CARF

the canadian amateur

May 1976 Number Five

Regs changes drafted

After a year's work, a sub-committee of the Federation's Regulations Committee has finished a first draft of a codified form of those Radio Regulations applicable to the Amateur Experimental Service. Some changes and amendments are included in the draft.

Undertaken at the request of DOC, the draft is now being circulated to CARF affiliate organizations and provincial societies for comment.

These organizations have been asked to circulate and publicize this draft and after the feedback has been reviewed by the Federation a final draft will be made available to DOC. The procedure calls for the Department to review the draft and it would accept, reject or amend this recommended codification and if the result is approved by the Department of Justice, would then publish it in the Canada Gazette, asking for public comment before making it effective.

Due to the legal format and size of this draft, it is impractical to distribute it directly to all Amateurs, so a summary is presented here. Copies of the complete document may be obtained by individuals or non-affiliated organizations for $10.00. It is free for your club or organization if it is, or becomes, an affiliate member of the Federation (the membership fee is $10.00).

(continued on Page 6)

Canadian Amateur assists in Alaska emergency

"I was talking to my Russian friend in the Ural mountains and my antenna was due north when this Mayday call came in." Marcel Gervais, VE7DOR, a Fort Nelson CPA agent was describing the two and a half hour drama in which he assisted a small Eskimo community to evacuate a child who had accidentally been shot while out hunting.

It was 5.58 GMT on March 24 when Marcel got the emergency call, very faint at first. The operator identified himself as Art Mortvedt, a teacher at the small Eskimo community of Shungnak on the Kobuk River about 180 miles east of Kotzebue, Alaska. He was operating on a mobile power unit, a tractor battery and he didn't think he had much power left. He asked that Marcel contact the troopers in Kotzebue or, failing that, the airforce.

Marcel, who had assisted in the Alaska 'quake emergency traffic during his stay in Ottawa, called the radio man on duty at the airport and asked him to make contact with the Kotzebue police via land phone. This he did and with the aid of a patch-in on his telephone, the State Police were able to speak directly with Art Mortvedt in Shungnak via CN lines and the radio transmitter in Fort Nelson.

Arrangements had been made to illuminate the airstrip with snowmobiles and at 12:30 am the plane landed and the injured boy was transported to hospital. Throughout the three hour drama, two-way radio contact had been maintained by two Amateur operators 1100 miles apart.

Syd Jameson, the only other Amateur in the community, monitored the entire operation in case Marcel lost contact.

TCA format changed

This month, The Canadian Amateur has adopted a new format for the publication of the regular news, features and technical articles from the Canadian Amateur scene.

This issue is a transitionary issue in which several of the ideas that have been discussed by the Federation and its members will be presented to the readers. The adoption of the newspaper stock and the web offset printing process, for example, enables us to increase the number of pages to 24, the largest issue of TCA to date.

Comments are welcomed by CARF concerning these changes in the magazine and any ideas for future changes in format or content.

CARF

the canadian amateur

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All correspondence is welcomed and should be addressed to the Editor, The Canadian Amateur, Canadian Amateur Radio Federation, Inc. P. O. Box 356, Kingston, Ontario.

For CARF National QSL Bureau services, write to: PO Box 66, Islington, Ont. M9A 4X1.

U.S. Licences available

A telephone conversation with the FCC clarified a recent ruling concerning the licensing of aliens. If any Canadian wishes to write the FCC exams and get a U.S. operator's licence and a station call, he must provide a U.S. address. This can be a mailing address and need not be a place of residence. Our FCC source said it serves only as a place through which the Commission can communicate with the Canadian operator, should the necessity arise.

From the Front Office

Good news for those who want to study for their Amateur Certificate of Proficiency. The only publication that provides a study guide for the new DOC multiple choice examination has just been published by the Canadian Amateur Radio Federation, Inc.

Written by two radio and electronics instructors in Kingston, Ont., Bill Bushell, VE3DXY and Bert Hovey, VE3EW, the guide provides a course in the technical and operating requirements of the new exam. Sample exam questions, including the circuit diagrams which may be required are included. The drawings have been approved by DOC Head Office.

The Canadian Amateur Certificate Study Guide covers updated theory, including transistor and solid state circuits, single sideband and FM transmission and basic rules for operating.

This text and the Canadian Amateur Radio Regulations Handbook provide a self-study course and study aids for classes in schools and community colleges.

Another study guide for those trying their Advanced Certificate is the next publication to be undertaken by your Federation. Its writing depends upon the issue of the new Advanced Amateur Certificate examination by the DOC.

The Canadian Amateur Certificate Study Guide ($5.00 ppd) and the Canadian Amateur Radio Regulations Handbook ($4.00 ppd) are both available from the Canadian Amateur Radio Federation, Inc. Box 356, Kingston, Ont. K7L 4W2. Money orders or cheques please.

Letter to the Editor

Dear Sirs,

I'm frustrated. In your October issue you gave info on CHU coding, but not what frequency it transmits on! So I wrote for more info as per the invitation. I received more information on CHU coding, meanings, etc., but not a mention of the Tx frequency again!

Now just read Feb. issue noting letter from a reader telling you that you 'missed the most essential detail...' Sorry, the most essential detail is what frequency to listen to it upon! Please advise in next issue.

Keep up the good work -- avid reader. Pardon this needle.

Yours sincerely,
Douglas Russell VE2EDR
Pointe Claire, Que.

(Sorry about our oversight; the information follows: CHU broadcasts simultaneously on frequencies 3330, 7350 and 14,670 kHz using Upper Sideband with full carrier reinserted. Power outputs are 3 kW on 3 and 14 MHz and 5 kW on 7 MHz. The 3 MHz antenna is a dipole with E-W lobes; the 7 MHz is vertical; and the 14 MHz antenna is a curtain array directed 315 degrees.

The station is located 10 miles S.W. of the Dominion Observatory in Ottawa and the frequencies used are synthesized from a rubimium frequency standard that is referred daily to the Canadian caesium standard.

SHORT-CIRCUITS

"POOR SAM WONDERS WHERE HE FAILED AS A FATHER; - HE ADVISED JUNIOR TO GO TO THE RADIO INSPECTOR'S OFFICE TO GET AN AMATEUR EXAM SYLLABUS AND HE CAME BACK WITH A CB PERMIT APPLICATION FORM!"

SSTV Band expands

DOC Headquarters advised the Federation on April 5, 1976, that on that date it was releasing information that SSTV operation will now be permitted from 3.725 to 3.890 MHz. Effective on that date, this makes an expansion of 140 kHz at the top end of the sub-band which will ease video communications between Canadian and U.S. SSTV enthusiasts.

If you have a copy of the Canadian Radio Regulations Handbook, paragraph 8.1 should be amended accordingly.

GRS figures top report

The DOC Annual Report for the fiscal year 1974-75 arrived just at our deadline and a quick glance gleaned a couple of interesting facts; major users of radio in Canada are -- you guessed it -- the GRS, with 123,012 stations (with permits). The Amateurs came fifth with 14,713. The dollar value of Amateur station licences placed in fifth again, with $147,130. The GRS again topped the list with $505,520. More on the report and its statistics in the June issue.

Ron Hough, VE7HR of Victoria B.C. was recently presented with the BCARA 'Ham of the Year' Award for 1975 by Floyd Beardsell VE7HI, President of BCARA and Alan Muir VE7BEU, President of the Victoria Short Wave Club. Ron retired as ARRL QSL Manager after serving the Amateur Radio fraternity of British Columbia in this capacity for 37 years. Ron has been a licensed operator since 1929 and received the BCARA Award once before, in 1958, becoming the first Ham to be presented twice with this Award. When asked for a comment, in true Ham fashion, Ron replied, "I would like to thank all the Hams who have helped me over the years".

CW ain't dead yet!

A recent 'help wanted' ad asked for radio operators for United Nations postings "in any part of the world" and required "30 words per minute on a semi-automatic key" and a minimum of 50 wpm on a teletype. The UN is looking for the old-fashioned, pre-union radio op who, in addition to brass pounding should be able to "maintain telegraph and voice radio transmitters, receivers and power units, TTY, TD, etc. and be familiar with the erection of mobile radio station's antenna and emergency repairs". And, just for good measure, as well as having a first or second class radio certificate, candidates must have a valid driver's licence.

For all this, the annual take is $7,430 plus $137 to $507 monthly allowance depending on the posting, which lasts for one year, possibly renewable. Joking aside, this could be a real adventure for some young operator with a yen to travel. If interested, write to Mr. Tarbah Solieman, Office of Personnel, United Nations, New York, N.Y. U.S.A. 10017.

U.S. operating forms

Canadian Amateurs returning the FCC Form 410 (Reciprocal operating authorization) to the U.S. should address it to the FCC, Box 1020, Gettysburg, PA. 17325.

CRAG — Canadian Repeater Advisory Group

The march of progress in radio technology has always seemed to bring problems to the Amateur in its train. The advent of radio broadcasting back in the early twenties brought an end to Amateur stations using spark transmitters. The arrival of TV again brought up a multitude of troubles arising from interference. The first problem disappeared over the years as Amateurs were able to purchase transmitting tubes and build CW and phone stations and techniques were evolved for dealing with interference. The same ingenuity went into solving the problems accompanying the popularity of TV.

Now it's the turn of VHF FM repeaters. This time it's not the same type of interference but the net result is the same ... problems for the Amateur. It's called 'intermodulation' and is usually peculiar to metro areas where the VHF and UHF spectrum is literally jammed with commercial users.

Although the Vancouver area DOC has been keeping a watchful eye on Amateur repeater frequency allocations in order to avoid their interaction with commercial users, the first reported case to CRAG of a repeater being put on quiet hours has occured in Montreal recently. VE2PY has been requested by DOC to cease daytime operation due to a complicated intermod effect on commercial stations. It shares an antenna with these users and is now looking for a new site.

A second case of intermod with a commercial station has arisen in Sudbury where VE3SRS has gone temporarily to 146.46/147.06 from 146.16-146.76 until it too is relocated.

A new repeater is proposed for Flin Flon, Manitoba, on 146.34/146.94 (subject to co-ordination) to be on the air this summer, along with three more in Quebec proposed for the Gaspe peninsula.

