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The Canadian Amateur Radio Magazine

MAY
1983

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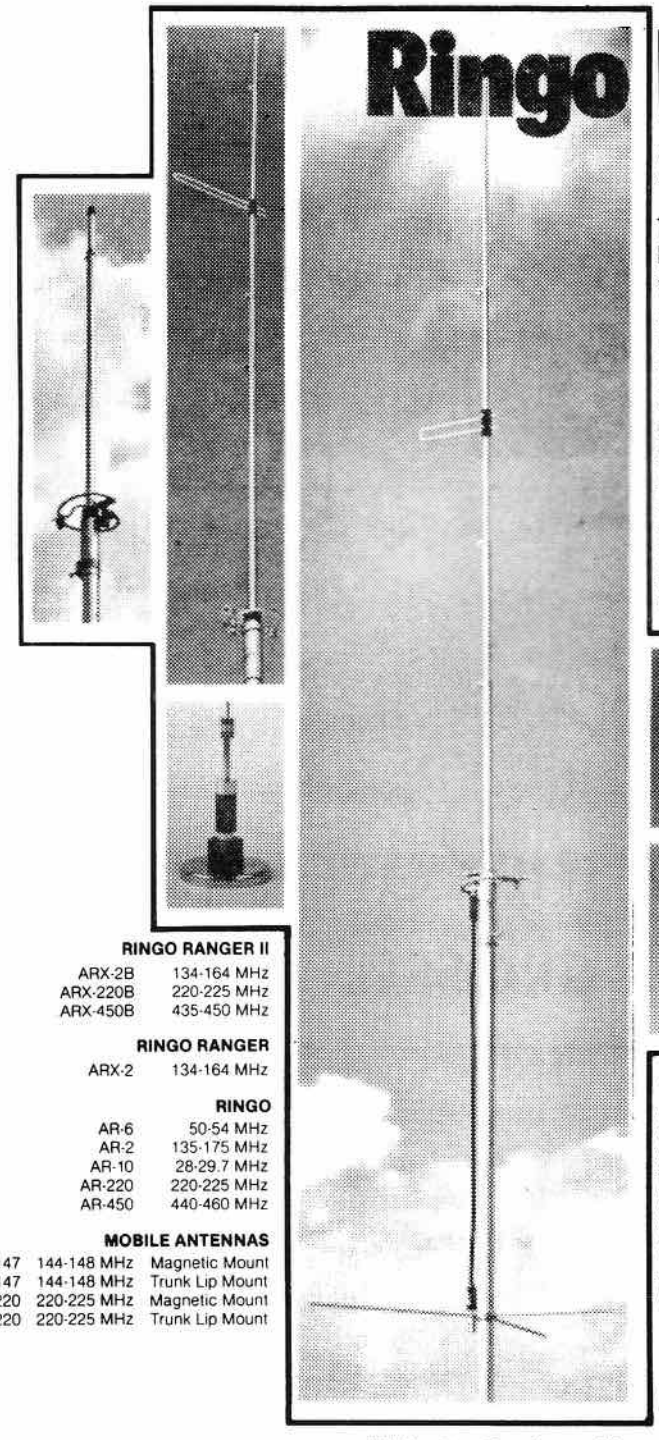

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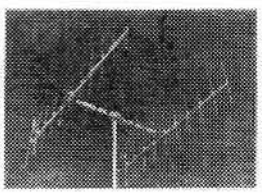

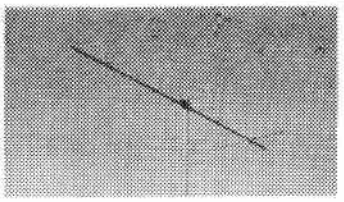

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TCA

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MAY 1983 Vol. 11 No. 5

TCA — The Canadian Amateur is published in Canada 11 times per year to provide Radio Amateurs, those interested in radio communications and electronics and the general public with information on matters related to the science of telecommunications.

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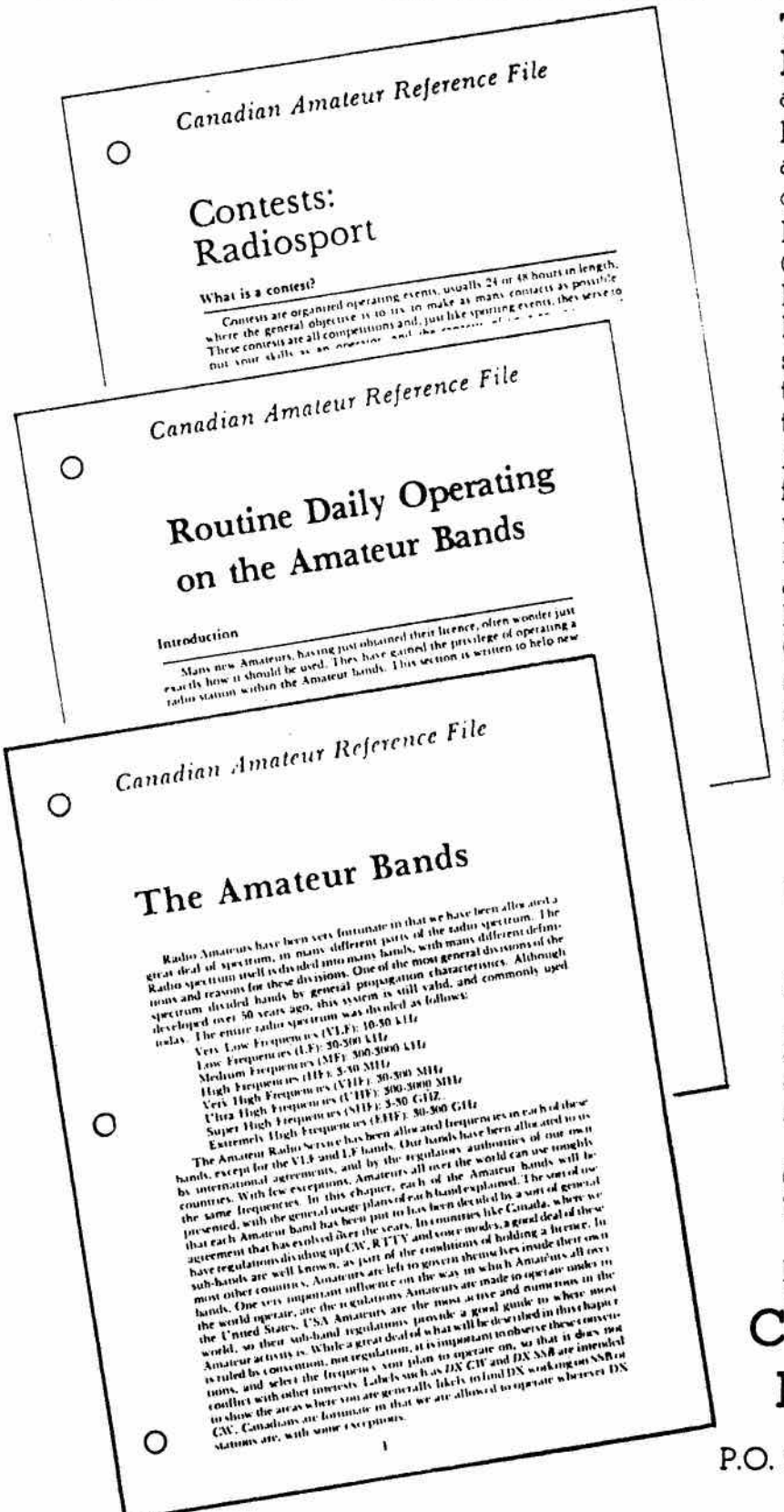
IT'S ALL HERE!



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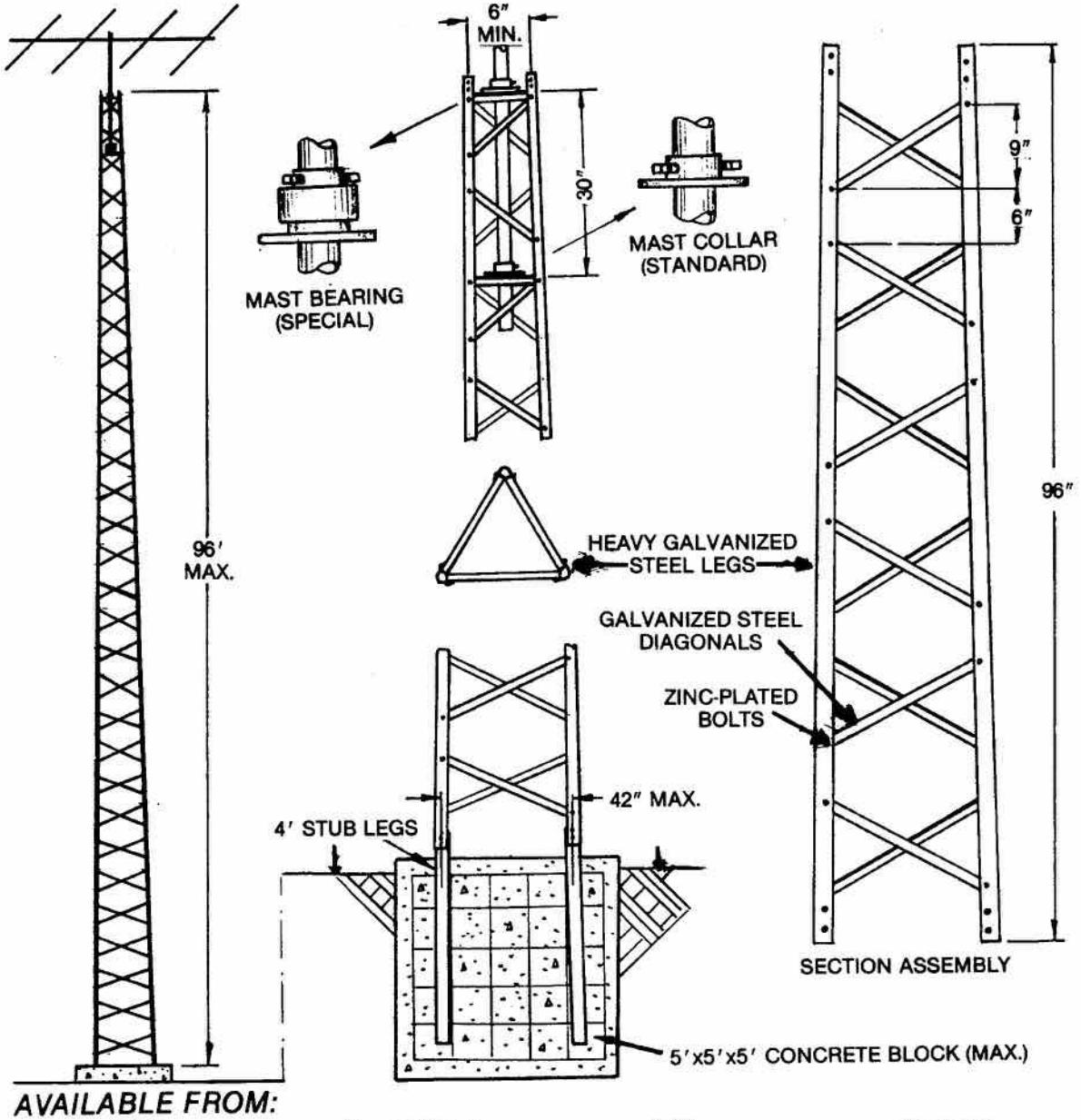

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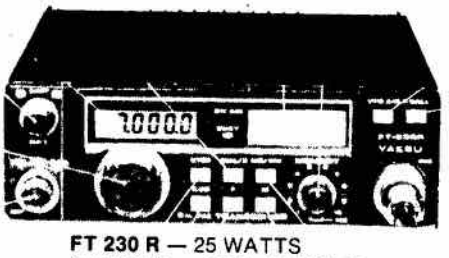

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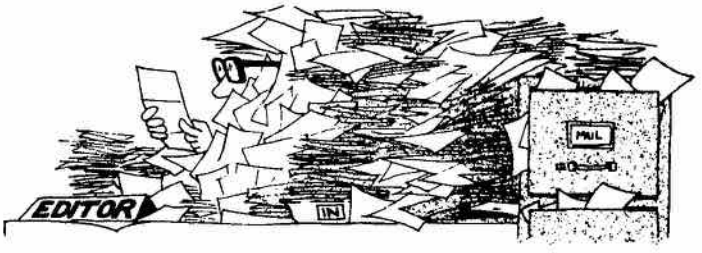

Hams across the water

Dear Editor:

I wish to take this opportunity to thank Art Stark, VE3ZS for the reviews you published in Feb. edition of my books FERRY COMMAND and NORTH ATLANTIC CAT. His remarks concerning my accuracy as to technical and operating events are really appreciated, coming from a real expert. How often have I been sailing along, deep into a book and enjoying it, when suddenly I am brought up short as if I have struck a rock when I come across a statement which is too obviously quite untrue!

By a rather strange coincidence you also have a story about Gordy Wightman, ex-VE2QU, now VE5XU. If author VE5JQ had gone back to prewar days he would find that Gordy was VE5HC in Vancouver. I QSO'd him almost 50 years ago when I was VE4PH in Edmonton. The event is mentioned on Page 97 of FERRY COMMAND.

The enclosed picture was taken at my autograph party last winter at the 245 (Air Services) branch of the Royal Canadian Legion in Dorval. From left to right. My XYL, Loretta, willing antenna experimental assistant for the past 38 years. Thain MacDowell, VE2NI, in a characteristic pose. Himself. (It is March 17th). John McGrail, VE3NQ, who flew with me over much dangerous terrain in many aircraft while we were in the Royal Air Force Ferry Command.

The odd part of our flying together was that we did not find out we were both hams until long after the war!

"73"

Don McVicar, VE2WW

Aviation has always been a second love to me (Amateur Radio being first). The "Goony Bird" is my favorite aircraft although I have never been up in one. Ernest K. Gann's "Fate is the Hunter" made it possible for me to see the Ferry Pilot's side of things. Now, along comes yourself and Commodore Powell! Keep writing.

ed.

Politics, ads on air

Dear Editor:

The recent operation by the British Columbia FM Association involving simultaneous retransmissions in our amateur HF bands should be dimly viewed by the fraternity. We should question the use of our frequencies for purposes other than experimentation, casual conversation and the spreading of goodwill *between individuals*. Was her majesty's visit to Canada an occasion to relinquish the good sense that has prevailed in our bands? We have traditionally avoided such topics as religion, politics and comments of an ethnic nature on the air. The X07RPT's transmission originating in Vancouver's Covered Stadium was simultaneously retransmitted on several frequencies in each of the HF bands (eg. 28.400, 28.495 and 28.520 khz). In the hour preceding the Queen's address, bagpipe music, long bursts of noise and advertisements for the province of British Columbia could be heard. The broadcast, of a message originating in Canada and meant for the world is more suited for Radio Canada international frequency assignments than for the ham bands. This regrettable incident, hopefully will not set a precedent.

Bob Slator, VE3KOY

Delays in delivery

Dear Editor:

Just received my February TCA today — it's almost like reading last week's newspaper as far as some of the information is concerned. It seems Canada Post just can't get over its bad habits acquired over the past few years.

I am enjoying those tales by Bill Deacon, VE3BDO — Am not an old 'brass pounder' except for age, but I did work for a short time for CPR Tels in 1920, and

LETTERS

have been interested in radio for many years, altho' not in the business. Got my ham ticket after I retired and even use an old key which I had used years ago. Maybe it's my age, but I hope BDO gives us some more of his tales.

Find TCA is improving — I guess we can only dream of more prompt delivery but miracles sometimes happen, or so I have been told.

"73"

Frank Pow, V36AVZ

The late deliveries should be ending very soon. It will be difficult but not impossible.

ed.

Riding with Bill Deacon

Dear Editor:

Have just finished reading the February issue of TCA and want to congratulate all responsible for an A-1 issue. I particularly enjoyed the article by Bill Deacon VE3BDO. Bill's stories and style have me riding the waves with him! Hope Bill can give us more in forthcoming issues. Also enjoy very much the article on Marconi and certainly hope something can be done by Canada to retain this historical setting.

Best Wishes,

Bill Stadnyk, VE4FT

More complete info please

Dear Editor:

For months now you have had a "OPERATION INFORMATION" section in the TCA.

This section contains the following:

a) Reciprocal operating agreements
b) Banned Countries list
c) Third party traffic agreements

This section, in my opinion, would be more complete if it contained the latest list of frequencies and mode of transmission allowed.

