Second Class Mail Registration
Number 5073

TCA

July/August 1985

The Canadian Amateur Radio Magazine

La Revue des Radio Amateurs Canadiens

VE3SE needs your help now!

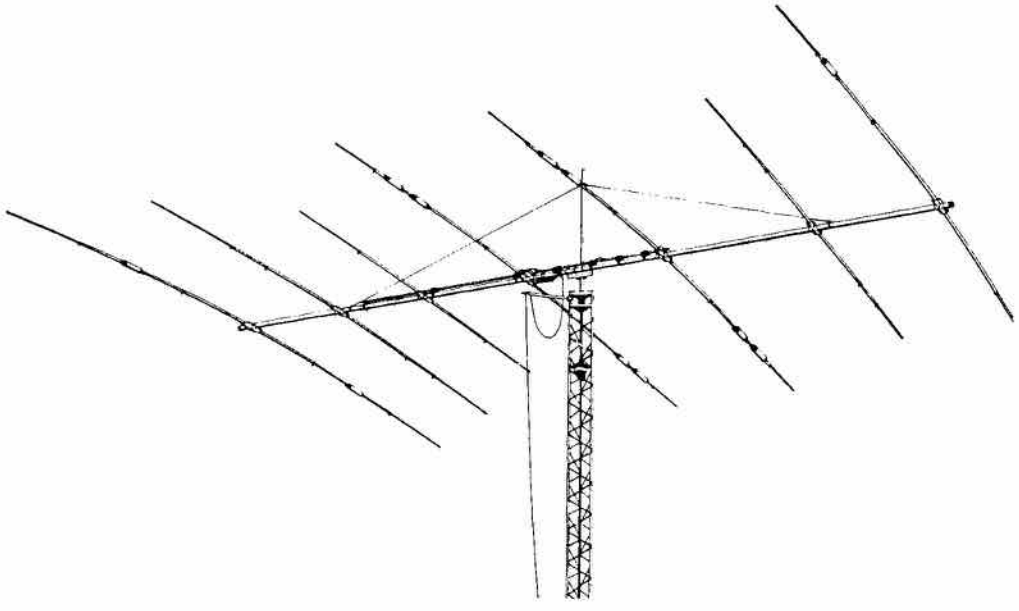
— Page 20

Albert Diamond VE4AIP and the Winnipeg Senior Citizen's ARC class.

What does Jim Swail do when he's not receiving the Order of Canada?

— See Page 40

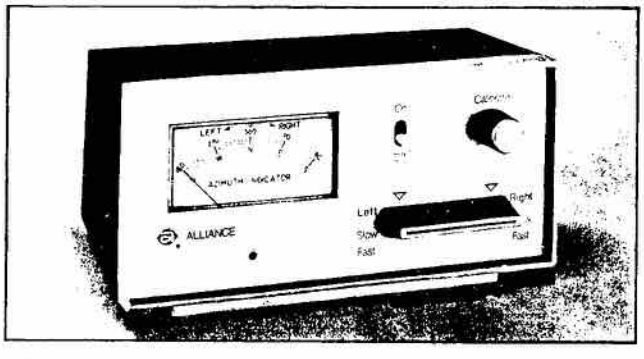
HF Tribanders World Famous Thunderbirds



TH7DX
7-Element, Broadband Triband Beam

This amazing new tribander, using a dual driven 7 element system on a 24' (7.3 m) boom maintains a VSWR of less than 2:1 on all bands, including ALL of ten meters. No compromise on gain performance was needed to achieve this efficiency. A unique combination of trapped and monoband parasitic elements produces a front-to-back ratio of 27 dB. In a parasitic array such as this, high efficiency traps are used rather than parallel stubs. These Hi-Q traps are capable of handling the maximum legal power with a 2:1 safety margin, and are superior to parallel stubbing for ease of assembly and maintenance. The TH7DX uses stainless steel hardware for all electrical—and most mechanical connections plus taper swaged 6063-T832 thick wall aluminum tubing. The antenna includes exclusive, die-cast aluminum, rugged boom-to-mast clamp, and heavy gauge element-to-boom brackets. The TH7DX comes complete with a Hy-Gain BN-86 balun.

Alliance Heavy Duty Rotator Model HD-73



C.M. PETERSON CO. LTD.

Communications Electronics Division
Head Office: C.M. Peterson Co. Ltd.
220 Adelaide St. North, London, Ont.
N6E 3H4 519-434-3204
Toronto Amateur Dept.:
1862 Kipling Ave., Toronto M9W 4J1
416-247-6667

Features and Specifications

The HD-73 rotator incorporates all the features that contribute to strength, durability and ease of installation without special tools or equipment as well as simple foolproof operation of the control box. The HD-73 rotator is constructed of heavy duty aluminum castings selected for their excellent strength capability and favorable weight characteristic, contributing to ease of erection and resistance to severe wind and adverse weather conditions for antennas up to 10.7 sq. ft. of wind load area. The HD-73 unit is factory lubricated with a lifetime high quality lubricant that will withstand temperature ranges of 120 degrees Fahrenheit to -20 degrees Fahrenheit.

The HD-73 mast support bracket design permits a centering procedure for in-tower application without shims or difficult trial and error adjustments and the base design permits easy four bolt in-tower mounting without spacers. The mast support bracket design also provides a positive drive no-slip option. The HD-73 has an improved automatic brake action for simplified operating procedure which also reduces risk of antenna damage by sudden stops imposing high inertia stresses on the antenna, tower and rotator. The HD-73 control unit features DUAL-SPEED rotation with one five-position switch. This presents a one revolution per minute speed for rotating over an extended arc and a slower speed for adjustment of, say, several degrees one way or the other for fine adjustments for the best signal on receiving and transmitting.

The rotator not only has a readily accessible externally located fuse for total unit protection, it also has an internally mounted automatic reset thermal protector for the motor and transformer against shorts or possible connection error or prolonged operation.

Max. vertical load - 1000# (vertical balanced)
Max. wind load bending moment - 10,000 in-lbs. (side-thrust overturning)
Starting torque - 400 in. lbs.
Brake torque (windmilling) - 1,600 in. lbs.
Hardened steel drive gears
Bearings - 100-3/8" diameter (hardened)
Mast mounting size range - 1-3/8" O.D. to 2-1/2" O.D.
Cable - 6 conductor
Voltage input - 117 volts A.C. 60 hertz
± 12 volts
Shipping weight - 17 lbs.

CIRCULATION OFFICE
P.O. Box 356, Kingston,
Ont. K7L 4W2
613-544-6161 (24 Hrs.)

ISSN 0228-6513

TCA

THE CANADIAN AMATEUR

July/August 1985 Vol. 13 No. 7

ADVERTISING REPRESENTATIVE
Don Slater VE3BID
RR 1 Lombardy,
Ontario K0G 1L0
613-283-3570

DESIGN & PRODUCTION
County Magazine Printshop Ltd.
RR 1 Bloomfield,
Ontario K0K 1G0

Printed in Canada

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.

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 recommended by the Canadian Amateur Radio Federation Inc. and its members receive it automatically. Indexed in the Canadian Periodical Index: ISSN 0228-6513.
Second Class Mail Registration Number 5073

CARF EXECUTIVE

C.A.R.F. President
Ron Walsh VE3IDW
10 Nicholson Cres.
Amherstview, Ont.
K7M 1X1
(613) 389-3301

Past President
Don Slater VE3BID
RR 1 Lombardy, Ont.
K0G 1L0
(613) 283-3570

General Manager & Treasurer
Lorna Hill VE3IWH
154 Colborne St.
Kingston, Ont.
K7K 1E2

Secretary
Mailes Dier VE3AP
RR 1, Finch, Ontario
K0C 1K0
(613) 346-2260

Vice President
Bruno Molino VE2FLB
26 des Anciennes,
Gatineau, Que. J8T 3T2
(819) 561-3689

Vice President
Fred Towner VE6XX
123 Rundleridge Close N.E.
Calgary, Alta. T1Y 2L2
(403) 280-0074

Vice President
Doug Burrill VE3CDC
151 Fanshaw Ave.,
Ottawa, Ontario
K1H 6C8
(613) 733-7108

Vice President
Art Blick VE3AHU
11 Manitou Cres.,
Amherstview, Ont.
K7N 1B1
(613) 389-2697

Legal Counsel
Gary Warren
157 McLeod St.,
Ottawa, Ontario
K2P 0Z6
(613) 236-0852

Quebec Director
Robert Sondack VE2ASL
260 Bellerive
Ile Ste Hélène
St Luc, Québec
J0J 2A0
(514) 348-9425

Ontario Directors
John Iliffe VE3CES
387 Selby Crescent
Newmarket, Ontario
L3Y 6E2
(416) 898-4875

Geoff Smith VE3KCE
7 Johnson Rd.,
Aurora, Ontario
L4G 2A3
(416) 727-6672

Mid West Director
Norm Waltho VE6VW
Box 1890
Morinville, Alta.
T0G 1P0
(403) 939-3514

Pacific Director
Walter Stubbe VE7EGR
1845 Fifth Ave.
Prince Rupert, B.C.
V8S 1S6
(604) 768-5220

Assistant Regional Directors

Stewart Harvey VO1OO

Jeannine Côté VE1BWP
Bruno R. Molino VE2FLB
Camille Tremblay VE2DNO
Antonietta Avanzini VE2AAV

Bill Carew VE3MEW
Barry Baggs VE3IVV
Mailes Dier VE3AP
Pierre Mainville VE3LPM
John Dunham VE3AKL
Frank Salter VE3MGY

Cecil Fardoe VE4AEE
Max Geras VE4ACX
Malcolm Timlick VE4MG

Vic Allen VE5AEN
Bill Munday VE5WM
Bjarne Madsen VE5ADA
William J. Wood VE5AEJ

Ken Schneider VE6COH
David Roberts VE6XY
Jim McKenna VE6SU

John Allan VE7DOM
Murray Brown VE7EIW
Sil Shaw VE7QC
Donna Stubbe VE7EHO
Bill Richardson VY1CW (Kelowna)

CARF Committee Chairmen

D.O.C. Liaison
Art Stark VE3ZS

News Service
Doug Burrill VE3CDC

Antenna Rights
Al Law VE3LAW

Electromagnetic Interference
Barc Dowden VE3TT

Emergency Communications
Ken Kendall VE3IHX

CARF Contests
Norm Waltho VE6VW
Box 1890
Morinville, Alta.
T0G 1P0

CARF Awards
John Brummel VE3JDO
P.O. Box 880
Stittsville, Ont.
K0A 3G0
(613) 836-2964

Reciprocal Licencing
Bruno R. Molino VE2FLB

TRC-24
Bill Roork VE3MBF

C.A.R.F. QSL Service
Jean Evans VE3DGG
P.O. Box 66,
Islington, Ont.
M9A 4X1

CARF Head Office
Debbie Norman,
Office Manager
Lise Nault Boislard
(613) 544-6161

WHAT IS CARF?

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.

SAVINGS-HOTLINE »»»» 1-807-767-3888

BIG SAVINGS

All advertised items are available at or through GARANT ENTERPRISES (while quantities last). A small shipping charge may apply. For approx. rates see TCA 4/85. All prices are F.O.B. Thunder Bay and are subject to change without notice. Residents of Ontario add 7% tax. PAYMENT: Certified Cheque, Money Order, or Telephone Transfer only! Use your credit card to buy a money order at your bank. All merchandise is brandnew. We are a factory authorized distributor for TELEX HY-GAIN, BUTTERNUT and GARANT. Sorry, no dealers please! Rural residents give phone no. and street address other than a box number.

BUTTERNUT ELECTRONICS **GARANT** **TELEX. hy-gain** BUTTERNUT ELECTRONICS **GARANT**

ROTOR SYSTEMS

CD-45 II, compl.	$ 189
HAM IV, complete	$ 355
T2X, complete	$ 429
HAM SP, complete	$ 399
HDR-300, compl.	$ 999
Thrust Bearing	$ 139
Tower Plate	$ 30

HF-ANTENNAS

Explorer 14/BN86	$ 459
QK-710, 30/40m	$ 169
TH7DXS w. BN-86	$ 719
TH5MK2S w. BN-86	$ 619
TH3JRS, 750 W PEP	$ 299
TH2MK3S	$ 279
Balun BN-86	$ 49
HQ2S, HY-QUAD	$ 419
Discoverer 7-1	$ 229
Discoverer 7-2	$ 509
Discoverer 7-3	$ 319
12 AVQS vertical	$ 77
14 AVQ/WBS	$ 109
18 AVT/WBS	$ 169

HF-ANTENNAS

2BDQ 80/40 dipole	$ 92
5BDQ doublet	$ 192
103BAS, 3el.10m	$ 105
105BAS, 5el.10m	$ 210
153BAS, 3el.15m	$ 149
DB-10/15S 10/15m	$ 249
205BAS, 5el.20m	$ 549
TH6/TH7 conv.kit	$ 239

VHF-ANTENNAS

64BS, 4el. 6m	$ 105
66BS, 6el. 6m	$ 205
V2S, 2m vertical	$ 69
23BS, 2m 3el.	$ 33
25BS, 2m 5el.	$ 40
28BS, 2m 8el.	$ 57
214BS, 2m 14el.	$ 99

CABLE & WIRE

Rotor Cable,10ft.	$4.95
RG8/U deluxe,10'	$8.90
RG8/U Std. 10ft.	$7.50
RG58/U Coax,10'	$2.90

BUTTERNUT

HF6V,10-80+30m	$ 179
HF2V, 80+40m	$ 169
2MCV, 2m vertical	$ 59
2MCV-5, 2m vert.	$ 69
TBR-160, 160m kit	$ 98
A-18-24,17+12m kit	$ 57
STR-II, radials	$ 65
RMK-II, complete	$ 95
T-2, roof tripod	$ 29
MPS, mast sleeve	$ 14
TLK for HF2V	$ 29
20MRK/30MRK	$ 45
HF3B BUTTERFLY	$ ASK

GARANT ANTENNAS

GB33DX,3el. beam	$ 399
TD-2005/S Std.	$ 127
TD-2005/HD H.Duty	$ 137
TD-160 conv. kit	$ 57
GD-6, 6 bands	$ 99
GD-8, 8 bands	$ 119
GD-7, 7 bands	$ 129
GD-9, 9 bands	$ 149

GARANT ANTENNAS

GD+2, conv. kit	$ 29
TD-traps, paired	$ 99
TD-balun, 1:1	$ 39
GD-SPECIAL BALUN	$ 94
Endinsulator STD	$ 3
Endinsulator HD	$ 8
#14 antenna wire	$ ASK
GRK-4 radial kit	$ 55

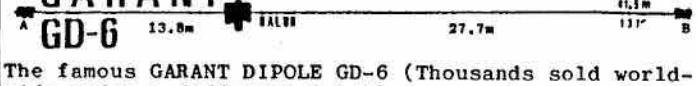
Electronics Today

On page 59, May issue, ELECTRONICS TODAY has published an article about the GARANT GD-6 and GD-8. Read for yourself what this independent Canadian magazine has to say about GARANT ANTENNAS.

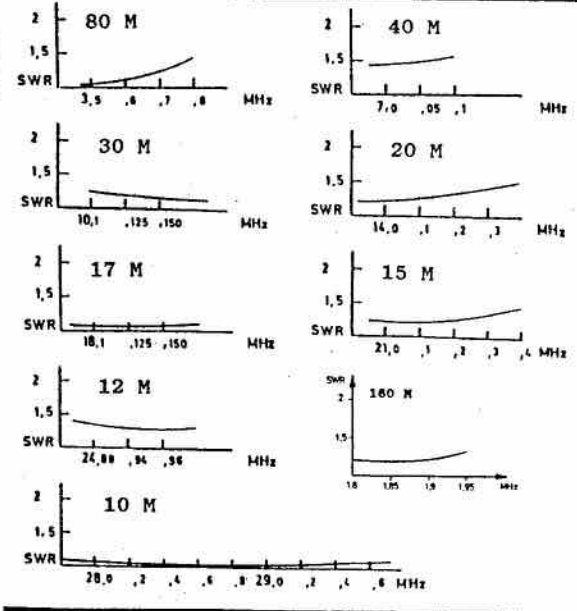
WORK ALL 9 HF BANDS WITH JUST ONE GARANT DIPOLE "GD"

ALL BAND NO TRAP ANTENNA !

NEW! NOW ALSO 160M-BAND WITH CONVERSION KIT GD+160!



The famous GARANT DIPOLE GD-6 (Thousands sold worldwide under a different label) can now be extended up to 9 bands. The GARANT DIPOLE GD-6 works 80-40-20-17-12-10m band. The GARANT DIPOLE GD-8 works 80-40-30-20 17-15-12-10m band. Our new GARANT DIPOLE GD-7 works 160-80-40-20-17-12-10m band, while the GARANT DIPOLE GD-9 works 160-80-40-30-20-17-15-12-10m band. The GD+2 kit upgrades your GD-6 to a GD-8 or your GD-7 to a GD-9. The GD+160 converts your GD-6 or GD-8 into the GD-7 or GD-9. The max. length for the GD-6/GD-8 is only 41.5m or 137ft. The SWR is very good, approx 1.5:1 or better. Independent test results prove it. See also SWR curves on the right. 50 Ohm coax connector in GARANT-SPECIAL-BALUN which matches this high impedance windom type antenna to your low impedance rig. For all rigs up to 500 W PEP. Heavy duty versions for 2KW or 5KW on request. All GARANT DIPOLES "GD-6 to GD-9" come with a 3 YEAR WARRANTY, because we believe in what we sell and we know our superior quality.



FREE SHIPPING ON ALL GARANT DIPOLES GD

GARANT DIPOLE GD-6, 6-band antenna....	$ 99
GARANT DIPOLE GD-8, 8-band antenna....	$ 119
GARANT DIPOLE GD-7, 7-band antenna....	$ 129
GARANT DIPOLE GD-9, 9-band antenna....	$ 149
GD+2 upgrading kit 30/15m for GD-6/GD-7	$ 29
GD+160 conv. kit for GD-6/GD-8 (160 m)	$ 59
GARANT SPECIAL GD-BALUN	$ 94

WHY SETTLE FOR LESS?

GARANT ENTERPRISES
227 County Blvd. DEPT. CF
THUNDER BAY, Ont. P7A 7M8

QUARTZ CRYSTALS

INTRODUCTION

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

Most of our work is with repeat customers, for whom our regular delivery is 2 weeks on average for custom crystals. We offer a rush service to our regular customers at no extra charge. However, where delivery is requested in just a few days, and very special attention is needed, we may request a premium price.

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 Additional data
1		T	146.340	INOUE IC22
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 $8.25 each, and the custom or commercial crystals are $9.85 each. The total is $75.60 plus $1.00 = $76.60. Ontario residents add 7% Ontario sales tax.

1985 PRICES

	HC6/U	HC25/U
AMATEUR		
Amateur bands	8.25	8.25
CUSTOM		
6 - 55 MHZ	9.85	9.85
5 - 5.9	10.90	13.15
4 - 4.9	12.00	17.50
3 - 3.9	13.15	17.50
1 - 2.9	17.50	—
55 - 100 (fifth)	13.15	13.15
Temp. Compensated Crystals		13.15
MPI Crystals		12.00

Below 1 MHZ, and above 100 MHZ, price available on request.

MODULES

Mocom 70	25.80
Mocom 35	22.70

REWORK MODULES to new frequency

General	20.65
Hybrids (MT500, MX300)	35.50

COMMON HOLDERS
MIL Designations

These holders accommodate the majority of requirements.

Approximately 3/4 x 3/4 x 5/16
HC-6/U .050 pins
HC-17/U .093 pins
HC-33/U wire leads

Approximately 1/2 x 3/8 x 1/8
HC-25/U .040 pins
HC-18/U wire leads

The above holders accommodate the majority of requirements.
Commercial customers should call for volume prices.

Lesmith Crystals

VISA

P.O. BOX 703, 54 SHEPHERD RD. OAKVILLE, ONTARIO, CANADA L6J 5C1
TELEPHONE (416) 844-4505 TELEX: 06 982348

MasterCard

Phone or write for more information

NEW!
ICOM Dual Bander
IC-3200A

The Most Compact Dual Bander at the Smallest Price

Finally there's a compact full featured 25 watt FM dual bander that's simple in design and operation, plus very affordable...the IC-3200A.

Dual Bands. The IC-3200A covers both the 2-meter (140.000–150.000MHz) and 70cm (440.000–450.000MHz) bands. The IC-3200A also features fully programmable offsets in 5KHz steps for MARS and CAP repeater operation.

25 Watts. The IC-3200A delivers 25 watts of output on both bands. Or the low power can be adjusted to one to ten watts.

Compact. The IC-3200A is only 5½"W x 2"H x 8½"D.

Simple to Operate. With only 14 front panel controls, the IC-3200A is by far the easiest dual bander to use.

Memory Lockout. For scanning only certain memory channels, ICOM utilizes a memory skip (M SKIP) function.

10 Tunable Memories. To store your favorite frequencies, 10 memories are provided. Each memory will store the receive frequency, transmit offset, offset direction and PL tone. Each memory can be tuned up or down when selected, yet automatically returns to the original frequency when reselected. All memories are backed up with a lithium battery.

Scanning. The IC-3200A has four scanning systems... memory scan, band scan, program scan and priority scan.

Other Outstanding Standard Features:

- New LCD display, easy to read in bright sunlight
- Tone encoder (all PL/subaudible tones built-in)
- IC-HM14 mic with up/down scan and DTMF
- One antenna connector (Duplexer already installed!)
- Variable tuning increments 5 and 15KHz (2-meters) 5 and 25KHz (70cm)
- Frequency dial lock
- Dual VFO's
- Mounting bracket

Optional Accessories. An optional IC-PS30 system power supply, voice synthesizer and IC-SP10 speaker are available.

See the IC-3200A at your local ICOM dealer for the best buy on a full featured dual bander.

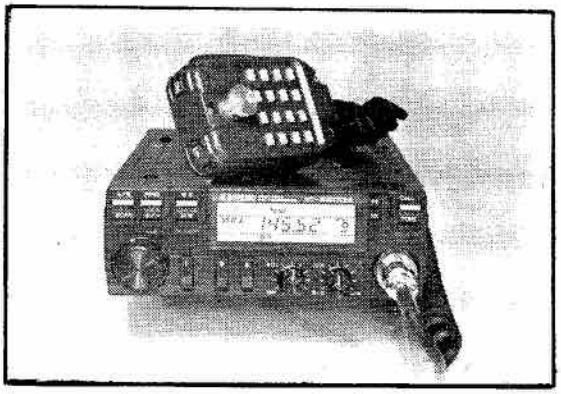
ICOM

First in Communications

ICOM America, Inc., 2380-116th Ave NE, Bellevue, WA 98004 / 3331 Towerwood Drive, Suite 307, Dallas, TX 75234

ICOM IC-3200
VHF/UHF Mobile!

