



# the canadian amateur

February 1976

Number Two

## Federal grants still available

Good news for senior citizens who may wish to try for a New Horizons grant from the federal Health and Welfare Department in order to equip radio clubs -- according to our Ottawa correspondent the program survived recent slashes in federal spending.

Senior citizen groups in Victoria, Vancouver, Penticton, BC, Toronto and Ottawa (there may be others) have obtained thousands of dollars to set up Amateur radio club rooms and equipment, including at least two repeaters, for groups of retired persons.

Information on how to set up such a project may be obtained from New Horizons Program, Social Service Programs Branch, Dept. of National Health and Welfare, Ottawa, Ont. K1A 1B5.

## Director-General appointed

Dr. John deMercado has been appointed as Director-General of Regulatory Services at DOC HQ, replacing Bud Hoodspith who resigned to become President of Roger's Cablevision in Toronto.

Dr. deMercado was Director-General of the Education Technology Program and has been with DOC for a number of years in the Engineering and Broadcasting fields.

## Unique hazards of Amateur radio

Amateur radio is a hobby that is unique in many ways, and has its unique hazards. Outside of the usual dangers associated with high voltages, there are three areas where caution must be exercised due to effects of radio frequency fields.

When operating in the 420-450 MHz band or higher, don't expose yourself to the RF field. Any transmitter of more than a few watts can produce RF fields which have dangerous physical effects on the human body.

If you, or anyone who frequents your shack, have a heart pacer implanted, stay well away from the transmitter or radiating antennas.

Last, but not least, comes a double warning from Manitoba concerning the effects of radio frequency emissions on hospital equipment. If you or your local radio organization is assisting in the local emergency plans concerning hospitals, from the Director of Biomedical Engineering in the Health Sciences Centre, M. B. Raber comes the warning "that the communications system used for radio contact with the ambulance can provide interference throughout the hospital..."

E. J. Hare of Manitoba Hydro backs up this statement with the following remarks:

"Radio transmitters, including ... various types of two-way radio communications, radio and inductive paging, radio controls, as well as some types of radio frequency power generators not intended as transmitters, such as radio frequency and inductive heaters ... are capable of interfering with the use of medical electronic measuring and monitoring equipment..."

"To help keep this interference to a minimum, it is recommended that radio transmitter antennas, where the hospital has control over them, be placed in such a manner as to minimize signals at locations where medical electronic equipment is used, and that the medical electronic equipment be shielded and otherwise be designed for minimum sensitivity to all types of electrical and radio interference."

One other word of advice ... with the availability of cheapie rice-burning VHF receivers to the general public, our repeater and other frequencies on the two metre band are wide open to interception by nefarious characters. Mention or discussion of absences from your house, such as family vacation plans, could mean a break-in and considerable loss of your worldly goods ... even, heaven forbid, the base station!

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- Amateur Radio League of Alberta
- Amateur Radio League of Manitoba
- Saskatchewan Amateur Radio League
- British Columbia Amateur Radio Association

## From the Front Office

February is the month when most of Canada's Amateurs sit back, wonder if their antenna system will survive the weather, make solemn promises (rarely fulfilled) to remodel their station and antennas this year, think back over the past year, and look forward to the first days of Spring.

Your national Federation looks back on a year full of achievement, purpose and hard work. By-Law Number Two, giving voting rights to Full members of Canada's national Amateur organization, was approved. Family memberships were created as well as Affiliated membership for all Amateur organizations. A special 16,000 issue of The Canadian Amateur was published and forwarded to every licenced Amateur in our country. The second edition of the Amateur Radio Regulations Handbook was published (and required two printings before year's end). The writing of a Canadian licencing manual was accomplished (with publication scheduled for spring 1976). CARF became a member of CRTPB and became involved as a committee member in C.S.A. The National QSL Bureau expanded with the addition of an out-going service for individual members...to mention only major items. And, we almost forgot - individual membership in your Federation doubled from 1000 to 2000 with the first month of 1976 showing a continuing increase in your Federation's strength.

This progress was due to the efforts of our dedicated officials and the realization by more Canadian Amateurs that we do need a strong national body to work with and aid government officials with the Amateur Service; to disseminate news and information about Canadian activities and developments; to consult with the fraternity on matters of importance and concern; and to supply other needed services.

Your Federation started the year 1973 with two services - The Canadian Amateur and the CARF/DOC Liaison Committee. Today our services include the National QSL Bureau; the CARF News Service (available to editors of provincial Amateur organizations, Affiliated members, and foreign publications); the CARF Bulletin Service (on the air bulletins on major nets from the chain of 'VCA' stations); CARF Canadian QSL Cards; sponsorship of the Canadian Repeater Advisory Group; publication of Canadian Amateur handbooks. Services supplied must also include the work of the National Executive which deals with the day-to-day matters affecting the membership; the elected Board of Directors who are responsible for policy decisions and overall management of the Federation's affairs; and the 1979 ITU WARC Committee.

The Federation wishes to thank all those members who have shown, given, or loaned their copies of The Canadian Amateur to other Amateurs to acquaint

them with the work and purpose of CARF. Many new memberships have resulted from this practice and this benefits everyone concerned, for increased membership strength means an increased number of services that can be provided by CARF.

If any Amateur needs extra copies for handing out, please send in your request ... we will fill as many as we can.

## Letter to the Editor

In reference to One Man's Opinion in the October issue, I most certainly agree with a reduction in the legal power limit. My support goes to VE3CQH in his hope that CARF can advocate such a move. My rig is a TS-520 and for QRP's I use an old Argonaut which I find takes somewhat more skill to make contacts with than the Kenwood!