Also under the "Banned countries list", Democratic Kamuchea is listed. Should it not be KAMPUCHEA instead?

Yours' truly

Marcel Cadieux, VE2BGC
R.R. # Perry Rd.
Aylmer, Quebec, J9H 5C9

OH! You are right! sorry. I will correct it in the June issue, unless the opportunity arises earlier. As for the other section, Peter Hammond and I will discuss it and we shall try to do something by the fall.

ed.

DOC's sounds of silence

Dear Editor:

Just read that VE3NEI received his copy of TCA (October issue) on Oct. 27/83. Well, my February issue arrived Mar. 11/83, late as always.

If I complain, I can also compliment.

My compliments to "Ron" of the D.O.C. Hamilton for very nice service.

In past issues of TCA a VE2 member wrote that the D.O.C. helped him locate a very high noise level on the power lines. I have had this problem on and off for years, many others who point their beams at nearby power lines know what I mean. If I could locate the trouble the power company would be glad to fix it.

The Power Company agreed that there was TVI in this region and my phone call to D.O.C. Hamilton was a good idea.

I phoned Hamilton, explained my problem. Later Ron phoned back to tell me he would call in next morning.

Next morning 2 D.O.C. inspectors arrived, checked my ham equipment noise levels, noise on Short Wave sets etc. and left to check nearly power lines. I thought, well that's about all that will be done and my noise level was still S5.

Two days later, a call from Ron tells me, one insulator, 2 houses up has been replaced and 5 other poles will be checked shortly.

Ten days later, Ron checked my equipment again and went out with the Power Company to check further.

My S meter runs about 0-1 now instead of 5 to 6 day and night.

I realize that the TVI was the most important thing here but as a ham, I was very satisfied that my complaint was well looked after.

I enjoy the TCA magazine.

Chuck Taylor, VE3AAN

P.S.: Happiness — is when the beam is pointing at the power lines and your S meter isn't even moving.

Hesler bows out

Dear Editor:

Have just returned from Florida and it is sort of good to be back home for a spell.

I am sorry, but I am going to have to discontinue the QCWA Column, for two reasons:

a) I find that since I remarried, there just are not enough hours in the day and as we shall be travelling a good deal, I just would not be able to keep a schedule, any better than I have for the past months.
b) Despite my pleadings, there is just not enough news being sent in, from the Chapters, to make up a column. I guess that I don't have to elaborate on this? I KNOW that I am very wordy; however, that would only carry me so far, without any real substance.

I appreciate, very much, on behalf of this organization, for your making the page open to me. Sorry that it could not work out. With kindest personal 73, I remain

Fraternally yours,

Ron J. Hesler, VE1SH
Director

Thanks for the try Ron. If you have time on your travels, please drop us a note for print. Space is

always available for those of us who volunteer.

ed.

Plate collector needs emittors

Dear Editor:

I am a license plate collector and a number of A.L.P.C.A. Automobile License Plate Collectors Association.

I have a complete set of N.S. passenger plates from 1918 to date. Now I have started on collecting Amateur Radio plates, and hope you can be of help to me.

I got the name of your organization from L.J. Fader (VE1FQ) of the Nova Scotia Amateur Radio Association. He said maybe you could mention my request for Amateur Radio plates in a future copy of your publications.

I want to get a display of Amateur Radio plates from all the provinces and N.W.T. and Yukon.

If you have any Amateur Radio plates you don't want, any year any province, I would be pleased to add them to my collection. I will pay the postage via Parcel Post.

Thanks for helping me with my hobby. If I can help you in any way please let me know.

Best Regards,
Jim Atwell
P.O. Box 456
Hantsport, N.S.
B0P 1P0

Hi!

Just a note to wish you continued success with T.C.A.

Too bad the mail wasn't as good. Still waiting for the February issue. Hi!

"73"
Terry, VE2EVO

CARF:

Nice work folks, you are putting Canadian hams on the map. Thanks.

Wayne V. Davison, VE1BEO
Kings Co., N.S.

Beware of the Covenant

Bill Wilson VE3NR

This is the time of year when Amateurs and would-be Amateurs often purchase new homes. Developers often try to ensure that the homes and subdivisions that they build will be forever attractive by enacting restrictive covenants which, among other things, prevent the erection of antennas or aerials.

Often the existence of a covenant is not made known until after the purchaser has purchased the property and it is too late to do anything about it. Covenants go with the land just like easements for power and telephone lines. Often they have an indefinite life. When you sign to purchase property which has a covenant attached to it, you are, in effect, signing a contract to observe the terms of that covenant for as long as you own the property.

The proper time for an Amateur to protect himself is when he makes an offer to purchase. The Amateur should make his offer conditional upon there being no restrictive covenant which will prevent his erecting Amateur antennas on the property he proposes to buy and describes in his offer. Then, when the Amateur asks his lawyer to search the title of the property, he should instruct his lawyer to advise him in writing if there are any restrictive covenants on the property and, if so, to provide a copy of the covenant.

The Amateur then has an opportunity to sit down with his lawyer and discuss all aspects of the covenant, including whether the antenna restriction is applicable to Amateur antennas and whether it can be set aside. Covenants are not always perfect and occasionally they can be set aside or anulled because they are obsolete, vague, unenforceable or abhorrent to Canadian society. The Amateur can then make up his mind whether to proceed with the purchase and live with the restriction or withdraw the offer and claim his deposit because the title to the property is not clear to his satisfaction.

The alternative to this course of action is, perhaps, to have one of his neighbours dig out a covenant and proceed to enforce it and seek damages through court action.

While the DOC is willing to step in and insist on federal jurisdiction over antennas when a municipality starts to make noises about a by-law controlling antennas, it cannot act similarly when a restrictive covenant controls antennas. In this latter situation DOC takes the position that federal jurisdiction over radio communications has no bearing since covenants are private and legal arrangements which relate to land. Property and civil rights fall under provincial jurisdiction and thus DOC cannot help us Amateurs with this kind of problem.

In Quebec, covenants are known as Servitudes.

B.C. advises Amateur help on exams

British Columbia Submission to the C.A.R.F. - D.O.C. Liaison Committee March 22, 1983 Written by Walter Stubbe (VE7EGR) Kelowna, B.C.

With special thanks to the following participants: The Kelowna Amateurs and The Orchard City Amateur Radio Club VE7CGE Lou Beaubien from the Burnaby Club, and VE7OO, VE7EGO, VE7DSH, VE7ESA, VE7BGJ, VE7APS, VE7BTG, VE7FED, VE7ESI, VE7AQA, VE7CDK, VE7VF, VE7ERZ, VE7YW, VE7CXJ, VE7AYT, and especially VE7NQ Ernie for his valued advise. VE6XX for providing a balanced viewpoint and VE7EHO for the coffee and examination input.

This submission is in response to a set of questions posed by The Federal Department of Communications regarding volunteer Amateur administered examinations.

However before we can attempt to answer those questions it becomes **imperative** that we examine the present set-up first.

With this in mind this submission will consist of the following items listed in order of presentation:

A. Present examination procedures.
B. Preferred examination procedures.
C. D.O.C. questions answered
D. Other relevant items.

A. Present Procedures

The present D.O.C. publications TRC-24 and TRC-25 give all the requirements needed to apply and participate in the examinations and require a written test on regulations containing multiple choice questions on regulations, operation of a radio station and a selection of Q Signals.

They require a narrative examination on theory usually consisting of 12 questions.

A morse code examination at either 10 or 15 wpm.

The selection process for the questions at present is the domain of The Department of Communications.

There has been a lot of criticism lately on two specific items in the examinations one being the quality of the C.W. portion of the exam, and secondly the level of difficulty of the advanced examinations.

Keeping in mind that Amateur Radio operators come from all segments of the population with varying levels of educations and different professions, it is not reasonable to expect all of those people to attain a level of proviciency in electronics similar to that of an engineer or professional technician.

This is however the present position of the Department given the last view of the Advanced Amateur Examinations where the candidate is expected to have detailed knowledge of any circuit that may appear in the Amateur Radio Handbook.

Currently there are two texts that are extensively used in the teaching of Amateur and Advanced Amateurs and examinations should be primarily based on those texts in use. Should there be areas that have not been included in the present text, the authors should be so advised or a new textbook could be produced. It is our position, however, that the Amateur Handbook should be a guide to Amateurs and not a textbook.

As to the morse code portion of the examination there is a constant criticism that the tapes and or the acoustics are bad, and in general it is difficult to pass this portion of the examination. There are a number of improvements that can be made to the morse code portion of the examination that will be detailed in the next section.

It is fair to state, however, that the Amateurs themselves should have some representation as to the level of difficulty of the exams to ensure its fairness to all without degrading our high standard.

PREFERRED EXAMINATION PROCEDURE

It is the opinion of the B.C. Amateurs that changes should be made in the format of examinations along the following lines:

Theory: A 25 multiple choice question examination; 2 mandatory examiner selected drawings; An interview by the examiner.

Rules and Regulations as well as morse code shall remain the same.

AMATEUR ADMINISTERED EXAMINATIONS

It is the consensus among the Amateurs in B.C. that the theory portions of the examination should be administered by the D.O.C. There is not at present a willingness by the Amateur community, nor any of the radio clubs to undertake this project. The morse code portion and the rules and regulation are another matter and there is a willingness to participate in that aspect of the examination.

As the D.O.C. does not seem to want to transfer the responsibility to the Amateur community as a cost saving matter, then, as Amateurs, we have to find a way that will substantially reduce this cost.

Although we realize that we can not please everybody, our solution to this particular item

should find favour with the D.O.C. as well as with the majority of Amateurs.

With this in mind we propose that C.A.R.F. makes the following recommendation to The Department of Communications as a last resort solution to the problem.

PROPOSED AMATEUR ADMINISTERED EXAMINATIONS:

1. The Department of Communications shall retain all responsibility for the theory portion of the examination.
2. The Amateur community shall take over the morse code portion of the examinations.
3. Either the D.O.C. or the Amateur community may administer the rules and regulations portion of the examination.
4. A pre-screening procedure will be set up by the Amateur community, ensuring that any candidate wishing to take the theory examination is ready to do so and has passed his morse code test.
5. That the initial examination remain free or charge but a re-examination fee be instituted as an incentive to pass the first test and discourage mis-use of the system.
6. That multiple choice examinations be reinstituted as previously described.
7. That examinations will be based on district rather than country in order to facilitate in class examinations where the number of students warrant it.

We feel that if the above points can be worked out a substantial saving may be obtained and could take some of the expenses out of the examination procedure.

We feel that this is the best compromise that can be worked out under the present conditions as there is no willingness on the part of the Amateurs in B.C. to take the **full** responsibility for the examinations and are not likely to take that step in the near future.

QUESTIONS FROM THE D.O.C.

A. (selection of amateur examiners)

We suggest that Amateur examiners shall be nominated by the area Amateur Radio Clubs to the D.O.C. with the final selections to be made by the Department.

B. (qualifications for amateur examiners)

Examiners shall be Advanced Amateurs, active in most aspects of Amateur Radio and should have been involved in the teaching of Amateur Radio courses.

C. (partiallity and conflicts of interests)

No teacher shall be involved in any examination where one or more of his/her students are being examined.

D. (scheduling of examinations)

If the multiple choice exam is reinstituted, it would be easier to increase the frequency of examinations in areas where the numbers warrant. Also the regional office could keep a supply of examinations on file that can be reused a number of times by giving the examinee a loose number sheet.

E. (examiners in remote areas)

No change in the present regulations.

F. (maintenance of integrity of exam papers)

As exams will be given by the Department this issue will not need to be addressed.

G. (uniformity of marks)

This issue also remains with the Department as the theory is the only area that requires a value judgement in the oral portion and the assessment of drawings involved as well as the skills of the examinee.

H. (examination paper production)

This item shall have to be the responsibility of the Department as the Amateur community does not have the funds to go into the mass printing of exams. The Department, however, can make a substantial saving in this regard by making the exams re-usable and then only provide answer sheets that need to be returned. The exams then can be stored for a future day.

I. (co-ordination and contact points)

This item should be left to the Regional offices in co-operation with the radio clubs in each region.

J. (provision of service in 2 languages)

This item will remain a Federal responsibility.

K. (desirability for a pilot project)

Omitted in later C.A.R.F. bulletin.

L. (how to ensure lower cost)

This item has been addressed in the submission and will again be given in the summation of the presentation.

M. (other relevant methods)

OTHER RELEVANT ITEMS

In summation, we should state that the items in this presentation should be seen as a final bargaining item and not a starting point. We feel that if all the items

B.C. SUBMISSION

should be adopted there will be a substantial saving to the Department as well as a stabilizing of the examination procedure which should make it easier for those of us that teach the Amateur courses.

In short the highlights of this summation are:

** Return to a multiple choice theory examination;
** Reinstitute the mandatory drawings and oral questioning;
** Regulations could be transferred to Amateur examination;
** Morse code examinations should be given by Amateurs;
** A pre-screening should be undertaken before the theory examination is attempted and the morse code shall be part of this pre-examination;
** Examinations primarily should be free of charge;
** A re-examination fee (suggested $10.00) should be instituted.;
** Examinations for the theory portion should be kept to the curriculum that is presently available in the teaching texts.

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CARF NEWS SERVICE

PHONEY VK7 CAUGHT OUT

The call sign VK7PM, allegedly being used on a boat manned by seal hunt protesters, was apparently being bootlegged. Several Canadian stations were recently called by an operator calling himself 'Peter' asking for phone patches. Because this person did not have an Australian accent the smart operators shied away from the bootlegger. When asked if he was in Canadian waters and if so, did he have a reciprocal operating authorization, 'Peter' got somewhat annoyed. He will probably be more than annoyed when DOC catches up with him. The Department was notified by an alert Ottawa operator, checked with the Australian authorities and started an investigation.

— CARF News Service

U.S. EXPANDS 20 METRE PHONE BAND

The expected U.S. 20 metre phone band expansion was authorized on March 31st by the FCC. The Commission expanded Extra class privileges down to 14.150 megahertz and both Extra and Advanced can now use phone from 14.175 to 14.225 megs. Expansion in other HF bands was not authorized at this time but a notice of proposed rule-making will be issued shortly asking for comment on further phone expansion, this time on 10, 15 and 80 metres. A minor change on 40 relating to Hawaii only is expected.

— CARF News Service

REG REVISIONS REVIEWED

As the old saying goes, you win some, you lose some and here's some proof. The same Privy Council Office which held up proposed license increases so long that they could not be implemented this year has been sitting on proposed revisions to the Amateur regs since last May. The proposed changes which surfaced a couple of weeks ago were some of those which resulted from recommendations made to DOC by Amateurs at the 1981 CARF Symposium. Included were revisions which would lift power restrictions on 160 metres, permit repeaters on ten metres, allow European Amateurs to use all of the two metre band while operating in Canada under a reciprocal operating agreement, redefine permitted bandwidths for AM, FM, FSK and Amateur TV. DOC hopes that now these drafts which it had submitted to the Privy Council have been found, they will be approved farily soon.

AMATEUR SATELLITE LAUNCH

The next Amateur satellite will ride on the European Space Agency Ariane vehicle, which is now scheduled for launching around June 3.

ROYAL REMARKS REPEATED

British Columbia Amateurs were involved in a novel way in the recent Royal Tour activities in Vancouver. During the ceremonies connected with the upcoming 1984 World Exposition, held in the new B.C. Place, the Queen's speech on March ninth was relayed by a 450 meg link to Vancouver repeater VE7RPT and re-transmitted on 20 and 40 metres. To mark the event, B.C. Amateurs were allowed to use the prefix "XO". A special QSL card is available to listeners who report hearing the broadcast. VE7 stations who used the "XO" prefix can obtain a special QSL card free from the B.C. government.

SPECIAL PREFIX FOR CURLERS

The special prefix 'Charlie Kilo' you may have heard earlier this month was permitted Moose Jaw operators to mark the World Ladies' Curling Championship, thanks to CARF director VE5AE.

Sydney Amateurs commemorate Marconi Anniversary

Lauchie McKeegan, VE1QD

About December 1st VE1QD Lauchie received a request from DOC Ottawa that the Sydney Amateur Radio Club membership considered organizing and operating a Memorial Station from Glace Bay Nova Scotia on December 15th to commemorate the 80th Anniversary of Marconi's first two way message Trans Atlantic from Glace Bay Nova Scotia to Poldu England Dec. 15, 1902.

