 VE7WJ. 1900 VE7WJ. 2700 W4BQY. 2750 W4BQY.

SSB: 350 N6JV, EA3BMT, EA5KB. 400 I4ZXO, W9LCR, N6JV, EA5KB, EA3BMT. 450 I4ZXO, N6JV, EA3BMT, EA5KB. 500 N6JV, NADIT, EA3BMT, EA5KB. 550 N6JV, N4DIT, EA5KB. 600 IK2AEQ, N6JV, EA5KB. 700 KF4FP. 750 EA5FCO. 900 DL9JH. 950 DL9JH. 1000 DL9JH. 1050 DL9JH. 1100 DL9JH. 1150 DL9JH. 1200 DL9JH. 1250 DL9JH, IK5ACO. 1300 DL9JH. 1350 DL9JH. 1400 DL9JH. 1450 DL9JH. 1500 DL9JH, W4UW. 1550 DL9JH. 1600 DL9JH. 1650 DL9JH. 1700 DL9JH. 1750 DL9JH. 1800 DL9JH. 1850 DL9JH. 1900 DL9JH. 1950 DL9JH. 2000 W4BQY.

CW: 350 W2HG, YV5BHI, HG9R. 400 W2HG, YV5BHI, HG9R. 450 W2HG, YV5BHI, HG9R. 500 W2HG, YV5BHI, HG9R. 550 JA2LGM, W2HG, NA1G, HG9R. 600 W2HG, NA1G, EA3DBO, HG9R. 650 W2HG, NA1G. 700 NA1G. 900 OZ5UR. 1150 VE1ACK. 1200 VE1ACK. 1500 IT9VDQ. 2100 W4BQY.

15 Meters: JR3TOE, OZ5UR, OZ4RS

20 Meters: EA3BMT

40 Meters: I2TZK, YU7DR

80 Meters: K9EC, YU7DR

160 Meters: YU7DR

Asia: JR3TOE

Africa: IK5ACO, W2HG

No. America: K3ZPG, W8EAO

So. America: IK5ACO, W2HG, DL9JI

Europe: K3ZPG

Oceania: IK5ACO, DL9JI

Award of Excellence: N6JV, W2HG, ONL-4003

Award of Excellence with 160 Meter Endorsement: DL3RK, N6JV, ONL-4003

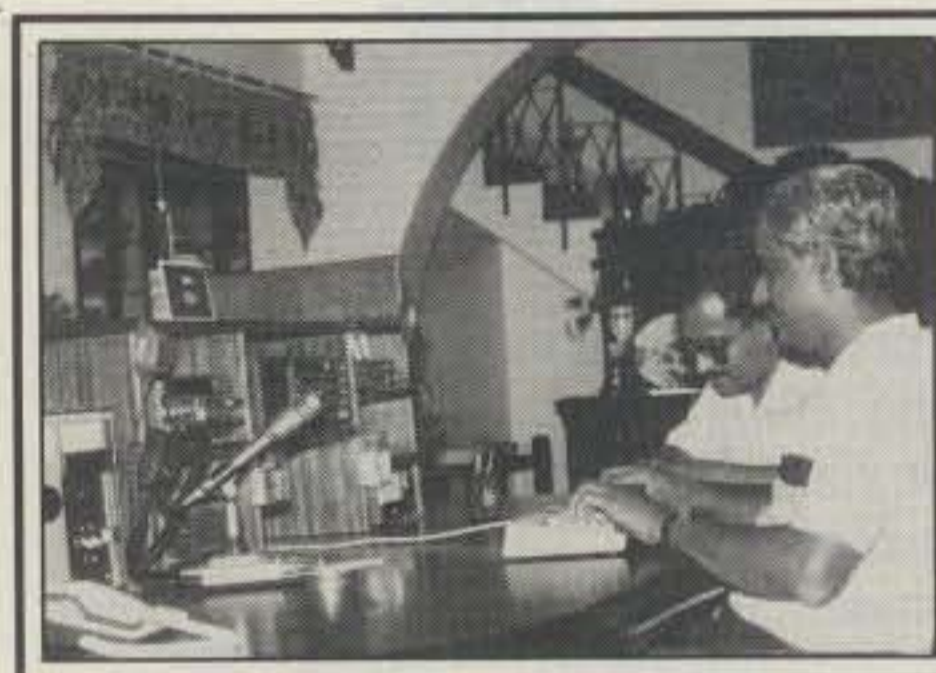
Award of Excellence Plaque Holders: K9BG, W1BWS, G4BUE, N3ED, LU3YLW4, NN4Q, KA3A, VE7WJ, VE7IG, N2AC, W9NUF, N4NX, SM0DJZ, DK5AD, WD9IIC, W3ARK, LA7JO, VK4SS, K6JG, N4MM, I8YRK, W4CRW, SM0AJU, K5UR, K6XP, N5TV, K2VV, VE3XN, W6OUL, DL1MD, DJ7CX, DL3RK, WB4SIJ, SM6DHU, N4KE, I2UIY, DL7AA, ON4QX, WA8YTM, YU2DX, OK3EA, I4EAT, OK1MP, N4NO, ZL3GQ, VK9NS, DE0DXM, DK4SY, UR2**, AB90, FM5WD, I2DMK, W4BQY, I0JX, SM6CST, VE1NG, I1JQJ, WA1JMP, PY2DBU, HI8LC, KA5W, K0JN, W4VQ, KF2O, K3UA, HA8UB, W8CNL, K7LJ, W1JR, F9RM, W5UR, WB8ZRL, SM3EVR, CT1FL, K2SHZ, UP1BZZ, W8RSW, WA4QMQ, EA7OH, K2POF, DJ4XA, IT9TQH, W8ILC, K2POA, N6JV, W2HG, ONL-4003, VE7DP.

Award of Excellence Plaque Holders with 160 Meter Endorsement: W6OUL, W4BQY, W5UR, N4NO, W8RSW, N4KE, I2UIY, W8ILC, W1BWS, NN4Q, G4GUE, LU3YLW4, I4EAT, VE7WJ, W9NUF, N4NX, VK9NS, DE0DXM, VE7IG, K9BG, AB90, FM5WD, SM0DJZ, DK5AD, SM6CST, I1JQJ, W3ARK, HI8LC, KA5W, UR2**, VE3XN, K6XP, LA7JO, W4VQ, K6JG, K3UA, HA8UB, W4CRW, N4MM, K7LJ, SM0AJU, KF2O, SM3EVR, K5UR, UP1BZZ, OK1MP, N5TV, K2POF, W8CNL, DJ4XA, IT9TQH, DL9RK, N6JV, ONL-4003, W1JR.

Complete rules and application forms may be obtained by sending a business-size, self-addressed, stamped envelope (foreign stations send extra postage if air-mail desired) to CQ WPX Awards, P.O. Box 1351, Torrance, CA 90505-0351 U.S.A.



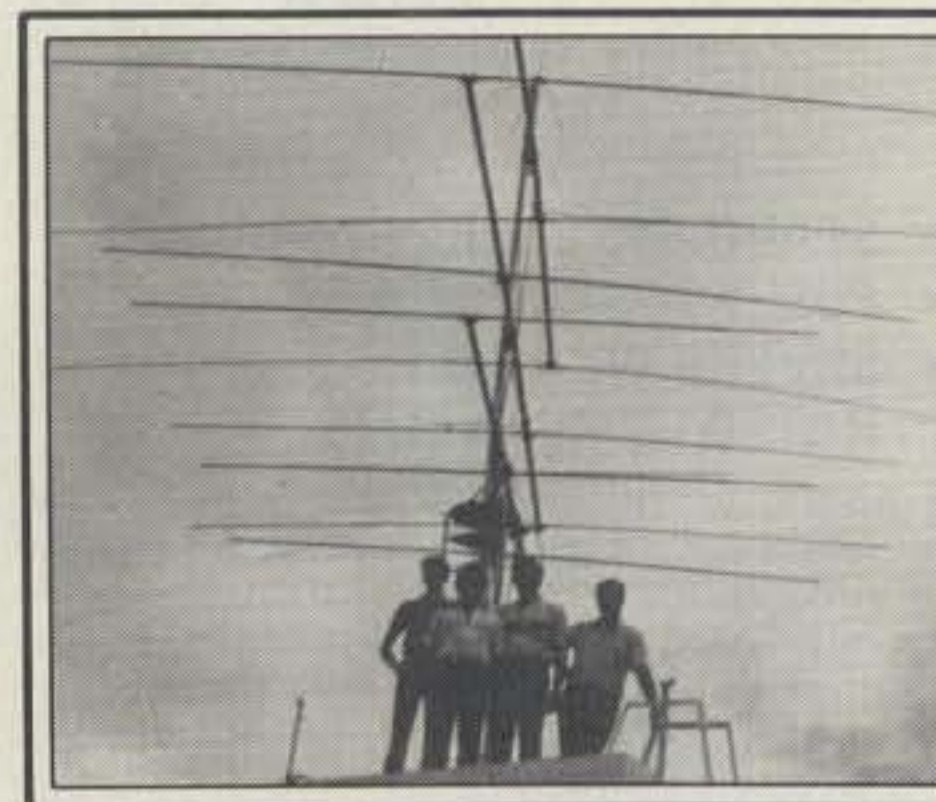
Participants in the 1988 CQ RTTY Contest, this group is shown here prior to the start of the contest. Left to right are Rom, VU2RUM; Lucky, VU2LBW; J. Srinivasan, VU2JX; and Nat, VU2NTA. They operated AT0J from VU2JX's shack.



In the wee hours at AT0J with VU2JX at the keys and VU2NTA logging.



The AT0J gang on day two of the contest.



The AT0J team up on VU2JX's roof. Murphy visited them and they had to change the rotator—three monobanders for 10, 15, and 20. Can you make out the inverted Vees for 40/80?

potential establishment of up to a dozen new countries in the Pacific! In a nutshell, islands that are more than 225 miles offshore from an independent country may well qualify as new additions to the DXCC list. Under the previous rule most of these off-shore islands had to be 500 miles to qualify. The new rule has touched off an avalanche of new country applications. In April there were no fewer than six such applications on file with the DXAC, all but one based on the new Rule 2(a). And there are many more potential "new ones" still under wraps.

Any enterprising DXer with a good set of maps can find other potential new countries under the new rule. First, locate countries that are DXCC entities by reason of government, by belonging to the United Nations, for example. Then find off-shore islands that are more than 225 miles away from the "parent" DXCC country. Some islands that deserve careful attention are Chesterfield Island off New Caledonia, Ashmore Island off Australia, and Minerva Reef off Tonga. How many more can you find?

Politics

Changes in the DXCC rules don't happen often enough to provide a steady flow of New Ones for the active DXer. Fortunately, the world political situation is suf-

ficiently fluid so that new DXCC countries can crop up at any time. Here are a few examples of potential New Ones.

Walvis Bay. On April 1, 1989 Namibia (formerly South West Africa) officially became independent of South Africa. It will be some time before the new government can actually assume control and begin acting independently from South Africa, but soon Namibia will apply for membership in the UN, ask the International Telecommunications Union (ITU) for its own prefix, and take over international relations. When it does, the enclave of Walvis Bay, over which South Africa is maintaining sovereignty, will be eligible for new country status. Walvis Bay is more than 300 miles away from South Africa, and thus will qualify under Rule 3: separation by another DXCC country. At present, contacts with stations in Walvis Bay don't count for DXCC at all, pending clarification of the independent status of Namibia.

North Korea. There is no question that this country is independent of South Korea. It even has an ITU-assigned prefix: P5. All the Democratic People's Republic of Korea (the official name of North Korea) needs to be added to the DXCC country list is a valid, documented operation. The North Koreans are active in international fox-hunting competitions; it can't be long before it is added to the DXCC list.

The WAZ Program

10 Meter Phone

327 I0WDX

15 Meter Phone

270 IK4ALM 272 K0JZM
271 I0WDX 273 KC8EU

20 Meter Phone

731 KC5ZA 734 EA6WV
732 I0OOZ 735 KI4TE
733 JR8KHA

80 Meter Phone

49 I0WDX

10 Meter CW

64 K3UA

15 Meter CW

143 NY2E 145 NQ7M
144 W1GL

20 Meter CW

322 WA1FCN 323 WA2UKA

40 Meter CW

99 K4PDV 100 EA7OH

All Band WAZ SSB

3309	WA4ACL	3318	DL7ABK
3310	GM0EGI	3319	HB9CZR
3311	JA8UBH	3320	KM7E
3312	K9WWT	3321	EA3CZM
3313	JA6AKV	3322	EI8AR
3314	A15P/PA	3323	DA1ZE
3315	I7VEZ	3324	HK3NTI
3316	KY7U	3325	DJ3EJ
3317	JA4JIF		

Phone/CW

6497	WB8SDC	6510	JA6BZA
6498	NZ0R	6511	W8XD
6499	W8QBY	6512	KX1T
6500	KZ3H	6513	WG5G
6501	IK2FMI	6514	JA7EDZ
6502	J13AUD	6515	K7EFB
6503	K2VSP	6516	WA5VGI
6504	NC3C	6517	OK3ZWV
6505	JA6RHH	6518	DL8HAZ
6506	WV6N	6519	DJ3OZ
6507	SP5ILO	6520	DL5OAI
6508	K8BL	6521	K7VAY
6509	SM4RBS		

All Phone

593 HK6BER 594 WB2PTH

Applications and reprints of the latest rules may be obtained by sending a self-addressed stamped envelope (65 cents) size 4 1/2 x 9 1/2 to the WAZ Manager, 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.

Palestine. For many years there has been a movement to form an independent country in the Middle East. Recently these efforts are gaining legitimacy. Such a country may attract international recognition from other Arab countries, thanks to outside political pressure to resolve the long-standing disputes in the region. The situation would be similar to Western Sahara, which was recently added to the DXCC list.

Belgium. Three new DXCC countries in the middle of Europe? That's a possibility, thanks to a recent constitutional change

in Belgium. The country decided to divide itself into a three-part federal state within 10 years: Flanders, Wallonia, and Brussels. The regions will have power over their communications. If the regions apply for separate ITU prefixes, or otherwise go their separate ways in amateur radio, they might count as three new DXCC countries.

Caribbean Islands. Several of the DXCC countries in the Caribbean are composed of more than one island. In at least a few cases there is some animosity between the islands, such as between Antigua and Barbuda. Should Barbuda split off from Antigua, it would easily qualify as a new DXCC country.

This survey of potential new DXCC countries is by no means complete. There are many other possibilities waiting for an enterprising DXer to submit an application to the DX Advisory Committee for separate DXCC status, keeping the DXCC program alive and well.

The Art of Listening

The flood of new DXCC countries has greatly increased the activity on the bands, as all of the 3000 or so Honor Rollers, and those within shooting distance of the Honor Roll, are under intense pressure to maintain their standing by working the "new one." Unfortunately, some DXers have forgotten one of the most basic tenets of DXing in this quest to get in the log: the important of *listening*.

It has often been said that DXing is 90% listening and only 10% transmit-

5 Band WAZ

As of April 1, 1989, 218 stations have attained the 200 zone level.

New recipients of 5 Band WAZ with all 200 Zones worked:

SV1ADG	JT1BG
JA4VUQ	YT3AA
PY1APS	

The top 14 contenders for 5 Band WAZ are:

1. N4WW, 199	8. HG19HB, 199
2. SP9PT, 199	9. K2UU, 199
3. K6YRA, 199	10. HA8XX, 198
4. K8EJ, 199	11. K7UR, 198
5. K9GX, 199	12. KB0U, 198
6. AA4V, 199	13. K6SIK, 198
7. SP6JCY, 199	14. VE8DX, 198

544 Stations have attained the 150 Zone level, as of April 1, 1989.

Applications and reprints of the latest rules may be obtained by sending a self-addressed stamped envelope (65 cents) size 4 1/2 x 9 1/2 to the WAZ Manager, Leo Haijsman, 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.

VHF UHF Tropo OSCAR

(the easy way)

TRANSVERTERS

6 Meter	2M IF	\$280.00
2 Meter	10 M IF	280.00
220 MHz	10 M IF	310.00
435 MHz	10 M IF	399.00

RECEIVE CONVERTERS

6 Meter	10 M IF	\$ 75.00
2 Meter	10 M IF	75.00
2 M (HP)	10 M IF	95.00
220 MHz	10 M IF	95.00
435 MHz	10 M IF	110.00

GaAs FET PRE-AMPS

6 Meter	T/R Switch	\$ 75.00
2 Meter	T/R Switch	75.00
220 MHz	T/R Switch	85.00
137 MHz	(weather sat)	75.00

ANTENNAS

137 MHz	5XY-137	\$ 90.00
	Circ. Pol. Harness	20.00
2 Meter	10XY-2M	85.00
	Circ. Pol. Harness	20.00
435 MHz	70-MBM28	65.00
	70-MBM48	95.00
	70-MBM88	135.00
900 MHz	DY20-900	94.00
1268 MHz	1268-LY	65.00
1296 MHz	1296-LY	65.00

Prices Subject to Change Without Prior Notice

ALL ANTENNAS INCLUDE 50 ohms Balun
Send 75¢ (3 stamps) for detailed specs on all
VHF & UHF Products



Spectrum International, Inc.
Post Office Box 1084Q
Concord, MA 01742 USA
(508) 263-2145

CIRCLE 144 ON READER SERVICE CARD

CABLE-TV BOXES

Descramblers • Converters

FREE CATALOG

TRANS-WORLD CABLE CO.
12062 Southwest 117th Ct., Suite 126
Miami, Florida 33186
800-442-9333

antennex

"The Magazine For Antenna Experimenters"

DO YOU -

- *Have a lousy mobile signal on all bands?
- *Need an inexpensive beam for 10 meters?
- *Unsure about using vert vs horiz antenna?
- *Need a low noise antenna for 160 meters?
- *Want to design an antenna just for you?
- *Need a program for design and plotting?
- *Need to solve a unique problem?
- *Know the best antenna for hamsats, etc.?
- *Need a disguised mobile antenna?
- *Want a cheap automatic coupler system?
- *Just want to learn more about antennas?

THEN SUBSCRIBE TO - **antennex**
12 MONTHLY ISSUES is only \$11.97 for
USA and possessions. \$17.00 foreign.

antennex

P.O. Box 8995 Dept. 19
Corpus Christi, TX 78412

CIRCLE 145 ON READER SERVICE CARD



A 20 meter CW WAZ was earned by Tom Plummner, KA8JZR, of Westerville, Ohio. First licensed in 1962, Tom has antennas all over the home QTH, flying a 3-element quad, a 2-element quad, an indoor dipole, a vertical with a GP, and a Cushcraft A4, this with two elements. A DXCC with stickers well into the 200-country area is on the wall of Tom's shack. To get the Single-Band WAZ filled out, it took some searching to get the last two—YB Indonesia and VS6 Hong Kong. Married and with one child, Tom is engaged in personnel work in the Columbus, Ohio area. His current license category is Extra class. Holder of certificate #275, Tom prefers CW. Zone 24 was the last one to be nailed.

ting. But to monitor the pile-ups around the potential new countries, one might think that the ratio belongs in the other direction.

Even as 3D2CR finished saying "listening 28510-30," a handful of apparently receiverless DXers called on frequency. Each such call produced a mini-pile-up of self-appointed "policemen," who as usual caused more QRM than if they had ignored the offending stations.

Other examples of DXers using the transmit function when they should have been in the receive mode were the nearly continuous calls of "What's your call?"; "What's the QSL information?"; "Where is he listening?"; and everyone's favorite, "When are you going to be on (160, RTTY, 30 meters)?" A few minutes of constructive listening would have answered all the questions and saved a lot of wear and tear on the ionosphere.

Even more important to successful DXing is the art of listening to the receive frequency of the DX station, as well as his transmit frequency. Most DXers appeared to be calling "blind," simply picking a frequency with the announced listening range and yelling for hours—often ultimately successful, but hardly efficient.

Any rig that can operate split can listen to the DX station's listening frequency as well as the transmit frequency. Simply flip between VFOs with the A/B switch, being careful not to transmit, as this would put you on top of the DX station. Once you find the spot where the DX station is listening; you can tail-end or toss your call in

CQ DX Honor Roll

The CQ DX Honor Roll recognizes those DXers who have submitted proof of confirmation with 275 or more ACTIVE countries for the mode indicated. The ARRL DXCC Countries List is used as the country standard. Honor Roll listing is automatic when submitting application or endorsement for 275 or more countries. Deleted countries do not count and are dropped from listing as they occur. Total countries are now 319. To remain on the CQ DX Honor Roll, annual updates are required. Honor Roll updates may be made at any time, in any number. Updates indicating "no change" will be accepted to meet the annual requirement. All updates must be accompanied by an SASE for confirmation. The fee for endorsement involving the issuance of a sticker is \$1.00.

CW

W9DWQ	321	W1NG	315	K9QVB	311	YU2TW	301	K2OWE	292	K2JF	283
K2FL	320	W4BQY	315	K8PYD	310	I3OBO	301	K4CXY	292	JH1VRO	282
N4JF	320	N4KG	315	AA6AA	309	WB4RUA	300	N5DX	291	K1VHS	282
K4CEB	320	W8KPL	314	W9RY	308	W0SR	300	I8WY	291	K7ZR	280
ON4QX	320	DL3RK	314	EA2IA	308	DL6QW	300	WA4JTI	290	I5XIM	280
K2TQC	319	K9AB	314	W4OEL	307	K3FN	298	KQ9W	290	W2LZX	280
K9MM	319	DL8CM	314	N2KW	307	DJ7CX	297	IT9QDS	290	W9NUF	280
DL1PM	319	N6CW	313	SM6CTQ	306	K8LJG	297	W1WAI	290	HB9AFI	279
K6JG	318	K1MEM	313	K3UA	306	WD9IIX	296	W1WLW	289	DL1QT	277
SM6CST	317	W2FXA	312	K9IW	305	KD8V	296	W4BV	289	KA3R	276
W6PT	316	K6EC	312	AB4H	304	N8MC	295	K8NA	288	W6DN	276
K4XO	316	OK1MP	312	W6SN	304	W9WAQ	295	W6YQ	287	DJ2PJ	276
N4MN	316	SM3EVR	312	K9BWQ	304	W0HZ	295	G2FFO	287	NS7Z	276
N4PN	315	YU1HA	312	W0IZ	303	N5FW	294	WA4DAN	287	K4SE	275
DL7AA	315	N6AR	311	W7CNL	302	IT9TQH	294	W9SC	287	W3BBL	275
N6AV	315	DJ1XP	311	WA8DXA	302	NN4Q	293	N4AH	287	G3KMQ	275
K6LEB	315	W6ID	311	IT9ZGY	302	WD9IIC	292	G2GM	286	F3TH	275