Repeater Directory

NOTES
A - Autopatch
P - Proposed
1 - Linked
2 - Temp Call
3 - RTTY
4 - Temp Freq 146.46/147.06

NEWFOUNDLAND
****

LOCATION	CALL	NOTES	INPUT	OUTPUT
CORNERBROOK	VO1KI		146.46	146.94
LABRADOR CITY/WABUSH	VO2AD		146.46	146.94
LABRADOR CITY/WABUSH	VO2AD		146.34	146.94
ST JOHNS	VO1GT		146.46	146.94

NOVA SCOTIA
****

LOCATION	CALL	NOTES	INPUT	OUTPUT
BRIDGETOWN	VE1BO		146.46	147.06
DARTMOUTH	VE1PB		146.25	146.85
GORE	VE1LHR		146.04	146.64
HALIFAX	VE1CBC		146.34	146.94
LIVERPOOL	VE1ASQ		146.46	147.06
MT BLOMIDON	VE1AEH		146.58	147.18
MULGRAVE	VE1RTI		146.22	146.82
NEW GLASGOW	VE1HR		146.16	146.76
SYDNEY	VE1JD		146.34	146.94
TRURO	VE1XK		146.46	147.06
YARMOUTH	VE1YAR		146.01	146.61

NEW BRUNSWICK
****

LOCATION	CALL	NOTES	INPUT	OUTPUT
BATHURST	VE1PL		146.34	146.94
FREDERICTON	VE1GT	A	146.34	146.94
FREDERICTON	VE1PD		146.16	146.76
MONCTON	VE1CQ		146.13	146.73
MONCTON	VE1RPT	A	146.28	146.88
PERTH	VE1KMT		146.46	147.06
SAINT JOHN	VE1KI		146.22	146.82
SAINT JOHN	VE1TWO		146.10	146.70
ST STEPHEN	VE1IE		146.28	146.88
SUSSEX	VE1SMT		146.01	146.61

PRINCE EDWARD ISLAND
****

LOCATION	CALL	NOTES	INPUT	OUTPUT
CHARLOTTETOWN	VE1AHC		146.40	147.00
CHARLOTTETOWN	VE1AHC		146.10	147.00
SUMMERSIDE	VE1CFR		146.25	146.85

QUEBEC
******

LOCATION	CALL	NOTES	INPUT	OUTPUT
ALMA	VE2EFM	P	146.25	146.85
AMOS	VE2KZ		146.16	146.76
AMQUI	VE2KH		146.28	146.88
BAIE COMEAU	VE2PR		146.10	146.70
CARLETON	VE2 ?	P	146.22	146.82
CHICOUTIMI	VE2IU	A	146.16	146.76
DOLBEAU	VE2EFA	A	146.10	146.70
GASPE	VE2 ?	P	146.28	146.88
HULL/OTTAWA	VE2CRA		146.34	146.94
HULL/OTTAWA	VE2CRA		443.30	448.30
HULL/OTTAWA	VE2CSO		146.10	146.70
HULL/OTTAWA	VE2KPG	A	147.96	147.36
HULL/OTTAWA	VE3OCR		146.25	146.85
HULL/OTTAWA	VE3ORA		146.28	146.88
HULL/OTTAWA	VE3 ?	P 3	147.90	147.30
JOLIETTE	VE2AMM		146.43	147.03
JONQUIERE	VE2EFB		444.00	449.00
JONQUIERE	VE2VPB		146.22	146.82
LA TUQUE	VE2EH		146.34	146.94
LAC ST JEAN	VE2SP		146.34	146.94
LES EBOULEMENTS	VE2 ?	P	146.13	146.73
MONT LOGAN	VE2OE		146.16	146.76
MONTREAL	VE2AU		146.31	146.91
MONTREAL	VE2BG		146.46	147.06
MONTREAL	VE2DN		146.16	146.76
MONTREAL	VE2ECM	A 3	146.04	146.64
MONTREAL	VE2MRC	A	147.72	147.12
MONTREAL	VE2PY		146.28	146.88
MONTREAL	VE2RM	A	146.40	147.00
MONTREAL	VE2VS		146.25	146.85
MONTREAL	VE2XW		146.10	146.70
MONTREAL	VE2HH		222.90	224.50
MONTREAL	VE2RM		444.00	449.00
MT TREMBLANT	VE2MT		146.13	146.73
PARC DES LAURENTIDES	VE2ES		146.28	146.88
PERCE	VE2 ?	P	146.19	146.79
PLESSISVILLE	VE2CRP		146.13	146.73
PORT ALFRED	VE2TG	P	146.43	147.03
QUEBEC CITY	VE2ASU		146.10	146.70
QUEBEC CITY	VE2DB	A	146.28	146.88
QUEBEC CITY	VE2LB	A	146.04	146.64
QUEBEC CITY	VE2OM		146.34	146.94
QUEBEC CITY	VE2SRC		147.72	147.12
QUEBEC CITY	VE2UX	1	146.22	146.82
QUEBEC CITY	VE2UZ		146.46	147.06
QUEBEC CITY	VE2VD		146.16	146.76
RIMOUSKI	VE2WM		146.22	146.82
RIMOUSKI	VE2CSL		146.34	146.94
RIVIERE DU LOUP	VE2NY	1	146.46	147.06
RIVIERE DU LOUP	VE2OD		146.19	146.79
SHERBROOKE	VE2SS		146.16	146.76
SHERBROOKE	VE2TA		146.19	146.79
SEPT ISLES	VE2CSI		146.34	146.94
ST JEAN	VE2CVR		147.84	147.24
TROIS RIVIERES	VE2AT		146.07	146.67
TROIS RIVIERES	VE2CRT		146.34	146.94
TROIS RIVIERES	VE2QW		147.90	147.30

ONTARIO
****

LOCATION	CALL	NOTES	INPUT	OUTPUT
BELLEVILLE	VE3KBR		146.40	147.00
BRACEBRIDGE	VE3MRT		146.28	146.88
BRAMPTON	VE3MHZ		146.28	146.88
BRANTFORD	VE3TCR		147.75	147.15
BROCKVILLE	VE3WXR		146.37	146.97
BROCKVILLE	VE3BAT	P	146.46	147.06
BURLINGTON	VE3RSB		147.81	147.21
CHATHAM	VE3KCR		147.72	147.12
CORNWALL	VE3SVC		147.78	147.18
DEEP RIVER	VE3NRR		146.16	146.76
ELLIOT LAKE	VE3NSR	P	146.16	146.76
FONTHILL	VE3WFM		146.69	147.09
GODERICH	VE3GOD		146.43	147.03
HAMILTON	VE3DRW		146.16	146.76
KINGSTON	VE3KER		146.34	146.94
KINGSTON	VE3KNR		146.19	146.79
KITCHENER	VE3KSR		146.37	146.97
LONDON	VE3LAC		146.46	147.06
LONDON	VE3NDT		146.34	146.94
MONTREAL RIVER	VE3LSP		146.46	147.06

NEW LISKEARD/COBALT	VE3TAR		146.34	146.94
NEW LISKEARD/COBALT	VE3TAR		146.46	146.94
MORRISBURG	VE3SVR		146.16	146.76
NORTH BAY	VE3NFM		146.34	146.94
ORILLIA	VE3LSR		146.25	146.85
OSHAWA	VE3OSH		147.72	147.12
OTTAWA/HULL	VE2CRA		146.34	146.94
OTTAWA/HULL	VE2CSO		146.10	146.70
OTTAWA/HULL	VE2KPG	A	147.96	147.36
OTTAWA/HULL	VE3OCR		146.25	146.85
OTTAWA/HULL	VE3ORA		146.28	146.88
OTTAWA/HULL	VE2CRA		443.30	448.30
OTTAWA/HULL	VE3 ?	P 3	147.90	147.30
OWEN SOUND	VE3OSR		146.34	146.94
PETERBOROUGH	VE3KRA		222.34	222.94
PETERBOROUGH	VE3PBO		146.34	146.94
PORT COLBORNE	VE3WCR		147.90	147.30
RAMORE	VE3TIR	1	146.46	147.06
RENFREW	VE3STP		146.46	147.06
ST CATHERINES	VE3NRS		147.84	147.24
SARNIA	VE3SAR		146.34	146.94
SAULT STE MARIE	VE3SJI		146.28	146.88
SAULT STE MARIE	VE3SSM		146.34	146.94
SUDBURY	VE3SRS	4	146.16	146.76
THUNDER BAY	VE3YQT		146.46	147.06
TIMMINS	VE3TIS	1	146.34	146.94
TORONTO	VE3RPT		52.760	52.525
TORONTO	VE3MHZ		146.28	146.88
TORONTO	VE3MOT		147.78	147.18
TORONTO	VE3RPT	A	146.46	147.06
TORONTO	VE3TDX		147.93	147.33
TORONTO	VE3TFM		147.87	147.27
TORONTO	VE3TOR		146.34	146.94
TORONTO	VE3TTY	3	146.10	146.70
TORONTO	VE3TFM		222.38	222.98
TORONTO	VE3RPT		448.30	443.30
TORONTO	VE3UHR		449.25	444.25
TORONTO	VE3UKW		449.40	444.00
WINDSOR	VE3III		146.46	147.06
WINDSOR	VE3III		146.28	147.06
WINDSOR	VE3WIN		146.40	147.00
WAWA	VE3WAW		146.34	146.94

MANITOBA
****

LOCATION	CALL	NOTES	INPUT	OUTPUT
BRANDON	VE4BDN		146.34	146.94
FLIN FLON	VE4 ?	P	146.34	146.94
MIAMI	VE4 ?	P	NOT	KNOWN
PINAWA	VE4PIN		146.34	146.94
SHILO	VE4 ?	P	146.25	146.85
WINNIPEG	VE4XK		146.46	147.06

SASKATCHEWAN
****

LOCATION	CALL	NOTES	INPUT	OUTPUT
ARCOLA	VE5MMR	P	146.22	146.82
JANSEN	VE5ESK		146.16	146.76
LAST MTN	VE5 ?	P	146.25	146.85
LLOYDMINSTER	VE5RI		146.34	146.94
MOOSE JAW	VE5CI		146.34	146.94
PRINCE ALBERT	VE5EEE		146.46	147.06
REGINA	VE5KE		146.46	147.06
REGINA	VE5SS		146.28	146.88
SASKATOON	VE5SK		146.34	146.94
SWIFT CURRENT	VE5SCR		146.28	146.88
WATROUS	VE5 ?	P	146.01	146.61

ALBERTA
****

LOCATION	CALL	NOTES	INPUT	OUTPUT
CALGARY	VE6AUY	A	146.46	147.06
CALGARY	VE6RPT	1	146.34	146.94
CALGARY	VE6 ?	P A	146.16	146.76
COLD LAKE	VE6OC		146.46	147.06
EDMONTON	VE6 ?	P A	146.16	146.76
EDMONTON	VE6HM		146.46	147.06
GRAND PRAIRIE	VE6OL		146.46	147.06
LETHBRIDGE	VE6CAM		146.28	146.88
MEDICINE HAT	VE6HAT		146.46	147.06
RED DEER	VE6QE		146.46	147.06
ROCKY MTN HOUSE	VE6VHF	1	146.28	146.88
WETASKIWIN	VE6SS	P	146.34	146.94

BRITISH COLUMBIA
****

LOCATION	CALL	NOTES	INPUT	OUTPUT
CHILLIWACK	VE7ELK		146.46	147.00
DAWSON CREEK	VE7DTE		146.34	146.94
FORT ST JOHN	VE7 ?	P	146.46	147.06
KAMLOOPS	VE7RKA		146.25	146.85
KAMLOOPS	VE7KAR		146.34	146.94
KELOWNA	VE7 ?	P	146.22	146.82
KIMBERLEY	VE7CAP		146.34	146.94
MASSETT	VE7DRZ		146.34	146.94
NANAIMO	VE7ISC		146.04	146.64
NELSON	VE7BTU		146.46	147.06
PENTICTON	VE7OKN		146.34	146.94
PORT ALBERNI	VE7BWU	2	147.84	147.24
PRINCE GEORGE	VE7AFG		146.34	146.94
SALMON ARM	VE7APH		146.46	147.00
TRAIL	VE7CAQ		146.34	146.94
VANCOUVER	VE7ESR		147.81	147.21
VANCOUVER	VE7RAG		147.63	147.03
VANCOUVER	VE7RPT	A	146.34	146.94
VANCOUVER	VE7VAN		147.72	147.12
VANCOUVER	VE7URG		449.00	444.00
VANCOUVER	VE7WRS		448.85	443.85
VERNON	VE7RWS		146.28	146.88
VICTORIA	VE7VIC	A	146.25	146.85
WILLIAMS LAKE	VE7DSQ		146.34	146.94

YUKON/NWT
****

LOCATION	CALL	NOTES	INPUT	OUTPUT
WHITEHORSE	VE8 ?	P	146.46	147.06

Sound familiar?