Quickly but with some reservations the membership offered to participate in the exercise which was to be operated at the same time as a two way Television conversation between the Governor General of Canada and the President of Italy.

Plans were made for the occasion with the finer details being worked out by the Special Events Committee — VE1QD - VE1CI - VE1WI - VE1ZB - VE1C3H - VE1CBL - VE1HK - VE1DM.

The primary concern of course was the antenna. George and Dan (VE1CEH and CBL) The Mr. Fixits from the Bay formulated a Plan to have a pole installed and even engaged the Services of a Pole Climber VE1CEI Bob to hoist

Raising the antenna: From left, George VE1, Bud VE1CI, Sonny VE1ZB, Lauchie VE1QD, Dan VE1CBC, Howie VE1WI, and VE1CEI Bob on top.

Mrs. Giola Marconi Braga with VE1AJ at mike, and from left: George VE1, John VE1CCM, Howie VE1WI, Bob VE1CEI, Lauchie VE1QD, Bud VE1CI, Bill VE1DM, and Dick VE1HK.

and secure a 4 element beam loaned for the occasion by VE1QD Lauchie.

True to their offer the Pole was placed and an able crew braved the cold Atlantic Coast line in true amateur tradition on December 11th and mounted the beam. Those taking part in the Antenna raising were VE1's - QD, CEH, CEI, ZB, CEJ, DM, CBL, IWI.

The big day of course was the 15th and many of the Club Members arrived at the Miners Museum to offer their assistance in making the day a success.

Many contacts were made including one with the English Marconi Anniversary station G4NVD at the Marconi College at Chesport England. About 40 KM East of London.

No contact was made with the Italian Commemorative Station 1Y4FGM, although many contacts were made all around it.

The amateurs in attendance were: VE1HK - VE1CI - VE1AUX - VE1WI - VE1HD - VE1DM - VE1NS - VE1CEH - VE1BVB - VE1BNF - VE1ZB - VE1ARS - VE1AJ - VE1CEI - VE1TB - VE1CCM and VE1QD.

Along with the many amateurs in attendance the station was visited by Marconi's daughter, Mrs. Giola Marconi Braga.

Mrs. Braga was delighted to chat with many of the operators and told of her father's deep interest in Amateur Radio. She was likewise pleased when an offer was extended to make her an honourary member of the Sydney Amateur Radio Club. She said she was highly honored and accepted the membership without hesitation.

During one contact with an Italian Station the mike was taken over by Dr. Fratta, Scientific Attache of the Italian Embassy, Ottawa; he was very thrilled and surprised to make such a contact.

The commemorative call CG1MCS was alloted to the Club until December 31, 1982.

(Lauchie tells us that the old Marconi properties in Glace Bay have been declared 'historic properties', which it is hoped will pave the way for a Marconi Museum there. Ed)

All QSL's Must be sent to P.O. Box 1051, Sydney, N.S. Certificates will be sent only in response to a QSL received.

"73"

VE1QD and VE1CI

Pictures courtesy Lauchie McKeegan, VE1QD.

VHF/UHF News

John Dudley VE5JQ

Varying conditions part of Moonbounce fun

I have received some inquiries asking for basic information on moonbounce or earth-moon-earth (EME) activity. This shall be the first of two parts describing this most interesting mode of communication.

Moonbounce is a relatively new form of amateur communication. Indeed radio amateurs have been the main group to develop it as a form of communication. The U.S. Army had, after the Second World War, developed a teletype link using moonbounce but it was not used long. The frequency was 111.5 MHZ, and the output power of the transmitter was 8,000 watts and very large antennas were required. The first amateur efforts occurred in 1952 when after three years of trying, W3GKP, was able to identify W4AO's 144 MHZ signals. W4AO ran a KW and a huge VHF rhombic. Not until 1960, however, was there a successful two-way amateur moonbounce contact. W1BU worked W6HB on 1296 MHZ. Both stations were using 1,000 watt klystrontube transmitters, parabolic dishes and narrow band receivers preceded by parametric amplifiers. The first two meter QSO came in 1969 when W6DNG and OH1NL worked using home brew equipment. It was W6DNG's 56th antenna array in his effort to make an EME QSO! Today, using maximum legal input, the best in antennas and receivers, two-way communication via the moon remains a marginal operation.

	50 MHZ	144 MHZ	432 MHZ	1296 MHZ	2300 MHZ
Perigee 221,463	177.89	187.08	196.62	206.17	211.43
Apogee 252,710	179.03	188.21	197.76	207.01	212.52

Signals are weak and often non-existent. Approximately 500 stations are operational or capable of EME today. All bands from 50 to 2300 MHZ have been used but 144 MHZ and 432 MHZ are the bands most commonly used.

In order to design a successful moonbounce station, one must have some knowledge of the EME circuit. The moon is only 2,160 miles in diameter. It subtends only an arc of ½° as observed from earth. It orbits the earth every 28 days in an eccentric path therefore travelling along a slightly different path each night of the lunar month. The moon varies in its distance from the earth, being closest at perigee, when it is 221,000 miles from

New grid moves to America

Over the last few years there has been much discussion about the adoption of a world-wide QTH locator system. For years in Europe a locator system has been used to designate QTH information. This system was readily adopted by Europeans and many VHFers put a lot of effort into collecting various grid squares as designated by the locator system. Recently both the Central States VHF Society and ARRL have endorsed the use of QTH locator systems. With ARRL taking the lead from the CSVHFS they have now introduced a new series of awards based on collecting various grid square locators. Details and instructions of how to determine your own grid square are in the January, 1983 QST. Basically, the world has been divided into 18 × 18 fields, each of which is 20° wide by 10° high. Each field is in turn divided into 100 squares, each 2° wide and 1° high. Each square can then be subdivided into subsquares, each 5 minutes wide and 2.5 minutes high. The QTH locator code of six characters based on your QTH's longitude and latitude can then be derived. For most purposes, the first four characters will be describing the field and square and are all that is necessary for most exchanges.

The ARRL will be issuing a Century Club Award for the various bands above 50 MHZ for contacts after January 1st, 1983. Thus, in addition to the ever popular Worked All States or Worked All Canada awards, there will be new wallpaper to chase after. This system should also increase activity on the higher bands where obviously geographic designations such as States or Provinces are too large a unit for most contacts. For the higher frequencies the ARRL suggest not 100 grid squares but 50 or 25, a decreasing number as the frequency increases. It is undetermined at present whether a new locator system will come to be part of an exchange during VHF/UHF contests. We look forward to working on the bands and being able to send you DO 62 IC.

earth and most distant at apogee, when it is 253,000 miles from earth. The moon is a very poor reflector, reflecting only approximately 7% of the signal that strikes it. The rest of the signal is absorbed. The reflected signal is diffused all over space and thus only a small portion returns to earth. The capture area of one's antenna is very small compared to the 90,000,000 square miles of the earth's surface observable from the moon. Thus, only a very small part of the energy transmitted from the earth ever returns back to the earth via moon reflection.

The path loss for the EME circuit has been calculated. Radio waves travelling through space are attenuated as the square ratio of the frequency. Thus, as frequency increases, so does path loss. The table below shows the path loss for the EME circuit for the various bands at both apogee and perigee. The difference between apogee and perigee is a round trip difference of 2.2 db. Thus, when communications are so marginal, most contacts are made at perigee.

Several factors come into play when determining which band you may wish to build an EME station for. As shown by the table, as we increase frequency, our path loss increases. Also, with increasing frequency, our transmission line loss is increased and there is an increased effect of receiver noise in our receiving systems. Also, there is a decreasing amplifier efficiency with increased frequency but a decreased physical size of antenna for the same amount of gain. Given all these factors, plus that of amount of activity, most stations have been on 144 or 432 MHZ. Most are on two meters but the antenna requirement tends to be larger in terms of physical space but is easier to produce adequate power at the lower two meter frequency. However, there is increasing activity at UHF on both 1296 and 2300 MHZ.

Now that the path loss has been determined one should be able to build the station with adequate power and antenna gain and receiver noise to overcome the path loss. However, it is not always that easy and other factors enter into whether or not you will receive your own echoes or signals from other stations from the moon. During the passage of a signal to and from the moon, the earth's magnetic field may produce several changes in polarization. This is called Faraday rotation and produces fading the length of which changes with frequency. At two meters, this fading period can last for up to 20 minutes. In addition to Faraday rotation, the rocking motion of the moon in its orbit can produce a rapid flutter known as libration fading. Also, local or ionospheric conditions around the earth can change signal strength such as an aurora producing increased absorption of the signal. Thus a station built to the precise db requirements for the path loss will not always make contacts because of these varying conditions. This, of course, is all part of the fun, and interest. Next month I shall continue with a more specific description of equipment requirements.

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CARF NEWS SERVICE

NEW SKED FOR AO-8 ANNOUNCED

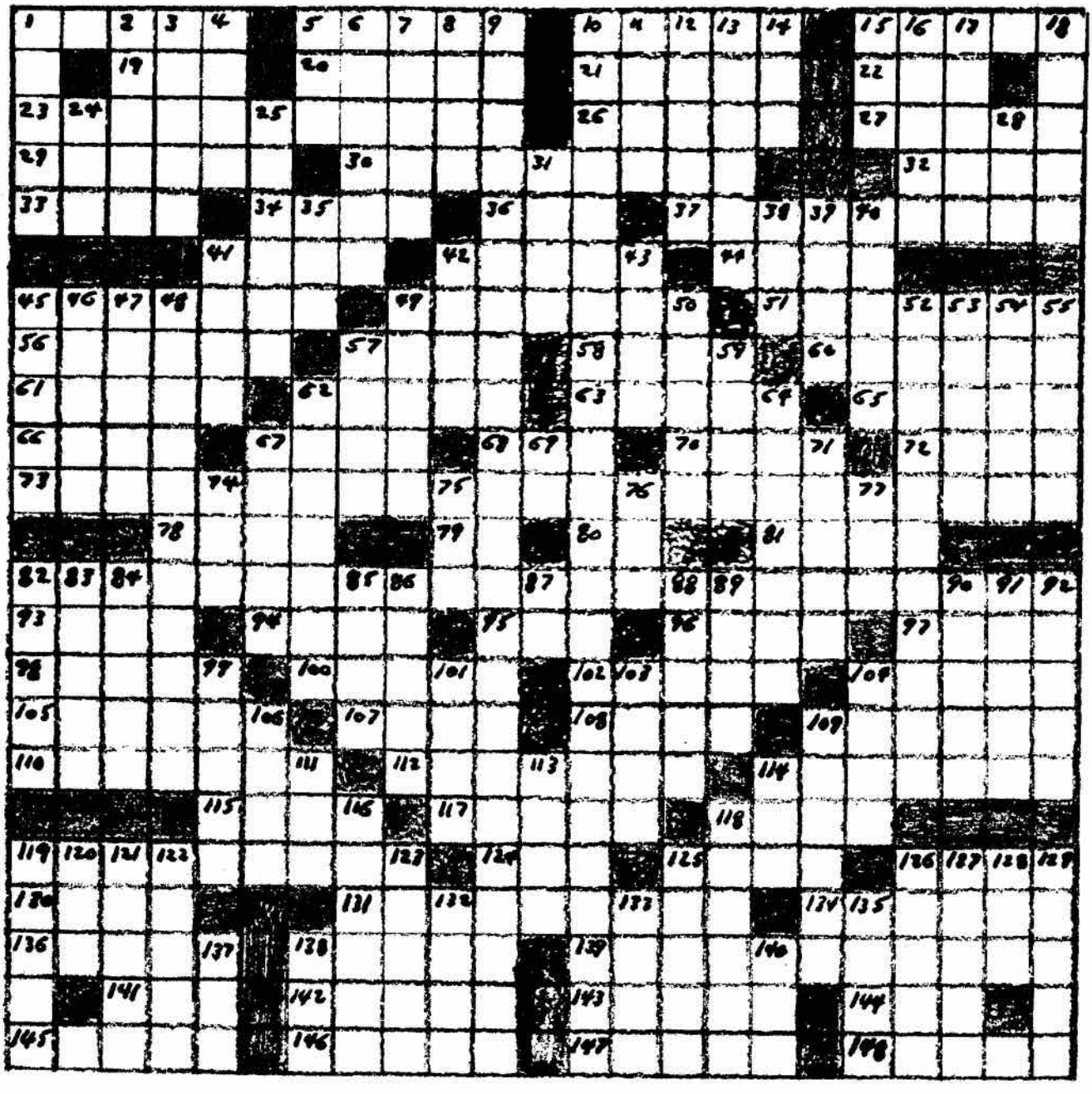
AMSAT OSCAR 8 Operations Manager W9KDR has announced a revised schedule for AO-8 effective immediately. The new schedule calls for Mode A on (UTC) Sundays, Mondays and Tuesdays, Mode J on Thursdays, Fridays and Saturdays. On Wednesdays AO-8 will be in recharge mode with even the beacon turned off for better charge rate.

AO-8 will be five years old on 5 March 83. There has been concern voiced recently about the overall battery condition. (ASR #51) AO-8 Command Stations W9KDR, W3HV, K3NW and W6CG as well as observer K9CIS have been closely monitoring battery condition as it is reflected in telemetry channel 3 according to W9KDR.

For several years AO-8 has been in dual AJ Mode twice a week. Although this provides a very heavy load, the strong battery in conjunction with careful monitoring has provided a maximum of satellite usefulness according to W9KDR. Now, with battery aging evidenced, more prudent power budgets are sought. The new schedule reflects the new realities together with an implicit recognition of the preponderance of Mode A time afforded by the several Radio Sputniks now operational.

"It's not generally known, but Mode J actually draws more power than Mode A," suggested Bernie Glassmeyer, W9KDR, from ARRL HQ recently. "In the past, when the batteries were new, we could live with dual AJ, but those days are over for the foreseeable future," added W9KDR. "Our aim has been to strike a balance of service between Mode A and J but always with the health of the spacecraft uppermost in our minds.

Amateur Crossword



Theme: Test equipment in the shack (or, a lot of found ins)

by VE1BCI

See next 3 pages of clues
Solution next issue

ACROSS

1 (a) Visible line across a crt.
(b) He disappeared without a —.
5 (a) Wiring tool. (backwards)
(b) Rhymes with liar.
10 (a) Prefix for com or cept.
(b) Amateurs are interesting people.
15 (a) To examine for the purpose of detecting errors.
(b) —— in derug needs a hug.
19 (a) Read only Memory.
(b) Royal Ontario Museum doesn't need one yet.
20 (a) The linear portion of a characteristic curve.
(b) Frequented by skiers.
21 (a) A cardinal point.
(b) The pole from where magnetic lines leave.
22 (a) To allow to sit unused for a long time.
(b) Suffix for stone or iron or space.
23 (a) Used to check resonant ccts.
(b) A cb'ers s meter? 3 wds.
26 (a) First word of a special chart used for finding transmission line z.
(b) Certain brothers cough drops.
27 (a) Position or up to date, followed by, few or many. All backwards.
(b) The amateur helps out — disaster. 2 wds. reversed.
29 (a) Having an output that varies in direct proportion to the input.
(b) A rig accessory that delivers up to a gallon.
30 (a) The unit of reactive power plus the nautical six feet. 2 wds.
(b) Volts, amps, resistors I can't — it all out.
32 (a) When turning a motor shaft you should check before or — is reached.
(b) Found in toad but not in frog. 2 wds. 2nd abbrev.
33 (a) A device used to match z and shaped like the letter E (non existant shape).
(b) A room for E's.
34 (a) One of two digits the computer understands. pl.
(b) found in nose and some in toes.
36 (a) With an E it means ended or finished
(b) Output voltage reading.
37 (a) To adjust an instrument to a standard.
(b) Older rigs had a — knob.
41 (a) Hot spot for crystals and others.
(b) Cakes bake best here.
42 (a) Proper self-esteem.
(b) The — amateur displayed his/her certificate.
44 (a) Found in paraffin but less in wax.
(b) Power amp. freq.
45 (a) Produced by the influence of a magnetic field.
(b) The novice was — to upgrade to General.
49 (a) Alike or even, followed by to clam up. 2 wds.
(b) He has a new father but still the —.
51 (a) A type of detection in receivers.
(b) The resu t of or that produced.
56 (a) To think logically and soundly.
(b) Does an amateur need a — to go on the air?