From the page seven Editorial in the same issue, years ago there existed a 'Gentleman's Agreement', when operating c.w. you stayed out of the 'fone section'. Old timers would not be caught in the fone band on c.w. for fear of what his fellow Hams would think of him. VE3ZS answers his own question asked in his first paragraph when he refers to the many 'demands' made of groups and individuals within the fraternity. If we are mature enough to run our own show, should there be so many demands? It would appear to me that we have to have regulations today as the Amateur sense of value is different from years ago. Unless there are restrictions and guidelines to govern our behaviour, operating practices just might get so out of hand, our hobby would not be so enjoyable.

J.A. Raven VE6XO  
Edmonton, Alberta.

## Proper Identification

According to the DOC regulation on identification, you must identify: '(i) At intervals not greater than thirty minutes during any period during which the station is transmitting.

'(ii) At the termination of: (i) A single transmission, or (ii) Each exchange of communications with another station' (GRR-II-27)

Note that you are not required to identify the beginning of each transmission, or at the end of each transmission in a series. During 'round tables' it is advisable, from the viewpoint of good operation, to identify your station at the time of entry, and then at intervals of a half hour as required by DOC during the period of participation.

You are, however, required by DOC to send your call sign when you sign off and leave the group. It is not required by DOC to send the call sign of the other station(s) being worked, and again, the sending of these call signs is only necessary for good operating practice where there may be some doubt as to which should be the next station to transmit.

Proper identification requires your FULL call sign. Using '7XX' or '7X squared' in place of VE7XX is an infraction.



Like so many Amateurs helping other hams and people in one's community, Garry VE3GCO, left, of Listowel had the chance to entertain Glen PY8ZAK, on leave, after VE3GCO handled numerous QSOs between people in the Listowel area and the Wycliffe Bible Translators Base Station PY8ZAK in Porto Velho in the Brazilian jungle. Glen also spoke to his own base and station via VE3GCO. Patches and ca'ls back home make people smile.

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Canadian Repeater Advisory  
Group

First, here are some updates for repeater directories: somewhat belated is the news that VE2XW, Montreal changed to 146.10-146.70 last fall; in Manitoba, a new machine is planned for Miami, southwest of Winnipeg and in Ontario a rig is underway for Montreal River, north of Wawa, in Lake Superior Park, with the call VE3LSP 146.46-147.06. It may be linked to Wawa, VE3WAW. A number of updates from Saskatchewan via VE5DA; VE5SWR is the call for the new Swift Current machine that was listed last month as 146.01-146.61 but should be 146.28-146.88; the Jansen/Yellowhead station call is VE5-ESK and is on the air; Carlyle/Moose Mountain call is VE5MMR and is on 146.22-146.82 and a wide coverage repeater for Watrous is in the works for this summer.

These repeaters are part of a program under way to cover Saskatchewan. The provincial government, realizing their usefulness in emergencies, has donated equipment, including walkie-talkies, to the Amateurs participating in this program. In Regina, permanent antenna installations have been set up on hospital premises for the use of the Amateur resources in an emergency.

This is the second anniversary of this column, which started in the February, 1974 issue as a follow-up to the two voluminous CRAG bulletins sent out to all repeater owners who could be located at the time. Further bulletins were sent to repeater councils and will continue to be sent as circumstances dictate; meanwhile the CRAG column will be used to bring problems, ideas and information before repeater owners and users.

During the two years of this column's existence, the number of known repeaters has more than doubled from about 75 to 165. CRAG, which was formed in the late fall of 1973, has during that time promoted the idea of repeater councils and a standard Canadian repeater channel plan, both of which have worked out well.

If any of our readers are thinking of setting up a VHF or UHF repeater and do not have information on their area repeater co-ordinating body, drop a line to the CRAG Secretary, J. Lyle Ward VE3CEZ, 2188 Iris St., Ottawa, and he will send you names and addresses of the council officials in your area.

Your CRAG editor for the bulletins is, and has been for the past two years, Doug Burrill, VE3CDC (ex-VE1FV). He would appreciate info on anything to do with repeaters, sent to him at 151 Fanshaw Ave., Ottawa K1H 6C8, Ont.

## Correction

The front page story on Alan Hooper that appeared in the January issue of TCA should have reported his home call as VE4MS, not VE3MS.

## Decoding CHU

In the October issue, we ran a story on the information conveyed by the various pauses, beeps and buzzes heard on the Canadian time standard station, CHU, Ottawa. After thanking us for the technical information on CHU, a reader told us that we "missed a most essential detail that would permit any Amateur to build a simple logic decoder for this signal".

"Each 'Time Code' is composed of five words (bytes) and each word is made up of a single start bit (logic 0), eight data bits and two stop bits (logic 1). A most elegant decoder then would be a Universal Asynchronous Receiver/Transmitter chip ... UART. The whole process then becomes extremely simple, as either a rather extensive logic decoder or a short software routine in the station microcomputer will format the data for display on the system of your choice.

"One additional note - the cut-off of the 2225 Hz tone at time 0.500 is the key time element to set the event specified in the 'seconds' word plus .5 sec."

This info, he concludes, "will probably save NRC a large number of letters from persons trying to figure out how to use this new and timely service from CHU."

Our thanks to Larry Kayser, who is an active member of AMSAT and controls the OSCAR satellites from his basement shack in Ottawa. His call is VE3QB and he was the first Canadian to obtain a US call, WA3Z1A, when 'aliens' were allowed by the FCC to obtain US station licences. Larry has already built a decoder and has his computer programmed to print out the time on his Vucocom display upon request.