SSB

K2FL	321	I8YRK	315	AB9O	310	KD8V	304	YU7KV	297	K9MNT	286
W6EUF	321	N6AR	315	WA4WTG	310	KC8YM	304	XE1OW	297	KB5RF	285
N4JF	320	I4ZSQ	315	WD8MGQ	310	I1POR	304	WA4ECA	297	I8IGS	285
W4UG	320	I8KDB	315	KU9I	310	XE1KS	303	WD9GQV	297	KF5AR	285
VE1YX	320	K9LKA	315	W6SN	310	W2LZX	303	WB3GPR	296	KD8V	284
K6WR	320	ON5KL	315	N6AHV	310	KB0U	303	KB3KV	296	KC7EM	284
F9RM	320	OZ8BZ	315	KB9OC	310	K0GT	303	I0SGF	296	KB2MY	284
EA4DO	320	K9AB	315	W8IMZ	310	G4ADD	303	K8NWD	296	KB7VD	284
W9DWQ	320	N6AW	315	K2JLA	310	K1MEM	302	KE4VU	296	WB3HAZ	283
TI2HP	320	K1UO	315	NY5L	310	N5FG	302	W0IYR	295	VE3MV	283
W4DPS	320	N6AHU	315	IV3YRN	310	W6FET	302	KK0C	295	ZP5JCY	283
W0YDB	320	W7OM	315	I8KCI	310	I3OBO	302	G3XTT	295	CX4HS	283
VE3MR	319	YV5DFI	315	K9HQM	310	K9UAA	302	W6MFC	295	I4CSP	283
DL9OH	319	VE3XN	314	WZ4I	309	KP4EQF	302	VE3XO	295	KB1JU	283
OZ3SK	319	YS1RRD	314	N4PN	309	N5FW	302	KI3L	295	AE2B	282
DJ9ZB	319	K8LJG	314	ZL1BIL	309	I5EFO	302	IN3ANE	295	AI9R	282
ZS6LW	319	W3GG	314	WD9IIX	309	KQ9W	302	WB4PUD	295	TG9EP	282
I8AA	319	I2LLD	314	K9QVB	309	I2MQP	302	WD0BNC	294	N1ALR	282
YU1HA	319	W1NG	314	K4CXY	309	XE1MDX	302	I5BDE	294	KF5DX	282
W3AZD	319	W1LQQ	314	W2FGY	309	KE4HX	302	K1VHS	294	WA8YTM	282
KS2I	319	SM4CTT	314	KR9O	309	WA3HUP	301	WB3CON	294	PY2DBU	282
N4MM	319	W7FP	313	W6NLG	309	VE3FJE	301	SM6CST	294	NP4CC	281
W4EEE	319	EA4LH	313	VK4VC	308	WB4NDX	301	KB8O	294	NX0I	281
ZL3NS	319	W8PCA	313	YV5AIP	308	YU2TW	301	VE3DLR	294	K9TI	280
4Z4DX	319	N2SS	313	N6AV	308	N4CRU	301	K4JLD	293	G4FAM	280
VE3GMT	318	VE7WJ	313	IT9TGO	308	KZ0C	301	K4SE	293	KU9Z	280
W9JT	318	OE2EGL	313	AI8M	308	N8BKF	301	KC8JH	293	XE1XM	280
ZL1AGO	318	F2MO	312	NS7Z	308	WT4T	301	AI5I	293	WD9IIC	280
K6YRA	318	W0SD	312	VE7DX	308	KB2HK	301	W9NUF	293	W9VA	280
PY1APS	318	K9RF	312	YV1AJ	308	K7LAY	301	KD5ZM	293	KB5DN	279
YV1KZ	318	K4MQG	312	NN4Q	308	AG9S	301	WB6OKK	293	EA6DE	279
K9MM	318	K9HDZ	312	WA4DAN	308	KB9KD	301	W5LLU	293	JH8NYK	279
N7RO	318	LA7JO	312	W8ILC/QRPp	308	K2JF	301	WA4LOF	292	KX5V	279
VE2WY	318	LU3YL	312	XE1OX	308	W0ULU	301	AC0A	292	N6CGB	279
YU1AB	318	G4CHP	312	WB1DQC	307	W4BQY	301	VE3FEA	292	WN5K	279
W9SS	318	N6OC	312	I0MBX	307	VE4AT	300	VP9CP	292	K4BYK	278
W4NKI	318	K3UA	312	KV2S	307	SV8CS	300	W8LKG	292	VE3IUE	278
I0ZV	317	W6DN	312	VK3JF	307	G4GED	300	SV1JG	292	WA4IUM	278
DJ1XP	317	9H4G	312	NJ2C	307	WB5TED	300	VE3IPR	291	DF6EX	278
KD8VM	317	VE3MRS	312	VE4SK	307	I2ZGC	300	W4JFE	291	KG9N	278
W2SUA	317	W4UNP	312	SV1ADG	307	NW5K	300	DU9RG	291	I8WYD	278
CT1FL	317	W4SSU	311	KB3OQ	307	WB6GFJ	300	XE1CI	291	WB0UFL	277
W0SFU	317	K6EC	311	KA9ABC	307	JH1VRO	300	ZL1BOQ	291	W4PTT	277
OE3WWB	317	I4LCK	311	W4UNP	307	WB6PSY	300	VE3CKP	290	KB0SY	277
N4WF	317	W0SR	311	WA2MID	307	IT9TQH	300	IK8CNT	290	WD0DMN	277
K6JG	317	K8NA	311	N4KE	306	K4LR	300	KC2FC	290	N0AMI	276
IT9ZGY	317	NJ0C	311	KC8EU	306	KA3HXO	300	F6BFI	290	N7ASL	276
K9BWQ	317	N2KW	311	KB5FU	306	KS0Z	300	JA5PUL	289	WA4OPW	276
K5OVC	316	W2CC	311	K8CMO	306	IK8BQE	300	W9TA	289	KC2RS	276
I0AMU	316	WB4UBD	311	KE3A	306	WA2FKF	299	G4ADD	289	WA9IVU	276
OA4OS	316	A18S	311	K3LUE	306	WA0TKJ	299	AI9U	289	WA9RCQ	276
OK1MP	316	KZ2P	311	W6BCQ	306	I6PLN	299	OK1AWZ	288	K0HQW	276
EA2IA	316	W2CC	311	WD8PUG	306	KA8T	299	WA6DTG	288	I2WZX	276
I8ACB	316	KB8DB	311	NA5W	305	DJ7CX	298	KA9TNZ	288	KA5YCM	276
OZ5EV	316	I4EAT	311	KZ8Y	305	K9SM	298	EA3KW	287	WB1EAZ	275
K8PYD	316	YS1GMV	311	K8VJV	305	I8LEL	298	AB9E	287	VE7BSM	275
DL6KG	316	W9OKL	311	EA1QF	305	JH4PRU	298	W9SC	287	VE5FX	275
W8ILC	316	I8XTX	311	K4RIG	305	EA9IE	298	PA0XPQ	287	I2EOW	275
K4XO	316	WB3DNA	311	K8ZZU	305	XE1HI	298	N8BJQ	286	W0FF	275
W8JXM	316	DK2BL	310	I4WZK	305	WE2L	297	VE6PW	286	I8INW	275
N4KG	316	AA6AA	310	W4UW	304	K5DUT	297	N3ARK	286	WB8TLI	275
XE1AE	315	WA4JTI	310	KB4HU	304	HP1JC	297	N9CPW	286		

The WAZ RTTY Program

As of April 1, 1989, CQ has issued the following RTTY Awards.

Mixed Frequencies

- | | |
|-----------|-------------|
| 1. F8XT | 9. YB5QZ |
| 2. TG9VT | 10. AB9O |
| 3. DK3CU | 11. W3DJZ |
| 4. JA1ACB | 12. W6JOY |
| 5. JA1JDD | 13. WB2CJL |
| 6. W1DA | 14. W0LYM/4 |
| 7. WB5HBR | 15. KA5CQJ |
| 8. WA6PJR | 16. OE2SNL |

All 20 M SSB

- | | |
|------------|------------|
| 1. JK2CFD | 11. W1DA |
| 2. I5FLN | 12. W2FG |
| 3. TG9VT | 13. JA3AUG |
| 4. JA1ZF | 14. UT5RP |
| 5. I8AA | 15. WA6PJR |
| 6. JA1DSI | 16. NJ0M |
| 7. JA1JDD | 17. W3KV |
| 8. JE1DTV | 18. KA5CQJ |
| 9. F6HUJ | 19. I0AOF |
| 10. JH1BIH | 20. JA2VFW |

All 15 Meter SSB

- I5FLN

All 10 Meter SSB

- KH6VP
- I5FLN

Details on this award may be secured from the WAZ Awards Manager, W4KA, Leo Haljman, 1044 SE 43rd Street, Cape Coral, FL 33904. Include a 4 1/2 x 9 1/2 envelope with 45 cents postage.

CQ DX Awards Program

SSB

1676	NP4CC	1680	N6CFO
1677	N4SRK	1681	KY7U
1678	EA4DO	1682	KT8W
1679	K2EEK	1683	HC1RF

CW

747	W8EAO	748	DF5TS
-----	-------	-----	-------

SSB Endorsements

320	W6EUF/321	310	N6AHU/315
320	K6WR/320	310	WB3DNA/311
320	F9RM/320	310	W9OKL/311
320	EA4DO/320	310	K9HQM/310
320	W0YDB/320	300	W6NLG/309
320	T12HP/320	300	KB3OQ/307
320	W9DWQ/320	300	WB5TED/307
320	W4DPS/320	300	K2JF/305
310	W4EEE/319	300	I1POR/304
310	4Z4DX/319	300	IK8BQE/300
310	W3AZD/319	275	IN3ANE/295
310	N4MM/319	275	F6BF1/290
310	VE2WY/318	275	KA9TNZ/288
310	W9SS/318	275	NP4CC/281
310	N7RO/318	275	NX0I/281
310	K9BWQ/317	250	K8YVI/250
310	W7OM/315	150	N6CFO/156

CW Endorsements

320	W9DWQ/321	200	KA2AOT/215
320	ON4QX/320	200	NX0I/209
310	DL1PM/319	150	WG7A/150
310	N4MM/316	28 MHz	VE1ACK
300	K9BWQ/304	3.5/7 MHz	KF5PE
275	N4AH/287	3.5/7 MHz	VE1ACK
275	K2JF/283	ORPp	W8EAO
250	K9DDO/264		

Total number of active countries is 320. The basic award fee for subscribers to CQ is \$4. For non-subscribers, it is \$10. In order to qualify for the reduced subscriber rate, please enclose your latest CQ mailing label with your application. Endorsement stickers are \$1.00. Updates not involving the issuance of a sticker are made free when an SASE is enclosed for confirmation of total. Rules and application forms for the CQ DX Awards Program may be obtained by sending a business size, No. 10 envelope, self-addressed and stamped, to CQ DX Awards Manager, Billy Williams, N4UF, Box 9673, Jacksonville, FL 32208 U.S.A. DX stations must include extra postage for air-mail reply. Please make all checks payable to the awards manager.

5 Band WAZ #69

Heiko Halfmann, DL4YAH, in Haltern, West Germany got the 5 Band WAZ Award in 1984. He holds the German Class B license, which allows the maximum output on amateur frequencies. Heiko works as a watchmaker. He was first licensed in 1979 and holds DXCC, 5B WAZ #69, and 5B DXCC #1280 among his awards. While he primarily works SSB, he also like to work CW at times. The gear is an IC-740 and IC-720 from ICOM along with a Drake L7 amplifier. A 5-element beam is used on the higher frequencies, while on 40 and 80 Heiko uses dipoles. He notes that his gear is pretty much straightforward with no innovative beams or special designs in his antennas. No other members of his family are amateurs.



Heiko Halfmann, DL4YAH, winner of 5B WAZ No. 69 at his operating position. Working mostly SSB, DL4YAH took not quite five years from when he was first licensed to gain both 5B WAZ and 5B DXCC. A watchmaker by profession, Heiko found Zones 1 and 26 the tough ones to corner.

In searching for the needed zones for 5B WAZ Heiko did a lot of scouting and patrolling on the bands, seldom bothering with the DX nets, though occasionally dropping in to visit. He does not work extensively in the DX tests, actually doing very little in these activities. Zone 1 in northwestern Canada/Alaska and Zone 26, the countries in the Malay Peninsula, were the hard ones for him to corner. He is a member of the DARC, the German national radio society, and the local unit, Ortsverband Waltrop DOK N-21. The local club has 20 or so members. Heiko's QSL is an ancient engraving of a Middle Ages watch factory. They used big wheels in those days. Take a look at Heiko's station. There is a big DX wheel in there, and anyone who earns 5B WAZ definitely is one.

right after he finishes the "QRZ," and you have increased your odds of working the DX station by orders of magnitude. It takes a little practice, of course, to coordinate switching between VFOs, tuning the correct VFO, and avoiding transmitting on the DX station's frequency, but nobody ever said DX was easy.

On second thought, maybe it's a good idea if most DXers *don't* practice this technique; it makes it easier for those of us who do.

July DX Events

Ralph Hirsch, K1RH, is returning to St. Pierre and Miquelon again this summer during the first week in July. He'll end up with FP/K1RH, unless his request for a special callsign is approved. Ralph is a member of the First Class Operator Club, and can usually be found 25 kHz up from the bottom of the bands on CW. I am not sure if he even owns a microphone. He'll be testing an ICOM IC-765. Stop by and tell him what you think of the rig.

Jack Bock, K7ZR, says the Western Washington DX Club's efforts to set up a joint US/USSR DXpedition have finally

borne fruit. Six members of the WWDXC will sail down the Volga River July 5-15 as guests of the Zilan DX Club. The group will visit UA4P Kazan, UA4L Ulianov, UA4C Saratov, UA4H Kuibishev, and UA4A Volgograd. The US DXers will operate club stations along the way, as well as their US calls prefixed by UA4/. Team members include Jim Hartwell, K7UDG; Jack, K7ZR; Elizabeth Aguilar, WA7WXA; Doug Passey, WR7Q; John Kiesel, KE7V; and Homer Spence, K7RA. They will try to make some contacts in the IARU HF Championship July 8-9, but their main function will be surviving the barrage of vodka toasts in each city.

Now that the US0SU operation has shown that joint US/USSR amateur exchanges can be successful for all concerned, we'll likely see more of these glasnost benefits. Look for a Soviet team at the Goodwill Games in Seattle in 1990.

You will note that there is no QSL Information section in this month's column. Please bear with us on starting up under new column editorship. QSL info will be back on line for next month.

73, Chod, VP2ML

THE SCIENCE OF PREDICTING RADIO CONDITIONS

The Royal Observatory of Belgium, the world's official keeper of sunspot records, reports a monthly mean number of 131 for March 1989. This results in a 12-month running smoothed sunspot number of 121 centered on September 1988. A corresponding 10.7 cm solar flux level of 206 was reported for the month of March by the Algonquin Radio Observatory in Ottawa, Canada.

Fig. 1, provided by the Space Environmental Services Center (SESC), Boulder, Colorado, depicts the record rapid rise of Cycle 22 from its beginning in September 1986. Note the close correlation between the International Sunspot Number and 10.7 cm solar flux level.

A smoothed sunspot number of approximately 180 is forecast for July 1989. This should correspond to a 10.7 cm solar flux level of approximately 220, as the cycle continues to rise towards a record-breaking maximum.

Sunspot Region 5395

Last month I reported the occurrence of sunspot region 5395, which produced one of the largest solar flares ever recorded. This solar flare was responsible for the complete blackout of the ionosphere during March 13 to 15. This particular region produced more than 50 solar flares of less magnitude, but also caused unstable conditions in the high-frequency radio spectrum before it passed out of view of the earth on March 20th. Fortunately, when this region reappeared during early April, it had almost completely burned out and had little effect upon the ionosphere.

Fig. 2, provided by SESC, is an exclusive, history-making telescopic photo taken on March 9th of the giant solar flare associated with sunspot region 5395. The large sunspot from which the flare appears to emanate is approximately 40 times the diameter of the earth. The stream of magnetized gases was carried by the solar wind from the flare to the earth's atmosphere. Here the solar magnetic material interacting with the earth's magnetic field generated an electric current which saturated the ionosphere and caused widespread auroral displays in high and mid northern and southern latitudes.

Fig. 3, provided by NASA, is a photo

11307 Clara Street, Silver Spring, MD 20902

LAST MINUTE FORECAST

Day-to-Day Conditions Expected for July 1989

Propagation Index	Expected Signal Quality			
	(4)	(3)	(2)	(1)
Above Normal: 2, 9-10, 14, 29	A	A	B	C
High Normal: 1, 3-4, 11, 13, 16, 25, 28, 30-31	A	B	C	C-D
Low Normal: 5-6, 8, 12, 15, 17, 21-23, 26-27	B	C	D	D-E
Below Normal: 7, 18, 20, 24	C	C-D	D-E	E
Disturbed: 19	C-D	D	E	E

Where expected signal quality is: A—Excellent opening, exceptionally strong, steady signals greater than S9.

B—Good opening, moderately strong signals varying between S6 and S9+, with little fading or noise.

C—Fair opening, signals between moderately strong and weak, varying between S3 and S6, with some fading and noise.

D—Poor opening, with weak signals varying between S0 and S3, and with considerable fading and noise.

E—No opening expected.
3 dB per S-Unit.

HOW TO USE THIS FORECAST

1. Find propagation index associated with particular band opening from Propagation Charts appearing on the following pages.
2. With the propagation index, use the above table to find the expected signal quality associated with the band opening for any day of the month. For example, an opening shown in the charts with a propagation index of 3 will be good (B) on July 1st, excellent (A) on the 2nd, good (B) again on the 3rd and 4th, good-to-fair (B-C) on the 5th and 6th, etc.

taken by the Skylab 3 astronauts of an intense solar flare which took place during 1973. It dramatically shows the plume of solar magnetized gas flaring from a spot on the sun's surface and extending out into interplanetary space, much as did the flare associated with sunspot region 5395.

July Propagation

Both the 15 and 20 meter bands are expected to share honors for optimum DX propagation conditions during July.

Excellent worldwide openings are expected on 15 meters throughout most of the daylight hours and through the evening hours, as well as to about midnight. Conditions should peak, with openings expected to most areas of the world, during the late afternoon and early evening hours.

Twenty meters is expected to remain open to one area of the world or another just about around the clock. Although DX openings should be possible at almost any hour, optimum worldwide conditions are forecast for the early evening hours, during the hours of darkness, and for

about an hour or two after local sunrise. Exceptionally strong signal levels are likely to occur during the hours of darkness.

As a result of the present high level of solar activity, some exceptionally good 10 meter openings are expected to many areas of the world during the daylight hours. Conditions are expected to peak during the afternoon hours, and openings should favor southern and tropical regions.

During the hours of darkness also look for some good DX openings on 40 meters, but seasonally high static levels may often make this band very noisy. High static levels are also likely to dampen DX openings on 80 meters, but some should be possible during the hours of darkness. Not many DX openings are expected on 160 meters during July because of seasonally high levels of static and increased solar absorption in the northern hemisphere.

Check last month's column for comprehensive band-by-band DX propagation predictions for July.

Short-Skip Openings

This month's column contains Short-Skip Charts for July and August 1989. Optimum short-skip conditions on most bands are expected during July, mainly as a result of the seasonal peak expected in sporadic-E propagation. During the daylight hours considerable short-skip openings are forecast for 10 and 15 meters over distances ranging between approximately 500 and 1300 miles, with some double-hop openings extending out to as much as 2300 miles. Excellent short-skip openings on 20 meters, ranging between approximately 250 and 2300 miles, are expected almost around the clock, with conditions expected to peak during the late morning hours and again during the late afternoon and early evening.

Good daytime short-skip openings can be expected on 40 meters for distances ranging between approximately 100 and 600 miles. Excellent nighttime openings should be possible on this band for distances between 250 and 2300 miles. Good 80 meter short-skip openings are forecast for the daylight hours up to distances of about 300 miles, with the range extending out to 2300 miles during the hours of darkness. While no 160 meter short-skip openings are expected during the daylight hours, some openings should be possible during the hours of darkness for distances up to approximately 1300

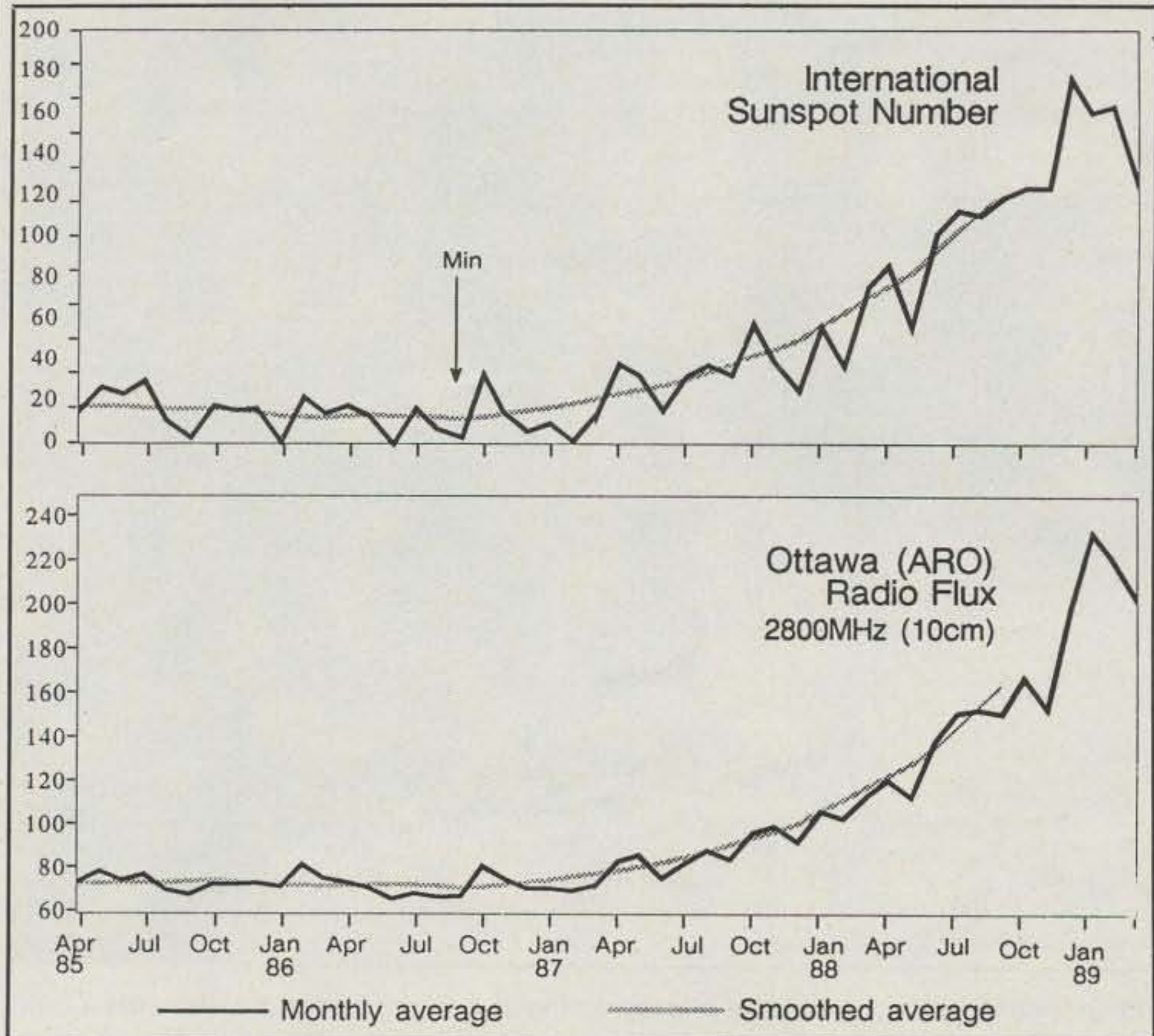


Fig. 1—The record growth of sunspot Cycle 22 from its beginning in September 1986 to date. Note correlation between sunspot numbers and 10.7 cm solar flux levels. (Graphs courtesy SESC)

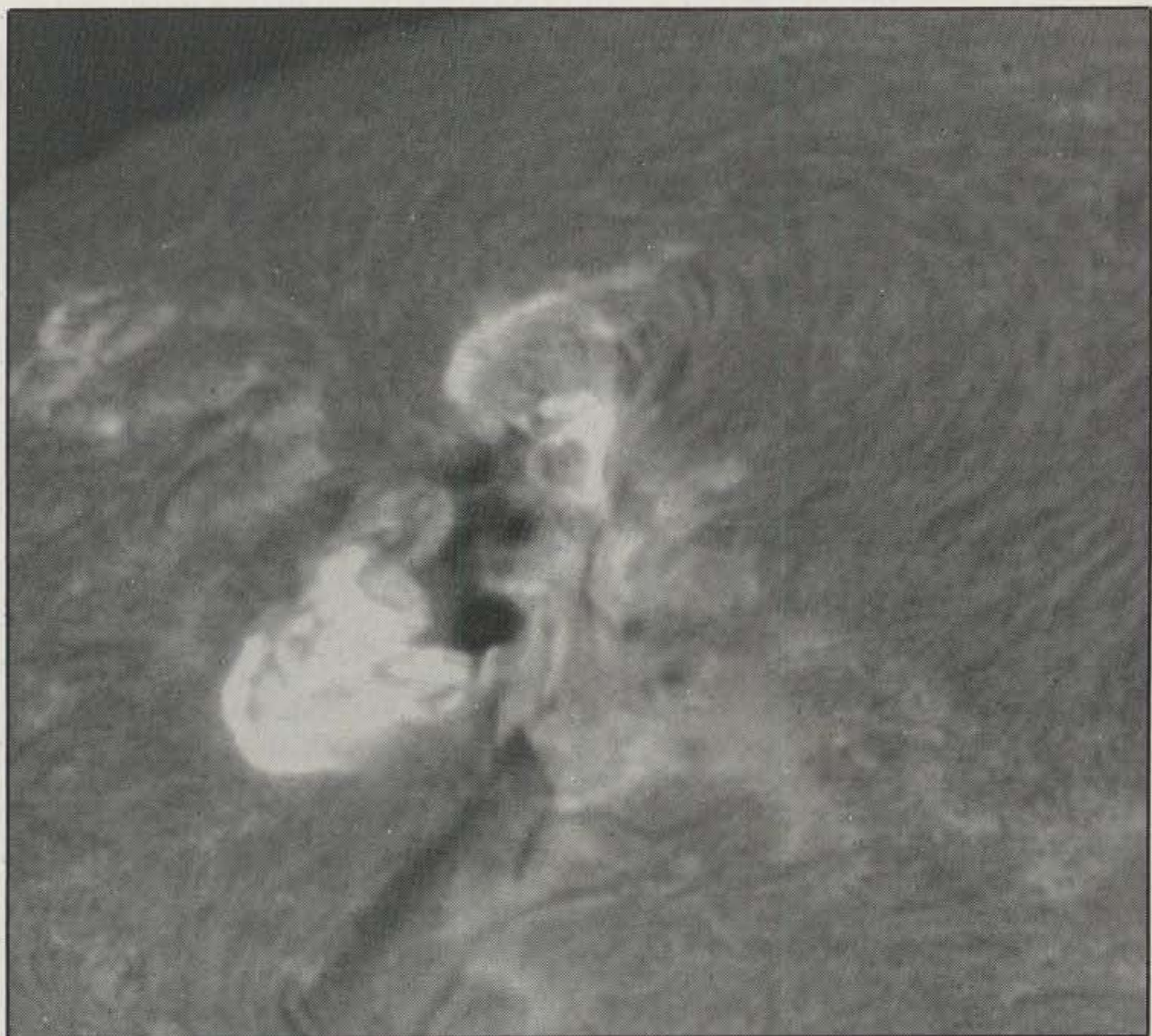


Fig. 2—Telescopic photo taken on March 9th of giant solar flare which disrupted HF communications and caused widespread auroral activity. (Photo courtesy SESC)

HOW TO USE THE SHORT-SKIP CHARTS

1. In the Short-Skip Chart, the predicted times of openings can be found under the appropriate distances column of a particular Meter band (10 through 160 Meters) as shown in the left hand column of the Chart. For the Alaska and Hawaii Charts the predicted times of openings are found under the appropriate Meter band column (10 through 40 Meters) for a particular geographical region of the continental USA as shown in the left hand column of the Charts. An * indicates the best time to listen for 80 meter openings.

2. The propagation index is the number that appears in () after the time of each predicted opening. On the Short-Skip Chart, where two numerals are shown within a single set of parenthesis, the first applies to the shorter distance for which the forecast is made, and the second to the greater distance. The index indicates the number of days during the month on which the opening is expected to take place, as follows:

- (4) Opening should occur on more than 22 days
- (3) " " " between 14 and 22 days
- (2) " " " between 7 and 13 days
- (1) " " " on less than 7 days

Refer to the "Last Minute Forecast" at the beginning of this column for the actual dates on which an opening with a specific propagation index is likely to occur, and the signal quality that can be expected.

