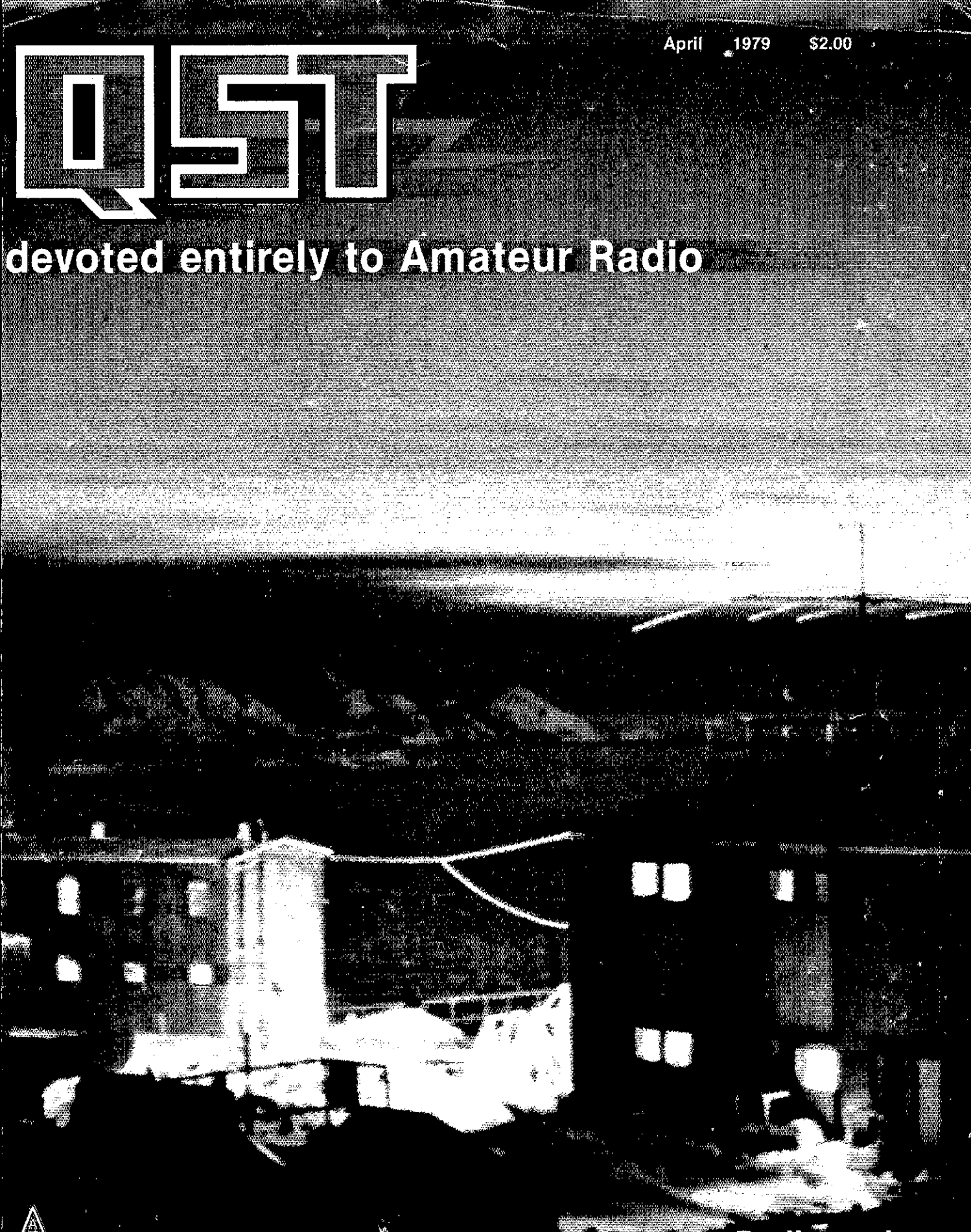
April 1979 $2.00

QST

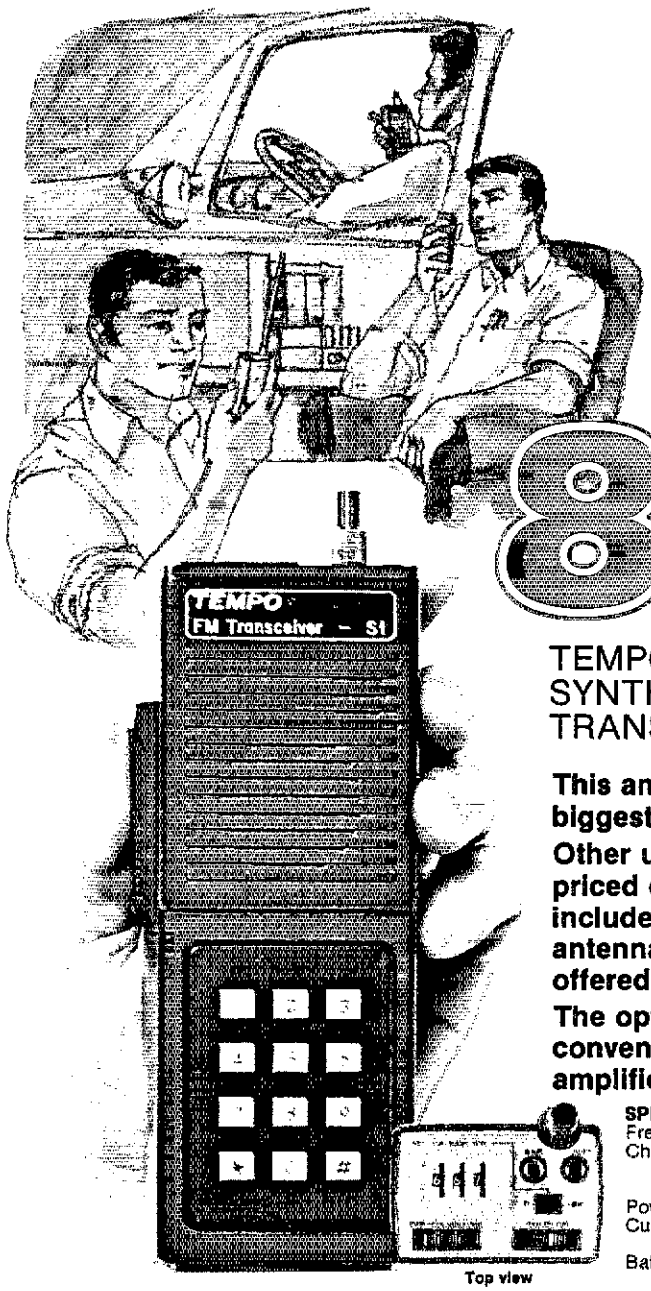
devoted entirely to Amateur Radio



Amateur Radio at the bottom of the earth

Page 49

PORTABLE... MOBILE... BASE STATION



*Shown with accessory touch tone pad

Top view showing controls

the TEMPO SYNCOM S1

DOES IT ALL AND GIVES YOU 800 CHANNELS

TEMPO PRESENTS THE WORLD'S FIRST SYNTHESIZED 800 CHANNEL HAND HELD TRANSCEIVER

This amazing pocket sized radio represents the year's biggest breakthrough in 2-meter communications.

Other units that are larger, heavier and are similarly priced can offer only 6 channels. The SYNCOM'S price includes the battery pack, charger, and a telescoping antenna. But, far more important is the 800 channels offered by the S1.

The optional touch tone pad adds greatly to its convenience and the addition of a Tempo solid state amplifier adds tremendously to its power.

SPECIFICATIONS

Frequency Coverage:	144 to 148 MHz
Channel Spacing:	Receive every 5 kHz, transmit Simplex or +600 kHz
Power Requirements:	9.6 VDC
Current Drain:	17 ma-standby 500 ma-transmit
Batteries:	8 pieces ni-cad battery included
Antenna Impedance:	50 ohms
Dimensions:	40 mm x 62 mm x 165 mm (1.6" x 2.5" x 6.5")
RF Output:	Better than 1.5 watts
Sensitivity:	Better than .5 microvolts

SUPPLIED ACCESSORIES
Telescoping whip antenna, ni-cad b pack, charger.

OPTIONAL ACCESSORIES
Touch tone pad: $55 • Tone burst generator: $29.95 • CTCSS sub-audible tone control: $29.95 • Rubb flex antenna: $8 • Leather holster: $16 • Cigarette lighter plug mobile charging unit: $6 • Matching 30 wa output 13.8 VDC power amplifi (S30): $89 • Matching 80 watt outpu power amplifier (S80): $169.

Price... $349.00 With touch tone pad... $399.00

The Tempo line also features a fine line of extremely compact UHF and VHF pocket receivers. They're low priced, dependable, and available with CTCSS and 2-tone decoders
The Tempo FMT-2 & FMT-42 (UHF) provides excellent mobile communications and features a remote control head for hide-away mounting.
The Tempo FMH-2, FMH-5 & FMH-42 (UFH) hand held transceivers provide 6 channel capability, dependability and many worthwhile features at a low price. FCC type accepted models also available.
Please call or write for complete information. Also available from Tempo dealers throughout the U.S. and abroad.

TEMPO VHF & UHF SOLID STATE POWER AMPLIFIERS

Boost your signal. . . give it the range and clarity of a high powered base station. VHF (135 to 175 MHz)

Drive Power	Output	Model No.	Price
2W	130W	130A02	$209
10W	130W	130A10	$189
30W	130W	130A30	$199
2W	80W	80A02	$169
10W	80W	80A10	$149
30W	80W	80A30	$159
2W	50W	50A02	$129
2W	30W	30A02	$ 89

UHF (400 to 512 MHz) models, lower power and FCC type accepted models also available.

NEW TOLL FREE ORDER NUMBER: (800) 421-8631
For all states except California.
Calif. residents please call collect on our regular numbers.

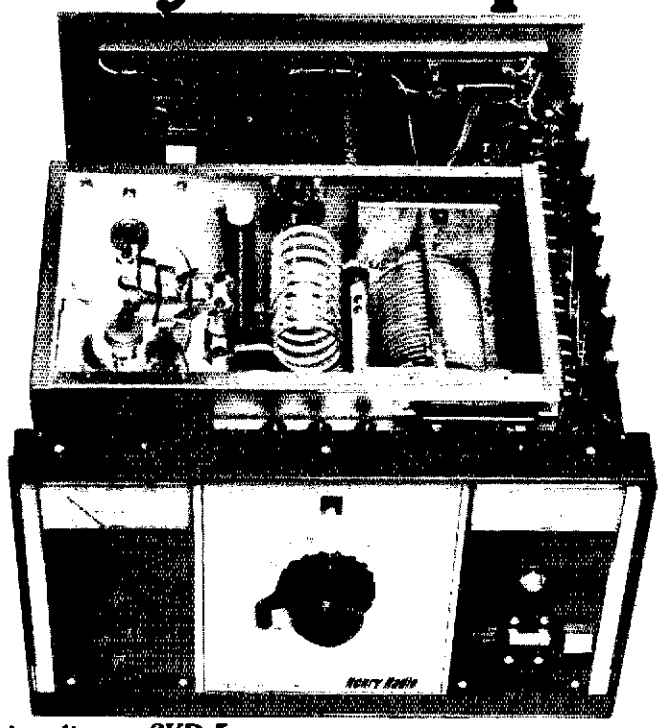
11240 W. Olympic Blvd., Los Angeles, Calif. 90064 213/477-6701
931 N. Euclid, Anaheim, Calif. 92801 714/772-9200
Butler, Missouri 64730 816/679-3127

Henry Radi

Prices subject to change without notice

Before you buy an amplifier

Lift the Lid

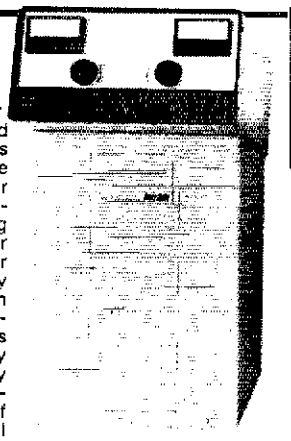


Before you invest your hard earned money in a linear amplifier, consider what's inside. That's where the difference in quality is obvious. No lightweight, cheaply built components...In Henry amplifiers you will find only the best quality, heavy duty components. We build our amplifiers to perform at peak level month after month, year after year. Both the 2KD-5 and the 2K-4A will operate full legal power continuous duty on all modes. We offer the amateur the linear amplifier that we would want in our own stations.

At Henry Radio we know how to build only one kind of amplifier...the best!

2KD-5 GENERAL SPECIFICATIONS:

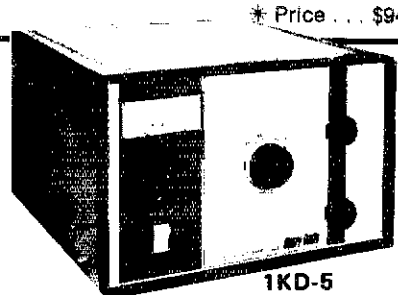
- The 2KD-5 is a 2000 watt PEP input (1200 watt PEP nominal output) RF linear amplifier, covering the 80, 40, 20, and 15 meter amateur bands.
- Two Eimac 3-500Z glass envelope triodes operating in a grounded grid circuit.
- Pi-L plate circuit with a rotary silver plated tank coil for greatest efficiency and maximum attenuation of unwanted harmonics.
- Full legal input in all modes. 2000 watts PEP input for SSB. 1000 watts DC input for CW, RTTY and AM.
- Jumper for 115 or 230 VAC, 3 wire single phase.
- 10.5" high x 15" wide x17.5" deep
- Price . . . $945.00



2K-4A

Never has a linear amplifier racked up so many hours of dependable operation for amateurs worldwide . . operating at full legal power . . . hour after hour . . . under every type of condition imaginable. Because the 2K-4A is built with the very best, heavy duty components available, it can loaf along at full legal power. It offers engineering and features second to no other linear on the market. The 2K-4A will put your signal on the air with greater strength and clarity than you ever dreamed possible. Operates on all amateur bands, 80 thru 15 meters (export models include 10 meters)•Two rugged Eimac 3-500Z grounded grid triodes•Pi-L plate circuit with silver plated tank coil•Resonant cathode-pi input circuit•Built-in SWR bridge & relative RF output meter•Maximum legal input all modes. Price $1195

The 2K-4 is still available for export and military use



1KD-5

A little less power, a little lighter, AND less expensive . . . but the 1KD-5 is a true Henry Radio linear amplifier, offering superior quality and dependability. It is designed to greatly boost the strength and clarity of your signal. Its heavy duty components guarantee years of trouble free, dependable performance.

The 1KD-5 is a 1200 watt PEP input (700 watt PEP nominal output) RF linear amplifier, covering the 80, 40, 20, and 15 meter amateur bands (also 10 meters on units shipped outside the U.S.). Features an Eimac 3-500Z glass envelope triode • ALC circuit • DC relay system • Relative RF power meter • Pi-L plate circuit with a rotary silver plated tank coil • Cathode Pi input matching circuits • Conservative power supply with solid state rectifiers.

Price $695.

3K-A COMMERCIAL/MILITARY AMPLIFIER*

A high quality linear amplifier designed for commercial and military uses. The 3K-A employs two rugged Eimac 3-500Z grounded grid triodes for superior linearity and provides a conservative three kilowatts PEP input on SSB with efficiencies in the range of 60%. This results in PEP output in excess of 2000 watts. It provides a heavy duty power supply capable of furnishing 2000 watts of continuous duty input for either RTTY or CW with 1200 watts output. 3.5-30 MHz. Price $1595.

4K-ULTRA*

Specifically designed for the most demanding commercial and military operation for SSB, CW, FSK or AM. Features general coverage operation from 3.0 to 30 MHz. Using the magnificent new Eimac 8877 grounded grid triodes, vacuum tune and load condensers, and a vacuum antenna relay, the 4K-ULTRA represents the last word in rugged, reliable, linear high power RF amplification. 100 watts drive delivers 4000 watts PEP input.

Price $3450.

*Not available for sale to amateurs in the U.S.

Export inquiries are invited.

Export models of Amateur units available for 10 meter operation also.

NEW TOLL FREE ORDER NUMBER: (800) 421-6631
For all states except California.
Calif. residents please call collect on our regular numbers.

11240 W. Olympic Blvd., Los Angeles, Calif. 90064 213/477-6701
931 N. Euclid, Anaheim, Calif. 92801 714/772-9200
Butler, Missouri 64730 816/679-3127

Henry Radio

Prices subject to change without notice

Imagine All The Places You Can Tuck ICOM's Remotable IC-280. (Think small.)

The **IC-280** 2 meter mobile comes as one radio to be mounted in the normal manner: but, as an option, the diminutive front one third of the radio detaches and mounts by its optional bracket, while the main body tucks neatly away out of sight. Now you can mount your 2 meter radio in pint-sized places that seemed far too cramped before.

Measuring only 2¼"h x 7"w x 3⅜"d, the bantam-sized microprocessor control head fits easily into the dash, console or glove box of even the most compact vehicle. Or if those places are already taken by the rest of your "mobile shack," the **IC-280** head squeezes into leftover nitches under the dash, overhead, under the seat or even on the steering column.

But don't be misled by the petite size of this subdivided radio: the **IC-280** is jam packed with the latest state of the art engineering and convenience features. No scaled down technology here!

With the microprocessor in the detachable control head, your **IC-280** can store three frequencies of your choice plus the dial, which allows you to select from four frequencies with the front panel switch without taking your eyes off the road. These frequencies are retained in the **IC-280's** memory for as long as power is applied to the radio, even when power is turned off at the front panel switch. And if power is completely removed from the radio the ±600 KHz splits are still maintained!

The **IC-280** works frequencies in excess of the 2 meter band with ICOM's outstanding single-knob tuning, so you can listen around the entire band without fooling with three tuning knobs. With steps of 15 KC or 5 KC, the **IC-280** puts rapid and easy frequency change at your single fingertip and instantly displays bright, easy to read LED's.

Available Options:

- Touch Tone pad/microphone combination, which fits the mic plug on the radio face with absolutely no modification
- 15' unassembled cable kit for long distance remote mounting of the detachable control head

IC-280
2 meter FM, 4+MHz
Mobile Transceiver

All ICOM radios significantly exceed FCC regulations limiting spurious emissions.

Specifications subject to change without notice.

IC-280 Specifications: □ Frequency Coverage: 143.90—148.11 MHz □ Operating Conditions: Temperature: -10°C to 60°C (14°F to 140°F); Duty Factor: continuous □ Frequency Stability: ±1.5 KHz □ Modulation Type: FM (F3) □ Antenna Impedance: 50 ohms unbalanced □ Power Requirement: DC 13.8V ±15% (negative ground) □ Current Drain: Transmitting: 2.5A Hi (10W), 1.2A Lo (1W), Receiving: 0.630A at max audio output, 0.450 at SQL ON with no signal □ Size: 58(mm(h) x 156mm(w) x 228mm(d) □ Weight: approx. 2.2 Kg □ Power Output: 10W Hi, 1W Lo □ Modulation System: Phase □ Max. Frequency Deviation: ±5 KHz □ Spurious Output: more than 60 dB below carrier. □ Microphone Impedance: 500 ohms dynamic or electret condenser type, such as the SM-2 □ Receiving System: Double superheterodyne □ Intermediate Frequency: 1st 10.695 MHz, 2nd 455 KHz □ Sensitivity: 1 uv at S +N/N at 30 dB or better. Noise suppression sensitivity 20 dB, 0.6 uv or less. □ Selectivity: less than ±7.5 KHz at -6 dB, less than ±15 KHz at -60 dB □ Audio Output: More than 1.5W. □ Audio Output Impedance: 8 ohms

HF/VHF/UHF AMATEUR AND MARINE COMMUNICATION EQUIPMENT

DISTRIBUTED BY:

ICOM

ICOM WEST, INC.
Suite 3
13256 Northrup Way
Bellevue, Wash. 98005
(206) 747-9020

ICOM EAST, INC.
Suite 307
3331 Towerwood Drive
Dallas, Texas 75234
(214) 620-2780

ICOM CANADA
7087 Victoria Drive
Vancouver B.C. V5P 3Y9
Canada
(604) 321-1833

April 1979
Volume LXIII Number 4

QST (ISSN: 0033-4812) is published monthly as its official journal by the American Radio Relay League, Newington, CT, U.S.A. Official organ of the International Amateur Radio Union.

Offices

225 Main Street
Newington, Connecticut 06111
Tel: 203-666-1541

Subscription rate $12.00 per year postpaid, U.S. funds, U.S. & Possessions; $13.50 in Canada; $14.50 elsewhere. Single copies $2.00. Foreign remittances should be by international postal or express money order or bank draft negotiable in the U.S. and for an equivalent amount in U.S. funds.

Second-class postage paid at Hartford, CT and at additional mailing offices. Postmaster: Form 3579 requested.

QST is available to the blind and physically handicapped on magnetic tape from the Library of Congress, Division for the Blind and Handicapped, Washington, DC 20542.

Indexed by Applied Science and Technology Index, Library of Congress Catalog Card No.: 21-9421. Microform editions available from Xerox University Microfilms, Ann Arbor, MI 48106.

THE COVER

Operating during an Antarctic winter can be tough sledding. K1KI took the cover photo and the others that accompany his article. It begins on page 49.

Contents

Technical

11 **A Low-Cost PC-Board Duplexer** *Robert D. Shriner, WAØUZO*
22 **The SHARC Audible Current Meter** *Leroy J. Stockemer, KØWOL*
28 **The Whys and Hows of Bifilar Filament Chokes** *Doug DeMaw, W1FB*
30 **Save Money — Build Your Own RF Choke!**
32 **A Big Signal from a Small Lot** *David S. Hollander, N7RK, ex-WB6NRK/7*
35 **Some Commonly Asked Technical Questions (and Their Answers)** *Stan Gibilisco, W1GV*
37 **Technical Correspondence**

Basic Amateur Radio

15 **A Simple CW Audio Filter** *Jim Bartlett, K1TX*
18 **Putting the Boots to Your HW-8 QRP Transceiver** *Doug DeMaw, W1FB*

General

49 **Amateur Radio at the Bottom of the Earth** *Tom Frenaye, K1KI*
52 **Public Service Before Disaster Strikes** *Brian E. Peters, WD4EPR*

Operating

79 **Straight-Key Night**
80 **Results, Ninth Annual ARRL 160-Meter Contest** *Bill Jennings, K1WJ and Tom Frenaye, K1KI*
83 **Results, 45th Annual ARRL November Sweepstakes** *Tom Frenaye, K1KI and Bill Jennings, K1WJ*

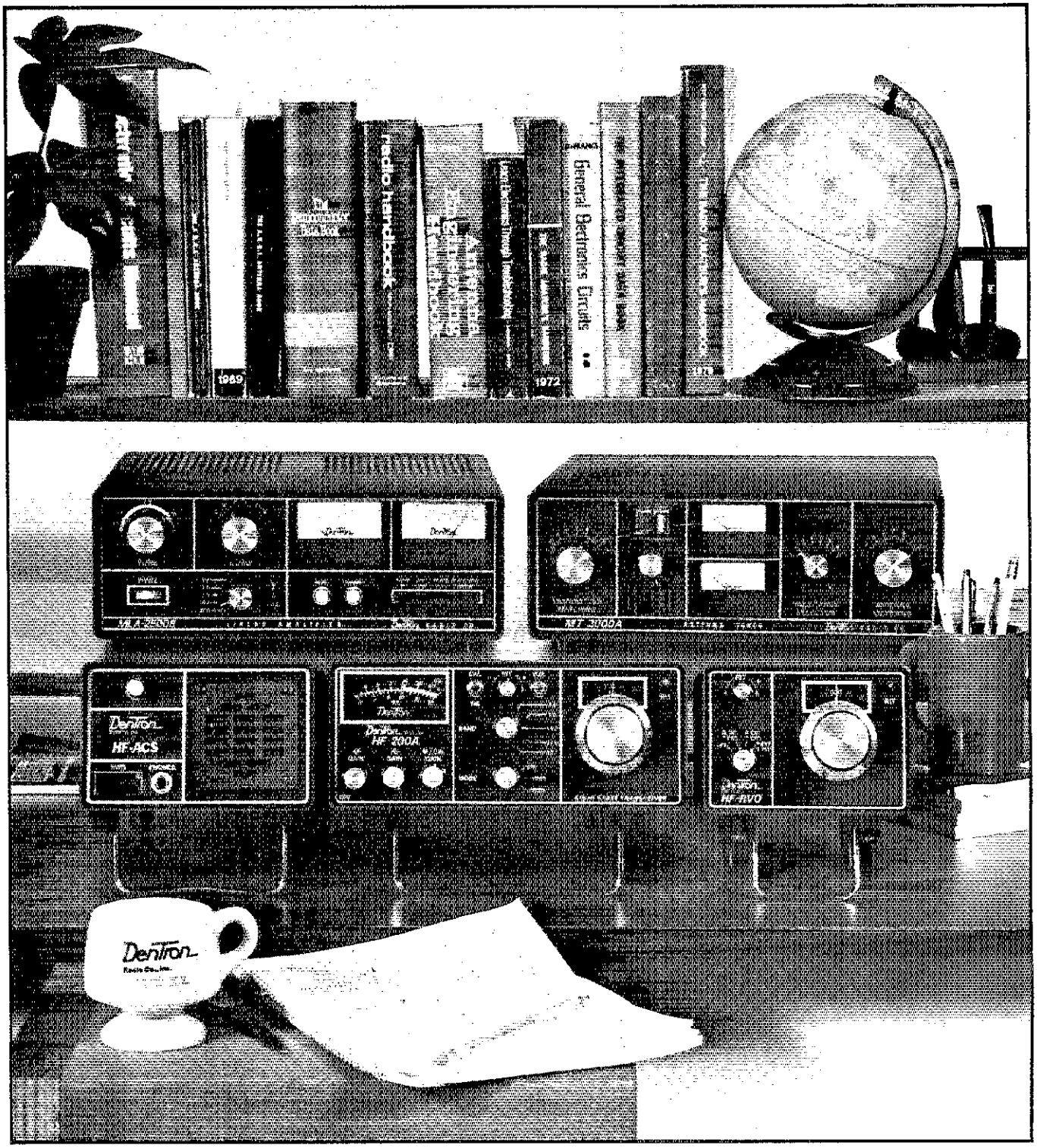
Organizational and Regulatory

9 **Long-Range Planning**
48 **Club Awards-Program Winners Show Ingenuity** *Rosalie White, WA1STO*
54 **Leaving a Mark on Tomorrow** *Michele Bartlett, N1AGD*
56 **Grandeur sur la Mississippi** *Don Allan, W5FVK and Jane Allan, W5MZI*
57 **FCC Organizational Shake-up**
60 **Moved and Seconded . . .**
64 **Safari Through Africa**
76 **Honor Thy Roll**
93 **It's All in a Dream**

Departments

62 Canadian NewsFronts
46 Circuit Board Etching Patterns
75 Club Notes
78 Coming Conventions
95 Contest Corral
66 Correspondence
27 Feedback
78 Hamfest Calendar
57 Happenings
44 Hints & Kinks
67 How's DX?
198 Index of Advertisers
64 International News
9 It Seems to Us
10 League Lines
72 The New Frontier
93 Operating News
94 OSCAR/RS Operating Schedule
39 Product Review
76 Public Service
75 Silent Keys
96 Station Activities
93 W1AW Schedule
63 Washington Mailbox
73 The World Above 50 MHz
71 YL News and Views
71 50 & 25 Years Ago

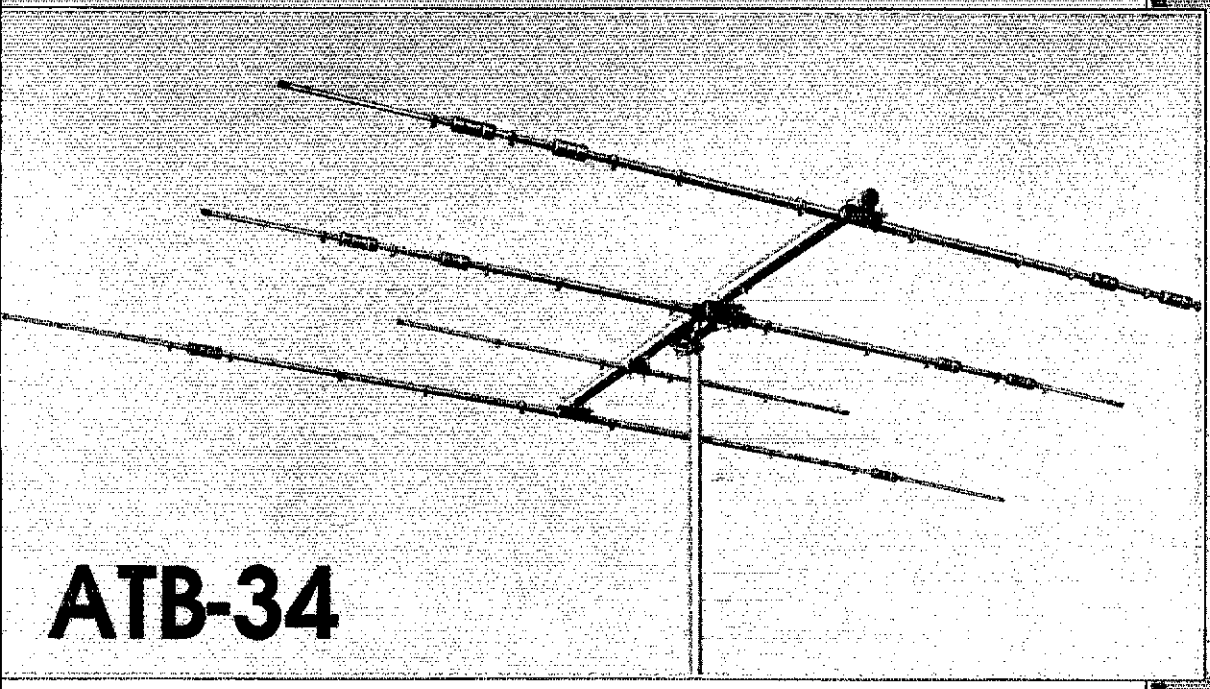
What every Amateur has been waiting for.... the new HF-200A Transceiver™



Build a complete station with DenTron®

DenTron Radio Company, Inc. / 2100 Enterprise Parkway / Twinsburg, Ohio 44087 / (216) 425-3173

CUSHCRAFT IS THE HF MULTI-BAND ANTENNA COMPANY.



ATB-34

Punch through the pile-ups with an ATB-34. The only three band beam to give you real full size performance. Check ATB-34 element lengths, check the trap design and construction. Check the spacing and the specially developed balun. All of these features add up to the no compromise performance that you expect from Cushcraft.

SPECIFICATIONS

3dB Beam Width	62°
Nominal Impedance	50 ohm
Power Handling	2000 Watts PEP
Boom Length	48'
Longest Element	32'8"
Turning Radius	18'9"
Wind Area	5.4 Ft.2
Weight	42 lbs.
Maximum Mast O.D.	2.5"

Cushcraft vertical antennas are designed to meet the exacting demands of your amateur radio station. They give top performance in easy to use packages. They can be installed at ground level or roof top.

Durability is guaranteed with double wall seamless aluminum base sections and fiberglass high Q traps. If you are interested in local contacts or long path DX communications, a Cushcraft vertical antenna is your best choice.

ATV-3	ATV-4	ATV-5
10-15-20 Meters	10-15-20-40 Meters	10-15-20-40-80 Meters
Height 13.8' (4.2mtrs.)	Height 19.4' (5.9mtrs.)	Height 24.4' (7.4mtrs.)

ALL MODELS

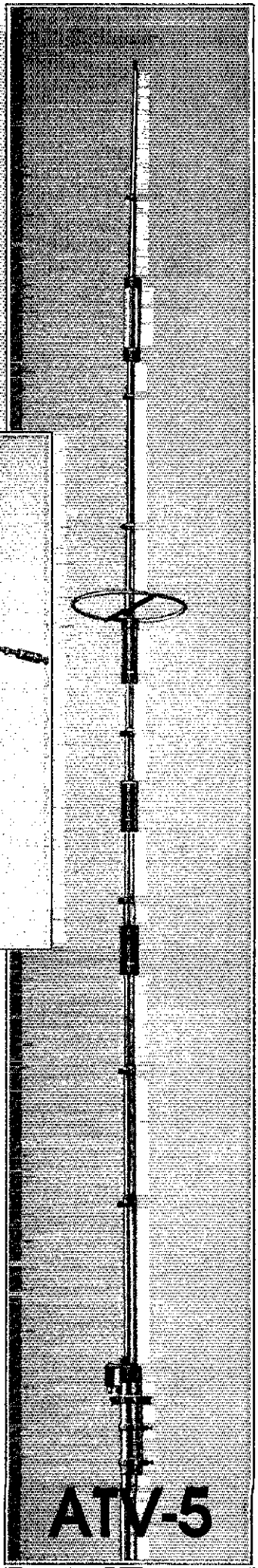
Power Handling 2000 Watts. Nominal Impedance 50 ohms. Maximum Mast Size 2" O.D.. Termination: accepts PL-259

UPS SHIPPABLE

cushcraft CORPORATION

THE ANTENNA COMPANY

IN STOCK WITH DEALERS WORLDWIDE P.O. BOX 4680 • MANCHESTER, NH 03108



ATV-5

TS-120S...A big little rig.

NEW!

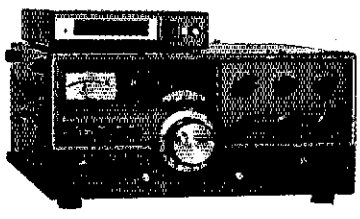
It's a compact, up to 200 watts PEP input, all solid-state HF transceiver with such standard features as built-in digital readout, IF shift, new PLL technology ...and requires no tuning!

Exciting and perfect for car or ham shack use! But, there's more to say about the TS-120S! This unique all solid-state HF, SSB/CW transceiver produces a hefty signal and also offers a lot of other great features in a very attractive, compact package.

FEATURES:

- All solid-state with wideband RF amplifier stages. No final dipping or loading, no transmit drive peaking, and no receive preselector tuning! *Just dial your frequency and operate!*
- Five bands, plus WWV. Transmits and receives on 80/75, 40, 20, 15, and all of 10 meters...and receives WWV on 15 MHz.
- 200 watts PEP (160 watts DC) input on 80-15 meters, 160 watts PEP (140 watts DC) input on 10 meters. LSB, USB, and CW.
- Digital frequency display (standard). 100-Hz resolution. Six digits. Special green fluorescent tubes eliminate viewing fatigue. Analog subdial, too, for backup display.
- IF shift (passband tuning), to remove adjacent-frequency interference and sideband splatter.
- Advanced PLL circuit, which eliminates need for heterodyne crystal element for each band. PLL lock frequency, CAL marker signal, and counter clock circuit use single reference frequency crystal. Simplifies circuitry, improves overall stability. Also improves transmit and receive spurious characteristics.
- Attractive, compact design. Measures only 3½" high X 9¼" wide X 13½" long, and weighs only 4.9 kg (11.7 lbs.). A perfect size for convenient mobile operation and rugged enough for either mobile or portable use. Also has all the desired features for optimum ham-shack operation at home.
- Noise blanker. You'll wonder where the ignition noise went.

See the big little TS-120S rig and matching accessories (VFO-120 remote VFO, SP-120 external speaker, PS-30 AC power supply, MB-100 mobile mounting bracket, AT-120 antenna tuner and YK-88C CW Filter) at your nearest Authorized Kenwood Dealer!



STILL AVAILABLE... KENWOOD TS-520S

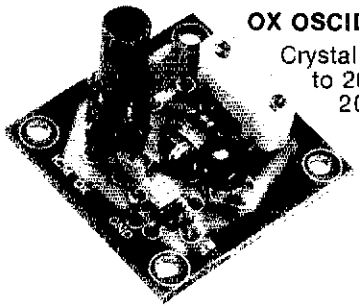
KENWOOD

...pacesetter in amateur radio

TRIO-KENWOOD COMMUNICATIONS INC

for the experimenter

INTERNATIONAL CRYSTALS & KITS / OSCILLATORS • RF MIXERS • RF AMPLIFIER • POWER AMPLIFIER



OX OSCILLATOR

Crystal controlled transistor type. 3 to 20 MHz, OX-Lo, Cat. No. 035100. 20 to 60 MHz, OX-Hi, Cat. No. 035101.

Specify when ordering

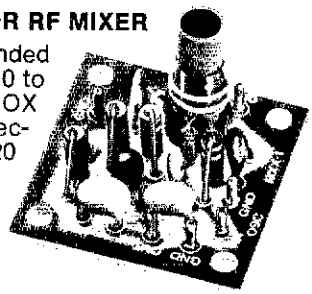
$5.22 ea.

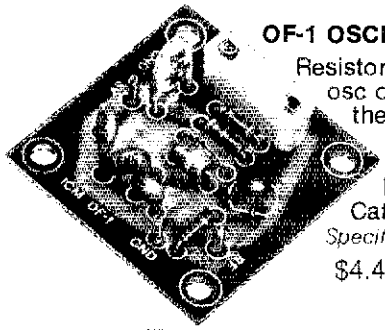
MXX-1 TRANSISTOR RF MIXER

A single tuned circuit intended for signal conversion in the 30 to 170 MHz range. Harmonics of the OX or OF-1 oscillator are used for injection in the 60 to 179 MHz range. 3 to 20 MHz, Lo Kit, Cat. No. 035105. 20 to 170 MHz, Hi Kit, Cat. No. 035106.

Specify when ordering.

$5.80 ea.





OF-1 OSCILLATOR

Resistor/capacitor circuit provides osc over a range of freq with the desired crystal. 2 to 22 MHz, OF-1 LO, Cat. No. 035108. 18 to 60 MHz, OF-1 H, Cat. No. 035109.

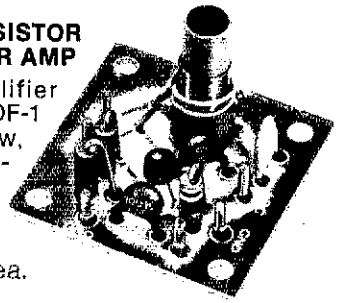
Specify when ordering.

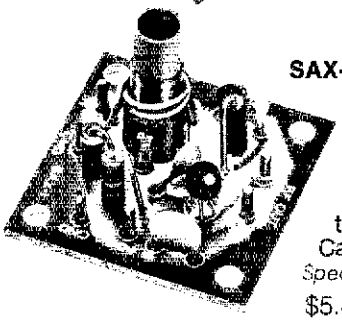
$4.48 ea.

PAX-1 TRANSISTOR RF POWER AMP

A single tuned output amplifier designed to follow the OX or OF-1 oscillator. Outputs up to 200 mw, depending on frequency and voltage. Amplifier can be amplitude modulated 3 to 30 MHz, Cat. No. 035104. *Specify when ordering.*

$6.06 ea.





SAX-1 TRANSISTOR RF AMP

A small signal amplifier to drive the MXX-1 Mixer. Single tuned input and link output. 3 to 20 MHz, Lo Kit, Cat. No. 03512. 20 to 170 MHz, Hi Kit. Cat. No. 035103.

Specify when ordering.

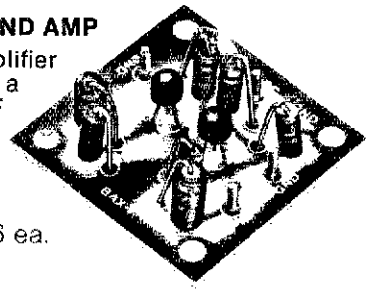
$5.80 ea.

BAX-1 BROADBAND AMP

General purpose amplifier which may be used as a tuned or untuned unit in RF and audio applications. 20 Hz to 150 MHz with 6 to 30 db gain. Cat. No. 035107.

Specify when ordering.

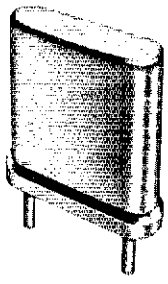
$6.06 ea.



.02% Calibration Tolerance

EXPERIMENTER CRYSTALS

(HC 6/U Holder)



Cat. No.	Specifications	
031080	3 to 20 MHz — for use in OX OSC Lo	
	Specify when ordering	$6.25 ea.
031081	20 to 60 MHz — For use in OX OSC Hi	
	Specify when ordering	$6.25 ea.
031300	3 to 20 MHz — For use in OF-1L OSC	
	Specify when ordering	$5.22 ea.
031310	20 to 60 MHz — For use in OF-1H OSC	
	Specify when ordering	$5.22 ea.

Shipping and postage (inside U.S., Canada and Mexico only) will be prepaid by International. Prices quoted for U.S., Canada and Mexico orders only. Orders for shipment to other countries will be quoted on request. Address orders to:

M/S Dept., P.O. Box 32497.
Oklahoma City, Oklahoma 73132

ICM

INTERNATIONAL CRYSTAL MFG. CO., INC.
10 North Lee . Oklahoma City Okla 73102

Directors

Canada

RONALD J. HESLER,* VE1SH, P. O. Box 418, Sackville, NB E0A 3C0 (506-536-1208)

Vice Director: William W. Loucks, VE3AR, 155 Brentwood Rd. N., Toronto, ON M8X 2C8 (416-231-8474)

Atlantic Division

HARRY A. McCONAGHY, W3SW, 8708 Fenway Dr., Bethesda, MD 20034 (301-365-4421)

Vice Director: Jesse Bieberman, W3KT RD 1, Box 66, Valley Hill Rd., Malvern, PA 19355 (215-827-7426)

Central Division

DON C. MILLER, W9NTP, RR 1, Box 95, Waldron, IN 46182 (317-525-6452)

Vice Director: Kenneth A. Ebneter, K9EN, 822 Wanona Trail, Portage, WI 53901

Dakota Division

GARFIELD A. ANDERSON, KØGA, 5820 Chowen Ave. South, Minneapolis, MN 55410 (612-922-1160)

Vice Director: Tod A. Olson, KØTO 292 Heather Lane, Long Lake, MN 55356

Delta Division

MAX ARNOLD,* W4WHN, 612 Hogan Rd., Nashville, TN 37220 (615-331-4556)

Vice Director: John H. Sanders, WB4ANX, 2149 Heatherly Rd., Kingsport, TN 37660 (615-247-3702)

Great Lakes Division

RICHARD A. EGBERT,* W8ETU, 6479 Red Fox Rd., Reynoldsburg, OH 43068 (614-866-3022)

Vice Director: George H. Goldstone, W8AP 1010 Burnham Rd., Bloomfield Hills, MI 48013

Hudson Division

STAN ZAK, K2SJO, 13 Jennifer Lane, Port Chester, NY 10573 (914-939-6681)

Vice Director: George A. Diehl, W2IHA, 20 Wilson Ave., Chatham, NJ 07928 (201-635-8703)

Midwest Division

PAUL GRAUER, WØFIR, Box 190, Wilson, KS 67490 (913-658-2155)

Vice Director: Claire Richard Dyas, WØJCP 2933 Dudley St., Lincoln, NE 68503 (402-432-2438)

New England Division

JOHN C. SULLIVAN, W1HHR, Whitney Rd., Columbia, CT 06237 (203-228-9111)

Vice Director: Fred E. Evans, W1JFF 74 Bedlow Ave., Newport, RI 02840 (401-847-4206)

Northwestern Division

ROBERT B. THURSTON,* W7PGY, 7700 31st Ave., N.E., Seattle, WA 98115 (206-523-8167)

Vice Director: Ronald D. Mayer, K7BT, 6115 S.E. 13th Ave., Portland, OR 97202 (503-232-7363)

Pacific Division

WILLIAM J. STEVENS, W6ZM, 2074 Foxworthy Ave., San Jose, CA 95124 (408-371-3619)

Vice Director: Robert C. Smithwick, W6JZU, 516 Remington Dr., Sunnyvale, CA 94087 (408-736-8601 business)

Roanoke Division

L. PHIL WICKER, W4AGY, 4821 Hill Top Rd., Greensboro, NC 27407 (919-299-9187)

Vice Director: Gay E. Milius, Jr., W4UG, 1416 Rutland Dr., Virginia Beach, VA 23454 (804-481-5095)

Rocky Mountain Division

MAURICE O. CARPENTER, KØHRZ, 1310 South Tejon St., Denver, CO 80223 (303-936-1411)

Vice Director: Lys J. Carey, KØPGM, 45 South King St., Denver, CO 80219 (303-935-2295 home, 303-744-4245 business)

Southeastern Division

LARRY E. PRICE, W4RA, P. O. Box 2067, Georgia Southern Station, Statesboro, GA 30458

Vice Director: Frank M. Butler Jr., W4RH, 323 Elliott Rd. S.E., Fort Walton Beach, FL 32548 (904-244-5425)

Southwestern Division

JAY A. HOLLADAY, W6EJJ, 5128 Jessen Dr., La Canada, CA 91011 (213-790-1725)

Vice Director: Peter F. Matthews, WB6UIA, 3403 S. Walker Ave., San Pedro, CA 90731 (213-547-5816)

West Gulf Division

JACK D. GANT, W5GM, 521 Monroe, N.W., Ardmore, OK 73401 (405-223-2619)

Vice Director: Raymond B. Wangler, W5EDZ, 642 Beryl Dr., San Antonio, TX 78213 (512-733-9632 home, 512-684-5111 business) 5111 Rose St., Grapevine, TX 76051

*Members Executive Committee

Section Communications Managers of the ARRL

Reports Invited: The ARRL Board of Directors (see list at left) determines the policies of ARRL. The 16 divisions of the League are further arranged into 74 administrative "sections," each headed by an elected Section Communications Manager. Your SCM welcomes reports of individual and club activity. ARRL Field Organization appointments are available covering a wide range of amateur radio operating interests. Whatever your license class, your SCM has an appointment available. Check with your SCM (below) for further information. Section boundaries are defined in the booklet *Operating an Amateur Radio Station*, free to members.

Canadian Division

Alberta — Sydney T. Jones, VE6MJ, 10706 — 57 Ave., Edmonton T6H 0Y6 (403-434-3862)
British Columbia — H. E. Savage, VE7FB, 4563 West 12th Ave., Vancouver V6R 2R4 (604-224-5226)
Manitoba — Peter Guenther, VE4PG, Box 178, Morris R0G 1K0 (204-746-2218)
Maritime-Nfld — Aaron D. Solomon, VE1OC, 8 Crichton Park Rd., Dartmouth, NS B3A 2N8 (902-466-5188)
Ontario — L. P. Thivierge, VE3GT, 34 Bruce St. W., Renfrew K7V 3W1 (613-432-5967)
Quebec — Harold Moreau, VE2BP, 80 Principale, St. Simon Co., Bagot J0H 1Y0 (514-798-2173)
Saskatchewan — Percy A. Crosthwaite, VE5RP, RR 3, Saskatoon S7K 3J6 (306-668-4619)

Atlantic Division

Delaware — Roger E. Cole, W3DKX, 345 E. Roosevelt Ave., New Castle 19720 (302-328-0581)
Eastern Pennsylvania — George S. Van Dyke, Jr., W3HK, 4607 Convent Ln., Philadelphia 19114 (215-637-8329)
Maryland-D.C. — Karl R. Medrow, W3FA, 718 W. Central Ave., Davidsonville 21035 (301-261-4008)
Southern New Jersey — William C. Luebkemann, Jr., WB2LCC, 116 Country Farms Rd., Marlton 08053
Western New York — Lonnie J. Keller, WA2AOG, 25 Highland Ave., Lancaster 14086 (716-681-2623)
Western Pennsylvania — Otto Schuler, K3SMB, 3732 Colby St., Pittsburgh 15214 (412-231-6890)

Central Division

Illinois — Edmond A. Metzger, W9PRN, 1520 South 4th St., Springfield 62703 (217-523-5861)
Indiana — John M. Kell, W9LTU, RR 8, Box 383, Greenfield 46140 (317-462-6097)
Wisconsin — Roy Pedersen, K9FHI, 510 Park St., Juneau 53039

Dakota Division

Minnesota — Helen Haynes, WBØHOX, 16 N.E. 7 Ave., Rochester 55901 (507-288-2437)
North Dakota — Lois A. Jorgensen, WAØRWM, Box 213, Abercrombie 58001
South Dakota — Lydia S. Johnson, WØKJZ, 506 Green St., Lead 57754 (605-584-1449)

Delta Division

Arkansas — Sid Pokorny, W5UAU, P. O. Box 4071, Horseshoe Bend 72512 (501-670-5598)
Louisiana — S. T. "Tom" Losey, Jr., K5TL, 172 Moor Rd., Shreveport 71106
Mississippi — E. Ed Robinson, W5XT, P. O. Box 602, Laurel 39440 (601-425-2381)
Tennessee — O. D. Keaton, WA4GLS, 141 Medearis Dr., Old Hickory 37138 (615-758-2329)

Great Lakes Division

Kentucky — Joseph E. Miller, K4DIM, 8901 Honor Ave., Louisville 40219
Michigan — Stanley J. Briggs, W8MPD/K8SB, 1885 Pinetree Rd., Trenton 48183 (313-676-6248)
Ohio — Harold C. Chapman, WB8JGW, 990 Northwest Potee Rd., S. Vienna 45369 (614-852-4260)

Hudson Division

Eastern New York — Guy L. Olinger, K2AV, 126 Dahlia Dr., Mahopac 10541
N.Y.C. & Long Island — Paul A. Lindgren, WA2UWA, P. O. Box 1158, East Hampton 11937 (516-324-1542)
Northern New Jersey — Robert E. Neukomm, WA2MVQ, 404 O'Brien Ct., Wyckoff 07481 (201-891-3064)

Midwest Division

Iowa — Max R. Otto, WØLFF, 733 W. Benton St., Iowa City 52240 (319-337-7179)
Kansas — Robert M. Summers, KØBXF, 3045 North 72nd, Kansas City 66109 (913-299-1128)
Missouri — Larry G. Wilson, KØRWL, 5415 E. 97th St., Kansas City 64137 (816-966-8953)
Nebraska — Ed O'Donnell, WBØGWR, 1001 N. Minnesota Ave., Hastings 68901

New England Division

Connecticut — William J. Pace, W1ID, 15 Upland Rd., Middlebury 06762 (203-758-9228)
Eastern Massachusetts — Richard P. Beebe, K1PAD, 82 Wyman Rd., Billerica 01821 (617-667-5609)
Maine — William C. Mann, W1KX, P. O. Box 73, N. Jay 04262 (207-645-3089)
New Hampshire — Robert Mitchell, W1NH, Box 137-A, Chester 03036 (603-895-3456)
Rhode Island — John Titterington, W1EOF, 45 Mountain Ave., Riverside 02915 (401-438-3619)
Vermont — Robert L. Scott, W1RNA, 9 Large St., Swanton 05488 (802-868-4944)
Western Massachusetts — William T. Lowe, W1TM, Commonwealth Ave., Great Barrington 01230

Northwestern Division

Alaska — Roy Davis, KL7CUK, Star Route A 560E, Willow 99688 (907-733-2317)
Idaho — Lemuel H. Allen, Jr., W7JMH, 1800 S. Atlantic St., Boise 83705 (208-343-9153)
Montana — Robert E. Leo, W7LR, RFD 3, Box 104, Bozeman 59715 (406-586-6417)
Oregon — Dale T. Justice, K7WW, 1369 N.E. Sunrise Ln., Hillsboro 97123 (503-648-8232)
Washington — Robert L. Klepper, W7IEU, 7027 51st NE, Marysville 98270 (206-659-3005)

Pacific Division

East Bay — Bob Vallio, W6RGG, 18655 Sheffield Rd., Castro Valley, CA 94546 (415-537-6704)
Nevada — Leonard Norman, W7PBV, P. O. Box 945, Boulder City 89005 (702-293-2091)
Pacific — George H. Morton, N7HR/KH6, 5689 Dovekie Ave., Ewa Beach, HI 96706 (808-499-1149)
Sacramento Valley — Norman A. Wilson, N6JV, Rte. 1, Box 730, Woodland, CA 95695 (916-666-1465)
San Francisco — Mark L. Nelson, AA6DX, 4023 Kent Ct., Arcata, CA 95521 (707-822-9674)
San Joaquin Valley — Charles P. McConnell, W6DPD, 1658 W. Mesa Ave., Fresno, CA 93711 (209-431-2038)
Santa Clara Valley — Jettie B. Hill, W6RFF, 22410 Janice Ave., Cupertino, CA 95014 (408-255-6714)

Roanoke Division

North Carolina — William C. Parris, AA4R, 6210 Gothic Ct., Charlotte 28210 (704-365-1150)
South Carolina — Richard McAbee, W4MTK, 205 Jewel St. N.W., New Ellenton 29809
Virginia — Richard "Rick" L. Genter, K4BKX, 3707 Bonmark Dr., Richmond 23234 (804-271-0505)
West Virginia — Karl S. Thompson; K8KT, 5303 Pioneer Dr., Charleston 25312

Rocky Mountain Division

Colorado — Robert W. Poirier, KØDJ, 1884 Pepperwood Dr., Colorado Springs 80910
New Mexico — Joe Knight, W5PDY, 10408 Snow Heights Blvd., N.E., Albuquerque 87112
Utah — Carl R. Ruthstrom, W7GPN, 437 Fifth St., Ogden 84404 (801-394-3314)
Wyoming — Chester C. Stanwaity, W7SDA, 353 S. Ferris St., Powell 82435 (307-754-3624)

Southeastern Division

Alabama — William E. Scates, WA4JYU, 172 Redstone Way, Birmingham 35215
Canal Zone — Alvin Sholk, KZ5AS, Box O, Balboa Heights
Georgia — Alpheus H. Stakely, K4WC, 2220 Lyle Rd., College Park 30337 (404-767-4837)
Northern Florida — Frank M. Butler, Jr., W4RH, 323 Elliott Rd., S.E., Fort Walton Beach 32548 (904-244-5425)
Southern Florida — Woodrow Huddleston, K4SCL, 219 Driftwood Ln., Largo 33540 (813-584-0984)
West Indies — José R. Lebron, KP4JL, 666 Manzanillo, Venus Gardens, Rio Piedras, PR 00926 (809-755-2579)

Southwestern Division

Arizona — Willard L. Haskell, AC7D, 3915 N. Campbell Ave. Sp. 102, Tucson 85719
Los Angeles — Perry Masterson, W6RHS, 485 S. Euclid Ave., Pasadena, CA 91101 (213-793-8557)
Orange — Fred Heyn, WA6WZO, 962 Cheyenne, Costa Mesa, CA 92626
San Diego — Arthur R. Smith, W6INI, 4515 Melisa Way, San Diego, CA 92117 (714-273-1120)
Santa Barbara — D. Paul Gagnon, N6MA, 3800 So. J St., Oxnard, CA 93030 (805-484-1951)

West Gulf Division

Northern Texas — Phil Clements, K5PC, 1313 Applegate Ln., Lewisville 75067
Oklahoma — Leonard R. Hollar, WA5FSN, RFD 1, 710 South Tenth St., Kingfisher 73750 (405-375-4411)
Southern Texas — Arthur R. Ross, W5KR, 132 Sally Ln., Brownsville 78521 (512-831-4458)

THE AMERICAN RADIO RELAY LEAGUE, INC.

"It Seems to Us..."

Long-Range Planning

This month we'd like to share with you some thoughts about the future. At its January meeting, the League's Board unanimously adopted the following:

". . . that the President is directed to appoint a long-range planning committee for the purpose of reviewing and making recommendations to the Board concerning the programs which the League is and should be providing to its members and to the Amateur Radio Service. This committee shall be composed of designated members of the Board, staff and knowledgeable individuals from among the League's membership. The committee shall present its proposed plan of action and proposed budget for approval at the July 1979 Board meeting and shall make its final report and recommendations no later than the July 1980 Board meeting."

Many of us have been concerned for some time that the League has been inclined to react, rather than proact. That is, we tend to spend our time responding to the pressures of others, whether those others be members, FCC, industry or the general public. One example is the fact that our membership services have become rather a patchwork quilt, constructed over a long period of time in response to individual requests by the membership, without any overall plan which coordinates them and eliminates those which may overlap or may not be cost-efficient. Similarly, we have tended for years to react to rulemaking proposals emanating from the Commission, rather than ourselves setting the course for the future regulatory development for the Amateur Radio Service and guiding the Commission into fulfillment of it.

Although this has been a more or less satisfactory arrangement for the 65 years of the League's existence so far, there are some pressures on us that make it expedient to stand back and take a look at ourselves, at the Amateur Radio Service, and at the future economic and political environment. Our membership has grown by some 50,000 in the past four years, with a comparable growth in the total number of licensed amateurs in the United States and Canada. Our costs of doing business have tripled in the past 10 years, making it difficult for us to maintain sufficient income to provide membership services at their traditionally high level. We have, in the past several years, been faced with a veritable barrage of regulations and proposals from the Federal Communications Commission. And finally, on this year's horizon is a World Administrative Radio Conference which may well have a significant impact on the future course of Amateur Radio worldwide.

It was a keen awareness of those pressures which led the Board to the passing of the motion which we quoted above. It was a keen awareness of those pressures and of the importance of the task which led ARRL President Dannals to promptly name the following members of the ARRL Long-Range Planning Committee: Victor C. Clark, W4KFC, Vice President, ARRL, Chairman; Jay A. Holladay, W6EJJ, Director, Southwestern Division, ARRL; Larry E. Price, W4RA, Director, Southeastern Division, ARRL; Charles Dorian, W3IPT, Life Member, ARRL; Herbert Hoover III, W6ZH, Life Member, ARRL; Hazard E. Reeves, K2GL, Member, ARRL; Richard L. Baldwin, W1RU, General Manager, ARRL. And, of course, President Dannals will participate ex officio.

Very quickly, a few words are in order to introduce to you the above LRPC members. Mr. Clark as an officer and Messrs. Holladay and Price as directors represent the League's Board on the Long-Range Planning Committee. Mr. Hoover is an outstanding example of a knowledgeable individual from the membership. Mr. Dorian is not only a knowledgeable individual from the membership but also has a valuable perspective from his Washington involvement. Mr. Reeves, again a knowledgeable member, brings to the LRPC his experience in the world of business and finance. Mr. Baldwin will coordinate the input from the ARRL staff.

Most importantly, these members of the LRPC are all intensely devoted to Amateur Radio and to ARRL.

By the time you read this, the LRPC will have begun to develop its proposed plan of action. Although you will be hearing much more about this committee in the months ahead, we urge you now to begin contributing any general thoughts you may have about long-range planning. Later on, of course, we'll surely have some very specific questions on which input from the general membership is desired, but for now let's deal in general concepts. Your comments can be addressed to LRPC, c/o ARRL hq., where they will be duplicated and distributed to members of the committee.

It is an important task which LRPC Chairman Clark and his committee have — please plan to participate and support their efforts. — *R. L. Baldwin, W1RU*

League Lines...

Did you help provide communications during the Iranian crisis? If so, here is a letter of appreciation addressed to you: "It's a pleasure to convey the appreciation of the Joint Staff for the excellent support provided by ARRL and its members during the recent Iran crisis. Initiating and maintaining Iran connectivity was due in significant measure to the professional efforts of the dedicated and enthusiastic ARRL people working on the problem. On behalf of the Joint Staff, please pass on to those who participated my thanks for a job well done. Van C. Doubleday, Major General, USAF, Dep Dir for OPS (C3 Systems), J-3 OJCS. signed JCS Washington, DC //J3"

ATTENTION ALL APRIL OPEN CD PARTY PARTICIPANTS. The dates given on page 85 of March QST for the April CD Party are incorrect. The CD Party begins at 2300 UTC April 7 and ends at 0500 UTC April 9 for cw. The phone portion of the CD Party starts at 2300 UTC April 21, and ends at 0500 UTC April 23. Parting has been such sweet sorrow, but we have finally disposed of all our old calendars. The dates appearing elsewhere for the CD Party have all been correct.

Hq. has received word of a new 2-meter terrestrial DX record via the transequatorial, or FAI mode. On February 16, 1979, SV1AB in Athens, Greece reported a 4419-mile (7127-km) contact with ZS6DN in Pretoria, RSA. Three days earlier, the South African station is understood to have also worked SV1DH, just six miles (10 km) closer. More details next month in "The World Above 50 MHz."

Deadline for registering your public-service net for the upcoming Net Directory is June 1, 1979. Registration cards may be obtained from Hq. for an s.a.s.e. Request CD-85.

During the February solar eclipse did you observe unusual propagation phenomena? To have your observations correlated with those of the solar eclipse nets organized by the Oregon State University Amateur Radio Club, send a copy of your reports to Allen Lefohn, KA7CBV, P. O. Box 196, Clancy, MT 59634.

The ARRL-organized IEEE ELECTRO/79 (NYC) technical session no. 23 will be held at 2 P.M. on April 25. It is entitled "Modern Design and Concepts for RF Communications --MF through Microwaves."

Instructors! Save your FCC form 610 instructions. Although Club and Training Department will still supply Form 610 in class-size quantities, for budget reasons instructions will no longer be provided for the instructor after the end of April 1979.

A Headquarters organization chart is yours for the asking. Please include with your request a stamped, self-addressed business-sized envelope.

We were pleasantly surprised by the number of entries in the ARRL flag contest, there having been a veritable deluge of entries. Although we promised a decision by March 15th, that'll have to be postponed for a few weeks. All entries are being examined by our volunteer committee of vexillologists, who will render an opinion as promptly as possible.

The League's annual reports for 1978 are now available, $1 postpaid. They include individual reports from each officer and director, from the general manager and treasurer, and the complete audited financial statements of the League as prepared by our outside auditors. If you have heard that it's difficult to find out what the League has been doing, don't believe it! The whole story is in these annual reports, awaiting your request for your copy. If you don't want the whole volume, but just the statement of income and expense, send along only a stamped, self-addressed business-sized envelope.

A Low-Cost PC-Board Duplexer

Interested in an inexpensive duplexer for the new club repeater? This design requires only basic tools to assemble, and provides 81-dB RX/TX isolation!

By Robert D. Shriner,* WAØUZO

I arrived at the design of this duplexer by studying several different tuned-cavity construction methods, and utilizing what I felt was the best of each of them. After deciding upon the basic design, I was faced with the problem of determining the necessary dimensions. Not having the knowledge needed to *calculate* the dimensions, I followed the advice of an old friend, WØYB — "Pick up any material you can find, measure it with a micrometer, mark it with chalk and cut it with an axe!"

Well, that is almost how I arrived at all of the dimensions, so don't ask me if others will work. All I can say is that considering the size, cost and ease of construction, I believe this is as good a duplexer as you can get. It certainly does the job, and you can't ask for more.[1]

The 2-meter duplexer described in this article is actually a combination of six individual tuned cavities.[2] However, a *single* section can be constructed and tuned so as to place the notch anywhere. For instance, let's say that your repeater has some bad interference from a public service transmitter on 155 MHz. To eliminate the interference, you could simply build a single low-pass cavity (inductor type) and wind about two turns of no. 14 wire 1/2 inch in diameter for the inductor.

Similarly, if the interference is coming from a transmitter operating at 130 MHz, the addition of capacitance to C1 of the high-pass type cavity should produce a notch at a lower frequency. Fig. 1 shows a completed 2-meter duplexer containing six cavities in all, three of the capacitive and three of the inductive type. Fig. 2A gives the electrical and mechanical details.

The use of capacitors and inductors across the coupling loops is nothing new. It was borrowed from the duplexer described in *FM and Repeaters for the Radio Amateur*, 2nd edition, page 87. A full description of the duplexer operation

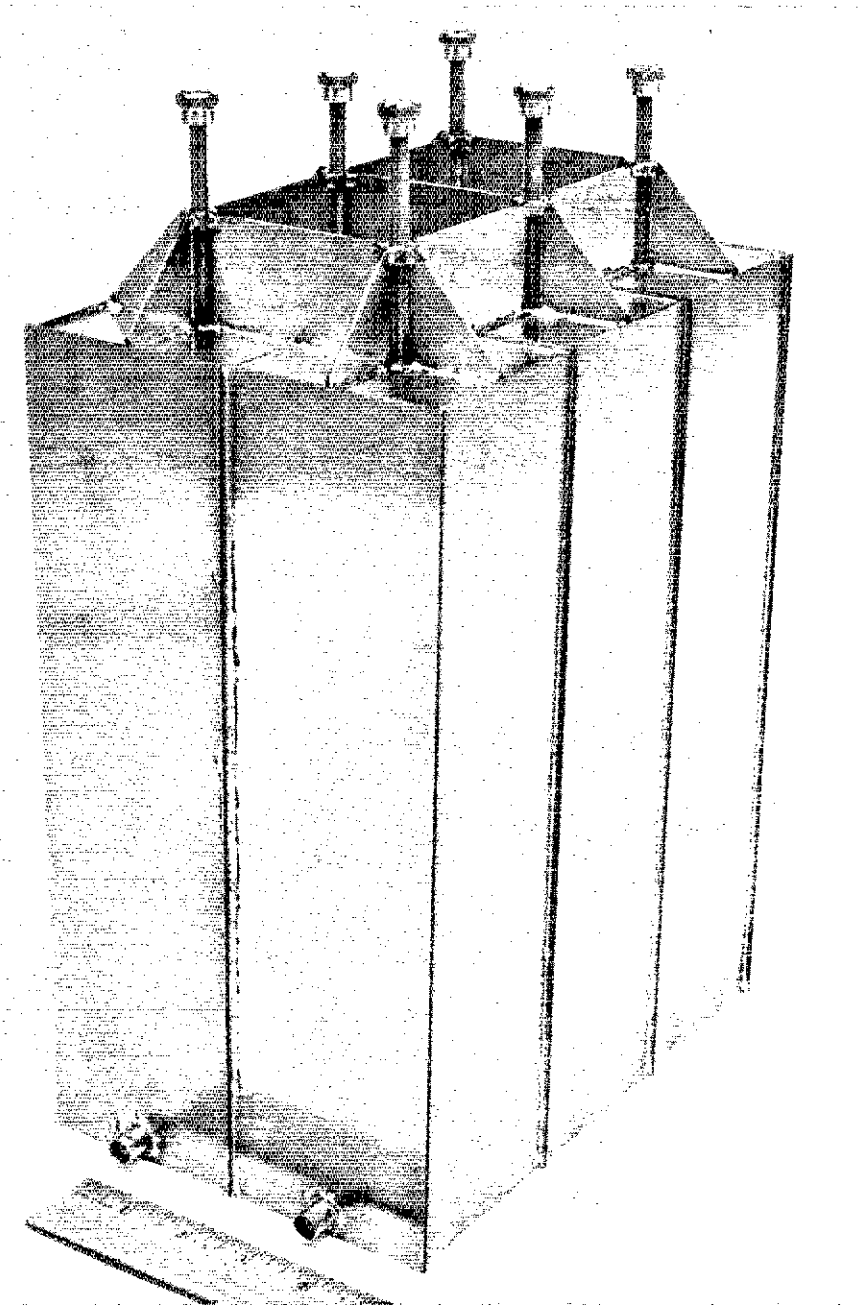


Fig. 1 — One completed pc-board duplexer, built in the ARRL lab by the author and ARRL Technical Dept. staffers.

*P. O. Box 969, Pueblo, CO 81002
[1]Footnotes appear on page 14.

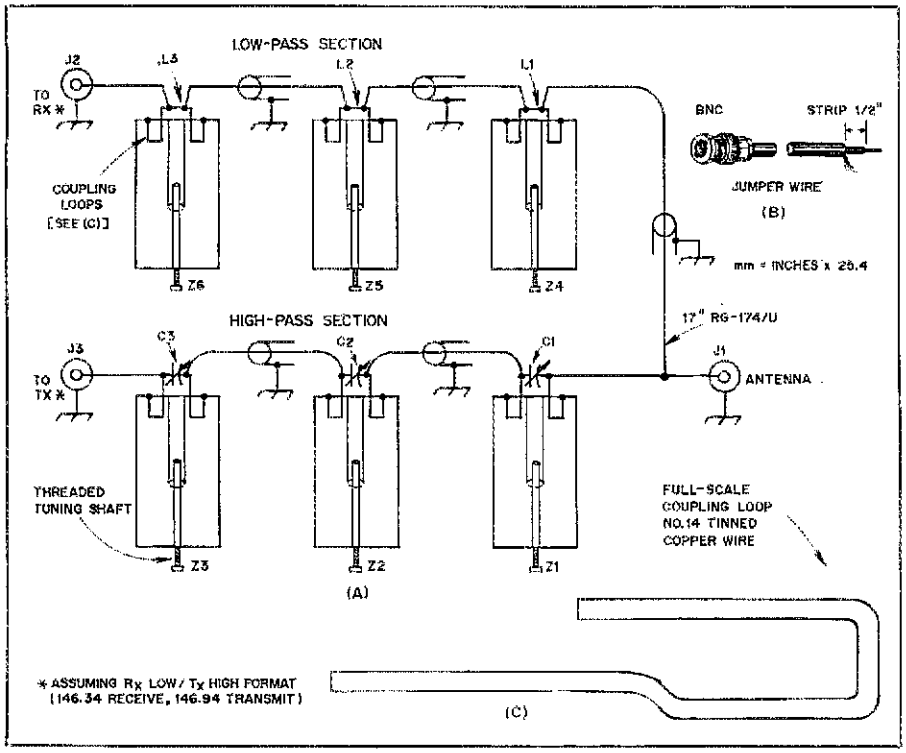


Fig. 2 — Drawing of the electrical and mechanical details of the duplexer. At A, two three-cavity sections are combined to yield 81-dB isolation between transmitter and receiver. A 34/94 machine is used in the example, with the repeater transmitter being on 146.94 MHz. Thus, the high-pass section is connected to the transmitter, and the low-pass section to the 146.34-MHz receiver. Shown at B is one of the two cables used to test individual cavities. Coupling loops should be made using the outline at C as a guide.

C1, C2, C3 — Enclosed air-variable capacitors, 2-18 pF.
J1, J2, J3 — BNC connectors (UG-1094/U).
L1, L2, L3 — See text.

is provided there and need not be repeated, except to say that a capacitor will produce a reject notch *below* the pass frequency, and an inductor will produce a notch *above* the pass frequency. The frequency where the notch occurs is inversely proportional to the amount of inductance or capacitance used.

The inductors at L1, L2 and L3 are straight pieces of no. 14 wire 1 inch long. I don't know the inductance in microhenrys, but believe me, it's not very much. Fig. 2B shows the makeup of cables for testing individual cavities. In use these cables replace interconnecting cables, being temporarily soldered to the input and output points of the cavity. Fig. 2C is an outline of the coupling loop used in two places in each cavity. The drawing is full scale, so just use it as a guide and bend your loops so that they fit inside the lines. In the low-pass cavities, the coupling-loop ends that stick through the board are bent inward over a 1/8-inch radius and soldered together forming the 1-inch wire inductor. Then the feed line, RG-174/U, is tapped along this line for the correct inductance. The capacitors are soldered to pc foils etched into the pipe-support plate.

Construction

Figs. 3 and 4 show the necessary tools and parts for building a single cavity. Study the photographs in Figs. 5 through 12 carefully so that you understand the assembly process. Figs. 11 and 12 show the details for a six-cavity duplexer. The construction techniques are the same for any number of cavities used together, except for the use of common walls in adjacent cavities.

When you have finished soldering the nuts inside the tubes, as explained in the caption of Fig. 7, place a small amount of epoxy glue in the threads of nut A and on one end of the threaded rod. Next screw the rod about 1/4 inch into nut A so that nearly the full length of the rod sticks out of the left-hand end of the small tube. Then reverse the assembly, slide it down into the larger tube and screw the rod a few turns into nut B. This will hold the rod and nut in proper alignment while the glue dries.

If the two brass tubes don't fit snugly when nested together, cut several slits in the end of the larger (7/16-inch) diameter tube. Clean off the burrs and bend the "fingers" in slightly so that a good contact is achieved. The brass tubes must be polished very smooth. I recommend steel wool for this purpose. The insides of the tubes can be polished with your electric drill and a small piece of steel wool wrapped around a wooden dowel rod. The two tubes should nest together and slip back and forth easily. Do not proceed until this fit has been obtained.

Circuit-board material was chosen for the enclosure, as it is the least expensive material available, and is temperature stable as well.[3] Silver plating is recommended for all interior surfaces, including the tubes.

All parts should be carefully cut to size and dressed for a nice fit before final assembly. For those of you who feel adventurous, I suggest trying other dimensions, as you might improve the performance of the unit. I know these dimensions work very nicely, and frankly, I'm scared to try changing them! Be my guest.

Take your time on the assembly, and make sure all parts are in proper alignment before final soldering. You will be amazed at how difficult it is to *unsolder* any of the joints once you've completed them. Therefore, any extra time spent double-checking alignment prior to soldering will be well worth the trouble. That's much easier than trying to square things up later on.

By using a small solder tack here and there to begin with, you can shift things by merely heating up individual points and applying a little pressure in the right direction. After you've finished the initial "tack" job, place a few more solder tacks along each joint and check alignment again. When you are sure all is well, solder the seam full length.

It is important that all joints be clean and as smooth as possible. Use only very high-grade 60/40 rosin-core solder. Polish all parts immediately before soldering, and try not to get any fingerprints on them. I recommend that you use *brass* nuts on the adjusting screw. These should be polished also.

Adjustment

The duplexer should be adjusted one cavity at a time. For test equipment you will need a good, variable-frequency rf generator and a good method of receiving and displaying the output amplitude of the duplexer or single-cavity filter. A high-frequency oscilloscope or sensitive dB meter is best, but a 2-meter receiver can be used in a pinch. A frequency counter should also be used to check the output frequency of the rf generator.

Make two jumper cables similar to the one shown in Fig. 2B. Start alignment with a cavity in the high-pass section of the duplexer. Solder the two jumper cables to the two coupling loops of one cavity. The center conductors should be attached at the input and output pads, and the shields soldered to the ground foil. Set the capacitor for approximately three-quarters of full capacitance. Attach the rf generator to one jumper-wire connector, and set the generator to your *low* frequency (146.34 MHz if the repeater is a 34/94 machine).[4] From this point on, we will refer to transmit and receive frequencies as "high" and "low," respectively.

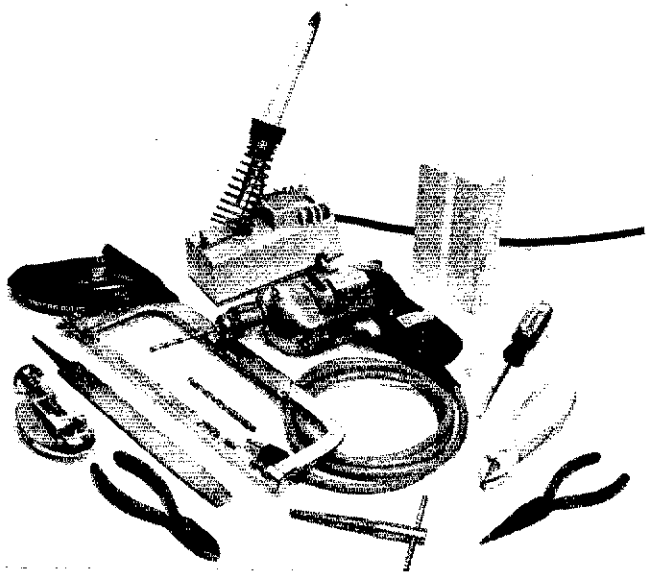


Fig. 3 — Tools required for assembly of the pc-board duplexer. Most of these are common items in the amateur workshop.

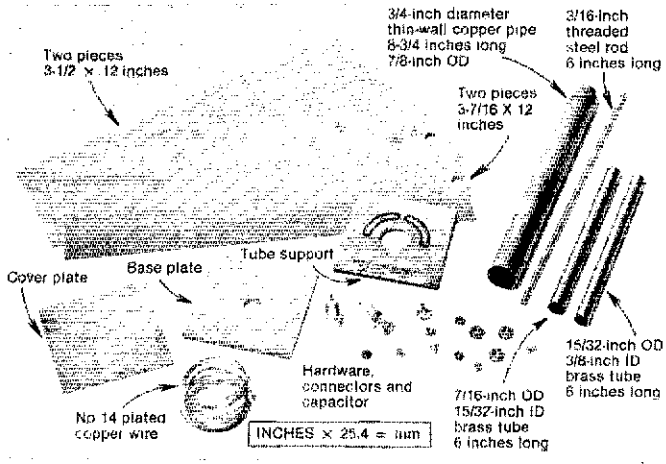


Fig. 4 — All parts needed to build a single cavity are shown in this photo. Six cavities were combined to make the duplexer shown in Fig. 1. The tube support, cover plate and base plate are all 3-7/16 inches square. The base place center hole is 7/16 inch in diameter and the tube support hole is 7/8 inch. The top plate is cut from 1/16-inch thick, double-clad stock, while 1/8-inch stock was used for the tube support and base plate.

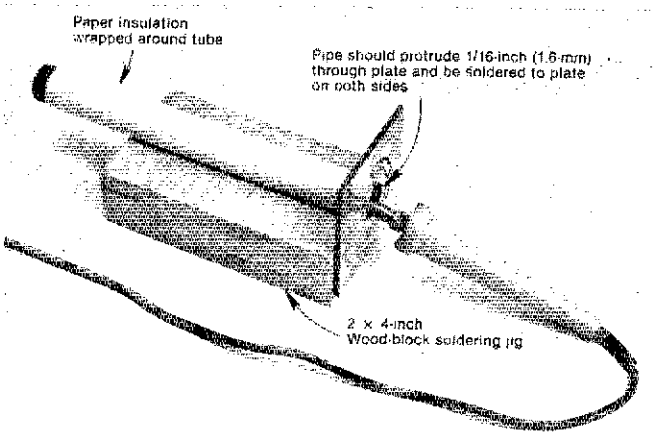


Fig. 5 — The tube-support plate and tube are soldered together using a 2 × 4-inch block of wood as a jig. The block is checked for squareness, and a groove is cut down the middle. (See Fig. 3.) Paper is wrapped around the tube to reduce heat loss during the preheating process.

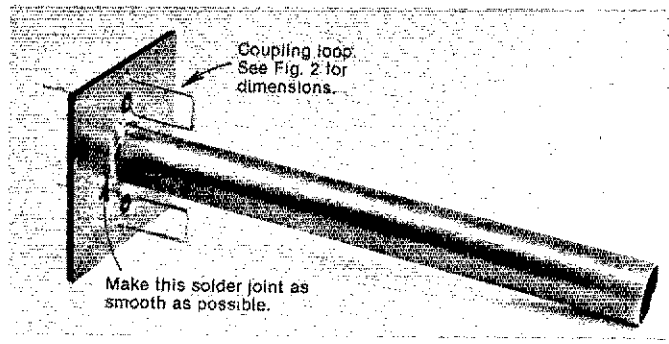


Fig. 6 — This photo shows the finished tube support assembly with both coupling loops in place. Make sure the solder joint at the base of the tube is as smooth as possible.

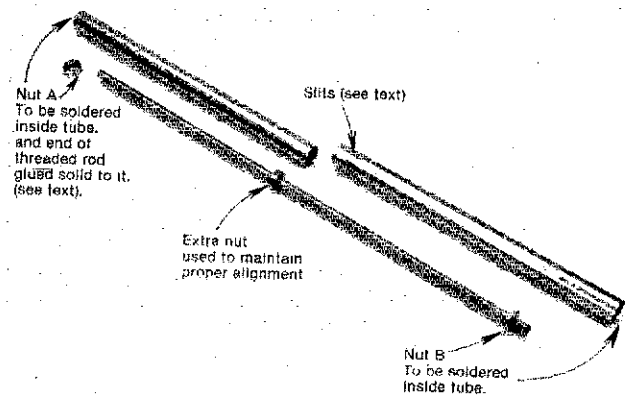


Fig. 7 — Grind off the corners of the three nuts used in this assembly. Use the threaded rod to align and hold the nuts in place for soldering. After the two end nuts are soldered, remove rod and discard center nut. Glue and assemble as described in the text.

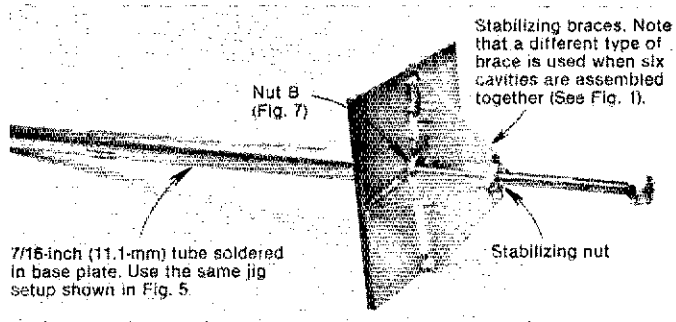


Fig. 8 — The completed frequency-adjustment assembly for a single cavity. Note the two nuts used at the end of the threaded rod. These were tightened together to form a "handle" for easy frequency adjustment.

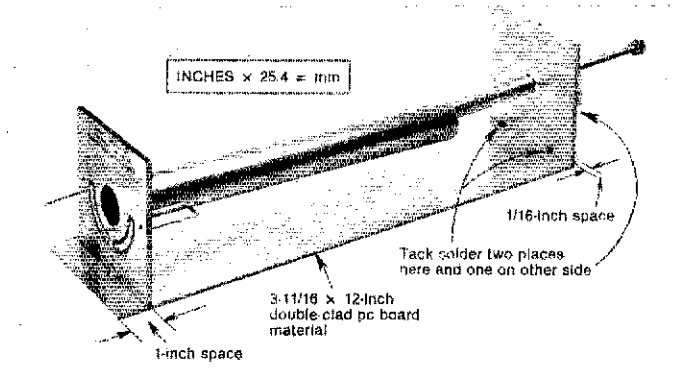


Fig. 9 — The beginning stages of cavity-case assembly. The two ends are tack-soldered to the side section and the two tubes are centered one inside the other before the soldering is completed.

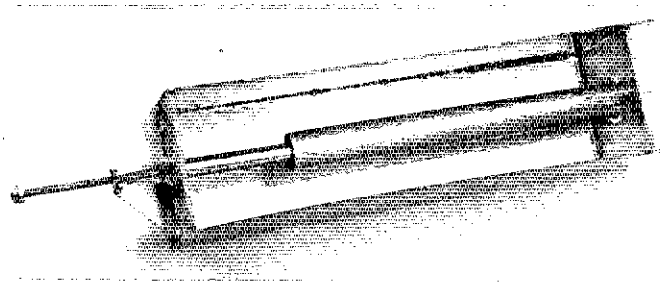


Fig. 10 — Final assembly of a single cavity. Tack-solder the side plates to the end plates and carefully check alignment of the tubes prior to soldering the seams full length. After all seams are fully sealed, lay the final side in place and solder all seams.

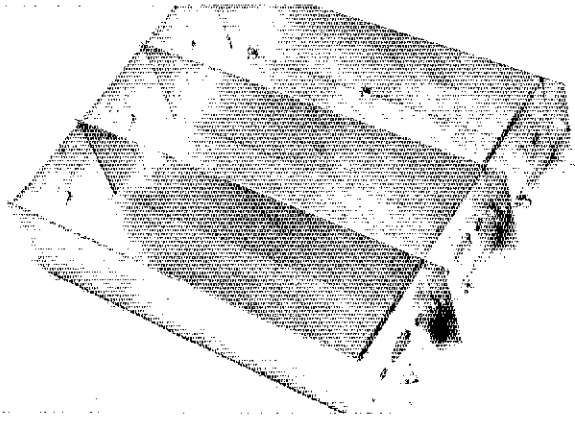


Fig. 11 — Interior view of duplexer. This half of the duplexer was mocked up without the tube assemblies to show how single cavities are combined to form the duplexer. The other three-cavity section is built in an identical manner on the other side of the large plate (bottom plate in this photo).

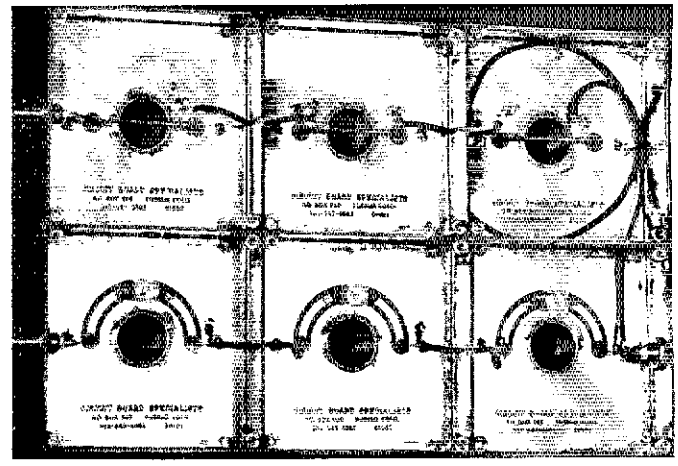
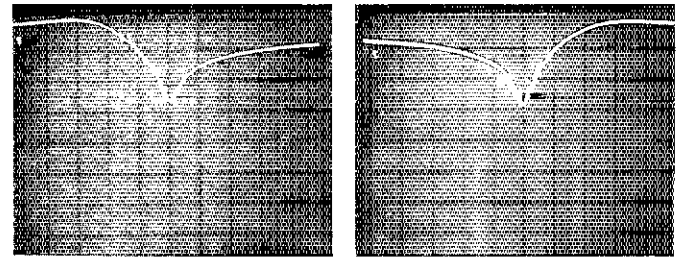


Fig. 12 — This photograph shows the interconnecting wires used between the six cavities in the duplexer. All shielded cables are RG-174/U. At the far right is the 17-inch length of cable used to connect the low-pass section to the antenna connector.



These spectrum-analyzer photographs display the characteristics of two single 2-meter cavities. Vertical divisions are 10 dB, and horizontal divisions are each 200 kHz. The photo on the left shows the response of an inductor cavity, which obtained a 27-dB notch relative to the pass frequency. At right, a capacitor cavity displayed a 28-dB notch.

Connect your receiving device to the jumper cable attached to the other side of the cavity. Adjust the threaded rod until a sharp notch (decrease in signal strength) is noticed. Then tune the generator to the high frequency and move it around until you find the pass frequency. This is easily determined with a scope or dB meter, but may be quite difficult with a receiver, because the pass frequency could be anywhere within 1 MHz or so of that desired. Make a note of the exact frequency of greatest signal amplitude. If the pass frequency occurs above that desired, increase the capacitance of C; if the pass appears below the desired frequency, decrease capacitance at C. Important: *Do not* attempt to set the pass frequency simply by adjusting the capacitor at C. This doesn't work.

Return the generator to the low frequency and readjust the tuning rod for the greatest notch (reject). Repeat this procedure as many times as is necessary to get the notch and pass frequencies separated by the correct amount. There will be some interaction between the two adjustments, so take you time and make small changes until the spacing is correct.

After the pass and notch frequencies are both set, it shouldn't be necessary to change the capacitor setting as long as the transmitter/receiver spacing isn't changed. If the repeater operating frequency is changed (say, from 34/94 to 15/75), simply retune the notch frequency in each cavity by adjusting the threaded rod. This will set *both the notch and pass* to the new frequencies. Set up all three capacitor cavities in this manner.

Adjust the inductor cavities in a similar manner by changing the position of the feed line on the connection between the two coupling loops. This changes the inductance. The proper spacing should be between 1 and 1-1/2 inches.

After all sections are adjusted individually, connect the high- and low-pass sections together as shown in Fig. 2A. Use RG-174/U coaxial cable between cavities. Connect the rf signal generator to J3 and the signal detector to J2. Terminate J1 with a 50-Ω resistive load. Readjust the threaded rods of all sections very carefully for the best notch at the high frequency. A very sensitive receiving device is required here, as the rejection is considerable.

Conclusion

With careful adjustment and a good transmitter and receiver, you should be able to construct a high-quality repeater system using this duplexer and a common transmit/receive antenna. (See page 11 of *QST* for May 1978 for interface methods and thoughts.) Careful attention should be paid to your antenna and feed line. Standing waves on the line will make it more difficult for the duplexer to do its job. Don't accept an SWR measured at the input end of a long feed line. Send someone up the tower and have him make the measurements *at the antenna.* If the SWR measured here is excessive, correct it *at the antenna.*

Careful engineering of the complete system is the key to top-notch performance, and the reward will be a well-balanced, long-life repeater system.

Notes

[1]A complete kit of parts cut to size is available from Circuit Board Specialists, P. O. Box 969, Pueblo, CO 81002.

[2]Cavities designed for 220-MHz operation have also been built and tested. The insertion loss at 220 MHz for a single cavity was measured in the ARRL lab at 0.4 dB, and the notch at 1.6-MHz spacing was measured as 38.5 dB. Dimensions are the same as for the 2-meter cavities, except that all *lengths* are shortened by 1/3 (33.3 percent).

[3]The temperature stability of the finished duplexer is quite good. It was subjected to a heat-lamp treatment in the ARRL lab and was placed outside overnight last winter (temperature −5° F), both without any detectable change in operation.

[4]A 146-MHz, low-frequency-in, high-out repeater is assumed in this discussion, for simplicity. If your repeater format is different, be sure to make the necessary changes in the tune-up and alignment procedures.

A Simple CW Audio Filter

Basic Amateur Radio: Skirt unwanted signals with this LC audio filter. With two FETs, a pot core and a handful of other parts, you can build this variable-bandwidth "Crudcutter."

By Jim Bartlett,* K1TX

The cw bands are crowded, to say the least — especially the Novice segments. If your receiver lacks selectivity, as do some direct-conversion and other simple rigs, you hear an unnecessarily large number of signals when attempting to copy the one desired. One solution is to increase receiver *audio* selectivity by adding a filter that has a narrow bandwidth and low insertion loss. This is helpful during ssb reception as well. Both of these desirable properties are directly proportional to the quality factor or Q of the tuned circuit used in the filter. An audio filter will also reduce the receiver wide-band noise (hiss) — another benefit. This improves the signal-to-noise ratio.

The lab prototype of the Crudcutter filter, installed in an aluminum enclosure. All controls and J2 are mounted on the front panel, J1 on the rear panel. Four rubber stick-on feet are attached to the bottom.

Circuit Description

Fig. 1 shows the circuit used for the Crudcutter filter. The basic design was suggested by W1FB. The tuned circuit consists of the combination of L1 and C4, and is designed to resonate at 700 Hz. Audio from the receiver headphone jack is connected to J1 where it is either filtered or passed directly to the output jack, depending upon the position of S1. C1 is an audio coupling capacitor. Its job is to pass the audio signal, but block any dc voltage that might also be present at the input. Q1 is an MPF102 or similar FET operating in the common-gate configuration. The value of R1 is selected for 2 to 3 mA of drain current in Q1, thereby ensuring a high drain impedance.

C2 and R3 form a decoupling network that keeps audio off the common dc line, preventing unwanted self-oscillation caused by feedback between Q1 and Q2 ("motorboating" or howl). A small value is used for the coupling capacitor, C3, so as not to load down the tuned circuit and lower the Q. This light coupling helps keep a narrow loaded bandwidth (BW_L) for the circuit. L1 is a 110-mH inductor wound on a pot core. Pot cores, a special branch of the magnetic-core family — as toroids are — look sort of like doughnut molds. They consist of two cups that fit together around a plastic bobbin. The winding is placed on the bobbin, and the two core cups are slipped over the bobbin, enclosing the winding.

The main advantage in using a pot core is the ease with which a large amount of inductance can be acquired. Pot cores are a good choice of coil form where a large inductance value is needed in a small amount of space. They are also easy to wind, compared to toroids, because of their bobbin/core format.

Pot cores are self-shielding, as are toroids. They are usually abundant at flea markets and swap meets; however, they are usually prewound and unmarked, so beware: Not any random core can be used in this circuit. Effective permeability (μ_e) of the Amidon core used in the Crudcutter is 1800, and the A_L value is 47 mH per 100 turns.[1,2]

L1 and C4 make up a parallel-tuned circuit. The sharpness or quality factor of this circuit is variable by means of R4, a "Q-killer" potentiometer. Adjustment of R4 allows a variable amount of resistance to be placed in series with L1, effectively changing the Q of the coil, and thus of the tuned circuit ($Q = X/R$).[3] If a 100-ohm pot cannot be readily obtained, or if a 500- or 1000-ohm unit is sitting idle in your junkbox, you may wish to modify the bandwidth control as shown in Fig. 1B.

After the signal is narrowed (peaked) by the LC filter, it is amplified by Q2, an n-channel FET operating in the common-source configuration. The source resistor is bypassed at audio frequencies by means of C5 to prevent degeneration and thereby ensure maximum stage gain. After being amplified, the filtered audio signal passes through C7 to the headphone jack. C7 is a coupling capacitor used to block the supply voltage from the headphones and their ground return.

The circuit of Fig. 1A is designed for use with high-impedance (2000-ohm) headphones. If you wish to use low-Z phones, such as 4- or 8-ohm hi-fi types, simply break the connection between points X and Y in Fig. 1A, and insert the transformer shown in Fig. 1C. Note that the center tap on the 1000-ohm primary is not connected.

Construction

The laboratory prototype for the Crudcutter filter is built in a homemade aluminum enclosure, as shown in the photos. A 1/4-inch (6.3-mm) phone jack is used at J2, and an RCA-type phono jack at J1. Although a circuit board was used in the prototype, it may be easier for individual builders to fabricate the circuit on a small piece of perf board or other breadboard material. If printed-circuit construction is desired, parts placement information can be found in Fig. 2, and

*Basic Radio Editor, *QST*

[1]References appear on page 17.

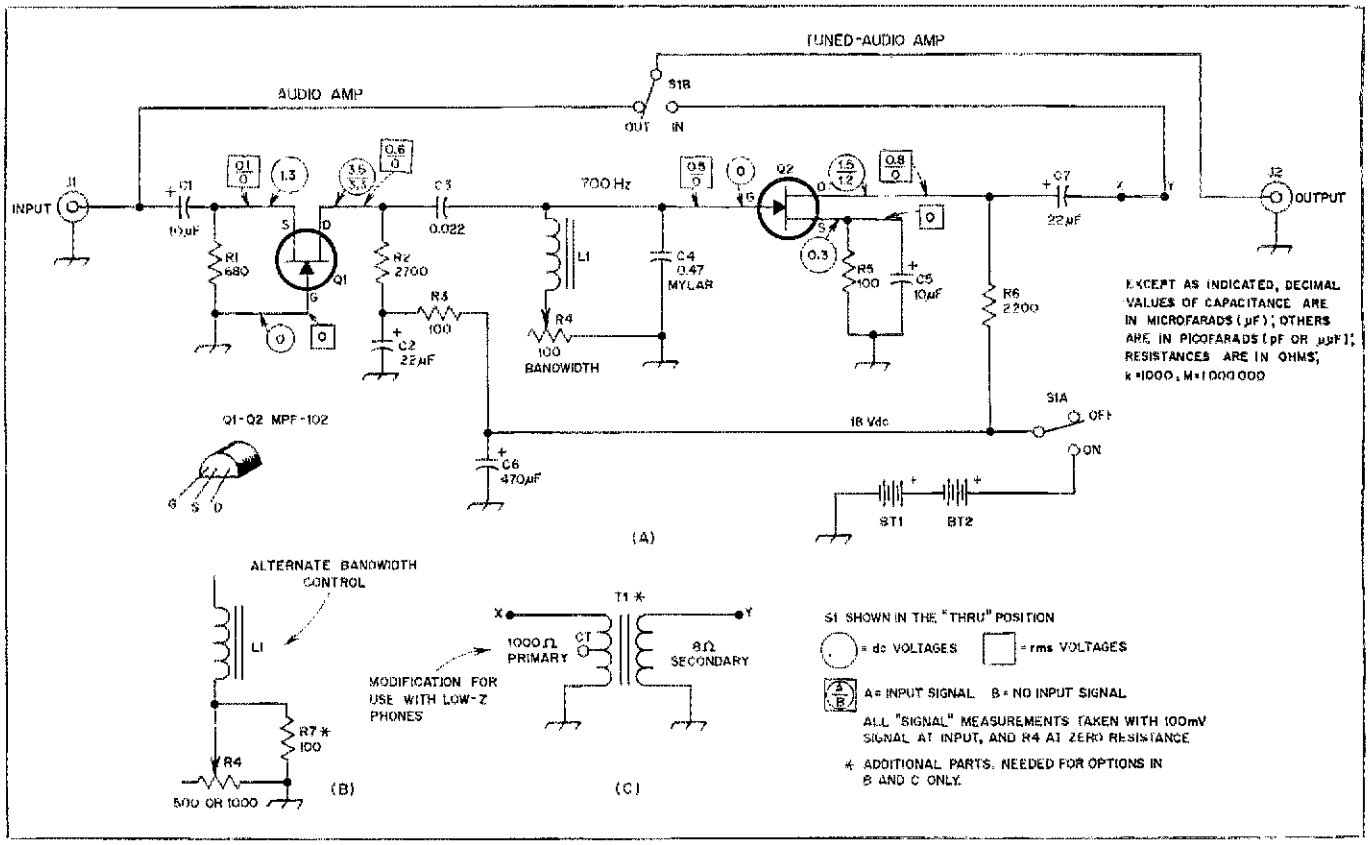


Fig. 1 — Schematic diagram of the Crudcutter audio filter. At A, the circuit is shown as built for the lab prototype shown in the photos. At B is an alternative bandwidth control that can be used if a 100-Ω potentiometer cannot be obtained. Shown at C is an audio transformer that can be added to improve performance if the circuit is to be used with 8-Ω headphones. Except for L1 and R4, part numbers below are Radio Shack.

BT1, BT2 — 9-volt transistor radio type (23-464).
C1, C5 — 10-µF electrolytic or tantalum (272-1411).
C2, C7 — 22-µF electrolytic, 35 V (272-1026).
C3 — 0.022-µF disk ceramic or mylar (272-1066).
C4 — 0.47-µF mylar (272-1071).
C6 — 470-µF electrolytic, 35 V (272-1030).
J1, J2 — Builder's choice of audio connectors.
L1 — 110 mH; 153 turns no. 28 enam. wire on Amidon pot core (PC-2616-77).
Q1, Q2 — MPF-102 or similar n-channel FET (276-2035).
R1 — 680-Ω composition (271-000 series for all composition resistors).
R2 — 2.7-kΩ composition.
R3, R5, R7 — 100-Ω composition.
R4 — 100-Ω potentiometer (Allied 854-7301).
R6 — 2.2-kΩ composition.
S1 — Dpdt toggle switch (275-663).
T1 — Audio output transformer; 1-kΩ primary, 8-Ω secondary (273-1380).
Misc. — Wire, perf board or pc board, enclosure, solder, battery clips, knob, hardware, paint.

an etching pattern is provided in the "Hints and Kinks" section of this issue.[4]

Regardless of the construction method used, care should be exercised to see that the "+" ends of all polarized capacitors are oriented properly, and that the two FETs are installed correctly. Battery polarity should be double-checked before the circuit is first turned on. Solder joints should all be clean, and excess component leads should be clipped off. If the circuit is built on a breadboard, component leads should be kept as short as possible, especially if a nonmetallic enclosure is to be used. This measure will prevent excess hum pickup by the circuit.

Operation

Addition of the Crudcutter filter to any receiver that lacks crystal or mechanical i-f filters should result in greatly improved selectivity. With R4 in the minimum-resistance position, the loaded bandwidth at the −3-dB points should be 35 Hz. Bandwidth is variable, with a maximum BW_L of 143 Hz occurring at the other extreme of R4.

The center frequency of the filter is 700 Hz with the values shown in Fig. 1; however, if you wish to change this, just add or remove turns on L1 to decrease or increase the resonant frequency respectively. To calculate the number of turns needed to arrive at a different inductance for L1, use this formula

$$\text{Turns} = 100\sqrt{\frac{\text{desired L (mH)}}{A_L\ (\text{mH}/100\ \text{t})}}$$

For example, for 110 mH with an A_L value of 47 mH per 100 turns,

$$100\sqrt{\frac{110}{47}} = 100\sqrt{2.34}$$

$$= 100 \times 1.53 = 153 \text{ turns}$$

To determine the necessary inductance for resonance of the tuned circuit at a specified frequency, plug the desired operating frequency and value of C into the following equation

$$L = \frac{10^9\left(\frac{1}{f \cdot 2\pi}\right)^2}{C}$$

where L is inductance in mH, C is capacitance in µF and f is frequency in Hz. Thus, for a desired filter "peak" at 900 Hz instead of 700, we would have

$$L = \frac{10^9\left(\frac{1}{900\,(6.28)}\right)^2}{0.47} = \frac{31.3}{0.47}$$

$$= 66.6 \text{ mH for L1}$$

This figure could then be used in the turns formula above to determine the windings needed to obtain the inductance.[5]

Using high-Z phones with the filter, you will notice that when the filter is turned on (inserted in the audio line), the audio level increases slightly. Since the selectivity of

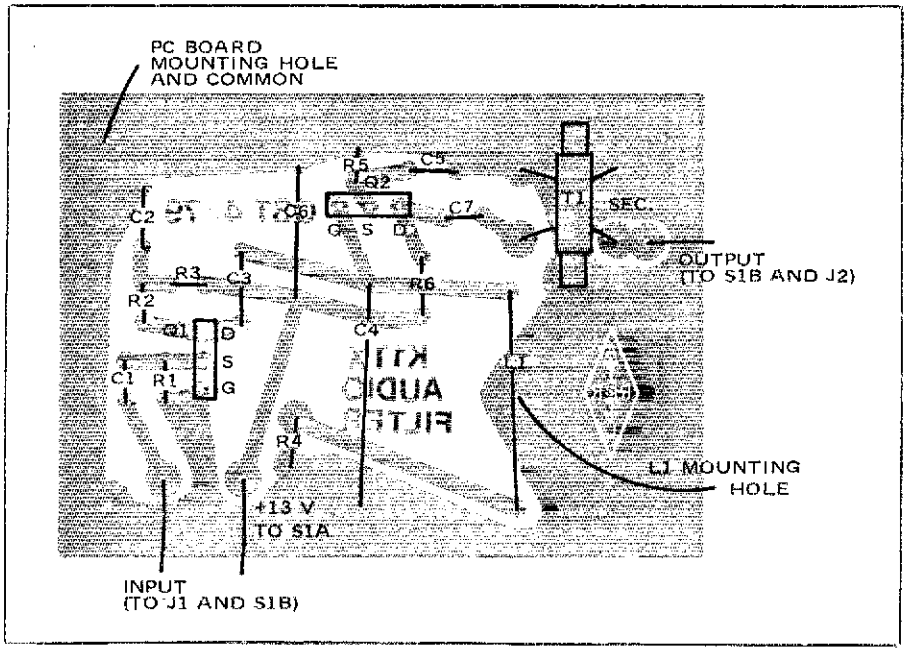
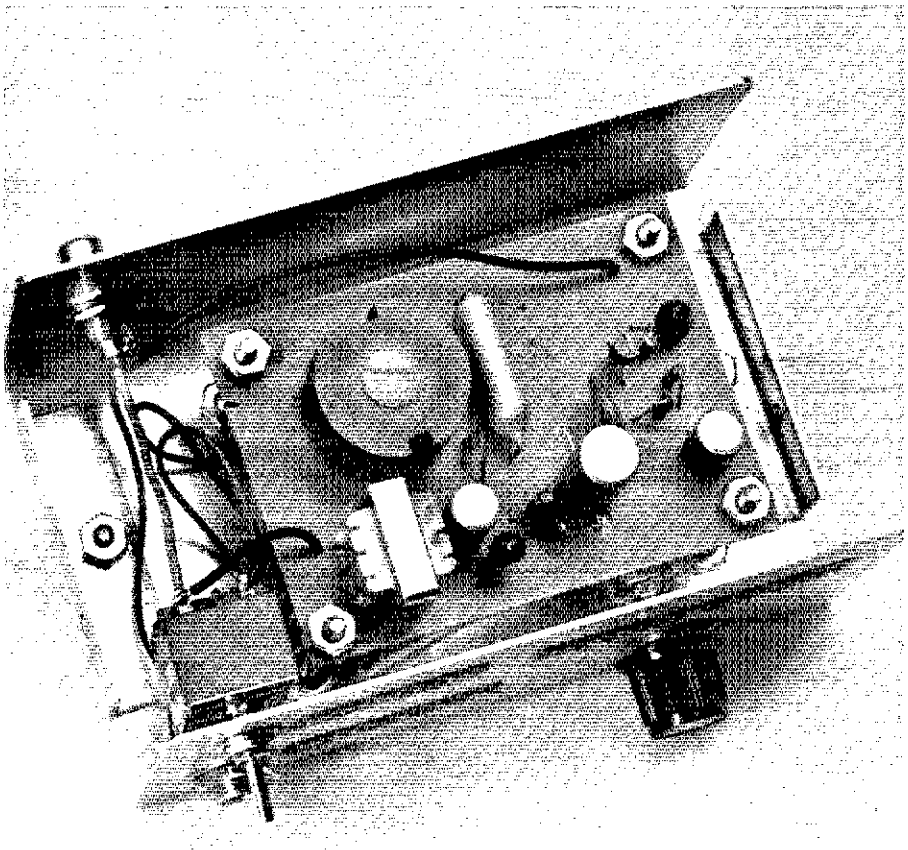


Fig. 2 — Parts placement diagram for the Crudcutter audio filter. All part values are indicated in Fig. 1 caption. Some resistors are mounted vertically on the pc board to conserve space. This view is an "X-ray" of the pc board, with shaded areas representing copper foil. The etching pattern is shown in the "Hints and Kinks" section of this issue. The drawing shows components as they should appear on the component side (nonfoil side) of the board. The pot core of L1 should be mounted at the point indicated, with the plastic screw and nut provided with the core. Be sure to tighten the plastic hardware only until snug. The core cups should come into firm contact to provide the proper inductance for the coil. Overtightening of the hardware may strip the plastic threads or crack the brittle core.



With the cover removed, the interior of the LC audio filter is easily visible. The two 9-volt batteries are located underneath the pc board, which is suspended by means of 6-32 hardware.

the filter is rather high, at first you may have difficulty tuning in a cw signal with the filter out and then trying to insert it. Unless the signal is initially tuned so that the resulting audio note is very close to 700 Hz, there's a good chance that when the filter is inserted the signal will be sufficiently far outside the passband that you won't be able to hear it at all! To ensure that you don't "lose" a signal this way, turn on the filter with the bandwidth control set at *minimum* (maximum resistance for R4). Thus, if you are not tuned to the center frequency of the filter, you can make the necessary receiver-tuning adjustments as you gradually reduce the filter bandwidth. After a little practice, you may "get an ear" for tuning all cw signals automatically to the center-design frequency of the filter (700 Hz), and the above procedure will not be necessary. This filter can be used during the reception of ssb signals also. Set R4 for the narrowest response that will provide good audio readability.

The filter may tend to "ring" slightly at the highest selectivity (narrow-bandwidth) settings of R4. If this becomes objectionable, simply increase the bandwidth setting slightly and the ringing should cease.

The Crudcutter won't make a $10 direct-conversion receiver into a Collins 75S-3, but it should make the simple receiver more fun to use on the cw bands. This doesn't preclude the use of the filter with more sophisticated gear. In fact, it can be used in conjunction with a good cw i-f filter to achieve even better results![6] If you decide to build the Crudcutter, remember: safety first — and have fun.

References

[1]For more information on pot cores and other ferromagnetic core materials, write Amidon Assoc., 12033 Otsego St., North Hollywood, CA 91607.

[2]Pot cores are covered in more detail in the "Transformers" section of Chap. 2 in *The 1979 Radio Amateur's Handbook*, ARRL.

[3]Quality factor and L/C/F calculations are discussed in the "Radio Frequency Circuits" section of Chap. 2 in *The 1979 Radio Amateur's Handbook*, ARRL.

[4]At the time of this writing, parts and pc boards are available from Circuit Board Specialists, P. O. Box 969, Pueblo, CO 81002. A kit of components including transformer, controls, pc board, knob, etc. (excluding cabinet and batteries) is $17.50; pc board only is $4.

[5]See reference 3.

[6]For best results, the receiver i-f filter should yield a center audio note at the same frequency as that of the audio filter.

Strays

I would like to get in touch with . . .

☐ anyone in the West or Southwest U.S. willing to rent his house and shack to a visiting ham and his family for three weeks in August 1979. Peter Conway, 7Q7BC, P. O. Box 5595, Limbe, Malawi, Africa.

Putting the Boots to Your HW-8 QRP Transceiver

Basic Amateur Radio: A signal increase of 9 dB for your QRP rig can turn marginal QSOs into solid ones! This amplifier provides 80- through 15-meter signal increases with only 1 watt of drive. Add these "boots" to your HW-8 and improve your QRP DX score.

By Doug DeMaw,* W1FB

An article describing a single-ended plug-in amplifier for the HW-7 series QRP transceiver left much to be desired for some *QST* readers.[1] ARRL hq. was hit with a rash of letters requesting a band-switching style of amplifier which included the 80-meter band along with the 40-, 20- and 15-meter bands. Coverage on 80 meters was inspired by the appearance of Heath's newer QRP box, the HW-8. The additional cost of single-band amplifiers over a band-switching unit was objectionable to some, and rightly so. Moreover, some builders reported problems with amplifier instability when they assembled the "Slippers" unit. The amplifier described here is aimed at HW-8 owners in particular. However, it can be used with any QRP transmitter if the latter has the output attenuated so that a maximum of 1 watt reaches the power amplifier input. It is a simple matter to install an appropriate T or pi type of resistive attenuator at the amplifier input when more driving power than is necessary appears at the output of the QRP transmitter.

This amplifier operates from a 12- to 14-volt dc supply. Maximum current drain is less than 2 amperes. A spectral analysis of the amplifier output indicated that it complies with the FCC requirement that all spurious energy be 40 dB or greater below peak carrier value. The spurious components are −45 dB or better on each of the bands covered by this circuit. A host of in-band spurs were observed at levels well below −40 dB. They are products generated within the HW-8 and do not originate in the amplifier described here.

Circuit Description

A pair of RCA 40977 stud-mount power transistors are shown in the circuit of Fig. 1. These are actually vhf devices and are used primarily because they were on hand at the time this circuit was developed. Later, RCA dropped this part from its line. Transistors with similar characteristics for hf-band operation may be used in place of the 40977, notably the Motorola 2N5642 which is an exact replacement. The specifications for the 40977 are 11 dB gain (approximate) at 118 MHz: Look for a substitute which has similar gain at 21 or 30 MHz. Maximum power dissipation is 25 watts. Power input is 0.5 watt (approximate) for 6 watts minimum output. Collector supply voltage is 12.5 nominal. Continuous collector current rating (maximum) is 5 A. Collector efficiency is 55 percent. The builder should not be afraid to experiment with other types of power transistors, especially if they can be obtained inexpensively as surplus from a reliable dealer.

This circuit operates broadband in the Class C mode. This technique simplifies band switching and lowers the cost. To ensure unconditional amplifier stability it is necessary to use shunt feedback from collector to base (R1, R2, C1, C2, L1 and L2). Broadbanding and stabilization of this type always results in a power tradeoff. In a similar circuit which used no feedback, the amplifier output could be as great as 15 watts, safely, even though the 40977s are rated at a nominal output of 6 watts each at 118 MHz. With the feedback networks shown, the output is approximately 12 watts on 80, 40 and 20 meters. Somewhat less output is available on 15 meters, owing to the lower output from the HW-8 on that band.

A pair of 10-ohm resistors and two miniature ferrite beads are connected from the transistor bases to ground. These components are used to discourage low-frequency oscillations. The 4-dB attenuator at the amplifier input reduces the HW-8 drive to a safe level. It is suggested that a switch be added to remove the pad during operation on 21 MHz. This will provide an amplifier output of roughly 8 watts on that band. The power output is on the order of 4 watts with the pad in the line.

Two 220-pF silver-mica capacitors are used in the collector circuit to prevent vhf self-oscillations and to lower the harmonic energy in the vhf range. The reactance of the capacitors is high enough in the hf bands to have minor effect on the amplifier power.

T1 of Fig. 1 is a broadband transformer with a 3:1 turns ratio. The transformer used in this design is homemade and is of the *conventional* variety (not a transmission-line transformer). Detailed information of the construction of this transformer is presented in the *ARRL Electronics Data Book* and in *Solid State Design for the Radio Amateur*. T1 consists of two rows of four Amidon FT-50-43 ferrite toroid cores (μ = 950) through which thin-wall brass tubing is

*Senior Technical Editor, ARRL.
[1]Footnotes appear on page 21.

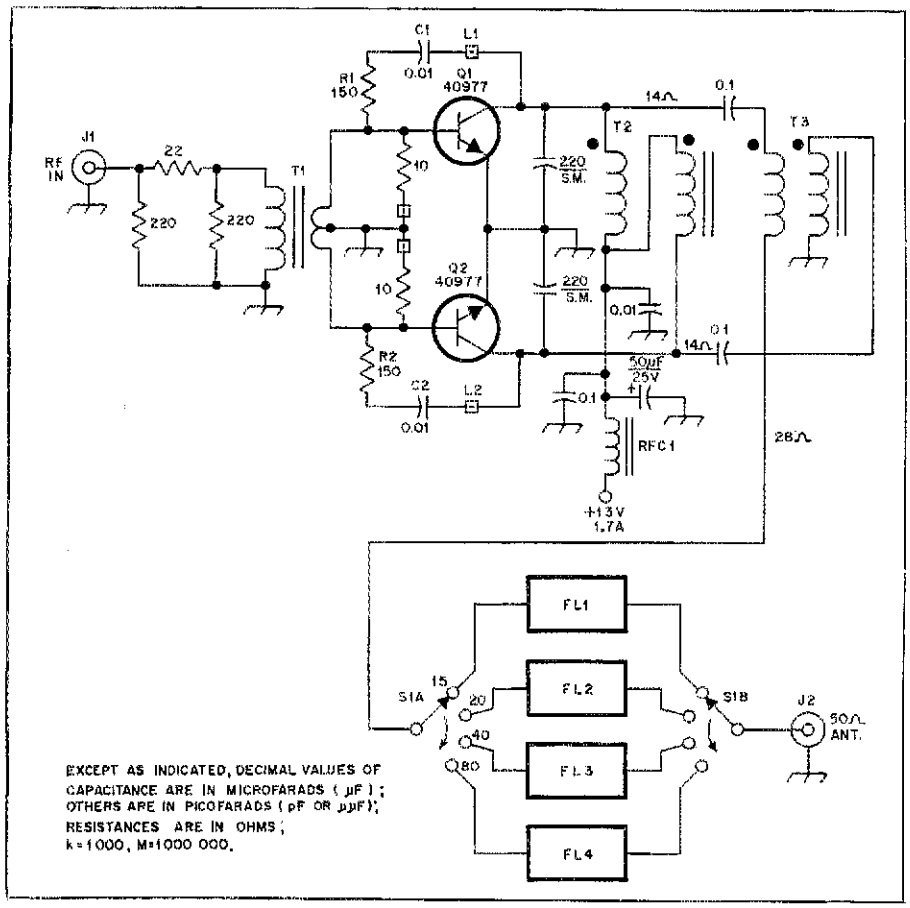


Fig. 1 — Schematic diagram of the solid-state four-band amplifier. Resistors are 1/2-watt composition types. Capacitors are disk or chip ceramic except the one with polarity marked, which is electrolytic or tantalum. S.M. is silver mica. Components with numbers which do not appear in the parts list are so identified for text discussion only.

J1, J2 — Panel-mount coaxial connector or phono jack.

L1, L2 — Miniature ferrite bead (950 mu) over lead of 0.01-μF capacitor. Same type of beads used on pigtails of 10-ohm base resistors.

Q1, Q2 — RCA transistor (see text).

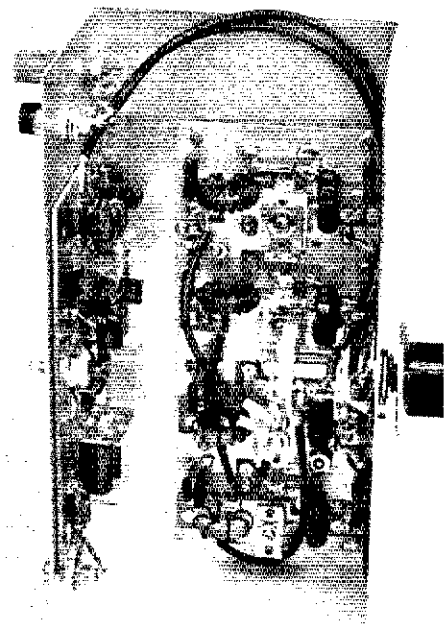
S1 — Two-pole, four-position ceramic or phenolic wafer switch (see text).

T1 — Broadband 3:1 transformer (see text).

T2 — Bifilar-wound broadband phase-reversing transformer with 8 bifilar turns of no. 22 enam. wire on two stacked FT-50-43 cores (950 mu). Wires have 8 twists per inch.

T3 — Broadband combiner transformer with 8 bifilar turns of no. 22 enam. wire, 8 twists per inch, on stacked FT-50-43 toroid cores.

RFC1 — Toroidal rf choke, 7 turns no. 22 enam. wire on FT-50-43 toroid core.



Inside the amplifier, with the filter board at right, amplifier board at left. The two power transistors are mounted against the rear panel, which serves as a heat sink.

passed and made common at one end (U-shaped single turn, in effect). Then, three turns of insulated wire are passed through the tubing to form the transformer primary. Pc-board headers are used at each end of the assembly to secure the tubing and provide copper tabs for connection to the main circuit board. The advantage in using this type of transformer is that a more precise secondary center tap can be established than is possible with a simple toroidal broadband transformer. Symmetry of the secondary helps to assure equal driving power to each transistor. Those wishing to experiment with a toroidal type of transformer at T1 can wind 9 turns of no. 28 enameled wire on an FT-50-43 core. A three-turn center-tapped secondary winding can be wound over the nine-turn primary. The tap must be in the *exact* center. The leads to the transistor bases should be laid out symmetrically and have equal lengths.

T2 is a phase-reversal transformer that places the collectors of Q1 and Q2 in push pull. The collector voltage is supplied through T2. A combiner transformer, T3, provides a 28-ohm output impedance from the two 14-ohm collectors. Half-wave harmonic filters (FL1-FL4, inclusive) are band switched at the amplifier output by means of S1. They are designed for a loaded Q of 1. The input impedance is 28 ohms and the output impedance is 50 ohms. Since these are low-pass filters, the cutoff frequency is set slightly above each amateur band to minimize insertion loss. Amidon powdered-iron toroid cores are used for the filter inductors.

Construction Notes

Double-sided pc board is used for the amplifier module, but single-sided board is specified for the filter assembly to reduce stray capacitance. The later could degrade the filters by virtue of detuning effects.

Double-sided board material is used for the amplifier circuit to help eliminate ground loops and subsequently improve stability. The ground returns for the input components which relate to the transistor bases are connected to floating pads on the etched side of the board. Small pieces of wire connect those pads to the ground-plane surface on the opposite side of the board. Conversely, the collector components have their ground connections on the *etched* side of the board. This procedure helps to ensure stability by breaking up rf current loops on the ground elements of the pc board. Fig. 2 shows the pc-board pattern for the amplifier. Fig. 3 contains the layout for the filter board.

The photograph shows the collector-base feedback networks being bridged in mid-air over the tops of Q1 and Q2. The board pattern provides copper pads for these components. Also, the prototype version shown photographically has the transistor strip leads bent down slightly to mate with the related pc pads. This mounting technique is not recommended. Two unfavorable conditions can result from this method: Excessive emitter-lead length introduces unwanted inductance, which in turn causes degenerative feedback. Degeneration lowers the amplifier gain and may encourage instability. Fur-

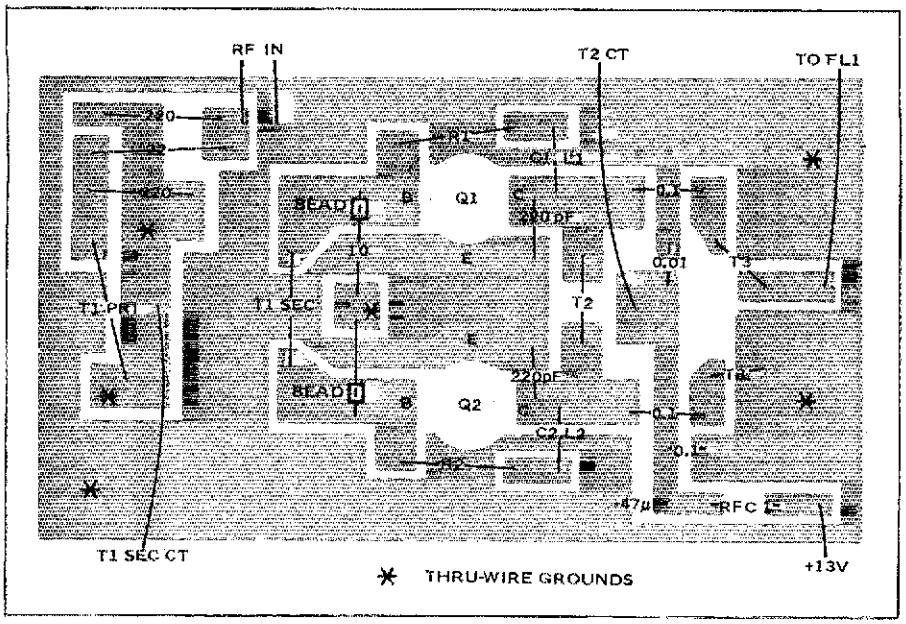


Fig. 2 — Parts placement guide for the amplifier board. Parts are mounted on the etched side of the double-sided pc board; the shaded area in this view represents the copper pattern. The other side of the board is unetched. (The etching pattern appears in the "Hints and Kinks" section of this issue.) Decimal-value numbers alone represent capacitance in microfarads. Whole-number values without units represent resistance in ohms. Note that ferrite beads are slipped over one end of each of the two 10-ohm resistors.

thermore, when the leads are bent up or down to mate with the pc board it is possible for undue stress to be exerted on the transistor body during heat cycling. This can cause physical damage to the transistors. The correct mounting procedure calls for the strip leads to come out from the transistor body at 90 degrees. They lie flat on the pc board pads to which they are soldered.[2]

The amplifier board is mounted against the rear wall of the U-shaped homemade chassis. The case serves as a heat sink. Heat transfer is enhanced by the addition of transistor silicone grease. It is applied to the mating surfaces of the transistors and cabinet. The stud nuts should be tightened only slightly beyond a finger-tight tension level. This will prevent damage to the transistors. Through-wires are added at several points on the amplifier board to join the ground foils on both sides of the board. Each through-wire is soldered to the pc board at both ends.

The Filter Module

Table I contains L, C and frequency data for the four filters. For the most part, standard-value silver-mica capacitors are not specified. This requires combining standard values in order to arrive at values which are close to those specified. Mica compression trimmers can be used at the center of each filter (see photograph) if desired. The author's model has the trimmers for final tweaking to obtain maximum output power and waveform purity.

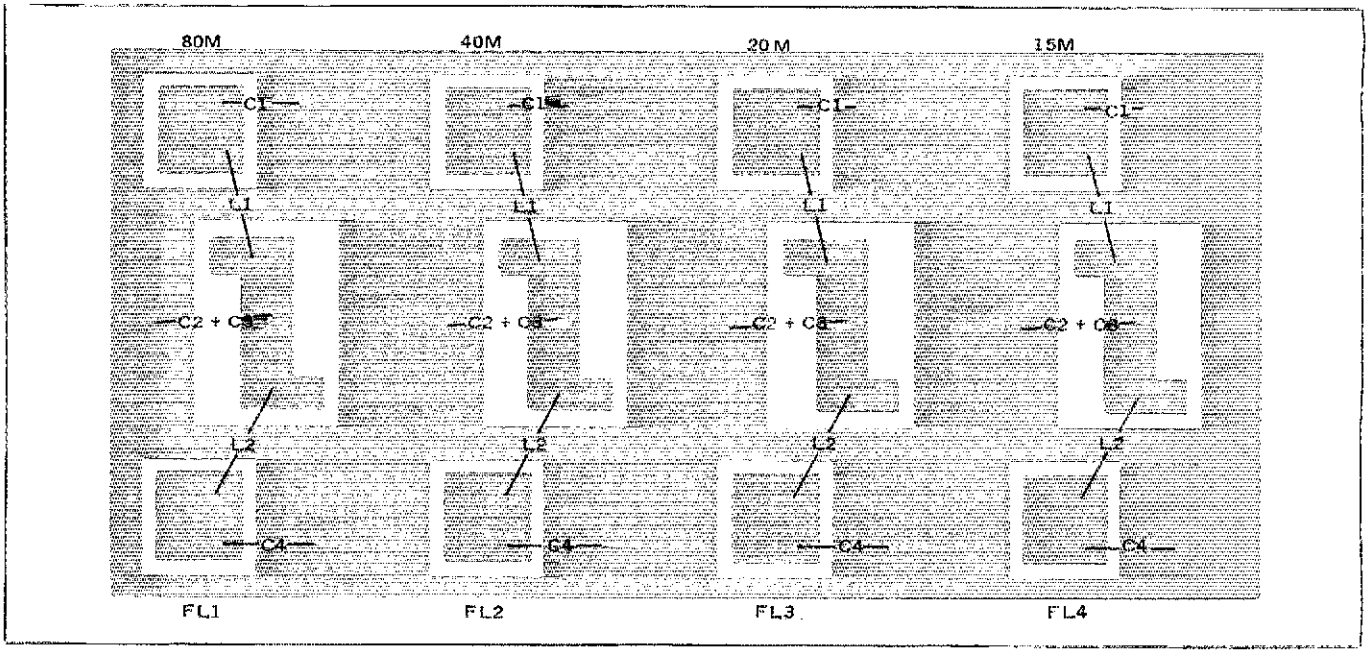
RG-174/U miniature coaxial cable is used for the rf leads. It is important to ground the shield braids at both ends of the cables which connect to the amplifier output, antenna jack (J2) and the two poles of S1. The remainder of the coaxial cables need to have the shields grounded only at the filter-board end. In the model shown, heat-shrink tubing is used at the ungrounded ends of the connecting cables. S1 should be a two-wafer type with at least one inch (25.4 mm) of distance between the wafers. This will ensure proper isolation between the filter inputs and outputs. For ideal conditions, a metal shield could even be installed between the wafer sections and bolted to chassis ground.

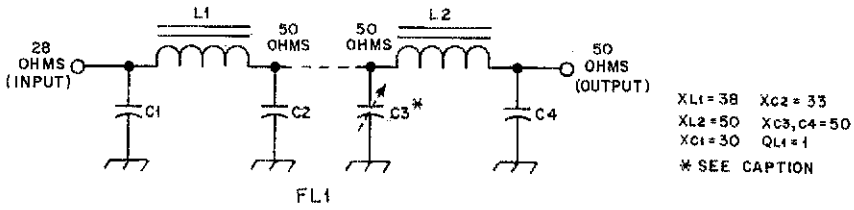
Operation

The power supply which Heath provides for the HW-8 will not be suitable for this amplifier. A regulated power supply of 2 amperes or greater is required.

The 40977 transistors are "SWR

Fig. 3 — Parts placement guide for the single-sided filter board showing details for one filter. Parts are mounted on the foil side of the board; the shaded area in this view represents copper. The etching pattern appears in the "Hints and Kinks" section of this issue.





FL1

Table 1

Band	f_{CO} (MHz)	L1 (μH)	L2 (μH)	C1 (pF)	C2 (pF)	C3, C4 (pF)	Toroid Core	Turns	Wire Size
15	23	0.26	0.35	230	210	138	T68-6	L1-7 TS L2-10 TS	no. 22
20	16	0.38	0.5	330	300	200	T68-6	L1-10 TS L2-10 TS	no. 22
40	8	0.76	1.0	663	600	400	T68-2	L1-11 TS L2-13 TS	no. 22
80	5	1.2	1.6	1000	965	636	T68-2	L1-14 TS L2-17 TS	no. 22

Coil and capacitor information for the half-wave harmonic filters shown in Fig. 1. All capacitors are silver-mica units. Parallel or series combinations can be used as needed to provide the approximate values listed above. An accuracy of ± 10 percent is recommended. *A mica compression trimmer can be used at C3 to provide final adjustment of the filters.

protected," to use the RCA vernacular. This means that anything from a dead short to a full open circuit can be tolerated at the amplifier output for short periods of time without causing device damage. A *maximum* mismatch period of 30 seconds is recommended.

The harmonic filters are designed for a 50-ohm termination. Therefore the antenna should not present an SWR of greater than 1.5:1, or filter performance will be impaired. Also, there will be a loss in output power when the SWR is high. A Transmatch and SWR indicator are recommended for use with any solid-state amplifier, including this one, particularly when the antenna does not present a 50-ohm load.

This amplifier will reach its saturated output-power level at slightly under 1 watt of drive at the bases of Q1 and Q2. Observe the increase in forward power to the antenna, then add no further drive once the point is reached where power output from the amplifier levels off.

Now that you've "put the boots to your HW-8," have fun and go after that DX you were reluctant to call with only 2 watts! QST

Footnotes

[1]DeMaw, "Slippers for the HW-7," *QST*, Dec. 1975, p. 45.

[2]Artigo and Johnson, "Fundamentals of Solid-State Power-Amplifier Design," *QST*, Sept. and Nov. 1972, and *QST*, April 1973 (in three parts).

Strays

CHECKSHEET REVISED

☐ Our League Lines item in August 1978 *QST* brought more than 100 ideas on how to revise the standard duplicate checking sheet used for ARRL-sponsored contests to accommodate the many new prefixes being issued by the FCC. Now that the dust has settled, the updated version is available to anyone requesting contest forms. The best idea came from a log submitted by WA4NTP. He may not be the originator of the idea, but he showed he knew a winner. A new 1979 ARRL *Handbook* is on its way to him. Other excellent ideas came from WA2MEQ/1, W2FTY, K3FR, K7QD and WB8TJS.

AWARD OFFERED

☐ Three two-way contacts, on any band or mode, with three stations located in the Grande Ronde Valley, Union County, OR, will earn amateurs the Grande Ronde Radio Amateurs certificate. Letter applications should include calls, dates and times of contacts claimed. Send to June Campbell, WB7FDB, Rte. 2, Box 2486, La Grande, OR 97850. The fee is $1 or 2 IRCs. — *W7KVV*

HAMS PITCH IN

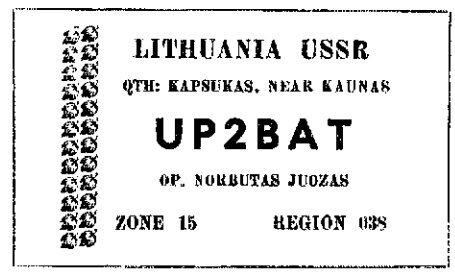
☐ Dick Lynch, N4ATT, reports that when fire destroyed the home of Ralph Messer, KA4DKJ, of Richlands, VA, in December 1978, local hams collected money for Ralph and his wife, and helped them find a new home and furnishings.

NOVICES NEED ADVICE

☐ What is your club doing to help newly licensed hams get on the air? Most new Novices could use some advice on purchasing equipment, setting up their shacks, and making their first QSOs. But instructors, often inundated with preparations for a new Novice course, don't always have time to follow up on their last batch of students. It is important that new licensees aren't left to flounder on their own and possibly drop the hobby out of frustration because they don't know other hams, or from being too embarrassed to ask for help.

Many clubs have solved this problem by assigning an "Elmer" to each new Novice or by establishing a committee to help new licensees. This also is a good opportunity to invite the Novices to attend the next club meeting with you, which will help them overcome any initial shyness.

There are as many solutions to this growing problem as there are hams! What are you doing for the kid next door, the retiree around the block, or the business executive in the next town who just got licensed? — *Jeanie Zaimes, AB1P*



What's so special about a QSL card from Lithuania? Everyone knows you can exchange QSLs with UP2-land via Post Box 88, Moscow, U.S.S.R., as indicated by this one received by CK1KE and sent us through the courtesy of VO1KE. Guess it must be that time again in the recycling sports year that makes this call so appropriate. Our correspondent also has a QSL from OH2BAD, but he says OK2SIR has yet to reply.

The SHARC Audible Current Meter

When Raymond Andrews, KØLZR, president of the Sand Hills ARC, suggested that club members design a special radio aid for blind amateurs, he got results.

By Leroy J. Stockemer,* KØWOL

The audible current meter described in this article originally was designed for a fellow radio amateur who is blind, but it may also be of special use to those blessed with sight. My friend needed a device to enable him to tune his transmitter to resonance. He also wanted very much to have a means of knowing the relative power input to the final rf stage. We reasoned that the latter could be accomplished by monitoring different current levels.

Other devices used previously by my fellow amateur proved undesirable because they tended to give false indications of resonance. Furthermore, they lacked a method of showing the power input or output of the rf stage. False indications, needless to say, can cause detrimental effects to the rf power tubes in the final amplifier. That misfortune befell my friend several times, a result of misadjustment.

As I thought over his situation, these criteria came to mind. There existed a need for a device that would track and indicate the movement of the existing current meter. Such a unit should have a means of indicating different current levels for adjusting the bias level and relative power input to the rf power amplifier. I rationalized also that the device must combine practicality, effectiveness and low cost. The practical aspect seemed to dictate that the unit would be of small physical size, have a minimum of operating controls and require only simple calibration techniques.

Initial efforts to produce a satisfactory device were rather disappointing. Several circuits were tried. They all involved too many components, along with a lack of simplicity. Determination, however, led to a design that seemed well suited for meeting the criteria.

Block Diagram Explanation

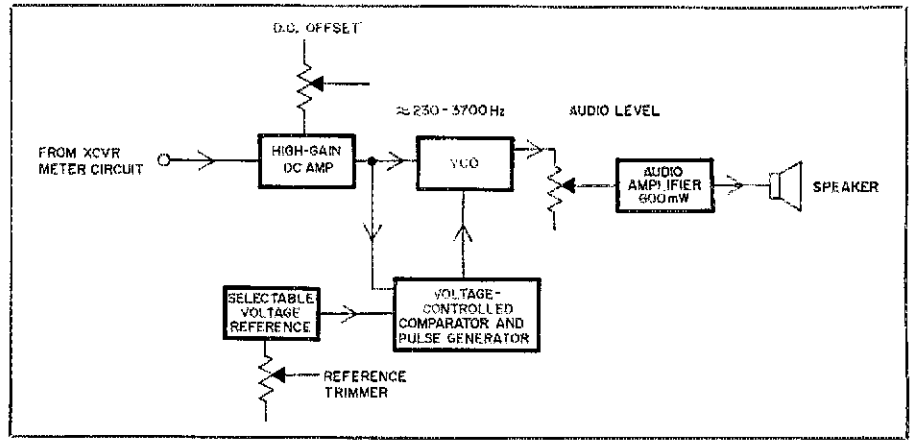
The block diagram (Fig. 1) illustrates the basic configuration of the audible current meter (ACM). It consists of a high-gain dc amplifier (40 dB) which feeds a voltage-controlled oscillator (VCO) and combination voltage-controlled comparator/pulse generator. A switch-selectable voltage reference is used in conjunction with the voltage-controlled comparator. The output of the VCO feeds a 600-mW audio amplifier which drives a small 8-ohm speaker.

The input terminals of the high-gain dc amplifier are connected to the meter terminals of the transceiver. The input voltage range is 0 to 50 mV, representing a meter deflection of 0 to 1 mA for the meter in a Swan 350 ssb transceiver. The meter current (0 to 1 A) is indicative of the input current to the final rf amplifier of the transmitter.

The ACM dc amplifier output voltage ranges from 1 to 5 volts. This variable-voltage output causes the VCO to vary in frequency from approximately 230 to 2100 Hz, representing a change in transmitter input current from 0 to 1 ampere.

When the transmitter is tuned through resonance (indicated by a dip in meter

Fig. 1 — Block diagram of the audible current meter.



*1604 Spruce St., Garden City, KS 67846

current) the audible pitch generated by the VCO goes from high to low to high. At the point where a dip is reached (the lowest pitch sound indicating resonance), the selectable-voltage reference may be set to a level representing a specific transmitter-input current. This enables the operator to load the power amplifier for the desired power input.

During operation, as the transmitter is adjusted for more input power, the voltage at the output of the dc amplifier increases; the tone goes higher in pitch until the selected current level is reached. (Of course, this current level must coincide with a dip in meter current, as mentioned above.) When it reaches a value equal to that selected by the voltage reference, the comparator becomes a pulse generator which gates the VCO *off* and *on* at a variable rate. Then the tone gates *off* and *on* at approximately a 2-Hz rate. If the current is increased further, the rate will rise to about 13 Hz, indicating the desired current level has been surpassed by an appreciable amount. The proper level is attained when the tone just begins to gate *off* and *on*.

The selectable voltage reference is designed to compare transmitter current levels representing 50 mA (to enable setting the idling current for the rf power amplifier) and 100, 200, 300, 400, 500 and 600 mA (for setting the desired power input). This arrangement seems to serve the purpose well.

We originally tried the circuit on a Swan 350 transceiver. Later it was modified to function with a Swan 700-CX. Results with both transceivers were remarkably good. The audible current meter can be used with nearly any type of meter that indicates current as long as the negative side of the meter is near ground potential. Other uses for the audible method, apart from those explained in this article, might be for an rf power-output indicator, an SWR monitor, or a remote monitoring device.

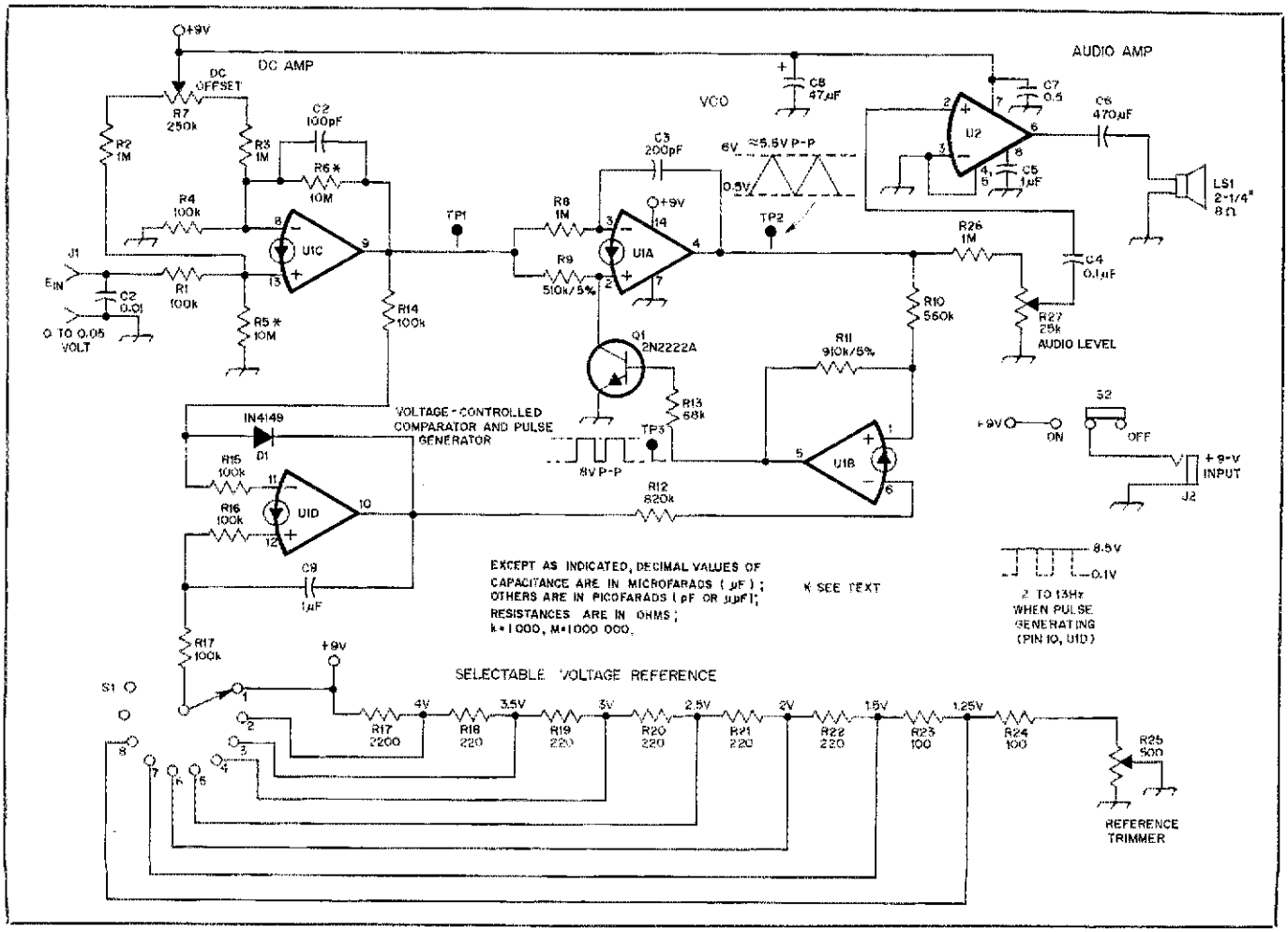
The Circuit

Our ultimate design incorporated the use of a low-cost LM3900 quad-amplifier IC using four Norton operational amplifiers. This amplifier seems rather unusual. Most op amps make use of differential input voltages, whereas the Norton amplifier differentiates between input currents. This allows the use of high-value resistors to convert input voltages to input currents. Another feature is that the Norton amplifier uses a current mirror to mirror the noninverting input current about ground. This allows the use of a single power supply voltage. Most of the circuitry consists of variations of the basic configurations given in applications manuals.[1]

The audible current meter utilizes two integrated circuits and one transistor, as shown in the schematic diagram of Fig. 2. To some people the diagram may seem rather complicated at first glance. It really isn't, however. U1A and U1B are the main components of the VCO, whereas U1C functions as the dc amplifier and U1D serves as a combination voltage-controlled comparator/pulse generator. U1 is an LM3900 14-pin DIP quad amplifier. Q1 performs as a switch in the VCO circuit. U2 is an LM380-8 (8-pin DIP) 600-mW audio amplifier. U1C, the dc amplifier, has a gain of approximately 100. Offset-control R7 is adjusted to pro-

[1] *Linear Applications Manual* (AN72), National Semiconductor Corp., February 1973.

Fig. 2 — Schematic diagram of the SHARC audible current meter. U1 is a type LM3900 quad-operational amplifier. U2 is a type LM380-8 600-mW audio amplifier. S1 provides a choice of voltage ranges furnished through the selectable voltage reference divider circuit. C9 is nonpolarized.



vide 1 volt at the test point (TP1) with the input at J1 shorted to ground. This 1 volt applied to the input of integrator U1A causes this voltage to be changed to an input current charging C3, effecting a ramp-up voltage at TP2. When this ramp reaches approximately 6 volts, it causes the Schmitt trigger U1B to trip. The output of U1B goes positive, turning on Q1 and causing pin 2 of integrator U1A to be grounded. By grounding pin 2, the integrator ramps down to approximately 0.5 volt. U1B then reverts back to the initial state (pin 5 low), turning off Q1. The cycle then repeats itself, thus generating an output waveform which is triangular. U1A and U1B, along with Q1, form the VCO. The frequency change of the VCO may be understood from the following relationship:

$$f_o = \frac{V_{in} - V_{be}}{2RC\,(\Delta V_o)} \qquad \text{(Eq. 1)}$$

where

f_o = frequency
V_{in} = input voltage to integrator
V_{be} = base-to-emitter voltage (≈0.5 V) of the integrator
R = R8 in the diagram = 1 MΩ
C = C3 = 200 pF
ΔV_o = ramp voltage = 6 V − 0.5 V = 5.5 V.

Since R, C, ΔV_o and V_{be} are essentially constant, Eq. 1 indicates that the frequency is directly proportional to V_{in}. Increasing the input voltage causes the frequency to increase.

U1D acts as a combination voltage comparator and pulse generator. With S1 in position no. 1, a 9-volt input is applied, holding the output of U1D (pin 10) high (8.5 V). This voltage is applied as an input to the inverting side of U1B, enabling the VCO. If S1 is set to position 3, a 3.5-volt input is applied to the noninverting input of U1D, still enabling the VCO. Now suppose that at the same time a 25-mV level is present at the input of J1. This would produce a 3.525-V output from the dc amplifier. Because this input to the inverting side of U1D is slightly greater than the 3.5 volts to the noninverting side, the output of U1D drops to approximately 0.1 volt. When the output of U1D goes low, the enable voltage to the VCO is removed. U1B ramps down to a low level and holds. At the same time, C9 is discharging, holding the output of U1D to a low level. D1 is also conducting, effectively removing the inverting input voltage to U1D. U1D remains low until C9 has discharged to a lower level. After C9 reaches a predetermined lower level, the U1D output again goes positive. This enables the VCO to operate again, generating an output tone. The positive transition at the output of U1D also reverse biases D1, allowing the comparison voltage to be sensed at the inverting input. C9 also couples this positive input to the noninverting input, holding the output of U1D high. After a period of time, C9 becomes charged and the voltage at the inverting input again drives the output low and the cycle repeats. From the above explanation, you can see how different settings of S1 can be used to compare the input voltage taken from a milliammeter to provide a means of determining representative current levels.

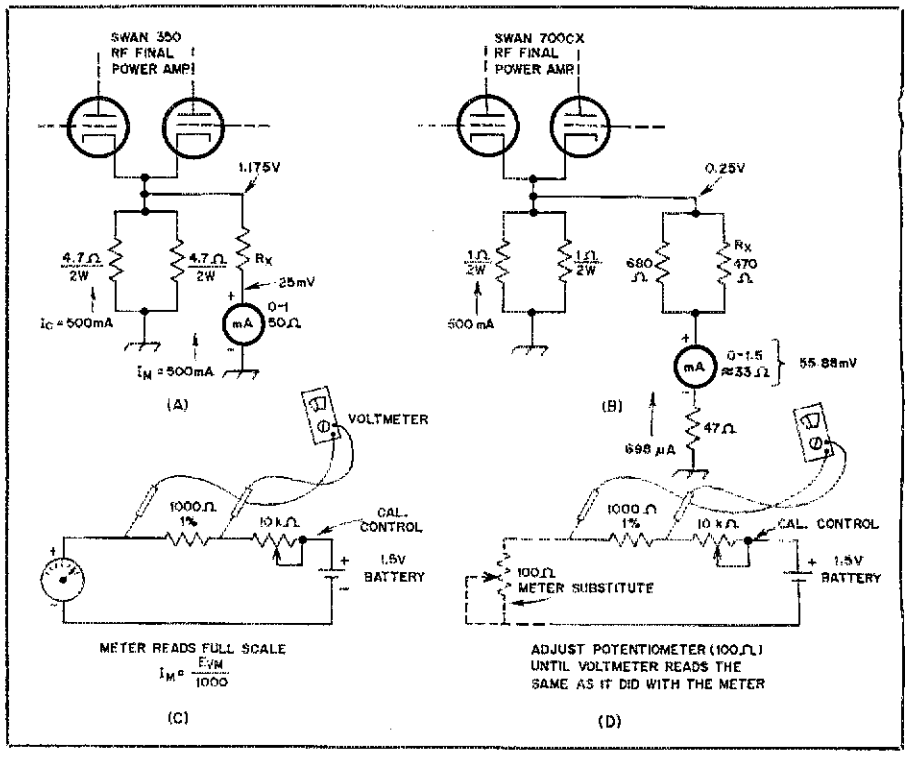


Fig. 3 — These drawings suggest how you would proceed to apply an audible meter circuit to a Swan 350 or Swan 700-CX. A simplified Swan 350 meter circuit is shown at A. The diagram at B is for the Swan 700-CX meter circuit. In both cases the cathode current is measured. Drawing C is for determining the full scale current of a milliammeter. Drawing D is for a circuit to determine the internal resistance of a milliammeter after the full scale current is ascertained.

Metering

Because there are various methods of metering current in different brands of equipment, use of a different gain figure for dc amplifier U1C may be necessary in some cases. As stated previously, the circuit shown was applied to a Swan-350 transceiver and later modified to accommodate a Swan 700-CX transceiver. Amateurs who may be considering the construction of an audible current meter are advised to study the metering circuit of the transmitter with which the audible meter is to be used. The two units must be electronically compatible. In many instances one will find that the manufacturer has installed a 0-1 milliammeter associated with various combinations of shunt and series resistors.

Fig. 3 provides some examples of metering arrangements. Circuit A is for the Swan 350 transceiver. The meter internal resistance is nominally 50 ohms. With 500 mA flowing in the final amplifier cathode circuit, a 0-1 milliammeter should have 500 μA flowing through it to register the 500-mA cathode current. Although the meter current is only 500 μA, the scale is calibrated in milliamperes. This 500-μA current causes a voltage drop of 25 mV across the internal resistance of the meter. By applying Ohm's Law and using the values just given, we can arrive at these results: E = IR = 500 μA × 50 ohms = 0.025 V = 25 mV. In this case the value of R_X would have to be 2300 Ω, but don't look for a 2300-Ω resistor in the meter voltage-divider circuit. There may be two or more resistors in parallel to make R_X the value needed to have the milliammeter register properly. One must compensate for circuit tolerances, meter error and all that good stuff put there seemingly to confuse the uninitiated. This arrangement yields a value of 50 mV across the meter for full-scale deflection.

Fig. 3B shows the meter circuit for the Swan 700-CX transmitter. In this case the voltage across the meter and 47-ohm series resistance is approximately equal to 56 mV. Here a current through the meter and voltage divider circuit of 698 μA represents 500 mA of transmitter current. Of course, the meter scale is marked to represent 500 mA. The important part of all this is being able to determine (1) the voltage across the meter circuit for a certain amount of representative transmitter current and (2) how to change the gain of

the dc amplifier in the audible current meter in order to obtain the desired results. If you know the resistance of the meter and the full-scale current reading, then calculating the maximum expected voltage across the meter for any current through it is simple. If you should be fortunate enough to have a good millivoltmeter then the voltage across the meter should be read and if the range of the meter is known, then the current may be read on the meter. A good millivoltmeter, however, is not likely to be found in most amateur stations.

Checking a Meter for Full-Scale Current

A simple method of checking a meter for full-scale current value and internal resistance is shown in Fig. 3C. All that is needed are a voltmeter, a 1000-Ω resistor (1-percent tolerance), a 100-Ω and a 10-kΩ potentiometer, plus a 1.5-volt battery. Connect the meter as shown in Fig. 3C with the potentiometer set for full resistance. Then decrease the resistance of the potentiometer until the meter just reads full scale. Measure the voltage across the 1000-Ω resistor and calculate the current through the meter by means of Ohm's Law.

$$I = \frac{E}{R} = \frac{\text{voltage across 1000-}\Omega\text{ res.}}{1000\ \Omega}$$

Leave the potentiometer set for full-scale indication on the meter. Next remove the meter from the circuit, replacing it with a 100-Ω potentiometer as shown in Fig. 3D. Adjust the 100-Ω potentiometer until the voltmeter reads exactly the same as when the meter was in place. Remove the 100-Ω potentiometer from the circuit and measure the adjusted resistance of the potentiometer. This resistance is the same as the internal resistance of the meter. Now calculate the full-scale voltage of the meter. The following steps illustrate how to perform the calculation. As an example:

1) Current calculated through the 1000-Ω resistor = 1 mA = 0.001 A = I_m.

2) Resistance of the potentiometer across the circuit measured 50 ohms = R_m.

3) Then $E_m = I_m R_m = 0.001 \times 50 = 0.05 = 50$ mV.

This example is well suited for the audible current meter shown schematically in Fig. 2.

If the transmitter to be used with the audible meter has a circuit such as illustrated by Fig. 3B, the full-scale reading will provide a voltage across the meter circuit of 168 mV. In a case such as this, the gain of the dc amplifier would need to be changed. If the circuit were left as it appears in Fig. 2, the amplifier would be driven into saturation before a full-scale meter reading occurred. Also, the current-comparison scale would not agree with the current readings of the meter. In order to avoid saturation, the gain to the amplifier is changed as follows.

Table 1

I_x,A	E_x,V	ΔE,V	R_x,Ω
$I_1 = 1.2$	$E_1 = 6.376$	$V_{cc} - E_1 = 2.624$	R17 = 1200
$I_2 = 1.0$	$E_2 = 5.48$	$E_1 - E_2 = 0.896$	R18 = 410
$I_3 = 0.8$	$E_3 = 4.584$	$E_2 - E_3 = 0.896$	R19 = 410
$I_4 = 0.6$	$E_4 = 3.688$	$E_3 - E_4 = 0.896$	R20 = 410
$I_5 = 0.4$	$E_5 = 2.792$	$E_4 - E_5 = 0.896$	R21 = 410
$I_6 = 0.2$	$E_6 = 1.896$	$E_5 - E_6 = 0.896$	R22 = 410
$I_7 = 0.1$	$E_7 = 1.448$	$E_6 - E_7 = 0.448$	R23 = 205
		$E_7 - 0 = 1.448$	R24 = 412

Step 1: Since the maximum (full-scale current) meter-circuit voltage is 168 mV and the maximum positive voltage available from the amplifier is 8 volts and the offset voltage at TP1 is 1 volt, the maximum allowable swing is 7 volts, or the output should not swing more than 7 volts for an input of 168 mV. The required gain for the amplifier is therefore

$$A_v = \frac{E_{out}}{E_{in}} = \frac{7\text{ volts}}{168\text{ mV}} = 41.67$$

We can then calculate the value of R5 and R6, using these values to change the gain of the dc amplifier and balance the input currents.

$$R5 \text{ and } R6 = (A_v - 1)R4 = (41.67 - 1)100\ k\Omega = 4.067\ M\Omega$$

Since this is not a standard value, we select the nearest standard value (3.9 MΩ). This value provides a gain of

$$A_v = 1 + \frac{R6}{R4} = 1 + \frac{3.9\ M\Omega}{100\ k\Omega} = 40$$

Step 2: Calculate $E_{out} \cdot E_o = E_{in} \times A_v = 168\text{ mV} \times 40 = 6.72$ V

Step 3: Determine the maximum comparison current for the particular transmitter. (We'll use 1.2 A here to illustrate.) Since 1.5 A is full scale, the ratio of maximum desired comparison (1.2 A) to maximum full scale meter current (1.5 A) times the maximum input voltage of 168 mV provides:

$$E_{in} = \frac{I_m E_m}{I_{max}} = \frac{1.2 \times 168\text{ mV}}{1.5}$$

$$= 134.4\text{ mV}$$

134.4 mV will represent the maximum voltage into the dc amplifier to be used for current comparison.

Step 4: Calculate the output voltage of the dc amplifier with 134.4 mV input.

$$E_o = E_{in}A_v + 1 = (134.4\text{ mV} \times 40) + 1 = 6.376\text{ volts}$$

Step 5: Determine the resistance of R17 for the selectable voltage reference. (See Fig. 2.) Let the current through the voltage divider equal 1.5 to 2.5 mA. Therefore

$$R17 = \frac{V_{cc} - E_o}{I_{ref}} = \frac{9\text{ V} - 6.376\text{ V}}{2\text{ mA}}$$

$$= 1312\ \Omega$$

where

V_{cc} = power supply voltage

E_o = 6.376 volts (calculated in step 3)

I = 2 mA (voltage-divider current)

Since 1312 Ω is not a standard value, we'll use the nearest standard value and re-establish the voltage divider current. Using 1.2 kΩ,

$$I_{ref} = \frac{E_{R17}}{R_{17}} = \frac{2.624}{1.2\ k\Omega} = 2.187\text{ mA}$$

Step 6: Now determine the rest of the resistances in the selectable voltage reference. First, determine the desired comparison currents. Then start a table, similar to Table 1, listing these current values and compute E_x, ΔE and R_x. Fill in the rest of the table. The computation procedure is

$$1)\ E_x = \frac{(E_1 - 1)I_x}{I_1} + 1$$

For example,

$$E_2 = \frac{(6.376 - 1)\,1.0}{1.2\text{ A}} + 1 = 5.48$$

where

$I_x = I_1, I_2, I_3, \ldots$

$E_x = E_1, E_2, E_3 \ldots$

$$2)\ \Delta E = E_1 - E_2, E_2 - E_3 \ldots$$

$$3)\ R_x = \frac{\Delta E}{I_{ref}}$$

For example,

$$R18 = \frac{E_1 - E_2}{I_{ref}} = \frac{0.896}{2.187\text{ mA}}$$

$$= 409.69\ \Omega$$

where I_{ref} was determined in step 5.

$$4)\ R_{24} = \frac{E_7}{I_{ref}} - 250$$

$$\text{where } 250 = \frac{R25}{2}$$

As can be seen from the table, if the

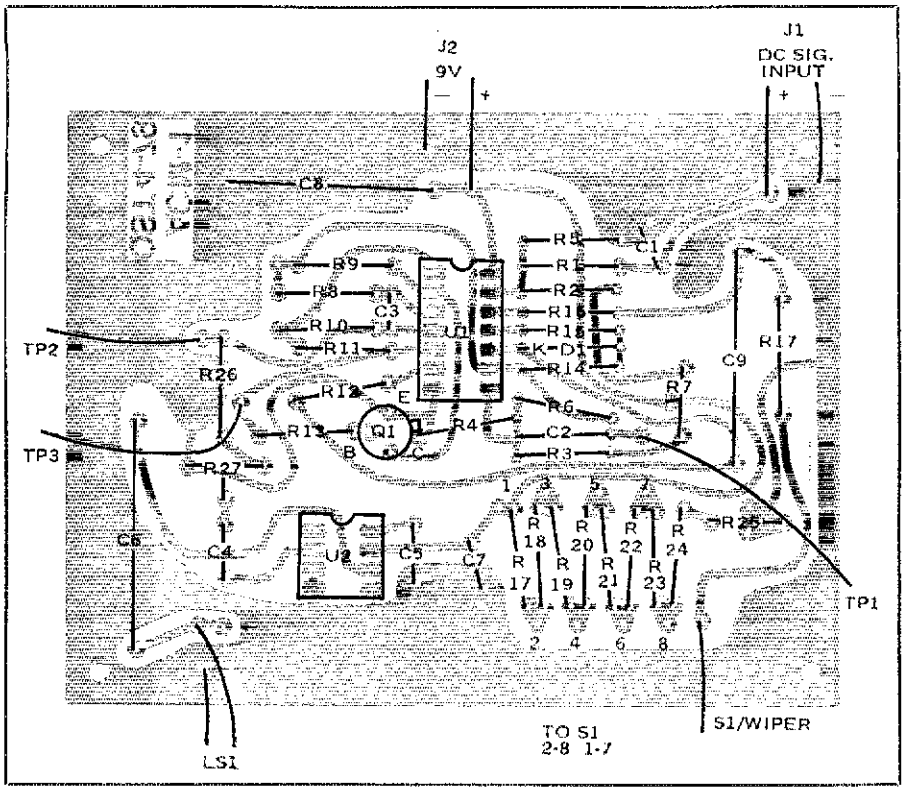


Fig. 4 — Parts placement guide for the audible current meter. Parts are placed on the nonfoil side of the board; the shaded area represents an X-ray view of the copper pattern. (The etching pattern appears in the "Hints and Kinks" section of this issue.)

values of transmitter current selected for comparison have a constant difference, the resistors R18 through R22 will be the same value. The formulas included allow for any desired current variable.

Whereas the resistors R18 through R24 are not standard values, I recommend that standard values be used instead. For example, for R18 through R22 use 430 ohms, for R23 use 220 ohms, and for R24 use 430 ohms. Although the accuracy will be somewhat affected by the substitution, an accuracy of 1.5 percent should be obtainable by adjusting R25. Of course one could make up the proper resistance values by paralleling combinations of resistors or by purchasing precision resistors. However, I do not suggest the use of precision resistors because they are more expensive and rather difficult to obtain.

Other Considerations

Other transmitter metering circuits may exist for which the foregoing information may not be applicable. However, the required input voltage and selectable voltage reference calculations should still apply. In some situations it may be advantageous to utilize a separate voltage divider in the transmitter in order to obtain the drive to be used with the audible current meter.

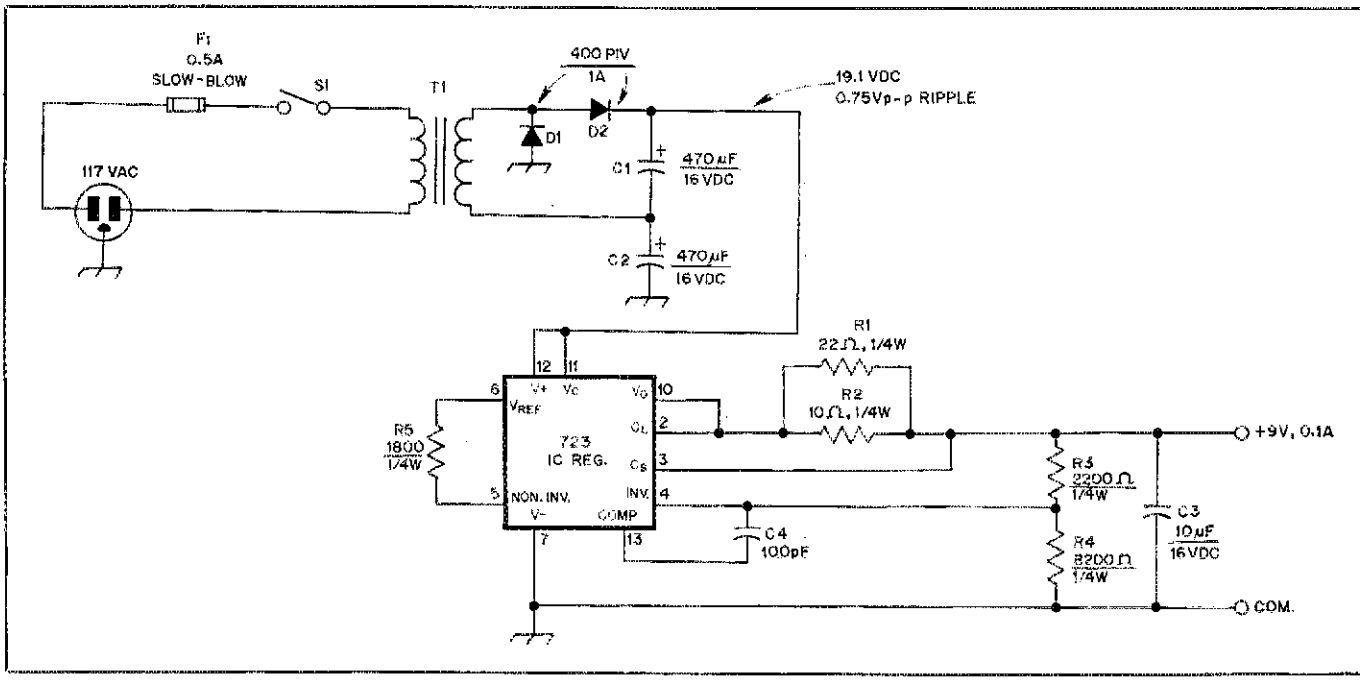
Although the device described in this article is used to monitor the current through the final amplifier of a transmitter, it could just as well be used to measure the SWR or rf power output. If the SWR were to be monitored, the selectable voltage reference resistors could be proportioned so that the no. 2 switch position could be used to calibrate the full-scale meter reading (maximum forward power) while the other positions would represent various levels of reflected power.

Construction

Construction of the audible current meter is facilitated by use of the circuit board pattern and the component placement guide, Fig. 4. Use of 1/4-watt 5-percent resistors is suggested. C3, the 200-pF capacitor in the integrator circuit, should be a silver-mica or other good-quality capacitor. C9, a 1-μF capacitor, is nonpolarized.

In choosing other components for the

Fig. 5 — Power supply diagram for the SHARC audible current meter.



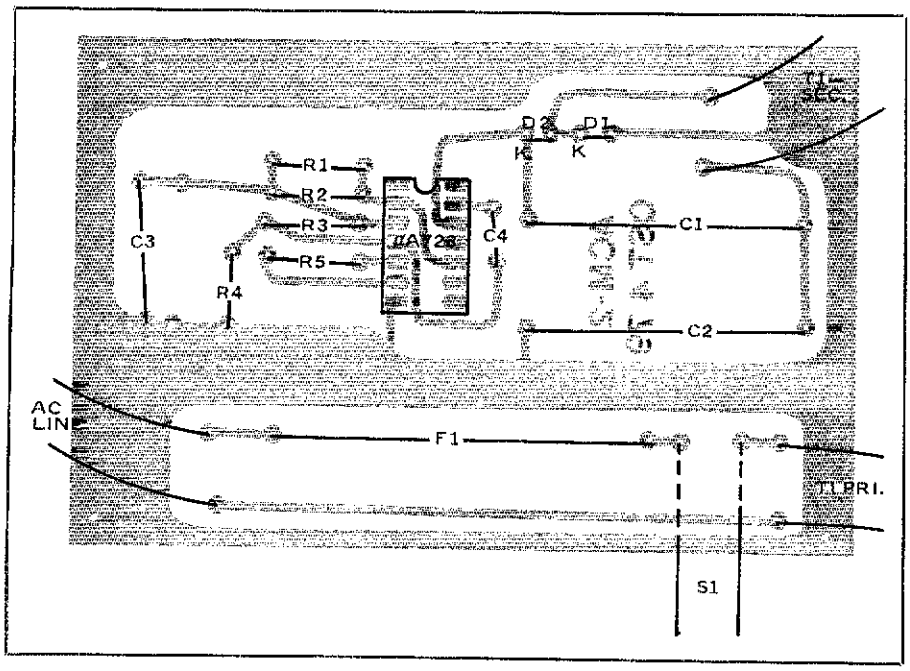


Fig. 6 — Parts placement guide for the audible current meter, shown from the component side of the board. The shaded area represents an X-ray view of the copper pattern (see "Hints and Kinks" section of this issue).

audible meter I selected a 10-position single-pole phenolic rotary switch for S1. OFF-ON switch S2 is a miniature single-pole slide switch. J1 is a 2-terminal phenolic pan-head screw-type terminal board. J2 is a miniature phone jack and R7 and R27 are (CRL) cermet vertical-mount printed-circuit potentiometers.

A 3-1/2 × 5 × 3-1/2-in. (89 × 127 × 89-mm) Minibox provides a suitable housing for the circuit-board assembly and the speaker, in addition to S1 and S2. A small square Minibox may be used to enclose the external power supply. A diagram and the printed circuit-board layout for a 9-V power unit to be used with the audible current meter are shown in Figs. 5 and 6.

Calibrating and Using the ACM

To calibrate the audible current meter, set the audio level control, R27, to approximately midposition. Connect a voltmeter to TP1 and short the J1 input to ground. Adjust the dc offset with R7 so that the voltage at TP1 measures 1 volt. This should produce a relatively low-pitched sound from the speaker. Remove the short from J1 and the sound from the speaker should become very high-pitched. Next, the voltmeter is connected to the common terminal of S1. R25 (the reference trimmer) is adjusted for the proper voltage at different positions of S1 with the adjustments set as near as possible to the voltage values calculated as E_x in Table 1.

The next step is to connect the audible meter to the metering circuit with which it is to be used. Switch S1 to the no. 1 (9-volt) position. Note that the pitch of the tone generated increases as the meter current increases. Set S1 to the desired position. Note that the tone begins to pulsate when the current through the meter equals the current level selected by S1. When the current is less than this value, the tone will be steady and lowers in pitch as the current through the meter decreases. If the current selected does not agree with the meter reading, it may be necessary to make a slight adjustment to the offset control, R7, to make the audible meter start pulsating at the selected current value and that of the meter. This completes the calibration.

When using the device while tuning a transmitter, a good suggestion is that the range switch, S1, be placed in the no. 1 (9-volt) position with the transmitter being tuned for the lowest pitch sound indicating resonance. Set S1 to the desired current position and increase the loading until the tone starts pulsating. The tone will be steady, or will increase and decrease in pitch as long as the meter current does not equal the value selected. This facilitates resonating the final amplifier (dipping the plate current) as the transmitter is loaded.

If the rf output power is being monitored, then one tunes the transmitter to obtain the highest pitched sound. A value one seeks to monitor is selected and the transmitter output is increased until the tone begins to pulsate.

The audible current meter is indeed a simple yet effective device. The ACM concept may be applied to measuring rf output, the SWR, or just the current in a circuit. I believe it is fair to say that the application of the audible current meter is limited only by the user's imagination. QST

Feedback

☐ An error exists in "A Noise Blanker for the Collins S/Line," by Doc Lask, K6CUF (February 1979 *QST*). On page 30 under the subhead, "Modifying the Noise Blanker," the second paragraph states that two coils are padded. The sentence should read as follows: "By padding *L2 and L3* on the blanker with 36-pF capacitance . . ." L4 is not used.

☐ In "Upgrading the SB-220 Linear Amplifier," February 1979 *QST*, R1 shown in Fig. 1 has an effective resistance of 50 ohms, not 100 ohms as is indicated in the text. The 50-ohm value works satisfactorily when the amplifier is being operated on 117-V house current, but on 234 V ac a value of 200 ohms at R1 provides better in-rush current control. It is also necessary to use contacts K1B for both 117 V and 234 V ac.

☐ The helium-neon laser pictured in February *QST*, page 42, operates on 474.0834 THz, not 474.0834 GHz. One THz equals 1,000,000 MHz or 1000 GHz.

☐ In "*El Hombre Y La Mar* Expedition" (November 1978 *QST*) the net control station in Spain was Manuel Vega Torregrosa, EA1TI, not Manolo Estavez.

☐ The "Roadeo Hams" (October 1978 *QST*, page 29) was written by K9BIL not K9ZZ. QST

Strays

W1AW WORKS THE WORLD

☐ If you were on the air during the weekend of December 2-3, you may have worked W1AW; nearly 2000 hams did. Members of the Western Connecticut Traffic and Emergency Net (WESCON) spent the daylight hours of that weekend at the Maxim Memorial Station contacting hams throughout the world on 10 through 80 meters. And they plan to do it again.

On May 12 and 13, the group will be providing everyone with another opportunity to work the ARRL headquarters station. The operation will begin at approximately 1400Z and end at 2100Z each day. (There may also be activity in between the regular Saturday evening W1AW transmissions.) All QSL cards will be answered. The WESCON crew hopes to be able to work you all. — *Stan Horzepa, WA1LOU*

The Whys and Hows of Bifilar Filament Chokes

Your next cathode-driven amplifier will need a bifilar filament choke. Here are the basic rules for designing your own ferrite-core unit.

By Doug DeMaw,* W1FB

Have you wondered how an rf choke is designed to fill a specific need? The fundamentals are really quite basic and easy to apply. This article provides simple rules of thumb which you can follow when selecting the right choke for a particular point in a circuit. You will also learn how to fabricate your own chokes for use in the filament/cathode circuit of grounded-grid amplifiers.

Fundamental Requirements

All rf chokes must satisfy a specific criterion: They need to exhibit at least a minimum amount of X_L (inductive reactance) at the lowest operating frequency of the circuit. The choke winding must be capable of passing the circuit current without excessive heating or voltage drop. The inductor must not have any "holes" across the chosen operating frequency range. Holes are series resonances which can be detected by tying the choke leads together and checking for resonances with a dip meter. An RX meter, if available, can be used to check the parallel resistance of the choke across the operating range of the inductor to ensure that it is well above the circuit impedance where the choke will be connected. In other words, if a circuit has a characteristic impedance of 50 ohms, the parallel-equivalent *resistance* of the choke should be at least 10 times higher than 50 ohms at all frequencies accommodated by the circuit.