## Working group for ITU input

Under the chairmanship of Art Stark, VE3ZS, a working group of the Regulations Committee is now studying background material from other organizations in preparation for input to the DOC preparatory committee for the World Administrative Radio Conference in Geneva in 1979. This conference will examine and possibly change the Amateur frequency allocations.

The working group members are George Davis VE3BBW, Frank Merritt VE7AFJ, Tom Atkins VE3-CDM, Bud Punchard VE3UD, Steve Chisholm VE4AI and Cary Honeywell VE3ARS.

Provincial societies have been asked to canvass clubs for input to the working group, but any club or individual with ideas on the topic of retention or expansion of existing frequency allocations may contact the group directly.

Write to the Chairman, Regulations Committee, Canadian Amateur Radio Federation Inc., Box 356, Kingston, Ont., or any member of the group.

# QSL Bureau Report

All Full Members of your national Federation can take advantage of the CARF QSL Service. Gather your QSL cards destined for Overseas, sort them alphabetically and forward them to the CARF National QSL Bureau, Box 66, Islington, Ont. M9A 4X1. Remember to put your CARF Membership Number on the bottom left side of the envelope.

Box 66 is cleared at least every three days. The mail is sorted, cards filed and any enquiries are promptly answered. Cards are forwarded to foreign destinations at least once a month and more often to destinations that have a high output.

Cards are packaged, addressed and mailed through Canadian postal channels to QSL Bureaus throughout the world and are forwarded to recipients through these bureaus.

The CARF National QSL Bureau also functions as a central incoming address for QSL cards addressed to Canadian Amateurs. Cards received are sorted and forwarded to the VE QSL Bureaus across Canada for onward delivery. CARF members may speed up the forwarding of QSLs addressed to themselves by sending SASE to Box 66. Again remember to put your CARF Membership Number on the envelope.

Some QSL cards received cannot be delivered readily. The lack of a Self Addressed Stamped Envelope at the VE QSL Bureaus is one cause, but every effort is made to ensure that cards will get to the Amateur concerned eventually. For Silent Keys, the Bureau normally checks with family or friends before forwarding. One major problem occurs when Amateurs have moved and fail to notify the Bureau, especially when a move out of province is made. Another is a change of call-sign and re-assignment of the former call to another Amateur. All Amateurs are advised to notify the bureaus when any change occurs.

When QSL cards remain unclaimed, they are returned to the sender with a note explaining the reasons.

## Age restriction regulations amended

As reported in the last issue of The Canadian Amateur, there is no longer any age restriction to obtaining an Amateur or Advanced Amateur Certificate.

The DOC amended the General Radio Regulations Part II by revoking subsection 99(5). There is now no age restriction on any class of Certificate. Holders of the CARF Radio Regulations Handbook should delete this from their copies (see page 11 of the second edition).

# The Canadian Amateur

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40	7.0 ~ 7.5
20	14.0 ~ 14.5
15	21.0 ~ 21.5
10(A)	28.0 ~ 28.5
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10(C)	29.0 ~ 29.5
10(D)	29.5 ~ 30.0
11	27.0 ~ 27.5 Receive only
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Mode of Operation;  
Input Power;

LSB, USB, CW and AM  
180 Watts DC INPUT SSB & CW  
90 Watts DC INPUT AM

Carrier Suppression;  
Sideband Suppression;  
Spurious Radiation;  
Distortion;  
Microphone Impedance;  
Modulation Method;

50 dB  
50 dB at 1,000 Hz  
Down 40 dB or more  
Down 35 dB or more  
High  
Balanced modulation(SSB)  
Low power modulation(AM)

Transmitter Frequency  
Response;  
Frequency Stability;

300 to 2,700 Hz(down 6 dB)  
Less than 300 Hz drift in starting  
Less than 100 Hz drift or less  
after 30 minutes of warm up

Antenna Output Impedance;  
Receiver Sensitivity;

50-75 ohms unbalanced  
-0.3µV S/N 10 dB (at 14 MHz) SSB/CW  
1µV S/N 10 dB(at 14 MHz) AM

Image Interference Ratio;  
IF Interference Ratio;  
Receiver Selectivity;

-50 dB and more(at 14 MHz)  
same as above  
SSB/AM  
2.4 kHz at -6 dB and  
4.0 kHz at -60 dB

Audio Output;

CW  
600 Hz at -6 dB and  
1.5 kHz at -60 dB  
2.5 Watts or more  
(10% distortion at 4 ohms load)

Audio Output Impedance;  
Power Source;

4 ohms  
100/110/117/200/220/234 Volts  
AC 50/60 Hz  
13.8 ± 10% DC

Power Consumption;

