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THE CANADIAN AMATEUR

Canada's Amateur Radio Magazine

La Revue des Radio Amateurs Canadiens

MARCH 1987

Telegrapher's daughter

— Page 10

*Catch the
Scouting
Spirit...*  SCOUTS CANADA

Page 16





NMO SERIES MOUNTING KITS AND HARDWARE

	MODEL NUMBER AND DESCRIPTION
	NMO-TMB Trunk Gutter Mounting Kit. Includes stainless steel mounting bracket, 17' RG 58 a/u coax and PL-259 connector.
	NMO-MM Magnetic Mount for temporary installations. Includes 12' RG-58 a/u coax and PL-259 type connector, fully assembled.
	NMO-TLM Trunk Lid Mounting Kit. Includes 17' RG/58 a/u coax and PL-259 connector.
	NMO-GC Temporary Gutter Clamp Mounting Kit. Includes 12' RG-58 a/u coax and PL-259 type connector, fully assembled.

	MODEL NUMBER AND DESCRIPTION
	NMO-B Antenna mounting hardware only. No coax or connector.
	NMO-K Complete Permanent Mounting Kit for 3/4" hole. Includes 17' RG 58 a/u coax and PL-259 connector.
	NMO-LLK-PL Permanent Low Loss Mounting Kit recommended for 800 MHz antenna installations. Includes 17' AA-3096 coax, and PL-259 connector.
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NMO SERIES

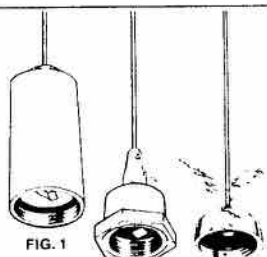


FIG. 1

FIG. 2

FIG. 3

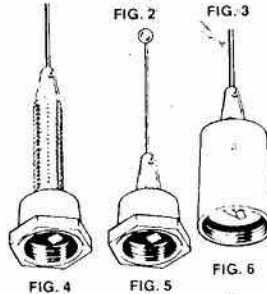


FIG. 4

FIG. 5

FIG. 6

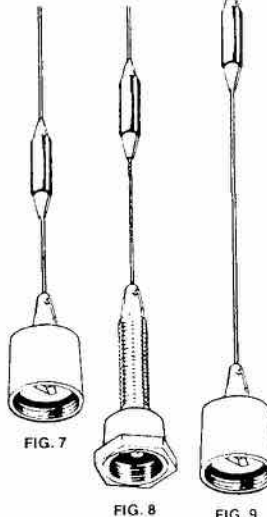
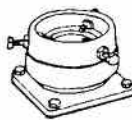


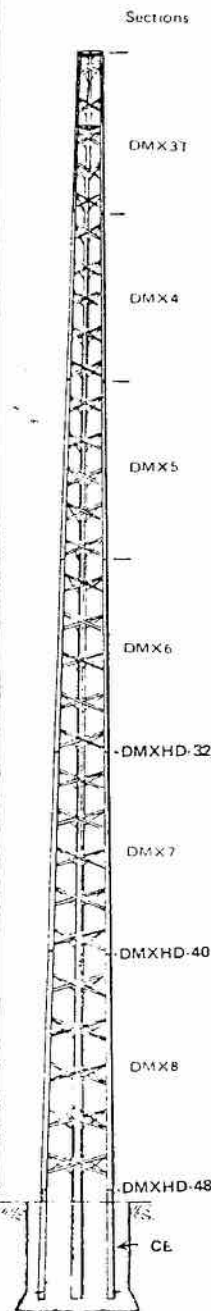
FIG. 7

FIG. 8

FIG. 9



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March 1987

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

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WHAT IS ?

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

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

EDITORIAL

QUA



Amateur Compatibility

discussed openly until reasonable options are available to assist the resolution of the problem.

Amateurs are not alone. All licensed transmitter services are prone to interact with electronic appliances in the immediate area of the antenna. Amateurs as well as the General Radio Service users are more intimately placed in the environment and in fact are often but a few feet from susceptible appliances.

The closer one examines the enigma of lack of immunity and its alter ego susceptibility, the more one appreciates the frustration a newcomer to Amateur Radio must accept. Operation in an urban environment is a fact of life—most of us have grown with the expansion of subdivisions and highrises. A reality, apparent today, is the close proximity of neighbours. Real estate is expensive, housing lots are smaller, condominiums and apartments are the accommodations of a transient city workforce.

The proliferation of entertainment devices is the choice of today—they're also big business, in spite of the fact they are made in the Far East and carry Canadian labels. CSA labelling is probably one of the most stringent requirements an off shore manufacturer can meet, if he is going to guarantee the best safety in the world, for consumer protection from hazards. I wouldn't want to see any other label.

Where safety is concerned most manufacturers understand legal liability. It is difficult to rationalize that almost all electronic appliances lack any form of built-in immunity. At the present time transmitter owners and owners of susceptible appliances have a conflict—how serious that conflict is depends on proximity. Is relief in sight?

Amateurs have a legal responsibility as well as a moral one to respect the electromagnetic environment—just as much as any other user who shares the spectrum. To assist in the resolution of the problem caused by lack of immunity, perhaps the time

has come to reduce the maximum power permitted the Amateur Service. The notion of using less power is not an unreasonable one when the advances in communication technology are considered. Whatever happened to the Amateur credo of "minimum power required to maintain communication"?

In this day and age of close neighbours there is no reasonable excuse to "boil the paint off his roof" with excessive power levels. We may soon find such practice is indeed detrimental to one's health. Studies are presently being undertaken to this effect in the United States.

I for one, subscribe to sensible operating practices and keeping peace with one's neighbours—many, many Amateurs similarly accept this aspect of our hobby. As responsible Amateurs we should be sensitive to the needs of other spectrum users and this includes neighbours. This concern should be paramount above any selfish interest high power might engender. The concern is that those not privileged to use transmitting equipment should be guaranteed safety from its effects. To expect any less is not to be a compatible Amateur.

By following judicious use of the spectrum and with reasonable power levels we can expect to earn the respect of those who are attempting to resolve this electronic blight called susceptibility.

The argument is often made that we need kilowatts to battle kilowatts, south of the border. Wouldn't it be wonderful if we decided collectively to put some skill back into this challenging and changing, all-consuming endeavour and limit our power to the antenna to normal transceiver outputs. Think of how it would help the spectral pollution we now experience. It's time to overhaul our approach to practical problems, with practical solutions. I'm for being compatible and I hope you are too.

The Canadian Amateur welcomes contributions to this column of opinion.

**BY RALPH CAMERON
VE3BBM**

The past year has brought to light many solvable cases of appliance electromagnetic incompatibility. While many of these cases relate to Amateur transmissions, almost as many do not. Data for these statistics are difficult to find. Again, the problem does not exist if it is not discussed openly. It will not be

LETTERS

BOUQUETS

Thanks for publishing the article on us in the December 1986 *Canadian Amateur*.

73, Wilf VE7US and
Rae VE7UR Moorhouse

I enjoy *The Amateur* a whole lot, good material, keep up the good work, guys and gals.

73, Bill VE7EGF

And we enjoy your cartoons, too, Bill—Editor.

HELP!

I won a Mosley Tribander 'Hornet' model TB-3B. I am unable to locate an address or phone number for the Mosley company in order to make enquiries regarding parts.

Is it possible you could assist me? Thank you.

R. Brook VE7DCD,
332 McIntyre Crescent,
Prince George,
B.C. V2M 4P8.

MARK YOUR CALENDAR

The Heritage Amateur Radio Club (HARK) has obtained permission from the Department of Communications to use the special prefix VX3 during the two week period between June 22 and July 5, 1987 to commemorate Cobourg's Sesquicentennial.

Operations will be in a section of the art gallery in historical Victoria Hall in Cobourg. Special QSL cards have been printed and it is planned to exchange greetings with Coburg, Australia, Coburg, W. Germany and Coburg, Oregon. Operations will be on SSB, CW and RTTY as follows:

On the 80 metre band— CW 3,550 kHz; SSB 3,800 kHz.

On the 20 metre band— CW 14,050 kHz; SSB 14,143 kHz; SSB 14,200 kHz; RTTY 14,180 kHz.

On the 15 metre band— CW 21,025 kHz; SSB 21,250 kHz.

On the 2 metre band— 146 550 kHz.

73, Barry Coleman VE3AAR
President, HARK

A NOTE ON YU LAND

I had a chance to visit Yugoslavia for a couple of weeks in October with my family and found it most interesting. Our destination was a little village called Bogatic.

About 20 km from where we were staying (with my in-laws) was a ham friend, YZ7XX, Nik. I went to visit him three days after arriving in Yugoslavia. My wife's uncle drove me there to drop me off for a few days and as we were travelling along, I constantly kept looking up for antennas. I had no luck spotting any on my journey until of course I saw one at my arrival at YZ7XX's QTH. After saying goodbye to my wife's uncle I looked up at Nik's antenna while chatting and exchanging handshakes.

Finally we had met after three years of communicating on 20 metres. We went into the house to meet his brother, YU7MIT and father, YU7MBG. Oh yeh— plus the shack, which included an FT102 and a homebrew amplifier. As for his antennas, his quad was down so that struck out for any communication back to Ontario. He had an 80 metre

with an inverted vee and 40 with a vertical roof mounted.

After an enjoyable dinner, Nik took me to the local radio club YU7GST to meet another Ham that was engaging in a YU contest on 80 that night. After chatting awhile with Nik (who knows his English very well) and saying hello to the contesters, I walked around and saw many awards and diplomas and also a classroom that contained 10 tables with a keyer on each and headphones. I asked about sessions here and was told that they give free lessons consisting of two hours a night, three times a week to beginners.

After leaving the club we went back to Nik's house to do some operating. My reciprocal licence was not available, so I operated under his call sign using his equipment. What fun!! I talked to many of my friends in Greece on 80 metres and also I contacted Hams in Italy, Romania, etc. After an enjoyable stay it was time to head back to Bogatic.

I plan to go back in 1988 for a longer time and I will take a rig with me to operate in Bogatic and also plan to visit my father's homeland—Greece.

73, John Frangos VE3NRP

EL SALVADOR EARTHQUAKE

On last October 1986, an earthquake destroyed vast parts of the City of San Salvador, the capital of the Central American country of El Salvador.

The Canadian Radio Amateur community moved immediately, in a fast and efficient way, to provide communications between the Salvadorean community residing in Canada, and their relatives in distress. One such Amateur, Tom Mitchell VE7TOM, was contacted and with the use of his excellent station equipment (Drake TR-7, Alpha 76-PA and HyGain TH6 beam antenna) we set ourselves to pass emergency traffic to and from YS stations. A total of 14 emergency QSOs were sent from Vancouver, and we received another 16, with a total of 20 contacts between parties. One of us (VE7FIF) having previous emergency traffic experience in CE land, immediately established a procedure by which all messages could be relayed with minimum delay.

Since no telephone (land lines) system was available in San Salvador, complete towns were without communications, the Salvadorean Red and Green Cross



used local AM broadcasting stations to relay messages to and from relatives via local hams in the 40m band. These in turn were received by other hams which passed the traffic to VE7 land. Messages ranging from health situations (life or death) to requests for blood bags were relayed to the Salvadorean community in Vancouver.

Without the help of Tom VE7TOM and his XYL Brenda, these QSOs could not have taken place and I hereby acknowledge their contribution in helping the Salvadorean families in distress.

I would like also to thank many other Central American stations. We are indebted to the following hams: Osvaldo HC2BL in Guayaquil, Ecuador; Gordon TI2VEC in San Jose, Costa Rica, and Ferdinando TI2FJ, same city and country, for initially helping with the first QSOs. We also thank Valerio TG9ZV/6 in Guatemala and Edgar TI2TH in Costa Rica for helping with traffic calls. I wish to express my personal gratitude to Jose Luis YS3PL of San Miguel, El Salvador for handling all the pressure under the adverse circumstances, and also to Italo YS1IM from the Salvadorean Red Cross, for clearing the red tape.

Carlos YS1CCK gave me unrequested help when we lost contact with YSland. Carlos XE2BMC from Tijuana, Mexico, gave important frequency information on the emergency nets. We even had help from faraway places, such as Uruguay: Raul CX8DM from Puerto Carrasco, and CX0ARI, the

Uruguayan Emergency Net station. YS7HL operated by Guillermo, also handled emergency traffic.

Ham Radio is well and alive, and after this show of solidarity and fraternity, I can say that we are proud members of the Canadian Radio Amateur community, ready to help in emergencies and disasters. This is the true spirit that should always motivate the human race. with 73 and DX,

Antonio L. Eguizabal VE7FIF

IF WE COULD BUT SEE...

I'm referring to a letter in the Jan./87 issue of *The Canadian Amateur* signed by A.E. Blick VE3AHU.

His opening paragraph lumped all three services, Navy, Army, and Airforce, together and went on to say that only a small percentage of wireless operators used CW to any extent.

From my personal experience this remark is totally wrong concerning Naval Operators. I served at sea for two years on a corvette and another two years in Naval Shore Stations, and our use of R/T (phone) was very limited.

At sea we were under 'Radio Silence' (no transmissions except in emergency). Inter-convoy transmissions were normally made by V/S (Visual Signalling by flag or lamp). R/T was only used when it was impossible to contact other vessels by the visual method.

The wireless operators stood round the clock watches copying endless messages from N.S.H.Q. or Whitehall W/T. These transmissions were random number or letter groups sent at speeds of 20 wpm plus. Plain language during wartime signified a very high degree of priority and was almost never used.

Our shore station activities consisted of both transmitting and receiving CW at speeds of 20 wpm plus.

From the foregoing, I believe that Mr. Blick should not have lumped Naval Operators into his general grouping, as far as CW is concerned.

He's probably right when he says that the forces had technicians to carry out repairs and maintenance to the radio sets, but what good is a shore-based technician when you are 1000 miles at sea? Fortunately our radios were very reliable, and I can't remember any major problems arising that we couldn't fix ourselves.

The ex-service personnel from WW2 are senior citizens now. They were trained and brought up on tube type equipment. Some are still using it, and a lot of it is still functioning well.

Many retirees are unable to spend

up to \$3000 to set up a respectable radio shack, and apart from this feel that the present exam structure is too onerous for a hobby.

Getting back to CW. I've worked Ham Stations whose CW is impeccable. I've also worked Ham Stations whom I swear have learned some different code than the standard International Morse Code. It would be helpful if we had a 'Q' signal that said, "Sorry we aren't using the same code, I can't copy you."

73, Ian McAuley VE3MYO

Some would consider it nit-picking, but since it is the second or third time I have seen a statement in print similar to the second sentence in the letter I felt I must comment.

The first sentence in the letter is quite true. However in the second he states that in a Canadian infantry division "these (communicators) would be members of the R.C.C.S.". This is only partially true. R.C.C.S. was responsible for communications at and between Brigade HQ and higher formations and forward to front line battalions. In the forward formations, communications were handled by regimental signallers trained within the units.

My first trip overseas in the '40s was as a regimental signal sergeant, not R.C.C.S. (but trained by them in the late '30s), and, although all my fellows had to be proficient in CW, I agree that they had little opportunity to use it. During my second holiday in Europe in the '40s, although no longer with the sigs, they were there with the rest of us tourists when we visited France at daybreak on June 6 1944.

I enjoyed both the editorial and VE3AHU's letter but felt I should write the foregoing.

73, G.V. Moran VE1BCY

JACK RAVENSCROFT SUSCEPTIBILITY DEFENCE FUND

Having followed the VE3SR Saga, the members of the Papua New Guinea Amateur Radio decided that they should help along with the many others around the globe. We feel that any positive outcome from the court hearings can only benefit Amateurs worldwide since we all live with the same problems to a lesser extent as VE3SR. Hopefully any spinoff will have an effect on manufacturers and this in turn will benefit the Amateur fraternity.

Enclosed is a small token of assistance from our 53 members.

R.E. Parkes P29PR
(Secretary PNGARS)

DOC APPOINTMENT

Ed Ducharme was named Director, Regulatory Policy and Planning and Assistant Director General, Radio Regulatory Branch. Previously, he was Director, World Administrative Radio Conference Activities.

THE AULD MUG AWARD

If you have been collecting cards from VK recently, see if you can find four contacts between Oct. 5, 1986 and the last America's Cup race in Feb. 1987. If you can, list them and send them to Awards Manager, W.I.A. (VK6 Division, P.O. Box 10, West Perth 6005 Australia). Certify your application as correct.

SATELLITES

RS5 and RS7 satellites are still operating, but there is little Canadian activity on them—VE3JLP.

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DOC News

DOC plans to review use of spectrum

BY BILL WILSON VE3NR

On Dec. 4, 1986, at the annual meeting of the Radio Advisory Board of Canada, the Department of Communications announced that it would be reviewing radio spectrum utilization policy for the various bands between 30 and 890 MHz, during 1987.

This review is of greatest importance to Radio Amateurs for many reasons, but primarily because it will have a profound effect on the future of Amateur Radio in Canada and the Amateur's use of advanced technologies. Amateurs have four bands in that part of the spectrum: 50-54, 144-148, 220-225, and 430-450 MHz and they are not even lightly used when compared with the 'commercial' bands in that same portion of the spectrum.

Of the non-Amateur bands, the TV bands excepted, the 138-144 and 148-174 MHz bands are the most heavily used bands in Canada. Some would say these two bands are absolutely full in the major metropolitan areas of Canada. Most of the stations operate in the land mobile service but along the coasts and in the Great Lakes ships also use the higher band. These two bands have propagation and coverage characteristics that make them most useful for land and maritime mobile service. For more than 30 years now everyone wanting a licence for a mobile system has sought a frequency in one of these two bands and that is still the situation. The alternatives are three bands above 400 MHz and one band below 50 MHz. They are not really comparable 'performance-wise' with the two bands at 138-144 and 148-174 MHz and users and manufacturers (who often design private

commercial mobile systems for their customers) do not prefer them.

Thus, we have all the right conditions for a whopping good competition for radio spectrum. DOC, by promising to review usage policies between 30 and 890 MHz, has just fired the starting gun! Following the last review by DOC in the early '70s the Amateurs lost the 420-430 MHz band. WARC '79 gave international recognition to that loss.

Many other different radio services (around 15) in addition to the land mobile and Amateur services use spectrum between 30 and 890 MHz and some of these may also be looked at by DOC. But most of the stations operating in these services are internationally mobile—for example: aeronautical mobile, aeronautical radionavigation, maritime mobile, meteorological aids, earth exploration, space operations, etc. The bands they use must therefore be internationally agreed and there is not the flexibility to deal with spectrum congestion that one has with purely domestic services. TV broadcasting also uses that chunk of spectrum.

