

THE CANADIAN AMATEUR

Canada's Amateur Radio Magazine

La Revue des Radio Amateurs Canadiens

SEPTEMBER 1987

SHACK OF THE MONTH



VE2DNQ shares his 'Shack of the Month' from 1935. Details of his shack are on Page 4, and this month's winners appear on Page 19.

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September 1987

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WHAT IS CARF ?

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

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

EDITORIAL

The President Speaks

BY JOHN VECCES

First, let me say that it is exciting to be elected president of CARF by the board.

Our board this year is a healthy mix of new and experienced members. In Ontario we had the first election in many years, just one indication of the growing strength of CARF at the grass-roots level.

The winter running of the CARF Canada Contest had the highest participation rate ever, with several multi-single stations active.

Our magazine, *The Canadian Amateur*, was consistently delivered to the Post Office on time and has grown to a constant 48 pages, with nearly half the issues at 56 pages. Advertising is up substantially.

On the financial front, we made our first profit in several years, and although it must unfortunately be used to balance losses in previous periods, I believe we have turned the corner toward a healthy association.

These are, however, the accomplishments of the previous board.

What do I see for the future?

Our first order of business must be to increase the number of Amateurs in Canada. The new tendency of the DOC toward allowing Amateurs to regulate their own turf should be vigorously exploited to sell the hobby to schools, to retirees, to Service clubs, and to bring back those who once were licensed and no longer hold a call. I believe the Amateur service of today has much to offer, each in their own way, to each of these groups.

This is not a call for simpler licence tests. It is not a call for the types of rules that in some countries allow thousands of untrained and technically ignorant radio operators on the air without tests or training. The exams should be at an appropriate level of difficulty for the privileges they grant. As an instructor in Amateur Radio courses for a number of years, I am firmly of the opinion, shared by many people in the same position, that the tests are not relevant to the problems facing the newly

licensed operator. To make them relevant is critical and a task that CARF is eminently capable of undertaking.

The Canadian Amateur should be a major part of attracting people to the hobby, and to that end one of the highest priorities of this board should be to obtain articles of wide interest and to enlarge the magazine to International class. If one compares the content of a single issue of *The Canadian Amateur* with the content of some of the more widely distributed Amateur magazines, there is not an insurmountable gap.

Every president has his stamp that he wishes to leave on the organization which he heads and I am no exception.

CARF is a service organization. Certainly, a majority of our members consider *The Canadian Amateur* as the most important part of membership, but we offer many additional services. The QSL bureau, international travel licence information, publications, and representation to the DOC are a few that come to mind. If we do nothing over the next year except extend member services we will have provided a major benefit to the Canadian Amateur community.

As you will appreciate, membership services are critically dependent on having the manpower to supply them. We are fortunate to have a large group of volunteers, each of whom is doing a task that he enjoys and that is important to the enjoyment of the hobby by others. We will need suggestions, but more than that we will require the volunteers to implement the programmes. CARF has no centralized staff to undertake projects. It is not a big etherial organization with unlimited resources. CARF is an association of its members and can only function so long as those members support it fully.

From my experience I believe they will pull together to make CARF the National organization for ALL Canadian Amateurs!

LETTERS

TO THE EDITOR

Congratulations and very best wishes on your important new assignment.

I certainly agree with the contents of your first editorial, and if there is anything that we can do, at any time, to be of assistance, please don't hesitate to call.

Amateur radio depends on the efforts of a small number of dedicated people, from all across the country, to preserve and advance the cause of our great hobby. Welcome aboard.

Thomas B.J. Atkins VE3CDM
President, CRRL Inc.

Just a note to say that I was most encouraged by your comments on page 3 of 1987 June *The Canadian Amateur*. Every good wish to you as you begin to work as editor.

Harry MacLean VE3GRO
Secretary, CRRL

SHACK OF THE MONTH

As suggested in the June *Canadian Amateur* please find enclosed my ham shack, VE2DNQ, as of June 1987 but what I find more important is my ham shack in June 1936! I built this 'ice box' in the fall of 1935 and got on the air in June of the following year. It certainly doesn't seem possible, to me that it was 51 years ago!

It featured a National S.W.3 receiver and the transmitter was built from four 201-A's in push-pull parallel. The call at that time was VE3TK.

Congratulations to all those responsible for putting out a very excellent magazine, *The Canadian Amateur*.

Frederick G. Bragg VE2DNQ

ONE ORGANIZATION

Please keep the talks going between the Canadian Amateur Radio Federation and the Canadian Radio Relay League.

Our club would like to see one organization representing Amateurs in Canada and I'll bet the DOC would be happy about it too.

Parley Meldrum VE7ADI
Sect'y East Kootenay ARC

REALLOCATION

Please find enclosed a copy of my letter to the FCC on the subject of General Docket 87-14, the proposed reallocation of the bottom 2 MHz of the 220 MHz band.

Although, as a Canadian Ham, I know my opinions and views are not of any concern to the American Government, I still felt that I should

express them, and remind the FCC that they will be affecting more than just the Hams in the U.S.A.

I hope the outcome of this proposal comes out in favour of Amateur Radio. We don't need another negative decision to set the hobby back further. I only wish more Hams would speak up. Apathy runs rampant in our hobby.

Doug MacKinnon VE3OLN
P.S. It's about time we all spoke up and supported each other regardless of which side of the border we live on.

The letter reads:

"This letter is in reference to General Docket 87-14. Reallocation of 220 to 222 MHz to the Land Mobile Service.

"I feel that the reallocation of any well-established Amateur frequencies to other uses, solely to appease business interests in very wrong and unjustified. This band is very much more active than one might realize, especially if one does not use any more than a repeater listing to base the opinion on. Is it only the money makers who influence the Government decision making? Is it because Amateur Radio is only a hobby, and the FCC stands to make more money off the Land Mobile service?

"Does not the invaluable service which Amateur Radio provides, time and time again in case of emergency and just to lend a helping hand, account for anything? Has the FCC thought out what possible harm taking away these frequencies will do to the Amateur community's ability to provide help in an emergency? Or is the feeling of the FCC and the Government, that another form of communications service, such as garbage collector, or Courier, or Freight Dispatcher can provide a more valuable service in a national or regional disaster. How soon it seems do they forget all the good things one does.

"I am a user of 220 MHz in Canada. Do I now have to look forward to listening to, and having to put up with interference directly from private Land Mobile stations? It's bad enough having to put up with all the intermod and other interferences spewed forth by private users who don't really give a damn about anything but the almighty buck. Because I live close to the Canada/United States border, and although we are still permitted to use the band, it will be rendered virtually useless to us because of this proposed reallocation.

SILENT KEY

Dan Person VE3KRO, March 13, suddenly, of a heart attack.

ROSS STEPHEN VE7DNG

Ross, formerly VE3UK when he was in Ontario, then VE7DNG in British Columbia, passed away on Oct. 25 1987.

"I do not feel that the FCC has the right to deprive me of the use and enjoyment of my hobby, solely because they want to make more money. That is what this reallocation would do. It would deprive me of a small piece of enjoyment, and that is wrong. How long will it be until some commercial interests persuade the FCC to reallocate the bottom 200 kHz of the 20 metre band to International Shortwave Broadcasting? I guess the bottom line is that the Government really does not care what the little guy wants. Just pay your taxes on time.

"I realize that being a Canadian ham, my opinion counts for diddly-squat in your books, but I felt this proposal was wrong, and had to let you know my opinion, even if it does fall on deaf ears.

"Have a very nice day. Your return comments are welcome."

ON AMATEUR EXAMS

Here's wishing you all the best as you take on the editor's job.

After reading some of the letters in the June *Canadian Amateur*, I feel it necessary to make a few comments.

However, first I must commend your comment about a merger with CRRL, and that Canadian Amateurs must have one unified voice to our government and the world, etc. Fine comment.

Now, first I would like to comment on the thoughtful article by J.F. Hopwood VE7AHB. I and my group of retired Amateurs have been studying the Canadian licensing system in some depth for a number of years, as the CARF TRC-24 committee. We have accurate DOC statistics going back to 1979. Indeed, our group was no doubt the best informed group in Canada on the subject. For years we have met weekly and we still do. Never, at any time did we say the exams should be made easier, or that we should lower our standards.

What we did say was that the exams should be *more fair*. We found that literally hundreds of people were being prevented from getting a licence, by certain unfair practices in the licensing system. Many candidates in all parts of Canada just gave up in complete frustration.

When candidates enter a code and theory class, they are trained from

LETTERS (cont'd)

either the CARF or CRRL study guide, both of which are excellent. However when candidates take the theory exam, they are confronted with questions from engineering or other books not used in their instruction. Goodness, what could be more unfair?

The solution we recommended was not to make the exams easier, but rather to set up a set of criteria for the questions for the theory exam.

What was the thinking behind our criteria? Simple. Since Amateur radio is for folks from all walks of life, and was never meant to be only for electronics experts, test people on what they have been taught in code and theory classes.

This led to the obvious conclusion that test questions should be based on material in CARF and/or CRRL study guides. This would make the tests much more fair.

The fact that *unfairness* is present in the system is realized when we note that some reasonably knowledgeable people are unable to get a licence or to upgrade after three or four years of hard effort.

So we don't see it as a matter of quality vs. quantity.

The facts before us clearly show that the number of licensed hams will start to decline unless we can improve the rate of entry of newcomers to the hobby.

Again, Mr. Hopwood, we do not suggest that we lower our standards. We do suggest the system be *more fair*, as noted above.

We agree with your idea that we should "make it more attractive to our young people by bringing the operational and technical skill requirements more in line with the state-of-the-art and new technology, such as computer applications." Also, Mr. Hopwood's call for looking at facts and debating them is excellent; also his call for a unified approach.

Next, I must commend Peter VE1PZ for his plea for a merger between CARF and CRRL. We should have one strong national organization to represent Canadian Amateurs.

Now, I would like to comment on thoughts expressed by Ron Tannenbawm VE3LZI in his letter 'New Courses'.

First, I must say that my group never suggested simplifying our exams. What we said was "more fair— not easier."

Mr. Tannenbawm's ideas on new courses are excellent. Perhaps if we could settle the competition between CARF and CRRL, we could get to work in earnest on drawing up new course material as Ron suggests.

Aside from his misconception about "simplifying our exams," Roy's ideas in my opinion are 'right on' and should be given wide consideration and debate.

Next, I must report that Don Sandison VE3OIH is also 'right on'

when he notes that *The Canadian Amateur* must survive in any merger arrangements. This is understood, as *The Canadian Amateur* is doing a fine job for Canadian Hams, and is still improving.

Bill Rook VE3MBF

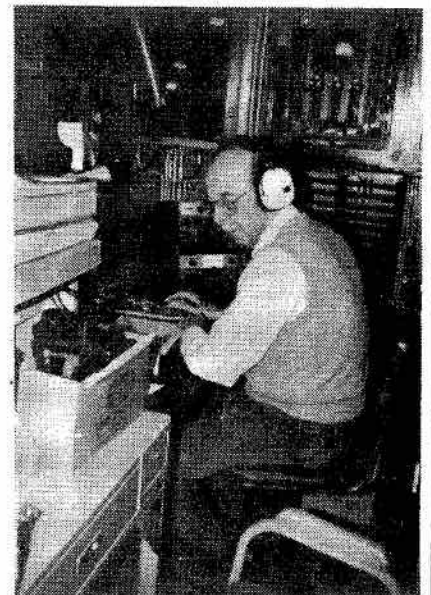
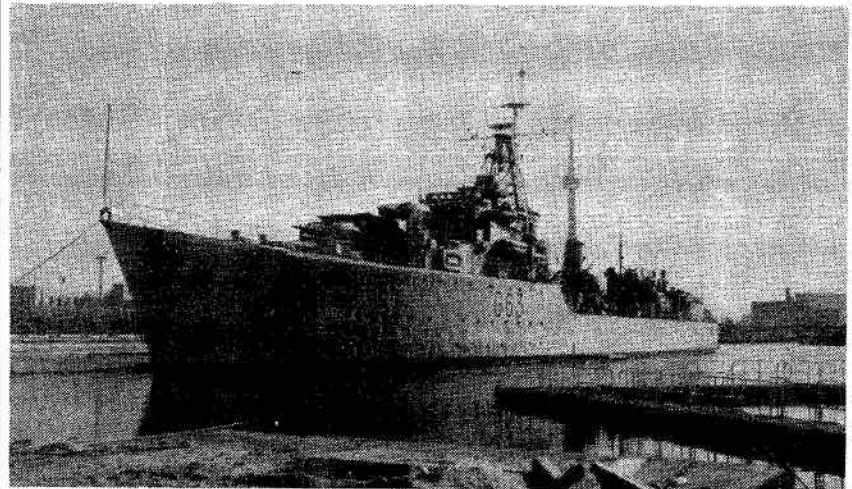
Memories of Haida

Your April 1987 edition of *The Canadian Amateur*, page 42, photo of HMCS Haida's Radio Room, really caught my eye.

I was the Chief Radioman in Haida from July '53 to Nov. '54 and it brought back memories too numerous to mention.

Best regards to all operators who served in HMCS Haida.

Granville B. Nickerson VE1BBL



Top: The HMCS Haida with Toronto's CN Tower in the background. Above left: Bruce VE3OUZ working 40 metre CW, Cap and all! Above right: Walter VE3ORD working 20 metre CW.

Ontario Retail Sales Tax & Flea Markets

HUGHES, LAISHLEY TOUHEY & SIGOUIN
BARRISTERS & SOLICITORS

Mr. Robert S. Nixon

Dear Mr. Minister:

Re: Canadian Amateur Radio Federation Inc.

I write to you in my capacity as Honorary Counsel to the Canadian Amateur Radio Federation and on behalf of Amateur Radio Operators with respect to a recent occurrence involving officials from the Ontario Retail Sales Tax Branch at a "Ham Flea Market".

Amateur Radio Operators popularly known as "Hams" have had a long standing tradition of getting together once or twice a year for the purpose of exchanging ideas, information, and pieces of equipment and gear with respect to Amateur Radio. These gatherings are sponsored by Amateur Radio clubs. These clubs are non-profit organizations and in some cases qualify as charitable organizations for the purpose of the Income Tax Act. In all cases, they are operated by amateur's to further their hobby. These clubs vary in size. In the large urban centre's the clubs may have a membership of 100 or more. In the smaller or rural areas the club membership may be as few as a dozen. These gatherings, which are perhaps misnamed as "flea markets" are an integral part of the hobby and very definitely further and advance the Amateur Radio hobby and it's many forms.

I understand that recently the Durham Amateur Radio Club arranged such a gathering and during the course of the day were visited by officials from the Retail Sales Tax Branch who insisted that people there hold Vendor's permits.

I have reviewed the Act and Regulations so far as there are available, and note the provisions of Section 28 of Regulation 904. On the basis of my knowledge of the Amateur Radio community, and the "Ham Flea Market's", it would seem they should be exempt from tax. These gatherings take place once or twice a year and there are usually one or two commercial retailers who attend these gatherings. Naturally these retailer's hold Vendor's permits and charge Retail Sales Tax.

The Federation for whom I act as Honorary Counsel, I am sure would be pleased to publicize widely in our various bulletins the need for clubs to insure that any commercial retailer's of Amateur Radio equipment hold valid Vendor's permits.

However, to insist that every Ham who has any gear to exchange or sell at a Flea Market must hold a Vendor's permit, is to very severely inhibit a long standing tradition amongst the Amateur Radio community. For example, I may decide at the last minute to attend the Smiths Falls Ham Radio Flea Market and to take a roll of coaxial cable with me to see if anyone is interested in buying it. This may be surplus to me and I may be quite happy to get \$5.00 for it or to exchange it for some different type of wire. Insistence upon a Vendor's permit is going to completely discourage me from selling it. We have in the past viewed these Ham Flea Markets as being analogous to garage sales. For the most part, and quite aside from the Commercial Retail Sales Tax which may take place, individual items are not sold for very much money.

I would ask on behalf of the Canadian Amateur Radio Federation and on behalf of Amateur Radio Operator's generally that your department recognize that "Ham Flea Markets" be exempt from collecting Retail Sales Tax - either through a clarification of the existing regulations - or by amending the regulations.

Since we are in the midst of that time of year when most clubs are conducting these gatherings, your early advice would be appreciated.

Yours very truly,
Timothy D. Ray

FROM THE MINISTER OF REVENUE

Dear Mr. Ray,

Thank you for your letter of June 9, 1987 concerning vendors at Ham Flea Markets.

As this involves Ministry operations, I have asked Mr. W.J. Lettner, Acting Deputy Minister of Revenue, to look into this matter. His comments are in the enclosed letter.

Robert F. Nixon
Minister of Revenue

FROM THE ACTING DEPUTY MINISTER OF REVENUE

The Honourable Robert F. Nixon has asked me to comment on your concerns regarding the requirement that participants of 'Ham Flea Markets' be registered to collect retail sales tax.

Under the Retail Sales Tax Act, all vendors who make taxable sales of goods are required to be registered. For the purposes of the Act, this would include vendors at flea markets who are considered to be operating a business and must have a permit and collect tax. Even though some of these vendors may participate only once or twice a year at these events, it would be inequitable and confusing to have some vendors collecting tax and not others.

Section 28 of Regulation 904 does allow religious, charitable, benevolent or non-profit organizations to hold fund-raising events without the requirement that they register and collect retail sales tax. They simply pay tax to suppliers of goods purchased for resale at these events. However, although the various ham radio clubs may be considered as charitable or non-profit organizations, this provision does not extend to the individual members who might sell at these events.

I can appreciate your concern regarding the value of this type of investigation. Although the amount of tax involved might not be significant in some instances, it is important to recognize that, to be fair and equitable, the legislation must apply to all vendors. For that reason, I am unable to grant your request to exempt participants of 'Ham Flea Markets' from the requirement to collect and remit retail sales tax.

I regret that I cannot provide you with a more favourable reply.

W.J. Lettner,
Acting Deputy Minister

FROM A DISGRUNTLED AMATEUR

For the following reasons I cancelled my membership with CARF, last year.

a) I did not agree with the fee hike for licences to \$20 from \$13.50 to 'help reduce the federal deficit'. This is a rise of more than 48%. Why did CARF not do anything about it? In the U.S.A. there are no fees for Amateurs. They convinced the government that Amateurs are not only hobbyists but also very valuable in relaying messages during emergencies. I think the Canadian Amateurs should have the same privileges as our friends in the U.S.A.

b) I cannot understand that the 'Ravenscroft affair' could happen in our country. TVI and other interferences happen all over the world and this would not be the only case. We have strong representations with the ARRL and here with CARF. If they had given a concentrated effort the problem could have been solved without the legal tangle. Mr. Ravenscroft has more than one neighbour. The others don't seem to complain. And lastly, an Amateur licence is issued by the federal government, not by a local one. Once again, why do CARF and ARRL have no stronger positions in such matters.

I hope you will print this as a letter to the editor in *The Canadian Amateur*. If there is a change in the attitude in this respect with CARF I certainly will become a member again.

Hans W. Schaedel VE3BWE

REPLY FROM VE3IDW

I regret you did not renew your membership in the Federation. However, I feel you are attempting to justify your action by implying that the Federation has not acted.