AC : 350 VA at the maximum  
final input  
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Frequency range.....	144MHz-148 MHz
Mode.....	SSB (A <sub>1</sub> ), FM (F <sub>1</sub> ), CW (A <sub>1</sub> ), AM (A <sub>1</sub> )
RF power output.....	SSB.....more than 20 watts DC input FM & CW...more than 10 watts output AM.....more than 3 watts output
RF output impedance.....	50 ohms (unbalanced)
Carrier suppression.....	Better than 40 dB
Sideband suppression.....	Better than 40 dB
Spurious radiation.....	Less than -60 dB
Maximum frequency deviation (FM).....	±5kHz
Repeater frequency shift width.....	600kHz
Tone burst time.....	0.5 - 1.0 sec.
Modulation.....	SSB—balanced modulation FM—variable reactance frequency shift AM—low power modulation
Microphone type.....	500 ohm dynamic microphone
AF response of transmitter.....	400Hz-2.600Hz (-9dB)
IF frequencies.....	SSB, CW, & AM—10.7MHz FM—1st IF—10.7MHz; 2nd IF—455kHz
Receiver sensitivity.....	SSB & CW—0.25µV input for 10dB S/N FM—1µV input for 30dB S/N AM—1µV input for 10dB S/N
20dB noise quieting.....	Less than 0.4µV
Image rejection.....	Better than 60 dB
IF rejection.....	Better than 60 dB
Bandwidth.....	SSB, CW, & AM More than 2.4kHz (at -6dB) FM More than 12kHz (at -6dB)
Selectivity.....	SSB, CW, & AM—Less than 4.8kHz (at -60dB) FM Less than 2kHz (at -50dB)
Receiver AF output.....	More than 2 watts (at 10% distortion, 8 ohm load)
Receiver AF output impedance.....	8 ohms
Frequency stability.....	Within + 2kHz during one hour after one minute of warm-up, and within 150Hz during any 30 minutes thereafter.
Squelch sensitivity.....	0.25µV
Power consumption.....	Transmitting; Maximum 95 watts (120 220VAC); 4 amperes (13.8VDC) Receiving (no signal) 45W (120 220VAC) 0.8 amperes (DC13.8V)
Power requirements.....	120 220VAC, 50-60Hz; 12-16VDC (standard DC voltage—13.8VDC)
No. of semiconductors used.....	Transistors—6.3; FETs—17; ICs—3; diodes—100
Dimensions.....	Width 278mm (10.9 in.) Height 124mm (4.9 in.) Depth 320mm (12.6 in.)
Weight.....	11kg (24.3 lbs)
Equipment provided.....	500 ohm dynamic microphone (1); 2 ampere and 5 ampere fuses (one each); extension speaker plug (1); auxiliary feet (2); pin-type plugs (2); AC cord (1); DC cable (1).

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**ANTENNAS** — If superior efficiency is your objective, then the KLM 144-150-12C circularly polarized antenna for tracking the satellites is what you are looking for. This 12 element Yagi offers 9db gain over a Dipole, and comes

complete with hardware and harness. Similar models are available for 432 MHZ operation.

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**ROTORS** — For proper tracking of the Oscar Satellites, a more specialized form of rotator is used. In addition to the normal horizontal plane rotator, a vertical plane rotator is needed. To do this job, Glenwood is now importing the KR-500 elevation rotator. The KR-500 mounts on the mast directly above your present standard rotor and controls the angle of the antenna so that you have maximum capability for either a horizon pass or a direct overhead pass.

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# RF effects on heart pacers

From time to time stories appear about the influence of radio transmissions on "heart pacers" implanted in a growing number of Canadians who suffer from heart malfunctions. Your reporter had a frequent visitor who had one of these life-prolonging devices and having heard some of the stories about them contacted a local specialist who works in conjunction with heart surgeons.

He said that it was true that in early models of these devices RF fields did have adverse effects on those using them. In fact the first problems arose when pacer users flying on commercial aircraft found their heartbeat influenced by radio gear on the plane. Since then more effective shielding and bypassing has reduced the risk to the point that ill effects are almost never encountered. However, a recent episode in London, Ontario was reported to the DOC field office by a blind, 59-year old Amateur operator who had a pacer "installed". He occasionally suffered from dizzy spells when operating his rig. The local RI, Watson Reed, found that information in medical journals was rather vague and took the problem to a London heart specialist, also an Amateur operator, who performed some tests.

He found that pacers did not appear to be affected when more than three feet from the transceiver. At less than three feet, the frequency of modulation did affect its operation. The average male voice did not appear to have any effect but whistling into the microphone did effect the pacer's pulses. A high-pitched woman's voice could affect the pacer's transmission of electrical impulses to the heart as was the case when the amateur's wife spoke into the microphone.

Normal voice single sideband operation on frequencies between 3.5-4.0 MHz did not give much trouble at three feet when output power of the transceiver was reduced to 60 watts. Using Morse code at that power was a different story. The output power was then reduced to 10 watts and even then the pacers would occasionally skip a 'beat'.

The greatest problem appeared to be when the microphone was clicked rapidly on and off. This resulted in surges of power producing a peak of power in the form of a pulse. Also, problems arose when some excessive peaks of modulation occurred.

A transceiver on two metres with an output of 1.8 watts affected the pacer at a distance of about six inches when the microphone was clicked on and off rapidly in succession. However, when modulated by voice, it did not affect the pacer.

Information gathered to date indicates a pacer within a range of three feet or more would probably not be affected by operation of an Amateur station. Further, a pacer implanted in a patient could add additional shielding to RF radiation. However, test equipment used during this experiment may not have been sensitive or accurate enough to be conclusive. Results may vary depending on the type of Amateur

equipment used, proper grounding, shielding, standing waves, power, frequency of modulation and possibly other factors.

When further tests have been conducted and conclusions reached, they will be compiled and made public.

Thanks to Watson Reed, DOC RI, Kitchener, Ont.

## Examining co-ax jackets

Bluewater and Sarnia Radio Club Bulletins

This data, compiled by Ted, W8MO from Amphenol and Times Wire and Cable engineering information, should aid Amateurs in selecting co-ax cable to suit different situations.

The outer jacket on a coax cable has a lot to do with the useful life of the cable. There are several jacket materials used for available cables. Vinyl, Class I is short lived and causes serious deterioration in a short time of the inner insulation around the centre conductor. Examples of cables using this jacket are RG-8/U, RG-58, RG-58A, RG-58B, RG-59 and RG-59A. These should only be used for short term projects.