3. Times shown in the Charts are in the 24-hour system, where 00 is midnight; 12 is noon; 01 is 1 A.M.; 13 is 1 P.M. etc. On the Short-Skip Chart appropriate daylight time is used at the path midpoint. For example, on a circuit between Maine and Florida, the time shown would be EDT; on a circuit between N.Y. and Texas, the time at the midpoint would be CDT, etc. Times shown in the Hawaii Chart are HST. To convert to daylight time in other USA time zones add 3 hours in the PDT zone; 4 hours in the MDT zone; 5 hours in the CDT zone, and 6 hours in the EDT zone. Add 10 hours to convert from HST to GMT. For example, when it is 12 noon in Honolulu, it is 15 or 3 P.M. in Los Angeles; 18 or 6 P.M. in Washington, D.C.; and 22 GMT. Time shown in the Alaska Chart is given in GMT. To convert to daylight time in other areas of the USA subtract 7 hours in the PDT zone; 6 hours in the MDT zone, 5 hours in the CDT zone and 4 hours in the EDT zone. For example, at 20 GMT it is 16 or 4 P.M. in N.Y.C.

4. The Short-Skip Chart is based upon a transmitted power of 75 watts c.w. or 300 watts p.e.p. on sideband; the Alaska and Hawaii Charts are based upon a transmitter power of 250 watts c.w. or 1 kw p.e.p. on sideband. A dipole antenna a quarter-wavelength above ground is assumed for 160 and 80 meters, a half-wave length above ground on 40 and 20 meters, and a wave-length above ground on 15 and 10 meters. For each 10 db gain above these reference levels, the propagation index will increase by one level for each 10dB loss, it will lower by one level.

5. Propagation data contained in the Charts has been prepared from basic data published by the Institute for Telecommunication Sciences of the U.S. Department of Commerce, Boulder, Colorado, 80302.

**CQ Short-Skip Propagation Chart
July & August 1989
Local Daylight Savings Time At
Path Mid-Point**

Band Meter	Distance Between Stations (Miles)			
	50-250	250-750	750-1300	1300-2300
10	Nil	08-10 (0-1)* 10-14 (0-3)* 14-18 (0-1)* 18-22 (0-2)* 22-08 (0-1)*	08-10 (1)* 10-14 (3)* 14-18 (1-2)* 18-22 (2-3)* 22-08 (1)*	08-10 (1-0)* 10-14 (3-1)* 14-18 (2-1)* 18-20 (3-2)* 20-22 (3-1)* 22-08 (1-0)*
15	Nil	08-10 (0-2)* 10-14 (0-3)* 14-18 (0-2)* 18-20 (0-3)* 20-22 (0-2)* 22-08 (0-1)*	08-10 (2)* 10-14 (3)* 14-18 (2)* 18-20 (3)* 20-22 (2)* 22-00 (1-2)* 00-08 (1)*	08-10 (2)* 10-14 (3)* 14-18 (2-3)* 18-20 (3-4)* 20-22 (2-3)* 22-00 (2)* 00-08 (1-0)*
20	10-01 (0-1)*	07-10 (0-2)* 10-18 (1-4)* 18-22 (1-3)* 22-00 (1-2)* 00-07 (0-1)*	07-10 (2-4)* 10-18 (4)* 18-22 (3-4)* 22-00 (2-4)* 00-02 (1-3)* 02-07 (1-2)*	08-10 (4)* 10-16 (4-3)* 16-00 (4)* 00-02 (3)* 02-07 (2)* 07-08 (4-3)*

40	08-10 (2-4)* 10-15 (3-4) 15-20 (4) 20-22 (2-4) 22-00 (1-3) 00-08 (1-2)*	08-10 (4) 10-12 (4-3) 12-17 (4-2) 17-18 (4-3) 18-22 (4) 22-02 (3-4) 02-05 (2-4) 05-08 (2-3)	09-10 (4-1) 10-12 (3-1) 12-17 (2-1) 17-18 (3-1) 18-21 (4-3) 21-05 (4) 05-06 (3-4) 06-08 (3) 08-09 (4-2)	09-18 (1-0) 18-19 (3-0) 19-20 (3-1) 20-21 (3-2) 21-22 (4-3) 22-06 (4) 06-07 (3-2) 07-08 (3-1) 08-09 (2-0)
80	06-12 (4) 12-16 (4-3) 16-00 (4) 00-06 (3-4)	07-08 (4-2) 08-10 (4-1) 10-12 (4-0) 12-16 (3-0) 16-18 (4-1) 18-20 (4-2) 20-22 (4-3) 22-07 (4)	07-08 (2-1) 08-10 (1-0) 10-16 (0) 16-18 (1-0) 18-19 (2-0) 19-20 (2-1) 20-21 (3-1) 21-22 (3-2) 22-05 (4) 05-06 (4-3) 06-07 (4-2)	07-19 (0) 19-20 (1-0) 20-21 (1-0) 21-22 (2-1) 22-04 (4-3) 04-05 (4-2) 05-06 (3-1) 06-07 (1-0)
160	18-19 (0-1) 19-20 (1) 20-22 (3-2) 22-00 (4-3) 00-06 (4) 06-08 (3-2) 08-09 (1) 09-10 (1-0) 10-18 (0)	19-20 (1-0) 20-21 (2-0) 21-22 (2-1) 22-00 (3-2) 00-04 (4-2) 04-06 (4-3) 06-08 (2-1) 08-09 (0-1) 09-19 (0)	21-22 (1) 22-01 (2-1) 01-04 (2) 04-06 (3-2) 06-07 (1) 07-08 (1-0) 08-21 (0)	21-23 (1-0) 23-01 (1) 01-06 (2-1) 06-07 (1-0) 07-21 (0)

*Predominantly Sporadic-E Openings

HAWAII July & August 1989 Openings Given In Hawaiian Standard Time

To:	10 Meters	15 Meters	20 Meters	40/80 Meters
East-ern USA	13-16 (1)	06-09 (1) 09-12 (2) 12-16 (3) 16-18 (2) 18-20 (1)	13-15 (1) 15-17 (2) 17-18 (3) 18-22 (4) 22-00 (3) 00-02 (2) 02-04 (3) 04-06 (2) 06-08 (1)	18-20 (1) 20-00 (2) 00-02 (1) 21-00 (1)**
Central USA	12-14 (1) 14-16 (2) 16-17 (1)	05-06 (1) 06-12 (2) 12-14 (3) 14-16 (4) 16-18 (3) 18-20 (2) 20-21 (1)	06-08 (2) 08-14 (1) 14-16 (2) 16-18 (3) 18-00 (4) 00-02 (3) 02-04 (4) 04-06 (3)	20-21 (1) 21-22 (2) 22-01 (3) 01-02 (2) 02-03 (1) 20-22 (1)** 22-00 (2)** 00-02 (1)**
West-ern USA	10-12 (1) 12-14 (2) 14-18 (3) 18-20 (2) 20-21 (1)	06-07 (1) 07-08 (2) 08-10 (3) 10-18 (4) 18-20 (3) 20-22 (2) 22-00 (1)	05-08 (4) 08-10 (3) 10-13 (2) 13-15 (3) 15-22 (4) 22-00 (3) 00-05 (2)	18-19 (1) 19-20 (2) 20-02 (4) 02-04 (3) 04-05 (2) 05-06 (1) 19-20 (1)** 20-22 (2)** 22-02 (3)** 02-03 (2)** 03-04 (1)**

ALASKA July & August 1989 Openings Given in GMT

To:	10 Meters	15 Meters	20 Meters	40/80 Meters
East-ern USA	NIL	21-00 (1) 00-02 (2) 02-03 (1)	12-15 (1) 22-00 (1) 00-02 (2) 02-04 (3) 04-05 (2) 05-06 (1)	07-10 (1)
Central USA	NIL	20-00 (1) 00-03 (2) 03-05 (1)	13-16 (1) 22-00 (1) 00-03 (2) 03-06 (3) 06-07 (2) 07-09 (1)	08-12 (1)

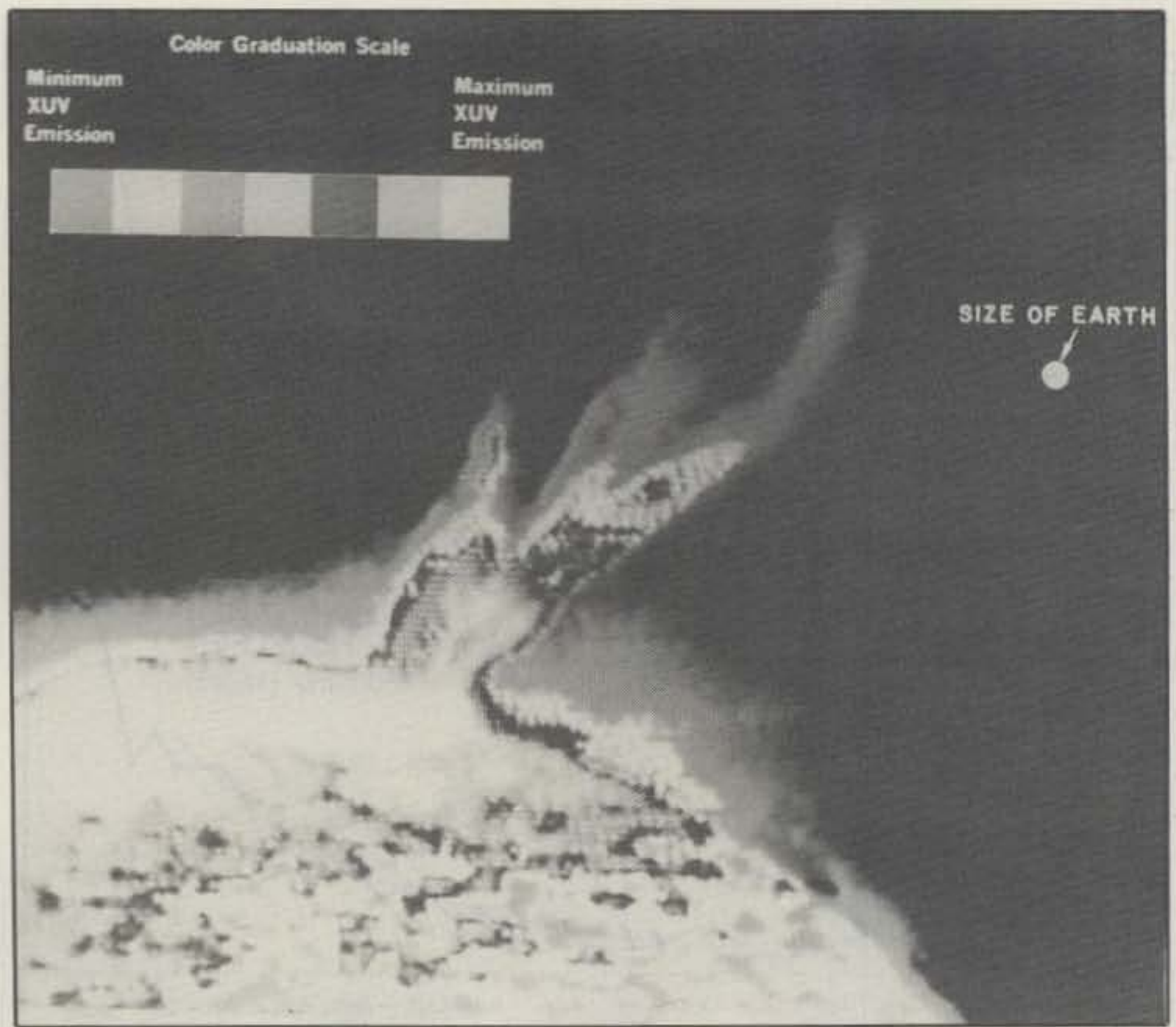


Fig. 3- Intense solar flare plume photographed in 1973 by Skylab 3 astronauts. Color gradients indicate intensity of emission (Photo courtesy NASA)

West-ern USA	01-04 (1)	17-22 (1) 22-00 (2) 00-02 (3) 02-04 (4) 04-05 (2) 05-06 (1)	13-14 (1) 14-15 (2) 15-19 (3) 19-01 (2) 01-03 (3) 03-06 (4) 06-08 (3) 08-09 (2) 09-11 (1)	07-09 (1) 09-12 (2) 12-13 (1) 09-12 (1)**
--------------	-----------	--	---	--

** Indicates best time for 80 Meter openings. Openings on 160 Meters are most likely to occur during those times when 80 Meter openings are shown with a propagation index of (2), or higher.

See explanation in "How To Use Short-Skip Charts" which appears in the box at the beginning of this column.

Note: The Alaska and Hawaii Propagation Charts are intended for distances greater than 1300 miles. For shorter openings, use the preceding Short-Skip Propagation Chart.

miles. When static levels are low, 160 meter nighttime openings may extend considerably beyond this range.

VHF Ionospheric Openings

With a seasonal peak expected in sporadic-E propagation, look for frequent short-skip openings on the 6 meter band. Most openings should fall within the 600-1300 mile range, but some may be as long as 2300 miles, and others may be somewhat shorter than 600 miles. The best times for these openings are a few hours before noon and again during the early evening hours, although they can take place at any time of the day or night. During many 6 meter sporadic-E short-

skip openings, signal levels may reach exceptionally strong levels.

Be sure to check the 2 meter band during intense 6 meter openings. Generally, 2 meter short-skip openings can take place when the shortest skip heard on 6 meters is on the order of 600 miles or less. Two meter openings, when they occur, are likely to range in distance between 1000 and 1300 miles.

Chances are good for meteor-type ionospheric openings on the VHF bands during the last days of July. A major meteor shower, the *Delta Aquarids*, should take place between the 28th and 31st.

Although not expected to reach peak intensity until mid-August, the *Perseids*, another major meteor shower, is expected to begin during the last days of July and should provide some openings on the VHF bands.

Considerably fewer trans-equatorial (TE) openings are expected on 6 meters during July, but some may still be possible from locations in the southern tier states. The best time to check for TE openings to South America should be between 8 and 11 PM local daylight time.

Some VHF short-skip openings may be possible during July as a result of auroral ionization. The best dates to look for such openings are shown as Disturbed or Below Normal in the Last Minute Forecast at the beginning of this column.

73, George, W3ASK

WE SHIP WORLDWIDE

Barry Electronics Corp.

WORLD WIDE AMATEUR RADIO SINCE 1950

Your one source for all Radio Equipment!

For the best buys in town call:

212-925-7000

Los Precios Mas Bajos en Nueva York

WE SHIP WORLDWIDE!



We Give You the Best in Amateur and Commercial Radios. . . Call Us. It's Lew W2BIE, Kitty WA2BAP, and Jan KB2RV

KITTY SAYS: WE ARE NOW OPEN 7 DAYS A WEEK.
Saturday & Sunday 10 to 5 P.M.

Monday-Friday 9 to 6:30 PM Thurs. to 8 PM
Come to Barry's for the best buys in town.



ONV Safety belts-in stock

YAESU

FT-767GX, FT-757GXII, FT-747GX,
FRG-8800, FT-736R, FRG-9600,
FT-4700RH, FT-212/712RH, FT-470

YAESU
FT-23/73/33/727R
FT411-811
FT-1903/1123
FTH-2005/7005

ICOM
IC2AT/12AT
IC02AT/32AT
IC2/4GAT
IC-A2/U16

Landmobile HT's
ICOM: U16, H16, V100, U400
MAXON, MOTOROLA,
YAESU: FTH 2005/2007
UNIDEN, REGENCY, KING,
MARINE ICOM: M5, M55, M700
AVIATION ICOM: A20, TAD

AMPLIFIERS
STOCKED:
RF Concepts
Mirage
TE Systems



IC-32AT



FT-470



TH-75AT



Motorola
Radius P-100

ALINCO
DJ-500T, DR-110T

FREQUENCY
COUNTERS:
1MHz-1.3GHz

COMMERCIAL
& HAM
REPEATERS
STOCKED.
WRITE FOR
QUOTES

Kantronics
UTU, KAM, KPC II,
KPC 2400, KPC IV,
KAM

SHORTWAVE RECEIVERS
STOCKED

Ten-Tec
Tuner 238

MOTOROLA AUTHORIZED DEALER
KACHINA COMMUNICATIONS DEALER

AUTHORIZED
SONY
DEALER

DIGITAL FREQUENCY COUNTERS
Opto Electronics model 1300H, 0-1300MHz
Long-range Wireless
Telephone for export in stock

BENCHER PADDLES,
BALUNS, LOW PASS FILTERS
IN STOCK

MIRAGE AMPLIFIERS
ASTRON POWER SUPPLIES
Saxton Wire & Cable, Int'l Wire
OPTO KEYERS STOCKED

Radios for Business,
Gov't, 2-way, etc.
Stocked & serviced,
call for great prices!

COMET ANTENNAS
STOCKED

HEIL
EQUIPMENT
IN STOCK

SANGEAN Portable Shortwave Radios



New TEN-TEC
Corsair II, PARAGON,
OMNI V

IIX Towers, Antennas,
Mobile Radio mounts
stocked. Call.

AMERITRON AUTHORIZED DEALER

KENWOOD



ANTENNAS
A-S, AES, Cushcraft, Hy-Gain,
Hustler, KLM, METZ, Mosley,
MODUBLOX, TONNA, Butternut,
Multi-Band

TS440S/AT, R-5000, R-2000, TS-940 S/AT, TM
231A/431A, TM-2570A/50A/30A, TR-751A, Ken-
wood Service Repair, TM-721A, TS-711/811A,
TM3530A, TH205AT, TH215A, TM-621A, TM-
321A, TS140S, TS680S, RZ-1, TS-790A.

Budwig ANT. Products
NEL-TECH DVK-100 Digital Voice Keyer
FLUKE 77, 83, 85, 87 Multimeters

Media Mentors—
Amateur Radio Course

VoCom/Mirage/Alinco
Tokyo Hy-Power/TE SYSTEMS
Amplifiers &
5/8λ HT Gain
Antennas IN STOCK

MICROLOG-ART 1, Air Disk,
SWL, Morse Coach

Professional
Soldering
Station
48 Watts
\$79

METRON
KW HF Mobile
Amplifier
Stocked

AR 900 Hand Held Scanner 100
ch. Covers 27-54, 108-174,
406-512, 800-950 MHz

AEA 144 MHz
AEA 220 MHz
AEA 440 MHz
ANTENNAS



BIRD
Wattmeters &
Elements
In Stock

EIMAC
3-500Z
572B, 6JS6C
12BY7A &
6146B



MAIL ALL ORDERS TO: BARRY ELECTRONICS CORP., 512 BROADWAY, NEW YORK CITY, NY 10012 (FOUR BLOCKS NORTH OF CANAL ST.)

New York City's

LARGEST STOCKING HAM DEALER
COMPLETE REPAIR LAB ON PREMISES

"Aqui Se Habla Espanol"

BARRY INTERNATIONAL TELEX 12-7670
MERCHANDISE TAKEN ON CONSIGNMENT
FOR TOP PRICES

Monday-Friday 9 A.M. to 6:30 P.M. Thursday to 8 P.M.
Saturday & Sunday 10 A.M. to 5 P.M. (Free Parking)

IRT/LEX-"Spring St. Station". Subways: BMT-
"Prince St. Station". IND-"F" Train-Bwy Station"
Bus: Broadway #6 to Spring St. Path-9th St./6th Ave.
Station.

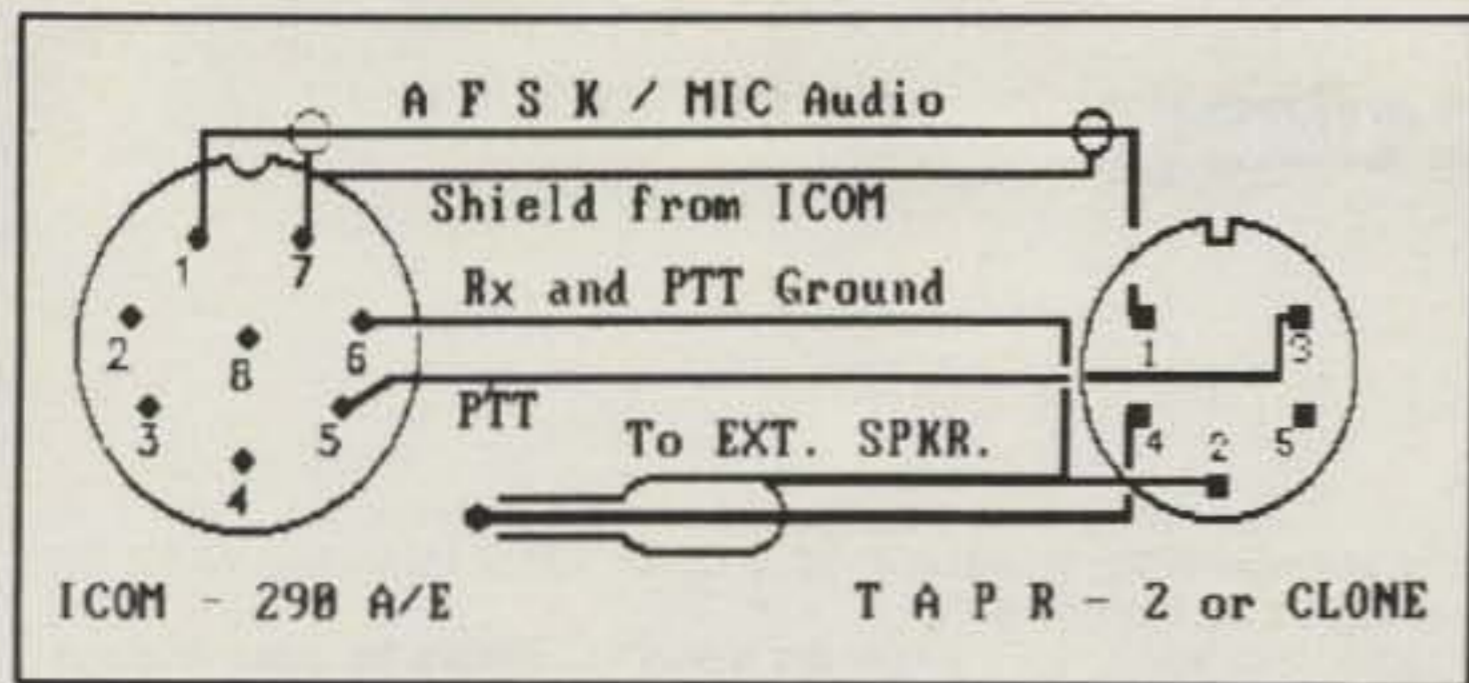
COMMERCIAL RADIOS
STOCKED: ICOM, Motor-
la, MAXON, Standard,
Yaesu. We serve munic-
ipalities, businesses, Civil
Defense, etc. Portables,
mobiles, bases, re-
peaters...

ALL
SALES
FINAL

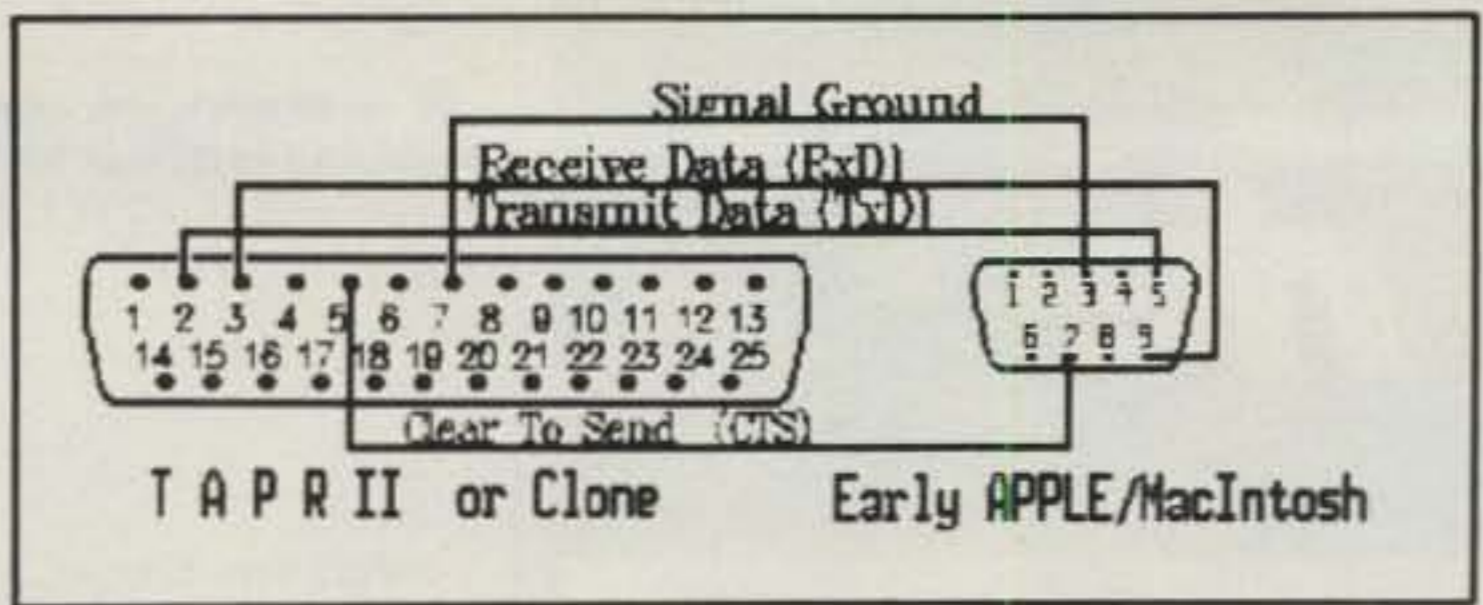
We Stock: AEA, ARRL, Alinco, Ameco, Ameritron, Antenna Specialists,
Astatic, Astron, B&K, B&W, Bencher, Bird, Butternut, CDE, CES, Cushcraft,
Daiwa, Eimac, Henry, Heil, Hustler, Hy-Gain, Icom, KLM, Kantronics, Larsen,
MJF, J.W. Miller, Mirage, Nye, Palomar, RF Products, Saxton, Shure,
Tempo, Ten-Tec, TUBES, Yaesu, Vibroplex, Duplexers, Repeaters, Scan-
ners, Radio Publications, Uniden, Kenwood, Maxon, RFC.

WE NOW STOCK COMMERCIAL COMMUNICATIONS SYSTEMS
HAM DEALER INQUIRES INVITED PHONE IN YOUR ORDER & BE REIMBURSED
COMMERCIAL RADIOS stocked & serviced on premises.
Amateur Radio Courses Given On Our Premises, Call
Export Orders Shipped Immediately. TELEX 12-7670

FAX: 212-925-7001



This month's illustration for the "Notebook."



