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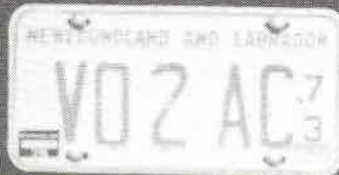
# TCA



NOVEMBER 1984

The Canadian Amateur  
Radio Magazine

La Revue des Radio  
Amateurs Canadiens



## INSIDE:

- News & Views on the Canadian Amateur Scene
- Ontario Hamfest
- YL News
- Contest Scene
- Technical Section

INTRODUCING



# FT-209R

**THE SUCCESSOR**  
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MICROMINIATURE 2 METER



- Keyboard entry of all operations
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- Ten Memory channels  
Each Memory stores either +/- shifts, or independent Tx and Rx frequencies
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County Magazine Printshop Ltd.  
RR 1 Bloomfield, Ont.  
K0K 1G0

**Printed in Canada**

ISSN 0228-6513



## THE CANADIAN AMATEUR

November 1984

Vol. 12 No. 10

### CONTENTS

|   |    |
|---|----|
| CARF Nominations Notice .....                       | 15 |
| Letters to the Editor .....                         | 17 |
| DOC Doings .....                                    | 19 |
| New Publication .....                               | 19 |
| Ontario Hamfest .....                               | 20 |
| Amateur Wireless Telegraphy .....                   | 22 |
| Amateur Goes Electric .....                         | 23 |
| Swap Shop .....                                     | 23 |
| TYRO .....  | 26 |
| Social Events .....                                 | 28 |
| YL News & Views .....                               | 29 |
| 10 MHz: Misuse It and Lose It .....                 | 30 |
| Frank Vaughan: Canadian Amateur Radio Pioneer ..... | 32 |
| Canada Contest .....                                | 35 |
| Scarborough 1984 Field Day .....                    | 39 |
| <b>TECHNICAL SECTION</b>                            |    |
| A Wide-Range Audio Function Generator .....         | 41 |
| Building a Quad .....                               | 43 |

**TCA— The Canadian Amateur** is published in Canada 11 times per year to provide Radio Amateurs, those interested in radio communications and electronics, and the general public with information on matters related to the science of telecommunications.

Unsolicited articles, reviews, features, criticisms, photographs and essays are welcomed. Manuscripts should be legible and include the contributor's name and address. A signed article expresses the view of the author and not necessarily that of C.A.R.F. Publications Limited.

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**TCA— The Canadian Amateur** is published by C.A.R.F. Publications Limited, 370 King St., P.O. Box 356, Kingston, Ontario, Canada K7L 4W2. It is available for \$20 per year or \$2.50 per copy. It is recommended by the Canadian Amateur Radio Federation Inc. and members receive it automatically.

Indexed in the Canadian Periodical Index: ISSN 0228-6513

**Second Class Mail Registration Number 5073**



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The Canadian Amateur Radio Federation, Inc. is incorporated and operates under a federal charter, with the following objectives:

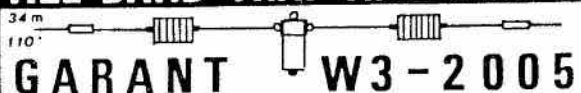
1. To act as a coordinating body of Amateur radio organizations in Canada;
2. To act as a liaison agency between its members and other Amateur organizations in Canada and other countries;
3. To act as a liaison and advisory agency between its members and the Department of Communications;
4. To promote the interests of Amateur radio operators through a program of technical and general education in Amateur matters.

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| HAM IV Rotator with control box, <u>OUR BESTSELLER</u> | \$ 355  |
| T 2 X Tailtwister, rotator with control box            | \$ 475  |
| HAM-SP like HAM-IV with braille for the blind OM       | \$ 439  |
| HDR-300 Heavy duty rotator with digital readout        | \$ 1280 |
| 5055910 Tower spacing plate kit                        | \$ 29   |
| 5146710 Heavy duty lower mast kit for HAM-IV, T2X      | \$ 109  |
| 5147210 Lower mast kit support for CD45II              | \$ 35   |

For price quote on rotor parts enclose a 32¢ stamp. Thanks.

### ANTENNAS

|   |        |
|---|--------|
| EXPLORER 14 w. BN-86, 4-el. beam, 10-15-20m,        | \$ 555 |
| QK-710 30m/40m conversion kit for Explorer 14       | \$ 145 |
| Discoverer 7-1 Rotary Dipole for 30m or 40m         | \$ 259 |
| Discoverer 7-2 2-element 40m beam, 6.5 dB gain      | \$ 579 |
| Discoverer 7-3 conv. kit for Disc. 7-2, 8.7 dB gain | \$ 369 |
| TH7DXS 7-el. triband beam with BN-86, 10-15-20      | \$ 809 |
| Conv. Kit for TH6DXX to TH7DX                       | \$ 299 |
| TH5MK2S 5-el. beam with balun, 10-15-20m            | \$ 699 |
| TH3JRS 3-el. beam, 10-15-20m, 600 W PEP             | \$ 335 |
| TH2MK3S 2-el. beam, 10-15-20m,                      | \$ 309 |
| HQ2S HY-Quad, 2-el. cubical quad, 10-15-20m         | \$ 689 |
| DB 10/15 3-el. duoband beam, 10 + 15m               | \$ 409 |
| 103BAS 3-el. monoband beam, 10m band                | \$ 169 |
| 153BAS 3-el. monoband beam, 15m band,               | \$ 245 |
| 105BAS 5-el. monoband beam, 10m band                | \$ 222 |
| 12 AVQS trap vertical, 10-15-20m                    | \$ 89  |
| 14 AVQ/WBS trap vertical, 10-15-20-40m              | \$ 117 |
| 18 AVT/WBS trap vertical, 10-15-20-40-80m           | \$ 187 |
| GRK-4 radial kit for above verticals                | \$ 45  |
| 14 RMQ roof mount & radials for above verticals     | \$ 69  |
| BN-86 ferrite balun, 1:1, 10-80m band               | \$ 39  |
| 2 BDQ multiband trap dipole, 80 + 40m               | \$ 99  |
| 5 BDQ multiband trap doublet, 80 - 10m              | \$ 219 |
| 64BS 4-el. beam for 6m band, 12.7 dB gain           | \$ 125 |
| 66BS 6-el. beam for 6m band, 15 dB gain             | \$ 235 |
| V2S 2m colinear gain vertical, 138-174MHz           | \$ 85  |
| GPG2A 2m ground plane base antenna                  | \$ 46  |
| 23BS 3-el. beam for 2m band, 6.1 dB gain            | \$ 45  |
| 25BS 5-el. beam for 2m band, 9.1 dB gain            | \$ 59  |
| 28BS 8-el. beam for 2m band, 11.8 dB gain           | \$ 79  |
| 214BS 14-el. beam for 2m band, 13 dB gain           | \$ 89  |

For other TELEX/HY-GAIN antennas see our catalogue.

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For TELEX/HY-GAIN crank-up towers, tiltable, 37 to 70 feet see our catalogue. All towers shipped free of charge by truck to destinations up to 500 km/300 miles north of the U.S.A./Canada border.

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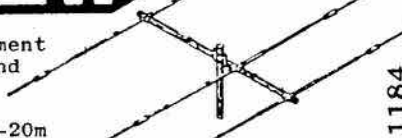


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3-element  
 triband  
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 for  
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1184

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|---------------------------------|--------|
| HF6V, 80-10m+30m vertical.....  | \$ 185 |
| TBR-160HD, 160m conv. kit.....  | \$ 75  |
| A-18-24, 18+24MHz conv. kit.... | \$ 41  |
| STR-II, radials for HF6V.....   | \$ 44  |
| RMK-II, radials + roof mount..  | \$ 69  |
| 2-MCV, 2m colinear vertical.... | \$ 48  |
| 2-MCV-5, 2m 5/2 wavelength....  | \$ 58  |

For more BUTTERNUT see our catalogue.

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|                                   |         |
|-----------------------------------|---------|
| 8-cond. rotor cable, each 10 ft.  | \$ 4.50 |
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| RG8/U-Coax, DeLuxe, each 10ft.... | \$ 8.50 |
| RG58/U-Coax, each 10 ft. ....     | \$ 2.50 |
| PL-259 Coax connector.....        | \$ 1.50 |

Prices include FREE shipping - ONLY - if ordered with rotor or antenna!

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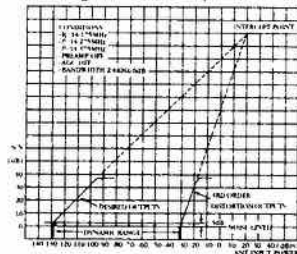
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ICOM's IC-730 go-anywhere HF all-band SSB/CW/AM transceiver, the best value on the market, has a proven record of high performance, ease of operation and durability. Compact in size, yet full-featured, the IC-730 has gained an uncomparable reputation.

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**Affordable.** Dollar-for-dollar, the ICOM 730 packs more punch and performance into a small package than ever thought possible.

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 **ICOM**  
The World System

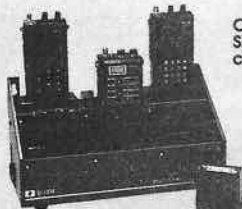
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# ICOM Handhelds

## Dollar-size and Dollar-wise

To meet your VHF and UHF communications needs, choose the ICOM 2-meter IC-02AT or the 440MHz IC-04AT full featured LCD readout handhelds. For exceptional features, quality built to last and a wide variety of interchangeable accessories, the IC-02AT and IC-04AT are optimum values.

**Standard features** include full frequency coverage...140-149.995MHz and 440-449.995MHz with transmit frequencies covering U.S. MARS and CAP frequencies without modification...10 memories, DTMF, duplex offset storage in memory (standard 600kHz plus four odd offsets), 32 keyboard selectable PL tones which store in memory, high/low power and internal lithium battery backup to maintain the memories for up to seven years. Slide-on battery packs with a battery lock, frequency lock and lamp on/off button provide operating convenience.



CM-60  
Six-position  
charger

**Scanning** systems are priority scan, memory scan and programmable band scan. Increments of 5, 10, 15, 20 or 25kHz are front panel selectable for band scan.

**Keyboard entry** with the 16-button pad allows easy access to all frequencies, duplex modes, memories, scanning, dial lock, PL tones, priority and DTMF.

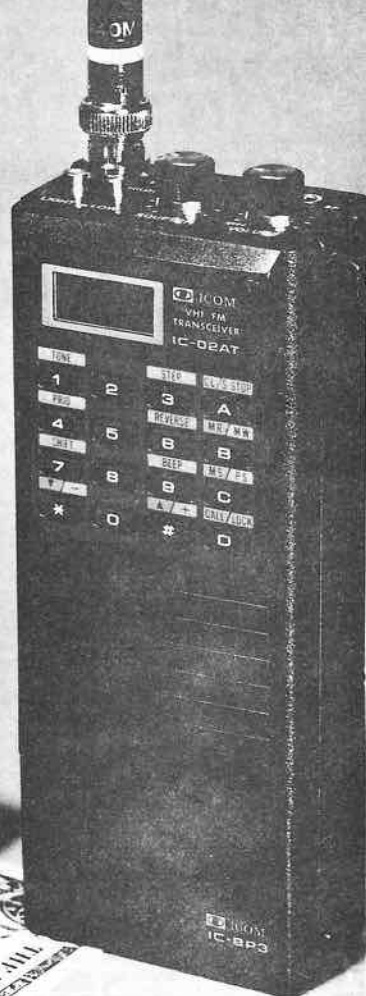
**An LCD readout** indicates frequency, memory channel, transmitter output, dial indicator, offset direction, PL tone and scan functions plus Rx signal strength.

**An aluminum case back** provides superior heat sinking when the IC-02AT and IC-04AT are run at the standard three watt level or optional five watt level. Output power is determined by the battery pack used.

**Accessories** for the IC-02AT and IC-04AT include all accessories for the IC-2A series plus the new long-life IC-BP8 and high power (13.2 volt) IC-BP7 battery packs, HS-10 boom headset, HS-10SA VOX unit, HS-10SB PTT switch-box and CM-60 six-position charger.

One method of charging the IC-BP7 and IC-BP8 is by applying 13.8 volts through the top connector of the transceiver. This allows operation of the transceiver with or without the battery connected.

See the IC-02AT and IC-04AT handhelds at your nearest ICOM dealer.



The IC-02AT and IC-04AT come standard with an IC-BP3 NiCd battery pack, flexible antenna, BC-25U wall charger, belt clip and wrist strap.

 **ICOM**  
The World System

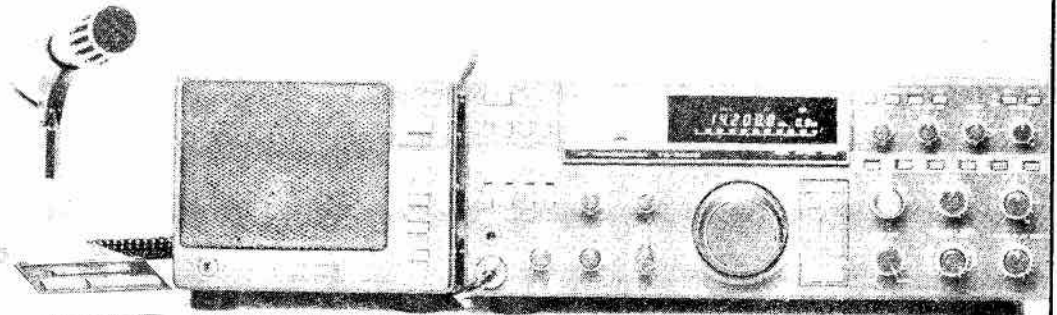
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Sony solid state B.W TV cameras Model DXC2000A with CRT viewfinder (2.5x3 screen) With viewing hood VFH-4 less lense. Accepts C mount screw thread Size 13x11x4 Operates from 115 vAC ..... \$125.00  
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VHF base station, Collins Model 242F2. Rack mounted with cabinet and manual. Uses pair 4X150 in final, 811s as modulator. 108-152 MHz, 4 xtal channels ..... \$125.00

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Gandalf local data sets Model LDS105. Box 5x3x8, aluminum, containing pwr supply (Hammond xmfr), PCB, 2 section thumbwheel switch, LED indicators etc. .... \$8.00

Teletype machines, Model 33. New batch just rcvcd, all with floor stands & only ..... \$25.00

Data terminal, teletype model 37 complete with table and pwr supply, very nice ..... \$140.00

Voltage regulators, Stabiline Model EM4115, 15 KVA. Uses slosyn motor driven variac, cabinet mounted with 4" sq line voltage meter. 95-135 input, output 115 Size 15x21x19 ..... \$150.00

Receivers, solid state Nems Clark telemetry rcvrs. Uses plugin RF tuners and plugin demodulators. Mainframe Model 1037. Supplied with RF plugin covering 135-155 MHz and one demodulator. Complete with copy of manuals. Units use modular construction throughout. Size 7x15.5x19. Built in pwr supply. Four front panel tuning meters and video filter sw included on front panel ..... \$250.00

Tape readers, Optical Digitronics Model 2500. Will read up to 8 channel tape. Speeds of 100 or 300 char/sec or stepping up to 60 char/sec. Solid state with copy of manual. Size 19x7x11 deep. Wt.25 lbs ..... \$20.00  
Tape reader, as above but Model 3500. With high speed brake and 500 or 1000 char/sec ..... \$25.00

RF power bridge made by Bruno-New York Industries Model 94E. Measures RF pwr 1 GHz to 10 GHz from 100 microwatts to 5 watts. Complete with 4 attenuators, bolometer & spare elements & manual. Self-contained in portable case ..... \$150.00

Here's an item to make your mouth water... A VHF Satellite Interrogation Transmitter. Made by American Electronic Labs., Model 120A. Fre. 120-155 MHz, 5 KW. Output tube 4CX5000A modulated with pr 4-1000A tubes. Unit is BIG BIG. Xmtr 76"x35"x40" wide, wt 1250 lbs. Transformer vault and modulator 45"x30"x62" wide, wt 1750 lbs. Final tuning elements in 'cavity' motor tuned. Complete with manuals. Crating extra if required ..... \$1200.00

Powerstat or variac Model 1256-2P-B. Input volts 120 or 240. Output volts 0-280. Max amps 56, max KVA 15.7 ..... \$150.00

Marine radar, small solid state unit made by Furuno Electric, Japan, Model FRS-24. 5" display with 6 ft scanner. Xmtr/rcvr mounted in scanner pedestal. Operates from 24 VDC. With converter unit (Furuno unit) to operate from 110VAC..... \$385.00

X Band transmitter/receivers. Very nice solid state units made by Vega Precision Labs. Approx size 4.5x4.5x2.5 inches. Built in 4 port duplexer, 50 ohm input/output, miniature Varian magnetron, 3 cavity preamp, xtal mixer, built in 28VDC pwr supply, peak power 400 watts output. Xmtr tuneable over 9.2-9.5 GHz, rcvr over 9.1-9.6 GHz. Complete with a copy of the technical manual ..... \$40.00

Terms of payment: Postal money order or certified cheque or equivalent. Orders with personal cheques held four weeks to allow cheques to clear. Regret this inconvenience but can no longer absorb NSF or rubber cheques.