25 watts output on both bands, full scanning with memory lockout, 10 tunable memories with lithium batteries, PL tone encoding, and only one antenna connector (duplexer is installed!). Price is reg $699.00, our introductory special is $629.00. Available April 1985



ICOM IC-471A UHF BASE REGULAR $1025.00
IC-471H UHF BASE REGULAR $1399.00
CALL FOR SPECIAL PRICE

- *75/25 Watts*
- *430 - 450MHz*
- *Fluorescent Display*
- *32 Memories*
- *32 PL Tones*
- *12 VDC Operation*

ICOM IC-47A UHF REGULAR $603.00
CALL FOR SPECIAL PRICE

- *440 - 450MHz*
- *TT Mic Included*
- *Microprocessor Controlled*
- *Scanning*
- *9 Memories*
- *32 PL Frequencies*
- *25 Watts*
- *12 VDC*

ICOM IC-37A 220 MHZ REGULAR $556.00
CALL FOR SPECIAL PRICE

- *220 - 225MHz*
- *9 Memories*
- *Scanning*
- *32 PL Tones*
- *25 Watts*
- *Internal Speaker*
- *12 VDC*

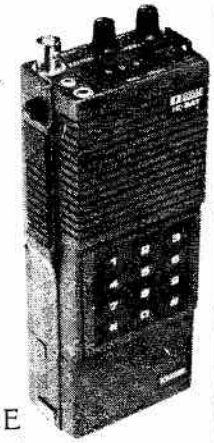
ICOM IC-02AT
VHF HANDHELD

- *Digital Readout*
- *Scanning*
- *10 Memories*
- *32 PL Tones*
- *3 Watt Std/ 5 Watt Opt*

REGULAR $409.00
LIMITED TIME
SPECIAL ==> **$365 .00**

ICOM IC-2AT
VHF HANDHELD

- *Easy to use*
- *Affordable*
- *Digital PLL*



REGULAR
$309.00

LIMITED TIME
SPECIAL ==> $265.00!!

ICOM IC-04AT
UHF HANDHELD

- *440 - 449.995MHz*
- *LCD Readout with S-Meter*
- *Frequency Entry*
- *PL Tones*
- *Scanning*
- *10 Memories*
- *3 Watt Std/ 5 Watt Opt*

REGULAR
$419.00

LIMITED TIME
SPECIAL ==> $369.00!!

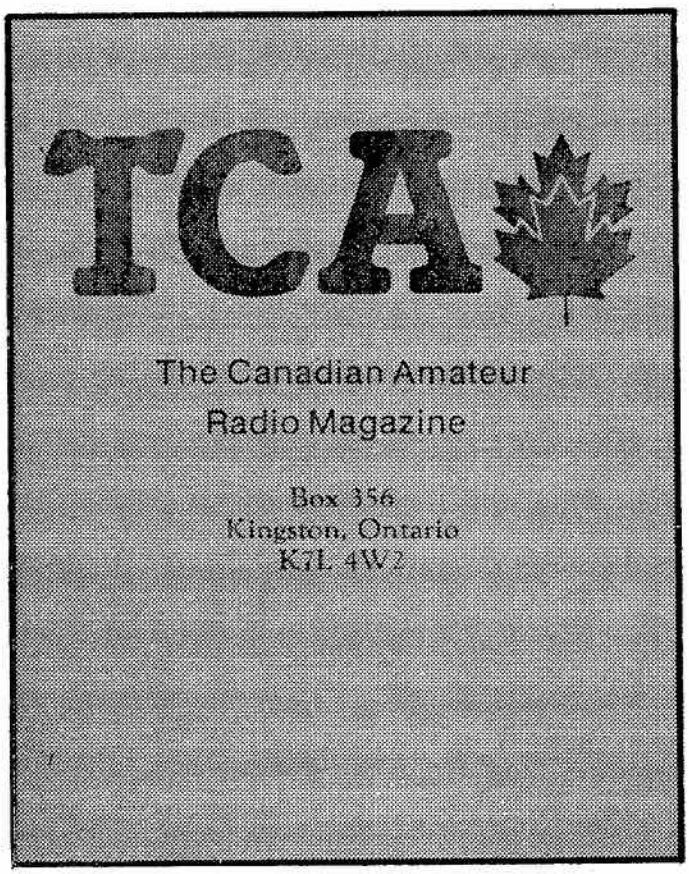
DON'T STOP NOW!

Continue reading this issue of TCA to see for yourself how entertaining and informative it is. Check out the high level of pure Canadian content. Take a look at our technical projects. Read about what *Canadian* Amateurs are doing!

Continue to enjoy TCA, then flip through to the back page and fill out the subscription form.

Continue to receive TCA— The Canadian Amateur, simply by filling out the form and mailing it to CARF.

Do it as soon as you can, but for now keep reading... Who are we to stop you from enjoying yourself?!



SUBSCRIBE NOW!

Fill in the form at the end of this magazine and start receiving TCA immediately!

CARF

You will also receive other benefits by joining CARF... including the FREE QSL Service, and more!

TCA— the greatest thing to happen to Canadian Amateur Radio since Marconi!

TOWERING VERSATILITY

Trylon ABC Towers

Whenever the application calls for lightweight, high-performance towering, the answer's as easy as ABC . . .

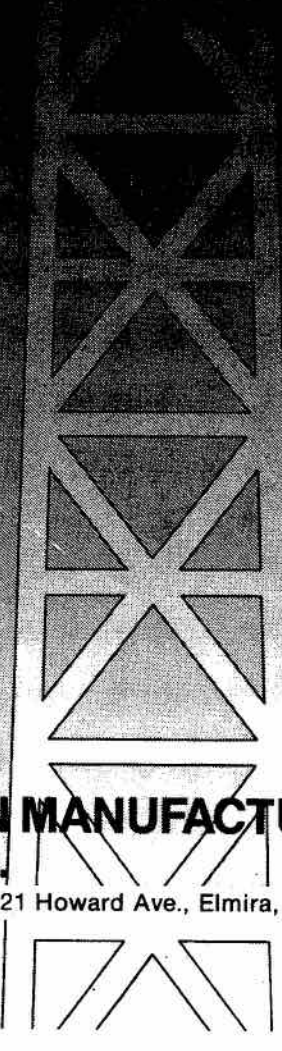
TRYLON ABC Towers have been proven effective for a wide range of lighting, navigational and broadcast applications. Clean, uncluttered lines and rugged all-steel construction make ABC the multi-purpose tower of choice for hobbyist and pro alike.

TRYLON ABC Towers are designed to make life easier. They're easy to transport, easy to assemble, easy to erect – and easy to look at once they're up. Best of all, they're easy on the pocketbook.

TRYLON ABC Towers come ready-to-use in convenient 8' modular sections for fast assembly and erection – and they're virtually maintenance free.

TRYLON ABC Towers. A single line for a lot of markets.

Call or write today for product performance and pricing.



TRYLON MANUFACTURING CO. LTD.

P.O. Box 186, 21 Howard Ave., Elmira, Ont. N3B 2Z6

Bytown Marine Ltd.
P.O. Box 11397
1140 Morrison Dr.
Nepean, Ont. N2H 7V1
1-613-820-6910

D & L Towers
4 Dividale Dr.
Toronto, Ont.
M4G 2N8
1-416-423-8892

Custom Riggers Ltd.
R R #9
Calgary Alberta
T2J 5G5
403-256-0771

Dollard Electronics
P.O. Box 58236
810 S.W. Marine Dr.
Vancouver B.C.
V6P 6E3
604-321-1833

YAESU

FREE CATALOGUE

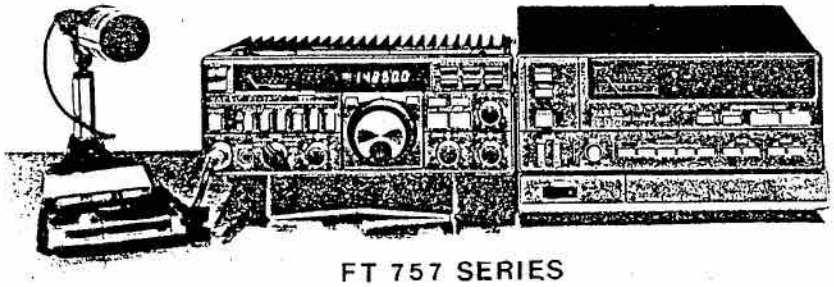
BRAD McCARTER
Box 262
MACTIER, ONTARIO P0C 1H0
Phone (705) 375-2836

FT-209

5 watts
$389.00

OPTIONS

YH-2	Headset
MH-12A2B	Speaker/Microphone
PA-3	DC/DC Car Adapter/Trickle Charger
MMB-21	Mobile Hanger Bracket
NC-15	Quick Charger/DC Adapter
FNB-4	12V, 500 mAh NI-Cd pack
CSC-11	Soft Case for FT-209R/RH w/FNB-4



FT 757 SERIES

CROSS NEEDLE METER DAIWA

YAESU

B&W BARKER & WILLIAMSON

MIRAGE

TELEX hy-gain

Hansen

AMIDON Associates

DRAKE

NyeViking

FRG 8800

GENERAL COVERAGE

PHONE: (705) 375—2836

BRAD McCARTER
Box 262
MACTIER, ONTARIO P0C 1H0

PRICES AND SPECIFICATIONS OF ALL EQUIPMENT AVAILABLE ON REQUEST

• LOWEST PRICES • 90 DAY FREE REPLACEMENT WARRANTY

SKYWAVE RADIO SYSTEMS LTD.

RETAIL STORE: 4465 LOUGHEED HIGHWAY, BURNABY, B.C. CANADA V5C 3Z2
MAIL ORDER: P.O. BOX 82127, NORTH BURNABY, B.C. CANADA V5C 5P2
PHONE: (604) 298-4720

ALLIANCE!

$259.00

HD-73 HEAVY-DUTY ROTATOR

with exclusive Dual-Speed Control!

For antennas up to 10.7 sq. ft. of wind load area. Mast support bracket design permits easy centering and offers a positive drive no-slip option. Automatic brake action cushions stops to reduce inertia stresses. Unique control unit features DUAL-SPEED rotation with one five-position switch. SPECIFICATIONS: Max. wind load bending moment—10,000 in.-lbs. (side-thrust overturning); Starting torque—400 in.-lbs.; Hardened steel drive gears; Bearings—100-⅓" diameter (hardened); Meter—D'Arsonval, taut band (backlighted). There's much, much more—so get the whole story!

CUSHCRAFT

A3 WORLD RANGER 3 ELEMENT BEAM 10, 15, 20 METERS

Dynamite in a small package! A3 is a real power house beam with plenty of gain and front to back ratio to handle the pile-ups on your favorite DX bands. The heavy duty traps have enough reserve for a high power linear. All of this performance is yours with a clean profile beam that can be mounted on a light weight tower and rotator in a very small space. Its rugged design features quality components like galvanized and stainless steel clamps, zinc plated U-bolts, fiberglass insulators and heavy wall tubing.

You'll be pleased at the ease of assembly because we have designed out unnecessary hardware and given you a fully illustrated instruction manual. Proven in DX-peditions and contests, A3 has become the world standard for 3 element beams.

$479.00

$295.00

COMBO SUMMER SPECIALS!!

CUSHCRAFT A3 + ALLIANCE HD-73
ONLY $ 699.00 DELIVERED !!

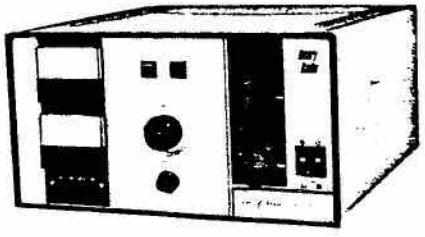
ALLIANCE U-110 rotor-$99.00

MINI-PRODUCTS HQ-1+ ALLIANCE U-110
ONLY $ 379.00 DELIVERED !!

HENRY!! EXCLUSIVELY AT.....
SKYWAVE!!!
GO FOR THE GUSTO WITH HENRY
HIGH POWER LINEARS!!! ALL
MODELS AVAILABLE, AND ALL
PRICES INCLUDE TUBES!!!

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

The 1KD-5 is a 1200 watt PEP input (700 watt PEP nominal output) RF linear amplifier, Features an Eimac 3-500Z glass envelope triode • ALC circuit • DC relay system • Relative RF power meter • Pi-L plate circuit with a rotary silver plated tank coil • Cathode Pi input matching circuits • Conservative power supply with solid state rectifiers.



2KD Classic... a desk model designed to operate at 2000 watts effortlessly, using two Eimac 3-500Z glass envelope triodes, a Pi-L plate circuit and a rotary silver plated tank coil. We challenge you to find a better desk model for even a thousand dollars more. $1799

HENRY RADIO

1KD-5 ONLY $1099 DELIVERED!!

YAESU

SKYWAVE WILL NEVER BE UNDERSOLD ON ANY YAESU PRODUCT !!!

FT-757GX + GX PWR SUPPLY=$1259

FT-757GX + HD PWR SUPPLY=$1309

FT-757GX + GX PWR SUPPLY
+ FC-757AT TUNER = $1699

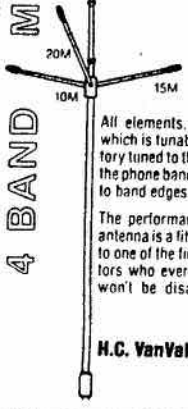
FT-757GX + HD PWR SUPPLY
+ FC-757AT TUNER = $1749

FT-980 + HENRY 2KD LINEAR
=$3899

NOTE! ALL PRICES SHOWN INCLUDE FREIGHT IF CHEQUE IS ENCLOSED WITH ORDER!!!!
ASK ABOUT SUMMER SPECIALS ON MFJ & MICROLOG!!!

W90KM MEMORIAL

4 BAND MOBILE



This antenna is a tribute to silent key Henry Kampe W9OKM, who was responsible for urging the manufacturer to produce it and for field testing it before production.

All elements, except 40 which is tunable, are factory tuned to the center of the phone bands. 2:1 SWR to band edges.

The performance of this antenna is a fitting tribute to one of the finest operators who ever lived. You won't be disappointed!

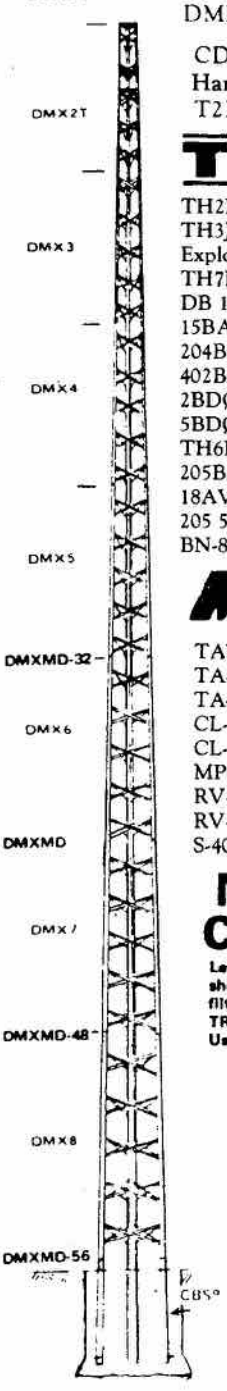
H.C. VanValzah Co.

ANY ORDER OVER $200 GETS FREE GIFT !!!!

HUSTLER!!
RM10 $25
RM15 $26
RM20 $36
RM40 $39
RM75 $42
RM80 $45
BUY 5, GET 10% OFF !!
MASTS $48

HEY! GUESS WHAT WE HAVE!! HOW ABOUT A TRUE AUTOMATIC COMPUTING DIGITAL SWR READOUT, COMPLETE WITH DIGITAL BARGRAPH DISPLAY OF RF POWER AND COLOR LED INDICTION OF ANTENNA MATCH!! MODELS AVAILABLE FOR HF/VHF/UHF only $179.00

DELHI Medium, Heavy Duty Ham Towers



DMX-HD-32 $395.00
DMX-HD-40 $519.00
DMX-HD-48 $579.00
DMX-MD-40 $439.00
DMX-MD-48 $559.00
DMX-MD-56 $629.00

HD mast $39.50
Bearing $31.50
DMX-5 straight $119.00

CD-45 11 $209.00
Ham IV $349.00
T2X $469.00

Service Depot For Telex Rotors

TELEX hy-gain

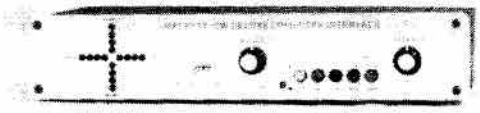
TH2MK3 2el tri-band	$295.00
TH3Jr. 3el tri-band	$319.00
Explorer 4el tri-band	sale $459.00
TH7DXX 7el tri-band	sale $729.00
DB 10/15 duobander	$399.00
15BAS 3el. 15 meter	$245.00
204BA 4el 20 meter	$489.00
402BA 2el 40 meter	$499.00
2BDQ 80/40 mtr,doublet	$98.50
5BDQ 80-10 doublet	$189.00
TH6DXX to TH7 conv.	$269.00
205BAS 5el. 20 mtrs.	$689.00
18AVT/WBS 80-10 vert	$179.00
205 5el. 2 mtr beam	$49.00
BN-86 Balun	$35.00

Mosley

TA-33jr. 3el tri-band	$319.00
TA-33Sr. 3el. tri-band	$459.00
TA40KR 40 mtr.adapter	$179.00
CL-33 3el tri-band	$489.00
CL-36 6el tri-band	$589.00
MPK-3 TA-33jr.conv.kit	$139.00
RV-4C 40-10 mtr. vert	$159.00
RV-8C 80 mtr. conv	$79.00
S-402 40 mtr beam	$499.00

MFJ RTTY / ASCII / CW COMPUTER INTERFACE

Lets you send and receive computerized RTTY/ASCII/CW. Copies all shifts and all speeds. Copies on both mark and space. Sharp 8 Pole active filter for 170 Hz shift and CW. Plugs between your rig and VIC-20, Apple, TRS-80C, Atari, TI-99, Commodore 64 or most other personal computers. Uses Kantronics software and most other RTTY/CW software.



MFJ-1229	$285.00
MFJ-1224	$159.00
MFJ-815 deluxe SWR wattmeter	$89.00
MFJ-401 Econo keyer 11	$89.00
MFJ-422 Econo c/w Bencher key	$159.00
MFJ-484 Grandmaster/memory	$209.00
MFJ-941D Deluxe versa tuner	$155.00
MFJ-949B Super deluxe tuner	$219.00
MFJ-962 1.5KW versa tuner	$339.00

cushcraft

A3 3el Tri-band	$449.00
A4 4el Tri-band	$499.00
A744 40mtr.adapter re A4	$149.00
R3 14,21,&10mtr. Ringo	$495.00
AV5 10-80 mtr. vertical	$139.00
FM ANTENNAS	
ARX-2B Ringo 2 mtr.	$79.00
A147-4 4el beam	$59.00
A147-11 11 el beam $95.00 A-147-22 22 el beam	$269.00
A-147.20T twist	$159.00
AFM-4D "four pole"	$159.00
BOOMERS	
215WB 15 el. 144-148 MHz	$179.00
32-19 deluxe 16.2DB	$219.00
AOP-1 Oscar Satellite pack	$295.00

KENWOOD

TS-930 SAT, Free microphone	$2399.00
TS-940S	$2499.00
TS-940SAT FREE Mic	$2699.00
SP-930 Speaker	$119.00
TS-430S H.F. Tranceiver	$$1249.00
PS-430 AC pwr supply	$199.00
TS-130SE Transceiver	$929.00
PS-30 pwr supply	$189.00
TS-530SP Transceiver	$995.00
TS-830S Transceiver	$1279.00
SP 830 Speaker	$89.00
TR-2600 2M handheld	$489.00
TR-7930 2 mtr. mobile	$519.00
TR-7950 2 mtr. mobile	$569.00
TR-9130 2 mtr. all mode mobile	$719.00
TR-780S VHF/UHF all mode	$1389.00
TW-4000 VHF/UHF mobile	$849.00
TM 201A compact 2M mobile	$469.00
R-600 communications RX	$549.00
R-1000 SWR RX and clock	$699.00
R-2000 Deluxe SWR RX	$849.00
KPS-12 12 amp pwr supply	$179.00
TL922A 10-160M linear	$1489.00
SM220 monitor scope	$559.00
AT230 Antenna tuner	$299.00
AT250 Automatic antenna tuner	$495.00
VC10 VHF converter	$229.00
MC-50 Desk Mike	$63.00
MC-60A Deluxe desk mike	$116.00
PC1A Phone Patch	$95.00

YAESU

FULL LINE AVAILABLE

FT-757GX HF & RX	$1039.00
FT-726 all mode 2 mtr.	$1129.00
FT-209R 2 mtr. H.Held	$389.00

Open Monday to Saturday 7:30 a.m. to 9 p.m.
Closed Sunday

Prices subject to change

H.C. MacFarlane Electronics Ltd.

R.R. #2 Battersea, Ont. K0H 1H0
Phone 613-353-2800 VE3BPM
YOUR ONE-STOP HAM SHOP
ANTENNA SYSTEMS INSTALLED WITHIN RADIUS 150 KM.
EXPERTISE FREELY GIVEN ANYWHERE

CHARGEX

Dealer for Delhi Towers, CDE Rotors, Hy-Gain, Mosley, Cushcraft and Hustler Antennas.
MFJ and B&W products.

master charge

Better than ever!

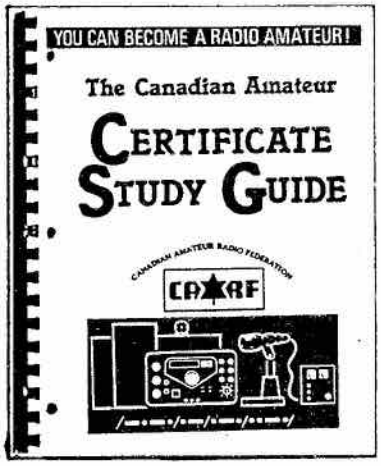
The Canadian Amateur Certificate Study Guide has built a strong reputation as Canada's Amateur examination text book. But the world of Amateur Radio has continued to grow and change with the times... and CARF has moved to meet the challenge.

In 1982, the Study Guide was completely rewritten and updated to suit the needs of the modern Amateur hopeful, and to cover all the material set out in the new TRC-24 from the Department of Communications.

CARF has called on Canada's leading talent in the Amateur Radio field... and now the Guide is better than ever! More material, clearly organized and thoroughly investigated to meet the examination requirements.

Make your studies as easy as possible. Order the Study Guide today!

Completely rewritten and revised for the new TRC-24



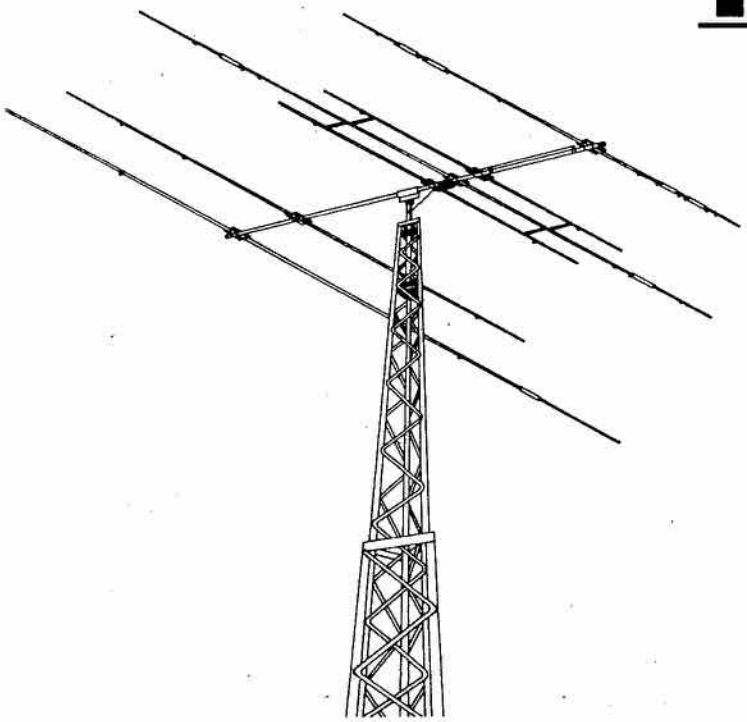
The definitive Canadian Amateur Examination Study Guide.