1) The present government has a one word policy and that is 'Cost Recovery'. Thus, the DOC has to charge a fee commensurate with the service. The fee we pay now still does not cover the cost of administering the Amateur service. Remember the U.S. Amateur community has taken over many of the examining functions, etc., which reduces the cost to the FCC. We are exploring this avenue, as is the DOC. We did object to a fee raise! However, it is inevitable that as costs rise, the fees must as well. If the DOC had followed the letter of the law, your fees would be much higher. You should have seen the changes in commercial fees. Our increase in fees was only a part of the whole picture. We feel that the way to reduce costs is to reduce what we ask the government to do. Thus we would like to see

Amateur involvement in the exam process., etc., to hold down or even eliminate fees.

People ask what we are doing about the new bands, too. This whole process takes an act of Parliament to change the Radio act. We have done everything to push this, as has the DOC. However, we are low in priority when compared to other bills before Parliament. It takes at least a year to get this through Privy Council. So, please don't say, "Why didn't CARF do anything about it?" We did do our best, and we constantly remind the government of the service we provide.

2) In regard to the Ravenscroft case, we do have a strong position. We have lobbied hard for the DOC to act. However, this judgement is not a radio problem. What many people can't accept is that Jack was not tried under the Radio Act. He was tried under the Nuisance Act. This is the same as someone's barking dog or loud stereo, etc. No matter what technical evidence was presented to say that Jack's equipment and operating was legal, the Judge ruled he was creating a nuisance. As for our strong position, how do you expect us to over-rule the law? We have written officials, met with officials (both officially and unofficially), helped raise funds and supported Ralph Cameron's efforts to the fullest. We have pressured the DOC to act and have informed everyone right up to the Minister.

We have reminded the DOC that licences are a Federal matter. The Law is the Law, however. It has been said that "the law is an ass," and in this case I agree. Remember, the legal tangle here is a civil matter. It is not enough to say you have a Federal licence. Local laws such as restrictive covenants on antennas can supercede a Federal licence. Thus, we remind all Amateurs to read and remove any such clauses before signing agreements. Once signed, you have given up the privilege.

As for CARF and CRRL not having a strong position on these things, you are mistaken. We have made the Amateur viewpoint clear, and worked to maintain our radio hobby. You must realize that there are some things we can't control, such as the Nuisance Law. However, we can try to change the interpretation. Also, there are some things like fees which we don't like, but we must pay some of the costs for what we want. The more we do for ourselves, the more we can lobby for maintaining, reducing or eliminating fees, etc.

I thank you for your letter, and hope you will understand we are working for your interests. We maintain a strong group in Ottawa, and work

hard on your behalf. We need your support, for the greater the membership, the greater the voice we have.

Ronald E. Walsh VE3IDW
President, CARF

A TOAST TO THE TEACHERS

Writing is not my strong point, as you will gather from the following, however gratitude compels me to write and say a hearty thanks to all teachers of Amateur radio. We the students could well languish on the GRS band forever if it were not for these dedicated people who give up their air time to teach us.

I am sure that I speak for all concerned when I say— Ladies and Gentlemen, thank you, and continue the good work.

In my case I would like to say a special thank you to John Iliffe VE3CES, Murray Powell VE3ATO and Steve Holland VE3LLD, and all the members of the YNARC who gave up their time for the code tests.

Alf Hepplestone

HOME SWEET HOME

In response to your article 'Securing the Shack'... it really hit home, if you will pardon the pun! The same night as receiving *The Canadian Amateur* and reading the article, our home was the target of a would-be burglar. As we were home and nearly asleep, we heard the basement window fall from its usual place to the floor 8' below. The noise and my arrival shortly thereafter consequently scared the person/s off. Needless to say, my new shack will be secure, anyway... it has no windows. Thanks for a most enjoyable magazine. A bit late arriving thanks to you know who!

Larry Barnett VE7EQL

THIRD PARTY AGREEMENT

I am pleased to inform you that an Amateur third party agreement has been concluded with Saint Vincent and the Grenadines, in the West Indies, and that this agreement comes into force on July 1, 1987. However, Amateurs in Saint Vincent and Grenadines may not pass traffic through telephone patches in their country.

M.K. Nunas, Manager,
Spectrum Management
Operations Division,
Department of Communications

Please address correspondence to the Editor at Box 356, Kingston, Ontario K7L 4W2, telephone 613-544-6161.



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EP-2010	15A 20A D.C. MAX	13.64 "
EP-3030	25A/30A D.C. MAX	18.70 "



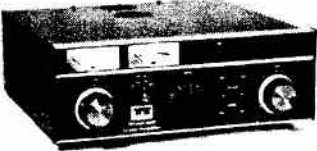



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DOC News

Spectrum 20/20

The SPECTRUM 20/20 symposium was held in Montreal during May 12-13. It was attended by over 150 spectrum users from across Canada and the United States. The purpose of the symposium was to discuss the needs of manufacturers, spectrum users and spectrum management into the 21st century. Certain changes required to the Radio Act to take us into the 21st century were to be addressed by the Hon. Flora MacDonald, Minister of Communications.

The symposium was hosted by Department of Communications and the Radio Advisory Board in Canada. This latter organization is made up of some 26 Canadian companies and organizations who have a vested interest in the compatible use of the electromagnetic spectrum. It is a forum to rationally address problems which ultimately affect the public, both in government policy and regulations.

The cooperation between the RABC and the DOC is essential to expand spectrum utilization.

NEW TECHNOLOGIES

One of the new technologies being used to help in spectrum planning is a tropospheric data base. A local Ottawa Company has converted the large database contained on the DOC's Communication Research Center Computer. The program runs on an IBM PC and sells for about \$8000. The program provides coverage prediction for planning purposes. It reduces the time necessary to prepare radio propagation coverage profiles from several weeks to a matter of hours. It is expected one spin-off from this technique will be the production of digital topographic maps from Energy Mines and Resources, by the year 2000. It will be possible to store all the coverage profiles of all spectrum users in such a data base.

OFFICE SYSTEMS

It is anticipated that cordless telephones will be introduced into office systems in the near future. These LAN or Local Area Network type systems will use 20-30mw transmitters, transmit a maximum of 30 feet and transmit digitally at 56 kbps. One major headache for the spectrum planners will be the conflict between

the users of cellular radio frequencies and the frequencies desired for these systems.

SHARP

Picture a single winged aircraft with a 36m wingspan, 17m in length and a microwave transmitter payload package of 1200 pounds, flying in circular orbit, 20 miles high. The remarkable thing about this aircraft is that it is to be powered from ground-based microwave transmitters. The coverage from such a satellite transmitter would be some 600 km and would provide rural telephone and cable broadcast distribution to remote areas. One major problem is the use of the planned frequency of 2.45 GHz (microwave ovens look out!). The current transmission devices used generate too much harmonic energy which would cause objectionable interference to harmonically related services. SHARP stands for Stationary High Altitude Relay Platform.

MOBILE RADIO

Digital speech techniques are the methods of future mobile trends. Such techniques can make use of digital compression to achieve better spectrum utilization and, while it has taken 15 years to achieve a 2:1 reduction in bit rate (without loss of intelligibility), the digital movers have just reached the level of analog development. It is expected the use of such advanced technology will permit channel spacings of 5 kHz by the year 2000. Just think how long ago we looked at 25 kHz spacings. The goal being sought is to achieve a throughput rate of 1 bit/Hz.

SHORT WAVE BROADCAST

The CBC has some 755 broadcast transmitters. There is a need for more services, enhanced quality and a need to prevent the existing quality from deteriorating. The broadcast plan from 525 kHz to 1605 kHz contains 108-10 kHz channels. It is expected that coverage to the Caribbean could be made by use of frequencies in the 2.1 MHz to 3.1 MHz band allocated for such purpose. A conversion to all existing short wave transmissions to SSB in 20 years will double the amount of spectrum available.

There has been some suggestion of

adoption of a standard pre-emphasis curve by the broadcaster to reduce or even eliminate splatter. This would require the adoption of a reciprocal curve by receiver manufacturers to preserve fidelity.

Medium wave operation of broadcast services may be extended to 33 miles by careful antenna design. This is a 2 times improvement.

DRBS or Direct Relay Broadcast Service in the frequency bands from 0.5 to 2.5 GHz has been recommended. Where the available frequencies are to come from may be of some concern to Amateurs. An actual frequency in the area of 1 GHz has been suggested.

HDTV or High Definition Television is being vigorously studied for obvious quality improvement. While the current aspect ratio has long been established at 4:3, the proposed HDTV would have this ratio changed to 19:3. It has been proposed to use a band from 22.5 to 23 GHz for such broadcasts. The bandwidth requirements have been defined as 40 MHz/channel.

SATELLITE COMMUNICATIONS

One of the challenges of the current occupancy in space has been the design of complex antennas that will provide the necessary directivity. This is the problem of the 'tailored footprint'. It is complicated by frequency and coverage area and protection of earth-based microwave systems that share these frequencies.

DATA TRANSMISSION

Data rates to 2.4 GHz are now being generated and it is proposed to use 21-26 or 60 GHz for transmissions within buildings, i.e. LANs.

MILITARY FREQUENCY USAGE

National Defence is the biggest consumer of frequencies and acknowledges 24,000 individual assignments. Items of military interest are amplitude companded single sideband modulation, airborne surveillance and target acquisition systems, SHARP platforms, Remotely Piloted Vehicles, cellular and trunking systems, free channel search systems, controlled lobe/null antennas, space based radars and position reporting systems.

Linked to frequency usage are a host of technologies embracing space-to-earth power conversion, beamed energy devices, laser creation of an ion path to allow artificial tropospheric scatter communications, improved buried antenna systems and the synthetic control of link distance by use of the resonant frequency of the oxygen molecule.

It is interesting to note that the day to day responsibility for use of the spectrum from 3-23 MHz rests with National Defence. This appears no different than use by our neighbours to the south. In essence, if a frequency is vacant, it is usable. Spectrum management systems that continually monitor spectrum usage will become widely used in the years ahead. In time of hostilities they will be mandatory.

THE YEAR 2000

Much discussion was devoted to services available by the year 2000. Some of it was very interesting, including the Telesat Canada paper on wide-ranging educational services to become available as well as widespread coverage for mobile telephones and data terminals. It is not widely known that Telesat Canada has pioneered the use of a spread spectrum low speed data network via satellite. It has been in use for at least two years. Such systems can effectively share overlapped spectrum with a high degree of immunity from common interference. The reader can draw his own conclusions as to where the necessary frequencies to support these services may be obtained.

COMMUNICATIONS SERVICES

Telecom Canada discussed the recent advances being made in their digital data service offerings. These services make use of sophisticated switched packet networks. Datapac, Datalink and Megaroute are all trademark services provided by Telecom Canada. They differ primarily in speeds and current offerings extend from 100 bps to 1.5 Mbps. Electronic mail services such as Envoy 100(TM) serves over 50,000 users. (There must be a story here.)

Service requirements to be addressed in future include more complex Local Area Networks and Integrated Office Systems. 'Intelligent Buildings' and 'The Smart House' concept will impose new service needs.

A newly proposed standard called Synchronous Optical Network (SONET- gadzooks, Shakespeare!) will have data rates exceeding 1.8 Gbps by the turn of the century.

Frequency bands suggested for use will be in the 25-31 and 37-40 GHz bands.

DEPARTMENT OF COMMUNICATIONS FORUM

Many of the speakers from the DOC provided some insight into how the Department functions in matters relating to Regulation and Policy. Operating with a budget of some \$60 M a year the DOC is charged with an almost impossible task of ensuring compliance, and amending enforcement and penalty provisions of the Radio Act. It was stated by Bob Jones and clarified by Rob Gordon of DOC that amendments had not been made to the Radio Act since 1938. The Privy Council Office can enact Regulatory reforms while the Minister holds power to deal with Regulatory Affairs. Perhaps this is an oversimplification, however, when regulations change, enforcement is required and in a tight budget year, when manpower simply does not exist to provide enforcement, one shouldn't expect regulatory change to be high on the agenda.

It was pointed out that the DOC handles some 29 classifications of radio services. Add to that all the attendant specifications that must be met and it gives some idea of the magnitude of responsibility held by the Department.

Some of the Departmental concerns deal with proposed revision to the 30-800 MHz band plan. A High Definition TV seminar is planned for this October. There is need to revise the Radio Act as well as means of reducing spectrum pollution.

An abstract submitted by Nissar Ahmed of DOC tackles the problem of appliance susceptibility. It is most unfortunate this topic was never raised as an issue for intelligent discussion, until the Hon. Flora MacDonald told the 150 plus delegates in attendance that she was instructing her officers to review the Radio Act relative to appliance susceptibility, an affliction of "substandard electronic equipment." Rob Gordon from DOC explained the process by which amendment to the Radio Act could be made.

EMI

As pointed out by the Minister, there are to be formal recommendations of changes to be made to the Radio Act by this Fall. These are made by a memo to Cabinet; they are then reviewed by Cabinet and turned into a Legislative Draft. The Draft then is reviewed by cabinet again and placed on the Legislative calendar. From here the revisions go to an ad hoc committee for discussion and assuming approval passes to the

Senate for formal approval. Royal Assent is then sought to effect the changes.

The feeling was expressed that meetings such as this sponsored by Department of Communications and the Radio Advisory Board in Canada serve a useful purpose of bringing together many users of the spectrum who have competing interests. It should permit a discussion forum with the body holding regulatory power an opportunity to air concerns of users. Such discussion is healthy and all those attending gave their undivided attention to serious consideration of the problems. Indeed, the inclusion of Canada as a member of the ITU requires that spectrum sharing is done in harmony with other countries, in a responsible fashion and for the good of all Canadians.

SUPPLEMENT TO SPECTRUM 20/20

Partial text of the speech by the Hon. Flora MacDonald at the Spectrum 20/20 Symposium held in Montreal May 3, 1987:

"My aim is to provide the best possible environment for radio-communication in Canada, while the Radio Act is a good legislative tool, amendments will be necessary to ensure its continued usefulness in a modern and dynamic telecommunications environment..."

"For example we need to ensure that equipment that is not meant to receive radio emissions does not receive them and malfunction as a result..."

"Technical standards for non-radio devices may need to be applied when they are built or imported, rather than at the consumer level. Such controls would eliminate the importation of substandard consumer electronic equipment..."

"The current Radio Act does not provide authority for such regulations. In that sense it simply is not doing its job..."

"Several other developed nations, including the United States, have legislated to deal with this problem. Recent events indicate that it may be timely for us to consider that as well..."

"I am therefore announcing a review of the Radio Act. We need to situate our radio communications activities firmly in the context of the information age..."

"I have asked my officials to develop proposals for amendments to the Act, in consultation with interested parties both inside and outside government."

Courtesy EMI Committee CARF

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- 5DBQ Deluxe 10-80 doublet..... \$269.00



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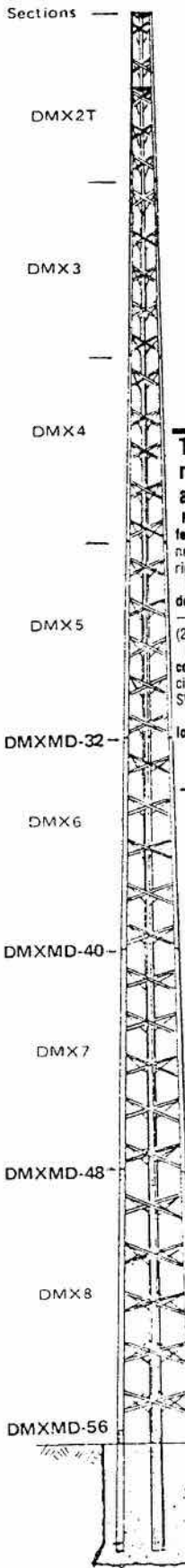
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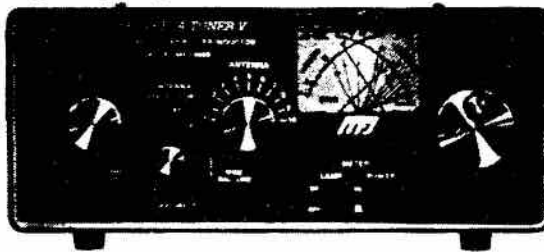
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CS-6G 6 pos. switch	\$55.00



This may be the world's most popular 3 KW roller inductor tuner because it's small, compact, reliable, matches virtually everything and gives you SWR/Wattmeter, antenna switch, dummy load and balun — all at a great price!

Meet "Versa Tuner V". It has all the features you asked for, including the new smaller size to match new smaller rigs—only 10 3/4" Wx4 1/2" Hx14 7/8" D. Matches coax, balanced lines, random wires—1.8 to 30 MHz, 3 KW PEP—the power rating you won't outgrow (250pf-6KV caps). Roller inductor with a 3-digit turns counter plus a spinner knob for precise inductance control to get that SWR down to minimum every time. Built-in 300 watt, 50 ohm dummy load, built-in 4:1 ferrite balun.



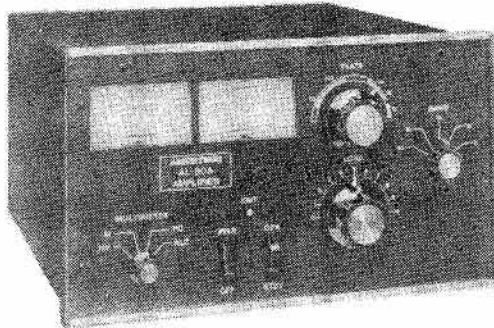
MFJ989B

SUPER 3KW TUNER SPECIAL \$495.00

Lighted Cross-needle Meter reads SWR, forward and reflected power all in one glance. Has 300 and 3,000 watt ranges. Meter light requires 12 VDC.

6 position antenna switch (2 coax lines, through tuner or direct, random/balanced line or dummy load). SO-239 connectors, ceramic feed-throughs, binding post grounds.

Deluxe aluminum low-profile cabinet with sub-chassis for RFI protection, black finish, black front panel with raised letters, tilt bail.



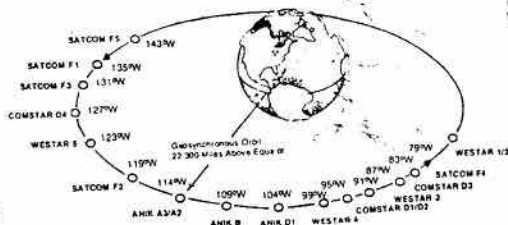
HF Linear Amplifiers

Designed and built to give reliable long-life performance. All four models cover 160 through 10 metres.

- AL-84** with 4 6MJ6 tubes - 600 watts PEP output.
- AL-80A** with 3-500Z tube - 1000 watts PEP output.
- AL-1200** with 3CX-1200A7 tube - full legal output with 100 watts drive.
- AL-1500** with 8877 tube - full legal output with 65 watts drive.

SPECIFICATIONS ON REQUEST

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- 10 ft. perf dish c/w polar mount ... \$695.00

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Minutes of 1987 CARF Annual General Meeting

KINGSTON, ONTARIO,
CANADA— MAY 30, 1987

The meeting was opened by the President, Ron Walsh VE3IDW, at 09:45 hrs. All present were asked to introduce themselves. The 'reports' booklet, which included reports from all directors and executive, was distributed. The president read his report and added that he had just received the newly released exam question bank from the DOC and distributed copies to those who required them. The new directors were introduced and applauded.

