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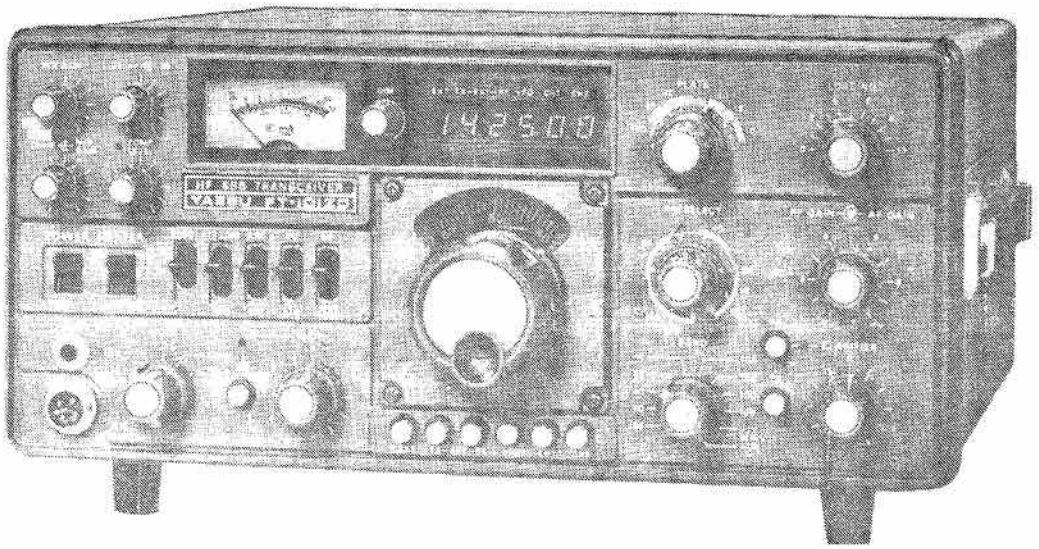
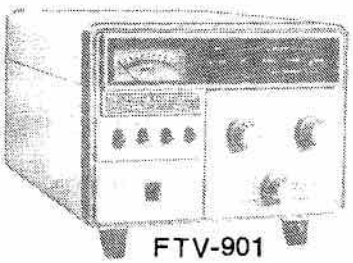
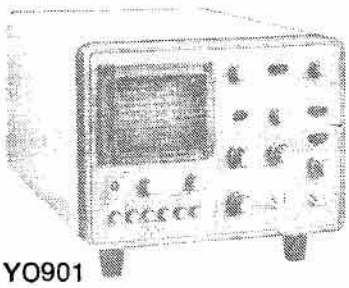
TO AMATEURS OF CANADA AND AROUND THE WORLD!





FTV-901



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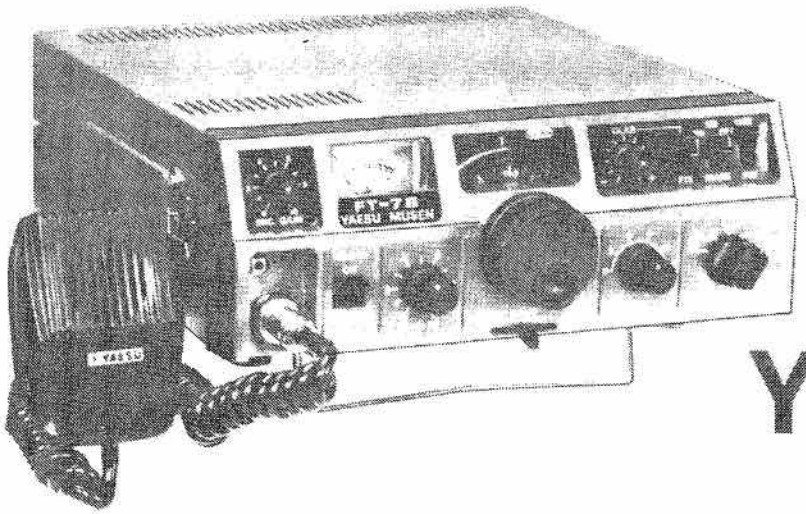

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TS-180S *with* DFC*

Digital Frequency Control* ...a Kenwood innovation for maximum HF operating enjoyment!

Kenwood's TS-180S with DFC is an all solid-state HF tranceiver designed for the DXer, the contest operator, and all other Amateurs who enjoy the 160 through 10-meter bands. The following features prove, beyond doubt, that the TS-180S is the classiest rig available!

- Digital Frequency Control (DFC), including four memories and manual scanning. Memories are usable in transmit and/or receive modes. Memory-shift paddle switches allow any of the memory frequencies to be tuned in 20-Hz steps up or down, slow or fast, with recall of the original stored frequency. It's almost like having four remote VFOs!
- All solid-state... including the final. No dipping or loading. Just dial up the frequency, peak the drive, and operate!
- High power... 200 W PEP/160 W DC input on 160-15 meters, and 160 W PEP/140 W DC on 10 meters (entire band provided). Also covers more than 50 kHz above and below each band (MARS, WARC, etc.), and receives WWV on 10 MHz.
- Improved dynamic range.
- Adaptable to all three proposed (WARC) bands.
- Single-conversion system with highly advanced PLL circuit, using only one crystal with improved stability and spurious characteristics.
- Built-in microprocessor-controlled large digital display. Shows actual VFO frequency and difference between VFO and "M1" memory frequency. Blinking decimal points indicate "out of band." Monoscale dial, too.
- IF shift... Kenwood's famous passband tuning that reduces QRM.
- Selectable wide and narrow CW bandwidth on receive (500-Hz CW filter is optional).
- Automatic selection of upper and lower sideband (SSB NORM/SSB REV switch).
- Tunable noise blanker (adjustable noise sampling frequency).
- RF AGC ("RGC"), which activates automatically to prevent overload from strong, local signals.
- AGC (selectable fast/slow/off).
- Dual RIT (VFO and memory/fix).
- Three operating modes... SSB, CW, and FSK.
- Improved RF speech processor.
- Dual SSB filter (optional), with very steep shape factor to reduce out-of-passband noise on receive and to improve operation of RF speech processor on transmit.
- 13.8 VDC operation.
- Also available is the TS-180S without DFC, which still shows VFO frequency and difference between VFO and "hold" frequencies on the digital display.

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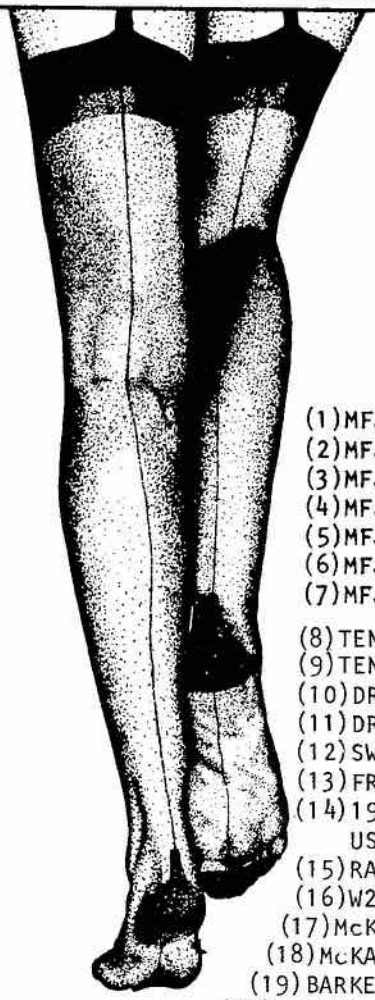

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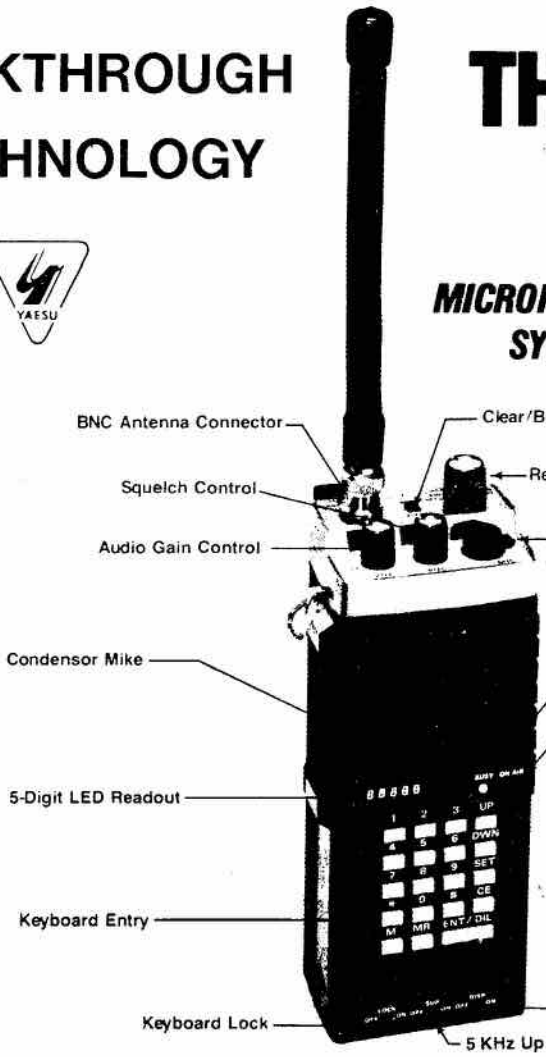

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$469.00

INCLUDES RECHARGEABLE BATTERY PACK AND CHARGER

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The Yaesu FT-207R Synthesized Handie has all the features you could want in a very compact package

- 144-148 MHz Range
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ASTRO 150/151
Performance Specifications

Frequency Range:	160 Meter Band . . . 1.8- 2.4 MHz*
	80 Meter Band . . . 3.9- 4.5 MHz
	40 Meter Band . . . 6.0- 8.3 MHz
	20 Meter Band . . . 13.8-16.0 MHz
	15 Meter Band . . . 20.8-23.0 MHz
	10 Meter Band . . . 28.0-30.0 MHz**
	*Model 151 only
	**Model 150 only
Mode:	CW, CWN, LSB, USB
	CW Break-in, Full and Semi
RF Input Power:	235 watts all modes, all bands
Carrier Suppression:	Better than 50 dB
Side Band Suppression:	Better than 60 dB
Microphone:	47 K ohms with push button tuning
AF Response:	300 to 3000 Hz
Spurious Radiation:	Harmonics: > 45dB below peak power
	Other: > 55dB below peak power
Receiver Sensitivity:	10 dB $\frac{S+N}{N}$ or better at .35μV
Image Ratio:	Better than 60 dB
Frequency Stability:	10 Hz/Hr. after warm-up
Receiver Selectivity:	SSB & CW 2.7 KHz (8 pole filter)
	Shape Factor 1.6:1
	CWN 300Hz (Xtal)
Audio Output Power:	Greater than 3 watts into 4 ohms
Power Requirements:	13.8 VDC @ 18A peak (Xmit)
	1A (Receive)

Weight. 12.9 Lbs. (5.86 Kg.)
Dimensions: 9¾" (247 MM) W x 3¾" (95.3 MM) H x 11⅞" (301.6 MM) D

*Specifications subject to change without prior notice.

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ST-3 Matching Antenna Tuner

200 W capability.

Separate backlit meters to read 200 W full scale forward power and 20 W full scale reflected power.

Incorporates a T section matching network and features an 18 position inductance value selection.

Antenna switching offers: coax 1 direct, coax 2, coax 3, single wire, and balanced line.

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Built-in speaker

13.6 VDC, 20A peak regulated output

110 VAC 60 Hz, 6A peak input required

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- PSU-5 AC Power Supply
- Matching Antenna Tuner, ST-3
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- MMBX Mobile Antenna Mounts

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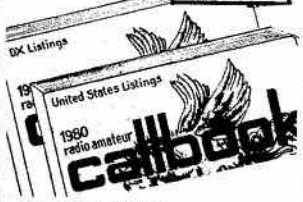

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The GLA-1000

SPECIFICATIONS

- Size: H. 5⅜" W. 11" D. 11"
- Weight: 24 lbs.
- Electrical Power Consumption: 117 VAC 50/60 Hz 12.5 Amps. Factory fused at 15 Amps. 234 VAC 50/60 Hz 7 Amps. Recommended fuse 10 Amps.
- Frequency Coverage
  80 Mtrs: 3.45 to 4.3 MHz
  40 Mtrs: 6.950 to 7.5 MHz
  20 Mtrs: 13.950 to 14.5 MHz
  15 Mtrs: 20.950 to 21.350 MHz
  10 Mtrs: With Modification by Licensed Amateur

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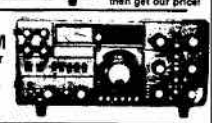

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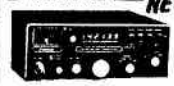

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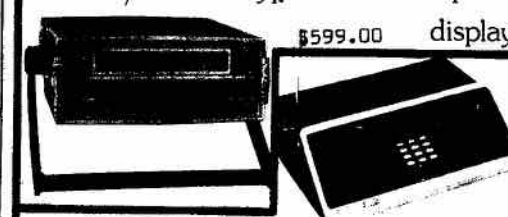

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ULTRA TUNER DELUXE Matches any antenna—coax fed or random wire on all bands (160-10 meters). Tune out the SWR on your antenna for more efficient operation of any rig. Home, mobile, portable—only 9"x2¾"x5" • 300 watt RF **output** capability • **SWR meter** with 2-color scale • **Antenna Switch** selects between two coax fed antennas, random wire, or tuner bypass • Efficient **Airwound inductor** • 208 pf. 1000V Capacitors • Attractive bronze finished enclosure.