DOWN

1 (a) Name or designation.
(b) All books have a —.
2 (a) Place where events take place.
(b) Home for ice surfaces.
3 (a) Arranged system of signals.
(b) Ciphered by a computer.
4 (a) Found in media but not in dot.
(b) Electro-magnetic indicating apparatus.
5 (a) Arrangement of root mean square.
(b) Found in resume. (proper order)
6 (a) A number.
(b) 27 mhtz band in meters.
7 (a) Small quantities.
(b) Ninth letter of Gk. alphabet. pl.
8 (a) Found in pearl.
(b) Long player? (in order)
9 (a) Building is one thing, operating another. How is your —? 4 wds.
(b) Degree of action, plus place of amateur operations.
10 (a) Test — of many units. 3 wds.
(b) Tools — harmonize — worth. pl.
11 (a) Found in month.
(b) Opposite of yes, plus millihenry.
12 (a) Meaning three, plus open cct.
(b) Singing group, plus capacitance.
13 (a) Electron tube timer, plus a chart.
(b) Found in "pattern M".
14 (a) Found in hearth.
(b) Real hot ham.
15 (a) Time period.
(b) 24 hrs.
16 (a) Difference between a min. and a max. of a variable. (reversed)
(b) Home on the —. (reversed)
17 (a) The difference freq. of two freq. is the — freq. plus the first letter of a familiar 26.
(b) A rabbit — a turtle in a race. 2 wds.
18 (a) What the "G" stands for in RG58U.
(b) To direct as a missile.
24 (a) Located between the knee and chest.
(b) Modern term for in the know.
25 (a) Tried and tested.
(b) Innocent till — guilty.
28 (a) Backward weight.
(b) In no way at all.
31 (a) Found in order in "a vowel".
(b) Part of a volt and eel.
35 (a) Man's name.
(b) Backward retreat.
38 (a) Once around the track.
(b) An armature winding.
39 (a) Found in firm.
(b) Doubt, plus part of rms.
40 (a) Prefix for band or cast.
(b) Wide.
41 (a) Backward mad.
(b) Last of protocol.
42 (a) Found in warp.
(b) Even in golf, plus watt.
43 (a) To withdraw all power (as a load).
(b) Place for refuse.

CLUES CONTINUED PAGE 26

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YAESU

FT-102

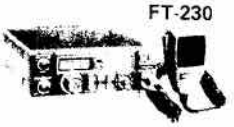
YAESU

FT-208R

FT-77

FRG-7700

FT-230



24 HOUR CLOCK

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Dual, independent clocks/Solid walnut case/ Functional and beautiful
~~$115~~ (plus $3.00 shipping)

$79

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Two independant 24 hour LCD displays! Read both GMT and local times at a glance.
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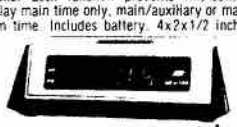
Night light. Forward/reverse, fast/slow set buttons. Lock function prevents mis-setting. Display main time only, main/auxiliary or main/alarm time. Includes battery. 4x2x1/2 inches.



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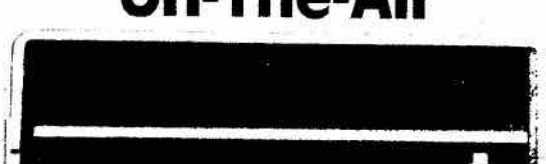

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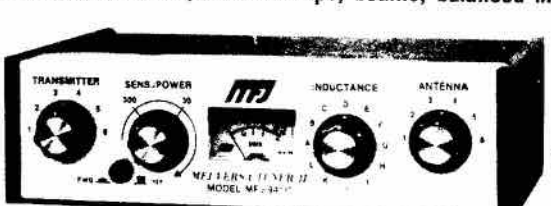

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Other 300W Model like 941C less ba

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Tunes out SWR on dipole verticals, whips, beams, quad
Built-in 4:1 balun, 300W SWR meter and 2 range wattm
6 position antenna switch position air-wound inductor co ing posts, black and beige ca

FROM PAGE 23

ACROSS

57 (a) Found in Arch.
(b) Coolidge Heights Radio Association.
58 (a) Australian flightless bird.
(b) Found in Muse.
60 (a) Misspelled male amateur who thinks he is a ladies' man?
(b) Found in Marching on.
61 (a) Rearranged towel.
(b) Ocean wide telephone companies' logo?
62 (a) An open fuse.
(b) Things get — in the wind.
63 (a) A negative plus to add.
(b) Opposite of minus, prefixed by minus.
65 (a) In a FET the element that corresponds to the plate of a tube.
(b) The center of a sink.
66 (a) Found in ants but not in hill.
(b) New Town Amateur Sales?
67 (a) resistors yellow band.
(b) Golpher's cry.
68 (a) Prefix for off or out.
(b) The talented amateur — a record.
70 (a) See 33a across shaped like Greek Tau.
(b) A hippie's tea house?
72 (a) To deserve as worked for.
(b) Amateurs — their tickets.
73 (a) What to read if you have never used a scope.
(b) A publication's title. 5 wds.
78 (a) Found mostly in loose.
(b) Capital of Norway. (reversed)
79 (a) Peru's prefix.
(b) Omega Alpha.
80 (a) First and last of Arizona.
(b) Active amateur.
81 (a) A crystal whose surfaces are not parallel to the x-y or z planes.
(b) Some sweaters have — necks.
82 (a) What you use to check SWR 4 wds.
(b) There may be a booklet with it.
93 (a) Opposite of out of.
((b) What's got — you?
94 (a) Found in done.
(b) Female deer followed by Gk. Nu.
95 (a) A tiny hole in an orifice. (reversed)
(b) A certain aircraft flying backwards.
96 (a) What you get with a hand on a live wire and a foot in a puddle.
(b) Rhymes with volt and dolt.
97 (a) Pertaining to temperatures near absolute zero.
(b) Prefix for genie or tronic.
98 (a) Found in "the volts amps".
(b) Electrical engineers plus "to deal a blow".
100 (a) The equality of one thing to another.
(b) Used to light fires.
102 (a) What the "u" stands for in rg58u coax.
(b) Pipe coupling or the number one.

DOWN

45 (a) Metal (fe), plus henry.
(b) Golf club with an H stamped on it.
46 (a) Most of Sir Isaac's last name.
(b) Fig — or New Toronto.
47 (a) Information on power.
(b) Any or facts, plus watt.
48 (a) A balun — to form the transformer.
(b) Applies, plus a donut shaped core.
49 (a) Prefix for cct. and wave.
(b) Not long.
50 (a) Prefix for meter or plex.
(b) More than two.
52 (a) Radar receivers depend on them for accuracy.
(b) Non-reflected — reflected wave.
53 (a) University of Cal. Amateur Assoc. Origins.
(b) In a tight spot I resort to this sort of thing hi hi.
54 (a) Change in pitch of a code signal.
(b) Birds do it also.
55 (a) 2000 lbs. the long way.
(b) Large weight plus north east.
57 (a) All of this typesetting print is one.
(b) Hint.
59 (a) Part of supply (in order).
(b) To eat, plus inductance.
62 (a) clown's name, plus part of foam.
(b) Be offside of the old man.
64 (a) Ointment, plus loose nut.
(b) Found in slave line.
67 (a) Electrically protected.
(b) Welded or bonded.
69 (a) Soviet prefix.
(b) Under and over but not quite out.
71 (a) Perform, plus picture tube.
(b) Dept. of Comm. radio tests.
74 (a) Most of lord, less of ford.
(b) Overload relay.
75 (a) Most of pig's feet.
(b) Heard on Collins.
76 (a) Prefix for acitor or tion.
(b) Farads.
77 (a) One of five freq. in a convertor stage.
(b) Total or result.
82 (a) Give way to.
(b) A good crop.
83 (a) Unity, plus opposite of AND in logic ccts.
(b) Take — the other.
84 (a) Found in thunderation.
(b) Under the house and eaves.
85 (a) Half of solder's alloy.
(b) Soft metal used in batteries.
86 (a) Prefix for tain or prise.
(b) Come into my shack.
87 (a) Most of a golf mound.
(b) Elect. Eng.
88 (a) Scrambled joint.
(b) Orange juice international.
89 (a) Insulator when dry.
(b) Good for home brew beam booms.
90 (a) Exchange.
(b) Business at a swap shop.

ACROSS

104 (a) To divide equally, as loads on generators.
(b) Will you — your —?
105 (a) Adding power to, such as an antenna or line.
(b) He drinks till he's —.
107 (a) C.w. this is plus a pronoun.
(b) Found in heed.
108 (a) Small loose grains of quartz found on the beach.
(b) To polish with a paper.
109 (a) Sometimes said at the end of a QSO.
(b) Virtuous distance?
110 (a) Wiring kept neat is said to be —.
(b) Opposite of nude.
112 (a) If your cct. bkr. trips you will have to —. 2 wds.
(b) To restore, the 3rd. person pronoun.
114 (a) Demonstrative idea, plus to sin.
(b) I will correct — or. 2 wds.
115 (a) To give out as light.
(b) Backward time.
117 (a) Found in mount Everest in proper order.
(b) Mountain plus what I equals.
118 (a) Neither hot nor cold — moderate.
(b) A fan will — your finals.
119 (a) A word in 104(a) across.
(b) A machine producing current.
124 (a) Prefix for carte on a menu.
(b) He QSO'd Norway and got —.
125 (a) Upsets or goes over.
(b) Amateurs receive no — for their services.
126 (a) Teeth for gathering hay or leaves.
(b) Prefix for off meaning illicit gain.
130 (a) Suffix for square as in math functions.
(b) Part of RMS.
131 (a) Put permanently in place.
(b) Your new beam will have to be —.
134 (a) Modes of transportation.
(b) Part of the national dream. pl.
136 (a) Most of a beast.
(b) I "am in a 'fog' —" backwards.
138 (a) Jumbled stereo set.
(b) Found in fish eye.
139 (a) Unequal or unbalanced.
(b) Includes the S.I. system.
141 (a) Bag or cyst.
(b) Strategic air command.
142 (a) From 15 to 20,000 hertz.
(b) Heard sound waves.
143 (a) Most of eternal.
(b) Found in enter.
144 (a) Help.
(b) Suffix for first or band.
145 (a) Prefix for rons or ronics.
(b) To vote into office.
146 (a) Miles per gallon per notion.
(b) Members of parliament's gross products nationalized.
147 (a) Found in class.
(b) Part of scale and saline solution.
148 (a) To perform plus a hotel.
(b) Found in donning.

DOWN

91 (a) Found in Pye radar.
(b) Scrambled derry.
92 (a) Fish eggs, plus x-ray.
(b) Small x-rated deer.
99 (a) 1st wd. of 112 across but backwards.
(b) To restore backwards.
101 (a) Prefix for ist, ical or istry.
(b) 1st half of the science of elements.
103 (a) Sodium and iridium symbols.
(b) Found in rain.
104 (a) Very necessary for a good ground.
(b) To make dirty by handling.
106 (a) Start of a U.S. politician.
(b) Found in dame.
109 (a) Reflected t.v. image called "m".
(b) Spook or spirit, plus 13th letter.
111 (a) One of two morse characters.
(b) Not dah.
113 (a) Nautical term backwards.
(b) Elect. Eng. in Norway.
114 (a) Over or prefix for IC.
(b) — this.
116 (a) Toward — whether — above. 3 wds.
(b) Found in "put foil".
118 (a) Found in candy ice.
(b) Reverse integrated cct. plus most of dynamic.
119 (a) Quality control function.
(b) School level of ability.
120 (a) Time period.
(b) Endless.
121 (a) Unwanted in radio but radio cannot exist without it.
(b) Din, clammor.
122 (a) Extra Terrestrial, plus Scottish name prefix.
(b) Found in "me cat".
123 (a) Found in "grind".
(b) Registered nurse — inside dia. — grid.
125 (a) Operations carried out to find causes or effects.
(b) Instruments used in above.
126 (a) Value obtained by dividing one number by another.
(b) Prefix for a type of detector.
127 (a) Atmosphere, plus backward identification.
(b) Found in direct aim.
128 (a) Printers need backward.
(b) Colored liquid reversed.
129 (a) Voltage sweep?
(b) Found in canes.
132 (a) Sent out by parcel post.
(b) Vessel or large floating craft.
133 (a) Found in recliner.
(b) London's National Register of Cash.
135 (a) 1st word in R.O.M.
(b) To identify as a computer.
137 (a) Segment of a play.
(b) What a logic cct. does when inputs agree with it.
138 (a) Man's name.
(b) Strategic air missile.
140 (a) Man's name.
(b) Lunar entry module, reverse.

Life on the Ocean Wave V

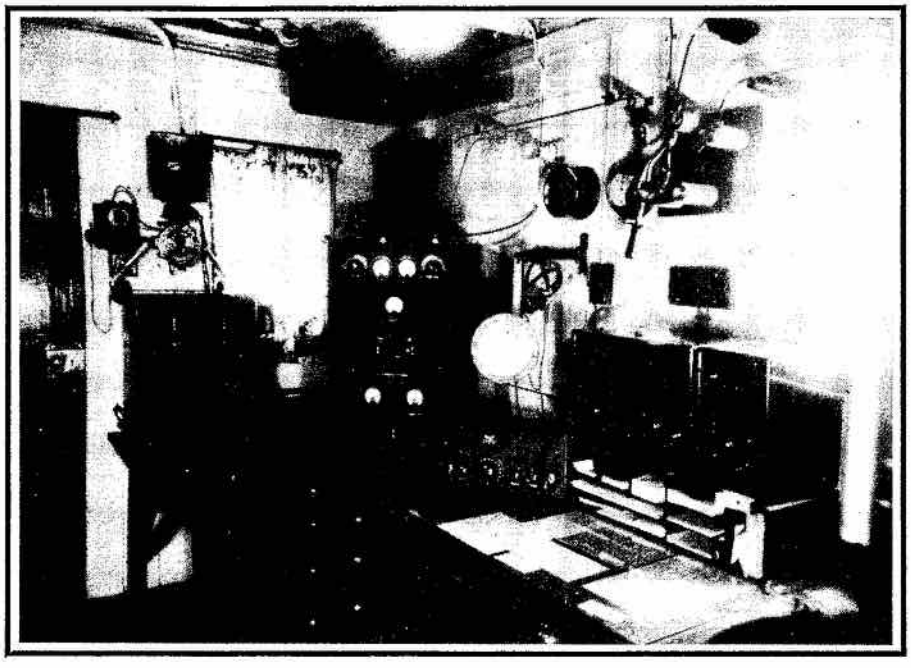
Bill Deacon VE3 BDO

Since I started these articles, I have been asked on a few occasions about the actual radio operating activities aboard ships. Therefore, this is going to be a mixed bag of comments on those activities as I experienced them. I must emphasize that last phrase, because there is bound to be someone who will say "that wasn't the way I found it". I also must emphasize that my operating experiences are far different from those who were on merchant ships in WWII.

On the freighters on which I sailed, traffic was almost non-existent. We did have routine exchanges with coast stations on departure, an example being on departure from Seattle for San Francisco, when we would call the Seattle Coast Station, KPE and transmit: "SS Parthenia QTO KPE BND KPH QRU". This told the Seattle station that the Parthenia was departing (QTO) Seattle (KPE) bound for (BND) San Francisco (KPH). KPH happened to be one of the best known coast stations in the San Francisco area. We could have sent "KFS", which was another San Francisco station operated by MacKay Radio. Other than that, our usual daily transmissions would be a TR which was simply sent to "CQ" and contained the ships's name, Position (either in relation to a well known geographical point or in latitude and longitude), course, speed and the port to which bound and from where. In addition, if we were a ship designated by the U.S. Weather Bureau to do so, we would send a weather report in specified form to the U.S. Weather Bureau via any coast station that would handle it. There were no charges involved in those messages.

At some point, we would send a message to the ship's agents at destination point advising estimated arrival time and, at the appropriate time, a message to the Pilotage authority advising the time we would arrive at the pilot pick-up point. Upon entering port, we would call the local Coast Station and advise "QTP", meaning we were entering port and closing the station down.

In addition to this traffic, we would copy appropriate weather reports and forecasts, together with the "TR"s of any nearby vessels for the information of the bridge. The copying of press on such ships was purely at the operator's discretion. If you were a "Good guy", you would copy a couple of press broadcasts for the benefit of the crew. I carried my own portable typewriter, so that I didn't mind fixing up some good typewritten news for the crew. Those who had no typewriter and had to handwrite were understandably somewhat reluctant to do much press work.