In the mid-'70s the DOC and the FCC added Mobile to the top end of the UHF TV band to get spectrum for that service. Eventually, WARC '79 added Mobile and Fixed to the band 809-890 MHz and this enabled Canada to change its domestic allocation table from Broadcasting to Mobile and Fixed, and thus be in conformance with the ITU Regs. It is improbable that more will be taken from broadcasting this time around. So, there we have some services that are not likely to become involved in the competition for spectrum between 30 and 890 MHz just now.

Some may think that because the ITU Radio Regulations do not provide additional or alternative allocations in the 2 metre Amateur band, Canadian Amateurs are safe from the possibility of part of this band being reallocated to non-Amateur radio services in Canada. They may draw this conclusion when they read the editorial in January 1987 QST reporting to U.S. Amateurs on the FCC's dismissal of a petition for the non-Amateur use of part of the 6 metre band in the States because the ITU Regs did not provide for an alternative allocation.

However, Canada can take advantage of clauses in the ITU Radio Regulations which allow a country to use frequencies in a manner not in accord with the ITU Regs provided that use does not cause harmful interference to radio used in accordance with the ITU Regs by another country. This was the basis for Canada's deleting Amateur Radio in the 420-430 MHz band from the Canadian domestic frequency allocation table in the '70s and turning it over to the land mobile service as well as for the addition of land mobile to the UHF TV band mentioned earlier.

Let's face it, our use of the 146-148 MHz band—land mobile and fixed—is very much the same as the commercial use of bands on either side of our 2 metre band. From a strictly technical point of view this makes for ideal band sharing conditions and some very good arrangements for sharing the 146-148 MHz with private commercial land mobile services could probably be worked out by DOC. There would be no equipment problems as most commercial land mobile gear being used today can be tuned to operate in the 2 metre Amateur band. In ITU Region 3 (Asia), Amateur shares the band 146-148 MHz with the Fixed and Mobile services.

Alternatively, there could be a simple reallocation of the 144-146 MHz band to Mobile as is the case in ITU Region 1 (Europe and Africa). International acceptance of either of these changes at the next WARC would be very easy, based on what is done in the rest of the world.

Later this year the DOC may publish a draft policy proposal for public consultation. If the Amateurs wait until then, the two national associations will have from 90 to 120 days to get their arguments drafted, their views coordinated and briefs sent into DOC—not much time when things are already half-decided. The two national associations should be starting now to work on this matter.

Also Amateurs should be making better use of the whole of the 2 metre band. Appropriate revisions to the present 2 metre band plan should be made quickly to encourage this. After all, "Use it or lose it" certainly applies here.

DOC APPOINTMENT

Diane Larsen, a Radio Inspector with the Vancouver District Office, recently won a competition for the position of District Manager, Whitehorse. Diane, who took up her duties in the Yukon in June, will be in the North for a minimum of two years. A DOC employee for six years, Diane is the Department's first woman District Manager.

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-Stuart D. Cowan, W2LX

*Stuart D. Cowan is recognized as one of the world's foremost authorities in ham radio. He is an author of Handbooks for Radio Amateurs, CB Operators, Shortwave Listeners, Kit Builders, Experimenters, and Students. He and Bill Orr (W6SAI) worked together in propagation studies on the new 10, 18, and 24MHz bands as authorized by the FCC. Experiments also included satellite communication. In the experiments he used Ten-Tec equipment for three years on cw and ssb "without a single problem or failure."



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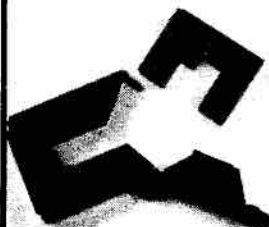
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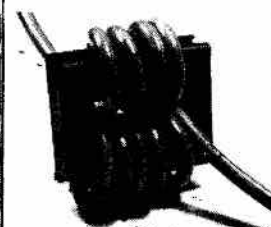
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Flora MacDonald, M.P., Minister of Communications, addresses Kingston Club

The Kingston, Ontario, Amateurs are doubly fortunate. They have a fine, active club, and their Member of Parliament is the Honourable Flora MacDonald, Minister of Communications.

We all are fortunate, too, that she was kind enough to attend the Club's meeting on Dec. 12 last year, and to address them on subjects of great interest to us all.

The Canadian Amateur is proud to reproduce, for all Canadian Amateurs, the speech she gave there.

A dinner meeting was held by the Kingston Amateur Radio Club on Dec. 12, 1986. Attending were 65 persons with many XYLS. Guest of honour was The Honourable Flora MacDonald, P.C., M.P., Minister of Communications. Other guests were two police officers, Inspector Paul Flewelling and corporal Bruce McKenna. From the DOC office were radio inspectors Paul Cook and Bill Holland. Also present was fire chief Walter Bush from Kingston Township Fire Department.

The dinner was held at No. 9 Legion, Kingston. Following the dinner KARC president George VE3LXA introduced the new executive of the club and guests. He then called on Bob VE3SV to present the club's activities for the past year. This should have impressed the guests with the club's capabilities for emergency communications.

Flora then gave an excellent speech: she discussed RF susceptibility and pledged the support of her department in the Ravenscroft case. Flora was thanked by Norm VE3NFW.

The club president for the second year is George VE3LXA, vice president is Don VE3MNE and treasurer is Eric VE3XE. Secretary for the third year is Bill VE3NFU. Program directors are Bill VE3PBL, Jean VE3MNI and Norm VE3NFW.

It was a great evening and the club hopes to hold another next year with more in attendance as we were limited to 65 seats for the dinner.— VE3NFU.

Here's the Minister's speech:
Ladies and Gentlemen,

What a pleasure it is to be with you this evening, in this Legion Hall, sharing Christmas dinner.

As the holiday season comes around, one always feels the need to

be among friends, among those with whom we share common experiences and a similar background.

Tonight, here in Kingston, a city which has become my home and which I have been honoured to represent in Parliament for over 14 years, I feel truly close to my roots, even though I was born in Cape Breton.

This is because it is a marvellous circle of events that has brought me here this evening to address the Kingston Amateur Radio Club as Canada's Minister of Communications.

As some of you know, I have a long-standing personal interest in the communication field. As a matter of fact, I grew up immersed in the communication world— my father was the senior telegraph operator in North Sydney, Nova Scotia, at the North American end of the transatlantic cable.

The Kingston Amateur Radio Club is fortunate to have present and past members like Herbert Walsh and Buster Doubleday who, as former landline telegraphers, have taught you firsthand of the importance of that transatlantic cable, particularly during the second World War.

It seems almost inconceivable today that during that war, the only way Winston Churchill and Franklin D. Roosevelt could communicate, other than travelling by boat to speak in person, was through Morse Code messages over that submarine cable.

But that's the way it was, not all that long ago. So my father, in the course of his duties, played a role in some of the most important discussions of the Allied Leaders, by retransmitting them down the line.

Même aujourd'hui, malgré la possibilité de communications de

masse instantanées dans le monde entier, les personnes dévouées restent encore l'élément le plus important et le plus indispensable de nos réseaux de communications.

Les Radioamateurs illustrent cette vérité d'une des façons les plus éclatantes. Au fil des ans, vos collègues et vous avez souvent joué un rôle vital comme messager et bon samaritain en retransmettant des renseignements essentiels lorsque les liaisons habituelles n'étaient pas disponibles.

Le professionnalisme et la fiabilité dont font preuve les radioamateurs dans de telles situations leur ont mérité une très bonne réputation auprès du grand public. Et ce n'est pas seulement au moment d'accidents ou de désastres que nous vous sommes reconnaissants.

C'est parfois pour une chose aussi simple que la transmission d'un message entre les membres d'une famille qui autrement n'auraient pas pu communiquer ensemble, à l'occasion de Noël, par exemple.

(Translation:

Even today, despite our capacity for instantaneous worldwide mass communications, dedicated individuals are still the most important and indispensable part of our communication networks.

(Amateur radio operators provide one of the clearest illustrations of this truth. Over the years you and your fellow operators have frequently played a vital role as messengers and good samaritans, retransmitting crucial information along the line when more routine links were not available.

(The professional and dependable manner in which amateur radio operators conduct themselves in such situations has earned you a very positive

image with the general public. And it is not only in times of accident or disaster that you earn our gratitude.

(Sometimes it's for as simple a matter as passing along a family greeting for those who might not otherwise be able to let each other know that they care. Like at Christmas.)

I know that members of your club have long been involved in phone patching activities and that your most senior member, Mr. Charles Millar, has even been specially commended by the Canadian Armed Forces for his work in this field.

EMERGENCY SERVICES

Mr. Millar, as a new year approaches in which you will celebrate both your 82nd birthday and the 57th anniversary of your radio licence—an impressive and perhaps unequalled milestone—permit me to express my good wishes and my sincere thanks for your outstanding service to Canada.

You exemplify the public-minded spirit that has characterized the Kingston Amateur Radio Club throughout its nearly four decades of existence, since its beginnings shortly after the Second World War as the Kingston Civil Defence Amateur Club.

The citizens of Kingston are grateful for your contribution to emergency preparedness through participation in exercises with the police and fire departments here.

They appreciate the help you have offered to the hearing impaired by constructing accessory devices for them.

They recognize the invaluable assistance you offer to one of our popular regional attractions by coordinating the sailing events at the Canadian Olympic Regatta at Kingston (CORK).

And they acknowledge the importance of the amateur radio station you were instrumental in establishing at St. Mary's on the Lake Hospital.

Yes, amateur radio operators have distinguished themselves as friends when times are good and as heroes in times of trouble. They have also made a name for themselves as researchers, forever pushing back the limits of their technology.

For all of these reasons, and because of their very responsible attitudes, they will continue—you will continue—to use the spectrum with full public approval.

CROWDED SPECTRUM

At the same time, of course, you know as well as I do how crowded the spectrum has become. It is an increasingly complex task to accommodate the rights of access of



Photo VE3NFU

Flora MacDonald and Inspector Paul Flewelling shake hands while Corporal Bruce McKenna looks on. Gaels and Celts everywhere.

many diverse spectrum users. Business, official, entertainment and personal uses of the airwaves must coexist without one user interfering with another.

To take just one example, problems occasionally arise with badly designed microelectronic circuits.

As more and more manufacturers introduce microchip technology into household appliances, toys, office equipment and even vehicles and aircraft, there is a growing risk of problems associated with radio frequency interference from a wide range of sources.

My department, in consultation with spectrum users across Canada, has had a key role in bringing this problem to the attention of the international community.

RFI GUIDELINES

We proposed the first international guidelines for manufacturers to follow in making electronic systems immune to interference. These early guidelines have since been upgraded and have helped to reduce the problem to a certain extent.

However, there has been an explosive growth in the use of digital electronic circuits in products from all corners of the globe, and we are concerned that the manufacturing sector has not, as a whole, fully taken the problem of immunity into account in the design and manufacture of consumer electronic equipment.

This problem has reached the stage where we, as a country, need to actively consider options such as legislative action to give substance to the guidelines and standards

developed by government and industry.

GENTLY DOES IT

However, let me make it clear that we will not rush to impose the heavy hand of government regulation unless absolutely necessary, particularly if we must do it outside an international framework of standards.

You in the amateur radio community understand better than anyone the importance of international good will to your activities. You have both produced and thrived on such good will in the past. We can hardly proceed without it in the present.

Moreover, government regulation may put constraints on the amateur community or risk imposing unnecessary costs on consumers and users of electronic equipment. Such equipment is essential to our well-being, both culturally and economically. Impeding its availability would have significant negative effects. As in many areas of public policy, a judicious balance will have to be struck.

You can be assured that the matter is of great concern to me and the department and that your views and interests are being taken into account.

We recognize that this issue of electromagnetic compatibility is one which is of concern to you as amateurs. I want to assure you that I, too, am concerned. My officials have followed the initial trial of the Ravenscroft-Houghtby civil suit in a lower level court. You are all familiar with that outcome.

Page 12

THE RAVENSCROFT CASE

I note that the appeal process is under way, and my staff and legal counsel are studying the grounds for appeal which have been prepared by Mr. Ravenscroft's counsel. Consequently, I do not propose to discuss this specific matter any further.

Compatibility and immunity issues, of course, are part of the larger goal of ensuring harmony in the management of the spectrum, which we see as a vital public resource.

To this end, as I am sure you are all aware, Parliament is presently considering legislation to ensure the financial equity and prudent administration of the government's spectrum management activities.

The purpose of Bill C-3 is to ensure that the costs of planning and managing the radio spectrum are shared equitably among its direct beneficiaries.

Nevertheless, I would like to assure you that the government recognizes the special situation and spectrum needs of Canadian municipalities. Therefore, no change will be made to the licence fee structure for municipalities and volunteer fire departments as a result of Bill C-3.

SPECTRUM PRESSURES

Amateur radio operators have historically enjoyed a remarkable share of the spectrum as their exclusive turf. This is because of their traditional role in communications, public safety and radio experimentation, as I described earlier.

Nevertheless, pressure is forever being brought to bear on Canada and other members of the International Telecommunication Union (ITU) to relinquish part of this very valuable airspace.

There are suggestions, for example, that short-wave broadcasters should be given some of your existing space in the 40 metre band, and that mobile land services such as pagers and dispatchers be allowed to use some of your space in the band between 144 and 148 MHz.

In another country, one more subject to commercial pressures, your spectrum share might be gobbled up quickly. We here in Canada are not prepared to be so hasty.

Spectrum managers have a long-standing relationship of trust and respect with amateur radio operators. As a result, you have access to a very generous portion of the spectrum. You are allowed to use great amounts of radiated power, larger than any user other than broadcasting. Much of this is due to your traditional role as radio explorers.

I would only ask you to bear in mind that, as your Minister of Communications, I am responsible to oversee the spectrum for all users. Moreover, radio is not something that stops at national boundaries. We have to bargain and negotiate continually for your rights, in a forum which is very competitive.

Even in Canada alone, we have seen unprecedented growth in both the uses and the users of the airwaves.

In the past 40 years, the number of radio licences in force in Canada has risen over 100 times, to three quarters of a million in 1986.

In half that time, mobile stations have grown in number from 60,000 to over half a million. These figures do not include the 355,000 stations licensed in the general radio service.

IT'S CROWDED OUT THERE

As of November 1986, there were 23,590 licensed amateurs using the airwaves in Canada.

Seven categories of radio stations existed in Canada in 1914. Thirty-three exist today to accommodate the innovative uses to which radio has been put since then.

In other words, it's crowded out there! So I'm basically asking you to look both ways when you step into the traffic. We don't want anyone hurt.

Amateur radio operators enjoy their historic status because they have had to pass rigorous examinations before being licensed and because they have, on the whole, been self-policing.

I know that I can rely on you to continue demonstrating your traditional professionalism as the spectrum becomes more and more crowded, and as our society comes to depend on sophisticated electronics in every area of life, creating the potential for interference problems like those I mentioned earlier.

Our trust in you finds tangible expression in the licences you are awarded. Many amateur radio operators have complained in recent years, however, that our licensing requirements and exams seem outdated.

I can understand why some of you would wonder why you need a certain proficiency in Morse code to be licensed today.

Or why those of you who can go into a store and purchase equipment would wonder why you need to know how to build a radio.

EXAM CHANGES

In response to your concerns, we recently circulated some proposed changes to regulation and policy.

We proposed a two-tier approach which would open the door to a novice with an interest in radio and some money for equipment. Such persons would have an operator's certificate after some 40 hours of basic training and would be permitted to operate at a very low power.

Those who still wished to experiment and tinker with radio would continue to be encouraged with a higher level of licence.

We have had several hundred responses to these proposals, from



Photo VE3NFU

"Tho' they may gang a kennin wrang, to step aside is human," counsels Flora MacDonald as she shakes hands with Paul Cook, one of her Department's Radio Inspectors, while Bill Holland, another R.I., and Corporal Bruce McKenna, Kingston Township Police (L) looks on.



Flora MacDonald and Kingston Fire Chief Walter Bush meet, as Bernie VE3NB looks on.

across the country, roughly one-third were in favour of the proposals in our 'Amateur Restructuring Paper.'

Another third were in favour with suggestions or had minor reservations, and the rest were not in favour unless there were major modifications.

These comments are being carefully evaluated and compared. New draft regulations and policies will be prepared during the course of the next year. We welcome any further recommendations you may have.

But I am glad to have this chance to tell you in person how much we appreciated hearing from all those of you who have made suggestions already.

In closing, I would like to repeat that the Canadian government recognizes you, the amateur radio operators of our country, to be good citizens of the airwaves, performing a valuable public service and practicing a very enriching activity.

We look forward to further friendly cooperation in the future as we work toward the common goal of maintaining the radio spectrum as a medium of information and public safety for all Canadians, and as a source of personal satisfaction for all of you.
Thank you.



Photo VE3NFU

"That amplifier's acting up again," thinks Bob Boyd VE3SV as he addresses the meeting.



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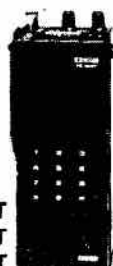
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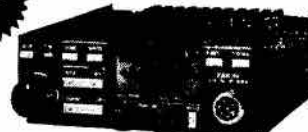


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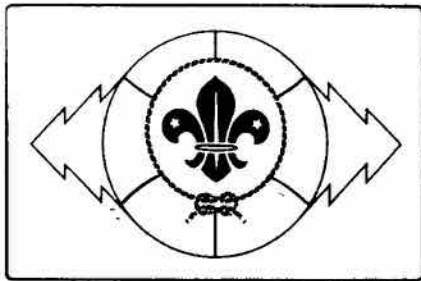
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JOTA 86

Scout

"Jamboree On The Air"

By Jason Beyette

It was Sunday, Oct. 12, 1986 when I got a phone call from two ham radio people (who happen to be my godparents), Bill Dunfield VE4ANI and his XYL Doris VE4APL, and they said, "Jason! we have some exciting news for you. Next weekend there will be a Scout Jamboree on the Air," and right then I pictured in my mind being able to talk to other boys around the world. So I quickly asked, "does this mean I will be able to talk to scouts in the United States and somewhere else?" VE4ANI replied, "That is correct, it will be very exciting."

Well, guess what! This just happened to be the weekend of our scout camp, where 11 scouts were going to camp together and get involved in other exciting activities. What do I do now? I just have to take part in the Jamboree on the Air, so along with my parents, we decided I would go to camp for Friday and part of Saturday and return for the Jamboree. This is what I did, which allowed me to participate in some of the camping activities which included a six-mile hike. I returned to the QTH of VE4ANI at 7 p.m. local time Saturday, to get involved in JOTA.

This is when it started to happen! We tuned in on the 20 metre band and before long we heard "Scout-Jamboree-on-the-Air." VE4ANI would call the other Ham, while VE4APL would copy the other Ham operator's call sign (VE4ANI is a white caner). After contact, the Scout Groups took turns introducing themselves to me, telling me a little about themselves, and their participation in scouts.

