Second Class Mail Registration
Number 5073

TCA

The Canadian Amateur Radio Magazine

$1.50

MARCH 1982

Watch out

ARRL/FCC Move on Phone Operations in Canada by visiting U.S. Amateurs

See Page 11

ISSN 0228-6513

TCA

THE CANADIAN AMATEUR

March 1982 Vol. 10 No. 3

Contents

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

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

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Indexed in the Canadian Periodical Index: ISSN 0228-6513

Second Class Mail Registration Number 5073.

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2 METER FM TRANSCEIVER

TR-7800

Kenwood's remarkable TR-7800 2-meter FM mobile transceiver provides all the features you could desire for maximum operating enjoyment. Frequency selection is easier than ever, and the rig incorporates new memory developments for repeater shift, priority, and scan, and includes a built-in autopatch DTMF encoder.

FEATURES

15 multifunction memory channels, easily selectable with a rotary control

M1-M13...memorize frequency and offset (±600 kHz or simplex).
M14...memorize transmit and receive frequencies independently for nonstandard offset.
M0...priority channel, with simplex, ±600 kHz, or nonstandard offset operation.

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M0 memory is priority channel. "Beep" alerts operator when signal appears on priority channel. Operation can be switched immediately to priority channel with the push of a switch.

Extended frequency coverage

143.900-148.995 MHz, in switchable 5-kHz or 10-kHz steps.

Built-in autopatch DTMF (Touch-Tone) encoder

Front-panel keyboard

For frequency selection, transmit offset selection, memory programming, scan control, and selection of autopatch encoder tones.

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Entire band (5-kHz or 10-kHz steps) and memories. Automatically locks on busy channel; scan resumes automatically after several seconds, unless CLEAR or mic PTT button is pressed to cancel scan.

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KENWOOD EQUIPMENT

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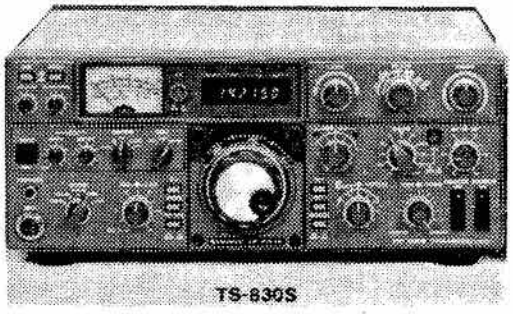
R-1000 Receiver ..... $639.
TR-7800 2 mtr 25W ..... $539.
TR-7850 2 mtr 40W ..... $629.
TR-2500 2 mtr HH ..... $439.
TS-530S HF transceiver ..... $1089.



TS-830S ..... $1289.

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BN-86 balun ..... $29.

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A-147-4el 2 mtr ..... $49.
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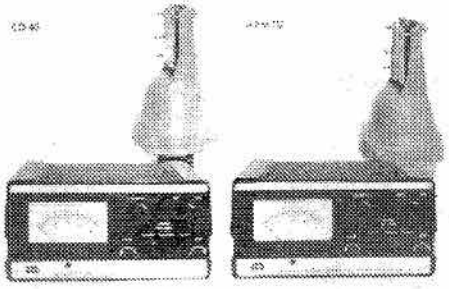

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RG8U ..... 49¢/ft
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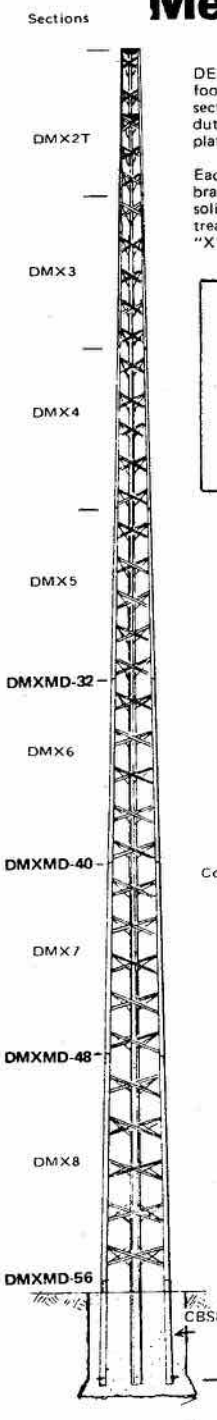


DELHI DMXMD and DMXHD towers use the larger and stronger sections of the 68 foot, eight section, Model DMX-68 TV Tower. DMXMD towers have a DMX2T top section. DMXHD towers have a DMX3T top section. Both top sections have heavy duty rotator plates and a No. 244A cast aluminum mast clamp installed on the top plate.

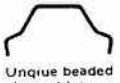
Each section is 8 ft. long and has beaded channel legs riveted together with "X" braces. Legs and braces are all steel, heavily galvanized before fabrication. Rivets are solid heat treated aluminum. Sections fit accurately together and are joined by heat treated nuts and bolts. The uniform tapered leg design together with evenly spaced "X" braces give the tower greater strength and reliability.

ANTENNA LOAD LIMITS

DMXMD Medium Duty Towers are designed to support an antenna load up to 6 square feet wind area. This is equivalent to two large TV/FM antennas or one large CB beam or one small amateur beam or one large VHF collinear.

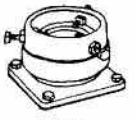
DMXHD Heavy Duty Towers are designed to support an antenna load up to 9 square feet wind area. This is equivalent to a very large CB beam or CB stacked array or a large amateur beam.

Guy wires must be used if larger loads are required or cross mounted antennas, or if greater height using straight sections is needed.

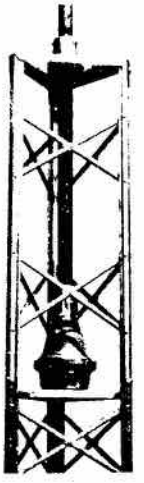


Unqiue beaded channel leg resists bending

244A
Cast Alum. Mast Clamp



BBMB
Ball Bearing
Mast Bearing

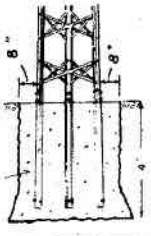


Top section of a Ham Tower with a rotator, mast and a Model BBMB installed.

Compact Tower Package

Hinge-Up Base

HUB3-6
HUB7-8



NOTE: DMXMD and DMXHD towers are shipped complete with the following: 8 ft. tower sections, top plate with cast aluminum mast clamp, rotor plate, three 4 ft. concrete base stubs, special nuts, bolts and washers. (No mast is included in package).

Specifications:

Model No.	Height without mast	Tower Sections Supplied	Weight in lbs.
DMXMD Medium Duty Towers			
DMXMD-32	32 ft.	DMX2T, DMX3, DMX4, DMX5	152
DMXMD-40	40 ft.	DMX2T, DMX3, DMX4, DMX5, DMX6	200
DMXMD-48	48 ft.	DMX2T, DMX3, DMX4, DMX5, DMX6, DMX7	272
DMXMD-56	56 ft.	DMX2T, DMX3, DMX4, DMX5, DMX6, DMX7, DMX8	351
DMXHD Heavy Duty Towers			
DMXHD-32	32 ft.	DMX3T, DMX4, DMX5, DMX6	170
DMXHD-40	40 ft.	DMX3T, DMX4, DMX5, DMX6, DMX7	241
DMXHD-48	48 ft.	DMX3T, DMX4, DMX5, DMX6, DMX7, DMX8	314

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Kenwood and Yaesu Radios
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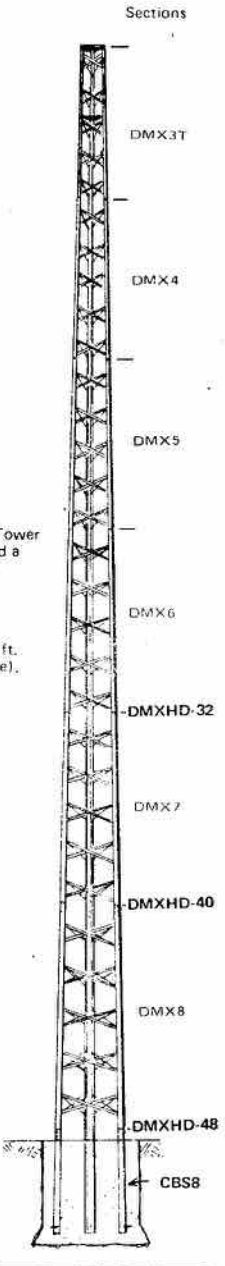

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2 meter multimode mobile, 12 VDC, 10 W. out, FM, SSB, CW, Priority channel, scanning, CW sidetone, squelch on SSB.

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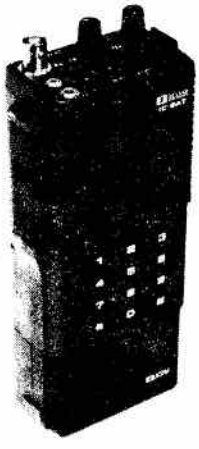

$ 339

IC-2AT

ICOM's popular 2 meter, 800 channel, compact, handheld transceiver with Touchtone® builtin. Comes standard with BP3 (250 mAh) battery, wall charger, belt clip, flexible antenna. A wide variety of batteries and accessories available.

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IC-25A

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AFFORDABLE.

Priced right to meet your budget as your main HF rig or as a second rig for mobile/portable operation.

COMFORTABLE.

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- One memory per band, for storage of your favorite frequencies on each band.
- Dual VFO system built in standard at no extra cost.

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- Receiver preamp built-in
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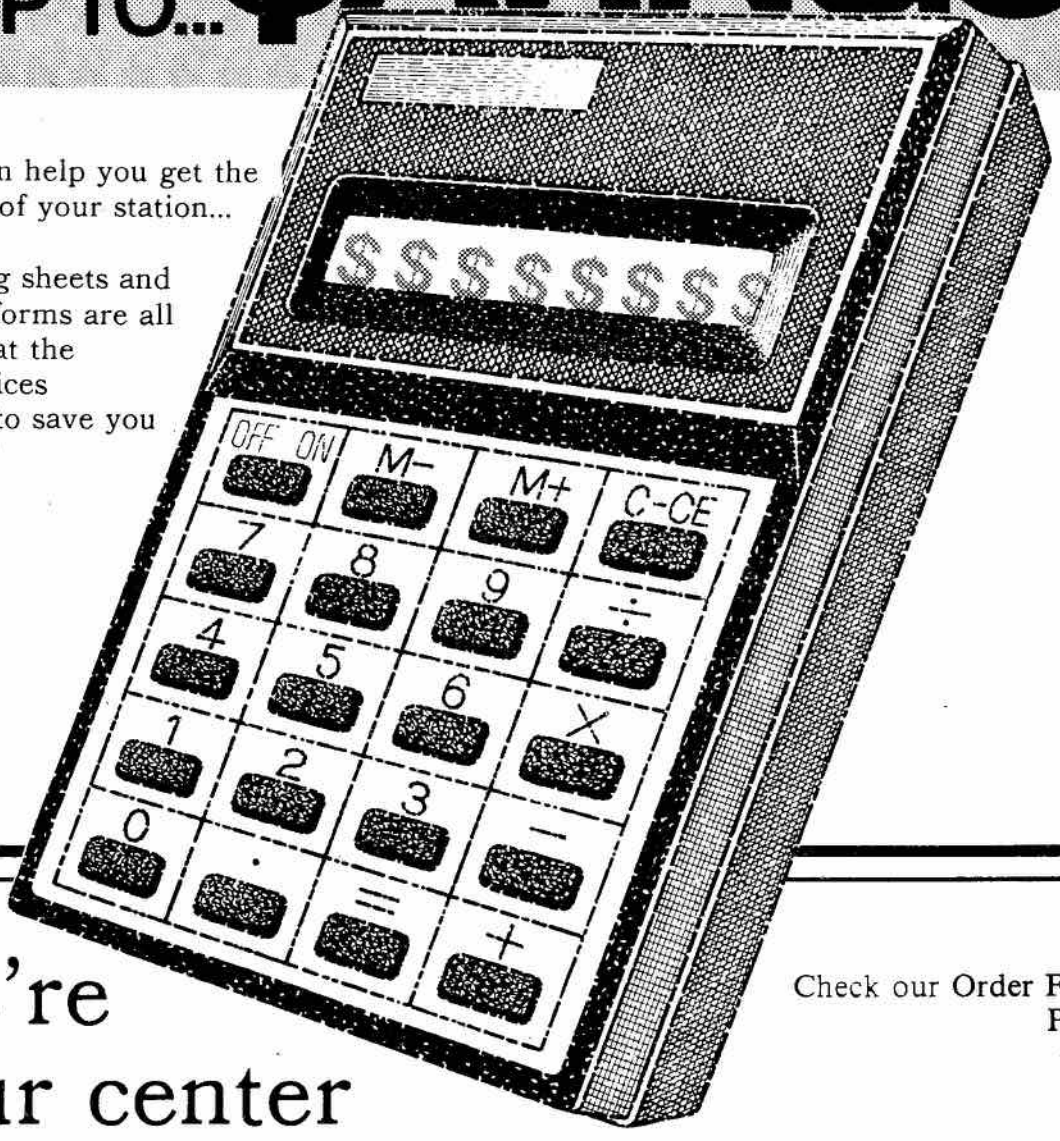

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WATCH OUT!

Phone Operations in Canada by visiting U.S. Amateurs

An effort is now being made on the part of the American Radio Relay League, through its Canadian Division, the Canadian Radio Relay League and the U.S. Federal Communications Commission to have DOC change the Radio Regulations so that visiting U.S. Amateurs can have privileges equivalent to Canadian Advanced Amateurs and use the so-called Canadian sub-bands.

CARF officials, who have had years of experience in international frequency negotiations, believe that Canadian Amateurs should be aware of the implications of this move. Although on the surface, the request may seem innocuous, their view is that if DOC accedes to these requests, it would be the thin edge of a potentially harmful wedge. The ARRL then could, after a decent interval, logically ask the FCC to extend the U.S. phone bands downward. The reasoning would be that since Canada has allowed U.S. Amateurs to use the so-called Canadian phone sub-bands while in Canada, there could therefore be no objection to allowing them to use the same bands when they are at home in the United States. The extensive representations that CARF has received during the past year have made it clear that Canadian Amateurs do not want to be crowded out of their (so-called) sub-bands.