All items used surplus unless indicated otherwise. FOB Smith Falls. Ontario residents include 7% Sales Tax. Any queries phone or write (include stamp for reply). Save on calls, phone anytime before 8 a.m. or after 6 p.m.



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OAKVILLE, ONTARIO, CANADA L6J 5C1

TELEPHONE (416) 844-4505

TELEX: 06 982348

## INTRODUCTION

Since it's incorporation in 1973, LESMITH has been known for it's extensive knowledge of crystal requirements for amateur, commercial, and military equipment. We maintain data on old and new models, and are willing to work with you on any requirements, commercial or experimental.

Most of our work is with repeat customers, for whom our regular delivery is 2 weeks on average for custom crystals. There is no premium for rush orders, and crystals in stock are sent out immediately.

## HOW TO ORDER

Give us at least the information suggested in the sample order below. If we need more information, we will request it. In most cases, this is enough to proceed.

| QTY | XTAL FREQ. | T/R | CARRIER | Make & Model<br>Additional data |
|-----|------------|-----|---------|---------------------------------|
| 1   |            | T   | 146.340 | INOVE 1C22                      |
| 1   |            | R   | 146.940 | "                               |
| 3   |            | T   | 157.845 | GE ROYAL EXEC                   |
| 3   |            | R   | 152.585 | "                               |

## PRICING

If the pricing is obvious, total the amount, add \$1.00 for First Class mail, and send in your money order, or cheque, with the order. If there is any doubt about the formula and or price, send in the order without the money. We will price the order and inform you by return mail. In the meantime, your order will be processed and shipped on receipt of your payment.

In the example, the amateur band crystals are \$8.00 each and the custom or commercial crystals are \$9.50 each. The total is \$73.00 plus \$1.00 = \$74.00. Ontario residents add 7% sales tax.

## 1984 PRICES

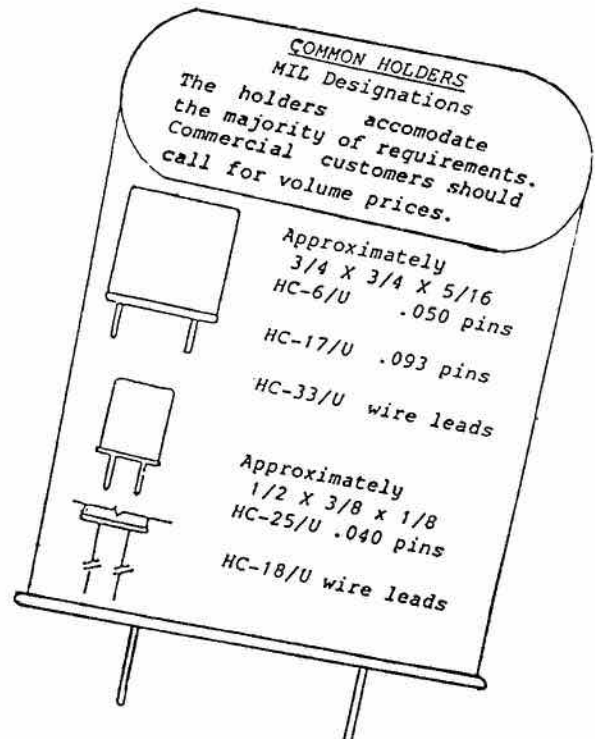
|                | HC6/U | HC25/U |
|----------------|-------|--------|
| <u>AMATEUR</u> |       |        |
| Amateur bands  | 8.00  | 8.00   |
| <u>CUSTOM</u>  |       |        |
| 6 - 55 Mhz     | 9.50  | 9.50   |
| 5 - 5.9        | 10.55 | 12.75  |
| 4 - 4.9        | 11.60 | 16.95  |
| 3 - 3.9        | 12.75 | 16.95  |
| Below 3 mhz    | 16.95 | -      |
| 55-100 (fifth) | 12.75 | 12.75  |

## MODULES

|          |       |
|----------|-------|
| Mocom 70 | 24.95 |
| Mocom 35 | 21.95 |

## REWORK MODULES to new frequency

|             |       |
|-------------|-------|
| General     | 19.95 |
| Hybrids     | 29.95 |
| MT500 MX300 |       |



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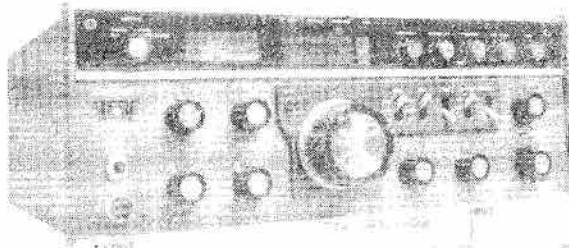


## Read & Save

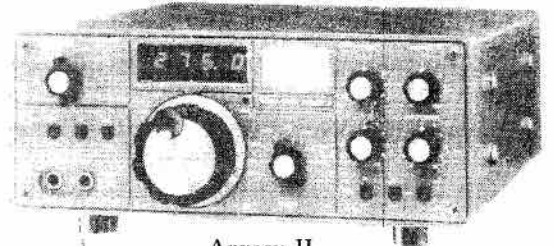
Yes— R & S stocks  
Ten-Tec, Kenwood, Icom, Yaesu  
along with Reliable Service



Ten-Tec Hand Held #2591  
Special— \$399.00



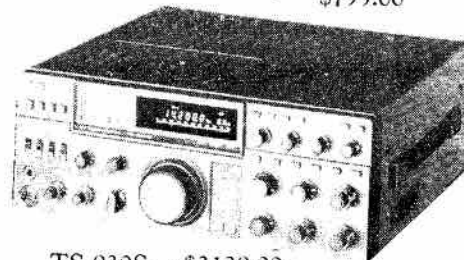
Corsair— \$1575.00  
includes  
FREE \$269.00 Power Supply



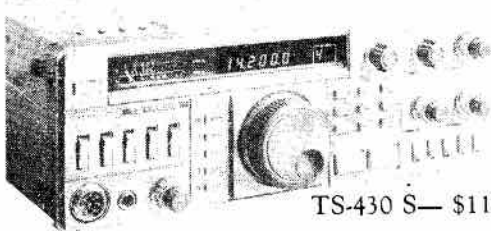
Argosy II  
\$795.00



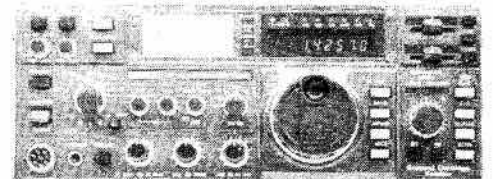
IC-27H  
\$499.00



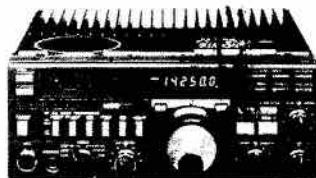
TS 930S— \$2129.00



TS-430 S— \$1199.00



IC-745— \$1225.00



Yaesu— #757  
\$1095.00

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# ICOM

The World System



## IC-02AT Handheld

The IC-02AT 2-meter LCD readout handheld features 10 memories, 32 PL tones, scanning, keyboard frequency entry, dial lock, 3W std., 5W opt., DTMF.

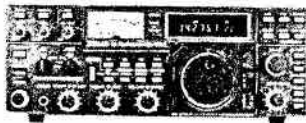
**\$ 399**



## IC-04AT Handheld

The IC-04AT 440MHz LCD readout handheld features 10 memories, PL tones, keyboard frequency entry, scanning, dial lock, 3W std., 5W opt., DTMF.

**\$ 409**



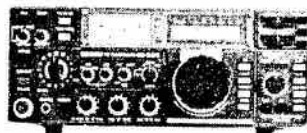
## IC-751 HF Base

Base station transceiver with a competition-grade ham receiver, 32 memories, 100KHz to 30MHz continuous tuning general coverage receiver and a full-featured all-mode solid-state ham band transmitter.

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IC-PS35 \$205 Regular Price  
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## IC-745 HF Base

All ham band HF transceiver, 16 memories, 100KHz to 30MHz general coverage receiver, and adjustable noise blanker and AGC.

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## IC-27A Compact Mobile

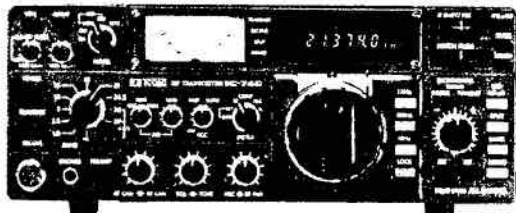
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**IC-27H 45W  
\$524**

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**\$999 incl internal PS-740**



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- Microprocessor Controlled
- 12 VDC Operation

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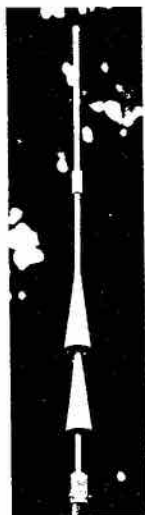


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## KT-3 Keyer-Trainer

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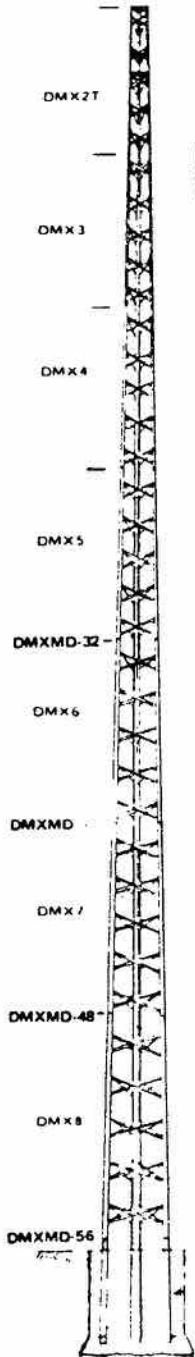




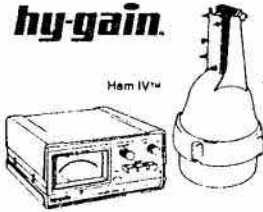
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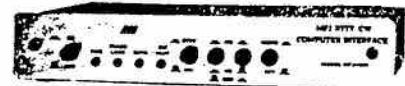
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FT-102 HF transceiver ..... 1039.00  
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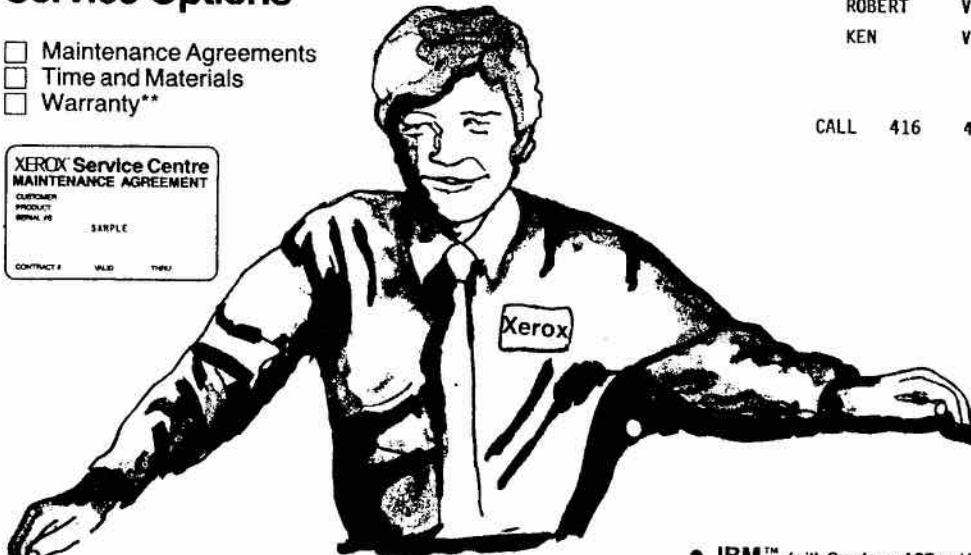
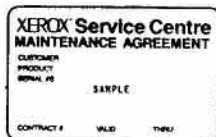
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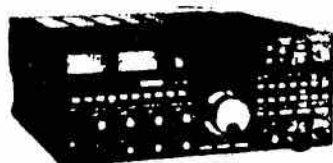
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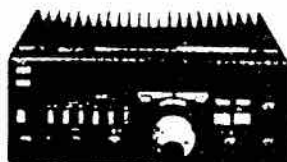
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- Adj Noise Blanker
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**NEW**

**FT-209R  
5 watts**

**\$ 389**



**FT-209R**

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**DAIWA**

POWER/REV/SWR CROSS NEEDLE METERS



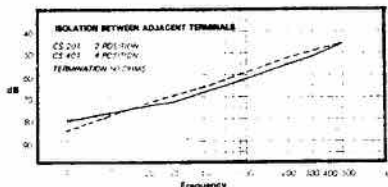
DAIWA cross needle meters make SWR and Power measurement quick and easy. Why bother with the inconvenience of the "older type" meters? With DAIWA there is only one meter to read and no tedious sensitivity adjustments to make - ever! DAIWA cross needle meters indicate forward and reflected power simultaneously. The SWR is read directly at the point where the two needles intersect. DAIWA quality insures reliability and accuracy. Once you've used this meter, you'll wonder how you ever managed without it in the past.

\$99.95    \$159.95    \$219.95    \$299.95    \$259.95

|                           | CN-520    | CN-620 (B)  | CN-630     | CN-650     | CN-720 (B)  |
|---------------------------|-----------|-------------|------------|------------|-------------|
| FREQUENCY                 | 1.8-60MHz | 1.8-150MHz  | 140-450MHz | 1.2-2.5GHz | 1.8-150MHz  |
| INPUT/OUTPUT IMPEDANCE    | 50 ohm    |             |            |            |             |
| POWER FWD                 | 200/2kW   | 20/200/ 2kW | 20/200W    | 2/20W      | 20/200/ 2kW |
| REF                       | 4/400W    | 4/40/ 400W  | 4/40W      | 0.4/4W     | 4/40/ 400W  |
| SWR DETECTION SENSITIVITY | 4W min    |             |            |            |             |
| TOLERANCE (full scale)    | ± 10%     |             |            |            |             |
| CONNECTORS                | SO-239    |             | SO-239     | N type     | SO-239      |
| DIMENSIONS (W x H x D mm) | 72x72x95  | 165x75x97   | 180x85x120 |            | 180x120x130 |

CAVITY COAXIAL SWITCHES

|                | CS-201  | CS-401 |
|----------------|---|--------|
| FREQUENCY      | 800MHz  | 800MHz |
| VSWR           | below 1.1   |        |
| POWER RATING   | 2.5kW PEP   | 1kW CW |
| IMPEDANCE      | 50 ohm  |        |
| INSERTION LOSS | Less than 0.2dB   |        |
| ISOLATION      | better than 50dB at 300MHz<br>better than 45dB at 450MHz<br>adjacent terminal |        |
| CONNECTORS     | SO-239  | SO-239 |
| OUTPUT PORT    | 2   | 4      |
|                | **Unused terminals grounded**   |        |



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Ga-As FET PRE-AMPLIFIERS



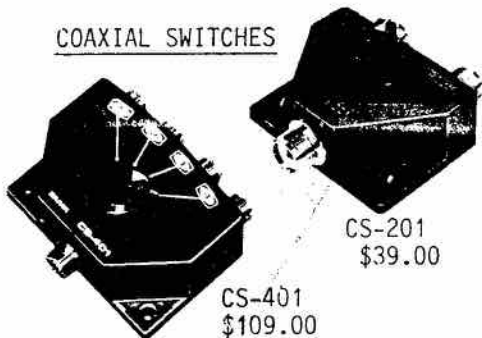
RX-430G

\$119.95    \$159.95

|                           | RX-110G          | RX-430G       |
|---------------------------|------------------|---------------|
| FREQUENCY                 | 144 - 148 MHz    | 430 - 440 MHz |
| GAIN                      | 15 dB min        | 13 dB min     |
| INPUT/OUTPUT IMPEDANCE    | 50 ohm           |               |
| RF POWER BYPASS RATING    | 30 W CW (FMI)    |               |
| POWER SOURCE              | 13.8 V DC 100 mA |               |
| DIMENSIONS (W x H x D mm) | 90 x 25 x 92     |               |

Reliable VHF/UHF Ga-As FET design for outstanding sensitivity and low noise. Can be placed directly into the antenna feed line. RF activated/Manual T/R switching.