The problem with Class I jackets is that to keep the plastic flexible a substance called plasticizer or extender is used. As soon as the cable is made up, this extender starts to migrate through the shield into the polyethylene insulation around the centre conductor. The polyethylene is damaged and cable losses go up. After a couple of years the increased losses are readily measurable.

The Class IIa jacket used on the newer cables is a rugged, long-life material that is abrasion-proof, not affected by the sun, and can be buried with expectations of a 10 to 20 year life. The jacket is non-contaminating, and the newer cables such as RG-213/U, which replaces RG-8/U, are standardized at 50 Ohms impedance to match modern test and laboratory equipment. Cables using the Class IIa jacket are RG-213, RG-58C, RG-59b/U.

Theoretically, foamed coax will have less loss than solid dielectric cable. But no foamed cable is made with Class II jacket or to Mil-Spec as far as shielding is concerned. Furthermore, unless the foam is gas filled, moisture can ooze through the jacket and into the bubbles in the foam. Losses go up rapidly when this happens.

(The author recommends that Amateurs ...) stick with late types of coax using Class IIa jackets and leave the foamed coax to TV types. Jacket details for coax may be checked in the cable makers' catalogues.



# Classic

		CLASSIC		TRAP MASTER		
Model		CL-33	CL-36	TA-33	TA-33Jr.	TA-36
Forward Gain	on 10 meters	reference dipole 08.0 db	isotropic source 10.1 db	08.0 db	08.0 db	08.0 db
	on 15 meters	reference dipole 08.0 db	isotropic source 10.1 db	10.1 db	10.1 db	10.1 db
	on 20 meters	reference dipole 08.0 db	isotropic source 10.1 db	08.8 db	08.0 db	08.0 db
Front-to-Back Ratio	on 10 meters	15.0 db	20.0 db	20.0 db	20.0 db	20.0 db
	on 15 meters	20.0 db	20.0 db	20.0 db	20.0 db	20.0 db
	on 20 meters	20.0 db	20.0 db	20.0 db	20.0 db	20.0 db
Power Rating	AM/CW	1 KW	1 KW	1 KW	300 wts.	1 KW
	P.E.P. SSB input to the final	2 KW	2 KW	2 KW	1KW	2 KW
Number of Elements		3	6	3	3	6
Maximum Element Length		27'	29' 9"	28'	26' 8"	29'
Boom Length		18'	24'	14'	12'	24'
Recommended Mast Size (diameter)		2"OD	2"OD	1½"OD	1½"OD	2"OD
Turning Radius		16'	19' 3"	15' 6"	14' 9"	19' 3"
Wind Surface Area (in square feet)		6	10.7	5.7	4.3	10.7
Wind Load (EIA Std. 80 MPH)		120 lbs.	210 lbs.	114 lbs.	86 lbs.	210 lbs.
Assembled Weight (approximately)		42 lbs.	69 lbs.	37 lbs.	20 lbs.	69 lbs.
Shipping Weight-via truck (approximately)		45 lbs.	71 lbs.	41 lbs.	28 lbs.	71 lbs.
Price		\$270.00	\$360.00	\$238.00	\$174.00	\$395.00

THE FOLLOWING INFORMATION APPLIES TO ALL OF THE ABOVE ANTENNAS.

Feed Point Impedance . . . 52 ohms

VSWR (at resonance) . . . 1.5/1

Recommended Transmission Line . . . RG-8/U

## 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

### ROTORS

AR-30 \$55.00

AR-40 \$66.50

CD-44 \$129.00

HAM II \$189.00

Wire for AR-30 and AR-40 12¢ ft.

Wire for CD-44 and HAM II 20¢ ft.

RG-58U coax 12¢ ft. RG-11U 23¢ ft.

RG-8U 23¢ ft. RG-'8U foam coax 25¢ ft.

## Eico Multimeters

4A3 4000 ohms per volt

20A3 20,000 ohms per volt \$22.50

100A4 100,000 ohms per volt \$52.50

PL-259 connectors for coax \$ 1.25

Chassis connectors \$ 2.50 (single hole)

Also DelHi and ROHN towers, etc.....

Prices subject to change



# RV-4C

Covers 10, 15, 20, and 40 meter bands. Power rated at 750 watts AM/CW and 2000 watts PEP input on SSB. Feed point impedance 52 ohms. Height approximately 22'. Recommended mast size 2" OD. Shipping weight 10 lbs., 4 ozs.

\$77.50

RV-8C conversion for 80 meters

... \$44.25

# MacFarlane Electronics Reg'd

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

## Fessenden describes first phone transmission

In a recent issue the passing of inventor Frederick Alexanderson last year at 97 was noted. It was his development of a rotating 10,000 cycle alternator which made feasible the first practical radio telephone transmissions by Canadian radio pioneer Reginald Fessenden. Here is the story, as told by Fessenden himself in a 1908 talk at an engineering convention in the US:

"In November 1899...I made some experiments with a Wehnelt interrupter for operating the induction coil used for sending ...

"It was noticed that when the sending key was kept down at the sending station for a long dash the peculiar wailing sound of the Wehnelt interrupter was reproduced with absolute fidelity in the receiving telephone. It at once suggested itself that by using a source with a frequency above audibility wireless telephony could be accomplished.

"Professor Kintner, who was at that time assisting me in these experiments and to whose aid their success is very largely due, was kind enough to make the drawings for an interrupter to give 10,000 breaks per second.

"The first experiments were made in the fall of 1900 with the above mentioned apparatus which was supposed to give 10,000 sparks per second but

which probably gave less. Transmission over a distance of one mile was attained but the character of the speech was not good and it was accompanied by an extremely loud and disagreeable noise, due to the irregularity of the spark.