Our fears are heightened when we recall that the requests to DOC originated in a unanimous resolution of the ARRL's directors meeting of July 24, 1980, followed by a letter from the ARRL's director for the Canadian Division in his capacity as president of the Canadian Radio Relay League on July 20, 1981 and one from the FCC in which they make their wants very clearly known. We know too that the ARRL have a professional lobbyist in Washington. Last month DOC told CARF that the FCC were not planning to extend the U.S. phone sub-bands. The FCC qualified their statement by using the words, "at the present time".

To CARF's knowledge, no complaints have been received from visiting U.S. Amateurs. If they want to talk home there is no problem in using the U.S. HF phone sub-bands. When they talk to Canadians or take part in club events or 'hamfests' they use one of the more popular VHF bands such as two metres. The CRRL's letter (courtesy Ray Perrin VE3FN)confirms this by saying, "The most popular radio for the traveller is an FM transceiver operating on two meters". In that band we have similar privileges.

It is said that we are not being hospitable. Yet, since dropping the permit system, our hospitality has allowed Technician and Novice classes, neither of which meets Canadian standards, to operate in Canada. There are lots of additional ways to be hospitable. We know them well, and we are. But that does not mean we have to agree to something that will facilitate the U.S. crowding us out of frequencies.

As a responsible, independent and Canadian organization, CARF suggests that individuals and organizations concerned with the consequences of this move should make their wishes known through CARF or direct to DOC.

For more background on this matter, it is suggested that 'QST' for September 1980, pages 50 and 53 and 'TCA— The Canadian Amateur' for November 1980, pages 21 and 22 will be helpful.

Speak up now, or forever hold your peace.

Don Slater VE3BID
President, CARF

JULY LAUNCH FOR NEW OSCAR SATELLITE

Not to be outdone by the Russian feat of launching six Amateur satellites all at once, the AMSAT organization will launch one single bird on July 6 which will beat the Russian ones in the time available for working it.

This next bird in the OSCAR series will feature an elliptical polar orbit quite different from the circular ones used by the Russian and previous OSCAR series. With its 'long' portion of the pass (its apogee) much higher than the circular orbits of the existing birds, its portion of the pass over the Northern Hemisphere will give Canadian and U.S. Amateurs close to a four-hour chance to work it. It will also feature a device to electrically boost its magnetic polarizing gadget which, by keeping the satellite lined up with the terrestial magnetic field, can ensure that it has antennas oriented towards the earth.

If the launch is successful and the bird operates, it will be labelled 'OSCAR 10'. VE3CDC

A Shipboard Tale

In the 1930's, many shipboard (and other) transmitters were spark, with the ability to wipe out an entire band or —as a matter of fact— the entire usable spectrum.

I recall sending to WNY, the New York Harbour station while our ship was approaching the Jersey shore, only to have WSC (Tuckerton, NJ) break in with a booming, "QRY! Ur QRM is all the way down to 15 metres!) Being a newcomer on the freighter Henry D, I was really rattled to have such a big signal chase me off the air. I had visions of the FRC (Federal Radio Commisssion, predecessor of FCC) yanking my radio licence.

That brought another phenomenon of those days into play— I began to sweat. The key became unmanageable in my fingers, and my mouth began to taste like battery electrolyte. There was 250 VDC in the earphone cords and the cotton insulation was very poor. The metal fillings in my teeth had started to act like the plates of a wet cell.

When I first came aboard Henry D in Boston, I had the usual beginner's luck. The bosun's mate woke me at 7:00 one morning with a furious pounding on the door of the shack. A clam-shell boom had taken down our 2-wire flat-top antenna and "the Old Man wants it fixed right now."

I went to the bridge, but by then the Captain had other ideas. He gave me a five-dollar bill and sent me ashore to buy a typewriter with it! Nowhere in Boston could I find a mill for five bucks, even after a long walk during which I managed to get lost in winding streets which had certainly been built over pre-Revolutionary cowpaths.

But a Divine Providence watches over dumb radio apprentices. In the window of a pawn shop I saw a Royal Pica which I got for five dollars after much haggling. When I got it back to the ship, the Old Man gave me hell for taking such a long time, then asked me for a sales slip! I had forgotten to get one!

The Captain of the ship has been, down through the ages, supreme master. He can perform marriages, conduct funerals and toss you in the brig. Except for the radio operator. 'Sparks' must obey the Captain's discipline, but the orders he receives on the air from the home office can countermand those of the Skipper. He is the Captain's link with the real bosses— the owners of the ship.

We shoved off for Providence, RI, to unload lumber. It was winter, and the Captain worried about icing which could damage his ship. He asked me to radio the tanker Emery Dean, which was steaming out of the harbour. I received no answer, which meant that her radio officer was off watch. "OK," said the Old Man. "Call the Skukovitch Stevedoring Company and ask if we should use tugs upriver."

I started the quenched gap and called WCC at Cape Cod. He said "Up," which meant go to 675 meters and transmit. Fine— it seemed I was getting pretty good at this. I stood at the porthole with the phone on, admiring a cute little seal swimming alongside. Then I realized that WCC should have called me with the answer, and the phones had been dead for a long time. I looked at the dial of the 3-tube receiver... I had never retuned it from the "working frequency." Sliding down to 600 meters, I called WCC who sarcastically asked me, "Where have you been?"

The message was that we should use tugs because of the ice. Time was running out and the Captain could get into trouble because of my day-dreaming. I wrote out the message as best as I could and took it to him. He took one look at it and asked, "Sparks, for crissakes, where have you been? We're already tied to the dock!." Sure enough, in my confusion I hadn't noticed that the engines were still.

I stayed out of sight for the rest of the day, but it developed that the Captain wasn't sore at me. Because of my bumbling performance he had save thousands of dollars in tug fees and gained points with the head office as a fearless navigator with expert control of his ship.

Ero Erickson, W9HPJ

CHANGE OF ADDRESS

Considerable time is wasted by having to search membership records because of incomplete information sent to the CARF Office. For example, the Office has received requests like this: Have moved to B.C. so please change address, etc, to J. Blow VE7XXX (new call), 123 Jones Ave., Smithville, B.C. V9Z 1B6.

Membership records are held in the computer system and a search can be made by *call, membership number or postal code only*. But, as none of the above is given for the former address, we cannot update label data until this information is received. The coding (first) line of your label contains this data, so please copy this out and send with your request for change, renewal, etc. so that an update can be made.

A Ham by any other name...

The word Ham, as applied to Amateur Radio dates back to 1908 and was the call letters of the first Amateur Wireless station, operated by some members of the Harvard Wireless Club. They were Albert S. Hyman, Bob Almy and Reggy Murray.

At first they called their station Hyman-Almy-Murray, but tapping out such a long name in code, soon called for a revision. They thus changed their sign to HY-AL-MU, using the first 2 letters of each name. Early in 1909 some confusion resulted between signals from Amateur Wireless HyAlMu and a Mexican ship named the Hyalmo. It was then the boys decided to use only the first letters of each name... and the call became HAM.

In the very early days of radio, Amateur Operators picked their own frequency and their own call letters. Then, as now, some Amateurs had better signals than some commercial stations. The resulting confusion and interference finally came to the attention of congressional committees and they in turn gave much attention to proposed legislation, designed to critically limit Amateur activity.

In 1911, Albert Hyman chose the controversial wireless legislation bill as his thesis at Harvard. His instructor insisted that a copy be sent to Senator Davis A. Walsh, a member of one of the Committees hearing the bill. The Senator was so impressed that he sent for Hyman to appear before the Committee. He was put on the stand and described how the little Amateur station was built.

He almost cried when he told the crowded committee room that if the bill went through they would have to close the station, because they could not afford the licence fees and all the other requirements that were set up in the bill. The debate started, and the little HAM became the symbol of all the little Amateur Stations in the country, crying out to be saved from the menace and greed of the big commercial stations that didn't want them around.

Finally, the bill got to the floor of Congress and every member talked about the poor little station Ham; that's how it all started and you'll find the whole story in the Congressional Record. Nationwide publicity associated radio station HAM with Amateurs. From that day to this..and probably to the end of time, in radio language an AMATEUR is a HAM.

Merle Henry W3MMY
the Sine of the Times,
Indiana County ARC,
Pennsylvania, U.S.A.

Letters:

IT'S THE LAW!

The enclosed clipping was taken from a Western Canada weekly newspaper. While it was aimed at Western farmers, it seems to apply very well to present-day hams with their modern equipment:

1. Gore's Laws of Design Engineering.
(a) the primary function of the design engineer is to make things difficult for the fabricator and impossible for the serviceman,
(b) that component of any circuit which has the shortest service life will be placed in the least accessible location.
(c) any circuit design must contain at least one part which is obsolete, two parts which are unobtainable and three parts which are still under development.

2. Campbell's Law of Repair:
(a) if you can get to the faulty part, you don't have the tool to get it off.
(b) if you can get the part off, the parts house will have it back-ordered.
(c) if it's in stock, it didn't need replacing in the first place.

Frank Holland VE3DVB
Kingston, Ont.

MORE HOMEBREW

Tnx for TCA, only one beef. Please take hint from VE7IW on Page 30 April issue. Do hope you can give us more of the technical, homebrew stuff. Also shoot for more adverts on where one can pick up parts— in Canada, not across the line!

Bob VE3LPJ

TCA WELCOMES LETTERS TO THE EDITOR. PLEASE SEND ALL CORRESPONDENCE TO EDITOR TCA, 1082 APOLYDOR AVE., OTTAWA, ONT. K1H 8A9.

THE CANADIAN

Contest Scene

Dave Goodwin VE2ZP, 4 Victoria Place, Aylmer,
Quebec J9H 2J3

CONTEST CALENDAR

March
6-7 ARRL DX SSB
13-14 RSGB Commonwealth CW*
20-21 BARTG RTTY*
27-28 CQ WPX SSB*
April
3-4 SP DX CW
10-11 CARF Commonwealth SSB*
17-18 SP DX SSB
24-25 Helvetia 26
24-25 H.M. King of Spain
8 World Telecom Day SSB
8-9 USSR CQ-M
15 World Telecom Day CW
30-31 CQ WPX CW
* see February TCA

10 MHZ: A TEST CASE

At the time this column is being written, we Radio Amateurs are waiting for the Department of Communications to allow us to operate on the 10 MHz band. This new band, 50 kHz wide from 10.1 and 10.15 MHz, is a band that will be shared on a non-interference basis with existing users. That means we must steer clear of them. The band will continue to be shared, certainly until the next WARC, and probably beyond that.

The present users of the band are almost exclusively powerhouse multiplexed RTTY systems with enormous signals. What is left of this band after the commercials take their slice is about 20 or 30 kHz of spectrum where stations using Amateur power levels are expected to communicate.

In view of the real functional size of the new 30 metre band, a number of organizations have made recommendations to their Amateurs on how the band should be used. IARU Region 1, in their conference in Brighton, England, last year, came down with a bandplan that appears to have gained wide acceptance outside Region 1 (Europe and Africa). It suggests that CW only be used from 10.100-10.140 MHz, and both CW and RTTY from 10.140-10.150 MHz. Note there is no segment recommended for SSB operation.

Of the 20 or 30 kHz that actually remains for Amateurs, most of that room is in 3 or 4 kHz splotches. If SSB were to be encouraged on 10 MHz, there would only be room for 3 or 4 QSOs, at best, to take place, while still providing some room for CW and RTTY work. It was for this reason that no SSB activity is being encouraged in Region 1.

10 MHz will be a test case for Canadian Radio Amateurs. By the recommendations of the CARF Symposium in Hamilton, Ont., Advanced Amateurs will be permitted use of A1A, A3E, F1A and F3E, with no phone/CW subbanding. This will be the first band capable of reliable round-the-world communication where we do not have regulated sub-bands.

The question we Canadians must face is whether we are responsible and mature enough to accept the global concensus that has developed, and use the band only for CW and RTTY. There have been some problems, I hear, with some Australian Amateurs self-righteously using SSB on 30 metres. Nothing in their licence conditions prevents them from doing this, but it is a violation of the global opinion that has developed. Do we Canadians want to follow the example of these few selfish Amateurs? Would Canadians like the distinction of having our operations on 30 metres compared to the operations of South American Amateurs at the bottom edge of 40 metres? I certainly hope not.

The Department has allowed us to make our own decisions on this band, thus setting a sort of precedent. If we want to be given further self-management in future years, on other bands, we must demonstrate we are mature enough to restrain our operations on a voluntary basis.

In my opinion, the whole question of CW/Phone/RTTY subbanding should be decided by Amateurs themselves, not by regulatory authority. In Canada, we have been lucky in that our regulations have generally reflected the distribution of activity in the Amateur bands.

Incidentally, the general attitude among Amateur organizations the world over has been to approach 10 MHz with great caution. For the time being, contests are not going to be organized on this band, and ARRL's DXCC desk have decided not to accept 10 MHz QSOs for DXCC credit.

In keeping with the caution

Amateur organizations are using, it is hoped that Radio Amateurs will use similar caution.

Excuse that little diversion, but I felt I had to address the 10 MHz question myself.

BACK TO CONTESTS

Almost the only contest of any great note in January was the CQ WW 160m CW Contest. Canadian participation was scant, and good propagation was even more scant. The whole weekend was a sad tale of flare after flare after flare. All this solar activity made for great North-South propagation, with superb signals from NP4A, KV4FZ, LU9EIE and, best of all, VP8ANT in the Antarctic.

Propagation to Europe was very poor, except on the Saturday evening, when at about 2300Z (yes, 2300) UB5s, OKs, DLs, Gs and GD4BEG were all available. A 4X, KH6, CN8 and other nice rare stuff showed up on Saturday night, but by the normal European sunrise opening (about 0600Z-0800Z), our good friend Aurora Borealis was back for a most unwelcome visit. Stations in the southeastern USA had a field day as, with all this north-south stuff, they were at times the only game in town. Look for N5JJ to set some sort of multi-single record. Almost nothing was heard from the Western USA, and VE5DX was known to be called by W0 stations.

Among the serious Canadian paticipants were VE3ABG, making in excess of 500 QSOs, and probably a Canadian record, VE3iNQ, VO1HP, VE1AXT and almost no-one at all from the West. VE3KKB and I were multi-single at VE3PCA, and made an embarrassing paultry 30k.

The general rule appeared to be: the further north you are, the worse off you are. VE3ABG was working stuff we could hardly hear from the West, and it appears that small number of degrees of latitude had great bearing on your success (or lack of it).