COAXIAL SWITCHES



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AMPLIFIERS



LA-2035



LA-4030



WITH Rx PREAMP

LA-2155

DAIWA amplifiers are designed for use with hand-held or other transceivers in either mobile or fixed station configurations. Because of its light weight and compact size, DAIWA linear amplifiers can be mounted under the dash, under the seat, or in any other convenient location.

The DAIWA linear amplifiers are equipped with RF activated stand-by circuitry.

Easy operation. Simply connect your antenna and your hand-held/transceiver to the linear amplifier.

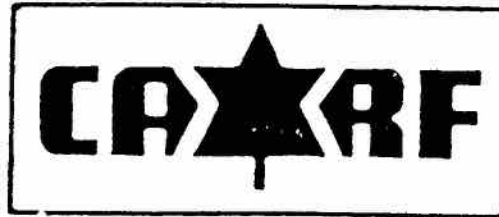
Connect a DAIWA linear amplifier to a suitable power supply and go!

\$379.95    N/A    \$179.95    \$109.95    N/A    N/A    \$229.95    N/A

|                           | LA-2155          | LA-2065          | LA-2060          | LA-2035           | LA-2030   | LA-4040          | LA-4030         | LA-4015                                    |
|---------------------------|------------------|------------------|------------------|-------------------|---|------------------|-----------------|--|
| BAND                      | 144-148MHz       |                  |                  |                   |   |                  |                 |  |
| MODE                      | FM SSB CW        |                  |                  |                   |   |                  |                 |  |
| INPUT POWER               | 25W              | 10W              | 0.5-3W           |                   | FM  | FM SSB CW        |                 | FM   |
|                           |                  |                  |                  |                   | 0.15-0.3W (Model A)<br>0.3-0.6W (Model B)<br>1.5-2.5W (Model C) | 10W              | 0.5-3W          | 0.15-0.25W (Model A)<br>0.3-0.6W (Model B) |
| MAXIMUM OUTPUT POWER      | 150W plus        | 60W plus         |                  | 30W plus          | 30W plus High position<br>*1W plus Low position                 | 35W plus         |                 | 15W plus                                   |
| POWER CONSUMPTION         | 13.8V DC 24A max | 13.8V DC 10A max | 11.8V DC 12A max | 13.8V DC 4.5A max | 13.8V DC 6A max   | 13.8V DC 10A max |                 | 13.8V DC 4.5A max                          |
| INPUT PLUG/CONNECTOR      | SO-239           | PL-259           | BNC-BNC (Cable)  | BNC               | BNC-BNC (Cable)   | PL-259           | BNC-BNC (Cable) |  |
| OUTPUT CONNECTOR          | SO-239           |                  |                  |                   |   |                  |                 |  |
| DIMENSIONS (W x H x D mm) | 170 x 74 x 250   | 100 x 41 x 170   |                  | 100 x 35 x 125    | 90 x 45 x 125   | 100 x 41 x 170   |                 | 100 x 35 x 125                             |



# ATTENTION



## MEMBERS

# NOMINATIONS

Nominations are now required from full voting CARF members of the Federation.

All six positions of Regional Directors become vacant June 1985. Each nomination must have five full CARF names and addresses on the nomination letter, as well as the candidate's signature, that He or She accepts the nomination.

Deadline of receipt of nominations is December 31, 1984. Please address all nominations to the CARF Office, Attention Secretary, Box 356, Kingston, Ontario K7L 4W2.

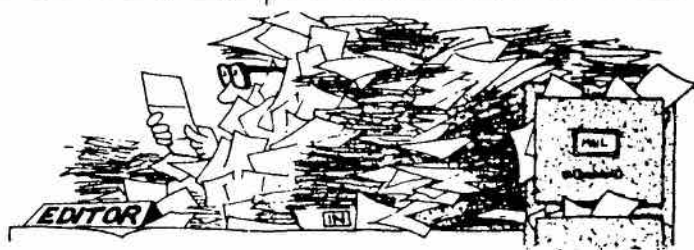
The position of Director is the most important office within the Federation; they represent you, the voting member. They set policy, vote on all major decisions and appoint the executive to carry out your wishes.

Exercise your privilege... select and vote.

General Manager  
Don Slater VE3BID



# LETTERS



## NEW REPEATER

There is now a two metre repeater in the Iroquois area. It should be completed and operational by December 30. Here are the details:

Call: VE3PTL

Input: 145.16, Output: 145.76

Emergency power available

Autopatch: by October '84

Coverage: about 25 miles

Input 10-15 W. (will likely be increased).

Teunis Blokland VE3MST

## MULTIPLE CHOICE TESTS

I have given up any idea of becoming a radio Amateur— at least until the theory part of the tests is updated and brought in to the multiple-choice category of examination. The U.K. and the U.S. both have multiple-choice tests. Multiple-choice tests can be marked by clerical help, and do not need an examiner with a Ph.D. in Engineering— High Frequency Physics to mark them...

Narrative tests are obviously unfair to people whose first language is neither English nor French, those whose handwriting is poor (either through accident or illness); and those who have been away from school for some years. The Theory test is more an examination on English and French—not on technical knowledge.

I have a 600 question (multiple-choice) manual printed especially to prepare people for the R. A. Exam in the U.K., and also a collection of sample questions from U.S. tests— perhaps the Canadian version will get out of the scholastic dark ages one day!

I spent many years in the Telecoms racket— the last ten as a

Training Specialist in Inside Plant Equipment— since 1967 all testing has been done by multiple choice examination in my Company— and with the penalty for incorrect guessing, these tests were better than narrative exams for weeding out the unsuitable and incompetent...

George W. Stockley  
Port Credit, Ont.

## OUR COVER

Last Month Cathy VE3GJH gave us a run-down on collections. Here's another one: Bert Farmer, collects car licence plates bearing VE call signs. Bert would like to get in touch with anyone who'd like to buy, sell or swap plates. Write him at 1155 Reader Crescent N.E., Calgary, Alta. T2E 5J8.

## FROM RESOLUTE

I've just ordered a Study Guide. I plan to make use of it up here at Resolute, N.W.T. to see if I can encourage a few more people up here to enjoy the wonders of Amateur Radio.

My home QTH is Winnipeg and my call is VE4GD. I am using the club station call, VE8MB, while here. Any who might be interested can find me on CW at the low end of 20 metres; I love to rag chew and will work all I can hear and understand. Have been in Amateur Radio off and on since 1947.

Don Strath VE4GD

Please send mail directly to: Frank Hughes VE3DQB, PO Box 855, Hawkesbury, Ont. K6A 3C9.

## IMAGE INTERFERENCE

Recently, while tuned to my favorite RTTY repeater, I heard what seemed to be interference from a commercial paging system on my two metre receiver. Further investigation, however, revealed that it was my own radio that was at fault, and that the commercial operator was not.

I own a Yaesu FT 207 R handheld which I use as a mobile, as a portable and, when I am at home, as my RTTY transceiver. The local RTTY repeater is on 146.700 MHz. The signal I heard was on 146.710, it appeared. It was clearly a paging system, and it could also be heard on its proper transmit frequency of 141.360 MHz.

The first thing I did was to call another Amateur 20 miles away or so and ask him if he could hear the signal on 146.710 MHz as well. It turned out that he could, and heard it on the same frequency on two of his radios, an ICOM 230 and an ICOM IC-2AT. On his third receiver, a Bearcat scanner receiver, the paging system showed up on 146.760 MHz.

Here is the explanation for this situation.

Modern VHF receivers are very broadbanded in frequency response, and many are capable of receiving signals over a 10 MHz bandwidth. My FT-207R has a local oscillator that runs at the receive frequency minus the first IF (in this case 10.7 MHz). Thus the local oscillator in my Yaesu was on 136.01 MHz. The paging company's signal on 141.36 entered the front end of the Yaesu, and was doubled in the mixer to 282.72

*Continued on next page* ▶



MHz. The difference between 282.72 MHz and 136.01 MHz is 146.71, the frequency that the receiver was ostensibly tuned to. And of course, the difference between 146.71 and 136.01 is 10.7 MHz, the IF.

Images! The bane of the super-heterodyne. In any mixer, the desired frequency and another—from the local oscillator—are mixed, and in the output from the mixer you can detect the desired frequency, the LO frequency, their sum, and their difference.

Here's a round-figure example. The desired frequency is an FM station on 90 MHz, the intermediate frequency of the receiver is 10 MHz. The LO is tuned to 100 MHz, and in the output there appears 90 MHz, 100 MHz, their sum (190 MHz) and their difference (10 MHz). Since the IF of the receiver is tuned to 10 MHz, this frequency is selected and amplified before detection.

There's a fly in this beautiful ointment. Suppose there is a strong signal on 110 MHz. Then, besides 90, 100, 190, and 10 MHz from the desired signal, there are 110, 100, 210 and 10 MHz from the unwanted one! This rides through on top of the desired signal.

The palliative is to select the desired frequency *before* the mixer. A tuned circuit or two will usually push the undesired frequency far enough down into the noise to make the reception acceptable.

— Editor

Well, you may ask, why didn't the Bearcat scanner receive the interference on the same frequency as the Yaesu and ICOM rigs? The answer lies in the fact that the Bearcat has a different IF (10.8 MHz) and thus the image falls on 146.76 MHz instead.

So, if you find something on the ham bands that doesn't sound like it ought to be there, do some calculations before concluding that the other operator is at fault. Be especially suspicious if the inter-

fering signal originates either  $\frac{1}{2}$ , 1 or 2X the IF away from your receive frequency.

By the way, it should be easy to fix this kind of problem with either a blocking filter placed in line with the antenna tuned to the interfering signal or a trap tuned to the interfering signal added to a T junction.

Robert Smits VE7EMD

### NEW REPEATER WITH 'SATPATCH'

Just received my September issue of TCA and noticed the article on B.C. Repeaters by VE7AHB. He

missed one repeater of interest, VE7ROB (Remote Oscar Base), 147.96/36 in Burnaby.

This is an automatic link with Oscar 10 Mode B. It uses touchtone control to access the 'bird' and a plan is being implemented to counter Doppler. A second control receiver will monitor the bird's beacon and compare its frequency to the uplink frequency for AFC.

As opposed to the usual auto-patch, this repeater has a 'SAT-PATCH.'

John R. Bareham VE7CFK  
Licensee (ex VE3ACY) △

## Lake Ontario Tall Ships Race

Amateurs in the Kingston, Ontario and Watertown, N.Y. area gave a real helping hand to the Kingston organizing committee for the Tall Ships Rendezvous in July. Because of lack of knowledge of what to expect, and some misunderstanding as to what was possible, the call for Amateur assistance went out rather late. Nevertheless, a dozen or more Kingston operators pitched in with great gusto. For several days the Operations Centre in City Hall was kept going 'round the clock. Equipment was borrowed from Bert Hovey VE3EW and Jack Whittingham VE3YC.

Out on the lake, Ed Robinson VE3MYC was operating from a small Canadian Naval vessel following the fleet, and using the Watertown repeater, W2WLR, with a lot of co-operation from George Bonadio, W2WLR himself, Ed managed to provide much better communication than could have been provided any other way.

On duty in the Operation Centre through the days and the long nights were Bill Bushell VE3DXY, Buster Doubleday VE3NF, Bill Mason VE3NFU, Ron Walsh VE3IDW, Jean Whitcomb

VE3MNI, Ted Toogood VE3HOC, Rick Whitcomb VE3NWT, Bernie Burdsall VE3NB and Pat Stever VE3MPZ.

An interesting feature to many people 'reading the mail' was the use of the callsign X03KAR by the base station. Kingston was officially celebrating Ontario's Bicentennial as far as the Tall Ships were concerned, so the use of the special (for July) prefix was an entirely appropriate one for the Kingston Amateur Radio Club's station.

Although not able to take much time to do any operating, Don Chown VE3NFG was co-chairman of the city's organizing committee.

On arrival of the ships in Kingston, a somewhat smaller net took care of communications for the berthing parties, using many of the same operators. Their help was a very significant factor in making the Kingston visit of the Tall Ships one of the best organized activities that many of the Captains had seen.

### SUPPORT TCA ADVERTISERS

Let Amateur Radio equipment dealers know that you saw their ad in TCA— The Canadian Amateur Radio Magazine!



# DOC Doings



Government of Canada  
Department of Communications

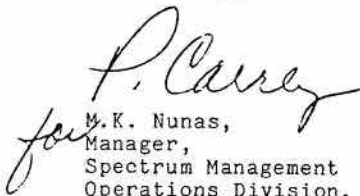
Gouvernement du Canada  
Ministère des Communications

Mr. Don Slater, VE3BID  
RR No. 1,  
LOMBARDY, Ontario.  
K0G 1L0

Dear Don,

The CRRL has outlined a problem with respect to the definition of the term "year" and how it is, or could be applied, by departmental officials responsible for amateur examinations and endorsements. I am pleased to include a copy of our response to CRRL and hope that this information will be of use and passed on to members of your federation.

Yours truly,

  
M.K. Nunas,  
Manager,  
Spectrum Management  
Operations Division.

Mr. H.J. MacLean, VE3GRO,  
Secretary,  
The Canadian Radio Relay League,  
P.O. Box 7009, Station E,  
OTTAWA, Ontario.  
N5Y 4J9

August 16, 1984

Dear Mr. MacLean:

This letter is to advise you of the results of our review regarding the literal interpretation of the term "one year".

The term "year" when applied to credits earned towards the Amateur and Digital Amateur certificate, shall be the period between the date of the examination in which the credit was earned to the corresponding date of amateur examinations held twelve months later (i.e.) four examinations.

EXAMPLE: If the credit(s) earned on an examination date of October 15, and the next October examination was held on October 20, the credit(s) earned on October 15 should be applied to the October 20 examination.

The term "year" when applied to the experience requirement for the Advanced Amateur examination shall be from the date of the examination from which an Amateur certificate was issued to the corresponding date of the amateur examinations held twelve months later (i.e.) four examinations.

EXAMPLE: If an Amateur earned his certificate on an examination date of April 20 and the next April examination is to be held on April 18, it shall be considered as one year and will satisfy the one year time requirement.

I trust that this interpretation is satisfactory.

Yours truly,  
M.K. Nunas,  
Manager,  
Spectrum Management  
Operations Branch.

## New Publication

*Radiosporting* is a new international monthly magazine written by and for active radioamateurs. It is especially aimed at those involved in the sports aspects of our hobby: contesters, DXers, VHF/UHF, SWL, etc. The closing date for the issue will be on the 15th of the preceeding month. The issue will be out on the first of each month. This short, 15-day lead time will make *Radiosporting* unique among other magazines. We are committed to making this magazine a first class publication. We have as contributors, the world's best Amateurs and we expect *Radiosporting* to become the most popular and respected journal of active and sport's minded Amateur radio operators.

Our policy is to promote quality and sportsmanship in Amateur Radio. We would like to cooperate with your publication on improving the quality of operating on Amateur bands by reporting on main sporting events such as contests, awards or special achievements.