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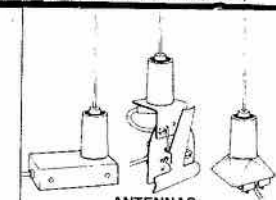

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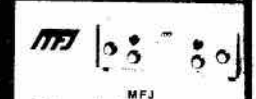

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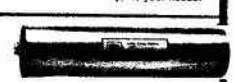

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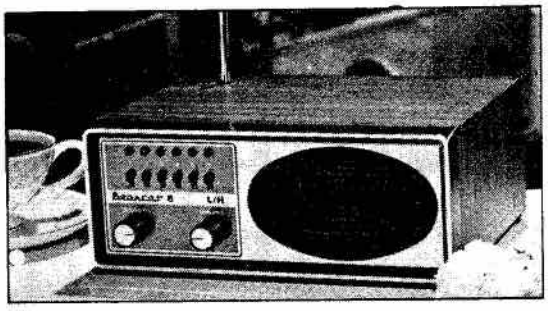

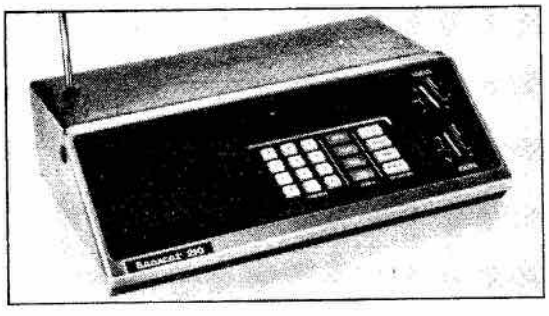

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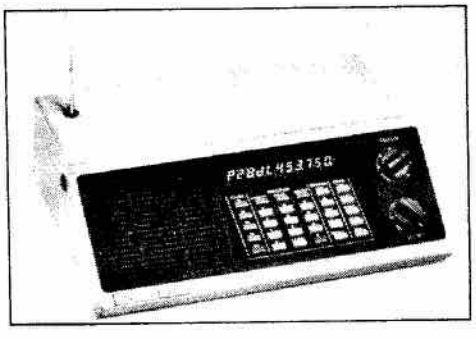

SCANNING MADE EASY.

The Bearcat scanners you see here represent just about the broadest range available. Whether you want economy or the ultimate quality in a scanner, Bearcat has it. Basic features include track tuning, single antenna, single manual scan switch, light emitting diodes, decimal display. Specific model features will help you choose the Bearcat you want.

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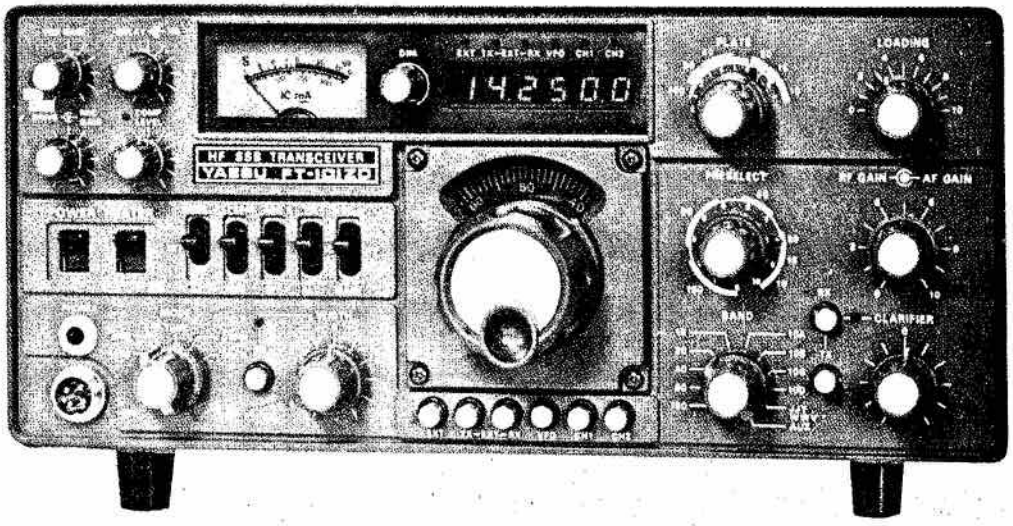
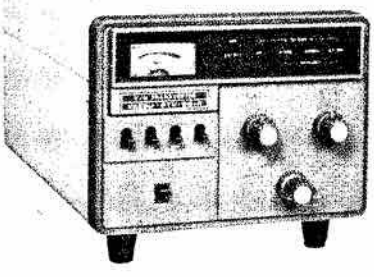
YAESU'S NEW FT-101ZD

HIGH-PERFORMANCE HF TRANSCEIVER



FTV-901R
VHF/UHF/OSCAR TRANSVERTER



In another industry first, YAESU brings you a three-band VHF/UHF transverter for your FT-101ZD station. The basic unit comes equipped with 144 MHz capability, and you may add our plug-in modules for 50 or 430 MHz as options. Repeater offset is provided for 6 and 2 meters, and full duplex operation on OSCAR modes A/B/J is possible with an external receiver.

When the HF bands are flat, switch to the "very highs", with the amazing FTV-901R VHF/UHF/OSCAR transverter. You're years ahead with YAESU.

PHONE PATCH/SPEAKER (not shown)

Round out your FT-101ZD station with the SP-901P combination hybrid phone patch/speaker. Like the other 901 series components, its styling and size are fully compatible with your FT-101ZD.

YO-901
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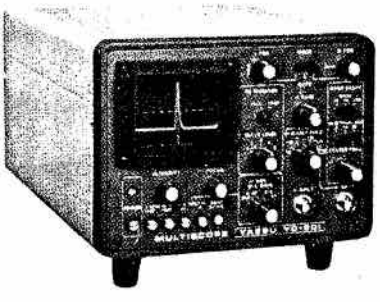

Unsurpassed monitoring capability is yours with the YO-901 Multiscope. Featuring a high performance oscilloscope, useful for countless station adjustments, the YO-901 also includes a two-tone generator, as well as an optional band scope for instant determination of band conditions and activity.

Narrow-band IF signal observation is not possible with the FT-101ZD and YO-901.

Price And Specifications Subject To
Change Without Notice Or Obligation

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SUPER SPECIAL

TR7500A $429.00

Get at no charge your choice of either Mosley MM-144 TK1 mobile antenna, value $49.50 or C.D.E. QT-1 Power Supply, value $59.95 at No Charge!

The TR-7500 is an advanced 2M FM transceiver. The TR-7500 has been developed by Kenwood's advanced VHF technology with the following major points to increase your enjoyment of the 2M band.

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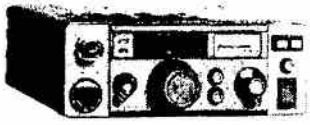
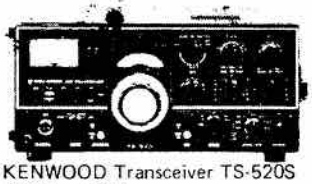


KENWOOD 2M FM
TR-7600



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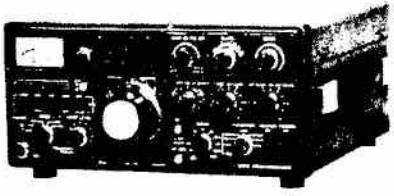

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Our Ref : CM/jp/3404-79(2)

Date : September 21, 1979

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Channel Busy Lamp
4 Memories plus Programmable Offset
BNC Antenna Connector
Squelch Control
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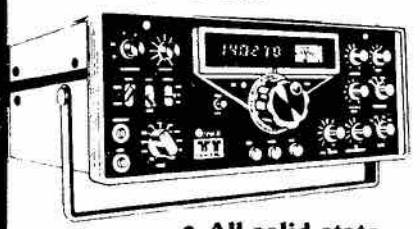

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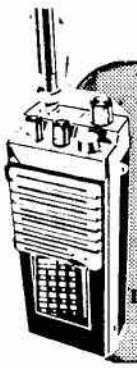

The Yaesu FT-207R Synthesized Handie has all features you could want.

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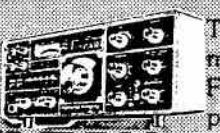

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Continuous duty	-108 dB at 42 MHz		
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READERS PLEASE NOTE:
Effective November 1, 1979, please send all material for publication ... correspondence, stories, photos and technical articles ... to TCA - The Canadian Amateur Box 356, Kingston, Ont. K7L 4W2.

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LETTERS:

BERMUDA QSL

Having operated portable VE3PE/VP9 for the past few years from mid-January to late March, it seems that quite a number of VE stations are anxious to receive confirmation of a contact with Bermuda to assist in becoming eligible for the various available awards, etc. This is evident from the numerous requests I have had for a QSL.

For those interested, I will be operating again next year, at the same time as mentioned above, on SSB; usually between 14100 and 14150 kHz. Will be pleased to provide anyone with a VP9 contact and will welcome calls from CW stations also.

For a QSL card, send one IRC to my Canadian address. A self-addressed envelope is not necessary.

Edmund C. Skowby VE3PE
35 William St., Apt. 101,
Stratford, Ont. N5A 4X9

COMPLAINTS
may be directed to
the Editor
WRITE THEM LEGIBLY IN THE
SPACE PROVIDED BELOW:

□

BASICS FOR NEW AMATEURS

I enjoy **TCA**, advertising, swap shop and the technical section. There are a few things that could help us 'new' Amateurs as follows:

1. What is the frequency for all the beacons from 160m to 10m?

2. A list of nets for CW and SSB and the time, 160m to 10m, etc. (net to the north)?

3. Net for weather and time.

4. Net for distress/emergency.

5. Net for national disaster (what to do, who to call, etc.).

I have talked to a few new Amateurs about this; I am sure they would appreciate this information. Keep up the good work.

Floyd J. Heney VE3KKA
Ottawa, Ont.

1. Maybe some of our readers can help us out on this one. 2. Here is a net directory which appeared some time ago in **The Ontario Amateur**, compiled by Bruce Carveth VE3BC. There are others, such as the CARFNET teletype net and probably a number of phone nets which operate, especially on 75 metres, in Central and Western Canada. Again, maybe readers could send us notice of nets operating in their area and we could come up with a directory for the whole country. 3. Time net? What's wrong with CHU and WWV? CHU is the Canadian time standard station on 3330 kHz, 7335 kHz and 14670 kHz. WWV, the U.S. time standard is on 2.5, 5.0, 10.0, 15.0 and 20 MHz. As for weather, there is a move to set up 'weather watch nets' in potential tornado areas in Ontario. 4. Should you find yourself involved in distress traffic such as call for assistance from ships or aircraft, in order to inform official agencies, one of the following Department of National Defense Rescue Co-ordination Centres may be called collect:

(604) 732-4141 Vancouver
(604) 388-1543 Victoria
(403) 475-3611 Edmonton
(613) 392-2811 Trenton
(902) 426-4730 Halifax

Distress traffic must be accurately logged and reported to your nearest DOC office.

If you become involved in international emergency traffic such as the welfare and other types of messages which characterize such disasters as widespread earthquakes in other countries. the contact point for government messages in or out or those related to the welfare of Canadian citizens in the stricken area is the Department of External Affairs in Ottawa. A collect call to (613) 996-8885 will put you in contact with the duty officer.

TCA welcomes Letters to the Editor. Please send correspondence to Editor TCA, P.O. Box 356, Kingston, Ontario, Canada K7L 4W2.

NET DIRECTORY

by Bruce Carveth VE3BC

PHONE NETS (EASTERN Time)

(Ontario)	DAY	NET	FREQUENCY
0600	Daily	Maritime Weather	3770
0700to 1800	Daily	ONTARS	3755
0700	Sunday	Maritime Old Timers	3750
0800	Daily	VE2 PL's	3750
0800	Daily	Happy Gang (Quebec Whitecane)	3765
0800	Daily	Professional Loafers	3787
0900	Sunday	Renfrew County	3740
0930	Sunday	Georgian Bay ARC	3783
1000	Saturday	Ottawa Pot Hole	3760
1000	Sunday	Ottawa Pot Hole	3760
1030	Sunday	Montreal ARC Forum	3770
1030	Sunday	Nortown ARC (Toronto)	3770
1100	Sunday	London ARC	3750
1100	Sunday	Metro ARC (Toronto)	3735
1100	Sunday	West Side ARC (Toronto)	7192
1115	Sunday	Scarborough ARC	3762
1200	Saturday	Trilliums	14140
1300	Saturday	Trans Canada	14135
1300	Sunday	Trans Canada	14140
1400	Tuesday	CLARA	14160
1600	Mon to Fri	Roadrunners	3795
1600	Saturday	Trilliums (YL & XYL)	3770
1630	Daily	Professional Loafers	3787
1645	Daily ex-Sun	Maritime Whitecane	3770
1700	Daily	VE2 PL's	3750
1800	Daily	Maritime	3750
1830	Daily	Chicken Junction	3790
1845	Daily	Quebec (French)	3780
1845	Daily ex-Sun	Laurentian	3755
1900	Daily	Ontario Phone	3770
1915	Daily	N.W. Ontario	3750
1930	Daily	Quebec (English)	3775
1930	Mon to Fri	WheelChair	3770
2000	Sunday	Telephone Pioneers	3760
2000	Wednesday	Whitecane	3765
2000	Daily	Manitoba	3765
2015	Daily	N.W. Ontario	3750
2100	Sunday	Skywide ARC (Toronto)	3770
CW NETS			
1100	Sunday	Pot Lid (Ottawa)	3620
1600	Daily ex-Sun	Ontario Daytime	3645
1830	Daily	Grey-Bruce	3645
1900	Daily	Ont./Que. Net	3535
1900	Daily	Atlantic Provinces	3654
1945	Daily	Eastern Canada	7040
1945	Daily	Manitoba Traffic	3660
2000	Wednesday	Maritime Slow Speed	3680
2130	Daily	Eastern Canada	3652
Ref. QST – W1AW Code Practice, 5 to 35 wpm			3580 & 7080
SWAP SHOPS			
1000	Sunday	Pot Hole (Ottawa)	3760
1200	Sunday	London ARC	3750
1930	Sunday	Ontario Swap Shop	3790
1930	Monday	Muskeg Swap Shop	3755
2030	Friday	Quebec Radio Net	3775

TUNING UP

Re the letter in the September issue, 'Tuning Up' by Roger VE2DBE and Andre VE2FNF.