As it appears that some of the martial law restrictions on communications and travel will soon be lifted in Poland, there is an even chance that Polish stations will be back on the air, in time for their annual contest. If they do come off as scheduled, the rules for that contest appear below.

Please do not forget the second running of the CARF Commonwealth Phone Contest on April 10-11. Official entry sheets and a list of Commonwealth call areas is available for an SASE from me or from Box 2172, Stn. D, Ottawa, Ont. K1P 5W4.

POLISH DX CONTESTS

Period: CW- 1500z 3 Apr to 2400z 4 Apr. SSB- 1500z 17 Apr to 2400z 18 Apr.

Bands: 80-10 metres

Classes: Single op, single or all band; multi-op, single transmitter, all bands.

Exchange: RST and serial number. SP stations will send their county (WOJ).

Contacts: work only SP stations, 3 pt/QSO. Each station may be worked once on each band.

Multiplier: Total of Polish counties or WOJ worked (max 49) regardless of band. The county will be sent as a two-letter group after the serial number.

Awards: Certificates to the top scorer in each class in each Canadian call area.

Entries: Must be sent by Apr 30 for CW and by May 15 for the SSB test. Entries go to: PZK Contest Ctte., P.O. Box 320, 00-950, Warsaw.

HELVETIA 26

Period: 1500z 24 Apr to 1500z 25 Apr.

Bands: 160-10 metres, CW and SSB.

Classes: single or all band, single operator only.

Exchange: RST and serial number. HB stations will include their canton.

Contacts: Work only Swiss stations, 3 pt/QSO.

Multiplier: Total of Swiss cantons worked, on each band, added together. Cantonal abbreviations are: AG, AI, AR, BE, BL, BS, FR, GE, GL, GR, JU, LU, NE, NW, OW, SG, SH, SO, SZ, TG, TI, UR, VD, VS, ZG, ZH.

Awards: Certificates to the top scorers on each Canadian call area.

Entries: should be sent within 30 days to: USKA Traffic Mgr., HB9MX, Strahleggwag 28, 8400 Winterthur, Switzerland.

H.M. KING OF SPAIN TROPHY

Period: 2000z 24 Apr to 2000z 25 Apr.

Bands: 160m-23 cm, CW and SSB. After making a QSO, you may not move to another band for 15 minutes.

Classes: Single op, all bands only. All stations must take one 4-hour break.

Exchange: RST and serial number. Spanish stations will include their province.

Contacts: Work only EA stations, 1 pt/QSO.

Multiplier: Total of EA provs. worked on each band. The city of Calella counts as a separate province from Barcelona.

Awards: Worldwide winner will receive (shades of the VP9 test) an 8-day trip to Calella to receive the first place trophy. Second and third place trophies will go by less extravagant means. Trophies will also be awarded to the top scorer on each continent. Certificates will be awarded to those making more than 75 QSOs.

Entries: Must be sent by June 1 to AGC, P.O. Box 181, Calella, Barcelona, Spain.

NO ANTENNA

A Mississauga, Ont. operator, Don Waring, has lost a seven-year legal battle with a housing developer's restriction on antennas. Don, licensed for 28 years, plans to move.

DX

Douglas W. Griffith VE3KKB
33 Foxfield Drive,
Nepean, Ont. K2J 1K6

March is a big contest month, and there should be lots of choice DX floating around the ether. The ARRL DX Contest starts on March 5, 1982 at 0000 GMT, and the CQ WPX SSB Contest takes place on the last full weekend in the month. There are usually quite a few DXpeditions for both contests, and especially for those just starting out, they provide an excellent opportunity to work a few new ones.

While on the subject of DXpeditions, I would like to comment on the atrocious behaviour of a few 'amateurs' (in every sense of the word) which I have heard recently. I will not try to belabour the point, as it has been the subject of many scathing editorials in the last few years, but one has to wonder what type of cereal boxes select individuals got their licences from.

Carriers, loud fan noise, belching, cat calling, foul language, etc., in addition to out-of-band operation, have all been part of recent phone operations, and one has almost come to accept, if not condone, such behaviour.

I had found that switching to CW resulted in far more agreeable conditions, and therefore I spent most of my time in the lower portions of the band. Unfortunately, some of the scum which had floated to the top of the phone bands has been carried downstream, and seems to be contaminating the CW portion more and more. During recent operations from XF4 and 1A0KM, carriers, people continuously asking "call?", foul language, etc. made working these expeditions a real challenge— one that I, for one, can do without. Whatever happened to listening?

What can we do about it? Well, there's the rub. *Nothing!* Canada no longer has any monitoring stations, and it is obvious that the U.S. FCC simply hasn't the manpower to worry about these infractions. Further, it is almost impossible to prosecute an individual even if he is suspected of causing malicious QRM. With the few individuals causing the problem, even peer pressure seems to be ineffective. As an individual, the best thing you can do is again nothing. You simply have to make the best of the situation. By making any comments on the air, you are adding to an already bad scene.

I hate to point an accusing finger to the South, but it is obvious that is where most of the problems are. It is equally regrettable that a few select individuals tarnish the reputations of a group of Amateurs whose numbers include some of the finest operators in the world. However, those few leave such a bad taste in my mouth that I can't help but think: God help us if their desired band expansion is ever granted.

Bits & Pieces

C9A Mozambique- There is still no sign of SM0KV or SM2EHZ, both expected to have been signing /C9A by now. Keep listening, as there has not been any indication that the operation has been cancelled. Also, W6YB is reported to be trying to obtain permission to operate from Mozambique.

JW Svalbard- SP2BHZ/JW is now JW0P. He is active most weekends, mainly on CW on 20 and 40M. Try 14.027 at 0200Z and 7.066 SSB at 0900Z. For QSO's after Nov. 1/81, QSL to SM5DQC. Also, JW2CF on 21.023 at 2100Z, JW6MY on 7.006 at 0815Z. QSL to LA6MY. JW5IJ on 21.355 at 2015. JW5OD on 7.017 at 0830Z. QSL to LA6ZW.

KG4H Guantanamo Bay- Mike is reported to be active most days on 28.535 at 1900Z. QSL's go to M. Waldrop, Box 73, FBPO Norfolk, VA. 23593.

VP2M Montserrat- W2WSE will be active as VP2MDP until Mar. 6/82, 80-10M SSB only. QSL to his home address. Also, Alex VP2MM on 20 and 15M CW, around 20-220Z. His new QSL manager as of Sep/81 is AB1U.

ZD9BV Tristan da Cunha- Finally it looks like some permanent activity from this semi-rare Atlantic island. Andy is a wireless operator on the island and will hopefully be QRV about Mar. 1 when he receives his new Kenwood TS-130S. It may take a while for him to get used to handling the pile-ups that he will undoubtedly create, so be patient. QSL's go to W4FRU.

GB2BC British Columbia House in London England will be celebrating its 100th anniversary this year. From Mar. 26-Apr. 1.

1982, the Surrey, B.C. Amateur Radio Club and the Sutton and Cheam Radio Society of Surrey, England, will jointly be operating the special event station GB2BC. QSL's go to VE7SAR, the Surrey ARC, P.O. Box 542, Surrey, B.C. Canada V3T 5B7.

AD0S/KH5 Palmyra- There is still a possibility that this may count, pending the receipt of an additional piece of documentation at the ARRL's DXCC desk. However, don't send your cards in yet.

KF1O/CE0X San Felix- It appears that this very controversial DXpedition will not count after all.

1982 is the 50th anniversary of the Mexican Amateur Radio Association. The following special prefixes have been issued for use by Mexican Amateurs for the year.

XE1	6D5
XE2	6E5
XE3	6F5
XF4	6J5 (Revillagigedo)

K4YT African Tour- Karl's proposed itinerary would have had them in TL8 Feb. 17-Mar. 1; 9Q5, Mar. 3-Mar. 17; 5Z4, Mar. 18-Apr.1; S79, Apr.2-8; and ET3, Apr.9-17. However, at the time this was written, he was already 9 days late leaving for his trip, and it was not known when he really was going, or indeed, if he still was. Keep your ears on the bands. He is an excellent operator, and always generates lots of excitement, so you should have no trouble finding him when and if he shows up.

ZK1CG N. Cook Is.- Opn. from Manihiki is planned for Feb25-Mar.15, mostly on 10, 15 and 20M phone. QSL to Victor Rivera, Box 618, Rarotonga.

3B9DA Rodriquez Is.- Alex 3B8DA is reported to be going to Rodriquez in June 1982.

Start thinking about antennas for 10 MHz. No specific date has been given, but a recent report stated that the new band would be open to Canadian Amateurs "soon".

If you find that most of the DX information is too dated by the time this reaches you, then I strongly recommend the bi-weekly DX Report, put out by Alan Leith. Al has had many years experience as editor of Long Skip, and his new DX news sheet is worth the $19.00 per year subscription. For anyone interested, write to: Alan Leith VE3FRA, 10 Fairington Crescent, St. Catharines, Ont. L2N 5W3.

Thanks to Long Skip, VE3EUP and the Canad-X Net, DX Report, VE2ZP, VE3JLP and the DARC Information Net.

QSL Information

CALL	QSL Via		
C53AP	G3LZZ	5Z4CL	W5BCB
CT2ARA	AG1K	5Z4CM	"
C21NIP	PA0GMM	6W8HL	WA4VDE
CN8BX	AK3F	6Y5YY	KA9BSD
CP6EL	WB1DQC	FR7BY	IS0IFA
D68AM	WB2OHD	T32DB	G8LGB
FM7CD	F5VU	XT2BJ	DL6FAL
HL2XV	HM2JN	3D6BP	N8AG
J3AH	W2GHK	YB0PG	KB5AS
OD5RZ	VE5QY	P47A	WB1HJF
TL8RC	F6EZV	YB3MD	JH8RTP
V2ASD	KA9BSD	VU2KMK	N7UT
VP8PO	WD8IIA	AH8B	NE4S
XT2AU	WA1ZEZ	VQ9JB	WD5BHP
YJ8NSW	W2NC	CN8BX	AK3F
ZF2DX	K0GVB	5N0KUY	JI1IMI
ZF2FR	KA9BSD	XF4MDX	XE1OX
ZP5XJA	JA1ODP	OD5RZ	VE5QY
3C0AC	N4NX	6Y5SH	AK1H
3C0BC	K4PHE	VP2EL	PA0VDV
		9U5JM	F3LQ
		7P8CG	WA0NAA

PA0GMM G.P. Van Den BERG,Twee Boom Laan 117, EOA 1624 E.C. Heoen,Netherlands.

9Q5VT-Dr.Vince Thompson,4028 Perlita,Apt.4, Los Angeles,Ca.,90039.

9X5MH Box 491,Kigali,Ruanda,Africa.

5N0WNL Box 3197,Lagos,Nigeria.

9J2TJ Box 28,Chisekeni.

A Touch of Lightning

By Ron Hands VE3SP

What happens when you hear a thunderstorm coming?

If you're like me, you ground your antenna, or antennas, and pull the AC plug to protect your rig.

That's what I did when I heard a storm coming one night in mid-September. Unfortunately, that proved not to be the complete answer to lightning protection.

Just as I was drifting off to sleep, there was a tremendous bang from the direction of the ham shack, followed immediately by a sinking feeling in the pit of my stomach. I shot out of bed and into the adjoining room. The lights still worked and there was no visible damage and no smoke; just a strange odour— perhaps it was ozone.

The ham gear, when I tested it, proved to have survived unscathed, apart from a one amp fuse in a TR switch which had opened up, and a diode or two in a VHF wattmeter.

Over on the other side of the room, however, there was a different story. That's where the TRS-80 computer sat, a Model I complete with expansion interface, two disk drives and a line printer.

Although the LED in the keyboard lit up, that was the only sign of life— a false one at that, as later investigation showed. It now appears that virtually every integrated circuit in both units of the computer itself, as well as in the disk drives and the printer, was wiped out by the lightning.

When I subsequently took it for an estimate of the damage, Radio Shack's service experts didn't consider it repairable, suggesting instead that I just replace the circuit boards. The story was the same with the printer: complete replacement of the circuit board was necessary. Both disk drives and the RS-232 circuit board also needed handfuls of new ICs.

Only the telephone interface had only moderate damage. And strangely enough, the video monitor, an Electrohome unit, was unscathed, even though it had been plugged into the same power bar as the other units.

Later inspection showed the ribbon cable between the printer and the expansion interface had holes punched in it, and one wire blown out of its jacket by the high voltage. In the expansion interface, one IC was blown to bits and one trace on the circuit board had vaporized. Other than that, no visible damage.

You may be asking how all this could happen when everything was disconnected from the AC line. I've asked myself that, too.

Here's the setup: The computer and the ham gear were on opposite sides of the room, and each set of equipment was plugged into its own power bar. The line cords from the two power bars were brought down to a triple-tap plug (three-wire variety) plugged into a wall outlet. When the storm loomed, I just pulled the triple tap, with both line cords still attached, and dropped it onto the floor. In so doing, it fell across the heavy ground wire which leads outside to a 10-ft ground rod driven alongside the tower. The tower is also bonded to the ground rod with heavy copper wire.

It appears quite certain that the lightning struck the tower. Most of the force may have been dissipated through the tower and grounding circuit. But some of it certainly hit the inverted vee antenna, because the feedline (300-ohm twinlead) was welded together about halfway down the tower.

Whether the damage to the computer was caused by pickup on the AC cord lying across the ground wire, or whether it came from straight RF pickup of the energy field radiated from the tower and inverted vee to the ribbon cables that connected the various computer units together remains a mystery.

What is certain is that a lot of equipment was wiped out in a very short time, and getting it repaired and replaced has been extremely tedious and time-consuming.

At this point, I should tie things up neatly by giving you my voice of experience with recommendations for avoiding damage from lightning.

I should give it to you, but I won't, because unfortunately there just doesn't seem to be any one foolproof method. An article in **TCA** suggested, and several other sources agreed, that extensive grounding is an absolute necessity.

John Lester VE3BZT, in his **TCA** article*, says that lightning is an alternating current in the 3 to 30 MHz range and therefore protection rests on a simple principle: "ground at radio frequencies, and with as low an impedance as possible over the widest possible radio frequency spectrum".