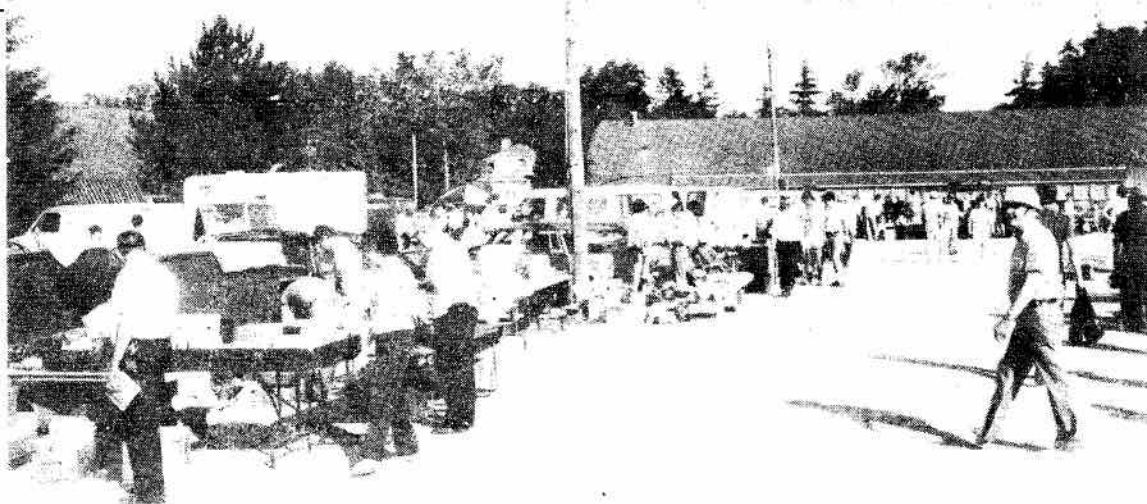
Also, we would like to receive a list of high claimed scores and results of contests, awards or special achievements in activities sponsored by your organization. We are looking for listings i.e. of top ten World-wide in each category in the International contest, high claimed scores and later final results, etc. We think that this will help you with additional publicity especially among sports-minded Amateurs.

Yuri Blanarovich VE3BMV  
Editor

### Attention CARF Members:

If you happened to miss copies of TCA, drop us a line with a request for your missing issue. CARF, Box 356, Kingston, Ont. K7L 4W2. Please include your postal code and membership number with request.





# Ontario Hamfest

by Geoff Smith VE3KCE

This year Lyn Winch G8ZCM and her committee pulled out all the stops and over 1800 admissions were sold to the July 14 Ontario Hamfest. Many Amateurs make this a weekend, camping in the field inside Milton Fairground race track. It is not unusual to see a horse being exercised during the hamfest, but those attending seem to use their money for something other than betting.

The great weather makes the Ontario Hamfest a fine outdoor event. As one can see from the photographs, the many vendors find it an easy task to sell from the trunk of their vehicle or at a small table. One does not have to worry about getting a hernia from carrying items a long distance, often the case at many hamfests. The commercial displays were located in three quonset huts, and from the crowds swarming around the displays it is hard to believe that money is tight. Many Amateurs were seen lugging cartons to the parking lot, and said cartons looked suspiciously like new rigs. One wonders how they were able to sneak them into the house past She-

Who-Must-Be-Obeyed, a skill not yet mastered by the author.

A popular feature of this gathering is the beer garden. This year the sun was particularly fierce and the entrance to the beer garden was not too difficult to find— one merely had to look for the crowd where the tongues were hanging down to the navel. Due to some bureaucratic stupidity beyond the control of the organizing committee, the beer sales could not commence until 1100 and there was one almighty stampede as the magic hour drew near.

Price of admission also included a chance on some very nice door prizes. Draws were made hourly from 1000 to 1400, and at 1430 quite a crowd assembled as the unclaimed prizes were drawn until they all had been awarded. Bob Fugard VE3DUF and his crew kept an eye on this part of the festivities: Bob has been a member of the Ontario Hamfest organizing committee every year since its inception, along with another stalwart, Art Sylvah VE3FMB.

A fixture at this hamfest for the past few years has been the 'goodies

truck' from Guelph, courtesy of Fred Hammond VE3HC. Fred annually cleans out various corners of his factories, and Amateurs have found some real 'bargoons' in cabinets, power bars and transformers.

The only real cloud on the horizon this year was the disappearance of a two-metre amplifier from the table of VE3NCN. Given that Bert has only about 10% vision, this seemed to be a nasty trick to pull on him. However it has come back via the grapevine that the culprit is known and that restitution will be made.

In closing, a tip of the hat to the members of the Burlington ARC for a job well done. Start saving your money for next year and this time don't forget the sun lotion.  $\Delta$

## CORRECTION

The article 'B.C. Amateurs in action at Marathon,' page 34, TCA July/August 1984, was written, and the photographs were taken, by Robert Smits VE7EMD. Frank omitted this from the copy, and he's sorry.





Here's the gung that made it possible: The Ontario Hamfest Committee, front row: Ferg Kyle VE3LVO, Ron Hoppe VE3IUJ; Back row: Ted Thorpe VE3HPL, Eric Sigvaldson VE3AVE, Lynn Winch G8ZCM, Chairperson, Sandy Paradise VE3MFZ, Barry Winch VE3NAV, Art Sylvah VE3FMB, Ken Robinson VE3WN, Robin Haighton VE3IUI, Peter Haighton. Not in picture: Bob Fugard VE3DUF, Jim Hallam.



The 'Guelph Goodies Truck' with Rocco VE3HGZ (left) and Fred VE3HC.



Bob Fugard VE3DUF, XYL Dorothy and Jean Simpson ran the ever popular prizes table.



'Do you think you own the Ether?'

# Amateur Wireless Telegraphy

Wireless telegraphy now plays an important part in the marine service of the world. The steamships of all important lines are equipped with it. By means of the shore stations weather reports, warnings of storms, etc., are regularly transmitted to ships at sea. Masters of ships keep in touch with each other and with their home offices, and reports, giving the approximate positions and other information, are regularly sent ashore. The position and distance of a ship with wireless equipment can be determined at short notice, and, in case of emergency, every vessel within a certain radius may be ordered to the help of a ship in distress. If, for instance, the *Hestia* lost off Grand Manan a few weeks ago, had had a wireless equipment, the disaster need not have occurred.

It will be readily understood that anything which interferes with prompt and accurate communication by the wireless system may work great injury and loss. From an article in the *Outlook* we learn that there is such interference, and how to deal with it has become a somewhat serious question. There are, it is stated, more than four thousand amateur wireless stations in operation throughout the United States. Hundreds of schoolboys in every part of the country have taken to this most popular scientific fad, and, by copying the instruments used at the regular stations and constructing apparatus out of all kinds of electrical junk, have built wireless equipments that in some cases approach the naval stations in efficiency. These amateur operators have learned the commercial and naval telegraph codes and are able to receive the

despatches as accurately and promptly as the naval operators for whom they are intended.

The amateur stations, have, in some places, interfered with the reception of official messages, causing long delays. The efficiency of some coastal stations of the navy has been greatly lessened. In cases of emergency likely to arise at any time, the interference might have

I particularly enjoyed the following: "Some (Americans) heed the warnings that have been given, but the majority do not care, and seem to enjoy bothering the regulars, asking them if they 'think they own the ether'." Sound familiar?

Norman Morgan VE1BLG

serious consequences. How to deal with this interference is the question. Some heed the warnings that have been given, but the majority do not care, and seem to enjoy bothering the regulars, asking them if they "think they own the ether." It is suggested that either the building of amateur stations must be prohibited, or at least regulated by law, or the navy department and the commercial companies must adopt improved apparatus designed to prevent certain forms of interference.

The agitation for the suppression of the amateur in wireless telegraphy is only "the first sign of a movement which must eventually result in a universal adjustment of the relations between the rival wireless telegraph companies and the naval systems, an adjustment that will require the services of both scientist and

lawyer. Because of its nature, the ether, as a medium of international communication, will require safeguards in the form of wise restrictions and regulations, much as a city thoroughfare or other institution involving public safety and convenience demands efficient organization for the public good." from *The Maritime Baptist*, Jan. 26, 1910, and thanks to VE1BLG. Δ

## Win a Certificate

Ontario Stations contact five, other North American Stations contact two, and DX stations contact one Amateur station in Peterborough during 1984 and get a distinctive Bicentennial Certificate. Use any band, any mode. Send \$1.00 and a list of contacts, as well as date and time of contacts (no QSL cards required) to: Peterborough Amateur Radio Club, P.O. Box 1205, Peterborough, Ont. K9J 7H4. Let us hear from you as soon as possible; it is fun to get together.

## Distress Traffic

If you hear distress traffic and are unable to render assistance, you should:

- 1 Maintain watch until you are certain assistance will be forthcoming
- 2 Enter the details in the logbook and take no further action
- 3 Take no action
- 4 Tell all other stations to cease transmitting.

From the London A.R.C. bulletin

(Answer should be No. 1, by the way.)





## Amateur goes electric

Amateurs have hobbies as well! Fred Green VE3IO, of Ottawa, is an electric car enthusiast. Besides the one shown here, assembled from a kit, Fred is working on 'electrifying' a Volkswagen.



## Swap Shop

Single insertion is \$1.00 (minimum charge) - 10 words and \$1.00 for each additional 10 words. To renew, send copy and payment again. Deadline is first of month preceding publication (e.g. Jan 1 for Feb. issue). Put your membership number and call (not counted) at the end of your ad. Print or type your ad and include your address with postal code. If using a phone number, include the area code. TCA accepts no responsibility for content or matters arising from ads. This feature is for use of members wishing to trade, buy or sell personal radio gear. It is not open to commercial advertising. Send to: TCA Swap Shop, Box 356, Kingston, Ont. K7L 2W2.

**FOR SALE:** All Heath equipment-1K Linear SB 201 80/40/20/15 \$480; Umatic keyer SA5010 \$140; Digital multimeter IM1212 \$150; Single trace osc. 5MHz I04560 \$180; I.C. Tester IT7400 \$75; G. Coulombe, 500 Springbank Dr., Apt. 708, London, Ont. N6J 4G6 (519) 657-0519.

**WANTED:** Collins 312B-3 Speaker. Stephen Canney VE3FAK, 2952 Bayview Ave., Willowdale, Ont. M2N 5K6, 416-221-5965.

**FOR SALE:** TH 6XX Hygain Triband \$250.00; Butternut Trapped Vertical All Bands (new) \$125.00; Hygain (trapped) All Bands 40-014 WX; Isopole 2M (new in carton) \$50.00; Ringo Ranger 2M \$30.00; Hustler Mobile 5 bands with quick disconnect; 80/40 Dipoles; Icom 730 (mint) 2 mikes with Vista 30 amp PS (asking \$800.); Kenwood 520 (mint) C.W filter- extra finals- mike (asking \$500.00); Clegg 2M 27B \$100.00; Autek Filter \$85.00; Drake Lo Pass Filter \$20.00; KW 109 Super

Match; Vibroplex Bug- President \$85.00; Speedex Hand Key \$15.00; Ameco Tube Code Osc \$20.00; Tower (painted) 40'; Tower (painted) 50'; 2 Cassettes-Panasonic- Bell & Howell; Telefunken Andante Stereo- Short Wave- Radio FM/AM; Akai Tape Deck (mint) \$100.00; Speakers, Headphones, P. Supplies, Heliac (long runs) Co-axial (new) 5 pole switch- misc. wire- table for shack. C.R Kilgour VE3 HPR, (416) 349-2036, R.R. 1, Grafton, Ont. K0K 2G0



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Dr. DX Cartridge Plugs Into C-64 Expansion Port

Doctor DX™ by AEA has been described by many experienced DXers as THE MOST EXCITING new product to ever come to Amateur Radio. There is something for everybody in Doctor DX, from the aspiring Novice to the Amateur Extra-Class operator.

**DOCTOR DX CAN OFFER MORE FUN THAN ACTUALLY BEING ON THE AIR.** With the DDX-64 you can still work DX when the bands are dead, your antennas are down, TV has you shut down, or when you are relegated to apartment living with no other ham gear. You can also enjoy the propagation that you would otherwise be deprived of because of working or sleeping schedules.

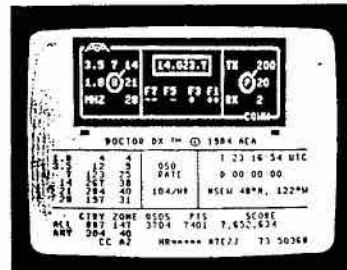
The DDX-64 takes all the mystery out of making CW contacts. It is easy to hook-up and operate and NO PREVIOUS COMPUTER KNOWLEDGE IS NECESSARY. This is THE answer for those who have never felt comfortable making CW contacts on the air. You will even learn the actual DX call letter prefixes and associated CQWV zones plus the expected times and bands for working particular DX during the peak of the sunspot cycle.

**GO ON A DXPEDITION TO ANY PART OF THE WORLD WITH DOCTOR DX.** Have you ever wondered what it would be like to work CW DX from another part of the world with a well equipped station? Now you can with Doctor DX. You can go on a DXpedition without leaving the comforts of your own home and avoid all of the expensive travel costs. Experience the thrill every ham has dreamed of for a fraction of the cost of actually making the trip.

**DOCTOR DX IS THE ONLY ALTERNATIVE TO POOR REAL LIFE PROPAGATION CONDITIONS.** The radio propagation programmed for each band represents what you would expect to hear on a good propagation day at the peak of the sunspot cycle with an omnidirectional antenna. The propagation follows the internal real-time clock that you set before beginning operation. As an example, the 10 and 15 meter bands are wide open during local daylight hours and closed at night (and vice versa for 80 and 160 meter bands). The simulated stations you hear (with proper prefixes) are at distances you would expect to hear under normal conditions for the time of day and band selected.

**LEARN PROPER CW OPERATOR SKILLS WITH DOCTOR DX.** The typical two-way contact exchange involves call letters, signal reports, and CQWV zones (all explained fully in the operator manual). If you miss any part of your QSO, you can ask for and receive a repeat. If you make a mistake, the other station may ask you for a repeat. You may even ask the other station to slow down (QRS) or speed up (QRQ) and he will. Learning proper operating procedures and technique is a natural with the DDX-64. Doctor DX will not reward bad operator habits. Whereas there are numerous means for training people in copy Morse code, the model DDX-64 is the first commercially available trainer that lets you learn good CW operating skills without having to make humiliating on-air mistakes. In fact, you can start practicing with the DDX-64 before receiving an FCC license. The DDX-64 is the ideal device for a novice to practice making CW contacts

DOCTOR DX IS THE ULTIMATE MORSE TRAINER. Utilizing advanced technology from AEA, Doctor DX offers the Morse operator what the Link trainers have offered airplane pilots for years. The skill level for any operator proficient from 5 to 40+ WPM can be greatly enhanced with practice on the DDX-64. Doctor DX consists of a plug-in hardware/software cartridge for the Commodore C-64 computer. A rear mounted phone connector accepts an input from your hand key or electronic keyer. The visual display of a transceiver front panel with human engineered operating controls appear on your TV screen along with instant score updating as you work new stations. Audio from received CW stations (as well as a sidetone following your sending) is monitored through the TV speaker or with a pair of headphones.



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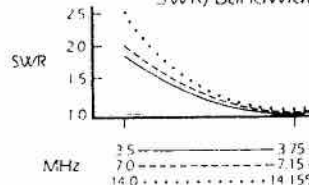
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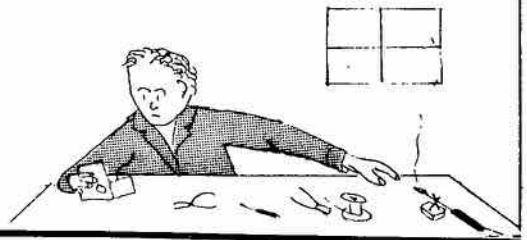
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# TYRO

By Frank Hughes VE3DQB



I sat quietly in the greenhouse, sipping a cool drink, and watching young Mark Space hoe my potatoes. Up one row he went, down the next, the sweat dripping off him in the hot sun. He'll do this by the hour, the reward being a trivial piece of obsolete stuff from my junk box. Ha! There's one born every minute, and another one to catch him.

At length he finished the potatoes, put the hoe back in its proper place and started towards the greenhouse, a signal for me to hide my drink, get up, and start to tickle the earth about a tomato. I appeared absorbed in this as he entered.

"I've finished hoeing the potatoes."

"Already? You have been quick. Want to start weeding the sunflowers now?"

This did not seem to appeal to him.

"Well, it's getting toward lunch time, and I'll have to go home then."

"Good lord, it is that late already? Oh, well. I've about finished here, so we could go inside and cool off, I suppose."

"Good idea. Don't forget your drink."

The impudent puppy! I took up the half-empty glass and led the way into the house, took a soft drink from the refrigerator and handed it to Mark, who had already helped himself to a glass from the shelf.

His eyes looked anxiously towards the stairway leading to the shack. There would be no getting away with it. I'd have to give him something for his work.

I switched on the receiver, tuned 14.100 by the crystal standard, and turned the volume down so that the teletypes and South American 'phone were not distracting, in the hope that a beacon would override

the noise and indicate the propagation. Then I sat down and looked at Mark.