The financial reports for CARF and CARF Publication were read by the treasurer, Ollie Schijns VE3LXO. Motion to accept report: Nate VO1NP,

Seconded by John VE3CES.
CARRIED.

The directors, executive and committee reports were read. All directors reported on their activities at local club meetings, hamfests and flea markets.

The affiliate club representative wished to have more participation from the clubs but pointed out that CARF must give more in return. Various ideas will be studied including the possibility of a monthly newsletter to bridge the gap between the CARF bulletins and *The Canadian Amateur*.

The VE3VCA station manager reported on his increased activity to raise money to purchase the necessary equipment for transmitting

RTTY and packet bulletins. This will give the station more exposure and allow clubs across the country quicker access to the bulletins.

Moved by VO1NP, seconded by VE3DXY that a vote of thanks be forwarded to Jean Evans VE3DGG, for her excellent work as QSL bureau manager. CARRIED unanimously.

Moved by Nate VO1NP, seconded by Howie VE3FKF that Bernie Burdsall VE3NB and Wilf Hill VE3ICQ, be re-appointed as auditors for the 1987 financial statement. CARRIED.

John VE3CES spoke on behalf of Ron VE3IDW, the outgoing president, thanking him for his services over the past years. Ron received a standing ovation from those present.

Motion to adjourn: Norm VE6VW, seconded: Nate VO1NP

G.W. Sansom
Secretary, CARF

Saskatoon Symposium '87

The following is a brief summary of the CRRL/CARF/DOC symposium held in Saskatoon on the weekend of Aug. 1, 1987. Presidents, Directors and officials from both national organizations enjoyed a weekend of workshops and discussions on topics of interest to all Canadian Amateurs. It is emphasized that the resolutions arrived at are the opinions of the majority present and not official policy. Recommendations will be submitted to the proper authorities.

- Selling Amateur Radio— Growth is essential, more participation is required in high profile activities such as Mall displays, etc.

- Two Metre Linking— National linking is technically possible. Provincial linking is underway and encouraged.

- Regulations— Is more enforcement required? No! This would be too costly.

- Banned Countries List— Canada must refuse to enforce communications laws imposed by other countries.

- Exams— Can we improve them? Yes!

- Spectrum Management— Voluntary band planning can work,

as evidenced by 2 and 160 metre bands and European activities.

- Contests— RTTY, ATU, PACKET, etc. Specialized modes have a right to be on the spectrum.

- Deregulation of HF— This will be implemented by the DOC in the future.

- Prefix Policy— Must be administered by a single national body. The objective of all present is to work for a national organization with one voice.

- EMI— Support must be given to the DOC, encouraging them to amend the radio act to deal appropriately with EMI.

- Industrial Noise— Amateurs seem to lack credibility when submitting reports of EMI. It appears that little action is effected until a commercial user complains.

- Interference— In regard to EMI and EMC problems, DOC should be more than just a watchdog.

- Political Concerns— Amateurs are unsure of their perceived value by politicians. In the opinion of those present, Amateurs should try to become more visible and show their true worth to the community.

AUDITOR'S STATEMENT

I have studied the 1986 Financial Statements of C.A.R.F. Inc and C.A.R.F. Publications Ltd. as required under the Bylaws.

The change from a deficit of \$24,556 in 1985 to a surplus of \$7,373 in 1986 is most gratifying and all responsible must be congratulated.

Possibly the investments can be increased to replace the \$2000 cashed in March 1986.

B.H. Burdsall VE3NB
Life Member C.A.R.F.

I have read the reports of the financial statements of both C.A.R.F. Publications Ltd., and Canadian Amateur Radio Federation Inc. as prepared by Debra Chapman.

These reports show 1986 as being a much better year for the organization. This is evident in the increase in membership income and publications income.

It is apparent that the austerity program initiated by the General Manager-Treasurer and enforced by the Office Manager, is responsible for this turn-about.

If these practices are continued for the balance of this year, then 1987 should be an excellent year.

Wilfred V. Hill VE3ICQ
Charter Life Member

CARF salutes graduates

For the past two years, the CARF Headquarters has been participating in a work experience program, in conjunction with Kingston's LaSalle Secondary School. The 'YOU TOO' Program is a course designed to assist mature students with training and preparation for re-entry to the work force.

CARF is assigned two students for the school term on a half-time basis, one each semester. Our students work in the office, updating computer records, answering the telephone, and generally applying their newly-learned skills of office procedure.

Our assistants for the past year have been Maureen Cooke and Lena Maguire. Both ladies have been invaluable to the office, participating fully in the many ongoing activities.



HOW IT WAS!

"The earth's curvature makes no difference at all. Our messages seem to carry best in fog and bad weather, thunderstorms and electrical disturbances do not interfere in the least, these Hertzian waves follow around smoothly as the earth curves. Messages can be sent to any distance given as sufficient height of wire— if you double the height of your mast, you can send a message four times as far— the range increases with the square of the mast's height. A horizontal wire, placed at whatever height, is of no value in sending messages— all that counts is the vertical component." —Dr. Erskine Murray, June 1899.

tnx UPDATE

PARDON?

"There is no possibility of solving the problems of atomic energy for at least 250 years." — panel of experts, U.S.A., 1932.

Their cheerful voices have become familiar to our numerous 'telephone regulars'.

On June 17, 1987, Maureen and Lena became graduates of the 'YOU TOO' Program. Our heartfelt congratulations are extended to both people for a job well done, and for having the courage to return to high school at this stage in their lives.

Congratulations are also due to the staff at LaSalle Secondary School and to the other Kingston employers who participated in this very worthwhile project. I urge anyone interested in updating their own office or computer skills to search out a similar project through the local school board. Who knows, maybe 'YOU TOO' will reach a new goal!



Maureen Cooke is presented with her Graduation Certificate by Don Goodridge, Principal of LaSalle Secondary School.



Lena Maguire (on the right) is presented with a special Typing Certificate by Joan Turnbull, an instructor of the 'YOU TOO' course.



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#1213	74.95

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Ravenscroft in the News

Jack Ravenscroft's name and plight have been on the minds of Canadian and International Amateurs for the last couple of years. The Canadian Amateur has collected a variety of items recently that pertain to this case. We kindly acknowledge the Radio Society of Ontario, the Ottawa Valley Mobile Radio Club, Ernie Welling of EP&T magazine, and of course, Jack Ravenscroft who is reported (through the grapevine) to have so many volunteer activities on the go, that he hasn't time to miss operating... Editor.

JACK RAVENSCROFT RECEIVES TROPHY

The Radio Society of Ontario awarded Jack Ravenscroft VE3SR the Clifford Marsh Memorial Trophy. Clifford, who became licensed in 1966, was a victim of multiple sclerosis. His father, Lloyd Marsh VE3PT, gave permission for the award to be established and it has been awarded by the RSO, on an annual basis.

The Clifford Marsh Memorial Trophy is presented to the Amateur Radio operator who, in the estimation of the RSO executive, has been known for his courtesy and helpfulness, and who exemplifies Amateur Radio at its best.

This award was presented to Jack some time ago and it may not be generally known that he was the recipient.

THE IMPECCABLE SOURCE BY JACK VE3SR

Beware of the 'impeccable source' found on 75 phone, whose

HELP WANTED

The CARF Office needs the current addresses of the following Amateurs, listed by name and last known address:

Murray Harrison VE3FQT, Elora, Ont. NOB 1S0.

Stewart V. Munro VE8CM, Hay River, NWT.

John (Jerry?) King VE7EHM, 100 Mile House, B.C.

Doug Ransom, Box 11, Wycliffe, B.C. VOB 2M0

Please tell Debbie if you have any information. Her address is P.O. Box 356, Kingston, Ont. K7L 4W2.

information is based on words from a good (and reliable) friend.

Personally, I prefer the written word, it is less likely to be misinterpreted and provides specific terms of reference.

Questions have been asked as to why the Houghtby Vs. Ravenscroft case couldn't have been settled out of Court. The logical answer to that is, "you had to be there".

Read the following and judge for yourself:

OFFER TO SETTLE

The Plaintiffs offer to settle this proceeding on the following terms:

1 (a) That the Defendant will be permitted to operate at a reduced wattage, with his large aerial within the azimuth of 260 deg. to 60 deg. ETN at whatever hour he desires on whatever days he desires.

(b) The Plaintiffs will agree to one further test, that the Department of Communications failed to conduct, to determine at what reduced power level the defendant can operate within the 260 deg. to 60 deg. azimuth, such that the 10% 'splash back' of power does not cause interference to the Plaintiff's equipment.

(c) The Defendant's large aerial (transmission/receiving end) will be directed to a suggested 260 deg. ETN as a neutral position and indicator of non operation after each and every transmission exercise.

(d) The Defendant's small vertical aerial will be dismantled entirely and neither this aerial nor any other aerial or equipment will be installed, relocated or expanded upon.

(e) The transmission/receiving end of the large aerial will never be directed in the 59 deg. to 259 deg. ETN zone.

(f) The Plaintiffs will not complain without just cause, and the Defendant will agree in writing to adhere to the terms and conditions of operation as proposed.

(g) If, and when future interference occurs, such that the Plaintiffs have reason to complain, the Defendant will take whatever immediate remedial action is necessary.

(h) The Plaintiffs will not be required to suppress any more of their equipment and will not be required to permit any persons into their home at the request of the Defendant.

The Defendant shall reimburse the Plaintiffs out of pocket expenses and

legal fees, but not to include expenses that would be incurred in an effort to settle this matter as described aforesaid.

2. Or in the alternative, the Plaintiffs propose:

(a) To agree to attempt to relocate within 60 days upon acceptance of this offer and on condition that a final sale move can be effected and financially approved provided that the defendants pay to the Plaintiffs the sum of Thirty Thousand Dollars (\$30,000.00) two weeks prior to the closing date of sale, for out-of-pocket expenses and legal fees and to off-set any loss incurred as a result of the effect of the Defendant's operation on the sale value of the Plaintiffs' home. DATED AT NEPEAN, this 2nd day of January 1986.

KEBE/CANNON/HENRY
Solicitors for the Plaintiffs

Ernie Welling reports in EP&T magazine that:

Both parties to the appeal need money for court costs and the Amateur radio fraternity, and some commercial spectrum users, have already built a fund for their side of the case.

The other side in the Ottawa case, the plaintiff who owns the susceptible equipment, has decided to seek contributions from industry. Letters have been sent to manufacturers and/or importers of electronic equipment and appliances.

Contributions are being sought to defend the second position in the appeal, that responsibility for equipment malfunction due to RF susceptibility in its design belongs to the radio licensee.

ON THE RAVENSCROFT CASE

An excellent editorial by Ralph Cameron— he is to be congratulated. Perhaps good may well come from the Ravenscroft case after all and Canada will lower the legal limit to 200 watts—and eventually the U.S. will do the same.

I'm often on the receiving end of a pile-up and to try to pick out the barefoot boys is nearly impossible because of the California kilowatts.

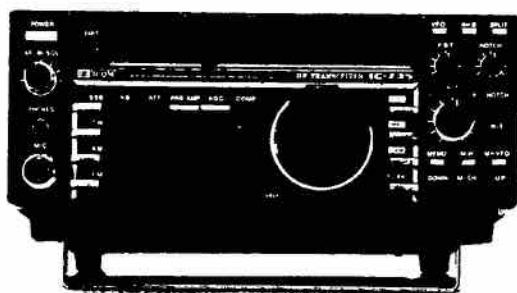
Good manners are often in inverse ratio to kilowatts!

D. Owen-Lewis V31PC

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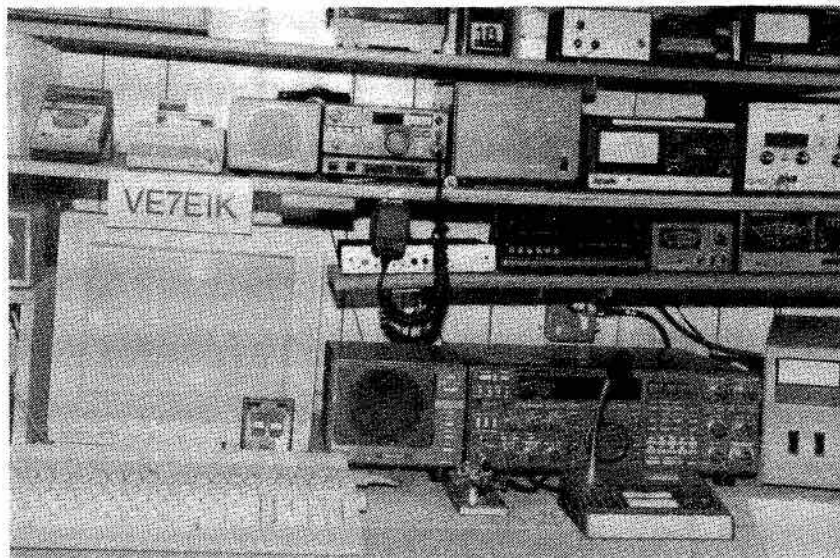
Shack of the Month

We asked for entries to our 'Shack of the Month' contest, and boy, did we get entries!

Thanks to VE3MTD, VE3PQB, VE3UU, VE3PKF, VE1TE, VE2DNQ and VE3HOQ. The job of choosing a winner was given to an 'elite panel of judges', but they chose two! (I guess we'll have to be more careful in our choice of judges next time!)

Both VE7EIK and VE7US were chosen for their variety of equipment as well as their ability to stuff it all in an area small enough to take a picture of. The judges liked the 19" rack and the many homebrew items in the VE7US station.

VE7EIK is not only commended for a multitude of different 'things' on the shelf but also for being able to keep it there without having it slide off. I guess all the Douglas Fir in B.C. must have been cut in a curved pattern the year George constructed his station. Congratulations to Wilf and Rae Moorhouse of Nanaimo B.C. for VE7US, and George Furtado of Penticton for VE7EIK. We'll send out a CARF hat to each and a six-month membership extension, which, of course, includes *The Canadian Amateur*.



THE LAT AND LONG OF IT

If you want to find the latitude and longitude of your transmitting location in British Columbia, and in many other provinces, too, you can read it from the small metal plate fastened to power poles. It will read something like 319 4808 3073. This translates to 123° 19' W; 48° 08' N. (All poles in this area are at 123°, so the first two numbers are omitted). The last four numbers are just statistics for the hydro authority.

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.



Vancouver Amateurs serve at events

BY J.F. HOPWOOD
VE7AHB

The Vancouver Provincial Emergency Program Amateur Radio Group provided key communications for several special community events around the Lower Mainland area during June and July. Equipped with their large Red Cross Emergency Communications mobile vehicle, the group helped out with the 1st Annual North Shore Biathlon and the parade and ceremony to mark the transformation of the EXPO 86 Canadian Pavilion/Canada Place into the new Vancouver Trade and Convention Centre.

Both events were fun activities, but will prove to be valuable training episodes for the day when a disaster communication need occurs. The spacious mobile communications vehicle is equipped with ICOM 144, 220 and 440 MHz mobile units provided by Com-West Radio. A first class operating console for an HF control centre is also a special feature!

Fifteen Amateurs manned the check points as communicators for the marshalls in the 1 km swim-10 km run Biathlon. Twenty-seven Amateurs working both simplex and duplex channels helped the marshalls with

radio-control over the 2 km parade route to the Trade and Convention Centre on Vancouver's downtown waterfront. The participating hams

received attractive event T-shirts for on-site identification and as keepsake gifts for their welcome assistance to the community.



Canadian Red Cross vehicle and Janice Wong VE7JAN, PEP Event co-ordinator.

Photo by VE7AHB

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.

WANTED: Wireless set no. 19 equipment and accessories. Especially looking for power amplifier and pocketwatch. I am willing to buy and/or trade equipment. Please write to Chris Bisailion VE3CBK, 91 Varley Drive, Kanata, Ont. K2K 1H5.

FOR SALE: Hallicrafters SX-62 general coverage receiver 550 kHz to 108 MHz, B&W 5100-B transmitter 3.4 to 32 MHz. \$50 each or \$90 for both. Also wanted: Sockets for two 811A tubes. John Baynham VE3GOX, RR 2 Ingleside, Ont. K0C 1M0.

WANTED: by collector/historian. N. Electric and Marconi 1920 Battery Radios, etc., National HRO-60 and National Thrill Boy. A. Nolf, 539 Kastelic Place, Burlington, Ont. L7N 3R5. 416-639-4768.

FOR SALE: Barker-Williamson all band apartment antenna AP10— see CQ July 1987 with all coils, manual \$45. Omni-

Tuner to tune packet with scope. See QST March 1987, \$55. Kantronics packet TNC2 with Commodore software, connectors, manuals— mint \$150. Richvale Telecommunications cables for C64/Vic 20 VL3 printer. VL4 modem \$30 each. Sentry SWR QRP bridge \$30. UPS extra. Monty Hart VE3TA, 55 Highland Ave., Barrie, Ont. L4M 1N2. 705-737-2252.

FOR SALE: From VE3OHO estate, Communications Terminal HAL CT-2200 \$500., Keyboard KB-2100 \$100., TV monitor YJE GM-1201 \$100. Contact Al Jackson VE3QQ, Box 994, Stayner, Ont. L0M 1S0, 705-428-3814.

\$1000 BUYS: Ham Radio Station consisting of Yaesu FT 101E with 2 extra 6JS6C & mike, Yaesu SP 101PB Landliner phonepatch/speaker, Yaesu YC 601 digital display, MFJ 752 Signal Enhancer II, CDE Ham III rotator system & cable, Mosley 3 element tri-band beam antenna Trap Master model TA33 & coax, and eight 8-ft. sections DMX self-supporting tower. Call Ted VE3HOC (613) 549-5454, Evngs (613) 389-0123.

BUILDING AN HF 600W LINEAR? Look no further. I have one fully built but not tested. First \$150 takes it away— I cannot

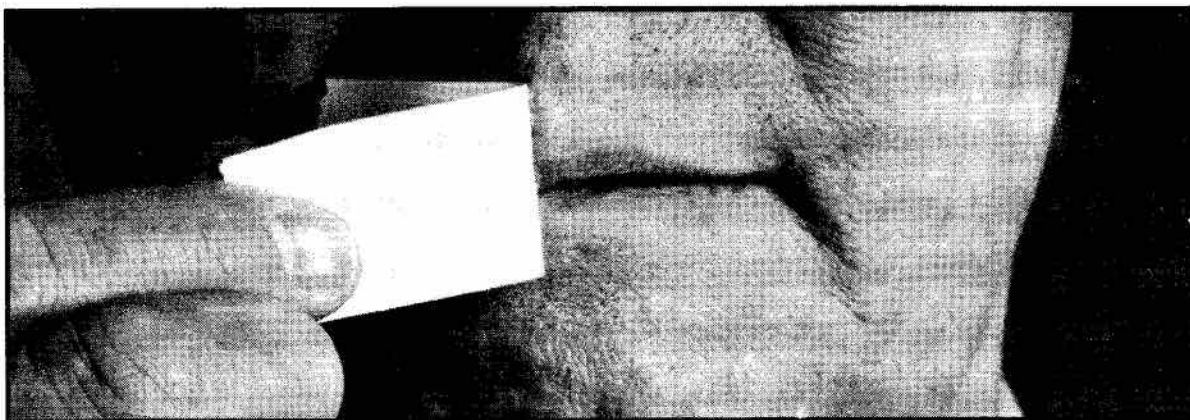
ship. Solid commercial stuff— beautiful cabinet, separate PS with all cables and cons, diagrams, 4CX250s, roller coil and counter. Reason for selling— I don't want another hernia! VE4OK, 199 Centrepointe Drive, Nepean, Ont. 225-5969.