A good rule of thumb for the *reactance* of an rf choke, X_L, is that it should be at least four times the impedance of the circuit where it is used. This will prevent unwanted power loss and mismatch resulting from using the wrong choke value in shunt with a specified impedance. By way of simple illustration, one would not want to shunt an rf choke across a 50-Ω driving source if the choke had an X_L of only 10 ohms. However, if the "four-times" rule is followed, the 50-Ω driving source would be in parallel with a reactance of 200 ohms, thereby having a minor effect on the circuit impedance. Once the required reactance is known, the amount of inductance needed for the lowest operating frequency can be found from

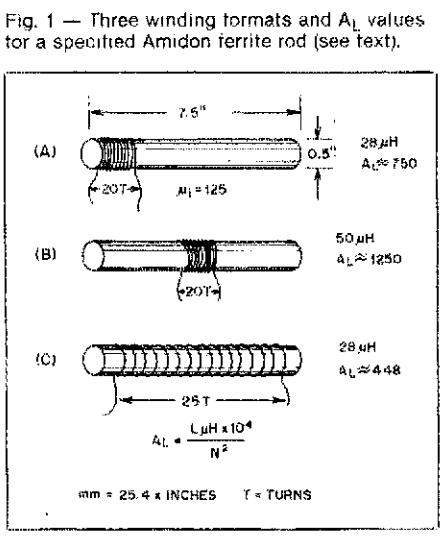
$$L_{\mu H} = \frac{X_L}{2\pi f}$$

where f is in MHz and π equals 3.14. Therefore, if we wanted to select an rf choke for use in a circuit which had a characteristic impedance of 100 Ω, and the lowest operating frequency was 1.8 MHz, we would find the inductance by

$$L_{\mu H} = \frac{400}{6.28 \times 1.8} = 35.4$$

where 400 is four times the 100-Ω level in our circuit. Remember, 35.4 μH is the *minimum* acceptable value of inductance. The higher the value above that amount the better. This same procedure is recommended when designing a broadband transformer: The windings should be based not only on turns ratio, but need to be sufficient in number to present a reactance which is at least four times the circuit impedance where the transformer is used.

Fig. 1 — Three winding formats and A_L values for a specified Amidon ferrite rod (see text).



Magnetic-Core Chokes

In the interest of miniaturization, a great number of rf chokes are wound on ferrite-core material. The advantage is twofold: The choke can be made much smaller than an air-core or dielectric-core equivalent. Fewer turns of wire are needed for a specified inductance, hence the winding resistance is lower. This leads to higher Q and reduced voltage drop, as Q $= 2\pi fL/R$ and $E_{drop} = I \times R$, respectively. More simply stated, $Q = X_L/R$ where R is the equivalent series resistance in ohms, f is in Hz and L is in henrys.

Determining the core size in terms of maximum flux density (B_{max}) is somewhat beyond the scope of this article. Each type of core material is rated by the manufacturer for B_{max} in gauss. The magnetic flux density (B) of the chosen core with its winding in place, and with ac excitation applied, must be less than the rated B_{max}

*Senior Technical Editor, ARRL.

of the core used. If not, the core will saturate and spoil the performance. In essence, we're talking about the *power-handling ability* of the core in use. The basic equation is

$$B_{max(ac)} = \frac{E_{rms} \times 10^8}{4.44\ f\ N_p\ A_e}$$

where

A_e = the equivalent area of the magnetic path in cm^2
E_{rms} = the applied ac voltage
N_p = the number of core turns
f = the frequency in Hz, and
B_{max} = the flux density of the *operating* circuit in gauss.

The term A_e is usually defined for the various cores in the manufacturer's literature, as is B_{max} for the core at saturation.

When ac and dc currents are present in the winding of an inductor or transformer which has a magnetic core material, the equation becomes

$$B_{max(total)} = \frac{E_{rms} \times 10^8}{4.44\ f\ N_p\ A_e} + \frac{N_p\ I_{dc}\ A_L}{10 A_e}$$

where

I_{dc} = the dc current in the winding and
A_L = the manufacturer's published inductance index for the core being used.

A Design Example

One of the drawbacks to using cylindrical cores (rods) is that there are no published A_L factors from which one can calculate the turns needed for a given inductance. This is because the permeability of a rod, unlike that of closed-core devices (toroids and pot cores), is related to the length versus the diameter (ℓ/d), referenced to the initial permeability (μ_i) of the core material. A ferrite rod will have a μ_e (effective permeability) somewhat less than μ_i. This was demonstrated by the writer in "Technical Correspondence" for January 1979 *QST*, where curves were presented for the μ_i values of rods made from standard core mixes.

The A_L determination is confused further by the placement of the coil on a ferrite rod. It evolves differently when the coil is close wound on one end of the core, close wound at the core center, or space wound across all of the core. Fig. 1 contains pictorial examples of this condition, based on a particular Amidon core with a μ_i of 125 (part no. R61-500X7). Some empirically derived A_L factors were developed by the author. They are given in Fig. 1. These numbers are based on

$$A_L = \frac{L_{\mu H} \times 10^4}{N^2}$$

where

N = the number of turns used during the test to determine the resultant inductance for a particular number of coil turns.

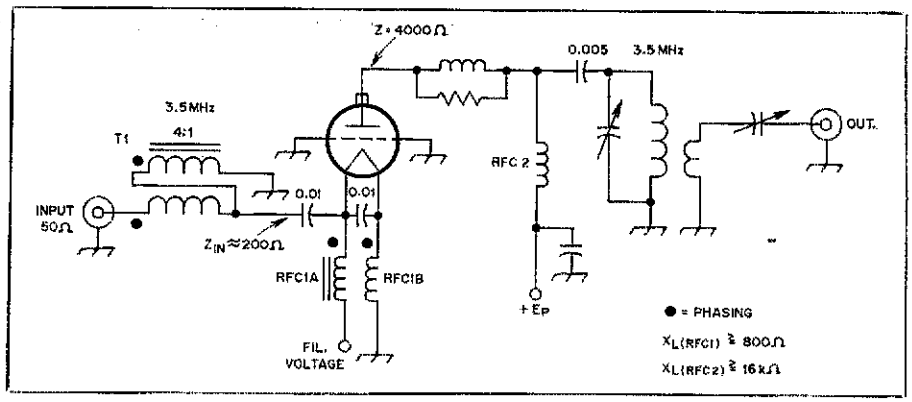


Fig. 2 — Typical circuit for a grounded-grid rf power amplifier in which a bifilar filament choke is employed (see text). T1 is a toroidal broadband input matching transformer.

Once A_L is found, the number of coil turns can be obtained from

$$N = 100 \sqrt{L_{\mu H} \div A_L}$$

where

N = the unknown turns and
$L_{\mu H}$ = the desired inductance.

The A_L values of Fig. 1 are applicable to only the rod core specified.

Fig. 2 features a typical PA power stage which is cathode driven. Assume that Z_{in} is 200 Ω (typical) or nearly so. This means that X_L of RFC1 should be four times 200, or 800 Ω, minimum. If we use the rod material specified for Fig. 1 and spread the bifilar coil turns over all of the core, we can compute $L_{\mu H}$ while using an A_L factor of 448. To find the necessary inductance for an X_L of 800 Ω at 3.5 MHz,

$$L_{\mu H} = \frac{800}{6.28 \times 3.5} = 36.4$$

This information enables us to learn how many turns are needed on the ferrite rod: $N = 100 \sqrt{36.4 \div 448} = 28.5$ turns. No. 14 wire will be used to ensure ample current capability through the winding. Because the choke winding is bifilar (two equal lengths of wire laid on the core, side by side), the effective number of turns is twice 28.5, or 57. The wire table tells us that 15 turns of no. 14 enameled wire will occupy one linear inch. Hence, the bifilar winding will fit in a 3.8-inch (97 mm) area of the core. Since the rod is 7.5 inches (190 mm) long, ample space exists. Actually, the winding can be made much longer if desired, thereby providing a reactance well beyond the four-times Z_{in} rule. If we were to use 6.5 inches (165 mm) of the rod for our winding, there would be room for 97 turns. This would net us approximately 110 μH, since the effective number of turns would be half of 97, or 48.5.

There is an ample reserve of flux density in the specified ferrite rod to satisfy the B_{max} requirements for most amateur 1-kW amplifiers. The core should not run warm or saturate with tubes such as 3-500Zs, 4-1000As and the like.

Final Comments

The net inductance of a single-wire winding versus a bifilar type of winding, if both occupy the same core area, is essentially the same. The Q also remains unchanged, according to lab tests by the author. Q_μ for RFC1 of Fig. 2 was measured as 150 at 8 MHz, although Q_μ in this application is not a significant design factor. In a narrow-band circuit it would become an important parameter.

Formvar-insulated wire is recommended for high-power filament chokes. The coating is tough and resistant to oil and acid. This will help to prevent shorted turns. The completed choke can be protected by encasing it in heat-shrink tubing or a generous coating of glyptol varnish.

Ferrite or powdered-iron choke cores are not recommended in the circuits which have high levels of rf or dc voltage. They are best suited to broadband applications at impedance levels less than approximately 500 Ω. Excessive voltages will cause corona between the core and the winding, leading to possible permanent damage.

Strays

A HAPPY ENDING

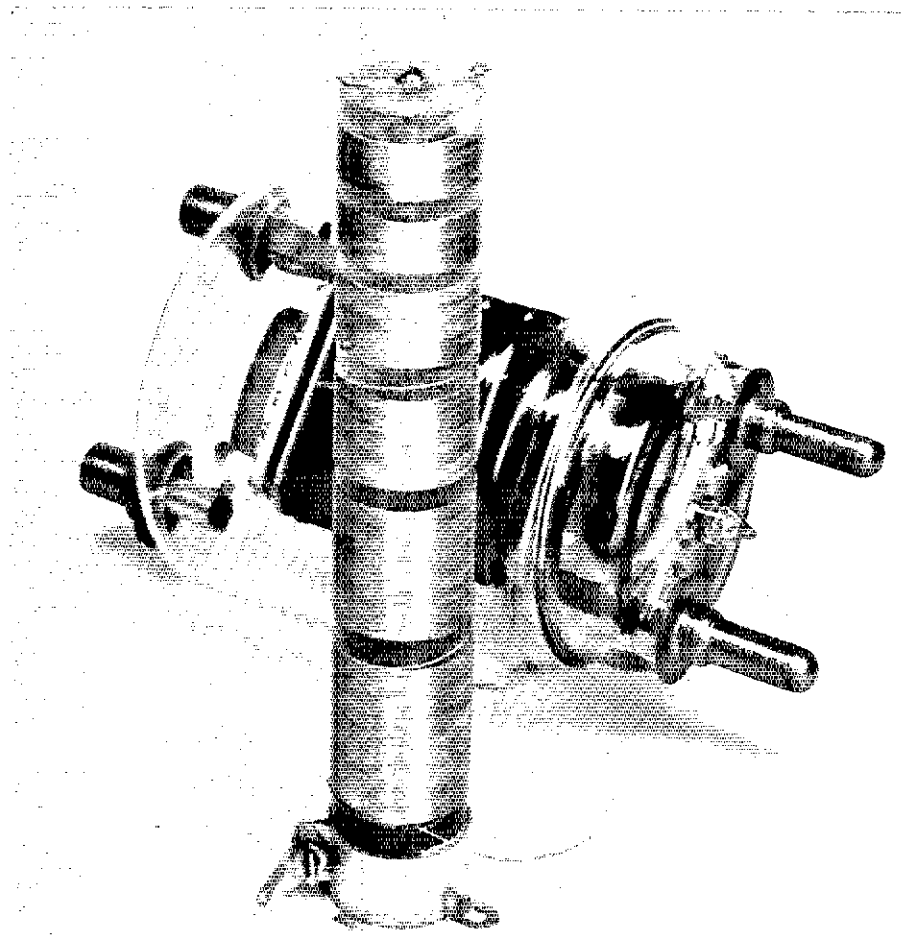
Just a few weeks before high-school graduation in 1971, Scott Porter of Fitzwilliam, NH, was involved in a motorcycle accident that left him paralyzed below the waist. After his rehabilitation, he held various jobs, but never really found his niche. Then, with the help of Dave MacLanahan, WA1FHB, Scott and his mother became licensed as WA1YTW and WA1YRW. MacLanahan wrote a story for a local paper, which was seen by officials for the state's vocational rehabilitation service. They called Scott, offered to send him back to school, and got him a wheelchair lift for his van. He's now studying for his bachelor's degree in math/physics, and hopes some day to get his commercial class ticket in addition to his Advanced class amateur license. — *Michele Bartlett, N1AGD*

Save Money — Build Your Own RF Choke!

Transmitter plate chokes are expensive and sometimes hard to acquire. Why not twirl your own? Here's how to tackle the job.

If your spare-parts bin resembles Mother Hubbard's cupboard, keep your eyes glued to these pages! If it's an rf choke of high-power rating that's keeping you from completing the amplifier which broods hopelessly in the corner of your workshop, take heart. You can build your own choke from some pretty ordinary materials. The model described here costs approximately $1.50 to assemble, and it will handle 2 kW PEP with ease from 1.8 to 30 MHz.

In order for an inductor to serve properly as an rf choke it must satisfy some important needs. First, it has to be capable of passing the circuit current without excessive heating. Secondly, it must have a high parallel resistance at the operating frequency — typically five to 10 times the characteristic impedance of the circuit element to which it is attached. The third commandment is that it have no series resonances at the frequencies of operation. Concerning the latter, you may have experienced a puzzling catastrophic event — a pi-wound rf choke that literally exploded when power was applied to your amplifier at some particular frequency. No doubt the choke pi windings slammed together with a loud bang, then trendrils of smoke curled up from the component. Well, chances are that the choke was self-series-resonant, caused by the distributed capacitance across the unit, plus the inductance traits. At the series-resonant frequency most of the amplifier rf power flows through the inductor to ac ground. This sets up a tremendous momentary



The completed choke and the 833A amplifier tube used for in-circuit checks.

field which causes the windings to collapse and burn. We'll look at this matter in greater depth later in the article.

Choke Description

When is a choke a choke? In the writer's case it had to be free of series resonances in the amateur bands from 3.5 to 30 MHz, be capable of handling 600 mA and look like a high impedance to the 5000-ohm, plate-load impedance of the amplifier tube. If it could meet all of these requirements, it would indeed be an rf choke.

An earlier trip to a plastics supplier resulted in the purchase of a scrap piece of Plexiglas rod which was two feet long and 1-1/4 inches in diameter (600 × 32 mm). The cost was $2.50 . . . inexpensive because of blemishes. An eight-inch (200-mm) piece remained from the original length, so it was used in its entirety as the form for the rf choke. The ends were made smooth and flat by means of a file, and the main body of the rod was rubbed with steel wool to remove the nicks and scratches.

An old filter-capacitor bracket seemed about right as a mounting foot. One was located in the junk box, and it worked fine after the bottom of the rod was built up with a few layers of masking tape to provide a snug fit. Next, two no. 30 holes were drilled off center through the sides of the rod (one at the top and another near the mounting bracket) to accommodate the ends of the winding.

A no. 8 tap hole was drilled one inch (25 mm) deep at the top center of the rod. It was tapped for an 8-32 screw thread to permit two no. 8 solder lugs to be affixed. The screw threads were dipped in epoxy cement before the hardware was tightened in place. This would help prevent loosening of the screw in the presence of heat.

No. 26 Formvar-coated copper wire was used for the choke winding. It was wound in a solenoidal manner (close spaced, single layer). The winding was broken up every so often with a group of quarter-inch (six-mm) gaps. This would help reduce the capacitance across the overall winding, thereby reducing the probability of unwanted series resonances. The numbers of turns per section are listed in Fig. 1. The upper end of the winding was attached to one of the solder lugs. A three-inch (76-mm) lead was left dangling at the lower end of the choke for subsequent connection to the high-voltage feedthrough bushing and plate bypass capacitor. Finally, two coatings of polystyrene Q dope were applied to the winding and allowed to dry. TV type high-voltage corona dope or glyptol would probably serve okay as substitutes for the Q dope.

Electrical Characteristics

The assembled choke was checked first for series resonances. The ends of the winding were shorted together by means of an eight-inch (200-mm) length of hookup wire. Then, a dip meter was coupled to one end of the winding. The range from 1.6 to 45 MHz was investigated to see if any dips occurred. Series resonances were found at 9.5, 12, 16, 18.5 and 26 MHz. Luckily, no dips were found in the amateur bands!

Finally, a laboratory RX meter was used to learn how high the choke parallel resistance was at 3.5, 7, 14, 21 and 28 MHz. At all frequencies the reading was 100 kΩ or higher. The choke would be more than adequate for the 5000-ohm plate load of the amplifier. As a matter of curiosity the choke was checked at 1.8 MHz; it showed a 100-kΩ characteristic there also.

The in-circuit performance with an 833A tube was excellent from 80 through 10 meters. The only complaint the writer might voice is that the Q dope formed little bubbles here and there after a few weeks of amplifier use, making the choke look as though it was suffering from dermatitis.

The choke has an inductance of 600 μH. A value of 110 was obtained during a check of the unloaded Q. Neither of these facts are especially significant to those who may choose to duplicate this design. But, if the reader departs from the layout shown in Fig. 1 these numbers may be helpful in developing an independent design.

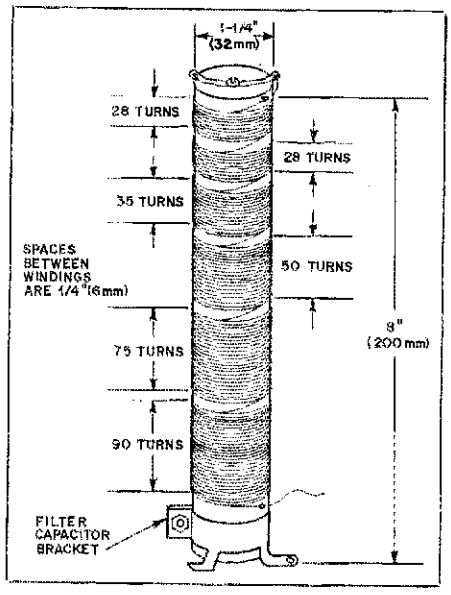


Fig. 1 — Pictorial drawing of the rf choke. No. 26 wire is used for the turns. A quarter-inch gap is used between the choke sections (see text).

Tag Ends

Other types of body material should be entirely suitable for winding homemade rf chokes. A high-quality type of glass-epoxy tubing might be okay as a coil form. If you have access to a ceramic kiln, try making your own forms. A glass Alka-Seltzer bottle might even be worth trying. The main considerations are the relative immunity of the material to heat, and the dielectric properties. PVC tubing, for example, is totally unsuitable, as is nylon. Such insulators will overheat and melt in the presence of high rf fields, and they will be lossy.

Admittedly, the choke described here is very large. Smaller chokes with fewer turns can be built for use in power amplifiers. The main point to this presentation is that you can make your own rf chokes inexpensively. Perhaps the greatest reward from such an effort comes when the component is ready to use only an hour after the construction starts. No need to wait days or weeks for a commercial choke to be delivered by mail! — *Doug DeMaw, W1FB*

Strays

UNIQUE WAS TROPHY OFFERED

Undoubtedly one of the most sagacious moves by any government agency was the recent FCC decision to issue lifetime ham calls. To mark this progression from simple order to eventual chaos, the SLBC&PS is offering the LER Displaced WAS Trophy to the first duly licensed amateur who submits QSLs confirming 50 QSOs with nonportable or nonmobile stations in states outside the indicated prefix area. The cards can be all from the same state (known as "making it the hard way") or from 50 different states ("the old-fashioned way"). Any authorized bands or modes may be used. Send your application and cards to L. E. Rapp Enterprises, File 13, Kippering-on-the-Charles, MA.

LEARNING VIA THE AIRWAVES

Amateur Radio has been found to be an effective teaching aid thanks to the success of courses in conversational German at the University of Louisville and Georgia Tech. During the 11-week course, students used on-campus ham radio stations to speak to each other in German. The students discussed hobbies, sports and other topics as they mastered the foreign language. The class practiced their German once a week on the 40-meter band, at a frequency of 7235 kHz. Instructors and students agree the course was successful, as the novelty of using the airwaves made learning more enjoyable. — *W4MGN and WØOWF/4*

A Big Signal from a Small Lot

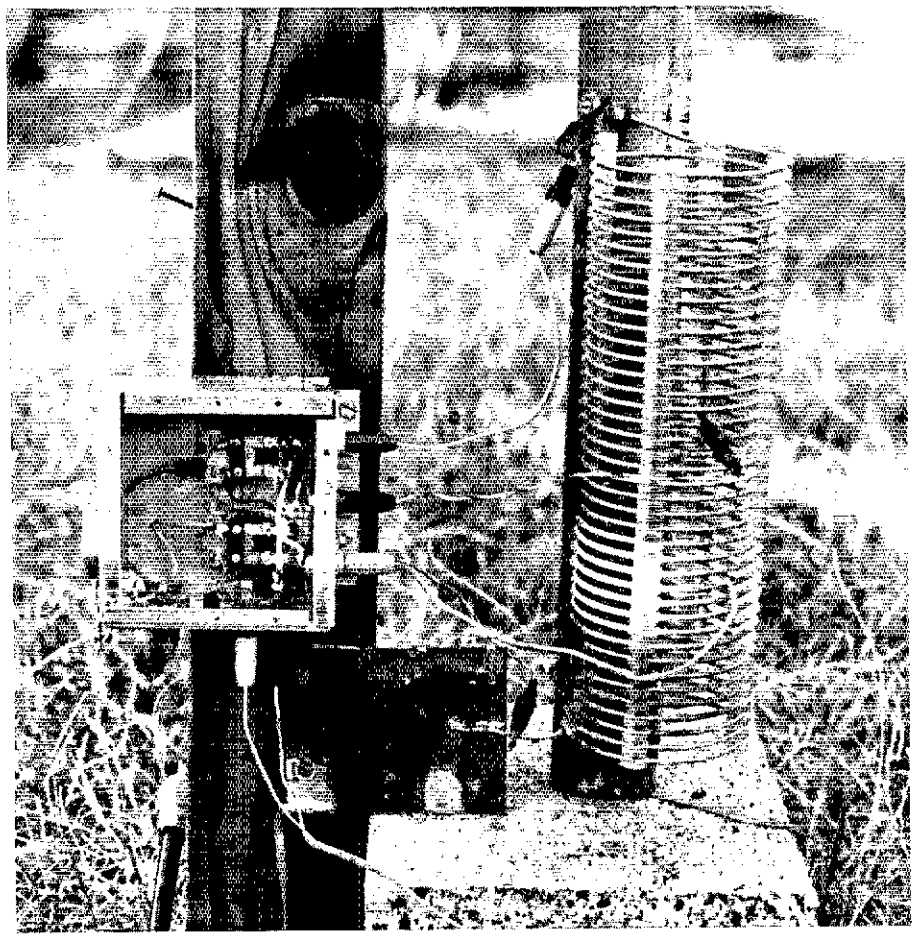
Good things often come in small packages. Consider N7RK's 60-foot vertical, a proven top-notch DX contest antenna.

By David S. Hollander,* N7RK, ex-WB6NRK/7

Regardless of what others throughout the rest of the country may think, not every radio amateur in Arizona has 10 acres of land or more on which to farm exotic antennas for DXing. On the contrary, indeed, many of us in the Grand Canyon state reside in apartments or homes with little or no space for outdoor antennas. Where there *is* space, most likely it is insufficient for installing an aerial designed for use on 75 or 80 meters, much less 160.

*Motorola Semiconductor Group, P. O. Box 2953, Phoenix, AZ 85062

Among these city dwellers living in the shadow of such limitations are many amateurs, like myself, who prefer operating on the low-frequency bands. Some, perhaps, have resigned themselves to the facts of their individual lives and settled for operation on 10, 15 or 20 meters or the uhf bands. Although I was faced with similar restrictions, dismay was not about to rule me out of my favorite bands. In the end I erected an antenna that rewarded me with a gratifying amount of DX and helped me earn a position in the top brackets of the 1976 DX contest on 160!



The N7RK antenna loading coil and relay box. Transmitting-type air-wound coils such as used in this photograph may be found in surplus military gear, dismantled broadcast transmitters or may be obtained from G. R. Whitehouse & Co., 11 Newbury Dr., Amherst, NH 03031.

The long winter nights of 1975, during which I was living in an apartment in Tempe, AZ, gave me the opportunity to observe that DX-minded amateurs on 75, 80 and even 160 were communicating across the oceans with modest amounts of power and, seemingly, with little difficulty. As I scanned these frequencies night after night, my desire to be a part of this DX action became more fervent. I realize that some *QST* readers may reason that if DX happens to be my goal, I should simply switch to 10, 15 or 20 meters. My ready-made rebuttal, of course, is that DXing on these bands lacks the challenge to be found on 75, 80 and especially 160 meters.

From Horizontal to Vertical

Conditions at the apartment where I lived that winter were such that I could install a 150-foot horizontal antenna. This end-fed wire, however, left much to be desired as far as DX is concerned. After all it was only 20 feet above ground. As a result the angle of radiation was very high. The best compliment I can give this antenna is that it did more to keep my interests aglow than anything else.

An observation I made that winter coincided with antenna theory dating back to the early days of radio. The best DX on 75, 80 and 160 meters came from stations having vertical antennas. This seemed particularly true on 160. Of course, an exception might occur if an amateur station had a horizontal antenna suspended 120 feet above ground. In a practical sense, however, such a situation is quite unlikely for the amateur whose residence is on a small city lot.

In time, I moved from the apartment to a house. While this transition gave me more personal freedom to work with antennas, the lot size, just 60 × 25 feet (18.3 × 7.6 m), offered no advantage for stringing up a suitable wire antenna for my favorite bands. No longer could I have a 150-foot antenna. In fact the smallness of the yard precluded the erection of even a half-wave antenna for 40 meters. Nevertheless, I was not dismayed by the prospects of being unable to string out a skywire.

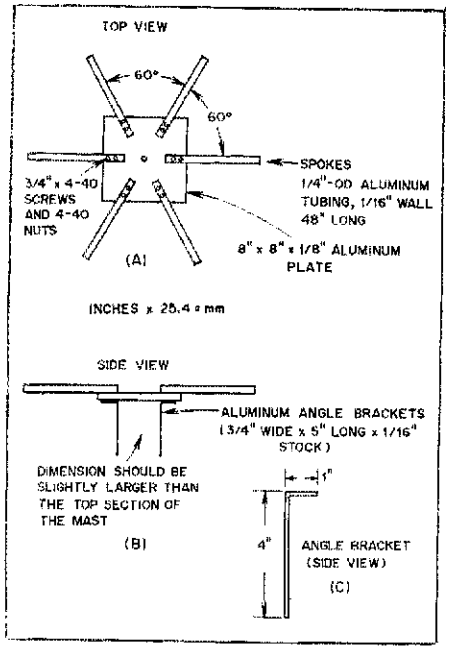


Fig. 1 — Construction of the N7RK vertical antenna capacitance hat. Each spoke is fastened to the aluminum plate by means of 3/4 × 4-40 machine screws and 4-40 nuts. The capacitance hat is fastened to the mast by means of plumbing or automotive hose clamps. To obtain good continuity between the hat and the mast, a length of wire mesh braid should be brazed to the mast and secured to the aluminum plate with the use of a solder lug and machine screw.

Long before leaving the apartment, I had firmly decided that my next antenna would be vertical. For that reason, the dimensions of the lot were of minor concern. Anxious to be ready for the next DX season, I experienced no difficulty in being motivated to erect a 60-foot radiator. Preparations began soon after getting settled at the new location.

That I decided upon a height of 60 feet was largely a matter of the material on hand. For some time I had saved some tubular TV masts, thinking that the day would come when they would be useful for my Amateur Radio activities.

Obviously there was little choice in where to locate the antenna. It could be erected in the middle of the yard or close to the house. My decision was to forgo any technical advantage of having the mast in the middle of the yard in order to leave that area free of any encumbrances. Instead it now stands against the carport. Placing the mast at this location enabled me to secure it to one of the 4 × 4 supports for the carport roof. Clamps placed at the 3- and 8-foot levels hold the mast firmly against the wooden upright.

About Construction

The material on hand consisted mainly of a 50-foot (15.2-m) telescoping TV mast. This turned out to provide a length of 44 feet when assembled. Consequently an additional 16-foot section was needed.

A capacitance hat, illustrated in Fig. 1, furnishes additional electrical length. The hat has six 4-foot tubular aluminum spokes equally spaced atop an aluminum plate. Each spoke is fastened to the plate with machine screws.

The mast is guyed at the 35-foot level and a point 2 feet below the top. I used ordinary TV guy wire, such as one may obtain at most electronics stores. To prevent any unwanted resonances occurring along the guys, each wire is broken at random points with insulators installed between the segments. Turnbuckles provide means for tightening the wires. Anchor points are each 25 feet from the base (two on the house and one on a fence post).

Purists might cast a jaundiced eye at my method of supporting the bottom of the mast above ground. Lacking a suitable insulator, I simply placed it atop a cinder block. No appreciable loss seems to have resulted, however.

The Ground System

A ground rod alone is usually not considered to be an effective means of providing a ground for a vertical antenna. Explanations to this effect are found in *The ARRL Antenna Book* and other texts. The ideal ground system would have been 120 radials, at least 1/2-wavelength long, spaced equally around the base of the antenna every 3 degrees.[1] Inasmuch as the distance from the base of the antenna to the end of the yard was only 60 feet, such an installation was slightly out of the question. Instead, I used far less than that amount. Indeed, amateurs often obtain good results with far fewer radials. My situation is a case in point.

Because of the space limitations at my new home, my ground system had to be

[1]Notes appear on page 34.

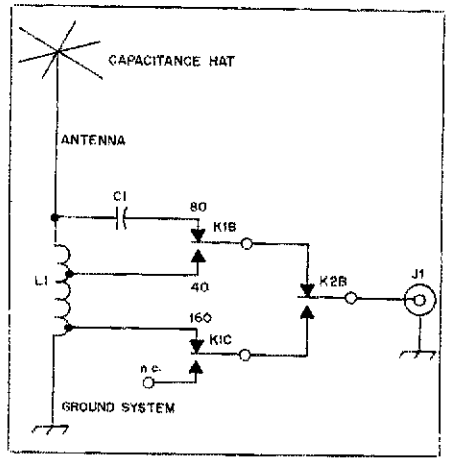


Fig. 2 — Antenna matching system for the N7RK vertical. The ground system consists of 20 radials of no. 12 copper wire, each 60 ft long (see text). L1 is a B & W no. 3035 coil tapped at 7 turns from the top and 4 turns from the bottom. Four 1200-pF fixed capacitors in series are used for C1. K1 and K2 are Potter and Brumfield KRP11DG dpdt 12-V dc relays with 10-A contacts. Only one set of contacts is used for K2. J1 is an SO-239 uhf connector.

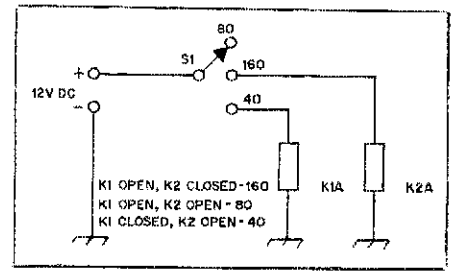


Fig. 3 — Band changing of the N7RK vertical antenna system is simplified by this relay control system. A two-conductor control cable to the remote outdoor tuning system is required. The ground return is by way of the coaxial feed-line braid. S1 is a single-pole, three-position rotary switch located on a control box in the station.

far short of the ideal. I compromised by laying out 20 radials of no. 12 copper wire, 60 feet in length and buried 3 inches in the ground.

After reading further on the subject of ground systems,[2,3] I learned that if only a small number of radials are used, there is little point in extending them out 1/4 or 1/2 wavelength. I reasoned that 1/8 wavelength would have been adequate for my installation. According to the literature I read, a large number of radials, even though short, are preferable to a few long radials. Most of the ground losses seem to occur near the base of a vertical antenna. Therefore, within reason, the more metallic surface area a radial system has near the base, the lower will be the ground losses.

Antenna Matching

In order to obtain a good antenna match for each of the bands, I relied mainly on a dip oscillator, an SWR indicator and a bit of cut and try. Arbitrarily, I decided to adjust the antenna first for operation on 75 meters. With the oscillator coupled to the base of the mast, I noted a dip that occurred at 3 MHz. This also indicated that the antenna was approximately 1/4 wavelength long at that frequency. However, at 3.8 MHz it would appear to be longer than 1/4 wavelength, with inductive reactance being evident at the feed point. To cancel this reactance, I inserted a capacitance of 300 pF in series with the antenna, as shown in Fig. 2. I arrived at that value purely by experimentation. Four 1200-pF, 500-V dipped-mica capacitors wired in series provide the 300-pF capacitance.

A 60-foot vertical antenna will display capacitive reactance at the feed point when operated on 160 meters, because it is electrically shorter than 1/4 wavelength. To cancel this capacitive reactance, inductance must be introduced into the antenna circuit. Fig. 2 shows this inductance, L1, in series between the antenna and the ground. Taps on the coil enable it to be used for both 160 and 40 meters. Although the tap points I use for L1 are indicated in the caption for Fig. 1, they

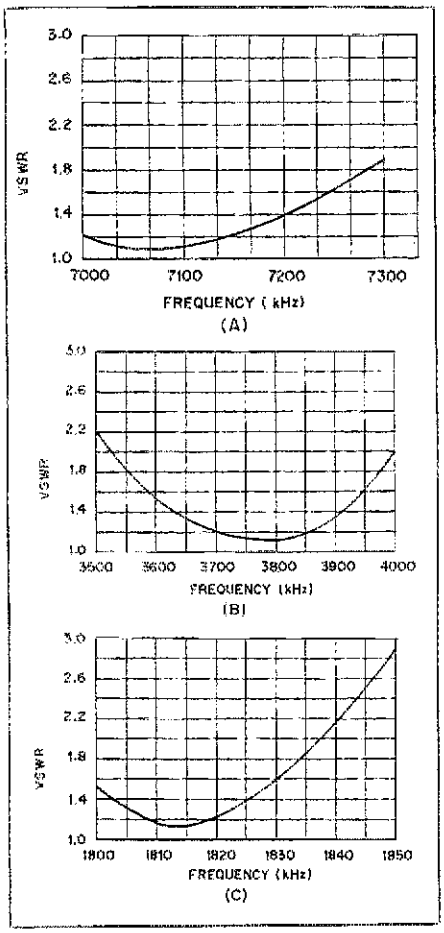
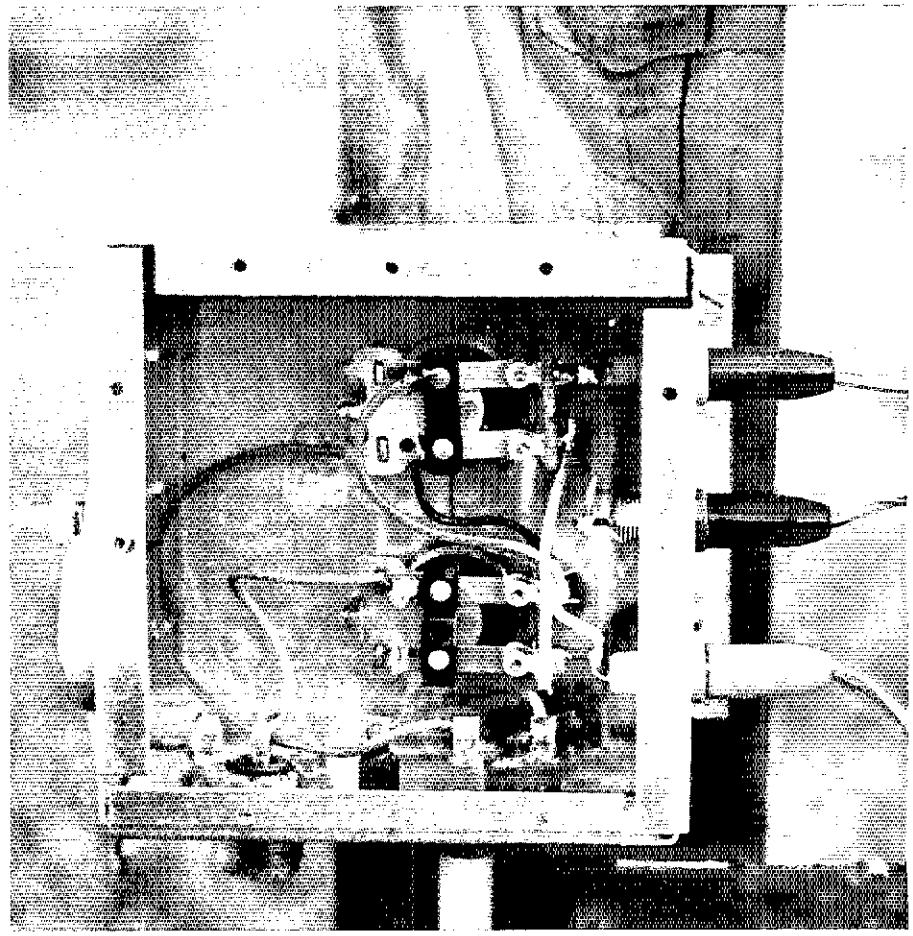


Fig. 4 — The three graphs compare the VSWR versus frequency for the N7RK vertical antenna for the 40- through 160-meter amateur bands.



This close-up photograph shows how the antenna changeover relays are housed at the base of the N7RK vertical antenna. The relays, remotely controlled from the shack, provide quick band changing.

may not be the same at other installations. Proper tap adjustment and minimum SWR are obtained rather easily by experimentation. Fig. 4 shows the results of SWR measurements at N7RK.

Control System

The simple control system illustrated in Figs. 2 and 3 eliminates trips to the antenna each time a switch from one band to another is made. L1 is a Barker and Williamson no. 3035 inductor. If one is not available, a suitable substitute would be an air-wound coil 2 inches in diameter (51 mm) having 40 turns. Such inductors are often found at flea markets or are offered for sale by surplus dealers. These same sources may also have a relay that is equivalent to the Potter and Brumfield 12-V unit no. KRP11DG that I use. A good idea is to check the coil voltage rating. For example, Potter and Brumfield makes this model with coils for 6, 12, 24, 48 and 110 V dc.

The relays should be protected from the weather by a suitable housing. I chose not to enclose the inductor perhaps because of the generally favorable weather conditions in my area. For regions subject to much moisture, enclosing both the coil and the relays seems desirable. Plastic freezer boxes are relatively inexpensive yet quite satisfactory for this purpose.

Only a two-wire cable from the shack to the changeover relays is required for the control circuit. The coaxial-cable braid may be used for the ground return. My relays are operated by a homemade 12-volt unregulated supply. Relays of other voltage ratings may be used, of course, but in such cases the supply voltage and current must be compatible with the particular relay to be used.

Antenna Performance

As evidence of success with this vertical antenna, let me offer these results. In the 1976 ARRL 160-meter contest I logged 345 QSOs and had 73 multipliers and 48 states. That earned me the second-highest score in the West and made me the winner for the state of Arizona. Furthermore, I established ocean-hopping contacts with Japan and New Zealand. I've worked ZL2BT several times on phone and cw. I should also point out that all of these contacts were made with just 200 watts input.

The success I've experienced with this antenna didn't end there. Over a six-month period I worked 97 countries on the 75-meter band. Many European stations were worked, even though that part of the world is generally difficult to contact from this section of the United States. An advantage I had on 75 meters, I will admit, is that I used a full kilowatt input.

Because the antenna also performs well on 40 meters, I've had rewarding experiences on that band, too. Not only do my 40-meter contacts include European stations but also stations deep in Asia. I have log entries for call signs such as VU2, 4S7, UJ8 and VQ9, all worked on the long path according to my friends with rotary antennas. They told me which direction the signals were from since I couldn't rotate my vertical!

If you have little room to install a typical wire antenna for the lower frequency amateur bands, consider the results I've obtained with this antenna. The world could be at your fingertips with the help of a simple 60-foot stick. QST

Notes

[1]"Grounding Systems," *The ARRL Antenna Book*, 13th edition, 1974, p. 61.
[2]See note 1.
[3]Stanley, "Optimum Ground Systems for Vertical Antennas," *QST*, December 1976.

Some Commonly Asked Technical Questions (and Their Answers)

We receive many inquiries on technical matters at Headquarters. Maybe your question is answered here.

By Stan Gibilisco,* W1GV

Most of us, at one time or another in our amateur activities, have faced a knotty technical problem. In 99 percent of the cases, we're able to come up with the answer — either from our own experience, reference to *The Radio Amateur's Handbook*, or maybe help from another amateur. But there are times when the answer evades us, completely.

Where can one turn? Among the many functions of your League headquarters is a Technical Information Service. Many members take advantage of this valuable service, with inquiries ranging from requests on how to fix an ailing rig to questions on circuit theory, etc.

Some questions asked of the TIS are answered by referring inquiries to specific articles in *QST* or to specific pages in the *Handbook*, particularly when the subject is complex. For example, someone might write us saying that he wants to build a 4-element quad. What should he use for dimensions, and what sort of results could he expect? The reply of our TIS crew would probably refer him directly to such an article as the classic by Lee Bergren, WØAIW (now WØAR), in the May 1963 issue of *QST*.

Now, sometimes such a response upsets our correspondent; an article *that* old? But our philosophy is that the *QST* article was written only after extensive experimentation, is still quite sound, and goes into the theory and mechanics and practice of building a quad antenna in far more detail than we can ever hope to achieve in an individual response to one of our members. In other words, it is an authoritative, comprehensive discussion of the problem raised by the member, and is likely the best advice he can obtain anywhere.

But a 1963 *QST?!* You don't have that issue? No problem, since back copies of many issues are available from ARRL Headquarters. And if the particular issue doesn't happen to be available, we can provide photocopies of the article. *QST* is also available on microfilm, all the way back to 1915. (Write University Microfilms, Ann Arbor, MI 48106, for prices and details.) In any case, you'd be able to get the information you're looking for more promptly than possible if the Hq. staffer had to rewrite it into his letter to you.

Another type of letter quite often received indicates that the writer has, let's say, a couple of spare 6146s and a 6C4 and a few other parts that he has picked up somewhere — and would we please design an amateur transmitter using these components? It should be sideband, of course, and cover 160 through 10. Wow! We would like to help. But to tackle this sort of project could involve a good many weeks' work on somebody's part, designing, constructing, and debugging. Since we must serve all members more or less impartially, and since we receive literally thousands of requests for technical assistance each year — hundreds of requests each month — the only fair response is reference to a similar design in past issues of *QST* or the *Handbook*.

Another point, having to do with speed of service: We try to stay current and answer each question in a few days or a week at the most. Please remember, however, that with another week or more involved in the mails going and coming, two weeks from your writing to your receipt of our answer should be about the norm. If it takes a bit longer . . . well, Hq. types also occasionally get sick or go on vacation or go traveling on League

*Assistant Technical Editor, *QST*

The ARRL Technical Information Service

The ARRL Technical Information Service is offered free to members. Although we are eager to help budding new amateurs with technical problems, in fairness to members we cannot respond to continuing requests for assistance from those who choose not to join the League.

In order for us to respond promptly to your inquiries we must have your name, your amateur call and license class (tell us if you're not licensed), your membership expiration date, and a stamped business-size envelope bearing your mailing address for our reply (IRCs acceptable from outside the U.S.).

In writing, we ask that you observe the following guidelines so we may provide the best possible service to the greatest number.

1) Before writing for technical asistance, search your files of *QST* and other ARRL publications. The answer you need may be there, available immediately. Consult the annual index of articles in each December issue.

2) Please —

Do not ask for comparisons between commercial products. Choice of equipment is largely a matter of personal preference. Consult Product Review information in *QST*, compare manufacturers' specifications in their brochures.

Do not ask for information on articles published in other magazines. Write to the editor or author of that article.

Do not request custom designs for amateur gear.

Do not ask advice on nonamateur matters. We cannot respond to questions about CB, marine radio, hi-fi, etc. (unless they concern interference caused by amateur gear).

3) Use a typewriter when possible; otherwise, write or print clearly. Please be reasonable in the number of questions you ask; try to limit your questions to three per letter.

4) When writing, please come right to the point, and be sure to share with us whatever experience you have had with the problem in question. This will avoid our reply covering ground you've already been over.

5) Address all technical questions to Technical Information Service, American Radio Relay League, 225 Main Street, Newington, CT 06111.

business, so sometimes there will be delays.

In short, any member of the League is welcome to appropriate help from the Hq. TIS staff in connection with equipment problems he may encounter. Your questions will help us to choose the types of technical articles and projects that our members would like to see in *QST* and the various handbooks.

A sampling of questions (and answers) follows. These are the kinds of questions received with the greatest frequency, and we hope to be able to save you some time as well as postage.

I am building one of your construction projects, which calls for an XYZ-1234 integrated circuit. I have not been able to locate this chip anywhere. Can you tell me where I might find it?

It does seem as though the present state of things does not favor the ham who likes to experiment and build. But there are many ways to scrounge up parts. The parts supplier list on page 17-11 of the 1979 *Handbook* can be of great help. We recommend that you write to every supplier in the appropriate category! This will maximize your chances of locating the part you need. If you know the name of the manufacturer and his address, drop him a line. (He may send you the address of a distributor in your area.) For discrete components, don't forget hamfests and flea markets.

What's the address for the So-and-So Corporation? I'm interested in more information about some of their products.

Quite often, the company will advertise in *QST*. A quick check of the Index of Advertisers will reveal whether or not this is the case. If so, just turn to one of the pages listed and it's pretty certain their address will be there! Failing this, try the *Thomas Register* at your local library.

I have an old receiver and know absolutely nothing about the circuit. Is there any source of an instruction manual for it?

There is an outfit called Hi, Inc., located at P. O. Box 864, 1601 Avenue "D," Council Bluffs, IA 51501. They sell instruction manuals for many kinds of old gear. Try writing to them. Be specific about the make and model number of the equipment. Chances are good they can help you out. For war-surplus manuals, try writing to Sam Consalvo, W3IHD, 7218 Roanne Dr. S.E., Washington, DC 20021.

How do various antenna types such as the dipole, vertical, Yagi, and long wire compare in terms of efficiency? Which do you recommend?

The first part of this question may sound complicated, but the answer is quite simple: Efficiency has nothing whatsoever to do with the kind of antenna used! If good construction practice is followed, the efficiency will be pretty near 100 percent. "Efficiency" refers to the ratio of radiated power to applied power, and that is all.

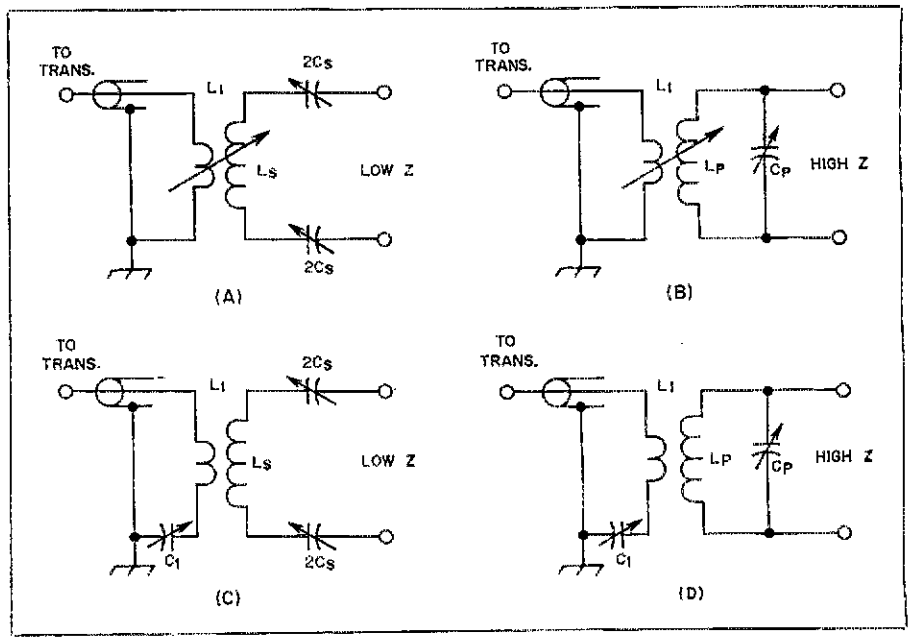


Fig. 1 — Simple circuits for coupling a transmitter to a balanced line that presents a load different from the transmitter output impedance. A and B are respectively series- and parallel-tuned circuits using variable inductive coupling between coils. C and D are similar but use fixed inductive coupling and a variable series capacitor, C1. A series-tuned circuit works well with a low-impedance load; the parallel circuit is better with high-impedance loads (several hundred ohms or more). The subscripts P and S stand for parallel and series.

Choosing an antenna for your station can be an involved decision, nevertheless. Antennas differ greatly in the particular *manner* in which they radiate, and whereas a long wire might be good for one application, a dipole might be better for another purpose on the same band. *The ARRL Antenna Book* provides enough information on antenna properties to keep you off the air for a long time while reading to decide on an antenna for your station. And it's *your* decision! We don't want to deprive you of all the fun, anticipation, experience and challenge (not to mention the frustration!) of doing it yourself. And anyway we can't tell you which antenna will work best for you. There are just too many variables. We're all at the same level here — often (if not usually) it's a trial-and-error business.

I put up a random dipole and am feeding it with 300-ohm "ladder line." Since 300 ohms is much higher than 50 ohms, I figured that the circuits in Fig. 20-19B or D on page 582 of the 1978 Handbook *would work as a Transmatch. But neither circuit works. How come?*

For the benefit of those who don't have a 1978 *Handbook*, Fig. 20-19 is reproduced here in *QST* style as Fig. 1. Before we answer this question specifically, we should point out one thing which (for lack of a better name) we'll call the "Kluge Axiom" (pronounced kloodge ack-see-um). This principle applies to many aspects of Ham Radio — especially rf matching circuits! In effect, it goes like this: Suppose Jim and Joe set out to solve a problem. Jim consults the reference manuals and works out all the formulas and builds the circuit according to the calculations, and if it doesn't work, he goes back to the drawing board and starts all over again; he continues this process until the circuit functions. Joe, on the other hand, goofs around in the lab until he stumbles by accident on a circuit that works. There's an excellent chance that Joe will find a solution before Jim.

The Kluge Axiom applies as follows to the above situation: Within specified constraints (in this case maintaining output balance), try anything and everything! Of course, the first thing to do is to try the circuits at A and C.

It so happens that with a random dipole, the impedance at the transmitter end of the feed line may vary over an enormous range. Although 300-ohm line is being used, the actual impedance at the input end could be as low as 20 or 30 ohms. (The exact value depends on many things, particularly the line length and antenna length.) Just because the *transmission line* has a characteristic impedance higher than 50 ohms, it is wrong to just straightaway conclude that you have to use the circuits at B or D.

The lesson to be learned here is that you're often better off trying circuit variations at random instead of sitting down and figuring out which circuit should be used on a theoretical basis (unless you're an engineer). The theory can be fascinating — but theory by itself won't make a single contact for you.

Technical Correspondence

The publishers of QST assume no responsibility for statements made herein by correspondents.

MORE ON "COLOR TVI"

☐ In reply to W8PHZ's letter in "Technical Correspondence" for September 1978, I can offer a possible solution to such problems. Any imperfectly conducting metal-to-metal bonds in the vicinity of the amateur transmitter and TV set can act as a diode, and hence as a generator of harmonics. Using both a low-pass filter at the transmitter and a high-pass filter at the TV receiver will be ineffective against such harmonics.

In my case, the following measures got rid of the problem: (1) replacing the guy wires on the TV antenna with new wires and egg insulators; (2) replacing the TV feed line, making sure the connections were clean and tight; (3) disassembling the trap vertical and cleaning all the joints, using anticorrosion grease after reassembly; and (4) installing small self-tapping screws on all the joints on the cubical quad spreaders.

A grid-dip meter is of no use in detecting the harmonic since its single tuned circuit cannot provide enough rejection of the fundamental. W6BD described his experiences with rectification in August 1978 *Ham Radio*. G3FXB described his in June 1978 *QST* ("Technical Correspondence").

If you're lucky, you might find the cause by trial and error. Start with the transmitting antenna and then proceed to other metal objects. See if shaking or wiggling a suspected joint has any effect. If in doubt, either improve or eliminate the joint, and if results are not obtained, proceed to another! — *Paul Zander, AA6PZ, 86 Pine Lane, Los Altos, CA 94022*

IMPROVED CW RECEPTION WITH DRAKE R-4, R-4A AND R-4B RECEIVERS

☐ After using a recently manufactured transceiver last Field Day, I noticed that my R-4A sounded awfully broad. The deficiency lies with the skirt selectivity. According to the manual, the 6:60-dB shape factor in the narrowest bandwidth is 1 to 6.5!

I have tried several audio filters, both of commercial manufacture and of my own design. The effectiveness of audio selectivity is limited because a strong signal can reduce the i-f gain when it is outside the audio passband but within the i-f passband. Turning off the age helps somewhat, but when listening to the weak signals, I still notice the problem. The Drake receivers have excellent notch filters, and it occurred to me that if there were some way to change the notch to a peak, the i-f selectivity could be improved.

In the R-4A, the T-notch filter is between the second converter, V3, and the first 50-kHz i-f amplifier, V4. Suppose some of the signal from the plate of V4 is fed out of phase onto the plate of V3. Further suppose that this feedback signal is attenuated so as to have the same amplitude as the output of V3, reducing the gain of the i-f amplifier to zero. Now what will happen if the notch filter is switched in? The balance will be upset at the notch frequency; the signal will reach the plate of V4 through the

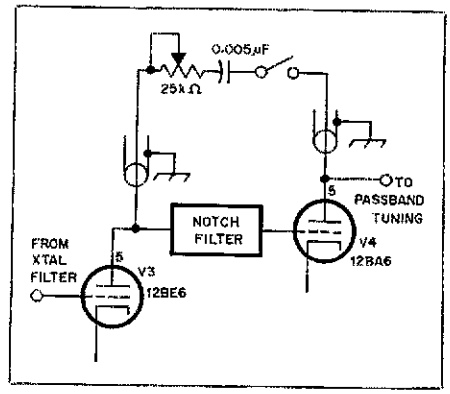


Fig. 1 — Notch-filter modification to the Drake R-4A receiver. When the 25-kΩ potentiometer is adjusted so that the signals cancel at the notch-filter input, tuning the notch to a particular frequency will upset the balance. The result will be a "peak" at that frequency.

negative feedback circuitry. All other frequencies will still be balanced out, and the result will be selectivity! This reasoning led me to try out the idea.

The circuit modification is shown in Fig. 1. A 25-kΩ potentiometer, a 0.005-μF capacitor and a miniature spst toggle switch (to select either normal or "inverted" notch function) were installed between the plates of V3 and V4.

The results were most gratifying. Tuning through a crowded cw band with the "notch inverter" operative, and then quickly opening the switch and turning off the notch filter, revealed that the modification was well worth the effort! I made the installation permanent by mounting the toggle switch on the front panel in place of the headphone jack. (This jack was rerouted to an extra hole on the rear apron.) The capacitor and potentiometer were installed point-to-point fashion right behind the switch. Coaxial cable was used for the wiring to reduce the possibility of interaction between stages and to minimize hum pickup.

Here is the initial adjustment procedure: Tune in a calibrator signal using the 4.8-kHz passband and close the switch. There should be a marked reduction in the signal. Adjust the potentiometer for minimum signal. Once this is done, the pot can be left alone.

To use the "notch inverter," adjust the receiver for cw reception using the 0.4-kHz passband. Tune in a calibrator signal for maximum S-meter reading. Close the switch and turn on the notch filter. A point should be found where the signal peaks. Set the notch exactly at this peak. (Note that this adjustment is critical!) The receiver is now ready for cw reception with improved selectivity.

The shape factor is probably still unimpressive, but there is no doubt that the selectivity is sharper. No oscillation occurs, although it comes pretty close when using the lsb portion of the passband with low background noise. There is no detectable ringing, even on the fastest cw signals. There is a slight reduction in i-f gain, as one would expect, but this is more than offset by the improvement in signal readibility under crowded band conditions. — *Stan Gibilisco, W1GV*

RADIATION RESISTANCE OF VERTICAL ANTENNAS

☐ The response to my article in September 1978 *QST*, "Designing a Vertical Antenna," has been excellent. I have received many letters about it.

Recently, Mr. Robert Dome, W2WAM, brought the graph appearing in his July 1972 *QST* article, "A Study of the DDRR Antenna," to my attention. I agree with his view that his chart will yield more accurate values of radiation resistance than the graph shown in my article. The chart is shown at Fig. 2.

It is my hope that this information will make short-vertical design easier. — *Walter J. Schulz, Jr., K3OQF, 3617 Nanton Terr., Philadelphia, PA 19154*

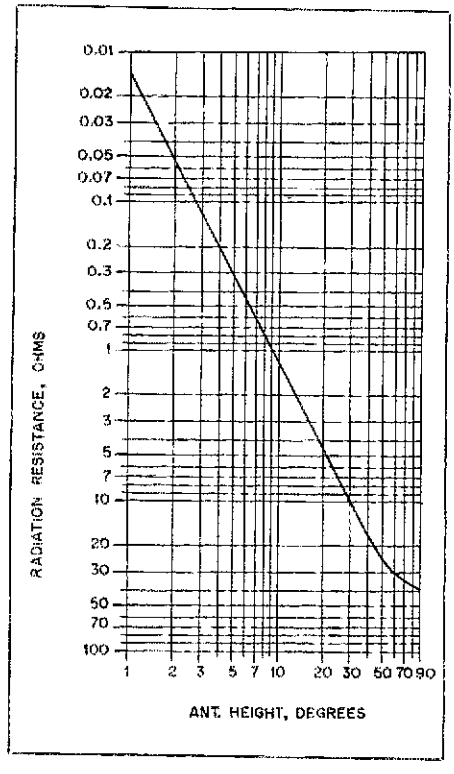


Fig. 2 — Graph for determining the radiation resistance of short vertical antennas. This is taken from Robert Dome, W2WAM, "A Study of the DDRR Antenna," July 1972 *QST*.

USING CHOPPER MODULATORS WITH WHEATSTONE BRIDGES

☐ In November 1976 *QST*, an article entitled "For Accuracy, Go Wheatstone" appeared concerning the use of the Wheatstone Bridge to make accurate resistance measurements. Sidney D. Gilstrap described a way to modify a

meter movement to give a zero-center indication, moving to the right or left depending on the polarity of the voltage.

There is another way to detect a voltage at the bridge output. It is simple, cheap and nonmechanical: the use of a chopper modulator.

A chopper is a special switch that chops or rhythmically interrupts the flow of current in a circuit. Direct current can thus be changed to pulsating dc or ac. The oldest choppers were simply relays which were made to chatter by providing them with a normally closed contact in series with the coil. When the armature was pulled toward the coil, the contact would break and the armature would fly back to its starting place. This is how the dc buzzer, car horn, and vibrator power supplies in old cars work.

The IC which takes the place of the mechanical hardware is called the CD4016 bilateral switch. Each chip contains four separate switches. Electrically, they act just like four relays. To make a simple interrupting-contact type chopper, only one of the switches is used. It must be driven by an external oscillator. The output can be amplified by an audio amplifier. When dc is fed to the input of the switch, a buzz will be heard in a speaker. When no dc is present at the input, nothing will be heard even though the control terminal is still receiving the oscillator output.

The Wheatstone Bridge can be connected to the chopper and amplifier to give an audio indication of when voltage is present. It should be possible to determine very closely when the bridge balances, since a null will occur. This method has been used for years in making special test equipment for the blind. A refinement of this principle is to put a clipper at the amplifier output to lessen the volume when the bridge is severely unbalanced. By so doing, more amplifier gain can be employed and a sharper null obtained.

I have been blind all my life and have been a ham for almost nine years. I have used a commercially available volt-ohmmeter which works on this principle. It is a very accurate and easy method for taking voltage and resistance measurements. — *Martin McCormick, WB5AGZ, 3401 Baird Dr., Edmond, OK 73034*

CALCULATING SOURCE IMPEDANCE OF FETS

Frequently there is a need to use an FET in the common-gate or common-drain configurations (source-driven amplifier or source-follower amplifier). These circuits equate approximately to the triode-tube counterparts — cathode-driven or cathode-follower arrangements. In applications where impedance matching is required for optimum power transfer and gain, attention to the source impedance is vital. The two circuits under discussion are shown in Fig. 3.

The basic equation for Z_o (source impedance) is $1/g_{fs}$. The transconductance of the FET at a given operating point is essentially the same as g_m (transconductance), the value of which can be found in the manufacturers' literature. In an actual circuit during operation, the I_{DSS} (drain-source current) may vary from, say, 2 to several mA. If this variation is known, the source resistor, R_s, should be calculated for the *average* I_{DSS}. For example, if the current shifts over a range of 2 to 6 mA,

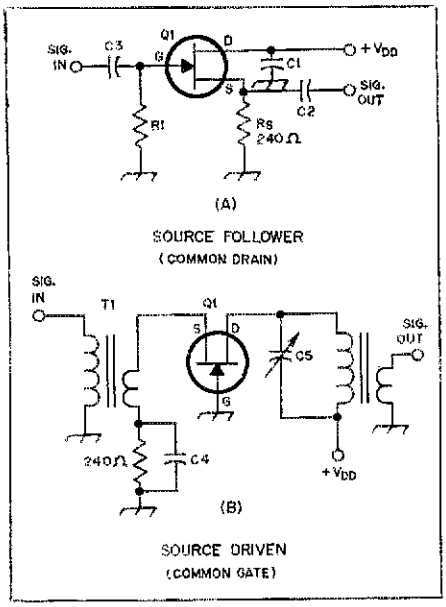


Fig. 3 — Common-drain and common-gate FET amplifiers. The 240-ohm resistor is for source-impedance matching, approximated by the formulas. C1 and C4 are bypass capacitors, C2 and C3 are blocking capacitors, and C5 is an output tank tuning capacitor. R1 is for gate bias.

R_s should be selected for a 4-mA condition. Therefore, if the gate is to be biased at −1 volt the value of R_s could be found from

$$R_s = \frac{1 \text{ volt}}{0.004 \text{ A}} = 250 \ \Omega$$

The value of R_s in Fig. 3 is the nearest standard value obtainable, 240 Ω. R_s must be included in the Z_o equation when the circuit of Fig. 3A is used.

Once R_s is known, the midrange g_m can be included in the equation to obtain Z_o or Z_{in} for the FET source. In this example we shall assume that the g_m spread of the FET is 2000 to 6000 μmhos. Hence, a g_m value of 4000 will be plugged into the sample equation. Therefore

$$Z = \frac{R_s}{1 + [g_m \ 10^{-6} (R_s)]}$$

where Z is the input or output impedance of the FET, g_m is approximately equal to the midrange g_{fs} value of the transistor, and Z and R_s are in ohms. Hence, for the circuit of Fig. 3A

$$Z_o = \frac{240}{1 + [4000 \times 10^{-6} (240)]}$$

$$= \frac{240}{1 + (0.004 \times 240)}$$

$$= \frac{240}{1.96} = 122.4 \ \Omega$$

This value is the parallel resistance of the characteristic source impedance and R_s.

In the example at B of Fig. 3, R_s need not be included in the equation, since it is below the secondary of T1 and is bypassed for rf. Therefore

$$Z_o = \frac{10^6}{g_m}$$

$$= \frac{1{,}000{,}000}{4000} = 250 \ \Omega$$

It should be stressed that these equations give *approximate* Z_o or Z_{in} values, but they are suitable for most amateur work. — *Doug DeMaw, W1FB*

BANDWIDTH CONSERVATION

The narrow-band voice-modulation technique that has recently appeared in *QST* should stir a lot of interest in a long-neglected facet of our operating practices. For those who would like to read about some other work in bandwidth compression, I recommend the following two additional sources: "Ease Radio Spectrum Congestion by Bandwidth Compression/Expansion," James J. Savidge, *EDN* (Electronic Design News) Magazine, May 20, 1973, and "Bandwidth Compression and Expansion by Frequency Division and Multiplication," Harvey L. Morgan, U.S. Patent 3,349,184, October 24, 1967.

The technique is not dependent on the characteristics of speech, but is applicable to any form of signal whose normal bandwidth exceeds its information rate; TV video is another example. The technique is applied at baseband (as is the case with nbvm) but the authors claim 10:1 frequency compression for speech and suggest that 30:1 might be feasible, based on the information rate of speech.

Another area of interest in modulation lore is that of dsb/sc (double sideband/suppressed carrier). Current IC technology now makes it possible to take full advantage of the coherent reception attributes of dsb/sc. Using phase-lock techniques, the presence of both sidebands can be used to synthetically reconstruct the missing carrier and track it. This results in a lock-in range substantially reduced from the total spectrum width of the signal. The result is quasi-bandwidth reduction, since the signals can overlap and yet not interfere with each other because of the lock-in criteria for their individual reception. — *H. W. Kupala, AF4L, 11241 — 111th Pl., Largo, FL 33540*

Strays

EASTERN VHF/UHF CONFERENCE MAY 5 AND 6

The Fifth Annual Eastern VHF/UHF Conference will be held May 5 and 6 at the New England Center at the University of New Hampshire, Durham. A full series of technical talks on vhf and uhf topics is scheduled, beginning at 9 A.M. Saturday. Noise-figure measurements will be made on converters and amplifiers for 50 MHz and above on Sunday morning. Registration is $10 before April 30 and $15 after. For further information, send an s.a.s.e. to Rick Commo, K1LOG, 3 Pryor Rd., Natick, MA 01760.

QST congratulates . . .

Frank Moore, WA1URA, former vice president and general manager of radio station WELI in New Haven, who has been named senior vice president of stations WVCG and WYOR, Coral Gables, FL.

Dr. Sidney King, W2UKO, who has been appointed supervising veterinarian at Yonkers Raceway in New York.

Alton Simpson, WA5TJB, who has been named executive director of the Arkansas Fire Protection Personnel Standards and Education Commission.

Product Review

ICOM IC-701 HF Transceiver

It seems as though everyone and his brother is introducing a new hf transceiver to the amateur market these days. Each is purportedly bigger and better than the competition's, performing all sorts of marvelous deeds with the exception of tying your shoelaces. With 128 transistors, 23 FETs, 56 ICs and 265 diodes, the INOUE Communications IC-701 is proof that good things can come in small packages.

The transceiver measures a mere 4-3/8 inches high × 9-1/2 inches wide × 12-1/4 inches deep (111 × 241 × 311 mm). When placed next to the competition's equipment, the IC-701 occupies considerably less space. With the matching IC-701PS ac-operated power supply, which measures 4-3/8 × 7 × 10-1/4 inches (111 × 178 × 260 mm), beside the transceiver they take up approximately the same amount of room as other transceivers alone. The power supply is connected to the back of the transceiver through a heavy-duty, yet flexible, six-foot umbilical cord so it's possible to stow the power supply away from the operating position. However, the power supply is styled to match the transceiver and contains an external 3- × 5-inch (76 × 127 mm) speaker, so if there's room at the operating position it might as well stay. For the record, the transceiver also has a built-in speaker, should it be used without the '701PS power supply.

The '701 is what you would expect from a transceiver employing space-age technology. With the optional RM-2 computer hookup, one can program the transceiver to scan an entire band, a portion of a band and even automatically switch bands and tune to specific frequencies! To incorporate remote band switching, the ICOM engineers have used a multisection, motorized rotary switch. Changing the position of the band switch results in a series of clicks as the rotary switch steps its way to the selected band.

The only option available for the '701 is the RM-2 computer. Items normally found as options on other radios are standard equipment on the '701. For example, standard equipment includes digital readout, wide and narrow cw bandwidths, a cooling fan, rf speech processor, band-pass tuning, noise blanker, dual-speed tuning dial, narrow and wide shift RTTY, VSWR indicator and a built-in second VFO. A single tuning knob controls each VFO independently with a front-panel switch selecting one of the following modes: transceive on VFO A; transceive on VFO B; receive on A, transmit on B; and receive on B, transmit on A. The package also includes a neatly styled Electret condenser microphone with built-in preamplifier. Dc voltage is fed to the preamplifier through the four-conductor microphone cable. There are *no* batteries to replace.

Technical Specifics

A block diagram of the IC-701 appears elsewhere in this review. The '701 employs a digital phase-locked-loop (PLL) circuit as the local oscillator for both transmit and receive. Output from the PLL is 9.0115 MHz higher than the frequency of operation (the i-f is 9.0115 MHz). The PLL frequency is determined as follows. A pulse generated by the optical chopper circuit, located at the tuning knob, is digitalized by the up/down counter in the large-scale integrated circuit (LSI) and used to control a programmable divider, also located inside the LSI chip. The programmable divider controls the PLL circuit which determines the frequency of the voltage controlled oscillator (VCO). A front-panel switch is used to select the synthesizer tuning rate at either 100-Hz or 10-kHz steps.

Receiver

Signals arriving at the antenna connector pass through the transmitter low-pass filter and an attenuator (0 or 10 dB) and are then diode-switched to one of the six individually optimized MOSFET rf amplifiers. From there, the signals are applied to a Schottky-diode, doubly balanced mixer where they are mixed with the local-oscillator signal from the VCO. The resultant i-f is at 9.0115 MHz and the signals are passed through a 10-kHz wide monolithic filter. The output from the filter is then passed through the noise-blanker gate to a second 9.0115-MHz filter with a bandwidth of 2.4 kHz. From there, the signal is amplified and routed to the band-pass tuning circuitry.

Basically, the band-pass tuning system consists of two SN76514 mixers with an additional filter located between them. The center frequency of this filter is 10.75 MHz and is 2.4 kHz wide. A variable-crystal oscillator (VXO) circuit provides identical injection information for both mixers at about 19.7615 MHz. This injection up-converts the existing i-f at 9.0115 MHz to the new 10.75-MHz i-f where the signal passes through the 10.75-MHz filter. Output from the filter is immediately down-converted to the previous i-f of 9.0115 MHz. Since the down-conversion is equal to the up-conversion (the oscillator being used for both), changing the VXO frequency does not change the frequency of the received signal. The output frequency is always equal to the input frequency; the VXO only changes the position of the signal in the 10.75-MHz filter passband.

Output from the band-pass tuning circuit is amplified in the i-f stages and applied to the product detector. For narrow cw operation, the signal is routed through an active audio filter, through a low-level af amplifier, low-pass filter and finally to the audio output stage. For wide cw operation, the active audio filter is bypassed.

A combination of i-f and audio-derived age systems is used in the '701. Age characteristics are switchable with a front-panel control, with FAST for cw operation and SLOW for phone work. The SLOW system features a hang-age characteristic.

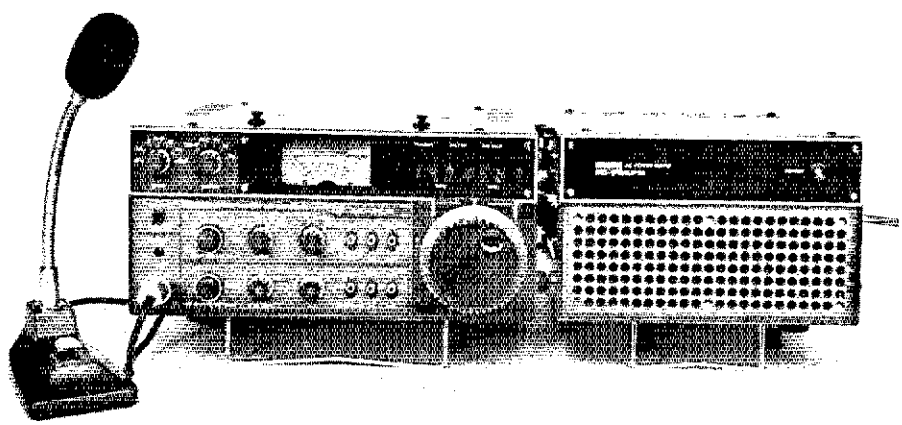
Receiver-performance tests as outlined by Hayward[1] were performed on the '701 and yielded the following numbers: noise floor, −133 dBm; blocking dynamic range, in excess of 120 dB (beyond limit of measuring equipment); and IMD dynamic range, 87 dB. These tests were performed at 14 MHz. An additional set of tests was run at 3.5 MHz where the numbers turned out to be identical except for the IMD dynamic range which increased to 89 dB.

Transmitter

The IC-701 transmitter circuitry is quite straightforward, as outlined in the block diagram. A detailed circuit analysis will not be given here. Simply, a double-sideband signal is generated at the 9.0115-MHz i-f and passes through the 9.0115-MHz filter where it becomes a single-sideband signal. From there it passes through a buffer stage to the transmit mixer. Here the signal is combined with the VCO to produce an output signal at the desired frequency of operation. Finally, the signal is applied to an amplifier and buffer, and then to

[1]Hayward, "Defining and Measuring Receiver Dynamic Range," July 1975 *QST*.

The ICOM IC-701, shown here with matching power supply/speaker unit. The '701 itself is the same size as the IC-211, and in fact looks practically identical to the 2-meter rig.



IC-701 BLOCK DIAGRAM

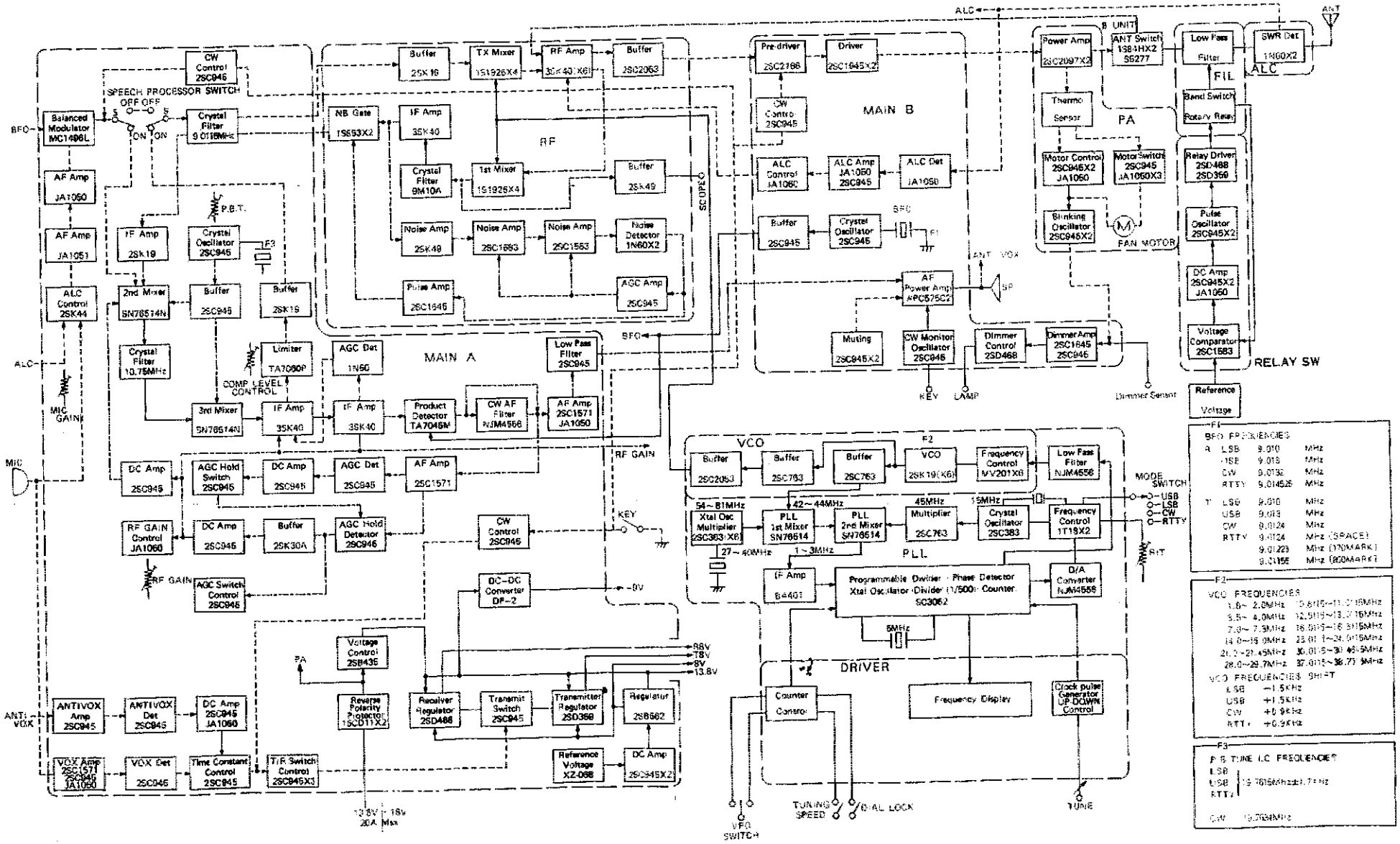
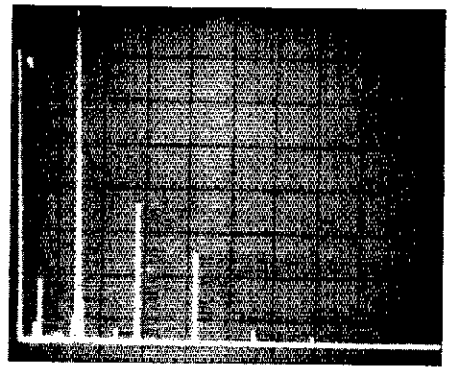


Fig. 1 — Block diagram of the IC-701, as shown in the owner's manual.

the predriver, driver and final-amplifier stages. Cw operation is accomplished by unbalancing the balanced modulator.

Rf speech processing is performed at the 10.75-MHz i-f and is of the rf-compression variety. With the processor switched on, the 10.75-MHz filter serves to eliminate the undesired sideband and the 9.0115-MHz filter is used to clean up the processed rf signal.

The predriver, driver and final-amplifier stages are broadband, which means that no transmitter tuning is necessary. All one does is select the frequency of operation and adjust the microphone- or cw-level control, and that's it. Needless to say, band switching is a snap. The transmitter has an SWR shut-down protection circuit, so if the load connected to the transmitter is significantly different than 50 ohms, the transmitter will automatically lower the output power in order to protect the final-amplifier devices. The transmitter has no difficulty working into various mismatches up to a 3 to 1 SWR while supplying full transmitter power. Spectrum-analyzer photographs of the transmitted signal are shown elsewhere in this review.



Here is a spectrum analyzer photograph of the worst case for spectral purity; the transmitter is operated at the full input power. The vertical scale is 10 dB/division and the horizontal display is 10 MHz per division. The second harmonic can be seen at 45 dB below the carrier and the third harmonic is at 54 dB below the carrier.

Operation

"Silky smooth" perhaps best describes the operation of the '701. Each knob and switch seems as though it has been independently engineered for the perfect "feel" — just what you'd expect from a radio in this price class! Transfer from receive to transmit is extremely quiet with none of the usual loud clicks or thumps. The same is true when changing bands or modes or when operating any of the six front-panel toggle switches.

The RIT push switch is of the latching type, so it must be pressed once to turn the RIT on and one again to turn it off. When the RIT circuit is on, it is automatically pulsed off if the main-tuning knob is turned! Should you not desire this luxury, a simple modification can be made which involves changing a lead from one post to another.

The large-scale meter can be used to monitor collector voltage, collector current, relative power output, rf speech-compression level, and SWR on the line. The noise blanker was found to be quite effective in reducing automobile ignition noise and helpful on certain types of line noise.

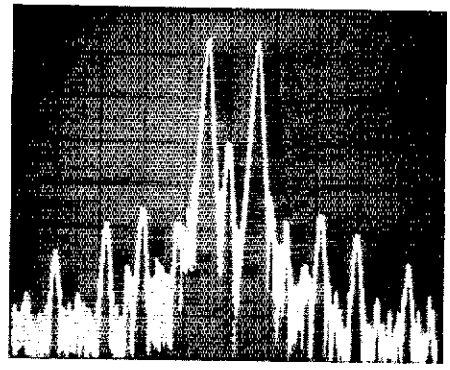
A thermostatically controlled cooling fan is another interesting feature of the '701. Should the final transistors need additional cooling, as they might during a very long transmission, the fan comes on automatically. It is extremely quiet, making it difficult to tell whether or not the fan is in operation. If the temperature of the final transistors should ever reach the danger point, the fan will switch to a higher speed and the frequency display will begin to flash on and off! The fan seldom came on during normal operation but energized a bit more frequently during "contest style" operation.

Inside the small "trap door" on top of the transceiver are located controls or switches for the following: display bright/dim, RTTY wide/narrow, SWR forward/reverse switch and sensitivity control, cw monitor level, frequency set, VOX gain, antiVOX, cw VOX delay, and ssb VOX delay.

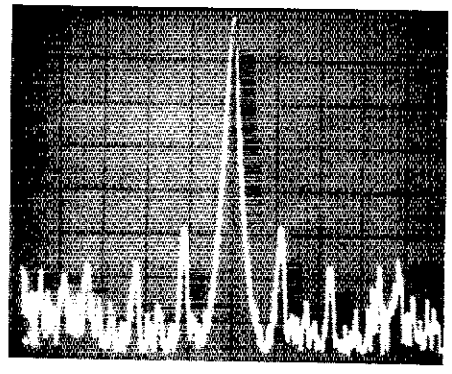
The two most commonly asked questions about the IC-701 have been, "How's the receiver hold up under strong signals?" and "What's it like tuning the bands in 100-Hz steps?" Well, laboratory tests are fine, but, there's no better test for a receiver than to hook it to a moderately sized antenna at a hilltop location in central Connecticut (or any other congested rf environment) during a contest weekend! So we did just that. With at least nine or 10 line-of-sight stations all operating with the maximum legal power and gain antennas (the closest was less than 1-1/2 miles away), no IMD products were noted when tuning the various bands. A slight amount of desensitization occurred when operating within 10 kHz or so of the station located 1-1/2 miles away. This impaired reception of only the weakest of signals and was not considered particularly objectionable. All in all, the receiver performed exceptionally well.

As for the tuning rate, it did take a few hours to get used to tuning the band in 100-Hz increments. There were no instances when an ssb or cw signal couldn't be tuned in to sound "just right." After a week of operation the step tuning was barely noticeable. There are two step rates with which the receiver can be tuned — 100 Hz and 10 kHz. In the 100-Hz position, one revolution of the tuning dial corresponds to a 5-kHz frequency change. In the 10-kHz position one revolution is 500 kHz. The faster rate position would be used for a quick QSY from one part of the band to another.

There were two minor sore points that we



In this photograph is the display of a two-tone IMD test as performed on the IC-701 running at the full rated input power level. The horizontal display is set for 1 kHz/division and the vertical scale corresponds to 10 dB per division. As can be seen, the third-order IMD products are down a remarkable 45 dB as referenced to the PEP output. The fifth order products are down roughly 49 dB.



This photograph is of the IC-701 transmitted signal on 14 MHz. Each horizontal division corresponds to 100 Hz and each vertical division is equal to 10 dB. The two large pips on either side of the carrier are 120-Hz hum, the level of which is 48-dB down from the main signal. The purpose of this photograph is to show the purity of the synthesized signal.

ICOM IC-701 HF Transceiver Specifications

Frequency Coverage: 1.8-2.0 MHz, 3.5-4.0 MHz, 7.0-7.5 MHz, 14.0-15.2 MHz, 21.0-21.5 MHz, 28.0-30.0 MHz

Transmitter

Dc input power: Ssb (A3J) 200 W, cw (A1) 200 W.
Emission modes: Ssb (A3J), cw (A1) and RTTY (F1).
Harmonic output: More than 40 dB below peak power output.
Spurious output: More than 60 dB below peak power output.
Carrier suppression: More than 40 dB below peak power output.
Unwanted sideband: More than 40 dB down at 1000 Hz af input.
Frequency stability: Less than 500 Hz change after switch on 1 minute to 60 minutes, and less than 100-Hz change after 1 hour. Less than 1-kHz change over the temperature range of −10°C to +60°C.
Power supply requirements: Dc 13.6 V ±15 percent at 18 A maximum.
Antenna impedance: 50 ohms unbalanced.

Receiver

Receiving modes: Ssb (A3J), cw (A1) and RTTY (F1).

Sensitivity:

Ssb, RTTY	2.4 kHz at −6 dB (adjustable to 1 kHz min.)
	4.0 kHz at −60 dB
Cw	0.5 kHz at −6 dB
	1.4 kHz at −60 dB
Cw narrow	0.2 kHz at −6 dB
	1.0 kHz at −60 dB.

Spurious response rejection: More than 60 dB.
Audio output: More than 1.5 W.
Audio output impedance: 8 ohms.
Price class: $1600.
Supplier: ICOM East, 3331 Towerwood Dr., no. 307, Dallas, TX 75234.

noted, the first being that the received audio on extremely loud signals could sound mildly distorted when using the fast agc. Use of the slow agc completely cured the problem. The second sore point was that of keying the transmitter. In order to properly operate the transmitter, the keyer must bring the key terminal to within 0.4 volt of ground. At least two keyers we tried would not key the transmitter. A simple cure for those keyers would be to use a relay between the keyer and the transmitter or, as we did, connect a 1-1/2-volt battery in series with the keyer output in reverse-bias fashion. This brings the key-down voltage to the negative side of zero volts. — *Jay Rusgrove, W1VD*

INFO-TECH MODEL 300 KEYBOARD

Recently joining the solid-state cw/RTTY keyboards now available, the Info-Tech model 300 offers all commonly used RTTY speeds (60, 66, 75 and 100 wpm), cw speed variable in 1-wpm increments from four to 125 wpm, a 700-character running buffer, 11 separate storage memories, an RTTY loop output, and a built-in afsk generator. The model 300 also has 110- and 300-baud ASCII. At the time of this writing, amateur use of ASCII is limited to OSCAR.

At first glance, the model 300 looks very simple — there isn't a single knob on the front panel! But commands are given by pressing the keys in various sequences. For example, after the three-wire line cord is plugged in and the power switch turned on, the "Morse" (cw) mode is selected by pressing the CONTROL and M keys simultaneously, entering the speed desired (as a numeral corresponding to the number of words per minute), and finally hitting the RETURN key. The cw weight ratio is variable in nine steps. The setting of the weight does affect the speed somewhat; the entered speed is correct only when the dit-to-space ratio is 1:1. All nine settings of the weight ratio are reasonable, in contrast to some keying devices with which a sizable portion of the control range results in ridiculous extremes.

A CQ key and a DE key are provided. For some reason, no word space is programmed into these functions following the characters, so if you hastily press the CQ and DE keys followed by WQ1XYZ, you'll hear it come out as "CQDEWQ1XYZ." The word-space bar must be used to insert the necessary spaces with these functions. For ragchewing, words can be "burst" typed one at a time, pausing for word spaces, or you can get way ahead of the output by using the buffer and separating words by means of the word-space bar.

The cw prosigns $\overline{AR}$, $\overline{AS}$, $\overline{BT}$ and $\overline{SK}$ are sent by shifting certain characters. All standard punctuation is also provided. There's a cw sidetone with adjustable volume built into the keyboard. A monitor output and auxiliary input are provided. The transmitter may be keyed through a remote PTT line.

One rather strange problem was encountered with the unit we tested. Although the cw keying output is handled by a relay rated at 200 V dc or 500 mA with a power limitation of 10 W, we couldn't get the model 300 to key either the Kenwood TS-820S or the Collins 32S-3. No matter what we tried to send, the keyboard produced only an erratic series of dits when connected to a transmitter. We tried only these two rigs, but neither of them offer a challenge to the keying-relay ratings. We informed Info-Tech of this difficulty and returned the keyboard to them. The problem was corrected by means of a three-conductor jack installed at the cw output instead of the original two-conductor jack. The two inner contacts are used for the keying circuit, isolating the relay contacts from the keyboard chassis. No further keying anomalies took place.

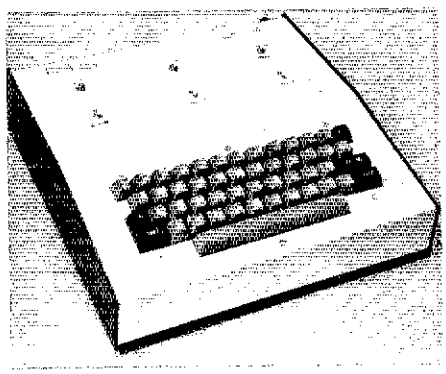
RTTY operating conveniences include a RETURN key which actuates the signals for carriage return, line feed, and the case of the character sent just before the RETURN key is pressed (either FIGS or LTRS), in that order. At the end of a 71-character line, the RETURN function is automatically triggered. There are no keys labeled FIGS or LTRS; case shifting is done automatically. However, FIGS and LTRS signals can be generated by shifting the period and comma. An RY test signal and a "quick brown fox" test key are provided. There's also an automatic cw identifier. An "RA monitor" output is provided for monitoring RTTY or ASCII transmissions with the receiving terminal unit.

The afsk feature makes RTTY transmission possible with any ssb transmitter or transceiver; the tones are simply fed to the microphone input in the lsb mode and the result is (theoretically) F1 emission. The afsk generator in the model 300 uses standard "high tones" (2125 and 2295 Hz for narrow shift and 2125 and 2975 Hz for wide shift). The audio output is 2.5 volts peak-to-peak, and if the tones are fed into the microphone jack, attenuation is usually necessary to prevent overloading the transmitter audio stages. The single-tone distortion of the afsk output was measured as 2 percent by means of an audio distortion analyzer.

The reason we say "theoretically" in the previous paragraph when referring to F1 emission is that the slightest stray noise will show up on the air along with the RTTY signal when F1 emission is sought in this way. The model 300 was tested with a popular hf ssb transceiver in the ARRL lab to see how clean the "F1" emission really would be. The result is shown in the spectral photograph of Fig. 1.

The memory capability of the model 300 is considerable. Errors can be corrected in the running buffer or storage memories anytime prior to their actual transmission. There are 11 storage memories, each 120 characters in length. If a message runs out of room while being programmed into a given memory, the overflow will be taken up by the next memory. Messages can be "nested," meaning that one message can end by calling another message from any of the storage memories. A separate identification memory is supplied. These memory features are identical for "Morse," RTTY and ASCII.

The instructions give installation and operation procedures, alignment information for the afsk generator and RTTY identifier, and details for changing the cw sidetone pitch. There is a brief circuit description with a schematic diagram. An errata sheet (including



The Info-Tech model 300 RTTY/ASCII/cw keyboard. The control functions are all executed by pressing the keys in specific sequences. The small black protuberance at the extreme upper right (rear panel) is part of the fuse holder. The only rotatable adjustment control is the cw sidetone volume pot, located on the rear apron.

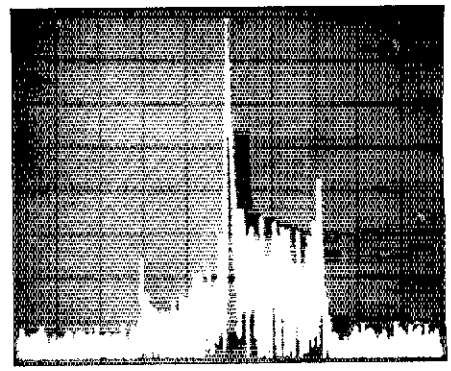


Fig. 1 — Spectral photo of TS-820S output on 3595 kHz lsb, with 2125-Hz single-tone input from the model 300. Each horizontal division represents 1 kHz and each vertical division represents 10 dB. The pip farthest to the right is the transmitter suppressed-carrier frequency. The center (tallest) pip is the signal resulting from the 2125-Hz tone. The pip at the left is the signal resulting from the second harmonic of the 2125-Hz tone. The transmitter power input was approximately 90 watts.

Info-Tech Model 300 Keyboard

Dimensions (HWD): 3-7/8 × 12-3/4 × 13 inches (98 × 324 × 330 mm).
Weight: 7.1 pounds (3.2 kg).
Power requirements: 110-120 V ac, 50-60 Hz, 12 W maximum.
Cw speed range: 4-125 wpm in 1-wpm increments.
Cw keying output: +200 V dc or 500 mA, 10-W maximum contact rating.
Cw monitor output: +20 V dc maximum off state, 50 mA maximum on state.
Cw auxiliary input: +5 V dc off state, 0.5 mA on state.
Sidetone audio: Approximately 1/2 W to internal speaker.
RTTY speeds: 60, 66, 75 and 100 wpm (Baudot code).
ASCII speeds: 110 and 300 baud.
Loop (fsk) output: nonisolated, open-collector; 200 V dc maximum off state, 100 mA maximum on state.
RA monitor output: at least +4 V dc marking, less than +0.3 V dc spacing, high impedance.
RTTY/ASCII afsk output: 2.5 V pk-pk, 1000 ohms impedance; 2125 Hz mark, 2295 Hz (space for narrow shift), 2975 Hz (space for wide shift).
Remote PTT output: +200 V dc and 100 mA maximum.
Buffer memory: 700 characters.
Storage memory: 11 addressable memories, 120 characters each; 1320 characters total.
Supplier: Info-Tech, Inc., 2349 Weldon Parkway, St. Louis, MO 63141.
Price class: $450.

the cw keying-connection modification) is supplied.

The model 300 should definitely interest the RTTY enthusiast and the high-speed cw operator. And of course, the OSCAR ASCII experimenter ought to give this unit careful consideration. — *Stan Gibilisco, W1GV*

DAIWA RF-440 RF SPEECH PROCESSOR

This reviewer has had an opportunity to operate the RF-440 for a period of several months. Mindful of the abuse which can be caused by improper operation of similar devices, my objective was to determine the degree of improvement in "talk power" that could be obtained without abusing my adjacent-channel neighbors on the hf bands.

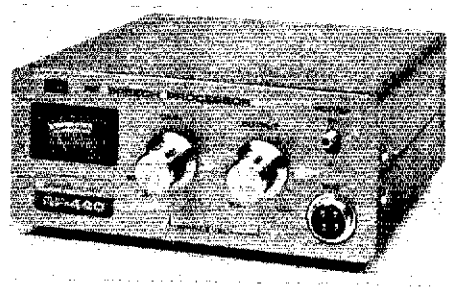
Upon unpacking the unit and examining the instruction manual, I found that a less-than-adequate job had been done in the translation into English. There are many typographical errors in the text, as well as a few in the schematic diagram (pins 3 and 4 are reversed on both the input and output, and two devices are labeled Q6). It took considerable time to study this problem and figure it out. This reviewer strongly suggests that the importer replace the current instruction manual with one which corrects the errors and "speaks" better English. The manual does not do justice to a fine piece of equipment.

The operating instructions are not much clearer. The assumption is made that the transmitter with which the processor will be used has an alc meter indication. The user is told that a plate-current meter or output power meter may be substituted, but then the manual fails to explain *how*. However, this reviewer's transceiver has an alc scale, and perhaps yours does too.

The RF-440 is connected, by means of suitable cables, between the microphone and the audio-input jack of the transmitter or transceiver. A plug is provided at the end of the output cable. This plug did not mate with the one on my rig, so it was removed and used at the input to connect the microphone to the processor. Where the plug had been, I installed another plug that matched the transceiver audio-input jack. It was at this point that the errors in the schematic diagram were discovered. Pins 3 and 4 are reversed at both the input and output, as shown on the schematic. Pin 4 is ground. The other is pin 3. Pin 3 at the input runs to pin 3 at the output. Similarly, pin 2 at the input runs to pin 2 at the output. Obviously, the remaining pin at each end is pin 1. It would have helped greatly if the color of the wires had been given in the schematic diagram.

Fundamentally, the RF-440 is an *rf* speech processor. Audio from the microphone is amplified, split, passed through two 90-degree phase shifts, and then into a balanced modulator where it is combined with an oscillator signal that has also been split and phase shifted. From there, the signal, now at rf, proceeds through an i-f amplifier and limiter, a filter, and then to a detector where it is mixed down to audio by an injected oscillator signal. Then it is passed through a buffer stage to the output.

The operation of the processor is quite simple. The gain control is set fully clockwise, and the output control is set fully counterclockwise. Adjust the output control until maximum



The Daiwa RF-440 rf speech processor. The level meter on the left has a built-in light to improve readability.

allowable swing is observed on your transmitter alc meter while you talk into the microphone. Now adjust the gain control, while talking about four inches from the microphone, until the level meter on the processor indicates "0." This explanation is garbled in the instructions, no doubt something has been lost in the translation. However, the procedure described above is the way to set it up, as determined by this reviewer, following many attempts at trying to understand what was really happening.

A noticeable improvement in average-power output was observed on a power meter but, of course, no accurate measurement of the enhancement under voice-frequency conditions could be made. The manufacturer claims a "four-times" increase in talk-power (6 dB, or about one S unit), and on-the-air contacts with hundreds of DX and domestic stations appear to support this claim.

The manufacturer cautions that splatter can result from improper adjustment of the output control, and suggests that this adjustment be checked frequently to assure that it is set at the proper level. The manufacturer also suggests that adequate cooling (airflow) of the final transmitter stage be provided as the average power to that stage increases three to four times with the use of the processor.

The RF-440 is superbly built, and provides a significant increase in talk-power from a transmitter. The '440 solid-state design should provide users with improved performance and reliable operation for a long time.

The RF-440 has a built-in ac power supply, and may be operated from 13.5 volts dc for mobile operation. The processor may be bypassed, effectively removing it from the microphone line by turning the gain control to the OFF position. — *Lee Aurick, W1SE*

DAIWA RF-440 Speech Processor

Clipping threshold: Less than 2 mV at 1 kHz.
Bandwidth: 2200 Hz at 6 dB down.
Freq. response: Approx. 300-3000 Hz at 12 dB down.
Distortion: Less than 3 percent at 1 kHz, 20 dB clipping.
Output level: More than 50 mV at 1 kHz.
Dimensions (HWD): 2-3/4 × 6 × 6 inches (70 × 152 × 152 mm).
Weight: 4-1/2 lbs (2 kg).
Power requirements: 115 V ac, 60 Hz at 12 mA. 13.5 V dc, 55 mA.
Price class: $135.
Supplier: J. W. Miller Division, Bell Industries, 19070 Reyes Avenue, Compton, CA 90224.

New Books

Antennas, by John Kraus, W8JK, published by McGraw-Hill, New York, NY. Cloth-bound edition, 6 × 9 inches, 561 pages. Price: $28.95.

This is a review of a book that *isn't* new. In fact, it was first published in 1950, and has been used by thousands of amateurs (and professionals) for the last 28 years. It was first obtained for use in the ARRL headquarters Technical library in 1950 (first-printing copies went for $8 then) and has been used as a reference for many staff-written antenna articles during the ensuing years. For those amateurs who are not familiar with this volume, here is a description of its contents.

Designed actually as a textbook for use in college-level engineering courses, *Antennas* contains theory of operation and design information for almost any antenna you might want to construct. The only popular array that comes to mind which is not included is the quad, a relatively new design at the time this book was published.

The first two chapters introduce definitions of "antenna" and "transmission line," and discuss gain, field patterns and directivity. Chapter 2 also introduces the point or isotropic source. The third chapter explains the antenna as an aperture and discusses the effective aperture of various antennas, and chapter 4 covers arrays of point sources.

The next 10 chapters deal with specific designs including the dipole, loop, helical, biconical, cylindrical, linear, reflector, slot, horn, longwire and other types of antennas. With each type of antenna, Kraus provides excellent diagrams to accompany his text explaining the theory behind the antenna operation, general properties, construction considerations and so on. Calculated field-strength intensity patterns, gain charts, and radiation resistance graphs are also included for most antennas.

The final chapter deals with antenna measurements including phase, gain, directivity, impedance, radiation resistance, current distribution, and polarization-measurement techniques.

Those amateurs who haven't already purchased a copy of *Antennas* should consider giving this book a prominent spot on their bookshelves. — *Jim Bartlett, K1TX*

Strays

QST congratulates . . .

☐ Ian Cook, WB2SZV, winner of a 1978 National Merit Scholarship. Ian attended Bronxville (NY) High, where he founded the school's Radio Club, WB2SJJ, and graduated first in his class. During the summer of 1978, Ian was the radio operator for the Bolivian project of *Amigos de las Americas*, a rural health/inoculation program for American youths in Latin America. He is a freshman at Princeton University.

☐ Phil Bettan, K2LIO, who has been promoted to president of Bettan Sales, Inc., Flushing, NY.

I would like to get in touch with . . .

☐ anyone stationed at Farfan Radio Station (NBA) during mid-60s, or aboard U.S.S. *Stickell* during 1966-67. Vic Behan, WB1CEG, 6 Alan Dr., Ansonia, CT 06401.

Hints and Kinks

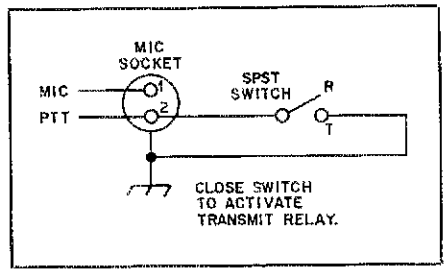
AUTOMATIC OUTPUT POLARITY FOR THE ACCU-KEYER

May I offer yet another modification for the ubiquitous Accu-Keyer (*QST* for August 1973, August 1975 and July 1976). The simple circuit change shown in the accompanying diagram solves a problem for the amateur who uses rigs with both grid-block and cathode keying. The selection of proper polarity becomes automatic by means of diodes. With this arrangement the Accu-Keyer may be used with a variety of transmitters or transceivers without worrying about the polarity of the voltage.

This modification is built on the WB4VVF board with just a few parts added between the output of Q4 and the terminal for the grid-block keying. The cathode keying circuit may be built on a 1 × 1-1/2-inch (25 × 38-mm) perforated or printed circuit board. My Accu-Keyer/Memory is now in use with my solid-state 2-meter transceiver which has positive-to-ground keying. It is a welcome "third hand" when operating through OSCAR 7 and 8. — *Bruce Balla, VE2QO*

HOLDING HEATH RELAY

An easier way to hold the HW-100 or the HW-101 relay in the transmit position than that suggested by WA1STQ ("Hints and Kinks," March 1978 *QST*) is to install a switch as shown in the accompanying diagram. This method requires only a spare microphone plug and the switch. There is no modification of the transceiver. — *David Shaffer, K3NXO/8*



This circuit permits the HW-100 or HW-101 transmit relay to be held in the ON position while using cw.

NEW BATTERY IMPROVES MICODER QUALITY

A common problem arising with the Heath HW-2036 2-meter transceiver when used with the older HW-1982 Micoder is poor audio quality after several weeks or months of operation. The symptoms are reports of failing audio quality and fuzziness of audio levels, both of which may disappear after turning off the receiver for a length of time. In my particular case I thought that the problem was one of those mysterious intermittents that might never be found.

Conferring by phone with the "hams at Heath" I was advised that the fault was simply an aging battery in the Micoder microphone. Unlike ceramic microphones, a battery is necessary to charge the capacitive element in the microphone of the Micoder. This element drives the first IC in the audio chain. A cure, until a battery failure again occurs, is to install a *good*-quality alkaline battery. — *John F. Marthens, WA6TKN*

NEW HIGH-PERMEABILITY FERRITE ROD

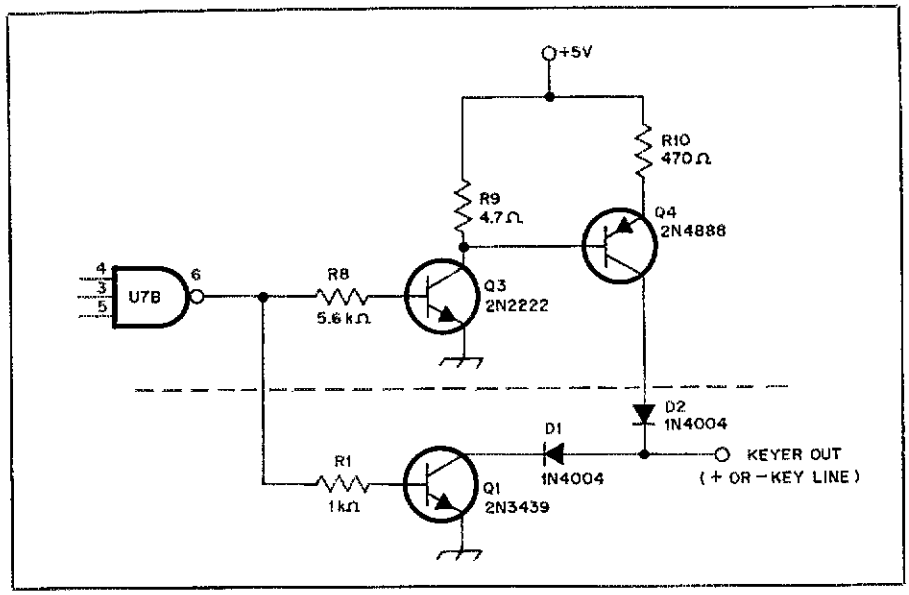
Previous ferrite rods on the market have had permeability that is too low and length that is too short for use as a satisfactory filament choke for grounded-grid amplifiers to be operated on the 160-meter band. As a result rf gets into the filament circuit and consequently into the 117-V ac line.

Amidon Associates, 12033 Otsego St., North Hollywood, CA, 91607, has released a ferrite rod with a permeability of 800. It has a diameter of 1/2 inch and a length of 6 inches.

Those amateurs who wish to use this new rod will do well to wind the coil on a wooden dowel and then slip the coil onto the rod, a procedure which will prevent breaking the ferrite. A suitable wire size should be employed to carry the filament current. For my 811s I use no. 14 enameled wire. Further information about the Amidon rod no. 30-33-7 may be obtained by writing to Mr. Jim Cox at Amidon. — *Ed Marriner, W6XM*

[Editor's Note: To ensure effectiveness of the bifilar-wound filament/cathode choke, the X_L should be approximately 4 or 5 times the input impedance of the grounded-grid amplifier. An acceptable rule-of-thumb value for most rf power amplifiers is to assume a maximum Z_{in} of 200 Ω at peak drive periods. Therefore, X_L for the choke winding equals 800 Ω minimum, which at 1.8 MHz requires an inductance of 70 μH. This can be checked by placing a 110-pF capacitor in parallel with the choke winding and checking for resonance by means of a dip meter. The 7-1/2 × 0.5-inch (191 × 13 mm) Amidon rod (μ_i = 125) is satisfactory, but the 4-inch (102-mm) rod is not. Since Q is not an important factor in the choke, the Amidon 6-inch (152-mm) rod (μ_i = 800) specified by W6XM will provide considerably higher X_L than the minimum requirement of 4 × Z_{in}, which is excellent.]

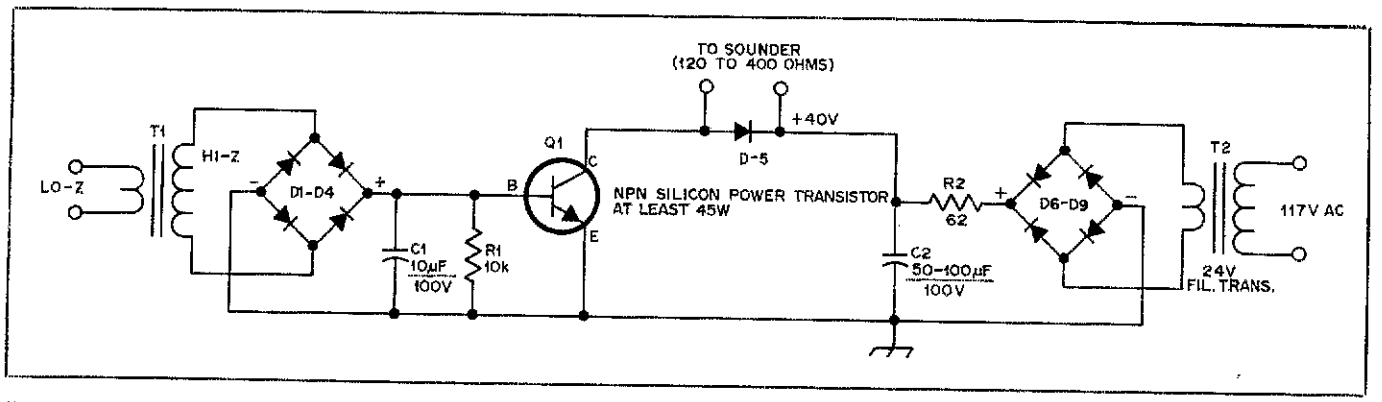
Modification of the Accu-Keyer/Memory for keying both positive and negative lines. Additions to the original circuit are shown below the dashed line. A junk-box variety transistor may be used.



A MORSE TELEGRAPH CODE CONVERTER

This circuit for a Morse telegraph converter should interest many amateurs who are ex-telegraph operators. I built it and find that it works very well. I pipe the W1AW transmissions from my receiver through the converter which provides the activating signal for my telegraph sounder. (I'd be interested in hearing tapes at W1AW sending between 60 and 70 wpm.)

While the circuit diagram calls for a 150- to 400-ohm sounder, my converter works very well feeding a 20-ohm sounder. The self-contained bridge-rectifier power supply provides 35 to 40 volts dc. All diodes are silicon rectifier types. The diode across the sounder prevents magnetic kickback of the sounder coils from damaging the single npn silicon power transistor. The power transistor may be



This converter will operate a telegraph sounder from a receiver or tape recorder. Details in text.

of the builder's choice but should be capable of handling 45 watts as well as the power-supply voltage.

T1 may be an old output transformer connected backward. One may also use a 6.3-V filament transformer, low impedance side connected to the headphone jack of the receiver. Although 10 μF is a nominal value for C1, the builder should experiment with other values. A value too small allows the cw tone to be heard in the sounder coils, while a value too large would make the sounder perform sluggishly. The value of C2 is not critical and may range from 50 to 100 μF. R2 is a 62-ohm surge resistor installed to prevent the diodes from failing when C2 charges. The present switching relay transistor is a Radio Shack RS-2020, silicon npn, solid-state device. — *Harry A. Turner, W9YZE*

CHECK THAT CIGARETTE LIGHTER CIRCUIT — THE POLARITY MAY BE REVERSED

Before connecting your new rig to that cigarette lighter of your newly purchased automobile, check out the polarity. Older cars generally had the casing of the lighter socket grounded to the chassis but some newer cars constructed with plastic dash panels may have the casing wired to the positive supply line. In cars where this may be so, unless a correction is made in the circuit, damage could occur to equipment attached to this voltage source. — *Burt Lang, VE2BMQ, in the bulletin of VE2RM, Inc., Montreal, PQ*

LONGER CALCULATOR BATTERY LIFE

Inexpensive pocket calculators such as the Texas Instrument TI-1000, using push-button ON and OFF switches, place a steady load of several microamperes on the internal battery when not in use. I inserted an unsoldered mini plug into the ac adaptor jack to keep the battery circuit open when not being used. Doing so increased battery shelf life considerably. — *Dr. J. H. Grant, K4HHR*

CURING OSCILLATION PROBLEMS IN THE CLUB FILTER

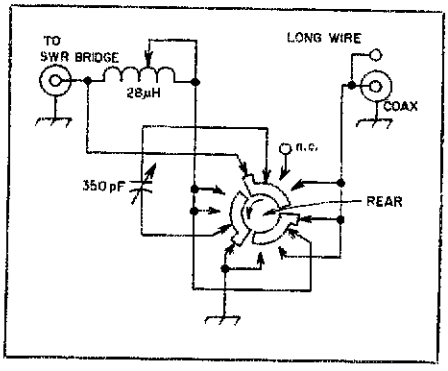
Some builders of "The Club Filter" (December 1978 *QST*) have run into the problem of an annoying oscillation in the first stage of the filter. Spencer Schubbe, N8AP, has furnished some suggestions for eliminating this problem.

It is possible for the type 741 operational amplifier to vary in gain as a result of differences in manufacturing, causing instability in the filter stage. In this case the value of R6 should be decreased until the oscillation stops and a crisp cw tone is heard. In some extreme cases it may also be necessary to increase the value of R7 to around 330 ohms. — *Garry Bartels, WB1CPM*

A TRANSMATCH SWITCH

By installing a 3-circuit 3-position switch in the Transmatch described in the 1975 edition of *The Radio Amateur's Handbook*, changing configurations is facilitated. A Mallory low-loss nonshorting switch (no. 4M2315C) is well suited for this purpose. If a 4-pole 3-position switch is available, it may be used by leaving one of the positions blank. My drawing shows the switch in position 1 which places the capacitor ahead of the inductor. Position 2 has the capacitor following the inductor and position 3 connects the capacitor between the inductor and the antenna. — *George L. Hunsaker, W5JOV*

W5JOV uses this switch arrangement instead of banana jacks to simplify operation of his Transmatch which employs the circuit shown on page 607 of the 1975 *Handbook*.



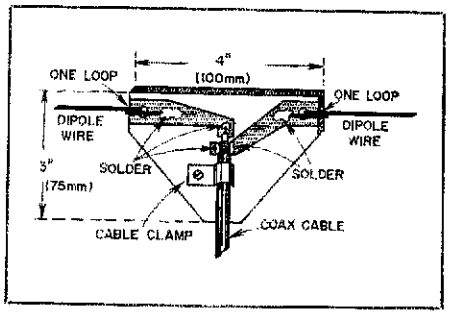
EASY DIPOLE CENTER INSULATOR

Single-clad pc board is handy for use as the center insulator of a dipole antenna. Fig. 1 shows the details of one made by the writer.

The pc-board material is trimmed as shown to a size which is compatible with the coax cable used. The copper is etched away except for the shaded areas indicated. A single loop of wire through the holes at each end of the center block will hold the antenna fast once the ends of the two wires are soldered in place as shown. The feed line is soldered to the appropriate copper foils, then clamped in place in the manner indicated.

The solder joints can be sealed by means of epoxy cement, as can the open end of the coax cable. This will prevent corrosion at the solder points. It will also prevent moisture from collecting between the shield braid and the polyethylene which insulates the inner conductor.

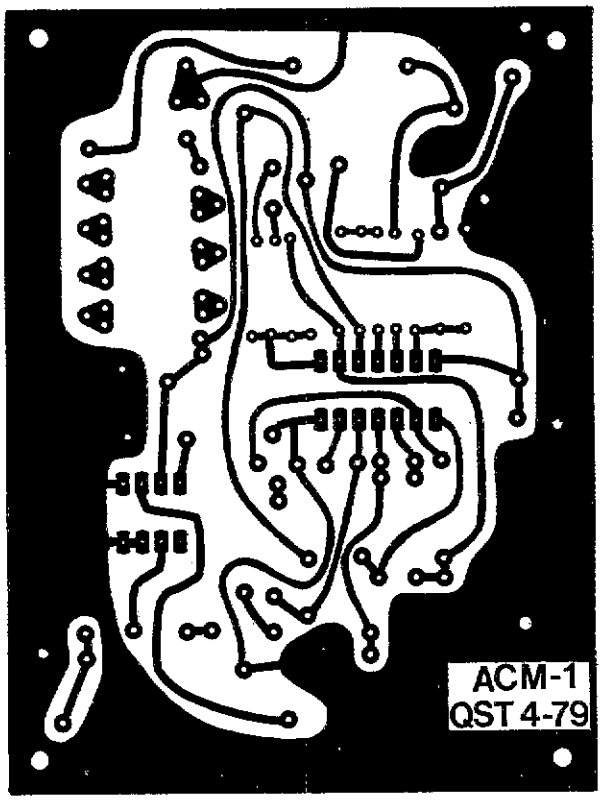
The version shown here was built when a lightweight 20-meter dipole was needed for a Caribbean QRP trip. The dipole conductors were made from no. 22 insulated hook-up wire. RG-58/U served as the feed line. — *Doug DeMaw, W1FB*

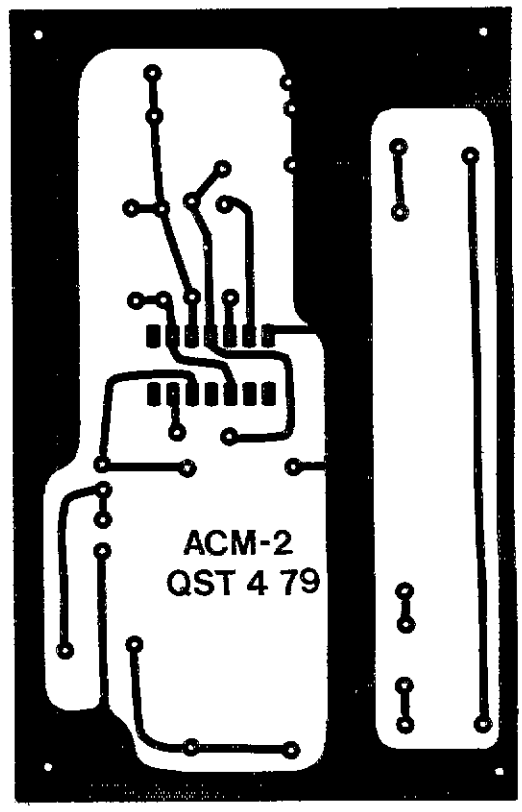


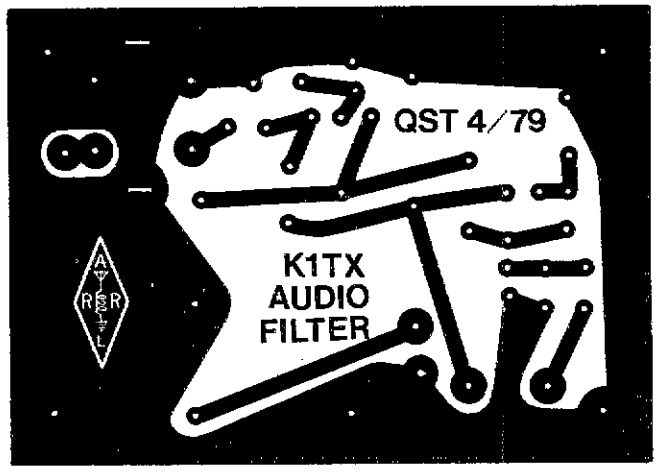
A handy dipole center insulator made with single-clad pc board designed by W1FB. It can be useful to Field Day operators and amateurs who take radio equipment on vacation safaris.

CURING IGNITION NOISE

Sources of static interference that can disrupt radio reception in an automobile, truck or boat can be difficult to trace and eliminate. Ignition noise is one of the most annoying problems found in many mobile installations. Radio amateurs who experience such interference will benefit from the sound advice given in the booklet, *Giving Two-Way Radio Its Voice*, published by the Champion Spark Plug Company. This well prepared publication covers noise-suppression fundamentals, preliminary procedures, methods of locating the sources of interference and techniques of solving noise







Circuit-board etching patterns for construction projects in this issue. Black represents copper, the patterns being shown here at actual size. Circuit boards represented on this page are single sided (copper on one side only). The upper pair of patterns is for the SHARC Audible Current Meter, at left for the meter itself and at right for the power supply (see Figs. 4 and 6, pages 28 and 27 of this issue). The lower pattern is for the Simple CW Audio Filter (see Fig. 2, p. 17).

problems. There are even tips for obtaining good marine reception. A copy of this booklet may be obtained by writing to the Champion Spark Plug Co., Box 910, Toledo, OH 43661. The cost is $1. This publication may also be obtained through some automotive parts distributors where Champion products are sold. — *Sandy Gerli, AC1Y*

REPLACING KENWOOD POWER PLUGS — A WARNING

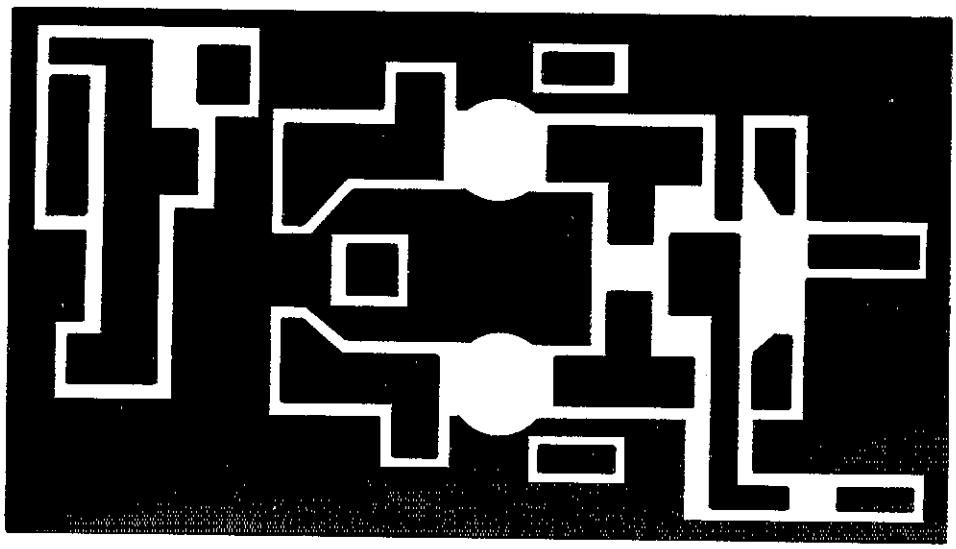
Recently I had to install a new power plug on my Kenwood TS-520S. I purchased the plug at a local ham-radio store and wired it according to the illustrations contained in the Kenwood owner's manual, but *following the numbers printed on the replacement plug.* After inserting the new connector into the transceiver I reached for the coaxial cable, a move that gave me a startling electrical jolt! *The rig was alive with 117 volts ac.*

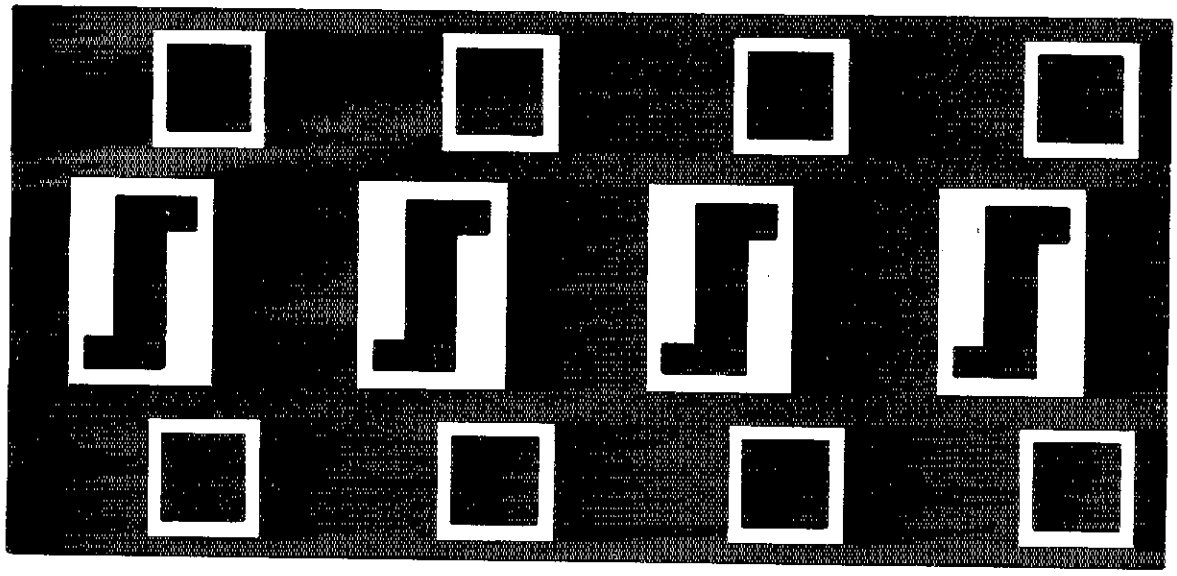
I returned to the store and asked to see a factory-wired cord. The numbering *was in reverse order,* right to left! Investigation has disclosed that Japanese plugs of the Jones type are numbered opposite to the numbering on American connectors. I was lucky not to get hurt or have the rig damaged. I wonder, however, if I might have been less than lucky had I wired the plug for a 220-volt line.

May I suggest, therefore, that anyone replacing such a plug obtain a Kenwood connector which may be ordered from the manufacturer. I'd also like to urge Kenwood to print a warning to this effect in future Kenwood manuals. — *Adalberto Sainz, KA4BBS*

TS-520 POWER INCREASE MODIFICATION

Amateurs in the United States who acquired Kenwood TS-520s built for use in Japan may wish to eliminate a provision which reduces the power output on the 10-meter band. The PA screen voltage-dropping resistor attached to the





Circuit-board etching patterns (continued). Boards represented on this page are double sided (copper-clad on both sides), with unetched copper on the "back" side forming a ground plane. The front sides of the boards are shown here at actual size, with black representing copper. The upper pattern is for the amplifier section of the "Boots for the HW-8," and the lower pattern is for the filter board (see Figs. 2 and 3, page 20 of this issue).

band switch can be jumpered to restore full power. The manufacturer was good enough to furnish me with this information which enabled me to modify my Kenwood, one of those built for use by Japanese amateurs. — *Dr. Richard Brown, YBØABV, W4VN*

MORE ABOUT ADAPTING THE HEATH NOISE BLANKER

While adapting the Heathkit SBA-104-1 noise blanker to my SB-101, following the ideas suggested in "Still More on the SBA-104-1" (August 1977 *QST*), I made the following changes which seem to correct the circuit presented in the article. L1 should be connected between C2 and C5, not between terminal 6 and R4. The IN/OUT switching arrangement should be so wired that the input is connected to terminal 5 of the blanker and the output to terminal 1. — *John E. Plapp, WA5WPJ*

ON UPDATING THE SWAN 350

Swan 350 owners who are interested in the modification described in the article, "Updating the Swan 350," November 1976 *QST*, may find this information useful. (The modification information also appears in the 1978 edition of *Hints and Kinks*.) While I find that most of those who have made the change are pleased with the results, some others did encounter a slight problem of insufficient drive on 15 meters. This can be eliminated by replacing the 68-pF driver-coil capacitor with one rated at 47 pF. The problem, when it does occur, seems to stem from the higher tube capacitance of the larger 8950 tubes.

Amateurs who seek to obtain 8950 tube specification sheets should be able to obtain a copy from a nearby distributor of RCA or GE tubes. Alternatively they may write to the manufacturer. Incidentally, the 8950 is still listed in the 1978/79 *Buyer's Guide* published by Cramer Electronics. — *Carl Coleman, K4WJ*

Club Awards-Program Winners Show Ingenuity

Creative ideas can inject enthusiasm into your group's activities.

By Rosalie White,* WA1STO

Belt Buckle Billboard, Hallowed Spirits Hunt, the Ready Team — these are some of the many phrases coined by Amateur Radio clubs to describe their point-winning activities for the ARRL Affiliated Club Awards Program. The awards program, developed by W1UED, is intended to stimulate activity, promote an exchange of ideas, and bestow publicity to deserving clubs. Participating groups compete on national, divisional and sectional levels; point awards are based on club activities. Tally sheets received by affiliated clubs in September 1977 listed many activities a group might sponsor during the year.

The categories of competition and examples of the listings are *PR* — club logo, bumper sticker, permanent display. *Classes* — licensing classes, Big Brother/Sister Program, graduation party. *Operating* — club-owned repeater, club-sponsored operating award, club net. *Conventions/Hamfests/Auctions* — Members participating in forums and speaking at hamfests, displays at hamfests, members speaking at conventions. *Club Bulletin* — artwork, Novice column, exchange bulletins. *Related Participation* — members who also are League officials or ARES members, 100 Percent Club. The point check sheet also included an "Other" category for nonclassifiable events.

This article will examine club activities not recorded as points in the competition. We know how difficult it is to keep accurate records for a whole year, and how easy it is to lose or forget about the tally sheet.

What's Been Done

One intriguing idea in the PR category is the Belt Buckle Billboard, developed by the Lockheed Employees' Recreation Club ARC (CA). Members of this club wear belt buckles engraved with the club call sign as a form of advertising. Another PR device, developed by the Rochester (NY) ARA, is to list the club telephone number in both the white and yellow pages of the phone book. Callers hear a taped message detailing how and where to get information on Amateur Radio and the club. The Mecklenburg (NC) ARS is considering placing *ARRL Repeater Directories* in North Carolina interstate highway welcome stations and information booths to increase the visibility of Amateur Radio.

In the Classes category, the Jersey Shore (NJ) ARS has devised a system to help Novices select their first rig. The club maintains a list of equipment owned by its members, and Novices are referred to whoever has the type of equipment they are interested it. Novices can then inspect and test the equipment to see if it meets their needs. Members of the Kilocycle Club (TX) who volunteer to operate the club station during the evening listen especially for Novice graduates of their club class. Novices also are invited to tour and operate the station with the aid of the volunteers. WA2MYG, a member of the Rochester (NY) ARA, has taped onto a cassette the ARRL's "blind and handicapped package" to help disabled persons interested in Amateur Radio. Another member of the club, WA2SYR, translated the package into Braille. The local library and the club circulate both copies of the ARRL package.

In the Operating category, the Ready Team, which is composed of Bluegrass ARC (KY) members, can travel on two hours' notice to any stricken area in the state to handle emergency communications. On Labor Day weekend and other holidays, Hualapai (AZ) ARC members monitor the club repeater for emergency traffic and motorist-assistance calls. Hallowed Spirits Hunt is the phrase coined by club members who patrol potential trouble spots on Halloween night.

In the fourth category, Conventions/Hamfests/Auctions, red knit caps worn at hamfests make members of the Boulder (CO) ARC more visible to visitors who have questions about Amateur Radio. The 220 Club (CA) records details of local conventions or hamfests onto tape for the club repeater. Members of the Turlock (CA) ARC increase their visibility at hamfests by wearing heavy cardboard silk-screened badges which they designed.

In the Related Participation category, many clubs have donated money to send IARU receiver/transmitter kits to less-developed countries. (See November 1978 *QST* for kudos information.)

If you're thinking, "My club manages an activity which is just as ingenious as nine-tenths of these winning clubs' ideas," write us about it and keep your eyes on "Club Notes" for honorable mentions.

The Winners

National Level: Rochester (NY) ARA; Atlantic Division and Western Pennsylvania Section: Indiana County ARC; Maryland Section: Aeronautical Radio Inc. ARC; Central Division and Illinois Section: Okaw Valley ARC; Great Lakes Division and Ohio Section: Triple States RAC; Hudson Division and Western New York Section: Rochester ARA; New York-Long Island Section: Long Island Mobile ARC; Northern New Jersey Section: 550 Club; Midwest Division and Missouri Section: PHD ARA; Iowa Section: Northeast Iowa RAA; New England Division and Western Massachusetts Section: Hampden County RA; Pacific Division and Pacific Section: Pacific Radio Amateur Transmitting Society; Roanoke Division and Virginia Section: Virginia ARA.

Congratulations to this year's winners!

*Manager, Club and Training Dept., ARRL.

Amateur Radio at the Bottom of the Earth

To those of all nationalities who inhabit Antarctica, the world's most desolate area, Amateur Radio is a taste of the warm sunshine they left behind.

By Tom Frenaye,* K1KI

Fifty years ago, the modern era of exploration in Antarctica was inaugurated, with Amateur Radio providing the vital communications link between Commander Richard E. Byrd at Little America and the rest of the world. Byrd first learned of the value of Amateur Radio during his expeditions to the Arctic, beginning in 1926. Upon his arrival in Antarctica in 1929, Little America was heard around the world,[1] as radio communications were maintained regularly during the two-year expedition. Not surprisingly, Amateur Radio proved to be more reliable than existing commercial routes. Byrd returned to Antarctica a number of times, and Amateur Radio was a key factor in his success.

Antarctica was first sighted in 1820 by separate expeditions from the United States, England and Russia. Intermittent exploration by many countries continued for the next century. In 1954, the United States committed itself to exploring the Antarctic by launching Operation Deep Freeze. Through this project, permanent bases were established (including one at the geographical South Pole) in preparation for the International Geophysical Year (1957 to 1958). In 1959, 12 nations signed a treaty unlike any other in the past and perhaps in the future — The Antarctica Treaty. It stipulated that Antarctica was to be free from military bases, maneuvers and weapons testing, and guaranteed freedom of scientific investigation and exchange of ideas on the continent. The agreement applied to all land, including ice shelves, below 60° south latitude.

Miles of Ice, Penguins — and Amateur Radio

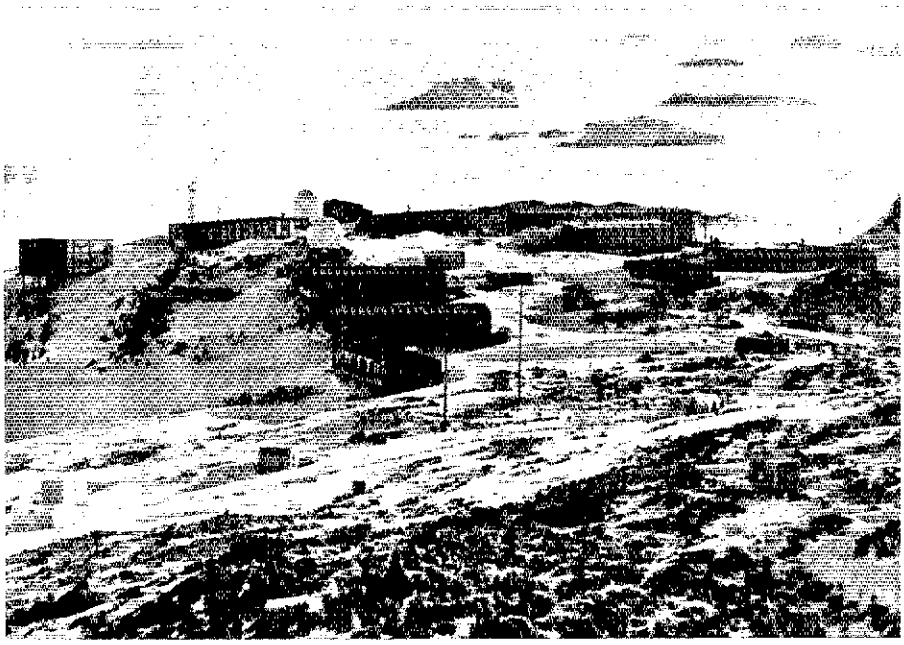
When you think of Antarctica, what images come to mind? Do you see only miles and miles of ice, penguins and a few scattered outposts? Antarctica is much different than you probably imagine. Forty percent of the world's fresh water is locked in its glaciers. The average ice thickness is 6000 feet; mountainous peaks tower more than 10,000 feet above the surface. The continent covers 5-1/2 million square miles, roughly the size of the United States and Mexico combined. Temperatures range from −127°F (−88°C) inland to +45°F (+7°C) along the Antarctic Peninsula. Its waters contain the world's richest fishing grounds. Large colonies of seals, penguins and sea lions dot the coastline.

Thirty-five year-round bases have been established on the continent by 11 nations (see Fig. 1). Argentina dominates the Antarctic Peninsula, where all eight of its bases are located. The U.S., which has four outposts, studies the continent's interior at the Amundsen-Scott South Pole base using ski-equipped C-130 aircraft. The U.S.S.R. circles Antarctica with five of its seven bases. Complex research is being performed at the outposts in biology, glaciology, geology, meteorology and physics (including radio propagation).

Many, but not all, Antarctic bases have active Amateur Radio stations. When permitted by their country's regulations, the ham stations are used primarily for phone patches to relatives and friends. You probably have heard one of the U.S. bases (KC4 prefix) running phone patches very late at night on 40 or 20 meters. By contrast, British Antarctic Survery bases

*Assistant Communications Manager, ARRL

[1]DeSoto, *Two Hundred Meters and Down*, ARRL, 1936, page 152.



The French Antarctic outpost at Dumont d'Urville overlooks the iceberg-laden ocean. *(FB8YE photo)*

(VP8) are not allowed to use Amateur Radio for phone patches (and those who man them sign up for a two-year hitch!).

Phone patches, one of the few diversions available in Antarctica, are the only way to communicate with relatives for much of the year — mail delivery is possible only during Antarctica's very short summer. If you hear Antarctic stations running phone patch traffic, let them finish without interference. Most operators will stand by afterward to work the many hams who want to get their first Antarctic QSO.

Buried Rhombics, 8000 Feet of Insulation

Operating a ham station in Antarctica presents a challenge in itself. Hurricane-force winds and frigid temperatures make erecting and keeping up antennas difficult. In many locations, snow accumulations force operators to add an extra section to their antenna towers to keep them out of the snow. At the South African base (ZS1ANT), located on an ice shelf, operators report excellent success with V beams and rhombics buried several feet in the snow.

In many cases, it is very difficult to ground equipment properly. Amateur Radio stations, scientific instruments, computers and other research equipment have to be grounded carefully so data collection isn't interfered with. The U.S. South Pole station sits atop 8000 feet of solid ice, which makes an excellent insulator.

Storms on the sun affect communications at the high latitudes (North and South polar regions) more than the low latitudes. Magnetic storms can produce auroral activity that distorts signals or makes communications impossible for days at a time.

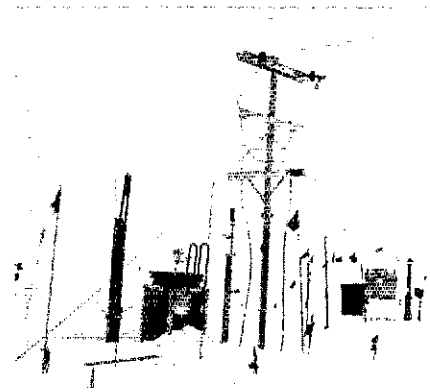
The quality of communication from Antarctica can vary widely. During the last low point of the sunspot cycle (1975 to 1976), November through February provided excellent worldwide communications from Antarctica on 20 meters, fair to good propagation on 15 meters, and occasional openings on 10 meters. From March to October, 40 meters was the preferred band, while 80 meters generated some surprisingly good results. The peak sunspot cycle of 1979 to 1980 should permit 20 meters to be used almost all year; 15 meters should be excellent during the southern summer (November to February).

All Amateur Radio operations from U.S. Antarctic bases are regulated by the National Science Foundation in conjunction with the Commander of the Naval Support Force in Antarctica (CNSFA), not by FCC. Primary communications between U.S. Antarctic bases are established by ssb and RTTY on various hf frequencies between 4 MHz and 17 MHz. Most communications to the U.S. are handled through the Navy's Teletype link via New Zealand. The increased use of satellite communications may alter this situation in the near future.

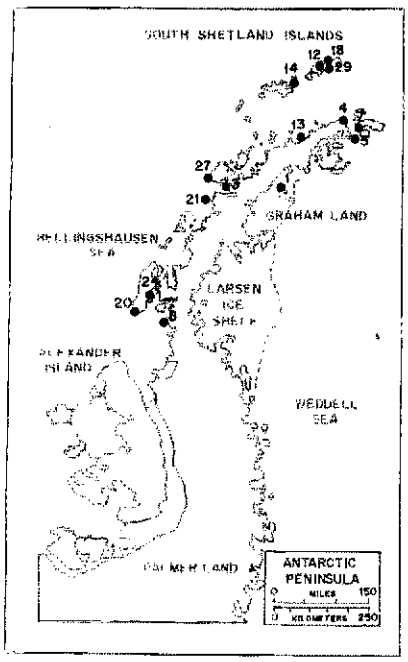
QSLs Require Patience

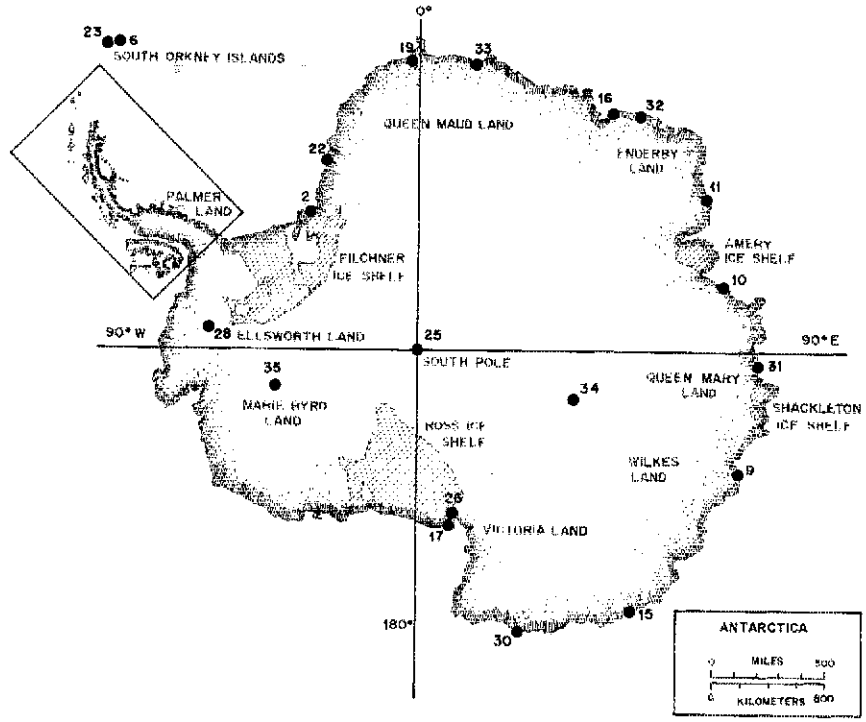
If you try to contact Antarctica, remember that radio operators there are not usually after contest-style QSOs because they are interested in finding out what is happening in the "real" world. Keep your ears tuned for the four bases in the South Shetland Islands and the two in the South Orkneys because both count separately toward DXCC. As with all QSL cards from DX stations, you must have patience because very infrequent service can delay Antarctic mail for months at a time. Many bases have managers or special QSLing information that you can get on the air or from the latest *Callbook*.

A variety of antennas punctuate the landscape at Vostok Station (4K1C/KC4AAE), the Soviet Union's outpost in central Antarctica.



The antenna terminal tower at the United States' Siple Station, site of KC4AAD. What looks like the end of a power line is actually the incoming terminal of a 13-mile dipole, used in several vlf experiments.





Amateur Radio in Antarctica

Map Ref/Base	*Lat/Long*
Argentina (LU-Z)	
1 Matienzo	64°58'S, 60°04'W
2 General Belgrano	77°54'S, 35°20'W
3 Almirante Brown	64°53'S, 62°53'W
4 Esperanza	63°24'S, 56°59'W
5 Marambio	64°14'S, 56°43'W
6 Orcadas	60°45'S, 44°43'W
7 Petrel	63°28'S, 56°17'W
8 San Martin	68°07'S, 67°08'W
Australia (VKØ)	
9 Casey	66°17'S, 110°32'E
10 Davis	68°35'S, 77°58'E
11 Mawson	67°36'S, 62°52'E
Chile (CE9)	
12 Presidente Frei	62°12'S, 58°55'W
13 General Bernardo O'Higgins	63°19'S, 57°54'W
14 Capitan Arturo Prat	62°30'S, 59°41'W
France (FB8Y)	
15 Dumont d'Urville	66°40'S, 140°01'E
Japan (8J1RL)	
16 Syowa	69°00'S, 39°35'E
New Zealand (ZL5)	
17 Scott Base	77°51'S, 166°46'E
Poland (HFØPOL)	
18 Arctowski	62°10'S, 58°28'W
South Africa (ZS1ANT)	
19 Sanae	70°19'S, 02°22'W
United Kingdom (VP8)	
20 Adelaide Island	67°46'S, 68°55'W
21 Faraday	65°15'S, 64°16'W
22 Halley Bay	75°31'S, 26°43'W
23 Signy Island	60°43'S, 45°36'W
24 Rothera	67°34'S, 68°08'W
United States	
25 Amundsen-Scott South Pole (KC4AAA)	89°59'43"S, 144°27'53"E
26 McMurdo (KC4USV/KC4USX)	77°51'S, 166°40'E
27 Palmer (KC4AAC)	64°46'S, 64°03'W
28 Siple (KC4AAD)	75°56'S, 84°15'W
Soviet Union	
29 Bellingshausen (4K1F)	62°12'S, 58°58'W
30 Leningradskaya (4K1G)	69°30'S, 159°23'E
31 Mirnyy (4K1B)	66°33'S, 93°01'E
32 Molodezhnaya (4K1A)	67°40'S, 45°51'E
33 Novolazarevskaya (4K1D)	70°46'S, 11°50'E
34 Vostok (4K1C/KC4AAE*)	78°28'S, 106°48'E
35 Russkaya (4K1H)	80°S, 105°W

*Used by U.S. exchange scientists

If you've worked more than a dozen of these, you're probably addicted to DXing!

The variety of possible contacts makes communicating with Antarctica interesting. A number of ships operate in Antarctic waters from December through March. Temporary field camps, usually complete with a ham station, often are set up in very isolated places. Even aeronautical mobiles can sometimes be heard as they journey across the continent on a supply mission.

What does the future hold for this icy continent? The Antarctic Treaty is in effect until 1989, but ever-increasing pressures to exploit the continent's vast resources threaten the treaty's viability. Antarctica's waters are fished for whales and krill (a small, shrimplike animal rich in protein). Exploitation earlier in this century nearly wiped out the continent's vast seal population. Thanks to strict conservation statutes enacted in 1959, seals are returning slowly to the Antarctic coast. Gold, copper and coal deposits already have been located; the discovery of oil reserves is predicted. Even the water is subject to exploitation: Several schemes have been proposed to mine fresh water by towing icebergs north.

The future of Antarctica presents complex scientific and political problems that will require very careful planning. To solve this dilemma, the cooperation which has existed among nations exploring Antarctica during the past 150 years must continue in the future. Amateur Radio, which has already played a significant role in the frozen continent, will undoubtedly continue to serve as a link with the rest of the world. OST

[Editor's Note: The author spent 1975-1976 at Palmer Station, serving as the communications coordinator and Amateur Radio operator (KC4AAC). The station population varied from 30 during the summer to only six during the long winter. Palmer Station enjoys a moderate Antarctic climate, with temperatures ranging from −30°F (−22°C) to +42°F (+6°C), frequent precipitation and persistent winds. Scientific research concentrates on the large seal and penguin rookeries on nearby islands, various coastal birds, geology and meteorology.]

Public Service Before Disaster Strikes

With their eyes and ears kept vigilantly on developing storms, hams are ensuring that tornadoes and other violent forms of weather don't take a toll of lives.

By Brian E. Peters,* WD4EPR

1530 (CST) — "WB5AAA, this is WB5BBB. I'm in southern Arlington, and I've spotted a low-hanging cloud that I think is rotating. It looks like a wall cloud, and a small funnel is coming from the bottom of it."

"Roger, WB5BBB. Can you determine a direction of movement on it?"

"It seems to be moving northeastward."

1550 (CST) — "This is WB5AAA at the National Weather Service. Are there any other stations on frequency in the Arlington/Irving area to confirm the funnel cloud?"

"WA5AAA . . . WA5CCC. I'm in Irving and I'm getting golf-ball-size hail."

1555 (CST) — "This is WB5AAA at the National Weather Service. The forecaster has issued a tornado warning for Tarrant and Dallas counties based on these reports. Keep us advised about any severe weather in your area."

1559 (CST) — "WA5AAA . . . WA5DDD. I'm in Irving, and I can see the wall cloud above the treetops. There are two funnels!"

1620 (CST) — "WA4AAA . . . W5EE. I'm on Highway 183 near Irving Mall. I can see the wall cloud, but there's only one funnel now. It looks like it's above Cowboy Stadium and getting longer."

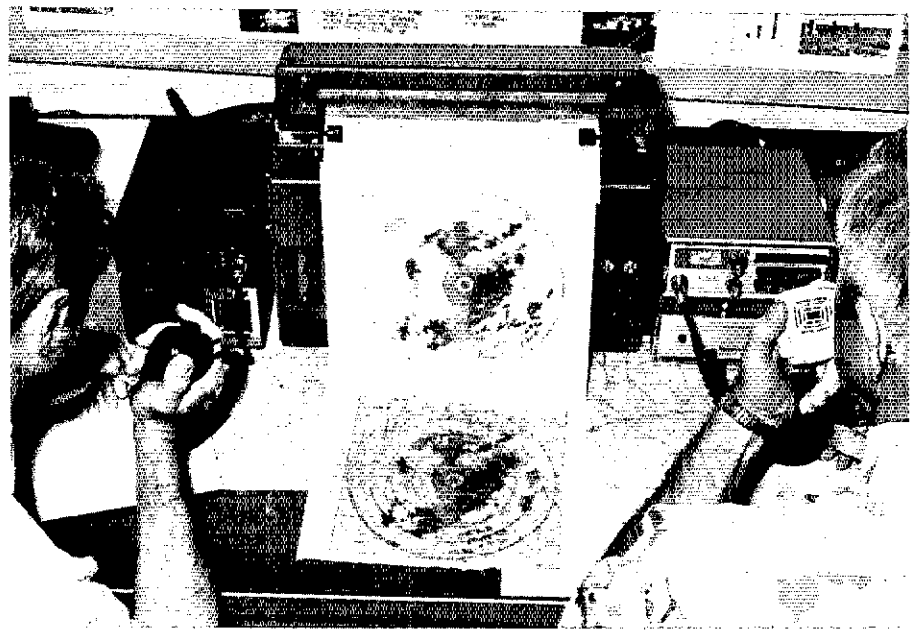
1624 (CST) — "This is WA5FFF. I've got the Dallas storm post manned in the Love Field Tower."

"Roger WA5FFF . . . WB5AAA. Last report was a funnel above Cowboy Stadium moving northeast. What can you see that way?"

1625 (CST) — "Yes, I see it — a definite funnel cloud. It's past the stadium now and the funnel is getting longer. It's kicking up debris — it's on the ground! Looks like it touched down around the intersection of Marsh and Walnut Hill. There's more debris — it's really tearing things up . . ."

A tornado swept through the Dallas/Fort Worth area on May 26, 1976, causing $1.3 million in damage. The 146.94-MHz transmission paraphrased above could have been an actual transcript. Hundreds of volunteer amateurs in the 38-county area of north-central and northeast Texas are organized under the Radio Amateur Civil Emergency Service (RACES) system sponsored by the Civil Defense. The RACES network is responsible for assisting the National Weather Service (NWS) in spotting and tracking severe storms and tornadoes. All severe-weather-related traffic is on 2-meters through a repeater which is released for exclusive use by spotters during emergencies.

RACES members are required to complete a formal class in severe-storm identification, communications procedures, and NWS operation. This training is sponsored by Civil Defense with



Claude Whitley, WB5FLQ (left) and Ben Myers, WB5HFH, man the radio post at the National Weather Service Forecast Office at Fort Worth, TX. Using a radar facsimile recorder, these hams direct spotters to areas of heaviest thunderstorm activity. *(photo by Brian Peters, WD4EPR)*

*National Weather Service, 5749 Montpelier Dr., Memphis, TN 38134

assistance from NWS. The instruction increases the reliability of storm reports by preparing amateurs to distinguish between tornadoes and "look-alikes."

The decision to activate or deactivate the RACES storm spotter network generally is made by civil defense. For unexpected or rapidly developing weather emergencies, however, several amateur stations have the authority to activate the net and serve as net control.

Network in Action

The RACES network is activated if a thunderstorm warning or a tornado warning or watch has been issued for the area. If the net is activated, the Weather Service notifies preselected amateurs that their services are needed at the Weather Service radio post. These amateurs have been chosen because of their knowledge of NWS operations and proven ability in net communications.

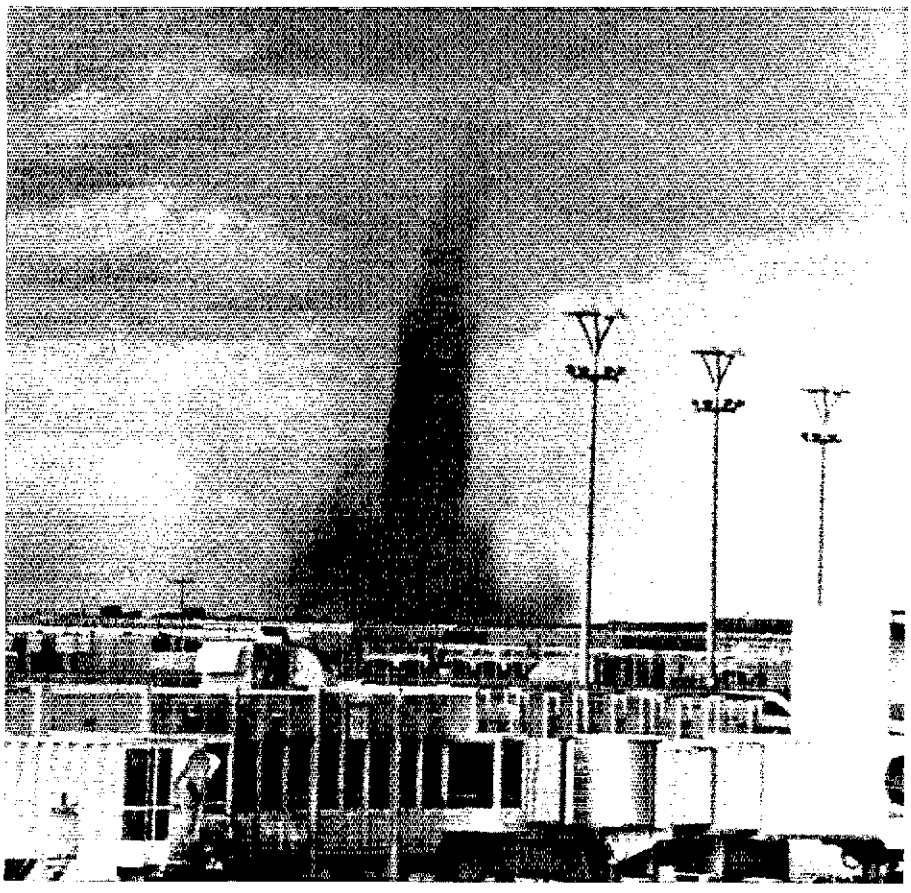
The radio post becomes a direct link between spotters in the field and the Weather Service. It sends forecaster requests for spotter reports in suspicious areas, confirmation requests, and status information to net control. During a tornado or severe thunderstorm, the radio post transmits the storm's location, time and movement as an aid to spotters. The Weather Service has permanent antennas and transmission lines for the radio post, but amateurs furnish their own transmitting and receiving equipment.

Once the net is activated, participants respond only to requests made through net control, and channel observations to net control. Net control directs traffic to the radio post; continuous monitoring by the radio post speeds critical spotter information to the forecaster.

It is often difficult to pinpoint a severe storm so other spotters know its exact location. To solve this problem, RACES members use a spotter grid map. The map covers Dallas and Tarrant counties with a 3-mile by 3-mile grid overlay. The spotters refer to the map's grid-square identification when transmitting reports.

The effectiveness of the RACES system was demonstrated during the May 1976 tornado. Although damage was excessive, remarkably only one person was injured. Alerted to the dangerous thunderstorm situation, spotters had transmitted detailed reports of the tornado's birth and turbulent history to the Weather Service.

The NWS seeks the aid of volunteer spotter groups throughout the country. The Amateur Radio Service offers an excellent source of volunteers to fill this demand. Amateurs are cooperative, willing to help, and, most importantly, have the skill and communications equipment needed to establish a storm spotting net. As the RACES system shows, the potential is large, and the need is great. Amateurs have provided valuable public service after disaster strikes. Organizing a weather net gives hams a chance to help *before* the emergency arises.



Their time on Earth is short, and their paths are narrow. But tornadoes cause terrible destruction when they strike. This one, which battered Denver in May 1975, transformed a thriving airport into a picture of desolation in a matter of seconds. *(photo courtesy National Oceanic and Atmospheric Administration)*

References

Amateur Radio and the National Weather Service. Prepared by the National Weather Service, Southern Region Headquarters, Fort Worth, TX, June 1977.

"Allies to Disaster Fighters," NOAA Magazine, Vol. 7, no. 4, October 1977, pp. 18-20.

The Work of Warning: A Plan for Timely, Local Severe Weather Warnings. The Office of Disaster Services, State of Iowa and the National Weather Service, Central Region, undated.

Organizing a Weather Net

For amateur groups interested in organizing a storm spotter net, here are a few guidelines. The first step is arranging a meeting between the National Weather Service and the amateurs. The meteorologist-in-charge of the local NWS office should be contacted to arrange the meeting. In most instances, Weather Service officials will be as unfamiliar with Amateur Radio as hams are with the NWS. The first meeting, then, should involve mutual education. NWS officials should be made aware of the capabilities and limitations of Amateur Radio, while the hams must gain an awareness of the NWS operation. Storm spotting and communication needs should be defined.

After the initial meeting, the amateur organizations involved in the net should designate one person or a small committee to represent them in devising an operating plan with the NWS official. The official can deal most effectively only with persons he knows represent all the amateurs. By necessity, he must avoid getting involved in factionalism. To be truly worthwhile, the weather net must transcend any factionalism in the amateur community.

The next step is to plan a method of operation and assign responsibilities within the net. Imagination in organizing the details will be limited only by the resources available. Attention should be devoted to several general areas:

Training — The Weather Service will help in conducting training sessions. How much is needed? What about refresher courses? Will training be required for net membership?

Communications — What frequencies are to be used? Where will spotters be needed?

Activation — How will the net be activated? Who will have this responsibility?

Reporting to the NWS — How will reports reach the NWS — by telephone from a central point to screen incoming reports, via a radio at the NWS office, or should both methods be used?

Spotter Plan Integration — How does the plan correspond to other spotter networks in operation or planned, such as civil defense? Can they be combined?

Weather Service Participation — How much and what type of involvement will be required or desired of Weather Service personnel?

There are many ways to answer these questions and tackle the planning stage. To a large extent, needs, resources and specific weather patterns will dictate the details of the spotter nets in each area. Most importantly, if a weather net is to succeed, the key word is cooperation — between the amateur organizations involved and between the hams and the National Weather Service.

Leaving a Mark on Tomorrow

There's malpractice, collision, fire and theft protection, but how do you insure the future of Amateur Radio? Leave it to the Foundation!

By Michele Bartlett,* N1AGD

Sailplanes, satellites and scholarships were on the minds of the Directors of the ARRL Foundation Board, which met in Miami on January 26, 1979. The big event that day was the transfer of all funds — approximately $48,000 — from the Foundation's Satellite Matching Fund and the Phase III Satellite Fund to the Amateur Radio Satellite Corporation (AMSAT). The Board also granted $300 to the ARRL Museum Fund to help the newly formed Museum Committee fulfill some of its goals, including the orderly display and protection of museum items and the restoration of the Hull-Bourne radio-controlled sailplane.

Amateurs are $481 closer to winning at the World Administrative Radio Conference, thanks to the donations of hams throughout the year to the Foundation's WARC Preparation Fund.

Two young amateurs will each receive $250 scholarships administered by the Foundation on behalf of a group of defunct Long Island radio clubs. The money entrusted to the Foundation by the clubs is to be used to help with the education of two Long Island amateurs each year. The recipients will be announced in April.

For more details on the Foundation Board meeting, read on!

MINUTES OF THE 1979 ANNUAL MEETING
OF THE BOARD OF DIRECTORS
THE ARRL FOUNDATION, INC.
January 26, 1979

1) Pursuant to due notice, the Board of Directors of the ARRL Foundation, Inc., met in annual session at the Ramada Airport Inn, Miami, Florida. The meeting was called to order at 9:00 A.M. with President Robert York Chapman, W1QV, in the Chair, and the following additional Directors present: Max Arnold, W4WHN; George duPont, WA1SVY; Richard A. Egbert, W8ETU; John Sanders, WB4ANX; John C. Sullivan, W1HHR; Stan Zak, K2SJO.

Director L. Phil Wicker, W4ACY, was absent because of a death in his family. The President expressed the regrets of the Board to Mr. Wicker.

Also in attendance at the invitation of the Board, was the President of the ARRL, Harry J. Dannals, W2HD, and several Directors and Vice Directors. Many of the non-participating observers left and re-entered the conference room during the course of the meeting.

2) The minutes of the 1978 Board meeting were approved with the following corrections.

The first sentence in paragraph one was corrected to read, "Pursuant to due notice, the Board of Directors of the ARRL Foundation, Inc., met in 1977/1978 annual session at the Headquarters building of the American Radio Relay League in Newington, Connecticut."

Moved by Mr. Sullivan, seconded by Mr. Sanders, VOTED to accept the correction to the minute.

Moved by Mr. Sullivan, seconded by Mr. Egbert, VOTED to accept the minutes of the 1977/1978 Board meeting.

3) President Chapman gave a brief report on the Foundation. He indicated he was indebted to Mr. duPont for his untiring effort in the work he has done and is doing in the Treasurer's position for the Foundation. Correspondence was received by the President from Dr. Perry Klein, relative to AMSAT funds and Mr. Jay Holladay, relative to transferring funds to the satellite program. The President discussed the letters and his reply.

4) The Treasurer's report was given by Mr. duPont. He reported on the orderly transfer of the Treasurer's functions to him by former President and Treasurer Larry Shima. He lauded the excellent bookkeeping of Mr. Shima.

Mr. duPont reported on the ARRLF funds up to the period of December 31, 1978. The Ernst and Ernst audited report up to that period of June 30, 1978 was distributed to the Board. He further reported that the tax return form has been properly filed and was pleased to report that no taxes are due.

A letter from the Ernst and Ernst auditors was read by Mr. duPont. He reported that action was being taken relative to their recommendations in the report.

5) The Secretary's report was given by Mr. Zak. He reported that a letter was received by him relative to a motion passed by the ARRL Board of Directors stating that a motion was passed indicating that *Roberts Rules of Order* shall prevail.

6) Mr. Arnold, as Chairman, gave a report of the Board Audit Committee. He reported no discrepancies were found.

7) Mr. duPont, as Chairman of the Investment Committee, reported on the Foundation investments. He discussed the various investments of the Board.

8) Mr. Zak, as Project Manager, OSCAR Education Program, reported that the National Science Foundation had turned down our request for funds. Mr. Dunkerley, from ARRL headquarters, had received notification from the NSF prior to leaving the employ of the League.

9) Mr. Egbert reported that he was unsuccessful in his endeavor to solicit funds from the Rockwell Company.

10) Moved by Mr. Sullivan, seconded by Mr. Sanders, VOTED that the meeting agenda be accepted.

11) Mr. Egbert, as Chairman, gave a report on the Availability Committee.

12) Moved by Mr. Sullivan, seconded by Mr. Sanders, that Mr. Robert York Chapman be nominated to the Office of President. Moved by Mr. Sullivan, seconded by Mr. Egbert, VOTED that the nomination be closed. The Chair instructed the Secretary to cast one ballot for Mr. Chapman. (Applause)

13) Moved by Mr. Chapman, seconded by Mr. Sanders, that Mr. John C. Sullivan be nominated to the office of Vice President. Moved by Mr. Egbert, seconded by Mr. Sanders, VOTED that the nominations be closed. The Chair instructed the Secretary to cast one ballot for Mr. Sullivan. (Applause)

14) Moved by Mr. Arnold, seconded by Mr. Chapman, that Mr. Stan Zak be nominated to the office of Secretary. Moved by Mr. Sullivan, seconded by Mr. Sanders, VOTED that the nominations be closed. The Chair instructed the Secretary to cast one ballot for Mr. Zak. (Applause)

15) Moved by Mr. Sullivan, seconded by Mr. Arnold, that Mr. George duPont be nominated to the office of Treasurer. Moved by Mr. Arnold, seconded by Mr. Sanders, VOTED that nominations be closed. The Chair instructed the Secretary to cast one ballot for Mr. duPont. (Applause)

16) The Board was in recess from 9:59 A.M. to 10:20 A.M.

17) Mr. Chapman recognized the observers at the meeting and requested Mr. Harry Dannals, W2HD, President of the ARRL, to provide some remarks to the ARRL Foundation Board. Mr. Dannals provided an inspiring message to the Board, indicating his support for their goals and requested the Foundation investigate the availability of funds from other Foundations.

18) After discussion on possible fund raising methods and policies, Mr. Chapman appointed Mr. duPont, as Chairman, to the Fund Raising Committee.

19) Mr. duPont, as Chairman of the Committee to Study Goals and Implementation of Goals, gave a report for the Committee. After extended discussion, and as a result of the discussion, the consensus of the Committee and the Directors was that the goals should be concentrated in the area of satellite funding efforts and the Scholarship Program.

Passing the bucks: ARRL Foundation President Robert York Chapman, W1QV, right, presents a check from the Foundation to Jay Holladay, W6EJJ, chairman of the Amateur Satellite Service Council. The funds will go to AMSAT. *(WB4ANX photo)*

*Assistant Secretary, ARRL Foundation

20) Moved by Mr. Egbert, seconded by Mr. Sullivan, VOTED unanimously that pursuant to the letter dated January 18, 1979, from Jay A. Holladay, Chairman, Amateur Satellite Service Council, to Robert York Chapman, President, ARRL Foundation, the Treasurer is ordered to transfer to the Amateur Radio Satellite Corporation funds identified as Satellite Matching fund and Phase III Satellite fund, including interest and dividends, as available on December 31, 1978 in the amount available after liquidation as designated by the grantors.

21) Moved by Mr. Sullivan, seconded by Mr. Zak, VOTED unanimously that pursuant to minute 21 of the 1978 ARRL Foundation Board meeting, the Treasurer is authorized to pay $300 to the ARRL for Museum and Building funds as designated by the grantors.

22) Moved by Mr. duPont, seconded by Mr. Sullivan, VOTED unanimously that the ARRL controller be designated to act as agent for the ARRL Foundation Treasurer and that he be authorized to co-sign withdrawals from checking and savings accounts presently active.

23) Moved by Mr. Sanders, seconded by Mr. Sullivan, VOTED unanimously that the ARRL Foundation Treasurer pay to the ARRL WARC Preparation Fund $481.99 as designated by the grantors.

24) Moved by Mr. Arnold, seconded by Mr. Egbert, VOTED unanimously that receipt of the Ernst and Ernst Audited Financial Statements for the fiscal year ending June 30, 1979 is acknowledged and that it become part of the ARRLF Treasurer's records.

25) Moved by Mr. Sanders, seconded by Mr. Sullivan, VOTED unanimously that the General Manager of the ARRL be requested to ask Headquarters staff personnel to promote contributions to the ARRL Foundation when attending hamfests and other meetings.

26) Moved by Mr. Egbert, seconded by Mr. Chapman, VOTED unanimously that the following addition be made to the Bylaws, Article II, Section 11, "On questions of order and procedure not otherwise determined by these Bylaws, the provisions of the current edition of *Roberts Rules of Order* shall prevail.

27) Moved by Mr. Sullivan, seconded by Mr. Chapman, VOTED unanimously that Director Egbert serve as liaison to the ARRL Board.

28) Mr. Chapman reported that he was reappointing all Chairmen and Committee members to the existing Committees.

29) Mr. Egbert reported to the President that the ARRL Board of Directors had, in the past two days, passed a motion reaffirming their support of the ARRL Foundation.

30) After extended discussion on providing a wider image for the ARRL Foundation, Mr. Chapman appointed Mr. Egbert as Chairman of the Communications Committee.

The Board was in recess from 11:41 A.M. to 11:47 A.M.

31) Mr. Chapman requested Mr. Holladay, Chairman of the ASSC Committee to address the Board. Mr. Holladay, in his address, requested an AMSAT liaison be appointed.

Mr. Chapman appointed Mr. Arnold as liaison for AMSAT-ARRL Foundation.

32) Mr. Zak, as Scholarship Chairman, presented a report of the Scholarship Committee. Scholarship forms to be used by the Committee were distributed to the members of the Board. He reported that 10 scholarship applications were received for the Long Island Scholarships. The approved application forms will be sent to the applicants with a return date of March 1, 1979. Copies will be sent to Committee members and a decision made by April 1, 1979 announcing the recipients of the awards.

33) There being no further business, moved by Mr. Sullivan, seconded by Mr. Sanders, VOTED to adjourn at 12:24 P.M.

Respectfully submitted,
M. Bartlett for
Stan Zak, K2SJO
Secretary

Strays

AUSTRALIAN MUSEUM FEATURES AMATEUR RADIO

☐ Next time you're in Melbourne, be sure to visit the two amateur stations in that city's Science Museum. One, VK3BWI, is owned and maintained by the Wireless Institute of Australia. It carries news from various radio clubs, the WIA, and the P and T Department (Australia's equivalent to the FCC and DOC). ATV on 432 MHz is also used. The other station, VK3AOM, is a demonstration station designed to educate the public about radio communication and, particularly, Amateur Radio. The station is manned by WIA volunteers. School children who tour the station learn to send their initials in Morse code, and it really fascinates them. The children and public generally make the job of the volunteer a very rewarding one, particularly when physically handicapped visitors come in. They can see that Amateur Radio has something for them and they show great interest.

The number of hams from around the world who migrate to the shack while looking through the museum is amazing. A large number of Ws and VEs have made their presence known and been welcomed. — *Ken Gillespie, VK3GK*

ZL CONFERENCE

☐ The 1979 Annual Conference of the New Zealand Association of Radio Transmitters will be held at Upper Hutt on June 1-4. Overseas visitors are welcome to attend. Write the Secretary, 1979 Conference Committee, P. O. Box 40-212, Upper Hutt, New Zealand. — *ZL2BHK*

AN ERIE CERTIFICATE

☐ The Radio Association of Erie (PA) awards the Worked Ten Erie Hams Award for two-way contacts (any band; any mode) with 10 residents of Erie. Photocopies of QSLs or log entries acceptable. Send information (a business-sized s.a.s.e. will speed delivery) to Radio Association of Erie, Box 844, Erie, PA 16512.

QST congratulates . . .

☐ Brian E. Peters, WD4EPR, recently appointed Warnings and Preparedness Meteorologist with the National Weather Service, Memphis, TN. He has been active with Amateur Radio Storm Spotters in Dallas-Fort Worth and Memphis.

☐ Tony Heinz, WB6KVB, winner of a "special mention of excellence" in the national Apker Award. The American Institute of Physics sponsors it in recognition of outstanding undergraduate work in the field.

☐ Lois Jorgenson, WAØRWM, who received the National Public Service Award from the National Weather Service. Lois has recently been named SCM of North Dakota.

☐ Dick Kaufmann, K2DMR, who received the Outstanding Achievement Award from the Industry Applications Group of the Institute of Electrical and Electronics Engineers (IEEE). Now retired, Dick was manager of power engineering in General Electronic's Industrial Power Systems Unit.

☐ Art Zygielbaum, WA6SAL, who, along with former hams Pete Hubbard and Dr. Richard M. Goldstein, and two others, received a patent on a digital demodulator-correlator. *(from* W6VIO Calling*)*

I would like to get in touch with . . .

☐ teenage hams in call areas 1, 2 and 3 who are interested in participating in a teen roundtable. Jeff Bier, KA2CRF, 16 Junard, Roslyn, NY 11576. State time and frequency preferences.

☐ other hams who are also amateur linguists. Gabe Gargiulo, 160 Elm, North Haven, CT 06473.

☐ former weather bureau employees who would like to form a 40-meter net. Robert Richard, Rte. 5, Box 243-14, Washington, NC 27889.

☐ a ham in Ljubljana, Yugoslavia, for a sked between 21.1 and 21.2 MHz or 28.1 and 28.2 MHz. Nick Kasoff, WD8PRT, 470 Polecat Rd., Yellow Springs, OH 45387 USA. I am 12 years old.

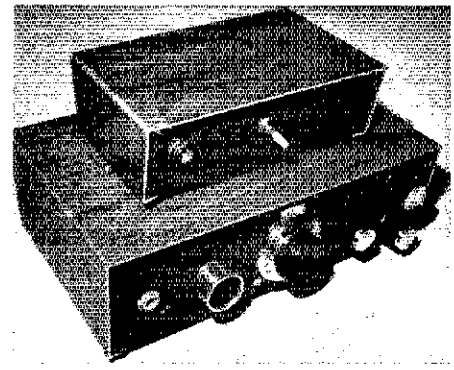
☐ others who participate or spectate drag racing or custom car shows. George W. Deas, WD9GIT, 39 Country Club Dr., Northlake, IL 60164.

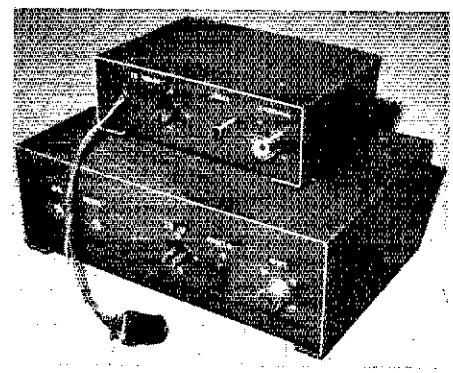
☐ hams who are members of a QRP net. Samuel LeBow, WB6FJZ, P. O. Box 3852, Long Beach, CA 90803.

☐ anyone who could lend me a schematic or manual of the Central Electronics Multiphase Exciter Model 20-A. I will copy and return promptly. A. McGinnis, WA2DTQ, 55 Patton St., Iselin, NJ 08830.

☐ teenage hams interested in starting an informal 75-meter net for ragchewing and technical help. Ray Parsons, WB2LUB, 150 Mosher Rd., Delmar, NY 12054.

☐ Boy Scouts who are hams. John Smith, KB4HE, Rte. 5, Box 23, Tocca, GA 30577.