Empress of Russia: HF transmitter in centre DF to right.

On the B.C. Coast service, there was a slightly greater volume of traffic, depending on the route you were sailing. We didn't get involved in pilot messages at all. Nor did we send progress messages to our Company except if things were substantially abnormal. There were a few messages to and from passengers, however; but the total monthly traffic on the coast service for most ships would perhaps be about 15 messages.

An exception was a CP freighter that carried canned fish, fish meal and fish oil. This ship only operated during heavy runs of fish, and primarily on the West Coast of Vancouver Island. We would receive panic messages from canneries or reduction plants after a big run of fish had been processed and there was a pressing need to get rid of the great load of canned salmon, sacks of fish meal, or tanks of fish oil. For my old friends of the West Coast who are reading this, I am talking about the old SS Nootka, on which I spent several happy summers. We didn't bother about press on those runs, since there were many radio sets on board keeping up to date with the world's happenings. Monthly traffic on that ship would total about 40 or 50.

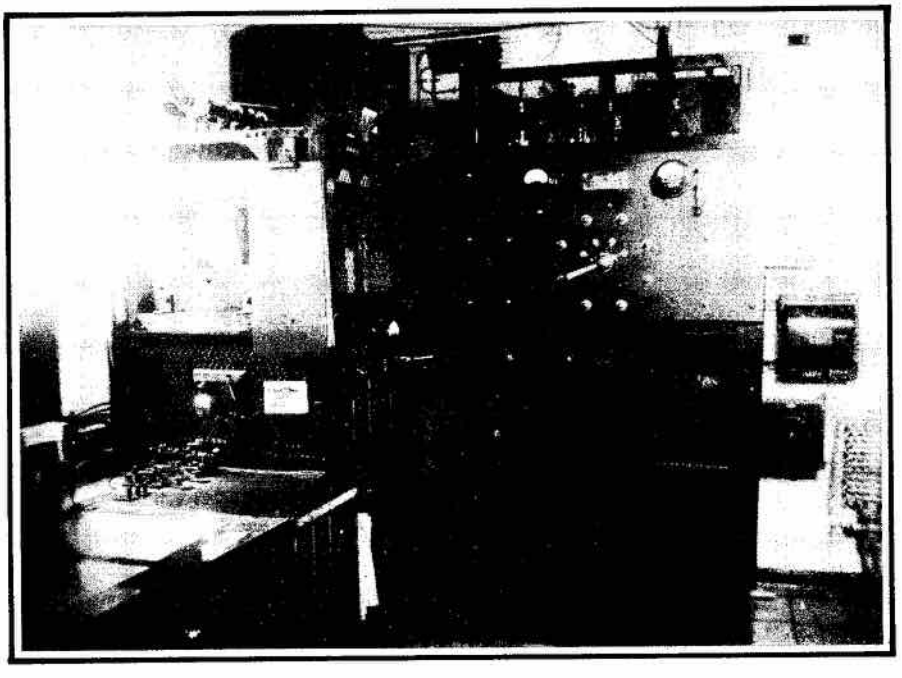
VE3BDO as chief operator.

The real operating took place on the "Empress" ships. Here, our passenger message volume was much more substantial, and the press copy was a real test of an operator's capabilities. A ship's paper was printed daily on those ships, and while there was a fair amount of ship's news, the main interest was in the world news, particularly in the immediate pre-war years when Hitler was cutting up his capers, and Mussolini not too far behind. Added to this was the Japanese invasion of China and the Edward VIII — Wally Simpson affair.

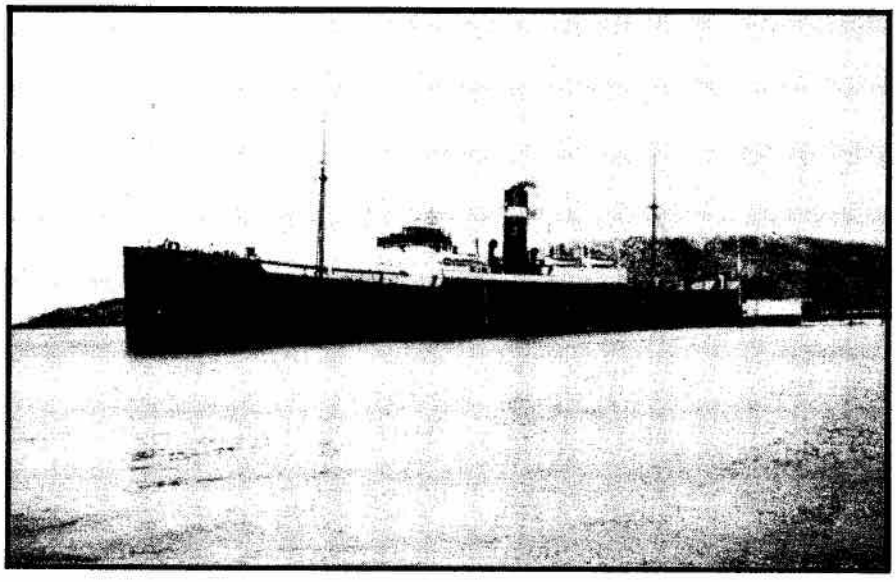
Press copy usually took place on my evening watch (2000-2400 local ship's time). At least, that was the case over about the Eastern two-thirds of the Pacific. We subscribed to an Associated Press service transmitted via KPH at San Francisco (actually located at Bolinas, Cal). In addition to that, we would copy the Canadian transmission from VAI at Vancouver, conditions permitting. We also would pick up UK broadcasts.

Press was copied in quintuplicate on a sort of onion skin paper. Of course, it was interleaved with 4 sheets of carbon paper; and the sheets were the so-called legal size. At press time, I would set out about 4 sets of quintuplicates so that I could change paper in minimum time. KPH usually sent the subscription press at about 25 WPM, and the only breaks in transmission, other than tape failures, were two 3-minute silent periods spaced a half hour apart. This was for observance of the "silent periods" required by international agreement to permit most effective use of automatic alarm systems in case of an SOS. The "silent periods" were from 15 to 18 minutes and 45 to 48 minutes past the hour, so, once the press transmission commenced, one copied non-stop for 27 minutes at a time.

You will realize that, when



Empress of Russia: Emergency and main transmitters.



SS Parthenia at Curacao.

copying any telegraphic transmissions, you are not aware of capital letters until after you have seen the copy. The inexperienced operator would find himself having to re-type or try to strike over those letters that required capitals. Also, sometimes the transmitting tape got fouled up, and if you were copying letter for letter, you likely would find yourself having to retype some copy after corrections from the transmitting end had been sent. The experienced operator learned to type about three words behind the transmission so that he knew where to type capitals, and he could also hold off typing if the tape fouled up. When one reached the end of a page, one sped up the typing to within one word of the transmission, then rapidly pulled the copy out of the "mill", hastily picked up the next quintuplicate set, tapped it to get all sheets and carbons aligned, zap it into the platen, align the paper and resume typing. I found that this usually ran me about 14 to 17 words behind what was being transmitted. Fortunately my memory and my typing speed were adequate to permit me to rapidly type up to within the 3-word range again. I cannot recall ever having to retype copy, and, considering that we supplied the ship's printers with something like 6 to 7 sheets of legal sized copy of new (including, incidentally, stock reports from the NYSE), you can see that a lot of extra work was avoided. To keep in good copying shape, I used to tune in high speed commercial transmissions at 50 WPM. However, this did not give me the "copying behind" capability. That came from copying other press transmissions that we didn't need. With these, I could experiment with copying behind to see just how far I could go with it.

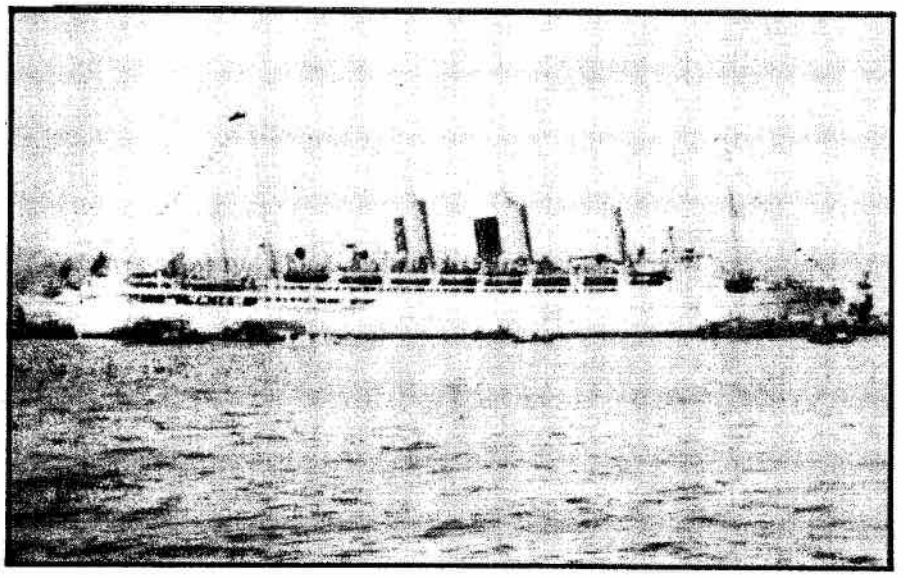
Press copy was delivered to the Captain, Chief Purser (who acted as editor for the ship's paper) and the printing office. Two copies were retained for our logs.

Incidentally, my first voyage on the Empress of Russia was as Third Officer, and the Second Officer was supposed to do most of the press copy. He was an ardent reader and spent just about all his watches sitting back in a wicker chair engrossed in some novel or other. Any outgoing traffic literally sat on the hook until I came in to take over the watch.

The one exception to his routine was at press time when, if he remembered, he tuned in KPH and got going on the job. However, sometimes the story was too exciting for him, so that he would be late in picking up the press. This was never a great problem for him, as he had a fantastic imagination and great writing skills. Consequently passengers read some really intriguing news items from the USA that just about left them breathless with anticipation for the next day's follow-up story on some events. During the Edward VIII-Wallace Simpson crisis, this fellow had a great opportunity to let his imagination roam in creating news items about that affair. He would build up over 2 or 3 days to some real fever pitch, then come out with a subsequent item indicating that the news source claimed they had been misquoted, etc., etc.

Passenger traffic was moderate. Of course, at Christmas time there was a heavy volume of Christmas greetings both incoming and outgoing. I think I sent a string of 32 greetings in one transmission to the US on one occasion. Luckily, we had numbered form types of greetings that were much cheaper to send than one created by the sender. This, of course, reduced our transmission time substantially. However, that didn't help at all on received greetings, because we had to convert them from number to a typed full, plain language greeting. Not counting Christmas season, our message total for a month would run about 300, exclusive of position reports, weather messages and all that routine stuff.

The tedious routine to be followed sometime before the end of the month was to fill out what was known as an "abstract". This was a large sheet on which the charging data for each message was detailed. A portion of the charge went to the ship, a much more substantial portion to the coast station's owners, and a



Empress of Russia in Manila. My favorite ship.

third portion to the telegraph organization that handled final delivery. These charges had to be converted from the Canadian dollars we had collected for the messages to the coast station and telegraph charges in the currencies of the companies' countries. This was not too long after most countries went off the gold standard, so conversion rates were constantly fluctuating. We would receive advice by radio from Marconi as to what the conversion rates would be in effect at any specific period.

Another sometimes tedious chore was the transmission of ship's Company Business to our agents in Yokohama. These were very long messages in cypher, and many times we had poor propogation to the Japanese coast station (this usually was on HF). What a grind it was to try sending a 100 word cypher message only to be broken in by the coast station with a request to QSZ (send each word twice). At other times, the coast station may have missed a group and consequently did not agree with the "check" or word count. He then would send "QTB" which meant "I don't agree with your check. I will repeat the first letter of each word". This was where break-in was very useful, as you could break in as soon as you found a letter missing from the sequence. However, in poor conditions it took a lot of concentration to make sure of each letter sent.

We used to have a free-for-all at Shanghai when we had traffic for that point. There were two coast stations there, one being the Chinese government's XSG, using a quenched gap spark transmitter on 500 khz, and the other being run by monks at the Zikawei Observatory, station FFZ on CW. The service via FFZ was far superior, and we always called them when we had traffic. If they did not respond, XSG would immediately fire up and call CQ QTC? We would just ignore this and wait for FFZ. When we finally made contact with the French station, XSG would then start calling CQ repeatedly asking QRU? or QTC? This, of course, was just malicious jamming to get revenge for our failing to give them the business.

After a long session at copying press, I would frequently call those coast stations from whom we usually received traffic and ask "QRU?" If propogation was good, the old amateur spirit would rise up in me and I would decide to WAC in the shortest time possible. This meant calling stations with whom we just never communicated, such as Sweden or Germany or Australia, etc and ask "QRU?". I think the best I did was a bit over one hour for WAC, adding in some extra European stations just for the fun of it. How corny can you get??

I might just mention that we were always willing to QSP traffic for ships that were in mid-ocean and couldn't raise coast stations on MF. Those ships would know, of course, that we had HF facilities, so they would get us to relay their traffic to wherever they requested. I found quite a different attitude during my 1934 trip to Europe, when I found that, in the Atlantic, the big German ships — Bremen and Europa — would not relay without charging for the service. In my biased view, the Pacific was a much friendlier area insofar as marine radio was concerned. Not only were ships helpful to each other, but the coast stations were not as rigid in their procedures. Perhaps this was because the traffic load was not as heavy. I guess the one exception to all this was the Orient coast. 500 Khz there was a shambles, with Russians, Chinese, Japanese and so on all fighting to make themselves heard on that one frequency while all of them were almost within stones throws of each other. The QRM there was so bad that on one occasion I heard a faint SOS in amongst all the QRM that apparently finally gave up. No one stopped for the call. No coast stations ordered a QRT SOS. The mad scramble to clear traffic just carried on. There was nothing we could do from our ship, as we had no super power to ride over all the other signals.

So much for marine operating. I have left out many details; but one can get too detailed and become very, very boring. Maybe that's happened already!! *(No! no! no! ed.)*

Meanwhile, keep smilin'.

CFARS: The popularity of patching

Art Sylvah
VE3FMB/CIW617

History

Possibly the first close association between the Amateur radio fraternity and the military in Canada occurred during WW II at which time the "Call to Arms" saw many of the electronics and communicator trade positions in all three services (ARMY, NAVY and AIR FORCE) filled by ham operators. Many of these Amateurs formed the nucleus of the Forces communications training cadre and it is a well documented fact that the experience and expertise of the Ham operators contributed greatly to an effective communications system.

AFARS

Shortly, after the war, on 8 Aug. 1946 to be exact, under the auspices of the RCAF, the Air Force Amateur Radio System (AFARS) was implemented and this program operated successfully for 6 years until 31 Aug. 1952, at which time a portion of the program integrated with the Civil Defence Communications Organization. AFARS was made up of approximately 500 licenced Amateur radio operators from across Canada and carried out such roles as providing communication in the area of search and rescue, assistance during national emergencies, and operating weekly nets on a regional and national basis.

The program was funded by DND, partially operated on various frequencies allocated outside the amateur radio bands, published an excellent quarterly magazine and provided various types of communications equipment on a loan basis to its members.

Mid 1950 on — Phone Patch Traffic

Perhaps the most visible association and as far as the military is concerned, the most beneficial, service in terms of morale, provided by the Amateur radio fraternity over the past 25 years or so, has been the provision of a person-to-person voice traffic link in the form of "phone patching" performed by Ham operators for service personnel stationed in remote and isolated locations so they may communicate with their families in Canada.

The first recorded and publicized account of this morale boosting communications service appeared in the 1956/57 period and involved Canada's first peace keeping force which was deployed in the Middle East (Egypt) with the United Nations Emergency Force. A young and enterprising Staff Sergeant whose call was VE3AHU set up the first Middle East Ham station to operate phone patches back to Canada and this same station operated successfully for about 10 years until the UN was abruptly asked to leave. Of course Amateur stations are now back on the air from the ME operating daily from the island of Cyprus, the Golan Heights and two bases in West Germany. Further, for the past 20 years or more, phone patches have been operated for servicemen in the Far North and from HMC Ships on sea deployments.

Not enough can be said for the hundreds of Amateur operators in Canada who have devoted their valuable time and equipment to perate informal traffic nets over the years. The communication service provided through Ham radio has been and continues to be tremendously popular as far as individual service people and their families and relatives are concerned; this can be seen from the impressive traffic volume figures. It is without a doubt a key morale booster for DND personnel serving at remote and isolated posts around the world.