WANTED: 6 metre multimode, IC 730 or FT 757, and FT 101 for parts. **FOR SALE:** FV 101B, external VFO for FT 101, \$100; MLA 2500 amp, 1400 watts out, new tubes, \$1100. Bill Richardson, Site 20, Comp. 63, RR 1 Whitehorse, Y1A 4Z6.

FOR SALE: Viewstar PT-2500A HF linear amplifier, Ham III rotor and control box; KLM 14 element 2 metre beam; Astatic D-104 Desk microphone. Reasonable offers will be considered. Wil Donohue VESZJ, 27 Delaronde Rise, Saskatoon S7J 3Z4 306-374-8919.

WANTED: 1. Manual (or photocopies) for Heath SB-620 Scanalyzer. 2. Power transformer for Heath DX-40 transmitter. 3. Coil L2 for Heath HB-620 Scanalyzer, part no. 52-101. Clark Forrest VE3BOF, Box 988, Mount Forest, Ont. N0G 2L0. 519-323-4664.

FOR SALE: Delhi 6 sections tower with a super base, 16 gauge, ball bearing mast bearing, listed \$860.45 plus tax, asking \$300. A six element TA 36 Mosley antenna excellent condition asking \$300. Drake TR4 and RV4 mint condition asking \$300. Speech processor, will consider swap with VHF or UHF equipment. George Muscat VE3GNM, 2766 Folkway Drive, Unit #32, Mississauga, Ont. L5L 3M3. 416-828-1578.



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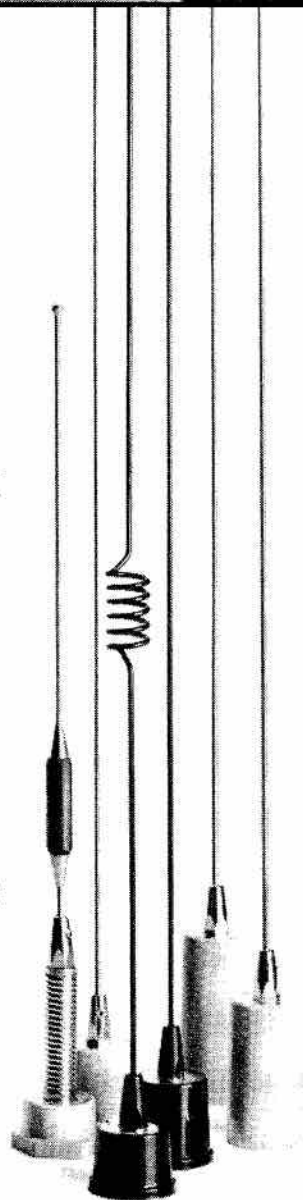
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604-872-8517. Toll Free 1-800-663-6734. Telex: 04-54666 CDN LARSEN VCR



Farm '87

BY FRANCIS SALTER
VE3MGY

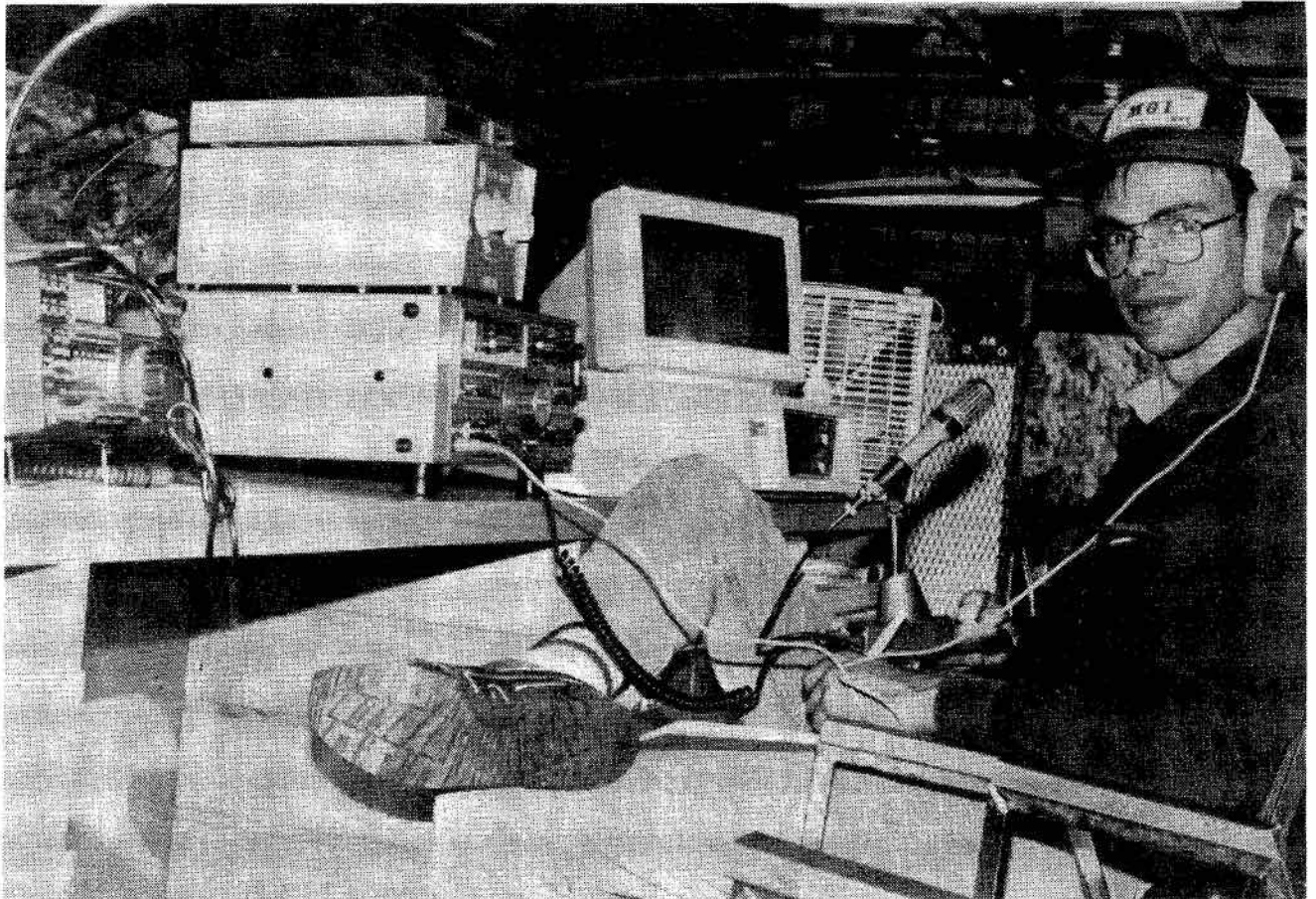
The loosely knit group of Amateurs in the London, Ont. area, known as the MGI group, went out on the farm for the 1987 Field Day. Bruce Elliott, who owns a farm near Kintore (That's between Medina and Thamesford, for those of you who asked) lent the Amateurs his farm for the Field Day weekend. Soon after his permission was granted, strange people began to appear on the farm, looking at trees, wandering up the outside ladder of the silo, disturbing distracted snakes in the farm yard and attracting the attention of neighbours who probably felt like they were being surveyed for an invasion. Of course, at the appointed time, the evening before Field Day, the farm began to resemble

a tourist park as vehicles and equipment arrived. On Saturday morning, the tall pine trees were topped with a mast for 160 metre operations, the silo grew a tri-band, and a tower with a gemquad was propped against the barn. Antennas for 40 phone, 20 metre packet and assorted VHF/UHF antennas rose on ladders, poles or other pieces of masting for the event.

In preparation for Field Day, a call sign with the initials of London Air Port was obtained as the contest call. Who could possibly miss VE3YXU? That question was answered resoundingly on Field Day in battle conditions. Meanwhile, back at the farm, which featured, incidentally, Old MacDonald in the form of Eoin MacDonald VE3OET, the antenna

work took much more time than anticipated and the two 20 metre stations were not on the air until dinner time. Meanwhile, Frank VE3MGY did his best to take the klutz award by falling over a tower and spraining his wrist. Those watching the fall gave him a 5.7, by the way.

After dinner, which was expertly prepared by Rose VE3NRY, VE3YXU settled down to the Field Day activities. VE3YXU was 6A ONT, running on 160, 80, 40, 20, 15, 2 metres and Labat's super resonators. Operators were Brad Seward VE3NRI, Rob Leroy VE3MGQ, Rose Leroy VE3NRY, Bill Skidmore VE3AUI, Al McRorie VE3GAM, Tony Varga VE3ZAV, Mike Price VE3NRI, Eoin MacDonald VE3OET, his XYL Barbara and father-in-law Bob



John Cramm VE3MPP on 80M phone.

Pennington, John Cramm VE3MBP, Bob King VE3LSQ alias Kamp Kammandant, Dave Toth VE3GYQ, Ken Humphrey VE3POW, Bruce and Elenore Elliott and their children, Tracy, Ryan and Daren and Frank VE3MGY, whose attempts to send morse code with a sprained wrist gave a new meaning to LID. Hugh Pollock VE3EWI and XYL Janet recorded the event with video equipment for our entertainment in the cold evenings of next winter. Janet made the acquaintance of the barn yard snake and Charlie, the Elliott's dog. Charlie loved the food for the weekend, and we have no report from the snake.

Propagation was sensational on all the bands. Activity continued until the wee hours of the morning, which was 0400 hrs. for 80 metre phone among others. However, after a delicious and abundant breakfast prepared by Brad VE3NRJ and Rose VE3NRI, the MGI group was back at mike, key and keyboard for the rest of Field Day. The VE3YXU call caused considerable difficulty for phone operators, especially for those who talked to them fellers south of the Mason-Dixon line who never ever

heard 'bout them thar yankees. After one SSB operator was told that it was "Yankee, as in Mark Twain's play, Damned Yankees." "Not bad for up north," was the reply. It's unlikely that Mark Twain would object to this liberty with his literary work, and it conveyed the letter in the call sign.

At 1400 the operation was shut down, the trees returned to normal, the silo lost its tribander and the quad melted into the ground. By 1800 hours the farm looked normal again, even if the participants in Farm 87 did not. However, sleep would cure most of the problems and the happy memories would remain. A special thank you goes to Bruce and Elenore Elliott for the use of their farm and the operators which they contributed when Tracy, Ryan and Daren helped out, the coffee which was provided until the Farm 87 coffee maker finally turned out some industrial strength coffee and to all the operators and assistants in the Farm 87 outing. To all of those who contacted us, we send 73 and good luck in the contest and DX from Frank VE3MGY and the rest of the MGI group.

A Canadian Radio Giant

BY ROY PARRETT VET7G

Everybody knows the names Marconi, De Forest and Popov, but few have heard of Reginald Fessenden, a Canadian physicist, who discovered a method of amplitude modulation and invented 'The Radio Telephone.' He pioneered the radio compass, transmitted speech and music in 1906, developed sonic depth sounders, submarine signalling devices and a turbo-electric drive for battleships. He built a TV set in 1919.

Fessenden devised a method of having radio waves rise and fall in intensity ('amplitude modulation') and demonstrated it in 1906.

This Canadian pioneer was born in East Bolton, Quebec in 1866. He studied at Trinity College, Port Hope, Ontario, and at Bishop's University in Lennoxville, Quebec. His mother, Clementina, was a great Canadian, the organizing secretary of the IODE. Born in Hamilton, and educated in Montreal, she was largely responsible for Empire Day—now Canada Day—being established in this country.

Fessenden went on to become the chief chemist at the Edison Laboratory in Orange, New Jersey and, later, a senior scientist at Westinghouse and General Electric, and professor of Electrical Engineering at Perdu and other universities.

Under his direction, the General Electric Company produced an alternator with an HF of 50,000 Hertz, which made possible radio telephony.

On December 24, 1906, he transmitted speech and music on a station that he had built himself. The same year he established two-way communication with Scotland with this equipment.

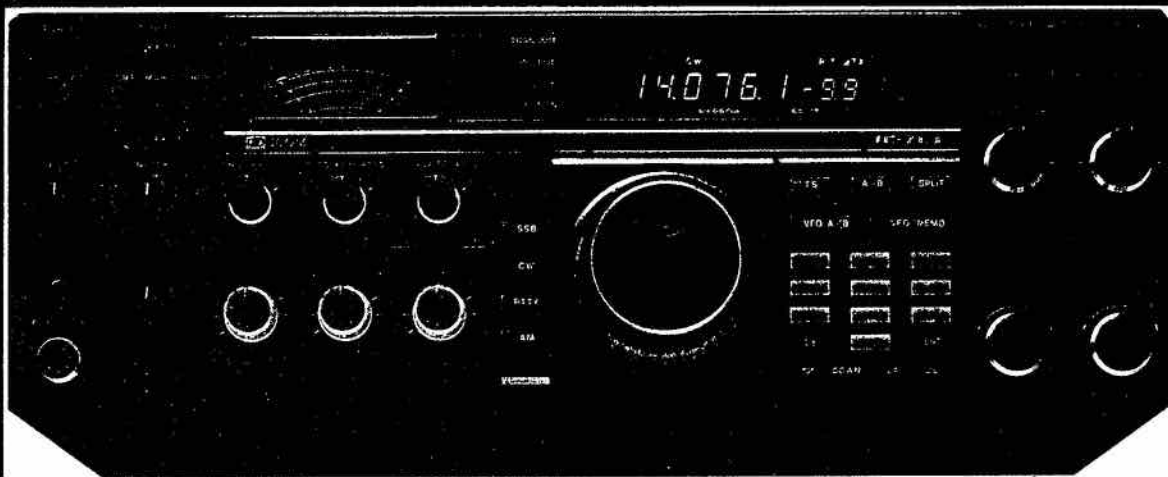
Probably his greatest contribution to radio was his hetrodyne principle in which the incoming frequency was converted to an intermediate one, more easily controlled and amplified.

Fessenden developed many new devices for the army and navy, including a 'visible bullet' for machine guns, a great improvement—the 'tracer'.

Many of his inventions were patented and developed by companies that employed him, hence he has not received the public acclaim that he deserves. He died in 1932.

Brad VE3NRJ on 20M phone.





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The IC-761 ushers in an exciting new era of amateur radio communications; an era filled with all the DX'ing, contesting, and multi-mode operating pleasures of a fresh new sunspot cycle. The innovative IC-761 includes all of today's most desired features in a single full-size cabinet. This is ham radio at its absolute best!

Work the World. The IC-761 gives you the competitive edge with standard features including a built-in AC power supply, automatic antenna tuner, 32 fully tunable memories, self-referencing SWR bridge, continuously variable RF output power to 100 watts in most modes, plus much, much more!

Superb Design, Uncompromised Quality. A 105dB dynamic range receiver features high RF sensitivity and steep skirted IF selectivity that cuts QRM like a knife. A 100% duty cycle transmitter includes a large heatsink and internal blower. The IC-761 transceiver is backed with a full one-year warranty and ICOM's dedicated customer service with four regional factory service centers. Your operating enjoyment is guaranteed!

All Bands, All Modes Included. Operates all HF bands, plus it includes general coverage reception from 100kHz to 30MHz. A top SSB, CW, FM, AM, and RTTY performer!

Passband Tuning and IF Shift plus tunable IF notch provide maximum operating flexibility on SSB, CW, and RTTY modes. Additional features include multiple front panel filter selection, RF speech processor, dual width and adjustable-level noise blanker, panel selectable low-noise RF preamp, programmable scanning, and all-mode squelch. The IC-761 is today's most advanced and elaborate transceiver!

Direct Frequency Entry Via Front Keyboard or enjoy the velvet-smooth tuning knob with its professional feel and rubberized grip.

Special CW Attractions include a built-in electronic keyer, semi or full break-in operation rated up to 60 WPM, CW narrow filters and adjustable sidetone.

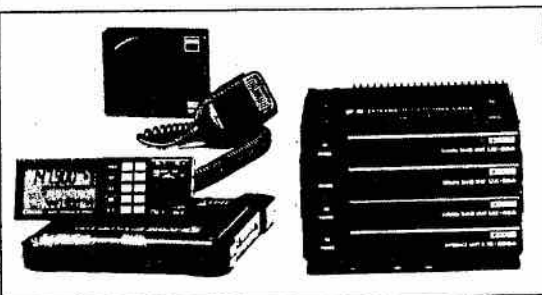
Automatic Antenna Tuner covers 160-10 meters, matches 16-150 ohms and uses high speed circuits to follow rapid band shifts.

Complementing Accessories include the CI-V computer interface adapter, SM-10 graphic equalized mic, and an EX-310 voice synthesizer.

You're The Winner with the new era IC-761. See the biggest and best HF at your local ICOM dealer.



The Automatic Antenna Tuner built into the IC-761 is the best in the Industry. When bands are changed the tuner immediately tunes to a preset position for the new band. This takes anywhere from 1 to 2 seconds. When you transmit for the first time within that band the tuner will fine tune for that portion of the band. This will again only take 2 to 3 seconds. This same fast and efficient tuning also takes place in Icom's external tuners, Models AT-500, AT-100, and AT-150. Tuners from other manufacturers will remain on the last band tuned up on until you transmit and/or they take from 10-15 seconds to tune.



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ICOM has introduced a six-band fiber-optic mobile transceiver. The "band units" are remotely controlled via a compact control unit. The compact controller, which measures only 2.9" x 2" x 1", can be placed in any convenient location near the operator; the band units can be placed in some other spot in your vehicle (such as the trunk). The band units are connected to the controller by a fiber optic cable to eliminate rf feedback.

- IC-900 \$749
- UX29A 2M 25W \$399
- UX29H 2M 45W \$
- UX49A 440MHz \$459

Among the features of the control unit are: 10 memories, two scanning systems (for memory and programmable scan), and crossband operation. Band units are available for 2 meters (25/45W), 10 and 6 meters, 220 and 440 MHz, and 1.2 GHz.

ASTRO

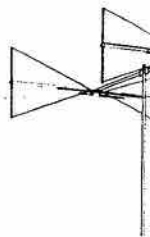
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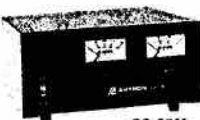
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	Continuous Duty (amps)	ICS* (amps)	Size (in.) H x W x D	Shipping Wt. (lbs.)
	37	50	6 x 13 1/4 x 11	46
	25	35	5 x 11 x 11	27
RS-20M	16	20	5 x 9 x 10 1/2	18
	9	12	4 1/2 x 8 x 9	13
	7.5	11	4 x 7 1/2 x 10 1/4	11
	5	7	3 1/4 x 6 1/2 x 9	9

RS-50A \$399; RS-50M \$449; VS-50M \$499
RS-35A \$275; RS-35M \$319; VS-35M \$359
RS-20A \$185; RS-20M \$219; VS-20M \$259
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- *32 feet tall - may be top loaded for additional bandwidth.

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- FT-209RH - 2m
- FT-709RH - 440 MHz



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- Covers 60 MHz - 905 MHz
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- 10w on 2 meters
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Telephone Pioneers aid Amateur Radio School

BY J.F. HOPWOOD
VE7AHB

The Telephone Pioneers of America (BC Chapter 53) have arranged to provide BC Tel's modern education center to assist Vancouver area clubs in offering Amateur radio licensing courses this fall. The clubs have pooled their teaching and material resources and have joined together as members of a board of trustees to manage the 'Lower Mainland Amateur Radio School.'