Within a month after the "Sardine Sender" appeared in *QST* (November 1978), W3IAG, Erie, PA, had a unit together and on the air. The 3/4-W, 80-meter rig (top) was mated with a receiver built from the "Learning to Work with Transistors" series of a few years back, and the first contact was with Chicago.

MEETING AIDS AWARD-SEEKERS

☐ A special on-the-air meeting between the Vienna (VA) Wireless Society and the Italian-American Roundtable was held recently to afford VWS members the chance to earn as many points as possible to achieve the La Scala of Milan award (October 1978 *QST*, page 60). Club members achieved 10 of the 20 points needed for the award; another meeting is planned. — *WB4GKN*

Grandeur sur la Mississippi

Baton Rouge = Red Stick? Funny name for a city; fine place for the 1979 National Convention!

By Don Allan,* W5FVK and Jane Allan,* W5MZI

Vacation in an enchanted land, a period in time thought to have passed into books and legends, and existing no more . . . the Deep South. Gracious plantation homes with broad lawns and formal gardens relive a period from antebellum history. Dark foreboding swamps with unlikely names — Atchafalaya, Lutcher, Devil's Swamp — stand as they did in the days when they were first seen by Bienville and Iberville, who discovered a settlement of Indians living on this bend in the great Mississippi River. They named it Baton Rouge, now the capital of Louisiana. The alligator and deer, 'coon and 'possum still abound in the wilderness area which surrounds us. The bayous that inspired Longfellow's "Evangeline" still are the highway and the lifeline of the "Cajun" community. Giant oak trees, festooned with living Spanish moss, provide graceful protection from near-tropical sun. Lush growth of flowers and foliage abounds.

When and Why

The 1979 ARRL National Convention will be held at the Centroplex in Baton Rouge, July 20 through 22. There will be excellent technical sessions, while booths for manufacturers' displays are almost all reserved and already in the design stage. The well-organized program features activities appealing to many different interests.

Since harmonics, large and small, must be safe and happy before OMs and YLs can enjoy their activities, children have been given first priority. There will be organized, supervised fun, with transportation included. There will also be free periods scheduled, with suggestions of things to see and do on an individual or family basis.

The Centroplex is a new facility in the municipal-government complex. It is located downtown where the concentration of points of interest is greatest. All accommodations are conveniently located, with facilities for RVs only three miles from the Centroplex. Early reservations are strongly recommended and a special gift will be provided for those who make them in advance.

Interstate 10, Interstate 12 and other major highways come into the city; Delta Air Lines will schedule VIP special accommodations beginning July 16. Dandrich Tour Company is arranging bus tours. If you're coming by raft or "tubing," we'll arrange to have the river wash you ashore right here!

We're planning some very special activities, parties and tours, as well as hamming, swapping, ARRL business and general renewing of friendships. Don't be concerned about the weather. Of course it's warm — so we have air conditioning (and sun tans). Yes, it rains (sometimes a shower every day), but when it does we go inside and do something else 'til the sun comes out again, so you may find yourself more comfortable than in many more temperate climates. The language should be no problem; after a couple of days y'all will be tawkin suthin too!

The best is saved 'til last! Each of the five nations that has captured and ruled this area has left a legacy of good cooking that cannot be surpassed. We're going to dazzle you with fresh Gulf shrimp and oysters, plump and full, served plain or in dishes that have been enjoyed for centuries by royalty and plain folks, alike. Real jambalaya, crawfish pie, candied yams, Southern fried chicken and fried Louisiana catfish.

While in this area, you may wish to extend your visit and see other things. Across the river from the Centroplex is the Port of Baton Rouge, the largest inland deep water port on the Gulf. Ocean-going tankers and freighters are a regular sight, with relatively tiny river tugs and barges, ferry boats and other river traffic a common sight. False River, less than 25 miles away, offers superb fishing and water sports in a lake created when a bend in the river was cut off from the main stream by natural erosion. The local industrial complex consists of a "golden strip" 75 miles long — petroleum and chemical plants which are, no doubt, responsible in some way for all of our conveniences. The State Capitol, the tallest in the nation, with its history of triumphs and tragedies, provides an overview of the whole area from its 34th-floor observation deck. Of course, New Orleans is little more than an hour away via Interstate 10. Avery Island, with its miles of gardens and aviary, has much to recommend it, as do the salt mines and Tabasco plant. These are located about 50 miles from Baton Rouge, and are also accessible by interstate. The Greater Baton Rouge Zoo, Louisiana State University, and the campus of Southern University are just a few of the places that might be of interest to you. Many others have been omitted because we hope to show them to you ourselves. Write '79 ARRL National Convention, P. O. Box 891, Baton Rouge, LA 70821.

*222 Oak Hills Pkwy., Baton Rouge, LA 70810

Happenings

Conducted By W. Dale Clift,* WA3NLO

FCC Organizational Shake-up

The Federal Communications Commission has announced its intent to reorganize its Safety and Special Radio Services Bureau. Under the plan, the Commission will change the name of the bureau to the "Private Radio Bureau" and abolish the present six divisions, replacing them with four new divisions. Scheduled to be abolished are Personal Radio Division (the division having jurisdiction over the Amateur and CB Radio Services); Aviation and Marine Division; Industrial and Public Safety Facilities Division; Industrial and Public Safety Rules Division; Land Mobile Spectrum Management Division; and the Legal, Advisory, and Enforcement Division. The new divisions would be called the Compliance, Licensing, Policy Development, and Rules Divisions.

The Commission's announcement also named most of the managers of the new "branches" of the four divisions. Of particular interest to amateurs: John Johnston, former chief of the Personal Radio Division, will head the Personal Radio Branch of the Rules Division.

However, the reorganization has run into at least one snag. The president of Local 209 of the National Treasury Employees Union, Edward DeVaughn, says the union will be filing unfair-labor charges based on the failure of the Commission to provide information "necessary to meaningfully negotiate as to the effect of this reorganization on the employees in the bargaining units." DeVaughn says the FCC management position is that the union does not "need" the information it is requesting.

GOLDWATER HOLDS RFI MEETING

On January 26, 1979, Senator Goldwater, who introduced his RFI bill, S.864, in the last session of Congress, held a meeting with those people who had presented testimony to the Senate Communications Subcommittee in June 1978. The purpose of the meeting was to examine progress that has been made in radio frequency interference suppression over the past several months. Most of those attending the meeting were representatives of manufacturing concerns. Charles D. Ferris, FCC chairman, was also there. Representing the ARRL was Hal Steinman, Washington area coordinator.

The manufacturers' viewpoint was that they were very aware of their responsibility to the public to make their equipment RFI-proof, but that they would prefer to do it voluntarily rather than through government regulation. They said government regulation would raise the costs of production of home-entertainment devices and therefore raise prices to consumers. Chairman Ferris, when asked by Senator Goldwater about the RFI complaint history of the past six months, said that the level of complaints had decreased, but that this possibly could be attributed to the fact that the FCC had changed its procedure for accepting complaints and no longer accepted complaints by phone. He also spoke briefly on the Commission's RFI Inquiry, General Docket 78-369, which explores all aspects of the interference problem (see March 1978 *QST*, pages 9, 48-50). Hal Steinman pointed out that the attendees of the meeting seemed to be overlooking the viewpoint of the licensee of a legally operating transmitter who is forced to curtail operation because of the presence of susceptible equipment in the vicinity. He also said that better designed receivers would allow for more efficient spectrum utilization.

Senator Goldwater asked that the manufacturers send his staff copies of updated circuit diagrams, instruction manuals, etc., as they are updated to incorporate RFI protection and consumer information about RFI. In view of the fact that the FCC is currently conducting an RFI Inquiry, and in order to allow the manufacturers more time to voluntarily make improvements in RFI susceptibility, Senator Goldwater said that he would not at this time reintroduce his RFI bill in the current session of Congress. He said he would decide later this year whether it would be worthwhile to meet again with the manufacturers and whether he should reintroduce his bill at that time. — *Hal Steinman, K1FHN*

ELIMINATION OF TELEGRAPHY CREDIT FOR AMATEUR EXTRA CLASS LICENSES PROPOSED (SS DOCKET NO. 79-22)

The Commission has proposed amending its rules to eliminate the granting of credit for the telegraphy portion of the Amateur Extra Class license examination to former holders of an Amateur Extra First Class license.

Amateur Extra First Class licenses were issued by the Federal Radio Commission from 1923 to 1933. Since then, equivalent licenses, designated Class A and then Advanced, have been issued by the FCC.

In 1952, the Commission created the Amateur Extra Class license, having more stringent written examination requirements than those associated with the Extra First Class license. However, the telegraphy proficiency requirement was the same for both.

Recognizing this identical requirement, the Commission in 1972 amended Section 97.25(d) of the rules to provide telegraphy credit for applicants who have continuously held the Amateur Extra First Class license and its successor licenses. The Commission noted, however, that since that time, the number of persons seeking credit had declined to the point where such an application was now rare, making the rule provision obsolete. Therefore, it proposed deleting Section 97.25(d), adding that the effective date of such an action would be delayed for six months to give any remaining eligibles a final opportunity to receive telegraphy credit toward the Amateur Extra Class exam.

Comments are due by April 30 and replies by May 30.

Action by the Commission February 13, 1979, by Notice of Proposed Rulemaking (FCC 79-95). Commissioners Ferris (Chairman), Lee, Washburn, Fogarty, White and Brown. — *FCC News Release*

FCC AMENDS PART 83 REGARDING COMMUNICATIONS BETWEEN SHIP RADIOTELEGRAPH STATIONS AND AMATEUR STATIONS

In 1939, the FCC adopted Sections 83.50 and 83.70 that allow certain ships operating in scientific research or exploration projects to communicate by telegraphy with amateur stations. Authorization is usually given when ". . . unusual circumstances make direct communications with amateur stations extremely beneficial to persons on board or to persons responsible for the scientific expedition . . . messages will not relate to commercial communications and . . . no harmful interference will result to stations in the maritime mobile service nor to stations in the radiolocation service." There is no ship currently operating with this authorization. Moreover, if communications between a vessel and amateur stations are desired, an amateur mobile station, which is a radio installation separate from the ship station, can be operated aboard the vessel, provided the operator is a licensed amateur and the requirements of Sections 97.101 and 97.114 of the Amateur Rules are observed.

The FCC has ordered that Sections 83.50 and 83.70 be deleted effective February 23, 1979. For further information on this proceeding, contact John Hays at FCC, 202-632-7197, Washington, DC.

PETITIONS FILED

The following petitions for rulemaking have been filed with the FCC:

RM-3281 requests the abolition of the FCC requirement of identifying the other station with which an amateur station is in communication if the conversation lasts less than one minute. This petition was filed by A. Kaeding, K8TMK.

RM-3302 requests that the rules be changed to delete the requirement that an Amateur station transmit the call sign of the station with which he is in contact. This petition is similar to RM-3281 and was filed by S. Mann, WB9PRU.

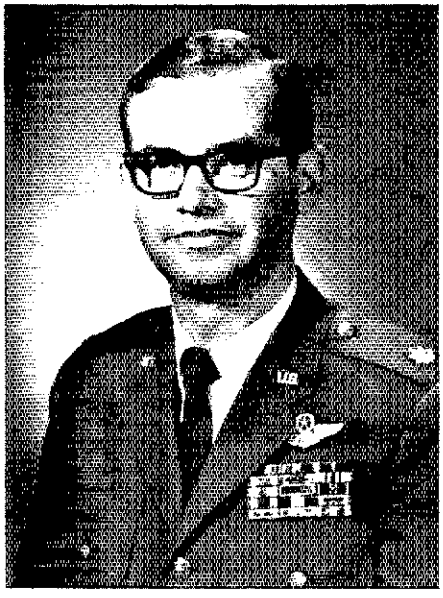
RM-3313 requests modification of the Amateur Rules to allow 16F3 emissions from 52.0-52.5 MHz. It was filed by ARRL.

RM-3314, also filed by ARRL, requests privileges for Novice licensees on the 220-MHz

*Deputy Manager, Membership Services, ARRL

band. (See March 1979 *QST*, page 58.)

RM-3317 requests the formation of a new radio service with frequency privileges between 27.41 and 28.0 MHz, said service to be administered by the Amateur Radio Service. It was filed by the Washington State CB Radio Association.



Lt.-Col. Peter M. Hurd, N1SS/K4NSS, has announced his retirement from the Air Force, effective August 1, 1979. Hurd has served as the executive secretary of FCC's WARC Advisory Committee on Amateur Radio (ACAR), and holds an FCC appointment to the National Industry Advisory Committee, serving as chairman of the Amateur Radio Services Subcommittee. The holder of an Amateur Extra Class license, Hurd received an M.S. in public administration from George Washington University in Washington, DC, writing his thesis on national telecommunications management. Among other achievements, Hurd was the founder and first-elected president of the Pentagon Amateur Radio Club, and was the guest speaker on WARC-79 at the 1977 Dayton Hamvention. He also presently serves as the regional vice president at large for Amateur Radio of the Armed Forces Communications and Electronics Association.

LEAGUE VICE DIRECTOR RESIGNS

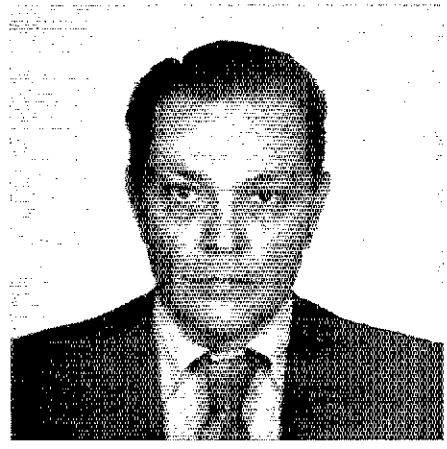
Pressing business commitments have compelled another ARRL vice director to resign. Robert H. Dilworth, W4LQE, submitted his resignation as vice director of the Delta Division, effective January 9, 1979. President Dannals appointed a former vice director from that division, John Sanders, WB4ANX, to complete the term of office. John served Delta Division members in that capacity during the 1974-75 term. — *Michele Bartlett, N1AGD*

SPENCE RETIRES

FCC Chief Engineer Ray Spence, W4QAW, will retire from the Commission at the end of this month. He became chief engineer eight years ago after having been deputy chief engineer for two years. His reputation for keeping political considerations out of the decisions of the Office of Chief Engineer is widespread.

Ray was graduated from Ohio State University in 1951 with a Bachelor of Science in physics. After serving on active duty with the Army Signal Corps in 1952-1954, he was a field engineer with Philco from 1954-1958. Then he became chief of the U.S. Air Force's Navigational Systems Branch at Oklahoma City. From 1960 to 1968, Ray was chief of the Voice Communications Systems Branch, R and D Service, at the Federal Aviation Agency.

Ray's Amateur Radio activity goes back to childhood. His original call was W8NVT, and he holds various awards, including the DXCC phone from both DL4BY and KZ5DX.



Ray Spence, W4QAW

LUKASIK NAMED CHIEF SCIENTIST

Stephen J. Lukasik will become the FCC's chief scientist upon the retirement of Chief Engineer Raymond E. Spence. At that time, FCC's Office of the Chief Engineer will become the Office of Science and Technology. The name change is designed to reflect the expanding role of the bureau in planning and conducting the FCC's technical, engineering and scientific studies and programs aimed at improving telecommunications.

Dr. Lukasik received his Ph.D. in physics from the Massachusetts Institute of Technology, and is presently the chief scientist of the Rand Corporation. He is a former director of the Advanced Research Project Agency of the Defense Department. Prior to his service with ARPA, Dr. Lukasik was vice president of the Systems Development Division of the Xerox Corporation.

NEW FCC OFFICE OF PUBLIC AFFAIRS

The FCC has established a new office to oversee the Commission's Public Information, Consumer Assistance, and Industry Equal Employment Opportunity and Minority Enterprise programs. The Office of Public Affairs will be responsible for keeping the public, including the press and FCC's regulatees, informed of FCC decisions and regulatory requirements, for encouraging public participation in the FCC's decision-making process, and for keeping the public informed of Commission policies promoting equal employment opportunity and minority participation in all aspects of the communications industry. Robert L. Mann, presently deputy assistant director for Public Education of the Council on Wage and Price Stability of the Executive Office of the President, will head the new office.

FEE REFUND UPDATE

In a First Report and Order adopted on January 31, 1979, the FCC announced that it will begin refunding fees collected from applicants in the various radio services, including amateur. See January 1979 *QST*, page 65. In Phase I, only fees of over $20 will be refunded. Smaller fees will be handled in Phase II, which has not yet been announced. At this time, the FCC has not finished printing the necessary application forms for refunds; that is expected to be completed in mid to late spring 1979 at which time the program will be underway. If you paid a fee for an amateur license of over twenty ($20) dollars between 1970 and 1976, you should be eligible for a refund. Watch "Happenings" for further details as they unfold. — *Alexander N. Gerli, ACIY*

LICENSE APPLICATION FACES POSSIBLE REJECTION

The application for an Advanced class license by a former Amateur Radio operator is being held under consideration by the FCC's Legal, Advisory and Enforcement Division, pending the outcome of a Designation Order released December 21, 1978.

According to the Order, released by Division Chief Gerald M. Zuckerman, Gary T. Gorniak, a former General class licensee who held station call sign WB4REN, was convicted on October 25, 1977, of a violation of Section 301 of the Communications Act of 1934, which states that a person shall not operate a radio station without an FCC license. The Order also says that Gorniak's station license has been suspended and revoked, and his operator's license has been suspended.

In a hearing held on January 27, 1977, it was concluded that in July 1975, Gorniak appeared at the FCC office in Atlanta and took a General class exam to fraudulently obtain a license for another individual. At that time, Gorniak's own operator's license was already suspended on an unrelated charge, according to the Initial Decision of the hearing released April 8, 1977. This decision concluded that Gorniak had continued to operate his transmitter in willful violation of the Order of Suspension. As a result of that decision involving both the fraudulent license and his continued operation, Gorniak's station license was revoked on May 31, 1977, and his operator license suspended for the remainder of the term.

The designation Order states that subsequent to the revocation and suspension of his licenses in May, Gorniak again operated transmitting equipment, and was convicted in U.S. District Court, Western District of Kentucky. He was fined $2000 and placed on one year's probation.

The Designation Order said that, "In view of Gorniak's operation of radio equipment in disregard of his suspensions and revocation, his past conduct in obtaining an Amateur license by fraud, and his violations of Commission rules, it cannot be determined that a grant of his application (for Advanced class license) would serve the public interest, convenience and necessity."

At presstime, a hearing was scheduled to be held in the Louisville vicinity, with the burden of proof on Gorniak to convince the Commission that he should be allowed to receive an Advanced class license. — *Michele Bartlett, NIAGD*

HONOR YOUR EDITOR WINNERS

The Amateur Radio News Service announced the winners of their "Reward Your Newsletter Editor" contest (September 1978 *QST*, page 59). Winners were chosen on the basis of general format, member contributions, editorials, club activity coverage, recruiting activity and training, as well as size of readership audience. First prize winners in each class were as follows: 100 or fewer distributed copies — "Salami Merchant" (Silver Creek ARA, Doylestown, OH, W8WKY, editor); 100-200 copies — "QCC News" (Chicago Chapter of the QCWA, W9MOL, editor); 200-300 class — "QUA" (Warrington Area Repeater Association, Warrington, PA, WB3CFE, editor); 300-400 copies — "Carrier" (Mt. Diablo Amateur Radio Club, Pleasant Hill, CA, W6CU, editor); 400-500 level — "AMSAT Newsletter" (Radio Amateur Satellite Corporation, Washington, DC, G3ZCZ, editor).

In the multi-club papers, 1000 or less distribution level, "Mobile News" (Amateur Radio Mobile Society of Purley, England, G3FPK, editor) shared first prize with "220 Notes" (Skokie, IL, W9IWI, editor). In the 1000 or more classification, first place was held by "Repeater Journal" (Carolinas-Virginia Repeater Association, Durham, NC, K4MOB, editor). We regret that space does not allow us to list the second and third place winners, but, with The Amateur Radio News Service, we say hearty congratulations to one and all. — *Bobbie Chamalian, WB1ADL*

LICENSE FIGURES

The FCC has issued the following license figures for the end of 1978: Novice 62,856; Technician 68,738; General 118,808; Advanced 83,436; and Amateur Extra 22,498. The total of all U.S. licensed radio amateurs comes to 356,336, representing an 8 percent increase over 1977 year-end figures.

SENATE SUBCOMMITTEE ON COMMUNICATIONS

The United States Senate Committee on Commerce, Science and Transportation has announced the members of the Subcommittee on Communications: Chairman, Ernest F. Hollings (Dem.-SC); Ranking Minority Member, Barry Goldwater (Rep.-AZ); Howard W. Cannon (Dem.-NV); John C. Danforth (Rep.-MO); James Exon (Dem.-NE); Wendell H. Ford (Dem.-KY); Daniel K. Inouye (Dem.-HI); Warren G. Magnusom (Dem.-WA); Larry Pressler (Rep.-SD); Donald W. Riegle, Jr. (Dem.-MI); Harrison Schmitt (Rep.-NM); and John Warner (Rep.-VA). It should be noted that Senator Cannon is chairman of the full committee.

PHOTOCOPIES OKAY

In a Report and Order on Docket 20672 released January 18, 1979, the FCC terminated a proceeding, which, if adopted, would have required that amateurs submit their original license when applying for a renewal or modification. By this action, the FCC has affirmed the right of amateurs to retain their original license and attach a photocopy of it to their form 610.

At one time the Commission found that some amateurs were altering their licenses to obtain operating privileges or examination credit for which they did not qualify. The majority of these forgeries were by Technician class operators who were examined by volunteers and who then altered their licenses to resemble those issued to Commission-examined Technicians.

Since the Commission granted examination credit to all Technicians in Docket 20282, however, and in response to protests from amateurs who want to keep all their licenses permanently, the FCC decided not to penalize the bulk of amateur licensees for the infractions of a few. The licenses are now printed on paper stock which readily shows any alteration, even in a photocopy. Therefore, the FCC has terminated proceedings in Docket 20672, effective immediately. — *Michele Bartlett, NIAGD*

BEHIND THE DIAMOND

When this Hq. staffer decided to pull up roots, he didn't let grass grow under his feet. Bernie Glassmeyer, W9KDR, made the leap from tractors to trajectories in January 1978 when he left his farm in Illinois to become the ARRL OSCAR 8 operations manager in the Club and Training Department. Bernie had barely two months to get stabilized here before he was rocketed to California to attend the launch preparations for OSCAR 8. (He shot the *QST* cover photo for July 1978.)

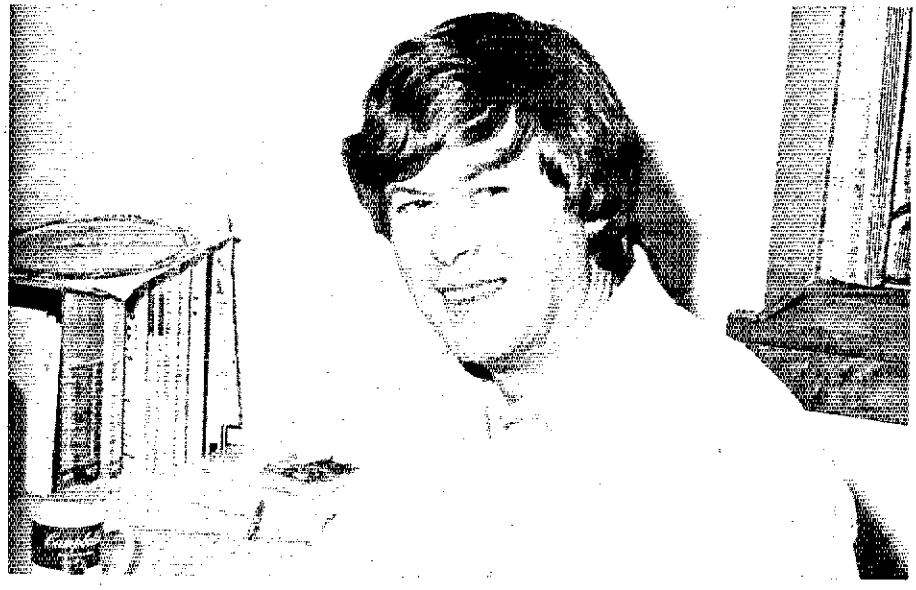
Among Bernie's responsibilities as OSCAR 8 operations manager is to operate the backup command station. When the computer-controlled primary command station at VE3HCR is not available, Bernie catches OSCAR 8 on its second orbit, switching the mode to conform to the schedule published in *QST*. He uses a full complement of antennas to do the job — three on 10 meters (one, a loop, is his own design) and four on 2 meters. In addition, he uses a "4 × 3 × 2 MHz Filter," which several hundred amateurs are now using to effectively cure a Mode J desense problem. Bernie designed the filter as well. Any current projects? "Oh, sure," he says. "W1VD and I are working on a new Mode J antenna with switchable polarization. And we're experimenting with loops, quagis, omnidirectional antennas — we're always in a state of experimentation."

Actually, Bernie had already spent a lot of time with his head in the clouds before joining the Hq. staff. He served for 10 years in the U.S. Air Force as an airborne electronic warfare officer with a top secret clearance, and was stationed in California from 1950 to 1960. He was first licensed in 1952 as W6TMX.

Upon rejoining the private sector, Bernie embarked on an electronics career in California that included systems engineering, design, repair, technical writing, drafting and product development. He returned to his native Illinois in the mid-'60s with his wife Nancy and their two young daughters. When he wasn't out plowing the amber waves of grain, he was designing and building their home, fishing, golfing or hamming on 160 meters through 70 cm.

Bernie enjoys cw (he *should* — he copies 30 words per minute) and likes to build radio equipment. He holds the DXCC and WAC awards, a Public Service Award, and needs only Alaska for the WAS award — on 6 meters. His pride and joy is an Illinois Section VHF Contest award. Bernie was one of the first amateurs to work through the Soviet Radio Sports satellites, and was only a minute shy of making the first transatlantic contact via RS-1. With such on-the-air activity, it is no wonder that Bernie was appointed the Hq. liaison for the VHF-UHF Advisory Committee. He is also a member of the ARRL Awards Committee.

Around the Club and Training Department, Bernie is known as "a real astro-nut." One thing is certain: For this ambitious amateur, the sky is the limit! — *Michele Bartlett, NIAGD* QST



Bernie Glassmeyer, W9KDR, is OSCAR 8 operations manager — and the most youthful grandfather on the Hq. staff!

Moved and Seconded...

This list is a continuation of the Minutes of the Executive Committee meeting of January 23, 1979, as reported in March *QST*, page 67. The remainder of the list of 1551 newly elected Life Members will be published in an upcoming issue.

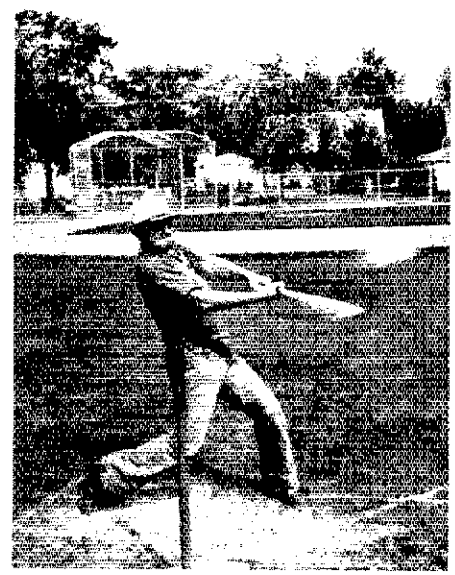
LIFE MEMBER APPLICANTS
January 23, 1979

H. H. Alderman, WA5ULJ; Carl D. Avers, W3DRY; Melvin Barnard, W9MAR; Barry D. Bayer, K9CFV; Wilbur G. Bemis, Jr., WB3EDI; Frank W. Bishop, Jr., WB4LBI; Robert O. Boatman, Jr., WA5SAH; William R. Bradford, K7EA; Berkeley Brandt, Jr., W7FML; Benjamin N. Cembrola, WA2MTT; Joseph L. Clark, WB4DDU; William I. Coburn WD4DTM; Crawford L. Cole, W4ZGX; Gerald R. Crow, WB4PVC; Paul S. Darrah, WB7EIX; Meade Davis III, WB7EOQ; Roger N. Dennis, WB2HWO; Paul W. Egbert, WA8PSN; Stephen K. Ellison, WB4KTH; William J. Emrich, Jr., WA5QZV; Peggy Ferguson, WA4KOP; David L. Fox, WA1QGC; Leonard E. Gates, W7CCV; Ronald J. Gonzalex, WB2QEA; Jeanie B. Haynes, WB4FOL; George W. Hendricks, Jr., WB4EER; Joseph M. Hinkle, N4VY; E. E. Hoisington, W4YTA; Morris Hornik, WB9JHW; Elisabeth Jackson, WDØFUH; Leo Jendraszkiewicz, Jr., N9QX; Kenneth Kucera, WBØZXU; Hugo L. Kleinhans III; Charles W. Lucas, W5VGE; Robert G. Lynch, W1EFH; Mark M. Maddox; Michael Marko, Jr., K2NU; C. K. Marston, WB4LXH; Ted McConnell, N5AFZ; Jonathan M. McFadden, WA6SUJ; John A. McKenzie, K8SSU; Richard F. Meese, WBØTAY; Robert A. Miller, N9RM; Richard L. Morefield, WB4TFW; William C. Morris, KL7JBJ; Wayne L. Mueller, W4LVM; Frank H. Nelson, K4JUB; Marion A. Noakes, W2UTF; William T. Pace, WB5NSR; Bill Packard; Frederick N. Pearson, W3GJP; Paul E. Petroske, W3IWX; Richard D. Pitts, WA6LMM; W. David Phillips, WA6WLJ; James B. Porter, Jr.; Nelson Preble, WB9TPW; James N. Price, K6ZH; M. Wayne Price, W5GIE; Arnold H. Rand, W2NYU/WA1JJV; Perry W. Remaklus, W1COW; Raymond Richard; Larry Austin Richards, WB5SQB; Jacqueline H. Robinson, K7IAF; Reuben Robinson, Jr., K3SQ; Wynn C. Rollert, K8DOQ; Herbert M. Rosenthal, W9IYG; John H. Schlierkamp, WA2FXC; Kurt Schrader, WB7UDA; John M. Schwerdt; Robert W. Seaberg, W3MDM/W9JIC; D. K. Siemer, KØJYD; Nolan H. Siemer, WØRCY; Norman S. Silsby, Jr., WA4BRL; Daniel A. Smith, WA7COQ; Allen W. Steiner, NØTE; Claude K. Still, WB5SVS; Shahane R. Taylor, Jr., W4PFG; Donald E. Thomas, N6DT; Dirck Teller, WA3ZIZ/PY2ZCL; Jack Van Natta, WB5DYE; Lewis A. Wagoner, WD8DIE; Clifford R. Ward, WA5LVG; Thomas B. Warren, WB3JHP; Kenneth E. Williams, Jr., WA4INO; Julius B. Waschin, WAØCIE; John H. Yells, Jr., N2JY.

Lowell Adams, WB4FSO; Tom C. Adams, WA5UEP; Paul F. Adrian, Jr., WD9BMI; C. Kurt Alexander, WB9UUY; Bill D. Allen, W5NQR/K9AKF; Kenneth E. Allinson, K6CIL; Dan W. Alwin, WAØRKF; Anthony Aman; Albert L. Anderson, W6GSP; Ronald William Apelquist, WBØNZB; Sheldon Apsell, W1GWR; J. Luther Arendell, WB4RLU; Arthur T. Arestad, W8WTL; Bill Arnold, WB5POG; Edward Aronson, K2AKN; John Averitt, KB4HN; William J. Baczuk, WA7WLT; Charles E. Bader, WB2OYD/WB9QVW; John D. Baer, WA6AJB; Carl W. Balster, WB2MJR; Donald C. Barnes, WAØTPR; John W. Barron, WA4LHT; Peter E. Barron, WA2IED; Paul E. Bass, WB8MWH; George J. Baustert, WA4CZW; Ronald G. Baxley, N4GB; John T. Beam, K9CVL; Jay L. Beavers, K5XO; Rex L. Beavers, W5SX; Larry E. Becker, W5VEO; Ralph A. Bellas, Jr., K9ZO; Claude M. Beltz, WA9OJU; John A. Bennett, N4XI; Harvey L. Bennett, N4UC; Barron R. Benroth, WA6ZDB; Richard Bernhard, W2FEO; David Bethke, N5DB; Frank Bicking, WB2JMA; James N. Bieneman, W9PV; Terry T. Biggs, WB7CHK; James G. Bingham, WB4JVZ; Donald E. Birch, K7NN; Keith E. Blackburn, Jr., WA4PLN; T. M. Blackmon, W5ETM; Dennis R. Blanchard, K1YPP; Elliott A. Bloch, K6ELX; Philip A. Block, K4PNV; Ronald C. Blocker, K9JON; Roderick K. Blocksome, KØDAS; Donald L. Blossom, WB5PUM; Richard W. Bluhm, W2KXD; Robert Jerome Blythe, K4KQF; Charles E. Boboltz, WA8KEP; Robert A. Bond, WB4GNT; Wilmer S. Bond, K7GYA; David W. Bondurant, NØDB; Frank H. Bonnell, WB9OHN; Dennis W. Bookmiller, WB2AIO; Don Borden, WB6PMJ; Donald Borowski, WA6OMI; Michael Kim Bottles, K7IM; Horace Boulton, WA6AAD; Richard C. Bourne, K2MG; John J. Bowden, WD9GPJ; Raymond C. Bower, WA1NMC; Kenneth D. Boyce, K7SAZ; Robert G. Boyd, WB6QQB; Richard G. Boyer, WA1WLZ; Dennis E. Bradford, WA7HGB; Dwight F. Brady, VE3GD; James E. Brady, WA3ROX; S. Ray Brady, WA4ATI; William M. Brady, WB6HDB; Harold J. Braschwitz, W8PN; Harry V. N. Braun, WB9FUU; Frank P. Brelsford; Charles J. Brenner II, WB9GJW; George D. Bretz, WB5MEV; Robert L. Brew, WBØUJS; Thomas C. Brickey, WBØWRK; George W. Briggs, K2DM; Philip L. Bright, KØZNV; Robert F. Brill, WA1TJT; Edwin W. Brink, K6TGG; Donald W. Brinkman, WB6KAR; Walter E. Britton, W9LYR; Wade R. Brock, K4YSB; Michael J. Bronoski, WBØLKA; James L. Brooks, WA4BMY; Donald F. Brown, W1JSM; Donald W. Brown, W8AZI; E. Allen Brown, WA3FYZ; Everett T. Brown, KA6CRU; Gary P. Brown, WA2ROV; Rosemary Brown, WB4DDN; Thomas F. Brown, Jr., WA4PMU; Merle E. Browne, Jr., WA7FIG; Karl Brownstein, W6PSI; Stanley G. Brugh, WA4VCK; Frank Bruno; Louis S. Brunson, WBØQKM; Reginald C. Brunson, WB4HXA; Jerry D. Bryan, WB5LTU; Thomas E. Buchan, WB9RRL; Edwin H. Buck, Jr., W4TXE; Roy Buckheit, WA2SDO; George F. Buckner, WA1FLA; Antonio E. Buendia, HK4CYX/W2; Robert A. Buford, WB5RKB; Robert Bunar, K1LKI; Roger W. Bunde, WB6HMP; William T. Burke, WØKNM; Hal Burton, WD6FHU; Stanley W. Busch, W8VWI; William J. Busse, Jr., WA9TUM; William B. Butcher, W4MSZ; Jack G. Butler, Jr., KØECO; Leonard M. Butsch, Jr., K4CNP; Jack A. Byrd, Jr., WA4KHJ; Orestes Caballero, N6OC; Carl A. Cacciatore, WB9PBR; Ralph D. Canada, WB6PDO; David J. Cancilini, WB6WEW; Johnny Cannon, WB5BDD; Clifford Carmichael, Jr., WA4AYQ; John P. Carobine, WB8RFB; Israel N. Caron; William L. Carpenter, WA6QZY; Keith M. Carr, W6ATM; William K. Carr III, K5TU; John P. Carrington, WB2SGS; Clarence E. Carson, W3KVC; Donald R. Cartee, WD4AEU; Michael J. Carter, K8CN; Francis R. Cartier, WA6RAY; Steve Caserza, WA6IXY; Richard T. Casey, WA9LRI; Henry A. Catherino, N8AT; James Cecchini, Jr., WD4BAE; Philip A. Chaney, W4NWZ; Stanley C. Chapman, W1HTE; Lloyd J. Chastant, W3NF; Oakley H. Clawson; Albert W. Clow, WA4LRZ; Edgar A. Clulow, W7TWL; Claude A. Cochran, WB4LOO; Gerry Cohen, N4GC; Guy B. Coleman, W6SCC; James E. Coleman, WA4EBM; R. L. Congdon, W5FIX; Jesse H. Conley, WA4FDX; Lawrence S. Coomber, WB5VAV; James M. Course, Jr., WA2IFL; James C. Cox, WAØMWP; Charles N. Coxey, Jr., N4OU; Denis R. Craft, WBØWGJ; Raymond Craig, N6ND; Melvin J. Cranmer, W2BYM; Norman T. Crawford, Jr., WD5CEG; Terri G. Creager, WA8ZKC; John S. Creamer, Jr., W5QXH; Tony A. Cromwell, WB6TYI; Herbert L. Crosby, WD5EFC; William T. Cross, WA3LJP; James Byron Crowe, WA5EDX; Sandro V. Cuccia, WB3ENF; Dennis L. Cullison, WB3LDJ; Robert M. Curtis, W6QCV; Glenwood E. Cyr, WA3LRB; Frank S. Darmofalski, W1FD; George L. Davis, K1PPF; James N. Davis, WB5VFS; Michael W. Davis, WB4MJA; Richard H. Davis, W8BWI; James J. DeLargy, WAØEBE; Gene H. Deck, WØPYZ/KL7; Warren Decker, W8JLD; Michael J. Deebel, KP4EBV; William J. Deegan III, WA4QLZ; Joseph Diaz, Jr., WB1AOX; James A. Dimond, WAØJPS; Dennis F. Dittiacur, WB8RUW; Earl Edwin Dodd; Richard W. Doering, WA6CFM; Donald E. Donovan, WB5OKJ; Walter G. Doring, K4RCP; James H. Downey, Jr., K5QNE; Clarence C. Drumeller, W5TKC; Floyd O. Duell, WØBND; Charles B. Dugue, WAØPRJ; R. R. Dunbar, Jr., WØPN; Cecil E. Duncan, W6DPI; Louis A. Dvorsky, N2IT; Charles E. Dykes, K4CUU; Richard E. Dyrack, K2LUQ; Jerry B. Eagle, W7KPZ; Michael W. Easley, K8TUU; Bob Eastwood, WBØRQZ; Gary D. Elliott, K7OX; Roger C. Elliott, WA4VLQ; John Curtis Elsik, WA5ZUP; Francis E. Erdle, N3AJ; Gustave G. Erdmann, W2MZN; Louis D. Eye II, AA4E; Douglas C. Fairbrother, K1FKW; Richard C. Fanning, W8QL; Charlie Farek, K5OC; Richard A. Farquhar, W8FQ; Austin C. Farrell, W2BXE/WA4RTR; Richard P. Farrell, K1QHL; Francis Federighi, WB2MXJ; Richard J. Ferree, W6RHI; Willis A. Finchum, W6HO; Robert A. Findlay, W6NZX; W. S. Finkelstein, WB6JAO; Eugene M. Fischer, W7IOR; Paul R. Fischer, W3HMP; Robert L. Fischer, III, WB2YEH; Kenneth M. Fish, N4AZQ; Gregg C. Flechtner, WB8WKP; Charles J. Fontenot, K5UA; Mark J. Franklin, KØKX; Owen L. Franks, WA6RBF; William F. Franks, Jr., WB4PMG; J. E. Frederick, Jr., AD4C; Clay Freinwald, Sr., K7CR; Peter W. Frentz, K3QOY; Leo W. Fry, K8PYD; Carl Fuller, WA7TOR; Richard D. Furash, WB1ATH; Thomas E. Gehman, N6NF; Charles E. Gagnon, W1LQQ; Robert Paul Gale, WA4GDX; A. G. Gann, W1UI; Carl H. Gardenias, WB6RMN; Darrel I. Gaston, WØEFE; Richard L. Gelber, K2WR; James G. Genius, WB5SZT/VE2; Peter J. George, WA1HXH; Leslie Getto, WB2DIT; Maxwell C. Gilbert, WA4YFU; William F. Gilbert, WØOPL; Edward M. Gillespie, W9BNA; John Leonard Giulietti, W1DH; John E. Glazner, W4EWD; Donald L. Glick, K9LI; Thomas E. Goez, KØGFM; Robert M. Golding, Jr., K4KMC; Bruce J. Goldstein, WA3AFS; Ralph J. Gonthier, W5VDG; Ray A. Good, III, AA9F; Gary M. Goodger, WB6GKK; William C. Goodloe, WA7GWJ; Thomas B. Goodwin, WB8DIM; James J. Gordon, W6PQP; H. James Gorman, Jr., K1VDQ; Roy Bell Goshorn, W3TEF; M. Edwin Goss, Jr., N3CW; Roy G. Gould, K1GSK; Douglas A. Graham, WA2IDL; James S. Grant, K1AZ; Lowell D. Grasham; Byron L. Green, Jr., KØMUP; Kenneth L. Green, WD4IDK; Martin Howard Green, VE3GMC/WA1WHU; Christopher Greentree, WA3YYW; David L. Gregory, WBØYYK; Nolen D. Griffith, Jr., K5ARH; David G. Grossman, WA1CVN; Richard J. Gubanich, K3MJ; Edgar R. Guillot, WB5NFU; Robert J. Gurniak, K3UC; Charles J. Gyurina, K2BU; Alan Hack, WA5VLX; Warren L. Hagman, WA7EAP/KL7HMK; Wendy S. Hagman, KL7BD; C. L. Hallmark, Jr., W5ZWM; Nils A. Hallstrom, WB7TJK; James M. Hampton, WA4JWS; Alton Curtis Harris, W2IQA; Benjamin J. Harte, Jr., WA3QVJ; Frank Hatanaka, W6EG; Charles C. Hay, WØLCE; Lloyd J. Hayney, W9NSJ/W2EFM; Charles E. Helvey, K4CZB; Norman N. Hemenway, K8PCF; F. Gerald Henderson, W1NZ; Robert W. Henderson, WA6GWS; Royce Henningson, K7QEQ; Ron Henson, WB5TTU; E. Martin Hermesch, WB4IYG; Jerre F. Hersh, Jr., Robert R. Hershman, Jr., WA3AID; Brian E. Herzog, WD5GYS; Arthur C. Hickman, K5OWC; Marquis D. Higginbotham, WB8APY; Henry R. High, W9KCL; Leonard A. Hill, WB4TDH; Richard D. Hill, WA4PFK; Roger T. Hillers, WB4ZAI; Robert E. Hilton, WB4WQS; Denis Lee Hinz, WBØRIB; Waldemar E. Hobach, K9YZI; Clyde S. Hobron, WB6VHY; Frank J. Hodan, Jr., WB3DQV; Albert B. Hodson, K6ATV; Roger H. Hoffenkamp; Julius M. Hoffer, W1DL; Fred W. Hoffert III, WAØQOA; James K. Hoffman, WB8HOG; Thomas G. Holmes, WB8QVC; Richard G. Holwerda, WB2OEQ; Harrison F. Hooker, Jr., W8YMO; Allan E. Horning, W7LTS; Daniel R. Horninger, WB3CSA; Carolyn L. Howells, WA7SVV; Paul C. Hurd, WA7ZGS; Merle K. Hutton, WA7JCK; Richard A. Jedlicka, W8PW; David W. Jefferies, W3PA; Charles S. Jekofsky, WB3DRF; Robert S. Jenkins, W7BKN; Richard Jensen, WB9ODF; James A. Johanson, K2SCU; Charles J. Johnsen, K9GTM; Ernest J. Johnson, W6ZRR; Gerald A. Johnson, KØJJ; John R. Johnson, WB6LMN; Lowell K. Johnson, WA4DEN; Robert H. Johnson, W5TO; Walter R. Johnson, K7VTR; Bruce A. Johnston, WB6MLB; Edward B. Jones, WA4ABG; Roy L. Jones, Jr., WA1ZLD; W. Dow Jones, Jr., WB9VKC; Alexander M. Kasevich, W1CDC; William R. Keagy, K6BQN; John J. Kessel, W4IL; Michael Kintner, WB3EHV; Charles S. Kirchmaier, Jr., W4BNK; John N. Kirkham, Jr., KC4B; John P. Kirkman, KA4E; David T. Kirschner, K4BWV; James D. Kittelsrud, WB8GCF; Ray P. Kittle, K8UBH; Jerry L. Kleiboeker, WB6SIS; Johann Klein, Jr., WA7VNS; Ernest H. Klinker, W6VKK; David J. Knaus, WA9POV; Jerry W. Knotts, K5SSZ; Ernest D. Kolb, WB2WZX; William M. Kosturko, W1VW; Peter Kragh, K2UPD/W1AYK; Richard F. Kreusch, WB2WGV; Thomas M. Kruszon, WB2PXL; Glenn H. Kuklewski, WA4VEW; Herman R. Kurrelmeyer III, W1MSK; Lawrence P. Kurtinitis, W8WNX; Robert J. Lacey, Jr., WA1QOO; Ricky N. Lassabe, WB5OTX; Malcolm Laughead, WB3FVT;

Charles D. Leach, WA3JOI; John B. Leaden, K7CHN; Floyd Lehman, WD6BER; Richard K. Leonard; David Ljungdahl, WBØRZO; Raphael P. Loutzker, K2IRK; Thomas Andrew Lovelace, K4BXU; J. Tom Lowery, WD4MMV; Robert A. Lyles, K9ET; Royce Maaske, WB9ROE; William R. Mabry, WA4QCL; Charles R. MacCluer, W8MQW; Thomas W. MacClure, W8CFT; Wilbert K. MacKinder, Jr., WA6GTG; Joseph Macy, AA4JM; Rolland E. Madara, W3PWG; William A. Mader, Jr., K8TE; Harold N. Magowan, W2ILN; Hans N. Mahr, K6MXF; David R. Manchester, WA2JSA; Robert Leo Manchester, WD4NDL; David Mandelkern, WA4BAX; Carlie A. Manion, W4BDC; Richard E. Mann, WØNHP; Edward Lee Maranville, KA9COJ; David G. Marcelli, N4CQ; William J. Marchand, WB7OKH; Herbert Marder, K3RLE; Ralph A. Marino, WA2CJY; Gerald Marion, WA9LZD; Billy J. Mark, WB7PQZ; Stanley R. Marks II, K5YDR; Ted M. Marks, W2FG; Viviano Martin, WB2JYX; Andrew Mason, Jr., WA9KPZ; Steven M. Mates, WA2FIQ; Dennis E. Mathias, WØQR; W. Paul Matthews, WA6DDL; Clifford Mattio, WD8MKP; Raymond G. Mattoon, KL7FON; Bill Mauzey, W6RT; Douglas R. Mayo, WA4SFL; James E. McCobb, K1LLU; Paul T. McConnell; Joe McCourt, WA5VTW; Lowell E. McCown, K4ITF; Robin S. McCray, WA3QLS; Ronald L. McDaniels, WA6CFY; Henry H. McDonald, Jr., K4DJV; Bertram W. McFadden, W6VPE; Thomas L. McKernie, N6TM; Hobart G. McLaughlin, WB8HNB; Dan H. McLean, WA4JTI; John W. McMahan, K9KVZ; Phil McMillan, N9ZK; C. K. McMillen, WB5CZU; Harold A. McMillen, K3BLM; Donald Bain McNeece, K6VWF; F. Barry McWilliams, W2HBY; James D. McWilliams, K6LHP; Clifford Paul Meeks, WB5SJZ; Don E. Meier, W7CR; John P. Meierdierks, WA6UWF; Charles Meisenheimer, WA9RRB; John A. Meister, WA7UWU; Francis J. Merceret, Jr., WB4BBH; Joseph M. Meserve, WA4HFF; Michael H. Metcalf, W7UDM; James A. Meyer, WD4IQD; Robert K. Meyer, K7PPC; Robert W. Meyer, WA9AKT; Scott R. Meyer, WB9IPX/WB8BPB; Edward J. Michalski, W1QD; Jerry E. Miller, KL7HSJ; Joseph T. Miller, WB4UNM; Mark Gregory Miller, K5DP; Roger D. Miller, WB9CIJ; William W. Milligan, WA8MOY; James E. Minchew, Jr., W4NKU; Terry R. Misener, WB5RGX; Richard R. Moersch, K9PCB; Howard E. Momberg, Jr., WD8CAA; Thomas H. Monroe, Jr., W6GGR; Harry D. Montgomery, Jr., WB4EXQ; Louis E. Moody, N3ED; Dwaine R. Moore, WB9UCD; Jerry L. Moore, WØHMA; John D. Moore, WD4ASD; John H. Moore, WA3BRZ; Michael Wayne Moore, WB4RSU; Arnold Moos, WA6SSG; H. James Morgan, KØYLY; Warren S. Mormile, WB2MYZ; Clyde J. Morrison, WA4TVN; William P. Morrison, N4ANX; Allan W. Morse, WB6MVL; B. H. Moschenross, KØBM; William H. Mosier, WB9RIV; Ronald G. Mudge, K2UZF; Brian H. Mullen, WB3ATA; John E. Mullen, K6CBL; Andrew J. Mullins, WB8YWV; E. L. Mundy, K5BYV; Larry E. Myers, W3MNE; Harry A. Naidl, W9VAU; Jim J. J. Nazar, VE4NC; James E. Neely; Eduardo Negron, KP4EQF; Robert Joe Nellans, KB9DE; Roy A. Nelsen, WB3DCH; Charles P. Nelson, K5EDK; Donald L. Nelson, WB6TKY; Steven K. Nelson, WA1EYF; Donald R. Nesbitt, N4HH; Adolf W. Newfeld, KØJWY; Daniel W. Nevels, WD5ETR; Paul A. Neveu, Jr., WICKA; Merle J. Newton, K2KVU; E. A. Nicholls, KB4GH; Morris W. Nichols; Thomas C. Nicholson, KA1BAZ; George H. Nickell, WB9SGH; Allen J. Nimerfroh, WB6JIM; Peter E. Niska, WB8YYF; Robert L. Nolan, Jr., WA6WGL; Steven A. Norman, WA4LUC; James Novacek, WBØULH; Joseph W. Novak, W8TVT; James L. Novakoff, WB1BUY; Donald E. Novy, Sr., WB9MYR; Michael L. Nowack, WB9RGA; George T. Noyes, Jr., W1XE; Gerald F. Nugent, Jr.; Robert L. Oblander, WBØRUX; Vincent Occhipinti, WA2FAE; Erich R. Oetting, WBØLLM; William J. Ogle, NØAP; Allan Olexa, WB8YFD; Anthony A. Olson, KØKCY; Robert A. Olson, WA1NWG; Brian E. Orr, WB7OAX; Edgar M. Osborne, Jr., K7ZMA; Fred Osterman, WA6GSC; Gary M. Overturf, WB6CYS; Alfred A. Ozimek, K2HMN; Kenneth E. Palm, AB1N; Harold F. Palmer, W4VDC; Edward J. Paragi, WB9RMA; Stephen L. Parker, W9LQO; Martin Parlan, WB6HDR; Howell J. Parry, W4OOM; Edward S. Parsons, K1TR; Robert H. Parsons, WB8RZE; Nicholas Pascuzzi, K3KCO; Louis P. Pataki, Jr., K2PRB; Frederic L. Patterson, N6AD; Robert A. Payne; Eugene R. Peetz, WA8RJL; John C. Pelham, W1JA; Claude A. Pennington, WD4BNA; Charles K. Perry, WB4OZX; Bill Peters, WØOLM; Hiram P. Peters, K5WC; Robert F. Peterson, Sr., K3DN; Randy W. Petruzielo, WA1OMZ; Walter H. Phillips, Jr., WD4CIA; Charles M. Philpott, WØRIU; Richard H. Pierce, K3MWV; John P. Piercy, W6QDI; Paul S. Pietras, W4LOO; Arthur W. Pightling, WA6OYS; Russell C. Pillsbury, K2TXB; Carlos M. Pinkston, Jr., WA5TBE; Ken Pisichko, VE4ZD; Gary L. Pittman, WD4FMV; Paul D. Pohlenz, WA3ODB; Thomas R. Polley, WA6GEV; Henry A. Pollock, WB4HFL; John F. Pomfret, W2AAF; Harry A. Poole; John L. Porteous, Jr.; Lorne D. Porter, K7TZH; A. M. Powell, W5FHW; Richard Lee Powell; Thomas Power, K2TP; Stephen J. Powlishen, K1FO; William Prago, WA2CIJ; Gerald G. Pullen, WB5PBC; Michael W. Prah, WB9BTR; Robert Larry Pratt, WA4JDJ; Steven K. Prescott, KØKDT; Arnold C. Price, WA3IWW; Duane Price, WD4BKE; Richard W. Price, WB8YXQ; Donald R. Prigge, W4JFS; James R. Proffitt, KH6C; Adam Quandt, WA6OCI; Hal Quiat, WBØPLS; Richard L. Rader, W4TMS; Krishnan Raghu, WB4NOU; Tony Ramos, KP4EFP; Robert E. Ramsey, KA8DFC; William R. Rapp, W2HWC; Joseph Z. Redman, W3AUB; Austin G. Regal, K4YFQ; Edgar C. Reihl, WA9ULU; Robbie W. Reneau, KH6JIB; Donald Retzer; C. M. Reynolds, N4FX; Richard M. Richardson, WBØFQD; Ronald Dale Rideout, WB5MQM; D. Paul Ridley, KB5DQ; Elizabeth Riemer, N7IT; D. Bert Rigden, WN6ACP; George A. Riscili, WA4NKQ; Earl A. Ritchie, VE3FBK; Robert B. Rives, W7WI; Joseph Robertson, WA6GTU; George A. Robinson, WA3LVR; Stanley R. Robinson, WA8DKH; John Edwin Rodgers, WA3LFY; John J. Rogers, KL7IEL; Leon Rogers, WAØLAB; John W. Ronski, WA1RAE; John C. Rooks, WAØYCZ; Don C. Ross, WA5LXZ; Ronald W. Ross, WA9SDA; Whitelaw Reid Ross, W7HOP; Thomas C. Roth, WD4DBV; Alvin Richard Rothe, Jr., WB3AMM; David R. Rowe, WB5PBA; H. Edward Rowe, WB3ANV; Joseph H. Rowe II, AG2Y; Guy E. Rowney, WB7CRX; Robert E. Royer, WA7LYN; David C. Rozzana, N6PZ; Robert W. Ruedisueli, W4OWA; Herbert Rugoff, WB2WOU; Kenneth A. Russel, K7VLG; Gordon G. Ryan, W7FEO; Richard C. Ryan, W7RGD; Richard G. Saeger, K3OO; Francis G. Sainsbury, N2FS; Philip C. Salley, WB4OZN; Charles R. Sanford, WA4MWQ; Delbert C. Sawyer, NØDS; Dean C. Scarbrough, WB8WMB; Robert D. Schaefer, W5RZ; Gail M. Schafer, WB3EFC; John H. Schaffer, W3SST; Louis H. Schall, W1JLI; John E. Scheibley, WB2JHF; Donald E. Schmidt, N8AC; James G. Schneider II, WA2YUS; Chester B. Scholl, Jr., K3ZFP; Peter H. Schuyler, WB8LWV; Bernard J. Seastrom, W1ZTK; Charles S. Secrest, AD8W; Jack E. Seider, WB9FZQ; James R. Sencenbaugh, K6TPS; Paul Seright, Jr., WB6JWZ; Allan L. Severson, AB8P; Donald C. Shaw, K7NKB; W. Richard Shaw, Jr., WB5YOE; William Stark Shaw, WA4BNM; Larry L. Shears, KB8EN; Edwin L. Sheldon, WØNWM; David Winston Shen, WA2KFJ; Arthur R. Shenk, WB6HKS; John D. Shimmel, WA8BKZ; Roger A. Shipman, WB8KZH; Dean W. Showalter, WA6PJR; Clifton W. Shrewsbury, W7QGS; Elliot Shwartz, W2DIE; Emilio R. Sibayan, N7ES; Donald R. Sides, WB6HSN/WB5LIM; Lawrence Morri Sires, WB6SON; David A. Skinner, WBØSPA; Vernon E. Skovgaard, W6JHC; George R. Smart, KØBIU; Richard J. Smart, WB7CKL; Elayne L. Smith, WA6TEZ; Lawrence A. Smith, WBØSSB; Lloyd W. Snowdeal, K8SCW; Raymond L. Sokola, K9RS; James C. Sorah, K4FSK; Joseph G. Spears, N9AE; Robert M. Sprigg, WA8FWR; George Stanek, W9RTP; John Stanford, WB8SVN; W. R. Stanley, N4TF; Cornell W. Starr; James C. Stallman, WØVE; Roger Stephens, K5VRX; Robert A. Stirling, WB2PAD; Frank Stockton, WA4AMW; J. Frederick Strom, K9BSL; Joseph W. Sullivan, Jr., WA1WLU; Walter R. Supina, N3WS; William G. Sutton, WA1MBD; Jerry H. Swalling, WA7ZTT; Michael S. Swanson, WB3GNC; James Teeple, WB2FEK; Don E. Telford, WA7PAL; Richard G. Thomasson, WB4GQA; Kenneth A. Thorman, WB8LZS; Kenneth R. Tiegs, WØWPW; Leo S. Towne, WA9QMT; Gary G. Travis, WBØSGE; Joseph Trombino, Jr., W2KJ; John Tudenham, WØJRP; J. David Tucker, WB6FAK; Charles A. Tuerk, WA3KQC; Jerome R. Turner, K9CCZ; Robert G. Uhrlass, WB2DXL; Thomas C. Vaughn, N3EE; Gene D. Volkman, AB9E; Thomas D. Walsh, K1TW; Jack C. Weigand, WB4KFM; Robert F. Weingaertner, WB2VUF; Henry Wener, WB2ALW; Gordon M. Wenz, N6GW; Ralph L. Wheaton, K7VNO; Clayton A. Wheeler, Jr., K1FNP; Robert A. Wheeler, WA4OPV; Frederick E. White, Jr., W2BCE; Donald B. Whitney, W1NEP; Gilbert E. Whitten, WBØBGV; David W. Whittle, W5QLH; Richard L. Wilkins, K4VHH; Charles E. Williams, Jr., W3GRK; Edmund A. Williams, W8APE; William Gerald Willis, N4BW; Robert L. Willsey, W5VRA; Woodrow A. Wilson, Jr., K1OQG; Thomas E. Wolfe, K4CMY; Douglas J. Wolff, WN2WZF; John R. Wood, WB4FET; Steven M. Wood, WA1QMZ; Victor A. Woodling, Jr., WB4SLM; Terry Wormington, WAØRAC; James C. W. Wright, WB4ROF; Donald A. Young, W1FFV; Richard M. Young, WA3VWA; Larry L. Zentgraf, N9BY; Milton R. Zollickoffer, WA3QQT. QST

Strays



N9AFU proves that even blindfolded, he is not All Fouled Up.

WHERE THE (BEEP) IS THAT BEEP BALL?

☐ Who would have thought, on that warm fall day, that a group of blind folks would beat a bunch of hams at a game played with a bat and a ball? Certainly not the Lake County (IN) Amateur Radio Club, who challenged the Matteson "Heards" to a game of Beep Ball. The game is played with an oversized mushball that beeps, and the players must be either blind or blindfolded. The object is for the batter to get to base before the outfielders find the beeping ball. The only sighted people are the pitcher, the catcher and the umpires (the latter being a matter of dispute). LCARA was soundly thrashed, 11 to 3. The hams provided the refreshments, and are looking forward to a rematch. The Heards went on to win the Midwestern Beep Ball Championships. As Mal Lunsford, WB9YOW, put it, "At least we were beat by the best!" — *NIAGD*

QST congratulates . . .

☐ Les Dwyer, KA4B, who was selected to present a paper about installing solar hot-water systems at the Miami Beach Solar and Conservation Technologies Symposium.

☐ seventh-grader Bill Wrbican, of Creighton, PA, whose interest in Amateur Radio led him to devise an outstanding presentation, "Brass Pounding and Modulating," aimed at his classmates. Several months later, Bill received the call sign KA3BMU.

☐ F. A. Furfari, K3IEX, who was elected to the Board of Directors of the Institute of Electrical and Electronics Engineers.

☐ the San Antonio Repeater Organization, which has received the National Weather Association's 1978 award for "outstanding contribution to operational meteorology by a volunteer group." The award was presented to the San Antonio amateurs for their service in obtaining and transmitting weather reports during the August 1978 Texas hill country floods when all telephone communications were lost. In announcing the selection, Charles H. Pierce of the National Weather Service said, "It is a pleasure to recognize people who unselfishly give their time and energy to serve their fellowman."

☐ Raymond Barnes, W1OIT, who received the Suggestion of the Year Award from a Connecticut state agency that promotes contributions from state employees. Barnes designed a device to determine why traffic lights malfunction, thereby saving the Department of Transportation the expense of returning the units to the manufacturer.

Canadian NewsFronts

Conducted By Ron Hesler,* VE1SH

Canadian WARC Delegation to Include Amateurs

At most, if not all, previous World Administrative Radio Conferences the Canadian delegation has included a radio amateur. In the days prior to our present two national society setup, this representative was usually the Canadian Division Director. Notwithstanding our repeated submissions to DOC over the past two years, the government has always taken the position that there would be no representatives from the "private sector" on the delegation this time.

We were therefore most gratified to learn, early in February, that the position of the government had changed and that it had been decided to include an amateur on the official delegation as a full member thereof (not an observer) in the capacity of "a technical expert on Amateur Radio."

Following consultation with *both* CARF and CRRL, Bud Punchard, VE3UD, has been nominated to the delegation by DOC. In this respect, it is perhaps of interest to note that this is not the first time that Bud has represented the Canadian amateur community on an important international committee or telecommunication body. Several years ago, upon the recommendation of then Canadian Director Noel Eaton, followed at a later date by CARF, Bud was named to represent Canadian amateurs on the ITU CCIR Study Group.

In making the announcement, Mr. E. D. Ducharme, the DOC director of WARC arrangements stated, "Mr. Punchard's nomination to the Canadian delegation is as a technical expert on Amateur Radio and should not be construed as that of representing any organization or organizations." As such, the CRRL was more than pleased to support the nomination in view of Bud's personal qualifications and full availability for the 10-week assignment in Geneva. Due to some rumors persisting at the time of this writing, it is important to point out that the expenses of Mr. Punchard will be fully borne by the government.

Bud shall therefore represent Canadian Amateur Radio on the delegation and as Mr. Ducharme further stated, "I shall be very disappointed should anyone construe or attempt to construe this nomination as in any way being related to any specific organization affiliation."

In addition to having previously served as the CARF-CRRL designated representative on the CCIR referred-to Study Group, Bud has long been active, *in many capacities*, on the Canadian Radio Technical Planning Board and is exceedingly well-qualified to represent Amateur Radio on our WARC delegation. He shall have our every support and best wishes for this new assignment.

CRRL AMATEUR OF THE YEAR

That time is here again . . . nomination time for the 1978 CRRL Amateur of the Year Award. If you know of anyone you believe is worthy of nomination for this distinctive award, please submit your nomination, together with full particulars, to CRRL headquarters. Your nomination shall receive every consideration by the CRRL Executive Committee. Those deemed worthy of recognition shall then be placed on a ballot, together with all recipients of the Division Certificate of Merit Award, to be voted upon by all our assistant directors. The presentation of this award will be made in October at the Radio Society of Ontario Convention in Ottawa.

The closing date for nominations is the end of May. It is not necessary that the person nominated be an ARRL/CRRL member. The 1976 recipient was Brit Fader, VE1FQ, while Noreen Nimmons, VE3GOL, walked off with the 1977 honors.

ARRL ADVISORY COMMITTEE APPOINTMENTS

At the end of December, President Dannals announced that the following VEs were appointed or reappointed to the following standing ARRL Advisory Committees: DX Advisory, Hal Parson, VE3QA; Contest Advisory, R. W. Guy, VE7TT; Emergency Advisory, Bill Parker, VE5CU; VHF Repeater Advisory, Ron MacKay, VE1AIC and VHF/UHF Advisory, Les Weir, VE3AIB.

Ron MacKay, VE1AIC would appreciate being placed on the mailing list of vhf repeater organizations or councils. His address: c/o Cornwall Post Office, Cornwall, PE.

CRRL ORGANIZATION PROCEEDS

As previously informed, we are presently in the process of a reorganization proceeding to the formal federal incorporation of the CRRL. Although we expected to make the formal presentation to the January ARRL Board meeting, this unfortunately has had to be postponed until the July meeting, inasmuch as illness and other valid considerations prevented the attendance of either your director or vice director at the January meeting. Counsel Benson was also indisposed so therefore the responsibility for *informally* representing Canada fell upon former Canadian Director and present League V.P. Eaton, VE3CJ.

In the meantime, President Dannals has appointed an Ad Hoc Committee, consisting of Vice Presidents Clark and Eaton, Director Hesler and Vice Director Loucks, together with requested assistance from ARRL Counsel Booth and CRRL Counsel Benson, to come up with specific recommendations for the July meeting. Therefore, in the very unlikely possibility that the Canadian Division representation should be again indisposed, for any reason whatsoever, the Board will be able to act on the Committee recommendations.

Not anticipating any Board problems with the reorganization and incorporation proceedings, *we have now made our new organization operational* with the following charter officers and directors: President, Ron Hesler, VE1SH; 1st Vice President, Bill Loucks, VE3AR; Vice President, Harry Dannals, W2HD; Secretary, Gordon Steane, VE3BMG and Directors George Spencer, VE4IM; Tom Atkins, VE3CDM and Albert Daemen, VE2IJ. The Executive Committee will consist of the president, first vice president and the secretary. Election procedure for the 1980-1981 term shall be fully detailed on this page and elsewhere in July *QST*.

REVISED DOC REGULATIONS

[] *Banned Countries List*: Iraq, Khmer Republic, Libya, Somalia, Turkey, Vietnam, Yemen (People's Democratic Republic). Re Khmer Republic (formally Cambodia): Amateur Station XU1AA has been authorized to exchange communications with other countries. In Yemen (formally Aden) call-sign allocations are 7OA-7OZ.

[] *Third-Party Traffic Agreements*: Bolivia, Chile, Colombia, Costa Rica, Dominican Republic, El Salvador, Guatemala, Guyana, Honduras, Israel, Mexico, Nicaragua, Peru, Trinidad and Tobago, United States, Uruguay and Venezuela. Negotiations for the establishment of agreement with Australia, Haiti, Jamaica and Liberia are now in progress.

[] *Reciprocal Licensing Agreements*: Austria, Barbados, Belgium, Bermuda, Brazil, Colombia, Costa Rica, Denmark, Dominica, Dominican Republic, Ecuador, Finland, France, Germany (Federal Republic), Honduras, Guatemala, India, Indonesia, Israel, Iceland, Luxembourg, Netherlands, New Zealand, Nicaragua, Norway, Panama, Peru, Philippines, Poland, Portugal, Senegal, Sweden, Switzerland, United Kingdom, Uruguay, United States and Venezuela. Negotiations for the establishment of agreements with Haiti, Italy, Liberia and Spain are now in progress. Additionally, recognizing that Commonwealth citizens are eligible for Canadian certificates and licenses, it has been decided to consider licensed amateurs who are citizens of any Commonwealth country as being eligible for reciprocal operating privileges in Canada, unless there is evidence that such a country does not grant reciprocal operating privileges to Canadians.

ONTARIO HAMFEST

The fifth annual Ontario Hamfest sponsored by the Burlington ARC will be held in Milton, ON, July 6, 7 and 8, 1979. Provisions for indoor displays, camping facilities, major prizes, flea market and auction have been made. This hamfest is the second largest gathering of Ontario hams. Talk-in frequencies will be 146.16/76, 147.81/21 and 146.52 simplex. Further details are available on the ONTARS net, 3755 kHz, daily, 7 A.M. to 6 P.M.

*Director, Canadian Division

Washington Mailbox

Conducted By Michele Bartlett,* N1AGD

Prohibited Practices — Or, "George, What's This Pink Slip?"

There are 13 "Thou Shalt Nots" in Part 97, Subpart E, "Prohibited Practices and Administrative Sanctions." Ignoring this subpart could prove unlucky.

Q. During a recent local disaster, I passed health and welfare traffic for the people in my town. Now the Chamber of Commerce wants to buy me a new tower and I don't know how to decline gracefully.

A. 97.112a states: "An amateur station shall not be used to transmit or receive messages for hire, nor for communication for material compensation, direct or indirect, paid or promised." This includes accepting gifts, even though you had no thought of any reward at the time you passed the traffic. You can truthfully say that, much as you appreciate their generosity, accepting the gift could give Amateur Radio a black eye. If the Chamber of Commerce or some other group still wants to demonstrate its appreciation, you might mention that there are many clubs and foundations that would gratefully receive a contribution to further the various aspects of Amateur Radio, such as scholarships for hams, OSCAR, Project Goodwill, etc.

Q. Doesn't 97.112 prohibit W1AW operators from being paid to operate the station?

A. No. 97.112b allows W1AW or any club station to compensate its operators, provided the station meets the following qualification: "The station must be operated primarily for the purpose of conducting amateur radiocommunication to provide telegraphy practice transmissions intended for persons learning or improving proficiency in the international Morse code, or to disseminate information bulletins consisting solely of subject matter having direct interest to the Amateur Radio Service . . ." The station must also conduct bulletins and code practice at least 40 hours per week, schedule operations on all allocated medium- and high-frequency amateur bands using reasonable measures to maximize coverage, and publish the schedule of normal operating times and frequencies at least 30 days in advance of the actual transmissions (97.112b 1-3).

Q. Our club wants to tape the National Weather Service bulletins and make them available on demand by a tone-encoded access through a repeater station. What do the rules say about this?

A. 97.113 says, "Subject to the provisions of 97.91 [pertaining to one-way communication] an amateur station shall not be used to engage in any form of broadcasting . . ." which is defined as "the dissemination of radio communications intended to be received by the public." It further states that an amateur station shall not be used for the "retransmission by automatic means of programs or signals emanating from any class of station other than amateur."

This means that you may not couple your repeater to a receiver that is tuned to broadcasts from other radio services, such as the National Oceanic and Atmospheric Administration or WWV.

However, there are at least two ways you can legally make this information available. If the weather service has a recorded *telephone* message, you can have one of the autopatch functions encoded to dial that telephone number. Thus it would not be a retransmission by automatic means, since it would only play on demand. Nor would it be the retransmission of a signal from a nonamateur station, since it's not a station at all, but a telephone recording.

The other way is to have someone record the weather, road conditions, etc. from a script onto a tape, updating the information every so often, and making the recording available to repeater station users. Some repeater groups do this, and it certainly is legal.

Q. The other day I was talking to a fellow who had his tape deck blasting music while he was transmitting. I told him this was illegal — he says it wasn't.

A. The rule is very clear on this point. The transmission of music by an amateur station is forbidden (97.115). So you were right.

Q. My friend and I are new hams. We'd like to make our contacts more private, so we have devised a code so that only we can understand what we're saying. Is this legal?

A. No. The transmission by radio of messages in codes or ciphers, in domestic and international communication is prohibited. All communications, regardless of type of emission employed, shall be in plain language, except that generally recognized abbreviations established by regulation or custom and usage are permissible (for example Q-signals or chess moves), as are any others where the intent is not to obscure the meaning but only to facilitate communications (97.117).

Q. There's a new ham on our repeater who insists on identifying during each transmission, like "WA6XYZ from KA6ABC, okay, Harold, thanks for the information. Will you be at the club meeting tonight? WA6XYZ from KA6ABC." I've told him this isn't necessary but he doesn't want to be cited for an unidentified transmission. What can I tell him?

A. While 97.123 does prohibit the transmission of unidentified radiocommunication or signals, there is another rule that applies in this instance. 97.84a says, "An amateur station shall be identified by the transmission of its call sign at the beginning and end of each single transmission *or exchange of transmissions*, and at intervals not to exceed 10 minutes . . ." Unidentified signals referred to in 97.123 include "kerchunking" a repeater, jumping into a QSO without identifying, or even saying "break-break." The latter should, in accordance with good amateur practice, be used only during an emergency. At other times when you wish to join a QSO, you should do so only at a break in the conversation, and then by transmitting your call and waiting for an acknowledgement.

Q. There's a ham who gets on our net occasionally who turns the air blue. We've tried to tell him to clean up his language, but with no effect. Finally, one net station started jamming him, reading paragraphs from Part 97 in an attempt to drown him out. That's not legal, is it?

A. No, the rules say that no licensed radio operator shall willfully or maliciously interfere with or cause interference to any radiocommunication or signal (97.125).

Q. But what about the other fellow? Wasn't he illegal as well?

A. Yes. Amateurs must not transmit communications containing obscene, indecent or profane words, language or meaning (97.119). This always provokes a flood of letters asking what is profane, indecent or obscene. There are probably as many answers as there are amateurs.

It's easy to forget that your intimate chat with a friend can be overheard by anyone with an amateur receiver — both at home and overseas. Most amateurs have, at one time or another, brought nonhams into the shack to share our hobby. Wouldn't it be a shame if we had to sit with our fingers poised on the tuning dial in case someone launches into a racy anecdote while we're demonstrating ham radio to a cub scout pack?

Q. Are there any other prohibited practices?

A. Yes, but they involve mostly common sense. For instance: 97.116 — Amateur radiocommunication for any purpose which is contrary to federal, state or local law is prohibited. No licensed amateur shall willfully damage any radio apparatus or installation in any licensed radio station (97.127). Bootlegging, and other false and deceptive signals are prohibited in 97.121. No one shall obtain or attempt to obtain, or assist another to obtain an operator license by fraudulent means (97.129).

The rules for the retransmission of radio signals by automatic means (prohibited unless the station is in repeater operation or auxiliary operation in accordance with 97.85-88) are contained in 97.126. And the prohibition of third-party traffic, with its accompanying provisions, appears in 97.114.

[Note: Questions appearing in this column are typical of those frequently asked of the FCC and other agencies. Answers, prepared at ARRL, have been approved by FCC staff. Numbers in parentheses refer to specific sections of the FCC rules.]

*Membership Services Assistant, ARRL.

International News

Conducted By Bruce Alan Johnson,* WA6IDN

Safari Through Africa: Part 2

Greetings again from Africa, where the writer is still on assignment for the International Amateur Radio Union. Our mission is to provide encouragement and assistance to IARU member-societies in Africa, do whatever we can to promote the growth (or, in some cases, the birth) of the Amateur Radio Service here, and to continue the IARU's preparatory work for the WARC-79 commencing in September.

Included in the itinerary (which covers virtually north to south) is attendance at the ITU Africa Seminar in Nairobi, where delegates from every African and Middle Eastern country have gathered to further their own understanding of the complexities and challenges of WARC. The Africans are well aware that the peaceful allocation of one of the world's scarcest resources is hardly to be considered an easy task!

Here are highlights from *some* of the stops along the safari in Africa:

Yaoundé, Cameroon — Although there are presently only three licensed radio amateurs in this little-known country, well-directed efforts are underway to launch the Amateur Service for use by its local citizens. In conversations with government officials, it was again made abundantly clear that Cameroon faces the same problem as almost every African country in making Amateur Radio an enterprise available to its people: low per-capita income. The "Project Goodwill" program was adopted eagerly as the key to much of the problem, but there are others — such as contending with the diversity offered by 200 tribes speaking 24 major and distinct languages! (French and English are official tongues, but are not spoken or read by all Cameroonians.)

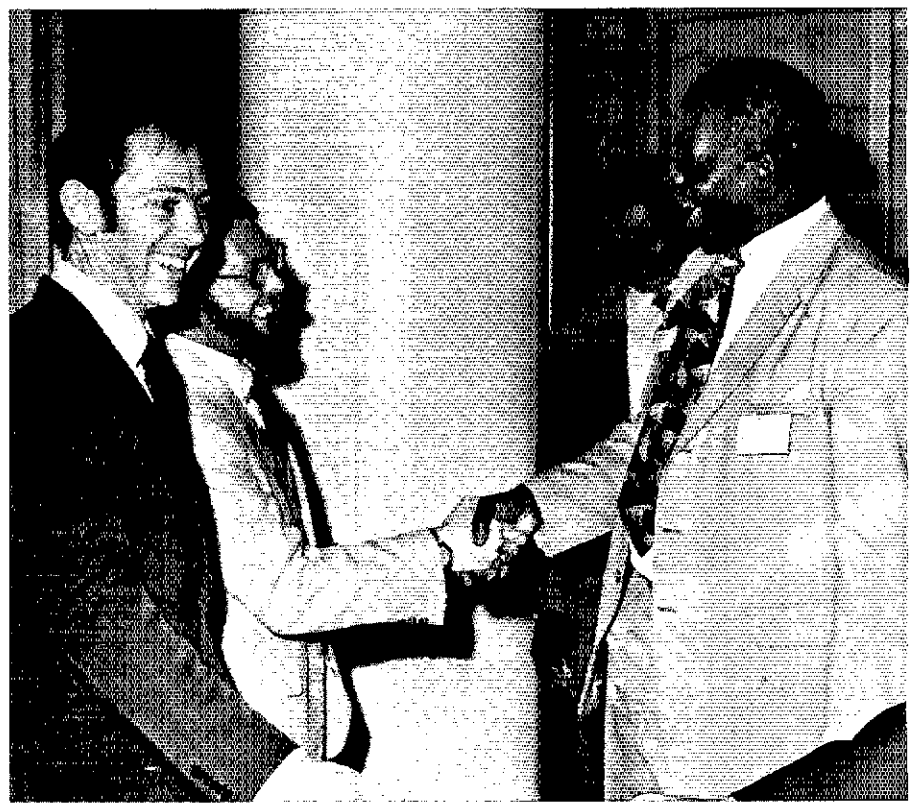
In its two decades of independence, the United Republic of Cameroon has built an admirable record of political stability and economic growth rare on this continent. Though its 7.6 million people come from the 200 tribes mentioned above, Cameroon has kept to a minimum the intertribal violence that has rent so many African nations, while producing steady, modest improvements in its standard of living.

Mr. William Tallah of the Ministry of Posts and Telecommunications is the man who is promoting the idea of full-scale adoption of Amateur Radio in Cameroon. In a recent meeting, he emphasized that there are still several government officials in key positions who do not yet appreciate what Amateur Radio can offer the country in its strides towards technological development. As of this writing, Mr. Tallah should have received (at his request) one of the simple "Project Goodwill" stations, which he plans to set up and demonstrate at the ministry itself. It's no different in Cameroon than anywhere else in Africa: It takes time — precious time — for new ideas to be assimilated into their way of life.

Freetown, Sierra Leone — In February, we focused in this column on the tremendous

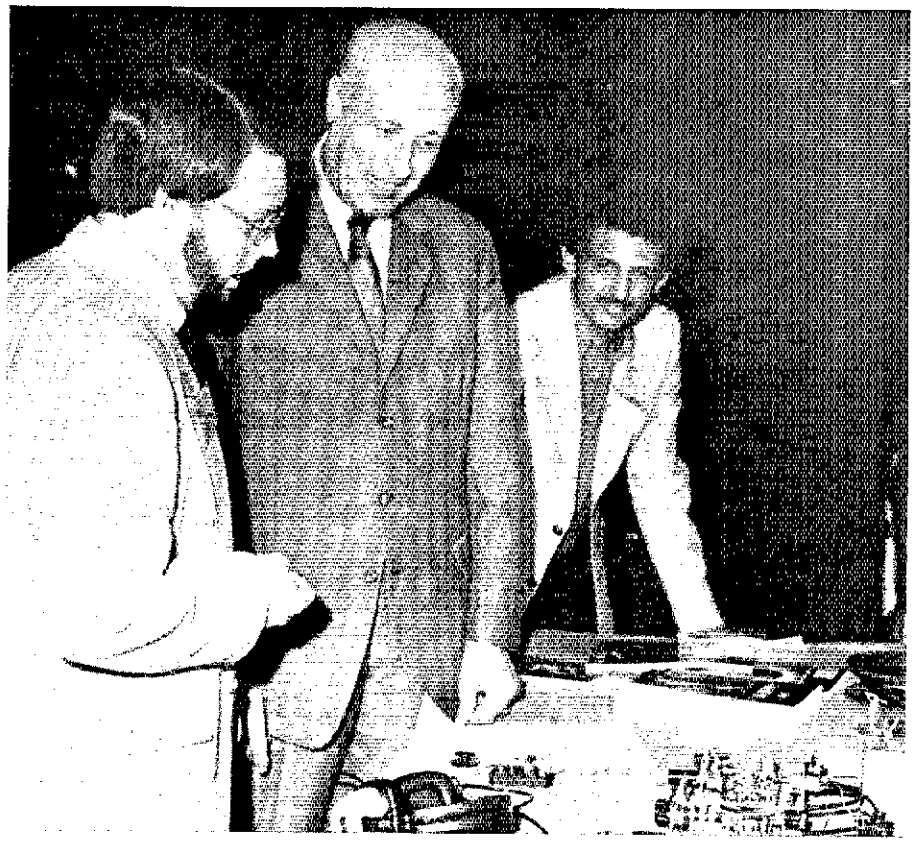
*International Services Officer, ARRL, on assignment in Africa for WARC preparation.

During the IARU/RSK reception on 14 February, African and Middle Eastern delegates showed intense interest in the Project Goodwill rigs, as an effective means of making Amateur Radio affordable to their people. *(Foto-Unique Kenya, Ltd.)*



John A. Deans, 5Z4NT, Chairman of the Radio Society of Kenya and WA6IDN/5Z4ARU of IARU hq. greet Koti Jackson, 9G1AJ, Secretary of the Ghana Frequency Registration and Control Board. *(Foto-Unique Kenya, Ltd.)*

Ennuen Tucker (l) and Senesie Kallon (r) are two enthusiastic Sierra Leonean students of Amateur Radio who are shown here building the Project Goodwill receivers. They had never before touched a soldering iron. *(WA6IDN/C5ARU photo)*



WA6IDN/5Z4ARU of IARU hq., the Honorable Mohamed Mili, Secretary-General of the International Telecommunication Union, and Hassan Mohamed Ahmed, J28AA, Chief of Radio-electric Services for the new Republic of Djibouti, discuss the Project Goodwill display at the IARU/RSK reception in Nairobi on 14 February. *(Foto-Unique Kenya, Ltd.)*

efforts of the Sierra Leone Amateur Radio Society to overcome the many obstacles an African radio amateur faces. One of the first points to be discussed in Freetown when I arrived was that of how to attract youth into Amateur Radio — for it is here that developing countries will reap the most benefits from investing in the Amateur Radio Service. The obvious answer is to offer some sort of Novice license which would grant restricted privileges (perhaps restricted, for example, to 10 watts on the 14-MHz band, which would dovetail with the Project Goodwill stations).

So, Sierra Leone is planning to adopt a Novice license, with a code speed requirement of 7-1/2 words per minute and a simple exam on basic regulations, radio theory and communications technique.

The highlight of my week in Sierra Leone was the privilege of watching two of the Project Goodwill receiver kits being built at Fourah Bay College by African students who are also members of the SLARS. They proudly pointed out (see photo) that they had studied code and theory, but this was the first time they had ever held a soldering iron or gotten to wind a toroid transformer. Their enjoyment of the work was evident, and so was their delight that so many amateurs outside Africa had gone to the trouble to sponsor them as they enter the ham's wide world.

There's a great deal of dedication among the Sierra Leoneans who are members of SLARS: meetings are frequent, relations with their national administration excellent. You're going to hear more and more 9L1s on the air, we're sure.

Banjul, The Gambia — Known as Africa's smallest country (it's an average of 12 miles wide, but 250 miles long), this beautiful nation lies sandwiched into the middle of Senegal on the hump of West Africa. On 4 February, the Radio Society of The Gambia was born, with the Gambian Director of Telecommunications present at a dinner hosted by Keith Bone, C5ABK.

More kits are needed by the new RSTG, for a training program has been launched for Gambians who desire to become amateurs. A transceiver will soon be operational in the society's headquarters, which bears the call sign C5AAA.

During a discussion on C5ABK's pleasant veranda one warm evening, two local amateurs made the point that they enjoyed describing The Gambia on the air — clearing up misunderstandings about African life, to be sure, but also painting pictures in words about the animal life, the flora, and the colorful, friendly Gambian people. "I feel barriers falling," one of them said. "I know it's not easy to understand a continent which has for so many years been enshrouded in mystery and myth. Somehow, talking on a person-to-person basis across oceans seems to go further than the printed word. Radio amateurs seem so *interested* in Africa!"

Nairobi, Kenya — Many thousands of miles to the east, more than 200 delegates gather in Kenya's modern capital city for the first seminar for the preparation of WARC-79. The International Telecommunication Union (based in Geneva, Switzerland) has organized a two-week session in which the developing countries of Africa and the Middle East will study the problems confronting the ITU's 154 member-countries come September 24.

At an outdoor reception hosted jointly by the IARU and the Radio Society of Kenya, nearly all of these delegates spent several pleasant hours in an atmosphere of Amateur Radio. The general atmosphere? One of great interest in what the Amateur Service has to offer their countries in terms of technical training and the creation of a unique national self-image on the air.

The Project Goodwill rigs were displayed, with English and French cards beside the rigs explaining their operation, capabilities, and the Project Goodwill. Plenty of Amateur Radio literature in English and French was also made available to delegates. As you can see, the delegates were intrigued, because many of them had earlier voiced their concern that Amateur Radio was simply beyond the reach of their peoples.

As a result of contacts made at the reception and during the seminar itself, the IARU is assisting the administrations of Tanzania, Sudan, Botswana, Seychelles, Lesotho and the People's Democratic Republic of Yemen in setting up economical training programs in Amateur Radio.

The mechanics of the 10-week WARC were the focus of the seminar, rather than the specific frequency-allocations needs of the attending nations. Nevertheless, the Republic of Nigeria said in a paper submitted to the delegates, ". . . The Amateur Radio Service deserves encouragement, for the direct benefits of radio science it offers, and we would like to make bold to suggest that wherever the Amateur bands are shared, they should be vacated for the exclusive use of amateur operators."

Next stops on the safari: Botswana and Egypt. See you on 20! QST

Strays

I would like to get in touch with . . .

[illegible] ham pilots or ground personnel who were involved with the F-104 Starfighter Program at either George or Luke Air Force Bases. Gary Pradu, WD6CKT, 601 Tulane St., Salinas, CA 93906.

[illegible] hams in the Lakeland, FL, area to make skeds for future phone patches. John Kelley, K2SHY, 1 Ely Court, Metuchen, NJ 08840.

Correspondence

The publishers of QST assume no responsibility for statements made herein by correspondents.

REQUIRE, NOT RECOMMEND, CODE

☐ I am against the FCC's WARC proposal of having code proficiency "recommended" instead of "required" ("It Seems to Us," February *QST*) because this action would eventually lead to a no-code license. Before I became an amateur I wanted the code requirement abolished. I knew I could pass the theory but I would have to put in a lot of time and hard work to pass the code test. I am now a Technician class licensee and have changed my mind. One does feel a sense of pride and achievement after passing the code. This achievement is what sets us apart from the rest. What would happen to ham radio without it? — *Chuck Ogburn, KA4CVL, Kenbridge, VA*

☐ I support the code tests and present standards of license exams. — *Kenneth Jensen, W8DLZ, Bay Village, OH*

☐ I think deregulation has gone far enough. I am not a licensed ham yet but I'm a converted CBer. I have watched the decline and corruption of the 11-meter band for the past 14 years. I was urged to get an ssb CB rig and did. Locally, I found the ssb people to be just as courteous as the hams but after a while I was tired of "playing like a ham operator." My friend N4ZV made some code practice tapes and in a month I passed my cw test. I say "yes" to increasing the number of hams but it's going to take people like N4ZV to recruit them. It won't come from more deregulation. — *K. L. Sturgill, Marion, VA*

☐ After making another 30-mile pilgrimage to Hartford, CT, to take my General test and not passing it, I was disappointed. But what upset me more was seeing the bitter disappointment of a 70-year-old man who has taken the test several times and failed. What possible harm could come to Amateur Radio if the FCC were to allow this person to enjoy the use of voice on the ht bands in the few years he has left? It seems to me that more and more older people are turning to ham radio as a retirement hobby. This will have an effect on Amateur Radio as it has in other parts of our society. I am not advocating the removal of the code requirement. It is a very necessary skill, but somehow it should not be made a barrier to a fuller enjoyment of the hobby for retirees who can add their experience and discipline to the voice bands. True we have voice privileges on 2 and 6 meters as Technicians but the ht voice bands are more varied. — *Jack Monaco, WA1YYK, Agawam, MA*

☐ I am sure there are very good and endless arguments for and against dropping the code requirement. However, I feel strongly that the word operator should not appear on any license without at least minimal demonstration of cw ability. — *Roy S. Williams, W6VON, La Mesa, CA*

KNOW YOUR HAZARD

☐ In your article, "I Wish Someone Would Come Along" ("Public Service," January *QST*), both parts were excellent. Points I would like to stress are first, know your location and second, know about hazardous materials. When I have asked travelers what their locations were I have often heard, "Just a minute, I'll find a mile marker." I'm sorry to say that emergencies don't wait for mile posts. Sgt. Wright wasn't kidding when he mentioned hazardous materials, so in the glove box of my car I carry a pamphlet called "Hazardous Materials — Emergency Action Guide." I got my copy from the local civil defense department but I hear it is also available through the U.S. Department of Transportation. It lists most of the dangerous materials carried by motor transport, their dangers and appropriate actions one should take when dealing with these chemicals. My suggestion is when such hazardous materials are involved in an accident, find out what they are, radio this news to the appropriate authority (fire or police) and tell everyone else to stay clear of the area. — *Lloyd Colston, WB5AXH, Ketchum, OK*

RIGHT-FOOT POSTSCRIPT

☐ Jim Griffin's (W9NJP) article "Starting a Message on the Right Foot" (January *QST* 1979, page 60) was a welcome instructive comment for those of us who are not regular traffic handlers. Traffic handling may seem complicated, rigid and formal but the rules are all simply based on common sense and courtesy to the operators down the line who will be servicing your messages. As a postscript I would offer two further comments. First, when originating a message, consider the element of timing. No amateur wants to deliver a Mother's Day greeting three days late. If you regularly originate traffic to a particular person, the chances are that there is a developed circuit. But if not, be sure to originate well in advance of the anticipated delivery date and use an appropriate handling instruction (HX) in the preamble to designate delivery time. Second, to minimize time and expense to the delivering station, use the handling instruction authorizing cancellation or collect charges applicable if delivery will require a toll. Simple inclusion of the telephone number may be enough to speed the message to its destination. Traffic is fun to handle and the process is terrific training for emergency communication. It's a thrill to deliver a message to someone who then becomes inquisitive about our hobby. The hams I've found who handle traffic are good people, friendly and helpful. Besides, you will find the fellowship among them rewarding. — *John Swartz, WA9AQN, Springfield, IL*

BREAKING THE CHAIN

☐ Sending and receiving QSL cards is one of the enjoyable aspects of Amateur Radio, especially after you have worked some new country and are looking forward to the day when you have confirmed your 100th for the DXCC award. I recently received a QSL card which was accompanied by a typical chain letter. It stated that I should send a dollar to the specified person at the top of the list and enter my name at the bottom, etc. I understand that these kinds of letters, usually called "chain letters" are illegal. Sending one, especially this way, puts a fellow amateur in a position of breaking the chain. What is one to do? What do fellow amateurs think of this sort of practice? — *Walter Miller, WA8AUO, Dayton, OH*

[Editor's Note: Chain letters are illegal. See "League Lines," November 1978 *QST* for details.]

A FAIR SUM

☐ This is to express my appreciation for the ARRL-sponsored insurance program. On December 2, 1978, I suffered the loss of my handie-talkie from a leased car I was using on business. A very courteous young lady at the insurance office guided me in making the claim and after filling out the necessary forms, I received payment by the end of December. They paid me the replacement cost which I thought was a fair sum. — *Matthew DeGumbia, AF1A, South Meriden, CT*

MESSAGES OF GREETINGS OK

☐ I belong to the Women Marines Association which has members all over the country, and I serve on the Public Relations Committee. I have been sending birthday greetings, signed by the president of our organization, to our members via Amateur Radio. Recently another amateur called me after the net and practically told me my messages were illegal. He said to read the "Washington Mailbox" column in February *QST*. If these messages are illegal I will stop sending them, but our members are so happy to get them. We receive letters all the time praising the value of the birthday greetings program. — *Harriet Creighton, WA3ATQ, Gouldsboro, PA*

[Editor's Note: Birthday greetings, congratulations on a promotion, and other messages of this sort can hardly be construed as "facilitating anyone's business." To our mind, WA3ATQ's traffic is not only OK, but is excellent public relations for Amateur Radio. The point that the "Washington Mailbox" column was trying to make was that *business* traffic cannot be handled via Amateur Radio. It doesn't matter whether the business traffic is on behalf of a nonprofit organization, or a profit-making one. The only exception is in a genuine emergency, like using the radio to call an ambulance to the scene of an accident.]

WHY ON THE NOVICE PORTION?

☐ Could someone please explain to me why certain U.S. and Canadian hams insist on having phone QSOs on the small patch that we Novices have alloted to us on the 80-meter band? Some people insist on splashing over 5-50 kHz. — *Bob Baker, WB1EAB, S. Yarmouth, MA*

OSCAR POWER

☐ Back when the OSCAR 6 satellite was still working, I made many contacts using a homebrew 10-watt cw transmitter on Mode A feeding a 7-dB-gain beam. Now I am attempting to get back on Mode A with OSCARs 7 and 8 but find that my 10-watt ssb signal to a 9-dB-gain beam can be only weakly heard if heard at all. Many signals abound that are much stronger than the 250-mW beacon. This would seem to indicate excessive power usage which knocks weaker signals off the satellites. On the last QRP day (10 watts erp maximum) I fed 10 watts into 80 feet of RG-58, got about 2.5 watts out, fed this to a simple quarter-wave ground plane up 35 feet and received excellent, well-above-the-noise, downlink ssb signals for most of the pass on OSCAR 8 Mode A. The OSCARs are meant for everyone. If we all use minimum power, then everyone can use them. — *Brian Ripley, K8BR, Jackson, MI*

TAPE TREPIDATIONS

☐ An innovative attempt to teach ham radio through cable television has failed dismally because of the carelessness and/or selfishness of a New Jersey club. In August I received confirmation from Training Aids Assistant Jeanette Zaimes, AB1P, that the "CQ Ham Radio" video tape series would be shipped to our community college on January 1, 1979. With that assurance, I proceeded with all the mechanics of establishing a noncredit evening course in ham radio to be aired over a local cable company. I arranged for 94 1/2 hours of air time, I spent money on advertisements, spoke at the local ham club, and spent much time constructing a TV set for the live call-in portion of the course. Articles commending the course appeared on the front page of *Florida Skip, Ham Radio Reports* and in the local newspaper. All of this was wasted effort. The course had to be cancelled thanks to the one club that didn't return the tapes on time as promised. The ARRL is not at fault. It's the people who borrow club training materials and don't return them on time who are. This kind of occurrence damages the credibility of Amateur Radio as well as the personal reputation of volunteer instructors. This kind of thoughtlessness cannot be allowed to destroy the whole program. — *Bob Lightner, WA4PWF, Gainesville, FL*

[Editor's Note: At this time, the ARRL Club and Training Department is not mailing out new film requests. However, those requests previously booked are being honored. Cooperation of the amateur community involved in circulating ARRL materials is still needed.]

How's DX?

Conducted By Clarke Greene,* K1JX

How Much Is That Frequency in the Window?

Almost every amateur who operates on the hf bands has encountered the chaos associated with large pileups on DX stations. The casual operator most often avoids confrontations with pileups and finds a peaceful frequency on which to carry out his operations. The DXer usually finds himself right in the midst of the cacophony, or may be indeed the very cause.

Over the years several schemes have been presented to alleviate pileup congestion. These suggested solutions would attempt to reduce the mayhem by improving the efficiency or rate at which a DX station works his "clients." The faster these stations can be worked, the better the order on frequency can be maintained, or so the reasoning goes. The practice of working by call area and the use of lists are both well-established members of this philosophical school. Both require cooperation and discipline among the participants.

Deep down inside, most DXers are pretty considerate. Not only do they realize that their fellow DX-seekers' enjoyment of the hobby is enhanced by orderly pursuit of a rare DX station, but they also recognize that this is to everyone's benefit to minimize interference to the other channels on the band. Unfortunately, the thrill of the chase (some call it greed) sometimes turns friendly coexistence into all-out war. The aforementioned solutions are all attempts toward an on-the-air truce. Some attempts are more successful than others.

The Russian magazine *Radio* recently offered another solution to the problem, in an article entitled "The Amateur Transmitter and the Problem of Interference." Here are the thoughts of A. Grechikhin, UA3TZ.

"In recent years, in connection with the growth in the quantity of Amateur Radio stations (it is expected that by 1980 there will be about a million of them), radio amateurs have made proposals concerning the allocation for their use of additional frequency segments. However, there are many claimants to new frequency bands and only time will tell whether the radio amateurs' requests will be listened to. Therefore, hoping and waiting, let us think whether everything has been done in those bands that we have today.

"There exists the extremely well-founded opinion that not one of the radiocommunication services uses its frequencies 100 percent. Wouldn't it be possible to increase the effectiveness of the frequency use in the amateur bands? We think so. For example, by going over from telephony to telegraphy it is possible to increase the number of simultaneously operating radio stations on account of narrowing bandwidth. . . .

"Maybe it would be desirable to provide in the band plans of the IARU for the allotment within each band of a frequency segment for each Region in which amateurs of that (and only that) Region could transmit. It is of course more convenient to carry out a communication on one frequency, but it seems to us that soon, distant communications will become impossible unless special measures are taken.

"And what if we went further and by analogy to the band plans drew up special time plans for each Region, continent or group of zones, indicating at what times stations of a given region were only to receive? It is known that in some services, for example the maritime, such "silent minutes" are established. Here is the simplest kind of example of an amateur time plan: Region 1 would be silent the first 20 seconds, Region 2 the second 20 seconds, and Region 3 the final 20 seconds of each minute. Communication would be short but dependable. By the way, amateurs operate in accordance with a similar sort of system when engaging in meteor-scatter communication."

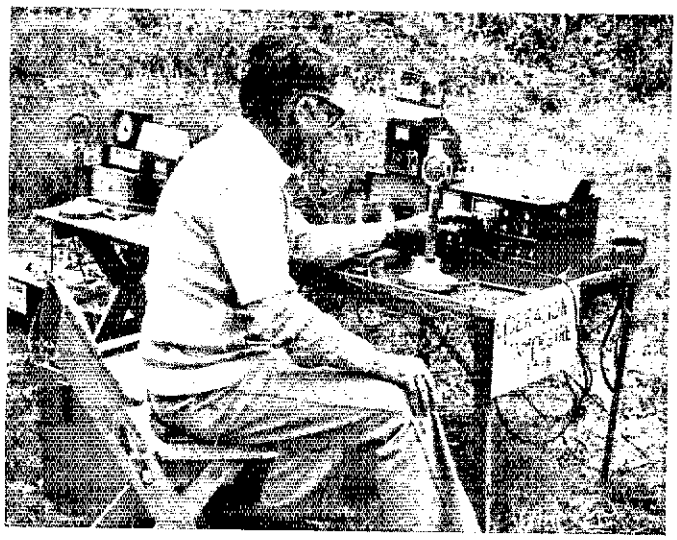
(Translation from Russian was generously provided by Dex Anderson, HB9BRQ/K3KWJ.)

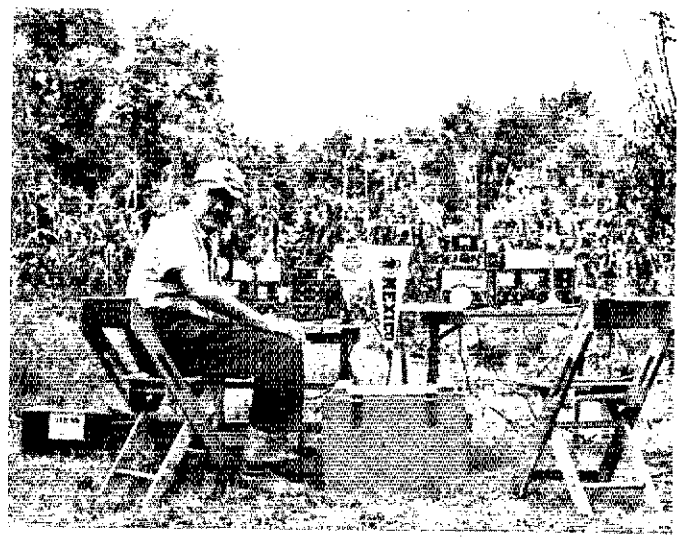
Does that sound a little familiar? The DXers in the audience who've been around for years recall that a DX station of two decades ago was never called on his own frequency. The practice of listening "10 up" or "five down" was universally used. The transceiver brought an end to this technique. Yet last year's Clipperton expedition clearly showed the value of split-frequency operation as a means toward improved communications effectiveness.

A well-known problem to DXers on 80/75 and 40 meters is hearing the DX through local QRM. The problem is especially in Japan and Europe. K1ZZ reports that while operating 4U1ITU during the 1978 CQWW Phone Contest, it was impossible for him to hear any North Americans below 3800 kHz. The only way Dave could work anyone was to transmit below and listen above 3800. He further says that a similar problem exists on 80 and 40 cw there. The activity level in Europe is much higher on those two bands than we in the U.S. are accustomed to.

Perhaps the solution proposed by UA3TZ is as close to a universal panacea for these problems as can be found. Instead of reducing interference by improving order on a channel, order is attained by reducing channel interference. For years a concept like this has been voluntarily used by the 160-meter DX fraternity. Their "DX window" is internationally accepted, and very successful. Has the time come to consider this approach for other hf bands?

*c/o ARRL, 225 Main St., Newington, CT 06111





Mexican amateurs have an annual Field day, just like U.S. and Canadian hams do. XE1EPA (left) operates from his station at the Popocatepetl volcano. XE1CRM (right) operates 40 ssb from the same location. XE1CRM and XE1EPA are two of the most popular ham stations in Mexico. They can be found most every day on 10 and 40 meters.

DX PORTFOLIO

Many DX stations handle their confirmations through *QSL managers*. One large group of amateurs does not, however. In the U.S.S.R. *all* cards go through the bureau at Box 88 in Moscow. Somehow, W3HNK has been suggested as being a QSL manager for some Soviet stations. Joe points out rather strongly that he is definitely *not* the QSL manager for *any* U.S.S.R. stations. A few Russian stations have been put in an uncomfortable position by these rumors, so by all means remember: Any and all QSLs destined for amateurs in the Soviet Union *must* be sent to Box 88, Moscow, U.S.S.R.

The job of being a QSL manager is a voluntary action. The job is without pay, yet requires considerable effort on the part of the manager. It isn't just a matter of courtesy to send a *self-addressed envelope* (s.a.e.) complete with return postage along with your QSL request — it is a necessity. Bill, W4YKH, writes that he has over 300 QSL requests from U.S. stations for his ZF2AP operation — all without s.a.s.e.s (self-addressed *stamped* envelopes). If any of these stations want a card for the October-November 1977 operation of ZF2AP, they should forward Bill an s.a.s.e. He also requests s.a.s.e.s from U.S. stations who wish cards for the October 1978 operation. His present call is ZF2BP.

Because of the lead time involved with publication of this column in *QST*, up-to-the-minute news really can't be reported here. Activity planned well in advance can and will be chronicled in "How's DX?" but by the time late-breaking bulletins appear in print, the DX is long gone.

There are several viable solutions to the problem. The first is to subscribe to one (or several) of the excellent *bulletins* covering the world of DX. Many of these are published weekly or semi-weekly, so their information is right up-to-date. Some of the more popular ones are listed in the table. There are other excellent newsletters, but they are either fully subscribed or are club membership bulletins.

Another prime source of DX news is your *local DX club*. Who would know more about activity than the active hams in your neighborhood? Many clubs sponsor a 2-meter spotting net either on an fm simplex frequency or through their own repeater. Membership in a local DX club has a lot to offer. If your area has no club, why not start an informal group?

Table 1

DX Bulletins

DX News Sheet
Published by Geoff Watts
62 Belmore Rd.
Norwich, England NR7 0PU

DXPress
Published by Central Bureau VERON
Postbox 1166
6801 BD Arnhem, Netherlands
Annual fee: $17

Long Island DX Bulletin
Published by Long Island DX Association (LIDXA)
P. O. Box 173
Huntington, NY 11743
Annual fee: $10

Long Skip
Published by The Canadian DX Association
P. O. Box 717, Station "Q"
Toronto, ON Canada M4T 2N7
Annual fee: $10

UPCOMING EXPEDITIONS

Albania — SM3VE and SM4CNN report that they have licenses and permission to operate. They are preparing to operate ZA5A during the last week of June and the first week of July. Look for them on all bands including OSCAR.

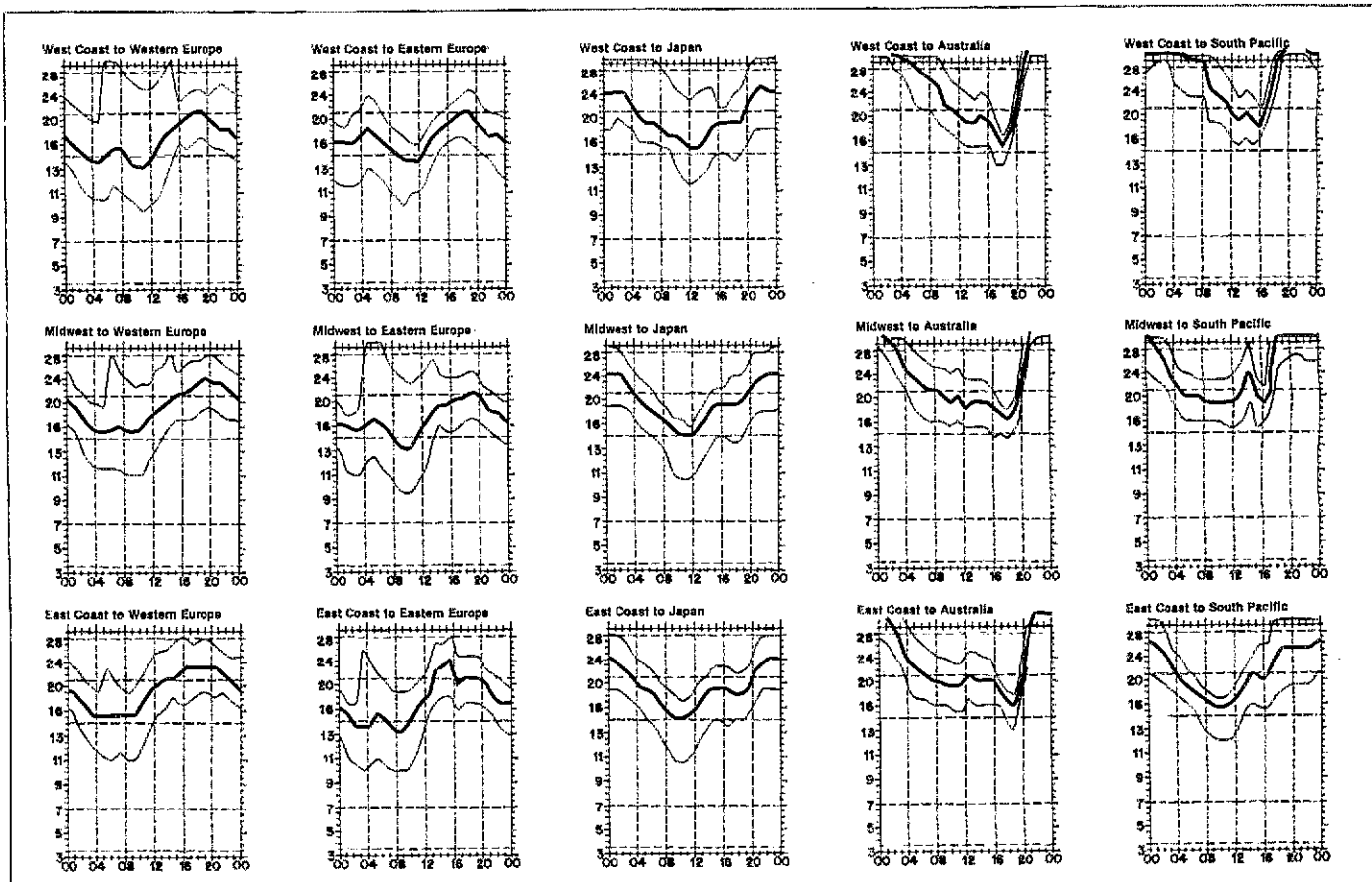
Aves Island — YV0AA hopes to be active in mid-April. A group including YV5ANA, YV5DFI, YS1RRD and K1MM plan an all-out cw and ssb effort for about 10 days.

Burma — In his DX column *Radio*, UW3AX reports that SP5AUC will be active as XZ2P in the near future.

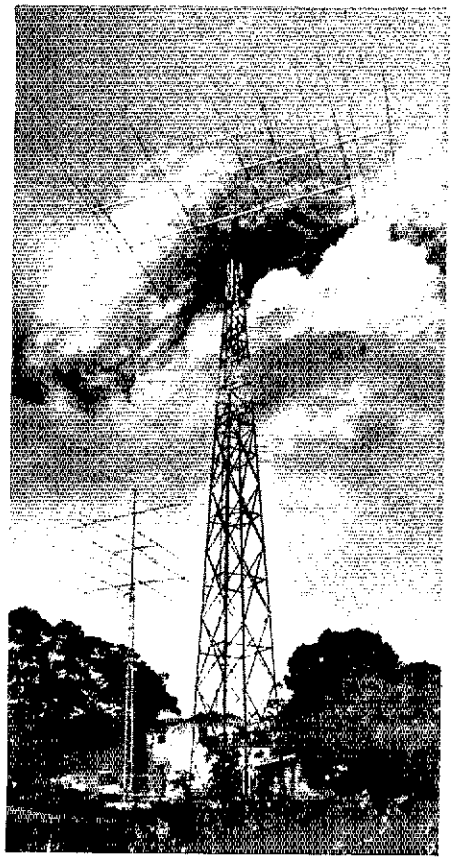
Sao Thome — D4CBS will be in Sao Thome for an extended visit beginning the last week in March. Although Angelo has a license and intends to take a rig, informal inquiries on the status of Amateur Radio in Sao Thome have gone unanswered.

Spratley Island — VK2BJL and ZL1ADI are coordinating a group which plans to depart from Brunei (VS5) on March 27 of this year. They hope to arrive on the 29th or 30th and operate for about seven days.

To prove that antennas can grow large anywhere in the world, 6Y5RS has installed his first-class installation near Kingston. Ruel's large tower is 105 feet tall, with four elements for 40 meters and six elements for 20 meters on top. The smaller tower supports four elements on 20 meters, a three-element 15- and 10-meter duobander and an 11-element 6-meter beam. And 6Y5RS plans yet another tower in the near future. *(photo courtesy 6Y5RS and W4KFC)*



When are the bands open? These charts predict this month's average propagation conditions for high-frequency circuits between the U.S. and various overseas points. One chart for East Coast to West Coast is also included. On 10 percent of the days of the month, the highest frequency propagated will be at least as high as the uppermost curve (highest possible frequency, or hpf). On 50 percent of the days of the month, it will be at least as high as the middle curve (maximum usable frequency, or muf). On 90 percent of the days of the month, it will be at least as high as the



QSL Corner

Administered By Dave DeMaw, KA1BUQ

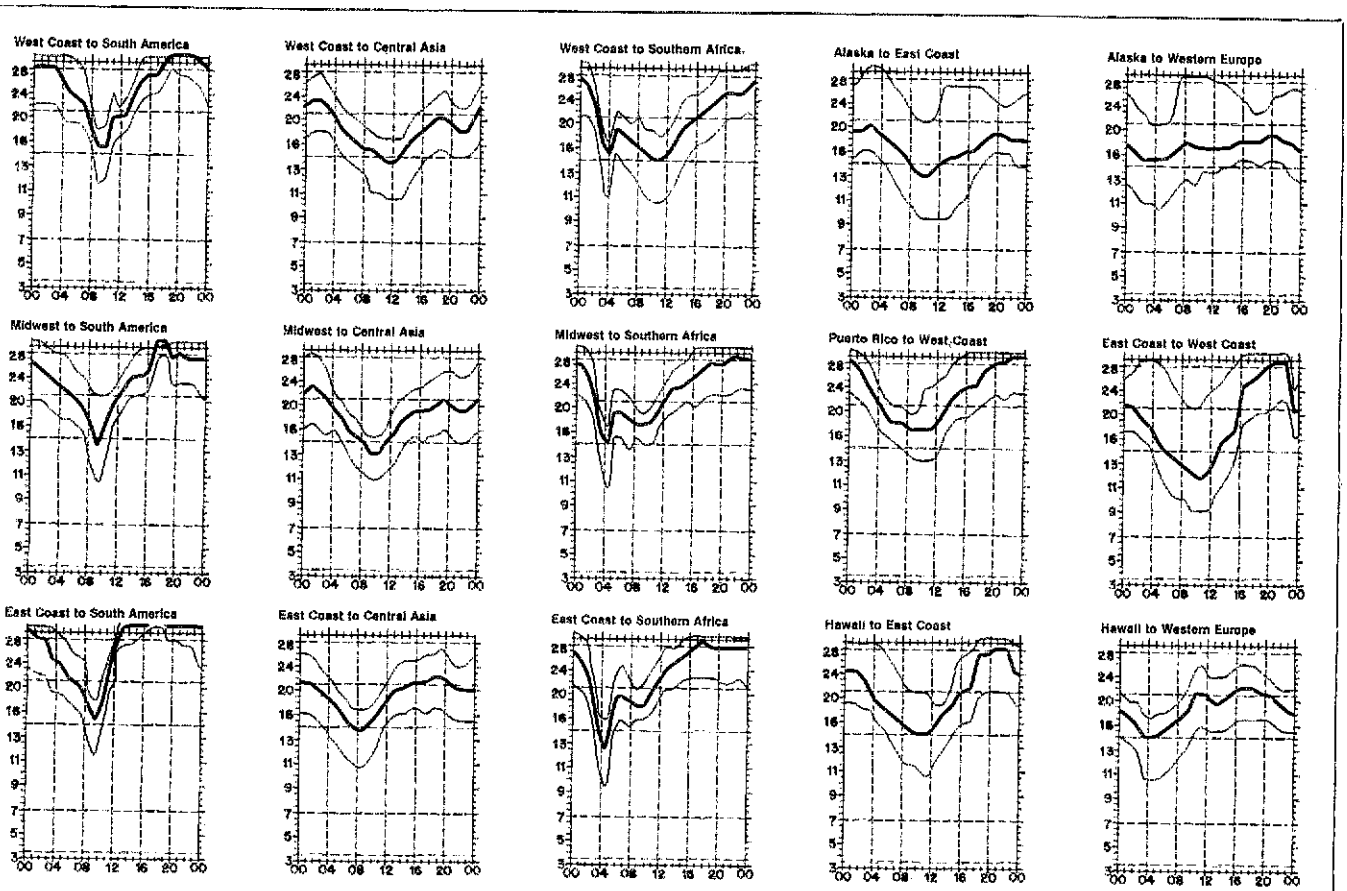
It is apparent that many amateurs are taking advantage of the savings provided by the ARRL-Membership Overseas QSL Service on a regular basis. Utilization of this "outgoing" bureau has grown dramatically since its inception in 1976. Approximately five tons of QSLs were distributed in 1978. This translates to 1,500,000 cards, an increase of 85 percent over 1977. It is expected that 1979 will reflect an even larger increase. Statistics for the first two months of 1979 show that almost 1-1/2 tons of QSLs were forwarded: 500,000 cards. Last month's column included an updated list of countries for which QSLs may be forwarded. Refer to it when submitting QSLs for overseas distribution.

Any ARRL member can use this service by adhering to these steps: (1) Pre-sort QSLs alphabetically by prefix (A4, AP, CE, F, HA, HI, JA, 3A2, etc.). (2) Enclose the address label from the brown wrapper of your current copy of *QST*. (3) Enclose $1. (4) Enclose an s.a.s.e. with 15 cents postage for confirmation that your QSLs were received for distribution. The s.a.s.e. may be omitted only if you include a note stating that no confirmation is necessary.

QSL MANAGERS

AP2TN (W8QFR)
C31QF 8/78-9/78 (DC7EU)
C31QG 8/78-9/78 (DL7QG)
C31QH 8/78-9/78 (DL7UN)
EA6EU (WD5BIF)
EL2AV (N6FL)
FR7BJ (WB9MFC)
GJ5CIA (N6MA)
HL9TB (W5TCX)
HL9TJ (K6VA)
JY3ZH (DJ9ZB)
KM6BI (W5RU)
KP4KK (WA3HUP)
P29JS (F6CYL)
S8FXT (VE3DPB)
TF3CW (K1RH)
TR8AC (W5RU)
TR8GDC (W5RU)
VP2DAY (WA4DWN)
VP2LGR (W5RU)
VP2SE (WA1SQB)
VP2SZ (WB8OBA)
VP5CHX (WA1SQB)
VQ9JJ (W5RU)
VU2DUE (W5RU)
WH4AAA (W5RU)
WD4CEM/KH4 (W5RU)
WB4SJN/DU2 (WB9MFC)
ZD7BB (G3PEU)
ZF1SV (VE7BXG)
ZF2CJ (K4VYN)
4S7AF (WB4ZNH)
4S7DX (WB4ZNH)
4Z4RV 10/29/78-on (WA4WTG)
5B4EP (K2IJL)
5J4QT (JA3KWJ)
8P6FD (VE2QO)
8Q7AF (WB4ZNH)
9I ICA (WA3NCP)
9V1TE (WAØTKJ)
DA2QE, Robert T. Chilcote, USAFSB Box 15, APO NY 09742
OX3WS, P. O. Box 264, 3900 Godthaab, Greenland
3D2BH, P. O. Box 735, Suva, Fiji
9N1MM, c/o N7EB, 12802 Sun Valley Dr., Sun City, AZ 85351

Our thanks for the preceding QSL information go out to DL7QG, GU3MBS, JA3KWJ, K2IJL, K2TV, K5QA, N7EB, VE2QO, WA4DWN, WA4FLR, WB4RKN, WA4WTG and W9NIN. qst



lowest curve (optimum traffic frequency, or fot). See January 1977 *QST*, page 58, September 1977 *QST*, page 35 and January 1979 *QST*, page 11, for a complete explanation. The horizontal axis shows Coordinated Universal Time (UTC); the vertical axis, frequency in MHz. Asterisk indicates long-path circuits. Data are provided by the Institute for Telecommunication Sciences, Boulder, CO. These predictions for April 15 to May 15, 1979, assume a sunspot number of 135, which corresponds to a 2800-MHz solar flux of 178.

DX Century Club Awards

Administered By Don Search, W3AZD

The ARRL DXCC is awarded to amateurs who submit written confirmation for contacts with 100 or more countries on the official ARRL DXCC List. You may also submit cards to endorse your award in 20-country increments through 240, 10-country increments through 300, and in 5-country increments above 300. The totals shown below are exact credits given to DXCC members from November 1 through November 30, 1978. An s.a.s.e. will bring you the full rules for participation in the DXCC, the DXCC list and application forms.

New Members

Mixed

W4FDA/300 PJ2AAX/153 K3LHD/124 DK6BU/111 W6UR/109 FM7AV/106 VE3BTQ/104 W2APD/102 KD4M/100
N5AN/265 WØJRN/153 WB9ZPU/124 WA3VJS/111 WB6TIJ/109 LA4AT/106 WB4LPP/104 WA2JDU/102 N4EZ/100
YU1DZ/227 K7BHM/150 WB4VUA/120 DK6JV/110 WB4ZGS/109 PY2ZGF/106 AA4EE/103 WB2PQG/102 PT2LS/100
PJ2FR/221 N6QY/149 PY6AJG/118 JA1IOA/110 AC6V/108 W3BBL/106 K5FNQ/103 WB3FIZ/102 W1VW/100
I1TLA/214 N2GC/142 WA3OED/115 JF1CCH/110 JA8MHG/108 W5VBX/108 W3RO/103 WB4RJO/102 W6SGU/100
N2DT/211 N6SA/137 AB5P/114 JR3MVF/110 K6ODK/108 JI1DCW/105 W4VF/103 GM4EQY/101 WB1ANT/100
JF1EZH/204 WA6RPF/136 K2AIO/114 W2WZ/110 N2CM/108 N5NO/105 WB3FAF/103 VE2DKU/101 WB5OON/100
WB9NKH/201 WA1UVX/126 WA1CCR/114 WD4AWR/110 W3FAF/108 W1BWS/105 WB8WSS/103 WA1DER/101 WBØMIX/100
W2SUE/173 DL4WD/125 WB9UKK/113 DM2AUJ/109 WD4IKM/108 DF4QW/104 WD4GSF/103 WA9SLU/101 WD6ATC/100
W6RK/169 OH2PQ/125 WB5WQG/112 LZ2SC/109 DK6US/107 G4BYB/104 K6DQ/102 WDØFDE/101 WD9CUP/100
YU1KMN/160 W8CEF/125 4Z4OZ/112 W4WSZ/109 W6SOD/107 KH6RM/104 OH1PR/102 KB4BU/100 YU2HJ/100
K5AS/153

Radiotelephone

I1AGC/238 JF1EZH/174 WA2NBM/125 VE1RQ/112 DL4NN/109 PY6AJG/107 G4BYB/104 N1ED/103 K6DQ/101
I1PHX/237 N8ANC/160 HS1ABE/122 WB5WQG/112 EP2MS/109 WD4DVZ/107 WA4MCH/104 WB3FAF/103 WA4INQ/101
EA3AIN/216 PJ2AAX/153 DL4WD/120 HI8MFP/111 HKØCLS/109 WD5DBV/107 WA6PJR/104 WB6LMN/103 WB1EWP/101
K2SD/209 W2SUE/141 W1YNE/119 W8CBR/110 QZ1BAO/109 K2ARO/106 WB6SWH/104 AA4EE/102 KD4M/100
N5KK/202 W6RK/135 K3LHD/118 WA4VLB/110 SV1DX/109 LA3RP/106 WD4IKM/104 DA1IN/102 WA3YGQ/100
WA4JQS/200 N6SA/132 WA1UVX/118 WB9UUE/110 AC6V/108 W6BZ/106 WD4JRR/104 JA1SGU/102 WB2RLJ/100
WB9NKH/187 WB4FNH/131 WB4VUA/118 WBØQQV/110 CX2XC/108 N5NO/105 JI1DCW/103 WA2JDU/102 WB9RPY/100
I3OBO/177 WA6RPF/129 WD4FRK/116 WD8BSX/110 P29MM/107 DK9XD/104 LU6DIN/WØ/103 WB4ZGS/102 WD8BAD/100

CW

I5XIM/207 JA8MHG/107 N2GC/106 OH2PQ/105 W3RO/103 WA2AUB/103 K6CR/102 VE3CXL/102 JH3JEX/101
OH8PF/110

5BDXCC

N5UR K4CEB

Endorsements

Mixed

W2AGW/363 W4EEE/350 K4YYL/336 WB8EUN/323 WB9EBO/307 N5NW/280 K6AAW/249 W7FF/202 WA4JJW/162
W1GKK/361 W4WV/350 W9GB/336 K4BVO/322 K5KX/305 W2CC/280 W5VGB/247 WB4RFZ/201 WB1CCH/161
WØELA/361 W8OK/350 JA4ZA/334 K5UR/322 K8LJG/305 W3ACE/280 JW5NM/243 WB9SLV/201 WB9HIP/161
W4OM/360 W2BMK/349 VE3MJ/333 K6XW/322 PAØTAU/305 WA4JTI/280 K2WT/241 K1WJB/200 W4CEB/160
W8GT/360 W5MMD/349 W4YN/332 K9AWK/322 W7YRO/305 W7DH/279 W4SNR/241 KH6DL/200 WA4DPU/160
WØMLY/360 W8KPL/349 W9DG/332 XE1KS/322 K9TN/303 VE3II/279 G3DOG/240 WA4QHV/200 K5MK/159
IØAMU/357 W6ONZ/348 W6TO/331 G3JAG/321 W2YD/301 W7DQ/277 K4AVC/240 W5ISF/200 WB9EEE/156
W4AAV/357 DL1HH/346 W6KNH/331 W2FG/321 WB2AMO/301 K4HRG/275 K9HLW/240 W6TPR/200 WØMVO/152
W7PHO/357 W5HDS/346 W7AO/331 I2LAG/320 JA8KB/300 IØZG/272 W4WXZ/240 WØRT/200 N5RQ/150
W8HT/357 XE1AE/346 W9HZ/331 I7HH/320 K7BR/300 AF5M/271 K1MEM/239 WAØFBQ/200 WA4MCH/150
4X4DK/357 K2TQC/345 K5YY/330 K4RA/320 K8RA/300 DL7NS/271 N5FW/225 WBØTIZ/200 WA4FKK/141
K3GU/356 PAØLOU/344 5M1CXE/330 VE3GCO/320 DL1LDI/297 K9CW/270 W9NGA/226 N9OK/197 WA7JBE/141
W4TM/356 WØAX/344 W3PVZ/330 W1BR/320 K6GWN/297 N8JW/270 WAØIDK/225 AA4TP/193 K3VDU/140
K4PDV/355 W6MUR/343 JA8JL/328 W4FPW/320 DL6MK/294 W2OB/270 K4PHE/223 6Y5MP/193 VE3DUS/140
W1JR/355 I5UA/342 K2CL/328 DL6KG/319 W2RS/293 WA4ENJ/270 WA4HDD/222 WA8KME/192 WA2URD/140
W2AO/355 W5HJA/342 K4CEB/328 N4XX/319 K2UU/293 WA5UBV/270 K4KA/221 K9ARZ/184 WB4KVM/140
W5IO/355 DL7HZ/341 LA1K/328 W9HK/318 OY7ML/292 W9LJL/268 K9BR/221 AA4NA/181 WA5YTX/137
W8AH/355 OE1FT/341 W7BGH/328 VE3BX/316 WA4MSU/291 W2MIG/267 WB4ASW/221 WA5TOS/181 WB4INE/136
DL3RK/354 K1IXG/340 HB9AHA/327 W6GO/316 K3GYD/290 W4DZZ/265 K1WJ/220 K2TV/180 WB5OBV/131
G3AAE/353 K4MQG/340 K9KA/327 JA8MS/315 W1LQQ/290 WØYZB/262 KH6HC/220 VE3WW/180 W7TIZ/124
IT9ZGY/352 ON4PA/340 W9ABA/327 DK3GI/312 WB2VET/290 WAØTKJ/262 N7MC/220 W2HXF/180 WA1STO/123
GI3IVJ/351 WA2RAU/340 WØPAH/327 K5LM/312 HB9AIJ/288 KH6CF/260 WA4LOF/220 W7EEJ/180 WA3EEE/121
OK1FF/351 W6ONM/340 ZS6IW/327 K6OJO/312 N4UH/288 N4GE/260 WB4NDX/220 WB4SXX/180 WØUBT/121
W1AA/351 ZS6RM/340 JA1JRK/326 WA9JWE/312 DL1BS/284 W1KLY/260 WB4QFH/220 N5JR/178 N4DX/120
W5FFW/351 K6YRA/339 ON4UN/326 W1BFA/311 WA2AUB/283 W5CPI/260 WA5SUE/220 JA1SGU/176 WB1CRG/120
W2GC/350 W6QNA/339 W5IR/326 K6PZ/311 SM7DMN/282 I3OBO/259 W6SWM/219 WA3BGN/175 WB9FRF/120
DL9OH/350 ON4IZ/338 DK3PO/325 W5QLT/311 DK3SF/281 JA2BP/257 WA4GKR/211 JA6GYG/171 K1ZD/119
K6LGF/350 W1SD/338 VE3GMT/325 WA8PYL/310 K8IA/281 W1CNU/257 ZS6BOK/208 WA7OSO/171 N9ABS/119
OZ3Y/350 W5RDA/338 W7JFO/325 AB4HI/307 WA3GJZ/281 VE5YA/255 K6RIP/205 WB9RSE/169 W4CLC/119
VE5RU/350 DL1CF/336 W7LFA/325 W6UY/307 N2AC/280 PY1SJ/253 EA7OH/204 OH2KP/162 WA5KTZ/119
W2FZY/350 K4IEX/336 K4BBF/324

Radiotelephone

IØAMU/357 EA2HX/337 W4QAW/326 I5TDJ/318 W1SD/305 W2MIG/264 WA4HDD/222 WA4LOF/200 W3KHQ/147
W7PHO/356 K6YRA/337 W9HZ/326 WB8EUN/318 WB6UJO/304 K4NJS/262 DF4FX/221 W7FF/200 WØMVO/142
W8AH/355 W3AZD/337 VE3GMT/325 DL3RK/316 OZ5EV/262 PAØKB/221 K6SX/220 WB9DVV/200 W5ILR/141
W5IO/354 F3DJJ/336 W4EPZ/325 K9KA/316 K8TB/299 WA4JTI/260 K6SX/220 W8CBA/198 K9UAA/140
ON4DH/353 VE3MH/336 W6ARJ/325 G3WW/315 OZ3PZ/299 I1HAG/254 K9MD/220 6Y5MP/193 WA2SRM/140
W4OM/352 I5WT/335 W7JFO/325 K6XW/315 WA8PYL/298 AA4AR/252 N2AC/220 WA7TTM/190 WB4KVM/140
DL9OH/350 K4MQG/335 W7LFA/325 N4XX/315 WB9EBO/297 OY7ML/252 PJ2FR/220 W5CPI/185 WB5PBA/140
W1AA/350 K4YYL/333 JA1JRK/324 DL6KG/314 W6UY/295 W9LW/248 WA4QMQ/220 N2BJ/182 WA7GGI/140
W4EEE/350 OZ3Y/333 YV1KZ/324 SM7ATN/314 DL9VS/292 N5NW/247 WB4NDX/220 ZP5YD/182 I1EVI/130
GI3IVJ/348 VE3MJ/333 EA8JJ/323 ZL3QN/314 K6PZ/289 W9DOR/245 W5SAA/220 N1AC/181 WB3CIW/130
VE5RU/348 I8AA/332 K4BBF/323 K5UR/312 W1BFA/289 K1CMI/240 ZP5RS/220 I6ICD/180 WA7ZJQ/128
W9WHM/348 ZS6RM/332 DK2BL/322 K6OJO/311 K2UU/288 K8GWM/240 K4HRG/215 VE3MRS/177 WB4INE/127
WØMLY/348 JA4ZA/330 DK3PO/322 W5QLT/310 OA4JR/284 IØOLK/235 W6SWM/213 K9ARZ/171 W9IVB/127
XE1AE/346 K5YY/330 W6CGB/322 K4BVO/309 VE3II/278 N8JW/232 W4KN/210 WA7KNK/166 WB9SLV/127
K6LGF/345 I8YRK/329 XE1KS/322 W2FG/308 W3ACE/277 I8YZP/229 ZP5EF/210 JA8GYG/165 WB5QBV/124
I5UA/342 W6KNH/329 I2LAG/320 WB5DJA/308 W7DQ/277 AF5M/228 W4EBO/208 WØTT/165 I6MRD/121
K8CFU/341 EA4JL/328 I7HH/320 DL9DY/307 DK3SF/271 W4DZZ/227 W1KSZ/201 VP2VBK/162 W6VZZ/121
K1IXG/340 W1GKK/328 N6NA/320 K5LM/307 IØZG/270 JW5NM/226 K2WT/201 W1BMY/161 AA4M/120
W1MMV/340 W9DC/327 W9BEK/320 W1DO/307 W1GKN/270 K3DH/223 DL8XL/200 WB9HIP/160 W4WVB/120
WA2RAU/340 ON4UN/326 HB9AHA/319 I1UW/306 W1LQQ/264 W2OB/223 G3DOG/200 ON8CX/151

CW

N4RJ/280 OZ7BW/224 W4KN/216 N8JW/184 K8WW/174 WB6RSE/163 W2OB/156 DJ2AA/140 DL1BS/135
K2TQC/277 OZ3Y/222 JA2BP/204 N5JR/177 K6RLY/166 DL1EV/161 DF4GV/151 W4WXZ/140 WA5YTX/126
JA1JRK/259 I3OBO/221 K5UR/202 W6UY/175 VE3BX/166 KH6HC/159 W2MIG/145 WA5YMW/140 W7EEJ/121
K6JG/246

Corrections

January Listing. Accidently left out, Mixed: W5EJT/338, WØBN/337, W3PVZ/325, K5OR/276, JR6CWC/240. Listing corrections. Should be mixed: W7MD/361, W4LBT/207. Phone: W1SEB/321. WØPGT should be WØPGI/351. K8KI should be W8KI/225. K8CFU/335 should be phone, not mixed. K1RN should be K1RH, mixed 140, cw 136. WA2CBE should be WA2CBU/125 mixed.

YL News and Views

Conducted By Louise Moreau,* W3WRE

YLs and CW

A lot of women in Amateur Radio enjoy cw. Mae Burke, W3CUL, spends several hours a day at the key with traffic. Those BPLs in her shack mean more than just letters, for her major work load is pounding brass. She tells of times when all signals are so weak that a voice would be impossible to copy but even a whispering S-3 signal can be copied on cw.

Canada's Noreen Nimmons, VE3GOL, is another dedicated traffic YL found regularly in the National Traffic System. She has a fist that we all would love to have.

The gal who originated our "33," Clara Reger, W2RUF, made that distinctive signature ripple with a key before it was ever heard on voice nets. If we hunt her she can be found working high-speed code on 80 meters, or at a very slow speed helping newcomers to gain confidence and build up their code toward a higher-level license. And Clara isn't the only YL doing this sort of work. Lillian Abbott, K8CKI, leaves the Buckeye Belle Net to work with the students in her Amateur Radio classes, then goes on the air to help them get that baptism of fire of the first contact.

For many of us it is fun to meet the challenge of learning another language and then pursuing it until we become fluent in it. And fluency is exactly the way we can describe Evelyn Headings' ability to enter code contests and win easily. For Evelyn, W7LLD, code just flows in her ear and comes out as words because it is just another language.

For the handicapped, code is often the only way it is possible to operate. For Kay Clark, VE3KAY and Mary Lou Stocksill, WB6SSZ, it is the only key to open the door to Amateur Radio. Both these women are unable to see or hear. For Kay, the vibrations of cw through her fingers bring the world into her shack, while Mary Lou's ability to detect just one single note in the audio spectrum opened the way for her to be able to reach out and meet all of us.

For those of us who want DX contacts, often the only way to catch a rare country for YL-club-sponsored certificates is by cw. Not every DX gal is fluent in English, nor are we able to handle the many languages of the world. But through Q-symbols, the code and that identifying "33" we can pick out and most times log other women anywhere.

One of these days an aspiring Novice will find herself tuning across the band and she will say, "Oh, that's Jane, or Hulda, or Ursula. I'd know her fist anywhere."

THE BRYLA AWARD

The YLs of Brazil have offered a special new certificate for contacts with women from their country and DX stations. For those outside of Brazil, certified standard log information must be submitted for contacts with YLs from 12 countries on three continents, plus eight YLs from Brazil. All information must be sent to the custodian, Therezinha Cardoso, PT2TF, SQN 102, Bloco E, Apto 604, Brasilia DF CEP 70,000 Brazil. The YLs in Brazil are making special times on their net to welcome checkins from other countries.

YLRL TAPE TOPICS

YLRL makes a special effort to insure that all blind Amateur Radio operators keep abreast with YLRL membership activities, by relaying information from "YL News and Views" and other parts of *QST*, as well as other news items concerning women in Amateur Radio through the Tape Topics activity of the club. These tapes are available for all sightless YL operators, whether they are members of the club or not. Information on this activity may be secured from the club tape librarians, either the Floridora YL club in the East or Raj Welch, K7NZO, in the West.

A similar activity is being carried out for the blind YLs in Canada by the Ontario Trilliums.

ABOUT THE YL CONTESTS

The most frequent requests that "YL News and Views" receives concern all the YL contests. The gals all plead that those who are working make very certain of the calls, or check them in either a YL Directory or the *Callbook* before refusing to acknowledge. A great many women have been told "Sorry, OM, this is a YL contest only," all because the YL who is trying to call them is a gal with a deep voice. So please make sure that the call is feminine on the phone portions of the contests.

Also there is a tendency not to tune the receiver beyond the calling frequency; many good contacts are lost because of this.

Novices who are trying to enter many of these activities are sometimes not being considered. There is a special YLRL award for the top score in the Novice bands and the Novices who are tied there have asked that we check those bands and call. It would be a few more log points for us and a chance for the eager-to-join-us Novices to earn that award.

YL CONTEST CUSTODIAN REMINDER

The mailing dates for both the YL-OM, and for the DX YL to NA YL Contests in 1979 will be the new YLRL Vice President Margaret Williams, WA4FTJ. Please send all logs directly to her, not to ARRL or "YL News and Views." The forwarding of these logs, due to delay in mailing, may cancel the eligibility of the contestant. QST

*YL Editor, *QST*. Please send all news notes to W3WRE's home address, 305 N. Llanwellyn Ave., Glenolden, PA 19036.

50 Years Ago

April 1929

☐ Ross Hull now turns attention to voice transmitters, and describes an elaborate setup to meet 1929 standards, complete with the desired 100% modulation. A UX250 modulates a 210, with a pair of 852s as a linear.

☐ The Federal Radio Commission was created on a one-year basis, but Congress is now considering extending its life again, largely because there is still much work to be done in straightening out the regulatory climate.

☐ In response to many member queries, Jim Lamb has built a powerful "hi-fi" complete with two turntables. J. R. Nelson of E. T. Cunningham adds considerable data on a.f. distortion in amplifiers.

☐ President J. E. Smith of National Radio Institute details the hows and whys of "beats" — heterodynes, that is.

☐ W4LD saved the price of an expensive antenna current meter by building his own version, the pointer measuring the expansion of a wire heated by the current — a "hot wire" meter.

☐ We've all noticed that some receiving antennas have an annoying resonance (usually at the wrong frequency) and W7ABN shows us some of the remedies.

☐ With the new regulations there's a lot of interest in converting power to direct current, and R. J. Kryter tells us the good and bad points of various rectifiers.

☐ Fellow named Shalkhauser from Peoria thinks the League is already old enough to start collecting historical items and records for future generations.

25 Years Ago

April 1954

☐ Summer is inviting us to portable opportunities, and W1VLH has built a nifty 2-meter unit which sits on the folded roof of his convertible, parked on a Connecticut mountain (hill?), working real DX.

☐ Lots of Novices have built the "35-watter" in an earlier *QST*, so W1ICP shows them how a v.f.o. can be added when they graduate to General Class.

☐ Mentioning Class AB_1 amplification at a hamfest will bring a heated discussion; W1DF calmly outlines the good and bad points and describes a unit taking advantage of the good.

☐ Chicago-area hams are enthusiastic about hidden transmitter hunts, and W9PYG shows us some of the techniques in use for direction-finding.

☐ "WIOU" staggers the imagination with his proposal that receiver selectivity can best be obtained by a limiter circuit, thus separating phone signals by their strength rather than their frequency!

☐ Any mainland contester has heard the powerful signal of KH6IJ; Katashi shares some of his 3-element beam secrets with *QST* readers.

☐ The 1953 Simulated Emergency Test was tops in demonstrating the amateur's ability to serve when disaster strikes.

☐ The popular S-40 receiver can be made much more effective on sideband if the modifications suggested by W3SGF are applied.

☐ FCC has indicated agreement with the League's proposal to expand the 10- and 20-meter voice segments.

☐ League membership has reached an all-time high — 60,000! — *WIRW* QST

The New Frontier

The World Above 1 Gig

Conducted By Bob Cooper Jr.,* W5KHT

Tapping a Tremendous Resource

An understanding of wave propagation or at least the DX possibilities offered by wavefront propagation is essential to proper utilization of our amateur assignments. Because we have been taught, for decades, that amateur (and commercial) microwave assignments are only suitable for "line of sight" communications, understandably amateur interest in the shf (super high frequency) bands has never materialized.

We are today in about the same state of development with amateur microwaves as we were with amateur vhf (5- and 2-1/2 meter) communications circa 1938; or amateur hf communications back in the mid-20s. Only unlike those two eras, when amateur equipment was the equal of so-called professional equipment, today commercial equipment is at or near its own "state of the art" in the gigahertz region. True, simplified amateur microwave equipment is yet to come for most of the bands above 1 GHz, but there is enough equipment around to make it possible for the avid amateur to create a station on virtually any of the bands between 1 and 20 GHz.

If anything is missing, it is simply the incentive to "try." In that regard let's talk about some of the telltale signs which dot the surface of the earth, suggesting to us that our amateur high-uhf and shf bands are a tremendous resource just waiting to be tapped.

The March column discussed the efforts of Australian amateurs to cross that large body of water along the South Australian seacoast known as "The Great Australian Bight," an area not unlike our own Gulf of Mexico in North America. Back in January 1978, a 1170-mile path at 2304.1 MHz was covered between VK6WG and VK5QR. This particular body of water is often overrun during the Australian summer by immense high (barometric) pressure areas which form out to the southwest of Australia in the southern regions of the Indian Ocean. Because of the regularity of such summer openings, a pair of 144-MHz beacons has been established at opposite ends of the Bight: VK6RPW (144.05) near Albany in western Australia and VK5VF (144.080) near Adelaide. Stations on both ends of the 1000-mile-plus circuit have learned to recognize the characteristics of the stable high-pressure areas which when combined with a long, straight (north by south) trough along the western Australia coast invariably provide ducting conditions.

This year's "summer season" began early — in November. VK6KZ, located in Perth and too far west and north to get into the "Bight tropo," has for three years running arranged his schedule to allow him to make one or two "field trips" across the 250 miles (400 km) to the vicinity of Albany. Many of these openings last 48 hours or more, providing sufficient time for VK6KZ to pack up a portable station and head into the ducting region.

This year it paid off handsomely. An opening that began in the afternoon of December 28 was really into high gear by the 29th. Setting up at a location some 30 miles inland from the coast, near Walpole, VK6KZ first established 1100-mile-plus 144-MHz contacts with various VK5 stations around 1600 local time. At 1924 local time he switched to 432 ssb and made it two-way with VK5MC; a station located at Mt. Gambier. The two agreed to switch on up to 1296.3 MHz and at 1938 local time (1138 UTC) they exchanged 559 reports over a new 1296 terrestrial record path of 1308.1 miles. When VK6KZ switched to 1296.3, he heard not one but two separate signals: VK5KK (1180.7 miles) was also on frequency and Wal reports that just for an instant he thought he'd misswitched to 80 meters!

VK6KZ went on to work VK5KK and also VK5RP; three 1180-mile-plus QSOs on 1296 in one evening is not a bad evening's work. The portable station at VK6KZ consists of between 1 and 2 watts of transmitter power from a 432 tripler, a 1-meter (3-foot) parabolic and a converter from Microwave Modules that has several stages of BFR-91 rf amplification in front of it. The VK5MC station utilizes the old 20-foot parabolic that used to be in service at VK3AKC for EME work, 40 watts of transmitter power, and a 1.5-dB noise figure front end using NEC1336 transistors. Antennas and power at VK5KK and VK5RP were similar to the VK6KZ portable configuration.

While the annual use of the "Bight" for extended amateur vhf, uhf and shf communications has become a regular feature of South Australia hamming, the first clue for it actually came from a professional study begun more than 11 years ago by a group known as the "Weapons Research Establishment." Setting up parallel 135-MHz and 1769-MHz "beacons" at Albany and Salisbury (a suburb of Adelaide), they monitored the 1000-mile-plus paths for six years. Their full report reads like a planning exercise for an amateur assault on world records: (1) 205 occurrences of 1-hour-or-less path openings at 135 MHz; (2) 49 occurrences of 1-hour-or-less path openings at 1769 MHz; (3) 70 occurrences of 15-hour (plus) path openings at 135 MHz; (4) 15 occurrences of 15-hour (plus) path openings at 1769 MHz.

These tests, conducted from September to May for six years, formed the basis for the current VK work across the "Bight." In other portions of the world, similar tests have been conducted indicating that long-haul surface ducting is not all that uncommon. In the absence of such professional testing, however, what is the basis for amateur attempts?

With the proliferation of vhf (and uhf) television broadcasting, observation of unusual propagation phenomena is available to virtually any amateur in the world. For example, along the northern coast of Australia television reception from Indonesian transmitters is so common that the Australian authorities are considering reassigning allocations in that region to escape the interference. To VK6s and 8s this suggests an opportunity to communicate on vhf, uhf and shf with YB/YC stations. In the Persian Gulf, along the Gulf of Aden and across the Arabian Gulf, there are similar situations involving "severe co-channel interference" between TV transmitters up to 1000 miles apart. This type of unusual propagation, manifesting itself as interference to commercial services operating in the vhf and uhf ranges (such as television), should be a "signal" to amateurs that the opportunity exists to communicate in the best of amateur tradition. Where else in the world do such conditions exist? You tell me and I'll pass it along through this column. Knowledge of where such conditions are found is the first step to encouraging amateur activity on the bands above 1 gig.

Mountaintopping — A Disadvantage?

For as long as amateurs have inhabited the world above 50 MHz we have accepted as gospel the thesis that the taller our vhf-uhf-shf antenna is above average terrain, the better our coverage will be. On the surface this bears out in practice. Certainly stations equipped with taller antennas or located on hills and mountains talk further under *normal* band conditions than those located at less elevated sites.

Westerners with access to mountain peaks for many years held most of the uhf and shf records for distance in Amateur Radio. They did it by hauling home stations to multi-thousand-foot peaks and coordinating uhf and shf contacts through 144 MHz or some other "lower" band.

More recent experience in Europe, Australia and between Hawaii and California suggests that having one or both stations at an elevated site during "ducting" may be a mistake. While the most experience to date has been with over-water paths, there is some evidence suggesting that similar conditions may also exist for overland paths. The evidence suggests that if the path is overwater the strongest signals are apt to be just a few feet above the surface of the water; literally "right on the deck."

These super-refractive "surface ducts" are very fragile freaks of nature; the result of a stable high-pressure area and some measure of humidity stratification over a stable sea produces the uhf/shf signal "trapping" or "waveguide-duct" effect. Any turbulence in the lower atmosphere breaks off the duct abruptly. When such ducts approach land masses they run into shoreline wind patterns. In the daytime the airflow is from the sea toward land and it reverses as the sun goes down. Apparently if land mass convection currents are gentle enough the duct can be "lifted" gently and slowly above the land mass area and not break apart in the process. The presence of California signals only at levels of 7-8000 feet msl in Hawaii illustrates this phenomenon. On the California end, the jumbled landscape creates wind currents and cross currents which totally disrupt or break off the duct very close to the shoreline.

*Rte. 5, Box 364, Guthrie, OK 73044

The World Above 50 MHz

Conducted By
William A. Tynan,* W3XO

New Standings Boxes Policy and Format

The February column leads off with a call for ideas regarding the standings boxes. They contain some calls that have just always been there, even though the stations have not been heard from in the four years that I have been the conductor of "The World Above 50 MHz." With the greatly increased activity, particularly on 2 meters, a lot of valuable column space is consumed whenever that box appears. Many responses were received to that editorial; almost all strongly urged retention of the standings boxes. This certainly supported this conductor's conclusions as to their usefulness and popularity. Many, however, argued for changes — especially dropping those who do not submit information at some regular interval. Others agreed that some changes in content are needed.

While there is no underlying unanimity of opinion other than "keep the boxes," I have done the best I can to establish some new guidelines for the box custodian and those submitting information. These are as follows:

☐ The standings boxes for 2 meters, 1-1/4 meter, 70 cm and 23 cm, as well as the EME Annals, will be continued; an attempt will be made to run each twice per year.

☐ For all standings boxes, except that for 23 cm, the distance column will be dispensed with.

☐ The state in which each U.S. station is located will be listed and EME capability indicated.

☐ The call-area column will include: (1) the 10 continental U.S. call areas plus KL7 and KH6, (2) each VE and XE call area, and (3) all DXCC countries except the U.S., Canada, Mexico, KH6, KL7 and the U.N. building.

☐ For the 23-cm standing, in which the distance will be retained, it will be the terrestrial distance. DX achieved via EME will not be listed; however, the state, country, etc. will count.

☐ In order to prevent the standings boxes from taking over the entire column as more stations pile up notable records, the number of stations listed in each call area will be limited to 25. Stations not heard from every two years will be dropped to make room for those who are currently active and desire to be listed. This does not mean that one must improve his total in order to remain listed. Just a simple statement that you are still active and desire to remain listed will be sufficient if you are still in the top 25 in your call area. In this connection, after the next appearance of each box, stations that have not been heard from in the four years that I have been the conductor of the column will be dropped unless they indicate that they wish to remain listed.

☐ The minimum number of states needed to be included in the listing is not a hard and fast rule but can be deduced by examining the lowest ranking stations in each particular call area. Occasionally, I may decide to include a station with a lower total if its specific location appears to make it more difficult to work other states than is the case for other parts of the call area. This rationale has been used in the 5th call area to include stations from far west and south TX as well as NM.

For the appearance of the 2-meter standing this month, only the 25 per call area rule has been imposed. Please provide within the next few months the necessary information on VE and XE call areas and countries, EME capability, etc. Otherwise, the current number of call areas will be assumed to be correct. Although it is not necessary, I would appreciate if updates be made on my special forms; an s.a.s.e. will bring three of them. In any case, please put box information on a separate sheet of paper rather than buried in a letter containing other information. Failure to do this is the most common cause of my neglecting to catch updates.

The Record Box

Appearing this month for the first time since January 1977 is the listing of terrestrial DX records. One factor holding up publication until now was a need to determine whether LU8DIN or LU5DJZ, both located in Mar del Plata, Argentina, had the southern end of the 2-meter record. It has been learned through YV5ZZ that LU5DJZ is a few miles to the south of LU8DIN and therefore it is he who shares the honors with KP4EOR. This should not detract from the fine accomplishment of LU8DIN.

There was also some consultation required with Australia and New Zealand, including confirmation of the recent VK capture of the 23-cm record.

It is with much regret that I am forced to delete 6 meters from the records. In recent months there have been so many contacts from northern Japan to Argentina that obviously surpass the old mark set by JA6FR and LU3EX in March 1956 that it is impossible to establish who the new record holders are. Doing so would be like trying to determine who has the DX record on 10 meters! If anyone can produce documentation demonstrating a new 6-meter record, I will be only too happy to include it the next time the record box appears.

ON THE BANDS

6 Meters — It's fair to say that February marked the "real" beginning of F2 DX for Cycle 21. True, there were a number of contacts made before that time, especially around last November 1, but they were extremely spotty and not shared in by many stations. Except for a very few exceptions, most work during that time was of the north-to-south type. This seems to be correlated better with earth's disturbed magnetic field rather than heightened 10.3-cm solar flux. For east-west paths, the reverse appears to be true. This is not exactly a new discovery but probably bears repeating. After a one-hour opening Saturday morning, January 27, to K4ERO/HC1, in which this conductor, and many others, finally caught up with the Ecuador station, February began with more and more reports of European TV reception. The French and British sound just above 41 MHz was in for hours at a time with very loud signals. In addition, the British video at 45 MHz was widely reported. Both sound and video from stations using two different European standards were heard by many at 48.25 MHz. Even the Russian Channel 1 video at 49.25 MHz was received by some, including W6XJ. Incidentally, there apparently is a Channel 1 station in Vladivostok as the Australians note a very loud buzz on 49.75 when the band is open in the direction of Japan. This should make an excellent beacon when we in this country are looking for JA openings. During the week of February 6, many Eastern stations experienced reception of the Gibraltar beacon ZB2VHF on 50.035. When he heard it over S9 on the 6th, WB2RLK/VE1 called its proprietor ZB2BL on the phone only to learn from his XYL that Jimmy was at work. Life on vhf does have its frustrations! A few days later G3COJ and GM8FFX, vhf editor for the RSGB publication *Radio Communications*, both called this conductor's answering machine to report reception at 1338 UTC February 8 by G3COJ of the 50-MHz signals from WB2RLK/VE1. The next day at about the same time, it happened — the first transatlantic 6 to 10 crossband contact of Cycle 21, when WB2RLK/VE1 hooked up with G3COJ. The following day, Saturday, February 11, W2IDZ also worked G3COJ while WB8IWI/4, SC, completed a 6 to 10 exchange with G3FXB. It was also reported that SM6PU heard WB8IWI/4 as well as WB4OSN in south FL and G3OHH is understood to have heard GW3NJY/W9. That same morning produced some excellent backscatter to the east with WB8IWI/4 hitting S9 here at W3XO. Other stations that were worked or heard at this time included WA4GPM, VA; WB4JGG, TN; WB4NXY/2, NJ; WB3ANT, PA and VE2DFO. The noon hours brought WB2RLK/VE1 a contact with WA7RTA, OR, as well as several 6s. Then at 2130 this conductor heard the faint signals of AL7C in Anchorage, AK, the first KL7 that this conductor has heard on 6 in 20 years. W3ILG and XYL, WB3FUR, were even more fortunate. At 2121 UTC, they both worked AL7C and his XYL, KL7HMH, from their QTH of Williamsport, PA, just 150 miles north of here. Signals for them were S9. A little later, at 2145 UTC, WB4OSN, W4WD and WD4IYS, all of south FL, worked KL7DJ, Fairbanks, with signals about 5 × 5.

The following day, Sunday, February 11, brought a raft of West Coast contacts for Northeast stations but nothing for us here in the Mid-Atlantic states. Later, at about 0240 UTC on the 12th, AL7C called K5ZMS on the phone to report a massive opening to JA in progress. Al said that the band was literally loaded with hundreds of JAs. WA8TTS informs me that the next morning the Eastern part of the country was treated to an opening to Panama, enabling many stations to work KZ5NW. From upstate NY, WA2TPU, newly on 6 meters, ran into some beginner's luck to work not only KZ5NW, as many others did, but also HP2VK and YS2CS. For the Midwest it was Puerto Rico, with KØWM and WØPUF, Rapid City, SD, both completing contacts with KP4AAN about 1540 UTC. Prior to that, at 1500 UTC, KØWM heard the 6Y5RC beacon on 50.025. During the same period, K5SW, OK, reports no luck on forward F2 but Sam was able to work several KP4s on backscatter with all beams

*Send reports to Bill Tynan, W3XO, P. O. Box 117, Burtonsville, MD 20730 or call 301-384-6736 and record your message.

vast. Perhaps the best way to summarize conditions that time is to cite the results of WB2RLK/VE1. For the first 13 days in February Bob had worked: 44 6s, 25 7s, one VE7 plus two 5s, HK4KL (1m), XE1GE and KZ5NW.

Several crossband contacts were made on the 14th but on the 15th things erupted with a 2-hour opening to Europe. G3AYC worked WB2RLK/VE1 for the second day in a row; then G3FXB took over the action as Bryan had to go back to work. Al proceeded to contact WB2RLK/VE1, K1IKN, W3XO, K3HFV, K2EGH, WA3DMF, W2EIF, N2ASC (15 watts) and WB2IIC to name just the few that I heard him come back to. Also overheard was DJ2RE working W2AXU, W2EIF and VE1ASI, and G3BA completing exchanges with WB2RLK/VE1 and W3HFY. Also in on the fun was G4CBW. Tony worked this conductor and several other stations. Most of the Europeans are now transmitting around 28.450 MHz in order to avoid the QRM above 28.500. This represents a change from the frequency of 28.700 recommended in this column several months ago. In the afternoon of that day WA8OGS, OH, worked KH6s NS, EQI and IAA between 1940 and 2050 UTC. Joe said that the KH6s hooked up with a number of stations in the 4, 8, 9 and 0 call areas on that occasion. The opening was preceded by strong backscatter from MN stations.

From the West come numerous reports of other KH6 openings. W7KPS, Seattle, tells of such sessions January 24 and 28 as well as February 4. The latter also included KG6 and JA. The February 4 opening was also reported by N0LL, KS. Larry and several others, including W7JF, MT, who completed 50-MHz WAS as a result, worked KH6IAA on that occasion.

As if the foregoing F2 fireworks were not enough, some very good Es sessions took place during late January. K7ICW, NV, reports openings of both the single- and double-hop variety. This is echoed by K3LTV, Pittsburgh, who notes working four Phoenix area stations including W7KMA, Tom's son and WB7TOV, his daughter-in-law. On Saturday evening (February 12 UTC) KA5CLB, NM, reports an Es opening to the south. Ed worked XE1TIS who had never before heard a signal on 6 meters.

The January *SMIRK Newsletter*, which is chuck-full of 6-meter information; includes the news that this worthy 6-meter promotional organization now numbers more than 3000 members. Incidentally, anyone who is a SMIRK member and does not have one (or more) s.a.s.e. on file with K5ZMS is missing a lot in not receiving the Newsletter. A current SMIRK project is the raising of funds to purchase a used 6-meter transceiver for Tom Christian, VR6TC, Pitcairn Island. That's a hot part of the world for radio propagation, and Tom is bound to be able to work a lot, including many U.S. stations. A rig has been located that can be made available if SMIRK can raise sufficient funds.

2 Meters — This past winter produced more than the usual amount of Es on the 2-meter band. One normally associates the winter Es season only with 6 meters, but this year a number of contacts were made on 2. January 28 seems to have been the most productive day. K7ICW, Lost Wages, reports a QSO with K5BMG, LA, during a very strong 6-meter opening. Apparently on the same opening, W5IF and K5EFW, Albuquerque, worked W5JTL, MS, and WA4CQG, AL, all with good signals. W5UWB, Kingsville, in south TX was caught with rig and antennas down, having just moved. But when John saw the wiggles on TV he sprang into action. Hastily erecting a single Yagi, and running only 10 watts from his TS-700, nevertheless he managed contacts with W0VHQ, MN, and WA7FPO, AZ. Two days before from 1230 UTC until 0315 UTC, N0LL, Smith Center, KS, worked Los Angeles area stations KA6CQM and WA6RSA and heard several others. On both occasions 6 meters was very active.

The piece on m.s. procedure in the December column evoked quite a few comments both for and against. WA4IYS and W4ISS were very emphatic in their opposition to changing the current 1S2, S3, etc. reporting system to one of using state or province. On the other hand, K7KOT says that he has tried the proposed procedure on a number of schedules and found it to be quite useful. Steve notes that others in the West are also using the exchange proposed by the Central States VHF Society Meteor Scatter Committee. Whether or not "a change" is made in the m.s. reporting is not up to this conductor, or even the Central States Meteor Scatter Committee no matter how eminent they may be. This group has merely made a suggestion in an attempt to allay a degree of confusion which exists with the currently accepted system. The only part this column has in this is to provide exposure for their proposal. Whether it becomes a new standard or not depends on the individuals running the m.s. skeds. The system used on any particular schedule is, after all, up to those conducting it. There is no real need for a universal standard as long as the two involved are aware of what they are supposed to be doing and sufficient information is exhanged to constitute a valid contact. Where the problem arises is on QSOs. In this case, the proposed new system would appear to have much to recommend it.

Speaking of m.s., one proponent of the mode is W5JTL, MS. George notes that he has worked 18 states via the meteor route and has 39 in all. What is particularly noteworthy is that he has never run more than 150 watts. W5JTL's record should provide inspiration for those who think they can't work DX on 2 meters because they don't have a kW.

Another myth that has fallen goes something like this: "A station running a four Yagi array on EME can only work stations with larger antennas." K4PKV and WB6ESQ have disproved that one. Both are using quad arrays of 16-element F9FTs and managed a contact with good signals both ways during a recent period of positive moon declination. The moral of this should be clear.

It being summer in that part of the world, the VKs and ZLs have been having great fun spanning the 1200 miles across the Tasman Sea via tropo. All sorts of contacts were made during the first half of January. Most were on fm, as might be expected, with equipment ranging all the way down to 10-watt rigs with whips. The conditions prevaded for a number of days but did vary. During times when the path, although open, but was not at its best, ssb was the mode that got through. This, of course, comes as no surprise to most of us. It is even reported that on January 5 VK2BQJ had a 1-1/2-hour QSO with ZL1TAB on 70 cm. This is the first out-of-Australia contact ever made on that band except via EME.

Thanks go to Eric Jamieson, VK5LP, vhf editor of the Australian magazine *Amateur Radio* for providing this fascinating peek at the vhf world down under.

2-M Standings

Figures are states (or WAS number), call areas and best DX in miles.

	WAS		
K0MOS	1	12	8008
K5CM	2	12	4600
N0JA	3	12	4607
K9HMB	4	12	9894
K1WHS	5	12	10749
WA4MVI	6	12	12000
K5JL	7	12	4600
K1FO	43	11	5015
K1MNS	42	11	5069
W1JR	41	10	2674
K1HTV	38	9	2616
WA1JXN	38	10	6919
K1BKK	37	10	3604
WA1OUB	36	8	1525
W1FZA	35	10	2750
W1XJ	35	8	1478
K1PXE	35	8	1400
W1AZK	34	8	1412
W1JSM	33	8	1440
W1YTW	33	8	1430
K1UGO	30	8	1370
K1GVM	29	8	1384
W1VTU	29	8	1296
WA4MMP/1	28	8	1345
W1AAI	28	7	—
W1FJH	27	8	1300
K1MTJ	26	7	1250
W1HDQ	24	7	1040
K1RJH	22	7	1450
K2RTH	44	11	11000
W2AZL	41	10	3770
N2MB	39	11	10000
W2CUX	38	8	1334
W2CXY	37	8	1360
W2ORI	37	8	1320
W2NLY	37	8	1300
W2BLV	37	8	1150
WB2WIK	35	8	1650
WA2FGK	33	8	1340
K2OVS	33	8	1250
W2CRS	30	8	1230
WA2PMW	29	8	1245
W2EVW	29	8	1232
K2CEH	29	8	1200
WB2CUT	29	8	1200
WB4NXY/2	29	8	1170
WB2VWW	28	8	1350
W2UZL	27	8	1310
W2CNS	27	8	1150
K2BWR	27	7	1380
K2DNR	27	7	1200
WA2PVV	25	8	1275
WB2TCC	25	8	1250
WB2SIH	25	6	1000
AB3D	40	10	2488
W3TMZ	37	9	2410
K3QCQ	37	8	1375
K3CFY	37	8	1250
W3XO	37	8	1190
K3WHC	37	8	1006
W3RUE	36	8	1250
WA3USC	34	8	1150
K3AP	33	10	2500
W3OMY	33	8	1200
W3BDP	32	8	1275
WA3UFU	31	8	1280
AE3T	31	8	1265
W3IWI	28	8	1200
W3LNA	27	8	970
K3CFA	25	8	1200
W3ZD	24	8	1350
WA3JUF	22	8	1350
WA3KPS	22	8	1200
W3TFA	21	8	1342
WA3DMF	21	8	1140
K3OBU	21	7	930
WA4GPM	47	10	4200
K4GL	46	11	4850
K4PKV	44	10	2287
WA4CQG	43	8	1350
WB4EXW	41	11	2274
K4IXC	40	10	4850
W4HJQ	40	10	2000
W4DFK	39	11	12000
W4HHK	38	9	1280
WD4GXN	37	8	1256
WB4NMA	37	8	—
K4QIF	36	8	1225
W4VHH	36	8	1125
W4WD	35	8	3727
W4ZD	35	8	1440
WA4FBH	35	8	1265
W4MKJ	34	9	1289
K4KAE	34	8	1210
W4FJ	34	8	1150
K1FJM/4	33	8	1187
W4ISS	33	8	990
WA4JUW	33	—	—
K0RH/4	32	8	1475
W4LNG	32	8	1330
WD4MUO	30	8	1300
WB5LUA	48	12	3797
K5MB	46	12	4500
K5BMG	46	10	4100
W5FF	44	10	5209
K5FF	43	10	5209
K5SW	43	10	1490
W5UGO	43	10	1398
K5MWH	42	10	1609
W5RCI	42	9	1289
K5WXZ	40	10	1450
W5JTL	39	10	1500
W5HFV	38	10	1285
W5HN	37	10	1500
W5SWV	34	8	1260
K5VWW	33	10	5200
WA5HNK	33	10	1540
W5UKQ	33	9	1290
W5UWB	30	8	1857
WB5BKY	29	9	1407
K5PTK	29	9	1350
W5SXD	25	6	1265
WA5TBE	24	—	—
W6PO	32	10	8000
WB6NMT	23	7	6100
K6OEH	21	10	5500
W6GDO	18	5	1326
W6WSQ	16	4	1390
K6HAA	13	4	2580
K6JYO	13	4	1240
WA6JRA	11	5	2591
K6HMS	11	4	1258
N6CA	8	3	1275
N6TX	7	4	5500
K6GAO	6	5	2500
K7CAD/6	6	2	—
K7NII	41	12	8490
WA7KYZ	30	10	6000
WA7BJU	30	10	2600
W7CI	31	9	2200
W7JF	28	9	1320
W7VEW	24	7	1300
WA7BBM	21	7	2175
K7CVT	20	5	1325
K7ICW	19	4	1278
K7QXA	13	4	1259
W8WN	47	10	10500
W8IDU	45	11	4500
K8AT	45	10	10100
WA8HTL	40	9	1300
K8AXU	38	8	1275
K8KJN	38		1152
W8IDT	36	8	1150
K8HWW	36	8	1100
W8YIO	36	8	1100
K8DEO	35	8	1200
K3WKZ	35	8	1100
K8IE	34	8	1100
WB8IGY	33	8	1125
W8NOH	31	8	1165
WA8NLC	31	8	1010
WB8FEZ	30	8	840
WA8LLY	28	8	820
W8TIU	24	8	1000
W8KBC	24	7	900
K8ZES	22	8	675
WA9NOT	49	12	9909
K9CA	46	10	1888
W9YF	45	10	4500
K9UIF	45	10	1874
W9UD	42	9	1600
K9SGD	42	9	1300
K9CT	42	9	1100
W9AAG	41	9	1200
K9AAJ	41	9	1200
WB9CAS	41	9	—
W9VI	41	9	1156
N9SS	41	9	1010
WA9AHJ	41	—	—
K9UNM	38	8	1046
K9XY	37	9	1350
W9BRN	36	9	1260
W9IP	35	8	1030
WA9EUA	35	8	881
W9VWY	34	8	1052
W9PBP	34	8	820
WB9QBU	31	—	—
W9NLP	30	10	1200
W9JDJ	29	8	1000
WB9TPV	28	9	1200
K9RVG	22	7	1100
W0LER	46	10	1620
W0SD	45	10	1312
W0EMS	44	10	1320
K0DAS	44	9	1260
K0CJ	43	9	1450
W0RRY	43	9	1265
W0RLI	42	9	1345
W0VB	41	9	1606
W0DGY	41	9	1300
W0RWH	40	10	1422
W0TG	37	10	1446
W0OHU	37	9	1203
WB0UFQ	36	9	1369
W0PW	35	9	1380
W0ENC	35	9	1360
W0PN	35	9	1187
WB0WFY	35	8	1254
WB0ZXU	33	9	—
K0TLM	29	9	1230
W0VHQ	29	7	—
K0SE	28	9	1177
WB0BVC	28	8	1161
W0DRL	27	9	1295
WB0IUT	24	8	1312
KH6NS	3	2	6000
K6YNB/KL7	15	11	2800
WA0LPK/ KL7	14	6	3524
VE1ASJ	18	6	—
VE1ZN	7	2	500
VE2DFO	41	10	10600
VE2YU	32	8	1300
VE2HW	18	6	800
VE3ASO	38	9	2140
VE3BQN	37	8	1250
VE3FN	37	8	1300
VE3DSS	37	8	1203
VE3EZC	33	8	1283
VE3AIB	29	8	1340
VE3EVW	29	8	1100
VE3EMS	27	8	1100
VE3FKX	27	7	1070
VE3AQG	18	8	1300
VE4MA	7	3	—
VE7BQH	12	3	7900
SM7BAE	15	9	11055
W1NU/VP9	9	5	800
VK5MC	7	7	10000
SM6CKU	5	4	4200
VK3ATN	4	4	10417
ZL1AZH	2	2	11055

Terrestrial Two-Way Records

Band, stations, distance in miles (km), date

2 meters	KP4EOR-LU5DJZ	3934 (6331)	2/12/78
1-1/4 meters	W6NLZ-KH6UK	2591 (4170)	6/22/59
70 cm	VK6XY-VK3ZQV	1611 (2593)	2/22/78
23 cm	VK6KZ/6-VK5MC	1310 (2109)	12/29/78
13 cm	VK6WG-VK5QR	1170 (1882)	1/17/78
9 cm	ZL2THW/p-ZL2TSM/p	278 (447)	2/2/75
5 cm	W6IFE/6-K6HIJ/6	214 (344)	6/18/70
3 cm	G4BRS-GM3OXX	324 (521)	8/14/76
1.25 cm	G3BNL-G3EEZ	96 (155)	9/14/75

Club Notes

Don't just consider films and famed speakers for good club programs. Douglas Co. ARC (KS) toured the Lawrence TRW Crescent Wire and Cable Co. Does that give you an idea of a slightly ham-related business in your area to visit? Or look within. "The Great Debate," put on by Greater Fairfield ARA (CT), covers topics such as "Resolved: That Linear Amplifiers Be Banned!" Members take pro and con positions to entertain, enlighten and enliven meetings. How about choosing a subject in advance, such as cw techniques, and have each member bring in articles, questions, personal stories and collected data for a round table, as Cimarron Valley ARA (KS) does. Try that old favorite used at business seminars as did PHD ARA (MO). Pair off members to ask each other questions about themselves. Every person then takes five minutes to introduce someone with interesting tidbits on latest operating activities, equipment, tale of Murphy woe (lost DX, lost antennas, lost contests), or how they got interested in Amateur Radio. They may even be nonham related: RC of Tacoma (WA) ran a hotcake contest between members.

Membership escalators to think over: Lincoln ARC (NE) purchased a club gin pole for members to borrow. When dues are paid to ARC of El Cajon (CA) treasurer, members are automatically entered in a raffle. Atlanta RC (GA) door prizes sometimes consist of club shirts. For pulling in and keeping younger members, St. Paul RC (MN) offers the use of the club post office box to receive new hams' QSLs. The *Callbook* doesn't have their addresses yet to refer people to, and with slow cw, a short address is coveted. Get new hams involved in club responsibilities, such as, official club-station QSLer, roll caller, etc.