The Guide

CARF

Always working for the Canadian Amateur

TELEX® hy-gain



EXPLORER 14

Broadband Tribander Beam with Quad-Band Option

A unique Para-Sleeve concept optimizes edge-to-edge bandwidth on 20, 15 and 10 meters. Solid state transceivers load to full output with VSWR below 2:1 so no antenna tuner is needed. Handles maximum continuous legal power with a respectable safety margin. The revolutionary compact design requires only 17'3" (5.3 m) turning radius and the entire assembly fits on roof tripod, mast or medium duty tower. Truly competitive performance against giant tribanders at half the cost. Superior construction includes stainless steel hardware, heavy gauge pre-formed element and mast brackets and thick wall swaged aluminum tubing. A BN-86 balun is included and a Beta Multi-Match provides DC ground to reduce lightning hazard and static. Rugged, easily assembled and so unique we've applied for a patent.

ORDER NO. 395S
Shipping Wt: 50 lbs. (22.7 kg)
UPS Shippable

Quad Band Option
Add a fourth band, either 30 or 40 meters to the Explorer 14 with the QK710 kit. Kit attaches to the driven element and is easily adjusted for either 30 meters (WARC) or 40 meters at minimal cost.

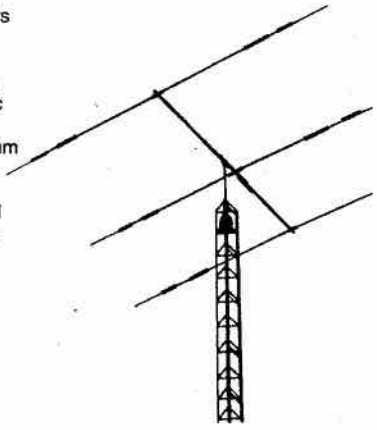
ORDER NO. 396S
UPS Shippable

TH3JRS

3-Element Triband Beam

Hy-Gain's Thunderbird Junior offers top performance with a compact design that makes it ideal where space is a limiting factor. Featuring separate and matched air dielectric Hy-Q traps for each band, it feeds with 52 ohm coax, delivers maximum F/B ratio without compromise. The TH3JRS has a VSWR of less than 1.5:1 at resonance on all bands. All hardware and clamps are stainless steel. Maximum power, 300 watts CW and 600 watts PEP output. Hy-Gain ferrite balun BN-86 is recommended for use with the TH3JRS.

ORDER NO. 221S-1
Shipping Wt: 20 lbs. (9 kg)
UPS Shippable

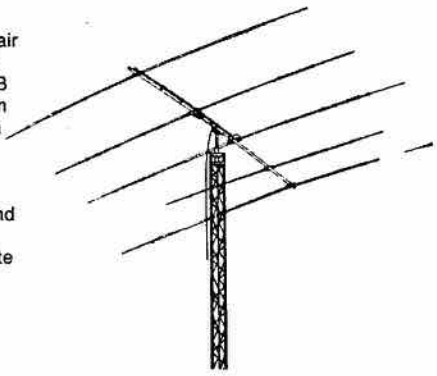


TH5Mk2

5-Element Broadband Triband Beam

The TH5 is now a BROADBAND TRIBAND! The TH5Mk2 offers an outstanding 9.0 dB gain. Separate air dielectric Hy-Q traps on each band allow the TH5Mk2 to be set on a F/B ratio of 27 dB with a minimum beam width. It features five elements on a 19' (5.8 m) boom with four active elements on 10, 15 and 20 meters. Also standard on the TH5Mk2 is Hy-Gain's exclusive Beta Match, and stainless steel hardware and compression clamps. A BN-86 ferrite balun is supplied.

ORDER NO. 393S
Shipping Wt: 77 lbs. (35 kg)
UPS Shippable



Our July Questionnaire

Please review the discussion on expanding our numbers in **TCA** *for 85 March, May, June, and July. Then complete this questionnaire and submit it to your Director, whose address is on page 2 of* **TCA** *(not to DOC— their request).*

A new 'beginners licence' will have to be added	agree disagree	☐ ☐
Unused bands will have to be used	agree disagree	☐ ☐
We will have to guard against and control abuses as on CB (GRS)— Bill Roork VE3MBF	agree disagree	☐ ☐
Reduce the code to 8 wpm, ease upon theory for all classes of licence and *no voice privileges!* — VE3FSN	agree disagree	☐ ☐
Reduce the code to 5 wpm, 20-80 cw only and NO PHONE Privileges— Gagetown ARC	agree disagree	☐ ☐
The examination requirements for this licence would be the present Amateur licence requirements in theory and regulations only, valid above 50 MHz — VE3KAS	agree disagree	☐ ☐
We have to project Amateur radio into the community (by advertising)— Dan Holmes	agree disagree	☐ ☐
When it comes to protecting Amateur Radio, a highly efficient Amateur emergency system would be making governments an offer they could not refuse— VE3WC	agree disagree	☐ ☐
Let's not lower our standards for the sake of getting more people into this service. Let's keep quality ahead of quantity	agree disagree	☐ ☐
If we want beginners to help us justify frequency space, they will have to be assigned to frequencies not presently used e.g. 220 MHz and up — VE3FXQ	agree disagree	☐ ☐

Remarks (Attach a letter, if you like):

(Signed) _____ call _____

EDITOR
Frank Hughes VE3DQB
P.O. Box 855
Hawkesbury, Ont.
K6A 3C9
613-632-9847 (24 Hrs.)

CONTRIBUTING EDITOR
(CARF News Service)
Doug Burrill VE3CDC
151 Fanshaw Ave.
Ottawa, Ont. K1H 6C8

TECHNICAL EDITOR
Frank Hughes VE3DQB
P.O. Box 855
Hawkesbury, Ont.
K6A 3C9

TECHNICAL DESIGN
Don Prickett VE5KP
41 McAskill Cres.,
Saskatoon, Sask. S7J 3K1

CONTEST SCENE
John Connor VE1BHA
279 Aberdeen St.
Fredericton, N.B.
E3B 1R6

AMSAT NEWS
Gordon Wightman VE5XU
3737 Victoria Ave.
Regina, Sask. S4T 1M4

MICROWAVES
Michael Ross VE2DUB
2285 St. Mathieu, Apt. 1401
Montreal, Quebec H3H 2S7

CRAG COLUMN
Cary Honeywell VE3ARS
P.O. Box 2610, Sta. 'D'
Ottawa, Ont. K1P 5W7

DX EDITOR
Douglas W. Griffith VE3KKB
33 Foxfield Drive
Nepean, Ont. K2J 1K6

YL NEWS AND VIEWS
Cathy Hrischenko VE3GJH
56 Stockdale Crescent
Richmond Hill, Ont. L4C 3S9

VHF/UHF
Bob Morton VE3BFM
8 Tornbay Dr., RR 2
Stouffville, Ont. L0H 1L0

PACKET RADIO
Brett Delmage VE3JLG.
304-1330 Richmond Road,
Ottawa, Ont. K2B 8J6

COVER PICTURE
Albert Diamond VE4AIP (at the blackboard) initiates a class into the mysteries of the nimble electron. Left to right: Joe Gleason VE4AMV, Albert Coldwell, J. Gahka, Earl Carter, Nate Dobbs, Genesan S. Ram, Wally Winters, Al Moodie, Joe Ozero VE4IO.

TCA
July/August 1985
Vol. 13 No. 7

QUA CARF

The JRSD Fund

The action against Jack Ravenscroft VE3SR is for $35,000 and would, if successful, effectively put him off the air. Jack says his legal costs could exceed $1,500 by the end of May alone. If the matter is not settled without a trial, he says that further legal costs could run to some thousands more. The significance to Amateurs is that if the suit against Jack is successful, then it sets a precedent for every annoyed neighbour in Canada who may wish to take similar action against an Amateur. It would not matter, as in this case, that the station is federally licensed to transmit and has a clean bill of health from the DOC.

As no single organization, including CARF, is financially able to put up this kind of money, it is up to the 24,000 Amateur licensees and their clubs to pitch in and help Jack to win this case. The objective of the JSRD Fund is first to assist Jack financially and then to consider the establishment of an on-going fund to help others who may get into a similar legal tangle. This fund is already under way and functions independently of any Amateur organization. Your contribution should go to the 'JRSD' Fund, Box 8873, Ottawa, Ontario K1G 3J2. The initials stand for the 'Jack Ravenscroft Susceptibility Defence Fund.'

— Doug VE3CDC

Older Amateurs, those licensed before 1950 or thereabouts, will remember the TVI troubles.

The first mass-produced TV sets in North America were sitting ducks for EMI from any source. The average Amateur transmitter of the time produced not only the desired frequency, but harmonics as well, extending well down into the television frequencies from 80 metres or below.

The TV manufacturers learnt how to design receiving systems that selected only the TV frequency from the myriad undesired ones, and the Amateurs learnt how to build transmitters that only put out within the Amateur bands. Between the two, TVI had been eradicated.

The cycle is about to be repeated. Manufacturers of household appliances and consumer goods are powerfully attracted by the cheapness of solid-state electronics, and the selling power of those words and 'computer.' So we have an influx of 'Solid state, computer controlled' appliances, some unfortunately designed by engineers without the necessary expertise to eliminate EMI.

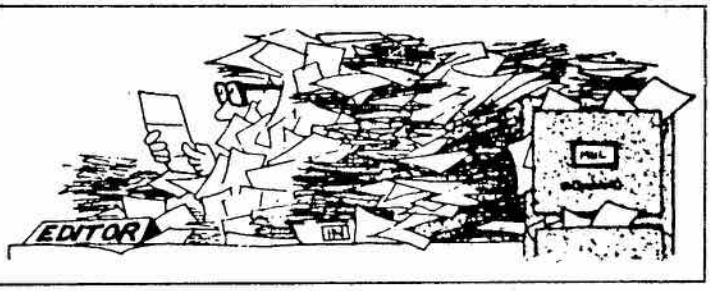
We can imagine a computer fitted car cruising the highway, when a police car nearby uses its radio and the car's computer sends it into an uncontrollable state. Nobody would blame the police car.

If the equipment is installed in a house, and a neighbouring Amateur's signal triggers it, the Amateur is likely to be blamed.

No reputable manufacturer deliberately cuts corners with EMI prevention: it is ignorance of an esoteric subject— few engineers are as familiar with the problems as the average reader of *TCA*. As experts, we have a job of education to do. Δ

— VE3DQB

LETTERS



ENJOY IT, CAMILLE!

Many thanks for the heart-warming wishes received from the members of the CARF executive upon my retirement.

This was a big surprise coming home last week from a stay down south.

Again I reiterate my sincere appreciation.

Good luck to all— Camille VE2DNO

ON DEREGULATION

There has been a lot of talk of de-regulation of the ham bands. I hope that this is all that it is at the moment... talk. If the bands are going to be de-regulated, I would seriously hope that someone who fully understands the consequences of de-regulation will issue some sort of directive/information to the field.

I have heard phone operators asking CW operators to move and asking whether or not they are aware of the "gentleman's agreement" that CW stay in the lower part of the bands.

Having had my ticket since before the WW2, I have watched the phone bands take over more and more of the 'CW portion of the bands.' Presently, at this location, only about 65 kHz of the 14 MHz band is available for CW operation. Other bands are following a similar trend.

I work both SSB and CW, with a preference to the CW mode since day one. In view of the call to de-regulate, it would appear that many Amateurs figure that they will move into the 'CW portions,' forcing the CW to compete with the SSB. I do not think that there will much competition. I have a selective receiver, with CW filters, and SSB stations do not bother me very much. However, I am not so sure that I would enjoy trying to have a SSB QSO with a KW of CW on the frequency, and this is what will happen if we do not watch what we are doing.

I do not think CW is going to go away in the near future. With trends toward high speed CW with computers; electronic keyers making CW much easier to handle, I think the CW will be with us for sometime to come.

Of course, on the other hand, with de-regulation, all "gentlemen's agreements" will go out the window, and everyone will operate as they please, as far as frequencies within the allotted ham bands are concerned.

Let's hope that sanity prevails.
— Fred VE7AOE

Anyone else care to write on deregulation?— Ed.

QRM, QRO AND QRP

I sympathize with Reg VE3DTU's feelings on having a QSO squashed by S9 + 30 QRM, and I very much like your answer.

But I submit that that kind of signal does not necessarily come from a 1 kW station. If it does, and the amplifier is switched off, the barefoot rig will still produce S9 + 20, which will have about the same effect. In fact a 10 watt station would produce S9 + 10 and still cause the same problem.

So we have to find a better solution. Turning the beam a little to put the QRM in the null might solve the situation, because nulls are often more than 30 dB deep. Or in the case of the LF bands, adjusting the phasing control of a steerable wave antenna. My point is that we have defences against QRM other than trying to enforce regulatory measures against the other stations. I am in general opposed to the unnecessary use of linear amplifiers (and much more opposed to the practice of driving them into NON-linearity) but somehow find ways to live in company with them.

—73, Bob VE7BS.

Misprision in the highest degree! An S9 + 30 dB signal does not have 'about the same effect' as an S9 + 20 one. It has ten times the effect, from

SILENT KEYS

BOB WYSE VE3CMA

With sadness and regret I report the death of a good friend and fellow Amateur, Bob VE3CMA. Bob obtained his Amateur licence in 1964 and his Advanced in 1967. He was president of the Nortown ARC (Toronto) 1968-69, taught code and theory classes and helped to write a chapter on transmitters for VE3CSE's Ham Handbook for Beginners. He moved to Geraldton in 1972 and was helping to organize the club's first ever Field Day at the time of his death.

He passed away on April 3, 1985. He is survived by his wife Sue VE3FTS, son Andy and daughter Sheri. A gentle man with wit and much patience, his companionship and expertise will be missed by all who knew him.— Ken VE3KRX.

GEORGE GOODWIN VE2DQ.

It is with deep regret that we have to inform you of the death of George VE2DQ. George was a life member of CARF and a frequent contributor to *TCA*. Except for the war years, George was active in Amateur Radio since 1935. In fact, if he had lived for another five weeks, he would have been involved for 50 years.

— Betty Whitehead VE2RR,
James P. Whitehead VE2PW

(George's last article in TCA *was "Antenna brewer's search" in June 1983, a perfect example of Amateur ingenuity in finding a 'tire store' solution to a difficult Amateur problem.— Editor.)*

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

the definition of the decibel.

Suppose you are listening to an S9 + 20 signal. An S9 + 30 dB signal on top will clobber your QSO completely, whereas S9 + 10 underneath will be only a minor nuisance— the difference between ten times the signal strength and one-tenth of it, as you would expect from the difference between 1 kW and 10 W. Don't take at face value everything you read in the 'Newington News.'

I claim to some expertise in this. When I first had this general coverage receiver, it was extremely insensitive. Few signals drove the meter above S9. So I removed the 1 mA S-meter movement and replaced it with a 50 microamp one. The effect was immediate and astonishing. The receiver's sensitivity was substantially improved, and I can now give DX stations eminently satisfactory reports. —Editor.

ON INCREASING OUR NUMBERS

The following are my personal recommendations for Amateur licensing in Canada.

1). Discontinue the advanced and packet radio licences. Go the same route as the U.K. One licence with code— full privileges Class 'A'. A no code 50 MHz and above licence Class 'B'. (Same theory and regulations as a Class 'A').

2). Return to multiple choice.

3). Exclude knowledge of SSTV in exams.

4). Decrease theory knowledge but increase operating practices.

5). Amateur Radio is dying of old age— it needs an injection.

73, Brian VE3KAS

Re the matter of a new 'beginner' class of licence, I am in favour of this. I think there is justification for a class of licence which would admit new members to the Amateur fraternity, who do not have the aptitude or opportunity to qualify for more advanced status. These people could qualify for a limited code speed, say 10 wpm, and basic knowledge, regulations, practices, etc. and have limited phone privileges.

I believe that some phone privileges are definitely in order, for example, two metres and up. One of the main reasons for this is so that people such as the XYL of an Amateur can legally operate a VHF/UHF rig, either base station or mobile, which would serve a very useful purpose not only for personal communications but in situations such as the recent Papal visit where a large scale communications project is set up.— Paul VE8YQ.

ON CW

I read with interest the article by VE1CGV 'A CW only ticket.'

When I started studying in 1975 to become an Amateur, I had no electronic background at all and I was 50 years old. For me, CW is a real pleasure. I received my ticket in December 1976 and I was clocking 20 wpm.

I spent many hours, days and evenings receiving at all speeds from W1AW at 5 to 35 wpm; the exams on electronics by DOC were a lot harder than CW. Even now, I still listen to W1AW and copy fast code. CW is not difficult to learn, it takes only time and perseverance, answering a CQ from a good operator at 15 to 25 wpm is a real thrill.

Personally, I am against any decision to lower sending and receiving speed requirements to 5 wpm.— Marcel VE2ESI

I believe that *TCA* has finally come up with a solution to the 'Expand our ranks' topic. It is a combination of VE3FXQ's suggestion that any non-code licence be for the underused bands— nothing below 220 at present— and the Gagetown Club's suggestion of a 5 wpm licence on *H.F. CW only.* With *NO* phone privileges below the suggested limit of VE3FXQ.

Add to the above the suggestions of VE3WC and VE1BC for public service - Emergency Service preparedness and willingness emphasized to each new Amateur as well as many of the seasoned ones, and our Amateur service will remain something of which to be proud.

The Code separates those who really have the dedication to become Amateurs from those who do not, especially among our high school and college graduates who can pass the theory with very little knowledge beyond that to pass high school science exams.

73— Don VE1CEN

(More letters on this subject on Page 23.)

Thanks to those Amateurs who have sent the editor copies of their letters to their MP's about the fee increase, and in particular to VE4FT who followed up his first letter to his MP with another, to which he attached copies of the April **TCA** *pages 20 and 21.*

Page 20 carries the letter headlined 'Let's move on licence fees!' and page 21, the article 'Tornado for dessert?' This article will inform his MP that Radio Amateurs do useful things, sometimes, and that the police can be grateful for their help.

Every MP should get a copy of that article, sent by a constituent of his. How about doing that?— VE3DQB

REPEATER LINK

It will soon be possible to link Peterborough's VE3PBO repeater to Toronto. Linking repeaters increases coverage without the interference potential of high power.

— Peterborough ARC News.

One advantage of our present licence requirements...

A new ham doesn't have to find a place for his antenna!

Crosswaves

Suit against Ottawa Amateur could set precedent!

Appliance Susceptibility and the Radio Amateur

By Ralph Cameron VE3BBM

Jack Ravenscroft, ex-VE2NV, now VE3SR, recently moved to the city of Kanata. Jack is active on the air as a DXer and in Amateur affairs. He served four years on the ARRL Contest Advisory Committee, and for two years on the ARRL DX Advisory Committee. He also found time to fulfill the duties of QSL manager for VE2 for ten years.

Jack chose his new location as a retirement home. It is in a suburban residential area, so he approached his neighbours with utmost caution to determine whether TVI or other forms of electromagnetic interference (EMI) occurred during his transmissions. A poll of all of his neighbours failed to uncover a single objection, except one. Jack voluntarily reduced power output on Nov. 15, 1984. Power has remained at the 100 watt output level since that time, when his antenna faces the affected home.

Susceptibility uncovered

The Department of Communications was called by the complainant to investigate a case of interference to a solid state furnace control at his house. The interference level was sufficient to key the furnace electronic control relay. There initially must have been a few veiled remarks of disbelief by the several DOC investigators present.

Furnace controller

The furnace controller was a Lennox 'Landmark' series and the owner claimed it was the first such installation in Kanata. This was also the first instance of furnace control susceptibility known to DOC.

Solution

A ferrite toroid installed by DOC on the AC line connecting the furnace controller and the sensor interface prevented any recurrence of the problem at any transmitter power level. (Power could be varied up to 1 kW to the antenna).

I wrote to Lennox Heating Systems of Etobicoke Ontario, manufacturer of the controller. I explained who I was, what was requested and the reason for the request. I mentioned this was a first occurrence and they would benefit by supplying a schematic. The company is cooperating.

Electronic organ

The next susceptible device tackled was a Yamaha electronic organ. This case of EMI has been detailed in the March *TCA*. The organ required considerable shielding, bypassing and filtering. Unfortunately, after five separate trips the Yamaha serviceman was prevented by the complainant from further work aimed at reducing the interference level. A complete report from Yamaha is available and I can attest to their responsible, conscientious attitude and concern. It should be borne in mind that interference of this severity seldom occurs. Yamaha performed all work at no charge to the complainant.

One meaningful aspect of the interference was the coincidental timing of a Caribbean schedule around 8:30 a.m. at VE3SR and organ practice at the complainant's. During this schedule the antenna points directly over the neighbour's house.

The complainant noted the simultaneous operation of the furnace control with very audible interference to the electronic organ. This confirmed that an external source was causing the problem; further work may well eliminate the trouble, although one cannot expect that it is simply a matter of installing a kit of parts, as the circuits are complex.

Further Tests

Before the complainant refused access to the house, during the course of one hour's testing by DOC no other appliances appeared affected, according to DOC's official report.

In an attempt to help resolve the problems occurring at the complainant's, I offered assistance to both parties. I was called one Sunday afternoon by the complainant to say they had been for a drive and upon returning found their microwave oven 'on.' Sporadic 'turn-on' seemed to happen on several occasions, quite at random.

The oven was examined by a Sears serviceman and run for a 30 day period, in the shop, with no apparent problem.

Another toroid

The Sears service group installed a ferrite toroid external to the oven (AC line) on instructions from DOC. Four turns of the power cord were made, but this did not appear to have any effect. Upon its return to the house, the oven once again commenced its cycle, sporadically and unattended. Obviously, an association was made with the other appliance interference but in some cases the oven operated while the Amateur was not on the air!

Although the oven was CSA approved, there was then and still is a concern on the part of the complainant that the oven may catch fire during a sporadic cycle. Operation of most ovens without a recommended 'glass of water' load could cause self-destruction of the magnetron.

The oven chamber however is protected by a high temperature sensor which cuts out at 300°F and removes oven power, should this limit be exceeded. If no load was presented to absorb microwave energy in the chamber, it is entirely possible internal heating within the magnetron would cause an internal short circuit. Since power circuits are fused, there is a high probability that the fuse would open and remove power. There's nothing to burn, the door must be closed to operate and when closed is relatively airtight except for fan vents.

Possible Causes

There is the possibility that the oven's sporadic operation could be due to power line transients. Indeed there have been major mains fluctuations in this area of Kanata.

The triac control devices used extensively to control power require a pulse of one polarity to conduct and a pulse of opposite polarity to reverse it. Should sporadic microprocessor operation occur, the triac could turn on. In this Sears oven the triac is connected directly to the line through the door interlocks.

Fire hazard

On one occasion the complainant mentioned to me that none of the oven controls stopped the oven operation after it had mysteriously triggered. Simply opening the door would have done it. It had previously been suggested by DOC that the complainant remove the wall plug to eliminate any concern of fire hazard, until a solution was found.

We may never know what caused this strange oven operation because the controller has been replaced (at no charge) by Sears service, although the Amateur was not notified.

No further tests or modifications to the organ have been permitted by the complainants— nor have DOC been permitted to run more definitive tests. The complainants have since insisted that the antenna of VE3SR not be pointed at their residence.

Notice is served

On Jan. 4, 1985, Jack and his XYL, as joint owners of their residence, were served with a legal instrument that stated the use of the transmitter in a particular manner was causing certain electric appliances to turn on and off at the complainant's house.