"How's the code coming?" I enquired.

"Pretty well. Up to eights, now."

"And theory?"

"Well enough. But I'd like to do more practical work. It's all very well to read about these things, but I find I learn better if I see things happen."

"Most people do, Mark. I'll try and get a few demonstrations going next time classes start."

"Demonstrations are all right, but I like to do the work myself. I enjoy it."

"Well, you've got enough stuff to start with in that box you got at the garage sale." (That's still a sore point with me.)

"Yes, but I don't have a meter."

"Well, make yourself one, then."

Mark look at me as if I'd suggested he design, make, and launch a lunar lander. At length he forced out: "How?"

"Well, there's three common kinds of meter. Moving-iron, moving-coil, and thermal. The easiest to construct is a moving-iron one."

"Go on."

"Get a matchbox, one of the big ones, and cut a window in one of the big sides, in the middle, about

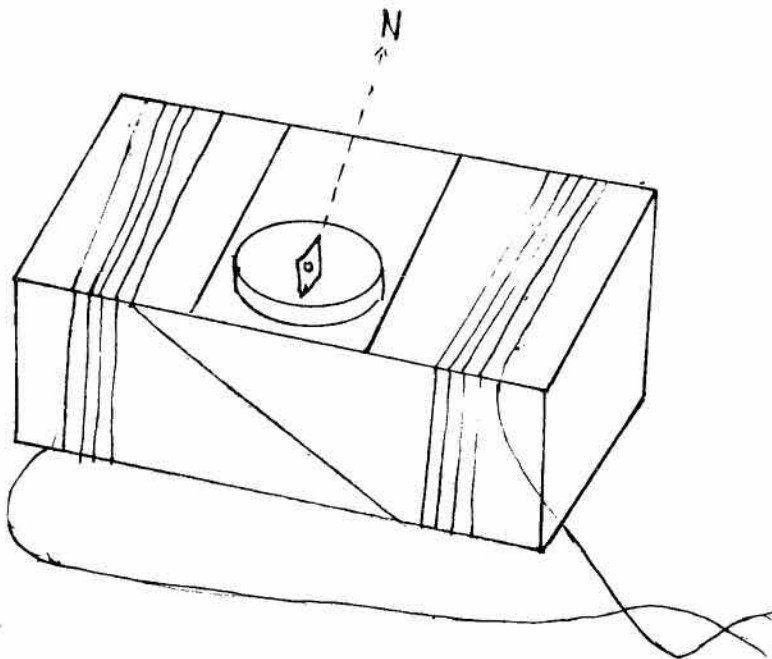


Figure 1— The matchbox and compass galvanometer. Mark cut a hole in the top of the matchbox, and wound as much fine wire as he could find round the ends of the box. His scout compass, in the matchbox drawer, indicated current flow by deflecting from its n-s orientation.



square in shape. Wind as much of the finest wire you can lay hands on— I'd suggest you unwind that burnt-out transformer for it— in two coils, one each side of the window. Use equal quantities of wire wound in the same direction each side.

"Then take your scout's compass and put it in the matchbox drawer, so that you can read it through the window. Set the unit on the table and orient it so that the needle points in the same direction as the windings of the wire.

"There's your meter."

The receiver suddenly drew my attention. QST DE JA2AGY BEACON, then the 9-second kilowatt dash, then the 100 watt, but the 10-watt one was lost under two South Americans who were going to lunch, I gathered, for they said "chow, chow" to each other.

Mark was looking at the clock, and his lips moved as he converted from 24-hour Z time to EDST. "I must go!" he said. "Mum'll be mad." And with a cheerful goodbye he went out of the house.

He'd forgotten his piece! Luck was with me.

A couple of days later, when the Quebec Radio Net had just closed and I was putting the phones down, Mark came into the shack.

"I made it!" he said, putting down his wired-up matchbox and compass on the bench. "What do I do with it now?"

"How well does it work?"

"Well, the needle swings back and forth when I put a battery across the coils."

"Then calibrate it."

"How?"

"Put a battery of known voltage across it, and note the deflection. Then put two batteries, and note the voltage and deflection again. Do this with several voltages by comparing its deflection with the curve. Here, use my nicads, but be careful with them."

Mark put one across his meter, noted the deflection, then two, then three.

"The needle swings a lot," he remarked.

"Fault number one of the meter. It's ballistic. A dead-beat movement is better."

"Oh-four-two degrees, oh-five-eight, oh-six-three."

"Fault number two. It's not linear."

"If it's that faulty, why did you tell me to make it?"

"Because you now know far more about meters than you would if you'd only read about them, or listened to lectures about them. And you do have a useable galvanometer— named after Luigi Galvani, the frog's-legs-and-animal-electricity man.

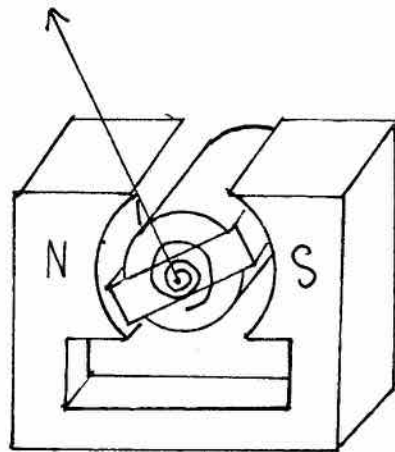


Figure 2— The d'Arsonval galvanometer. The pole-pieces of the magnet are made cylindrical, and a concentric cylinder of soft iron is supported between them. This ensures that the lines of magnetic force are radial over a large area of the poles. Between the pole-pieces and the soft iron cylinder a rectangular aluminum frame is supported between two fine jewelled bearings (not shown in the sketch). The coil is wound on the frame, and the ends are brought out to terminals by hairsprings. The hairsprings provide the restoring force to return the coil to zero when no current flows, and one of them is adjustable to set the zero. A pointer attached to the frame gives the analogue readout of voltage or current.

"It has other faults, too. What you are doing is comparing the strength of the field made by your coil with the strength of the earth's magnetic field. And the earth's field varies from time to time, and place to place.

"These faults are partly curable, and some refined, sensitive moving-iron meters, using a magnet to control the moving needle and shielded from the earth's field, have a place in the laboratory. Heavy-duty moving-iron meters, using a soft-iron piece instead of a compass magnet, are used a great deal, for they can respond to AC. Yours won't.

"But the real, worth-while shack meter is the moving-coil type. Jacques d'Arsonval had the splendid idea of inverting the positions of the magnet and coil in a galvo. The coil is suspended, either by a wire or by fine bearings, in the field of a magnet. The magnet field is made even by careful design and construction of the pole-pieces of the magnet. This causes the coil to deflect equal amounts with equal increments of current.

"And the coil is wound on an aluminum former. Now when the current to be measured passes through the coil, the coil moves in the magnetic field. When the aluminium former moves— because it is attached to the coil— the magnetic field causes a heavy current to circulate in it. This opposes the swing, so the meter needle moves dead-beat, that is, without swinging back and forth."

"Then why didn't you have me make a moving-coil meter?"

"Because it's a more difficult job than the simple compass needle one. You need a powerful magnet, and the pole-pieces of correct shape, and a watchmaker's jewelled bearing for the coil to move in, and hairsprings to control the swing and to convey the current to the coil. Then the coil itself, on the aluminum former, must swing

Continued on next page ▷

exactly through the magnet gap. Not a job you can complete in an hour."

"Oh. By the way, did you get the parcel from K and K Electronics yet? You ordered a couple of cheap transistors for me."

I'd hoped he'd forgotten.

"Yes, came in this morning. Here we are," I lifted the plastic envelope out of the box. Unfortunately, Mark peered in.

"You got some of those cheapy CB meters, too," he put his hand in uninvited and brought one out. He peered at it. "I can see the coil, and the magnet, and a hairspring," he announced.

"Yes, it's all there, reduced to the cheapest possible construction. We can be thankful for the CB fad, the fallout of useful parts will continue for a long time."

"I hoed nine rows of potatoes last Saturday," said Mark, meaningfully.

"All right. You can have the meter for it, and a hoeing round the sunflowers."  $\Delta$

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The Spaceport Amateur Repeater Club (SPARC) has been authorized by AMSAT to transmit space shuttle mission commentary for all missions on Special Services Channel H2, 145.963 MHz of AMSAT-OSCAR 10 satellite. Shuttle audio will be provided for several hours a day as time permits. Reception reports to: SPARC, P.O. Box 672, Merritt Island, FL 32952.

W5YI Report

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**Those of us** who make a living maintaining Japanese electronics find difficulty in ensuring that substitute parts are available. PanSon, of 32-70 31st St., Long Island City, N.Y. 11106 have produced an 1160-page guide listing 1,120,000 prices of 560,000 Japanese parts and part numbers, plus no longer available parts, which they might find most useful. At US \$49.95, a busy serviceman might save its cost in long distance calls over a year.

## Social Events

### THE ONTARIO TRILLIUMS

Come tie one on at our 20th Anniversary Dinner. Prizes, Cash Bar, Sat. May 11, 1985, 6 p.m. Howard Johnson's Hotel, Progress Court, Scarborough. Limited number of tickets, Price \$20 each. Bring the OM or a friend. Send cheque or money order to: Beverley Blakey VE3LZU, Apt. 1014-111 Davisville Ave., Toronto, Ont. M4S 2G4. Special Hotel Rates if you wish to stay overnight— \$52 Single or Double \$59, Order direct, Order early.

### THE 8TH ANNUAL NEWMARKET FLEAMARKET

'The Friendly Fleamarket,' Sat. Nov. 10, 1984, 0800-1400.

All roads lead to Newmarket, Ontario on Sat. Nov. 10 as the York Region ARC proudly presents the 8th edition of its annual 'Newmarket Fleamarket'. The location is once again the Newmarket Community Centre on Civic Drive. The town of Newmarket is just north of Toronto and easily accessible by highway or GO bus. Talk-in is on 146.52 MHz simplex and through the local repeater VE3YRC (147.825 MHz input/147.225 MHz output). Doors open at 0630 for vendors only and for the general public at 0800.

Admission is \$2 per person (children under 12 admitted free) and the price of admission includes

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The Southern Ontario Repeater Team's newsletter tells of a new 2 metre MSO in London. It's called a Litter Box and operates on 147.450 MHz simplex, call VE3TLB. It will record and repeat messages and programs. Sounds like fun.

a door prize ticket. Vendors will be charged a table rental of \$3 per table plus general admission.

Tables may be reserved by contacting Geoff VE3KCE at the address below. Tables will be held until 0800 unless payment is made in advance. Make out all cheques or money orders to the York Region ARC and forward them to: Geoffrey Smith VE3KCE  
7 Johnson Road,  
Aurora, Ontario  
L4G 2A3

For further information, contact VE3KCE at the address above or at (416) 727-6672 in the evening. Refreshments will be available at the fleamarket site. Last year over 900 people attended this event and the members of the York Region ARC hope to see you there this year.

### CALENDAR

**October 27, 1984:** Fred Hammond Appreciation Dinner, San Giovanni Banquet Hall, Mitchener Road, Guelph. Details September TCA.

**November 10, 1984:** York Region ARC 8th Annual Fleamarket. Details above.

**Nov. 17, 1984:** The Ontario Trilliums Christmas Party, Q.E. Hotel, Nov. 17. Call VE3COH, 266-9604.

**Feb. 2, 1985:** Niagara Peninsula ARC Big Event and Flea Market.

**May 11, 1985:** Ontario Trilliums 20th anniversary Dinner, Howard Johnson's Hotel, Progress Court, Scarborough.

**May 19, 1985:** Southern Ontario Repeater Team Fleamarket, Medway High School, Arva.

Does your club sponsor hamfests, fleamarkets, get-togethers of all kinds? Let TCA know about them in good time to list them in our Calendar.





# YL NEWS & VIEWS

By Cathy Hrischenko VE3GJH

Years ago when the OM and I first started going to electronic flea markets I would be the only YL selling, and I would see few YL's on the other side of the tables. I'm happy to say that has all changed now. Look around next flea market and you will see what I mean. We look forward to meeting our old friends and making new ones.

You may recall I asked for help to locate a YL I had met in Guelph from VE2 land. As they say, "It pays to advertise." I received a nice letter from her and met her again at the Hamburg, New York hamfest. Her name is Dora Hague VE2HAX.

Don't forget to send in those AC-DC logs, even if you only made a few contacts.

Over the years I've noticed some really different QSL's. Some of the English YL's have typically home-maker ones. Here are three for your entertainment. If you've got an unusual QSL or have received one from a YL, I'd love to see it.

This column is short, as I'm in the midst of making a bridal gown for daughter Dot VE3HUO, bridesmaid's dresses and cake and... and... and ..! and Company. Tell you more later.

So I'll leave you with this, which I found on my sister-in-law's refrigerator:

A hostess is like a duck. Calm and serene on the surface, but Paddlin' like hell underneath!

73/88/33 as the case may be,

Cathy VE3GJH

**Congratulations to Peel ARC**, for this is their twentieth year of existence. To mark the occasion properly, VE3AZA, their first president, has taken office for 1984-5!

OP: MARY ADAMS

## G4GAJ



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Misuse it AND Lose it!

# The 10 MHz Band: Be Careful!

by Bob Eldridge VE7BS

Many times in the history of the Amateur Service we have raised the cry of "Use it or lose it!" in respect to some frequency band or other, and recently there have been suggestions that we need to use the new 10 MHz band more widely or it may be taken away from us.

This band is rather different from most, and a new motto may be more apropos— "Misuse it AND Lose it!" Because of this, national societies have agreed in the International Amateur Radio Union that the 10 MHz band will not be included in contests or major award programmes.

A letter from Hop VE7AHB was printed in the March 1984 TCA, suggesting that we should get with it and take advantage of this relatively non-QRM band. Some aspects of his letter prompted me to contact Hop and discuss the 10 MHz situation, and he suggested maybe I should put something together for publication about the history and the possibilities of the band. Hence this article.

I have a special interest in 10 MHz, having worked on and off from 1971 to help get it into our allocations. I haven't tried to research the subject, so there are some missing pieces of the story; but what I have to say is from firsthand knowledge.

## How it began

The first suggestion I heard that we could possibly get new bands at 10, 18 and 24 MHz was in an article in *CQ Magazine* in the late 60's, I believe by a K6. Then at an Amateur dinner at the Cave Valaisanne in Geneva, during the CCIR Special Joint Meeting which preceded the Space WARC 1971,

Prose Walker W4BW (then in charge of the regulation of the U.S. Amateur Service) gave a talk in which he mentioned that the U.S. was discussing the possibility that there was now a chance that we could get new bands, at HF to fill in some of the gaps between present ones.

By 1976 it was an agreed aim in IARU that we should shoot for bands at 10, 18 and 24 MHz, and in the case of 10 MHz the proposal was for 10.1-10.6 MHz exclusive Amateur. In its proposal to DOC, CARF, as a result of a careful study of the various claims on 10 MHz, believed it to be realistic to be a little more conservative by suggesting 10.1-10.4. IARU did its work well, and when the CCIR Special Preparatory Meeting of 1978 convened, the input documents from many governments incorporated proposals for a new Amateur band somewhere below 10.7.

## Consensus

Meanwhile, in the mysterious way that consensus arrives in the Amateur world, the Amateurs in the traditionally supportive nations were preparing evidence that we needed new bands, and the effect securing them would have on improving reliability of communications.

Australia and Canada paid special attention to "proving up" 10, and we managed to get documents through CCIR Study Group 8 which included propagation study data showing that 10 would sometimes be useful when both 7 and 14 MHz were not. One of the documents dealt with the extra hours of traffic time which

would be available and the other with the improvement in reliability, so both sets of figures were submitted for the consideration of the Special Preparatory Meeting.

10 MHz was one very small part of the overall WARC preparation in CCIR— the late Bud Punchard VE3UD was at this time concentrating on safeguarding the Amateur Satellite situation in CCIR Study 2, and the U.S. group had a whole mess of topics in hand. But this story is about 10 MHz, not about the whole WARC.

## We have input

In case this is incomprehensible to some people, I should explain that Amateurs participate in CCIR (the initials in French of the International Consultative Radio Committee), which puts together the technical basis for decisions to be made at World Administrative Radio Conferences. The Special Preparatory Meeting 1978 was a joint meeting of all the Study Groups of CCIR for the specific purpose of compiling a technical report for the use of delegates to the impending WARC 1979.