We have used the Yaesu FT-101 series for many years and now have three years on our FT-201; have not replaced one of the three tubes in either unit.

Our method is to use the standing wave bridge, set on the forward reading. Set the carrier drive just high enough to be seen on the bridge and tune for the highest reading on the SWR Bridge. This is not only fast and accurate but keeps the drive current low on the finals. On checking both of their methods through a watt meter, my method showed a higher power output.

Even if **TCA** was late for September, it was still worth waiting for, as it covers Canadian radio activity very well and each issue is worth reading.

Ernie Savage VE7FB
Vancouver, B.C.

THE EXAM DEBATE

In recent issues of **TCA** there have been some letters which seem to indicate some confusion and unhappiness with the Amateur examinations. There's the 'too hard' faction, and there's the 'it was alright for me in the old days' faction. Both seem to miss the essential point of the problem.

Besides being a ham, I am also an educator (I teach Biology in a Regional College) and making up and giving exams are a part of my life. There is one cardinal rule, which every educator knows, in evaluation of learning, and that is: every student must be given a clear picture of exactly what he/she has to know before the exam is written.

I know that my students would be pretty uptight if I did not give them a clear statement of objectives (in fair **detail**) of just what they have to know prior to their writing and, in fact, this basic policy is practised by all responsible educators. It definitely isn't good enough to tell them all they have to know is 'everything'!

Now, I'm not aware that DOC issues anything that could be called specific learning objectives. It seems to me that if a prospective Amateur knew well in advance **exactly** what he/she **had to know** in order to pass the exam, and if the exam was designed specifically to test whether these objectives had been met, much of the argument about levels of difficulty would disappear. It would then be the student's responsibility to ensure that he/she can meet these objectives prior to sitting for the exam. A set of clear learning objectives would also be a considerable aid to persons planning ham courses to prepare students for the exams.

I'd like to suggest that the job of designing and administering examinations be contracted by DOC to professional educators whose job it is to know something about evaluation methods. I think perhaps this would be best handled by the local Regional or Community Colleges which are scattered around the country in most communities.

To summarize: I think the 'exam problem stems from the fact that, at present, the entire evaluation is in the hands of people with little or no experience in education evaluation methodology. I, and I'm sure others, would be prepared to help. Is it possible for CARF to appraoch DOC about this possibility?

Dr. D.K. Edwards VE7AKU
Victoria, B.C.

Yes it is, Don. The whole matter of the exams was discussed at the CARF National Amateur Radio Symposium last month and a meeting was scheduled with DOC subsequent to that. We hope to carry a full report in the January TCA.

'PASSING THE BUCK'

DOC has ironed out many of the bugs in the new (exam) system and if any more pressure is put on them to make exams easier, then Amateur radio will suffer for it...

It appears to me that **TCA** has become a crying towel for those who have tried the exam and failed. Constructive criticism is one thing but most of these letters to the editor concerning exams I feel are merely 'passing the buck' to someone else because of their failure... it appears that **TCA** is going to have to start a new column... it should be called 'Ann Landers for Amateur Operators'.

Let me point out that I am self-taught and have no electronic background at all. I did not know that a resistor and capacitor even existed. After studying the CARF Study Guide for six months, I successfully passed my Amateur Certificate on the first try. In six months, I studied sufficiently to pass the regs, code (which at first I was convinced I could never master), and the theory. All this while working for a living, raising a family of three young children, taking care of my house and property and the many other things that everyday living requires of all of us...

It appears to me that people are afraid to admit that it is their own faults that they have failed. Blaming someone else sure isn't going to help them pass. Amateur radio is an elite society of people who have worked hard to have it and enjoy it, and if people wish to join the ranks, then they should have to work for it. Otherwise, GRS is the place for them.

This may seem strongly worded to you, but a little soul-searching by the ones who complain the most will probably bear out many of my comments.

The Ottawa District Office of the DOC in July and October have made an excellent effort to provide those writing the exams with good facilities which were quiet, comfortable and spacious. The code was excellent and well-presented. I feel they have put out a special effort and show their concern for those writing. For my part, I have sent them a letter of thanks for their efforts and hope they will continue in their efforts to make things as easy as possible for all those writing.

Art Lamarche VE3LAA
Petawawa, Ont.

The full version of Art's letter [and Dr. Edwards' above] was given to the Symposium's working group on the exams which was attended by the DOC officials who make them up.]

Analog vs Digital

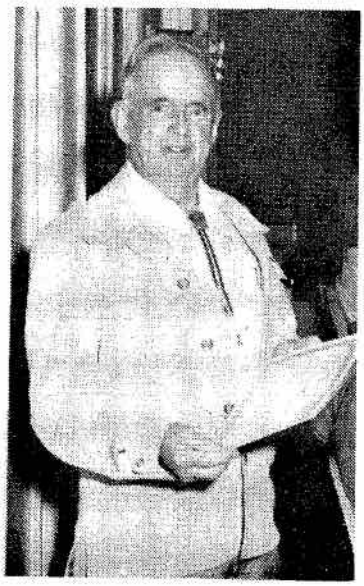
The clock with sweep hands is analog. The digital clock 'samples' time.

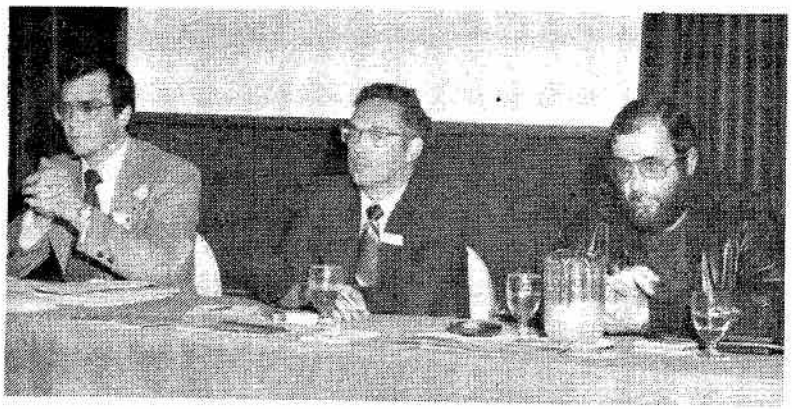
When watching a motion picture, there is nothing on the screen 50% of the time. Continuous analog action has been converted to a digital form (i.e. still pictures) which the viewing process transfers back to an analog experience.

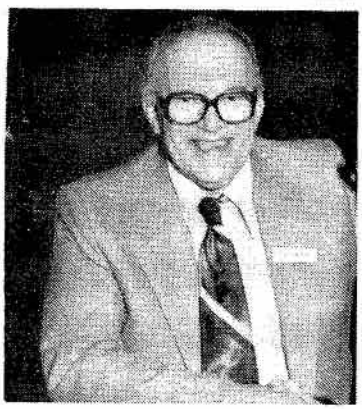
- The Ontario Amateur

RSO Convention

in pictures





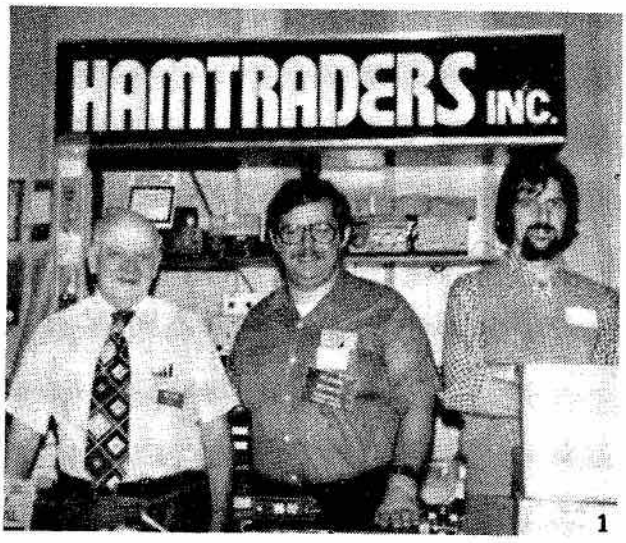


Clockwise from left: CARF President Bill Wilson presented Gerry King VE3GK with an award for his part as a reviewer of the new CARF Instructor's Guide, authored by Art Blick VE3AHU and Ron Walsh VE3IDW; Art Stark VE3ZS, author of the CARF Regulations Handbook, received an award from CARF President Bill Wilson VE3NR for his work on the new Handbook; The DOC Forum, left to right, Larry Greatham from HQ who sets the exams, Ron Powers, Ottawa District Office, and John da Silva who marks the digital operator exams; Ron Belleville VE3AUM, one of Canada's well-known Amateurs, livened the banquet scene as master of ceremonies.

Photos by Rick Van Gastel VE3HVA
& Don Slater VE3BID

This page, clockwise from above: Penny Robinson VE3ERO, who chaired the RSO Convention Committee, presents George Meredith VE2EWC with the grand prize, an HF transceiver; Lutze Ecker (above) of Ham Radio Atlantic and Tony Grist (below) of Glenwood Trading Co. represent equipment distributors from the East and West Coasts respectively; The whole gang (the heavyweights, anyway) appeared at the CARF booth. Left to right, Bernie Burdsall, Bill Wilson, Fred Towner and Art Blick.

Opposite page: One of the highlights of any convention is the opportunity to view a variety of Amateur radio equipment. Here are some of the operators of outlets for such gear from across Canada. Beginning top left: 1 Murray Lampert (centre) and crew of Hamtraders; 2 Chris Schultheiss (left) and the crew from Comm/Plus; 3 Dick Walker of Bytown Marine; 4 Winnifred and Doug Wismer of WSI Radio; 5 Udo Franz of Canadian Communications; 6 Harold MacFarlane of MacFarlane Electronics; 7 Gary Harris and Bill Hopson of Heathkit; 8 Bruce McCoy of Canadian QSL's.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1


2


3


CANADIAN QSL
PRINTING SERVICE
1128 BRYDGES ST. (REAR)
LONDON 453-2531
8


WSI RADIO
4

6

5


7

Canada first in direct Satellite-to-Home TV

As a result of a project sponsored by the federal Department of Communications in co-operation with broadcasters and provincial departments, Canada becomes the first country to install earth stations in private homes to test a direct broadcast satellite service using the Anik B satellite. The project started in late September is planned to continue until at least next spring.

"If this project is a success and if our government decides to develop the concept of direct-to-home satellite broadcasting a step further, millions of Canadians in remote and rural areas will benefit," said DOC Minister David MacDonald.

The department purchased 100 earth stations from SED Ltd. of Saskatoon to be used in the project. Electrohome Ltd. of Waterloo, Ont. and Andrew Antenna Ltd. of Toronto were major subcontractors. Engineers from the DOC have been working for several years in developing the technology of small, low-cost earth stations.

The dishes are being distributed now to families in Ontario and there are plans to extend the project to British Columbia and possibly the Yukon and Northwest Territories at a later date. More than 12 hours a day of TV programming will be available over Anik B, the satellite launched last December for Telesat Canada.

BOOST THE CONSULTATIVE PROCESS

Both Canadian and U.S. Amateurs can consider themselves fortunate in the fact that both DOC and FCC have a consultative process on a democratic basis when it comes to changes in radio regulations. To our knowledge, no other country extends this privilege to their Amateurs. To make it work, however, Amateurs should respond, either individually or through their clubs, to requests for comments ... use it or lose it!. Which should remind us that the DOC has asked for comments on the use of the 900 MHz band for a new GRS, for suggested exam questions and for comments on the uses foreseen for the band 890 MHz to 10.68 GHz. The details were published in a recent issue of **TCA**.

Symposium successful!

Working in both English and French for the first time, the Third CARF Amateur Radio Symposium met in Montreal on November 3 and 4. Workshops on packet radio, examinations, regulations and policy worked out recommendations to be presented officially to the Department of Communications.

Seven DOC officials, including district, regional and headquarters officials, sat in on the deliberations.

The Saturday sessions, attended by some 70 Amateurs, including operators from as far away as British Columbia and Newfoundland, were topped off by a banquet at which CFARS Co-ordinator Ivan Rene de Cotret, on behalf of the Department of National Defense, thanked Amateurs for their morale building phone patch service for Canadian Forces personnel at isolated posts in far-away places.

The French and English workshops combined their efforts in a bilingual general assembly on the Sunday morning. Details of the recommendations adopted there will be in the CARF Newsletter and the January issue of **TCA**.

The event was made successful by the combined efforts of the Union Metro Des Sansfilistes and RAQI, the Quebec provincial organization.

A High Stability, Parallel-T Audio Oscillator

James Park VE7IW

In response to the request for technical articles for **TCA**, Canadian radio Amateurs are now, hopefully, cranking out a flood of material. The first consideration is, however, what is the 'typical' subscriber looking for? A homebrew, nineteen-transistor SSB transmitter design, or a new way to hang a wire in the air? With the expansion of the magazine occurring so recently, only time, and some positive and negative feedback from the readers, will indicate which way to go.

Speaking of positive and negative feedback – herewith the 'twin-T' oscillator.

What is it? It is an audio oscillator, with excellent frequency stability, reasonably good waveform, high output voltage. It works over a wide range of supply voltages and draws very little current.

What can it be used for? In my case, I needed a single audio frequency at adjustable levels up to a volt or so, with reasonable waveform; to trouble-shoot some audio circuitry. (My homebrew tube-type audio generator had been converted to a CW monitor some years back, and I didn't want to disturb it!)