Kudos to Atlanta RC (GA) members who are considering the repairing of used/damaged hearing aids to give to the underprivileged, and to Radio Amateurs of Greater Syracuse (NY) who donate a set of ARRL publications to area libraries in memory of Silent Key members. — *Rosalie White, WA1STO*

Hampden Co. RA (MA) asked computer companies to display their wares at a meeting. WB1CJH (l) is president. Another twist is to get the local computer club and your club on a joint venture for Field Day — computer logging, etc. *(K1ZQB photo)*

Silent Keys

It is with deep regret that we record the passing of these amateurs:

K1CA, Walter J. Swenson, Strafford, NH
W1HPA, Frank J. Cholod, Pittsfield, MA
W1IOI, Frank J. Lavender, Fairfield, CT
W1JCX, Herbert E. Cole, Scituate, MA
W1LON, Charles W. Knight, Springfield, MA
W1SDA, Clifford M. Waltman, Westbrook, ME
K2EHP, Robert J. Vane, Uniondale, NY
W2INS, Charles R. Hoffman, Centereach, NY
WA2JZU, Charles G. Kretschmar, Pompton Plains, NJ
W2KSS, Silvio Kieser, Park Ridge, NJ
WA2LYT, Harry Weinberg, Bayville, NJ
W2NIW, Anthony Alfano, Port St. Lucie, FL
W2OE, Walter B. Russell, Northville, NY
W2OK, George Linzer, Whiting, NJ
WA2PWZ, Harlan V. Smith, Newark, NJ
W2TZP, Samuel D. Van Kirk, Phelps, NY
WB3AIL, Ronald B. Ashman, Freeland, PA
W3EGA, Richard K. Lyons, Coatesville, PA
W3EOZ, Thomas A. Consalvi, Ardmore, PA
WB3EPM/WA2CIK, Ralph E. Parsons, Rydal, PA
W3HJI, William M. Reilly, Madera, PA
WB3IWQ, Melvin Leonard, Jr., Middletown, PA
K3MMR, Donald A. Bender, State College, PA
K3SNZ, Vincent C. Braxton, Philadelphia, PA
WA3VJC, Marc B. Raker, Philadelphia, PA
W4AQ, Philip L. Bascome, Tampa, FL
ex-K4DLE, Earnest B. Ezelle, East Point, GA
K4JBW, Gilbert L. Rossiter, New Port Richey, FL
W4NUW, George F. Zaizour, Chattanooga, TN
WD4OAC, Fred W. Boughton, Daytona Beach, FL
WB4RHL, John W. Fargis, Reidsville, NC
WB4THY, James D. Robinson, Birmingham, AL
WA4UQP, Ralph J. Williams, Selma, AL
W5AHA, Joe Phillips, Starkville, MS
W5AK, John V. Durant, Albuquerque, NM
W5JY, John G. Tittle, Pasadena, TX
K5MUI, John H. C. Ward, Loranger, LA
WB5OIT, Gene A. Wallace, Boyd, TX
W5QZG, Bruno J. Reich, Houston, TX
W5RQT, Lester U. King, Corning, AK
W6ASC, Wayne C. Wallace, Hemet, CA
W6BXP, Cecil A. Amberson, Upland, CA
WA6DXM, Edward Y. Cuffe, Hemet, CA
W6GWD, Orville L. Dewey, Bragg, CA
W6HMI, William C. Bremigan, Santa Barbara, CA
W6HUR, Robert N. Pelton, Montebello, CA
WA6IWG, Elsworth O. Musser, Concord, CA
K6IWV, Mae Coltin, El Monte, CA
WA6KRQ, David F. Gross, Thousand Oaks, CA
W6LM, G. S. "Sam" Corpe, Wrightwood, CA
WB6MID, Albert A. Touchette, Redwood Valley, CA
WA6RST, Truett A. Greener, Covina, CA
WB6RUO, Lawrence R. Youngman, Montecito, CA
WB6SEH, Vern G. Strachan, Fullerton, CA
WA6SJM, Walter J. Clayton, San Diego, CA
K6UIB, Isaac H. Moore, Pomona, CA
W7DX, David R. Brush, Bellevue, WA
K7IRY, Jack L. Drinkall, Nampa, FL
W7JIN, Jerrold H. Hohl, Bellingham, WA
WB7OIK, Jack W. Nielsen, Cornville, AZ
W7RVS, Robert H. Ingalls, Tucson, AZ
WB7TCS, Erika F. McGiveney, Tacoma, WA
WB7THW, Don W. Puckett, Portland, OR
W8BBS, Robert R. Richards, Stockport, OH
W8CFQ, Arlington B. Corey, Grandville, MI
WB8DRW, Kathleen V. Jones, South Charleston, WV
W8DYB, Charles L. Burgess, Wheeling, WV
W8EOO, Wasco Kulonbonish, Bridgeport, OH
W8FTW/DA2EB, Michael Zunich, Detroit, MI
W8FYO, Joseph A. Hills, Dayton, OH
WD8IVT, Thomas B. Mosher, Brighton, MI
WD8JGJ, Dr. William S. Bowden, Marine City, MI
WA8MBH, Thomas K. Decker, Marietta, OH
W8NGY, Alfred Foley, Cleveland, OH
WD8NSW, Jack W. Wiseley, Jr., Whitmore Lake, MI
W8ODV, John P. Quitter, North Olmsted, OH
K8OKZ, Dee O. Hokanson, Grand Ledge, MI
W8QQL, Wallace P. Beck, Lansing, MI
WD8SCW, Frank W. Moses, Glasgow, WV
K8YQL, Robert J. Bennett, Lakewood, OH
W9BGQ, Clemente Carducci, Chicago Heights, IL
W9OR, Albert F. Marthens, Evanston, IL
W9SQM, Carl E. Jacobson, Cochrane, WI
WB9YTN, Wayne L. Perryman, Springfield, IL
KØHNT, Hugo E. Carter, Wood River, NE
WØTCH, Francis L. Schiel, West Branch, IA
WØVSK, Roy S. Lund, Valley City, ND
ex-WØVWF, Claude Borrett, Des Moines, IA
ex-VE1CF, Capt. Edward T. Tertry, Parrsboro, NS
VE7CDK, C. Kevin Doyle, Peachland, BC
VE7MP, Paul McAnay, Vancouver, BC
DL1CN, Curt Braune, Kiel, Germany
G5RH, Denis Q. Aldridge, Somerset, London
TF3AP, Asgeir Petursson, Reykjavik, Iceland
TF3AW, Olafur Axelsson, Reykjavik, Iceland
SM6NY, Gosta Nystrom, Goteborg, Sweden

Strays

KIDS' NET ON 15 METERS

An International Kids' Net meets the first and third Sunday of each month at 1900 UTC on 21.175 MHz. Please send an s.a.s.e. (U.S. postage) to Nick Kasoff, WD8PRT, 470 Polecat Rd., Yellow Springs, OH 45387.

TIN MAN HAS A HEART — AND SOUL!

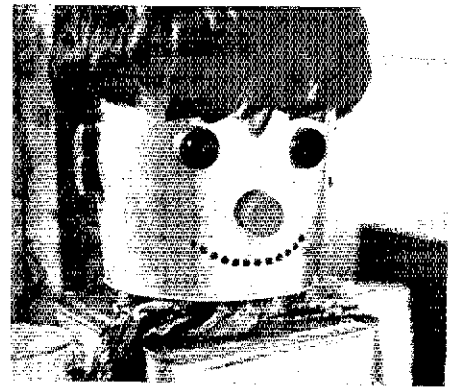
Look out, R2D2! Move over, C3PO! Make way for Gustoffer R. Ghost, Jr.!

Gus is a real Rube Goldberg creation, says his creator Austin J. Rudnicki, K6IA, a self-proclaimed "digitalogicalegerdemaniac," who assembled the can man from scrap parts, mostly courtesy of the U.S. Navy.

Gus's head is a tin paint pail and his mouth is a row of LEDs. His ears are typewriter ribbon spools. Two spray can tops are his eye sockets, which house green pilot lights. A complicated, computerized midsection enables Gus to function.

As master of ceremonies, Gus assisted the Santa Barbara Amateur Radio Club with the Royal Order of the Wouff Hong initiation rites at the 1978 ARRL National convention. Later in the year, Gus put in an appearance at the SBARC Christmas dinner, during which he played the part of the general agent in charge of the "Federal Confusion Commission."

Gus does not like to be called a robot, which is a mindless machine with no soul. Indeed, he seems to have a mind of his own. When not appearing at Amateur Radio functions or entertaining the children on Halloween, he resides by the television and dreams grand can dreams. — *Michele Bartlett, N1AGD*



Gus — a mechanical marvel.

Public Service

Conducted By Robert J. Halprin,* K1X

Honor Thy Roll

When the Public Service Honor Roll was first started, it was, as WINJM indicated in January 1970 *QST*, ". . . intended to supplement the traditional BPL and take into account the many public service functions of amateurs that are not involved in the 'pieces of paper' handling of record messages." But even with the various alterations to PSHR since then, it still seemed to appeal mainly to the formal traffic handler while leaving other dedicated public-service-oriented amateurs out in the cold. PSHR should encourage, stimulate and reward versatile public service communications. The revised PSHR, which goes into effect with June 1979 station activity reports, comes a lot closer to accomplishing this goal. See Table 1.

This version of PSHR is similar to ideas presented in this section in October 1975, by the then-conductor WA1FCM, in a column called "Speaking of an Honor Roll." And that column incorporated all sorts of suggestions from amateurs interested in seeing PSHR improve or be nearer the 'state of the art.' What happened since then? In 1976 a poll was taken of the Communications Department field organization, approximately 5000 strong, about what they thought of a revised PSHR. What followed could have been predicted. Those who bothered to vote, a very small percentage, came out like night riders in the old South. The result? The status was quo. Until now.

Many of the same ideas were presented in the Winter 1978 *CD Bulletin* for comment. This time, the response was overwhelmingly positive. So, with that in mind, the proposals were transformed into a program. ARRL section communications managers were notified in early February (a few weeks before this is being written) of the modifications. It may cause some initial uncertainty but we hope amateurs will soon become comfortable working within the new guidelines. And the best part is that qualifiers will be eligible for certificates; the amateur must qualify for PSHR 12 consecutive months or 18 out of 24. The minimum monthly point total will be 60; Novices and Technicians qualify with 40. Your call sign must appear in the *QST* list, so please report your activities to your SCM on a timely basis. Late reports don't count — they'll be unlisted numbers.

Let's take a look at the categories, past and present, for a moment. The first five categories are essentially the same, except QNI credits have been increased. Why? That's to recognize the net regulars, who form the backbone of traffic/emergency or weather nets, etc. But why continue to separate cw from phone/RTTY? To encourage versatility, one of the reasons that PSHR exists.

The phone patch category is being deleted. Why? Whether we like it or not, these days many patches are run for totally unessential or even a bit shady purposes. FCC has taken a dim view of much of this patchwork. 'Nuff said? But any *emergency* message handled by an amateur, be it a phone patch or an autopatch, or informal, or formal, in the nude, or whatever, is rewarded in category seven. But please note: This has to be bona fide emergency traffic — communications directly relating to the immediate safety of life of individuals or the immediate protection of property. A little morbid, eh? Yes, but the point needs to be made. Please don't claim numbers in category seven for sending an inquiry message to find out how Aunt Bluebell is doing.

The new category six provides extra incentive for delivery of formal traffic. Yes, deliveries are already contained in the monthly traffic count. But it is evident that some traffic handlers are falling down on the job when it comes to (gulp) actually picking up the telephone and delivering the message. We need more positive reinforcement for efficient delivery of traffic. Maybe this will help. Agree? But there doesn't seem to be any reason to include BPL in PSHR any longer, as the amateur gets sufficient recognition from the *QST* BPL list. And while BPL is strictly for traffickers, PSHR is not.

The new category eight is actually the old category nine, except that emergency coordinator has been added in with net manager. An EC's job requires as much, if not more, effort as a net mangler, and in many areas the functions overlap. And last but not least, the new category nine gives some recognition to hams who take part in at least one non-emergency communications event during the month, be it a parade, walkathon, drill, SET etc.

There's a lot of innovative public service operating going on these days so we hope to see many new call signs appearing up in lights. Report your activities and your PSHR tally to your SCM (see page 8) each month. The criterion is not cast in concrete so, as WINJM concluded his January '70 column, ". . . Well let's start it, see how it goes."

Table 1

Revised PSHR

	Points each	*Maximum points*
1) QNI cw nets	1	30
2) QNI phone nets	1	30
3) NCS cw nets	3	12
4) NCS phone nets	3	12
5) Performing pre-assigned NTS liaison	3	12
6) Delivering a formal piece of traffic to a third party	1	unlimited
7) Handling (formal or informal) emergency traffic	5	unlimited
8) Serving as net manager or emergency coordinator for the month	5	5
9) Participating in a public service event	5	5

Table 2

***QST* PSHR Bibliography**

Year	*Issue*	*Page(s)*
1965	June	84
1969	July	63-64
1969	September	66-67
1969	November	75
1970	January	52-53
1970	February	60
1970	March	53-54
1970	April	76
1970	May	65-66
1970	September	72
1971	March	78
1971	July	61
1972	September	70
1973	December	58-59
1975	October	72-73

*Asst. Communications Manager, ARRL.

PUBLIC SERVICE DIARY

□ Newhall, CA — January 5. The first major snowstorm of the season closed the interstate between Los Angeles and Bakersfield and according to planned procedures, the Red Cross opened a shelter for stranded motorists. The Santa Monica Amateur Radio Club provided the communications between the shelter and the Red Cross services center in Newhall. (WB6YTV

□ *Repeater Log.* According to reports received to date, repeaters and tm simplex frequencies were used in conjunction with 119 vehicular emergencies, 16 weather emergencies, six crime reports, five search and rescues, four fires and five miscellaneous incidents. Repeaters involved were WR1s ABP ACL, WR2s AAC ADM, K3PSP, WR4s AGT AIZ AKY AOE WB4HHN, WR5s ABA ABY ACM ADP AEQ AIF AJB APK ARH ARO, K5PS, WR6s AAA ACE ADS AII, WR8s ABI AGA AGR AJK, WR9s ACM ADU ANR, K9UT, WA0AUQ.

AMATEUR RADIO EMERGENCY SERVICE REPORTS

□ Crofton, KY — December 8-9. Over 13 inches of rain fell in a 24-hour period causing extensive flooding. Local hams set up a net control station at the emergency operations center to provide communications links with the Red Cross and other relief agencies. Net control functioned as a dispatcher for rescue and relocation activities and also coordinated communications between local CB groups and the rescue squads. (WA4ZVL, EC District II KY)

□ Portland, OR — December 28. K7JAD was contacted by the Red Cross to set up a communication link between a command post and the crash site of DC-8. The link was established and traffic was handled throughout the emergency. (K7JAD, K7WW SCM OR)

□ SEC Reports. For January, 29 SEC reports were received, denoting a total ARES membership of 12,089. This represents a 17-percent decrease in reports received one year ago (35), and a 13-percent decrease in ARES membership (13,916). Sections reporting were Alta, Ariz, Ark, Del, EBay, EMass, EPa, Ind, Iowa, Kans, Mar/NFld, Minn, Mont, NH, NLI, NFla, NTex, Ohio, Okla, SDgo, SF, SJV, Sask, SFla, SNJ, Va, Wash, WVa, WPa.

NATIONAL TRAFFIC SYSTEM

The SET has come and gone and we've all lived to tell about it. Wonderful! Don't forget; the madness reconvenes October 6-7, 1979. There's quite a backlog of certificate issuances to duly record; here goes:

TCC-Pacific: N5MR K6OE N6PZ N7AM K7HLR CAN-D: WB5HHK K5OWK WA5RNG W9IEM W9JUJ WB9TOW WA0TFC WB0VDR. 8RN-E K8AAZ W8GGZ WB8MTD WA8WPW. 2RN-E N2IC (fifth annual), W2IT (second annual). The following TCC-Eastern (E) certificates were issued

(years of service in parentheses): W4UQ (17), W2GKZ (11), W8PMJ (8), W4SQQ (5), WA2ICB (4), W3YQ (2), K3KW (1); W3PQ received a new certificate and K1EIR, W2CS and VE3GOL received certificates as well, but the years of service are unknown at this writing. CAN-E (maximum annual is 9): K4QCQ (9), W9CXY (9), W9NXG (9), W9QLW (9), WØHI (9), W5MI (8), WØAM (8), K5MC (6), W5RB (3) W4ZJY (2), K4KWQ (1), N5TC (1), N9JF (1), W9JUJ (1), WA9QCF (1), WBØOBH (1); new certs to WN4KKN, WD9DMV and NØSM.

January Reports

Area Nets

(evening sessions)
(daytime sessions)

1	2	3	4	5	6	7
EAN	35	3001	85.7	1.931	98.5	
EAN	64	1484	23.2	.860	88.3	
CAN	34	1837	54.0	1.307	99.5	
CAN	64	558	8.7	.306	99.5	
PAN	33	1805	54.7	1.392	97.9	
PAN	31	697	22.5	.390	100.0	
Region Nets						
1RN	117	1252	10.7	.575	88.6	94.0
2RN	120	1210	10.1	.632	99.5	99.0
3RN	93	761	8.2	.660	96.2	96.0
4RN	128	1968	15.4	.511	72.1	100.0
RN5*	37	568	15.4	.573	94.3	99.2
RN6*	62	1095	17.7	.600	100.0	98.4
RN7	124	1385	11.2	.702	100.0	98.4
8RN	99	947	9.6	.482	93.5	99.0
9RN	95	807	8.5	.556	92.0	99.2
TEN*	62	799	12.9	.545	86.2	100.0
ECN	50	284	5.7	.400	100.0	75.8
TWN						96.9
TCC						
TCC Eastern	216[1]	1450				
TCC Central	214[1]	1059				
TCC Pacific	136[1]	1252				
Sections[2]	4684	26535	5.5			
Summary	5932	50754	8.6			
Record	6155	42589	19.1			

*Incomplete report

[1]TCC functions not counted as net sessions. [2]Section and local nets reporting (135): ASN (AK), AENB AEND AENJ AENM AENS AENV (AL), OZK (AR), ATEN HARC (AZ), BCEN (BC), SDNN (CA), CN CPN WESCON (CT), DEPN (DE), FAST FMTN FPON FPTN NFPN PBTN PEN QFN QFNS (FL), GVEN GASSB GSN NGSN (GA), I75mN ICN TLCN (IA), IMN MTN (ID/MT), ITN QIN (IN), KPN KSBN QKS-SS (KS), KSN KYN (KY), LRN LTN (LA), EM2mN EMRI EMRIPN HHTN WMPN (MA/RI), MEPN MMN MTN WRIN (MB), MDD (MD/DC), AEN CMEN PTN (ME), MACS MITN MNN QMN (MI), MSN MSNI MSPN MSSN PAW (MN), NEMOE (MO) APN (MR/NF), MN MSBN MTN (MS), THEN (NC), WNN (NE), GSFM NHCWSN (NH), JSARS MCN NJN NJPN OBTTN SPARTN UCETN (NJ), NMRRN SWN (NM), NYSPN (NY), BN OSN DARATN NWOSN (OH), OLZ ONON OPEN OTWN STN (OK), CMN GBN GBSSN LN ODN OLN OPN OSN (ON), ARESTN WCN (OR), EPA EPAEPTN PFN PTTN WP2mTN WPA WPAPTN (PA), WQV/UHF (PQ), NJQN SDEN SDWN (SD), SATN (SK), TN TNN WTVHFN (TN), TTN (TX), BUN UCN (UT), SVEN VFN VN VNTN VSBN VSN (VA), WSN WVN WVNN WVPN (WV).

1 — NET
2 — SESSIONS
3 — TRAFFIC
4 — AVG.
5 — RATE
6 — % REP.
7 — % REP. TO AREA NET

Transcontinental Corps

This marks the last TCC report filed by Bill Wageman, K5MAT, Pacific TCC Director. Bill says, "This is my last report after 6-1/2 years of working with the greatest bunch of people in ham radio, TCC Pacific. It is my sincere hope that they will support W5KH with the same kind of enthusiasm they gave me." Barry Newberger, W5KH, has been appointed as Bill's successor. Thanks, Bill, for your tireless efforts.

1	2	3	4	5
TCC Eastern	238	90.8	4057	1450
TCC Central	226	94.7	2173	1059
TCC Pacific	142	95.8	2530	1252
Summary	606	93.8	8760	3761

1 — AREA
2 — FUNCTIONS
3 — % SUCCESSFUL
4 — TRAFFIC
5 — OUT-OF-NET TRAFFIC

TCC Roster

The TCC Roster (January): Eastern Area (VE3SB/ N2YL, Directors) — W1s KX NJM OD XX, WA1s VEI ZAZ, K1s BA EIR GN SSH XA, W2s CS FR GKZ MTA RQ, WA2s ICB SPL, WB2KDC, K2PL, N2s TW YL, W3s FAF PQ YQ, WA3WQP, K3s KW NGN, N3HR, W4s MEE SQQ UQ, WA4s CCK, WB4PNY, K4s BKX KNP, N4KB, W8PMJ, WB8WTS, K8KMQ, VE3s GOL SB. Central Area (W5GHP/W9JUJ, Directors) — WN4KKN, N4MD, W5s KLV RB, WA5s BHF INJ IQU RKU, WB5s FDP HHK KKT NKC SDD, K5s GM MC, N5s TC TS YL, W9s CXY DND JIJ JUJ NXG, N9TN, WØs AM HI, WAØs TNM YVT, KØs EVH EZ, AFØO. Pacific Area (K5MAT, Director) — N5s MR NG, W5s JOV KH, K5MAT; N6s GW PZ WP, W6s EOT OA SX VZT WA6UAZ, K6OE, N7s AM, NO, W7s DZX EP GHT LYA VSE. K7s HLR IWD, ADØA, WØKON, KØs BN DJ TER, WBØTAQ, VE7ZK.

Independent Nets (January 1979)

1	2	3	4
Amateur Radio Telegraph Society	31	2207	207
Central Gulf Coast Hurricane	31	215	2810
Clearing House	31	261	588
Empire Slow Speed	32	122	417
Hit & Bounce Traffic	52	338	635
Hit & Bounce Slow	30	60	171
IMRA	27	488	1079
NY State Phone Traffic & Emergency	31	245	1615
North American SSB Traffic	25	260	189
North American Traffic and Awards	31	85	1519
Washington Region PON	18	24	377
20 Meter ISSB	26	319	445
75 Meter ISSB	31	857	1321
7290 Traffic	47	875	2853

1 — NET
2 — SESSIONS
3 — TRAFFIC
4 — CHECK-INS

Public Service Honor Roll January 1979

This listing is available to amateurs whose public service performance during the month indicated qualifies for 40 or more total points in the following nine categories (as reported to their SCM). Please note maximum points for each category: (1) Checking into cw nets, 1 point each, max. 10; (2) Checking into phone/ RTTY nets, 1 point each, max. 10; (3) NCS cw nets, 3 points each, max. 12; (4) NCS phone/RTTY nets, 3 points each, max. 12; (5) Performing assigned liaison, 3 points each, max. 12; (6) Phone patches, 1 point each, max. 20; (7) Making BPL, 3 points regardless of traffic total; (8) Handling emergency traffic directly with a disaster area, 1 point each message; (9) Serving as net manager for entire month, 5 points. This listing is available to Novices and Technicians who achieve a total of 20 or more points.

67
WB2RMI
66
WD4COL
64
AA2H
AF2L
WB3JGP
WB4PNY
W5BGE
W9JUJ
63
W5KLV
61
K1BA
W1TN
W2MTA
WA3NAZ
W4OGG
VE5HG
WA6UAZ
W7GHT
WB8YDZ
AFØO
59
W1GUX
WA4JDH
W8SOP
58
WB1DXR
W2RQ
57
VE3GT
WB5NKC
WB5SDD
56
WB1AUV
W2SQ
WA2UWA
K2VX
WA2ZJP
K4BKX
N4NK
VE4PG
N4WA
WB5NKD
WD5GVR
W6OA
WB8MTD
WD8NKA
WDØBFR
55
WB4ZOJ
K5QEW
W8VPW
54
WA1MJE
W2XD
53
VE3GOL
WD8DMX
52
VE1CH
VE1WF
AA2S
WA4CCK
51
WA3PXA
50
K2GCE
N3HR
K5SOR
49
W1UD
VE3DPO
VE3GFN
VE3GJG
W3YQ
VE4IZ
W4NWM
VE5AE
WD6EEN
N6EIC
K7GXZ
WA7MEL
WAØTNM
WAØYVT
48
WA1YWK
VE3JIR
47
WB2KIH
W2ZQ
N3AKC
WD5AHH
N8ABA
46
K1CE
K4VHT
WB5LAT
WB5MVR
K5OWK
WB6UZX
N6WP
KØJTW
KØPIZ
45
VE1RO
WA4BZY
WD4CNQ
W4FMN
44
WA1TBY
W1TM
WB2PJU
VE3FGU
VE3FHZ
VE3JRT
AC3N
K3ORW
W3PD
W4ANK
K4EV
WD4ISN
WA4LGT
WA4PFK
W4PIM
N4PQ
WB4QBB
VE4QU
VE4RO
K4XE
AE5I
W5VMP
N6GW
KB8GC
WD8LRT
WB8YRY
W9XD
WBØPYD
43
WA2AIV
K3JL
W4JK
WA4UYD
W5JOV
KL7JEB
W8YIQ
41
W1DOY
WB1EMU
W1ZPB
WB2IDP
WB2JAY
WD4AWN
AA5J
W6JXK
WB7EBP
AF8V
KØFRE
40
N3AIU
WBØHOX
39
WA4JPK/T
29
WB3EYY/T
27
WA2HEB/T
22
WB2AIU/T
KA2CHK/T
WB2RMJ/T
WB3GZR/T
WD4BAJ/T
WA4MJT/T

Brass Pounders League January 1979

Perhaps you've noticed the reference each month at the top of this listing regarding BPL Medallions. Readers are referred to December 1973 *QST* for background information. With many newcomers to traffic handling since then, it's a good time to repeat.

Way back in 1954, the ARRL Board of Directors passed a motion to establish an award to be presented to any operator making BPL for the third time. The award is in the form of a medallion. After an individual's call appears in the BPL table the third time, the individual is sent an affidavit card on which he/she indicates that all traffic was handled on standard ARRL form on amateur bands and reported to the SCM. When the card is returned, the medallion is sent to have the recipient's call engraved on it, then shipped to the individual.

The medallion is a one-time-only award, i.e., it is not issued every three times someone achieves BPL. It is not necessary that the three months involved be consecutive. Any three months since June 1954 will qualify an operator. Only individual amateurs operating at their own stations are eligible for the medallion. It is not necessary to ask for the medallion; the procedure outlined above begins automatically after the *QST* issue bearing the third BPL listing appears in print.

BPL Medallions have been awarded to the following amateurs since last month's listing: WB2RMI, W3BBN, WD4NSG, WA4PFK, WB4TZR, WA4YSK, K5OWK, W5TI, WB8QEU.

The BPL is open to all amateurs in the United States, Canada and U.S. possessions who report to their SCM a message total of 500 or a sum of originations and delivery points of 100 or more for any calendar month. All messages must be handled on amateur frequencies within 48 hours of receipt in standard ARRL form.

1	2	3	4	5	6
W3CUL	497	1181	1402	49	3129
W9JUJ	27	624	574	7	1232
WA4BZY	256	376	278	310	1220
WA4JDH		533	537	3	1073
WAØRWM	38	500	15	295	848
W5KLV	2	436	376	20	834
WA3WQP	40	348	394	10	792
WAØAUX	27	252	461		740
W3VR	259	155	297	14	725
WB2RMI	6	363	330	22	721
WØKON	33	349	327	4	713
WB4PNY	5	411	271	24	711
WØZWL		347	1	343	691
WØMZI	28	368		312	680
VE3GOL	16	292	306	33	647
WA6AMK	13	316	281	27	637
WA3ZRY	20	289	263	42	614
K5OWK	190	98	288	27	604
W5TI	43	266	204	84	597
W8VPW	33	256	293	15	597
WA4CCK	5	292	289	7	593
WB5SDD	16	253	274	49	592
WA1MJE	19	251	296	8	574
W4JK	1	299	269	2	571
W4SQQ		268	294		562
W7DXZ	21	260	269	7	557
K1BCS	86	178	271	16	550
WA2ELD		274	274		548
K3KW	3	323	215	3	544
WB5MVR	158	75	215	93	541
W2RQ	3	204	220	16	533
W7SQT	6	353	2	171	532
W5UH	123	307	97		527
WB3JGP	78	169	274	5	526
WD8KZX	53	220	110	143	526
K4TH	17	245	157	105	524
N3HR	21	201	256	45	523
VE3JIR	37	220	239	26	522
W2ZQ	15	253	246	7	521
WB3JZA	89	21	216	195	521
WB6EIG	18	248	248		514
K5JGZ	54	192	257	7	510
W3BBN	178	93	190	46	507
KL7JEB	33	224	236	13	506
VE1BXC	11	199	245	46	501
WBØHOX	2	187	299	12	500
WA2SPL (Dec.)		1110	1137	31	2278
VE3KK (Dec.)	307	199	396	101	1003
VE3GOL (Dec.)	64	415	446	63	988
VE3JIR (Dec.)	50	386	418	35	890
W7EP (Dec.)	1	317	239	34	591
VE3GFN (Dec.)	6	288	270	14	580
W6NL (Dec.)	84	216	249	9	558
WB8WTS (Dec.)	14	266	253	4	537
WA1VEI (Dec.)		228	278	4	510
Multioperator station:					
WA4PUP	251	108	135	82	576

BPL for 100 or more originations-plus-deliveries:

WA3ATQ	288	WB4MXG	118
W5FC	193	WD4CUD	115
W7JMH	188	W8SOP	113
WB4RIS	185	WBØZEB	105
WAØUEN	132	VE3KK	101
WBØVGN	127	N3KZ	100
K5OUK	125	NØAOL (Dec.)	143
WD4COL	120	WA3EOW (Dec.)	105

Multioperator station:
W9UMH 116

1 — CALL
2 — ORIG.
3 — RCVD.
4 — SENT
5 — DEL.
6 — TOTAL

Coming Conventions

April 21-22
Missouri State, Kansas City, MO

May 19
Wisconsin State, Lake Delton, WI

May 19-20
Alabama State, Birmingham, AL

May 25-27
New York State, Rochester, NY

May 26-27
Tennessee Section, Knoxville, TN

June 15-16
Central Division, Milwaukee, WI

June 16-17
Georgia State, Atlanta, GA

June 30-July 1
West Virginia State, Jackson's Mill, WV

July 27-29
Oklahoma State, Oklahoma City, OK

August 4-5
Arkansas State, Little Rock, AR

August 11-12
Pacific Division, Reno, NV

ARRL NATIONAL CONVENTIONS
July 20-22, 1979
Baton Rouge, LA

July 25-27, 1980
Seattle, WA

March 13-15, 1981
Orlando, FL

MISSOURI STATE CONVENTION

April 21-22, 1979, Kansas City, MO

The PHD Amateur Radio Association, Inc., of Liberty, MO, will sponsor the 1979 Missouri State ARRL Convention (10th annual Northwest Missouri Hamfest) on Saturday and Sunday, April 21-22, in the Trade Mart Building at the downtown Kansas City, MO, Airport.

A complete program of forums: FCC, ARRL, DX, contest, technical, legal, XYL, commercial exhibits, 100 swap tables, all inside the 45,000 square foot, one level, air-conditioned building. Unlimited free parking adjoining the site. (RVs welcome.)

Doors open 11 A.M. to 6 P.M. Saturday and 11 A.M. to 5 P.M. Sunday. Set up for commercial exhibitors 8 A.M. Saturday and for swappers at 10 A.M. FCC exams will be given at 8:30 A.M. Saturday. FCC form 610 and copy of amateur license must be sent to PHD Amateur Radio Association by April 15. *No walk-ins.*

There will be a Saturday night banquet at the world-famous GOLD Buffet, with Perry Williams, W1UED and Jerry Hall, K1TD, from ARRL hq., and Midwest Division Director Paul Grauer, WØFIR, as guests.

Preregistration is $2; admission at the door is $2.50. Banquet tickets $8. Those desiring banquet tickets are urged to order them in advance. All preregistrations will be held at the door. Talk-in on 146.34/94. For information and preregistration write to PHD Amateur Radio Association, Inc., P. O. Box 11, Liberty, MO 64068, phone 816-781-7313.

Hamfest Calendar

***California:** The 24th annual West Coast UHF Conference will be held May 5-6 at the Dunfey Hotel, 1770 S. Amphlett Blvd., San Mateo. Technical and uhf operating sessions, antenna gain measurements, and receiver noise-figure measurements will be featured. Advanced registration, $5, must be made before April 15; $7 at the door. Banquet luncheon on May 5, price $8.50, reservation must be received by April 15. Write West Coast UHF Conference, 350 E. Middletown Rd., Mountain View, CA 94043.

Connecticut: The Pioneer Valley Repeater Assn. flea market is April 22 from 10 to 5 at Newington High School, Newington. Free admission and parking. Additional info from Arnie Depascale, K1NFE, P.O.D. M, Plainville, CT 06062; or Evangelo Demetriou, K1MMX, 38 Volpe Ct., New Britain, CT 06053.

Georgia: The Kennehouchee ARC will hold a hamfest April 22 from 8 to 4 at the North Georgia Fairgrounds in Marietta. Talk-in on 28/88. For details, contact John Ellis, W4MRJ, 15 Whispering Way, Atlanta, GA 30328, 404-252-3779, or Gene Abercrombie, W4HYC, 404-255-1974.

Illinois: The Kishwaukee Radio Club and the DeKalb County Amateur Repeater Club will hold their 21st annual indoor/outdoor hamfest on May 6, from 8 to 3 at Notre Dame School, DeKalb. Tickets $1.50 in advance or $2 at the door. Indoor tables available; outdoor setup free. Talk-in on 146.13/73 and 94 simplex. For tickets and directions, send s.a.s.e. to Howard Newquist, WA9TXW, P. O. Box 349, Sycamore, IL 60178. Requests received after April 27 will be held at the door.

Illinois: The 18th annual Moultrie Amateur Radio Klub hamfest will be held April 22 at the Moultrie County 4-H Center Fairgrounds. Heated indoor and large covered outdoor flea market. No charge to vendors. Space available on first-come-first-served basis. Talk-in on 146.94 and 146.055/655. Write to M.A.R.K., P. O. Box 327, Mattoon, IL 61938.

Illinois: The Rock River Radio Club will hold its 13th annual hamfest on April 22 at the Lee County 4-H Center, south of Dixon. Camping area, prizes, food available. Talk-in on 146.52 simplex or WR9ADG repeater 146.37-146.97. Tickets are $2 at the gate or $1.50 in advance. Contact RRRC Hamfest, Chuck Randall, W9LDH, 1414 Ann Ave., Dixon, IL 61021.

Indiana: The Cass County ARC's second annual hamfest is on May 6, from 7 to 4 at the 4-H Fairgrounds. Go north of Logansport on Highway 25, turn right at road 100. Advanced tickets $1.50, $2 at the gate. Outside setup free, $1 under cover. Free camping, refreshments, ladies activities, prizes. Talk-in on 146.52 and Logansport Repeater 147.78-18. For details, write Dave Rothermel, K9DVI., RFD 4-Box 146G, Logansport, IN 46947.

***Louisiana:** The Shreveport ARA will sponsor their annual hamfest May 4-5 at the Louisiana State Fairgrounds. Advanced tickets are $3, $4 at the door. Contact the Shreveport ARA, P. O. Box 7033, Shreveport, LA 71107.

Massachusetts: The Central Massachusetts ARA will hold an auction and flea market on April 27 at the Main South American Legion Post 341 in Worcester. Doors open at 6 P.M. auction begins at 7. Flea market tables are $5, dealers welcome. Talk-in on 146.37-146.97, also .52 direct. Contact CMARC, W1BIM, 215 Brigham Hill Rd., N. Grafton, MA 01536, or call Rene Brodeur, WA1LEA, 617-753-7480; or Dave Penttila, 617-885-4995.

Massachusetts: The Hampden County Radio Assn. will host its annual flea market on May 4 at the Feeding Hills Congregational Church, at the intersection of routes 57 and 187, west of Springfield. Charge of $2 per table, no admission fee. Doors open at 7; refreshments available. For more info, call Andy Bouchard, WB1BZW, 413-786-2301.

Massachusetts: The fourth annual South Shore Repeater Assn. ham auction begins at noon April 21, at Central Junior High School, Weymouth. Check-in starts at 9; refreshments and prizes. Talk-in on 147.90/30 or 52 direct. For details, write SSRA, Town Hall Annex, 402 Essex St., Weymouth, MA 02188.

***Mississippi:** The Jackson ARC, Vicksburg ARC, Crystal Springs ARC and ECHO Repeater Club of Jackson will sponsor a hamfest April 21-22 at Manhatten Academy in Jackson. Admission is free. Contact hamfest chairman Steve Rumfelt, 2566 Crestleigh Manor, Jackson, MS 39204, 601-373-1871.

New Jersey: The Delaware Valley Radio Assn. flea market is April 22 from 8 to 4 at the New Jersey National Guard 112th Field Artillery Armory in Lawrence Township, Trenton. Advanced registration $2, at the gate $2.50, tailgating $4 additional, bring own table. Talk-in on 52, 07/67 and 84/24. Write D.V.R.A., P. O. Box 7024, West Trenton, NJ 08628.

New Jersey: The fourth Trenton Computer Festival will be held April 22-23 from 10 to 5 at Trenton State College. Commercial exhibits, electronics flea market. Admission is $4, students pay $2. For additional info, write TCF-79, Trenton State College, Hillwood Lakes, P. O. Box 940, Trenton, NJ 08625 or call 609-771-2487.

***North Carolina:** The Gaston County ARS hamfest is May 6 at Karyae Park in Gastonia. Cost is $2. Write Cyrus Rowe, 1248 Castlegate, Gastonia, NC 28052.

***North Carolina:** The seventh annual Raleigh Amateur Radio Society hamfest is April 22 at the Crabtree Valley Mall in Raleigh. General admission $3, talk-in on 04/64. Flea market, prizes, FCC amateur tests. For details, write RARS Hamfest, P. O. Box 17124, Raleigh, NC 27609.

Ohio: The Miami Valley F.M. Assn. 10th annual FM B*A*S*H is April 27 from 8-midnight at the Dayton Hamvention in the Convention Center. Admission free, refreshments available. Contact Miami Valley F.M. Assn., P. O. Box 263, Dayton, OH 45401.

Pennsylvania: The Tamaqua Transmitting Society hamfest is May 6 at the F.O.P. grove, one-half mile south of Tamaqua off Rte. 309. FCC exams will begin at 9. Donation $2. Talk-in on 705/105 and 52 simplex. For details, write Tony Sarli, W3CMA, 164 Spruce St., Tamaqua, PA 18252.

Pennsylvania: The fifth annual Warminster ARC flea market and auction is May 6 from 9 to 4 at the William Tennent Intermediate High School, in Warminster. Registration $1 per car, tailgating $2, indoor tables available for $3. Talk-in on 16/76 and 52 simplex. Contact Horace Carter, K3KT (K3ZAC), 38 Hickory Lane, Doylestown, PA 18901, or call 215-345-6816.

Puerto Rico: The Radio Club de Puerto Rico will hold its annual convention and hamfest April 28-29 at the Condado Holiday Inn Hotel, San Juan, For details, write GPO Box 693, San Juan, PR 00936.

Texas: The joint 7290 Tfc Net/Texas Tfc Net picnic is April 27-29 at Kerrville State Park. Technical program, ARRL forum and Tfc talks. Weiner roast Friday night, barbecue Saturday night. Registration $4. Contact Will Thompson, W5TYS, 9656 Lanward, Dallas, TX 75238 before April 18.

***Washington:** The Skagit ARC hamfest is April 21 at Grange Hall in Bryant. Cost of $5 includes program and banquet. Write to Norman G. Ray, W7LFA, 14005 132 Ave. N.E., Kirkland, WA 98033, or call 206-821-2985.

Wisconsin: The 3-F ARC's annual swaptest is May 5 from 8 to 3 at the Neenah Labor Temple, 157 S. Green Bay Rd., Neenah. Talk-in on 52. Indoor swap area, free auction, food. Tickets and tables cost $1.50 in advance, $2 at door. Contact Mark Michel, W9OP, 339 Naymut St., Menasha, WI 54952.

*ARRL Hamfest

Strays

WHO'S CALLING?

For all amateurs who are fans of square dancing note how similar the jargon of the two hobbies is. "Somehow, I thought a *California Twirl* was a rotatable tower . . ."

"Sweepstakes sure is hard on tubes. I had to *Fan the Top* of my linear for an hour when it was over!"

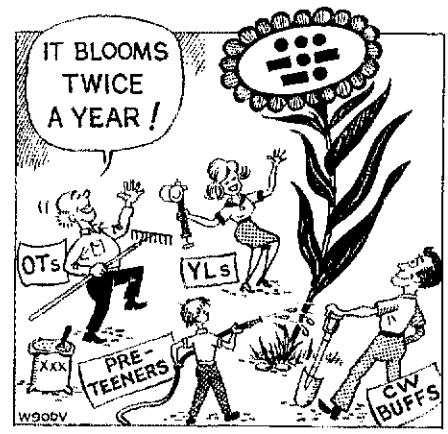
"Someone told me *Trade the Wave* meant working split frequency . . ."

"The frequency's in use, Old Man. Would you please *Scoot Back* up the band a bit?"

"All we ever do on Field Day is *Box the Gnat* and *Swat the Flea!*"

The words in italics are all popular square dance calls. — *Sandy Gerli, AC1Y*

Straight-Key Night



The only way to tell a real cw operator from a bodybuilder is by the type of metal each chooses to pump!

By Bill Jennings,* K1WJ

There's been a lot of hoopla lately about the emergence of bodybuilding as a major sport. The film *Pumping Iron* has given the bodybuilders an identity, a rallying cry. Media exposure for the premier performers of the sport, such as Arnold Schwartzenegger, has undoubtedly done much to enhance its stature and enticed many to start "pumping iron."

Whether cw operating, via the straight-key mode, has been around as long as bodybuilding is immaterial. What is important is that brass-pounding can be considered every bit as much a valid sport as bodybuilding. True, aside from perhaps a slightly stronger wrist and a little more forearm endurance, brass-pounding has very little effect on our physical condition. The benefit of "pumping brass" is measured in expanding the muscles of the mind, a strengthening of the memory cells, in keeping an old and valued art form alive.

I don't envision a time when Curt Gowdy will be announcing the Annual Brass-Pounding Championships on ABC's "Wide World of Sports," but the semi-annual Straight-Key Night is as good a tribute to "pumping brass" as any.

The January 1, 1979, running of Straight-Key Night brought in a very respectable 181 reports, detailing QSOs with 938 different stations, from all 50 states, each VE call area (except VE8) and a half-dozen DX countries.

W6FU received three votes to win the "Best Fist" honors. Fifteen others were hot on 'FU's heels with two votes each in the balloting. They were: VE3NG, W2GJ, W4BIW, W4KFC, N5GE, W7BH, W7ITJ, WA7NXL, WB8QLA, WD8DWO, W9TG, AD0W, AF0W, W0TTA and WD0GQK.

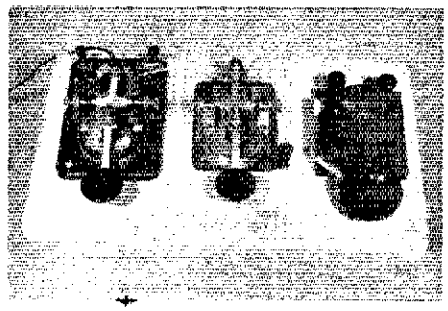
The competition for Most Interesting QSO was every bit as close, with five stations getting more than one vote. K3APM with three votes nosed out WA3YKD, WD4KJF, W7BH and WD8DWO, who each had two votes. W7BH and WD8WDO were the only two stations to receive multiple votes in both categories.

The next SKN will be held on July 4. See "Operating Events," June 1979 *QST*, for details.

Arnold Schwartzenegger, eat your heart out!

Sideswipes

I got a keyer from my parents for Christmas. It came on the 28th and I built it just in time *not* to use it on SKN. (WD9GDJ) My least interesting QSO was with a chap who seemed to be trying to make as *many* QSOs as possible during SKN . . . A year ago, I had the same experience with the same fellow. Next year, I doubt that I'll try contacting him. (K7DV) I'll bet you get over 200 SKN reports this time. (WD6BNR) [Pretty close, Scott. Bet we go over 200 for July 4 SKN. — Ed.] Well, when it's −20° F outside in North Dakota, you can't do much else but enjoy Straight-Key Night. (WD0BRL) I've been in every SKN since I got my Novice at age 13. I'm 15 now and plan on being in SKN for the rest of my brass-pounding days. (N7ANU) My most interesting QSO did not even occur on SKN, but on the day before with a WB5NHH, who was practicing up for SKN! (WA3GSB) I've never (in 18 years) entered a contest and probably never will. However, my first experience with SKN has convinced me that SKN is going to be a semi-annual event for me. (K8VAY) Will probably miss the July SKN, but I'll be in there pounding on Millard Fillmore's anniversary! (N5RU) Since this is now a 24-hour event, some consideration might be given to calling it SKD (Straight-Key Day) instead of SKN. (W4AX) Oldest Key: W8HQP, 103 years. (W7TO) I noticed that QSOs became shorter after 1800Z. Was it me or something psychological in SKN that affected everyone? (W3QYL) This event helped to relieve my "signal report blues," as most QSOs consisted of more than just a 599 signal report. (WD4HSA) Have a brass key with a side switch. If you close the switch (like old Morse keys) a flame shoots up out of the center of the rear nut (controls contact spacing) and lights your cigar. Hi! (W9AND) Most signals heard sounded more like keyers than straight keys. "The Old Man" would have been proud. (KB3DS)



On SKN, N6TO is a triple threat. From the left, Gary's keys are a Signal Corps J-38, a Bunnell solid brass key, and an Army J-5A.

"Where are those dim days of the past,
When with our straight keys we would cast
A spell we tho't would ever last?
And things we made we'd proudly tell
Each other how they worked so well,
Midst rosin core's distinctive smell!
How mercury vapor's flashing light
Made such a warm and friendly sight —
When everything was going right!
Those memories are yours and mine
For they are of a special kind,
Then twice a year return to mind —
On straight-key night . . . they're underlined!"
— *George, W5JOV*

*Communications Assistant, ARRL

Strays

I would like to get in touch with . . .

☐ anyone, especially DX hams, who would like to exchange Morse telegraph keys. John Elwood, W7GAQ, 5716 N. 34th Dr., Phoenix, AZ 85017 U.S.A.

☐ Myrlin Wylie, K6RFX, who started me in Amateur Radio many years ago. Lew Reinberg, W2BIE, 572 Wildwood Rd., West Hempstead, NY 11552.

☐ young hams, licensed or future, around my age, 13. Mike Aldrich, KA2BWT, 1458 Two Rod Rd., Marilla, NY 14102.

☐ other hams who hold patents. Richard Adamaitis, W4PJW, 7138 Columbia Circle, R.R. 5, Fort Myers, FL 33908.

☐ anyone who uses or has used the A-Tronix Visual Code Reader. Berand Kirschner, WB0YCQ, 2756 Newport Ave., No. C, Tustin, CA 92680.

☐ others using the Heathkit ET-3400 Microprocessor trainer. E. Adams, K2YEF, 718 Graisbury Ave., Haddonfield, NJ 08033.

☐ fellow amateurs 13 years old and younger, interested in being pen pals. W. Welch, 14337 Cooper, Taylor, MI 48180.

Results, Ninth Annual ARRL 160-Meter Contest

In the spirit of equal rights, can 160 still be called the "gentleman's band"?

By Bill Jennings,* K1WJ and Tom Frenaye,** K1KI

Average. That's about the best way to describe the ninth running of the ARRL 160-Meter Contest. No better than average conditions, average number of participants, average final scores. When you stop to think about it, average isn't such a bad way to describe the previous 160-meter contest — in fact 160-meter operating in general. Average brings to mind a steady yet purposeful type of operator. Not flashy or radical, but an operator willing to sacrifice speed in operation to take time to get the job done right. A gentleman (gentlewoman?) operator.

The 160 regulars, the operators who nursed 160 through the lean years, those who babysat the fledgling "Top Band" since it was opened for amateur use in the late 1920s, will tell you that the "average" 160-meter band conditions and operators suit them to a tee. And if for a couple of special weekends during the winter months, contest operators can take to 160, raise the level of operating activity for a few hours and co-exist with the average 160-meter operator for the mutual benefit of both, then the purpose of holding such an event as the ARRL 160-Meter Contest has been served.

In the aftermath of the weekend of December 1-3, 1978, 352 160-meter contest entries were received, representing every state but South Dakota, four Canadian provinces, and seven DXCC countries. The 352 logs were a mere 5 percent fewer than the total of 373 entries logged in 1977. Average.

DX call signs found in the various entries included all continents but Africa. Some of the prefixes that were on and available to be worked were CO, DK, F, G, GD, HI, JA, KP1, KG4, KG6, KZ5, HP, OK, PAØ, PZ, TG9, VP2D, VP2V, VP9, VR3, YU, YV, 4U1ITU and 6Y5.

In comparing the 1977 and 1978 160-meter contests, one would be hard pressed to find extreme differences. The average Top Ten scores for both single and multioperator stations dropped noticeably by about 17k points per entry to 76,396 points in 1978 compared with over 93k points per entry for the single operators in the 1977 contest. The multioperator stations in the Top Ten posted an average score about 11k points below the 1977 average of 67,000 points.

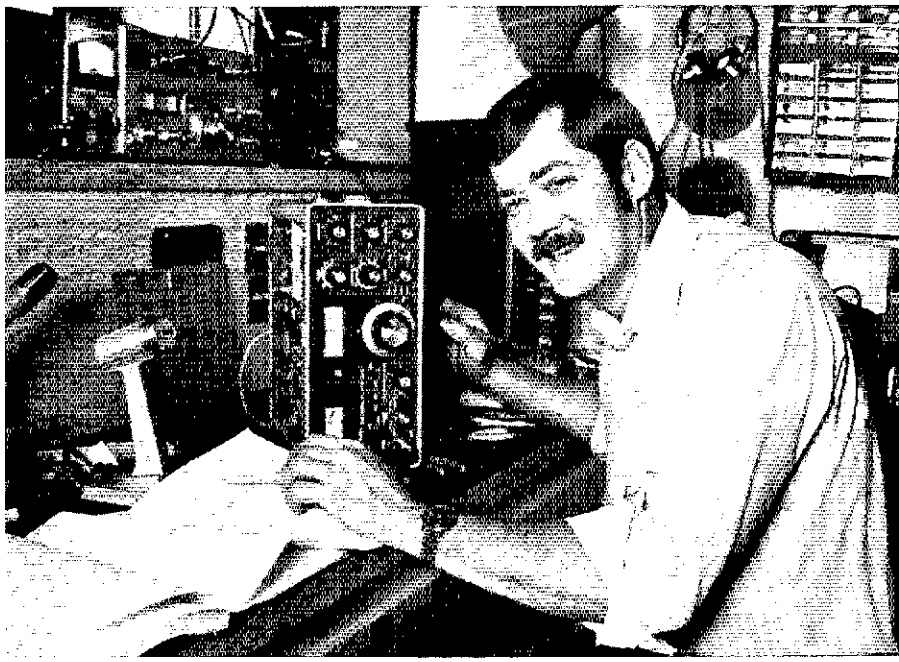
Competition was extremely tough for Top Ten scores. A few miscopied call signs or duplicates left in the log might have made a difference of several places on the list. The crowded Eastern part of the country accounted for the major portion of the big scores, though a few W5s managed to sneak in. In the West, K6SE just edged out AA7A, operating from W7IUV, with the extra points coming from a greater number of DX QSOs.

As far as contest statistics go, several bright spots, in the form of new All-Time Division Records, appeared. N4PN, aside from turning in the number one single-operator score in the 1978 contest, now holds the Southeastern Division single op record.

The only multioperator station to better previous division records was K5GO in the Delta Division.

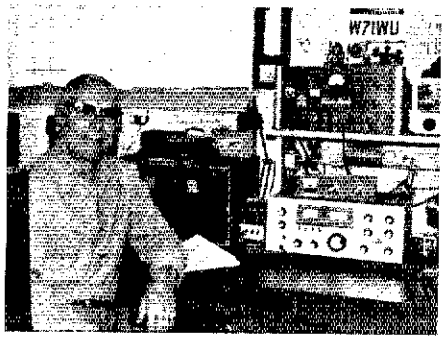
Certificate winners can expect their awards about the 15th of the month that this report appears in *QST*.

For those who haven't tried 160, especially during the contest, and feel that operating on 160 is a completely different ball game compared to the other bands, we'll leave you with the thoughts of W1BB, who gave a few tips on operating in the 160-meter band, published in *QST* in conjunction with the announcement of the first ARRL 160-Meter Contest in 1970: "Operating efficiently on 160 is about like operating efficiently on any other band as far as procedures go, except that it is harder to work DX."



WB4JVY, with a little encouragement from his XYL, WA4ZCS, made the 160 bash his very first contest.

*Communications Assistant, ARRL
**Assistant Communications Manager, ARRL



Alan, W7IWU, takes time out from his 160-meter activities to say "howdy from Idaho."

KØGVB, the lone entry from Iowa, put that section into 220 logs.

Left to right: N4FJ, W4WJ and N4OW, the operators of W4WJ, Southern Florida.

Soapbox

Got to learn more about the band for next time (AE5E). It is easier to work JAs from here than to work W1s (W7IUV)! This has become a great club activity — a winter field day (K9IFO). My first serious effort on 160, after 45 years (VE2JR). Thanks to the Horn family for letting me borrow 50 acres of noiseless reception. Should have listened to Uncle Richard's opinion — "They weren't long enough, tall enough or enough of them." His turn next year to lay down 7000 feet of radials (WA9PFB). Can't even guess how our random wire worked (TG9ML). Somewhat of a nostalgia trip for me. When first licensed in 1951, the only phone privileges were 10 and 160 meters. Couldn't afford but one crystal so missed out on 160 (W5SOD). Band was even jammed up here in Wyoming. In the first half hour of operation I worked two other cowboys (W7TO). Heard no signals within 400 miles except N5NR (W5GWD). I invested $100 for each additional 1000 points over last year. Am currently looking for financial assistance (WA7GCI). An especially nice contest for contest operators, but not DXers. Quite a few DX window violations (W1BB). We had a ball getting all set up for what we thought was going to be a killer installation with a 5/8 wave vertical. However, all plans do not go well (W7IXZ). Both the 160- and 10-meter contests are nominsanity contests. They allow you a long break time to recharge yourself, fix antennas, meet other people in your family . . . (WB2JSJ). First contest in 16 years of being a ham (WB4JVY). I thought conditions stunk (W6BA). Balloon-supported wire is the answer to the city lot problem. Couldn't launch it until after dark. Tried it earlier and umpteen B-B guns appeared (W4YOK). Main reason for the improvement over last year was the addition of a Beverage receiving antenna and I spent about twice the amount of time operating rather than fixing things (VE3INQ). The amount of courtesy and good operating practices was overwhelming (W6WBY)! First season on 160. Best contest I have ever entered (WAØDXZ/5). Conditions fair/poor. Very little DX to speak of (W4WJ). This writer's versions of W1FB's "Quickie" preamp and the 4T-ES Loop were battle-tested and both well proved their worth (W7XZ).

Division Leaders

Single Op		*Multiop*
VE3AKG	Canadian	VE1AXT
K3BSY	Atlantic	K3SXA/3
WØAIH/9	Central	W9AZ
WØZTL	Dakota	WBØSNH
K5UR	Delta	K5GO
N4AR	Great Lakes	W8JI
W2YV	Hudson	— —
WAØTKJ	Midwest	WØEEE
W1PL	New England	N1RI
W7NCO	Northwestern	W7IXZ
W7XZ	Pacific	AI6V
W8LRL	Roanoke	W4PRO
KØCL	Rocky Mountain	WØMS
N4PN	Southeastern	N4BP
K6SE	Southwestern	WB7DDQ
K5NA	West Gulf	K5OG
JA3ONB	DX	W6QL/6Y5

Feedback

Please note the following corrections to the 1977 160-Meter Contest, the results of which are found starting on page 76 of April 1978 *QST*.

In the Division Leaders Listings, under the multiop heading in the Northwestern Division, the call should read N7NC not N7SC.

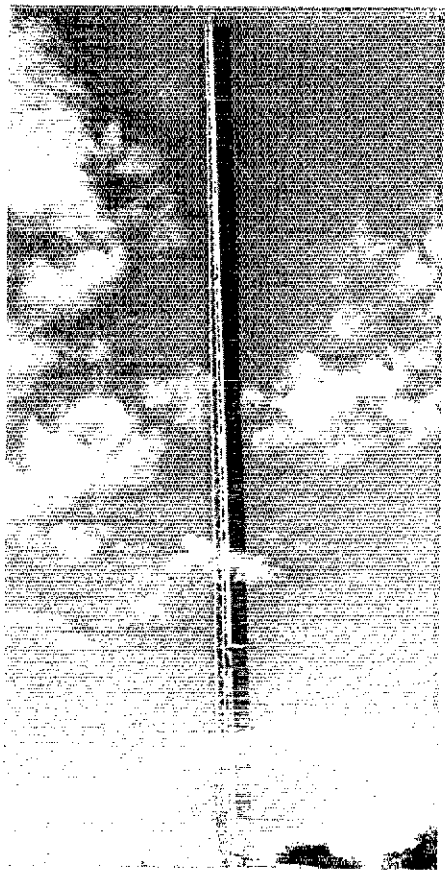
The call sign WØBF with a line score of 10,215 - 112 - 45 should be added in second place in the score listings for the Minnesota Section.

Scores

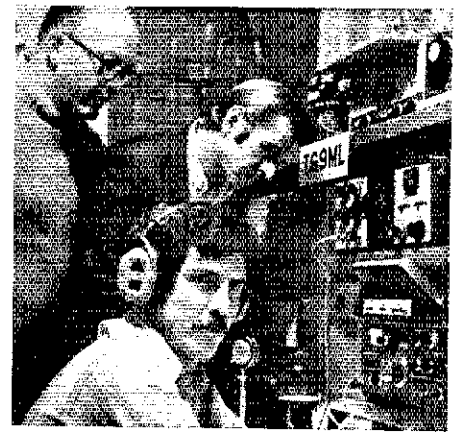
Scores are listed by country, by province within Canada, and by section within each U.S. call area. The highest single-operator station in each ARRL section and in each country receives a certificate. The highest multiple-operator station in each section and country receives a certificate if there are three or more such entrants or, if, in the opinion of the Awards Committee, the entrant displays exceptional effort. Read the score listings as follows: call, score, QSOs, multiplier, hours of operation. QST

Top Ten

Single Operator		*Multioperator*	
N4PN	97,040	W8JI	79,849
W8LRL	88,640	WA8SJX	71,923
N4AR	84,388	K5GO	70,664
W2YV	76,298	W4PRO	58,482
K5NA	75,850	N4BP	55,440
N4EA	75,040	W8LT	53,430
WØAIH/9	75,024	K8US	45,596
K8CCV	72,494	K5OG	41,792
K5UR	59,685	W9AZ	40,946
K9BGL	59,500	W5KI	40,320



Not everyone has room for a 228-foot vertical but many will envy the W4WJ back forty (or 160?). *(W4WJ photo)*



TG9ML (left), a welcome multiplier in a few logs, shows off his shack to visitors TG9KV and K1MM (sitting).

F8EX sends greetings to fellow 160 buffs from across the big pond.

DX

Cuba
CO2KK 140- 10- 7- 3

Japan
JA3ONB 1444- 34-19-
JH1LKH 70- 7- 5- 5

Dominica
VP2DD 234- 14- 9-

France
F8EX 18- 3- 3- 1

Guatemala
TG9ML 112- 8- 7-

Jamaica
W6QL/6Y5(+W6KG) 13,608-162-42-

Surinam
JA1PIG/PZ 864- 48-18-

U.S.A.

1

Connecticut
AA1K 19,695-251-39-28
K1TN 12,648-186-34- 6
N1YL 11,764-175-34-12
W1ID 8745-131-33-13
K1DW 7560-126-30- 9
W1GNC 7223-115-31- 9
K1LGM 6448-124-26- 7
N1JW 4940- 85-29- 5
W1WEF 4860- 81-30- 4
W1WY 4672- 71-32- 4
W1QV 3080- 70-22- 4
W1BWS 2940- 46-30- 5
K1TX 1548- 43-18- 2
K1ZZ 1496- 34-22- 1
K1VKO 882- 21-21- 7
W1BIH 792- 22-18- 1
N1CC 704- 22-16- 3
W1VZ 60- 6- 5- 1

Eastern Massachusetts
W1PL 35,305-335-53-27
W1YN 24,318-285-42-14
K1VV 9660-138-35- 6
W1JR 6318- 78-39- 5
W1BB 5504- 80-32- 9
W1BVL 144- 9- 8- 1
W1MX(K1MK,W1XG,WA4TTG, oprs) 16,728-198-41-

Maine
N1DE 25,430-275-15-

New Hampshire
WA1TZV 11,088-168-33-10
W1TZ 2448- 51-24- 6

Rhode Island
N1RI(+KA1s AIR AYM,N1DM, WB1s DET DEU EHO) 32,148-335-47-29

Vermont
WB1GQR(WB2JSJ,opr) 34,854-289-43-15
K1IK 23,664-245-48- 6

Western Massachusetts
N1YY 15,873-213-37-13

2

Eastern New York
W2YV 76,298-549-68-23
W2IB 56,522-476-59-24
K2DW 5882- 85-34- 7
K2MN 2704- 52-26- 5
W2DW 868- 32-14- 2

N.Y.C. - L.I.
W2KIU 14,042-205-34-20
W2GP 9870-138-35-
N2KA 8096-128-32- 9
N2MS 5012- 88-28- 9
W2DGZ 2120- 53-20- 7

Northern New Jersey
N2LT 33,456-318-51- -
W2FJ 25,944-279-46-22
W2BHM 21,240-233-45-17
W2GD 11,040-135-40- 2
K2BK 9916-132-37- 9
W2LVT 8122-131-31-
WB7EME/2 7392-114-32-
K2JT 5160- 86-30- 4
WA2PQU 690- 23-15- 7

Southern New Jersey
K2BWR 13,572-171-39-14
W2EHN 8085-114-35- 7

Western New York
W2MTA 23,083-280-41-16
WA2IKR 17,958-219-41-12
W2IE 11,988-162-37- 7
W2QIP 11,058-144-38- 7
K2OS 10,332-142-36-12
W2ZOJ 7047-120-29-11
WA2IKO 6144- 96-32-13
WA2UUK 5220- 87-30-23
WB2QAX 3317- 52-31- 6
WA2EYA 3250- 65-25-17
WB2FUY 2024- 46-22- 6
WA2RXB 1922- 31-31-13
WA2AOG 1596- 38-21-
W2AAU 1083- 27-19-
W2STM 1020- 60-17- 3

3

Delaware
K3HBP 7458-113-33- 8
K3SXA/3(+N3ND,K3SM) 33,746-356-47-35

Eastern Pennsylvania
K3UEI 47,681-466-51-23
W3NZ 18,128-203-44- 6
W3AJS 14,436-199-36-15
N3KR 10,980-151-36-13
K3OQF 10,692-147-36-13
W3CNS 7904-104-38- 4
W3AP 5110- 73-35- 2
W3HGN 3380- 65-26- 1
K3NGN 2304- 48-24- 3
W3RJ 480- 24-10-

Maryland - D.C.
K3ZJ 41,028-393-52-23
K3ZZ 39,273-363-63-21
W3GN 31,872-329-48-
K3TA 18,791-217-43- 5
N3TR 17,725-196-45- 6
W3FA 13,338-168-39-
K3KA 4402- 71-31- 6
WB3GWM 882- 21-21-
W3PEV 30- 5- 3- 1

Western Pennsylvania
K3BSY 50,232-447-56-24

4

Alabama
K4TO 51,129-366-69-17
WB4JVY 2738- 37-37-16

Georgia
N4PN 97,040-590-80-
K4BAI 9435-126-37- 7
AA4EI 1480- 37-20-
WB4NMA(+W4DWE) 800- 25-16- 2

Kentucky
N4AR 84,388-561-73-19
K4FU 44,100-350-63-14
W4YOK 35,400-295-60-13
N4XM 10,682-106-49- 7
W4RHZ 6460- 95-34-20
WB4HNH(+WB4ASW) 15,372-183-42-22

North Carolina
W4TMR 47,488-453-56-25
K4JYS 35,616-314-56-18
N4PY 35,496-345-51-23
AA4S 19,656-171-56-10

Northern Florida
N4WW 65,699-372-73-25
W4VQ 18,480-159-56- 6
WA4SGF/M 12,804-141-44-13
WB5YLT/4 672- 21-16- 5

South Carolina
WA4JWS 5432- 97-28- 8
K4CNW 5162- 89-29- 6

Southern Florida
W4OO 43,416-309-67-17
N4IN 39,372-276-68-21
W4BV 8385-106-39-
N4BP(+N4UM) 55,440-367-72-28
W4WJ(+N4s FJ OW,oprs) 29,986-257-58-24

Tennessee
N4ZZ 55,945-416-67- 8
K4MZE 616- 22-14- 4
KB4CG 30- 5- 3- 1

Virginia
N4EA 75,040-542-67-40
W4YE 25,700-259-50- 8
KA4DSL 25,438-275-46-13
WB4URW 22,638-228-49- 9
N4RA 15,179-176-43- 8
W4DM 11,508-137-42- 4
N4NW 9590-137-35- 5
N4CD 6264-108-29- 7
W4UG 4960- 80-32-11
W4KMS 4500- 75-30- 8
WD4IMB 4050- 45-45-
K4OAQ 2808- 54-26- 2
N4MM 972- 24-18- 1
W4PRO(+K3RUQ,WB3CCZ,N4DJ W4HBK,N5BA) 58,482-507-57-30

5

Arkansas
K5UR 59,685-428-69-22
K5GO(+K8CC) 70,664-478-73-19

Louisiana
K5KLA 23,956-226-53-13
N5AN 20,104-175-56-10
WD5HBK 494- 19-13-11

Mississippi
WA0DXZ/5 17,480-187-46-40
N5XA 13,728-140-48-12
AE5H 5228- 85-36- 9
W5AQ 5840- 70-40- 8
W5GWD 4140- 69-30-12
WA5NYG/5(Multiop) 8568-126-34-12

New Mexico
W5DO 19,140-162-35- 8

Northern Texas
N5JB 23,328-216-54-12
K5RA 12,400-158-40-
N5XII 11,472-117-48-11
W5FIX 9890-112-43-10
W5QF 9758-119-41- 8
WB5RPU 8323-100-41- 7
N5UA 5304- 75-34- 8
W5SOD 3224- 62-26- 8
KA5CDZ 528- 22-12- 2
WD5BIK(+WB5VZL) 1258- 37-17- 5

Oklahoma
W5HFN/5 360- 15-12- 9
W5KI(+N5MF,K0JPX) 40,320-317-63-24
KN5TTN(+K5QNM) 5082- 77-33- 9

Southern Texas
K5NA 75,850-502-74-20
K5SF 13,865-143-47-15
N7OA/5 4650- 75-31- 7
K5RC 3080- 55-28- 2
K5DL 672- 21-16- 3
K5OG(N5UT,K5NI,oprs) 41,792-319-64-40
K5TM(+K5ZD) 8858-100-43- 5
AE5E/5(+AC5R,WB5s HZC ITT, WD5BIP) 4901- 83-29-15
N5EM(+WA4EWV,K5HGB) 2652- 51-26- 8

6

East Bay
K6HIH 17,776-199-44-
N6LU 12,160-151-40-17
AD6D 7800-130-30-25
K6TS 7398-137-27-13
WA6EUZ(+WB6OVV) 14,848-181-41-27

Los Angeles
K6SE 55,755-399-63-19
WA6MBP 10,400-130-40-13
WB6WQA 6200-100-31-11
W7CB/6 5400-100-27- 9
N6IH 154- 11- 7- 2

Orange
N6PE 18,135-200-45-13
W6BA 16,544-173-47-13

Santa Barbara
W6WBY 3476- 79-22-11
W6JEO 2736- 72-19- 9
K6MXO 722- 19-19- 6
W6TYR 722- 19-19-15
N6VR 420- 21-10- 1

Santa Clara Valley
N6RZ 23,712-225-52-18
WB6NSF 15,826-193-41-19
N6QW 1908- 53-18- 8
W6FOP 484- 22-11-14

San Diego
N6ND 19,200-200-48-15
K6NY 14,490-153-46-26
WA6VNR 7385-101-35-19
K6XT 5200-100-26-
W6XM 3240- 81-20- 6
W6ZI 154- 11- 7- 6

San Francisco
AE6U 9945-109-45- 8
WB6FCR 154- 11- 7- 3

San Joaquin Valley
K6MO/6 15,480-167-45-11
K6YK 11,340-135-42- 1
W6MTJ 6912- 96-36-13
N6YD 528- 24-11- 3
AI6V(+W6YKM) 22,654-241-47-

Sacramento Valley
N6JV 27,978-269-52-
AA6DX/6 6550-131-25-10
WA6BRV 1764- 49-18- 4

Hawaii
KH6IJ 2024- 46-22- 7

7

Arizona
W7IUV(AA7A,opr) 53,046-400-63-20
WB7DDQ(N7AZ,K7RMJ, WB7AMR,oprs) 25,864-244-53-19

Idaho
N7SU 13,366-163-41-
W7HZL 8750-125-35-16
K7ER 3520- 80-22-12
K7TM 2982- 71-21- 3
K7BUY 1682- 29-29-
W7IWU 896- 28-16- 2

Montana
K0PP/7 22,672-218-52-22
W7CJB 9792-136-36-19
W7JYW 8680-124-35-17
K7CPC 104- 13- 4- 3

Nevada
W7XZ 31,860-289-54-28
WB7OQW(K7OX,opr) 15,238-199-38-19
AE7K 2090- 55-19- 7

Oregon
W7NCO 34,547-279-61-
WA7RTA 22,491-199-51-20
WA7PEZ 6250-125-25- 9
W7LT 946- 43-11- 8
W7IMP 684- 38-18- 6
AA7W 616- 28-11- 3
W7IXZ(+KB7BM,W7IYA, WB7VZP) 26,117-259-49-

Utah
K7UM 21,700-217-50-13

Washington
WA7GCI 32,376-277-87-30
W7NP 17,507-212-41-18
W7DPW 14,828-167-44-21
N7AM 14,212-154-44-11
K7DZ 12,978-147-42-11
W7BYK 7840-112-35-14
K7IDX/7 2688- 56-24- 6
W7TU 2280- 60-19- 5
WB7OVA 1352- 26-26- 5
W7SX(+WA7ZTN) 20,332-221-46-20
N7RV(+WA7FXB) 1856- 58-16- 9

Wyoming
W7TQ 7056- 98-36- 7
W7IRL 2304- 48-24- 4
WA7ZZY 1512- 42-18- 7

Alaska
KL7GIH 4200- 84-25-12
KL7HBK 924- 33-14-13

8

Michigan
K8MJZ 40,880-365-56-23
W8CNL 27,608-235-58-15
W8IOU 16,320-180-51-25
K8LJG 5600- 80-35- 4
K8NG 5280- 80-33- 2
W8VPC 4582- 79-29- 5
K8OT 3132- 54-29- 3
W8WVU 2352- 56-21- 4
WA8SIX(+K8s FC JM) 71,923-505-71-32
K8HPS(WB8VDL,W9PX,K0XR, oprs) 18,090-201-45-14

Ohio
K8CCV 72,494-538-67-30
W8DB 47,502-374-63-15
WA8TNO 23,500-235-50-32
K8FU 17,424-198-44-10
W8EX 11,137-125-43- 6
K8BL 8658-111-39- 5
WB8IGY 6480- 90-36-
K8MR 6200-100-31- 3
K8IQQ 3780- 70-27- 5
K8CQ 3562- 67-26- 3
W8JI(+KA8BVM,N8ABS,WD8s CNQ UXX) 79,849-521-77-
W8LT(K1LT,K8s ND NU,WB8s INY YIJ,WD8AMX,oprs) 53,430-408-65-42
K8US(+WB8QWI) 45,596-413-55-20
N8TL(+WB8s MVW QMC) 30,240-280-54-27
AC8E(+W8IDM) 22,748-242-47-24

West Virginia
W8LRL 88,640-530-80-
K8OQL 27,489-279-49-
K8SR 468- 18-13- 1
W8JWX 320- 16-10- 1

9

Illinois
K9BGL 59,500-422-70-22
K9BG 30,894-268-57-18
W9OA 30,804-302-51-12
W9PNE 27,572-220-61-12
WA9PFB 26,847-231-57-22
K9AB 23,808-246-49-13
K9JU 20,910-205-51-14
W9GT 18,336-191-48-10
K9CW 11,760-140-42- 9
W9REC 1932- 42-23-
WD9GGY 1840- 46-20- 3
W9ABA 1496- 44-17- 6
W9HPG 320- 16-10- 1
W9AZ(K9s IFO NR,W9NKR, WB9s WEC WEU ZKK,WD9CJA oprs) 40,946-347-59-21

Indiana
WB9QCP 58,630-446-65-24
W9LT 45,087-394-57-19
K9ZUH 22,400-224-50-15
W9JOO 18,216-207-44-11
W9MDW 16,830-165-51- 6
W9RE 11,256-134-42- 4
K9FW 4056- 78-26- 7
AB9D 800- 25-16- 4
W9EI(+W9NJD) 24,200-242-50-16

Wisconsin
W0AIH/9 75,024-527-72-18
W9WQ 21,244-226-47-16
N9KS 420- 21-10- 2

0

Colorado
K0CL 32,547-281-57-10
N0ZA 1428- 34-21- 5
W0MS(+WB0CMM) 34,998-304-57-

Iowa
K0GVB 26,440-220-67-18

Kansas
WA0TKJ 48,685-370-65-25
N0IN 23,997-209-57- 9
W0AM 19,342-152-63-14
N0UU 14,196-135-52-11
W0UY 9594-117-41-14
K5JZN/0 1680- 35-24-

Minnesota
W0EKS 5832- 96-46-
K0SE 2400- 40-30- 4
WB0SNH/0(+WB0NHD) 10,412-137-38-16

Missouri
N0TT 41,391-327-63-18
WA0FRQ 28,329-247-57- 9
W0BTD 38,320-236-60-
AE0K 10,912-124-44-16
W0EEE(WA0RAD,WB0s GRJ ZLB,WD0GOX,oprs) 14,022-171-41 7
W0RGX(+WD0FKB,WD0s EFP FOH) 7490-107-35-25

Nebraska
K0UP 37,359-295-63-16

North Dakota
W0ZTL 20,300-203-50-11
K0FRP 1696- 56-28- 5
WA6FUZ/0 1216- 32-19- 7

VE

Maritime - Newfoundland
VE1AKT(+VE1BCZ) 18,120-219-40-30

Quebec
VE2JR 2880- 60-24-15
VE2OJ(VE2s NM SO,VE3s ABG HJV,oprs) 17,094-231-37-27

Ontario
VE3AKG 27,649-320-43-11
VE3INQ/3 12,628-154-41-29

British Columbia
VE7CC 25,742-206-61-
VE7BBQ 1764- 49-18-
VE7CMK 280- 14-10-

Check Logs
W1AW(W1EH,opr), WA2GKF,K3VA,W4WZR, W6BYH,W7CX,W9RMA

Disqualifications
K1PBW,WA1TFF,K2IGW,N5RR(+AJ5B),K9MK(+K9s GL VV, WB9TIY),K0JUS(+AF0N,K0s SHO TG).

Results, 45th Annual ARRL November Sweepstakes

Records broken; to-the-wire finish in cw Top Ten. Whew! What a contest.

By Tom Frenaye,* K1KI, and Bill Jennings,** K1WJ

In almost all ways, the 1978 ARRL November Sweepstakes was a record breaker. We received more logs than ever before (2997, up 10 percent), more club entries than before (112, up 16 percent), the highest total club score (NCCC), and the highest single-operator score on phone (N6CJ from KP4RF). Add to that the 41 new single-operator division records (37 last year), the closest finish in the top ten on cw and more clean sweeps (354) than ever before, and you'll have to agree that it was a record-breaking contest.

The number of logs received didn't quite break the 3000 mark but were almost identical on phone (1507) and cw (1490). Club and local competition seemed to really bring out the closest battles. On cw, W6HX (N6NT, op), N6TR and K6RR (N6CJ, op) of the Southern California Contest Club all placed in the top ten, with the difference between their scores only eight QSOs! The Mad River RC battle was between K3UA and K3LR who also both finished in the top ten in the high-power category, the difference here only five QSOs and a multiplier. The low-power cw battle was between KØDJ and WØETT in Colorado with D1 in the number eight slot and ETT number 10. The Mad River group also had quite a battle of multioperator stations with WB8IBM, K8ND and W8XU finishing fourth, sixth and eighth, respectively.

This intense competition on the local level also spurred on many ssb participants. Colorado's KØRF and KØCL battled it out for fifth and sixth place honors, the difference only two QSOs when the dust had settled. Arizona produced the closest, low-power battle with K7JVR edging W7UV by only five QSOs. Again, the multioperator category produced tight contests. The Northern California Contest Club placed three stations in the top ten — W6JZU, W6YX and N6RZ. In Connecticut, N1MM and K1XA of Murphy's Marauders cracked the top ten, along with the Yankee Clipper group at W1XX.

This should prove once and for all that the best way to score big is to match yourself up with someone you know nearby and give 'em hell. The Northern California Contest Club takes this philosophy to heart by sponsoring numerous trophies and awards to its own members. Their number one finish for the fourth year in a row is clearly very impressive. They increased their victory margin over the Potomac Valley RC by nearly two million points this year, despite PVRC's narrow 42k point lead in cw scores.

The medium level of club competition was just what Murphy's Marauders needed to liven things up. They scraped together 15 entries and two million points more than last year.

The local level of competition produced some very interesting results. The Cascades ARS of Jackson, Michigan, scored a narrow victory in a close race. Their phone totals dominated, while their cw score was topped by the next four finishers. The reconstituted Texas Association of Contest Operators, now a local power, finished a close second. The number four and six finishers in the local class competition, the Flyweight DX Group and the Point Radio Operators Society, weren't even on the charts last year.

A decrease in scores shows things are changing in a few clubs, but on the whole, club aggregate scores were up. Another ingredient to NCCC's victory in the unlimited category was the large turnout of members. Nearly 70 percent of NCCC's members submitted scores or participated in club multioperator efforts. Compare that to the PVRC and YCCC averages of about 40 percent and look at your own club effort while looking toward next year.

Club scores and local competition aren't everything though and mention should be made of the other outstanding SS scores. The Top Ten phone scores averaged nearly 20k points greater than last year, with the average entry making 1922 QSOs (80 per hour)! N6CJ operating from KP4RF smashed his own existing record by 15k points. On cw, the average top ten score was up by a scant 600 points.

*Assistant Communications Manager, ARRL
**Communications Assistant, ARRL

Division Leaders — Single Operator

Division	CW High Power	CW Low Power	Phone High Power	Phone Low Power
Canadian	VE7CC*	VE4OY*	VE5DX*	VE4OY*
Atlantic	K3UA*	K3TM*	K3UA	W2KI*
Central	W9RW*	N9BT	K9CT*	WB9EGZ
Dakota	KØZZ*	NØNO*	KØZZ*	WAØLKL*
Delta	K5GO*	K4XU*	W5VSZ	N5DX*
Great Lakes	K8NZ	K8EKG	K8LX*	W8LAQ
Hudson	W2GD*	W2CS*	K2TR*	K2UF*
Midwest	NØGA*	WAØTKJ	K5JZN/Ø*	WBØISW*
New England	K1GQ*	W1ZT*	K1VTM*	N1YY
Northwestern	K7RI*	K7QD*	K7RI	WB7BNP
Pacific	N6BT	N6XI*	K6OQ	WB6SHD*
Roanoke	K4VX*	N4DW*	K4VX*	K8BS
Rocky Mountain	WØCP	KØDJ*	KØRF	NØMC
Southeastern	N4RR	N4TZ	KP4RF*	WD4OIX
Southwestern	W6HX*	AA7A*	W7KW*	K7JVR*
West Gulf	K5GA	K5MR	K5JA*	N5UD

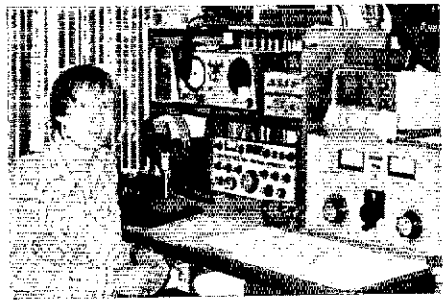
*New records

Division Leaders — Multioperator

Division	CW	Phone
Canadian	VE3ART/3	VE3ECP
Atlantic	WA2ECA	WA2ECA
Central	W9YH	W9YH
Dakota	KØTK	KØLTC
Delta	N4AJJ	AA4AA
Great Lakes	WB8JBM	WB8JBM
Hudson	K2GQ	K2XR
Midwest	KØWA	KØWA
New England	N1MM	K1GZL
Northwestern	K7WPC	KL7HR
Pacific	K6AYA	W6JZU
Roanoke	N4WA	K8KT
Rocky Mountain	NØAE	N7AON
Southeastern	W4AQL	N4WW
Southwestern	N6HE	WB6OBZ
West Gulf	K5KG	K5RX

W6AM (N6TJ, op), no. 2 cw

Fred (WD4SKH/T) passed his Technician exam two days before the SS and stuck it out for 6636 points from North Carolina.



WA6VFF piled up 366k points for the NCCC while finishing third in the East Bay section on both phone and cw.

Affiliated-Club Competition

Club			*CW*	*Phone*
Unlimited Class	*Score*	*Entries*	*Winner*	*Winner*
Northern CA Contest Club	14,874,540	140	N6BT	K6OQ
Potomac Valley Radio Club	12,208,744	115	W3LPL	K4VX
Yankee Clipper Contest Club	7,601,038	81	K1GQ	K2TR
South Jersey RA	1,664,444	59	K2YY	K2YY
Medium Class				
Murphy's Marauders (CT)	4,657,790	40	K1PR	K1VTM
Mad River RC (OH)	4,056,098	40	K3UA	K3UA
Frankford RC (PA)	2,857,800	38	W2GD	K3ZA
North Texas CC	2,687,836	29	N5JB	K5JA
Texas DX Soc.	2,555,824	34	K5GA	K5RC
Western Washington DXC	2,123,568	34	K7RI	K7RI
Wireless Inst. of Northeast (NY/NJ)	2,090,332	25	N2NT	K2PE
Ill-Wind Contesters (IL)	1,735,628	25	W9RW	K9RF
Buffalo Area DXC (NY)	1,635,332	15	N2MF	K2IGW
Central Illinois DX & CC	1,463,284	14	K9CT	K9CT
Southern CA CC	1,397,000	14	W6HX	—
Central Arizona DXA	1,328,496	12	W7KW	W7KW
Gloucester County RC (NJ)	1,265,164	22	N2CQ	W2KI
Kansas City DXC (MO)	808,542	11	KØXR	WBØISW
Saginaw Valley ARS (MI)	795,770	26	K8DO	K8OT
Northern Florida ARS	694,316	11	N4UF	N4UF
L'Anse Creuse ARC (MI)	679,026	23	K8DD	K8DD
Wisconsin Valley RA	677,714	14	W9NA	W9NA
Murgas ARC (PA)	654,404	18	WB3JGP	WB3FAA
Ft. Wayne RC (IN)	653,920	15	K9UWA	K9UWA
Central Michigan ARC	588,972	22	W8TJQ	WA8SQL
Kettle Moraine RA (WI)	559,488	30	W9HE	N9KS
Ohio Valley ARA	484,900	10	W8RSW	—
Utica ARC (NY)	360,090	13	K2XU	WA2PCF
West Allis RAC (WI)	314,958	17	K9KR	K9KR
Motor City RC (MI)	214,114	12	K8SIA	K8SIA
Local Class				
Cascades ARS (MI)	758,056	10	K8MJZ	K8MJZ
Texas Assn. Contest Ops	742,582	6	K5TM	K5TM
John Brown Univ. ARC (AR)	731,644	7	K5GO	N5DX
Flyweight DX Group (TN/VA)	716,474	6	N4DW	—
Willamette Valley DXC (OR)	619,760	5	—	W7NI
Point Radio Opr. Soc. (PA)	587,156	8	K3KO	—
Mid-Missouri ARC	534,550	8	—	WØVE
Blue Grass ARC (KY)	521,678	10	WB4PRU	WB4PRU
Central Virginia CC	521,424	5	—	N4HB
Colorado Contest Conspiracy	474,376	3	—	—
RC of Tacoma (WA)	463,010	10	—	W7BUN
Central Florida DX Assn.	453,338	9	N4SA	N4SA
Sevier County ARC (TN)	441,462	6	K4XU	K4XU
Connecticut Wireless Assn.	441,066	9	W1ECH	W1TCJ
Salem ARC (OR)	430,768	4	N7ES	—
Western Carolina ARS (NC)	405,024	4	—	—
Synton ARC (IL)	394,602	9	K9CW	KB9AW
Minnesota Wireless Assn.	392,862	4	—	—
Massillon ARC (OH)	391,122	7	K8AC	K8AC
Poughkeepsie ARC (NY)	389,598	5	—	—
Indy DXers (IN)	349,642	3	—	—
M.I.T. RC (MA)	346,012	5	—	N1HR
Duluth Guns RC (MN)	342,434	4	KØII	—

W2GD finished on top for the first time with an impressive 2500 point lead. His 11th place finish past year (missed number 10 by 6 QSOs) must have given him that extra incentive. The next six finishers were unbelievably close — number seven could have been number two with only eight more QSOs! In fact, number 10 VE7CC could have been first with a paltry increase in his QSO rate of only two per hour.

The 1975 low-power phone record of WA5VDH was smashed by N5DX, leaving the rest of the pack well behind. On cw AA7A didn't break the record but his 6000 point lead over number two K5MR made the victory comfortable.

Multioperator leaders were K1GZL on phone and WA2ECA on cw. The K1GZL group clearly outdistanced the competition but there were several groups on the heels of WA2ECA.

This was really the year of new division records. Single operator records were all broken in the Atlantic, Canadian, Dakota, Hudson, Midwest and Southwestern Divisions. Arizona now holds three of the S.W. Division records usually held by Southern California stations. Even far-away Alaska found itself (herself?) with the multioperator title in the Northwestern Division as the KL7HR group put together a winning entry. The oldest record broken was in the Dakota Division where WAØLKL is the new low-power phone king, erasing the WBØDSP 1972 record. The oldest one still on the books is the 1969 low-power record from the Southeastern Division held by K4WAR (K8UQA/K8WW, op).

One interesting statistic culled from this year's SS logs was the year first licensed (from the check given in the contest). Of the logs received at Hq., 39 percent gave out checks of 1970 or later. About 25 percent fell into each of the 1960-69 and 1950-59 categories. The 1940s had 3 percent, 1930s about 5 percent and 1920s about 2 percent, with only two entries before 1920. Exactly half of the entries gave first dates of license of 1965 or later. Feel like you're getting older?

Only those stations making a clean sweep on both modes are listed in this year's tabulation. Cw clean sweeps were up 219 percent and phone sweeps were up 60 percent. Last year only 10 stations managed a sweep on both modes, 1978 honors go to 36! A few operators made it on both modes, K1MM for one, but used different call signs (KZ5JM and KZ5NO). Incidentally, next year's clean sweep total will be only 74 sections, as Canal Zone licensing will be handled by Panama with HP call signs issued.

Whidbey Island DXC (WA)	332,007	9	—	WB7BFK
Burlington ARC (VT)	327,516	4	—	—
Hell Gate ARC (MT)	324,762	6	K7QA	K7QA
Rockford ARA (IL)	314,530	5	—	K9IKP
Las Vegas RAC (NV)	309,620	3	—	—
Canton ARC (OH)	308,930	7	W8TD	WB8URG
Rowan ARS (NC)	303,218	6	—	N4UH
Mitre-Bedford ARC (MA)	287,108	7	W1FM	W1FM
Whitewater Valley ARC (IN)	285,902	5	AA9S	—
Schenectady ARA (NY)	271,660	4	—	—
Central Michigan Contesters	241,398	5	—	—
Ozarks ARS (MO)	235,692	8	—	WBØTMK
Eastern Iowa DXA	230,902	4	WØVU	—
Mike & Key ARC (WA)	223,648	5	—	N7NW
Saline County ARC (AR)	204,472	4	—	—
Spokane RA (WA)	202,847	7	K7JV	—
Manchester RC (CT)	202,714	6	W1WEF	—
Montgomery ARC (MD)	202,164	5	—	WB3FAF
Old Barney ARC (NJ)	201,434	4	—	—
Foothills ARS (CA)	197,822	7	—	W6LID
Granite State ARA (NH)	195,984	4	—	—
Southeastern DXC (GA)	194,404	4	—	—
Libertyville & Mundelein ARS (IL)	191,428	4	—	—
Hollywood ARC (FL)	177,796	3	—	—
Land of Lakes ARC (MI)	166,442	5	—	WA8OWG
AR Transmitting Soc. (KY)	163,384	3	N4XM	—
Sioux Falls ARC (SD)	161,332	3	—	WAØARS
Hazleton ARC (PA)	160,402	5	K3UK	—
HTC-South Campus ARC (MN)	156,966	4	—	KØCN
Ventura County ARC (CA)	152,678	6	—	WA6IJZ
Abington ARC (PA)	147,318	5	—	KA3AQF
St. Charles ARC (MO)	143,056	6	WBØQZY	WBØQZY
Penn. Wireless Assn. (PA)	140,386	4	—	—
Rochester ARC (MN)	139,792	4	—	—
Larkfield ARC (NY)	139,354	10	K2CMV	WB2GUB
Signal Hill ARC (SD)	137,208	4	—	—
Northwest ARC (IL)	129,712	7	N9NA	WD9ADM
Great South Bay ARC (NY)	128,110	4	—	—
Coconino County ARC (AZ)	124,710	5	W7YS	—
Northrop RC (CA)	121,114	4	—	W6CN
Billerica ARC (MA)	115,520	4	—	—
Rio Hondo ARC (CA)	115,112	4	—	WA6EZV
Ambridge Area School Dist. RC (PA)	108,518	6	WB3HSV	—
Chicago Radio Traffic Assn. (IL)	104,552	5	W9REC	—
Cuyahoga Falls ARC (OH)	101,826	9	WB8VNR	KA8BCZ
Hamfesters RC (IL)	97,788	4	—	—
ARINC ARC (MD)	96,616	4	—	—
Four Lakes ARC (WI)	85,176	4	—	WD9GRI
Westpark Radiops (OH)	83,724	6	—	W8IMF
Valley ARA (VA)	74,886	5	W4XD	—
Brightleaf ARC (NC)	71,796	5	—	—
IBM Owego ARC (NY)	71,778	5	—	—
Lake Success RC (NY)	55,036	7	WA2ISH	WA2DZD
Rip Van Winkle ARS (NY)	49,506	3	—	—
Columbus ARC (GA)	46,702	3	—	AK4T
Fresno ARC (CA)	25,690	3	—	—
Bay Area ARC (MI)	23,254	3	—	—
Missouri Western ARC	14,316	3	—	—
Albany ARC (NY)	9,816	3	W2UU	—

VE3AKG is still trying to figure out how he missed Utah on cw. Even so, his low power station finished no. 1 in the Ontario section.

Despite nervousness over his first contest, Shawn (KA2BSC/N) picked up seven new states.

VE4OY no. 1 low power Canadian Division phone and cw

Overall, the logs were neater, had fewer duplicates, and fewer call sign/exchange errors than last year. Even the number one scorers overlook a few duplicates, no matter how carefully the logs are checked. W2GD had one and KP4RF had three, showing you can't be perfect and number one at the same time.

A lot of extra effort went into the SS log checking, score typing and associated paperwork this year so the results could make the April issue. Special thanks to Arlene Duguay again this year for the necessary typing of the score listings.

Soapbox

Murphy took a different form with me this year. After making sure that I had no weekend commitments, I was flattened with the flu during the cw weekend. But, lacking common sense and being more than a little stubborn, I made a stab at it anyway. P.S. don't touch the logs — oops! Too late! (K8MN). Fifty QSOs were plenty for this old fogy. I figured, let the young hot shots fight it out until the last second (W2FSL). Who says there is no such thing as beginner's luck? First SS ever and made a clean sweep. Being in South Carolina is almost like being rare DX (W4MPY). Was nearly wiped out when Halloween pranksters covered the tower with pink toilet paper (W1GNC). You haven't lived until you've tried the SS using all indoor antennas in a ground-floor apartment in Alaska. It's kind of like yelling for help from a life raft in the middle of the ocean. If you yell long enough, somebody will hear you (KL7JEO). I developed a new contest named the *Sleep*stakes. It begins 0301 UTC November 7 and ends when you get up. You may operate the full time period with no time-outs (WB3JGP). Administered a Novice written exam during a "break" in my SS operation (WA2JCX). Very tough for 5 watts (WAØPED). In the phone portion of the SS, never use standard phonetics. You must think up something clever that will catch everyone's attention. My QSOs per hour picked up after I changed from "Delta Juliett Whiskey" to "Delicious Juicy Watermelon." It's silly, but it helped (WD5DJW). Being licensed in 1935 caused some problems. About 80 percent of the time I had to repeat my check. They wouldn't believe 35 and wanted it to be 55 or 75 (K9NA). A really wild and crazeee . . . contest! (WD4MYD). Can anyone tell me the odds of working a KL7, a VE8, two Wyoming stations, and a JA1 without even hearing a station in my neighboring state of West Virginia? (K4EMX). When you think that you hear "CQ SS" coming from the showerhead — you know that you've had enough! (NØTT). You can't have your station powered up then have your wife plug in the curling iron, electric rollers, and hair dryer. You tend to loose points groping in the dark for the breaker (KØWA). Once upon a time, in the kingdom of OYW, there lived a king. And on a certain weekend in the 11th month, the king had decreed that all the peasants must vacate their homes and observe a royal holiday. And all the peasants obeyed their king. Which is why this humble station, in a bid to work all 75 sections for a clean sweep, did not achieve that goal! (VE3XJ). Sure wish that the FCC's computer programmer had to dupe these logs by hand (K8KT/WB8SAW). I had always escaped Murphy during the SS, until this year. After a few hours of SS-cw, Mr. Stomach decided to empty himself. Result: 16 extra hours of rest and a lot fewer QSOs (KØMPH).

Top Ten Phone

Single Operator		*Low Power*		*Multioperator*	
KP4RF	333,600	N5DX	197,100	K1GZL	231,150
W7KW	306,150	WB6SHD	169,950	W6JZU	223,350
W6HX	290,250	K7JVR	166,950	N1MM	219,600
VE5DX	289,050	W7UV	166,200	KØWA	218,300
KØRF	282,450	K4XU	160,950	K5RX	217,650
KØCL	282,150	WAØLKL	153,300	W1XX	211,640
K2TR	276,150	W2KI	151,950	WA2ECA	209,850
K7RI	275,132	NØMC	148,650	W6YX	208,680
KØZZ	274,800	N1YY	146,400	K1XA	206,700
W7ZQ	273,450	VE4OY	145,950	N6RZ	204,832

Clean Sweep

Phone and CW

K1RT	K2TR	N4DW	W6JZU
K1KI	N3AD	W4DM	K6FB
W1ZM	K3RA	AF5L	W6BIP
W1BIH	K3UA	K5TM	AC7P
K1VR	K3FR	W5AC	N7AM
W1OO	WB4SKI	K5GA	K8LX
K1RX	K4XU	W6BH	N3ER/8
K1BW	K4PJ	N6KB	K8MFO
W2PV	K4VX	N6BT	W9RW

Top Ten CW

Single Operator		*Low Power*		*Multioperator*	
W2GD	180,264	AA7A	147,704	WA2ECA	141,766
W6HX	177,896	K5MR	141,932	KØWA	140,976
K3UA	177,450	K4XU	141,300	W4AQL	140,306
K1GQ	177,304	N4DW	137,850	WB8JBM	138,380
W7KW	177,098	NØNO	136,080	W9YH	132,192
N6TR	177,008	W2CS	135,926	K8ND	131,984
K6RR	176,712	VE4OY	135,648	N1MM	131,066
N4RR	175,346	KØDJ	135,216	W8XU	128,316
K3LR	174,324	WB5YEM	131,128	K6AYA	125,208
VE7CC	173,550	WØETT	129,352	N6TA	121,212

How was your first hour?

CW	*QSOs*	*Band*	*Phone*	*QSOs*	*Band*
W2GD	81	10/40	KP4RF	80	10/15
W6HX	73	15	W7KW	140	10
K3UA	91	40	W6HX	113	10/15
K1GQ	83	40	VE5DX	123	10/15
W7KW	76	10	KØRF	130	10/15
N6TR	81	15	KØCL	133	10
K6RR	74	10	K2TR	107	10/15
N4RR	60	20	K7RI	114	10/15
K3LR	73	15/20/40	KØZZ	117	15
VE7CC	75	10	W7ZQ	130	10

Used SS as a training exercise for some of my Field Day gang. Look out, FD! (N4WA). No sooner had the cw contest started than TVI troubles developed with the gentleman next door. I noticed that his outdoor antenna (TV) had a long feed line and the antenna and feed line were both very close to my 20-meter beam. I invited him to try my "rabbit ears" TV antenna, since they worked fine on my TV with no TVI. The neighbor's TV worked fine with no trace of TVI with the "rabbit ears." He asked me where he could buy such an antenna. I told him to keep mine. Cheapest TVI cure that I have found yet (WB4HNH). Can't believe that Iowa kept me from a clean sweep on phone to go with the one that I got on cw. North Dakota, VE8, or Wyoming, yes, but Iowa?? (WB4FOT). Many great phonetics in use in the phone SS (N6JCi). Received many points and lots of support from stations who weren't actively in the contest, especially around the 1900 to 2100 QSO mark, in the last three hours of the contest. Never would have broken 2000 Qs without all those guys on 10 and 15 meters who helped me out (W7KW/W6TPH). The SS truly does strange things to one's mind. For instance, I heard one poor sap calling "CQ FD, CQ FD . . ." (WBØVGN). Attempted a microprocessor-run duping system, but rf was leaking in and wouldn't leak out. So by 2200 UTC on Saturday, it was back to CD-77 (K2ZW1/WB2PJM). Cw SS is one of the only things worth missing Saturday Night Live for . . . (N5APQ/N5AAU). A beam, a beam, my kingdom for a beam (N2OM). How about proposing a 24-hour SS, kinda like Field Day, but with just *one* break permitted in the 30-hour period. The break would be anything from 0 hours to 6 hours, thus giving "float time" at the beginning, during and at the end for anyone who wants to do it (N6CJ). Got home at 2055 UTC and had to use the hair dryer to warm up the rig! (WD8OKL). The 45th SS was quite an event. Over the years I don't recall how many times I've sent in an SS log, but it sure has to be quite a number in all. Thinking back to when it was a two-weekend affair, I find myself wondering which format that I like best. Perhaps the present setup is best, but in past times you had a second chance to contact those few remaining sections that had not been worked. I'm not complaining though, because every SS included, I don't think I've called "CQ SS" over a dozen times in all (VE3ACB). How someone can work a contest and think at the same time I'll never understand (WD9HZK). Those new calls sure are fun! It KIRT (KIRT) should KILL (KILL) Ninety-Four Wild Women (N4WW) or Ninety-Five Wild Women (N5WW), a COP (ACØP) may KIIK (KIIK) him in jail, but if he KIST (KIST) them instead, then he may get a lot of ACID (ACID) stares or be told to fly his KITO (KITO)! (K8DD). Families do not understand SS — they still want to eat! (N9YL). Sweepstakes happiness is sending no. 71 20 minutes before the end of the contest . . . and getting back an even lower number! (WA2SEL). I operated the last two Sweepstakes as KL7IUN, running a kW. Quite a difference being just another 5, running 3 watts. I would propose a category for most points per watt. That would be my only chance to win anything. My total would be 4554.67. A kilowatt station would have to score over 4 million points to beat me (AB8N/5). Think that I was the oldest op participating in the SS from the Western New York Section. Age is 76. The old man had a ball (W2GA). Standard of operating throughout was excellent, but never have I heard so many amateurs in such a short time stumble so much with their keyers (VE3KK). Too bad making a clean sweep has to involve working third-world multipliers like South Carolina, Mississippi and North Dakota, not to mention Panama, whoops, Canal Zone (KT1N). Biggest thrill was keeping pace with many of the "Big Guns" through the first hours of the contest, despite my lowly power (180 watts) and lowly (25 feet) antennas. (N9BT). QSO number 15 was with KA9AOD who was sending cw about 15 wpm. When I heard him a little later on, he was doing about 35 wpm. Best improved fist (WD6DTN). I missed the propagation charts for SS like you had for last year's contest. But it didn't seem to matter much as condx were excellent here (WA8MAM). We've discovered that it is increasingly hard for a class "A" station, using dipole antennas to break a station that makes quick QSOs, running "B" power . . . maybe using different portions of the bands would help. Example: The first 50 (or so) kHz of each band would be reserved for class "A" stations and the rest for class "B," with "intermingling" as desired by the participants (WB5ZRN/WB5UXL). My check log looks like something from King Tut's tomb (K7MM). Working from a rare state (VT) is not such an advantage — every other guy wants QSL info. Very time-consuming. QSL to WB2JSJ (WB1GQR).

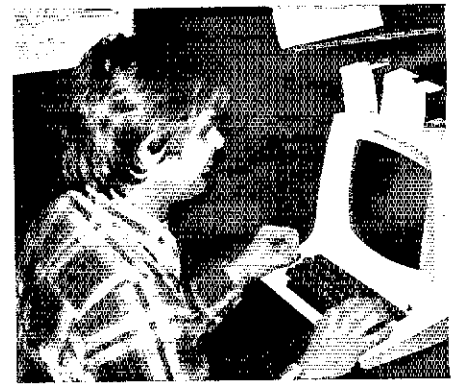
Feedback

The gremlins came out of the woodwork in last year's writeup. Cw — K9BGL with a score of 118,854 and K9BG with 116,948 points disappeared from the Illinois listings. N9TI was incorrectly noted as K9TI. N6NE was the low-power leader in the East Bay. WB1ALW/N's number three Novice score wasn't properly credited. WB5TGIL/N was overlooked as the number five Novice scorer and WDØBNL/N was listed as BML.

Phone — K1XX should have been credited with a score of 221,408. Great Lakes Division Leader W8KIC had WB8MZZ at the mic. K5HWO should have been credited with 118,500 points (number 2 in Oklahoma). N6NB was the Southwestern Division multiop leader. The W9CUS entry was a multiop effort by Explorer Post 373. W9OBF had 135,050 points for his low-power Central Division record score.

Clubs — The Gloucester County RC score was 666,908 (23rd) with WB2OSQ the club phone winner. The Central Michigan ARC phone certificate winner was W8VPC giving the club 536,988 points (30th). The Radio Club of Tacoma score was really 505,696 points (31st) and W7BUN claimed the club honors.

Apologies to all for the errors.



KØDG (KØDG at the logging terminal) no. 2 multiop Nebraska phone.

Jack (WB7VBC/N) picked up 12,642 points from Idaho on cw.

Scores are listed by call area, ARRL section, and in order from highest to lowest score, single-operator scores first and multiop second. The letter A or B at the end of each line indicates the power class of the entry. Example: K1VTM 259,950- 1733-75-24-B means 259,950 total points, 1733 QSOs, 75 sections, 24 hours of operation and power over 200 watts.

CW Scores

U.S.A.

1

Connecticut

K1PR 172,350-1149-75-24-B
K1ZZ 171,900-1146-75-24-B
K1RI 170,100-1134-75-24-B
W1XT 169,608-1146-74-24-B
K1KI 168,750-1122-75-24-B
K1TO 163,500-1090-75-24-B
W1ZM(K1ZM,opr) 156,750-1045-75-24-B
W1GNC 138,824- 938-74-24-B
K1VTM 134,680- 910-74-24-B
K1WB 132,150- 881-75-24-B
W1WEF 109,224- 738-74-23-A
W1ECH 107,748- 738-73-24-A
W1TCJ 90,480- 696-65-21-B
N1JC 90,374- 619-73-24-A
WA1CCR 87,696- 609-72-19-A
W1VV 79,476- 537-74-14-B
W1BIH 77,700- 518-75-13-B
K1RM 74,888- 506-74-11-B
WA1UUA 51,000- 375-68-11-A
K1JD 44,574- 323-69- 9-A
W1XK 40,524- 307-66-10-A
N1JA 38,400- 300-64-15-A
K1XA 31,070- 239-65- 5-B
W1RM 28,914- 237-61- 6-A
WB1DUI 27,376- 232-59-21-A
AA1K 26,048- 176-74-13-A
WB1GFK 24,274- 229-53-21-A
K1DW 23,598- 207-57-11-A
K1WA 23,200- 200-58- 7-A
K1IN 22,494- 163-69- 5-A
K1LOM 22,050- 175-63- 7-A
W1VH 21,712- 184-59-10-B
N1JW 16,200- 150-54- 6-A
K1NYK 14,080- 160-44- 9-A
WA1YEC 13,668- 134-51-11-A
WB1FNK 10,608- 104-51-11-A
WA1YCO 8008- 91-44- 9-A
K1AAF 7800- 100-39-14-A
WB1ARX 7280- 91-40- 8-A
KA1BKM 6916- 91-38-21-A
WB1HLU/N 5250- 75-35-24-A
N1CC 4402- 67-33- 2-A
K1OQG 3078- 57-27- 2-A
WB1EFW/N 1080- 27-20- 5-A
WA1RLV 690- 23-15- 3-A
WB1ESJ/N 216- 12- 9- 7-A
N1MM(+K1XM) 131,066- 923-71-24-B
W1XX(+W1s JKS OD) 119,720- 820-73-24-B
W1LJ(+W1s OD XX) 102,200- 700-73-24-B
WB1ALW(+WA1ZDW) 74,408- 524-71-23-A
KA1BDI(+KA1ASL,WB1EHO, WA4PSC) 56,448- 449-63-24-A
AD1O(+W1WP) 28,884- 249-58-16-A
WB1ADR(+KA1ARB,WB1HHZ) 2244- 51-22-11-B

Eastern Massachusetts

K1AR 171,000-1140-75-24-B
K1EA 158,250-1055-75-24-B
K1OME 157,768-1066-74-24-B
W1WAI 125,580- 897-70-24-B
K1VR 121,050- 807-75-20-B
N1HR 113,368- 766-74-23-A
W1LK 111,744- 776-72-23-B
K1IU 110,260- 745-74-19-B
K1MEM 81,792- 558-72-15-B
W1RND 71,994- 507-71-17-A
K1VUT 70,006- 493-71-24-A
K1CUD 59,276- 406-73-20-B
WB1ANT 57,888- 402-72-19-A
W1VL 54,940- 410-67-18-A
W1EM 49,420- 353-70-16-A
WA1WDE 43,092- 342-63-17-A
W1JR 42,280- 302-70- 7-B
W1AX 41,272 299-69- -B
WA1UZH 39,040- 320-61-24-B
W1ZR 38,352- 282-68-11-A
W1AQE 32,604- 247-66- -A
W1FJ 30,500- 250-61- 6-B
WA1UJU 22,736- 203-56-17-A
WB1DMZ 22,440- 204-55-15-A
KA1AIF 21,300- 213-50-20-A
WB1CNM 18,444- 174-53-19-A
WA1ZFD 17,056- 164-52-11-A
N1AU 16,830- 153-55-15-B
AB1J 11,556- 107-54-10-A
WA1WDZ 10,530- 117-45-14-A
W1PLJ 10,320- 120-43-11-B
AC1C 10,132- 149-34-11-A
WB1GCC 9030- 105-43-11-A
WA1USJ 8686- 101-43- 6-A
W1RH 7728- 92-42- 3-A
WA1KSF 7076- 122-29- 7-B
K1ECC 6160- 77-40- 5-B
WA1NMF 5402- 73-37-18-A
WA1CRT 4410- 63-35-12-A
N1CW 3840- 60-32- 6-A
WA2EHV/1 3712- 54-34- 5-A
W4HMV/1 3472- 56-31- 6-A
K1MC 644- 23-14- 3-A
N1AHS 144- 9- 8- 4-A
W1MX(AI6E,K1s MK SX,N1RC, WB9NFQ,oprs) 97,890- 753-65-22-B
K1BG(+K1s PAD PTE,N1RR, WB1DFV) 69,580- 490-71-24-A
AC1D(+WB1s FCO FGI) 36,580- 310-59-19-B
WA1LMJ(+WA1SOF) 26,400- 220-60-13-B
WB1GEX(+KA1AFF) 21,168- 196-54-22-A

Maine

N1SW 131,776- 928-71-24-B
K1OT 104,228- 734-71-19-B
W1KX 79,278- 543-73-18-A
K1OK 75,762- 569-69-19-A
W1QO 31,800- 212-75-10-B
K1SA 11,969- 136-44- 5-A
WB1DHF 10,028- 109-46-17-A

New Hampshire

K1GQ 177,304-1198-74-24-B
K1RX 136,200- 908-75-24-B
K1TA(N2FB,opr) 131,128- 886-74-24-B
K1FWE 110,476- 778-71-24-B
K1HI 98,832- 696-71-23-B
N1WR 95,192- 652-73-24-A
AC1Z 59,616- 432-69-22-A
W1RR 37,944- 306-62- 9-B
K1EQA 30,208- 236-64-15-A
K1LL 23,088- 222-52- 5-A
W1UN 22,644- 222-51- 6-B
AD1Y 17,172- 162-53-12-A
W1HMP 2604- 62-21- 9-A
AC1J 1000- 25-20- 2-A

Rhode Island

K1AO 130,608- 907-72-24-B
N1RI 105,228- 711-74-24-A
WA1TFF 29,204- 298-49- 8-B
N1DM 23,484- 206-57-10-A
K1DS 20,406- 179-57- 7-A
WB1DET 15,936- 249-64- -A

Vermont

W2RQ/1 152,352-1058-72-24-B
WB1GQR(WB2JSJ,opr) 102,760- 734-70-24-B
WA1GUV 29,402- 241-61-12-A
WB1BZR 21,836- 206-53-20-A

Western Massachusetts

K1BW 162,450-1083-75-24-B
W1ZT 123,078- 843-73-24-A
K1RQ 106,400- 760-70-18-B
W1YK(K1TK,opr) 105,412- 722-73-20-B
N1YY 92,158- 649-71-24-A
AC1I 84,140- 601-70-21-A
K1SSH 72,864- 506-72-15-B
W1GG 58,752- 408-72-13-A
W1PWK 34,544- 254-68-21-A
K1FIR 28,188- 243-58- 8-B
N1TZ 11,224- 122-46- 6-A
W1JP 8442- 101-42-11-A
KA1BDD 702- 27-13-14-A
N1SR 570- 19-15- 5-A

2

Eastern New York

W2PV(K1DG,opr) 161,250-1075-75-24-B
W2YY 139,860- 945-74-22-B
W2CS 135,926- 931-73-24-A
W2AZO 122,976- 854-72-24-B
K2TR 108,450- 723-75-21-B
K2UF 82,052- 562-73-24-A
K2GBH 69,580- 490-70-19-A
WB2CFP 55,900- 430-65-20-B
WA2OTC 55,476- 414-67-18-A
WB2WQA 44,220- 335-66-18-A
W2OW 39,606- 287-69- 9-B
K2ZM 39,600- 300-66-10-B
K2XA 37,712- 281-69- 9-B
WB2JZZ 35,200- 275-64-15-A
WB2GJQ 27,028- 233-58-23-A
WA2STM 26,314- 223-59-22-A
AA2Y 20,904- 201-52-11-A
W2NRD 20,286- 161-63-20-A
WB2SNT 18,630- 135-69-14-A
KA2AKS 7380- 90-41-18-B
WB2MJQ 7224- 84-43- 8-A
K2OY 7052- 86-41-10-A
W2PKY 5544- 84-33- 2-A
W2UU 5520- 69-40- 8-A
WA2VAX/N 4270- 61-35-19-A
WA2RQH 3216- 67-24- 5-A
KA2BSC/N 3190- 55-29-13-A
WA2BXT 2940- 49-30-10-A
WB2LUB 2640- 66-20- 2-A
W2FSL 1800- 50-18- 7-A
WA2AXH 1656- 36-23-13-A
WA2LRU 728- 26-14- 5-A
WA2EAF(+WB2EYB) 19,504- 184-53-10-A
WA2QWF(+K2QE) 17,442- 171-51-21-A

New York City - L.I.

N2NT 166,944-1128-74-24-B
K2AU 143,372- 982-73-24-B
K2PE 134,976- 912-74-24-B
W2AEE(WA2ZKY,opr) 134,758- 923-73-24-B
N2GC 100,594- 689-73-23-A
K2SX 94,720- 640-74-15-B
N2UN 87,552- 608-72-23-B
WB2EZG 54,016- 422-64-14-B
WA2CIQ 47,600- 340-70-16-A
WB2RNT 42,600- 355-60-19-A
N2WX 34,348- 277-73-17-A
WB2UBK 25,916- 209-62-15-A
WB2HIQ 23,896- 206-58-10-B
K2CMV 17,100- 150-57-16-A
K2QD 11,266- 131-43-10-A
AB2K 13,160- 140-47- 5-A
WA2ATL(K1TA,opr) 10,860- 155-35- 3-A
W2DUS 5520- 92-30- 5-A
W2III 4958- 67-37- 8-A
WA2ISH 3776- 59-32- 5-A
W2NBI 3120- 52-30- 8-A
W2CZZ 3100- 50-31- 4-A
W2HD 2700- 50-27- 7-A
WA2YUS 2200- 50-22- 3-A
KA2CIW 360- 17-10- 9-A
WA2QAO 96- 8- 6- 1-B

Northern New Jersey

W2GD 180,264-1218-74-24-B
AF2A 137,824- 944-73-24-B
N7EI/2 127,576- 862-74-24-B
WA2SZQ 127,440- 885-72-24-B
W2SHM 104,580- 747-70-23-B
K2DM 98,696- 676-73-24-A
WA2OVE 95,480- 682-70-18-B
WB2POG 60,168- 436-69-17-A
K2IT 57,156- 433-66-13-A
WB2FGZ 53,600- 400-67-22-A
W2SQ 46,080- 360-64- 7-A
WB2TSY 43,746- 317-70-16-A
WB2FUE 40,180- 287-70-18-B
W2HCA 36,120- 258-70-20-A
W1GD/2 31,350- 275-57-17-B
W2VQ 21,400- 214-50- 7-A
K2YGM 20,384- 196-52- 4-B
WA2WSD 16,320- 160-51-15-A
WB2IDP 13,912- 148-47- 3-A
K2VX 12,012- 143-42- 8-A
K2BJA 10,200- 100-51- 6-A
W2HR 10,044- 162-31-11-A
W2II 9438- 143-32- 6-A
WA2PQU 7728- 92-42-10-A
WB2GZC 7052- 86-41- 3-A
WB2KHQ 2646- 63-21- 4-A
WB2TOM 1680- 42-20- -A
K4LDR/2 1386- 33-21- 3-A
AD2K 1020- 30-17-10-A
WB3JON/2 416- 16-13- 7-A
K2GQ(Multiop) 59,640- 426-70-22-B
K2OP(+WA2DKJ,WB2DMH) 54,936- 436-63-24-A

Southern New Jersey

K2YY 145,336- 982-74-24-B
N2CQ 133,950- 894-75-24-B
W2KI 126,290- 865-73-24-B
N2MM 124,360- 829-75-23-B
WA2VYA 116,328- 786-74-23-B
AA2Z 104,938- 739-71-19-B
AB2E 104,328- 718-73-20-B
W2LYL 101,324- 694-73-17-B
W2PAU 79,520- 560-71-21-B
N2OM 75,924- 513-74-21-A
WB2BYU 73,146- 501-73-24-A
WB2VFT 66,284- 454-73-20-A
W2KP 64,860- 470-69-18-A
WA2MNO 62,376- 452-69-23-A
N2HI 60,520- 445-68- -B
WA2OOS 51,084- 387-66-19-A
WA2KOK 39,468- 299-66-21-B
N2UU 39,060- 315-62-13-A
K2HPV 39,000- 300-65-18-A
AB2W 32,010- 291-55-12-B
WB2OOG 29,500- 250-59-11-A
WB2BWL 25,552- 220-58-14-B
N2CC 24,400- 200-61- 8-A
KA2BOP 22,624- 202-56-17-A
W2FGY 19,588- 166-59-22-B
WB2UVB 16,340- 190-43-20-A
W2GND 16,280- 110-74-14-A
W2CN 14,976- 144-52-13-B
WB2SUT 14,490- 161-45-22-B
N2ALA 13,552- 154-44-14-A
K2TD 12,900- 129-50- 4-B
K2AA(WB2VNU,opr) 12,136- 148-41-10-A
K2JF 11,680- 146-40-10-A
W2REB 9594- 123-39- 7-A
WA2YSA 9324- 111-42- 6-B
WB2QHK 8316- 99-42- 6-B
W2EA 7210- 103-35- 5-A
KB2CW 5346- 81-33- 8-A
KA2BEW/N 4480- 56-40-18-A
K2OSV 3700- 74-25- 5-A
WD2AHO 3520- 55-32- 6-A
WA2DUE 3008- 47-32- 7-A
WB2LCH 2958- 51-29- 7-A
W2OGZ 2300- 50-23- 5-A
WB2VLD 2024- 46-22-10-B
WA2WJL 1408- 32-22- 6-A
WA2ONW 1276- 29-22- 6-A
WA2CUW 910- 35-13- 3-A
WB2HGI 800- 20-20- 5-A
WB2SJA 476- 17-14- 7-A
WA2FZB 70- 7- 5- 2-A
WB2YGE 18- 3- 3- 3-A
KA2CQX/N 6- 3- 1- 1-A
WA2MGV 6- 3- 1- 1-A
WA7UJW/2 4- 2- 1- 1-A
K2KA(+N2IA) 65,554- 449-73-19-B
KA2BPV(+K2NH) 2024- 44-23-15-A

Western New York

N2MF(K2ZJ,opr) 158,410-1085-73-24-B
W2TZ 148,320-1030-72-23-B
W2RR(WA2AOG,opr) 146,438-1003-73-24-B
K2IGW(WA2LCC,opr) 140,296- 988-71-24-B
K2ZL 123,540- 870-71-24-A
WB2ABD 106,726- 731-73-24-A
K2EU 106,412- 719-74-23-B
K2UNR 80,514- 567-71-18-B
W2FLY 77,818- 533-73-23-A
W2JJ 73,982- 521-71- 6-B
N2DS 63,044- 444-71-20-A
N2DE 60,776- 428-71-24-A
WA2EYA 56,028- 406-69-22-B
WA2SON 54,270- 405-67- 9-B
K2OVI(WA2FGE,opr) 51,120- 355-72-24-B
WA2AIV 35,376- 268-66-13-A
W2EZ 34,720- 280-62-20-A
N2EY 30,920- 272-55-11-A
N2NW 26,432- 224-59- 3-A
K2VF 24,416- 218-56-14-A
K2XU 15,872- 128-62- 9-A
WB2LWM 15,808- 152-52-12-A
K2RN 15,496- 149-52-15-A
W2TOP 12,903- 150-43- 7-B
WB2TUM 11,958- 127-47-11-A
N2GU 11,322- 111-51- 7-A
W2GA 10,800- 100-54-10-A
K2VV 10,716- 114-47- 2-B
W2FXA 10,658- 73-73- -A
KA2BGX/N 6840- 90-38-16-A
K2UV 4212- 54-39- 6-A
K2UAN 4080- 85-24- 6-A
WA2LEZ 3534- 57-31- 8-A
WB2QAX 3400- 50-34- 3-A
K2GWN 3360- 70-24- 4-A
W2AV 3100- 50-31- 3-A
WA2IMG 2952- 82-36- 8-A
N2DM 2478- 59-21- 5-A
WA2SSJ 1404- 27-26- 5-A
N2ALB 180- 10- 9- 6-A
WA2QXA 50- 5- 5- 1-B
W2NES 8- 2- 2- 1-A
WA2ECA(+N2CU) 141,766- 971-73-24-B
W2HG(+WA2HGS) 77,380- 530-73-22-B
W2OW(AA2M,K2OC,N2HP, SM0CCM,WA2s BSN IKO ZJP,WB2s DDE PGU,oprs) 55,752- 404-69-24-A
K2ZR(+AA2B,K2NS,N2GR, WA2OJX,WB2s OJX OKB OXG WOX) 54,210- 417-65-21-A
WA2ORS(+WA2s GJU JAL) 53,802- 441-61-24-A
K2ZW(WB1s FIG FSS,WB2s DYJ KIM ULC,oprs) 23,256- 204-57-24-A

3

Delaware

K2HVN/3 49,700- 355-70-20-B
K3HBP 46,860- 355-66-13-A
W3NX 42,048- 292-72-12-A
N3AHA 21,774- 191-57-13-A
N3AKC 18,900- 189-50-15-A

Eastern Pennsylvania

N3AD 152,400-1016-75-24-B
W3GM 114,394- 807-71-22-B
K3VA 112,896- 784-72-19-A
K3OA 108,000- 750-72-24-A
AA3R 95,900- 685-70-20-B
W3GRW 90,580- 647-70-20-B
WB3JGP 90,440- 646-70-24-A
W3RJ 85,974- 623-69-12-B
W3MA 83,766- 607-69-17-B
W3BI 79,094- 557-71-18-B
WB3JUK 78,440- 530-74-21-B
K3VW 76,800- 600-64-13-B
W3ARK 75,920- 520-73-17-A
K3NB 71,824- 536-67-15-B
W3ZGD(WB3EWA,opr) 67,450- 475-71-24-B
WA3BNT 66,722- 457-73-16-B
W3CNS 66,500- 475-70-17-A
W3FAF 58,078- 409-71-11-A
K3UK 51,800- 370-70-18-A
W3EFY 42,746- 319-67-19-A
W3BGN 36,300- 330-55-10-A
K3WGR 33,500- 250-67-18-A
K3ALL 28,892- 233-62-17-A
AD3Y 28,258- 199-71-14-A
WB3CAI 26,078- 221-59-18-A
WB3GZV 24,738- 217-57-17-A
N3KR 24,360- 203-60- 9-A
K3RL 19,712- 176-56- 4-A
W3TB 19,656- 189-52- 9-A
K3TW 19,176- 204-47- 4-B
WA3MVP 18,480- 168-55- 7-B
W3IVW 12,560- 157-40- 9-B
KB3BW 12,220- 130-47-16-A
WB3FNZ 10,304- 112-46- 6-A
W3EVW 9200- 100-46- 6-B
W3ADE 8840- 130-34- 4-B
N3HW 7332- 94-39-11-A
WB3AKI 6786- 87-39-13-A
WB3DIV 4800- 80-30- 6-A
W3CEI 3780- 70-27-11-A
W3DZH 3600- 50-36- 5-A
WA3VIL 3240- 54-30-11-A
K3ND 1152- 32-18- 2-B
KN3TFM 756- 27-14- 5-A
KA3AHX 600- 20-15- 5-A
WB3FAA 384- 16-12- 2-A
K3UC(+AD3F,K3s SY VDU, WA3VQK,WB3EVL) 78,256- 536-73-24-A
K3KW(+WB2AFM) 19,200- 200-48- 9-A
WB3KHE(+WA2PHA,WB3KHF) 5760- 120-48-20-A

Maryland - D.C.

W3LPL 172,716-1167-74-24-B
N3CW 152,884-1033-74-24-B
K3RA 148,200- 988-75-24-B
K3NA 144,978- 993-73-24-B
WA3DSD 140,722- 991-71-24-B
K3KU 140,296- 988-71-24-B
K3IM 125,652- 849-74-24-A
W3GG(WA3ZAS,opr) 119,280- 840-71-24-B
N3AM 118,260- 810-73-24-B
K3ZZ 117,360- 815-72-24-B
W3XY 116,070- 795-73-24-A
N3GH 111,444- 753-74-24-B
K3IA 106,272 738-72-19-B
N3TR 103,806- 711-73-24-B
W3MR 99,968- 704-71-21-B
WA3RSK 96,230- 659-71-23-A
K3ID 92,868- 654-71-20-B
N3SL 92,564- 634-73-20-A
K2PLF/3 91,880- 640-71-24-A
K3NS 86,256- 599-72-19-A
K3PI 86,196- 653-66-24-A
W3AZ 81,464- 599-68-21-B
W3FA 81,060- 579-70-19-B
N3OS 78,936- 572-69-20-A
W3GRF 78,192- 543-72-15-B
W3UJ 76,752- 533-72-22-B
K3AO 63,784- 476-67-11-B
N3II 60,918- 429-71-15-A
WA3RWP 49,572- 458-54-19-A
WA3EOQ 48,640- 380-64-17-B
W3GN 47,286- 333-71-15-A
K3CU 46,990- 355-69-13-A
K3APM 45,312- 354-64-20-B
W0VJD/3 37,346- 263-71-19-A
K3SA 35,518- 301-59- 6-B
W3HVM 34,580- 242-70-11-B
N3IC 26,660- 215-62- 7-A
WA3WTQ 26,564- 229-58-21-A
WA3UPH 25,616- 217-59- 7-A
AB3B 24,156- 198-61-11-A
W3PYZ 24,064- 188-64-10-A
W3IGJ 23,246- 197-59-12-B
W3EF 21,424- 206-52-18-A
K3ON 19,560- 163-60-10-A
W3ABC 17,584- 157-56- 6-A
W3IUU 16,320- 170-48- 8-A
N3RL 5394- 87-31- 3-B
K2SCU/3 5236- 77-34- 4-B
W3FGE 1768- 38-23-10-A
W3TUX 1088- 32-17- 4-A
W3IDT 1064- 28-19- 2-A
N3JA 384- 16-12- 6-A
K3WS 54- 9- 3- 4-A
W3GNQ 30- 5- 3- 1-B
W3RIL 2- 1- 1- 1-B
K3RS(+W3ZZ) 118,260- 810-73-22-B

Western Pennsylvania

K3UA 177,450-1183-75-24-B
K3LR 174,324-1194-73-24-B
W3AS 131,250- 875-75-24-B
K3KO 103,368- 708-73-19-A
WB3AXN 102,564- 693-74-23-B
K3VK 96,068- 658-73-29-A
K3WT 90,304- 664-68-23-A
W3IW 86,904- 612-71-19-B
WA3FYJ 82,800- 600-69-19-B
K3FR 78,900- 526-75-23-A
W3HDH 73,440- 510-72-16-B
K3VX 68,328- 468-73-18-A
N3EE 55,552- 448-62-12-B
WB3HSV 28,416- 222-64-20-A
K3OY 18,370- 167-55-13-A
WA3UNX 16,740- 155-54-10-B
WB3FKC 14,868- 118-63-13-A
W3NGO 13,640- 155-44-11-A
W3GQ 11,500- 115-50-12-A
WN3CWW 9180- 102-45- 5-A
WB3JXH/N 4536- 81-28-10-A
WB3CMZ 4352- 64-34-10-A
WA3GSB 3594- 105-36- 6-A
KA3BQE 2232- 62-18-15-A
KA3AVD/N 1320- 44-15-17-A
WB3FMS 144- 9- 8- 2-A
WB3DKT(+WB3HSV) 41,080- 316-65-13-A

4

Alabama

N4FD 120,916- 817-74-19-B
N4KG(WN4KKN,opr) 49,096- 361-68- 7-B
K4RJ 46,138- 316-73-18-A
K4ZGB 45,360- 360-63-19-A
K4GSK 10,952- 74-74-15-A
WD4PZN 950- 25-19-13-A
W4CUE(N4QB,WA4s DGI JCI JWZ QIN,WB4s KSC PXL THY VHH VSH,WD4s FZA OKY,oprs) 58,320- 405-72-23-A
WB4KSL(+WB4SFV) 36,580- 295-62-17-A

Georgia

K4BAI 147,750- 985-75-24-B
W4RTZ 120,916- 817-74-24-B
N4TZ 89,392- 604-74-22-A
K4BAM 81,600- 544-75-24-A
AA4GA 74,160- 515-72-21-A
AA4U 68,182- 467-73-15-A
WA4IBI 60,444- 414-73-21-A
KB4HZ 40,946- 347-59-18-A
W4BFR 22,356- 162-69-14-B
W4GXW 2214- 41-27- 4-A
K4DHB/4 570- 19-15- 8-A
W4AQL(WA2MBP,WB3DRE,N4HR, WA4s ABV QCH ZBO,oprs) 140,306- 961-73-24-B

Kentucky

N4XM 119,140- 805-74-24-B
K4KWT 100,048- 676-74-22-A
WB4PRU 88,350- 589-75-23-B
WB4AIN 84,656- 572-74-18-B
WB4FOT 76,200- 508-75-17-A
WA4UIH 74,124- 522-71-21-B
K4FU 65,712- 444-74-18-A
WA4GHO 45,672- 346-66-16-A
WB4ZRQ 36,864- 288-64-15-A
K4HRF 30,360- 230-66-11-A
WB4HNH 29,484- 234-63-14-B
WB4UQI 28,290- 205-69-22-A
W4RHZ 27,840- 240-58-14-A
K4EMX 23,718- 201-59-15-A
K4AVX 11,004- 131-42- 3-A
WD4LWH 10,880- 136-40-18-A
KD4U 7380- 90-41- 8-A
N4AGT(+AC4G,K4VCS,WA4RDS, WB4PVC,WD4HCS) 73,698- 519-71-24-A
N4TY(+WD4SKG) 42,768- 324-66-13-A

North Carolina

N4AA 146,520- 990-74-23-B
K4MPE 143,850- 960-75-24-B
AB4V 69,438- 489-71-20-B
K4JEX 63,616- 448-71-16-A
WA4LWD 60,000- 400-75-22-A
WA4FFW 55,176- 418-66-10-B
WB4BGL 32,760- 252-65- 9-A
N4RE 26,668- 226-59- 8-A
W4OMW 24,522- 201-61-14-B
KE4I 23,100- 154-75-11-B
W1FTX/4 13,452- 114-59- 8-A
WD4OCO 11,200- 112-50-10-A
N4QY 9680- 110-44- 8-B
N6DR/4 9492- 113-42- 5-B
WD4SKH/T 6636- 79-42-21-A
WA4YCB 2900- 50-29- 6-A

Northern Florida

N4SA 150,380-1030-73-22-B
N4UF 129,502- 887-73-24-B
WB4SKI 128,170- 854-75-24-B
WD4ITK 81,648- 567-72-20-A
AA4NA 37,926- 301-63- 8-A
WB4ZAY 30,228- 229-66-16-A
WD4IIO 25,216- 197-64-11-A
WA4NUO 23,320- 212-55-12-A
W4VQ 13,536- 141-48- 3-B
WA4DOL 12,320- 140-44-17-B
KA4ESB/N 4158- 63-33-15-A
WB4OTS 3604- 53-34- 2-A
WA9WZV/4 1472- 32-23- 7-A
N4WA(+WA4FAU,WB4ANA, WN4IIV) 94,608- 648-73-19-B
WA4OEM(+AA4ES) 16,500- 165-60- 8-A

South Carolina

W4MPY 55,950- 373-75-22-A
WD4AWN 49,348- 338-73-16-A
W4NZR 46,230- 345-67-20-A
N4ZG 36,920- 284-65-24-A
AE4Y 30,360- 253-60-12-A
N4ST 24,056- 194-62- -A
WB4AFP 20,648- 178-58- 7-A
WA4TNI 4788- 63-38- 7-A
N4EE 3024- 54-28- 4-B

Southern Florida

N4RR 175,346-1201-73-24-B
N4BP(N8RC,opr) 145,336- 982-74-20-B
W4LOO 82,732- 559-74-24-B
K4XB 59,540- 458-65-20-B
WB4FSZ 50,784- 368-69-23-A
N8GG/4 40,528- 298-68-14-A
N4TW 36,432- 264-69-10-A
N4XR 33,300- 150-74-15-A
WD4KPG 31,878- 253-63-15-A
WD4AHZ 27,816- 244-57-19-A
N4WW 27,552- 246-56- -B
N4NJ 21,216- 204-52- 5-A
WA4RRB 9522- 69-69-11-A
N4AJD 242- 11-11- 2-B
N8RC/M4(N4BP,opr) 220- 11-10- 1-A
KB4FW(+N4BBQ,WA4UOB) 18,792- 174-54-14-A

Tennessee

K4PUZ 158,064-1068-74-24-B
K4XU 141,300- 942-75-24-A
WB4FEC 128,016- 889-72-24-B
N4SX 124,320- 888-70-24-B
N4TN 122,100- 815-75-24-A
N4RG 114,600- 764-75-17-B
K4OAQ 108,624- 744-73-24-A
K4PJ 105,900- 706-75-12-B
K3CQ/4 91,884- 629-73-23-B
WD4EXO 49,842- 351-71-23-A
AB4H 45,500- 350-65-10-B
WA4EVB 41,272- 308-67-16-A
W4OGG 29,890- 245-61-10-A
K4HPP 7800- 100-39- 2-A
WB4WHE 988- 26-19- 4-A
WD4PEQ/N 120- 10- 6- 8-A
N4AJJ(+KB4CG,WA4YSJ) 97,664- 202-66-24-B
WD4EOL(KA4s CVG DYD ECE, N4ALX,WB4CME,WD4s DGU GUL GUM EWA IBN NEF ZVV,oprs) 5640- 81-45-24-A

Virginia

K4VX(WB4SGV,opr) 168,900-1126-75-24-B
K4FJ 142,000-1000-71-24-B
N4DW 137,850- 919-75-24-A
K4PQL(K4YEP,opr) 119,088- 827-72-22-B
W4DM 117,450- 783-75-21-B
N4UU 111,150- 743-75-24-B
W4HBK 108,484- 733-74-24-A
N4RV 107,400- 716-75-20-B
K4AF(K1ER,opr) 106,260- 770-69-18-B
W4YE 97,776- 679-72-18-A
K4JM 88,476- 606-73-15-A
N4YE 85,272- 627-68-23-A
K4RZ 68,072- 508-67-21-B
K4YE(K3NPV,opr) 67,864- 499-68-12-B
WB4DBK 65,240- 473-70-16-A
W4KFC 57,132 414-69- 8-B
WB4JAY/4 54,528- 384-71-24-A
K4KDN 52,272- 363-72-20-A
N4LF 51,208- 346-74-16-A
N4YJ 50,094- 363-69-17-A
W4MYA 45,648- 317-72-10-A
W4NH 41,004 406-67-12-B

W4ZM	40,716- 351-58- 8-B
WD4ECK	36,934- 313-59-15-B
K4EBY	36,300- 330-55-13-B
W3YY/4	35,746- 293-61- 9-B
W4KP	34,404- 564-61-20-B
W4ZEI	33,768- 268-63-15-A
W4EZ	30,996- 246-63- 8-B
K4ZA	27,156- 186-73-14-B
WA1LJP/4	25,970- 249-53-23-A
K4GEL	25,856- 202-64-11-A
W4GF	25,296- 204-62- 6-B
W4XD	24,522- 201-61- 8-A
K4SAD	21,518- 203-53-12-A
N4APK	20,008- 164-61-10-A
K4UK	19,836- 174-57- 9-A
N4RA	16,912- 151-56- 4-A
N4ZR	16,598- 193-43- 5-B
W4UQ	15,620- 142-55- 4-B
WA4WYN	12,500- 125-50- 4-B
KA4DSL	11,220- 110-51-11-A
WD4JHY/N	11,136- 116-48-16-A
WB7OXF/4	10,528- 112-47-15-A
N4AHI	7176- 92-39-20-A
K4FNE	6560- 82-40-11-A
WD4JBJ	6438- 87-37-10-A
W4EI	5208- 84-31- 2-B
W4KMS	2520- 42-30- 7-A
W4ZRI	1672- 38-22-12-A
N4MM	98- 7- 7- 1-A
WA4YTN(+WA4KWU)	89,880- 642-70-22-B
WA4FKK(+W3DJI)	69,296- 488-71-24-A

West Indies

KG4KG	96,276- 678-71-24-B

5

Arkansas

K5GO	171,600-1144-75-24-B
AE5L	136,200- 908-75-22-B
WB5YEM	131,128- 886-74-24-A
WB5WOQ	36,736- 287-64-19-B
WD5DJW	10,670- 127-42-14-A
WD5HSX	8692- 106-41-12-A
W5EIJ	2352- 49-24- 3-B
WB5VIO	2268- 42-27-12-A

Louisiana

K5OA(K5KU,opr)	147,760- 995-74-24-B
K5TS	88,272- 613-72-15-B
W5WG	58,400- 400-73-23-A
W5MH	20,020- 154-65- 6-A
WD5EAE	5940- 95-33-18-A

Mississippi

W5VSZ	137,414- 967-71-24-B
K3ZMI/5	71,550- 485-75-24-A
N5GW	37,572- 303-62-12-A
AE5H	12,500- 125-50- 9-A
WD5GDA	10,578- 129-41-10-A
W5TV(+WD5KDA)	27,938- 229-61-16-A

New Mexico

WA5YTX	124,954- 849-73-20-B
AA5B	92,300- 650-71-20-A
W5YZ	90,450- 603-75-18-A
WD5JYU	35,490- 273-65-23-A
W5VBO	29,412- 258-57-22-A
K8TE/5	198- 11- 9- 1-A

Northern Texas

N5JB	158,360-1070-74-24-B
W5MYA	148,336-1016-73-20-B
K5RHZ	142,524- 963-74-24-B
K5MR	141,932- 859-74-24-A
N5CR	136,800- 950-72-24-B
K5NW	131,760- 915-72-24-B
N5TP	115,050- 767-75-22-B
K5KJ	104,636- 707-74-21-A
WB5RPU	75,744- 526-72-22-A
AE5K	56,050- 475-59-17-B
K5ME	55,648- 376-74-21-A
N5XU	54,604- 374-73-23-A
N5AU	50,310- 387-65- 7-B
K5SOR	44,588- 314-71-16-A
K5BOX	39,440- 290-68-16-A
N5BT	38,940- 295-66-17-A
K5JA	35,912- 271-67- -B
K5MC	28,792- 236-61-11-A
N5EX	20,680- 188-55-18-A
WD5CHD	20,564- 194-53-16-A
W5GN	12,728- 86-74- 7-A
K5HM	8528- 104-41- 4-B
KB5AH	7396- 86-43-21-A
N5ASU	5226- 67-39-14-A
N5UO	1824- 38-24- 2-A
WD9EBF/5	1080- 30-18-11-A
WD5HJQ	832- 26-16-19-A
WD5BCI	416- 16-13- 5-A
WB5KTD(+N5HD,WB5s PKH VZL, WD5BIK)	57,540- 411-70-24-A
WB5TGK(+K5GO,WD5ACA)	42,036- 339-62-18-A
K5JEF(WA7VMC,WB9VBZ, WB0OLA,oprs)	12,784- 136-47-12-A
AD5F(+WD5GPK,WN5EAT)	10,300- 103-50-18-A

Oklahoma

N5CG	86,620- 610-71-23-A
WB5WFB	80,080- 572-70-21-A
W5KI	67,744- 464-73-22-A
AE5Y	43,692- 331-66-20-B
K0JPX/5	21,230- 193-55-10-A
WB5OSM	3000- 50-30-11-A

Southern Texas

K5GA	171,300-1142-75-24-B
K5TM	171,000-1140-75-24-B
K5ZD	170,550-1137-75-24-B
W5AC(K5GN,opr)	158,100-1054-75-24-B
N5DU	146,816- 992-74-24-B
K5WA	133,644- 903-74-22-B
K5LZO	131,128- 930-74-21-B
K5HXR(KA5CHW,opr)	123,000- 821-75-24-B
K5GB	76,960- 520-74-20-A
AD5Q	74,620- 533-70-19-A
K5EI	65,888- 464-71-19-B
K5JS	57,168- 397-72-12-B
K5MA	53,620- 383-70- 7-B
W5WQN	53,568- 372-72-24-B
W5RRR(W5LSZ,opr)	43,310- 305-71-18-B
WA5GZX	37,180- 286-65-19-A
N5WW	35,088- 344-51- 7-B
W5NR	25,870- 199-65-11-B
K5NA	25,032- 149-56- 3-B
WD5BCK	16,302- 143-57-18-A
K5RC	15,604- 166-47- 3-B
WB5FMY	14,740- 134-55-13-A

AB8N/5	13,664- 122-56-18-A
K5BZU	10,710- 119-45- 9-B
WB5GMB	10,290- 105-49-10-A
AC5K	10,030- 170-59- 8-A
K5IU	8170- 95-43- 2-A
WD5JJS	2240- 40-28-13-A
WD5JML	1656- 36-23- 7-A
N5AOV	1036- 37-28-13-A
N5RF	810- 27-15- 5-A
K5KG(+AD5Y)	83,070- 585-71-21-B
N5AAU(+N5APU)	47,180- 337-70-17-B

Canal Zone

KZ5FR	138,262- 947-73-24-B
KZ5JM(K1MM,opr)	115,950- 773-75- -B

6

East Bay

N6RO	166,056-1122-74-24-B
N6TV	159,300-1062-75-24-B
W6BH(WA6VEF,opr)	151,050-1007-75-24-B
N6IG	150,088-1028-73-24-B
K6XV	148,148-1001-74-24-B
K6XO	139,500- 930-75-24-B
N6OP	136,948- 938-73-24-B
K6HIH	136,368- 947-72-24-B
N6KB	121,800- 817-75-24-B
N6VV	106,800- 712-75-24-B
K6PJY	105,080- 740-71-23-A
WA6DIL	103,944- 732-71-17-B
N6NF	99,900- 666-75-23-A
W6BB(N6KL,opr)	43,520- 340-64-17-A
K6ATV	39,128- 292-67-12-A
AG6P	35,466- 257-69-22-A
N6DN	34,840- 260-67-20-A
K6CSL	31,500- 250-63-23-A
WB6ZEP	28,416- 222-64-14-A
WB6DHH	8190- 91-45- 7-A
WB6IZQ	1530- 51-25- 4-A
K6ZM(+WA6DGX)	102,240- 710-72-24-B
AI6V(+K6OYE)	88,324- 622-71-24-B
WD6EIZ(+WD6FGA)	198- 11- 9- 4-A

Los Angeles

W6HX(N6NT,opr)	177,896-1202-74-24-B
W6AM(N6TJ,opr)	151,500-1010-75-20-B
K6SE	140,700- 939-75-24-B
K6MP	130,092- 879-74-20-B
N6PN	110,852- 749-74-23-A
N6GL	58,380- 417-70-23-A
WD6EHL	44,380- 317-70-24-A
N6SU	42,612- 318-67-16-B
K6ASK	34,710- 267-65-22-A
N6HC	33,960- 283-60-10-A
W7CB/6	32,708- 221-74-13-B
W6OEO	32,364- 261-62-10-B
WB6WQA	27,248- 262-52-16-B
N6IC	18,600- 124-60- 3-A
N6QH	13,570- 115-59- 7-A
WD6DTN	9152- 104-44-19-A
AB6J	3584- 56-32-13-A
WA6FAA	3564- 54-33- 8-A
N6AA	3300- 50-33- 1-A
WU5JJV/6	2100- 84-25-13-A
N6HE(+WB6KWU)	93,832- 634-74-24-B
N6MI(+AA6W)	86,724- 594-73-24-B
WA6FSF(+WA6PZI,WB6s CJA JJE)	82,344- 564-73-24-A
W6YRA(WB6ICK,WD6BAY,oprs)	13,590- 151-45- 9-B
W6LS(AI6M,W6JDB,oprs)	12,144- 138-44- 6-A

Orange

K6RR(N6CJ,opr)	176,712-1194-74-24-B
K6WI	109,938- 753-73-20-A
WB6GCF	17,500- 175-50-18-A
N6NJ	16,300- 163-50- 7-B
WD6CUT	14,112- 144-49-20-A
N6HK	5920- 74-40- 5-B
WD6FLV	5320- 70-38-20-A
W6LEN	4216- 52-34- 6-A
WB6AJV	2838- 43-35- 4-A
WA6RND	1598- 47-17- 4-A

Santa Barbara

N6TR	177,008-1196-74-24-B
W6KPJ	87,308- 598-73-24-A
N6MA	86,140- 590-73-13-B
W6OUL	22,100- 170-65-10-B
W6TKF	18,354- 161-57- 9-A
W6MUL	10,000- 100-50- 7-A
WB6ONN	9718- 113-43-16-A
WD6CYW	5688- 79-36- 7-A
WB6JKM	260- 13-10- 4-A

Santa Clara Valley

N6BT	167,700-1118-75-24-B
W6JZU(W1ARR,opr)	157,950-1053-75-24-B
N6TU	155,400-1036-75-24-B
N6SF(WB6USV,opr)	146,304-1016-72-24-B
N6MG	140,156- 947-74-24-B
N6CN	133,800- 894-75-24-B
N6XI	126,000- 840-75-24-A
W6YL(WA6HCI,opr)	122,932- 842-73-24-B
K6RU	119,880- 810-74-24-B
N6NF	107,712- 748-72-24-B
WB6RIU(K6RM,opr)	100,940- 721-70-24-B
K6BR	95,192- 652-73-18-B
W6IO	92,856- 636-73-22-A
W6XX	88,182- 621-71-19-B
AA6UO	85,988- 581-74-23-A
K6KLY(WA6HJV,opr)	78,256- 584-67-23-B
K6OQ	66,560- 516-65-13-B
W6XB	63,000- 450-70-15-B
K6DC	57,600- 400-72- 8-B
W0AW/6	54,372- 396-69-23-A
AJ6V	49,542- 359-69-19-A
AA6GM	47,488- 371-64-14-B
N6QW	47,436- 354-67-16-A
W6NWS	42,210- 315-67-18-A
W6SUJ	33,280- 256-65-12-B
W6LH	31,496- 254-62- -19
WA6ITV	26,078- 221-59-19-A
W6SZN	24,864- 222-36- 9-A
N6ZB	22,204- 182-61- 8-A
W6NLI	19,890- 153-65-14-A
W6KZJ	14,840- 140-53- 7-B
K6LWT	13,680- 120-57- 9-A
K6MO	13,500- 135-50- 7-A
N6IQ	11,328- 118-48- 3-B

W6OPO	10,560- 110-48-17-A
WA6BZT	8712- 99-44-10-A
AA6PZ	3000- 50-30- 3-B
WB6DFX	2304- 36-32- 5-A
WD6GYJ	1080- 27-20- 6-A
WA6HAD	144- 9- 8- 2-A
N6TA(+N6s KT VQ)	121,212- 819-74-24-B
N6RZ(+AAGT,WA6OCE,WB6CJE)	120,450- 803-75-24-B
W6YX(N1OO,W2JU,K4EO, WA4BAX,N7MH,K0SB,opr)	117,512- 794-74-24-B
AA6G(+WD6AGJ)	102,638- 703-73-24-B
K6MA(+N6s IA KV,WB6YZI)	98,208- 682-72-23-B
K6FB(WB6JGS + Net)	82,800- 552-75-24-B
AA6KB(+WB6s GSZ POT)	68,600- 490-70-23-A
WD6EPV(+WB6CBJ)	63,918- 477-67- 7-B

San Diego

N6ND	149,328-1037-72-24-B
W6UQF	70,140- 501-70-19-A
WB6HGJ	68,112- 473-72-12-A
K6NA	65,462- 461-71- 9-B
K6ZH	32,630- 251-65- 9-A
N6KW	28,380- 215-66-13-A
WA6UAZ	17,056- 164-52-11-A
AA6EE	240- 12-10- 1-A

San Francisco

N6BV	153,624-1038-74-24-B
AA6DX	117,822- 807-73-24-B
N6CQ	84,750- 565-75-24-A
KA6AXV	11,868- 129-46-14-A
K6LRN	11,232- 108-52- 4-A
WB6FCR	1470- 35-21- 8-B
W6BIP(+WA6OJI)	119,700- 798-75-23-B

San Joaquin Valley

WB6ION	132,714- 909-73-22-B
AD6W	56,166- 407-69-24-A
K6AO	29,008- 196-74-12-B
N6PR	25,600- 200-64-16-A
N6OM/6	20,020- 182-55-12-A
K6TG	15,428- 134-58-12-A
WB6KHR	12,036- 118-51-13-A
WB6ITM	2248- 58-28- 2-A
K6AYA(+WA6OEC)	125,208- 846-74-24-B
W6YKM(+W6MYP,WA6EZM)	118,698- 813-73-23-B

Sacramento Valley

N6JV	118,500- 790-75-24-B
W6TPH	113,150- 775-73-24-B
K6SG	102,528- 712-72-23-B
W6EGX	41,400- 300-69-17-A
WA6FFI	26,334- 209-63-22-A
W6NKH	25,986- 183-71-10-B
N6JM	8556- 93-46- 4-B
WA6BRV	7544- 92-41- 7-A

Hawaii

KH6IJ	120,984- 882-71-20-B
KH6GGZ	42,250- 325-65-18-A
KH6JUK	11,562- 123-47-15-A
VE7ZZ/KH6	8800- 100-44- 5-A
WH6ABV(+AH6Z,K7SS)	28,602- 227-63-21-A

7

Arizona

W7KW(K7GM,opr)	177,098-1213-73-24-B
K6LL/7	168,484-1154-73-24-B
AA7A	147,704- 998-74-24-A
N7US	113,316- 798-71-24-B
W7ZMD	109,224- 745-74-23-B
K7NO	103,600- 700-74-20-B
W7YS	72,144- 501-72-20-A
N7CW	71,856- 499-72-15-A
WB7PXS	65,808- 457-72-22-A
AB7E	47,450- 365-65-22-A
WA7NXL	36,846- 267-69-16-B
K7JVR	34,716- 263-66-12-A
K7TX	30,044- 259-58-18-A
N7OS	11,070- 135-41- 4-A
WB7TWK/N	9408- 112-42-19-A
WB7PNZ	3300- 50-33-20-B
WA7YDS	1134- 27-21- 3-A
WB7UDJ/N	1116- 31-18- 8-B
WB7QDQ	1080- 27-20- 9-A
W7HSS(+KA7BNM,WB7WQJ)	3772- 58-32-11-A

Idaho

K7MM	124,392- 852-73-24-B
K7QU	114,848- 776-74-21-A
K7TM	107,352- 756-71-24-A
AC7P	102,300- 682-75-24-A
K7FR	49,600- 400-62-21-A
W7ZRC	42,640- 328-65-14-A
WD6DBA/7/N	14,600- 146-50-21-A
WB7NSW	13,524- 147-46-14-A
WB7VBC	12,642- 129-49-21-A
WB7TJI	12,000- 120-50-12-A
K0EJ/7	8400- 100-42- 3-A
WN7CSI	5772- 78-37-15-A
KA7AGR(+KA7CKD)	70- 7- 5-19-A

Montana

K7QA	136,200- 908-75-21-B
W7JYW	124,350- 830-75-24-B
K0PP/7	96,214- 659-73-23-A
K7CPC	66,882- 471-71-23-A
N7AMZ	64,220- 494-65-22-A
K7CHY	37,044- 294-63-11-A
N7ANT	22,960- 205-56-19-A

Nevada

WA7NIN(N6SF,opr)	164,132-1109-74-24-B
W7IA	115,048- 788-73-24-A
AD7K	107,164- 734-73-24-A
WA7YHP	99,752- 674-74-24-A
W7HI	63,360- 440-72-15-A

Oregon

W7NI	161,476-1106-73-24-B
WA7RKJ	122,832- 853-72-24-B
W7KMB	81,792- 576-71-20-A
N7ES	44,488- 332-67-18-A
N7TE	44,160- 320-69-24-A
W7ZR	39,556- 341-58- 9-B
WA4HRG/7	38,674- 317-61- 6-B
WA7HZA	33,880- 242-70-16-A
W7JZV	23,088- 156-74-13-B
WB7TEM	7728- 92-42- 9-A
K7GDN	7476- 89-42-11-A

W7LT	7428- 86-49-11-B
WB7WOE/T	6264- 87-36-12-A
WB7PXZ	5460- 65-42-16-A
K7EAU	5328- 74-36-17-A
K7ZMR	4736- 64-37-10-A
K7UN	4140- 92-45-11-A
W7TWL	1920- 40-24- 6-A
WA7TTD	672- 21-16- 5-B
K7WPC(+WB7PQU)	91,908- 666-69-21-B

Utah

N7DF	112,700- 814-70-23-A
W7LRG	22,230- 195-57-12-A
WB7SVQ	7030- 95-37-16-A

Washington

K7RI(K1UA,opr)	169,608-1146-74-24-B
W7WA	142,800- 952-75-24-B
K7UR	120,274- 847-71-24-B
K7WA	99,792- 693-72-24-A
WB7QEL	97,696- 688-71-24-A
W7BUN	95,200- 680-70-23-B
W7LKG	76,254- 537-71-23-B
N7AM	76,050- 507-75-24-B
WB7FFF	73,840- 520-71-17-B
WB7PSP	73,000- 500-73-21-A
K7OEW	72,520- 518-70-21-A
W7NP	51,544- 379-68-16-B
K7JV	44,712- 324-69-18-A
WB7WUM	39,772- 326-61-17-B
K7NF	37,324- 301-62-10-B
W7LRO	35,360- 272-65-17-B
WB7AYB	34,304- 256-67-15-A
W6VNJ/7	30,076- 207-73-11-A
K7HBN	29,832- 226-66-18-A
W7BYK	27,200- 200-68-13-A
W7RCS	23,780- 205-58-16-B
WB7RMQ	14,820- 130-57-15-A
K7UU	14,798- 151-49- 4-A
K7BFL	9324- 111-42- 5-A
WB7UXK	9306- 99-47-10-B
WB7QMR/N	3332- 49-34-10-A
N7DX	2800- 50-28- 2-B
KA7BAY	1518- 33-23-10-A
K7LXC	442- 34-13- 3-A
K7EFB	32- 4- 4- 1-B
N7RV(+K7YST)	44,520- 318-70-17-B
W7YH(AC6D,AB7Y,WB7s EHM SOL,oprs)	26,820- 262-55-24-A

Wyoming

K7IO	112,858- 773-73-22-B
WB7UVB	25,500- 250-51-14-A

Alaska

KL7AF	71,632- 484-74-16-B
KL7MF	21,924- 203-54- 6-A
KL7AW	16,740- 155-54-13-A
KL7BN	9400- 94-50-17-A
WB6BYU/KL7	6006- 77-39-12-A
KL7JEO	576- 18-16-23-A

8

Michigan

K8LX	153,150-1021-75-24-B
WA8RRR	135,326- 953-71-24-B
N3FR/8	111,300- 742-75-24-B
N8BM	104,190- 755-69-22-B
WA8MAM	102,120- 690-74-24-A
W8LAQ	101,388- 714-71-22-A
W8MNL	99,216- 689-72-24-B
WA8RTP	98,140- 701-70- -B
K8DD	98,112- 672-73-18-B
W8TJQ	93,900- 626-75-24-A
K8MJZ	92,775- 653-71-24-B
WA8QAF	86,870- 595-73-24-A
WA8MEC	82,512- 573-72-19-B
AC8Y	81,664- 638-64-19-B
WA8QEF	77,004- 558-69- -B
K8MW	76,254- 537-71-24-A
W8VPC	76,254- 537-71-18-A
WD8DMX	64,446- 467-69-20-A
K8DO	61,992- 492-63-22-B
AA8A	60,192- 456-66-21-A
WD8DWQ	60,060- 462-65-24-A
WB8FEZ	58,476- 443-66-22-A
WB8YDR	56,166- 407-69-24-A
WB8YRY	56,032- 412-68-19-A
W8JKU	55,056- 372-74-24-B
W8KUK	54,002- 403-67-16-A
K8OT	50,646- 367-69-22-B
W8HW	49,014- 389-63-20-A
K8SIA	45,152- 332-68-17-B
KB8EG	44,730- 315-71-14-A
K8KA	40,656- 308-66-11-A
N8EA	36,992- 289-64-10-B
N8LA	35,508- 280-66-22-A
N8MK	34,500- 250-69-13-A
W8QS	32,488- 262-62-14-B
K8KQJ	28,884- 249-58- 8-A
K8RDJ	28,560- 238-60-15-A
WD8DSV	28,080- 216-65-14-B
WB8AAX	26,800- 200-67-10-B
W8MPD	24,780- 210-59- 8-A
W8EGI	21,000- 175-60- 7-A
W8JUP	20,292- 178-57-10-A
WD8DKM	19,152- 168-57-11-A
W8IJS	18,600- 155-60-16-A
N8AGR	16,960- 160-53-17-A
K8CV	16,830- 153-55-11-A
W8OM	16,390- 149-55- 6-A
N8RW	15,680- 140-56-11-A
W8PVI	14,688- 153-48-11-A
K8KM	12,096- 126-48- 9-B
WB8MKR	12,064- 116-52- 4-A
K8PW	11,956- 122-49- 6-A
WA8SQL	11,858- 121-49-14-A
WD8RIN	10,100- 101-50- 8-A
W8PBO	9944- 113-44- 2-B
WA8MOY	9086- 154-59-14-A
K8LF	8772- 102-43- 5-B
WA8VEB	8550- 95-45- 4-A
WB8HSA	8000- 100-40- 5-A
WA8ZTQ	7290- 81-45- 8-A
KA8AEE	7020- 90-39-24-A
KA8BPY/N	5360- 67-40-14-A
KB8CK	5180- 74-35- 9-B
N8ANQ	3328- 52-32-13-A
N8AOE	2970- 55-27- 7-A
K8GB	2924- 43-34-14-A
W8TKW	2850- 57-25- 9-A
AE8W	2298- 39-31-15-A
KA8CKM/N	2240- 64-35-11-A
W8WVU	1848- 42-22- 1-A
AC8R	1134- 27-21- 8-A
AC8W	816- 24-17- 3-A
WD8JRU	468- 18-13- 5-A
WD8PXW	378- 21- 9- 9-A
W8YL	360- 18-10- 2-A
W3GQJ/8	200- 10-10- 3-A
W8LCU	132- 11- 6- 1-A
WN8NII(+WB8ITB)	46,964- 398-59-19-A
W8TQE(K8s AQM KIC TI,KA8ALH WA8ARS,WB8s DUC ZFB,WD8s ASD AUX KLP KLQ,oprs)	46,008- 324-71-24-A
WD8CEG(+K8UE,WD8s QUP QUQ)	45,292- 338-67-23-B
WD8ECT(+WD8ECU)	31,122- 257-63-22-A
WB8DSG(+KA8BIM,WD8s OWQ RPF)	22,512- 201-56-18-A
K8CDM(+WA8VJB)	18,792- 324-58- -A
WA8OWG(+W8YO)	16,770- 215-39-22-A
N8HT(+WD8CQN)	16,626- 163-51-17-B
WD8CSA(Multiop)	11,906- 207-58-17-A
K8TI(+K8s AQM TI,KA8ALH, WB8s DUC ZFB,WD8s ASD AUX KLP KLQ)	11,562- 141-41-24-A
WB8UHS(+KA8AYW,WB8WIM, WD8NQG)	9270- 103-45-22-A
K8DAC(K8TU,N8s MK RW,WB0M, WB8GUD,oprs)	3250- 65-25- 4-A
WA8LSS(+WD8CUQ)	3224- 62-26- 9-A
K8AQM(+K8s KIC TI,KA8ALH, WB8s DUC ZFB,WD8s ASD AUX KLP KLQ)	2604- 62-21-15-A

Ohio

K8NZ	161,320-1090-74-24-B
K8MR	158,508-1071-74-24-B
W8WPC(K8BPX,opr)	156,584-1058-74-24-B
K8AC	137,520- 955-72-24-B
K8EKG	108,216- 752-72-24-A
W8TK	101,568- 736-69-18-B
W8KRR	97,236- 666-73-20-A
W8CD	93,744- 651-72-22-B
K8URE(N9AG,opr)	91,396- 626-73-19-B
W8UPH	89,424- 621-72-24-B
WD8ALG	87,080- 622-70-24-B
N8VV	85,392- 593-72-23-A
K8FU	84,348- 594-71-19-B
W8TD	83,354- 587-71- -A
W8RSW	77,088- 528-73-14-B
K8MN	76,320- 530-72-16-B
K8BL	70,700- 505-70-17-A
WB8RTJ	70,290- 495-71-21-A
WB8URG	63,336- 451-68-22-A
WD8DTG	55,936- 437-64-19-A
K8EE	55,062- 399-69-17-A
AA8S	49,840- 356-70-21-A
W8LHV	49,536- 344-72-16-B
W8VGI	48,776- 364-67-17-B
N1AL/8	48,360- 390-62-10-A
K6SLM/8	46,784- 344-68-22-B
WB8NBA	44,856- 356-63-18-A
W8QWI	40,200- 300-67-11-B
WD8AFB	35,910- 285-63-14-A
AC8X	34,320- 264-65-16-A
W8GOC	33,792- 256-66- 9-A
WD8QMP	32,642- 267-63-17-A
W8GS	32,850- 225-73- 7-B
W8XT	31,000- 250-62-14-A
K8BA	28,896- 258-56-15-A
W8II	24,966- 171-73- 9-B
W8OWP	22,816- 184-62-13-A
WB8ZUR	20,406- 179-53-12-A
W8YU	18,480- 165-56- 9-B
KA8A/N/N	18,468- 171-54-23-A
WB8VNR	18,242- 169-54-20-A
WD8PFS	11,376- 158-36-22-A
K8MFO	11,250- 75-75- 7-A
W8KHP	11,074- 113-49-10-A
KA8BON	10,912- 124-44-17-A
K8CQ	10,368- 72-72-11-A
W8IM	9800- 100-49- 7-A
K8DL	9000- 100-45- 2-A
N8AFE	8600- 100-43- 8-A
WB8TJS	8600- 100-43-10-A
AA8V	8320- 104-40- 7-A
K8KR	7400- 100-37- 5-A
WD8DKJ	6992- 76-46-18-A
WD8MBK	6770- 97-35-12-A
WB8NBY	6090- 87-35- 7-B
K8AZ	5760- 90-32- 3-A
WD8IJZ	5250- 75-35-19-A
W8MC	5000- 50-50- 5-A
KA8CGF/N	4988- 86-29-23-A
KA8BCZ	3808- 56-34-10-A
K8AAZ	3752- 67-28- 3-A
W8DXT	3250- 65-25-15-B
WA8ZNC	2754- 81-27- 4-A
WD8JRQ	2176- 42-26- 8-A
WB8UVZ	672- 21-16- 5-A
WB8VPB	260- 13-10- 3-A
WB8UFO	24- 4- 3- 1-A
WB8JBM(WB8DQP + loggers)	138,380- 935-74-24-B
K8ND(+AD8I,K8NU)	131,984- 904-73-24-B
W8XU(+AD8P,W8FN,WB8WMB)	128,316- 867-74-24-B
AC8E(+K8AAZ,W8IDM)	70,858- 499-71-22-B
K8DDG(WA1TWD,KB8AH,WB8YIJ oprs)	19,800- 198-50-24-A

West Virginia

N8II	140,014- 959-73-24-B
K8JQ	94,608- 657-72-15-B
WB8AKQ	86,240- 616-70-21-A
W4NW/8	67,196- 476-73-11-A
W8UT	48,764- 334-73-13-A
W8CUL(KA1BSF,opr)	19,576- 213-46-21-A
WA8DGE	19,030- 173-55- 9-A
W8JWX	16,092- 149-54- 8-A
K8SR	13,230- 135-49- 4-A
WD8KAC	800- 40-20- -A

9

Illinois

W9RW	155,550-1037-75-22-B
K9KM	148,888-1006-74-23-B
K9CT	139,680- 970-72-24-B
K9RF(K9UIY,opr)	137,048- 926-74-23-B
K9RG	135,716- 917-74-24-B
K9RMA(K9ND,opr)	133,420- 953-70-24-B
K9BGL	125,712- 873-72-24-B
K9ZO	124,128- 862-72-24-B
N9BT	110,852- 749-74-24-A
K9RS	106,896- 729-74-24-B
WB9MSV	100,512- 698-72-24-A
N9NA	87,230- 671-65-22-A
N9AX	61,600- 440-70-22-A
WD9CUG	57,378- 393-73-20-B
WD9INS	55,160- 394-70-24-A
K9AR	54,944- 404-68-12-B
K9BK	53,170- 409-65-11-B
AA9R	52,854- 383-69-17-A
W4VA	49,558- 349-71- 8-B
W9TM	49,446- 369-67-16-A
WA0AXH/9	49,368- 363-68-24-A
K9CW	47,952- 324-74-15-A
WD9DMV	44,268- 357-62-23-A
W9QWM	43,070- 295-73-16-A
WB9JSR	40,832- 319-64- -A

W9LNQ 36,260- 245-74-19-A
W9REC 28,400- 200-71-21-A
WB9SMU 25,048- 202-62-21-A
WD9ADH 23,112- 214-54- 7-A
WB9VJN 21,890- 199-55-10-A
K9CC 19,012- 194-49- 7-B
W9HPG 17,914- 169-53-10-A
W9KTB 15,980- 170-47-10-A
N0NN/9 15,548- 169-46-17-A
N9TI 11,880- 135-44- 3-B
WD9IFD 11,782- 137-43-13-A
W9WR 11,520- 96-60- 9-B
K9KD 11,266- 131-43- 5-A
K9LW 10,360- 148-35- 6-A
W9LBQ 7920- 88-45- 9-A
WD9HTM 6142- 83-37-15-B
K9JA/9 5822- 71-41- 3-A
K9JK 4026- 61-33- 3-A
KA9ALR/N 3528- 63-28-10-A
W9IB 3520- 55-32- 6-A
WB9TBU 3300- 50-33- 9-A
W9AGM 3000- 50-30- 3-A
W9ZEN 2400- 50-24- 6-A
N9YL 1040- 40-26- 4-A
K9PW 396- 18-11- 1-A
K9AT 288- 16- 9- 2-A
WA9WXC 180- 10- 9- 2-A
W9YH(AD9O,K9s GL MK PW VV, WD5BVQ,oprs)
132,192- 918-72-24-B
N9JF(+WA9QNM)
75,550- 494-75-21-A
K9GS(+W9PK,WD9IOK,net)
70,574- 497-71-24-A
WB9TXO(N9BB,WB9AGY, WD9EMA,WA0AVL,oprs)
64,416- 488-66-19-B
W9TRC(+WA9AQN)
62,928- 456-69-21-A
WD9EVV(+WD4FFW,WB9BVW)
3696- 66-28-10-A

Indiana

W9TG 150,900-1006-75-24-B
K9UWA 129,500- 875-74-23-B
WB9QCP 99,680- 712-70-24-B
W9OBF 98,864- 668-74-24-A
W9LT(N9NO,opr)
94,752- 658-72-23-B
W9JOO 90,872- 614-74-24-A
W9FC 84,184- 619-68-22-A
WB9VJE 75,402- 531-71-23-B
W9LTU 74,550- 525-71-21-A
WB9PIR 63,840- 455-70-23-A
K9FW 63,364- 511-62-23-B
W9RE 59,228- 442-67- 9-B
N9JG 53,060- 379-70-20-B
WB9UKE 45,072- 313-72-17-A
AA9S 43,928- 323-68-13-A
WB9JKO 42,480- 295-72-12-A
WA9TBW 33,600- 280-60-14-B
KA9AOD 31,752- 252-63-24-A
WD9GCI 23,836- 202-59-10-A
N9RC 21,930- 215-51-15-B
W9QLW 19,344- 156-62- 9-B
WB9JVB 13,916- 142-49- 9-B
WB9IZL 13,392- 216-62-12-A
K9KB 9400- 100-47- 8-B
W9CM 700- 25-14- 2-A

WB9VOG 180- 10- 9- 6-A
WD9FEP 144- 9- 8- 5-A
W9YB(WB4NNO,K9HI,N9s NB NC, WB9s PUM YEH,oprs)
106,800- 712-75-24-B
WB9NMC(+WB9OSJ)
48,840- 407-60-18-B
W9NAA(N8RK,N9LN,oprs)
37,700- 290-65-11-B
WD9HMY(+WD9HIZ)
25,056- 216-58-24-A
K9IU(WA2s BIJ ECZ,W3EP, WB5FID,WB9VVV,oprs)
10,164- 121-42-10-A

Wisconsin

W9NA 147,600- 984-75-23-B
K9BN 107,550- 718-75-22-B
WD9HFW 103,368- 708-73-23-B
N9AW 98,808- 716-69-22-B
N9UR 96,652- 662-73-24-A
W2WOE/9 93,456- 649-72-23-B
W9OC 92,016- 639-72-24-A
WB9UAI 88,128- 612-72-24-A
W9GHY 64,512- 504-64-24-A
W9HE 61,774- 461-67-16-A
WA9SQN 60,166- 449-67-16-A
WB9EJE 57,572- 389-74-21-A
K9WWT 56,280- 420-67-14-B
K9KR 39,780- 306-65-20-B
N9EZ 39,168- 306-64-10-B
K9WTF 37,800- 300-63-20-B
WB9VOZ 37,180- 286-65-19-A
N9KS 35,760- 298-60-17-B
WB9KPX 32,368- 238-68-11-A
K9UU 31,720- 488-65-17-A
WD9BCM 27,000- 270-50-17-A
N9AU 23,808- 192-62- 7-A
W9HI 23,744- 212-56- 8-A
WB9VHI 23,408- 209-56-16-A
W9TP 20,628- 191-54- 8-A
WA9EDZ 14,336- 128-56- 9-A
WB9BSO 10,904- 116-47-14-A
N9HR 7800- 100-39-10-A
WD9IGJ 6808- 92-37- 8-A
WB9IXS 6800- 100-34-14-A
WD9DTF/T 6264- 86-37-16-A
KB9BU 3596- 62-29-12-A
WD9IKN 3200- 64-25-13-A
WD9EFJ 3060- 51-30-14-A
WD9AXU 2576- 56-23-16-A
K9JXW 2530- 55-23- 2-A
W9YCV 1978- 43-23- 2-A
WB9SVN 1628- 37-22-12-A
N9AGE 1540- 35-22-10-A
WB9WFB 1536- 32-24- 4-A
KA9CHP/N 1040- 26-20- 9-A
WB9WBV/N 850- 25-17- 4-A
WA9POV 384- 16-12- 2-A
WD9HTG/N 260- 13-10- 3-A
WB9RKF 234- 13- 9- 3-A
WA9AKV 154- 11- 7- 2-A
WD9AYE(WB9SVO,WD9JHU)
20,048- 179-56-18-A

0

Colorado

W0CP 154,760-1060-73-24-B

K0DJ 135,216- 939-72-24-A
W0ETT 129,352- 874-74-24-A
W0YK 111,754- 787-71-24-B
N0DV 96,832- 712-68-22-A
AC0S 70,148- 494-71-18-B
W0LQ 55,610- 415-67-12-A
K0GUZ 27,120- 226-60-16-A
N4UW/0 24,072- 204-59- 8-A
W0SG 18,224- 136-67- 9-A
W0GO 16,060- 146-55-10-A
WD0GXR/N 14,560- 140-52-24-A
KA0CLS 5476- 74-37- 9-A
AB0G 3200- 50-32- 6-A
WD0DJH 2900- 50-29-18-A
N0AE(+WB0TGA)
18,054- 177-51-12-B

Iowa

N0GA 156,300-1042-75-24-B
K0MM 147,556- 997-74-24-B
WA0VKF 139,138- 953-73-24-B
W0EJ 137,824- 944-73-24-B
K0IS 100,100- 715-70-23-A
W0VU 91,020- 615-74-23-B
W0IZ 90,082- 617-73-24-A
WB0PYD 85,910- 605-71-21-A
N0BB 41,400- 300-69-19-A
WB0UCP 40,068- 318-63-15-B
K0INR 38,908- 274-71-20-A
W0WP 34,800- 232-75-15-A
WB0VDE 31,944- 242-66-14-A
WD0CWV 18,150- 165-55-13-A
W0NMU 8480- 90-47-14-A
AD0F 7462- 91-41- 4-A
W0JTC 6168- 91-34- 9-A
WD0HWU/N 5796- 69-42-13-A
WD0BNP 5168- [illegible]
WB0UBL 3596- 62-29- 3-A
W0GA 3100- 50-31- 2-B
KA0BYI/N 3016- 52-29-11-A
WD0FGY/N 1122- 33-19- 6-A
WB0FPE 162- 18- 9- 2-A
W0IO(AE0R,WA0s KVD RJY,WB0s CHP CSG,WD0GDL,oprs)
69,552- 504-69-24-B

Kansas

K0XR 143,372- 982-73-24-B
WA0TKJ 107,136- 744-72-22-A
W0KI 79,424- 544-73-24-A
WB0AOR 20,300- 175-58-14-A
W0ODT 14,672- 131-56-13-A
WD0EFT 14,000- 125-56-18-A
WB0YJT 5568- 87-32-16-A
WA0CFQ 1218- 29-21- 4-A
W0RT 828- 23-18- 1-A
W0IX 200- 10-10- 1-A
K0CS 2- 1- 1- 1-B
K0WA(+AB0S)
140,976- 979-72-24-B
W0QQQ(K0MJ,N0AEU,KA0BNN, W0VS,WB0s NHX QFU SFV SRX, WD0s ACD CEV,WD5CAW,oprs)
60,248- 443-68-24-A

Minnesota

W0ZZ 153,624-1038-74-24-B
N0NO 136,080- 945-72-24-A
W0HW 122,400- 850-72-24-B
K0IJL 121,838- 865-71-24-A
W0UC 114,336- 794-72-24-A
K0II 109,938- 753-73-24-A

W0YCR 106,760- 785-68-21-B
W0SA 85,118- 583-73-15-B
K0FZG 84,956- 634-67-24-A
K0BR 66,732- 498-67-24-A
W0ROE 63,280- 452-70-19-A
N0AJJ 48,280- 355-68-21-A
K0MPH 42,960- 358-60- 9-A
N0ADJ 41,808- 312-67-15-A
WD0FFE 37,310- 287-65-22-A
WB0UKI 37,052- 314-59-19-A
N0BU 36,112- 296-61-14-B
W0UBT 26,082- 207-63-11-B
WA0PPL 15,198- 149-51- 9-A
WD0CNQ 10,710- 119-45- 7-A
N0AGW 10,100- 101-50-14-A
KA0ASU/N 9696- 101-48-21-A
K0VW 7200- 100-36- 4-A
W0YHE 2700- 50-27- 6-A
WA0QWY 112- 8- 7- 2-A
K0TK(+K0FVF,WB0GOB)
93,520- 668-70-18-B
WB0ONK(+WB0UIP)
84,632- 596-71-24-A
W0MN(+WB0RSW)
64,812- 491-66-20-A
K0LTC(K0GRA,N0AKZ,W0UBT, WB0s FBN GPR MCJ SNG SNP, WD0BQR,oprs)
44,352- 352-63-24-A
WD0GXG(+WD0GEN)
20,458- 193-53-18-B

Missouri

N0SS 128,908- 871-74-21-B
K0VBU 104,412- 722-73-24-A
N0TT 102,524- 722-71-24-A
W0QWS 91,908- 666-69-21-A
K0DEQ 86,052- 606-71-19-B
K0VUW(K0FU,opr)
81,480- 582-70-19-B
W0VE 80,496- 559-72-24-B
WA0FBQ 69,020- 493-70-19-A
W0RNG 67,728- 498-68-21-A
WB0QZY 61,608- 453-68-19-A
WB0LFY 45,600- 380-60-16-B
N0DC 42,840- 306-70-20-A
N0RJ 42,822- 351-61-17-A
WB0ZGD 37,654- 281-67-14-A
WA0UDZ 37,062- 261-71-22-A
WD0EVT 34,100- 275-62-13-A
WD0ATR/N 14,896- 152-49-21-A
WD0BBO 9900- 110-45-13-A
K0BM 9000- 100-45- 3-A
WD0ARX 8944- 104-43-17-A
WD0CRW 4662- 63-37-15-A
WB0OGK 3976- 71-28- 3-A
W0YZZ 2604- 42-31- 4-A
WD0BBN 832- 26-16-10-A
WB0FCK 340- 17-10- 8-A
W0EEE(AE0A,N0AX,WA0RAD, WB0ZLB,oprs)
118,400- 800-74-24-B
WB0TPP(+WB0UFJ,WD0AZM)
43,952- 328-67-22-A

Nebraska

K0UP 133,298- 913-73-23-B
K0BI 52,272- 363-72-22-A
WD0BQG/N 15,290- 139-55-13-B
W0OPL 12,220- 130-47-14-A
WA0BHT(+K0ODF)
13,568- 128-53-16-A

North Dakota

AE0E 85,492- 638-67-23-B
K0FRP 83,776- 616-68-21-A
WB0VUJ 28,396- 229-62-17-A
W0RIB 28,272- 228-62-11-A
WD0ECS 8260- 118-35- 8-A

South Dakota

K0ZZ 171,828-1161-74-24-B
WB0VGN 61,410- 445-69-18-A
K0JV 58,355- 429-68-18-A
K0HP 8036- 98-41- 5-A
K0OR 440- 22-10- 4-A
WD0EMB(+WD0CXU)
48,374- 361-67-16-A

VE

Quebec

VE2AH 80,040- 580-69- -B
VE2AQP 56,304- 414-68-22-B
VE2EDL 45,824- 358-64-19-B
VE2WA 21,560- 146-55- 5-A

Ontario

VE3AKG 121,656- 822-74-24-A
VE3DAP 84,000- 600-70-23-A
VE3GCE 82,368- 572-72-22-A
VE3JTP 47,748- 346-69-17-A
VE3BZR 43,960- 314-70-13-A
VE3ACB 35,742- 259-69-16-A
VE3EZZ 26,934- 201-67-14-A
VE3XJ 23,680- 160-74-20-A
VE3ARL 23,232- 176-66-15-A
VE3JSO 21,888- 192-57-10-A
VE3KK 17,700- 118-75-15-A
CF3HQV 9100- 102-45-13-A
VE3WZ 8064- 96-42- 5-A
VE3KQD 1350- 45-30-10-A
VE3BMV 50- 5- 5- 1-A
VE3ART/3(VE3s ATO DAO GAS' oprs) 98,946- 717-69-20-B

Manitoba

VE4OY 135,648- 940-72-23-A
VE4XI 24,592- 212-58-17-A
VE4RRC(VE4s ACJ AHS,oprs)
43,560- 330-66-24-B

Saskatchewan

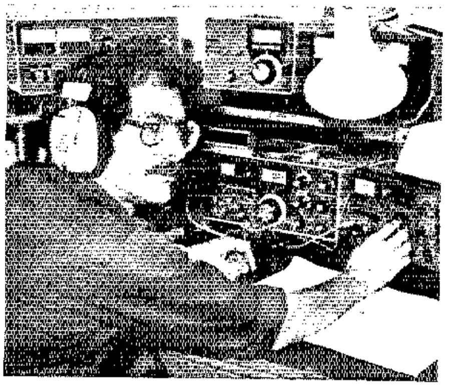
VE5ABL 55,580- 397-70-16-A
VE5JQ 8200- 100-41- 9-A

Alberta

VE6ATT 31,388- 266-59-16-A
VE6ALD 3280- 82-40-10-A

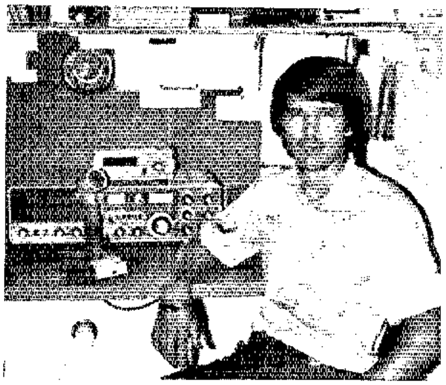
British Columbia

VE7CC 173,550-1157-75-24-B
VE7ARQ 90,576- 612-74-23-A
CF7IQ 46,364- 346-67-19-B
VE7CMK 37,164- 326-57- 9-B
VE7PW 34,438- 257-67-12-A
VE7CGN 31,374- 249-63-14-A
VE7CMF 31,248- 248-63- -A
VE7CPT/7 28,272- 228-62-19-A



K8ND (K8NU at the controls) no. 6 multiop cw

K8LX no. 1 Great Lakes Division phone



WD4OIX no. 1 low power, phone Southeastern Division

Phone Scores

U.S.A.