The Amateur Radio Clubs will control and direct the planning and operation of the school. They will

recruit and provide instructors, determine course syllabus and co-ordinate relations with the Amateur community, students and, when required, the local DOC. Each club will appoint a representative to serve as a member of a Board of Trustees. The Board will elect a Chairman, Vice Chairman and Secretary/Treasurer.

The Telephone Pioneer Amateur Radio Group are co-ordinating the use of classrooms, audio-visual equipment and reproducing documents for the instructors and students. The modern classrooms and other amenities, including parking,

are free of charge. BC Tel places high priority on community service programs.

The 22 week course will begin September 29, 1987. Publicity, including media attention, letters, notices and posters will be distributed to all relevant institutions, clubs, schools and associations, plus the local DOC offices. Interested parties should contact Vol Riley VE7EYG (531-4917); John Coulthard VE7ARR (731-5669) or Hu Reijne VE7CHW (277-393).



Above, left to right: John VE7ARR, John VE7AOV, Vol VE7EYG, Larry VE7LR and Brian VE7CTE planning the school courses.



The Education centre.

A BETTER GROUND SYSTEM

Scientists working on an Army Grounding Analysis project have shown that grounding with a standard 6-foot metal rod, or even several rods in parallel, is often unsafe and more often inadequate for good low-noise communications. They have found that a better ground can be established by stapling a 100 foot length of standard 1/8 inch stranded steel wire to earth every 4 feet with 6 inch pegs.

A three pound hammer (in lieu of the ten pound sledge hammer used with the ground rod) should be sufficient to drive in the pegs.

Tests at all sites over the country show the surface wire to be 32 to 95 percent more efficient than the 6 foot ground rod.

—WSKR & SPARC GAP

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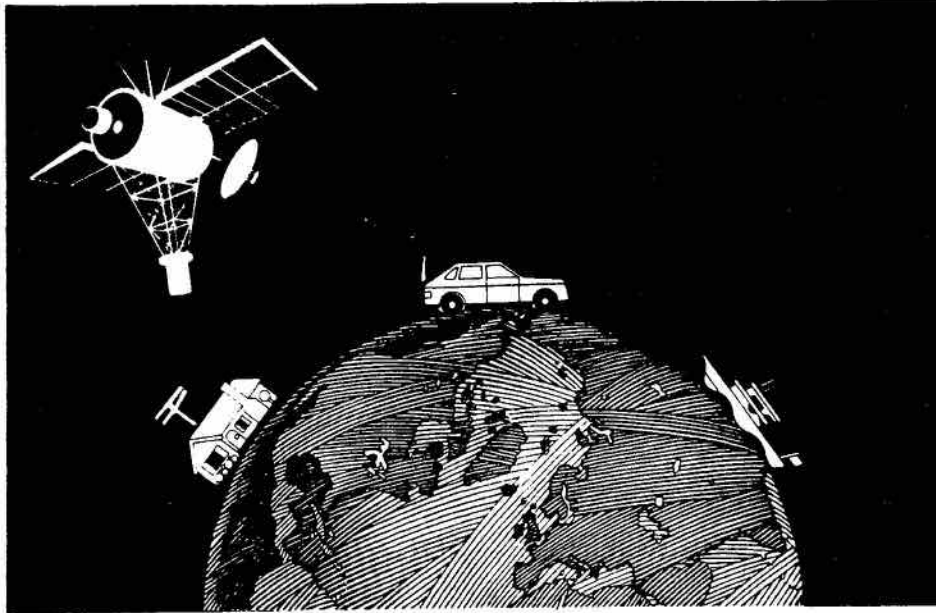
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Photos by VE7AHB

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CHAPTER 53 - AND THE LOWER MAINLAND AMATEUR RADIO CLUBS

Social Events

3rd ANNUAL CALGARY HAM RADIO FLEA MARKET

Saturday September 19, 1987, 9 a.m. to 1 p.m. at Parkhill Community Centre, 4013 Stanley Road S.W., Calgary, Alberta. Admission: \$2, Great Door Prizes. Sponsored by Novatel ARC, P.O. Box 7578, Station E, Calgary, Alta. T3E 3M3. Talk-in on 146.52 MHz SIMPLEX.

PACKET RADIO SYMPOSIUM

Sept. 19, 1987, Barrie, Ont. The Hex-9 Group of the BARC is holding its 3rd Packet Radio Symposium co-sponsored by and held at Georgian College, Barrie.

Packet talks for beginners from 9:30 a.m. Main Discussion at 1 p.m. Emphasis this year on networking. Guest speaker: Lyle Johnson WA7GXD, well-known in TAPR circles. Talk-in 146.25/146.85 VE3LSR. Registration \$5. Info: Hex-9 Group, Box 254, Barrie, Ont. L4M 4T2. Pre-register via packet VE3FJB-1

Note: RSO annual convention will be held at the same time enabling attendance at both.

WORKSHOP ON EMI AND EMC IN HEALTH CARE FACILITIES

The problems and costs of electromagnetic interference (EMI) and electromagnetic compatibility (EMC) are becoming increasingly important in hospitals as electronic systems are used in a greater variety of monitoring, diagnostic and therapeutic devices. Not only are there more devices susceptible to EMI, but there is an ever-growing number of medical, commercial and consumer electronic products which emit EMI.

The Bureau of Radiation and Medical Devices, in collaboration with the Electronics Test Centre and the University of Alberta Hospitals will sponsor a workshop on Electromagnetic Compatibility in Health Care Facilities to be held Nov. 18 and 19, 1987 in the auditorium of the Alberta Research Council, 250 Karl Clark Road, Edmonton, Alberta.

OBJECTIVES

The objectives of the workshop are to explore the nature of problems caused by EMI and EMC in hospitals while identifying the major sources of problems and factors contributing to them. Possible solutions to EMI problems will be discussed and recommendations made for action by users, manufacturers and regulatory agencies.

A registration fee of \$75 will be

charged and registration forms can be obtained from Linda Hilts, EMI/EMC Workshop, Electronics Test Centre, P.O. Box 8330, Station F, Edmonton, Alberta T6H 5X2.

THE FOREFATHERS AWARD

Awards of the Scarborough Amateur Club Inc., have always been devised to encourage world-wide communication to Canada. Often you will hear on the air, "CQ CQ CANADA," and sometimes it is a foreign station working on one of our Canadian awards. To reverse this flow across the oceans, SARC introduces The Forefathers Award.

The following rules are necessary to qualify:

1. All QSO's after Dec. 1, 1980 00:01;
2. Must have a logged QSO with 25 Amateur radio stations which are in the country of your forefathers or ancestors.
3. Any band, any mode.

The following requirements are necessary:

1. Send a copy of your log certified by one licensed radio Amateur as correct. NO QSL CARDS REQUIRED.
2. Available to licensed radio Amateurs and SWL's.
3. To receive award send with application, two green stamps or three IRCs. This is to cover cost of certificate, handling and mailing. Deliver to Awards Chairman or mail: Scarborough Amateur Radio Club Inc. Awards Chairman, P.O. Box 1174, Station 'D', Scarborough, Ont. M1R 5B5.

1987 SCOUT JAMBOREE

On Saturday, Sept. 26, 1987, VE3RCS Portable and VE3VCA Portable will be operating a display station as part of the large-scale Scout Jamboree. About 2600 Scouts from Canada and the U.S. will be appreciated on 2M, 20M, 40M, and 80M bands from 1100z to 1600z. The operating schedule is:
80m - 1100-1200z VE3RCS
40m - 1200-1300z VE3VCA
20m - 1300-1430z VE3RCS
20m - 1430-1600z VE3VCA
2m - Monitoring 146.94 down to 600 146.79 down to 600

Equipment for the station is being supplied by VE3RCS, VE3VCA and VE3PTB. Help make the event memorable for the Scouts. Contact the portable station.

CLARA 20TH BIRTHDAY CELEBRATION

September 11-13, 1987
Sheraton Parkway Hotel
#7 Hwy and Hwy 404
Richmond Hill, Ontario

The Ontario Trilliums will have a

CALENDAR

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

Sept. 11-13: CLARA 87 Celebration. Details This issue.

Sept. 12-13: Ham Happenings, Nanaimo ARA, Parksville, B.C. Details this issue.

Sept. 13: CSLARA Annual Hamfest in the Butler Arena at 6985 Mackle Rd., Côte St. Luc, Montreal, Que. Doors open 9 a.m. Admission free.

Sept. 19: Kingston ARC Third Annual Amateur Radio and Electronics Flea Market, Kingston, Ont. Details: Bernie Burdsall VE3NB, 613-544-4438.

Sept. 26: Scout Jamboree, details this issue.

Dec. 6-7: TELCO Pioneers 23rd Annual QSO Party. Details to appear in a future issue.

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

Publicize your get-together here. Write the Editor, P.O. Box 356, Kingston, Ontario K7L 4W2. Please let us know about your events three months in advance to list them in the Calendar.

hospitality room at the Clara '87 celebration. Everyone is invited to drop by for an eyeball QSO.

For further details, write: '87 Celebration, c/o Cathy Hrischenko, VE3GIH, 56 Stockdale Cres., Richmond Hill, Ont. L4C 3S9.

HAM HAPPENINGS '87

September 12-13, 1987
Parksville Community Hall
Parksville, B.C.

Pot-Luck dinner & social w/bar 1900 hrs. on Saturday; dealer displays, flea market, swap'n'shop, seminars, unreserved auction 1000-1500 on Sunday.

Cost— \$5 per family. Talk-in frequencies 145.430 & 146.640 (down .600)

For tickets or further information call Ernie VE7FB or Pete VE7FY on the mainland; Muir Communications or Al VE7BEU at 384-4604 in Victoria, Bill VE7JY at 758-9752 or Don VE7ABL at 752-9131 in Nanaimo.

JRSD FUND

If you haven't done so yet, please write your MP about Ravenscroft and make a donation— 1% of the value of your rig seems fair— to the JRSD Fund, Box 8873, Ottawa K1G3J2.

Does your local library carry the radio Amateur call books? If not, ask them!

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DX NET LIST

Readers with a long memory may remember that I mentioned a good source of DX Net information in the February issue of *The Canadian Amateur*. Well the list finally arrived in the summer break and I'm pleased to be able to tell you, at last, about Dieter Konrad OE2DYL's useful little publication.

Called the *DX Net List*, the single sheet is updated annually and contains information on all the DX nets you might ever want to know about, organized in two sections. One covers those nets which are on every day, 33 altogether, and a second covers those that come on once a week of which there are 70. This second group is sub-divided into the seven days of the week for ease of reference. I should mention at this point that Dieter uses a fairly broad brush when he decides which nets to include with the result that some of his entries are not true DX nets. For example he includes things like the Pacific Maritime Mobile Net (0200 UTC on 14.313 MHz) and the International Aircontrollers Net (1100 UTC on 4.277 MHz). However these nets will occasionally have some interesting DX check-ins and I think it's better to have as comprehensive a list as possible of international nets and accept the fact that some of these will rarely have interest to DXers. Just note the name of the Net and draw your own conclusions.

It's no surprise to read that the most popular band for these nets is 20 metres. However, Dieter's list also includes nets that operate on 15, 40 and even 75 metres. Clearly many of the last group will rarely if ever be accessible to VEs. How many readers have even heard, much less checked into the Russian DX Net on Wednesdays at 0100 UTC on 3.640 MHz?

The price for this useful publication? \$3(US) or 4 IRC. I strongly recommend the IRC method of payment, I sent Dieter an International Money Order in U.S. Dollars and he returned it, politely pointing out that it would cost him \$1.25 just to cash it! The address is Dieter Konrad OE2DYL, Bessarabierstrasse 39, A-5020 Salzburg, Austria. A return address label, rather than a SAE, should be sent.

BANNED COUNTRY LIST

Those of you who read *QST* will have noticed a sensible decision by the CRRL; they will no longer be publishing the ITU 'Banned Countries

List'. This list has been a pet peeve of mine ever since I became a DXer. The first time I read the list it seemed clear enough, for example Turkey was there. Obviously, for reasons best known to themselves, the Turkish Government had decided that Amateur radio operations in Turkey would not be allowed. However it wasn't long before I spotted a TA station on 20 CW cheerfully handing out contacts and giving information on how to QSL.

What was going on? A more recent example has been Saudi Arabia which appeared on the latest list of banned countries published here in *The Canadian Amateur*. In this case, within a month I was reading activity reports in *QRZ DX*, for example, that showed that at least one HZ station was as active as ever. *QST* points out that the lists are often inaccurate due to either local officials misinterpreting ITU questionnaires or local policy changes that have not been passed on to ITU. As most of us guessed long ago, DOC admits that there is no harm done in Canadian stations working stations in countries that appear on one of these lists. If anyone is breaking any laws it's the fellow at the other end, not you! I'm going to suggest to our editor that we also drop further mention of this misleading catalogue of countries.

WWCC AGAIN

In the June issue of *The Canadian Amateur* I printed all the details on the World Wide Century Club, W4FRU's suggestion for a replacement for the existing DXCC. As I hoped, it has stimulated some interest. I had a long conversation with Dave Goodwin VE2ZP who was once *The Canadian Amateur's* contest Editor and a few weeks back *TCA's* current Contest editor, John Connor VE1BHA/3, sent me a long letter with his reactions to WWCC. Neither of them was very enthusiastic about the proposal. Perhaps the best thing I can do is to pick out what seemed to me to be their main complaints.

They both point out that the idea of dividing the world up into squares, in this case, 10 degree each side, is not new.

The Swedish national Amateur radio society, SARL, already has a worldwide grid square program which some people feel has the potential to replace DXCC. Unfortunately no details are available, to me anyway, on just how this system is structured. We should also remind ourselves at this point

that the geographic squares idea for VHF is now very well established on a world wide basis using the so-called 'Maidenhead Square' system. John is concerned that an arbitrary decision seems to have been made by suggesting that we use the National Geographic Atlas to define where those 10 degree lines lie. I believe there is a fallacy here as lines of latitude and longitude are not dependent on which atlas you look them up in, any more than logarithms depend on which book of tables or calculator you use to find them. They are absolutes whose 'Fix accuracy' depends on the instruments you use to determine them.

However I can see problems with deciding whether a station is just inside or outside, or even straddling a side of a square. (See elsewhere in the column for some startling news on the 'position' of several landmarks in the U.S.!) Not to get too ridiculous, one can imagine a DXpedition going to the corner of four adjacent squares and by dint of putting an antenna in the corner of each square offering DXers the possibility of four consecutive contacts with four different squares! Perhaps this has already happened with the VHF square system? Another concern seems to be that if we are not going to use 'Countries' we already have an award system based on another way of dividing up the globe and this is, of course, the Worked All Zones (WAZ) award.

Here we have the 40 zones of the WAZ program compared with the 465 squares of WWCC. WAZ, by a cunning choice of where the zone lines run, is a challenge certainly comparable to the basic DXCC however 465 separate confirmations, many of them in extremely obscure parts of the world, looks to me like almost the ultimate challenge. W4FRU talks about a ten year task for the very keenest DXers.

Choosing a potential successor for DXCC is not an easy task! I think I'll give John the last word... for this issue anyway... by quoting directly from the last paragraph of his letter.

"As I learned when I was considering this subject ten years ago, at first it appeared to be pretty easy and straight-forward. But it really does get complicated. It seems to me that, all things considered, it is quite remarkable that DXCC has held up as well as it has. Though there are disputes in the interpretation of the DXCC rules, I think if you came right down to it, just about everyone would

agree with probably 90-95% of the countries on the DXCC list. It's just when you get to the 'funny countries' that the disputes arise. My favorite in this category is Sable and St. Paul. I mean, come on!"

GRID SQUARE SHIFTS

The DXer, the journal of the Northern California DX Club, contains some fascinating information about the 'position' of a number of prominent U.S. landmarks.

Apparently the National Geodetic Survey have just published the results of 12 years of work fine-tuning the national system of benchmarks. Some 250,000 of them were redetermined using state-of-the-art surveying instruments including navigational satellites. The final results are startling, to say the least of it. The new latitudes and longitudes show the following shifts in the position of these well known features.

Golden Gate Bridge- moved 314 feet southwest.

Space Needle, Seattle- moved 312.22 feet west.

Washington Monument- moved 94.5 feet northeast.

Flagstaff of the Judiciary Building, Honolulu- moved 1480.8 feet southeast. (That's more than a quarter of a mile!)

All these changes will be incorporated into new editions of nautical and geodetic charts over a period of time. While the grid square designators for most hams will not change those who live within a few hundred feet of a grid line may eventually find that they are in a new grid square. As *The DXer* points out, this will eventually create some unique problems for ARRL, SARL and any other Amateur organizations using grid squares. What to do about credits for stations worked in one square when we now discover that they were actually in another!

BITS AND PIECES

BV TAIWAN— Despite my remarks in the February issue about a new crop of hams coming on the air from Taiwan, I hadn't noticed any improvement recently. That was until July 6 when I was listening on 20 with the beam in the general direction of Asia when I heard a very weak CQ, with no takers, which I identified as BV2DA. Great excitement, as BV will be a new one for me, when I finally work it. You've guessed, I went back to his CQ about five times but he obviously couldn't hear me and nobody else had noticed him either. Eventually a W5 called him and gave him a 559. (He was 419 with me). After a quick exchange the BV went back to calling CQ for a further period with no

takers. I gave up calling eventually, but I'm checking the frequency every day now in the hope that the band will really open up one morning and I'll snare him! Details? 14.005 MHz at 1200 UTC. I see he is reported in *QRZ DX* as working into W7 in June at 1445 UTC. Also a W0 worked him on phone on 14.186 MHz at 1350 UTC.

T32 EAST KIRIBATI (Line IS)— Henry T32BC is on Christmas Island in East Kiribati. Important to note that this is the other Christmas Island, perhaps not quite so rare as the one in the Eastern Indian Ocean, VK9. I found Henry chatting to a friend in West Kiribati who was only running 5 watts to a dipole up in the palm trees. The later was about a 41 with me but Henry was a solid 59, and when we spoke a little later he gave me a 59 too.

Our contact was short as he had to leave for a meal but it was nice to have such a solid contact with a relatively rare country. You should try 14.138 MHz at 0400 UTC. Current DX newsletters list two other stations active from T32, namely T32AN and a great many reports in T32BF. The former station is reported on 14.220 MHz at 0315 UTC. BF is very consistent, five reports showing him either on 14.177 or 14.178 MHz between 0215 and 0345 UTC. QSLs to KH6GDR.

KC4 ANTARCTICA— This one ought to be in the Cooper's Beefs section as it deals with a further confusion factor in the allocation of U.S. call signs. Until recently if you heard a KC4 it was from Antarctica, but not anymore apparently. The FCC, in its infinite wisdom, has decided to start

allocating KC4 2 x 3 calls to novices in the 4th call area. However all is not lost, if you can remember that KC4AAA through AAF and KC4USA through USZ really are in Antarctica you can ignore all the rest!