Why build it? Well, it's simple, cheap, and reliable. The parts are readily available. It can be made extremely small and portable if desired, and current drain is almost nil.

You don't want to trouble-shoot audio circuits? Ok, let's include provision for a key jack and high-impedance headphones, and you can practice morse with it. (Or you could lend it to a beginner.) We can add a lower impedance output if you wish. How about a small speaker? If you can find a place in your CW rig where you can syphon off a few volts at a few ma. it makes a fine keying monitor. In a pinch, you can disconnect the feedback networks, and you have an audio amplifier and with minor modification an impedance transformer.

The real reason to build it? Well, obviously, this isn't aimed at the experimenter who is busy working moonbounce. It is aimed at what seems to be a large, and perhaps growing, segment of the Canadian Amateur population that no longer does, or perhaps never has done, a little construction and experimentation with individual electronic components.

The ultimate objective? To hook you on the idea of doing a little building – permanently of course.

Figure 1 gives the schematic diagram of the project in its simplest form. No, it's not original. This circuit, like most, has been around for years. It is a little different from the usual single-stage twin-T oscillator, in that a 'buffer' stage has been included. This particular format was taken from a fifteen-year-old G.E. transistor manual circuit.[1] The transistor type was changed, and anything else that was required.

In operation, Q2 is a common-emitter amplifier, with 180 degree phase reversal between base and collector. Positive and negative feedback, depending on frequency, take place via the high-pass network, C1,C2,R3; and the low-pass network, R1,R2,C3. At the frequency of operation, as determined by the actual values of resistors and capacitor chosen for the feedback networks, an in-phase signal is presented to the base of the

buffer, Q1, and finally fed back to the base of Q2, causing sustained oscillation. (Unless something goes wrong. Hi!) The original circuit claimed a frequency stability of 0.2% over a temperature range of -55 deg. C to + 80 deg. C.

Besides changing the transistor type to 2N3904's, (NPN, silicon, high-speed switch. Relatively high gains at low collector currents and low CE voltages. A good, low power, all-round audio, r.f., or switching transistor). I added an output network consisting of 0.1 ufd. capacitor and a potentiometer of at least 25K. It's nice to have a volume control, if you hang a pair of high-impedance headphones from output to ground, and an output-level control is a must if you are going to inject an audio test signal into different circuits in a malfunctioning audio system. The inductive headphones will, of course, distort the output waveform, but, if anything, the note is nicer to listen to.

A key can be plugged into the normally-closed jack in the emitter circuit of Q1, for code practice, and pulled out if the oscillator is used for some other purpose. The keying isn't bad. A little click on break, but no problem in following a bug at 30 wpm. or better. Keying the emitter of Q2 gave a small amount of chirp, noticeable at low frequencies.

The pot. or rheostat in series with the emitter of Q2 can be left out if desired. I put it in for a little extra negative feedback, for the odd time when a higher-class waveform might be desired. (Even a 100 ohm fixed resistor helps the waveform. If you put in too much resistance, of course, you kill the oscillator. Sometimes it is handy to have the **Distortion Control**, though, and set it for best waveform with a scope at the output.)

The values of the feedback network components? For my purposes I used: R1,R2,18K each. C1,C2,0.02 ufd. each. R3, 1800 ohms. C3, 0.04 ufd. Frequency around one kHz., depending on the tolerance of your components and whether you make R3 variable. It is possible to obtain one or two hundred Hz. shift with a little more distortion. Too much, or too little, resistance at R3, will, of course, kill the oscillations. In general, make C1 equal to C2 and C3 equal to twice C1 or C2. Make R1 equal to R2, and R3 equal to one-tenth R1 or R2.

Changing R1 and R2 to 47K and R3 to 4.7K, and using the same capacitors as before, the fo was adjustable around 300 Hz., if you want to check the low end of a communications audio pass-band.

R1, R2, each 10K, R3, 1K; C1,C2, each 0.01 ufd., C3, 0.02 ufd., gave a fo adjustable around 2 kHz or more. It's possible to make the fo continuously adjustable, but would require a lot of capacitors and switching, and ganged R1, R2. Still it might be fun to try.

For a keying monitor, find somewhere in your rig where you can steal a few volts at a few ma., or use a keying relay to key the emitter circuit of Q1.

For an emergency audio amplifier, disconnect all the feedback network capacitors, and hook a signal to the base of Q1 through a 0.1 ufd. capacitor. Voltage gain should be around 17X with 100 ohms in the emitter lead of Q2. Frequency response fairly flat from 100 Hz. to 100 kHz. Hi-fi anyone? It will handle around 700 mv. pp. input signal level before severe distortion. Oh yes, don't disconnect R1 and R2, the 18K feedback resistors, as they also provide the base-current line for Q1.

Now, what's the catch to all this? Well, the AC load on Q2 is already quite low, (Q2 collector resistor is only 3.3Kohms), but if you hang less than a few thousand ohms to ground from the output terminal of the unit, you will kill the oscillation. Not to worry – nobody dies – no smoke – no damage. It is best to keep the load up around 30K to 40K ohms if possible. With a 25K ohm output level control as the additional load on Q2, the signal output voltage is around eleven volts p-p. This is with a 12 volt DC supply and the unit drawing about 3 ma. My original circuit, though designed for 12 volts, worked well from 9 to 22 volts.

If you want to load the circuit a little heavier, see figure 2. Now you can load the output down to around 3K at a full output signal voltage of between ten and eleven volts, before waveform distortion just begins to be noticeable. Not a bad bargain for a sixty-five cent transistor and two resistors. The only hooker is that Q3 will draw around seven ma. Still, your total current is only around 10 ma. now, at 12 volts.

At this point someone will probably decide that if current drain doesn't matter

why not include the convenience of a speaker? Ok. (With some reluctance due to the increased current demand and fairly low audio level.) See figure 3.

Output from a speaker is about right for one person, who may not wish to wear headphones; or for a small group around a table. It certainly wouldn't do for a classroom situation. Current demand is approximately 10 ma. at 12 volts for Q4, giving a grand total of around 20 ma.; total power about 240 mw. (Still under the max. collector dissipation for a single 2N3904.)

At this stage I got hooked. I changed Q3 to a phase-splitter, by putting half of the emitter resistance in the collector circuit and then fed a pair of 2N3904's in class B, zero bias (almost), single-ended, push-pull, with one power supply. The results were less than spectacular, and I was converting to a 2N3904-2N3905, two-supply circuit, with Q3 back to its original form, when I realized three things: 1.) I didn't have a 2N3905 (pnp) on hand. 2.) I was hooked! 3.) I couldn't afford the time to be hooked!

With that, sanity slowly returned, and I reluctantly pushed the project away. Is it exhausted? Absolutely not. Why not re-design with junction FET's? How about two of these little oscillators at different frequencies, and mix at the input to the audio system of your transmitter for two-tone SSB testing? Still only 6 ma. of current at 12 volts, four transistors and a handful of resistors and capacitors.

Any bugs? Only one I found (besides loading the output too heavily, of course). A long scope lead with a certain capacity, connected across the load at the emitter of Q3, was reflecting back a capacity at the output of Q2, that could, under some conditions, kill the oscillator by introducing undesired phase shift at this point. The 1K resistor in series with the output stopped the effect altogether.

Just a couple of final words. You're still not convinced. "Why bother?" "You can do it better with a chip." "Who wants to build anything anyway?" "Leave that stuff to those few, kinky, far-out experimenters who really get off on it."

Well, maybe you have a point. We can't 'fight progress', or turn back time. We can, however, still decide in some small ways, just how much we are going to let 'progress' **rule** our lives. You can buy all the vegetables you want at relatively reasonable prices at the supermarket. They come in finished form: clean, nice-looking and tasteless. I'm afraid I find L.S.I. circuits, and completely manufactured 'ham' gear the same. I think I'll opt for a garden for my own vegetables, and discrete components (most of the time) for my own electronic projects – poor though they may be. At least they still have flavour -- they still are fun.

After having been almost completely absent from Amateur radio for many years and starting back, something seems lacking. Where are the technical discussions that used to stud so many QSO's? What ever happened to that ancient and honourable tradition of almost every Amateur building his own transmitter? We seem to have paid quite a price for the extra 3 kHz bandwidth per phone signal, we gained. Drop the code, buy all your gear – and is it Amateur radio or CB?

Funny, construction was never easier. A piece of Vector board, a handful of push-in, spring loaded clips, a little aluminum box to put it in if you wish. If you desire a permanent circuit just replace the spring loaded terminals with the ones that look like spade lugs and solder each one. It works as well as copper foil, is faster, and still allows experimenting with the circuit, if the spirit moves you. You can build this oscillator using Vector components, or something similar, in the time it used to take me to cut a couple of tube-socket holes in a steel chassis. Takes much less energy, too.

Oh yes, why not build in modules, maybe on small pieces of Vector board, and never destroy them? In this circuit you will always have a CC-CE amplifier, no matter what you use it for. Why destroy it? You'll rebuild the same thing over and over. Just disconnect the feedback network and use it in any number of projects.

Oh well, there will always be a few nuts hiding in the woodwork, swooping down on old TV chassis with wild cries and a pair of sidecutters, trying to get something for nothing out of electronic circuits, and sometimes almost making it.

Why not try it? You may get hooked.

James Park VE7IW
2181 28th St. N.E.
RR#4 Salmon Arm
B.C. V0E 2T0

Ref: 1. G.E. Transistor Manual, 1964, p207.
2. J&J Electronics Ltd., P.O. Box 1437, Wpg., Man. R3C 2Z4.

FIG.1

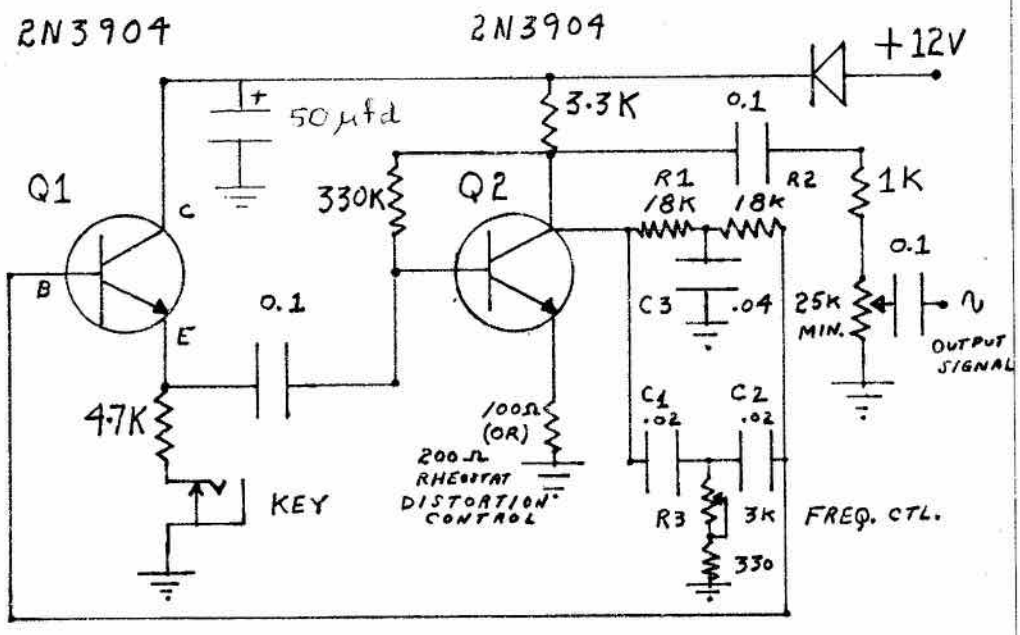


FIG.2

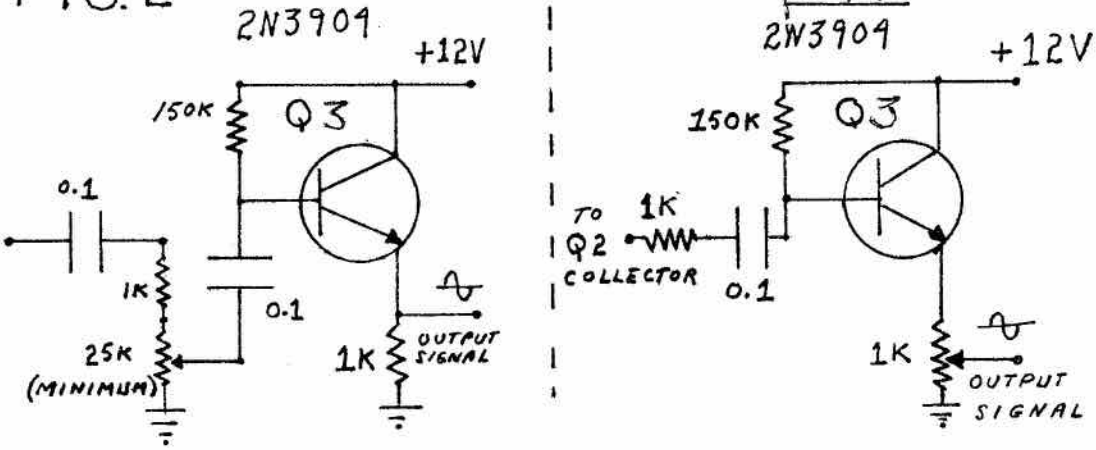
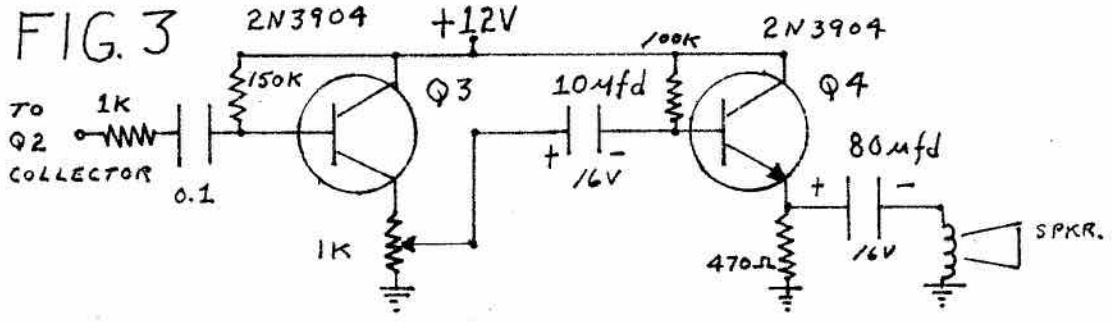


FIG.3



What is an Antenna Noise Bridge?