"By the end of 1903, fairly satisfactory speech had been obtained by the arc method above referred to, but it was still accompanied by a disagreeable hissing noise. In 1904 and 1905 both the arc method and another method in which the 10,000 cycle alternator (built by Alexanderson at the GE plant) was employed, had been developed to such an extent that the apparatus could be used practically ... The transmission was, however, still not absolutely perfect.

"By the fall of 1906 the high frequency alternator had been brought to a practical shape and was used for telephoning from Brant Rock to Plymouth, a distance of 11 miles, and to a small fishing schooner, this being the first instance in which wireless telephony was put in practical use. The transmission was perfect and was admitted by telephone experts to be more distinct than that over wire lines, the sound of breathing and the slightest inflections of the voice being reproduced with the utmost fidelity."

## 1915: Amateurs found to be useful!

The Groundwave

Over 60 years ago, in September 1915, the US government had just received evidence of the usefulness of Amateur Radio Operators. The scene was Sayville, Long Island, where Radio Station WSL was located, owned by the Atlantic Communications Co. It was determined that the ACC was further owned by a company in Germany. Officials were of the opinion that the Sayville station might be transmitting information on about 9000 metres (33 kHz) which contained clandestine military information directed towards German submarines.

At that time, June 1915, only one man had experience in recording material directly off the air... and sure enough, that pioneer was an Amateur. His name was Chas. E. Epgar of New Jersey. His Amateur experimental station was 2MM. He was approached by the US Secret Service and Inspector L.R. Krumm of the radio service to set up equipment to record every transmission carried out by WSL.

In less than a week, Charles had recorded 175 cylinders of material which were turned over to governmental agents who determined that acrostic codes were used in transmission of material that could be construed as an 'unneutral act' against countries opposed to Germany in the war. (The US was not yet involved directly in the war.) Based on the recordings, which formed a record from which the coded messages could be deciphered, the US gov-

ernment on July 9, 1915, announced that in the future the transmitter at Sayville would be operated by American Naval officers in the interests of its proprietors, and that the Secretary of Commerce had refused to issue a licence for operation of WSL by the ACC.

When advised of the manner by which the evidence was gathered, Dr. Frank, a German scientist and operator of the station, said "That Mr. Epgar can record messages sent out by wireless on a phonograph cylinder is hardly worth discussion. That is physically impossible! I have never heard of its being done. If Mr. Epgar has accomplished it, he should get his idea patented and perhaps we will buy it."

(Thanks also go to Wireless Age, Sept. 1915 and QCWA News.)

## USA special calls

Those odd-ball calls beginning with AA through to AL which you may have heard since January 1 are special bicentennial calls in use by Amateurs in the continental USA and its far-flung possessions. AA to AF may be used respectively by WA, WB, W, K, WD, WR and WN licences.

AG to AK are allotted to possessions outside of continental USA; Alaska is AL (what else!).



# ULTRAMATIC

## MODEL KR50 ELECTRONIC KEYS

A completely automatic electronic keyer that is fully adjustable to your operating style and preference, speed, touch and weighting, the ratio of the length of dits and dahs to the space between them. It is a keyer you control, not the other way around, to transmit your thoughts clearly, articulately and almost effortlessly. The iambic (squeeze) feature allows the insertion of dits and dahs with perfect timing. It greatly reduces manual effort, prevents errors. Full instructions are included in the manual.

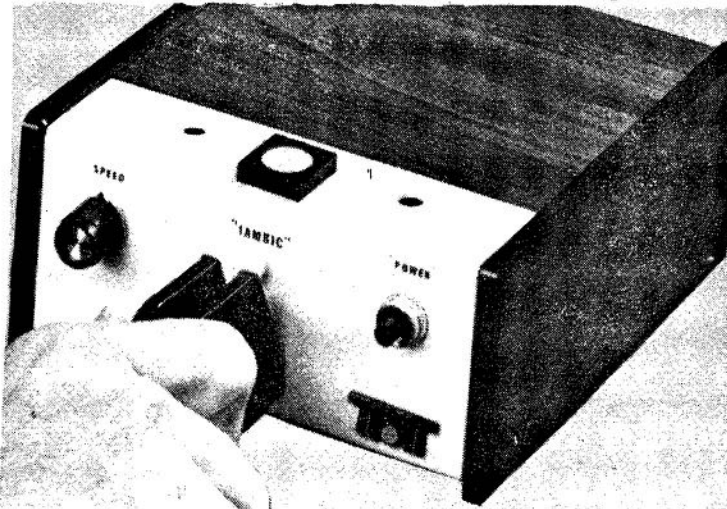
An automatic weighting system, pre-set by you, provides increased character to space ratio at slower speeds, decreasing as the speed is increased, keeping the balance between smoothness at low speeds and easy to copy higher speed. High intelligibility and rhythmic transmission is maintained at all speeds, automatically. Or, if a single preset constant weighting is desired, a switch provides it.

The paddles are the famous "Torque Drive" which are pivoted on low-friction ball bearing assemblies. Electro-magnetic return force is adjustable from nearly zero to over 50 grams. At any desired value, the "feel" is precise and smooth, for the kind of CW that is relaxing to send and a joy to copy.

Memories are provided for both dits and dahs but either may be defeated by switches on the rear panel. Thus, the KR50 may be operated as a full iambic (squeeze) keyer, with a single memory or as a conventional type keyer. All characters are self-completing, of course.

In addition, a convenient "straight key" button is provided for emphasis, QRS sending or transmitter tune-up.

The KR50 is designed to occupy a permanent place in your shack for the years, perhaps decades ahead. A permanent investment that will pay big dividends in the enjoyment of CW.