Then I replied, giving similar statistics about myself. I even talked to some Girl Guides! And at this time I thought to myself how exciting this is. We continued to work on the air for a while longer, then took a break to learn some other fantasies about Ham Radio.

Here is my name in Morse code:

JASON BEYETTE

I also learned the phonetic code, which Ham Radio operators use regularly. We then went to bed.

On Sunday morning, another Ham, Ray Pike VE4ADP, called VE4ANI on a special radio, that you use for short distance communications. A two metre rig.

So off to VE4ADP's QTH we went



Jason seems absorbed in a QSO while VE4ANI stands by.

and made some contacts to the United States.

We finished the day with a steak barbecue at VE4ADP's QTH.

From having this exposure to Amateur Radio, I have learned many different things that I would like to share with you.

Ham Radio operators, in my opinion are not Amateurs, they must have many skills to be able to operate the rigs in a proper manner. They are very friendly, courteous, trustworthy much like we are taught in scouts, and "are always considerate to other people."

I would like to thank the Ham Radio people for working with the scouts in this event. I enclose some photographs of our participation in JOTA.

I wish to become a Ham operator someday. I also will make many new

friends by exchanging letters with the scouts and people I met through radio.

Jason Beyette,
R.R. 5, Dauphin, Man.

P.S. I am 11 years old and this is my first year in scouts. I belong to the 5th Dauphin Cub and Scout Group.

Jason has earned himself a book token for this splendid effort. Ask VE4ANI and VE4APL to help you start on Amateur Radio now, Jason. You could earn your licence in a year. — Editor.

FROM ONTARIO HYDRO

We need your help with a serious and continuing electrical safety problem involving the installation and removal of TV, CB and other types of antennas.

Each year there are a number of serious electrical contact accidents and fatalities among members of the public who attempt to install or remove antennas. They are often not fully aware of all the hazards involved in this work and in their attempt to get the job done, push or lift the antenna up into an energized power line or they lose control of it and it falls onto the power line.

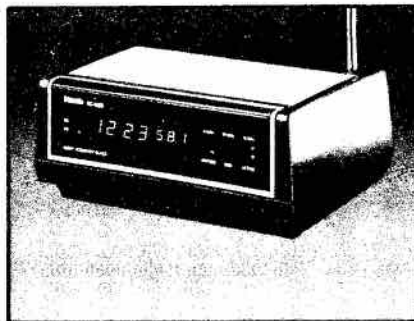
The members of your club are all well aware of these hazards and as in past years, we would appreciate it if your club could help us in warning the public by being on the lookout for hazardous installations and by placing warning posters in a conspicuous location in your clubhouse where any visiting member of the public might see it.

If you require any further information or warning posters or other electrical safety information, please contact: D.M. Bernard, Ontario Hydro, 700 University Avenue H2-B16, Toronto, Ont. M5G 1X6.

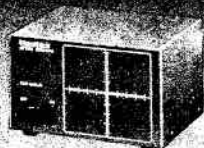
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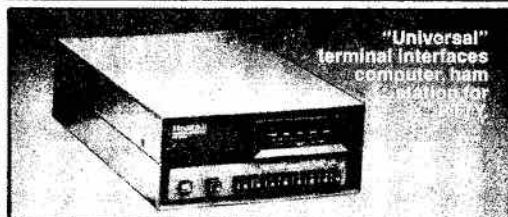
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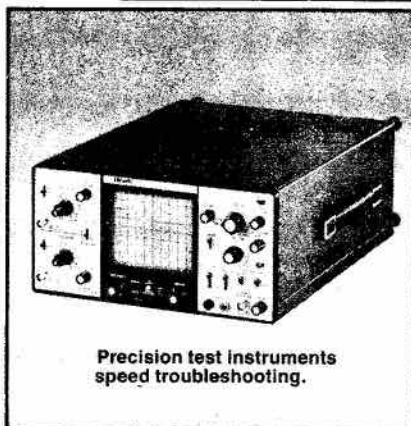
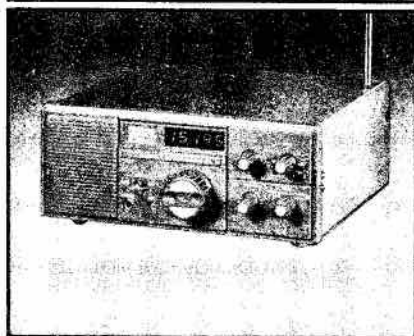
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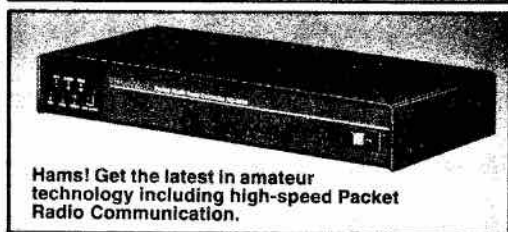
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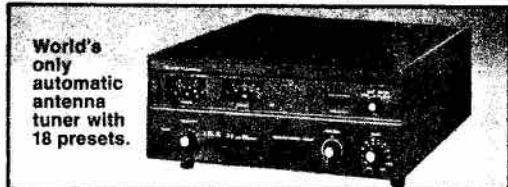
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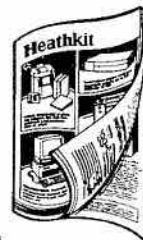
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QEHS Amateur Radio Display

**BY JIM CLEVELAND VE1CHI
AND BERNARD CONRAD
VE1BLM**

In November, Queen Elizabeth High School, Halifax, held its second annual Amateur Radio display sponsored by the Halifax Amateur Radio Club. Club members, Jim Cleveland VE1CHI and Bernie Conrad VE1BLM, teachers of Physics and English at the high school, organized the display.

A 2 metre station was operated by Herb Bradley VE1ADA, and an HF station was operated throughout the day by members of the Halifax club, primarily Brit Fader VE1FQ, Don Watters VE1BN and Fred Benjamin VE1BSY.

Many students spoke with local Amateur radio operators in the area on 2 metres. A computer programme display generated the 'dits' and 'dahs' of Morse Code, actively used by students throughout the day. Students had the opportunity to generate code on the telegraph key and were awarded a certificate of code proficiency by Andy Hodder VE1BV for the effort of sending their name in code.

During the day, stations from as far away as South Africa were heard on HF, but the opportunity to talk to radio Amateurs in Canada and other countries sparked the most student interest. Using a home brew 20 m antenna up about 8 feet, contacts were made in Paris, Ont., Windsor, Ont., Pennsylvania, U.S.A. and Milano, Italy.

The school newspaper editor, Nancy Barnes, conducted an on-air interview with Al Sass, a VE3 station in Paris, Ont. about 100 km west of Toronto. Al told Nancy that his home town was renowned for the first long distance telephone call by Alexander Graham Bell. Nancy also learned that Al has been contacting an Australian station every day for the past year. Nancy discovered that Al's age was 50 but it was rumoured that she did not reveal her age.

The display had its serious moments as well. Physics students had lab problems to do, including questions on resonant frequency and wavelength of the two antennas that hung overhead in the classroom.



Brit Fader VE1FQ and Nancy Barnes at the HF station.



A study in concentration. Key and keyer intrigue a QEHS student.

Students discovered that short-wave listening was a beginning to the exciting world of Amateur radio. Those who want to become active in Amateur Radio will have to study Morse Code, pass an examination in radio theory, and take an objective examination on radio regulations.

At the end of the day, several students helped to take down the display and wrap up a very successful day. The students of the high school

wish to thank the members of the Halifax Amateur Radio Club who took the time to drop in to assist with the display and share with QEHS students their experiences in Amateur Radio.

Several local Amateurs dropped in during the day to add moral support: Bob VE1PQ, Bruce VE1AVH, Andrew VE1BHO, Len VE1BXI, Bob VE1BFX, Art VE1CJW and Doug VE1BLE.

The idea of an independent, Canadian, national Amateur Radio society has been recommended since the beginnings of Amateur Radio. But the low Amateur population, coupled with the large geographical extent of Canada, prohibited success until your national Federation was formed in 1967.

During that year, Canada celebrated its 100th Birthday with a multitude of local, regional and national special events, including EXPO 67, with the various media devoting much time and space to acquaint us with our great country and its history, diverse outlooks and achievements. A feeling of Canadian nationalism was generated and, as one scribe noted, "the branch plant mentality outlook is beginning to erode."

The feeling that, as Canadians, we were fully capable of looking after our own affairs, led to the Amateur Radio League of Alberta (ARLA), at the instigation of the Calgary Amateur Radio Association, forwarding a letter to the other provincial Amateur organizations and the Canadian Division ARRL requesting that they consider the formation of an independent National society and send representatives to meetings to be held during the Manitoba Convention on the Labour Day weekend in Winnipeg. These meetings were attended by representatives from ARLA, the Manitoba Association of Amateur Radio Clubs (now Amateur Radio League of Manitoba, ARLM), the Radio Society of Ontario (RSO), Cdn. Div. ARRL and other interested persons.

Four sessions were held during the weekend and resulted in the founding of the Canadian Amateur Radio Federation with its Headquarters in Winnipeg and a temporary President, Jim Roik VE4UX, and Secretary-Treasurer, Jim Couprie VE4CS, appointed to handle affairs until the first annual meeting was held, with instructions to publicize the Federation and solicit membership. Membership was to be available to provincial Amateur organizations, with each appointing a Delegate, who together would form the Board of Delegates and meet annually to elect the Officers. The RSO volunteered to produce a Constitution and present it to the Board for approval at the first annual meeting to be held during the first RSO Convention in Brampton, Ontario. (The author became involved with CARF at this time when appointed as Ontario Delegate and

instructed to produce the constitution documents.)

Several items in the Minutes of the founding sessions can be noted:

(a) individual membership in CARF was not considered feasible at that time but the goal of individual membership was to be adopted.

(b) the Canadian Director ARRL, Noel Eaton VE3CJ, stated that the geography (size) of Canada will prohibit frequent meetings; best estimates show that only 30% to 40% of Amateurs can be considered active; there are (in 1967) 3600 Canadian members of ARRL; his main problem was a lack of input as few of the questionnaires he sent out are returned; and a Canadian Amateur organization would not be able to take over the activities of ARRL in, and for,



At the last CARF AGM, Ken VE3CRL presented Art with a gavel, sorely needed to keep us all in order. That's George VE3JQW, 'Clubs' editor, applauding.

Canada, such as production of a national publication, services to clubs and individuals and the representation of Canada to IARU; that ARRL would probably 'bless' the formation of a Canadian organization but, if the ARRL is asked to leave Canada and the organization fell through, the ARRL would hesitate to come back.

(c) all agreed that cooperation between ARRL and CARF was necessary but CARF must be independent, particularly on the national level.

(d) for rep-by-pop, CARF should have three Delegates from Ontario, two from Quebec and one from each other province, but voting power between that of the P.E.I. Delegate and all other Delegates was a factor to be considered. The result was the adoption of one delegate per province, each with one vote.

(e) ARLA, MAARC and RSO each donated \$25, as did the Canadian Director ARRL, with R. Beardow VE3AML donating \$10, to commence the finances of CARF. Dues of

provincial members were set at 25 cents per dues-paying member of the organization and it was estimated that this would produce an income between \$500 and \$800 per year for CARF. (Remember that this was 1967 when costs, and wages, were about one-sixth of today.)

From such small beginnings has your national Federation grown. Individual, associate membership came in 1972; the national publication—*THE CANADIAN AMATEUR*—had its first issue in 1973, with a circulation of 400; individual membership control, with limited control by provincial members, occurred in 1975 and full individual control in 1981.

CARF is now governed by a Board of six Regional Directors, each elected by the voting members of the respective Regions. They elect the Officers and appoint other officials to assist them in the management of CARF affairs. Dues income has grown from about \$500 to an estimated \$100,000 in 1987 and membership has risen from three provincial members to over 4,000 individual members. It should be noted that CARF had a peak of 5,200 members in 1982/83, but major problems with the circulation of *TCA*, and the destruction of membership records in 1984, led to a decrease of about 1,500 but this membership is being regained with production and circulation of *The Canadian Amateur* now better than ever before.

Having been involved with CARF since its founding, your author looks back on its first 10 years of existence as a period of great achievement, much frustration and confusion, the expenditure of large amounts of time and some personal finances by most of those involved and the formation of solid friendships. Finances and, later, individual membership support, were always low.

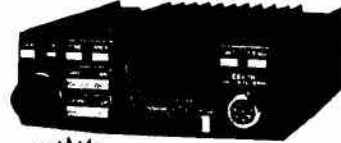
Success started to come in 1977 when membership increased rapidly and then doubled in the next five years with a consequent large increase in finances and greater ability to attract more Amateurs into official positions.

In future columns I will be looking into the old files of your Federation and reporting how your organization has progressed. Many others were involved in our development and I can hope that they will correspond with me about 'the good old days' so present members can gain an insight into the ideas we had, the work done, problems faced and how they were overcome.

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Jack Ravenscroft Susceptibility Defence Fund

Two years will soon have elapsed since the time Jack Ravenscroft VE3SR received a legal note demanding he cease transmitting from his home station because it was deemed to be causing a nuisance to his neighbour's electronic appliances.

The subsequent temporary injunction which occurred in July of 1985 prevented Jack from using any of his Amateur Radio gear until a trial could determine the liability in the case. The permanent injunction handed down in January 1986 saw the temporary injunction upheld even after a series of tests by the Department of Communications determined that several devices in the plaintiff's home lacked an immunity necessary to reject transmissions from Jack's transmitter. Tests were run at many power levels, yet some problems remained at a power level approaching 5 watts. The problem was unique to the one location with the exception of one other basement TV which used rabbit's ears.

An initial complaint of furnace control interference was rectified by using a ferrite toroidal core on the sensor leads leading to a long unshielded room sensor which approximated a half wave on 20M, the band of operation.

A claim of interference to a microwave oven was rejected outright by the County Court Judge when it was determined the erratic oven operation was due to a faulty control board—a manufacturer's recall notice was entered as evidence.

A problem remaining is the sensitivity of an electronic organ. It is doubtful this problem will ever be satisfactorily resolved because of sentimental value. The manufacturer had offered to replace this instrument, free of charge, at one point. The Organ Service Manager testified that the noise issuing from the organ, which was caused by audio rectification, had been reduced by 75% from that heard prior to remedial measures being undertaken.

Although Jack remains off the air, he has not been thumb-twiddling. He took on the responsibility of President

of the Kanata Golden Era Senior Citizens Association. He is also vice president of the Goulbourn Friendship Club. These interests help him pass the time, which he finds very long.

Jack does listen frequently and from his comments hears many voices mention his call. He has not transmitted since the temporary injunction in July, 1986. (A fact he has had to defend on several occasions. A recent letter he received from the plaintiff's lawyer, alleging transmitting activity and consequent interference to their TV and furnace control has been legally refuted. In fact Jack's transmitter has been located at another Amateur's, far removed from the suburb of Kanata, where Jack and his wife Helen reside.)

It should be a matter of a very few weeks before the Appeal documents will be filed with the Supreme Court of Ontario and the date for an Appeal is set. The grounds for Appeal are known now; however, legal arguments addressed at Appeal differ from those at trial. There will be no arguments based on facts found at the trial, nor substantiating evidence found since the trial. The Appeal will be set to argue how the Law was applied, in the case of 'Nuisance', alleged. The outcome will be important to every licensed transmitter owner. It should remove any doubt about our relation to this enigma called appliance susceptibility: who must regulate it and who will enforce it.

Steps are under way to set the JRSD Fund in a legal framework. A Trust Agreement is being drafted to accomplish several objectives. First, the three administrators will be given protection from liability, in the event potential disputes arise with the disbursement of funds. The limit of liability will be set to not exceed the amount donated by a donor or, an amount pro-rated to the expenses vs. collections made up to that point. This protection has been recommended by several legal advisors. Secondly, the Trust purpose is to provide financial assistance to VE3SR in his present litigation, as it is considered the successful outcome will be of benefit to all licensed transmitter owners. Thirdly, the Fund does not intend to defray expenses of any punitive penalties assessed and which by law have been found to have been the

result of an illegal action. (This does not include legal expenses.)

As a final objective, the Trust Agreement must define the ultimate dispersal of any residue of funds. Since the Fund was expressly established for the defence of VE3SR, the residue will be required to be returned pro rata to each and every donor. This is a legal requirement and it is not simply a matter of renaming the trust to cover a use which was not specified at the time of solicitation. There are some things which can be done after the legal obligations are satisfied in order to achieve a goal of putting the residue in a General Defence Fund. The General Defence Fund concept is contingent on a successful appeal.

One issue which is a little more difficult to resolve is annual elections of officers, not only now, but in future. From our own experience, the notion of wide geographic separation between the Trust administrators would make the success of an ongoing fund very cumbersome and inefficient. This is an area which can be addressed when the time comes. Remember all funds collected require two signatures for endorsement before funds may be dispersed. Only solicitor statements have been honoured to date with a small amount required for miscellaneous expenses. An annual audit is planned and the cost of this plus tax on any fund interest are the only other anticipated expenses.

Notices will be published when the final Trust Agreement document has been prepared. All donors' names supporting the Fund will be attached to the Trust Agreement and will form part of it.

This issue concerns Amateurs and all licensed transmitter owners. A just and equitable appeal is the reason funds are being solicited. We are not a charitable trust and for this reason do not issue receipts for charitable donations. The legal profession understands the application of the law, in this instance—engineers understand the technicalities of electromagnetic compatibility. Perhaps the Appeal will permit a resolution of this conflict.

The appeal date is not known as of Jan. 15, 1987.

Please support the JRSD Fund. Thank you.

TECHNICAL ARTICLES

TCA welcomes technical articles. Please send them to the Technical Editor, Bill Richardson VY1CW, RR1, Site 20, Box 63, Whitehorse, YT Y1A 4Z6.

The 'Smart House'

To Mr. G.N. Bowling, Dept. 6J24
Bell Northern Research Ltd.

Dear Mr. Bowling:

I have read with great interest the exciting concept of the 'Smart House'. It promises to be revolutionary in the approach made to improve safety, convenience and system flexibility in the home. I am glad to see Canadian industry planning to become involved in this industrial undertaking.

The Canadian Amateur Radio Federation represents some 5,000 licensed transmitter owners which, by virtue of their location, are nested mainly within the community. We have concerns about the Smart House concept and its compatibility with nearby electromagnetic sources. You may or may not be aware that the design of any classes of consumer products has not been made with any regard for devices which either make use of or share common portions of the spectrum used in the Smart House approach.

The prospect of having a domestic, centrally located microprocessor, with little or no compatibility with the surrounding electromagnetic environment is a frightening prospect. You may also be aware that there has been an ever increasing incidence of conflicts among those who share the spectrum. This has largely resulted from "no need to worry about other users" attitude.