The complainants, now the plaintiffs in this matter, were legally advised that the problem they were encountering and the solution of it was the joint responsibility of Jack and his wife. It also stated "that all of the appliances so affected to that date have been examined and found to be in perfect working order and to meet or exceed accepted standards." It further stated, "that notice is served, that should any damage or injuries occur which may be (by reasonable assumption) caused by the operation of the Amateur equipment, they will be held responsible and liable for all damages so incurred." The notice continued that the plaintiffs are concerned about the "stress caused by the unpredictable behaviour of the appliances affected, as well as by the danger which exists should an appliance such as the microwave oven be turned on and left in operation for a period of time while the (plaintiffs) are not at home."

"I would respectfully suggest that you cease the operation of your transmitter entirely or take whatever precautions are necessary in order that this problem cease entirely and immediately. In the event the disturbances continue, I am advising my clients to apply for a permanent injunction in order to protect themselves." On April 22, 1985 VE3SR was served with a summons to appear at a hearing May 3, 1985. This was postponed until May 17. No decision was made at that time and further preceedings are scheduled for May 28. The outcome of these hearings could result in a court trial permanently barring Amateur operation at Jack's location.

Ray Perrin, VE3FN and a Director of CRRL, has assisted Jack by presenting an affidavit to Jack's attorney. The technical information in the affidavit supports the absence of the oven being a fire hazard. He has also provided statistics of the incidence of EMI in North America.

Electronic equipment owned by the public is only protected from the results of its susceptibility to RF by mutual agreement as to solutions between the Amateur and the complainant. It is frustrating, time consuming and annoying for all concerned, especially the non-technical consumer... and in this case an expensive and trying course of events for the Amateur.

Legal Costs

Litigation has proven to be an expensive process and at present Jack's expenses exceed $1000 and should a trial ensue a minimum of $5000 cost is anticipated.

The legal ramifications of this case will be extremely far reaching because it is being tried as a civil case. It could permit injunctions to be placed against pagers or any type of transmitting equipment— without exception... and that includes us, the Amateurs of Canada.

It has been proven that VE3SR is operating under the terms and conditions of his licence and yet this action could be instituted against any licensed transmitter owner. It should be the obligation of the Amateurs to defend such actions collectively where there is just cause. I believe this is such a case.

It is therefore proposed to solicit financial support from concerned Clubs, Groups and individual Radio Amateurs to help absorb VE3SR's legal fees.

At the May meeting of the Ottawa Amateur Radio Club I proposed that a committee of three licensed members take the necessary steps to open a trust account for the Jack Ravenscroft Susceptibility Defence Fund, to be known as JRSD Fund. The club unanimously agreed, and I was named chairman of the committee along with Rick Van Gastel VE3MJV and Bruce Lauer VE3HVA. We have taken steps to set up the fund. Donations are already being received.

Your views and support are needed now— if you ever needed an issue, this is it. Don't think it can't happen to you. Δ

Post-natal care of the newborn Amateur

Teaching Amateur Radio

By Dan Holmes VE3EBI

Much thought has been given over the years to the introduction of new blood into the Amateur community and the training of recruits. The clubs and federations have created good study material aimed at preparing the aspiring Amateur to pass the DOC exams.

Whenever the course of studies is considered, there is a range of opinion as to whether the Amateur should be fed just enough material to pass the exam, or be given sufficient to enable him to progress easily to higher levels.

Many are concerned with what appears to be a disproportionate number of greybeards in our ranks, and feel we need to attract youth to our avocation. Although this is a valid concern, we should not try to resolve it by diluting the quality of the education. To do this may well turn the Amateur service into a superficial playtime activity.

The recruitment of young people is a problem that should be dealt with outside the context of training; and will not be dealt with here. There are many fine and intelligent young people who, on being attracted to Amateur radio, will make the effort. What will these students be when they attain that precious ticket? Will they be 'DX hounds,' or 'home brewers,' or both? They really won't know until they get their feet wet. It would make sense to give them the training that will enable them to make their own decision later.

The discussion here will be under two general classifications:

- The type of training and the course material available, basic and advanced.
- The post-natal care and feeding of our newborn Amateur.

The Initial Course

The student should be given a sound basic electronic course aimed at the telecommunication speciality. This will enable him to build upon it by self study. Currently, I use the study guide by Ralph Zbarsky VE7BTG; and have used the CARF Study Guide. I teach to a somewhat higher level than these. Both of these study guides shrug off some of the math, etc., as being too complex for the basic Amateur certificate.

With this I disagree. A familiarity with the scientific calculator makes even the trigonometry with vector diagrams, a simple and understandable project. (I hope I don't get loud shrieks of disagreement from former students). However, within an average teaching time of 60 hours it is only possible to teach so much. We must remember that many of the students at the start would not know an electron from a pail of water. To expect them at the end of the course to have more than a minimal grasp of schematic circuitry is a little much.

The TRC 24 syllabus is a rather awe-inspiring document. While it calls only for standard block diagrams, in the past some schematic diagrams have been included. This, no doubt, has some merit if— and only if— they are quite basic.

Many of those aspiring to the Advanced Operator's ticket have a gap of several years between writing their Operators Certificate and the Advanced. A solid review of the earlier material has been found to be essential before going on to the more esoteric realms.

What is needed

Unfortunately, the course outlines available give a rather hit-or-miss selection of new or more advanced material. What is really needed is a text which treats each topic of the course in a review mode, leading consistently into the more advanced treatment of the subject. Then topics not part of the basic course could be added after this.

Now our new Amateur, his ticket clutched in his hot little hands, with visions of working the world, wants to get on the air. Now, the translation of all this theory into a working Amateur station becomes a problem: What kind of equipment? New or used? What kind of antenna?

Then we have the new Advanced Amateur. Much more knowledgeable, we would say. He now wants to try something new such as RTTY or slow scan. He knows the theory, but perhaps he would be a little more sure of doing it right if he had some help.

All of which brings us to worthwhile projects to make club meetings or publications interesting. Practical chalk talks or factual papers on 'how to' by some of our more knowledgeable members could be of great service. Special evenings devoted to this could be offered apart from regular club meetings if we did not wish to take the time of regular meetings, always providing that the interest was there.

Making it known at the Amateur classes that there is an organization interested in their 'aftercare' would be an incentive and encouragement to the budding Amateur; and would give considerable vitality to our clubs. Δ

Reprinted from the Ottawa ARC's *The Groundwave*

On Expanding Our Numbers

This sequence ends the correspondence 'On expanding our numbers.' All correspondence in full and all comments received will be forwarded to CARF's executive, so that they can submit a brief to DOC. This brief will be based on the opinions of well-informed Amateurs, who have considered a wide range of proposals published in TCA.

To widen the brief's base, please complete the Questionnaire on page 16, and submit it to your CARF director for his guidance.— Editor.

Here are extracts from letters the editor has received on the subject of attracting new Amateurs. Space does not permit publishing them at length, though it breaks my heart to cut so savagely.— Editor.

Those with average minds out there are quite capable of passing the tests as they now exist. The solution to the problem of getting more VE's (not XM's) is exposing them to Amateur Radio through advertising.

We definitely don't need more of the type of people who do not wish to progress from 2 metres. A well-watered down technical test and a code test below 10 wpm would result in a host of belt-packing 2 metre people who would only add to the chaos.

— Roly Burley

The requirements to learn morse code is totally archaic. The real purpose today is to restrict the number of new Amateurs entering the hobby and is counter-productive.

The course of study and examination should include station setup, good operating practice, the hazards of using such equipment as linear amplifiers, proper grounding, antenna design, tube vs. solid state finals, satellite operation, computers in Amateur radio, towers and erection. Many lids operate poorly out of ignorance, not malice.

New Amateurs must demonstrate an understanding of good station setup (not radio theory), good operating practice (not CW), and an appreciation for safety.

— Mike VE3NET

Gagetown ARC's article "A CW only ticket" in May *TCA* is very good, and I am sure most Amateurs across Canada would agree with the concept outlined there. This proposal should be submitted to DOC as a joint recommendation by CARF and CRRL.

I agree completely with David VE3WC's letter about the Amateur Radio Emergency Service, (May *TCA)* and I would like to invite him and others to participate in the ARES net, Sundays at 2000 Z near 14.115 MHz.

— Jack VE4AJE

I am strictly against any system that would make the present Amateur exam easier. I know of one Amateur who tried five times before he finally received his ticket, receiving credit each time for the little he did know. He now uses 2M only, does not intend to try for his Advanced, and six months after receiving his licence, is unable to tell the difference between a diode and a transistor.

If an Amateur ticket is worth having, it is worth working for. I have had mine for a good many years, and it seems to me that a bunch of ex-CBers is trying to bring us all down to their level. Oh for the good old homebrew days when if you wanted something you didn't buy it, you built it. That was part of the fun of being a radio Amateur.

— Cyril VE7APG

I doubt very much if RTTY or Morse Code or even Packets is anything but a mystery to most people. So Amateurs should spend time talking about the enjoyable people met or befriended through Amateur Radio.

The pitch should center around enjoyable conversations, enlightening discussions, and cultural exchanges. Sell people on people and promote Amateur Radio as a means of contact, with the side interest given to technology.

As salesmen know, it is easy to sell something if the customer sees it as fun and so attractive that the expense is easily justified.

— Lyle Blake

Now turn to page 16 and fill in the Questionnaire. Δ

Another Space Amateur

Tony England W0ORE and John David Bartoe W4NTZ are expected to lift off into space between the ninth and fifteenth of July.

Operation will be confined to 2 metres, FM phone and SSTV, as a 10-metre antenna system in the cargo bay of the orbiter is not feasible yet.

Dr. England most sensibly wants to emphasize the educational side of Amateur radio, as distinct from the competitive. So, most of his voice operation will be skeds with schools or radio clubs.

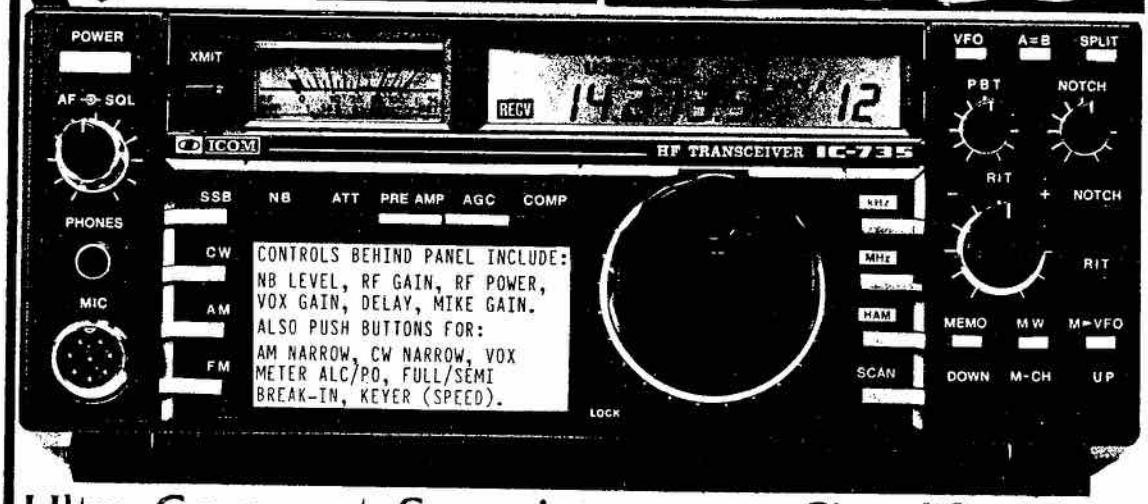
Nevertheless, there will probably be some open time, and Tony or John may be able to make unplanned QSO's.

The equipment will be a Motorola 2 metre FM handheld, similar to that used by W5LFL on the first Amateur space effort, and an SSTV package (camera, switcher, frame storer and transmitter) donated by Robot, Panasonic, and others.

Operating frequencies will be coordinated by AMSAT. ARRL will be the liaison between NASA ad the news media— via *Westlink Report.*

Δ

NEW ICOM IC-735



Ultra Compact

The new ICOM IC-735 is what you've been asking for...the most compact and advanced full-featured HF transceiver with general coverage receiver on the market. Measuring only 3.7 inches high by 9.5 inches wide by 9 inches deep, the IC-735 is well suited for mobile, marine or base station operation.

Superior Performance

It's a high performer on all the ham bands, and as a general coverage receiver, the IC-735 is exceptional. The IC-735 has a built-in receiver attenuator, preamp and noise blanker to enhance receiver performance. PLUS it has a 105dB dynamic range and a new low-noise phase locked loop for extremely quiet rock-solid reception.

Simplified Front Panel

The large LCD readout and conveniently located controls enable easy operation, even in the mobile environment. Controls which require rare adjustment are placed behind a hatch cover on the front panel of the radio. VOX controls, mic gain and other seldom used controls are kept out of sight, but are immediately accessible.

More Standard Features

Dollar-for-dollar the IC-735 includes more standard features...FM built-in, an HM-12 scanning mic, FM, CW, LSB, USB, AM transmit and receive, 12 tunable memories and lithium memory backup, program scan, memory scan, switchable AGC, automatic SSB selection by band, RF speech processor, 12V operation, continuously adjustable output power up to 100 watts, 100% duty cycle and a deep tunable notch.

Options. A new line of accessories is available, including the AT-150 electronic, automatic antenna tuner and the switching PS-55 power supply. The IC-735 is also compatible with most of ICOM's existing line of HF accessories.

EARLIER ADS INDICATED THE CW FILTER AND KEYER AS STANDARD. IN ORDER TO KEEP THE BASE PRICE LOWER THESE ARE NOW OPTIONAL.

WE'VE GOT 100 OF THE NEW IC-735's ON ORDER. THAT'S MORE THAN THE DISTRUBUTORS ORDER. BECAUSE OF THE LARGE ORDER WE CAN OFFER YOU UNHEARD OF PRICES ON THIS NEW TRANSCEIVER. ORDER YOUR NEW IC-735 NOW. CALL OR WRITE FOR OUR SUPER SPECIAL (TOO LOW TO PRINT) GROUP PRICES ON PURCHASES OF 3 OR MORE. IC-735 LIST PRICE $1149.00 CALL NOW !!

Check These Features:

1. The rotator frame can house up to 4 motors to increase the torque and load capacity of your antenna system.
2. Each motor is equipped with a Super Wedge and Clutch brake system which works independently from the main frame gear train.
3. Maximum brake power is 18,300 lbs/in when 4 motors are installed. The main frame and reduction gear train have been designed to withstand maximum wind loading.
4. The motor unit can be dismantled easily for maintenance if required.
5. A 1½" to 2½" diameter can be installed and aligned easily with the rotator center.
6. Low voltage (24VAC) motors are used to ensure safety during installation work on the antenna tower.
7. Low cost 6-wire control cable can be used for the low voltage motors.
8. The control panel can be removed easily for calibrating the direction indicator.
9. Balanced type control knobs have quick lock mechanisms on both sides.
10. The advanced Super Wedge and Clutch brake system (Slip clutch type) provides exceptional holding power and protects the rotator mechanism from excessive torque.

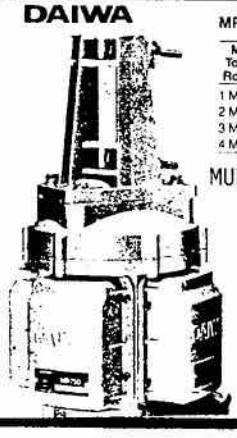
DAIWA

MR-750E/MR-750PE

Multi Torque Rotator	Output Torque lbs/in	Brake Power lbs/in
1 Motor	610	5,200
2 Motors	1,200	9,600
3 Motors	1,800	13,900
4 Motors	2,400	18,300

MR-750U Motor For use with MR-750E and MR-750PE Standard Rotators

MULTI-TORQUE ANTENNA ROTOR FROM DAIWA



MR 750E Rotator Standard Model (58 sec/rotation)

MR 750PE Rotator For use with Pre-Set Controller (58 sec/rotation)

CR-4 Manual Controller for use with MR-750E

CR-4P Controller with Pre-Set function for use with MR-750PE Rotators

MR-750E with ONE motor $399
MR-750PE wth ONE motor $439
MR-750U Extra motor----$129

Social Events

HALIFAX HAPPENINGS

The Fourth Annual Halifax-Dartmouth ARC Fleamarket held May 11, was preceded by a Celebrity Roast of Brit Fader VE1FQ which honoured his 50 years in Amateur Radio and contributions to the service. It also kicked off the 'Brit Fader Scholarship Fund,' an annual award of $500 to an Amateur pursuing electrical engineering studies. This will be administered by the Halifax ARC. I don't know all the exact requirements yet. The club is attempting to arrange tax exemption status for donors by Revenue Canada. Walt Wooding VE3WW, Fred Hammond VE3HC, Don Bain VE1LZ, and Fred Stevens VE1DX, were 'roasters.'

As for the fleamarket: bigger and better every year; some 300 Amateurs and visitors attended. Both Atlantic Ham Radio from Saint John N.B. and R & S Electronics had fully stocked displays. I brought out the CARF Booth and set up a full display. Took in 13 membership applications! —VE1ZN

CENTRAL ONTARIO PACKET RADIO SYMPOSIUM AND FLEA MARKET

Saturday 21 September 1985, Georgian College, Barrie, Ont.

A committee has recently been appointed to plan a symposium on packet radio being sponsored jointly by the Electronics Technology Division of Georgian College and the Barrie ARC, including the HEX 9 Group. The latter body has recently become one of the most active operating groups in the country. It has developed the packet radio repeater VE3LSR located near Barrie and is actively involved in establishing additional repeater facilities that will connect the whole of the central Ontario region with Ottawa.

For further information send your name, callsign, phone number and address to HEX 9 GROUP, Box 151, Orillia, Ont. L3V 6J3. Please indicate if you plan to attend the fleamarket and/or symposium and if you would be willing to speak on a topic.

The following symposium topics are intended as suggestions only, and many others could be added. The committee will welcome your further advice and comments.

—practical advice on how to enter packet radio; commercial and non-commercial TNCs now available, costs, pros and cons.

—how to interface a TNC with existing two-metre transceivers.

MAPLE RIDGE HAMFEST

Maple Ridge ARC announces their Hamfest '85, July 13-14 at St. Patrick's Centre, 22561-121 Street, Maple Ridge, B.C. All the usual attractions of a Hamfest plus a draw for a Commodore 64, interface and monitor, and other prizes. Registration chairman is Bob Haughton VE7BZH. Hamfest Registration, Maple Ridge ARC, P.O. Box 292, Maple Ridge, B.C. V2X 7G2.

CORRECTION

Tom Wong will not be at the Saskatchewan Hamfest, (August 2-3-4). The DX Forum will however, take place as announced.

CALENDAR

July 1: Canada Day Contest and Parks Canada centennial.

July 13: 11th Ontario Hamfest, Milton fairgrounds. Details June *TCA.*

July 13-14: Maple Ridge ARC Hamfest '85. St. Patrick's Centre, Maple Ridge, B.C. Details July *TCA.*

July 27-28: Okanagan International Hamfest, Oliver Centennial Park, Oliver, B.C. Details May *TCA.*

July 27 and 28: 33rd Annual Pacific North West DX Convention, Richmond Inn, Richmond B.C. Details April *TCA.*

Aug. 2, 3, 4: Saskatchewan Hamfest '85. Details June *TCA.*

Aug. 14-Sept. 2: VE3CNE operates from the Canadian National Exhibition. Details June *TCA.*

Sept. 21: Central Ontario Packet Radio symposium and flea market, Georgian College, Barrie. Details July *TCA.*

Sept. 27-29: RSO/CRRL Convention, London, Ontario. P.O. Box 73, Hyde Park N0M 1Z0. Details January *TCA.*

October 16: DOC licence examination.

Publicize your get-together here. Write the Editor, TCA, P.O. Box 855, Hawkesbury, Ontario K6A 3C9.

Let TCA know about your events three months in advance to list them in the Calendar.

"--and only used by a little old lady on Sundays to set her clock to CHU." The Ottawa Club's Fleamarket. Photo Keith VE2XL.

The Saga of Northern Radio

By Thomas R. Roach*

It was early September when the Hudson's Bay Company steamer *Nascopie* anchored opposite the trading post of Arctic Bay, Baffin Island. Along with the supplies for the year 1936-37 was a new manager for the post, Alan Scott.

Leaving home in Scotland to return to northern Canada must have been especially poignant for him because during this vacation he had met and fallen in love with Eileen Wallace. Only once was there the chance he might exchange letters with her before the steamer returned next September. In March or April he would send a dog-team south with trade reports and mail. With luck, it would bring him a letter on its return, along with orders from the Company.

Scott's situation was not unusual in Canada's Arctic in the mid-1930s. The majority of traders, missionaries, prospectors and members of the Royal Canadian Mounted Police were equally isolated. In the next few years, however, Scott was witness to a series of events that changed the lives of all those living in the North.

His employer, the Hudson's Bay Company, issued radio receivers and transmitters to all its northern trading posts, allowing them to communicate directly with each other and with the outside world. Radio destroyed the barrier to communications caused by climate and distance, just as the airplane was to simplify travel.

The First Stations

The use of radio for northern communications started in the years before the First World War with the establishment of two radio stations by the Government of Canada. The stations, located at The Pas and Fort Nelson, were part of the plan to build a railway line to Fort Churchill on Hudson Bay.

As the railway line neared completion in the late 1920s, more radio stations were built on the northern coastline along the route that ships would follow as they sailed into the port. By 1936 when Alan Scott was landing at Arctic Bay, the railway and string of guiding radio stations had been completed and the harbour opened.

Most of the radio stations were operated in the shipping season; only the stations at Coppermine and Chesterfield Inlet were 'on the air' all year round. In 1930, a day or two before Christmas, these two stations had been instructed to make daily broadcasts of news and personal messages. The Hudson's Bay Company was to use these government stations as links in its own radio network.

In addition to its commercial importance, the creation of a fur-trade radio network in the 1930s brought far-reaching changes to the lives of Northern residents.

The decision to study the feasibility and usefulness of radio network was made by the Company in 1934. Aboard the *Nascopie* on her trip north that summer was Fur Trade Commissioner Ralph Parsons, and Governor of the Company Sir Ashley Cooper. These men talked at length with a summer employee working as a radio operator on the ship, George Horner, about the role radio could play in the North.

Parsons, who had spent all his working life in the fur trade, also knew the positive impact that improved communications would have upon his northern staff.

A Demonstration

In the next two years, two of the Company's young apprentices who held Amateur radio licences, demonstrated that low-power radio sets could operate in the North. G.C.M. Collins at Norway House and D.G. Sturrock in the Western Arctic were able to communicate with other Amateurs all over the world from their isolated locations.

Sturrock was the first to use short-wave radio communication in the fur trade for private commercial purposes. As an apprentice at Tuktoyaktuk in the summer of 1934 he operated a radio station with a small dry-battery transmitter, and set up the same station at Cambridge Bay when transferred there in the fall of 1934.

The Hudson's Bay Company obtained a private commercial licence for Sturrock to enable him to carry on two-way communication of Company business with the government radio station at Coppermine.

As early as 1928, W.E. Brown, while post manager at Wager Inlet, had conducted experiments with a CW transmitter made from parts of an obsolete radio receiver. Late in 1934, while Brown was a district manager working out of the Winnipeg office, he showed Fur Trade Commissioner Ralph Parsons and his assistant James Cantley a CW transmitter he had recently built.

Mr. Parsons turned to Jim Cantley and told him to make a note to the effect that they would install four sets in the Straits the following summer.

Continued on next page ▷

* Reprinted with permission from *The Beaver*, published quarterly by the Hudson's Bay Company, 77 Main St. Winnipeg, Man. R3C 2R1. Condensed from the original.

The HBC experiments

Ralph Parsons asked George Horner, the *Nascopie's* radio operator, to carry out a series of experiments during the summers of 1935 and 1936 when he was again working on the *Nascopie.* Using the radio in the steamer to communicate with sets he had left at carefully chosen locations, he investigated the characteristics of radio transmissions in the Arctic.