1

Connecticut

K1VTM 259,980-1733-75-24-B
W1ZM(K1ZM,opr)
242,250-1615-75-24-B
K1PR(WA1MAO,opr)
241,388-1631-74-24-B
K1RT 232,200-1548-75-24-B
K1RM 230,550-1537-75-23-B
W1AW(W3AZD,opr)
150,220-1015-74-16-B
K1ZZ(K1TO,opr)
127,440- 885-72-19-B
K1WB 125,800- 850-74-24-A
N1JW 115,440- 780-74-20-B
WA1SQB 102,300- 682-75-11-B
WA1ZVS 101,324- 694-73-22-A
N1JC 80,216- 542-74-24-A
K1WA 79,278- 543-73-19-A
W1VV 76,500- 510-75-13-B
WA1ZOW 74,444- 503-74-16-A

K1THP 61,776- 429-72-13-B
W1TCJ 60,480- 420-72-12-B
K1KI 55,500- 370-75- 8-B
W1WEF 50,662- 347-73-14-A
K1EB 48,248- 326-74-10-B
WA1NRG 44,756- 334-67-15-B
W1XK 43,680- 336-65- 9-A
WB1DUI 43,166- 353-61-14-A
K1BV 41,600- 325-64- 8-B
K1DD 40,392- 306-66-12-A
N1ADE 40,032- 278-72-14-A
WA1UDA 37,808- 278-68- 9-A
WA1YEL 33,396- 253-66-19-A
N1CC 32,154- 233-69- 8-A
K1DW 32,076- 243-66- 9-A
K1TN 30,940- 238-65- 6-B
WB1FKC 29,118- 211-69-14-A
WB1BXR 27,324- 253-54-16-A
W1XT 26,112- 204-64- 7-B
W1BIH 22,050- 147-75- 8-B
WA1LBU 19,596- 142-69- 8-B
K1WJ 18,270- 145-63- 3-B
WB1FNK 13,156- 143-46-13-A
W1HB 9250- 125-37- 6-A
W1ECH 7000- 100-35- 3-A
K1DII 6600- 100-33- 6-A
W1RM 2120- 53-20- 1-A
N1MM(+K1s PR XM)
219,600-1464-75-24-B
W1XX(+W1s CJ OO)
211,640-1430-74-24-B

K1XA(+W1GNC)
206,700-1378-75-24-B
WB1ADR(+KA1ARB,WB1HHZ)
28,842- 253-57-14-B

Eastern Massachusetts

K1TA 195,900-1306-75-24-B
K1VR 189,450-1263-75-24-B
N1AU 131,650- 879-75-22-B
WA1UZH 124,538- 853-73-24-B
N1HR 104,682- 717-73-21-A
K1IU 101,550- 677-75- -B
W1FM 84,816- 589-72-23-A
K1MEM 71,250- 475-75-13-B
KA1AQ 69,296- 488-71-24-A
K1ECC 65,100- 465-70-14-B
K1YSE 60,918- 429-71-18-B
KA1CC 50,922- 369-69-17-A
K1LS 41,808- 312-67- 9-B
W1CRL 39,476- 278-71-24-A
N1EB 38,088- 276-69-14-A
WB1CNM 35,490- 273-65-20-A
W1FJ 34,404- 282-61- 5-B
WA1LMJ 32,880- 276-65-10-B
N1AS 30,660- 219-70-16-A
N1RC 29,920- 272-55-15-A
N1GB 29,100- 194-75-18-A
K1CUD 27,776- 217-64-14-A
W1IRH 24,430- 349-70-12-B
K1LXJ 23,780- 205-58-17-A
K1PAO 22,056- 622-74-20-B

W1PLJ 16,960- 160-53-11-B
W1GXT 13,200- 150-44-10-B
N1CW 15,400- 140-55- 8-A
K1CHY 8366- 89-47- 7-A
WB1GDY 5610- 85-33- 6-B
W1JR 2856- 51-28- 1-B
W1MX(K1MK,opr)
162- 9- 9- 1-A
K1PDX(+AC1D,WB1s FCO FGI)
52,780- 406-65-10-B
W1BK(+WA1UAR)
50,180- 386-65-17-B
W1TKZ(K1s DGF TK UR,KA1BDE N1s ABS ADY,WA1s HVS PQY RSV TBV YOJ ZLQ,WB1s BUM NUQ ELQ,oprs)
46,632- 348-67-22-B
WA1VMU(N1EE,WA1ZZV,oprs)
6616- 72-39- 2-A

Maine

N1AFC 116,620- 833-70-23-B
WA1TJX 40,068- 299-67-14-A
WA1WRJ 31,356- 234-67- 6-A
W1OO 24,600- 164-75- 9-B
WA1RDH 7038- 69-51- 8-B
K1BZ 3584- 56-32- 3-A
K1SA 4- 2- 1- 1-A
N1SD(+K1IXZ)
99,936- 694-72-24-B

New Hampshire

K1GQ(K1DG,opr)
231,150-1541-75-24-B
K1RX 202,050-1347-75-24-B
W1RR(K1EA,opr)
187,200-1248-75-24-B
K1LL 182,700-1218-75-22-B
K1OX(K1OME,opr)
106,674- 773-69-10-B
N1OM 72,000- 500-72-23-A
WA1TFH 66,640- 476-70-19-A
WA1YIV 29,832- 226-66-16-A
AC1J 20,048- 179-56- 6-A
W1HMP 18,200- 182-50-17-A
AD1Y 17,808- 159-56- 8-A
W1ICU 5402- 73-37- 4-A
W1UN 280- 14-10- 2-B
K1GZL(+WB1GGQ,WA1s FET PTU) 231,150-1541-75-24-B
WB1CAG(K1UTI,WA1s QCQ YQQ, WB1s CTE FGY FHM FPG,oprs)
131,600- 940-70-24-B
WB1FCR(+WB1s ESP FNO)
103,180- 737-70-22-B

Rhode Island

WA1TFF 196,200-1308-75-24-B
WA1TAQ 111,000- 740-75-19-A
W1GFH 104,390- 715-73-22-A
K1HMO 60,680- 410-74-13-B

N1DM 26,230- 215-61- 8-A
N1AGU 19,264- 172-56-12-A
K1DS 18,368- 164-56- 6-A
K1KYI 15,134- 161-47- 6-B
W1RFQ 8378- 71-59-12-B
N1RI 2862- 53-27- 1-A
KA1BDI/1(+KA1ASL,WB1EHO)
28,224- 224-63-15-A
WB0ICS/1(+WA2PIV)
17,056- 164-32-14-A

Vermont

WB1GQR(WB2JSJ,opr)
182,400-1216-75-24-B
K1IK 170,200-1150-74-20-B
WB1BZR 20,520- 190-54- 9-A
WB1ELC(+K1FWE)
187,200-1248-75-22-B
WA2HRL/1(+WA2IMG,WB2s ADM EJG) 53,176- 391-68-24-A

Western Massachusetts

K1BW 201,150-1341-75-21-B
N1YY 146,400- 976-75-24-A
K1ST 109,650- 731-75-12-B
N1TZ 106,708- 721-74-24-A
K1RQ 102,150- 681-75-18-B
WA1MJE 79,920- 555-72-17-A
W1GG 58,240- 416-70-11-A
WA1PCJ 54,264- 399-63-21-A
K1SF 24,780- 177-70- 8-B
N1SR 21,228- 183-58-10-A
WB1AUL 12,864- 134-48- 4-A
K1FIR 10,368- 108-48- 5-B
K1KNQ 2800- 50-28- 2-B
AA1D(+AD1L,KA1BMJ,WB1s GVR HGD) 54,252- 411-66-17-B

2

Eastern New York

K2FR 276,150-1841-75-24-B
W2PV(K1AR,opr)
259,050-1727-75-24-B
W2YV 199,350-1329-75-24-B
K2ZM 148,692-1004-74-24-B
K2UF 108,750- 725-75-24-A
WB2KMY 78,384- 552-71-24-A
W2AZO 61,238- 457-67- 8-B
WA2WFK 51,188- 382-67-16-A
K2OY 44,616- 338-66-13-A
W2HBY 29,388- 237-62-12-A
AA2Y 29,036- 238-61- 9-B
WB2MJQ 22,800- 190-60-10-B
WB2OFV 17,914- 169-53- 9-B
WB2KHE 17,280- 135-64-14-A
WA2ZYM 14,472- 134-54-10-B
N2FS 8448- 96-44- 9-A
W2DW 8100- 90-45- 3-B
WB2LNB 7790- 95-41- 9-A
W2ARQ 7384- 71-52-16-A
WA2RNX 5550- 75-37- 6-A
WA2GVC 2714- 59-23- 3-A
K2AE(K2XV,WB2CFP,oprs)
149,036-1007-74-24-B
K2GBH(+WA2KCL,WB2QOH)
76,320- 530-72-14-B
WB2EYB(+WA2EAF)
56,304- 391-72-12-A
WA2JDH(+WA2s JDI QZE RIU)
15,600- 150-52-15-B

New York City - L.I.

K2HVN 126,300- 842-75-19-B
K2PE 116,100- 774-75-17-B
N2GC 89,688- 606-74-23-A
WB2RNT 74,236- 554-67-19-A
K2AU 64,386- 441-73-11-B
AB2K 40,392- 297-68-17-A
WB2HIQ 32,110- 247-65-10-B
WB2GUB 28,730- 221-65- 9-A
W2HAE 23,310- 185-63- 8-A
N2OZ 20,304- 188-54-12-B
K2SX 19,520- 160-61- 4-B
WA2DZO 17,380- 158-55-14-A
WA2ISH 15,600- 150-52-11-A
WB2KCT 14,892- 146-51-14-B
K3JNZ/2 14,000- 125-56-23-A
WB2QEL 13,452- 114-59- 5-A
WA2JCX 13,440- 160-42-19-A
W2NBI 11,092- 118-47- 8-B
WB2PXA 10,914- 107-51- 9-B
W2III 10,800- 100-54- 9-A
WA2MFW 9548- 154-31-18-A
WA2TSF 5712- 68-42- 4-A
WA2SEL 5100- 75-34- 3-A
K2OVS 5000- 50-50- 5-A
WB2SPI 3696- 56-33-10-A
K2RO 3360- 56-30- 6-A
W2CZZ 968- 22-22- 3-A
WA2JAS(KA2CLQ,N2BU,WA2s ASZ JBY SEL,WB2s FEK QEU, WN2VVR,oprs)
151,694-1039-73-24-B
N2MG(+N2PL)
108,450- 723-75-24-B

Northern New Jersey

N7TT/2 183,520-1240-74-24-B
WA2SZQ 172,134-1179-73-24-B
W2GO 148,774-1019-73-15-B
WB2OYT 103,650- 691-75-18-B
WB2POG 60,480- 420-72-13-B
K2LG 58,032- 403-72-18-B
W2SQ 50,920- 380-67- 6-B
N2IC 39,396- 402-49- 8-B
N2ALL 31,410- 349-45-14-B
W2GNW 22,110- 165-67-14-A
WB2LUD 17,202- 141-61- 9-A
K2DM 16,992- 177-48- 5-A
WB2ULO 15,720- 131-60-11-A
WA2PQU 12,980- 110-59-12-A
WA2WSD 10,944- 114-48- 7-A
W3EVQ/2 8084- 94-43-15-A
AD2K 7820- 85-46-17-A
WA2UDT 6200- 100-31- 3-A
WB2KUQ 4836- 78-31- 3-A
K2VX 3900- 75-26- 4-A
K2OP 432- 19-14- 1-A
K2XR(+K2OWR,WB2WIK,K4LDR)
163,050-1087-75-24-B
W2RQ(+W2SHM)
162,150-1081-75-19-B
K2GQ(KA2ACM,N2BQ,W2s AQR IMM,WA2s CKB KYG MYZ NXW, WB2s FAS JVE KGN KYE NEX LVH RIB SRY ZDH,oprs)
94,608- 660-72-24-B
W1GD(+N2EW)
50,728- 373-68-20-B

Southern New Jersey

K2YY 178,650-1191-75-24-B
N2MM 164,850-1099-75-24-B
WA2VYA 162,060-1110-73-24-B
W2KI(K2PO,opr)
151,950-1013-75-24-A
K3DVS/2 122,248- 826-74-23-A
AB2E 111,888- 756-74-18-B
WB2VFT 103,950- 693-75-21-A

WA2OMY 103,660- 710-73-19-B
AA2Z 95,460- 645-74-15-B
N2OM 90,000- 600-75-20-A
W2PAU 72,720- 505-72-17-B
W2FGY 71,632- 484-74-24-B
WA2WJL 68,728- 484-71-15-A
WA2KOK 60,480- 420-72-20-B
WA2NBM 51,240- 366-70-23-B
WB2YOF 50,410- 355-71-22-B
WB2UVB 39,440- 340-58-22-A
KB2CW 34,816- 272-64-16-A
K2TD 31,720- 244-65- 8-B
N2ALA 31,248- 252-62-10-A
K2JF 30,940- 221-70-12-B
WB2FJE 25,200- 200-63- -B
AI2B 23,640- 395-60- -B
W2REB 22,790- 215-53- 8-A
WA2RCB 21,228- 183-58-15-A
WB2PHD 21,112- 203-52-16-A
K2HPV 17,970- 155-58- 9-A
W2LYL 12,232- 139-44- 2-B
K2AA(KA2BOP,opr)
11,960- 130-46- 9-A
W2PFQ 11,342- 107-53-14-B
K2TN 11,088- 99-56- 7-A
W2GND 10,880- 80-68- 9-A
WA2EMB 10,584- 98-54- 5-A
WB2PHD 10,556- 203-52-16-A
WA2AWS 9956- 131-38- 8-A
WB2HGI 9000- 75-60-15-A
WA2DUE 7644- 98-39-10-A
N2CC 6800- 100-34- 4-A
WB2VLD 3080- 55-28- 6-B
W2OGZ 2400- 48-25- 4-B
W2TDN 2356- 62-19- 3-A
WB2YPX 2300- 50-23- 9-A
WB2SJA 1330- 35-19- 4-A
WA2PFC 220- 11-10- 2-A
WA7UJW/2 132- 11- 6- 3-A
WB2RUX 88- 11- 4- 2-A
W2PJC 54- 9- 3- 2-A
WA2MGV 4- 2- 1- 1-A
N2CQ(+AE2V)
46,748- 377-62-10-B
WA2FZB(+WB2AOL)
22,504- 194-58-18-A

Western New York

K2IGW(WA2LCC,opr)
208,350-1389-75-24-B
N2MF 171,976-1162-74-21-B
WA2PCF 110,852- 749-74-22-A
W2RR(WA2AOG,opr)
103,040- 736-70-12-B
N2NW 95,164- 643-74-24-A
K2VV 78,242- 551-71- 8-B
K2OVI(WA2FQE,opr)
77,256- 522-74-24-B
WB2NFB 59,340- 430-69-21-A
WA2UUK 55,626- 381-73-21-B
KB2DE 50,976- 354-72-24-A
WB2RXS 50,024- 338-74-17-B
WA2AWX 48,180- 330-73-14-A
K2QL 44,822- 307-73-24-A
W2VDX 44,104- 298-74-19-B
WA2ORS 43,974- 349-63-24-A
K2SOT 41,144- 278-74-16-B
WA2AFQ 38,784- 303-64-19-B
WB2YQH 38,776- 262-74-16-A
WB2RWW 38,324- 286-67-17-A
WB2LWM 30,240- 240-63-13-A
K2UV 26,792- 197-68-10-A
N2APB 24,034- 197-61-15-A
WB2QDN 22,560- 188-60-13-A
W2PGC/M 17,280- 144-60-15-A
AC2J 16,302- 143-57- 2-B
WA2KGN 15,128- 124-61-12-B
K2XU 14,700- 105-70- 8-B
WB2ABD 13,254- 141-47- -A
WB2QAX 11,200- 100-56-10-A
W2EXA 10,658- 73-73- -B
WB2TQM 8000- 100-40- 5-A
K2VF 7600- 100-38- 6-B
WB2GTB 7440- 62-60- -B
W2JJ 6720- 120-28- 2-B
W2NES 936- 26-18- 5-A
WA2LPZ 432- 18-12- 2-A
W2GJ 12- 3- 2- 1-A
WA2ECA(+K2ZL)
209,850-1399-75-24-B
K2ZR(+AA2B,K2NS,WA2OJX, WB2s OJX OKB OXG WGX)
95,992- 676-71-24-A
W2OW(N2HR,K2OC,WA2s BSN KCO,WB2s PGU PHD SQS,oprs)
85,626- 603-71-24-B
K2ZWI(WA2s BML FHF,WB2s DYJ PJM ULC,WA3RPG,oprs)
73,920- 528-70-24-B
K2GEE(+WB2BNX)
33,000- 275-60-14-A

3

Delaware

WA3TVS 82,080- 570-72-22-B
N3AHA 54,400- 400-68-20-A
K3HBP 41,316- 313-66-14-B
W3NX 29,962- 211-71-15-A
AC3T 11,716- 101-58- -A
W3WNG 11,288- 166-34-11-A
N4AIG/3 9072- 72-63-10-A
W3SUE 8400- 105-40- 4-A
WA2NXK/3(+WB2NXK)
17,248- 154-56-15-A

Eastern Pennsylvania

K3ZA 186,628-1261-74-23-B
K3JFZ 133,196- 938-71-18-B
W3IVW 125,424- 871-72-19-B
K3NB 111,222- 751-74-16-B
W3GM 101,400- 676-75-20-B
WA3VJU 97,440- 696-70-23-B
WB3FAA 93,312- 648-72-22-B
W3BGN 91,168- 616-74-10-B
W3IQS 83,028- 561-74-23-A
N3AO 80,100- 534-75-10-B
WB3JGP 74,736- 519-72-22-A
WB3FNZ 66,882- 471-71-22-A
WB3CAI 60,384- 444-68-24-A
KA3AQF 54,536- 401-68-24-A
WB3AVF 52,272- 363-72-22-A
WB3AAK 44,354- 331-67-21-A
WB3FKQ 45,890- 353-65-12-B
WB3GZV 39,040- 305-64-18-A
WB3OYQ 38,778- 281-69-24-A
WB3EKV 37,488- 264-71-12-A
K3MWA 32,116- 259-62-21-B
WB3FYT 31,104- 243-64-17-A
WA3YON 30,128- 269-56-21-A
WB3EMG 28,448- 254-56-13-B
AA3B 27,242- 257-53- 4-B
W3RJ 18,000- 200-45- 3-B
WA3VIL 15,582- 159-49-11-A
WB3KFK 14,400- 150-48-15-A
KB3BW 14,352- 138-52- 7-A
K3VW 14,104- 172-41- 4-A
AD3Y 14,000- 125-56- 8-A
WB3BCF 13,400- 134-50- 9-A
WA3YTI 12,444- 122-51-10-A
W3GTD 12,000- 125-48-10-A

WB3KNJ 11,760- 120-49- 9-A
W3DZH 10,600- 100-53- 7-A
KA3AHX 8610- 105-41-11-A
K3TW 7500- 150-25- 2-B
K3ECV 7254- 93-39-10-A
K3AGU 6670- 115-29-12-A
WB3IOV 5180- 70-37- 3-A
K3ND 3658- 59-31- 3-B
WA3MKB 2914- 47-31-11-A
K3RL 1632- 34-24- 3-A
W3EVW 1240- 31-20- 2-B
WA3BWN 832- 26-16- 3-A
K3UC(+K3s SY VDU,WA3VQK, WB3EVL) 131,400- 876-75-24-B
K3ZFG(+WA3UOC,WB3AYT)
65,794- 491-67-15-B
WB3CIW(Multiop)
56,160- 390-72-22-B
W3ZGD(WB3s BLM ERZ EWA)
54,604- 374-73-24-B
WB3KHE(+WA2PHA,WB3KHF)
47,580- 366-65-24-A
K3CSG(AC3O,WA3WAC,WB3s CWZ IOV KFH,oprs)
20,930- 322-65-15-A

Maryland - D.C.

K3ZJ 210,150-1401-75-24-B
W3FA(WA3ZAS,opr)
202,800-1350-75-24-B
W1FLM/3 202,200-1348-75-24-B
W3LPL(W3XY,opr)
199,200-1328-75-24-B
WA3DSD 198,450-1323-75-24-B
K3SA 182,250-1215-75-24-B
K3NA 175,676-1187-74-20-B
N3GB 165,316-1117-74-24-B
WA3VUQ 143,100- 954-75-23-B
N3RL 140,400- 936-75-23-B
K3TA(N3TR,opr)
134,384- 908-74-24-B
W3UJ 120,916- 817-74-23-B
K2PLF/3 111,690- 765-73-22-A
K3ZZ 106,580- 730-73-24-B
WB3CFD 103,304- 698-74-23-A
K3PI 100,788- 681-74-24-A
WA3ZJT 96,068- 658-73-24-B
WA3RSK 89,550- 597-75-24-A
W3UO 79,920- 555-72-24-B
W3IDT 79,132- 542-73-21-A
K3IU 77,616- 539-72-12-B
N3II 74,888- 506-74-14-A
WB3FAF 74,168- 508-73-20-B
WA3UPH 68,034- 493-69- 9-B
WB3CGI 67,392- 468-72-21-A
W3AZ 60,336- 419-72-24-B
W3ADO(N6CY,opr)
46,930- 361-65-10-B
WB3ANV 45,832- 337-68-17-A
K3ON 44,660- 319-70-16-A
N3JA 44,380- 317-70-15-A
W3GNQ 40,820- 314-65- 9-B
W3HVM 36,432- 264-69-10-B
W3IGJ 24,840- 207-60- 9-B
WA3VPL 23,312- 188-62-10-A
AB3B 23,040- 180-64- 7-A
N3AM 20,800- 200-52- 4-A
WA3TAI 19,140- 165-58- 5-B
N3TR(K3TA,opr)
15,800- 158-50- 2-B
W3PWQ 14,518- 119-61-10-A
K3ZNV 9240- 110-42- 8-A
K3IC 9200- 100-46- 3-A
WB3BZU 8800- 100-44- 7-A
WB3BXU 5576- 68-41- -A
WB3ANZ 5460- 78-35-12-A
K3WS 3150- 63-25- 3-B
W3TUX 3074- 53-29- 4-A
W3FQF 2378- 41-29- 4-A
K3APM 570- 19-15- -B
W3BIL 2- 1- 1- 1-B
K3RA(+N3s EO IC)
169,500-1130-75-24-B
WA3EKL(+WA3s BDF KCY)
167,400-1116-75-24-B
WB3JHP(+WB3LGV)
15,840- 165-48-18-A

Western Pennsylvania

K3UA 224,250-1495-75-24-B
WA3TBW 221,704-1498-74-24-B
K3FR 75,000- 500-75-18-A
N2GL/3 63,840- 456-70-21-A
WB3CRB 35,328- 276-64-24-A
K3KO 28,800- 225-64- 7-A
N2SL/3 26,220- 230-57- 8-A
K3FOP 25,420- 205-62-11-A
KB3BV 23,436- 186-63-12-A
WN3CWW 22,784- 178-64- 8-A
WA3LJW 21,352- 157-68-12-A
WB3AKK 15,134- 161-47-12-A
WA3ESH 8184- 66-62-12-B
K3LR 2244- 51-22- 1-A
WB3KJD 1584- 33-24- 2-A
K3LA 952- 34-14- 3-A
WB3HSV 696- 29-12- 2-A
WA3PCX 8- 2- 2- 2-A
WB3DHG(+K3s LA LR,WA3YTA)
204,000-1360-75-24-B
W3KWH(K3s IVE RYA TP,W3SVJ, WA3s DEE DKY IWA FYJ,WB3s AGB BOV EHQ,oprs)
150,900-1006-75-24-B
K3RN(+W3AS)
142,650- 951-75-24-B
WB3JSI/3(K3SQD,WA3s ZBJ ZBU, WB3s AFH BRD CEW EKB EVZ, oprs) 55,580- 397-70-24-A
W3GQ(+KA3ACV)
50,616- 342-74-14-A
WB3HDT(+KA3BJZ,WB3IJK)
45,952- 359-64-24-A
WB3DKT(+K3OV)
19,722- 173-57- 8-A

4

Alabama

N4KG(WN4KKN,opr)
191,250-1275-75-24-B
N4FD 124,800- 832-75-22-B
AC4X 70,650- 471-75-12-B
K4ZGB 67,636- 457-74-16-A
K4VNM 45,900- 306-75-21-B
W4PVK 29,920- 220-68-24-A
N4QB 27,720- 231-60-13-A
N4AQS 23,940- 190-63-10-A
K4GSK 5408- 52-52-11-A
WA4MGJ 2332- 53-22- 5-A
WA4UGF(+KA4CRU,WB4TCH, WB9NZF)
171,750-1145-75-23-B
KB4GQ(KA4ELV,N4AWW,oprs)
54,040- 386-70-20-B

Georgia

WD4HXC 182,354-1249-73-24-B
N4EU(WA4OZT,opr)
141,766- 971-73-15-B
K4HAV 102,300- 682-75-21-B

AA4GA 74,850- 499-75-13-B
AI4X 38,360- 274-70-22-A
AK4T 34,780- 235-74-19-A
K2JEK/4 32,688- 227-72-19-A
WB4YBE 20,240- 184-55-14-B
WD4MYD 18,644- 158-59-10-A
WD4DGZ 18,544- 152-61- 8-A
WD4NAE 15,048- 132-57- 7-A
K4BAM 13,794- 121-57- 6-A
AA4U 10,856- 118-46- 4-A
W4GXW 10,710- 119-45- 6-A
WD4IRQ 10,494- 99-53-18-A
K4BAI 7954- 97-41- 2-B
WD4IIW 1428- 34-21- 2-B
W4AQL(WA2MBP,WA3WCO, WB3DRE,N4HR,WA4s QYV ZBO, WB4RBL,oprs)
161,616-1092-74-24-B
WD4IXD(+WD4EFK)
152,784-1061-72-22-B
W4MRJ(+N4AUF,WA4s NAD URY, WD4HJJ) 71,100- 474-75-18-B
WD4ICC(+WA4JAJ,WD4ICD)
57,670- 395-73-24-A
WD4CJU(+WD4GQT)
25,194- 221-57-11-A

Kentucky

K4FU 121,800- 812-75-20-B
WB4HNH 117,216- 792-74-22-B
WA4YOF 105,300- 702-75-19-B
WB4PRU 102,712- 694-74-21-B
WB4FDT 91,168- 616-74-22-A
WA4UIH 44,086- 329-67-16-B
K4KWT 24,274- 229-53- -A
WB4OSS 24,000- 161-75- 8-B
WB4JFX 16,592- 122-68-20-A
WB4QNG 12,960- 135-48-12-A
WB4HDK 5916- 58-51- 8-A
WD4HPL(+WA4s QAL YNV)
48,490- 373-65-12-B

North Carolina

N4UH 176,660-1210-73-24-B
N4AA 151,200-1008-75-19-B
K4JEX 118,650- 791-75-16-B
N4QY 91,650- 611-75-20-B
WD4QCO 88,448- 691-64-21-B
KB4JO 72,036- 522-69-18-A
WD4AVY 47,304- 324-73-22-A
N4RE 45,260- 310-73-13-A
WD4GXO 21,228- 174-61-10-A
W4YK 15,000- 100-75- 7-B
WD4GWQ 12,500- 125-50-14-B
W4OMW 12,154- 103-59- 7-B
WB4AQK 11,352- 132-43-13-A
WA4COZ 11,076- 142-39-14-A
KB4AP 4148- 61-34- 2-A
WA4SLC 2760- 46-30- 7-A
WD4DEA 1512- 36-21- 4-A
N6DR 1404- 39-18- 1-B
N4GF 704- 22-16- 1-B
W4ATC(AA4s NC OO,WA4DFP, WN4BBJ,oprs) 58,995- 393-75-11-B
WA4HWT(+WB4OTP)
50,250- 375-67-16-A
WD4HDX(+WA4WAC)
32,950- 235-69-24-A
W4AMC(AI4J,KA4CIO,W4OMW, WA4s SLC VOJ,WD4s EIQ IOA, oprs) 20,160- 144-70-20-B

Northern Florida

WB4SKI(WB4QBB,opr)
215,850-1439-75-24-B
N4UF 210,600-1404-75-23-B
N4SA 159,300-1062-75-18-B
W4ZTW 71,712- 498-72-18-B
W3TOO/4 56,856- 412-69-19-A
N4MS 48,750- 325-75-22-B
WD4BIW 46,240- 340-68-18-A
WB4YEV 43,956- 333-66-16-A
WA4OEM 43,928- 323-68- 8-A
W4VQ 29,200- 200-73- 5-B
AA4NA 20,000- 200-50- 3-A
W4BSO 15,680- 140-56-10-B
N4GG 10,824- 123-44- 3-B
WD4ETG 10,248- 122-42- 6-A
WA4ESH 6540- 109-30- 7-B
N4EF 4620- 66-35- 2-B
WD4IJO 3996- 54-37- 6-A
WA4YUB 3720- 62-30- 8-A
WD4JWR 1892- 43-22- 6-A
WA4QGW 630- 21-15- 3-A
WA4GYJ 544- 17-16- 3-A
WB4DIL 384- 16-12- 3-A
N4WW(+KG4OO,WB4s DRZ YFF)
192,150-1281-75-24-B
WA4DUD(+WB4GDT)
123,340- 881-70-24-B
N4ID(+WA4s OFE QFJ)
44,660- 319-70-23-A

South Carolina

N4ZG 58,312- 394-74-23-A
N4DT 54,464- 368-74-15-B
WA4RYN 49,140- 351-70- 8-A
WD4NNP 31,872- 249-64-19-A
K4ADI 25,530- 185-69-11-A
WB4AFP 19,494- 171-57-10-A
WA4WSV 3432- 52-33- 9-A

Southern Florida

W4PCS(K1DH,opr)
197,400-1316-75-21-B
WD4OIX 75,072- 544-69-20-A
WD4HSP 58,290- 435-67-22-A
N4BP 32,240- 310-52- 5-B
WB4FYS 12,412- 107-58- 7-B
WD4FGI 520- 20-13- 4-B

Tennessee

K4XU 160,950-1073-75-24-A
N4ZZ 114,302- 853-67-12-B
KB4CG 100,886- 691-73-24-A
K3CQ/4 99,300- 662-75-19-B
K4PJ 91,050- 607-75-16-B
WD4EXO 62,550- 417-75-23-A
WB4YFW 31,950- 225-71-14-A
WB4WHE 25,132- 206-61-20-B
WD4HUT 18,800- 188-50-10-A
WA4ZZU 11,526- 113-51- 9-A
AA4AA(+AA4s H KT TN TP, AB4H,K4s LN LSP,N4s IR TN, W4JD) 177,150-1181-75-24-B
WA4UCE(WA4QZM,WB4s BFS IFB WD4s GZS GZV,oprs)
40,650- 271-75-22-A
WD4EOL(KA4s DYD EKD,N4ALX, WD4s EWA GUL GUM GUP IBN, oprs) 37,204- 262-71-23-A

Virginia

K4VX(K3EST,opr)
229,350-1529-75-24-B
W4BVV(WA3AMH,opr)
203,400-1356-75-24-B
W4QAW(W3ZZ,opr)
201,900-1346-75-24-B

K4AF(WB3DNL,opr)
187,902-1287-73-24-B
N4RV 172,800-1152-75-22-B
K4YF(K3KU,opr)
153,750-1025-75-18-B
W3YY/4 147,150- 781-75-22-B
N4HB 141,600- 944-75-21-B
WB4BVY 128,550- 857-75-22-B
N4DW 125,250- 835-75-23-B
W4EI 120,742- 827-73-20-B
K4PQL 119,400- 796-75-21-B
W4MYA 117,150- 781-75-15-B
W4DM 110,550- 737-75-18-B
N4DJ 107,550- 717-75-22-B
K0DX/4 85,050- 567-75-13-B
WA4NTP 76,650- 525-73-19-B
K4YT 73,730- 505-73- -B
K2BA/4 72,300- 482-75-18-B
N4MM 59,550- 397-75-13-A
WA4ZIV 56,548- 422-67-21-B
K4GKD 56,760- 410-68- 8-B
WA1LJP/4 55,592- 450-66-24-A
AA4D 51,408- 357-72-15-A
N4ZR 45,760- 352-65-10-B
WA4EMU 40,986- 297-69-22-A
W4EZ 36,500- 250-73- 9-B
W8AKS/4 30,228- 229-66-14-A
K4ZA 29,054- 199-73-13-B
K4FNE 27,840- 232-60-11-A
W4NH 26,780- 206-65- 6-B
W4JVN 25,472- 199-64-12-B
K4FJ 23,500- 250-47- 5-B
WD4NNC 22,320- 188-60-17-A
W4XD 20,736- 192-54-12-A
N4AHI 20,130- 183-55-19-A
W4KMS 19,588- 166-59-13-A
WA4CYR 16,166- 137-59- 7-A
W4KP 15,782- 147-53-14-B
KA4DSL 14,396- 118-61- 8-A
W4NW 10,580- 115-46- 4-B
N4RA 6984- 97-36- 3-B
K4UR 4550- 65-35- 5-A
W4YE 2800- 50-28- 1-A
WA4WYN 1496- 44-17- 1-B
WB2WVG/4 1026- 27-19- 2-A
K4EBY(+K4YEP)
147,900- 986-75-21-B

West Indies

KP4RF(N6CJ,opr)
333,600-2224-75-24-B
KV4GC 12,852- 126-51- 9-A

5

Arkansas

N5DX(K8CC,opr)
197,100-1314-75-24-A
WD0APC/5 84,712- 569-74- -B
AE5L 49,800- 332-75-12-A
WD5HSX 30,622- 251-61-14-A
W4OGG/5 26,000- 200-65- 9-A
WD5DJW 19,910- 181-55-16-A
WB5VIO 19,440- 180-54-14-A
WD5FAK 15,620- 142-55- 8-A
WA5DTK 1260- 30-21- 3-A
WA5TCL(+K5LG)
140,850- 939-75-21-B
WA5YJV(WB5WOQ,WB8VMN, WB9RKS,oprs)
108,600- 724-75-24-B

Louisiana

K5SL 104,250- 695-75-24-A
WB5UQW 96,360- 660-73-23-B
W5WG 60,200- 430-70-20-A
KB5FI 52,910- 407-65-19-A
WA4FIB/5 49,580- 335-74-16-A
W5MH 23,532- 159-74-11-A
WD5DUD 20,448- 144-71-15-B
N5JM 17,056- 164-52- 6-A
K5KLA 11,250- 75-75- 7-A
WD5BUA 5220- 87-30- 7-A

Mississippi

W5VSZ 221,400-1476-75-24-B
K5UKH 61,650- 411-75-18-B
AE5H 59,700- 398-75-16-A
N5IQ 43,800- 300-73-13-A
WD5GUP(+WD5JNC)
9800- 70-70-19-A

New Mexico

W5YZ 128,168- 866-74-24-A
AA5R 108,336- 732-74-14-A
WD5FVK 91,020- 615-74-22-A
WB5TXJ 39,312- 273-72-20-A
K5TA 18,984- 226-42- 4-A
K5XY 11,340- 126-45- 6-A
K8TE/5 8200- 100-41- 2-B

Northern Texas

K5JA 257,400-1716-75-24-B
N5CR(W5MYA,opr)
248,850-1659-75-24-B
N5JB 158,400-1056-75-20-B
N5UD 126,300- 842-75-22-A
WB5WJX 114,912- 798-72-20-A
AF5K 112,858- 773-73-16-B
WA5BFR 104,536- 716-73-21-A
WB5SXW 90,881- 640-71-24-A
AD5L 75,774- 519-73-24-A
AG5N 63,360- 440-72-20-A
WB5MJK 61,050- 407-75-21-B
WA0SHA/5 59,924- 422-71-20-A
W5LKP 57,888- 402-72-19-A
N5EG 54,360- 453-60-13-B
N5EX 49,284- 333-74-18-A
K5ERJ 45,960- 383-60-11-A
K5TJ 39,564- 314-63- 4-B
K5KJ 36,966- 303-61- 4-B
N5ASU 33,938- 239-71-15-A
K5RY 29,436- 223-66-12-B
K5NW 27,664- 247-56- 3-B
K5BVM 26,496- 207-64-13-A
AF5H 26,196- 222-59- 7-A
N5KT 26,112- 204-64-11-A
WA5GYX 24,600- 205-60-15-A
KB5AH 22,572- 171-66-21-A
W5SOD 9200- 100-46- 6-B
W5TEN 7920- 110-36-10-B
K5MR 6800- 100-34- 2-A
KA5CDZ 4698- 87-27- 3-B
K5RX(+K5XR)
217,650-1451-75-24-B
WB5UKI(+AA5D,K5RT I,WB5s JBP LWB WYE,WD5EWP,oprs)
204,000-1360-75-24-B
WB5AHX(Multiop)
128,168- 866-74-24-B
K5JEF(WA1YJW,WA3ZPP,WB5s PUN QCN,WD5ISA,WA7VMC, WB0TEV,oprs)
110,550- 737-75-24-B
AG5B(+WB5OFB,WD5GXD)
63,360- 440-72-24-A
WB5TGK(+K5GD,WD5ACA)
59,130- 405-73-24-A

N6TR no. 6 cw

WB7RKE no. 1 low power Utah phone

N5DX no. 1 low power phone

K5FUV(+N5AU) 51,740- 398-65- 7-B

Oklahoma

K5CM 190,050-1267-75-23-B
N5CG 178,800-1192-75-24-B
N5ND 111,296- 752-74-21-B
K5DEC 52,688- 356-74-19-B
WD5FRQ(+WD5HBX) 76,664- 518-74-24-A
WB5VXL(+WB5ZRN) 16,800- 175-48-14-A

Southern Texas

K5TM(K5ZD,opr) 253,650-1691-75-24-B
K5RC(K5WA,opr) 233,850-1559-75-24-B
N5DU 169,312-1144-74-20-B
K5LZO 159,000-1060-75-17-B
WA5LYX 105,364- 742-71-23-B
WD5CSK 97,980- 690-71-22-B
K5GA 97,200- 648-75-11-B
K5EI 92,736- 644-72-15-B
K5GB 86,544- 601-72-16-B
K5DX 82,650- 551-75-18-B
WA5UHT(KA5CHW,opr) 62,980- 470-67- -B
K5NU 53,300- 410-65- 6-B
K5NA 46,176- 312-74- 5-B
W5RRR(W5LSZ,opr) 45,544- 328-74-19-B
K5BZU 39,798- 297-67- -B
N5ATC 35,728- 308-58-18-A
N5ALS 22,814- 187-61-17-A
WD5AAH 16,188- 142-57-15-A
N5RO 15,808- 152-52-13-A
N5APQ 15,180- 138-55- 7-A
K5MEN 12,936- 132-49-13-A
WD5IEB 12,236- 133-46- 9-B
WA5ABR 11,424- 112-51- 7-A
WD5EHB(K5TM,opr) 8658- 111-39- 2-B
K5WA(K5RC,opr) 8424- 108-39- 1-B
N5DB 5100- 75-34- 4-A
WB5GGK 5046- 87-29- 9-B
K5TU 1680- 35-24- 2-A
N5ZR(KA5CHW,opr) 1380- 30-23- 3-A
W5HNS 832- 26-16- 1-A
W5AC(K5GN,WD5DLZ,oprs) 202,050-1347-75-24-B
K5HXR(+KA5CHW,WA5KRI) 146,876-1006-73-24-B
K5KG(+AD5W) 145,200- 968-75-24-B
N5WW(+K5TU) 118,548- 801-74-13-B
W5TMV(+WB5MWT) 14,040- 117-60-16-A

Canal Zone

KZ5NO(K1MM,opr) 163,950-1093-75-17-B
KZ5OO 9090- 101-45- 8-B

6

East Bay

N6IG 249,300-1662-75-24-B
N6RO 243,150-1620-75-24-B
W6BH(WA6VEF,opr) 215,400-1436-75-24-B
N6KB 204,450-1363-75-24-B
AI6V(N6KT,opr) 203,204-1373-74-24-B
WA6OIL 189,440-1280-74-20-B
K6HIH 178,340-1205-74-24-B
K6RV(AI6V,opr) 171,400-1142-75-23-B
WA6BUB 146,964- 993-74-20-B
K6GYE 138,116- 946-73-23-B
K6PJY 102,712- 694-74-23-A
WB6TZQ 89,688- 606-74-13-B
N6VV 74,692- 526-71- -B
N6AMG 50,960- 364-70-18-B
WA6KEQ 45,158- 337-67-19-A
WB6ZEP 38,220- 273-70-16-A
K6CSL 34,272- 272-63-24-A
W6RT 31,020- 235-66- 6-A
K6ALV 30,552- 228-67- 9-A
N6DN 8722- 89-49- 5-A
W6RB(N6KI,opr) 5300- 106-25- -A
WB6DHH 4290- 65-33- 4-A
N6DA 520- 26-10- 1-B
K6XO(+N6TV) 171,384-1158-74-24-B
K6ZM(+K5GOE,N6OP) 130,500- 870-75-24-B

Los Angeles

W6HX(N6NT,opr) 290,250-1935-75-24-B
W6CN 92,204- 623-74-21-B
N6HC 86,400- 600-72-22-B
W7CB/6 77,400- 516-75-14-B
WA6EZV 53,760- 420-64-13-A
W6GNS(WB6RXW,opr) 45,144- 342-66-19-A
AB6J 37,922- 283-67-24-A
K6MP 34,430- 313-55- 4-B
N6HE 26,220- 230-57- 5-B
AA6BG 22,200- 185-60-13-A
N6IC 18,200- 130-70- 8-A
WA6NPA 14,406- 147-49-12-A
WB6OEO 14,310- 135-53- 8-B
K6SE 11,250- 75-75- 7-B
WA6BIE 9120- 76-60-15-A
WA6WAZ 8720- 109-40- 5-A
WB6NFO 6956- 74-47- 9-A
W6PFE 6642- 81-41-10-A
WB6WWU 3420- 57-30- 6-A
KB6FN 2914- 47-31- 6-A
N6AA 1224- 34-18- 1-A
K6UYK 384- 16-12- 3-A
WA6SFM(WA6s FSF PZL,WB6s CIA JJE,oprs) 82,800- 552-75-22-A
W6YRA(AI6K,N6TS,WB6LHO, WD6BAY,oprs) 35,532- 282-63-12-A

Orange

WD6FLV 36,570- 265-69-20-A
N6HK 15,196- 131-58- 8-B
WB6GCF 7990- 85-47- 6-A
WA6AUJ 7488- 117-32- 4-A
WB6AJV 1550- 31-25- 3-A
AG6I(+WD6GKS) 84,972- 582-73-24-A
W6LEN(+WB6TPG) 21,492- 199-54-11-A

Santa Barbara

N6MB 133,050- 887-75-19-B
N6TR 119,664- 831-72- 8-B
WA6IJZ 50,662- 347-73-20-B
WA6DJS 38,440- 267-72-14-B
N6ADI 34,860- 249-70-11-A
W6KPJ 24,396- 214-57- 9-A
WB6JKM 19,332- 179-54-15-A
W6OUL 17,600- 160-55- 5-B
AG6F 13,200- 110-60-10-A
WB6NZL 10,000- 100-50- 9-A
WB6OBZ(+AJ6O,W6TAG) 142,000-1000-71-23-B
N6AFT(+AB6R) 34,364- 242-71-15-A
WB6OBQ(WB6s PLG RNT,oprs) 15,496- 149-52- 8-A

Santa Clara Valley

K6OQ(WB6DSV,opr) 252,750-1685-75-24-B
N6BT 241,950-1613-75-24-B
N6MG(WA6PGB,opr) 204,150-1361-75-24-B
WA6HCI 198,450-1323-75-24-B
N6TA 181,800-1212-75-21-B
WB6SHD 169,950-1133-75-24-A
K6KLY 168,000-1120-75-22-B
K6HNZ 161,550-1077-75-24-B
W6XX 160,580-1085-74-18-B
K6BR 152,850-1019-75-19-B
WB6DFX 136,650- 911-75-23-B
W6LH 130,240- 880-74-21-B
N6TU 130,092- 879-74-20-B
W6OKK 129,000- 877-75-20-B
N6NF 107,136- 744-72-20-A
W6NLG 93,024- 646-72-18-B
K6RM 90,958- 623-73-18-A
N6QW 90,900- 606-75-22-A
WA6ITV 83,808- 582-72-22-B
K6RU 83,804- 586-73-16-B
N6XI 81,614- 559-73-13-A
WB6RIU 78,144- 508-74-12-B
AJ6V 77,586- 579-67-15-B
AA6GM 46,718- 329-71- 8-B
WA6FFI 40,460- 289-70-23-A
W6SXD 36,580- 295-62-17-B
W6XB 33,390- 265-63- 9-B
WA6BZY 27,956- 241-58-14-A
N6IQ 25,630- 233-55- 5-B
K6VGW 23,668- 194-61- 9-A
WD6BWO 21,888- 192-57-10-A
W6WZF 18,512- 178-52-14-A
W6SUJ 17,278- 163-53- 7-B
WA6SVW 15,582- 147-53-18-B
W6LID 13,144- 124-53- 7-A
WA6LIJ 9200- 100-46- 6-A
WD6FMG 3456- 64-27- 4-A
WB6OML 2494- 43-29- 5-A
K6DC 580- 20-17- 2-B
W6JZU(W1ARR,AA6UO,oprs) 223,350-1489-75-24-B
W6YX(K4EO,N1OO,N7MH, WA6HJV,oprs) 208,680-1410-74-24-B
N6RZ(+AA6I,WA6OCV) 204,832-1384-74-24-B
K6FB(AA6G,WD6AGJ,oprs) 186,450-1243-75-24-B
WB6POT(+AA6KB,WB6GSZ) 142,852-1006-71-22-B
WD6EPV(+WB6CBJ) 117,364- 793-74-21-B
W6OWQ(+WA6AVS) 97,344- 676-72-15-B
K6MA(+WA6NIL,W8RPA) 68,320- 488-70-17-B
W6YL(WD6s CHF UBM,oprs) 68,310- 495-69-15-A

San Diego

K6NA(WA6ELX,opr) 240,900-1606-75-24-B
WA6NEL 117,450- 783-75-15-B
N6ND 94,752- 658-72-12-B
K2UVG/6 47,304- 324-73-16-A
W7KHN 40,560- 312-65- 7-A
W6KDO(WD6CZR,opr) 30,240- 252-60-19-A
WA6UFY 28,928- 226-64- 3-B
W6UQF 22,140- 205-54- -A
K6GC 15,960- 140-57-10-A

San Francisco

N6BV 246,300-1642-75-24-B
AA6DX 170,250-1135-75-24-B
N6CT 161,320-1090-74-15-B
WB6FCR 68,976- 479-72-21-B
N6QC 32,340- 231-70-13-A
W6BIP(+WA6s DJI PYN) 150,900-1006-75-24-B
WB6NBR(+WA6RNF) 55,238- 389-71-16-A

San Joaquin Valley

AA6R 149,504-1024-73-21-B
W6YKM 125,800- 850-74-22-B
WB6YKY 60,384- 444-68-21-B
WB6ION 60,176- 449-67- 7-B
N6PR 50,646- 367-69-20-B
K6AO 18,000- 150-60- 9-A
WA6YAB 10,406- 121-43- 8-A
K6TG 9408- 98-48-12-A
K6AYA(+WA6OEC) 172,950-1153-75-24-B

Sacramento Valley

K6SG 152,292-1029-74-21-B
N6JV 71,484- 483-74-22-B
N6JM 54,750- 365-75-10-B
WB6RDA 47,710- 367-65-13-A
WA6OWH 44,968- 308-73-15-A
WA6EZM 34,580- 247-70-12-A
K6XB 27,720- 198-70-18-A
WA6FYP 19,600- 175-56- 9-A
W6NKR 3626- 49-37- 4-B

Pacific

KH6WF 152,700-1018-75-21-B
KH6IJ 136,900- 925-74-17-B
KH6GMP 66,096- 459-72-14-B
KH6JTW 21,212- 184-69-10-A
K2SS/KH6 88- 8- 8- 3-A

7

Arizona

W7KW(W6TPH,opr) 306,150-2041-75-24-B
K6LL/7 229,050-1527-75-24-B
K7JVR 166,950-1113-75-24-A
W7UV 166,200-1108-75-24-A
AB7E 75,740- 541-70-22-A
W7ZMD 54,720- 380-72-15-B
N7CW 35,952- 321-56- 5-A
N7AGX 34,680- 289-60-14-A
N7ACP 21,624- 204-53-13-A
WB8PNZ 11,340- 135-42-14-B
K7TX 8190- 91-45- 5-A
N7US 7210- 103-35- 2-B
K7RUF(KA7BFZ,WB7PGR,oprs) 25,200- 200-63-12-B

Idaho

K7NHV(KØEJ,opr) 198,912-1344-74-24-B
W7LQT 144,152 974-74-24-B
WN7CSI 39,680- 310-64-18-A
AC7P 27,300- 182-75-12-A
K7TM(+AE7L,K7FR,WB7NSW) 118,500- 790-75-24-A

Montana

W7JYW 183,224-1238-74-24-B
W7TYN 152,100-1014-75-21-B
W7YB 136,800- 950-72-24-B
K7GA 122,544- 851-72-13-B
WA7IIQ 5640- 60-47- 7-A
N7ANT 374- 17-11- 2-A
W7FO(N7AF1,WA7s FLG LSF MUU PZO YSH,WB7s BLL UKK,oprs) 98,264- 692-71-18-B

Nevada

WA7NIN(N6SF,opr) 247,800-1652-75-24-B
WB7OQW(K7OX,opr) 240,900-1606-75-24-B
N7YL 87,408- 607-72-24-A
WA7DIA 44,208- 307-72-16-A
WB7VVH 9180- 102-45-18-A
WB7PIJ(WB7PIP,opr) 35,700- 255-70-20-A

Oregon

W7NI 233,544-1578-74-24-B
WA4HRG/7 179,228-1211-74-22-B
W7ZR 99,084- 718-69-11-B
W7XN 85,100- 574-75- 9-B
W7MLJ 45,640- 326-70-19-A
W7TWL 28,600- 226-63-17-A
WB7RKT 28,224- 224-63- -A
K7GDN 25,088- 196-64-14-A
W7JZV 23,250- 155-75-15-B
W7LT 15,344- 137-56-13-B
WA7PWZ 10,290- 105-49- 9-A
K7EAU 7854- 119-33-18-A
WA7GZA 3180- 53-30- 4-A
K7FD(+WA7s WEP WNG) 100,936- 682-74-24-A
WA7AJE(WB7s ECW NMM PJR SHD SHE,oprs) 23,010- 195-59-19-A

Utah

N7DF 111,836- 766-73-12-B
WB7RKE 74,936- 551-68-22-A
W7GXC 69,642- 477-73-15-A
WB7TND 50,176- 392-64-12-B
W7LRG 42,768- 297-72-15-A
WB7SVQ 34,368- 358-48-14-A
K7UT 19,332- 179-54- 6-A
WA7ZRB 13,770- 135-51-16-A
N7AON(+WB7RJM) 117,320- 838-70-22-B

Washington

K7RI(W7WA,opr) 275,132-1859-74-24-B
N7ZZ 216,150-1441-75-24-B
N7NW 142,376- 962-74-16-B
WB7BFK 131,868- 891-74-17-B
WB7BNP 130,050- 867-75-24-A
N7AM 94,050- 627-75-22-B
W7BUN 82,880- 560-74-13-B
W7LKG 77,328- 537-72-23-B
K7AWB 75,150- 501-75-22-A
AC6D/7 59,924- 422-71-24-A
K7JV 58,098- 421-69-18-A
W7NP 48,896- 382-64-14-B
KZWA 44,730- 315-71-16-A
K7WTG 43,524- 351-62-10-B
WB7UXK 41,038- 289-71-19-B
K7IOO 34,914- 253-69-16-A
WA7GVM 30,686- 228-67- 6-B
W7LRD 29,812- 257-58- 9-A
K7ND 29,104- 214-68-17-A
WA7PVE 24,310- 187-65-10-A
W7NG 21,708- 201-54-10-A
W7DWJ 20,880- 180-58-16-A
N7ACI 15,856- 196-43- 5-B
K7IDX/7 15,688- 148-53- -A
K7CR 14,784- 154-48- 6-A
N7DX 13,616- 148-46- 3-B
W7HX 11,800- 118-50- 4-B
K7BFL 10,494- 99-53- 4-A
K7QLC 10,000- 100-50- 9-A
W7WIA 9900- 110-45- 7-B
N7AII 9416- 107-44- 5-B
K7NF 8600- 100-43- 5-B
WB7ALS 8200- 100-41- 8-A
K7EFB 3040- 70-36- 4-A
WB7OXA 4320- 72-30- 9-A
N7LXG 3392- 53-32- 4-A
WB7PSP 1886- 41-23- 2-A
K7IM 1800- 60-15- 3-A
K7UU 1216- 32-19- 1-B
WA7OII 1188- 33-18- 3-B
W7JIE 1152- 36-16- 2-A
K7ETU 576- 24-12- 4-A
W7DOU 480- 20-12- 2-A
WB7SWU 390- 15-13-11-A
W7BCS 32- 4- 4- 1-B
N7AMV 2- 1- 1- 1-A
W7DK(K7QLC,W7KKN,WA7s ZPK ZZA,WB7s QNP VBV VGX,oprs) 105,364- 742-71-20-B
W7UMX(K5WTA,WB5TWK, WB7AQX,oprs) 92,448- 642-72-21-B
N7RV(+WA7LVN) 52,268- 358-73-16-B

Wyoming

W7ZQ(KØUK,opr) 273,450-1823-75-24-B
WB7TRQ 86,632- 637-68-16-A
K7IO 59,644- 403-74-16-B
K3PUR/7(+WBØTUB) 32,320- 249-65-17-A

Alaska

KL7HCC 121,800- 870-70-12-B
KL7AF 83,352- 604-69-18-B
AL7W 15,660- 145-54-18-A
KL7JEO 1320- 33-20-20-A
KL7HR(+AL7AF,KL7s IUM IVX IXZ,WL7ABB) 143,956-1005-73-20-B

8

Michigan

K8LX(WA8ZDT,opr) 223,200-1488-75-24-B
K9UK/8(WB9DZS,opr) 186,000-1240-75-24-B
W8FF 182,250-1215-75-24-B
K8MJZ 167,100-1114-75-24-B
AC8Y 141,000- 940-75-22-B
N3ER/8 139,650- 931-75-24-B
W8MNL 134,028- 918-73-23-B
WA8QEF 118,050- 787-75-24-B
W8LAQ 113,442- 777-73-20-A
K8OT 111,740- 755-74-23-B
K8DD 82,938- 601-69-16-B
K8SIA 80,068- 541-74-17-B
WA8MAM 79,500- 530-75-23-A
WD8MGQ 78,522- 569-69-24-A
K8GSR 70,448- 476-74-21-B
W8HW 66,882- 471-71-22-A
WA8MEC 66,452- 449-74-17-B
WA8SQL 62,928- 437-72-20-B
N8AGY 61,628- 434-71-18-A
WD8QOY 56,550- 435-65-20-B
WB8AYW 56,240- 380-74-18-A
WA8OWG 51,800- 370-70-17-A
K8CV 49,446- 369-67-22-A
WA8MJY 48,248- 326-74-17-A
WD8JMP 47,360- 320-74-17-A
WD8DKM 46,574- 319-73-17-A
WA8ZTQ 41,616- 289-72-20-B
K8RDJ 41,540- 310-67-17-A
WB8UIA 40,870- 305-67-11-A
K8KM 39,476- 278-71-14-B
W8QGP 38,304- 266-72-12-B
W8UZC 35,700- 238-75-19-A
N8LA 29,510- 227-65-14-A
WB8SBI 29,264- 248-59-11-B
WB8VCC 28,944- 216-67-14-A
W8KZM 28,368- 197-72- 8-B
K8ICE 28,160- 220-64-13-B
WB8UKU 27,772- 262-53-17-A
WA8RRR 27,600- 230-60- 4-B
WD8DSV 26,928- 198-68-10-B
K8RO 26,586- 211-63- 6-B
K8BP 25,792- 208-62-14-A
W8ETH 25,536- 224-57-10-B
WB8OBF 23,058- 189-61-11-A
WD8MAW 22,960- 205-56-12-B
W8VPC 18,240- 160-57- 9-A
WD8OKL 17,914- 169-53- 6-A
WA8QAF 17,710- 161-55- 6-A
W8IJS 16,872- 148-57-10-A
K8LF 16,732- 178-47- 4-B
WB8MKR 16,632- 132-63- 4-A
WD8NQE 15,544- 134-58-11-A
WD8JRL 14,490- 161-45- 7-B
AC8W 13,328- 136-49- 5-A
W8TJQ 12,688- 122-52- 6-A
WB8IGU 10,614- 87-61- 6-A
WD8KZX 10,300- 103-50- 7-A
WB8VVY 9844- 107-46- 7-A
WD8JFE 9500- 95-50- 7-A
N8AOE 9494- 101-47-12-A
K8IDZ 9408- 84-56-12-A
WB8ZME 9240- 110-42- 3-A
W8VPW 8976- 102-44- 6-A
K8EMQ 8820- 90-49-11-A
W3GQJ/8 8550- 95-45- 4-B
N8AME 6068- 74-40-13-A
K8CQF 6032- 73-42- 5-A
WD8PXW 5346- 99-27- 8-B
WD8IKZ 4620- 66-35- 4-B
K8GB 3990- 57-35- 3-B
K8MAJ 3840- 64-30- 8-A
WB8HOD 2806- 61-23- 3-A
N8AGR 2310- 55-21- 3-A
WB8UVQ 2300- 50-23- 3-B
K8QLM 2160- 45-24- 6-A
W8JUP 1386- 33-21- 2-A
WB8QFR 1008- 24-21- 5-A
W8QN 840- 28-15- 2-B
W8MAA(K8HXW,opr) 400- 20-10- 2-A
KB8CK 160- 10- 8- 1-B
K8ZRH(+WD8NXO) 93,150- 621-75-15-B
WB8JYX(+WA8s QPN UPU, WB8MOG,WD8AYW) 88,800- 600-74-24-B
WD8NKA(+WA8FTA, WD8KBO) 84,816- 589-72-24-B
WD8CEG(+K8UE,WD8s OUP OUQ) 73,556- 518-71-23-B
K8EA(+WB8s VWE YRY ZAD ZHC WD8s AYV DSB JXK LAQ) 69,408- 482-72-24-B
K8DAC(K8TU,KA8BWL,N8s MK RW,WD8JEQ,oprs) 59,214- 417-71-18-B
K8DO(+WD8s JNQ POK) 58,464- 364-63-20-B
W8TQE(K8s AGM KIC,W8LTE, WB8s DSU VBP ZFB,WD8s AUX CRY KLP KLQ,oprs) 56,980- 385-74-16-B
K8JM(+WA8SJX) 54,860- 422-65-23-B
N8HT(+WD8CQN) 50,400- 420-60-23-B
WB8UHS(+KA8AYW,WB8WIM, WD8NGG) 40,064- 313-64-23-A
WA8VJB(+K8CDM) 35,490- 273-65- -B
W8MAI(WB8NSF,WD8s IEV MAW, oprs) 32,208- 244-66-16-A
N8EP(+WD8PLE) 31,868- 257-62-15-A
AC8U(+WD8OLM) 21,450- 165-65- 8-A
WB8LWS(+WB8ZME) 21,228- 174-61- 9-A
WA8LSS(+WD8CUQ) 20,720- 185-56-12-A
WD8CSA(+W8MPD) 10,498- 181-58-12-A
WA8LAY(+WB8NUS,WD8IMJ) 4482- 83-27- 4-A

K2GQ (WA2KYG at the mike) no. 3 multiop NNJ phone

W9YB (l to r — WB9PUM, N9NB, N9NC) no. 1 multiop Indiana cw

K5GO no. 1 Delta Division cw

Ohio

W8KIC(WB8MZZ,opr)	219,450-1463-75-23-B
K8AZ	207,180-1380-75-24-B
K8MR	205,350-1369-75-24-B
AC8E	170,644-1153-74-24-B
N8LL	141,474- 969-73-23-B
N8RA	135,272- 914-74-24-B
K8MN	133,350- 889-75-21-B
WD8ALG	94,572- 639-74-23-A
W8UPH	91,908- 621-74-24-B
K8FU	83,916- 567-74-17-B
WB8VPA	83,916- 567-74-24-B
WB8URG	77,380- 530-73-22-A
WB8TJS	71,000- 500-71-18-A
K8BL	70,500- 470-75-18-A
K8EE	64,232- 434-74-20-A
K8URE	60,300- 403-75-18-B
WB8JHQ(WD8DTG,opr)	54,740- 391-70-19-A
W8VQI	52,128- 362-72-17-B
AD8P	51,100- 365-70- -B
W8HQN	50,728- 373-68-22-B
WB8NBY	48,910- 365-67-19-B
K8CMO	44,712- 324-69-11-A
W8IDM	44,250- 295-75-20-A
W8KPI	42,704- 314-68-15-B
K8KR	41,888- 308-68-14-B
AA8S	40,320- 288-70-19-A
WB8APJ	38,100- 254-75-13-B
W8YD	36,000- 250-72-14-B
K8BPX	31,644- 293-54- 8-B
WD8EOL	30,016- 224-67-18-A
K8AC	28,080- 195-72- 5-B
W8FN	27,136- 212-64- 6-A
KA8BCZ	26,400- 220-60-16-A
W8RSW	25,456- 172-74-10-B
W8FQG	24,180- 186-65-17-A
W8TK	23,200- 200-58- 5-B
W8OJW	20,060- 170-59-14-A
WD8JRD	18,370- 167-55-18-A
W8IMF	17,820- 162-55-10-B
WA8RCN	17,080- 122-70- 4-B
W8DXT	16,170- 165-49-19-A
WD8OTO	15,792- 141-56-15-A
K8UHX	13,310- 121-55- 5-A
W8VZE	12,932- 106-61- 5-B
K8MFO	11,250- 75-75- 7-A
W8SDV	10,800- 100-54-10-B
WD8JRQ	10,780- 110-49-11-A
N8AFE	10,648- 121-44- 8-A
WD8IJZ	9752- 106-46- 9-A
K8EKG	8560- 107-40- 4-A
WD8PFS	7378- 119-31- 8-B
K8OL	4884- 66-37- 3-B
N8BN	4356- 66-33- 3-A
WD8DKJ	3696- 56-33-17-A
WA1GUD/8	3604- 53-34- 4-B
N8AFY	3402- 63-27- 6-A
AC8X	198- 11- 9- 1-A
K8VVB	196- 14- 7 2-A
WA8ZNC	72- 6- 6- 1-A
W8XT	8- 2- 2- 1-A
WB8JBM(WB8s DQP LSN, WD8LEN,oprs)	195,932-1342-73-24-B
K8ND(+AD8I,K8NU,WB8WKB)	183,150-1221-75-24-B
K8DDG(+WA1TWD,KB8AH,WB8s VLR YIJ + Net)	69,800- 464-75-24-A
W8VL(+WB6LIV,K8BBY, WB8URN)	69,154- 487-71-12-B
WD8OYO(+WD8PMW)	3328- 52-32- 4-B

West Virginia

N8II	193,050-1287-75-24-B
K8BS	80,400- 536-75-23-A
KB8FJ	47,880- 342-70-18-A
WD8CZA	34,894- 239-73-19-B
N8AIL	22,960- 205-56-16-A
W8UT	5538- 71-39- 3-A
W8CUL(WD8CBJ,opr)	4800- 100-24- 2-B
K8UQ	864- 27-16- 4-B
WA8DGE	8- 2- 2- 1-A
K8KT(+WB8SAW)	154,906-1061-73-23-B

9

Illinois

K9CT	238,800-1592-75-24-B
K9RF(K9NO,opr)	202,316-1367-74-24-B
K9BGL	175,200-1168-75-24-B
K9ZO	172,500-1150-75-24-B
K9RMA	171,504-1191-72-24-B
K9SC	142,376- 962-74-22-B
K9IKP(K9UIY,opr)	139,500- 930-75-21-B
K9RS	134,850- 899-75-24-B
WB9TIY	108,750- 725-75-15-B
WA9VKN	98,550- 657-75-18-B
K9KD	90,132- 609-74-24-A
AB9M	82,288- 556-74-20-B
K4VUD/9	81,144- 588-69-24-A
WØRW	75,000- 500-75-11-B
WD9ERG	74,592- 518-72-24-A
K9BQL	72,144- 501-72-17-B
WB9MSV	60,006- 411-73-14-A
W9UVM	51,724- 386-67-12-B
WB9BDK	47,736- 351-68-20-B
WD9INS	46,900- 335-70-24-A
K9GS	45,288- 306-74-14-A
WD9IIX	42,612- 318-67-21-B
WD9ADH	36,300- 275-66- 8-A
W9HPG	30,464- 224-68-15-A
WD9AEU	29,172- 221-66-13-B
AD9K	28,272- 228-62-20-A
N9AHY	27,360- 228-60-15-A
WB9VLM	26,362- 269-49-12-A
W9CQD	25,375- 205-61-14-A
KB9AW	25,220- 194-65-18-A
W9VA	25,200- 200-63- 4-B
W9JUI	24,420- 185-66-16-B
W9LRG(W9AG,opr)	24,282- 213-57- 7-A
W9IIC	23,028- 202-57-11-A
WD9COL	21,158- 149-71- -B
WD9HZK	20,034- 159-63-20-A
K9VV	19,908- 158-63- 6-A
K9GL/9	18,600- 186-50- 3-B
WD9AKE	18,040- 164-55- 9-A
W9IL	17,784- 171-52- 5-B
W9USS	17,600- 160-55-17-B
WD9DYR	16,864- 136-62-15-A
WB9JSR	16,632- 154-54- A
W9GT	16,576- 112-74- 8-B
W9REC	16,254- 129-63-15-A
W9QWM	13,566- 133-51- 8-A
WD9FVH	11,280- 120-47- 9-A
K9JK	10,058- 107-47- 5-A
K9NA	8366- 89-47- 7-A
K9PW	6006- 77-39- 3-A
WD9EGT	5180- 74-35- 7-A
WA9WXC	3484- 67-26- 5-A
N9NA	1584- 33-24- 7-A
WB9OTE	1340- 35-19- 7-B
WB9MEL	1254- 33-19- 4-A
K9CW	1160- 29-20- 2-A
WD9FJE	972- 27-18- 2-A
W9YH(AD9O,K9s GL MK VV, WB9DEP,oprs)	174,600-1164-75-24-B
K9CC(+K9s JK MR,WB9SAD)	132,460- 895-74-24-B
N9AGC(+N9AAP,KA9ATB)	123,750- 825-75-23-B
K9BK(+AA9R)	92,448- 642-72-21-B
N9UN(+DK3XJ)	75,900- 506-75-21-A
K9YUG(+WB9WUW)	65,700- 438-75-23-A
WB9MMM(+WB9SFT)	61,488- 427-72-21-A
WD9EVZ(Multiop)	51,198- 371-69-23-A
WD9DPT(+WD9AYF)	36,722- 301-61-10-B
WD9GUE(+WD9HBA)	25,520- 220-58-18-B
W9CA(+N9AIB)	2052- 38-27- 6-A

Indiana

W9RE	223,050-1487-75-24-B
K9UWA	195,000-1300-75-24-B
W9ZRX(W9ORF,opr)	191,550-1277-75-24-B
N9QX	119,300- 796-75-23-B
N9JG	106,800- 712-75-22-B
AA9S	78,526- 553-71-17-A
WD9IPP	72,854- 499-73-15-B
N9RC	72,432- 503-72-15-B
K9CDB	68,850- 459-75-12-A
WB9UKE	64,084- 433-74-16-A
K9KB	55,950- 373-75-13-B
WB9CEX	37,488- 264-71-22-B
WA9WUC	36,208- 292-62- 7-A
K9FW	33,158- 281-59- 8-B
K9UT	25,288- 218-58- 9-A
W9QLW	22,400- 175-64-11-B
KB9DE	20,736- 192-54-10-A
WB9LCN	18,762- 159-59-10-A
WD9EWT	14,076- 138-51- 8-A
WA9SUS	11,904- 124-48- 5-A
WB9IWN	8580- 130-33- 2-B
N9AFU	7128- 108-33- 6-A
N9AKI	4624- 68-34- 6-A
WB9PIR	2646- 49-27- 4-A
WB9ZDH	1394- 41-17- 3-A
WB9UAD	1050- 25-21- 2-A
K9KY	576- 24-12- 2-B
K9XA(+N9s NB NC,WB9NTL)	162,750-1085-75-24-B
K9IU(WA2s BIJ ECZ,W3EP, WB5FID,WB9VVV,oprs)	63,360- 440-72-19-A
W9LJ(WA9ITB,WB9s CUY VJE, oprs)	51,976- 356-73- 9-A
W9NAA(K9PS,N8RK,WD9FRS, oprs)	15,950- 145-55- 7-B

Wisconsin

W9YT(WB9KMQ,opr)	165,000-1100-75-24-B
N9AW	155,400-1036-75-24-B
WB9JBF(WB9OEC,opr)	147,600-1025-72-23-B
K9FYA	129,150- 861-75-19-B
W9NA	129,056- 895-74-17-B
W9GHY	115,730- 815-71-22-B
WB9EGZ	91,500- 610-75-24-+
N9KS	75,800- 512-75-20-B
K9KR	70,272- 488-72-20-B
K9BX	66,000- 440-75-17-B
WB9VOZ	65,660- 469-70-24-A
WB9ORO	60,680- 410-74-19-B
W9FBC	48,750- 375-65- 9-B
W9OEJ	44,208- 307-72-17-A
N9AU	41,480- 305-68-13-A
WB9EJE	39,304- 289-68-16-A
WB9IZT	37,180- 286-65-17-A
WA9BZW	36,312- 267-68-21-B
W9CUS(WB9PCM,opr)	33,240- 277-60-20-A
W9HI	32,688- 227-72-10-A
WD9GRI	29,880- 249-60-21-A
N9MN	28,272- 228-62-17-B
WB9SVO	28,202- 239-59-12-A
WA9AKV	26,784- 216-62-13-B
W9GKJ	26,288- 212-62- 5-A
W9HE	24,852- 218-57-10-A
WB9WFB	22,388- 193-58-10-B
WA9SQN	21,632- 208-51-12-A
K9WTF	21,616- 193-56- 7-B
WB9SVN	20,910- 205-51-17-B
WD9BCM	19,980- 185-54-12-A
N9AGE	19,600- 200-49-15-A
K9BTQ	19,380- 170-57-10-A
KB9DZ	18,560- 160-58-14-A
WB9ECM	18,090- 135-67-17-A
WD9EKP	17,238- 168-51-14-A
K9JIG	16,854- 159-53-16-A
WD9BCP	15,400- 175-44-11-B
W9GIL	15,000- 100-75-15-A
W9HHX(N9OD,opr)	14,980- 214-35- 6-A
K9IAC	14,812- 161-46-10-A
K9BN	10,800- 150-36- 3-B
WB9RNL	8316- 99-42- 7-A
WB9ZPC	7416- 103-36- 7-A
N9HR	7400- 100-37- 4-A
WB9MPF	7040- 80-44- 4-A
WB9SVM	6480- 90-36- 5-A
WD9CLP	5478- 83-33-11-A
K9JPS	5320- 70-38- 4-B
AA9K	4608- 77-32- 4-A
WB9IXS	4250- 87-25- 4-A
WB9RKF	2808- 52-27- 4-A
WA9ZYL	1806- 43-21- 4-A
W9MKY	1242- 27-23- 3-A
WB9WBZ	400- 25- 8- 2-A
W9DQA(K9VER,W9MZS,WB9UEP, oprs)	143,280- 995-72-24-B
W9DC(+WB9PCQ)	113,664- 768-74-22-B
WB9HME(+WA4TLV,K9VTY, WA9NFG,WB9s FWK TOC,WD9s DTT DTU HTA ILG)	92,160- 640-72-24-B
WD9BLG(+WD9s BKU IGY)	14,798- 151-49- 4-A

Ø

Colorado

KØRF(KØGU,opr)	282,450-1883-75-24-B
KØCL	282,150-1881-75-24-B
WØCP	234,000-1560-75-24-B
WØYK	227,400-1516-75-24-B
WAØVKF	188,100-1254-75-24-B
NØMC	148,650- 991-75-24-A
WØETT	144,000-1000-72-21-A
WBØPEA	120,984- 852-71-21-A
KØPVI	115,292- 779-74-23-A
WØQKY	98,716- 667-74-24-A
KØXD	91,908- 621-74-15-A
NØDV	75,184- 508-74-19-A
WØRMA	74,550- 525-71-18-A
N4UW/Ø	70,794- 513-69-14-A
WØDK(WØPWS,opr)	19,520- 160-61-11-B
NØAJM	10,080- 120-42-11-A
NØAE(+WBØTGA)	76,032- 594-64-15-B

Iowa

ADØF	108,000- 720-75-20-B
KØJGH	75,000- 500-75-24-A
WBØCHS	59,214- 417-71-18-B
NØAFL	53,392- 376-71-23-A
WAØQID	44,064- 306-72-15-A
WØPPF	30,755- 233-66-17-B
WDØAYT	19,328- 151-64-15-B
WDØCMT	18,032- 161-56-14-B
WØNMU	17,640- 140-63-12-A
WØWP	15,000- 100-75-12-A
WBØMLF	11,040- 115-48- 9-A
WAØDCR	4440- 60-37- 4-B
WBØFPE	1254- 33-19- 2-A
WØIO(AEØR,WBØs CHP CSG, WDØs EKP GDL,oprs)	43,952- 328-67-12-B
WBØOKP(+WØYSC)	9288- 108-43-12-A

Kansas

K5JZN/Ø	182,800-1153-75-24-B
WBØISW	127,950- 853-75-24-A
KØCS	77,700- 518-75-14-B
WBØTOC(WBØWHB,opr)	73,130- 515-71-24-A
WØQW(WB1GVD,opr)	47,214- 387-61-19-B
WDØBRX	23,430- 213-55-22-A
KØPFV	15,912- 154-52- 6-A
KAØBCW	13,066- 139-47- 8-B
WAØTKJ	8400- 100-42- 2-A
WBØPEO	1558- 41-19- 7-A
KØWA(+ABØS,KAØs ANQ ANS BBX)	218,300-1475-74-24-B
WØQQQ(WD5CAW,KØMJ,KAØADV KAØBNN,NØAEU,NØSC,WØVS, WBØs NHX QFU SFV SRX,opr)	61,486- 433-71-22-A
WBØAOR(+KH6IQO)	30,378- 249-61-15-A

Minnesota

KØIJL	174,750-1165-75-22-B
WAØLKL	153,300-1022-75-24-A
KØCN	104,850- 699-75-22-A
WØUC	84,656- 572-74-16-A
KØFZG	80,808- 546-74-23-A
ACØW	78,800- 532-75-24-A
KBØC4	60,480- 432-70-19-A
NØADJ	58,904- 398-74-18-A
KØMPH	54,612- 369-74-12-A
WAØQIT	48,672- 338-72-17-A
WA2HFI/Ø	39,336- 248-66-18-A
WBØUKI	38,090- 293-65-17-A
NØNO	37,944- 306-62- 6-A
WAØCQG	33,696- 312-54-15-A
KBØBO	32,256- 252-64- 9-A
KØSE	32,116- 217-74-14-A
WAØJKT	27,324- 207-66- 9-B
KØILI	25,132- 206-61-12-B
WDØBMM	24,800- 200-62-12-A
WAØVHX	24,400- 200-61- 6-A
WDØCNQ	24,304- 217-56- 8-A
WBØDHS	23,880- 199-60-14-A
WAØFPL	11,508- 137-42- 5-A
KØLIP	8352- 116-36- 4-B
NØALL	3120- 52-30- 4-A
KØVW	352- 16-11- 1-A
KBØCQ	308- 14-11- 5-A
KØLTC(KØGRA,NØAKZ,WØUBT, WBØs FBN GPR MCJ SNG SNH SNP,WDØBQR,oprs)	113,124- 857-66-24-A
WBØDQU(+WAØPYB)	102,492- 702-73-24-B
KØTKG(+KØFVF,WBØGDB)	100,350- 669-75-22-B
WBØYUC(+WDØFQF)	48,688- 358-68-23-A
WAØQWY(+KAØCRQ)	42,752- 334-64-20-A
WDØGEN(+WDØGXG)	36,000- 300-60-12-A
WB1FJG/Ø(+WB1DQN)	17,644- 172-51- 6-A

Missouri

NØRJ	160,284-1083-74-23-B
KØFU	151,650-1011-75-22-B
WBØTCQ	145,050- 967-75-22-B
WAØBJR	122,840- 865-71-24-B
KØDEQ	121,360- 820-74-20-B
WØQWS	85,200- 568-75-21-A
WØVE	83,768- 566-74-19-B
WBØTMK	70,080- 480-73-21-A
WBØUZU	67,990- 523-65-19-A
WDØDBM	64,380- 435-74-20-A
WBØLFY	61,740- 441-70-24-B
WBØUXI	56,550- 377-75-20-B
WBØOQV	51,840- 360-72-14-A
KØRWL	41,976- 318-66-12-B
WØMYQ	35,328- 276-64-16-A
WAØEQY	32,384- 253-64-15-A
KØVBU	28,672- 224-64- 7-A
WØYZZ	25,200- 210-60-10-A
WØCDC	25,080- 190-66-11-B
WBØQZY	24,208- 178-68-13-A
WBØVPF	21,600- 180-60-14-A
WDØBBO	20,790- 189-55-12-A
WBØOMC	20,764- 179-58-11-A
WDØHBI	15,000- 150-50- 2-A
WBØVXV	14,784- 112-66-24-A
WBØTPK	13,356- 126-53-16-A
WDØFDK	8360- 110-38- 8-A
WBØUFJ	8320- 104-40-13-A
WBØOYW/M	3584- 64-28- 4-A
WBØTPP	2950- 59-25- 5-A
WAØABI	2800- 50-28- 5-A
KØBM	2600- 50-26- 3-A
WDØGPU	2600- 50-26- 4-A
WDØGPV	2300- 50-23- 3-A
WAØUDZ	528- 22-12- 2-A
NØSS(+WBØNJS)	172,800-1152-75-24-B
WØEEE(NØAX,WBØs SDK ZLB, WD9EWE,WDØGOX,oprs)	125,700- 838-75-24-B
WBØZGD(+WDØELL)	50,850- 339-75-23-A
WBØBBN(WBØs QXW SJP,WDØFDG oprs)	49,950- 333-75-20-B
KØAZV(KAØCDG,WAØOIS, WDØFNP,oprs)	30,592- 239-64-18-A

Nebraska

KØUP	125,400- 836-75-22-B
KØSCM	124,818- 879-71-16-B
KØJBL	71,856- 499-72- -B
WAØJCE	48,034- 329-73-16-A
NØWB	36,850- 275-67-16-A
WDØFAA	22,176- 198-56-13-A
WAØYPY(+WAØJIM)	113,540- 811-70-22-B
KØDG(+KØTVD,KAØAAA, NØAON,WAØs IWF ROP,WDØDLN)	105,520- 740-74-24-B
KØCQB(+WBØIUT)	99,936- 694-72-24-A

North Dakota

AEØE	191,512-1294-74-24-B
WAØCSL	132,486- 933-71-16-B
KØFRP	70,152- 474-74-16-A
WDØECS	67,060- 479-70-17-A
WDØDAM	33,528- 254-66-14-A
WØRIH	7140- 102-35- 3-A
WAØLJN	4440- 60-37- 7-A
WA2DJM/Ø	1300- 30-43- 4-A
WØHSC(WBØYVX,WDØAJS,oprs)	21,276- 194-54- -A

South Dakota

KØZZ	274,800-1832-75-24-B
NØSD	106,856- 722-74-19-B
WBØMWJ	99,750- 665-75-19-B
WØSD	97,686- 729-67-10-B
WAØARS	88,914- 609-73-24-A
KBØAF	75,168- 522-72-22-B
WAØARZ	68,310- 495-69-18-A
KØJV	68,228- 461-74-16-A
WBØSTR	29,436- 223-66-14-B
KØOR	22,578- 213-53- 7-A
WBØTUJ	15,912- 153-52- 5-B
WØWUU	9760- 80-61- 9-A
WBØYQT	4108- 79-26- 3-A
KØHP	2600- 50-26- 3-A
ACØP(+WD8CIR)	52,440- 380-69-20-A
WDØEMB(+WDØCXU)	25,200- 225-56- 7-A

VE

Maritime - Newfoundland

WB2RLK/VE1	27,462- 199-69- 4-B

Quebec

VE2UUN	16,224- 156-52- 6-A

Ontario

VE3GAS	172,224-1196-72-24-B
VE3GD	77,400- 516-75-21-A
VE3FEA	35,000- 250-70-10-B
VE3IIJ	32,870- 245-63-14-B
VE3IPS	30,866- 253-61-11-A
VE3JAR	30,134- 247-61-11-B
VE3ECH	7644- 82-46-11-A
VE3HMV	2- 1- 1- 1-A
VE3ECP(+VE3BXY)	77,050- 513-75-19-B

Manitoba

VE4OY	145,950- 973-75-23-A
VE4XI	14,406- 147-49- 7-A

Saskatchewan

VE5DX	289,050-1927-75-24-B

Alberta

VE6CGY	148,950- 993-75-14-B
VE6ATT	85,800- 572-75-20-A
VE6MP	81,322- 557-73-21-B
VE6AGV	41,674- 311-67- 8-B

British Columbia

VE7CNY	234,450-1563-75-24-B
VE7WJ(WA1LKX,opr)	222,000-1480-75-23-B
VE7AQF	135,420- 915-74-24-B
VE7AJP	96,944- 644-73-15-B
VE7CMK(VE7CML,opr)	78,798- 571-69-11-B
VE7BIG	54,096- 392-69-14-A
CF7IQ	37,654- 281-67-15-B
VE7ARQ(+VE7AUE)	28,420- 245-58- 6-A

Yukon - N.W.T.

VE8CC	23,200- 232-50- 4-A

Check Logs

Phone - W1PWK,WA1STN, WA9AUM/1,N3BO,K4JST, W9AFN/M4,WD8NHE,WD8NBE, WD8PXW,K9EE,KB9CI,WD9JIE, WBØZSA,VE3IPR,CG6LB

CW - WA1STN,WA9AUM/1,K3TP, WB3GAV,K6AM,WB6WLL, W8VUV,K9EE,WD9BCP,WD9ERG, WDØFKZ

Disqualifications: Phone - none.

CW - N6DA(WB6SHD,opr),K9SC, VE5DX

Operating News

Conducted By John F. Lindholm,* W1XX

It's All in a Dream

It's all in a dream . . . ascending to the post of communications manager of ARRL . . . the very same office occupied by the legendary F. E. Handy, W1BDI, and more recently by the father of the National Traffic System, George Hart, W1NJM. How did this all happen? It all flashes before me now . . .

In the misty shadows I see myself receiving a Novice ticket two days before Christmas, 1954 . . . the excitement of immediately firing up on the air with a 6V6 oscillator-transmitter and S-38C receiver, calling CQ, and sweating bullets as a station in Rhode Island responds. And through the murky fog, I see graduation to General class with a Viking II persistently pouring out rf in CD Parties, contests and traffic nets. Oh no! W1BVR, 1RN net manager, is giving me the dreaded "straight-key treatment" for lids who can't copy the code. I must have botched up the net!

Still in college and wet behind the ears, I become the SCM for Western Massachusetts . . . it's the big time. Hey gang, let's organize one of the first Novice nets in the country. It's all in a dream.

It's 1959 and with stars in my eyes I report for my first full-time job at League headquarters. I'm in awe to work for Mr. Ham Radio himself, W1BDI . . . as his assistant communications manager, cw. On the first day, I park my dad's '55 Chevy in Circulation Manager Houghton's private parking spot next to ARRL headquarters. How was I to know that the peons park in the municipal lot two blocks and 50¢ away?

Do I recognize W1ZDP's testy expletives, as he trips over a multitude of contest logs in the hallowed halls of 38 LaSalle? Not yet 21, I'm ordering my first drink (thanks for vouching for me, Mr. Houghton!) at Phil's going-away testimonial and thinking a "manhattan" is the land of the W2s. That first "belt" proves otherwise!

Then there is the day I ski to work to finish the Field Day results for *QST*; and turning down an offer to work side by side with an upstart named Baldwin in *QST* production, because I like CD better.

The dream continues as I reluctantly leave Headquarters in 1962 to pursue my chosen career of teaching high school science, an adventure of love that is to last 14-1/2 years. But I find time to return to Headquarters several summers to gain valuable experience in all phases of the communications department . . . tour guiding, checking DXCC cards and contest logs, writing public service accounts, editing the *Repeater Directory* . . . being an architect of the Daytime National Traffic System.

Time flashes by as I'm elected vice director in 1974. I assume the reigns of Connecticut section emergency coordinator, promoting a strong link between amateurs and the American Red Cross.

But is it just a dream that I am now the communications manager? Let me pinch myself. It is for real! But how can I possibly follow in the footsteps of the giants of Amateur Radio with whom I have rubbed shoulders . . . the Handys, the Harts, and the Huntoons? What bids for the future?

Selecting the cream of our heritage and welding it to a newly charted forward course can project us into the exciting new Amateur Radio of the post-WARC 1980s. Given the same support of those stalwarts of radio lore . . . the assistance, guidance, patience and faith of the SCMs, the net managers, OOs, DXers, contesters, you the members of ARRL can make all good things possible. For it is you the ARRL member, the backbone of Amateur Radio communications, that can make anything happen!

*Communications Manager, ARRL

SCM ELECTION NOTICE

To all ARRL members in the Southern Texas, Colorado, San Francisco, British Columbia, Sacramento Valley, Los Angeles, Georgia, West Virginia and Washington sections: You are hereby solicited for nominating petitions pursuant to an election for Section Communications Manager. A petition, to be valid, must contain the signatures of five or more full ARRL members residing in the section concerned. Photocopied signatures are not acceptable. No petition is valid without at least five signatures *on that petition.*

Petition forms (CD-129) are available on request from ARRL headquarters but are not required. The following form is suggested:

(Place and date)

Communications Manager, ARRL
225 Main Street, Newington, CT 06111

We, the undersigned full members of the . . . ARRL Section of the . . . Division, hereby nominate . . . as candidate for Section Communications Manager for this Section for the next two-year term of office. (Signature . . . Call . . . City . . . ZIP . . .)

SCM candidates must have been a member of the League for a continuous term of at least two years and a licensed amateur of General class or higher (Canadian Advanced Amateur Certificate) immediately

W1AW Operating Schedule (October 29, 1978-April 29, 1979)

PST	CST	EST	UTC	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
6 A.M.	8 A.M.	9 A.M.	1400 *	Slow[1]	Fast[2]	Slow[1]	Fast[2]	Slow[1]		
7	9	10	1500 *	←		Cw Bulletins[3]	→			
8	10	11	1600 *	←		RTTY Bulletins[4]	→			
1 P.M.	3 P.M.	4 P.M.	2100 *	Fast[2]	Slow[1]	Fast[2]	Slow[1]	Fast[2]	Slow[1]	Slow[1]
2	4	5	2200	←		Cw Bulletins[3]				→
3	5	6	2300	←		RTTY Bulletins[4]				→
4	6	7	0000	Slow[1]	Fast[2]	Slow[1]	Fast[2]	Slow[1]	Fast[2]	Fast[2]
5	7	8	0100	←		Cw Bulletins[3]				→
6	8	9	0200	←		RTTY Bulletins[4]				→
6:30	8:30	9:30	0230	←		Phone Bulletins[5]				→
7	9	10	0300	Fast[2]	Slow[1]	Fast[2]	Slow[1]	Fast[2]	Slow[1]	Slow[1]
8	10	11	0400	←		Cw Bulletins[3]				→
9	11	12	0500	←		RTTY Bulletins[4]				→
9:30 P.M.	11:30 P.M.	12:30 A.M.	0530	←		Phone Bulletins[5]				→

[1]Slow code practice on cw bulletin frequencies, 8 minutes each session; 5, 5, 7-1/2, 7 1/2, 10, 13, 15 wpm.
[2]Fast code practice on cw bulletin frequencies, 8 minutes each session; 35, 30, 25, 20, 15, 13, 10 wpm.
[3]Cw bulletins, 18 wpm, on: 1.835, 3.58, 7.08, 14.08, 21.08, 28.08, 50.08, 147.555 MHz.
[4]RTTY bulletins 60 wpm/170-Hz shift on 3.625, 7.095, 14.095, 21.095, 28.095 147.555 MHz.
[5]Phone bulletins on 1.835, 3.99, 7.29, 14.29, 21.39, 28.59, 50.19, 147.555 MHz.
Please note that all footnoted frequencies are approximate.

Normal W1AW visiting hours are 3:30 P.M. to 1 A.M. seven days a week (local Eastern Time). The station address is 225 Main St., Newington, CT 06111 (about seven miles south of Hartford). Note: ARRL office-visiting hours are 8 A.M. to 5 P.M. Monday through Friday. Maps with local street detail are available upon request. If you wish to operate when visiting, you must have your original operator's license with you. The best time for visitors to operate is on weekdays between 1 and 4 P.M. local time. (Schedules can also be arranged to work W1AW.) The station will be closed April 13, 1979. *Staff:* Chief Operator/Asst Communications Mgr. C. R. Bender, W1WPR; Chris Schenck, W1EH; Charles Chadwick, K8AXL.

In a communications emergency, monitor W1AW for special bulletins as follows: *phone* on the hour, *RTTY* at 15 minutes past the hour, *cw* on the half hour.

To improve your fist by sending in step with W1AW (but not over the air!) and to allow checking the accuracy on certain tapes, note the UTC dates and QST text to be sent in the 0300 practice from the issue of *QST* two calendar months past: April 4, It Seems to Us; April 10, World Above; April 15, League Lines; April 19, Public Service; April 23, Happenings; April 27, Operating News.

prior to receipt of petition at Headquarters.

Petitions must be received at Headquarters on or before 5:30 P.M. Eastern Local Time, June 8, 1979.

Whenever more than one member is nominated in a single section, ballots will be mailed from Headquarters on July 2, 1979, returns counted August 21, 1979 and SCMs elected as a result of the above procedures will take office October 1, 1979.

If no petitions are received for a section by the specified closing date, such section will be resolicited in October *QST*, and an SCM elected through the resolicitation process will serve a term of 18 months.

Vacancies in any SCM office between elections are filled by appointment by the communications manager.

You are urged to take the initiative and file a nominating petition immediately.

John F. Lindholm, W1XX
Communications Manager

Appointments: In the Alabama Section, William E. Scates, WA4JYU, was appointed to complete the term (until December 31, 1979) of Frank S. Brown, W4LNN (resigned).

In the West Virginia Section, Karl S. Thompson, K8KT, has been appointed to complete the term (until September 30, 1979) of Donald B. Morris, W8JM (resigned).

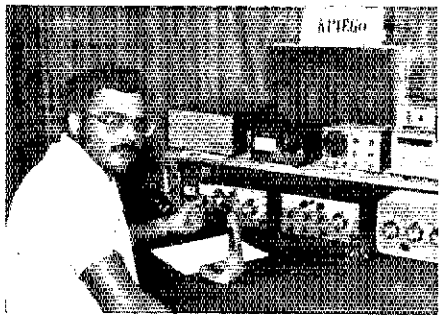
MEET YOUR SCM

Helen Haynes, WBØHOX, has been Minnesota SCM since October 1977. Helen was born in Athens, GA, and educated at the Academy for the Blind, in Macon. She resides in Rochester and is a self-employed salesperson and telephone operator. First licensed in 1972, WBØHOX holds an Advanced class license, is manager of DTRN, has earned BPL and PSHR, and has seen considerable operation in emergencies. She is a member of the Rochester Amateur Radio Club and MARS, and is active on 80-2, with 75 phone her favorite. She promises to "do her best as the SCM of Minnesota."

Minnesota Section SCM Helen Haynes, WBØHOX.

The section communications manager of the West Indies Section is José Lebron, KP4JL (ex-KP4EGO). KP4JL received his B.S.E.E. from the University of Puerto Rico and now serves as a communications systems supervisor for the Puerto Rico Water Resources Authority. He holds a Commercial Radiotelephone First Class license in addition to his Amateur Extra Class. KP4JL is a member of the Board of Directors of the Radio Club of Puerto Rico, holds EC and OTS appointments, and is a licensing-class instructor. Although active on 10/15 ssb and 2-meter fm, José finds time for photography as well as hi-fi design and listening. QST

West Indies Section SCM José Lebron, KP4JL. *(KP4RK photo)*



DATE (UTC)	OSCAR 7 Ref. Orbit	OSCAR 7 Time (UTC)	OSCAR 7 Long. W.	OSCAR 8 Ref. Orbit	OSCAR 8 Time (UTC)	OSCAR 8 Long. W.	SOVIET RS Ref. Orbit	SOVIET RS Time (UTC)	SOVIET RS Long. W.
1 April	20011	0024:32	68.4	5459J	0130:08	66.0	1876	0047:36	123.4
2 April	20024	0118:49	82.0	5473A	0135:19	67.3	1888	0052:19	126.1
3 April	20036	0018:09	66.9	5487A	0140:31	68.7	1900	0057:01	128.8
4 April	20049	0112:26	80.5	5500X	0002:29	44.2	1912	0101:44	131.5
5 April	20061	0011:47	66.3	5514A	0007:40	45.5	1924	0106:26	134.2
6 April	20074	0106:04	78.9	5528A	0012:52	46.8	1936	0111:09	137.2
7 April	20086	0005:24	63.8	5542J	0018:03	48.1	1948	0115:52	139.7
8 April	20099	0059:41	77.3	5556J	0023:14	49.4	1960	0120:34	142.4
9 April	20112	0153:58	90.9	5570A	0028:26	50.7	1972	0125:17	145.1
10 April	20124	0053:18	75.8	5584A	0033:37	52.0	1984	0129:59	147.9
11 April	20137	0147:35	89.4	5598X	0038:49	53.3	1996	0134:42	150.6
12 April	20149	0046:55	74.2	5612A	0044:00	54.7	2008	0139:25	153.3
13 April	20162	0141:12	87.8	5626A	0049:12	56.0	2020	0144:07	156.8
14 April	20174	0040:33	72.7	5540J	0054:23	57.3	2032	0148:50	158.8
15 April	20187	0134:50	86.2	5654J	0059:34	58.6	2044	0153:32	161.5
16 April	20199	0034:10	71.1	5668A	0104:46	59.9	2056	0158:15	164.2
17 April	20212	0128:27	84.7	5682A	0109:57	61.2	2067	0002:34	136.7
18 April	20224	0027:47	69.5	5696X	0115:08	62.5	2079	0007:17	139.4
19 April	20237	0122:04	83.1	5710A	0120:20	63.8	2091	0011:59	142.2
20 April	20249	0021:24	68.0	5724A	0125:31	65.2	2103	0016:42	144.9
21 April	20262	0115:41	81.6	5738J	0130:42	66.5	2115	0021:24	147.6
22 April	20274	0015:02	66.4	5752J	0135:53	67.8	2127	0026:07	150.3
23 April	20287	0109:19	80.0	5766A	0141:05	69.1	2139	0030:50	153.1
24 April	20299	0008:39	64.9	5779A	0003:02	44.6	2151	0035:32	155.8
25 April	20312	0102:56	78.4	5793X	0008:13	45.9	2163	0040:15	158.5
26 April	20324	0002:16	63.3	5807A	0013:25	47.2	2175	0044:57	161.2
27 April	20337	0056:33	76.9	5821A	0018:36	48.5	2187	0049:40	163.9
28 April	20350	0150:50	90.5	5835J	0023:47	49.8	2199	0054:23	166.7
29 April	20362	0050:11	75.3	5849J	0028:58	51.2	2211	0059:05	169.4
30 April	20375	0144:27	88.9	5863A	0034:09	52.5	2223	0103:48	172.1
1 May	20387	0043:48	73.8	5877A	0039:21	53.8	2235	0108:30	174.8
2 May	20400	0138:05	87.4	5891X	0044:32	55.1	2247	0113:13	177.6
3 May	20412	0037:25	72.2	5905A	0049:43	56.4	2259	0117:56	180.3
4 May	20425	0131:42	85.8	5919A	0054:54	57.7	2271	0122:38	183.6
5 May	20437	0031:02	70.6	5933J	0100:05	59.0	2283	0127:21	185.7
6 May	20450	0125:19	84.2	5947J	0105:16	60.3	2295	0132:03	188.5
7 May	20462	0024:40	69.1	5961A	0110:27	61.7	2307	0136:46	191.2

Have you listened to OSCAR 8 yet? It is available to anyone with a good-quality, 10-meter or 70-cm receiver. To track it, you'll need an OSCARLOCATOR and the above reference-orbit information (also available on W1AW bulletins). It orbits the earth every 103 minutes; the morning and evening passes occur at approximately the same times each day. Decoding the telemetry from the beacon is a simple matter using the ARRL OSCAR telemetry forms, available from Hq. for an s.a.s.e. When you return it, we'll send you a colorful OSCAR 8 QSL card.

To keep abreast of the latest developments, tune in to the regular phone and cw bulletins over W1AW, AMSAT bulletins transmitted around 29.490 MHz on Mode A, 145.960 MHz on Mode B, during O 7 reference orbits, and AMSAT nets (East Coast at 0100 UTC Wednesdays; Mid States at 0200 UTC; West Coast at 0300 UTC, all on 3850 kHz lsb); (International net at 1800 UTC Sundays on 14,280 kHz usb).

Notes

1) The times and longitudes are for the satellites' first equator crossing each day, which is called the reference orbit.
2) Due to spacecraft problems, OSCAR 7 will not be maintained in any specific mode.
3) All Monday orbits are reserved for QRP use only. Use a maximum of 10 watts erp. Wednesdays are reserved for special experiments. Schedule O 7 experiments through AMSAT, O 8 experiments through ARRL. At no time exceed 10 W erp using Soviet RS.
4) The OSCAR 7 Mode B and OSCAR 8 Mode J transponders invert signals. Upper sideband into the uplink becomes lower sideband on the downlink.
5) O 7 progresses an average of 28.737571° W. per orbit in a period of 114.944858 minutes. O 8 progresses an average of 25.808120° W. in a period of 103.228227 minutes. RS period is 120.3894 minutes. RS progresses 30.227° W.
6) O 8 modes of operation are Mondays, Tuesdays, Thursdays and Fridays — Mode A. Saturdays and Sundays — Mode J. Wednesdays are for experimental use on Mode A or J or recharge Mode D. Soviet RS transponders are on Saturdays and Sundays for QSOs. Wednesdays are for experiments only.

Spacecraft Frequencies

Spacecraft	*Uplink*	*Downlink*	*Beacon*
O 7			
Mode A	145.850-145.950 MHz	29.400-29.500 MHz	29.502 MHz
Mode B	432.125-432.175 MHz	145.975-145.925 MHz	145.972 MHz
O 8			
Mode A	145.850-145.950 MHz	29.400-29.500 MHz	29.402 MHz
Mode J	145.900-146.000 MHz	435.100-435.200 MHz	435.095 MHz
RS			
Mode A	145.880-145.920 MHz	29.360-29.400 MHz	29.401 MHz

Further information on the radio amateur satellite program can be obtained free of charge from ARRL hq.

Contest Corral

APRIL

5: West Coast Qualifying Run, (W6OWP prime, W6ZRJ alternate), 10-35 wpm at 0500Z. The run takes place at 9 P.M. PST the night of April 4. Frequencies are approximately 3590/7090 kHz. Underline one minute of the highest speed you copied, certify that your copy was made without aid, and send to ARRL for grading. Please include your full name, call (if any) and complete mailing address. A large, stamped, self-addressed envelope will help to expedite your award/endorsements.

7-8: Open CD Party, cw, 2300Z April 7 until 0500Z April 9. Complete rules March, page 85. **QRP ARC International QSO Party,** March, page 88. **SP-DX Contest,** cw, March, page 88.

11-12: DX-YL to NA-YL Contest, cw, March, page 88.

13: W1AW Qualifying Run, 10-35 wpm at 0300Z (10 P.M. EST April 12). Transmitted simultaneously on 1.835 3.58 7.08 14.08 21.08 28.08 50.08 147.555 MHz. Other details per the April 5 listing.

14-15: SP-DX Contest, phone, March, page 88.

18-19: DX-YL to NA-YL Contest, phone, March, page 88.

21-22: Open CD Party, phone, 2300Z April 21 until 0500Z April 23. Complete rules March, page 85. **EME Competition,** Part 1, February, page 79. **Common Market DX Contest,** cw, March, page 88. **County Hunters SSB Contest,** starts 0000Z April 21, ends 2359 April 22. Two four-hour time-out periods 0800-1200Z each day. Suggested frequencies: 3920-3940 7220-7240 14,275-14,295 21,375-21,395 28,575-28,595. Work mobiles only between 3925-3935 7225-7335 14,280-14,290. Exchange signal report, county and state (or country). CW-to-ssb contacts are permitted. Score one point for each fixed or portable station worked, five for DX stations, and 10 for mobiles. Multiply by number of U.S. counties and Canadian stations worked for final score. Mobiles may be worked each time they change county or band. Mobiles on a county line count one QSO but two multipliers. Logs to John Ferguson, WØQWS, 3820 Stonewall Ct., Independence, MO 64055. **Bermuda Amateur Radio Contest,** sponsored by Radio Society of Bermuda, the full 48-hour weekend period, UTC. Operate 36 hours maximum with minimum three-hour off times noted in log. Single operator only from own private residence or property. 1977 and 1978 top winners eligible for area awards only. Eighty through 10 meters, no crossband or cross-mode contacts permitted. (No phone contacts between VE/W and G or West Germany on 40 meters.) All contestants exchange signal report. Canadians send province, U.K. send county, U.S. send state, West Germany exchange DOK number. U.S. and Canada work West Germany, U.K. and Bermuda only. U.K. and West Germany work only W/VE/VP9. Five points per QSO. Final score is QSO points times total number of VP9s worked on each band. Top scorers in each state, province, U.K. county and DOK area receive certificates. Top U.S., Canada, U.K. and West German scorers receive trophies. Log in UTC, check for dupes, sign a statement that you've complied with the rules and the terms of your license. Logs must be received by the Contest Committee, Radio Society of Bermuda, Box 275, Hamilton 5, Bermuda by June 30. (Parishes: Sandys SAN, Pembroke PEM, Southampton SOU, Hamilton HAM, St. George STG, Devonshire DEV, Warwick WAR, Smiths SMI, Paget PAG.)

28-29: PACC Contest, 1000Z April 28 until 1600Z April 29. Other details in March, page 88. **Helvetia 26 Contest,** March, page 88. **Zero District QSO Party,** March, page 88.

29: W1AW Qualifying Run, 10-35 wpm at 2300Z (7 P.M. EDT). See April 13 for more details.

MAY

2: West Coast Qualifying Run, 10-35 wpm at 0500Z (9 P.M. PST May 1).

5-6: Florida QSO Party, sponsored by Florida Skip, from 1500Z May 5 until 2359Z May 6. FL stations work other FL stations for QSO credit only. Out-of-state stations work FL only. No repeater QSOs. Two entry classes for FL stations: Class A operate portable or mobile on emergency power, running 200 watts (cw or PEP) or less and outside of home county. Class-B stations are all others. FL stations exchange signal report and county. Others give signal report, state/province/country or ITU zone. Suggested frequencies: cw 3555 7055 14,055 21,055 28,055; phone 3945 7279 14,319 21,379 28,579 kHz 146.52 MHz. FL stations score one point per QSO. Multiplier is sum of states (49 maximum), provinces (12 max.), DX countries (15 max.), and ITU regions (3 max.). Out-of-state stations score two points per FL QSO. Multiply by number of FL counties worked (67 max.). Class A stations only multiply score by 1.5 to obtain total. At the discretion of the contest committee, stations and/or operators may be disqualified for improper reporting, excessive duplicates, errors in multiplier lists, unreadable logs, obvious cheating, etc. Anyone disqualified this year will be barred from next year's contest. Phone and cw logs are to be separated. Usual log/summary format. Usual awards and plaques to top single-operator score phone and cw from FL and out of state, also to top FL club score. Include a 15-cent stamp for results. Entries to Florida Skip Contest Committee, Box 660501, Miami Springs, FL 33166. Must be received by May 31. **New York State QSO Party,** sponsored by the University of Buffalo ARC, from 1700Z May 6 to 0500Z May 7 and 1200-2359 May 7. Stations may be contacted once on phone and once on cw on each band. Mobiles/portables changing counties may be reworked. Exchange signal report, serial number (start with 001) and NY county or state/province. Suggested frequencies: phone, 3900 7275 14,285 21,375 28,550; cw, 1810 3560 7060 14,060 21,060 28,060; Novice, 3725 7125 21,125 28,125. Score one point per QSO times the number of multipliers: states, provinces, countries and NY counties for NY stations; and NY counties for others (62 max.). Number each new multiplier. A check sheet is required for each entry with more than 100 QSOs. Awards. Logs must be received by June 16. For results send a no. 10 s.a.s.e. Entries to Michael Bergman, WD2AJS, 45 Swartson Ct., Albany, NY 12209. **Vermont QSO Party,** sponsored by Central Vermont ARC, from 2100Z May 5 until 0100Z May 7. VT stations score one point per QSO, multiply by total number of ARRL sections and countries worked. Others score three points per QSO, multiply by total number of VT counties worked on each band (14 max.). Awards. Suggested frequencies: cw, 3565 7065 14,065 21,065 28,160 50,260 144-144.5; phone, 3909 3932 7290 14,325 21,375 28,600 50,360 145.8. Exchange signal report and VT county or ARRL section/country. Mail logs by June 15 to Peter Kragh, W1AYK/K2UPD, 170 Summit Ave., Ramsey, NJ 07446. **LIARS 10-X QSO Party,** sponsored by Long Island ARS of 10-X International. 48-hour period UTC. Use 28.9 to 29.2 MHz. Three points for LIARS member, two points for 10-X member and one point for non-10-X members (max. 3 points per QSO). Trophy and certificate awards. Logs showing date, call sign, name, QTH, 10-X number, LIARS number mailed by June 15 to Bob Watson, WA2MHL, 2 Suffolk Ct., Oceanside, NY 11572.

8: W1AW Qualifying Run, 10-35 wpm at 0200Z (10 P.M. May 7). See April 13 for more details.

12: Frequency Measuring Test, begins with a callup at 0300Z and 0600Z (evening of May 11). The periods for measurement start at 0307Z (20 meters), 0315 (40 meters) and 0323 (80 meters); for the late run 0607, 0615 and 0623, respectively. Each measuring period lasts five minutes. Submit your averages for each five-minute period which will be compared to the umpire's reading. (The umpire is a professional measuring laboratory.) Tell how many readings you took to form your averages. Approximate frequencies for the early run are 14,096 7065 3560 kHz. Late-run frequencies are 14,105 7047 3555 kHz. Your report must be received by May 28. W1AW will start transmitting the official results in a special bulletin May 29.

12-13: Russian Contest (CQ-M), sponsored by the Radio Sports Federation of the U.S.S.R., from 2100Z May 12 until 2100 May 13. 80-10 meters; cw and ssb. Call CQM. Categories: single-operator single band, single-op multiband and multi-multi. Exchange signal report and serial number. Soviet stations will transmit RST plus region (oblast) number. The same station may be worked once per band, regardless of mode. Contacts between stations on the same continent count one point; on different continents three points. Contacts between stations in the same country count only for multipliers. Each different country is a multiplier. Total multiplier is total countries on every band. Awards. Mail logs by July 1 to the Krenkel Radio Club, Box 88, Moscow, U.S.S.R. **World Telecommunications Day Contest,** phone, the full 24-hour period UTC, May 12th, sponsored by the Brazilian Society LABRE (Liga de Amadores Brasileiros de Radio Emissao). This event commemorates yearly World Telecommunications Day (May 17). Each participant will attempt to make the highest possible number of contacts with the different ITU zones of the world in order to enable his country to win the ITU Trophy. Operation 160 through 10 meters. Categories are single operator, multiband, fixed station or mobile maritime operating on 76 to 90 ITU zones, inclusive; clubs to be considered as special multiop/multiband participants (all operators of "multis" must sign the log). Send RST and ITU zone. Contacts in the same country from 160 through 10 meters count zero points; in the same country in the same zone on 40-20-15-10 count one point, on 160 and 80 two points; in another ITU zone on the same continent, on 20-15-10 count two points, on 40 three points, on 160 and 80 four points; in another zone on another continent 20-15-10 three points, 40 five points, 160-80 six points. Repeat contacts on other bands count for points, but zones counted once only. For country determination use the ARRL DXCC Countries List. To determine points for the country, (and the trophy) scores of the five top entries per country per mode are added together. (Multis not added in for this final score.) Trophy, medals, certificates. Log separately for each mode, see that they're postmarked before June 30 and send to LABRE, U.I.T. Contest Coordination, P. O. Box 07-0004, 70.000 Brasilia DF, Brazil. Note: W1, 2, 3, 4, 8 and 9 are in ITU Zone 8; W5, Ø, Zone 7; W6, 7, Zone 6; VE/VO 1, 2, Zone 9; VE3, Zone 4; VE4, 5, Zone 3; VE6, 7, Zone 2; VE8 Yukon, Zone 2; the rest of VE8 split between Zone 2, 3, 4 and 75. Logs to contain usual info, time in UTC, stations, messages, band, notation of new continent, zone multiplier and points; complete with summary and signed declaration.

19: Armed Forces Day; see next month; **World Telecommunications Day,** cw, see May 12-13 above.

19-20: EME Competition, Part 2, see February, page 79. **Massachusetts QSO Party; Canal Zone QSO Party,** see next month.

26: W1AW Qualifying Run, 10-35 wpm at 2000Z (4 P.M. EDT). See April 13 for more details.

26-27: Iberoamerican Contest; CQ WPX Contest, see next month.

JUNE

2-3: Nebraska QSO Party
Minnesota QSO Party
9-10: VHF QSO Party
16-17: All Asian Contest, phone
23-24: Field Day
30-1: 7-Land QSO Party

JULY

4: SKN
14-15: Radiosport Championship

AUGUST

4-5: UHF Contest

SEPTEMBER

8-9: VHF QSO Party
16: Frequency Measuring Test

Station Activities

SCM ✕ ARES ✕ OVS ✕ SEC ✕ OBS ✕ TCC ✕ OO ✕ NTS ✕ WAC ✕ CP ✕ A-1 OPR ✕ EC ✕ DXCC ✕ RCC ✕ WAS ✕ STM ✕ OES ✕ OTS ✕ NM

CANADIAN DIVISION

ALBERTA: SCM, S. T. Jones, VE6MJ — SEC: VE6XC. Net Mgr.: (APSN) VE6AFO. Net Mgr.: (ACWN) VE6BBL. The Northern Alberta Radio Club members were active and supplied communications for the Nordic Ski Club and their cross country races. The Simulated Emergency Test was alsmost a complete flop this year owing to lack of participation and poor conditions. Fellow amateurs if we are to be ready in the event of an emergency we must be prepared. Let's do better in Oct. SET. "Info on '79 National Convention, P. O. Box 891, Baton Route, LA 70821. Traffic: VE6CEY 120, VE6HO 76, VE6ABC 32, VE6BBL 30, VE6AVV 22, VE6QN 20, VE6XD 17, VE6MJ 16, VE6CJT 14, VE6JH 12, VE6BID 6, VE6WJ 5, VE6YW 5, VE6BIM 4, VE6CE 4, VE6CFQ 2, VE6KP 1.

BRITISH COLUMBIA: SCM, H. E. Savage, VE7FB — British Columbia Emergency Net election for asst. Net Mgr. is progressing and soon the net will have help for their Net Mgr. B. C. ARPS net 3755 at 0200Z has been averaging better than one hundred check-ins per night, and that covers pretty well all the Province. Dogwood Chapter, QCWA End of Month Breakfast are great success and hope to have Breakfast with the Four Corner Group soon. VE7HQ is now active from Spring Island Loran Station. We all wish Victoria Short Wave Club a Happy 50th Anniversary. Traffic: VE7ZK 208, VE7FB 90, VE7COA 78, VE7DFY 61, VE7BLS 16, VE7BLO 15.

MANITOBA: SCM, Peter Guenther, VE4PG — Asst. SCM: VE4JP. SEC: VE4TR. NMs VE4TE VE4NM VE4IZ VE4VJ. A good turnout on SET and much was learned as a result. Congrats to all who participated. Also thanks to all the clubs that allowed the facilities of the repeaters. By now everyone is looking for spring. WRIN QNI 60, QTC nil, 4 sess. MMN QNI 610, QTC 61, 31 sess. MTN QNI 219, QTC 91, 31 sess. MEPN QNI 1439, QTC 80, 31 sess. Traffic: VE4IZ 166, VE4PG 151, VE4RO 146, VE4FK 103, VE4IX 43, VE4QU 39, VE4HR 38, VE4AAD 37, VE4JA 36, VE4NM 33, VE4TE 32, VE4JP 31, VE4NE 28, VE4LB 25, VE4JI 24, VE4TK 16, VE4LU 15, VE4QJ 15, VE4ACX 12, VE4BE 12, VE4LS 11, VE4XN 11, VE4ID 8, VE4CR 7, VE4MG 7, VE4DS 6, VE4AEJ 6, VE4OW 6, VE4AAU 5, VE4AED 4, VE4AX 4, VE4GF 4, VE4HA 4, VE4XQ 3, VE3AAF 2, VE4OD 2.

MARITIME-NFLD: SCM, Aaron D. Solomon, VE1OC — A/SCM VO1FG. STM: VE1WF. SEC: VE1ASW. NPN Mgr.: VO1JN. Silent Keys: VE1AOG VE1MH VE1RE VE1WT N4EN; XYL-VE2AM. Hospital: VE1BMF VE1NC. Test of comm. and tfc. handling purpose of Prov.-wide N.S. SET. P.E.I. formed teams to locate radio-act. Sat. debris. VE1YO VE1ASW part. in Hfx.-Truro car Rally, ice and wind storm damaged antennae of VE1s AHW AGU AGH ALP ACZ BMJ QM XJ and others. VE1PZ travelling to WHO, Geneva, equipped with 2M. Transc. Congrats to VE1BLO on passing Adv. Am. exam and to VE1BXC on winning BPL this month. Flautist W2TDY guest of VE1AL. VE1RY Ed. new pub. NBARA "NB Ham." VE2BRI VE6APH/1 VE7CAM/1 act. on 2M. VE7AVW/1 on 10M. VE1FQ rec'd plaque HMCS Skeena for phone-patching. VE1WF ran 13 Trng. sess. Phlew on Traffic Handling. APN had 6 extra sess. to handle SET traffic. VO1MR working Oscar 7/8.30 Students started Am. Radio course at College of T&T, St. John's Nfld. APN: sess 40, QNI 240, QTC 191/179. NPN: sess. 31, QNI 1183, QTC 5. Traffic: (Jan.) VE1BXC 501, VE1WF 365, VE1RO/LCR 165, VE1OC 61, VE1RI 45, VE1LJ 27, VE1KR 22, VO1PR 20, VE1BKM 12, VE1CH 9. (Dec.) VO1PR 10, VO1GW 8, VO1JN 4.

ONTARIO: SCM, Larry Thivierge, VE3GT — SEC: VE3APK. STM: VE3GOL. NMs: VE3AJN VE3DPO VE3EWD VE3GJG VE3GFN VE3IFP and VE3ISW. The NTS branch of ARPSC was very prominent during SET '79. Traffic volume was heavy but thanks to a well prepared and organized net flow chart, traffic moved smoothly. BPLs earned by VE3s GOL JIR and KK. Special thanks to all stations who participated. The second edition will be during the first weekend in Oct. mark your calendars now. Congrats to the Bruce ARC on recent League affiliation. VE3AMZ on the VHF-UHF Advisory Committee for the RSO. VE3HLP penning a DX column for the Windsor ARC Bulletin. QCWA Southern Ont. Chapter has 128 members and are looking for more SOC members to QNI their net on 3770 kHz, Sun. at 1300 hours. VE3RPT is one of the busiest repeaters in Canada. ONTARS reports a total QNI of 172,795 during 1978. VE3CES has digital certificate number 12. CARTG sponsoring two awards on RTTY, all VE/VO and, the Merit Award. Contact VE3RTT for details. VE3EYW has info on the Sault Ste. Marie and Northern Ont. Award. Mark Apr. 27-29 for the Dayton Hamvention. Long time NTS stalwart VE3ATR active on 2 meters. VE3FHZ new EC for Delta and this Section's first OES appointment. Ontario's traffic training programme off and running. Many clubs becoming incorporated. VE3GFE inducted into the Hamilton Club's "Order of the Gavel." New amateurs in London are, VE3s KCU KSO LDI and LDK. Latest additions to the OVMRC are VE3s KMR GG JRH and KLX. Rideau ARC has active group of 59 members. VE3HOG asst. EC for York North. VE3KLX big help with the Section's OTS certificate renewal programme. Officers Orillia ARC are VE3s AMB FYW JPS and HYC. VE3BL a Silent Key. Guelph City Council declared June 2 through 9 as Amateur Radio Week. Many events are scheduled. Traffic: (Jan.) VE3GOL 647, VE3JIR 522, VE3KK 374, VE3HGJ 303, VE3JRT 254, VE3GT 239, VE3GFN 224, VE3DPO 219, VE3ISW 216, VE3CYR 211, VE3GJG 175, VE3APK 173, VE3FZG 157, VE3FHZ 139, VE3HB 132, VE3FOZ 100, VE3GNW 91, VE3JJK 90, VE3DVE 84, VE3IMR 72, VE3HC5 58, VE3FGU 57, VE3FRG 49, VE3AJN 48, VE3ANJ 29, VE3ATR 39, VE3EHL 38, VE3EKS 38, VE3GYD 34, VE3DUK 29, VE3JRO 21, VE3FCU 20, VE3ILP 20, VE3BVG 17, VE3BZB 16, VE3DZH 5, VE3HOG 5, VE3FGV 2, VE3SB 2 (Dec.) VE3GYD 64, VE3FGV 56, VE3AWE 48, VE3HCS 47, VE3EKF 33, VE3BZR 22, VE3GRO 21, VE3ILP 14, VE3COH 10, VE3FCU 7.

QUEBEC: SCM, Harold Moreau, VE2BP — SEC: VE2DEA. VE2NL new EC for Sept-Iles & Port Cartier area. All stations are invited to give suggestions to the SCM as to what you would like to see in print. Please let me know of any goings-on you would like to have written in QST. Avec regrets je dois vous annoncer le deces d'un pionnier parmi les amateurs du Quebec, VE2AI. Depuis 1921 Gaston exploitait une station Amateur. Traffic: VE2UN 92, VE2EC 26, VE2APT 10.

SASKATCHEWAN: SCM, P. A. Crosthwaite, VE5RP — Moose Jaw sponsoring the 1979 Hamfest. Their theme will be "Particifest" which is very appropriate for the proposed Hamfest. It is hoped to have an ARRL "Particifest." The dates will be July 27, 28 & 29 please address all querries to "PARTICIFEST" Box 150, Bushell Park Saskatchewan S0H 0N0. The '79 ARRL National Convention will be held in Baton Rouge, Louisiana July 20-22. For further info write to P. O. Box 891, Baton Rouge, LA 70821 U.S.A. Traffic: VE5HG 118, VE5AE 79, VE5NJ 14, VE5UX 5, VE4RP 4, VE5CQ 2, VE5KS 2.

ATLANTIC DIVISION

DELAWARE: SCM, Roger E. Cole, W3DKX — SEC: W3PQ. STM: W3WD W3QQ. PSHR: N3AKC 47, K3JL 43. ARRL National Convention '79 info P. O. Box 891, Baton Rouge, LA 70821. N3ND/K3SXA had highest mixed score and K3SM highest cw score on QSO Party. New license info received by SCM Novice: KA3BXC & KA3CFZ. Tech.: KA3BOH. Gen. KA2CRL. Adv. WB3GOO & WB3GXD. Congratulations to EC WB3ENF and assistants WB3FOE and WB3EOU for work on the SET. Their Tfc Handling training session at G. Read Jr. H.S. Jan. 25th helped the activity on 3.905 MHz and 2 meters. DTN (Dec) QNI 343, QTC 111. DTN QNI 414, QTC 116. DEPN: QNI 83, Tfc 24. Traffic: (Jan.) N3AKC 155, W3OQ 74, W3DKX 59, WA3WIY 52, WB3GOI 50, WB3DUG 43, W3WD 17, K3JL 17, WA3DLH 5, AC3T 5, WB3ANC 2, W3HGA 2. (Dec.) W3WD 14.

EASTERN PENNSYLVANIA: SCM, G. S. Van Dyke Jr., W3HK — SEC: WA3PZO. NMs: K3KW K3NGN W3VA W3IAZ. Net repts: PTTN QNI 477, QTC 196; LVN QNI 18, QTC 23; AREC (2) QNI 12; PFN QNI 382, QTC 710; EPA QNI 808, QTC 540. EPAEP&TN QNI 432, QTC 265; EPAEP&TN SET QNI 121, QTC 133; LCARES QNI 124, QTC 20. OO repts: K3RDT WA3TMP WA3RPG W3RJ: OBS repts: N3AIU WA3RPG W3CL W3ID K3EBZ W3AVJ; OVS repts: W3GOA WB3CTU K3YD N3CP W3CL WA3BJQ. BPL: W3CUL WA3WQP W3VR WA3ZRY WB3JGP N3HR WB3JZA WA3ATQ. PSHR: WB3JGP N3HR AA3B W3DP W3PD N3AIU WA3RPG WB3CAI N3KZ. Sta reporting activity on SET: WB3JZA WB3BIZ WB3JGP W3VA W3DP WA3VIL WA3JYZ WB3KCV N3AIU KA3AHC WB3KWE. The gang in EPA especially EPA and PTTN have really been growing. The new members report regularly, now if we could only get the old timers to do the same EPA would be on top! Congrats to the NMs. Few new BPLs this month. Gotta build a fire under the phone appointees for CD tests! WA3ATQ reports the Celsius thermometer is no good, it never gets that warm in Poconoes! WB3JYY now a "G" class. Many report tfc in SET vy heavy and made it very enjoyable. N3AIU & WB3GZV got their WAS. W3ADE has two outlets in Chicago KA9DGC and KA9DGD one daughter-in-law, other grand daughter! The Pack Rats went at it again in VHF contest. W3EU watching the oil tank guage instead of RF output! New officers Frankford Radio Club N3AW pres.; N2SS, VP; N2MM, secy.; N2LT, treas. MARC K3JML, pres.; W3VRB, VP; K3FUT, secy.; WB3FKQ, treas.; K3ETN K3MWA W3DZH AD3L & WB3CAI, dir. Thanks for all the nifty club papers! Traffic: (Jan.) W3CUL 3129, WA3WQP 792, W3VR 725, WA3ZRY 614, K3KW 544, WB3JGP 526, N3HR 523, WB3JZA 521, WA3ATQ 458, K3NGN 399, W3BI 383, AA3B 212, N3KZ 200, W3IPX 185, W3DP 141, AD3X 133, W4PD 128, WB3JYZ 116, W3FAF 108, N3AIU 107, W3VA 102, WB3GZV 83, N3CD 55, WB3CAI 42, WA3VIL 34, K3YD 28, W3ID 24, N3CP/4 22, W3ADE 19, WA3TMP 18, K3EBZ 16, WA3RPG 12, W3CL 11, W3RJ 4, WA3BJQ 2, W3HK 2, WB3HPV 2, K3AI 1, K3AIZ 1, W3AVJ 1, W3EU 1, W3GOA 1, W3WRE 1. (Dec.) N3HR 342, WA3YDC 54. (Nov.) WA3TAV 63. (Oct.) N3KZ 12.

MARYLAND-DISTRICT OF COLUMBIA: SCM, Karl R. Medrow, W3FA — Our SEC W3HJH was almost but not quite overloaded with SET traffic. Congrats to all you participants for a job well done. WB5FIX has switched wagons pending his transfer. W3EPV gives in to a warm trip to ZF1-Land. WA3RSK has the KW amp fixed and all fall courses passed. N3RL tries XE-Land for a short trip, and has a new 2M box. W3ZNW is making a mid-winter shack move. K3IS says lotsa school work! WA3FYZ and WB3BDU are LM ARRL congrats. W3WBY reports repeater auto patches are on the decline. K3HPG is back into DX with tower and tribander after 3 years of cliff dwelling. W3CDQ made 1 QSO in the CD party. W3FZV beat her with 55. KB3AP is right in there with the tfc men. With the nets: Net/Manager Sessions/Tfc/QNI Avg. MEPN/AA3S 28/183/28.4. Topper K3ORW. Others were W3DKX AE3W WA2YFM and WA3ZRY. MDD/W3PQ 61/313/9.4. Top Brass N3AKC W3FA and W3PQ. MDC PON/W3OYY 4/10/26.5. WR/PON/W3DFW 18/24/20.9. No more MDCTN! Look for MEPN nightly 3920 at 6 PM local. N3SJ was big on the Eastern Shore. WA3YKK is out of the woodwork. K3ORW has the SET on Phone working very smoothly. W9VJD/3 responded to a Test Emergency message. WB3GES has a new electronic keyer. AA3S is busy with increased MEPN activity. WA3FUJ gives him a run in Frederick. WB3GZU finds early morning pickings good. N3QA corrects his count upwards. AD3H is enjoying school. K3IU has it all organized for contests and tfc. N3CL has school and traffic neatly balanced. WB3JRW keeps a slick file card log. Congrats to the Maryland ARC of Rockville a new affiliate. The FAR is conducting a new LOGO contest. Big prize. The Anne Arundel RC have their new antenna tower and antenna up with increased 2M., coverage. Thanks to them and the FAR for news bulletins. Traffic: (Jan.) N3CL 393, WB3GZU 332, W3FA 206, N3SJ 145, K3ORW 103, AA3S 94, N3QA 90, K3IU 89, W9VJD/3 79, W3HJH 68, KB3AP 63, AD3H 49, WB3CES 29, WA3FUJ 25, W3FZV 17, WB5FIX/3 17, WB3JRW 16, W3WBY 16, W3ZNW 11, W3EOV 9, K3HPG 6, WA3YKK 6, N3RL 2. (Dec.) WA3FUJ 10.

SOUTHERN NEW JERSEY: SCM, Bill Luebkemann, WB2LCC — SEC: W2HOB.

Net	Freq.	Time (PM)	Sess	QNI	QTC	Mgr.
NJN/E	3695	7:00	36	526	311/264	AF2L
NJN/L	3695	10:00	33	332	239/190	AF2L
NJPN	3950	6:00	44	905	735/825	K2VX
JSARS	.91	8:30	31	354	76/65	WA2HEB
MCN	.075	10:30	36	404	150/148	AA2H
SPARTN	.94	10:30	31	275	77/76	KB2EV

Jan. was a busy month indeed, with the SET the center of activity. Sat. Jan. 6 saw a half foot of snow on the ground, yet 20 brave souls, representing 6 out of 9 counties, made it to Northfield for the SET preparatory meeting. The SET was well as the revised section plan was discussed. The weekend of the 27th/28th was busy also, with all 9 county ARES groups playing an active roll in the SET. Tornadoes, hurricanes, downed aircraft, rioting, we had it all and still survived. Many thanks to those who participated, and to those who didn't why not contact your EC, SEC or myself for further info. It's fun! Traffic: (Jan.) W2ZO 521, AA2H 295, KB2EV 248, W2SWE 232, N2AFN 195, W2HOB 161, WB2LCC 153, WA2KNZ 148, N2AJG 140, K2IB 126, WB2PUW 126, K2UL 108, K2ADJ 99, WA2HCV 88, WB2UGA 88, WA2KWW 87, WA2HEB 83, N2ABT 66, W2KP 56, WA2GTJ 54, WB2EVL 47, WD2AHO 45, WA2WSV 34, N2ALS 33, WB2FJE 32, WB2HZR 29, K2RH 28, WB2CAK 16, W2HZH 14, WA2TPX 13, WB2SPW 12, WB2VFT 9, WB2KKS 7, N2FC 5, WB2BVB 4, WA2RHJ 4, KA2BBW 3, KB2GM 3, W2FFU 2.

WESTERN NEW YORK: SCM, Lonnie J. Keller, WA2AOG — STM: W2MTA. SEC: WB2FTX (Welcome aboard Dave!) As you can see from the above, we have a new SEC effective Feb. 1, WB2FTX. We wish N2JC the best of luck and a big "thank you" for his many years of dedicated service as SEC, as he "retires" due to time conflicts. Welcome to new OTS WB2KHT, also WDN asst. mgr. in charge of training. W2RUF would like to remind all of us that all APO and FPO traffic picked up requires that the addressee's Social Security No. must be included. New Syracuse Univ. ARC officers are AA2S, pres.; KA2DQF, VP; AD2X, treas.; Novice-to-be Cee Peterson, secy., AD2X, tfc. mgr. They held a Valentine Message Week on campus Feb. 7-14, and began a Novice class Feb. 19. W2MTA and W2RUF NCS the NYSCN on 3677 Sun. at 10 AM local time. All are encouraged to check in. Very high activity in the SET Jan. 27-28. Reports rcvd indicated activity in every county in the Section. Very well done! Hope your group sent their report to N2JC or WB2FTX for inclusion in QST! KB2HF is ex-WB2RXS and has a new Yeasu line, Heath amp and a rejuvenated antenna system. Welcome to new Affiliated Clubs Allegany Highlands ARC and the Buffalo Radio Amateur Group (BRAG). K2IZA is new pres. of the Canisteo Valley ARC. Rochester VHF Group's Jan. meeting was a 30th Anniversary party, congratulations! WA2ZKD now has received capability on 1296-2304-3300 MHz and expects to add 1296 xmit too. KA2AOZ and WB2PES are forming a new ragchew net, contact them for details. Skyline ARC in Cortland County has a new repeater on 146.03/147.03. The Oneida County Traffic and Emergency Net meets daily at 7:00 local time on the 146.19/.79 repeater. Congrats to new Advanced WA2FSU and Extra WA2VEZ, W2FR has a new Omni-D and WA2ZJP and new Triton IV. BPL to WA2ELD; PSHR to W2MTA, WA2ZJP WA2AIV and WB2PJU. Traffic: (Jan.) WA2ELD 548, W2MTA 316, WA2HSB 276, WB2PJU 256, WA2MFV 166, W2FR 158, W2PZL 150, W2RUF 143, WA2ZJP 130, N2APB 116, WA2AOG 115, W2ZOJ 104, WA2AIV 65, WA2ORS 59, AF2K 48, K2GWN 48, WB2OMZ 45, AF2A 39, W2ROF 38, WA2PCF 24, WB2LMS 23, WB2KHT 15, W2GJ 14, KA2CFX 12, WB2EOX 12, K2VR 6, WB2FPI 4, WA2ANU 4, WA2ZKD 4, WA2EKW 2. (Dec.) WA2HVT 34, WB2KHT 30, WB2LMS 26.

WESTERN PENNSYLVANIA: SCM, Otto L. Schuler, K3SMB — A. SCM: N2FM. SEC: W3VUP. STM: W3YQ. Asst. SECs: WA3LJW WA3JBQ. NMs: K3LL W3NEM W3KUN W3MML.

Net	Sess.	QNI	QTC	Freq.	Time/Day
WPACW	33	563	276	3585	7:00P Dy
WPAPTN	34	539	218	3983	6:30P Dy
WPAMTN	31	628	142	146.28/88	8:00 Dy

Our congratulations and best wishes to W1XX in his new endeavors as the new OM. The SET was a very good operation according to reports received around the Section. Our sympathies are with W3QEK on the passing of his XYL, and with K3VYY on the loss of his father. WB3GAB EC for Jefferson County and WB3JDI EC for Crawford County. New Novices are KA3s BAX BZN BMU CJJ CDR CDS CDT CDU CDV CDW BTW BTI BTH BTF. Congratuations and a big star to the clubs teaching so many. WB3BRA WB3HUJ and WB3KFC have upgraded to Advanced. WB3HAU is now N3AOJ. WB3LFA is N3AOK. Quad County ARC officers for 1979 are K3FS, pres.; WA3FFC, VP; WA3UFN, secy.; W3IJT, treas. South Hills Brass Pounders WA3SRD, pres.; WA3WNT, VP; WB3ACC, secy.; WB3AKK, treas.; W3MML, K3VVX & W3QNI, dir.; K3IBD W3ZYG and WB3AXO, trustees. Beaver Valley ARC W3GAE, pres.; WA3ZOC, VP; WB3FKE, secy.; WB3HWB, treas. If I have missed any club officers please drop me a card. Traffic: W3EGJ 225, N3FM 205, K3LL 166, WA3PXA 143, W3YQ 140, AC3N 106, W3TEF 85, WB8PAV/3 62, N3EE 61, N3WS 59, W3MML 56, AF3B 51, WB3EYY 47, W3AS 42, N3NR 45, K3HCT 36, W3RUL 32, WB3GWJ 30, W3KUN 23, WA3ONT 20, WA3UNX 29, WB3IAB 16, W3SN 16, N4DR/3 16, W3IJT 8, WB3GZR 7, K3VOV 7. AB3X 4, WB3EML 4, W3LOD 4, K3CR 3, K3UA 3, K3GP 2.

CENTRAL DIVISION

ILLINOIS: SCM, Edmond A. Metzger, W9PRN — Asst. SCM: Harry Studer, W9RYU. SEC: W9AES. NMs: WA9KFK and WB9JSR. Cook County EC: W9HPG.

Net	Freq.	Times(Z)/Days	Tfc	Sess.
ILN	3690	0030/0400 Dy	415	64
Ill Phone	3915	2245 Dy	167	30
NCPN	3915	1200/1700 M-S	188	54
IEN	3940	1400 Su	no rpt.	

The W9VEY memorial station and two meter net had a traffic count of 7. W9NJP's new QTH is Cleveland, OH. WR9AKB now at new location in Springfield (on Memorial Hospital) with increased 450 MHz coverage. K9DQU participated with the Chicago Snow Command and other amateurs during the Jan. snow storms. W9SXL back on 160 meters after many months. He is now beginning his 45th year as an ARRL member. New LAMARS (Libertyville and Mundelein Amateur Radio Society) are calls WA9HRN WB9VIV K9SPL and K9IW.

29.6 FM
MEGAHERTZ

ADDS AN IMPORTANT NEW DIMENSION TO OPERATING ENJOYMENT

COMTRONIX FM-80

80 CHANNEL 10W TRANSCEIVER

can place 29.6 MHz at your fingertips in minutes (along with seventy-nine other channels spaced at 10 kilohertz intervals).

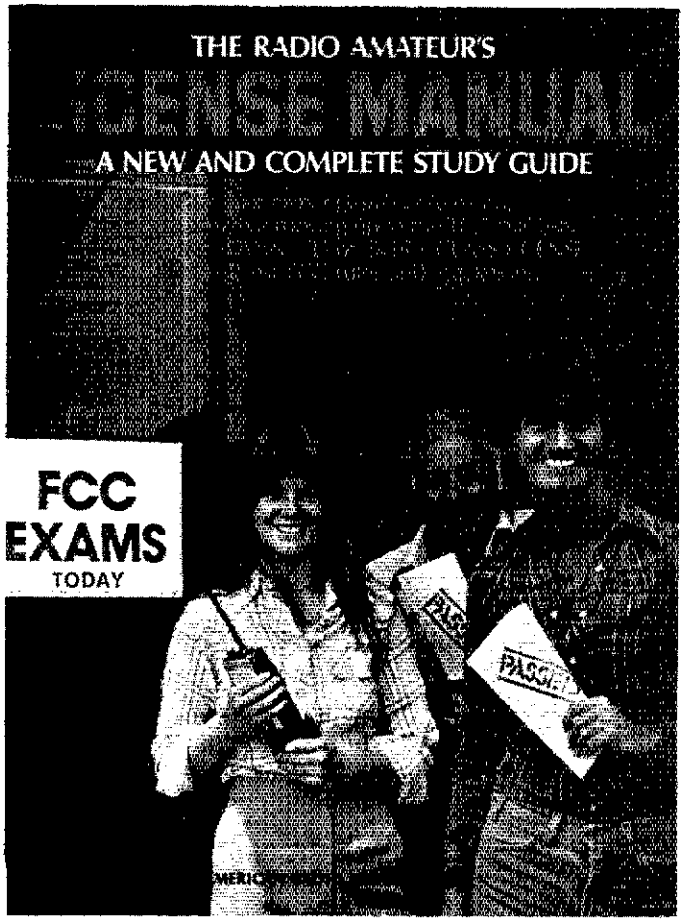
- 80 channels, 28.91 to 29.7MHz.
- PLL freq. synthesized. No xtls.
- 10 watts power output, NBFM.
- Excellent receiver.
- Small! Book size! 2.3"H, 6.5"W, 8.75"D (less projections).
- Low drain. Only 2.2A @ 13.8VDC.
- LED digital channel readout.

Really enjoy your FM conversations on the hi-end of ten. COMTRONIX FM-80 users are making the initial contact on 29.6 then moving to another channel for a leisurely conversation. Congestion on 29.6 is relieved . . . capture effects avoided. With 80 channels at their disposal and without need to tune or readjust, FM-80 users change channels at will, take full advantage of an interesting, often exciting "ten-hi" range.

At your dealer or write for brochure.
(Dealerships open in some areas. Please inquire.)

$269
Calif. residents please add tax.

COMTRONIX, Inc. 116 Lark Center Drive Santa Rosa, CA 95401 (707) 528-7670



- All the latest test information for the Technician, General, Advanced and Extra class license.
- Complete and up-to-date text of FCC part 97 rules and regulations.

Available soon at your local dealer or direct from ARRL. $4.00 U.S. $4.50 Elsewhere. 77th edition

AMERICAN RADIO RELAY LEAGUE
225 Main St.
Newington, CT 06111

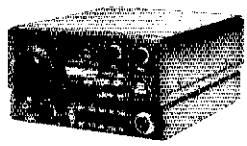
TIME'S RUNNING OUT ON LOW, LOW PRICES!

NOW FREE PHONE
800 854-6046
CALIF. CUSTOMERS PLEASE CALL OR VISIT STORES LISTED BELOW
PLUS FREE SHIPMENT ALL ITEMS U.P.S. (Brown).

CALL US FOR YOUR SUPER DEALS ON ALL ICOM PRODUCTS

2 meter SSB at prices too low to print here! Ask us.

Very compact, mobile maximizer. 144-148MHz. Two built-in VFO's make any split, 600kHz, 1MHz or whatever. Provides SSB, FM, CW. 10W p.e.p. output SSB, 10W, A1, F3. Receiver has excellent sensitivity, S/N ratio all modes. 13.8VDC operation. One of the best, multi-mode mobile transceivers.

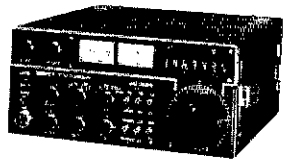


ICOM-IC-245

2 METER SSB

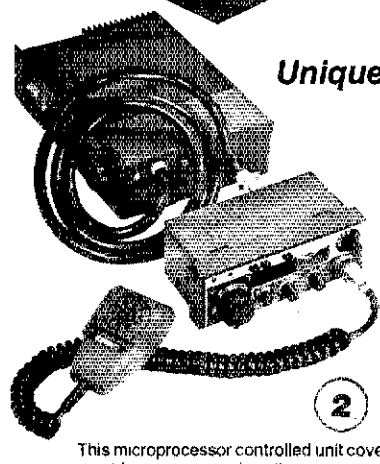
Complete, high quality 2 meter transceiver covers 144-148MHz, provides SSB, FM, CW. Power output 10W, p.e.p.SSB, 10W A1, F3. Synthesized w/ 7 digit readout in 100 Hz or 5kHz steps. Any offset from 10kHz through 4MHz, 10kHz steps. Outstanding receiver, pulse-type I-F noise blanker. Vox, CW monitor. Full metering. Synthesized w/digital readout. 13.8VDC and 117VAC.

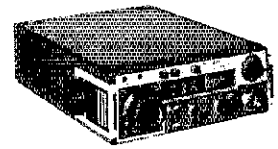
IC-211SSB



ICOM-IC-280 NEW 2 METER MOBILE

Unique ICOM 2-piece design



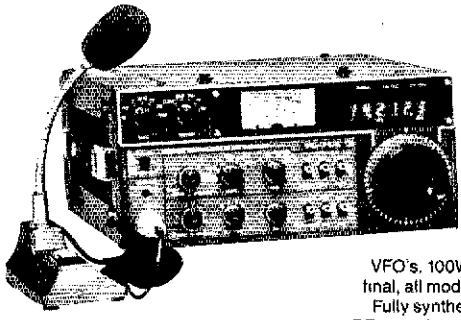


(1) Control head and electronic unit nest and lock together for a neat unit that mounts conveniently under dash.

(2) Optionally detach units. Leave control head in position, mount electronic unit remotely and join the two with cable.*

This microprocessor controlled unit covers 143.9 to 148.11 MHz, provides memory and synthesis requirements for the most critical FM operator. Can store any three frequencies. Offers ±600kHz splits. Power output, 10W reducible to 1W. Receiver is double superhet with FET front end. Crystal and ceramic filters in I-F's. 13.8VDC operation.

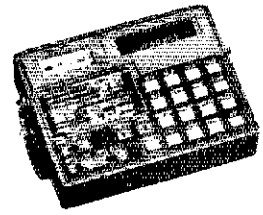
*(CK28 mounting cord, bracket required. This is optional and not supplied with IC-280)



ICOM IC-701

One of the world's most advanced HF transceivers featuring dual, independently selectable, digitally synthesized VFO's. 100W power output. Solid state, no tune final, all modes, all bands. Covers 1.8 to 30MHz. Fully synthesized tuning, 100Hz/division, 5kHz per turn. RF speech processor . . . VOX . . . RIT . . . AGC . . . noise blanker . . . full metering. 13.8VDC.

ICOM RM-2



Use with IC-701, IC-211, IC-245. Provides memory and frequency control including automatic band change and memories for four different frequencies plus automatic increment or single step tuning in 100kHz, 1kHz or 15kHz steps. Provides automatic offset for repeaters when used w/ IC-211 or IC-245.

OVER THE COUNTER (Mon. thru Sat. 10 AM to 5:30 PM) MAIL ORDER, Phone, Write.

ANAHEIM, CA 92801
2620 W. La Palma
(714) 761-3033 (213) 860-2040
1 mile east Knotts Berry Farm

SAN DIEGO, CA 92123
5375 Kearny Villa Road (714) 560-4900
Highway 163 & Clairemont Mesa Blvd.

OAKLAND, CA 94609
2811 Telegraph Ave. (415) 451-5757
Hwy 24 Downtown. Left 27th off-ramp.
NEW STORE!

BURLINGAME, CA 94010
999 Howard Avenue (415) 342-5757
5 miles south on 101 from S.F. Airport

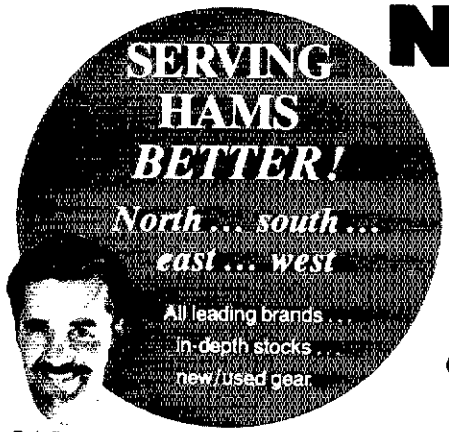
VAN NUYS, CA 91401
6265 Sepulveda Blvd. (213) 988-2212
San Diego Fwy at Victory Blvd.

HAM RADIO OUTLET™

VISA MasterCharge

• ALDA • ALLIANCE • ALPHA • AMECO • ATLAS • BIRD • CDE • COLLINS • CUSHCRAFT • CURTIS • • DENTRON • DRAKE • EIMAC • HUSTLER • HY-GAIN • ICOM • KENWOOD • KLM • MFJ • MOSLEY • PALOMAR • ROHN • ROBOT • SHURE • SWAN • TELEX • TEMPO • TEN-TEC • TRISTAO • TELREX • TRI-EX • WILSON • YAESU • more.

Prices/specs subject to change without notice. Calif. residents add sales tax



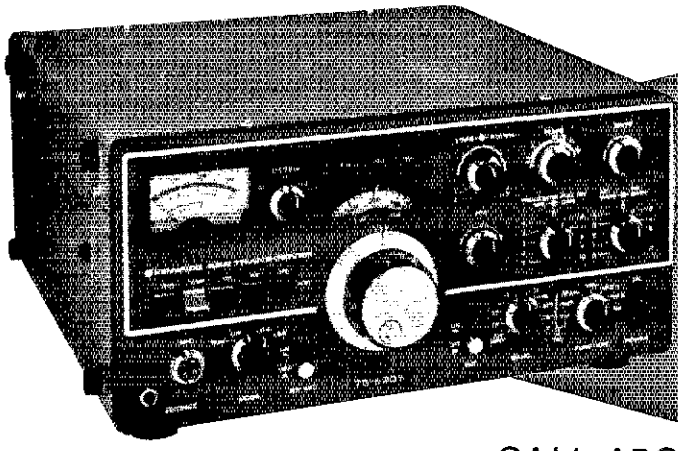
Bob Ferrero, W6RJ/K6AHV, Jim Rafferty, N6RJ
other well known hams give you courteous, personalized service

NOW...FREE PHONE!

800 854-6046

CALIF. CUSTOMERS PLEASE CALL OR VISIT STORES LISTED BELOW

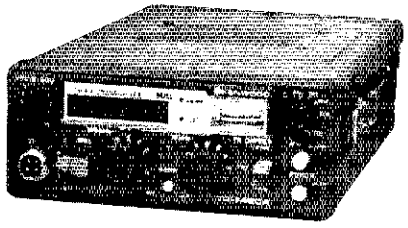
PLUS FREE SHIPMENT
ALL ITEMS U.P.S. (Brown).



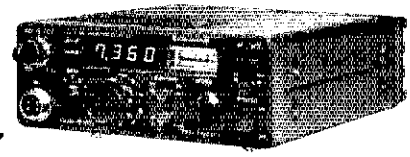
CALL FOR YOUR SPECIAL PRICE ON KENWOOD 520S AND OTHER KENWOOD EQUIPMENT

SPECIAL PRICING FOR MAR. & APR. CALL!!

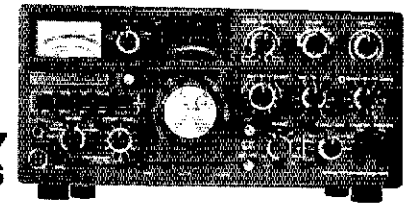
CALL ABOUT NEW 25W MODEL



TR-7400A

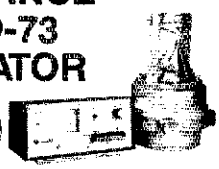


TR-7600-25



TS-820S

ALLIANCE HD-73 ROTATOR



$109

HAM X ROTATOR

Reg. $349.95

$249

ALLIANCE U-100 ROTATOR

$39.95
(Regular $59.95)

HAM III ROTATOR

$129.95

OVER THE COUNTER (Mon. thru Sat. 10 AM to 5:30 PM) MAIL ORDER, Phone, Write.

ANAHEIM, CA 92801
2620 W. La Palma
(714) 761-3033 (213) 860-2040
1 mile east Knotts Berry Farm

SAN DIEGO, CA 92123
5375 Kearny Villa Road (714) 560-4900
Highway 163 & Clairemont Mesa Blvd.

OAKLAND, CA 94609
2811 Telegraph Ave. (415) 451-5757
Hwy 24 Downtown. Left 27th off-ramp.

NEW STORE!

BURLINGAME, CA 94010
999 Howard Avenue (415) 342-5757
5 miles south on 101 from S.F. Airport

VAN NUYS, CA 91401
6265 Sepulveda Blvd. (213) 988-2212
San Diego Fwy at Victory Blvd.

HAM RADIO OUTLET™

VISA mastercharge

• ALDA • ALLIANCE • ALPHA • AMECO • ATLAS • BIRD • CDE • COLLINS • CUSHCRAFT • CURTIS • • DENTRON • DRAKE • EIMAC • HUSTLER • HY-GAIN • ICOM • KENWOOD • KLM • MFJ • MOSLEY • PALOMAR • ROHN • ROBOT • SHURE • SWAN • TELEX • TEMPO • TEN-TEC • TRISTAO • TELREX • TRI-EX • WILSON • YAESU • more.

Prices/specs subject to change without notice. Calif. residents add sales tax.

The Sangre de Cristo Mountains - ETO'S backyard

WHY WISH YOU'D BOUGHT ALPHA?

"IS SOMETHING ELSE "JUST AS GOOD?"

New ***ALPHA*** owners often tell us, *"I wish I'd saved my time and money and bought an* ***ALPHA*** *in the first place."* Why not benefit from their experiences? Compare first!

TRY TO GET ANY OTHER MANUFACTURER TO TELL YOU - IN WRITING - THAT IT'S SAFE TO OPERATE HIS DESK TOP LINEAR AT A FULL D-C KILOWATT . . . SAY FOR 24 HOURS KEY-DOWN. OR, ASK HIM FOR A FULL YEAR WRITTEN WARRANTY. LOTS OF LUCK!

YOUR NEW *ALPHA* WILL HAPPILY AND COOLY RUN THAT KILOWATT KEY-DOWN . . . FOR 24 DAYS IF YOU WISH. AND YOU'LL BE PROTECTED BY ETO'S UNMATCHED WARRANTY FOR TWO YEARS. WE PUT IT IN WRITING ALL THE TIME. IT'S THE WAY WE BUILD AND WARRANT EVERY *ALPHA*!

The new ***ALPHA's*** are the best we've ever built. Nothing else even approaches an ***ALPHA's*** combination of power, convenience, quality, and owner protection. The ETO/***ALPHA*** two year limited warranty offers you eight times as much protection as the industry-standard 90 day warranty.

The new ***ALPHA 374A*** adds NO-TUNE-UP operation to all the other traditional ALPHA qualities and capabilities. You can hop instantly from one HF band to another, with full maximum legal power and with little or no amplifier tune-up at all! (If new amateur bands are added, you can manually adjust your ***ALPHA*** to work them also.)

In 1974 the original ***ALPHA 374*** set a standard of high power convenience that has remained unmatched since. Despite its small size, not even one '374 owner ever burned out a power transformer. Impressive? The new '374A has an even huskier power supply. And it has ETO's ducted-air system with acoustically-isolated centrifugal blower to insure cool, whisper-quiet operation.

Before you get serious about any other brand of linear, compare its convenience and quality, its transformer heft, its cooling system efficiency and noise level - and its warranty - with the ***ALPHA's.*** Be sure to ask around about its reputation.

Call or write for detailed literature and thoroughly check out all the great new ***ALPHA's*** . . . so you don't make a mistake.

ETO

EHRHORN TECHNOLOGICAL OPERATIONS, INC.
BOX 708, CAÑON CITY, CO 81212 (303) 275-1613

SPECIALIZING IN CENTRAL AND SOUTH AMERICAN TRADE

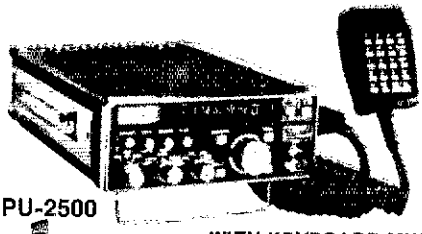
N&G

DIRECT FACTORY DISTRIBUTORS

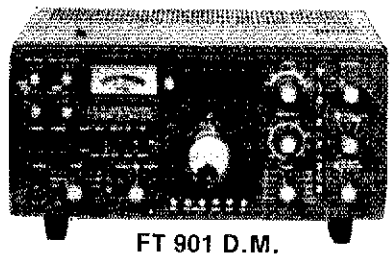
Wilson • Info-Tech • NyViking
Shure • Yaesu • Larsen • Midland
CDE • Callbooks • Dentron • B&W
VHF Engineering • Hustler • Swan
Bird - Cushcraft • HY-Gain • TenTec
Icom • KLM

Ride our YAESUMOBILE FREE to and from Miami Int'l. Airport. "We offer lots more than price."

YAESU STANDARD OF THE WORLD



CPU-2500
WITH KEYBOARD MIKE



FT 901 D.M.

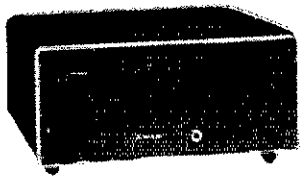
FRG 7000

202R

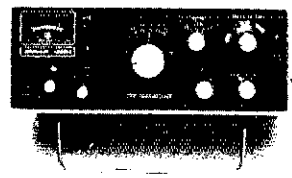
5 BAND
MOBILE
45

SWAN ELECTRONICS

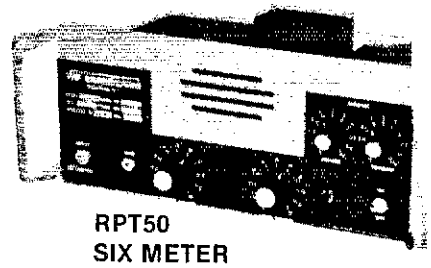
A member of the Cubic Corporation family of companies



HF-700S



100 MX MOBILE TRANSCEIVER



RPT50
SIX METER
VHF. ENG. FM REPEATER

OUR NEW MAIN HEADQUARTERS ADJACENT TO MIAMI INT'L AIRPORT
7285 N.W. 12th STREET
MIAMI, FLA. 33126
SE HABLA ESPANOL

SUPPORT YOUR LOCAL AMATEUR RADIO DEALER

When buying Yaesu equipment, remember the dealer from whom you purchase that equipment is responsible for the warranty service.

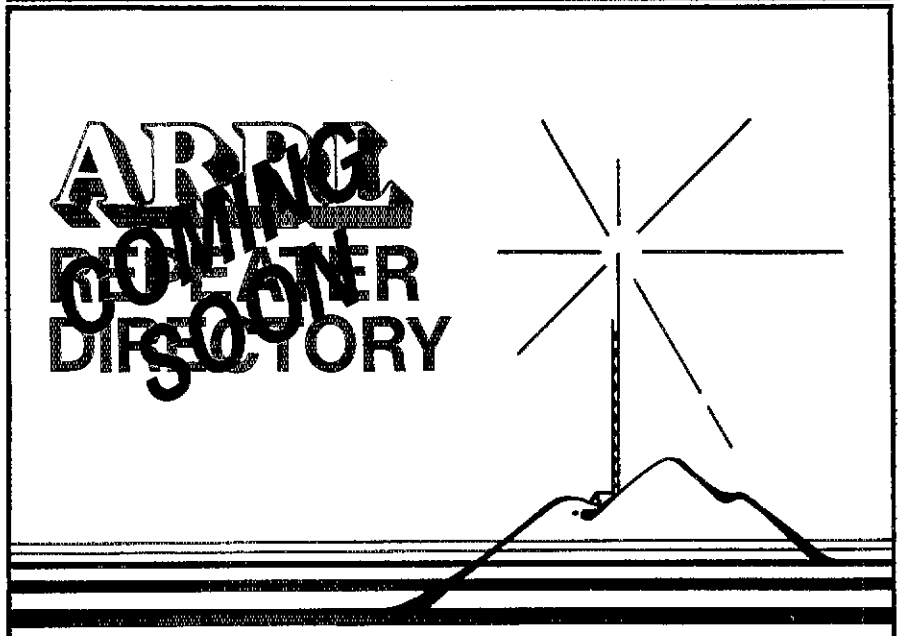
SPECIAL EXPORT PRICES

UPS (BROWN)

master charge

VISA

DADE: (305) 592-9685 BROWARD: (305) 763-8170



WB9VCH K9BIQ and WB9VQP provided emergency two meter communications for the Zion Ill. Civil Defense Unit during the New Year's Day snowstorm. The Ninth Region Net Daytime report for Jan. is 157 messages during 64 sess. with Ill. participation of 97% with W9JIJ W9NXG W9YCE W9BKE WB9SIB WD9DSG WD9EVV and W9HOT. Make plans now to attend the '79 ARRL National Convention in Baton Rouge, LA on July 20-22. WD9IIX AF9C WD9DYR WB9TZF WD9GKF WB9KOY WB9ZPN K9MDK K9PAJ WD9GVY K9AKC and W9HPG are the newly elected officers of Hamfesters (Chicago). New Novices are KA9CTY and KA9DAK and new Techs are KA9CRR and KA9BVS. New Generals heard are KA9BVR WD9BBI WD9BBJ N9ANP and N9AIB. W9LIC underwent heart surgery. K9EOC WA9KJV N9CR W9YZE K9KXP W9ATF N9WL WB9KHU and WB9OPO were elected as officers of the Egyptian Radio Club. Our sympathy to WB9TTN and his family upon the death of his father XZ2KN in an auto accident in Burma. Contact W9IPO chmn. of the Super Chicago '79 QCWA National Convention to be held Sept. 7-8 and 9 for details on this big event. The League's executive committee voted club affiliation for Amateur Radio Club of Mt. Vernon, The Morton Amateur Radio Club and OMIK Amateur Radio Club and declared them duly affiliated clubs. The Western Ill. Amateur Radio Club's officers for the coming year are WB9VKC K9MGG WB9YRH and W9LMT. The Southern Ill. Amateur Radio Society's 1147.78/18 repeater has a new 200-ft. commercial tower. New hamfesters calls are N9ANP and N9AIB. W9JIJ is the only BPL recipient for the month. The CAND Mgr. reports 558 messages during 64 sess. and that W9JIJ W9HOT W9NXG and WB9DJT were the Ill. participants. Traffic: W9JIJ 508, WD9DMV 263, WB9JSR 244, K9BVE 218, W9NXG 190, K9PNG 183, W9HOT 100, W9OK 171, N9TN 125, N9DR 122, K9EEA 107, W9KR 103, WD9BEX 92, W9OBS 55, WD9DSG 54, N9MX 45, W9YCE 44, W9OYL 42, K9SW 31, W9HPG 30, WA9AQN 26, W9LNO 26, W9PRN 26, WB9ZED 19, W9HBI 15, WB9VFY 7, K9DQU 6, K9BK 1.

INDIANA: SCM, J. M. Kell, W9LTU — SEC: W9UMH. Net Managers: K9CGS (ITN), W9JUJ (QIN), WB9YXN (ICN), W9PMT (VHF PAM). Dec. Net Reports, Times in UTC and freq in kHz.

Net	Freq.	Time/Days	QNI	QTC	Sess.
ITN	3910	1330/2130/2300 Dy	4369	929	99
QIN	3656	1430/0100/0400 Dy	1050	445	89
ICN	3708	0015 Dy			
IPON	3910	1330 Su	126	1	4

Dec. report VHF nets from W9PMT; QNI 521, TFC 18. Ind. was 100% represented on D9RN again this month. The weatherman cooperated this year resulting in the best SET in years. A lot more use made of 2M repeaters and more liasion between them and the low frequency nets. More participation by the state agencies (i.e., Red Cross and CD). This Jan. the IN State Police participated with amateur stations at almost every district post and even a station downtown Ipls at state headquarters. This activity a part of their new INCERT program. A lot of people introduced to Public Service Communication and traffic handling for the first time. One SET message was passed from WB9FNR to OSCAR 8 on Mode A and received by WB9GCV on Mode J. OSCAR being in both modes. Distance on ground was 110 miles. A first in at least IN. Overall SET was a tremendous success. WB9CCO and W9LZX became Silent Keys. VHF Nets report for Jan. from W9PMT, QNI 407, QTC 8. Traffic: (Jan.) W9JUJ 1232, W9UMH 466, W9FC 375, W9QLW 215, W9TG 164, WB9UYU 154, W9XD 152, N9AEI 109, W9EI 98, W9LTU 92, W9DLF 79, WA9OKK 70, WA9QCF 70, W9DKP 67, K9TKE 64, K9FG 63, WA9TJS 59, WD9FIC 56, W9RTH 28, W9PMT 25, K9UT 22, N9AKI 19, W9WEI 18, K9ET 16, W9CMT 16, WA9KAG 16, K9CGS 12, WA9GJZ 12, W9NAA 12, WD9CIS 11, K9DZC 10, WA9OHX 9, N9PS 9, W9BDP 8, W9HUF 8, W9OTR 3, AA9U 3 (Dec.) AA9S 178, K9EQT 28, W9PMT 26.

WISCONSIN: SCM, Roy A. Pederson, K9FHI — SEC: W9FZC. NMs: W9AYK WB9ICH W9IEM WB9ZRE K9KSA WB9KPX K9LGU K9EN. Nets, freq, time, QNI, QTC, Mgr. BWN, 3985, 1245Z M-S, 783, 676, W9AYK. BEN, 3985, 1800Z Dy, 739, 114, W9IEM. WSBN, 3985, 2300 Dy, 1242, 307, WB9ICH. WNN, 3725, 2315Z Dy, 87, 5, WB9ZRE. WIN-E, 3662, 0100Z Dy, 355, 112, WB9KPZ. WIN-L, 3662, 0400Z Dy, 288, 140, K9LGU. WRN, 3662, 0130Z Sat, K9EN. Wi Ex PO, 3925, 1801Z M-F, 582, 34, WA9NIX. K9EF going to 8R3-Land In Mar. MARA swaptest Apr. same location as last year. Wis. QSO party Mar. 31 2100Z to 0300Z Apr. 2 with 24 hour maximum operating limit, phone and cw same contest. New General in Phillips KB9COE. '79 ARRL National Convention Baton Rouge, LA. July 20-22 4 hours of seminars on emergency communications, traffic handling and Public Service. Don't forget WNA picnic July 8. Any YL's read this, WISYL net Mon. 8:00 AM local time 3980. WD9IUX new General in West Bend. W9TXB passed Advanced. WD9AQY received General and is now N9AOZ. WSBN BEN BWN certificate to WD9ESZ. BPL to W9ZGQ. How well did you do in SET? WA9GJU now KB9FA. New ham in Baraboo area KA9DFX. New in Delis area KA9DCS. New General Superior KA9CAW, new General Ashland KA9DBB. YTARC State convention May 19 Lake Delton, 3F swaptest May 5 Neenah. Central Division Convention June 15-16 Red Carpet inn Milwaukee. Items from Intercom, Hamtrix, Smoke Signals. Traffic: (Jan.) W9ZGQ 852, W9CXY 341, W9DND 271, WD9COC 189, W9IEM 169, K9FHI 135, K9UU 118, WD9EAQ 92, W9YCV 90, K9LGU 84, WB9ICH 81, WD9ESZ 69, WA9ZTY 65, W9DM 64, WD9DHF 61, WB9KPX 60, W9AYK 54, KB9FA 52, WB9YPY 52, N9CE 41, W9IHW 38, WB9RRU 38, KB9CV 36, W9UW 35, WB9BRE 33, W9BCC 33, K9AQ 32, W9FZC 32, WB9MPF 32, K9JPS 30, W9MTL 30, WB9ZRE 29, K9AKG 28, W9FDY 28, K9HDF 28, WB9JSW 28, K9VSY 28, W9TXB 25, W9YYL 25, WA9DXW 21, WB9ESM 20, K9ANV 16, WB9YPZ 13, WD9AJA 12, WB9ROD 11, WD9BKT 9, WB9LKC 8, W9OP 6, W9ZBD 3. (Dec.) W9BOC 59, W9UT 2.

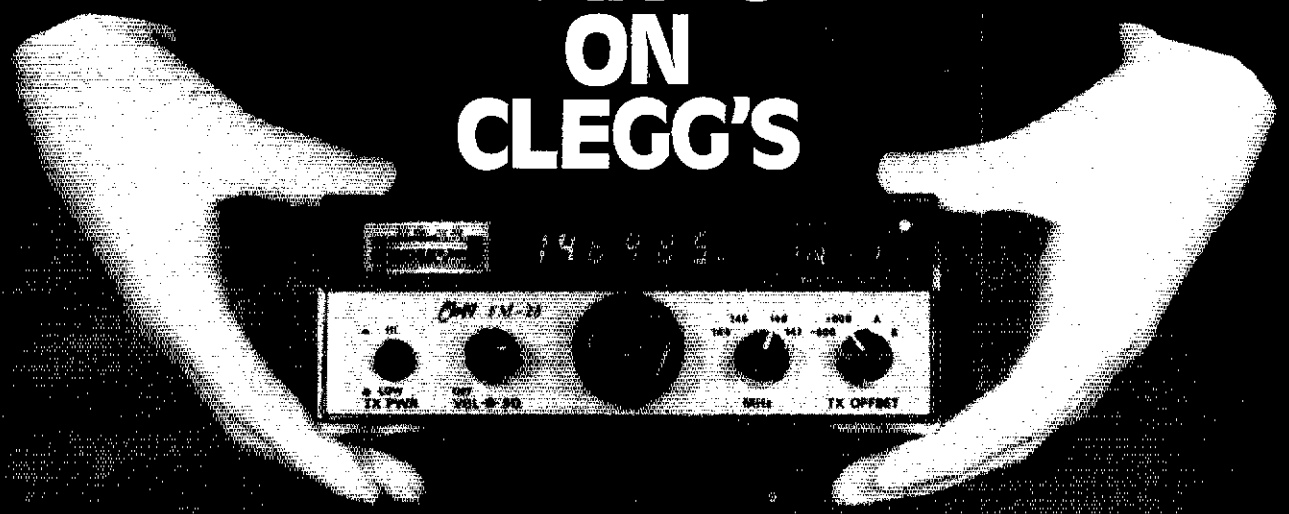
DAKOTA DIVISION

MINNESOTA: SCM, Helen Haynes, WBØHOX — SEC: KØHJC. STM: AFØO.