Conducted and radiated appliance susceptibility is well documented and

in the past year several cases have been described. There can be the threat of both property loss and the potential for personal hazard, when the immunity of electronic devices is not considered during the design. The automotive industry has been particularly cautious, during the design phase, to ensure that electromagnetic compatibility (EMC), has been considered for their products.

The potential for EMC related problems resulting from using distributed twisted pair cables, as proposed in the Smart House, would be severe. The EMC-related problems are perhaps ones which proponents of this innovative technology have already studied. Would you be kind enough to advise whether this is the case and if so, your success. Most Amateur operators who have grown up with problems of EMC in their own homes as well as their neighbours may be able to offer simple, constructive suggestions, to eliminate these undesirable effects.

Amateurs would welcome any opportunity to participate with your Company in the identification and resolution of such problems, prior to design completion. We may have just the test bed you're looking for.

Yours truly,

Ralph D. Cameron
Chairman, EMI Committee
Canadian Amateur Radio Federation
cc Mr. R. Walsh, President C.A.R.F.
Mr. W. Liddell, Chairman, EMC
Committee, Radio Advisory Board of
Canada

TO THE CANADIAN AMATEUR RADIO FEDERATION

Dear Mr. Cameron:

Thank you very much for your timely letter of Nov. 28, 1986.

We are, in fact concerned about the issues you raise regarding Smart House interference ingress and egress, and as Chairman of the relevant Smart House sub-committee, are investigating the matter.

Your offer of help is appreciated, and perhaps we could discuss the matter on the telephone?

It occurs to me that the U.S. ARRL may have similar concerns—do you have the name and address of your opposite number in that organization?

Yours sincerely,
T. Bowling

WITHOUT PREJUDICE

Ms. M. Angela Henry

Dear Ms. Henry:

Re: Ravenscroft ats. Houghtbys

We have your letter of Nov. 14, 1986. We are advised by Mr. Ravenscroft that his transmitter has been in the possession of Mr. Ralph Cameron since April 26, 1986, and is no longer situate at Mr. Ravenscroft's residence at 34 Binscarth Crescent. Mr. Ravenscroft is prepared to allow you, accompanied by a DOC inspector, to attend at his residence to verify the above at any time.

It is apparent that the interference experienced by the Houghtbys is being caused by the particular susceptibility of their equipment, and not by Mr. Ravenscroft. In view of the above, we are instructed to advise you as follows:

(i) In the event of any future interference experienced by the Houghtbys, Mr. Ravenscroft should not be contacted in any way by your clients. All correspondence should be in writing and directed to Borden & Elliot.

(ii) Should any motion for contempt be instituted against Mr. Ravenscroft, we will be asking for our costs as between a solicitor and his own client.

Please advise your clients to govern themselves accordingly.

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W2ZVY LONG VALLEY, N.J.
K2HL1 HIGH BRIDGE, N.J.
ALLEN WATSON EDMOND, OKLA.
ONBND / W9BSKI CINCINNATI OHIO
K00NL COLUMBIA, MO.
W4MS CARY, N.C.
W4TVZ ALEXANDRIA, VA.
PIONEER AMATEUR RADIO CLUB FRENCH, ME.
NEBRASKA CHAPTER DCMA LINCOLN, NE.
TON BRACKET FRENCH, ME.
THE SYRACUSE VHF CLUB INC. SYRACUSE, N.Y.
PUTNAM EMERGENCY & AMATEUR APTA. LEAGUE CORNEL N.Y.
SHERBOGAN COUNTY A.R.C. SHERBOGAN, WI.
LANARS LIBERTYVILLE, ILL
CENTRALINA A.R.C. MAIDEN N.C.
LIVERPOOL & DISTRICT AMATEUR RADIO SOCIETY- U.K.
S9M3 EI 514H3
W9TJR EVERETT, WA.
GUY VALLEE, PETAWAN, ONT.
CLUB DE RADIO AMATEUR de la VALLEE du RICHELIEU
CENTRAL CANADA BROADCAST ENGINEERS
RAPUA NEW GUINEA A.R.S.
WEST ISLAND A.R.C. - POINTE CLAIRE P.Q.
SENIOR CITIZENS A.R.C., BURNABY, B.C.
Mr. & Mrs. Aliver Johnson, Richmond B.C.

Moncton Area A.R.C., Moncton, N.B.

RADIO AMATEUR DU QUEBEC INC.
SASKATOON A.R.C. SASKATOON SAS7.
VES800
SUDBURY AMATEUR RADIO CLUB (DNT.)
SOCIETY OF NEWFOUNDLAND RADIO AMATEURS
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H9R9W
S. HEATHCOTE, DOLLARD DES ORMEAUX, QUE.
FRANK WELLS, HAMILTON ONT.
VE2UB

Point Grey A.R.C. Victoria B.C.
North Bay A.R.C. North Bay Ont.
Moose Mountain A.R. Assoc. Estevan, Sask.
Northern Alberta Radio Club, Edmonton Alta.
Seaside Peninsula A.R.C.
VE7PI VE7F8F VE7DJM VE7DVK VE7GLM
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(via RAG1)
Yarouath A.R.C. Yarouath N.S.
Trail & District F.M. Club Trail B.C.
North Shore A.R.C. Oshawa Ont.
Keith Estley Zealand N.B.
Saskatoon A.R.C. Saskatoon Sask.
Kemptville A.R.C. Kemptville Ont.

N6N3H
W2EDF Sparta N.J.
W2G18 Andover N.J.
Playground A.R.C. Fort Walton Beach Fla.
Clyde Norton Kinnelonka Minn.

MORE THAN A PILOT

This is Don McVicar's latest book. It gives an account of post WWI Canadian and American aviation, including an account of Howard Hughes' flights, with some attention given, as one might expect from McVicar, to his Amateur activities.

Foreign Affairs

This replaces Gazette Notice No. TRS-026-85 dated 14 December 1985.

1. The following countries have notified the International Telecommunications Union that they forbid radiocommunications with Amateur stations under their jurisdiction:

Angola (People's Republic of)
Burma (Socialist Republic of the Union of)
Ethiopia
Ghana
Iraq (Republic of)
Saudi Arabia (Kingdom of)
Suriname (Republic of)
Thailand*
Zaire (Republic of)

2. Canada has concluded agreements or arrangements with the following countries to permit the transmission by Canadian Amateurs of international communications on behalf of third parties.

Antigua and Barbuda*	United States of America
Australia	Uruguay (Oriental Republic of)
Bolivia (Republic of)	Venezuela (Republic of)
Chile	
Colombia (Republic of)	
Costa Rica	
Dominica	
Dominican Republic	
El Salvador (Republic of)	
Grenada	
Guatemala (Republic of)	
Guyana	
Haiti (Republic of)	
Honduras (Republic of)	
Israel (State of)	
Jamaica	
Mexico	
Nicaragua	
Paraguay (Republic of)	
Peru	
Trinidad and Tobago	
United Kingdom of Great Britain and Northern Ireland**	

* Permitted on special request.

** This third party traffic agreement is restricted to messages sent on behalf of third parties from 'special events stations' in the U.K. to Amateur stations in Canada.

3. Canada has concluded agreements or arrangements with the following countries to permit licensed Amateur radio operators to operate radio stations while temporarily in the other country:

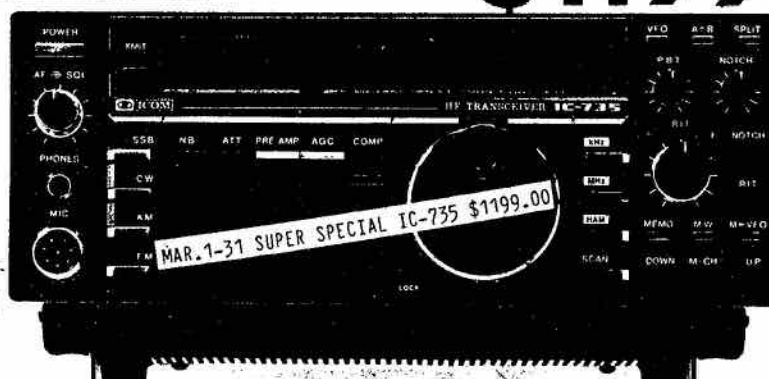
Antigua and Barbuda	Philippines (Republic of the)
Australia	Poland (People's Republic of)
Austria	Portugal
Bahamas (Commonwealth of the)	Saint Lucia
Barbados	Senegal (Republic of the)
Belgium	Sweden
Bermuda	Switzerland (Confederation of)
Botswana (Republic of)	Trinidad and Tobago
Brazil (Federative Republic of)	United Kingdom of Great Britain and Northern Ireland
Chile	United States of America
Colombia (Republic of)	Venezuela (Republic of)
Costa Rica	Yugoslavia
Denmark	
Dominica	
Dominican Republic	
Ecuador	
Finland	
France	
Germany (Federal Republic of)	
Greece	
Grenada	
Guatemala (Republic of)	
Haiti (Republic of)	
Honduras (Republic of)	
Iceland	
India (Republic of)	
Indonesia (Republic of)	
Ireland	
Israel (State of)	
Italy	
Jamaica	
Japan***	
Luxembourg	
Malta (Republic of)	
Netherlands (Kingdom of the)	
New Zealand	
Nicaragua	
Norway	
Panama (Republic of)	
Papua New Guinea	
Peru	

*** Effective November 16, 1986.

References: Article 32 of the International Telecommunications Union Radio Regulations and sections 50, 61 and 62 of the General Radio Regulations, Part II.

ICOM IC-735 \$1199

SALE



HF Transceiver/General Coverage Receiver

The IC-735 is today's most versatile compact transceiver! Ideal for fixed, mobile or portable operation! The IC-735 features 105dB dynamic range, adjustable noise blanker, tunable I.F. notch, and 100 watts output with 100% duty cycle. The IC-735's unique design includes a hatch cover to protect seldom used controls.

List Price was \$1449.00
Sale \$1199 Mar 1-31

Frequency Coverage

Receiver: 0.1-30MHz; Transmitter: 1.8-2.0MHz, 3.4-4.1MHz, 6.9-7.5MHz, 9.9-10.5MHz, 13.9-14.5MHz, 17.9-18.5MHz, 20.9-21.5MHz, 24.4-25.1MHz, 27.9-30MHz.

Frequency Resolution

10Hz, 1kHz, or 1MHz

Power Supply Req. / Current Drain (Transmit Only)

13.8V DC $\pm 15\%$ (negative ground) current drain 20A max. at External AC power supply is available for AC operation.

Dimensions

9.5"(237mm)(W) x 3.7"(92mm)(H) x 9"(225mm)(D)

Output Power

SSB: 10-100W PEP; CW, FM: 10-100W; AM: 10-40W

Max. Freq. Deviation

± 5 kHz

Emission Modes

SSB (USB/LSB), CW, FM, AM

Sensitivity

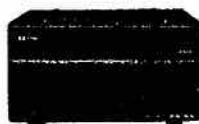
SSB, CW: 0.1-3.6MHz, less than 1.0 μ V for 10dB S/N; 1.6-30MHz, less than 0.15 μ V for 10dB S/N; AM: 0.1-1.6MHz less than 6 μ V for 10dB S/N; 1.6-30MHz less than 1 μ V for 10dB S/N; FM: 1.6-30MHz less than 0.3 μ V for 12dB SINAD

- 12 Memories Frequency, Mode
- 100 Watts
- Large LCD Readout
- FM Standard
- IC-HM12 Mic Included Standard
- Tunable Notch
- 100% Duty Cycle
- 105dB Dynamic Range
- QSK to 40WPM



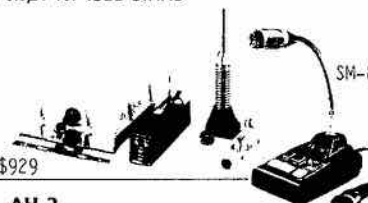
\$579

AT-150
Automatic Antenna Tuner



\$289

PS-55
AC Power Supply



\$929

AH-2
HF Automatic Antenna Tuner

HF Equipment	
IC-735 Gen. Cvg Xcvr	\$1349
IC-745 Gen. Cvg Xcvr	1529
IC-751A Gen. Cvg. Xcvr	2299
Receivers	
IC-R7000 25-1300 + MHz Rcvr	1599
IC-R71A 100 kHz-30 MHz Rcvr	1379
VHF	
IC-275A All Mode Base 25w	1699
IC-271H All Mode Base 100w	1249*
IC-27A FM Mobile 25w	629
IC-27H FM Mobile 45w	669
IC-28A FM Mobile 25w	629
IC-28H FM Mobile 45w	669
IC-38A FM Mobile 25w	
IC-2AT FM HT	389
IC-02AT FM HT	579
IC-22AT Micro HT	469
UHF	
IC-471A All Mode Base 25w	1099*
IC-471H All Mode Base 75w	1399*
IC-47A FM Mobile 25w	789
IC-48A FM Mobile 25w	669
IC-4AT FM HT	485
IC-04AT FM HT	639
IC-3200A FM 2m/70cm 25w	855
220 MHz	
IC-37A FM Mobile 25w	499*
IC-3AT FM HT	485
Repeaters	
IC-RP3010 440 MHz	1799
IC-RP1210 1.2 GHz	1999

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- VOLT & AMP METER ON MODELS RS-20M & RS-35M.
- Separate Volt and Amp meters, with Voltage adjustable from 5-15 Volts on VS-20M and VS-35M.

PERFORMANCE SPECIFICATIONS

- INPUT VOLTAGE: 105-125 VAC.
- OUTPUT VOLTAGE: 13.8VDC ± 0.05 volts. (Internally Adjustable: 11-15 VDC)
- RIPPLE: Less than 5mV peak to peak (full load & low line)
- REGULATION: ± 0.5 volts no load to full load & low line to high line.

Models	Continuous Duty (amps)	ICS* (amps)	Size (in.) H x W x D	Shipping Wt. (lbs.)
RS-50A, RS-50M, VS-50M	37	50	6 x 13 3/4 x 11	46
RS-35A, RS-35M, VS-35M	25	35	5 x 11 x 11	27
RS-20A, RS-20M, VS-20M	16	20	5 x 9 x 10 1/2	18
RS-12A, RS-12M	9	12	4 1/2 x 8 x 9	13
RS-10A	7.5	11	4 x 7 1/2 x 10 1/4	11
RS-7A	5	7	3 1/2 x 6 1/2 x 9	9



MODEL VS-50M

LOWEST PRICED DIGITAL TRANSCEIVER



INTRODUCTORY SPECIAL \$999.00

ARGOSY II, SSB/CW HF TRANSCEIVER, MODEL 5250... \$1129

A unique combination of small size, simplicity and low cost. Great for mobile, portable and base station use. Operates 80, 40, 30, 20, 15 and 10 meters in 500 kHz segments, plus 40 kHz overshoot at band edges. 100 watts output with solid state, no tune, final. 12 to 14 VDC at 500 mA, RX, 9A TX. Octonary filters, 250 Hz, 500 Hz or 1.8 kHz. RX sensitivity: 3 μ V for 10dB S/N. Offset tuning range, 8 kHz. Variable notch filter, greater than 50 dB. 200 Hz to 3.5 kHz. Optional noise blanker. Famous Ten-Tec QSK CW. Clutter-free front panel allows single-hand operation without ever looking at the rig, even with fat fingers. Isn't that different! Weighs in at a mere 8 pounds. HWD 4"x9.5"x12".

Model 225 115/230 VAC 9A power supply	\$235
Model 222 Mobile Mount, w/quick release	\$50
Model 223A Noise blanker (plug-in)	\$69
Optional Astron RS-12A 12amp supply	\$139

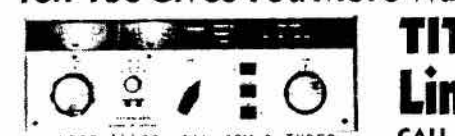


2KW ANTENNA TUNER, Model 229A... \$499

Designed to match your 50 ohm, un-balanced coaxial, transmitter output to virtually any, balanced or un-balanced antenna. General coverage from 1.8 to 30 MHz. Handles all the power the law allows.

- Reversible "L" network circuit for best match and bandwidth, at either hi or lo, antenna impedance.
- Avoids false load indication
- Ceramic insulators and coil forms throughout. Silver plated switch contacts and roller inductor coil
- Built-in SWR bridge
- Built-in balun
- System by-pass switch
- 4 Position antenna select switch
- Attractive Ten-Tec Corsair styling
- Also available in kit-form. Model 4229... \$389

Ten-Tec Gives You More Wa



LIST \$4499 with 10M & TUBES

"BOOM BOX" EXTRAORDINAIRE! Remoted power supply, compact, desk top linear amplifier. Puts out a solid 1500 watts continuous power on RTTY, AMTOR or SSVT. Lightning CW and super AMTOR performance.

Watch for NEW Ten-Tec All-Mode Gen. Coverage Dig

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1/2 WAVE-----	\$32
5/8 WAVE-----	\$59
SHIPPING INCLUDED	
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BY-1 BLACK BASE \$	
BY-2 CHROME BASES	
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757 QSYer - the best th



The QSYer provides entry - the single transceiver. Actual microprocessor, the 757's computer processing only two channels of data and one for the transceiver - just standard-sized tele commercial-quality attractive, sloped m

FOR YAESU QSY-75

TEN-TEC

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mp PS 5250-----\$ 235
NTURY-22 CW-----\$ 699
mp PS 579-----\$ 180
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KW ANT TUNER---\$ 499
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F XCVR!

PACKET CONTROLLERS:

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MF J-1274-\$29
PK-64-----\$36
PK-64A-----\$45
HFM-64-----\$169
PK-80-----\$369
PM-1-----\$299
PK-232-----\$559
KPC-2-----\$289
KAM-----\$559
KPC-2400-\$559
2400Modem\$269
UTU-XT/P-\$519

NEW VIBROPLEX

AMBIIC BRASS RACER \$79.95
AMBIIC STANDARD-----\$ 99
AMBIIC DELUXE-----\$109

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Yaesu 757 with keyboard frequency
feature left off this remarkable
computer terminal with its own 8-bit
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station is accomplished in seconds by
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diately - anywhere in the range of the
using two or more buttons on the
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-757GX FOR ICOM IC-735
\$159.00 QSY-735 \$159.00

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FT-767GX. A new concept in convenience, control and reliability: the next generation of amateur base equipment. Receives 100 kHz to 29.99999 MHz and transmits on all HF amateur bands. Optional 6m, 2m and 70cm modules plug in. Built-in automatic antenna tuner included in addition to Yaesu's exclusive Computer-Aided Transceiver System. Offers the most logically grouped controls yet.



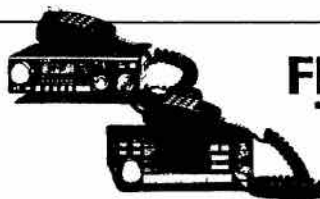
FT-757GX. Get maximum HF performance for your dollar in a compact mobile-ready package. Includes electronic keyer 600-Hz CW filter AM and FM modes. AF speech processor. 25-kHz marker generator. Dual VFOs. Single-button VFO memory swap for split-frequency operation. Eight memories. Push-button quick memory. Band scan. High performance general coverage receiver. QSK operation. Computer interface capability. And more.