The study was a success and Parsons asked Horner, then in his last year of engineering studies at the University of New Brunswick, to make plans for a network of radio stations.

At the same time as the Company had under consideration the establishment of a network, a request for help was received from the newly-formed federal Department of Transport.

In a letter to Ralph Parsons written in the spring of 1937, the Controller of Radio, W.A. Rush, explained that the government wanted to expand radio coverage by installing a year-round station on the east coast of Hudson Bay, preferably at one of the Company's posts. Not only would this relieve supply problems, but it would give the radio operators some social contacts. Rush thought that either the post at Great Whale River or at Port Harrison would be ideal.

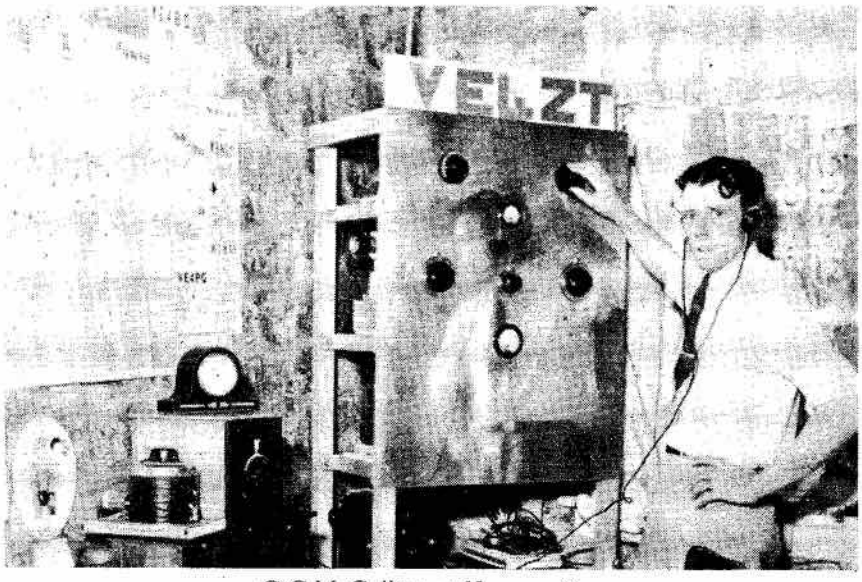
Parsons seized the opportunity and soon reached an agreement with Rush, that in return for its co-operation the Company would be issued licences for a number of radio stations. Also the government stations would co-operate in the operation of the network.

Off the shelf equipment

In April 1937, Parsons hired Horner as the Company's radio engineer. He had only a few months available before the *Nascopie* sailed. He moved to Winnipeg and put together the equipment for the first stations and trained operators.

The radio sets and the equipment to power them were models of ingenuity. Horner's choices show he had a thorough understanding of all the problems likely to be encountered in the Arctic, given the lack of resources at the isolated trading posts.

The first problem shown by his tests and the experiences of the Company's Amateur radio operators, was that dry batteries couldn't be used to provide the needed power. Not only were a large number needed to operate a transmitter and receiver for a year, but they had to be kept from freezing.



G.C.M. Collins at Norway House.

This was a major drawback because, in the treeless North, coal was used to heat the trading posts. It came with the other supplies on the *Nascopie* and it was not unusual for the steamer to miss an annual delivery because of adverse ice conditions. As a result, a pot might not have enough fuel to heat the living quarters through a winter.

Horner devised an ingenious solution to the energy problem: he purchased a system of windmill-powered generators charging a series of lead-acid batteries. As long as the generator kept them fully charged, the batteries could not freeze. These supplied the low voltage.

Horner finally decided on a voltage inverter for the high voltage. These had been developed to power automobile radio receivers. The receiver and transmitter chosen by Horner were small and compact by the standards of the age; each was about the size of a toaster.

K.I.S.S.

The small size of the complete station and its simple inexpensive equipment were important factors. It did not take up too much room in cramped living quarters and was easy to transport and install. The choice of compact equipment, however, meant that two important compromises had to be made.

First, the sets could not transmit or receive voice communications; they used CW. Second, the transmitter had an output of 12 watts. The transmitter had a long range when atmospheric conditions permitted but messages could not be received at the Company's offices in Winnipeg with any regularity.

Arrangements were therefore made for the posts to communicate directly with their nearest Canadian government radio station so as to ensure reliable communictions. Arctic Bay, for instance, was to use the government station on Nottingham Island, several hundred miles to its south.

The government stations acted as relay points, saving messages for the Company's trading posts until they called in at certain scheduled times and then forwarding their telegrams.

The Arctic Bay radio was installed for Alan Scott in September 1937 by George Horner and the ship's carpenter, Clem James. One of the first messages sent out by Scott was a proposal of marriage to Eileen Wallace. She accepted by letter and the following year travelled north on the *Nascopie.* The two were married by the Anglican Bishop of the Arctic, A.L. Fleming. △

To be continued

Qu'est-ce que l'UMS?

par Bernard VE2LC

Question bien pertinente pour beaucoup de membres et d'autres personnes interéssées à notre hobby. Voici un article que trace les origines du Club et qui fut publié dans "L'UMS," no. 4, juin 1976, et écrit par nul autre qu'un de ses fondateurs: Adrien St-Martin, VE2BLN.

"Historique de l'UMS"

Le présent article se veut une tentative d'historique de l'Union Metropolitaine Des Sans Filistes De Montreal. De toute première importance pour notre groupe, j'ai cru que la chose pourrait intéresser les lecteurs du journal de l'UMS.

En guise de départ, parlons des circonstances qui ont précédé la formation importante de notre mouvement.

Au collège Marie-Victorin.

Au tout début, des cours de radio-amateur pour l'obtention du certificat d'amateur étaient organisés au Collège Marie-Victorin par Adrien VE2BLN. Cette activité s'est implantée lentement au sein de notre institution et c'était en septembre 1971. Une telle organisation ne va pas toujours de soi. Le manque de motivation a été la cause principale de l'échec de ce groupe qui ne se rendit même pas à la fin des cours. Il est vrai que la nature du mouvement était insuffisamment connue dans notre milieu. En 1972 on répéta l'expérience parmi les étudiants réguliers sans plus de résultat; mais en 1973 avec l'aide de Emile VE2DDU et de Jean-Marie VE2DIH (aujourd'hui VE2HM), commença l'ère des réussites que nous connaissons aujourd'hui. Les cours cette fois s'adressaient à des adultes véritablement intéressés à la radio-amateur. Ces cours se donnaient le soir. Mentionnons ici quelques noms de personnes qui ont participé à ces premiers cours dispensés au Collège Mario-Victorin. Ce sont pour la plupart aujourd'hui de bons amateurs et que servent bien la cause: André Bosivert VE2DPA, Guy Gingras VE2DTT, Fernand Gendron VE2AXK, Gérald Gravel VE2BKM, Jean-Marie Chartier VE2BBU, André Demers VE2DTD, Bernard Dupont VE2BTW, Guy Allaire VE2BYE, Jean-Pierre Casavant VE2BAC, Gabriel Laperrière VE2AIT, Prosper Levaguerez VE2AUD, Pierre Montpetit VE2DRR, Jean Taillon, VE2BEU, Jean Taillon VE2DPD (aujourd'hui VE2ZO), Romain Trudel VE2DTR, Lionel Lamoureux VE2DVD, Serge Primi VE2DVT etc..

Précisons que toutes ces personnes, n'ont pas nécessairement obtenu leur certificat l'année même mais se sont présentées et ont réussi leurs examens subséquemment. Cette première session s'adressait à 72 personnes.

Cette même année 1973, naissait officiellement le Club VE2CMV. Le club à ce moment était exclusivement un club de Cegep et n'admettait personne de l'extérieur. Le 11 mai de cette même année, avait lieu l'inauguration de la station radio-amateur du Cegep sous la présidence d'honneur de monsieur Jean-Marc Cliche, secrétaire général du Collège Marie-Victorin.

Une invitation pressante avait été lancée aux autorités du Collège, aux professeurs et étudiants. Durant cette journée, plus d'un centaine de personnes se rendaient sur les lieux. Les démonstrations qui se sont déroulées ont été un succès complet. L'assistance a été émerveillée en entendant plusieurs stations locales se signaler sur les 80 mètres et les communications sur 20 mètres ont permis des communications au loin, notamment TJ1AU du Cameroun et des stations françaises comme F6BDS de Salon, arondissement situé au sud de la France.

Parmis les invités se trouvaient plusieurs personnes particulièrement intéressées à la radio amateur. Nommons, Bob VE2AAO, Robert VE2AVG, Rosaire VE2BOU, Fernand Gendron alors VE2SWL, etc.

Adrien VE2BLN, titulaire de la station VE2CMV a tenu à préciser pour le bénifice de l'auditoire la nature et les objectifs principaux du mouvement radio amateur. Voici en bref ce qu'il énonçait en cette circonstance:

"La radio amateur est:
— une occupation scientifique en même temps qu'un passe temps très intéressant.
— une entrée dans le vaste domaine de l'électronique.
— une occasion magnifique de communiquer avec toutes les personnes qualifiées, abstraction faite de race, de nationalité, de religion d'idéologie etc., et ceci au moyen d'une station privée de radio sur des fréquences particulières."

L'objectif principal a été précisé comme suit:

"Promouvoir un esprit de fraternité, d'entr'aide et de collaboration entre les hommes. Cet objectif se traduit de différentes façons suivant les circonstances. Tantôt ce sera une aide efficace dans des cas de désastre comme ce fut le cas tout dernièrement lors de secousses telluriques qui ont jeté la consternation au Pérou en 1970, tantôt, ce sera un message urgent à transmettre à une famille, tantôt ce seront des données scientifiques sur les télécommunications. Il va de soi que les conversations amicales ne sont pas exclues pour celui ou celle qui s'adonne à ce dérivatif."

En guise de conclusion, Adrien VE2BLN ajoutait:

"Le mouvement radio amateur, comme d'ailleurs tous les autres mouvements, est une suite de démarches plus ou moins longues et fastidieuses, parfois, de petites déceptions et enfin de réussite magnifique, comme c'est le cas aujourd'hui au Collège Marie-Victorin.

En terminant cette presentation Adrie VE2BLN précisait:

"Pour demeurer bien vivant, *Il faut demeurer jeune...* et c'est ce que le club. VE2CMV entend réaliser au Collège Marie-Victorin avec un club de radiophiles jeune, fort, vigoureux et actif".

La petite histoire de L'UMS proprement dite, débute le 31 mai 1974. Un groupe important de personnes qui a ce moment suivaient le cours de radio amateur dont Jean Larose connu aujourd'hui sous l'indicatif d'appel VE2DVC proposait l'ouverture du club VE2CMV au public radio

Voir page prochaine ▷

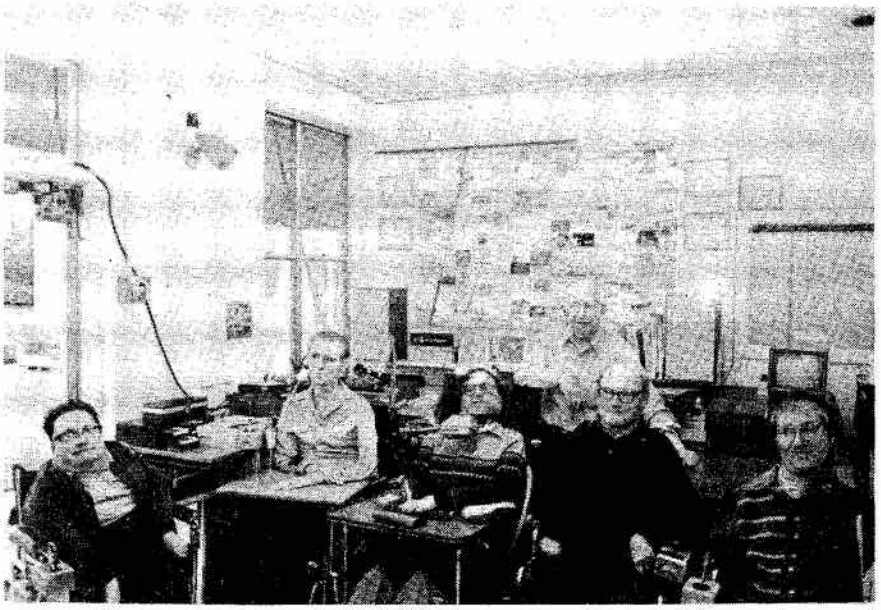
Pearson Hospital Amateur Radio

By Robert Smits VE7EMD

Amateur radio station VE7PH is located in the Polio Ward of the Vancouver Pearson Hospital and is operated by five quadraplegics, who make this hospital their permanent home.

Brian, Orval, Chester, Brian and Jimmy all have paralyzed arms and legs and, in spite of their handicap, are able to get around by the use of electrical wheelchairs. A few years ago, they discovered that not only were they able to learn the theory required to obtain an Amateur radio certificate, but with a little patience and a great deal of practice, they were also able to learn Morse, and send it with electronic keyers and a 'mouthstick' or specially designed micro-switched mouth keyer.

All five successfully passed their Amateur examinations, and 12 months later, also earned their Advanced Amateur Radio Certificates, which required sending and receiving Morse at 15 w.p.m. and advanced electronic theory.



Advanced Amateurs Jimmy Wallace VE7BLO, Brian Fitzgerald, Orval McBride, Harry Beardsell VE7ZQ (Station sponsor), Chester McKeller and Brian Cruickshank.

In January 1984, Harry Beardsell VE7ZQ, the sponsor of the station, used funds donated by lower mainland Amateurs to re-equip the station with modern up-to-date equipment. Most of the equipment used at the station (VE7PH) has been modified so that it can be operated with a mouthstick. Even the 8 position 'Memory Switch' on the TS 430S HF rig can be operated by external push buttons.

The station is quite active on all bands, especially 15 and 20. In addition, during Rick Hansen's 'Man in Motion' world tour, these hams will provide a Vancouver link for Rick's Amateur radio communications system. Δ

Brian at the mike of VE7PH. This is the base station for the 'man in motion' project.

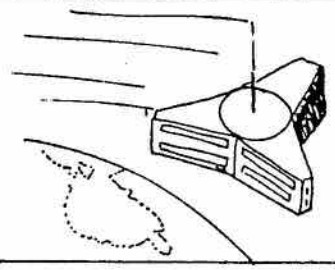
▷ *Continué de Page 29*

amateur, c'est à dire une ouverture à l'extérieur du Collège Marie-Victorin et qui admettrait toute personne intéressée à la radio amateur. L'idée fut acceptée d'emblée par les autorités du Collège Marie-Victorin. On peut dire que cette assemblée de 31 mai 1974 a réellement été le point de départ du groupement que nous connaissons aujourd'hui sous l'appellation de Union Metropolitaine des Sans Filistes de Montreal.

À suivre

AMSAT NEWS

By Gordon Wightman VE5XU
3637 Victoria Ave.
Regina, Sask. S4T 1M4



Minimum Detectable Signal

Just how much signal do you require to make a contact? If a signal can just be detected when it is at the same level as the noise received, then this level is defined as the 'Minimum Detectable Signal' or MDS.

MDS = -174 dBm + NF (dB) + 10 Log (BW)

(Base 10 logs)

NF is noise figure which is additional noise generated in the receiving system. It is measured in dB.

BW is I.F. Bandwidth and is measured in Hertz (Hz).

174 dBm is a function of Boltzmann's constant (1.38 x 10E-23 Joules/^{0}K) and a reference temperature (290^0 Kelvin or 17^0 Celsius).

dBm is a signal level, referenced to 1 milliwatt (0 dBm or 0.2236 Volts into a 50 Ohm system).

As can be seen in this equation, the narrower the I.F. bandwidth and the lower the noise figure (pre-amp mainly) the lower the minimum signal level that can be detected.

The Figure gives some typical MDS levels for different I.F.s and noise figures.

Every 1.0 dB improvement will increase the Power Level received by just over 25%! For weak signal communications keep noise figures low and I.F.s as narrow as possible.

Most people can copy CW with a signal-to-noise (s/n) ratio of 4 dB, and a s/n ratio of 12 dB on SSB.

The biggest contributor to path loss is distance. For line of sight free space communications, the path loss is determined from

$L = 10 \text{ Log } 16{,}364 / (F \times D)^2$

L is Loss in dB
F is frequency in MHz
D is distance between antennas in feet (x 0.3048 = m)

A Basic computer program is included for those who want to do this type of calculation for various distances and frequencies.

As can be seen from this equation, every time the distance *or* frequency is doubled, the path loss increases by 6 dB (4 times).

If you are a person with a sharp ear and can work at near 0 dB s/n ratios, don't forget the loss of signal in the coax between the antenna and the receiver. A 1 dB improvement (or loss) with marginal signals really does make a difference. Mounting a good low noise pre-amp right at the antenna terminals will give you spectacular results with weak signals.

Next month— Determining antenna requirements for AMSAT-OSCAR 10 based on MDS and Path Loss.

Δ

Bandwidth	3 dB N.F.	1 dB N.F.
4 MHz (e.g. TV)	-105 dBm	-107 dBm
800 KHz (mode L A010)	-112 dBm	-114 dBm
150 KHz (mode B A010)	-119 dBm	-121 dBm
2100 Hz (SSB)	-138 dBm	-140 dBm
600 Hz (CW)	-143 dBm	-145 dBm
100 Hz (PLL)	-151 dBm	-153 dBm

```
10 PRINT"□"
20 PRINT"THIS PROGRAM DETERMINES THE PATH LOSS"
30 PRINT" BETWEEN TWO DIPOLES IN FREE SPACE"
31 PRINT:PRINT
50 INPUT"SEPARATION IN FEET(FT),MILES(MI) OR KILOMETERS(KM) ";A$
60 PRINT"DISTANCE IN ";A$;"="
70 INPUT D
75 PRINT
80 INPUT"FREQUENCY(MHZ)= ";F
100 IF A$="MI"THEN 500
110 IF A$="KM"THEN 450
120 IF A$="FT" THEN 400
130 GOTO50
400 W=1
410 GOTO 510
450 W=3280.84
460 GOTO510
500 W=5280
508 REM L=LOSS
510 L=(10*LOG(16364/((F*D*W)↑2)))/LOG(10)
550 PRINT"□"
560 PRINT"FREQUENCY=";F;"MHZ"
570 PRINT"DISTANCE=";D;A$
580 PRINT"ATTENUATION=";L;"DB"
600 PRINT:PRINT:PRINT
610 INPUT"CONTINUE (Y/N)";Y$
615 PRINT
620 IF Y$="Y" GOTO50
1000 END
```


VHF/UHF

By Bob Morton VE3BFM
8 Thornbay Dr., RR 2
Stouffville, Ont. L0H 1L0

20 kHz— Boon or Bust?

By Robert Smits VE7EMD

Over much of North America, the two metre band is humming over the '20 kHz Bandplan.' Those areas of the country presently operating on existing 30 kHz bandplans in densely populated areas will soon be forced to choose between 20 or 15 kHz. Those who opt to do nothing will be faced by an invasion of repeaters, operating between existing 30 kHz channels.

Uninformed comments have suggested that adoption of 20 kHz will force some repeaters off the air, and that fewer repeaters will be able to exist than under a 15 kHz plan.

When Clay Freinwald K7CR, secretary of the Western Washington frequency coordinating group, was asked, "Can't we just leave well enough alone? Aren't there enough repeaters now?", he replied as follows... "This sounds great... Unfortunately there is no method of limiting the number of repeaters, they just keep coming, coordinated or not. A change to 20 kHz spacing is a method whereby you put physics on the side of the coordinators and create a system whereby the band is full, it's livable, and does not as in the case of the 15's lay the groundwork for an unlivable situation."

When Amateurs began operating two metre repeaters in North America, they began with ex-commercial service equipment. They spaced the repeaters every 120 kHz.

When more space was needed, the spacing was divided and we had the 60 kHz bandplan. When the repeaters using outputs below 147.00 MHz filled up, the section from 147.00 to 148.00 MHz was used as well. Since receivers of the day had restricted bandwidth in the RF stages, repeater inputs were 600 kHz higher than the output above 147.00 MHz.

When this too was filled up, this evolved into the 30 kHz plan familiar to most Canadian Amateurs.

It is difficult to stop 'progress.' Eventually, enough repeaters are built to fill all available channels. Densely populated areas of the United States soon reached that point. Some areas elected to split the 30 kHz channels yet again and insert repeater pairs in between each existing repeater, with the inputs and outputs arranged + or - 600 kHz just like the adjacent repeaters.

Achievements

Peter Shilton VE3EMS, Elliot Lake, made the top 10 list for confirming worked-all-states on 220 MHz. A special plaque will be awarded for this achievement.

Peter VE3EMS made #5 to confirm 50 grid squares on 220 MHz. He will receive a special plaque for this also. Peter was also the first Canadian to qualify for the ARRL sponsored VHF/UHF Century Club (VUCC) Awards.

Hans Peters VE3CRU, Toronto, was the first VE/VO to obtain the VUCC Award on 432 MHz. (#14 I believe for all that have qualified).

In total, there are SEVEN different band plans for the two segments of two metres. From 144.5 to 145.5 we have three: 20 kHz spacing on odd numbered frequencies (the most popular system). 20 kHz spacing on even numbered frequencies (the southern California system) and 15 kHz spacing (Colorado only). From 146 to 148 MHz we have four systems... 30 kHz with no splinters, 30 kHz with upright splinters, 30 kHz with reverse splinters, and 20 kHz spacing. The only item all plans have in common is a 600 kHz transmit offset.

15 kHz Disadvantages

Even under ideal adherence to technical specifications, 15 kHz spacing yields adjacent channel interference. According to "Carson's Rule," an FM signal deviated 5 kHz by a 3000 Hz audio signal requires 16 kHz bandwidth.

Many users and even some repeaters have the audio gain high enough to cause distortion. Clipping produces square waves, and they can produce significant sidebands out to 18 kHz.

The Japanese two-metre FM channels are organized at 20 kHz spacing. Amateur equipment of Japanese origin is designed for this system and although modified to cover extra spectrum, and to have repeater offsets, uses the same IF filters. On a 15 kHz plan this results in 'splatter' being heard under any strong adjacent channel condition.

The use of 15 kHz splinters causes marked degradation to the performance of the radios of users of the adjacent systems.

With 15 kHz spacing, a separation distance of adjacent channel repeaters is mandatory.

These problems, of course are not nearly as bad as when repeaters coordinated on opposite 15 kHz bandplans 'talk' to each other, and lock up both machines.

20 kHz Advantages

Adjacent channel interference is minimal and tolerances essentially the same as for 30 kHz. There are no physical separation requirements for adjacent chan-

nels. Un-coordinated splinter channel repeaters will not work, since the splinters are 10 kHz apart.

All radios produced within the past five years are fully compatible and will work without modification, unlike 15 kHz, which requries more selective receivers and transmitters limited to <4.5 kHz deviation.

When the band is full, the level of interference will be dramatically less than 15 kHz. If you doubt this, ask anyone in the Northeast United States. According to Clay Freinwald K7CR and Jon Marcinko W7FHZ, two of the authors of the plan, "The change from 30 to 20 kHz spacing (or 30/15 to 20) is a situation where everyone— existing systems and their users, as well as future systems and their users— come out ahead."

20 kHz Bandplan

The band plan is as follows:

Band	146-148 MHz, 144.5-145.5 MHz
Channel Spacing	20 kHz
Input/Output Spacing	600 kHz
144.5-145.5 MHz systems	In low and out high
146 MHz systems	In low and out high
147 MHz systems	In high and out low

20 kHz History

In 1977, the point was reached in Western Washington, Oregon and Southwestern British Columbia where all available 30 kHz channels were in use. Instead of adopting one of the 15 kHz plans, a careful study of how to utilize the two metre spectrum was undertaken.

