

# **CARF** the canadian amateur

October 1977

No. 9

Continued on Page 6

## Regs Service to relocate

In the Disneyland world of Ottawa politics, another gambit by the federal Cabinet in its 'decentralization' program will move DOC's Telecommunications Regulatory Service out of Canada's capital to Quebec City.

Beginning in 1980, this removal of yet another national public service unit, in this case DOC's most important contact point with the electronic and telecommunications industries, is to be completed by 1982.

For these industries, and Amateurs too, this decision by the Cabinet, which sources indicate was made over the strong opposition of the DOC Minister,

### National Symposium Topic

## Amateur Radio in the 1980s

As reported last month, the discussions between your Federation's vice-president, Fred Towner VE2DNW, and Dr. John de Mercado, Director-General of DOC's Regulatory Service on the subject of the DOC proposals for a 'novice' and 'no-code' certificate led to the idea of a national Amateur symposium to discuss the whole future of Amateur radio in Canada.

Further talks have led to action and your Federation is now making plans to convene the meeting, which will have full participation by DOC officials, for the last weekend in November in the nation's capital. With an optimum figure of about 50 participants, it is hoped that the CARF invitations to major Amateur organizations across Canada will produce panels with well-considered and positive recommendations to DOC for

Continued on Page 11



JOHN DE MERCADO

For background information on Dr. de Mercado, see page 2.

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The Canadian Amateur is the official monthly publication of the Canadian Amateur Radio Federation, Inc. It is distributed to members and is available to others for \$7.00 per year. The Federation is incorporated and operates under a federal charter, with the following objectives:

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

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**Cover Photo**

Dr. de Mercado's professional credentials include a doctorate in electrical engineering, P. Eng. (Ontario), member of the Institute of Electrical and Electronics Engineers, the Engineering Institute of Canada and the associate committee of the National Research Council. He is a director of the Standards Council of Canada and finds time to contribute to research and teach occasionally at Carleton University in Ottawa.

**Canadians honored  
for satellite amp**

Seventeen scientists and technicians employed at the Communications Research Centre (CRC) of the DOC, just west of Ottawa, recently shared a \$2,500 public service incentive award for their "exceptional and distinguished" contribution to Canada's HERMES satellite project.

When it was found that no industrial supplier anywhere would commit itself to the specifications, tight schedule and cost constraints involved to build the necessary electronic hardware, the CRC team designed and built the spacecraft receiver's novel field effect transistor amplifier (FETA). It was among the first 12 GHz FET amplifiers ever developed, and the first designed and qualified for a space application. HERMES, an experimental, advanced technology communications satellite, was launched in January 1976 and is the world's most powerful.

The CRC FETA project was kicked off in November 1973. The first prototype amplifier, making revolutionary use of then-experimental gallium arsenide (GaAs) field effect transistors, was ready the following July. Despite tight deadlines, considerable time and effort had to be expended to ensure the reliability of the new solid state devices and other integrated circuit components.

Using the know-how generated in the development of the FET amplifiers, Canadians are now working on Telesat Canada's next spacecraft, ANIK-B, which will be the first commercial spacecraft to fly with the new FET technology.

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# New US repeater band

According to CARF's FCC sources, that agency is issuing a regulation, effective Nov. 4, which will permit expansion of repeater operations in the U.S. Two metre repeaters will be allowed from 144.5-145.5 MHz.

Canada does not have any regulations on the use of Amateur stations as repeaters so, subject to the emission restrictions explained in the article by VE3 ZS (see Page 9), Canadians could also operate repeaters in this new area. Our Radio Regulations Part II, however, under Section 59 (3), restricts the deviation of FM emission to 3 kHz, in the frequencies to be used in the new repeater band.

Your Federation proposes to include a recommendation to DOC for removal of this restriction on the agenda of the forthcoming national Amateur symposium convened by CARF.

A band plan has been adopted by California repeater associations and will likely be accepted across the U.S. It features low input, with a 600 kHz higher output and 20 kHz channel spacing, with the first pair being on 145.10 -- 145.70 MHz. In this new band, the 200 kHz, from 144.90 -- 145.10 is reserved for simplex operation, while the 20 kHz separation also permits simplex between repeater frequencies and reduces interference between them.

## DUTY REDUCTION

# Red Tape cut

Your Federation has a report from VE3TT who has been investigating the channels through which CARF must go to seek an end to customs duties on imported Amateur equipment. Recent developments in federal government procedures have introduced public hearings before the Tariff Board in place of the previous pleading to various agencies.

CARF is advising the Board that it intends to prepare a brief for submission before the end of this year, requesting

relief from import duties on Amateur equipment.

It will be a slow process, however, with the prospect of many months elapsing before a hearing will be scheduled as a result of our brief.

# Stolen rigs

A stolen rig column will be published in The Canadian Amateur if enough input is given to CARF. A description of the equipment, the serial number, etc., plus the date and place of the theft should be given, along with who should be notified if the gear is located.

To start off, here is a rig that was stolen in the Ottawa area: One KDK-14X Mk II Serial #5653 and one Unimetric Marlin 23 Channel GRS set Serial No. 50100119. Owner VE7DHE Al Ethier. Contact CARF, Box 356, Kingston, Ont. K7L 4W2.

# WARC '79 News

An International Telecommunications Union announcement confirms that the World Administrative Radio Conference in 1979 will be broadened to include consideration of Article 41 of the ITU Radio Regulations concerning Amateur radio stations, as well as frequency allocation matters.

This Article includes references to the Morse code requirement, third party traffic regulations, power limitations and the technical qualifications required of Amateurs.

Control of satellite transmissions in order to prevent interference with other services will also be included in the discussions.

# WX Broadcasts

Amateurs along the Great Lakes are reminded that there is a continuous weather broadcast on 161.5 MHz which includes storm warnings and other weather alerts for Southern Ontario. Details of this service may be obtained from Printing and Publishing, Department of Supply and Services, Ottawa, Ont. for \$2.00 per year.

(Thanks to VE1DW)  
october 1977 - page three



Canadian Repeater Advisory Group

### VE3DWL Hugh Lines

Info from the Maritimes notes that the Yarmouth repeaters are to be linked to one another to give the Yarmouth ops a better coverage. In Saint John, some 20 Amateurs from the N.B. Telephone are planning a two metre job for that city.

In the national capital, Ottawa repeaters are springing up in profusion. VE3OEA (a temporary call) with auto-patch, is now on 146.22-146.82, which will be changed to 146.07-146.67; the Telephone Pioneers are going ahead with VE3TEL on 146.43-147.03. A local GRS club which has a number of Amateurs in it is setting up on 147.72 - 147.12.

On the West Coast, VE7AZB tells us that the Masset repeater VE7DRZ is out of service and the Prince George repeater VE7RPG has changed to 146.28/146.88. The Prince Rupert club is going to build another repeater on 146.46/147.06.

From Saskatchewan comes a story of a unique installation which has proved to be very reliable despite, or probably because of, its unusual environment and power source. Here's the story on it as written by Gord VE5UJ in the SARRL publication 'QSO':

The Last Mountain repeater VE5AI, operated by members of the Last Mountain Radio Club, has been in operation for over a year. It is located on hilly pasture land near Duval. The 146.25/.85 MHz machine receives and transmits from a 4 element colinear antenna atop a wooden pole.

The electronic installation consists of transmitter, receiver, ident. and COR control boards by VHF Engineering. The tone decoder and duplexer were also built by club members.

The repeater operates from an area that is free of power lines and uses a windmill storage battery setup to supply the operating voltage. The equipment needs no other power because it operates in an insulated underground room which remains cool in summer and above freezing in winter. The near constant daily temperature eliminates much of the fussiness inherent in many repeater components.

The battery power supply compartment is also located in this enclosure, an ideal environment for the lead-acid cells.

The windmill is a rebuilt unit mounted on a 30-foot high, 4-leg tower. The 10-foot propeller, governor and gear box are used to turn a rewind Chrysler alternator. Excitation voltage is supplied to the alternator by a centrifugal switch when sufficient speed has been reached to charge the batteries.

An operating range with a radius of nearly 50 miles has been realized with this repeater, and contacts with base stations 100 miles or more away are not uncommon. It fills the coverage gap between the Regina, Saskatoon and Yellowhead repeaters.

## Canada's youngest?

VE3GUA Guenther Achleitner of Agincourt, Ont. writes that his son Oliver has received his Amateur Certificate although he is just 11 years old, with a birthday coming up on Oct. 25. He is using his Dad's call sign while waiting for his own station licence.

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# Interference problems get attention

The fantastic proliferation of CB radio transmitters, the steady climb in Amateur stations and the increase in commercial radio systems has made the problem of electro-magnetic interference (EMI) an urgent item on the agenda of various organizations.

Your Federation was represented by VE3UD, Bud Punchard, at the Canadian Standards Association (CSA) committee "on immunity to EMI or consumer electronic apparatus" (like TV and stereo sets) which met on Sept. 7. A new document from DOC was discussed but, while presenting the problem in some detail, it offered no cure, standards or legislative panaceas for EMI. It provided designers of electronic equipment with a detailed picture of the field strengths that their products would encounter. This gives designers an idea of the degree of immunization they would have to build into their products and would assist in the development of suitable standards.

The problem of what organization will write the interference rejection standards that TV, hi-fi and radio equipment must meet has not been solved. Work is going on in the U.S. along this line and the development of test equipment and standards is under way on an experimental basis. This could well be of benefit to Canada as a large part of our home entertainment equipment is imported from the U.S. or Japan ... and the latter would no doubt meet any U.S. standards in all of its exports.

## Glasses needed

VE3JKW, Dr. John K. Warnica, is requesting assistance in collecting eye glasses for use in 'Third World' clinics. John, an eye specialist, has travelled to such places as the Dominican Republic, Honduras and Haiti to do clinical work (at his own expense) and needs all types of glasses, ordinary eyeglasses (bifocals or single lens), sun glasses, plastic or glass. The lenses must be unbroken but type of frame is not critical. Please send all glasses to John at Baycrest Drive, RR 1 Barrie, Ont. L4M 4T8.

(RTTY News)

The CSA committee was informed that DOC intends to replace the present TRC-19, "Suppression of Inductive Interference, Cross modulation and Swamping", with two documents written in layman's language. This should be a help in EMI cases involving Amateurs who could find it a handy reference in discussing EMI problems with neighbors.

The Canadian Radio Technical Planning Board, of which your Federation is a member, is re-activating its committee on the EMI problem. A new chairman, W.R.E. (Emerson) Johnston of Bell Northern Research, should put new life into this committee as he has been on CSA committees on EMI problems and is engaged in EMI research with BNR.

There are EMI problems, both technical and legal, that confront Amateurs and your Federation is forming a national committee to gather information, assess the situation and make recommendations for action which can help to solve them.

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will affect the present close day-to-day liaison between the radio industry and the Department.

The inevitable loss of the experienced professional and technical personnel who will elect to remain in Ottawa could create additional problems for both industry and the Department. The effect on DOC planning for the 1979 WARC frequency conference can only be surmised at this time.

Typical of the reaction from leading telecommunications organizations to the original hints last spring are the words in a letter from your Federation sent to the DOC Minister in May:

"Such a move appears to the Federation to be almost incredible and unsupported by any logic other than that of political expediency.

"Our reasons for this attitude must be obvious - we believe that as long as Ottawa is the capital of the nation to which this Federation is dedicated, the location of any Federal department's headquarters or any part of them log-

ically belong in the capital by reason of historic precedent, the adequate communications and transportation and the presence of long-established head offices of national organizations representing every facet of Canadian economic and social life. These include national organizations concerned with telecommunications which find the (TRS) probably their most important point of contact with your Department.

"The loss in time and money in the actual move and the cost of new premises would be more than matched by the costs to scores of organizations and possibly hundreds of individuals who would have to maintain liaison and do business with your Department's Telecommunications Regulatory Service in some relatively inaccessible location.

"The Federation trusts that the proposal to undertake such a removal, which would appear to only aggravate problems which are already apparent in "decentralization", will be abandoned by the government of which you are a part.