FL-7000 Solid State Linear Amplifier with Automatic Antenna Tuner & P.S.

FRG-9600 60-905 MHz scanning receiver. One of the best of it's breed.

Find out more. We carry the complete line of Yaesu HF and VHF/UHF transceivers and accessories. For full information, contact us today.



FT-270RH. Smallest 2-meter, 45 watt mobile rig available. Includes: 10 memories. LCD display. Band scanning with programmable upper and lower limits. And much more.

FT-2700RH. The only dual-band 25-watt mobile rig with crossband full-duplex capability. Great for telephone style communications, or 2-meter and 440-MHz operation. Compact package fits most anywhere.



FT-209RH, FT-709R.

Get out with 5 watts on 2 meters, or 4 1/2 watts on 440 MHz.

There's a battery saver for extended monitoring.

Microprocessor-based functions offer 10 memories for

receive frequency, standard or non-standard offset and tone encode/decode with an optional module. Even a variety of sophisticated scanning functions, plus much more, all within an ultracompact, lightweight case.

FROM MOBILE TO GLOBAL.



FT-726R. Link up to OSCAR 10 for amazing satellite DX. Perfect for apartments and antenna-restricted neighborhoods. FT-726R offers crossband full-duplex capability on 2-meters and 435 MHz. Other features include 11 memories and dual VFOs.

FT-727R is a completely self-contained VHF and UHF FM hand portable transceiver providing up to 5W or 0.5W RF output on user-selectable channel splits across both 2m and 70cm amateur bands.



FT-23R

"Mini-handly". Odd splits on 7 memories, standard splits on all 10. Six digit frequency display, plus memory channel, CTCSS information,

repeater shift information. Bargraph shows signal strength and relative power output. 144-148 MHz frequency coverage. Zinc/aluminum die cast case. It's even rainproof. Power output is 2.5 watts with 600 mA standard battery. .5 watt with optional battery pack.



CLEAROUT IC-271H 100W 2M \$1249
IC-471A 25W 440 \$1099
IC-471H 75W 440 \$1399

IC-471

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Affaires Etrangères

1. Les pays ci-après ont notifié l'Union internationale des télécommunications qu'ils interdisent les radiocommunications avec les stations d'amateur relevant de leur juridiction:

Angola (République Populaire d')
Arabie Saoudite (Royaume de l')
Birmanie (La République socialiste de l'union de)
Ethiopie
Ghana
Iraq (République d')
Suriname (République du)
Thaïlande*
Zaïre (République du)

2. Le Canada a conclu avec les pays ci-après des accords ou des arrangements permettant la transmission par les amateurs canadiens des communications internationales en provenance ou à destination de tierces personnes:

Antigua-et-Barbude	Royaume-Uni de
Australie	Grande-Bretagne et
Bolivie	d'Irlande du Nord**
(République de)	Trinité et Tobago
Chili	Uruguay (République
Colombie	Orientale de l')
(République de)	Venezuela
Costa Rica	(République de)
Dominicaine	
(République)	
Dominique	
El Salvador	
(République de)	
Etats-Unis d'Amérique	
Grenade	
Guatemala	
(République du)	
Guyane	
Haïti (République d')	
Honduras	
(République de)	
Israël (Etat d')	
Jamaïque	
Mexique	
Nicaragua	
Paraguay	
(République du)	
Pérou	

3. Le Canada a conclu avec les pays ci-après des accords ou des arrangements autorisant les radio-amateurs du Canada à exploiter des stations de radiocommunications lorsqu'ils séjournent dans ces pays:

Allemagne (République fédérale d')	Papua-Nouvelle-Guinée
Antigua-et-Barbude*	Pays-Bas
Australie	(Royaume des)
Autriche	Pérou
Bahamas (Commonwealth des)	Philippines
Barbade	(République des)
Belgique	Pologne (République populaire de)
Bermudes	Portugal
Botswana (République de)	Royaume-Uni de
Bresil (République fédérative du)	Grande-Bretagne et
Chili	d'Irlande du Nord
Colombie (République de)	Sainte-Lucie
Costa Rica	Sénégal
Danemark	(République du)
Dominicaine (République)	Suède
Dominique	Suisse
Equateur	(Confédération)
Etats-Unis d'Amérique	Trinité et Tobago
Finlande	Venezuela
France	(République de)
Grèce	Yougoslavie
Grenade**	
Guatemala	
(République du)	
Haïti (République d')	
Honduras (République de)	
Inde (République de l')	
Indonésie (République d')	
Irlande	
Islande	
Israël (Etat d')	
Italie	
Jamaïque	
Japon***	
Luxembourg	
Malte (République de)	
Nicaragua	
Norvège	
Nouvelle-Zélande	
Panama	
(République de)	

* Permisses sur demande spéciale.

** Cet accord de trafic au nom de tierces personnes est limité aux messages envoyés au nom de tierces personnes par les stations d'amateur du Royaume-Uni, lors d'événements spéciaux aux stations d'amateur du Canada.

*** En vigueur le 16 novembre 1986.

Source: Article 32 du Règlement des radiocommunications de l'Union internationale des télécommunications et les articles 50, 61 et 62 du Règlement général sur la radio, Partie II.

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

MICROWAVES

Once you have assembled a basic 10 GHz transceiver using a surplus microwave motion detector and IF board/modulator, there are a number of ways to increase the range of your microwave station.

One of the most significant improvements that can be made is the addition of a dish antenna. The existing feedhorn can be used to feed the dish if the F/D ratio is about right. A two-foot diameter dish, which I have found to be optimum for mountain-topping, will deliver a gain of 30-35 dB compared to the horn gain of 10-15 dB, an increase of about 20 dB! Do this at both ends of the link and your system gain increase will be 40 dB, quite an improvement.

Additional gain can be obtained by replacing the low power 10-15 mW Gunn diodes with 100 mW or higher power versions now available, a 10 dB increase, at least. The mixer diode is another candidate for replacement with a more sensitive low noise device.

Going from a single transistor to an IC for the 10.7 MHz IF amplifier could provide up to 40 dB of additional

gain, if it can be kept stable. Watch for plans of such an amplifier in next month's column.

Reducing the bandwidth will increase the gain by 3 dB each time the bandwidth is halved. Using the common 220 kHz 10.7 MHz IF filter as a starting point, the following chart illustrates gain resulting from successive halving of the bandwidth.

Bandwidth (kHz)	Gain
220	0
110	3
55	6
28	9
14	12
7	15
4	18
2	21
1	24

To achieve this improvement, the frequency stability must be maintained to much closer tolerances than the free running oscillator in a Gunnplexer or motion detector. This usually requires some sort of a crystal locked AFC system and temperature control to keep both transceivers on the correct frequency. We will be

looking at some of these techniques in future columns.

For those of you who want the ultimate station, right away, SSB Electronics is now producing linear transverters for the 10 GHz band. Switching from FM to SSB or CW makes all the difference in the world as you know from weak signal work on the lower bands. Non line-of-sight paths become commonplace and a variety of scatter modes become useable.

SSB ELECTRONICS 10 GHz TRANSMIT MIXER XTM-1

The XTM-1 is a linear transverter that converts two metre signals to the 10 GHz band. With an input of 20 mW to 3 watts at 2 metres, it delivers 100 mW at 10 GHz. A high power 200 mW version is also available.

The two metre signal is mixed with a local oscillator from the XRM-1 5 mW output at 10.224 GHz in a linearized GaAs FET mixer, producing about 0.1 mW at 10.368 GHz. A 30 dB amplifier raises the power to 100 mW using a power to 100 mW using a power GaAs FET.

SSB ELECTRONICS 10 GHz RECEIVE MIXER XRM-1

The XRM-1 is a receive converter that converts 10 GHz signals to the 2 metre band.

The output of the XLO-1 Local Oscillator, 5-10 mW at 2.556 GHz, is fed to a frequency quadrupler, filtered by a cavity resonator, and amplified by a GaAs FET power amplifier stage. The resulting 10.224 GHz signal is split by an etched directional coupler, feeding about 3 mW injection to the receive mixer with the remaining 5 mW used to drive the XTM-1 Transmit Mixer.

SSB ELECTRONIC LOCAL OSCILLATOR XLO-1

The XLO-1 is a 5 mW, 2.556 GHz crystal oscillator, required to drive the XRM-1 receive mixer.

The 106.5 MHz oscillator signal is multiplied 24 times to 2.556 GHz through bandpass filters on the multipliers and an output filter at the final frequency. An internal 9 V regulator allows the use of a supply voltage between 10 and 15 V DC. Frequency stability is better than 10 PPM over +5 to +30 degrees C and better than 5 PPM with optional temperature compensated crystal.

Price class is \$700 Canadian and is available from Hans Peters VE3CRU of Transverters Unlimited, Box 6288, Station A, Toronto, Ont. M5W 1P3, who can provide additional information.

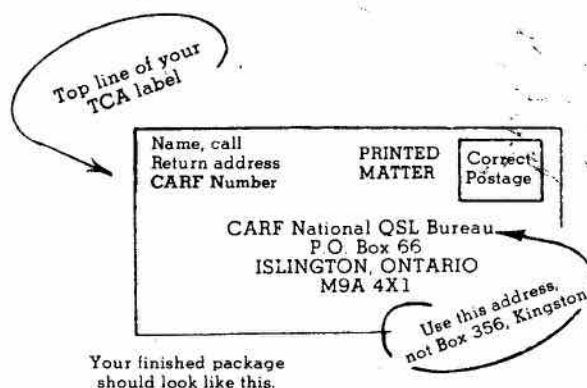
Free QSL Service

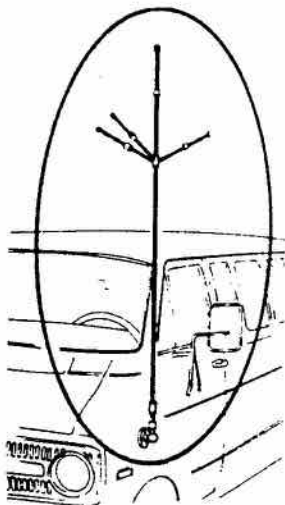
The CARF Outgoing QSL Service will forward your QSL cards to anywhere in the world. This service is free to CARF members.

1. Sort cards alphabetically by prefix.
2. Sort Canadian cards numerically by call area.
3. Place small lots of cards in strong, heavy envelopes and seal securely. Include the label (or copy or facsimile) from your current copy of *The Canadian Amateur*. Wrap heavier packages in strong paper or put in a cardboard box. Tie securely. Do not staple.

4. Address your package as shown in the diagram.

5. Do not register the cards! This only delays them, costs more and is not really necessary.
6. If you want proof that CARF received your cards, enclose a self-addressed, stamped postcard or envelope with 'Receipt' marked on it.
7. If a package should be damaged on arrival (very rare), CARF will send you a list of cards received so you can check to see if any were lost.





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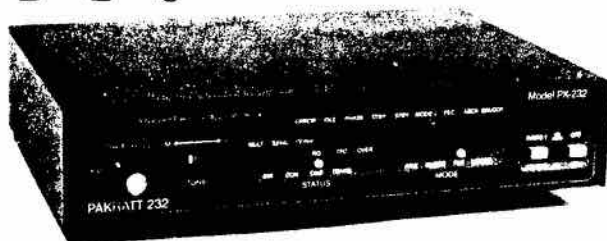
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CONTEST SCENE

Some Amateurs do not like contests. Yes, I know that is hard to believe, but it is true. They see them simply as a disruption, a lot of crazy people going around the bands yelling a lot of meaningless numbers at each other.

Well, on the surface that is exactly what a contest is. But there is a lot more to it than that. Maybe it would be useful to stop for a moment and remember how contesting came about in the first place.

Back when radio was new (which wasn't that long ago), it could be difficult to tell if you were getting out or not. For one thing, you didn't know if there was anyone else on. The obvious thing to do was to set aside a certain time when everyone would get on the air and work each other. That way you would at least know that there were other people on.

Human nature being what it is, people were soon comparing how they had done in these events. Soon scoring systems were devised, and contesting was born.

But is this really necessary in today's world of appliance-type Amateur radio? You know there are other people out there, and if you have shelled out several thousand dollars for the latest rig, maybe an amplifier and beam, then it had jolly well better get out! You know that you can work Europe with the flick of a switch, or Japan if you are on the west coast. Even if you have a more modest station, there is plenty of DX to be had.

Then why have contests in this day and age? Well, aside from the fact that a lot of people enjoy competition for its own sake, contests do serve useful purposes. They are an excellent training ground for operators, and they help to promote band occupancy.

Contests are a perfect way to train operators in the skills of HF radio. CW contests will do wonders for your code proficiency. Contests will teach you to copy practically inaudible signals under the worst possible conditions. Contesting forces you to become a propagation expert. But these skills are not useful just in contests. They are valuable in both day-to-day operating, and of course in emergency situations. Have you ever listened to a station operating from the site of some emergency, say an earthquake? They usually have low power and poor antennas. They can't wait for the propagation to get better. They have to pass their traffic now. Funny, but doesn't that sound an awful lot like contest conditions. Contesters thrive on working stations

with no signal when propagation is lousy and the QRM is 20 dB over S9.

Band occupancy is another important point. The old saying "Use it or lose it" has never been more true than today. When was the last time, here at the bottom of the sunspot cycle, that you heard anyone on ten metres? There is plenty of activity in the DX contests.

An example of these points comes from this year's ARRL 10M contest. VE2LJ was playing around, and managed to work a few Europeans on aurora. The band then went out, so he put the keyer on repeat mode and let it call CQ for him. At 9 p.m. local time, he was called by a VK4. Experienced contesters are aware of this path.

Incidentally, the present conditions on ten remind me very much of the start of Cycle 21. Back in the summer of 1977, I was in New Brunswick working Europeans on ten metres via double hop sporadic E. That fall, the first true F layer DX showed up in the form of ZLs. They would start coming through around 5 p.m. local time, followed a couple hours later by the VKs. So I am really beginning to suspect that we have passed the bottom of the cycle. Take heart, better propagation should be here fairly soon.

But first, there is the CQ WPX SSB Contest the last weekend of March. This is a fun contest, where the

multiplier is the prefix of your callsign. This means that almost everybody in Canada is a pretty good multiplier, with the exception of the VE3s. Sorry about that, but there are an awful lot of VE3s—they just aren't very rare.

Below is a list of the current Canadian records in this contest, not including results from last year's contest which haven't been published yet. As you can see, Yuri VE3BMV was rather dominant. Who is going to take his place now that Yuri has taken up residence in New Jersey? Time will tell.

The next best thing to working DX or a contest is talking to fellow DXers and contesters. And the best place to do this is at the annual Dayton Hamvention. I'll be there this year. Hope to see you.

CANADIAN RECORDS WPX SSB

CATEGORY	CALL	SCORE	YEAR
ALL BAND	VE6OU	5,253,399	1982
10M	VE3BMV	2,796,255	1980
15M	VE3BMV	3,690,450	1982
20M	VE3BMV	2,332,400	1983
40M	VE3BMV	3,397,962	1985
80M	C23XO	1,329,840	1985
160M	CG3MFA	319,140	1985
MS	VE1DXA	8,272,704	1982
NM	CK7WJ	16,545,370	1979

SWAP SHOP

FOR SALE: HOME in Nakusp, B.C., 733 Columbia Crescent. Nine yrs. young, 1450 sq. ft. plus 325 sq.ft. court-yard-sundeck. Beautifully fenced and landscaped. Double garage, Sauna with pool. Underground wiring, sewer, street lights, side walks. **EXCELLENT DX-Location.** Curling, fishing, golf, Hot Springs, Ski Hill. Contact VE7EHD, 604-265-3175.

FOR SALE: Yaesu FT-707, excellent condition, \$525, VE3GUA, 416-292-1317. **WANTED:** I am trying to complete a collection of kid's books; the 'Rick Brant Science Adventure Series' by John Blaine. The titles I need are 'Rocket Jumper', 'The Deadly Dutchman' and 'Danger Below'. These were published by Grosset and Dunlap. I will pay up to \$10 each and shipping. David Sloan VE7CVE, 4960 Sussex Ave., Burnaby B.C., Canada. V5G 4N9.


FOR SALE: IC-290H, 2M Multimode XCVR, New condition, \$500, Frank Merritt VE7FPM, 1851 Meredith Rd., Nanaimo, B.C., V9S 2M6.

WANTED: HW7 or 8, or Century 21. Please state price and condition. Bob Rollheiser VE6AAO, Box 2609, Peace River, Alta. T0H 2X0. 403-624-4754.

FOR SALE: MFJ Model 401 Keyer \$75.00. Bencher Model BY-1 Iambic Paddles \$50.00. J. Benson, VE3JIH, 234 Third St. N., Kenora, Ont. P9N 2L7.

Send your 'Swap Shop' notices to the TCA Swap Shop, Box 356, Kingston, Ont. K7L 4W2. Single insertion is \$1.00 minimum (10 words) and \$1.00 for each additional 10 words. To renew, send copy and payment again. Please print or type, and put your membership number and call (not counted) at the end of your ad. Include your full address with postal code; if using a phone number, include the area code. TCA accepts no responsibility for content or matters arising from ads. This feature is for the use of members wishing to trade, buy or sell personal radio gear.

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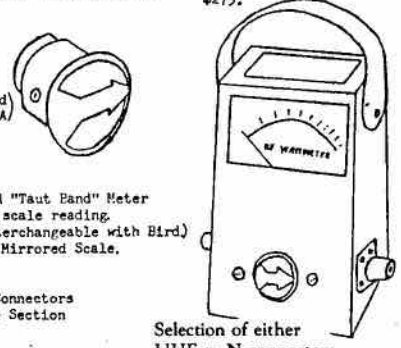


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Canada's Amateur Radio Magazine

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Power Range	Frequency (MHz)	2-30	25-60	50-125	100-250	200-5	4-1.0
5 watts		82012	82020	82028	82036	82045	
10 watts		82013	82021	82029	82037	82046	
25 watts		82014	82022	82030	82038	82047	
50 watts	82004	82015	82023	82031	82039	82048	
100 watts	82005	82016	82024	82032	82040	82049	
250 watts	82006	82017	82025	82033	82041	82050	
500 watts	82007	82018	82026	82034	82042	82051	
1000 watts	82008	82019	82027	82035	82043	82052	
2500 watts	82009						
5000 watts	82010						

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George Morgan VE3JQW
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From the Clubs...

First of all, I wish to thank Ian VE3MYO of the Eastern Ontario ARC for the following item (and Ian, I can always find space for this kind of news):

"Congratulations to Stan Clarke of Green Valley, Ont., who now sports the Amateur radio callsign VE3SGC. He has shown that neither age nor physical incapacity can stop a person from obtaining an Amateur radio licence.