By Dave Bennett VE7AZG

The other day I was talking to a relative newcomer to our radio hobby about an antenna problem she was having. All the symptoms appeared to indicate a lack of resonance on the band she wanted to work.

"Why don't you check the resonant point with a noise bridge?" I suggested. "That way you will know if your antenna is too long or too short."

Her response – "Okay, but what's a noise bridge?" – is what prompted this article. Having made the same suggestion to a few old-timers as well as newcomers and received substantially the same answer, I felt a short descriptive article might point the way to this marvelous little device.

So – what is a noise bridge? An antenna noise bridge, to give it its full title, is a device which produces broadband white noise. A null in the noise level is indicated when the indicating device - a receiver - to which it is attached is tuned to the resonant frequency of the antenna. Further, it will, via a dial on its face, give you the approximate impedance of the antenna in ohms.

Refer to Figure One for the setup used. As you can see, the receiver is tuned to a null, or dip, in the noise level at about 3750 kHz, while the bridge shows about 50 ohms.

The noise bridge itself consists of a signal source - the broadband noise generator - and a standard bridge circuit. The bridge circuit has a potentiometer in one leg, the antenna in question in the other leg, with a detector (the receiver) across the bridge (see Fig. Two).

An antenna is fundamentally a resonant circuit whose characteristic impedance reaches a minimum at a single frequency. This minimum will be the radiation resistance. The resonant frequency is the point at which the inductive and capacitive components of the antenna cancel each other out.

In use, the dial of the bridge should be set to the estimated value of the antenna radiation resistance (i.e. 72 ohms for a dipole, 50 ohms for a vertical or inverted 'V', etc.). With the antenna and receiver connected to the bridge, tune the receiver over the range where the resonant point is expected. Determine where the best null, or dip, in the noise level falls - indicated by a minimum 'S'-meter reading and a drop in the audio level. Now adjust the bridge for the best noise by rotating the knob on the bridge while watching the 'S'-meter. Repeat these last two steps for highest accuracy. The bridge is balanced when the resistive value of the antenna is equal to the value set on the dial. The best results are obtained with the receiver volume control wide open and the RF gain turned down to a comfortable listening level.

A general coverage receiver has been found more useful than an Amateur-band-only receiver or transceiver. If the antenna resonant point is beyond the tuning range of the latter, you have no way to tell where it is. It should also be noted that most Amateur-band receiver systems employ a sharply tuned preselector. When tuning from end to end of an Amateur band, the preselector will have to be constantly repeaked, which is not necessary on most genral coverage receivers. If higher accuracy is necessary, once the resonant point has been found in an Amateur band, the Amateur-band-only receiver can be used.

Note: Do not transmit into the Bridge! You may damage it beyond repair.

Among other things, the noise bridge can also be used to determine the electrical quarter- or half-wave lengths of coax. (See reference three for complete details.)

A quarter-wave length of coax should

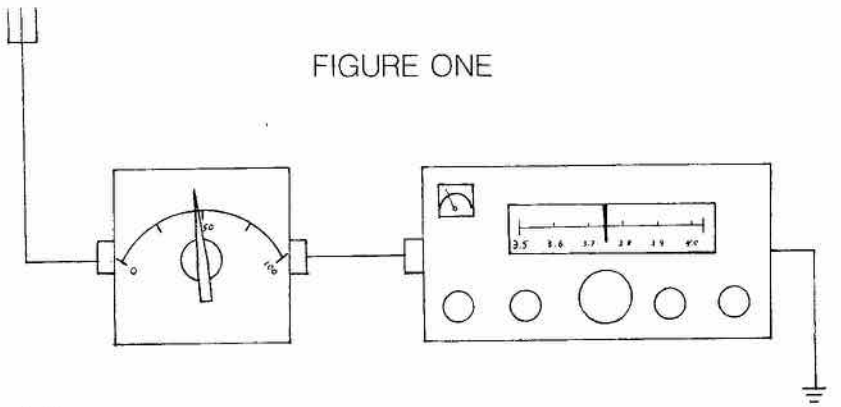
be open at the far end; half-wave should be shorted. Set the noise bridge dial to read zero ohms, then follow the normal tuning procedure outlined above. If your line is a half-wave at the null frequency, the resistance shown by the bridge is the antenna resistance. If it isn't, the reading has to be modified by applying standard transmission line formulas for electrical length of line used.

Using the standard noise bridges available from Omega-T and Palomar Engineers to determine the resonant point of an antenna, as described above, is likely to be the most practical use most of us will put the instrument to. However, for those who want to know more than that, there are several home-brew devices in the literature which will allow you to determine just about everything there is to know about any antenna. The articles in references 7 and 8 may be of particular interest.

References:

1. R.T. Hart W5QJR, "The Antenna Noise Bridge", QST, Dec. 1967, p.39.
2. Don Nelson WB2EGZ, "The RF Bridge", Ham Radio, Dec. 1970, p.18
3. G. Pappot YA1GJM, "Noise Bridge for Impedance Measurements", Ham Radio, Jan. 1973, p.62.
4. John Lawson K5IRK, "Noise Bridge" (letter), Ham Radio, May 1974, p.66.
5. Ade Weiss K8EEG, "Noise Bridge" (ham notebook), Ham Radio, May 1974, p.66.
6. Forrest Gehrke K2BT, "Impedance Bridges", (letter), Ham Radio, March 1975, p.60.
7. Robert A. Hubbs W6BXI, and A. Frank Doting W6NKU, "Improvements to the RX Noise Bridge", Ham Radio, Feb. 1977, p.10.
8. Arjen Raateland OH2ZAZ, "Noise Bridge Construction", (letter), Ham Radio, Sept. 1977, p.8.
9. Lloyd M. Jones W6DOB, "Use Noise to Tune Your Station", 73, April 1978, p.160.
10. T.J. Anderson WD4GRI, "Noise Bridge Calculations with Texas Instruments Programmable 58/59 Calculators," Ham Radio, May 1978, p.45.
11. Leonard H. Anderson, "Antenna Bridge Calculations", Ham Radio, May 1978, p.34.

FIGURE ONE



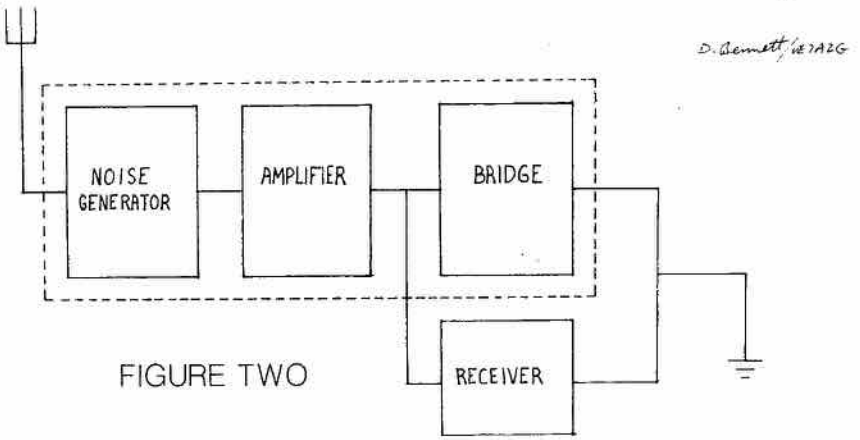


FIGURE TWO

Pilot Lamp Controller

STABILIZES CRYSTAL OVEN

Crystal oscillators and phase locked loops often need a temperature-controlled oven to retain maximum frequency stability, but the ones available are either expensive or use special components not readily at hand.

This oven uses low-cost parts such as standard pilot lamps for the heater elements and a one-chip control and sensing circuit that can maintain the temperature to within 0.5°C of the set value. The oven can be built for $7 or $8, the major cash outlay being for the oven's enclosure.

The LM3911 temperature controller is the heart of the circuit. It contains a temperature sensor, a stable voltage reference, and an operational amplifier. The sensor, which exhibits a temperature change of 10 millivolts per degree Kelvin, is connected directly to the non-inverting input of the op amp. Its output voltage is compared with the voltage set externally by the temperature trip-point potentiometer R1.

If the oven temperature increases above the trip-point, the voltage from the op amp begins to fall. Consequently, the current through transistor Q1 decreases and so does the pilot lamp's filament current. Current continues to decrease until the oven temperature falls sufficiently to be detected by the sensor. At that time, the voltage at the non-inverting port of the op amp falls, op amps output voltage increases, and the filament current increases. The process is continuous.

The LM3911 provides sufficient base-current drive for a transistor of modest gain, such as the 2N3055. This transistor will drive four Chicago Miniature 6ES lamps. If more lamps or lamps with a higher current are required for generating high oven temperatures, Q1 should be replaced with a Darlington-pair npn power transistor, such as the T1P20.

When two lamps are used, the circuit can be set to an oven temperature between 22°C and 43°C for a 1.5x2x3" enclosure and an outside temperature of 20°C or more. Stable operation is reached in less than 10 minutes from a cold start. For each additional lamp in the circuit, the maximum oven temperature will increase by 10°C or so.

The most temperature-critical elements should be placed close to the LM3911, near the centre of the oven housing. If a crystal oscillator is housed, the crystal should be in direct contact with the LM3911. The temperature controller chip is available in several package types. In all cases, pins 1 through 4 are used to make circuit connections. If the eight-pin dual in-line package (DIP) is the one employed, unused pins 5 through 8 should be soldered directly to the crystal holder as shown in Fig. 2.

Almost any material may be used for the oven enclosure. However, the inside surface of the selected case should be covered with asbestos or some other insulating material. A 1/16 inch thick layer of the insulation, glued to the inside of the cover, will suffice.

The component values shown in in the circuit (Fig. 1) assume a 15-volt supply voltage, but other voltages can be used by changing the value of R2 to equal (V-6.8) kilohms, where V is the actual supply voltage. The pilot lamps should have a rated voltage slightly below the supply voltage used.

from the Peterborough ARC News
by D.D. Brown
Drawings by Ken King VE3XQ

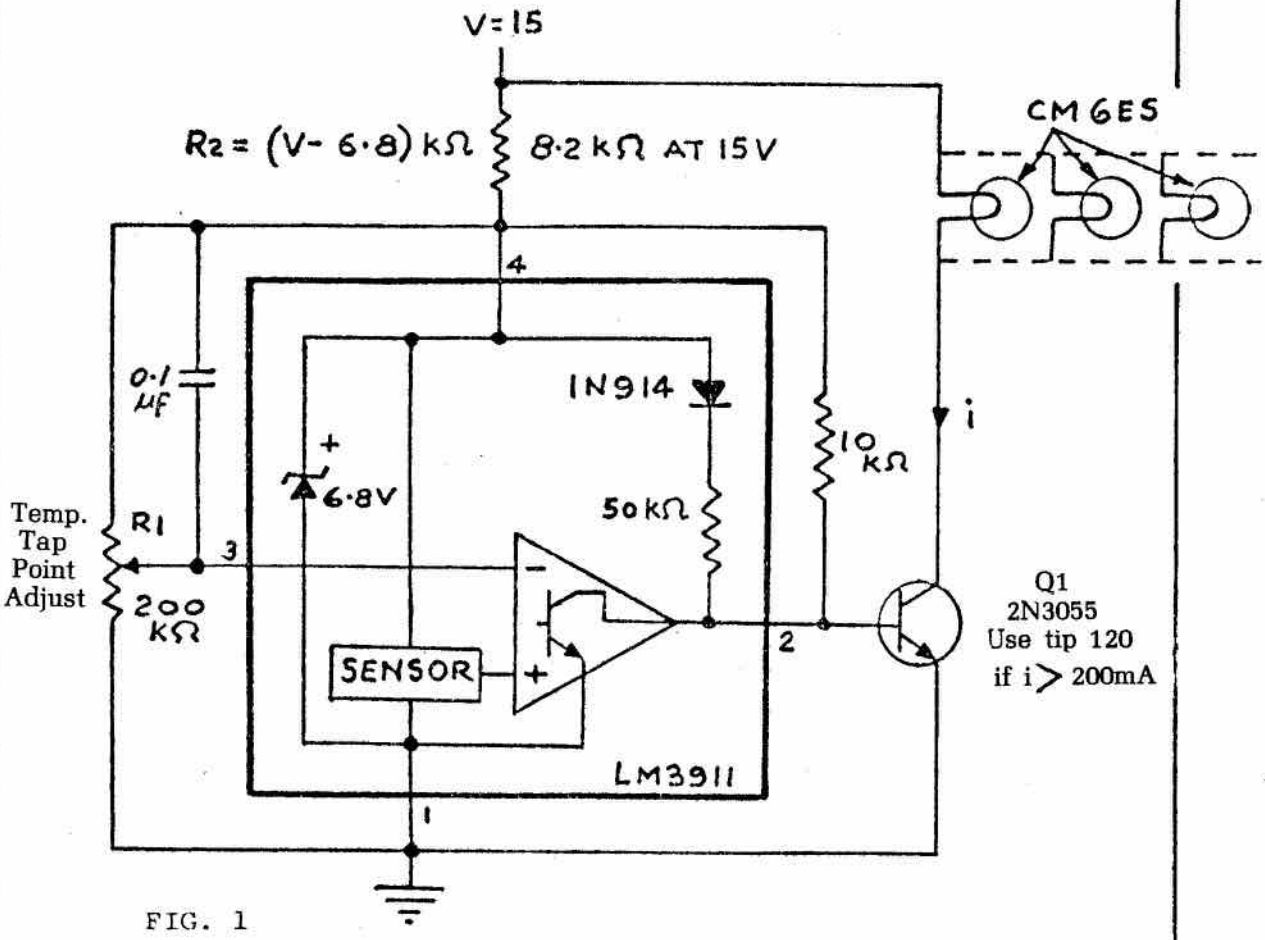

V=15
R2 = (V- 6·8) kΩ
8·2 kΩ AT 15V
CM 6ES
4
0·1 μf
IN914
+
6·8V
10 kΩ
i
Temp. Tap Point Adjust
R1
3
50kΩ
200 kΩ
SENSOR
2
Q1
2N3055
Use tip 120
if i > 200mA
LM3911
1