Bret Fader, VE1FQ, has a Halifax telephone number which may ring bells (no pun intended!) with two metre fans -- the last four digits are 22 82. John Clark, VE3KE, chairman of the St. Lawrence Valley Repeater Council, which has boosted standard 600 kHz separation of two metre channels, nevertheless has as the last four digits of his Ottawa line the numbers 46 94!

CARF Annual meeting

The annual general meeting of the Federation will be held in Ottawa, the corporate headquarters city on June 5. It will be followed by the Board of Directors meeting which is expected to carry on with a session on the following day due to the large amount of business to be transacted.

Regulations changes (Continued from Page One)

The intent of this document is to:

- consolidate and codify those regulations concerning the Amateur Experimental Service into a single document,
- where necessary, clarify existing regulations,
- simplify the rules governing the Amateur Experimental Service,
- provide for flexibility and ease of amendment of such rules to meet and reflect technical advances, and
- provide for technological advances in experimentation, such as satellite operations, which are not covered in the present regulations.

To accomplish these points, the following concepts have been adopted and followed as far as practicable:

- The grouping of regulations under five headings:
- General - definitions, purpose, etc.
- Licensing - classes of licences, application, duration, etc.
- Technical Standards - frequency bands, types of emission, etc.
- Operating Standards - observance of international agreements, identification of stations, prohibitions, etc.
- Operating Personnel - qualifications, examinations, etc.

- the retention of existing wording of current regulations where possible,
- where necessary, the minor editorial amendment of current regulations to reflect their import and intent
- editorial amendments to reflect the codification,
- the addition and/or deletion of regulations to reflect current and anticipated changes in radio communication,
- the simplification of existing regulations in line with current technical and operational techniques, procedures and practices, with provision for further refinements to be made by 'guide lines'.

Experience gained in the use of 'guidelines', especially in relation to the development of Amateur automatic repeaters, has proven that this method of regulation is satisfactory and workable. It not only simplifies the regulations, but obliviates the need for detailed ones which, should they be found inadequate or overly restrictive, require considerable time and effort to amend. By using guidelines they can be adjusted with comparative ease and dispatch, without the lengthy legal procedure required for amendments to the Radio Regulations.

Frequency Sub-Bands

Consequently, it is recommended that the frequency sub-bands be removed as Schedules to the Regulations and applied as necessary through the guidelines. Applicable adjustments have been made to the appropriate sections of the Regulations.

It is further recommended, for the convenience of users, that guidelines be published as appendices to the publication in which the Regulations are issued.

Examinations

Provision has also been made for conducting examinations for Amateur Certificates of Proficiency by other than Department personnel. This is in line with recommendations previously made by the Canadian Amateur Radio Federation, Inc. Adoption of the recommendation would relieve the work load on Radio Inspectors, while at the same time permitting the Department to retain adequate control.

Provision has also been made for more practical log-keeping requirements, in line with recommendations by the Federation. It is believed that the existing detailed logging requirements no longer serve a useful purpose insofar as the Amateur Experimental Service is concerned. The practicability of trying to keep a log while operating mobile from a car or aircraft is certainly open to question and there is also the safety factor to consider. At the same time, it should be recognized that many Amateurs will, for their own use and interest, continue to maintain a log.

Comments from individuals or groups should reach the Committee before June 30, c/o CARF, Box 356, Kingston, Ontario K7L 4W2.

Alberta organizes AARES

Under the direction of E. Roy Ellis, VE6XC, ARRL SEC, and with the encouragement of the Amateur Radio League of Alberta, a provincial emergency communications system is being organized.

An Amateur Radio emergency communications system has been in existence in Alberta since 1954 and is still in operation. However, the time has come when considerably more participation in this field is needed to demonstrate to to the powers that be that the Amateurs can supply a capable communications network both locally and province wide.

The plan is to mould together all existing nets and establish others as the need arises with all using a standard message handling procedure in order to deal with any emergency that may arise.

ALL AMATEURS should be able to handle a message correctly, especially in times of disaster. We should also be familiar with the operation of an emergency communication system, the importance of net discipline, and how to originate a proper message, how to receive a message and how to check, log and deliver the message.

DOC News

The DOC has announced that it has issued standards which will permit the direct attachment of certain customer-provided terminal devices which have been certified by the Department to the communications networks of federally regulated common carriers. This includes Bell Canada and B.C. Telephone. Other phone companies are provincially regulated.

This ruling will allow subscribers of these two companies to purchase devices okayed by DOC rather than having to lease them from the carriers.

The first devices eligible for certification are automatic telephone answering and recording machines, plugs and jacks. These will be followed by acoustically coupled devices, alarms and other network non-dialling equipment.

The standards are a North American first. They do not include phone patches.

Sponsoring a convention?

The amount of research and experimentation in electronics and telecommunications done by the federal government is in many cases little known to Canadian Amateurs whose magazines are mostly of foreign origin.

Canada is a leader in many research and development projects in these areas and officials of the Department of Communications and the Communications Research Centre in Ottawa are willing to send members of the Department and the Centre to speak at Amateur conventions.

Canadian Amateurs can thus learn what Canada is doing ... in many cases it is way ahead of other nations... and both industry and government learn more about each other because it is a good bet that 75% of the audiences at Amateur conventions are connected with the telecommunications or electronics business in either a professional or technical category.

If you are planning a regional or provincial Amateur convention, why not write to: John Davidson, Director, Information Services, Department of Communications, Ottawa, Ont. K1A 0C8, stating the general area of talks you would like ... antennas, radar, satellites, line communications ... or one of DOC's travelling exhibits. Find out what Canada is doing in these fields from professionals, many of whom are Amateur operators themselves. (Note that DOC pays the speaker's expenses.)

CLARA AC/DC CONTEST

Time: 1800 GMT Sept. 11 to 1800 GMT Sept. 12, 76.
Bands: 20, 15, 40 and 80
Suggested Frequencies: Phone - 14.160, 14.280, 21.300, 7.200, 3.775, 3.900. CW - 14.035, 21.035, 7.035, 3.690. Check all frequencies.
Exchange: RS, RST REPORT, QTH and NAME.

Each station can be worked twice; once cw and once phone or on two different bands (cw or phone)

Score: (Non Clara members) one point for each Clara member worked plus three points for each bonus station worked. Multiply by the number of Canadian call areas worked. e.g. 40 stations worked, 3 bonus stations worked on 2 different bands and 6 call areas. 40 plus 18 (9x2) times 6 (call areas) equals 348 points.

Clara members: one point for each contact.

Contest is for all YLs and OMs. Prizes: First place Clara member; First, Second and Third place for non-Clara members. All contestants sending in logs will have a chance on a draw for a mini-prize.

Send logs with claimed score showing Date, Freq., Time, Report, QTH and Name to:
Marjorie Karl, Box 191, Foremost,
Alberta T0K 0X0
not later than Nov. 15, 1976

Bonus Stations: VE1AMB, VE2JZ, VE3COH, VE4ST, VE5HO, VE6BDA and VE7JB.

RSO Convention

Hundreds of radio Amateurs from all over Ontario and beyond will be converging on the Holiday Inn, Don Valley Parkway and Eglinton Ave. in Toronto for the 9th Annual Convention of the Radio Society of Ontario on Oct. 22, 23 and 24.

A rich program of activities is being planned, and RSO expects this to be a 'real top-notch get-together' not only for Amateurs but for their XYLs as well. A number of rooms will also be established as meeting places for clubs and organizations, where 'members and friends will be able to meet informally between convention sessions'.

For more information, contact the Radio Society of Ontario, P.O. Box 334, Station U, Toronto, Ont. M8Z 5P7.

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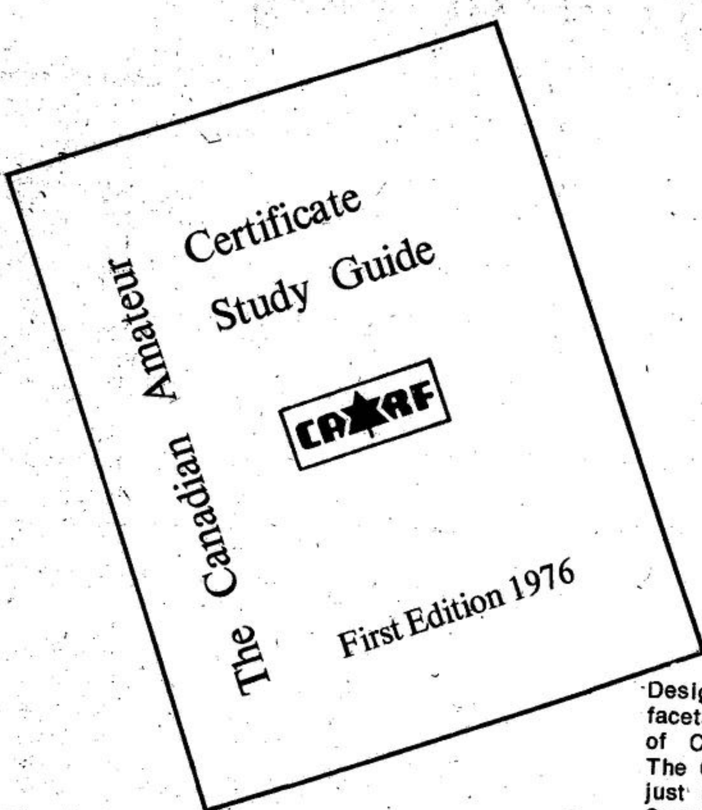

Order your copy now!