JY JORDAN— *Long Skip* refers to the Jordanian awards as outstanding, so here are a few suggestions for nabbing a JY. JY9IU on 14.017 MHz at 1515 UTC with QSLs via HB9ABA; JY5DL on 14.267 MHz at 1855 UTC; JY5CI on 14.142 MHz at 1635 UTC; JY6ZZ on 14.220 MHz at 1445 UTC and JY8CI on 14.028 MHz at 1355 YTC.

PREFIXES

While not a hunter of unusual prefixes myself, I know that there are a number of hams who do enjoy this aspect of DXing.

For those of you who are into this game, here are a few new ones you should know about:

OF and OI— Finnish stations may use these prefixes for the rest of 1987. They are in celebration of 70 years of independence.

VD1— New Brunswick stations may use this prefix to celebrate the 200th anniversary of the founding of the militia in the province.

VX3— The celebration here is the 150th birthday of Cobourg, Ontario. I assume that only stations in the Cobourg area will be able to use this prefix.

Thanks are due to the following sources for some of the material appearing in this column: *QST*, *OE2DYL*, *QRZ DX*, *VE2ZP*, *VE1BHA/3*, *W4FRU*, *Long Skip*, *The DXer*. ■

Amateur space telescope planned

The Independent Space Research Group (ISRG) moved its headquarters to Rochester, N.Y. The ISRG is attempting to construct a launch of a small (18" diameter) orbiting telescope for use by amateur astronomers and educational institutions of all levels. The satellite, called Amateur Space Telescope or AST is being designed to transmit pictures in digital form over Amateur radio bands so that anyone with modest Amateur radio gear can receive pictures.

A few months ago, AMSAT accepted a proposal for AMSAT participation in the AST project. AMSAT has agreed to build communication devices for the satellite, help organize a control station network, and allow the use of phase III satellites as relays between the AST and the ground. Two projects

have been proposed for the coming year.

1. A test, in cooperation with AMSAT, of Phase III satellite's ability to act as a downlink relay. A test setup would mimic the proposed communication system planned for the AST, in terms of ERP, data rate, etc., and use it to transmit digital pictures from a CID camera up to the satellite and back to earth.

2. Design and construction of a prototype interface capable of taking recorded digital pictures from the satellite and creating a picture on a TV screen or homemade photographic printer.

Anyone interested should contact Jesse Eichenlaub at 1170 Genesee Street, Bldg. 5, Apt 3, Rochester, N.Y. 14611 or phone 716-464-0125.

—Ottawa Groundwave
& SPARC GAP

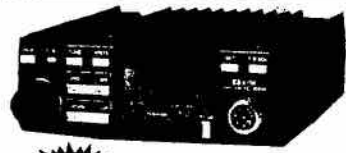
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CONTEST SCENE

With the coming of September, it is time to start thinking about the upcoming contest season. Time to make those antenna improvements that you thought of during the summer, and time to sit down and come up with a strategy to finally beat your crosstown rival.

This month I have some high claimed scores from last year's CQ Contests, results from the ARRL team ten metre contest, and some thoughts on the past ten years of CQ contest activity in Canada.

CQ finally got around to publishing the high claimed scores for last year's contests, and they proved to be very interesting indeed. The phone scores leave little doubt that conditions really were very good, with several record and near-record scores amongst the VE entries. John VE6OU/3 ran away with the single operator competition, totalling 4.8M points, a Canadian record if it stands up. On 15 metres, VO1SA came close to the record score with just over 1M, while VE3CDX has a potential record on 20M, also just over 1M. On 160M, Yuri has a claimed score of 54k from VE3BMV. (I thought Yuri was in New Jersey now?) In the multi-single class, VE3BVD came up just short of the record with 6M points.

Two CW scores are particularly noteworthy, both in the single operator all band category. VE3IY keyed his way to 1.2M, and VO1MP was close behind with 1.1M.

Bear in mind that these are only high claimed scores. There may be some bigger scores yet to be made known, and there is, of course, the ever present possibility of... oh my... disqualification. (How do they make those big scores?) Actually, disqualification is a very rare thing, and I suspect that the VEs don't turn in big enough scores to get disqualified.

Turning to official, final, no doubt about it, published scores, we have the 1986 ARRL 10 metre contest. Heading up the VE contingent this year was none other than Reg VE1BNN, who came up with 64k, good for the number nine phone-only place world wide. Number one among the Canadians on CW was Andy VE1ASJ with 37k, while the mixed mode leader was VE3XN with 45k. Full results are in July QST.

As you can see, at this point in the sunspot cycle, if you want to work 10 metres, VE1 is the place to be. People keep asking me why I have kept my VE1 call. Any further questions? If anyone wants to ask me about 80 metre propagation from VE1, I'll be

glad to go on for an hour or so. How about 160?

Actually, though, I should point out that it's not all good in VE1. Remember, when you are working a contest from the Maritimes, you are *between* the eastern U.S. and Europe. It certainly makes you appreciate front to back ratio, or your lack of it.

UPCOMING

The Northern California Contest Club is seeking publicity for their 1987 California QSO Party, to be held from 16Z Oct. 3 until 22Z Oct. 4. Single operator stations are limited to 24 hours participation, while multi operators can work the full 30 hours. The object is to work as many California stations and counties as possible, and you can work each station once on CW and again on phone on the same band. Send your QSO number and province, and the Californians will send their QSO number and county. Phone QSOs are worth two points, CW three, and there are 58 counties in the state. The

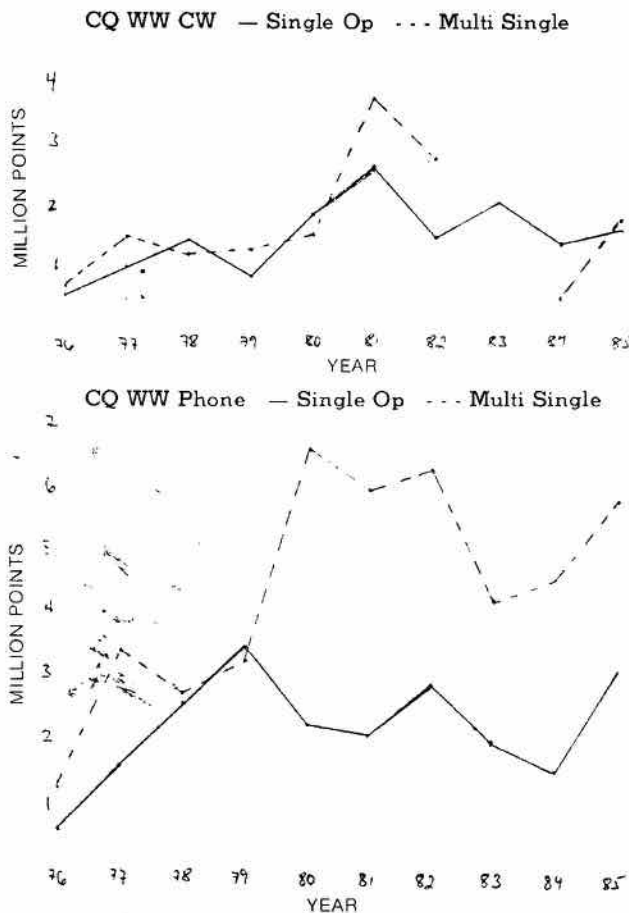
deadline for logs is Nov. 15, with dupe sheets if you have more than 200 QSOs. The usual range of awards is offered. So, if you want an opportunity to check out your new Californian rhombic, you might want to drop in on this one. Logs go to Gary Caldwell WA6VEF, 1830 Polk Street, Concord CA 94521.

CQ CONTEST TRENDS

I have in the past been accused of being overly fascinated with numbers. I suspect that there is some justification for this claim. My doctor and I thought that we had cured this particular obsession, but I recently suffered a relapse and did some looking at the top Canadian scores in the CQ Phone and CW Contests over the last ten years. I have plotted these scores, as shown elsewhere.

Some interesting points can be made looking at these graphs. Considering phone first, it can be seen that the single operator scores have tended to be in the 2 to 2.5 million point range with the

Continued on next page



MICROWAVES

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

The ARRL VHF/UHF Contest this June was the occasion for what may have been the first SSB contact on the 10 GHz band in Canada, at least over any significant distance. The contact took place on June 14, 1987 at about 1630 UTC between VE3ASO/3, located at Foymount, Ontario (FN15PK) and VE3IMT/2 at a lookout site in the Gatineau, north of Ottawa (FN25WM). The two operators were Dennis VE3ASO and Don VE2DWG, using the contest site call of Keith VE3IMT. The distance involved was about 109 kilometres. Co-ordination was carried out on 2-metre SSB, and the 2-metre beam heading was used to establish the aim for the microwave horns. 10 GHz contact was first

established on CW mode and, since signal strength was adequate switched to SSB, with 5 x 5 reports each way.

Both stations made use of the SSB Electronics transverter units, manufactured in West Germany and distributed here by Transverters Unlimited (Hans VE3CRU). These have a nominal output of 100 milliwatts (0.1W), putting them in the QRO category for this band, and a receiver noise figure of 2.5 dB. They convert signals to and from the 2-metre band, allowing use of a multi-mode portable as an IF unit. This combination provides a system gain at least 50 dB higher than the FM-mode Gunnplexer (tm) units commonly used in this

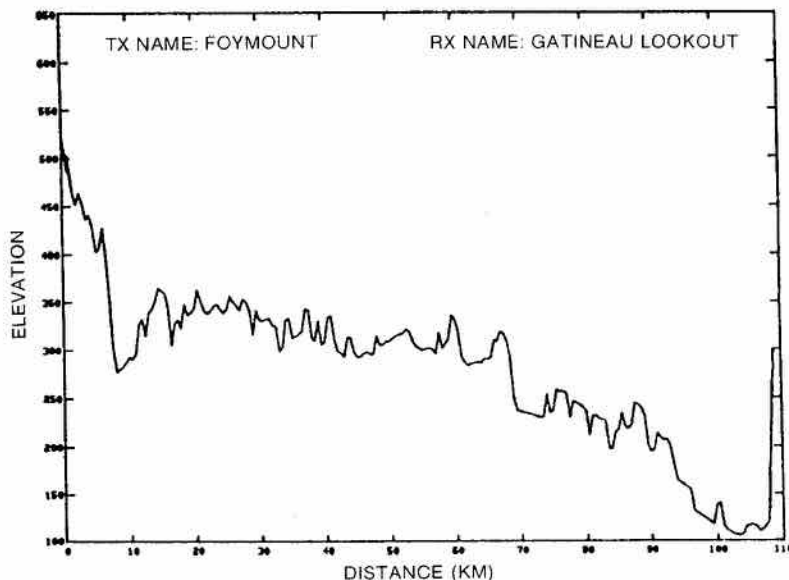
range, and allowed the contact to be made using 3.5 inch horn antennas at each end. FM mode would have required that at least one end make use of a two-foot dish and, even with the extra 15 dB of gain, would have been very close to the FM threshold of -100 dBm. SSB provides an additional advantage for weak-signal work, since it does not encounter the complete loss of intelligibility that occurs with FM signals about 10 dB from the absolute receiver threshold, instead degrading gracefully, for dB, down to threshold and beyond.

Further contacts are planned for later this summer as part of the 10 GHz Cumulative Contest and it is hoped that additional stations may be operative by then. Kees PAOKKZ/VE3 in Ottawa has been working on his own homebrew design for some time and is not too far from being ready to go. He has come up with a phase-locked-loop design for the conversion oscillator which will allow him to tune anywhere in the 10 to 10.5 GHz range. The commercial units are limited to the 4 MHz tuning range of the 2-metre units used to drive them, starting at 10,368 MHz.

Incidentally, we encountered about plus/minus 200 Hz short-term drift in frequency during the contact. This may not sound that good until it is pointed out that this corresponds to about a 2 Hz change in the fundamental frequency of the conversion oscillator, operating at 106.5 MHz, not allowing for any drift in the 2-metre unit. This is a short-term stability of two parts in 100 million, not too shabby at all!

We would be interested to learn of any prior SSB activity which may have taken place in this band in Canada. In any case, we have some distance to go to equal our cousins to the south; it has just been announced that American west-coast Amateurs have completed a 47 GHz SSB contact, probably a world record for highest frequency of SSB operation, Amateur or otherwise. My congratulations to these pioneers. ■

Don Jarvis VE2DWG



CONTEST (cont'd)

occasional score flirting with the 3 million mark. This means that if you are intent on winning the phone single operator competition, you are going to need somewhere in the neighbourhood of 2000 to 2500 QSOs.

Multi-single scores were generally quite close to the single operator scores up until 1980. At that point, the multi-single scores jump way out in front of the single operator. I am not entirely clear as to the cause of this, although I have some ideas. In any case, recent multi-single scores have been fairly consistently in the 5M range. We could call 1980 the birth of serious multi-single competition in Canada.

On CW, the case is a little different. Top single operator scores are clearly less than the top phone scores,

usually being in the vicinity of 1.5M. The upward trend seems a bit more marked than on phone, with smaller variations in the score from year to year.

Multi-single scores on CW have stayed close to the single operator scores. We do not see the break in scores that we see in 1980 on phone. Perhaps the fact that there has been relatively little competition in CW multi-single has something to do with this.

Well, I could do a more detailed analysis of all of this, but I think I'll just leave it for you to ponder over. Myself, I'm off for another session with my analyst. He wants to do some electroshock treatment. I've tried to explain to him that after getting used to RF burns, electroshock isn't going to do any good, but I can't seem to make him understand. ■

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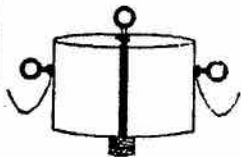
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The Barrhaven EMI Survey

THE RADIO ENVIRONMENT

Barrhaven is a development in the southern area of the City of Nepean. One feature we can claim is the number of locally licensed high power transmitters. Within 300 metres east of the nearest residential street, we have a 50 kW broadcast station and antenna array. One kilometre to the south of the development we have three short-wave transmitters belonging to the National Research Council. These transmitters operate with various power levels between 7 and 20 kW into very modest single structure ground planes. The NRC transmitters have been located here for over 25 years which makes the site older than the community, by some 2-3 years.

To the west of Barrhaven another five-element broadcast antenna array and transmitter area located about two kilometres from the nearest residence. The area to the west is currently a mushrooming building expansion. Five km to the south, a 50 kW transmitter and antenna array complete the local radio environment.

THE TELEPHONE BLUES

Having moved here 20 years ago, one soon learned to become accustomed to such things as one-second time ticks heard on one's stereo equipment or even a vacant TV channel. The advent of new low-cost modular telephones soon gave us an appreciation of talking 'through' local music accompanied by time signals, when making a phone call. The lack of interference rejection in one popular phone was so great, when a local broadcast station quintupled its power, it necessitated replacement of whole blocks of this type of modular phone. It was done in a most responsible fashion, but only after resident complaints. How many residential complaints of malfunctioning telephones, received during this period is something known only by the Telephone Company. Even the local DOC office received calls from the Telephone Company reporting incidents of this type, with a request for help! Again, no record of the incidence.

Certainly, some minimum shielding or rejection against undesired effects with electronic devices such as these should be mandatory. Just how much rejection

is needed has taken the designers 15 years to comprehend. One cannot always assume radio transmitters will be sited so remote from the radio sensitive devices that no interaction takes place. Responsible modern design engineering must acknowledge EMC as a technical reality. To do less is gross technical negligence. Recently, there has been an indication that the effect has been 'acknowledged.'

MANDATE OF THE RADIO ACT

The Department of Communications has a mandate to regulate radio-communications; however, it has no clear mandate to regulate the effects of any other devices, including control equipment, which may malfunction when exposed to electromagnetic radiation. Statistics of radio interference in the use of the spectrum for communications purposes are regularly kept by DOC, but those related to what may be collectively called 'susceptibility' do not appear to be recorded. There is some reason to believe some statistics may actually be buried in the DOC computer, but no one knows how to retrieve the information. There is almost a paranoia that a manufacturer's name may be publicly associated with a real live case involving an EMC problem.

There have been many cases reported of electronic appliances/control equipment malfunctioning in the proximity of transmitters. Many cases involve potential property loss and threat to life combined with an element of inconvenience. The resolution of the problem is compounded by lack of knowledge by service personnel, manufacturers and records of incidence of occurrence. The general public is frequently unaware they are experiencing the problem and when brought to their attention finds no one to respond to their dilemma. Where would you go if you had such a problem? I have personally investigated two cases of EMI where contacted service personnel proceeded to enter the complainant's home, opened the patio doors and pointed to the nearest Amateur Radio antenna and stated emphatically, "There's your problem." What recourse of defence does any licensed owner have under such an allegation? (Author's note: In

one of these instances the TV set had just been serviced; however, the service company had not eliminated the internal fault in the TV—the Amateur was blamed. The complainant sought and obtained retribution from a somewhat embarrassed dealer.)

Radio Amateurs have tended to move to new developments as subdivisions have opened, in concert with the general population. It is because of their immersion in urban environments and their consequent proximity to neighbours that they have experienced more problems related to susceptibility than most spectrum users. They have consequently contributed more to the art of resolving such conflicts than any other spectrum user. There have been very few technically unexplained cases of susceptibility which Radio Amateurs and the complainant have not successfully resolved. The irony, of course, is who is responsible and who pays for corrective action?

PASSING THE BUCK

Responsibility for these devices which should not respond to the spectrum lies with no one group. There are no test limits to meet and there has been no burning quest to develop measurement techniques which provide consistent repeatable measurements. At least, the techniques have existed, for several years, right in our own National Research Council but, a voluntary EMC standard with no strings attached gets just this kind of result. It is a 40 year old problem which has literally begged for an answer. As a simplification, the spectrum managers can say they have no mandate to regulate the problem in the first place, but what is their mandate to ensure responsible spectrum sharing.

In 1977 a group called the Canadian Radio Technical Planning Board raised the issue of incidence of lack of immunity or its alter ego susceptibility. Concrete proposals were made to develop all the controls necessary to minimize the effects which were happening to commercial users as well as all licensed services (including the Armed Forces). An Advisory Bulletin entitled EMCAB-1, Issue 1 was issued by DOC and subsequently 5000 copies distributed

to industry. One manufacturer sent copies to every subsidiary around the world that was engaged in manufacturing. Concern for the problem must have caused it to abate but five years later a technically updated document, EMCAB-1, Issue 2 emerged. This Electromagnetic Compatibility Bulletin covered exactly the problem. It defined it, it described it and even contained a list of 28 appliances which could malfunction in the currently defined electromagnetic environment of 1983.

INCIDENCE

In 1970, there were over 15,000 cases of what can be classed as EMI across Canada, from Radio Amateurs alone. By 1975, these had grown to 30,000. It is difficult to believe the problem simply does not exist because it is not recorded or discussed. If there is no mandate for interest then there never will be a reason to discuss it as a problem. The bright side of these rather dull facts is that very, very few Radio Amateurs cause local problems. We've had to solve our own problems of compatibility and up to this point have been the first to admit some problems will never be solved. In spite of all the foregoing, some communities do have a serious problem with EMI.

Barrhaven is somewhat uniquely situated, but so is Richmond Hill and Aurora, and how many other communities is anyone's guess. The only practical way to obtain meaningful statistics is to go to a community where these problems are known to exist and take a survey of those people affected. The recorded results are not hearsay or conjecture or a figment of anyone's imagination — they are real.