The interfacing of the TAPR 2 and the Apple computer. Note the CTS line.

This may cause the files display to roll over into another page, but this is no problem either, since the **Pg Up** and **Pg Dn** keys will take you to the next page of the directory. As soon as you are finished in the **F7** directory mode, a quick exit can be executed by pressing the **ESC** key and returning to the terminal mode.

Just to be sure there is no confusion about the use of the **ALT C**, I should explain that it is used both in the **F7** directory to change the type of display, and again in the terminal mode to "Clear" the screen.

F8—The Password to "User Easy" Packet Operation

The **F8** function key is the password into the most adventuresome mode of packet that your PC or clone has ever enjoyed. Here is the key to this new standard of packet automation. As soon as you connect to the other station (also using MFJXFER) press **F8**. Then when the pop-up window displays, press **B** (binary). Quickly another pop-up will appear, and at that point press **W** (What's in the connected station's directory?).

Here is the way we discover **W**hat is available to us from the connected station's designated drives, and how we download a picture or file to our drive, be it binary or picture format. If you see a picture that you want or don't already have, again press **F8**, then **P**, and this time when the second pop-up window appears, press **D** for "download." You will then be prompted for the file name and extension of the picture file that you desire to download. Type it in exactly as it was displayed in the directory you just received a moment ago. Be sure you have a formatted disk in the designated drive to which your binary files are routed, and press **< ENTER >**. If you are the sending station, the screen will do some very fast and spectacular maneuvers and end up in a quad split-screen with a display of the file size, byte length, bytes in, bytes out, and block size. In addition, there will be a display of the condition of the upload or download every 8 blocks of transfer, whether picture or binary file, at the sending station. In Bob's transfer routine, a block is equal to 128 bytes of data.

Now if you are the receiving station,

there will be some fast changes to your screen, also, as it goes to the color picture palette which is received in the first line of the picture header. The disk drive will run for a moment, placing the title of the picture on the disk. Each time a packet is received, several lines of the picture will be painted onto the screen and written to the disk at the same time. In a moment or two the complete picture will be on the screen and saved to disk.

The program automatically returns both stations to the terminal mode so that further packet communications can be conducted or more files can be selected.

If this is a VHF or UHF packet station, the sending station can be unmanned, since the entire operation can be managed from the download station.

To put the finishing touches to this month's installment of "The Packet User's Notebook," the author of the program, Bob Slomka, and MFJ Enterprises Inc. are allowing me to include the "User Easy" help list of the program commands. This will illustrate to the prospective user just how easy to use the program is.

Until next month, happy packeting!

73, de Buck4ABT



SAVE TIME and MONEY with THE HAZER

Bring things down for safety and convenience.

Never climb your tower again with this elevator system. Antennas and rotator mount on HAZER, complete system trans tower in vertical upright position. Safety lock system operates while raising or lowering. Never can fall.

Complete kit includes winch, 100 ft. of cable, hardware and instructions. For Rohn 20 and 25 G Towers.

Hazer 2-Heavy duty alum. 12 sq. ft. load	\$311.95 ppd.
Hazer 3-Standard alum. 8 sq. ft. load	\$223.95 ppd.
Hazer 4-Heavy galv. steel 16 sq. ft. load	\$291.95 ppd.

NEW for ROHN 45 and 55 Towers

Hazer 8-Heavy duty galv. steel 16 sq. ft. load	CALL
Ball Thrust Bearing TB-25 for any of above	\$64.50 ppd.

Send for free details of aluminum towers specifically engineered for use with the Hazer. Two sizes; M-13 (13" wide) and M-18 (18" wide). All bolted construction, no welds. Easy to install hinge base, walk up erection. Complete tower UPS or air freight shippable. Pre-assembled or kit form.

Satisfaction guaranteed. Call today and charge to Visa, MasterCard or mail check or money order.

GLEN MARTIN ENGINEERING INC.

Rte 3, Box 322

Boonville, MO 65233

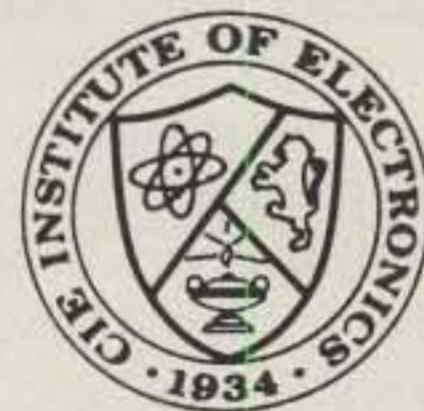
(816) 882-2734 FAX 816-882-7200



CIRCLE 141 ON READER SERVICE CARD

CIE Cleveland Institute of Electronics, Inc.

Accredited Member National Home Study Council



CIE is the world's largest independent study electronics school. We offer ten courses covering basic electronics to advanced digital and microprocessor technology. An Associate in Applied Science in Electronics Engineering Technology is also offered.

Study at home—no classes. Programs accredited and eligible for VA benefits.

CIE Cleveland Institute of Electronics
1776 East 17th St., Cleveland, Ohio 44114

YES! I want to get started. Send me my CIE school catalog including details about the Associate Degree program.

Print Name _____

Address _____ Apt. _____

City _____ State _____ Zip _____

Age _____ Area Code/Phone No. _____

Check box for G.I. Bulletin on Educational Benefits

Veteran Active Duty **MAIL TODAY!**

ACQ 05

CIRCLE 142 ON READER SERVICE CARD



CONFIDENCE.

What you want when buying amateur equipment—in the product itself and the dealer who sells it. At RF Enterprises we're working to deliver that confidence.

Our products are fairly valued and from reputable manufacturers. Quality of the product and its long term investment value come first with us. For example, our wire and cable from Belden and Andrew and our Rohn and Hy-gain towers will continue to pay you dividends long after their cheaper counterparts are no longer useable.

If we carry a product, we're endorsing that product as being worthy of your consideration and a fair value. We've made some choices—we don't sell everything.

As a dealer we strive to fill your orders promptly and deliver what we say. Our large inventory insures product availability **but** if we should be out of a product—we'll tell you—up front. No back orders or hassles with factory drop shipping without your knowing. We **stock** what we sell!

We know your needs. We've been involved in HF, VHF, DXing, contesting, a DX-pedition, traffic handling, OSCAR, and plain rag-chewing. We have "hands-on" experience with most of our products. For your protection, we are a Dunn and Bradstreet listed and rated company.

ORDER WITH CONFIDENCE.

rf enterprises

**HCR Box 43
Merrifield, MN 56465
1-800-233-2482**

Announcing

(from page 6)

WM8T, from Gaylord, MI; Top of Michigan ARC; various times from July 19-22, but July 21-22 from 1700Z to 0200Z the next day; CW 14.040, SSB 3.965, 14.265, 21.350, 28.365. For certificate send QSL and 9 x 12 SASE to P.O. Box 88, Gaylord, MI 49735.

W9ZL, from Oshkosh, WI; Fox Cities ARC; July 29 to Aug. 2 in the daylight hours; 28.450, 21.300, 14.293, 7.243 MHz. All QSLs must include contact number. Send SASE or \$1.00 for 8 x 10 certificate to FCARC, 318 E. Brewster St., Appleton, WI 54911, or to WD9FLJ via the Callbook address.

8-land, from South Dakota Centennial Wagon Train; the hams of South Dakota; May 10 through Sept. 4; various frequencies and modes according to the license class of the operator. To QSL send SASE and QSL card to South Dakota Wagon Train, P.O. Box 91, Sioux Falls, SD 57101.

8-land, Colorado Six Meter Invitational Net activity day contest; from 1400Z July 1 to 0300Z July 2. All stations make contacts on 50 MHz exchanging call-sign, first name, grid square, and SIN number (if any). SIN members count for three points and non-SIN members for two. Overall score is obtained by multiplying number of states worked by the number of points logged. First- and second-place winners receive certificates, and all operators sending in their scores will receive a copy of the results. Send logs including date and time of QSOs by July 31 to N0AKI, 8529 Fenton St., Arvada, CO 80003 (SASE appreciated).

United Kingdom (???)ATC, call of station not fully given, from Cardington Airfield, UK; Bedford and District ARC; July 15; the 15 and 20 meter bands on HF, depending on propagation. Contact Bedford and District ARC, G3WTP, 1 Perring Close, Sharnbrook, Bedford, MK44 1JE, United Kingdom.

VE4IHF, from the International Peace Garden, on the border of Manitoba and North Dakota; International Hamfest; 9 AM to 5:30 PM July 7 and 8 (no frequencies given). For QSL send SASE and 1 IRC. For Peace Garden Award send 3 IRCs. Send to VE4XN, Dave Snyder, 25 Queens Crescent, Brandon, Manitoba, Canada R7B 1G1.

VE8 North Magnetic Pole DXpedition, from Cornwallis Isl., Bathurst Isl., King Christian Isl., North Magnetic Pole, Ellesmere Isl.; Team "Nord France"; July 1-24 (no times given); SSB (plus or minus 3 kHz) 28355, 21155, 14155, 7055. Send QSL to VE8 North Magnetic Pole, BP 37, 59374 Loos, Cedex, France. In commemoration of the bicentenary of the French Revolution, all QSOs of July 14 will be sent a photo of the DXpedition team.

•The following hamfests, etc., are slated for July:

July 1, **Western Colorado ARC Hamfest**, Colorado National Guard Armory, Grand Junction, CO. Contact Randy Martens, NT0N, P.O. Box 3422, Grand Junction, CO 81502 (303-242-4205). (VE testing.)

July 2, **Wilkes-Barre Hamfest & Computerfest**, Ice-A-Rama, Sports Complex, Wilkes-Barre, PA. Contact Mike Benish, K3SAE, RD 1 Box 214, Pittston, PA 18643 (717-388-6863).

July 4, **Firecracker Hamfest**, Bressler Picnic Grounds, Harrisburg, PA. Contact Dave Dormer, KC3MG, 717-939-4957.

July 5-8, **MARAC National Convention**, Kiva Inn, Abilene, TX. Contact Chuck Dobbins, 1902 Mission Creek Circle, Houston, TX 77084 (713-579-7932, machine, leave message); or check in on the County Hunter Net frequency of 14.336 daytime or 3.865 nighttime.

July 7-9, **International Hamfest**, International Peace Gardens, on the International boundary 14 miles north of Dunseith, North Dakota on Hwy. 281. Contact Tom Williams, WD0ATI, 612 S. 11th St., Bismarck, ND 58504 (701-258-1947).

July 8, **South Milwaukee ARC Swapfest**, American Legion Post 434, Oak Creek, WI. Contact The South Mil-

waukee ARC, P.O. Box 102, S. Milwaukee, WI 53172-0102.

July 8, **Des Moines RAA Hamfest 89**, Adventureland Inn, Des Moines, IA. Contact W0AK, Attn. KB0CQV, P.O. Box 88, Des Moines, IA 50301, or call 515-276-8949. (VE testing.)

July 8-9, **19th Annual ARRL Division Convention and Hamfest**, Marion County Fairgrounds, Indianapolis, IN. Contact Indianapolis Hamfest Assn., P.O. Box 11776, Indianapolis, IN 46201, or call 317-356-4451.

July 8-9, **Wyoming Hamfest**, Holiday Inn, Cheyenne, WY. Contact Fred Dumire, N7JPR, P.O. Box 6262, Cheyenne, WY 82003.

July 8-9, **Maple Ridge Hamfest**, St. Patricks Center, Maple Ridge, BC, Canada. Contact Bob Houghton, VE7BZH, Box 292, Maple Ridge, BC V2X 7G2, Canada.

July 9, **DuPage ARC Hamfest & Computer Show**, American Legion Grounds, Downers Grove, IL. Contact Hamfest Chairman, DuPage ARC, P.O. Box 71, Clarendon Hills, IL 60514 (SASE), or call Ed at 312-985-0527. (VE testing.)

July 9, **North Hills ARC Hamfest**, Northland Public Library, Pittsburgh, PA. Contact Bob Ferrey, Jr., N3DOK, 9821 Presidential Dr., Allison Park, PA 15101 (SASE), phone 412-367-2393. (VE testing.)

July 9, **Batavia Hamfest**, Alexander Firemen's Grounds, Alexander, NY. Contact Genesee Radio Amateurs, P.O. Box 572, Batavia, NY 14021 (SASE). (VE testing.)

July 9, **LIMARC ARRL Long Island Hamfair**, NY Institute of Technology, Old Westbury, Long Island, NY. Call Mark Nadel, NK2T, 516-796-2366, or Hank Wener, WB2ALW, 201-694-1811.

July 14-16, **Glacier-Waterton International Hamfest**, Three Forks Campground, Montana. Contact D. Cole, VE6EY, 923 Whitehill Way NE, Calgary, Alberta T1Y 3G1, Canada.

July 15, **Union Hamfest**, Union Fairgrounds, Union, ME. Contact Maud Peterson, N1EBC, Box 601, Augusta, ME 04330 (207-445-2977). (VE testing.)

July 16, **SCARC 89**, Sussex County Fairgrounds, Augusta, NJ. Contact Don Stickle, K2OX, Weldon Rd., RD 4, Lake Hopatcong, NJ 07849 (201-663-0677).

July 16, **Van Wert ARC Hamfest**, fairgrounds, Van Wert, OH. Contact the Van Wert ARC, 301 N. Washington St., Van Wert, OH 45891.

July 16, **Zero-Beaters ARC Hamfest**, Washington Fairgrounds, Washington, MO. Contact Al Lanwermyer, 909 Nora, Washington, MO 63090. (VE exams.)

July 22, **Ausable Valley ARC Swap-Shop**, Mio, MI. Contact Tim, 517-826-5549.

July 22-23, **Mountain ARC Hamfest**, Red Rocks Campground, Pike National Forest, Woodland Park, CO. Contact MARC, Box 1012, Woodland Park, CO 80866, or call Joe Tafoya, N0CMD, 719-687-3641.

July 23, **Amateur Cross Link Repeater Hamfest**, "The Hall" (1535 S. Harlem Ave.), Berwyn, IL. Contact ACLR, P.O. Box 348257, Chicago, IL 60634 (SASE), or call 312-712-5100.

July 28-30, **Central Oklahoma Radio Amateurs Ham Holiday**, Lincoln Plaza Hotel Conference Center, Oklahoma City, OK. Contact CORA, P.O. Box 850625, Yukon, OK 73085. (VE testing.)

July 29, **Ski Country ARC Hamfest**, Colorado Mountain College Community Education Center, Glenwood Springs, CO. Contact SCARC, P.O. Box 302, Carbondale, CO 81623 (303-945-9342).

July 30, **Hamfesters Radio Club Hamfest**, Will County Fairgrounds, Peotone, IL. Contact Don Burch, N9DWI, 8438 S. Kolin Ave., Chicago, IL 60652 (312-582-9776). (VE testing.)

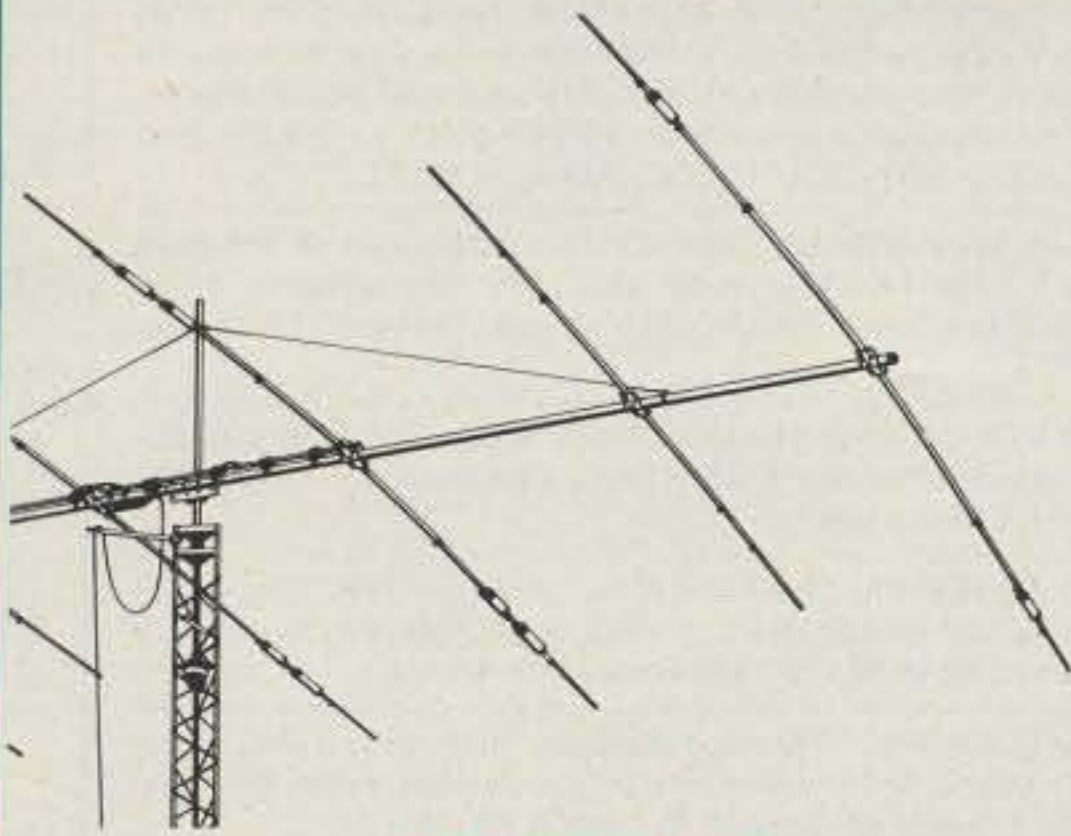
July 30, **BRATS Maryland Hamfest and Computerfest**, Maryland State Fairgrounds, Timonium, MD. Contact BRATS, P.O. Box 5915, Baltimore, MD 21208. (VE testing.)



rf enterprises

We Specialize in Antennas & Towers.
We Ship Worldwide.

hy-gain antennas & towers



Tribanders
TH7DXS Explorer-14 TH5MkIIS

Monobanders
204BAS 203BAS 205BAS
155BAS 153BAS 105BAS
103BAS 64BS 66BS

VHF, OSCAR, & VERTICALS
CALL US FOR HY-GAIN EQUIPMENT!
TOWERS

Crank-up, self-supporting, galvanized steel towers.
"SS" series rated at 9 ft²; "HD" series rated at 16 ft².
HG-37SS HG-52SS
HG-54HD **CALL FOR PRICES!** HG-70HD

ANTENNAS

TOWERS

YAESU



FT-757 GX-II

Compact, Go Anywhere,
Full Featured HF Performance

Call us for all YAESU equipment:
HF TRANSCEIVERS MOBILE UNITS
HANDHELDS AMPLIFIERS

YES! WE STOCK ACCESSORIES.

TEN-TEC



MODEL 561 CORSAIR II

OTHER TEN-TEC PRODUCTS:

Model 585 Paragon
Model 425 Titan Linear Amplifier
Model 229B Antenna Tuner

Mobile Antennas! Metal Project Boxes.

AMPLIFIERS & TUNERS

AMERITRON

MIRAGE



NYE -VIKING MB-V-A

rf concepts

AMP SUPPLY



MFJ 989C

ASTRON SUPPLIES

RS-4A...\$ 39.95 RS-7A...\$ 49.95 RS-12A...\$ 69.95
RS-20A... 88.95 RS-35A...139.95 RS-50A...199.95
RS-20M...109.95 RS-35M...159.95 RS-50M...219.95
VS-20M...124.95 VS-35M...174.95 VS-50M...232.95

NEW!

RFE is now stocking
IIX Equipment

CUSHCRAFT:

Tribander Special! A3S & A4S.....\$259.95 / \$339.95
A743 & A744 30/40 meter add-on kits available.
Verticals: AV3, AV5, and the new R4 and AP-8
Monobanders: For 10, 12, 15, 20, and 40 meters.
VHF & UHF: Antennas for FM; SSB & CW, OSCAR.
617-6B, A50-6, & A50-5 for 6 Meter Openings!
4218XL & 3219 for 2 Meter DXing.
Additional Boomers for 220 and 432 MHz.
OSCAR & ATV antennas.

If you need a CUSHCRAFT antenna, we can supply it!

KLM World Class Antennas.

KT34A...\$395.00 KT34XA...\$585.00
VHF,UHF, & OSCAR Antennas.
We stock KLM HF Monobanders!

BUTTERNUT

HF6V Vertical HF2V Vertical
RMK II roof mount kit, STR II radial kit,
WARC resonators, & TBR-160 coils.
HF5B Compact Beam.

ALPHA DELTA

DX-A...\$46.95 DX-DD...64.95 DX-KT...\$27.50
DX-CC...\$79.95 NEW! Control line protectors!

HUSTLER:

6BTV, 5BTV, G6-144B, G7-144, G7-220

Complete mobile systems. CALL!

MOSLEY: Specials on TA-33, TA-34, CL-33, Pro-67!

ROTORS

TELEX/hy-gain

HDR-300
T2X
HAM IV
CD 45 II

YAESU

G400/400RC
G600RC
G5400B

ALLIANCE

HD-73 U-110

ROHN

Self-supporting: Rated (ft²): HDBX=18; HBX=10; BX=6
Galvanized steel with base and rotor plate.

Today's best tower buy! Freight additional but you save
with our volume shipper's discount!

HBX40..... HDBX40.....
HBX48..... HDBX48.....
HBX56..... BX64.....

Guyed tower sections: Complete packages & components

Sections: 25G, 45G, 55G CALL for prices!

Call us for all your ROHN requirements!

Fold-over towers:

FK2548..... FK4544.....
FK2558..... FK4554.....
FK2568..... FK4564.....

Prices 10% higher in western states.

Tower Hardware:

Guywire: 3/16EHS / 1/4EHS.....\$0.15/0.18
CCM Cable Clamps: 3/16 / 1/4.....\$0.39/0.49
Turnbuckles: 3/8"E&E & E&J.....\$6.95/7.95
1/2"E&E & E&J.....\$12.95/13.95
Preformed "Big Grips" 3/16&1/4.....\$2.49/2.99
Guy Insulators: 500D / 502.....\$1.69/2.99

Phillystran Guy Systems:

HPTG-2100 / -4000 / -6700 Cable...\$0.30 / 0.50 / 0.70 /ft.
Cable ends and potting compound in stock.

WIRE & CABLE

BELDEN COAX:

9913 Low loss\$0.47/ft. RG-8X(9258).....\$0.22/ft
RG-213/U(8267).....0.48 RG-11A/U(8261)....0.43
RG-8/U(8237).....0.38 RG-58A/U(8259)....0.17
RG-8/U(8214).....0.42 RG-59/U (8241)....0.18
RG-214/U(8268).....\$2.99/ft.

COPPERWELD ANTENNA WIRE:

Solid: 12 ga...0.12; 14 ga...0.09; Stranded 14 ga...0.10/ft.

ROTOR CABLE:

Std.(6-22, 2-18)...\$0.21 Hvy Dty(6-18,2-16)...\$0.38/ft.

We stock Andrew Helix & Connectors.

Full line of Amphenol connectors.

ALINCO-AMERITRON-ANTENNA SPECIALISTS-ASTATIC-BENCHER-B&W-CREATE-DAIWA
KANTRONICS-LARSEN-MFJ-MOSLEY-PALOMAR-SANTEC-SHURE-TONNA-WELZ-AND MORE

VISA MasterCard

Prices subject to change
without notice.

1-800-233-2482

(Orders only please)

rf enterprises

HCR Box 43

Merrifield, MN 56465

(Located at Jcn. Co. 3 & 19)

Personal checks verified with
TELECHECK

Minnesota residents add
6% sales tax.

SHIPPING INFO., TECHNICAL, MN, & DX

218-765-3254

Returns require prior authorization
and are subject to 15% restocking fee

Shipping additional
except as noted.

TELEX: 4933032 RFE UI FAX: 218-765-3308

Ham Shop

FREE TO CQ SUBSCRIBERS

Advertising Rates: Non-commercial ads are 20 cents per word including abbreviations and addresses. Commercial and organization ads are 60 cents per word. Boldface words are \$1.20 each (specify which words). Minimum charge \$2.00. No ad (non-subscriber) will be printed unless accompanied by full remittance. Non-commercial ads free to CQ subscribers, as space permits, maximum 3 lines each. All ads must be typewritten double spaced. Recent CQ mailing label must accompany ad.

Closing Date: The 10th day in the third month preceding date of publication. Because the advertisers and equipment contained in Ham Shop have not been investigated, the Publisher of CQ cannot vouch for the merchandise listed therein. Direct all correspondence and ad copy to: CQ Ham Shop, 76 N. Broadway, Hicksville, NY 11801.

CW have you down? Why let a mental block against CW stand between you and upgrading? When you use the PASS Publishing **CW Mental-Block Buster**, you will **explode mental blocks** with guided meditation, visualization and affirmations. This is not a CW practice tape. PASS Publishing's **CW Mental-Block Buster** audio cassette and practice booklet are only \$19.95 ppd. In the U.S. (NY residents add \$1.50 sales tax). PASS Publishing, P.O. Box 570, Stony Brook, NY 11790.

POST CARD QSL KIT: Converts Post Cards, Photos, to QSLs! Stamp brings circular. K-K Labels, P.O. Box 412, Troy, NY 12181-0412.

SCHEMATICS: Radio receivers 1919/70s. Send Brand name, Model Number, SASE. Scaramella, P.O. Box One, Woonsocket, RI, 02895-0001.

CABLE T.V. CONVERTERS: Jerrold™, Oak, Scientific Atlantic, Zenith and many others. "New" MTS stereo add-on: mute & volume. Ideal for 400 & 450 owners! Call 1-800-826-7623. B & B INC., 4030 Beau-D-Rue Drive, Eagan, MN 55122.

QSL MGR/BEAM HEADING/PREFIX LOCATOR for C64/128 & IBM. **OVER 10,000 CALLS** with quarterly updates. Send large SASE to N7CTY, Box 738, Cornelius, OR 97113.