"Your assurance that this is the case would be welcomed by the Federation."

The Federation, like other organizations which wrote, received only a non-committal reply.

## MF Surplus rigs

An official notice has been published stating that medium frequency (2-4 MHz) radiotelephone service at Coast Guard stations on the Great Lakes will be discontinued as of Jan. 1, 1979.

If and when these rigs appear on the surplus market as ships and shore stations re-equip, they may be available to Amateurs.

They are, according to R. Walsh VE1DW, usually multi-channel, crystal controlled AM, with some DSB and SSB rigs in use. They can be modified to send CW.

VE1DW writes that "the marine whip designed for 2 MHz operation could be used in experiments on 160 metres. Some of the rigs are 12 volt DC and some are 110 volt AC. I have an old one of these rigs and find it will receive 160 and 80 metre signals. The channels used range from 2.003 MHz to 4.415 MHz..."

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# CHAP aids handicapped

The Canadian Handicapped Aid Program (CHAP) has been in existence since 1973. At that time, the HAP representatives for Canadian International DX Club and Short Wave Listener International decided that a HAP organization was needed in Canada.

CHAP was created so that handicapped Canadians could receive as much assistance as possible within their own country. It has always been closely linked with the original HAP in the U.S. and is now a member of the HAP International Coordinating Committee (HICC).

The lead of HAP and HAP-US has been followed in such things as deciding who will be assisted and how the assistance will be given. Equipment, reading and reference material and club memberships are available.

Canadian SWL clubs - including the above clubs, Trans World DX Club and the Ontario DX Association - have supported CHAP through fund raising projects, bulletin columns, contributions of memberships, etc. The Association of

North American Radio Clubs (ANARC) has officially recognized CHAP. During 1974-75, the Radio Canada Shortwave Club carried bi-monthly 'CHAP reports on its program. Stations such as Radio Nederland and HCJB continue to support CHAP and other HAPs. A 'CHAP News' paper is sent free to all supporters of our program.

Besides the club sponsored activities, funds are also raised through the sale of cancelled postage stamps, DX rallies, auctions and so on, and through individual donations. CHAP is a non-profit, volunteer-staffed organization and donations and assistance from people is always appreciated. A shortage of good receivers is always a problem.

Ideas and suggestions for CHAP operation are welcome. Information on CHAP services, operations and projects is available from H.T. Sellers, Chairman, Canadian Handicapped Aid Program, 23 Lamont Ave., Weston, Ont. M9N 2J9.

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## NEWS BRIEFS

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West Coast Amateurs are keeping tabs on the progress of two sailing vessels which have almost completed an east to west Northwest Passage voyage.

Harry Beardsall VE7ZQ of Vancouver is keeping in touch with Willy de Roos, a Dutch adventurer who sailed from Falmouth, England, last May. At last report, he was rounding Alaska.

Bob Sutherland VE7CWE of Ladner reports that he keeps in touch with a Quebec crew on a 35-foot ketch skippered by Real Bouvier which is close behind the de Roos vessel.

--- The New Brunswick EMO, remembering the disastrous St. John River floods, now has a mobile emergency operating centre in a specially-equipped van. Radio communications are provided by two metre Amateur gear that can be tied into the provincial radio systems in an emergency, GRS equipment and telephone equipment.

--- VE3AIB Les Weir will replace VE3

BBW George Davis in the ARRL VHF/UHF Advisory Committee.

--- The Montreal ARC at its September meeting heard VE3UD, Bud Punchard, CARF WARC '79 Working Group Chairman, on the subject of the forthcoming ITU conference and the need for a strong national Amateur organization. John M. Henry VE2DNM, CARF president, gave a slide lecture on the satellite telecommunications.

## 17,827 stations in Canada

A count of Amateur stations for the end of August shows 17,827 now licensed -- up 531 from the last figures at the end of June.

The largest boost usually occurs early in the new year when students in the fall and winter classes finish their studies and write the exams.

CARF provides a FREE outgoing QSL card service to members. Here's how it works, as described by the manager, Jean Evans VE3DGG.

**Outgoing Cards** -- Gather up your DX cards and sort them alphabetically; sort your VE, VE0 and VO cards by district number and mail them to the CARF National QSL Bureau, Box 66, Islington, Ont. M9A 4X1. Be sure to put your return address and CARF number on outside of packages or envelopes. To keep postage to a minimum for you, mail as Printed Matter.

**SASE** -- Self Addressed Stamped Envelopes - If you wish to save postage costs, you can enclose SASE with your outgoing. They will be relayed to a volunteer who looks after your cards.

**Box 66 Clearing** -- Ken Rolison VE3 CRL is in charge of this work, and Box 66 is cleared 3 to 5 times weekly. They are then delivered to me at my QTH once a week.

**Processing Cards** -- Cards are sor-

ted immediately and all letters checked. Mailing cards is done as volume dictates (usually twice monthly) but, if necessary, three times per month. Every card is cleared at the end of each month even if only 1 or 2 cards for a rare prefix. NO card is left in files at end of each month.

**Unclaimed Cards** -- We try every means to get every card delivered before returning them to the originating countries as Unclaimed. We believe it is better to have a card returned, rather than have the sender wonder why he has not received a QSL card in return. Each unclaimed card carries a notation of why it could not be delivered. Other countries do this for us, so in the interests of good public relations throughout the 'ham' radio world, we reciprocate. These cards are enclosed in outgoing, and no extra postage is used.

5 x 7 envelopes are good, but if not available, then whatever size you have will suffice. Good luck, hope to hear from you.

73 de Jean Evans VE3DGG  
CARF National QSL Bureau Manager  
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\*\*\*\*\*

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## Swap Shop

Several requests for Swap Shop information have been received and, if this proves to be a popular feature, it will be run regularly. To make it go, however, we must have input from readers as to where and when these nets take place.

Here are a few for starters (times are Eastern): Ottawa Valley Mobile Radio Club, Sundays 10 am on 3760 kHz and the same info is on Ottawa VE2CRA repeater (34/94) Mondays at 2000 hrs; VE2RM repeater, Montreal (6.40/7.00) Thursdays at 1900 hrs; the 'CJ' net (Ontario) 1930 hrs Sundays on 3790 kHz; the Quebec net 2030 hrs on Fridays at 3775 kHz; Hamilton, Wednesdays at 2000 on VE3DRW (16/76); London ARC, Sundays at 1200 on 3750 kHz and the 'Muskeg' Swap Shop, Mondays 1730 hrs on 3755 kHz.

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# A new RFI problem

Here is an odd-ball facet of radio interference gleaned from an Associated Press story from Milwaukee, U.S.A.

The combination of a two-way radio and a fuel-injected car can pose problems even if the two aren't in the same vehicle.

The problem arises when the wiring picks up radio transmissions from the CB or any other kind of two-way radio.

The fuel-injection system controls the flow of gasoline to the motor by means of electronic signals from the engine. It cannot, however, tell the difference between a valid engine signal and a spurious signal from a two-way radio.

"It causes it to open too long or out of sequence," said Helmut Buchwald, service manager for Mossner Motors, a foreign car dealer. The fuel-injection system, in its confused state, either speeds up or cuts the fuel flow.

For drivers whose radio interferes with fuel injection, owner's manuals for both radio and antenna are the best place to start looking for the source of the trouble. Make sure you did everything the manufacturer recommends.

A good antenna ground is mandatory occasionally it is necessary to run a

grounding line between the antenna base and some point known to be connected to the car's chassis. And the radio's power source should be as close to the battery as possible, connected with heavy wire.

The problem also might be in the injection system. You might find that, over the miles, the fuel-injection unit itself, which is in a metal-plastic box, might be suffering from some corrosion where it is mounted to the car chassis.

The first step then is to clean the ground connections and then tighten the screws. If that doesn't work, things might get complicated.

For the radio operator, checking those two areas should clean up the problem. If it doesn't, the operator is in the same boat as the driver whose fuel-injection system is thrown into a tizzy by a passing transmitter.

In some cases, the problem might be on the transmission end. The operators are sometimes running far in excess of the power they're supposed to be running.

The last alternative is to have the car equipped with radio-frequency filters.

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## A Word of Caution

ON 2 METRE RIGS

Many of the new 2-metre transceivers now on the market (with more appearing every day) are "all mode" units. These units, in addition to covering the FM portion of the band (146.00-147.99 MHz), are also capable of operation in the lower half of the band (144.00-145.99 MHz) on CW and SSB; FM operation is also possible on the lower half. And herein lies a trap for the unwary...

Section 59.(3) of the General Radio Regulations Part II reads -

"59.(3) Frequency modulation with any mode of emission shall not produce a carrier deviation exceeding

(a) plus or minus 15 kilocycles in the frequency bands 52-54, 146-148 kilocycles and higher bands specified in section 45; or

(b) plus or minus 3 kilocycles in any other frequency band."

So, unless you have means of re-

ducing the deviation of your transmitter (your receiver would probably require adjustment as well) to the appropriate level, don't use FM between 144-146 MHz.

VE3ZS

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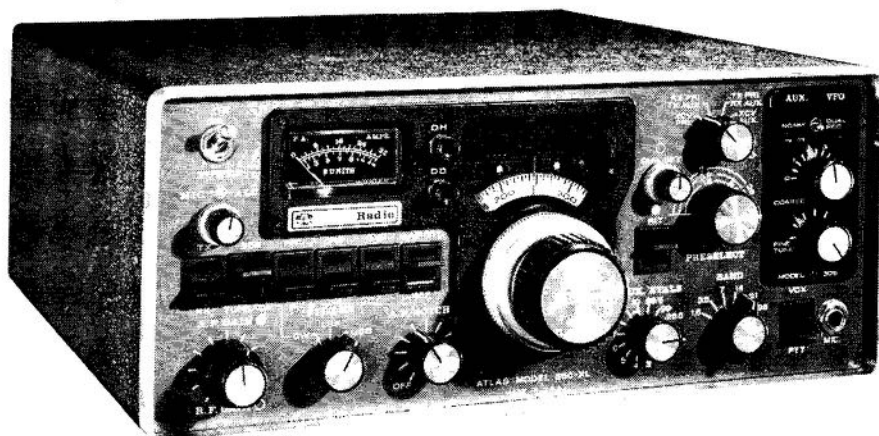
## Linear Amps

Earlier this year DOC proposed new regs to control the illegal use of linear amplifiers. These were published in 'The Canada Gazette' for public comment and your Federation made several suggestions to tighten up the proposals as they were made. The new regs, which will appear soon (probably before the end of this month), will require the buyer to certify that he is authorized to use such equipment.

october 1977 - page nine



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| Model 305 Plug-in Auxiliary VFO                | \$215.  |   |        |
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regulations and other matters affecting Canadian Amateurs in the future.

### AMATEUR RADIO IN THE 1980's - A VIEW BY DOC REGS HEAD

Not only did the discussions result in the plans for the symposium, but an offer was made to Dr. de Mercado to use the columns of this publication to express to CARF members some of his views on the future. He responded with the following:

"I was very pleased when Fred Towner told me of plans that were being made to hold a one day conference on 'Amateur Radio in the 1980s' in Ottawa this fall, and was especially pleased to accept his invitation to share some of my personal thoughts on the theme of the conference on its eve.

"Amateur Radio (more properly entitled, Canadian Amateur Experimental Service) began with its first licensee, David Lloyd 3AW, in 1920 and today more than 17,800 Canadian Amateurs enjoy the hobby. Over the last half of the century there have been a myriad of changes in the rules, regulations and associated frequency bands available. During this period, and especially over the last ten years, there have also been many innovations in technology that promise even greater opportunities and possibilities for Amateur Experimenters, especially in the bands above 144 Mhz. Foremost among these are the rapid growth and the expected proliferation of the home micro-computer which will, in time, challenge Amateurs to innovate digital radio schemes for data communications hobbies.

"The spectrum is a finite but renewable resource and as radio systems proliferate, the increase in congestion will demand that new techniques be found to "fully share" available frequencies among the greatest possible numbers of users.