In 1978, Western Washington adopted the '20 kHz Bandplan,' followed shortly by Oregon and British Columbia. In these areas, new repeaters were coordinated on the 20 kHz channels, and those on the odd channels were encouraged to move up or down 10 kHz. This was done even though one additional pair would have been created had they gone to odd numbered pairs since far more repeaters would have had to change frequencies. Those that wished to stay on odd channels were allowed to do so, but warned that it was possible that new repeaters would eventually be coordinated 10 kHz away. At this writing, all the repeaters in Western Washington, Oregon and Southwest British Columbia have moved to the 20 kHz plan, although there are repeaters in isolated areas in Northern B.C. that have not changed.

The '20 kHz' plan has continued to grow in area and now includes British Columbia, Washington, Oregon, Idaho, Montana, Utah, Arizona, Michigan and Texas. Areas that are considering the plan include Hawaii, Florida, Minnesota, Kansas, Oklahoma, Lousiana, and Northern and Southern California

20 kHz spacing has been chosen for the FM segments of all North American bandplans where historical precedent was not a factor. Witness 220 MHz, ten and six metres, the 'sub-band' on two metres, and even the new bandplans on 1296 MHz use 20 kHz spacing. Amateurs elsewhere in the world have avoided 15 kHz. Europe and Australia/New Zealand use 25 kHz, and Japan, even with its extremely crowded conditions, uses 20 kHz.

Users go wherever the repeater goes. Repeaters at the outset were reluctant to change for fear of losing users (or paying members) found that their fears were groundless.

Older radios like the IC-22S were easily modified, while most of the users' radios that were crystal controlled could be padded or in extreme cases, new crystals purchased.

The Numbers Game

At first glance, it certainly appears that using 15 kHz spacing will allow more repeaters on a given chunk of spectrum than 20 kHz. Between 146 and 148 MHz, the 15 kHz plan produces 53 channels of which there are 27 primary channels on 30 kHz spacing (13 from 146.6-146.97, and 14 from 147.000 to 147.39), with 26 secondary or splinter channels sandwiched in between the primaries.

The 20 kHz plan results in a total of 39 channels between 146 and 148, 19 in the lower MHz (146.62-146.98) and 20 in the 147 MHz range (147.00-147.38), but all channels are primary.

Walt Christiansen WA5KXX, the Zone One (Northeast Texas) two metre frequency coordinator, recently took all existing coordinated two metre frequencies in the Zone One area and reassigned them on paper to the 20 kHz spacing plan. Zone One includes the Dallas-Fort Worth metropolitan area and is the most congested area in the state.

All existing repeaters were able to be assigned a frequency under this plan, with several pairs *left over!* Due to adjacent channel physical spacing requirements, not all the current 15 kHz repeater channels can be assigned. Even with reduction of the total number of frequencies on 20 kHz as compared to 15 kHz, all the 20 kHz channels can be used without any spacing requirements. There is virtually no difference in the number of 'usable' repeater channels between the two plans.

The Future

If an area does decide to move from 30 kHz to 20 kHz, it does not mean that all ODD numbered repeaters have to be moved tomorrow. Just use 20 kHz for new repeaters, and protect existing machines with 'grandfather' rights for a reasonable period of time. If you are faced with an existing 15 kHz situation, and it is politically possible, the best thing to do may still be bite the bullet and shuffle your machines while you still have the option.

The British Columbia experience with 20 kHz has been very positive. The 20 kHz bandplan makes sense and it is recommended highly if you can still adopt it. Δ

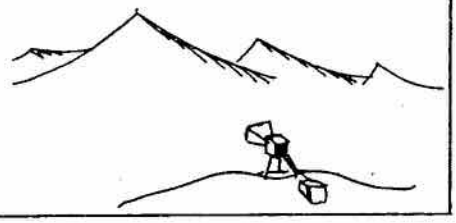
Robert Smits VE7EMD is currently Vice Chairman and two metre coordinator for the Pacific Region Amateur Frequency Coordination Association (PARFCA) in British Columbia. He is also Deputy Provincial Coordinator of the Provincial Emergency Program Amateur Radio Service and immediate past president of the British Columbia F.M. Communications Association.

EMI TIDBIT

Did you know DOC have identified a talking card table in Barrhaven (Nepean, Ontario). Apparently the owner, new to this RF jungle of CHU and BC stations was a little reluctant to confess he had a prime case of audio rectification. I don't know the age or model of the table, but I would like to try and tape it for the next Bridge competition! VE3BBM

MICROWAVES

By Michael Ross VE2DUB 988 Hudson,
St. Bruno, Quebec J3V 3Y2



10 GHz ATV: The Easy Way

By Ed Sullivant WB5MAP

Microwave motion detectors used in burglar alarm systems are slowly going out of service. Evidently, they present false alarms too often and not many want to bother fixing them. They operate just out of the 10 GHz Amateur band and can tune through the Amateur band without any trouble.

I scrounged the motion detectors from two businesses. Each source stipulated that they wouldn't be returned to security or alarm service. In fact, all I wanted was what they referred to as the 'source,' which was the 10 GHz cavity and feedhorn. Everything else went into the junk box. One business is a small part-time business repairing alarm systems in a basement. He had several units in a corner with defective 'sources' which he gave me as soon as he knew why I wanted them. The second business is a national company that is taking them out of service as soon as they break. In the first case, eight out of nine worked, and in the second case four out of nine worked. Even in the case of bad Gunn diodes, the diodes only cost about $20.

The Gunn diode motion detectors come in at least three types. A transceiver has a mixer in the cavity with the Gunn diode. A transmit-only has a Gunn diode, no mixer, and therefore cannot receive. A transmit-receive combination has separate transmit and receive cavities with the RF coupled to the receive cavity with a short piece of hardline. I have only experimented with the transceive and the transmit-only types, but I can see no reason why the transmit-receive combination wouldn't work like the transceivers.

Theory of Operation

The Gunn diode oscillator works comfortably on 6.5 to 8.5 volts with little change in output power. If this voltage had video or other voltage superimposed on it, we would have an oscillator with a little AM and some FM characteristics.

The 7805 regulator rides 5 volts above a reference point determined by the conduction of the transistor. A 2N2222A was used in the circuit shown. Any general-purpose NPN transistor with medium (50-100) gain with the necessary frequency response for video will do. The bias resistors may have to be adjusted if a change is made. The LM317 regulator provides a stable reference for the transistor to work with. The Freq Adj. pot is a panel control.

The Freq Trim pot is adjusted with the Freq Adj. panel control at minimum resistance for about 8.25 volts at the output of the 7805. You should now be able to adjust the output from 7.5 to 8.25 volts with the Freq Adj. pot. This corresponds to about 8 MHz or more than two TV channels.

The input circuit has both Subcarrier In and Video In with a 4.5 MHz trap. You can use only the one you need and delete the other if it is not used. Start with the modulating input adjustment at maximum resistance and work down until the picture or audio is best.

A 4.5 MHz audio sub-carrier can be added very easily. The W6ORG circuit[23] works great with only one minor modification. I eliminated the output adjust pot.

The receive end is the simplest. Just connect a piece of RG59 through a balun to your TV. I have tried matching impedances at the mixer (about 2K ohms) and found nothing to gain bouncing the picture around my basement. Longer distances will require warmer weather.

Mechanically, tuning the cavity is easy, but I wouldn't recommend it unless tuning with the Freq. Adj. pot won't bring the signal in its normal tuning range. The brass tuning screw with the locknut is the only frequency adjustment on the cavity. The other tuning screws are mainly for SWR, so don't bother them. Find someone with a calibrated signal source or a method of measuring the frequency. Yes, there was a trick to this article. With a calibrated signal source (such as a Gunnplexer™), use the transceiver as a receiver. Connect your TV to the mixer and set the Freq. Adj. pot at mid-range. Now loosen the locknut and adjust the brass screw for the first good white raster. Since the oscillator is above the Amateur band, you are now at your reference frequency plus the frequency of the TV station you chose. Carefully tighten the locknut.

Circuit Notes

The circuit in the schematic has been tried with success with at least a half-dozen variations. Point-to-point wiring with standoffs on a single-sided PC board and pen-and-etch PC boards work equally well. Don't forget the decoupling capacitors. All resistors were 1/8 watt carbon or metal film. Component values can be substituted, but watch the bias on the transistor. I used 10-turn trimmers for ease of adjustment, but single-turn trimmers will work just as well.

This circuit has appeared in *AS* (April 1984) and *CQ* (July 1984), and is reproduced in *TCA* with permission.— Michael VE2DUB

Cautionary Note

The Gunn diodes should not be removed from their holders unless absolutely necessary. They are extremely fragile and easily lost if dropped on a crowded bench. The Gunn diodes used are normally operated at 7.5 volts and can work up to 10 volts. Above this they tend to go poof, so check the modulator output before connecting the Gunn diode.

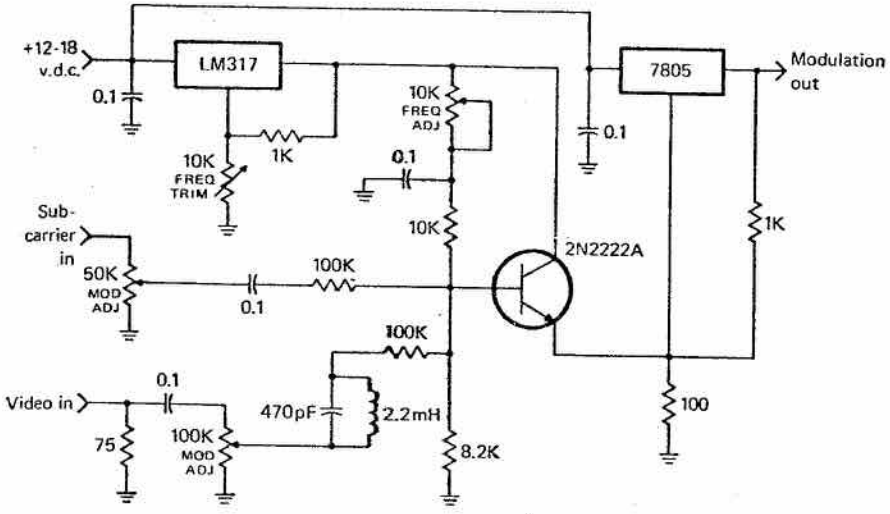
References

Chapter 16, *The Gunnplexer Cookbook*, Bob Richardson, 1981, Ham Radio Publishing Corp.

"FMA5 Audio Subcarrier Gen. Revisited," *A5 Magazine*, Tom O'Hara, May-June 1980.

Page 14-32, *ARRL Handbook*, 1981.

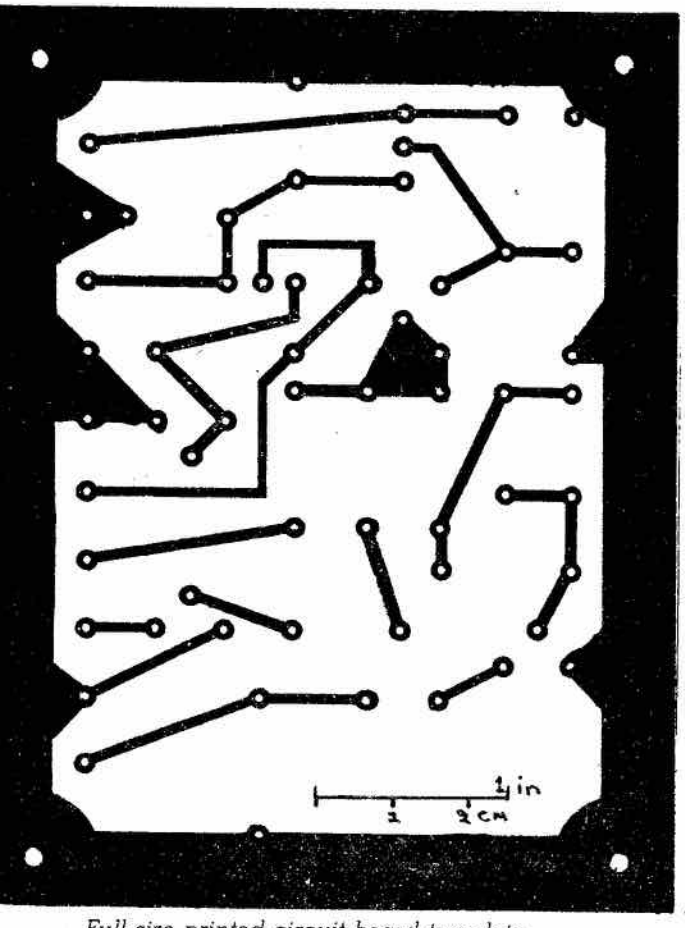
△



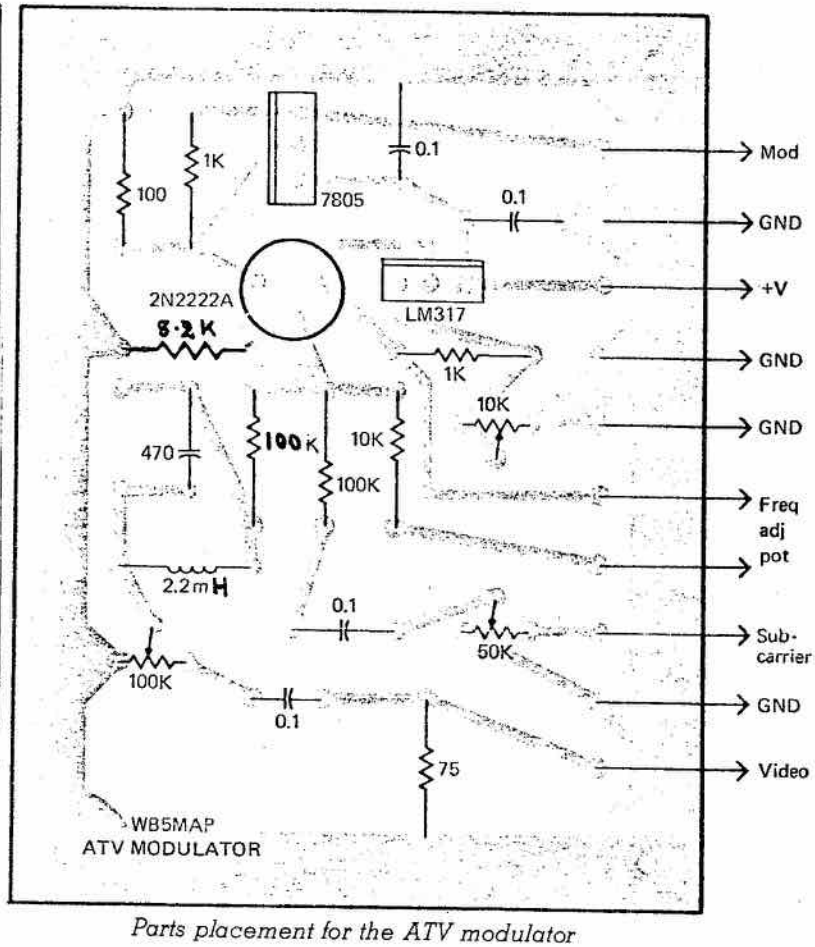
The WB5MAP ATV modulator schematic

Parts List

1 – LM317 adjustable voltage regulator
1 – 7805 + 5 volt regulator
1 – 2N2222A
4 – 0.1 microFarad disk capacitor
1 – 470 picoFarad capacitor
1 – 2.2 microHenry coil
1 – 100K trimpot
1 – 50K trimpot
1 – 10K trimpot
1 – 10K pot
1 – 75 ohm ⅛ watt resistor
1 – 100 ohm ⅛ watt resistor
2 – 1K ohm ⅛ watt resistor
1 – 8.2K ohm ⅛ watt resistor
1 – 10K ohm ⅛ watt resistor
2 – 100K ohm ⅛ watt resistor



Full-size printed circuit board template



Parts placement for the ATV modulator

Late News

Southern Ontario Disaster

Tornadoes struck several towns in Southern Ontario on May 31 just after 1600 EDT. Amateurs were handling emergency traffic within the hour.

Marion VE3NLN is EC for ARRL and the Barrie ARC. She was on her way to pick up her husband when the scanner locked on to a police announcement that a transport truck was on top of cars. Gathering that something pretty bad was happening, she went home for the mobile rig, and found the repeater VE3LSR was off the air.

Going on 52 simplex she went to the Red Cross headquarters to open the station there. By 1730, after having jury rigged a cable or two, she was on the air as net controller with about 24 Amateurs checking in. The licensee of LSR drove out to the repeater and found the power was off, and no emergency battery.

He hooked extension cables to his car to activate the repeater, then called in to the net to tell them he had fuel for about an hour, and called for the emergency generator. VE3EP drove his truck from Shanty Bay with the generator.

"I went to the Simulated Emergency Test in Toronto a month or so ago," said VE3NLN, "without this experience, I would have been completely lost. We hadn't got around to a SET in Barrie before a real emergency hit us."

The net continued until 0200 Saturday, and re-opened at 0730. It has continued operating from early morning till 2100 over Saturday, Sunday, Monday and Tuesday, handling registry traffic, as well as search and enquiry traffic.

Only those necessary Amateurs were allowed at the actual disaster site, but many others all across the province helped. A health and welfare net operated on 3762 kHz until Monday evening.

The CBC Journal showed a busy woman with Marion VE3NLN on her cap on Monday evening.

Here are the names of some of those active during the emergency. A fuller report will follow in the September *TCA*.

Casey VE3NGT, a visitor who happened to be passing, was sent to a registry till midnight. Dan HGK and Nancy IKH did duty at the Armouries. Ruth ATP and her husband Alex NIV were at St John Vianney, a spot that got hit. Brian ODB, at home with a recently amputated leg, backed up the EC by making local calls. He copied every message. Bob DE found motor oil for the generators when urgently needed. Tom FKK, a Metro policeman, scared the life out of the EC when he reported to her for duty in uniform after completing his shift.

Peter MAS, Larry OHM, Jan BII, Gord CRI, Bill DJO, Bob OYA, Gord KDU, David KNU, Dob DE, Joe GAS, Tom FQW, Don MTB, Monty TA, Dan HGK, Nancy IKH all put in many hours of service during the disaster.

Simple program to track satellites

The following program was originally written for the IBM PC by VE2DAF and published in Vol.1 No.2 issue of the Air Canada Radio Group *Beacon*. I have rewritten it for the C64; it will also run on the VIC20.

```
10  INPUT"ORBIT NUMBER   ";O:INPUT"LONGITUDE   ";L
20  INPUT"INCREMENT   ";I:INPUT"PERIOD IN HRS   ";P
30  INPUT"NR OF ORBITS REQD  ";X:INPUT"CROSSING TIME   ";C
40  OPEN4,4,0:PRINT#4,"STS-9 ORBITAL DATA":PRINT#4
50  PRINT#4,"LONG. INCREMENT = ";I;". PERIOD = ";P;".":PRINT#4:PRINT#4
60  PRINT#4,"ORBIT #","EQX (DEG)","EQX TIME (HRS.MIN)"
70  O1=O
80  C1=(C-INT(C))*.6+INT(C):PRINT#4,O1,L,C1
90  IFO1=O+XTHENEND
100 O1=O1+1:L=L+1:IFL>360THENL=L-360
110 C=C+P:IFC>24THENC=C-24
120 GOTO80
130 END
```

Club News

HALIFAX AREA CLASS

Our Amateur Radio Class has grown beyond our wildest dreams. We are planning two classes this fall. An Amateur Class and an Advanced Amateur Class. Both will commence the first week of October at the Harrietsfield School, Harrietsfield, N.S. Class will be each Monday and Thursday evening. Students should be ready to write the DOC exams in February 1986. Please contact us if you know of anyone who would like to take either course.

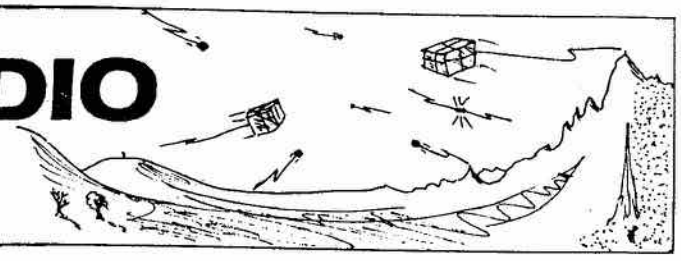
Dan VE1JV 479-1557
Spud VE1BC 868-2343

Lethbridge, Alberta, Amateurs can use VX6 to celebrate the 100th anniversary of the city from July 14 to July 27 1985.

VE5 Amateurs may use CH5 from July 28 to August 10 to salute Hamfest '85, Saskatchewan's 80th anniversary of entry into Confederation and the Centennial of the North West Rebellion.

PACKET RADIO

By Brett Delmage VE3JLG
304-1330 Richmond Rd.
Ottawa, Ont. K2B 8J6



Ottawa links to EASTNET

Early in the morning of April 7, 1985, a new era in radio communications began in Ottawa. At 0012 EST two-way packet radio communications were established between VE3PAK, located at the top of the Arts Tower, Carleton University (site of the VE3OCR 146/220 MHz repeater) and KD2AJ in Plattsburgh, NY.

The two stations were connected via W2UXC-1, a simplex digital repeater (digipeater) which had been recently installed at a commercial television transmitter site on Lyon Mountain, about 20 miles East of Plattsburgh. This digipeater was the result of cooperation between Amateurs from both cities, who had been working since December to establish a packet radio link between themselves. Amateurs committed to the development of packet radio in the National Capital Region donated a radio and terminal node controller (TNC) for use in W2UXC-1, which was installed and is now maintained by the packet radio enthusiasts in Plattsburgh.

The VE3PAK digipeater, operating on the standard North American packet allocation of 145.010 MHz, had been installed in the fall of 1984. Its realization was the result of efforts and loans of equipment from dedicated Amateurs in the Ottawa area and groups including the Pioneer ARC, Carleton University ARC and VITA/AMSAT Ottawa Working group. VE3PAK now serves a rapidly growing network of packet radio operators, currently numbering about 15. It permits them to communicate over distances greater than they can work directly, and performs the vital repeat function necessary to connect Ottawa with the large EASTNET packet radio network operating throughout the Eastern US.

Since the implementation of the link, local Amateurs have accessed packet bulletin board systems (PBBS) located as far away as Newington CT. (ARRL HQ, W1AW-4) and South Mass. (WORLI) and have conversed with other packet station operators throughout the Northeastern U.S.

Electronic versions of the ARRL packet radio newsletter, GATEWAY have been transferred over the system to a local PBBS, VE3FXI. It is interesting to note that this newsletter is available immediately after it is released (published) and a typical issue containing 15,000 characters can be moved to Ottawa by packet, 100% error-free in less than one hour. Those subscribing to the printed version may receive it a week or more later (barring any postal disruption!).

The VE3FXI PBBS is accessible 24 hours/day. Stations may connect to it (establish two-way packet communications) and read messages that other users have left for them, leave messages for any other user or read bulletins such as CARF Radio News, or Gateway.

Use of this packet network will continue to grow . Members of the Ottawa VITA/AMSAT working group are beginning to use it regularly to exchange technical information related to PACSAT development with fellow workers and staff located in Washington. Automatic forwarding of mail to/from the VE3FXI PBBS with other PBBSs in the network is being developed. The mail will be exchanged in the wee hours of the morning, of course, so as not to load down the network and slow it down when users are ragchewing.