Net	Freq.	Time/Day	QNI	QTC	Manager
PAW	3925	9-12/1-5	3483	345	WAØYVT
MSPN N	3945	12:05 P	572	92	KØZBI
MSPN E	3929	5:45 P	663	218	WØDUW
MWX	3925	6:15 P	372	305	WBØUKI
MSSN	3710	5:30 P	121	12	AFØO
MSN 1	3685	6:30 P	285	100	WØRIO
MSN 2	3689	10:15 P	149	69	KØPIZ

Your new SEC is KØHJC, from Anoka, MN. He operates a

GET YOUR HANDS ON CLEGG'S



1979 FM-28!!

25 WATTS
144-148 MHz
FULLY SYNTHESIZED
5 KHz STEPS
PROVISIONS FOR NON-STANDARD OFFSETS
AND ONLY $295.00

Last year we promoted the FM-28 at $329.95 in an attempt to acquaint the 2 Meter FM gang with this superb transceiver. We never experienced such an enthusiastic response.
As a result of the great popularity of this radio we've been able to increase production, reduce our cost, improve reliability, and tighten specifications.
So now in 1979 when you purchase a new FM-28 you become a real winner. We have reduced our price still further. And our warranty on the 1979 production is now a full 12 months.

ORDER YOURS TODAY DIRECTLY FROM CLEGG!

Send your check or money order for $295 and we will pay domestic UPS. Or order yours on your VISA or Master Charge card and we'll add the few dollars for shipping to your credit card charges.

Clegg

Communications Corp
1911 Olde Homestead Lane
Greenfield Industrial Park East
Lancaster, PA 17601
(717) 299-7221

FOR BEST PRICE AND FAST DELIVERY

CALL

1-800-325-3636

TOLL FREE

HAM RADIO CENTER

a classic case...

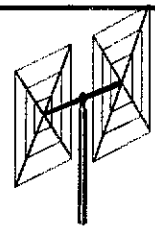
of simplicity in design providing reliability and contest winning performance, at rock bottom prices.

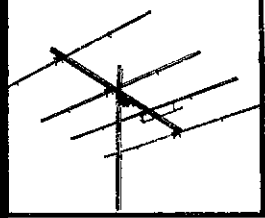
30 years of use test in all kinds of field conditions prove the quality of a Gotham antenna. The prices below prove the economy.

FAMOUS GOTHAM QUADS

Two element quads with full wavelength driven element and a reflector, gain is equal to that of a three-element beam and directivity is exceptional. ALL METAL construction (except the insulators). Totally complete with boom, aluminum alloy spreaders, sturdy universal type boom mount, wire and all hardware; requires 52 ohm and 72 ohm coax; full instructions for simple assembly and installation included; assembled weight 25 lbs; a fool-proof quad that always works with great results. This cubical quad is the antenna used by the DX champs and it will do a wonderful job for you.

Now check this super price: 10/15/20 quad, complete, ready for simple assembly... JUST $65.95.





CHAMPIONSHIP BEAMS

In an age of compromise, Gotham beams stand out offering championship performance at modest prices. Adjustable to any frequency within band, at lowest SWR, these beams are built strong to resist adverse weather conditions. Each beam is full size for full size performance, not mini beams, or trapped beams; including boom, all hardware, and gamma match; requires 52 or 72 ohm coaxial feedline; 7/8" and 1" aluminium alloy elements for maximum strength and low wind loading.

12 EL 2M Beam $64.95 **4 EL 10M Beam $66.95**
6 EL 6M Beam $62.95 **4 EL 15M Beam $65.95**
5EL 10MBeam $84.95 (Truck shipped, not UPS)

FREIGHT PREPAID on 2, 6, and 10M beams shipped to the 48!

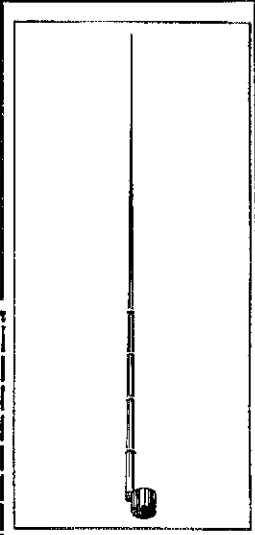
ALL BAND VERTICAL ANTENNAS

Effective low angle, omnidirectional radiation, easy assembly and operation, no guy wires needed, occupies little space, can be installed at ground level, exceptionally rugged, broad banded, low initial cost, no maintenance, proven and tested design. Guaranteed Gotham quality at low Gotham prices. One of the best antennas for the price. LOADING COIL INCLUDED. Absolutely complete.

V40 vertical antenna for 40, 20, 15, 10 and 6 meter bands. Especially suited for the novice who operates 40 and 15. **JUST $25.95**

V80 vertical antenna for 80, 40, 20 ,15, 10 and 6 meter bands. Our most popular vertical. Used by thousands of novices, technicians and general license hams. **JUST $27.95**

V160 vertical antenna for 160, 80, 40, 20, 15, 10 and 6 meter bands. Same as the other vertical antennas, except that a large loading coil permits operation on the 160 meter band. **JUST $29.95**



GOTHAM

2051 N.W. 2nd Ave., Miami, Fl 33127

"Getting out for 30 years"

☐ Please send the following:

Quantity | Description | Amount

(Florida residents add 4% sales tax)

Send self addressed, stamped envelope for literature.

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

How to order: Remit total amount with order. We ship verticals, 2, 6, and 10M beams (except 5 EL 10M Beam) prepaid to the 48. Other beams and all quads sent freight collect cheapest way, due to size of package. Check your local truck lines for estimated freight rates. For fast COD service on all prepaid antennas, call (305) 573-2090.

REMEMBER!
VERTICALS SHIPPED FREIGHT PREPAID ANYWHERE IN THE WORLD!

Complete Line of Replacement Parts for CB - STEREO - TV

Model UG-175
Adapts PL-259 for use with RG58U Cable
1-9 Qty .25
10-99 Qty. .22

Model UG-176/U
Adaptor for RG-59/U Cable
1-9 Qty. .20
10-99 Qty. .18

Model FS-71
RCA Shielded Plug
1-9 Qty. .30
10-99 Qty. .27

Model FS-68
Standard Stereo Phone Plug with ¼" phone plug, screw terminal
1-9 Qty. .45
10-99 Qty. .40

Model FS-73
⅛" Miniature 3.5mm Plug
1-9 Qty .25
10-99 Qty .22

PL-259 for RG8U Cable
1-9 Qty .50
10-99 Qty .45

4 Pin Mic Connector
1-9 Qty .95
10-99 Qty .90

3 Pin Mic Connector
1-9 Qty. 1.20
10-99 Qty. 1.10

Model CB 584
Adapts PL-259 to Motorola plug or RCA type phone jack.
1-9 Qty .99
10-99 Qty. .90

Model FS-187
3-Conductor open circuit phone jack
1-9 Qty .45
10-99 Qty. .40

UHF/VHF Splitter with Matching Transformer
Separate F-59 and ring included
Model SP 902 UHF/VHF 1-9 Qty 1.50 10-99 Qty 1.40
Model SP 903 UHF/VHF/FM 1-9 Qty 1.60 10-99 Qty 1.50

MODEL FS-72
Heavy Duty Clip Leads
Two each of 5 different colors
22" long tip to tip
1-9 Qty 1.00
10-99 Qty. 1.00

Matching Transformer
75-300 ohm
VHF/UHF/FM 75-300 ohm matching unit input accepts "F" type fittings. 300 ohm twin lead output. Features low insertion loss, ac/dc blocking w/excellent match.
1-9 Qty. . . . .50 10-99 Qty. 55

Axial Lead Capacitors
50 MFD x 450 volts
1-9 Qty 1.30
10-99 Qty. 1.20
100 MFD x 450 volts
1-9 Qty 1.40
10-99 Qty. 1.30

Emitter Resistors
0.5 ohm
2W 1-9 Qty .20 10-99 Qty. .18
3W 1-9 Qty. .25 10-99 Qty. .20
5W 1-9 Qty. .30 10-99 Qty. .25

Focus Rectifier
8 KV 1-9 Qty. .80 10-99 Qty. .70
6.5 KV 1-9 Qty. 1.00 10-99 Qty. .90

Lighter Plug
1-9 Qty. .70
10-99 Qty .64

Fuse Holder Model FH-1
Fuse holder with 18" wire for all standard ¼" fuses, 1/2 amp fuse.
1-9 Qty. .45
10-99 Qty. .40

Fuse Holder Model FS-50
Holds ¼" x 1¼" fuses. Can be used on panels up to 5/16" thick. Has bayonet knob. No screwdriver required.
1-9 Qty. .60
10-99 Qty. .55

3AG Fuses 1A,2A,3A,4A,5A,6A
1-9 Qty. .13
10-99 Qty. .11

IMMEDIATE DELIVERY WITHIN 48 HOURS
Minimum order $10.00 Add $1.00 postage
Quantity discount prices Mfgr inquiries Welcome
Ask For Our Complete Price List

FUJI - SVEA ENTERPRISE
a Division of Fuji-Svea Incorporated
P.O. Box 40325 Cincinnati, Ohio 45240
TOLL FREE TELEPHONE Nationwide 800/543-1607 Ohio 800/582-1630
Hours Mon-Fri 10-7, Sat 11-5

YAESU

The radio.

Is Our Number 1 Line At

Cohoon Amateur Supply

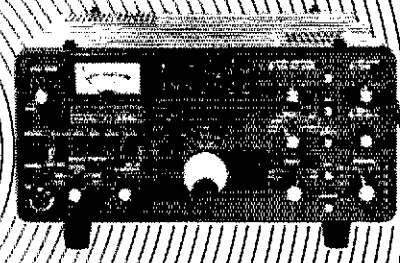
TO SERVE YOU BETTER

2 LOCATIONS

SOUTH

307 McLeans Hopkinsville, KY 42240

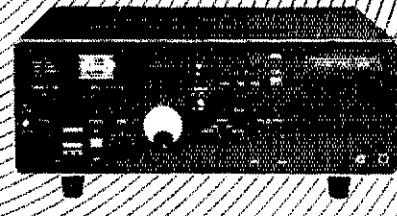
502-886-4534



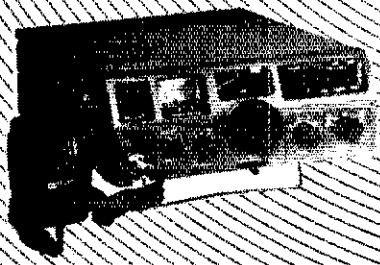
WEST COAST

1298 Via Alta, Santa Maria, CA 93454

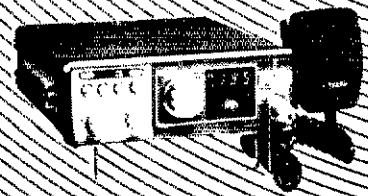
805-937-8685



Also Stocking:



TEN-TEC **KANTRONICS**
TEMPO **ATLAS**
WILSON **DENTRON**
INFO-TECH **CUSHCRAFT**



Write For Used Equipment Sheets and Catalog

Drake TR-4 on 80 through 10, but has plans for a linear and an all mode 2-meter station. He can be found on either of the two Section Phone Nets. MN amateurs are now involved in snow watch. They are taking measurements of snow depth and water content in order to help the N.W.S. in Minneapolis to keep track of possible water problems. W0VB has renamed his creation the Lunar Directory after finding a 432 EME directory exists. This is a comprehensive world wide 50 MHz and above directory. K0BZP reports there is a 2282 repeater near Grand Rapids operated and sponsored by the Northern Lakes Amateur Club. They have started a Net — all are welcome to check in on the AESN. After 15 years of absence WD0FFE formerly WA0BWH checked in on MSN 1 21 sess. and on MSN 2 27 sess. AF0O, ex-WB0ZAL is the proud owner of a terminal unit which she was able to put together. Please note AF0O is net mgr. of MSN 1 and WD0BFR is mgr. of MSSN. Our thanks to W0RIQ who acted as mgr. for the past three months. Traffic: WB0HOX 500, WA0YVT 379, WA0TRC 198, AF0O 166, K0PIZ 140, WB0RIQ 111, WD0BFR 108, K0HJC 105, WB0UKI 105, N0HY 99, WA0RKV 70, N0AHA 69, K0ZBI 61, W0RIQ 58, WB0NZB 47, W0HZU 46, K0CSE 42, K0TS 36, WB0SYT 32, W0OPX 31, WB0QEU 31, KA0BZP 30, WB0RCW 26, WD0GYQ 22, WB0JYT 17, K0JTW 14, WB0LRK 14, K0DEG 7, N0JP 7, K0FLT 6.

NORTH DAKOTA: SCM, Lois Jorgensen, WA0RWM — SEC: WB0TEE. OBS: W0DM. Congrats to the reorganized Jamestown Radio Club. Repairs of Valley City Repeater is complete. WB0WSQ resigned as DATA Mgr. WA0CRW accepted the duties. Sorry to report KA0AGO a Silent Key. OM is WD0BMA, we express our sympathy. Congrats to upgrades: Novice to Tech KA0CAB KA0CAE KA0CLD WD0HPX. Gen. to Adv. WD0FKG K0FUP K0FRP. Extra passed by WA0UNA now AG0R. WD0FUY left Minot AFB for McGuire AFB in NJ.

Net	kHz	CST/Days	Sess.	QNI	QTC	Mgr.
Goose River	1990.0	0900 Su	4	44	0	W0CDO
DATA	3996.5	1830 S-S	26	405	174	WB0WSQ
YL WX	3997	0730 S-S	31	609	595	WA0RWM

Traffic: WA0RWM 848, K0FRP 136, WB0WIB 106, WB0OAJ 102, W0CDO 94, WA0CRH 82, N0AFP 65, K0GGI 31, WB0WSQ 30, WB0JGM 22, W0DM 14.

SOUTH DAKOTA: SCM, Lydia S. Johnson, W0KJZ — Asst. SCM: W0DVB. SEC: WA0TNM. NMs are W0s WE ZWL UEN TNM. Endorsements: OTS: W0CLS W0DVB WB0EVQ K0JV WB0VGN. New OTS K0AS K0FRE. Endorsed ECs WA0BZD WA0CUL K0TVJ. New EC K0JV for Lawrence Co. Endorsed OBS K0CX. Aberdeen repeater WB0JZZ/R operates on 146.31/.91. ARRL Dak. Div. convention are Oct. 5, 6, 7 at S.F. Ramada Inn Airport. Contact WA0RIQ and WB0YQT. WB0ZEB made BPL. BHARC officers are AA0F, pres.; K8ZTT/0, VP.; K0HF, Secy.; K0CX, treas. Bear Mtn. repeater freq moved to 25.85. WB0IOK moving to 8-Land. BHARC donated a complete set of ARRL publications to Rapid City Public Library. Traffic: (Jan.) W0ZWL 691, W0MZI 680, WA0VRE 270, WB0VGN 262, WB0EVQ 194, WA0TNM 178, W0DVB 141, WA0UEN 132, W0HOJ 131, WD0BMR 105, K0FRE 64, W0IG 31, W0KJZ 25, WB0KUD 23, WB0OMF 20, WD0BMS 10. K0AS 6, K0JV 2. (Dec.) WB0ZEB 196.

DELTA DIVISION

ARKANSAS: SCM, S. M. Pokorny, W5UAU — SEC: WA5VNV. NM: AD5D W5MYZ W5POH WA5ZMZ. Nets, Time/Day, QNI, QTC, Mgr. ARN, 3995, 0030/Dy, 1716, 130, AD5D. OZK, 3760, 0100/Dy, 169, 19, W5MYZ. ASN, 3740, 0130/T-S, 98, 11, WB5WPV NEAWN, 146.28/88, 0130/T-S, 149, 19, WB5WJH. SCARC, 28.765, 107, 7, WD5HJC. APN, 3937, 1200/M-S, 1189, 69, W5POH. M-Bird, 3928, 2230/M-F, 838, 52, WA5ZWZ. A slow speed net now in operation, Mon. thru Fri. on 3740 at 7:30PM with K5BIL and WB5WPV as NCs. Harrison Hams and Repeater were busy when explosion of Allied Tele. Co. bldg. occurred putting two exchanges out of service. Stations were set up at Police Dept. fire dept. hospital and Radio KHOZ. Hams from Mtn Home, Branson, Fayetteville and Russellville offered help but it was not needed. W5ASD has new 2 & 6 mtr beams. AD5D new OTS & OBS for ARN. A new repeater at Blytheville, "W5ENL/RPT" on 146.07/67. OBS WB5WWA 5 W5UAU 3. Traffic: W5BLP 54, AD5D 42, W5POH 27, W5UAU 21, WB5WWA 6, WB5GQH 1, WD5CAA 1.

LOUISIANA: SCM, S. T. "Tom" Losey, Jr., K5TL — Asst. SCM: K5DPG. SEC: WB5IYH. STM: N5YL. NMs: W5GHP N5ES N5IB WB5IYH. Regret to report W5CEZ a Silent Key. N5WD W5JPV WA5IQU active on CAND. K5DPG K5BLV WB5CDX N5ES K5TL active on DRN5. Shreveport Hamfest to be first weekend in May at the Sports For Boys Club on the LA State Fair grounds. The Jan. SET was another success for our Section. All Nets reported heavy traffic with many new stations checking in. Welcome to the 115 new amateurs in our Section. WB5IKT applied for DX award. Traffic Handlers Picnic to be held in Lafayette third week of June — see you there. Many ECs needed around the State.

Net	Freq.	Time(PM)/Day	QNI	QTC	Mgr.
LAN	3615	7&10 Dy	459	253	W5GHP
LTN	3910	6:30 Dy	790	326	N5ES
LSN	3703	7:30 M-F	228	23	N5IB
LRN	3587.5	6:30 Su-W	18	22	N5RB
RACES	3993.5	8:00AM Su			WB5IYH
LEN	3910	9:00AM Su			WB5IYH

Traffic: K5TL 258, W5GHP 256, N5YL 207, WA5IQU 167, N5ES 155, K5ARH 144, K5DPG 131, WB5LBR 84, N5IB 60, N5RB 60, WB5USS 44, WB5RTW 39, K5BLV 38, WB5CDX 33, WB5IYH 28, N5EK 14, WD5GJB 9, W5YN 6, WB5IKT 2.

MISSISSIPPI: SCM, E. Ed Robinson, W5XT — SEC: WB5FXA. SET has produced many and varied emergencies. Rain, snow and ice have also added a few real emergencies. We should take stock of our personal emergency equipment, evaluate our co. and state arrangements. Two meter or other local communications with direct and repeater, handi-talky, portable and mobile, emergency power supplies and fixed rigs should be in order. Local nets, community, intercommunity, co. and state liasion are necessary. The MSBN (along with MSN, MTN, and RACES) have continued to improve our status. ECs, clubs and individuals must ALL be prepared and willing to contribute. CAND-(W5KLV) sess. 64, QTC 558. DRN5 Rep. 100% by WD5GNR. MSBN(K5WSC) sess. 31, QNI 2976, QTC 134, MTN(K5OAF) sess. 31, QNI 160, QTC 43. MSN(WA5IDF) sess. 14, QNI 102, QTC 15. MN(WA5JWD) sess. 31. QNI 658, QTC 27. Capital AEN(WB5SNB) QNI 77. Traffic: K5OAF 143, W5EDT 89, WB5SNB 65, W5WZ 33, WA5OKI 21, WB5YGQ 9, WD5DCK 8.

TENNESSEE: SCM, O. D. Keaton, WA4GLS — Asst. SCM: WB4PRF. SEC: WB4DYJ. STM: W4ZJY.

Net	Freq.	Time(Z) Days	Manager
TN	3.635	0000 Dy	AF4T

TN	3.635	0300 Dy	N4UC
TPN	3.980	1040 M-F	WA4EWW
TPN	3.980	1145 M-F	W4PFP
TPN	3.980	1300 S&Su	W4PFP
TPN	3.980	2330 M-S	WB4YPO
TNN	3.710	2300 MTThF	WA4CNY
ETTMN	28.7	0100 W&F	WB4NFJ
ETVHFN	145.02	2300 T&Th	WB4DZG
TCDWN	146.16	0100 W	WA4BOC
	146.76		
	146.31		
	146.91		
WTVHFN	146.37	0130 Dy	WA4VVX
	146.97		

The above listings are for the summer months. Phone nets report 150 sess., 6710 QNI, 1032 QTC. CW Nets report 72 sess., 478 QNI, 239 QTC. WD4HKK awarded section net cert. for his participation in the Northern FL Phone net. Officers of the Short Mountain Repeater Club are WA4LXR, pres.; WA4RYH, vice-pres.; WA4QQM, secy-treas. The 13/73 & 31/91 repeater link worked very good during SET. Tnx to WB4FUR & W4YXA. WA4ROB & WD4LPJ rec'd. courtesy membership in the Short Mt. Rpt. Club. Sumner County Repeater Assn. officers are K4EKE, pres.; WB4ZCJ, vice-pres.; WB4CPO, secy.; also operates a net on 147.84/147.24 7:00 P.M. CST. T. Cookeville Repeater Assn. officers are WA4RYH, pres.; WA4OWU, vice-pres.; N4WS, secy-treas. Traffic: WA4CNY 387, W4OGG 359, AF4T 201, WB4PRF 197, WB4DYJ 188, WA4NIF 185, N4UC 159, WB4BKF 130, K4CNY 121, WA4GLS 79, K4XE 49, W4ZJY 47, WB4YPO 43, WB4GBI 43, W4PFP 43, K4VM 37, WA4BCS 32, KB4G 31, WA4DKC 23, WA4WVW 20, WA4IOL 17, K4UMW 13, K4MOA 10, W4EWR 10, W4TYV 9, WB4ZSZ 9, W4PSN 7, K4DEC 6, WA4FMR 6, WA4WHQ 6, WD4MMZ 5, W4VJW 4, W4RUW 3.

GREAT LAKES DIVISION

MICHIGAN: SCM, Stanley J. Briggs, W8MPD/K8SB — Asst. SCMs: WA8DHB W8SPD. SEC: WA8EFK. STM: WB8MTD. NMs: K8LNE KB8AI K8RV K8KMQ WB8YDZ WD8LSV.

Net	Freq.	UTC/Day	QNI	QTC	Sess.
QMN*	3683	2300/0300 Dy	1313	337	59
GLETN	3932	0230 Dy	1342	309	31
MACS*	3953	1600 Dy	1064	300	31
MiTN*	3953	0000 Dy	650	289	29
UPN*	3922	2230 Dy	954	160	35
MNN*	3722	2230 Dy	321	71	30
WSSBN	3935	0000 Dy	859	68	31
BR	3930	2230 M-S	417	30	24
MEN	3930	1400 Su	173	4	4
ARES	3932	2230 Su	85	4	4
VHF Local Nets 14 reports			950	366	61

*NTS Section Nets. For the first time in three years the SET in MI ran on schedule without a real snow emergency getting in the way! Early reports indicate that SET was again a success in this Section. Thanks to all who helped with the exercise on the local and state level. The first Section Traffic Awards for 20 or more originations on behalf of the public went to K8KMQ WD8KZX WB8QYU W8SOP and W8VPW. Appointments: WD8PZS OTS. W8QG OO-II. Reports received: OOs: K8JH K8RCT W8SOP. OBS: N8AG W8GZF WD8IXV K8NKB WD8POK WA8RNB W8SOP AC8Y. I am sorry to report the following Silent Keys in the MI Section: W8SLV K8WEW. More upgrades — Congratulations: Adv: W8IDN WB8YIG WD8IXX WD8RCN KA8CZS WB8YTX WD8SSU to N8ALW. General: WD8MIB WD8PAF WD8ORQ WD8LHT WD8DJA WD8KJT WD8LUH WB8UDD WD8LHS KA8BHC to N8ARK. WD8QSE WD8LNM, WA8AUT to N8NLM, WD8IBM. Try the Michigan Novice Net, a good place to start cw traffic work. All amateurs are welcome in it. Traffic: (Jan.) W8VPW 597, WD8KZX 528, W8SOP 484, WB8MTD 432, WA8DHB 278, WD8NKA 222, K8KMQ 191, W8MPD 182, WD8CSZ 176, WB8YDZ 176, WB8QYU 173, WD8DMX 165, WB8YRY 159, WD8LRT 142, AF8V 134, K8DTG 125, K8RV 121, W8YIQ 108, WB8PAF 107, WB8ZIY 103, WA8QAF 95, WD8LSV 87, WB8YIG 87, N8AKY 79, W8CUP 75, WB8WYO 69, W8ACW 68, WD8BSE 67, WB8SYA 66, WD8IEW 64, AC8F 59, WD8EGO 58, WB8BNN 56, WA8AXF 54, W8LCU 54, AC8Y 53, KB8GC 53, KB8AI 53, WB8POL 52, WB8ITT 51, K8LNE 50, K8GXV 42, WD8MCN 41, W8WOJ 39, W8NOH 37, N8ABA 35, K8DYI 31, WB8AXI 30, W8EOI 30, W8IHX 29, W8VIZ 28, WD8OKU 27, K8ZJU 25, WA8PIM 25, W8GVS 24, W8HIN 24, W8LDS 24, WD8QOM 23, W8TBP 22, WA8YAN 22, KB8BS 20, WA8VBF 20, WD8JFF 20, WB8NBD 19, WD8IXZ 18, W8DT 17, KB8GT 17, WD8NJO 17, N8AOA 16, WD8IAG 16, W8JXJ 15, W8SCW 15, W8RNQ 14, KA8CPS 14, WA8EOW 13, WB8IEK 13, K8QBZ 13, WD8ROK 13, W8PBO 12, W3GQJ/8 11, WB8HPZ 11, W8DCN 11, KB8FK 10, WB8HSN 10, WA8MDK 10, W8YDA 10, WB8AFO 9, K8CN 9, W8OFQ 9, N8ACL 8, W8JUP 8, WB8VAI 8, WA8WVV 8, WD8MJB 8, N8AFZ 7, WA8FXR 7, W8WVL 7, K8DD 5, WB8UZM 5, K8JED 4, WB8VVF 4, WB8UUJ 3, WA8GTG 3, KA8CUT 2, W8HKL 2, WB8NCD 1. (Dec.) KB8GC 27, WD8OKU 27, WD8PZS 6.

OHIO: SCM, Harold C. Chapman, WB8JGW — Asst. SCMs: WA8MCR W8TP N4VY. SEC: K8AN. NMs: AF8A N8CW W8DIL WB8KWD K8OZ WB8YGW. Net reports (Jan.)

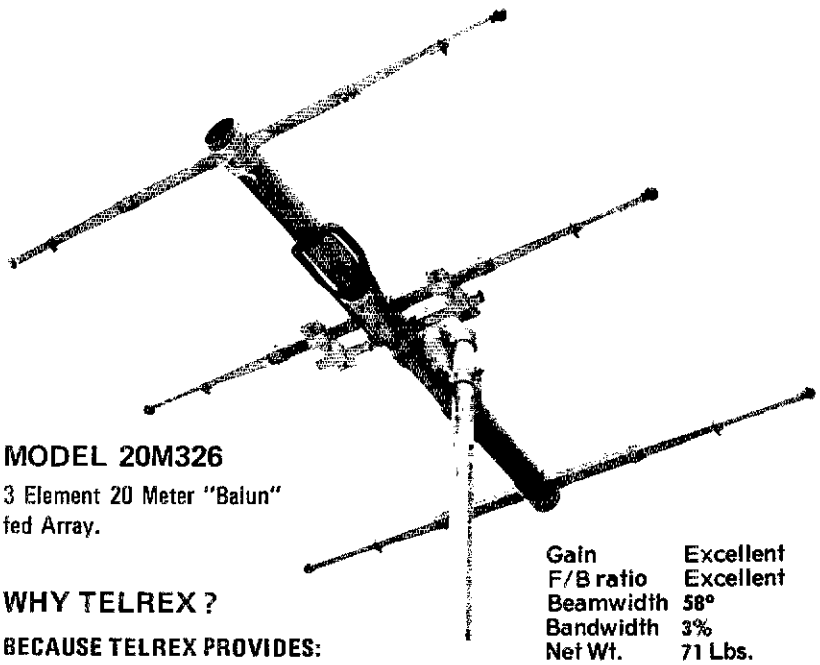
Net	QNI	QTC	Sess.	Time(Z)	Freq.
OSN	342	133	31	2310	3.577
OSSBN	3933	1511	113	1530/2115/2345	3.9725
BNR	138	162	34	2300	3.605
BN	772	414	66	0300/2345	3.577
O6mN	444	52	33	0200	50.160
ONN	130	60	30	2330	3.708

Increasing numbers of stations are reporting activity; 105 for Dec., 130 for Jan. Let's increase it to 150! An increase in the number of traffic reports indicates more outlets and better coverage in the Section. K8AAZ made BPL second month in row. First session of SET '79 appeared very successful according to what I heard on the nets and reports received. Let's prepare for Oct. and make it even better. ECs — don't forget your reports to K8AN. New Champaign-Logan club officers: WB8ZFF, pres.; WB8ZOL, vice-pres.; WD8BXZ, secy-treas., Clinton Co. has new repeater K8SYS/R 147.72/12. Upgrades: WD8KBW to Extra. Appointments: EC, K8JDI for Columbiana Co. WB8MYE Miami Co.; Net Mgr AF8A; OES, WA1TWD; OO, K8DHJ, N8FU; OTS, WB8PIY K8DHJ, N8FU. ONN Net Certs. K8DDG AF8A WB8RTJ WD8PUH. Local net reports: Van Wert County — QNI 35, QTC 1, sess. 4; BRTN QNI 342, QTC 116, sess. 36; TSRAC QNI 996, QTC 304, sess. 52. Looking forward to seeing all of you at Dayton or one of the many hamfests coming up in the Section. Traffic: (Jan.) K8AAZ 643, K8AN 454,

STEP UP TO TELREX

Professionally Engineered Antenna Systems

FEATURING: THE TELREX PRECISION TUNED "MONO-BAND" ARRAY



MODEL 20M326

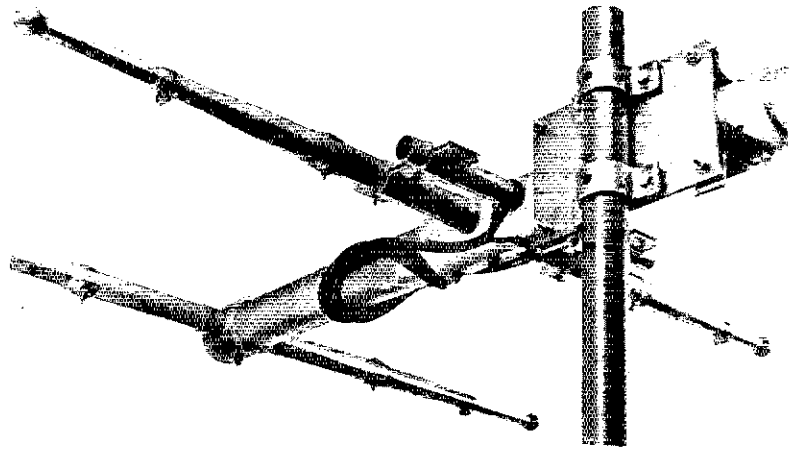
3 Element 20 Meter "Balun" fed Array.

Gain	Excellent
F/B ratio	Excellent
Beamwidth	58°
Bandwidth	3%
Net Wt.	71 Lbs.

WHY TELREX ?

BECAUSE TELREX PROVIDES:

Longevity	Which lowers the overall cost considerably.
Durability	Reducing high maintenance cost by avoiding the necessity for continuous climbing and repairs.
Performance	Producing "Top-man-on-the-frequency" results!
Assurance	Confidence in your Telrex Antenna's durability creating peace of mind!
Satisfaction	In knowing that you have purchased the Best!



Note: The ruggedized boom to mast straps (providing rigidity at the mounting point), the corona balls (dampening element vibration and electrical noise), and the high performance T-Match, and "Balun" system. These refinements and many more are available on Telrex Antennas such as the 20M646, 20M536, 20M436, 20M326, 15M845, 15M532, 10M636, 10M523.

With a Telrex Array you can be sure of Optimum Performance per element at your site with a high S/N ratio, F/B ratio, and minimum interference (TVI, BCI, and QRM).

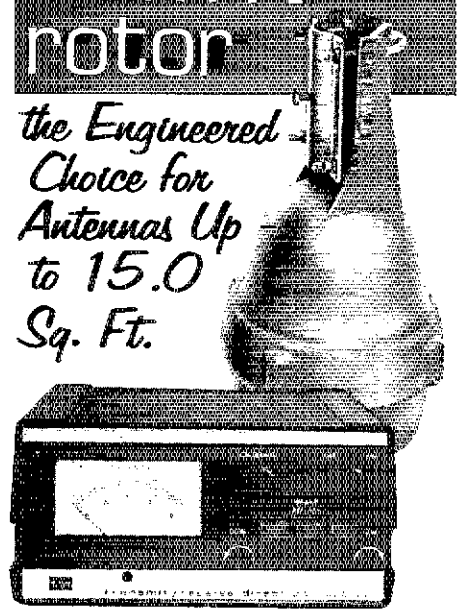
TV and Communications Antennas Since 1921

telrex LABORATORIES

For technical data and prices on the complete Telrex line, write for catalog PL-7
Telrex Labs, Inc., P.O. Box 879, Asbury Park, N.J. 07712 Phone 201-775-7252

target your signal with a Ham IV rotor

the Engineered Choice for Antennas Up to 15.0 Sq. Ft.



If your antenna array is up to 15.0 sq. feet, you need the new Ham IV that combines the best in proven performance and professional features: all steel drive gears, positive power breaking, full ball bearing construction, a professionally styled control center, and more.

ON TARGET CLUB KIT

Send for your Free On-Target Kit with colorful embroidered patch, membership certificate and card plus details on the proper rotor to match your antenna. Enclose $1 for handling and mailing costs. Send to:

CDE CORNELL-DUBILIER

CORNELL-DUBILIER ELECTRIC CORPORATION
SUBSIDIARY OF FEDERAL PACIFIC ELECTRIC COMPANY
150 Avenue L, Newark, New Jersey 07101
Dept: BH

358

I'm On Target—Send Kit To: H4

Name

Address

City

State Zip

☐ Enclosed $1. for kit handling & mailing.

or

☐ Send free details on all CDE rotors.

Novice, QRP, 200 w, deluxe — good, better, best — $299, $369, $399, $699, $869, $899, $1069. TEN-TEC has them all. A choice of seven HF transceiver models — a choice of power levels — a choice of operating features (and accessories) for beginner or old timer. Best of all, there's a wide choice of prices to fit every amateur budget.

TEN-TEC "OMNI" TRANSCEIVERS — REALLY CHOICE. Top of the line. Deluxe in every respect. Deserving of a place in the finest of operating positions. All solid-state 100% duty cycle 200-watt final amp.; 8-bands (160-10 m plus convertible 10 MHz and "Aux" band positions); broadband design for no tune-up; built-in VOX and PTT; built-in Squelch; 4-position CW-SSB filter and 8-pole crystal filter with separate mode switch to permit using all filters in all modes; 2-speed break-in; 2-range offset tuning; optimized sensitivity from 2 μV on 160 m to 0.3 μV on 10 m; greater dynamic range (typically better than 90 dB) plus PIN diode switched 18 dB attenuator; WWV at 10 MHz; front panel control of linear/antenna bandswitching; phone patch jacks; "timed" crystal calibrator (on "A" model only); zero-beat switch; SWR bridge; adjustable ALC and sidetone; dual speakers; plug-in boards; "clamshell" aluminum case with black vinyl covering plus warm dark metal front panel; full shielding, optimum size for convenient operation: 5¾"h x 14¼"w x 14"d. Model 545 OMNI-A with analog dial, only $899; Model 546 OMNI-D with six 0.43" LED digital readouts, $1069. Model 645 keyer, $85, Model 243 Remote VFO, $139, Model 248 Noise Blanker, $49, Model 252MO AC Power Supply, $119.

TEN-TEC "ARGONAUT" TRANSCEIVER—QRP CHOICE. The challenge and excitement of working the world on 5 watts. And every feature you need: all solid-state; 5 bands (80-10 m); full amateur band coverage SSB/CW; sensitivity less than 0.5 μV; offset tuning; 4-pole IF crystal filter, 2.5 kHz bandwidth; analog dial; vernier tuning; automatic sideband selection; built-in speaker; 5-watt input to broadband push-pull final amplifier; PTT; full CW break-in; adjustable sidetone volume and pitch; built-in SWR bridge; TVI filter; plug-in boards; small and light weight enough to go anywhere (4½"h x 13"w x7"d and 6 lbs.). World beating price, too: Model 509 only $369; Model 210 AC Power Supply just $34.

TEN-TEC 540/544 TRANSCEIVERS—POWER CHOICE. 200 watts from the bottom of 80 m to the top of 10 m — SSB or CW. No compromise from the leader in solid-state HF technology. Instant band change without tune-up; sensitivity 0.3 μV; offset tuning; 8-pole crystal-lattice filter; WWV at 10 & 15 MHz; push-pull solid-state final amp.; 100% duty cycle; adjustable ALC with LED indicator; built-in SWR bridge; PTT; full CW break-in; adjustable sidetone pitch and vol.; zero-beat switch in Model 544. Choose the value leading Model 540 with analog dial and built-in 25 kHz pulsed calibrator for just $699 or the Model 544 with six 0.43" LED digital readouts for $869. Model 240 160M converter, $110; Model 262M AC Power Supply with VOX, $145; Model 252M AC supply only, $119.

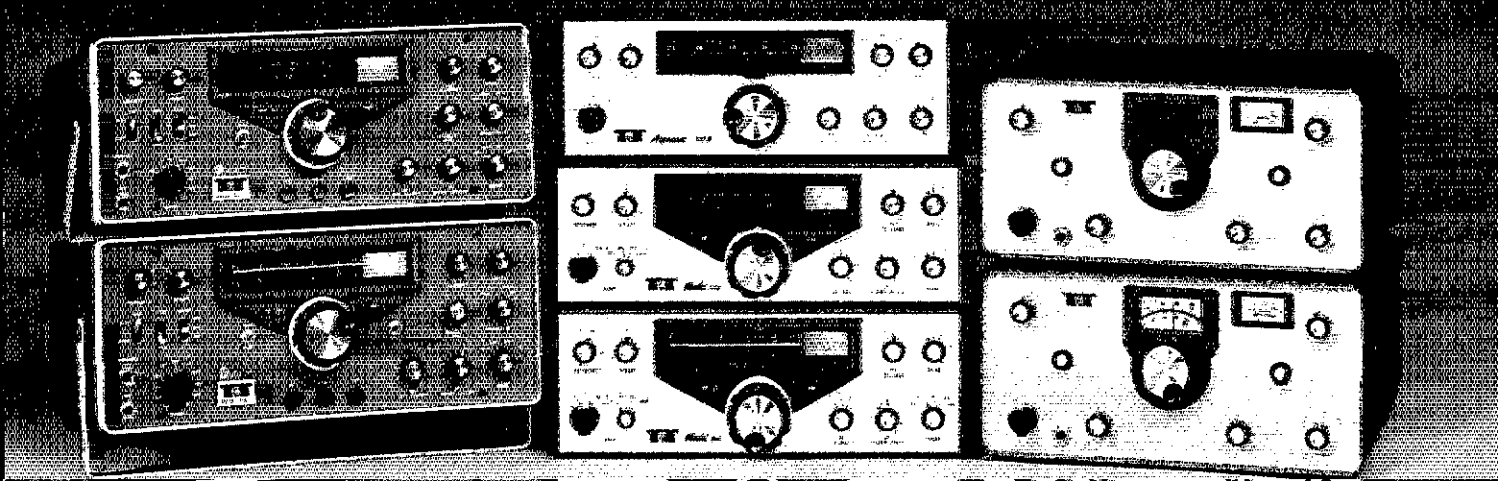
TEN-TEC CW TRANSCEIVERS—BUDGET CHOICE. The "Century 21" series. Unique. Modern technology with old-fashioned value. Fine performance, reliability, and simplicity of operation, all at low cost. Win raves from novices and confirmed brass pounders alike. All solid-state; 5 bands (80-10 m) full amateur band coverage; receive CW and SSB, transmit CW; sensitivity 1 μV or less; offset tuning; 3-position selectivity (2.5 kHz, 1 kHz, 500 Hz); 70 w input to push-pull Class C final amp.; broadbanded for no tune-up or resonating; full break-in; adjustable side-tone level; built-in AC power supply. Choose Model 570 with analog dial for only $299; Model 574 has a 5 LED digital readouts for only $399.

The choice is all yours when you choose TEN-TEC HF transceivers; see your nearest dealer or write for full details.

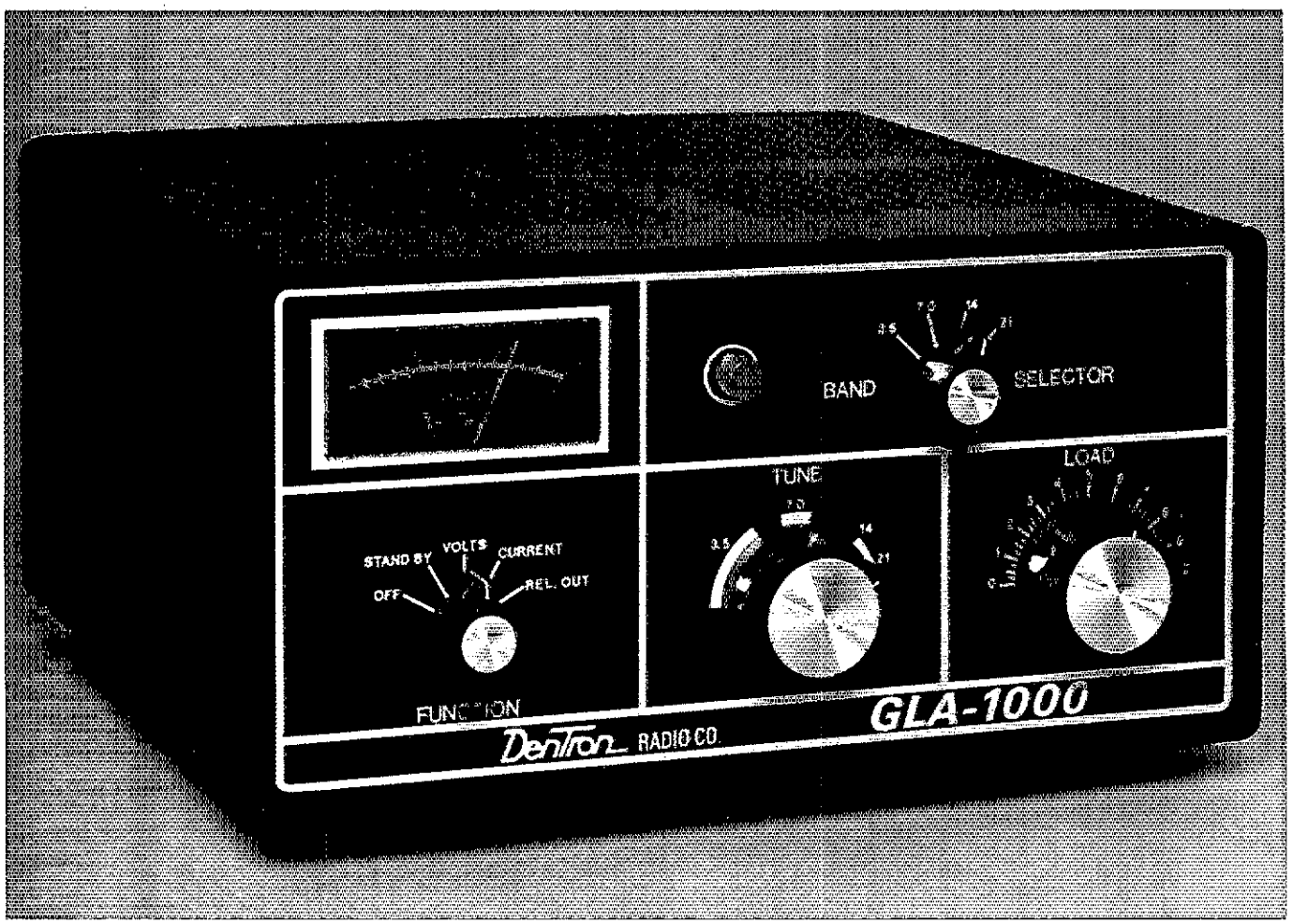
arma

TEN-TEC, INC.
SEVIERVILLE, TENNESSEE 37862
EXPORT 4719 LINCOLN AVE., CHICAGO, ILL. 60646

WIDEST CHOICE IN HF TRANSCEIVERS: TEN-TEC



ANOTHER FIRST FROM DENTRON
more power for less.



In January, 1978, our engineers developed a unique linear amplifier. The GLA-1000 was to be the smallest amateur linear to offer 1200 watts SSB PEP input, and 1000 watts CW input, with a built-in power supply, at the lowest possible price, $379.50 sugg. retail.

How would it perform? Could a unit this small (5⅜"H x 11"W x 11"D) and economical measure up to high standards set by "professional" amateurs across the country? We decided to let a group of amateurs tell us.

The GLA-1000 was field tested for 1 month by the following amateurs: Robert Allen W8IO, Harold Unger WA2EON, Robert Schiers NØAN, Jim Turle WA8RCN, Alan Applegate KØBG, Howard Townsend WA5MLT, Mickey LeBoeuf K5ML, Tom Lutman WB8ZWY, Ed Clegg W3LOY and Andy Calandria K5MVP. The group was instructed to "use the prototype under tough operating conditions, not to baby it in any way."

What was the response? Some on the air comments received by W8IO, *"Fantastic signal, 12 db over barefoot exciter"* (75SSB). *"Excellent keying, no change in wave form, 5-9 +30 db in Kentucky"* (40CW). From NØAN, *"Overall quality excellent and up to the standards DenTron has come to stand for."* From K5ML, *"Finally a high quality amplifier that everyone can afford."*

Response was unanimously positive. Build a powerful linear with special features like full metering of essential voltages and currents, a back-lit, black-out meter that even includes a relative, power output function. Keep it small and economical so that it is within the reach of all amateurs, and you've got a winner!

In inflationary times like these, it's important to find ways to do more for less.

We did, and we're proud of it.

Great Size, Great Power, Great Price. Great Little Amp

DenTron Radio Co., Inc.

2100 Enterprise Parkway
Twinsburg, Ohio 44087
(216) 425-3173

$379.50 Sugg. Retail
FCC Type Accepted

ARRL Publications

The Foundation of a Dynamic Hobby.

☐ **THE RADIO AMATEUR'S HANDBOOK** Internationally recognized, universally consulted. The all-purpose volume of radio. Packed with information useful to the amateur and professional alike. Contains hundreds of photos, diagrams, charts and tables. 56th Ed. **$9.75 U.S. $10.75 Canada. $12.00 Elsewhere.**

☐ **THE RADIO AMATEUR'S LICENSE MANUAL** Study guide and reference book. Complete with typical questions and answers to the FCC amateur exams for Technician, General, Advanced and Extra Class. 77th Ed. **$4.00 U.S. $4.50 Elsewhere.**

☐ **THE ARRL ANTENNA BOOK** Theoretical explanation and complete instructions for building different types of antennas. Simple doublets, multielement arrays, mobile types, rotaries and others. 13th Ed. **$5.00 U.S. $5.50 Elsewhere.**

☐ **ARRL HAM RADIO OPERATING GUIDE** A ready reference source and guide to good operating practices, ideal for the amateur who wishes to brush up on operating procedures and who wishes information on all facets of amateur operating. 1st Ed. **$4.00 U.S. $4.50 Elsewhere.**

☐ **A COURSE IN RADIO FUNDAMENTALS** Twenty-six chapters present the electrical and electronic principles that are basic to understanding radio circuit operation. 5th Ed. **$4.00 U.S. $4.50 Elsewhere.**

☐ **GETTING TO KNOW OSCAR—FROM THE GROUND UP** This booklet is a reprint of an extremely popular series appearing in *QST*. **$4.75 U.S. $5.50 Elsewhere.**

☐ **SOLID STATE DESIGN FOR THE RADIO AMATEUR** Thorough treatment of the use of solid state devices. Provides a wealth of tried and proven circuitry plus practical application data. 1st Ed. **$7.00 U.S. $8.00 Elsewhere.**

☐ **OPERATING KIT** The active ham's favorites—The Ham Radio Operating Guide, Log Book, Message Pad and U.S.A. Call Area Map. Just **$6.50**

☐ **HINTS AND KINKS** If you build and operate an amateur radio station, you'll find this a mighty valuable book in your shack and workshop. Vol. 10. **$4.00 U.S. $4.50 Elsewhere.**

☐ **SINGLE SIDEBAND FOR THE RADIO AMATEUR** A digest of the best articles from *QST*. Includes discussions of theory and practical how-to-build-it descriptions of equipment. 5th Ed. **$4.00 U.S. $4.50 Elsewere.**

☐ **SOLID STATE BASICS** Perfect as a study guide for the beginner or as a refresher for the more experienced builder. Complete with a ten watt transmitter as a workshop exercise. 1st Ed. **$5.00 U.S. $5.50 Elsewhere.**

☐ **UNDERSTANDING AMATEUR RADIO** Explains in simple language the elementary principles of electronic and radio circuits. Includes how-to-build-it information on low cost receivers, transmitters and antennas. A "must" guide for the newcomer. 3rd Ed. **$5.00 U.S. $5.50 Elsewhere.**

☐ **TUNE IN THE WORLD WITH HAM RADIO** The complete beginner's package. Everything needed to obtain a Novice license: Theory, rules, how to assemble a station, and operating practices. With one-hour code cassette 2nd Ed. **$7.00**

☐ **FM AND REPEATERS FOR THE RADIO AMATEUR** a complete treatment of 1m and repeaters. Includes chapters on receivers, transmitters, antennas as well as repeater operation. 2nd Ed. **$5.00 U.S. $5.50 Elsewhere.**

☐ **ARRL ELECTRONICS DATA BOOK** Includes data on radio frequency circuits, filter design, *L*, *C*, and *R* networks, antennas and feed systems. This 128-page reference is a useful addition to the amateur's technical library. 1st Ed. **$4.00 U.S. $4.50 Elsewhere.**

☐ **SPECIALIZED COMMUNICATIONS TECHNIQUES** Seven chapters cover the more esoteric forms of amateur radio: ATV, SSTV, FAX, RTTY, Satellite Communications, and advanced communication techniques. 1st Ed. **$4.00 U.S. $4.50 Elsewhere.**

☐ **RADIO FREQUENCY INTERFERENCE** A must publication for all hams! Full treatment is given to the causes and solutions for those pesky interference problems. Complete with illustrations and photos of the more common kinds of interference. 1st Ed. **$3.00 U.S. $3.50 Elsewhere.**

☐ **THE RADIO AMATEUR'S VHF MANUAL** A thorough treatment of vhf. Covers receiving and transmitting principles, techniques and construction, antenna and feed system design, uhf and microwaves, test equipment, interference causes and cures. 3rd Ed. **$4.00 U.S. $4.50 Elsewhere.**

☐ **ARRL CODE KIT** Two cassettes provide practice at 5, 7½, 10 and 13 wpm. Step-by-step progression and use of random code characters plus proven suggestions and hints in the accompanying instruction book make increasing your code proficiency easy! **$8.00**

☐ **THE ARRL ANTENNA ANTHOLOGY** 4 chapters packed with information on vertical, Yagi, quad and miscellaneous antenna types along with a section on antenna theory and test methods. Taken from the pages of QST **$4.00 U.S. $4.50 Elsewhere.**

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

I would like these publications shipped to me postpaid. Ship to:

NAME _____ CALL _____

STREET _____

CITY _____

STATE/PROVINCE _____ ZIP/PC _____

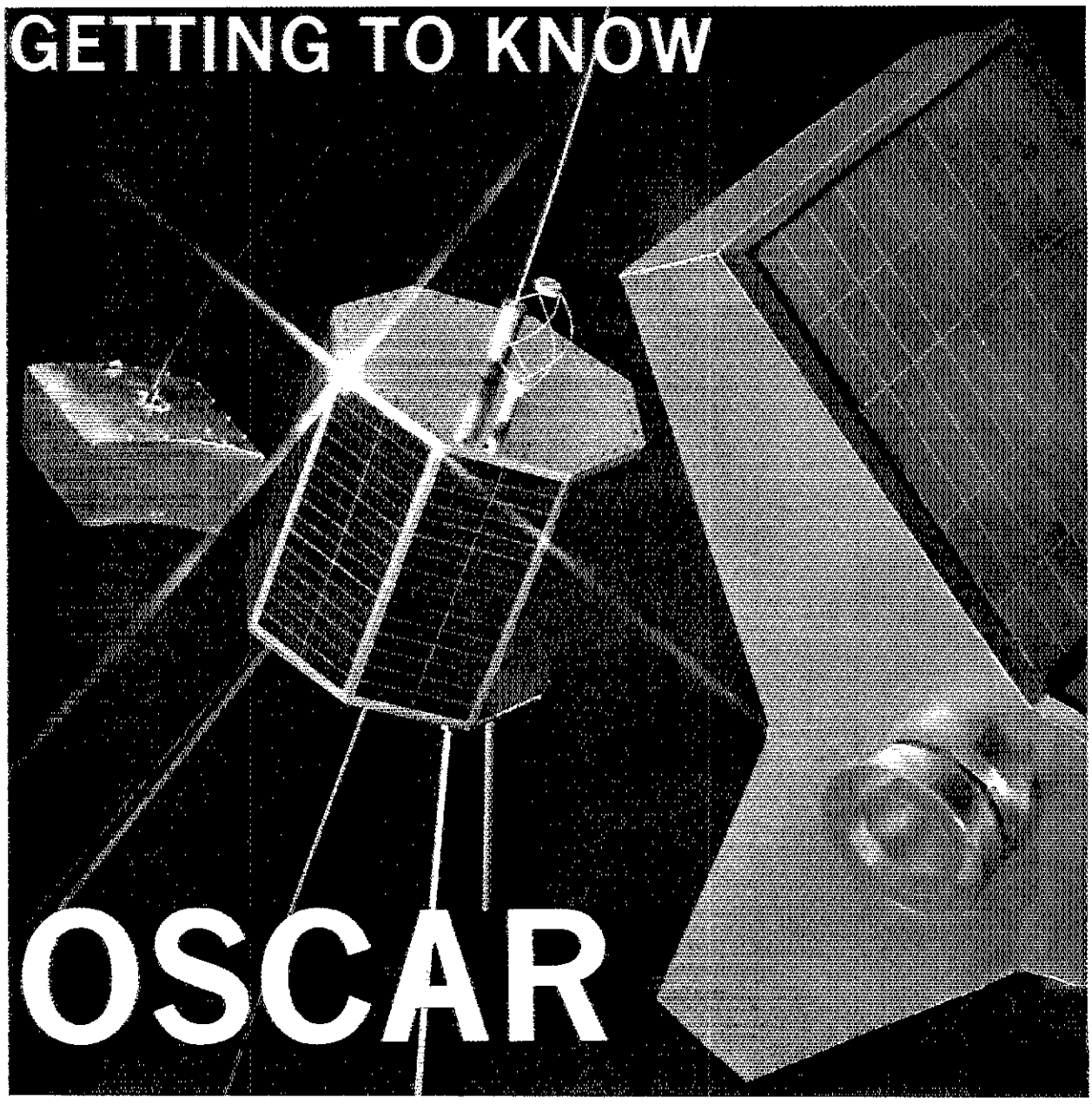
Total enclosed or charged to MC, BAC, or Chargex Account: $ _____

Charge to my: BankAmericard/Chargex No. _____

Expires _____

Master Charge No. _____

Expires _____ Bank No. _____



Brand New! . . .IT'S NOW BIGGER AND BETTER THAN EVER!

There's never been a better time than now to share in the space age adventure of satellite communication.

GETTING TO KNOW OSCAR FROM THE GROUND UP, the popular reprint from QST, has been repackaged and now includes some of the latest up-to-date information about the amateur satellite program. Re-titled SATELLITE COMMUNICATIONS, this new package contains complete and in-depth coverage of the basics of satellite communication; tracking instructions, locator maps and orbital overlays for OSCAR 7 and 8 and the two Russian "RS" satellites; OSCAR 8, Mode J operation — vhf goesintta, uhf comesoutta; geosynchronous satellites and the future; how OSCAR can be used in rescue operations; complete plans for a 435 MHz receive filter. You'll also get background information on the two Russian "RS" satellites and how to qualify for the new OSCAR 8 Mode J Club.

Become part of the fascinating future of Amateur communication. Get your copy of SATELLITE COMMUNICATIONS . . . TODAY!

Available from your local dealer or directly from ARRL.

$4.75 U.S. $5.50 Elsewhere

AMERICAN RADIO RELAY LEAGUE
225 MAIN ST.
NEWINGTON, CT 06111

Ad Nauseam! REAL·STATE·OF·THE·ART

DIGITAL INSTRUMENTATION FROM OPTOELECTRONICS, INC.

TWO NEW AC-DC BATTERY PORTABLE COUNTERS

OPTO-8000.1A 10Hz to 600MHz Frequency Counter

- Precision TCXO time base 0.1PPM Stability 17-40°C • Super Sensitivity with preamps in both HI-Z & 50 Ohm inputs <10 mV to 150 MHz <50 mV @ 600 MHz
- Auto Decimal Point • Aluminum Case • Socketed IC's • Three position attenuator: X1, X10, X100 (avoids false counting)

#OPTO-8000.1A Factory Assembled - **2 Year Guarantee** $329.95
#OPTO-8000.1AK Kit Form - **1 Year Parts Guarantee** $279.95
#NI-CAD-80 NI-CAD Battery Pack (Installs in case) ..... $ 19.95

OPTO-7000 10 Hz to 600 MHz Miniature Counter

- XTAL (TCXO) Time Base ±.08PPM/°C Standard • Aluminum Case • HI-Z & 50 Ohm inputs
- 1 Sec. & 1/10 Sec. Gate times • Auto Dec. Pt. • Built-in Prescaler and Preamps Standard

#OPTO-7000 Factory Assembled - **1 Year Guarantee** $139.95
#OPTO-7000K Kit Form ..... $99.95 **#AC-70** AC Power Pak ..... $ 4.95
#NI-CAD-70 NI-CAD Battery Pack and Charger Circuitry ..... $ 19.95
#TCXO-70 Optional Precision TCXO Time Base 0.1PPM, 17-40°C ..... $ 79.95

Designed and assembled in Ft. Lauderdale, Florida U.S.A.

CM-1000 Digital Capacitance Meter

- Featured Sept. 1978 Radio Electronics Magazine • Measures from 1 pf to 9999 ufd. • 4 Ranges • 6" Digits • Aluminum Case • Accuracy of 1% less one digit

#CM-1000 Factory Assembled ..... $179.95 **#P-1000** Probe $6.95
#CM-1000K Kit Form ..... $129.95 **#P-1000K** Probe Kit $4.95

T-100 Precision Thermometer

For Use with Digital Voltmeter • Output 10 mv per Degree • Switchable Fahrenheit/Celsius
• Resolution to .01° with 4½ Digit Meter • Requires two 9V Batters - not included

#T-100 Factory Assembled & Calibrated $59.95 **#T-100K** Kit Form $39.95

#D-450, Antenna, Rubber Duck, RF Pickup, 450 MHz $12.50
#D-146 Antenna, Rubber Duck, 146 MHz $12.50
#RA-BNC Right-Angle BNC Adapter for Above Antennas ..... $ 2.95

PROBES:

#P-100 50 Ohm, 1X Direct Connection RF Probe ..... $ 6.95
#P-101 Lo-Pass, Attenuates RF at audio frequencies 19.95
#P-102 HI-Z, 2X High Impedance, general purpose 19.95

TERMS: Orders to U.S. and Canada add 5% to maximum of $10.00 per order for shipping handling and insurance. To all other countries, add 10% of total order. Florida residents add 4% state tax. C.O.D. Fee, $1.00. Personal checks must clear before merchandise is shipped.

master charge

BANKAMERICARD

Factory Direct - Phone Orders

(305) 771-2050 • 771-2051

OPTOELECTRONICS, INC.

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

DXpedition...The Ultimate Fantasy

Clipper ships sailing to foreign shores. Sixteen amateurs primed for adventure, coming together as the first group in 20 years to set foot on the remote French Island, Clipperton. Their goal: 30,000 QSO's in just 7 days.

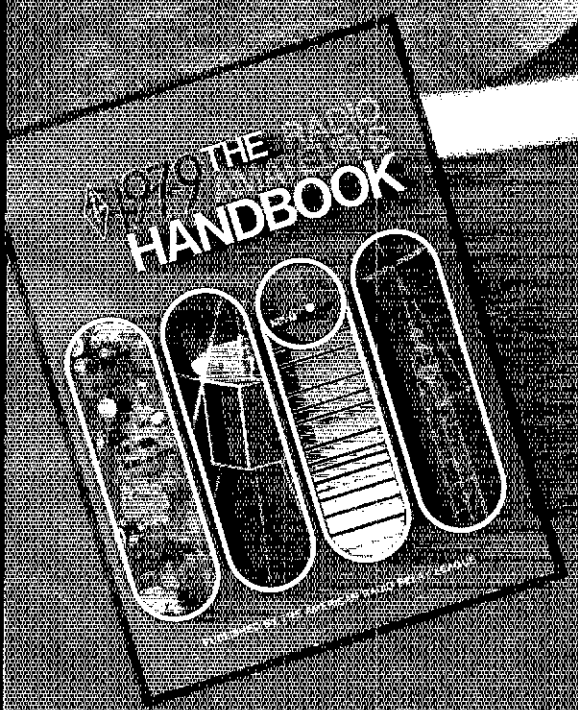
If you're like most of us, a rare DXpedition is more a dream than a reality, but the Clipperton Linear Amplifier from DenTron brings the thrill of a DXpedition to you.

The Clipperton-L™ was inspired by the famous DXpedition on which 3 MLA-2500's were used. We built the Clipperton with 4 rugged, economical, 572 B's in the final to provide a full 2KW PEP on SSB and 1KW CW on 15 through 160 meters. With features like hi-lo power selector for equal efficiencies at 1 or 2 KW, a power transformer that is vacuum impregnated, wide spaced tuning and loading capacitors, built-in ALC and an improved whisper-quiet cooling system, the excitement of crashing a pile-up can be yours.

Clipperton-L suggested price $599.50.
FCC type accepted.

DenTron
Radio Co., Inc.
2100 Enterprise Parkway
Twinsburg, Ohio 44087
(216) 425-3173

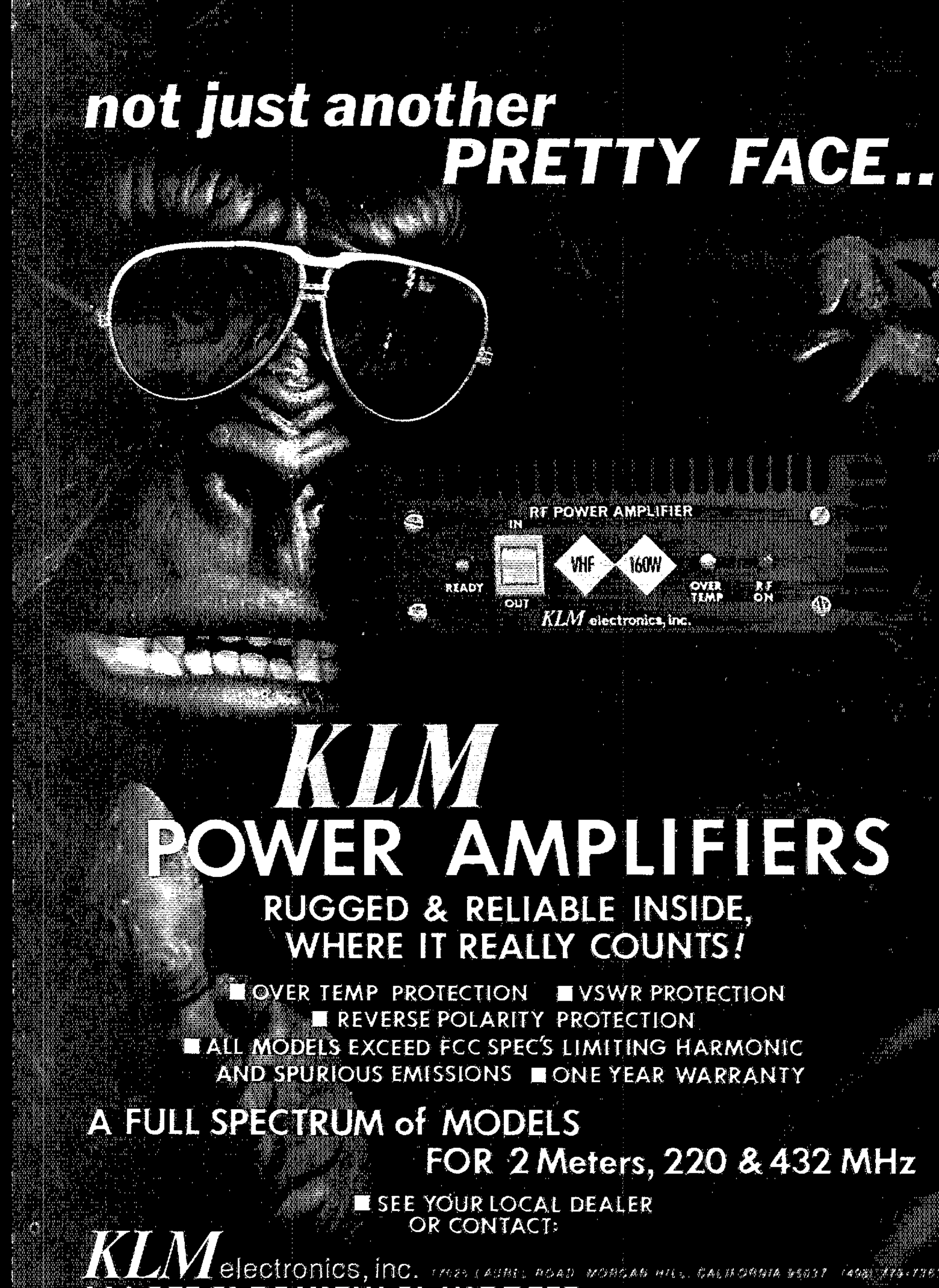
Dedicated to making amateur radio more fun.



I LIKE THIS BOOK. YOU WILL TOO!

NARROW BAND VOICE MODULATION — Stunning discovery on how to shrink transmitter bandwidth. NBVM is the significant new breakthrough in communications technology. How-to section lets every ham share in this exciting new discovery. NEW PROJECTS — Transmitters, receivers, high performance converters, power supplies, and more. SOLAR POWER — You, the Sun and Amateur Radio. ANTENNAS — Every kind . . . Every description. THEORY — The latest in design and application. There's more. Don't pass up the new edition of *The Radio Amateur's Handbook*. Available soon at your local ARRL dealer, or direct from ARRL. Paper edition only $9.75 US, $10.75 Canada, $12.00 Elsewhere. Buckram edition $15.75 US and $18.00 Elsewhere. Postpaid.

AMERICAN RADIO RELAY LEAGUE
Newington, CT 06111


not just another
PRETTY FACE...
RF POWER AMPLIFIER
IN
OUT
READY
VHF
160W
OVER TEMP
RF ON
KLM electronics, inc.
KLM
POWER AMPLIFIERS
RUGGED & RELIABLE INSIDE,
WHERE IT REALLY COUNTS!
■ OVER TEMP PROTECTION ■ VSWR PROTECTION
■ REVERSE POLARITY PROTECTION
■ ALL MODELS EXCEED FCC SPEC'S LIMITING HARMONIC AND SPURIOUS EMISSIONS ■ ONE YEAR WARRANTY
A FULL SPECTRUM of MODELS
FOR 2 Meters, 220 & 432 MHz
■ SEE YOUR LOCAL DEALER
OR CONTACT:
KLM electronics, inc.

WD8LLD 450, WB8KWD 367, WB8WTS 358, W8PMJ 313, K8FE 260, WA8HGH 233, K8BYR 215, W8ENI 180, WD8DIP 175, K8OZ 169, WB8VLR 168, WD8QMP 140, WA8GMT 138, W8DIL 129, W8TH 128, W8QZK 125, WD8DTG 123, WD8DDJ 119, AF8A 114, WB8SIQ 110, WD8CDA 108, KA8BOE 97, AB8P 89, W8JMD 88, WA8SSI 88, K8PE 86, WD8PPQ 86, WA8ROQ 86, WB8CJU 83, WB8UBR 83, K8DDG 80, N8TM 79, W8WEG 78, WB8YTI 77, WB8OMQ 75, WA8T6X 74, WD8KBW 73, WB8GM 67, W8GRT 67, WB8TRK 66, N8CW 64, W8TP 63, WD8JTT 62, WA8MIH 61, WB8JGW 60, W8QEM 60, WD8MKC 57, WB8SRC 57, W8MOK 54, N8AKS 53, K8CKY 52, K8DL 52, WA8SED 51, W8MGA 50, AC8X 50, WB8UWD 46, WB8KKI 45, WD8JPA 44, WB8MEK 40, WA8MHO 40, WD8LPP 39, KA8BZM 35, WB8FWF 34, WB8LMC 34, W8GGX 33, WD8OYK 33, WD8QZM 33, K3RC 33, WB8GGR 32, WB8RSM 32, WB8TJS 32, K8CYX 30, W8ILC 30, K8HLJ 30, WD8KFN 30, WD8JPX 29, W8LZE 29, WB8YGW 28, WB8LWY 27, WB8PIY 27, WB8RUW 26, WB8HMI 23, W8RG 23, K8YUW 21, WD8EKI 17, WA8MAZ 17, WB8VZX 16, W8BHL 15, WB8MRL 15, W8KRF 14, N8ASH 13, WD8INK 13, WA8BOV 12, N8JR 12, N8AUC 11, WB8UDA 11, W8EMK 10, WB8TSM 10, WB8UPA 10, W8GRG 9, W8OUU 9, WB8QHV 9, WD8LOL 8, WD8PYV 8, W8BPK 7, AE8N 7, WD8PEI 7, WA1TWD 7, N8AUH 6, KB8GG 5, K8ND 5, WB8PHO 5, W8QCU 5, K8DHJ 5, N8FU 5, W8IM 5, W8DYF 4, W8ERD 4, WB8NTR 4, K8NU 4, WD8OYO 4, W8ZM 4, WD8JIL 3, W8LT 3, W8UPH 3, WB8YIJ 3, N8AA 2, W8XT 2. (Dec.) K8CMR 5, WB8ZOL 3.

HUDSON DIVISION

EASTERN NEW YORK: SCM, Guy L. Olinger, K2AV — SEC/ASCM: WB2VUK. ASEC: W2IT K2AYQ. STM: WA2SPL. NM: W2CS W2WSS. Nets: NYPON 5PM 3913, ESS(Slow) 6PM 3590, NYSPTEN 6PM 3925, NYS 7&10PM 3677, SDN 930PM M-F 66/06. Congrats to new CCNR brass WA2MZJ K2LV WB2KAB WB2MOG W2YLE K2DN WB2ORK WA2VQE. Not much gossip in mail this month, but hear W2CS came back speechless from West Coast (frog in throat) and had to order breakfast from Linda using cw. Correspondence 2 months behind here due to gruesome work. Text of message following says it all about SET. "I am pleased to convey greetings to the amateur radio operators throughout New York State who all participated in the Simulated Emergency Test weekend on Jan. 27 28 X Emergency preparedness is a vital component in Amateur Radio operations and I salute the efforts of all participating in this test X May your efforts toward preparing and testing amateur radio capabilities under Simulated Emergency conditions prove successful and beneficial — Hugh L. Carey Governor New York State." Well Deserved! Interesting note ... starting to see traffic from Lake Placid, Jan. PSHR: WA2OTC W2IT WA2SPL WB2KDC K2AV WB2EAG. BPL: WA2OTC (first) WA2SPL WA2EQW. Traffic: WA2SPL 1148, WA2OTC 520, W2IT 316, WA2EQW 293, WB2EAG 225, WB2KDC 215, K2AV 111, N2EF 84, WB2ZSG 75, WA2CJY 40, K2HNW 24, WB2ELA 8, WA2AZZ 3, K2RRR 2, WB2VVS 2.

NEW YORK CITY — LONG ISLAND: SCM, Paul A. Lindgren, WA2UWA — Asst. SCM: Steve Bloom, WB2IDP. STM: WB2BNY. NM: WB2LIG. NM/ASCM: WB2EUF. The following are traffic nets in and around the NLI section.

Net	Time/Day	Freq.	Manager
NLI*	1900/2200 Dy	3630	WB2EUF
NLIPN*	1730 Dy	3928	WB2LIG
ESS	1800 Dy	3590	W2WSS
Clear House	1100 Dy	3925	WB2AEK
Mike Farad	1300 M-S	3925	K1PZU
NYSTPEN	1800	3925	WA2SPL

*Denotes Section Net, all times local. W2HAE moving to FL after many years of service to the Section. We wish him the best of luck and he will be looking for his friends on 15 and 20 meter cw. Many thanks to outgoing SCM and SEC K2IZ and K2HTX for making the transition so easy. Their hard work and dedication have made the past five years go quickly and well. W2XY and WA2DNK proud parents of YL harmonic. New officers for Hall of Science Radio Club N2PM, pres.; WB2KUY, v.pres.; W2VZQ, treas.; WA2YUS, secy. New licenses and upgrades KA2DMY HP1MJE/W2 KA2BMB KA2CEK K2TLW and WB2SGA. Congratulations to the following on their new appointments. K2OPJ N2NT K2NQ N2LI as OO. WB2KIH K2HD K2LIE WB2BNY and WA2YUS as OTS. WB2IDP as OES. WA2INJ as OBS. WB2IDP and WA2YUS as OVS. WB2BNY is the new STM. Please give Jim your full support. High QNI for NLI K2GCE WB2EUF WB2IDP N2MG and K2LIE; for NLIPN, WA2UWA WB2LIG N2MG K2GCE and WB2RQW. We need an SEC and more ECs. If you think you are qualified for these important positions and can help please contact your SCM. WA2LBJ new EC for Shelter Island. WB2LIG now NM for NLIPN. LIMARC ATC repeater almost ready to go. New officers for Larkfield ARC — trustees WB2GUB W2DDZ and WB2CIK; WA2TSF secy.; K2HTX treas. I regret to announce WB2VBM and WB2JWT are Silent Keys. WB2DCJ passed his 1st Class Radiotelephone. K2UB put up his first antenna on the roof in nine years. WB2YUJ put up 80-meter dipole. Syosset High School Radio Club WA2JAS now on ATV and RTTY. They would be interested to contact all radio clubs with similar capabilities. Address to write to for information on ARRL National Convention is PO Box 891 Baton Rouge, LA 70821. All appointees must report regularly or your appointment will be canceled. I need your reports for this column. Remember the column is only as good as you make it. The traffic nets need your help. If you are not sure about procedures just check in and they will help you. The nets are listed every other month in this column. Thanks very much and I hope for all your cooperation in the next 2 years. Traffic: (Jan.) WA2UWA 251, WB2KIH 107, K2GCE 86, W2MLC 82, WB2IDP 77, WA2CZY 68, WB2DCJ 43, K2LIE 43, N2MG 37, WB2YUJ 30, W2GP 19, K2IZ 14, WB2FKZ 10, WA2KXE 8, K2TV 4, K2UB 4, N2NT 2. (Dec.) WA2CZY 61, K2VL 40.

NORTHERN NEW JERSEY: SCM, Robert Neukomm, WA2MVQ — SEC: WB2VUF. STM: W2XD. NM: AF2L K2VX WA2LHV & WA2OPY.

Net	Mgr.	Freq.	Time/Days	Sess.	QNI	QSP
NJN	AF2L	3695	7:00 P Dy	35	526	264
NJN	AF2L	3695	10:00 P Dy	33	532	190
NJPN	K2VX	3950	6:00 P Dy 9:00 A Su	44	905	625
OBTTN	WA2OPY		Dy			
NJSN	WA2LHV		6:30 P MWF			
NJVHF	WA2LHV	49/49	10:30 P Dy			

Congratulations to the following: WB2AXG to Tech; KA2BWR to Advanced; WB2KLF to Advanced. JA1BMI now N2AFT and JA3AER now N2ATT. Bergen Amateur Radio Assn. had the film of the 7J1RL DXexpedition at

their last meeting tnx to JA3AER/N2ATT. W2QHV was elected as a "Fellow" of the Radio Club of America. W2BUB a SK's station has been donated to the Aerospace Program of the Newark Board of Education with one of the teachers a ham named as trustee of its location at the Barringer High School. Sussex County Amateur Radio Club was active in the SET as was the Union County Emergency and Traffic Net. Late listing of new upgrades: to Tech; KA2AHO WB2POD WA2VNG; to General; KA2AJR WA2FNZ WA2JDJ and Advanced; WA2EWG WB2GCC. New hams: KA2DKQ and WA2ZIQ. The USS Ling Submarine Assn. is looking for "hams" to rehabilitate its radio shack. Any NNJ "hams" who formerly were Radiomen during WWII, please contact WA2MVQ. Welcome the following to NJN W5DTR/2 WB2TOM and AG2R. WD2AKR tried working 2-meter mobile via a train trip to FL with little luck! WB2RMI has a new 80-watt amplifier for his 2-meter gear and finally made it into OSCAR 8! WA2IXB survived Lehigh Univ. this semester with a 3.81 average! He also reports he's attempting to organize a radio club at Lehigh. SET came off quite well: 12 OPs were NCs and 16 OPs were liaison to 2RN. We are looking for more 2-meter VHFers and also for novice and tech to check into the Slow Net. WB2TOM is new OTS. W2CVW has a new Omni. K2HLK is recovering from a heart attack and is interested in starting a club for those owners of Central Electronics 100V and 200V. How about it gang? Traffic: (Jan.) WB2RMI 721, W2RQ 533, K3VX 319, N2NS 303, AF2L 292, W2CQB 271, W2SQ 242, WA2MVQ 212, KA2CHK/T 200, WB2RMJ/T 175, KA2BWR 140, WB2JVE 140, W2XD 103, WB2KLF 85, N2IC 73, WA2EPK 62, WB2AIU/T 48, WB2MCO 46, K2NJ 42, WA2QWR 42, K2SE 37, W2UEZ 35, WD2AID/T 23, WA2NPP 22, WB2AXG 21, K2ZFI 21, WA2DLZ 18, WB2HSG 15, W2CC 10, WB7UOO/2 9, WA2QWR 7, KA2AVA/T 5, WD2AKR 4, WA2IXB 3, W2CVW 2. (Dec.) W2CVW 5.

MIDWEST DIVISION

IOWA: SCM, Max R. Otto, WØLFF — Stranded motorists near Wilton were given an assist from portable station operated by WAØYRN WAØAUQ WBØTSG WBØCQW and WBØLIF. KØIIR liaison to 75M where WBØTWW was NCS with 52 stations. Due to efforts of KØVM KØQVF WØHUP and WBØMMT Iowa's first 223.34/224.94 is operating and linked with 448.75/443.75 at Waterloo. WBØTEU new treas. of SARC. WBØUFE-FT-ss7R, WBØZKG and WBØRMT-QF-1A filters, NØAHJ-MT-2000A, WDØFOY and WBØTRI-TR7400, WØZPM-IC-280, WDØDCF-FT-101EE WDØGEM-FT-101, KØARA-TS-820S, WAØRCU-FL-2100B, WØGM made good DX score operated by WBØYUI and WBØSEL. Old timers are sad to hear ex-W9JQU-M. Sutton is a Silent Key. Congrats for upgrades: WDØDCE and WDØDCO-Tech., WDØGEM-Gen., KBØFB-Adv. and WBØZEC-Extra. Officers at Waterloo: WBØUFL, pres.; WBØJFF, vp.; WBØZMY, secy.; WBØZEC, treas. Yours truly had fine eyeball at annual Waterloo Ham-of-the-year banquet honoring WDØAKB. For info on '79 National Convention, write P.O. Box 891, Baton Rouge, LA 70823. WBØYUI redecorating, fired up shack instead of the rig.

Net Mgr.	Freq.	Time(Z)Days	QNI	QTC	Sess.
Iowa 75M WAØVZH	3970	1830 M-S	1158	98	27
Iowa 75M WØYLS	3970	2330 M-S	1003	75	27
TLCN WØYLS	3560	0030 Dy 0400	428	161	62
Iowa Code WBØNSS	3713	0100 T-T-S	70	18	13

Traffic: (Jan.) WAØAUX 740, WØSS 242, AEØR 180, WØYLS 123, WBØPYD 104, WDØGDL 68, WBØKHO 56, WBØMCX 50, WBØUPF 48, WØLFF 40, KØCNM 38, KØGP 38, WØUPX 34, KØOFI 27, KØIIR 25, WBØNSS 19, KØHCO 16, WDØFEW 15, KØKAQ 8, WØMKA 5, KAØBYI 5, KAØBBE 3, WØBQJ 2. (Dec.) KØEVH 353. (Nov.) KØEVH 140. (Oct.) KØEVH 137.

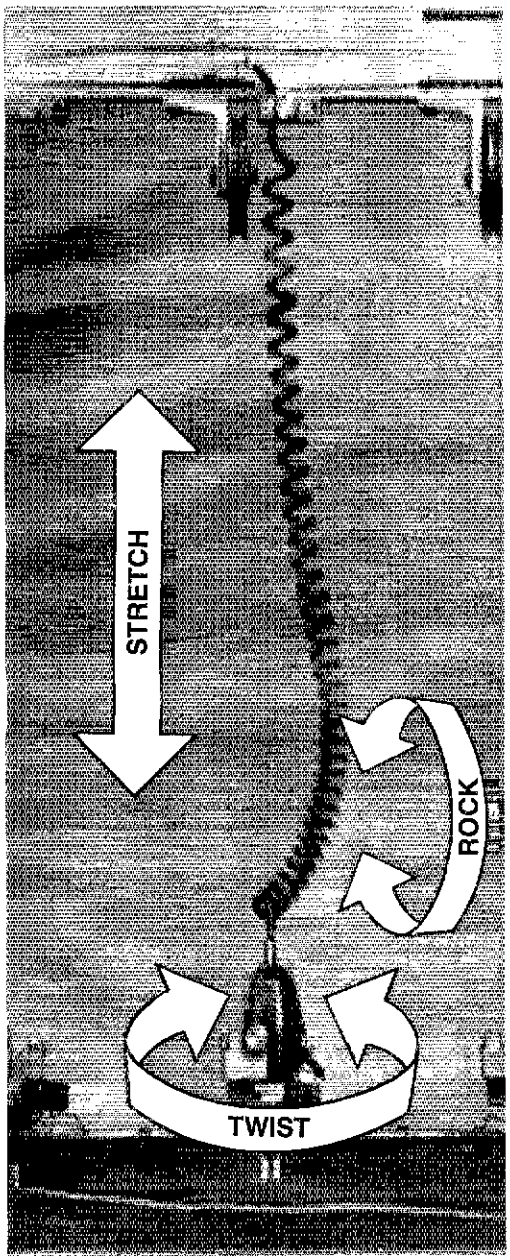
KANSAS: SCM, Robert M. Summers, KØBXF — First of all our deepest sympathy to WØOYH on the loss of his brother. Net Reports for Jan. KSBN QNI 1567, QTC 324. KPN QNI 280, QTC 30. Ks WX Net QNI 1138, QTC 559. CATN QNI 1394, QTC 114. QKS QNI 596, QTC 309. QKS-SS QNI 206, QTC 106. Late Dec. report for QKS-SS QNI 139, QTC 43. KSBN QNI 1351, QTC 239. KPN QNI 313, QTC 64. Individual reports that missed the last report were WØOYH 304, WØFDJ 43, WØERQ 24, KØYTA 27, KØKD 2 and WØCHJ 76. It appears that when I do set an early deadline, we miss quite a few who do report. WØOYH also had a PSHR total of 61. SET for 1979 appeared to be a real success. The number of messages received here indicate so and I know the list WØKL received was even larger. Wichita Amateur Radio Club has elected WBØNOG as pres. for 1979 and his assisting officers are vp. WB4GSS, treas. WBØIDY, sec. WBØZNV and bulletin editor WBØZNM. Traffic: WØOYH 313, WDØACG 302, WØKL 237, KØEZ 202, WAØFBP 146, WØAM 145, KØBXF 120, WØFIR 103, WØHI 96, WAØLBB 80, WØFT 63, WDØESF 54, WØFDJ 42, WØNYG 38, WAØBUT 31, KØKD 28, AAØC 25, KØYTA 24, KØFPC 22, WØRBQ 22, WDØDZE 21, WØRBO 19, NØAPJ 19, NØIN 14, WØOAG 14, WØPB 13, WBØCJB 8, WØZUX 8, KØGZL 4, KØJID 2, WA4WJX 2.

MISSOURI: SCM, L. G. Wilson, KØRWL — Asst. SCM, Joe Flowers, WØOTF. SEC: WBØFKY. At the recent Kansas City DX Club meeting, WØAR was again presented with a trophy for WØAAA. This award is given to the member of the most countries worked in a calendar year. WØAR recorded a 245 and has set his sights on an even 300 this year. We also enjoyed an excellent presentation on computerized propagation forecasting. New officers for the St. Louis ARC are AAØA, pres.; WAØIYY, vice-pres.; WØRUR, treas.; WAØKMF, secy. Thanks and congratulations to all who participated in the 1979 SET in MO. As usual, another job well done.

Net	QNI	QTC	Net	QNI	QTC
METN	322	126	NEMOE	137	31
HBN	412	42	SCEN	88	9
MEOW	889	169	MON	348	314
MON (Dec.)	260	327	MON 2	171	65
MON 2 (Dec.)	150	85			

Your truly is now the proud owner of a brand spankin' new memory keyer. It's first real smoke test will be as a multi-op effort during the upcoming DX contest. Our deepest sympathy to the families and friends of KØCWQ and WØSJE who joined the ranks of the Silent Keys. After working and hamming with WØJSE for a number of years his loss will be felt greatly by fellow MO hams. Congrats to the following new licensees: Novice: KAØs CGY CGZ CHJ CHQ CHV CIA CIC CID CIH CIX through CIZ CJA CJB CJM CJN CPU CPX CQL CQM CQR CQU

fact: our quality assurance is your performance insurance.

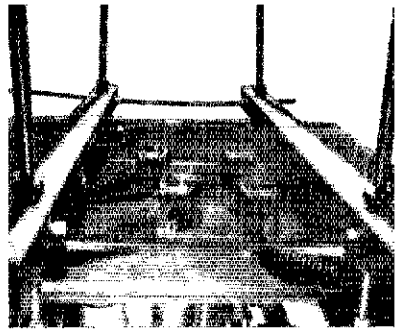


Originally designed for battlefield ruggedness, the microphone elements in Shure mobile and communications microphones offer unequaled reliability. Our quality control engineers anticipate the worst possible field conditions. These microphones have been subjected to the most rigorous tests in the industry, including six-foot drops onto hard floors; violent vibration tests; temperature variation tests ranging from a bitter -54°F. to a searing 185°F.; and 100% humidity tests. We've even dragged them behind automobiles on open roads and subjected them to a battery of corrosion tests. And yes, they really work after all that!

Exclusive Three-Way Flex Tester

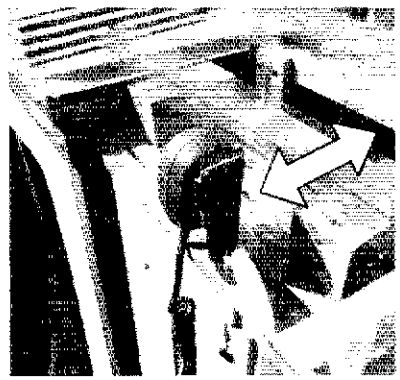
Shure knows that the single most common cause of microphone malfunction is failure of the cord. An exclusive Shure-designed story-and-a-half tall microphone cord tester dishes out more abuse than the average microphone gets in a lifetime.

Stretch, rock, and twist: first, the cord tester stretches the microphone to the full length of the cord. Then it simultaneously rocks the microphone 270° at the end of the cord while it gives the microphone a violent 90° twist in two directions. And this goes on day after day!



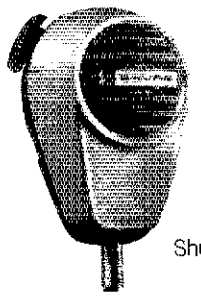
3-D Shake Tester

A microphone that fails spells disaster for a mobile communications system. Every Shure microphone is designed to withstand hours in our brutal 3D Shake Tester — simulating years of driving over rough, bumpy roads.



Million-Cycle Switch Tester

Another abused microphone component is the switch. Shure-designed long-life leaf switches operate with a wiping action that resists the buildup of corrosion and dirt. And Shure's ongoing tests show that they continue to make contact reliably and positively after *one million switching operations.*



mobile communications microphones

SHURE®

The name Shure Brothers Inc. on the back of your mobile microphone is your assurance of proven quality and reliability.

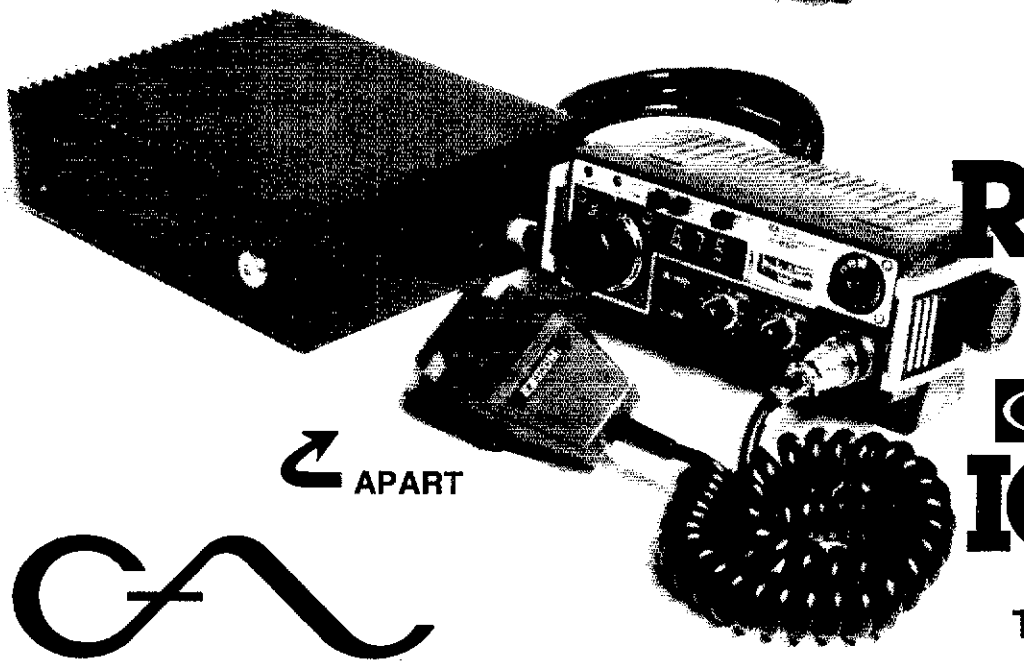
Shure Brothers Inc., 222 Hartrey Ave., Evanston, IL 60204 In Canada: A. C. Simmonds & Sons Limited
Manufacturers of high fidelity components, microphones, sound systems and related circuitry.

Free.

Touch Tone® Microphone or Remoting Kit CK28 with ICOM IC-280 Purchase!

ICOM has the small space solution to a lot of mounting problems...

Mount your new IC-280 either way: snapped together . . . or snapped apart to fit into a small space. Compact head section measures only 2-1/4" high × 7" wide × 3-3/8" deep.



The New Remot-able ICOM IC-280.

C&A Electronic Enterprises

Distributors of Commercial and Amateur Radio Equipment

22010 S. Wilmington Ave., Suite 105
Carson, CA 90745
(213) 834-5868 *(California residents)*

TO ORDER
or
Quotes On Your Amateur Needs

call 800-421-2258

(TOLL FREE — OUT-OF CALIFORNIA)

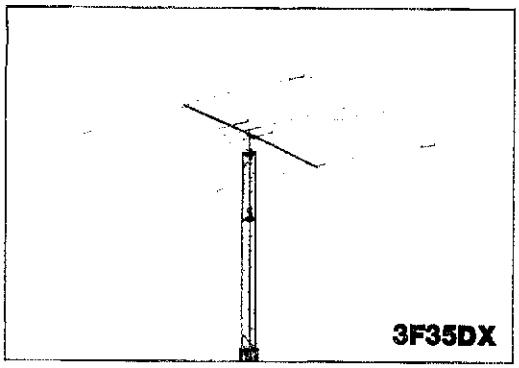
TET®

ANTENNA SYSTEMS

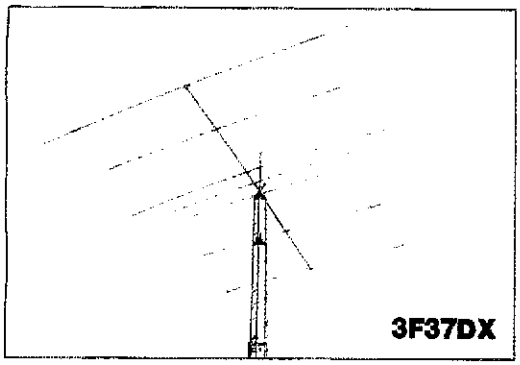
Multi Band Beam Super DX Series

NEW HIGH PERFORMANCE TRI-BAND BEAMS AS GOOD AS FULL-SIZE MONO BAND ANTENNAS.

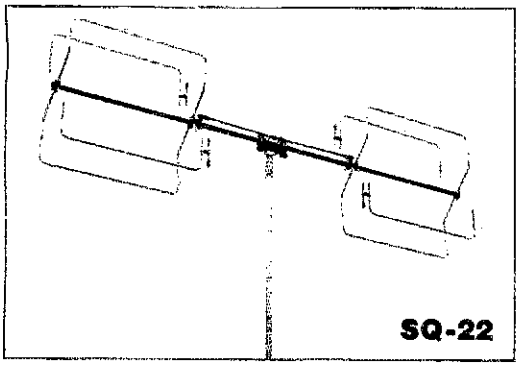
These beams employ a hybrid system which is a combination of separate full-size driven elements for each individual band and Hi-Q-trap parasitic elements. These features result in high radiation-efficiency, high power-rating, and excellent VSWR over the entire bandwidth.



3F35DX



3F37DX



SQ-22

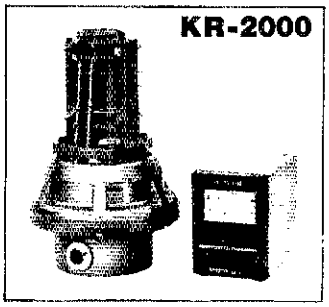
MODEL		3F37DX	3F35DX
BAND		14 21 28	14 21 28
ELEMENTS		7	5
ELEMENTS PER BAND	20m	3	3
	15m	5	3
	10m	5	3
ANTENNA GAIN	20m 15m 10m	Excellent	
FRONT BACK RATIO		Excellent	
MAX. POWER INPUT		3kw	3kw
VSWR		1.5 or better	1.5 or better
IMPEDANCE		50Ω	50Ω
MAX. ELEMENT L.		10.5m	10.5m
BOOM LENGTH		7.5m	5.0m
BOOM DIAMETER		50mm	50mm
TURNING RADIUS		5.3m	5.25m
WIND RATING		40m/sec.	40m/sec.
SUITABLE MAST		50mm	50mm
WEIGHT		23kg	17kg

"SWISS QUAD VHF SERIES"

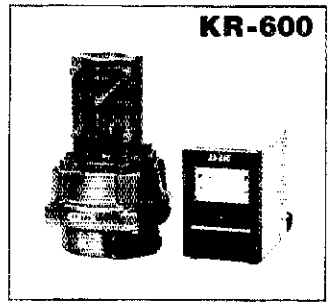
SQ-22 TWO METER DUAL QUAD

Antenna gain and front-to-back ratio are well improved when two elements are driven in phase difference compared to a single driven element such as a conventional quad or yagi. The SQ-22 provides the owner with features such as simple assembly and light weight.

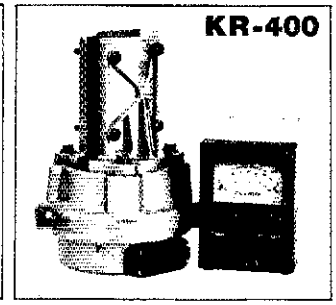
KEN PRO ROTATORS



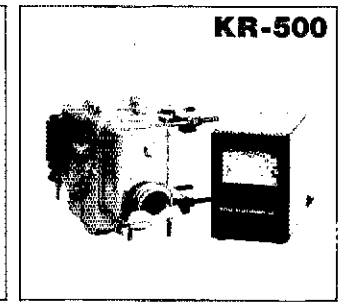
KR-2000



KR-600



KR-400



KR-500

425 Highland Parkway, Norman, Oklahoma 73069

Tel (405) 360-6410

TET U.S.A.

through CQW CQZ CRN CRP CRV CSH CSN CSR CSV CTE CTH CUE CUU CUX CVD CVG CWB CWE CWM CWQ CWU and WB@TIM. Tech: N@s AJI AKL AKR AOU AOX and APU. General: N@s AHI AJS and AKO. Traffic: (Jan.) W@BMA 878, W@HH 464, K@NK 458, WB@VHN 251, W@QUD 149, W@TF 139, W@BV 114, K@SSN 98, W@QAU 67, K@SI 56, WD@FZJ 45, AE@L 40, K@BM 35, WB@OKK 32, K@RWL 30, W@BVL 22, WD@EVT 19, N@JL 13, N@WM 13, WA@KUH 9.

NEBRASKA: SCM, Ed O'Donnell, WB@GWR — The Midway ARC, Kearney, sponsored their 3rd Annual Midway Spring Ham Convention, Mar. 31 and Apr. 1. Under the leadership of W@PXD, the Kearney Club should be really congratualted for an excellent convention. WA@ASM, State EC held a successful SET throughout the state, in Jan. Info on '79 National Convention, P.O. Box 891, Baton Rouge, LA 70821. 160 Nebr. WX Net, QNI 616, QTC 5; Cornhusker Net, QNI 849, QTC 35; Mid-Nebr. ARES 2Mtr Net, QNI 231, QTC 7; Morning Phone Net, QNI 1389, QTC 31; Nebr. ARES 75 Mtr Net, QNI 158, QTC 1; Nebr. Storm Net, QNI 1554, QTC 123; Pawnee ARC 2 Mtr FM Net, QNI 144, QTC @; Platte Valley 2Mtr Net, QNI 51, QTC @; P M Net, QNI 361, QTC 121; QCWA Net, QNI 78, QTC @; Sandhills WX Net, QNI 165, QTC 52; Western Nebr. Net, QNI 600, QTC 56. Traffic: W@FQB 204, K@GND 243, WA@BOK 97, W@VEA 94, K@AIE 84, WA@CBJ 67, WA@OQX 67, W@GEQ 42, W@EUT 22, WB@NFG 22, WB@GAK 19, W@ZNI 19, K@BRS 18, K@RRL 15, WA@VYX 15, WB@GWR 14, WB@HOG 13, WB@GMQ 9, WB@MKD 9, WB@IBT 8, W@PXD 8, WA@QEX 6, W@YFR 5, WA@ZPM 5, WD@AHV 4, W@NIK 4, W@RJA 3, W@DJU 2, WA@LOY 2, K@SFA 1.

NEW ENGLAND DIVISION

CONNECTICUT: SCM, W. J. Pace, W1ID — SEC: W1SY. STM: WB1AIU. NMs: K1EIC K1EIR WA1ELA WA1LOU K1DFS.

Net	Freq.	Time/Day	Sess.	QNI	QTC
CN	3640	1900/2200 Dy	67	487	295
CPN	3965	1800 M-S	40	729	395
Nutmeg	28/88	2130 Dy	36	876	236
WESCON	78/18	2030 Dy	41	1018	201
EASTCON					
Emerg.			5		45
CARWERS (WX)		1700 TTh			

High QNI CN: WA1UUA W1KV K1EIR K1GF W1EFW. High QNI CPN: WB1AIU W1HMJ W1NQO K1EIC. In spite of short notice our new SEC, and all his ARESs and ECs did a terrific job in recent SET. Bob is already preparing for second half session in Oct. Great idea for clubs! Sponsor a home-brew nite as FARA is doing to foster the art of do-it-yourself electronics! Prizes awarded to the best examples. From the PVRA Times: N1ABL really has a good one going here. The GUESTITORIAL by W1TUW is a classic and should be must reading for all repeater users. Very impressive membership list totals more than 600! Congratulations to K1EIC on her new diamond from W1HAD! New W1AW works-the world weekend scheduled for May 12-13. Watch for QST coverage. K1DFS and his CARWERS wx men providing valuable public service through their instant wx service to WFSB TV as "Hilton's Hams." STM WB1AIU pushing for new Waterbury RC. Interested parties should contact him any night on the WESCON net. W1EB building a very enviable 80-meter DX record with his Beverage antenna. WB1AVE decided quads and New England are not compatible! WA1YKR rediscovers that new-fangled mode AM! All traffic nets show a tremendously increased rate of QNI which no doubt indicates some of our newer hams have discovered the rewards and satisfaction to be gained in handling traffic! According to the W1QSL bureau, the K1TGX standard QSL text has worked wonders in clearing out backed-up QSL files in Springfield. The second annual PVRA flea market scheduled for Sun. Apr. 22nd from 10 AM to 5 PM at Newington HS. Traffic: W1EFW 273, K1GF 263, WA1UUA 240, WA1LOU 183, WB1ACZ 181, K1EIC 147, K1XA 138, W1XX 115, W1OD 98, K1AQE 94, WB1DGR 81, WA1RLV 80, KA1DJ 76, W1VW 71, K1OOG 66, WB1ASH 56, W1BNN 55, WA1CCR 52, W1JA 49, WB1AIE 42, W1GVT 40, WB1CPF 31, WB1DQP 30, N1ADE 22, WB1GIR 20, W1BDI 17, W1KV 17, K1EUW 8, W1CUH 6, W1VS 3.

EASTERN MASSACHUSETTS: SCM, Rick Beebe, K1PAD — SEC: WA1BLG. STM: WA1ZAZ. All EC reports go to K1PAD thru Mar. Apr. reports to WA1BLG. Appointments: ECs K1NLQ N1RR K1HAQ. SEC: WA1BLG. OO: W1EGE. OBS: K1UR.

Net	Freq.	Time/Day	QNI	QTC
EMRI	3.66	17/2300 Dy	613	406
EMRIPN	3.898	1730 Dy	516	354
EM2MN	90/30	2000 MWF	49	49
	145.8	2000 TTh		
NEEPN	3.945	0830 Su	54	39
EASN	3.726	0555/1930 Dy	34	1
HHTN	04/64	2200 Dy	418	113

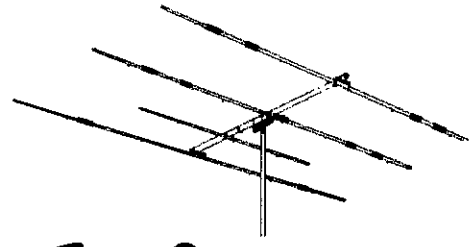
All nets were active during the SET. K1PAD would like to thank W1ALP for all the help getting started as SCM. STM WA1ZAZ requests that traffic reports be sent in no matter how small. K1PAD WA1BLG K1IOE WA1IDA W1REP WA1OQV and W1XA working on Section Emergency Plan. W1XA new EC Advisory Committee rep. Bedford and Chelmsford groups active during the Jan. flooding. North Shore Repeater Assn. Quannapowitt Radio Assn. and Lynnfield groups running novice classes. Billerica and Chelmsford Clubs running combined General Class with more than 50 students. Quannapowitt Radio Assn. sponsoring an Activity Award. Wellesley Club had W1YRC with DXpedition show and sponsoring their own WAS Award. Framingham members had banquet and Emergency Net meeting. New affiliated clubs: Minuteman Repeater Assn. and Greater Lawrence Amateur Radio Fellowship. W1NF a ham 77 years, wow! W1BI (ex-W1GM) 88 years young, another wow. W1LMU received 50-year plaque from the League. AB1Z has submitted modulation/mode petition to FCC. WA1BLG buying new house. WB1DFV home from the hospital. New FT-7 for N1RR K1PTE WA1QAA. 11M rigs modified for 10M by WA1MEJ WB1DGM WB1DFO. WA1MTN has FT-901DM. WA1ZCO has Atlas 210. WA1FIT has S-line. W1AYA antenna down but repairs underway. K1CLM putting in 70 hours per week on Intruder Watch. K1HYM has new son. W1LE in San Diego during Feb. WB1FAX KA1AHD WB1FJQ upgraded to General, congrats. Wellesley Auction Apr. 7 in Wellesley. W1DYS on from Tampa. WA1AYQ also in FL. W1CFU on 160 cw. W1BB active on 160 in CD Party. Please send interesting news items for publication to K1PAD. Traffic: (Jan.) K1BA 412, WB1DXR 407, WA1TBY 382, WA1ZAZ 348, WA1VAB 250, K1GN 249, W1PEX 236, K1CE 198, W1FJI 126, WA1YWK 112, WA1EYY 111, W1DMH 89, WB1GEX 79, K1BZD 66, WB1EZT 63,

CALL TOLL FREE

1-800-228-4097

Communications Center

443 N 48th Street
Lincoln, Nebraska 68504
In Nebraska Call (402)466-8402



Antenna Sale!

HY-GAIN

		Regular	Special			Regular	Special
TH6DXX	Super Thunderbird	$299.95	$239.95	18HT	Hy-Tower 80-10M vertical	299.95	239.95
TH3MK3	3 el. 10-15-20M beam	229.95	179.95	18AVT/WB	80-10M Trap vertical	99.95	79.95
TH3JR	3 el. 10-15-20M beam	149.95	129.95	14AVQ/WB	40-10M Trap vertical	69.95	57.00
Hy-Quad	2 el. 10-15-20M Quad	229.95	179.95	12AVQ	20-10M Trap Vertical	39.95	32.95
205BA	5 el. "Long John" 20M beam	289.95	229.95	14RMQ	Roof Mounting kit (verticals)	33.95	29.95
155BA	5 el. "Long John" 15M beam	169.95	139.95	5BDQ	80-10M Trap doublet	89.95	69.95
105BA	5 el;"Long John" 10M beam	119.95	99.95	2BDQ	80-40M Trap doublet	49.95	39.95
204BA	4 el. 20M beam	219.95	179.95	66B	6 el. 6M beam	119.95	99.95
204MK5	5 el. conversion kit	99.95	79.95	203	3 el. 2M beam	15.95	
153BA	3 el. 15M beam	79.95	69.95	205	5 el. 2M beam	17.95	
103BA	3 el. 10M beam	54.95	44.95	208	8 el. 2M beam	25.95	
402BA	2 el. 40M beam	209.95	169.95	214	14 el. 2M beam	31.95	
BN-86	Balun for beam antennas	15.95	15.95	LA-1	Deluxe lightning arrestor	59.95	49.95
TH2MK3	2 el. 10-15-20M beam	149.95	119.95				

MOSLEY

		Regular	Special
Classic 33	3 el. 10, 15, 20 Mtr. beam	304.75	209.95
Classic 36	6 el. 10, 15, 20 Mtr. beam	392.75	269.95
TA-33	3 el. 10, 15, 20 Mtr. beam	264.00	189.95
TA-36	6 el. 10, 15, 20 Mtr. beam	392.75	269.95
TA-33 Jr.	3 el. 10, 15, 20 Mtr. beam	197.00	149.95
TA-40KR	40 Mtr. Add On	119.95	89.95

CUSHCRAFT

ATB-34	4 ele. 10, 15, 20 Mtr. beam	289.95	219.95	A147-11	11 ele. 146-148 Mhz. beam	36.95	30.95
ATV-4	10, 15, 20, 40 Mtr. Vertical	89.95	69.95	A147-22	22 ele. Power Pack	109.95	89.95
ATV-5	10, 15, 20, 40, 80 Mtr. Vertical	109.95	89.95	A144-10T	2 Mtr. "Twist" 10 ele.	42.95	34.95
ARX-2	2 Mtr. Ringo Ranger	39.95	32.95	A144-20T	2 Mtr. "Twist" 20 ele.	62.95	52.95
AR-6	6 Mtr. Ringo	36.95	32.95	A147-20T	2 Mtr. beam	62.95	52.95
ARX-220	220 Mhz. Ringo Ranger	39.95	32.95	A430-11	432 Mhz. 11 ele. beam	34.95	29.95
ARX-450	435 Mhz. Ringo Ranger	39.95	32.95	A432-20T	430-436 Mhz. Beam	59.95	49.95
A144-11	11 ele. 144-146 Mhz. beam	36.95	30.95				

HUSTLER

3-TBA	3 ele; 10, 15, 20 Mtr. beam	259.95	189.95
4-BTV	10-40 Mtr. Vertical	99.95	79.95
5-BTV	10-80 Mtr. Vertical	134.95	99.95
RM-75	75 Meter Resonator	16.95	14.50
RM-75S	75 Meter Super Resonator	31.95	27.50
G6-144B	2 Mtr. Base Colinear	79.95	59.95
G7-144	2 Mtr. Base Colinear	119.95	89.95

WILSON

System One	5 ele. 10, 15, 20, Mtr. Beam	274.95	229.95
System Two	4 ele. 10, 15, 20 Mtr. Beam	219.95	179.95
System Three	3 ele. 10, 15, 20 Mtr. Beam	179.95	149.95
WV-1	10-40 Mtr. Vertical	79.95	69.95

ROTORS

HamIII $125.00 **T2X Tailtwister** $199.95 **Alliance HD 73** $109.95

Call for prices on rotor cable, Coax, Towers, and Accessories. All prices do not include shipping.

18HT

We carry all major brands of ham radios
AT DISCOUNT PRICES

BANKAMERICARD

Yaesu — Kenwood — Drake — ICOM — Dentron —
Ten-Tec — Swan — Tempo — Midland — E.T.O. — Wilson

master charge

NEW! NEW! NEW!

KDK

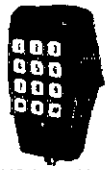
FM2016A

All Solid State-CMOS PL digital synthesized - No Crystals to Buy! 5KHz steps - 144-149 MHz-HUGE ⅜" LED digital readout PLUS MARS-CAP and MULTIPLE OFFSET BUILT IN. ● 5 MHz Band Coverage - 1000 Channels (instead of the usual 2 MHz to 4 MHz-400 to 800 Channels) ● 4 CHANNEL RAM IC MEMORY WITH SCANNING AND AUTO TRANSMIT ● MULTIPLE FREQUENCY OFFSETS ● ELECTRONIC AUTO TUNING - TRANSMIT AND RECEIVE ● INTERNAL MULTIPURPOSE TONE OSCILLATOR ● RIT ● RF ATT ● DISCRIMINATOR METER - 16 Watts Output-Superior Receiver Sensitivity and Selectivity - 15 POLE FILTER, MONOLITHIC CRYSTAL FILTER AND AUTOMATIC TUNED RECEIVER FRONT END, COMPARE! ● Superb Engineering and Superior Commercial Avionics Grade Quality and Construction Second to None at ANY PRICE.

$369.00

SHOWN WITH OPTIONAL μP-800 MICRO-PROGRAMMER*

Regulated AC/PS
Model FMPS-4R . . . $39.95



FMMC-1* Microphone with Built-in Touch Tone Pad.

WHY BUY LESS?
THE FMMC-1 HAS IT *ALL!*

- New! Auto key up
- Snap-Action Keyboard
- Adj. level and tone balance
- Use with any transceiver
- Only 3¾" x 2" *$39.95

- **FREQUENCY RANGE**: Receive and Transmit: 144.00 to 148.995 MHz, 5 Khz steps (1000 channels) + MARS-CAP and MULTIPLE OFFSET BUILT IN.
- **HUGE ⅜" LED DIGITAL READOUT.**
- **4 CHANNEL RAM SCANNER WITH IC MEMORY AND AUTO TRANSMIT**: Program any 4 frequencies and reprogram at any time using the front panel controls—search for occupied (closed) channel or vacant (open) channels. Internal Ni-Cad included to retain memory (no diode matrix to wire or change).
- **MULTIPLE FREQUENCY OFFSETS: NO CRYSTALS TO BUY - EVER** - Any offset any split! "Odd Ball" splits accomplished by digital programming. Never any need for crystals!
- **INTERNAL MULTIPURPOSE TONE OSCILLATOR BUILT IN**: Sine Wave 1750 Hz tone burst for "whistle on operation" and sub-audible tone operation. Internal 2 position switch for automatic and manual operation, tone burst or sub audible tone PL - adjustable 60-203 Hz (100 Hz Pre-Set).
- **AIRCRAFT TYPE FREQUENCY SELECTOR**: Large and small coaxially mounted knobs select 100KHz and 10KHz steps respectively. Switches click-stopped with a home position facilitate frequency changing without need to view LED's while driving and provides the sightless amateur with full Frequency Selection as standard equipment.
- **FULL AUTOMATIC TUNING OF RECEIVER FRONT END AND TRANSMITTER CIRCUITS**: DC output of PLL fed to varactor diodes in all front end RF tuned circuits provides full sensitivity and optimum intermodulation rejection over the entire band. APC (AUTO POWER CONTROL) - Keeps RF output constant from band edge to band edge. NO OTHER AMATEUR UNIT AT ANY PRICE has these features which are found in only the most sophisticated and expensive aircraft and commercial transceivers.
- **TRUE FM**: Not phase modulation - for superb emphasized hi-fi audio quality second to none.
- **RIT CONTROL**: Used to improve clarity when contacting stations with off frequency carrier.
- **MONITOR LAMPS**: 2 LED's on front panel indicate (1) incoming signal-channel busy, and (2) Transmit.
- **FULLY REGULATED INTEGRAL POWER SUPPLY**: Operating voltage for all 9v circuits independently regulated. Massive Commercial Hash Filter.
- **MODULAR COMMERCIAL GRADE CONSTRUCTION**: 3 Unitized modules eliminate stray coupling and facilitate ease of maintenance.
- **ACCESSORY SOCKET**: Fully wired for touch tone, phone patch, and other accessories. Internal switch connects receiver output to internal speaker when connector is not in use.
- **MULTI-PURPOSE METER**: Triple Function Meter Provides Discriminator Meter, "S" Reading on receive and Power Out on Transmit.
- **RECEIVE**: Better than .25uv sensitivity, 15 POLE FILTER as well as monolithic crystal filter and AUTOMATIC TUNED LC circuits provide superior skirt selectivity - COMPARE!
- **HIGH/LOW POWER OUTPUT**: 16 watts and 1 watt, switch selected. Low power may be adjusted anywhere between 1 and 16 watts. Fully protected - short or open SWR.
- **RF ATT**: Live right next to King Kong Repeater and can't operate? With the 2016A You Can ; Just flick the RF ATT switch. Only the 2016A has this feature.
- **OTHER FEATURES**: Dynamic Microphone, built in speaker, mobile mounting bracket, external 5 pin accessory jack, speaker jack, and much, much more. Size 2½ x 7 x 7½. All cords, plugs, fuses, microphone hanger, etc. included. Weight 5 lbs.

Manufactured by one of the world's most distinguished Avionics manufacturers, Kyokuto Denshi Kaisha, Ltd.
First in the world with an all solid state 2 meter FM transceiver.

master charge

VISA*

AMATEUR-WHOLESALE ELECTRONICS

8817 S.W. 129th Terrace, Miami, Florida 33176
Telephone (305) 233-3631 ● Telex: 51-5628
U.S. DISTRIBUTOR DEALER INQUIRIES INVITED

ORDER NOW TOLL-FREE
Credit card holders may use our toll-free ordering number
Ask for operator 701
(800) 824-7888
In California (800) 852-7777
Alaska and Hawaii (800) 824-7919

Regional Sales & Service Centers:
East: Sanford Communications, Inc. Colonia, N.J. (201) 574-3003
Northeast: Buzzards Bay Electronic Buzzards Bay, Mass. (617) 759-3376
West: The Radio Shop Riverton, Utah (801) 254-0991
Northwest: Action Supply, Inc. Boise, Idaho (208) 344-5084
Midwest: Universal Service Columbus, Ohio (614) 866-4267
South: Electronic Communications Highland Springs, Virginia (804) 737-5100

NEW! SIGMA MODEL AF250L
DEVIATION/MODULATION METER
SPRING SPECIAL

$99 REG. $169.

FEATURES: Extremely stable local oscillator for easy measurement of HF, VHF, and UHF bands employing negative feedback, to insure extremely high stability ● Easy to read, accurate linear scale ● Direct off the air signal measurement capability. **OPTIONAL 12v DC Power Kit - $12.** ***FULLY CERTIFIABLE FOR COMMERCIAL USE.***

SPECIFICATIONS: Frequency: 1.8MHZ-520MHZ/3 range select (A,B,C,EXT), A range: 26.5 MHZ-40MHZ, B range: 48MHZ-60MHZ, C range: 140MHZ-156MHZ (generous overranges), EXT. range: 1.8 MHZ-520MHZ (Need Signal Generator) ● Input level: (1) Through type input level: IW-200W (RF Input Terminal), (2) Direct input level: More than 80db/50ohm impedance ● Amplitude modulation: 0-100% ● Frequency diviation: 0-20KHZ ● Accuracy: +/-3% of full scale ● Intermediate frequency: 10.7MHZ ● RF Attenuator: 0-60db variable ● Audio Signal oscillator: (1) Audio Frequency—1,000HZ (1 KHZ), (2) Output level—More than 1V RMS (variable) ● Power Source: AC117 ● Dimensions: H-5½" (140mm), W-10¼" (260mm), D-7¼" (184mm) ● Wt.: 7lbs.

*REVOLUTIONARY!!!

COMPARE AT ANY PRICE!
μP-800 MICRO-PROGRAMMER
FOR KDK 2016A AND 2015R

- 800 CHANNEL PROGRAMMABLE MEMORY WITH SCAN. RETAINS MEMORY WHEN OFF.

AND

- FULL BAND RANDOM SCAN - UP OR DOWN
- SINGLE STEP SCAN FEATURE IN ANY MODE.
- MEMORY SLOW SCAN
- HOLD AND TRANSMIT AT ANY TIME.
- AUTOMATIC RESUME
- EASY INSTALLATION

$99.00

ACCESSORIES FOR KDK:
FM2016A AND FM2015R

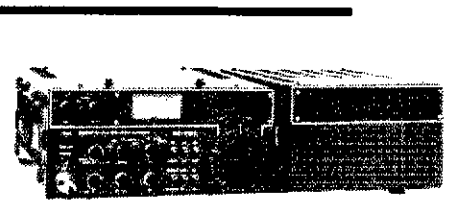
- μP 800 - Micro Programmer 99.00
- FMPS-4R Regulated AC Power Supply ... 39.95
- FMMC-1 Touch Tone Microphone 39.95
- FMAT-1 ¼ Wave Portable Antenna For Motel, Hotel, or Apt. 7.95
- Extra DC Power Cord & Plug 4.00
- Extra Mounting Bracket 6.00

NEW! TRISTAO'S
40 foot Self-Supporting Crank-up Mast

Regular **$345**

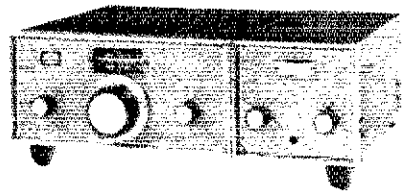
COMPLETE
With Hinged Mounting Plate And House Bracket

Our Price
$310
$19 Shipping Anywhere USA



SUPERB! NEW ICOM IC-701S H.F. XCEIVER

Please Write For Special Package Prices



ATTENTION NEW HAMS!!

ATLAS RX-110 RECEIVER
- CW and Normal SSB - Five Band Full Coverage
- Built in AC Supply and Speaker
- Converts to Five Band Transceiver

ATLAS TX 110 PLUG-IN TRANSMIT MODULE
- CW and Normal SSB - Five Band Full Coverage
- 15 Watts Input (200 Watts with Optional P.A.)

Please Write For Special Package Prices

NEW CDE HAM III ROTATORS—

Reg. $159.95 — $125

SIGMA RF-2000 SWR & POWER METER

Cal PWR Scales 200W-2000W Freq. Range 3.5-150 MHz. Please do not confuse the RF2000 with similar appearing lower priced units. RF2000 is an individually calibrated professional quality instrument. Unequaled at many times the price. Size 7" (w) x 2-1/3" (d).

$35

SHIPPING ANYWHERE U.S. - $1

AMATEUR-WHOLESALE ELECTRONICS

8817 S.W. 129th Terrace, Miami, Florida 33176
COURTEOUS PERSONAL SERVICE—SAME DAY SERVICE
Telephone: (305) 233-3631 • Telex 51-5628 • Store Hours: 12-5 Mon.-Fri.
DEALER INQUIRIES INVITED

ORDER NOW TOLL-FREE
Credit card holders may use our toll-free ordering number
Ask for operator 701
(800) 824-7888
In California (800) 852-7777
Alaska and Hawaii (800) 824-7919

WA9NEW 63, WA1FNM 61, W1LE 60, WB1EMU 57, W1ATX 46, N1EE 39, WA1IGL 33, KA1AHD 28, K1TK 20, WA1QAJ 19, WA1IFE 14, WB1EYE 11, W1XA 8, K1LCQ 7, W1EMG 6, K1UR 3, WA1VKB 3. (Dec.) WA1VEI 510, K1BA 435, WA9NEW 355, K1GN 185, WA1YWK 160, K1BSO 141, WB1GEX 91, WA1FNM 37, N1EE 1.

MAINE: SCM, Bill Mann, W1KX — New Appts.: WA1MUX ASCM: WA1YNZ EC Aroostook Co. Renewed: N1RP EC Lincoln Co. Work underway for ham call letter plate bill whereby ham plate would have one-time cost of $5. Contact your representative. Pine State ARC newsletter lists 16 new Novices resulting from club classes. On Aroostook ARA third anniversary membership stands at 50. Several members of Sandy River ARC supplied comms. at Sugarloaf Races Jan. 20. Streaked Mtn. rptr. provided needed SET comms. Hoss Traders Tailgate Swapfest, Deerfield, NH, May 12. Info on '79 National Convention, P.O. Box 891, Baton Rouge, LA 70821. Sess./QTC/QNI. AEN 11/199/100. SPSN 17/21/61. BYN 27/38/1006. Traffic: (Jan.) KA1DM 407, W1KX 305, N1RP 174, W1HDC 128, WA1MUX 90, WA1QFX 85, WA1YNZ 85, W1BJ 82, N5YX/1 78, WA1JZP 59, WA1SMY 55, WB1BYR 47, W1ISO 46, W1JTH 44, K1BZ 34, K1JCX 27, W1AHM 24, W1BMX 24, K1TVT 21, WA1JCN 18, W1GU 11, K1JK 8, W1OTQ 6, K1TZH 6, W1IWX 5, WB3HYD/1 4. (Dec.) K1TEV 3.

NEW HAMPSHIRE: SCM, Robert C. Mitchell, W1SWX/W1NH — SEC: K1RSC, NMs: W1TN & N1NH. Concord Brass-pounders officers: W1JY, pres.; WA1FSZ, vice-pres.; WB1ASY, secy-treas. The Conn Valley FM Assn's other repeater is K1OJH/Rpt, 147.84/147.24. WA1PSI received new callbook for his outstanding OO work. New OTS is W1QYY. The Manchester repeater is 147.855 in & 147.255 out. The W1JB Medicare Net held its SET during the Jan. 25th storm. K1HI 2-meter rig was stolen. KH6JKQ moved to Exeter. WA1SQM moved to AZ. W1RMH received the National Weather public service award. W1TN has new HW8. Info on 1979 National Convention from Box 891, Baton Rouge, LA 70821. VE3FCH/W1 moved to Saskatchewan. WB1CDR was guest weatherman on WNNE-TV & explained contribution of Wx info the Conn. Valley FM Assn. of NH & VT. K1OIQ of Mt. Washington Observatory will be in VE4-Land for the eclipse. WB1HFI & XYL, WB1HGQ use FT227R & Kenwood TS-820S. Retired W1TTX now has more time for hamming. K1UQX vacationed in VP9. W1BYS uses WR4ALM repeater in Tampa. N1NH has call plates on car & motorcycle. WB1CMM moved to NH from Taxachusetts. Traffic: (Jan.) K1BCS 550, W1TN 327, N1NH 189, WB1FHI 85, K1HI 81, WA1HOB 49, W1NH 42, K1UQX 30, W1CUE 25, K1ACL 16, W1JB 15, W1GUX 12, WA1PEL 8, WB1CTJ 5, W1BYS 3, W1UN 1. (Dec.) W1GUX 223, WB1HFI 18, W1FYR 16.

RHODE ISLAND: SCM, J. Titterington, W1EOF — WA1WKK, asst. mgr., RIEM 2-mtr ttc Net reports big month for net-sess. 23, QNI 194 and ttc 77. WA1CSO, net mgr., back from CA vacation with new low-band rig. Several groups took part in the SET and amount of activity was encouraging. Officers at EBAWA: N1XW, pres.; KA1AIR, vp-treas.; WB1EHO, secy. Officers at PRA: K1GDS, pres.; K1DT, vice-pres.; W1GS, secy.; WA1TAQ, treas. KA1ASC W1EYH and W1KKR, exec bd. The tentative date for the Newport Mini-convention and Hamfest is weekend of Oct. 13, 1979. More on this later. WB1EJI burning up the 10-meter band and KA1BBY ditto on 80. For personal reasons, AB1D has resigned as SEC. Sorry to report that and now the search starts for another SEC. We have other appointments open-contact me-you may qualify. Traffic: W1EOF 99, WA1YUH 25, N1RI 10.

VERMONT: SCM, Bob Scott, W1RNA — SEC: W1VSA. Repeaters handling direct assistance to the public will be reported this month and the following month. Any amateur assisting stranded motorist, reporting accidents to state police, and autopatching emergency messages should be reported to the control operator of the Repeater used. Control stations should send info to the SEC. WA1YEH EC for 01/61 and 34/94 heads up large task force of amateurs for four day operation this month. Communications for Junior JC's project. WR1ACA Repeater group holds weather net Mon. thru Fri. nights at 10:00 PM. Carrier 27/477/37, GMN 27/562/46, VTSSB 31/550/90, VTRFD 4/70/20, NE SWOT 4/27/0. Emergency Traffic WR1AFL 2 WR1AEA 3. Traffic: K1BQB 168, K1OXD 33, WB1BZR 3.

WESTERN MASSACHUSETTS: SCM, Bill Lowe, W1TM — SEC: WA1DNB. STM: W1KK. NMs: W1UD (WMN) WA1MJE (WMFN). Section activity very good during the Jan. SET. NTS and ARES nets well organized with good performance. Traffic heavy. Top QNI WMN with 28, W1BVR and W1UD. NTS and ARES needs more activity and representation in Worcester county. CMARA please note. W1UD doing well as NM. WB1AUV now OO class 2. K1JHC now OTS. W1ZPB doing phone patches for students at Northfield. SCM visited HCRA during Jan. meeting. Excellent program well planned. SCM available for visits elsewhere. Official appointment holders must report to SCM regularly or else. Traffic: WA1MJE 574, W1TM 221, W1UD 198, W1KK 171, W1DOY 79, WB1AUV 68, W1ZPB 62, K1IJV 60, N1CQ 55, W1BVR 46, N1YY 37, WB1EHS 35, W1EFC 24, K1JHC 17, WA1OPN 8, K1BE 6.

NORTHWESTERN DIVISION

ALASKA: SCM, Roy Davie, KL7CUK — We have a new SEC for this section, KL7FSE who replaces KL7IKX who resigned due to business pressures. The SET was not represented very well this time; however, those who did operate in it reported very good results. KL7JDI chosen Amateur of the Year by the Anchorage ARC. ASN reports lots of activity as usual, also APCPN. KL7IYH and KL7JAA conducting Novice classes. The Kodiak Club hard at work trying to raise funds for their various projects. KL7IS and KL7AG and families are touring the CONUS and warmer WX. The Alaska DX Assn. growing very rapidly and is an ARRL Affiliate. Don't forget the ARRL National Convention in Baton Rouge LA July 20-22. Write Louisiana Council ARC, P.O. Box 891, Baton Rouge, LA 70821. Traffic: KL7JDI 122, KL7CUK 42, KL7JDH 42.

IDAHO: SCM, Lem Allen, W7JMH — The Kootenai ARS has recently received their ARRL Charter and are holding a celebration banquet in Coeur D'Alene Mar. 17. Secy. is WB7WUB. The Mountain Home Air Force Base has reorganized their club with WB7URE, pres.; KA7BLR, vp; WB7OGO, secy-treas.; WA4BFE liaison. They have been busy DXing, contesting, building and working QRP. Congrats to WA7LRP, new EC for Latah Co.! Many SET reports have been received and it is gratifying to observe the improvement in ability and scope of the groups who participate.

Net	Freq.	Time/Day	Sess.	QNI	QTC

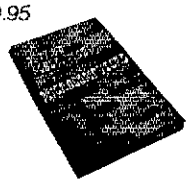
NOT FOR BEGINNERS

"HOT" NEW BOOKS FOR MICRO-COMPUTER PROS!

The latest in micro-computer books that people waited in line to buy!

TV Typewriter Cookbook
By D. Lancaster

Covers tvt terms, principles, configurations, memories, system design, cursor & update circuitry & techniques, hard copy, color graphics, keyboards & encoders. 256 pgs. *#21313 . . . $9.95*

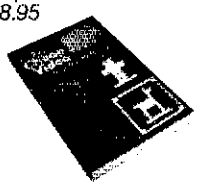


Getting Acquainted with Microcomputers
By L. Frenzel

Explains basic concepts, definitions, organization, architecture, operation, software, programming & personal computing. With experiments for self-education. 288 pgs. *#21486 . . . $8.95*

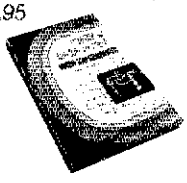
Z-80 Microcomputer Handbook
By W. Barden, Jr.

All about the Zilog Z-80, a very sophisticated microprocessor: its hardware, its software, and microcomputers built around it. 304 pgs. *#21500 . . . $8.95*



The Cheap Video Cookbook
By D. Lancaster

A complete guide to super-low-cost alphanumeric & graphic microprocessor-based video displays, with construction details on a seven IC circuit—& much more! 256 pgs. *#21524 . . . $5.95*

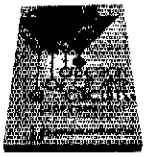


Design of Active Filters, with Experiments
By H. Berlin

An intro to the theory, design & use of active filter circuits using the 741 op-amp chip—and no complex math. Many experiments, examples. 240 pgs. *#21539 . . . $7.95*

8080/8085 Software Design
By C. Titus, P. Rony, D. Larsen & J. Titus

Offers basic & advanced instructions for assembly language programming. Covers mathematical manipulations, number-base conversions, decoders, arrays, etc. 336 pgs. *#21541 . . . $9.50*



Design of OP-AMP Circuits, with Experiments
By H. Berlin

The fundamentals of operational amplifier devices (*e.g.*, 741 & 3900) in linear amps, differentiators, filters & nonlinear amps. 35 experiments. 224 pgs. *#21537 . . . $7.95*

Design of Phase Locked Loop Circuits, with Experiments
By H. Berlin

Details the design of the basic PLL circuits, detector, phase comparator & voltage-controlled oscillator circuits. 15 experiments. 256 pgs. *#21545 . . . $8.95*

555 Timer Applications Sourcebook, with Experiments
By H. Berlin

Deals with the many uses of the 555 timer "chip"—for timing, signal generation, voltage regulation, control, sequencing. 15 experiments. 160 pgs. *#21538 . . . $5.95*

TTL Cookbook
By D. Lancaster

Explains what transistor-transistor logic is, how it works & how to use it—for a digital counter & display system, electronic stopwatch, digital tachometer, voltmeter, etc. 336 pgs. *#21035 . . . $9.50*

CMOS Cookbook
By D. Lancaster

What CMOS is, how it works, & how to power, use, test & interface it, etc. With minicatalog of over 100 devices. 416 pgs. *#21398 . . . $10.50*

AVAILABLE FOR THE FIRST TIME BY MAIL!

NO RISK OFFER!

YOURS TO EXAMINE AT NO RISK FOR 15 DAYS

317

Clip Out–Mail Today!

YES—Please send me the book(s) indicated below. If I'm not completely satisfied, I may return any or all within 15 days of receipt for full credit or refund. Add sales tax where applicable.

☐ 21313 ☐ 21539 ☐ 21538
☐ 21486 ☐ 21541 ☐ 21035
☐ 21500 ☐ 21537 ☐ 21398
☐ 21524 ☐ 21545

☐ I have checked 3 or more titles and deducted my 10% savings.

Name _____ (Please Print)

Address _____

City _____

State _____ Zip Code _____ Total: $_____

☐ Check ☐ Money Order ☐ Master Charge
☐ Visa/BankAmericard
Exp. Date_____
Account No.: _____
Interbank No.: _____ (Master Charge only)

Signature: _____
Minimum credit card purchase: $10.00

MAIL TO:
Howard W. Sams & Co., Inc.
4300 W. 62nd St.
Indianapolis, IN 46206

MU52

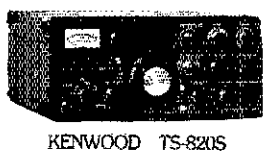
Prices subject to change 6 months after issue date.

Call Toll Free 1-800-243-7765

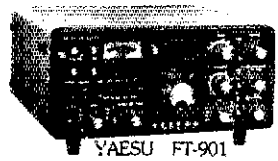
FREE

- **Retail Price Catalog**
- **Monthly Computerized Used Equipment List**
- **Courteous, Personalized Service**

WILSON MARK IV



KENWOOD TS-820S

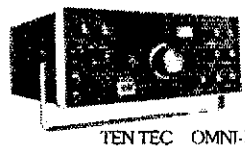


YAESU FT-901

ICOM IC-701

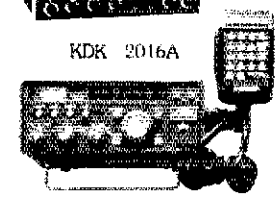
KDK 2016A

CUSHCRAFT ANTENNAS



TEN TEC OMNI-D

GLA-1000



CPU 2500 R/K

OVER 50 BRANDS IN STOCK

• KENWOOD • SWAN • KDK • DENTRON •
• MOSLEY • WILSON • YAESU • DRAKE •
• LARSEN • BENCHER • PIPO • BEARCAT •
• B & W • DATONG • ICOM • PANASONIC •
• ARRL PUBLICATIONS • ALLIANCE • MFJ •
• CUSHCRAFT • TRAC • MICROLOG • CDE •
• FINCO • DSI • DAYBURN INSULATORS •
• BIRD • ASTATIC • HAM KEY • REGENCY •
• HUSTLER • SAXTON • TEN TEC • AMECO •
• AMCOMM • CALL BOOK • KLM • TEMPO •
• ATLAS • ALDA • COVERCRAFT • HY-GAIN •
• J.W. MILLER • MURCH • PFENTONE •
• SHURE • TAB BOOKS • SAMS BOOKS •
• ROHN • BUTTERNUT • Plus Many More! •

★ NEW AND USED EQUIPMENT
"Get on our used equipment mailing list"

★ TRADES WELCOME
"The best allowances anywhere"
"We buy good used SSB gear"

★ FREE CATALOG
"Prices of all major manufacturers"

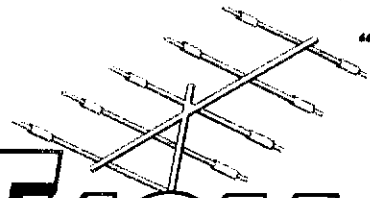
★ SAME DAY U.P.S. SHIPPING
"Just a phone call away"

★ COMPLETE RADIO SERVICE SHOP
"Mail Order Repair Service"

• Fast Efficient Service • We Repair All Brands • All Work Guaranteed • Amateur Extra/First Class Licenses • Send Us Your Defective Equipment U.P.S. Collect • Please Include Manual and Power Supply • Free Shipping Both Ways If Work Is Done • Most Repairs Done and Shipped Within 7 Days

OUR FINE REPUTATION SPEAKS FOR ITSELF

"YOU SHIP IT WE FIX IT"



THOMAS COMMUNICATIONS

Call or Write for your super quote today!

95 Kitts Lane, Newington, Conn. 06111
"Near ARRL Headquarters"

Connecticut Residents Call:
(203) 667-0811

master charge VISA

OPEN MON.-FRI. 10-6 • THURS. 10-8 P.M. • SAT. 10-4

EASY DIRECTIONS: Rt. 15 South — 2 blocks past McDonald's. (Berlin Turnpike)

A Look at

THOMAS COMMUNICATIONS

New Equipment – All new equipment on display is operating for actual "on the air" QSO's. We really know our gear!

Used Equipment – We recondition and guarantee all our used equipment. We make sure it satisfies you!

Service Shop – You've probably heard of our fine service reputation – using Cushman CE4B signal generators, Hewlett Packard oscilloscopes, Bird wattmeters – we fix it right!

Inventory Warehouse – Our large volume assures you the best prices!

And Our Service Is Even Better! Give Us a Call and See For Yourself!

1-800-243-7765

THOMAS COMMUNICATIONS

95 Kitts Lane, Newington, Conn. 06111
(203) 667-0811

FARM	3935	0200 Dy	30	1487	116
ICD	3990	1510 M-F	24	590	27
IMN	3635	0230 M-F	28	109	249
TV Emg	145.44	0400 Su	5	.	
Mini-Cassia	146.94	0300 Su	4	13	7
SW Emg	146.34/94	0330 Su	5	182	.

Elmore Co. net now operating weekly on 146.52 FM, details later. Traffic: W7GHT 364, W7JMH 251, AC7P 53, WA7NRP 7, KN7WLF 6, W7TSM 4, WB7TET 3.

MONTANA: SCM, Robert Leo, W7LR — KA7DCS, 10-yr.-old daughter of KB7AS, new ham in Bozeman. Dick also has 2 more hams in the family: KA7DCT & KA7DCU! Missoula, Cut Bank & Kalispell hosting the 1979 Waterton-Glacier hamfest. Sorry to hear XYL of W7LZY a Silent Key. K7ABV continues super DX. Big Jan. activity was SET. Very good MT participation, with RACES and EC's both active. New MT Section Net, 1st & 3rd Sun. 3947 kHz, after RACES net (about 9:30 AM local time). QCWA net 9AM Sat. 3938. IMN Jan QNI 109, QTC 249, plus 5 SET sess. with QTC 55. MTN had special SET sess. MTN QNI 1153, QTC 231. W7TGU has 18 net sess. per week, is NC on 3 nets, and Mgr. of MTN FB! Info on 79 Nt'l ARRL Convention, Box 891, Baton Rouge, LA, 70821. WA7GAC having a ball on ZL trip & QSO's Bozeman hams via ZL1BEQ recip. license. Gt Falls ARC 1st Mon. 7:30 PM MPC Hospitality Room. Havre 2nd Tue., call W7IDK. Missoula ARC 2nd Sun 7:30PM MPC Bldg. Butte ARC every other Fri. 8PM club room, call WA7PZO asst. SCM. Kalispell ARC 4th Thur., call WA7PDC. Anaconda call W7TYN, Thompson Falls-no hams within 90 miles! except WA7IJN. Cut Bank 1st Mon., call WB7BHV. W7OIO suggests that 4 hams in MT collect news their areas and send to W7LR for this column. Good idea. Traffic: K7GHY 136, W7TGU 74, W7NEG 73, W7IXD 67, W7TYN 52, W7LR 51, WA7KMP 38, W7HAH 30, W7LBK 26, W7DB 20, N7AMZ 11.

OREGON: — SCM, Dale T. Justice, K7WWR — Asst. SCM: K7JF. SEC: W7HLF. New appointments: WB7ROG as EC for Jackson Co., WB7QFH EC for Hood River County. Net reports for seven nets (PdxAARES, JCARES, AREST, OSN, BSN, LBARES, and 1676.) total 3480 ckins, 390 traffic, and 157 sessions. The ice storms in East Mult. Co. and Portland required lots of amateur help, especially with food and wood deliveries. Operations were active for several days until power was restored to the affected area. New on six meters: W7AVV. WB7DIP made 21 OBS transmissions in Jan. New Novices in the Astoria area are KA7CWN and KA7CXP. Traffic: (Jan.) W7VSE 640, WA7IHS 307, K7IWD 275, K7NTS 271, K7KVV 219, WB7OEX 91, W7XI 87, K7QPW 84, K7WWR 57, WB7RAP 33, W7GUH 16, W7LT 16, WA4HRG 5, WB7OIJ 4. (Dec.) K7NTS 437, K7IWD 191, WB7OEX 88.

WASHINGTON: SCM, Bob Klepper, W7IEU — SEC: WA7RWK. STM: W7DZX. NTNQNI 1771, QTC 96. ESN QNI 492, QTC 36. WAHTS QNI 816, QTC 286. NWSSB QNI 816, QTC 27. WSN QNI 305, QTC 112. W7DZX off air with blown relay. New officers for WWDX Club are: K7RI, pres.; W7CAZ, vice-pres.; WB7FFF, secy.; K7YDO, treas.; WA7GRE K7GR W7OTO K7DS K7OAK K7RS, trustees. W7HHU enjoys new Atlas 110. Interested in the '79 National Convention? Details from P.O. Box 891, Baton Rouge, LA 70821. W7PHO and WWDXC members WA7ZTL K7YDO W7GVF AF7ZA and some 6-Land stations ran about 500 phone patches during the holidays in spite of bad condx. WB7PSP chasing DX on 10 and studying for Extra. 1979 officers of SARC are: WB7SWW, pres.; WB7OPZ, secy.; KB6AL, treas. WB7FDE and AE7P new associate members of Willamette Valley DX Club. W7ERH getting ready for Oct. SET, are you? New officers of Radio Club of Tacoma are: WA7ZPK, pres.; WA7FUS, vice-pres.; AE7X, secy.; K7AFU, treas.; W7OVW W7KKN W6GCI WA7ZZA, board. Sorry to report the following are Silent Keys: WB7ERA WB7PUO K7SOM W7BV K7ANP W7ZXL W7JIG. For upgrading WA7YCM is sending code practice on 146.52 at 9:30 PM. See you at Skagit ARC Hamfest at Bryant April 21. New officers for ESN are: W7XI, mgr.; WB7FDD, AF7P, asst-mgrs.; WB7ONP, secy. Guess I goofed, W7DX is not a SK, sorry Dave. New officers of West Seattle ARC are: WB7YRC, pres.; K7JBZ, vice-pres.; WB7RMD, secy.; N7AIF, treas.; W7IAZ, steward; W7AUK K7NC E7LCS WA7PME WB7SEV, trustees. WB7FGC active during SET on emergency power. SEC WA7RWK reports 994 ARES members and nearing the 1000 goal. New officers of PSCARC are: W7JPH, pres.; W7IEU, vice-pres.; K7VNI, secy.; W7PRW, treas. Vancouver Hamfair May 12-13, Yakima Hamfest May 20. New officers for BEARS: W7WS, pres.; W7GY, vice-pres.; AA7L, secy.; WB7PEW, treas.; N7IL, trustee. K7RBR's 90 yr old Grandad is a new Novice and looking for a sounder to work Morse. K7MF didn't enjoy 2 weeks in Chicago with a −50 degree chill factor. W7JIE, EC for Salvation Army, setting up emergency operations in their trailer and HQ. WA7LKZ WA7IPG W7CZA going QRP with HW-8's. K7WF new Club Historian for LCARA. Hope you all will help with the communications for the Diabetes Bikathon April 29. Traffic: (Jan.) W7DZX 557, KL7JEB 506, W7AK 448, WA7BDD 134, N7AJ 128, W7IEU 121, WB7PSP 119, WA7PHD 109, K7GXZ 87, WB7EBP 79, W7GB 72, K7NZV 57, W7BUN 55, WB7FDE 51, WA7CBN 47, W7APS 40, W7EBU 35, W7JIE 26, W7LG 22, W7ZEV 17, WB7CFH 16, W7HHU 12, W7BCS 10. (Dec.) WA7RVA 19.

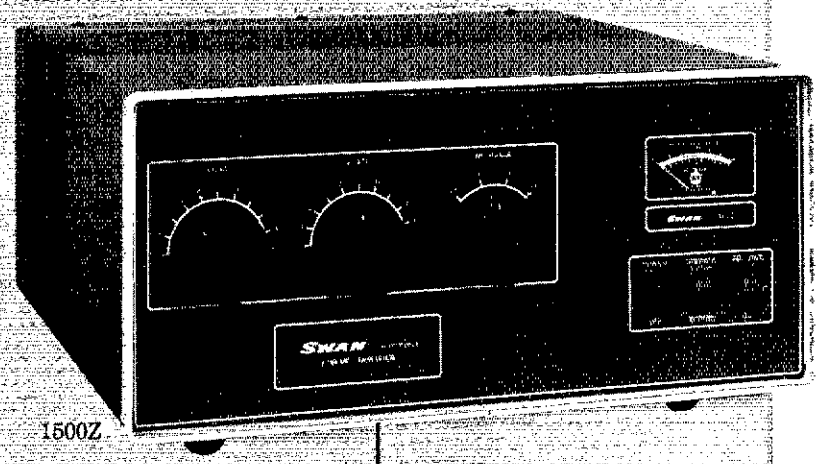
PACIFIC DIVISION

EAST BAY: SCM, Bob Vallio, W6RGG — Asst. SCMs: K6UWR W6ZF VE2AQV/W6. SEC: K6UWR. PSHR: W6OA WB6UZX W6JXK. KA4DZW new OO Fairfield as well as serving as AEC in Solano Co. WB6YBA active on NCN. N6IG rebuilding Sunol Ridge remote, also operating new Berkeley remote. UCARC planning Novice class in fall quarter. WA6NTI handled lots of SET ttc, as did W6OA. K6ARE and N6OP sending out OO reports. Thanks to SEC K6UWR and his ECs there is more activity and interest in Emer Comm in the section than ever before. MDARC 1979 officers: W6AMH, pres.; WA6MWU, vp.; WB6FOA, secy.; WA6OJT, treas.; W6PFW & WB6BIX, Dir. Their club paper, The Carrier, featured a four page picture spread of their Christmas party. Congrats to new editor, VE2AQV. EBARC 1979 officers: K6ZR, pres.; AI6S, 1 vp; WB6DOB, 2 vp; WD6FYF, 3 vp; WD6FRP, secy.; Peter Annas, treas; WB6FJC, editor. SBARA upgraders: WA6TMU, Extra; WD6GKN & KA6CLL, General. SCV has nosed out EB in the total of NCN activity honor-rollers. C'mon gang, check into NCN, 3630 daily at 1900 & 2030, and 144.81/145.41 at 1930 PST. Traffic: W6OA 259, W6JXK 123, WA6NTI 122, WB6UZX 98, N6IG 22, WB6YBA 15, WD6BMX 11.

NEVADA: SCM, Leonard M. Norman, W7PBV — SEC: K7ZAU. New ARC officers for LVARC W7ILX, pres.; WB7RQC, vp; WD9CKM/7, treas.; W7IZU, secy. W7DIK

NOW THERE ARE 3

SWAN LINEAR AMPLIFIERS

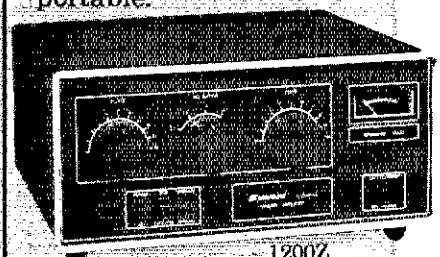


1500Z

Swan linear amplifiers give you all the power you need for low power transmitters in a choice of compact models engineered for maximum efficiency and performance. All three units operate on 80, 40, 20, and 15 meters with AC input of 110V-220VAC, 50-60 Hz.

THE 1500Z. The self-contained 1500Z with tuned input makes it an ideal companion for the Swan 100MX! A high quality, conservatively rated, 110/220 VAC power supply provides 2200 volts DC to two 572B tubes. Rated at 1500 watts PEP input, nominal output is 750 watts into the antenna. Metering is selectable for "relative output," "Ip," and "Ep," and instant operation with the "Operate" and "Bypass" switch.

THE 1200Z completely self-contained amplifier and power supply gives you 1000 watts PEP input on SSB and 750 watts DC input on CW. With most of the features of the 1500Z, this unit is lightweight and portable.



1200Z

THE MARK II 2000 watt Linear Amplifier delivers maximum legal PEP power on SSB and 1000 watts DC on CW, including 10 meter band. Included is a matching power supply. Both units are independently cooled with low noise blowers.

Available only through authorized dealers.

MARK II

Please send full details on Swan Linear Amplifiers to:

NAME _____

ADDRESS _____

CITY _____

STATE _____ ZIP _____

SWAN ELECTRONICS
305 Airport Road, Oceanside, CA 92054
(714) 757-7525

IT'S NEW! IT'S EXCITING! POLY PAKS GIANT

1¢ SALE "ONE PENNY GETS YOU TWO"*

*Buy any item on this page and choose 2nd item for only one penny!

* of the same cat. no.

A PENNY MORE GETS YOU TWO

Item	Sale	2 for
☐ 6-SKINNY TRIM POTS, PRECISION, asst. styles, values 50% yield (#2389)	1.29	12 for 1.30
☐ 60pc-PRECUT, PRETINNED WIRE, various lengths and colors (#1971)	1.29	120 for 1.30
☐ 60 MINI RESISTORS, for PC appl., vert, 1/8W, color coded (#2235)	1.29	120 for 1.30
☐ 8-TRANSISTOR RADIO EARPHONES, 8 ohms imped (#2946)	1.29	16 for 1.30
☐ 10-5K POTS, audio taper, plastic snap-in mounting (#5124)	1.29	20 for 1.30
☐ 10-1&2 MEG DUAL POTS, audio taper, "snap-in" mnt (#5125)	1.29	20 for 1.30
☐ 50-1 AMP ZENERS, wide asst. of values, untested (#1964)	1.29	100 for 1.30
☐ 12-SCR'S & TRIACS, 10 AMP, asst. values, untested (#2067)	1.29	24 for 1.30
☐ 3-QUADRACS, 10 AMP, 100% prime, 50-100-200 V, TO-220 (#5048)	1.29	6 for 1.30
☐ 20-MINI RECTIFIERS, 1½ AMPS, 25V, epoxy, axial (#5374)	1.29	40 for 1.30
☐ 10-1N4007 1000V MINI RECTIFIER, epoxy case, axial leads (#2383)	1.29	20 for 1.30
☐ 75 MOLEX CONNECTOR Type M1938 4, makes 14 to 40 pin sockets (#1609)	1.29	150 for 1.30
☐ 50 IF TRANSFORMERS, asst sizes (#3589)	1.29	100 for 1.30
☐ 10-T.V. CHEATER CORD JACKS, (#5519)	1.29	20 for 1.30
☐ 10-1 AMP 200V MINI RECTIFIER, IN4003, epoxy, axial (#2378)	1.29	20 for 1.30
☐ 4-1.5V SILVER OXIDE WATCH BATTERIES, (#5063)	1.29	8 for 1.30
☐ 3-LCD WATCH READOUTS, 3½" digits, 7 seg, dim 1½ x 1" (#5066)	1.29	6 for 1.30
☐ 20 IC DICE CHIP, complete circuitry, asst, sizes (#5065)	1.29	40 for 1.30
☐ 2-100KHz MARKER CRYSTALS, specify 104.067, 104.092, or 114.00 KHz (#3896)	1.29	4 for 1.30
☐ 12-1.5V LAMP AND SOCKET SET, 200ma, T2 style (#3956)	1.29	24 for 1.30
☐ 10-RCA PHONO JACKS, chassis mount, teflon base (#5119)	1.29	20 for 1.30
☐ 10-COAXIAL PIN HEAD LEDS, RED (#5617)	1.29	20 for 1.30
☐ 4-5 DIGIT 7—SEGMENT READOUTS, in flat pak case (#5616)	1.29	8 for 1.30
☐ 4-¼" BLOCK TRIM POTS, 5K (#2536)	1.29	8 for 1.30
☐ 1 "FOTO FET" N CHANNEL, Crystalonics, 1-Sealed Effect Transistors. (#1169)	1.29	2 for 1.30
☐ 1-VOLTAGE REGULATOR, TO202 case, 12V 600MA (#1900)	1.29	2 for 1.30
☐ 1-3 DIGITS ON A DIP, LED, red, DL-33 (#1887)	1.29	2 for 1.30
☐ 3-MM5262 2K DYNAMIC RAM, specify type (#3459)	1.29	6 for 1.30
☐ 10-2N711 HIGH SPEED SWITCHING TRANSISTORS, TO18, npn (#3374)	1.29	20 for 1.30
☐ 2-15W HI POWER TRANSISTORS, 220V, npn, TO66 (#2787)	1.29	4 for 1.30
☐ 3-24 PIN IC SOCKETS (#2168)	1.29	6 for 1.30
☐ 1-MM5312 DIGITAL CLOCK CHIP, 100% (#1525)	1.29	2 for 1.30
☐ 2-MM5725 4 FUNCTION CALCULATOR CHIP, 100% (#2036)	1.29	4 for 1.30
☐ 1-MM5202 ERASABLE PROM, 100% (#3450)	1.29	2 for 1.30
☐ 3-10 AMP 25V BRIDGE RECT, comb style (#2447)	1.29	6 for 1.30
☐ 10-2N3565 RF TRANSISTORS, TO106, 2N5133 (#3372)	1.29	20 for 1.30
☐ 6-LINEAR SWITCHING TRANSISTORS, 2N2905, pnp, TO5 (#3375)	1.29	12 for 1.30
☐ 50-2 AMP CYLINDRICAL RECT, up to 1K, u-test (#4006)	1.29	100 for 1.30
☐ 6-OPEN-FACE READOUTS, LED, red, some segs missing mostly duals (#3952)	1.29	12 for 1.30
☐ 10-2N2222 (or equiv.), TO-18 metal case (#1992)	1.29	20 for 1.30
☐ 10- DATA ENTRY SWITCHES, SPST, 1 amp, norm open 125V (#5321)	1.29	20 for 1.30
☐ 8-TRANSISTOR RADIO EARPHONES, 8 ohms imped (#2946)	1.29	16 for 1.30
☐ 15-FLUORESCENT OVERFLOW READOUT TUBES, w/leads (#3288)	1.29	30 for 1.30
☐ 10-2N3704 TO92 TRANSISTORS (#3490)	1.29	20 for 1.30
☐ 1-2N5001 80V TRANSISTORS STUD (#2800)	1.29	2 for 1.30
☐ 3 MICROPROCESSOR/SUPPORT CHIPS, asst. MM5780-90 series, 24-28 pin (#5639A)	1.29	6 for 1.30
☐ 6 CLOCK/CALCULATOR CHIPS, asst. MM5378, 75, 5737 etc. (#5638A)	1.29	12 for 1.30
☐ 25 DTL FAIRCHILD IC's, gates and flip flops, Dip, 100% (#2709)	1.29	50 for 1.30
☐ 1-24 VOLT 50 MIL. TRANSFORMER, 115 V input, open frame, 1" x 1" x 3/4" (#5631)	1.29	2 for 1.30
☐ 10-2N3704 TRANSISTORS, silicon, TO-92 case, hfe-300, 100% (#5625)	1.29	20 for 1.30
☐ 10-2N3705 TRANSISTORS, silicon, TO-92 case, hfe-150, 100% (#5626)	1.29	20 for 1.30
☐ 10 D33021 TRANSISTORS, low power, silicon, hfe-60, TO-92 (#5627)	1.29	20 for 1.30
☐ 1 ALLEN BRADLEY POT, 10K, 2-1 4 watts, type-J, 2" x ¼" shaft (#1748)	1.29	2 for 1.30
☐ 50 ASST. RED LEDS, 20% or better, various styles and types (#5624)	1.29	100 for 1.30
☐ 10 G.E. POWER TAB TRANSISTORS, D40N1, N2, some NS, TO-220 (#5629)	1.29	20 for 1.30
☐ 2-¼" BLOCK TRIM POTS, 200K (#2535)	1.29	4 for 1.30
☐ 1-12VDC 5MIL REED RELAY, spst, N.O, 2200 ohms, 7/8" x 5/16" x 5/16" (#5515)	1.29	2 for 1.30
☐ 50 TEMP. COEFFICIENT VOLTAGE REF. DIODES, asst. volt, +50% (#5647)	1.29	100 for 1.30
☐ 10 LM-380 IC's, 2 watts, dip, 50%+ yield, U-test (#1975)	1.29	20 for 1.30
☐ 50 RED BLOCK DISC CAPS, assorted values, 50% material (#1698)	1.29	100 for 1.30
☐ 50 SHOCKLEY DIODES, most popular switching diode, hobby & untested (#1072A)	1.29	100 for 1.30
☐ 6 OPTO-COUPLER, 1500V isolation, hobby material, U-test (#2629A)	1.29	12 for 1.30
☐ 4 CHERRY MICRO SWITCH, 125 VAC, 15A, N.C. type E-13, screw terminals (#5525)	1.29	8 for 1.30
☐ 5 SPST PUSHBUTTON MOMENTARIES, rt. angle, pc mt, on-on' (#5638)	1.29	10 for 1.30
☐ 25 TTL's, with 7400's, U-test, dips (#2415A)	1.29	50 for 1.30

Item	Sale	2 for
☐ 30 RADIO AND TV KNOBS, asst styles, sizes (#B217)	1.29	60 for 1.30
☐ 60 TUBULAR CAPACITORS, asst volts and sizes (#B219)	1.29	120 for 1.30
☐ 55 LOW NOISE RESISTORS ¼, ½W, HiFi, etc (#220)	1.29	110 for 1.30
☐ 50 POWER RESISTORS, 3,5,7 w. axial, pop sizes (#B228)	1.29	100 for 1.30
☐ $25 SURPRISE, all kinds of parts in a pak (#B294)	1.29	2 for 1.30
☐ 12 PANEL SWITCHES, rotary, slide, toggle, etc (#B295)	1.29	24 for 1.30
☐ 60 COILS AND CHOKES, rf, parasitic, if, etc (#B297)	1.29	120 for 1.30
☐ 60 TERMINAL STRIPS, up to 4 solder lugs (#B334)	1.29	120 for 1.30
☐ 60 PRECISION RESISTORS, ½W, 1%, axial (#B363)	1.29	120 for 1.30
☐ 50 MICA CAPACITORS, asst values (#B373)	1.29	100 for 1.30
☐ 10 SETS RCA PLUGS AND JACKS, phone (#B402)	1.29	20 for 1.30
☐ 60 DISC CAPACITORS, asst values long leads (#B437)	1.29	120 for 1.30
☐ 20 TRANSISTOR ELECTRO'S, asst up and ax (#B453)	1.29	40 for 1.30
☐ 75 HALF WATTERS, resistors, color coded, asst (#B454)	1.29	150 for 1.30
☐ 35 SILVER MICAS, red backs, axial, asst. (#B455)	1.29	70 for 1.30
☐ 6-50 AMP RECT, asst volts up to 2S, stud (#L717)	1.29	12 for 1.30
☐ 100 GERMANIUM DIODES, axial leads, u test (#L642)	1.29	200 for 1.30
☐ 100-STABISTORS, Regulator, sensing and computer. Axial. excellent yield (#2140)	1.29	200 for 1.30
☐ 100 PRINTED CIRCUIT ¼ WATT RESISTORS, asst (#U1060)	1.29	200 for 1.30
☐ 12 TRANSISTOR SOCKETS, asst npn and pnp types (#U651)	1.29	24 for 1.30
☐ 50-3 AMP SILICON RECTIFIERS, axial, asst V (#U865)	1.29	100 for 1.30
☐ 50 POLYSTYRENE CAPS, plastic coated, prec. (#U1052)	1.29	100 for 1.30
☐ 10 NE-2 bulbs, for 110vac projects, hobby, etc (#U1222)	1.29	20 for 1.30
☐ 10 PROXIMITY REED SWITCHES, (#U1258)	1.29	20 for 1.30
☐ 6 2N918 UHF TO-18 TRANSISTORS (#U1423)	1.29	12 for 1.30
☐ 30 MOLEX CONNECTORS, nylon, asst. sizes (#5642)	1.29	60 for 1.30
☐ 50-MINI BLOCK CAPACITORS, Erie, red square discs. Asst. values. (#1698)	1.29	100 for 1.30
☐ 6-CALCULATOR AC ADAPTOR JACK, standard threads 3 terminals. (#2316)	1.29	12 for 1.30
☐ 50 ONE AMP ZENER DIODES, asst, axial, u test (#U1964)	1.29	100 for 1.30
☐ 5-PA-263 THREE WATT PC BOARDS, for amps (#U2013)	1.29	10 for 1.30
☐ 5 MINI MOTORS, 1½ Vdc, for many hobby proj (#U2551)	1.29	10 for 1.30
☐ 50 IN4000 RECTIFIERS, asst to 800V, u test (#U2594)	1.29	100 for 1.30
☐ 15 PRINTED CIRCUIT BOARDS, asst sizes, hobby (#U2010)	1.29	30 for 1.30
☐ 2 MERCURY SWITCHES, silent touch, SPST (#U2823)	1.29	4 for 1.30
☐ 6 ITS A SNAP, 9 VDC BAT-clip, red n black lead (#U2852)	1.29	12 for 1.30
☐ 8 1400 VOLT "RED BALL" RECTIFIERS, axial 1 AMP (#U2590)	1.29	16 for 1.30
☐ 20 1N4148 SWITCHING DIODES, 4 nsec. axial (#U3000)	1.29	40 for 1.30
☐ 3-10 AMP QUADRACS, w/trigger diode up 600V (#U3620)	1.29	6 for 1.30
☐ 5 MICRO SWITCHES, push, asst types (#U3011)	1.29	10 for 1.30
☐ 40 SQUARE DISC STYLE CHOKES, color coded (#U3203)	1.29	80 for 1.30
☐ 30 TRANSISTORS TO92 2N4400 series, u test (#U3291)	1.29	60 for 1.30
☐ 6-TRANSISTORS TRANSFORMERS, audio, inter, etc mini (#U3295)	1.29	12 for 1.30
☐ 15 PRINTED CKT TRIMMER POTS, asst values, etc (#U3346)	1.29	30 for 1.30
☐ 20 ft CABLE, 1 cond shielded, 1-24, for phone (#U3653)	1.29	40 ft 1.30
☐ 10-PNP 30 WATT TO-3 TRANSISTORS, hobby (#U3772)	1.29	20 for 1.30
☐ 50 TUBE SOCKETS, 4,5,6,7 pin tubes, asst (#U3839)	1.29	100 for 1.30
☐ 1-10 AMP POWER TAB QUADRAC, 200 PRV, TO220, 2/trigger (#1590)	1.29	2 for 1.30
☐ 10-BULLET RECTIFIERS, 1.5 amp, 200V, axial (#84)	1.29	20 for 1.30
☐ 6 -READOUTS, MAN 3, common cath, LED, the claw, RED (#3338)	1.29	12 for 1.30
☐ 8-LEDS, asst. sizes and shapes, red, green, yellow, amber (#3869)	1.29	16 for 1.30
☐ PHOTO FLASH ELECTRO. CAP, 600 MF - 360 V (#3897)	1.29	2 for 1.30
☐ 2-CIRCUIT BREAKERS, glass sealed, axial, rated - 1 amp (#3905)	1.29	4 for 1.30
☐ MICRO MINI TOGGLE, SPST, 2 pos, on-off, 125V 3 amps (#3936)	1.29	2 for 1.30
☐ 5-CB CRYSTALS, orig. used w/synthesizer, asst. freq, HC-18/U holder (#5051)	1.29	10 for 1.30
☐ 4-PUSH BUTTON, SPST, PANEL, N.C. 125V - 1 A (#5289)	1.29	8 for 1.30
☐ 10-INSTRUMENT KNOBS, asst. styles and colors, ¼" shaft (#5121)	1.29	20 for 1.30
☐ 4-TAPE HEADS, Hifi types (#5182)	1.29	8 for 1.30
☐ 5-TANTALUM ELECTROS, TEARDROP style, 2.2uf - 25V (#5205)	1.29	10 for 1.30
☐ 2-INLINE FUSE HOLDERS, complete w/5 amp fuse (#5213)	1.29	4 for 1.30
☐ 30-4" CABLE TIES, non-slip white plastic (#5217)	1.29	60 for 1.30
☐ 30pc-HEAT SHRINK, asst. sizes, 50% shrinkage (#5248)	1.29	60 for 1.30
☐ 20 TOROIDS, some with coils (#5431)	1.29	40 for 1.30
☐ 10-15V ZENERS, 400mw, axial, glass case (#5404)	1.29	20 for 1.30
☐ 2-ALUMINUM HEAT SINKS, for TO-220 (#5330)	1.29	4 for 1.30
☐ 2-5.1V. 5%, 10W, STUD ZENER, DO-4 case (#5287)	1.29	4 for 1.30

1,000,000 TTL IC "A PENNY MORE GETS YOU TWO" SALE

It's our special penny IC JAMBOREE for our valued customers everywhere!

Order by Cat. No. 92CU1861 & Type No.

Type	SALE	2 FOR	Type	SALE	2 FOR	Type	SALE	2 for
☐ SN7401	$.18	$.19	☐ SN7444	.59	.60	☐ SN7472	.30	.31
☐ SN7402	.18	.19	☐ SN7450	.20	.21	☐ SN7474	.35	.36
☐ SN7403	.18	.19	☐ SN7451	.20	.21	☐ SN7480	.50	.51
☐ SN7405	.21	.22	☐ SN7453	.20	.21	☐ SN7482	.69	.70
☐ SN7406	.29	.30	☐ SN7454	.21	.22	☐ SN7483	.69	.70
☐ SN7407	.29	.30	☐ SN7455	.19	.20	☐ SN7485	.89	.90
☐ SN7408	.21	.22	☐ SN7460	.21	.22	☐ SN7488	.79	.80
☐ SN7410	.18	.19	☐ SN7464	.19	.20	☐ SN74180	.69	.70
☐ SN7411	.25	.26	☐ SN7465	.19	.20	☐ SN74182	.79	.80
☐ SN7413	.40	.41	☐ SN7470	.30	.31	☐ SN74192	.85	.86
☐ SN7416	.25	.26	☐ SN7491	.59	.60	☐ SN74193	.89	.90
☐ SN7420	.19	.20	☐ SN7494	.69	.70	☐ SN74194	.89	.90
☐ SN7423	.29	.30	☐ SN7495	.69	.70	☐ SN74195	.69	.70
☐ SN7426	.29	.30	☐ SN7496	.65	.66	☐ SN74197	.89	.90
☐ SN7427	.29	.30	☐ SN7498	.19	.20	☐ SN74190	1.49	1.50
☐ SN7437	.25	.26	☐ SN74107	.33	.34	☐ SN74200	4.95	4.96
☐ SN7438	.25	.26	☐ SN74109	.49	.50	☐ SN74284	3.95	3.96
☐ SN7440	.19	.20	☐ SN74114	.25	.26	☐ SN74285	3.95	3.96
☐ SN7443	.69	.70	☐ SN74121	.35	.36	☐ SN74298	1.49	1.50
			☐ SN74123	.59	.60			

"OOOOPS" POP OPS STARRING A PENNY MORE GETS YOU TWO

Order by Type No.

Type	SALE	2 FOR	Type	SALE	2 FOR
☐ LM300N	.49	.50	☐ NE565H	.79	.80
☐ LM300H	.49	.50	☐ LM703H	.39	.40
☐ LM301V	.25	.26	☐ LM704H	.19	.20
☐ LM301H	.25	.26	☐ LM709H	.19	.20
☐ LM308V	.39	.30	☐ LM710N	.29	.30
☐ LM308H	.59	.60	☐ LM711N	.39	.40
☐ LM318V	.99	1.00	☐ LM733N	.59	.60
☐ LM320-6V	.99	1.00	☐ LM741H	.19	.20
☐ LM322N	.79	.80	☐ LM741N	.39	.40
☐ LM322H	.59	.60	☐ LM1304N	.99	1.00
☐ LM340K-18V	.99	1.00	☐ LM1310N	.99	1.00
☐ LM340K-24V	.99	1.00	☐ MC1312N	2.49	2.50
☐ LM340T-6V	.99	1.00	☐ LM1414V	.49	.50
☐ LM340T-12V	.99	1.00	☐ LM1800N	.79	.80
☐ LM340T-18V	.99	1.00	☐ LM3028H	.89	.78
☐ LM350N	.79	.80	☐ LM4250H	1.99	2.00
☐ LM377H	1.49	1.50	☐ 75451	.29	.30
☐ LM380N	.89	.90	☐ 75453	.29	.30
☐ NE531H	1.49	1.50	☐ 75491	.49	.50
☐ NE532N	.25	.26	☐ 75492	.49	.50
☐ NE550N	1.25	1.26	☐ 75494	.69	.70
☐ NE550H	.29	.30	☐ PA263	.77	.78
☐ NE561N	1.99	2.00	☐ DM8864	.99	1.00
☐ NE565H	.89	.90			

25 AMP BRIDGE RECTIFIERS

Order No. 2273 & voltage

PIV	2 FOR	SALE
☐ 25	1.26	1.25
☐ 50	1.96	1.95
☐ 100	2.26	2.25
☐ 200	2.96	2.95
☐ 400	3.51	3.50
☐ 600	4.26	4.25
☐ 800	4.96	4.95

LASER DIODES

5 to 8 watts,

$8.88

2 for $8.89

No. 3508

LEDS!

YOUR CHOICE 6 for $1.29
1¢ SALE 12 for $1.30

Order by Cat. No.

☐ # 1788	MICRO TOPHAT RED
☐ # 1942	MED YELLOW STUBBY
☐ # 1802	MICRO SINGLE PIN RED
☐ # 2793	JUMBO Amber
☐ # 2135	JUMBO RED
☐ # 2136	JUMBO GREEN
☐ # 2137	MICRO RED
☐ # 2790	JUMBO RED CLEAR

RIBBON CABLE AT THIN PRICES

Cond	Sale		2 for	
☐ 10	10 ft	$1.98	20 ft	$1.99
☐ 14*	8 ft	1.98	16 ft	1.99
☐ 20	5 ft	1.98	10 ft	1.99
☐ 25	4 ft	1.98	8 ft	1.99
☐ 26	4 ft	1.98	8 ft	1.99
☐ 34	3 ft	1.98	6 ft	1.99
☐ 36	3 ft	1.98	6 ft	1.99
☐ 40	2 ft	1.98	4 ft	1.99
☐ 50	2 ft	1.98	4 ft	1.99
☐ 60	1 ft	1.98	2 ft	1.99

• Ultra flat!
• 28 AWG

Order by Cat. No. 3939 and conductors.

*color coded.

10 AMP - POWER TABS!

1730 - SCR'S
1446 - TRIACS
1590 - QUADRACS

PRV	Sale	2 for
50	$ .69	$ .70
100	.88	.89
200	1.19	1.20
400V	1.39	1.40

1- 10 WATT STEREO

AMPLIFIERS!