"Amateurs continue to have the privilege of a generous frequency assignment which is still relatively uncongested when compared, for example, with the land mobile service which has less amount of spectrum available to it and

some 20 times (or more than 300,000) users although I appreciate that a simple comparison on this basis alone does not tell the complete story.

"As an electrical engineer with a long interest in radio communications and computer techniques, I have been particularly interested in the Amateur Service and some of the complexions that it could conceivably take on in the 1980's. In particular, I am excited by the possibilities that digital radio systems offer for experimental data communications in the VHF and UHF bands. There are, I know, many of my more learned technocratic colleagues that would welcome the opportunity to join the Amateur fraternity as experimenters in these bands and who would bring with them a wealth of new technical innovations that I am certain, in time, all Amateurs would profit from. At the same time we would also benefit from the traditions of friendship and helpful camaraderie that has long characterized the Canadian Amateur Radio Service.

"I know that your association, through the fall meeting, plans to solicit your views on various new licensing options that the Department of Communications has proposed. I can only add my own sincere hope that discussions of the licensee options presented, and any new ones that might be considered at the meeting, will take place in an atmosphere of objective cordiality."

Dr. John deMercado

## DOC Notes

Some DOC offices are still handing out outdated copies of Telecommunications Regulation Circular TRC-24 on the requirements for Amateur Certificates. These old TRC's unfortunately do not list the CARF Study Guides for the Amateur and Advanced Amateur tickets nor the Radio Regulations Handbook. These publications are the only ones that are geared to the new multiple choice examinations.

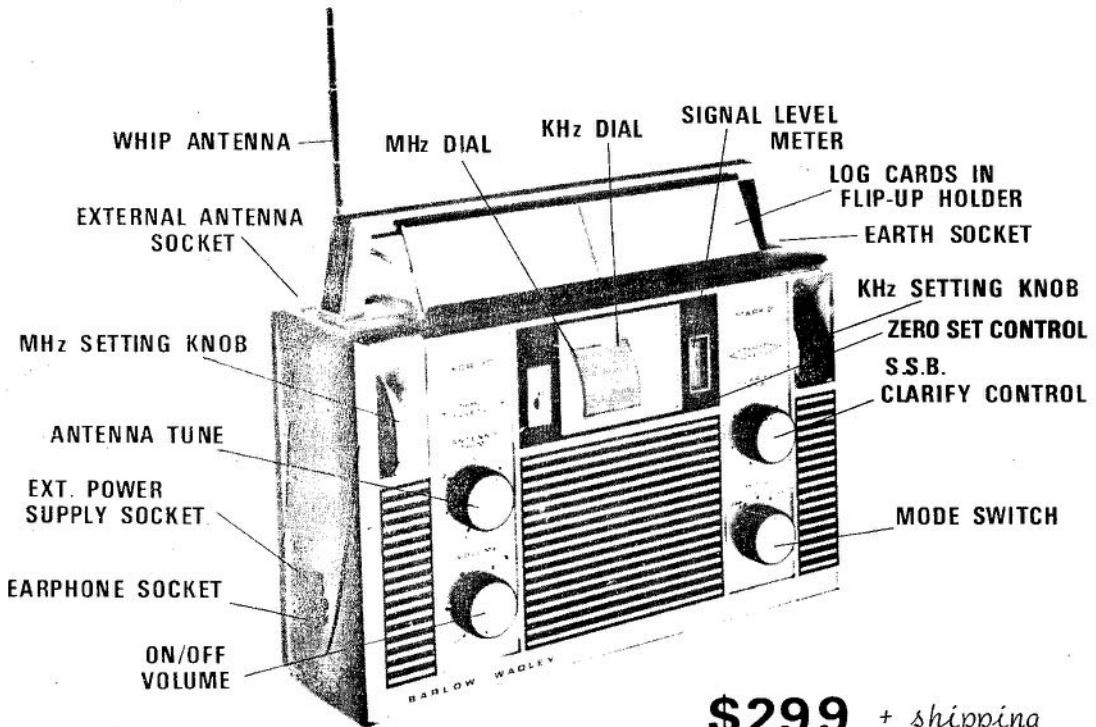
The matter has been brought to the attention of DOC and it is anticipated that an amended version of TRC-24 will be issued soon with a list of all the CARF publications.

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Apply these shipping rates unless directed otherwise!!

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Alberta	8.00
Saskatchewan	7.00
Manitoba	7.00
Ontario	6.00
Quebec	6.00
Newfoundland	10.00
Nova Scotia	8.00
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**A WOLF  
IN SHEEP'S  
CLOTHING**

# Fair deal or rip-off?

Every now and then we receive an irate letter from readers asking this question in regard to the prices they see for Amateur gear in Canada compared to prices in the United States.

In all fairness to Canadian dealers, let's look at the whole picture. First off, one problem is that we call our currency the same as the U.S. currency. There the resemblance ends ... even the colours are different ... and just try to use a Canadian dollar in the U.S. For starters, the value of the Canadian paper called a "dollar" when expressed in U.S. currency is less than the U.S. "dollar"... the two are not really comparable.

On top of the fact that this value is discounted at about 8% or more, there are two other significant factors which enter into the pictures. The U.S. importer buying Japanese goods can, due to the 'economies of scale', negotiate a larger discount on his great quantities than can a Canadian importer with a market potential at least 1/10 that of the U.S. on his resultant smaller quantities.

The second factor is that the total of the import and sales tax duties in Canada are much higher than the U.S. government levies imposed on the same

imports in the U.S. These factors, 15% and 12% in Canada, are cumulative, on top of the higher wholesale price paid by Canadian dealers.

It's a fact of life that our cost of living and costs for goods in nearly all areas of everyday life are higher than in the U.S. These factors above present a fairer picture of the Amateur gear prices than is gathered at a first comparison of U.S. and Canadian dealer prices.

## The Radio Environment

DOC, in a recent technical publication, provides some interesting statistics on radio stations in Canada. The following figures are as of March 31, 1977:

Licensed Stations (non-broadcasting)

In Canada there were about 828,386 radio licences\* in force. The major user categories are -

Land Mobile	245,324
General Radio Service	491,651
Government	101,663
Amateur	16,573
Aeronautical	15,814
Maritime	14,705
Experimental	1,120

The annual growth rate in the number of stations has typically been between 10 and 20% for the past several years, and in most cases is not expected to change radically in the near future. In the specific case of GRS systems, however, projections suggest that this annual increase will be about 100-120% over the next few years, saturating at a likely level of some 3-4 million stations.

Licensed Stations (Broadcasting)

760 TV stations  
425 AM stations  
288 FM stations

Not all radio stations (e.g. some government stations) are issued licences. Therefore, the number of stations exceeds the number of licences in force. Amateur stations now number more than 17,800.

## Crackdown on illegal ops

With the feedback from the various General Radio Service symposiums held across the country, the DOC have got the message that both GRS operators and Amateurs want a crackdown on illegal operation and other offences. Look for positive and vigorous action in this area in the coming months if the statements by DOC brass at some of the meetings are to be taken as gospel.

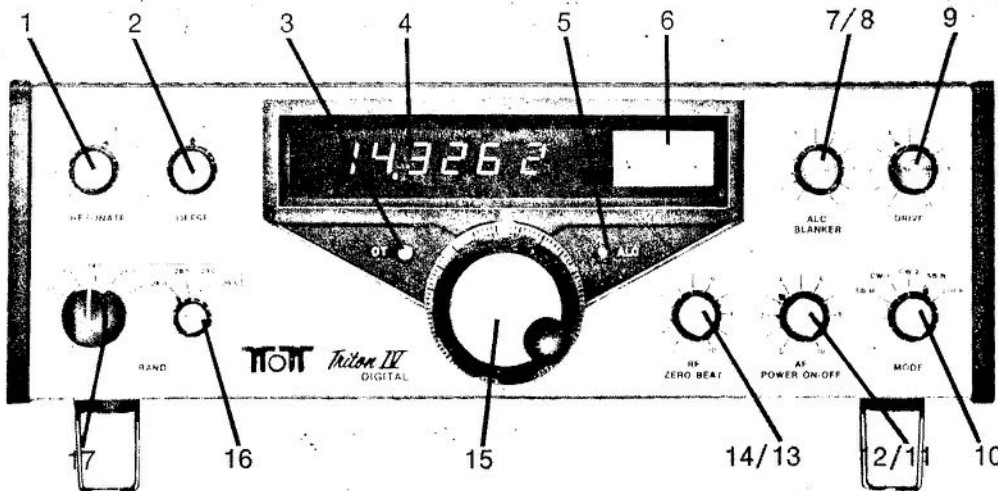
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# Memo



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Six digits to 100 Hz.
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Indicates ALC region.
6. METER  
"S"-Meter/SWR bridge.
7. ALC CONTROL  
Threshold adjust.
8. NOISE BLANKER  
On-off switch.
9. DRIVE  
Rf power control.
10. MODE SWITCH  
Ssb/cw/lock
11. AF CONTROL  
Receiver audio level.
12. POWER ON-OFF  
Controls power supply.
13. RF CONTROL  
Receiver rf gain.
14. ZERO BEAT SWITCH  
CW transmitter frequency adjust.
15. MAIN TUNING KNOB  
1 kHz markings.
16. BAND SWITCH  
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17. BAND SWITCH  
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# The Order of the Gavel

A CLUB BUILDER

VE3ARX - Bill McCaslin

What makes a club grow?...A repeater?...An active emergency corps?... building projects?...teaching new recruits?...organized code classes?...fellowship around the coffee pot? Yes, it's all of this, but we have discovered there is something else that goes deep to the heart of the club and nourishes its "esprit de corps!" It is ROOTS!...the club's beginnings!

Too often, we neglect to appoint an historian to record the foundation on which the club was built and on which good men laboured and sacrificed their time and talents and energy. Too often, even their names are forgotten.

During my presidency of Hamilton Amateur Radio Club, in 1975, I was appalled that our link with our past was all but wiped out. No one knew for sure when the club was founded or by whom, or under what circumstances sparked the need to assemble together. Few people even amongst the old-timers could name presidents accurately beyond seven years and yet it was rumoured the club was started pre-World War II.

Seeking out Geoff Legg VE3GLL, 1973 President of H.A.R.C., I presented the idea of "The Order of the Gavel," to recognize and identify in a permanent manner, every president who received the gavel of office. Geoff was invaluable in his contribution to the wording of the document and subsequently was appointed permanent secretary for the Order of the Gavel of H.A.R.C. The general membership gave unanimous support to proceed with the idea in Nov. 1976.

To identify all the former presidents and call signs going back to 1933 was no easy task, since most records had been lost in a wartime fire and in-between records were missing. But with the help of club members and many who had dropped membership many years ago, the picture gradually took form. At last our records were complete, over a span of 44 years!

So it was a memorable event, when on April 20, 1977, "The Order of The Gavel" was officially proclaimed and dedicated. A splendid 28"x36" oak plaque was unveiled by our first president (1933), Art Ferguson, VE3HP, of Port Elgin, Ontario, assisted at his request by Mrs. Inez Clemence of Hamilton, widow of the co-founder of the club... the late Wib Clemence VE3KM. On the plaque, name plates were attached indicating the year each President served.

The dedication ceremony was carried out by club member Rev. James Thomas VE3FBU, whose inspiring address will long be remembered.

There were many happy and nostalgic moments, as former presidents related stories about hamming and home-brew equipment in the "dirty thirties". Each president was presented with a special framed document on which was inscribed the symbol of the "Order of the Gavel"... a gavel standing in an arc of laurel leaves...to be proudly displayed in their radio shacks.

Now, what has been the result of all this?...In the first three months of this year, our membership has practically doubled. Due to the "Order of the Gavel"? ...I cannot say...but there is a strong feeling of belonging, and to being a part of history...there is a warm feeling of concern in our midst, and there is a new spirit emerging...old pictures of Field Days and other activities are being dug out and donated voluntarily. The mood seems to be "Let's write our history!... Let's preserve those pictures of by-gone days, that are taking on new meaning; for these are our roots!...Now we belong!