Unlike the current situation with two metre FM (voice), where many repeaters all provide similar service and go unused a great deal of the time, the Ottawa area has one packet network which has been widely supported, and is designed to serve all. Users and implementors of this network look forward to continued expansion of this unified system throughout 1985 and the addition of network facilities including VHF links to other parts of the province, an HF link to Western and other networks and a satellite gateway. Δ

YL NEWS & VIEWS

Cathy VE3GJH, our YL contributor, was in a car accident in mid-May, no bones broken, but a lot of bruises. Her YL column will be back in September. Get well soon, Cathy!

LEUKAEMIA IN AMATEURS

Jim VE7EFM sends a copy of a page in the *Lancet* (April 6 1985), with a letter headlined "Silent keys: Leukaemia mortality in Amateur Radio operators." The writer of this letter analysed the 'Silent keys' column of *QST* and obtained death certificates for 1691 Washington State and California Amateurs.

Among 1691 death certificates for the general male population, 12 or 13 deaths from leukaemia would be expected. Among these Amateurs, 24 such deaths were reported.

There is debate about the susceptibility of humans to electromagnetic fields. Some consider exposure to such fields as carcinogenic, others point out that electrical work often involves exposure to metallic vapours and chemicals, particularly PCB's, known carcinogens.

CONTEST SCENE

By John Connor VE1BHA

July 13-14 IARU Radiosport
20-21 CQ WPX VHF Contest
Aug 10-11 WAE CW
Sept 14-15 WAE Phone

Nice summer weather and a declining sunspot cycle may combine to dampen your enthusiasm for sitting in front of the rig and playing radio. But don't despair. There's still plenty of fun to be found in the various operating activities slated for the next few months. Always remember, Low Sunspots Build Character.

A while back, I suggested that people send in their contest results so they could be published here quickly, three months or so after the contest. Apparently only one person thought much of that idea. George CG7EIK sent along a copy of his summary sheet for the WPX SSB, and therefore gets his name and 20M score in lights. George made 816 QSOs with 323 prefixes for a total of 655k. Included in that is a BY4AA QSO. FB George.

Now to the results of the 1984 CQ WPX CW Contest, which were reported in May *CQ*.

The Canadians really did an outstanding job in this contest, with two people finishing in the top seven worldwide. Canada also produced four number one North American scores.

Leading the way was Yuri VE3BMV, with the world high 40M score, a fine 1.5M points. That was also good for a new North American record.

On 15 metres, Dave VE2ZP went over to Carleton University and piloted VE3OCU to the number seven spot worldwide.

On ten metres, not too many people were willing to brave the lack of sunspots. In fact, not a single American submitted a log. In Canada, only VE2AEJ/3 was willing to have a go at it. He scratched out 30 QSOs and 1,960 points. But that was good for top spot in North America.

Two other Canadians also finished first in North America. On 80M, Sauli VE1AIH set a new Canadian record with 101k, while VE3MFA established a new North American record of 6.5k on 160M.

The number one 20M score was 403k by VO1QU. In the single op all band competition, Jim VE3IY beat out John VE6OU with 1.7M. Jim takes home the CARF trophy for his work.

With all those good operators out setting records on their own, the multi operator competition was pretty light. In fact, the only multi-op entry was old reliable VE7ZZZ with a 694k score as a multi-single, earning them the Tetrahedral Contest Circle Trophy.

Again, congratulations to all. Let's hope we did as well this year.

WPX VHF Contest

Still in the realm of WPX contests, this year will see a new one added to the roster in the form of a WPX VHF Contest. This contest was first announced in February *CQ*. It is a 48 hour contest, with no mode limits. It is worldwide, and will be held on 50 through 1296 MHz. The exchange consists of callsign and serial number, and there are eight different entry categories.

If you are familiar with VHF, then you probably don't need any encouragement to get on for this. But if you are not familiar with VHF, why not give it a try? Who knows, you might discover a completely new facet of the hobby.

Even if all you have in the way of VHF equipment is a handheld, you can still take part in the FM only category. Take the handheld, a cool drink, and go sit out in the sun while you make a few contest QSOs. No one ever said you couldn't take a relaxed attitude towards contesting.

WAE CONTESTS

I thought that I might take this opportunity to mention the WAE (Worked All Europe) Contests, sponsored by the national radio club of West Germany. These contests generate quite a high level of activity, and can serve as an excellent chance to get tuned up for the fall contest season. They are 48-hour activities, with a signal report and serial number as exchange. They have a unique feature called a QTC, where you report back previous QSOs to another station. Since he doesn't know what you will be sending, sloppy operating just won't do.

A few hours in the WAE CW can do wonders for your fist. It also shows you just how good some of the European CW ops are, particularly the East Europeans. The rules are a bit lengthy to give in detail here, but if you are interested, you can check *CQ Magazine's* Contest Column.

That about does it for this month. I will make one final plea for people to send me a photocopy of their summary sheet from contests they have taken part in. Then we can get some early results into print. Don't let George do all the work.

In September, we will have a look at the Big One, the Contest, the CQ World Wide DX Contest.

Δ

CQ WW VHF WPX CONTEST RULES

Date: 0000Z 20 July 1985 to 2400Z 21 July 1985

Bands: All authorized Amateur bands from 6 metres through 23 centimetres.

Modes: All authorized modes allowed. Repeater contacts are not valid, and satellites are considered to be repeaters.

Exchange: Serial number and callsign.

Points: 50, 70 and 144 MHz one point per QSO; 220 and 432 MHz two points per QSO; 1296 MHz four points per QSO. Work stations once per band, regardless of mode.

Multipliers: Prefixes per band.

Scoring: Total QSO points times total number of prefixes.

Entry Classes: Single operator single band, single band low power, multi-band, multiband low power. Multi-operator single band or multi-band. Portable with temporary power source. FM only. Low power is defined as 25W PEP or less output.

CANADIAN RESULTS

WPX CW 1984

CATEGORY	CALL	SCORE	QSOS	PREFIXES
ALL BAND	VE3IY	1,707,040	1242	470
	VE6OU	1,319,136	1069	416
	VE6CHW	638,000	651	319
	VE3DZV	531,566	586	301
	VO1AW	375,480	449	252
	VE4AEX	168,272	302	208
	VE3FEA	9,984	60	52
	VE1CJK	8,904	61	56
28 MHz	VE2AEJ/3	1,960	30	28
21 MHz	VE3OCU (Op. VE2ZP)	809,100	779	372
14 MHz	VO1QU	403,326	563	297
	VE6CB	294,224	449	259
	VE3NBE	44,500	144	125
	VE7AV	15,194	79	71
7 MHz	VE3BMV	1,489,950	797	385
3.5 MHz	VE1AIH	101,008	162	118
1.8 MHz	VE3MFA	6,552	50	36
	VE3INQ	1,258	21	17
MULTI-SINGLE	VE7ZZZ	694,941	763	309

REPEATER CALL SIGNS

The Amateur Radio League of Alberta proposes that the DOC should, prior to issuing a call sign for a repeater, produce a letter from the local coordinating body, setting a frequency.

This procedure is already informally in place in Alberta. It puts the onus on the Amateur to do his homework before asking the DOC for a call.

CARIBBEAN NEWSLETTER

The Eastern Caribbean Newsletter is full of items of Amateur interest to those planning to visit the area. Send an SASE to George Rand, 313 E. 10th St., Apt 5, New York, N.Y. 10009. It's free— George only asks for the envelope. How you get U.S. stamps is your problem.

READ THIS TO A WHITE-CANER

The CNIB will host all white-caners from 0900 to 1700 on Saturday, Sept. 28 in the Pool Bar, 3rd Floor, Holiday Inn, City Centre, London, Ontario, at the RSO Convention.

Get your cameras oiled and loaded for field day and hamfests— and look for a *TCA* best photo prize announcement in the September edition!

SWAP SHOP

FOR SALE: HAM IV Antenna Rotor, never used. In original carton with control unit and handbook. $295. or nearest offer. You pay shipping, VE7EHD, 604-265-3175.

FOR SALE: TET Roof Tower, Never Used. Four sections 12" square plus base = 33 ft. high above your roof. Extra strength anti-corrosive aircraft type aluminum. Total weight only 123 lbs. Incl. working top steps, HD thrust bearing, rotor plate, SS hardware. Save digging & concrete— $995. or nearest offer. You pay shipping. VE7EHD, 604-265-3175.

FOR SALE: GEM Quad, Never Used. Two elements, complete with spider, fiberglass spreaders, wire & balun. 10, 15, 20 metres & wire for 2 metre band. Handbook and instructions. $220. or nearest offer. You pay shipping. VE7EHD, 604-265-3175.

FREE: 100 Worldwide Stamps. When you request to see our approvals— no obligation, cancel anytime, please include 50¢ for mailing— Philtex, 11225 Omer-Heroux Suite - CA- Montreal Nord, Que., H1G 4V8.

FOR SALE: Heathkit SB-644A remote VFO, mint condition, $100.00. Heathkit SBA-104-1 Noise Blanker kit, unopened, factory sealed carton, $30.00. Offers/trades considered. Leigh Hawkes VE1ZN, P.O. Box 864, Armdale, N.S. B3L 4K5. (902) 445-3579.

FOR SALE: FLDX 400/FRDX 400 Yaesu Twins, $595 O.B.O., matching desk mike, speaker, excellent condition, no modifications 403-289-1326 or write VE6CCC.

WANTED: Two tubes Telefunken Number ELL80 or North American Tube 6HU8. Anyone with these please contact: R.J. Boutet VE3BYH, 70 Brookview Gardens, Sudbury, Ont. P3A 5C5 or (705) 560-3392 collect.

WANTED: 10-160 metre transceiver. Max Anderson, RR 2 Berwick, N.S. B0P 1E0. 902-538-3310

Send your 'Swap Shop' notices to the TCA Swap Shop, Box 356, Kingston Ont. K7L 4W2. Single insertion is $1.00 minimum (10 words) and $1.00 for each additional 10 words. To renew, send copy and payment again. Please print or type, and put your membership number and call (not counted) at the end of your ad. Include your full 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 the use of members wishing to trade, buy or sell personal radio gear.

TECHNICAL SECTION

Section Editor
Frank Hughes VE3DQB

Its wails can help you tune up your rig and Antenna Tuner

Build a Swailer

The SWAILER is a tune-up aid for blind Amateurs that provides an audible indication of RF output and indicates SWR, offering White Caners a simple method of operating antenna tuners.

Operation

As an RF output indicator, the Swailer functions like many existing audible relative power indicators, in that the transmitter is tuned up to obtain that highest possible tonal pitch from the built-in speaker, without losing the tone altogether.

When maximum output has been achieved, press the SWR push button S2. A change in tone indicates the presence of a reflected wave. With the button depressed, adjust the antenna tuner until the tonal pitch is closer to the original tone. Alternately touch up the transmitter output (with the button released) and the antenna tuner (with the button depressed) until the two tones are as nearly matched as possible. Identical tones indicate an SWR of 1:1.

Adjust R4 to establish a comfortable tonal range. The setting of R4 is an operating convenience only, and has no effect on the function of the system.

For your initial setup, install an additional SWR meter ahead of your tuner to check things out, because the SWR button on the SWAILER, being normally to ground, may ground the meter in your pickup unit when switched to read reflected power. When everything has been checked out, remove the temporary meter, and leave the meter in your pickup unit switched to the forward position.

Circuit Description

U1 (figures 1 and 2) is a differential amplifier driving U2, a voltage-to-audio frequency converter. Q1, Q2 and Q3 function as a current mirror, necessary for the unit to produce a useable range of audible tones.

U1 amplifies the difference between input 3 (Forward voltage) and input 2 (Zero volts when S2 is normally closed, or reflected voltage when S2 is held open). Thus, when all reflected power has been tuned out, the output of U1 will be the same with S2 open as with S2 closed, resulting in identical tones being produced by U2.

R4 is a 'set-and-forget' control to obtain a workable tonal range.

Input Signals

The Swailer requires samples of both the forward and reflected DC voltages from the transmission line between your rig and antenna tuner. If there is room in your SWR meter, you could build the Swailer in.

Install a 1/8" stereo jack in your SWR bridge. Ground the sleeve, connect the tip contact to the reflected power diode, meter side, the third contact to the forward power diode, meter side.

If your tuner does not have metering, you will need an SWR bridge, such as the Radio Shack Catalogue No. 21-525 Field Strength/SWR Meter, with a jack installed as described above.

Make up a cable from 2-wire shielded cable with a 1/8" stereo plug on each end to connect the Swailer to your SWR bridge or tuner.

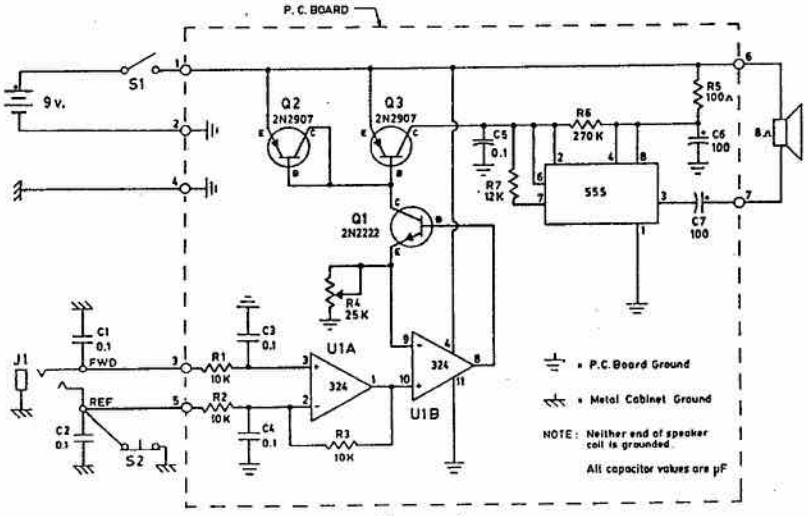


Figure 1

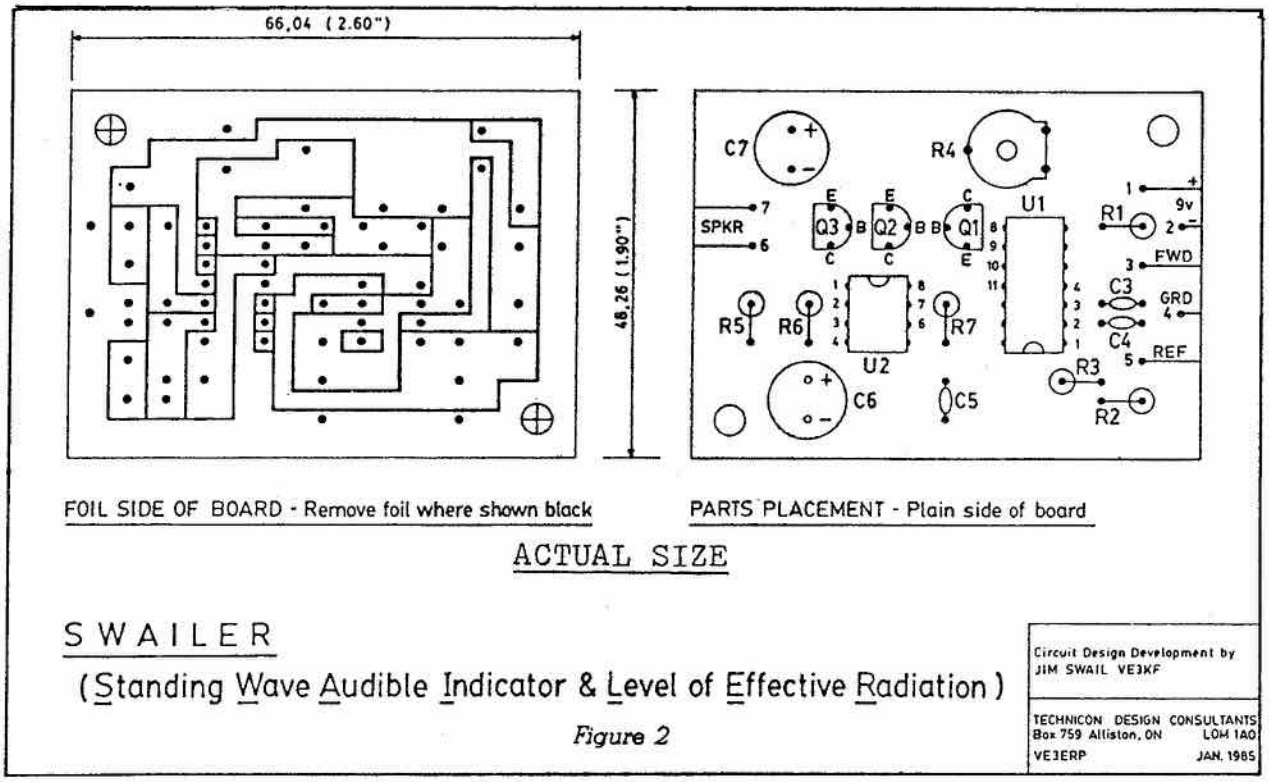


Figure 2

Construction Notes

The Swailer can be installed in any small metal enclosure (the shielding is VITAL). I used a Radio Shack #270-251 cabinet with S1 and S2 mounted on the front panel , and J1 on the rear panel. I drilled a few holes in the rear panel and epoxy-glued the speaker over the holes. Ground the cabinet carefully.

There is nothing critical about parts placement, except for RF by-pass capacitors C1 and C2, which should be soldered directly across J1, with leads as short as possible. When laying out your enclosure, don't forget to leave room to tuck in the 9 volt battery.

Conclusion

Even if you are a sighted Amateur you might like to try using a Swailer. Listening to its gentle voice is a lot easier than trying to watch the antics of several meter dials at the same time.

Most of the credit for developing the Swailer belongs to Jim Swail VE3KF and Lloyd McSheffrey at the National Research Council in Ottawa, who took my original design (which didn't work very well), refined it, redesigned it, and made it come to life.

Δ

Swailer Parts List

(Cat. Nos. shown are from Radio Shack 1984 catalogue).

QTY.	Part No.		
5	272-135	C1, C2, C3, C4, C5*	0.1 uF disc ceramic,
2	272-1028	C6, C7	100 uF electrolytic
3	271-1335	R1, R2, R3	10 K
1	271-336	R4	25 K Potentiometer
1	271-1311	R5	100 ohm
1	271-8050	R6	270 K
1	271-8035	R7	12 K
1	276-1711	U1	LM324 Op Amp Quad
1	276-1723	U2	555 Timer
1	276-1999	-	14 pin DIP socket
1	276-1995	-	8 pin DIP socket
1	276-2009	Q1	2N2222 NPN transistor
2	276-2023	Q2, Q3	2N2907 PNP transistor
1	275-624	S1	S.P.S.T. switch
1	275-1548	S2	NC pushbutton
1	40-245	-	2 inch 8 ohm speaker
1	270-251	-	Cabinet
2	274-249	J1	1/8" stereo jack
1	270-325	-	Battery snap
8	270-1392	-	Push-in terminals
-	275-1276	-	2-wire shielded cable
2	274-284		1/8" stereo plug
1	21-525		SWR meter (if required)

* Note: C3, C4 and C5 can be printed circuit type capacitors, such as #272-1069. You may find that the disc ceramics are a little too large to fit the circuit board layout without a bit of crowding.

Build this

Simple Capacitance Meter

By Stan Heaps VE1AVT

A meter for direct measurement of capacitance is extremely useful. It allows you to identify those capacitors that you bought in bargain packages or removed from surplus circuit boards but which are labelled by unfamiliar codes.

Use of a bridge circuit or dip meter is not as convenient as use of a direct measurement meter. The meter circuit shown in the Figure is about the simplest possible, is very easy to use, and covers a range from a few picofarads up to 5 microfarads in ranges of 0 to 50pF, 500pF, 0.005, 0.05, 0.5 and 5 microfarads. The lowest range allows you to measure the capacitance of a few inches of coaxial cable or twisted wires.

A single chip is used to provide two inverter gates. I used a 7400 NAND gate. A 7402 NOR or 7404 inverter would be equally good but would require different pin connections from those shown in the figure. The 2-pole switch S1 allows different pairs of capacitors to be connected to the chip in order to generate a square wave of frequency approximately 500kHz, 50kHz, 5kHz, 500Hz or 50Hz.

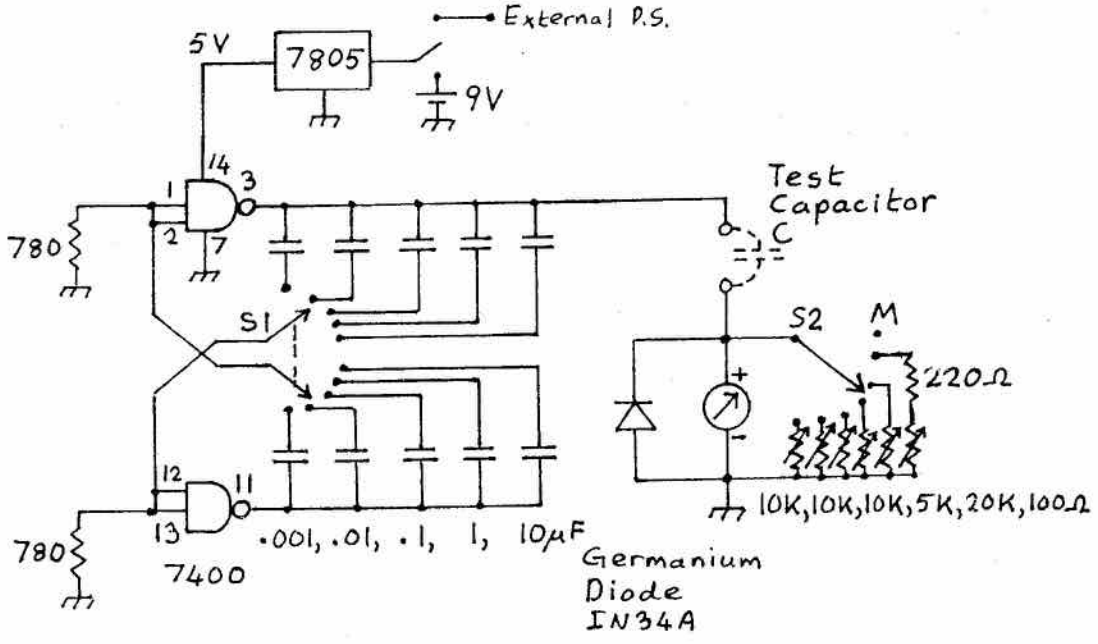
The square wave is applied to the test capacitor C. Each pulse charges the capacitor with a charge proportional to the capacitance. The average charging current, also proportional to the capacitance, is measured by the (Radio Shack) 0-50 microammeter. During the time between successive pulses the capacitor discharges mainly through the diode. The variable resistors are PC-board potentiometers. Each is adjusted initially so that the meter reads correctly when various known capacitors are used for C. Since high accuracy is not usually required when measuring capacitance, it is sufficient to use standard capacitors for the calibration.

Switches S1 and S2 do not need to be ganged but must be switched to the same range. That is, S1 must switch in 0.001 microfarad when S2 switches in the 10k, etc. Note that S1 is used to switch in 10 microfarads when S2 switches in either 20k or 100 ohms.

The 5V for the 7400 chip is supplied either by a 9V cell or an external power supply and is regulated to 5V by a 7805 voltage regulator. An alternative form of regulation would be through use of a 5.1V Zener diode.

I have used this meter for several years and have been very satisfied with it. I housed it in a Radio Shack experimenter box measuring 6"x 3"x 2" and connected the components 'floating' on the leads to the switches. An external lead is connected to contact M of the S2 switch so that the microammeter may also be used as a meter without reference to the rest of the circuit. The circuit may also be used as a source of square waves of frequencies approximately 50Hz, etc., although each pulse rise and fall contains a noticeable overshoot spike.