He suggests a radial system; in

* May 1981 issue

fact, two radial systems— one from the ground wire at the house entrance of the electric system, and a second from the ground rod at the base of the utility transformer pole that serves the house. He suggests 10 radials at each point, averaging 50 feet in length.

Some hams told me that connecting the tower to the grounding system is not really much good because the conductivity of the tower is so much less than the conductivity of feedlines. The lightning will choose the low impedance path, and that's likely to be the feedline.

If you're going to ground the tower, I've been told, run heavy copper wire or braid right from the top, not the bottom. Others suggest one should not ground the tower at all.

Certainly, pulling the AC plug wasn't the answer. If I had left the computer plugged in, it's entirely possible that the connection to Hydro ground provided by the three wire system would have minimized damage.

Since the mishap, I've added a GE surge suppressor in the AC line. I've also moved the computer to a different room, as far away from antennas and feedlines as I can manage.

And I intend to hide in a closet when I hear a lightning storm in future. I've heard that works!

Seriously, lightning is a mysterious and elemental force, and if we hams insist on poking steel and aluminum structures 60 feet or more into the air, so that they become the highest object in the neighbourhood, we might well study whatever literature is available on protecting ourselves and our equipment. Commercial radio services must have come up with valid answers, and perhaps we can tap their store of expertise.

Maybe there's a good topic here for a future radio club meeting. I'm still interested in any advice I can get.

The Hamilton Amateur

Bird-watcher's Bonanza!

By Doug Burrill VE3CDC

The half-a-dozen Russian satellites launched simultaneously last December 17 included a new type of Amateur space gimmick identified as a 'robot'. The satellites, labelled RS3, 4, 5, 6, 7 and 8, sport a variety of beacons, automatic responders and repeater functions.

RS3 is a straight CW beacon with two outputs, 29.321 and 29.401 MHz. RS4, the second beacon bird, operates on 29.360 and 29.403 kHz.

RS5 and RS7 are quite a new species of bird life called 'robots'. These ingest an upward signal CW on two metres, indicating first that they are available by sending "CQ" which stops when a signal appears in the input pass band of their receivers. For example, your 'up' signal on two metres calling "RS5 de VE3TCA" should bring a response, "VE3TCA de RS5 QSO NR 123" (or whatever the serial number of the robot's transmission happens to be).

Their computers are human enough to respond "QRZ", "QRM" or "RPT" if it misses your call and, believe it or not, they may respond "QRS" or "QRQ" if your morse is above or below their acceptable rate of 10 to 25 words per minute. These ingenious birds apparently dump all of the stored information on their flight over Russia and it is rumoured that eventually those who work a robot will get a QSL card from Moscow's famous Box 88.

These two little wonders operate on the following frequencies: RS5 inputs on 145.826 and outputs on 29.331 or 29.452 megs; RS7 inhales on 146.835 and exhales on 29.341 or 29.501 MHz. It may also have a 'translator' on board but this was not apparent at the time of writing. A translator is a form of repeater but, unlike terrestial repeaters, the input frequency accepted can vary over the frequency band of the satellite receiver and corresponding varying frequency will be squirted earthward from its transmitter.

RS6 and RS8 are both translators. These will work on any transmission mode, but users are asked to confine transmissions to CW or sideband in order to conserve satellite power.

To assist in locating them, they each have beacons. RS6 beacon transmits on 29.411 and 29.453 megs and RS8 puts out markers on 29.461 and 29.502 MHz. Each has a 40 kHz band pass. RS6 operates on an input of 145.910 to 145.950 megs and puts forth on 29.410 to 29.450 MHz. Its companion machine, RS8, takes inputs from 146.960 to 146.000 MHz and outputs on 29.460 to 29.500 MHz.

The six birds are in a polar orbit about 1100 miles up and can be accessed during their half-hour passes by an two metre CW transmitter or any FM transmitter by removing the mic and making an arrangement to key the carrier. As for receiving, a good general coverage one or a transceiver with reasonable sensitivity and a ten-metre dipole will do the trick. For those who would upgrade their receiver sensitivity, a simple preamp using a J-Fet such as the Motorola MPF-102, which sells for about one buck, should help.

For orbit information, check the AMSAT nets on 3850 MHz. Times are Wednesday (GMT) 0200Z for the AMSAT Eastern Net, 0300Z for the Mid-Continent Net and 0400Z for the Pacific gathering. (Tuesday p.m. for North Americans.)

Still More Usable Antenna For Your Money... PLUS 30 Meters!

That's right, Butternut's new Model HF6V offers you more active radiator on more bands than any other vertical of comparable height at any price. The HF6V's exclusive Differential Reactance Tuning™ circuitry lets the entire 26-foot antenna work for you on 80/75, 40, 30, 20 and 10 meters, and a loss-free linear decoupler provides full quarter-wave unloaded performance on 15 meters. Better still, the HF6V can be modified—without surgery—for the remaining WARC bands when the time comes. Here are just a few of the features that make the HF6V the ideal WARC antenna for your new WARC station:

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- ★ Retrofit capability for 18 and 24 MHZ bands.
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Model HF6V (automatic bandswitching 80-10 meters)	$169	9
Model TBR-160 (160 meter base resonator)	58	4
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Model RMK-II (roof mounting kit with multiband radials)	65	6
	STR KIT 39	4

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Ham Radio's most p antenna tuner. Improv

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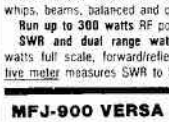
Run up to 300 watts RF power output.
SWR and dual range wattmeter (300 & 30 watts full scale, forward/reflected power). Sensitive meter measures SWR to 5 watts.
Flexible antenna switch selects 2 coax lines, direct or through tuner, random wire/balanced line, or tuner bypass for dummy load.
12 position efficient airwound inductor for lower losses, more watts out.
Built-in 4:1 balun for balanced lines. 1000V capacitor spacing.
Works with all solid state or tube rigs.
Easy to use, anywhere. Measures 8x2x6", has SO-239 connectors, 5-way binding ished in eggshell white with walnut
Other 300W Model : MFJ-94 like 941C less balun

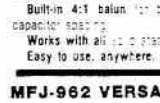
MFJ-900 VERSA TUNER



MFJ-900 $75

Matches coax, random wires 1.8-30 MHz.
Handles up to 200 watts output; efficient air-wound inductor gives more watts out. 5x2x6".
Use any transceiver, solid-state or tube.
Operate all bands with one antenna.
2 OTHER 200W MODELS:
MFJ-901, $90 like 900 but includes 4:1 balun for use with balanced lines.

MFJ-962 VERSA TUNER III



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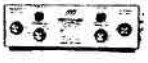
Run up to 1.5 KW PEP [illegible] from 1.8-30 MHz.
Built-in SWR Wattmeter [illegible] watt ranges [illegible]
6 position antenna sw [illegible] (direct or [illegible]
4:1 balun, [illegible] Ceram[illegible]

MFJ-949B VERSA TUNE



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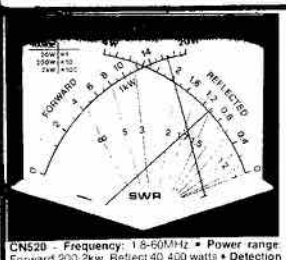
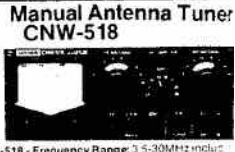


CN520 - Frequency: 1.8-60MHz • **Power range** Forward 200-2kw, Reflect 40-400 watts • **Detection Sensitivity:** 40 watts minimum • **Accuracy:** 10% at full scale • **Dimensions:** 72W x 72H x 95D m

Model CN-620B (New 2 Kw Scale)

Frequency Range 1.8—150 MHz
SWR Detection Sensitivity 5 Watts min.
Power 3 Ranges Forward: 20/200/2000 Watts)
Reflected, 4/40/400 Watts)
Dimensions [illegible]

Manual Antenna Tuner CNW-518



CNW-518 - Frequency Range: 3.5-30MHz includ WARC bands • **Power rating** 1kw CW (500w • **Output Impedance:** 10-250 ohms (40-10 mete 25-100 ohms (80 meters) • **Insertion loss:** less 5 dB

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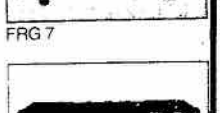
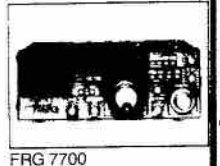


FRG 7



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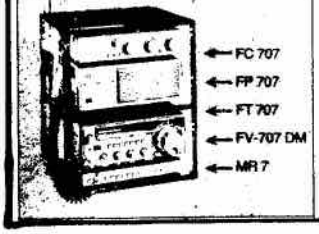

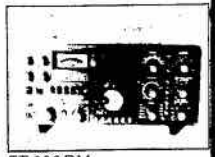

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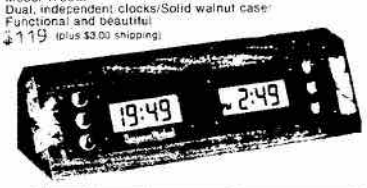

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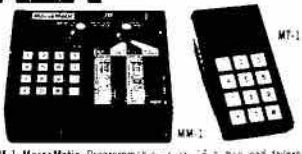

MM-1 MorseMatic Programmable keyer (8 button pad tailors unit to operate as a Memory Keyer, Morse Trainer, Beacon, or Automatic Serial Number Sequencer. Speed: 2-99 wpm. 500 character memory. Use with a paddle, paddle keys grid block, cathode or transister circuits. 9-16.5 @ 350 ma

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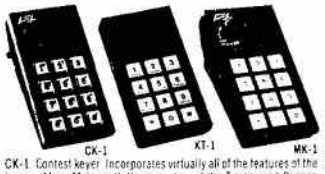

CK-1 Contest keyer. Incorporates virtually all of the features of the famous MorseMatic, with the exception of the Trainer and Beacon modes. Two pre-set speeds for fast recall, and a stepped variable speed control for contesting. 1-99 wpm. 9-16vdc @ 350 ma

Regular $ 199 - ***Sale Price $ 155***

KT-1 Keyer/Trainer. All of the features of the MT-1. However, except for the on/off volume control, all other functions including speed, sidetone pitch, weighting, tune & more, are programmable by using the keypad to address the internal microprocessor. Speed variable, 1-99 wpm. Automatic tune function allows two handed xmtr tuning. Trainer provides a sequence of 24,000 characters with 10 starting positions or a random point. 9-16vdc @ 350 ma

Regular $ 199 - ***Sale Price $ 155***

MK-1 Morse Keyer. Features similar to the keyer portion of the KT-1 without automatic tune function. 9-16vdc @ 350 ma

Regular $ 119 - ***Sale Price $ 95***

AEA MBA-RO Basic CW/ASCII/Baudot Reader. Reads and displays up to 99 wpm CW copy, 60-67-75-100 Baudot & ASCII at 110 baud (hand typed, 300 baud). 32 character flourescent display shows up to 5 words at one time. 12vdc

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MBA-RC Deluxe Reader/Code Converter. Similar to the **MBA-RO** with the addition of a code converter which converts Morse CW input to Baudot or ASCII TTY output.

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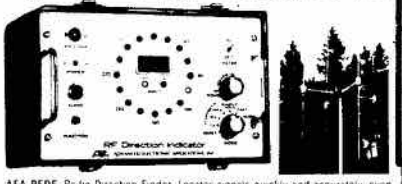

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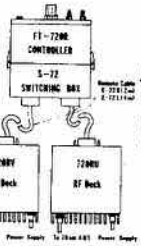

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ICOM HM-8 TOUCH TONE MIKE	$ 45
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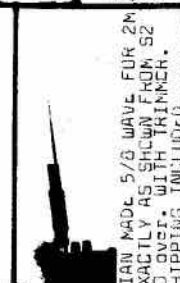

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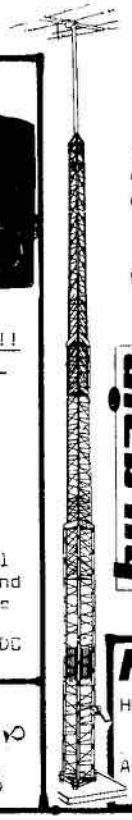

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Coaxial Cables

What type of coax is best for you?

To most of us Amateurs, coaxial cable means either RG58/U, RG59/U, RG8/U or RG11/U. Because coaxial cable is the simplest, easiest and most readily available component for the Amateur to transmit radio energy, we often neglect to look at it closely.

Let's have a closer look at the kind we are most used to seeing clamped to our towers and running in the shack: the flexible coaxial cable.

The familar RG-/U derived from 'radio guide' was designated for RF transmission lines, both coaxial and waveguide types. The UG/U system, derived from 'Union Guide', was assigned to RF connectors and adapters used with these lines. The suffix U was used to indicate a 'universal' system of numbering.

In flexible coaxial lines, solid or stranded copper wire is normally used for the centre conductor of the cable. Silver plating is applied to prevent oxidation of the copper when the cable is used at elevated temperatures. Tin plating is used to facilitate soldering to connectors; however, the use of tinned conductors should be limited to low-frequency operations where the thickness of the plating will not significantly increase cable attenuation.

A polyethylene dielectric is used almost exclusively where the maximum temperature will not exceed 185°F. The use of Teflon is required when temperatures from 185 to 500°F are encountered in the vicinity of the dielectric.

As a rule, the outer conductor consists of a close fitting braid of fine copper wire. A number of fine wires are combined to form a carrier comparable to a single flat red in a woven basket. These carriers are woven in and out to form the braid.

To avoid excessive radiation loss and to ensure proper shielding, about 99% braid coverage is required. This coverage is determined by the stranding of the carrier, and the number of carriers and the 'lay' of the braid. The lay is defined as that length of cable required for the carrier to make one complete revolution around it and determines ultimate cable flexibility.

Tin or silver plated strands are used for the same reasons as for the inner conductor, as well as the apparent RF resistance of the braid. Occasionally, a second braid of either copper or steel is used to improve the shielding properties of the cable. The second shield has only a minimum effect upon attenuation and is designed primarily for improved flexibility and shielding.

The jacketing material generally used with polyethylene cable is composed of black vinyl resins extruded over the outer conductors. There are two types of vinyl which are used for jacketing purposes: regular vinyl and non-contaminating vinyl.