The Hamilton Amateur Radio Club would like to suggest that other clubs across our nations follow our example and preserve their roots. In this respect, we offer through CARF the design of "The Order of the Gavel" free, as a common symbol for all participating clubs. You owe it to your presidents, and as the wording of the plaque says in part

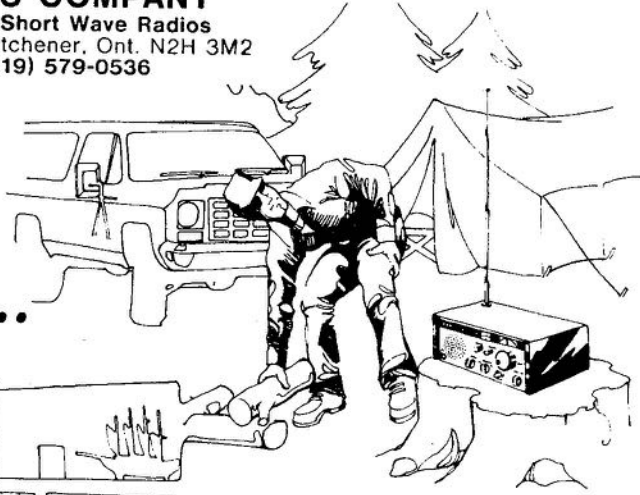
## WSI SALES COMPANY

# Memo

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fine ssb/cw tuning • 100% solid state, dc power cord available for external 12V dc operation from auto or boat • Built-in telescoping antenna, provision for external antenna • Built-in speaker • Drake HS-1 cushioned, impedance-matched headphones now available • Small size of 13" wide, 11" deep, 5.5" high (33 x 28 x 14 cm) • Weight 14 lbs. (6.4 kg).

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...so adequately...

"This award is the highest honour the club can bestow and is reserved for those who have given unstintingly of their time and talents.

The Order of the Gavel has been awarded in appreciation of a job well done to those named below, who during their term as President upheld the dig-

nity of office with honesty, integrity, and leadership, whilst perpetuating the universal fellowship, of the Amateur Radio Fraternity."

I believe that just about says it all! (Great idea Bill! Any club wanting the plaque design write to CARF, Box 356, Kingston, Ont. K7L 4W2).

## Thermometers go metric

With a year of unusual weather behind us, and with temperature being a daily topic, this letter to your editor from our Mritimes correspondent is timely. Jack Holmon VE1CP writes:

"Thank you for the book on the metric system which you were so good to send to me. While I agree with the author on so many of his points and arguments, there are a few that seem odd to me, although I am sure he did an awful lot of research on it to get the history and the credit for creating the system in print, mentioning various scientists, mathematicians and so on. However he omits some and gives a somewhat different story from my source of information, and from our physics course at college.

"Chambers Biographical Dictionary which I have (dated 1898) lists Gabriel Daniel Fahrenheit as a physicist born in Danzig and goes on to state - "About 1714 he first used quicksilver instead of spirits of wine (alcohol) for thermometers. He fixed his freezing point at 32 degrees to avoid negative measurements." This statement doesn't agree with another encyclopedia which puts it much better and more logically, in that thermometers were used to measure and record the ambient weather temperature, and Fahrenheit took the average coldest day in that part of Germany (or is it Poland?) as his zero, so he wouldn't have minus quantities for extreme temperatures below that very often. He took the hottest day recorded there as his 100. He didn't pick the freezing point at 32 - that was incidental. He also found that a mixture of brine and ice also reached his zero. Metric proponents make fun of Fahrenheit for adopting a

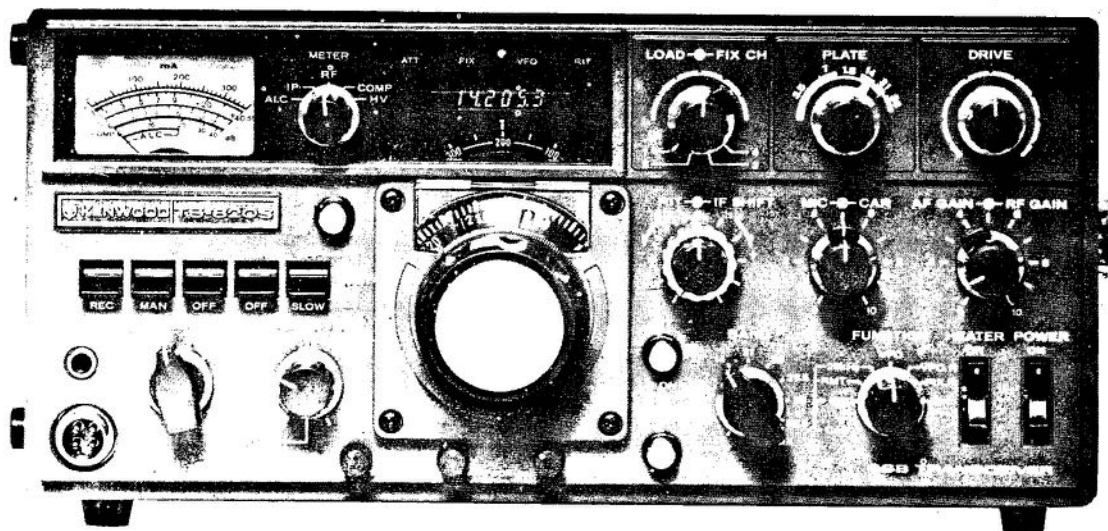
scale that wasn't on the decimal system and picking 32 degrees as the freezing point and 212 as the boiling point! Actually he did have a decimal system, or perhaps we should say a centigrade scale that covered the normal ranges of the weather temperature in which human beings lived and were most interested. Consequently the Fahrenheit thermometer is essentially a weather instrument.

"Celsius took the two markers of freezing point and boiling point as his zero and 100, because he felt that these were two common points which could be used to calibrate any thermometers without reference to his own. Later he had to modify this statement to add "at sea level" for at high altitudes water will boil at 200 degrees! The Celsius or Centigrade thermometer as we have always called it up until recently, is a laboratory instrument - when does the weather temperature ever reach boiling point? or a temperature that human beings can live in? Besides the graduations are too coarse.

"The joker in this thermometer business so far as the Metric Commission goes, is that it is not a part of the Metric system at all, and there is no authority for its being promoted as such. While scientists may have agreed on it as an international standard, it is not mentioned in the MKS or CGS system (Metre, Kilogram, Second or Centimeter, Gram, Second) promoted by Giorgi at an international meeting of scientists in 1904. In any case the thermometer was around 75 years before deBorda sold his metric system to the French Government in 1791.

"The author of the book you sent me doesn't mention Jean-Charles deBorda at all, although Chambers credits him  
october 1977 - page 17

# TS-820S



We told you that the TS-820 would be the best. In little more than a year our promise has become a fact. Now, in response to hundreds of requests from amateurs, Kenwood offers the TS-820S... the same superb transceiver, but with the digital readout factory installed. The worldwide demand for the TS-820 far exceeded our initial production plans. However, production capacity has been substantially increased and our objective is to make the TS-820S more readily available to you. As an owner of this beautiful rig, you will have at your fingertips the combination of controls and features that even under the toughest operating conditions make the TS-820S the Pacesetter that it is.

## Features

Following are a few of the TS-820S' many exciting features

**SPEECH PROCESSOR** • An RF circuit provides quick time constant

compression using a true RF clipper as opposed to an AF clipper. Amount of compression is adjustable to the desired level by a convenient front panel control

**IF SHIFT** • The IF SHIFT control varies the IF passband without changing the receive frequency. Enables the operator to eliminate unwanted signals by moving them out of the passband of the receiver. This feature alone makes the TS-820S a pacesetter



TV-506  
\$269

TV-502  
\$269

VFO-820  
\$169

TS-820S  
\$1199

SP-520  
\$36

**PLL** • The TS-820S employs the latest phase lock loop circuitry. The single conversion receiver section performance offers superb protection against unwanted cross-modulation. And now, PLL allows the frequency to remain the same when switching sidebands (USB, LSB, CW) and eliminates having to recalibrate each time.

**DIGITAL READOUT** • The digital counter display is employed as an integral part of the VFO readout system. Counter mixes the carrier, VFO, and first heterodyne frequencies to give exact frequency. Figures the frequency down to 10 Hz and digital display reads out to

100 Hz. Both receive and transmit frequencies are displayed in easy to read, Kenwood Blue digits

## Specifications

**FREQUENCY RANGE:** 1.8-29.7 MHz (160-10 meters)  
**MODES:** USB, LSB, CW, FSK  
**INPUT POWER:** 200W PEP (in SSB)  
 160 W DC on CW  
 100 W DC on FSK  
**ANTENNA IMPEDANCE:** 50-75 ohms, unbalanced  
**CARRIER SUPPRESSION:** Better than -40 dB  
**SIDEBAND SUPPRESSION:** Better than -50 dB  
**SPURIOUS RADIATION:** Greater than -60 dB  
 (Harmonics more than -40 dB)  
**RECEIVER SENSITIVITY:** Better than 0.25uV

**RECEIVER SELECTIVITY:**  
 SSB 2.4 kHz (-60 dB)  
 4.4 kHz (-60 dB)  
 4.5 kHz (-6 dB)  
 0.5 kHz (-60 dB)  
 1.2 kHz (-60 dB)  
 \*(with optional CW filter installed)  
**IMAGE RATIO:** 160-15 meters: Better than 60 dB  
 10 meters: Better than 50 dB  
**IF REJECTION:** Better than 80 dB  
**POWER REQUIREMENTS:** 120/220 VAC, 50-60 Hz, 13.8 VDC (with optional DS-1A DC-DC converter)  
**POWER CONSUMPTION:** Transmit 280 Watts  
 Receive 26 Watts (heaters off)  
**DIMENSIONS:** 13-1/8" W x 6" H x 13-3/16" D  
**WEIGHT:** 35.2 lbs (16 kg)

**VFO-820**  
 Function switch provides any combination of transmit/receive transceiver with the TS-820S. Both are equipped with VFO indicators showing which VFO is in use.

CW FILTER #55  
 DC-DC CONVRT. #59

## SP-520

Although the TS-820S has a built-in speaker, the addition of the SP-520 provides improved tonal quality. A perfect match in both design and performance.

## TV-502

The TV-502 transverter puts you on 2-meters the easy way. Operates in the 14.4-0.145.7 MHz frequency range with a 145.0-146.0 MHz option. Completely compatible with the TS-820S, the TS-520S and most any HF transceiver.

## TV-506

Similar to the TV-502 except that it opens up the 6-meter band (50.0-54.0 MHz) to your HF rig.  
 \*The TS-820S and DG-1 are still available separately.

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with helping to measure the arc of the meridian from the equator to the north pole and establishing the metric system. (The metre is 1/40,000,000 of the length of that arc, he said.)

"The author mentions that the Fahrenheit thermometer will be around for a long time yet, as millions upon millions of household thermometers, oven thermometers, thermostats are Fahrenheit's calibration. The same is true of barometers calibrated in inches of mercury which are the only ones available or in use, not "kilopascals" that Environment Canada is using.

"With all due regard to the scientific mandarins in Environment Canada, in the weather office part of it, they have introduced one new measurement after another to confuse the general public. Adopting the Celsius thermometer readings in their wx reports, without mentioning Fahrenheit equivalents (as they did for a year in England) was bad enough, but then they brought out this "kilopascal" business for barometer readings, which means nothing to the general public whose barometers are in inches. The next idea

of some genius was then to talk about the chill factor in "watts per sq. metre" which means nothing to the general public, who always associates watts with heat, not cold. I suppose the next thing will be to give the wind direction in a 360 degree aximuth and do away with the points of the compass! Anything to make the weather information as difficult and useless to the general public, as possible. When is a government service not a service? When it can't be understood and used by the general public! Trained seals of the government's metric commission, that chap in Winnipeg called them. The metric commission aren't getting very far with the post office who are still using ounces, pounds, etc. and I hear the marine weather report is still using knots!

(Just to vindicate your view, Jack, in air-ground-air radio where instant comprehension is an absolute necessity, communicators and pilots still use inches of mercury, as well as "kilopascals" for barometric pressure readings, and altimeter readings are still in feet. Ed.)