At the Special Preparatory Meeting we ran into serious opposition from some of the developing countries, who use HF very widely for their internal communications, and for whom 10 MHz is right smack in the middle of the most valuable frequency spectrum. And the broadcasters sincerely believe that if the Fixed Service is going to relinquish any frequencies they should go to Broadcasting. We had to make some changes in the precise wording of the report, but the data in the Tables of figures went





through unscathed.

The combination of IARU's official presence plus many Amateurs serving on national delegations, works very well, especially when we have a very strong case. We had a few months left of WARC 79 preparation, and Bud Punchard, who had been appointed by DOC to the Canadian WARC team to advise on Amateur matters, worked to consolidate the input from Amateurs which related to the Amateur Service in the Canadian proposals to WARC. Fortunately, DOC were quite receptive all the way along the path, so within Canada we had no problem.

Much has been written about the tension and the victories and the defeats through the months of WARC 79. As far as Amateur Radio was concerned, there was nothing so difficult to maintain as the feasibility of something—anything—at 10 MHz. Under the combined assaults of the Maritime and the Broadcasting Services, both dedicated to getting some extra frequency spectrum somewhere, the Fixed Service people became firmer and firmer that they were not prepared to give up anything below about 20 MHz. The Broadcasters even publicized a document listing all the broadcasting stations operating outside their official bands as proof of their great need!

#### **By the skin of our teeth**

When it came down to the wire on the allocations around 10 MHz we were pared down from several hundred Hz exclusive to a few hundred exclusive and a few hundred shared, then by stages it became obvious there was no chance of any exclusive allocation at all, and the width of the shared allocation got narrower and narrower, and the status became secondary. At the last minute, and by the skin of our teeth, we salvaged the allocation we now have: 50 kHz on the basis of no harmful interference to the Fixed Service. It was the hardest fight we had, and we felt

it was a great achievement to get anything at all. One positive aspect of it was that the band would be available as soon as WARC 79 was ratified in each country, without the five to ten years wait that applies to 18 and 24 MHz.

#### **Potential Dangers**

IARU recognized the potential dangers that could arise if we cause problems to the service with Primary status on the band. It was agreed to recommend to national societies that telephony should not be authorized and that power should be limited. There is nothing in the international Allocations Table which mentions these limitations; they are just sound common sense in the circumstances. During the first few months when the band was authorized for Amateurs by their respective regulatory authorities, there was some sporadic SSB operation, but it seems to have dried up long ago.

Most Amateur operation is below 10.109, and it tends to spread upwards and fill in the gaps between commercials if congestion seems likely (but with modern rigs there is room for lots of CW signals in a few kHz). I was on the band the first day it was authorized in Canada, was there when the JA's arrived and later when the W's came on. On that occasion I just sat and listened in admiration to VE1ASJ, who must have made WAS in the first few hours. So far the Amateurs seem to have upheld the best traditions of the Service, and have avoided operation on the channels used by Fixed Service stations.

#### **That 10.109-10.115 Portion**

U.S Amateurs are not allowed to operate between these frequencies, to protect a government station which operates on 10.112 MHz. There is no legal impediment to a Canadian Amateur operating there, except for the basic rule that he must not interfere with any station in the Fixed Service.

But the U.S. limitation is there for good reason: we live next door and it makes good sense that we should not deliberately go in there. Apart from considerations of voluntary cooperation and all that stuff, there is also the possibility that if we cause problems we might have to be legally restricted too. The more we can do to regulate ourselves, the less motivation there is for DOC to come up with new rules.

The fact is there is usually room elsewhere anyway, and there seem to be few Amateur signals from any country in the 09-15 segment.

#### **The Danger**

The only real danger is that something will be scheduled on 10 MHz which gives rise to a pileup. Or worse, a contest with several pileups! Common sense often goes by the board in the enthusiasm of the moment (or the frustration or the fury).

Country by country, we could lose what little we have. It would be a pity, because it's a pleasant band to work on, with an atmosphere all its own. △

#### **The author:**

VE7BS was chairman of Canadian National Study Group 8 of CCIR during the period leading up to the 1979 WARC, and a delegate for Canada at several international conferences. He wrote the draft for the Canadian 10 MHz support document and was chairman of the subgroup which dealt with the Amateur Service sections of the Report of the Special Preparatory Meeting (for WARC '79), Geneva 1978. He was on the delegation from Canada to the 1979 WARC, and is currently chairman of the Working Group which deals with the Amateur Service in Canadian National Study Group 8.



# Frank Vaughan

by Malcolm Redding VE1IZ

*Frank Vaughan was a contemporary of Reginald Fessenden. He contributed much to the advancement of early radio in Canada and was well-known in professional circles in his day. This article reminds us of our not-too-well-known heritage in the development of radio.*

Born of Canadian parents in Liverpool, England, in 1874, Frank Vaughan started his electrical career with telephone companies in British Columbia in 1892. Five years later, he and his parents moved to Saint John, N.B., where he was employed with the Northern Electric Co.

In 1899, he went to Boston where he received additional experience with electrical engineering firms for the next two years, while taking evening courses in engineering at Massachusetts Institute of Technology. Later, Frank worked in the testing department of the General Electric Co. in Schenectady, New York.

## **An entrepreneur**

Returning to Saint John in 1902, he set up a private practice in electrical engineering, consulting and contracting, later founding Vaughan Electric Co. in 1906. He was Chief Engineer, General Manager and President of this Company until its closing and his retirement in 1942. This firm had many contracts for the design and installation of electrical equipment for large power generating plants, steamships, a drydock, schools, hospitals, manufacturing companies, commercial businesses, and municipalities.

In addition to all these, as one of his hobbies, he developed great skill

in the early pioneering of radio, in which he gained national recognition. All this commenced in 1902, when he built a spark transmitter which he used to communicate by code with a government marine radio station on Partridge Island, about three miles away in Saint John harbour. By 1906, he had improved his radio equipment so that he could transmit voice signals, a very unusual technique at that time.

## **Experimental Licence**

In April 1912, the Canadian Government issued him an experimental licence, XAO (one of the first 10 in Canada), to use 'Wireless

*Opposite, above:  
Frank Vaughan keys his basement rig in 1906. Spark gaps on the left. Those two things like watches are actually pocket voltmeters.*

*Left:  
Frank with his working model painting of Partridge Island. The painting is now in the New Brunswick Museum, but is not on display.*





Telegraphy,' but on certain conditions:

- The wavelength must not exceed 200 metres.
- Power not to exceed 2 kilowatts.
- Cease operation on receipt of the signal 'STP' or on a call by telephone from the nearby government marine radio station.

World War I suspended his radio experiments but he was frequently called upon during those years by local authorities and the federal government to provide services ranging from bomb detection to the refitting of electrical equipment in government ships.

Following the war, he resumed his radio experiments and presented technical papers along with demonstrations before many engineering, medical, university, and other educational institutions.

### A Broadcasting Station

His work with radio technology continued, and in 1922 he built a broadcasting transmitter equipped with the then recently invented electron tubes, and originated broadcasts from his home, mostly musical programs, and with the call sign '9BI'. This was the first radio station to broadcast in New Brunswick. His broadcasts over the next few months were heard as far away as Tacoma, Washington, by an Amateur radio experimenter who reported reception as coming in "clearly and steadily".

In 1925 Frank donated this equipment to the University of New Brunswick where it was again operated, but under a new call sign, '1DO'.

By 1928, radio broadcasting had come to Saint John and a

commercial station was put on the air, with the call sign CFBO. As part of the inaugural program on March 14, Frank gave an address entitled 'The Progress of Wireless Communication, Especially Wireless Telephony.'

### Academic Distinction

For his radio pioneering, and long and faithful service to engineering in 1922, the University of New Brunswick conferred on him the degree of Master of Science (Electrical).

He had many other associations with professional, academic, scientific and engineering institutes and associations both in Canada and the U.S.A.

Frank did not keep an Amateur licence later than the 1920's but

*Continued on next page ▶*



relaxed with another hobby, mainly after retirement in 1942, in which he displayed considerable skill in the art of sketching and painting, primarily cats, dogs and birds. One work for which he was particularly noted was a mechanized and electrified painting of Partridge Island, complete with a bell buoy that moves and also rings, a lighthouse with flashing light, a fog horn that sounds two blasts every half minute, and a vapor representing the well-known Bay of Fundy fog is released to slowly rise from the water.

### Many Tributes

Following his retirement, he received many letters from engineers in Canada and the United States in tribute to his eminent career in electrical engineering and to a very special quality of friendliness and personal interest in those persons whom he had met. This quality is typically exemplified in a letter from a friend who at that time (1942) was Chief Electrical Engineer, CPR, Toronto who wrote, "that during the compiling of your enviable record, you have done harm to no man and have lived, to the letter throughout, to the highest ethics of the business and personal world."

With Frank Vaughan's passing in 1958, Canada lost one of its lesser-known radio pioneers: he left a rich legacy of professionalism and friendship among the many with whom he came in contact.  $\Delta$

**The Waterloo Region** Amateur Radio Service provided ground communications for the Woodstock to Paris Microlite Race... Good heavens, Woodstock to Paris in a microlight aircraft? What's the great circle distance, and how do they navigate the Atlantic?... Oh, they mean Paris, Ontario, near Brantford. About 60 or 70 miles. That's different.

From the Kitchener-Waterloo ARC's  
*Kilowatter.*

# Canada Day Contest

The Canadian Amateur Radio Federation is pleased to announce the Canada Contest 1984, 0000Z to 2400Z 30 December, 1984.

**Valid Contacts:** This contest is open to all Amateurs. Everybody works everybody on the 160, 80, 40, 20, 15, 10, 6 and 2 metre bands in both CW and Phone. The same station may be worked twice on each band, but no crossmode contacts are allowed.

**Categories:** Single operator, all band; single op, single band; all bands, Amateur Certificate; all band, QRP; single band, QRP. (QRP defined as 5 watts DC output or less); Multi-single.

**Exchange:** RST and serial number. VE1 stations should also send their province.

**Points:** 10 points for each contact with a station in Canada. VE0 counts as Canada. 4 points for contacts with stations in other countries. 20 bonus points may be claimed for each contact with a CARF official station, using the TCA or VCA suffix. (ie. VO1VCA, VE7TCA)

**Multipliers:** Total of Canadian Provinces and Territories worked on each band on each mode, for a total of 24 possible multipliers.

**Score:** Final score is QSO points times multiplier.

**Suggested Frequencies:** 1810, 1840, 3525, 3770, 7025, 7070, 14025, 14150, 21025, 21250, 28025, 28500, 50040, 50110, 144090, 146520 kHz. We suggest Phone during even hours, CW during odd hours, Z. (Some of these phone frequencies may run into a bit of a problem with the recent American phone band expansions.)

**Entries:** A valid log must contain log sheets, dupe sheets, and a summary sheet showing claimed QSOs, QSO points, multipliers and

score calculation. Summary and multiplier checksheets are available for an SASE. Entries should be mailed within one month of the contest, with your comments, photos, etc. to CARF Contest, c/o Norm Waltho VE6VW, General Delivery, 9714 94th St., Morinville, Alta. T0G 1P0.

**Awards:** Certificates will be awarded to top-scoring entries in each class in each province, territory, USA call area and DXCC country. Second and third place certificates where scores warrant. Additionally, the following trophies will be awarded: Single op, all bands— CARF Trophy; Single op, all bands, Amateur— C.M. Peterson Co. Ltd. Trophy; Single op, single band— TCA Editor Trophy; Multi op, all bands— Glenwood Trading Co. Ltd. Trophy.

**Results:** will appear in a future issue of TCA. Non-members of CARF may include an SASE with their entry for a copy of the results.

## HOW FRIENDLY ARE YOU?

Have you ever gone into a new city and announced your presence on a repeater and gotten no answer? Only to hear someone else on seconds later? Or maybe you have been listening to the local machines and heard a strange call. Did you respond? The above little bit of sour grapes was thought up on my holidays as I was going through some new territory. And I've avoided talking to a new call. It's possibly a little late for this year, but the next time you hear a new call, why not pop in and say hello.

From Hi-Q,  
Lakehead A.R.C.,  
September.





CANADIAN AMATEUR RADIO FEDERATION INC.  
 FEDERATION DES RADIO AMATEURS DU CANADA INC.  
 c/o Norm Waltho VE6VW, General Delivery, 9714 94th St.,  
 Morinville, Alta. T0G 1P0.

**CANADA CONTEST  
 CONCOURS DU CANADA**

CALL INDICATIF \_\_\_\_\_

- single operator all band  
opérateur simple, toutes les bandes
- single operator single band \_\_\_\_\_ MHz  
opérateur simple, une bande
- multi operator single transmitter all band  
opérateurs multiples, un émetteur, toutes les bandes

**SCORE CALCULATION**

total QSOs  
QSOs totaux

Canadian QSOs  
QSOs avec Le Canada  × 10 =  points

other QSOs  
autres QSOs  × 4 =  points

bonus QSOs  
QSOs bonis  × 20 =  points

QSO points  
points de QSOs =  points

multiplier  
multiplicateur  (see over for chart)  
(regardez au verso)

total score = QSO points × multiplier =  points  
 points totaux = points de QSOs × multiplicateur =  points

name \_\_\_\_\_ call  
nom \_\_\_\_\_ indicatif \_\_\_\_\_

adresse \_\_\_\_\_  
adresse \_\_\_\_\_

TX/RX \_\_\_\_\_ POWER  
EMITTEUR/RECEPTEUR \_\_\_\_\_ POUVOIR \_\_\_\_\_

antennas \_\_\_\_\_  
antennes \_\_\_\_\_

OPERATORS: \_\_\_\_\_  
OPERATEURS: \_\_\_\_\_

NATIONAL VOICE OF THE CANADIAN AMATEUR  
 VOIX NATIONALE D'AMATEUR CANADIEN

date: \_\_\_\_\_

signature: \_\_\_\_\_



# CANADA CONTEST CONCOURS DU CANADA

## MULTIPLIER CHART

## CARTE DES FACTEURS DE MULTIPLICATION

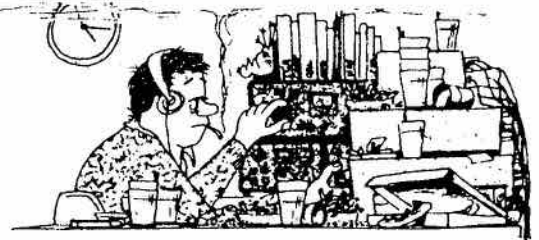
Fill in QSO number sent of each new multiplier in the correct box  
Entrez le numero de QSO emis pour chaque multiplicateur nouveau dans le bon boîte

| Province<br>Province<br>Territory<br>Territoire | VO1<br>VO2 | VE1<br>NS | VE1<br>NB | VE1<br>PEI | VE2 | VE3 | VE4 | VE5 | VE6 | VE7 | VE8 | VY1 | VE0 | TOTAL |
|---|------------|-----------|-----------|------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| Bande/Mode<br>Bande/Emission                    |            |           |           |            |     |     |     |     |     |     |     |     |     |       |
| 1.8 cw  |            |           |           |            |     |     |     |     |     |     |     |     |     |       |
| 1.8 phone                                       |            |           |           |            |     |     |     |     |     |     |     |     |     |       |
| 3.5 cw  |            |           |           |            |     |     |     |     |     |     |     |     |     |       |
| 3.5 phone                                       |            |           |           |            |     |     |     |     |     |     |     |     |     |       |
| 7 cw  |            |           |           |            |     |     |     |     |     |     |     |     |     |       |
| 7 phone   |            |           |           |            |     |     |     |     |     |     |     |     |     |       |
| 14 cw   |            |           |           |            |     |     |     |     |     |     |     |     |     |       |
| 14 phone  |            |           |           |            |     |     |     |     |     |     |     |     |     |       |
| 21 cw   |            |           |           |            |     |     |     |     |     |     |     |     |     |       |
| 21 phone  |            |           |           |            |     |     |     |     |     |     |     |     |     |       |
| 21 phone  |            |           |           |            |     |     |     |     |     |     |     |     |     |       |
| 28 cw   |            |           |           |            |     |     |     |     |     |     |     |     |     |       |
| 28 phone  |            |           |           |            |     |     |     |     |     |     |     |     |     |       |
| 50 cw   |            |           |           |            |     |     |     |     |     |     |     |     |     |       |
| 50 phone  |            |           |           |            |     |     |     |     |     |     |     |     |     |       |
| 144 cw  |            |           |           |            |     |     |     |     |     |     |     |     |     |       |
| 144 phone                                       |            |           |           |            |     |     |     |     |     |     |     |     |     |       |

TOTAL MULTIPLIER =   
MULTIPLICATEUR TOTAL =



# CONTEST SCENE



By John Connor VE1BHA

- Nov. 3/4— CW Sweepstakes
- 10/11— European DX RTTY Contest
- 17/18— Phone Sweepstakes
- 24/25— CQ WW DX CW Contest
- Dec. 1/2— ARRL 160M Contest
- 8/9— ARRL 10M Contest
- 30— CARF CANADA Contest

Well, the results of the CQ WW Phone Contest have shown up in the September issue of *CQ Magazine*. A summary of the Canadian results is included below.