### SPECIFICATIONS

Speed Range: 6-50 w.p.m.  
 Weighting Ratio Range: 50% to 150% of classical dit length.  
 Memories: Dit and dah. Individual defeat switches.  
 Paddle Actuation Force: 5-50 gms  
 Power Source: 117VAC, 50-60 Hz, 6-14 VDC  
 Finish: Cream front, walnut vinyl top and side panel trim.  
 Output: Reed relay. Contact rating 15 VA, 400 V. max.  
 Paddles: Torque drive with ball bearing pivot.  
 Side-tone: 500 Hz tone.  
 Adjustable output to 1 volt.  
 Size HWD: 2 1/2" X 5 1/2" X 8 1/4"  
 Weight: 1 3/4 lbs.

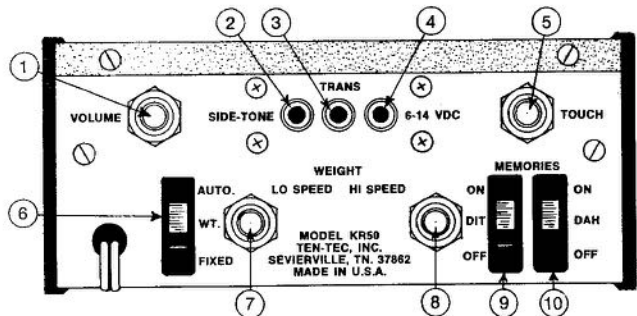
### REAR PANEL CONTROLS

1. Side-tone level control.
2. Side-tone output jack.
3. Keyed output jack to transmitter.
4. Input power jack for 6 to 14 VDC operation.
5. TOUCH control. Adjusts amount of electromagnetic force on paddles.
6. Weighting selection switch. In AUTO position weighting will change between preset limits as SPEED control is varied. In FIXED position, weighting will remain constant at preset amount regardless of SPEED setting.
7. LO SPEED weight control. Lengthens character ratio. Ad-

justs weighting limit to be obtained when SPEED control is at minimum when automatic weighting is used, or sets fixed weighting on heavy side, i.e. character length longer than normal.

8. HI SPEED weight control. Shortens character ratio. Adjusts weighting limit to be obtained when SPEED control is maximum when automatic weighting is used, or sets fixed weighting on light side, i.e. character length shorter than normal.

9. DIT MEMORY defeat switch.
10. DAH MEMORY defeat switch.



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

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# TECHNICAL TALKS

Gordon Ball VE3CSH

On several occasions during the past summer, while driving during electrical storms and listening to two metres, I observed a phenomena which convinced me that lightning was affecting the propagation of two metre signals. As I learned more about this effect, it corroborated my own ideas about VHF propagation, and I developed my own guidelines for observing and studying 'lightning scatter'.

My experience indicates that when a VHF signal strikes the highly ionized region near lightning, the incident energy is scattered and part of it is reflected back towards the earth. The reflection or scattering lasts only as long as the lightning exists and 'openings' of a few seconds are normal. Usually the lightning is visible during this time. Best reflections occur with 'sheet' lightning, that is lightning that jumps from cloud to cloud. With this form of lightning, often the entire sky is lit up for several seconds. But results happen when the lightning occurs on a line between the transmitter and the receiver and a few miles from the receiver on the transmitter side. This is an optimum point since the signal is scattered through a minimum angle. This follows the principles of optical reflection (angle of incidence equals angle of reflection). Most of the scattered signals I have heard had a path length of 100 to 200 miles, although longer and shorter paths can occur. Usually, the transmitter is just over the horizon from the receiver.

If you want to try listening for lightning scatter, pick a busy repeater frequency, where the repeater is just out of range under normal conditions. In the Ottawa area, a busy Montreal repeater might be suitable. If lightning of the right form occurs in about the right location, a few seconds of signal will be heard. Often this is long enough to hear a call sign or repeater identifier. The signal will come through at the same time as the lightning is visible. A good reflected signal is often strong enough to reach full receiver quieting and even to open the receiver squelch. Be patient though, not all lightning will reflect a useable signal and if there is no transmitter on that frequency, you won't hear anything except static crashes. You might even listen to your local repeater and try to identify any unusual signals. No special equipment is required; all of my own observations have been made using either the 'Pre-Progress' base station or the HW-202 in the car.

The first time that I noticed lightning scatter was last summer when stations in the southern USA came through on VE2CRA (Hull-Ottawa). Obviously there were other unusual propagation conditions involved, but during actual lightning strikes, at least one WB5

## Lightning effects on 2 m signals

call sign, along with some southern drawl, was copyable.

Returning to Ottawa one weekend, I drove through a severe storm near Renfrew with a great deal of lightning activity. I listened for a long time and heard nothing unusual. I had just about given up and was listening to the Mt. St. Patrick repeater VE3-STP (near Renfrew) when a lightning flash occurred and a voice in French, likely from Montreal, took out the local station using VE3STP. During a subsequent lightning flash, I copied a WB2 station calling another WB2. Again the reflected signal was strong enough to take out the local station.

Later in the year, west of Kitchener, I picked up scattered signals from VE3RPT (Toronto). During the first lightning stroke I picked out two call signs and during the second one I copied the c.w. identifier.

QST of September 1975 mentions a two-way contact made via lightning scatter on VHF c.w. This type of operation would likely appeal more to the experimenter and DXer than to the button pusher, but anyone who can pick up signals scattered by lightning and understand what is happening, will learn something about VHF propagation.

A word to the wise, lightning can be dangerous, so don't take unnecessary risks.