## Technical Talks

---

# Audio Rectification

Here are some ideas for beating radio interference in home entertainment equipment, as written by M.D. Connolly in the DOC Ontario Region Information Circular ORC-1:

With the proliferation of radio transmitters operating in residential areas, the susceptibility of most home entertainment audio equipment to this form of interference has become evident.

Audio rectification occurs when the apparatus containing an audio amplifier (stereo, radio, TV, etc.) is exposed to a radio frequency signal of high strength. Such a high field strength is encountered only in the immediate vicinity of the transmitter. Typically, in the case of solid state equipment, the base-emitter junction of a low-level amplification stage acts as an AM detector. Once detected, the modulation (usually voice) is amplified in the manner inherent in the amplifier design and reproduced by the

speaker(s).

It must be emphasized that the characteristics of the transmitters involved are not responsible for the occurrence of audio rectification and that the remedy lies in modification to the 'affected' apparatus.

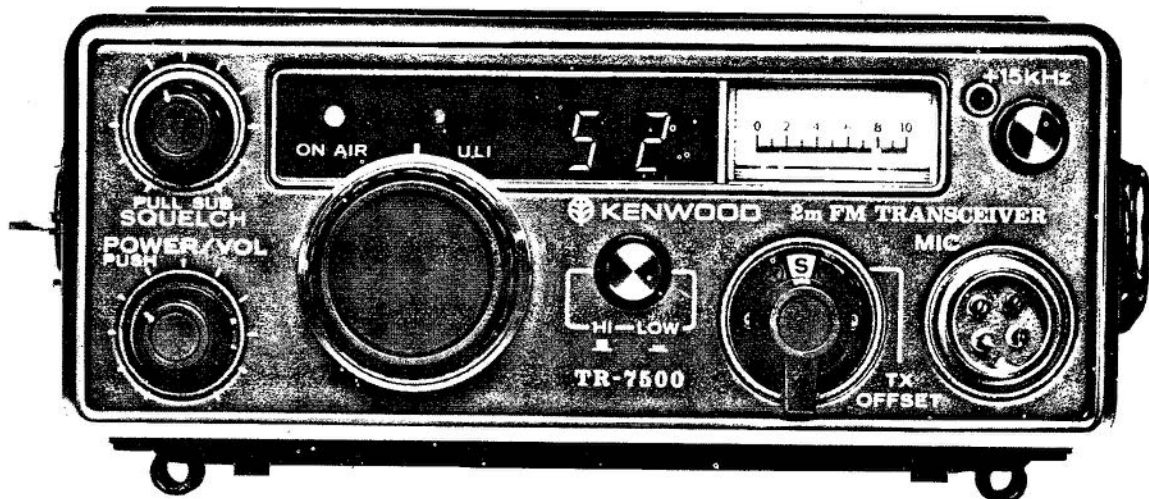
With this in mind, the following measures may be taken to eliminate audio rectification:

### Step 1 - SHIELDING SPEAKER LEADS

Probably the most common entry point(s) of the radio frequency signal into the audio amplifier is via the leads connecting the speaker(s) to the amplifiers (this is especially true of systems having remote speakers). In the case of stereo systems, this condition is typified by the interference being audible regardless of sound source (tuner, phonograph, tape deck, etc.). Fortunately, this is the form of pickup most easily eliminated. The replacement of

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# TR-7500



There are a number of good 2 meter FM transceivers on the market. You may already own one. But, even if you do, we suggest that you put your radio to this test. And, if you're thinking of buying one, this test should be a helpful guide.

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**\$399**

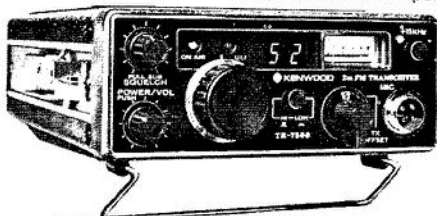
- |  | NO                       | YES                      |
|--|--------------------------|--------------------------|
| Is it PLL synthesized?                             | <input type="checkbox"/> | <input type="checkbox"/> |
| Does it have 100 channels (88 pre-programmed)?     | <input type="checkbox"/> | <input type="checkbox"/> |
| Does it have 12 extra diode programmable channels? | <input type="checkbox"/> | <input type="checkbox"/> |
| Does it have single knob channel selection?        | <input type="checkbox"/> | <input type="checkbox"/> |
| Does it have a LED digital frequency display?      | <input type="checkbox"/> | <input type="checkbox"/> |
| Does it have a powered tone pad connection?        | <input type="checkbox"/> | <input type="checkbox"/> |
| Does the receiver have helical resonators?         | <input type="checkbox"/> | <input type="checkbox"/> |

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**AUGUST**

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If your answer is NO to any of these, the TR-7500 is the radio that you should own. And, in addition to these important features, you get proven Kenwood quality, value and service.



TR-7500  
*Specifications*

**NEW!**

Semiconductors: Transistors ..... 41  
 FETs ..... 8  
 ICs ..... 7  
 Diodes ..... 35

Frequency Range: 146.01 to 147.99 MHz  
 Mode: FM  
 No. of Channels: 100  
 Operating Temperature: -20 to +50 degrees C  
 Power Voltage: 11.5 to 16.0V DC (13.8V DC nominal)

Grounding Polarity: Negative ground  
 Antenna Impedance: 50 Ohms  
 Current drain: Less than 0.5A in receive with no input signal  
 Less than 3A in transmit (HI) Less than 1.5A in transmit (LOW) (at 13.8V DC)  
 Dimensions: 172 mm (6-3/4") wide  
 250 mm (9-7/8") deep  
 75 mm (2-15/16") high  
 Weight: Approximately 2.2 kg (4.8 lbs.)

**TRANSMIT SECTION**  
 RF Output Power: High: 16 Watts  
 Low: 1 Watt (approximately)  
 Modulation: Variable reactance frequency shift  
 Frequency Deviation: ± 5 KHz  
 Spurious Radiation: Better than -60dB

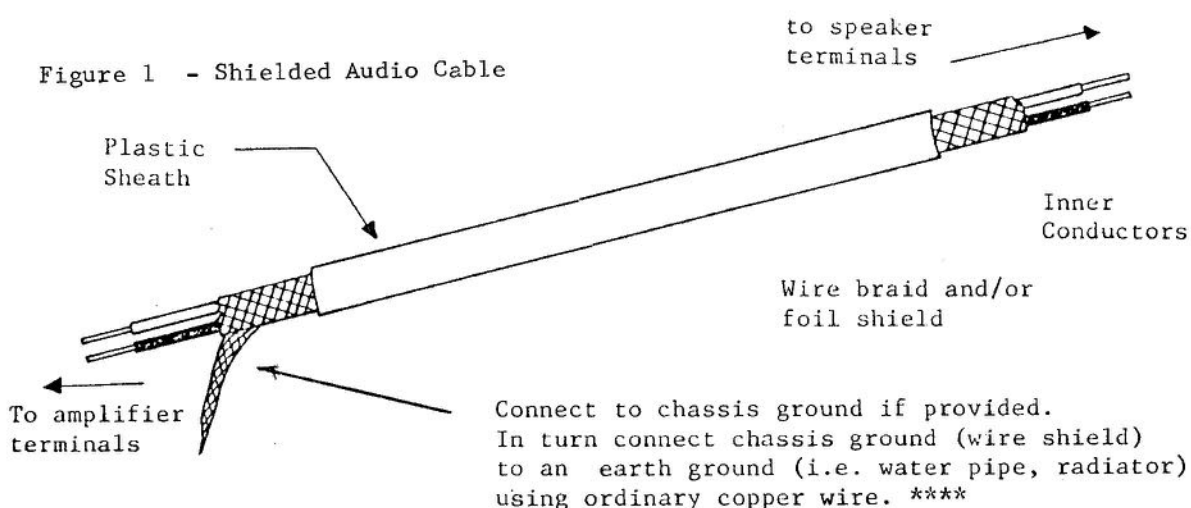
Tone Pad Input Impedance: 600 Ohms  
 Microphone: Dynamic microphone with PTT switch, 500 Ohms

**RECEIVE SECTION**  
 Receive System: Double conversion superheterodyne  
 Intermediate Frequency: 1st IF: 10.7 MHz  
 2nd IF: 455 KHz  
 Sensitivity: Better than 0.4 µV for 20dB quieting, Better than 1 µV for 30dB S/N  
 Squelch Sensitivity: Better than 0.25 µV  
 Selectivity: 12kHz at -6dB down  
 40 kHz at -70dB down  
 Image Rejection: Better than -70dB  
 Spurious Interference: Better than -60dB  
 Audio Output: More than 1.5 watts across 8 Ohms load 10% distortion  
 Intermodulation: Better than 66dB

FOR THESE AND OTHER ITEMS IN OUR LATEST CATALOGUE, WRITE TO:-

**GLENWOOD TRADING COMPANY LTD. 278 East 1st St. North Vancouver, B.C. V7L 7B5**

Figure 1 - Shielded Audio Cable



Connect to chassis ground if provided. In turn connect chassis ground (wire shield) to an earth ground (i.e. water pipe, radiator) using ordinary copper wire. \*\*\*\*

Do not attempt to ground a "hot" chassis. If no ground terminal is evident contact a qualified serviceman for advice.

the regular speaker lead by shielded audio cable will generally eliminate this condition. Figure 1 illustrates this cable and how it may be utilized.

should only be attempted by qualified personnel. Contact the manufacturer's representative to determine if this service is available. Some manufacturers may consider any warranties void unless the work is performed by their personnel.

The next steps require a certain degree of technical and practical ability and

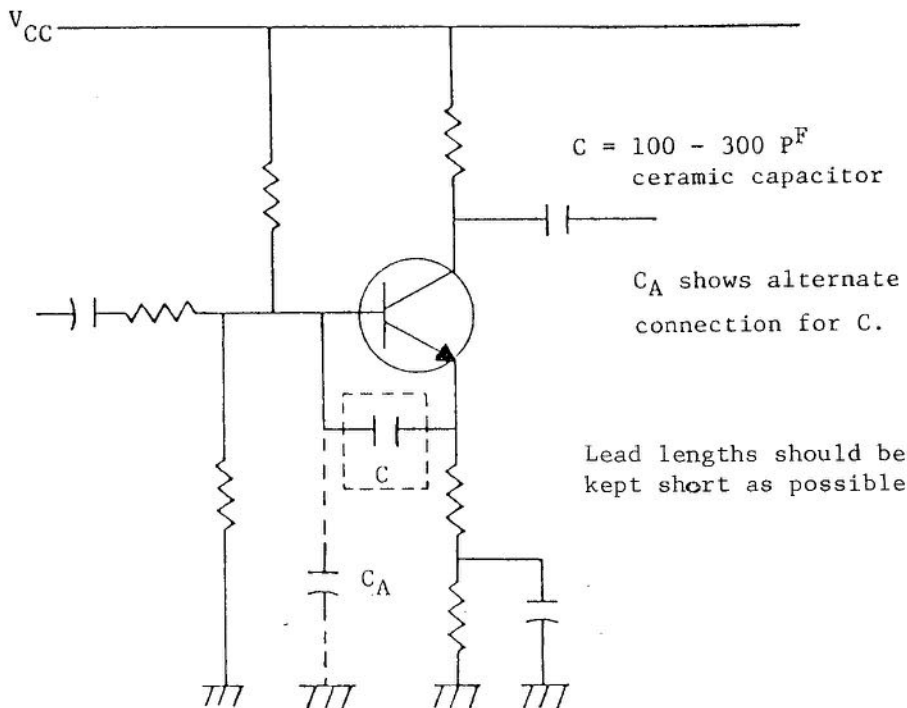


Figure 2 - Bypassing Amplifier Stage

# CHOOSE TOP PERFORMANCE FROM THIS SHOWCASE OF H.F. RIGS



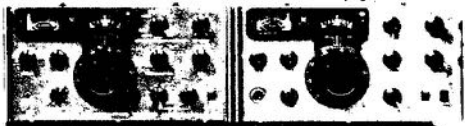
## NEW . . . TS-820S from KENWOOD

The same superb transceiver but with the digital-readout now factory installed. Many features, including 10 thru 160 meter coverage; 200 watts P.E.P.; integral IF shift; solid-state except driver and final stages; noise-blanker; VOX and semi break-in CW; PLL Circuitry; USB/LSB/CW/FSK; phone patch terminals; RF Speech processor; and much more.