NOW AVAILABLE: 14 KARAT GOLD CALLSIGN JEWELRY. Lapel pins, necklaces, more. Information: KB2MB, H&M Jewelry, 26 Edgecomb Road, Binghamton, NY 13905.

ATTENTION WRITERS: Manuscripts wanted on a wide variety of communications and monitoring subjects. SASE brings want list or send your suggestions, resume, credits. Tiare Publications, P.O. Box 493, Lake Geneva, WI 53147.

CHASSIS, CABINET KITS: SASE. K3IWK, 5120 Harmony Grove Road, Dover, PA 17315.

ANOTHER DAY with an empty mailbox? Improve your QSL returns with *Secrets of Successful QSL'ing* by Gerry L. Dexter. This complete guide to reception reporting and QSLing SWBC, Utility, ham, and medium-wave stations covers everything from basics to advanced techniques. Just \$9.95 plus \$1 s/h, \$2 s/h foreign orders, U.S. funds only. Order now from Tiare Publications, P.O. Box 493, Lake Geneva, WI 53147.

HOME BREW PROJECTS LISTS. SASE to WB2EUF, Box 708, East Hampton, NY 11937.

HAMS: USE AIRMAIL POSTAGE not IRCs. Many countries, monthly bargains. List: #10 SASE. William Plum, 12 Glenn Road, Flemington, NJ 08822 (201-788-1020).

HAM HOLIDAY IN VP5. Join cycle 22 fun from rare DX QTH Turks & Caicos Islands. We supply transceiver, antenna, process license, and offer accommodations as low as 7 nights \$390 double occupancy in private bungalow. Direct Pan Am service, 80 minutes Miami. Details VP5D, P.O. Box 100858, Ft. Lauderdale, FL 33310 (809-946-4627; 28.885 daily).

QSLs & RUBBER STAMPS—Top Quality! Card Samples and Stamp Information \$1.00 (refundable with order). Ebbert Graphics D-2, Box 70, Westerville, OH 43081.

IMRA—International Mission Radio Assn. helps missionaries—equipment loaned; weekday net, 14.280 MHz, 1:00–3:00 PM Eastern. Rev. Thomas Sable, S.J., University of Scranton, Scranton, PA 18510.

KNOW FIRST! Ham radio fanatics—you need **THE W5YI REPORT**, a twice-monthly award-winning Hot Insider Newsletter. Acclaimed best! Confidential facts, ideas, insights, nationwide news, technology, predictions, alerts. Quoted coast-to-coast! We print what you don't get elsewhere! \$21.00 annually w/money-back guarantee! **FREE SAMPLE** for S.A.S.E. (two stamps). W5YI, Box 10101-C, Dallas, Texas 75207.

FOR SALE. CQ/Ham Radio/QST/73 magazines @ 75¢ (thru 1975) and \$1.00 (1976-up) each, including shipping. \$3.00 minimum order. W6LS, 2814 Empire, Burbank, CA 91504-3297.

CERTIFICATE for proven contacts with all ten American districts. SASE to W6LS, 2814 Empire, Burbank, CA 91504-3297 brings data sheet.

CLANDESTINE CONFIDENTIAL NEWSLETTER: Latest info on secret broadcasters. Six issues \$10 US, \$13 foreign, US funds. RR4 Box 110, Lake Geneva, WI 53147.

HALLICRAFTERS Service Manuals. Amateur and SWL. Write for prices. Specify Model Numbers desired. Ardco Electronics, P.O. Box 95, Dept. C, Berwyn, IL 60402.

WANTED: Older model bugs, unusual bugs, and miniature hand keys. State price, condition. Dave Ingram, K4TJW, Rt. 11, Box 499 #1201 South, Birmingham, AL 35210.

HAM RADIO REPAIR! Tube through solid state. Robert Hall Electronics, Box 8363, San Francisco, CA 94128 (408-729-8200).

HAM TRADER YELLOW SHEETS. In our 28th year. Buy, Swap, Sell ham radio gear. Published twice a month. Ads quickly circulate—no long wait for results. Send #10 SASE for sample copy. \$13 for one year (24 issues). P.O. B. 2057, Glen Ellyn, IL 60138-2057, or P.O. Box 15142, Seattle, WA 98115.

Ready to explore VHF/UHF operating? Get Ed Noll's *Basic Guide to VHF/UHF Ham Radio*. Covers equipment, antennas, propagation, repeaters, contesting, band plans, and more. All the basics you need! Just \$6.95 plus \$1 shipping (\$2 foreign) US funds from Tiare Publications, P.O. Box 493, Lake Geneva, WI 53147.

1989 Atlanta HamFestival July 8th & 9th



- Free Parking within 25 yards!
- Hotel and Restaurant same building
- Tailgate Sales
- Air Conditioned Flea Market and Exhibits
- Country Style BBQ
- Parking for RV's
- 20+ Forums • DX Verification • Testing
- Prizes! Prizes!! Prizes!!!
- ICOM, KENWOOD, YAESU, MFJ ...More!

24 hour information --- (404) 739-8716

Located at the New!!
Georgia International Trade Center

Atlanta HamFestival
Post Office Box 77171
Atlanta, Georgia 30357

CIRCLE 91 ON READER SERVICE CARD

PASS Publishing's **CW Mental-Block Buster** program helps you **explode mental blocks** that hold you back. This powerful program is based on over 40 years of research in accelerated human development. **CW Mental-Block Buster** uses guided meditation, visualization, and affirmations to **explode mental blocks**. This is not a CW practice tape. The **CW Mental-Block Buster** audio cassette and practice booklet are only \$19.95 ppd. in the U.S. (NY residents add \$1.50 sales tax). PASS Publishing, P.O. Box 570, Stony Brook, NY 11790.

WANTED: Knowledgeable Ham Operator interested in working in Radio Broadcasting both as technician and perhaps some announcing. Reply: P.O. Box 21, Cedarville, CA 96104, or call 916-233-3570.

QSL CARDS: Look good with top quality printing. Choose standard designs or fully customized cards. Better cards mean more returns to you. Free brochure, samples. Stamps appreciated. Chester QSLs, Dept. C, 310 Commercial, Emporia, KS 66801.

QUANTITY DISCOUNTS on Tektronix dual trace #661 scopes (DC-3500 MHz), excellent condition, \$60 ea. (lots of 10, \$50 ea). Also: Hewlett-Packard signal generators 1.8-4 Giga-Hertz, excellent condition, \$50 ea. (lots of 10, \$40 ea). Also: Various signal generators 1-7 GigaHertz \$50 ea. (lots of 10, \$40 ea.) F.O.B. WW5B, P.O. Box 460, Brookshire, Texas 77423 (713-934-4659).

WANTED: All types of Electron Tubes. Call toll-free 1-800-421-9397 or 1-612-429-9397. C & N Electronics, Harold Bramstedt, 6104 Egg Lake Road, Hugo, MN 55038.

RADIO DESK CONSOLE CABINET. Build your own. Drawings, Photographs, List of Materials, \$7.95 ppd. Bill Morris, WA5RSC, P.O. Box 3, Temple, TX 76503-0003.

POLICE/FIREFIGHTER HAMS: Please send your call, name, address, rank, department name for inclusion in special roster, available next year. Capt. Bob Blakeslee, N2IHQ, 1 1/2 Macomber Ave., Binghamton, NY 13901.

WANTED: Ham Equipment and other property. The Radio Club of Junior High School 22 NYC, Inc. is a nonprofit organization, granted 501(C)(3) status by the IRS, incorporated with the goal of using the theme of Ham Radio to further and enhance the education of young people nationwide. Your property donation or financial support would be greatly appreciated and acknowledged with a receipt for your tax deductible contribution. Have a wonderful vacation, but remember your support is needed as much in the summer as the rest of the year. WB2JKJ and the crew do not stop when school does. Please write to us at: P.O. Box 1052, New York, NY 10002, or call our round-the-clock hotline: (516) 674-4072. Thank you!

COUNTY OUTLINE MAPBOOK: For each of the fifty states. 8 1/2 x 11, 70-pound opaque paper, 3-hole punched, space for logging contacts. Only \$7.50 plus \$2.50 shipping. Mobile QSL Bureau Press, Box 6436-A, Florence, SC 29502.

The DX Bulletin provides all the DX, propagation, QSL, equipment, DXpedition information you need, every week. SASE or call for samples. Box 50-C, Fulton, CA 95439 (707-523-1001).

FULL COLOR QSL CARDS made on Kodak paper from your negative, slide or print, \$32.95 per 100. Request samples (enclose \$1.00). BIZCARD CO., Box 191-C, Stevensville, MI 49127.

OLDTIMERS! N6AW is writing a book about W6AM. If you have a story to tell about Don Wallace, take a few minutes to jot it down and send it to me. Jan D. Perkins, N6AW, 524 Bonita Canyon Way, Brea, CA 92621.

The DX Magazine is your monthly ticket to the DX game: DXpedition reports, QSL managers, propagation, equipment reviews, more. Only \$15/year. Box 50C, Fulton, CA 95439 (707-523-1001).

ELECTRONIC COMPONENTS: Free 192-page catalog including, capacitors, resistors, relays, connectors, soldering equipment, and supplies. MOUSER ELECTRONICS, 1-800-992-9943.

WRITTEN EXAMS SUPEREASY. Memory aids from psychologist/engineer cut studytime 50%. Novice, Tech, Gen: \$7 each. Advanced, Extra: \$12 each. Moneyback guarantee. Bahr, 2535-D7 Marietta, Palmbay, FL 32905.

The *World Ham Net Directory* lists special interest ham nets for DXers, missionaries, weather watchers, retired persons, and many other interests. \$9.95 plus \$1 shipping (\$2 foreign) US funds from Tiare Publications, P.O. Box 493, Lake Geneva, WI 53147.

EMBROIDERED EMBLEMS, ENAMELED PINS, your design, excellent quality, free booklet. A.T. PATCH CO., Dept. 67, P.O. Box 682, Littleton, NH 03561 (603-444-3423).

Rusprint QSLs. Working to help you look good and log that hard earned contact. Several card themes. (Cartoon, Patriotic, Mike & Key, Contest, Others.) Prices? Some low as 2.5 cents each! Quantities? Start at 100. Plastic card holders. Display 20 cards. 3-\$3.95. 4 & up \$1.20 each. More information? Business SASE with 45¢ postage. Rusprint, Rt 1, Box 363CQ, Spring Hill, KS 66083.

ATLAS Radios Wanted—Working or not. RF PARTS Co. (619) 744-0720, 800-854-1927.

HAVE AM CAPABILITY? Join SPAM (Society for the Promotion of AM). For information and membership, send \$1 and SASE to SPAM, WB6TRQ, Box 62, Potrero, CA 92063.

HAMLOG COMPUTER PROGRAM. Full features, 17 modules, Autologs, 7-band WAS/DXCC. Apple \$19.95. IBM, CP/M, Kaypro, C128 \$24.95. CQ—KA1AWH, PB2015, Peabody, MA 01960.

CB-TO-10M CONVERSIONS: FM kits, frequency modification hardware, books, plans, high-performance CB accessories. Catalog \$2. CBCI, Box 31500CQ, Phoenix, AZ 85046.

HIGH-QUALITY TOOLS AND STAINLESS STEEL HARDWARE, ELECTRONIC SOLDERING STATIONS/IRONS. European and American screwdrivers, nutdrivers, wire cutters, pliers, hex keys, balldrivers, and more! Free catalog. Robert Mink Import-Export, Box 6437C, Fair Haven, NJ 07704 (201-758-8388).

K1BV's GIGANTIC AWARDS DIRECTORY. Complete rules 1050 different certificates from 103 countries. 230+ pages. \$15.60 postpaid. Ted Melinosky, 525 Foster St., South Windsor, CT 06074-2936.

URM-25() R.F.; URM-127 Audio Generators \$150 ea. (Accessories Extra While They Last.) Generators, P.O. 7057, Norfolk, VA 23509 (804-853-9146).

Electronic Kits & Assemblies. For our latest catalog send a large SASE (45¢) to: A & A Engineering, 2521 W. LaPalma #K, Anaheim, CA 92801.

RTTY JOURNAL: Published ten times per year. Covering the digital modes of RTTY, AMTOR, FAX, PACKET, plus technical and other interesting articles about this fascinating phase of Ham radio. \$10.00 per year USA, foreign slightly higher. RTTY JOURNAL, 9085 La Casita Ave., Fountain Valley, CA 92708.

BROWNIE'S QSLs since 1939. Catalog & Samples \$1.00. 3035 Lehigh St., (REAR), Allentown, PA 18103.

"The '850 Found a New Friend"



The industry standard RC-850 Repeater Controller can now talk with your computer.

And there's so much for them to say!

The '850 computer interface improves the management of your voice repeater system. It allows you to command and program interactively from your terminal or personal computer using a MODEM or packet TNC. Even preview and edit repeater messages by typing words from the controller's vocabulary directly into message slots.

Retrieve and catalog data relating to your site measurements, equipment status, and repeater and command activity. Download

and print out the information programmed into your controller. And view your system "front panel" on your computer screen.

You'll find the RC-850 controller on the leading voice repeaters around the world. ACC pioneered remote programming of repeaters - and continues to pioneer with remote computer access. While the rest of the world just talks about catching up, ACC continues to lead the way in advanced repeater technology.

Now, with its computer interface, the '850 can be best friends with your computer.

acc

advanced
computer
controls, inc.

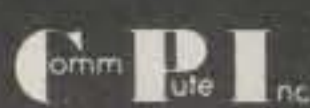
2356 Walsh Avenue, Santa Clara, CA 95051 (408) 727-3330

CIRCLE 98 ON READER SERVICE CARD

KENWOOD ICOM YAESU

We want to be Your Radio Store

Full Line of Amateur Radio and Computer Interfacing & Accessories. - Tim W7IQY or Preben K7KMZ



(801) 467-8873

(800) 942-8873

1057 E. 2100 So. Salt Lake City, Utah 84106

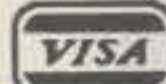


PORTA-BEAM Model DL-146

At last! A completely portable 2 meter three element Delta loop beam. Easy to set up with no small parts to lose. Low VSWR over entire 2 meter band. Gain equivalent to a 4-element Yagi. All elements and feed line with BNC connector store inside a 3 ft boom. An ideal emergency antenna, backpackable (18 oz.), general field use with accessory mast. Money back if not fully satisfied.

\$84.95

(Free shipping)



P.O. Box 520011-C
Salt Lake City, UT 84152

SUMMITTEK

AM (801) 277-4205



Quality Microwave TV Antennas

Multi-Channel 1.9 to 2.7 GHz, 40dB + Gain

30-Channel System complete \$149.95

12-Channel System complete \$104.95

2-Channel System complete \$ 79.95

Phillips-Tech Electronics

P.O. Box 8533 • Scottsdale, AZ 85252

(602) 947-7700 (\$3.00 Credit all phone orders!)

MasterCard • Visa • CODs Quantity Pricing

THEY'LL THINK THEY'RE JUST HAVING FUN



YOU'LL KNOW THEY'RE LEARNING

Carole Perry's (Dayton 1987 Ham of The Year) "Introduction To Amateur Radio" package allows children of all abilities to achieve success.

Ready-to-teach package contains: Teacher's Manual with 26 lesson plans, Code Practice Oscillator for Morse Code practice, Spacecode audiocassette which follows lesson plans. **\$99.95**

● FREE Video Tape Showing Classroom Use

- Any motivated teacher can teach the program.
- Ham Radio program is used as a motivational tool to teach skills in other subject areas.
- 24 hour Hotline is available for help and questions.
- High motivational activities, homeworks, fund raisers, quizzes, & reproducibles included.



Media Mentors inc.

P.O. Box 131646
STATEN ISLAND,
N.Y. 10313-0006
718 983-1416

CIRCLE 73 ON READER SERVICE CARD

QSL SALE! 100 QSL cards, plus bonus, \$8. \$3 thereafter. Shipped postpaid within two weeks. Guaranteed correct! Free samples. Shell Printing, KD9KW, Box 50, Rockton, IL 61072.

SUPERFAST MORSE CODE SUPEREASY. Subliminal cassette, \$10. LEARN MORSE CODE IN 1 HOUR. Amazing new supereasy technique, \$10. Both \$17. Moneyback guarantee. Free catalog: SASE. Bahr, 2535-D7 Marietta, Palmbay, FL 32905.

DIGICOM/64 technical operations manual. Painless operating instructions. NEW EDITION. \$6 ppd. Fuller, N3EFN (Dept. CQ), RD2, Box 40-31, Guys Mills, PA 16327.

ELECTRONIC TEST EQUIPMENT, parts, tubes, government surplus. Free Catalog. EF Electronics, P.O. Box 326, Aurora, IL 60507.

SUPER HAM PROJECTS & USED GEAR LISTS! Send SASE to: WA4DSO, 3037 Audrey Dr., Gastonia, NC 28054.

CHEAP PACKET for the C64/C128. Digicom 64 TNC emulator disk with documentation and schematics for AM7910 based HF/VHF interface, \$6.00 ppd. Complete kit \$49.95. Assembled \$79.95. Both include free disk. Add \$2.50 shipping. See my 73 Magazine article (August 1988) for details. SASE for information. Barry Kutner, W2UP, 614-B Palmer Lane, Yardley, PA 19067.

ATLAS RADIO—SWAN Repair Service: Factory trained technicians, FAST service and reasonably priced. RF PARTS Co., 1320 Grand, San Marcos, CA 92069. (619) 744-0720, 800-854-1927.

ATTENTION SX-88 OWNERS: Am looking for past and present owners of SX-88's to begin a registry of these receivers for historical purposes. Contact Bob Forman, W9RJH, Monmouth, IL 61462-0068.

WANTED: Kenwood TS-440S, accessories. KJ6HL (818) 887-6750.

COMMUNICATIONS BATTERIES: CLONE-PACKS! ICOM BP-3S Double BP3 "Wall Chargeable" \$43.95, BP5 \$42.95; YAESU FNB2 \$21.95; SANTEC 142/442/1200 (3 pin) \$22.95. "REBUILDING—SEND-UR-PACK" ICOM BP3 \$20, BP5 \$28, BP7/8 \$34; Yaesu FNB4/4A \$38; Kenwood PB21 \$18, PB25/H/26 \$28; T-T 2991 \$29. "U-DO-IT REPAIR INSERTS" ICOM BP2 \$18.95, BP3 \$16.95, BP5 \$23.95, BP7/BP8 \$28.95; KENWOOD PB21 \$12.95, PB24 \$19.95; AZDEN 300 \$22.95; YAESU FNB4/4A \$32.95; TEMPO S1,2,4,5,15/450 \$22.95; "ANTENNAS" 2MTR 5/8-Tel/BNC \$18.95. "CORDLESS PHONE AND PAGER BATTERIES." BEST PRICES—FREE CATALOG. PA + 6%. \$3 Shipping/order. VISA-M/C + \$2. Call (814) 623-7000. CUNARD ASSOCIATES, Dept. C, R.D. 6, Box 104, Bedford, PA 15522.

COUNTY HUNTER'S MOBILE REPLY CARDS: ONE CENT SALE—90# white index, black ink, no call. 500/\$5.00; 1000/\$10.00. Your call in to A.R.S. 500/\$7.50; 1000/\$14.00. Add \$2.50 shipping/500; \$3.50 shipping/1000. We print QSL cards—Standard and custom. SASE for samples and prices. Mobile QSL Bureau Press, Box 6436-A, Florence, SC 29502.

MOSLEY 75 METER 2-element linear loaded beam, 82 foot elements, 36 foot boom. One of a kind prototype. Works great. Used 3 months. Sold QTH, must sell antennas. Cost \$2900, sell \$1497. KK4WW, P.O. Box 1, Blacksburg, VA 24063 (703-382-4458).

RADIO OPERATOR'S WORLD ATLAS. 215 hardbound pages of detailed color maps and statistics. Obscure DXCC countries like Rotuma included. Compact 5" x 7" size replaces clumsy jumbo atlases. Send \$16.95 to: WQCP, 4150 E. Quincy Ave., Englewood, CO 80110.

WANTED: Good working AN/GRC-9 unit. C. Hayes, 3675 Estates Drive, Florissant, MO 63033.

RADIO SHACK COLOR COMPUTER Ham Software and Hardware. Free catalog. Dynamic Electronics, Box 896, Hartselle, AL 35640 (205-773-2758).

R-390A RECEIVER PARTS: Info SASE. CPRC-26 military Man-pack Radio, 6 meter FM, with antenna, crystal, handset: \$22.50, \$42.50/pair, radio-only \$9.50. Military-spec TS-352 Volt/ohm/Multimeter, leads, info: \$12.50. Patrol Seismic Intrusion Device ("PSID") TRC-3: \$37.50 apiece, \$127.50/set of four. Add \$4.50/piece shipping, \$9 maximum. Baytronics, Box 591, Sandusky, OH 44870.

FREE Ham Gospel Tracts. SASE. N3FTT, 5133 Gramercy, Clifton Heights, PA 19018.

STAINLESS STEEL U-BOLTS, Turnbuckles, Eye Bolts, Screw Eyes, Rivets, Bolts, Screws. Small Quantities, Free Catalog. Elwick, Dept. 734, 230 Woods Lane, Somerdale, NJ 08083.

NEW NOVICE? Looking for a low-priced rig? Try the Communications Exchange Sheets. Sample \$1.00. CES, 2224 Cooper, Sheboygan, WI 53083.

QUADS: Lightweight, fiberglass construction. Ten meter \$89.95; 10 and 15 meter \$139.95; 10, 15, and 20 meter \$199.95. Lightning Bolt Antennas, RD#2, Volant, PA 16156 (412-530-7396).

AU-PAIR IN AUSTRIA: We are looking for an Au-pair person to stay with us from Sept. 89 until July 90. Two children (10/12 years), contract according to Austrian regulations. Amateur station available. Gerhard Elsigan, OE3GEA/5, Traunfuerstr 143a, A-4053 Haid, Austria.

WANTED: MILITARY SURPLUS R.F. Harris Corp. Model RF280 transceiver, RF281 Antenna Coupler, RF280 Module Boards, URC-94 Transceiver. Also need ARC-164, ARC-150, ARC-159 radios. Top dollar paid, or trade for new amateur gear. Write or phone Bill Slep, 704-524-7519, Slep Electronics Company, Highway 441, Otto, NC 28763.

ROSS'S\$\$\$ NEW JULY SPECIALS: KENWOOD TH-205AT \$249.90, TW-4100A \$459.90, TM-231A \$390.90, TS-440S \$1039.90, TH-31AT \$199.99, KLM KT-34A \$384.90, 435-40CX \$199.90, ICOM IC-27A \$334.99, IC-45A \$289.90, IC-32AT \$539.90, IC-725 \$809.90, MFJ 1278 \$224.90, 949C \$134.90, 986 \$239.90, 1278 \$224.90, YAESU FT-711RH \$369.90, FT-411 \$336.90, FT-109RH \$276.99, FT-209RH \$276.99, FT-73RTT \$289.90, FT-33RTT \$299.90. CUSHCRAFT ARX2B \$39.90, R4 \$204.90, A3 \$259.90. All L.T.O. (Limited Time Offer). LOOKING FOR SOMETHING NOT LISTED?? CALL OR WRITE. Over 8780 ham-related items in stock for immediate shipment. Mention ad. Prices cash, F.O.B. Preston. Hours Tuesday-Friday 9:00 to 6:00, 9:00 to 2:00 P.M. Mondays. Closed Saturday & Sunday. ROSS DISTRIBUTING COMPANY, 78 South State (P.O. Box 234), Preston, Idaho 83263. Call (208) 852-0830, FAX (208) 852-0833.

UNIVERSAL TIMER: LCD display of world time and temperature in F° or C°, 24 zones, \$22. See February CQ page 62. Small solar panels chargers from \$10. Send SASE. NY add tax. B.E.A.M., Solar & Electronics, 6205 11th Ave., Brooklyn, NY 11219.

WANTED: Simple X-Y oscilloscope as a tuning indicator displaying audio signals. N2ETH, 97 Tindle Ave., Buffalo, NY 14224.

AMIGA, MACINTOSH, ATARI, XL/XE/ST Amateur radio public domain software for \$4.00 disk. SASE with two stamps for catalog. Specify computer! Kinetic Designs Hamware, Box 1646, Orange Park, FL 32067-1646.

UL7DA (Oblast 029) is in need of recent International and North American Callbooks. If you have a set you can spare, sent them to L.A. Kuznetsov, UL7DA, P.O.B. 1, 490038, Semipolatsinsk, Kazakh, USSR.

WANTED: Kenwood IF-232C level translator; SB-110 6 meter transceiver; original copy MFJ-1286 gray-line program. WB2WPM or FAX 716-862-4176.

C64-128 SOFTWARE: 1000's of programs for ham, education, utilities, games. \$3.50 to \$5.00 per disk. SASE for catalog. Manna Software, 15426 Yukon Avenue, Lawndale, CA 90260.

HAM PROGRAMS and other "shareware" for IBM/compatibles. Large SASE for catalog. JK&S, POB 50521, Indianapolis, IN 46250-0521.

TEKTRONIX oscilloscopes and other surplus equipment. Send #10 SASE for catalog. MACTRONICS, 19625 S.W. 269 Street, Homestead, FL 33031.

ROSS'S\$\$\$ USED July SPECIALS: KENWOOD TS-530S \$619.90, R-300 \$189.90, T-599D & R-599D \$509.90, TS-930S W/AT \$1399.90, ICOM IC-211 \$389.90, IC-271H \$689.90, PS-20 \$159.90, YAESU FTV-650 \$179.90, YO-100 \$169.90, FT-720VH \$229.90, YC-601 \$169.90, ROBOT 400 \$329.90. Looking for something not listed?? Call or write. We have over 235 USED ITEMS in stock. Mention ad. Prices cash, FOB Preston. Hours Tuesday-Friday 9:00 to 6:00, 9:00 to 2:00 P.M. Mondays. Closed Saturday & Sunday. ROSS DISTRIBUTING COMPANY, 78 South State, P.O. Box 234, Preston, Idaho 83263 or call (208) 852-0830, FAX # (208) 852-0833.