Designed to provide an understanding of the many facets of communication required for the Department of Communications Radio Amateur Examination, The Canadian Amateur Certificate Study Guide has just been produced through the services of your Canadian Amateur Radio Federation.

Included in the contents of this 80-page book is information on basic electronics, semiconductor devices, circuits, propogation, antennas, transmission lines, station equipment and operating procedures - plus a wide variety of additional background information and problems related to the DOC Examination and the operation of the Amateur Radio Station.

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CARF views for WARC 1979

This preliminary presentation concerning the Amateur Experimental Service's requirements for future frequency allocations is in response to the Department of Communication's request for a distinctly Canadian proposal for Amateur frequencies to be included in the Canadian position for the ITU 1979 World Administrative Radio Conference.

The Canadian Amateur Radio Federation is pleased to undertake this task on behalf of the Amateur radio operators of Canada. The Federation is the only entirely Canadian, federally chartered organization representing Amateurs of Canada on a national basis. It does so on a democratic, consultative basis.

As noted, this paper is a preliminary one prepared on short notice in order to acquaint cognizant committees and working groups with an outline of the procedure which the Federation intends to follow and the basis of its ultimate proposal which will be presented in due course, after the work of its WARC Working Group is completed. The Amateurs of Canada will be afforded the opportunity, through the columns of 'The Canadian Amateur', our monthly publication, and the CARF News Service, to study and comment on the draft proposal. They will thus have an opportunity to make an input to the final form of the proposal.

It is realized that the requirements of Amateurs in any one ITU Region, and if possible, in all three Regions, should be compatible. This does not necessarily mean that they will be identical. For example, there is a number of factors that must be considered on the domestic scene such as the requirements of other Canadian users of the radio frequency spectrum. There would appear to be a necessity of making the Canadian proposals for the Amateur bands as compatible as possible with the demands of these users, both commercial and governmental.

On the international scene, the desirability of attaining compatibility with the Amateur proposals in other national jurisdictions requires their being compared to the Canadian proposals. This is difficult because of the fact that the International Amateur Radio Union (IARU) has refused to recognize the Canadian Amateur Radio Federation, Inc.

To remedy this lack of information, the Federation has asked the regulatory body of the most significant contrihuting nation to the IARU, the U.S. Federal Communications Commission, for information and consultation on its WARC committee's proposals in order to achieve as much compatibility as possible between the U.S. and Canadian positions.

The IARU Region I secretariat has kept the Federation informed as to its proposals and the papers received from it have included the Region 3 proposals.

A definitive Canadian proposal will be available after discussion with other interested countries and domestic users and after more information is gathered from these and other sources. At this time, therefore, it is not possible to present a table of the frequency bands which will be in the final proposal.

Governments have recognized the need for the services which Amateur radio operators can supply by setting up portions of the radio spectrum for their use. In the words of the ITU, 'it is a service in which land or mobile stations are operated for self-training, intercommunication and technical investigations carried on by Amateurs who are duly authorized persons interested in radio technique solely with a personal aim and without pecuniary interest.'

The justification for its existence to date and for its continued existence, must be made within these confines when dealing with international conferences. This paper attempts to do this in a relatively broad fashion in order to point out the direction in which arguments may have to be made in the forum of the 1979 conference.

Any justification should include the use being made of the bands and their occupancy. This is extremely difficult to judge with the type of operation encountered in the Amateur bands, where there is no fixed frequency operation nor indeed fixed band operation for any one station. At this time, there is little information on this aspect nor is

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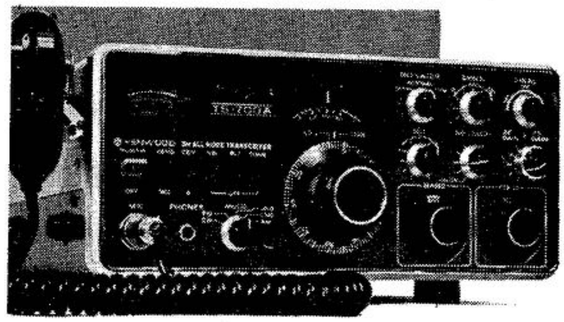

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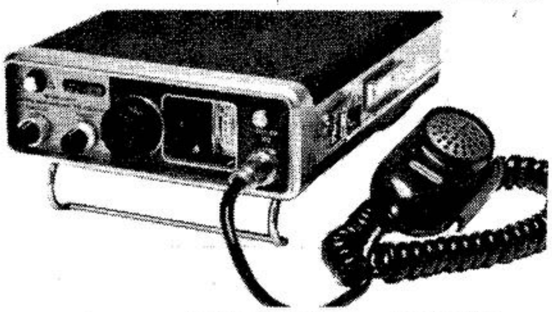

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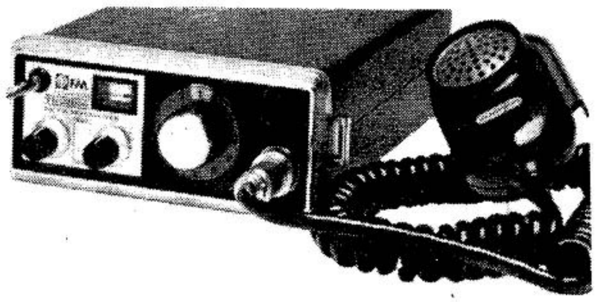

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"Much of the initial work of opening up new frequencies...has been performed by Amateurs."

there any method available at the moment to judge the frequency of use of any one band or frequency. Indeed, it may be difficult to apply these criteria to the Amateur service, although they may be quite valid for other radio services.

History of Amateur frequency allocation

After the introduction of commercial wireless services in the early 1900s, many individuals all over the world began to experiment with electromagnetic waves for communication purposes. Because of the newness of the art, there were no regulations or restrictions. By 1912, the use of the spectrum by Amateurs received national recognition in Canada and the United States and they were permitted to experiment with all of the 'useless' spectrum above 1.5 MHz. Amateurs soon discovered that the higher frequencies were capable of providing long range communication, particularly during daylight hours, with reasonable power levels. By 1922, Amateurs were restricted to operation in the exclusive band 0.968 to 2.0 MHz. The bands 1.5-2.0, 3.5-4.0, 7.0-8.0 and 14.-16. MHz were allocated in 1924. As commercial and government requirements increased rapidly all over the world during the late 1920's, the need to regulate the radio spectrum on an international basis resulted in the ITU Radio Conference of 1927. Amateur radio received international recognition and was awarded shared use of the bands 1.715-2.0 MHz and 3.5-4.0 MHz, exclusive use of 7.0-7.3 MHz and 14.0-14.4 MHz and shared use of 28.0-30.0 and 56.0-60.0 MHz.

Each succeeding ITU Radio Conference - 1938, 1947 and 1959 - has modified these band allocations, particularly their different use in Region 1 (Europe and Africa), Region 2 (North and South America) and Region 3 (Asia, Oceania and the remainder of the world). At the 1947 Conference, exclusive bands were allocated to Amateurs in Region 2 from 7.0-7.3, 14.0-14.3, 21.0-21.45, 28.0-29.7, 50.0-54.0, 144-148, 220-225 and shared use of 420-450 MHz. Various exclusive bands from 1.215 GHz to 22 GHz were also allocated. The pattern of these international allocations is quite clear. Amateurs have been awarded 'useless' frequency bands above those used commercially and by governments, only to have these privileges withdrawn when these frequencies proved to be valuable. Much of the initial work of opening up new frequencies by development of equipment, systems and actual experimental use has been performed by the Amateurs. It is abundantly clear that the justification of the Amateur radio service requires very careful consideration on a world-wide basis. The question is 'Why should portions of the valuable spectrum be set aside for the Amateur Experimental Service ?'

Justification for Amateur Radio

The leading industrial nations such as the USA, USSR, Great Britaon, France, Germany, Japan, etc. are well aware of the importance of maintaining a high degree of capability in the electronic art for application in communications, scientific and industrial equipment and systems. It is becoming more and more evident that a country which does not support and encourage this capability can never achieve status as a first class nation. Without a strong electronics industry, it will not be able to build, maintain and improve first class transportation and communication systems, competitive industrial activity of every type and scientific research laboratories to help keep it abreast of the current state of the art. Only highly developed nations are capable of advancing the art.

One of the prime sources which generates interest in electronics is Amateur radio. Many young people who become interested in communication through Amateur radio later achieve prominence as professional electronic engineers and scientists. Conversely, many professional engineers and scientists obtain their Amateur licences in order to develop their skills in designing and building new systems and equipment. They can gain first-hand knowledge of the performance of this equipment by operating it on the Amateur bands. There is a quiet and unheralded feedback of knowledge and experience both ways; from Amateur to professional and from professional to Amateur. The fact is that a fair percentage of Amateur radio operators are actually professionals in the electronics field, although the fraternity attracts people from all walks of life.

The encouragement of Amateur radio activity by government administrations is a sound way to build a strong, knowledgeable pool of experienced radio operators and electronics experimenters. This is a most valuable asset to a country trying to develop its industries and increase its standard of living. Communication in all forms is one of the vital factors for the successful development of any country. A strong body of Amateur radio operators provides a 'ready-made' source of proficient and experienced communications experts, both technical and operational - and at no cost to the country.