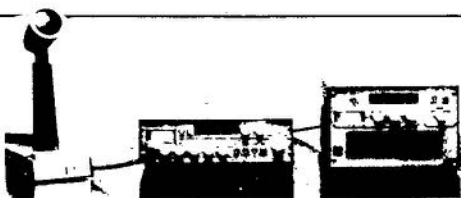
## NEW . . . TS-520S from KENWOOD

It combines the fine, proven characteristics of the original TS-520 with many new and improved features! Covers 160-10 meters completely plus WWV. Improved sensitivity and spurious response characteristics; new improved speech processor; new highly effective noise blanker (ANOISE BLANKER THAT REALLY WORKS!); phone patch terminals; completely solid-state except driver and final stages; built-in supply; switchable AGC; RTI control; 25 Khz. calibrator and much, much more, at an unbelievably reasonable price.



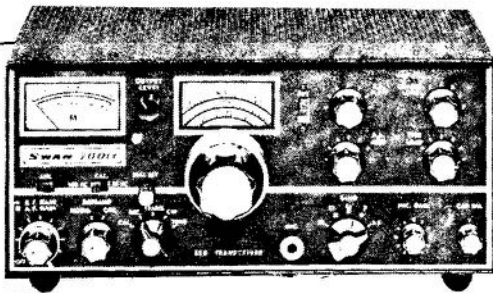
## KENWOOD R599D/T599D . . . THE TWINS

The no compromise pair . . . R-599D features all solid state; 1.8 to 29.7 MHz; WWV; 1KHz readout; crystal filters; effective noise blanker; 4 way VFO; built-in squelch; accurate S-meter regardless of RF Gain setting; switchable AGC; 25 Khz. calibrator; RIT . . . The T-599D features solid state except driver and finals; highly stable VFO; 4 way VFO; VOX Semi-break-in CW with sidetone; transverter terminals; covers 3.5 - 29.7 Mhz. Drop us a line for detailed specifications.



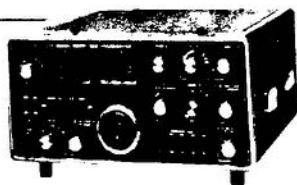
## NEW . . . THE ASTRO 200

Brand new transceiver built in the U.S.A.; state of the art 100% solid-state communications center with over 40,000 frequency synthesized channels covering 80-10 meter bands completely with 200 watts P.E.P. input. Push-button VFO frequency control - no tuning knob!; large 6 digit frequency display; fully RIT and harmonic suppression; built-in SWR bridge; broadbanded - no finals to tune; CW filter/station console/AC Supply/Matching speaker/mobile mount, available. Write for specs.



## SWAN ELECTRONICS 700CX TRANSCEIVER

700 watt P.W.P. Powerhouse, 80-10 meters; 25 Khz calibrator; best "watts-per-dollar" value on the market today!



## UNIDEN 2020 TRANSCEIVER

A unique SSB transceiver with an unusual combination of advanced engineering and operating features. Operates USB, LSB, CW, and AM on 80 - 10 meters. Features include: Phase-lock-loop (PLL) Oscillator circuit, hybrid digital frequency readout, advanced solid-state design (only 3 tubes), AC & DC power supplies built in, CW filter (standard), cooling fan (standard), VOX and semi-break-in CW, 25 KHZ. calibrator, WWV receiving capability, dual RIT control, plus many more.

45 BRISBANE ROAD UNIT 18, DOWNSVIEW ONT. TEL: 661-8800

# HAMTRADERS INC.

## Step 2 - BYPASSING AMPLIFIER STAGES

If Step 1 proves ineffective or only partially effective, then capacitive bypassing of individual amplifier stages should be considered. This involves the installation of small electrical components called capacitors in the amplifier stage exhibiting rectification. If the capacitor is carefully chosen, then the radio frequency signal is prevented from entering the stage, but audio frequencies are left unaffected. Noting if the level of the interference may be varied by the volume control may be a guide toward isolating the offending stage. If the level can be varied, then the offending stage precedes the volume control. Convers-

ely, if the level of interference cannot be varied, then the offending stage follows the volume control.

Fig. 2 shows a typical amplifier stage showing placement of a bypass capacitor.

## Step 3 - INSERTION OF BLOCKING INDUCTANCE

In unusually difficult cases, it may be necessary to add a blocking inductance in addition to the foregoing. This inductance presents a high impedance to radio frequencies while passing audio frequencies virtually unimpeded.

Fig. 3 shows a typical amplifier stage with the addition of a blocking inductor 'L'.

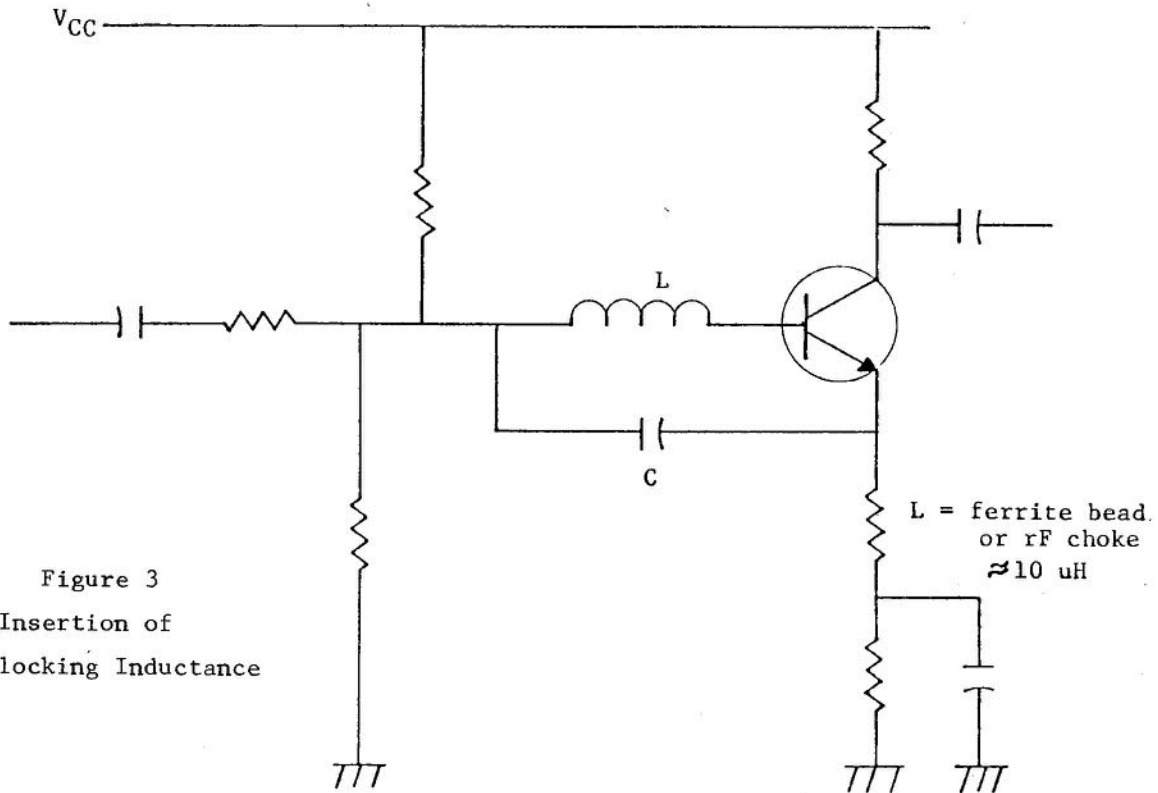


Figure 3

Insertion of  
Blocking Inductance

## Check your Label

Your membership label has, as its first line, a coded reference such as: Y-999-JUN 77. The 'Y-(((' denotes your individual membership number as given on your membership certificate; 'JUN 77' indicates that our computer service will print out this label (and all others with this date) in June 1977. and these

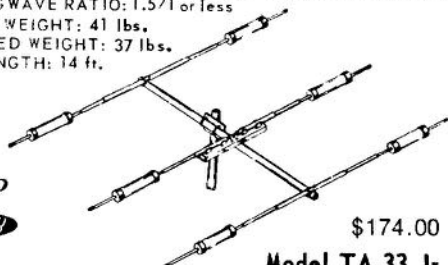
labels will be forwarded to the CARF HQ Office. The Office will then use the labels to forward a renewal notice. Renewal stickers are not issued for Membership Certificates due to the difficulties and expense incurred. Your address label is your renewal certification.

# MOSLEY ANTENNAS

## Model TA-33 for 10, 15, and 20 meters \$238

The Mosley TA-33 three element beam provides outstanding 10, 15, and 20 meter performance. Exceptionally broadband - gives excellent results over full Ham bandwidth. Exclusive Mosley trap design offers resonant frequency stability under all weather conditions. Element center sections are of double thickness aluminum to reduce sag. Boom requires no bracing. Heavy duty universal mounting plate fits masts up to 1 1/2 inch O.D. Antenna handles full KW AM/CW or 2 KW P.E.P. SSB input. Feed with one coax line, RG-8/U recommended. The TA-33 may also be used on 40 meters with TA-40 KR conversion. Complete with Hdw.

FORWARD GAIN: Up to 8 db. TURNING RADIUS: 15.5 ft.  
 FRONT-TO-BACK: 20 db. or better WIND LOAD: 114 pounds.  
 MAX. ELEMENT LENGTH: 28 ft. WIND SURFACE: 5.7sq. ft.  
 STANDING WAVE RATIO: 1.5/1 or less  
 SHIPPING WEIGHT: 41 lbs.  
 ASSEMBLED WEIGHT: 37 lbs.  
 BOOM LENGTH: 14 ft.



\$174.00

### Model TA-33 Jr.

Mosley TA-33 Jr. has quality and performance found in the TA-33. Rated to 300 watts AM and CW, - 1000 watts P.E.P. on SSB. Complete with Hdw. The Junior may be converted to MP-33 with higher power rating with MPK-3 Kit. Shipping weight 28 lbs. Assembled weight 20 lbs.

## The Classic 33 10, 15, and 20 meters

Beam designed to provide the extra gain for working hard-to-reach DX. Incorporates exclusive Mosley "Weather-Proved" traps with resonant frequency stability. Features new boom to element clamping and balanced radiation. Hardware is stainless steel. Feed with 52 ohm RG-8/U coax. Fits up to two inch mast. Use with most heavy-duty rotors. 1 KW AM/CW or 2 KW P.E.P. SSB input.

FORWARD GAIN: Full 8 db. compared to reference dipole or 10, 1 db. over isotropic source.

FRONT-TO-BACK: 20 db. or better on 15 and 20; 15 db. on 10 meters.

STANDING WAVE RATIO: 1.5/1 or better.

MAXIMUM ELEMENT LENGTH: 27 ft.

ASSEMBLED WEIGHT: 42 lbs.

BOOM LENGTH: 18 ft.

SHIPPING WEIGHT: 47 lbs.

TURNING RADIUS: 16 ft.

WIND LOAD (80 MPH

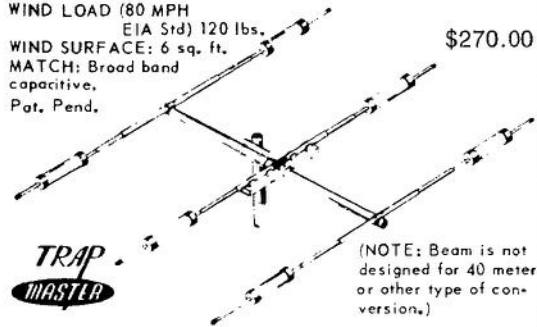
EIA Std) 120 lbs.

\$270.00

WIND SURFACE: 6 sq. ft.

MATCH: Broad band capacitive.

Pat. Pend.



(NOTE: Beam is not designed for 40 meter or other type of conversion.)