REPEATERS JAMMERS? Pinpoint them with our "Handi-Finder"—attaches to HT. Kits: \$24.95, or less! Club project discounts! NOARD, 29460-C Lorain, Cleveland, OH 44070 (216-777-9460).

WATTMETER: Dentron WP2A (2K PEP) \$60. C. Perry, Box 4583, Yuma, AZ 85364.

THE NATIONAL HAM SHOPPER "NHS." monthly buy, sell, trade publication. Why keep that OLD RIG around? You could turn it into CASH\$ or another rig you always wanted. Ads are quickly advertised and answered for fast results. As a NEW SUBSCRIBER you can place one FREE AD (with a 60 word limit). Ad Rate: Noncommercial .25/word; Commercial .60/word. Subscription: \$10.00/year, \$20.00/2 years. SEND TO: NHS, P.O. Box 10738, Elmwood, CT 06110.

ANY QSL CARD, message, photo, business card, etc., put in a 2 1/4 or 3 inch button. Specify size and pin or mirror back. Send with \$3.95 to Custom Badges, 303r River Road, South Hadley, MA 01075.

HEWLETT-PACKARD Model 606A Signal Generator, 50 kHz to 65 MHz, for communication equip. servicing. \$100/\$150 or trade for linear amplifier parts, vacuum capacitors/relays. A. Emerald, 8956 Swallow, Fount. Vly., CA 92708.

TWO OF AMERICA'S MOST POPULAR FM STATIONS.



No wonder Yaesu's FT-212R Series and FT-4700RH mobiles are so popular.

Not only are the features unique and plentiful. The operation hassle-free. And the mounting options flexible. But also, each radio now features a built-in PL board. Plus *you* choose the optional mic that best fits your operating and budget needs.

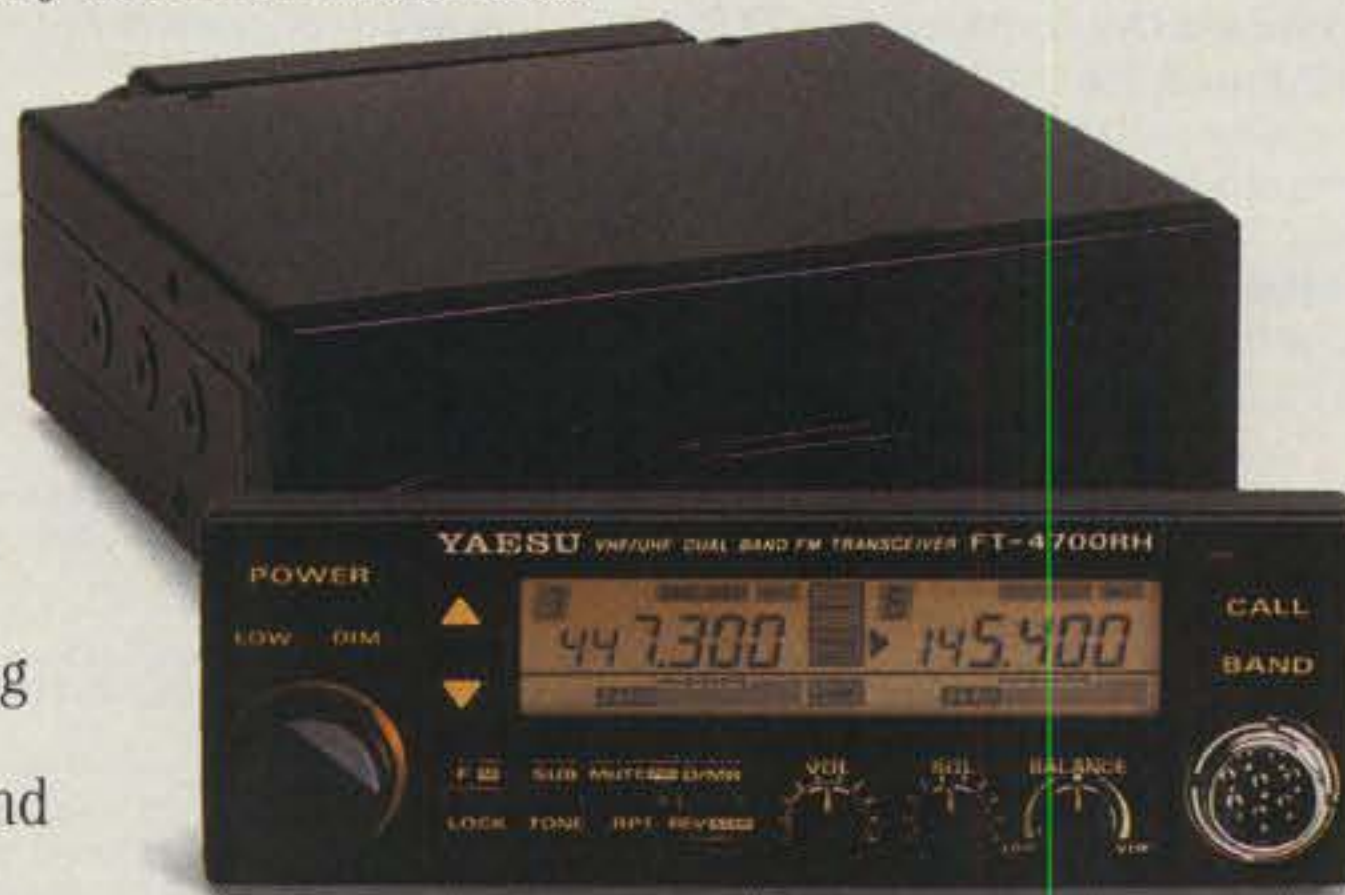
FT-212R SERIES. MOBILES THAT DOUBLE AS ANSWERING MACHINES.

FT-212R take messages while you're away (with DVS-1 option)! 45-watt output (35W on 440 MHz). Built-in PL encode/decode. 18 memories. Auto repeater shift. Scanning routines. Offset tuning from any memory channel. Extended receive. Audible command verification. High/low power switch. Oversize amber display. Choice of optional mic. More.

Let the 2-meter FT-212R and 440-MHz

FT-4700RH. DUAL-BAND PERFORMANCE, REMOTE-HEAD DESIGN.

Mount the FT-4700RH almost anywhere—the "brains" on your dash, visor, or door; the "muscle" under your seat. 50 watts on 2 meters, 40 watts on 70 cm. Full crossband duplex. Simultaneous monitoring of each band, complete with independent squelch settings on the main and secondary bands. Built-in PL encode/decode. 9 memories (each



band). Extended receive. Reverse repeater shift. High/low power switch. Patch cord for remote mounting. Bright LCD display. Backlit controls. Choice of optional mic. More.

Want more information? Call **(800) 999-2070** toll-free. Or ask your dealer about Yaesu's FT-212R Series and FT-4700RH mobiles today. Two of America's favorites.

Choose your optional mic: MH-15 C8 DTMF mic, or MH-15 D8 DTMF auto-dialer mic



YAESU USA 17210 Edwards Road, Cerritos, CA 90701
(213) 404-2700. **REPAIR SERVICE:** (213) 404-4884.
PARTS: (213) 404-4847.

YAESU

Prices and specifications subject to change without notice. PL is a registered trademark of Motorola, Inc. Specifications guaranteed only within amateur bands.

If you enjoy Amateur Radio, you'll enjoy CQ.



It's a different kind of ham magazine. Fun to read, interesting from cover to cover, written so you can understand it. That's CQ. Read and enjoyed by over 80,000 people each month in 116 countries around the world.

It's more than just a magazine. It's an institution.

CQ also sponsors these thirteen world famous awards programs and contests: The CQ World Wide DX Phone and CW Contests, the CQ WAZ Award, the CQ World Wide WPX Phone and CW Contests, the CQ World Wide VHF WPX Contest, the CQ USA-CA Award, the CQ WPX Award, the CQ World Wide 160 Meter Phone and CW Contests, the CQ Five Band WAZ Award, the CQ DX Award, and the highly acclaimed CQ DX Hall of Fame. Accept the challenge. Join the fun. Read CQ.

Also available in a Spanish language edition. Write for rates and details.

SUBSCRIBE TODAY!



The Radio Amateur's Journal
76 North Broadway
Hicksville, NY 11801

Please start my CQ subscription with the next available issue.

Enclose payment or charge information with order. Term and Rate (check one):

	USA	VE/XE	Foreign
1 Year	<input type="checkbox"/> 19.95	<input type="checkbox"/> 22.	<input type="checkbox"/> 24.
2 Years	<input type="checkbox"/> 38.	<input type="checkbox"/> 42.	<input type="checkbox"/> 46.
3 Years	<input type="checkbox"/> 57.	<input type="checkbox"/> 63.	<input type="checkbox"/> 69.

Paid by: Check Money Order
 VISA MasterCard

Card Number:

--	--	--	--	--	--	--	--	--	--

Allow 6-8 weeks for delivery of first issue

Name _____
Street _____
City _____
State or Country _____ Zip _____

AMRAD COMPUSOFT: IBM Compatible computer software by a ham for the ham. All easy to use and simple. Currently available: FieldDay, \$15.95. Logging and dupe program. Fast and accurate. PacBoard, \$10.95. Community packet BBS. PacTerm, \$10.95. Simple generic packet terminal. LogBook, \$8.95. Simple shack log book. To order, send check or money order to AMRAD COMPUSOFT, 182 Harborview, Lake St. Louis, MO 63367. Mo. residents add 6.725% tax. Allow 4-6 weeks delivery.

Over 500 **Familiar Sayings.** Booklet \$5.00. Ted Besesparis, W4NPM, Box 4242, Lantana, Florida 33465.

LEARNING MORSE CODE? ALREADY KNOW IT BUT NEED PRACTICE? Got MORSEMAN PLUS!!! MORSEMAN PLUS is a Morse Code tutor/trainer program for IBM-PC's and compatibles. MORSEMAN PLUS will teach Morse Code to a beginner or practice the old timer at any speed from 5-9 wpm. MORSEMAN PLUS will send random characters or random words and MORSEMAN PLUS will also send text from ANY ASCII file or directly from the keyboard! Version 3.0 is only \$17.95 (\$18.95 for 3.5" disk). The next release FREE to registered users of MORSEMAN PLUS 3.0!!! Send check or money order (no cash please) to: Robin Gist, NE4L, P.O. Box 975, Auburn, AL 36831-0975. Order now and upgrade sooner!

NOVICES, here's the chance to find that first rig. Want ads in the Communications Exchange Sheet are only \$2.00. Send SASE for info, or ad to: CES, 2224 Cooper, Sheboygan, WI 53083.

HAM TEST EQUIPMENT, RCA VoltOhmyst \$15, RF Sig-Gen \$45, AF Sig-Gen \$35. Large list. K6KZT, 2255 Alexander, Los Osos, CA 93402 (805-528-3181).

WANTED: Bypass and 160 conversion for the Johnson Viking Matchbox #250. Marvin Rosen, N3BQA, 20 W. Madison St., Baltimore, MD 21201 (301-685-6308).

FOR SALE: Midland 2 mtr. rig, nine sets of crystals installed, \$85. R/A Scanner programmable, \$125. Complete color computer, everything goes with it, \$300. More info send SASE to P.O. Box 518, Whitehouse, FL 32220.

TUBES: Large selection, very low prices, all widely used in radio equipment. SASE for price list to Arne at 5725 West Lake St., St. Louis Park, MN 55416.

WANTED: Tektronic 310A scope and Eico 810 dipper manual or copy. George Marts, W0TDH, 5022 Pennsylvania, St. Louis, MO 63111 (314-353-7669).

WANTED: Old issues of CQ, QST, Ham Radio Horizons for collection. I1POR, Gianluigi Portinaro, Via Deandreis 52, 13040 Palazzolo Verc., Italy.

CRYSTALS: SASE for my list. K8LJQ, 2023 Lannen Rd., Howell, MI 48843.

SELL: 8877 Eimac new in sealed box, purchased 1987, \$475. Art, K1UKO, 203-853-0587.

KENWOOD VFO-820, like new in original box, manual and cable, \$130. Will ship. Ken, 614-532-9606.

BUY: Amateur radio equipment, good/bad. For large list/\$1 and SASE. Joe Bedlovies, 241 Dover Street, Bridgeport, CT 06610.

YAESU FT-980, filters, updates, SP-980P, MD-1, all perfect, \$1195. FC-757AT, \$250. IC-745, FM board, \$695. FOB K1LEC, 802-886-8121.

WANTED: Rohn EF-25 erection fixture (gin pole), Ameritron RCS-8V, Kenwood AT-230, HC-10 clock. Sell: Cushcraft 22SK, A-147-22, K0MK, 218-865-6541.

WANTED: Owner's manual for the Tempo RBF-1 SWR/watt meter. Also want Tempo 20/20 HF, CT 220-TR FM trans, AC power supply/spkr, CT220-40 or CT220-80 amp, ext VFO, CT606-b2 or CT606-02 FM amp, and Tempo HF linear. Owner's manual for the VESTO 44 foot tower and platform. Anyone wishing to part with BLACK Tempo equipment please send list and prices to Wayne Smith, KC41LD, 7040 SW 17th Place, Ocala, FL 32674 (904-237-6351).

FREE: Ham Radio Gospel Tracts. SASE N3FTT, 5133 Gramercy Dr., Clifton Hts., PA 19018.

WANTED: Copy of owner's manual for the Tektronics Type 502 oscilloscope. Please send your info and price to N9GXA, Rte. #1, Box 122, Berne, IN 46711.

SX-96 plus 12 inch speaker, good shape, \$90, has book. TR4-C/34PNB/RV4-C/AC-4 mint with book, \$380. All gear U ship. K7ABV, 406-727-7032.

FOR SALE: YAESU FR-101 communications receiver. Covers ham bands plus general shortwave bands. Also includes 2 and 6 meter modules. In excellent condition, \$225. John Ladd, N7HZG, 10869 Forest Ln. NE, Bainbridge Island, WA 98110.

DONATE OLD QST, CQ, ARRL Handbooks for Korean Ham Club, KARL. Mike Bae, 1340 Miravalle Ave., Los Altos, CA 94022.

FOR SALE: Attention key collectors (1 only), manufacturer Theodore R. McElroy, Deluxe Model MacKey, SN 365 (base black in color, 1934 vintage). Serious inquiries only. Tony Musero, K3UKW, 1609 So. Iseminger St., Phila., PA 19148 (215-271-8898).

WANTED: Hy-Gain, Telrex, Wilson 5-element 10 and 15 meter mono-band antennas, Bird 43 wattmeter, Kenwood DM-81 dipmeter, YK-88SN filter, ICOM PS-30. K0MK, 218-865-6541.

FREE: 89 foot motorized tower: US Tower HDX589-MDPL, complete, 2 yrs. old. You remove and pay all costs. 1-716-837-8311.

WANTED TO TRADE: C64 PD programs on disk, have games/utility/ham. Don Traves, WB4CVH, USN Section, USMTM DET. JUBAIL, APO New York, NY 09298-5006.

LEARN CW with your Commodore. Sell AEA DQ-64 Doctor Trainer Simulator, \$50. Commodore 1571 disk drive, \$100. Trade for MC60A or 2M Kenwood transceiver. Angel, 212-304-3870 evenings.

WANTED: HQ-215, HE-30/KT320, Adventurer, DX20, DX35, HG10, 2-NT, 2-C, B-line. Must be inexpensive, clean cosmetically and mechanically. Dave Heil, J52US, Bissau/Dept. of State, Wash., D.C. 20520-2080.

HEWLETT-PACKARD Model 606A Signal Generator, 50 kHz to 65 MHz, for communication equip. servicing. \$100/\$150 or trade for Linear Amplifier Parts, Vacuum capacitors/relays. A. Emerald, 8956 Swallow, Fount. Vly, CA 92708.

BUY: Amateur Radio Equipment, Good/Bad. For large list/\$1 and SASE. Joe Bedlovies, 241 Dover Stret, Bridgeport, CT 06610.

CRYSTALS: SASE for my list. K8LJQ, 2023 Lannen Rd., Howell, MI 48843.

SELL: Tempo One (Grey), Palomar meter, Shure 444 mic, new finals \$275; Midland 13-898B, 40 ch, with freq. counter, Turner +3 mic \$250. Pete, P.O. 463, Austin, MN 55912.

CQ, QST, HANDBOOKS FOR SALE: SASE for list and prices. W3ICZ, Hemlock Farms, Box 1580, Hawley, PA 18428.

TS-940S OWNERS: Select memory banks from front panel with my modification. Send SASE and quarter to Ralph Cabanillas, Jr., W6IL, 2359 Creston Dr., Los Angeles, CA 90068.

WANTED: Old AM Broadcast Radios of the 20s, 30s, 40s, 50s, and earlier. Please write with full description including condition and price. Gerry Skloot, 2923 Mandalay Beach Road, Wantagh, NY 11793 (516-221-3535).

FOR SALE: 13-500 Midland Mobile 2 meter Rig with 9 sets of crystals installed. 144-148 comes with Mike and manual, \$85. R/S DX-300 SW Receiver, \$150. For more info send SASE to P.O. Box 518, Whitehouse, FL 32220.

FOR SALE: Drake 2C Receiver and Drake 2NT Transmitter. Both in good condition. Assorted crystals included. \$150, I ship. Phone (606) 474-6896.

FOR SALE: Drake SPR4 shortwave receiver, very good condition with 23 xtals, \$299. Alpha 77D amp, \$2,795. K3UKW, Tony Musero, (215) 271-8898.

NEEDED: Power Transformer for Heathkit HQ-10 Monitor Scope. John Somers, KC3YB, 93-25 Beechwood Place, Crisfield, MD 21817.

WANTED: Atlas 210-X Mobile Transceiver 80-10 meters, good condition, price neg. Cobra 132 late model, or 132-A 23-chan transceiver. Contact Les Roberts at 1-714-838-8963 from 0800 to 1400 PDT. N6RPP

METERS: RCA VoltOhmyst \$15, Heath AC-RMS \$20, Heath IM-11 VTVM \$18, EICO 232 AC-P/P \$20, other items. K6KZT, 2255 Alexander, Los Osos, CA 93402 (805-528-3181).

WANTED: New collectors wants old telegraph keys and bugs. Jerry, N9AW, 414-481-8831.

FT-ONE, all filters and all manuals, excellent condition, \$1200. Call (215) 269-2909.

WANTED: Riteway 4 x 5 backs. Also 250-310MM Modern view camera lenses. T.N. Colbert, WA8MLV, Burton, OH 44021.

WANTED: Yaesu FV-901DM and FTV-901R. Send price and condition to Tim Hoy, Box 3734, La Mesa, CA 92044.

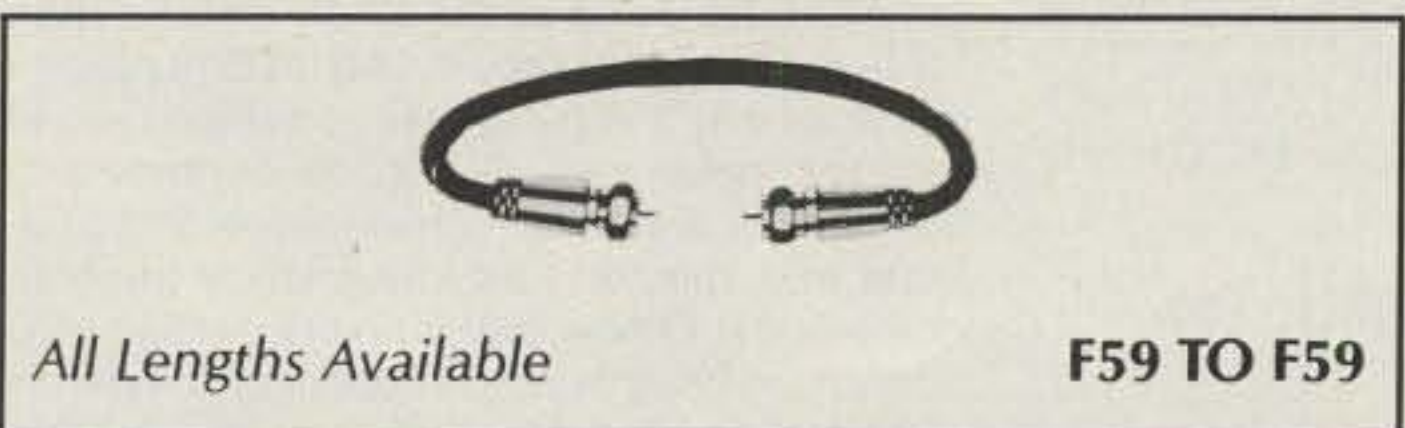
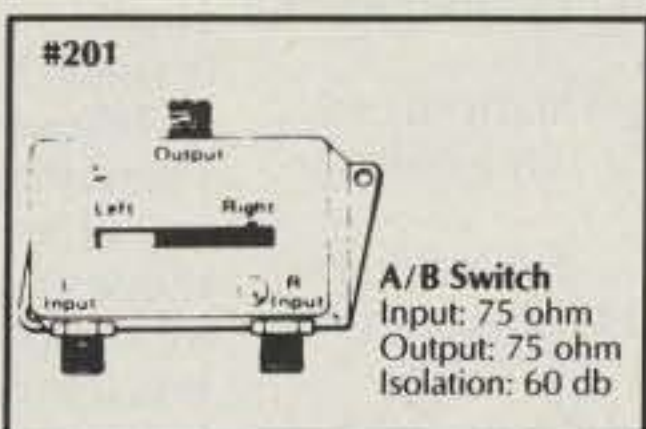
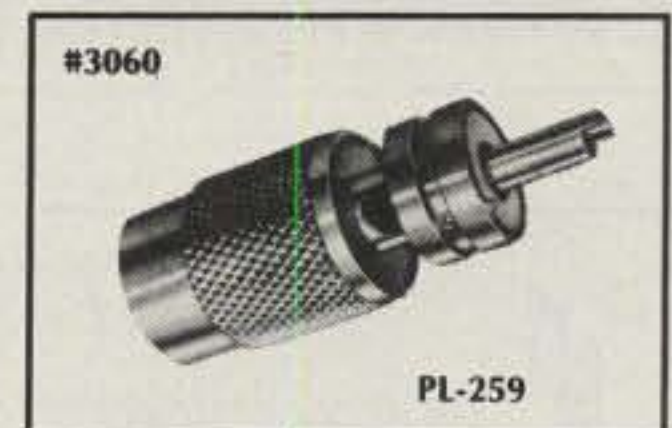
FREE Ham Radio Gospel Tracts. SASE to N3FTT, 5133 Gramercy Dr., Clifton Hts., PA 19018.

FOR SALE: Heights Tower sections AC-18, AJ-26, AJ-30, and aluminum foldover kit for tower sections 18", 22", and 26". VE5ZJ, 27 Delaronde Rise, Saskatoon, Sask., S7J 3Z4 (306-374-8919).

IBM XT COMPATIBLE 512K, 2FD, serial, parallel, mono, like new, \$495 FOB (408) 739-1833. Mike Bae, Box 4808, Santa Clara, CA 95054.

D.L.S. ENTERPRISE, INC.

Quality Ham, Satellite, Cable, and Video Accessories



D.L.S. carries a complete line of Connectors:

- UHF • BNC • 'N' • 'F' • Twin Ax • TNC •

D.L.S. also carries a complete line of Splitters, Amplifiers, Transformers, Surge Protectors, Cable and Cable Assemblies, Switches, and other Accessory related products.

Above are just a few of the many different products D.L.S. carries.

For a FREE CATALOG
Please Call:

305-749-9575
or Write:

To ORDER
or

For QUOTES
1-800-535-8666

D.L.S. ENTERPRISE, Inc.

10278 N.W. 47th Street • Sunrise, FL 33351

Fax: 305-749-6119

CIRCLE 154 ON READER SERVICE CARD



Sparky J Antennas

Balanced J-pole antennas that roll up small enough for your pocket or briefcase, yet have the punch of a full size half-wave radiator. A great answer for apartment dwellers or as a super emergency antenna. Don't leave home without one, because nobody beats these J's—nobody!

20 M—\$49.95
15 M—\$43.95
10 M—\$39.95
6 M—\$32.95
2 M—\$29.95
7 M—\$24.95
Add \$5 S & H

™
using a
Sparky J
here*

Sparrow Hawk Communications
450 Westfield Rd, #C Alpine, UT 84004
(801) 756-7842



VECTOR FINDER

Handheld 2-mtr/220 MHz phase sense direction finder. Used with any FM xcvr. Oil compass.

Type VF-142, \$124.95, \$3.50 S&H. Call/write for info. CA add tax.

RADIO ENGINEERS, 3941 MT. BRUNDAGE
SAN DIEGO, CA 92111 619-565-1319

* OMAR ELECTRONICS *

FOR ALL YOUR AMATEUR NEEDS
SPECIAL PRICES on all

MFJ PRODUCTS * A.R.R.L. PUBLICATIONS *
ALINCO PRODUCTS and other Ham Radio equipment!

VISA 404-466-3241 MasterCard

OMAR ELECTRONICS • Omar Pupo WA8FON

RTE 1 HIGHWAY 81 SO. • LOGANVILLE, GA 30249

HAM RADIO LICENSE SELF STUDY GUIDES

It is easier than ever to become a ham radio operator! All of the questions and answers that appear on all amateur radio license examinations are known and published! All manuals contain all word-for-word questions, multiple choices with correct answer identified. A short explanation tells you why each answer is correct!

WRITTEN TEST PREPARATION

NOVICE (302 Questions) \$4.95
TECHNICIAN (288 Questions) \$4.95
GENERAL (286 Questions) \$4.95
ADVANCED (507 Questions) \$4.95
EXTRA CLASS (441 Questions) \$4.95

(plus \$1.50 shipping charges each)

ALL 5 MANUALS (postpaid) \$22.95

MORSE CODE TEST PREPARATION

The Code Teacher (0-5wpm) \$9.95
(2 cassette tapes - add \$1.50 shipping)
3-15 wpm (Speed Builder) \$4.95
13 wpm Test Prep Tape \$4.95
12-22 wpm (Speed Builder) \$4.95
20 wpm Test Prep Tape \$4.95

(plus \$1.00 shipping charges per tape)

ALL 6 TAPES (0-22 WPM) \$29.95

(Six tapes 0-22 wpm shipped postpaid)

ALL MANUALS/CODE TAPES \$49.95

All orders shipped same day received.