Because polyethylene has a chemical affinity for some of the plasticizers used in the regular vinyl jacket, the development of the non-contaminating type was undertaken. Although the dissipation factor of nearly all dielectric materials except Teflon increases with age due to natural oxidation, the use of a non-contaminating jacket limits deterioration on cable performance. Since the rate of aging is temperature dependent, the use of cables with the non-contaminating jackets is especially important where the cables will be subjected to elevated temperatures.

Compare the attenuation of two samples of coaxial cables, one with a contaminating jacket (RG8/U) and the other with a non-contaminating jacket (RG8A/U) stored for a number of days at a temperature of 200°F. After 160 days, the attenuation of the cable with the contaminating jacket at 3 000 MHz increased nearly four times while the attenuation of the cable with the non-contaminating vinyl jacket increased only 0.01 dB per foot at the same frequency. It must be emphasized that while this 200°F test simply accelerated the aging process, normal aging will cause the same effect at a slower rate.

The useful life of cables jacketed with the contaminating type of vinyl is in the neighbourhood of three to seven years. Beyond this point the attenuation increases exponentially and reaches very high values. On the other hand, cables with non-contaminating jackets offer life expectancies well in excess of 15 years. Considering that their extra cost only runs about 5¢/ft, the non-contaminating types of cables are a good investment.

Some polyethylene cables are jacketed with high molecular

weight carbon-weight carbon black loaded polyethylene. These jackets contain no plasticizers whatsoever and offer life expectancies in excess of 25 years. In addition, they are ten times less permeable to moisture than the vinyl jackets.

Teflon insulated coaxial cables are jacketed with slightly different materials. Because of the higher temperature characteristics of the Teflon dielectric, it is desirable that the jacket also exhibit these same properties. For this reason, Teflon cables are usually jacketed with a close wrap of Teflon tape, followed by one or more fibre glass braids impregnated with silicon varnish.

We are all familiar with the foamed dielectric flexible cable version. These cables were designed to satisfy the requirements for a low attenuation, low capacity, flexible rf cable. The dielectric consists of cellular polyethylene, foamed with an inert gas to produce completely enclosed cells within the polyethylene. Amphenol Polyfoam and Belden Foam-Core cables are of this type.

Compared to a standard RG-/U cable of equivalent size, the attenuation of foam dielectric cables is reduced by as much as 35%. This is particularly desirable where long runs are required or for VHF or UHF applications.

Next time you buy coax, have a closer look.

Gerard Piette VE3GWN
in Algoma Amateur

FM IN GB

Great Britain legalized CB radio in the 27 meg band in November but permits frequency modulation only, thus cutting off legal operating to the million AM rig operators which have been on the air illegally. Meanwhile, back here in Canada, the CB craze has subsided, with a 33% drop in licensed stations. Amateur radio on the other hand is gradually creeping up to the 21,000 mark for licensed stations.

Fire Communications for the Amateur

How Alberta Amateurs set up Radio back-up for fire season

Brian Davies VE6CKC

A meeting was held earlier this year which involved Norm Simons VE6HR, myself and A.D. (Bill) Griggs, head of the Telecommunications Section of the Alberta Forest Service.

This meeting was arranged by myself in response to a request from Mr. Griggs for Amateur Radio back-up during the Forest Fire Season.

At a fire, a crew of men have a Crew Boss who is equipped with a VHF/FM hand-held radio. Up to three of these crew bosses would report to a Sector Boss. The sector bosses would be in VHF/FM contact with other sector bosses, the Line Boss, the Fire Boss, the Base Camp and using VHF/AM radio with the Fire Aircraft.

Behind the line and usually several kilometres from the fire is the Base Camp. This is a tent camp located as near as is feasible to landing areas for fixed or rotary wing aircraft, and to the fire. At the base camp, a station is set up to communicate with a Ranger Station or Forest Headquarters.

As you can guess, fires don't cooperate and often these base camps cannot be located conveniently. In such cases, a repeater is set up at Fire Lookout Site to extend the range of the base camp.

When a fire season occurs that proves as serious as last year's, this communication gear is spread extremely thin across the Province.

Amateurs would not be asked to advance to the fire itself, but instead would be used in a traffic handling role at the base camp or behind. In some remote areas, a portable HF station would be set up to pass traffic to larger centres.

One example would be if a base camp had to be located a kilometre or more from the landing area, a pair of Amateurs would coordinate personnel and equipment transfers. Also, Amateurs may be able to work into one of our repeaters and thereby increase the flexibility of the system.

The Alta. Forest Service has an agreement with the U.S. Forest Service for operational equipment and personnel and have standing agreements with several major suppliers of radio gear in the province, which could mean that our services would only be required during very bad fire seasons.

Mr. Griggs opened the door for our participation by writing to me last fall. During our meeting with him, it was evident to us that he had a high opinion of the traffic handling capabilities of Amateurs, particularly in emergency operations.

He suggested that a letter be drafted by his Department which would explain your involvement in this scheme and the urgency of the situation. This letter could be presented to your employer and would save a lot of explaining. Alberta Forest Service would supply transportation or costs thereof, accommodation and food.

If you are interested, please contact me or any of the ARLA executive. If writing, please give both home and work phone numbers.

VE6, ARLA

Reginald Who??

In December there was considerable publicity on the commemoration of Marconi's feat of transatlantic signalling some 80 years before. What was practically ignored was that it was the 75th anniversary of the first voice broadcast by a Canadian inventor and physicist from Quebec's Eastern Township, Reginald Fessenden.

So little known are his inventions and his development of the continuous wave method of transmission - which is the basis of modern radio - that at a large club meeting in the nation's capital, a show of hands netted only about ten out of the 150 or more members who had ever heard of him. In an effort to make Canadians aware of their countryman's contribution to radio we have obtained permission to reprint the following article from a recent issue of the Globe and Mail, Toronto.

Voices on Radio

Reminders of Quebec-born Inventor

What do you have to do to become famous in Canada? All Quebec-born Reginald Aubrey Fessenden did was invent a radio transmitter which could send words and music rather than just Morse Code, the electro-turbine engine for battleships, a wireless compass - the precursers of sonar and radar, the first electrified musical instruments, and enough other bits and pieces to have more than 500 patents during his lifetime.

His efforts to introduce a new theory of radio transmission was so heroic that the New York Herald Tribune eulogized at his death: "It sometimes happens, even in science, that one man can be right against the world. Professor Fessenden was that man."

But for all of this, his mother, Clementina, might be better known in Canada. As a founding member of the IODE, she helped establish Dominion Day. Indeed, so unknown is Fessenden that the Encyclopedia Canadiana mispells his name.

But Fessenden's name should be remembered again in 1982 in this country if only because we have just passed the 75th anniversary of the first transmission of voice over the radio.

It was on Christmas Eve in 1906 in Brant Rock, Mass., that Fessenden became humanity's first disc jockey and radio announcer. He and a group of associates beamed a program of Christmas music and greetings to a dozen or more ships of the United Fruit Co. banana fleet as they sailed in the Caribbean. At that moment, radio ceased being Marconi's wireless telegraph and started its trek toward the ubiquitous Top 40, All News, Jazz Till Midnight entertainment box we enjoy today.

The broadcast followed nearly a decade of work in which the native of East Bolton, Que., and graduate of Bishop's College in Lennoxville, Que., struggled with the problem of how to send voice signals through the air.

Fessenden had come to radio experimentation after working with Thomas Edison in his laboratories in New York and teaching for several years. And he might have made his inventions in Canada if McGill had not turned him down when he applied for a professorship there.

As a young man, he showed his persistence in getting what he wanted by refusing to accept an initial, brutal rejection by Edison. In his job interview, Edison asked what he knew about electricity. Fessenden said he didn't know anything, but was willing to learn. "Have enough men who don't know anything about electricity," replied Edison in dismissing him.

Fessenden finally got a job: His money running out, he hung around the construction site in New York where Edison's company was installing electric wires. When somebody quit, Fessenden was there to pick up his tools. His skill and diligence with electrical installation soon was parlayed into a laboratory position with the genius of Menlo Park.

Biographer Ormond Raby in the book *Radio's First Voice* has the hulking, re-bearded 'Reg' first realizing radio voice transmission was possible while pitching rocks into the water of Chemung Lake near Peterborough, Ont. Up to that time, the notion of how radio transmission worked followed a theory of Marconi's which likened it to an electric spark shot into the air by a whiplash effect.

Fessenden reasoned that the radio wave emissions were continuous, the same as the outward movement of ripples in water. To broadcast voice sounds, one needed to interrupt radio waves, which travelled at the speed of light,

about 10,000 times a second.

In 1900, Fessenden made the first wireless broadcast of a voice when he hailed an assistant a mile away with the unassuming question, "Is it snowing where you are, Mr. Thiessen?"

Unfortunately, the broadcast was full of static and later attempts to broadcast overseas ran into transmission problems caused by the changing height of the ionosphere. To overcome these problems, Fessenden invented a 'frequency alternator,' which transmitted power at 70,000 cycles a second.

In 1906, another breakthrough occurred when an attempted voice transmission between two towers located 17 km (about 11 miles) apart in Massachusetts was accidentally picked up by one of Fessenden's associates in Scotland.

This convinced Fessenden he had finally solved all the problems of sending voices over the air and emboldened him to schedule the Christmas Eve Broadcast. To heighten the drama, the radio operators on the banana boats were told only that there was going to be a special broadcast. (The United Fruit Co. had bought Fessenden's equipment for ship-to-shore telegraph communication.)

So they were amazed when at 9 p.m. they heard a voice and not a series of clicks. It announced that Handel's Largo would be played off an Edison phonograph. Handel was followed by Fessenden playing a violin accompaniment to his assistant's caroling of "O, Holy Night." Finally, the sailors were wished a Merry Christmas.

Mr. Raby records the reactions of one startled sailor to the unexpected event. He told his shipmates, "listen, I hear an angel's voice on the microphone, and music and singing, too."

The years that followed saw Fessenden make numerous other inventions ranging from submarine communication systems to iceberg detectors. He was continually in court battles with two millionaires from Pittsburgh, Penn. - whom he had gone into partnership with - for money owed to him from his radio patents. Finally, in 1928 he was awarded several million dollars in settlements on his claims.

In 1932, he died in Bermuda and was buried with a headstone that included an inventor's epitaph written in Egyptain hieroglyphics. "I am yesterday," it proclaims, "and I know tomorrow."

But perhaps the real epitaph of a man whose contributions continue to far outstrip his fame was delivered in a speech he gave to a group of students at the Ontario high school he had attended in his youth. Speaking of human civilization, he said, "Of all the hundred things we shall be remembered for, most of all we shall be remembered for our inventions."

As a Canadian inventor, Fessenden may not have been much remebered, but every time we listen to a radio one of his inventions may be telling us something.

A Cheap Dial Drive

Back in the days when I built everything in my station, the biggest problem was finding the greenbacks to buy the parts. Today the biggest problem is finding the parts to build something with!

This idea was conceived when I couldn't afford two National ACN, MCN or similar dials for my home-brewed, stripped-down version of a National NC173. Today you can't buy an ACN or MCN, but there are a few diehards left who may need a good cheap dial drive for a project.

The idea was born when I used to repair the odd radio for my father-in-law who restored antique battery radios of 1930 vintage and earlier. Some of them contained some rather unique dial drives.

To start with, you need an aluminum disc which is bolted to a flanged ¼ inch shaft coupling. This is supported in place by angle brackets containing shaft bearings in which the aluminum disc rotates. Where do you get a flanged shaft coupling? They can usually be found in old war surplus junk or can be made from ¼ inch shaft gear which is not uncommon.

The aluminum disc is turned by the friction provided by a ¼ grommet that's slipped over another piece of ¼ shaft on which the tuning knob is located. This tuning shaft is also mounted in shaft bearings.

The holes for mounting the bearings for either the disc or drive shaft should be enlarged so the pressure can be adjusted on the grommet that provides the friction. It's very easy to adjust the pressure so that there is no slippage and the dial is fairly free to turn.

Does it work? After about 20 years, one is now slipping since it hasn't been turned for amost five years and the grommet is losing its resiliency. The other works well.

If you're not familar with MCN's and NC173's, the big grey beast in the corner of my shack is an NC173. It's a brother of the one that was used on the Kon-Tiki expedition many moons ago when Thor Heyerdahl sailed across the Pacific on a balsa-wood raft. The home-brewed little cousin resides in my garage and is used to listen to the local broadcast station.

Ron VE3WZ
in SPARC Gap

The Trials and Tribulations of Troubleshooting Amateur Gear

or How to Drive Yourself and Your Family Nuts!

Having been a fan of RTTY for a long time, in September 1980 an ASR-35 was obtained from Croft Taylor in Ottawa. I finally was the proud owner of a marvelous piece of mechanical engineering and what a marvel it is! It is also heavy and I do mean HEAVY! To transport this piece of equipment from Ottawa to Aurora is a story by itself.

After a cursory inspection, dusting, cleaning and oiling, I decided that the basic knowledge I had of RTTY was certainly not enough to dislodge the secrets it held. As no schematics came with it, I obtained some information about it from the Teleprinter Corp. in Berkeley Heights N.J. - at a rather steep price I might add.

In the meantime a Flesher TU-170 (used) was obtained. Still, with all the info I had at my fingertips (Hi Hi) I was unable to make it work properly, i.e. print off the air. Some local hams that were active with RTTY were consulted. The consensus was that I should rewire the whole kit and kaboodle, which as I recently discovered was not needed!

Miles of wire were ripped out and discarded including the Data Set 101 that came with it. An extensive wiring job was performed, whereby the keyboard switches and tape distributor switches were wired in series with the selector magnet driver board, also in series with the Flesher TU-170, which as retuned, using a DSI counter for the proper frequencies of 2125 and 2295 HZ. The Flesher has its own local loop supply and using the local mode, success was instantly obtained. It worked perfectly... that was very gratifying, but I now only had a noisy electric type writer... How would this combination perform on off-air signals?

The input from the Flesher Modem was now connected to the speaker output of a Yaesu FT-101. Various bands were scanned for an ASCII signal, which proved to be a waste of time as ASCII signals proved to be very elusive as well as far and few between.

A cassette tape with RTTY signals was obtained from Dave VE3SAT in Keswick which performed great on his ASR-33, but left much to be desired when I tried to use this tape as a source of ASCII signals. Copy was at least 50 % garbage with some recognizable words but far from acceptable performance. So back to the drawing board.