"At 72 years of age, Stan joined the Eastern Ontario Amateur Radio Club, located at Moose Creek, Ont., as a short-wave listener. He has been incapacitated from childhood by a bout of polio and wears braces on his legs, necessitating the use of crutches. Long years of use of crutches has caused muscular problems to his hands, but despite this handicap, his desire to become a licensed Amateur radio operator overcame them.

"His thrill at contacting another ham operator in Calgary and one in Russia on his first day of operation has made his efforts in studying and practice very worthwhile."

My thanks to Elmer Lodmell VE6BLO for a follow-up to an item I passed along quite some time ago:

"The Whispering Hills ARC held its first meeting Aug. 26, 1985, with nine interested people in attendance. Since then it has grown to 138 members. It has a charter and enough senior members to qualify for a federal grant under the New Horizons program.

"The first objective of the club was to operate a repeater in the vicinity of Athabasca, which is now up and operating using a commercial tower owned by Spectrolab Limited of Athabasca. With the antenna installed at the 200-foot level, the system is providing good coverage in an area where two-metre communication was non-existent. It has a back-up storage battery supply and could operate a week without power. If an emergency should arise in that area, this repeater could be put to good use.

"We will, in the near future, have a UHF link with VE6RJK at Wellington, and, later on, possibly, with VE6QCR. We would like to see links into Grande Prairie, Peace River, Fort McMurray, Edson, Hinton, Camrose, etc."

This past month we have had mail returned marked 'Moved, Address Unknown,' for C. Dow, Club Rep for the Moncton Area ARC, for Ron Nagel, Club Rep for the Regina ARA, and for Fred Robinson VE3GCP, Club Rep for the Hamilton ARC. We have removed these three from our mailing list until we receive new information.

NEW GROUP FOR RETIRED AMATEURS

Here's an idea worth copying.

A group of retired Amateurs is being formed to meet a weekday need for this age bracket.

This new informal group:

- (a) Will not infringe on any Amateur radio club.
- (b) Will be independent and not sponsored by any other entity.
- (c) Will be a discussion group with activities directed towards helping with and sharing both the problems and opportunities of Amateur radio.

A suitable name will be determined by the membership. A warm welcome is extended to retired radio Amateurs, and also to retirees requiring assistance in preparing for DOC exams, etc.

The idea of a weekday group originated with retired SARC people who formed the Senators group to mutually help each other study for DOC exams, and to cope with other Amateur radio problems. This new group will be similar in concept, but independent of the Senators. The Senators realized that 10-12 people was about the maximum limit for good round-table discussion, consequently the last members in, Art Millard VE3PKK and John Head VE3OGA, were asked to form another independent unit.

• meetings are each Wednesday, 9:30 a.m. to 12:30 p.m., except on holiday Wednesdays.

• Meetings are in the upper hall of Heron Park Community Centre, on Lawrence Avenue East, West Hill, just west of the ball park at the intersection of Manse Road, in Pickering.

• inaugural meeting is on Nov. 12, 1986.

• no membership fees.

• mid-morning break: tea, coffee, cookies.

John Head VE3OGA (tnx SPARC-GAP)

NEWS FROM P.E.I.

The Island's Amateur Radio Association welcomes visiting Amateurs and encourages them to make contact whenever the two-metre repeaters can be accessed. The Island repeaters are: VE1HI Charlottetown 146.340 IN 146.940 OUT (covering most of the Island and mainland New Brunswick and Nova Scotia) and VF1CRA Charlottetown 146.070 IN 146.670 OUT, linked to Springhill, N.S. Western Queens County and all of Prince are served by VE1CFR Summerside 146.250 IN 146.850 OUT and VE1ATN O'Leary 147.120 IN 147.720 OUT. The association

runs a two-metre net on VE1HI Charlottetown every Sunday at 9 p.m. local time. Charlottetown Amateurs hold eyeball QSOs every Saturday over breakfast and coffee, and they welcome visitors.

DISASTER PREVENTION

Engineering training now has a mathematical and applied science slant, instead of a practical, hands-on experience in plant and machinery operation. Dr. Ralph Caldicott recognized that this change meant that competence in fault-logic, failure analysis and problem-solving was not being developed. So, in 1981, he formed in the U.K. the Institute of Diagnostic Engineers.

The Institute provides all the usual services of such organizations, and circulates a bi-monthly newsletter *Diagnostic Engineering*. The Institute now has over 6,000 members.

Branches of the Institute are active in the U.K., Australia, New Zealand, the Arab countries, and are being formed in the U.S.A., Canada and Europe.

More information from: Dr. Ralph Caldicott, Institution of Diagnostic Engineers, 3 Wycliffe Street, Leicester.

NEW LEGISLATION

On Oct. 21, President Reagan signed landmark communications privacy legislation into law. The Electronics Communications Privacy Act takes effect on Jan. 19, 1987. Primarily directed against the scanner industry... and users who listen to cellular phone calls... it covers far more than that.

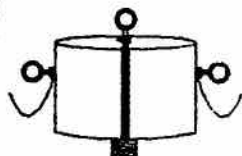
This law makes it illegal to listen to spread spectrum, RCC's, studio links, cellular and more. What you can listen to: Amateur, CB, marine, aeronautical, satellite Network feeds, any government or law enforcement agency, etc.

For more information see *W5YI Report*, Nov. 15, 1986.

CARF News Service

TEN METRE BEACONS

IARU has announced a plan to form a network of beacons on 28.2 MHz, similar to the one working on 20 metres. The time sequence format, with four power levels, would be the same, too. Wonder where 10 metre packet stations will operate?



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GB+7 \$ 176.00	\$ 10.00	1105MXX \$ 645.00	\$ 11.00
TD-2005/S \$ 122.00	\$ 6.90	1200FX \$ 955.00	\$ 15.00
TD-2005/HO \$ 130.00	\$ 7.90	#303 \$ 47.00	\$ 6.90
TD-160 \$ 56.00	\$ 6.90	#300 \$ 85.00	\$ 6.90
GD-6/500W \$ 95.00	\$ 6.90	#1211 \$ 57.00	\$ 6.90
GD-6/2KW \$ 185.00	\$ 7.90	#1213 \$ 57.00	\$ 6.90
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GD-9/500 \$ 145.00	\$ 9.90	- RESIDENTS OF ONTARIO ADD 7 %	
GD-7/2KW \$ 235.00	\$ 9.90	SALES TAX TO PRICE AND S.H.I.	
GD+2 \$ 29.00	\$ 6.90	- NO SALES TAX ON ORDERS OUTSIDE OF ONTARIO.	
GD+160 \$ 59.00	\$ 7.90	- PAYMENT: MASTERCARD, CERTIFIED CHEQUE, MONEY ORDER	
GD-BAL500W \$ 85.00	\$ 6.90		
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TD-BAL1:1 \$ 39.00	\$ 6.90		
TD-TRAPS \$ 85.00	\$ 6.90 (PAIR)		

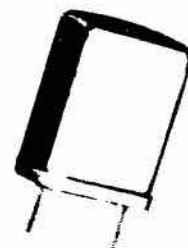
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The Winter Sports 1986 from Dec. 26 to Jan. 1/'87 called for maximum activity around all QRP calling frequencies 3560, 7030, 10106, 14060, 21060. Action on the other contest weekends during December was quite heavy and immovable from any QRP calling frequency. Other QRO stations during non-contest weekends are usually quite pleasant and agreeable to moving a little thus allowing the 'rock bound' QRP to operate.

HOW MANY AMATEURS DOES IT TAKE TO CHANGE A LIGHT BULB?

One to chair the meeting,
one to explain the problem,
one to put it another way,
one to recall oil lamps, and
lecture on how the lamp was
filled, the chimney cleaned, the
wick trimmed, the match struck,
the lamp ignited, the chimney
replaced, and the light level
adjusted,
one to offer to homebrew a light
bulb, for it will only take about
six weeks to get the parts,
one to ask for volunteers, and
listen to a dead silence,
one to turn the switch off,
one to stand on a chair,
one to hand him a bulb,
one to tell him in which
direction to turn it,
one to switch on,
one to exclaim "it isn't
working,"
one to test the bulb presumed
defective, and find it
serviceable,
one to open the fuse box,
one to search through a dark
house for a flashlight,
one to render first aid,
twenty who did not attend the
meeting to explain how it
should have been done.

VE3VCA

CARF would like to invite Amateurs who are in the Kingston area to come operate the club station, VE3VCA. President Ron Walsh, reports that "our signal using a Viewstar PT-2000A and TH-7 is amazing." The station creates a pile-up every time it gets on the air. Ron reports that in one hour of operating on April 27, he worked TU2IO, EI4ZH, UQ1EWC, EA8BLP, GW4HSH, SH3BH and VE6JW/DL. If you'd like to visit the station, contact us and make an appointment.

GLEANINGS

None of my efforts proved very fruitful or rewarding during the Winter Sports week but quite a few stations were worked on the last day (Jan. 1). W3EERapologized for calling SKN on 14060 with his 100W but gave me 449 for my 10W then moved up 5 with a cheery BCNU agn, 73. Rick WL7BDK from Sterling AK reported only working CA and OR up to Dec. 28. Bill NROJ was 559 with his 4W from Gilroy CA near SF. Tony W2GUM from Long Branch NJ reported 459 using his G5RV and remarked he hoped to be QRP soon.

Wonder where all the Canadian QRP stations are hiding? VE6AXW in Edmonton bent my needle at S9+20dB with his 1W homebrew rig one evening then promptly reduced power to 250 milliwatts to hold the needle at S9. Al can usually be found building one thing or another from his own design then testing it with someone on the air. We have all sorts of promises from around town but everyone has kept to QRO it seems because no one talks QRP on the air nor answers a QRP CQ.

Do we need some other incentive besides ENJOYMENT while experimenting with low power and today's electronic marvels? Any suggestions will be welcomed by your editor and may even spark the combustible material under a few just waiting for your idea. Defy the courts and go QRP, be brave, turn down your excessive QRO and live longer!

QRP-METER

In QRP work it seems we always run out of the lower scale measuring devices and tie up our only VOM with a myriad of wires. Here is a little gem with information as applied to one of those surplus meter movements. In this case made by the Gruen Watch Co.

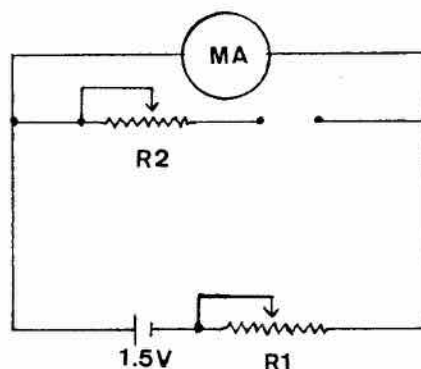
METER RESISTANCE

Any 0-1mA scale can be extended to measure 5mA, 50mA and 250mA simply by adding a switch and some resistors and will be sufficiently accurate for most experiments.

First find the internal resistance of the unknown meter movement by using the 'half-scale deflection' procedure. For this you will need two variable resistors and a 1.5 volt battery. Remember the meter will only carry a few millivolts without a resistor in series and any more will blow the movement.

In this experiment a 20k ohm multi-turn pot was used as R1 (Fig. 1). DO NOT try to measure the meter

movement with an ordinary ohm meter. Use a breadboard style hookup with R1 set to about 3-5k ohms (very little reading on the meter) before attaching the last wire in the circuit. Then with all connections secure, adjust R1 for a full scale reading by turning the pot very carefully toward less resistance and leave connected. Take a 2.0k ohm multiturn pot as R2 and connect it across the meter (parallel) and adjust it for a half scale reading. R2 when measured out of the circuit will be equal to the resistance of the meter, or 50 ohms in this example, see figure.



Formula 1. $R_{sh} = R_m$ divided by $K-1$ where: R_{sh} is the needed shunt. R_m is the unknown movement. K is the required new scale. 1 is the original meter scale.

SHUNT RESISTANCE

After finding the meter resistance R_m , add a 150 ohm resistor, R_4 , in series with the meter which performs a dual role: 1) acts as ballast to delay meter action should you momentarily overload the circuit and 2) the shunt value becomes easier to work in Formula 1.

Solving for the low scale (0-5mA) = $50 + 150$ divided by $5-1 = 50$ ohms which means overall resistance O_1 , O_2 , O_3 (Fig. 2) will reroute all except 1mA of current. To use the middle scale (0-50mA) add total low scale 50 ohm shunt to the meter movement and series resistor then divide by $50mA = 50 + 200/50 = 5$ ohms. Which means O_2 and $O_3 = 5$ ohms and subtracted from 50 ohms leaves 45 ohms as R_3 . To solve for the third scale (0-250mA), $R_1 = 50 + 200/250 = 1$ ohm, subtracted from 5 ohms leaves 4 ohms as R_2 .

Therefore in the schematic of Fig. 2 (see next month), $R_1 = 1$ ohm, $R_2 = 4$ ohms, $R_3 = 45$ ohms. Your figures may vary depending on the meter movement resistance and what scales you have chosen.

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CALENDAR

1987

Mar. 7: Peel ARC Flea Market.

Mar. 18: DOC licence exam.

April 11: Durham Region Flea Market. Details March issue.

April 15: DOC licence exam.

May 12-13: Symposium on spectrum usage, Montreal. Details April *Amateur*.

May 20: DOC licence application deadline.

June 22 - July 5: Cobourg, Ontario, sesquicentennial prefix VX3. Details March, letters.

Sept. 4-7: RCCS 'Reunion '87. Details March *Amateur*.

Sept. 11-13: CLARA 87 Celebration. Details October YL column.

Applications for DOC licence examinations Sept. 23. DOC licence examinations June 17, Oct. 21.

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

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

The deadlines for *The Canadian Amateur*, 1987, are for May, March 20; June, April 17; July/August, May 22; September, July 17; October, Aug. 21; November, Sept. 18; December, Oct. 23 and January 1988, Nov. 13.

R.C.C.S. REUNION

The Communications and Electronics Branch of the Canadian Armed Forces presents 'Reunion 87' at Canadian Forces Base Kingston Sept. 4 to 7, 1987.

If you served in the Royal Canadian Corps of Signals, or the Communications Research Branch Royal Canadian Navy, or the Telecommunications Branch Royal Canadian Air Force, then You and your Lady are cordially invited to attend this All-Ranks Reunion to help us celebrate the 50th Anniversary of the 1937 opening of SIGNALS' new home in Vimy Barracks.

For details and Registration Form please write NOW to: Reunion 87, Attn: Fred McQuillan, P.O. Box 1983, Kingston, Ont. K7L 5J8.

FLEA MARKET

Peel ARC will hold their annual flea market on Saturday, March 7, at the Huttonville Community Centre, Embleton Road and West Mississauga Road, Brampton, Ont. Doors will open at 9 a.m., Vendors 7:30 a.m. \$3 per person, \$5 a table for vendors, \$10 commercial. Talk-in VE3PRC 146.880-600, information from Bill Booth VE3NXX, 416-792-7204.

Social Events

Radio Spectrum Usage Symposium Planned

Plans to hold a major symposium on radio spectrum usage and future directions in Canada were announced by the Radio Advisory Board of Canada (RABC) at their recent annual general meeting in Ottawa.

'Spectrum 20/20' will be held in Montreal, May 12-13, 1987 and is being sponsored by the RABC and the Federal Department of Communications (DOC).

The RABC is a non-profit association of 24 organizations concerned with the use of the radio spectrum. These in turn represent the users of radio communications and related service providers, manufacturers and professional societies. The Board's purpose is to consult and advise the DOC on behalf of industry on the development, management and regulation of radio services in Canada.

The symposium, with the theme, 'Spectrum Usage—Future Directions in Canada,' will bring together the telecommunications operators, radio Amateurs, consultants and regulatory bodies. These speakers will forecast the radio services and

technologies which are likely to be in use by the early part of the 21st Century and to identify the associated spectrum demands. DOC speakers will address the evolving role of government in spectrum management.

Also announced at the RABC annual meeting was the re-election of its president, Jim O'Shaughnessy, Telecom Canada's Director General—International.

For further information contact Ronald McAdam, General Manager, 613-728-8692.

DURHAM REGION FLEA MARKET

The South Pickering and North Shore ARCs will hold their 6th Annual Flea Market on Sat., April 11, 9 a.m. to 2 p.m. at Pickering High School, Church St. North, Pickering Village, Ajax. Admission \$3, children under 12 free, prizes. Vendor tables \$6 plus admission from South Pickering ARC Inc. c/o H. Vardon VE3DAX, 36 Roosevelt Ave., Apt. 4, Ajax, Ont. L1S 2L4, 416-683-7562. Talk-in VE3SPA 147.975-375, VE3OSH 147.772-120.



The CLARA group at the Waterton Hamfest. L to R: (top) VE6's CRN, CRJ, ATP, CLL, NB, VF, LCI, ASU, CKI, YG, VJ. (bottom) AYR, AQB, AHA, AAM, XYL, 7DKC. Photograph by VE6VW (Hon. YL).

BACK FROM TANZANIA

A letter from Keith McGillivray VESVJ, who until recently was 5H3HM, asks me to pass along his thanks to the many VEs who contacted him in Tanzania and often helped him. He also mentions the fine service he received from the CARF QSL bureau who handled most of his outgoing cards. While operating from Africa, Keith sent out over 3,000 cards, either direct or via the bureau. Should there be any of you out there who worked him and still don't have a card please let him know and he will be glad to send you a 5H3HM card back.

In his letter Keith talks about some of his experiences with QSLing from a DX location. On the question of how to write the date he tells me he prefers the 'May 4/86' format to the 4/5/86 way since the latter may be either the 5th of April or the 4th of May! I remember commenting on this very point in an earlier article and recommending the use of Roman numerals so that a contact in May would come out 4/V/86. The problem with 'May 4th' is that while it is fairly well understood throughout Western Europe it means little or nothing to some of our Amateur friends out in the Far East, for example. While Latin is of course a European Language too, albeit classed as 'dead', its simpler elements, like the numbering system, seem to be recognized internationally.

DX NETS

I'm still waiting for a comprehensive listing of DX Nets from the source in Austria I mentioned last month. Meanwhile, to fill the gap, as I seem to be asked about the nets almost every week, I thought I'd give you an interim list. It's been culled from a very far-flung source, the journal of the Redcliffe Radio Club in Queensland, Australia! Thanks to our observant editor for bringing the list to my attention.

WWCC

As most of you know by now the whole DXCC program is currently under review and the DXAC has been asking for comments and suggestions for improvements. An interesting idea has been reported in CQ which quotes Jim McCook W6YA as the source. Jim calls his program the World Wide Century Club, WWCC. His plan is deceptively simple and goes like this:

1. Divide the world into squares $10^0 \times 10^0$ (648 squares)
2. Eliminate the water (183 squares) leaving 465 squares.