## CL-36 \$349

## Mosley 2 Metre Antennas

- D12 Diplomat 5/8 ground plane \$35.50  
 BASE ANTENNA  
 MY-144-9 E1. 14dB 2KW Yagi \$49.50  
 MY-144-5 E1 10dB 2KW Yagi \$39.50  
 MM-144 5/8 mobile C/W spring and base \$31.50

### HF Vertical Antennas

- RV-4C 40 - 10 mtr, 2 KW \$77.25  
 RV-8C 80 mtr conversion \$45.25  
 80 - 10 Mobile antenna available  
 MPK-3 \$63.00

### TA-33 Jr. Pwr. Conversion Kit

### HY-GAIN ANTENNAS

- 18ABT/WB 10-80 mtr. vertical \$138.95  
 TH6DXX 6el. tri-band beam \$339.00  
 204BA 4el. 20 meter beam \$259.00  
 BN 86 balun \$22.50  
 RG-8U 25cft. RG-8U foam 28cft.  
 PL-259 connectors \$1.00 \$10.50 doz.  
 FC-50 60MHz Counter D \$165.00  
 650MHz Pre Scaler \$39.50  
 6 digit LED clock kit 12/24hr. \$34.50  
 Larseh magnetic mounts \$16.50

### KENWOOD RADIOS

- TS-520S \$859.00  
 TS-820S \$1199.00  
 TS-700A \$639.00  
 TR-7200A \$295.00  
 TR-7400A \$499.00  
 TR-2200A \$299.00  
 TR-7500 \$399.00

### CDE ROTORS

- AR-30 \$59.50  
 AR-40 \$79.50  
 CD-44 \$158.00  
 HAM II \$199.00  
 HAM III \$209.00  
 Big-Talk \$125.00  
 Tail Twister \$379.00  
 Rotor plate \$6.50  
 Rotor wire 21cft 8 wire  
 12cft 5 wire

All orders over \$350.00 shipped prepaid in Canada except VE8 land and Labrador

Prices subject to change

# MacFarlane Electronics Reg'd

RR No. 2 Battersea, Ont  
 Phone (613) 353-2800  
 VE3BPM



# Bouquet for DOC

The following is from the Canadian General Radio Service Alliance 'Quarterly' but it is of interest to Amateurs as well as CB operators.

Many times we have listened to DOC field office personnel describe themselves as 'mediators', not policemen.

And it's a good thing they're not. Canadian GRS/CB operators have had things pretty much their own way for the past five years. Suggestions and proposals made to DOC have, by and large, been taken seriously and acted on in due course.

You must remember that the steps necessary to enact any new legislation involving the Radio Act is very difficult, time-consuming and cumbersome. Regional DOC Inspectors are often torn between rules which appear contradictory, even silly, and operators who are both a credit and a Big Pain on the Band. The good operators may cause TVI and use procedures that are not exactly 'according to Hoyle' in the act of carrying out their good works, and the bad operators may escape prosecution because of the difficulty, or even impossibility, of translating Radio Act penalties into reality in the court room. And "while Rome burns", the politicians and top-level officials of the communications ministry fail to come to grips with major changes in a doddering old act which bears about as much relevance to present day applications as does Dr. Ballard's Dog Food to the Anik Satellite.

Everywhere we look we find likable DOC people working hard on problems of the General Radio Service in their respective areas. For the most part, they are energetic, open and quite willing to assist those requiring 'sorting out'. We have yet to receive one major complaint about the conduct of DOC officials during an investigation. They appear to follow an excellent code of courteous conduct at all times, and in the face of some pretty hairy disputes among operators and their neighbours experiencing TVI. You've got to give them credit. It's a little like being a hockey referee when he has to step in between two players involved in a wild scrap on the ice. Not only that, DOC inspectors

can't explain the nuances of 'audio swamping' in a lousy, poorly-shielded TV or stereo receiver to some poor schnook who paid six or eight hundred bucks for it! He simply won't accept rational argument.

So, here's to Canada's Department of Communications field people. Treat them with courtesy and respect and you'll find all the doors open. (Amen!)

THE CANADIAN

## Contest Scene

The Ontario YL/XYL Trillium club is sponsoring a contest Nov. 4 7:30 pm EST to Nov. 5 7:30 pm EST. Trillium members will call "CQ TW". To call a member, call "CQ TOT". Exchange signal report, name, QTH and, if you are a Trillium member, give your membership number. The same Trillium member may be contacted twice if bands and/or modes are different. CW and phone QSOs count 5. Xmters on 150 watts or less on CW or AM or 300 watts PEP SSB or less can add 1.25 points. 100 points can be added for working 10 Trillium members plus 100 for each additional Trillium contact.

A plaque goes to the highest non-Trillium score, certificates to second and third place scorers and a free year's membership to the highest scoring Trillium member.

Logs must be postmarked no later than Dec. 31, 1977. Send to Eva Colleck, 155 Midland Ave, Scarborough, Ont. M1N 3Z8. Suggested frequencies: 3770, 3885, 7240, 7103 kHz and 14.280, 14.140 and 14.035 MHz.

## Bell goes modern

The major telephone operating company in Ontario and Quebec, Bell Canada, has caught up with the 20th Century and has now converted its old manual phone patch "mobile service" into autopatch (automatic dialing from the vehicle) in Hamilton and Toronto.

# HEAVY DUTY HAM TOWERS

DMXHD Heavy Duty Ham Towers can support a large amateur beam of up to 9 sq. ft. wind area. Guy wires must be used if larger loads are required or cross bar mounted antennas or if greater height using straight sections is needed.

DELHI DMXMD and DMXHD towers use the larger and stronger sections of our standard eight section, 68 foot TV tower, Model DMX-68. DMXMD towers have a DMX2T top section, DMXHD towers have a DMX3T top section. Both top sections have a No. 244A cast aluminum mast clamp installed on the top plate.

Each section is 8 ft. long and has beaded channel legs riveted together with "X" braces. Legs and braces are high tensile steel, heavily galvanized before fabrication. Rivets are solid heat treated aluminum. Sections fit accurately together and are joined by heat treated nuts and bolts. The uniform tapered leg design together with evenly spaced "X" braces give the tower greater strength and reliability.

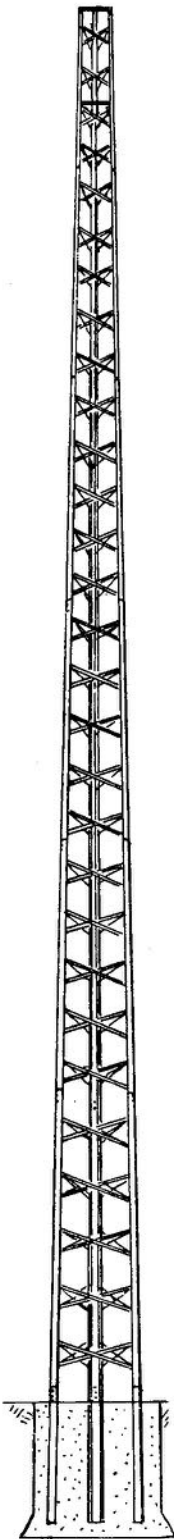
**NOTE:** All DMXHD Series Ham towers are shipped complete with the following:

8 ft. tower sections, top plate with cast aluminum mast clamp, rotor plate, three 4 ft. concrete base stubs, special nuts, bolts and washers. (No mast is included in package).

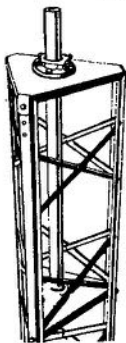
Model No.	Height of Tower	Tower Section Supplied	Wt. in lbs.
DMXHD-32	32	DMX3T, DMX4, DMX5, DMX6	170
DMXHD-40	40	DMX3T, DMX4, DMX5, DMX6, DMX7	241
DMXHD-48	48	DMX3T, DMX4, DMX5, DMX6, DMX7, DMX8	314

Items which may be ordered separately.

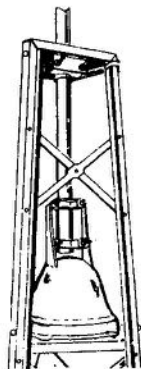
CBS6	Concrete base stubs for DMXHD-32	14
CBS7	Concrete base stubs for DMXHD-40	20
CBS8	Concrete base stubs for DMXHD-48	21
HUB 3-6	Hinge-up base for DMXHD-32	20
HUB 7-8	Hinge-up base for DMXHD-40 or DMXHD-48	24
HD Mast	2" O.D. x 12 Ga. x 8' Galv. mast	18
MD Mast	1-1/2" O.D. x 14 Ga. x 8' Galv. mast	10
BBMB	Cast alum. ball bearing mast bearing:	
	2" O.D. capacity	2
TA-6	Thrust bearing with tapered rollers.	
	1-1/2" O.D. capacity	2



DMXHD-48

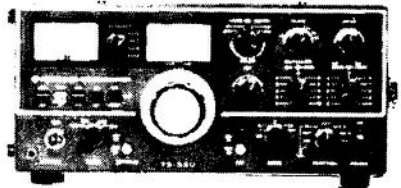


Top of tower with mast clamp plate installed.



Any make of rotator can be mounted on rotor plate.

**NOW AVAILABLE!**



TS-520  
80-10 M Transceiver

Prices subject to change

All orders over \$350.00 shipped prepaid in Canada except VE8 land and Labrador

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Phone (613) 353-2800  
VE3BPM

# == Atlantic Convention Report ==

Held at St. Andrew's, N.B., this year, the Atlantic Labor Day weekend convention drew about 400 Amateurs from both sides of the border. The banquet speaker was John M. Henry VE2DNM, your Federation President, who also spoke at the CARF forum, as did your Editor, Doug Burrill VE3CDC.

Nate Penney VO1NP, CARF Atlantic Director, and CARF Secretary Joan Powell VE3FVO, along with Doug and John, formed an all-East-Coast group on the platform (Three of them were born and lived in Saint John; Nate boasts St. John's as his native city.)

The main prize, a Kenwood 820, went to W1AZC of Houlton, Maine. The two metre hidden transmitter hunt was

won by John Perkins VE1FH of Halifax and the code copying contest went to Harley Grimmer VE1MX, also of Halifax, at 40 words per minute. The consolation prize for the runner-up was a T-shirt which read: "I'm not a fast operator, I'm not a slow operator, I'm just a half fast operator".

Five Old-Timers were awarded special certificates for 50 or more years on the air. Al Smith VE1BY; Walter Hyndman VE1BZ (a former lieutenant-gov. of P.E.I., by the way); Fred Rafferty VE1AN; 'Buzz' Butler VE1BT; and Jack Holman VE1CP. Jack, having the distinction of being the oldest ham there, was presented with a specially minted 1977 'St. Andrew's Dollar'. In contrast, Jack presented the youngest Amateur at the banquet, Kevin Weeks VE1BOE (13) with a T-shirt bearing the appropriate words, "I've got the world by the ears"! Among the younger ones, Dave Macauley VE1BOD, who is 2 months younger than VE1BOE, was registered for the day events.

By odd chance, a visiting Amateur, the president of the Sri Lanka (Ceylon) Radio Society was passing through St. Andrew's on the way to visit his son in Halifax and, noticing the host of mobiles in town, joined the festivities on Sunday. John Amaratunga 4S7JA compared notes with John Henry VE2DNM and presented John with a plaque bearing the Society crest.

## Spectrum divisions

With all of the abbreviations in use these days and with much attention centered on the upcoming world conference on re-allocation of radio frequencies, here is a reminder of how the radio spectrum is labelled:

Very Low Frequency	VLF	10-30 kHz
Low frequency	LF	30-300 kHz
Medium frequency	MF	300kHz-3MHz
High frequency	2 HF	3 - 30 MHz
Very High "	VHF	30 - 300 MHz
Ultra high "	UHF	300MHz - 3GHz
Super high "	SHF	3 - 30 GHz
Extremely high	EHF	30 - 300 GHz

## Technical Talks

### Basic Antenna Facts

Judging from discussions held during coffee breaks at club meetings, most new Amateurs are confused as to how antennas work - and many 'old' Amateurs have difficulty in explaining their operation. This article will hopefully explain such items as 'gain', 'directivity', 'radiation angles' and the like.