PA, hi-fi, mobile, 12V (#5324)
8.88 2 for 8.89

HOW TO ORDER

When ordering, always use catalog number, type no., the name of the magazine you are ordering from and the month

FREE! FREE!

Buy $20[00] Worth Choose Any Two $1[29] Items Free

1N4000 Epoxy Rectifiers

Cat. No.	Type	Volts	Sale		1¢ SALE!	
2377	1N4001	50	10 for	$ .75	20 for	$ .76
2378	1N4002	100	10 for	.85	20 for	.86
2379	1N4003	200	10 for	.95	20 for	.96
2380	1N4004	400	10 for	1.19	20 for	1.20
2381	1N4005	600	10 for	1.39	20 for	1.40
2382	1N4006	800	10 for	1.49	20 for	1.50
2383	1N4007	1000	10 for	1.59	20 for	1.60

LED WATCH GUTS

$1.95 2 for $1.96

Factory "lay-arounds." Do they work? Who knows! A micro digital technicians bonanza. The complete guts are there. With black case and leatherette band. 5 functions: HOURS, MINUTES, SECONDS, MONTH, & DATE. Sorry, no specs.
Cat. No. 5267 Wt 4 oz.

POLY PAKS®

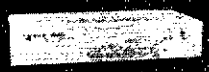
COD's MAY BE PHONED!

P.O. BOX 942-M4
SO. LYNNFIELD, MA 01940

Terms: Add Postage Rated: Net 30
Phone: (617) 245-3828
Retail: 16-18 Del Carmine St. Wakefield, MA
MINIMUM ORDER: $8

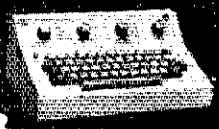
FROM THE COMPANY WITH A LONG LINE OF RTTY FIRSTS

RVD-1002
1st RTTY
Video Generator



1971

1972



DKB2010
1st RTTY & MORSE
Keyboard

1973

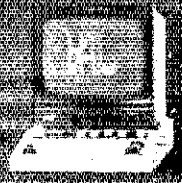
RVD-1005
Improved RTTY
Video Generator

1974

1975

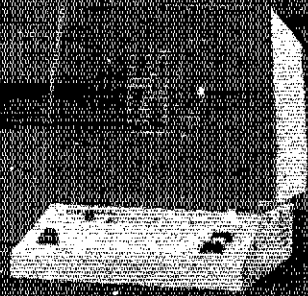
ST6000
High-performance
RTTY Demodulator

DS3000 KSR Version 2
1st Microprocessor
Controlled Amateur Equipment
with Editing for Baudot & ASCII



1976

1977



1978

DS3000 KSR Version 3
1st 3-mode Amateur Send-Receive Terminal
for Baudot, ASCII, and MORSE

1979

ST5000
Low-cost, Big-performance
RTTY Demodulator

AND NOW...

DS3100ASR

The FIRST Automatic Send-Receive Electronic Terminal for Baudot, ASCII, and MORSE

- Type and edit your message **while** receiving
- 200 line storage
- 24 line screen
- Non-volatile and programmable HERE-IS
- Internal real-time clock
- RTTY **and** CW ID
- WRU answer-back
- Upper **and** lower case ASCII

$1995.00
Call or write
for complete
new catalog

HAL COMMUNICATIONS CORP.
Box 365
Urbana, Illinois 61801

In Europe contact:
Richter & Co.: Hannover

on the sick list. WA7ESM out of hospital. WB7SKM running code & theory class for Novice to Extra. WA7JUO operating Moon-bounce. K7UGE repeater now has autopatch on 34/94. N7AIX running a code & theory class, free to LVARC members. New ARC officers for NARA K7OX, pres.; WA7OZP, vp; WB7SKM, secy/treas. W7SK in the hospital. K7WLY reported an outstanding SET. KA7ATK back in NV from 8-Land. K7SN running slow speed Novice net on 21.777 MHz. W7EIX reports ARRL Pacific Division Convention schedule for Aug. 11-12, 1979 at the MGM Hotel Reno. QSL to WB7EIX for details. Traffic: W7ILX 111.

PACIFIC: SCM, George Morton, N7HR/KH6 — Into on 79 Natnl Convention: POB 891, Baton Rouge, LA 70821. Kauai ARC doing wingding job in Civil Defense! They have new RACES plan in the mill, and really exercise their emergency nets. Latest test was simulated plane crash at Lihue airport; well done to all who participated. Who sez wx in paradise is always balmy & beautiful? Several days of gale winds and rain have taken their toll. KH6BZF lost 12 Yagis, KH6IHP was lucky enuf to be around and take his EME rig down before winds cud cause damage. Steve will be on 144 EME soon! As if wind and rain weren't enuf, thunder and lightning kept HECO crews busy nights replacing transformers, et al. Ewa Bch a chilly 58, had to put a blanket on the bed. BPL KH6ST. Traffic: KH6ST 159, KH6BZF 20, KH6JJP 14.

SACRAMENTO VALLEY: SCM, Norman Wilson, N6JV — Asst. SCM: W6NJU. New officers for the North Hills ARC are WB6PWT, pres.; KB6GX, vp; N6ASN, secy.; W6BWZ, treas.; W6DZ K6CJ N6BD WB6PHK, dir. The Golden Empire ARS in Chico elected WA6GUO, pres.; WD6CPM, vp.; WB6CQF, secy.; WB6JKZ, treas.; K6HTM, editor; K6BYS, pub. The Nevada County ARC elected WA6LMS, pres.; K6PRN, vp.; WA6SOH, secy-treas. Members of the RAMS and North Hills provided communications for the motorcycle races at the Sears Point Raceway. W6SX gave a presentation on the National Traffic System before the Sierra Foothills ARC. They meet on the 2nd Thur. of the month at 7:30 PM in the Bowman grade school. Congratulations to WB6PBS who made Advanced Class. Traffic: W6SX 120, W6RSP 30, W6DEF 27.

SAN JOAQUIN VALLEY: SCM, Charles McConnell, W6DPD — SEC: WA6YAB. WA6IQZ new EC for San Joaquin Co. ECs needed in Amador and Tulare Co. Officers of the Sierra ARC of High Mojave are WA6OYR, pres.; George Kreager, 1st vp; WA6EXV, 2nd vp; WB6VXI, secy.; N6PR, treas. The club meets the 2nd Mon. in Ridgecrest. Officers of C-CATS are WA6VFC, pres.; W6NTK, vp; WA6CTR, secy-treas. Officers of the Delta ARC are N6EL, pres.; WB6EGM, vp; KA6BJQ, secy.; WD6AMG, treas.; KA6CTG WB6NSZ W6RRN WD6DRO are General. WD6BLH Advanced. WB6NLO now KB6GJ. WA6HWA is KA6Z. WD6EHX is N6BBU. WB6WQS is KB6JG. W6YKM has another TS820. WA6UOR a TS820S and Kenwood Twins. KA6CAJ a HW2036A. W6OZL and WA6UUL are Silent Keys. WB6VIN worked 165 countries. For info on the 1979 ARRL National Convention, write P.O. Box 891, Baton Rouge, LA 70821. The Fresno Hamfest is May 11-13, 1979 at the Sheraton Inn in Fresno. Write Fresno Hamfest, P.O. Box 783, Fresno, CA 93712 for info. All ARRL CS appointees are invited to attend the CD appointees meeting at the Hamfest. Traffic: (Jan.) K6RAU 23, W6DPD 22, K6PMG 20, WA6YAB 17. (Dec.) WB6RYG 25, WB6WYA 4.

SANTA CLARA VALLEY: SCM, Jettie Hill, W6RFF — SEC: WB6IZF. SCVRS-WR6ADE and members getting ready for the March of Dimes Walkathon. The 1979 National Convention is July 20-22. For info write P.O. Box 891, Baton Rouge, LA 70821. SCV Emergency Net busy during SET, as well as the North Calif Net. SCV has 861 ARES membs, and 17 EC according to WB6IZF. W6OII busy as usual on nets and emergency work. WA6HAD sent over 100 tubes to Pakistan thru AP2PA. N6AU had station on emergency power at Portola Valley firehouse during SET. WB6VWK lost his 80-meter ant during a storm. New antenna works FB with an average of one new country per day! W6ASH reports the SPECS Net in operation for over 22 years and 52 ops active for SET. W6AUC works four nets and gets a good traffic total. W6DVB is pres. Norcal QCWA. N6NF busy with OO duties. K6FS is PAARAs delegate to CCRC. KA6BEU working 40, 15 and 10 with 40 watts with good results. PAARA is looking for a printer for PAARAgraphs-any help? FARS held their annual banquet at the Blue Pheasant. FARS officers are W8RPA WB6OML WA6ROM K6MA and WA6EAA, and they are preparing for the years activity: flea market, Field Day and SS contest. N6KO edits SCCARCs Short Skip and does a fine job. EMARC officers are WA6VAO WD6AGF WA6YJR WD6AGL and WD6FLG. NCN RELAY reports the following on the Honor Roll: WD6AFR K6AXT AB6AYJ KA6CGO WD6GUA WA6JWK WA6KRA W6KZJ WA6MIV WA6NMQ W6RFF WB6TQV W6YBV N6YE K6YKG WA6ZFK and W6YTV. These NCN members check into the net 15 or more times during the month. An active *group*, ARRL members active in traffic or many other activities may be eligible for an ARRL CD appointment. Write or phone me or on NCN. Traffic: (Jan.) W6YBV 294, W6RFF 93, W6AUC 87, W6OII 30, W6KZJ 23, W6ASH 20, WA6HAD 19, N6AU 9. (Dec.) WB6IZF 2.

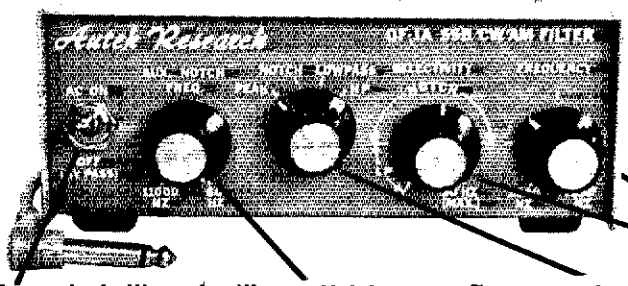
ROANOKE DIVISION

NORTH CAROLINA: SCM, Bill Parris, AA4R — STM: N4UE. SEC: K4CJZ. Great participation in SET in Jan. Thanks to all who took part. Be sure to get SET reports into Hq. Congrats to WA4CUD & WB4MXG who made BPL. Officers of Tar Heel Emergency Net include WB4MMK, NM; N4ALE, secy.; WD4CNR WD4NAO KB4IZ, dir. A word of thanks from us all to WB4MXG & W4OFO for service with THEN. Good turnout at first Hamfest held in Elkin. Welcome to Triod ARC of Murphy now affiliated with ARRL. Officers of Alamance ARC include KA4AKB, pres.; WD4HCP, vp; WB4BHQ, secy-treas.; WB4VHE, dir.; W4IZI, engr. Third Annual Auction held by Charlotte ARC great success. Weather Watch Net progressing very well on 28/88 repeater each Wed. at 7 PM. New 2-meter DX alert frequency is 146.58. Congrats to KB4BH on achieving 5BWAS. Plans shaping up for big Hamfest in Raleigh Apr. 22. Training classes getting underway in Greenville, Charlotte & Winston. Recent upgrades to Advanced: WD4JWQ WD4CXS WD4AIE; General: KA4CZQ WD4JIH WD4AXX WD4CMM WD4OOS KA4CIO WD4JFR WD4IUQ; Tech.: KA4FHT WD4OKH. WD4CNO now NCS on D4RN. W4IZI reports he is now on 220 MHz RTTY with a large group from Salisbury, Winston, Greensboro & Burlington. Support your local radio club and keep the activity reports coming in. See you at the Raleigh Hamfest Apr. 22. Traffic: W4WXZ 314, W4EAT 308, WB4MXG 252, WA4CUD 245, K4VHT 146, K4DHX 134, AA4R 133, K4MC 128, WD4CNO 112, K4FTB 98, KB4IZ 74, WB4WII 74, N4UE 73,

Does Your Shiny New Rig Really Have:

"STATE-OF-THE-ART" SELECTIVITY

BRAND NEW



Add an Autek.

QF-1A Active Filter

For SSB & CW

PATENT PENDING

Only $65 ppd. U.S.A.

115 VAC supply built-in. Filter by passed when off.

Auxiliary Notch rejects 80 to 11,000 Hz!

Four main filter modes for any QRM situation.

Continuously variable main selectivity (to 20Hz.)

Continuously variable main frequencey. (250 to 2500 Hz, all modes.)

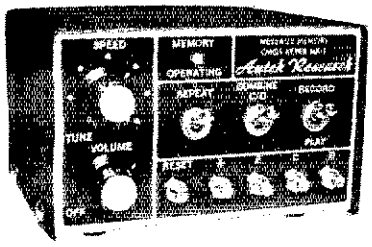
AUTEK pioneered the **ACTIVE AUDIO FILTER** way back in 1972. Today, we're still maintaining that engineering leadership. Our **QF-1A** evolved from suggestions from thousands of owners, and years of dedication to making the "ultimate" filter. No gimmicks — just something that really "works" like the ad says. You're in for a treat!

Autek filters gained their reputation by using a costly **INFINITELY VARIABLE** design. Yet, mass-production (we sell only **ONE MODEL** — the best) makes it a tremendous bargain. You're not limited by a few fixed positions. You vary selectivity 100:1, and vary frequency over the entire usable audio range. **PEAK CW** (or voice) with an incredible **20 HZ BANDWIDTH**, but also variable all the way to "flat." Imagine what the **NARROWEST CW FILTER MADE** will do to **QRM!** Reject whistles with the most flexible **NOTCH** you've heard. Wide or narrow. Depth to 70 dB. **LOWPASS** helps you cope with **SSB** hiss and splatter. Skirts exceed 80 dB. Most above features were in the popular QF-1 (See excellent review in March, 1977 **QST**.) The new "A" model is more selective, adds a **HIGHPASS** mode for **SSB**, and a great **AUXILIARY NOTCH** (35 to 60 dB) to give **TWO NOTCHES, NOTCH/PEAK, NOTCH/LOWPASS,** or **NOTCH/HIGHPASS!** If this doesn't convince you, please **ASK ON THE AIR.** Owners are our best salesmen!

Due to cost and panel-space limitations, even the latest rigs only include a fraction of the **QF-1A** features. We recommend you buy the best rig you can afford, spend $3,000 or more, then add a **QF-1A** and listen to the improvement! **WORKS WITH** Yaesu, Kenwood, Drake, Swan, Atlas, Tempo, Collins, Heath, S/1, etc., **ANY RIG!**

Hooks up in minutes. Plug into your rigs phone jack, or attach to speaker wires. Plug speaker or phones into **QF-1A** rear-panel jack. That's it! Filter supplies 1 watt to fill a room. No batteries rqd. (+12 VDC hookup possible.) 6½x5x2½". Handsome light/dark grey styling. Get yours today.!

CMOS PROGRAMMABLE KEYER MAKES CW FUN!



Calls CQ while you relax.

Also remembers name, QTH, contest exchanges.

Record anything you want in seconds!

Model MK-1 $99.50 ppd. U.S.A.

Our classic MK-1 should make you wonder why anyone would buy an ordinary keyer, when memory costs so little! Records 4 messages. Just select "record," tap the A, B, C, or D message, and start sending at any speed! Record over old messages as easily. Playback by tapping the same button. Each message holds about 25 characters (letters, numbers). Total 100 characters. Handy repeat switch repeats message forever until reset. Very useful for **CQ's. YOU SIT BACK AND WAIT FOR A CALL!** Another switch combines two messages for 50 characters. "Memory-saver" feature standard.

This "state-of-the-art" keyer pleases beginners and CW "pros" alike. **DOT AND DASH MEMORIES. TRIGGERED CLOCK. IAMBIC. SELF COMPLETING. JAM PROOF. 5 to 50+ WPM. LATEST CMOS FOR LOW CURRENT.** Built-in monitor, speaker. Widely adjustable tone, volume. Perfect weighting at all times. No fiddling with an adjustment that varies with speed. **NEW: DUAL TRANSMITTER OUTPUTS** key **ANY** modern (post 1963) ham rig directly without a battery or relay, including difficult-to-key solid-state rigs. **115VAC** supply built in, or connect **9-14 VDC** to rear panel. Use with **ANY** paddle. 6x3½x5". Burned-in and tested. Sockets for **IC's.** Full instructions.

COMING SOON for memory buffs: Memory expander plugs into memory socket of **ANY MK-1** ever made. Allows 16 messages, 400 chars . . . Well under $50. Installs in less than 30 minutes. Buy your **MK-1** now, and easily add memory later if you like!

FLASH! MK-1 used to set new world's CW record. A single operator worked 3992 DX QSO's & 275 band-countries in only 48 hours! Get the choice of champions — Autek!

ORDER WITH CONFIDENCE. NO LONG DELAYS HERE. We ship 95% of orders from stock. 12 month warranty. If not delighted, return in 15 days for a prompt refund. (less $2 handling charge). Try our great service!

Autek Research Box 5127E Sherman Oaks, Ca. 91403

ORDER BLANK (Or Use Separate Sheet of Paper)

Please Rush
ppd. via ☐ QF-1A Filter at $65.00
Speedy UPS. ☐ MK-1 Keyer at $99.50

Add 6% tax in Calif. Add $3 each to Canada. $2 for UPS air. Add $15 each for other continents (shipped air).
Enclosed is $_____.

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

Send to Autek Research, Box 5127E, Sherman Oaks, Ca. 91403.

Harrison

"DON'T SETTLE FOR LESS!"
You deserve the best of equipment, the best of service, plus the real pleasure you always get when you deal with "HAM HEADQUARTERS USA".

"When you deal with me I personally see to it that your needs receive individual attention. You will enjoy quickest delivery from our large inventory of factory fresh, latest improved production models. If you wish, we will fire up and check it out for you. And because we do not let things out on trial basis, everything you get will be truly brand new, untampered with!

Should you ever run into any trouble, we are here to take care of you. We service what we sell, our Lab is among the finest in the country.

With it all, I'm very competitive, I will try to beat any equivalent deal you got. (and even if my price seems a few dollars higher, I assure you it is still the greatest bargain anywhere.)

So, drop me a line or phone me. Tell me what you want to get, what you have to trade in, what offers you have—I'll do the rest." TNX 73

BEN SNYDER W2SOH.

YAESU

FT-901DM 160-10M XCVR	$1459
FT 101 ZD 160-10M XCVR	895
FT 301DM 160-10M 240W Dig	935
FT-7 80-10M 20W	499
FT-7B 80-10M 100W	675
CPU2500RK FM Mob. Keyboard	585
FT-227RA Auto Scan 4 Mem	399
FT-202R Hand held 2M	199
FT-127RA 220 MHz AutoScan	479
FL-2100F 80-15M Linear	515
YP-150 Dummy load	86
SP-901P Speaker/Patch	74
FTV-901 2M XTVR	455
YO-901 Monitor	445
FV-901DM Synthesized VFO	415
FC-901 Antenna Tuner	199
YD-148 Hi/LoZ Desk mic	50
FC-301 Antenna Tuner	170
FV-301 VFO	125
FP-301D P/S Identifier	239
YO-301 Monitor Scope	263
SP-120 External Speaker	25
XF-30B AM Filter	40
XF-30C CW Filter	40
E.R.B. External Relay Box	17
LL-301 Phone Patch	49
XF-30B AM Filter	40
XF-30C CW Filter	40
YO-101 Monitor Scope	320

KENWOOD

TS-820S Digital, 160-10 Mtrs.	$1299
TS-820 160-10 Meters, IF shift	1100
R-820 160-10Mtrs, notch til.VBT	1099
VFO-820Remote VFO	175
SP-820 External Speaker	65
TS-520S 160-10M Trans.	849
DG-5 Dig. Freq. Display	199
VFO-520S Remote VFO	155
SP-520 External Speaker	33
AT-200 200-W antenna tuner	159
TL-922A 160-15M linear amp.	1199
SM-220 Station Monitor	349
BS-8 SM-220 Pan display	75
BS-5 SM-220 Pan Display	75
DS-1A DC-DC converter	69
TS-600 6M SSB/CW/FM/AM 10W	799
TS-700SP 2 mtr. SSB/CW/FM/AM	799
TR-7625 2mtr. XCVR	425
RM-76 Micro Processor	125
VFO-700S External VFO	135
TR-8300 70 cm FM trans.	369
TV-502S 2 mtr. Transverter	299
TV-506 6 mtr. Transverter	279
MC-50 Dynamic base mic	45

TEMPO

S-1 Syncom	349
S-1T W-TT	399
TSCC	16
S-30 Amplifier	89

ICOM

211	952
215/BC	308
280	490
701AC	1792
RM-2	203

PACE

Communicator I	239
Communicator II	399

ATLAS

210X	765
210X/NB	810
215X	765
215/NB	810
220-CS	155
220CS/VX5	210
200-PS	105
DD6-C	235
P-C-120	60
DMK	55
NT-1	29
DL-200	15

ALDA COMMUNICATIONS

Alda-105	595
PS-115	84.95
PS-130	149.95
PC-701	39.95

CALL US!! IT'S TOLL FREE 1-800-645-9187

Harrison radio

"Ham Headquarters U.S.A. ®"

CHARGE IT! MASTER OR VISA

FARMINGDALE
2265 Route 110, 11735 (516) 293-7990

NEW YORK CITY
301 Madison Avenue, 10017 (212) 697-8910

Valley Stream
10 Sunrise Highway 11580, (516) 872-9565

RHODE ISLAND
Cranston 589 Resevoir Ave. 02920 (401) 467-3181

Please continue to call or send mail orders to:
20 Smith Street Farmingdale, N.Y. 11735
800-645-9187 or 516-293-7990
SE HABLA ESPANOL

PROMPT ORDER DEPT.

We carefully pack and ship ham gear, accessories and parts to most any part of the world. **Address orders to:**
20 Smith Street
Farmingdale, N.Y. 11735
Or - Phone your orders to
(516) 293-7990

N.Y. residents only, add N.Y. Sales Tax

OPEN NITES 'TIL 9
Saturdays 'til 6

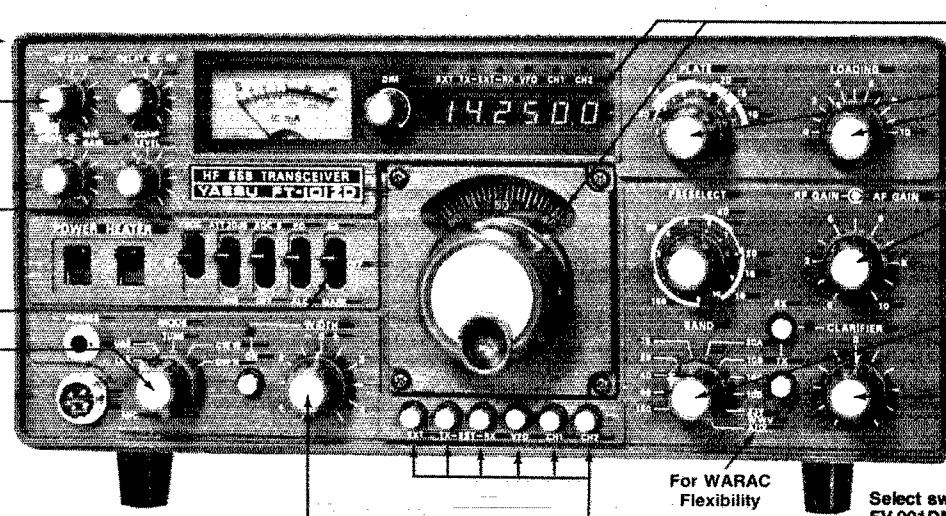
N.Y.C HOURS:
9 AM to 6 PM
9 AM to 2 PM Sat.

ALL NEW

FT-101ZD

HIGH-PERFORMANCE HF TRANSCEIVER

Today's technology, backed by a proud tradition, is yours to enjoy in the all-new FT-101ZD transceiver from YAESU. A host of new features are teamed with the FT-101 heritage to bring you a top-dollar value. See your dealer today for a "hands on" demonstration of the performance-packed FT-101ZD.



SPECIFICATIONS

TRANSMITTER

PA Input Power:
180 watts DC
Carrier Suppression:
Better than 40 dB
Unwanted Sideband Suppression:
Better than 40 dB @ 1000 Hz, 14 MHz
Spurious Radiation:
Better than 40 dB below rated output
Third Order Distortion Products:
Better than −31 dB
Transmitter Frequency Response:
300-2700 Hz (−6 dB)
Stability:
Less than 300 Hz in first 30 minutes after 10 min. warmup; less than 100 Hz after 30 minutes over any 30 min. period
Negative Feedback: 6 dB @ 14 MHz
Antenna Output Impedance:
50-75 ohms, unbalanced

GENERAL

Frequency Coverage:
Amateur bands from 1.8-29.9 MHz, plus WWV/JJY (receive only)
Operating Modes:
LSB, USB, CW
Power Requirements:
100/110/117/200/220/234 volts AC, 50/60 Hz; 13.5 volts DC (with optional DC-DC converter)
Power Consumption:
AC 117V: 75 VA receive (65 VA HEATER OFF) 285 VA transmit; DC 13.5V: 5.5 amps receive (1.1 amps HEATER OFF), 21 amps transmit
Size:
345 (W) × 157 (H) × 326 (D) mm
Weight:
Approximately 15 kg.

COMPATIBLE WITH FT-901DM ACCESSORIES

RECEIVER

Sensitivity:
0.25 uV for S/N 10 dB
Selectivity:
2.4 KHz at 6 dB down, 4.0 KHz at 60 dB down (1.66 shape factor); Continuously variable between 300 and 2400 Hz (−6 dB); CW (with optional CW filter installed): 600 Hz at 6 dB down, 1.2 KHz at 60 dB down (2:1 shape factor)
Image Rejection:
Better than 60 dB (160-15 meters); Better than 50 dB (10 meters)
IF Rejection:
Better than 70 dB (160, 80, 20-10 m); Better than 60 dB (40 m)
Audio Output Impedance:
4-16 ohms
Audio Output Power:
3 watts @10% THD (into 4 ohms)

arma amateur radio manufacturer's association

Price And Specifications Subject To Change Without Notice Or Obligation

YAESU **The radio.**

379X

YAESU ELECTRONICS CORP., 15954 Downey Ave., Paramount, CA 90723 ● (213) 633-4007
YAESU ELECTRONICS Eastern Service Ctr., 9812 Princeton-Glendale Rd., Cincinnati, OH 45246

WD8NYN/4 70, W4EHF 67, WD4EPO 60, WA4SRD 57, WA4UTC 53, KB4HG 52, N4ZH 51, WD4WII 48, W4FMN 46, W4PNY 42, W4ACY 41, WB4CYN 38, WD4FJM 35, WB4RGS 37, N4BEX 34, WD4LMM 33, WD4ABZ 32, WB4CES 31, N4BEH 28, WA4UYS 28, WA4IHG 27, N4ALE 26, WA4PID 25, W4IZI 24, K4TPK 21, N4AGP 20, WB4VOZ 20, WB4VHE 18, K4AI 15, WB4ETY 14, W4OCZ 14, WA4UPH 13, WD4NTE 10, WD4HYM 9, WA4AKB 8, WA4WFY 8, K4KA 7, W4TY 5, K4DJ 4.

SOUTH CAROLINA: SCM, Richard McAbee, W4MTK — Asst. SCM: WB4UDK. STM: W4ANK. NMs: WA4SJS KD4D.

Net	MHz	Time(Z) Dy
CN	3.718	2230 Dy
CNE	3.573	0000 Dy
SCSSBN	3.915	0000 Dy
CNL	3.573	0300 Dy
Anderson 2M ARES	146.37/.97	0230 Dy
W. Carolina 2M ARES	147.765/.165	2330 Dy
York Co. 2M ARES	146.43/147.03	2330 Dy
Long Mtn. Nt	147.87/.27	0145 TTh

Please try to help out by checking into your favorite net. Congrats to newly organized club & officers — Western Carolina ARS !! WD4RHV, pres.; KB4CK, vp; WD4GAT, secy.; K4VIA, treas.; WB4WOX, act. chmn. Thanks for good participation on SET. Congrats to new OTSs: K4PFC WA4VYS AF4E WB4AFP W4FMZ W4NQL WB8TCT/4 & WB4FEU. Congrats N4PO WD4AWN & W4ANK on PSHR. SC SSBN check-ins 1848, tfc 220. Anderson 2 Mtr ARES check-ins 354, tfc. 13. CNE QNI 294, QTC 128. York Co. ARES check-ins 291, tfc. 5. Traffic: N4PO 438, K4ZN 305, W4NTO 145, W4ANK 95, W4MTK 89, W4NQL 77, WD4AWN 64, W4FMZ 58, K4FRX 47, WB4HVL 42, WB8TCT/4 38, WD4HBX 34, WB4UDK 29, WA4SJS 25, K4PFC 23, W4OCX 23, W4FVV 23, N4BCD 20, WB4FEU 13, WB4DRO 12, WA4EOD 11, WB4JNE 10, W4DRF 10, WD4EDU 8, WA4VYS 8, KB4IU 7, KA4BGX 6, N4EE 5, WB4DRT 4, WB4NBK 2, WD4LLC 1.

VIRGINIA: SCM, Rick Genter, K4BKX — ASCM: W4YE. STM: W4SQQ. SEC: WB4ZNB. Chief OO W4HU.

Net	kHz	Time	Sess.	QTC	QNI	Mgr.
VNTN	3907	Noon	31	313	387	WA4FDV
VSBN	3947	6/10:15 PM	63	859	1703	W4JK
VSN	3860	6:30 PM	26	142	387	WA4YIU
VN	3680	7/10 PM	62	636	1025	WB4FLT

W4YE was active in the 160 contest and getting ready for the ARRL DX contest. If you haven't yet signed the OCS and/or ODS petitions, see W4YE. KI4W, ex-WA4FTJ, is new vice-pres. of YLRL. ARES nets are going strong report ECs W3BBN N4IF W4NWM W4PXA WB4QAX and W4YVG. K4BAV is back with new antenna and Swan 270. W4WWQ has new triband beam. W4LXB off air for remodeling. W4HU W4JUJ W4KFC N4NK W4OOL and W4YE report CD party activity. WA4RXY reports some real "practice" for ARES team due to ice storm. N4NK WB4PNY W4SUS and W4TZC have new Omni's. WB4QEB is back after completing Masters at Perdue. EA3BCN now KG4O in VA Beach. WA4NTP now sharing rig with his YL, KA4FZA. W4KFC attended ARRL board meeting in FL. AD4J DXing on 75 with new SB-200. WD9HFO/4 busy repairing ice damaged antennas. AD4G is keeping informed from the Official Bulletins sent by WA4SBC. WB4PNY has finally let WA4EQW use his new FT-7. K4SPS now has the Franklin repeater in operation. PSHR: K4BKX WA4CCK WB2JAY/4 W4JK N4NK W4NWM WD4OVR WB4PNY and WA4UYD. BPL: W3BBN/4 WA4CCK W4JK WB4PNY and W4SQQ. Due to limited space in this column, refer to "The Virginia Ham" for additional activity information. Contact WA4FDV, editor, same address as K4BKX, page 8 QST. Traffic: (Jan.) WB4PNY 711, WA4CCK 593, W4JK 571, W4SQQ 562, W3BBN/4 507, N@ZO/4 494, N4NK 473, K4KNP 443, WB4FLT 265, WB4DBK 256, W4UQ 236, WD4OVR 234, K4BKX 209, K4ITV 193, KB4N 176, KF4R 147, WB4ZNB 137, WB4RDV 135, W3BBQ/4 134, K4GR 130, W4SHJ 130, WA4STO 105, W4YVG 100, WA4YIU 87, K4EJ 83, WA4UYD 80, WA4ONR 78, N4FM 77, W4LXB 76, WB4KIT 75, N4IF 74, WB2JAY/4 71, WA4FDV 70, W4NWM 61, W4OKN 61, K@JH/4 51, WA4RXY 47, WB4MAE 43, KI4W 41, W4OOL 40, WB4LAB 37, N4LE 35, WB4DQZ 32, WD4PIH 29, WB4TPT 29, N4SD 27, WD4AZI 23, W4UVA 21, KA4CHK 20, AG4D 17, W4SUS 17, N4YQ 16, WA4WWQ 14, W4CFV 12, W4TZC 11, N5BAJ/4 10, K4BAV 10, WA4QCI 10, WA4OWC 10, WD4RDF 10, WA4WQG 9, WB4FDT 8, W4KFC 8, N4DW 7, WB4ZWT 7, N4ATT 5, K4MLC 5, N3RC/4 5, WA4NTP 4, W4YE 4, W4JHF 3, WD4KUK 3, W4PXA 3, WD9HFO/4 2, AD4J 2, W4JUJ 2, W4KXE 2, W4DM 1. (Dec.) N5BAJ/4 50, N4FM 32, N4YQ 32, KI4W 32, W4CFV 17, W4TZC 15, N4BBX 10, WB4LAB 8, N4UY 8, WA4PBG 7, WB4RZW 4, K4SPS 4.

WEST VIRGINIA: SCM, Karl Thompson, K8KT — SEC: K8QEW. STM: WA8WPW. Net Mgrs: Phone: W8YP Novice: WD8JYM; WVN: WA8WPW. Statewide SET exercises were held under the direction of K8QEW with at least 12 counties participating. Successful meeting held in Feb. between Morgantown, Fairmont and Clarksburg hams and National Wx Svc; organized by WB8BPS. Council meeting held in Feb. to plan program for 1979 Convention at Mtl. Program to include FCC Forum and Amateur exams. Contact K8KT for details. W8HZA made 85 contacts in CD party using 3 watts.

Net	Freq.	Time-Z	Ck-In	Tfc	Sess.
Hillbilly	14290	1700 Su	181	56	4
Novice	3730	2215 Dy	131	46	29
Phone	3990	1700 Dy	609	47	29
CW	3567	0000 Dy	232	84	32
Phone	3990	2300 Dy	1348	152	31

Traffic: WA8WPW 411, W8HZA 82, WD8LDY 76, WB8AKQ 76, K8YL 58, K8QEW 57, W8YP 53, WD8JYN 38, WD8JYM 36, W8CKX 32, WB8TDA 31, WB8YMJ 24, N8AJC 18, K8KT 17, K8ZDY 17, WD8DHC 15, W8VOI 14, W8CAL 8, WD8EFS 8, W8FG 8, WD8CDQ 5, WD8CUS 5.

ROCKY MOUNTAIN DIVISION

COLORADO: SCM, Robert W. Poirier, K@DJ — SEC: W@GOW. STM: WB@MCL. NM: K@CNV WB@ZQG. W@WYX submitted impressive figures for the Weather Net in 1978. Daily averages were over 70 messages and over 26,000 messages were handled by him alone last year! SET within the section was very successful with several areas reporting greater activity from both amateurs and local officials. Another SET is planned for this Fall so those who could not take part in this one past will have another chance. K3PUR/@ new EC for District 22. WB@TAQ enjoying his new RTTY gear when not operating aeronautical mobile from his 1949 Luscombe. Colorado section congratulates W5KH on his being elected new TCC Director for the Pacific Area. Net Tfc. Jan.: Columbine 31 sess.; QNI 1250, QTC 179, informals 800, QNF 1500; CWN QNI 353; QTC 317, QNF 1098; EPN 20 sess.; QNI 45, QTC 10, QNF 300; Hi-Noon 29 sess.; QNI 1209, QTC 49, informals 268, QNF 1288.

SEE US IN DAYTON

HAMTRONICS USED GEAR • TEST EQUIPMENT • SPECIALS

30-DAY GUARANTEE ■ 90-DAY FULL CREDIT TRADE-IN ■ FREE SHIPPING VIA UPS ONLY

Limited quantities. First come, first served. *(if weight or size exceeds UPS max., we will ship freight collect)*

Allied
AX-190 Receiver $159

Ameco
PV-50 $ 9
CN-50 29
CN-144 39
TX-62 79
621 VFO 45

B&W Waters
Nuvertor 2+6 Conv. $ 75
6100 SSB Xmitter 395
670 SSB Adaptor 39
Co-Dax Keyer 95

Central Electronics
100V Transmitter 325
MM-2 Scope 69
20-A SSB Adaptor 79

Clegg
22'er FM $129
66'er 6M Xcvr 115
99'er 6M Xcvr 59
Interceptor BRCUR 275
Ant Pre Amp 22
All Bander 69
HT-146 125
2 Vess 259
FM-27-B Xcvr 325

Collins
75A4 Receiver $395
75S3B Receiver 695
75S1 Receiver 349
KWM-2 Xcvr 595
32S1 Xmitter 349
PM-2 AC Supply 95
516 F2 AC Supply 139
312B5 Console 425
361D2 Mount 29

Drake
2A Receiver $149
2B Receiver 189
2AQ SPKR QMULT 29
R4 Receiver 289
R4-B Receiver 349
R4-C Receiver 399
MS-4 Speaker 19
2NT Transmitter 125
2NT Transitter 99
TR-6 695
TR-22 2 Meter 140
T-4X Transmitter 339
TR-72 2 Meter FM 225
AC-4 AC Supply 95
TR-4-C Transceiver 449
CC-1 Console
CPS-1 Supply
SC-2 Conv
SC-6 Conv
SC-1 Calibrator
The above all assembled complete pkg. Only $200

Dycomm
10-0 2 M Ampl $125
35-0 401N 110 Out 130
470-25 450 MC 120
P-1416 16 Amp Supply 95

Eico
720 Transmitter $ 49
722 VFO 39
730 Modulator 39

Elmac
AF-67 Transmitter $ 45
PMR-8 Receiver 79

Genave
GTX22M FM $165
GTX-200 2M FM 149

Globe/Galaxy
VHF 6+2 Transm $ 39
Chief Transmitter 39
Galaxy III Xcvr 159
Galaxy V Xcvr 189
Galaxy V Mk II 239
GT-550 Xcvr 279
GT-500A Xcvr 329
AC-400 Supply 79
FM-210 2M FM 95

Gonset
Com II 2M $ 75
Com II 6M 69
Com IV 2M 129
GC-105 2M 115
G-28 Xcvr 149
G-50 Xcvr 149

Hallicrafters
S-108 Receiver $ 99
SX-101 Receiver 159
HT-32 Transmitter 179
HT-32B Transmitter 269
SX-99 Receiver 79
SX-115 Receiver 349
HT-37 Transmitter 159
HT-40 Transmitter 49
SX-99 Receiver 99
SX-117 Receiver 189
SR-150 Xcvr 259
SR-160 Xcvr 159
SX-146 Receiver 175
HT-44 Transmitter 159
SX-111 Receiver 149
SX-122 Receiver 249
S-36 UHF Receiver 125

Hammarlund
HQ-110 A VHF Receiver $189
HQ-110C Receiver 119
HQ-110AC Receiver 149
HQ-145X Receiver 169
HQ-170C Receiver 159
HQ-180 Receiver 379
HQ-215 Receiver 259
SP-600 Receiver 179
HX-50 Transmitter 169

Heathkit
SB-300 Receiver $199
SB-301 Receiver 229
HR-10-B Receiver 69
SB-303 Receiver 269
SB-220 Linear Amp 449
SB-102 Trivcvr 379
DX-60B Transmitter 69
HW-32 Transmitter 85
HW-100 Transceiver 249
SB-100 Transceiver 299
SB-401 Transmitter 249
SB-101 Transceiver 349
SB-650 Digital Freq. Display 149
HW-30 Twoer 29
Also Sixer 29
H-10 Monitor 69
VHF-1 Seneca 79
HW-12 Transmitter 75
HP-23 AC Supply 49
HP-23B AC Supply 59
HW-202 2M FM Xcvr 159
SB-620 Spectrum Analyz 120
SB-102 Xcvr 369
SB-610 Scope 95
HA-20 6m Linear 125
SB-634 Console 175
SB-604 Spkr 29.50
SB-644 VFO 129.50
SB-230 Linear 359
SB-104 Transceiver 625

ICOM
IC-21 2M FM Xcvr $299
IC-230 Demo 369
IC-22A 2M FM Xcvr 185
IC-30A 432 MCFM 269

Johnson
1-KW Matchbox/SWR $195
Courier Linear 139
Ranger I Transmitter 85
Ranger II Transmitter 139
Valiant I Transmitter 129
Invader 2000 Xmitt 495

Kenwood
T-599 Transmitter $289
R-599 Receiver 289
TS-520 Tranc 429
QR-666 259
QR-666 Receiver 239
TV 502 Transvertor 179

Knight
T-60 Transmitter $ 39
r-100 Receiver 59
TR-108 Trancur 2M 79

Lafayette
HA-800 Receiver $ 89
HP-350 Receiver 149
HE-45 Transceiver 49

Midland
509 H.T. $149

Millen
92200 Transmatch $149
90651-A Grid Dipper 95

National
NC-270 Receiver $119
NC-300 Receiver 129
NCX-5 Transceiver 279
NCX-5MK II Transcvr 299
NC-303 Receiver 199
AC-500 AC Supply 69
NCX-500 Transceiver 199
NCX-3 Transceiver 149
NC-190 Receiver 149
NC-105 Receiver 69

Regency
HR-2B 2M FM $169
HR-220 FM 220 MC 185
AR-2 2M Amplifier 85
HR-25 2M FM 225
HR-6 Meter FM 189

SBE
SB-34 Transceiver $249
SB-33 Transceiver 189
SB-144 2M FM 175
SBZ-LP Linear 179

Standard
SRC-146 HT $149
826 M Trnscvr 195
SRC-144 395
SRC-851T 250

Swan
700-CX Xcvr $459
260 Cygnet 289
270 Cygnet 329
500 Xcvr 299
500 CX Xcvr 389
117-XC AC Supply 95
14X DC Module 39
MK II Linear 475
KK VI 6 Meter 550
250 C 6M Xcvr 349
FM 2X2M Xcvr 169
FM-1210A 2M 249
350 Transceiver 269
350C Xcvr 299
600R Receiver 339
600T Transmitter 399
410 VFO 79

Tempo
Tempo one Xcvr $299
AC One Supply 79
FMH 2M H.T. 149
CL-220 Trncur 220 MC 179
FMH 2M w/Talkie 149

Ten Tec
PM-3 Trnsur $ 49
Argonaut Xcvr 199
KR-40 Keyer 79
RX-10 Receiver 49
S-30 Signalizer 29
Triton II 479

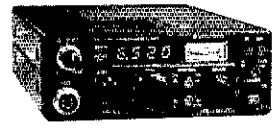
Yaesu
FT-401 Xcvr $499
FRDX 400SD Rec 325
FT 2 Auto 2M FM 249
FT-101B Xcvr 549
FL-2100B Linear 295
FV-101 VFO 79
101E Xcvr Demo 695

Test Equipment Bargains
Boonton "Q" Meter $295
Tektronix 5140 249
Tektronix 545A 950
5 3/54A Plug-in wide band preamp . . 75
Hickok 695 Generator 69
Bendix BC221 Freq Meter 39
Polarad Spectrum Analyzers A84T. . . 1695
Hewlett Packard 400C 75
Precision E-400 Signal Generator. . . . 125
Electro Impulse Spectrum Analyzer . . 395
Dyna/Sciences Model 330 Digital Multimeter 195
Hewlett Packard 4905A Ultra Sonic Detector 550
Hewlett Packard 120A Scope. 250
TS-323/UR Frequency Meter 175
Hewlett Packard 4910B Open Fault Locator 650

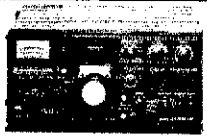
General Radio 650A 150
Measurements Mod 80. 195
Nems Clark 1400. 495
Ballantine 300H 175
PACO Scope Mod-S-50 75
Singer FM-10C 3495
Simpson 260 V.O.M.. . . . . 49.50

The inventory quantities of the items shown in this list vary. There may be one or several of any item. Some items may be sold by the time you read this ad. It is also likely that we have items in stock that are not listed, as a result of the many trades we make each day. We reserve the right to sell accessories and power supplies with matching transceivers and transmitters. Please allow up to 10 working days to ship your order so that we may check and service the gear you purchase.

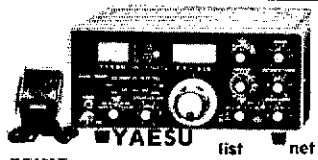
YAESU FT227RA
Regular $399.00
Cash (no trades) $339.15



KENWOOD TR-7600
Regular $375
Cash (No Trades) $318.75



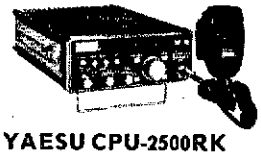
KENWOOD TS-820
Regular $1100.00
Cash (No Trades) $935.00
TS-820S
Regular $1299
Cash (No Trades) $1104.15



YAESU

	list	net
FT101F	$799.00	$679.15
FT101FE	$759.00	$645.15
FT101FX	$699.00	$594.15

All cash (no trades)



YAESU CPU-2500RK
(with keyboard mic)
Regular $585.00
Cash (no trades) $497.25

MAIL & PHONE ORDERS WELCOMED. BANK AMERICARD ACCEPTED. ALL UNITS GUARANTEED

HAMTRONICS
DIVISION OF
Trevose Electronics

4033 BROWNSVILLE ROAD
TREVOSE, PA. 19047
Telephone:
(215) 357-1400

Outside PA
Call Toll Free
800-523-8998

1-800-438-2006

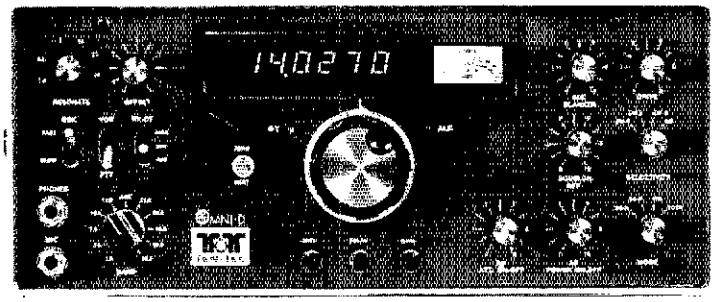
GET THE BEST QUOTE FIRST
CALL BOB'S TOLL FREE

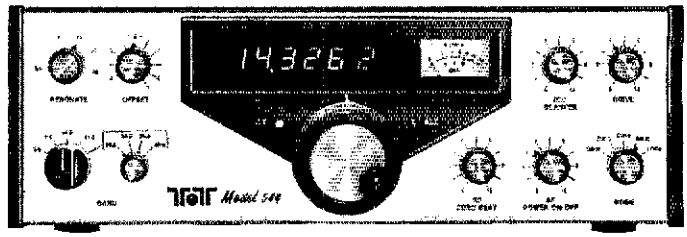
TEN-TEC
TRANSCEIVERS & ACCESSORIES

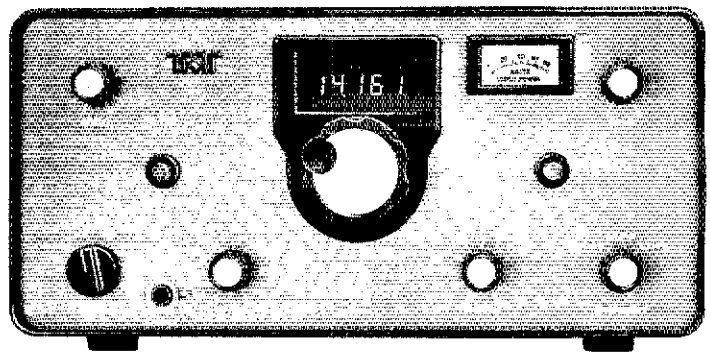
545 160-10m OMNI 200w Xcvr	$ 899.00
546 As above, w/Digital readout	1069.00
645 OMNI Keyer	85.00
248 OMNI Noise Blanker	49.00
252M 18A, 110 vac power supply	119.00
252M/E 18A, 110/230v supply	126.00
540 80-10m 200w Xcvr	699.00
544 As above, w/Digital readout	869.00
252M 18A 110 vac power supply	119.00
262M As above, w/VOX	145.00
252M/E 18A 110/230v supply	126.00
262M/E As above, w/VOX	152.00
207 Ammeter	14.00
240 160m converter	110.00
241 Xtal oscillator	35.00
242 External VFO	179.00
244 Digital display	197.00
245 150 Hz CW filter	25.00
249 Noise blanker	29.00
Ten meter Xtal each	5.00
1102 Snap-up legs pair	1.00
570 Century 21 70w CW Xcvr	299.00
574 Century 21/Digital	399.00
670 Century 21 Keyer	29.00
276 Century 21 Calibrator	29.00
274 Century Digital Mod Kit	90.00
247 Antenna Tuner	69.00
277 Antenna Tuner/SWR Bridge	85.00
509 Argonaut 80-10cm 5w Xcvr	369.00
206 A Crystal calibrator	29.00
208 External CW filter	29.00
210 AC power supply	34.00
210/E 110/220 vac ps	39.00
215P Microphone w/plug	29.50
KR1A Dual paddle assembly	35.00
KR2A Single paddle assembly	17.00
KR5A Single paddle keyer, DC	39.50
KR20A Single paddle keyer, AC/DC	69.50
KR50 Dual paddle Ultramatic, AC/DC	110.00

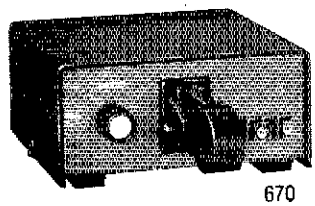
BOB STOCKS THE FAMOUS BRAND NAMES

Ten-Tec, Drake, Midland, KLM, Alpha, Alda, Dentron, Tempo, Swan, Amcom, Icom, Bird, Telex, Cushcraft, HyGain, Hustler, Shure, Ameco, Taylor, CDE, Barker & Williamson, Consolidated Towers, Kenwood.

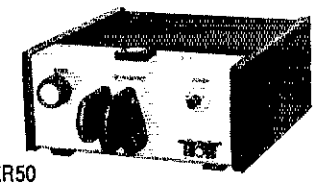








670



KR50

BOB'S AMATEUR RADIO CENTER

318 N. Main St. Salisbury, NC 28144 Hours: M-Sat 9am-7pm, Wed. to 9pm

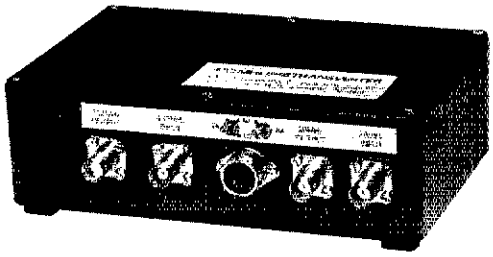
Call For Quotes Toll-Free VISA master charge **NC residents call 1-704-636-7959**

1-800-438-2006

MICROWAVE MODULES LTD.

432 Mhz Linear Transverter

UP YOUR FREQUENCY!



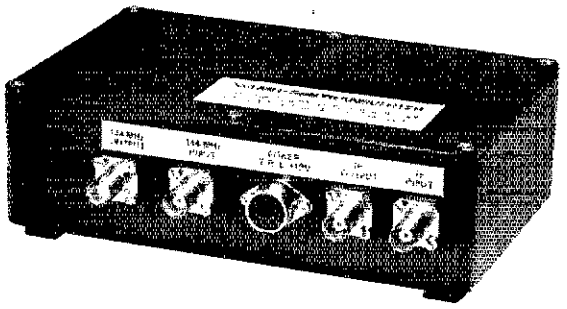
Put your 28Mhz Transceiver to work at 432Mhz!!

- EXTRA RANGE (434-436 Mhz) for Satellite operation.
- 10 Watts RMS output power.
- Simple Frequency Range Selection Using Toggle Switches.
- Highly Stable Regulator Controlled Crystal Oscillator Stages
- 30 dB Receiver Gain.
- Better than 3.0dB Noise Figure.
- Antenna Changeover Achieved by Low Loss Pin Diode Switch.
- 50 Mhz and 144 Mhz I.F.'s Available.

MMT432/28-S —PRICE: $329.95 INCLUDING SHIPPING

144 Mhz Linear Transverter

Join the Fun on 2 Meter Sideband — using your 28Mhz Transceiver.

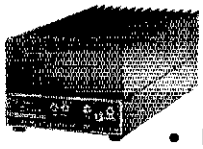


- 10 WATTS RMS OUTPUT POWER
- 30dB RECEIVER GAIN
- BETTER THAN 2.5dB NOISE FIGURE
- 50 Mhz I.F. AVAILABLE

MMT 144/28 — PRICE: $259.95 INCLUDING SHIPPING

432 Mhz LINEAR AMPLIFIER

ALL MODE **100 WATTS OUTPUT**



- 100% DUTY CYCLE RATED
- RFVOX
- 10dB MINIMUM GAIN
- FULLY PROTECTED VSWR, OVERHEATING, REVERSE POLARITY

MML432/100—PRICE: $449.95
INCLUDING SHIPPING

432-436 Dual Range Receiving Converter

- OSCAR, MODE J RECEPTION
- 30dB GAIN
- BETTER THAN 3.0dB NOISE FIGURE
- I.F.'s AVAILABLE: 28-30Mhz, 144-146Mhz

MMC 432/28-S —PRICE: $95.95
INCLUDING SHIPPING

GUARANTEE

ALL MICROWAVE MODULES PRODUCTS ARE GUARANTEED FOR 1 YEAR. IN ADDITION, THEY MAY BE RETURNED WITHIN 10 DAYS FOR A FULL REFUND IF YOU ARE NOT SATISFIED FOR ANY REASON.

TEXAS RF DISTRIBUTORS IS THE EXCLUSIVE IMPORTER OF MICROWAVE MODULES PRODUCTS, AND WE SUPPLY A COAST-TO-COAST DEALER NETWORK. WRITE OR PHONE FOR DETAILS OF THESE PRODUCTS AND THE OTHER VHF AND UHF MICROWAVE MODULES PRODUCTS WHICH WE STOCK.

TEXAS RF DISTRIBUTORS, INC.

JOE - WA5HNK CARL - W5UPR

Exclusive U.S.A. Distributors of Microwave Modules Products

4800 WEST 34TH STREET • SUITE D12A
HOUSTON, TEXAS 77092
PHONE 713/680-9797 • TELEX 791322

Traffic: (Jan.) W0WYX 2649, K0YFK 1104, WA0HJZ 790, WB0ZQG 270, AD0A 136, W0MDT 108, K0DJ 96, W0NFW 79, N0ACW 73, WB0UWE 62, W0LAE 54, W0GO 44, WD0DNM 43, W0RE 42, WB0HZL 33, W0GW 9. (Dec.) WA0HJZ 738, K0DAP 120, W0NFW 41, W0LAE 40, W0LQ 10.

NEW MEXICO: SCM, Joe T. Knight, W5PDY — SEC: W5ALR. NMs: WD5AHH, K5KPS. Southwest Net (SWN) meets daily on 3585 kHz, at 2000 local time and handled 262 msgs with 251 stations reporting in. New Mexico Roadrunner Net (NMRRN) meets daily on 3939 kHz at 1800 local and handled 110 msgs with 1197 stations reporting in. New Mexico Breakfast Club meets daily on 3940 kHz at 0700 local, handled 135 msgs with 835 check-ins. W5JOV has resigned as NM, WD5AHH our new NM, K5IKL and his computer do a fine job on net rosters. The Sandia Crest-Cabillo Peak link is a valuable asset linking the state from north to south. W5ALR & W5JOV with WD5AHE gave ham radio a good boost on radio & TV. Traffic: W5UH 527, W5DAD 300, W5JOV 281, WD5AHH 150, K5KPS 130, KL7HSF 27, WA5MIY 10, KB5DA 8.

UTAH: SCM, Carl R. Ruthstrom, W7GPN — SEC: WA7ZBO. The UVHFS Road and Weather net continues to meet Mon. thru Fri. at 1400-1500 and 2330-0030 UT. Your writer erred in a previous report for the evening time of net operation. The net has done some commendable work in reporting traffic hazards and congestion on streets and highways. W7BE is net mgr. and reports 1280 check-ins for the month. Since Dec. a total of 150 individuals have been active in the net. WB7AMR and W7GPN are net controls with others substituting as required. Repeater WR7AIZ is used and freq. is 146.34/94. UARC members active in assisting in a search for a downed aircraft near Provo. Monitoring this activity affirmed the effectiveness of amateur radio to work with other organizations in an emergency situation. The SET came off well, simulating a "Deep Freeze." Traffic: K7HLR 254, WA7MEL 69, WA7JRC 59, W7UTM 16, KB7DC 13, W7GPN 13, W7OCX 13, W7HKC 4.

WYOMING: SCM, Chester C. Stanwaity, W7SDA — SEC: WB7EIN. NMs: WA7WFC K7KSA WB7NHR. OTSs: W7LYA W7SQT WA7WXQ. The Casper ARC participated in Jan. SET. W7TVK reports 65 check-ins 26 of those were on CW. KA7DCM new call in Thermopolis. K7HAW is in hospital in Cheyenne, W7NK now home after successful surgery. WA7ZZY has a couple of prospects about ready for novice examination in Cokeville. For more information on the 1979 ARRL National Convention, P. O. Box 891, Baton Rouge, LA 70821. WB7NHR reports Wyoming Cowboy Net held 23 sess. with 828 QNI 11 QTC. Traffic: W7SQT 532, W7LYA 327, WA7GYQ 80, WA7SGG 28, K7SLM 4.

SOUTHEASTERN DIVISION

ALABAMA: SCM, William E. Scates, WA4JYU — SEC: K4WYT. STM: WA4JDH. Old Timers Night held by HARC on Feb. 23. AL section had a great SET with fine use of CW VHF and HF. Thanks to K4WYT W4IBU and WA4JPK. Bay Minette had a good practice session for SET. They had a real emergency. It was handled with old pros K4JIE W4APO and WD4ASH and other members of Baldwin County Civil Defense. BARC started the spring session of code classes with another large group of prospective hams in attendance. WB9HBJ/4 in charge. WA4BHS also had a nice turnout for Advanced classes. I have heard a lot of antenna work going on via 2 mtrs. Spring is not far off, gang, so you can pull wire for real. Tornado season is just around the corner. Traffic: (Jan.) WA4JDH 1073, WN4KKN 143, WA4ZPZ 125, W4IBU 98, K4AOZ 88, WA4FYO 86, WD4GZV 64, WA4JPK 49, WA4JYU 48, WB4TKU 43, WA4YCM 37, WB4RCF 25, WB4TVY 24, WB4EKJ 21, W4CNQ 19, K4JIE 9, K4UMD 6. (Dec.) WA4JDH 2071, WA4FYO 92, WA4VKD 86, W4UP 78, WB4EKJ 60, W4IBU 51, K4BFT 49, WN4KKN 44, WB4TKU 29, WB4TVY 13.

CANAL ZONE: SCM, Alvin Sholk, KZ5AS — In order to allow amateurs world-wide to obtain KZ5 prefix prior to its proposed deletion Oct. 1 79, three QSO parties are planned on all bands and all modes. 0001Z May 19 to 2400Z May 20 79; 0001Z Sept. 22 to 2400Z Sept. 23 79; 0001Z Sept. 29 to 2400Z Sept. 30 79. Certificates will be available for 5, 25 and 50 KZ5 contacts. Demonstration tapes of narrow band voice modulation (NBVM) left by VE2AGF during his recent visit to the Canal Zone were played at the last CZARA meeting and the membership was impressed with the possibilities of this mode.

GEORGIA: SCM, A. H. Stakely, K4WC — SEC: K4SWJ. NM: K4JNL WA3NAZ. Congrats to WA4BZY and WA4PUP making BPL. Congrats to WA4BZY K4EV WA3NAZ W4PIM and WB4ZOJ making PSHR. A fantastic SET well organized by K4SWJ highlighted the month. Activity was very widespread, lots of lessons learned and readiness for the real thing reached a new high. The Governor's proclamation, TV, radio, and newspaper coverage plus public demonstrtions made this SET the best ever. GSN QNI 557, QTC 483, CGVHFN QNI 84, QTC 8, CVEN No. 2 QNI 650, QTC 18, NGSN QNI 27 and 25 for Dec. GSN meets daily at 0000 and 0300Z on 3.595. GSBN meets daily at 2330Z on 3.975. Ga. RTTY Net meets Fri. at 0100Z on 3.620 LSB. QCWA net meets Sat. at 1400Z on 3.830; if you have 25 years of hamming, call in. CGVHFN meets daily at 0030Z on 146.85. Atlanta ARES net meets at 0200Z Mon. on 22/82. Newnan Emerg. Net meets 0200Z Mon. on 19/79. CVEN No. 2 meets daily at 0030 on 146.52 simplex and at 0230Z on 34/94. Congrats to WD4PAH making Advanced, to WD4PAG making General and to N4BGH making Technician. Columbus Hamfest Mar. 31-Apr. 1 (no foolin'). Atlanta Hamfest June 16-17. N4UZ now on 75 with Swan 260. Contact SCM for field appointments. Traffic: (Jan.) WA4BZY 1220, WA4PUP 576, W4PIM 394, WA3NAZ 347, K4WC 300, W4FOE 219, WB4ZOJ 216, W4WXA 182, K4NM 114, W4GH 85, N4UZ 66, WA4VMV 53, K4EV 49, W4HON 45, K4BAI 24, W4BIA 19, AK4T 11, N4BGN 10, K4PIK 4. (Dec.) W4GH 249, WA4BZY 156.

NORTHERN FLORIDA: SCM, Frank M. Butler, Jr., W4RH — SEC: AA4FG. STM: N4WA. NMs: WD4LUG WB4PGB. New/renewed appts.: KF4U K4IEX & WB4RIS as OTS. SNCs for NFPN earned by N4ARJ N4BEY WA4GFU WA4IBV WD4IED K4KHV KB4LD WA4NMH W4TOH and WB4WXP. Effective Feb. 1, the All-Fla. Phone Net (CFN) moved to 7272 kHz. WA4VLT got rig troubles fixed, but now QRL work. WR4ACZ, 16/76, planning satellite receiver in Gulf Breeze, with audio link on 220 MHz. KA4FQI/FQZ are new graduates of WD4HDT's Novice Class; another started in Feb. W4WNY has new antenna farm at W. Fla. CD EOC in Defuniak Springs. New officers of Chipola ARC: WA4HFG, pres.; WD4PDK, v.p.; W4KXZ, secy-treas.; N4AXJ, editor. N4WA new prexy of Tallahassee ARC. KA4ELI is pres. of newly-formed club at N. Fla. Christian School. A4US received QSL from

The communications revolution has a message for you... there's opportunity for the NRI-trained technician.

From Police Radio to CB... Microwave to Marine Radio... AM/FM to TV Broadcasting, Skilled Maintenance and Repair Specialists Earn the Top Dollar.

The incredible electronic age continues to grow by leaps and bounds as business, government, and public services expand communications networks. Private citizens by the millions have CBs, scanners, and amateur radio equipment. Every radio station has mobile and fixed equipment, and TV stations are adding minicams and microwave relays.

You Can Learn a New Career at Home

You can get in on the action by taking NRI's Complete Communications Electronics course at home in your spare time. No previous experience is necessary ...NRI starts you with the basics and, using easy-to-understand "bite-size" lessons and exclusive "hands-on" training, gives you both the theory and practical experience you need to get ahead fast.

Build and Keep 2-Meter Digitally Synthesized VHF Transceiver

You get actual bench training as you build this industrial quality two-way radio. And you build key servicing instruments like a CMOS frequency counter and TVOM meter that you'll use both for learning and earning. NRI even includes special training to get your "ham" radio license so you can go on the air with your transceiver.

FCC License or Full Refund

Government regulations require an FCC radiotelephone license to work on most broadcast equipment. You pass the FCC exam *or your tuition will be refunded in full.* Offer valid for six months after completion of your course.

Free Catalog...No Salesman Will Call

Send today for the free 100-page NRI catalog with all the facts. And learn about other careers as a CB Specialist, TV/Audio Serviceman, and Digital Computer Electronics. Listen to the message. If coupon has been removed, write: NRI Schools, 3939 Wisconsin Ave., Washington, D.C., 20016.

NRI We grow people

NRI Schools
McGraw-Hill Continuing Education Center
3939 Wisconsin Avenue
Washington, D.C. 20016

All career courses approved under GI Bill.
☐ Check for details.

Please check for one free catalog only.
NO SALESMAN WILL CALL

- ☐ TV/Audio/Video Systems Servicing. Choose from 5 courses.
- ☐ Complete Communications Electronics with CB • FCC Licenses • Aircraft, Mobile, Marine Electronics
- ☐ CB Specialists Course
- ☐ Amateur Radio • Basic and Advanced
- ☐ Digital Computer Electronics • Electronic Technology • Basic Electronics
- ☐ Small Engine Repair
- ☐ Electrical Appliance Servicing
- ☐ Automotive Mechanics
- ☐ Auto Air Conditioning
- ☐ Air Conditioning, Refrigeration, & Heating including Solar Technology

Name (Please Print) Age

Street

City/State/Zip

Accredited by the Accrediting Commission of the National Home Study Council 19-049

MFJ INTRODUCES THE

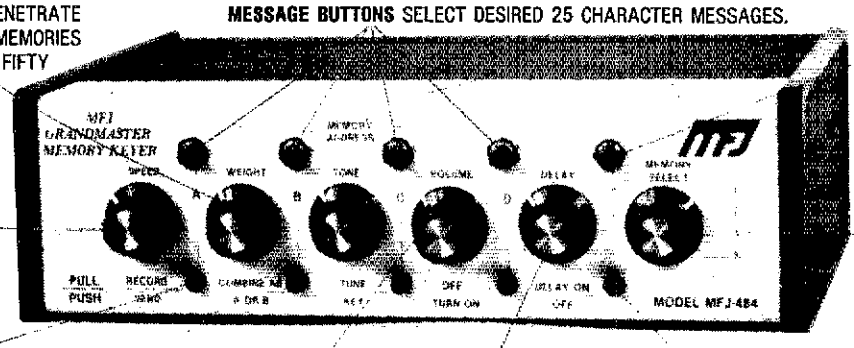
NEW! *GRANDMASTER* MEMORY KEYERS

At $139.95 this MFJ-484 GRANDMASTER

memory keyer gives you more features per dollar than any other memory keyer available — and Here's Why . . .

WEIGHT CONTROL TO PENETRATE QRM. **PULL** TO COMBINE MEMORIES A AND B FOR 1, 2, OR 3 FIFTY CHARACTER MESSAGES.

MESSAGE BUTTONS SELECT DESIRED 25 CHARACTER MESSAGES.



RESETS MEMORY IN USE TO BEGINNING.

SPEED CONTROL, 8 TO 50 WPM. **PULL** TO RECORD.

MEMORY SELECT: POSITIONS 1, 2, 3 ARE EACH SPLIT INTO MEMORY SECTIONS A, B, C, D (UP TO TWELVE 25 CHARACTER MESSAGES). SWITCH COMBINES A AND B. **POSITION** K GIVES YOU 100, 75, 50, OR 25 CHARACTERS BY PRESSING BUTTONS A, B, C, OR D.

LEDs (4) SHOW WHICH MEMORY IS IN USE AND WHEN IT ENDS.

TONE CONTROL. PULL TO TUNE.

VOLUME CONTROL. POWER ON-OFF.

DELAY REPEAT CONTROL (0 TO 2 MINUTES). **PULL** FOR AUTO REPEAT.

LED INDICATES DELAY REPEAT MODE.

NOW YOU CAN CALL CQ, SEND YOUR QTH, NAME, ETC., ALL AUTOMATICALLY.

And only MFJ offers you the MFJ-484 Grandmaster memory keyer with this much flexability at this price.

Up to twelve 25 character messages plus a 100, 75, 50, or 25 character message (4096 bits total).

A switch combines 25 character messages for up to three 50 character messages.

To record, pull out the speed control, touch a message button and send. **To playback,** push in the speed control, select your message and touch the button. That's all there is to it!

You can repeat any message continuously and even leave a pause between repeats (up to 2 minutes). **Example:** Call CQ. Pause. Listen. If no answer, it repeats CQ again. To answer simply start sending. LED indicates Delay Repeat Mode.

Instantly insert or make changes in any playing message by simply sending. Continue by touching another button.

Memory resets to beginning with button, or by tapping paddle when playing. Touching message button restarts message.

LEDs show which 25 character memory is in use and when it ends.

Built-in memory saver. Uses 9 volt battery, no drain when power is on. Saves messages in memory when power loss occurs or when transporting keyer. Ultra compact, 8x2x6 inches.

PLUS A MFJ DELUXE FULL FEATURE KEYER.

Iambic operation with squeeze key. Dot-dash insertion.

Dot-dash memories, self-completing dots and dashes, jamproof spacing, instant start (except when recording).

All controls are on front panel: speed, weight, tone, volume. Smooth linear speed control. 8 to 50 WPM.

Weight control lets you adjust dot-dash-space ratio; makes your signal distinctive to penetrate QRM.

Tone control. Room filling volume. Built-in speaker.

Tune function keys transmitter for tuning.

Ultra reliable solid state keying: grid block, cathode, solid state transmitters (−300 V, 10 ma. max., +300 V, 100 ma. max.). CMOS ICs, MOS memories. Use 110 VAC or 12 to 15 VDC. Automatically switches to external batteries when AC power is lost.

OPTIONAL SQUEEZE KEY

for all memory keyers. Dot and dash paddles have fully adjustable tension and spacing for the exact "feel" you like. Heavy base with non-slip rubber feet eliminates "walking". $29.95 plus $2.00 for shipping and handling.

THIS MFJ-482 FEATURES FOUR 25 OR A 50 AND TWO 25 CHARACTER MESSAGES.

- **Speed, volume, weight, tone controls**
- **Combine memory switch**
- **Repeat, tune functions**
- **Built-in memory saver**

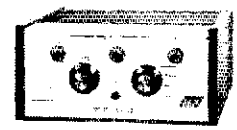
$99.95

Similar to MFJ-484 but with 1024 bits of memory, less delay repeat, single memory operating LED. Weight and tone controls adjustable from rear panel. 6x2x6 inches. 110 VAC or 12 to 15 VDC.

THIS MFJ-481 GIVES YOU TWO 50 CHARACTER MESSAGES.

- **Repeat function**
- **Tune function**
- **Built-in memory saver**

$79.95



Similar to MFJ-482 but with two 50 character messages, less weight controls. Internal tone control. Volume control is adjustable from rear panel. 5x2x6 inches. 110 VAC or 12 to 15 VDC.

For Orders Call toll-free 800-647-1800

Order any product from MFJ and try it. If not delighted, return within 30 days for a prompt refund (less shipping).

Order today. Money back if not delighted. One year unconditional guarantee. Add $2.00 shipping/handling.

For technical information, order/repair status, in Mississippi, outside continental USA, call 601-323-5869.

Order By Mail or Call TOLL FREE 800-647-1800 and Charge It On VISA master charge

MFJ ENTERPRISES, INC. P. O. BOX 494 MISSISSIPPI STATE, MISSISSIPPI 39762

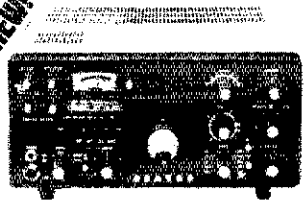
CALL A.R.S.O.N. NOW!
615 868-4956
for the Best DEALS

Amateur Radio Supply of Nashville, Inc.

615 South Gallatin Road, Madison, Tennessee 37115

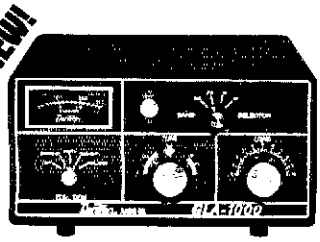
best prices · best service · best trades

NEW!



THE NEW FT101ZD
!! IN STOCK!!
Digital 160M-10M
Deluxe Feature
Check the others . . . then get our price!

NEW!



DENTRON GLA 1000
1 KW DC Input!
1200 W. PEP!!

DENTRON

Clipperton L
MLA 2500 B
DTR 2000 L

We have the new Dentron AF-1A Audio Processor.

Dentron Antenna Tuners, Antennas and SWR Meters.

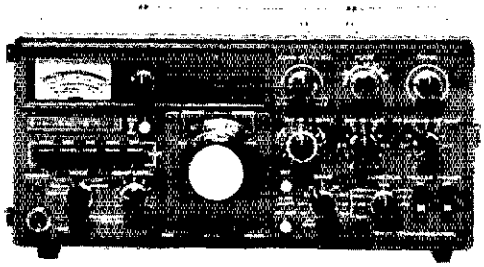
CHECK OUR PRICES

Fast UPS delivery. Place your order then standback!!! We ship your order the same day we get it. Best prices and quick handling of your order.

Used Equipment? Our stock turns fast - write or call your specific needs.

CLOSEOUT SPECIALS!
Send S.A.S.E. for our pink sheet specials.

STORE HOURS
Mon. - Fri. 9 AM - 5 PM
Sun. 1 PM - 6 PM



TS-820S KENWOOD
Deluxe 1.8 - 30 MHZ Transceiver
Call or write for special price!!!

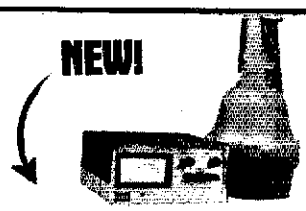
NEW!

KENWOOD TR7600
KENWOOD TR7625
10 or 25 Watt FM 2 meter xcvr synthesized with memory **Get our best price!**

PUT YOURSELF IN THE PICTURE!!
SSTV
ROBOT

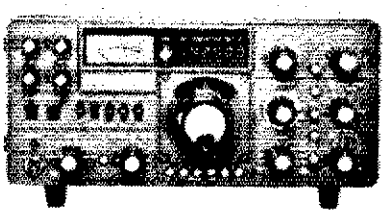
IN STOCK
Call or write for prices.

NEW!



CDE ROTOR SPECIALS
The NEW HAM IV Rotor

Shipping included in cost, etc.
HAM IV Rotor $147.00
Ham IV Rotor with 100 ft. rotor cable $162.00
Ham IV Rotor plus 100 ft. each - rotor cable and first grade RG 8U $185.00
Send cashiers check or M.O.



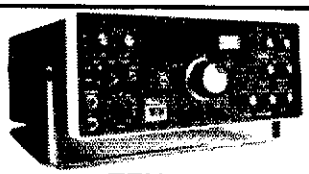
YAESU FT 901 DM
Call for yours today!

We stock the FULL Kenwood and Yaesu line. CALL US!!

MIRAGE
- **B108 2M AMP**
- **MP1 HF SWR MTR**
- **MP2 VHF SWR MTR**

We've got 'em in stock!
Call or write for prices.

DATONG
We stock the amazing Datong FL-1 agile active audio filter - absolutely a fantastic addition to your station.



TEN-TEC
OMNI D & A
UNBEATABLE PRICES!!
Full TEN-TEC Line In Stock

Get On Frequency!
DSI Counter Semi-kit

Write or call for special price.

Sure, we take trades on new equipment! Call or write. We're Burning to Make "Hot" Deals!!

ZL2BT for 160m QSO! KC4N made WAS. WB4RIS runn ing PP for Navy ships in Mediterranean. WA4QHV new pres. of N. Fla. DX Assn.; W4FDA is Bulletin Editor W4ZTW is newest member. New Daytona Beach Rptr Assn. officers: KB4GW, pres.; WA4ONZ, vp; WA4IDI secy.; WB4NGJ, treas. DBARA Hambone College con tinues active with instructors KB4T W4YRL WA4ONZ & WB4GHU. One class will be devoted to the visually han dicapped. KF4U back on QFN & RN5 with trap dipole has plans for tower and quad. WB4BU made DXCC K4IEX made DXCC Honor Roll. W3AZD, ARRL Hq. was visitor at Orlando DX Club. Cloverleaf Farms ARC has new tri-band beam and tilt-over tower. Brooksville using 145.50 for club simplex FM frequency. Traffic: (Jan.) WB4RIS 373; WD4HIF 272, N4WA 199, AA4FG 182, WD4NYY 158, WA4CRI 140; WB4TZR 118, W4MGO 117 WB4QBB 107, N4BBY 105, W4FZX 103, WD4HXS 54, K4RNS 51, KB4T 48, WD4IIO 48, W4KIX 47, W4LDM 42, W4RH 42, W4DTV 38, W4JL 36, W4MVG 35, WA4NMH 32, WA4EYU 24, KF4U 21, WB4ADL 19, N4ARJ 18, WB4VAP 14, WA4VLT 13, K4IEX 12, WB4DTS 11, WB4YKV 10 WA4CLY 9, KB4B 6, WB4WOO 5, KB4LD 3. (Dec.) W4JL 148.

SOUTHERN FLORIDA: SCM, Woodrow Huddleston, K4SCL — Asst. SCM: W4KGJ. SEC: AA4WJ. Congratula tions to Dade Amateur Radio Club for putting on an outstanding Hamboree Jan. 27 and 28, well attended by over 5000. With state-wide SET postponed until Feb. 3 and 4, our Jan. traffic was light, but two stations earned BPLs: K4TH with 524 total and WD4COL with 120 originated plus delivered. K4TH has added a new Drake UV3 to his station. K4ZK enjoyed visiting in Calif. for two weeks. N4XR is enjoying working JA stations on 40 meters with his vertical antenna and 150 watts. We ex tend "Welcome to Florida" to W4JM who recently mov ed to Lakeland from Atlanta, GA. K4GRM is in a new QTH and getting active again. WB4WYG reports a big list of stations qualifying for FPTN net certificates: W4DDW W4DTS WA4EIC K4EJW WA4EYU WA4HHC W4IAD WA4IWW K4KIC W4KMN WA4NBE K4SJA. Earn ing SWFTN certificates were WA4BYT K4ENA WA4JWW W4NNW K4SSO WB2CMR K4DPY and K4IRT. Con gratulations to all. Traffic: K4TH 524, W4MEE 491 K4SCL 444, WA4PFK 324, WB4WYG 323, WD4COL 301 WA4GYR 242, K4EUK 240, WA4LGT 212, WB4FVV 210 WA4NBE 205, WA4FKE 187, K4ZK 163, W4GPL 154 W4NTE 151, WD4ISN 147, N4KB 139, W4YCL 137 WA4SCK 125, WA4EIC 109, WB4PIB 109, WB4AID 100 W4KGJ 90, WA4RLV 78, W4IRA 61, WB4CDQ 53, K4YX 52, W4AZJ 44, WB4NJU 44, K8PXM 40, W4IYT 38 W4KMN 33, K4WYN 31, W4WYR 31, N4AUO 29, WA4HXL 27, WB4SNX 27, K4SJH 23, K4BLM 18, W4SMK 17 WA4MJT 16, WD4BAJ 15, WA4BYT 12, K4GRM 9, N4TW 4, WB4GSV 2, WB4DWU 1, N4XR 1.

WEST INDIES: SCM, Jose R. Lebron, KP4JL — Recently two meter activity has decreased all the repeaters are working fine, we invite all hams to continue using this band. The local FCC office has modified the amateur ex aminations schedule. I suggest you make an appoint ment if you plan to travel from the center part of the island. The three Novice courses now taking place are almost finished, about 60 new hams will be on the air very shortly. We invite you to encourage them to update and to join the League. KP4AM installed monobanders WB4AIK upgraded to Technician. WP4AAZ now KP4AL. See you in the Hamfest.

SOUTHWESTERN DIVISION

ARIZONA: SCM, Marshall Lincoln, W7DQS — NMs W7UOQ WA7KQE W7EP. New club officers reported by early Feb. are: OPRC — N7EH, pres.; AC7D, vice-pres. W7UV, secy.; WA7KEF, treas. Tucson Repeater Assn. — W7UV, pres.; N7KI, vice-pres.; WA7RWY, secy.; N7EH treas. Ariz. ARC — K7WMG, pres.; WA7VWG, vice-pres. N7AIY, secy.; WA7LVA, treas. Scottsdale ARC — WB7PXP, pres.; WB7TJV, vice-pres.; WB7PXL, secy. WB7BQ, treas. Silent Keys reported are WA7YWZ WB7DCO, WB7ONM and WA7KKE. The Hualapai ARC reports working on a RACES communications van issued by the Mohave County Emergency Services organization. Much more SET activity was reported this year than for many previous years. Congratulations to all for your interest and enthusiasm. W7DQS wishes to thank all individuals and organizations who have helped me during my tenure as SCM, and wish to best of suc cess to my successor. All reports beginning Apr. should be sent to the new SCM. Thanks to the few clubs who have kept me posted on your activities. I urge ALL clubs and active ham groups to send newsletters and other reports to your new SCM. Nets (Jan.): SWN 262 ATEN 155 (Dec.): Cactus 254. Traffic: (Jan.) W7EP 407 K7MC 144, WB7TPY 86, K7UXB 79, K7NTG 66, K7CG 60 WA7KQE 50, W7DQS 32, K7NMO 31, WA7WEB 23, AC7C 23, N7EH 20, WA7NXL 16, K7JKM 7. (Dec.) W7EP 591.

LOS ANGELES: SCM, Perry Masterson, W6RHS — Th Radio clubs are responding well to my plea for reports This month we heard from the Northrop club and the ATV club in addition to the usual group. Tnx for the response. W6CK and XYL traveled for 4 months last summer. Enroute north to Alaska, they were guests of the Portland chapter of the Morse Club. Then to Den mark, Norway, Sweden, Finland and Russia, both ways via the Queen Elizabeth 2. Upon their return, they were guests of the Atlanta chapter. As President of the So Cal Chapter, he advises that many prominent hams will be among the 150 persons expected to attend its 197 meeting in Pasadena, April 28. N6PZ has added an HQ- Hybrid Quad to his Stn. He reports it works very well K6ASK is still working with the Boy Scout program K5DY/6 reports heavy SET traffic. SCN needs more pa ticipation from the LA section. For newcomers, th SCN/2 is a 13 wpm only session. The URAC is gearing u to supply kits to IARU for their project goodwill. W6INI reports DXing good. He has added 4 new countries Also, lots of traffic for SET. W6RIQ is having a good tim on 10-meter AM (double sideband with carrier).

Net	Time	Freq.
SCN/1	0230 UTC	3598 kHz
SCN/2	0430 UTC	3598 kHz (13 wpm)
SCN/VHF	0500 UTC	147.045/147.645 MHz
RN6D	2030 UTC	7275 kHz

Try your luck and skill on the above listed nets. Becom a good traffic handler. The OQs have been active again We have a good group in the Section. They are doing a FB job. We had good SET response this year. I will mak a separate report to HQ for inclusion in QST. Traffic K5DY/6 266, W6INH 234, W6OEO 149, N6PZ 113, K6E 71, W6QAE 50, N6HE 43, WB6YID 32, W6BWG 2 W6BRO 16, K6CL 6, WB6AIT 2.

ORANGE: SCM, Fred Heyn, WA6WZO — ASCM K6KNC. SEC: AE6N. STM: WB6DAB. NMs: WB6AK W6CPB & K6JT. ECs: WB6ARK W6DQR K6GGS W6LK WA6PLZ W6SQE & W6WPP. Thanks to all who pa

TUFTS RADIO

STOCKS **Vhf engineering** PRODUCTS

SAME DAY SHIPMENT ON MOST ORDERS

RECEIVERS

RX28C	28-35 MHz FM receiver with 2 pole 10.7 MHz crystal filter	$ 64.95
RX28C W/T	same as above wired & tested	129.95
RX50C Kit	30-60 MHz rcvr w/2 pole 10.7 MHz crystal filter	64.95
RX50C W/T	same as above wired & tested	129.95
RX144C Kit	140-170 MHz rcvr w/2 pole 10.7 MHz crystal filter	74.95
RX144C W/T	same as above-wired & tested	131.95
RX220C Kit	210-240 MHz rcvr w/2 pole 10.7 MHz crystal filter	74.95
RX220C W/T	same as above-wired & tested	131.95
RX432C Kit	432 MHz rcvr w/2 pole 10.7 MHz crystal filter	84.95
RX432C W/T	same as above-wired & tested	142.95

RXCI	accessory filter for above receiver kits gives 70 dB adjacent channel rejection	9.95
RF28 Kit	10 mtr RF front end 10.7 MHz out	13.50
RF50 Kit	6 mtr RF front end 10.7 MHz out	13.50
RF144D Kit	2 mtr RF front end 10.7 MHz out	18.50
RF220D Kit	220 MHz RF front end 10.7 MHz out	18.50
RF432 Kit	432 MHz RF front end 10.7 MHz out	29.50
IF 10.7I Kit	10.7 MHz IF module includes 2 pole crystal filter	29.50
FM455 Kit	455 KHz IF stage plus FM detector	18.50
AS2 Kit	audio and squelch board	16.00

TRANSMITTERS

TX50 Kit	transmitter exciter, 1 watt, 6 mtr	44.95
TX50 W/T	same as above-wired & tested	71.95
TX144B Kit	transmitter exciter-1 watt-2 mtrs	34.95
TX144B W/T	same as above-wired & tested	65.95
TX220B Kit	transmitter exciter-1watt-220 MHz	34.95

TX220B W/T	same as above-wired & tested	65.95
TX432B Kit	transmitter exciter 432 MHz	49.95
TX432B W/T	same as above-wired & tested	87.95
TX150 Kit	300 milliwatt, 2 mtr transmitter	24.95
TX150 W/T	same as above wired & tested	43.95

POWER AMPLIFIERS

PA2501H Kit	2 mtr power amp-kit 1w in-25w out with solid state switching, case, connectors	69.95
PA4010H Kit	2 mtr power amp-10w in-40w out-relay switching	69.95
PA50/25 Kit	6 mtr power amp, 1w in, 25w out, less case, connectors & switching	59.95
PA144/15 Kit	2 mtr power amp-1w in-15w out-less case, connectors and switching	49.95
PA144/25 Kit	same as PA144/15 kit but 25w	59.95
PA220/15 Kit	similar to PA144/15 for 220 MHz	49.95
PA432/10 Kit	power amp-similar to PA144/15 except 10w and 432 MHz	59.95

Blue Line ... RF power amp, wired & tested, emission-CW-FM-SSB/AM

Model	Band	Power Input	Power Output	
BLC 10/70	144 MHz	10W	70W	149.95
BLC 2/70	144 MHz	2W	70W	174.95
BLC 10/150	144 MHz	10W	150W	269.95
BLC 30/150	144 MHz	30W	150W	249.95
BLD 2/60	220 MHz	2W	60W	189.95
BLD 10/60	220 MHz	10W	60W	169.95
BLD 10/120	220 MHz	10W	120W	269.95
BLE 10/40	420 MHz	10W	40W	159.95
BLE 2/40	420 MHz	2W	40W	189.95
BLE 10/80	420 MHz	10W	80W	289.95

POWER SUPPLIES

PS15C Kit	15 amp-12 volt regulated power supply w/case, w/fold-back current limiting and overvoltage protection	99.95
PS15C W/T	same as above-wired & tested	134.95
PS25C Kit	25 amp-12 volt regulated power supply w/case, w/fold-back current limiting and overvoltage protection	139.95
PS25C W/T	same as above-wired and tested	169.95
PS25M Kit	same as PS25C with meters	159.95

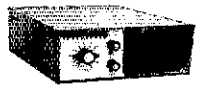
PS25M W/T	same as above-wired and tested	189.95
O.V.P.	adds over voltage protection to your power supplies, 15 VDC max.	14.95
PS3A Kit	12 volt-power supply regulator card with fold-back current limiting	11.95
PS3012 W/T	new commercial duty 30 amp 12 VDC regulated power supply w/case, w/fold-back current limiting and overvoltage protection	274.95

REPEATERS

RP150 Kit	repeater-6 meter (less crystals)	599.95
RP150 W/T	repeater-6 meter, wired & tested	899.95
RP144 Kit	repeater-2 mtr-15w-complete (less crystals)	599.95
RP220 Kit	repeater-220 MHz-15w complete (less crystals)	599.95
RP432 Kit	repeater-10 watt-432 MHz (less crystals)	649.95
RP144 W/T	repeater-15 watt-2 mtr	899.95
RP220 W/T	repeater-15 watt-220 MHz	899.95
RP432 W/T	repeater-10 watt-432 MHz	949.95

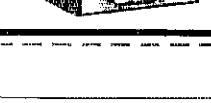
DPLA50	6 mtr close spaced duplexer	680.00
DPLA144	2 mtr, 600 KHz spaced duplexer, wired and tuned to frequency	409.95
DPLA220	220 MHz duplexer, wired and tuned to frequency	409.95
DPLA432	rack mount duplexer	379.95
DSC-D	double shielded duplexer cables with PL259 connectors (pr.)	29.95
DSC-N	same as above with type N connectors (pr.)	34.95

TRANSCEIVERS



TRX50 Kit	Complete 6 mtr FM transceiver kit, 20w out, 10 channel scan with case (less mike and crystals)	259.95
TRX144 Kit	same as above, but 2 mtr & 15w out	259.95
TRX220 Kit	same as above except for 220 MHz	259.95
TRX432 Kit	same as above except 10 watt and 432MHz	284.95
TRC-1	transceiver case only	34.95
TRC-2	transceiver case and accessories	54.95

SYNTHESIZERS



SYN II Kit	2 mtr synthesizer, transmit offsets programmable from 100 KHz-10MHz, (Mars offsets with optional adapters)	169.95
SYN II W/T	same as above-wired & tested	239.95
SYN 220 Kit	same as SYN II Kit except 220-225 MHz	169.95
SYN 220 W/T	same as above-wired & tested	239.95

OTHER PRODUCTS BY VHF ENGINEERING

CD1 Kit	10 channel receive xtal deck w/diode switching	$ 8.95
CD2 Kit	10 channel xmit deck w/switch and trimmers	16.95
CD3 Kit	UHF version of CD1 deck, needed for 432 multi-channel operation	14.95
COR2 Kit	carrier operated relay	23.95
SC3 Kit	10 channel auto-scan adapter for RX with priority	21.95
CWID Kit	159 bit, field programmable, code identifier with built-in squelch tail and ID timers	42.95
CWID	wired and tested, not programmed	59.95
CWID	wired and tested, programmed	64.95
TD3 Kit	2 tone decoder	39.95
TD3 W/T	same as above-wired & tested	64.95
HI 144 W/T	4 pole helical resonator, wired & tested, swept tuned to 144 MHz ban	34.95
HI220 W/T	same as above tuned to 220 MHz ban	34.95
HI432 W/T	same as above tuned to 432 MHz ban	34.95

Name _____ Call _____

Address _____

City _____ State _____ Zip _____

Order _____

☐ Check enclosed ☐ Visa ☐ Master Charge ☐ American Express

Credit Card No. _____

Signature _____ Card expiration date _____

Prices FOB Medford MA. MA residents add 5% sales tax.

Minimum $3.00 for shipping & handling on ALL ORDERS.

TUFTS

RADIO ELECTRONICS

209 Mystic Avenue
Medford MA 02155
1-800-225-4428
Mass. residents only
(617) 395-8280

OPEN DAILY 9-9 SATURDAY 9-6

hamtronics, inc.

OSCAR HEADQUARTERS

★ **Quality VHF & UHF Kits At Affordable Prices**

SSB TRANSMITTING CONVERTERS

FEATURES:

- Linear Converter for SSB, CW, FM, etc.
- A fraction of the price of other units
- 2W p.e.p. output with 1 MW of drive
- Use low power tap on exciter or attenuator pad
- Easy to align with built-in test points

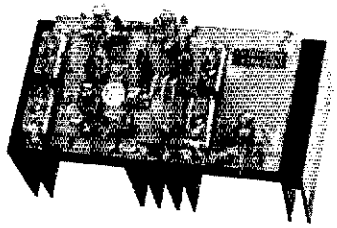
Frequency Schemes Available:

MODEL	INPUT (MHz)	OUTPUT (MHz)
XV2-1	28-30	50-52
XV2-2	28-30	220-222
XV2-3	28-30	222-224
XV2-4	28-30	144-146
XV2-5	28-29	145-146
XV2-6	26-28	144-146

ONLY $59.95!

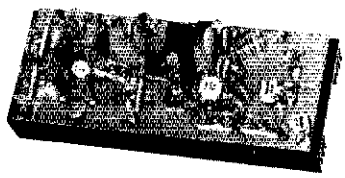
VHF Linear PA's

- Use as Linear or Class C PA's
- For XV-2 Xmtg Converters, T50 Exciters, or any 2W Exciter



LPA 2-15 Kit $59.95

- 15W out (linear) or 20W (class C)
- Solid State T/R Switching
- Models for 6M, 2M, or 220 MHz



LPA 2-45 Kit $109.95

- 45W out (linear) or 50W (class C)
- Models for 6M or 2M

LPA 8-45 Kit $89.95

For 2M, 8-10W in, 45W out

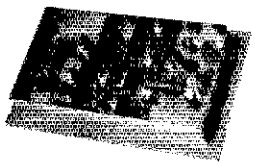
T80 UHF POWER AMP

- Broadband PA
- No Tuning Required
- Class C PA
- 430-470 MHz
- 13-15W Out
- 200 mW Drive

Model T80-450
$79.95
Wired & Tested

VHF RECEIVING CONVERTERS

LET YOU RECEIVE OSCAR AND OTHER EXCITING SIGNALS ON YOUR PRESENT HF RECEIVER!



MODEL	RF RANGE	I-F RANGE
C28	28-32MHz	144-148MHz
C50	50-52	28-30
C144	144-146	28-30
C145	145-147	28-30
C146	146-148	28-30
C110	Aircraft	26-30
C220	220-222	28-30
C222	222-224	28-30
Special	Inquire About Other Ranges	

ONLY $34.95

UHF RECEIVING CONVERTERS

MODEL	RF RANGE	I-F RANGE
C432-2	432-434	28-30MHz
C432-4	432-436	144-146
C432-5	435-437	28-30
C432-7	427.25	61.25
C432-9	439.25	61.25
Special	Inquire About Other Ranges	

ONLY $34.95

A9 Extruded Alum Case with BNC's for above Converters (Optional) ... $12.95

VHF&UHF FM RECEIVERS

- *NEW GENERATION RECEIVERS
- *MORE SENSITIVE *MORE SELECTIVE (70 or 100 dB)
- *COMMERCIAL GRADE DESIGN
- *EASY TO ALIGN WITH BUILT-IN TEST CKTS
- *LOWER OVERALL COST THAN EVER BEFORE

R70 6-channel VHF Receiver Kit for 2M, 6M, 10M, 220 MHz, or com'l bands..... $69.95
Optional xtal filter for 100 dB adj chan 10.00

R90 UHF Receiver Kit for any 2 MHz segment of 380-520 MHz band..... $89.95

FAMOUS HAMTRONICS PREAMPS let you hear the weak ones!

Great for OSCAR, SSB, FM, ATV. Over 10,000 in use throughout the world on all types of receivers.

P9 Kit $12.95
P14 Wired $24.95

Specify Band When Ordering

- Deluxe vhf model for applications where space permits
- 1-1/2 x 3"
- Models avail to cover any 4 MHz band in the 26-230 MHz range
- 12 Vdc
- 2 stages
- Ideal for OSCAR
- 20 db gain
- Diode transient protection
- Easily tunable

P8 Kit $10.95
P16 Wired $21.95

Specify Band

- Miniature vhf model for tight spaces - size only 1/2x2-3/8
- Models avail to cover any 4 MHz band in the range 20-230 MHz
- 20 db gain
- 12V

P15 Kit $18.95
P35 Wired $34.95

- Covers any 6 MHz band in UHF range of 380-520 MHz
- 20 dB gain
- 2 stages
- Low noise

NEW FM/CW EXCITER KITS

BUILD UP YOUR OWN GEAR FOR MODULAR STATIONS, REPEATERS, & CONTROL LINKS

- Rated for Continuous Duty
- Professional Sounding Audio
- Built-In Testing Aids

T50 Six Channel, 2W Exciter for 2M, 6M, or 220 MHz (Specify band)..... $49.95

T50U Six Channel, 1W Exciter for 430-450 MHz uhf operation $49.95

▶Ask For Free Catalog◀

IT'S EASY TO ORDER!

CALL OR WRITE **NOW** FOR **FREE** CATALOG OR TO PLACE ORDER!

PHONE 716-392-9430. (Electronic answering service eves & weekends)

Use credit card, c.o.d., check, m.o.

Add $2.00 shipping & handling.

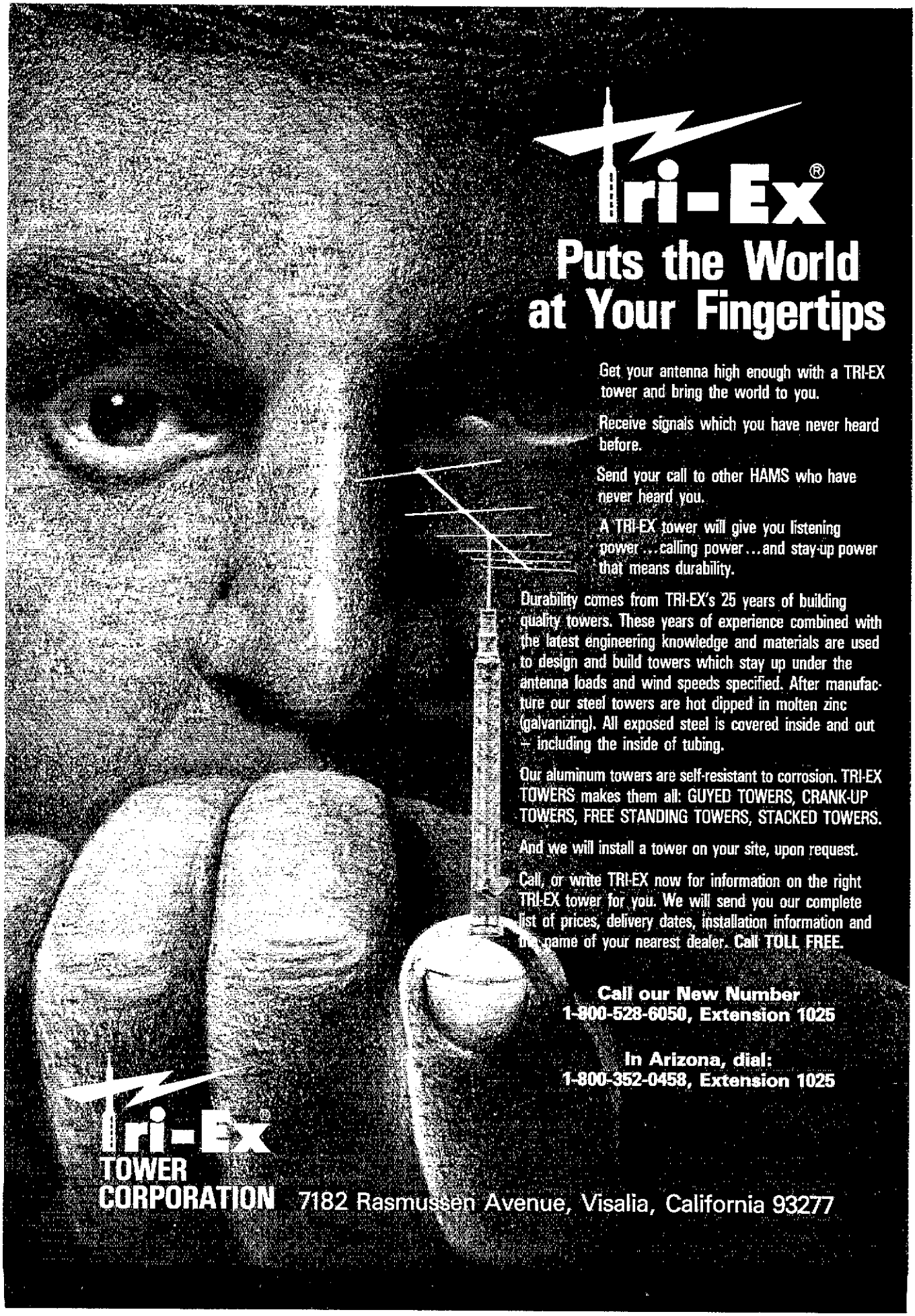
IN CANADA, order from Communications Plus, 3680 Cote Vertu; St-Laurent, Quebec or phone 514-337-7255. Add 38% to cover duty, tax, and exchange.

Note New Address and Phone No.

hamtronics, inc.

65B MOUL RD · HILTON, NY 14468

--Dealer Inquiries Invited--


Tri-Ex®
Puts the World
at Your Fingertips
Get your antenna high enough with a TRI-EX tower and bring the world to you.
Receive signals which you have never heard before.
Send your call to other HAMS who have never heard you.
A TRI-EX tower will give you listening power...calling power...and stay-up power that means durability.
Durability comes from TRI-EX's 25 years of building quality towers. These years of experience combined with the latest engineering knowledge and materials are used to design and build towers which stay up under the antenna loads and wind speeds specified. After manufacture our steel towers are hot dipped in molten zinc (galvanizing). All exposed steel is covered inside and out – including the inside of tubing.
Our aluminum towers are self-resistant to corrosion. TRI-EX TOWERS makes them all: GUYED TOWERS, CRANK-UP TOWERS, FREE STANDING TOWERS, STACKED TOWERS.
And we will install a tower on your site, upon request.
Call, or write TRI-EX now for information on the right TRI-EX tower for you. We will send you our complete list of prices, delivery dates, installation information and the name of your nearest dealer. Call TOLL FREE.
Call our New Number
1-800-528-6050, Extension 1025
In Arizona, dial:
1-800-352-0458, Extension 1025
Tri-Ex
TOWER
CORPORATION
7182 Rasmussen Avenue, Visalia, California 93277

ticipated in making SET in Jan. the biggest and best yet. AE6N plans to have another EC meeting this year to asses this last SET and to plan for the next one to be held later this year in Oct. WB6DAB has moved to Wyo.; he will be hard to replace as STM. New appointments are OTSs: WA6PEE WA6OCA and WB6QBZ; OOs: W6TIO and N6PE; and OBS: N6AIW. Congrats to N6PE for winning the plaque in the Delta QSO Party. For preregistration including the banquet for the SW ARRL convention (to be held Oct. 19-21 at the Sheraton-Anaheim Hotel) send (before Sept. 15) a $17 check made out to Hamcon Inc., P.O. Box 1227, Placentia, CA 92670. The OC Council of ARO elected WA6LFF as Chmn. and KA6DLG as secy. Top officers for 1979 of the Lee De Forest RC (in Hemet) are WA6UVF pres.; N6BAE, vice-pres.; W6OB, secy-treat. Anaheim ARA and K6KNC, pres.; WB6QVY, vice-pres.; K6TWK, rec. secy.; K6QJ, corr. secy.; WB6SKE, treas. Barstow ARC are WD6DEY, pres.; W6HUG, vice-pres.; WB6KHK, secy.-treas. The Fullerton ARC presented the St. Jude Hosp. & Rehabilitation Center ARC $100 for its outstanding program which includes the club's station of WD6BPT. Anyone interested in direction finding including T-hunting on 40 and 80 meters please call (549-8516) or write to SCM. Anyone interested in becoming a volunteer FCC examiner (for special handship cases) contact W6IBR who has done so; also if you think you are in need of one please contact WA6RNA. Traffic: WB6EIG 514, WB6OBZ 173, WB6BZZ 140, AE6N 132, W6NTN 118, K6GGS 100, WA6QCA 93, W6RE 75, WA6TLE 49, K6WI 42, K6XI 35, W6CPB 29, WB6AHK 19, WA6PEE 15, WB6ULU 10, WA6WZO 6, WB6AKR 1.

SAN DIEGO: SCM, Arthur R. Smith, W6INI — The Palomar ARC repeater, 146.13/73, provided communications for the County Office of Disaster Preparedness during floods in late Jan. The club has organized a rainfall reporting net under the supervision of WB6HMY to assist the local NWS. If you are interested in message traffic try the Palomar repeater, 146.13/73 any evening at 2030 PT. W6JSL and K6HAV give instruction to beginners. N6GW has been apptd STM. Gordon is highly experienced in this field. WA6UAZ has been apptd NM for SCN/VHF net on the Laguna Beach repeater 147.045/645 meeting nightly at 2100 PT. 1979 club officers: So. Bay ARS WA6SJX, pres.; WB6SIS, vp; WD6AUU, secy.; WD6CSS, treas. TelCo Club WB6IGP, pres.; WA6RYZ, vp; WA6WVR, secy-treas. AA6EE placed first in CA in the 4th Dist QSO party. Upgraded to Tech WA6VMO. New Novice is KA6EKH. WA6KEW reports that Imperial Valley ARA had successful auction in Jan. The S.D. Police Dept has asked amateurs to participate in their Community Radio Watch. First to work 100 200-MHz stns in the 220 Club contest is W6SLF followed by W6GIC and W6KBD. Traffic: (Jan.) WB6PVH 451, WA6UAZ 383, WA6AMK 344, N6GW 213, WB6HMY 198, WA6ZZL 91, K6HAP 76, N6RD 66, N6AT 63, WA6SKU 63, WA6UFY 40, W6HUJ 27, WB7SUA 19, W6UQF 10, WA6HJJ 8. (Dec.) WA6AMK 637, N6GW 335, N6BB 4.

SANTA BARBARA: SCM, D. Paul Gagnon, N6MA — SEC: W6RIC. STM: N6WP. Ventura Cty ARC K6VMN, pres.; WB6GNS, vp; N6AFI, treas.; WD6BCN, secy.; Central Coast ARC WB6QMN pres.; W6KCG, vp. Bunker Ramo ARC WB6PLG, pres.; KA6CNR, vp; WA6OMH, treas. "JJ" Secy. Satellite ARC KA6AKC, pres.; K6KVA, vp; WB6OPB, vp; WA6VNO, secy; WD6DSK, treas. Speakers included W6FA at Conejo Valley ARC on Lasers; N6CZ at Ventura Cty ARC on Worldwide travel including the South Pole; and N6MA at Poinsettia ARC on ARRL and local organization. K6MEP active again in Jan. VHF contest from Triumfro Peak and made 18000 points. WA6IJZ K6VMN WA6DJS AC6I WB6GNS N6AFI WA6EVT AG6F and WD6BCN assisted. Santa Barbara and Poinsettia clubs donated funds for purchase of WARC rigs for an underprivileged country. Upgrades: WB6RDV to Advanced, WD6ESU to General and WB6IIY to Extra. N6WP received award for most PSHR points in 1978 (350) and WØKON hax received the award for most traffic points (3579). WØKON made BPL in Jan. for the 3rd month in a row. Buzz is the new mgr. of the Sixth Region Net. WB6JKM and W6ZRR sent 77 bulletins each in Jan. WA6SRJ qualified for DXCC. K6SZS:Edgecom 3000A, N6AMS-Wilson Mark IV, WØKON and N6YH-new Omni's, WB6IIY Classic 33 and 60-ft. tower. The '79 National Convention will be in Baton Rouge July 20-22. For info write Box 891. WB6EQB named Commanding Officer of his Navy Reserve Unit. Thanks to all who participated in SET. PSHR: N6WP 46, K6YD 13, WD6EEN 49, N6GC 41, N6YH 23, WA6LBO 42, N6MA 29. Traffic: (Jan.) WØKON 713, N6WP 276, N6MA 107, N6YH 105, WA6LBO 60, N6GC 24, WD6EEN 23, K6YD 21, W6POU 14, NØFB 2, WB6JKM 2. (Dec.) K5BNH 372.

WEST GULF DIVISION:

NORTHERN TEXAS: SCM, Ted Helthecker, W5EJ — As of April 1, 1979, your new SCM is Phil Clements, K5PC; 1313 Applegate Lane; Lewisville, TX 75067 Tel. (214) 221-2222. Please address all monthly rpts and all other correspondence to him. A new club formed in Dallas; the Dallas Microprocessor Group-hams who are into computer application and experimentation. You can find them on the 90/30 rptr. SET was the biggest success ever, with a terrific turnout all over the Section. There will be a picnic at Tyler State Park on May 5th Tyler, TX for the Central Gulf Coast Hurricane Net/southwest Tfc Net members. Hosts are K5QOW and AJ5F. Openings in San Angelo and Midland/Odessa areas for an Emergency Coordinator. Your help desperately needed! Tornado and flood season is upon us. Is your emergency and portable equip. up to snuff?! Are your records up-to-date with your local EC? Have you reviewed your local and Section Emergency plan? PSHR for Jan. WB5SDD AA5J WB6LAT W5VMP AF5I AJ5F K5SOR. BPL for Jan. W5TI WB5SDD W5FC K5OUK. Tfc. totals for the Section in Jan. was 4282 points, a modern day record, but not near the amount we really handled. Please report any tfc you handle to K5PC via TTN or TEX by the 5th of each month so that we may receive our just credit for the dedication of the ops that perform this worthy public service. Traffic: (Jan.) W5TI 597, WB5SDD 592, W5FC 390, AA5J 376, K5PC 262, K5OUK 255, WD5HHK 229, AJ5F 196, N5CY 177, K5MC 171, WB5LAT 160, WA5INJ 108, WA5ZNZ 106, N5BT 101, W5VMP 87, WA5NSJ 63, K5SOR 61, AE5I 53, WA5UOC 46, WB5JCT 33, N5WB 28, K5DOI 26, WB5UHO 24, W5CTZ 22, WA5EZT 22, WB5DMR 20, AE5U 18, K5QKM 17, W5YK 12, N5FL 4, K5HSZ 4, KB5GU 4. (Dec.) W5SHN 476, WB5RPU 61, N5BT 8.

OKLAHOMA: SCM, Leonard Hollar, WA5FSN — Jan. reflected more traffic handled by OK stations than in '77 or '78. WB5MVR made BPL. Jim has been helping the 5th district QSL bureau and doing FB. Ardmore Red Cross Awards dinner was interrupted by a real emergency lasted more than 24 hours. More later on this. OFOON had largest average daily participation, while Sooner

NEW MFJ-962 1.5 KW Versa Tuner III

For $159.95 you can run up to 1.5 KW PEP and match everything from 1.8 thru 30 MHz: coax, balanced line, random wire. Built-in balun. SWR, dual range forward and reflected power meter. Flexible six position antenna switch. Outstanding value.

FREE MFJ LOGBOOK . . .

Just ask your MFJ dealer to demonstrate these 1.5 KW Versa Tuner IIIs. Logbook quantities are limited.

$159.95

The NEW MFJ-962 1.5 KW Versa Tuner III lets you run up to 1.5 KW PEP and match any feedline continuously from 1.8 to 30 MHz: coax, balanced line or random wire.

This gives you maximum power transfer to your antenna for solid QSO's and attenuates harmonics to reduce TVI and out-of-band emission.

An accurate meter gives SWR, forward, reflected power in 2 ranges (2000 and 200 watts).

A flexible six position antenna switch lets you select 2 coax lines thru tuner or direct, or random wire and balanced line.

A new all metal, low profile cabinet gives you RFI protection, rigid construction, and sleek styling. Black finish. Black front panel has reverse lettering. 5x14x14 inches. A flip down wire stand tilts tuner for easy viewing.

Efficient, encapsulated 4:1 ferrite balun. 500 pf, 6000 volt capacitors, 12 position inductor. Ceramic rotary switch. 2% meter.

Built-in quality. Every single unit is tested for performance and inspected for quality. Solid American construction, quality components. One year limited warranty.

For your nearest MFJ dealer, call toll-free 800-647-1800. Stop by your dealer. Compare it feature for feature with other tuners. Compare its value, its quality and its performance.

After a truly side by side comparison, you'll be convinced that its value, quality and features make it a truly outstanding value.

Why not visit your dealer today? If no dealer is available order direct from MFJ.

MFJ-961 1.5 KW VERSA TUNER III has balun, six position antenna switch. Matches coax, balanced line, random wire, from 1.8 to 30 MHz.

6 position antenna switch lets you select 2 coax lines thru tuner or direct, or random wire and balanced line.

$139.95

The MFJ-961 1.5 KW Versa Tuner III gives you a flexible six position antenna switch. It lets you select 2 coax lines thru tuner or direct, or random wire and balanced line.

Run 1.5 KW PEP. Match any feedline from 1.8 to 30 MHz: coax, balanced line, random wire.

Gives maximum power transfer. Harmonic attenuation reduces TVI, out of band emissions.

Black all metal cabinet. Black front panel has reverse lettering. Flip down wire stand tilts tuner. 5x14x14 inches.

Encapsulated 4:1 ferrite balun. 500 pf, 6000 volt capacitors, 12 position inductor, ceramic switches. SO-239s, ceramic feedthrus. One year limited warranty.

Every single unit is tested for performance and inspected for quality. Solid American construction, quality components.

For your nearest MFJ dealer, call toll-free 800-647-1800. Visit your dealer and compare. You'll find real value.

Why not see the NEW MFJ-961 1.5 KW Versa Tuner III at your dealer's today? If no dealer is available order direct from MFJ.

FOR YOUR NEAREST DEALER OR FOR ORDERS

CALL TOLL-FREE 800-647-1800

Order any product from MFJ and try it. If not delighted, return within 30 days for a prompt refund (less shipping).

Order today. Money back if not delighted. One year limited warranty. Add $8.00 shipping/handling.

For technical information, order/repair status, in Mississippi, outside continental USA, call 601-323-5869.

Order By Mail or Call TOLL FREE 800-647-1800 and Charge It On VISA master charge

MFJ ENTERPRISES, INC.

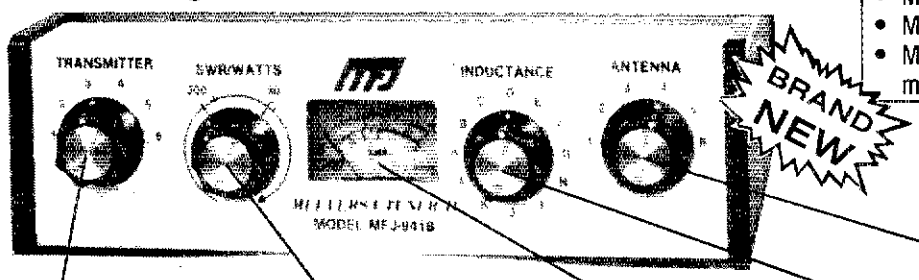
P. O. BOX 494
MISSISSIPPI STATE, MISSISSIPPI 39762

This NEW MFJ Versa Tuner II . . .

has SWR and dual range wattmeter, antenna switch, efficient airwound inductor, built in balun. Up to 300 watts RF output. Matches everything from 1.8 thru 30 MHz: dipoles, inverted vees, random wires, verticals, mobile whips, beams, balanced lines, coax lines.

MFJ LOWER PRICES!

NEW, IMPROVED MFJ-941B HAS . . .
- More inductance for wider matching range
- More flexible antenna switch
- More sensitive meter for SWR measurements down to 5 watts output



NEW LOWER PRICE

$79.95

Transmitter matching capacitor. 208 pf. 1000 volt spacing.

Sets power range, 300 and 30 watts. Pull for SWR.

Meter reads SWR and RF watts in 2 ranges.

Efficient airwound inductor gives more watts out and less losses.

Antenna matching capacitor. 208 pf. 1000 volt spacing.

Only MFJ gives you this MFJ-941B Versa Tuner II with all these features at this price:

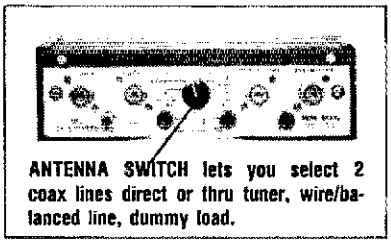
A SWR and dual range wattmeter (300 and 30 watts full scale) lets you measure RF power output for simplified tuning.

An antenna switch lets you select 2 coax lines direct or thru tuner, random wire/balanced line, and tuner bypass for dummy load.

A new efficient airwound inductor (12 positions) gives you less losses than a tapped toroid for more watts out.

A 1:4 balun for balanced lines. 1000 volt capacitor spacing. Mounting brackets for mobile installations (not shown).

With the NEW MFJ Versa Tuner II you can run your full transceiver power output — up to 300 watts RF power output — and match your transmitter to **any** feedline from 160 thru 10 Meters whether you have coax cable, balanced line, or random wire.



ANTENNA SWITCH lets you select 2 coax lines direct or thru tuner, wire/balanced line, dummy load.

You can tune out the SWR on your dipole, inverted vee, random wire, vertical, mobile whip, beam, quad, or whatever you have.

You can even operate all bands with just one existing antenna. No need to put up separate antennas for each band.

Increase the usable bandwidth of your mobile whip by tuning out the SWR **from inside your car.** Works great with all solid state rigs (like the Atlas) and with all tube type rigs.

It travels well, too. Its ultra compact size 8x2x6 inches fits easily in a small corner of your suitcase.

This beautiful little tuner is housed in a deluxe eggshell white Ten-Tec enclosure with walnut grain sides.

SO-239 coax connectors are provided for transmitter input and coax fed antennas. Quality five way binding posts are used for the balanced line inputs (2), random wire input (1), and ground (1).

NEW 300 WATT MFJ VERSA TUNER II'S: SELECT FEATURES YOU NEED.

NEW MFJ-945 HAS SWR AND DUAL RANGE WATTMETER. NEW LOWER PRICE

$69.95

Same as MFJ-941B but less 6 position antenna switch.

NEW MFJ-944 HAS 6 POSITION ANTENNA SWITCH ON FRONT PANEL.

$69.95 NEW LOWER PRICE

Same as MFJ-941B but less SWR/Wattmeter.

NEW MFJ-943 MATCHES ALMOST ANYTHING FROM 1.8 THRU 30 MHz.

$59.95 NEW LOWER PRICE

Same as MFJ-941B, less SWR/Wattmeter, antenna switch, mounting bracket. 7x2x6 in.

ULTRA COMPACT 200 WATT VERSA TUNERS FOR ALL YOUR NEEDS.

MFJ-901 VERSA TUNER MATCHES ANYTHING, 1.8 THRU 30 MHz. NEW LOWER PRICE

$49.95

Efficient 12 position air inductor for more watts out. Matches dipoles, vees, random wires, verticals, mobile whips, beams, balanced lines, coax. 200 watts RF, 1:4 balun, 5x2x6 in.

MFJ-900 ECONO TUNER MATCHES COAX LINES/RANDOM WIRES. NEW LOWER PRICE

$39.95

Same as MFJ-901 but less balun for balanced lines. Tunes coax lines and random lines.

MFJ-16010 RANDOM WIRE TUNER FOR LONG WIRES. NEW LOWER PRICE

$29.95

1.8 thru 30 MHz. Up to 200 watts RF output. Matches high and low impedances. 12 position inductor. SO-239 connectors. 2x3x4 inches. Matches 25 to 200 ohms at 1.8 MHz. Does not tune coax lines.

For Orders Call toll-free 800-647-1800

Order any product from MFJ and try it. If not delighted, return within 30 days for a prompt refund (less shipping).

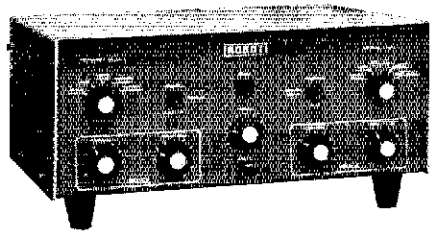
Order today. Money back if not delighted. One year unconditional guarantee. Add $2.00 shipping/handling.

For technical information, order/repair status, in Mississippi, outside continental USA, call 601-323-5869.

Order By Mail or Call TOLL FREE 800-647-1800 and Charge It On VISA MasterCard

MFJ ENTERPRISES, INC. P. O. BOX 494 MISSISSIPPI STATE, MISSISSIPPI 39762

HAM FAMILIES LOVE SSTV



THEY'D RATHER *BE ON* TV THAN WATCHING TV.

Instead of you in the ham shack and your family watching TV, SSTV brings the whole family together. The younger kids like to watch the pictures come in from all over the world, and help the older ones make up all kinds of "TV Programs." And Mom likes having the whole family involved.

IT'S HABIT FORMING.

Once you've set up your SSTV station you'll discover an entire new world of amateur activity and operators! Building your SSTV programs, participating in SSTV nets, working with over 13,000 SSTV stations all over the world! SSTV is fascinating, fun, and habit forming.

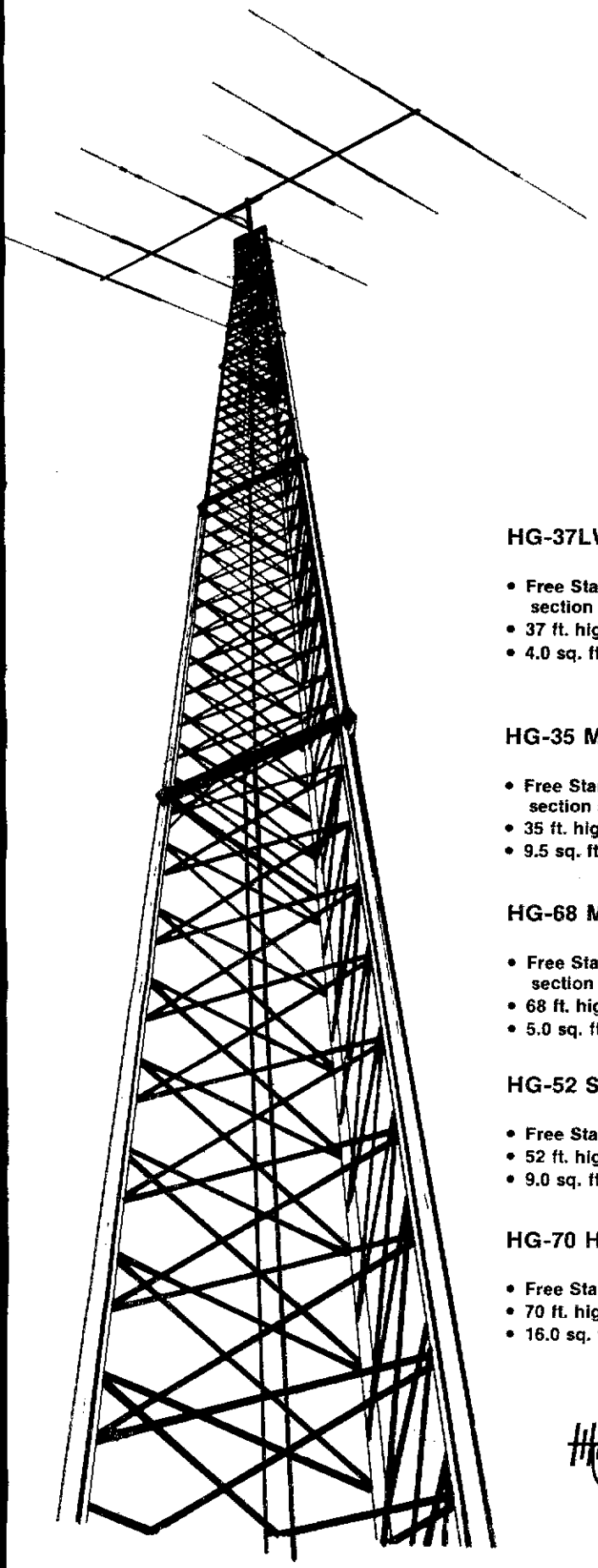
THE ROBOT 400 SCAN CONVERTER MAKES IT EASY.

Just plug the Robot 400 into your existing station and connect it to your home TV set with a Robot RF Adaptor kit, and you're ready to receive SSTV pictures. Add a CCTV camera and you've got a complete transmitting and receiving SSTV station. That's all there is to it.
See a SSTV demonstration at your Robot dealer today.

ROBOT

ROBOT RESEARCH, INC.
7591 Convoy Court, San Diego, CA 92111, (714) 279-9430

Write for our SSTV Fact Pack and the name of your nearest dealer.



Crank-ups™

We've given you the best antenna on the market. Now put it on the best tower. The name Hy-Gain says quality ...need we say more?

HG-37LWCB

- Free Standing Crank-Up with lower section secured to building
- 37 ft. high
- 4.0 sq. ft. of Antenna Area

HG-33 MT2

- Free Standing Crank-Up with lower section secured to building
- 33 ft. high
- 8.5 sq. ft. Antenna Area
- 10 ft. sections

HG-35 MT2

- Free Standing Crank-Up with lower section secured to building
- 35 ft. high
- 9.5 sq. ft. Antenna Area

HG-50 MT2

- Free Standing Crank-Up with lower section secured to building
- 50 ft. high
- 8.6 sq. ft. Antenna Area

HG-68 MT2

- Free Standing Crank-Up with lower section secured to building
- 68 ft. high
- 5.0 sq. ft. Antenna Area

HG-37 SS

- Free Standing Crank-Up
- 37 ft. high
- 9.0 sq. ft. Antenna Area

HG-52 SS

- Free Standing Crank-Up
- 52 ft. high
- 9.0 sq. ft. Antenna Area

HG-54 HD

- Free Standing Crank-Up
- 54 ft. high
- 16.0 sq. ft. Antenna Area

HG-70 HD

- Free Standing Crank-Up
- 70 ft. high
- 16.0 sq. ft. Antenna Area

hy-gain® electronics
DIVISION OF TELEX COMMUNICATIONS, INC.

8601 Northeast Highway 6 • Lincoln, Nebraska 68505 U.S.A.
Telephone: (402) 467-5321 telex: Hygain Lcln a 48-4324

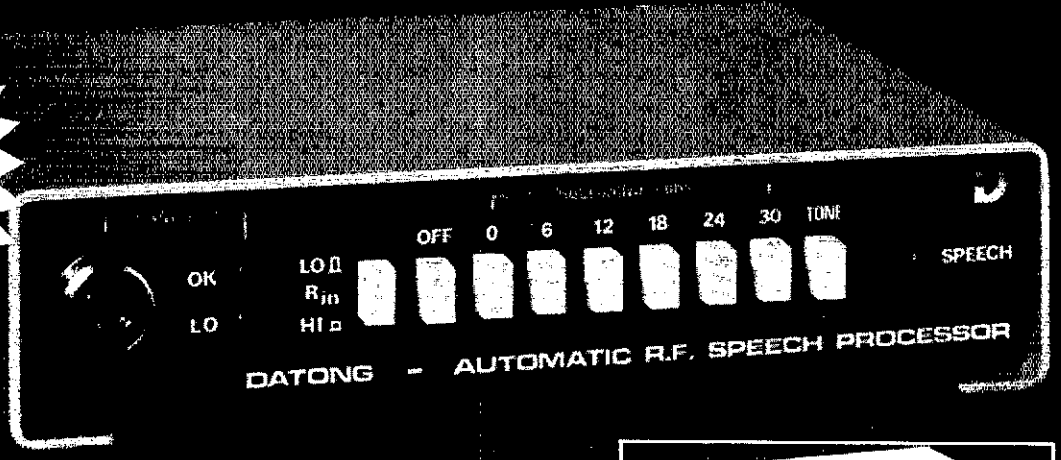
EUROPE: 22, rue de la Légion d'Honneur
93200 Saint-Denis - France

arma

had highest average on daily traffic movement. OLZ *could do with more participation.* Garvin family now 100% licensed, all working traffic. Classes going in Woodward and Moreland, Okla. Repeater Soc. Mid-Winter meeting at Enid well attended. If this organization is to grow and succeed with the goals set for it, it will take the support of all VHF minded (and other) amateurs in OK. This group can do much to promote and assist amateur activity here in the state. A series of 3 excellent articles boosting Amateur Radio in the Enid Morning News weekly magazine section. Thanks to K5CAY for these. Traffic: (Jan.) K5OWK 604, WB5MVR 541, K5JGZ 510, W5REC 352, WB5NKC 305, W5RB 218, WB5KKT 148, WA5MLT 146, WB5NKD 132, WB5EAY 104, WA5OUV 79, W5BYC 76, WB5ELG 73, WB5ULI 53, WA5FSN 49, WB5OCZ 48, WB5QFE 45, W5SUG 45, W5FKL 43, W5UYH 35, K5CAY 33, W5VOR 28, WD5ETB 23, WB5CRX 20, WB5OVT 16, KA5DRD 6, KB5EK 6, WA5UTO 4. (Dec.) WB5KKT 136, WB5OCZ 25, WA5MLT 21, WB5OHK 17, WB5KVA 7.

SOUTHERN TEXAS: SCM, Arthur Ross, W5KR — Asst. SCM: N5TC. SEC: WD5CZI. Net Managers-at-large, WA5RKU. CW: N5TC, phone. OOs rprtg this month: K5MEN WB5CIT K5DL. OVS rprts this month: N5AJQ WB5CIT. TTN Manager K5QEW is new OTS. EC WA5RVT rprts excellent SET with simulated bad weather and tornadoes. OO K5MEN advises visitors to San Antonio to dial 229 1541 for a recording of latest Amateur Radio news and coming events; sponsored by San Antonio Telephone Pioneers ARC. OVS N5AJQ busy with Science Fair project in chemistry. EC W5CKC and OES W5SPD sent in super report for SET, but too long for this column; over 100 Amateurs took part. OTS AE5X reports WB5URV has TRS80 computer on line and operating RTTY on cw. K5ROZ is back on the nets; welcome back, pres. OTS K5WA reports an Amateur Radio Councel in forming stages in the Houston area; says new officers of Texas DX Society are: K5DX, pres; K5MA, vp; K5JS, secy-treas.; also reports he has new antennas for all bands with great improvement over vertical. CHARRO (Brownsville) had successful hamfest in Jan. with over 100 registered; first annual "week-before-superbowl-hamfest" watch for 1980! Info on '79 ARRL National Convention, write P.O. Box 891, Baton Rouge, LA 70821. Traffic: (Jan.) W5KLV 834, N5TC 459, K5HZR 238, W5BGE 167, WB5MMI 154, W5KR 154, K5QEW 84, WA5RVT 65, W5TTW 40, WB5CIT 37, WB5YDD 24, K5ROZ 18, W5BHO 16, AE5X 16, W5SPD 13, WD5IEB 5, K5RVF 4. (Dec.) K5PE 132, AE5X 14, K5WA 8, K5MEN 2.

NEW FROM DATONG! CRACKS PILEUPS!



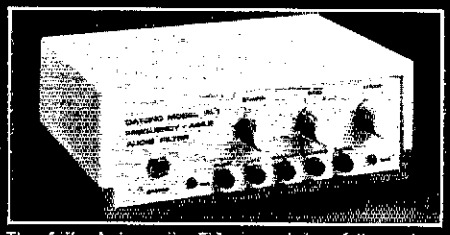
FIRST CAME THE FL1...
NOW, THE ASP...AN AUTOMATIC SPEECH PROCESSOR

ONLY **229.95**

- ONE YEAR WARR.
- Prepaid Shipping
- Prepaid Insurance
- VISA
- MASTERCHARGE

The ASP internally generates its own SSB signal and processes it up to 30 lb.! This Processed signal is demodulated and delivered to your rig's mike input with fully automatic AGC control of both input & output level.

- Installs between mike and transmitter!
- No need to open the rig!
- Push button selection of processing — up to 30 lb!
- Harmonic distortion — less than 0.5% at 1kc.
- Internal tone generator allows easy and accurate initial adjustment — no scope needed.
- Selectable HiZ or LoZ mike input.
- Operates from 12VDC internal or external
- Size 7¼"x6"x13¾".
- For use in PTT (non Vox) operation.



The fully Automatic FL1 state of the art audio filtering from Datong still only **179.95**

FROM YOUR DEALER OR

Dedicated to Excellence

AR Technical Products Corp. (Exclusive Importers of DATONG FL-1's)

Box 62 Birmingham, Michigan 48010
Telephone 313/588-2288

ASSOCIATED RADIO 913-381-5900

8012 CONSER BOX 4327
OVERLAND PARK, KANSAS 66204

CALL US WITH YOUR REQUIREMENTS

AMERICA'S NO. 1 Real Amateur Radio Store

Associated Wants to Trade
Call US
913-381-5900

TRADE BUY SELL

NEW AND RECONDITIONED EQUIPMENT.

NOTE: SEND $1.00 FOR OUR CURRENT CATALOG OF NEW AND RECONDITIONED EQUIPMENT.

★ ALSO WE PERIODICALLY PUBLISH A LIST OF UNSERVICED EQUIPMENT AT GREAT SAVINGS. A BONANZA FOR THE EXPERIENCED OPERATOR.

TO OBTAIN THE NEXT UNSERVICED BARGAIN LIST, SEND A SELF ADDRESSED STAMPED ENVELOPE.

CALL COLLECT NOW
(314) 961-9990

MID COM ELECTRONICS, INC.

2506 S. BRENTWOOD BOULEVARD
ST. LOUIS, MISSOURI 63144
9 to 9 Monday thru Friday
9 to 4 Saturday

CALL NOW FOR THE BEST DEAL EVER ON THE FOLLOWING LINES:

ATLAS, COLLINS, DENTRON, DRAKE, HY GAIN,
ICOM, KENWOOD, MOSLEY, STANDARD, CUSHCRAFT,
SWAN, TELE TOW'R, TEMPO, WILSON, MICROLOG, MFJ
. . . AND MANY MORE.

VISA MasterCharge

'79 ARRL NATIONAL CONVENTION

Baton Rouge, Louisiana

Louisiana Council of Amateur Radio Clubs

INVITES YOU

July 20, 21, 22, 1979

TO

Grandeur on the Mississippi

REGISTRATION DATA FORM

NAME _____ CALL _____

STREET _____

CITY _____ STATE _____ ZIP _____

MAIL TO:
LCARC
Post Office Box 891
Baton Rouge, La. 70821

	Each Person	Number
Pre-registration with Banquet	$23.00	
Pre-registration Only (After July 1 $7.00)	$ 6.00	
XYL/YL Registration ($4.00 After July 1)	$ 3.00	
Fine Tuning	$ 2.50	
Acadiana Tour Before July 1	$15.00	
Plantation Tour Before July 1	$12.50	
RV Space Before July 1 per day	$ 5.00	
Wouff Hong	$ 1.00	
Non Amateur Registration	$ 2.00	

REGISTRATION REQUIRED FOR ALL EVENTS

Ham-Ads

(1) Advertising must pertain to products and services which are related to Amateur Radio.

(2) The Ham-Ad rate is 70 cents per word. A special rate of 25 cents per word applies to hamfest and convention announcements, to individuals seeking to dispose of or acquire personal equipment, and to other advertising which, in our opinion, obviously qualifies for the individual rate.

(3) Remittance in full must accompany copy since Ham-Ads are not carried on our books. Each word, abbreviation, model number, and group of numbers counts as one word. Entire telephone numbers count as one word. No charge for postal Zip code. No cash or contract discounts or agency commission will be allowed. Tear sheets or proofs of Ham Ads cannot be supplied. Submitted ads should be typed or clearly printed on an 8-1/2" × 11" sheet of paper.

(4) Closing date for Ham-Ads is the 20th of the second month preceding publication date. No cancellations or changes will be accepted after this closing date. Example: Ads received March 21 through April 20 will appear in June *QST*.

(5) No Ham-Ad may use more than 100 words. No advertiser may use more than two ads in one issue. A name or call must appear in each ad. Mention of lotteries, prize drawings, games of chance, etc. is not permitted in *QST* advertising.

(6) New "commercial" advertisers must submit a production sample of their product (which will be returned) and furnish a statement in writing that they will respond appropriately to customer complaints and will stand by and support all claims and specifications mentioned in their advertising before their ad can appear.

The publisher of *QST* will vouch for the integrity of advertisers who are obviously commercial in character, and for the grade or character of their products and services. Individual advertisers are not subject to scrutiny.

Clubs/Hamfests

QCWA Quarter Century Wireless Association is an international nonprofit organization founded 1947. Any Amateur Radio Operator licensed 25 or more years is eligible for membership. Members receive a membership call book and quarterly news. Write for information. Q.C.W.A. Inc. 1409 Cooper Drive, Irving TX 75061.

PROFESSIONAL CW operators, retired or active, commercial, military, gov't., police etc. invited to join Society of Wireless Pioneers — W7GAQ/6 Box 530, Santa Rosa CA 95402.

FREE Sample copy Long Island DX Assn. bulletin. Latest DX news. Business size s.a.s.e. to the L.I. DX Assn., P. O. Box 173, Huntington NY 11743.

QST and CQ 1950-1975 issues for sale. Send s.a.s.e. if ordering 73, Ham Radio, or other QST and CQ issues. One dollar minimum order and all issues cost 25c each, including USA shipping. Send chronological list and full payment to W6LS, 2814 Empire, Burbank, CA 91504. Available issues and refund sent within one month.

ROCHESTER Hamfest & NY State ARRL Convention, May 25-27. Add you name to mailing list. Send QSL to Rochester Hamfest, Box 1388, Rochester, NY 14603. Phone 716-424-1100.

RADIO Expo '79 September 15th and 16th, 1979, Lake County Fair Grounds, Routes 120 and 45, Grays Lake, Illinois. Manufacturers displays, flea market, seminars, ladies programs. Advance tickets, $2. Write EXPO, P. O. Box 305, Maywood, IL 60153. Exhibitors inquiries: Expo Hotline 312-345-2525.

THE 15th Annual Penn Central Hamfest will be held Sunday, April 29, 1979 at the Woodward Township Fire Hall from 11:00 A.M. to 5:00 P.M. Talk-in on 13/73 and 52. For info write K3QDA, Richard Sheasley, R.D. no. 1, Box 454, Linden, PA 17744 or call W3GPR, Ted, 1-717-323-3343.

STARVED Rock Hamfest — June 3 — See May Hamfest Calendar details via s.a.s.e. April W9MKS, R.R. no. 1 Box 171, Oglesby, IL 61348 — 815-667-4614.

SUPERFEST 1979 Peoria Illinois. Now two fantastic days — September 15th and 16th. Manufacturers (R.L. Drake, etc.), forums and excellent programs for the ladies. Great smorgasbord Saturday night. Advance tickets $2. Exhibitors and advance tickets write: Peoria Hamfest, 5808 N. Andover Ct., Peoria, IL 61614.

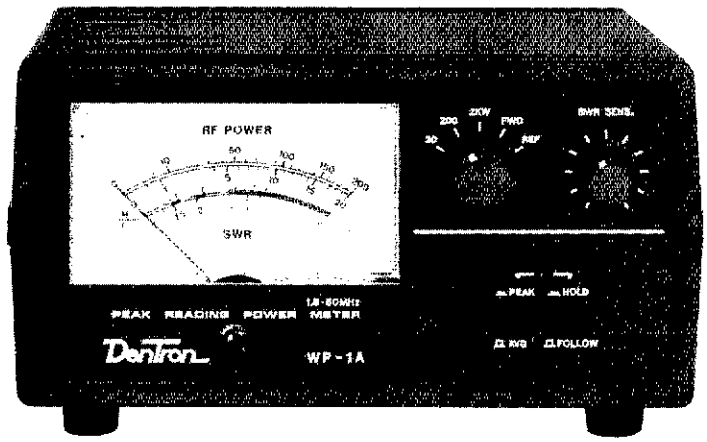
HAMFEST! Indiana's friendliest and largest hamfest. Wabash County Amateur Radio Club's 11th annual hamfest will be held Sunday, May 13, 1979, rain or shine, at the Wabash County 4-H Fairgrounds in Wabash, Indiana. Large flea market (no table or set-up charge), technical forums, activities for the YLs, free overnight camping, plenty of free parking, good food at reasonable prices. Only one ticket to buy this year. Donation is $2.50 for advance tickets — $3 at the gate. Children under 12 years old are admitted free. For more information or advance tickets, write Dave Nagel, WD9BDZ, 555 Valley Brook Ln., Wabash, IN 46992. S.a.s.e. required.

WARREN, Ohio Hamfest — Sunday August 19, 1979, Trumbull KSU Campus; Ohio 45 at Warren Outerbelt. Our 22nd year with the big & famous flea market. $2 registration. Prizes: Ten-Tec 546, complete; Wilson Antenna system; Mark 2 HT; Atlas 110 special and more. Mobile check-in. Arrowsigns lead from interstates, main highways. For map, details, QSL: Hamfest, Box 809, Warren, Ohio 44482.

PACIFIC Northwest Hamfest, July 14 & 15, HAM Inc., Box 78442 Seattle, WA 98178.

FIFTH Annual Northwest Pa. Hamfest, Saturday, June 9, 1979, Crawford County Fairgrounds, Meadville, PA. Note date change. Gates open at 8 A.M. Bring your own tables. $2 in, $1 out to display. $2. admission, refreshments. Commercial displays welcome. Talk in 04/64, 81/21, 63/03. Details C.A.R.S. P. O. Box 653, Meadville, PA 16335. Attention: Hamfest Committee.

Introducing Two New Meters From DenTron



Accessories for the amateur station are much like accessories for the automobile. Is cruise control or air conditioning really necessary? Maybe not, but it surely makes the drive more comfortable.

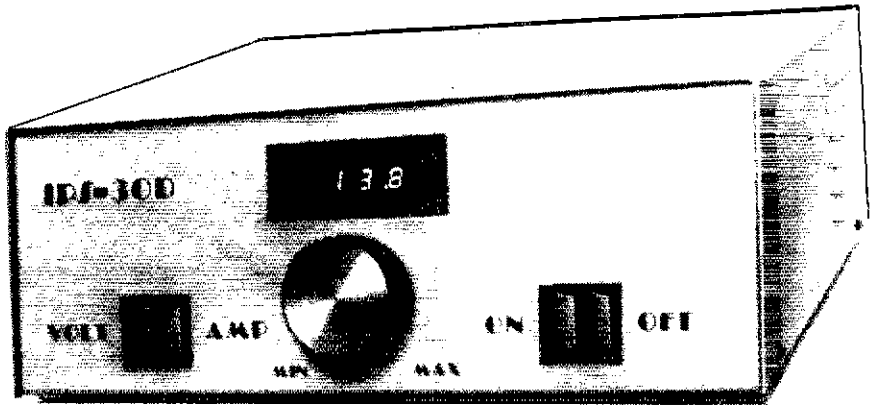
DenTron's WP-1A is an accessory for your station that will undoubtedly add to your operating pleasure. The large 3½" meter is calibrated for 20/200/2000 watts and 160 - 6 meter coverage. We are proud to boast the fact that the WP-1A is the only meter available with a peak reading feature and also a hold function, (the meter locks on highest voice peak). The WP-1A also includes an SWR bridge.

Also available in a VHF version is the WVP-1A, calibrated for 20/200 watts, 50-150 MHz coverage (6 & 2 meters). The WVP-1A also includes a peak reading feature and hold function and SWR bridge.

DenTron®

WP-1A $149.50 Sugg. Retail
WVP-1A $149.50 Sugg. Retail

Dedicated to Making Amateur Radio More Fun!



IPS-30D

This regulated power supply from AIC features digital readout; 30 ADC INTERMITTENT; 20 ADC continuous; variable front panel; voltage control; 3-14 VDC with Digital Volts and AMP readout. G.I.S.M.O. will make you a SPECIAL QUOTE on this and their AIC products during the next 30 days: IPS-30, IPS-15, IPS-30M, IPS-15M, and IPS-15D. Call today!

G.I.S.M.O. 1-800-845-6183

In S.C. call 1-366-7157
2305 Cherry Road, Rock Hill, S.C.
29730 (Exit 66-B off I-77)

KENTUCKY Ham-O-Rama, Sunday, May 20 at Boone County Fairgrounds in Burlington, Kentucky. 10 miles south of Cincinnati, Ohio on I-75. Prizes, flea market, indoor exhibits, refreshments. Info: N.K.A.R.C., Box 31, Ft. Mitchell, KY 41017.

THE Eastern Connecticut Amateur Radio Club will sponsor an Electronic Flea Market and Hamfest from 9 A.M. until 6 P.M. with an auction at 1 P.M. on May 20th at Point Breeze Restaurant in Webster, Mass. It will be held rain or shine. For more information and flyers, contact K1SYI, Richard Spahl. Telephone 617-943-4420 after 8 P.M.

MOULTRIE Amateur Radio Klub 18th annual hamfest, April 22, at Moultrie County 4-H Center Fairgrounds located 3 miles east of Sullivan on Illinois Route 121 and 1 mile north on Cadwell road. Heated indoor and large covered outdoor flea market. No charge to vendors. Write M.A.R.K., Box 327, Mattoon, IL 61938. Talk in 146.94 and 146.055/.655

HAMPHEST-Gastonia, North Carolina — Third Annual — ARRL sponsored. Sunday May 6, 1979, Ashbrook High School, one mile south of I-85 on 50th New Hope Road. Food and lodging, very large paved parking lot, plenty of indoor tables, ragchew area. Prizes: Swan TB4-HA, Ham IV rotor, coax and cable, 50 ft. tower. Contact: N4ATO or W4FSA.

QSL Cards/Rubber Stamps/Engraving

TRAVEL-PAK QSL Kit — Send call and 25c; receive your call sample kit in return. Samco, Box 203, Wynantskill NY 12198.

DELUXE QSLs, Samples 25c. Petty, W2HAZ, P. O. Box 5237, Trenton NJ 08638.

DON'T buy QSL cards until you see my free samples. Fast service, economical prices. Little Print Shop, Box 9848, Austin TX 78766.

$2.70 per 100 (1000 order). 30 original two-color styles. 125 cards minimum. We ship 2-weeks after your check clears or you may have your money back! Satisfaction guaranteed. Send 30c stamps for catalog. VP5QED Press: Box 1523-Boca Raton, FL 33432.

DISPLAY and protect your QSLs with 20 frame plastic holders. Seven for $3.00 prepaid. TEPABCO, Box 198T, Gallatin TN 37066.

FREE Samples — Stamp appreciated. Samcards, 48 Monte Carlo Dr., Pittsburgh, PA 15239.

QSL CARDS — 3 color, antenna, straight key, brass key, globe or eagle design 100-$10, 200-$15, free catalog, Rusprint, Box 7575, Kansas City, MO 64116.

CUSTOM printed and photo QSLs, very economical, free samples. Stamps appreciated. Stu, K2RPZ, Box 412, Rocky Point, NY 11778. 516-744-6260.

QSLs, Catalog 45c N & S Print, P. O. Box 11184 Phoenix AZ 85061.

QSLs with class! Unbeatable quality, reasonable price. Samples, 50c refundable. QSLs Unlimited, 1472 SW 13th Street, Boca Raton, FL 33432.

WANT QSLs Fast? Send $9.95, name, address, call. 100 multi-color sent return mail! ($4.00 each additional hundred) Satisfaction Guaranteed! (Samples only: 25c.) W5YI; Box 1171-C; Garland, TX 75040.

QSLs Second to none. Same day service. Samples 50 cents. Include your call for free decal Ray, K7HLR, Box 331, Clearfield, UT 84015.

QSLS — Variety, value, quality, custom, samples and catalog 45c. Alkanprint, Box 3494, Scottsdale AZ 85257.

QSLs — The K@AAB collection plus many new custom designs. Send No. 10, 28c, s.a.s.e. for free samples and prices. Marv W@MGI, 2095 Prosperity Ave., St. Paul, MN 55109.

CREATIVE QSL Cards — Personal attention. Imaginative new designs. Send 50c. Receive catalog, samples. Wilkins Creative Printing, P. O. Box 787-1, Atascadero, CA 93422.

QSLs samples and catalog 50c. Ritz Print Shop, 5810 Detroit Ave., Cleveland, OH 44102.

QSLs. Reasonable cost. Samples 25c. N3QA Printing, Box 68, Stevensville, MD 21666.

QSLs — Printed from your design — samples 25c. Custom QSLs — 1301 Geil, Des Moines, IA 50315.

BE SURPRISED — Get a variety of cards — 100 for $6. or 200 for $9.50 All three colors, fast service, satisfaction guaranteed. Constantine 1219 Ellington, Myrtle Beach, SC 29577.

QSLs by W7HUL. Samples 50c. 8511 19th Ave. N.W., Seattle, WA 98117.

BUDGI-CARD: Free samples, send 15 cent stamp, to Budgi-Card P. O. Box 73, Hooksett, NH 03106.

FREE samples — stamp appreciated. Conner, 522 Notre Dame Ave., Chattanooga, TN 37412.

CLUB call pins, 3 lines 1-1/4 x 3-1/4 $1.55 each, call, first name and club. Colors: black blue or red with white letters. (Catalog) Arnold Linzner, 2041 Linden Street, Ridgewood, NY 11227.

ENGRAVED Call Pins by AC2P — 4 lines $1.75; 3 lines $1.50; 2 lines $1.25. Assorted Colors. Locking pin. Richard Tygar, 5 Chelmsford Drive, Wheatley Heights, NY 11798.

NAMETAGS — 1-1/2 x 2-1/2 One line $2.50. Each additional line $0.50. 12 colors. Tag-it Co., Box 2062, Indianapolis, IN 46206.

RUBBER stamps $3 includes postage. NJ residents add

QUADS TOWERS QUADS TOWERS QUADS

Complete quads from $125.00
2, 3, 4 el-pretuned. Three kinds of spreaders to choose from. Telescoping or one piece.
**Send 30c stamps for lit. on quads, towers, or both, or tel. 1-813-988-4213 day or night.

Two towers to choose from. The Aluma tower or the E Z Way steel tower. Both crank down and tilt over. Prices start at $183.00.

SKYLANE PRODUCTS — W4YM
406 Bon Aire Ave., Temple Terrace, Fla. 33617

QUADS TOWERS QUADS TOWERS QUADS

2-3-4-5 el. quads. Three kinds of spreaders to choose from. From $125.00. Skylane quads can take wind and ice.

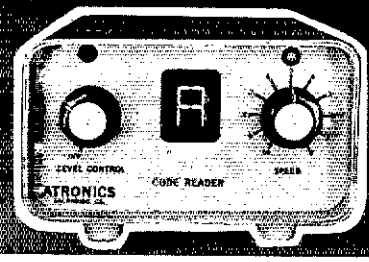
E Z Way towers crank down and tilt over. Immersed inside and out with aluminum, or galvanized — your choice. From $400.00.

Phone night or day: 813-988-4213, or write enclosing $.30 postage.

SKYLANE PRODUCTS — W4YM
406 Bon Aire Ave., Temple Terrace, Fla. 33617

NEW VISUAL CODE READER AND ELECTRONIC KEYER

Our popular, lowest priced CODE READER KIT Model KCR101 $149
Ready made CODE READER Model CR101 $225



Works with any keyer, including squeeze keyer in speeds from 7 WPM to 40 WPM. Both in a single unit. Model CR101EK $249

from A-TRONIX

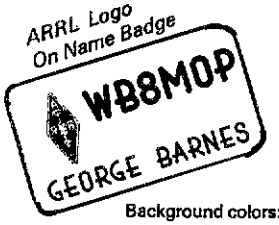
The Atronics Code Readers:
- Display letters, numbers, and commonly used punctuation visually as Morse Code signal is received.
- Operating speed 5 to 50 WPM at selected speeds.
- All Solid State.
- Makes code learning faster and easier.
- A single connection to your receiver or transceiver speaker puts it into operation.
- Hard copy read-out of CW available with TU-102 TTY interface Module accessory.

Buy Factory Direct & Save! Send for Free Literature.
USE YOUR BANKAMERICARD OR MASTER CHARGE.
A-TRONIX P.O. Box 2946, Laguna Hills, CA 92653 (714) 830-6428

The Sign Man

301-263-6292
108 Kuethe Drive • Annapolis, MD. 21403

ARRL Logo On Name Badge

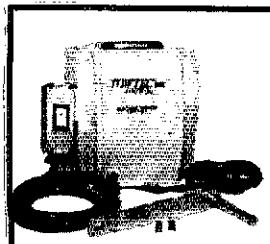


Call Letters & Name
$3.50 each
Md. Residents Add 5% Tax

Background colors: Blue, red, black, white LIFE MEMBER BADGES Silver only
Badges with your club logo available at $2.95/ea. - 15 or more

300 logos in stock, QCWA, Tower, Atom, etc.
Look for our booth at Dayton, Gaithersburg, Manassas & Others

TIRED OF CRANKING?



Motorize Your Tower With Our Electric Hoist/Winch
- STURDY — RELIABLE — EASILY INSTALLED
- IN USE ON E-Z WAY, HEIGHTS, TRI-EX, TRISTAO, ROHN, ALUMA, VERSATOWER, WILSON, TEL-TOW'R, PIPES, ETC.

TOWTEC CORP. $225
118 ROSEDALE RD., YONKERS, N.Y. 10710 Tel. (914) 779-4142

DIPOLE HEADQUARTERS

Famous "W2AU" Balun

MODEL 1:1 or MODEL 4:1 **$14.95** Plus $1.00 Shipping

HANDLES FULL 2 KW PEP AND THEN SOME. Broad Banded 3 to 40 M.
HELPS TVI PROBLEMS By Reducing Coax Line Radiation
NOW ALL STAINLESS STEEL HARDWARE. 50239 Double Silver Plated
IMPROVES F/B RATIO By Reducing Coax Line Pick Up
REPLACES CENTER INSULATOR Withstands Antenna Pull of Over 600 Lbs
BUILT IN LIGHTNING ARRESTER Helps Protect Balun — Could Also Save Your Valuable Gear
BUILT IN HANG UP HOOK Ideal For Inverted Vees, Multi Band Antennas, Dipoles, Beam and Quads

VISA **MINIMUM ORDER $10.00** (Please add enough to cover shipping.)

CABLE

8U FOAM, hi density braid, 50'	$11.95
8U FOAM, hi density braid, 100'	22.00
RG58A/U, stranded center, 100'	8.95
RG58, 2 ft. w/PL259 on each end	3.05
RG58, 3 ft. w/PL259 on each end	3.35
RG58, 5 ft. w/PL259 on each end	3.85
RG58, 12 ft. w/PL259 on each end	4.45
RG58, 50 ft. w/PL259 on each end	7.85
450 OHM LADDER LINE (1" Space) 100'	12.95
GUY WIRE, steel/plastic, 100 ft.	4.95

COPPER WIRE

#14 STRANDED 100' spool	$9.95
#14 SOLID, enameled 100' spool	$5.95

INSULATORS

AIRPLANE style, porcelain ins., wt. .2 lb.	2/$ .99
DOG BONE style, porcelain ins., wt. 2 lb.	3/ 1.25
HY GAIN #155 center insulator, wt 1.5 lb.	5.95
HY GAIN Cycolac end ins. pair, wt 1 lb.	3.95
MOSLEY dipole center insulator, wt. 1 lb.	4.25

CONNECTORS and ADAPTORS

PL259, UHF male conn.	2 for $1.59
SO239, UHF female, chas. mtg.	.89
UG175, Adapts RG58 to PL259	2 for .59
UG176, Adapts RG58 to PL259	2 for .59
PL258, UHF double female	.99
DM-SP, UHF double male conn.	1.09
M359, 90 deg. UHF elbow conn.	2.10
UG88U, BNC male for RG58	1.49
IO84, BNC female chassis mtg.	.99
M358, UHF "T" connector	2.49
UG255, Adapts UHF female to BNC male	3.49
UG273, Adapts BNC female to UHF male	1.59
AMPHENOL LIGHTNING ARRESTORS	3.00

MOR-GAIN **HALF-SIZE FULL PERFORMANCE Multi-Band HF Communications Antennas**

MOR-GAIN HD DIPOLES ... • One half the length of conventional half wave dipoles. • Multi-band, Multi-frequency. • Maximum efficiency – no traps, loading coils, or stubs. • Fully assembled and pre-tuned – no measuring, no cutting. • All weather rated – 1 KW AM, 2.5 KW CW or PEP SSB. • Proven performance – more than 15,000 have been delivered.

MODEL	BANDS (Meters)	PRICE	WEIGHT (Oz/Kg)	LENGTH (Ft/Mtrs)
40-20 HD	40/20	$53.25	26/.73	36/10.9
80-40 HD	80/40 + 15	61.25	41/1.15	69/21.0
75-40 HD	75/40	58.75	40/1.12	66/20.1
75-20 HD	75/40/20	70.25	44/1.23	66/20.1
75-10 HD	75/40/20/15/10	78.25	48/1.34	66/20.1
**80-10 HD	80/40/20/15/10	80.25	50/1.40	69/21.0

RADIO PUBLICATIONS, INC.

SPECTRONICS, INC.
(312)848-6777 1009 GARFIELD ST. OAK PARK, ILL. 60304

Govt. SURPLUS ELECTRONIC EQUIPMENT CATALOG

New ITEMS . . . New BARGAINS!
***FREE* UPON REQUEST!**
Send today for FREE copy of NEW CATALOG WS-79. Address Dept. QST

FAIR RADIO SALES
1016 E. EUREKA • Box 1105 • LIMA, OHIO • 45802

tax. Clinton Hoar, W2UDO, 32 Cumberland Ave., Verona NJ 07044.

DIAMOND Smugglers never wear our badges!! Everybody recognizes you in our distinctive name badge!! Three lines $3 (red, blue, black, wood). Peter O'Dell, AE8Q, 1427 23rd St., Parkersburg, WV 26101.

NAMETAGS 1" x 3" $3.25. Engraved with name, call letters, QTH. Limit 20 letters per line. Red, blue, yellow black, walnut with white letters. Other colors available. Nielsen Communications Inman, NE 68742.

QUALITY QSLs, Samples 35c. Kleinheinz, 1313 Willow, Chippewa Falls, WI 54729.

PICTURE QSL cards of your shack, etc. from your photograph or black & white artwork, 500 $16; 1000 $23.25. Also unusual non-picture designs. Generous sample pack 75c, half pound of samples $1.25. Custom-printed cards, send specifications for estimate. Raum's, 4154 Fifth Street, Philadelphia, PA 19140. Closed July 15th to August 15th.

APRIL'S special is on our Series 4 cards. Brochure, samples, 35c. Worldwide QSL Press, Box 2344, El Cajon, CA 92021.

General

CANADIAN surplus catalogs. Jam packed with goodies. Rush $1. Etcox Electronics 183G Hymus, Pointe Claire, Quebec H9R 1E9.

DXPEDITION XYL approved? VP2M QTH for rent. Beautiful brand new house. 2 1/2 acres, tropical garden overlooking Caribbean and mountians. Swimming pool. 3 bedrooms, maid service, hamshack and antenna farm. VP2MF, Box 2, Plymouth, Montserrat, West Indies.

TRADE. Need PL 172A/8295A tubes, have SP600JX to trade. William J. Ford VE3KHB, RR 6, Smiths Falls, ON K7A 4S7.

CALL Toll-free (800-327-7798). Ask for Bob Hoffman, Jaro Electronics Corp. We buy all types of tubes. Top prices paid for Varian, Eimac, Amperex, RCA, Western Electric, Raytheon, In Florida Call toll-free: 800-432-8524. Address: 412 27th St., Orlando, FL 32802.

SPIDERS for boomless quads. Heliarc welded aluminum. Al's Antennas, 1339 South Washington Street, Kennewick, WA 99336.

NOVICES: Need help for General Ticket? Complete recorded audio-visual theory instruction. Easy, no electronic background necessary. Write for free information. Amateur License Instruction, P. O. Box 6015, Norfolk, VA 23508.

WE Buy Electron tubes, diodes, transistors, integrated circuits, semiconductors. Astral Electronics, 321 Pennsylvania Ave., Linden, NJ 07036. 201-486-3365.

TELETYPEWRITER parts, manuals, supplies, equipment. Toroids. S.a.s.e. for list. Typetronics, Box 8873, Ft. Lauderdale FL 33310 W4NYF. Buy parts, late machines.

SERVICE by W9YKA. Professionnal grade lab, FCC 1st class license. Amateur and industrial ssb-fm equipment. Repairs, calibration, modifications, consultation. Reasonable rates. Write or call Robert J. Orwin, Communications Engineer, P. O. Box 1032, La Grange Park, IL 60525. 312-352-2333.

WANTED: Radios, parts, books, magazines before 1928. W6ME 4178 Chasin Street, Oceanside, CA 92054.

VERY interesting! Next 7 issues $2. Ham Trader Yellow Sheets, Sycamore IL 60178.

TEFLON Stock, s.a.s.e. W9TFY, Frank Wirt, Alpha IL 61413.

COLLECTOR wants to buy battery radios made before 1929, pre 1940 TVs, wireless gear, crystal sets, early parts, tubes, magazines etc. Top prices paid. Jacobs, 1-8th St., Pelham NY 10803.

ARCOS — Amateur Radio Components Service. Parts and assemblies for transmitting converters and power amplifiers for OSCAR and vhf-uhf. Eimac, Dowkey, Bird, Amphenol, KLM. S.a.s.e. for catalog. Fred Merry (W2GN) 35 Highland Drive, East Greenbush, NY 12061.

ATLAS Motorola fm and ssb Marine Radio Motorola Pagers bought and sold. W5BCO, Ralph Hicks, P.O. Box 15633 Tulsa OK 74112. 918-582-1333.

MANUALS for most ham-gear made 1937/1970. Send 25c coin for "Manual Catalog" postpaid. H. I. Inc., Box 0864, Council Bluffs, IA 51501.

COLLINS repair and alignment, $75. Former Collins engineer. First Radiotelephone, Extra, calibration laboratory, K1MAN 207-495-2215.

AUTHORIZED distributor Microwave Modules, F9FT Antennas, new K2RIW Tandem Reflector antennas. Radio Clinic 212-327-4952 N2MB (formerly WA2BIT).

REPAIRS by N2MB (formerly WA2BIT) all ham gear. First Class FCC License. NY area. 212-327-4952.

HAM Radio Repair. Expert repair and alignment in our modern lab., prompt, reasonable. "Grid" Gridley, W4GJO, 3824 Malec Circle, Sarasota, FL 33583.

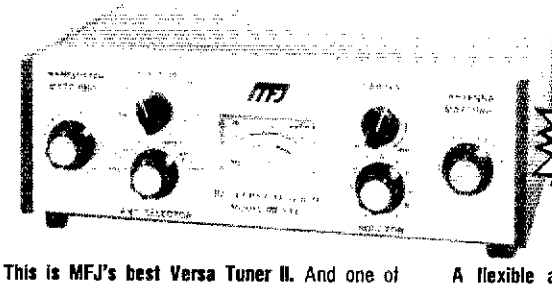
TRANSFORMERS rewound, Jess Price, W4CLJ, 507 Raehn, Orlando, FL 32806.

E2 Deals are hard to beat. Try me and see for new or used ICOM, CushCraft, KLM, Yaesu, Drake, Wilson, VHF Eng., Ten-Tec, Swan, Dentron, CDE, Hustler, Larsen, and more. W9EZ, Bob Smith Electronics, RFD no. 3, Fort Dodge, IA 50501 — 515-576-3886.

KEYER Kits $12.95 to $24.95. Iambic, dash override, dot/dash memories. S.a.s.e. for information. MSC, 1304 Toney Drive, Huntsville, AL 35802.

NEW MFJ *DELUXE* Versa Tuner II

$119.95 buys you one of the world's finest 300 watt antenna tuners with features that only MFJ offers, like . . . dummy load, SWR, forward, reflected power meter, antenna switch, balun. Matches everything from 1.8 thru 30 MHz: coax, random wires, balanced lines.



MFJ's Best Versa Tuner II . . .
Solid American Quality

$119.95

This is MFJ's best Versa Tuner II. And one of the world's finest 300 watt (RF output) tuners.

The MFJ-949 *Deluxe* Versa Tuner II gives you a combination of quality, performance, and features that others can't touch at this price . . . or any price.

PERFORMANCE: You can run your full transceiver power output — up to 300 watts RF output — and match your transmitter to any feedline from 1.8 thru 30 MHz whether you have coax, balanced line or random wire.

FEATURES: A 200 watt 50 ohm dummy load lets you tune up for maximum performance.

A sensitive meter lets you read SWR with only 5 watts and both forward and reflected power in two ranges (300 and 30 watts).

A flexible antenna switch lets you select 2 coax lines direct or thru tuner, random wire or balanced line and dummy load.

A large efficient airwound inductor 3 inches in diameter gives you plenty of matching range and less losses for more watts out.

1:4 balun. 1000 volt capacitors. SO-239 coax connectors. Binding post for balanced line, random wire, ground. 10x3x7 inches.

QUALITY: Every single unit is tested for performance and inspected for quality. Solid American construction, quality components.

The MFJ-949 carries a full one year unconditional guarantee.

Order from MFJ and try it — no obligation. If not delighted, return it within 30 days for a refund (less shipping).

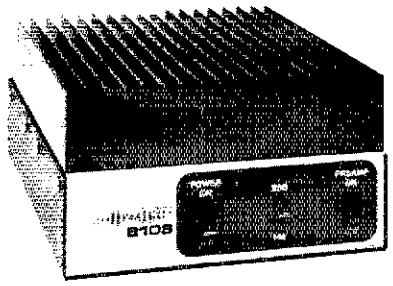
To order, simply call us toll free 800-647-1800 and charge it on your VISA or Master Charge or mail us a check or money order for $119.95 plus $3.00 for shipping/handling.

Don't wait any longer to tune out that SWR and enjoy solid QSO's. Order your *Deluxe* Versa Tuner II at no obligation, today.

MFJ ENTERPRISES, INC.

P. O. BOX 494
MISSISSIPPI STATE, MS 39762
CALL TOLL FREE 800-647-1800
For technical information, order/repair status, in Miss., outside continental USA, call 601-323-5869.

MIRAGE B108
VHF POWER AMPLIFIER



MIRAGE B108 Solid State VHF Power Amplifier with built-in Receive Preamplifier. 144-148 MHz. Conservatively rated. 5-15w in/80w nominal output. Switchable for FM, CW and SSB (adjustable delay) 13.6vdc/10-12A. Preamp provides a noticable improvement in weak signal reception. 10db Gain - 2.5 db Noise Figure. Optional control head for remote operation. 5-3/8" x 3" x 8" 3 lbs. 1 year Warranty on Parts and Labor, 90 days on RF Power Transistors **$169.95**

RC-1 Remote Control Head w/18' cable . . **24.95**

CALL TOLL FREE:
1-800-558-0411 Nationwide
In Wisconsin: 1-800-242-5195

master charge THE INTERBANK CARD — VISA

AMATEUR ELECTRONIC SUPPLY®
4828 West Fond du Lac Avenue
Milwaukee, Wisconsin 53216
Phone (414) 442-4200

PASS FCC HAM EXAMS QUICKLY & EASILY

WITH AMECO BOOKS AND CODE COURSES!

BRAND NEW QSO TAPES

NEW QSO AND PRACTICE cassette tapes give concentrated practice for GENERAL and EXTRA exams. Each tape contains random code groups, QSO-type material, and actual on-the-air QSO's, similar to the FCC exams. The tapes are difficult to memorize and yet contain QSO practice material. They are ideal for study. Each tape contains four actual FCC-type exams at different speeds with FCC-type questions and answers.

GENERAL CLASS QSO TAPE. Cat #105-QT. Four groups of practice material and QSO exams at 12, 13, 14 and 15 WPM $4.95

EXTRA CLASS QSO TAPE. Cat #106-QT. Four groups of practice material and QSO exams at 19, 20, 21 and 22 WPM $4.95

The following code courses contain a 32-page book on code learning, code practice material on tape at graduated code speeds, and FCC-type exams at the exam speeds.

ADVANCED CODE COURSE — 12 lessons from 8 to 18 WPM — for General Class exam.
#103-33 (1 — 12" LP record) $3.95
#103-T (1 cassette tape) $4.95

SENIOR CODE COURSE — 22 lessons from start to 18 WPM — for Novice and General Class exams.
#101-33 (2 — 12" LP records) $7.50
#101-T (2 cassette tapes) $8.95

EXTRA CLASS CODE COURSE — 10 lessons from 13 to 22 WPM — for Extra Class Code exam.
#104-33 (1 — 12" LP) $3.95
#104-T (1 cassette tape) $4.95

AMATEUR THEORY COURSE. Complete home study course in Amateur Theory for Novice, Technician and General Class licenses. Contains 14 lessons (from DC through transmission and reception), study guides and hundreds of FCC-type multiple-choice questions. Excellent foundation for all ham licenses. No previous experience required.
320 pages. #102-01 . . . . . $4.95

The following license guides contain detailed, easy-to-understand answers for FCC study questions, plus sample FCC-type exams using multiple choice questions.

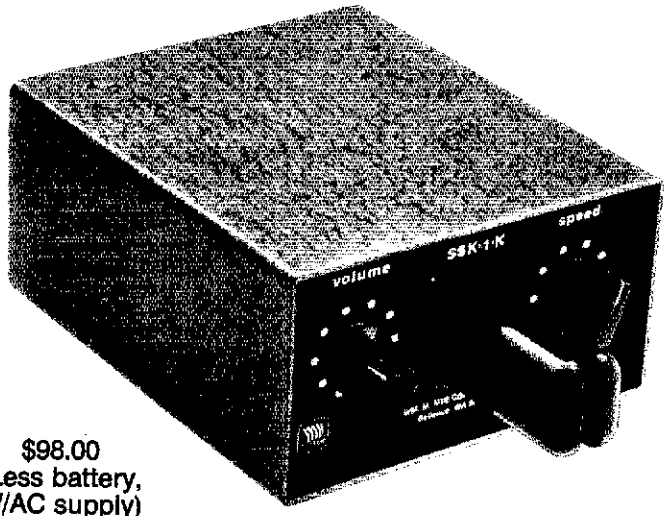
NOVICE AND GENERAL CLASS LICENSE GUIDE. #5-01 for Novice and General Class exams.
64 pages. $1.50

ADVANCED CLASS LICENSE GUIDE. #16-01 for Advanced Class license exam.
64 pages. $1.50

EXTRA CLASS LICENSE GUIDE. #17-01 for Extra Class license exam.
48 pages. $1.50

at ham distributors or from

AMECO
Publishing Corp.
275Q Hillside Ave.
Williston Park, N.Y. 11596



$98.00
(Less battery,
W/AC supply)
SSK-1 key only)
$23.95

It's NEW!
It's from NYE!

NYE VIKING IAMBIC KEYER

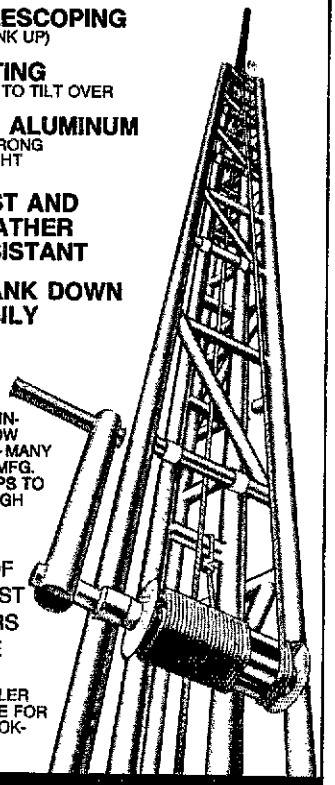
For faster, surer sending, here's a whole new kit of tools in one compact, handsome cabinet! The NYE VIKING Iambic Keyer gives you all the action features of the Super Squeeze Key ... Plus! Keys either negative-, or postive-keyed transmitter up to 200 Ma at 250 volts ... operates on internal 9V battery, or 115 V AC. The NYE VIKING 404 audio oscillator and speaker are for monitoring and practicing. Flip a switch and you can use the "dash" paddle for tuning or to simulate old-fashioned "bug" keying.

Available at leading dealers throughout the U.S.A.
Order NYE VIKING products by toll-free telephone! Call 1-800-426-2742. VISA, BANK-AMERICARD, or MASTERCHARGE credit cards accepted.

WM. M. NYE COMPANY, INC.
1614 - 130th Ave. N.E., Bellevue, WA 98005 * (206) 454-4524

ALUMA TOWERS
EXCELLENT FOR AMATEUR RADIO

- ★ **TELESCOPING** (CRANK UP)
- ★ **TILTING** EASY TO TILT OVER
- ★ **ALL ALUMINUM** — STRONG — LIGHT
- ★ **RUST AND WEATHER RESISTANT**
- ★ **CRANK DOWN EASILY**



EASY TO INSTALL, LOW PRICES — MANY MODELS MFG. CRANK-UPS TO 100 FT. HIGH

ONE OF THE BEST TOWERS MADE

SEE DEALER OR WRITE FOR FREE BOOKLET.

ALUMA TOWER COMPANY
BOX 2806QST
VERO BEACH, FLORIDA 32960 U.S.A.
PHONE A/C 305-567-3423

16-POLE R-4C SSB!