DX NETS

FREQ	TIME	NET NAME	DAX
14.080	*	WIAW DX Bulletin	*
14.173	1730	CanadaX Info Net	Sunday
14.174	1700	Safari East African Net	Daily
14.175	1000	Caribbean DX Net	Daily
14.175	2030	Round Table DX Net	Daily
14.207	2100	Arctic Norway Net	Tue/Wed
14.220	0630	P23JS Net	Daily
14.225	1300	W7PHO Family Hour	Daily
14.250	0500(?)	Arabian Knights Net	Friday
14.265	0530	Pacific DX Net	Tue/Fri
14.280	1200	WA2NHE DX Net	Daily
14.285	0500	WB6LED Net	Thu/Sat/Sun
14.290	*	WIAW DX Bulletin	*
14.297	0900	Arctic Norway Net	Sat
14.310	0330	Brown Sugar Net	Daily
14.320	1200	South East Asia Net	Daily
21.080	*	WIAW Bulletin	*
21.155	1100	DX9KE Net	Daily
21.180	0600	VX DX Net	Wed/Fri/Sun
21.183	0600	VK Europe DX Net	Daily
21.190	0400	Redcliffe Radio Club Net	Sat
21.220	1400	JA DX Net	Daily
21.275	1800	WA2NHE DX Net	Daily
21.295	1830	American Safari DX Net	Daily
21.345	1400	Arctic Norway Net	Sat
21.345	2330	W7PHO Family Hour	Daily
21.355	1700	Afrikaner Net	Daily
21.390	*	WIAW DX Bulletin	*

* Consult QST for winter and summer schedules

3. No distinction for band or mode. Any contact on any band but 10 MHz acceptable. Special interest groups such as RTTY, AMSAT, etc. can arrange their own awards.

4. Phase in the WWCC at the same time as the DXCC is phased out (frozen not lost).

5. Initial confirmation for 200 WWCC areas, endorsements for 300, 400 and 465. Establish system to eliminate all contacts made through organized lists.

6. Use a continental identifier with the square to identify the continent. N— North America, O— Oceania, AE for Europe-Asia where there is a bridging of land masses between two squares.

Jim points out a number of advantages to his plan. It would tend to lessen or end those 'DX lockout countries' like Albania and Burma. It would also end all those pleas to a rare DX station to QSY to another band or mode, there being no advantage to having more than one contact with a square.

WWCC looks like a difficult award, W6YA thinks it might take ten years to work them all, perhaps more. However with those locked out countries looking as though Amateur operations will never be officially

approved perhaps ten years plus isn't all that long.

Without consulting an atlas I'm not sure what Jim's rule #2 means when it says 'Eliminate the water', is he dumping all those remote islands that have given us so much pleasure (pain?) in chasing over the years?

I think that would be a great pity.

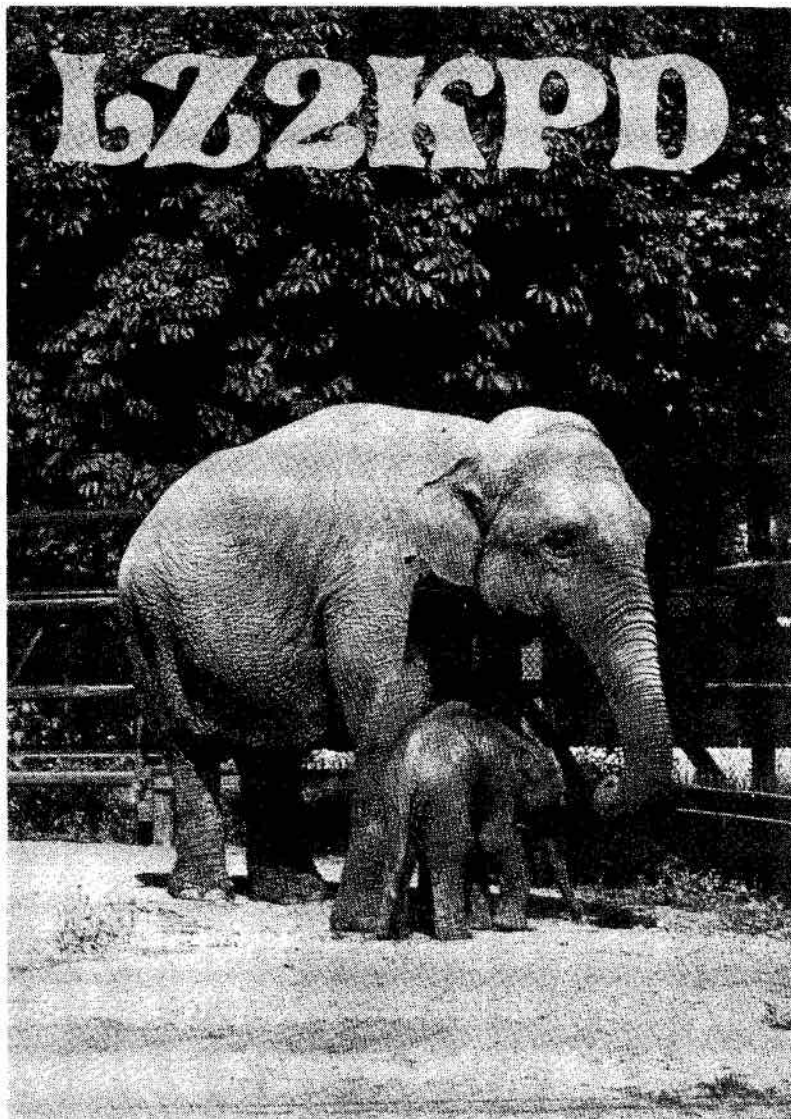
Apart from that I think there's considerable merit in Jim's plan, it's easy to understand and administer and should eliminate the need for a committee along the lines of the DXAC to interpret the rules. Of course the idea owes a considerable debt of gratitude to the Maidenhead Square system which is now getting so well established world wide for VHF contacts.

I should be interested to hear readers views on Jim's idea. Many thanks to CQ Magazine for bringing it to my attention.

COOPER'S BEEFS

Working some of the rarer countries through a major pile-up is tough going for most of us. There is a minority of DXers who have spent a great deal of time and money to ensure that they can put down a pile-up busting signal anywhere in the world. Stacked antenna arrays and linears help to ensure that they get through, blotting out the little guy's signal on the first call and demanding the attention of the DXpedition operator. I have mixed feeling about this approach because, while we all want to get through, if we make it too easy for ourselves, where is the satisfaction? (There are no prizes awarded for conquering Mount Everest in a helicopter!) However this is not the point of this month's beef though it does lead up to it. Talking to one of these power station operators about a recent DXpedition I asked him how he had got on.

No problem, apparently, he had worked them on a number of bands and, in addition, several times on 20 metres "To make sure I really was in his log." I was astounded. All I could think was every time my friend worked the DXpedition beyond the first contact this was taking away a contact that someone else in the world would otherwise have made with this rare country. I realize that a good case can be made for contacts on several bands, lots of people are working on multi-band awards like 5BDXCC, for example. But several contacts on the same band, same mode seems to me to be thoughtless, to put it mildly, or just plain greedy if you want to call a spade a spade!



"This month's prize for odd QSL cards goes to LZ2KPD. Why would you choose two elephants as an illustration for your card? Perhaps Nick just likes elephants?"

3Y PETER 1 ISLAND

The top DX story of the month continues to be Peter 1st Island. As many of you will know by now, the first expedition, a one-man affair by Bob Winter KD7P, was cancelled at the last moment. Bob is the chief Radio Operator on the U.S. Coast Guard ice breaker *Polar Sea* and he was banking on being airlifted onto the island by one of the ship's helicopters. However

when the ship got close to Peter 1 Island a combination of one unserviceable helicopter, ice conditions and the water forced the abandonment of the attempt. We can imagine how disappointed Bob was and only hope that he gets another try on a subsequent voyage near the island.

Hope now centres on the Norwegian DX group, who at this moment, Jan. 20, are en route in a chartered seal hunter from New Zealand.

They hope to be on the island for about five days with a starting date as early as Jan. 23. Sadly the slow publishing timetable magazines are forced to follow means that by the time you read this the expedition will all be history. Never mind, those of you listening to DX bulletins on the air or

just keeping up with the gossip on the bands will know enough about the effort to be looking out for those 3Y signals on 14.022 and 14.145 MHz, good luck!

Before leaving the subject I noticed in my latest copy of the *The DXer* from Northern California, that the NCDXF are making a sizable contribution to the second try at Peter 1 Island, in fact it is the biggest contribution they have ever made. They have done this because they believe this may well be the "most important DXpedition of the decade."

BITS AND PIECES

HS Thailand— Activity seems to be picking up from this part of S.E. Asia; too bad Thailand is currently on the banned countries list! Worldradio reports the following stations heard: HSOA, a club station, has been heard on both SSB and CW on 20 metres. Listen on 14.172 MHz at 1450 UTC and 14.012 MHz at 0200. Another club station, HSOC, was heard on 14.017 at 2400 UTC working VE7s(!). Other possibilities are HS4AMS on 14.227 MHz at 3200 UTC and HS4ANH on 7.002 MHz at 1830 UTC and 7.085 MHz at 1900 UTC.

S7 SEYCHELLE ISLANDS— S79DX seems to be very active on CW. He has been reported on the West Coast on 14.015 MHz at 1600 UTC and in Europe on 7.001 MHz at 1630 and 21.009 MHz around 1200 UTC. Other stations currently active from the Seychelles include S79WHW, 21.042 MHz at 1700 UTC and on phone at 14.180 MHz after 1830 UTC. Finally S79CW was heard on 14.189 MHz at 1730 UTC.

A22 BOTSWANA— I recently worked A22CL on 14.122 MHz at 1840 UTC. Charlie is a retired Alberta grain farmer currently on a CUSO contract in rural Botswana and he enjoys chatting with VEs. He is presently running a TS430S into a TH-5, the whole station being solar powered by a 40-watt panel charging a large truck battery. Worldradio reports two other stations active from A2. If you are on 40 metre CW look for A22BW who shouldn't be too difficult to work as his speed is reported to be 12 wpm! On 20 metre phone A22TJ has been heard on 14.210 MHz around 1715 UTC.

KH3 JOHNSTON ISLAND— Brice VE3EDR reports hearing KN4BPL/KH3 on 80 metres. Try 3.806 MHz at 1100 UTC.

Thanks are due to the following sources for some of the material appearing in this column: VE5VJ, *Redcliffe Radio Club Magazine*, *Worldradio*, VE3EDR, *CQ Magazine*, *The DXer* and W6YA.

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Packet Timing Revisited

BY VE3KLW

One of the least understood aspects of packet radio is timing; i.e., the various TNC timing parameters, radio turnaround times, etc., and how they interact to determine data throughput and channel occupancy. After hearing NK6K give an interesting talk on the subject at the Barrie symposium, I decided to improve my own understanding of the problem, and at the same time produce something that should help others do the same. What emerged from this exercise were some thoughts on how a group of users in a LAN could jointly optimize their TNC parameters for best performance. Note that some of the terms used may not apply to all TNC units, so users of TNCs other than the TNC2 may have to translate them accordingly.

It is difficult to visualize timing relationships without a diagram. Refer to Figure 1.

Figure 1 shows station #1 transmitting a packet to station #2, which we hope will receive it correctly and acknowledge it. What ingredients do we need to ensure that transaction is successful (aside from an adequate RF path, no collisions, etc.)? First let's look at station #1, where we introduce a time interval T1, which, for the purpose of this discussion, I will refer to as that station's turnaround time.

T1 is the time it takes that station to get ready to receive a packet after transmitting the last bit of data and releasing the PTT line. We can further subdivide T1 into the two intervals, which we shall refer to as Trt and Tcd. Trt is the radio turnaround time, i.e., the time it takes to go from transmit mode to receive mode and be fully ready to receive a signal on the correct frequency. It is determined by t/r relay switching time, synthesizer

lockup time (where applicable), receiver risetime, and so on.

Tcd is the time from when a signal first appears on the channel to the time at which the carrier detect (DCD) circuit in the TNC modem declares that a signal is present and tells the TNC it can begin decoding data to look for the start of a packet. Tcd is determined primarily by the time it takes the receiver squelch to open (if squelch is used), plus the risetime of the DCD circuit (this is a slight oversimplification, as there is also some time required for the TNC to acquire synchronization with the incoming bit stream).

Now let's look at station #2. Here the time interval we are concerned with is T2, which is the time from the end of the other station's transmission to the first data bit of the packet transmitted by station #2 in acknowledgement. This interval might be referred to as dead time (or NK6K's more colorful parlance, packet's black hole!), since it is the total time during which no useful information is transmitted by either station. Again we can subdivide the interval, this time into three subintervals. The first, which I will not bother naming, is the time it takes the DCD to drop after the end of the other station's transmission; it is determined by the squelch and DCD circuit falltimes and should be relatively short. Next is the interval between DCD dropping and the assertion of the PTT line for the start of station #2's transmission, which is set by the TNC's DWAITS parameter. Finally, there is the interval from PTT assertion until the start of the actual packet (i.e., the start of the flag which marks the beginning of the frame). This interval is set by the famous (infamous?) TNC TXDELAY parameter.

Now the requirement for successful transmission and acknowledgement of the packet between the two stations can be stated very simply: $T2 > T1$. T2 needs to be longer than T1 so that station #1 will be fully ready to receive the acknowledge packet. On the other hand, it should only be slightly longer, otherwise we are increasing the transaction time and lowering the overall throughput. Let us assume for the moment that T1 is fixed. How should we adjust T2 to achieve near-optimum throughput?

We have two parameters we can play with, DWAITS and TXDELAY; I believe that there is a natural tendency to adjust the latter, perhaps because more operators understand what it does (or at least think they do!). I submit that this approach is a mistake. Although they both can be used to adjust T2, there is a fundamental difference between these parameters in the way they affect other users and the overall efficiency of the shared channel.

Lengthening DWAITS increases the gap between transmissions and thereby allows more time for other stations to jump in and make use of the channel, whereas making TXDELAY longer increases the transmission length and needlessly uses up channel capacity. Note: there is a third TNC parameter, called RESPTIME in the TNC2, which has a direct effect on T2; however, I am assuming here that RESPTIME = 0 (as recommended by TAPR for normal keyboard use) and it therefore has no bearing on this discussion.

Alright then, how do you set TXDELAY? Glad you asked. The purpose of TXDELAY is not to compensate for the other guy's total turnaround time, but to delay the start of your packet until your words, the receive-to-transmit switching time... let's call it Trt. In addition, TXDELAY must allow time for the other station's carrier detect to come up. The requirement for your TXDELAY then is:

$TXDELAY > Trt + Tcd$

where Trt applies to your station, and Tcd applies to his. Once again, it should not be set to much more than the minimum required to do the job. If this condition is satisfied, then the other station can copy your packets (barring collisions, insufficient signal strength, etc.).

(To be continued)

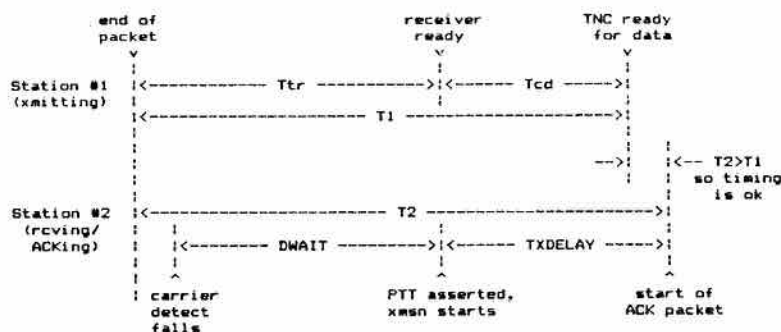


FIGURE 1

75 Metre DX Antennas

BY PETER NIBLOCK VE7ZG

The principal requirement for a good 75 metre DX antenna is low angle radiation. Most horizontal dipoles at heights of 10 to 15 metres above average ground have a vertical radiation lobe as shown in Fig. 1. The critical takeoff angle for 75 metres is between 5 and 30 degrees. Fig. 1 shows that most of the radiation from a low dipole or inverted V is at 45 to 60 degrees.

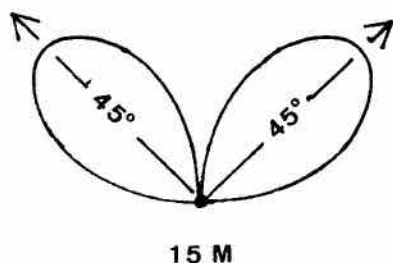


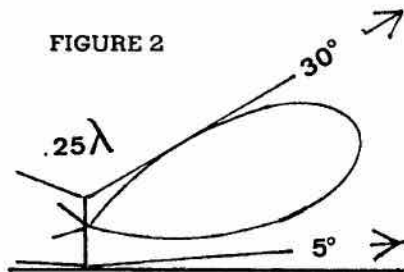
FIGURE 1

It is not until the dipole is .5 wavelength or more above ground that the radiation angle lowers enough to provide reasonable DX results. A high dipole at heights of 50 metres or more can be a very good DX antenna. VS6DO and LU2FFD are using dipoles strung between tall apartment buildings, and as anyone who chases 75 metre DX knows, they both have outstanding signals compared to other stations in those countries, using low antennas.

A much easier approach to achieving low angle radiation is the vertical antenna. A quarter wave vertical antenna over lossless ground has a pattern as shown in Fig. 2. Most of the radiation occurs between 5 and 30 degrees, right where it does the most good. The only problem is the ground system. For hams in VE5 and central VE6, the vertical is great because the ground conductivity is 30 to 40 mmhos/metre, and this will provide the pattern shown in Fig. 2 with a simple set of ground radials.

Most of Canada has a very low ground conductivity, so that the vertical needs an elaborate ground system to lower losses. In addition, it is impossible to lower ground losses in the first mile from the antenna ground system.

FIGURE 2



The book by ON4UN offers some practical ideas for overcoming the previously mentioned problems. John has been experimenting for many years with low band antennas. He suggests the full wave loop since it is easy to feed, is broad banded, and when fed in one corner provides vertical polarization. Its radiation angle is low and the null in the plane of the loop can be a benefit in lowering QRM.

PROTOTYPE

A prototype loop was built from #14 stranded copper wire. (Fig. 3) It was supported from a nylon rope stretched between a 23 metre tower and a tall tree. The apex was at 22 metres and the base was 33.5 metres across and 3 metres above the ground. The length of the wire in the loop was calculated from the formula, 308 divided by the frequency in MHz. SWR was 1.3/1 at 3.775 MHz. After some experimenting, it was found that the SWR could be improved by raising the centre of the base leg. A nylon rope was run through a pulley at the apex and back to the centre of the base leg. The antenna was fed with RG8U coaxial cable with the centre conductor to the sloping side of the loop and the braid to the base leg.