Problem Areas

With such an effective communication service operating over the years, why the need for a formal radio system . . . CFARS?

Up until about 1976, there didn't appear to be a need, and then unfortunately, two particular problems were encountered which delayed the traffic process for extended periods and, in some cases, made it necessary to temporarily close down particular stations.

The first problem was the increasingly difficult task of finding licenced military Amateur radio operators who were willing to volunteer to serve in isolated or remote locations. The courses and the on-job training given at many of the military Amateur radio clubs to assist personnel to obtain their Amateur radio licences, and in a few cases the willingness of some military Amateur radio operators to do a second tour of duty at remote locations did not provide a viable or permanent solution.

The second problem encountered was that of interference which at times was intentional jamming and which delayed the traffic process for extended periods.

Interference for the most part can be attributed to rapid growth in the hobby and the subsequent

crowded conditions in the Amateur bands.

CFARS

Because of the Department of National Defence desire to continue this most worthwhile communications service and as a result of the problems already described, National Defence Headquarters decided to launch a program to be known as the Canadian Forces Affiliate Radio System — CFARS.

Basically, CFARS was organized to operate in a somewhat similar fashion to the United States Military Affiliate Radio System (MARS) which has operated successfully for over 50 years. Certainly, the volume of traffic would not compare to the MARS program, but if the volume of our informal nets over the past 25 years was any indication, quite a number of affiliate stations would be needed to operate CFARS!

As such, the basic operational concept was that CFARS would:

a. operate on specially allocated frequencies outside the amateur radio spectrum;
b. provide membership to include military installation stations, military Amateur radio unit/club stations and a number of designated volunteer affiliate licenced Amateur radio operators;
c. operate using quasi-military voice and operating procedures;
d. operate on several different radio nets, for example: a Northern net, a Maritime or HMC Ships net, a United Nations Canadian Contingents net, a National net, and a Training net.
e. use international callsigns while operating within its own framework.

The CFARS designers had realized from the start that to organize and operate the system could take considerable time. Up to 1976, the CFARS program had been mainly in the initial concept stage and various development aspects had yet to be worked out and finalized. These included:

a. an allocation of a full range of frequencies;
b. obtaining DOC approval for designated radio Amateurs to operate outside the amateur bands;
c. the publication of a comprehensive CFARS operating manual;
e. the tasking of a command and control organizations;
f. the formulation of exactly how many networks should be operated;
g. the possibility of publishing a periodic CFARS News bulletin; and
h. various other administrative details.

It was generally agreed that the long range outlook would be to operate a traffic and phone patch service for Canadian Forces personnel wherever they were located, be it sea deployments, the Far North, United Nations peacekeeping operations and other locations where the number of service personnel would warrant the service.

In April and May of 1978, trials were conducted by operating on a CFARS frequency of 13972.5 kHz — just outside the 20-meter Amateur band. Participants included military amateur stations at Ismailia, in the Middle East, and the Golan Heights, in Syria, and thirteen Amateur stations in Canada. The selection of the Canadian stations was made on advice received from the Ismailia station.

Temporary international callsigns were used. The trials were conclusively successful, with the traffic volume having risen dramatically above that normally handled within the amateur bands.

Worthy of note, tests which had previously been carried out by DOC on similar equipment as that used by the Ismailia station during the CFARS trials had already shown that frequency tolerances and stability were well within those allowed by radio regulations.

AIM AND BENEFITS OF CFARS

Generally, CFARS was designed to improve the radio communications service provided over the years on the Amateur frequencies by:

a. being an adjunct to existing military radio facilities, thus providing an extra means of communication when necessary;
b. eliminating a recurring problem of interference, mainly caused by increasing congestion of the Amateur bands — the main cause of delays in the handling of phone patches and message traffic; and
c. ensuring that military Amateur stations in isolated or remote locations would not be shut down because licenced radio Amateurs were not available to operate such stations.

Specifically, the system was designed to benefit the military and individual CFARS members as follows:

MILITARY

a. add flexibility to the present military Amateur communications;
b. maintain morale by providing

Patching

a viable voice/message traffic system;
c. provide a pool of civilian communicators familiar with basic military communication procedures; and
d. provide an emergency communications capability if required.

INDIVIDUAL MEMBERS
a. provide training and stimulate an interest in military communications;
b. widen the horizon for radio Amateurs interested in the traffic/message handling aspect of the hobby;
c. provide an additional way to perform a public service; and
d. ensure a continued and close association between the Amateur radio fraternity and military.

To say that CFARS has been a success, would be the understatement of the year. It is impossible to place a value on a phone patch between a husband in the Golan Heights and a wife and his children in Canada. "How is the car working?" "Did my income tax refund arrive?" "How is school going"? "Did you score any goals last week, son?" Immediate answers to questions uppermost in the mind of a man serving his country, half way around the world from home.

Your writer has an inkling of the value. Write a letter home from Ismailia, Egypt asking similar questions and you might get lucky and have an answer in three months! That's why I'm a member of CFARS.

As of this writing — early 1983 — many Canadian Amateur radio operators have chalked up four, five and six thousand patches — an indication of the popularity of the service and the dedication of the operators.

CARF NEWS SERVICE

BEACONS OLD AND NEW

The ten-metre beacon, VE3TEN, located in Ottawa, Ontario, is back on the air on 28.175 megahertz, thanks to George Roach, VE3BNO and John Henry, VE2VQ. The twenty-four hour fifty watt signal is fed to a quarter-wave antenna mounted on a 100-foot tower. By this fall it is hoped to have it converted to all solid-state and add another frequency between 28.200 and 28.300, yet to be determined. Another propagation indicator for the Ottawa area is the national time standard station, CHU. It has outputs conveniently close to the 80, 40 and 20 metre Amateur bands on 3.333, 7.336 and 14.236 megahertz. Reports on VE3TEN can be sent to CARF, Box 356, Kingston, Ontario, K7L 4W2.

EEC OPS SEEK COMMON TICKET

Amateurs in the countries of the European Economic Community are working for a common licensing agreement. This would permit Amateurs licensed by one country in the EEC to operate in any other EEC country without having to complete applications and obtain permits provided they observe the host country's regulations. The result would be a freer movement of Amateurs and a reduced workload for the radio administration of the EEC countries. It is expected that this will take a year or so before it is finally effective.

YL News and Views

Cathy Hrischenko VE3GJH
56 Stockdale Crescent
Richmond Hill, Ontario
L4C 3S9

Maritime Sparkettes elect new executive for 1983

The Maritimes Sparkettes YL Amateur Radio Club was formed by Chris Weeks VE1AKO and other YLs with the help of Bert Wittaker VE1RT in 1966. Mildred VE1AQI (now VE3GTI) was appointed first President. The Sparkettes meet Wednesday 9:30 a.m. local time on 3.770. A very attractive crest was designed by Walter VE1AHD, OM of Eileen VE1AML. The Sparkettes have various activities during the year and can usually be seen at the Eastern Conventions.

From left: Chris VE1AKO, President; Margie VE1YV, Vice-President; and Alma VE1MY, Secretary-Treasurer.

Anyone wishing information about joining the Maritime Sparkettes, can contact Alma VE1MY.

The new Executive for 1983:
Chris VE1AKO President
Margie VE1YV Vice President
Alma VE1MY Secretary-Treasurer

Chris VE1AKO has been an active ham since 1964. Chris has been president of the Maritime Sparkettes before and also past president of CLARA. Chris can be heard often on the Maritime Net. Margie VE1YV has been on the air many years. Many years ago she and her OM were on Sable Island but it didn't have special status then.

Alma VE1MY was first licenced October 11, 1938. She and her OM Wilbur VE1KK have been involved in radio ever since.

Congratulations to the new executive and wish you a most successful year.

I shall leave you with these words: The more you make, the more TAXING life becomes.

73/33/88 as the case may be
Cathy Hrischenko VE3GJH

CLARA AC-DC winners

Results of CLARA AC-DC

CLARA Winners:

First	Claire EI7CW
Second	Muriel VE3LQH
Third	Diana G4EZI

Non CLARA Winners:

First	Stephen VE3JPJ
Second	Frank VE3DVB
Third	Roy VE3BNV
a tie	

and Harry W6ZT

Trillium Week-end Winners:

First	Mary VE3COH
Second	Thelma VE3CLT
Third	Irene VE3IRS

Non TOT Winners:

First	Stephen VE3JPJ
Second	Tom Hedges VE3GVZ
Draw Prizes	Eva VE3EVA
	Thelma VE3CLT
	and Steve VE3JPJ

Congratulations to all the above winners and hope next year you will try again. These contests are alot of fun and the prizes are worthwhile.

Klink, clunk

The wearing of seat belts has become compulsary in England as of the first of the year. The following was in the London (England) Sunday paper. I thought it was right to the point!

"Klink — Clunk — As of January 31 seat belts will be compulsory. Until then, it is perfectly legal to smash your face in."

The VIC-20

RTTY anyone?

Fred Towner, VE6XX

I have been running into a growing number of U.S. Amateurs running the Commodore VIC-20 computer, using the Kantronics Interface box on the air for ASCII, Baudot and CW. I don't know for sure how good they are on RTTY, but they sure do sound nice on CW. Looking at the price of the alternatives available here in Canada, that VIC-20/ Kantronic box sure looks awfully attractive. Mind you, the price in the U.S.A. bears no resemblance to the prices here in Canada, but still, it appears to offer the best price/performance relationship available at this moment.

My father, WD6ERN, has a Microlog, ACT-1, and I have talked to several others who have this dedicated unit. It doesn't seem to be able to hold a candle to the VIC-20 insofar as performance is concerned. In fact, many owners of the ACT-1 seem to be exceedingly disappointed in the unit. The most common complaint is that the built in demodulator isn't worth a darn. I know my father has been trying to get satisfactory performance out of his unit since Christmas, when he received it. To date we have been unable to hold a CW QSO using his unit, despite 20 over S9 sigs both ways.

As one of our advertisers, Atlantic Ham Radio, has advertised the Kantronics Interface, I thought that maybe some of our members might be interested in one person's experience with this unit. I've spoken to Dick Moody, KC4K back some time ago on 20 metres and was so impressed with the sound of that VIC-20 combo, and with its performance, that I asked Dick to send me a story about his experience with the unit. That letter follows:

Dick Moody, KC4K
Waynesburg, PA, U.S.A.

Dear Fred:

In answer to your query, the VIC-20 is superb as a keyboard and, with the Kantronics Interface, all the necessary info is with the software associated with it. It is very easy to put on the air.

I've used it at various speeds to send and receive, and, with the 1056 characters of buffer, sent at 90 WPM to a ham who had a display on the other end, I was pleased to see he had no trouble copying.

I had W3RS send to me at 85 WPM and my display read it just fine, after I had made a slight adjustment in my receive frequency. However, you should note, to copy at this speed the signal must be good, and with a minimum of noise and QRM or you will not get good copy on your readout.

I use a 12 inch tube for my monitor, and, as I am sitting only three feet from the monitor, I thought the possibility of radiation would be less with a small screen, especially when you consider that the average enthusiastic CW operator would probably spend many hours glued to the set. Of course I really do not know if a larger screen would or could produce problems but, after thinking about that and operating requirements, I decided I really did not need a larger screen.

The display is controlled completely by the Kantronics Interface, as the signal comes from your receiver, through the filters in the Interface, and, interacting with the software that comes with the interface, is displayed on your monitor.

I've been in love with CW for 45 years and really don't need the display, as long as the other guy stays below 55 WPM, but I sure get lost when I have to go above 60. I am noticing an increase in my copying ability on my part. However, of course sitting there four to eight hours per day and copying code will surely give you some increase in proficiency, even if you don't have a brain in the head.

Everything I needed to connect my Omni to the VIC-20 was included in the software and Kantronics Interface. I needed nothing extra except the display monitor, which, by the way, could have been a colour set. I preferred black and white for CW and RTTY.

Down here in the States the VIC-20 is now selling for as low as $129 and I've seen the Kanatronics Interface for as low as $169 and with the software, an extra $49. So, for less than $350 it's possible to put a station on the air with fully automated CW, ASCii and Baudot.

I worked an Italian station the other day, and would you believe it, — he was also using a VIC-20.

One thing I should mention, I like the key pressure tension on my VIC-20. I built a Microcroft some years ago and one of the reasons I never got going with it to any extent was the feeling of sloppy keys. For some reason I seem to like a little pressure on the keys and my VIC provides that. It has a good keyboard.

Some of the fellows have a weighting adjustment that can be used to adjust the length of the dots for various speeds, the VIC-20/Kantronics Interface does not have this adjustment, but I have never worked a station that did not express the highest regard for the quaity of keying from the VIC-20.

Fred, I can't see how these people (manufacturers of VIC-20 and Interface) can fail, I sure wish I had invested in this company!

"73" Dick

TECHNICAL SECTION

Loss of memory avoided by circuit

Gordon Woroshelo VE3EYW

Having purchased a new car recently, I found that there was little room up front for my good old 2 meter transceiver. In looking over the selection of rigs on the market, I discovered at least two really small units that could solve my problem.

My new car offered only one place to mount the rig. That was in place of the ash tray, which I seldom used anyway. I found the fit to be almost perfect. I finally chose the new Azden PCS 4000 because of its small size, 16 memories and many other features.

Upon installing it, everything went well and I programmed in several repeater and simplex channels. That is, until I suddenly lost all memory after leaving the rig in the car overnight. I checked the built-in nicad battery used for memory backup, but it was OK. Over the next few days, I continued to have random memory problems — sometimes I'd lose it after stopping and starting and sometimes I wouldn't.

I reasoned that the problem was due to transients on the 12 volts dc line feeding the rig. I then tried a wild variety of line filters consisting of diodes, zener diodes, small and large capacitors, chokes, coils and everything but the kitchen sink! Nothing was 100% successful. At that point, I was almost licked and was ready to sell the rig.

In my adventures, however, I noted that I did not lose the memory if I turned the rig power switch off before starting the car engine. If I started the car, waited a few seconds and then fired up the rig, the memory remained intact.

So I designed a circuit that would do this automatically every time I started the car; that is provide a delay on energization. The circuit is shown below. You can construct this circuit on a perf board or handwire. I mounted my board in a small handy box with banana jacks for input/output connections. Any equivalent is fine. Nothing is critical.

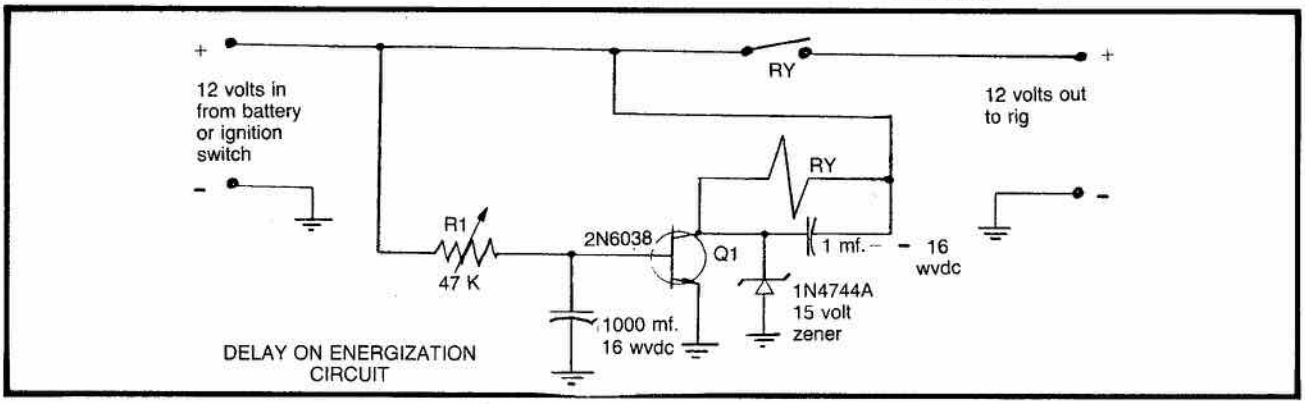
Variable resistor R1, can be any pot or equivalent. It sets the delay time and can be set anywhere from less than a second to several seconds. I chose 4 seconds. The greater the value of R1, the greater the delay. Transistor Q1 is a 2N6038 darlington, 4 amp unit. Any suitable substitute can be used. One could probably use a regular transistor also. In any case, it should be able to comfortably handle the coil current of relay RY.