Improve the early-stage selectivity of your Drake R-4C while adding 8 additional poles (total 16) with an internally-mounted, switchable set of first IF crystal filters. Reduce QRM, leakage, overload. Ideal for DX and contest work. Overall shape factor better than 1.4. Maximum skirt selectivity with maximum intelligibility. Total bandwidth with CF-2.1K/8: 2100 Hz at -6dB, 2900 Hz at -60 dB. Modest variable bandwidth. Other bandwidths available. Filter set can be mounted in receiver and relay switched with our kits which start at $33.00. 3 and 4 filter switching options can include our CF-600/6 and/or existing 8-kHz first-IF filter, all internally mounted, controlled from rear or front panel. USB and LSB CF-2.1K/8 pair is $120.00 per set. Money back if not satisfied. Add $3 shipping per order; $6 overseas air. Dealer inquiries welcome.

Sherwood Engineering Inc.
1268 South Ogden St.
Denver, Colo. 80210
(303) 722-2257

BREW IT!
Baluns & Coil Kits for Ham Gear in ARRL Handbook & QST
Postpaid

BALUNS

Balun for Transmatch per ARRL Handbook Page 585
Get POWER into your Antenna

1 KW — 4:1 Impedance	$11.50
2 KW — 4:1	14.00
1 KW — 4:1, 9:1, or 1:1 (pick one)	13.00
2 KW — 4:1, 9:1, or 1:1 (pick one)	15.50
100 W — 4:1, 6:1, 9:1, or 1:1 (pick one)	7.50

COIL KITS

Ultramountaineer Miniature 40 M CW Transceiver — QST Ap '75 p 28	6.50
Tuna Tin II — WAS 40 M Transmitter — QST May '76 p 15	4.75
Herring — Ald V Dir. Conv. Receiver — QST Jul '76 p 21	6.25
Codzilla I — Amp. for Tuna Tin, Etc. — QST Feb '77 p 14	7.50
CB Slider — VFO — QST Mar '77 p 15	6.50
QRP Transmatch — 25 W Max — Handbook p 350	6.50
Mini Miser's Dream Receiver — QST Sep '76 p 21	12.75
80-10 M FET Preselector — Handbook p 265	15.50
RF Sensed Antenna Changeover Relay — QST Aug. '76 p 22	5.50

All baluns & coils are wound, ready to mount. Many other interesting coil kits in our List 4C. Send a stamped envelope for list.

CADDELL COIL CORP.
POULTNEY, VT. 05764 802-287-4055
WE LIKE TO WIND COILS—TRY US

2-METER FAVORITES
RUBBER DUCKIES

HM-4

Model HM-4. Has 5/16"-32 thread. Fits Motorola HT's, ICOM IC215 and Standard 146A $7.00
Model HM-5. Same as above, but with PL-259 connector $7.00
Model HM-226. Same, with TNC connector for Wilson 1405 ..... $16.00
Model HM-227. Same, but with BNC connector termination $11.00
Model HM-228. With F connector for Wilson 1402 & Tempo $10.00

HM-5

ADD $1.00 to each order for shipping.

SPECTRONICS, INC.
(312)848-6777 1009 GARFIELD ST. OAK PARK, ILL. 60304

CB CONVERSIONS +

THE CREAM OF THE CONVERSIONS
† Brand new E. F. Johnson 4740 SSB/AM Transceiver
† 400 KHz in the best part of 10 meters
† At least 25 watts PEP output
† Extended range VXO ± 5KHz minimum
† Digital readout
† Noise blanker
† Mobile or base (w/AC supply option)

READY TO GO -- $199.00 ppd, USA
LISTEN ON 10 — YOU'LL HEAR ONE

DO YOUR OLD CB A FAVOR
Let us professionally convert it to 10 meters, with VXO AND and INCREASED POWER (SSB)
EXAMPLES: —Johnson 4740, 4730, 352D for $38 in one week
—Cobra 139, Midland 13-893, Johnson 352 - $44
-Or custom quote on ANY rig (ave. under $50)

HW 2036 -- Wipe out the 833Hz blues!

WRITE FOR DETAILS

CERTIFIED COMMUNICATIONS
4138 SOUTH FERRIS FREMONT MICHIGAN 49412
VISA (616) 924 4501 MASTER CHARGE

ANTENNA BREAK/THROUGH!

AV-1

APARTMENT/PORTABLE

low-profile, no radial antenna your neighbors or landlord can live with! Ideal for APARTMENTS, CONDOS, CAMPSITES, MOBILE HOMES or RVs, SHIPS or BOATS. Perfect for FIELD DAY or EMERGENCIES, too!

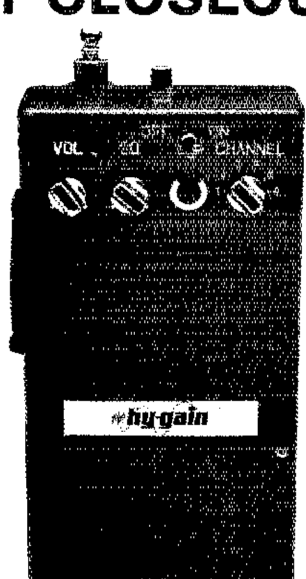
- 80-10 meters by quick, no-tool band change
- takes maximum legal input
- full quarter wave on 10, 15 and 20 — 16' maximum height
- mounts anywhere... yard, tower, porch rail... includes mounting post
- breaks down to 5' package; assembles in seconds without tools
- broad banded... no adjustment across 10, 15, 20 or 40; 200 kHz bandwidth on 80
- adjusts to 1:1 VSWR at any frequency with no tools in seconds... needs no antenna tuner

only $89.95 plus $3 UPS
MASTER CHARGE or VISA cards ok

Just one of 27 great antenna ideas from Antenna Supermarket — call or write for our new hot-off-the-press catalog and new March 1, 1979 price list. Hours 9:30 a.m.-5:00 p.m. Central time, Monday-Friday.

ANTENNA SUPERMARKET
P.O. Box 563
Palatine IL 60067
(312) 359-7092

HT CLOSEOUT



Hy-Gain Model 3806 2m FM Hand-Held Transceiver. 144-148 MHz. 1 watt nominal output, 6 channels with crystals for 146.52 T/R supplied. 12 vdc. Uses optional Nicad power pack or 8 AA penlight cells (not supplied). LED transmit indicator. Meter shows battery condition in transmit and signal strength in receive. Telescoping antenna. Jacks for external 12vdc, antenna and earphone. Tough plastic case is water tight and highly break resistant. Separate microphone and speaker give superb audio quality on both transmit and receive. HOT, very selective receiver - low intermod. 8.5"h x 3.42"w x 1.85"d. (Regular $189.00) .... **CLOSEOUT $149.00**

Accessories:	Reg.	NOW
3807 Nicad battery pack	34	29
1104 Touch tone pad	49	39
1106 Wall charger	9	7
1107 Cigarette lighter cord	9	7
1108 External antenna adaptor	9	7
1110 Leather carrying case	17	14
1111 Carrying case	8	6
269 Flexible antenna		5
(8) AA alkaline batteries		7
Crystals* each		5

*3806 supplied with crystals for 146.52 Simplex. Most standard simplex and repeater crystals carried in stock. Please order any oddballs from your favorite crystal manufacturer.

Quantity limited. Order direct from this ad. Send check or use your Mastercharge or VISA. Allow $4.00 for UPS in the 48 States. ★★CALL TOLL FREE★★.

master charge THE INTERBANK CARD — VISA®

AMATEUR ELECTRONIC SUPPLY®

4828 W. Fond du Lac Avenue
Milwaukee, Wisconsin 53216
Phone: (414) 442-4200
Wisconsin WATS: 1-800-242-5195
Nationwide WATS: 1-800-558-0411

350-XL, $795. Mosley TA-33 beam, $179. New Ham-III rotors, $109. Kenwood transceivers: 820-S, $949. 520-S, $619. Alpha Linear, $1149. Used Kenwood 820-S, $950. Specials: New Dentron 2000 watt linears, $535. Used Collins 30S-1, $1395. Drake R-4C, $519. New Drake TR-7 transceiver, $1195. Special: New Drake AC-4 supplies, regular, $150, cash $119. Used Ham-4 Rotor, $139. Moory Electronics Company, P. O. Box 506, DeWitt, Arkansas 72042 Tel.: 501-946-2820.

MOBILE Ignition Shielding gives more range, no noise. Kits and custom systems. Literature. Estes Engineering. 930 Marine Dr., Port Angeles WA 98362.

GEOCHRON Wanted — Malcolm Ringel, 305 Buckhead Avenue, Atlanta, Georgia, 30305, 404-231-0084.

MICROWAVE Specialists — We buy and sell microwave test instruments, waveguide components. Send inquiries. Lectronic Research, 1423 Ferry, Camden, NJ 08104.

CLEANING house: TS-820S — new — $975, HRO-500 excellent — $400. Johnson kW Matchbox $100., K2JSO, 212-338-3313.

KDK's new FM2016A $314. TouchTone mike for KDK's $36. Bearcat 250 scanners $264.88. Atlas 210X w/N.B. $665. Write for red hot specials! Ben Franklin Electronics, 109 N. Main, Hillsboro, KS 67063. 316-947-5751.

COLLINS 32S-3 no. 101223, 75S-3B no. 15583, 516F2, 312B-4 all winged & in excellent condition. $1375. WA7MAI Larry 509-632-5603.

TRS-80 programs, DXCC, WAS tracking. Dup-search, log contests. List $1.00 refundable. WA4PYF Box 145; Lithonia, GA 30058.

LOWEST prices electronic parts. Confidential catalog free. Knapp, Dept. Q, 4750 96th St. N., St. Petersburg, FL 33708.

TEKTRONIX 545A oscilloscope with dual trace plug-in, 30 MHz, $350. WA9CQS 317-856-5558, 5546 Kentucky Ave., Indianapolis, IN 46241.

WANTED: Transceiver or transmitter — receiver reasonably priced, W9HF, 3685 Sycamore, Marion IN 46952.

COLLINS w/e 75S3B $625, 75S3 $440. Both in mint condition. K1FPJ 203-589-6120.

MINT collins Round 75S3C, 32S3, 312B4, Wing 75S3, 516F2. John White, N8JW, 3629 Delta River, Lansing, MI 48906.

INVENTORY reduction sale — Wilson system I — $193. System II — $158. Monobander M420 — $149. DB43 — $135. Yaesu FT-301D w/power supply — $845. TTW Radio, 871 Homewood, Salem, OH 44460. Telephone: 216-332-0965.

COURSE "HF Amplifier Design" based on Carson's hf amplifier book. Taught by him and other members of Electrical Engineering staff at University of Missouri-Rolla. May 7-9. Contact: Burns Hegler, WØGQM, 218 ERL, UMR, Rolla, MO 65401. 314-341-4718.

WILL buy Valiant IIs, factory wired only. State condition. W8MJ.

RTTY Parts and Machines: Model 28 printers, typing reperfs, TDs. Gears — all machines. Underdone reperf for 28ASR, complete, $285. Auto CR-LF, non-overline kits for 28 printers, $12.75pp. M28 stand-alone TD, $170pp. Model 15 gearsets. Model 14TD, $50. M14 typing reperf, $95pp. Much more. Send s.a.s.e. for complete list machines and parts. Lawrence Pfleger, K9WJB, 1715 E. McPherson, Kirksville, MO 63501.

WANTED — 2 af amplifiers (audio) early vintage. 3-1/2 to 1 or 4-1 or 3-1 ratio. Quote your price. Contact F. Ciulini, 6359 So. Keeler Ave., Chicago, IL 60629. Phone 312-767-8938.

CRYSTALS: S.a.s.e. list. K8LJQ, 355 Mower Rd., Pinckney, MI 48169.

MOBILE power supply, Henry TP-400 for 150-500 watt transceivers. $50 or trade. Mike Gauthier, K6ICS, 9550 Gallatin, Downey, CA 90240.

WILSON handhelds for special price s.a.s.e. Bill Gerhardt, 2700 Greenlee, Austin, TX 78703.

B&K TEST equipment. Free catalog. Free shipping. 15 percent discount. Spacetron-BS, 948 Prospect, Elmhurst, IL 60126.

TR7, IC-701, Omni, Swan-100MX, Mark-II/IV, IC-211, UV-3, HF-200A, MLA-2500B, GLA-1000, Exidy computers, . . . and on and on. Call toll free for sales quote. The Comm Center, Laurel, MD. 1-800-638-4486.

DESK equipment console. Build from drawings, photographs. $4.75. Bill Morris, WA5RSC, P. O. Box 411, Lubbock, TX 79408.

FOR SALE: Microlog cw demodulator AVR-1, cw keyboard AKB-1 and video monitor. $650 firm — I will ship. J. Grandinetti. WA2SRM P. O. Box 106, Lakewood, NJ 08701. 201-363-1000 daytime.

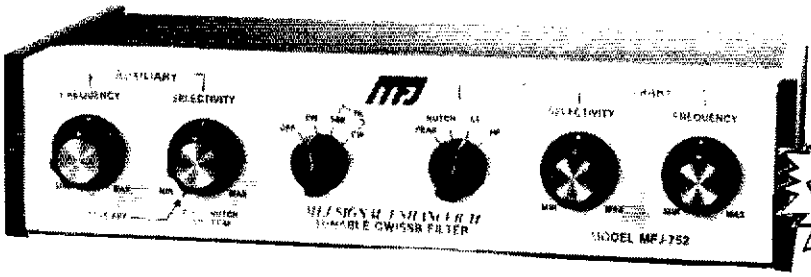
WILSON handhelds and antennas — Big Discounts! Bearcat 210 scanners $209.88! New Pace Communicator I 3 watt handheld $195! Alda 103 or 103A $422! Many more money savings specials — Write for list! Ben Franklin Electronics, 109 N. Main, Hillsboro, KS 67063. 316-947-5751.

OWNER Repair of Amateur Radio Equipment book. $7.95. One repair easily recovers cost. K6RQ, 14910 LG Blvd. Los Gatos, CA 95030.

ROSS Specials: Looking for a good buy in Ham Gear? Call all the WATS lines first, then call me. I will be $1.50 to $40.00 less depending on the amount of your purchase. Plus I want to be sure you are happy with your

NEW MFJ Dual Tunable SSB/CW filter

lets you zero in SSB/CW signal and notch out interfering signal at the same time.



Ham Radio's Most Versatile Filter

BRAND NEW

$79.95

The MFJ-752 Signal Enhancer is a dual tunable SSB/CW active filter system that gives you signal processing performance and flexibility that others can't match.

For example, you can select the optimum Primary Filter mode for an SSB signal, zero in with the frequency control and adjust the bandwidth for best response. Then with the Auxiliary Filter notch out an interfering heterodyne . . . or peak the desired signal.

For CW, peak both Primary and Auxiliary Filters for narrow bandwidth to give skirt selectivity that others can't touch. Or use Auxiliary Filter to notch out a nearby QSO.

The Primary Filter lets you peak, notch, low-pass, or highpass signals with double tuned filter for extra steep skirts. The **Auxiliary Filter** lets you notch a signal to 70 db. Or peak one with a bandwidth down to 40 Hz.

Tune both Primary and Auxiliary Filters from 300 to 3000 Hz. Vary the bandwidth from 40 Hz to almost flat. Notch depth to 70 db.

MFJ has solved problems that plague other tunable filters to give you a constant output as a bandwidth is varied. And a linear frequency control. And a notch filter that is tighter and smoother for a more effective notch.

Works with any rig. Plugs into phone jack. 2 watts for speaker. Inputs for 2 rigs.

Switchable noise limiter for impulse noise; trough clipper removes background noise.

Simulated stereo feature for CW lets ears and brain reject QRM. Yet off frequency calls can be heard.

Speaker and phone jacks. Speaker is disabled by phones. OFF bypasses filter. 110 VAC or 9 to 18 VDC, 300 ma. 10x2x6 inches.

Every single unit is tested for performance and inspected for quality. Solid American construction, quality components.

The MFJ-752 carries a full one year unconditional guarantee.

Order from MFJ and try it — no obligation. If not delighted, return it within 30 days for a refund (less shipping).

To order, simply call us toll free 800-647-1800 and charge it on your VISA or Master Charge or mail us a check or money order for $79.95 plus $3.00 for shipping/handling.

Don't wait any longer to use Ham Radio's most versatile filter. Order your MFJ Dual Tunable SSB/CW Filter at no obligation, today.

MFJ ENTERPRISES, INC.
P. O. BOX 494
MISSISSIPPI STATE, MS 39762
CALL TOLL FREE 800-647-1800
For technical information, order/repair status, in Miss., outside continental USA, call 601-323-5869.

APRIL SPECIALS

BONUS: Extra 3% Discount on merchandise when order is accompanied by Cashier's Check or Money Order.

	List	Spl.
HY-GAIN		
#221 TH3JR — Low Power Triband Beam	$149.95	$109.50
#386 18AVT/WB — 10-80 M. Vertical	99.95	73.00
#214 14 El. 2 Meter Beam	31.95	23.75
#388 TH3MK3 — 3 El. Triband Beam	229.95	Write
#389 TH6DXX — 6 El. Triband Beam	299.95	Write
MOSLEY		
TA-33 3 El. Triband Beam. Others — Write	264.00	169.00
CUSHCRAFT		
ARX-2 2 Meter Ringo Ranger	39.95	29.75
A147-11 11 El. 2 Meter Beam	36.95	27.50
ATB-34 4 El. Triband Beam	289.95	215.00
ALLIANCE		
HD-73 Rotor for above beams	159.95	99.00

OTHERS: B&W, Hustler, CDE, Wire & Cable, Wilson — See March QST.

MC & VISA WELCOME

Send stamp for price sheet and descriptive information. PRICES DO NOT INCLUDE SHIPPING. We do not export.

COMMUNICATIONS SERVICES
326 A WEST MAIN STREET
PHILADELPHIA, MS 39350
Phone: 601-656-5345 Hours: 7-5 Mon.-Fri.

Prices are subject to change without notice.

ALL BAND TRAP ANTENNAS!

PRETUNED - COMPLETLY ASSEMBLED - ONLY ONE NEAT SMALL ANTENNA FOR UP TO 6 BANDS! EXCELLENT FOR CONGESTED HOUSING AREAS - APARTMENTS LIGHT - STRONG - ALMOST INVISIBLE!

FOR ALL MAKES & MODELS OF AMATEUR TRANSRECEIVERS - TRANSMITTERS - GUARANTEED FOR 2000 WATTS SSB 1000 WATTS CW. FOR NOVICE AND ALL CLASS AMATEURS!

COMPLETE AS SHOWN with 90 ft. RG58U-52 ohm feedline, and PL259 connector, insulators, 30 ft. 300 lb. test dacron end supports, center connector with built in lighning arrester and static discharge - molded, sealed, weatherproof, resonant traps 1"X6" - you just switch to band desired for excellent worldwide operation - transmitting and recieving! WT. LESS THAN 5 LBS.

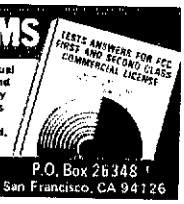
1 ANTENNA WORKS LIKE 6 SEPARATE ANTENNAS! Can be used in attics, tops of buildings. Inverted or "sloper" Vs or V beams in minimum space. NO HAYWIRE HOUSE APPEARANCE - NOT A KIT! READY TO HANG OUT OF THE BOX! No center support - NO BALUNS NO TUNERS needed, unless you want to use them! SWR is 2-1 or less over all bands except 80 (simple adj. for low or high end for low SWR). THOUSANDS IN USE ALL OVER THE WORLD SINCE 1960! EASIEST INSTALLATION, BEST APPEARANCE & PERFORMANCE of any all band trap dipole made today.

160-80-40-20-15-10 bands 2 trap--149 ft with 90 ft. RG58U - connector - Model 777BU . . .$59.95
80-40-20-15-10 bands 2 trap --- 102 ft. with 90 ft. RG58U - connector - Model 998BU . . .$54.95
40-20-15-10 bands 2 trap --- 54 ft. with 90 ft. RG58U coax - connector - Model 1001BU . . .$53.95
20-15-10 bands 2 trap --- 26 ft. with 90 ft. RG58U coax - connector - Model 1007BU $52.95

RG58U is OK for 500 watts CW - 1000 watts SSB - RG8U is $18.00 extra P.P. for any antenna. SEND FULL PRICE FOR POST PAID INSURED DEL. IN USA. (Canada is $5.00 extra for postage - clerical - customs - etc.) or order using VISA Bank Americard - MASTER CHARGE - AMER. EXPRESS. Give number and ex. date. Ph 1-308-236-5333 9AM - 6PM week days. We ship in 2-3 days. PRICES MAY INCREASE SO - ORDER NOW AND SAVE! All antennas guaranteed for 1 year. Money back trial! Made in USA. FREE INFO. AVAILABLE ONLY FROM.

WESTERN ELECTRONICS Dept. AQ-4 Kearney, Nebraska, 68847

PASS FCC EXAMS



The Original FCC Tests-Answers exam manual that prepares you at home for FCC First and Second class Radiotelephone licenses. Newly revised multiple-choice exams cover all areas tested on the actual FCC exam. Plus "Self-Study Ability Test." Proven! $9.95 postpaid. Moneyback Guarantee.

COMMAND PRODUCTIONS Radio Engineering Division — P.O. Box 26348 San Francisco, CA 94126

FACSIMILE

COPY SATELLITE PHOTOS, WEATHER MAPS, PRESS!

The Faxs Are Clear — on our full size (18-1/2" wide) recorders. These commercial-military units now available at surplus prices. Learn how to copy with our FREE Fax Guide.

ATLANTIC SURPLUS SALES
3730 NAUTILUS AVE. BROOKLYN, N.Y. 11224
Tel.: (212) 372-0349

selection. We have Kenwood, Yaesu, ICOM, Ten-Tec, Drake, Dentron, Hy-Gain, ETO, Mosley, CushCraft, Hustler, Larsen, Taylor, MFJ, Etc. We have the largest stock and best selection of amateur equipment in the Intermountain West. Call 208-852-0830. Close Mondays at 2 p.m. Ross Distributing Company, 78 South State, Preston, ID 83263.

GUY Wire, Aircraft Control Cable. Strong, easy to install, flexible. Clamps, turnbuckles, more. Send dollar, refundable to STANGE; Box 145; Lithonia, GA 30058.

LIST your used equipment. $1 for three months. Current list free by s.a.s.e. Mail description, condition, address, price, phone number and remittance to: Mail Listing Service, P. O. Box 2567, Winter Haven, FL 33880.

ROHN Towers — Buy wholesale direct from distributor. 20G sections, $28.82 each — 25G sections $37.62 each — 45G section $57.20 each — 100 foot tower kit complete $646.02 — 40 foot free standing BX tower $179.45 — 48 foot 25G foldover freight paid $565. Hill Radio, 2503 GE Road, Bloomington, IL 61701. 309-663-2141.

RTTY — NS-1A demodulator W/T $26.95; kit $19.95; board only $4.95. Bandpass active filter 2125/2295 Hz. kit $11.95; W/T $16.95. All postpaid. S.a.s.e. for info. Nat Stinnette Electronics, Tavares, FL 32778.

WANTED: KDK FM50-SXR 6-mtr xcvrs. WA6ENS, 464 Calle De Castellana. Redondo Beach, CA 90277.

FREE catalog of new merchandise with low prices. ICs, semiconductors, resistors, capacitors and more. Key Electronics, Box 3506Q, Schenectady, NY 12303.

WANT Valiant SSB adapter. W8MJ.

COLLINS Station, like new mint, (round) less than 15 hours total use. KWM-2A, 312B-5, 516-F2, 30L-1 over $7000 list selling for $2500. WB1DOX, W. Teghtmeyer, 25 Riverbank Dr., Stamford CT 06903. 203-322-0050.

EXPERIMENTERS' challenge — satellite TV reception — more than 40 channels of television from 5 geostationary satellites available. Hundreds of hams and experimenters building receiver terminals. My "Satellite Study Package" explains what is involved, how to do it. $10 postapid. Bob Cooper, W5KHT, Suite 106, 4209 NW 23rd, Oklahoma City, OK 73107.

WANTED: GE MASTR ER-41C receiver, ET-58 transmitter, 4KC15A10, also HT-220 preter 2 freq. with PL. Fred Findling, Box 125 Littleton, NH 03561.

CERTIFICATE Hunters! Where are your awards? Mount them in our plaques, s.a.s.e. Bill Morris, WA5RSC, P. O. Box 411, Lubbock, TX 79408.

ICOM 701, complete, like new, $1350 free UPS ship. Going all homebrew and need the cash. John, WD5ACC, Rte. 3, Roanoke, TX 76262. 817-430-1447.

QUAD Builders — blizzard/hurricane proof your antenna. Fiberglass vaulting poles. Incredible strength. S.a.s.e. for info. K5WSE, Box 20-AA, San Antonio, TX 78201 512-699-9260.

COLLINS: 32S1 — $350, 516F2 — $145, 75S1 — $265, CP-1 $130, 75S3 — $395. Excellent Condition. W9ZR 1-414-532-6643.

FOR SALE: Yaesu FTV-250 transverter with MOSFET preamp, $175; Wavetek model 30 function generator with sweep, $50; Heath IT-28 RC bridge, $25; N1RM, 4 Maple Lane, Brookfield, CT 06804. 203-775-4061.

FOR SALE: 20 meter mono-bander Hy-Gain 204-BA; Tilting boom to mast clamp: BN-86 Balun: $115. Clark, W3HZ. 1-215-356-7322.

TRADE: FR101S/SPK, mint, for: best transceiver, Rx/Tx comb, 75A4 or R4A, B, C. Send details to WA2LZZ, Tim Cook, Box 23, Tuslog Det 63-2, APO N.Y. 09040.

TEN-TEC Triton IV digital transceiver, VFO, P.S. w/VOX, Ammeter, N.B., 10 mtr xtals, cw Filter. Used less than one hour. $875. Poly 88 system II computer assembled, no memory never used $700 or best offer or trade. Dwight Elliott, K4BOK, 1225 Branchwater Lane, Birmingham, AL 35216. 205-823-3007.

SELL — Johnson Ranger, excellent condition, $95. K9HQG, Rte. 2, Box 20, Baldwin, WI 54002. Ph. 715-684-2110.

SELL: two new Ham II control units $40 each. Wanted: HW-12 for 75 meters. W2IPI, 10 Woodbridge Road, Gibbsboro, NJ 08026. 1-609-784-8363.

DRAKE C-Line: R4-C; 4 NB, FL-1500, FL-500 $525. T4X-C with Linear Systems 400 watt ac/dc supply — $575. Combo $995 firm. You pick up. WA2URT, 516-921-6188.

TEN-TEC OM3-A 40 and 20 meters, $45. 405 linear, 50W $100. Never used. Original cartons. WB9CLJ, 8520 Kimball, Skokie, IL 60076. 312-675-5287.

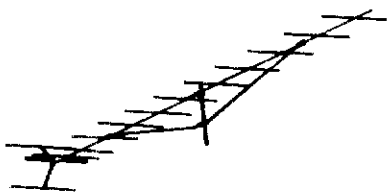
NATIONAL NC-300 w/accessories absolutely mint w/manual $150; Heath HX-10 Marauder beautifully wired, mint condx, perfect for RTTY (rated 100 percent duty cycle at 180 watts) but sounds great on ssb and cw, w/manual $175; Genave GTX200 30W 2m fm w/20 xtals installed, PTT mic, manual, etc., perfect condx $175. Prefer local deal so I can demo these beautiful rigs but will ship FOB NJ. WB2WIK, 24 Louis Dr., Budd Lake, NJ 07828. 201-691-0557.

ELECTRONIC T-R switch wanted. Homebrew or manufactured it in good condition. Bernard Fair, 19455 Houghton, Detroit, MI 48219.

SWAN 500, 117-XC, p.s. $365 call Carol, WB7STG 406-587-1387 after 0500Z.

PRINTED circuit boards available for construction articles in this issue and past two QSTs. Low prices, s.a.s.e., Daniel Gravereaux, 602 Carter St., New Canaan, CT 06840.

16 ELEMENTS
144 MHz
F9FT



The **'Tonna'** *You've been hearing about*

144/146 MHz
50 ohms
length 6.4 m.

SWR 1.2:1
Horiz./Vert.
Wt. 4.4 kg.

Side lobe attenuation - Superb

Horizontal aperture
2 × 16°

Vertical aperture
2 × 17°

$79.95

9 Element 144-146 ..... **$39.95**
4 Element 144-146 ..... **$32.95**

MADISON
ELECTRONICS SUPPLY, INC.
1508 McKINNEY
HOUSTON, TEXAS 77002
713/658-0268

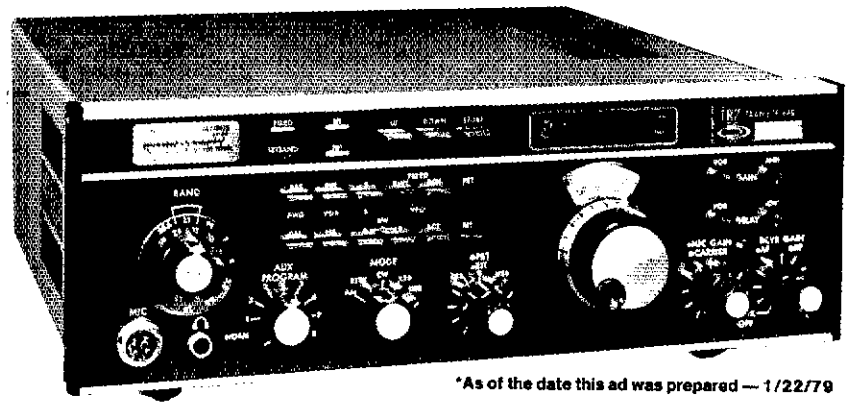
Instant ***Identity***

The time has come for all amateurs to unite on sight. We must know each other as do other fraternal organizations. The ability to recognize each other on any occasion is a true mark of fraternal brotherhood. Group III, (WB2LCK, KB2DX and KB2DZ) designed this 10 karat gold ring to portray our great and proud fraternity. This exquisite ring is made exclusively for you by Josten's (world famous for their quality achievement rings) with your call letters prominently displayed. For detailed information and reusable ring sizer...Write:

No Obligation

Group III Sales Co.
Dept. 51 P.O. Box 259
Little Neck, N.Y. 11362

Interested in **DRAKE?** Get the DEAL from **AMATEUR ELECTRONIC SUPPLY**



*As of the date this ad was prepared — 1/22/79

fabulous Tr-7 in Stock for Immediate Delivery.*

TR-7/DR-7 Xcvr w/dig, gen coverage	$1295.00
TR-7 160-10m Transceiver	1100.00
DR-7 Digital/gen cov board	195.00
PS-7 120/240V ac supply	195.00
MS-7 Speaker	33.00
RV-7 Remote VFO	195.00
FA-7 Fan for TR-7 or PS-7	25.00
NB-7 Noise blanker	90.00
SL-300 300 Hz crystal filter	52.00
SL-500 500 Hz crystal filter	52.00
SL-1800 1.8 KHz crystal filter	52.00
SL-6000 6 KHz crystal filter	52.00
MMK-7 Mobile mounting kit	49.95
MN-7 160-10m 250w matcher	165.00
MN-2700 160-10m 1Kw matcher	279.00
B-1000 4:1 balun	24.95
WH-7 160-6m wattmeter	89.00
7073 Hand microphone	19.00
7077 Desk microphone	45.00
Aux-7 Range program board	45.00
RRM-7 Range receive module	7.50
RTM-7 Range transceive module	7.50
385-0004 TR-7 service manual	30.00
R-7 160-10m receiver	TBA
R-7/DR-7 Rcvr w/dig, gen coverage	TBA
R-4C 160-10m receiver	699.00
4-NB Noise blanker	74.00
FL-250 250 Hz 8-pole crystal filter	52.00
FL-500 500 Hz 8-pole crystal filter	52.00
FL-1500 1.5 KHz 8-pole crystal filter	52.00
FL-4000 4 KHz 8-pole crystal filter	52.00
FL-6000 6 KHz 8-pole crystal filter	52.00
MS-4 Speaker for 4-line	33.00
T-4XC 160-10m transmitter	699.00
AC-4 AC supply	150.00
DC-4 DC supply	195.00
DL-300 300w dry dummy load	19.95
DL-1000 1kw dry dummy load	39.95
DSR-2 10 KHz-30 MHz dig. receiver	3200.00
L-4B 2000w PEP linear amplifier	995.00
L-7 2Kw PEP 160-15m linear	995.00
MN-4C 160-10m, 250w matcher	165.00
B-1000 4:1 balun	24.95
MN-2000 80-10m 1000w matcher	250.00
W-4 1.8-54 MHz wattmeter	79.00
Optional crystals each	7.50
Fixed frequency crystals each	9.50
TV-42-LP 100w low-pass filter	14.60
TV-5200-LP 1Kw (100w/6m) low-pass	26.60
TV-3300-LP 1Kw 80-10m low-pass	26.60
TV-75-HP 75 ohm high-pass filter	13.25
TV-300-HP 300 ohm high-pass filter	10.60
1340 UV-3 2m FM Xcvr	595.00
1343 UV-3 2m/220 MHz FM Xcvr	695.00
1344 UV-3 2m/450 MHz FM Xcvr	695.00
1346 UV-3 2m/220/450 MHz FM	795.00
220 MHz add-on, factory installed	175.00
450 MHz add-on, factory installed	175.00
1504 PS-3 AC power supply	89.95
1330 UMK-3 Remote trunk kit	69.95
1339 Control head	90.00
385-0002 UV-3 service manual	25.00
1525EM Microphone w/touch-tone	49.95

Call TOLL FREE: 1-800-558-0411

master charge THE INTERBANK CARD

your BANKAMERICARD welcome

AMATEUR ELECTRONIC SUPPLY®
4828 West Fond du Lac Avenue
Milwaukee, Wisconsin 53216
Phone: (414) 442-4200
Wisconsin WATS: 1-800-242-5195
Nationwide WATS: 1-800-558-0411

BRANCH STORES
28940 Euclid Avenue; Wickliffe, Ohio 44092
Phone: (216) 585-7388
Ohio WATS: 1-800-362-0290

621 Commonwealth Ave; Orlando, FL 32803
Phone: (305) 894-3238
Florida WATS: 1-800-432-9424

To: AMATEUR ELECTRONIC SUPPLY
4828 W. Fond du Lac ave; Milwaukee, WI 53216

I am interested in the following NEW Equipment:

.....

I have the following to trade: (What's your Deal?)

.....

Ship me: .....

I Enclose $ ..... I will pay balance (if any):

☐ COD (20%Deposit) ☐ Mastercharge ☐ VISA

Acct nr: ..... Exp ....

Name: .....

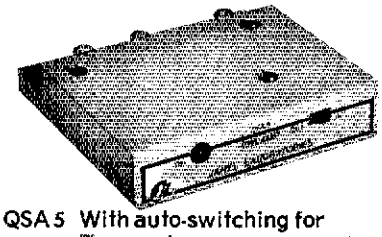
Address: .....

City &
State: ..... Zip .....

☐ Send latest NEW and USED Equipment Listings.

ENJOY VHF/UHF WITH JANEL ACCESSORIES

2 METER PREAMPS



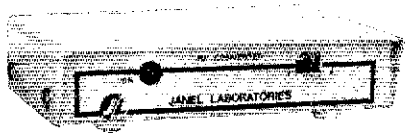
QSA 5	With auto-switching for Transceivers	$41.95
PM-1	Miniature module	16.95
144PB	Classic Preamp	21.95

Other Preamps

Outstanding JANEL quality — the result of careful assembly and thorough testing of each unit.

30PB	28-30 MHz	$21.95
50PB	50-52 MHz	21.95
53PB	52-54 MHz	21.95
220PB	220-225 MHz	21.95
432PA	420-450 MHz	33.00
432PC	432 MHz, 2 dB NF	54.95
432PE	432MHz, 1 dB NF — Write for details on this super preamp	90.00

CONVERTERS



Receiving Converters for serious VHF/UHF operation. Ideal for all modes including OSCAR. High out of band rejection and overload resistant.

144CF	Deluxe 2 meter receiving converter, 2 dB NF	$ 79.95
432CF	Deluxe 432 receiving converter, 2.8 dB NF	79.95

Accessories

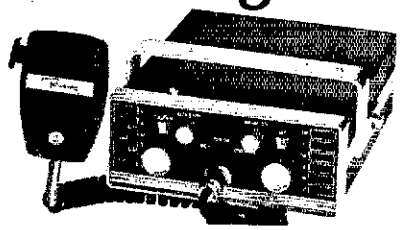
01-A	10 MHz Precision Oscillator .2 ppm	$ 79.95
432FA	6½" tuneable High Q Cavity Filter .5 dB loss	105.00
432FA.2	Cavity Filter as above but .2 dB max. loss. Can be used ahead of 432PE preamp	$115.00
ISOLINE	2 Meter Antenna Isolator for vertical beams	14.95

Please add $1.40 shipping and handling on all orders. Prices shown are for USA only. Write or call for FREE CATALOG showing our full line of Preamps, Converters, and Precision Oscillators. Export inquiries and orders (except Canada) should be sent Extech Ltd., 5319 S.W. Westgate Dr., Portland, OR 97221.

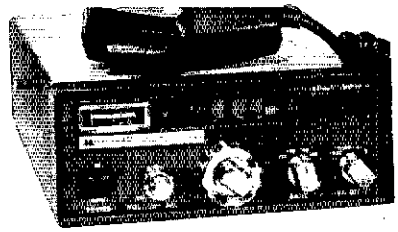
Janel Laboratories

33890 Eastgate Circle
CORVALLIS, OREGON 97330
Telephone (503) 757-1134

FM Bargains

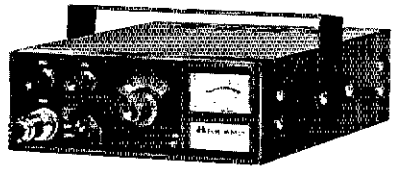


REGENCY HR-312 2m FM Transceiver. 25w, 12ch T/R w/146.94 crystals, mic & mounting brkt. (Reg $269) . . . . . **CLOSEOUT $169.00**



MIDLAND 13-510A 2m FM Transceiver. 12vdc, 25/1w, 143 - 149 MHz. PLL synth. 1200 ch in 10KHz steps with 5 Khz up-shift. 4 offsets, + or - 600 KHz and 2 optional postions. Size: 2-5/8"H x 6-3/4"W x 9-5/8"D. Mic and mobile mt included. (Reg.$399.95) . . . . . **SALE $349**

13-513 220 MHz FM Transceiver. Looks like 13-510 . 20, 10 or 2 watts output. 100 frequencies between 220.00 and 225.00 MHz in 10 KHz steps with a 5 KHz shift-up. 4 offsets, + or- 1.6 MHz supplied, 2 optional. (Reg. 449.95) . . **SALE $389**



13-509 220 Mhz FM Xcvr - 10w, 12ch w/223.50 Mhz, mic & mt. (Reg. $179.95) . . . . **SALE $159**

YAESU FT-227R 2m FM Transceiver. 12vdc. 10w. 800 ch synthesized, 144-148 Mhz. in 5 KHz steps. Memory, standard plus programmable offsets, tone burst, LED readout. Mic & mounting brkt.(Reg.$389.00) . . . . . **SALE $339.00**

FT-227RA New model of above w/autoscan feature (Reg. $399) . . . . . **SALE $359.00**

master charge THE INTERBANK CARD

VISA

CALL AES NOW - NO CHARGE

— Use our TOLL FREE NUMBERS —

AMATEUR ELECTRONIC SUPPLY®

4828 West Fond du Lac Avenue
Milwaukee, Wisconsin 53216
Phone (414) 442-4200
Wisconsin WATS: 1-800-242-5195
Nationwide WATS: 1-800-558-0411

Branch Stores in:
Wickliffe, Ohio & Orlando, Florida

---

2 KW 6 meter station — Drake TR6, Raytrack amplifier, Universal 26-60 foldover tower, 130' RG-17U, TR44 rotor, 24" 2 1/8 mast, beams, mike, monitor scope, excellent condition, $2250 firm. WBØRIW, 9229 Lincoln Ct., Wichita, KS 67207. 316-686-6288.

AMPLIFIER Parts — Vacuum Variables, vacuum relays, hi-transformers, 4CX1000s and sockets, coaxial relays. Yaesu YC-355D frequency counter $80. Mark Mumaw, WB6UOE, 801 N. Fairview, Burbank, CA 91505. 213-849-9164.

SELL: Kenwood Twins — $575, Dentron tuner 10-80AT-$50, w/custom cabinet — $650 Kenwood TR 2200A, chgr, batteries, 8 pr. crystals — $150, IC 215 Mint chgr, batteries — $180. Wanted HT 220 for 450 MHz. Call Larry Katz, WA2EHM, 212-646-4167.

REASONABLE, tubes, literature, tester, recorders, components, Moderns; antiques. S.a.s.e.; 10 pages. W4BLQ, 8158 Edgewater, FL 32032.

YAESU Station: FR101S w/cw filter, SP101B, FL101, FL2100B, cables, manuals, factory checked for the sale, shipping paid, $1450. Mike Peters, W9GHY.

KENWOOD TS-900 xcvr, ac supply, ext. vfo; excellent condx. Owner's & shop manuals, spare matched finals, orig. cartons, cables, dust cover, etc. See July '73 QST for product review. New over $1.1 k, asking $750. Martin, WBØMJG, 303-452-7917.

WANTED: HW-101 or Swan 350C or 500C or Tempo One or 2020 with p.s., manuals, untampered. KØOIK 319-355-2472 evenings.

FOR SALE: Hy-Gain 3750 transceiver with speaker and VFO $1,600. Collins 32S 3A $1,800. Collins 75S 3C $1,200. MidCom Electronics, Inc. 314-961-990.

SELL: Telrex 3-el 20 mtr; Wanted: Phone patch. K1RO 203-266-7478.

RTTY, Hal ST-6 (3 shifts) $165. CV-89 T. U. with scope (any shift) $60. Alltronics Model L (2 shifts) with scope and polar relay $80. All units unscratched, working perfectly. Prices include UPS. K6TFZ, 6053 Goodland, North Hollywood, CA 91606.

2KW 80-10 m ssb linear amplifier, 1kW cw, using two 4-400As. Top quality components, excellent signal. Includes power supply, $300. Bill, K4GAD/2 201-273-3653.

SIGNAL one CX7A serial 0897710243 out of California. Modified to CX7B all except led display. Excellent condition, spare final. $1200. WB2MPZ, Tony Sperduti, 4740 Newton Road, Hamburg, NY 14075. Home 716-649-7527. Work 716-821-3593.

OMNI-A, TEN-TEC's newest. Must sell with ps 252 MO. Used 3 hours. $850 shipped USA. WD4IBN 1-615-344-8625.

SYNCOM 1 — Tempo $298. KDK — FM 2016A — $327. TS-520 — $679. FT-101F — $649. Bird distributor — Complete stock now! 20 amp power supply $69. Mustang 1 kW dummy load $15. Lunar 2M 10-80 BL amp. $169. FT-227 RA — $327. Amphenol PL-259 49 cents. Radio Wholesale, 2012 Auburn Avenue, Columbus, GA 31906. John, WB4JUN: 404-561-7000. Nites & holidays: 404-561-5300.

WANT: Vomax (T4XC), W9MTS 312-394-9418.

ICOM 22S with VIP mod. $185. WA1RIT, 11 Glenwood Rd., Andover, MA 01810.

SALE: Swan 350C transceiver & 117CX power supply and speaker. Absolutely mint. Used very little. Original cartons & manual. $395. & ship. Plane, 42 Pennsylvania Ave., Niantic, CT 06357.

SALE: Pearce-Simpson Gladding 25 watt 2 meter tm transceiver with built in pre-amp. Mint. $125. & ship. Plane, 42 Pennsylvania Ave., Nianitc, Conn. 06357.

NCX-3 transceiver — A-1 condition, manual homebuilt a.c. power supply — Shure 444 mike — MFJ ant. tuner, 16010 new — Heathkit SWR bridge, Hallicrafters speaker — all $270. WB2CVT, 125-12 Cronston Ave., Belle Harbor, NY 11694. 212-634-2167.

HT-220 vhf 5W, 6 freq. $400; HT-220 5W, 2 freq., PL $350; uhf HT-220 4 freq, OL, 4W $350. Rapid Battery charger $100. WB4ORM 904-863-1700.

SELL Heathkit SB-200 amplifier — $350. Drake TR-22C with AC-10 power supply $225. All equipment in excellent condition with manuals. 313-623-7620 or Bill Prazuch — K8IFK 3663 David K. Dr., Waterford, MI 48095.

JOHNSON 275 Matchbox, 750 watts, ssb, $50. Bill K4GAD/2 201-273-3653.

FOR SALE: Heath SB-102 transceiver, HP-23A power supply, SB-600 speaker, $400. 606-679-5801 after 6:00 P.M. EST, or Dexter Alexander, 337 N. Maple St., Somerset, KY 42501.

TELREX 15 meter beam, optimum spaced 5 elements on 36 foot boom, excellent only $175. Wilson DB-33 $95. Prefer local deal. KØCKX 319-354-4478.

TWO Tram/Diamond 60, AM/SSB transceivers, easy conversion to 10 meters, like new condition, $75.00 each. WB2KOS, 25 South Hillside, Succasunna, NJ 07876. 201-584-3575.

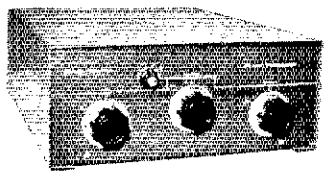
BIRD slugs. Have 10D, 50E, 5000H. Need 250H, 500H, 1000H. W4NIQ.

VFO Hy-gain 675A. Claimed output 38.235 MHz to 38.675 MHz. Tested 38.213 MHz to 38.741 MHz. Very stable. Fine tune 17 kHz. Floating 12V chassis. Original retail $99.95, $50 new in box. Schematic included. Dennis Sneva, WB7QMB, 430 West 3rd, Moscow, ID 83843. 208-882-5837.

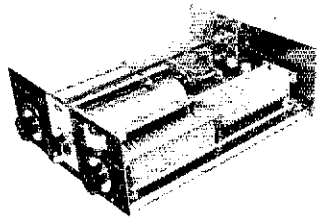
TRADE-Galaxy Comm 1A 200 watt xtal controlled ssb

NEW — FROM MURCH ELECTRONICS — THE ULTIMATE TRANSMATCH

NEW — The UT-160 & UT-160B



UT-160, less balun & meter $194.50 + shipping
UT-160B, with balun, no meter $212.75 + shipping

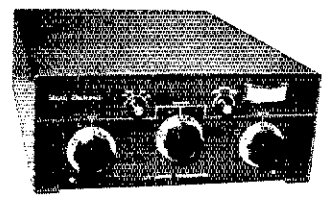


Internal construction
Of UT-160 models

- UT-160, UT-160B, UT-160M & UT-160MB models:
- Air wound inductor tapped every turn each band
- All B models for use with balanced lines, heavy duty 3 core balun
- All M models have relative output meter

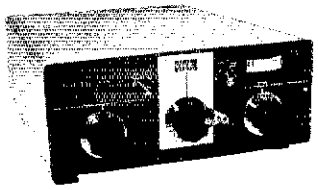
12"Wx15½"Dx5"H, 13 lbs. shipping wt.

NEW — The UT-160M & UT-160MB



UT-160 M with meter, no balun $212.75 + shipping
UT-160MB with meter, balun $230.50 + shipping

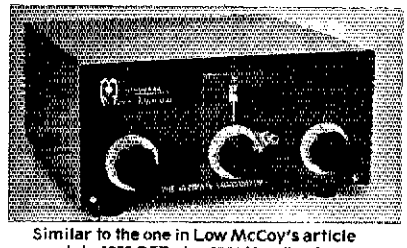
NEW — The UT-2000B



- Continuous coverage 160-10 meters
- Rotary inductor with turns counter
- Relative power output meter
- Three core balun

12"Wx15½"Dx5"H, 13 lbs. shipping wt.
$242.50 + shipping

MODEL UT-2000A
ULTIMATE TRANSMATCH

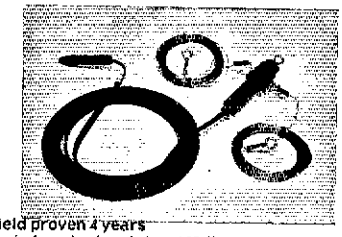


Similar to the one in Low McCoy's article
July 1970 QST also 1976 Handbook

- Use with any coax or end fed random wire antenna, ideal for apartment dwellers
- 80-10 continuous, including MARS
- Rotary inductor with turns counter for precise and rapid tuning

12"Wx12"Dx5½" H, 12 lbs. shipping wt.
$139.95 + shipping

MODEL 68A
MULTIBAND ANTENNA 10-80 M



- Field proven 4 years
- Sealed center insulator, 102 ft. wire, 30 feet heavy duty twin lead
- Coax fitting to connect twin lead to 52 ohm transmission line (68 feet or more, not included)
- Ready to use. Great on all bands when used with the Ultimate Transmatch
- 2000 w P.E.P.

$44.50 p.p.

SEE YOUR DEALER OR ORDER DIRECT

- Use these Transmatches with any antenna — dipoles, random wires, verticals, whips, beams
- Function switch — in, out, dummy load (not supplied), ground (switch not on UT-2000A)
- Provides SWR of 1 to 1 to the transmitter
- Full legal power on all bands 160 to 10 meters (UT-2000A 80 to 10)
- Outputs for coax, random wire, balanced line
- 4000 volt capacitors, heavy duty construction throughout
- Use with any watt meter, SWR bridge
- Changing frequency by a few kilocycles normally requires only a slight adjustment

Send for our literature

MURCH ELECTRONICS, INC. BOX 35 FRANKLIN, MAINE 04634 PHONE 207-565-3312

KAUFMAN BALUN

new and improved

KAUFMAN water tight BALUN — molded plastic — with or without BALUN 1:1 impedance match

Patent No. D219106 — For dipoles, beams, inverted "V", and quads

KAUFMAN Center Insulator with BALUN	$15.00 postpaid USA
KAUFMAN Center Insulator without BALUN	10.00 postpaid USA
Dragon Fly antenna construction sheet and drawing	2.00 postpaid USA

3 Kw PEP
4 Ounces
Q1 Ferrite

KAUFMAN INDUSTRIES
BOX 817
REEDS FERRY, NH 03054

S-LINE OWNERS

ENHANCE YOUR INVESTMENT

with

TUBESTERS™

Plug-in, solid state tube replacements

- S-line performance—solid state!
- Heat dissipation reduced 60%
- Goodbye hard-to-find tubes
- Unlimited equipment life

TUBESTERS cost less than two tubes, and are guaranteed for so long as you own your S-line.

SKYTEC
Box 535
Talmage, CA 95481

Write or phone for specs and prices.
(707) 462-6882

CURTIS LSI's help you

speak MORSE

- ★ 8044; Keyer-On-A-Chip* (Replaces 8043) . $14.95
  Apr '75 HR, Feb '76 QST, Radio Hdbk '75, Apr Hdbk '77-78
- ★ 8044-3; IC,PCB,Socket,Manual 24.95
- ★ 8044-4; Semi-Kit 54.95
- ★ 8045; Morse Keyboard-On-A-Chip IC . . . 59.95
- ★ 8045-1; IC,PCB,FIFO,Sockets,Manual . . 89.95
- ★ 8045-2; Semi-Kit 159.95
- ★ 8046; Instructokeyer-On-A-Chip IC 49.95
- ★ 8046-1; Semi-Kit 79.95
- ★ 8047; Message Memory-On-A-Chip IC . . 39.95
- ★ 8047-1; IC,PCB,RAM,Sockets,Manual . . 69.95

(add $1.75 on above for postage and handling)

EK-430; CMOS Keyer* (Feb '76 QST) 124.95
IK-440A; Instructokeyer* (Mar '76 QST) 224.95

*now with dash memory as standard

System 4000 Ham Computer (see Jan '78 QST) (write)

Curtis Electro Devices, Inc.
Dept. Q (415) 964-3136
Box 4090, Mountain View, CA 94040

HAM SHACK ELECTRONICS

TEN-TEC, INC.

SWAN ELECTRONICS

Wilson Electronics Corp.

cushcraft CORPORATION

CALL OR WRITE FOR A QUOTE

(315) 788-8790

HAM SHACK

ELECTRONICS

7080 BRADLEY ST. RD.
WATERTOWN, NY 13601

SCANNER SPECIAL

REGENCY K-100
BEARCAT 210

Your Choice $199.95

• USE YOUR SWAN • VISA • MASTERCHARGE •

xnscvr w/xtals for 3987.5 kHz and 4467.5 kHz (CAP), AC400 supply and manual. Swap for Argonaut 509. Andy, WA5GYM, 152 Treehaven Dr., Jackson, MS 39212.

TEN-TEC 544 digital transceiver, remote VFO, blanker, cw filter, VOX, power supply, like new, original cartons, $850. K8CV (ex-K8CVV) 313-549-1846.

DRAKE "C" line, R4C, T4XC, MS4/AC4, E-Tek Freq. Readout/Counter, .5 and 1.5 Hz. filters, n.b., 10 m xtals to 28.950 MHz, $1200. WA2KNF, Trade, Box 236, Setauket, NY 11733.

WANTED: SB-200. WDØFFL, 34464 Greentrees, Sterling Heights, MI 48077.

WANTED: Manual or information for a Kaar model DT76 mobile vhf fm radio. Will pay postage and reasonable fee to copy, and will return in excellent condition. Ed Fluehe, WA7DAX 3509 Muriel Way, Granger, UT 84119. 801-966-5077.

FOR SALE: Regency HR-212 with 10 channel scanner and 6LB model 400B synthesizer $225; Heathkit HA-202 40W amplifier $55; all manuals. Joe Bartz Jr., WA3NVD, 320 So. Meade St., Wilkes Barre, PA 18702.

WANTED: HY-Quad, also Ham II. All responses answered. WBØZFN.

FACTORY rebuilt Ham II rotator; unused; Rohn 10 ft. 2 in. Mast — $90. Ben Hellman, W2VB 516-621-3056.

HAVE Drake TR4C, AC4 supply, MS4 speaker, Dentron Supertuner, Hy-Gain TH3Jr, D-104 mike, extras. Want to trade for stereo components, photography or darkroom equipment, or cash offer. WD5JLH.

TOWER: Tri-Ex TM-358 55 foot self supporting — nests down to 23 feet bargain at $650. John Seibert, R. D. 2, Box 72H, Hollsopple, PA 15935. 814-288-4529.

SELL: Drake B-Line: R4B $330; T4XB, AC4 $330; MS4 $25; L4B $650. All units absolute mint condition. Used very little. Sell individually or as a package $1250. Original cartons. U-Pay UPS. W8UKT/4, 616 Allegheny Dr., Sun City Center, FL 33570. 813-634-6198.

CLEGG FM-27B all Acc., manual, etc. Excel condx $175 incl. UPS. T. Donohoe, W2NJS, 3057 Chestnut St. NW, Washington, DC 20015. 202-244-3332.

FOR SALE: Hallicrafters HT-32B mint $250. Millen 500 watt rf amplifier 80-10 m, 811As plus 1500V heavy duty p.s. $75. Johnson Viking-II, 180 watt 160-10m plus W.R.L. VFO $100. Jon Kohn, RD4, Shippensburg, PA 17257. 717-532-3175.

PROP pitch (small) $70, heavy duty MIMS rotor (110V ac) $70, Swap mint lantern slide projector for antenna tuner components or VOM. W2ZN, 3 Puddingstone Ct., Morristown, NJ 07960. 201-267-0657.

ANTIQUE Collectors: National NC-101X receiver, w/speaker, manual. One owner. Best offer over $100. FOB San Antonio. N5RA 512-822-7269.

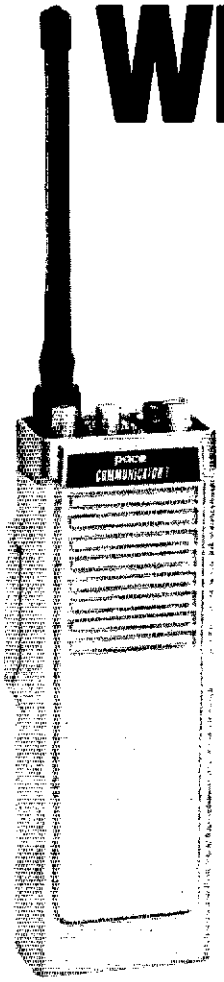
FOR SALE: Davis CTR-2 Counter factory aligned $180. Ampex 7500 VTR $100 needs repair. Ampex 5100E VTR $150 needs repair. Charles Wall, WB4MYA, Route 3, Clarksville, TN 37040. 615-552-2199.

4-1000A tube, $40. Original carton, untested. K9BO, David Cornell, 2 Oakwood Drive, Elsah, IL 62028.

WANTED: Heath HG-10B VFO. Matt Mildrem KA1AMF 203-828-0733.

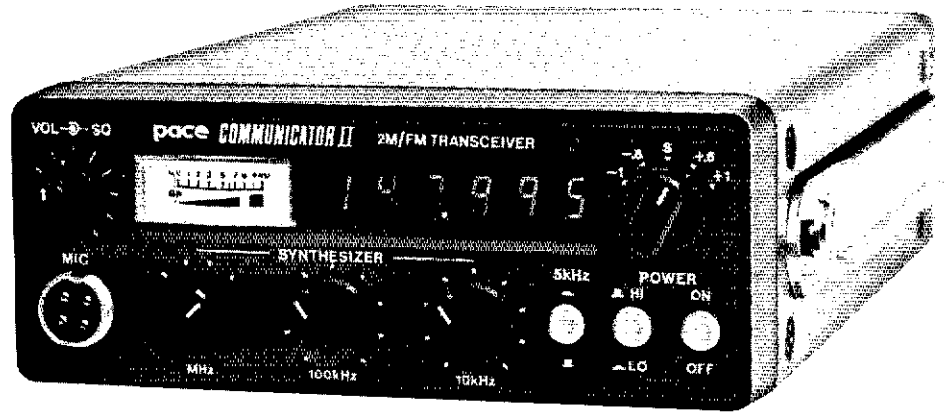
GALAXY V MK. 2 xcvr 80-10 meters w/p.s., speaker. Will take best offer. WBØYQO 515-628-2539.

WE KNOW YOU WANT THE VERY BEST!



In a market already over crowded by others, all making claim to being "THE BEST', we knew we had to be better. **COMMUNICATOR I** our 6 channel, 3 watt handheld, and **COMMUNICATOR II** our 800 channel synthesized 25 watt mobile offer all the features of the "BEST" – and a few extra, including our one year warranty and a toll free 800 number answered by other hams who speak your language.

PACE COMMUNICATOR – THE VERY BEST!



pace COMMUNICATOR

AMATEUR PRODUCTS GROUP **PATHCOM INC.** 24105 SOUTH FRAMPTON • HARBOR CITY, CA 90710

TOWER HARDWARE

GALVANIZED STEEL GUY WIRE
3/16 EHS (3990 lbs.) $9/100'.....$85./1000'
1/4 EHS (6000 lbs.) $11/100'.....$99./1000'
5/32" 7X7 Aircraft (2700 lbs.).....$7./100'

GALVANIZED CABLE CLAMPS and THIMBLES
3/16CCM (fits 3/16 or 5/32).....$.30
1/4CCM.....$.40
Thimble (fits all cable sizes).....$.25

HEAVY DUTY GALVANIZED TURNBUCKLES
3/8" Eye and Jaw (6000 lbs.).....$5.50
1/2" Eye and Jaw (11000 lbs.).....$7.50

PREFORMED GUY DEADENDS
3/16" (3990 lbs. hold rating).....$1.35
1/4" (6000 lbs. hold rating).....$1.55

HEAVY DUTY PORCELAIN GUY INSULATORS
500D (for 3/16" or 5/32" cable).....$.80
502 (for 1/4" cable).....$1.55

ROHN TOWERS
25G – $36. 45G – $58. 55G – $94.
48' 25G Foldover Tower.....$599.
48' 45G Foldover Tower.....$799.
(freight prepaid on foldover towers)
40' BX Tower (6 sq. ft. ant.).....$175.
40' HBX Tower (10 sq. ft.).....$200.
40' HDBX Tower (18 sq. ft.).....$250.
Write or Call for other Rohn Products

CDE ROTORS (Latest Production)
Ham 4 (new model).....$134.95
Tailtwister (new low price).....$184.95

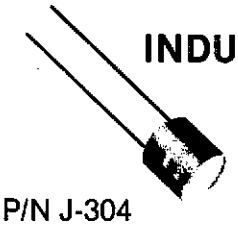
WIRE and CABLE
Belden 8 cond. rotor cable.....$.17 ft.
Mil Spec RG-213/U.....$.27 ft.

F9FT ANTENNAS
16 Element 144 Mhz.....$69.95
21 Element 432 Mhz.....$59.95

Club or Group Discounts available on large orders. Write or call K5GW for a quote on your tower needs at:

TEXAS TOWERS
113 Starlite Drive, Plano, Texas 75074
Tel. 214 / 423-2376 Mon-Sat 1 to 9 P.M.

New MINIATURE INDUCTOR



Actual Size

P/N J-304

SEND FOR SPEC SHEET

- IDEAL FOR P.C. USE
- EPOXY ENCAPSULATED
- 3.3 μH TO 10,000 μH
- TEMPERATURE 105°C
- HIGH QUALITY

*ONLY **$1.86** Each!*

MC Division
E. I. & S. Corp.
5 Lowell Ave.
Winchester, Mass. 01890
(617) 729-8700

NEW JERSEY HAMS

VISIT OUR SHOWROOMS
10 MINUTES FROM RT. 80 & 95
WE HAVE THE ITEMS YOU WANT
(Will mail or you can pick up)

2m mag mount with ⅝ antenna
LARSEN LM-MM-150K
49" stainless steel rod, quadruple plated, and coil. A full 3dB gain over a ¼ wave length antenna. Magnet guaranteed permanent in ordinary use. Complete with 12' of RG-58 AU coax & connector.
29.95 REG. 38.45

HAM KEY-Model HK-3
Deluxe straight key • Heavy base, no need to attach to desk • velvet smooth action
$13.95 REG. 16.98

WALK-IN SPECIAL!
QSL CARD HOLDERS
HEAVY PLASTIC
40 pockets
REG. 1.39 **99¢**

DRAKE LOW PASS FILTER
TV-3300-L.P. 1000 watts max. below 30 MHz. Attenuation better than 80 dB above 41 MHz. Helps TV i-f interference, as well as TV front-end problems.
Reg. 26.50 **22.95**
Limited Time Offers.
Add $2 per mail order to cover shipping & handling.

People-to-people communications
radiomasters
3 Tenafly Rd., Englewood, N.J. 07631
(201) 568-0738 (at the monument)
Master Charge & VISA Accepted

HAM II Rotator with controls, mint condition, $50, will ship. W1MZB.

FOR SALE: 32S-3 $600 & 75S-3 $500. W6USG, Box 807, Alturas, CA 96101. 916-233-4360.

TELEGRAPH Equipment — Antique sounders, resonators, relays and more. Great for Telegraph and Railroad displays or memoribilia. Send large s.a.s.e. 28c postage to Dennis Lampe, 2827 Rosebud, Cincinnati, OH 45238. Telephone 513-451-2864.

WESTERN Electric AM 1178/GRC (432 mc) Trip-Amp (4X150s), 3-5W 2 m in, 125-150W 432 mc out $35. Spectrum International H-frame (4 stack), 432 mc. $40. Nuvistor converter CN-50 (6 m) CN-144 (2 m) $25 each. PS-1 p.s. $7.50. Tempo RBF-1 SWR/watts $35. KLM 14 el. yagi, 432 mc., $16.95. 14AVQ/WB (may need trap work) $16.95. Complete sets of QST magazine 1970-78, make offer. W6RQZ.

WANTED for personal collection — National Radio SW3, SW4, AGS, FB7, FBX, S-G tuner, N6-5 tuner, HFC, HF5, NHU, SW series coils, all power supplies. Magazines — Radio News, Short Wave Craft. Bill Fox, WB6NMP, 624 Jefferson Ct., San Jose CA 95133. 408-258-9972.

SELL: Heath HW-202 w/crystals, $125; HW-202-1 p.s., $25; SB-300 rcvr, $150; SB-610 Monitorscope, $60; Motorola L43GGB 25 watt Consolette, $125; D43GGB utility base, $100; 1 ea. "G" TX and RX strips, $15 ea; 2 ea. GE 30 watt Hiband Custom Exec., $200 ea; Singer/Gertsch FM-7/DM-3 frequency and deviation meter, $600; Simpson 260 VOM, $40; Hallicrafters S-40B receiver, $25. D. Marshall, W7MBH, 1803 Scenic Dr., Alamogordo, NM 88310. 505-437-6374.

R-390A receiver, absolutely mint, little use, recent professional alignment and calibration, with manuals and cabinet. $600 plus freight. Paul Beavin, K4LRJ, 4091 Northlake Creek Cove, Tucker, GA 30084. 404-938-9245.

INSTANT cash waiting for best HW-100 offered. WD4GSJ, 10137 Brownwood, Orlando, FL 32807.

NEW HW-101 & HP-23C supply $395. Heath Pawnee $150. Swan 160X & 117AC supply $450. All mint condition. K7BDY. 602-537-2450 evenings.

WANTED: Expired ham radio license plates. Collector desires plates from all states for collection. Offering $1, each plus postage. Joe Franko, 1101 Evamar, Midland, MI 48640.

WANTED — DX100 Heathkit xmtr. Harry Ober, WB6CGZ, Box 8044, Van Nuys, CA 91409.

HW-8 Heath $100. MJF Versatuner $50. Ten-Tec 215P mic $20. Ben Dreyer, W7OUW Box 286, Lakeside, OR 97449.

TR4 with n.b. and p.s. for $450 or trade for T4XB, and KDK2015R 50 mc. old $380. K7KOT 1642 Browns Pt. Blvd., Tacoma, WA 98422. 206-927-5456.

WANTED — Kenwood remote VFO for TS-900 also wanted ac p.s. for TS-900. Pleae call or write WB8RJX, 2108 Raskob, Flint, MI 48504 or 1-313-238-0390 before 2 P.M.

WANTED — Collins linear model 30S1. Write Ralph, WB6PCZ, 321 East Cedar, Burbank, CA 91502.

WANTED: Viking VFO Model 122 with book, Jim Bullen, 5604 Mosswood Lane, Fern Creek, KY 40291.

FOR SALE: Wilson WE-800 — 2m-fm transceiver with G. E. Ni-Cads. $350. Joe — WB1GEW, 203-421-4549.

FOR SALE: Hallicrafters HT-37 xmtr $125. Hammarlund HQ 180 General rcvr $150. Mike, bug, $15 each. All excellent condition. K1RJS 203-745-0683.

WRL 40/75 ssb txcvr. 300 watts, works well, $80 without supply — WD9BHT, 715-249-5698.

DRAKE TR-4 with factory installed cw filter, RV-4C, MS-4, AC-4, mike, Jr. Monitor tuner, Trim-Tenna 20 m beam. Make offer. K3ETS, Rev. Zeares, Orrtanna, PA 17353.

ATLAS 210X with noise blanker, excellent condition $525. Fred, W6QQB 213-664-2388.

VACUUM variables, $35. 713-492-2548. D. Peak, WB5OZZ, 21235 Park Royal, Katy, TX 77450.

New Receiver Audio Filtering Processor

DXER

How many times have you lost a weak DX contact because of strong carrier interference? The 1040R exclusive 3-band continuous coverage SSB Filter will eliminate monotone carrier interference. Perhaps you enjoy rag chewing QSOs. You can now have them with your 1040R.

CW OPERATOR

DXer or rag chewer alike will appreciate the unparalleled fingertip control over a 45 or 105 Hz bandwidth filter. Even if you have a CW filter the 1040R will improve your selectivity. Just flick the switch and your contact will jump out of the pack with your 1040R.

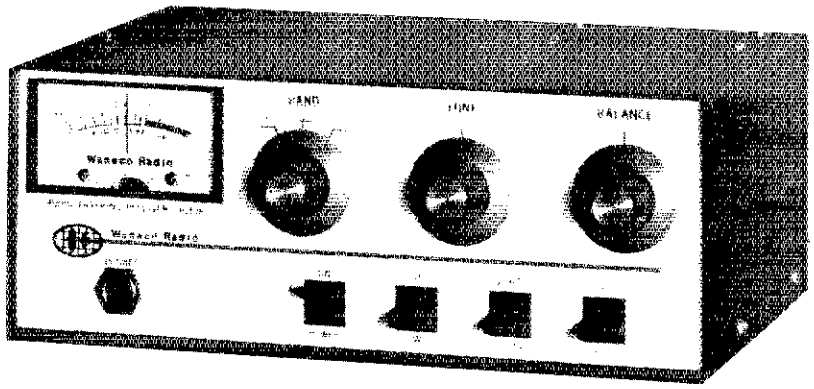
SIGNAL REPORTS

Exchanging signal reports, giving audio A/B comparisons, reporting on your friends' speech processors is one of Amateur Radio's most pleasant past-times. For the first time accurate audio level reports are possible with the audio level strength meter in the 1040R.

Model 1040R

PLUGS INTO YOUR EXISTING AUDIO OUTPUT

1 yr. warranty



$185. prepaid. USA

Delivery from stock.

master charge
BANKAMERICARD

■ **Up to −70dB noise separation** ■ **45/105 Hz bandwidth CW audio filter** ■ **Audio speech level strength meter** ■ **Built in loudspeaker with 3-way audio distribution** ■ **Continuous coverage notch filter 100 to 12,000 Hz.**

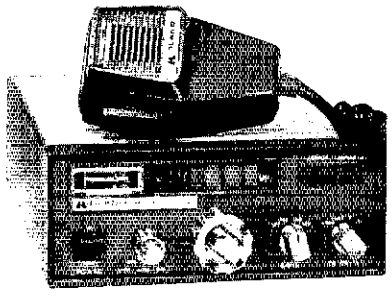
Write or phone for complete specifications.

Dealer inquiries invited.

Waneco Radio

Post Office Box 491, Hawthorne, CA 90250 ● (213) 675-2797

BIG CLOSEOUT



SAVE $100 on Midland 13-510

MIDLAND 13-510 2m FM Transceiver 12vdc, 25/1w, 144 - 148 MHz. PLL synth. 3200 ch in 10 KHz steps with a 5 Khz shift-up and 4 offsets, + or - 600 KHz and 2 optional. Multiple FET front end with high-Q resonator filter and ceramic IF filters. Large 6 digit LED readout. Polarity and VSWR protected. Tone burst and discriminator connections. Large lighted S/RFD meter. Compact size: 2-5/8"H x 6-3/4"W x 9-5/8"D. Mic and mobile mt incl. (Reg $399.95) **CLOSEOUT $299**

Order direct from this ad! Allow $6.00 for UPS. Send check or use your Mastercharge or VISA. Order by phone, TOLL FREE.

CALL TOLL FREE:

1-800-558-0411 Nationwide

In Wisconsin: 1-800-242-5195

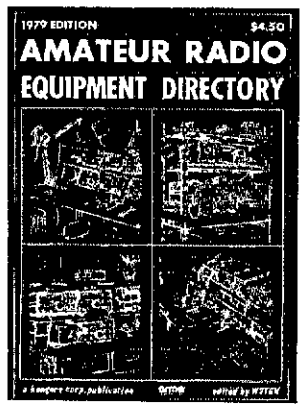
AMATEUR ELECTRONIC SUPPLY®

4828 West Fond du Lac Avenue

Milwaukee, Wisconsin 53216

Phone (414) 442-4200

ALL NEW 1979 EDITION



THIRD BIG EDITION! The most complete directory of Amateur Radio Equipment — over 1600 products — over 100 manufacturers/distributors. Includes prices, specifications and pictures of transceivers, transmitters, receivers, amplifiers, power supplies, transverters, antennas, tuners, towers, meters, microphones, keyers, VFO's, pre-amps, test gear, etc. etc.

BONUS — Included with each directory is a free newsletter containing the latest price and product information. No ham library is complete without a copy of the 1979 Edition!

Order your copy today! Only $4.50 postpaid (U.S.), $6.00 First Class Mail (U.S.) — Canada $5.50 — Foreign (air) $8.00.

KENGORE CORP. Dept. B

9 James Ave. Kendall Pk., NJ 08824

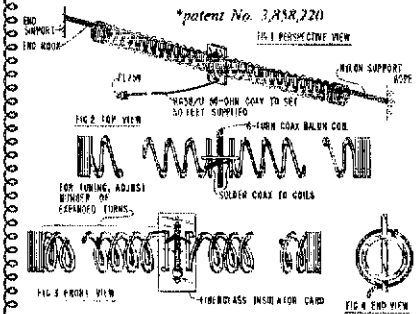
Special offer — a complete set of 77, 78 and 79 Directories is available for $9.00 (U.S. only).

SLINKY!®

a lot of antenna in a little space

new Slinky® dipole* with helical loading radiates a good signal at 1/10 wavelength long!

*patent No. 3,858,220



• This electrically small 80/75, 40, & 20 meter antenna operates at any length from 24 to 70 feet • no extra balun or transmatch needed • portable — erects & stores in minutes • small enough to fit in attic or apartment • full legal power • low SWR over complete 80/75, 40, & 20 meter bands • much lower atmospheric noise pickup than a vertical and needs no radials • kit includes a pair of specially-made 4-inch dia. by 4-inch long coils, containing 335 feet of radiating conductor, balun form, 50 ft. RG58/U coax, PL259 connector, UG-175/U adaptor, 100 ft. nylon rope and instructions • now in use by US Dept. of State, US Army, radio schools, plus thousands of hams the world over

Money Back Guarantee when returned within 2 weeks

TELETRON CORP., *AVAILABLE AT ALL LEADING DEALERS. IF NOT, ORDER DIRECT*
Suite 100
Box 64
Kings Park, N.Y. 11754

Complete Kit #80-40-20 **$39.95** postpaid
(N. Y. residents add sales tax)

name.....

street.....

town.....zip.....

enclose check with order • we ship UPS upon receipt of order • COD's $1 extra

WANTED — VHF-UHF power amp., working condition. K2LNS 34 W. Somerset St., Raritan NJ 08869.

TRANSMITTER for sale — Conar model 400, 25 watts input, crystal control for 80, 40, 15 bands, $55. WB3IEN Jerome Humphrey, 618 Magee Ave., Patton, PA 16668. 814-674-8306.

SB401, in working condition on cw only, $180, xtal pack, will ship, WA5BCB, Box 30141, New Orleans, LA 70190.

DON and Mike super guaranteed buys: ICOM IC-280 $385; Dentron GLA-1000 amplifier $319; Teletow'r 55 ft. self support/breakover $499; Yaesu FT225RD — call; Tonna 144/16 el $79.95; Hy-Gain 18AVT/WB + 100' RG8X $100; TH6DXX $238; TH3MK3 $175; Bird 43, slugs, stock, prepaid; Mallory 2.5A/1000 PIV epoxy diode 19c ea; Cetron 572B $29.50; Belden 8214 RG8 foam 25c/ft; 8448 8 wire rotor cable 16c/ft; 9888 doubleshield foam 39c/ft; Times 1/2" foam hardline 65c/ft; Berktek RG8X 15c/ft; Consolidated HD-18GA galvanized tower $29.95/10'; Alliance HD73 rotor $109.95; U100 $44.95; Amphenol silverplate PL259 59c ea. Call for fast quotes, prices FOB Houston, all items guaranteed. Madison Electronics, 1508 McKinney, Houston, TX 77002. 713-658-0268.

COMPLETE station, Heath TX-1, RX-1, SB-10, spkr, mike, cables, spare tubes. Excellent condition, cabinets mint. Best offer over $325. Kenneth Waldrop, WA4WYD, 435 N. Pond Trail, Roswell, GA 30076. 404-992-2291.

HT-220 6 freq. 16-76, 31-91, 07-67, 34-94, 52, spare, Flex antenna, ni-cads, charge, carrying case. $400. W@OZG, Rte. 1, Box 103W, Edelstein, IL 61526.

ATLAS 350XL, DD6XL, 350PS, still on warranty, $1000 or best offer. WB9EPS, eves. 608-935-3156.

DENTRON MLA-2500 with 10 meters, new, used only 10 hours, $750. High power not my thing. WA3FUJ 301-662-5784.

KENWOOD TS-520 with cw filter, remote speaker, external VFO, DG-5 digital display. Mint condition $800. K9BIL, Rte. 1, Deerfield, WI 53531. 608-249-2870.

HEATH checked HW-8 transceiver, HWA-71 power, HD-1426 meter, HD-1416 keyer, Cantenna, manuals, license course. $220 package. Novy, 505-388-1608.

WANTED — External VFO for Yaesu FT-75B, WB4QPH, 1549 Findlay St., Deltona, FL 32725.

YAESU FV-101B external VFO. Handsome, refrigerator-sized home brew linear. Two 24-hour clocks. Heath HO-10 scope & HM-102 SWR/wattmeter. Cubex quad antenna. Johnson Patch & Big Dummy. KA@CFZ Box 2442, Grand Junction, CO 81501. 303-243-4953.

KENWOOD TS-820S dc supply, D104 mic., cover, Sherwood cw filter $925. Swan 500, pwr. supply/spkr., Shure mic., $300. Barlow-Wadley XCR-30 MKII SWL rcvr. .5-30 MHz $150. Maxi-Tuner transmatch (mint) $220. Navy vlf rcvr. RAK-7, manual, less supply $50. Heath HW-8 transceiver, RIT, full break-in, ni-cads. $125. Heath HM-102 SWR/watt (new) $32. Drake TA-4 transceive adapter for SPR-4 (and T-4X series) $20. SWR/field meter $12. Realistic "Weathercube" $13. Stereo amp. 20W $10. Ten-Tec KR-50 "Ultramatic" Keyer $75. or make offer, less shipping. J. Rowland, P. O. Box 155, Park Ridge, NJ 07656.

SALE: Heath; SB-104, speaker, power supply, lambic keyer, SWR meter, Cantenna; KDK FM144; Wilson 1402 w/pad; TPL 302 amp, tone decoder. S. D. Smith 4438 Lymbar, Houston, TX 77096. Make an offer.

WANTED: Argonaut 509, 405 amplifier, and 251 power supply, or 405 and 251 only. WD9BGA, Karl Heil, 2401 Fishhatchery Rd., Madison, WI 53713. 608-251-2581.

WILSON WE-800, have two, sell one, includes power-pack, batteries, charger all 3 mo. old $410. K5YNS 512-392-4581.

DRAKE DG-3 power supply $55. You pay shipping. Alden W8JTD, 2443 Fuller Road, Colorado Springs, CO 80918

ICOM 211 mint condition, $700. W4DGA 703-273-8278.

HW-101, HP-23B, cw filter $325. Dentron 80-10AT $45. Both mint. W2GCW 518-828-9860.

SELL: Telrex beam TB5EM/4KWP, *10-15-20 $285; E-Z* Way tower RBX 40 ft tilt down-raise up with Ham-M rotator, 200 ft. cable and 200 ft. RG8U poly foam $250 panadapter PR-1-see rec. and trans. signal — $85. W9BE 312-835-1077 eves.

DRAKE SSR-1 receiver for sale. $250 all solid state. General coverage .5-30 MHz 100 percent mint. John LaVoe, 39 Church, Adams, NY 13605.

GOING mobile and QRP, everything goes, super goodies plus years of junk. S-Line: 75S-3B, 32S-3, 30L-1, 516F-2, 312B-4; custom antenna control; Heath scope; all in beautiful, walnut, custom, closable, secretary/desk-type console, fully XYL-approval for living room; Collins winged/mint. Rohn 48-foot, 25G-type, fold-over tower. Mosley Classic 33 tri-bander; rotator/control unit; mics, headsets, keyer, Vibroplex bug, 800 feet each of Belden 8214 (RG-8/U) and 8448 (control) cables; years of ham, sound, control, and broadcast junk; gold mine junkboxes of components and construction materials. Sold only as "package;" you pick up or ship; asking $4,500, but taking bids. Come inspect, I'll buy coffee. WA5EXD, in Callbook; 512-379-7317.

LIKE new Triton I and 261 p.s. $450. Perfect SB-200 $340. W. Davidson; 3000 Sedgewick; Lynchburg, VA 24503.

WANTED — Viking Valiant, Ranger, Valiant "2" or other similar cw xmtr good condition. W2JLF 11758.

A-TRONICS — code reader, like new, factory tested with instructions. $130. K1ZBD, 19 Moss Road, Monroe CT 06468. Tel.: 203-268-0067.

FL-110 linear wanted, excellent shape, KB5CA, 1591 Congo, Houston, TX 77040. 713-466-1856 after 7 P.M. CST.

THE Wilson GIVE-A-WAY

Wilson Electronics announces a factory authorized rebate program. Here's how it works:

Purchase a TT-45 and a System Three at the same time and Wilson will give you a factory 5% rebate from the price you paid for the package. You can use this to pay for the concrete to install it, or buy the XYL a little something to keep her happy! Or . . . we will give you, at no charge, a M-27, the best 7 element, 2M beam available today! The choice is yours to make!

Just send Wilson the receipt of your purchase from your dealer, showing your cost, and let us know what you want — 5% cash, or a M-27. But hurry! This offer starts April 1, expires midnight, April 30, 1979, and receipt must be mailed before June 1, 1979.

Don't wait! See your nearest dealer to take advantage of this great Give-A-Way!

SPECIFICATIONS

TT-45 TOWER

- Maximum height, 45'
- 800 lbs. winch with padlock feature
- 2800 lb. raising cable
- Totally freestanding with proper base
- Total weight, 189 lbs.

Recommended accessories:
RBRF-10, SBRF-10, CBRF-10.

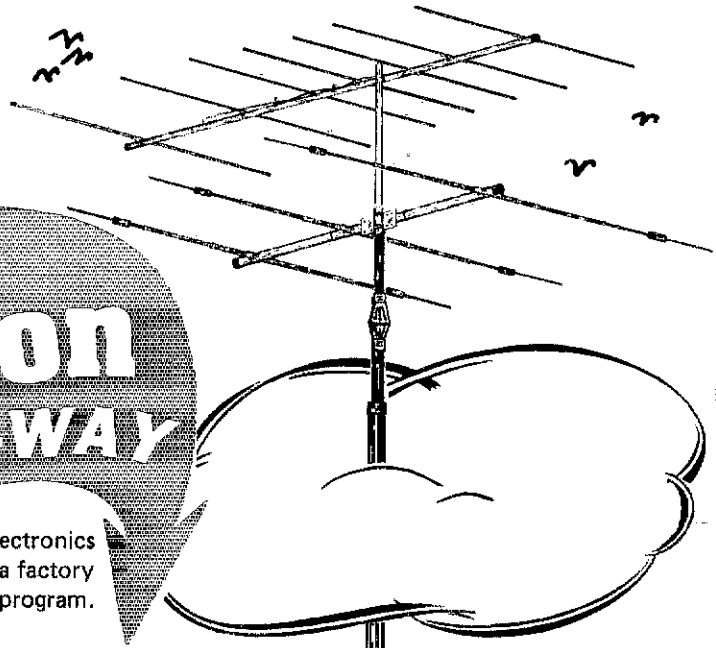
The TT-45 is a freestanding tower, ideal for installations where guys cannot be used. If the tower is not being supported against the house, the proper base fixture accessory must be selected.

SY-3 TRI-BAND ANTENNA

Band MHz	14-21-28	Maximum mast diameter	2" O.D.
Maximum power input	Legal limit	Surface area	5.7 sq. ft.
VSWR at resonance	1.3:1	Wind loading @ 80 mph	114 lbs.
Impedance	50 ohms	Assembled weight (approx)	37 lbs.
Boom (O.D. x length)	2" x 14' 4"	Shipping weight (approx)	42 lbs.
No. of elements	3	Direct 52 ohm feed or balun	
Longest element	27' 4"	Maximum wind survival	100 mph
Turning radius	15' 9"		

M-27 - 7 ELEMENT 2M BEAM

Band MHz	144-148 MHz	Turning radius	37.13"
VSWR	1.2:1	Mast diameter (O.D.)	1" - 1½"
Impedance	50 ohms	Surface area	.44 sq. ft.
Boom (O.D. x length)	1" x 64"	Wind loading @ 80 mph	5.5 lbs.
Number of elements	7	Shipping weight (approx)	6.5 lbs.
Longest element	40"	Assembled weight (approx)	3.5 lbs.
Beam width @ 3 dB pt.	27 degrees		



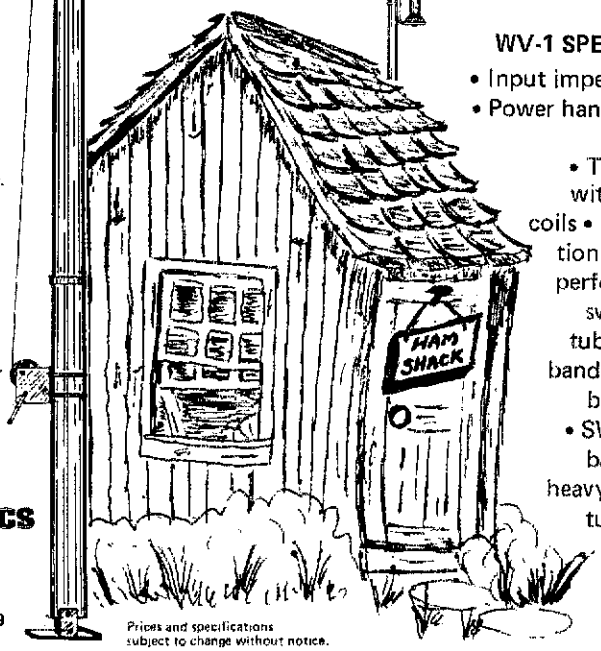
See what just some of the many satisfied Hams say about the Wilson Antennas.

My SY-3 performs like a Monobander, and loads up as easy as a dummy load!
. . . Jim Rafferty N6RJ

I always boast that my Wilson Antennas are the best in the world.
. . . Paul Panzeca W2POQ

Best move I've ever made in my Hamming career. Tnx for a great antenna!
. . . John Sklepkowycz VE3IPR

Don't forget the WV-1 for the best in vertical needs. The WV-1 is the 10-40m Antenna you should consider!



ACT NOW!

Buy the WV-1 and Wilson will treat you to the Radial Kit . . . FREE of charge!

WV-1 SPECIFICATIONS:

- Input impedance: 50 ohms
- Power handling capability: Legal limit
- Two High-Q traps with large diameter coils • Low angle radiation omnidirectional performance • Taper swaged aluminum tubing • Automatic bandswitching • Mast bracket furnished • SWR: 1.1:1 on all bands • 1½" O.D. heavy wall aluminum tubing • Does not require guying • *Overall* length: 19' 8".

Consumer Products Division
Wilson Electronics Corp.
A Subsidiary of REGENCY ELECTRONICS, INC.
4288 South Polaris Avenue • P. O. Box 19000 • Las Vegas, Nevada 89119
Telephone (702) 739-1931 • TELEX 684-522

Prices and specifications subject to change without notice.

COLLINS KWM-2 (36470) R/E, $1100; KWM-2A (16504) plug-in relays, $850; TS-820S, $875. All mint. WA6VBL. 213-249-5085.

WANTED: Three element tri-band beam, rotator. W2GVK, 516-499-7958.

FOR SALE: Hammarlund HQ-129, Knight T-60 and Heathkit VFO. Ken Class 609-587-1359.

COMPLETE Heathkit station, SB-104A transceiver, SB-230 linear, many accessories, three deck "L" shape desk riser, all mint. Also SBE-34 transceiver and Standard 826 two meter with nine channels and ac supply. Call or write for details, photo. Don Winter, WA2IQP, 56 Harbor Beach Rd., Miller, Place, NY 11764. Telephone 516-928-4152.

SELL: Heath SB-102 transceiver and SB-640 external VFO. Both excellent condition, with manuals. Package deal only. Asking $369. Watson, K1ABP, Old Farm Road, Sturbridge, MA 01566.

HALLICRAFTERS SR150, $150. Hallicrafters SR500, $350. Both have power supplies, mikes, manuals, Keith Bryant, WAØPIR, 115 Lafer St., Sigourney, IA. 52591.

FOR SALE: SBE-34 200. You ship. Phone FF7-0708, WB2YPO.

HEATH SB-102 and SB-600 $400; Heath VFO and DX60B $100; IT-121 FET tester $75. Beautiful like new condition complete with manuals, built by a craftsman. Must sell to settle estate. Langenhagen, 13 Mast Hill, Hingham, MA 02043. Telephone 617-749-1064.

WANTED: Johnson Kilowatt Desk. Chuck, WA4GGL, Box 766, Dahlgren, VA 22448.

ROSS' New Specials: all in factory sealed cartons. Kenwood TR7400 $359; R300 $235; TR7600 $323; Yaesu FT101ZD phone; FVT-250 $225; FT227R $298; YP150 $74; YC500 $195; YC500S $295; Dentron DTR2000L $1,039; GLA-1000 $314; Astro 200A $789; SPS 200 $120; BPS 200 $100; Alda 103 or 103A $425; Alda 105-phone; Swan 100MX $750; ICOM 280 $277; Midland 13-513 $375; Tempo VHV1 plus $339.90; Drake MN4C $130; TR-7/DR-7 phone; Amcomm 2M15B $169; BSM 15C $84; 2M15R $125; Alliance HD-73 $98; CD Ham III $122; Mosley TA33, $177. Call me at 208-852-0830. Ross Distributing Company, 78 South State, Preston, ID 83263.

SALE: HQ-180AX — good condition — $290. Pickup only WB2PSK Cornwell, RD2, Box 79, Blairstown, NJ 07825 201-362-8527.

FOR SALE: Yaesu station, FT-101EE FT-101B, FV-101B, YP-150, SP-101B, with fan and mikes. Heathkit HD-10 keyer and ATB-34, 4 ele. beam. Call or write William Beyer, WA2JXK, 78 Broadmoor Cir. Ormond Beach, FL 32074. 904-672-5868.

WANTED: Elmac 2-01C diode for HP 410B VTVM. Sell antique parts, RCa plate-filament transformer, magnetic modulator, grid leaks, fixed, variable capacitors, sockets, knobs, switches, old tube testers. Gene Hubbell, W7DI/W9ERU, 6633 E. Palo Verde Lane, Scottsdale, AZ 85253. 602-948-7413.

CODE practice cassettes — computer generated, perfect code. High quality, full 90-minute cassettes. QSO tapes very much like new FCC code exam. Printed text included. 25 QSOs at 15 wpm order no. C7 — 25 QSOs at 22.5 wpm order no. C8. Other types and speeds available. All cassettes $5.95 each ppd. S.a.s.e. for catalog. MC and Visa welcome. K5SMG, 810 Cardigan, Garland, TX 75040. 214-495-3604. Dealer inquiries invited.

TELETYPE model ASR35, with automatic winder and supplies. Good condition. $600. W1HXE 802-387-4653.

NATIONAL pre-WWII receiver wanted. Also consider other manufacturers. W1GWM, P. O. Box 73, Kennebunk, ME 04043.

ATLAS 180 with 117 ac console, deluxe mobile mount (all super good), including resonators for 40 and 80 meters. $525. I ship UPS. WBØWYI, John McNaught, 515-347-5398. Rte. 2, Afton, IA 50830.

HEATHKIT SB-102 transceiver, plus power supply SB-630, SB-600, microphone. Factory aligned, never used. Write for details. WB2AED, Windy Hill, Ivy Cliff Road, Campbell Hall, NY 10916.

DRAKE R4B, T4XB, AC-4, MS-4 mint $800. K5NI 4120 Kipling, Beaumont, TX 77706. 713-892-0993.

TEMPO VHF/One synthesized two meter with ssb adaptor. Works fine. $360. WBØBLR 1-712-322-0786.

SELL EICO 720 cw transmitter, EICO 730 modulator $100. Excellent condition with manuals. Ship UPS collect. WB2VFN 201-835-0528.

ATLAS 210X/NB, DMK, DCC, $690. DD6C $200. Swantenna ssb, MMBX $100. Call 205-428-8869 Jim, WA5RAX.

WANTED: Echo 70 cm transceiver new or used. WA2QVI, 24 Sheraton Oaks, North Little Rock, AR 72116. 501-835-6839.

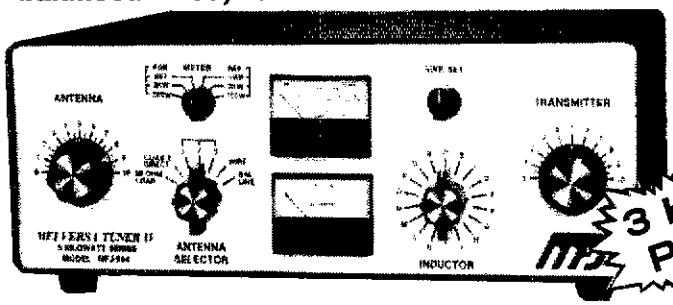
HEATH QRP transceiver HW-7 w/xtal filter, mint, $80 pp. UPS. Staker, 377 South Harrison, East Orange, NJ 07018.

FOR SALE: R 390A receiver with maintainence and operating manuals; condition: very good; frequency coverage continuous, .5- to 32 megahertz, triple conversion, linear tuning with mechanical digital readout throughout frequency range, 6 position bandwidth filters .1-to-16 kilohertz; audio filter; accessory outputs on rear of receiver — i.f.; unbalanced and balanced antenna jacks, etc. Will ship but prefer local pickup; Price $490. Telephone 203-561-1465 (K1QEN).

FOR SALE: Swan 700CX, 117XC p.s., 14C dc p.s., VX-2 VOX, WM-1500 wattmeter/SWR bridge, ST-1 antenna tuner, Murch 80-10 dipole, FS-1 f.s. meter; WB1FPD, 29 Josephine Drive, Hampton, NH 03842. 603-926-2763.

NEW MFJ *DELUXE* 3 KW Versa Tuner IV

The MFJ-984 *Deluxe* 3 KW Versa Tuner IV gives you a combination of features that only MFJ offers, like . . . exclusive RF ammeter, dummy load, SWR, forward, reflected power meter, antenna switch, balun. Matches everything from 1.8 thru 30 MHz: coax, balanced lines, random wires.



FREE MFJ LOGBOOK . . .

Just ask your MFJ dealer to demonstrate this MFJ-984 Versa Tuner IV. Logbook quantities are limited.

$299.95

This is MFJ's best 3 KW Versa Tuner IV. The MFJ-984 *Deluxe* 3 KW Versa Tuner IV gives you a combination of quality, performance, and features that others can't touch at this price.

PERFORMANCE: You can run up to 3 KW PEP and continuously match any feedline from 1.8 to 30 MHz: coax, balanced line or random wire.

FEATURES: A 10 amp RF ammeter insures maximum power to antenna at minimum SWR.

A separate meter gives SWR, forward, reflected power in 2 ranges (2000 and 200 watts).

A flexible antenna switch lets you select 2 coax lines thru tuner and 1 thru or direct, or random wire, balanced line or dummy load.

A 200 watt 50 ohm dummy load lets you tune your exciter off air for peak performance.

All metal, low profile cabinet gives RFI protection, rigid construction. Black. Anodized aluminum front panel. 5x14x14 in. 20 pounds.

A flip stand tilts tuner for easy viewing.

Efficient, encapsulated ferrite 4:1 balun. 500 pf, 6000 volt capacitors. 18 position dual inductor, 17 amp ceramic rotary switch. 2% meters. SO-239 coax connectors. Ceramic feedthru for random wire, balanced line. Binding post for ground.

QUALITY: Every single unit is tested for performance and inspected for quality. Solid American construction, quality components.

The MFJ-984 carries a full one year limited warranty.

For your nearest MFJ dealer, call toll-free 800-647-1800. Stop by your dealer. Compare it feature for feature with other tuners. Compare its value, its quality and its performance.

After a truly side by side comparison, you'll be convinced that its value, quality and features make it a truly outstanding value.

Why not visit your dealer today? If no dealer is available call toll-free 800-647-1800 and order direct from MFJ. $8.00 shipping.

MFJ ENTERPRISES, INC.

P. O. BOX 494
MISSISSIPPI STATE, MS 39762
CALL TOLL FREE 800-647-1800
For technical information, order/repair status, in Miss., outside continental USA, call 601-323-5869.

COMPUTERIZED GREAT CIRCLE BEARINGS

$1.00 Postpaid Worldwide ($2.00 for Air Mail) **$1.00**

*Centered on your QTH *Gives return bearings also
*660 locations listed *Distances in miles & km

Bill Johnston, N5KR
1808 Pomona Dr., Las Cruces, New Mexico 88001

SAFETY BELT AND LANYARDS

NYLON/NYLON S/B (USED) . . $38.50 pp.
- New ½ inch nylon rope lanyard and one new snap supplied with above S/B.
- WAIST SIZE — MEDIUM (34-42)

Vacuum Variable Ceramic Capacitors
- 25-450pF @ 40kV Jennings/ITT $275 pp.
- **COLLINS MECHANICAL FILTER**
  CENTER FREQUENCY 455Kc
  BANDWIDTH 1Kc @ 3dB .... $30.00 pp.

LINK, 1081 ARON ST., COCOA, FLA. 32922

TRIPOLE MULTI-BAND

The TRIPOLE™ antenna covers the 160, 80, 40, 20, 15, 10 and 6 meter bands without retuning or a tap change. 80 to 120 ft length. 2 KW PEP. Twinverted V and horizontal without an antenna tuner. Neat appearance, built-in balun, rugged, aids mast or tower guying. A best choice for an all-around amateur station antenna.

Guaranteed. Kit T80-K $54.95; Assembled T80-A $69.95 Prices postpaid cash. TX residents add 5% sales tax.

Call or send card for information on TRIPOLE antennas and feedline kits. Order direct or ask your dealer.

"best"

Universal Radio Co. Dept. Q1
P. O. Box 26041
El Paso, Texas 79926 (915) 592-1910

$5.45 U.S. POSTPAID
SPECIFY COLORS

$4.95 U.S. POSTPAID

Tell The World You're A "HAM"

WHITE POLY FRONT PANEL, SOLID BILL, MESH BACK AND SIDE PANELS. AVAILABLE IN ROYAL BLUE WITH RED LETTERS OR RED WITH BLUE LETTERS.

ANY TWO
$9.95
POSTPAID
S.C. RES. ADD 4%

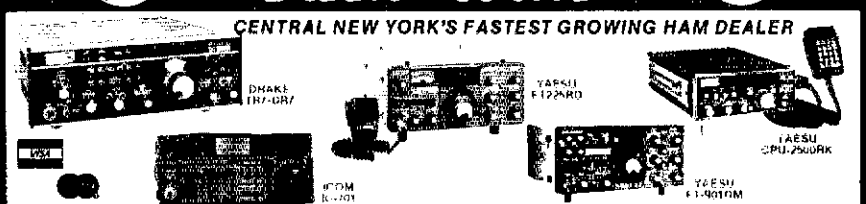
ALUMINUM PLATE, WHITE ENAMEL WITH AMATEUR RADIO OPERATOR IN RED EMBOSSED LETTERS. YOUR CALL IN WEATHERPROOF BLUE VINYL LETTERS.

$6.45 POSTPAID

QRV AMATEUR RADIO SPECIALTIES
P. O. Box 32161 Charleston, S. C. 29407

Radio World

CENTRAL NEW YORK'S FASTEST GROWING HAM DEALER



Featuring Yaesu, Icom, Drake, Atlas, Ten-Tec, Swan, Dentron, Pace, Palomar, Alda, Midland, Wilson, KDK, MFJ, Microwave Module, Standard, Tempo, Astron, KLM, Hy-Gain, Mosley, Larsen, Cushcraft, Hustler, Mini Products, Universal and Tristao Towers. *We service everything we sell!* Write or call for quote. **You Won't be Disapointed.**
We are just a few minutes off the NYS Thruway (I-90) Exit 32

Warren K2IXN

ONEIDA COUNTY AIRPORT TERMINAL BUILDING
ORISKANY, NEW YORK 13424
CALL TOLL FREE 1-800-448-7914
N.Y. RES. CALL 315-337-2622 OR 315-337-0203

Bob WA2MSH

ACCEPT NO SUBSTITUTES!

Before you make the choice of a new hand-held, ask about these important features:

1. Is the case fiberglass reinforced Lexan®?
2. Are the batteries convenient for carrying extras?
3. Is the capacity sufficient for a day's operation?
4. Is there a method for conserving battery life when high power is not required?
5. Does it fit your hand comfortably?
6. Do you have a choice of charging methods?
7. Do you have an ample choice of accessories to back up your radio?

If you can answer 'yes' to all of the above, then you've made the obvious choice.

YOU WANT A WILSON MARK IV HAND-HELD . . . AND ACCEPT NO SUBSTITUTE FOR IT!

Wilson hand-helds have been known world-wide for exceptional quality and durable performance. That's why they have been the best selling units for years.

The Mark Series of miniature sized 2-meter hand-helds continues the tradition of dependability and operation, but in an easier to use, more comfortable to carry size.

The small compact size battery pack makes it possible to carry one or more extra packs in your pocket for super extended operation time. No more worry about loose cells shorting out in your pocket, and the economical price makes the extra packs a must.

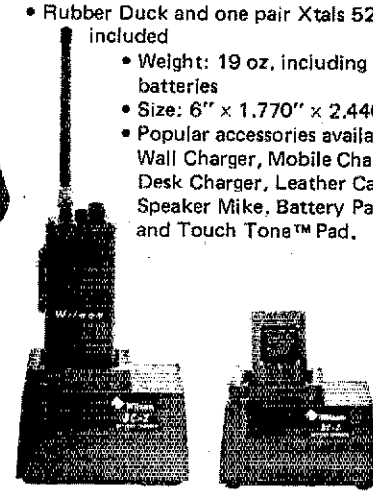
Conveniently located on top of the radio are the controls for volume, squelch, accessory speaker mike connector, 6 channel switch, BNC antenna connector and LED battery condition indicator.

Optional Touch Tone™ Pad available.

MARK IV: ≅ 1 & 4.0 watts

SPECIFICATIONS:

- Range: 144-148 MHz
- 6 Channel Operation
- LED Battery Condition Indicator
- Individual Trimmers on TX and RX Xtals
- Rugged Lexan® outer case
- Switchable Hi-Lo Power
- Current Drain: RX 15 mA
  TX - Mark IV: 900 mA Hi, 400 mA Low
- 12 KHz Ceramic Filter and 10.7 Monolithic Filter included.
- 10.7 MHz and 455 IKz IF
- Spurious and Harmonics: more than 50 dB below carrier
- BNC Antenna Connector
- .3 Microvolt Sensitivity for 20 dB Quieting
- Uses special rechargeable Ni-Cad Battery Pack
- Rubber Duck and one pair Xtals 52/52 included
- Weight: 19 oz. including batteries
- Size: 6" x 1.770" x 2.440"
- Popular accessories available: Wall Charger, Mobile Charger, Desk Charger, Leather Case, Speaker Mike, Battery Packs, and Touch Tone™ Pad.



Illustrated is Wilson's BC-2 Desk Top Battery Charger shown charging the Mark Series Unit or the BC-4 Battery Pack only.

To obtain complete specifications on the Mark IV, along with Wilson's other fine products, see your local dealer or write for our Free Amateur Buyer's Guide.

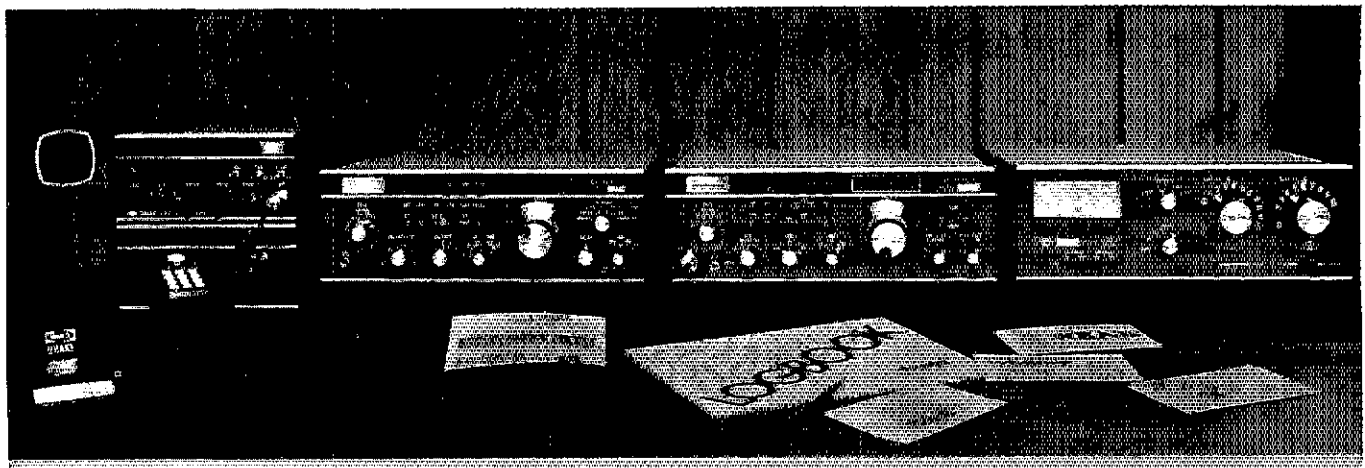
Consumer Products Division

Wilson Electronics Corp.

A SUBSIDIARY OF REGENCY ELECTRONICS, INC.

4288 South Polaris Avenue • P. O. Box 19000 • Las Vegas, Nevada 89119
Telephone (702) 739-1931 • TELEX 684-522

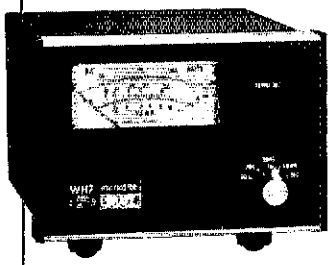
Prices and specifications subject to change without notice.



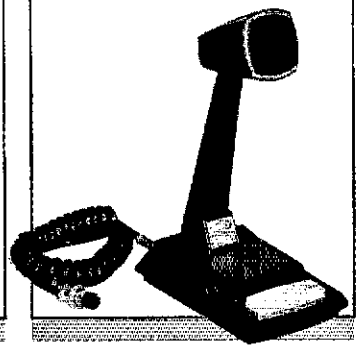
DRAKE ACCESSORIES

add a new dimension to your present gear...

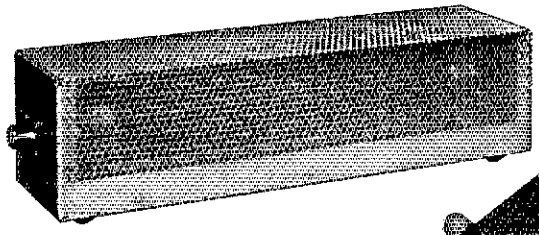
Drake WH-7 Directional RF Wattmeter



Drake 7077 Dynamic Desk Microphone

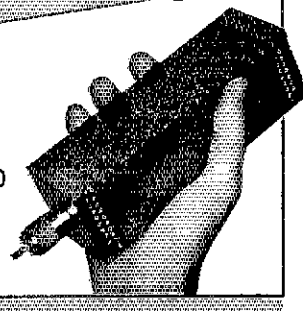


Drake "Dry" Dummy Loads



Drake DL-1000

Drake DL-300



no oil required

Model 1514 Drake WH-7

• **1.8-30 MHz** coverage • **Through-line,** versatile, lab accuracy, low cost • **Removable coupler** for remote metering • **Includes four calibrated scales:** three for rf power from QRP to high power (0-20, 0-200 and 0-2000 W full scale) and one for direct reading VSWR • **Line impedance:** 50 ohm resistive • **Power:** 2000 W continuous • **Accuracy:** ± (5% of reading + 1% of full scale) • **Size:** 5.3″H x 6.9″W x 7.5″D (13.5 x 17.5 x 19 cm) • **Wt:** 3 lbs (1.4 kg)

$89.00

Drake 7077

• **Audio and level characteristics** custom designed to match the transmit audio requirements of the Drake TR-7 • **Features both VOX and PTT** operation without modification • **High Impedance** • **Includes coil cord and plug** wired for direct installation to the Drake TR-7 • **Style and color** provide a beautiful match to the Drake 7-Line • **Size** 4.3″W x 5.8″D x 9.3″H (10.9 x 14.7 x 23.6 cm). **Wt.** 1lb, 7 oz. (650 g).

$45.00

Model 1551 Drake DL-1000

• **1000 watts** for 30 seconds, with derating curve to 5 minutes. Designed to accept Drake FA-7 cooling fan for extended high power operation • **VSWR of 1.5:1 max.** 0-30 MHz • **Provided with SO-239** coax connector, and rubber feet for desk or bench use • **Size** 14 x 3.6″ (35.6 x 9.1 cm). **Wt.** 2 lbs (910 g)

$39.95

Model 1550 Drake DL-300

• **300 watts** for 30 seconds, with derating curve to 5 minutes • **Built-in PL-259 coax connector** for direct connection to rear of transceiver or transmitter-no jumper coax necessary • **VSWR of 1.1:1 max.** 0-30 MHz 1.5 max. 30-160 MHz • **Ideal as bench test device** for amateur or commercial hf and vhf gear. • **Small size** fits conveniently in any field service tool box. 6.7 x 2.08″ (17.0 x 5.3 cm). **Wt.** 11 oz (310 g)

$19.95

Prices and specifications subject to change without notice or obligation.

For a FREE Drake Full Line Catalog contact your favorite Drake Dealer.

R. L. DRAKE COMPANY

DRAKE®

540 Richard St., Miamisburg, Ohio 45342
Phone: (513) 866-2421 • Telex: 288-017

Why Buy Microlog??

compare these EXCLUSIVE features for silent RTTY/Morse operation

AVR-2 Digital Receiving and Display System for Morse and RTTY (Baudot and ASCII).

Exclusive Features/Options:

- *New* On Screen Display of Received Morse Speed
- Real Time, 24 Hour, 6 Digit Clock
- Normal or Magnified Display
- Normal or Inverted Video (Black or White)
- Continuous Display of Operating Mode
- Regenerated Audio Tone
- Audio/Visual Tuning Indicators
- *New* Computer Trainer with Audio Cassette Interface

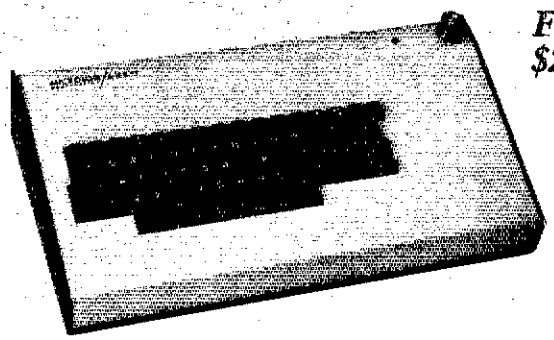
From $399.00

*9" Monitor Shown $189.00

AKB-1 Programmable Memory Keyboard for Morse and RTTY. Converts information typed in plain text to Morse and RTTY (Baudot and ASCII).

Exclusive Features/Options:

- *New* "Brag Tape" Interfaces With Your Personal Audio Cassette Recorder
- Store in Message Memory While in Transmit or Receive Modes
- Quadruply Redundant Gold Plated Keyboard Switches
- All Control Functions are Keyboard Operated — Digital or Analog Selection of Morse Speed
- Automatic Transmit/Receive Switch
- *New* Expanded Text and Message Memories to 1950 Characters
- Automatic CW Identification in RTTY
- Generates 5 Character Random Code Groups for Practice
- A Full 63 Key Keyboard
- Engraved Personalized Call Letter Key



From $299.00

(Some features above are extra cost options which may be added to the basic equipment at any time.)

*Other Monitors Available or use your own TV with R.F. Modulator $29.95

Prices Subject to Change

One year warranty on all products. Add $4.00 shipping per item. MD residents add 5% sales tax.

master charge THE INTERBANK CARD

VISA

MICROLOG CORPORATION

4 Professional Drive – Suite 119
Gaithersburg, Maryland 20760
Telephone (301) 948-5307

AUTEK MK-1 Memory Keyer, Mint, $60. Pickup only. W1DB, phone 203-429-7062, Storrs, CT.

ALL Good Gear! Heathkit: HM-102 $27.50; HD-1426 $5.50; HD-1410 $38.50; ERC SL-55 active audio filter $38.50; homebrew keyer $11; Lafayette SWR/field strength $11. I ship all. Bob Jackson, AG5X, 713-488-0065.

SWAN 750CW xcvr 117XC pwr supp. w/spkr, mint, unused, asking $600 shipped UPS. Jim, WA1EDN 413-732-0895.

DRAKE TR-3, RV-3, AC-3, new finals, alignment, One owner, mint. $395 UPS prepaid. KJFFX, 11110 Norlee Drive, Silver Spring, MD 20902. 301-949-1925.

KENWOOD 7600, two months old $295; p.s. $25. WA1YIO 603-224-5737.

HW-101, power supply, cw filter, TRAC keyer, Ham-Key paddle, Shure 444 mike, SWR bridge, Dentron matcher. All mint condition, $500. Dan Gold, WB8WRL, Cleveland, OH 216-752-0026.

KEYBOARD — Deluxe Telstar, 72 character, memory, programmable, used very little, (cost $400 new), $225. Local; Frank Stolpen, W2HZQ, 212-998-2743, 2060 E. 19th St., Brooklyn, NY 11229.

FOR SALE — Or Trade — Like new in original cartons: 1) HAL — RVD-1005 visual display unit. 1) HAL ST-6 RTTY terminal unit with AK-1 atsk-OSC. 1) HAL — RKB 2010 keyboard with 128 key extended memory key strokes, dual mode for cw. 1) MD 12 modified page printer — automatic carriage return. 1) Oscilloscope for tuning. 1) Complete set of technical manuals. All for good video tape recorder outfit. Zeb DeVille, K5ISY, Box 4007, Alexandria, LA 71301. 318-640-0234.

FOR SALE: Reel tape dipole model 18TD $45. Info-Tech computer system 30C with monitor & keyboard $650. Hy-Gain ferrite balun $10. ToughTone pad complete $25. D-104 w/preamp $25. TR4C $500. TR4CW $600. Power supply AC-4 $120. Bird Termaline dummy load model 82A $125. VOM Triplett model 630-NA $55. Glen Staples, 5005 W. Yale Ave., Denver, CO 80219.

SELL: Complete Yaesu station FT-301D, FP-301, FV-301, YO-301, $1100. Also have FT-221R $425, FT-620B $275. All excellent with manuals and original cartons. George Jones, W4XP, 10009 Nottingham, Huntsville, AL 35803. 205-883-1503.

HAMMARLUND HQ-110C 6-160m receiver, god condition with clock, $100 or best offer. Jack Parmentier. WB2SIB, 166 Canton, Tonawanda, NY 14150 716-693-4182.

COLLINS S/Line, winged, 75S3B with cw filter, 32S3 with speech processor, speaker and ac supply. $1400 complete, or consider separate. WA6IYC, 1352 Calle De Oro, Thousand Oaks, CA 91360.

OLD Radio Tubes. Disposing of my collection of old and rare radio tubes. Send want list and s.a.s.e. to N4XE, 2739 Colonial Ave., Roanoke, VA 24015.

TEMPO 2020 seldom used with matching VFO. Both shipped for $690 certified check. WB7ODF, Rte. 1, Box 50, Rathdrum, ID 83858. 208-772-5203.

TEMPO One with digital readout, fan — $295. Bob Craig, K6XZ, 707-539-1007.

MOTOROLA HT-220 slimline on 146.52, immaculate E series $350; Hallicrafters SX-73 $125; 2 RCA 7094 tubes & 35 ea. WB6KCN 213-893-9224.

WANTED — owner's and/or service manual with schematic for KDK FM 50-SXR II. Will pay for Xeroxing if you call me first at 505-455-2392 after 6 P.M. MST. Bob Skaggs, KA5BHQ.

SALE — 2 meter Clegg FM-DX with Vista XX-R power supply — less than 3 hours logged. Mint everyway — manuals — $385 firm. 804-572-3534, WD4NCB.

DRAKE TR4CW — $475. W1EWD, 5 Sunnyslope Drive, Middletown, CT 06457.

SWAN 500-C (clean) with 230XC pwr supply. Transceiver completely gone thru and aligned by Swan Jan. 79. $400 firm. (WB7ECU), Route 1, Box 667-A, Hayden Lake, ID 83835, or call 208-772-4751.

SELL Drake R4B receiver, T4XB transmitter. MS-4 speaker and power supply. With manuals $750. W1TIM 802-886-2874.

COLLINS KWS-1 $595; 75A4 — $350; KWM-1, 516E-1, 516F-1, mobile mount — $395. All excellent condition. Pickup by buyer desired. Les Dubin, W2AQN, 514 Esplanade, Pelham Manor, N.Y. 10803. 914-738-2697.

FOR SALE: 51S1 $1350. Raytheon marine xceiver (ssb/am, 65W) $495. Prop-pitch (large) converted by mech eng; accessories, cable (better than Telrex!) $695. SR2000, PS2000, HA20 $795. FT101B, FV101A $599. FT301D, FP301, CW $795. HW12/HW32, ac/dc $150 ea. New: VFO700S $100. TR7400A $359. 351D1 $50. 351D2 $75. R599D $319. IC280, IC3P $449. W1FBG, 603-436-2884 (nites).

KIRK 3 element helicoidal 40 meter beam, never assembled, $450. Original cost $589. Yaesu FTV-650 6 meter transverter, $85. Will ship either. Does anyone have any contest software for Digital Group Z-80 system? John Hill, P. O. Box 307, Eastham, MA 02642. 617-255-6980.

SELL: 75S3 w/200FL, ex condx, $475. Steve — WA8RXL 216-758-1891.

HEATH HW-2021 2 meter handheld with auto-patch and 3 xtals, excellent condition $180. WB9TVT 414-458-9800 — ZIP 53081.

30 AMPS at 13.8 V dc (115 V ac input) power supply. 5 year limited warranty. Hammertone metal case. $124.95.

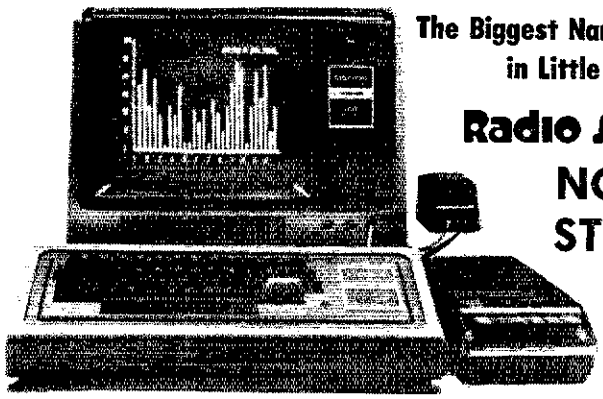
Spring Cheer is Here!

A CHORUS OF VALUE FROM . . .

Burghardt INC.
AMATEUR CENTER

"America's Most Reliable Amateur Radio Dealer"

The Breakthrough RADIO SHACK TRS-80 Computer



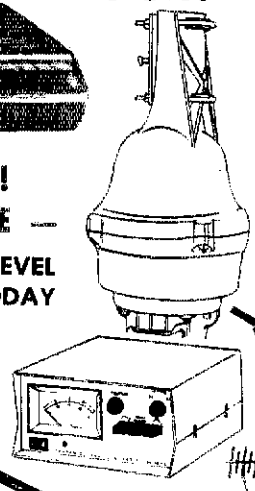
The Biggest Name in Little Computers!

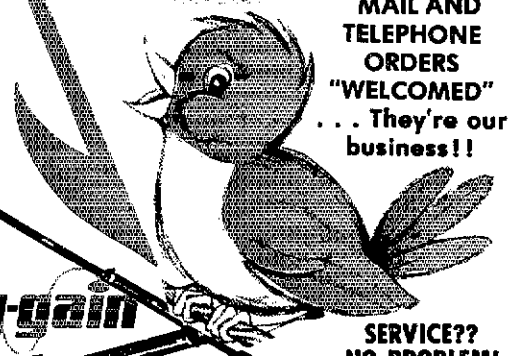
Radio Shack

NOW IN STOCK!

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

S-P-E-C-I-A-L INTRODUCTORY OFFER!
F-R-E-E $75.00 "SOFTWARE" PACKAGE —
YOUR CHOICE w. PURCHASE of TRS-80 LEVEL II/16K RAM Machine at $988.00! Write TODAY for Full Information!





MAIL AND TELEPHONE ORDERS "WELCOMED" . . . They're our business!!

CDE HAM-IV ROTORS
New/Improved Heavy Duty Rotor with Control (LESS CABLE)
NOW ONLY . . . $159.95

hy-gain

SERVICE?? NO PROBLEM! It's OUR Policy.

Wilson

Mosley

"CHARGE IT"

VISA master charge

SPECIAL TRI-BAND BEAM OFFER SAVE 10% PLUS

SWING INTO SPRING with a NEW 10-15-20-METER BEAM!

SELECTED SAVINGS on MOSLEY, HY-GAIN and WILSON TRIBAND BEAMS and CDE HAM-IV ROTORS
TERMS: "CASH" ONLY/NO TRADES!

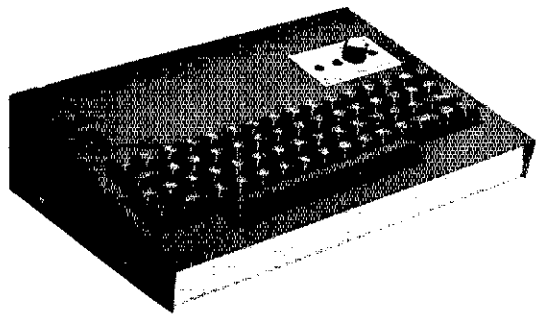
MAKE/MODEL	DESCRIPTION	REGULAR PRICE	SPECIAL PRICE	PACKAGE PRICE*
HY-GAIN TH3-MK3	3-Element/1KW	$229.95	$179.95	$311.90
HY-GAIN TH6-DXX	6-Element/2KW	$299.95	$249.95	$374.90
MOSLEY TA-33JR.	3-Element/1KW	$151.85	$129.95	$266.90
MOSLEY TA-33	3-Element/2KW	$206.50	$169.95	$299.90
MOSLEY TA-36	6-Element/2KW	$335.25	$279.95	$399.90
MOSLEY CL-33	3-Element/2KW	$232.50	$189.95	$320.90
MOSLEY CL-36	6-Element/2KW	$310.65	$259.95	$379.90
WILSON SYSTEM I	4-Element/2KW	$274.95	$224.95	$349.90
WILSON SYSTEM II	3-Element/2KW	$219.95	$179.95	$311.90
WILSON SYSTEM III	3-Element/2KW	$199.95	$169.95	$299.90

** INCLUDES NEW CDE HAM-IV HEAVY-DUTY ROTOR IN ADDITION TO TRI-BAND BEAM! SHIPPING INFO: ALL FREIGHT-CHARGES — F.O.B. WATERTOWN — "COLLECT!"*

PHONE NO. (605) 886-7314 P.O. BOX 73 WATERTOWN, SOUTH DAKOTA 57201

MKB-2000 KEYBOARD

NEW!



ONLY $300.00 ppd.
(Wis. Res. add 4%)

MORE FEATURES FOR YOUR MONEY

* Complete set of alphanumeric, punctuation, and special function keys
* 512 character text buffer
* 10 reprogrammable 50 character message memories
* 5-99 WPM, keyboard selectable
* Built-in sidetone with adjustable tone and volume
* Buffer/Memory fullness indicators
* RTTY with "Brag Tape" cassette interface, AFSK modulator, ASCII, and memory expansion options available
* 1 year warranty on parts and labor
* Attractive anodized brushed aluminum and gray wrinkle finish case, only 13.3 x 9.4 x 3.5 in.

Send For Free Information **Order Yours Today**

Ask About Our MVD-1000 Video Display

DGM ELECTRONICS

master charge VISA

787 Briar Lane, Beloit, Wis. 53511 (608) 362-0410

electronic calculators

LIST	HAM NET	TEXAS INSTRUMENTS ELECTRONIC CALCULATORS
$299.95	$269.95	T.I.-59, 960 STEP PROGRAMMABLE SCIENTIFIC
124.95	112.45	T.I.-58, 480 STEP PROGRAMMABLE SCIENTIFIC
59.95	53.95	T.I.-57, 150 STEP PROGRAMMABLE SCIENTIFIC
49.95	44.95	T.I.-55, 32 STEP PROGRAMMABLE SCIENTIFIC
59.95	53.95	T.I. PROGRAMMER, CONVERTS DECIMAL/OCTAL/HEX
69.95	62.95	T.I. MBA, SUPER PROGRAMMED FINANCIAL
LIST	**HAM NET**	**HEWLETT-PACKARD ELECTRONIC CALCULATORS**
$750.00	$675.00	H.P.-97, 224 STEP PROG SCIENTIFIC PRINT/VISUAL
450.00	405.00	H.P.-67, 224 STEP PROG SCIENTIFIC
275.00	247.50	H.P.-19C, 96 STEP PROG SCIENTIFIC PRINT/VISUAL
175.00	157.50	H.P.-29C, 98 STEP PROG SCIENTIFIC
175.00	157.50	H.P.-10 BASIC HAND HELD PRINTER VISUAL
325.00	292.50	H.P.-91, PREPROGRAMMED SCIENTIFIC PRINT/VISUAL
100.00	90.00	H.P.-33E, 49 STEP PROG SCIENTIFIC
80.00	72.00	H.P.-32E, PREPROGRAMMED SCIENTIFIC WITH STAT
60.00	54.00	H.P.-31E, PREPROGRAMMED SCIENTIFIC
495.00	445.50	H.P.-92, PREPROGRAMMED FINANCIAL PRINT/VISUAL
120.00	108.00	H.P.-38E STEP PROGRAMMABLE SUPER FINANCIAL
75.00	67.50	H.P.-37E, PREPROGRAMMED FINANCIAL

WE STOCK ALL HEWLETT-PACKARD CALCULATOR SOFWARE AND ACCESSORIES

SEND ME THE CALCULATOR(S) INDICATED BELOW. COMPLETE WITH INCLUDED ACCESSORIES, INSTRUCTIONS AND MANUFACTURERS WARRANTY. I UNDERSTAND THAT IF I AM NOT COMPLETELY SATISFIED I MAY RETURN IT WITHIN 10 DAYS FOR A COMPLETE REFUND (LESS SHIPPING)

MODEL(S) _____ QUANTITY _____ AMOUNT ENCLOSED $_____

WE HONOR _____ VISA _____ MASTERCHARGE _____ MONEY ORDERS _____ COD

ADD $2.00 FOR POSTAGE AND HANDLING. PLEASE ALLOW 10 DAYS FROM DATE OF RECEIPT OF ORDER FOR DELIVERY. TEXAS RESIDENTS ADD 5% SALES TAX

CARD NUMBER _____ EXPIRATION DATE _____

FULL NAME _____ CALL _____

STREET _____ CITY _____ STATE _____ ZIP _____

MORE LITERATURE MODEL(S) _____

**********DEALER INQUIRIES INVITED**********

Hartwells Office World, Inc.

MAIL TO: 6810 LARKWOOD
HOUSTON, TEX 77074
ATTN: STEVE, WA5OEN
PHONE: A.C. (713) 777-2673

All ratings continuous duty. Other models: 20 amp, $99.95; 16 amp, $79.95; 10 amp, $69.95; 8 amp, $59.95; 6 amp, $44.95. Add shipping; COD accepted. JRS Electronics, (WA8OGS), P. O. Box 1893, Cincinnati, OH 45201. See you at Dayton Hamvention.

FOR SALE: TI SR-56 prog. pocket calculator, $45; Unique long wire tuner, $55; Mini-Products hybrid quad HQ-1 antenna, $70; Heath SB-614 station monitor, $125; all excellent, all with manuals. U ship evns/wkends 913-651-6021. WBØUPR.

KENWOOD TS820S digital with manual, $825, certified check, original carton, K5BPY, 2101 South Rankin, Edmond, OK 73034. Phone 405-341-7501.

COLLINS Station KWM-2 (late), 516F-2, 312B-4, 75S3-C (all Round), 1500, 800, 500, 100 and am filters for receiver. $1800 or best offer. Call Jack, N6UC, 714-544-5369.

RTTY HAL ST-6 terminal unit with AK-1 AFSK generator $225 incl UPS. WD4CKA 615-453-1892.

OSTs back issues to 1915, call or write — 1931 to 1940, $200 — 1950 to 1965 $75 plus UPS — W3ZD, 215-675-4539 — 520 Centennial Road, Warminster, PA 18974.

WANTED: Railroad landline telegraph sounder. Richard Bondurant, 3461 Scottview Drive, Richmond, VA 23225.

SIGNALONE CX7B, immaculate, warranty $1495. Payne Radio, K4ID, 615-384-2224.

ANTENNA closeout: Wilson WV-1 40-10 meter vertical, $54.95. System II, $154.95. System I, $184.95. Coax — times 500 RG-213/U, MIL Spec replacement for RG-8, 100' multiples, 23c/ft, 400' roll (shipped UPS), or larger quantities, 21c/ft. Universal aluminum towers, self supporting — 25 percent off list. Add shipping; COD accepted. JRS Electronics, (WA8OGS), P. O. Box 1893, Cincinnati, OH 45201.

HEATHKIT SB-101, HP23A power supply, SB-600 spkr, $300. Ext. VFO LM-640, $125, SB-610 monitor scope, $125, SB-220 linear, $400, Heath keyer and all Single Banders, make offer. SB-303 rcvr., $200. Negotiate. K3RLY 301-631-5277.

WANTED: HT-220 Slimline without PL. WAØNRF. 218-525-2945.

FOR SALE, Phillips Model PM3240 dual-trace 50 MHz oscilloscope. George Cobley, KØKGR, RR 1, Box 95, Central City, IA 52214 (319-842-2653).

DRAKE cw rig, R-4 receiver; 2-NT transmitter; Heath HG-10B VFO. 100 watt, full break-in. Excellent condition. Cables and manuals. $325. WB6NAM, 41 Castle St. San Francisco, CA 94133. 415-433-7519.

SALE: R599A with 6 and 2 meters, excellent $380; KDK FM144-10SXRII synthesized, excellent $260; Wilson HT HH400C Commercial on 143.9 thru 148.15 rare excellent T.T.P. $500. Vhf 450 transceiver with scan, 4 watt, $200; 144 synthesizer $100.; Clegg Venus 6 meter needs tech $100; KBØAR, 303-247-1515 P.M.

HEATHKIT HW-101 — 2 months old, factory aligned and still under 90 day warranty, HP23C power supply and speaker all for $450, HW32 — 20 meter SSB transceiver $90. WB2VPT/1, Pine Hollow Drive, Middlebury, CT 06762. 203-758-8195.

HEATH SB-300 with cw/am filter, SB-400 with crystal pack, SB-600, Turner mike, mint condition $400; DX-60B, HG-10B VFO, Johnson T-R switch $125, All with manuals. A. Bacchi, 36 Tidewater Ave., Massapequa, NY 11758.

WANTED: Collins mechanical filters for 75A4 receiver. Part no. 522-9090-00 F-455J-08 800 c.p.s. Part no. 522-9092-00 F-455J-60 6 kc. E. W. Maddux, Rte. 4, Box 410, Warrior, AL 35180.

ESC 144 Jr. Needs some work. As is $250. Hy-Gain 18 AVT/WB $30. Ask for N1ACH 203-677-4875 after 7 P.M.

HEATH SB-102, cw filter, HP-23B, HP-13B, and SB-600. Excellent condition. Includes manuals, cables. $475 takes all. WA9RLF 312-473-0926.

DRAKE T4X, R4, AC4/MS4, cables, many xtra xtals. I'll ship; $550. AJ6J, 1907 Tondolea, LaCanada, CA 91011. 213-790-4054.

YOUR MARK II & MARK IV HEADQUARTERS!

MARK II 2.5-WATT $229.95 Plus Shipping

MARK IV 4-WATT $259.95 Plus Shipping

IN STOCK

THEY WORK AS GOOD AS THEY LOOK!

SHOWN WITH OPTIONAL TT PAD

SPECTRONICS, INC

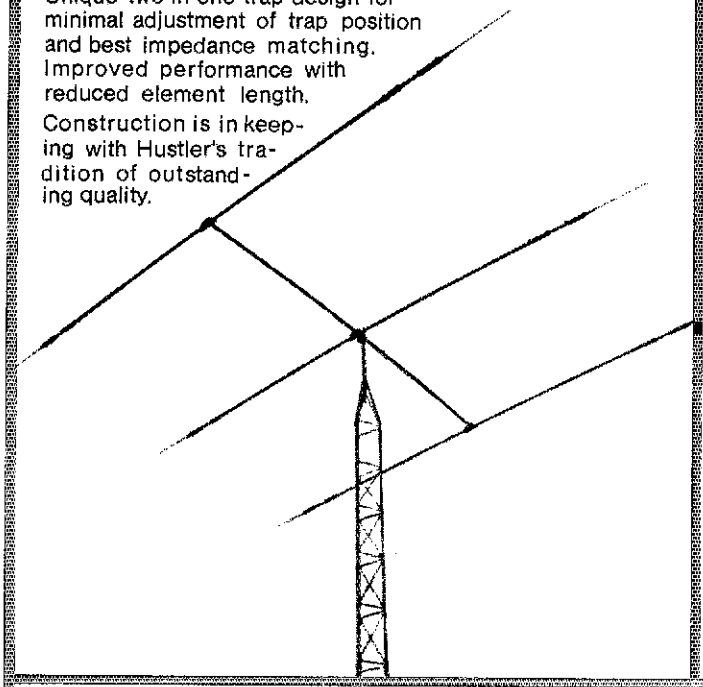
(312)848-6777 1009 GARFIELD ST. OAK PARK, ILL. 60304

What's new from Hustler...

3-TBA Tri-Band Beam
10 - 15 - 20 Meter
Fixed Station Antenna

Unique two-in-one trap design for minimal adjustment of trap position and best impedance matching. Improved performance with reduced element length.

Construction is in keeping with Hustler's tradition of outstanding quality.

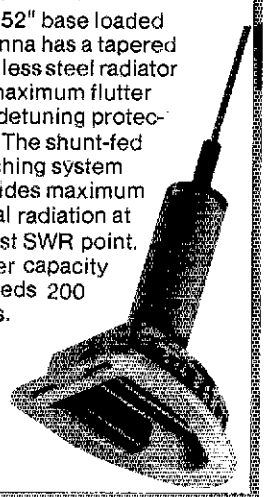


BBLM-144A
2-Meter
Magnetic Mount
Antenna

The truly unique magnetic mount design grips with greater strength than conventional magnetic versions.

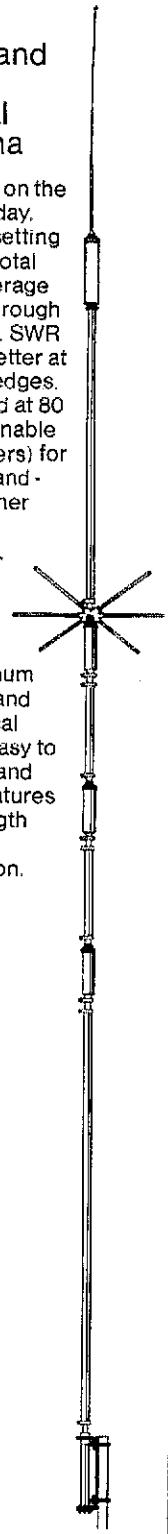
Get full use of your vehicle as a ground plane.

This 52" base loaded antenna has a tapered stainless steel radiator for maximum flutter and detuning protection. The shunt-fed matching system provides maximum signal radiation at lowest SWR point. Power capacity exceeds 200 watts.



5-BTV
Five Band
Trap
Vertical
Antenna

The finest on the market today. One trap setting provides total band coverage from 40 through 10 meters. SWR is 1.6 or better at the band edges. Top loaded at 80 meters (tunable to 75 meters) for greater bandwidth; higher radiation frequency. Solid one-inch fiberglass trap forms give optimum electrical and merchanical stability. Easy to assemble and install. Features high strength aluminum construction.

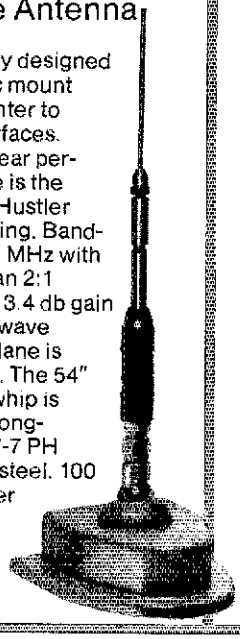


MOM
Magnetic
Mount
Monitor
Antenna

The center loaded MOM features a magnetic mount design that holds with five times the efficiency of other brands. Multi-band design covers all VHF-UHF frequencies from 37 to 512 MHZ. 17-7 PH tapered stainless steel whip and chrome plated brass parts provide longer life.

SFM
2-Meter
5/8 Wave Length
Magnetic Mount
Mobile Antenna

The newly designed magnetic mount holds tighter to metal surfaces. Sharp, clear performance is the result of Hustler engineering. Bandwidth is 6 MHz with better than 2:1 VSWR. A 3.4 db gain over 1/4 wave ground plane is achieved. The 54" tapered whip is made of long-lasting 17-7 PH stainless steel. 100 watt power capacity.



HOT-10
Trunk Lip
Mount Mobile
10 Meter
Antenna

Get in on the 10 meter band action now with this new center loaded antenna from Hustler. Installs easily with no special tools. The mount has 180° swivel adjustment for vertical positioning. And the HOT-10 has a 17-7 PH 53" stainless steel mast for long life performance!

HUSTLER®

Clearly the choice of those who know quality.

See us at the
Dayton Hamvention

new·tronics corporation

15800 Commerce Park Dr. • Brookpark, Ohio 44142

KDK FM 2016A

at $359.00 it's for YOU

FULL POWER

That's right, the New KDKFM2016A Two Meter Transceiver at **$359.00** is for **YOU**. 1000 Channels, Built-in Mars, Cap Frequency coverage, Big Bright 3/8" LED Digital Readout Display, 4 Channel Ram Memory, any offset, any split, 16 Watts output and much more. Shown with the optional UP800 Micro-Programmer — Total Programmable Scanning capability! Optional Touch Tone Encoder Microphone Model FMMC-1 for **$49.95**. Matching power supply model FMPS-4 for **$39.95**. Come in, call or write, let us ship one of these new exciting transceivers to you. You may trade in your Receiver, Transmitter, Transceiver, Linear, or What-ever. **Call Now**. Prices FOB N.Y.U.S.A. Export Inquiries are invited.

CTG Communications Technology Group, Incorporated

448 Merrick Road, Oceanside, N. Y. 11572 U.S.A. (516) 536-5724

Communications for Worldwide Use

COLLINS 136B-2 recent $75. Kenwood TR-7200A $150. Nye-Viking SSK-1K keyer $65. Sky-Tech CW-1 speaker $10. Ameco PT-2 transceiver preamp $50. Craig 4 amp regulated supply $20. 115/230 3000 V dc 850 mA transformer $25. FOB Henry TP400 dc supply $40. Other items from 25 year collection, list for s.a.s.e., 209-733-3215, Dick Shideler, 3731 Evergreen, Visalia, CA 93277.

BEAM headings — Computer generated for your QTH. Includes all ARRL countries, U.S. states, VE provinces, UA Republics, VK territories, others. 8 page listing $5. Deluxe version includes approximate time differences $6. Bruce McNair, N2YK, 12 Marion Ave., Howell NJ 07731.

FREQUENCY Counter. Simpson model 710, 10 Hz to 60 MHz plus. New, still in box. $100. WB6NAM, 41 Castle St., San Francisco, CA 94133. 415-433-7519.

COLLINS filters: F455FA08 — $75, F455FA21 — $50. W9ZR, 1-414-532-6643.

I Will assemble and test your Heathkit. Please write or call me for complete details. Paul J. Preidecker, WA5WBF, 4123 Durness Way, Houston, TX 77025, 713-667-4293.

FOR SALE: VHF Engr. 2m xcvr, good condx, 2W, 5 sets xtals, pop. freqs., mic., cables. Must sell quickly for book money for college. Asking $100 call 315-268-4353 WA2ZRK.

COAX — RG8U foam $17.95 100ft. 80 percent shield $19.95 95 percent shield RG58U or RG59U $6.95 100 ft. shipping $2/100. Free Catalog — amateur, commercial, connectors, stereo. Nemal Electronics, Dept. QS49, Box 2712 Miami, FL 33140.

GOODIES: Drake SC-2, SC-6, CC-1, CPS-1 $150; Magnum Srx for T4X-C $99; Classic 36 $175; Hygain 80-10m dipole $49; New KLM 14 e 2m beams $49, baluns $19; Weather radar, 50 mile range, complete $395 or trade. Want High power amplifier components, large hf/vhf antennas and towers. Inquiries s.a.s.e. Jim Stitt, 800 Franklin Road 6, Lebanon, OH 45036.

COLLINS Kilowatt station. Mint condition. KWD-1 transmitter $575, 75S3 receiver $450, 75A4 receiver $375 with manuals. If package, sale will include CDE direction control and Electro-Voice Model 606 Microphone. Estate W9IMP, 222 Cedar Avenue, Danville, IL 61832. 217-442-0268.

COLLINS wanted: S/Line, 312B4, 30L1. W9QYH, 1605 Ridge Rd., Green Bay, WI 54304.

FOR SALE: Kenwood TS-700A, mint condition, $450, WB6DSK, 2000 Vista Drive, Modesto, CA 95355. 209-526-9573.

HEATH HW101, HP23A, new 6146's, good condition w/manuals $250. Shipped UPS collect upon receipt of certified check. Joe Schwartz, 1352 Kingfisher, Apt. 25, Sunnyvale, CA 94087.

DRAKE TR-4CW, AC-4 supply, RIT, 7075 Mic., new August, mint, hardly used, $750. WA2UOI, Lexington Smith, NYC, 212-TR9-6580.

SELL: Hallicrafters SX-117 receiver $150. HT-44 w/p.s. $200. Home brew 1 kW (811's) amplifier $150. All in mint condition. Call W. Luhrs 201-741-4322 after 5:00 P.M.

FT-901 DM $1150, FTDX560 $350, Dentron Supertuner $95, Unique wire tuner standard $95, equipment mint condition. W1ABJ, 1751 Beacon, Brookline, MA 02146. 617-232-7080.

NEW Triplett 0-5 V dc edge panel meters (model 420E) 0-5 V dc range 4 inch scale, regular price $41.84, our price $20. Alltronics, 15460 Union Avenue, San Jose, CA 95124.

BUSINESS For Sale: Radio Sales and Service located on busy U.S. Highway 19 St. Petersburg Florida near the Pinellas Square Mall. Business comprised of C-B, Phone, Radio and Marine Equipment. 1978 gross sales $147,000. Same owner 9 years. Land for sale if desired. Owner will consider trade, terms or cash to a responsible party. Total price for business is $100,000. Premiere Associates, Inc. Realtor 4801 — 49th St. No. St. Petersburg, FL 33709. 813-522-0551.

TR-7400A "KENWOOD" OWNERS: SCANNER KIT

- Installs completely inside rig, no obtrusive external connections.
- Scans the complete band or only the portion you select on the Mhz switch of your rig (e.g. 144-148 or 146-148 Mhz).
- Scan frequency is displayed on digital readout.
- Two miniature toggle switches supplied with kit (Scanner: on-off, scan-lock) may be mounted externally or on the top or bottom cover of the rig.
- In the scanner off mode the TR-7400A behaves normally, in the scanner on mode the scanner locks up on an occupied frequency, pauses for a preset time (3-30 seconds) and then resumes scanning. This means you can eavesdrop all over the band without lifting a finger. When you hear something interesting you flip the switch to the lock mode and the rig is ready to transmit.
- Scans at the rate of 50 Khz per second.
- Complete with detailed instructions (even for the beginner).

INTRODUCTORY OFFER
Kit: $39.95; preassembled and tested: $59.95
add $1.50 for postage and handling

FT-227 "MEMORIZER" OWNERS: SCANNER KIT

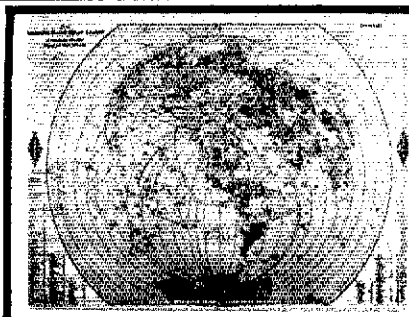
- Selectable sweep width (up to full band).
- Scans only the portion of band you select.
- Scans at the rate of 200 kHz per second.
- Switch modification on mike allows you to scan past, or lock on, any occupied frequency.
- Complete kit with detailed instructions.
- Installs inside rig; no obtrusive external connections.
- Rig can easily be returned to original condition whenever desired.
- Scans to present limits and reverses
- Automatic bypass of locked frequency in 3½ seconds unless you press lock-on switch.

Kit: $34.95, preassembled and tested $54.00
add $1.50 for postage and handling
Also available: Scanners for your IC-22S; $34.95 kit; $54.00 assembled.

DEALER INQUIRIES INVITED

AED ELECTRONICS

750 LUCERNE RD., SUITE 120
MONTREAL, QUEBEC, CANADA H3R 2H6
TEL. 514-737-7293



WORLD MAP

A big 30 x 40 inches; printed in eight colors. Continental boundaries plainly marked. Each country prefix shown on the country and in a marginal index for easy reference.

The ARRL World Map is your best buy in operating convenience. $3.50 postpaid anywhere in the world.

THE AMERICAN RADIO RELAY LEAGUE, INC.
NEWINGTON, CT. 06111

NEW CW COPIER

Now you can copy the fast CW stations. The NEW DE-150 plugs into a transceiver's earphone jack & displays Morse code as it is being received. New characters are entered from the right and shift left giving a continuous display of the latest code received. $425.

One year warranty and 15 day return privilege. Add $3 for shipping. VISA & MC cards welcome.

Dynamic ELECTRONICS INC.
(205) 773-2758 Box 696 Hartselle, AL 35640

with innovative system engineering that offers you a number of "first in the world" features.

The Drake 7-line system:

Drake TR-7: The first amateur transceiver in the world to offer full general coverage (0-30 MHz) reception capability, 1.8 to 30 MHz transmission capability, and synthesized "up-conversion" design techniques. It's ready now for future band expansions, MARS, and other services.

Drake R-7: The first amateur receiver in the world to combine full general coverage (0-30 MHz) reception and synthesized "up-conversion" design techniques, with transceive capability, full passband tuning, notch filter and dual receive antenna circuitry.

The Drake UV-3 system:

Drake UV-3: The first amateur fm transceiver in the world to offer 3 fully synthesized bands (144-220-440 MHz) in a single transceiver, and bandswitched from the front panel. A remote mounting kit, PS-3 matching ac supply and 1525EM pushbutton microphone round out the system.

For a FREE Drake Full Line Catalog contact your favorite Drake Dealer.

R. L. DRAKE COMPANY DRAKE®

540 Richard St., Miamisburg, Ohio 45342
Phone: (513) 866-2421 • Telex: 288-017

NATIONAL HRO-M rack mounted receiver complete with rack mounted speaker and coil storage. All coils included. Best offer. Estate W9IMP, 222 Cedar Avenue, Danville, IL 61832. 217-442-0268.

Jobs for Hams

COUNSELORS: Ham Radio, Camp Wayne children's camp, N.E. PA Jul./Aug. 12 Allevard St., Lido Beach, NY 11561. (include tel no.) 516-889-3217.

CAMP Counselor: Minimum age 20. To operate amateur station, teach code; assist in building kits. June 23 — August 20. Camps in New England. Write: K2GBS 18 Dolma Road, Scarsdale, NY 10583.

SUMMER camp counselor. General or better, to teach Novice program and DXing at boys private camp in New Hampshire. Good equipment, triple beam tower, established program. Approx. mid-June to August 20th. Winter office: Camp Cody, 5 Lockwood Circle, Westport, CT 06880. Mr. Stolz 203-226-4389.

WANTED for summer of 1979: Instructor in electronics and ham radio. Must have at least a General class FCC license. Small boys' science camp in Pennsylvania. Apply: Donald Wacker, 43 Franklin Street, Cedar Grove, NJ 07009.

COUNSELOR — Maine boys camp — Ham Radio — Electronics — Code — General license — May bring own equipment. June 20th — Aug. 18th. Write: R. Krasker, 95 Woodchester Drive, Chestnut Hill, MA 02167.

SYRACUSE Cable Systems — Inside Plant Supervisor — must be comfortable with video waveform, VITS and quantitative video testing. Vhf experience required — microwave experience desirable. Mainline Technician — responsible for maintenance of cable television two-way mainline and distribution system using state-of-the-art techniques and instrumentation. Requires willingness to work outdoors and two years previous experience in maintenance of cable vision amplifiers. This is an opportunity to participate in one of the most advanced systems in the country. Contact Roy Ehman VE6EV/W2 at Syracuse Cable Systems, 500 South Salina Street, Syracuse, New York 13202. 315-474-4444. An Equal Opportunity Employer M/F.

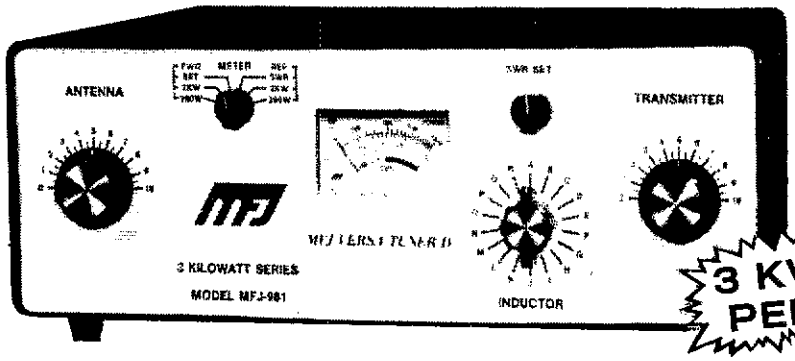
Index of Advertisers

AED Electrontes: 196
AGI Electronics: 134
ARRL '79 National Convention: 165
AR Technical Products: 163
ATV Research: 158
Accu-Circuits: 182
Advanced Receiver Research: 182
Aldelco: 134
Aluma Tower: 173
Amateur Electronic Supply: 130, 170, 171, 173, 174 177, 178, 183
Amateur License Instruction: 158
Amateur Radio Supply of Nashville: 149
Amateur Wholesale Electronics: 128, 129
Ameco Publishing Co.: 171
American Radio Relay League: 99, 102, 106, 115, 116, 119, 173, 186, 196
Amphenol RF Division: 130
Antenna Supermarket: 174
Associated Radio Communications: 163
Atlantic Surplus Sales: 175
A-Tronix: 169, 184
Autek Research: 139
Autocode: 130
BW Communications Co.: 158
Barker & Williamson, 176
Barry Electronics: 172
Rex Bassett Electronics: 162
Bell Industries: J. W. Miller Division: 112
Belcher, Inc.: 186
Burghardt Amateur Center: 192, 193
Butternut Electronics: 160
C Comm: 187
C & A Electronics Enterprises: 124
Caddell Coil: 173
Certified Communications: 173
Clegg Communications: 103
Cohoon Amateur Supply: 105
Colorado Silver Co.: 168
Command Productions: 175
Communications Center: 107, 127
Communications Services: 175
Communications Technology Group: 196
Comtronic: 99
Cornell-Dubilier: 111
Cubex Company: 108
Curtis Electro Devices: 179
Cushcraft: 5, 121
DGM Electronics: 126, 194
D&V Radio Parts: 180
Davis Electronics: 164
Dayton Hamvention: 160
Dentron Radio: 4, 114, 118, 162, 167
R. L. Drake: 190, 197
Dynamic Electronics: 196
E.H. Electronics: 108
Ehrhorn Technological Operations: 100
Electronic Research Corp. of Virginia: 146
Fair Radio Sales: 169
Fuji-Svea: 104, 176
G.I. Enterprises: 184
G.I.B Electronics: 170
Germantown Amateur Supply: 138
Gilfer: 161
G.I.S.M.O.: 167
Gotham: 104
Greene Insulator: 186
Group III Sales: 177
HAL Communications: 137
Ham-n-Aids: 106
Ham Hobby Publishers: 180
Ham Radio Center: 102, 104, 106, 109, 110, 112
Ham Radio Outlet: 96, 97
Ham Shack Electronics: 168, 179
Hamtronics (Hilton, NY): 152
Hamtronics (Trevose, PA): 143
Harrison Radio: 140
Hartwell's Office World: 194
Henry Radio Stores: 1, Cov. II
Hobby Systems: 180
Hustler, 195
Hy-Gain Electronics: 159
ICOM: 2
Info-Tech: 109
Inline Instruments: 161
International Crystal Mfg. Co.: 7
Janel Laboratories: 176, 178
Johnston, Bill-Computerized Great Circle Bearings: 188
KLM: 120
Kampp Electronics: 161
Kantronics: 126, 150
Kaufman Industries: 179
Kengore Corp.: 183
Kirk Electronics: 180
LaRue Electronics: 184
Lattin Radio Laboratories: 138
Link, John: 188
Lunar Electronics: 165
MC Division: Electronic Instrument & Specialty Corp.: 181
MFJ Enterprises: 108, 148, 150, 155, 156, 166, 171, 172, 175, 188, 200
Macrotronics: 154
Madison Electronic Supply: 170, 177
Magnavox: 158
Microlog: 191
Mid Com Electronics: 164
Mini-Products: 172
Murch Electronics: 179
N&G Distributors: 101
National Radio Institute: 147
Nye Co., William: 173
Optoelectronics: 117
Pagel Electronics: 142
Palomar Engineers: 198
Pathcom, Inc.: 181
Payne Radio: 110, 122
Poly Paks: 136
QRV Products Co.: 188
Radio Amateur Callbook: 158
Radiomasters: 181
Radio World: 188
Robot Research: 157
Rush Electronics: 146
Rusprint: 154
SST Electronics: 161
Sams, Howard W.-Computer Books: 131
Savoy Electronics: 112
Sherwood Engineering: 173
Shure Bros., Inc.: 123
Sign Man: 169
Skylane: 169
Skytec: 179
Southeastern Crystal Corp.: 166
Spectronics: 169, 173, 180, 194
Starved Rock Radio Club Hamfest: 142
Swan Electronics: 135
TET Antenna Systems: 125
Teletron Corp.: 183
Telrex Labs: 111
Ten-Tec: 109, 113, 144
Texas RF Distributors: 145
Texas Towers: 181
Thomas Communications: 132, 133
TOWTEC CORP.: 169
Tri-ex Tower: 153
Trio-Kenwood: 6, Cov. IV
Tufts Radio Electronics: 151
UPI Communications: 138
Unadilla Reyco: 142
Unique Products: 134
Universal Radio: 188
Van Gorden Engineering: 182
WIEP DX QSL Service: 186
Waneco Radio: 183
Webster Radio: 199
Western Radio Electronics: 175
Whitehouse, G.R. & Co.: 168
Wilson Electronics: 185, 189
WrighTapes: 168
Yaesu Electronics Corp.: 141, Cov. III


Dial your discount...
Call Webster FREE
(800) 344-2198
IC-280
Transceiver
Special Introductory Offer
List $551
KENWOOD Transceiver TS-520S
160 thru 10M
List $849.
PRICE TOO LOW TO PRINT
ICOM IC 701S, 160 thru 10M
PRICE TOO LOW TO PRINT
Call or write for your monthly SUPER DISCOUNT BULLETIN!
KENWOOD
KENWOOD 2M FM
TR-7600 List $375.
Dial for your discount!
YAESU
YAESU FT-227R
2 Meter FM $399.
Dial for your discount!
KENWOOD Transceiver
TS-820S 160 thru 10M
List $1299.
PRICE TOO LOW TO PRINT
KENWOOD R-820 $929.95
List $1099.
KENWOOD
TL-922 List $1199.
Dial for your discount!
DRAKE
YAESU FT-901DM
160 thru 10M $1459.
Dial for your discount!
YAESU Receiver
FRG-7 Broadcast to 30 Mhz $370.
Dial for your discount!
KENWOOD FM/SSB
TS-700SP List $759.
Dial for your discount!
DRAKE TR-7/DR-7 $1295.
PS-7 $195.
Dial for your discount!
ICOM
KENWOOD RM-76
List $125.
Dial for your discount!
ICOM
YAESU FT-101ZD
FT 101E, 160 thru 10M $895.
Dial for your discount!
DRAKE TX T-4XC $699.
RX R4C $699 160 thru 10M
Dial for your discount!
ICOM Transceiver 2M FM SSB
IC 211 List $991
Dial for your discount!
ICOM 245-SSB
2 Meter FM SSB
PRICE TOO LOW TO PRINT
Super Signal Savings!
ROTORS
CD44 $154.95 - SALE $94.95
Ham X $349.95 - SALE $199.95
Total Tower lines available.
Call for info.
ROTORS
Ham III
Reg. Price $194.95
NOW ONLY $114.95
Prices subject to change without notice!
ICOM Transceiver 2M FM
IC 245 List $620.
Dial for your discount!
Webster
SWAN
SWAN 100MX, 80 thru 10M
1 KC readout, built-in noise
blanker and VOX
Send us your name and address — get ADVANCE INFO FREE
FT-202
Hand-held
Transceiver
$199
Dial for your discount!
Call for price and additional information!
Books Available:
ARRL Handbook
US & Foreign
Call Books
Webster
radio, inc.
2602 E. Ashlan, Fresno, CA 93726 — Ph. (209) 224-5111

NEW MFJ-981 3 KW Versa Tuner IV

For $199.95 you can run up to 3 KW PEP and match everything from 1.8 thru 30 MHz: coax, balanced lines, random wires. Built-in balun, SWR, dual-range forward and reflected power meter.



3 KW PEP

FREE MFJ LOGBOOK . . .

Just ask your MFJ dealer to demonstrate these 3 KW Versa Tuner IVs. Logbook quantities are limited.

$199.95

The NEW MFJ-981 3 KW Versa Tuner IV lets you run up to 3 KW PEP and match any feedline continuously from 1.8 to 30 MHz: coax, balanced line or random wire.

This gives you maximum power transfer to your antenna for solid QSO's and attenuates harmonics to reduce TVI and out-of-band emission.

An accurate meter gives SWR, forward, reflected power in 2 ranges (2000 and 200 watts).

A new all metal, low profile cabinet gives you RFI protection, rigid construction, and sleek styling. Black finish. Rich anodized aluminum front panel. 5x14x14 inches. A flip down wire stand tilts tuner for easy viewing.

Efficient, encapsulated 4:1 ferrite balun. 500 pf, 6000 volt capacitors, 18 position dual inductor. 17 amp, 3000 volt ceramic rotary switch. 2% meter. SO-239 coax connectors, ceramic feedthru for random wire and balanced line. Binding post for ground.

Every single unit is tested for performance and inspected for quality. Solid American construction, quality components. Full one year limited warranty.

For your nearest MFJ dealer, call toll-free 800-647-1800. Stop by your dealer. Compare it feature for feature with other tuners. Compare its value, its quality and its performance.

After a truly side by side comparison, you'll be convinced that its value, quality and features make it a truly outstanding value.

Why not visit your dealer today and see the NEW MFJ-981 3 KW Versa Tuner IV? If no dealer is available order direct from MFJ.

MFJ-982 3 KW VERSA TUNER IV has balun, 7 position antenna switch. Matches everything: coax, balanced lines, random wires continuously from 1.8 to 30 MHz.

- ***7 position antenna switch***
- ***4:1 ferrite balun for balanced lines***

$199.95

Flexible 7 position antenna switch lets you select 1 coax thru tuner and 2 coax thru tuner or direct, or random wire and balanced line.

Up to 3 KW PEP. Match any feedline from 1.8 to 30 MHz: coax, random wire, balanced line.

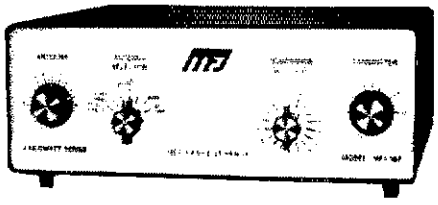
Gives maximum power transfer. Harmonic attenuation reduces TVI, out of band emissions.

Black metal cabinet, anodized aluminum front panel. Flip down wire stand. 5x14x14 in.

Encapsulated 4:1 ferrite balun. 500 pf, 6000 volt capacitors, 18 position dual inductor, 17 amp ceramic switches. SO-239 coax connectors, ceramic feedthru for random wire, balanced line, binding post for ground.

Made in USA. One year limited warranty.

See it at your nearest dealer. If no dealer is available order direct from MFJ.



If you already have a SWR/wattmeter, the MFJ-982 is for you.

MFJ-980 3 KW VERSA TUNER IV has built-in balun for balanced lines. Matches coax, balanced lines, random wires, 1.8 to 30 MHz.

- ***Encapsulated 4:1 ferrite balun for balanced lines***

$169.95

Up to 3 KW PEP. Match any feedline from 1.8 to 30 MHz: coax, random wire, balanced line. Heavy duty encapsulated 4:1 ferrite balun.

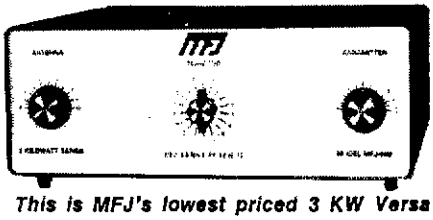
Gives maximum power transfer. Harmonic attenuation reduces TVI, out of band emissions.

Black metal cabinet, anodized aluminum front panel. Flip down wire stand. 5x14x14 in.

500 pf, 6000 volt cap., 18 position dual inductor, 17 amp ceramic switches.

Made in USA. One year limited warranty.

See it at your nearest dealer. If no dealer is available order direct from MFJ.



This is MFJ's lowest priced 3 KW Versa Tuner IV.

FOR YOUR NEAREST DEALER OR FOR ORDERS

CALL TOLL-FREE 800-647-1800

Order any product from MFJ and try it. If not delighted, return within 30 days for a prompt refund (less shipping).

Order today. Money back if not delighted. One year limited warranty. Add $8.00 shipping/handling.

For technical information, order/repair status, in Mississippi, outside continental USA, call 601-323-5869.

Order By Mail or Call TOLL FREE 800-647-1800 and Charge It On VISA master charge

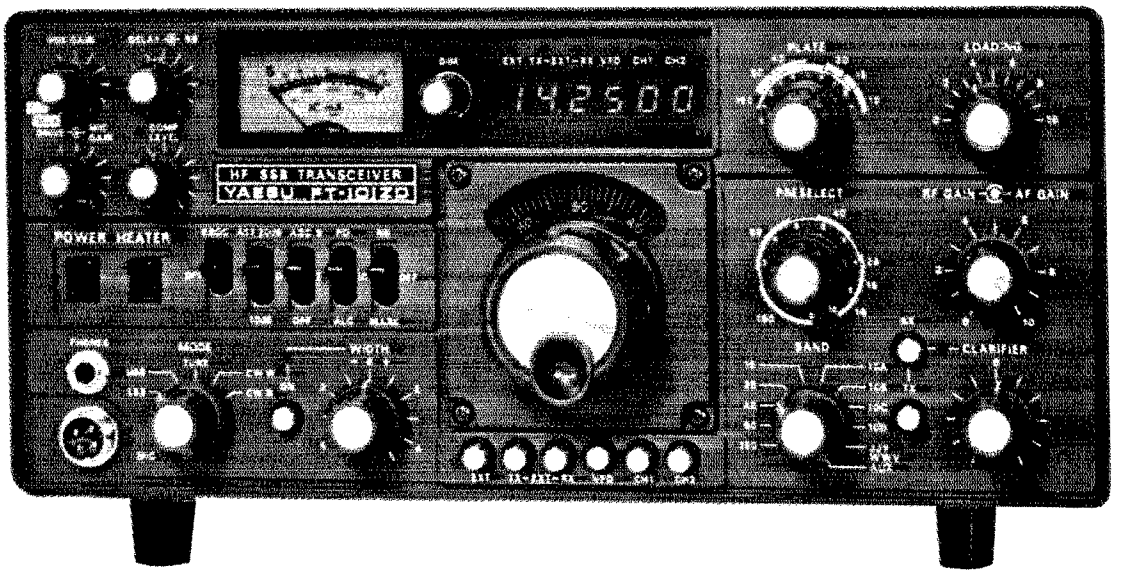
MFJ ENTERPRISES, INC.

P. O. BOX 494
MISSISSIPPI STATE, MISSISSIPPI 39762

YAESU'S NEW FT-101ZD

HIGH-PERFORMANCE HF TRANSCEIVER

The all-new FT-101ZD has many features of the FT-901DM including compatibility with the FT-901DM accessories.



EXTERNAL VFO

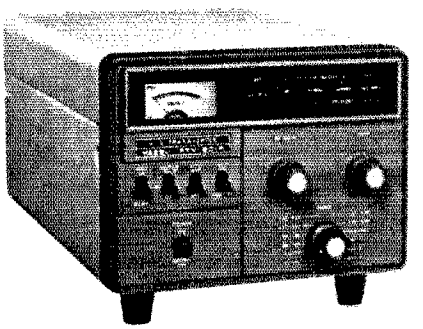
The FV-901DM provides scanning and memory capability for your FT-101ZD transceiver. Using PLL synthesis in 100 Hz steps, the FV-901DM features an auto scan mode, which will search the band until it finds a signal—perfect for watching for openings. The manual scanner will scan at one of three rates, while you just flick a switch.

Forty frequencies may be stored into memory, for control of the transmit, receive, or transceive frequency. And a clarifier allows fine tuning between the 100 Hz steps, as well as tracking of a drifting memorized signal. In DX or contest situations, you'll be seconds ahead of the competition with the FV-901DM.

FC-901
ANTENNA COUPLER (not shown)

The FC-901 is a compact, efficient antenna tuner. The FC-901 features an in-line wattmeter, SWR meter, and provision for selection of three coax-fed antennas and one single wire antenna. Present a 50 ohm load for your FT-101ZD all across the band with the FC-901 antenna coupler.

FTV-901R
VHF/UHF/OSCAR TRANSVERTER



In another industry first, YAESU brings you a three-band VHF/UHF transverter for your FT-101ZD station. The basic unit comes equipped with 144 MHz capability, and you may add our plug-in modules for 50 or 430 MHz as options. Repeater offset is provided for 6 and 2 meters, and full duplex operation on OSCAR modes A/B/J is possible with an external receiver.

When the HF bands are flat, switch to the "very highs", with the amazing FTV-901R VHF/UHF/OSCAR transverter. You're years ahead with YAESU.

PHONE PATCH/SPEAKER (not shown)

Round out your FT-101ZD station with the SP-901P combination hybrid phone patch/speaker. Like the other 901 series components, its styling and size are fully compatible with your FT-101ZD.

YO-901
MULTISCOPE

Unsurpassed monitoring capability is yours with the YO-901 Multiscope. Featuring a high performance oscilloscope, useful for countless station adjustments, the YO-901 also includes a two-tone generator, as well as an optional band scope for instant determination of band conditions and activity.

Narrow-band IF signal observation is not possible with the FT-101ZD and YO-901.

Price And Specifications Subject To Change Without Notice Or Obligation

YAESU

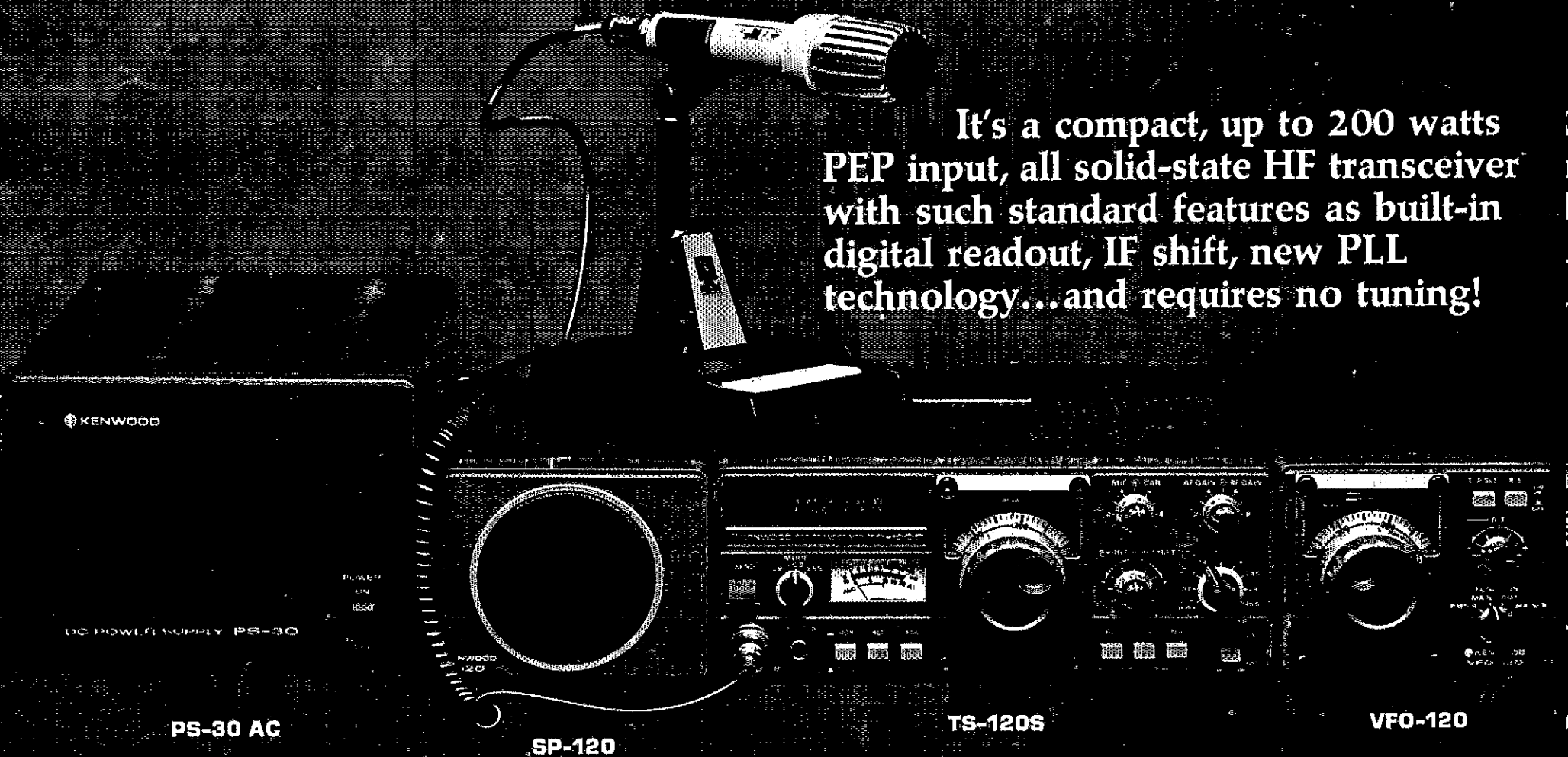
YAESU The radio.

arma amateur radio manufacturers association

479X

YAESU ELECTRONICS CORP., 15954 Downey Ave., Paramount, CA 90723 ● (213) 633-4007
YAESU ELECTRONICS Eastern Service Ctr., 9812 Princeton-Glendale Rd., Cincinnati, OH 45246

TS-120S...A big little rig.



It's a compact, up to 200 watts PEP input, all solid-state HF transceiver with such standard features as built-in digital readout, IF shift, new PLL technology...and requires no tuning!

PS-30 AC

SP-120

TS-120S

VFO-120

Exciting and perfect for car or ham shack use! But, there's more to say about the TS-120S! This unique all solid-state HF, SSB/CW transceiver produces a hefty signal and also offers a lot of other features in a very attractive, compact package. See this new model at your Authorized Kenwood Dealer!

KENWOOD

...pacesetter in amateur radio

TRIO-KENWOOD COMMUNICATIONS INC.
1111 WEST WALNUT/COMPTON, CA 90220