Only two Canadians in the single operator all band category

managed to score over one million points, a reflection of the continuing downward trend in the sunspot cycle. Henry VE7WJ lent his station out to NU6S who walked off with the honours as top single op in Canada with a fine score of just over 2M. Coming in second was John VE6OU with almost 1.3M.

The single band single operator competition was pretty light on 28 and 21 MHz. VE3CVX was top dog on 28 MHz with 145,860 points. On 21 MHz, VE6AGV was the lone entrant, totalling 31,164 points.

Yuri C13BMV had a fun

weekend and established a new Canadian record on 20M, racking up over 2000 QSOs on his way to a 910K score. Yuri found 36 out of 40 zones and 140 countries in setting that mark.

Forty metres saw a close battle between Max VO1CV and Gary VE3GCO, who operated as C13GCO. Gary made more QSO's, but Max used his geographical advantage to find ten more multipliers, and set a new 40M record of 257,712 points. In addition, he walked off with the trophy for top Canadian single op single band.

Continued on next page ▶

## 1983 CQ Phone Contest Results

| CALL            | SCORE     | QSOs | ZONES | COUNTRIES | CALL                | SCORE     | QSOs | ZONES | COUNTRIES |
|-----------------|-----------|------|-------|-----------|---------------------|-----------|------|-------|-----------|
| <b>ALL BAND</b> |           |      |       |           | <b>14 MHz</b>       |           |      |       |           |
| VE7WJ (NU6S)    | 2,017,111 | 2450 | 118   | 229       | C13BMV              | 910,976   | 2087 | 36    | 140       |
| VE6OU           | 1,299,825 | 2125 | 94    | 171       | C15RA               | 178,089   | 953  | 26    | 61        |
| VE2AYU          | 690,000   | 891  | 86    | 214       | VE1DX               | 162,588   | 616  | 26    | 76        |
| VE2EVO          | 269,880   | 592  | 65    | 132       | VE2FGS              | 107,916   | 540  | 24    | 68        |
| VO2CW           | 232,544   | 665  | 59    | 110       | VE5XV               | 88,776    | 351  | 30    | 78        |
| VE4RP           | 135,384   | 406  | 61    | 86        | VE5AE               | 33,670    | 240  | 33    | 42        |
| VE7COW          | 94,160    | 345  | 46    | 58        | VE6BEP              | 32,922    | 242  | 22    | 37        |
| VE2PD           | 93,324    | 239  | 45    | 109       | VE2FJX              | 3,227     | 137  | 7     | 6         |
| VE4CCC          | 50,922    | 205  | 51    | 72        | <b>7 MHz</b>        |           |      |       |           |
| VE3FEA          | 45,396    | 154  | 41    | 76        | VO1CV               | 257,712   | 953  | 26    | 76        |
| VO1AW           | 22,910    | 107  | 21    | 58        | C13GCO              | 207,564   | 1037 | 21    | 71        |
| VE7EIK          | 18,790    | 186  | 13    | 22        | <b>1.8 MHz</b>      |           |      |       |           |
| VE4AKN          | 15,844    | 99   | 32    | 36        | VE3MFA              | 23,275    | 341  | 12    | 23        |
| VE2JO           | 14,145    | 80   | 24    | 68        | VE1BN               | 8,160     | 66   | 13    | 35        |
| VE1AYB          | 8,924     | 98   | 16    | 30        | VE3INQ              | 4,704     | 113  | 8     | 13        |
| VE7ENG          | 7,242     | 95   | 17    | 17        | <b>MULTI SINGLE</b> |           |      |       |           |
| WB1LC/VE8       | 504       | 18   | 12    | 9         | VE1DXA              | 4,279,908 | 3638 | 127   | 365       |
| <b>28 MHz</b>   |           |      |       |           | VE3CYX              | 2,748,954 | 2219 | 131   | 376       |
| VE3CVX          | 145,860   | 849  | 21    | 57        | VE5GP               | 1,311,711 | 2341 | 91    | 176       |
| VE4AIY          | 12,804    | 110  | 14    | 30        | VE7CQR              | 1,256,351 | 2054 | 170   | 163       |
| VE4IF           | 5,187     | 47   | 13    | 26        | VY1CC               | 238,506   | 754  | 54    | 73        |
| VE5AFG          | 4,020     | 49   | 11    | 19        | <b>MULTI MULTI</b>  |           |      |       |           |
| <b>21 MHz</b>   |           |      |       |           | VE3PCA              | 3,407,112 | 3102 | 123   | 351       |
| VE6AGV          | 31,164    | 266  | 15    | 27        | VE7ZZZ              | 1,736,092 | 2719 | 107   | 177       |
| <b>3.8 MHz</b>  |           |      |       |           | WB1/VE2             | 1,660,980 | 2850 | 93    | 192       |
| VE3BEW          | 46,398    | 626  | 13    | 25        |                     |           |      |       |           |



On the low bands, VE3EEW was the sole entrant on 80M, turning in 46,398 points. Meanwhile, VE3MFA came out as number one on 160M, with 23,275 points.

In the multi-single competition, Bob and the boys from Bridgewater at VE1DXA must be getting bored with winning, having been the top MS for five years of the past six, including the last three years in a row. They came up with one of their usual good efforts, close to 4.3M. The trophy, however, goes to the runner-up, VE3CYX who ran up 2.7M points.

Multi-multi seems to be getting more popular in Canada, thanks largely to VE7ZZZ and VE3PCA. PCA came first with 3.4M, well ahead of ZZZ.

Not all the action by Canadians in this contest took place in the Great White North, however. Bob Nash VE3KZ took some time away from the beach in St. Kitts to operate as VP2KBZ. Bob managed to talk his way to the fifth world high single operator all band score, amassing almost 4.3M points. As well, he receives the Single Operator Expedition Trophy for his efforts. Well done, Bob.

Next month, the CW results.

### December Contests

December sees a couple of 'specialty' contests, the 160M contest and the 10M contest, both sponsored by ARRL. Both these contests have been seeing some large changes over the past few years. On 160M, more and more people are getting on the band with new 160-10 rigs, as well as KW amplifiers. If you think that 160M is nothing but weak signal and slow CW you haven't been on the band lately. (Possibly with good reason, some would say.) You might want to have a listen to this one. But remember, power restrictions are still in effect in Canada, if I am not mistaken.

The second weekend of December features the 10M contest.

You might wonder what the point is in going on 10 now. But now is the time when we really need to have people on the band, with people leaving it as the sunspots go down. Ten metres never dies, it just QSB's.

Winding up the year is the CARF Canada Day contest, which falls on Dec. 30 this year. This contest is well suited for the holidays, it's a relaxed, pleasant operating event. This is a good contest for your first attempt at contesting, too.

Rules for the 160M and 10M contest are below. Rules for the Canada Contest are elsewhere in this issue. With that I'll wrap it up for this month.

73, John

### ARRL 160M CONTEST

Period: 2200Z 1 Dec. to 1600Z 2 Dec. (42 Hours)

Categories: Single op and multi-single.

Exchange: Report and ARRL Section.

Multipliers: ARRL Sections plus VE8/VY1 plus DXCC Countries. Scoring: 2 points per QSO with a station in an ARRL section and 5 points per QSO with DX stations; final score is total points times multiplier.

Remember not to transmit in the DX window, 1825-1830 kHz. Logs with more than 200 QSO's must submit a dupe sheet. Entries go to ARRL.

### ARRL 10M CONTEST

Period: 00Z 8 Dec. to 24Z 9 Dec. Operate 36 out of the 48 hours. Listening time counts as operating time.

Categories: Single op mixed mode, single op phone only, single op CW only, multi-single (mixed mode only).

Exchange: RST plus province.

Multipliers: 50 U.S. states, Canadian call areas, DXCC countries.

Scoring: 2 points per phone QSO, 4 points per CW QSO, 8 points for each QSO with an American Novice or Technician (signing /N

or /T). Final score is total points times total multipliers.

No crossmode contacts are allowed, and CW is only below 28.5 MHz. If you are operating mixed mode, you may work other stations on both CW and Phone, i.e. you can work the same station twice. If you make more than 500 QSO's, a dupe sheet is required. Entries go to ARRL. △

## Canada Contest Correction

Due to Murphy and the speed at which I compiled the last three Canada Contests, some of the Amateurs scores have been mixed up under the wrong Contest.

VE6CAW's entry in all band Canada Day 83 should be in the Canada Contest 83; this takes the trophy for all band single operator.

VY1CCM's entry in Canada Day 83 should be CY1CCM, sorry finger problems.

DA2CF's entry which shows up under the Canada Day Contest 83 should be under the Canada Contest 83.

Norm VE6VW

## PRCS

Another concept goes down into the black hole of an acronym—the Personal Radio Communication Service. This is an extension of the 'cordless telephone' idea to car telephones. It is planned to use channels near 900 MHz. There is furious opposition from the cellular radio manufacturers, whose product is far more expensive. PRCS routes calls to and from your home telephone from your car or from a hand-held either direct or via a repeater. While the proposal is 'stateside' only at the moment, if it gells, look for it up in Canada too.

W5YI Report





## Scarborough ARC's Field Day Checklist

# Scarborough's 1984 Field Day

*from Scarborough ARC News*

Field Day 1984 has come and gone. As a general overall appraisal, we can only conclude that the Scarborough Club's effort was an outstanding success in every way.

All the months of planning and hard work by many people, covering every aspect of the operation, all came together magnificently at 2:00 p.m. Sat. June 23, 1984 at Bruce's Mill Conservation Park.

Indeed, the logistics of the operation are something to consider in the circumstance that the whole thing is accomplished by volunteers working together. Now let's take a little closer look as some of the major steps which are involved in getting ready for FD:

- Financing— allocation of club funds for various goods required.
- Recruitment— lining up club members and interested non-members, and determination of where and how each will participate.
- Antenna design— design of antennas for all bands, all modes to be used. Max. gain in dB is the objective.
- Material acquisition for antennas. This involves procurement of the technically-best available equipment at optimum cost.
- Antenna construction— this involves many people working to exacting electrical and mechanical standards to cut, drill, assemble and test antennas, with tests being conducted using transceivers, noise bridge, plotting SWR at band edges and mid-band, careful marking of fine tuned positions, careful

disassembly and packing for storage and transportation.

- Storage of FD equipment— for this we owe a most hearty 'thank you' to Bill Clifford VE3HMZ of Clifford Van and Storage.
- Acquisition of Antenna towers— In addition to towers on hand from other years, it was necessary that we acquire a number of additional towers this year. A special detail was set up to take down some standing towers, and pick up some towers already down.
- Assembly of towers— all towers were fitted and assembled at Clifford Van QTH by a detail of club members. Bolts used were newly acquired by Tom VE3NSJ after due checking for sources and prices.
- Loading of Van— all assembled towers were loaded in a 40-foot van along with motor-generators, gas cans, ropes, stakes, antenna masts, extendable masts, ground rods, cable reels and signs.
- Feed lines— all new coax feed lines were prepared from best available new material cut to the fraction of an inch and fitted with proper new soldered fittings, all carefully tested, in working toward virtually flat SWR results. Feed-lines were cut and marked for all the bands to be used.
- Power for rigs— starting many months ago, arrangements were made for provision of proper power sources for stations to be set up. Follow-ups were made at appropriate intervals to assure that no snags developed. Clifford Van made the pick-up.
- Unloading of Van— upon

arrival at the FD site, for which a permit had been obtained almost a year ago, the van was unloaded and parked at what eventually became the site of the 20-metre CW station.

- Layout of the site— using a plan developed well in advance, the various stations were located on the site, with consideration of minimum inter-station interference. Stations were quite a distance apart around the periphery of the site. The motor-generators and cable reels were located about the centre of the site. The crew for each station parked cars adjacent to the various stations. Ground was hard.

- Support crew— the chief climber brought his own support crew, consisting of Boy Scouts and interested friends. This crew functioned with almost military precision in carrying out their varied duties, including tower and antenna erection, serving hot food and tea or coffee— even at 3 am (this helped the operators, loggers and checkers).

- Deployment of power cables— cables were spread out from the motor-generator area to each station location so that power could be transferred to each station location.

- Erection of station bases— each station crew set up its own station base at its designated location on the site. Some used tents and some used camper vehicles. The station crews erected their own facilities.

- Deployment of towers— pre-assembled towers were moved from

*Continued on next page ▷*



the van area to the station locations either by the station crew or the support crew.

- Erection of towers— using stakes and ropes moved from the van area, towers were erected by the support crew in locations chosen by the station crews, within the general plan.

- Assembly of antennas— beam antennas and some others were re-assembled from previously prepared parts and packages. This was done by station crews under the watchful eye of the chief antenna designer. Wire antennas were pre-cut and assembled and came in neatly packaged coils, with matching transmission lines, and baluns where required.

- Installation of antennas— after towers had been erected and beam antennas assembled, beam antennas were installed atop towers by the chief climber using gin pole brought by VE3AXM, with assistance from the support and station crews. Precision and skill displayed was a joy to see. Beams in place, next came connection of feed-lines (previously cut and fitted).

- Set-up of stations— suitable tables for equipment were installed at each station, along with necessary floor coverings and chairs. Each station was to be fitted with a watt-meter, and interconnecting cables, keys or paddles and ground rods were all furnished by the station crews. Provision was made for light for night-time operation at each station.

- Papers for record keeping— Copies of official FD forms were provided to each band leader by the FD Coordinator. Scratch paper and pencils were furnished by the station crew.

- Meal preparations— Meal arrangements were made in advance by each station crew. Some groups operated on a 'bring your own' basis, while others preferred to have one member provide a meal for the crew, say at breakfast, one at lunch and another person provide dinner. Beverages were usually tea,

coffee or soft drinks, with an occasional 'sore throat cure'. One observer was heard to muse whether DOC covered such things in their exam program. Hams seem to eat very well on this weekend.

- Sleeping accommodations— all provided to suit individual tastes. Some had cots, some sleeping bags, some preferred foam mattresses in vans, some slept in campers (when not operating of course).

- Preparation for operation— some station crews held meetings at members' homes to discuss various operating procedures. In some cases 'dry runs' were made to enable station crews to become familiar with equipment they were to operate. Some special appurtenances were obtained in advance.

- Signs— using pre-purchased poster board, yellow to match the colour of one of our sponsors, signs were made for each station to show the frequency (band) and mode— either code CW or phone.

#### Other Points

- Participation— we were pleased by the increase in the number of members participating this year. We also had the help of many friends of the clubs. Some members did not participate because they found it not possible to be there all weekend, Next year we will advertise that part-time help is welcome.

- Benefits of Field Day— Regardless of the outcome of the competitive scoring, all participants had a whale of a lot of fun and learned a lot. As a group we proved to ourselves and many others that we could indeed provide reliable communications in event of an emergency.

- Use of 2-metre band— The 2-metre band was used to communicate with Scarborough from the FD site, to request those coming to bring certain needed items. This was an excellent example of planning for emergency, and worked out real well when several critical items were delivered

to the FD site in timely fashion.

- Safety— Safety was a primary consideration at all times. It paid off.

- Overall evaluation— At the early date of this writing, well before the point totals are available, we can only conclude that our club conducted a highly successful operation. In the process, we had major contributions from many people, and much greater participation than we had last year.

After all, the whole thing is really an exercise in emergency preparedness. As a coordinated body of interested Amateur operators, we surely well demonstrated what we could do in an emergency— while operating from open country.

A lot of our members sharpened their operating skills, and gained valuable experience which will make them better operators in many respects.

Thus, regardless of final point totals in the contest, individual members and our club came out big beneficiaries from the FD exercise.