The loop supplying the current to the selector magnet driving board (SMD) was padded with resistance to change the loop current from 60 MA to 20MA and various values in between, without any success. Locally it kept printing great whatever I did to it.

The loop was now padded with all kinds of inductance in order to see if maybe *that* was missing. Although this looked better, I was getting other letters to print that I never got before. I was still getting 50% garbage of the tape.

At this point, five months after I had started to work on this machine I cried "HELP". This cry was answered by John VE3CES who appeared one Saturday afternoon with a dual trace scope, a signal generator and his homebrew terminal unit. John was just as flabbergasted at the fact that locally the unit worked fine, but would not demodulate properly. When John left the shack, his message was "I think there is something wrong in the lowpass filter of the Flesher unit, Tom!" At least, that was a lead to root out the problem.

A letter was fired off to Flesher, who responded very quickly. The reply was: "The Flesher works fine for an ASR-33 and therefore should work for the -35 as they have the same SMD. However, it you happen to have an older unit (which I did) the capacitors of the lowpass filter should be changed to half their original value (0.005 UF Mylar). Did you know that after hunting high and low for these values, that the only source I could find was Electro Sonic's ARMACO brand?

The capacitors were installed, the TU re-aligned again and bingo— paydirt! The unit demodulated like a charm. The AFSK output could be recorded on tape and could be printed flawlessly on playback. The first ASCII signals printed off the air were from V1AW on 40 meters.

98% copy was obtained. There were some static crashes that took care of the other 2%. A week later my first two-way contact was established with N0CV on 20 metres.

Because of the few ASCII signals on the air at present, a converter kit was obtained from VE-4-LOGIC. This unit converts 8 level ASCII to 5 level Baudot and vice versa. I have not been able to get this to work yet, but I am sure that sometime in the future that too will finally yield to my probings and work as it is supposed to.

TECHNICAL INFO:

It has been my experience so far that no two ASR-35 machines are alike, all seem to be differing widely inside. They usually have the selector driver magnet board in common, which is the heart of the machine.

If you have a unit that works fine locally, that is locally using its own power supply found in the Data Set 101, you are then very close to an ideal situation whereby you could remove this loop supply and substitute the Modem supply, (using the TTY loop supply and interfacing this with the Modem is also a good way of hooking everything up by the use of opto-isolators). Anyhow, the negative line of the TU should reach terminal 2 of the SMD. A 100 volt 60MA current works fine if the positive loop connected to terminal 7 of the SMD has about 100 ohms resistance in series. This just acts as a current limiting resistor as the modulation transistor in the TU gets a little warm and it is best to try limiting the build-up of heat in the TU. Terminal 14 on the SMD could also be used for this purpose. This puts 680 ohms in the loop.

The AFSK output of the Flesher can be directly connected to the mike input of the Yaesu. Tune the rig for LSB in the band of interest (do not exceed 160 MA IC current!) if your rig is well tuned and has good carrier suppression, the result of your transmission is FSK -F-1- as allowed by the DOC for the Amateur class with 6 months of CW experience.

For ease of tuning the incoming signal, a scope is almost a MUST. Any cheap unit that you can lay your hands on will do nicely. Power output should be kept within manufacturers' specs. For the Yaesu, the AM specs of 160 MA for AM operation is a good guideline, which in my case results in about 25 watts average power.

When this is fed into a Dentron GLA 1000 linear, using a maximum current of 500 MA at 1000 volts, it results in an average output of 75 to 100 watts which is more than sufficient for RTTY on the HF bands. This combination has worked well at this QTH for hours with no overheating, if a fan is also used for cooling.

I have purposely left out any schematics in this article as most applications are unique for the ASR-35. If you are interested in more details, I would be more than pleased to help out if I can... after all, the more ASCII signals on the band, the more chances I will have to make a contact HI HI. And by the way, the sub-title of this little article does not need an explanation, does it now?

Tom Van Den
Elshout VE3LNT
in CARTG Bulletin

Writing for Publication

Glenn VE6AFF
in Northern Alberta Radio Club Emitter

We would like to think that there are a number of people just waiting to write an article for publication, however, they feel reluctant because they feel the subject matter is not interesting enough or it's too difficult to write the material.

If you have an idea for an article, you can ask the opinion of others to determine if you should proceed. You can also contact the editor to determine space requirements, etc.

One approach might be the following:

1. If there are drawings or diagrams, do these first. This lets you use them as an aid when writing and provides a means of double checking for errors. (Use pencil or black ink.)

2. List all the points you wish to mention in the article, making them as brief as possible.

3. Write around these points and make them flow together. (A pencil and eraser is easier than a pen.)

4. When you have it ready, you can have someone you trust read it, then, if possible, have it typed...

5. Send the article to the Editor. Enclose your name and phone number.

The same can be said for TCA; send articles to the Editor, c/o the address in the masthead, page one.

SYMPOSIUM

The sixth annual CARF National Amateur Radio Symposium will be hosted by the Scarborough Amateur Radio Club on May 28 and 29. Registration and a get-together will be from 1930 to 2130 hours on the Friday evening and the discussion groups will meet all day on the Saturday. Both events will be at the Wexford Collegiate, 1176 Pharmacy Road in Scarborough, Ontario. For info contact VE3CLT, Thelma Woodhouse, Secretary Scarborough ARC Inc., Box 174, Scarborough, Ont. M1R 5B5.

CARF News Service

10 MHZ

New Zealand has joined the countries legalizing operations in the 10 meg band.

An Amateur's View

presented to SARC NEWS from Bill Roork VE3MBF

We belong to a special group, some might say an 'elite' group. We have a language of our own, and some rather special skills. Why are we 'special'? We are special in that we've earned the right to use the radio spectrum, at least the 'Ham Bands'. With pleasure we use that hobby in which there is something for everybody, from the rag chewer to the ardent DXer or contester.

Many of us feel that we should not be using our facilities and privileges for just our own fun, but that we should contribute more to our community, both as individual Amateurs and collectively through our clubs. There are many ways we can contribute. One way is to work actively toward the growth of the Ham community and expand with the ever-present electronic revolution as it brings more technically minded or curious individuals in our direction.

Today our clubs have a marvelous opportunity, and we should be participating in the ongoing developments of our technology. We have the talent base and experience to meet this challenge, however we are barely scratching the surface of our capabilities. We shall have to find ways to use our talent base, even though they are already busy people. The electronic revolution is pushing our way. In exchange for the privileges we have now, we must make our contribution. We face a challenge, but it is a challenge full of opportunity for us.

Looking now at the already unprecedented electronic explosion, I draw your attention to a little bit of our own history.

Radio Amateurs are governed internationally through developments of the World Administrative Radio Conference. We are part of a world-wide program. The Canadian part is governed by the DOC under the Federal Minister of Communications. Less than 1% of our population are hams (0.009).

We operate under the provisions of The Radio Act of Canada, though we are only a small part of the Act; and amateurs to boot. Still, look at our radio spectrum, and our world wide facilities and capabilities. We have a precious natural resource. We are lucky to have been guided and governed by capable and dedicated people. The first lever of control is the necessary radio licence.

At this point let's see where we are with our licence control. Prior to 1979 the theory portion of our licence exams were multiple choice questions, unchanged for years. Our class instructors taught their students on that basis. By this system several thousand hams were licensed during the period between 1975 to 1979. Of those that qualified then, most are now advanced Amateurs.

By research I've found that by around 1978 even local DOC inspectors felt it was time to change the questions, as they had been long used, and technology had much advanced. So in 1979 the DOC came out with a new format. Questions would now be requiring a narrative answer. With the new format the DOC also provided a guide for candidates (TRC-24). This guide contains the bones, by key words and phrases, of what is expected.

But where were instructors and students to go for details?. So far a number have tried to hang meat on the bones of TRC-24, for example, Biback, Glen Emo, CARF, CD/ARRL, Mike Goldstein, and the Burnaby Amateur Radio Club. Even so, 1979 was a disaster, as there was only a 6% pass rate that year in Canada.

Meetings began between DOC and CARF & CRRL. Improvements in the pass rate were needed, yet the standards had to be kept high. A revised draft of TRC-24 has been made available for comment. One can see that the DOC is trying to help us, however the wheels of Government turn slowly.

Following are some of the points in the revised draft.

1. Reinstitute the sending portion of the morse test.
2. The section on general radio regulations expanded to include operating procedures.
3. A section on Regulations and operating procedures. (All the information needed for study.)
4. A section on the Amateur Station, with DOC including data on the practical side of setting up and operating a station, and on safety as well.
5. Exams to be given by prearrangement.
6. A section on Distress, Urgency and Safety.
7. A morse receiving qualification requiring 100% equivalent if there are no more than five errors, with two minutes for review and correction.
8. A section on the Theory part which contains expansions and additions on the original still listing key words and phrases.

With the revised draft the DOC has received much input. The New Draft TRC-24 was a big improvement, though a basic problem on theory definition still exists.

At the RSO convention the DOC noted that they had received much comment, and that they intend to publish a book of 600 questions. The DOC will then confine exam questions to their published book outline.

The DOC also indicated that they want another meeting before finalizing their plans.

The proposed next meeting should be very interesting!

Amateur Puzzle

John W. Ficner VE3DQM

The words hidden in the puzzle below may be found horizontally, vertically, diagonally, forward or backward. Just to make it a little tougher, I did not bother to circle the first word, hi.

VE3DQM

AMATEUR RADIO #2

U X I A B B A Z J E W M L C O J C K O S H J N B K
S C M X M T V T Z D Y A L F H D C I X Q S L M G S
C L A E L H O R D S T R F U X E D W W L Y P A F X
M O O E T G K D X E J C C G O S N X B G C M F L N
G T D P I E K F S V Y O G E V F H R M G M C O L N
C X N E E D R T J C G N P D O Z F W Y A I G L I B
O S I L W R Z G Q N J I M T Y Y K S W L X K E M I
U T J J A T M D K H F S I M Y W H F E M B Z J K X
X G I W E D L I X M W Q G Q I S R F I T E Z A K F
V A O D R V C D U O K I O N C I M U X N K G R Z R
S E C N A D E P M I L L D A Q U U B O L A B G O B
G W B R L P R Q T R F O N J L H K H U F E E T N N
N K O T M K Z E E P M N Y T N F P T J P H C G B A
R W B J W S S T D F E Y I L H O X P P D E N W O K
K W R E X T J Q E R D P J O R T I A W L G N Y A V
R N F O E F P E T Y L E O C H G N T F P V T E H D
B G X B G X D E N I Z K I R L F H E A Q I F I C W
F L Y L J B C A E G M M R V C P R T M G D I S J T
I D S G A X M R F C S O K B V I C G F E A W H B R
R W E C F I R Y U E T Y X A Y H M B Q C L P Y X W
X T K K C T S N W C K W K P A P U M E A Q E O U Y
M L I W K E N S E K C A I Q Z O B O T A L U U R V
Q U A D N U G R K A M R T L V W D F F G M S E L P
C Q Z U H T I Y B V O U T G Y E I K Q G Q L D W V
G W T E C D D Y N N N M H F U R Q W J H N Q A K G

FIND THESE HIDDEN WORDS IN THE ABOVE PUZZLE:

beam	delta	director
gamma	henry	impedance
microphone	multiplier	offset
quad	reflector	scanner
windom		
dynamic	element	feedback
marconi	meter	micro
patch	power	propagation
sloper	test	tune

Who pays?

Amateurs who offer their services to public agencies in an emergency should give a thought as to the liability, if any, which the agency would assume if the Amateur incurred a loss or damage involving his rig, car or other property or, worse still, suffered injury or death in the course of his activities on behalf of the public agency.

The Kitchener-Waterloo ARC became concerned enough with this question to query its District DOC Office on this point. The Department consulted with the Ontario Workmen's Compensation Board and DOC District Manager G.A. Worsnop then replied to the club secretary, Craig Howey VE3HWN:

"...Mr. J.O. Simpson (Solicitor) replying for the Workmen's Compensation Board indicated persons who volunteer or are called upon to act in an emergency would not be covered under the Workmen's Compensation Act for any injuries, unless they were bona fide employees of the municipality or province. Under the circumstances outlined, Amateurs participating in an emergency situation would not qualify as employees within the definition of the Workmen's Compensation Act.

"On-going discussions with the Emergency Planning Co-ordinator for the Province of Ontario concerning this, has produced his assurance that he will endeavour to have the Workmen's Compensation Act amended to extend coverage to Amateurs who have been called upon to respond in an emergency."

Clubs in other provinces may find it enlightening to pursue the matter with their own WCB or the equivalent provincial body.

The Amateur Heritage

This is the start of a series of articles by VE6EA in the Northern Alberta Radio Club's bulletin 'Emitter'. I will reprint the whole series if I receive them all...Ed.

"The transmission of intelligence by electricity has reached, in its broadest sense, its final stage of development..."

How's that again? You are wondering who said that and when? How about in 1905! That's right. It was in the Cyclopedia of Applied Electricity, published in 1905 and I have the five-volume series of textbooks!

In the beginning it was Spark which was used for wireless transmission. The wavelengths were long and the power was great in the commercial applications. High powered stations transmitted from huge antennas across the oceans with great reliability.

The Spark signal was a 'damped wave'; it consisted of a series of pulses caused by individual sparks jumping across the spark gap in the transmitter. Each pulse sort of 'tailed off', somewhat like a musical note emitted by a percussion instrument. The rate at which this took place was called 'decrement' and there were instruments to measure this. This system could only be used for Morse code transmission, of course, as it was practically impossible to convey the human voice this way. It was tried many times, but with little success. Finally, methods were devised to generate 'continuous waves', or CW as we now abbreviate it.

At first, as the frequencies were low, high frequency alternators were used. These were known as Alexandersen alternators for the engineer who invented them. They were very successful and the powers were very high; as much as hundreds of Kilowatts and as high as 50 kHz.

Another generator of high power CW was the Poulsen arc. This was also very successful and was much used. You are no doubt wondering why tubes were not used, and if so, we should point out that about all that could be obtained with the tubes then available might be a few hundred Watts. We should point out here that CW means the type of wave and not the mode of transmission.

Now, how about modulating this new form of wave. Many attempts were made with varying degrees of success. Possibly the first successful effort was made by R.A. Fessenden in 1906, when he transmitted Christmas greetings and music to the banana ships travelling from the Caribbean to the Atlantic ports of the U.S.A.