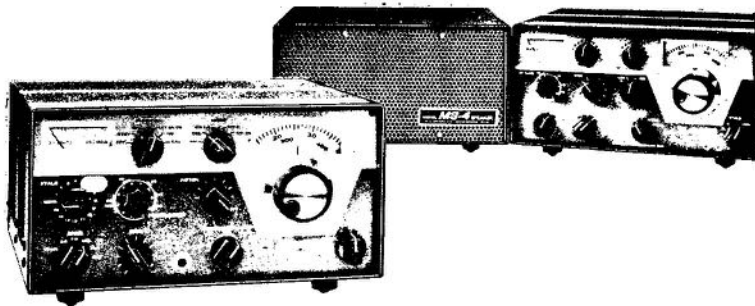
First, let us consider a 'point source in free space' - the most elementary type of antenna. This could consist of a

small, round ball that we can somehow supply with R.F. This point source will radiate the power supplied in every direction, i.e. with no directivity or gain.

The next considered radiator would be an 'elementary dipole' which consists of a small bar possessing length in relation to diameter. Look at it as a linear series of point sources with each point source radiating. It can readily be seen that the maximum radiation of this ele-

# Drake C-Line

R. L. DRAKE COMPANY



Model No. 1511  
**Drake MS-4 Matching Speaker**

(Shown on facing page) for use with R-4, R-4A, R-4B and R-4C Receivers. (Has space to house AC-3 and AC-4 Power Supplies).

**Power Supplies** for T-4, T-4X, T-4XB or T-4XC (The AC-4 can be housed in an MS-4 speaker cabinet).

Model No. 1501 Drake AC-4  
Model No. 1505 Drake DC-4

**Accessory Bandwidth Filters** available: Model No. 7011 Drake FL250, Model No. 7013 Drake FL500, Model No. 7015 Drake FL1500, Model No. 7017 Drake FL4000, Model No. 7019 Drake FL6000.

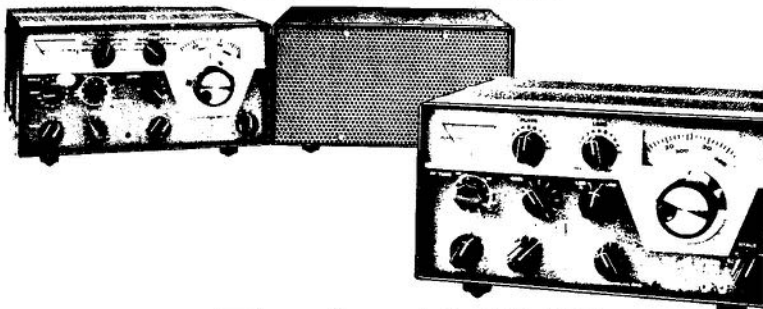
**Linear Amplifier** see page 15

**RF Wattmeters** see page 3

**Matching Networks and FS-4 Synthesizer** see page 14

**Push Button Encoding Mike** see page 20

## Drake R-4C



## Drake T-4XC



**Drake TR-4Cw Sideband/Cw Transceiver**  
with Model No. 1319 **Drake RV-4C Remote VFO**



Write for Catalogue Sheets c/c J. H. Williams VE3XY

**C. M. PETERSON CO. LTD.**

Communications Electronics Division

Head Office C.M. Peterson Co. Ltd.

220 Adelaide Street North, London, Ont. N6E 3H4 434-3204

Toronto Amateur Dept.: 47A Colville Road Toronto 15

### DRAKE MICROPHONES

Wired for use with Drake transmitters and transceivers, for either push-to-talk or VOX. Type of operation is determined by the VOX control setting of the transmitter.



**Desk Type Model No. 7075**

• **Type:** Heavy Duty Ceramic Desk Top • **Cable:** Four Foot, 3-Conductor, One Shield • **Output Level:** Minus 54 dB (0 dB = 1 volt/microbar) • **Frequency Response:** 80-7000 Hz • **Switching:** Adapts to either push-to-talk or VOX.



**Hand-Held Type Model No. 7072**

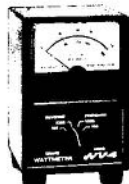
• **Type:** Ceramic, hand held • **Cable:** 11' Retracted, 5' extended, PVC 3 Cord, 1 shielded, Coil Cord • **Case:** Cyclac • **Finish:** Grey • **Output Level:** Minus 65 dB (0 dB = 1 volt/microbar) • **Frequency Response:** 300-3000 Hz • **Switching:** Adapts to either push-to-talk or VOX.

## Drake Directional RF Wattmeters



Model No. 1513

1.8-54 MHz



Model No. 1515

20-200 MHz

### Drake AA-10 Power Amplifier

10 dB power increase greatly adds to the transmitting distance covered by and 2-meter fm transceiver running up to 1.8 watts output



Small size: 2"H x 2.1"W x 5.5"D (51 x 52 x 140 mm)

# ANTENNAS

mentary dipole will occur at right angles to the length as this is the direction at which the radiation from each of the point sources will add while the radiation from adjacent point sources along the length will cancel (Fig. 1)

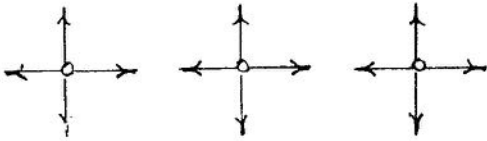


Fig. 1

This directivity of radiation in the elementary dipole is such that it will produce, broadside to the length, an effective gain of  $3/2$ , or 1.76 dB as compared to the point source.

The next antenna we will look at is the half-wave dipole, the most common antenna. The half-wave dipole owes its usefulness to the fact that it is the shortest uniform radiator which will support a standing wave for which all the elements of current are in phase. The directivity of the half-wave dipole will produce, broadside to the length of the antenna, an effective gain of 1.64, or 2.16 dB, compared to the point source.

In normal practice, the performance of antenna systems is compared to that of a half-wave dipole situated at the same height as the centre of the antenna system and oriented so that the directivity of the dipole coincides with the direction of maximum radiation of the system. But note that some manufacturers of antennas use the point source (sometimes called an 'isotropic radiator') as the reference and you should subtract 2.16 dB from these figures to equate performance with the half-wave dipole.

## Antenna Impedance

Impedance is determined by the instantaneous value of the voltage present divided by the current, if these quantities are in phase, the resultant is a pure resistance; if not, the impedance has a

reactive component. In an antenna, the current and voltage are about 90 degrees out of phase except at the centre where the standing wave of voltage is changing polarity and equals zero and at the ends where the current equals zero.

## Antenna Resistance

The energy supplied to an antenna is dissipated in the form of radiated energy and in heat losses in the antenna structure. The total power dissipated is:

$$P_a = I^2R + I^2R_o$$

where 'R' is a measure of the resistance that produces heat losses and  $R_o$  is an assumed resistance which would have dissipated the power radiated as heat if it had been present.  $R_o$  is commonly called the Radiation Resistance and for a half-wave dipole in free space is about 73 ohms and this decreases to about 65 ohms for a practical antenna due to the presence of ground and other conductors and dielectric material in the radiation field of the antenna.

## Length of a Half-Wave Dipole

The length of a half-wave dipole in free space is given by  $492/f$  (MHz) feet or  $5905/f$  (MHz) inches. Various factors come into play for practical antennas such as the ratio between length and diameter, the capacity added to the radiator by insulators, etc. Below 30 MHz the equation is modified to  $468/f$  (MHz) feet and above 30 MHz the equation becomes  $5905K/f$  (MHz) inches with the value of K determined by the length/diameter ratio. A ratio of 100 gives  $K = .91$ ; a ratio of 2000 gives  $K = .95$

## Directivity of a Half-Wave Dipole

The radiation pattern of a half-wave dipole in free space can be computed using the formula:

$$F_o = \frac{\cos(90^\circ \cdot \cos \phi)}{\sin \phi}$$

where  $\phi$  is the angle of radiation from the length of the antenna. I.e. broadside is 90 degrees. Working the equation out on your calculators will give results such as:



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$$\begin{aligned}
 F(90^\circ) &= 1 \\
 F(60^\circ) &= .816 \\
 F(30^\circ) &= .414 \\
 F(0^\circ) &= 0
 \end{aligned}$$

### Vertical Plane Radiation Pattern

The radiation pattern from a practical antenna in a horizontal plane is affected by the presence of ground. The direct wave radiated will be joined with the radiated wave that is reflected from ground and this reflected wave can add to or subtract from the direct wave so that maximum radiation will occur at a specific angle, or angles, in relation to the ground (Fig. 2)

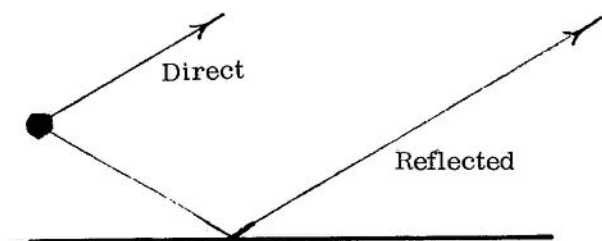


Fig. 2

The angle(s) of maximum radiation in the vertical plane will depend on the height of the horizontal radiator above ground and can be computed from the equation:

$$F_a = \sin(h \cdot \sin a)$$

$$(\lambda = 360)$$

where  $a$  is angle to horizon and

$h$  is height in electrical degrees

To find nulls (angles of minimum radiation), equate  $\sin(h \cdot \sin a)$  to zero.

This means that  $(h \cdot \sin a)$  will equal  $0^\circ, 180^\circ, 360^\circ$ , etc.

To find maximum angles of radiation, equate  $\sin(h \cdot \sin a)$  to 1.

This means that  $(h \cdot \sin a)$  will equal  $90^\circ, 270^\circ, 450^\circ$ , etc.

For example: to find the maximum angles of radiation for an antenna that is one wavelength ( $360^\circ$ ) above ground -

$$h = \lambda = 360^\circ$$

$$\text{Let } h \cdot \sin a = 90$$

$$\text{then } 360 \cdot \sin a = 90$$

$$\sin a = 90/360 = 0.250$$

$$a = 14.5^\circ$$

$$\text{also Let } h \cdot \sin a = 270$$

$$\sin a = 270/360 = .750$$

$$a = 49^\circ$$

There will be two maximums, one at  $14.5^\circ$  and the other at  $49^\circ$  to the horizon. Similarly, there will be nulls at  $0^\circ, 30^\circ$ , and  $90^\circ$ .

An examination of this formula indicates that any horizontally polarized antenna that is less than a quarter-wave high will have maximum radiation at an angle of  $90^\circ$  - in other words, straight up. And a quarter-wave at 80 metres is 70 feet, for 40 metres 35 feet. As the height increases so will the vertical angle of maximum radiation decrease until, at one half-wave above ground the angle is  $30^\circ$ . So a tri-band beam, 35 feet high, will have maximum radiation at a vertical angle of  $30^\circ$  on 20 metres; of  $20^\circ$  and  $90^\circ$  on 15 metres; and at  $14.5^\circ$  and  $49^\circ$  on 10 metres. Or will become a more effective DX antenna as the frequency increases for the same height.

The reflective properties of the ground will not effect this angle of maximum radiation but will affect the amount of power that is radiated at that angle. Also, obstructions that are present in the field of the antenna, such as buildings, trees, etc, will affect the angle of maximum radiation as they will change the angle of reflection and/or dissipate the power contained in the reflected wave.

Future articles will contain information on 'simple' antennas for Amateur use, vertical and horizontal antennas and antennas for receiving signals.

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\*-Stations XV5AA, XV5AB and XV5AC were authorized to exchange communications with Amateurs of other countries by the former Saigon regime.

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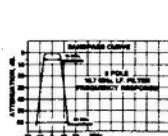
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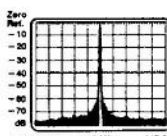
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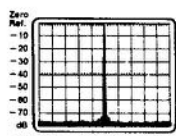
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