For RY, I used a KRP series from my junk box. I paralled up the four sets of contacts to handle the 6 amps for the rig and provide low on resistance. Any miniature 12 vdc relay can be used although I recommend a coil current of less than 150 ma.

All other parts are standard. The parts used here are very non-critical and your junk box will come in handy.

I suspect this circuit will help users of a variety of other rigs out on the market that have internal battery backup for memory but have trouble retaining this memory for any length of time. I would be interested in hearing of similar experiences from other Amateurs.

Good luck and happy mobiling.



DELAY ON ENERGIZATION CIRCUIT

Studying for the Digital Ticket: Part VI

John Blommers, VE6BAA

This installment goes through about half the outline of study topics on page 12 of the DOC's TRC-24 booklet. When preparing for the Digital exam. all the topics covered on this list should be reviewed. Use this tutorial session to do so.

PART 1 — SAMPLING AND MODULATION

Sampling Theorem

An analog signal must be sampled at a rate at least twice that of the highest frequency present in that signal. This rate is called the Nyquist Frequency, and signals sampled at a rate greater than this can be reconstructed without distortion. The reconstruction is accomplished by passing the samples through a low-pass filter with a bandwith equal to the original signal bandwidth. In practice, the samples are also digitized, so that they may be manipulated by digital electronics and transmited on digital communications channels. This process is called analog-to-digital conversion (A/D). If the signal is digitized to eight bits of resolution, then it can be resolved to one of 256 voltage levels. This causes an average error of plus or minus 1/512 in the digital representation of the samples. This is perceived as noise.

Pulse waveform characteristics

A puise waveform can be characterized by its duration T, its amplitude A, its risetime R1 and its falltime F1. See figure 1A. The risetime is the time it takes for the waveform to go from 10% to 90% of its amplitude. The falltime is the time it takes for the waveform to drop from 90% to 10% of its amplitude. Other salient characteristics are overshoot — where the voltage temporarily exceeds the amplitude, and ringing — a decaying oscillation after the overshoot occurs. For a perfect pulse, we have the frequency spectrum as shown in figure 1B. Note that the spectrum has zero components at multiples of the pulse duration.

Pulse amplitude modulation

The modulating signal consists of pulses of fixed width whose amplitude is that of the original waveform being sampled. See figure 2.

Pulse Duration Modulation (PDM)

Also called pulse width modulation. These pulses are of fixed amplitude, and can be processed by digital systems. The width of the pulses is in proportion to the amplitude of the samples of the analog signal we want to transmit. See figure 3.

Time Division Multiplex (TDM)

Several independent signals are sampled at the same rate. Their samples are sent one after the other over one communications channel. At the receiving end, the signals may be reconstructed by properly sorting out the sequence of samples into their original order. Figure 4 shows how four signals are sampled (PAM) and multiplexed on one channel.

Pulse Code Modulation (PCM)

Samples from some input waveform are digitized using an analog-to-digital converter. Let each digital sample be a word of length N bits. On a PCM channel these bits are transmitted serially, beginning with the least significant bit (LSB) and ending with the most significant bit (MSB). Words are transmitted one after the other in a continous stream of data. At the receiver, the bit stream is converted back into digital words. These words are passed through a digital-to-analog converter (D/A) to reconstruct the analog samples of the original input waveform. Of course we use a low-pass filter according to the requirements of the sampling theorem. For example, suppose a waveform varies between +7 and −7 volts. We digitize it using a four-bit word. We sample it every second and assign the appropriate 4-bit word. The sequence might be as follows:

Time	0	1	2	3	4
Voltage	+3	+1	−2	+7	+4
Word	0011	0001	1110	0111	0100

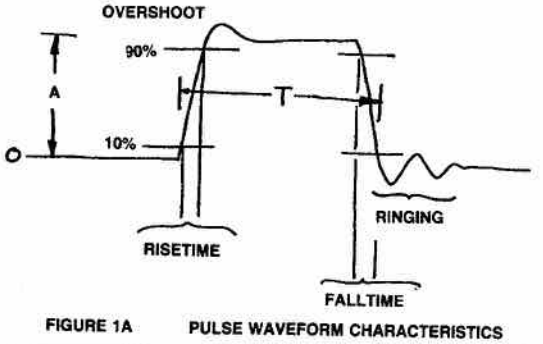


FIGURE 1A PULSE WAVEFORM CHARACTERISTICS

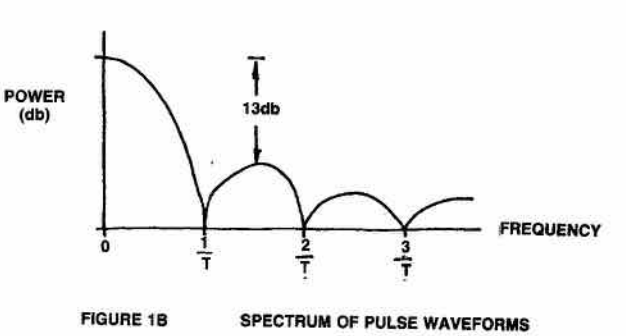


FIGURE 1B SPECTRUM OF PULSE WAVEFORMS

analog device. It will also accept these audio tones from another modem and convert the signals back into RS-232-C signals. Some modems come equipped with acoustic couplers so that a telephone can be inserted. Of course Amateurs are loath to use the telephone when radio can be used instead! With a little manufacturing of custom connecting cables, our Amateurs can communicate via digital radio.

The nearest type of emission I can find to describe this scenario is F3. What we need is a type of emission F6 which reads "telegraphy by frequency modulation of a carrier using an audio subcarrier". This covers a host of sins because the type of modulation used on the audio subcarrier is not specified. For your Bell 103 style modem, it is simple frequency shift keying between two frequency pairs — 1070 + 1270 Hz and 202 + 2225 Hz. For your Gandalf Supermodem II it is a very complex waveform.

Types of Digital Modulation

(a) Amplitude Shift Keying (ASK). The carrier amplitude is at one of two levels — low to represent a zero and high to represent a one. As with any form of amplitude modulation, the immunity to noise isn't too great. See figure 6A.

(b) Frequency Shift Keying (FSK). The carrier frequently is at one of two frequencies — low to represent a zero and high to represent a one. This method enjoys high noise immunity. See Figure 6B.

(c) Phase Shift Keying (PSK). The phase of the carrier is inverted by 180 degrees to represent a one, and is left alone to represent a zero. See figure 6C.

(d) Quad Phase Shift Keying (QPSK). See the "Error Characteristics" notes earlier on in this section. See also figure 6D.

Codes

(a) BAUDOT
- — five-bit code
- — has LETTERS and FIGURES codes to shift the carriage down and up. This allows up to 62 unique characters to be defined with 5 bits.

(b) ASCII
- — American Standard Code for Information Interchange
- — defines 127 character codes (7-bit code)
- — 8th bit is optional and user-defined. This bit may represent parity (for error detection) or graphics characters (TRS-80 computer).
- — used to communicate data on telecommunications facilities and RS-232-C computer peripherals.

(c) EBCDIC
- — Extended Binary Coded Decimal Interchange Code
- — used exclusively by IBM and imitative vendors.

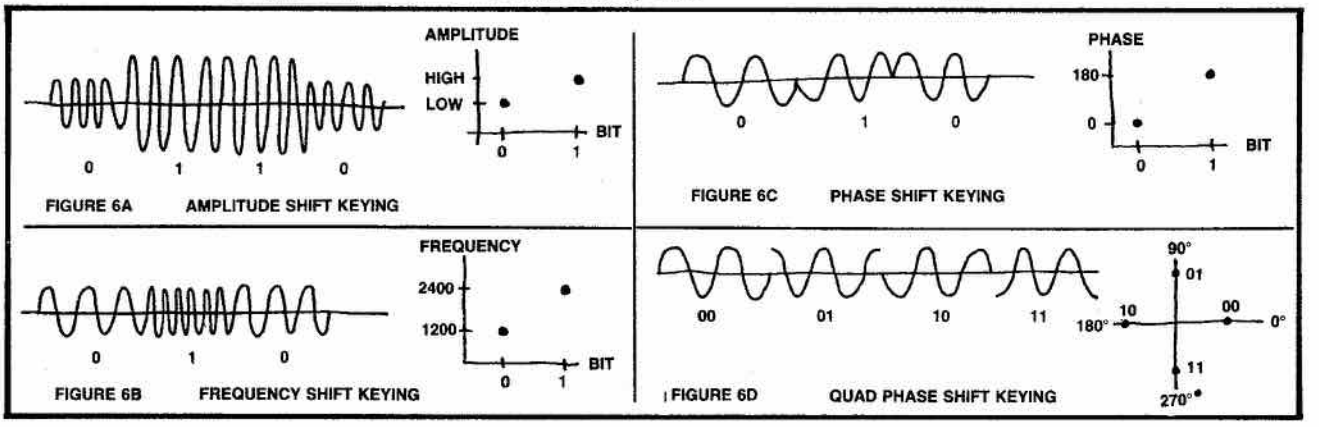
Standard Interfaces

(a) RS-232-C
- — implemented using a 25-pin connector
- — +3 to +25 volts represents binary zero
- — −3 to −25 volts represents binary one
- — one pin for serial input, one for output
- — several handshake lines for data transfers
- — several lines for modem control
- — one line carries a clock frequency
- — signal ground and protective ground
- — common interface to terminals and printers.

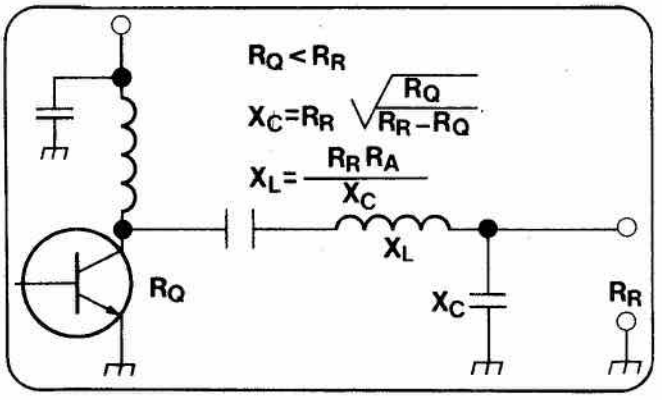
(b) Parallel
- — ex: the Centronics printer interface
- — eight lines send characters into printer
- — four of these return printer status
- — high data transfer rate possible.

(c) GPIB
- — also known as IEEE-488 or HP-IB
- — 8 bidirectional data/address lines
- — 5 control lines for parallel devices
- — three handshake lines coordinate byte zfers
- — popular interface for test instruments and desktop computers (ex. Commodore PET).

(d) S-100
- — 100-pin bus for microprocessor interfacing
- — carries clock lines
- — carries all data and address lines
- — various and sundry control lines
- — requires many ground lines between signal lines to minimize noise and crosstalk.



MATH NOTES FOR HAMS



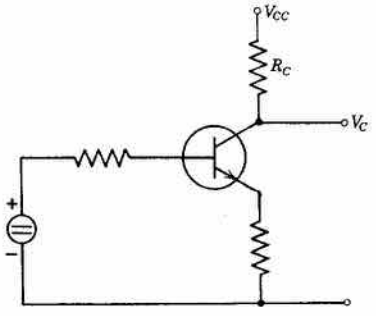
Philip Gebhardt VE3ACK

Manipulating Equations (Part 2)

Substituting Expressions

Last time, we looked at some of the possibilities for substituting numbers into equations. This time, we will look at what to do when you have an equation, but no number to fit into it.

In some cases, replacing a single variable with an expression is straightforward — almost like substituting a number. Figure 1 shows a standard transistor circuit. As is generally the case, the power supply voltage (V_{cc}) and the collector voltage (V_c) are known. The collector load resistance (R_c) can be determined by referring to a schematic diagram or by tracing the actual circuit. However, calculating the power dissipated by the resistor is not just a matter of applying equation 1, because we don't know the voltage across the resistor.



$$P = \frac{(V_R)^2}{R_c} \quad (1)$$

We can calculate the voltage drop across R_c however by using equation 2.

$$V_R = V_{cc} - V_c \quad (2)$$

Now it is possible to calculate the power dissipated by the resistor by substituting equation 2 into equation 1 to obtain equation 3.

$$P = \frac{(V_{cc} - V_c)^2}{R_c} \quad (3)$$

In such a simple case, you could calculate the voltage in your head to avoid the paperwork. But, as stated last time, understanding the simple cases provides you with the background to tackle the complicated problems.

$$X_L = \frac{QR_1 + R_1R_2/X_C}{Q^2+1} \quad (4)$$

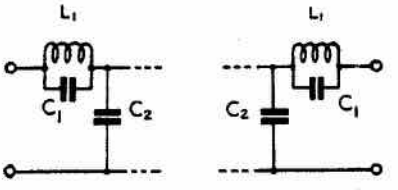
where f, C, Q, X_C, X_L have their standard meaning R_1, R_2 are the resistive impedance to be matched

Equation 4 is used to determine the reactance of the coil in a pi-network. On its own, it is fairly complex. However, the inclusion of X_C (the reactance of the loading capacitor) in the equation further complicates the matter. Since for a five-band rf power amplifier both f and C change on each band, therefore X_C must change on each band. It is obvious then that X_C does not have a single value. As a result, it must be calculated as part of the operation of finding X_L. By substituting equation 5 into equation 4 (the theoretical equation), we produce the practical equation (equation 6).

$$X_C = \frac{1}{2\pi fC} \quad (5)$$

$$X_L = \frac{QR_1 + 2\pi fCR_1R_2}{Q^2+1} \quad (6)$$

There are even times when mathematicians or engineers make a substitution solely for convenience. For example, when several constant-k pi-sections are used in a low-pass filter (see Figure 1 of the last installment), the input and output sections are usually m-derived pi-sections. The end section schematics are shown in Figure 2 and the required equations appear as equations 7, 8 and 9.



m-derived end sections for use with intermediate π section

$$L_1 = \frac{\sqrt{1 - \left[\frac{f_c}{f_\infty}\right]^2} \cdot L_k}{2} \quad (7)$$

$$C_1 = \frac{C_k \cdot 1 - \left[\sqrt{1 - \left[\frac{F_c}{f_\infty}\right]^2}\right]^2}{2\sqrt{1 - \left[\frac{f_c}{f_\infty}\right]^2}} \quad (8)$$

$$C_2 = \frac{\sqrt{1 - \left[\frac{f_c}{f_\infty}\right]^2} \cdot C_k}{2} \quad (9)$$

Since there is a recurring element in the equations, the equa-

tions can be simplified by letting

$$\sqrt{1-\left[\frac{f_c}{f_\infty}\right]^2} = m$$ and substituting in equations 7, 8 and 9.

The results are shown as equations 7(a), 8(a) and 9(a).

$$L_1 = \frac{mL_k}{2} \qquad (7a)$$

$$C_1 = \frac{C_k(1-m^2)}{2m} \qquad (8a)$$

$$C_2 = \frac{mC_k}{2} \qquad (9a)$$

Not only does the use of 'm' simplify the written equations, but it also establishes that there is a common link between the three equations. As a result, when performing the actual calculations, you can determine the value of m once and then use it whenever necessary. In addition, the use of L_k and C_k demonstrate the similarity between constant-k sections and m-derived sections. All these interrelationships would be lost, if the equations were not written in the form shown.

The last example of mathematical manipulation to be presented this month shows how to use substitution to obtain a completely new equation.

Starting with the simple concept that at resonance inductive reactance (X_L) equals capacitive reactance (X_C), an entirely new and useful equation is generated.

$$X_L = X_C$$

$$2\pi fL = \frac{1}{2\pi fC}$$

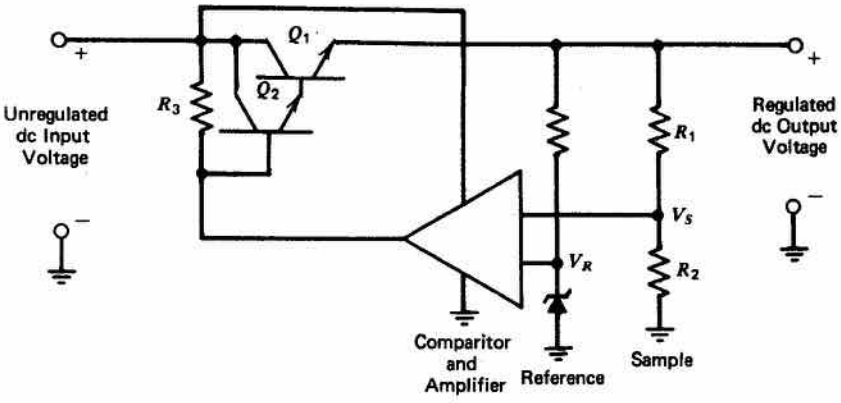
$$f^2 = \frac{1}{(2\pi L)(2\pi C)}$$

$$f^2 = \frac{1}{4\pi^2 LC} \qquad f = \frac{1}{2\pi\sqrt{LC}}$$

It's amazing what shows up when you apply a little substitution.