Radio Amateurs have vividly demonstrated the value of their acquired skills during emergencies

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3.	CW filter as standard	Yes	No	No
4.	Regulated screen voltages for stable operation of final	Yes	No	No
5.	Independent rf circuits for Tx and Rx	Yes	No	No
6.	Dual RIT control 5kHZ or 1kHZ	Yes	No	No
7.	Slow/fast AGC switch	Yes	No	yes
8.	PLL VFO for excellent stability and tracking linearity	Yes	No	No
9.	Noise Blanker for pulse type noise	Yes	Yes	Yes
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SPECIFICATIONS

Frequency Ranges;

Bands(meters)	Frequency(MHz)	
80	3.5 ~ 4.0	
40	7.0 ~ 7.5	
20	14.0 ~ 14.5	
15	21.0 ~ 21.5	
10(A)	28.0 ~ 28.5	
10(B)	28.5 ~ 29.0	
10(C)	29.0 ~ 29.5	
10(D)	29.5 ~ 30.0	
11	27.0 ~ 27.5	Receive only
WWV	15.0	Receive only

Mode of Operation;	LSB, USB, CW and AM
Input Power;	180 Watts DC INPUT SSB & CW 90 Watts DC INPUT AM
Carrier Suppression;	50 dB
Sideband Suppression;	50 dB at 1,000 Hz
Spurious Radiation;	Down 40 dB or more
Distortion;	Down 35 dB or more
Microphone Impedance;	High
Modulation Method;	Balanced modulation(SSB) Low power modulation(AM)
Transmitter Frequency Response;	300 to 2,700 Hz(down 6 dB)
Frequency Stability;	Less than 300 Hz drift in starting Less than 100 Hz drift or less after 30 minutes of warm up
Antenna Output Impedance;	50-75 ohms unbalanced
Receiver Sensitivity;	0.3μV S/N 10 dB (at 14 MHz) SSB/CW 1μV S/N 10 dB(at 14 MHz) AM
Image Interference Ratio;	−50 dB and more(at 14 MHz)
IF Interference Ratio;	same as above
Receiver Selectivity;	SSB/AM 2.4 kHz at −6 dB and 4.0 kHz at −60 dB CW 600 Hz at −6 dB and 1.5 kHz at −60 dB
Audio Output;	2.5 Watts or more (10% distortion at 4 ohms load)
Audio Output Impedance;	4 ohms
Power Source;	100/110/117/200/220/234 Volts AC 50/60 Hz 13.8 ±10% DC
Power Consumption;	AC: 350 VA at the maximum final input DC: 22A at the maximum final input. 7A in receiving with final tubes heater "on" and 2A with heater "off"
Dimensions;	14-3/4" wide(350mm) 6-1/2" high(165mm) 13-1/4" deep(333mm)
Weight;	Approx 39.6 Lbs. (18kg)

"They have shown ingenuity and resourcefulness by providing communication services under adverse conditions."

and disasters in many parts of the world. Again and again, they have shown ingenuity and resourcefulness by providing communication services under the extremely adverse conditions which usually accompany disasters.

Although organized as a 'contest', the annual 'field day' exercises in North America give enthusiastic and dedicated Amateurs the opportunity to show how efficient communications can be established between thousands of stations, without access to primary electric power sources. In many cases, they have provided the only means of communication to and from, and within, disaster areas on a local, national and international basis. Such emergency operations are provided on a strictly voluntary basis by Amateur operators, using their own equipment.

Through daily contacts between thousands of Amateurs communicating over both long and short distances, a vast practical knowledge of the propagation characteristics of representative portions of most of the usable radio spectrum has been built up. This knowledge and 'feel' for the frequency spectrum has been directly applied in the design and operation of commercial broadcast and radio communication circuits all over the world.

Radio Amateurs contribute directly to the economy by providing a market for equipment and components manufactured specifically for them. They contribute indirectly to the economy by supplying a significant source of professional and technical people who are vital to the development of many types of primary and secondary industry through improvement of communications and electronics.

Millions of contacts between Amateurs in many countries promote goodwill and better understanding among many people of the world. Because of these personal communications, Amateurs have a greater influence on the projection of a nation's image than is generally understood by government officials charged with this responsibility. While difficult to prove, it is believed that the projection of a nation's image by the informal personal contacts made by Amateurs is more effective than formalized international short wave broadcasting - and this is at no cost to the country.

Beginning with the first use of electromagnetic waves at the turn of the century, Amateurs have made many important technical contributions. They were the first to discover and exploit the so-called short waves above 1.5 MHz. They discovered the principle of regeneration, pioneered in the development of high frequency receivers and transmitters, mobile radio, crystal control of frequency, filters and propagation theory. They were the first to exploit single sideband phone transmission and reception which is so widely accepted by the military and industry. Important contributions have been made by designing, building and operating Amateur earth-orbiting satellites. Two of these, OSCAR 6 and OSCAR 7, are now in orbit and operating successfully. A new sophisticated elliptical orbit satellite for launching in the next few years is now in the design and development stage.

Prepared by the WARC 1979 Working Group of the Canadian Amateur Radio Federation Inc., February 23, 1976 for submission to DOC.

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Many of the TTC's ex-students now hold responsible positions in Television stations the world over and experience over the past three years has enabled them to plan a course and method of teaching that is unique.

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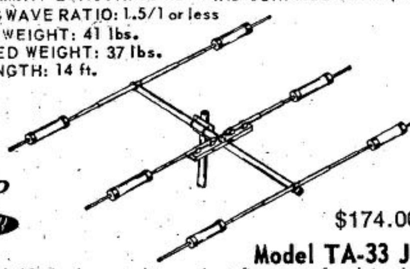
FORWARD GAIN: Up to 8 db. TURNING RADIUS: 15.5 ft.
FRONT-TO-BACK: 20 db. or better WIND LOAD: 114 pounds.
MAX. ELEMENT LENGTH: 28 ft. WIND SURFACE : 5.7sq. ft.
STANDING WAVE RATIO: 1.5/1 or less
SHIPPING WEIGHT: 41 lbs.
ASSEMBLED WEIGHT: 37 lbs.
BOOM LENGTH: 14 ft.



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FORWARD GAIN: Full 8 db. compared to reference dipole or 10. 1 db. over isotropic source.
FRONT-TO-BACK: 20 db. or better on 15 and 20; 15 db. on 10 meters.
STANDING WAVE RATIO: 1.5/1 or better.
MAXIMUM ELEMENT LENGTH: 27 ft.
ASSEMBLED WEIGHT: 42 lbs. BOOM LENGTH: 18 ft.
SHIPPING WEIGHT: 47 lbs. TURNING RADIUS: 16 ft.
WIND LOAD (80 MPH EIA Std) 120 lbs.
WIND SURFACE: 6 sq. ft.
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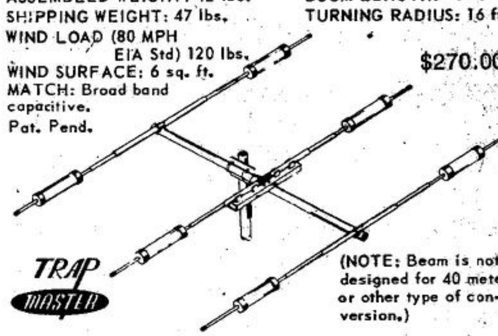

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Wire for AR-30 and AR-40 12¢ ft.
Wire for CD-44 and HAM II 20¢ ft.
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RG-213 33¢ ft.

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New approach to QRM in hi-fi

Recognizing that electro-magnetic interference (EMI) problems are increasing at an alarming rate, a recent Consumer Products Engineering Bulletin issued by the Electronics Industries Association (EIA) states in part:

"Because of the proliferation in the past few years of rf transmitting equipment (AM, FM, TV, radar, radio Amateur, Citizens Band, etc.) it is a necessary requirement of good equipment design to engineer circuits with built-in interference rejection.

"Original equipment manufacturers can no longer expect the serviceman to correct normal type interference problems in the field. The cases are becoming too frequent and the cost of correction too high to ignore this interference in the original design."

Many responsible manufacturers of home entertainment equipment have a policy of supplying filters for eliminating interference. In some cases the necessary modifications are made at no cost to the consumer.

Voluntary after-the-fact measures on the part of manufacturers, however, are simply not enough. As long as the inclusion of additional components for "electromagnetic compatibility" (euphemism for non-susceptibility to rf interference...Ed.) increases a manufacturer's costs, however slightly, there will be reluctance to take steps to improve equipment by the manufacturers themselves. What appears to be necessary, therefore, is federal legislation giving the DOC the authority to regulate the manufacture of home entertainment equipment and thus to protect the consumer.

Manufacturers have stated that they would be willing to provide preventative circuitry in their equipment if all the other manufacturers would do likewise. One way to accomplish this is with DOC authority.

Even with enabling legislation, the DOC cannot take action to regulate manufacturers until compatibility standards are established. One method of establishing radio frequency interference (RFI) standards would be to determine the strength of RF fields which may be encountered in typical residential areas and to design home entertainment devices to operate properly in these fields.

A great number of factors interact to determine the field strength which may be encountered in any given situation - factors such as the relative location of the transmitting antenna and the home entertainment equipment and the effective radiated power of the transmitter.

Consider for example an Amateur radio installation employing 100 watts output and a dipole antenna. At a distance of roughly 10 meters (30 ft.) from the antenna, the calculated field strength is 2.2 volts/meter (v/m). Assuming that interdwelling distances in the order of 10 meters are realistic for today's urban areas, it appears that 2 v/m is near the lowest acceptable level for any standard adopted. This is especially true when you consider that the field strength encountered 10 meters from a transmitter having 600 watt output, driving a directional antenna with 8 dB gain relative to a dipole, is 13.5 v/m. Both of the above examples assume a 10 dB structural loss which results when a radio signal passes through a building.

Thus, though interference potential can be aggravated by indiscriminate use of unshielded speaker or interconnecting leads, analyses such as those presented here suggest that compatibility standards for home entertainment electronic equipment be in the range from 2 to 15 v/m. Further, it is suggested that measurements made to test the compatibility of a device be made in the band 0.5 to 1000 MHz.

Voluntary assistance by responsible manufacturers can only be a temporary solution to EMI problems. The long term solution requires legislation that will give DOC the right to regulate the manufacture of home entertainment devices. Beyond this, compatibility standards should be established by a group representing industry and users such as the Canadian Standards Association (CSA). These standards would be used by DOC to promulgate enabling legislation to facilitate the solution to RF interference problems. Your Federation is assisting in the solution of these problems in CSA and Canadian Radio Technical Planning Board committees.

Call it EMI, RFI or electromagnetic susceptibility or compatibility, we're working on it and we're making progress. But if we are ever to enjoy the benefits of Amateur Radio in an atmosphere free from contention over alleged interference, we must all work together to solve EMI problems now!

Bill Westbrook VE3EKA
Ottawa ARC EMI Committee

Clarification of information

Many Canadians subscribe to that excellent and informative US Amateur newsbulletin, HR Report. In the issue of March 19, 1976, however, there are two items concerning Canadian regulations that could be, through no fault of the editor, misleading or at best confusing, and which appear to be the result of his correspondent misconstruing the information he obtained.

One item was to the effect that 'effective immediately' the DOC has ruled that slow scan television is now considered a form of facsimilie (A4) and therefore is 'now permitted on all authorized A4 frequencies'. (The underline is ours).

The fact is that this ruling was made some years ago and was published in 'DOC Guide Lines' dated Nov. 4, 1971. Further, the item states that it is required that a 'repeater licence be endorsed' before a repeater may be used for SSTV. It must be remembered that in Canada there is no such thing in law as an 'Amateur repeater station'; an Amateur station used as a repeater is just another Amateur experimental station, and therefore must comply with all regulations, including those for SSTV, relative to all Amateur stations. It does not have a special licence or a special endorsement.

The second item is to the effect that Canadian Amateur station licences 'no longer' require an 'annual endorsement'. The fact is that Canadian Amateur station licences are issued for a five-year period - not annually - and remain valid upon payment of the licence fee on an annual basis. The licence does not have to be endorsed or validated unless there is a change in any of the particulars (e.g., change of address, 10-metre or ATV operation, etc.) which, once made, is good for the life of the licence. A check with the DOC headquarters elicited the information that the item was probably a misinterpretation of an explanation of computer problems; in a few instances the computer failed to show an alternate station location (e.g. summer cottage) when new licences were being prepared in one of the DOC Region offices. This oversight on the part of the computer necessitated the return of a few licences for addition of the extra data.