He used a large carbon microphone in series with the ground lead of the transmitter! It was wrapped with asbestos to protect people from RF and heat burns! The power was about 1kW. As time went on, better and larger tubes became available and better methods were developed to modulate them.

At first, absorption modulation was used. A coil coupled to the antenna coil was connected to a carbon microphone. The resistance of the mike varied with the speech and a varying amount of power was absorbed from the circuit. This resulted in a low degree of modulation. When used with a transmitter of much power, it wasn't a good idea to touch the mike.

The first real advance was the Heising system, which was described by R.A. Heising, in the Proceedings of the IRE in 1921. This was the first plater modulation system; it was sometimes called the Constant Current system.

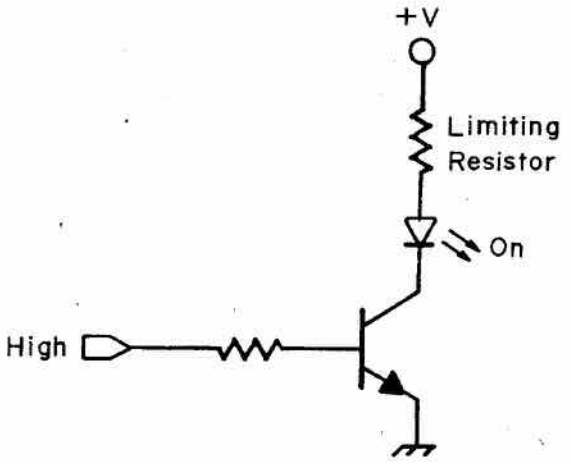
This was the common type of modulation for many years until the Class B system was devised by Barton in 1931. QST carried a number of articles in 1932 and later covering this method which became the preferred method used by hams. The same year, many of the makers of broadcast sets used it in the output stage. The tube used was the type 46 which was a zero bias tube, operating at 400 volts on plates; two of them were able to turn out 20 watts of good audio. This tube immediately became popular with hams for audio and RF purposes.

All the methods so far are amplitude modulation, or AM as we say now. There are also Frequency and Phase Modulation methods in use. These are mostly in use on the VHF bands because they usually require more bandwidth than can be spared on HF. While narrow-band FM has been used on these bands, a different detector is needed to demodulate them and the advantages are minimal.

On VHF, the situation is better for FM or Phase Modulation as more frequency space is available.

LED Chains

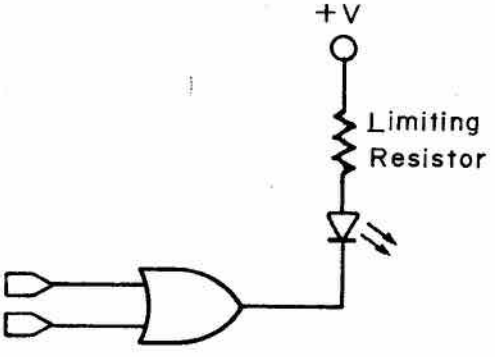
By Adrian Brookes VE3GOJ



Transistor Switched

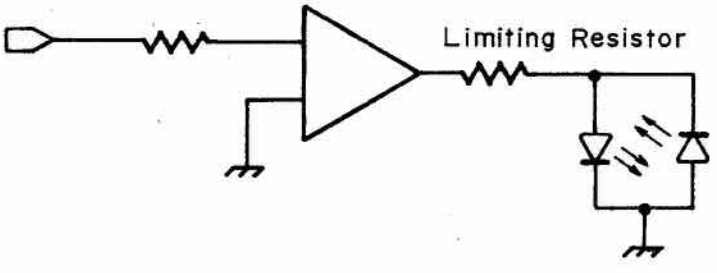
No, this is not a new winter driving aid— but an effective method of saving power for battery operated equipment. If you build portable equipment that uses discrete LED devices to display status information, then you can save power by using an LED chain.

The common method of driving LED indicators, both discrete and seven segment numeric type, has been to connect each LED between a current limited voltage potential. LED devices can also be driven from current sourcing/sinking logic or open collector transistor switches.



Open Collector Gate

Instead of supplying each LED with current individually, a more efficient method of driving a number of LED devices would be to series all of the LED devices you plan to use and place the entire chain across a current limited potential. Since the current required to illuminate a single LED will also be the current flowing through the entire chain, then you could realize a savings of



Comparator or Op-Amp Driven

((N-1)xIn) amps
where N = Total number of LED devices
In = current drive to illuminate one LED

For instance, if you were using six LED devices at 20mA each, then a current savings of 100mA would result from chaining (assuming all LED devices are ON).

The only limiting factor to using LED chains is that the total forward voltage drop of all the seriesed diodes must be less than the potential difference between the power connections that they will be driven from.

LED chains can be driven from positive, negative or bipolar supplies and only a single current limiting resistor is required for the entire chain.

There is a catch to the current savings however, for each LED that you want to be able to turn on and off, you must provide a switching transistor and a base biasing resistor. The switching transistor can be of either NPN or PNP type, depending on how the circuit logic of your project is arranged.

For NPN transistors, the collector is connected to the anode of the LED while the emitter is connected to the cathode. When no base bias is applied, the transistor is in the off state and appears transparent to the circuit. Curent is allowed to flow through the LED and it illuminates. When base bias is applied and the transistor is in the ON state, it provides a low resistance current path around the LED. As no current flows through the LED in this condition, it is prevented from illuminating.

PNP transistors are used when the complimentary logic state applies. The collector is connected to the cathode of the LED and the emitter is connected to the anode. When base bias is applied, the transistor is off and the LED illuminates. When the base bias is low, the transistor will be ON and the LED will be prevented from illuminating.

The 2N3904/2N3906 plastic high speed switches work well and are low in cost.

Although the diagrams show discrete LED devices used in a chain, 7 segment displays could be driven in a similar fashion, providing you had the extra space and the current savings is essential. If the LED chain drive current is kept near the upper end of the diode current limit, then the intensity of the LED devices will not noticeably vary when the individual LED devices are turned on and off. The only LED devices not to use are the type that have built-in current limiting resistors. □

Adrian Brookes VE3GOJ
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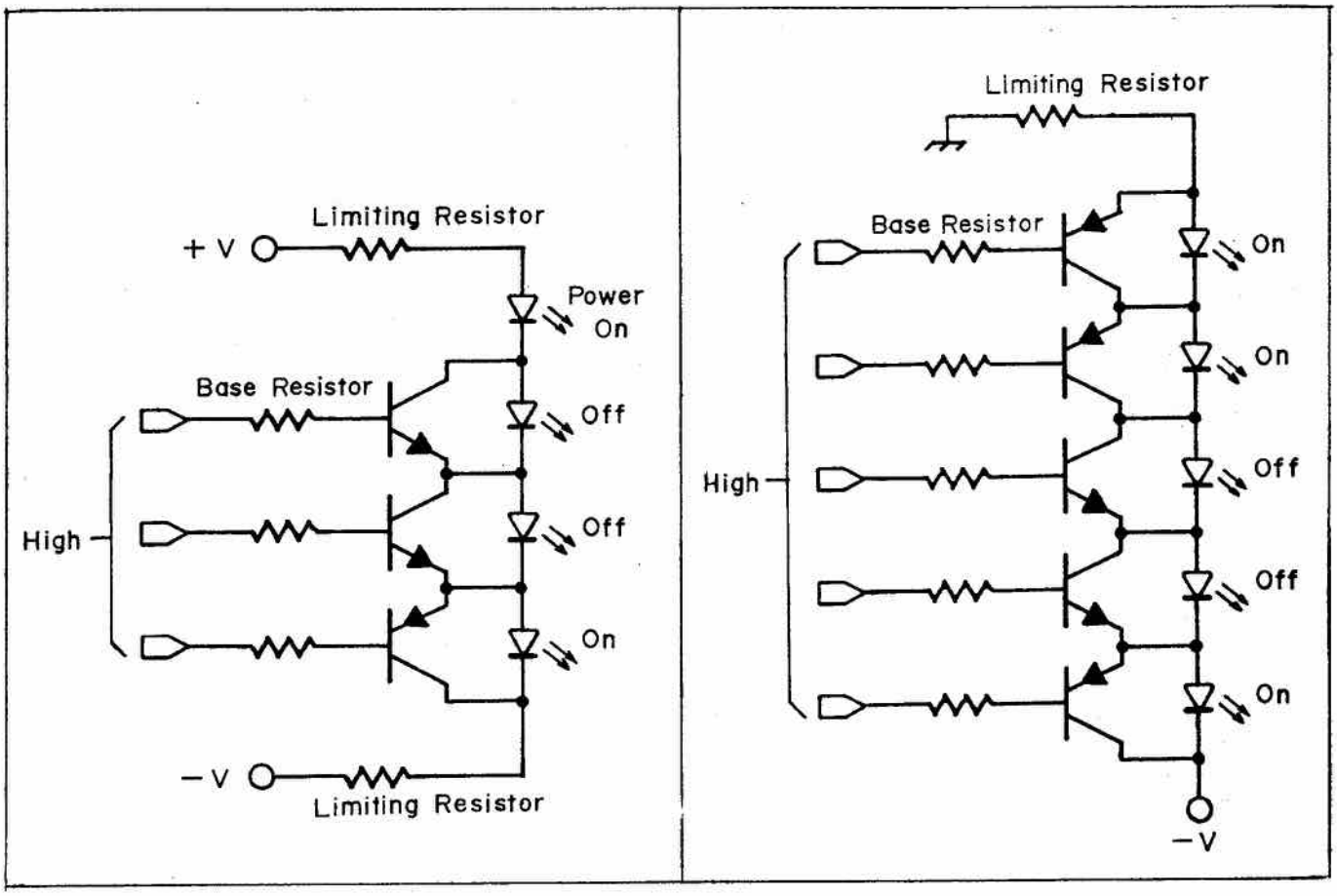
Ottawa, Ont.



Two Tone Audio Source

for SSB testing

By Jack Botner VE3LNY

I recently got a complaint of distortion on my SSB signal on the air. Since I operate a modern and expensive appliance, it never occured to me that it might malfunction in this way. But how to test it? Subjective reports from other Amateurs on the air are notoriously unreliable, but that is how most of us check out our rigs.

A look in the Radio Amateur's Handbook suggests two ways to check out an SSB signal: with a two-tone audio signal, and with a spectrum analyzer. Since spectrum analyzers are beyond the reach of most Amateurs, that left the two-tone test method to try. The two-tone test is very simple, but requires an oscilloscope to view the results.

Unfortunately, the Handbook had little to say on how to obtain the audio source for the test. A little digging revealed that the two tones should be around 600 and 1000 Hz (not critical), and a pure sine wave is required.

Building an audio oscillator is easy. There are many simple circuits available. However, few provide a pure sine wave and stable oscillation. The problem is, when the feedback in the circuit is too low, it will not oscillate, and when it is too high, the waveform is distorted. There is a critical point where the feedback is just right, but complex circuitry is usually required to maintain that point.

THE CIRCUIT

The circuit in the schematic shows two 741-type OP-Amps connected as Wein bridge audio oscillators. These oscillators use a pair of diodes in one of the feedback paths to stabilize the operating point, which results in a clean sine wave. The circuit operates on the principle that, as the signal level falls, the diode resistance rises, thus increasing the positive feedback and restoring the level. (Note that the diodes and the 100K resistor shunt some of the positive feedback to ground.)

The third OP-Amp provides a virtual ground at one-half of the supply voltage so that a single-ended power supply can be used. The output of this OP-Amp is really the ground of this circuit, and all components connected to this point would have been grounded if split supplies had been used.

CONSTRUCTION

The pinouts for the OP-Amps in the schematic are for the LM348N quad OP-Amp (only three are used in this circuit). The LM348N is an inexpensive 14-pin DIP IC. Other 741-type IC's could be used here, such as the LM741CN single OP-Amp. Layout and construction are not critical. The output level control can be a regular control or, if you plan to use the generator with only one transmitter, it can be a trimmer.

OPERATION

The trimmers on the oscillators must be adjusted with an oscilloscope before the unit can be put into operation. They should be adjusted while observing the output of each oscillator (ie connect the oscilloscope to the output pin of the OP-Amp, not the output of the generator).

Each oscillator should be adjusted to a point just below the clipping level, and one oscillator adjusted down further until both oscillators are producing exactly the same output voltage. At this point, the oscillators are generating very clean sine waves of equal amplitude. If you connect the oscilloscope to the combined output of the generator, you will see a jumble, since the two tones are unrelated harmonically.

The generator should be connected to the microphone input of the transmitter under test using good quality shielded wire. If RF is picked up at the microphone input, it will cause distortion in your signal for sure (in fact, this was my problem).

In operation, the generator will

cause your transmitter to operate at full PEP output, so keep the tests brief. The output level control should be adjusted so that the Mic Level control on your transmitter is in its usual operating position, and the transmitter's ALC is just beginning to operate.

The RF output from the transmitter must be monitored on an oscilloscope. This can be accomplished in one of several ways. If you have a wideband scope, you can sample the RF from the transmitter output using a very small capacitor, and feed it directly into the vertical amplifier.

If your oscilloscope is not sufficiently wide-band, you can get access to the vertical deflection plates on the CRT for this test. Connect a capacitor (100 to 1000 pf and sufficient voltage) to one of the vertical deflection plates, and connect it to a jack so that it is accessible from the outside. You can then sample the transmitter output with a small capacitor (25 to 50 pf) and connect it to this jack. If you have another receiver with access to the IF signal, you can use it to receive the transmitted signal and connect the oscilloscope to the receiver IF.

Finally, if you do not have an oscilloscope, a nearby friendly ham can receive your signal and check it out on his scope for you.

The waveform on the oscilloscope should appear as in the photographs in the handbook. Look for two forms of distortion: flat-topping and crossover distortion. The envelope should be a smooth sine wave, crossing over in the middle (unlike the AM envelope). Distortion in the signal will result in an abnormally broad bandwidth.