The survey asked what devices were affected. What was the country of manufacture? What is your address? Statistically there were no surprises. The first paragraph tells you something about the radio environment in the Barrhaven subdivision of Nepean. While there were over 50 telephoned responses to the survey, the conclusions may interest readers. They are appended for your perusal.

One lesson learned was that discussion of the mechanism of the cause and effect of the problem and a simple test to determine whether a practical solution exists sometimes solicits very useful information as well as desirable cooperation which may well enable one to resolve the annoyance to the owner's satisfaction. Can you imagine your reaction to not being able to use your VCR or that

new clock radio you got for Christmas. Some owners had to rotate their TV sets through 90 degrees to effect minimal interference — then viewing was just passable.

A COMMON PROBLEM

Barrhaven is blessed with an approachable, interested, and active Community Association and it was by their request that a presentation on EMI/EMC and its effects was made at one of their Board meetings. The positive response was something that was most gratifying. From a show of hands around the table, 13 out of 14 members had been experiencing appliance related EMI, and never knew it. Their cooperation in helping conduct the survey was exemplary and the conception of being an Amateur-Radio-only related problem was placed in perspective. It was fortunate an executive member of the survey team had previous experience with EMI, in the U.K. Amateur groups may need to make this approach more often if we need to plead our case, with any sense of fairness or lack of legal protection. It would make so much sense that a limited preemption from problems of EMI be given licensed transmitter owners, similar to that provided in the United States. Preemption would be worthwhile pursuing and would give us the legal recourse we may need to survive as an Amateur Experimental Service.

Postscript— Two manufacturers of commercial products when contacted have indicated a hidden bonus in adding EMI protection to their products— the mean time between failure (M.T.B.F.) has improved by 30% and added cost has been negligible when incorporated at the design stage. What more could you ask for?

FINDINGS: BARRHAVEN SURVEY, APRIL 6, 1987

1. There were 53 telephoned responses to the survey.
2. From the total there were 48 complaints of audio rectification on Bell-supplied phones.
3. There were 15 complaints of audio rectification occurring in telephones of foreign manufacture.
4. There were six complaints of domestic clock radio audio rectification.
5. There were four complaints of automobile radio detuning and audio rectification.
6. There were ten complaints of interference on VCRs, in playback mode.
7. There were ten complaints of visual interference to television receivers.
8. There were four cassette recorders which suffer audio rectification.
9. There were 16 stereo receiver/hi-fi combinations which had objection-

able audio rectification or suffered swamping.

10. There were two computer modems and two intercoms that were completely useless. One intercom was located 2 km from the offending source.
11. Ground fault isolators were completely useless in one location.
12. Garage door opener light intermittently lit.
13. Two Nursery monitor systems malfunctioned to point of inoperation.
14. Musical instruments, video tuner, telephone answering service all malfunctioned or were reported to be useless.
15. One electrical kitchen fan appeared to rectify a local transmitter and speech as well as music was audible.
16. Telephones on second floors were in most instances useless because of increased interfering level from longer wire drops. Calls would regularly misdial from these locations and represent a security hazard.
17. One homeowner stated he had spent \$250 on repairs to his new VCR in an attempt to reject a local radio station. The dealer replaced all the mechanical motors, etc. After this the dealer explained he didn't think there was a cure because he lived in Barrhaven too and had the same problem!
18. Most homeowners were aware they had a problem when they moved here, but no one told them electronic appliances would malfunction when in proximity to a radio transmitter.
19. Some homeowners had reported the incidence of susceptible appliances to Department of Communications and had received a brochure in the mail. To most, the brochure detailed procedures relating to their appliance, but they were not capable of understanding what was technically meant.
20. Most homeowners were aware of many other neighbours who had similar experience to their own, but for one reason or another had not responded to the survey.
21. In several cases Bell Canada had responded to apply suppression devices on phones and in many cases this had been a successful resolution of the problem.
22. In many cases the local radio station had responded by supplying suppression devices and these too had proven adequate. It should be noted the statistics gathered did not include those appliances so suppressed.
23. Several respondents expressed surprise to learn there were no mandatory standards to ensure a

Continued on next page ▶

From the Clubs...

George Morgan VE3JQW
687 Fielding Dr.
Ottawa K1V 7G6

ROCKY MOUNTAIN RALLY

Hermann Booth VE6CBL writes in the Calgary ARA's *Key Klix*, "...The Rocky Mountain Rally in the Pincher Creek area was a huge success this year, with 20 hams participating from Calgary and 12 from the Lethbridge area. Many of the Calgary hams invited their wives to come along for a fun weekend, and I haven't talked to anyone yet who did not have a good time. As a matter of fact, we have already written down some bookings for next year's rally. There were some communications problems: both repeaters in the area were not workable because of the terrain, but a simplex channel pulled us through and everything went pretty well according to plan. Cal VE6LZ and I would hereby like to thank everybody who participated for a great job, and we hope to see you all next year for an even better rally."

CONGRATS TO VAN ISLE

My thanks to the Victoria Short Wave Club' *Zero Beat* for the following:

"If you didn't read it in the *Times-Colonist* maybe you should read it in *Zero Beat* (see below) and give the Van Isle ARC a big round of applause. Art Jackson VE7FED has worked hard for the QA Hospital and, as you know, he has a personal reason for providing this service to the patients therein. Any licensed Amateur is invited to come down to the 'Ham Shack' at the QA Solarium on Tuesdays at 7 p.m. and show the patients how to operate this modern station."

The following is the newspaper article referred to above:

Handicapped teenagers living in Queen Alexandria Hospital's Anscomb House have been given a

permanent link to the world courtesy the Van Isle Amateur Radio Club.

The ham radio club, with the aid of volunteer radio enthusiasts, erected a 12-metre tower and antenna for the group home residents Saturday, enabling them to talk around the globe.

"We'd been operating about a year with temporary equipment and our trailer," club president Art Jackson said. "The kids have shown an interest for over a year so we thought we'd spring for the money and buy an antenna."

The next step, Jackson said, is to train those interested for their Federal Department of Communications (DOC) licence. Until then they can only operate under the supervision of a licence holder.

The nice thing is, it's a link where people on the other end don't know they're handicapped unless they choose to tell them... Last year they were talking to a guy in Vancouver for about 10 minutes before he said he was blind. They were astounded he could operate the equipment," Jackson said.

For hams wanting to say hello, the station's call letters are VE7GCW.

AND IN KINGSTON..

According to the Quinte ARC's Newsletter:

"... Station VE3SMH is at St. Mary's Hospital in Kingston. The funding for this station came from the federal New Horizons program. Bert Hovey VE3EW directed the project at the beginning and it went on the air in 1979. At present, the Kingston ARC maintains the station with financial backing from the hospital. Gary Penwarden VE3HWS, who has made the station a major interest since it began operating, is the station manager.

"The hospital has established an award to recognize the long and dedicated volunteer service that people render to it, and Gary, with well over 2000 hours of service over seven years, is on the plaque in the entrance lobby of the hospital along with the other people honoured. It should be noted that an important service that Gary and VE3SMH perform is to pass traffic on behalf of people who are in the hospital. This service has proved to be a great morale booster, and helps speed the recovery of the patients."

According to the Burnaby ARC's *Burnaby Connection*, Sunday, April 26, was a beautiful sunny morning, just perfect for the annual Vancouver

Sun Run. Club members were at their designated positions at strategic locations along the 10 km course by 7:30 a.m., the run started at 8:30 a.m., and the first runner crossed the finish line in a record time of about 28 minutes.

Besides all the traditional runners in their shorts, T-shirts and running shoes, there were five or six wheelchair participants, one on ski-wheels, one group pushing a bed, and another group that formed a centipede. There were also three dogs.

Radio communications went very well, keeping the officials, police and medical personnel up-to-date on the progress of the runners, as well as anyone in difficulty.

Congratulations on a job well done to Lou VE7CGE and his team. ■

BVARC CERTIFICATE

20th Anniversary Award Certificate, Beaver Valley Amateur Radio Club VE7 BW1, QTH Trail, Rossland, Salmo, Fruitvale, Montrose, Castlegar, Genelle 49° N Latitude 117° W Longitude.

Ham Radio Amateurs outside the club must contact two members of the BVARC on HF or VHF via satellite in order to acquire the 20th Anniversary Award Certificate (8½x11 parchment paper).

The time limit to earn a certificate is July 1, 1987 to July 1, 1988.

Proof of two BVARC contacts and one dollar to partly cover the costs, must be sent to the secretary: R.W. Briggeman VE7ETR, Secretary, 3659 Cottonwood Drive, Trail, B.C. V1R 2S4

HOW IT WAS!

Return signals are only possible with a return circuit through the earth, according to expert, Michael Pukin. "Every now and then we are told that wireless signals may someday be sent to Mars. These suggestions are unscientific for the simple reason that we cannot get a ground to Mars, and, therefore cannot take it into close partnership with our Hertzian oscillations. Without that partnership, there is no possibility of covering long distances." —*Radio Doings*, July 19, 1925.

tnx UPDATE

CROSSWAVES (cont'd)

minimal freedom from the effects of licensed transmitting facilities.

24. Most complaints occur and are most severe within a radius of 1-2 km from local broadcast facilities.

25. While this survey was conducted because of complaints within the Community, it was also conducted as a service to the Community. It is significant to note that NO other transmitter owner, other than the five high-power broadcast facilities was a contributor to the above statistics.

26. The most prominent countries of manufacture concerned with products surveyed were from: Korea, Hong Kong, Japan, Singapore and Taiwan. ■



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QRP

Moe Lynn VE6BLY
10644-146 St.
Edmonton, Alta. T5N 3A7

More on an international flavour this month, having received two despatches from Australia.

First was a complete set of drawings, pictures and text from Drew VK3XU all about his DC86-Direct Conversion receiver ideal for QRP portable or standby. Photos included actual size PCBs which down under are referred to as Printed Wiring Boards. Construction is not for the faint of heart nor, as Drew pointed out in his article, is it a Mickey Mouse project. Great care was taken in the design to eliminate overloading from strong signals; no pulling of the VFO, selectivity equal to some present-day commercial rigs as well as sensitivity being .4 microvolts. Drew also include a troubleshooting guide showing typical voltages on both AF filter/output amp/S meter amp and RF amp/VFO/Product det. schematics. Even his power supply design has typical voltages marked on the schematic. Parts list of 88 capacitors, 88 resistors, 13 ICs, 11 diodes, 7 transistors, 5 toroids, 2 PWBs and a cabinet all confirm the magnitude of this undertaking. Drew also offered any reasonable amount of help if anyone built the DC86 and were unable to locate a problem. His article states a kit of parts including PWBs is \$95 VK, or 'Bare-Bones'—PWBs, toroids, and all semiconductors is \$52 VK. Order from Ian J. Truscott's Electronic World, 30 Lacey Street, Croydon, Vic 3136 Australia. VK3XU sent his permission for reprinting so anyone that feels it could be worthwhile are encouraged to write CARF or the Editor, stating your views. If ordering the kit direct just mention you saw it in *The Canadian Amateur* first.

PACKET QRP

The second despatch from VK was the Australian Amateur Packet Radio Association C64 package for packet radio on a 1541 disk. This could prove to be an interesting QRP aspect of operating. Barry VK2AAB and the AAPRA have done a lot of work on the C64 package as they call it. Mine was received with specs for VHF band operating, but is now modified for HF and performed quite admirably after incorporating a modification by Nat VK2OP presented in their newsletter *Digipeat*. Tony VE6ABR tells me while visiting Jo VK2KAA who is AAPRA sec/treas that she mentioned mine was the first package sent to Western Canada. He is interested in the end result while keeping an eye out for a C64 to run it on. Maybe this package can be combined with these other CW,

AMTOR, RTTY projects around there if switching in between these homebrew units is not too complicated to figure out.

"CONNECTED TO: VE7EHL was my first QSO and it was certainly strange after calling him to see "Connected to VE7EHL the, "Hello Moe your ok but tones raspy for some reason." He faded out along with all the other signals on the band that evening and we had an inch of rain pour down in less than ten minutes. As for the raspy tones it turned out my TNC had a band timing capacitor across the VCO section of the XR2206 IC. Back to testing on the air again and the PTT TTL transistor a 2N2222 had an open base/emitter junction. With these repairs carried out it was back to testing on the air when the disk decided to quit cooperating. It was returned for replacement and an upgraded disk also ordered. Research is progressing toward including a DCD (data carrier detect) indicator either visual or audible/visual while awaiting arrival of the new disks.

GLEANINGS

Once again we hear promises of reverting to QRP, this time John W6MKK gave me 589 for 6W one afternoon on 14060 with his 100W registering S4 on my meter. Summer activities are biting in to 'on the air' time and no reports by mail have left me without words. A reply enquiry from Bill VE3KHB postmarked June 22 was received June 25. Another, giving me details of NWT & YRS Reunion '87 in early September from Vince VE2HBQ postmarked July 5 was received here July 7, too late for planning a trip of that distance. Other letters not of an Amateur nature were equally as expedient during the recent mail disruption.

From Bob NM7M another two pager advising his intentions of doing a two part article for ARCI *Quarterly* on available propagation programs both commercial and public domain. His wife Mary Lou NM7N had 76 countries toward the DXCC Golden Jubilee Award doing it all QRP. Bob also advised that Henry NU4H will soon be sending me the super propagation program for my C128 mentioned in the June QRP column. Jack VE6BOX tells me everyone is enjoying their new 2 metre repeaters which favour the resort areas around Edmonton.

NET NEWS

Rick WL7BDK was the only station reporting in on the VE QRP net these

past few Sundays. Must be all are otherwise occupied what with the nice warm weather we have had this summer. Des, which is short for Desmond VE3ABT hasn't been heard from in quite a while, was called Les in the June issue for which I apologize. See you on 3560, 7030, 10106, 21060 or 28060 and don't forget 14060 Sunday at 1900 UTC if you are near the rig.

Other QRP QRG are VK 1815, 3530, 7025, 14050, 21130, 28125. G same as VE. W is similar except 7040. Actually QRP is useful anywhere on the band, is contagious, prolongs longevity, does not disrupt your neighbours, besides being a LOT OF FUN!

CONTEST RESULTS

Last item received in the mail was the Spring 1987 QRP ARCI QSO Party Standings which was postmarked PM June 20 in the Eastern states and received here PM July 13. So it just goes to show there is no point in praising the postal service only to have it undone with a delivery like this. Needless to say the top ten did not include anyone outside of the continental United States which results will be well publicized in other Amateur organs.

Canadian participants were few and far between, but one outstanding score was that of Dennis VE3DRB with 180,744 total points using 1.8 watts on three bands, a homebrew rig and ground plain antenna. Next was Peter VE5VA with 138,800 points using one watt on a single band. Thomas VE3KKO was third with 101,724 points using 3.5 watts on two bands. David VE3OOL 73,476; Bill VE3EFC 17,424; Rick VE1NH 35,568; Bill VE3EFC 17,424 using a battery; Moe VE6BLY 3,910; Peter VE7EKS 3,300. Other North America: Jake XE2IOF 120,400; Art XE2VKR 80,934. Outside North America: Peter OK1DKW 40,800; Peter G3XJS 4,554; G4EBO 1,584; Robert G4JFN 1,1554; Masaki JH4UYB 40 points using 5 watts on one band with a TS930S and Yagi antenna. According to the rules, any call area with only one entrant does not qualify for even an honorable mention when it is a single entry. ■

MOVING?

If you're moving, please let Debbie know your new address. Write her at P.O. Box 356, Kingston, Ont. K7L 4W2.

Art Blick VE3AHU
P.O. Box 356,
Kingston, Ont. K7L 4W2

THE COLUMN

Important aspects of your national Federation are its organization, administration and finances. CARF is organized so that the Full members—those that possess a Canadian Amateurs, or higher grade, Certificate of Proficiency in Radio—have effective control of the policies and management of the corporation. As it is impracticable to consult every member every time a change in policy or management is felt to be required, membership control is effected by having the Full members nominate and elect six Regional Directors to speak for them. These Directors form the Board of Directors with the responsibility to make policy decisions and to exercise overall management of CARF affairs.

The Board of Directors meets annually, usually during May or June immediately after the conclusion of the Annual General Meeting (AGM), and elects the Officers who are responsible to the Board for managing day-to-day affairs. The Officers consist of the President, Vice President(s), General Manager, Treasurer and Secretary who, together with the Immediate Past President, form the National Executive and hold meetings every quarter between AGMs.

The President is the titular head of CARF, Chairman of the Board and chief Executive Officer; the General

Manager is the chief Administrative Officer; the Treasurer is the chief Financial Officer and all three Officers are directly responsible to the Board for decisions made and action taken in their respective areas. This means that CARF cannot become a 'one-person organization', for virtually every decision and/or action requires some measure of executive, administrative and financial involvement and ensures that consultation between these Officers occurs before decisions take place. The key is that the GM and Treasurer are responsible to the Board and not to the President.

There is a Senior Vice President who can, in the inability or absence of the President, perform the functions of that office. Other VPs may be elected by the Board to perform special functions, such as was done in 1986 when the author was elected to work with a CRRL official to make a comprehensive Review of CARF and CRRL to determine if a merger between the two organizations was practical and possible.

The Secretary is responsible for the handling of official correspondence, the giving of required Notices, the keeping of Minutes of meetings and is the custodian of the official Seal of the corporation and official records. The Immediate Past President functions principally as an advisor to the National Executive.

An important part of the organization is the committee structure with each committee chairperson appointed by the Board. The Board also approves the guidelines under which the work of the committee is performed and gives the chairperson the power to act and to add committee members. A listing of the committees, and their chairperson, as given on page 2 of each issue of *The Canadian Amateur*. As a matter of interest, the first committee of the Federation was the DOC Liaison committee, formed in 1968 under the chair of the late Jim Strain.

Also on page 2 will be found a listing of the Assistant Regional Directors. These officials are appointed by the appropriate Regional Director to assist the Director in the performance of the responsibilities of his/her office and also serve as a pool of officials to be appointed, or elected, to national positions—Directors, Officers and Committee Chairpersons. Note that, for 1987/88, former Assistant Regional Directors Pierre Mainville VE3LPM and J.F. Hopwood VE7AHB

will fill the positions of Ontario and Pacific Directors.

A vital part of your Federation is the Head Office located in the Stella Buck building of the J.K. Tett Memorial Complex, 370 King St. W., Kingston, Ont. The Head office functions under the overall management of the General Manager and under the direction of the Office Manager, Debbie Norman, with a present staff of one other employee. The Office also serves CARF Publications Ltd. and, each working day, clears the mail from Box 356, sorts same for action or forwarding, enters all monies received in the appropriate Daily Cash Book, updates membership records, forwards items ordered and answers any correspondence dealing with the work of the Office. The Office is responsible for producing the mailing labels for each issue of *The Canadian Amateur*, for the deposit of monies received in the bank, for the production, and forwarding to the Treasurer, of a weekly recap of finances received and deposited, for the production and mailing of invoices, and more.

Your Federation is primarily financed from membership dues received, with lesser amounts obtained through the sale of CARF Publications and from interest received on funds invested. The major expense is the production and forwarding of the national publication done under a contract with CARF Publications Ltd. The costs of administration, and expenses incurred by CARF officials and committees in the performance of their duties, are other major expenses. An annual budget is prepared by the Treasurer and General Manager, approved by the Board, and, unless unforeseen and untoward expenses occur, all disbursements are made according to the financial figures given in this document. CARF is incorporated as a non-profit organization and, fortunately (or unfortunately) has always met this stipulation with any profit made (such as from Life membership dues received and sale of publications) turned into investments that function as a Reserve Fund.