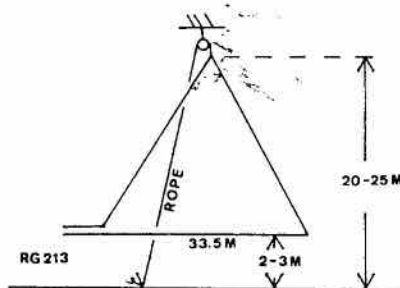


FIGURE 3

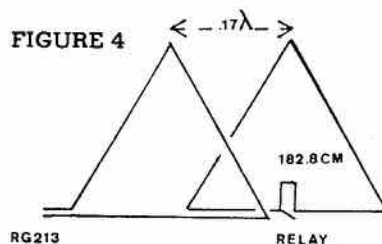
In areas where icing is a problem, a low voltage, 10 to 20 amp transformer can be connected to the feedline and ice can be melted from the shack.

Results with the loop were good but I thought that the performance could be improved. It is generally accepted that a 2 element quad will perform as well as a 3 element yagi and give lower radiation angles when mounted at low heights than a yagi will. A second loop was suspended from the same support rope as the first loop with a spacing of .17 wavelength between them. The second loop was cut for resonance at 3.68 MHz to act as a reflector.

Tests were conducted with JA1FRE, JA6BJT and ON4AT. The antenna had about 6 dB gain and a front to back ratio of 18 dB. The second loop was then tuned to 3.9 MHz, to act as a director. Subsequent tests showed that the pattern had reversed itself, as theory would dictate. SWR was 1.3/1 at 3.775 MHz.

The final antenna is shown in Fig. 4. You will notice a 182.8 cm section of 450 ohm line on the parasitic element. The relay allows the selection of the parasitic element as either a director or a reflector. The parasitic element is tuned for resonance at 3.9 MHz when the relay is closed, and 3.68 MHz, with the relay open.

FIGURE 4



CONCLUSION

The antenna works well from 3.725 MHz to 3.830 MHz and has proven that it will hold its own against the better W6 and W7 stations. Construction is simple and economical, and results should far surpass the average inverted V or low dipole.

Editor's Note.

Peter is well known in the 75 metre DXing circles and his accomplishments are easily heard in the pileups. In a future issue, Peter's 3 element vertical yagi will be presented.

Meteor Burst Communications

BY BILL RICHARDSON
VY1CW

Amateurs have made many contributions to communications over the past several decades. One area where these contributions were of great importance, yet little recognized, is meteor burst communications. This type of communications is widely used for military, government and commercial data relay.

THEORY

Meteors are extraterrestrial objects that enter the earth's atmosphere. Travelling in elliptical orbits around the sun, most are dust-like particles, although some can reach very large dimensions. The number of particles entering the atmosphere on a given day is estimated at 10 to the tenth power.

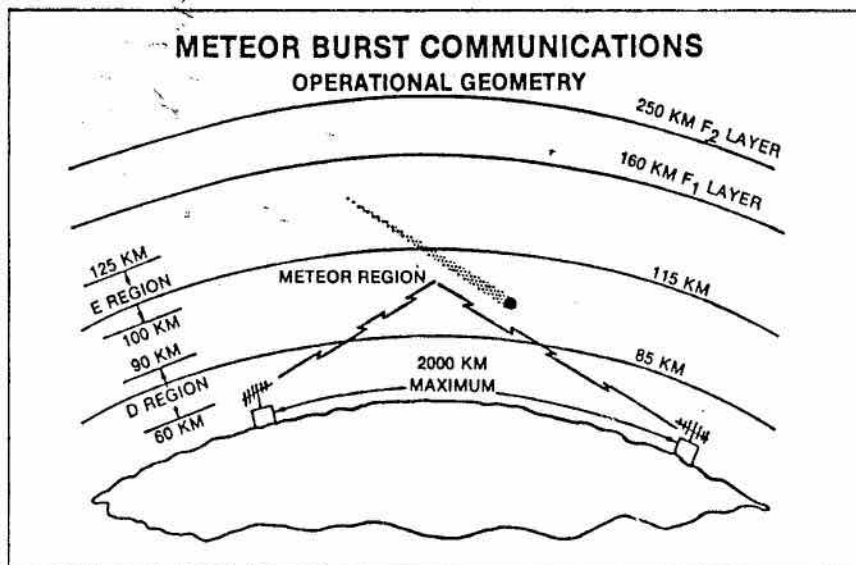
A meteor enters the atmosphere at speeds of 10 to 75 km/sec. As it begins colliding with the molecules in the atmosphere, the kinetic energy of the meteor is dissipated in the form of heat, which causes the surface atoms of the meteor to vaporize. This causes the electrons to be stripped from the atoms, leaving a trail of positively charged ions and free electrons. This trail of charged particles reflects radio signals.

The ionized trail is a long, thin paraboloid. Electron density of the ionized trail is proportional to the mass of the meteor, and ranges from 10^{10} to 10^{18} electrons per metre. A typical meteor trail will be 25 km long and have a diameter of 2 metres.

TIME VARIATIONS

Meteors are classified into two types, sporadic and shower. Sporadic meteors enter the atmosphere from all directions with varying velocities. Since they are random, their radiant and occurrence are random, allowing precise measurements of their average number over a period of time.

Sporadic meteors are the most widely used in this form of communications since their occurrence is of a statistically reliable nature. The maximum number occurs in August and the minimum in February, with a difference ratio of 3 to 1. This is caused by the earth's motion adding to, or subtracting from, that of the sun's through space. A



daily variation also exists with the greatest number in the early morning hours. This results from the morning sweeping effect as the earth moves forward whereas in the evening hours, the meteors have to overtake the earth. The daily variation is a 4 to 1 ratio.

Shower meteors result from particles travelling in well-defined orbits. They are very predictable and appear to radiate from one point in the sky. Amateurs tend to use showers for most of their meteor communications.

SIGNAL CHARACTERISTICS

Meteor trails are classified as over-dense or under-dense, relating the electron density of the trail to the reflection of radio signals. Under-dense trails have an electron density of 10^{14} electrons/metre or less while over-dense trails are 10^{14} electrons/metre or greater. Over-dense trails reflect radio signals since the trail is so dense that the waves cannot penetrate it. Signal levels for over-dense trails are much stronger and of longer duration than for under-dense trails.

Signal fading is more prevalent on over-dense trails because of signal reflection from different parts of the trail causing signal cancellation. Ionospheric winds also affect the over-dense trails more than the under-dense ones. Very little theory has been

developed for over-dense trails since their unpredictable nature makes them undesirable for reliable communications.

An under-dense trail does not actually reflect radio signals. Instead, the radio wave passes through the trail and excites individual electrons. The excited electrons act like small dipoles and thus reradiate the radio signal at an angle equal but opposite to the incident angle. The signal reaches its peak in a few hundred microseconds and can last for several seconds. Signal fading from these trails is caused by phase interference from the radial expansion and diffusion of the trail.

In an actual meteor burst communications system, sporadic 'E' and reflections from aircraft can also be used, but they are unpredictable.

SYSTEM APPLICATIONS

Meteor burst systems can provide effective communications for both point-to-point and network applications for distances up to 2000 km or even greater if relay stations are employed. When relay stations are used, automated data store and forward techniques are employed.

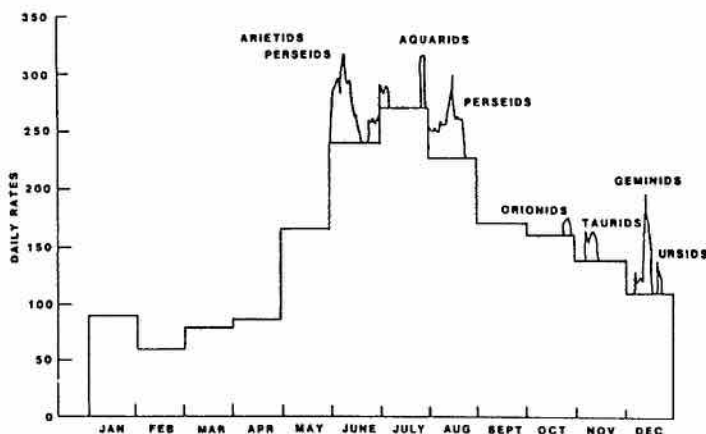
The equipment can be deployed quickly, making it useful for emergency applications. Its small size makes it useable for mobile installations.

The United States Department of Agriculture uses a meteor burst system in the western states to monitor snow depths, precipitation, and other weather data. Two master stations provide network polling of over 500

remote stations. A similar system is in use in Alaska to monitor weather data, wind and wave conditions in the Gulf of Alaska, communications from remote camps, and flight weather data and aircraft reports from remote

airfields. Various military groups are using meteor communications for long range voice and data as well as tracking of ships and aircraft. This is particularly useful at high latitudes as the signals are not affected by aurora the way HF signals are.

SEASONAL VARIATION OF METEOR RATES



Typical Meteor Burst Communications System

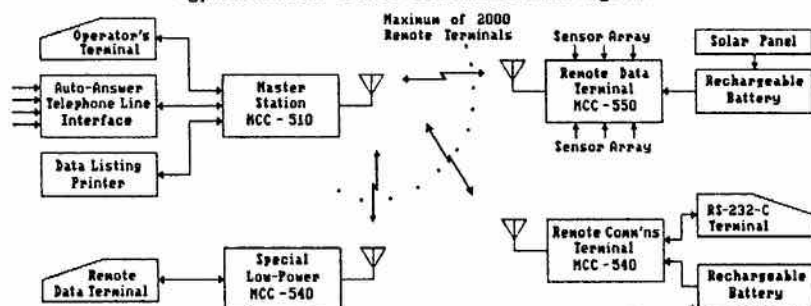


TABLE 1 ESTIMATE OF PROPERTIES OF SPORADIC METEORS

Notes		Mass (Grams)	Radius (cm)	Number Swept Up By Earth Per Day	Electron Line Density Elect./Meter
Particles That Survive Passage Through Atmosphere		10^4	8	10	--
Particles Totally Dis- integrated	Overdense Visual	10^3	4.0	10^2	--
		10^2	2.0	10^3	--
		10	0.8	10^4	10^{18}
	Underdense Non-Visual	1	0.4	10^5	10^{17}
		10^{-1}	0.2	10^6	10^{16}
		10^{-2}	0.08	10^7	10^{15}
In Upper Atmos- phere		10^{-3}	0.04	10^8	10^{14}
		10^{-4}	0.02	10^9	10^{13}
		10^{-5}	0.008	10^{10}	10^{12}
		10^{-6}	0.004	10^{11}	10^{11}
		10^{-7}	0.002	10^{12}	10^{10}
Particles That Cannot Be Detected By Radio		10^{-8} to 10^{-13}	0.004 to 0.0002	Total About 10^{20}	Practically None

SYSTEM PERFORMANCE

Most systems operate with data rates of 2 to 4 kbps in the 30 to 50 MHz area although sometimes frequencies as high as 200 MHz are used. Transmit power is usually 1000 watts for master stations and 300 watts for remote stations. Performance is defined as the 'waiting time' required to transfer data from one station to another. Factors affecting the 'waiting time' are operating frequency, transmitter power, antenna gain, data rate, and receiver threshold level. The receiver threshold level is defined as the signal level required to achieve a particular bit error rate (BER). This is a function of modulation type, BER required, and inherent receiver noise.

On an average full duplex meteor burst system, data rates of over 100 words per minute can be realized over a yearly period.

EQUIPMENT

Three types of terminals are used in a meteor burst system: master station, remote data terminal, and remote communications terminal. All are microprocessor controlled.

The master station consists of transmitter, receiver, duplexers and computer system. This station controls both the communications protocol and the routing of data. The master station illuminates the meteor trail with a coded RF pulse. When a suitable trail is found, a communications link is established with the remote station. The master station operates in half duplex mode for data acquisition or in full duplex for telecommunications and store and forward use.

The remote station operates in half duplex only. Its transmitter is usually a 200-watt unit to a dipole antenna. Remote sites are usually solar powered.

CONCLUSION

These commercial applications provide an economical and reliable means of communication for applications where more normal types of systems are either impractical or unreliable because of propagation anomalies. They are more complex than the setups Amateurs have used and some of the philosophy is different, but possibly the Amateur fraternity can learn from commercial and military users to improve their meteor communications without having to wait for specific showers.

Two TVI Tips

From Key Klix, Calgary, Alberta

COAXIAL CABLE LEAKAGE

Eliminating interaction between coaxial cables solved a severe case of TVI at the residence of VE6CBY last autumn. During CW transmissions, interference appeared as dark, rolling bars across the TV screen. These always seemed to occur while the XYL was watching her favorite program. This interference occurred on all HF bands from 8 through 10 metres.

Extensive grounding measures were tried but no improvement was noted. The rig was a Heathkit SB100, operated at 100 watts to an all band vertical mounted on the roof. Testing with a dummy load caused no TVI. This proved that the problem was in radiation from the coax or the antenna.

The coax to the antenna ran parallel to the TV cable coax for 3 metres with a separation of less than a metre, to the same point where they exited the house. When the coax to the vertical was rerouted away from the TV cable, all TVI stopped.

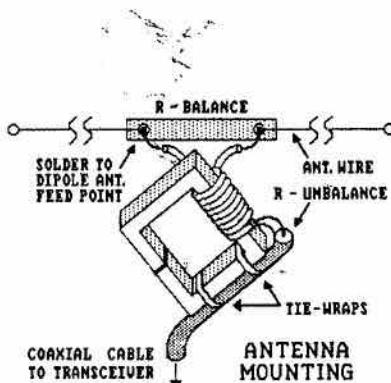
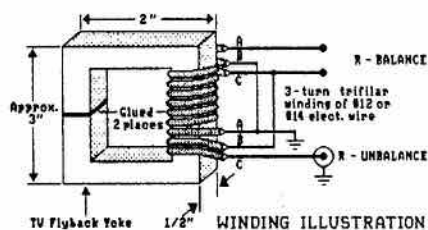
Apparently, coupling was occurring from one coax to the other. New coax of good quality has a leakage factor of 5%. This can result in high signal levels to the TV, and if the cable is old, poor quality, or damaged, interference will be even worse.

A simple solution to one case of TVI.

BUILD A BALUN

A simple solution for some cases of TVI is the balun. A balun serves two purposes. One is to match an unbalanced feedline to a balanced antenna, and the second is to prevent RF from travelling on the shield of an unbalanced line. Impedance transformation can also be accomplished with a balun.

For those that want to experiment, the following diagrams should be self

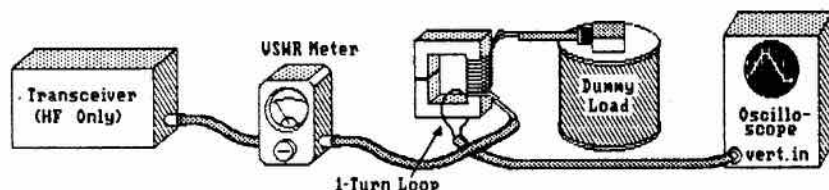


explanatory. The balun shown will result in a 1:1 ratio. The core material is salvaged from a TV flyback transformer. Windings are #14 insulated wire. Most of these cores will be in two pieces and must be glued together

before winding. All sharp edges should be smoothed and the core wrapped with electrical tape. If high power is to be applied to the balun, heat shrinkable tape should be used. It has a very high insulation factor.

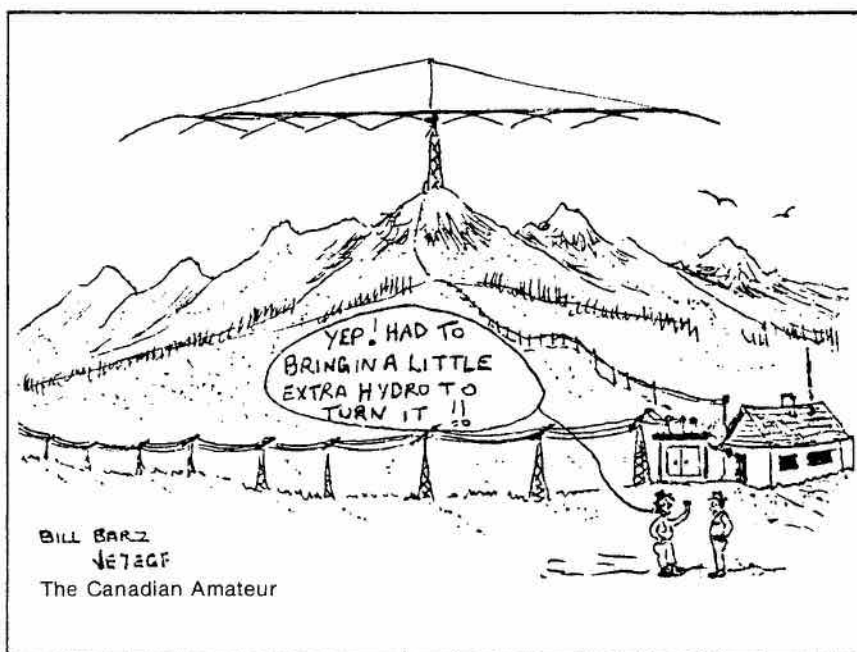
The core has a very high permeability so that only three trifilar turns are needed. This reduces the effective capacitance and provides a low SWR across the HF bands. The original balun had an SWR of 1:1 on 80 metres and 1.15:1 on 10 metres.

The power handling capability of the balun can be checked with a setup as shown. The power is increased until the sine wave on the scope display starts to distort. Beyond this point, TVI can be caused.



TEST SET-UP FOR MEASURING BANDWIDTH AND CORE SATURATION

These excellent figures were drafted by Don VE2DWG, The Amateur's technical illustrator.





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WARM-UP
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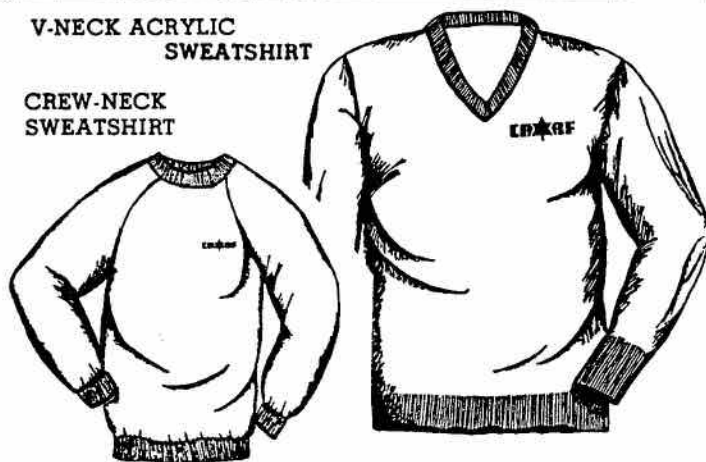
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