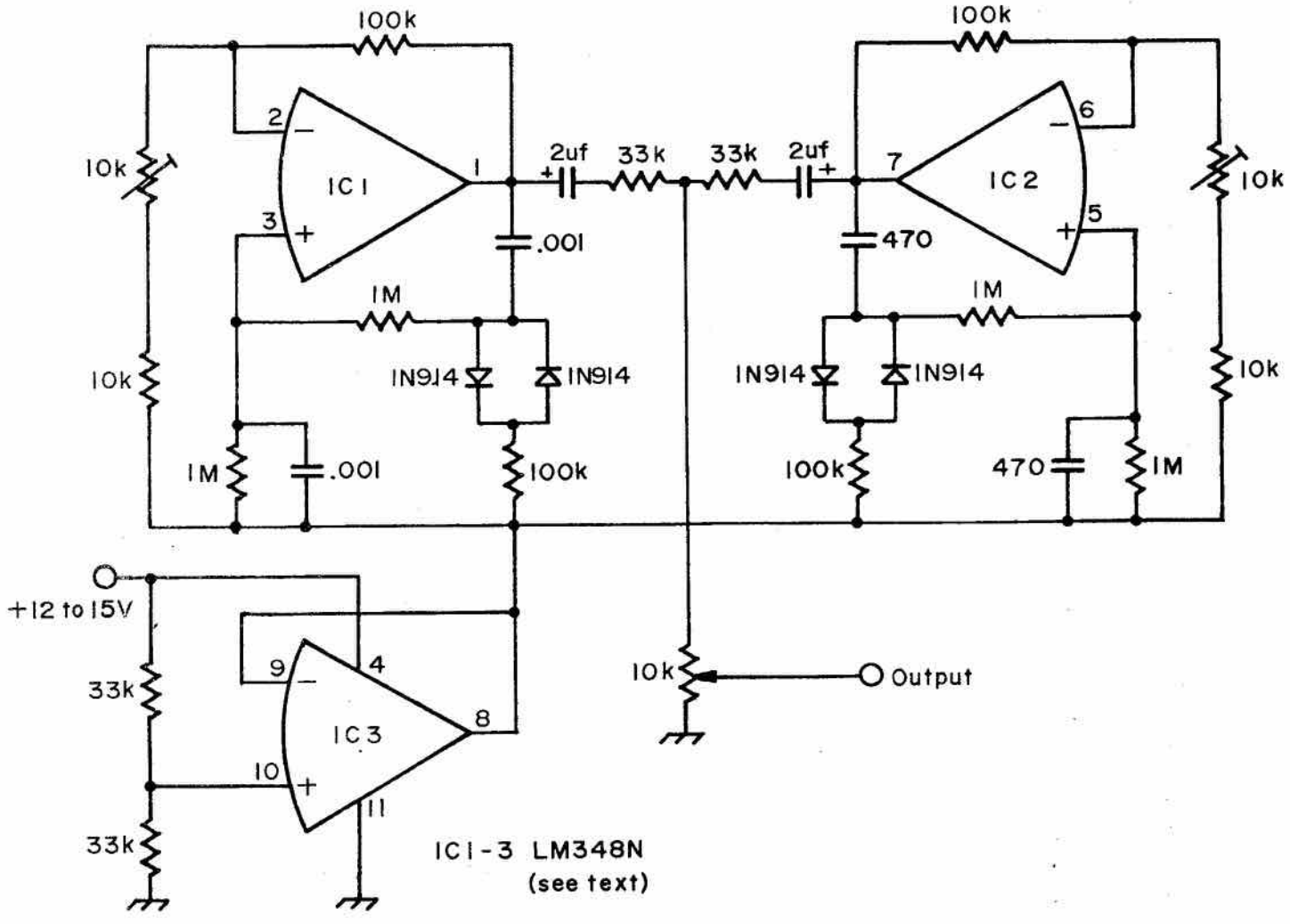
CONCLUSION

Phone operators, even appliance operators like me, should have some means of verifying proper operation of our transmitters. The two-tone oscillator is a cheap and effective way of accomplishing this.

REFERENCES

Single-Sideband Transmission, The Radio Amateur's Handbook.
Common Silicon Diodes Stabilize Oscillator, Electronics Designer's Casebook.

Jack Botner VE3LNY
35 Wynford Hts. Cr. No. 1708
Don Mills, Ont.



Infosection

NEW WOODPECKER

The FCC in the U.S.A. will permit expansion of facsimile and Amateur TV on most HF phone bands where A3 emissions are now authorized. The expansion for these modes is effective Feb. 22. While that may be good news for U.S. Amateurs, the bad news for all Amateurs is that the U.S. Air Force, not to be outdone by the Russians, is going to put its own "woodpecker" on the air in 1983. It will be in the shape of 1.2 megawatt ERP over-the-horizon radar working from 5 to 25 MHz. Ironically, according to an HR Report item, the station will be located near Moscow in the state of Maine. Unlike the Russian military, the USAF has promised to work with Amateurs to reduce its environmental impact. CARF News Service

SYMPOSIUM

The sixth annual CARF National Amateur Radio Symposium will be hosted by the Scarborough Amateur Radio Club on May 28 and 29. Registration and a get-together will be from 1930 to 2130 hours on the Friday evening and the discussion groups will meet all day on the Saturday. Both events will be at the Wexford Collegiate, 1176 Pharmacy Road in Scarborough, Ontario. For info contact VE3CLT, Thelma Woodhouse, Secretary Scarborough ARC Inc., Box 174, Scarborough, Ont. M1R 5B5.

CARF News Service

CARF Head Office

The CARF Office in Kingston, Ont. is open from 9 a.m. to 3 p.m. on weekdays; Phone 613-544-6161. Below is listed the names and positions of the CARF Office Staff for your convenience.

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FOR SALE: Viking Match Box w/ Directional Coupler and Manual $75^{00}. Two Desk type mikes (Turner) $15^{00} each. VE3ANX 1-705-924-2819.

WANTED: Heathkit HW-12 or HW-12A with power supply in working condition. Heathkit HDP21A microphone. Dentron HF-200 transceiver. D. Conrad, Box 306, Armdale P.O. Halifax, N.S. B3L 4K4.

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WHAT IS CARF?

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

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

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VO1NP Nate Penney, Box 10, Shoal Harbour, Nfld. A0C 2L0. 709-466-2931.

Operating Information

RECIPROCAL OPERATING AGREEMENTS

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

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

How to use the CARF QSL Service

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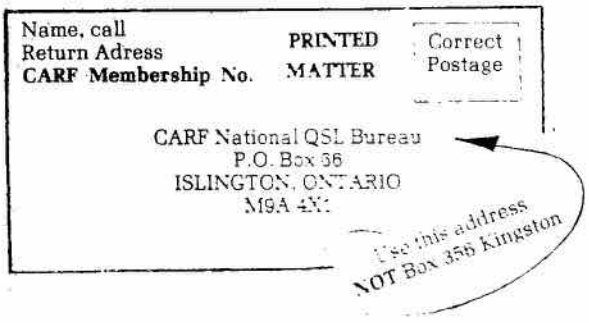
Please observe the following rules when using the CARF Outgoing QSL Service:

1. Sort cards alphabetically by prefix.
2. Sort Canadian cards numerically by call area.
3. Place small lots of cards in strong, heavy envelopes and seal securely. Wrap heavier packages in strong paper or put in cardboard box. Tie securely. Do not staple!
4. Address your package as shown in the diagram.
5. **Do not register the cards.** This only delays them, costs more and is not really necessary.
6. If you want proof that CARF received your cards, enclose a self-addressed, stamped postcard or envelope with 'Receipt' marked on it.
7. If a package should be damaged on arrival (very rare), CARF will send you a list of cards received so that you can check if any were lost.

(For an explanation of QSL Bureaus in general, see the CARF Regulations Handbook chapter on QSLing.)



BANNED COUNTRIES LIST

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

Democratic Kamuchea, Iraq (Republic of), Libya (Socialist People's Libyan Arab Jamahiriya), Somali Democratic Republic, Turkey, Viet Nam (Socialist Republic of), Yemen (People's Democratic Republic of), Zaire (Republic of)

THIRD PARTY TRAFFIC AGREEMENTS

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

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

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

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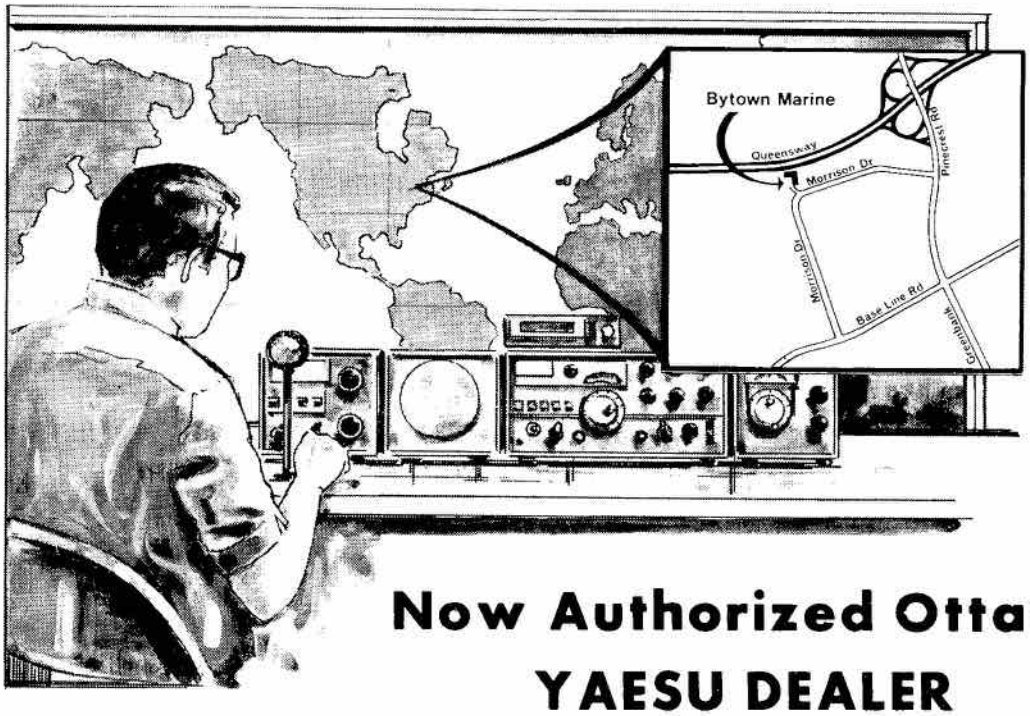

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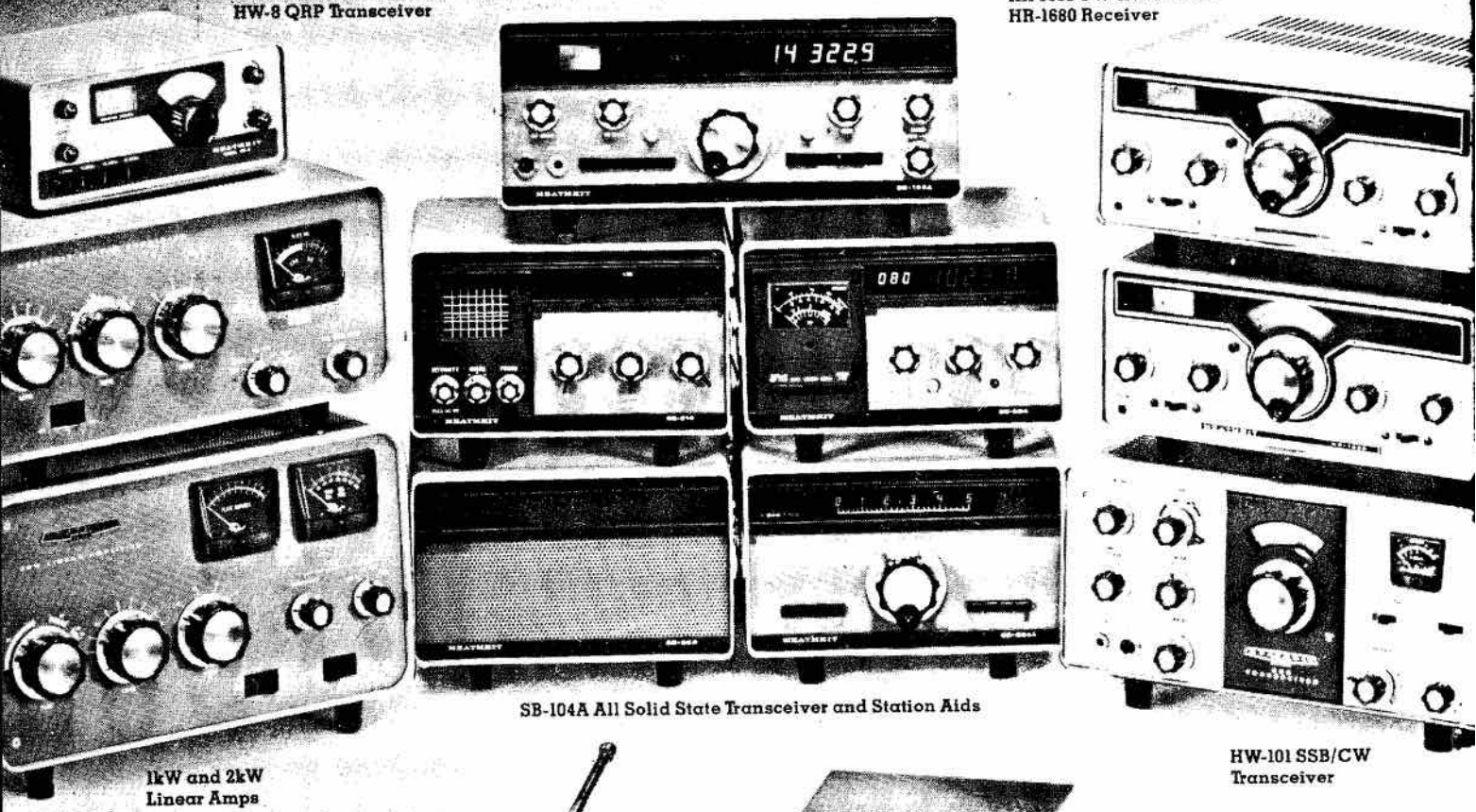

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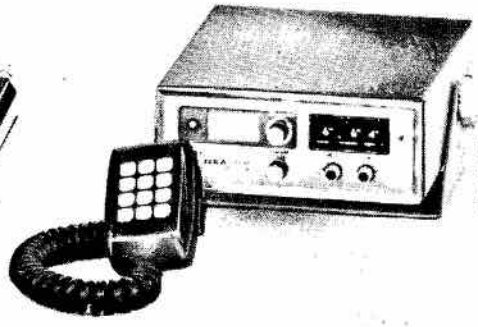

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