Question Period

Here is this month's question. Figure 3 shows



the diagram of a basic voltage regulator circuit using an op-amp such as the 741. In the circuit, R_1 and R_2 form a voltage divider across the output, from which a sample voltage (V_S) is developed. The op-amp compares the sample voltage to a reference voltage (V_R) developed across Zener diode Z_1. The input voltage to the op-amp is the difference between the reference voltage and the sample voltage. See equation 10.

$$V_{in} = V_R - V_S \qquad (10)$$

Since the sample voltage is dependent on the output voltage (V_0), we can relate the two using equation 11.

$$V_S = V_0\left(\frac{R_2}{R_1+R_2}\right) \qquad (11)$$

Substituting equation 11 into equation 10 will provide you with a practical equation. Write down the new equation and then use it to determine V_{in}, if V_R = 5.6V, R_1 = 44k, R_2 = 56k and V_0 = 10V.

Forward your complete solution along with the required information about yourself to the address given in Part 1 of the series.

Corrections to 'Math Notes for Hams', TCA, March 1983, pp 37-39.

The corrections are confined to the section titled 'Manipulating Equations (Part 1)' and only errors which might create confusion and misunderstanding are listed here.

p. 37 — middle column, last line:

An amateur Radio version of the simple equation above could be $\lambda = \frac{300}{f}$ where λ is the wavelength (in metres) of an rf signal and f is the frequency in MHz.

p. 38 — Caption for Figure 1:

Insert f_c in the empty brackets.

Equations:

Equations are referred to by number in the text, but no numbering system appears beside the actual equations.

$L = \frac{Z_o}{\pi f_c}$ is Eq'n 1

$C = \frac{1}{2\pi f_c Z_o}$ is Eq'n 2

and so on, to

$L = \frac{150 \times V}{f}$ which is Eq'n 6.

With the above guidelines, readers should be able to label equations 3, 4 and 5 on their own.

— middle column, second line:

20 x 20 should read **24 x 10^6**.

p. 39 — left column, first sentence:

To avoid confusion that the required value of inductance might be minus 1.5 μH and the calculated value might be minus 1.4 μH, the hyphens should be replaced with the dashes indicated in the original. The sentence then reads:

Despite the small discrepancy between the required value — 1.5 μH — and the inductance of your coil — 1.4 μH — the frequency will shift only slightly...

Further Note: To enable readers who may have been confused due to these errors, the deadline for submission of answers to 'Question Period' has been extended to **May 16th**.

The Maple Ridge A.R.C. is hosting Hamfest 83 on the 2-3 July 1983. Location Maple Ridge Fairgrounds 30 miles east of Vancouver on #7 Hwy. Registration — Hams $5.00, non Hams over 12, $2.00.

Food, displays, swap & shop, bunny hunts, at least 2 major prizes plus many more, ladies and children's programs. Lots of camper space with some electrical hookups. Talk in freq. 146.20/80 146.34/94.

For registration info. (20% off for pre registration) contact Bob Haughton VE7BZH, Box 292 Maple Ridge, B.C. V2X 7G2.

Canadian Amateur Radio First

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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.

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OPERATION INFORMATION

RECIPROCAL OPERATING AGREEMENTS

Canada has concluded agreements or arrangements with the following countries to permit licensed Amateur radio operators to operate radio stations while temporarily in the other country: Australia, Austria, Barbados, Belgium, Bermuda, Botswana (Republic of), Brazil (Federative Republic of), Chile, Colombia, (Republic of), Costa Rica, Denmark, Dominica, Dominican Republic, Ecuador, Finland, France, Germany (Federal Republic of), Greece, Guatemala (Republic of), Haiti (Republic of), Honduras (Republic of), India (Republic of), Indonesia (Republic of), Iceland, Ireland, Israel (State of), Italy, Jamaica, Luxembourg, Malta (Republic of), Netherlands (Kingdom of the), New Zealand, Nicaragua, Norway, Panama (Republic of), Papua, Peru, Philippines (Republic of the), Poland (People's Republic of), Portugal, S. Lucie, Senegal (Republic of the), Sweden, Switzerland (Confederation of), United Kingdom, United States of America, Uruguay (Oriental Republic of), Venezuela (Republic of).

Negotiations for the establishment of similar agreements or arrangements with the Republic of Bolivia, Cuba, Japan and Italy have been initiated.

How to use the CARF QSL Service

The CARF Outgoing QSL Service will forward your QSL cards to anywhere in the world. This service is **free to CARF members.** If you send a lot of cards, a CARF membership will soon pay for itself in view of the high cost of postage when cards are mailed direct.

Please observe the following rules when using the CARF Outgoing QSL Service:

1. Sort cards alphabetically by prefix.
2. Sort Canadian cards numerically by call area.
3. Place small lots of cards in strong, heavy envelopes and seal securely. Wrap heavier packages in strong paper or put in cardboard box. Tie securely. Do not staple!
4. Address your package as shown in the diagram.
5. **Do not register the cards.** This only delays them, costs more and is not really necessary.
6. If you want proof that CARF received your cards, enclose a self-addressed, stamped postcard or envelope with 'Receipt' marked on it.
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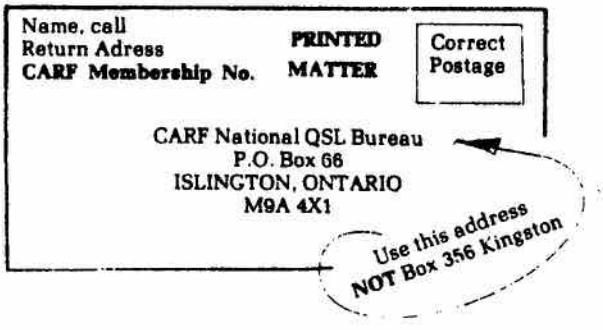
(For an explanation of QSL Bureaus in general, see the CARF Regulations Handbook chapter on QSLing).



BANNED COUNTRIES LIST

The following countries have notified the International Telecommunications Union that they forbid radiocommunications with Amateur stations under their jurisdiction: Democratic Kamuchea, Iraq (Republic of), Libya (Socialist People's Libyan Arab Jamahiriya), Somali Democratic Republic, Turkey, Viet Nam (Socialist Republic of), Yemen (People's Democratic Republic of), Zaire (Republic of).

THIRD PARTY TRAFFIC AGREEMENTS

Canada has concluded agreements with the following countries to permit Amateur radio operators to exchange messages or other communications from or to third parties: Australia, Bolivia (Republic of), Chile, Columbia (Republic of), Costa Rica, Dominican Republic, El Salvador (Republic of), Guatemala (Republic of), Guyana, Haiti, Honduras (Republic of), Israel (State of), Jamaica, Mexico, Nicaragua, Paraguay (Republic of), Peru, Trinidad and Tobago, United States of America, Uruguay (Oriental Republic of), Venezuela (Republic of).

Negotiations for the establishment of similar agreements or arrangements with Ecuador and the Federal Republic of Nigeria have been initiated.

Amateurs who wish to operate in Commonwealth countries other than those listed above should apply to the embassy in Canada or directly to the appropriate regulatory agency.

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2. Sort Canadian cards numerically by call area.
3. Place small lots of cards in strong, heavy envelopes and seal securely. Wrap heavier packages in strong paper or put in a cardboard box. Tie securely. *Do not staple.*
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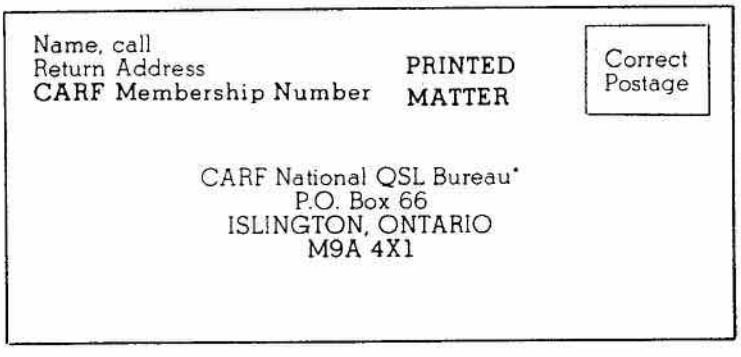

Your finished package should look like this.

*Use this address, not Box 356, Kingston

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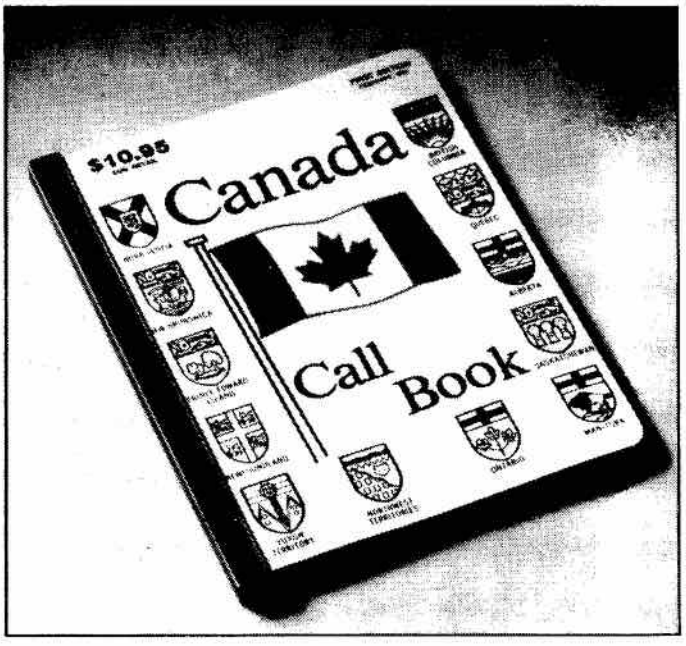

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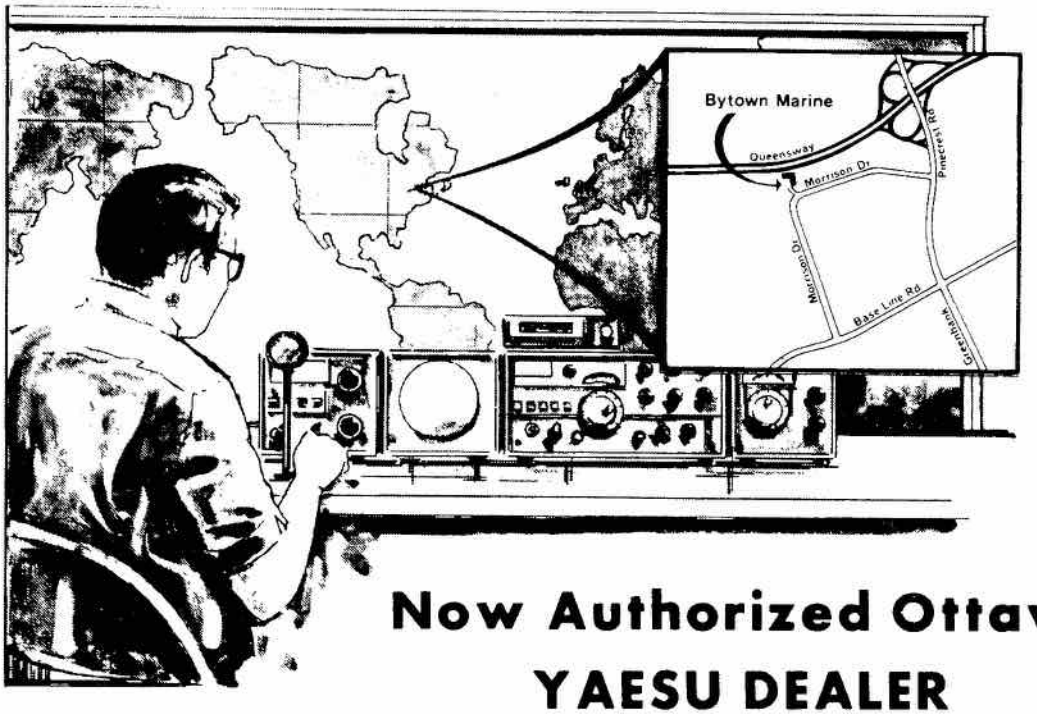

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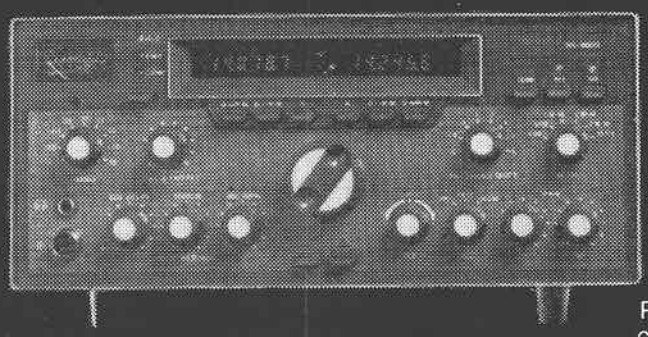

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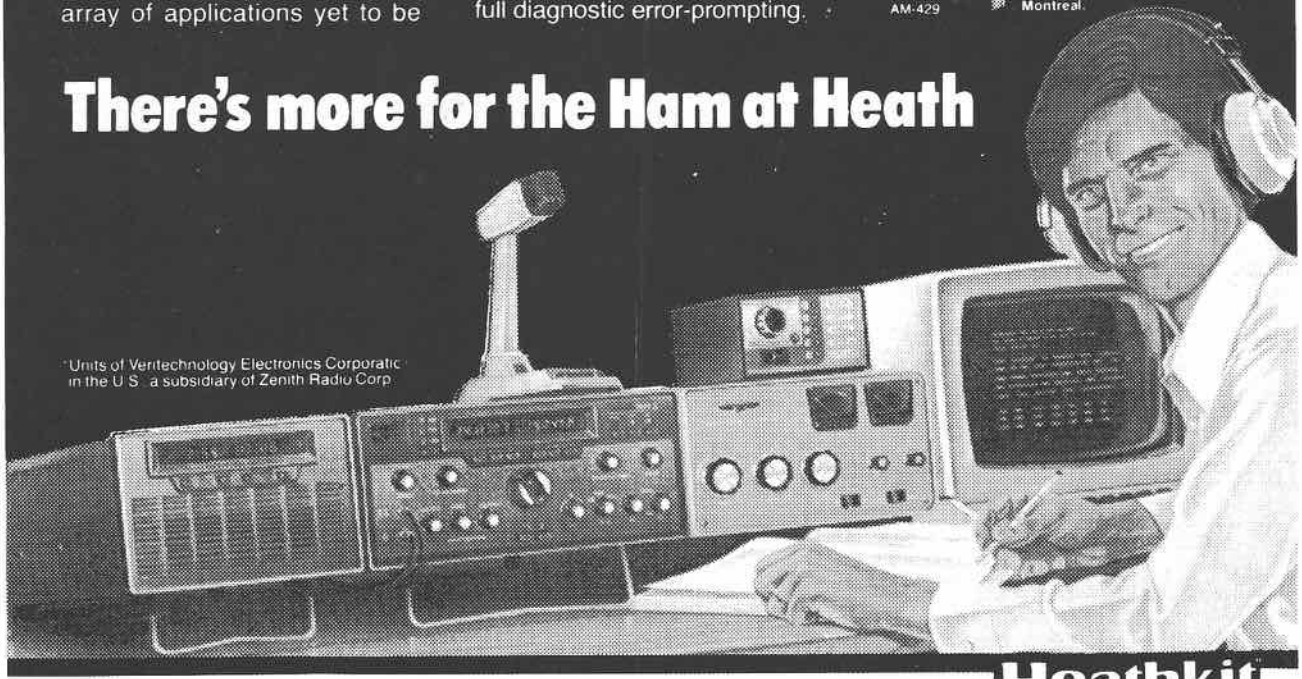

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