As for the contest aspect of Field Day 1984, we can recognize that we did the best we could. Propagation conditions were very poor, but this condition was the same for all participants. So, win or lose in the contest, we are big winners— and we await publication of scores with anticipation and confidence.  $\Delta$

## A Break for Seniors?

Saskatchewan ARL's QSO reports a motion, to be discussed at the next meeting, of the following proposal:

Moved by SARR offer senior citizens a reduced membership rate because:

Some are on welfare

Some are broke

Some are over the hill

Some are disillusioned

Some are on welfare, broke, over the hill and disillusioned.



# TECHNICAL SECTION

Section Editor  
Ed Hartlin



10 Hz-1 MHz, Sine, Square or Triangular

## A Wide-Range Audio Function Generator

by Jack Botner VE3LNY  
35 Wynford Cres. #1708  
Don Mills, Ont. M3C 1L1

Here is a project for building a flexible yet simple audio function generator that would be a useful addition to any ham shack. The function generator described in this article uses only two IC chips, yet provides both square-wave output and a choice of sine-wave or triangle-wave output, simultaneously. And the generator can be powered from any supply of 9 to 15 volts DC at under 20 ma, including a battery. This circuit has 5 decade frequency ranges providing a total range of 10 Hz to 1 MHz.

The signal generator is based on the Exar 2206 function generator chip. The 2206 is capable of generating a variety of waveforms of high stability and accuracy. In this circuit, the 2206 is configured as a sine wave generator with low harmonic distortion. As a fringe benefit, a square wave signal is also available from the 2206. With the addition of a switch, a triangle wave can be generated in place of the sine wave. Each waveform is passed through a trimmer resistor to allow

for level adjustments, and buffered by a wide-bandwidth dual op-amp, the LF353N.

I built the function generator on a piece of perforated vectorboard, using sockets for the two IC's. All the parts are placed on the board, with tie-ons for the controls that go on the front panel of the unit. I mounted the generator on the cover of a Hammond 14110 handy case. The circuit board goes on one side of the cover, a small power supply on the other side, and the switches and controls go on the top of the case. The result is compact yet neat, with plenty of room for the controls and a dial.

The frequency determining capacitors C1-C5 should be good quality units with as close tolerance as you can find. R3, R5, R6 and R7 are trimmer resistors and should go on the circuit board. R1 is the frequency control, which should be mounted in the center of the case top. R8 and R9 are the sine/triangle and square wave output level controls, and could be mounted in the top corners of the handy case. I mounted the frequency range

control in the lower left-hand corner of the case top, and two output jacks in the lower right-hand side. Finally, the power switch went in the center-left area, and the sine/triangle switch in the center-right side of the case top.

All those trimmer resistors serve a purpose, to allow you to set the unit up to generate a uniform output signal level for all waveforms. You should have access to an oscilloscope to make the initial adjustments to the unit. First of all, set the symmetry control Rb to the middle of its range. Connect the sine wave output of the unit to the oscilloscope and turn it on. Set the output level controls R8 and R9 to maximum output level, the range switch to the middle range, and S1 to sine wave. Observe the waveform on the oscilloscope, and adjust R3 so that the signal is comfortably below the clipping level. Then adjust Ra for the cleanest sine wave. If the waveform is not symmetrical, Rb should be adjusted.

The maximum peak-to-peak

*Continued on next page* ▷





# Building a Quad

by Jack Spall VE3BTQ  
101 Daphne,  
Barrie, Ont.

All of the handbooks give information on quad dimensions, types and various feed systems, but none of them go into actual layout, which I intend to do.

I do not intend to get into the argument of which is the better antenna, a quad or a yagi, however, I do know you can build your own tri-band quad which will require no tuning and the performance will be amazing.

This quad has extremely high front-to-back and front-to-side ratio.

Do not use the quad measurements given in the various books, as these are nearly all based on American frequencies. Figure out your own for your favourite centre band frequency.

Driven element (DR) in feet =  
 $1005 / (F \text{ in MHz})$   
Reflector element (RE) in feet =  
 $1030 / (F \text{ in MHz})$   
Director element (DI) in feet =  
 $975 / (F \text{ in MHz})$

You will require about 125 feet of wire for 10 M elements; 102 feet for 15 M elements and 150 feet for 20 M elements. Ten M has 3 elements, 15 & 20 M have 2. Cut loops of wires 12 inches longer than required. For the wire, use hard drawn aluminum #14 copperweld or, #14 drawn copper wire.

**Spreaders**— I used round fiberglass 13 feet long. However, aluminum can be used. For the centre connection, either  $1\frac{1}{4}$ " aluminum angle or  $1\frac{1}{4}$ " aluminum

tubing can be used. (This will depend on the size of your spreaders).

**Clamps**— Use Stainless Steel.

**Rotor**— As the completed quad is quite light, an AR 11 or heavy duty TV rotor can be used. However, a heavier type with brake is preferred.

**Boom, 14' Long**— Use 2 pieces of TV masting,  $1\frac{1}{2}$ " in diameter by 10' in length. Splice the centre, and run a  $\frac{1}{4}$ " bolt through splice to keep it tight (use swaged masting). If you wish to have a 3 element on 20 M, you will need a 28-foot boom.

**Beam Mounting Plate**— Use  $\frac{1}{4}$ " aluminum, 10"x6". See Fig. 4. As my rotor is mounted inside the tower, about 2' from the top, I had to make two mounting plates of  $1/16$ " steel. (I used an old steel panel from the junk box.) As my rotor is a CD Mark III, I have used about 8' x  $1\frac{1}{4}$ " galvanized water pipe for masting and installed a mast bearing to control side sway.

Make 4 units (as shown in Fig. 1 and Fig. 3). An extra set is required for the 10 metre driven element. I used aluminum tubing for this. Use 1" aluminum tubing for the centre piece, and  $7/8$ " for spreaders with 10" of  $\frac{1}{2}$ " PVC at the ends pushed about 3" into the spreader and clamped. If aluminum tube is too small to allow PVC, cut a slit about 3" long in it.

Spreader length required is 7 feet from the centre. If you use a different type of spreader and want to use angle aluminum in the centre, use clamps for keeping the

spreaders in place; two per side.

## Assembly and Wiring of Units (Fig. 2)

Select a level area about 30 feet square, and lay out two sets of spreaders as follows: Using a piece of mast pipe for the centre piece, place clamps over pipe to keep unit in place. Using a large carpenters' square, make sure the spreaders are  $90^\circ$  apart. Then, using three wooden stakes on each spreader to keep them there, measure the distance from the centre for each set of elements and wrap paper tape around spreader for use as a marker:

10M RE 6' 4" DI 6' DE 6' 2"

15 M RE 8' 7" DE 8' 4"

20 M RE 12' 10" DE 12' 6"

Put a large spike wherever you marked the tape for 10 M. Using a 100' steel measuring tape, hang the end on one of the spikes and measure around the square, keeping tape on its side. If the measurement does not agree with your required dimensions, move spikes keeping distance between spreaders the same (and distance from the centre the same), until tape when pulled taut is exact length. Drill a small hole to take wire through spreader and make sure wire is exact length, then twist together and solder, and cut off any excess wire. As the 20 M elements are at or near end of spreader, do not drill a hole. Instead, use a small clamp made up as follows (see Fig.

Continued on next page ▷



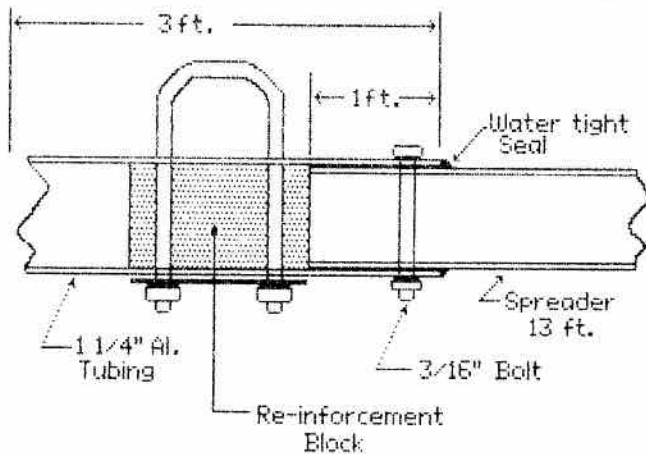
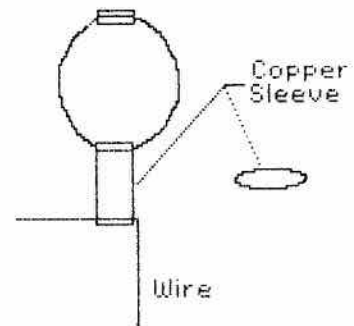
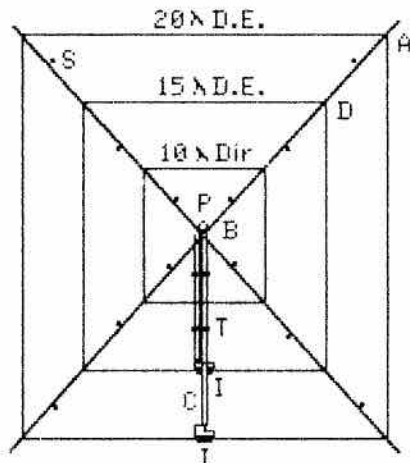


Fig. 1 ASSEMBLY OF SPREADERS (not to scale)



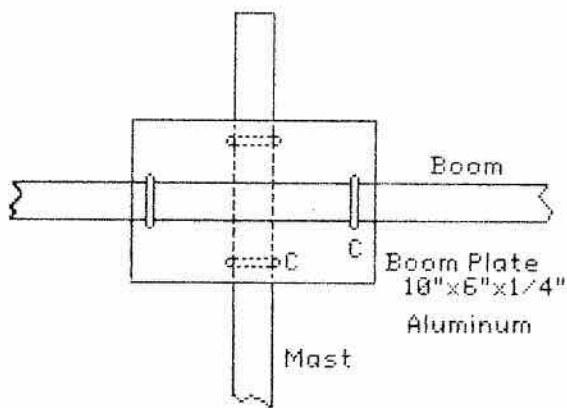
Clamp "A" (make 8)

Fig. 3



- A-see detail
- B-clamps
- C-coax feed
- D-drill 1/8" hole
- I-insulator
- P-1.25" pipe
- S-stakes
- T-tape ties

Fig. 2



BOOM PLATE

Fig. 4



3) over end of spreader. If you use aluminum spreaders with PVC at the end you can drill a hole for wire, however, you will have to insulate the 15-10 M elements from pipe; keep the insulator at the centre of the unit. When buying PVC, make sure to buy the yellow kind as the white is not as good and tends to become brittle from RF. Do not use wooden dowels, as they will rot off in a year or less.

Upon completion of the first unit, move it aside to allow room to work on the next one. The easiest way is to mount it on the boom and here is how.

Mount boom on side of mast about 12' up. Use a couple of clamps, large enough so that boom will move sideways. For the first unit you can keep boom end close to mast (do not forget to measure and mark boom at 13' and 6½' for the elements). With the help of willing hands, lift element at the centre, and carefully move unit over to mast and onto boom so it can be tightened down. Make the 10 M DE next and then the other 20 M element.

### Attaching Coax and Feed Lines

Using a small insulator at the centre of wire, attach coax feed line and solder onto wire, tape or use cable tie to keep it in place. Run coax straight up to boom. This keeps the elements in place. Tape or tie the 15 and 20 M feed lines together. Also tie along boom and down to switching box or into shack. When attaching the last set of elements to the boom, use a step-ladder in order to reach the boom, and tighten down the clamps. Try to keep all sets of elements in line, though there is little effect if they are slightly off. Attach the boom to the mast plate and tighten on to boom as this is off-centre, i.e., keep 10 M DE about 2' away from the tower. I used a counterweight balance at the light end of about two pounds.

### How To Feed The Quad (See Fig. 5)

I find the easiest way is by using a sleeve balun made as follows: Measure a ¼ wave of 72 ohm coax (RG 11) allowing an extra 6" for connection to antenna

$$\frac{1}{4} \text{ wave} = \frac{246 \times \text{VF}}{\text{FREQ IN MHZ}}$$

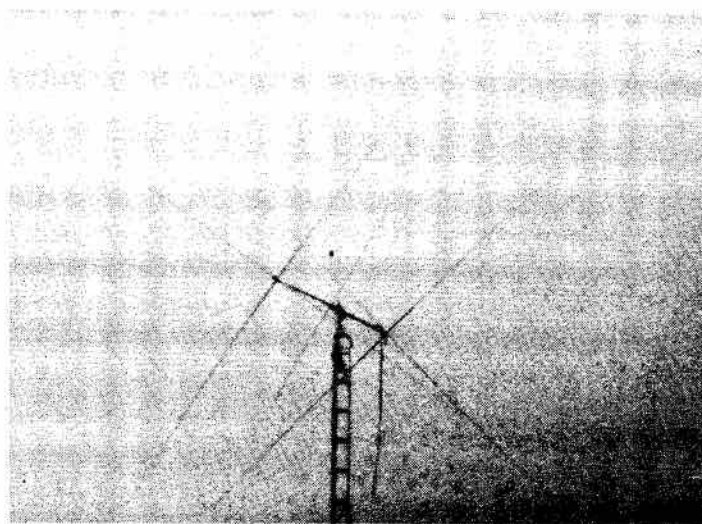
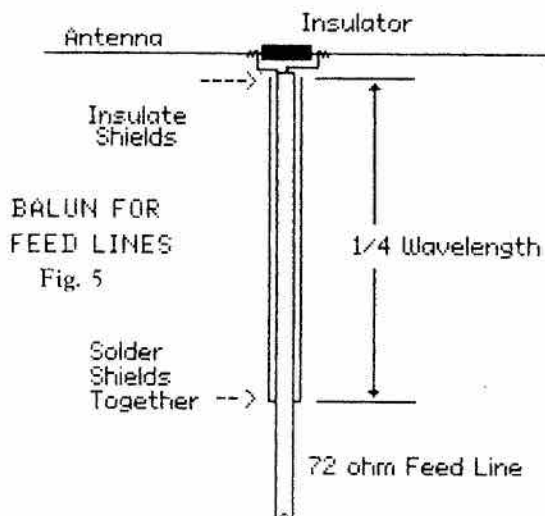
VF = .66 for Polyethylene  
.81 for Foam

Make sure the extra 6" does not become part of the balun.

To make the balun, you will have to strip the shield from an odd piece of coax about 1½' longer than

required. Measure and mark the piece of 72 ohm coax you are going to use. After you have pulled the extra shield over the insulation, strip the insulation sufficiently to solder the two shields together. Make sure the shields do not touch at the antenna end. Wrap a layer of tape over the new shield to keep water out.

If you are careful with your measurements, no tuning is necessary, the SWR will be very low at cut frequency, 1.2 or so, and should be that way all across the band except for 10 metres. Fire up and work the DX. △





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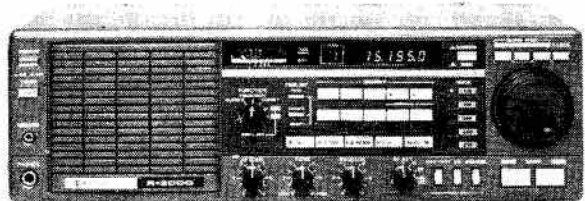
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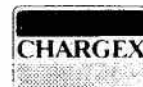


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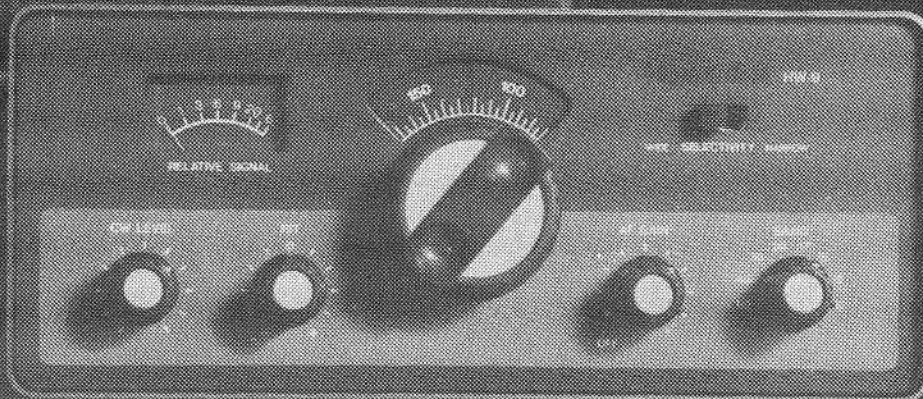
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