Both of these items have been discussed with DOC Headquarters in Ottawa and it has been reaffirmed that there have been no new or recent relevant amendments to the General Radio Regulations. When in doubt - Ask your Federation!

(Regulations concerning the Amateur Experimental Service are contained and discussed in the CARF publication 'The Canadian Amateur Radio Regulations Handbook' which may be obtained from your Federation at Box 356, Kingston, Ont. K7L 4W2 for $4.00 per copy).

How to beat Intermod on Two

Bill Wilson, VE3NR, in the
Ottawa Groundwave

The antenna circuits of most VHF receivers are very broad. They offer little or no protection to the input tube or transistor from very strong undesired signals up to 5 MHz removed from the desired signal. The result is that the input circuits can be severely overloaded and intermodulation products created.

This tunable helical resonator is designed to protect a 2-meter receiver from the overloading signal of a neighborhood base station that results in receiver intermods. It solved my problems which were caused by a paging transmitter about 0.7 miles distant on 149.77 MHz.

The inner conductor of the resonator is a self-supporting coil made of 2 2/3 turns of #6 solid copper wire, 1 1/2 inches inside diameter and about 2 1/4 inches long. The outside conductor or shield is a piece of three inch copper drainpipe 6 inches long. The coil is centred coaxially in the shield and has one lead soldered to the inside of the shield about 2 inches from the end. A 10 mmfd variable capacitor is connected between the other end of the coil and the inside of the shield. It will be helpful if the capacitor is the kind that can be locked after the filter has been tuned.

The filter operates by 'shorting' the transmission line at notch frequency, and so careful attention has to be paid to the transmission line connections to the coil. Two phono sockets are mounted close together in the shield where each can be connected by its own very short jumper to one common tapping point, 1/3 of a turn from the ground end of the coil. One terminal is connected to the receive terminal of the T-R relay and the other to the receiver antenna terminal.

Adjustment of the filter presents a couple of interesting problems because you will want to tune it to a frequency you do not want to hear. The first step is to find the frequency of the overloading signal. Look for a nearby base station then check for the frequency either with the operator or with the DOC inspector. It may be above or below the 2-meter band. By stretching or squeezing the coil a little, adjust the filter so that you can 'notch out' a 2-meter Amateur signal, for example, near the maximum of the variable capacitor's range if the undesired signal is above the 2-meter band, or near the minimum if it is on the low side. Then when the intermods are heard, just tune slowly away from the 2-meter frequencies you work until the filter is resonant on the overloading signal and the intermods drop out.

The advantage of this filter is that it does not hinder the frequency agility of the receiver as do the other good methods of resolving intermods, i.e. RF cavities, or RF crystal filters. This filter has a measured loaded Q of 600 and an attenuation of 35 to 40 dB. It tunes from 135 to 155 MHz. The ends of the filter need not be capped if the phono sockets, coil and capacitor are at least 1/2 the diameter of the shield in from each end.

A smaller filter of lower Q can be made using 1 1/2 inch diameter copper pipe and a coil of 3 turns of #10 wire about 3/4 inch inside diameter and 1 1/4 inches long. The tap is about 1/3 turn from the ground end. The same principles of construction and adjustment procedures apply.

Ref: W.W. McAlpine and R.O. Schildknecht, 'Coaxial Resonators with Helical Inner Conductor', Proceedings of the IRE, vol. 47, no. 12, page 2099, Dec. 1959.

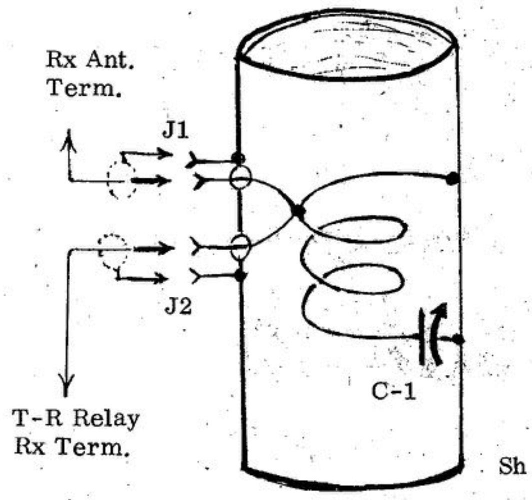

Fig. 1 'Notch-Stop' Filter
J1, J2 = chassis coax connectors;
C1 = 10 mmfd; Sh = Shield (3" copper pipe)

Amendments available

If you purchase the newly-published bound edition of the Radio Act and Regulations mentioned here last month ($2.50 from booksellers or Info Canada where it still operates) be sure to ask for the amendments.

Although it is just off the press, the contents were closed off in late 1974. It is a safe bet that few of us are about to build gigahertz equipment, but note that the schedule of Amateur frequency bands in this edition is not up-to-date.

The band 21.0-22.0 GHz should be deleted and 24.00-24.05 GHz for equally shared Amateur and Amateur satellite use, and 24.05-24.25 GHz for secondary Amateur and primary radiolocation use, should be added.

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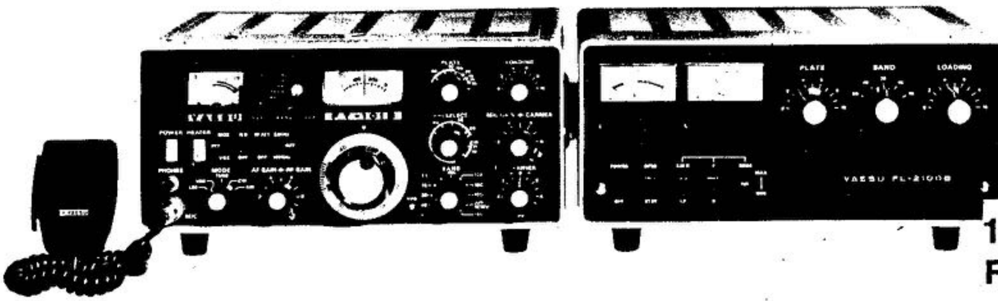

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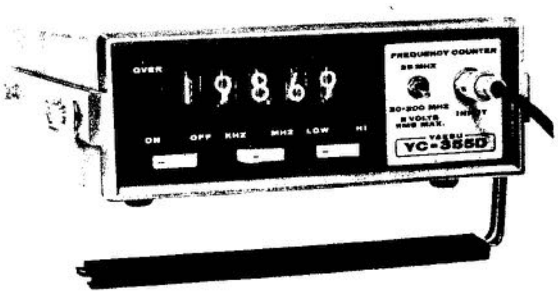

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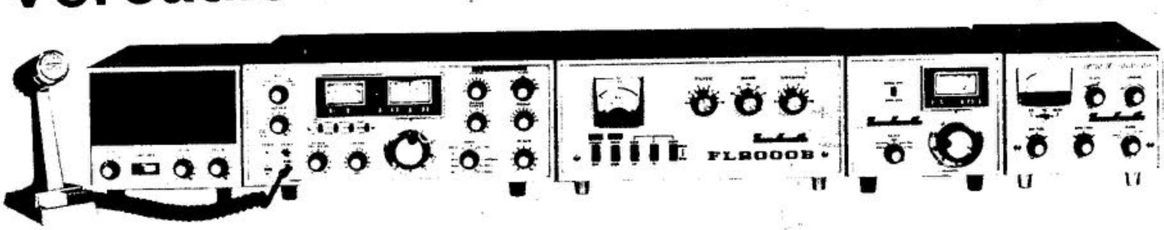

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Factors determining VFO Performance

by P.A. Macdonald VE7BRW

Most variable frequency oscillators consist of a resonant LC circuit of adjustable frequency, an R.F. amplifier and two interconnections, one linking the resonant circuit to the amplifier input, the other feeding a portion of the amplifier output to the resonant circuit in such a manner that the two currents peak at the same time.

There are a number of alternative circuits but there is one that, in standing the test of time, has become ever more popular. Today it is found in the Radio Amateurs' Handbook, the R.C.A. Transistor Manual, and in a number of texts, all of which bespeaks its performance.

The tube and transistor versions are shown in Fig. 1.

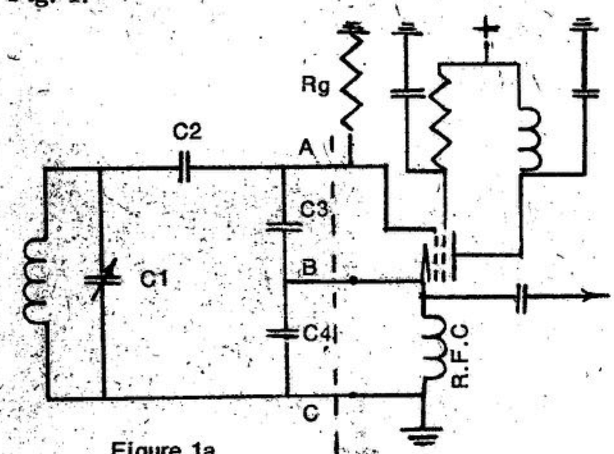

Figure 1a

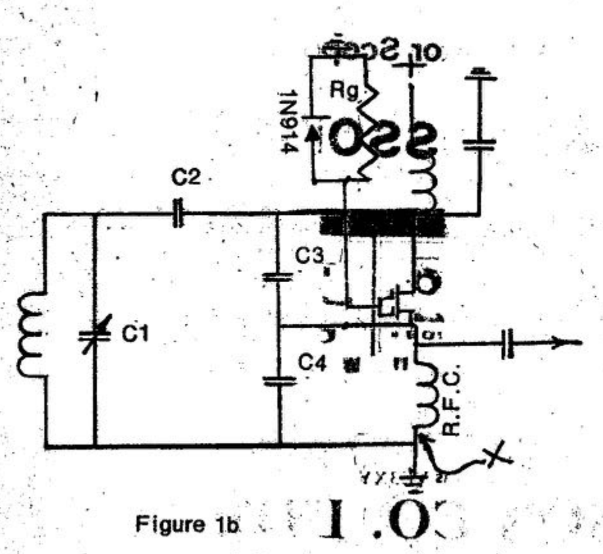

Figure 1b

OSCILLATOR OPERATION

Initially it is desirable to discuss the tube circuit. The resonant tank section is to the left of the line A.B.C.; the amplifier to the right.