The above is a brief outline of how CARF is organized, administered and financed, in order to perform its function as a national society. Further information on particular aspects of organization, administration and financing of the Federation can be obtained by contacting your Regional Director. ■

VE1 MUF

The MUF Contest Group, made up of Amateurs from the Fredericton, New Brunswick area, recently installed a 10 metre propagation beacon. Using the callsign VE1MUF, the beacon operates on 28.282 MHz, with a power output of 500 mW. The transmitter is located in Keswick Ridge, N.B. (Grid Square FN 65 NX). Reception reports welcome. Please QSL via the bureau, or c/o Greg Gilmore, VE1XH, Crocks Point Road, Keswick Ridge, N.B. EOH 1N0.

WEST COAST MONITORING STATIONS

DOC Monitoring Station (during office hours), P.O. Box 3396, 3884 192nd Street, Langley, B.C. V3A 4R7. Tel: (604) 576-8691.

FCC Monitoring Station (24 hours a day), P.O. Box 1125, Ferndale, Washington. 98248 Tel: (206) 354-4892.

Delayed Braking for Ham Series Rotors

BY BILL FRETWELL VE3CCT

After watching my antenna come to a shuddering halt every time the rotor was used, I decided to devise a method for delaying the braking of the rotor.

Without taking up space going into the mechanical details of the various Ham rotators, let us proceed with this modification to the control box. Very clear pictorial views of the control unit are featured in the December, 1985 issue of *73 Magazine*.

All components are installed under the chassis rear area. Any layout is acceptable. I left one end of the chassis rear apron clear for installation of a Cinch-Jones type of 8 pin connector to ease connecting and disconnecting of the rotor cable.

A separate power supply must be added to provide power for the delay control relay and timing capacitor. Two methods have been tried, one a full-wave bridge and one using a double. These alternatives are only mentioned because availability of a suitable transformer will dictate the method to use. The end result is to have 20 to 24 volts at 300 mA.

The delay indicating pilot lamp, although not a necessity, does indicate when brake locking occurs. In two control boxes, delays of 3.5 and 5 seconds were easily obtained. This seems to be sufficient time to allow the rotor to come to a complete stop before the brake engages.

After collecting the parts required, this project can be completed in about three hours. When using a chassis punch for the pilot lamp hole, it is convenient to remove the control paddle levers to gain access and manoeuvrability. Make the cut from the hole by starting from the front towards the back. This allows the aluminum to be cut before the steel.

PROCEDURES

Remove the meter and drill holes for the additional parts. Remove the paddles as previously mentioned. I located the pilot lamp below the brake release paddle. Mount the pilot lamp. Remove the original wires from the brake paddle microswitch and the

wire that goes to the top of the power transformer. This wire will go to one of the open control relay contacts. The other side of the above switch contact will go to the cold end of the power switch. Finally, connect the pilot lamp using the remaining relay contacts and complete other wiring as shown in the accompanying schematic. Reinstall the meter and the modification should be complete.

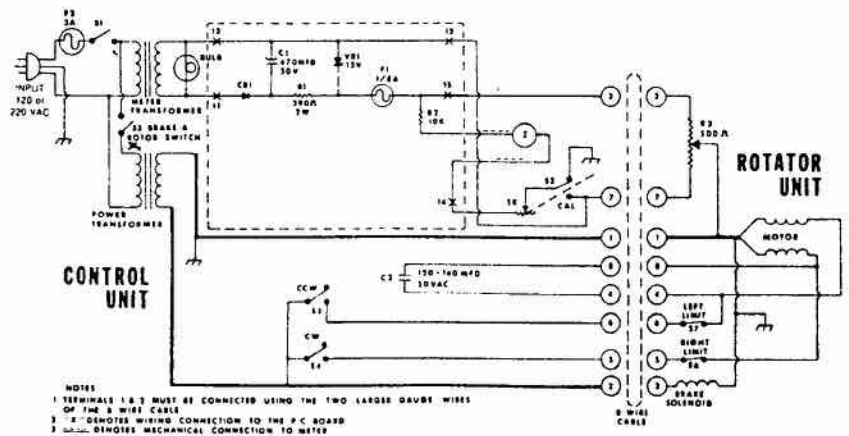
Test the unit and measure the delay. If the required 3 to 5 second delay does not result, experiment with

different values of timing capacitors. Usually addition or deletion of 500 MFD will provide the proper delay.

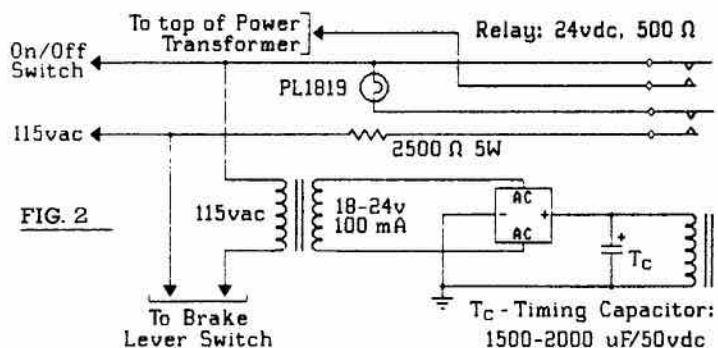
PARTS REQUIRED

- Transformer, Radio Shack 273-1385 or 273-1386.
- Pilot lamp and holder
- Bridge rectifier, Radio Shack 276-1161, 1A at 50 volts.
- Timing capacitor, 1500 MFD at 50 volts, 272-1048
- Resistor, 2500 ohm at 5 watts.
- Relay, DPST, normally open contacts, 500 to 600 ohm coil.

FIG. 1— ORIGINAL CIRCUIT DIAGRAM



NOTES:
 1. TERMINALS 1 & 3 MUST BE CONNECTED USING THE TWO LARGER GAUGE WIRES OF THE 8 WIRE CABLE.
 2. 2" DIMETER WIRING CONNECTION TO THE P.C BOARD.
 3. DANGER! MECHANICAL CONNECTION TO METER.



Microprocessors simplified

BY VIC HENDERSON
VE3FOX

I doubt that anyone reading this has never heard of a microprocessor. These wonderful little devices, the electronic equivalent of the human brain, represent the ultimate in man's efforts to pack more and more into less and less space. With microprocessors now showing up in the latest Amateur gear, it is only natural that Amateurs want to know how they work. Unfortunately, the complexity of these devices is usually reflected in the depth of the articles written about them, offering the reader a wealth of facts but still no idea of how they really work. To rectify this, I decided to write a very simplified article on microprocessors— what they are and how they work. I stress that this is to be a VERY simplified article, written only to give an appreciation of microprocessors. It won't give you a working knowledge of them. In fact, if you have ever designed with a microprocessor, I suggest that you skip to the next article, since this will probably bore you. The description to follow will be valid for any microprocessor, whether it is in a radio, home computer or an Oscar antenna tracking system.

First, a description of a microprocessor, its pins and their functions. Usually the largest device in any digital circuit, the actual microchip occupies the same space as a regular transistor, although its package is somewhat larger. A typical micro can contain the equivalent of 10,000 to 20,000 transistors. Some of the better known microprocessors are the 8080, 8085, Z80 and the 68000, to mention only a few. Refer to Fig. 1 for the following groups of pins and their description.

Power supply pins on the device usually need 5 volts and ground. Enough said about that— I told you this would be simple.

A clock pin (sometimes two) requires a square wave input from a crystal or other source. This is the 'heartbeat' of the device, making sure that all internal action proceeds in an orderly manner. The clock is similar to the Drill Sergeant, keeping everything in step.

Next we have the 'address lines'.

Most things that the micro has to 'talk' to have a unique address, to keep them all separate. To send information to such a device or read information from it, the microprocessor first sends out a coded address on the address lines and the proceeds to exchange data with that device. This is akin to a postman first reading the address on a letter destined for you and then delivering it to your house. (The microprocessor is much faster).

This exchange of information takes place over a set of 'data lines', again,

in the form of a coded message. These lines are unique, in that they can either send data out or take data in. This is known as bi-directional.

Another group of lines known as 'system control' are used to send additional info to other system components. This is not actual data, but rather a set of signals which tells about the type of operation being performed, such as reading, writing or processing interrupts.

A similar set of pins input

Continued on next page ▶

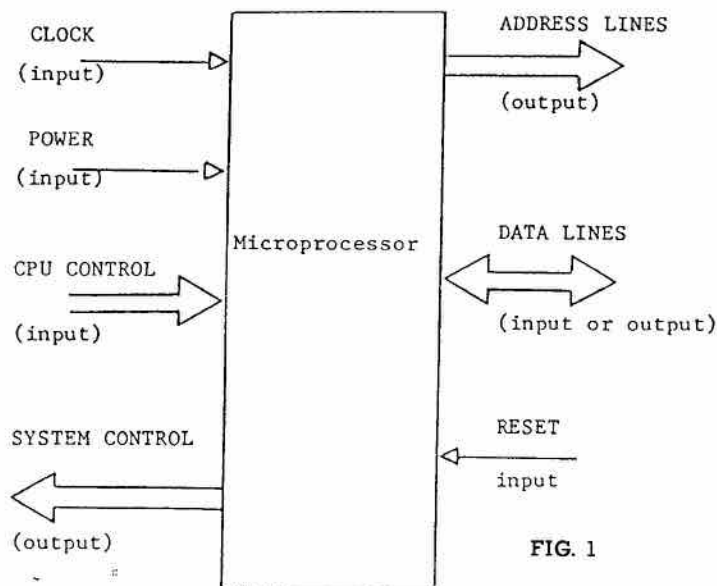


FIG. 1

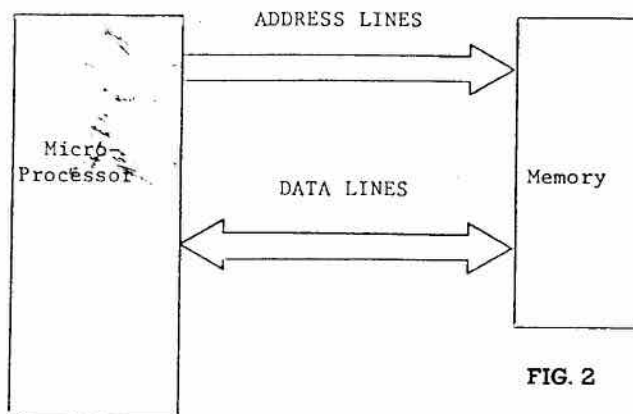


FIG. 2

information about what is happening in the system. These are known as 'CPU control' (CPU meaning Central Processor Unit) and they are used by the micro to ascertain non-data information such as whether some outside device is trying to interrupt operations or halt processing entirely. More about this later.

Last, but not least, is the reset pin. An input signal on this pin will start the microprocessor over from 'square one'. It sets all internal circuitry to a known state, ready to begin processing. On a microcomputer this is also connected to the prominent button near your keyboard (cleverly marked RESET). When all else fails, push this.

If you've stuck with me this far, you should have a pretty good idea of the various input and output signals that the micro deals with. A little like knowing the parts of an automobile engine, but not how they all function together. So, let's carry on to an equally simplified description of how it all fits together.

The most important thing to remember about a microprocessor is that it cannot do anything that it is not told to do. (We humans still have a purpose.) The data fed to the microprocessor usually comes from a memory or outside source, and the decisions it makes, based on the input

data, are made according to the microprocessors internal circuit as it was originally designed. Refer to Fig. 2 for the following.

Typical operation depends on information stored in a memory. This is known as a program. How to produce the information and put it in the memory is the subject of a much longer article, so we won't go into that now. Let's just assume that we have our program in memory, starting at address 0 (zero).

When power is first turned on, an internal signal is usually applied to the RESET line, thus initializing the microprocessor.

The first action by the micro is to send out address 0 (zero) on the address lines and then input, on the data lines, information stored at that address of the memory. This data is called a word. Here is where the microprocessor starts to make decisions. Based on the data just input the micro will either 1) stop 2) perform an internal calculation 3) output a signal to some other device in the circuit or 4) get more data. The latter case is what often happens. Because a complete instruction for the micro often involves more than one word, the micro will now increase the address by one and send this out on the address lines. It then will input the word at this memory location (address

1), make a logical decision about it, and carry on. Basically, and I mean VERY basically, that is how the entire operation will progress until the end of the program. Now, that wasn't too difficult, was it?

In practice, there are a few wrinkles to this process, which could be explained now so that you can see the micro working in a more realistic sense. Be assured that this will still not get too complicated, so read on.

Since it would be very restrictive to run a program daily once, then quit, most programs are put into a loop so that they always jump back to the start or some other place when finished. Also, because of logical decisions made while the program runs, the micro doesn't always look for memory words in a sequential fashion. It is common to jump back and forth in memory as conditions change. Not only does memory reading occur, but portions of memory can also be written to, such as when the microprocessor wants to store some information. This is like keeping a notepad.

Okay so far? We now have the microprocessor operating according to what it reads from the memory. In the real world, other information is also read by the microprocessor to determine what course of action to take. Using the same address, data and control pins, which are used to access the memory, we can also access virtually any other device. For instance, on a hand-held transceiver with a keypad input and LCD readout, the micro can read the buttons being pushed on the keypad, store the frequency in memory and write the memory back out to the readout. It will then wait for further commands. The program stored in the internal memory is what tells the micro how to do all this.

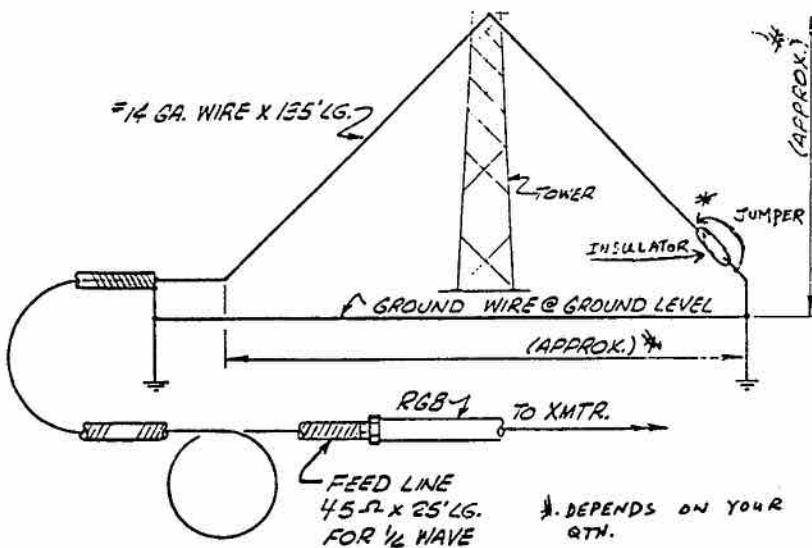
One other way to make use of the micro is with a group of lines, previously referred to as 'CPU control'. These allow an external device to signal the processor to stop what it is doing, jump to a special place in the program to service the interruption, and then return to the original program. Commonly, called 'interrupt lines', they are used for handling devices that need infrequent action.

I hope, for everyone who has persisted to this point, that you now have a better appreciation of how a microprocessor works. Each of the different types of microprocessors on the market has its own peculiarities, such as the number of pins and how they function but, once you know the basics, they apply to all microprocessors.

1/2 Delta Loop

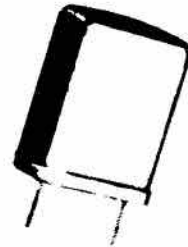
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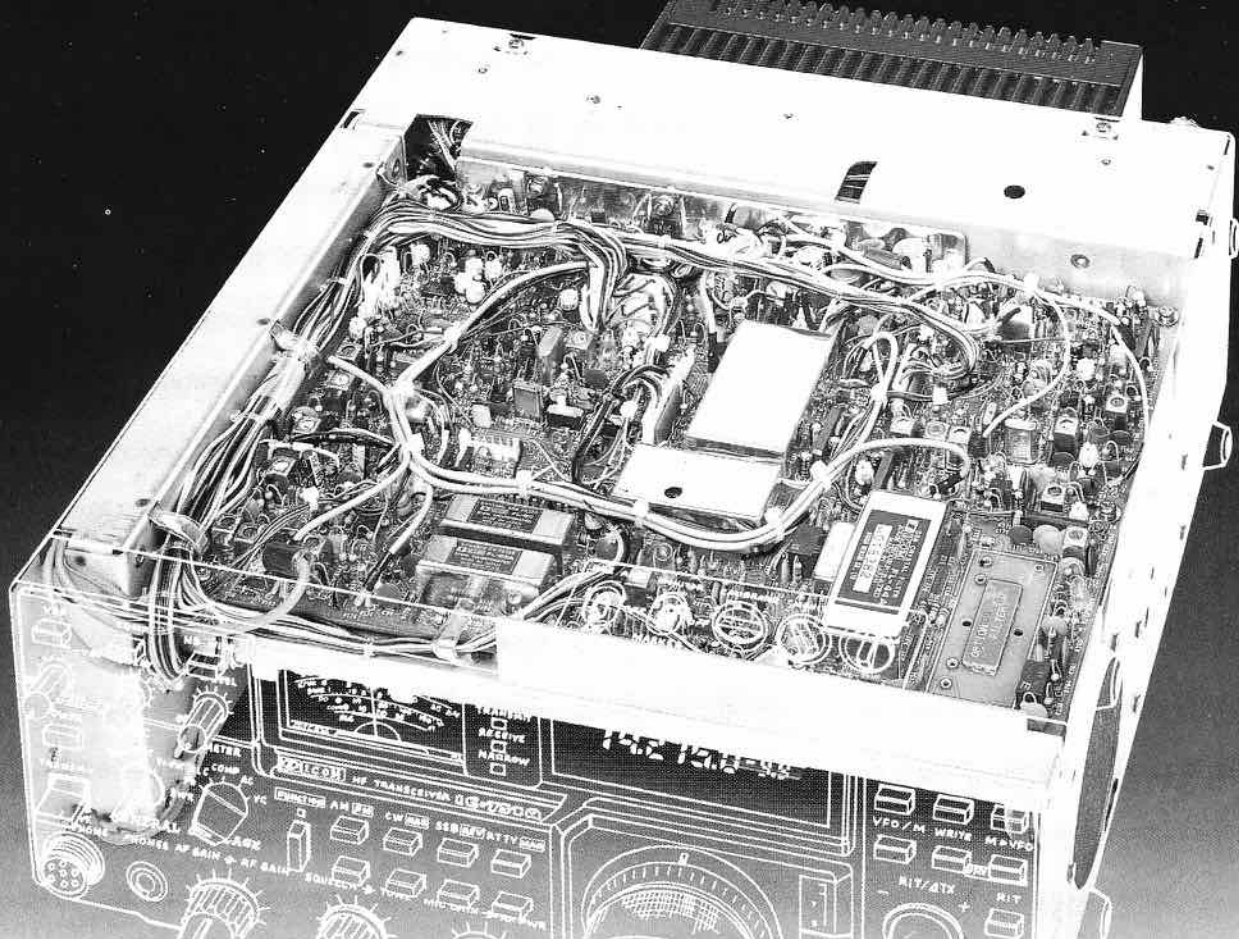
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