Credit card phone orders - 10 a.m.-2 p.m.

W5YI MARKETING

P.O. Box #565101 • Dallas, Texas 75356

Tel: (817) 548-9594

CIRCLE 85 ON READER SERVICE CARD

Our Readers Say (from page 8)

Postage Problems

Editor, CQ:

Recently I have worked quite a few amateurs on 10 meters, and it gives them and me a thrill to find that I am a first contact for either VE6 or VE7 land. As a result, many do send me an SASE for a fast response, which I am more than happy to answer.

The problem is that it costs 44¢ Canadian to send a first-class letter to the United States. This equates to about 37¢ with the currency conversion. Many hams send me SASEs with 25¢ stamps on them. This results in many of the letters NOT being delivered by Canada Post because of the 7¢ differential. What I have been doing is steaming off the U.S. stamps and affixing Canadian postage, but this practice is becoming quite tedious.

After talking to a few hams in the local area, two other solutions were discussed:

A. Ask hams to send in a green stamp with their cards. I understand many hams cannot afford this practice, so I leave this alternative to those who can afford it; or,

B. Send a blank envelope, as I find it no problem to answer these QSLs but some hams in Canada will not.

This means it is up to the individual hams who are completing the QSO to establish the best route for card exchange.

If a problem arises with the above, there is always the QSL bureau. Thank you for your time, and I hope you can find a way to relay this message to your readers.

Gerald Shand, VE6BLI/VE7
Tumbler Ridge, BC, Canada

Contesters Have Rights, Too

Editor, CQ:

I've been an amateur radio operator now for all of nine months, and have just completed totaling up my log sheets from the CQ WPX SSB

Contest. I did very well considering I was restricted to 10M. I beat the Novice/Tech score of last year by 30 thousand points (I think, hope, I added everything right). But what has me really wired was an incident that happened to me, and I'm sure has happened to other hams as well.

While in a pile-up (I was the pilee) with some JA stations, a loud and almost explosive carrier tone came blasting over my headset. Who's the fool tuning up on frequency that is already in use and loaded with DX, I thought to myself as I tried to copy the calls and QSO numbers of the stations I was in contact with. Needless to say, the JA stations left and the frequency went quiet, all except for the carrier tone, which would start up every time I called contest. I politely said that the frequency was in use, but this person(s) was hell bent on interfering with my signal. I moved to another frequency, asked if it was in use and proceeded to call contest. Sure enough the tone came back. Now this was getting a little ridiculous. It seemed that every time I moved to another frequency this person(s) would follow me as well.

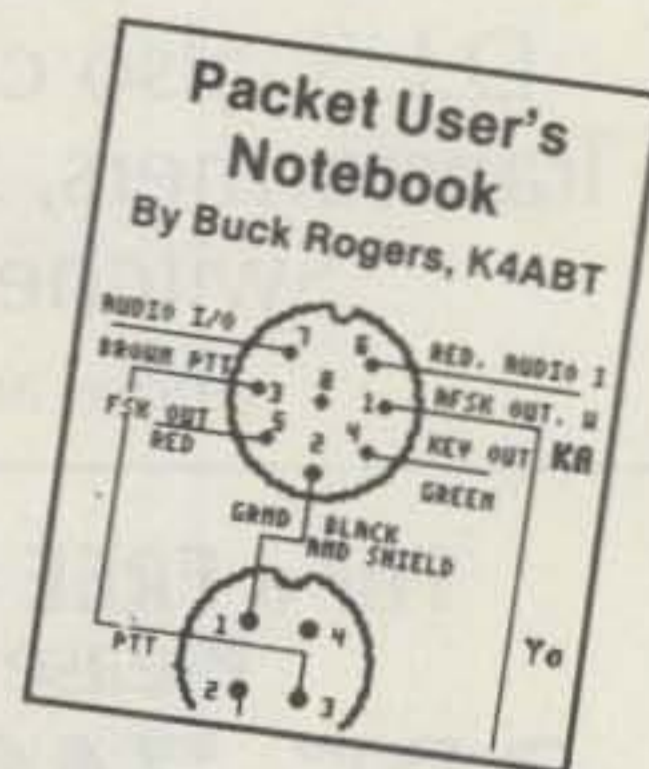
This lasted about 45 minutes. After this time I think this person got tired of jamming my signal, or went on to someone else. Now I know that when a contest is going on it seems that almost all of the bands are in use by us crazies trying to get as many contacts as we can in the time allotted us. It makes the non-contest folks quite angry when they hear this, or when they get into a QSO and all the other operator asks for is a call, signal report, and QSO number. I guess if I was a non-contesting person I would feel the same way. But to deliberately jam someone's signal or cause chaos is something that shouldn't be tolerated by the ham community. I know that it's very hard to stop something like this from happening. Maybe we need to be assigned specific frequencies during the contests, or have a gentleman's agreement. But it was very discouraging and totally

(continued on page 115)

Packet User's Notebook

By Buck Rogers, K4ABT

Available Now!



This brand new book is your one source of essential information for the newcomer or oldtimer. Tips, tricks and techniques from a real insider. Over 90 diagrams showing the tried and true connections for popular TNCs, transceivers and computers. Why chance destroying hundreds or thousands of dollars of equipment with risky connections? This is a genuine nuts-and-bolts how-to-do-it manual that every packet operator should have on the bookshelf. Packet is not only the fastest growing segment of amateur radio, it is the fastest changing, too! Why rely on information that may be a year or more out of date when **Packet User's Notebook** is hot off the press with the latest essential information? Don't "connect" without it. It is only \$9.95, and that's a small price to pay for peace of mind. Order today. (See CQ's Book Shop, p. 48)

Our Readers Say

(from page 114)

uncalled for. I only hope for the jammer's sake that if you happen to read this, you realize that contesters have just as much right being on the air as you do, and that you don't take the fun away from us by intentionally causing interference or jamming our signals.

David S. Weir, N9HQZ
Belleville, IL

Congratulations, W3ASK, on 38 Years!

George, W3ASK:

My grateful congratulations for your 38 years as Propagation Editor for CQ. That's great! Starting your 39th year must give you a great deal of satisfaction and reward.

As an old Prop Hunter, you certainly have given ham radio most excellent service in the field of propagation. Know many amateurs who will not turn on their receivers and transmitters until they look at your monthly Propagation Column. You have earned a ton of appreciation and thanks, George, from every ham in this world. I will assure you if I should reach that Big Radio Shack in the sky before you, I'll save you a place right alongside me so I'll have somebody intelligent to talk to.

Associating with the ham fraternity as much as I have down through the last 71 years since I got my first ham ticket, hams would ask me about propagation, and I'd fire right back, "Do you take CW and read it?" If the answer was yes, then I would tell the person, "Look at

George Jacobs' column on Propagation. He tells it like it is and seldom misses!" Then by golly the lad would ask, "Do you read it, W6ZF?" I would answer, "You bet I do. How would I know if my predictions were right if I didn't read George's column?" That has always brought laughter.

I agree with you. I think this cycle is going to set another all-time record, as you call it. I think this cycle will hit a high of about 224 and look for it in the first three months of 1990! We have had some extremely high solar flux counts in the last month. I think the smoothed count of this cycle will astound us all! In looking at cycles back to 1700, it is amazing to me the number of high cycles, short/long cycles, etc. Wish I had more time to devote to the study, but at my age of 81 I now have so many other things in the hamper that I can't devote the time to propagation I once did. Now USAF MARS is my baby!

Better QRT, as my hook is cleared for now. Take good care, George, and again congratulations on the fine work you have done and continue to do in propagation. You are a known authority and a damn fine human being in this world according to my xtal ball!

Ron Martin, W6ZF
Napa, CA

"Larry's Curtain"

Editor, CQ:

No trees, no money, no tower, new band, no sweat! Here's what I did.

My 80M end-fed inverted "L" allowed me to operate on 17 meters when it was opened to us

(with tuner) but seemed very marginal. I then looked inward to see what I could do.

I have a Butterfly beam in the center of my roof held up with guy wires. Guy wires are the key here. All my guy wires are insulated at the top, since my experiments done long ago indicated this was best. So here is what I did, and maybe this will help you find a solution for your own situation. I tied all my guy wires together at the roof-top level (bottom) with more guy wire except for the last one. This means all six of my vertical (mostly) guys and tie-in wire was "HOT," not grounded. I then fed one corner with coax cable and connected the shield to the rain gutter for ground (all my drain pipes were grounded long ago). This resulted in an antenna that is a "screamer" on 17 and 30 meters. The SWR is 2.2 and 1.9, respectively.

The clincher is it's TWO "S" UNITS stronger than the 80 meter wire on 17 and 30 meters both receive and transmit (using rig "S" meter for measurements). I have worked Perth City, Australia, and Italy with my "barefoot" Kenwood TS-140S on phone on 17 meters in the past week.

I will leave the "why" it works to the experts. Try it, it works! Or write to me and I will try to help you out.

I am now working on another antenna for the attic with approximately 500 feet of wire (twin-lead). If successful, I will probably remove all outdoor antennas, since I lost my whole station to a lightning strike two years ago. I'll keep you posted.

Larry Coppala, KD4ZD
9500 Sissone Drive
Fairdale, KY 40118

Round-trip to Europe* on G.A.P. Airwaves for only \$169.00

Introducing

THE CHALLENGER DX-V

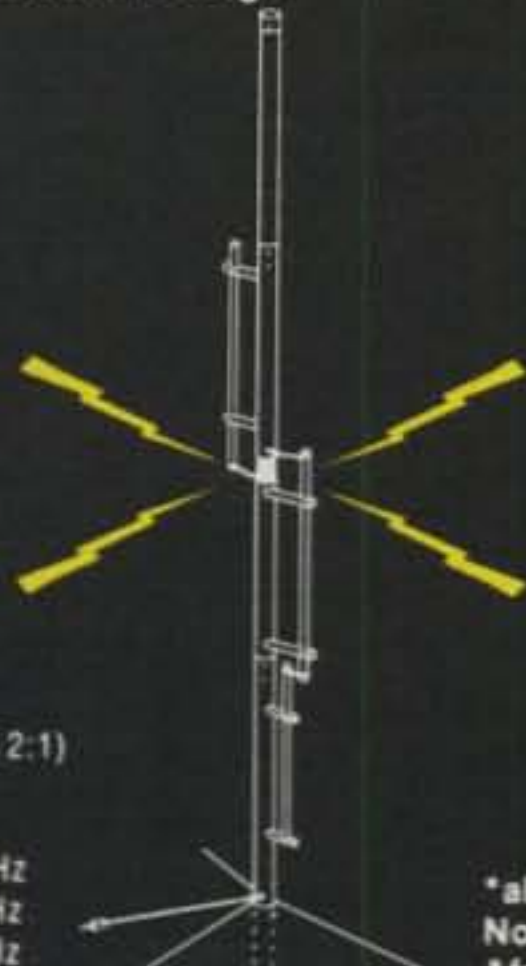
A Unique Multiband Antenna that Utilizes the Patented
G.A.P. Center Launch Technology

The Revolution in Antenna Design

That . . .

but has NO!!!

- Operates all five bands 80'-40'-20'-15'-10m
- Launches RF from an elevated G.A.P.
- Provides 1500 W peak operation
- Assembles in less than 30 minutes
- Comes pre-tuned. No adjustments are necessary
- Has short Radials 3 @ 25'
- Is self-standing with a drop in Ground Mount
- Is only 31 Feet High
- Has a wide bandwidth (less 2:1)
- Three portions of 80m band available.
Low—Ctr Nominally 3.6 MHz
Mid—Ctr Nominally 3.8 MHz
Top—Ctr Nominally 3.9 MHz



- Traps
- Coils
- Transformers
- Baluns
- Resistors
- or Base Insulators

*also Asia, South America, North America, Australia, Africa and Antarctica.

Best of all the ENTIRE antenna is always active!!

G.A.P.

To Order Call—(407) 388-2905

\$169.00 plus shipping & handling
Florida residents add 6% tax



ANTENNA PRODUCTS
6010-Bldg. J
N. Old Dixie Highway
Vero Beach, FL 32967

Engineering Consulting's computer controlled Ham Shack
Now display Ultra's screen via packet with automatic update!

Ultra Comshack 64 Repeater Controller

HF & VHF Remote Base* Autopatch* CW Practice* Rotor Control
Voice Meters Paging* Logging* Polite ID's* Packet Control

Model CS64S
\$349.95
Includes: Interface, disk, cables, Manual Simplex version available on request

Comshack 64 Options

Controller Features *Change variables remotely from touchtones or Packet *Unlimited voice vocabulary! *Alarm Clock, auto execute *Individual 4 digit user codes *Disk & Printer logging of users, tel #'s, lapsed time *18 Rotating Polite ID's *16 External relay controls *2-tone & sub tone Paging *CW Practice with voice *Security mode, T.tone mute *Voice announces each user call sign when logging on	Autopatch & Reverse *1020 (18 digit) tel #'s stored *Quick dial & answer *Directed, general page *Selected restricted patch *Telephone control input Dual Combined Remotes *20 Macro memories *Scan up/down; 100Hz steps *Monitor & lock modes *Operate splits, combine HF & VHF radios as Dual VFO's *Automatic mode selection *Talking S Meter; Voltmeter *Voice Beacon rotating msg	External relays; 3 DPDT relays +5 Open Col. Tr. Sw...CS 8\$79.95 *Rotor control D.C. to digital display & Voice; for all rotors.HM1\$49.95 *Packet & BBS; Voice Meters & Alarm Inputs; 8 On/Off PK8 .\$.149.95 *Slave Packet interface & cable Links PK8 to 2nd C64 PK1\$49.95 *EPROM Autoboot, custom PROM cart with your system.CART.\$ 99.95 *C64 & 1541 12V.Switching supply crystal controlled ...DCPS.\$119.95 *System Manual ;Refunded with purchase of CS64S.....MN1...\$ 15.00
--	---	--

Computer Control YAESU FT-727R C64 OR IBM Mini Cat Allows H.T. to scan 100 Channels & programs H.T. for field use! Digital "S" Meter; comment fields; auto resume & delay; Scan Lock-outs; Loads FT727 in 15 sec. Hardware, cables, & disk included for C64 or IBM Model 727 \$39.95	Touchtone Decoder 4 digit sequence; & QUAD expansion 4 relay option 2"x3" TSDQ 8/20 V & audio in; Field Program 50,000 Codes; Mom. & Latching; DPDT Relay; Wrong digit reset; LED for digit valid & latch; inc. 24 Pin connector QUAD option adds: four 2 Amp. relays; 5 digit master on/off control for each relay. TSDQ \$79.95 QUAD \$99.95	Decode-A-Pad Touchtone to RS232 300 Baud Interface Use with all computers Decodes 16 touchtones Includes Basic program DAP \$ 89.95 12 Volt C64 SWITCHER Crystal 50Hz 5VAC 5V. 2A. C64 & 1541 DCPS \$119.95
--	--	---

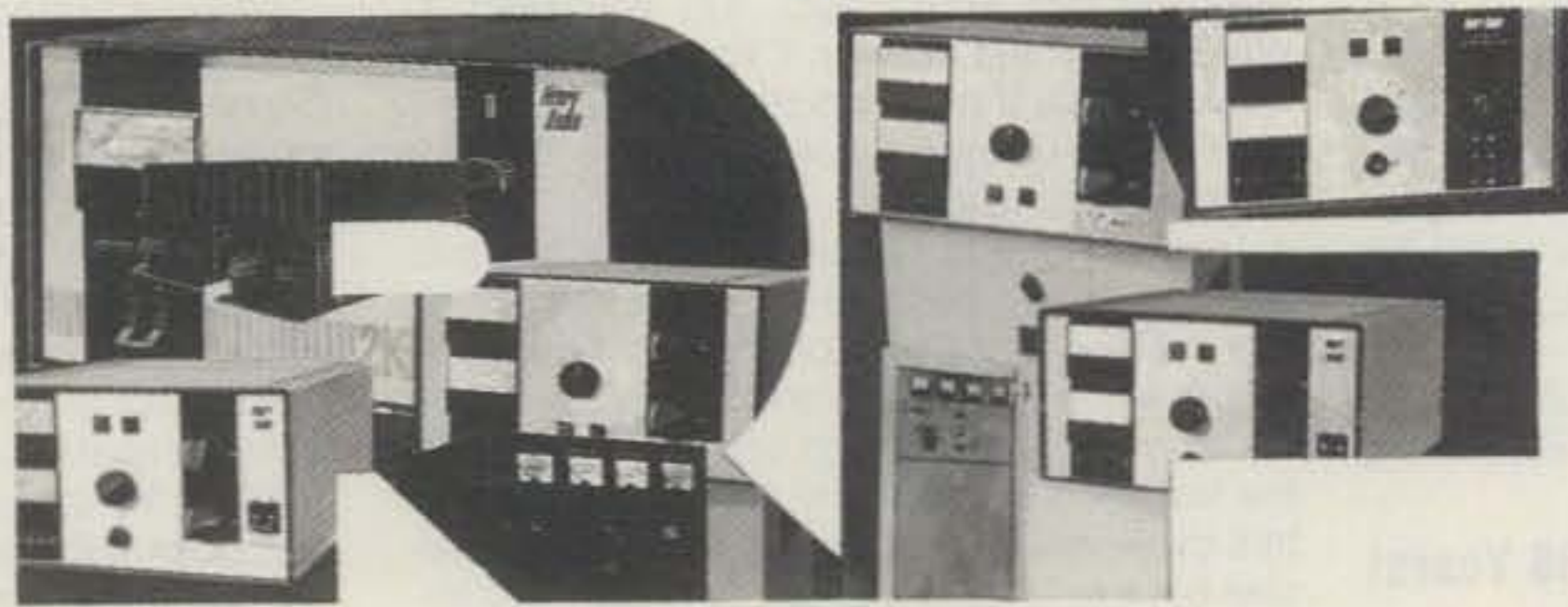
AUDIO BLASTER IC02;04;2AT;FT727;411 U16;FT209;109;73;23 Module installs inside all H.T.'s. 1 watt audio amp! When it needs to be loud! Installs in 15 Min. Used by police, fire! Model AB1S \$22.95	New C64 "Packet Talker" Stores messages (BBS) on disk for up to 300 users; touchtone commands recall & speak messages. Interface to repeaters or for individual use; Works all TNC's; C64 or 128; gives your Packet terminal a voice! Inc. disk & interface PKTA \$189.95
--	---

ENGINEERING CONSULTING
583 CANDLEWOOD ST.
BREA, CA. 92621
TEL:714-671-2009 * FAX:714-255-9984

CIRCLE 14 ON READER SERVICE CARD

Please send all reader inquiries directly.

At Henry Radio,



should be our middle name

**We're aiming this message
at the thousands of amateurs who
are also electronics engineers. . . .**

because we may have just what you are looking for.

We started building amplifiers for amateur use more than 25 years ago. We know that we build the broadest line in the world and we also believe they're the best. A lot of people must agree with us because 40,000 of our amplifiers are in use throughout the world. And because we are so versatile and quality conscious, hundreds of our amplifiers, both stock and custom designed, are being used by commercial, industrial and military users worldwide. They are key components in scores of high tech systems used in a broad range of applications.

Thousands of Henry amplifiers are still used for communications. . . amateur, commercial, MARS, military, short wave broadcast, FM broadcast, VHF link, domestic, foreign. . . Henry amplifiers go everywhere for diverse services. HF

point-to-point, VHF, UHF, SSB, AM, FM, RTTY, packet, meteor burst, digital, marine shore station. Are you beginning to get the idea? If you need a special purpose vacuum tube amplifier for a specific frequency from 2 MHz to 500 MHz at power levels up to 10,000 watts, we invite your inquiry.

But communications is only the beginning. Think about plasma generation, sputtering and etching, thin film deposition, laser excitation, nuclear magnetic resonance (NMR), photo-emissions and mass spectrometry, scientific research, industrial production. . . Henry equipment is used in all of these applications. We have always been customer driven and still are.

Recent projects include:

10,000 watt 41 MHz Meteor Burst U.S. Air Force
10,000 watts 70 MHz Cyclotron
2,000 watts 45 MHz numerous customers including SHAPE Headquarters, U.S. Dept. of Interior, The Mitre Company, M-A Com, Etc.
2,000 watts 13.5 MHz Plasma generator for vacuum etching, many customers.
1,000 watts 13.5 MHz Same application as previous listing
5,000 watts 13.5 MHz Same application as previous listing
5,000 watts various Marine HF frequencies Shore stations
10,000 watts 90 MHz Laser Excitation
2,000 watts 110 to 150 MHz United Technology
3,000 watts 300 MHz NMR

4,000 watts 145 MHz VHF Point-to-Point — Indonesia
1,000 watts 300 MHz Cancer Hyperthermia
20,000 watts 100 MHz Pulse for Laser Excitation
2,500 watts 27.12 MHz to ignite Argon Torch Photo-Emissions Spectrometry — Switzerland
2,000 watts 27.12 MHz Mass Spectrometry England
1,000 watts 400-450 MHz NASA
2,000 watts 13.56 MHz Sputtering — Munich, Germany
3,000 watts 6 MHz Shortwave AM — Broadcast
10,000 watts 90 MHz FM Broadcast
5K Classic Amplifiers HF Communications. . . export

If you have a requirement for high power RF, please call Ted Shannon, Meredith Henry or Ted Henry. And don't forget, Henry Radio still produces the world's broadest line of fine Amateur amplifiers.



Henry Radio

2050 S. BUNDY DR. LOS ANGELES, CA 90025 (213) 820-1234
Toll free order number: (800) 877-7979 TELEX: 67-3625(Henradio) FAX(213) 826-7790

CIRCLE 47 ON READER SERVICE CARD

DIAMOND ANTENNA

KNOWN WORLD-WIDE FOR PREMIUM
QUALITY ANTENNAS AND METERS

POWER/SWR METERS



- Forward & Reflected Power & SWR
- Selectable RMS or PEP switch
- 3 Power Ranges:
5/20/200 Watts
30/300/3KW (SX-100 only)
- Power Meas. Accuracy 5% (typ.)
- Insertion Loss: 0.2 dB Max.
- Wideband Performance

FIVE MODELS TO CHOOSE FROM

SX-100	1.6-60 MHz	\$129.95
SX-200	1.8-200 MHz	\$99.95
SX-400	140-525 MHz	\$109.95
SX-600	Dual-Band 1.8-200 & 140-525 MHz	\$169.95
SX-1000	4-Band 1.8-160, 430-450 800-930, 1240-1300 MHz	\$229.95

For detailed information please
read the "New Products"
article in April '89 CQ Magazine.