FIG. 1

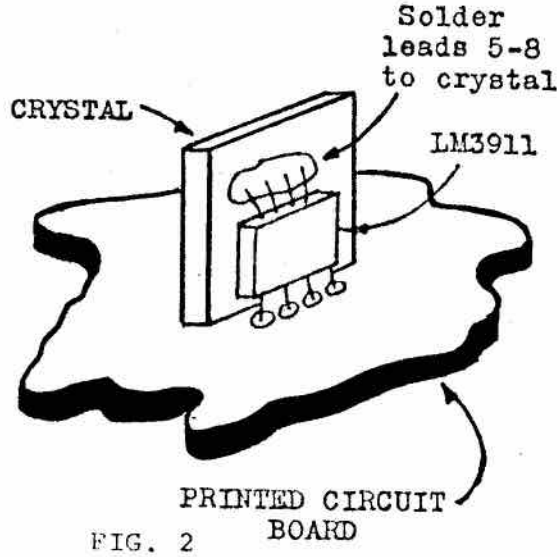

Solder leads 5-8 to crystal
CRYSTAL
LM3911
PRINTED CIRCUIT BOARD

FIG. 2

5 ways to drive an Amateur crazy

1. When you hear a DX station calling out be sure to tune up right over top of him. That way no one else will be able to copy his call or know when he is finished calling out.

2. Send 'CQ' for about two or three minutes. Then when anyone who might be listening is falling asleep throw in your call twice; now that you have his attention start all over again.

3. When you get someone be sure to send his call three or four times everytime you go back to him so he won't forget it.

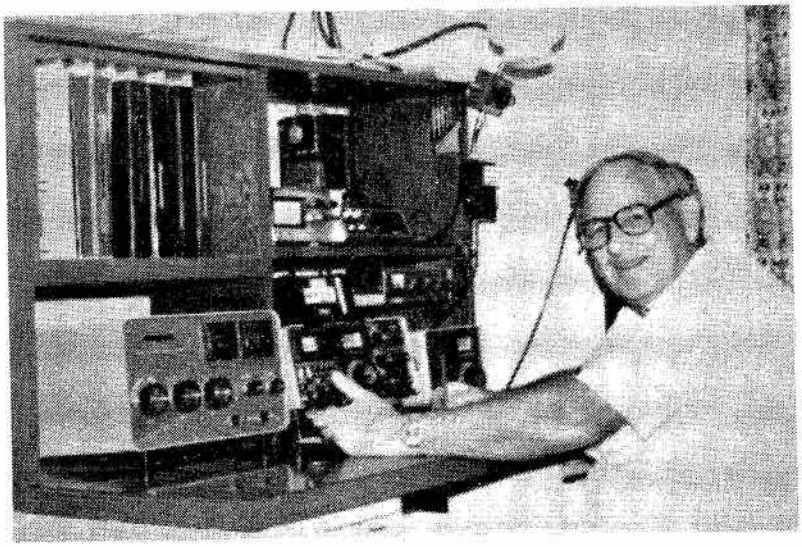
4. When you make a mistake just send two or three dits. Your contact will figure out what you are doing eventually.

5. Take your time tuning up. Then when you have some people waiting to find out who you are, move up or down a few kilocycles and call out. You are sure to have a clear spot as everyone else is still waiting for you where you tuned up.

Debbie Robb VE3KRI
202 Secord St.
Thunder Bay, Ont. P7B 3E5

Canadian QSL Bureaus

G.D. Holeton VE6AGV,
4003-First St. N.W.,
Calgary, ALBERTA.



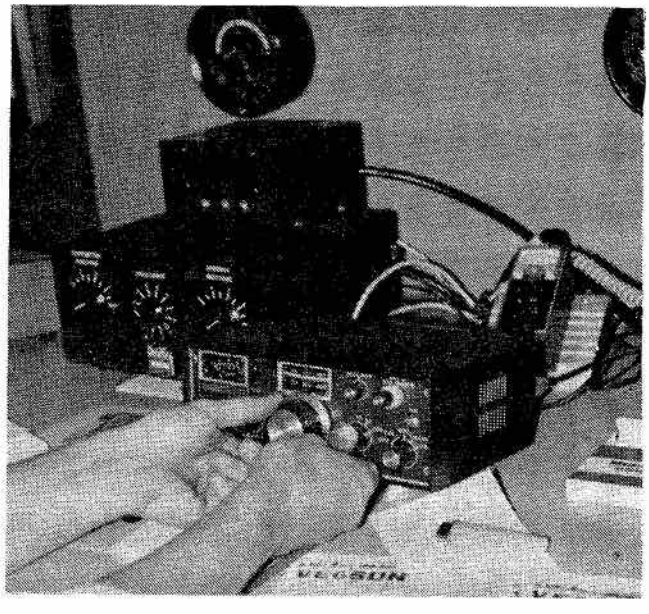
As Doug is retired, he says the four or five days a month needed to handle the 25,000 cards a year is no problem! It seems to him as though 80% of the cards go to about 5% of Alberta's Amateur population. Doug prefers to run an account for postage and envelopes (3 cents each) as it relieves all the variations in sizes, changes in postal rates, etc.

Once a year, VE6AGV publishes in the provincial Amateur publications a list of calls with five or more cards. Others are distributed at Amateur gatherings. Doug wishes to remind all hams to be sure to notify their respective bureaus of any call or address change.

VE6SUN

Solar Power may be the new frontier for an energy-conscious society ... and VE6SUN is in the forefront!

The solar equipment used for the solar powered station used by the Calgary ARC during Stampede Week was supplied through the kind generosity of the Province of Alberta, Research Council and was a commercially built, self-contained unit. Four solar panels each having 36 cells are racked at the top of the unit and elevated at 60 degrees to the south. These in turn, kept charged six 105 Amp. batteries located in the base of the system. The entire package was placed on the roof of the exhibition building housing our display and supplied 25 Watts continuous power to the station down below. Also on the roof was our tower, tri-bander and Vee antenna arrangement. Sunlight conditions were so good for the ten days, we found our batteries always charged with maximum voltage drop on any one of the days a mere .19 volts. Readings 12.65 volts receive and 12.52 volts transmitting.



Above: The operating desk at VE6SUN, getting one of the rigs fired up for a 'ragchew' on 20 metres.

The entire project VE6SUN went for ten days without a hitch. It took 70 volunteers to erect the antennas, assemble the booth and operate the station. Then, after the last QSO was made, take everything down and cart it away. Many were tired, but we all have that feeling of accomplishment that comes after the completion of a job well done.

Anyone interested in running a similiar project, and would like further details, please contact the Calgary Amateur Radio Association – Box 592, Calgary, Alberta, T2P 2J2. We will be happy to forward the information on to them.

VE6SUN Committee.

Above: Station VE6SUN with some of the more than 70 volunteers of the Calgary Amateur Radio Association manning the booth. About 75,000 of the visitors to the Stampede viewed the booth and caught a first-hand glimpse of an operating 'ham station'. VE6SUN was also the subject of two well-produced television documentaries. Below: VE6SUN power supply and tri-bander up on the roof of the exhibition building housing the station. The solar panels shown provided enough power to keep the six 105 A/H batteries stored at the base of the panels always close to full charge.

On Amateur

Reference the letter in **TCA**, April 1979, 'Justifying Amateurs' by Henry B. Ruh, WB9WWM. Since it referred to my article 'Must Our Hobby Be Justified?' February 1979, I was very pleased to have some sort of reaction. As I pointed out at the beginning of my article, I was, and am, interested 'in encouraging Amateurs to take a broader look at the entire question.' (Ted King, VE1PW, started the discussion with: 'Can You Justify Your Hobby?' **TCA**, Spetember, 1978.) Having said this, I think it's worth having a closer look at Henry's letter. (I wish he had taken a closer look at my article!)

Despite the title 'Must Our Hobby Be Justified?' I did not set up an 'either/or' situation. Rather, I **questioned** the **reasons advanced** for justifying Amateur Radio and the ways to do so; but ultimately, I thought, advanced a number of far more important reasons, that, in fact, did more than justify our hobby!

True, our hobby is a 'luxury' of our civilization – but then, so is political freedom, so are human rights such as freedom of speech. I suppose you could say, "They contribute nothing to our basic needs." I guess it all depends on what you consider our basic needs to be. If you're talking about soup in the pot, a roof overhead and a fire in the hearth, I would have to agree. But, Henry, I didn't really think your country or mine had as their most fundamental reason for existence – mere physical survival. In fact our peoples have both demonstrated, over the years, a willingness to individually relinquish their physical survival to maintain that nebulous, non-edible, non-drinkable, non-burnable thing called 'freedom'. I admit it does seem to be subject to interpretation, more and more, and there is confusion between freedom and licence, still, it is **the** fundamental of our societies, and what does, indeed, still distinguish us from totalitarian systems.

I must refer to your paragraph on whether to build or to buy. I think a lot of Amateurs must be revolving in their graves, or be down the basement or out in the shops – gnawing on their soldering guns over some of your statements. Your paragraph implies that 'bought' radio equipment is 'modern' and 'reliable' and that 'experimentation' and 'tinkering' are of value primarily so we can deal with 'makeshift whatnots' which, I suppose, translates into that now dirty word, 'homebrew' equipment.

'Tinkering; makeshift whatnots;' what a heck of a way to describe, refer, or even allude to, several decades of honourable, Amateur technical history. Do you really think we used 'spark' in the forties, fifties, sixties? Do you really think our homebrew rigs were makeshift whatnots? I can only suggest a fast perusal of the various handbooks, magazines, for the periods involved. The schematics should tell you at a glance the calibre of homebrew transmitters and the **technical competence** of those who emulated these designs for their personal use. True, over the years any keen experimenter will build up (and often more quickly tear down) a variety of projects that satisfy his curiosity about some particular phase of radio-frequency electronics. Some of these are transmitters, and being unsatisfactory (or some problem or principle having been solved or understood) the breadboard circuit is reduced again to parts. Long may it continue! But to confuse this type of

James Park

experimentation with the thousands upon thousands of truly excellent homebrew transmitters built and operated over the years, is not very logical.

Interestingly enough, those of us who took advantage of World War II surplus parts often had transmitters that for ruggedness and reliability would put all but the finest present-day commercial equipment to shame. We saw a lot of military radio gear and parts, built to military standards. It was only natural that quite a few of those parts and practices ended up in the construction processes of home-brew transmitters. If equipment built from such parts sources as BC-375 tuning units was not reliable then I doubt the brushed-aluminum boxes of today are either. As a matter-of-fact, much of the equipment with electrolytic filter capacitors connected in series and with TV sweeptube finals, turned out commercially, was actually a step backwards from the war-surplus, oil-filled capacitors and 807 and 813 finals we were used to. Reliable? With a bought, scrounged, or second-hand, transformer, it was quite possible to close the shorting switch on your key and walk away, secure in the knowledge that if you came back a week later your rig would still be pumping out r.f. (No, that was not my carrier that used to QRM you!) How many commercial rigs for the Amateur market, over the past few decades were designed for continuous carrier service? Lots of homebrew rigs used to be. Progress? A 50% duty cycle? Pshaw! How reliable is a commercial rig you can't repair yourself? What if your friendly, neighbourhood repairman isn't available? We not only built our gear, we often designed it as well. We could certainly repair it, and if necessary quickly modify it. My partially home-designed, completely home-built transmitter of the early nineteen fifties went thusly: 6AG7 – 6SK7 – 6SK7 – 6SK7 – 6AG7 – 807's – 6Y6 (and modulator). Yes, tubes. In thirty years of hamming I have had one or two tube failures in homebrew gear. Interestingly enough, you would not be able to detect the difference in signal from that old rig to signals from most of the 'bought' equipment of today. It **was** reliable. It **was not** a 'makeshift whatnot'! Neither was it unique. There were lots of fine, homebrew rigs around. They were the rule, not the exception.

I am not 'against' commercially manufactured equipment on the bands. In fact, I appreciate those Amateurs who are devoted almost solely to operating and thereby help maintain occupancy of 'our' frequencies for those of us who may experiment more than operate. I would be saddened if the swing to commercial equipment ever became complete. It would seem to reduce the richness and diversity of a splendid hobby, not to mention depriving many new operators of the enjoyment of experimenting simply because it 'wasn't done'.

Well, on with this reply to the letter. (You can see, as a past master of the dogmatic statement – nothing irritates me more than dogma!)

As an amateur naturalist and a person who at one time both studied and worked in the science of biology, I am well aware of the (partially) closed environmental system within which we exist. I also well appreciate the problems of populations versus resources within our closed system.

➡

The solutions are scientifically simple, sociologically difficult. They involve taking dead aim at 'population' and some of what passes for 'progress'. However, I digress. If the radio spectrum is a 'natural resource', of course it must be shared, and on a priority basis. But will we forever be so stupid that 'military' and 'propaganda' must be up on the top of the priority list? Will we ever mentally evolve to the point where we no longer allocate bandwidths of 6 MHz to communicate TV giveaway shows? Oh, I know, one must be practical and face the realities. Well, someone must also occasionally say "Hogwash!" and try to suggest alternatives to locked-in, unimaginative thinking. Expediency and efficiency can't always be of first importance. (They sometimes have a tendency to lead to extermination.)