Δ



Capacitance measurement circuit.

Dipole Antennas

By VE3DQB

Radiation Angle

Driving along a road on a hot day, there is sometimes an appearance on the road far ahead as if it was water-covered. This mirage is caused by hot air close to the surface of the road bending light from the sky up to the eye (Figure 24).

Figure 24: The heated air near the surface of a road bends the light waves from the sky up to your eye.

A similar thing happens to radio waves in the high atmosphere. Instead of being bent UP, they are bent DOWN, back towards the surface of the earth. (Figure 25.) The atmosphere at these heights contains free electrons: these do the reflecting. The region is called the *ionosphere.*

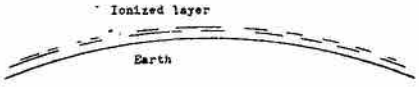


Figure 25: The ionized layers in the atmosphere bend radio waves down, like an inverted mirage.

This inverted mirage make HF DXing possible. Knowledge of its effects will help the Amateur time his operating to advantage. Also, it will enable him to adjust his antenna for long-distance work.

The important fact relating antenna to reflecting layer is the angle at which the radiation from the antenna strikes the layer. The shorter the wavelength, the shallower must this angle be, for steep angles at these wavelengths do not result in reflection of the wave (Figure 26).

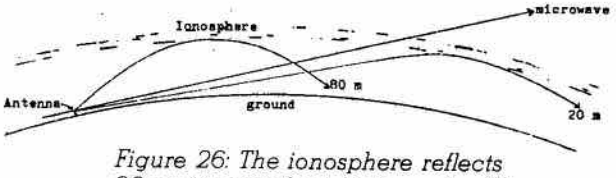


Figure 26: The ionosphere reflects 80 metre signals at high angles, 20 metre signals at lower angles, and microwave signals not at all.

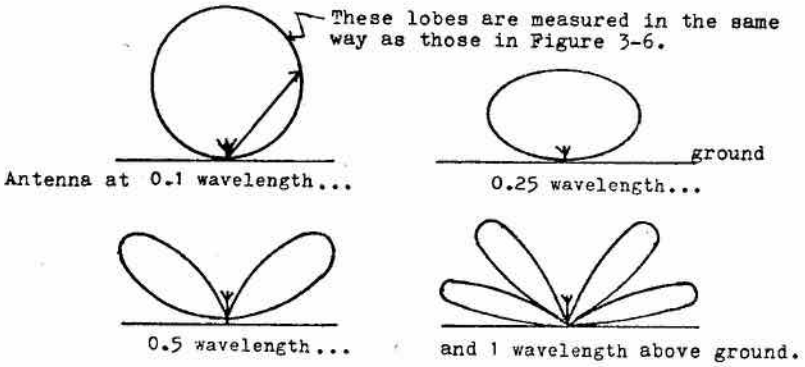


Figure 27: Not only the radiation resistance changes with closeness of the ground. Pattern does, too. This is how the doughnut shape of an antenna far from ground is distorted if the antenna is only a fraction of a wavelength high.

Practically, the ideal is to get the best possible signal aimed at the horizon or up to 30 degrees above it, in the direction you want to favor. Only satellite work requires aiming the signal much above the horizon.

The effect of the ground on the pattern of radiation from a dipole antenna at one-quarter wavelength above ground is shown in Figure 27. The doughnut is 'flattened' on the ground side. At half a wavelength, the pattern is changed to two lobes, pointing upwards at 30 degrees to the horizon. Looking down on the antenna, the pattern is of two lobes at right angles to the direction of the antenna.

A vertical antenna shows a reflection in the ground too. Indeed, if the ground is a good one, or is artificially made so by burying wire round the antenna site, a quarter-wave vertical makes, with its reflection, a half-wave antenna, the feed point being between its lower end and ground. Such an antenna is an excellent low-angle radiator. (Figure 28).

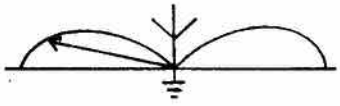


Figure 28: The pattern of a vertical antenna close to ground is excellent for radiating at low angles.

Short Dipoles

A dipole need not be a half-wavelength long. A dipole cut for 15 metres will work on 20. However, the impedance at the feedpoint will not be a pure resistance. Instead, there will be reactance present, which will have to be tuned out if the feedline is to have a low standing-wave ratio. (More on this in Chapter 11.)

Continued on next page ▷

Folded Dipoles

The center impedance of a dipole antenna is 73 ohms. In some antenna configurations, like the yagis described later on, this figure changes to a much lower resistance. Extremely low resistance is difficult to match to a transmitter, and the losses of the system increase: this is because the resistance of the antenna wire becomes comparable with the radiation resistance, and so take a large share of the power.

The feedpoint impedance of an antenna can be raised by putting up two antennas close to each other, short-circuiting the ends, and feeding one of them in the middle (Figure 29).

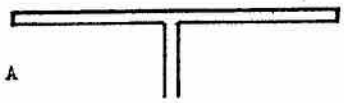


Figure 29a: The Folded Dipole. Two antennas are set up and short-circuited at their ends. ONE of them is split at the center and fed at that point. This arrangement has an impedance of about 300 ohms.

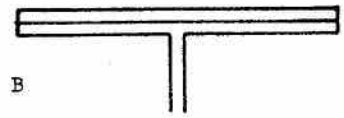


Figure 29b: This 3-wire dipole multiplies the feedpoint impedance by 9. If the wires in A or B are of different diameters, the feedpoint multiplication ratios are changed.

An often-used antenna of this kind is made by cutting some TV twinlead to length for the band considered, and shorting the ends. When this antenna is excited, identical currents will flow in both wires. So, if the same power is applied to this and to an ordinary dipole, the current flowing in the feedlines will differ. That in the *folded dipole* (as this two-wire antenna is called) will be only half that in the ordinary one.

Now $W = I^2R$. If we feed 73 watts to an ordinary dipole, the current in the feedline is ($73 = I^2 \times 73$), one amp. If we feed 73 watts to a folded dipole, the current is only one-half of that for the ordinary dipole, which we know is one amp. So $I = \frac{1}{2}$ amp. Plugging this in the formula, $W = I^2R$, we get $73 = (\frac{1}{2})^2 \times R$. R, the feedpoint impedance of this antenna, is therefore 292 ohms, an excellent match for the TV wire as a downlead.

Summary

A dipole antenna is one in which two poles of electromagnetic force appear in use, one at each end of the antenna. If the dipole is a half-wavelength long, after allowance for the velocity factor, its center impedance is resistive and 73 ohms, if center-fed, and 600 ohms, if end-fed. If other than a half-wavelength long, the impedances are complex.

The radiation pattern of a dipole in free space is doughnut shaped. If the ground, or grounded objects, are near, this pattern is distorted.

The reflection of a half-dipole close to ground may serve to complete the dipole.

Chapter 4

The Antenna Laboratory

It is easy, practical, and very instructive to set up a few experiments to clarify antenna concepts. The preferred frequency for this is in the 420 MHz band: here a transmitter is easily set up, and dipole antennas are roughly a foot long. While for accurate measurement transmitter and receiver should be separated by at least 20 wavelengths— 40 feet or so for this frequency— demonstration of antenna properties is practical in a small room. At longer wavelengths this is not possible.

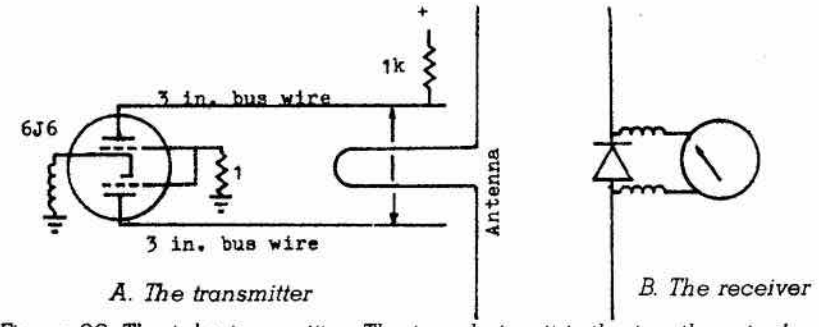


Figure 30: The tube transmitter. The tuned circuit is the two three-inch lengths of bus wire ½ inch apart going to the anodes. Tuning is done by moving the shorting bar. The bar can be soldered into place when tune-up is done.

Figure 30b: The receiver

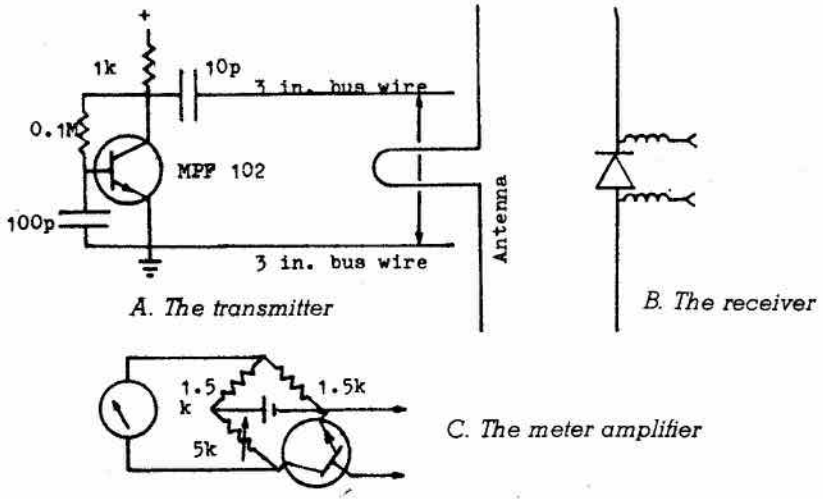


Figure 31a: The transistor transmitter.

Figure 31b: The transistor receiver. A meter booster is needed for the lower transmitter power (Figure 31c).

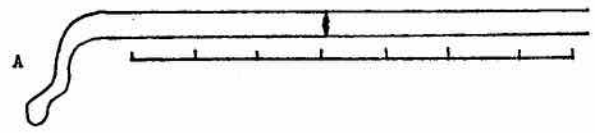


Figure 32a: A diagram of the Lecher wires, bridge and scale.

Figure 32b: The practical Lecher wavemeter.

The Transmitter

The transmitter can be a station at 420 MHz, if available, the grid- (or gate-) dipper (if it goes that high in frequency), or a simple oscillator cobbled together for the purpose. A 6J6 tube or other miniature dual triode, if available with a heater and B+ supply, makes an excellent signal source. Figure 30 shows the circuit used long ago at VE3DQB, a transmitter that gives out ample energy for measurement at 20 wavelengths, using a diode and multimeter for a receiver.

A FET or junction transistor can be used to supply the RF, though the smaller ones give out too little energy for the simple diode detector to be of much use. So a meter-booster transistor is needed in the receiving circuit, as shown in Figure 31.

Measuring the frequency

To measure the frequency and to ensure that emissions are within the allotted band, either a 500 MHz counter is needed, or, better, a set of LECHER (lee'ker) wires. This is a length of transmission line with a scale and moveable shorting bar. Its construction is shown in Figure 32. It is put together from whatever scrap wood is available, and should be at least 4 feet long. The scale is a measuring tape. The bridge, a short strip of metal, rides on a block of wood under the wires, and short-circuits them.

A length of 300 ohm TV line forms a flexible connection from the Lecher wires to the transmitter. It is short circuited and insulated at the pickup end, and soldered to the wires at the other. The wires themselves are lengths of 16 gauge bus wire, soldered to tag strip at each end, fixed to supports and pulled taut. The bridge should slide easily and evenly under them, short-circuiting them in all positions.

In use, the Lecher wires are coupled to the transmitter by the pickup line. The line end is put near the transmitter tank. The transmitter is switched on, and the anode (drain) milliammeter is watched as the bridge is moved slowly along the line. The current will rise as the bridge moves to several points along the wires: these points are about half-wavelengths apart.

The velocity factor of the line makes the measured half-wave about 95% of the free-space wave. The half-wavelengths measured should be:
1/2 x (300/435) x 0.95 metres, or 0.33 metres (330 millimetres).

Such an emission is in the middle of the '70 cm' band, and checks should be made frequently during a series of experiments to ensure that changing temperatures, for instance, do not affect the frequency enough to put it out-of-band.

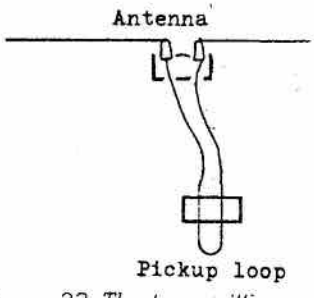


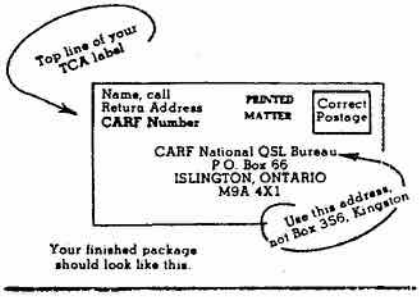
Figure 33: The transmitting antenna, with feedline to a link coupling. Δ

Next issue: Chapter Four continues with The Antenna Laboratory.

Free CARF QSL Service

The CARF Outgoing QSL Service will forward your QSL cards to anywhere in the world. This service is **free to CARF members.**

1. Sort cards alphabetically by prefix.
2. Sort Canadian cards numerically by call area.
3. Place small lots of cards in strong, heavy envelopes and seal securely. Include the label (or copy or facsimile) from your current copy of *TCA*. Wrap heavier packages in strong paper or put in a cardboard box. Tie securely. **Do not staple.**
4. Address your package as shown in the diagram.
5. **Do not register the cards!** This only delays them, costs more and is not really necessary.
6. If you want proof that CARF received your cards, enclose a self-addressed, stamped postcard or envelope with 'Receipt' marked on it.
7. If a package should be damaged on arrival (very rare), CARF will send you a list of cards received so you can check to see if any were lost.



ALGOMA COURSE COMPLETED

The Algoma ARC's Amateur radio course for 1984/5 is now completed. Nine students passed the Regulations portion of the exam, 8 have passed theory, 5 have Morse code transmitting credit and 3 receiving. One is now VE3OTJ.

Congratulations to all, and keep at it! Congratulations and thanks to Dave VE3EGC, Gerard VE3GF and Tom VE3MOP, their instructors.

CARF Log Sheets (Package of 50).....$2.50 + $1.00 postage ☐ $3.50 _____
CARF Message Forms ..... ☐ $2.25 _____
CARF Crests $2.00 plus 50¢ handling and shipping ..... ☐ $2.50 _____
CARF Logos (6"x2½") ..... ☐ 4/$1.00 _____
Check one: ☐ adhesive sticker ☐ window decal

Texts and Study Guides

Certificate Study Guide, 1984 Edition..... $15.00 _____
Advanced Study Guide .....$7.50 _____
Instructors Guide For Amateur Licence .....$4.50 _____
Regulations Handbook (Current, Dated 1983).....$9.50 _____

Canadian Amateur Reference Guide

Basic H.F. Antennas .....$2.25 _____
By Art Blick VE3AHU, 1983, 23 Pages
Contests: Radiosport .....$1.75 _____
1983, 12 Pages
The Amateur Bands .....$2.25 _____
1983, 12 Pages
Routine Daily Operating .....$1.75 _____
1983, 16 pages
DX.....$2.25 _____
By John Gilbert VE3CXL, 1983, 15 Pages
Establishing An Amateur Station .....$2.25 _____
By the late Bud Punchard VE3UD, 1982, 11 Pages
Monitoring And Reference Frequencies .....$3.50 _____
1983 with Updates to 3/84, 19 Pages + Updates
Digital Transmission Techniques.....$3.25 _____
By John Iliffe VE3CES, 1984, 31 Pages
Cable Television Signal Leakage.....$3.50 _____
By Tony Van Wouw VE7CCI, 1984, 19 Pages
Binder— 2" D-Ring with CARF Logo .....$9.00 _____
For Reference Sections

Add $.50 Postage and Handling ..... .50 _____
Total— Please Remit by Cheque, Money Order, Mastercard or Visa ..... _____

Name: _____

Call: _____

Address: _____

_____

_____ *Postal Code:* _____

Mastercard ☐ Visa ☐

Card Number _____ *Expiry Date* _____

Signature _____

.....

For Office Use Only
Cash Book _____ *Order Complete* _____
Remarks: _____

CARF P.O. Box 356 Kingston, Ontario, Canada K7L 4W2
B.P. 613-544-6161

Membership Application
Demande D'Adhésion

Full Voting Member Membre a part entière avec droit de vote	$20.00 per year pour un an $55.00 for 3 years pour 3 ans $90.00 for 5 years pour 5 ans	_____
Associate Member (Non voting, non licensed or foreign call signs) Membre associé (Adhérent sans droit de vote, sans licence ou détenteur d'indicatif d'appel étranger)	$20.00 per year pour un an $55.00 for 3 years pour 3 ans $90.00 for 5 years pour 5 ans	_____
Members residing outside Canada Membre residant à l'étranger	Same as above, except in U.S. Funds to cover additional postage costs. Même que membre associé, mais en monnaie U.S. pour couvrir les frais postaux.	_____
Additional Family Members Membres d'une même famille	$2.00 for each year extra per person $30.00 for life $2.00 par année par personne A Vie $30.00	_____
Life Membership Adhésion a vie (Full or Associate/Membre votant ou associé)	$300.00	_____
		Total _____

Name
Nom _____
Call
Indicatif d'appel _____
Address
Adresse _____
City *Postal Code*
Ville _____ *Province* _____ *Code Postal* _____

Membership #, if renewal
Date _____ *No d'adhérent si renouvellement* _____

Mastercard and Visa Service now available:
Master-charge et Carte Visa acceptées:
Card #
No de la Carte _____
Expiry Date
Date d'expiration _____

Signature _____

Canadian Amateur Radio Federation
Federation Des Radioamateurs du Canada

P.O. Box
B.P. 356 Kingston, Ontario, Canada K7L 4W2
613-544-6161

master charge

CHARGEX

YAESU

"WHEN ONLY THE **BEST** WILL DO"

summer means 2m

FT-203R	**2M 2.5 watts**	**$295.00**
FBA-5	Battery case for 6AA dry cells	14.95
YH-2	Heatset	31.00
MH 12A2B	Speaker microphone	35.00
FTS-6	Programmable tone squelch	45.00
PA-3	DC/DC car adapter/tickle charger	32.00
FTT-3	Encoder DTMF	39.00
MMB-21	Mobile hanger bracket	18.00
NC-9B	117 VAC compact charger	9.00
NC-9C	220 VAC compact charger	9.00
NC-18B	117 VAC compact charger	13.00
NC-15	Quick charger/DC adapter	99.00
FNB-3	10.8V, 425 MAH Ni-Cad	58.95
FNB-4	12V, 500 MAH Ni-Cad	64.00
CSC-10	Soft case for FNB-3	17.95
CSC11	Soft case for FNB-4	17.95
FT 209R	**2M 3 Watts**	**369.00**
FT 209RH	**2M 5 Watts**	**389.00**
YH-2	Headset	31.00
MH 12A2B	Speaker microphone	35.00
FTS-6	Programmable tone squelch	45.00
PA-3	DC/DC car adapter/tickle charger	32.00
MMB-21	Mobile hanger bracket	18.00
NC-9B	117 VAC compact charger	9.00
NC-9C	220 VAC compact charger	9.00
NC-18B	117 VAC compact charger	13.00
NC-15	Quick charger/DC adapter	99.00
FBA-5	Battery case for 6 AA size Dry cells	14.95
FNB-3	10.8 VAC, 425 MAH Ni-Cad	58.95
FNB-4	12V, 500 MAH Ni-Cad	64.00
CSC-10	Soft case for FNB-3	17.95
CSC-11	Soft case for FNB-4	17.95

OVERLAND

FT 290R	**Portable 2m 2.5 Watts**	**475.00**
YM-49	Speaker microphone	29.95
YM-50A	DTMF microphone	70.00
MMB-11	Mobile hanger bracket	54.0
CSC-1	Soft case for FT 290R	17.95
NC-11B	Standard 16 hour charger	12.00
FTS-32	Encoder/decoder	110.00
FP-80A	Power supply	99.00

2M Means: MOBILE

FT 270R	**2M 25 Watts**	**519.00**
FT 270RH	**2M 45 Watts**	**539.00**
FTS-8	Programmable tone squelch	59.00
FVS-1	Voice Synthesizer	49.00
SP-55	External speaker (4 ohms)	32.00
MH 14B8	Speaker microphone	39.00
MH 15A8	Microphone with DTMF	59.00
SB-10	PTT switch for YH-1 or MF-1A3B	34.00
YH-1	Headset with lightweight boom	31.00
MF-1A3B	Microphone with flexible arm	39.00
MMB-26	Mobile mounting bracket	T.B.A.
FT 2700RH	**2M 25 Watts VHF/UHF Dual Band**	**$799.00**
FTS-8	Programmable tone squelch	59.00
FVS-1	Voice Synthesizer	49.00
SP-55	External speaker (4 ohms)	32.00
MH-15A8	Microphone with DTMF	56.00
SB-10	PTT switch for YH-1 or MF-1A3B	39.00
YH-1	Headset with lightweight boom	31.00
MF-1A3B	Microphone with flexible arm	39.00
MMB-27	Mobile mounting bracket	18.00

Contact Armaco Electronics Ltd.
for colour brochure and
name of your nearest **YAESU** dealer.

Armaco Electronics Ltd.
P.O. Box 24625, Station 'C'
Vancouver, B.C. V5T 4E2
(604) 876-4131

Armaco **YAESU** **Armaco**

Exceptional Performance in a Great New Design. The All-New HW-9 Deluxe QRP CW Transceiver.

Setting the competitive standard in QRP CW has been our tradition through two generations of Transceivers. Now that tradition for excellence in performance, price and value brings to a new generation Heathkit Transceiver state-of-the-art microelectronics and lightweight portability.

Designed for broadband coverage of 250 kHz of CW on 80, 40, 20 and 15 meters and expandable to the 30, 17, 12 (WARC bands) and 10 meters, the HW-9 brings greater versatility, reliability and ease of use to the fields.

The HW-9 eliminates the necessity to fine tune each band. Its wide-band front end uses a double balanced mixer and 4-pole crystal filter to pull in wide dynamic range signals. Solid state T-R switching provides for full break-in on any band. And the automatic AGC provides superior receiver performance and audio response.

The unit features single conversion in the main signal path, greatly reducing spurious responses while attaining outstanding image rejection. A full four watts of RF output power (three watts on 10 meters) is available on transmit RIT (Receiver Incremental Tuning) permits tuning the receiver 1 kHz above or below the transmit frequency. And the tuning dial is calibrated in 5 kHz increments for easy identification of frequency.

Rugged and lightweight, the HW-9 is ideal for portable operation. Transceiver can be powered from batteries, a lighter socket, solar power units or 120 240 VAC with the HWA-9 compatible power supply.

MORE DETAILS IN CATALOG

FREE! For complete details and specifications get a copy of the latest Heathkit Catalogue. **WRITE:** Heath Company, 1020 Islington Ave., Toronto, Ontario M8Z 5Z3. Visit your nearest Heathkit Electronic and Computer Centre, listed below left, for an exciting hands-on try-out.

Visit your nearest **Heathkit Electronic** and **Computer Centre.** Our Centres, located in Vancouver, Calgary, Edmonton, Winnipeg, Mississauga, Ottawa and Montreal sell, display and service the complete Heathkit product line.

There's more for the Ham at Heath

Heathkit

Heath Company