(Gord would like to hear from others interested in or observing this phenomena. Write c/o The Canadian Amateur, Box 356, Kingston, Ont.)

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### BANNED COUNTRIES LIST

Iraq, Khmer Republic\*\*, Libya, Pakistan, Somalia, Turkey, Viet-Nam\*, Peoples Democratic Republic of Yemen.

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

\*\* - Station XU1AA has been authorized to exchange communications with Amateurs of other countries.

### THIRD PARTY TRAFFIC AGREEMENTS

Bolivia, Chile, Costa Rica, Dominican Republic, Guyana, Honduras, El Salvador, Israel, Nicaragua, Peru, Trinidad, Tobago, U.S.A. (Territories and Possessions) and Venezuela, Guatemala and Uruguay.

### RECIPROCAL LICENCING AGREEMENTS

Belgium, Brazil, Dominica, Dominican Republic, France, Ecuador, Federal Republic of Germany, Guatemala, Israel, Peru, Luxemburg, Netherlands, Norway, Nicaragua, Poland, Portugal, Republic of Panama, Senegal, Sweden, Switzerland, Uruguay, U.S.A., Venezuela, Denmark, Iceland and Finland.

Note: All Commonwealth countries are eligible for reciprocal Amateur operating privileges unless evidence that a country does not grant reciprocal operating privileges to Canadian Amateurs.

---

## NEW HEATHKIT HW-201 HANDHELD TWO-METER TRANSCEIVER—a great value in personal and emergency communication gear



Compare the HW-201 with any other handheld two-meter transceiver. In value and performance, we think you'll agree it's unsurpassed.

A top-mounted knob selects any of five crystal-controlled channels—we even include a crystal for 146.94 MHz to get you on the air fast. And, to save money, a single crystal controls both transmit and receive! A simplex/offset switch and —600 kHz crystal actually give two transmit frequencies for every crystal you buy—just like having a 10-channel transmitter! The transmitter output is one watt minimum with

0.005% (or better) stability. Frequency modulation and a separate built-in mike provide a better signal. The receiver features 0.5  $\mu$ V sensitivity for 12 dB SINAD and a squelch threshold of 0.3  $\mu$ V or less.

The HW-201 comes with built-in nickel-cadmium batteries and a separate AC charger. The battery-saver circuit uses a pulsing technique to extend the battery life by 75% in the standby/receive mode.

To make the HW-201 an even better value, we've included accessories worth up to \$60—a crystal for 146.94 MHz, a —600 kHz offset crystal, a flexible "rubber duckie" antenna plus an output for an external antenna, a built-in nickel-cadmium battery pack and a separate AC charger. And you get them all at no extra cost when you buy the HW-201.

For personal and emergency communication, the optional HWA-201-3 Auto-Patch Encoder accesses telephone lines through repeaters with touch-tone input. The 12-digit keyboard and keying light mount directly on the front of the transceiver. You can add the encoder when you build the transceiver or later.

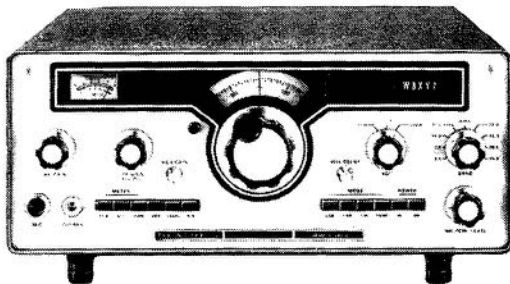
Finally, the HW-201 is both compact and lightweight—it weighs just two pounds, including batteries! The HW-201 and HWA-201-3 are not difficult to build, but, due to compactness, some soldering experience would be helpful. Alignment requires only a VOM or VTVM.

Kit HW-201, Handheld Transceiver . . . . 239.95

Kit HWA-201-3, Auto-Patch Encoder . . . 54.50

HWA-201-2, Carrying Case . . . . . 17.50

## NEW HEATHKIT HW-104 CW/SSB TRANSCEIVER—



The same basic circuitry as our top-of-the-line SB-104. The new HW-104 is 100% solid state—cool and quiet—with an output you can instantly switch from 100 watts to 1 watt. Its coverage extends from 3.5 to 29.0 MHz. And, if you need the top end of 10 meters, add the optional HWA-104-1 accessory. Its coils and filters fit onto the "104's" existing circuit boards and take you up to 29.7 MHz.

The HW-104's performance is superlative. Transmissions are clean and crisp—at 100 watts third-order distortion is 30 dB down and unwanted sideband suppression is 55 dB. In the receiver, broadband design virtually eliminates adjacent signal overload, yet sensitivity is less than 1  $\mu$ V. And because cross-

modulation and intermodulation have been dramatically reduced, signals seem to "pop out" of a quiet background.

15 MHz WWV position on the bandswitch, a 15 kHz per turn spinner, 5 kHz markings on the circular dial, 100 kHz/25 kHz calibrator for accuracy to 2 kHz. 12 VDC powered and the optional noise blanker provides up to 50 dB effective blanking. For base use, buy the optional HP-1144 AC Power Supply. Plug-in phenolic circuit boards and two wiring harnesses simplify construction. Alignment requires only a VTVM, mike and dummy load.

Kit HW-104, Transceiver . . . . . 799.95

Kit HWA-104-1, 10-M Accessory . . . . . 27.50

Kit HP-1144, AC Power Supply . . . . . 139.95

Kit HS-1661, Matching Speaker . . . . . 29.95

Kit SBA-104-1, Noise Blanker . . . . . 34.50

Kit SBA-104-2, Mobile Mount . . . . . 47.50

Kit SBA-104-3, 400 Hz CW Crystal Filter 66.50

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