"Amateur Radio is justified by what it contributes to the welfare, security and technology of society." Well, on the first two I couldn't agree more, although my support for the last is qualified. Also, I would add "of society and **the individual**". Unfortunately, in much of the world, the individual has no value whatsoever, aside from being a member of society. God forbid it should ever happen here. What? Some of us see signs that our technology is already bringing this about, due to its worship of efficiency and expediency? Heretics! But I digress again.

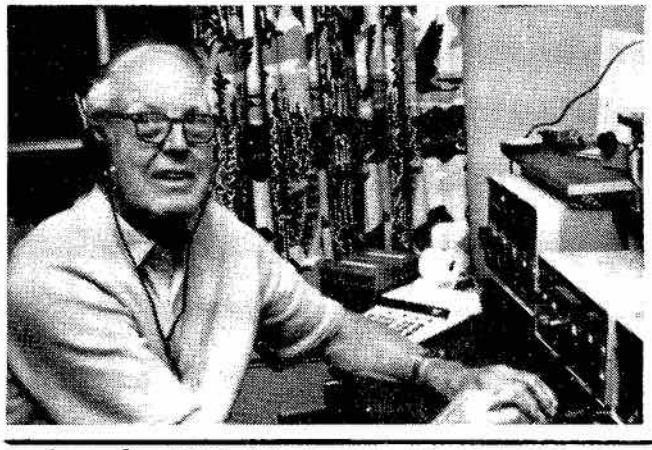
Okay, to the heart of the problem. It would appear that Amateur Radio is justified by what it contributes to the welfare and security of society. It also appears, to me, that the greatest contribution Amateur Radio can make will flow from the **personal radio communications** it makes possible between average individuals of different countries. Sure there's a long way to go. An RST, name and QTH doesn't necessarily lead to peace between differing nations and political systems; still it is a start. It's always harder to kill someone you recognize as a fellow man. Now if this seems to difficult, or you feel it is impossible to sell the concept to the third world and others, then I suggest having 'modern, reliable' equipment for emergency communications is a bit of a joke. Better to have a modern, reliable, lead-sheathed, blast-proof, closed system hamshack!

There is one statement in your letter, Henry, I could not agree with more. It is where you say, "The world has a need to communicate". If someone, somewhere, does not make **this single point** in defense of retention of Amateur Radio and its frequencies at WARC '79, then the total dialogue may well end up being of academic interest only; and don't worry about frequencies, we won't be around to use them anyway! Yes, our vaunted progress has eliminated 'spark' from 20 metres. We would not accept it today. No, today we have a 'woodpecker'. Do you think it's an improvement? Sort of makes you stop and think each time you hear it and you realize what they are looking for – or does it?

Time to put the typewriter away once more; perhaps to erupt again, sometime in the future, like some old, almost-extinct volcano. Perhaps it will be thought that what spews forth is mostly gas, but I hope there are a few rocks and a little hot lava, just to draw attention to the fact that there often is more than one way to go.

If I have learned anything of value from Amateur Radio, it has been exactly that!

CD★XRF James Park
2181 28th St. N.E.
Salmon Arm, B.C.



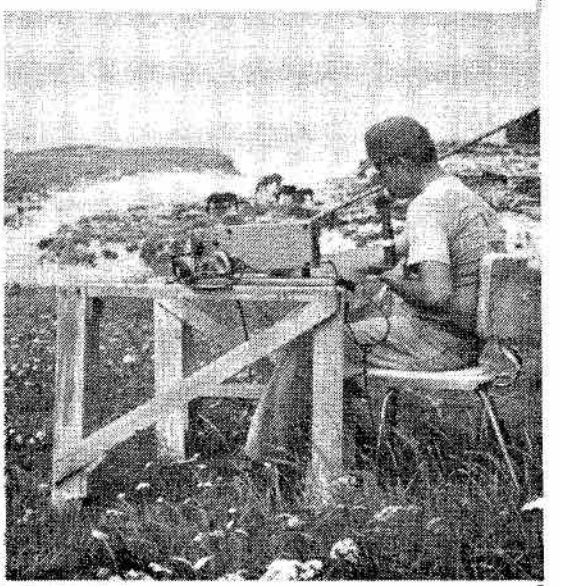
Silent Key

One of Canada's first Amateurs, Ted Welsman VE3WW, who was on the air in 1912 recently died in Waterloo, Ontario. Born in 1899, Ted was an engineer with Bell Telephone and had previously spent time as a radio operator on the Great Lakes and Sable Island. Ted was active on the air until his death.

-Photo- VE3KK

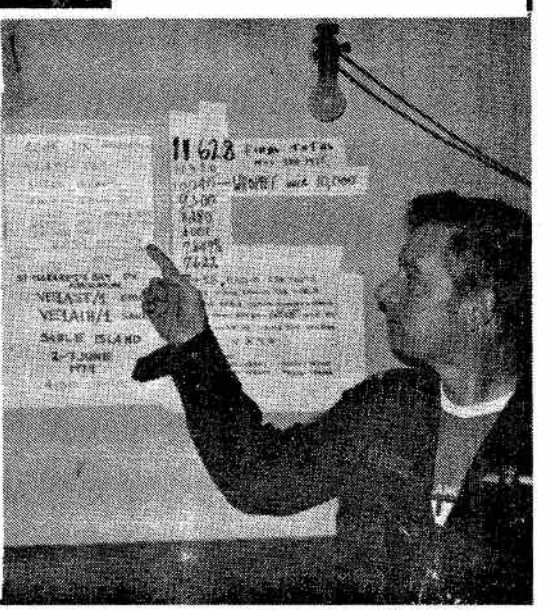
Sable Island DXpedition

Here are some pictures of the August DXpedition to Sable Island sent to us by Ted King VE1BCN who was one of the intrepid operators to visit the 'Graveyard of the Atlantic'.



Doug Megill VE1AZW in a sort of Field Day set-up with his Kenwood 820S and the famed Sable Island ponies grazing in the background.

As can be seen, the group are all Armed Forces personnel. L to R: Ted King VE1BCN, Doug Megill VE1AZW, Bev Reynolds VE1TL, team leader Noel Funge VE4CF and CARL Schermerhorn VE3XQ. The group racked up more than 8,200 contacts in their six-day session.



Doug Megill points to their contact records and those left by previous intrepid souls.

10 Metre Beacon

Although the 28 MHz beacon project was started as long as ten years ago, a number of recent contacts strongly suggests that the existence of up to a dozen stations is not very widely known. Therefore they are not being used to the extent they could be.

Before the current project, there had been a small number of 28 MHz beacons used for propagation studies; notably GB3LER during the IQSY (1964-5), ZC4WR (1963-5), ZD7WR (1968) and DL0AR. These beacon transmitters used frequencies around 29 MHz. The last-named station was used by the Max Planck Institute specifically for studying auroral propagation.

At the beginning of 1968, the German Society DARC stated the essential features of an organized network of transmitters to be run by Amateurs on the 21, 28 and 50 MHz bands, together with a companion organization of receiving stations — the World-wide Observation Program (WOP). The proposal for this World-wide Network of Amateur Radio Beacon Transmitters (WAB)* called for stations to be established on each continent. They were to operate with a time-sharing arrangement on a common (main) frequency, in the case of 10m, of 28,200 KHz for periods of five minutes in each hour, reverting to an individual (secondary) frequency for the remainder of the time. This two-frequency operation of WAB stations was intended to allow WOP stations to monitor either the changing direction of propagation paths during the day or to examine a particular path on a more continuous basis. In practice only the 28 MHz band was taken up in an organized way. It is not serious that the 21 MHz band has not been used. There are now many beacons on the 50 MHz band, brought into being by the increased sunspot activity.

DARC installed the first 28 MHz beacon of this new program on Mt. Predigtstuhl in Southern Germany, followed fairly soon after by the RSGB with one at Crowborough in SE England. Then Noel VE3CJ, during one of his visits on IARU business in Europe, found out about the project and so VE3TEN was built by Larry VE3QB and the network started to grow.

Originally the beacons were placed on frequencies between 28, 150 and 28,200 KHz. This was reviewed when the U.S. FCC opened that portion of the band to American novice operation — notwithstanding informed protests from Europe — and the segment 28,200-28,250 KHz was recommended for beacons by IARU Region 1 Division. This has now been extended up to 28,300 KHz. In case anyone should wonder why a portion much higher up the band, say 29+ MHz, was not used, it is pointed out that the network was being established and used during the sunspot cycle minimum and 1 MHz would have then meant a great deal of difference in the propagation of signals.

The purposes of the beacons may be defined as follows:

1. To indicate the conditions over the path between the beacon and the observer to help communication prospects, e.g. by directional calls.

2. To provide, within ground wave range, reliable signals for testing and alignment of antennas and apparatus.

3. To offer facilities for serious study of propagation phenomena.

The last of these allows the Amateur Service to make a useful contribution in the scientific field. Whilst the opportunities for Amateurs to make notable advances in the use of HF as happened in the early days have dwindled, there are, contrary to some opinion, still many

*now known as 'International Beacon Project' (IBP) to avoid confusion with the 'Worked All Britain' award (WAB).

Project

By Alan Taylor G3DME

aspects of propagation to be explored. The sporadic E (Es) and trans-equatorial (T-E) modes are good examples.

The establishment of transmitting stations is only half the endeavor to make use of the beacons in the way outlined above. The other half is the reception and observation of the transmissions, preferably on a regular basis over a fairly long period. This type of activity has, unfortunately and disappointingly, been very sparse. So far as the writer knows, the only two observers to have made use of the beacons in serious studies have been Serge Canivenc F8SH and Martin Harrison G3USF, although observations fed to them by other Amateurs, especially F5DE, must be acknowledged with gratitude.

The former, as Es co-ordinator for Region 1, has found the European stations invaluable in his work. The latter has been looking at the Cyprus (5B4CY) and Mauritius (3B8MS) paths in particular for some years through the sunspot minimum and is still doing so with the maximum approaching. At this point it is relevant to note that his work and the interim results so far published in papers for IARU and CCIR are well regarded in professional circles. This is, of course, quite significant in the context of WARC this year and the fight to retain the Amateur bands.

There are two reasons for writing this article. The first is to draw attention to the project itself. The second is to suggest how clubs or groups might be able to make use of the network in an organized manner under the heading of the third purpose noted above. It is thought that this type of activity would be particularly suitable for groups associated with educational establishments with a technical curriculum. It would make a worthwhile study for a radio course or thesis and could, at the same time, involve additional aspects, such as statistical studies, design and manufacture of peripheral equipment and so on. The framework of such an effort might be:

Find out who is interested.
Create a small co-ordinating body through whom advice might be asked or given (a steering committee).
Assess the capabilities of the interested members. These would include such things as equipment available, preferred times of observation, etc.
Select the paths to be monitored on a regular basis and allocate them to observers.
Collate and analyze the observations.
Publish the results!

There are one or two additional points to be made to assist anyone setting up such an observation program. Firstly, work done in England suggests that it is quite adequate at the current stage of the game for only the presence or absence of a signal to be noted, i.e. signal strength may be disregarded as a not overly helpful complication. Second, the consistency of observation may be considerably enhanced by the use of tape recording. As a brief example: if a timing circuit (the ubiquitous NE555!) is used to switch on a recorder connected to the receiver for, say, 10 seconds every five minutes, then observations for a full 24 hours can be accommodated on one side of a C90 cassette. Thus many hours of sampling of the path can be reviewed in an hour or so. It can be seen that this recording activity is capable of a fair degree of development in automatic operation and sophistication. A word of warning though on this aspect, again based on experience in England. It is difficult (dare I say impossible?) to put together equipment including chart recorders to automatically record when the desired signal and only that signal is

present! At least that is true when considering signals of a level which can be sorted out aurally from the noise and other extraneous signals. If you don't believe me, try it - and please let me have details of the circuits used if you make it work!

Access to some form of computing apparatus would be helpful.

Finally, a word about the establishment of more transmitting stations. While it might be considered to be 'a good thing' to have many more beacons on the air (one from every DXCC country?) it would seem unrealistic to exceed, say, 40 at 2.5 kHz spacing. This mainly arises from the impracticability of sharing frequencies on a geographical basis, since a 28 MHz low power signal can be propagated over great distances in many directions at the same time.

This means we must try to avoid a proliferation of beacons. So it is to be hoped that anyone thinking of commissioning another will let me know, so that I can advise on any likely clash with existing or planned stations and can also coordinate the frequency plan. I should also add that, although it is possible for one man to establish a station, it is almost essential that it be done by a club or at least a small group of enthusiasts to cover sickness, holidays and so on.

Alan Taylor G3DME
c/o A.H. Miller
162 Corry Pl.
Penticton, B.C.

SCHEDULE OF INTERNATIONAL BEACON PROJECT
STATIONS - 28 MHZ

Frequency	Station	Location	Remarks
Group 1 (Operational)			
28 175	VE3TEN	Ottawa, Canada	
200	Common		
205	DL0IGI	Mt. Predightstuhl near Salzburg	On 28 200 KHz, H to H+5, H+30 to H+35
207.5	N4RD	Englewood, Fla. USA	Non-operational?
210	3B8MS	Signal Mount Mauritius	
212.5	ZD9GI	Gough Island. S. Atlantic	
215	GB3SX	Crowborough, England	
217.5	VK2WI	Sydney, Australia	Awaiting confirmation of operational status
220	5B4CY	Limassol, Cyprus	
225		Reserved for VE3TEN	
230	ZL2MHF	Mt. Climie, New Zealand	
235	VP9BA	Southampton, Bermuda	
245	A9XC	Hamala, Bahrain	
247.5	EA2OIZ		'Unofficial'
257.5	DK0TE	Konstanz, FR Germany	
Group 2 (Construction stage)			
212.5	ZD9GI	Gough Island, S. Atlantic	
222.5	HG5		
237.5	LA5TEN	Oslo, Norway	
242.5	ZS1CTB	Capetown, S. Africa	
Group 3 (Planning stage)			
227.5	FX****		
232.5	VP8***		
240	PY1***	Rio de Janeiro, Brazil	
267.5	HB****		
272.5	TU****		
275	VE7TEN	Vancouver, Canada	
277.5	DL****	Hamburg, FR Germany	

Discussions are taking place about locations in the Antarctic (KC4 & VP8), Kenya and Nigeria.