The tank consists of an inductance L, a tuning capacitor C1 and three fixed capacitors C2, C3, C4, with the latter in series. The resultant capacity of these three, denoted by C5, is given by:

$$\frac{1}{C5}=\frac{1}{C2}+\frac{1}{C3}+\frac{1}{C4}$$

Now C5 is parallel with C1 so that C, the total capacity across the inductance, is

$$C = C1+C5$$

It will be seen that C2, C3 and C4 act as potential dividers for any r.f. current in the tank circuit. When the tank circuit is connected to the amplifier at A, B and C, the r.f. potential drop across C3 is applied to the grid-cathode section of the tube, thus driving the amplifier at the tank frequency. The r.f. plate current of the amplifier reaches the cathode through C4. The associated voltage drop across it becomes a part of the voltage system of the tank circuit and in phase with it. C3 controls the action of the tank on the amplifier; C4 controls the action of the amplifier on the tank.

STABILITY OF TANK CAPACITY

There is a capacity, Cg, associated with the grid section of the tube (and the gate of a field effect transistor) of about 5 pf. which becomes added to the tank resonant capacity. This would be of no significance if it were constant, but unfortunately the value changes during operation. The effect is minimized by making C3 very large relative to Cg, generally between 300 pf and 600 pf. This means that C4 must also be large, since the ratio of C3 to C4 determines the feedback from the amplifier to the tank.

RESONANT FREQUENCY

The resonant frequency of a tank circuit is given by the formula:

$$F=\frac{1}{2\pi}\sqrt{\frac{1}{LC}-\frac{r^2}{4L^2}}$$

THE SIGNIFICANCE OF r

The numerical value of r is always very small relative to the values of L and C, hence the squares of their values are even more divergent, so that the ratio $r^2 / 4L^2$ is generally neglected. However, in the case of a self-sustaining oscillator, where interest is focused on on the final few cycles of millions, r plays a predominant role.

Resistance, like a number of other physical ideas, has experienced an expanded role with the expansion of physical knowledge.

The r in equation 3 has a much broader connotation than the r which originated in Ohm's Law. In the present case, it is an expansion of the idea of r as it appears in Joule's Law in the form:

$$H = 0.24\ r\ i^2\ t$$

where H is the heat liberated within the conductor at the expense of electrical energy supplied to it over the time t.

Ohm's Law relates current to voltage; Joule's Law relates current to heat.

The development of the A.C. theory and the associated idea of energy loss from, but beyond the conductor by induction, expanded the heat aspect of r from that generated within the circuit, to the total energy withdrawal irrespective of the site at which the heat appears.

The instinctive association of r with the physical property of a conductor has to be abandoned. In equation 3 it signifies energy, specifically energy removal. It includes resistive losses, inductive losses and energy withdrawn as load. In the present case the load includes the energy fed back to the tank circuit.

Hence the conclusion that, if the oscillator is to be frequency stable:

1. The load must be constant
2. The load should be minimum, since any change in r resulting from a change in load may be expected to be proportional to the load.
3. Since the heat generated within the tank circuit depends upon the square of its current, this circuit should be operated at the lowest possible current. A circuit operating at 0.1 ma will generate only one ten thousandth of the heat resulting from 10 ma operation.
4. If the heat in the tank circuit is allowed to accumulate, a rise in temperature will result and hence a change in the physical dimensions of the circuit. Since the values of L and C are determined by their physical dimensions, and since these values are the major frequency determinants, they should be designed for major heat dissipation and should have minimum ohmic resistance.

All the foregoing emphasize that an oscillator should never be regarded as a source of energy, but only of a signal to serve as an activator for the systematic release of energy from a system specifically designed for such control.

R AND Q

Articles dealing with oscillators emphasize the importance of a tank circuit having a high Q.

At the beginning of an oscillating cycle there is a specific amount of energy in the tank circuit. By the completion of the cycle some energy will have been lost. The ratio of the initial energy to the energy lost is defined as the Q of the circuit. For example, if the circuit Q is 100, there will be an energy loss of 1% per cycle. For sustained oscillation, this amount will have to be supplied by the amplifier. Thus stating that an oscillating circuit should have a high Q is just another way of saying that the energy loss should be a minimum.

OSCILLATOR PERFORMANCE

A discussion on oscillator performance is a discussion on oscillator stability. Stability is a quantitative phenomenon and hence it is desirable to report it quantitatively. Unfortunately, most articles expressing satisfaction with a circuit tend to be joyous rather than quantitative. The R.C.A. Manual, giving one of the most recent reports on the present circuit, is specific and can certainly be regarded as authoritative. In the 3.5-4 mHz range the drift is given as a maximum of 30 Hz/2 hrs. after a 30 second warm-up; 50 Hz in the 5-5.5 mHz range and 200 Hz between 8-9 mHz. Expressed in terms of drift/hr/mHz these data become

	Hourly drift at
3.5 mHz	4.3 Hz/hr/mHz
5.0 mHz	5.0 Hz/hr/mHz
8.0 mHz	12.5 Hz/hr/mHz

It will be seen that the drift increases more rapidly than the frequency and that the change in rate between 3.5 and 5.0 mHz is not nearly as great as between 5 0 and 8 mHz. Hence the inference that little stability is to be gained by going below 3.5 mHz. The 30 second warm-up time is to be noted. Again it is to be noted that the data assume a continuity of drift rate over the short term, e.g. minutes. The data are for a Fet, not a tube circuit.

TUBE CIRCUIT

Some six or seven years ago, the writer built a tube circuit, not so much with the idea of putting it into service as to study its performance over a period of time.

The resonant circuit was housed in a box constructed of aluminum plate 3/16 inch thick, bolted to an aluminum angle of 1/8 inch wall. This container was rigid beyond question and weighed 12 lbs., giving it high thermal stability. The tube section was assembled in a separate container fastened to the main box, but thermally insulated from it by a 1/4 inch plastic sheet.

Initial tests suggested that a 6BH6 tube was as good as any and better than most.

In order to keep the energy down, potentials were reduced to the lowest possible values consistent with oscillation. One particular tube, for example, had a plate potential of 12.5 volts; combined plate and screen current of 160 μamp; heater current of 70 ma with a heater potential of 2.8 volts; 50 seconds warm-up time for emission to start. The notes report a clear oscillograph beat against a crystal in 100 seconds and zero drift over two hours, measured from two minutes after switch on. Other notes show that drifts of 4-5 Hz were not uncommon, as were drifts of about 15 and 30 Hz/hr.

What was interesting and provocative was that while the drift rate changed from time to time, the rate of drift at any one time was remarkably constant. If the drift was say, 30 Hz/hr, it would arrive right on schedule after two hours, as good as any airline and much better than the C.N.R.

This led to an examination of drift as a function of heater current. It was found that the direction of drift was dependent on heater temperature, i.e. it could be changed from + to -, hence an explanation for the zero drift.

Since the long term emission characteristics of the cathode are inherently variable, it was reasonable to conclude that this was responsible for the observed periodic change in drift rate. The observed short term consistencies suggested that the circuit had an inherent stability of a higher order which was being overridden by this single factor. Hence the conclusion that another type of emitter might yield a much more stable circuit.

The recent availability of a gate-protected-field-effect-transistor at a reasonable cost led the writer to a further examination of the circuit, since the Fet characteristics are equivalent to a vacuum tube with a different, and presumably more stable, type of emitter

RELATIVE TUBE-FET PERFORMANCE

To compare the performance of the tube and Fet circuits, a tank circuit was constructed with leads to an external amplifier. Tube and Fet amplifiers were built that were as similar as could be and which were readily interchangeable on the mounting block external to the resonant circuit. The tube was a 6BH6 operated at reduced potentials; the Fet was a Sylvania E.C.G. 222 dual gate, gate protected transistor, operated at an applied potential of 5 volts. All fixed capacitors were silvered mica, since this is a standard practice.

Frequency measurements were made by counter. Beating against a crystal oscillator is a satisfactory alternative if somewhat more cumbersome.

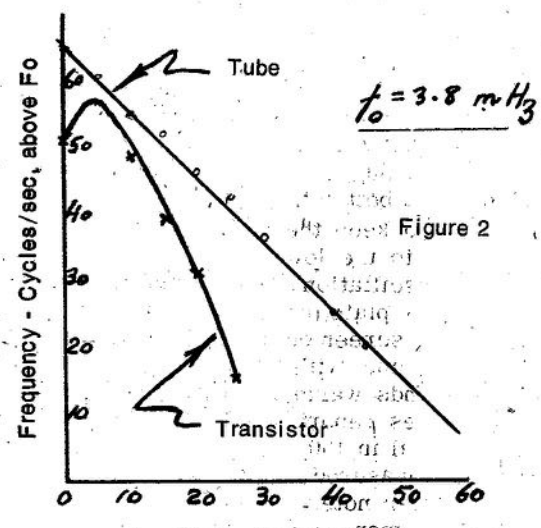

Figure 2

The observed drifts are shown in Fig. 2. It will be seen that the drift rate of the transistor circuit is about double that of the tube. Attention is also called to the change in direction of the transistor drift five minutes after switch on. The performance of both circuits is obviously a long way from satisfactory and is suggestive of capacitor trouble.

Oscillator Drift

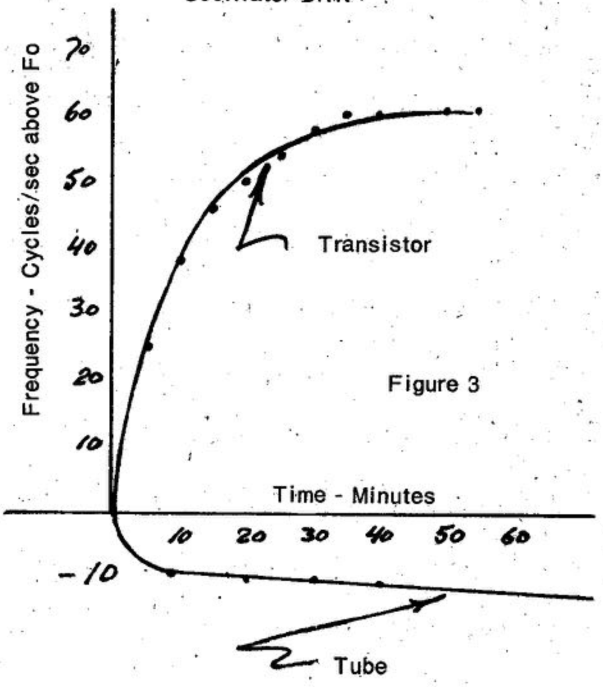

Figure 3

N.P.O. ceramic capacitors were substituted for the silvered mica. The resulting performance is shown in Fig. 3. The tube response characterizes the best attributes of a good tube circuit, the drift is steady at 6 Hz/hr, and the warm-up time is of no practical significance.

The transistor data are much more interesting and informative, for the curve is exponential. These occur when two interrelated physical processes are present, one independent of the other and proceeding at a constant rate; the other being dependent on the first, its rate increasing (or decreasing) with time and its consequences being such that they tend to offset the results of the first process.