BASE & REPEATER ANTENNAS

- Fiberglass Sheathed Antennas rated at 100 mph
- Stainless Steel hardware for 1 1/4-2 1/4" O.D. mast

MONO-BAND

Model	Band	Gain dB	Lth	Am Net
F22	2M	6.7	11'	\$109.95
F23	2M	7.8	15'	159.95
F718	70cm	11.5	15'	229.95
F1230	23cm	13.5	10'	169.95

MULTI-BAND

Model	Band	Gain dB	Lth	Am Net
X-50	2M&70cm	4.5/7.2	6'	\$109.95
X-200	2M&70cm	6.0/8.0	8'	159.95
X-500N	2M&70cm	8.3/11.7	17'	199.95
U-200	70&23cm	8.3/11.7	6'	129.95
U-300	70&23cm	8.6/13.2	8'	159.95

Duplexers and Triplexers Available

FOR NEAREST DEALER CALL:

(800) 854-1927
(619) 744-0700

"QUALITY NEED NOT BE EXPENSIVE"

Advertiser's Index

AEA/Adv. Elec. Applications.....	5
ARRL.....	51
AVC Innovations.....	51
Ace Communications-Monitor Div....	76
Advanced Computer Controls.....	109
Alinco Electronics.....	10, 11
Alpha Delta Communications.....	93
Amateur Electronic Supply.....	17
Amidon Associates.....	51
Antennas West.....	69, 77, 103
Antennex.....	95
Antique Electronic Supply.....	75
Antique Radio Classified.....	85
Applied Solutions.....	75
Associated Radio.....	75
Astron Corp.....	85
Atlanta Hamfestival.....	108
Austin Custom Antennas.....	72
Azimuth Communications Corp.....	75
Barker & Williamson.....	87
Barry Electronics.....	101
Bencher, Inc.....	64
Bilal Co.....	76
Burghardt Amateur Center.....	28
Butternut Electronics.....	77
CATS.....	69
CB City International.....	85
CQ Bookshop.....	48
CQ Buyers Guide.....	48
C & S Sales.....	90
Cellular Telephone Company, The....	74
Certified Communications.....	69
Cleveland Institute of Electronics..	105
Colorado Comm. Center.....	53
Command Technologies.....	69
CommPute, Inc.....	110
Communications Concepts.....	76
Communications Electronics.....	83
Computeradio.....	103
Cushcraft.....	29
D.L.S. Enterprises, Inc.....	113
DRSI Digital Radio Systems.....	6
Datacom International.....	65
Delaware Amateur Supply.....	49
Delta Computing Technologies.....	39
Delta Loop Antennas.....	81
Digitrex Electronics.....	75
Electron Processing, Inc.....	68
Engineering Consulting.....	115
Falcon Communications.....	87
G.A.P. Antenna Products.....	115
Great Circle Map Co.....	31
Hall Electronics, Doug.....	64
HAMRAD.....	85
Ham Radio Outlet.....	12
Ham Station, The.....	73
Hamtronics, Inc.....	68
Heath Company.....	9
Henry Radio.....	116
Hustler Antennas.....	14
ICOM America, Inc.....	Cov. IV
IIX Equipment.....	82
Jan Crystals.....	39
Jun's Electronics.....	71

RF POWER TRANSISTORS

We stock a full line of
Motorola & Toshiba parts
for amateur, marine, and
business radio servicing

SEE YOU AT THE
LOS ANGELES
"HAMCOM 89"

Partial Listing of Popular Transistors in Stock

P/N	Net Ea	P/N	Net Ea	P/N	Net Ea
BFR96	\$ 2.75	MRF646	\$25.00	2SC2781	\$32.75
MRF134	15.00	MRF648	31.00	2SC2879	21.00
MRF136	21.00	MRF653	14.50	2SC2904	32.50
MRF136Y	47.00	MRF654	20.00	2SC2905	34.50
MRF137	24.00	MRF660	10.75	40582	9.50
MRF138	35.00	MRF843/F	22.50	LOW NOISE FIGURE	
MRF141G	190.00	MRF846	37.75	MGF1402	17.95
MRF148	34.00	MRF873	29.75	MRF901	1.25
MRF150	79.50	MRF1946	15.00	MRF911	2.00
MRF151G	170.00	PT9847	21.00	MRF966	2.00
MRF153	395.00	RF120	22.00	NE25537/2SK205	3.25
MRF154	497.00	SD1229	12.00	NE41137/3SK124	3.25
MRF156	537.00	SD1272	12.00	J310	1.00
MRF171	34.50	SD1278-1	13.75	U309	1.75
MRF172	58.75	SD1405	16.00	U310	1.75
MRF174	80.00	SD1407	25.00	2N4416	1.00
MRF208	14.50	SD1428	29.50	3N204	2.00
MRF212	19.50	SD1429-3	16.00	3N211	2.00
MRF221	11.00	SRF2072	12.75	OUTPUT MODULES	
MRF224	13.50	SRF3662	24.00	SAU4 440 LIN	49.50
MRF237	2.00	SRF3775	13.00	SAU17A 903	50.00
MRF238	14.00	SRF3800	17.50	SAV6 158	42.50
MRF239	15.00	2N1522	11.95	SAV7 146	42.50
MRF240/A	15.00	2N3553	2.25	SAV12 146 HT	23.50
MRF245	32.00	2N3771	3.50	SAV15 222	58.75
MRF247	24.75	2N3866	1.25	SAV17 146 50W	66.50
MRF248	33.00	2N4048	11.95	M57710A	32.75
MRF260	8.00	2N4427	1.25	M57713	49.50
MRF261	9.00	2N5109	1.75	M57715	42.25
MRF262	9.00	2N5179	1.00	M57726 144	59.95
MRF264	10.50	2N5589	13.00	M47727 144	69.50
MRF309	60.00	2N5591	13.50	M57729 440	69.95
MRF314A	29.75	2N5641	12.00	M57732L	33.00
MRF315A	32.50	2N2642	13.75	M57735 50	47.50
MRF316	64.50	2N2643	18.00	M57737 144	58.50
MRF317	59.75	2N5944	10.00	M57741L/M/H	57.00
MRF321	23.75	2N5945	10.00	M57745	89.95
MRF327	57.00	2N5946	12.50	M57755	78.75
MRF406	13.50	2N6080	7.50	M57762 1296	69.75
MRF412	22.00	2N6081	8.50	M57764 806	74.00
MRF421	24.00	2N6082	10.00	M577712,M57733	use
MRF422	36.00	2N6083	11.00	M57737,SC1019	SAV7
MRF427	17.00	2N6084	12.75	SC1027	use SAU4
MRF428	50.00	2N6097	20.00	SC1028	use SAV15
MRF429	39.00	2N6255	2.50	MHW710-1,2,3	61.00
MRF433	11.00	2SC730	4.50	MHW820-1	76.00
MRF435	68.50	2SC1307	4.00	MHW820-2	82.00
MRF448	73.50	2SC1729	16.25	SPECIAL TUBES	
MRF449	22.50	2SC1946	18.75	6CL6	9.95
MRF449A	18.25	2SC1946A	16.75	6GK6	7.95
MRF450	13.50	2SC1947	9.75	6HF5 GE	14.95
MRF450A	14.25	2SC1955	9.00	6JB6 GE	15.95
MRF453	18.50	2SC1968A	22.00	6JS6C GE	15.95
MRF454	14.00	2SC1969	2.50	6KD6 GE	15.95
MRF454A	17.00	2SC2029	2.50	6LF6 GE	15.95
MRF455	11.25	2SC2075	1.75	6LQ6/6MJ6	15.95
MRF455A	12.75	2SC2094	18.50	12BY7A	8.95
MRF458	20.00	2SC2097	28.00	572B/T160L	83.00
MRF460	23.50	2SC2097MP	62.00	811A	14.95
MRF464	25.00	2SC2099	29.50	833A	89.75
MRF466	18.75	2SC2166C	2.00	M2057	22.75
MRF475	6.75	2SC2221	8.25	5894	43.00
MRF476	4.00	2SC2237	7.00	6146B	13.95
MRF477	11.75	2SC2284A	24.75	6550	14.95
MRF479	13.75	2SC2289	13.75	7581/KT66	14.95
MRF485MP	18.50	2SC2290	14.75	8874	349.50
MRF492	14.75	2SC2290MP	39.50	8875	339.00
MRF497	14.25	2SC2312C	4.75	8950	18.00
MRF515	2.50	2SC2379	31.25	3CX800A7	339.50
MRF555	3.00	2SC2509	9.00	3CX1200A7	419.95
MRF557	5.25	2SC2559	28.25	3CX1500A7	629.50
MRF559	2.25	2SC2630	23.00	4CX250B	74.50
MRF607	2.50	2SC2640	15.00	4CX1000A7	399.00
MRF629	3.00	2SC2641	16.00	3-500ZEMAC	114.50
MRF630	3.75	2SC2642	28.25	3-500ZEMAC	129.95
MRF641	18.00	2SC2694	46.75	4-400C	139.95
MRF644	23.00	2SC2695	31.75		

MATCHED & SELECTED TUBE AND TRANSISTOR FINALS
IN STOCK FOR AMATEUR AND COMMERCIAL EQUIPMENT

Orders received by 1 PM PST shipped UPS same day.

Next day UPS delivery available - We Export

No extra charge for C.O.D. or VISA/MC Orders

Ship/Hand. 1 lb. U.S. or Foreign Sm Pkt Air 8 oz. \$5.00

Minimum Order \$15

Quantity Pricing Available

PARTS ORDERS ONLY - NO TECHNICAL (800) 854-1927

ORDER LINE • INFORMATION
or TECH HELP

(619) 744-0728

FAX 619-744-1943



RF PARTS

1320 Grand Avenue
San Marcos, CA 92069



RF PARTS

1320 Grand Avenue
San Marcos, CA 92069



If You Want the Most Advanced TNC Today...

In 26 countries around the world, tens of thousands of amateurs know that Kantronics is the leader in bringing tomorrow's technology to their stations today. They also know they will always be among the first to incorporate just-introduced features and modes with Kantronics software and firmware updates.

And, they know that Kantronics is unique in its ability to seek out, develop and incorporate the most advanced features into each of five different TNC models before anyone else. Why? Because every program Kantronics writes, and every unit Kantronics designs and produces are born right here at the factory in the U.S.A.

Meet Your Mailman

In this age of telco LANS, E-mail and FAX,



PBBS is just one of the firsts Kantronics delivered.

you will know you have mail in your **Personal Packet Mailbox™** when your KAM "STA" LED is blinking. New firmware level 2.85 has also added a handy automatic mailbox user-

connect. So save your computer and monitor life by turning them off when you are away, and never miss a beat on the airwaves.

Version 2.85 KAMs have increased Packet Cluster™ compatibility, **KA-NODE™** path preservation, KA-NODE recognition of the "NET" nodes and HF baud rates from 50 through 300! And there are three new mailbox commands: *List Mine, Read Mine* and *Kill Mine*.

and Tomorrow...

Will the Real Dual-Port Please Stand Up?

Read our lips. The KAM™ is the only true **dual-port** when it comes to packet. Your Personal Packet Mailbox™ is accessible from both HF and VHF! Version 2.85 has dual-port compatibility with RLI/MBL boards and KISS mode for both ports. You can monitor HF and VHF packet operations at the same time. Users can even gateway from HF to VHF (or in reverse) through your KAM.

Kantronics All-Mode™ (KAM) has Packet, WEFAX, ARQ, FEC, RTTY and CW reception. But we have five models to suit your particular taste. Ask your dealer for the best choice today...and tomorrow.

Kantronics
RF Data Communications Specialists

1202 E. 23rd Street Lawrence, Kansas 66046
(913) 842-7745

BALUNS



For beams. 1.7-30 MHz. 6-Kw PEP 1:1 or 4:1 ratio. Model BA-2000 \$72.95.



For dipoles. 1.7-30 MHz. 6-Kw PEP 1:1 or 4:1 ratio. Model 2K \$67.95.



1.7-30 MHz. 1-Kw. 1:1 or 4:1 ratio. Model 1K \$45.95.



1.7-30 MHz. 350-w PEP. Ratios to match 50/75/100/150/200/250/300/375/450/600/800 ohms. Specify ratio. Model PB \$23.95.

Add \$4 shipping/handling in U.S. & Canada. California residents add sales tax.

TUNER-TUNER™

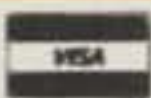


- Tune your tuner without transmitting!
- Save that rig!

Do you use an antenna tuner? Then you need the new Palomar Tuner-Tuner to tune it to your operating frequency without transmitting. Just listen to the Tuner-Tuner's noise with your receiver. Adjust your tuner for a null and presto! you have 1:1 SWR. It's as simple as that.

Easy to install. Works with all rigs. Eliminates tuneup damage. Your rig will love it!

Model PT-340 \$99.95 + \$4 shipping/handling in U.S. & Canada. California residents add sales tax.



Send for FREE catalog that shows our complete line of noise bridges, SWR meters, pre-amplifiers, loop antennas, VLF converters, audio filters, baluns, RTTY equipment, toroids and more.

PALOMAR ENGINEERS

BOX 455, ESCONDIDO, CA 92025
Phone: (619) 747-3343

Please send all reader inquiries directly.

Say You Saw It In CQ

Advertiser's Index

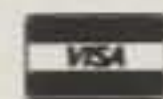
K2AW's Silicon Alley.....	77
K/S Electronics.....	74
Kantronics.....	118
Kenwood, USA.....	Cov. II, 1, 2
Lakeview Co.....	75
Lanz Company.....	71
LaRue Electronics.....	19
MFJ Enterprises.....	55, 56, 57
Madison Electronic Supply.....	67
Martin Engineering, Glen.....	105
Maxcom Inc.....	65
Media Mentors.....	110
Memphis Amateur Electronics.....	77
Micro Control Specialties.....	49
Mirage/KLM.....	25
Mission Communications.....	103
Missouri Radio Center.....	120
NCG Company.....	42
Naval Electronics.....	49
Nemal Electronics.....	16
Omar Electronics.....	114
OPTOelectronics Inc.....	7
Orion Business International.....	65
PC Electronics.....	42
Pacific Cable Co.....	71
Palomar Engineers.....	71, 119
PAYL Software.....	82
Philips-Tech Electronics.....	110
QSLs by W4MPY.....	81
R&L Electronics.....	43
RF Concepts.....	89, 91
RF Connection.....	103
RF Enterprises.....	106, 107
RF Parts.....	117
Radio Amateur Callbook.....	61
Radio Engineers.....	114
Radio Shack.....	21
Radio Works.....	72
RadioKit.....	51
Reno Radio.....	59
Ross Distributing.....	76
Sommer Antenna Systems.....	20
Sparrow Hawk Communications.....	114
Spec Comm.....	82
Spectrum International.....	95
Summitek.....	110
Ten-Tec (Pull-out chart).....	34, 35
Texas Comm Center.....	69
Texas Towers.....	62, 63
Trans World Cable Co.....	95
Unadilla Antennas.....	81
Universal Amateur Radio.....	68
W5YI Marketing.....	77, 114
W9INN Antennas.....	85
W & W Associates.....	47
Williams Radio Sales.....	64
Wilson Antennas.....	8
Wrightapes.....	72
Yaesu Electronics.....	Cov. III, 15, 111
Yost & Company.....	82

We'd like to see your company listed here too. Contact Arnie Sposato, N2IQO, at 516-681-2922 to work out an advertising program tailored to suit your needs.

THE 15 BEST



- 1 RX-100 Noise Bridge..... \$69.95
- 2 PT-340 Tuner-Tuner..... \$99.95
- 3 Loop Antennas 10 kHz up.. \$62.95
- 4 LA-1 Loop Amplifier..... \$84.95
- 5 M-827 SWR/Power meter.. \$129.95
- 6 P-410X Xcvr Preamp..... \$149.95
- 7 P-408 Receiver Preamp... \$129.95
- 8 VLF Converter 10-500 KHz. \$79.95
- 9 Beam Balun 6 Kw PEP..... \$72.95
- 10 2K Dipole Balun 2-Kw CW.. \$67.95
- 11 1K Balun 1-Kw CW..... \$45.95
- 12 350w balun; many ratios... \$23.95
- 13 Amplifilter™ for SWL's... \$79.95
- 14 Super-Snooper™ for SWL.. \$39.95
- 15 Toroids—RFI Kit..... \$15.00



FREE catalog on request.

PALOMAR ENGINEERS

Box 455, ESCONDIDO, CA 92025
Phone: (619) 747-3343

Please send all reader inquiries directly.

**ORDER
TOLL-FREE
1-800-821-7323**

**Dependable Service
At The Right Price . . . Everytime**

MasterCard—VISA—Discover

Missouri Radio Center

AEA • ALINCO • ASTRON • ALPHA-DELTA • ANTENNA SPEC • B & W • BENCHER • BUTTERNUT • CUSHCRAFT

KANTRONICS • KENWOOD • LARSEN • MFJ • MIRROR/KLM • NYE VIKING • RF CONCEPTS • UNIDEN • YAESU

KENWOOD



TS-940 "DX-CELLENCE"

- All Band, All Mode Transceiver
- Direct Keyboard Entry
- Engineered for the DX-Minded and Contesting Ham
- Its Got It All!

YAESU



FT-767GX HF/VHF/UHF BASE STATION

- Add Optional 6m, 2m & 70cm Modules
- Dual VFO's
- Full CW Break-in
- Lots More Features

ICOM **NEW!**



IC-765 NEW HF TRANSCEIVER

- Built-in Automatic Antenna Tuner and Power Supply
- 99 Memories • 100 W Output
- 160-10M/General Coverage Receiver
- Band Stacking Registers

uniden

SCANNERS

- BC-100 XLT.....\$189.
- BC-200 XLT.....259.
- BC-590 XLT.....199.
- BC-760 XLT.....269.
- BC-800 XLT.....229.
- HR-2600 (10 meters)...295.

KENWOOD



TS-140S AFFORDABLE DX-ing!

- HF Transceiver With General Coverage Receiver
- All HF Amateur Bands
- 100 W Output
- Compact, Lots of Features

YAESU **NEW!**



FT-736R VHF-UHF BASE STATION

- SSB, CW, FM on 2 Meters and 70 cm
- Optional 50 MHz, 220 MHz or 1.2 GHz
- 25 Watts Output on 2 Meters, 220 and 70 cm
- 10 Watts Output on 6 Meters and 1.2 GHz • 100 Memories

ICOM **NEW!**

IC-725 NEW ULTRA-COMPACT HF TRANSCEIVER



- USB/LSB/CW, AM Receive
- Optional Module for AM Transmit and FM TX/RX
- 160-10M Operation • 100 W Output
- Receive 30 kHz to 33 MHz
- 26 Memories with Band Stacking Registers

ASA **CP-100**



Complete Terminal Unit for Morse, Baudot, ASCII, AMTOR

**NOW 1/2 PRICE
CLOSEOUT SPECIAL
ONLY \$169. DELIVERED**

Software Available
Call Now—Don't Delay

KENWOOD

220 MHz SALE



TH-315A 2.5W, FM HANDHELD



TM-621A 2M/220, 45/25W MOBILE



TM-321A 25W, FM TRANSCEIVER

YAESU



FT-212 RH

THE "ANSWERING MACHINE" 2 METER MOBILE

- 45 Watts Output
- Multiple Scanning Routines
- 10 Memories
- Hi/Lo Power Switch

ICOM

IC-2GAT
IC-4GAT

2 Meter & 440 Handhelds

- IC-2GAT RX 138-174 MHz TX 140-150 MHz 7 Watts
- IC-4GAT 440-450 MHz 6 Watts



ASTRON



- RS7A . . . \$51
- RS12A . . . \$75
- RS20A . . . \$92
- RS20M . . \$112
- VS20M . . \$129
- RS35A . . \$149
- RS35M . . \$167
- VS35M . . \$179
- RS50A . . \$209
- RS 50M . . \$235
- RM50M . . \$259
- VS50M . . \$245

KENWOOD **NEW!**

TH-75A 2M/70CM DUAL BAND HT



- Receive 141-163.995 & 438-449.995 MHz
- One Watt Power on Each Band
- Monitor Both Bands at Same Time
- CTCSS Encode/Decode Built-in

YAESU **NEW!**

FT-470 COMPACT DUAL BAND FM HANDHELD (2M/70CM)



- 21 Memories for Each Band
- Dual VFO's for Each Band
- Up to 5 Watts Power
- Built-in CTCSS
- Built-in 10-Memory DTMF Autodialer

ICOM

IC-32AT SUPER DUALBAND FM HANDHELD



- 5 Watt on Both Bands
- Receive 138-174 MHz 440-450 MHz
- Stores Standard and Odd Offsets

MFJ SALE MFJ

LARGEST STOCK OF ALL YOUR MFJ FAVORITE ACCESSORIES
CALL TODAY FOR BEST PRICE



Extra Savings on the **MFJ-1278** Multi-Mode Data Controller

102 N.W. Business Park Lane Kansas City, MO 64150
Send SASE For Used List

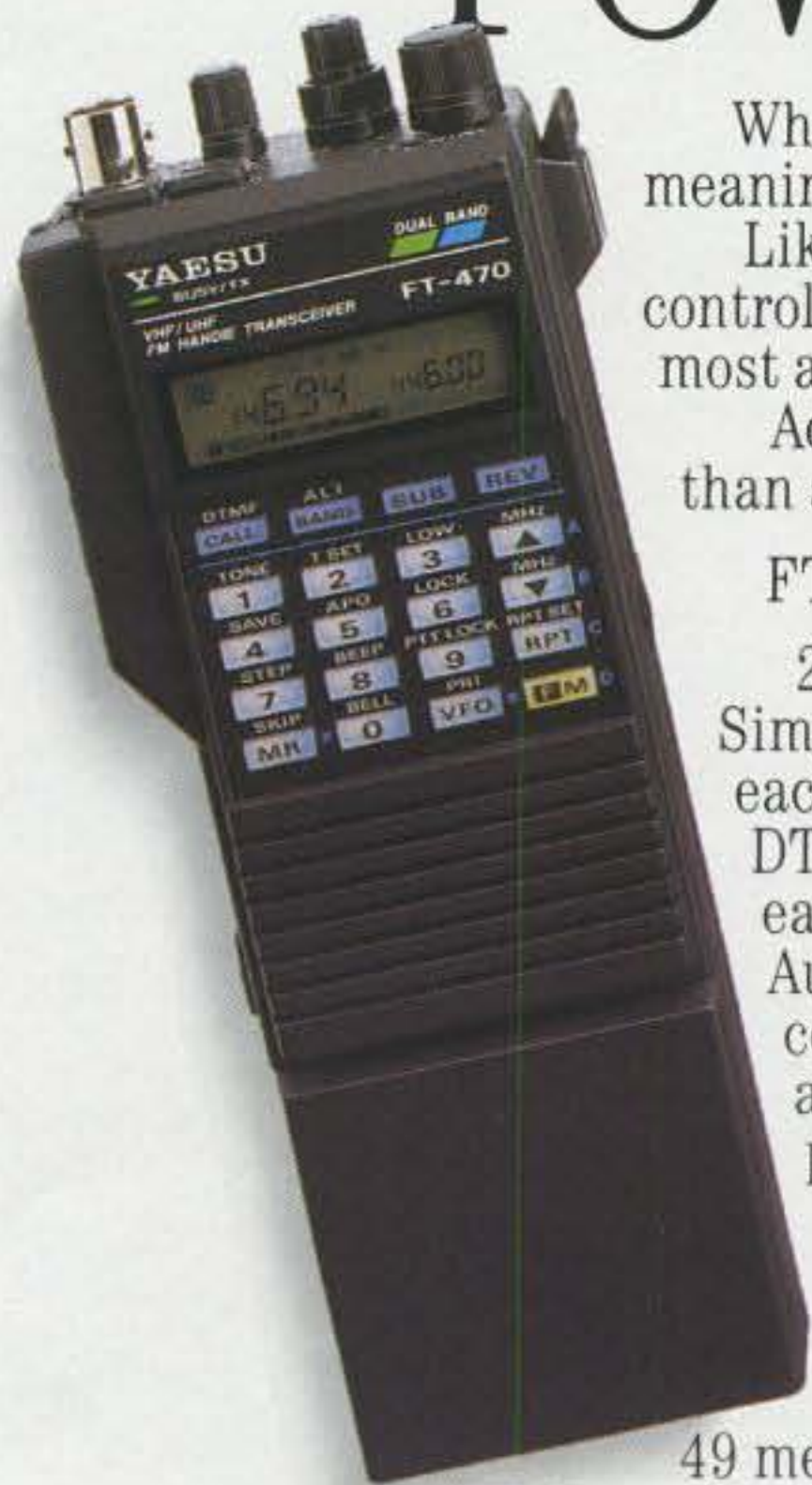
Call Toll Free—9am - 6pm Mon.-Fri. 9am - 2pm Sat.
In Missouri Call—816-741-8118

MOST ORDERS SHIPPED SAME DAY

• DAIWA • HUSTLER

HYGAIN • ICOM •

OUR COMPLETE LINE OF PORTABLE POWER TOOLS.



When you're talking Yaesu handhelds, power takes on many meanings.

Like maximum RF output. Sophisticated microprocessor control. Deceptively simple operation. Even cost savings—as most accessories are interchangeable throughout the line.

Added up, it's no wonder amateurs choose Yaesu HTs more than any others.

FT-470. DUAL-BAND OPERATION PERFECTED.

2 meter and 430-450 MHz. 42 memories. Simultaneous receive of both bands. Dual VFOs each band. PL encode/decode. Paging feature. DTMF autodialer (10 memories, 15 digits each). Auto repeater shift. Scanning features. Auto power-off. Battery saver. Extended receive. Audible command verification. Keypad and rotary-dial frequency entry. Battery packs available from 2.3 to 5 watts. More.

FT-411 SERIES. MAXIMUM SINGLEBAND PERFORMANCE.

2-meter FT-411 and 440-MHz FT-811.

49 memories. Dual VFOs. PL encode/decode. DTMF autodialer (10 memories, 15 digits each). Auto repeater shift. Scanning features. Auto power-off. Battery saver. Extended receive. Audible command verification. Keypad and rotary-dial frequency entry. Many battery packs available, from 2.3 to 5 watts. More.



FT-23R SERIES. SMALL, SMART, RUGGED.

2-meter FT-23R, 220-MHz FT-33R, and 440-MHz FT-73R. 10 memories (7 store odd splits). Memory scan at 2 frequencies per second. High/low power switch. LCD power output and "S"-meter display. Many PL features. Auto-battery saver. Aluminum-alloy case. Water-resistant seals. Many battery packs available, from 2 to 5 watts. More.

Want more information? Call **(800) 999-2070** toll-free. Or ask your dealer about Yaesu's FT-470, FT-411 and FT-23R Series handhelds. The power in handheld performance.

YAESU USA 17210 Edwards Road, Cerritos, CA 90701 (213) 404-2700. **REPAIR SERVICE:** (213) 404-4884. **PARTS:** (213) 404-4847

YAESU

ICOM

IC-765 HF Transceiver



MAKE YOUR DREAMS A REALITY!

ICOM incorporated your most requested features with modern technology's best designs to produce the remarkable IC-765 dream rig. Its combination of excellent performance and superb reliability truly open a new dimension in HF operating enjoyment.

THE HF FOR TODAY'S ACTIVE AMATEUR.

Includes: ***Band Stacking Registers.** Each band's VFO's retain the last selected frequency, mode and filter choice when changing bands. Produces the equivalent of 20 VFO's; two per band. Great for multiband DX'ing! ***99 Fully Tunable Memories.** Store frequency, mode and filter selections. Each one can be returned and/or reprogrammed independent of VFO operations. Memories 90-99 also store split Tx/Rx frequencies. ***10Hz Readout.** Perfect on-the-dot frequency selection for nets, DX skeds and data communication modes. ***Full QSK Break-in.** For super CW operations!

*Direct Digital Synthesizer (DDS).

Assures ultra-fast PLL switching and lock-in for excellent PACKET and AMTOR operations.



***Maximum Operation Flexibility!** The three step attenuator cuts multi-station overloads. ***Built-in AC Supply.** The IC-765 is 100 percent duty cycle rated for cool operation and superb performance on all modes! ***Fully Automatic Antenna Tuner.** With built-in CPU and memory for extremely fast tuning and one-touch operation. Wide tuning range. ***CW Pitch Control.** Total operating comfort and convenience for successful contesting and DX'ing. An iambic keyer with adjustable speed and weight is also built into the IC-765! ICOM also included ***Narrow 500Hz CW**

Filters. The FL-32A and FL-52A deliver razor sharp selectivity. A serious DX'ers delight! 250Hz FL-53A and FL-101 optional.

The IC-765 General Coverage Receiver covers all bands, all modes and is backed by ICOM's full one-year warranty at any one of our four North American Service Centers. The IC-765 turns your dreams into reality!

ICOM

First in Communications

ICOM America, Inc., 2380-116th Ave. 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 Canada
All stated specifications are subject to change without notice or obligation. All ICOM
radios significantly exceed FCC regulations limiting spurious emissions. 765-489.

CIRCLE 75 ON READER SERVICE CARD