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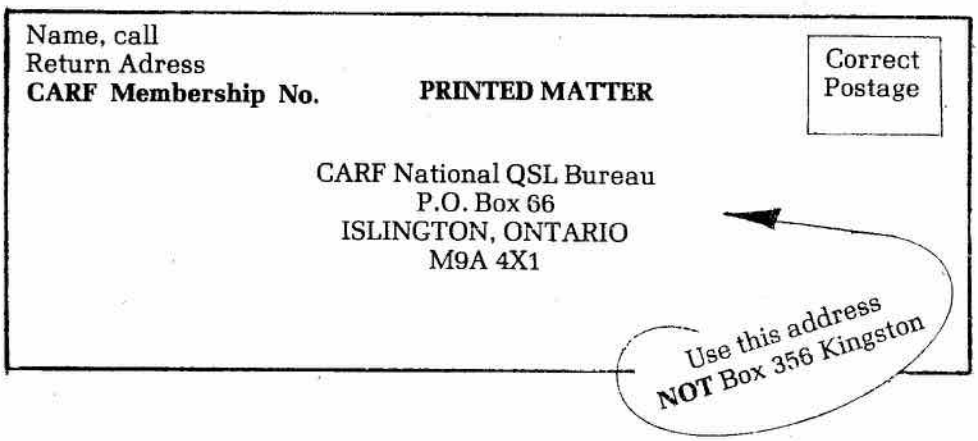

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The Calgary Amateur Radio Association reminds all Western Canadian Amateurs of the 1979 CARA-Heathkit WPX Award. R.J. Beck VE7IG of William's Lake, B.C. was the 1978 winner. The time has come to start planning and thinking about the 1979 WPX contest.

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5. No registration is required. Award is made on data published in CQ Magazine.

For more information write to: Custodian, CARA-Heathkit WPX Award, Calgary Amateur Radio Association, P.O. Box 592, Calgary, Alberta T2P 2J2.

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Please make these changes to your copy of The CARF Certificate Study Guide.

Page 8: $P=E^2.R$ should be $P=I^2.R$

$P=V^2.R$ should be $P=\frac{E^2}{R}$

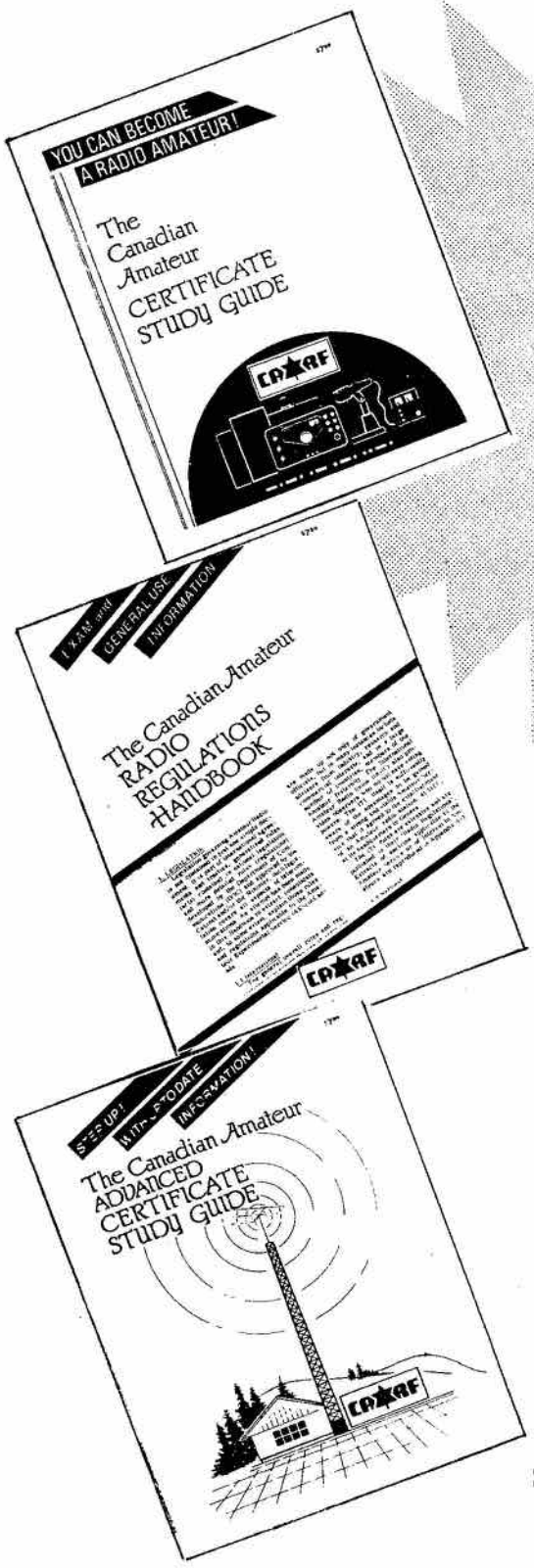
$V^2 = P.R$ should be $E^2 = P.R$

$V = \sqrt{235}$ should be $E = \sqrt{235}$

Page 18: 4.7×10^{-6} secs should be 4.7×10^{-10} secs

Page 24: $\frac{120}{12} = \frac{100}{N_S}$ should be $\frac{120}{12} = \frac{1000}{N_S}$

Also note: Due to the increased size and circulation of the Canadian Amateur Certificate Study Guide, readers may find some collating errors in their copies. Readers finding blank or out of order pages should contact The Canadian Amateur Radio Federation, Inc., Box 356, Kingston, Ont. K7L 4W2.



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3. To act as a liaison and advisory agency between its members and the Department of Communications;
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New revised, up-to-date editions of the CARF Study Guides and Regulations Handbook are now available from the CARF Office. Radio Shack outlets and many Amateur equipment distributors will also be handling these publications. Attractive discounts are also available for bulk orders (more than 15); contact CARF or Radio Shack for details.

A new Instructor's Guide is now available for $5.00 through the CARF Office. This new publication has been written by experienced instructors for the use and guidance of experienced instructors, new instructors and clubs organizing study groups or courses on Amateur Radio. Includes course schedules, sample lesson plans, instructional techniques, sample exam questions, etc.

Publication of the Radio Operator's Handbook has been delayed due to unforeseen circumstances and work is progressing on the Digital Operator's Study Guide. Both publications should be available soon ... see future issues of TCA for details.

CARF Cards

Cards, as shown, size 5½" by 8½", printed Royal Blue on White, are available from the CARF Office at cost plus postage – 25 for $1.00 via First Class Mail; 30 for $1.00 via Third Class Mail. The cards are specifically designed to identify your club members handling public service or other Communications via Amateur Radio. Fill in the pertinent information for your area on the back of the cards and place one inside the front window of the mobile to give positive identification and to publicize Amateur Radio. Send orders to CARF, Box 356, Kingston, Ont. K7L 4W2 together with cheque or money order to cover.

Infosection

CARF Bulletin Station sked

CARF News Service Radio Bulletins are heard from its key station VE3TCA every week, using the facilities of Ottawa's Carleton University Amateur Radio Club station VE3OCU. Here is the sked:

Sundays:

1745 Z 14.140 MHz SSB
1930 Z, 14.077 MHz CW 15 wpm
(approx.) 2130 Z 14.077 MHz RTTY
(After CARFNET; first in 5 level Baudot at 45.5 baud, then 8-level ASCII at 110 baud.)
2300 Z 3.755 MHz SSB

Tuesdays:

0100 Z 3.590 MHz CW 15 wpm
0130 Z 3.610 MHz RTTY (as above)
(Note that times shown will be Sunday p.m. and Monday evenings in North America.)

The Bulletins are also transmitted simultaneously on VHF/UHF in morse code over the Carleton University ARC's repeater VE3OCR, on Tuesdays at 2000 hrs Eastern Time. It outputs on 53.150, 146.850 and 224.940 MHz using F2 (MCW) at 15 wpm.

After the RTTY bulletin on 20 metres, VE3TCA ops will be happy to work any station which can use ASCII (8 level) and also, for those who can only receive ASCII but can transmit 5-level, the operators will have both receiver printers in the loop in order to receive whichever code may be used by those working them. The FCC does not allow ASCII transmissions as yet and this procedure will permit U.S. as well as Canadian stations to work 'cross-code'.

OTHER CARF NEWS STATIONS

VE7TCA: Mondays 0230Z 3.618 MHz RTTY 5 level
0245Z 3.755 MHz SSB (After BC ARPS Net)
VE5WM: nightly 0100 Z 3.785 MHz SSB (Sask Phone Net)
Sundays 1530 Z 3.780 MHz SSB (ARES Net)
VE5GG Thursdays 1830 Z 14.077 MHz RTTY 5 level

A number of two metre repeaters provide local coverage. VE7BBQ is on VE7RPT 34/94 Thursdays at 2000 Pacific Time and VE5WM is on VE5KE 46/06 nightly at 0300 Z.

NOTE TO READERS:

TCA - The Canadian Amateur is in the process of changing its staff. Please note that all material for publication ... correspondence, stories, photos and technical articles ... should be sent to TCA - The Canadian Amateur, Box 356, Kingston, Ont. K7L 4W2.

Free QSL Service for members

1. Sort QSLs by prefix and stack face up in a single stack.
2. Keep weight of one parcel under one pound. Parcel carefully and seal securely.
3. Put your name, call, etc. in upper left corner
4. Put your CARF membership no. in lower left corner.
5. Send to CARF QSL Services, P.O. Box 66, Islington, Ont. M9A 4X1.
6. Do NOT register parcel. This causes delay.
7. Check with Post Office for requirements if sending by Third Class Mail
8. If receipt required, enclose SASE with cards.

BANNED COUNTRIES LIST

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

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

Note: The calls 7OA to 7OZ are assigned to the Peoples Republic of Yemen.

THIRD PARTY TRAFFIC AGREEMENTS

Bolivia, Chile, Columbia, Costa Rica, Dominican Republic, Guyana, Honduras, El Salvador, Israel, Mexico, Nicaragua, Peru, Trinidad/Tobago, USA (Territories and Possessions), Guatemala, Uruguay, Venezuela.

RECIPROCAL OPERATING AGREEMENTS

Austria, Barbados, Belgium, Bermuda, Brazil, Colombia, Costa Rica, Denmark, Dominica, Dominican Republic, France, Ecuador, Federal Republic of Germany, Finland, Guatemala, Honduras, Iceland, India, Indonesia, Israel, Luxembourg, Netherlands, New Zealand, Norway, Nicaragua, Panama, Phillipines, Poland, Portugal, Peru, Senegal, Sweden, Switzerland, United Kingdom, U.S.A., Uruguay and Venezuela.

Note: As a general rule, DOC will consider licensed Amateurs of Commonwealth countries for reciprocal privileges in Canada if the other country does the same.

CARF

Order Form

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(Foreign Call Sign Holders and non-licensed supporters)

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ADVANCED AMATEUR CERTIFICATE STUDY GUIDE ☐ $7.99 _____

INSTRUCTORS GUIDE ☐ $5. _____

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(Ontario adds 7% sales tax) Print name and call desired

MONEY ORDER or CHEQUE TOTAL _____

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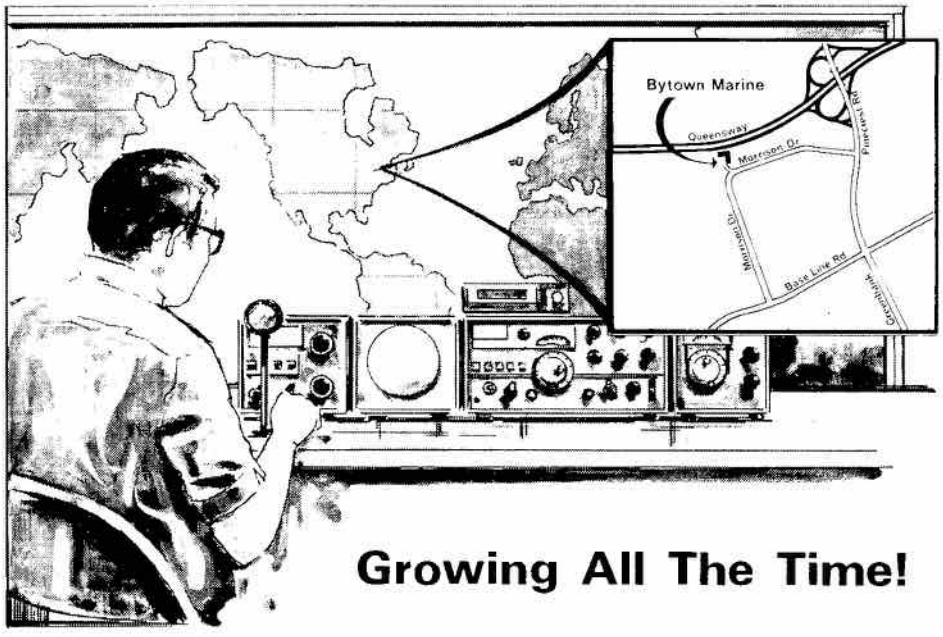

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