In the present case, there is no problem in determining the processes. The first is obviously the generation of heat at a constant rate within the oscillating circuit. The second will result from the existence of a thermally insulated heat pocket somewhere in the circuit. As heat is liberated within the pocket its temperature will rise and heat will be driven out at a rate that is proportional to the temperature. Eventually a condition of equilibrium is established at which the rate of evolution of heat within the pocket is equal to the rate at which it is driven out. At this point the exponential curve eases into a straight line. In the present case the time is 40 to 45 minutes.

Since the only difference between the tube and transistor circuits is the tube and the transistor with its associated diode, the heat pocket must lie between them. A touch of the soldering iron immediately established the diode as a major offender, so following Biblical Injunction, it was plucked out.

DIODE REMOVAL

The grid circuit of a vacuum tube plays an important role when the tube is used in an oscillating system. As the voltage in the tank circuit rises in its positive swing, the grid of the tube will begin to draw electrons from the cathode and an electron current will be established in the grid circuit. While initially the current and its rate of growth are small, they both increase very rapidly so that a high negative potential develops across the grid resistor and amplification is cut off.

In the case of a Fet, the control gate is insulated from the internal current, thus the device lacks the equivalent of a grid current. There are certain diodes which, when connected from gate to ground, provide voltage-current characteristics similar to a grid current. This is the function of the 1N914 in Fig. 1b.

If this is to be removed, some other source of bias should be introduced and this can be done by inserting a resistor, denoted by Rk, in the emitter circuit between the r.f. choke and ground. In Fig. 1b, this will be at the point X. Now as the gate potential becomes more positive, the resulting increase in collector current will generate an increasing potential drop across the resistor and of the correct sign to apply an increasing negative bias to the control gate. Because the capacitor C4 is in parallel with the resistor, the r.f. potential drop will be determined by this capacitor, not the resistor, and will thus be very much smaller than the d.c. bias.

It is informative to consider the amplifier as not just an r.f. unit, but as a d.c. amplifier upon which an r.f. amplifier is superimposed.

As the biasing resistor is increased, the applied d.c. bias tends to approach the value of any d.c. signal on the grid, so that the d.c. current and associated voltages tend to become ever more stable hence when Rk is made very great, the r.f. amplifier is sitting upon a very stable foundation.

DETERMINING THE VALUE OF Rk

Figures 4 and 5 show the manner in which the frequency of the oscillator, and its collector current, change with the changing values of Rk.

With regard to frequency, it will be seen that it tends to be independent of Rk between values of 6 and 7 thousand ohms and hence independent of the current in this region. Figure 5, obtained with an applied collector potential of 14.5 volts, shows a second stable region between 3 and 5 thousand ohms. In Fig. 4, with an applied potential of 3.6 volts, this second region is just beginning to show. The circuit will oscillate at 1.5 volts; at this value the region of inflection at 6500 ohms is present, but there is no sign of the lower step.

DETERMINING THE VALUE OF THE APPLIED COLLECTOR VOLTAGE

Fig. 6 shows the relation between frequency change and the potential of the power supply. Data

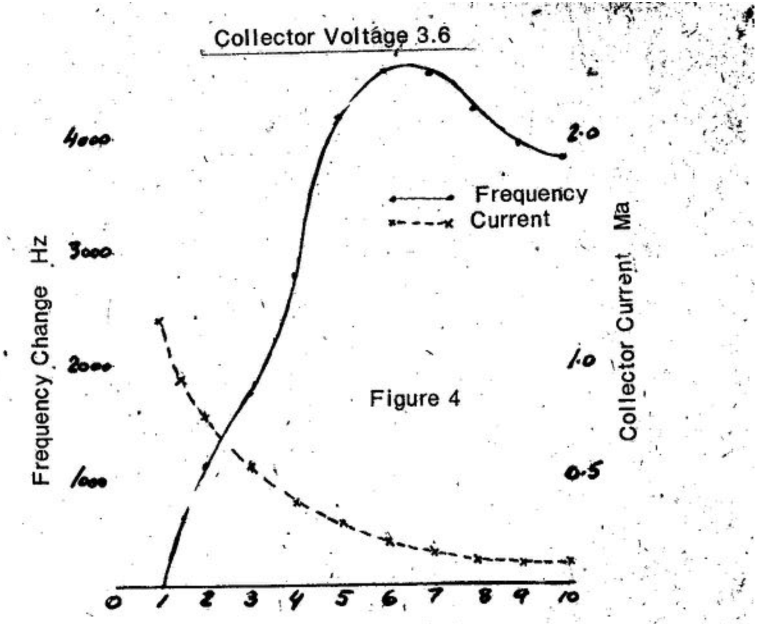

Figure 4

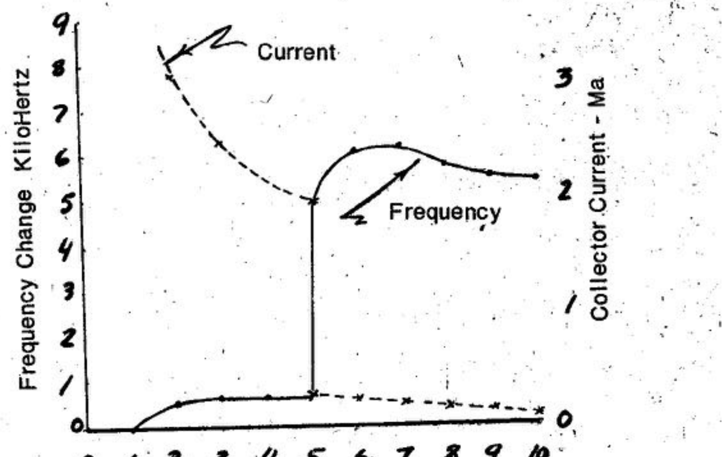

Figure 5

below 3 volts is not shown as the change of frequency with voltage for lower values is so great that it destroys the perspective of the working range of the total curve.

The rate of change of frequency with voltage is almost constant above 14 volts.

The foregoing data suggest the following operating values:

Rk = 6500 ohms

Applied Potential = 14 volts

OBSERVED PERFORMANCE

The circuit operates over a wide range of potentials starting at about 1.5 volts. Optimum performance is obtained at the values indicated above but there is another factor not heretofore considered; this is the current through the transistor.

The relation between stability and current is

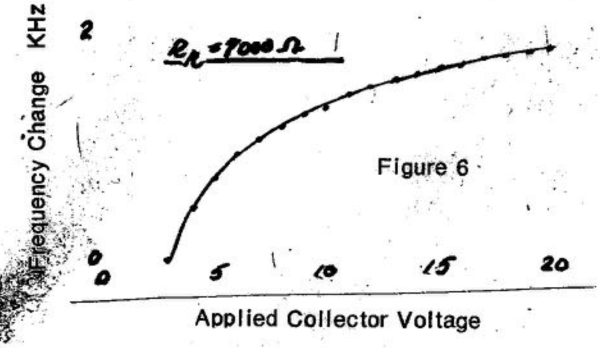

Figure 6

shown in Fig. 7. It will be seen that a random fluctuation of ± 30 kHz exists with a current value of 130 μ A and increases rapidly with current increase. Optimum stability exists at and above 220 μ A.

The degree of stability is shown by Fig. 8. It has a value of ± 1 Hz. The increase above this value over the region T is not random stability, but thermal change resulting from closing a door to the room. As soon as the significance of the frequency rise was realized, the door was opened, the frequency started to drop and returned to its initial value in 15 minutes.

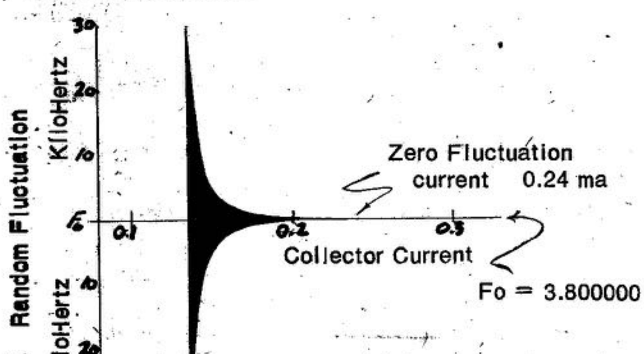

Figure 7

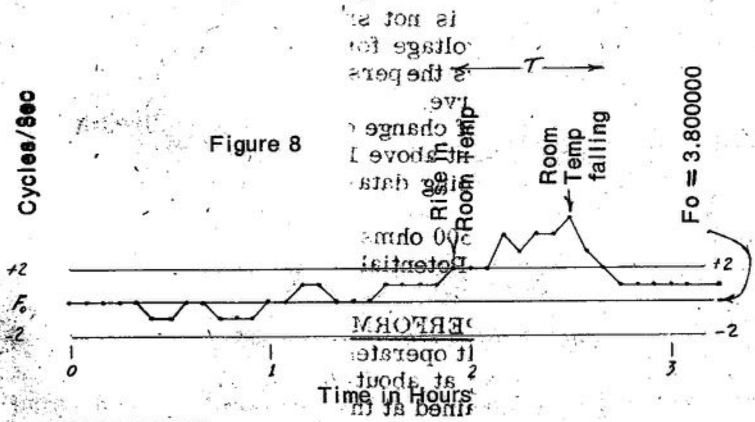

Figure 8

CONCLUSION

Stability is determined by certain intrinsic characteristics of the transistor and by two extrinsic - temperature and voltage stability.

The measured temperature coefficient of the oscillator is 15 Hz/Degree F.

The minimum voltage-frequency coefficient, obtainable from Fig. 6, is 40 Hz/volt and requires a minimum operating potential of 14 volts.

Thus, in order to observe oscillator fluctuations of 1 Hz or less, arising from intrinsic characteristics of the transistor, it is necessary to regulate the temperature to 1/15 degrees F and the voltage supply to 0.2%.

These were approximate values used when running the curve of Fig. 8 so it is proper to conclude that the intrinsic characteristics of a transistor permit a minimum oscillating stability of ± 1Hz. The subject warrants further study.

Correction

A recent article in The Canadian Amateur and in the CARF News Service contained the following statement: "...your national Federation was requested, by Region 1 IARU, to set up a central mailing address...". The gremlins were at work again; the statement should read "...your national Federation was requested, by a member society of Region 1 IARU, to set up a central mailing address...".

Amateur terms in CB

In recent feature stories on the General Radio Service (CB) appearing in various Canadian periodicals, the writers have included lists of the 'CB lingo' which is certainly picturesque and descriptive. However, one notes with interest the inclusion of some long-standing Amateur terms such as 'landline', 'twisted pair', 'YL', 'XYL' and an interesting variation of the traditional telegrapher's sign-off of '73' or '88' -- now appearing on CB as 'threes' or 'eights on you'!

BANNED COUNTRIES LIST

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

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

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

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

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